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SUBJECT: Application for amends to licenses DPR-58 & DPR-74,revising TS 4.6.5.1, "Ice Condensedr,Ice Bed" & associated bases to reflect max ice condenser flow channel blockage assumed in accident analyses.

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INDIANA MICHIGAN POWER

December 3, 1998

AEP:NRC: 09000

Docket Nos.: 50-315
50-316

U.S. Nuclear Regulatory Commission
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Gentlemen:

Donald C. Cook Nuclear Plant Units 1 and 2
TECHNICAL SPECIFICATIONS CHANGE REQUEST
ICE CONDENSER FLOW CHANNELS

Indiana Michigan Power Company, the Licensee for Donald C. Cook Nuclear Plant units 1 and 2, proposes to amend Appendix A, technical specifications (T/S), of facility operating licenses DPR-58 and DPR-74 pursuant to 10 CFR 50.90. The Licensee proposes to revise T/S 4.6.5.1, "Ice Condenser, Ice Bed," and its associated bases to reflect the maximum ice condenser flow channel blockage assumed in the accident analyses.

Attachment 1 provides a detailed description and safety analysis of the proposed changes. Attachments 2A and 2B provide marked up T/S pages for unit 1 and unit 2, respectively. Attachments 3A and 3B provide the proposed T/S pages with the changes incorporated for unit 1 and unit 2, respectively. Attachment 4 describes the evaluation performed in accordance with 10 CFR 50.92(c), which concludes that no significant hazards consideration is involved. Attachment 5 provides the environmental assessment.

The proposed changes have been reviewed by the plant nuclear safety review committee and by the nuclear safety and design review committee.

A001

Copies of this letter and its attachments are being transmitted to the Michigan Public Service Commission and Michigan Department of Public Health, in accordance with the requirements of 10 CFR 50.91.

Sincerely,

R. P. Powers
Vice President

SWORN TO AND SUBSCRIBED BEFORE ME

THIS 3rd DAY OF December, 1998

Janice M. Bickers
Notary Public

My Commission Expires 2/16/2001

/jmc

Attachments

JANICE M. BICKERS
Notary Public, Berrien County, MI
My Commission Expires Feb. 16, 2001

c: J. A. Abramson, w/attachments
J. L. Caldwell, w/attachments
MDEQ - DW & RPD, w/attachments
NRC Resident Inspector, w/attachments
J. R. Sampson, w/attachments

bc: T. P. Beilman, w/attachments
J. J. Euto
B. J. Hickle
G. Homna
FOLIO, w/attachments
D. F. Kunsemiller/J. B. Kingseed/G. P. Arent/M. J. Gumns
M. W. Rencheck/E. R. Eckstein/D. F. Powell/D. R. Hafer/
K. R. Baker
J. F. Stang, Jr., - NRC Washington, DC, w/attachments

ATTACHMENT 1 TO AEP:NRC: 09000

DESCRIPTION AND SAFETY ANALYSIS FOR PROPOSED CHANGES

Description and Safety Analysis for the Proposed Changes

A. Summary of Proposed Changes

The Licensee proposes to revise technical specification (T/S) 4.6.5.1.b.3 and 4.6.5.1.c, "Ice Condenser, Ice Bed," and its associated bases for Donald C. Cook Nuclear Plant units 1 and 2. The proposed change would revise the surveillance for ice condenser flow channels to provide a more conservative sampling approach for initially assessing the potential for flow channel blockage and to impose specific criteria for assessing the extent and significance of any observed blockage when compared to the maximum blockage allowed by analysis. This criteria is not adequately defined in the current surveillance. Additionally, the surveillance will be changed to utilize the term flow channel (vice flow passage) to be consistent with corresponding T/S 3.6.5.1.b. Information currently located in 4.6.5.1.b.3, involving areas not considered to be a flow "channel," is relocated to T/S 4.6.5.1.c. Finally, the bases are revised to define a flow channel and the reason for the maximum allowable blockage. The current bases provide no information related to flow channel blockage.

The proposed changes are described in detail in section E of this attachment. T/S pages that are marked to show the proposed changes are provided in attachments 2A and 2B for unit 1 and unit 2, respectively. The proposed T/S pages with the changes incorporated are provided in attachments 3A and 3B for unit 1 and unit 2, respectively.

B. Description of the Current Requirements

T/S surveillance requirement 4.6.5.1.b.3 requires an inspection every 18 months to confirm that flow passages (top deck floor grating, intermediate deck and flow passages between ice baskets and past lattice frames) in each ice condenser bay have not accumulated frost or ice exceeding a nominal thickness of 3/8 of an inch. This is accomplished by visual inspection of at least two flow passages per bay. Exceeding the criteria for either selected passage requires visual inspection of an additional 20 representative passages. More than one restricted flow passage per bay is evidence of abnormal degradation of the ice condenser. Surveillance requirement 4.6.5.1.c requires a similar assessment of the lower inlet plenum support structures and turning vanes.

C. Bases for the Current Requirements

No bases are provided for the current surveillance requirements. However, it is clear that the approach was based on the assumption that frost and ice buildup would be fairly uniform throughout each bay of the ice condenser. Therefore, inspection of a few flow channels would provide a good indication of overall conditions in that bay, constituting the basis for acceptance or

indicating the need for additional inspection/evaluation of ice condenser conditions. A criterion to resolve "indications of abnormal degradation" was not provided in the surveillance or the bases.

D. Need for Revision of the Requirement

The Licensee is submitting this amendment to T/S surveillance 4.6.5.1.b.3 and 4.6.5.1.c, to:

i. address the potential for non-uniform accumulation of frost/ice within the ice condensers by increasing the sample size to selectively include areas where operating experience has shown increased accumulation;

ii. provide a specific numerical acceptance criteria (based on analysis) for assessing "indications of abnormal degradation" in flow channels;

iii. clarify the term flow "channel" and consistently utilize it in surveillance 4.6.5.1.b.3. because this term is used in the corresponding T/S LCO 3.6.5.1b; and

iv. remove from T/S 4.6.5.1.b.3. the discussion of ice condenser areas not comprising flow channels (as utilized in the analysis of ii. above) and consolidate these areas under T/S 4.6.5.1.c where similar areas are included.

E. Description of the Proposed Changes

The Licensee proposes to revise T/S surveillance 4.6.5.1.b.3 to:

i. require an increase in the surveillance sample size from the current 2 flow channels per ice condenser bay to 4 flow channels per bay. The additional two flow channels inspected are specified to include one in radial rows 1 (adjacent to the containment wall) and one in radial row 9 (adjacent to the crane wall);

ii. in the case of discovering more than one restricted flow channel per ice condenser bay, require a 100% inspection of the bay to determine that the bay is less than 15% blocked; and

iii. (and iv.) consistently utilize the term flow "channel" in lieu of flow "passage" to maintain consistency with corresponding T/S LCO 3.6.5.1b. The meaning of the term flow channel is clarified by removing mention of the top deck floor grating area and the intermediate deck area. These two areas are relocated to T/S 4.6.5.1.c where other areas important to ice condenser performance are included.

The Licensee proposes to include appropriate bases for T/S 4.6.5.1.b.3 and 4.6.5.1.c consistent with the changes described in i, ii, iii, and iv above. The bases should also clarify the intent of "representative" sample of 20 additional flow channels as utilized in the T/S.

F. Bases of the Proposed Changes

In January 1998, a detailed inspection and mapping of the accumulation of frost and ice in the unit 1 and unit 2 ice condenser flow channels was performed. The inspection showed that the flow channels in each ice condenser bay associated with ice baskets in radial rows 1 (adjacent to the containment wall) and radial row 9 (adjacent to the crane wall) had the most accumulations of frost and ice. Evaluation of the inspection results attributed the condition to a slight temperature gradient in the ice condensers resulting from the generally warmer crane wall and the cooler containment wall. This gradient has been attributed to causing the increased sublimation rates observed for ice in row 9 baskets. Some of the mass lost due to sublimation in row 9 is believed to migrate to cooler regions of the ice condenser and shows up in row 1 as increased frosting. Due to the higher sublimation rates in row 9, these baskets have most frequently been subjected to ice addition activities. Ice additions to the baskets can result in ice spillage into the adjacent flow channels. This ice then becomes a potential nucleation site for frost growth and accumulation. The ice condenser mapping showed that frost and ice accumulation frequently involves relatively localized areas attributed to the nucleation and growth mechanism.

Due to this mechanism, the flow channels in radial rows 1 and 9 are generally not representative of the other flow channels in rows 2 through 8. To provide reasonable assurance that rows 1 and 9 are properly assessed during ice channel surveillance activities, the specification is being changed to require 1 additional sample from each radial row 1 and radial row 9 in each bay. This has the effect of biasing the sample in a conservative direction that should tend to promote sample expansion and additional evaluation utilizing the 15% blockage criteria when warranted. The nucleation and growth mechanism is also the reason that expansion of sampling due to discovery of obstructed channels is specified to be performed in the area that the obstruction was found. This is considered more representative and conservative than randomly expanding the sample to areas not adjacent to the area of the observed obstruction.

As described in Chapter 14.3.4, Containment Integrity Analysis of the Cook Nuclear Plant Updated Final Safety Analysis Report (UFSAR), a Transient Mass Distribution (TMD) computer code was utilized for the sub-compartment analysis of the unit 1 and unit 2 containments. The analysis was performed assuming a total blockage of up to 15% of the flow areas through the ice condensers. The analysis was applicable to both unit 1 and unit 2 and assessed the effects of the 15% ice condenser flow blockage on the peak differential pressure acting across the operating deck, the crane wall, and the containment shell. The analysis models the lower compartment as 6 elements and the ice condenser is modeled with 6 sections. The analysis does not perform detailed flow channel analysis, but the TMD analysis lumps the ice condenser bays with as few as 2.75 bays together. The 15% flow blockage analysis assumed a uniform ice blockage throughout the ice condenser flow paths. The basis for the TMD flow areas

includes the areas between the ends of the lattice frames and the wall panel air ducts on both the crane wall and the containment wall sides. The minimum ice condenser flow area through each bay occurs at the lattice frame support elevations and is taken to be the net open area at these support elevations. This includes the net open area left between the crane wall and the containment wall inside surfaces, after subtracting out the areas for the ice condenser equipment at that elevation, that includes: ice baskets full of ice, lattice frame, lattice frame columns, wall panel air ducts, wall panel cradles, and other appurtenances. This is conservative, as the minimum area would be at the lattice frame elevation, and the flow areas elsewhere would be larger. The blockage was assumed to be permanent, i.e., no credit was taken for the high energy flow of air and steam entering the ice condenser to blow out or melt accumulations of frost or ice. Additionally, the one dimensional flow model of the current TMD code does not consider the beneficial effects of cross-flow within the ice condenser.

G. Impact of the Proposed Changes

The proposed changes are required to support startup of unit 1. The ice condenser is required to be operable prior to entering mode 4. If the change is not approved, the mode change cannot be made.

This submittal affects some of the same pages as submittals AEP:NRC:1319 and AEP:NRC:1291. AEP:NRC:1319 involves proposed changes to the ice condenser ice weight T/S and AEP:NRC:1291, involving the distributed ignition system, provides new bases pages that affect the same pages as this submittal. The T/S pages in attachments 2A, 2B, 3A, and 3B do not reflect the changes proposed in the other submittals. Changes will be incorporated based on when each request is approved.

H. Schedule Requirements

The Licensee requests approval of this request by January 20, 1999, to meet the startup schedule.