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 MURLEY, T. E. Document Control Branch (Document Control Desk)

SUBJECT: Forwards response to Suppl 4 to Generic Ltr 88-20,
 "Individual Plant Exam of External Events for Severe
 Accident Vulnerabilities." Fire analysis portion of plant
 exam performed using Level I PRA.

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AEP:NRC:1082D

Donald C. Cook Nuclear Plant Units 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
INDIVIDUAL PLANT EXAMINATION OF EXTERNAL EVENTS PROGRAM PLAN,
RESPONSE TO GENERIC LETTER NO. 88-20, SUPPLEMENT NO. 4

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

Attn: T. E. Murley

December 18, 1991

Dear Dr. Murley:

On June 28, 1991, the NRC issued Generic Letter 88-20 Supplement 4 to formalize the requirements for an Individual Plant Examination of External Events (IPEEE) for operating licensees. Specifically, the generic letter required licensees to perform an IPEEE and identify potential improvements to address important contributors to risk and implement necessary improvements. Supplement 4 also required that licensees submit their proposed programs for conducting the IPEEE. The attachment to this letter provides the description of the IPEEE program pursuant to that request for the Donald C. Cook Nuclear Plant Units 1 and 2.

This letter is submitted pursuant to 10CFR50.54(f) and, as such, an oath of affirmation is enclosed.

Sincerely,

A handwritten signature in cursive script, appearing to read 'E. E. Fitzpatrick'.

E. E. Fitzpatrick
Vice President

tjw

Attachment

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Dr. T. E. Murley

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AEP:NRC:1082D

cc: D. H. Williams, Jr.
A. A. Blind - Bridgman
J. R. Padgett
G. Charnoff
NFEM Section Chief
A. B. Davis - Region III
NRC Resident Inspector - Bridgman

STATE OF OHIO)
COUNTY OF FRANKLIN)

Eugene 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 foregoing Response to Generic Letter No. 88-20, Supplement No. 4: Individual Plant Examination of External Events Program Plan, 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 18th
day of December, 1991.

[Signature]
NOTARY PUBLIC
Commission Expires 3-9-96



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Attachment to AEP:NRC:1082D
INDIVIDUAL PLANT EXAMINATION
OF EXTERNAL EVENTS (IPEEE)
FOR THE
DONALD C. COOK NUCLEAR PLANT

Pursuant to the requirements of Generic Letter 88-20, Supplement 4 "Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities - 10CFR50.54(f)", the following information is presented. The information is provided in three sections: 1) Project Approach 2) Methodology and 3) Program Schedule.

1.0 PROJECT APPROACH

American Electric Power Service Corporation (AEPSC) is currently implementing the objectives of Generic Letter 88-20 through Supplement 4 with the performance of a Level III Probabilistic Risk Assessment (PRA) considering both internal and external events. The PRA is being performed with realistic assessments of the plant's behavior under severe accident conditions and is based on the plant's configuration and operating procedures in effect on August 1, 1989. AEPSC and Cook Nuclear Plant personnel have been actively involved in this process as performers of the analysis and as technical and operational reviewers. In addition, AEPSC is complying with the NRC's request to have USI A-45 (Decay Heat Removal), GI-131 (Movable In-core Flux Detection Systems), Charleston Earthquake, and NUREG/CR-5088 (Fire Risk Scoping Study), addressed and resolved in the PRA. Interface with the USI A-46 program (Seismic Qualification of Equipment) is addressed later in this Attachment.

The Cook Nuclear Plant PRA Project is being performed and managed by AEPSC with support from the Individual Plant Evaluation Partnership (IPEP). For our scope, IPEP is comprised of Westinghouse Electric Corporation and Fauske and Associates. In addition, subcontractors in the seismic analyses area include EQE, Paul C. Rizzo and Associates and Stevenson & Associates.

Work for the Cook Nuclear Plant is being conducted in conformance with the appropriate requirements of 10 CFR 50, Appendix B. This ensures a high degree of quality and allows the PRA results to be utilized to satisfy IPEEE requirements and assist in future licensing activities. An independent review team is also being used to provide further confidence in the IPEEE process and results. The team's efforts will supplement but not be as extensive as the 10CFR50 Appendix B reviews.

2.0 METHODOLOGY

SEISMIC ANALYSIS

The seismic analysis for the Donald C. Cook Nuclear Plant is being performed with a Seismic Probabilistic Risk Assessment (SPRA) using the guidelines provided in NUREG/CR-2300, NUREG/CR-2815 and NUREG/CR-4840. Enhancements identified in Appendix I of Generic Letter 88-20, Supplement 4 for a "New PRA" have been incorporated into the program. The analysis is generally divided into five subtasks as follows: (1)

seismic hazard analysis, (2) fragility analysis of plant structures and components, (3) seismic initiating event analysis, (4) seismic event tree analysis, and (5) seismic systems analysis (fault tree modeling). Each of these tasks is discussed in more detail below.

Seismic Hazard Analysis

Since the Electric Power Research Institute (EPRI) has not analyzed the probability of seismic events for the Cook Nuclear Plant site, a site-specific seismic hazard analysis has been prepared for the Cook Nuclear Plant site by an independent consultant, Paul C. Rizzo and Associates. This hazard analysis produced a set of weighted seismic hazard curves, each having a probability of representing the true curve. The seismic hazard curves are based on a log-normal distribution and were developed considering historical information. In addition to the site specific hazard curve, the Lawrence Livermore National Laboratory (LLNL) curve (NUREG/CR-5250) developed for Cook Nuclear Plant is also being used in the analysis.

Fragility Analysis

For the Cook Nuclear Plant SPRA, fragility has been defined as the free field ground acceleration level at which failure of a given component to perform its safety related function is predicted. Failures are considered due to loss of pressure boundary, significant inelastic deformation, inability to operate, partial collapse, or a combination of failure modes. Fragility analysis was used to define the limits of structural integrity, functional capability, or operability with the associated uncertainty for plant components and structures that have the potential to affect safe shutdown of the plant following an external event. Fragility parameters consist of estimates of median seismic acceleration capacities with standard deviations based on log normal statistical distributions.

Fragility parameters for the Cook Nuclear Plant were established based on plant specific evaluations using existing calculations (supplemented by additional calculations where necessary) and applicable generic data from public domain references for commonly used equipment. Plant walkdowns, using the procedures adapted from EPRI NP-6041, were conducted in November 1990 and March 1991 to screen plant equipment, identify outliers of concern and provide input to decisions regarding the acceptability of generic data for Cook Nuclear Plant equipment and structures. Some additional confirmatory walkdowns of the Unit 1 and 2 containments are planned in 1992 to formally document the applicability of earlier Unit 1 findings to Unit 2 and vice versa. The scope of the completed walkdowns included considerations for impact on shutdown decay heat removal (USI A-45) and potential seismic impact on movable in-core flux mapping systems (Generic Issue - 131). Due to the advanced schedule of the IPEEE walkdowns relative to those for the

Seismic Qualification Utility Group pursuant to USI A-46, coordination of the two programs was achieved by using some of the USI A-46 plant walkdown team members including the USI A-46 contractor and by providing the IPEEE results to the USI A-46 program manager.

Seismic Initiating Event Analysis

The methodology used for determining the seismically induced initiating events and their respective frequencies consisted of the following four basic steps:

1. The analyst selected the critical buildings, structures and equipment that determined plant status following a seismic event.
2. Given the failure of each of the items listed in step 1, the plant disposition was defined. Failures with similar results were grouped together.
3. The frequency of occurrence for each of six selected seismic intervals up to 1.5g peak ground acceleration, and the probability of failure for each group described in step 2 at each interval were then determined from the seismic hazard analysis and the fragility analysis, respectively.
4. An event tree which contained, as its nodes, the seismic interval of interest and the failure groups identified in step 2 was developed and quantified. The sequence frequencies were then determined by the seismic interval frequency and the corresponding fragilities calculated in step 3.

The initiating events analyzed for the SPRA include: transients, LOCAs, steamline/feedline break, loss of offsite power, and the special initiator - loss of essential service water.

Seismic Event Tree and Fault Tree Analysis

The Cook SPRA employs much of the work previously generated for the ongoing Level III internal events analysis of the Cook Nuclear Plant Individual Plant Examination (IPE). That is, the event trees and fault trees developed for the internal events analysis are generally only being modified or enhanced to include the plant or system response to a particular seismic event. The fault trees used in the seismic accident sequence quantification, therefore, include the random failures, human errors, test and maintenance unavailabilities, and common cause failure probabilities, as well as the seismic failures of components and buildings whose failure could lead to the system failure.

The event trees and fault trees are being quantified in the same manner as the IPE accident sequence quantification for internal initiators. Specifically, contractor-developed software is being used to perform the event tree analysis using fault tree linking.

FIRE ANALYSIS

The fire analysis portion of the Donald C. Cook IPEEE is being performed using a Level I PRA. Information contained in the Cook 10CFR50 Appendix R analysis is being utilized and applied to the fire PRA. Additionally, in accordance with Generic Letter 88-20, Supplement 4, the generic fire PRA limitations identified by Sandia in the Fire Risk Scoping Study (NUREG/CR-5088) are being addressed. In this regard, plant walkdowns have been performed both inside and outside containment to address: 1) seismic/fire interactions, 2) the effects of fire suppressants on equipment, and 3) control system interactions. Additional items being considered in the analysis include fire brigade response, the effectiveness of fire barriers, and the use of cable separation at Cook Nuclear Plant. Also, the COMPBRN-IIIE computer code is being used to better model the effects of fire on equipment of interest.

Event trees and fault trees from the existing Cook Level I Internal Events PRA are being utilized, where possible, to quantify scenarios resulting from internal fires. The results of this quantification, as well as other screening based on core damage frequency, are being used to determine fire scenarios meeting NRC reportability requirements.

OTHER EXTERNAL EVENTS

The other external events portion of the Cook Nuclear Plant PRA includes appropriate external events other than seismic and internal fires. Specifically, plant specific analysis is being performed for external flooding, aircraft accidents, severe winds, ship impact accidents, hazardous materials accidents (off-site and on-site), turbine missiles, and external fires.

A screening approach which meets the intent of that displayed in Figure 1 of Generic Letter 88-20, Supplement 4, is being used in the evaluation of other external events. Existing information and analyses has been utilized as much as possible to analyze the aforementioned events. Those events leading to core damage or unsatisfactory containment performance will be reported to NRC in accordance with the criteria set forth in the original Generic Letter 88-20.



3.0 PROGRAM SCHEDULE

As reported in letter AEP:NRC:1182 on October 24, 1989, the original scope of the Individual Plant Examination for the Donald C. Cook Nuclear Plant included internal and external events. Since the scope definition for the external events analysis has been modified to address the NRC's requirements for the IPEEE, it is believed that the current program, which is nearing completion, meets the directives of Generic Letter 88-20, Supplement 4. As such, and consistent with the commitment made in AEP:NRC:1082A, on December 10, 1991, it is expected that the NRC submittal for the Cook Nuclear Plant IPEEE will be made by April 30, 1992. This submittal will be made notwithstanding the additional seismic walkdowns scheduled in 1992. These walkdowns, which supplement the earlier seismic walkdowns, are only being made to document the assumptions that the earlier Unit 1 walkdown results apply to Unit 2 and vice versa. There is every expectation that the results will prove the Units similar and confirm the applicability of the seismic analysis to both Units 1 and 2.