Docket

Docket Nos. ~~50-315~~ and 50-316

FEB 24 1981

Mr. John Dolan, Vice President
Indiana and Michigan Electric Company
Post Office Box 18
Bowling Green Station
New York, New York 10004

Dear Mr. Dolan:

SUBJECT: ENVIRONMENTAL QUALIFICATION OF SAFETY-RELATED ELECTRICAL EQUIPMENT

RE: D. C. Cook Unit Nos. 1 and 2, License Nos. DPR-58 and DPR-74

Reference: Order for Modification of License Concerning the Environmental Qualification of Safety-Related Electrical Equipment, October 24, 1980.

This letter transmits the preliminary results of our review of environmental qualifications of safety-related electrical equipment at your facilities. This evaluation was based on your submittals received over the past months.

The facilities' license were modified by the referenced Order of October 24, 1980, to require that all safety-related electrical equipment be qualified to specified requirements not later than June 30, 1982. In addition, the Order noted that a licensee is obligated to modify or replace inadequate equipment promptly.

The staff's review of your submittals has resulted in our identifying a number of potential equipment deficiencies involving a lack of proper documentation, inadequate justification of assumed environmental conditions following an accident, and/or inadequate environmental testing of equipment, such that conformance to the DOR guidelines, as required by the Order, cannot be demonstrated. You are requested to review our identified deficiencies, and their ramifications, and provide us your overall finding regarding continued safe operation of your facilities. Accordingly, in order to determine whether your license should be modified or suspended, you are required pursuant to 10 CFR 50.54(f), to provide within 10 days of receipt of this letter, a written statement, signed under oath or affirmation supporting the safe operation of your facilities, that takes into account the NRC staff's preliminary list of deficiencies.

8103110183

OFFICE▷							
SURNAME▷							
DATE▷							

NRC FORM 318 (10/80) NRCM 0240 OFFICIAL RECORD COPY ☆ USGPO: 1980—329-824

The purpose of this statement is to provide the NRC with needed assurance, by the licensee, regarding the continued safety of the facilities until you can provide an item-by-item reevaluation in a detailed documented manner at a later date. A negative finding on your part concerning the safety of continued operation would result in a unit shutdown, and should be reported as a Licensee Event Report (LER) within twenty-four (24) hours of the determination to the appropriate NRC Regional Office. Include in the LER the actions you have taken for the immediate resolution of the matter. A copy of any such LER should be sent to the Director, Division of Licensing, Office of Nuclear Reactor Regulation.

Please submit a copy of your reply to us via telecopy.

Sincerely,

ORIGINAL SIGNED
Thomas M. Novak, Assistant Director
for Operating Reactors
Division of Licensing

Enclosure:
Evaluation Report

cc w/enclosure:
See next page

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Docket

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

February 24, 1981

Dockets Nos. 50-315
and 50-316

Mr. John Dolan, Vice President
Indiana Michigan Electric Company
Post Office Box 18
Bowling Green Station
New York, New York 10004

Dear Mr. Dolan:

SUBJECT: ENVIRONMENTAL QUALIFICATION OF SAFETY-RELATED ELECTRICAL EQUIPMENT

RE: D. C. Cook, Unit Nos. 1 and 2, Nos. DPR-58 and DPR-74

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The facilities' licenses were modified by the referenced Order of October 24, 1980, to require that all safety-related electrical equipment be qualified to specified requirements not later than June 30, 1982. In addition, the Order noted that a licensee is obligated to modify or replace inadequate equipment promptly.

The staff's review of your submittals has resulted in our identifying a number of potential equipment deficiencies involving a lack of proper documentation, inadequate justification of assumed environmental conditions following an accident, and/or inadequate environmental testing of equipment, such that conformance to the DOR guidelines, as required by the Order, cannot be demonstrated. You are requested to review our identified deficiencies, and their ramifications, and provide us your overall finding regarding continued safe operation of your facilities. Accordingly, in order to determine whether your licenses should be modified or suspended, you are required pursuant to 10 CFR 50.54(f), to provide within 10 days of receipt of this letter, a written statement, signed under oath or affirmation supporting the safe operation of your facilities, that takes into account the NRC staff's preliminary list of deficiencies.

Mr. John Dolan
Indiana and Michigan Electric Company

cc: Mr. Robert W. Jurgensen
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American Electric Power
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2 Broadway
New York, New York 10004

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Bridgman, Michigan 49106

U. S. Nuclear Regulatory Commission
Resident Inspectors Office
770 Red Arrow Highway
Stevensville, Michigan 49127

William J. Scanlon, Esquire
2034 Pauline Boulevard
Ann Arbor, Michigan 48103

The purpose of this statement is to provide the NRC with needed assurance, by the licensee, regarding the continued safety of the facilities until you can provide an item-by-item reevaluation in a detailed documented manner at a later date. A negative finding on your part concerning the safety of continued operation would result in a unit shutdown, and should be reported as a Licensee Event Report (LER) within twenty-four (24) hours of the determination to the appropriate NRC Regional Office. Include in the LER the actions you have taken for the immediate resolution of the matter. A copy of any such LER should be sent to the Director, Division of Licensing, Office of Nuclear Reactor Regulation.

Please submit a copy of your reply to us via telecopy.

Sincerely,

Thomas M. Novak, Assistant Director
for Operating Reactors
Division of Licensing

Enclosure:
Evaluation Report

cc w/enclosure:
See next page

Partial Review

Equipment Evaluation Report By The
Office of Nuclear Reactor Regulation

For Indiana and Michigan Electric Company
D. C. Cook Units 1 and 2

Docket No. 50-315/316

Partial Review

EQUIPMENT EVALUATION REPORT BY THE OFFICE OF NUCLEAR REACTOR REGULATION

FOR INDIANA AND MICHIGAN ELECTRIC COMPANY
D. C. COOK UNITS 1 AND 2
DOCKET NO. 50-315/316

ENVIRONMENTAL QUALIFICATION OF SAFETY-RELATED ELECTRICAL EQUIPMENT

3 EQUIPMENT EVALUATION

The staff evaluation of the licensee's response included an onsite inspection of selected Class IE equipment and an examination of the licensee's report for completeness and acceptability. The criteria described in the DOR guidelines and in NUREG-0588, in part, were used as a basis for the staff evaluation of the adequacy of the licensee's qualification program.

The NRC Office of Inspection and Enforcement performed (1) a preliminary evaluation of the licensee's response, documented in a technical evaluation report (TER) and (2) an onsite verification inspection (June 16-17, 1980) of selected safety-related electrical equipment. The engineered safety features actuation, air-recirculation, and containment isolation systems were inspected at Unit 1; the containment spray system was inspected at Unit 2. The inspection at both units verified proper installation of equipment, overall interface integrity, and manufacturers' nameplate data. The manufacturer's name and model number from the nameplate data were compared to information given in the Component Evaluation Work Sheets (CES) of the licensee's report. The site inspection is documented for Units 1 and 2 in an onsite inspection report (from D. W. Hayes to E. L. Jordan, dated July 1, 1980). No deficiencies were noted. For this review, the documents referenced above have been factored into the overall staff evaluation.

3.1 Completeness of Safety-Related Equipment

In accordance with IEB 79-01B, the licensee was directed to (1) establish a list of systems and equipment that are required to mitigate a LOCA and an HELB and (2) identify components needed to perform the function of safety-related display information, post-accident sampling and monitoring, and radiation monitoring.

The staff developed a generic master list based upon a review of plant safety analyses and emergency procedures. The instrumentation selected includes parameters to monitor overall plant performance as well as to monitor the performance of the systems on the list. The systems list was established on the basis of the functions that must be performed for accident mitigation (without regard to location of equipment relative to hostile environments).

The list of safety-related systems provided by the licensee was reviewed against the staff-developed master list.

Based upon information in the licensee's submittal, the equipment location references, and in some cases subsequent conversations with the licensee, the

staff has verified and determined that the systems included in the licensee's submittal are those required to achieve or support: (1) emergency reactor shutdown, (2) containment isolation, (3) reactor core cooling, (4) containment heat removal, (5) core residual heat removal, and (6) prevention of significant release of radioactive material to the environment. The staff therefore concludes that the systems identified by the licensee (listed in Appendix D) are acceptable, with the exception of those items discussed in Section 5 of this report.

Display instrumentation which provides information for the reactor operators to aid them in the safe handling of the plant was not specifically identified by the licensee. A complete list of all display instrumentation mentioned in the LOCA and HELB emergency procedures must be provided. Equipment qualification information in the form of summary sheets should be provided for all components of the display instrumentation exposed to harsh environments. Instrumentation which is not considered to be safety related but which is mentioned in the emergency procedure should appear on the list. For these instruments, (1) justification should be provided for not considering the instrument safety related and (2) assurance should be provided that its subsequent failure will not mislead the operator or adversely affect the mitigation of the consequences of the accident. The environmental qualification of post-accident sampling and monitoring and radiation monitoring equipment is closely related to the review of the TMI Lessons-Learned modifications and will be performed in conjunction with that review.

The licensee identified 125 items of equipment in Unit 1 and 137 items in Unit 2 which were assessed by the staff. Because Units 1 and 2 are nearly identical,* the review can be performed as one. Differences in the units will be identified by a parenthetical expression, with the applicable unit number enclosed.

3.2 Service Conditions

Commission Memorandum and Order CLI-80-21 requires that the DOR guidelines and the "For Comment" NUREG-0588 are to be used as the criteria for establishing the adequacy of the safety-related electrical equipment environmental qualification program. These documents provide the option of establishing a bounding pressure and temperature condition based on plant-specific analysis identified in the licensee's Final Safety Analysis Report (FSAR) or based on generic profiles using the methods identified in these documents.

On this basis, the staff has assumed, unless otherwise noted, that the analysis for developing the environmental envelopes for D. C. Cook Units 1 and 2, relative to the temperature, pressure, and the containment spray caustics, has been performed in accordance with the requirements stated above. The staff has reviewed the qualification documentation to ensure that the qualification specifications envelope the conditions established by the licensee. In addition, the staff assumed, and requires the licensee to verify, that the containment spray system is not subjected to a disabling single-component failure.

*Except that (1) main steam and narrow range RCS temperature transmitters are not part of Unit 2's engineered safeguards actuation and (2) Unit 1 does not have a dedicated post-accident monitoring system.

Equipment submergence has also been addressed where the possibility exists that flooding of equipment may result from HELBs.

3.3 Temperature, Pressure, and Humidity Conditions Inside Containment

The licensee has provided the results of the accident analysis as follows:

		Max Temp (°F)	Max Press (psig)	Humidity (%)
LOCA	Lower Compartment	241	10	100
	Upper Compartment	130	8	100
MSLB	Lower Compartment	328	9.9	100
	Upper Compartment	158	8.1	100

The staff has concluded that the minimum temperature profile for equipment qualification purposes should include a margin to account for analytical uncertainties in the calculated temperature profiles for postulated accidents. The licensee's minimum temperature profile for qualification purposes is based on a conservative MSLB analytical model that results in temperatures higher than what might realistically be expected and is acceptable.

The staff has also concluded that, for the equipment which is qualified for the LOCA environment only, use of the steam saturation temperature corresponding to the total building pressure (partial pressure of steam plus partial pressure of air) versus time will provide an acceptable margin for a postulated LOCA environmental effect on equipment.

The licensee's specified temperature (service condition) of 241°F for the lower compartment during a LOCA satisfies the above requirement and is therefore acceptable. However, the specified temperature (service condition) of 130°F for the upper compartment does not satisfy the above requirement. A saturation temperature corresponding to pressure profile (234°F peak temperature at 8 psig) should be used instead. The staff also requires that, for equipment in the upper compartment which is used for the MSLB, the same service conditions as for LOCA conditions in the upper compartment should be used. The licensee should update his equipment summary tables to reflect this change. If there is any equipment that does not meet the staff position, the licensee must either provide justification that the equipment will perform its intended function under the specified conditions or propose corrective action.

3.4 Temperature, Pressure, and Humidity Conditions Outside Containment

The licensee has provided the temperature, pressure, humidity and applicable environment associated with an HELB outside containment. The following areas outside containment has been addressed:

(1) Auxiliary building

The staff has verified that the parameters identified by the licensee for the MSLB are acceptable.

3.5 Submergence

The maximum submergence levels have been established and assessed by the licensee. Unless otherwise noted, the staff assumed for this review that the methodology employed by the licensee is in accordance with the appropriate criteria as established by Commission Memorandum and Order CLI-80-21.

The licensee's value for maximum submergence is at elevation 614 ft 0 in. Equipment below this level has been identified by the licensee, along with the proposed corrective action. The licensee identified 29 safety-related electrical components for Unit 1 and 35 for Unit 2 as having the potential for becoming submerged after a postulated event. Most of these components are electrical cables (power, control, instrument) inside floodup tubes. However, no evidence of environmental qualification of these floodup tubes was provided by the licensee. Furthermore, some electrical penetrations, transmitters, cable terminations, and valve motor operators have the potential of being submerged. The licensee stated that the components in question perform their function immediately after the accident, long before they are submerged, and are not required to operate after a LOCA. The staff considers that a component can be exempt from submergence qualification if the licensee can provide an assessment of the failure modes associated with the submergence of the component. The licensee should also provide assurance that the subsequent failure of this component will not adversely affect any other safety functions or mislead an operator. Additionally, the licensee should discuss operating time, across the spectrum of events, in relation to the time of submergence. If the results of the licensee's assessment are acceptable, then this component may be exempt from the submergence parameter of qualification.

3.6 Chemical Spray

The licensee's FSAR value for the chemical concentration is 2000 ppm boric acid solution; however, the exact volume percent and pH values were not provided by the licensee. Therefore, for the purpose of this review, the effects of chemical spray will be considered unresolved. The staff will review the licensee's response when it is submitted and discuss the resolution in a supplemental report.

3.7 Aging

Section 7 of the DOR guidelines does not require a qualified life to be established for all safety-related electrical equipment. However, the following actions are required:

(1) Make a detailed comparison of existing equipment and the materials identified in Appendix C of the DOR guidelines. The first supplement to IEB-79-01B requires licensees to utilize the table in Appendix C and identify any additional materials as the result of their effort.

(2) Establish an ongoing program to review surveillance and maintenance records to identify potential age-related degradations.

(3) Establish component maintenance and replacement schedules which include considerations of aging characteristics of the installed components.

The licensee identified a number of equipment items for which a specified qualified life was established (for examples, 5 years, 15 years, or 40 years). In its assessment of these submittals, the staff did not review the adequacy of the methodology nor the basis used to arrive at these values; the staff has assumed that the established values are based on state-of-the-art technology and are acceptable.

For this review, however, the staff requires that the licensee submit supplemental information to verify and identify the degree of conformance to the above requirements. The response should include all the equipment identified as required to maintain functional operability in harsh environments.

The licensee indicated that this phase of the response is outstanding and that the review is in progress. The staff will review the licensee's response when it is submitted and discuss its evaluation in a supplemental report.

3.8 Radiation (Inside and Outside Containment)

The licensee has provided values for the radiation levels postulated to exist following a LOCA. The application and methodology employed to determine these values were presented to the licensee as part of the NRC staff criteria contained in the DOR guidelines, in NUREG-0588, and in the guidance provided in IEB-79-01B, Supplement 2. Therefore, for this review, the staff has assumed that, unless otherwise noted, the values provided have been determined in accordance with the prescribed criteria. The staff review determined that the values to which equipment was qualified enveloped the requirements identified by the licensee.

The values required by the licensee inside containment are an integrated dose of 4×10^4 to 1.5×10^8 rads. The radiation service condition provided by the licensee is lower than provided in the DOR guidelines (4×10^7 rads) for gamma and beta radiation. The licensee is requested to either provide justification for using the lower service condition or use the service condition provided in the DOR guidelines for both gamma and beta radiation. If the former option is chosen, then the analysis--including the basis, assumptions, and a sample calculation--should be provided.

A required value outside containment of 1.7×10^7 rads has been used by the licensee to specify limiting radiation levels within the auxiliary building. This value appears to consider the radiation levels influenced by the source term methodology associated with post-LOCA recirculation fluid lines and is therefore acceptable.

4 QUALIFICATION OF EQUIPMENT

The following subsections present the staff's assessment, based on the licensee's submittal, of the qualification status of safety-related electrical equipment.

The staff has separated the safety-related equipment into three categories: (1) equipment requiring immediate corrective action, (2) equipment requiring additional qualification information and/or corrective action, and (3) equipment considered acceptable if the staff's concern identified in Section 3.7 is satisfactorily resolved.

In its assessment of the licensee's submittal, the NRC staff did not review the methodology employed to determine the values established by the licensee. However, in reviewing the data sheets, the staff made a determination as to the stated conditions presented by the licensee. Additionally, the staff has not completed its review of supporting documentation referenced by the licensee (for example, test reports). It is expected that when the review of test reports is complete, the environmental qualification data bank established by the staff will provide the means to cross reference each supporting document to the referencing licensee.

If supporting documents are found to be unacceptable, the licensee will be required to take additional corrective actions to either establish qualification or replace the item(s) of concern. This effort will begin in early 1981.

An appendix for each subsection of this report provides a list of equipment for which additional information and/or corrective action is required. Where appropriate, a reference is provided in the appendices to identify deficiencies. It should be noted, as in the Commission Memorandum and Order, that the deficiencies identified do not necessarily mean that equipment is unqualified. However, they are cause for concern and may require further case-by-case evaluation.

4.1 Equipment Requiring Immediate Corrective Action

4.2 Equipment Requiring Additional Information and/or Corrective Action

Appendix B identifies equipment in this category, including a tabulation of deficiencies. The deficiencies are noted by a letter relating to the legend (identified below), indicating that the information provided is not sufficient for the qualification parameter or condition.

Legend

R - radiation
T - temperature
QT - qualification time
RT - required time
P - pressure
H - humidity
CS - chemical spray
A - material-aging evaluation; replacement schedule; ongoing equipment surveillance
S - submergence
M - margin
I - HELB evaluation outside containment not completed

QM - qualification method
RPN - equipment relocation or replacement; adequate schedule not provided
EXN - exempted equipment justification inadequate
SEN - separate-effects qualification justification inadequate
QI - qualification information being developed
RPS - equipment relocation or replacement schedule provided

As noted in Section 4, these deficiencies do not necessarily mean that the equipment is unqualified. However, the deficiencies are cause for concern and require further case-by-case evaluation. The staff has determined that an acceptable basis to exempt equipment from qualification, in whole or part, can be established provided the following can be established and verified by the licensee:

(1) Equipment does not perform essential safety functions in the harsh environment, and equipment failure in the harsh environment will not impact safety-related functions or mislead an operator.

(2a) Equipment performs its function before its exposure to the harsh environment, and the adequacy for the time margin provided is adequately justified, and

(2b) Subsequent failure of the equipment as a result of the harsh environment does not degrade other safety functions or mislead the operator.

(3) The safety-related function can be accomplished by some other designated equipment that has been adequately qualified and satisfies the single-failure criterion.

(4) Equipment will not be subjected to a harsh environment as a result of the postulated accident.

The licensee is, therefore, required to supplement the information presented by providing resolutions to the deficiencies identified; these resolutions should include a description of the corrective action, schedules for its completion (as applicable), and so forth. The staff will review the licensee's response, when it is submitted, and discuss the resolution in a supplemental report.

It should be noted that in cases where testing is being conducted, a condition may arise which results in a determination by the licensee that the equipment does not satisfy the qualification test requirements. For that equipment, the licensee will be required to provide the proposed corrective action, on a timely basis, to ensure that qualification can be established by June 30, 1982.

4.3 Equipment Considered Acceptable or Conditionally Acceptable

Based on the staff review of the licensee's submittal, the staff identified the equipment in Appendix C as (1) acceptable on the basis that the qualification program adequately enveloped the specific environmental plant parameters, or (2) conditionally acceptable subject to the satisfactory resolution of the staff concern identified in Section 3.7.

For the equipment identified as conditionally acceptable, the staff determined that the licensee did not clearly

(1) state that an equipment material evaluation was conducted to ensure that no known materials susceptible to degradation because of aging have been used,

(2) establish an ongoing program to review the plant surveillance and maintenance records in order to identify equipment degradation which may be age related, and/or

(3) propose a maintenance program and replacement schedule for equipment identified in item 1 or equipment that is qualified for less than the life of the plant.

The licensee is, therefore, required to supplement the information presented for equipment in this category before full acceptance of this equipment can be established. The staff will review the licensee's response when it is submitted and discuss the resolution in a supplemental report.

5 DEFERRED REQUIREMENTS

IEB 79-01B, Supplement 3 has relaxed the time constraints for the submission of the information associated with cold shutdown equipment and TMI lessons-learned modifications. The staff has required that this information be provided by February 1, 1981. The staff will provide a supplemental safety evaluation addressing these concerns.

APPENDIX B

Equipment Requiring Additional Information
and/or Corrective Action
(Category 4.2)

LEGEND:

Designation for Deficiency

R - Radiation
T - Temperature
QT - Qualification time
RT - Required time
P - Pressure
H - Humidity
CS - Chemical spray
A - Material aging evaluation, replacement schedule, ongoing equipment surveillance
S - Submergence
M - Margin
I - HELB evaluation outside containment not completed
QM - Qualification method
RPN - Equipment relocation or replacement, adequate schedule not provided
EXN - Exempted equipment justification inadequate
SEN - Separate effects qualification justification inadequate
QI - Qualification information being developed
RPS - Equipment relocation or replacement schedule provided

Equipment Description	Manufacturer	Component No.	Deficiency
Control Cable	Continental	3119	QT,CS,R,M,A,S,QM
Control Cable	Continental	3120	QT,A,QM
Control Cable	GE	3120	QT,A,QM
Power Cable	Anaconda	3120	QT,A
Control Cable	Continental	3121	QT,CS,R,M,A,S,QM
Control Cable	GE	3121	QT,CS,R,M,A,S,QM
Control Cable	Continental	3122	QT,CS,R,M,A,S,QM
Control Cable	GE	3122	QT,CS,R,M,A,S,QM
Control Cable	Continental	3123	QT,A,QM

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Control Cable(1)	GE	3123	QT,A,QM
Instrument Cable	Boston Insulated Wire Co.	3064	QT,CS,M,A,S,QM
Instrument Cable	Rockbestos	3064	QT,CS,A,S,QM
Instrument Cable	Samuel Moore & Co.	3075	QT,CS,A,S,QM
Instrument Cable	Continental	3075	QT,A,QM
Instrument Cable	Boston Insulated Wire Co.	3075	QT,CS,R,M,A,QM
Instrument Cable	Cerro Wire & Cable Co.	3077	QT,CS,A,S,QM
Instrument Cable	Samuel Moore & Co.	3077	QT,CS,A,S,QM
Instrument Cable	Continental	3077	QT,A,QM
Power Cable(1)	Okonite	324	RT,QT,M,A
Power Cable	Okonite	324/IMO-325, 326	RT,QT,M,CS,A,S,QM
Power Cable	Essex	324	T,P,QT,R,A,QM
Power Cable	Okonite	399	QT,CS,M,A,S,QM
Power Cable	Anaconda	3102	QT,T,P,A,QM
Instrument Cable	Okonite	3102	QT,A
Power Cable	Anaconda	3116	QT,CS,A,S,QM
Power Cable	Essex	3116	QT,CS,A,S,QM
Power Cable	Kerite	3116	QT,CS,R,M,A,S,QM
Power Cable	Anaconda	3103	QT,T,P,A,QM
Power Cable(1)	Kerite	3127	QT,R,A,S,QM

(1) Unit 1

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Electrical Penetrations	Conax Corp.	EP-1	QT,CS,A,S,QM
Electrical Penetrations	Conax Corp.	EP-2 thru EP-14	QT,CS,A,S,QM
Fan Motors	Westinghouse	TBDP	CS,A
Hydrogen Recombiner	Westinghouse	NA,ID.HR-1,2	QT,CS,A
Differential Pressure Transmitter	ITT Barton	764	QT,T,P,M,CS,A,S,QM
Differential Pressure Transmitter	Foxboro	E13DM-HSAHI (MCA)	T,A,QM
Differential Pressure Transmitter	ITT Barton	368	QT,T,P,H,A,QM,RPN
Differential Pressure Switch	ITT Barton	289A/199	QT,P,M,A,QM
Differential Pressure Transmitter	Foxboro	E13DH-HSAHI MCA	A,S,QM
Differential Pressure Transmitter	Foxboro	E13DH-HSAHI MCA	A,S,QM,T
Differential Pressure Transmitter	ITT Barton	332	QT,P,M,H,A,QM
Differential Pressure Transmitter	Foxboro	E13DM-HSAMI	QT,P,M,A,QM
Differential Pressure Transmitter	Foxboro	E11GM-HSAE1 (MCA)	QT,A,QM
Differential Pressure Transmitter	Foxboro	E11GM-HSAE1	QT,T,P,A,QM
Pressure Transmitter	ITT Barton	763	QT,P,CS,M,A,QM
RTD	Rosemount/Sostman	176KF/11834B	QT,CS,A,QM
RTD	Rosemount/Sostman	176KS/11901B	QT,T,CS,M,A,QM

APPENDIX B (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Radiation Monitor	Westinghouse	1101	T,P,QT,RT,M,CS,A,QM RPN
Pressure Switch	Mercoid	DA-7031-153	QT,T,P,A,QM,RPN
Limit Switch	NAMCO	EA180	RT,CS,A
Pump Motor	Reliance	5810P	A,QM,QI
Electro-Pneumatic Transducer	Fisher	546	QT,A,QM
Solenoid Valve	Automatic Switch Co.	HP-8300C58RU HT-8300B58RU	QT,T,P,H,A,QM,RPN
Solenoid	Automatic Switch Co.	HT-8316B17	QT,M,T,P,A,QM
Solenoid Valve	Automatic Switch Co.	NP-831654V	QT,A,QM,CS
Control Cable Termination	NA	NA	QT,CS,R,M,A
Control Cable Termination	NA	At valve motor operator	T,P,A,QM
Control Cable Termination	NA	Various	QT,A,QM
Control Cable Termination	NA	At terminal block	QT,A,QM
Control Cable Termination	NA	At solenoid	QT,T,A,QM
Instrumentation Termination	NA	Barton Instrument Termination	QT,CS,M,R,A,S,QM
RTD Termination	NA	RTD termination	QT,CS,R,A,S,QM
Penetration Terminations	NA	Penetration termination	QT,A,S,QM

Equipment Description	Manufacturer	Component No.	Deficiency
Instrument Cable Termination	NA	Splice at penetration	QT,CS,M,R,A,S,QM
Instrument Termination	Foxboro	NA	QT,CS,A,S,QM
Power Cable Termination	NA	Spliced to standard kapton	QT,R,M,A,S,QM
Power Cable Termination	NA	Spliced to standard hypalon	QT,R,M,A,QM
Termination	NA	At value motor operators, hydrogen recombiners, fan motors	QT,CS,R,M,A,S,QM
Cable Termination	NA	At pump motor	QT,A,QM
Valve Motor Operator	Limitorque	SMB-1,-00,-2/ IMO-51,52,53 54,128; ICM-111,129	CS,A,S
Valve Motor Operator	Limitorque	SMB-1/IMO-315, 316,325,326	CS,A,QM
Valve Motor Operator	Limitorque	SMB-00/QCM-250	CS,A,S
Valve Motor Operator	Limitorque	Various outside cont.	T,A,QM
Instrument Cable(2)	Boston Insulated Wire Co.	3077	QT,CS,R,M,A,S,QM
Instrument Cable(2)	Raychem	3111	QT,CS,A,S
Instrument Cable(2)	Raychem	3112	QT,CS,A,S
Instrument Cable(2)	Continental	3069	QT,T,P,A,QM

(2) Unit 2

Equipment Description	Manufacturer	Component No.	Deficiency
Power Cable(2)	Cyprus	324	QT,T,A,QM
Power Cable(2)	Cyprus	325	QT,T,A,QM
Power Cable(2)	Cyprus	347	QT,CS,A,S,QM
Power Cable(2)	Anaconda	347	QT,CS,A,S,QM
Power Cable(2)	Cyprus	3102	QT,T,A,QM
Power Cable(2)	Essex	324	QT,T,P,A,QM
Power Cable(2)	Anaconda	3102	QT,T,P,A,QM
Power Cable(2)	Anaconda	3103	QT,T,P,A,QM
Differential Pressure Transmitter(2)	ITT Barton	764	QT,P,CS,A,S,QM

(2) Unit 2

APPENDIX C

Equipment Considered Acceptable or Conditionally Acceptable (Category 4.3)

LEGEND:

Designation for Deficiency

R - Radiation
T - Temperature
QT - Qualification time
RT - Required time
P - Pressure
H - Humidity
CS - Chemical spray
A - Material aging evaluation, replacement schedule, ongoing equipment surveillance
S - Submergence
M - Margin
I - HELB evaluation outside containment not completed
QM - Qualification method
RPN - Equipment relocation or replacement, adequate schedule not provided
EXN - Exempted equipment justification inadequate
SEN - Separate effects qualification justification inadequate
QI - Qualification information being developed
RPS - Equipment relocation or replacement schedule provided

Equipment Description	Manufacturer	Component No.	Deficiency
Grease	Mobil	Mobilux EP-2	
Pump Grease	Mobil	Mobilux #2	
Motor Oil	Mobil	D.T.E. Oil Medium	
Motor Grease	Mobil	Mobilux #2	
Pump Oil	Mobil	D.T.E. 797 Oil	
Coupling Grease	Mobil	Coupling Grease	
Motor Oil	Mobil	D.T.E. Oil Heavy Medium	
Coupling Grease	Mobil	Sovarex L-0	

APPENDIX C (Continued)

Equipment Description	Manufacturer	Component No.	Deficiency
Pump Motor	Westinghouse	5808Z,5009H 5009-p24	A
Control Cable Termination	NA	Cable Term. at Valve	A
Valve Motor Operator	Limitorque	SMB-000/VMO-101,102	A
Valve Motor Operator	Limitorque	Various outside cont.	A
Valve Motor Operator	Limitorque	SMB-00/NMO-151,152,153	A
Valve Motor Operator	Limitorque	SMB-2/ICM-306,305	A

APPENDIX D

Safety-Related Systems List[1]

Function	System
Emergency Reactor Shutdown	Reactor Coolant
	Reactor Protection
	Safeguards Actuation
	Chemical and Volume Control
Containment Isolation	Main Steam
	Main Feedwater
	Chemical and Volume Control
	Residual Heat Removal
	Reactor Coolant Pump Seal Water
	Ice Condenser Refrigerant Supply
	Containment Purge
	Emergency Core Cooling
	Auxiliary Feedwater
Reactor Core Cooling	High Pressure Injection
	Intermediate Pressure Injection
	Low Pressure Injection
	Accumulators

[1]The NRC staff recognizes that there are differences in nomenclature of systems because of plant vintage and engineering design; consequently some systems performing identical or similar functions may have different names. In those instances it was necessary to verify the system(s) function with the responsible IE regional reviewer and/or the licensee.

Function	System
Containment Heat Removal	Containment Spray
	Containment Ventilation
	Containment Sump Recirculation
Core Residual Heat Removal	Residual Heat Removal
	Power Operated Relief Valves
	Main Feedwater
	Auxiliary Feedwater
	Main Steam
	Component Cooling Water
	Essential Service Water
Prevention of Significant Release of Radioactive Material to Environment	Containment Spray (Iodine Removal)
	Hydrogen Control
	Post Accident Monitoring
	Containment Radiation Sampling[1]
Supporting Systems	Emergency Power
	Control Room Habitability
	Remote Shutdown Monitoring

[1]To be covered as part of TMI-2 Lessons Learned.

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