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May 11, 1983

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

Attention: Ms. E. G. Adensam, Chief
Licensing Branch No. 4

Re: McGuire Nuclear Station
Docket Nos. 50-369, 50-370

Dear Mr. Denton:

Attached is Duke Power Company's response to open items identified in the Franklin Research Center Technical Evaluation Report (TER) concerning environmental qualification of electrical equipment for McGuire Nuclear Station. Although the TER references only McGuire Unit 1, the equipment covered by the TER and the associated resolutions apply equally to McGuire Unit 2 unless specifically stated otherwise.

Please advise if there are additional questions regarding this matter.

Very truly yours,

H. B. Tucker /BS

Hal B. Tucker

GAC/php
Attachment

cc: Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
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Mr. W. T. Orders
NRC Senior Resident Inspector
McGuire Nuclear Station

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MCGUIRE NUCLEAR STATION - UNITS 1 AND 2

RESOLUTION OF NRC/FRC TECHNICAL EVALUATION REPORT ITEMS

The attached information provides the resolutions for items identified in the NRC/FRC Technical Evaluation Report (TER) for McGuire Nuclear Station. Attachment 1 is a table that identifies the TER Items and provides a reference to the appropriate resolution. Attachment 2 provides a discussion of the resolutions for each category with additional detail on certain items for clarification purposes or as requested by the Staff. Attachment 3 provides justification for interim operation (JIO) for the TER items still pending completion of qualification. It should be noted that although the TER references McGuire Unit 1, the equipment covered by the TER and the associated resolutions apply equally to McGuire Unit 2 unless specifically stated otherwise. The resolutions provided herein are consistent with those discussed with the NRC Staff on March 29, 1983.

In addition to the attached information which addresses specific equipment items, the following paragraphs address specific issues contained in Section 4.3 of the TER.

TER Paragraph 4.3.3.3 - Nuclear Radiation Dose

With regard to radiation dose, the McGuire NUREG 0588 submittal identifies certain equipment as being exposed to a total radiation dose less than the NRC Staff's screening value of $4X10^7$ Rads. In Duke's response to the NRC's previous Equipment Qualification SER for McGuire, we stated that the equipment which has a 40 year normal dose plus accident dose less than the NRC Staff's screening value is only required for a short term function and is therefore not exposed to a high radiation dose prior to performing its safety function. Additionally, to support the radiation values identified in the McGuire NUREG 0588 submittal, Duke Power Company has provided to the NRC Staff a radiation analysis including bases, assumptions, and sample dose calculations (Ref. Duke Power Company letters from H. B. Tucker to H. R. Denton dated February 14 and March 21, 1983).

TER Paragraph 4.3.5 - Submergence

With regard to submergence, Duke's response to the NRC's previous SER states that in a review of the safety-related motor operated valves located below the maximum post-LOCA water level, it was determined that for all defined events the valve motor operators will perform their safety function prior to becoming submerged. The flood level will reach the lower most safety-related valves at approximately 5 minutes into an accident situation. These valves, however, will have moved to their safety position at approximately 15 seconds into an accident situation and are not required to reposition subsequent to submergence. This time interval provides adequate margin to assure the completion of the required safety function. Additional information concerning these valves is found in the McGuire FSAR, Section 15.4.1.3.

With specific regard to the TER item concerning failure modes associated with the submerged valves and the effects on other equipment and the operators, we are providing the following additional information:

All motor operated valves located below the maximum LOCA water level are categorized as to their operation in relation to flooding. These three categories are:

1. The valve is not required for post-LOCA operation of any of the safeguard systems. Therefore, operation subsequent to flooding is unnecessary.

2. The valve is normally in the post-LOCA position. Therefore, it is not required to reposition before or after flooding.

3. The valve receives a safety signal to close upon the occurrence of a LOCA and is not required to reposition subsequent to flooding.

Duke's response to the previous SER specifically addresses Category 3 above. However, for all valves in the above categories there is no failure mechanism associated with submergence that could cause these valves to spuriously reposition or fail in a position other than the designated safety position. Additionally there is no failure mechanism associated with submergence that can affect the performance of a safety function by another piece of safety-related equipment.

With regard to misleading information being supplied to the operator, we have determined that there is a potential for losing control room position indication for these submerged valves due to shorting in the valve limit switch compartment. Although these valves are in their safety position prior to submergence and are not required to reposition following submergence, Duke has implemented an operator aid computer (OAC) application that will produce a valve position report whenever a high water level is detected in the containment sump. This OAC application is designed to report the position of these valves prior to submergence thereby providing the control room operators with an alternate method of verifying the position of these valves.

ATTACHMENT 1

MCGUIRE NUCLEAR STATION - UNITS 1 AND 2

RESOLUTION OF NRC/FRC TECHNICAL EVALUATION REPORT ITEMS

IDENTIFICATION OF TER ITEMS AND CORRESPONDING RESOLUTIONS

MCGUIRE NUCLEAR STATION - UNITS 1 AND 2

RESOLUTION OF NRC/FRC TECHNICAL EVALUATION REPORT ITEMS

TER ITEM	COMPONENT	MFGR	MODEL	TER CATEGORY	RESOLUTION
1	Solenoid Valve	Valcor	V526	II.C	4
2	Solenoid Valve	Valcor	V526	II.C	4
3	Solenoid Valve	Valcor	V70900213	II.A	5,JIO
4	Solenoid Valve	Valcor	V70900213/V70900211	II.A	5,JIO
5	Solenoid Valve	Valcor	V70900213	II.A	5,JIO
6	Solenoid Valve	Valcor	V526/V573	II.C	4
7	Solenoid Valve	Valcor	V70900211/V70900213	II.A	5,JIO
8	Solenoid Valve	Powers Regulator	2650002	I.B	7
9	Solenoid Valve	ASCO	NP8316E34E/NP8316E36E	II.C	4
10	Solenoid Valve	ASCO	NP8316E34E	II.C	4
11	Solenoid Valve	ASCO	NP8316E34E	II.C	4
12	Solenoid Valve	ASCO	NP8316E34E/NP8316E36E	II.C	4
13	Solenoid Valve	Atwood-Morrill	MSIV	III.B	3
14	Solenoid Valve	Target Rock	77CC	II.C	4
15	Solenoid Valve	Borg-Warner	FWIV	IV	7
16	Valve Motor Operator	Rotork	NA1/NA2	I.A	1
17	Damper Motor Operator	Rotork	11NAZ1	I.A	1
18	Valve Motor Operator	Limitorque	SMB	II.A	5

RESOLUTION OF NRC/FRC TECHNICAL EVALUATION REPORT ITEMS

TER ITEM	COMPONENT	MFGR	MODEL	TER CATEGORY	RESOLUTION
19	Valve Motor Operator	Rotork	NA1	I.A	1
20	Damper Motor Operator	Rotork	7A/3MW	II.C	4
21	Valve Motor Operator	Limitorque	SMB	II.A	5
22	Valve Motor Operator	Limitorque	SMB	II.A	5
23	Valve Motor Operator	Rotork	NA2	II.C	4
24	Valve Motor Operator	Rotork	NA1	I.A	1
25	Valve Motor Operator	Limitorque	SMB	II.A	5
26	Valve Motor Operator	Limitorque	SMB	II.A	5
27	Valve Motor Operator	Rotork	NA2	II.B	6
28	Valve Motor Operator	Rotork	NA1	I.A	1
29	Flow Transmitter	Veritrak	59DP	III.A	2
30	Cable	Anaconda	EP/HYPALON	I.A	1
31	Level Switch	Robertshaw	SL402843	I.B	7,J10
32	Level Transmitter	Barton	386A	II.A	5
33	Level Transmitter (Unit 1)	Barton	764 (Lot 2)	IV	7
34	Level Transmitter (Unit 1)	Barton	764 (Lot 2)	IV	7
35	Cable	Anaconda	EP/HYPALON	I.A	1
36	Cable	Brand-Rex	PVC	IV	7
37	Cable	Brand-Rex	PVC	IV	7
38	Pressure Transmitter (Unit 1)	Barton	763 (Lot 2)	IV	7
39	Pressure Transmitter	Rosemount	1153GA9	II.B	6

RESOLUTION OF NRC/FRC TECHNICAL EVALUATION REPORT ITEMS

TER ITEM	COMPONENT	MFGR	MODEL	TER CATEGORY	RESOLUTION
40	Cable	Brand-Rex	XLPE	II.A	5
41	Pressure Transmitter (Unit 1)	Barton	763 (Lot 2)	IV	7
42	D/P Switch	Solon	7PS1ADW	II.A	5
43	D/P Switch	Solon	7PS1ADW	I.B	7
44	D/P Switch	Solon	7PS1DW	I.B	7
45	Signal Transmitter	RIS	SC1302	IV	7
46	Acoustical Monitor	TEC	1414	I.B	7
47	Level System	Westinghouse	RVLIS	I.B	7,J10
48	Radiation Monitor	GA	RD23	II.A	5
49	Cable	Rockbestos	RSS6104-1081	I.B	7
50	Limit Switch	NAMCO	EA-180	II.C	4
51	Limit Switch	NAMCO	EA-180	II.C	4
52	Limit Switch	NAMCO	EA-180	II.C	4
53	Limit Switch	NAMCO	EA-740	II.C	4
54	Limit Switch	NAMCO	EA-740	II.C	4
55	Limit Switch	NAMCO	EA-740	II.C	4
56	Limit Switch	NAMCO	EA-740	II.C	4
57	Limit Switch	Micro Switch	LSM4N	II.A	5
58	Limit Switch	Micro Switch	LSM4N	II.A	5
59	Limit Switch	NAMCO	EA170302	II.C	4
60	Limit Switch	NAMCO	EA170302	II.A	5

RESOLUTION OF NRC/FRC TECHNICAL EVALUATION REPORT ITEMS

TER ITEM	COMPONENT	MFGR	MODEL	TER CATEGORY	RESOLUTION
61	Temperature Controller	Love Controls	54	I.B	7
62	Temperature Controller	Love Controls	834	I.B	7
63	Temperature Controller	Love Controls	836	I.B	7
64	Temperature Controller	Love Controls	8134	I.B	7
65	Temperature Controller	Love Controls	8160	I.B	7
66	Temperature Controller	Love Controls	8165	I.B	7
67	Temperature Controller	Love Controls	8173	I.B	7
68	Temperature Controller	Love Controls	8174	I.B	7
69	Thermostat	United Electric	800G6CS	I.B	7
70	RTD	Weed	101AZNA3C621	I.B	7
71	RTD	Rosemount	176KS	I.B	7,
72	RTD	Rosemount	176KF	I.B	7,
73	Motor (NI Pmp)	Westinghouse	73F69618	II.C	4
74	Motor (CCP)	Westinghouse	72F44587	II.C	4
75	Motor (NS Pmp)	Westinghouse	73F56019	II.C	4
76	Motor (RHR Pmp)	Westinghouse	71F13494	II.C	4
77	Motor (Smp Pmp)	Allis-Chalmers	151335645023	II.A	5,J10
78	Motor (Ann Vent Fan)	Reliance	2YF273608	II.C	4
79	Motor (ABFXF)	Reliance	1YF882	I.A	1
80	Motor (DG Vent Fan)	Reliance	1YF272608	II.C	4

RESOLUTION OF NRC/FRC TECHNICAL EVALUATION REPORT ITEMS

TER ITEM	COMPONENT	MFGR	MODEL	TER CATEGORY	RESOLUTION
81	Motor (FPCP AHU)	Reliance	2YF882311/1YF882311	I.A	1
82	Motor (FPCP)	Westinghouse	72F44649	II.C	4
83	Motor (FPCP AHU)	Reliance	882311	II.A	5
84	Motor (GW Smp Pmp)	Reliance	2Y273734	IV	7
85	Motor (CCW Pmp)	Westinghouse	72F44689	II.C	4
86	Motor (CC Pmp)	Westinghouse	72F44587	II.C	4
87	Motor (NSW Pmp)	Westinghouse	72F36530	II.C	4
88	Motor (H2 Skimmer Fan)	Reliance	1YF882315	II.A	5
89	Motor (Cont. Air Ret.)	Reliance	2XF-330081	II.A	5
90	Terminal Block	States	ZWM	IV	7
91	Terminal Block	States	ZWM	II.A	5
92	Terminal Block	Buchanan	SS & TS	II.C	4
93	Terminal Block	Stanwick	SLS	I.A	1
94	Terminal Block	Stanwick	SLS	II.C	4
95	Terminal Block	Stanwick	DG	II.C	4
96	Terminal Block	Buchanan	P0721	I.B	7
97	Terminal Block	Buchanan	0721	I.B	7
98	Fuse	Littel Fuse	Normal & Slo Blo	IV	7
99	Fuse	Littel Fuse	Slo Blo	IV	7
100	Fuse	Bussmann	FNA	IV	7

RESOLUTION OF NRC/FRC TECHNICAL EVALUATION REPORT ITEMS

TER ITEM	COMPONENT	MFGR	MODEL	TER CATEGORY	RESOLUTION
101	Fuse	Bussmann	FNA	IV	7
102	Fuse	Bussmann	KTK	IV	7
103	Indicating Light	Cutler-Hammer	E29	II.A	5
104	Indicating Light	Cutlet-Hammer	E30	II.A	5
105	Indicating Light	Cutler-Hammer	E30	IV	7
106	Indicating Light	Cutler-Hammer	E29	IV	7
107	Selector Switch	Cutler-Hammer	10250T	IV	7
108	Electrical Switch	Cutler-Hammer	10250T	II.A	7
109	Fuse Block	Bussmann	4575	II.A	5
110	Fuse Block	Bussmann	3792	II.A	5
111	Fuse Block	Bussmann	3839	II.A	5
112	Fuse Block	Bussmann	4439	II.A	5
113	Fuse Block	Bussmann	3792	I.A	1
114	Fuse Block	Bussmann	4575	I.A	1
115	Fuse Block	Bussmann	2808	II.A	5
116	Fuse Block	Bussmann	2807	II.A	5
117	Relay	Cutler-Hammer	D23	IV	7
118	Relay	Cutler-Hammer	D23	II.A	5
119	Relay	Cutler-Hammer	D26	II.A	5

RESOLUTION OF NRC/FRC TECHNICAL EVALUATION REPORT ITEMS

TER ITEM	COMPONENTS	MFGR	MODEL	TER CATEGORY	RESOLUTION
120	Relay	Struthers-Dunn	219	IV	7
121	Relay	Agastat	7000 series	IV	7
122	Surge Suppressor	Gen. Semi'c'tor	Transzorb	IV	7
123	Surge Suppressor	Gen. Semi'c'tor	Transzorb	IV	7
124	Panel (AVFU Cnt)	Farr	-	I.B	7
125	Transformer	Westinghouse	PRM75	I.A	1
126	MCC	Gould	K Line	I.A	1
127	MCC	Nelson Elect.	Class 1035u	II.A	5
128	Alarm	RIS	ET1215	III.B	3
129	Optical Isolator	175D127	175D127	III.B	3
130	Resistor	Ohmite	Brown Devil	IV	7
131	Resistor	Ohmite	Dividohm	III.B	3
132	Sealant	3M	Scotch Cast 9	I.A	1
133	Splice Material	Raychem	WCSFN	II.C	4
134	H_2 Recombiner	W Sturtevant	A	I.A	1
135	Elect. Penetration	D. G. O'Brien	Types A-H, J-M	I.A	1
136	Cable	BIW	XLPE	II.A	5
137	Cable	Samuel Moore	EP/Hyp	II.A	5
138	Cable	Samuel Moore	EP/Hyp	II.A	5
139	Cable	Samuel Moore	EP/Hyp	II.A	5

RESOLUTION OF NRC/FRC TECHNICAL EVALUATION REPORT ITEMS

TER ITEM	COMPONENTS	MFGR	MODEL	TER CATEGORY	RESOLUTION
140	Cable	Samuel Moore	EP/Hyp	II.A	5
141	Cable	Samuel Moore	PVC	IV	7
142	Cable	Samuel Moore	PVC	IV	7
143	Cable	Okonite	Tefzel 280	II.A	5
144	Cable	Okonite	Tefzel 280	II.A	5
145	Cable	Okonite	Tefzel 280	II.A	5
146	Cable	Okonite	EP	II.A	5
147	Cable	Okonite	EP	II.A	5
148	Cable	Okonite	EP	II.A	5
149	Cable	Okonite	EP	II.A	5
150	Cable	Okonite	EP/Hyp	II.A	5
151	Cable	Okonite	Hypalon	II.A	5
152	Cable	Okonite	Hypalon	II.A	5
153	Cable	Brand-Rex	XLPE	II.A	5
154	Cable	Brand-Rex	XLPE	II.A	5
155	Cable	Brand-Rex	XLPE	II.A	5
156	Cable	Anaconda	EP/Hyp	I.A	1
157	Cable	Anaconda	EP/Hyp	I.A	1
158	Power Supply	Lambda	LCS	IV	7
159	Valve Motor Operator	Rotork	NA2	II.C	4
160	Motor (FP AHU)	Reliance	1YF882311	II.A	5

RESOLUTION OF NRC/FRC TECHNICAL EVALUATION REPORT ITEMS

TER ITEM	COMPONENTS	MFGR	MODEL	TER CATEGORY	RESOLUTION
161	Panel (ABFU Cnt)	Allison	-	I.B	7

ATTACHMENT 2

MCGUIRE NUCLEAR STATION - UNITS 1 AND 2

RESOLUTION OF NRC/FRC TECHNICAL EVALUATION REPORT ITEMS

RESOLUTION DISCUSSION

MCGUIRE NUCLEAR STATION - UNITS 1 AND 2

RESOLUTION OF NRC/FRC TECHNICAL EVALUATION REPORT ITEMS

Resolution No.	Resolution Discussion
1.	This equipment is in TER Category I.A, Equipment Qualified. No resolution is required for this equipment.
2.	This equipment is in TER Category III.A, Equipment Exempt from Qualification. No resolution is required for this equipment.
3.	This equipment is in TER Category III.B, Equipment Not in the Scope of the Review. No resolution is required for this equipment. It should be noted that TER Item 13 (solenoid valve supplied by Atwood-Morrill as a part of the main steam isolation valves) was incorrectly identified as a TER Category III.B item. The environmental qualification of these solenoid valves is documented in Atwood-Morrill Report 201-39500 dated May 1, 1979.
4.	This equipment is in TER Category II.C, Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule Justified. Duke Power Company has reviewed the items in this category and determined that the TER concerns can be satisfactorily resolved for McGuire. Documentation of the specific resolutions for each TER Item is currently in progress. As discussed with the NRC Staff on March 29, 1983, the methods for resolving these concerns are consistent with the NUREG 0588 Category II requirements and NRC Generic Letter 82-09 and include one or more of the following: • Aging simulations were included in the test program for the equipment. A qualified life based on McGuire conditions has been determined with appropriate equipment/component replacement schedules established. • Surveillance and maintenance activities established to review equipment for significant aging degradation. • Equipment has been determined to have no significant aging mechanisms based on material evaluation or Duke experience. In all cases where radiation is an environmental parameter, the equipment has been shown to be qualified for the 40 year normal dose plus the appropriate accident dose (typically 1 year). With specific regard to TER Items 55 and 56 (EA-740 limit switches furnished by NAMCO), it should be noted that these two items are not used in safety-related applications outside containment and therefore do not require environmental qualification.
5.	This equipment is in TER Category II.A, Equipment Qualification Not Established. Duke Power Company has reviewed the items in this category. Technical resolutions have been determined and documentation of the specific resolutions for each TER Item is currently in progress. Additionally, key resolutions discussed with the NRC Staff on March 29, 1983 are as follows:

Resolution No.	Resolution Discussion

- Traceability of installed equipment to the qualification documentation was a principle concern for cables (TER Items 40, 136-140, and 143-155), Limitorque valve motors (TER Items 18, 21, 22, 25, and 26), hydrogen skimmer fan motors (TER Item 89). For these items, Duke Power Company has identified the auditable link between the installed equipment and the qualification documentation and is updating the qualification files with this information.

  This effort will be based on manufacturer's certifications that are traceable through specifications, purchase orders, or other pertinent documents.

- Valcor solenoid valves models V70900211 and V70900213 (TER Items 3, 4, 5, and 7) were originally qualified by similarity to another Valcor solenoid valve. However, the specific models identified above are presently undergoing qualification testing that is scheduled for completion in September 1983. Duke Power Company intends to use the qualification test results from this new test program as the basis of qualification for these Valcor solenoid valves.

  Refer to the attached JIO for this equipment.

- Solon differential pressure switches model 7PS1ADW (TER Item 42), located in the upper containment are qualified for less than one hour. These switches detect high differential pressure between the upper and lower containment associated with large breaks and actuate to provide an open permissive to dampers located between the upper and lower containment. This high differential pressure in containment will occur and equalize less than one minute into the event. Once the switches have provided the permissive signal, they are electrically isolated from the circuit and perform no further safety function. Based on the design described above, the location of the switches (upper containment), and the need for their function only for a large break event, qualification for less than one hour is justified. Additionally, margin is provided between the required time (1 minute) and the qualified time (5 minutes).

- Micro Switch limit switches model LSM4N (TER Items 57 and 58) provide damper position indication only and are used to observe damper position during testing of the associated ventilation system. These switches perform no safety function, are not used by the operators as a basis for a required action and their failure cannot prevent satisfactory accomplishment of any required safety function. Additionally, these switches will be removed from safety power prior to startup following the first refueling outage of the respective McGuire units.

- Allis Chalmers sump pump motors model 151335646023 (TER Item 77) located outside the containment are exposed to only a post-LOCA radiation environment. Duke Power Company has pursued the radiation qualification of these motors with the manufacturer and obtained a manufacturer's statement that the motor is qualified. However, Duke Power Company will replace these motors with qualified motors having complete qualication documentation.

Resolution No.	Resolution Discussion

Refer to attached JIO for this equipment.

6. This equipment is in TER Category II.B, Equipment Not Qualified. Duke Power Company has reviewed the two items in this category. Based on our review we have determined that the following additional information addresses the TER concerns and in conjunction with the qualification documentation referenced in the McGuire NUREG 0588 submittal demonstrates qualification of the two equipment items.

- TER Item 27 - Rotork Model NA-2 Valve Actuators Located Outside Containment

  Statement of Problem: Following exposure to 212°F steam environment for 200 hours, the torque switch mechanism in the Rotork NA-2 style actuator failed resulting in the motor running to stall and burning up following the actuation of a valve in the close direction. This situation is described in Rotork Test Report TR-3025.

  Background Information: The torque switch mechanism of the NA-2 actuator was the component which failed during qualification testing as reported in TR-3025. The NA-2 torque switch mechanism (helix) is made of a thermoplastic material, nilotron, which at approximately 180°F becomes pliable resulting in failure to actuate the torque switch at the end of valve stroke. As noted in our response to the McGuire Unit 1 equipment qualification SER, TR-3025 demonstrates that at least one valve operation is available after a torque switch mechanism failure; therefore, the valves are capable of moving to their safety position. It should be emphasized that the torque switch failure could occur only after the valve has reached its safety position and would not affect the valves' ability to remain in its safety position, would not affect other safety-related equipment, and would not mislead the operator.

  Duke has analyzed all NA-2 actuator applications at McGuire and has determined that once the actuator has reached its safety position, no additional safety operation is required.

  Conclusion: Based on the Rotork NA-2 test report TR-3025 and the above discussion, Duke has determined that these actuators are capable of performing their safety function and that continued use of the NA-2 actuator in its current applications is acceptable.

- TER Item 39 - Rosemount Transmitters Model 1153GA9 (RCS Wide Range Pressure Transmitter) Located in the Annulus.

  Statement of Problem: Based on the FRC review, the Rosemount 1153GA9 transmitter is identified as not qualified for accident conditions. This conclusion was reached based on the Rosemount qualification report submitted as part of the H. B. Robinson facility SER response. This H. B. Robinson report identifies a failure of some components in the 1153 Series A transmitters due to environmental testing in accordance with IEEE 323-1974 which significantly exceeds the McGuire requirements.

Resolution No. | Resolution Discussion

Background Information: The applicable qualification document for the McGuire 1153GA9 transmitter, as referenced in Duke's NUREG 0588 submittal, is Rosemount Report No. 3788, Revision A. This report documents results of type testing which qualifies the Model 1153 Series A transmitter for Class 1E service in Nuclear Power Generating Stations in accordance with IEEE 323-1971. Specifically, Rosemount Report No. 3788, Revision A documents that the Rosemount Model 1153 Series A transmitter successfully completed testing with no significant anomalies under the following conditions: Temperature-350°F; Pressure-120 psig; relative humidity-100%; and radiation dose-$4X10^7R$; and chemical spray. The accident environment for the McGuire Unit 1 and 2 RCS wide range pressure transmitters, located in the annulus, is 142°F, relative humidity 100% and radiation dose $1.2X10^7R$. Pressure, steam, and chemical spray environments are not applicable environmental parameters in the annulus. With regard to transmitters O-ring seal integrity, station procedures will require O-ring seal replacement consistent with transmitters calibration intervals. Replacement intervals for the entire transmitter or the circuit board is being reviewed and will be addressed and included in our qualification files.

Conclusion: The Rosemount report referenced in the H. B. Robinson SER response does not apply to the Duke transmitters since the report addresses a qualification program which significantly exceeds the McGuire requirements. Therefore, based on Rosemount's Report No. 3788, Revision A and the above discussion, Duke has determined that the subject transmitters are qualified to perform their safety function in the annulus accident environment as identified in the McGuire NUREG 0588 response.

7. This equipment is in either TER Category I.B, Equipment Qualification Pending Modification or TER Category IV, Documentation Not Made Available. Duke Power Company has reviewed the items in these two categories and determined that the major deficiency noted in each category is documentation not available for review (Note: circumstances related to documentation not available for review included qualification testing not complete at the time of our submittal, proprietary nature of certain qualification documentation, and certain documents not requested by NRC/FRC). We have further determined that qualification documentation is now available in Duke files for the equipment items noted in the following table.

For the remaining equipment items in these two categories, the following information is provided:

- TER Item 31; Robertshaw Level Switches - Model SL402843

These level switches are installed outside containment in the doghouse and function to terminate main feedwater flow in the event of a main feedwater line break in the doghouse. Main feedwater termination is required in order to prevent the flooding of safety-related equipment in the doghouse.

Resolution No. | Resolution Discussion

As stated in the Duke NUREG 0588 submittal for McGuire, these switches were in a qualification program that was scheduled for completion in 1982. Following evaluation of the results of the thermal aging portion of this qualification program, Duke has decided to replace the Robertshaw level switch with a Magnetrol level switch which is presently undergoing qualification testing. The testing is scheduled for completion by April 1983. The results of the Magnetrol level switch testing will be provided in the McGuire NUREG 0588 submittal.

Refer to the attached JIO for the Magnetrol level switches.

- TER Item 47 - Reactor Vessel Level Instrument System (RVLIS)

The RVLIS is a TMI/NUREG 0737 item (II.F.2). The environmental qualification documentation for the equipment in this system subject to harsh environment is scheduled to be available by May 31, 1983.

Refer to the attached JIO for the RVLIS.

- TER Item 71; Rosemount RTD's - Model 176KS

These RTD's are provided to monitor reactor coolant system wide range temperature and are used for post-accident monitoring indication. As stated in the McGuire NUREG 0588 submittal, these RTD's will be replaced at each refueling outage of the respective McGuire units. This replacement commitment for Rosemount 176KS RTD's is based on the qualified (test) radiation dose of $1X10^8$ rads and the NRC requirement to address source terms associated with the contained accident scenario.

The materials used in this model RTD have been reviewed for thermal aging effects. The results show that no significant thermal degradation will occur during one refueling interval. Based on the thermal aging review and the qualified radiation dose of $1X10^8$ rads, the proposed replacement schedule is justified.

- TER Item 72; Rosemount RTD's - Model 176KF

These RTD's are provided to monitor reactor coolant system narrow-range temperature and have a short term reactor trip input function. As stated in the McGuire NUREG 0588 submittal, these RTD's would be replaced on a 10 year cycle unless it could be shown that EPR is a non-critical material of the RTD. Based on our review of the materials used in the RTD, we have found that EPR which was initially thought to be a material in these RTD's is in fact not an RTD material. Therefore, based on the qualification report for these RTD's, a review of the materials of these RTD's (including thermal and radiation aging), and the application of these RTD's, these RTD's are qualified for 40 years of normal operation plus their short-term trip function.

Resolution No.	Resolution Discussion

- TER Item 84; Reliance Motor - Model 2Y273734

  This motor is installed outside containment and serves as the motor drive for the groundwater drainage sump pump. Although this motor is exposed to a pipe break environment, it is not required to function for any pipe break event. Further, failure of this motor following exposure to the postulated harsh environment will not prevent the satisfactory accomplishment of any required safety function by other safety-related equipment.

- TER Item 124 - Annulus Ventilation Filter Unit Control Panels

  These panels have been relocated to a mild environment on both McGuire units.

- TER Item 161 - Auxiliary Building Filter Unit Control Panel

  These panels have been modified and reclassified as non-safety-related on both McGuire units; therefore, environmental qualification is not required.

MCGUIRE NUCLEAR STATION - UNITS 1 AND 2

RESOLUTION OF NRC/FRC TECHNICAL EVALUATION REPORT ITEM

QUALIFICATION DOCUMENTATION REFERENCES FOR CATEGORY I.B AND IV ITEMS

FRC ITEM NO.	COMPONENT	MFGR	MODEL #	QUALIFICATION DOCUMENTATION
8	Solenoid Valve	Powers Regulator	2650002	CCL Test Report A-490-82
15	Solenoid Valve	Borg-Warner	FWIV	Borg Warner Test Reports 1785 and 1779, dated 11/12/79
33	Level Transmitter (Unit 1)	Barton	764 (Lot 2)	WCAP-9885
34	Level Transmitter (Unit 1)	Barton	764 (Lot 2)	WCAP-9885
36	Cable	Brand-Rex	PVC	Duke Report QTF TR-032 (Supersedes TR-017)
37	Cable	Brand-Rex	PVC	Duke Report QTF TR-032 (Supersedes TR-017)
38	Pressure Transmitter (Unit 1)	Barton	763 (Lot 2)	WCAP-9885
41	Pressure Transmitter (Unit 1)	Barton	763 (Lot 2)	WCAP-9885
43	D/P Switch	Solon	7PSIADW	CCL Report A-490-82
44	D/P Switch	Solon	7PSIDW	CCL Report A-490-82
45	Signal Transmitter	RIS	SC1302	RIS Manual SC-1302 (MCM-1346.00-0010)
46	Acoustical	TEC	1414	TEC Test Report 517-TR-03, Rev. 3
49	Cable	Rockbestos	RSS6104-1081	Rockbestos Test Report 2806

MCGUIRE NUCLEAR STATION

FRC ITEM NO.	COMPONENT	MFGR	MODEL #	QUALIFICATION DOCUMENTATION
61	Temperature Controller	Love Controls	54	CLL Test Report A-490-82
62	Temperature Controller	Love Controls	834	CCL Test Report A-490-82
63	Temperature Controller	Love Controls	836	CCL Test Report A-490-82
64	Temperature Controller	Love Controls	8134	CCL Test Report A-490-82
65	Temperature Controller	Love Controls	8160	CCL Test Report A-490-82
66	Temperature Controller	Love Controls	8187	CCL Test Report A-490-82
67	Temperature Controller	Love Controls	8173	CCL Test Report A-490-82
68	Temperature Controller	Love Controls	8174	CCL Test Report A-490-82
69	Thermostat	United Electric	800G6CS	CCL Test Report A-490-82
70	RTD	Weed	101AZNA3C621	CCL Test Report A-490-82
90	Terminal Block	States	ZWM	ESSEM IV-B-4 & IV-B-5/Duke Analysis
96	Terminal Block	Buchanan	P0721	CCL Test Report A-490-82
97	Terminal Block	Buchanan	0721	CCL Test Report A-490-82
98	Fuse	Littel Fuse	Normal & Slo Blo	ESSEM III-A-7/Derating Curve
99	Fuse	Littel Fuse	Slo Blo	ESSEM III-A-7/QTF TR-047
100	Fuse	Bussmann	FNA	ESSEM III-A-4/QTF TR-040
101	Fuse	Bussmann	FNA	ESSEM III-A-4/Derating Curve
102	Fuse	Bussmann	KTK	ESSEM III-A-1/Derating Curve
105	Indicating Light	Cutler-Hammer	E30	ESSEM VI-C-1/QTF TR-040

MCGUIRE NUCLEAR STATION

FRC ITEM NO.	COMPONENT	MFGR	MODEL #	QUALIFICATION DOCUMENTATION
106	Indicating Light	Cutler-Hammer	E29	ESSEM III-B-1/QTF T -040
107	Selector Switch	Cutler-Hammer	10250T	ESSEM VI-A-1/QTF TR-040
117	Relay	Cutler-Hammer	D23	ESSEM VII-A-2.1/QTF TR-040
120	Relay	Struthers-Dunn	219	ESSEM VII-A-3/Duke Test Report
121	Relay	Agastat	7000 series	ESSEM VII-C-5/Agastat Spec.
122	Surge Suppressor	Gen. Semi'c'tor	Transzorb	ESSEM III-C-1/G.S. Spec.
123	Surge Suppressor	Gen. Semi'c'tor	Transzorb	ESSEM III-C-1/G.S. Spec.
130	Resistor	Ohmite	Brown Devil	ESSEM IX-B-2/Derating Curve
141	Cable	Samuel Moore	PVC	Duke Report QTF TR-032 (Supersedes TR-017)
142	Cable	Samuel Moore	PVC	Duke Report QTF TR-032 (Supersedes TR-017)
158	Power Supply	Lambda	LCS	ESSEM VIII-G-1/Lambda Spec.

ATTACHMENT 3

MCGUIRE NUCLEAR STATION - UNITS 1 AND 2

RESOLUTION OF NRC/FRC TECHNICAL EVALUATION REPORT ITEMS

JUSTIFICATIONS FOR INTERIM OPERATION

MCGUIRE NUCLEAR STATION - UNITS 1 AND 2

JUSTIFICATION FOR INTERIM OPERATION

TER Items 3, 4, 5, & 7 - Valcor Solenoid Valves (Models V70900-21-1, - 3)

Valcor solenoid valves (Models V70900-21-1 and V70900-21-3) are used in various safety-related applications both inside and outside containment. In all safety-related applications, these valves are normally energized. Additionally, in all safety-related applications the safety function of the solenoid is, by design, to de-energize. Following the performance of the safety function (i.e.,de-energizing), these solenoids are not required to re-energize.

These Valcor solenoid valves were the subject of IE Bulletin 80-23. This bulletin identified a problem with the solenoid coils in terms of not being designed for continuously energized applications. In response to this situation Duke Power Company has replaced the coils on the McGuire Unit 1 and Unit 2 Valcor solenoids with coils of an improved potted construction.

Valcor solenoid valves with these new coils are presently in a qualification test program. All initial baseline testing and thermal and cyclic aging is complete. The entire test program is scheduled for completion in July, 1983 with the qualification report scheduled to be available in September, 1983 However, these solenoid valves are considered to be acceptable for use at McGuire pending completion of the qualification program based on the following:

1. The use of these valves in applications where the safety function is to de-energize.

2. The problems experienced with normally energized operation were a result of a problem with the old coil design only.

3. The coil has been redesigned for normally energized operation by (1) a change in materials of construction and (2) the addition of a potting compound between the solenoid coil and the shell enclosure.

   (a) Materials of Construction - All materials utilized in the construction of the new coils and U.L. rated for continuous operation at 220°C (428°F) with the exception of a tape used to cover both the solder joints and the complete coil winding. The tape is classified as a 180°C (356°F) tape and is a U. L. recognized component.

   (b) Potting Compound - The potting material used is rated by Emerson and Cuming at 350°F.

4. The significance of the above design improvements is as follows:

   (a) The utilization of the higher temperature rated materials means that the new coils will be suitable for normally energized operation at normal and accident temperatures. The addition of the potting material allows the coil to dissipate more heat, and in normal operation, the coils will operate at a reduced temperature which extends the operating life. This has been proven by the additional testing described in interim test report MR70905-21-3-1.

(b) Valcor has subjected six (6) prototype potted solenoid coils to thermal aging tests. The coils were energized such that the coil wire is at its rated material temperature of 220°C (428°F). No failures were experienced in this testing.

(c) Based on test data obtained from valves at an equillibrium ambient temperature of 140°F, the coil temperature rose 91°F over ambient after 15 minutes of energization. Using 91°F as the coil temperature rise during a LOCA, the coil temperature would be 433°F. This is based on a constant ambient of 327°F plus the 15°F margin recommended by IEEE-323 (1974). The 433°F coil temperature figure is conservative for the following reasons. First, the coils will be energized before and during a LOCA. Therefore, the only mechanism affecting the coil temperature rise will be the increase in the ambient temperature and not the change in state (energization) of the coil. The increase in the ambient temperature will not have as great an effect on the coil temperature rise as the change in state of the coil, because the coil saturation temperature before the onset of a LOCA averages 337°F. Second, as the coil temperature begins to rise, the resistance of the coil wire increases, thereby reducing the power required by the solenoid, resulting in a reduction in the amount of heat to be dissipated by the valve. Third, the fifteen minute specified energization of the coil after the onset of the LOCA exceeds McGuire requirements by a factor of three, rather than the 10% margin recommended by IEEE-323 (1974).

5. The previous radiation and seismic qualification of the solenoid valve with the new coil is unaffected by the replacement of the coil and the addition of the potting compound for the following reasons:

(a) All materials utilized in the new coil as well as the potting material are rated acceptable in a radiation environment at least $2X10^8$ rads, which exceeds the McGuire requirements by a factor of two (2).

(b) The addition of the potting compound and the changes in the coil design increase the weight of the solenoid valve by less than 10%, and does not affect the response of the moving parts of the solenoid valve. The addition of the potting compound increased the rigidity of the solenoid coil, a seismic improvement over the original updated design.

MCGUIRE NUCLEAR STATION UNITS 1 AND 2

JUSTIFICATION FOR INTERIM OPERATION

TER Item 31 - Robertshaw Level Switch (Model SL402843)

As stated in the McGuire NUREG 0588 submittal, the Robertshaw level switches were in a qualification program that was scheduled for completion in 1982. Following evaluation of the results of the thermal aging portion of this qualification program, Duke decided to replace the Robertshaw level switch with a Magnetrol level switch which is presently undergoing qualification testing.

The baseline functional tests, thermal and cyclic aging, and seismic portions of the Magnetrol test program are complete with only the HELB simulation remaining to be completed. The HELB test is scheduled for completion by the end of April, 1983.

Based on our decision to replace the Robertshaw level switches with Magnetrol level switches (Model A103F-3X-Y-MPG-TDM-S1MD4DC-S1MD4DC-S1MD4DC) and since the Magnetrol switches have not yet completed qualification testing, the following justification for interim operation is provided for the Magnetrol switches pending completion of qualification testing.

Magnetrol level switches are now installed on both McGuire units. These switches are located outside containment in the doghouse and function to terminate main feedwater flow in the event of a main feedwater line break in the doghouse. Main feedwater termination is required in order to prevent the flooding of safety-related equipment in the doghouse. The feedwater line break environment in the doghouse results in a temperature of 240°F and a very brief pressure transient to 9 psig.

It is our engineering judgement that the Magnetrol level switches will not only successfully pass the HELB portion of the qualification program but are also acceptable for interim operation based on testing. Magnetrol has performed dry heat tests on the identical switch mechanisms utilized in the McGuire level switches at 300°F for up to 1954 hours with no failures. In addition, elevated temperature and humidity aging tests were performed on a Magnetrol model no. A153F-Y-MPG-TDM-S1MD4DC-S1MD4DC-S1MD4DC level switch, which is similar to the McGuire switches for a total of 160 hours at 300°F and 480 hours at 95-100% relative humidity. The only problems encountered were 1) a broken housing cover gasket after 110 hours at 300°F, 239 hours at 95-100% relative humidity and 30 to 40 cover installations and 2) micro switch mounting screws were becoming loose during the test. These are not a concern for the McGuire evaluation because 1) the problem with the housing gasket occurred at 110 hours, which greatly exceeds the duration of the postulated McGuire doghouse environment and occurred after at least 30 cover installations. Duke maintenance procedures requires an inspection of the housing gasket each time the cover is removed and 2) Magnetrol now utilizes lock-tite on the micro switch mounting screws to prevent loosening of the screws.

MCGUIRE NUCLEAR STATION - UNITS 1 AND 2

JUSTIFICATION FOR INTERIM OPERATION

TER Item 47 - Reactor Vessel Level Instrument System (RVLIS)

The RVLIS is a TMI/NUREG 0737 item (II.F.2) which is being furnished for McGuire by Westinghouse. This system is installed on Unit 1 and is required by license condition to be installed on Unit 2 prior to startup following the first Unit 2 refueling outage. It should be noted that even though this system is installed on Unit 1, it will not be declared operable until upgraded emergency operating procedures are approved and implemented (late 1983).

The environmental qualification of the equipment in this system subject to a harsh environment is complete and addressed in the McGuire NUREG 0588 submittal with the exception of the Minco strap-on RTD's. Westinghouse has recently successfully completed the qualification of these RTD's which will be documented in WCAP 8687, Supplement 1, E42A in late May, 1983. However, because Duke Power Company has not reviewed the qualification data and since the Unit 1 RVLIS system will be energized for test purposes prior to being declared operable, we have reviewed the impact of failure of the Minco strap-on RTD's on other safety-related equipment. Our review indicates that failure of the Minco RTD's would not prevent the satisfactory accomplishment of any required safety function by other safety-related equipment.

MCGUIRE NUCLEAR STATION - UNITS 1 AND 2

JUSTIFICATION FOR INTERIM OPERATION

TER Item 77 - Allis Chalmers Pump Motor (Model 151335645023)

These motors are located outside the containment and subject only to post-LOCA recirculation radiation ($9.1X10^4$ Rads TID 40 years plus 1 year post-accident). These motors are provided to drive sump pumps associated with RHR and containment spray pump leakage collection.

Duke Power Company has obtained a letter from the manufacturer stating that these motors are qualified for the postulated radiation environment. However, we have been unable to obtain copies of test/analysis data to support the manufacturer's statement. As a result of the lack of confirmatory documentation, these motors are being replaced with Reliance Electric motors having complete qualification documentation for the postulated radiation environment. These motors are scheduled for replacement on both McGuire units by May 16, 1983.

Interim operation until the changeout is complete is acceptable based on the extremely low normal radiation dose that would be experienced by these motors prior to their changeout (by May 16, 1983), accessibility of these motors for maintenance/repair, and the manufacturer's certification of radiation qualification at $1X10^5$ Rads.