



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

TERA

February 13, 1981

Docket No. 50-245
LS05-81-02-028



Mr. W. G. Council, Senior Vice President
Nuclear Engineering and Operations
Northeast Nuclear Energy Company
Post Office Box 270
Hartford, Connecticut 06101

Dear Mr. Council:

SUBJECT: ENVIRONMENTAL QUALIFICATION OF SAFETY-RELATED ELECTRICAL EQUIPMENT

RE: MILLSTONE NUCLEAR POWER STATION, UNIT NO. 1

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 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 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.

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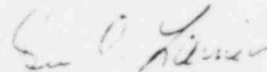
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February 13, 1981

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,



Gus C. Lainas, Assistant Director
for Safety Assessment
Division of Licensing

Enclosure:
Equipment Evaluation
Report

cc w/enclosure:
See next page

Mr. W. G. Council

- 3 -

February 13, 1981

cc w/enclosure:

William H. Cuddy, Esquire
Day, Berry & Howard
Counselors at Law
One Constitution Plaza
Hartford, Connecticut 06103

Natural Resources Defense Council
917 15th Street, N. W.
Washington, D. C. 20005

Northeast Nuclear Energy Company
ATTN: Superintendent
Millstone Plant
P. O. Box 128
Waterford, Connecticut 06385

Mr. James R. Himmelwright
Northeast Utilities Service Company
P. O. Box 270
Hartford, Connecticut 06101

Resident Inspector
c/o U. S. NRC
P. O. Box Drawer KK
Niantic, Connecticut 06357

Waterford Public Library
Rope Ferry Road, Route 156
Waterford, Connecticut 06385

First Selectman of the Town
of Waterford
Hall of Records
200 Boston Post Road
Waterford, Connecticut 06385

John F. Opeka
Systems Superintendent
Northeast Utilities Service Company
P. O. Box 270
Hartford, Connecticut 06101

Connecticut Energy Agency
ATTN: Assistant Director
Research and Policy
Development
Department of Planning and
Energy Policy
20 Grand Street
Hartford, Connecticut 06106

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 I Office
ATTN: EIS COORDINATOR
JFK Federal Building
Boston, Massachusetts 02203

PARTIAL REVIEW

Equipment Evaluation Report By the
Office of Nuclear Reactor Regulation

For Northeast Nuclear Energy Company
Millstone Nuclear Power Station Unit No. 1
Docket No. 50-245

Environmental Qualification of Safety-Related
Electrical Equipment

Date: February 13, 1981

PARTIAL REVIEW

EQUIPMENT EVALUATION REPORT BY THE
OFFICE OF NUCLEAR REACTOR REGULATION

FOR NORTHEAST NUCLEAR ENERGY COMPANY
MILLSTONE NUCLEAR POWER STATION UNIT NO.1
DOCKET No. 50-245
ENVIRONMENTAL QUALIFICATION OF SAFETY-RELATED
ELECTRICAL EQUIPMENT

3.0 STAFF EVALUATION

The staff's evaluation of the licensee's responses was accomplished by performing an on-site inspection of selected Class IE equipment and by examining the licensee's report for completeness and acceptability. The criteria described in the DOR Guidelines and NUREG-0588, in part, were used as a basis for the staff's evaluation of the adequacy of the Licensee's qualification program.

During the week of June 30, 1980, NRC and FRC representatives visited the Millstone 1 plant site, inspected safety-related systems and equipment, identified and tabulated safety-related components through discussions with plant personnel, and conducted a general review of NNECO's 1978 submittal of June 2, 1980. The inspection verified proper installation of equipment, overall interface integrity, and manufacturers nameplate data. The manufacturer and model number from the nameplate data was compared to information given in the Licensee's submittal.

The following evaluation incorporates the NNECO submittal and the Franklin Research Center technical evaluation report (TER).

3.1 COMPLETENESS OF SAFETY-RELATED EQUIPMENT

In accordance with the DOR guidelines, the licensee was directed to establish a list of systems and display instrumentation needed to mitigate the consequences of a LOCA or HELB, inside or outside containment, and reach safe shutdown. The lists of safety-related systems and display instrumentation were developed from a review of plant safety analyses and emergency procedures. The display instrumentation selected includes parameters to monitor overall plant performance as well as to monitor performance of the systems on the list. The systems list was established on the basis of the functions that must be performed for mitigation of the consequences of a LOCA or HELB without regard to location of equipment relative to a potentially hostile environment. The staff has determined and verified that the systems considered by the licensee 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. In certain instances NNECO has opted to provide enclosures or environmentally controlled areas in the reactor building and the turbine building. No specific details of the enclosures or HVAC systems have been included in the Licensee's submittal. The licensee must provide this information per paragraph 6.0 of this report. The staff's systems review has not included those equipment items discussed in Section 5.0 of this report. The systems and instrumentation list is contained in Appendix D. The licensee submitted an

extensive list of safety-related electrical equipment (Appendix B and C). This list was evaluated and identical components within a plant area exposed to the same environment were grouped; 120 types of equipment were identified and assessed by the staff.

3.2 Service Conditions

The Commission Memorandum and Order (CLI-80-21), dated May 23, 1980 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 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 Millstone 1 relative to the temperature, pressure, and the containment spray caustics, have been performed in accordance with the above stated requirements. For this review the staff 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 environmental conditions are enveloped by the large break LOCA environmental

conditions. The staff assumed and requires that the licensee verifies, that the containment spray system is not subjected to a disabling single component failure and therefore satisfies the DOR Guideline requirements of Section 4.2.1.

Equipment submergence has also been addressed where the possibility exists that flooding of equipment may result from high energy line breaks (HELB).

3.3 TEMPERATURE, PRESSURE, AND HUMIDITY CONDITIONS INSIDE CONTAINMENT

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

	Max. Temp. (F)	Max. Press. (psig)	Humidity
LOCA	273	26	100%
MSLB	NOT STATED		

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. A margin of 20 F above steam saturation temperature is considered to be appropriate 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 273 F does not satisfy the above requirement. Furthermore, the licensee-specified pressure is low as compared to the plants of similar design. The licensee is requested to verify that the pressure profile in the FSAR was calculated based on the code requirements defined in NUREG-0588. If, by using these codes, the peak containment pressure is still 26 psig, then 20 F above the steam saturation temperature corresponding to the pressure profile (288 F peak temperature at 26 psig) should be used. If however

the calculated peak pressure is higher than 26 psig than the 20 F above the steam saturation temperature corresponding to the new pressure profile should be used.

3.4 TEMPERATURE, PRESSURE AND HUMIDITY CONDITIONS OUTSIDE CONTAINMENT

The licensee has provided the temperature pressure, humidity and applicable environmental values associated with a HELB outside containment in the following plant area:

1. Reactor Building - 14.5 Feet Elev.
2. Reactor Building - 42.5 Feet Elev.
3. Reactor Building - 65.8 Feet Elev.
4. Reactor Building - Corner Rooms
5. Steam Tunnel
6. Turbine Building
7. Control Room

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

3.5 SUBMERGENCE

The maximum submergence levels have been established and assessed by the licensee. The staff assumed for this review, unless, otherwise noted, that the methodology employed by the licensee is in accordance with the appropriate criteria as established by the Commission Memorandum and Order (CLI-80-21), dated May 23, 1980. The licensee's value

for maximum submergence results from a one foot height differential between the drywell floor (elev. zero feet eight inch) and the lower rim of the torus vent. The licensee has not identified any equipment below this level.

3.6 Chemical Spray

The methodology and guidance for developing chemical spray criteria was provided by the DOR Guidelines and NUREG-0588. The licensee has stated that the containment spray system (demineralized water) is used to cool the drywell after a LOCA or MSLB inside primary containment, however, no credit is taken for this action in the safety analyses. Since spray can be used, any equipment upon which it impinges must be qualified for the spray parameter. For the purpose of this review, the effects of spray will be considered unresolved.

3.7 AGING

The DOR Guidelines, section 7, does not require a qualified life to be established for all safety related electrical equipment, however, the following actions are required:

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

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

3.8 RADIATION (INSIDE AND OUTSIDE CONTAINMENT)

The licensee has provided values for radiation levels postulated to exist following a LOCA event. The application and methodology employed to determine these values have been presented to the licensee as part of the NRC staff criteria contained in the DOR Guidelines, NUREG-0588 and the guidance provided in IEB-79-01B, Supplement 2. Therefore, for this review, the staff has assumed that the values provided, unless otherwise noted, have been determined in accordance with the prescribed criteria. The staff's review assessed that the values to which equipment was qualified, enveloped the requirements identified by the licensee. The value established by the licensee are 9.2×10^7 RADS GAMMA and 1.3×10^9 RADS BETA inside containment. These values envelope, with margin, the Licensees specified values at the equipment location. A required typical value established outside containment of 1.8×10^6 RADS (Gamma plus neutrons)

has been used by the licensee to specify limiting radiation levels within the reactor building. This value appears to consider the radiation levels influenced by the source term methodology associated with post-LOCA recirculation lines and is therefore acceptable.

4.0 QUALIFICATION OF EQUIPMENT

The following subsections are the staff's assessment, based on the licensee's submittal, and the Franklin TER 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 conditioned only on the satisfactory resolution of the staff's concern identified in Section 3.7.

The NRC staff in its assessment of the licensee's submittal and the TER did not review the methodology employed to determine the values established by the licensee. However, in reviewing the TER a determination was made by the staff as to the stated conditions presented by the licensee. Additionally, the detailed review of supporting documentation referenced by the licensee (e.g., test reports) has been completed by FRC.

The environmental qualification data bank to be established by the staff will provide the means to cross reference each supporting document to the referencing licensee.

Where supporting documents were 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. An appendix for each subsection is attached which provides a list of equipment which requires additional information and/or corrective action. 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 the tabulation of their deficiencies. The deficiencies are noted by a letter relating to the legend, indicating that insufficient information has been provided for the qualification parameter or condition.

As noted in Section 4.0, these deficiencies do not necessarily mean that the equipment is unqualified. However, they are cause for concern and require further case-by-case evaluations. 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 licensees:

- (1) Equipment does not provide essential safety functions in the harsh environment and failure of it in the harsh environment will not impact safety related functions or mislead an operator.
- (2a) Equipment performs its function prior to 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 criteria.
- (4) Equipment not subjected to a harsh environment as a result of the postulated accident.

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

It should be noted that where testing is presently 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 their proposed corrective action, on a timely basis, to assure that qualification can be established by June 30, 1982.

4.3 EQUIPMENT CONSIDERED ACCEPTABLE OR CONDITIONALLY ACCEPTABLE

Based on the staffs review of the licensees submittal and the TER 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 a material evaluation on their equipment was conducted to assure that no known materials susceptible to degradation due to aging have been used in their equipment.
- (2) establish an ongoing program to review the surveillance and maintenance records of their plant 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.

5.0 DEFERRED REQUIREMENTS

IE Bulletin 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. To permit a uniform program schedule

the SEP plant reviews have been amended. The staff required that this information be provided by February 1, 1981.

APPENDIX B

List of Equipment in Section 4.2, Equipment Requiring
Additional Information And/Or Corrective Action

NOTE: (R) Licensee has committed
to replace equipment

LEGEND:
Designation for Deficiency

- | | |
|---|--|
| R - Radiation | M - Margin |
| T - Temperature | I - HELB Evaluation Outside
Containment Not Completed |
| QT - Qualification Time | QM - Qualification Method |
| RT - Required Time | RPN - Equipment Relocation or Replacement,
Adequate Schedule Not Provided |
| P - Pressure | EXN - Exempted Equipment Justification
Inadequate |
| H - Humidity | SEN - Separate Effects Qualification
Justification Inadequate |
| CS - Chemical Spray | QI - Qualification Information Being
Developed |
| A - Material Aging Evaluation,
Replacement schedule, Ongoing
Equipment Surveillance | RPS - Equipment Relocation or Replacement
Schedule Provided |
| S - Submergence | |

TER Item No.	Equipment Description	Manufacturer	Model/ Type	Deficiency
2A	SOV Operator	ASCO	LBX8320	QM,A,CS,R
2B	SOV Operator	ASCO	LBX8230	QM,A,R
3A	SOV Operator	Aktomatic	15-527	QI
3B	SOV Operator	Aktomatic	15-527	QI
3C	SOV Operator	ASCO	80174	QI
3D	SOV Operator	ASCO	LB831615	QI
3E	SOV Operator	ASCO	HB8302027F	QI
3F	SOV Operator	ASCO	8302027RF	QI
3G	SOV Operator	ASCO	WBL8300B58R1	QI
3H	SOV Operator	ASCO	HT8320A189	QI
5	MOV	Limitorque	SMB-3	QI
7A	MOV	Teledyne	T-40-200	QI

APPENDIX B, Continued

TER Item No.	Equipment Description	Manufacturer	Model/ Type	Deficiency
7B	MOV	Teledyne	T-40-100	QI
7C	MOV	Teledyne	T-40-100	QI
7D	MOV	Teledyne	T-10-40	QI
7E	MOV	Teledyne	T-10-20	QI
7F	MOV	Teledyne	T-40-20	QI
7G	MOV	Teledyne	T-10-15	QI
7H	MOV	Teledyne	T-10-20	QI
8A	MOV	Teledyne	T-10-20	QI
8B	MOV	Teledyne	T-40-150	QI
8C	MOV	Teledyne	T-10-20	QI
9A	MOV	Limitorque	SMB-000	QI
9B	MOV	Limitorque	SMB-1	QI
10	MOV	Teledyne	T-4-15	QI
14	Cable	Kerite	UNK	R
15	Cable	Kerite	UNK	R
16	Cable	Kerite	UNK	R
17	Cable	Kerite	UNK	R
18	Cable	Kerite	UNK	R
19	Cable	Kerite	UNK	R
21	Cable Splice	Raychem	Type WCF-N	R
27A	Motor	GE	5K818841A134	A,R

APPENDIX B, Continued

TER Item No.	Equipment Description	Manufacturer	Model/ Type	Deficiency
27B	Motor	GE	5K447 XAM206	A,R
27C	Motor	GE	5K6329 XC3A	A,R
27D	Motor	GE	5K6338 XC28A	A,R
(R) 35	Temperature Switch	Fenwall	17002-40	QM,A,R
56A	SOV Operator	ASCO	LB831615	QI
56B	SOV Operator	ASCO	HB8302	QI
56C	SOV Operator	ASCO	8300B	QI
57	Solenoid	Atkomatic	13110	QI
58	SOV Operator	ASCO	HVA904052A	QI
60	MOV	Teledyne	T-4-10	QI
61A	MOV	Teledyne	T-10-25	QI
61B	MOV	Teledyne	T-40-100	QI
62	MOV	Teledyne	T-4-25	QI
63	MOV	Teledyne	T-10-60	QI
64	MOV	Teledyne	T-40-100	QI
65	MOV	Teledyne	T-4-10	QI
83	SOV Operator	ASCO	8300B610R	QI
84A	MOV	Limitorque	SMB-000	QI
84B	MOV	Limitorque	SMB-2	QI
1	Solenoid	AVC	C-5450	QM,A,CS,R

APPENDIX B, Continued

TER Item No.	Equipment Description	Manufacturer	Model/ Type	Deficiency
6	Converter	Masoneilan	8005	QI
11	MOV	Velan	254B	QI
13A	Electrical Penetrations	GE	NS-02	QM,A,R
13B	Electrical Penetrations	GE	NS-03	QM,A,R
13C	Electrical Penetrations	GE	NS-04	QM,A,R
20	Cable	GE	Type K	QI
23	Terminal Block	GE	EB-25	A,QM,CS,R
24	Limit Switch	NAMCO	EA-740	QM
24A	Limit Switch	NAMCO	UNK	A,QI
25	Limit Switch	Allen Bradley	802T-AW2	A,QI
25A	Limit Switch	Micro	DTF2-2RN2	A,QI
25B	Limit Switch	Micro	BAF1-2RN2	A,QI
25C	Limit Switch	Micro	51-MLT-6022	A,QI
25D	Limit Switch	Micro	SIMLT-76922	A,QI
26A	Motor	GE	5K6339 XC44A	A,QI
26B	Motor	GE	5K8311 71A2	A,QI
26C	Motor	GE	5K8611 8GA1	A,QI
31	Level Switch	Magnetrol	730	A,QI
44	Pressure Switch	Dual Snap	604	A,QI

APPENDIX B, Continued

TER Item No.	Equipment Description	Manufacturer	Model/ Type	Deficiency
45	Pressure Switch	Meletron	372	A,QI
46	Pressure Switch	Square D	AGW24 Class 9012	A,QI
67	Wire Connector	Burndy	Type T&B	A,QI
68	Wire Connector	Burndy	UNK	A,QI
69	Wire Connector	Burndy	Type Scotch LOK	A,QI
(R) 70	Wire Connector	Burndy	Type Scotch LOK	A,QI
(R) 71	Wire Connector	Burndy	UNK	A,QI
(R) 78	Relay	GE	HGA	A,QI
(R) 79	Temperature Element	Thermo Electric	Type T	A,QI
85A	MOV	Teledyne	T-4-25	A,QI
85B	MOV	Teledyne	T-40-100	A,QI
85C	MOV	Teledyne	T-40-80	A,QI
85D	MOV	Teledyne	T-10-40	A,QI
85E	MOV	Teledyne	T-4-20	A,QI
28	Transformer	GE	UNK	RPN
29	Fan Motor	GE	5K184 AL217	RPN
30	Level Switch	Yarway	4418C 4418CE	RPN
32	Flow Switch	PEECO	HP-F	RPN

APPENDIX B, Continued

TER Item No.	Equipment Description	Manufacturer	Model/ Type	Deficiency
34	Transformer	GE	UNK	RPN
36	Heater	UNK	UNK	RPN
37	Thermostat	Johnson Service	T-900	RPN
39	Radiation	GE	194X927	RPN
40	Pressure Switch	Meletron	9201-21 3772-6SS49A -292; 9201-21	RPN
41	Pressure Switch	Barton	288	RPN
42	Pressure Switch	Mercoid	DA70438 04R21E	RPN
43	Pressure Switch	Static-O-Ring	5N-AA3; 12N-AA4	RPN
46A	Pressure Switch	Custom Components	UNK	RPN
47	Pressure Switch	Barksdale	B2T-A12SS; BIT-A12SS-CS	RPN
48	Pressure Switch	GE	551032 GAWWI	RPN
49	Switch Gear	GE	NP60844-B	RPN
50	Switchgear	GE	ADK-5	RPN
51A	MCC	GE	7700	RPN
51B	MCC	GE	7700	RPN
52A	MCC	GE	HP171366	RPN
52B	MCC	GE	HP171366	RPN
53	Battery Charger	Fansteel	4039 Form A	RPN
54	Motor Generator Set	GE	560405E603 5K365AK2005V 5SJ4404A23Y56	RPN
55	Diesel Generator	Fairbanks Morse	38TD8	RPN

APPENDIX C

List of Equipment in Section 4.3
 Equipment Considered Acceptable or Conditionally Acceptable

LEGEND: A - Material Aging Evaluation

TER Item No.	Equipment Description	Manufacturer	Model/ Type	Deficiency
22	Connector	Conax	N-1101-32	A
59	SOV Operator	ASCO	8316E	A
66	Connector	Ideal Set Screw	UNK	A
72	Cable	UNK	UNK	A
73	Cable	UNK	UNK	A
74	Cable	UNK	UNK	A
75	Cable	UNK	UNK	A
76	Cable	UNK	UNK	A
12	MOV	Limitorque	SMB-0-25	A
33	Flow Transmitter	Barton	278	

APPENDIX D

Plant Safety-Related Systems
and Display Instrumentation

A. Safe Shutdown Systems

System	Term	Function
Reactor Protection/Trip System*	S	Trips reactor when predetermined setpoints are exceeded
Automatic Depressurization*	S	Relieves reactor steam to the suppression pool to lower reactor vessel pressure for LPCI/Core Spray operation.
Feedwater Coolant Injection system*	I	High-pressure coolant injection for small break LOCA and reactor vessel depressurization.
Emergency Condensate Transfer System*	L	Make up water to the core spray & FWCI Systems
Low Pressure Coolant Injection/Containment Spray System (Drywell)*	L	Long-term post-accident core and containment cooling.
Service Water system (Diesel Generator Cooling)*	L	Cooling water to the diesel generator.
Emergency Service Water System*	L	Cooling water to the LPCI heat exchanger
Gas Turbine Generator*	I	Emergency power primarily for FWCI System safety-related equipment.
Diesel Generator*	I	Emergency power for essential safety-related equipment.
480 v Load Centers*	L	Electrical power to essential equipment.
Batteries/Battery Charger*	L	Backup power source to vital dc powered equipment.
125 v dc Distribution*	L	Power for essential safety-related equipment.

* Required for both safe shutdown and accident mitigation.

** Review of these systems deferred until after February 1, 1981, as referenced in Section 2.2.2.

*** Required for accident mitigation only.

(S) Short Term _____ Less than 24 hours.

(I) Intermediate Term - Up to 30 days.

(L) Long Term _____ 30 days plus.

APPENDIX D, Continued

B. Accident Mitigating Systems

System	Term	Function
Core Spray Injection	I	Post-accident reactor makeup water source.
Isolation Condenser system*	I	Emergency heat sink on loss of main condenser and normal feed-water.
Primary Containment Isolation System*	L	Isolates containment penetrations in case of accidents.
Standby Gas Treatment System	I	Post-accident containment atmosphere control system.
Room Ventilation Coolers (CS/LPCI)**	I/L	Cooling for motors of certain vital pumps.
Ventilation Systems (Screen House, Turbine Building Switchgear Area, Diesel Generator Room, Gas Turbine Building)**	I/L	Self-explanatory
Post-Accident Sampling and Monitoring	L	Self-explanatory
Control Room Ventilation**	L	A redundant, vital ventilation system to maintain the control room habitable at all times.

APPENDIX D, Continued

C. Accident Mitigation and Safety Shutdown Instruments
(LOCA, MSLB, FWLB)

Required Vessel Level (wide band level, narrow range mid band)	L
Reactor Vessel Pressure	L
Torus Water Temperature (24)	L
MSLB Detection Instruments (Steam Flow & Tunnel Temperature)***	S
Main Steam Header Pressure (Low)	I
Drywell Pressure***	I
MSIV Closure/Reactor Trip (Stem Mounted Limit Switches)***	S
ADS/CS Interlocks (Core Spray)***	S
Torus (Level)***	L
Group 4 Isolation Flow (Isolation Condenser)***	S
Reactor Pressure High (Isolation Condenser Initiation)***	S
Reactor Vessel Level (Low, Low-Low, Triple Low)***	L