



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 76 TO FACILITY OPERATING LICENSE NO. DPR-58  
AND AMENDMENT NO. TO FACILITY OPERATING LICENSE NO. DPR-74  
INDIANA AND MICHIGAN ELECTRIC COMPANY  
DONALD C. COOK NUCLEAR PLANT UNIT NOS. 1 AND 2  
DOCKET NOS. 50-315 AND 50-316

Introduction

On February 1, 1984, the NRC issued Generic Letter 84-04 to all operating PWR licensees, construction permit holders, and applicants for construction permits on the subject of "Safety Evaluation of Westinghouse Topical Reports Dealing With Elimination of Postulated Pipe Breaks in PWR Primary Main Loops". The staff evaluation concluded that an acceptable technical basis has been provided so that the asymmetric blowdown loads resulting from double ended pipe breaks in main coolant loop piping need not be considered as a design basis for the Westinghouse Owners Group plants, provided that two conditions are met:

1. Reactor primary coolant main loop piping at Haddam Neck and Yankee Nuclear Power Station are acceptable provided the results of seismic analyses confirm that the maximum bending moments do not exceed 42,000 in-kips for the highest stressed vessel nozzle/pipe junction.
2. Leakage detection systems at the facility should be sufficient to provide adequate margin to detect the leakage from the postulated circumferential throughwall flaw utilizing the guidance of Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems," with the exception that the seismic qualification of the airborne particulate radiation monitor is not necessary. At least one leakage detection system with a sensitivity capable of detecting 1 gpm in 4 hours must be operable.

The Generic Letter also provides the basis by which licensees may request an exemption from General Design Criteria 4 (GDC-4) for removing or not installing protection against asymmetric dynamic loads (e.g., certain pipe whip restraints). Exemption requests are to include a safety balance in terms of accident risk avoidance attributable to protection from asymmetric blowdown loads versus the safety gains resulting from a decision not to use such protection. In the latter category are (1) the avoidance of occupational exposures associated with use of and subsequent removal and replacement of pipe whip restraints for inservice inspections, and (2) avoidance of risks associated with improper reinstallation.

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On July 1, 1985 (50 FR 27006), the Federal Register published for comment a proposed rule in a notice entitled "Modification of General Design Criteria 4 Requirements for Protection Against Dynamic Effects of Postulated Pipe Ruptures." Specifically, Criteria 4 in Appendix A to Part 50 is modified with the addition of the following:

"However, the dynamic effects associated with postulated pipe rupture of primary coolant loop piping in pressurized water reactors may be excluded from the design basis when analyses demonstrate the probability of rupturing such piping is extremely low under design basis conditions."

The acceptable analysis is discussed in the Federal Register Notice and is the same kind of analysis and required findings as discussed in Generic Letter 84-04. Therefore, an acceptable response to Generic Letter 84-04 would be an acceptable response to the provisions of the proposed rule.

#### Background

On December 23, 1977, the NRC issued Facility Operating License No. DPR-74 to Indiana and Michigan Electric Company for the operation of the Donald C. Cook Nuclear Plant Unit No. 2. License Condition 2.C.(3)(a), entitled "Analysis of Reactor Vessel Supports and Internals", required the following:

"Indiana and Michigan Power Company shall submit by September 30, 1979, an analysis which defines the loads on the reactor coolant system and internals for a postulated break at or very near the cold leg of the reactor pressure vessel nozzle and evaluates: (a) the full restraint capability of the reactor coolant system, (b) the structural capability of the internals, and (c) the safety margins of each. The required analysis shall be performed using the approved hydraulic model referenced in WCAP-8708, "MULTIFLEX, A Fortran IV Computer Program for Analyzing Thermal-Hydraulic Structure System Dynamics." If modifications to the facility are indicated by the results of the analysis, Indiana and Michigan Power Company shall submit them for review and implement them on a schedule acceptable to the Commission."

By letter dated January 25, 1978 from the NRC to licensees, this issue was further defined and applied to other facilities. The licensee responded to the license condition and the January 25, 1978 NRC letter by letters dated May 15, 1978, September 26 and December 7, 1979, and February 15 and October 8, 1980. The licensee, Indiana and Michigan Electric Company (IMEC), became a member of the Westinghouse Owners Group for resolution of the issue, therefore, Generic Letter 84-04 responds to the license condition as addressed in the "Introduction" above and the licensee's response to Generic Letter 84-04 applies to the exemption and requirements of the proposed rule (Criteria 4 to Appendix A of Part 50).

## Evaluation

The evaluation of the Westinghouse Owners Group program for resolution of this issue is contained in Enclosure 1 of Generic Letter 84-04. In that evaluation, which is directly applicable to D. C. Cook Unit Nos. 1 and 2, the staff evaluated the Westinghouse analysis and concluded that pipe whip restraints and other protective measures against the dynamic effects of a break in the main coolant piping are not required. The evaluation also included two conditions for acceptability which were included in Generic Letter 84-04 and are discussed below.

By letter dated September 10, 1984, the IMEC submitted their response to Generic Letter 84-04 regarding the resolution of Unresolved Safety Issue A-2, "Asymmetric LOCA Loads". In accordance with the requirements of the Generic Letter, the licensee provided information concerning: (1) the capability of the leakage detection systems installed at D. C. Cook to detect a one gpm leak within four hours and (2) the safety balance addressing the consequences of not installing piping restraints. Items (1) and (2) were submitted in support of the licensee's request for an exemption to GDC-4 of Appendix A to 10 CFR Part 50 for D. C. Cook Units 1 & 2; item (1) was also submitted to support deletion of License Condition 2.C.(3)(a) from Operating License No. DPR-74 for D. C. Cook Unit 2.

This evaluation addresses the request to delete the license condition. However, in so doing, this evaluation also addresses the requirements to meet the proposed rule. Generic Letter 84-04 required that two conditions be met in support of any action to be taken by licensees. The first condition is not applicable to D. C. Cook; it applies only to Haddam Neck and the Yankee Nuclear Power Station. For the second condition we have reexamined the leak detection system capability in order to support the granting of a partial exemption to GDC-4 regarding analyzing the effects of certain postulated pipe breaks. As indicated in the Cook FSAR Section 4.2.7 on reactor coolant pressure boundary leakage detection, the leak detection system includes (a) the containment air particulate monitor, (b) the containment radioactive gas monitor, (c) the containment sump monitor and (d) the humidity monitor. We have reviewed the leakage detection system, the Cook Technical Specification, Sections 3.4.6.1 and 3.4.6.2 dealing with this system and the licensee's letter dated September 10, 1984 and we conclude that the leak detection system meets the criteria previously established for leak detection systems (1 gpm in four hours) when utilizing leak-before-break and is therefore acceptable. The licensee has provided the analysis found acceptable in Generic Letter 84-04 and in meeting this condition of the Generic Letter the license condition 2.C.(3)(a) will be satisfied and the license condition may be deleted as requested by the licensee.

Generic Letter 84-04 also required that a safety balance be performed in terms of accident risk avoidance attributable to protection from asymmetric blowdown loads versus the safety gains resulting from a decision not to use

such protection. The licensee has performed a safety balance in terms of occupational radiation protection as a requirement to obtain an exemption to GDC-4. For the staff's review, the acceptance criteria used were those stated in Section 12 of NUREG-0800, (SRP) and Regulatory Guide 8.8, "Information Relevant To Ensuring That Occupational Radiation Exposures At Nuclear Power Stations Will Be As Low As Is Reasonably Achievable." The licensee, as part of their justification for the exemption to GDC-4, has estimated an occupational dose saving for plant personnel of approximately 1600 person-rem per unit. This occupational dose estimate is based on the occupational dose expected during installation of the extra restraints. The licensee will save additional dose to plant workers during inservice inspections and maintenance procedures in and around the reactor coolant system. The staff review of the licensee's analysis shows it to be a reasonable estimate of dose saving. Therefore, from the perspective of radiation exposure and ALARA considerations, the staff finds the request acceptable. On the basis of the evaluations, we find the basis for the deletion of the license condition and the exemption to GDC-4 to be acceptable. In meeting the requirements for the exemption, the licensee has also met the requirements of the proposed rule.

#### 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 issued 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

We have 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 this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: November 22, 1985

#### Principal Contributors:

K. Wichman  
R. Goel  
D. Wigginton