



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 108 TO FACILITY OPERATING LICENSE NO. DPR-58

INDIANA AND MICHIGAN ELECTRIC COMPANY

DONALD C. COOK NUCLEAR PLANT, UNIT NO. 1

DOCKET NO. 50-315

Introduction

By letter dated February 10, 1987, Indiana and Michigan Electric Company (licensee) proposed certain changes to the Technical Specifications (TS) for the Donald C. Cook Nuclear Plant, Unit No. 1, concerning the ice condenser ice baskets and flow passages. Specifically, the licensee requested an extension of the surveillance interval for weighing ice baskets and inspection of ice condenser flow passages. Additional clarification and justification for the request was provided by letter dated April 30, 1987.

Evaluation

Currently, the TS require surveillance, by weighing, of the ice baskets at least once per 9 months and visual inspection of ice condenser flow passages at the same interval. The current TS require those ice condenser surveillances be performed by May 10, 1987. The licensee proposed extending the surveillance intervals until the end of the Cycle 9-10 refueling outage (currently anticipated to begin at the end of June 1987) in order to avoid a surveillance outage (plant shutdown) before the upcoming refueling outage. A surveillance outage to satisfy the current technical specifications surveillance schedule is necessary since the surveillance in question cannot completely be performed at power due to ALARA (occupational radiation exposure) considerations. Visual inspection of ice condenser flow paths involves inspection of lattice frames, intermediate and top deck gratings, lower plenum support structures, turning vanes, and at least two flow passages (between baskets) per bay. More than half of the inspections must be conducted in the ice condenser lower plenum and therefore are subject to ALARA considerations; the remainder are performed in the accessible upper plenum region. Relative to the weighing of ice baskets, all ice baskets, except those in the rows adjacent to the containment wall and the crane wall, can generally be weighed with personnel access to the upper plenum region only and thus at power. The baskets in rows 1 and 9 often cannot be weighed without first freeing the baskets due to their tendency to become frozen in place. This additional operation requires personnel to enter the lower plenum which raises ALARA concerns. The licensee argued that the proposed extensions to the surveillance schedule should apply to all of the subject surveillances on the grounds that the administrative burden of performing the partial surveillances outweighs the benefit to safety provided by a small potential gain in safety margin.

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To buttress the request for a schedule extension, the licensee evaluated the results of past surveillances to determine the impact of the proposed request. With regard to ice condenser flow path visual inspections, the licensee has noted that 6 of the 8 visual inspections performed since 1982 have satisfied the acceptance criteria. The two exceptions, occurring in

October 1983 and July 1985, resulted when inspections were performed after ice replenishment and prior to post-maintenance cleanup. After post-maintenance cleanup, surveillance results were acceptable. Both surveillance failures resulted from maintenance performed in modes 5 or 6 and were corrected before the plant entered mode 4. Inspection of the ice condenser in the as-found condition following power operation has not shown any problems with blockage of flow passages. Furthermore, there have been no ice replenishment operations during the current period of operation. Thus, the staff concludes that the relatively recent history of visual inspections indicates that the existence of flow blockage is unlikely; additionally, the proposed surveillance extension involves a reasonably short period of time of operation at power. Consequently, the staff finds the proposed change to TS 4.6.5.1.b.3 extending the surveillance interval for flow passage verification will have no significant impact on safety and is, therefore, acceptable.

With regard to the weighing of ice baskets, the licensee has evaluated past ice basket weights and the effect of sublimation to determine the impact of the proposed schedule extension on the ability of the ice condenser to perform its safety function. Technical Specification 4.6.5.1.b.2 which requires weighing of ice baskets at 9-month intervals also requires a minimum weight of 1220 pounds of ice per basket with a total ice condenser weight of 2,371,450 pounds. The minimum weight of 1220 pounds per basket contains a 10% conservative allowance for ice loss through sublimation with the intent to assure a minimum ice weight of 1098 pounds at the end of the surveillance interval.

The licensee, using data from past surveillance intervals, has performed several sets of calculations to estimate the amount of ice that will be present in each basket at the end of the current surveillance interval including an extension period. Specifically, calculations were performed to estimate ice weights on July 31, 1987. Calculations were performed for the period ending July 31, 1987 even though the refueling outage is scheduled to begin at the end of June 1987 in order to provide a measure of conservatism in the calculation. Calculations were performed to estimate the ice weight per basket for each ice condenser bay and each row group, this distinction being required by the technical specifications.

The first set of calculations estimated ice losses using data from the last five surveillance intervals. The ice loss rate calculations were performed using average expected values and rates at the lower 95 percent confidence level. These ice loss rates, both average rates and the rates at the lower 95 percent confidence level, were then applied to the "as-left" ice weight of the latest surveillance, June 1986.

The results of the licensee's calculations performed at the lower 95 percent confidence level indicate that all bays except bays 1, 7 and 24 are expected to have average basket weights above 1220 pounds. Importantly, bays 1, 7 and 24 are expected to have average basket weights above 1098 pounds, which is established as the minimum acceptable ice weight for operation in the bases for the technical specifications. Estimates of basket weights for row groups resulted in the prediction that all row-groups except row groups 1-2, 4-3, and 9-3 are expected to have average weights above 1220 pounds. Again it is important to note that the exceptions are expected to have average weights above 1098 pounds. Using the same basic approach, the licensee estimated that the total ice condenser ice weight, with at least 95% confidence, would be 2,545,376 pounds in comparison with the limit of 2,371,450 pounds required by TS 4.6.5.1.b.2.

As noted above, the licensee estimated ice weights using data from the last five surveillances. The staff, in that regard, requested the licensee justify the use of ice weights over that period by comparison with the data from the last surveillance interval in order to determine if more recent trends are apparent. Furthermore, the staff requested the licensee confirm that there have been no significant events at the plant, e.g., inadvertent door openings or defrosting, since the last surveillance which may affect the ice inventory. In response to staff queries, the licensee responded that there have been no significant events at the plant since the last ice weighing which would materially affect the ice inventory or invalidate the use of past data to estimate current performance.

Additionally, the licensee performed a second set of calculations using ice loss data from the last surveillance interval to determine if more recent trends in ice loss could be determined. The results of the licensee's calculations indicated that when the most recent ice weight losses were subtracted from the lower 95 percent confidence limit of ice weights there were two bays and one row group below the TS limit of 1220 pounds per basket. However, those three groups remained above the 1098 pounds per basket limit established in the bases for the technical specifications.

The first two sets of calculations described above were performed assuming ice weight measurements reflecting a gain in ice weight were, for analysis purposes, a zero ice loss. Thus, no credit was taken for the fact that random weighing of baskets can result in basket ice weights increasing from one surveillance to the next, especially if surveillance occurs frequently. The assumption that an ice weight gain can be modeled as a zero ice loss was originally thought by the licensee to be conservative and is so in the case of average ice losses. However, when statistical methods are used to estimate ice losses at the lower 95 percent confidence level an ice gain will result in a larger standard deviation than a zero ice loss. Therefore, the actual data reflecting an ice weight gain should be used in the prediction of the weights. The licensee, in response to this matter, performed a third set of calculations using actual ice weight increases as appropriate with data from the last five surveillance intervals. The results of these calculations indicate that all but five bays would have a basket weight greater than 1220 pounds with 95 percent confidence; those five bays would have a weight greater than 1098 pounds.

For ice condenser row groups it was estimated, with 95 percent confidence, that all but seven row groups would exceed the limit of 1220 pounds per basket. Of those seven row groups, five were predicted to have ice weights above 1098 pounds per basket; however, the basket weights in row groups 1-2 and 4-3 were predicted to be 1048 pounds and 1061 pounds, respectively. Thus, two row groups would contain, by July 31, 1987, less ice than the minimum limit established in the bases for the technical specifications.

In response to this situation, the licensee has responded that the licensing basis containment safety analysis for D. C. Cook Unit 1 was based on a total ice weight of 2,000,000 pounds or 1029 pounds per basket. Therefore, even though two row groups may not contain sufficient ice to satisfy the bases for the technical specifications, adequate ice would be present to satisfy the assumptions of the safety analysis. The staff has discussed this apparent discrepancy between the technical specifications and the licensing basis safety analysis and the licensee has indicated their intent to pursue this matter as part of an overall program to modify the technical specifications and surveillance related to ice weight.

The staff has considered the arguments provided by the licensee and concurs that the proposed change to TS 4.6.5.1.b.2 to allow an extension of the surveillance interval for weighing the ice baskets is warranted, and does not present a significant safety impact. The surveillance interval extension proposed by the licensee involves a relatively brief time period of operation at power and analysis indicates that the ice condenser, over that time period, will contain sufficient ice, adequately distributed, to perform its safety function.

ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the 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 amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously published a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets 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 this amendment.

CONCLUSION

The staff has concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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Date: May 8, 1987