INDIANA & MICHIGAN ELECTRIC COMPANY

P.O. BOX 16631 COLUMBUS, OHIO 43216

> September 30, 1985 AEP:NRC:0775W

Donald C. Cook Nuclear Plant Unit No. 2 Docket No. 50-316 License No. DPR-74 REQUEST FOR ENVIRONMENTAL QUALIFICATION EXTENSION BEYOND NOVEMBER 30, 1985

Honorable Nunzio J. Palladino Chairman U. S. Nuclear Regulatory Commission Washington, D.C. 20555

Dear Dr. Palladino:

Pursuant to 10 CFR 50.49(g) and the Commission's Generic Letter No. 85-15, the Indiana & Michigan Electric Company (IMECo) hereby requests an extension beyond November 30, 1985, to establish the environmental qualification of four items of electrical equipment currently installed at the Donald C. Cook Nuclear Plant Unit No. 2. Advance notice of IMECo's intent to request this extension was recently provided to the Commission in IMEC's letter dated September 17, 1985 [letter No. AEP:NRC:0775Y, Milton F. Alexich (IMECo) to Nunzio J. Palladino (NRC)]. The length of the extension requested is until D. C. Cook Unit 2 is shut down for refueling. In any case, this extension is not requested beyond February 28, 1986.

IMEC has been working diligently to comply with the requirements for environmental qualification of electrical equipment set forth in 10 CFR 50.49. IMECo has completed virtually all of the environmental qualification work for both D. C. Cook units that was originally identified in May 1983 [letter AEP:NRC:0775C, R. F. Hering (IMECo) to H. R. Denton (NRC) dated May 20, 1983.] Originally 74 items were identified for each unit, with many items involving several pieces of equipment and associated cables, valve operators, sensors, transmitters, cable terminations, etc. The items in question here (pre-aging not established for certain transmitters prior to environmental qualification testing, and certain cables not qualified for submergence) were only identified or confirmed subsequent to May 1984.

In October 1984 IMECo committed to the NRC staff to accomplish all known work required to be in compliance with the environmental qualification regulations by the end of the 1985 refueling outage for each D. C. Cook unit. Included with this commitment was the justification for continued operation pending full qualification of the equipment. [Letter No. AEP:NRC:0775N from M. P. Alexich (IMECo) to H. R. Denton (NRC) dated October 18, 1984.] For D. C. Cook Unit 1, all known environmental qualification work will be completed during the refueling outage that began in April 1985. Work associated with the remaining four items for D. C. Cook Unit 2 will be accomplished during the Fall refueling outage, which was scheduled to commence in November 1985. Due to circumstances beyond IMECo's control, the schedule for the Unit 2 refueling

8510070170 850930 PDR ADOCK 05000316 PDR PDR outage has slipped by approximately three months and will not begin prior to November 30, 1985. This unavoidable slip in the scheduled refueling outage necessitates the request for an extension of the November 30, 1985 deadline.

Three unscheduled outages (on July 15, August 2, and August 24) following steam generator tube leakage, have caused the slip in the schedule for refueling. D. C. Cook Unit 2 is still shut down following the August 24 leakage and will be returned to service no earlier than October 9, 1985. As noted in our letter of September 17, 1985, Unit 2 has approximately 90 effective full-power days (EFPDs) of fuel available for continued operation in the current fuel cycle. Assuming startup on October 9, 1985, we can plan for no more than 51 days of operation at full power prior to November 30, 1985. A refueling outage commencing on November 30, 1985 would result in a loss of at least 39 EFPDs in the current fuel cycle. Discharging fuel prior to achieving design burnup is both uneconomical and, at this late date in fuel cycle planning, could greatly complicate the safety analysis for the next fuel cycle.

IMECo has worked to accomplish some of the tasks associated with final compliance with environmental qualification requirements for Unit 2 during the recent unscheduled outages. Based on our experience with performing the same work in Unit 1, we estimate that the critical path items will require an outage of seven weeks. Thus, if the Commission does not grant this request for an extension, IMECo will be faced with the following options:

(1) shutdown on November 30, 1985 for an early refueling outage--during which environmental qualification tasks are completed, or

(2) shutdown on November 30, 1985 for a seven-week maintenance outage--during which environmental qualification tasks are completed--followed by approximately six weeks of operations to the end of design core burnup and shutdown for refueling.

Electing option 1 would result in an economic penalty to IMECo's ratepayers of approximately \$180,000 for each EFPD lost and would require a reevaluation of the safety analysis for the next fuel cycle. It is possible that the new safety analysis would require changes to the core design for the next cycle--further complicated by the fact that fabrication of the fuel assemblies for the next cycle has been completed. This postulated reanalysis and redesign is certainly possible, but it is time-consuming and costly. Failing to operate to the end of fuel cycle design life is also inconsistent with DOE-sponsored programs to encourage high fuel burnup as a conservation measure and a means of reducing spent fuel generated for disposal.

Electing option 2 simply results in approximately seven weeks additional outage time for D. C. Cook Unit 2. It is unlikely that the maintenance performed during an outage to accomplish environmental qualification tasks would shorten the scheduled time for the refueling outage. This constitutes a hardship on IMECo's ratepayers. Based on the differences in fuel costs for D. C. Cook and coal-fired units on AEP's system, the additional outage time would result in an additional cost of approximately \$180,000 per day. The four items for which an extension beyond November 30, 1985 is requested are described in some detail in the attachment to this letter, which also provides the justification for continued operation (JCO). In some cases, as noted below, the NRC Staff has already reviewed and approved the JCOs. For three items, continued operation is justified because the safety function can be accomplished by alternative equipment. One item involves certain transmitters for which "pre-aging" of the components was not performed prior to environmental qualification testing. Thus, the service life of the transmitters cannot be conclusively established. However, based on the type test data of the original qualification and the similarity of these transmitters to ones that have been qualified, there is reasonable assurance that the transmitters would perform their safety function at this point in their service life. Furthermore, the safety function of certain of the transmitters can be accomplished by alternative equipment. The four items can be described as follows:

Item #1. The cables for reactor coolant system hot and cold leg resistance temperature detector Nos. NTR-120, -140, -210, -220, -230, and -240 are routed below the predicted maximum post-accident containment flood level and are not environmentally qualified for submergence. The cables must be re-routed. In each case the safety function of these detectors can be accomplished by alternative equipment. This JCO has been reviewed and accepted by the NRC Staff.

Item #2. Cables for ITT Barton narrow-range steam generator level transmitters designated BLP-112, -122, -132, and -142 are routed below the predicted maximum post-accident containment flood level and are not environmentally qualified for submergence. The cables must be re-routed. In each case the safety function of these transmitters can be accomplished by alternative equipment. This deficiency was only recently discovered [letter No. AEP:NRC:0775U from M. P. Alexich (IMECo) to H. R. Denton (NRC) dated June 28, 1985], and the NRC Staff has not reviewed the JCO.

Item #3. Triax cables for post-accident high-range monitor Nos. VRA-2310 and -2410 are routed below the predicted maximum post-accident containment flood level and are not environmentally qualified for submergence. Flood-up tubes must be installed. The information required to be obtained from these monitors can be developed using alternative equipment. This JCO has been reviewed and accepted by the NRC Staff.

Item #4. The service life of various ITT Barton and Foxboro transmitters cannot be established conclusively because pre-aging of these components was not accomplished prior to environmental testing. IMECo has identified 43 of these transmitters that have a safety function and require environmental qualification. IMECo will replace all of the transmitters; it is estimated that this task will take seven weeks to complete. However, the type test data in support of the original qualification, as well as analysis of test data from similarly constructed transmitters, provides reasonable assurance that the transmitters will function as intended in accident conditions at this point in their service life. A JCO for certain of the transmitters (the list having been recently expanded) has been reviewed and accepted by the NRC Staff.

In summary, IMECo submits that its justification for an extension from the Commission is compelling. The JCOs provide reasonable assurance that continued operation will not adversely affect public health and safety. We are not asking for any additional days of operation beyond those previously scheduled; we simply request to make up in December, January, and possibly February those days which were lost in August, September, and October. The schedule slippage necessitating this request was clearly due to circumstances beyond the Company's control. Furthermore, IMECo has worked expeditiously and made a good-faith effort to accomplish this work on a timely basis. Several deficiencies that were previously identified were corrected during the current unscheduled outage. The remaining tasks could not be performed during the time frame of the current outage. IMECo has accomplished for both D. C. Cook units virtually all of the work associated with environmental qualification of electrical equipment originally identified as required for compliance with 10 CFR 50.49. All work for D. C. Cook Unit 1 has been accomplished. Thus far IMECo has spent an estimated \$1.7 million to comply with environmental qualification regulations for Unit 1. Unit 2 costs will be comparable. The only alternatives available to the Company, if the extension is not granted, would result in unnecessary, significant additional costs to our ratepayers.

For all of the above reasons, IMECo requests an extension of the November 30, 1985 deadline for compliance with environmental qualification regulations for D. C. Cook Unit 2 with respect to the four enumerated items until the commencement of the refueling outage at the end of the current fuel cycle.

As requested by Generic Letter No. 85-15, copies of this letter have been transmitted to the Director, Office of Nuclear Reactor Regulation, and the Director, Office of Inspection and Enforcement. IMECo believes this fulfills any reporting requirements which may apply for the equipment items identified in the attachment.

This document has been reviewed by the Plant Nuclear Safety Review Committee (PNSRC) and by the Nuclear Safety and Design Review Committee (NSDRC).

This document has been prepared following Corporate procedures which incorporate a reasonable set of controls to ensure its accuracy and completeness prior to signature by the undersigned.

Very truly yours,

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M. P. Alexich 905 Vice President 9/30/85

MPA/mi Attachment cc: Thomas M. Roberts, Commissioner - Washington, D.C. James K. Asselstine, Commissioner - Washington, D.C. Frederick M. Bernthal, Commissioner - Washington, D.C. Lando W. Zech, Jr., Commissioner - Washington, D.C. Harold R. Denton, Director, NRR - Washington, D.C. James M. Taylor, Director, IE - Washington, D.C. John E. Dolan W. G. Smith, Jr. - D. C. Cook Plant R. C. Callen G. Bruchmann G. Charnoff NRC Resident Inspector - D. C. Cook Plant

-5-

ATTACHMENT TO AEP:NRC:0775W ENVIRONMENTAL QUALIFICATION JUSTIFICATIONS FOR CONTINUED OPERATION DONALD C. COOK NUCLEAR PLANT UNIT NO. 2

Item #1

Equipment Description:	Cables for Reactor Coolant System not and cold leg resistance temperature detectors.
Equipment Manufacturer:	Samuel Moore, Boston Insulated Wire, and Cerro Wire & Cable.
Equipment Model/Item No(s).:	3075 and 3077.
D. C. Cook Unit 2 SCEW(s): Plant ID No(s):	CI-8, CI-9, and CI-11. Various cable numbers; cables serve resistance temperature detectors designated NTR-120, -140, -210, -220, -230, and -240.
Qualification Deficiency:	These cables are located below the predicted flood level for the worst-case design-basis accident. They are not qualified for submergence.

Justification for Continued Operation (JCO):

The safety function may be accomplished by some designated alternative equipment if the principal equipment has not been demonstrated to be fully qualified [10 CFR 50.49(1)(1)].

Discussion:

NTR-110, -120, -130, -140, -210, -220, -230, and -240 are resistance temperature detectors located in the hot and cold leg piping of the four reactor coolant loops. The cables for six of these eight resistance temperature detectors are routed below the predicted maximum post-accident containment flood level. The cables servicing the coolant loop Nos. 1 and 3 hot leg resistance temperature detectors, NTR-110 and -130 respectively, are routed above this elevation and do not require submergence qualification.

Hot leg temperature information is therefore expected to be available for coolant loop Nos. 1 and 3 even following the worst-case maximum post-accident containment flooding because the cables to the hot-leg RTDs are located above flood level. Average coolant temperature for these loops may be obtained through use of the main steam pressure transmitters located outside containment, in conjunction with saturated steam tables. The cold leg temperature for these loops may then be computed from the hot leg temperature and the average temperature. Therefore, the safety function of the RTDs can be accomplished through the use of the alternatives.

Based on our engineering evaluation, we believe that postulated failure of this equipment under the accident environment resulting from a design-basis accident will not lead to significant degradation of any safety function.

A similar JCO was submitted for NRC staff review in References (1) and (2). References (3) and (4) document the NRC staff's acceptance of that JCO.

Item #2

Equipment Description:	Cables for ITT Barton narrow range steam generator level transmitters.
Equipment Manufacturer: Equipment Model/Item No(s).:	Samuel Moore and Boston Insulated Wire. 3075.
D. C. Cook Unit 2 SCEW(s): Plant ID No(s):	CI-5 and CI-7. Various cable numbers; cables serve narrow-range steam generator level transmitters designated BLP-112, -122, -132, and -142.
Qualification Deficiency:	These cables are located below the predicted flood level for the worst-case design-basis accident. They have not been adequately tested for submergence.

Justification for Continued Operation (JCO):

The safety function may be accomplished by some designated alternative equipment if the principal equipment has not been demonstrated to be fully qualified [10 CFR 50.49(1)(1)].

Discussion:

The narrow-range steam generator level transmitters perform two functions for the D. C. Cook Nuclear Plant, a short-term trip function and a long-term post-accident monitoring function. With regard to the short-term trip function when the steam generator has a low level, these transmitters must respond within 22.1 seconds following a main steam line break. During this period the containment flood level will not rise high enough to threaten the cables, whose submergence qualification has not been proven through sequential testing (separate effects testing has, however, been performed successfully).

For the long term, the plant Technical Specifications require at least one post-accident monitoring transmitter per steam generator. In this capacity, the narrow range steam generator level transmitters are considered a redundant indication of auxiliary feedwater flow (since changes in feedwater flow will affect the steam generator level), normally provided by four transmitters located outside containment (FFI-210, -220, -230, and -240). It is noted that the FFIs share a common, balance-of-plant power supply; however, neither the power supply nor the FFIs will be exposed to the same accident environment as the in-containment transmitters.

Based on our engineering evaluation, we believe that postulated failure of this equipment under the accident environment resulting from a design-basis event will not lead to significant degradation of any safety function.

A similar JCO and a request for schedular extension was submitted for NRC staff review in Reference (6). As indicated in Reference (7), the NRC Staff has not yet reviewed this JCO.

Attachment

Item #3

tem #3	cables for post-accident high
quipment Description:	Triax instrument can monitors. range area radiation monitors.
Quipment Manufacturer: Quipment Model/Item No(s).: D. C. Cook Unit 2 SCEW(s): Plant ID No(s): Qualification Deficiency:	Raychem and Brand Nex. 3074 and 3112. CI-21 and CI-22. Various cable numbers; cables serve monitors designated VRA-2310 and -2410. These cables are located below the predicted These cables are located below the predicted flood level for the worst-case design-basis flood level for the worst-case design-basis
	accident. They are not qualified for submergence.

Justification for Continued Operation (JCO):

The safety function may be accomplished by some designated alternative equipment if the principal equipment has not been demonstrated to be fully qualified [10 CFR 50.49(1)(1)].

Discussion:

These are the in-containment high range area radiation monitors which were installed because of post-TMI requirements.

Because the post-accident high-range area monitor must function long-term following a design basis event, its electrical cables must be protected against submergence with flood-up tubing. Although the flood-up tubing has not yet been installed at the D. C. Cook Nuclear Plant Unit 2, engineering and design activities have been completed.

In the event of containment flooding, the equivalent monitoring function may be completed through use of the Post-Accident Sampling System.

Based on our engineering evaluation, we believe that postulated failure of this equipment under the accident environment resulting from a design-basis event will not lead to significant degradation of any safety function.

A similar JCO was submitted for NRC staff review in Reference (1), and approval of that JCO is documented in References (3) and (4).

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Item #4

Equipment Description:	Pressure and differential pressure transmitters serving various functions.
Equipment Manufacturer: Equipment Model/Item No(s).:	ITT Barton and Foxboro. 763/764 Lot 1 and 763/764 Lot 2 and Foxboro E Series.
D. C. Cook Unit 2 SCEW(s):	I-1, I-2, I-4, I-13, I-15, I-19, I-20, I-21, I-22, and I-25.
Plant ID No(s):	Steam generator level transmitters BLP-110, -111, -112, -120, -121, -122, -130, -131, -132, -140, -141, and -142; Main steam flow transmitters MFC-110, -111, -120, -121, -130, -131, -140, and -141; Pressurizer level transmitters NLP-151, -152, and -153. Reactor Coolant System pressure transmitters NPP-151, -152, and -153, and NPS-153; Feedwater flow transmitters FFC-210, -211, -220, -221, -230, -231, -240, and -241; and Main steam pressure transmitters MPP-210, -211, -220, -221, -230, -231, -240, and -241.
Qualification Deficiency:	Fre-aging of these components was not done prior to environmental testing. The service life of the transmitters cannot be conclusively established.

Justification for Continued Operation (JCO):

The validity of partial type test data in support of the original qualification has been considered [10 CFR 50.49(1)(2)].

Discussion:

In Reference (1), IMECo provided a JCO for the steam generator level, main steam flow, and pressure level transmitters identified above. That JCO noted that IMEC's consultant, Impell Corporation, had drafted a report on material aging with questionable equipment life values, and that the report was still under review. NRC acceptance of that JCO is documented in Reference (3).

Final reports on material aging have now been issued by Impell. Due to the unavailability of essential data, the results provided are considered inconclusive. Because of the uncertain status of presently installed equipment, IMECo has decided to replace these transmitters with equipment whose qualification is fully known. It has also been decided to replace not only the steam generator level, main steam flow, and pressurizer transmitters previously identified, but also the reactor coolant system pressure, feedwater flow, and main steam pressure transmitters identified above.

We believe the instruments to be qualified, despite the inconclusiveness of the data. The presently installed Foxboro E Series and Barton Lot 2

transmitters are essentially identical to newer transmitters manufactured and fully qualified to include pre-aging tests. These qualification tests have determined that the equipment has a minimum of a 10-year qualified life. The transmitters installed in D. C. Cook Unit 2 have been subjected to operational conditions for approximately seven and a half years since initial criticality in March 1978. It is our judgment that this information adequately supports our contention that the existing Foxboro and Barton Lot 2 electronic transmitters installed in Unit 2 are qualified by similarity to those tested to include pre-aging. Because of this, we believe that the equipment will perform their functions as required during and following a design-basis event beyond November 30, 1985 until, as a minimum, the next Unit 2 refueling outage.

The existing Barton Lot 1 transmitters installed in Unit 2 are very similar to the Barton Lot 2 transmitters except that the circuit board is of a slightly different size and grade, a different manufacturer was used to provide an integrated circuit, and PVC jacketing was deleted from some terminals. All other components such as the sensing units, casing, sealing mechanisms, etc., are essentially identical to the Lot 2 transmitters. A conservative activation energy of 0.78eV (based on a metal film resistor which is the limiting case) envelopes all components in the Lot 1 transmitters including the integrated circuit and circuit board. This value was used in the aging calculations for the newer transmitters. Sufficient margin also exists in the irradiation values used in the Lot 1 test report to prove that normal radiation levels will not degrade performance.

Because of the analysis presented here and because of the similarity of the Barton Lot 1 transmitters to transmitters of Lot 2 and later lots, it is our judgment that this information adequately supports our conclusion that the existing Barton Lot 1 electronic transmitters installed in Unit 2 are qualified by similarity and analysis to those tested for pre-aging. Because of this, we believe that the equipment will perform their functions as required during and following a design-basis event beyond November 30, 1985, until, as a minimum, the next Unit 2 refueling outage.

Based on our engineering evaluation, we believe that postulated failure of this equipment under the accident environment resulting from a design-basis event will not lead to significant degradation of any safety function.

Attachment

References

- Letter No. AEP:NRC:0775N, Milton P. Alexich (IMECo) to Harold R. Denton (NRC), dated October 18, 1984.
- (2) Letter No. AEP:NRC:07750, Milton P. Alexich (IMECo) to Harold R. Denton (NRC), dated December 10, 1984.
- (3) Letter from Steven A. Varga (NRC) to John E. Dolan (IMECo), dated January 11, 1985.
- (4) Letter from David L. Wigginton (NRC) to John E. Dolan (IMECo), dated February 22, 1985.
- (5) Letter from Harold R. Denton (NRC) to John E. Dolan (IMECo), dated March 1, 1985.
- (6) Letter No. AEP:NRC:0775U, Milton P. Alexich (IMECo) to Harold R. Denton (NRC), dated June 28, 1985.
- (7) Letter from Reba M. Diggs (NRC) to John E. Dolan (IMECo), dated September 11, 1985.