

INDIANA & MICHIGAN ELECTRIC COMPANY

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April 24, 1981
AEP:NRC:00500A



Donald C. Cook Nuclear Plant Unit Nos. 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
Second Quarterly Report on Hydrogen Mitigation and Control

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Denton:

This letter and its attachments constitute our second quarterly report on hydrogen mitigation and control for the Donald C. Cook Nuclear Plant Unit Nos. 1 and 2. This report is being submitted in fulfillment of the commitment made in our AEP:NRC:00476 submittal dated October 7, 1980 and supplements the information previously transmitted to the Commission via our first quarterly report, AEP:NRC:00500, dated January 12, 1981.

As stated in our first quarterly report, installation of the in-containment portion of a Distributed Ignition System (DIS) is scheduled during the 1981 refueling outages for Unit Nos. 1 and 2 of the Cook Plant. Detailed information concerning the in-containment portion of the DIS is provided in Attachment No. 2 to this letter as requested by members of your Staff. Design of the outside-containment portion of the DIS has been completed and the necessary material orders placed. Our efforts are directed toward having the DIS operational in Unit No. 2 by June 1, 1981.

The attachments to this letter address the various topics associated with a hypothetical event resulting in the generation of substantive amounts of hydrogen. This information is provided in the attachments as follows:

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<u>Attachment No.</u>	<u>Topic</u>
1	Containment Structural Evaluation
2	Distributed Ignition System Design
3	Inadequate Core Cooling/Hydrogen Control Equipment
4	Equipment Survivability
5	Research Program Status
6	Core Cooling Capability Subsequent to Hydrogen Combustion
7	Preliminary Safety Evaluation

As stated in Section 2.0 of the enclosure to our AEP:NRC:00500 submittal, AEP is investigating various candidate hydrogen control methods in conjunction with Duke Power Company and the Tennessee Valley Authority. An evaluation of the studies performed to date with regard to Halon inerting, Electro-magnetic interference emissions from spark discharge igniters, and the use of catalytic combustors will be forwarded to the NRC in our next submittal on this topic.

Testing performed by AEP/TVA/Duke/Westinghouse at Fenwal Incorporated verified the ability of the glow plug igniter utilized in the DIS to reliably ignite lean hydrogen/air/steam mixtures in the presence of water spray and fans. Confirmatory tests performed by the Lawrence Livermore Laboratory (UCRL-84167) further substantiated our conclusions with regard to the Fenwal test results; that is, the glow plug igniter is a reliable ignition source under a variety of adverse conditions. The containment pressure and temperature responses to hydrogen combustion have been conservatively estimated using the CLASIX computer code. The results of the CLASIX analyses show that deliberate ignition of hydrogen would not pose a threat to containment integrity and would not result in environmental conditions more severe than the conditions to which most of the necessary equipment has been qualified to.

Based on the results of the aforementioned testing and analyses, we have concluded that the DIS would serve to reduce the consequences of hypothetical events similar in nature to the TMI-2 accident involving the generation of substantive amounts of hydrogen. The research and development programs, described in Attachment No. 5 to this letter (being funded by AEP/TVA/Duke in conjunction with the Electric Power Research Institute), are expected to provide confirmatory information in support of the DIS mitigation concept. The merits of any potential modification to the present DIS design uncovered during the research program will be duly considered.

Mr. Harold R. Denton

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A hypothetical small break loss-of-coolant accident with failed ECCS injection (S2D) has been analyzed and the acceptability of the DIS mitigation concept shown for the hydrogen generation associated with approximately 80 weight percent zirconium cladding oxidation; a more severe event from a hydrogen control standpoint than the TMI-2 accident. In light of the knowledge gained from the above mentioned testing and analyses, as supplemented by our continued awareness of the issues discussed by the NRC Staff with regards to the Sequoyah and McGuire Nuclear plants, it is our position that the DIS described in Attachment No. 2 to this letter will constitute the final hydrogen control system for the Donald C. Cook Nuclear Plant pending completion of the generic degraded core rulemaking. It is our belief that consideration of additional event sequences beyond S2D is not warranted at this time.

Indiana & Michigan Electric Company interprets 10 CFR 170.22 as requiring that no fee accompany this submittal.

Very truly yours,


R. S. Hunter
Vice President

cc: John E. Dolan - Columbus
R. C. Callen
G. Charnoff
D. V. Shaller - Bridgman
R. W. Jurgensen
Region III Site-Inspector