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SUBJECT: Application for amends to licenses DPR-58 & DPR-74,modifying TS 4.6.5.1.b.1,2 & 3 to change ice condenser bed SR interval from 9 months to 18 months.

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INDIANA MICHIGAN POWER

AEP:NRC:1193

Donald C. Cook Nuclear Plant Units 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
UNITS 1 AND 2 ICE CONDENSER ICE BED SURVEILLANCE REQUIREMENT TECHNICAL SPECIFICATION AMENDMENT REQUEST

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Attn: T. E. Murley

November 15, 1993

Dear Dr. Murley:

This letter and its attachments constitute an application for Technical Specifications (T/Ss) changes for Donald C. Cook Nuclear Plant Units 1 and 2. Specifically, we are proposing to modify Unit 1 T/S 4.6.5.1.b.1, 2, and 3 and Unit 2 T/S 4.6.5.1.b.1, 2, and 3 to change the surveillance requirement interval from 9 months to 18 months.

Attachment 1 provides a detailed description of the proposed changes, the justification for the changes, and our proposed determination of no significant hazards consideration performed pursuant to 10 CFR 50.92(c). Attachment 2 contains the existing T/Ss pages marked to reflect the proposed changes. Attachment 3 contains the proposed T/Ss pages.

The proposed changes have been reviewed by the Plant Nuclear Safety Review Committee and by the Nuclear Safety and Design Review Committee.

In compliance with the requirements of 10 CFR 50.91(b)(1), copies of this letter and its attachments have been transmitted to Mr. J. R. Padgett of the Michigan Public Service Commission and to the Michigan Department of Public Health.

A001

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This letter is submitted pursuant to 10 CFR 50.54(f) and, as such, an oath statement is attached.

Sincerely,

E. E. Fitzpatrick
Vice President

Attachments

cc: A. A. Blind - Bridgman
G. Charnoff
J. B. Martin - Region III
NFEM Section Chief
NRC Resident Inspector - Bridgman
J. R. Padgett

bc: S. J. Brewer/J. B. Kingseed/S. A. Hover
D. H. Malin/K. J. Toth
M. L. Horvath - Bridgman
J. B. Shinnock
W. G. Smith, Jr.
B. A. Wetzel, NRC - Washington, D. C.
AEP:NRC:1193
DC-N-6015.1

STATE OF OHIO)
COUNTY OF FRANKLIN)

E. E. Fitzpatrick, being duly sworn, deposes and says that he is the Vice President of licensee, Indiana Michigan Power Company, that he has read the forgoing Units 1 and 2 Ice Condenser Ice Bed Surveillance Requirement Technical Specification Amendment Request, and knows the contents thereof; and that said contents are true to the best of his knowledge and belief.

E E Fitzpatrick

Subscribed and sworn to before me this 15th day of November, 1993.

Diana L. Eads
NOTARY PUBLIC

DIANA L. EADS
Notary Public, State of Ohio
My commission expires 2-24-95

Attachment 1 to AEP:NRC:1193

10CFR50.92 Determination for Proposed Changes to the
Donald C. Cook Nuclear Plant Units 1 and 2
Technical Specifications

1.0 SECTIONS TO BE CHANGED

Unit 1: Technical Specification (T/S) 4.6.5.1.b.1, 2, and 3.
Unit 2: Technical Specification (T/S) 4.6.5.1.b.1, 2, and 3.

2.0 EXTENT OF CHANGES

We are proposing to change the surveillance requirement interval from 9 months to 18 months on the referenced Technical Specifications for chemical analysis, weighing, and flow passage inspection of the ice condenser.

3.0 CHANGES REQUESTED

Identical changes are being sought for both the Unit 1 and Unit 2 Technical Specifications.

3.1 UNIT 1

We are proposing to make the following changes to the Unit 1 Technical Specifications.

Revise T/S 4.6.5.1.b Surveillance Interval Requirements

Currently, there is a nine month surveillance requirement to perform chemical analyses of the ice bed to ensure a boron concentration of 1800 ppm and a pH of 9.0 to 9.5 at 25°C, verify at a 95% confidence level that adequate ice inventory is available and distributed evenly, and ensure that adequate flow area is available. We are proposing to change this interval to 18 months.

3.2 UNIT 2

We are proposing to make the following changes to the Unit 2 Technical Specifications.

Revise T/S 4.6.5.1.b Surveillance Interval Requirements

Currently, there is a nine month surveillance requirement to perform chemical analyses of the ice bed to ensure a boron concentration of 1800 ppm and a pH of 9.0 to 9.5 at 25°C, verify at a 95% confidence level that adequate ice inventory is available and distributed evenly, and ensure that adequate flow area is available. We are proposing to change this interval to 18 months.

It should be noted that the bases for T/S 3/4.6.5.1 will need to be updated to reflect the increased time interval if the proposed amendment is approved.

4.0 DISCUSSION

System Description

The ice condenser is designed to ensure that the overall system will be available to provide sufficient pressure suppression capability to limit the containment peak pressure to less than 12 psig during LOCA conditions assumed in the accident analysis. In particular, the requirements for the ice bed ensure 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 a LOCA, and 3) contain sufficient heat removal capability to condense the reactor coolant system volume during a LOCA.

Currently, the ice bed is determined operable by meeting various surveillance requirements which include 1) verifying ice bed temperature is less than or equal to 27°F at least once per twelve hours, 2) performing chemical analyses of the ice bed to ensure a boron concentration of 1800 ppm and a pH of 9.0 to 9.5 at 25°C at least every nine months, 3) verifying at a 95% confidence level that each basket contains at least 1220 lbs of ice every nine months, 4) ensuring adequate flow area is available at least once every nine months, 5) performing a visual inspection at least once per 18 months of the inlet plenum support structures and turning vanes to ensure ice buildup is not to the point of indicating abnormal degradation of the ice condenser, and 6) verifying the structural integrity of the ice baskets by inspecting a representative sample at least once every 40 months. All of these surveillance requirements are met by performance of approved plant procedures.

The first line of defense to determine the operability of the ice condenser lies with the operator. As mentioned above, the ice bed temperature is monitored at least once every twelve hours to ensure temperatures are less than or equal to 27°F. This is accomplished in a conservative manner by reviewing at least 18 different points throughout the ice condenser and ensuring they are all less than or equal to 27°F. Throughout the year the average ice bed temperature generally ranges between 16°F and 21°F, well below the 27°F setpoint. In addition to the surveillance requirements, there are alarms in the control room which will indicate to the operator if any of the points being recorded reach 27°F. Also, weekly operator tours require the operators to walkdown the refrigeration system to evaluate its ability to function. This includes walking down the

chillers, air handling units, and glycol pumps to ensure that they are in proper working order. The tours also require the operators to open a sample of the intermediate deck doors to ensure they are not frozen shut. This helps to ensure that no abnormal degradation of the ice condenser is occurring due to condensation or frozen drain lines in localized areas.

The next line of defense is the performance of various procedures to ensure the ice bed is in good physical condition, consistent with the assumptions used in the accident analysis. Due to the nine month surveillance requirement, these surveillances are currently completed at least once during a fuel cycle while the reactor is on line and once during the refueling outage. These surveillances are referenced above and include chemical sampling, ice basket weighing, and flow passage inspection. The reason for the chemical sampling is to ensure the boron concentration and pH requirements are met to preclude dilution of the containment sump following a LOCA. The minimum weight figure of 1220 pounds of ice per basket contains a 10% conservative allowance for ice loss through sublimation. Flow passage inspection is performed to ensure the absence of abnormal ice bed degradation as would be indicated if accumulations exceed the 3/8" specified in the technical specifications. When these surveillances are performed while in a refueling outage, as-found data is collected prior to performing the labor intensive maintenance routine. The maintenance routine typically includes weighing as many baskets as possible within an allotted time frame and emptying the baskets that would not, based on operating experience, weigh greater than 1220 pounds at the start of the next refueling outage. The subsequent maintenance includes refilling the ice baskets with ice and performing defrosts of the ice condenser as necessary to ensure maximum heat transfer capability during the upcoming fuel cycle. Also, significant effort is dedicated to cleaning up ice that accumulates during the emptying/refilling process of the ice baskets to ensure no flow blockage occurs during the subsequent fuel cycle.

Two remaining surveillances are performed to ensure that no abnormal degradation of the ice condenser is taking place. The first, performed on an 18 month frequency, is an inspection of the inlet plenum and turning vanes for frost or ice accumulation. The second, performed on a 40 month frequency is a visual structural inspection of the ice baskets to ensure that they are free of detrimental structural wear, cracks, corrosion or other damage.

Reason for Proposed Technical Specification Change Request

The request to increase the surveillance interval from nine months to 18 months would decrease the number of evolutions necessary to enter containment during operation of the unit to verify ice basket boron concentrations, weights, and flow area blockage. The revised surveillance interval would require the performance of such ice bed monitoring during refueling outages. We believe that improvements in ice bed inspection results due to modified maintenance techniques and design changes that have been implemented since 1984 provide adequate assurance that the ice condenser can meet and even exceed its design function without performing the surveillances on a nine month frequency. Also, increasing the surveillance interval would reduce the stresses put on the baskets and their supports due to repeated weighing evolutions.

Justification for Proposed Technical Specification Changes

T/S 4.6.5.1.b.1

An increased surveillance interval for the chemical analysis required by T/S 4.6.5.1.b.1 is justified for the following reasons. First, prior to refilling baskets during refueling outage maintenance activities, the borated water source used to make ice is sampled to verify that the boron concentration and pH levels are met. A review of licensee event reports dating back through 1978 revealed no occurrences of failing to meet the surveillance requirements of this specification. Also, a review of ice condenser basket boron concentration and pH sample data between August, 1986 and September, 1992 for Unit 1 and between August, 1986 and January, 1993 for Unit 2 was reviewed, and other than a few problems due to the sampling techniques, no problems were apparent in meeting the surveillance requirements of this specification. Also, it should be noted that an increase to the 18 month frequency has already been approved in the new standard technical specifications for Westinghouse plants issued in September 1992 by the NRC. The frequency of 18 months was developed considering these facts: 1) Long term ice storage tests have determined that the chemical composition of the stored ice is extremely stable, 2) Operating experience has demonstrated that meeting the boron concentration and pH requirements has never been a problem, and 3) Someone would have to enter the containment to take the sample, and, if the unit is at power, that person would receive a radiation dose.

T/S 4.6.5.1.b.2

A review of licensee event reports regarding ice basket weighing dating back through 1978 for T/S 4.6.5.1.b.2 was performed. During this time frame, there were three occurrences in Unit 1 and five occurrences in Unit 2 when some of the surveillance requirements were not met. T/S 4.6.5.1.b.2 requires the following three criteria be met to meet ice inventory requirements. 1) A representative sample of at least 144 ice baskets must be weighed and determined to contain at least 1220 pounds of ice at a 95 percent level of confidence, 2) The minimum average ice weights of the sample baskets from radial rows 1, 2, 4, 6, 8 and 9 in each of three groups shall not be less than 1220 pounds of ice at a 95 percent level of confidence, and 3) Minimum total ice condenser weight at a 95 percent level of confidence shall not be less than 2,371,450 pounds. The occurrences occurred in 1982, 1983, and 1985 in Unit 1 and in 1982, 1983, 1984, and 1986 in Unit 2.

As a result of the problems encountered, an ice condenser task force was formed composed of plant engineers, AEPSC engineers, and consulting specialists in refrigeration. This task force provided numerous recommendations to improve the cooling capability of the ice condenser refrigeration system and developed better maintenance techniques to improve ice weights. Some of the recommendations which have been incorporated as design changes include installing a programmable defrost controller for air handling units to ensure that heat loads are distributed evenly throughout the ice condenser to reduce excessive sublimation in localized areas. During refueling outage ice replenishment activities, tools and various other materials had accumulated in the duct work, which created hot spots in the ice bed and increased sublimation rates where the duct work was blocked. Debris screens were installed over wall panel openings to preclude clogging of duct work used to cool the ice bed. Also, a flow balance of the duct work was performed in both units to distribute cooling more evenly to the crane wall in order to reduce sublimation rates that were occurring in rows 8 and 9. Many other design changes have been installed to improve the reliability and performance of the ice condenser refrigeration system. Maintenance techniques developed included using vibrators to empty baskets and developing tools to replace cruciforms in the baskets. This task force is still intact and convenes periodically to review the status of ice condenser issues.

As recommended by the task force, maintenance techniques were also enhanced to increase the ice weights in baskets to ensure minimum technical specification requirements would be met without having to shut down the reactor mid-cycle to replenish ice inventory. This was

accomplished by developing techniques to empty the basket completely and then refilling it with new ice instead of adding water to existing ice or packing ice by hand to increase ice weight. These techniques, as well as the above design change implementations, have led to an increase in the average as-found ice basket weights of at least 90 pounds in Unit 1 since September of 1985 and in Unit 2 since December of 1984. It should be noted that the third requirement for total minimum ice condenser weight has always been satisfied and has never been an issue of concern. The deficiencies have occurred when calculating average individual and group basket weights.

Recommendations also resulted in a heightened awareness of the importance of the refrigeration system and its associated maintenance practices which have been improved to ensure that air handling units are repaired in a timely manner. Weekly tours by operations personnel have also been incorporated to identify refrigeration system deficiencies before they have an adverse effect on the condition of the ice condenser. The actions required by T/S 4.6.5.1.a, which is performed on a 12 hour interval, as well as associated alarms offer adequate indication for ice bed and refrigeration system status prior to any abnormal degradation of the ice condenser.

Based on the previous discussion, we propose that the surveillance interval of nine months for T/S 4.6.5.1.b.2 be increased to 18 months. A similar request, published in the Federal Register on February 20, 1991 was made by Duke Power Company for their Catawba Nuclear Station, Units 1 and 2, and was subsequently approved by the NRC. Duke Power Company increased their minimum required ice weights approximately five percent to account for expected sublimation. We believe this is not necessary for the Cook Nuclear Plant request because the previous weighings during the Unit 1 and Unit 2 refueling outages dating back through 1986 have met all surveillance requirements without any ice additions being made mid-cycle.

<u>T/S 4.6.5.1.b.3</u>

With respect to the flow passage inspections required by Technical Specification 4.6.5.1.b.3, licensee event report histories were reviewed back through 1978. In that time frame, there were seven occurrences between 1983 and 1988 which indicated that the requirements of the specification had not been met. In each of the cases, however, it was concluded that the flow passages were not degraded to such a degree that would have prohibited the ice

condenser from performing its design function as assumed in the short-term containment integrity analysis. Since 1988 there has been no indication of abnormal ice bed degradation with respect to meeting the requirements of T/S 4.6.5.1.b.3.

We believe that the surveillances performed per T/S 4.6.5.1.a on a twelve hour interval and the added tours performed on the ice condenser refrigeration system by operations personnel provide sufficient indication of abnormal degradation of the ice condenser prior to it becoming a concern. It should be noted that the failures that occurred per T/S 4.6.5.1.b.2 also occurred during a similar time frame (1982 through 1986), and we believe the design changes implemented and the enhanced maintenance techniques discussed above have contributed to reducing the amount of ice build-up in the flow passages. Also to be considered are the extensive efforts that are put forth to ensure flow passages are cleaned out following maintenance activities during a refueling outage. New methods were developed in 1992 to perform localized defrosting of the ice condenser bays which have reduced frost buildup on the ice condenser lattice framework along the crane and containment walls. Based on the fact that the surveillance requirements for the procedures have been met since 1988, through three mid-cycle inspections, in both Unit 1 and Unit 2, we request that the interval for inspection be increased to 18 months.

5.0 NO SIGNIFICANT HAZARDS DETERMINATION

We have evaluated the proposed T/Ss exemption and have determined that it should not require a significant hazards consideration based on the criteria established in 10CFR50.92(c). Operation of the Cook Nuclear Plant in accordance with the proposed amendment will not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated.

The increase in the surveillance interval does not create a significant increase in the probability or consequences of an accident previously evaluated. Recent operating experience with the ice condenser indicates that all required boron concentrations, pH levels, ice weights, and frost or ice accumulation criteria established in the T/Ss have been met without any corrective or preventive action being taken during the mid-cycle inspections. This provides confidence that the ice condenser will continue to be able to perform as assumed in the safety analysis. Therefore, we conclude that the proposed T/Ss changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

(2) Create the possibility of a new or different kind of accident from any previously analyzed.

The increase in the surveillance interval for the ice condenser from 9 to 18 months will not affect the functionality or required performance capability of the ice condenser. The above review found no possibility of a new or different kind of accident from any previously analyzed.

(3) Involve a significant reduction in a margin of safety.

The proposed T/Ss changes only change the surveillance frequency requirements which we believe will not challenge the ability of the ice condenser to perform its function as defined in the safety analysis. Other T/Ss and plant indications are in place to warn the operator of refrigeration system problems prior to possible ice bed degradation. Therefore, we conclude that the T/S change does not involve a significant reduction in a margin of safety.

6.0 PENDING T/Ss PROPOSALS IMPACTING THIS SUBMITTAL

There are currently no other T/Ss proposals under review that would impact this submittal.