November 2, 2000

MEMORANDUM TO: Claudia Craig, Chief
Section 1
Project Directorate III
Division of Licensing Project Management

FROM: George T. Hubbard, Chief **/RA/ B. Thomas for:**
BOP and Containment Systems Section
Plant Systems Branch
Division of Systems Safety and Analysis

SUBJECT: SAFETY EVALUATION FOR PROPOSED REVISION TO THE UPDATED SAFETY ANALYSIS REPORT REGARDING TORNADO MISSILE PROTECTION REQUIREMENT (TAC NOS. MA9176 AND MA9178)

Plant Name: Donald C. Cook Nuclear Plant Units 1 and 2
Licensee: Indiana Michigan Power Company
Review Status: Complete

By letter dated June 8, 2000, Indiana Michigan Power Company (licensee) requested an amendment to the facility Operating Licenses DPR-58 and DPR-74 for Donald C. Cook Nuclear Plant (CNP) Units 1 and 2, respectively. The amendment proposed changes to the CNP Updated Final Safety Analysis Report (UFSAR) concerning the requirements of physical protection against tornado generated missiles (TGMs) for certain structures, safety-related systems and components (SSCs). The change will allow the use of a probabilistic risk assessment (PRA) as an alternate method to determine the SSCs which could be excluded from having additional physical protection against TGMs.

The Plant Systems Branch (SPLB) has prepared the enclosed Safety Evaluation after having reviewed the licensee's submittal. Projects is responsible for obtaining SPSB's approval of the results of the licensee's PRA analysis. We consider our efforts on TAC Nos. MA9176 and MA9178 complete.

Docket Nos.: 50-315 and 50-315

Attachment: As stated

CONTACT: D. Shum, NRR/DSSA/SPLB
301-415-2860

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SAFETY EVALUATION FOR PROPOSED CHANGES TO UPDATED FINAL SAFETY ANALYSIS REPORT REGARDING TO TORNADO MISSILE PROTECTION REQUIREMENT
DONALD. C. COOK NUCLEAR PLANT, UNITS 1 AND 2
DOCKET NOS. 50-315 AND 50-316

1.0 INTRODUCTION

By letter dated June 8, 2000, Indiana Michigan Power Company (licensee) requested an amendment to the facility Operating Licenses DPR-58 and DPR-74 for Donald C. Cook Nuclear Plant (CNP) Units 1 and 2, respectively. The amendment proposed changes to the CNP Updated Final Safety Analysis Report (UFSAR) concerning the requirements of physical protection against tornado generated missiles (TGMs) for certain structures, safety-related systems and components (SSCs). The change will allow the use of a probabilistic risk assessment (PRA) as an alternate method to determine which SSCs could be excluded from having additional physical protection against TGMs.

2.0 BACKGROUND

During recent reviews of SSCs at CNP for potential targets susceptible to the TGM damage, the licensee identified that some SSCs were not physically protected against TGMs. These SSCs include external components (ventilation, combustion air intake, and engine exhaust) associated with emergency diesel generators (EDGs); external components associated with switchgear room heating, ventilation, and air conditioning (HVAC) intake systems; walls and roof enclosing the east end of the fuel handling building; and openings in the roof on the east and west end of the fuel handling building. Subsequently, the licensee proposed to revise the CNP UFSAR to address:

a. SSCs not having physical protection against TGMs.

b. PRA techniques used to determine the need for these SSCs to be physically protected against TGMs.

3.0 EVALUATION

3.1 SSCs Not Having Physical Protection Against TGMs.

In accordance with the requirements of General Design Criteria (GDC) 2 and 4, nuclear power plants must be designed to withstand the effects of tornado and high wind generated missiles. The guidance and criteria for licensing acceptance for determining whether the GDC requirements governing TGM protection are met are described in Standard Review Plan (SRP) Section 3.5.1.4, “Missiles Generated by Natural Phenomena,” and Section 3.5.2, “Structures,

Systems, and components to be Protected from Externally Generated Missiles." The acceptance criteria generally specify that SSCs should be provided with physical TGM protection (barriers) for the maximum credible tornado threat. However, SRP Section 3.5.1.4 also includes acceptance criteria that permit elaxation of the above deterministic guidance, if it can be demonstrated that the probability of damage to the unprotected SSCs is sufficiently low.

SRP Section 2.2.3, "Evaluation of Potential Accidents," establishes the acceptable level of probability of damage resulting from TGMs to the unprotected SSCs. SRP Section 2.2.3, in part, states that: the probability of occurrence of the initiating events leading to potential consequences in excess of 10 CFR Part 100 exposure guidelines should be estimated using assumptions that are as representative of the specific site as is practicable. SRP Section 2.2.3 further states that because of low probabilities of the events under consideration, data are often not available to permit accurate calculation of probabilities. The expected rate of occurrence of potential exposures in excess of 10 CFR Part 100 guidelines of approximately $1x10^{-6}$ per year is acceptable if, when combined with reasonable qualitative arguments, the realistic probability can be shown to be lower."

The licensee proposed to use the PRA techniques in accordance with the guidance described in the SRP to determine whether the SSCs, discussed above, could be excluded from having additional physical protection against TGMs. Subsequently, the licensee proposed to revise the UFSAR to reflect the use of PRA as an alternate method to determine the need for physical protection of these SSCs against TGMs.

The licensee performed a PRA using the methodology, "Tornado Missile Risk Evaluation Methodology (EPRI NP-2005)," developed by the Electric Power Research Institute (EPRI), to determine the risks associated with postulated TGM strikes on the above cited SSCs. Results of the PRA indicated that the probability of potential exposures in excess of 10 CFR 100 guidelines occurring as a result of TGM strikes on these SSCs is approximately $1.477x10^{-7}$ per year for Unit 1 and $1.481x10^{-7}$ per year for Unit 2. These results satisfy the guidance described in SRP Section 2.2.3 and SRP Section 3.5.1.4 for the exclusion of the cited SSCs from having additional physical protection against TGMs.

Based on its review, the staff finds that the above licensee's approach to determine TGM targets not required to have physical protection against TGMs is consistent with the guidance described in SRP Section 2.2.3 and SRP Section 3.5.1.4, and therefore, is acceptable.

3.2 EPRI Methodology Used to Determine the Need for the Above SSCs be Physically Protected Against TGMs.

The licensee proposed to add a new section (Section 1.4.1.5.5, "Probabilistic Methodology for Determining Risk from Tornado Generated Missiles") to the UFSAR. This proposed new section, in part, describes the EPRI methodology (also known as "TORMIS'') used for the CNP probabilistic missile strike analysis.

TORMIS is a methodology accepted by the staff for determining the probability of TGM striking targets (i.e. walls and roofs of buildings on which penetrations or exposed portions of systems/components are located). However, the staff's acceptance of an application using TORMIS is subject to appropriate resolution of five (5) specific concerns as identified in the

Safety Evaluation Report (SER)[1]. These specific concerns are related to the assumptions used in the input parameters for the risk analysis (e.g. locations and numbers of potential missiles presented at a specific site, wind speed, wind speed near the ground, etc.). The licensee provided discussion to address each of the concerns.

Based on its review, the staff finds that the licensee has assumed a conservative value and provided justification for its selection of the value for each of the concerns identified in the SER for TORMIS. Therefore, the staff finds that the addition of this new Section 1.4.1.5.5 to the UFSAR is appropriate and acceptable.

4.0 CONCLUSION

Based on its review and the evaluation described in the above, the staff finds that the licensee's proposed changes to the CNP UFSAR concerning requirements of additional physical protection for SSCs against TGMs, and the addition of the new Section 1.4.1.5.5, "Probabilistic Methodology for Determining Risk from Tornado Generated Missiles," to the UFSAR to describe the EPRI methodology used for the CNP probabilistic missile strike analysis, are acceptable.

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[1] NRC Safety Evaluation Report, dated November 29, 1983, for EPRI reports (NP-768, NP-769 and NP-2005).