

TE RA



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

March 27, 1981

Docket No. 50-285

Mr. W. C. Jones
Division Manager, Production
Operations
Omaha Public Power District
1623 Harney Street
Omaha, Nebraska 68102



Dear Mr. Jones:

SUBJECT: ENVIRONMENTAL QUALIFICATION OF SAFETY-RELATED ELECTRICAL EQUIPMENT

RE: FORT CALHOUN, LICENSE NO. DPR-40

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 facility. This evaluation was based on your submittals received over the past months.

The facility license was 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 DPR 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 facility. 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 facility, that takes into account the NRC staff's preliminary list of deficiencies.

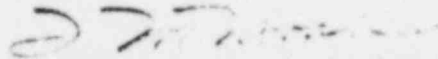
810406 0 221

P

The purpose of this statement is to provide the NRC with needed assurance, by the licensee, regarding the continued safety of the facility 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

Omaha Public Power District

cc:

Marilyn A. Tebor
LeBocuf, Lamb, Leiby & MacRae
1333 New Hampshire Avenue, N.W.
Washington, D. C. 20036

Mr. Emmett Rogert
Chairman, Washington County
Board of Supervisors
Blair, Nebraska 68023

Omaha Public Power District
ATTN: Mr. Spencer Stevens
Plant Manager
Fort Calhoun Plant
1623 Harney Street
Omaha, Nebraska 68102

Mr. Frank Gibson
W. Dale Clark Library
215 South 15th Street
Omaha, Nebraska 68102

Alan H. Kirshen, Esq.
Fellman, Ramsey & Kirshen
1166 Woodmen Tower
Omaha, Nebraska 68102

Mr. Dennis Kelley
U.S.N.R.C. Resident Inspector
P. O. Box 68
Fort Calhoun, Nebraska 68023

Mr. Charles B. Brinkman
Manager - Washington Nuclear
Operations
C-E Power Systems
Combustion Engineering, Inc.
4853 Cordell Avenue, Suite A-1
Bethesda, Maryland 20014

Director, Criteria and Standards Division
Office of Radiation Programs (ANR-460)
U.S. Environmental Protection Agency
Washington, D. C. 20460

U.S. Environmental Protection Agency
Region VII
ATTN: EIS COORDINATOR
324 East 11th Street
Kansas City, Missouri 64106

Director, Nebraska Department of
Environmental Control
P. O. Box 94877, State House Station
Lincoln, Nebraska 68509

PARTIAL REVIEW
EQUIPMENT EVALUATION REPORT BY THE
OFFICE OF NUCLEAR REACTOR REGULATION

FOR OMAHA PUBLIC POWER DISTRICT
FORT CALHOUN
DOCKET NO. 50-285

3 STAFF 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 (March 13-14, 1980) of selected safety-related electrical equipment. The low-pressure safety injection system was inspected. The inspection 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 in a report dated March 26, 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 on the licensee's submittal, the staff has concluded that the information on safety-related systems included in the submittal is insufficient to verify that those systems are all the systems 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

acknowledges the licensee's effort to include only those safety-related systems located in a potentially harsh environment. However, this review requires the listing of all safety-related systems, both inside and outside potentially harsh environments. As noted in Appendix D, additional information on core residual heat removal and supporting systems is required to verify the completeness of safety-related systems. Exceptions to the requirements are 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 129 items of equipment which were assessed by the staff.

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, 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. During this review, the staff assumed that for plants designed and equipped with an automatic containment spray system which satisfies the single-failure criterion, the main-steam-line-break (MSLB) environmental conditions are enveloped by the large-break-LOCA environmental conditions. The staff evaluated the design of the containment spray and found that the system is not subjected to a disabling single-component failure and therefore satisfies the requirements of Section 4.2.1 of the DOR guidelines.

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 accident analyses as follows:

	<u>Max Temp (°F)</u>	<u>Max Press (psig)</u>	<u>Humidity (%)</u>
LOCA	285	57	100
MSLB	401	(Not Provided)	100

The staff has concluded that the minimum temperature profile for equipment qualification purposes should include a margin to account for higher-than-average temperatures in the upper regions of the containment that can exist due to stratification, especially following a postulated MSLB. 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 either a postulated LOCA or MSLB whichever is controlling, as to potential adverse environmental effects on equipment.

The licensee's specified temperature (service condition) of 285°F does not satisfy the above requirement. A saturation temperature corresponding to the peak profile (305°F peak temperature at 57 psig) should be used instead. 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 provide either justification that the equipment will perform its intended function under the specified conditions or propose corrective action.

The staff notes that for the EEQ review the accidents which were used to evaluate equipment were LOCAs inside containment. As stated in Section 3.2 of this report, this plant is equipped with an automatic containment spray system. However, the temperature for the MSLB inside containment exceeds the LOCA profile by 115°F for a short time (about two minutes). The licensee should provide the analysis to verify that the effects of this short-term peak temperature do not affect the environmental qualification of the safety-related equipment which was qualified using LOCA profile.

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 have been addressed:

- (1) ECCS pump rooms (HPSI, LPSI, and containment spray) Rooms 21 and 22
- (2) Main steam and main feedwater piping areas (Room 81)
- (3) Ventilation areas containing safety-related equipment

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 the 1000.9 ft level. Equipment below this level has been identified by the licensee, along with the proposed corrective action. The licensee identified eight safety-related electrical components as having the potential for becoming submerged after a postulated event.

The licensee stated that the equipment required to function under submerged conditions has been qualified by test or analysis or by design modifications using qualified sealer material. Therefore, conditioned only on the satisfactory resolution and review of the supporting documentation discussed in Section 4 of this report, the staff concludes that the licensee's response satisfies the Commission requirements and is acceptable.

3.6 Chemical Spray

The licensee's FSAR value for the chemical concentration is 1700 ppm boric acid solution. The licensee identified that some of the equipment was tested using different spray solutions ranging between 1000 ppm and 3000 ppm boric acid. Based on a review of the information submitted by the licensee, the staff concludes that the justification provided in using less severe solutions is incomplete in part. The staff requires that the licensee amend his response and justify the qualification adequacy of all the equipment that was subjected to less severe caustic sprays expected at the plant site. 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 value required by the licensee inside containment is an integrated dose of 3×10^6 rads. This value does not envelope the DOR guideline requirements (4×10^7 rads) and therefore is not acceptable. The radiation service condition provided by the licensee is lower than provided in the guidelines for gamma and beta radiation. The licensee is requested to either provide justification for using the lower service condition or use the 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 4×10^6 rads has been used by the licensee to specify limiting radiation levels within the low- and high-pressure safety injection ECCS system pump rooms of the auxiliary building (Room 13). 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

Deliberately left blank.

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.

6 DEFERRED REQUIREMENTS

122 79-012, 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

Item	Equipment	Manufacturer	Model	Deficiency
C-27	Solenoid Valve	Valcor		RPN,QM-S
C-28	Solenoid Valve	ASCO	NP8320A185E	RPN,QM-S
R1-1	Solenoid Valve	ASCO	HTX831429	T,P,EXN,R-M
R1-2	Limit Switch	Fisher Governor Co.	304	T,P,EXN,R-M
R5-1	Motor Operator	Limitorque	SMB-003	T,P,R,EXN
S-1	Limit Switch	Fisher Control	304	T-M,EXN
S-2	Solenoid Operator	ASCO	WPHT-831429	QM

APPENDIX B (Continued)

Item	Equipment	Manufacturer	Model	Deficiency
I-26	Solenoid Valve	ASCO	WPHT-831429	QM,R-M
I-15	Limit Switch	Fisher Governor Co.	304	R-M
I-27	Solenoid Valve	ASCO	WPHT-831429	R-M
I-7	Limit Switch	Fisher Governor Co.	304	R-M
R1-3	Solenoid Valve	ASCO	HTX831429	R-M,T,P,QM-EXN
R1-4	Unit Switch	Fisher Governor Co.	304	R-M,T,P,QM-EXN
R2-1	Solenoid Valve	ASCO	HTX831429	R-M,T,P,QM-EXN
R2-2	Limit Switch	Fisher Governor Co.	304	R-M,T,P,QM-EXN
R4-1	Motor	Allis Chalmers Co.	030	R-M,T,P,QM-EXN
R4-2	Solenoid Valve	ASCO	HTX831429	T,P,QM-EXN
R4-3	Limit Switch	Microswitch	BZE6	T,P,QM-EXN,R-M
R4-4	Limit Switch	Fisher Governor Co.	304	R-M,T,P,QM-EXN
S-8	Level Transmitter	GE/MAC	555	T,P
S-4	Motor/HVAC	Trane	SCMZ-304	QM-T,P
S-5	Fan Motor	ILG Industries		QM,T,P
R3-2	Limit Switch	Fisher Governor Co.	304	QM-EXN,P,T
C-16	Temperature Sensor	Alison Control Inc.	ASL-120(132)	QM
C-17	Temperature Sensor	Alison Control Inc.	ASL-72(192)	QM

APPENDIX B (Continued)

Item	Equipment	Manufacturer	Model	Deficiency
C-18	Temperature Sensor	Alison Control Inc.	ASL-60-SS	QM
R2-3	Solenoid Valve	ASCO	HTX831429	T,P,QM-EXN
R2-4	Limit Switch	Fisher Governor Co.	304	T,P,QM-EXN
R4-5	Solenoid Valve	ASCO	LB8316C44	R-M,P,T,QM-EXN
R4-6	Limit Switch	Honeywell	OPAR30	P,T,QM-EXN
R3-1	Solenoid Valve	ASCO	WPHT831429	P,T,QM-EXN
I-8	Limit Switch	NAMCO	D1200G	R-M
I-9	Limit Switch	NAMCO	D1200G	R-M
R2-5	Solenoid Valve	ASCO	HTX(HT)	P,T,QM-EXN
R2-6	Limit Switch	Fisher Governor Co.	304	P,T,QM-EXN
R2-9	Limit Switch	Fisher Governor Co.	546	P,T,QM-EXN
R4-7	Solenoid Valve	ASCO	HTX-831429	P,T,QM-EXN
R4-8	Limit Switch	Fisher Governor Co.	304	P,T,QM-EXN
C-6	Cable Splices			T-M
C-0	Flow Transmitter	Foxboro	E13DH	R,S-SEN
I-30	Solenoid Valve	ASCO	HTX831429	R-M
I-13	Limit Switch	NAMCO	D2400X	R-M
I-2	Solenoid Valve	ASCO	HTX831429	R-M
I-14	Limit Switch	Microswitch	OP-AR7112	R-M
I-19	Solenoid Valve	ASCO	HT8321A5	R-QM
I-11	Limit Switch	NAMCO	D1200G	R

APPENDIX B (Continued)

Item	Equipment	Manufacturer	Model	Deficiency
I-20	Solenoid Valve	ASCO	LB8316C44	R,QM
I-25	Solenoid Valve	ASCO	HT8321A5	R,QM
I-6	Limit Switch	Microswitch	51ML1	R-M
I-18	Solenoid Valve	ASCO	LB8316C44	R,QM
I-5	Limit Switch	Microswitch	51ML1	R-M
R1-11	Motor Operator	Limitorque	SMB-000	T,P,QM-EXN
R1-14	Solenoid Valve	ASCO	HTX831429	T,P,QM-EXN
R1-15	Limit Switch	NAMCO	D2400X	T,P,QM-EXN,R-M
R7-1	Solenoid Valve	ASCO	HTX	T,P,QM-EXN,R-M
R7-2	Limit Switch	NAMCO	D1200C	T,P,QM-EXN,R-M
R4-9	Solenoid Valve	ASCO	HTX	T,P,QM-EXN
R4-10	Limit Switch	Fisher Governor Co.	304	T,P,QM-EXN
I-24	Solenoid Valve	ASCO	LB8316C44	R-QM
I-12	Limit Switch	NAMCO	D1200G	R
I-21	Solenoid Valve	ASCO	LB8316C44	R-QM
I-10	Limit Switch	NAMCO	D1200G	R
R1-5	Solenoid Valve	ASCO	HTX831429	T,P,QM-EXN
R1-6	Limit Switch	Fisher Governor Co.	304	T,P,QM-EXN
R1-12	Motor Operator	Limitorque	SMB-2	T,P,QM-EXN
R1-13	Position Switch	Fisher Governor Co.	546	T,P,QM-EXN,R-M
R2-7	Solenoid Valve	ASCO	HTX831429	T,P,QM-EXN

APPENDIX B (Continued)

Item	Equipment	Manufacturer	Model	Deficiency
R2-8	Limit Switch	Fisher Governor Co.	304	T,P,QM-EXN
R4-11	Solenoid Valve	ASCO	HTX	T,P,QM-EXN
R4-12	Limit Switch	Fisher Governor Co.	304	T,P,QM-EXN
I-29	Solenoid Valve	ASCO	WPHT831429	R-M
I-17	Limit Switch	Fisher Governor Co.	304	R-M
I-28	Solenoid Valve	ASCO	WPHT831429	R-M
I-16	Limit Switch	Fisher Governor Co.	304	R-M
R4-13	Solenoid Valve	ASCO	HTX831429	T,P,QM-EXN
R4-14	Limit Switch	Microswitch	BEZ6-2RQ2	T,P,QM-EXN,R-M
C-21	Pressure Transmitter	Foxboro	E11GM	SEN
C-23	Heaters	E. I. Wiegand Co.	Cartridge	R,P,QM
C-22	Pressure Transmitter	Foxboro	E11GM	SEN(R)
C-20	Pressure Transmitter	Foxboro	E11GM	SEN(R)
C-35	Level Transmitter	Foxboro	E13DM,DH	SER-R
R3-3	Solenoid Valve	ASCO	LB8320A26	P,T,QM-EXN,R-M
R3-4	Limit Switch	NAMCO	D2400X	P,T,QM-EXN,R-M
R1-7	Solenoid Valve	ASCO	HT831429	P,T,QM-EXN
R1-8	Limit Switch	Fisher Governor Co.	304	P,T,QM-EXN,R-M
R1-9	Solenoid Valve	ASCO	HT831429	P,T,QM-EXN
R1-10	Limit Switch	Fisher Governor Co.	304	P,T,QM-EXN,R-M

APPENDIX B (Continued)

Item	Equipment	Manufacturer	Model	Deficiency
C-28A	Solenoid Valve	ASCO	NP8320A185	RPN
C-29	Solenoid Valve	ASCO		

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

Item	Equipment	Manufacturer	Model	Deficiency
C-19	Fan Motor	Reliance	60-30-1200	A
C-32	Fan Motor	Reliance	4830-20-MM	A
I-4	Motor	GE	5K815526A35	
I-23	Solenoid Valve	ASCO	LB8316C44	
I-22	Solenoid Valve	ASCO	LB8316C44	
C-3	Electrical Penetrations	Conax		

APPENDIX C (Continued)

Item	Equipment	Manufacturer	Model	Deficiency
C-4	Adhesive Sealant	Dow-Corning	RTV-3144	A
C-36	Cable Splices	Amp & Amer. Pamcor	AMP-CAT-321280	
C-34	Cable Splices	Feeder Cables		
C-37	Vent Fan Splices	Dow-Corning	RTV-3145	
C-7	Terminal Blocks	States	M-25014(16) (18)	
C-8	Terminal Boxes	Hoffman		
C-9	Cable	Cerro-Wire & Cable		A
C-10	Cable	Cerro-Wire & Cable		A
C-11	Cable	Cerro Wire & Cable		A
C-12	Cable	Cerro-Wire & Cable		A
C-13	Cable	Anaconda Wire	Triplexed	A
I-3	Motor	GE	5K815524A51	
C-14	Motor Operator	Limitorque	SMB-0	A
C-15	Motor Operator	Limitorque	SMB-0	A
I-1	Motor	GE	5K818837A38	
C-1	Motor Operated Valve	Limitorque	SMB-0	A
C-2	Motor Operated Valve	Limitorque	SMB-3	A
S-12	Solenoid Valve	Valcor		A
S-13	Limit Switch	Fisher Controls	304	
S-11	Solenoid Valve	ASCO	LB8316C36	

APPENDIX C (Continued)

Item	Equipment	Manufacturer	Model	Deficiency
S-20	Motor Operator	Limitorque	SMB-000	A
S-14	Solenoid Valve	ASCO	WPHT831429	
S-15	Limit Switch	Fisher Governor Co.	304	
S-16	Motor Operated Valve	Limitorque	SMB	A
S-9	Motor Operated Valve	Limitorque	SMB	
S-6	Solenoid Valve	ASCO	HTX	
S-7	Solenoid Valve	ASCO	HT8320A8	
S-16	Motor Operated Valve	Limtorque	SMB	A
S-10	Limit Switch	Fisher Governor Co.	304	

APPENDIX D

Safety-Related Systems List¹

FUNCTION	SYSTEM
Emergency Reactor Shutdown	Reactor Coolant Reactor Protection Safeguards Actuation Chemical and Volume Control
Containment Isolation	Chemical and Volume Control Main Steam Feedwater and Blowdown Containment Spray Demineralized Water System Containment Hydrogen Purge Instrument Air High Pressure Safety Injection Low Pressure Safety Injection Nitrogen Supply Plant Air Sampling Raw Water Waste Disposal Auxiliary Feedwater
Reactor Core Cooling	High Pressure Injection Low Pressure Injection Safety Injection Tanks
Containment Heat Removal	Containment Spray Containment HVAC
Core Residual Heat Removal ²	Low Pressure Injection (Part of Shutdown Cooling) Power Operated Relief Valves Main Feedwater Auxiliary Feedwater Main Steam Component Cooling Water Raw Water

¹The NRC staff recognized 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.

²Additional systems information needed for this function.

APPENDIX D (Continued)

FUNCTION	SYSTEM
Prevention of Significant Release of Radioactive Material to Environment	Containment Hydrogen Purge Sampling Radiation Monitoring Post Accident Sampling and Monitoring Containment Spray (Iodine Removal)
Supporting Systems ²	Control Room Ventilation