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October 15, 1984

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

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

Dear Ms. Adensam:

Please find attached the latest revision of Duke's NUREG-0588 submittal for McGuire Nuclear Station. The purpose of this revision is to provide a general update of the equipemtn tables as well as to consolidate certain qualification information (e.g., the McGuire TER Response) into the McGuire NUREG-0588 submittal. The following major areas of revision should be noted:

1. The introduction has been revised to include 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.

   With specific regard to TER Items 31, 47, and 77, justifications for interim operation (JIO's) previously submitted have been resolved. The JIO covering TER Items 3, 4, 5, and 7 (Valcor Solenoid valves) has been updated.

2. The introduction has also been revised to include Duke Power Company's response to 10CFR50.49(b).

3. Attachments 6, 7, 8, and 9 of the NUREG-0588 submittal have been deleted for consolidation purposes. The information in these attachments has been incorporated into the equipment summary sheets and/or placed into the appropriate equipment qualification files.

4. Attachment 3 has been revised to reflect the environmental parameters resulting from a new analysis for a main steam line break in the doghouse.

If there are any questions regarding this, please advise through normal licensing channels.

Very truly yours,

Hal B. Tucker

Hal B. Tucker

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Attachment

cc: Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

W. T. Orders
NRC Resident Inspector
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Mr. Ralph Birkel
Division of Project Management
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MCGUIRE NUCLEAR STATION - UNITS 1 AND 2

ENVIRONMENTAL QUALIFICATION OF ELECTRICAL EQUIPMENT

In accordance with 10CFR50.49 and the Category II guidelines of NUREG-0588, Duke Power Company is providing the information in this submittal to demonstrate that electrical equipment required to perform a safety-related function in a harsh environment is environmentally qualified. In addition to equipment specific information, this submittal also contains a discussion on compliance with 10CFR50.49(b) and Duke's response and resolutions to open items identified in the Franklin Research Center Technical Evaluation Report (TER).

With regard to the format of this submittal, the information described above is arranged as follows:

- Introduction, Discussion of 10CFR50.49(b) and Response and Resolutions to Open Items Identified in the Franklin Research Center Technical Evaluation Report (TER).
- Attachment 1 - Summary of Environmental Qualification of Class 1E Equipment Located Inside Containment
- Attachment 2 - Summary of Environmental Qualification of Class 1E Equipment Located in the Annulus
- Attachment 3 - Summary of Environmental Qualification of Class 1E Equipment Located Outside Containment and Exposed to HELB Environment
- Attachment 4 - Summary of Environmental Qualification of Class 1E Equipment Located Outside Containment and Exposed to the Post-LOCA Recirculation Radiation Environment
- Attachment 5 - Duke Power Company Position on the Category II Guidelines of NUREG-0588

Attachments 1, 2, 3, and 4 provide a tabular listing of Class 1E equipment exposed to harsh environment and inlcude appropriate qualification data for the equipment. Attachment 5 provides the Duke Power Company position on the Category II Guidelines of NUREG-0588.

MCGUIRE NUCLEAR STATION - UNITS 1 AND 2

ENVIRONMENTAL QUALIFICATION OF ELECTRICAL EQUIPMENT

COMPLIANCE WITH 10CFR50.49(b)

In response to 10CFR50.40(b) Environmental Qualification of Electrical Equipment Important to Safety for Nuclear Power Plants, Duke Power Company is providing the following information:

With regard to 10CFR50.49(b)(1), safety-related electrical equipment located in a harsh environment is identified in Duke Power Company's NUREG-0588 submittal for the McGuire Nuclear Station.

With regard to 10CFR50.49(b)(2), Duke Power Company has not identified any non-safety-related electrical equipment located in a harsh environment whose failure under the postulated accident conditions could prevent satisfactory accomplishment of a safety function by safety-related equipment. This determination was based on a review of Duke's design practices for McGuire, the McGuire electrical and physical separation criteria, and previous reviews in this area with regard to IE Information Notice 79-22. The McGuire safety-related electrical power and control systems are designed in accordance with Institute of Electrical and Electronics Engineers (IEEE) Std. 308-1971 and IEEE Std. 279-1971, respectively, as discussed in the McGuire Final Safety Analysis Report (FSAR). These two standards, as implemented in the McGuire design, place strict requirements on the interfacing of safety-related and nonsafety-related electrical equipment. Nonsafety-related loads receiving power from safety-related buses are automatically tripped from these buses by safety-related breakers, receiving trip signals generated by the plant protection systems, in order to preclude unacceptable influences of nonsafety-related equipment on the safety-related power system. The McGuire separation requirements are discussed in FSAR Section 8.3.1.2.7 and have previously been reviewed and accepted by the staff (see McGuire SSER 2).

With regard to control systems where nonsafety-related equipment provides input to control safety-related equipment, accident actuation signals are provided to override the nonsafety-related control inputs. In addition to the override feature, nonsafety-related inputs to safety-related control systems are reviewed during the design process to ensure that no failure modes of the nonsafety-related inputs can preclude completion of the required safety actuation. The combination of the override feature and the review of nonsafety-related control inputs ensures that no unacceptable influences of nonsafety-related equipment on safety-related equipment can occur to prevent the satisfactory accomplishment of a safety function.

In addition to the design features described above, Duke Power Company performed an analysis of control systems at McGuire in response to Office of Inspection and Enforcement (IE) Information Notice 79-22. The purpose of the analysis was to determine what, if any, design changes or operator actions would be necessary to ensure that environments caused by high energy line breaks would not cause an electrical nonsafety-related control system to fail in such a manner as to complicate the event beyond the assumptions of the accident analysis. The systems considered in this analysis were identified by Westinghouse for McGuire and reviewed by the licensee for the interaction described above. The systems reviewed were the steam generator power-operated relief valve (PORV) control system, the pressurizer PORV control system, the main feedwater control

system, and the automatic rod control system. The results of this review for McGuire revealed that no design changes or operator actions were required to address the issue. Duke Power Company has recently documented the same analysis with the same results for the Catawba Nuclear Station in response to NRC Staff Question 420.3. The staff has reviewed the information provided and found the Catawba analaysis acceptable (see Catawba SER (NUREG-0954)).

This issue is also being addressed by the NRC as an Unresolved Safety Issue (A-47). Duke Power Company is following the status of this issue and will take action as appropriate when this issue is resolved.

With regard to 10CFR50.49(b)(3), McGuire Technical Specification Table 3.3-10 identifies accident monitoring instrumentation and serves as the basis for accident monitoring requirements. The items identified in Table 3.3-10 are located in a harsh environment and included in the McGuire NUREG-0588 submittal except the containment pressure transmitters, the RWST level transmitters, steamline pressure transmitters, unit vent radiation monitors, and the steam relief radiation monitors. The containment pressure transmitters, RWST level transmitters, steamline pressure transmitters and the unit vent radiation monitors are located in mild environments, and therefore, not subject to the requirements of 10CFR50.49. The steam relief readiation monitors are located in a harsh environment; however, the monitors are not required to function for the event that causes the harsh environment. Furthermore, these radiation monitors are not employed as a post-accident parameter for operator action.

It should also be noted that consistent with NUREG-0737, Supplement 1 and NRC Generic Letter 82-23 Duke Power Company has provided information to the NRC Staff regarding Regulation Guide 1.97, Revision 2. Additional qualification activities (if any) in this area will be persued upon completion of the NRC Staff's review and subsequent issuance of an SER on this subject.

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/[illegible] TECHNICAL EVALUATION REPORT ITEMS

TER ITEM	COMPONENT	MFG	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	RG36104-1081	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 151335645023 (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 1153A9 (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-$4X10^7$R; 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 $1.2X10^7$R. 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 J10 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 J10 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 supplemental documentation to WCAP-9157 has established a 10 year qualified life for the Rosemount Model 176KS RTD's. The applicable equipment summary sheet has been revised to reflect this supplemental documentation (Attachment 1, Page 10).

- 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
35	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)

These Valcor solenoid valves have two basic applications at McGuire - system isolation (de-energize upon receipt of a safety signal) and containment hydrogen sampling (periodically energize to open sample lines). Recent qualification program results (Valcor Report QR 70900-21-1 and 3) demonstrate proper qualification for the system isolation function; however, qualification for longer than 2 days post DBE for the containment hydrogen sampling application has not been demonstrated by the Valcor program. Therefore, this JCO addresses only the hydrogen sampling application for these solenoid valve operators.

As originally designed, the sample valves for the containment hydrogen sampling system were to be normally closed when its associated solenoid was de-energized. This design required the system operator to open the sample valves (i.e., energize the solenoids) to take a containment air sample. However, because of the qualification program results regarding long term operability demonstrated (2 days post DBE) versus the system operability requirement (10 days post DBE), a system design change is currently being implemented. This design change now makes the sample valves normally open when the solenoid is de-energized, thereby assuring that a containment air sample would be available for at least 10 days post DBE. It should be noted that the containment isolation function for the hydrogen sample system is performed by other qualified valves.

Duke Power Company is reviewing the Valcor qualification program results to determine the action required to extend the post DBE operability of these solenoid operators. Resolution of this issue is scheduled for March, 1985 and may involve solenoid valve modifications or permanent system design changes.

MCGUIRE NUCLEAR STATION UNITS 1 AND 2
RESOLUTION OF 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 not 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 9psig.

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 encouraged 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.

Resolution:

The equipment summary sheet (Attachment 3, page 30a) has been revised to reflect new documentation (TR-060) which qualifies the Magnetrol level switch to its postulated accident environment.

MCGUIRE NUCLEAR STATION - UNITS 1 AND 2
RESOLUTION OF 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.

Resolution: Review of the Minco strap-on RTD's qualification report has been completed and qualification of the RTD's is documented in Attachment 1, page 10A.

MCGUIRE NUCLEAR STATION - UNITS 1 AND 2
RESOLUTION OF 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.

Resolution:

Change-out of the Allis Chalmers pump motor to Reliance pump motors is complete and qualification of the Reliance pump motors is documented in Attachment 4, Page 7.

ATTACHMENT 1

SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT

LOCATED INSIDE CONTAINMENT

Page	Rev.	Page	Rev.	Page	Rev.
1	1	1N1	1		
2	1	1N2	2		
3	1	1N3	1		
4	2				
4A	0				
5	1				
6	1				
7	1				
8	1				
8A	0				
9	2				
10	2				
10A	0				
11	1				
12	1				
13	1				
14	1				
15	1				
15A	0				
16	1				
17	1				
18	2				
19	1				
20	1				
21	1				
22	1				
23	1				
23A	1				
24	1				
25	1				
26	1				
27	1				
28	1				
29	2				
30	1				
30A	D				
31	2				
32	1				
33	1				
34	2				
35	2				

D = Deletion

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT
LOCATED INSIDE CONTAINMENT

EQUIPMENT ID: (1) Transmitter - Pressurizer Pressure (Lower Containment) (Unit 1)

MANUFACTURER: Barton (NSSS)

MODEL #: 763 (Lot 2)

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $2.5X10^6R$ Chem Spray: N/A	Temp: 380°F Press: 75 psig RH: 100% Rad: $5X10^7R$ Chem Spray: Boric acid and sodium hydroxide soln. 2750 ppm Boron, 8.5 pH	SI Initiation (<5 min.)	5 minutes post DBE	+10%	Max. Error 7.7% (5 min.)

QUALIFICATION REPORT: WCAP 9885 (MCM-1399.03-439)

METHOD: Test

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT
LOCATED INSIDE CONTAINMENT

EQUIPMENT ID: (1) Transmitter - Pressurizer Level (Lower Containment) (Unit 1)

MANUFACTURER: Barton (NSSS)

MODEL #: 764 (Lot 2)

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $1.4X10^7$R Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 380°F Press: 75 psig RH: 100% Rad: $5X10^7$R Chem Spray: Boric acid and sodium hydroxide soln. 2750 ppm Boron, 8.5 pH	2 weeks post DBE	4 months post DBE	± 25%	Max. Error 15%

QUALIFICATION REPORT: WCAP 9885 (MCM-1399.03-439)

METHOD: Test

EQUIPMENT ID: (1) Transmitter - S/G Level (NR) (Lower Containment) (Unit 1)

MANUFACTURER: Barton (NSSS)

MODEL #: 764 (Lot 2)

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $2.3X10^7$R Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 380°F Press: 75 psig RH: 100% Rad: $5X10^7$R Chem Spray: Boric acid and sodium hydroxide soln. 2750 ppm Boron, 8.5 pH	Reactor trip (<5 min.) Plus 4 months post DBE	4 months post DBE	Trip Function: +5% (5 min) PAM Function: ± 25% (4 mo)	<+5% (5 min) Max Error 15% (4 mo) (Note 5)

QUALIFICATION REPORT: WCAP 9885 (MCM-1399.03-439)

METHOD: Test

EQUIPMENT ID: (1) Transmitter - RCS Flow (Lower Containment) (Unit 1)

MANUFACTURER: Veritrak (NSSS)

MODEL #: 59DP4

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)

The RCS flow signals are not required for accidents that cause a change in the normal containment operating environment.

Failure of the RCS flow transmitters due to the adverse environment following an accident will not prejudice the safety function of other equipment claimed in the accident analysis. Additionally, the information provided by this instrument is not employed as a post-accident monitoring parameter.

QUALIFICATION REPORT: N/A

METHOD: N/A

EQUIPMENT ID: (1) Transmitter - Main Steam Flow (Unit 1)

MANUFACTURER: Veritrak

MODEL #: 76DP1

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)

The Main Steam flow signals are not required for accidents that cause a change in the normal containment operating environment

Failure of the Main Steam flow transmitters due to the adverse environment following an accident will not prejudice the safety function of other equipment claimed in the accident analysis. Additionally, the information provided by this instrument is not employed as a post-accident monitoring parameter.

QUALIFICATION REPORT: N/A

METHOD: N/A

EQUIPMENT ID: (1) Transmitter - Pressurizer Pressure (Lower Containment) (Unit 2)

MANUFACTURER: Barton (NSSS)

MODEL #: 763 (Lot 4, Lot 5)

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $2.5X10^6R$ Chem Spray: N/A	Temp: 420°F Press: 57 psig RH: 100% Rad: $5X10^7R$ Chem Spray: Boric acid and sodium hydroxide soln. 2500 ppm Boron, 10.7 pH	SI Initiation (<5 min.)	5 minutes post DBE	+10%	+10%

QUALIFICATION REPORT: WCAP 8587 Supp. 1, EQDP-ESE-1 and WCAP 8687 Supp. 2, E01A (MCM-1399.03-0472)

METHOD: Test

EQUIPMENT ID: (1) Transmitter - Pressurizer Level (Lower Containment) (Unit 2)

MANUFACTURER: Barton (NSSS)

MODEL #: 764 (Lot 4, Lot 5)

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $2.5X10^6R$ Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 420°F Press: 57 psig RH: 100% Rad: $5X10^7R$ Chem Spray: Boric acid and sodium hydroxide soln. 2500 ppm Boron, 10.7 pH	2 weeks post DBE	4 months post DBE	±25%	±15%

QUALIFICATION REPORT: WCAP 8587 Supp. 1, EQDP - ESE-3 and WCAP 8687 Supp. 2, E03A (MCM-1399.03-0472)

METHOD: Test

EQUIPMENT ID: (1) Transmitter - S/G Level (NR) (Lower Containment) (Unit 2)

MANUFACTURER: Barton (NSSS)

MODEL #: 764 (Lot 4, Lot 5)

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $2.3X10^7$R Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 420°F Press: 57 psig RH: 100% Rad: $5X10^7$R Chem Spray: Boric acid and sodium hydroxide soln. 2500 ppm Boron, 10.7 pH	Reactor trip (<5 Minutes) Plus 4 months post DBE	4 months post DBE	Trip Function +5% (5 Minutes) PAM Function: ±25% (4 months)	+5% (5 min) ±15% (4 months)

QUALIFICATION REPORT: WCAP 8587 Supp. 1, EQDP-ESE-3 and WCAP 8687 Supp. 2, E03A (MCM-1399.03-0472)

METHOD: Test

EQUIPMENT ID: (1) Transmitter - RCS Flow (Lower Containment) (Unit 2)

MANUFACTURER: Barton

MODEL #: 764

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)

The RCS flow signals are not required for accidents that cause a change in the normal containment operating environment.

Failure of the RCS flow transmitters due to the adverse environment following an accident will not prejudice the safety function of other equipment claimed in the accident analysis. Additionally, the information provided by this instrument is not employed as a post-accident monitoring parameter.

QUALIFICATION REPORT: N/A

METHOD: N/A

EQUIPMENT ID: (1) Transmitter - Main Steam Flow (Unit 2)

MANUFACTURER: Barton

MODEL #: 764

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)

The Main Steam flow signals are not required for accidents that cause a change in the normal containment operating environment.

Failure of the Main Steam flow transmitters due to the adverse environment following an accident will not prejudice the safety function of other equipment claimed in the accident analysis. Additionally, the information provided by thisinstrument is not employed as a post-accident monitoring parameter.

QUALIFICATION REPORT: N/A

METHOD: N/A

EQUIPMENT ID: (1) RTD - RCS Temperature (NR) (Lower Containment)

MANUFACTURER: Rosemount (NSSS)

MODEL #: 176 KF

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $1X10^8R$ Chem Spray: N/A	Temp: 332°F Press: 66 psig RH: 100% Rad: $1X10^8R$ Chem Spray: Boric acid and sodium hydroxide soln. 1.146 wt % Boric acid 8.5 pH	Reactor Trip (<5 min.)	5 minutes post SLB	±0.2%	±0.2%

QUALIFICATION REPORT: WCAP 9157 and Duke letter Parker to Denton dated December 19, 1979 (MCM-1399.03-0438)

METHOD: Test/Analysis

EQUIPMENT ID: (1) RTD - RCS Temperature (WR) (Lower Containment)

MANUFACTURER: Rosemount (NSSS)

MODEL #: 176 KS

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $1X10^8R$ Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 332°F Press: 66 psig RH: 100% Rad: $1X10^8R$ Chem Spray: Boric acid and sodium hydroxide soln. 1.46 wt. % Boric acid 8.5 pH	2 weeks post DBE	2 weeks post DBE	±0.2%	±0.2%

QUALIFICATION REPORT: WCAP 9157 and Supplemental Documentation dated July 20, 1983 and Duke letter Parker to Denton dated December 19, 1979 (MCM-1399.03-0438)

METHOD: Comparison to Model 176 KF, Test/Analysis

EQUIPMENT ID: RTD - Temp. Comp. RVLIS (1) MANUFACTURER: MINCO MODEL #: S8809 S8810

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $1X10^8R$ Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 420°F Press: 75 psig RH: 100% Rad: $1.6X10^8R$ Chem Spray: 2750 PPM H_3BO_3 NaOH to 10.7 pH	4 months post DBE	4 months	±5.0°F ±1.19%	±1.0°F ± .24%

QUALIFICATION REPORT (4): EQDP-ESE-42
WCAP-8687, Supp. 2, E-42A
(MCM-1399.03-473)

METHOD: Test

EQUIPMENT ID: (1) Excore Neutron Detectors (Power Range) (Lower containment)

MANUFACTURER: W IGTD (NSSS)

MODEL #: WL-23686

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)

The power range neutron detectors are not required for accidents that cause a change in the normal containment operating environment. Further, failure of these detectors as a result of exposure to a harsh environment will not preclude the safety function of other equipment claimed in the accident analysis. Additionally, the information provided by these detectors is not employed as a post accident monitoring parameter for operator action. The flux monitoring instrumentation required per Regulatory Guide 1.97 will be provided by other equipment to be added at a later date.

QUALIFICATION REPORT: N/A

METHOD: N/A

EQUIPMENT ID: (1) Electric Hydrogen Recombiner (Upper Containment)

MANUFACTURER: W Sturtevant (NSSS)

MODEL #: A

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 180°F Press: 14.8 psig RH: 100% Rad: $8.1X10^7$R Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 309°F Press: 62 psig RH: 100% Rad: $2X10^8$R Chem Spray: Boric acid and sodium hydroxide soln. 2500 ppm Boron, 10 pH	3 months post LOCA	1 year post LOCA	N/A	N/A

QUALIFICATION REPORT: WCAP 7820 and Supplements 1-4, WCAP 7709-L and Supplements 1-4 (MCM-1399.36-0004)

METHOD: Test

EQUIPMENT ID: (1) Containment Air Return Fan Motors (Upper Containment)

MANUFACTURER: Joy/Reliance

MODEL #: 2XF-330081

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 180°F Press: 14.8 psig RH: 100% Rad: $7.6X10^7R$ Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 350°F Press: 85 psig RH: 100% Rad: $1X10^9R$ Chem Spray: Boric acid and sodium hydroxide soln. 3000 ppm Boron, 10.5 pH	2 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Test Report X-604 (MCM-1211.00-1147); Test Report NUC-9, and Supplement dated 4/14/80 (MCM-1211.00-1559)

METHOD: Test

EQUIPMENT ID: (1) Hydrogen Skimmer Fan Motors (Upper Containment)

MANUFACTURER: Joy/Reliance

MODEL #: 1 YF-882315

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 180°F Press: 14.8 psig RH: 100% Rad: $7.6X10^7$R Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 350°F Press: 85 psig RH: 100% Rad: $1X10^9$R Chem Spray: Boric acid and sodium hydroxide soln. 3000 ppm Boron, 10.5 pH	2 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Test Report X-604 (MCM-1211.00-1147); Test Report NUC-9 and Supplement dated 4/14/80 (MCM-1211.00-1559)

METHOD: Test

EQUIPMENT ID: (1) Valve Motor Operators (Lower Containment)

MANUFACTURER: Rotork

MODEL #: NA-1 (S/N < B-4800)

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $6.7X10^7$R Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 340°F Press: 75 psig RH: 100% Rad: $2X10^8$R Chem Spray: Boric acid and sodium hydroxide soln. 1750 ppm Boron, 7-9pH	5 min. (Notes 7 and 8)	30 days post DBE	N/A	N/A

QUALIFICATION REPORT: Test Reports N11/4, December 1970; TR 116, October 1973; TR 222, June 1975 (MCM-1205.34-0001)

METHOD: Test

EQUIPMENT ID: (1) Valve Motor Operators (Lower Containment)

MANUFACTURER: Rotork

MODEL #: NA-1 (S/N > B-4800)

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $6.7X10^7$R Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 385°F Press: 75 psig RH: 100% Rad: $2X10^8$R Chem Spray: Boric acid and sodium hydroxide soln. 6200 ppm Boron, 9.5pH	5 min. (Notes 7 and 8)	30 days post DBE	N/A	N/A

QUALIFICATION REPORT: Rotork Report 43979-1 Rev. A dated December 19, 1978 (MCM-1205.34-0010)

METHOD: Test

EQUIPMENT ID: (1) Valve Motor Operators (Lower Containment)

MANUFACTURER: Limitorque

MODEL #: SMB (Order#: 383584-A, 391179-A, 391179-B)

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 180°F Press: 14.8 psig RH: 100% Rad: $4X10^6R$ Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 340°F Press: 105 psig RH: 100% Rad: $2X10^8R$ Chem Spray: Boric acid and sodium hydroxide soln. 3000 ppm Boron, 10.5 pH	5 min. (Notes 7 and 8)	30 days post DBE	N/A	N/A

QUALIFICATION REPORT: Limitorque Test Report B0058, Appendix B and C, January 11, 1980 (MCM-1205.34-0002)

METHOD: Test

EQUIPMENT ID: (1) Valve Solenoid Operators (Lower Containment)

MANUFACTURER: Valcor

MODEL #: V526, V573

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $7.5X10^7R$ Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 346°F Press: 113 psig RH: 100% Rad: $2X10^8R$ Chem Spray: Boric acid and sodium hydroxide soln. 1720-2200 ppm Boron, 9.5-10.5 pH	Operate upon receipt of a safety signal	31 days post DBE	N/A	N/A

QUALIFICATION REPORT: Test Report QR-52600-5940-2 dated July 5, 1979 (MCM-1205.34-0012)

METHOD: Test

EQUIPMENT ID: (1) Valve Solenoid Operators (Lower Containment)

MANUFACTURER: Valcor

MODEL #: V70900-21-1, V70900-21-3

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $2.0X10^7$R Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 431°F Press: 87 psig RH: 100% Rad: $2.2X10^8$R Chem Spray: Boric acid and sodium hydroxide soln. 2000 ppm Boron, 11.5 pH	See JIO	See JIO	N/A	N/A

QUALIFICATION REPORT: Valcor Report QR70900-21-1/3 (MCM-1210.04-0193)

METHOD: Test

MPIC

EQUIPMENT ID: (1) Containment Air Return Isolation Damper Motor (Upper Containment)

MANUFACTURER: Rotork

MODEL #: 11NAZ1

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 180°F Press: 14.8 psig RH: 100% Rad: $8.1X10^5R$ Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 340°F Press: 75 psig RH: 100% Rad: $2X10^8R$ Chem Spray: Boric acid and sodium hydroxide soln. 1750 ppm Boron, 7-9 pH	5 min. (max) post DBE	30 days post DBE	N/A	N/A

QUALIFICATION REPORT: Test Report N11/4, December 1970; Test Report TR116, October 1973; TR222, June 1975 (MCM-1205.34-0001)

METHOD: Test

EQUIPMENT ID: (1) Valve Solenoid Operators (Lower Containment)

MANUFACTURER: ASCO

MODEL #: NP8316E34E, NP8316E36E

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $2.0X10^7$R Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 346°F Press: 110 psig RH: 100% Rad: $2X10^8$R Chem Spray: Boric acid and sodium hydroxide soln. 3000 ppm Boron, 9.5-10.5 pH	De-energize upon receipt of safety signal (<5 min. post DBE) (Note 7)	30 days post DBE	N/A	N/A

QUALIFICATION REPORT: Test Report AQS21678/TR (MCM-1210.04-0117)

METHOD: Test

EQUIPMENT ID: (1) Valve Solenoid Operators (Lower Containment)

MANUFACTURER: Target Rock

MODEL #: 79L

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $5.7X10^7$R Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 385°F Press: 66 psig RH: 100% Rad: $1.3x10^8$R Chem Spray: Boron, acid and hydrazine 6200 ppm Boron, 8.6-10 pH	(Note 9)	14 days post DBE	N/A	N/A

QUALIFICATION REPORT: Test Report 2375, 9/26/79 (MCM-1205.34-0007)

METHOD: Test

EQUIPMENT ID: (1) Differential Pressure Switch for Damper Control (Upper Containment)

MANUFACTURER: Solon

MODEL #: 7PS1ADW

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 140°F Press: 14.8 psig RH: 100% Rad: $8.1X10^5R$ Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 150°F Press: 15 psig RH: 100% Rad: $2.1X10^6R$ Chem Spray: Boric acid and sodium tetraborate soln. 2000-4000 ppm Boron, 4.7 pH	1 min. post DBE	5 min. post DBE	± 0.5 psig	± 0.3 psig

QUALIFICATION REPORT: Test Reports A293-80 (MCM-1211.00-1505); Test Report A294-80 (MCM-1211.00-1506); Report A-276-80-1 (MCM-1211.00-1489); Test Specification MCS-1211.00-0006, Supplement 9

METHOD: Test

EQUIPMENT ID: (1) Electrical Penetrations (Lower Containment)

MANUFACTURER: D.G. O'Brien

MODEL #: Types A,B,C,D,E,F,G,H,J,K, L,M, cathodic protection penetration and spares (Note 10)

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $8.5X10^7$R Chem Spray: Boric acid and sodium tetraborate soln. (Note 11)	Temp: 340°F Press: 15 psig RH: 100% Rad: $2X10^8$R Chem Spray: Boric acid and sodium hydroxide soln. 4000 ppm Boron, 8.8 pH	4 months post DBE	4 months post DBE	N/A	N/A

QUALIFICATION REPORT: D.G. O'Brien, Inc. Test Reports ER-247, ER-252, and ER-227 (Types A,B,C,D,E,F,G,H,J,K,L,M and Cathodic Protection); Wyle Laboratories Test Report 45869-1 (Types B,C,D,E,F,G,H,J,K,L and M); Duke Letter Tucker to Denton dated November 18, 1982 (MCM-1480.08-0001, 2 & 3, and MCM-1361.00-0042)

METHOD: Test/Analysis

EQUIPMENT ID: (1) Electrical Penetrations (Lower Containment)

MANUFACTURER: Conax Corporation

MODEL #: Type N and BH

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $1x10^8$R Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 342°F Press: 80 psig RH: 100% Rad: $2.0x10^8$R Chem Spray: Boric acid 2050 PPM Boron 6-10 pH	1 year post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT(4): Conax Qualification Report No. IPS-1037 (MCM-1361.00-0061)

METHOD: Test/Analysis

EQUIPMENT ID: (1) Cable- Control and Power (Lower Containment)

MANUFACTURER: Okonite

MODEL #: EP, EP/Hypalon and FREP Insulation (Procurement Specs: MCS-1354.01-1,2, 3&4 MCS-1354.02-4,6&9)

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $6.7X10^7$R Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 345°F Press: 104 psig RH: 100% Rad: $2X10^8$R Chem Spray: Boric acid, sodium hydroxide and sodium thiosulfate soln. 3000 ppm Boron, 10.5 pH	30 days post DBE	130 days post DBE	N/A	N/A

QUALIFICATION REPORT: Test Reports N1 dated May 2, 1975 (MCM-1354.00-0010); G1 dated February 17, 1976 (MCM-1354.00-0045), G3 dated June 28, 1979 (MCM-1354.00-0012); FN-1 dated July 3, 1978 (MCM-1354.00-0013)

METHOD: Test

EQUIPMENT ID: (1) Cable - Control (Lower Containment)

MANUFACTURER: Okonite

MODEL #: Tefzel 280 Insulation (Procurement Spec: MCS-1354.04-6)

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $8.5X10^7$R Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 341°F Press: 112 psig RH: 100% Rad: $2X10^8$R Chem Spray: Boric acid, sodium hydroxide and sodium thiosulfate soln. 3000 ppm Boron, 10.5 pH	4 months post DBE	130 days	N/A	N/A

QUALIFICATION REPORT: Test Report K-0-1, September 1979 (MCM-1354.00-0011) and K-8-1, April 4, 1981 (MCM-1354.00-0044)

METHOD: Test

EQUIPMENT ID: (1) Cable - Control and Power (Lower Containment)

MANUFACTURER: Anaconda

MODEL #: EP and EP/Hypalon Insulation (Procurement Specs: MCS-1354.01-2 & 4 & MCS-1354.02-3,6&9)

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $9X10^7R$ Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 346°F Press: 113 psig RH: 100% Rad: $2X10^8R$ Chem Spray: Boric acid, sodium hydroxide and sodium thiosulfate soln. 3000 ppm Boron, 10.5 pH	3 months post DBE	4 months post DBE	N/A	N/A

QUALIFICATION REPORT: Test Reports F-C4350-2 (MCM-1354.00-0008) and F-C4350-3 and Supplement (MCM-1354.00-0009)

METHOD: Test

EQUIPMENT ID: (1) Cable - Control (Lower Containment)

MANUFACTURER: Brand Rex

MODEL #: XLPE Insulation (Procurement Specs: MCS-1354.02-4,5,7 & 9, & MCS-1354.04-14)

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $7.5X10^7R$ Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 346°F Press: 113 psig RH: 100% Rad: $2X10^8R$ Chem Spray: Boric acid and sodium hydroxide soln. 6200 ppm Boron, 10 pH	30 days post DBE	120 days post DBE	N/A	N/A

QUALIFICATION REPORT: Test Reports FC4113 (MCM-1354.00-0007); FC5120-1 (MCM-1354.00-0023); and FC5120-3 (MCM-1354.00-0024)

METHOD: Test

EQUIPMENT ID: (1) Cable - Instrumentation (Lower Containment)

MANUFACTURER: Eaton (Samuel Moore)

MODEL #: EP/Hypalon Insulation (Procurement Specs: MCS-1354.03-1, 2,3&5 & MCS-1354.04-2&5)

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $7.5X10^7R$ Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 340°F Press: 105 psig RH: 100% Rad: $2X10^8R$ Chem Spray: Boric acid and sodium hydroxide soln. 2000 ppm Boron, 9-11 pH	30 days post DBE	30 days post DBE	N/A	N/A

QUALIFICATION REPORT: Test Report F-C3683 (MCM-1354.00-0006)

METHOD: Test

EQUIPMENT ID: (1) Cable Termination/ Splice Material (Lower Containment)

MANUFACTURER: Raychem

MODEL #: WCSF-N Sleeves and Breakouts

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $8.5X10^7$R Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 357°F Press: 70 psig RH: 100% Rad: $2X10^8$R Chem Spray: Boric acid and sodium hydroxide soln. 3000 ppm Boron, 10.5 pH	4 months post DBE	4 months post DBE	N/A	N/A

QUALIFICATION REPORT: Test Reports F-C4033-3, (MCM-1367.01-0001) 71100, (MCM-1367.01-0003), and 2001 (MCM-1354.00-0034)

METHOD: Test/Analysis

EQUIPMENT ID: (1) Stem-Mounted Limit Switches (Lower Containment)

MANUFACTURER: NAMCO

MODEL #: EA 180, EA 740

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $6.7X10^7$R Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 340°F Press: 66 psig RH: 100% Rad: $2X10^8$R Chem Spray: Boric acid and sodium hydroxide soln. 3000 ppm Boron, 10.5 pH	5 min (Note 8)	30 days post DBE	N/A	N/A

QUALIFICATION REPORT: Namco Reports QTR-106, Rev. 3 dated September 2, 1981 (MCM-1205.34-0009), and QTR 111, Rev. 0 dated October 1, 1981 (MCM-1205.34-0008)

METHOD: Test

EQUIPMENT ID: (1) Seal Material for Cable Entrances and Termination Fittings (Lower Containment)

MANUFACTURER: 3M

MODEL #: Scotch Cast 9 (XR-5240)

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $6.7X10^7R$ Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 340°F Press: 15 psig RH: 100% Rad: $2X10^8R$ Chem Spray: Boric acid and sodium hydroxide soln. 4000 ppm Boron.	4 months	4 months post DBE	N/A	N/A

QUALIFICATION REPORT: Wyle Test Report 44390-1, Rev. A (MCM-1364.00-0005)

METHOD: Test/Analysis

EQUIPMENT ID: (1) Containment Radiation Monitors-High Range (Lower Containment)

MANUFACTURER: General Atomic

MODEL #: RD-23 Ionizatio. Chamber

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 240°F Press: 14.8 psig RH: 100% Rad: $8X10^7R$ Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 315°F Press: 70 psig RH: 100% Rad: Note 12 Chem Spray: Boric acid and sodium thiosulfate and sodium hydroxide, 3000 ppm Boron, 10.5 pH	2 weeks post LOCA	18 days post LOCA	Note 13	Note 13

QUALIFICATION REPORT: General Atomic Test Report E-254-960 dated May 1, 1981 (MCM-1346.05-0137)

METHOD: Test/Analysis

EQUIPMENT ID: (1) Cable for Containment Radiation Monitors - High Range (Lower Containment)

MANUFACTURER: Rockbestos

MODEL #: RSS-6-104-1081 (Second Generation)

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 240°F Press: 14.8 psig RH: 100% Rad: $8X10^7R$ Chem Spray: Note 14	Temp: 315°F Press: 70 psig RH: 100% Rad: $2X10^8R$ Chem Spray: Boric acid and sodium thiosulfate and sodium hydroxide 3000 ppm Boron, 10.5 pH	2 weeks post LOCA	1 year post LOCA	N/A	N/A

QUALIFICATION REPORT: Rockbestos Test Report 2806 (MCM-1354.00-0040)

METHOD: Test

EQUIPMENT ID: (1) Acoustical Valve Position Monitors-accelerometers, charge converters and cables (Lower Containment)

MANUFACTURER: TEC

MODEL #: 2273A Accelerometers
504A Charge Converter
160-2 Transient Shield
2273-C2 Cable Assembly

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.8 psig RH: 100% Rad: $8X10^7R$ Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 510°F Press: 85 psig RH: 100% Rad: $2X10^8R$ Chem Spray: Boric acid, hydrazine and sodium phosphate soln. 2300 ppm Boron, 7-7.5 pH	2 weeks post DBE	1 month post DBE	N/A	N/A

QUALIFICATION REPORT: TEC Test Report 517-TR-03 Rev. 3(MCM-1346.17-0009, 10,11,12,13,14 & 16)

METHOD: Test

EQUIPMENT ID: Incore Thermocouple System (1) Cables and Connectors

MANUFACTURER: Combustion Engineers

MODEL #: N/A

ACCIDENT ENVIRONMENT (2)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT(3)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 327°F Press: 14.4 psig RH: 100% Rad: $1.3X10^8R$ Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 460°F Press: 100 psig RH: 100% Rad: $2.1X10^8R$ Chem Spray: Boric acid and sodium hydroxide 3000 ppm Boron pH 10.3	4 months post-DBE	4 months post-DBE	N/A	N/A

QUALIFICATION REPORT: Combustion Engineering Report No. 17682-CCE-SR80-1, Rev. 00

METHOD: Test

Note: Unit 1 in-containment components installed
Unti 2 in-containment components to be installed prior to start-up following first refueling outage.

MCGUIRE NUCLEAR STATION - UNITS 1 AND 2

ENVIRONMENTAL QUALIFICATION OF CLASS 1E
EQUIPMENT LOCATED INSIDE CONTAINMENT

Note 1

All equipment identified in this table is located inside the containment. Specific locations with regard to upper or lower containment are noted for each equipment type.

Note 2

The parameters that compose the overall worst-case containment accident environment are as follows:

Temperature (Upper Containment): 180F peak; time history as shown in FSAR Figure 6.2.1-24 (Rev. 36).

Temperature (Lower Compartment): 327F peak; time history as shown in FSAR Supplement 1, Q042.73, Figure 7 Revision 39.

Pressure (Upper and Lower Compartment): 14.8 psig peak; time history as shown in FSAR Figure 6.2.1-23 (Rev. 36).

Relative Humidity: 100%

Radiation: Total integrated radiation dose for the equipment location includes 40 year normal operating dose plus the appropriate accident dose.

Chemical Spray: Boric acid and sodium tetraborate spray resulting from mixing in the containment sump of borated water from the RWST and sodium tetraborate solution from ice bed melt. Concentrations are as follows:

Initial Spray:	2000 - 2100 ppm Boron 4.0 - 4.7 pH
Recirculation Spray:	1800 - 2200 ppm Boron 6.0 - 10.0 pH

Note 3

Equipment operability requirements in the containment accident environment are as identified in FSAR Table 3.11.1-1 (Rev. 43).

Note 4

Deleted

Note 5

A requirement for McGuire is to limit the positive error for the trip function of narrow-range steam generator level transmitters to +5%. The original Lot 2 report noted an error of +7.3% early in the steam test transient. Additional tests were performed on the same unit using water as the process medium instead of nitrogen. This caused the temperature of the strain gage to track the temperature of the circuit board more closely during the first minute and limited the positive error to less than 4%. In other words, the temperature difference between the strain gage and the circuit board has been reduced to a level compatible to McGuire functional requirements.

Note 6

Deleted

Note 7

Five minutes is adequate time to assure containment isolation and the required repositioning of other safety-related valves.

Note 8

During the 30 days following a postulated accident, the containment temperature and pressure will approach normal; therefore, additional service can reasonably be expected from this equipment.

Note 9

The Target Rock solenoid valves are used in the reactor head vent system to provide a path for removal of non-condensable gases. Core events leading to the generation of significant amounts of non-condensable gases occur early in the postulated accident sequences and are of short duration; therefore, these valves are only required to operate within the first few days of the accident. The need for venting non-condensable gases is not anticipated beyond the 14 day qualification of the valves.

Note 10

Electric penetration types B, C, F, G, H and K are the only penetrations required to function electrically in the containment accident environment. All electric penetrations, however, are designed and qualified to maintain their mechanical integrity under normal and postulated accident environmental conditions.

Note 11

The McGuire electric penetrations are protected from direct spray impingement by galvanized steel boxes.

Note 12

The manufacturer's test report states that the detector assembly is constructed of metal and ceramic and is not affected by radiation.

Note 13

This equipment has been installed per NRC requirements stated in NUREG 0737. Overall system accuracy should be within a factor of 2 over the entire range as stated in Regulatory Guide 1.97, Rev. 2*. The calibrated accuracy of the system is ±20% of the system's range.

Note 14

The cables for the containment radiation monitors (high range) which are located inside the containment are routed in conduit, and, therefore not exposed to chemical spray.

Note 15

Deleted

Note 16

Deleted

ATTACHMENT 2

SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT

LOCATED IN THE ANNULUS

Page	Rev.	Page	Rev.	Page	Rev.
1	2				
1a	0				
2	1				
2A	0				
3	1				
4	1				
5	1				
5A	0				
6	1				
7	1				
7A	0				
8	1				
8A	0				
9	1				
9A	D				
10	1				
11	1				
12	1				
13	1				
14	1				
15	1				
16	2				
17	D				
18	1				
19	1				
20	1				
21	1				
22	1				
23	1				
2N1	2				

D = Deletion

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT
LOCATED IN THE ANNULUS

EQUIPMENT ID: Transmitter-Containment Sump Level

MANUFACTURER: Barton

MODEL #: 386A

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $1.2X10^7$R	Temp: 172°F RH: 100% Rad: $2X10^8$R	4 months post DBE	1 year post DBE	±13%	±13%

QUALIFICATION REPORT: Wyle Test Report 43904-1, Vol. I - Rev. C, Vol. II - Rev B (MCM-1210.04-0016)

METHOD: Test

MPIC

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT
LOCATED IN THE ANNULUS

EQUIPMENT ID: Transmitter-Annulus Pressure MANUFACTURER: Barton MODEL #: 386A

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $1.2X10^7$R	Temp: 172°F RH: 100% Rad: $2X10^8$R	4 months post DBE	1 year post DBE	±13%	±13%

QUALIFICATION REPORT: Wyle Test Report 43904-1, Vol. I - Rev. C, Vol. II - Rev B (MCM-1210.04-0016)

METHOD: Test

EQUIPMENT ID: Transmitter-RCS Pressure (WR) (Unit 1) MANUFACTURER: Rosemount MODEL #: 1153GA9

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: 1.0×10^6R	Temp: 350°F RH: 100% Rad: 4×10^7R	4 months post DBE	1 year post DBE	± 10%	±6.95%

QUALIFICATION REPORT: Rosemont Test Report 3788, Rev. A (MCM-1210.04-0173)

METHOD: Type Test Similarity

MPIC

EQUIPMENT ID: Transmitter-RCS Pressure (WR) (Unit 2) MANUFACTURER: Rosemount MODEL #: 1153GD9

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $2x10^6$R	Temp: 350°F RH: 100% Rad: $4X10^7$R	4 months post DBE	1 year post DBE	± 10%	-5.5%

QUALIFICATION REPORT: Wyle Test Report 45592-1 (MCM-1210.04-0178)

METHOD: Type Test

MPIC

EQUIPMENT ID: Transmitter-RCS Pressure (WR) (Unit 1) MANUFACTURER: Barton MODEL #: 763 (Lot 2)

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $1.2X10^7$R	Temp: 380°F RH: 100% Rad: $5X10^7$R	2 weeks post DBE	1 year post DBE	± 10%	± 7.7%

QUALIFICATION REPORT: WCAP 9885 (MCM-1399.03-0439)

METHOD: Test

EQUIPMENT ID: Transmitter - RCS Pressure (WR) (Unit 2) MANUFACTURER: Barton MODEL #: 763 (Lot 5)

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $1.2X10^7$R	Temp: 420°F RH: 100% Rad: $5X10^7$R	2 weeks post DBE	1 year post DBE	± 10%	±10%

QUALIFICATION REPORT: WCAP 8587 Supp. 1, EQDP-ESE-1 and WCAP 8687 Supp. 2, E01A (MCM-1399.03-0472)

METHOD: Test

EQUIPMENT ID: Valve Solenoid Operators MANUFACTURER: Valcor MODEL #: V70900-21-3

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $1X10^4$R	Temp: 346°F RH: 100% Rad: $2X10^8$R	De-energize upon receipt of a safety signal (5 minutes post DBE) (Note 3)	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Test Reports QR-52600-515-Rev. B (MCM-1210.04-0115); QR-70900-21-1-Rev. A (MCM-1210.04-0118); MR7095-21-3-1 (MCM-1210.04-0119)

METHOD: Test/Similarity

EQUIPMENT ID: Valve Solenoid Operators MANUFACTURER: Valcor MODEL #: V526

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $1X10^4R$	Temp: 346°F RH: 100% Rad: $2X10^8R$	De-energize upon receipt of a safety signal (5 minutes post DBE) (Note 3)	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Test Report QR-52600-5940-2 dated July 5, 1979 (MCM-1205.34-0012)

METHOD: Test

EQUIPMENT ID: Valve Solenoid Operators MANUFACTURER: ASCO MODEL #: NP8316E34E

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $1X10^4R$	Temp: 346°F RH: 100% Rad: $2X10^8R$	De-energize upon receipt of a safety signal (5 minutes post DBE) (Note 3)	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Test Report AQS21678/TR (MCM-1210.04-0117)

METHOD: Test

EQUIPMENT ID: Valve Motor Operators MANUFACTURER: Rotork MODEL #: NA-1 (S/N <B-4800)

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $1X10^4$R	Temp: 340°F RH: 100% Rad: $2X10^8$R	5 minutes post DBE (Note 3)	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Test Reports N 11/4 dated 12/70; TR-116 dated 10/73; TR-222 dated 6/75 (MCM-1205.34-0001)

METHOD: Test

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT
LOCATED IN THE ANNULUS

EQUIPMENT ID: Valve Motor Operators MANUFACTURER: Rotork MODEL #: NA-1 (S/N >B-4800)

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $1X10^4$R	Temp: 385°F RH: 100% Rad: $2X10^8$R	5 minutes post DBE (Note 3)	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Wyle 43979-1, Rev. A, dated December 19, 1978 (MCM-1205.34-0010)

METHOD: Test

EQUIPMENT ID: Valve Motor Operators MANUFACTURER: Rotork MODEL #: NA-2

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $1X10^4$R	Temp: 163°F RH: 100% Rad: $3X10^7$R	5 minutes post DBE (Note 3)	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Test Reports N11/4 dated 12/70, TR-116 dated 10/73, TR-222 dated 6/75 (MCM-1205.34-0001)

METHOD: Test

EQUIPMENT ID: Valve Motor Operators

MANUFACTURER: Limitorque

MODEL #: SMB
(Order #: 383584-A, 391179-A, 391179-B)

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $1X10^4$R	Temp: 340°F RH: 100% Rad: $2x10^8$R	5 minutes post DBE (Note 3)	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Limitorque Test Report B0058, Appendix B and C, dated 01/11/80 (MCM-1205.34-0002)

METHOD: Test

EQUIPMENT ID: Stem-Mounted Limit Switches MANUFACTURER: NAMCO MODEL #: EA-180

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $1X10^4R$	Temp: 385°F RH: 100% Rad: $2.3X10^8R$	5 minutes post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: NAMCO Report QTR106, Rev. 3, dated 09/02/81 (MCM-1205.34-0009)

METHOD: Test

EQUIPMENT ID: Limit Switch MANUFACTURER: Microswitch MODEL #: LSM4N

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)

This equipment will be removed from safety power before startup after the first refueling. This equipment provides damper position indication only and is not used as a basis for any required operator action. Additionally, failure of these switches will not prevent satisfactory accomplishment of any required safety function.

EQUIPMENT ID: Cable - Triaxial Instrumentation MANUFACTURER: Boston Insulated MODEL #: XLPE Insulation (Procurement Spec: MCS-1354.04-13)

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $3X10^7$R	Temp: 300°F RH: 100% Rad: $2X10^8$R	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: B.I.W. Test B912 (MCM-1354.00-0017)

METHOD: Test

EQUIPMENT ID: Cable - Instrumentation

MANUFACTURER: Brand Rex

MODEL #: XLPE Insulation (Procurement Specs: MCS-1354.03-8 & MCS-1354.04-6)

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $3X10^7$R	Temp: 346°F RH: 100% Rad: $2X10^8$R	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Brand Rex Test FC4113 (MCM-1354.00-0007), FC5120-1 (MCM-1354.00-0023) and FC5120-3 (MCM-1354.00-0024)

METHOD: Test

EQUIPMENT ID: Cable - Instrumentation MANUFACTURER: Eaton (Samuel Moore) MODEL #: EP/Hypalon Insulation (Procurement Specs: MCS-1354.03-1,2,3 & 5 & MCS-1354.04-2 & 5)

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $3X10^7$R	Temp: 340°F RH: 100% Rad: $2X10^8$R	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Samuel Moore Test FC3683 (MCM-1354.00-0006)

METHOD: Test

EQUIPMENT ID: Shielded Pair Armored Jacketed Instrumentation Cable

MANUFACTURER: Eaton (Samuel Moore)

MODEL #: PVC Insulation

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $3X10^7R$	Temp: 340°F RH: 100% Rad: $5X10^7R$	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Duke Test Report TR-032 (MCM-1354.00-0022)

METHOD: Test

EQUIPMENT ID: Cable - Shielded Pair Armored Jacketed Instrumentation

MANUFACTURER: Brand Rex

MODEL #: PVC Insulation

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $3X10^7$R	Temp: 340°F RH: 100% Rad: $5X10^7$R	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Duke Test Report TR-032 (MCM-1354.00-0022)

METHOD: Test

EQUIPMENT ID: Cable - Instrumentation MANUFACTURER: Okonite MODEL #: Hypalon Insulation (Procurement Spec: MCS-1354.03-4)

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $3X10^7$R	Temp: 340°F RH: 100% Rad: $3.5X10^7$R	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: 110E, November 12, 1970 (MCM-1354.00-0016) and Duke Test Report TR-032, November 5, 1982 (MCM-1354.00-0022)

METHOD: Test

EQUIPMENT ID: Cable - Control

MANUFACTURER: Okon'te

MODEL #: EP/Hypalon, FREP, & EP Insulation (Procurement Specs: MCS-1354.02-4,6 & 9)

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $3X10^7$R	Temp: 346°F RH: 100% Rad: $2X10^8$R	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Okonite Test Reports N1, May 2, 1975 (MCM-1354.00-0010); FN-1, July 3, 1978 (MCM-1354.00-0013)

METHOD: Test

EQUIPMENT ID: Cable - Control

MANUFACTURER: Eaton (Samuel Moore)

MODEL #: EP/Hypalon Insulation (Procurement Spec: MCS-1354.03-6)

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $3X10^7$R	Temp: 340°F RH: 100% Rad: $2X10^8$R	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Samuel Moore Test FC3683 (MCM-1354.00-0006)

METHOD: Test

EQUIPMENT ID: Cable - Control

MANUFACTURER: Anaconda

MODEL #: EP/Hypalon Insulation (Procurement Specs: MCS-1354.02-3, 6 & 9)

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $3X10^7$R	Temp: 346°F RH: 100% Rad: $2X10^8$R	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Anaconda Test FC4350-2 (MCM-1354.00-0008), FC4350-3 and Supplement (MCM-1354.00-0009)

METHOD: Test

EQUIPMENT ID: Cable - Power

MANUFACTURER. Anaconda

MODEL #: EP/Hypalon and EP Insulation (Procurement Specs: MCS-1354.01-2 & 4)

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $3X10^7$R	Temp: 346°F RH: 100% Rad: $2X10^8$R	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Anaconda Test FC4350-2 (MCM-1354.00-0008), FC4350-3 and Supplement (MCM-1354.00-0009)

METHOD: Test

EQUIPMENT ID: Cable - Power

MANUFACTURER: Okonite

MODEL #: EP and EP/Hypalon Insulation (Procurement Specs: MCS-1354.01-1, 2, 3 & 4)

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $3X10^7$R	Temp: 346°F RH: 100% Rad: $2X10^8$R	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Okonite Test [illegible] 1, May 2, 1975 (MCM-1354.00-0010); G1, February 17, 1976 (MCM-1354.00-0045); G-3, June 28, 19[illegible] CM-1354.00-0012)

METHOD: Test

MCGUIRE NUCLEAR STATION - UNITS 1 AND 2

ENVIRONMENTAL QUALFICATION OF CLASS 1E
EQUIPMENT LOCATED IN THE ANNULUS

Note 1

The parameters that compose the overall worst-case annulus accident environment are as follows:

Temperature: 142°F peak; Annulus temperature excursion due to a main steam line break inside containment as shown in calculation MCC-1223.14-00-0006.

Relative Humidity: 100%

Radiation: Total integrated radiation dose for the equipment location includes 40 years normal operating dose plus the appropriate accident dose. The accident dose is a function of the operability time required in the accident environment.

Note 2

The operability time demonstrated is the period required for the equipment to reach its qualified radiation dose in the accident environment. Temperature transients in the annulus, due to a MSLB (142°F) or LOCA (122°F) inside containment, are minimal and well within the design capabilities of the equipment. Therefore, temperature is not a factor in operability time.

Note 3

Five minutes is adequate time to assure containment isolation and the required repositioning of other safety-related valves.

Note 4

Deleted

Note 5

Deleted

ATTACHMENT 3

SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT

LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO HELB ENVIRONMENT

Page	Rev.	Page	Rev.	Page	Rev.
1	1	33	2		
2	1	33a	2		
3	1	34	2		
4	1	34a	2		
5	1	35	2		
6	1	35a	2		
7	1	36	2		
8	1	36a	2		
9	D	37	2		
10	2	37a	2		
11	1	38	1		
12	1	39	1		
13	1	40	1		
14	D	41	1		
15	1	42	1		
16	1	43	1		
16a	0	44	1		
17	1	45	1		
18	1	46	1		
19	1	47	1		
20	1	48	1		
21	1	49	1		
22	2	50	1		
22a	2	51	1		
23	1	52	1		
24	2	53	1		
24a	2	54	1		
24b	2	55	1		
24c	2	56	1		
25	2	57	1		
25a	2	58	1		
26	2	59	1		
26a	2	60	1		
27	2	61	1		
28	1	62	1		
29	2	63	1		
29a	2	64	1		
30	1	65	0		
30a	2	66	2		
31	2	66a	2		
31a	2	3N1	2		
32	1	3N2	1		
32a	D				

D = Deletion

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT
LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO HELB ENVIRONMENT

EQUIPMENT ID: Containment Spray Pump Motors

MANUFACTURER: Westinghouse, Buffalo

MODEL #: 73F56019-1S73, 73F56019-2S73, 73F56019-3S73, 73F56019-4S73

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)

This equipment is not required to function for HELBs that affect its environment

QUALIFICATION REPORT: Duke Report MDS/PDG-77-1, Calculation MCC-1206.47-00-0001

METHOD: Analysis

EQUIPMENT ID: Residual Heat Removal Pump Motors

MANUFACTURER: Westinghouse, Buffalo

MODEL #: 71F13454-1S72, 71F13454-2S72, 71F13495-1S72, 71F13495-2S72

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)

This equipment is not required to function for HELBs that affect its environment

QUALIFICATION REPORT: Duke Report MDS/PDG-77-1, Calculation MCC-1206.47-00-0001

METHOD: Analysis

EQUIPMENT ID: Safety Injection Pump Motors and Spares

MANUFACTURER: Westinghouse, Buffalo

MODEL #: 73F69618-1S75, 73F69618-2S75, 73F69618-3S75, 73F69618-4S75 81F32009-1S82-12

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F	Temp: 212°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: WCAP 8754 (MCM-1318.00-0026) and Duke analyses (MCC 1381.05-00-0101, MCC 1381.05-00-0102)

METHOD: Test and Analysis

EQUIPMENT ID: Centrifugal Charging Pump Motors and Spares

MANUFACTURER: Westinghouse, Buffalo

MODEL #: 72F44587-1S73, 72F44587-2S73, 72F44587-3S73 72F44587-4S73 81F32008-1S82-11

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F	Temp: 212°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: WCAP 8754 (MCM-1318.00-0026) and Duke analyses (MCC 1381.05-00-0101, MCC 1381.05-00-0102)

METHOD: Test and Analysis

EQUIPMENT ID: Nuclear Service Water Pump Motors and Spares

MANUFACTURER: Westinghouse, Buffalo

MODEL #: 72F36530-1S75, 72F36531-1S75, 72L10936-1S75, 72L10937-1S75 81F32007-1S82-11

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F	Temp: 212°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: WCAP 8754 (MCM-1318.00-0026) and Duke analyses (MCC-1381.05-00-0101, MCC-1381.05-00-0102)

METHOD: Test and Analysis

EQUIPMENT ID: Ground Water Drain Sump Pump Motors

MANUFACTURER: Reliance

MODEL #: 2Y-273734

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)

This equipment is not required to function for HELBs that affect its environment.

QUALIFICATION REPORT: Duke Report MDS/PDG-77-1, Calculation MCC-1206.47-00-0001

METHOD: Analysis

EQUIPMENT ID: Component Cooling Pump Motors and Spares

MANUFACTURER: Westinghouse, Buffalo

MODEL #: 72F44689-1S74, 72F44689-2S74, 72F44689-3S74, 72F44689-4S74, 72F44690-1S74, 72F44690-2S74, 72F44690-3S74, 72F44690-4S74 81F32006-1S82-11

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F	Temp: 212°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: WCAP 8754 (MCM-1318.00-0026) and Duke analyses (MCC-1381.05-00-0101, MCC-1381.05-00-0102)

METHOD: Test and Analysis

EQUIPMENT ID: Boric Acid Transfer Pump Motors

MANUFACTURER: Chempump/ Westinghouse

MODEL #: Chempump Model GVH-10K-12H-1S

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)

This equipment is not required to function for HELBs that affect its environment

QUALIFICATION REPORT: Duke Report MDS/PDG-77-1, Calculation MCC-1206.47-00-0001

METHOD: Analysis

EQUIPMENT ID: Fuel Pool Cooling Pump Motors

MANUFACTURER: Westinghouse, Buffalo

MODEL #: 72F44649-1S74, 72F44649-2S74, 72F44650-1S76, 72F44650-2S76

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 156°F	Temp: 156°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: WCAP 8754 (MCM-1318.00-0026) and Duke analysis (MCC 1381.05-00-0101)

METHOD: Test and Analysis

EQUIPMENT ID: Residual Heat Removal Air Handling Unit Motors and Spare

MANUFACTURER: Reliance

MODEL #: 2YF-882311, 1YF-882311

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)

This equipment is not required to function for HELBs that affect its environment

QUALIFICATION REPORT: Duke Report MDS/PDG-77-1, Calculation MCC-1206.47-00-0001

METHOD: Analysis

EQUIPMENT ID: Containment Spray Air Handling Unit Motors and Spare

MANUFACTURER: Reliance

MODEL #: 1YF-882311

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)

This equipment is not required to function for HELBs that affect its environment

QUALIFICATION REPORT: Duke Report MDS/PDG-77-1, Calculation MCC-1206.47-00-0001

METHOD: Analysis

EQUIPMENT ID: Fuel Pool Air Handling Unit Fan Motors and Spare

MANUFACTURER: Reliance

MODEL #: 3YF-882311, 1YF-882311

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 156°F	Temp: 156°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Thermal Life Analysis (MCC-1381.05-00-0127)

METHOD: Analysis

EQUIPMENT ID: Annulus Ventilation Damper Actuators

MANUFACTURER: Rotor

MODEL #: 7A

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)

This equipment is not required to function for HELBs that affect its environment

QUALIFICATION REPORT: Duke Report MDS/PDG-77-1, Calculation MCC-1206.47-00-0001

METHOD: Analysis

EQUIPMENT ID: Annulus Ventilation Fan Motors MANUFACTURER: Joy/Reliance MODEL #: 2YF-273608

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMGNSTRATED (% OF SPAN)

This equipment is not required to function for HELBs that affect its environment.

QUALIFICATION REPORT: Duke Report MDS/PDG-77-1, Calculation MCC-1206.47-00-0001

METHOD: Analysis

EQUIPMENT ID: Annulus Ventilation Filter Unit Preheater and Controls

MANUFACTURER: Farr

MODEL #: N/A

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)

This equipment is not required to function for HELBs that affect its environment.

QUALIFICATION REPORT: Duke Report MDS/PDG-77-1, Calculation MCC-1206.47-00-0001

METHOD: Analysis

EQUIPMENT ID: Aux. Bldg. Filtered Exhaust Fan Control Panel ABFXF-CP-1A, 1B, 2A, & 2B MANUFACTURER: Powers MODEL #: N/A

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
This equipment is not required to function for HELBs that affect its environment					

QUALIFICATION REPORT: Duke Report MDS/PDG-77-1, Calculation MCC-1206.47-00-0001

METHOD: Analysis

EQUIPMENT ID: Firestat (temperature switch) MANUFACTURER: United Electric MODEL #: 800G-6CS

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
This equipment is not required to function for HELBs that affect its environment					

QUALIFICATION REPORT: Duke Report MDS/PDG-77-1, Calculation MCC-1206.47-00-0001

METHOD: Analysis

EQUIPMENT ID: Aux. Bldg. Filtered Exhaust Fan Motors and Spares MANUFACTURER: Reliance MODEL #: 1YF-882811, 1YF-882812 1YF-882900, 1YF-882901

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)

This equipment is not required to function for HELBs that affect its environment

QUALIFICATION REPORT: Duke Report MDS/PDG-77-1, Calculation MCC-1206.47-00-0001

METHOD: Analysis

EQUIPMENT ID: AHU Differential Pressure Switches

MANUFACTURER: Solon Mfg. Co.

MODEL #: 7PS1DW

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)

This equipment is not required to function for HELBs that affect its environment

QUALIFICATION REPORT: Duke Report MDS/PDG-77-1, Calculation MCC-1206.47-00-0001

METHOD: Analysis

EQUIPMENT ID: Valve Motor Operators

MANUFACTURER: Limitorque

MODEL #: SMB Order Numbers:
375826-A, 375834-A,
375829-A, 375835-A
375831-A, 379664-B
375832-A, 379857-A
375833-A

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F	Temp: 250°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Limitorque Test Report: B0058, Appendix D, 1/11/80 (MCM-1205.34-0002)

METHOD: Test

EQUIPMENT ID: Valve Motor Operators (Doghouse)

MANUFACTURER: Limitorque

MODEL #: SMB Order Numbers: 383584-A & 391179-A, -B

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 300°F*	Temp: 340°F	3.77 min.	5.9 min.	N/A	N/A

*Doghouse environment at time safety function completed - Ref. MCC-1381.05-00-0156.

QUALIFICATION REPORT: Limitorque Test Report: B0058, Appendix B, 1/11/80 (MDM-1205.34-0002)

METHOD: Test

EQUIPMENT ID: Valve Motor Operators MANUFACTURER: Limitorque MODEL #: SMB Order Numbers: 383584-A & 391179-A, -B

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F	Temp: 340°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Limitorque Test Report: B0058, Appendix B, 1/11/80 (MDM-1205.34-0002)

METHOD: Test

EQUIPMENT ID: Valve Motor Operators MANUFACTURER: Rotork MODEL #: NA-2

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F	Temp: 163°F (Note 3)	One reposition	One reposition	N/A	N/A

QUALIFICATION REPORT: Rotork Test Reports N11/4, December 1970; TR116, October 1973: TR222, June 1975; TR3025, April 1980 (MCM-1205.34-0001), Rotork Test Report 3059 (MCM-1205.34-1)

METHOD: Test

EQUIPMENT ID: Valve Motor Operators (Doghouse)

MANUFACTURER: Rotork

MODEL #: NA-1 (S/N < B-4800)

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 300°F*	Temp: 340°F	3.77 min.	5.9 min.	N/A	N/A

*Doghouse environment at time safety function completed - Ref. MCC-1381.05-00-0156.

QUALIFICATION REPORT: Rotork Test Reports N11/4, December 1970; TR116, October 1973; TR222, June 1975 (MCM-1205.34-0001)

METHOD: Test

EQUIPMENT ID: Valve Motor Operators MANUFACTURER: Rotork MODEL #: NA-1 (S/N < B-4800)

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F	Temp: 340°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Rotork Test Reports N11/4, December 1970; TR116, October 1973; TR222, June 1975 (MCM-1205.34-0001)

METHOD: Test

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT
LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO HELB ENVIRONMENT

EQUIPMENT ID: Valve Motor Operators (Doghouse) MANUFACTURER: Rotork MODEL #: NA-1 (S/N > B-4800)

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 300°F*	Temp: 385°F	3.77 min.	7.2 min.	N/A	N/A

*Doghouse environment at time safety function completed - Ref. MCC-1381.05-00-0156.

QUALIFICATION REPORT: Wyle 43979-1, Rev. A, dated 12/19/78 (MCM-1205.34-0010)

METHOD: Test

EQUIPMENT ID: Valve Motor Operators MANUFACTURER: Rotork MODEL #: NA-1 (S/N > B-4800)

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F	Temp: 385°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Wyle 43979-1, Rev. A, dated 12/19/78 (MCM-1205.34-0010)

METHOD: Test

EQUIPMENT ID: Valve Solenoid Operators (Doghouse)

MANUFACTURER: Valcor

MODEL #: V70900-21-3, V70900-21-1

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 300°F*	Temp: 346°F	2.57 min.	6.0 min.	N/A	N/A

*Doghouse environment at time safety function completed - Ref. MCC-1381.05-00-0156.

QUALIFICATION REPORT: Test Reports QR70900-21-1 Rev. A (MCM-1210.04-0118); QR52600-515 Rev. B (MCM-1210.04-0115); MR70905-21-3-1 (MCM-1210.0119)

METHOD: Test & Similarity

EQUIPMENT ID: Valve Solenoid Operators MANUFACTURER: Valcor MODEL #: V70900-21-3, V70900-21-1

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 330°F	Temp: 346°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Test Reports QR70900-21-1 Rev. A (MCM-1210.04-0118); QR52600-515 Rev. B (MCM-1210.04-0115); MR70905-21-3-1 (MCM-1210.0119)

METHOD: Test & Similarity

EQUIPMENT ID: Valve Solenoid Operators (Doghouse)

MANUFACTURER: ASCO

MODEL #: NP 8316E34E, NP 8316E36E

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 325°F*	Temp: 346°F	5.6 min.	6.0 min.	N/A	N/A

*Doghouse environment at time safety function completed - Ref. MCC-1381.05-00-0156.

QUALIFICATION REPORT: Test Report: AQS21678/TR (MCM-1210.04-0117)

METHOD: Test

EQUIPMENT ID: Valve Solenoid Operators MANUFACTURER: ASCO MODEL #: NP 8316E34E, NP 8316E36E

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 330°F	Temp: 346°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Test Report: AQS21678/TR (MCM-1210.04-0117)

METHOD: Test

EQUIPMENT ID: Valve Operator - MSIV (Doghouse)

MANUFACTURER: Atwood & Morrill

MODEL #: 34" MSIV w/Chicago Fluid Pwr. actuator

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 325°F*	Temp: 340°F	5.6 min.	5.9 min.	N/A	N/A

*Doghouse environment at time safety function completed - Ref. MCC-1381.05-00-0156.

QUALIFICATION REPORT: Test Report Procedure No. 20139500 dated 5/1/79 (MCM-1205.34-0005)

METHOD: Test

EQUIPMENT ID: Valve Solenoid Operators MANUFACTURER: Valcor MODEL #: V526, V573

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F	Temp: 346°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Test Report QR-52600-5940-2, July 5, 1979 (MCM-1205.34-0012)

METHOD: Test

EQUIPMENT ID: Valve Operator FWIV (Doghouse) (Unit 1)

MANUFACTURER: Borg Warner

MODEL #: 12" Gate w/Elect Hyd. Oper. NVD P/N 36310

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 300°F*	Temp: 330°F	2.57 min.	5.9 min. (Note 4)	N/A	N/A

*Doghouse environment at time safety function completed - Ref. MCC-1381.05-00-0156.

QUALIFICATION REPORT: Test Report Nos. 1785 & 1779, dated 11/12/79 (MCM-1205.34-0006)

METHOD: Test

EQUIPMENT ID: Valve Operator FWIV (Doghouse) (Unit 2)

MANUFACTURER: Borg Warner

MODEL #: 12" Gate w/Elect Hyd. Oper. NVD P/N 88500

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 300°F*	Temp: 345°F	2.57 min.	6.0 min. (Note 4)	N/A	N/A

*Doghouse environment at time safety function completed - Ref. MCC-1381.05-00-0156.

QUALIFICATION REPORT: Test Report No. 1989, dated 05/18/83

METHOD: Test

EQUIPMENT ID: Level Switch (Groundwater Drainage Sump C Level)

MANUFACTURER: Robertshaw

MODEL #: SL-402-B4-3

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
This equipment is not required to function for HELBs that affect its environment.					

QUALIFICATION REPORT: Duke Report MDS/PDG-77-1, Calculation MCC-1206.47-00-0001

METHOD: Analysis

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT
LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO HELB ENVIRONMENT

EQUIPMENT ID: Level Switch (Doghouse)

MANUFACTURER: Magnetrol

MODEL #: A103F-3X-Y-MPG-TDM-S1MD4DC-S1MD4DC-S1MD4DC

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 240°F	Temp:285°F	15 seconds following a main feedwater line break	Continuous	±0.25"	±0.25"

QUALIFICATION REPORT: Duke QTF Report TR-053 and TR-060.

METHOD: Test

MPIC

EQUIPMENT ID: Stem Mounted Limit Switches (Doghouse) MANUFACTURER: NAMCO MODEL #: EA180, EA740

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 300°F*	Temp: 340°F	2.57 min.	5.9 min.	N/A	N/A

*Doghouse environment at time safety function completed - Ref. MCC-1381.05-00-0156.

QUALIFICATION REPORT: NAMCO Test Report QTR-106 dated 9/2/81 (MCM-1205.34-0009) and
NAMCO Test Report QTR-111, Rev. 0 dated 10/01/81 (MCM-1205.34-0008)

METHOD: Test

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT
LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO HELB ENVIRONMENT

EQUIPMENT ID: Stem Mounted Limit Switches MANUFACTURER: NAMCO MODEL #: EA180, EA740

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F	Temp: 340°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: NAMCO Test Report QTR-106 dated 9/2/81 (MCM-1205.34-0009) and
NAMCO Test Report QTR-111, Rev. 0 dated 10/01/81 (MCM-1205.34-0008)

METHOD: Test

EQUIPMENT ID: Stem Mounted Limit Switches MANUFACTURER: NAMCO MODEL #: EA-170-302

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F	Temp: 248°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: NAMCO Test Report QTR-107 dated 3/11/81 (MCM-1205.34-0011)

METHOD: Test

EQUIPMENT ID: Cable - Control (Doghouse)

MANUFACTURER: Brand Rex

MODEL #: XLPE Insulation (Procurement Specs: MCS-1354.02-4, 5, 7 & & 9 & MCS-1354.04-14)

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 325°F	Temp: 346°F	5.6 min.	6.0 min.	N/A	N/A

*Doghouse environment at time safety function completed - Ref. MCC-1381.05-00-0156.

QUALIFICATION REPORT: Test Reports FC4113 (MCM-1354.00-0007) FC5120-1 (MCM-1354.00-0023) and FC5120-3 (MCM-1354.00-0024)

METHOD: Test

EQUIPMENT ID: Cable - Control

MANUFACTURER: Brand Rex

MODEL #: XLPE Insulation (Procurement Specs: MCS-1354.02-4, 5, 7 & & 9 & MCS-1354.04-14)

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 330°F (Note 6)	Temp: 346°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Test Reports FC4113 (MCM-1354.00-0007) FC5120-1 (MCM-1354.00-0023) and FC5120-3 (MCM-1354.00-0024)

METHOD: Test

EQUIPMENT ID: Cable - Instrumentation (Doghouse)

MANUFACTURER: Eaton (Samuel Moore)

MODEL #: EP/Hypalon Insulation (Procurement Specs: MCS-1354.03-1, 2, 3 & 5 & MCS-1354.04-2 & 5)

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 325°F*	Temp: 340°F	5.6 min.	5.9 min.	N/A	N/A

*Doghouse environment at time safety function completed - Ref. MCC-1381.05-00-0156.

QUALIFICATION REPORT: Test Report F-C3683 (MCM-1354.00-0006)

METHOD: Test

EQUIPMENT ID: Cable - Instrumentation MANUFACTURER: Eaton (Samuel Moore) MODEL #: EP/Hypalon Insulation (Procurement Specs: MCS-1354.03-1, 2, 3 & 5 & MCS-1354.04-2 & 5)

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 330°F (Note 6)	Temp: 340°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Test Report F-C3683 (MCM-1354.00-0006)

METHOD: Test

EQUIPMENT ID: Cable - Control, Instrumentation, and Power (Doghouse)

MANUFACTURER: Okonite

MODEL #: EP, EP/Hypalon, & Hypalon Insulation (Procurement Specs: MCS-1354.01-1, 2 & MCS-1354.02-4, 6, 9 & MCS-1354.03-4)

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 325°F (Note 6)	Temp: 340°F	5.6 min.	5.9 min.	N/A	N/A

*Doghouse environment at time safety function completed - Ref. MCC-1381.05-00-0156.

QUALIFICATION REPORT: Test Reports N1, May 2, 1975 (MCM-1354.00-0010); FN-1, July 3, 1978 (MCM-1354.00-0013); G-3, June 28, 1979 (MCM-1354.00-0012; 110E, November 12, 1970 (MCM-1354.00-0016); Duke Test Report TR032, November 5, 1982 (MCM-1354.00-0022); G1, February 17, 1976 (MCM-1354.00-0045)

METHOD: Test

EQUIPMENT ID: Cable - Control, Instrumentation, and Power

MANUFACTURER: Okonite

MODEL #: EP, EP/Hypalon, & Hypalon Insulation (Procurement Specs: MCS-1354.01-1, 2 & MCS-1354.02-4, 6, 9 & MCS-1354.03-4)

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 330°F (Note 6)	Temp: 340°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Test Reports N1, May 2, 1975 (MCM-1354.00-0010); FN-1, July 3, 1978 (MCM-1354.00-0013); G-3, June 28, 1979 (MCM-1354.00-0012; 110E, November 12, 1970 (MCM-1354.00-0016); Duke Test Report TR032, November 5, 1982 (MCM-1354.00-0022); G1, February 17, 1976 (MCM-1354.00-0045)

METHOD: Test

EQUIPMENT ID: Cable - Control (Doghouse)

MANUFACTURER: Okonite

MODEL #: Tefzel 280 Insulation (Procurement Spec: MCS-1354.04-6)

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 325°F	Temp: 341°F	5.6 min.	5.9 min.	N/A	N/A

*Doghouse environment at time safety function completed - Ref. MCC-1381.05-00-0156.

QUALIFICATION REPORT: Test Report K-0-1, September 1979 (MCM-1354.00-0011), and K-8-1, April 4, 1981 (MCM-1354.00-0044)

METHOD: Test

EQUIPMENT ID: Cable - Control

MANUFACTURER: Okonite

MODEL #: Tefzel 280 Insulation (Procurement Spec: MCS-1354.04-6)

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 330°F (Note 6)	Temp: 341°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Test Report K-0-1, September 1979 (MCM-1354.00-0011), and K-8-1, April 4, 1981 (MCM-1354.00-0044)

METHOD: Test

EQUIPMENT ID: Cable - Control and Power (Doghouse)

MANUFACTURER: Anaconda

MODEL #: EP Insulation and EP/Hypalon Insulation (Procurement Specs: MCS-1354.01-2 & 4, & MCS-1354.02-3, 6 & 9

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 325°F	Temp: 346°F	5.6 min.	6.0 min.	N/A	N/A

*Doghouse environment at time safety function completed - Ref. MCC-1381.05-00-0156.

QUALIFICATION REPORT: Test Reports F-C4350-2 (MCM-1354.00-0008) and F-C4350-3 and Supplement (MCM-1354.00-0009)

METHOD: Test

EQUIPMENT ID: Cable - Control and Power MANUFACTURER: Anaconda MODEL #: EP Insulation and EP/Hypalon Insulation (Procurement Specs: MCS-1354.01-2 & 4, & MCS-1354.02-3, 6 & 9

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 330°F (Note 6)	Temp: 346°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Test Reports F-C4350-2 (MCM-1354.00-0008) and F-C4350-3 and Supplement (MCM-1354.00-0009)

METHOD: Test

EQUIPMENT ID: Remote Starter 1NIA & 1NIB MANUFACTURER: Westinghouse MODEL #: A201 J3CA

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)

This equipment is not required to function for HELBs that affect its environment

QUALIFICATION REPORT: Duke Report MDS/PDG-77-1, Calculation MCC-1206.47-00-0001

METHOD: Analysis

EQUIPMENT ID: Contactor 1FW27A MANUFACTURER: Westinghouse MODEL #: A201 J3CA

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
This equipment is not required to function for HELBs that affect its environment					

QUALIFICATION REPORT: Duke Report MDS/PDG-77-1, Calculation MCC-1206.47-00-0001

METHOD: Analysis

EQUIPMENT ID: Current/Voltage Alarm (Note 7) MANUFACTURER: RIS MODEL #: ET1215

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 132.4°F (worst case)	Temp: 140°F	Continuous	Continuous	± 2.5%	± 0.5%

QUALIFICATION REPORT: RIS Specification (ESSEM V-A-4)

METHOD: Analysis

EQUIPMENT ID: Fuse (Note 7) MANUFACTURER: Bussmann MODEL #: FNA

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F (worst case)	212°F (Note 8)	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Bussmann Derating Curve (ESSEM III-A-4)

METHOD: Analysis

EQUIPMENT ID: Fuse (Note 7) MANUFACTURER: Bussmann MODEL #: KTK

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F (worst case)	212°F (Note 8)	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Bussman Derating Curve (ESSEM III-A-1)

METHOD: Analysis

EQUIPMENT ID: Fuse block (Note 7)

MANUFACTURER: Bussmann

MODEL #: 3792

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F (worst case)	Temp: 250°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Bussmann Manufacturing Report dated 3/13/79 (ESSEM IV-A-1)

METHOD: Analysis

EQUIPMENT ID: Fuse block (Note 7)

MANUFACTURER: Bussmann

MODEL #: 3839

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F (worst case)	Temp: 250°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Bussmann Manufacturing Report dated 3/13/79 (ESSEM IV-A-5)

METHOD: Analysis

EQUIPMENT ID: Fuse block (Note 7)

MANUFACTURER: Bussmann

MODEL #: 4439

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F (worst case)	Temp: 250°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Bussmann Manufacturing Report dated 3/13/79 (ESSEM IV-A-2)

METHOD: Analysis

EQUIPMENT ID: Indicating Light (Note 7)

MANUFACTURER: Cutler-Hammer

MODEL #: E29

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 200°F (worst case)	Temp: 255°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Duke QTF Report TR-010 (MCM-1393.02-0003, ESSEM III-B-1)

METHOD: Test

EQUIPMENT ID: Optical Isolator (Note 7)

MANUFACTURER: E-Max

MODEL #: 175D127
175D126

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 132.4°F (worst case)	Temp: 223°F	Continuous	Continuous	N/A (Note 9)	N/A (Note 9)

QUALIFICATION REPORT: Duke QTF Report TR-055 (CNM-1338.00-00-0034)

METHOD: Test

EQUIPMENT ID: Fuse block (Note 7)

MANUFACTURER: Bussmann

MODEL #: 2807 and 2808

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F (worst case)	Temp: 250°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Bussmann Manufacturing Report dated 3/13/79 (ESSEM IV-A-11)

METHOD: Analysis

EQUIPMENT ID: Fuse block (Note 7)

MANUFACTURER: Bussmann

MODEL #: 4575

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F (worst case)	Temp: 250°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Bussmann Manufacturing Report dated 7/24/80 (ESSEM IV-A-3)

METHOD: Analysis

EQUIPMENT ID: Power Supply (Note 7) MANUFACTURER: Lambda MODEL #: LCS

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 132.4°F (worst case)	Temp: 160°F	Continuous	Continuous	±10% regulation of output voltage	± 1% regulation of output voltage

QUALIFICATION REPORT: Lambda Specification Data (ESSEM VIII-G-1)

METHOD: Analysis

EQUIPMENT ID: Relay (Note 7) MANUFACTURER: Cutler-Hammer MODEL #: D23

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F (worst case)	Temp: 255°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Duke QTF Report TR-010 (MCM-1393.02-0003, ESSEM VII-A-2.1)

METHOD: Test

EQUIPMENT ID: Relay (Note 7)

MANUFACTURER: Cutler-Hammer

MODEL #: D26

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F (worst case)	Temp: 255°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Duke QTF Report TR-010 (MCM-1393.02-0003, ESSEM VII-A-2.2)

METHOD: Test

EQUIPMENT ID: Relay (Note 7) MANUFACTURER: Struthers-Dunn MODEL #: 219

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F (worst case)	Temp: 222°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: McGuire Nuclear Station Pipe Rupture Temperature Component Test (MCM-1393.02-0001, ESSEM VII-A-3)

METHOD: Test/Analysis

EQUIPMENT ID: Relay - Timing (Note 7)

MANUFACTURER: Agastat

MODEL #: 7000 Series

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 130°F (worst case)	Temp: 165°F	Continuous	Continuous	±20%	±20%

QUALIFICATION REPORT: Agastat Specification Data (ESSEM VII-C-5)

METHOD: Analysis

EQUIPMENT ID: Resistor (Note 7)

MANUFACTURER: Ohmite

MODEL #: Brown Devil

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 208°F (worst case)	208°F (Note 8)	Continuous	Continuous	±3% of resistor value	±1% of resistor value (Note 10)

QUALIFICATION REPORT: Ohmite Derating Curve (ESSEM IX-B-2)

METHOD: Analysis

EQUIPMENT ID: Surge Suppressor (Note 7)

MANUFACTURER: General Semiconductor

MODEL #: Tranzorb

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F (worst case)	Temp: 302°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: General Semiconductor Specification (ESSEM III-C-1)

METHOD: Analysis

EQUIPMENT ID: Resistor (Note 7)

MANUFACTURER: Ohmite

MODEL #: Dividohm

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 130°F (worst case)	130°F (Note 8)	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Ohmite Derating Curve (ESSEM IX-B-3)

METHOD: Analysis

EQUIPMENT ID: Switch and Indicating Light (Note 7) MANUFACTURER: Cutler-Hammer MODEL #: E30

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F (worst case)	Temp: 255°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Duke QTF Report TR-G10 (MCM-1393.02-0003, ESSEM VI-C-1)

METHOD: Test

EQUIPMENT ID: Selector Switch (Note 7)

MANUFACTURER: Cutler-Hammer

MODEL #: 10250T

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 208°F (worst case)	Temp: 255°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: QTF Report TR-010 (MCM-1393.02-0003, ESSEM VI-A-1 & 4)

METHOD: Test

EQUIPMENT ID: Terminal Block (Note 7) MANUFACTURER: States MODEL #: ZWM and NT

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 212°F (worst case)	Temp: 346°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: QTF Report TR-028 (MCM-1393.02-0004, ESSEM IV-B-4 & 5)

METHOD: Test

EQUIPMENT ID: Terminal Block (Note 7)

MANUFACTURER: Buchanan

MODEL #: Solid Link SS & TS

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 208°F (worst case)	Temp: 346°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: QTF Report TR-028 (MCM-1393.02-0004, ESSEM IV-B-2 & 3)

METHOD: Test

EQUIPMENT ID: Terminal Block (Note 7)

MANUFACTURER: Stanwick

MODEL #: DG & SLS

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 208°F (worst case)	Temp: 346°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: QTF Report TR-028 (MCM-1393.02-0004, ESSEM IV-B-1.1 & 1.2)

METHOD: Test

EQUIPMENT ID: Signal Transmitter (Note 7)

MANUFACTURER: RIS

MODEL #: SC-1302

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 130°F (worst case)	Temp: 140°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: RIS Specification (MCM-1346.00-0010)

METHOD: Analysis

EQUIPMENT ID: Fuse (Note 7) MANUFACTURER: Littelfuse MODEL #: Normal Blo & Slo Blo

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 208°F (worst case)	208° F (Note 8)	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Littelfuse Derating Curve (ESSEM III-A-7)

METHOD: Analysis

EQUIPMENT ID: Level Switch - UHI Water Accumulator

MANUFACTURER: Barton

MODEL #: 288A

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)

This equipment is not required to function for HELBs that affect its environment.

QUALIFICATION REPORT: Duke Report MDS/PDG-77-1, Calculation MCC-1206.47-00-0001

METHOD: Analysis

EQUIPMENT ID: Transmitter - Auxiliary Feedwater Flow (Doghouse)

MANUFACTURER: Rosemount

MODEL #: 1153DD5

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)

The Auxiliary Feedwater Flow is not required to mitigate the consequences of a main steam line break in the doghouse.

QUALIFICATION REPORT: N/A

METHOD: N/A

EQUIPMENT ID: Transmitter - Auxiliary Feedwater Flow (Doghouse)

MANUFACTURER: Rosemount

MODEL #: 1153DD5

HELB ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN HELB ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 240°F	Temp: 350°F	Continuous	Continuous	±28.13%	±28.13%

QUALIFICATION REPORT: Wyle Test Report 45592-1 (MCM-1210.0178)

METHOD: Test

MCGUIRE NUCLEAR STATION UNITS 1 AND 2

ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT
LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO HELB ENVIRONMENT

Note 1

The methods employed to evaluate pipebreaks and to determine the resulting environmental parameters are discussed in Duke Power Company Report MDS/PDG-77-1. The Evaluation of the Effects of Postulated Pipe Failures Outside Containment for McGuire Nuclear Station.

Note 2

The pipe rupture environment is assumed to exist for 2 1/2 hours based on 30 minutes at the peak temperature after which action by the operator isolates the break and allows the Auxiliary Building temperature to decrease to normal in 2 hours. Use of the term "Continuous" indicates operability required/ demonstrated throughout the pipe rupture period.

The pipe rupture environmental analysis for the Doghouse was conducted separately taking into consideration different sizes of main steam line breaks. The equipment summary sheet parameters are based on the "worse case" size break with respect to actuation time of the equipment and the time when the Doghouse temperature reaches the qualification temperature of the equipment. All equipment located in the Doghouse is identified under "Equipment ID."

Note 3

Rotork Test Report TR-3025 shows that when the qualified temperature for these valves is exceeded, the torque switches may fail on the next operation of the valves. Since at least one additional operation is available after the valve's temperature qualification has been exceeded, the valve can be relied upon to move to its safety position. No further safety function is required.

Note 4

The test was conducted for 30 minutes, however, the Class 1E solenoids which operate the FWIV's de-energize upon initiation of containment isolation and allow the FWIV's to close within 5 seconds. With the solenoid valves de-energized, the FWIV's will remain in a closed position indefinitely.

Note 5

Deleted

Note 6

The HELB analysis has identified pipe breaks resulting in higher temperatures; however, there are no cables exposed to temperatures above 330°F, except in the doghouse which is addressed separately.

ATTACHMENT 4

SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT

LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO THE

POST-LOCA RECIRCULATION RADIATION ENVIRONMENT

Page	Rev.	Page	Rev.	Page	Rev.
1	1	36	1		
		36a	0		
2	D	37	1		
3	1	38	1		
4	1	39	1		
5	1	40	1		
6	1	41	2		
7	1	42	D		
8	1	43	1		
9	1	44	1		
10	1	45	1		
11	1	46	2		
12	1	47	1		
13	1	48	1		
14	1	49	1		
15	2	50	1		
16	1	51	1		
17	1	52	1		
18	1	53	1		
19	1	54	1		
20	1	55	1		
21	2	56	1		
22	1	57	1		
22A	0	58	1		
23	1	59	1		
24	1	60	1		
25	1	4N1	1		
26	1				
26A	D				
27	1				
27A	D				
28	1				
29	1				
30	2				
30A	0				
31	1				
32	1				
33	1				
34	1				
35	1				

D = Deletion

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT
LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO THE POST-LOCA RECIRCULATION RADIATION ENVIRONMENT

EQUIPMENT ID: (1) Boric Acid Transfer Pump Motors MANUFACTURER: Chempump/Westinghouse MODEL #: Chempump Model GUH 10K-12H-1S

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)

These motors are not required to operate in the post-LOCA recirculation radiation environment

QUALIFICATION REPORT: N/A

METHOD: N/A

EQUIPMENT ID: (1) Centrifugal Charging Pump Motors and Spare

MANUFACTURER: Westinghouse, Buffalo

MODEL #: 72F44587-1S73, 72F44587-2S73, 72F44587-3S73, 72F44587-4S73 81F32008-1S82-11

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$8.8X10^4$RAD	$2X10^8$RAD

QUALIFICATION REPORT: WCAP 8754 Rev. 1 (MCM-1318.00-0026), WCAP 7829 (MCM-1318.00-0027)

METHOD: Test and Analysis

EQUIPMENT ID: Containment Spray Pump Motors (1) MANUFACTURER: Westinghouse, Buffalo MODEL #: 73F56019-1S73, 73F56019-2S73, 73F56019-3S73, 73F56019-4S73

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$5.2X10^5$RAD	$2X10^8$RAD

QUALIFICATION REPORT: WCAP 8754 Rev. 1 (MCM-1318.00-0026), WCAP 7829 (MCM-1318.00-0027)

METHOD: Test and Analysis

EQUIPMENT ID: (1) Fuel Pool Cooling Pump Motors

MANUFACTURER: Westinghouse, Buffalo

MODEL #: 72F44649-1S74, 72F44649-2S74, 72F44650-1S76, 72F44650-2S76

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$5X10^3$RAD	$2X10^8$RAD

QUALIFICATION REPORT: WCAP 8754 Rev. 1 (MCM-1318.00-0026), WCAP 7829 (MCM-1318.00-0027)

METHOD: Test and Analysis

EQUIPMENT ID: (1) Residual Heat Removal Pump Motors

MANUFACTURER: Westinghouse, Buffalo

MODEL #: 71F13494-1S72, 71F13494-2S72, 71F13495-1S72, 71F13495-2S72

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$4.6X10^5$RAD	$2X10^8$RAD

QUALIFICATION REPORT: WCAP 8754 Rev. 1 (MCM-1318.00-0026), WCAP 7829 (MCM-1318.00-0027)

METHOD: Test and Analysis

EQUIPMENT ID: (1) RHR and Containment Spray Rooms Sump Pump Motors

MANUFACTURER: Reliance

MODEL #: S/N 1YF-883032

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$9.0X10^4$RAD	$2X10^8$RAD

QUALIFICATION REPORT: Radiation Qualification Report/Class 1E Small Powerhouse Motors (MCC-1381.05-00-0128)

METHOD: Analysis

EQUIPMENT ID: (1) Safety Injection Pump Motors and Spare

MANUFACTURER: Westinghouse, Buffalo

MODEL #: 73F69618-1S75, 73F69618-2S75, 73F69618-3S75, 73F69618-4S75
81F32009-1S82-12

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$2.8X10^5$RAD	$2X10^8$RAD

QUALIFICATION REPORT: WCAP 8754 Rev. 1 (MCM-1318.00-0026), WCAP 7829 (MCM-1318.00-0027)

METHOD: Test and Analysis

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT
LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO THE POST-LOCA RECIRCULATION RADIATION ENVIRONMENT

EQUIPMENT ID: Annulus Ventilation System Fan Motors (1) MANUFACTURER: Joy/Reliance MODEL #: 2YF-273608

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$4X10^6$RAD	$1X10^7$RAD

QUALIFICATION REPORT: Radiation Qualification Report/Class 1E Small Powerhouse Motors (MCC-1381.05-00-0128)

METHOD: Analysis

EQUIPMENT ID: (1) Auxiliary Building Filtered Exhaust Fan Motors and Spares

MANUFACTURER: Reliance

MODEL #: 1YF-882811, 1YF-882812
1YF-882900, 1YF-882901

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$3.0X10^5$RAD	$2X10^8$RAD

QUALIFICATION REPORT: Radiation Qualification Report/Class 1E Small Powerhouse Motors (MCC-1381.05-00-0128)

METHOD: Analysis

EQUIPMENT ID: (1) Diesel Generator Ventilation Fan Motors

MANUFACTURER: Joy/Reliance

MODEL #: 1YF-273608

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$2X10^4$RAD	$1X10^7$RAD

QUALIFICATION REPORT: Radiation Qualification Report/Class 1E Small Powerhouse Motors (MCC-1381.05-00-0128)

METHOD: Analysis

EQUIPMENT ID: (1) Fuel Pool Cooling Pump Air Handling Unit Fan Motors & Spares

MANUFACTURER: Reliance

MODEL #: 3YF-882311, 1YF-882311

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$5X10^3$RAD	$1X10^6$RAD S/N 3YF-882311 $2X10^8$RAD S/N 1YF-882311

QUALIFICATION REPORT: Radiation Qualification Report/Class 1E Small Powerhouse Motors (MCC-1381.05-00-0128)

METHOD: Analysis

EQUIPMENT ID: (1) RHR Pump and CS Pump Air Handling Unit Fan Motors & Spares

MANUFACTURER: Reliance

MODEL #: 2YF-882311, 1YF-882311

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$5.2X10^5$RAD	$2X10^8$RAD

QUALIFICATION REPORT: Radiation Qualification Report/Class 1E Small Powerhouse Motors (MCC-1381.05-00-0128)

METHOD: Analysis

EQUIPMENT ID: 600 Volt Load Centers (1) Worst case: 1ELXD & 2ELXD

MANUFACTURER: Gould

MODEL #: K-Line

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$6X10^4$RAD	$1X10^5$RAD

QUALIFICATION REPORT: Gould Report (MCM-1312.03-165, OM-301-80)

METHOD: Test and Analysis

EQUIPMENT ID: Motor Control Centers MANUFACTURER: Nelson Electric MODEL #: Class 1035U
(1) Worst case: 1EMXB4 and 2EMXB4

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$6X10^4$RAD	$1X10^5$RAD

QUALIFICATION REPORT: MCM-1314.01-246

METHOD: Test and Analysis

EQUIPMENT ID: Diesel Batteries (1) Worst Case: 1EDGB

MANUFACTURER: Nife

MODEL #: HIP-4

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$5X10^3$RAD	(Note 4)

QUALIFICATION REPORT: (Note 4)

METHOD: (Note 4)

EQUIPMENT ID: (1) Diesel Battery Chargers
Worst Case: 1EDGB

MANUFACTURER: Power Conversion Products

MODEL #: 3S-130-100CE

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$5X10^3$RAD	(Note 4)

QUALIFICATION REPORT: (Note 4)

METHOD: (Note 4)

EQUIPMENT ID: (1) Potential Transformers, in RCP Switchgear
Worst Case: RCP-1D and RC -2D

MANUFACTURER: Westinghouse

MODEL #: PTM 75

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$4X10^4$RAD	$4X10^4$RAD

QUALIFICATION REPORT: Report MCM-1312.07-46

METHOD: Test and Analysis

EQUIPMENT ID: Valve Motor Operators (1)

MANUFACTURER: Limitorque

MODEL #: SMB Limitorque Order Order Numbers: 375826-A, 375829-A, 375831-A, 375832-A, 375833-A, 375834-A, 375835-A, 379664-B, 379857-A

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$5X10^6$RAD (worst case)	$2X10^7$RAD

QUALIFICATION REPORT: Limitorque Test Report B0058, Appendix D, dated 1/11/80 (MCM-1205.34-0002)

METHOD: Test

EQUIPMENT ID: Valve Motor Operators (1) MANUFACTURER: Limitorque MODEL #: Limitorque Order Numbers: 383584-A and 391179-A, B

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$5X10^6$RAD (worst case)	$2X10^8$RAD

QUALIFICATION REPORT: Limitorque Test Report B0058, Appendix B, dated 1/11/80 (MCM-1205.34-0002)

METHOD: Test

EQUIPMENT ID: Valve Motor Operators (1) MANUFACTURER: Rotork MODEL #: NA-2

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$5X10^6$RAD (worst case)	$3X10^7$RAD

QUALIFICATION REPORT: Rotork Test Report N14/2 dated 5/70 (MCM-1205.34-0001), Rotork Test Report 3059 (MCM-1205.34-1)

METHOD: Test

EQUIPMENT ID: Valve Motor Operators (1)

MANUFACTURER: Rotork

MODEL #: NA-1 (S/N<4800)

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$5X10^6$RAD (worst case)	$2X10^8$RAD

QUALIFICATION REPORT: Rotork Test Report TR-116, dated 10/73 (MCM-1205.34-0001)

METHOD: Test

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT
LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO THE POST-LOCA RECIRCULATION RADIATION ENVIRONMENT

EQUIPMENT ID: Valve Motor Operators (1) MANUFACTURER: Rotork MODEL #: NA-1 (S/N>4800)

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$5X10^6$RAD (worst case)	$2X10^8$RAD

QUALIFICATION REPORT: Wyle Report 43979-1 Rev. A dated December 19, 1978 (MCM-1205.34-0010)

METHOD: Test

EQUIPMENT ID: Valve Solenoid Operators (1) MANUFACTURER: Valcor MODEL #: V526, V573

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$5X10^6$RAD (worst case)	$2X10^8$RAD

QUALIFICATION REPORT: Valcor Test Report QR-52600-5940-2, dated July 5, 1979 (MCM-1205.34-0012)

METHOD: Test

EQUIPMENT ID: Valve Solenoid Operators (1) MANUFACTURER: Valcor MODEL #: V70900-21-3

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
1.1×10^8 RAD (worst case)	2×10^8 RAD

QUALIFICATION REPORT: Valcor Test Report QR-70900-21-1 Rev. A (MCM-1210.04-0118); QR-52600-515, Rev. B (MCM-1210.04-0115); MR70905-21-3-1 (MCM-1210-04-0119)

METHOD: Test Similarity

EQUIPMENT ID: Valve Solenoid Operators (1) MANUFACTURER: ASCO MODEL #: NP8316E34E

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	1.1×10^8 RAD (worst case)	2×10^8 RAD

QUALIFICATION REPORT: ASCO Test Report AQS21678/TR (MCM-1210.04-0117)

METHOD: Test

EQUIPMENT ID: Valve Stem Mounted Limit Switch (1) MANUFACTURER: NAMCO MODEL #: EA-170-302

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$1X10^6$RAD (worst case)	$2X10^8$RAD

QUALIFICATION REPORT: NAMCO Report QTR-107 dated 3/11/81 (MCM-1205.34-0011)

METHOD: Test

EQUIPMENT ID: (1) Valve Stem Mounted Limit Switch (Unit 1) MANUFACTURER: NAMCO MODEL #: EA-180, EA-740

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$1X10^6$RAD (worst case)	$2X10^8$RAD

QUALIFICATION REPORT: NAMCO Test Report QTR-106 dated September 2, 1981 (MCM-1205.34-0009) and NAMCO Test Report QTR-111, Rev. 0 dated 10/01/81 (MCM-1205.34-0008)

METHOD: Test

EQUIPMENT ID: Motor Operated Dampers (1) MANUFACTURER: Rotork MODEL #: 7A

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$3X10^7$RAD (worst case)	$3X10^7$RAD

QUALIFICATION REPORT: Rotork Test Reports N14/2 (MCM-1205.34-0001); Supplemental Information (MCM-1211.00-1563)

METHOD: By similarity to Rotork NA2 Operator

EQUIPMENT ID: Three-Way Solenoid Valve (1) MANUFACTURER: Powers MODEL #: 265-0002

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$1.05X10^6$RAD	$1.16X10^6$RAD

QUALIFICATION REPORT: Test Specification MCS-1211.00-06, Supplement 10; Test Report A-490-82 (MCM-1211.00-1645); Report A-320-80-02 (MCM-1211.00-1524)

METHOD: Test

EQUIPMENT ID: Annulus Vent Filter Unit (1) Control Panels

MANUFACTURER: Farr

MODEL #: N/A

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)

These panels have been relocated to a mild environment

QUALIFICATION REPORT: N/A

METHOD: N/A

EQUIPMENT ID: Annulus Ventilation Filter Unit Preheater and Controls (1)

MANUFACTURER: Farr

MODEL #: N/A

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	4.06×10^7 RADS	4.5×10^7 RADS

QUALIFICATION REPORT: Test Report MCM-1211.00-1685

METHOD: Test and Analysis

EQUIPMENT ID: ABFU Control Panels (1) MANUFACTURER: Allison MODEL #: N/A

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)

These panels are non-safety-related, and their failure in the harsh radiation environment will not preclude accomplishment of a safety-related function.

QUALIFICATION REPORT: N/A

METHOD: N/A

EQUIPMENT ID: (1) Proportional Temperature Controller

MANUFACTURER: Love Controls

MODEL #: 54- 834- 838- 8134 -8160- 8187- 8173- 8174

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$2.05X10^4$RAD	$2.26X10^4$RAD

QUALIFICATION REPORT: Test Specification MCS-1211.00-06, Supplement 10; Test Report A-490-82 (MCM-1211.00-1645); Report A-320-80-02 (MCM-1211.00-1524)

METHOD: Test

EQUIPMENT ID: (1) High Temperature Detection Thermostat

MANUFACTURER: United Electric

MODEL #: 800G-6CS

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$1.05X10^6$RAD	$1.16X10^6$RAD

QUALIFICATION REPORT: Test Specification MCS-1211.00-00, Supplement 10; Test Report A-490-82 (MCM-1211.00-1645); Report A-320-80-02 (MCM-1211.00-1524)

METHOD: Test

EQUIPMENT ID: Resistance Temperature Detector (1) MANUFACTURER: Weed MODEL #: 101-1.2N-A-3-C-6-A2-1

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$2.05X10^4$RAD	$2.26X10^4$RAD

QUALIFICATION REPORT: Test Specification MCS-1211.00-06, Supplement 10;
Test Report A-490-82 (MCM-1211.00-1645);
Report A-320-80-02 (MCM-1211.00-1524)

METHOD: Test

EQUIPMENT ID: Differential Pressure Switch (1) MANUFACTURER: Solon MODEL #: 7PSIDW

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$1.65X10^6$RAD	$1.82X10^6$RAD

QUALIFICATION REPORT: Test Specification MCS-1211.00-06, Supplement 10;
Test Report A-490-82 (MCM-1211.00-1645);
Report A-320-80-02 (MCM-1211.00-1524)

METHOD: Test

EQUIPMENT ID: Differential Pressure Switch (1) MANUFACTURER: Solon MODEL #: 7PSIADW

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	1.05×10^{5} RAD	1.16×10^{6} RAD

QUALIFICATION REPORT: Test Specification MCS-1211.00-06, Supplement 10;
Test Report A-490-82 (MCM-1211.00-1645);
Report A-320-80-02 (MCM-1211.00-1545)

METHOD: Test

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT
LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO THE POST-LOCA RECIRCULATION RADIATION ENVIRONMENT

EQUIPMENT ID: (1) Pressure Transmitter - Annulus Pressure

MANUFACTURER: Barton

MODEL #: 7PSIADW

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$1.0X10^3$RAD	$2X10^8$RAD

QUALIFICATION REPORT: Wyle Report #43904-1, Vol. I - Rev. C, Vol. II - Rev. B (MCM-1210.04-0016)

METHOD: Test

EQUIPMENT ID: Limit Switch (1) MANUFACTURER: Micro Switch MODEL #: LSM4N

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)

This equipment will be removed from safety power before startup after the first refueling. This equipment presently serves an indication function only and is not used by the operator as a basis for any required action.

QUALIFICATION REPORT: N/A

METHOD: N/A

EQUIPMENT ID: Terminal Blocks (1) MANUFACTURER: Buchanan MODEL #: 0721 and P0721

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$1.05X10^6$RAD	$1.16X10^6$RAD

QUALIFICATION REPORT: Test Specification MCS-1211.00-06, Supplement 10;
Test Report A-490-82 (MCM-1211.00-1645);
Report A-320-80-02 (MCM-1211.00-1524)

METHOD: Test

EQUIPMENT ID: (1) Control and Power Cable

MANUFACTURER: Anaconda

MODEL #: EP Insulation and EP/Hypalon Insulation (Procurement Specs: MCS-1354.01-2&4, & MCS-1354.02-3,6&9)

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$1.1X10^8$RAD	$2X10^8$RAD

QUALIFICATION REPORT: Anaconda Test Reports F-C4350-2 (MCM-1354.00-0008) and F-C4350-3 (MCM-1354.00-0009)

METHOD: Test

EQUIPMENT ID: (1) Control Cable

MANUFACTURER: Brand Rex

MODEL #: XLPE Insulation (Procuremer Specs: MCS-1354.02-4,5,7, & 9, & MCS-1354.04-14)

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$1.1X10^8$RAD	$2X10^8$RAD

QUALIFICATION REPORT: Brand Rex Test Report FC4113 (MCM-1354.00-0007), FC5120-1 (MCM-1354.00-0023) and FC5120-3 (MCM-1354.00-0024)

METHOD: Test

EQUIPMENT ID: (1) Control, instrumentation, and Power Cable

MANUFACTURER: Okonite

MODEL #: EP, EP/Hypalon and Hypalon Insulation (Procurement Specs: MCS-1354.01-1&2, MCS-1354.02-4,6&9, & MCS-1354.03-4)

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$1.1X10^8$RAD	$2X10^8$RAD

QUALIFICATION REPORT: Okonite Test Reports N1, May 2, 1975 (MCM-1354.00-0010); FN-1, July 3, 1978 (MCM-1354.00-0013); G-3, June 28, 1979 (MCM-1354.00-0012); 110E November 12, 1970 (MCM-1354.00-0016); Duke Test Report TR032 (MCM-1354.00-0022); G1, February 17, 1976 (MCM-1354.00-0045)

METHOD: Test

EQUIPMENT ID: (1) Shielded Pair Armored Jacketed Instrumentation Cable

MANUFACTURER: Brand Rex

MODEL #: PVC Insulation

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$3X10^7$RAD	$.5X10^7$RAD

QUALIFICATION REPORT: Duke Test Report TR032 (MCM-1354.00-0022)

METHOD: Test

EQUIPMENT ID: Control Cable (1)

MANUFACTURER: Okonite

MODEL #: Tefzel 280 Insulation (Procurement Spec: MCS-1354.04-6)

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$1.1X10^8$RAD	$2X10^8$RAD

QUALIFICATION REPORT: Okonite Test Report K-0-1, September 1979 (MCM-1354.00-0011) and K-8-1, April 4, 1981 (MCM-1354.00-0044)

METHOD: Test

EQUIPMENT ID: (1) Instrumentation Cable

MANUFACTURER: Eaton (Samuel Moore)

MODEL #: EP/Hypalon Insulation (Procurement Specs: MCS-1354.03-1,2,3,&5 & MCS-1354.04-2&5)

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$1.1X10^8$RAD	$2X10^8$RAD

QUALIFICATION REPORT: Samuel Moore Test Report F-C3683 (MCM-1354.00-0006)

METHOD: Test

EQUIPMENT ID: (1) Shielded Pair Armored Jacketed Instrumentation Cable

MANUFACTURER: Eaton (Samuel Moore)

MODEL #: PVC Insulation

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$3X10^7$RAD	$5X10^7$RAD

QUALIFICATION REPORT: Duke QTF Report TR-032 (MCM-1354.00-0022)

METHOD: Test

EQUIPMENT ID: Fuse (1) (Note 6) MANUFACTURER: Bussmann MODEL #: FNA

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$1.6X10^6$RAD (worst case)	$1.6X10^6$RAD

QUALIFICATION REPORT: Duke QTF Report TR-040 (MCM-1393.02-0006, ESSEM File III-A-4)

METHOD: Test

EQUIPMENT ID: Fuse Block (1) (Note 6)

MANUFACTURER: Bussmann

MODEL #: 3792

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$1.6X10^{6}$RAD (worst case)	$1X10^{10}$RAD

QUALIFICATION REPORT: Radiation Analysis (ESSEM File IV-A-3)

METHOD: Analysis

EQUIPMENT ID: Fuse Block (1) (Note 6)

MANUFACTURER: Bussmann

MODEL #: 4439

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$1.1X10^{3}$RAD (worst case)	$1X10^{10}$RAD

QUALIFICATION REPORT: Radiation Analysis (ESSEM File IV-A-3)

METHOD: Analysis

EQUIPMENT ID: Fuse Block (Note 6)

MANUFACTURER: Bussmann

MODEL #: 4575

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$1X10^{6}$RAD (worst case)	$1X10^{10}$RAD

QUALIFICATION REPORT: Radiation Analysis (ESSEM File IV-A-3)

METHOD: Analysis

EQUIPMENT ID: Indicating Light (1) (Note 6) MANUFACTURER: Cutler-Hammer MODEL #: E29

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$5X10^5$RAD (worst case)	$5X10^5$RAD

QUALIFICATION REPORT: Duke QTF Report TR-040 (MCM-1393.02-0006, ESSEM File II-B-1)

METHOD: Test

EQUIPMENT ID: Relay (1) (Note 6) MANUFACTURER: Cutler-Hammer MODEL #: D23

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$1X10^6$RAD (worst case)	$1X10^6$RAD

QUALIFICATION REPORT: Duke QTF Report TR-040 (MCM-1393.02-0006, ESSEM File VII-A-2.1)

METHOD: Test

EQUIPMENT ID: Relay (1) (Note 6) MANUFACTURER: Cutler-Hammer MODEL #: D26

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	3×10^5 RAD (worst case)	1×10^6 RAD

QUALIFICATION REPORT: Duke QTF Report TR-047 (MCM-1393.02-0007), ESSEM File VII-A-2.2)

METHOD: Test

EQUIPMENT ID: (1) Surge Suppressor (Note 6)

MANUFACTURER: General Semiconductor

MODEL #: Transzorb

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$1.6X10^6$RAD (worst case)	$2X10^7$RAD

QUALIFICATION REPORT: General Semiconductor Specification; Radiation Analysis (ESSEM File III-C-1)

METHOD: Analysis

EQUIPMENT ID: (1) Selector Switch (Note 6)

MANUFACTURER: Cutler-Hammer

MODEL #: 10250T

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$5X10^5$RAD (worst case)	$5X10^5$RAD

QUALIFICATION REPORT: Duke QTF Report TR-040 (MCM-1393.02-0006, ESSEM File VI-A-1,4)

METHOD: Test

EQUIPMENT ID: Terminal Block (1) (Note 6)

MANUFACTURER: States

MODEL #: ZWM and NT

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$1.8X10^6$RAD (worst case)	$3X10^7$RAD

QUALIFICATION REPORT: Radiation Analysis (ESSEM File IV-B-4 & IV-B-5)

METHOD: Analysis

EQUIPMENT ID: (1) Switch and Indicating Light (Note 6) MANUFACTURER: Cutler-Hammer MODEL #: E30

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$1.8X10^5$RAD (worst case)	$1.9X10^5$RAD

QUALIFICATION REPORT: Duke QTF Report TR-040 (MCM-1393.02-0006, ESSEM File VI-C-1)

METHOD: Test

EQUIPMENT ID: Fuse Block (1) (Note 6) MANUFACTURER: Bussmann MODEL #: 2808

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$1.1X10^3$RAD (worst case)	$7X10^6$RAD

QUALIFICATION REPORT: Radiation Analysis (ESSEM File IV-A-11)

METHOD: Analysis

EQUIPMENT ID: Terminal Block (1) (Note 6)

MANUFACTURER. Stanwick

MODEL #: SLS

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$2X10^4$RAD (worst case)	$3X10^7$RAD

QUALIFICATION REPORT: Duke QTF Report TR-047 (MCM-1393.02-0007) (ESSEM File IV-B-1.1)

METHOD: Test

EQUIPMENT ID: Fuse (1) (Note 6)

MANUFACTURER: Littelfuse

MODEL #: Slo-Blo

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$3X10^5$RAD (worst case)	$3x10^7$RAD

QUALIFICATION REPORT: Duke QTF Report TR-047 (MCM-1393.02-0007, ESSEM File III-A-7)

METHOD: Test

ATTACHMENT 5

DUKE POWER COMPANY

ON THE CATEGORY II GUIDELINES OF NUREG 0588

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21	2				
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MCGUIRE NUCLEAR STATION

NUREG 0588 CATEGORY II GUIDELINES	DUKE POWER COMPANY POSITION
1.0 ESTABLISHMENT OF THE QUALIFICATION PARAMETERS FOR DESIGN BASIS EVENTS	
1.1 Temperature and Pressure Conditions Inside Containment - Loss-of-Coolant	
1.1.1 The time-dependent temperature and pressure, established for the design of the containment structure and found acceptable by the staff, may be used for environmental qualification of equipment.	The containment structural design has been based on the results on an analysis performed by Westinghouse employing the methodology described below. The results of this analysis are reported in Section 6.2 of the FSAR.
1.1.2 Acceptable methods for calculating and establishing the containment pressure and temperature should be qualified are summarized below. Acceptable methods for calculating mass and energy release rates are summarized in Appendix A.	Westinghouse employs the methodology described in WCAP-8312A for calculating the LOCA mass and energy release. Appendix A to NUREG-0588 indicates that this methodology is acceptable to the Staff.
Pressurized Water Reactors (PWRs)	
Ice Condenser Containment - Calculate LOCA containment environment using LOTIC or equivalent industry codes. Additional guidance is provided in SRP Section 6.2.1.1.B, NUREG-75/087.	Westinghouse conforms to the Staff position for Ice-Condenser Plants by employing LOTIC to calculate the containment transient following LOCA.
1.1.3 In lieu of using the plant-specific containment temperature and pressure design profiles for BWR and ice condenser types of plants, the generic envelope shown in Appendix C may be used for qualification testing.	Plant-specific profiles are the basis for McGuire equipment qualification testing.

	NUREG 0588 CATEGORY II GUIDELINES	DUKE POWER COMPANY POSITION
1.1.4	The test profiles included in Appendix A to IEEE Std. 323-1974 should not be considered an acceptable alternative in lieu of using plant-specific containment temperature and pressure design profiles unless plant-specific analysis is provided to verify the adequacy of those profiles.	Plant specific profiles are the basis for McGuire equipment qualification testing. It should be noted that the IEEE 323-1974, Appendix A temperature and pressure profiles envelop the worst-case McGuire containment accident temperature and pressure conditions and have been used by some manufacturers for generic qualifications.
1.2	Temperature and Pressure Conditions Inside Containment - Main Steam Line Break (MSLB)	
1.2.1	Where qualification has not been completed, the environmental parameters used for equipment qualification should be calculated using a plant-specific model based on the staff-approved assumptions discussed in Item 1 of Appendix B.	The environmental qualification testing for equipment located inside containment has been completed.
1.2.2	Models that are acceptable for calculating containment parameters are listed in Section 1.1.2.	Westinghouse employs the methodology described in WCAP 8822 for calculating the mass and energy release following a Main Steam Line Break (MSLB). At the specific request of Duke, Westinghouse has completed the mass and energy release calculations assuming no entrainment. Westinghouse conforms to the Staff position for Ice-Condenser Plants by employing LOTIC to calculate the containment transient following MSLB.
1.2.3	In lieu of using the plant-specific containment temperature and pressure design profiles for BWR and ice condenser plants, the generic envelope shown in Appendix C may be used.	Plant specific profiles are the basis for McGuire equipment qualification testing.

NUREG 0588 CATEGORY II GUIDELINES	DUKE POWER COMPANY POSITION
1.2.4 The test profiles included in Appendix A to IEEE Std. 323-1974 should not be considered an acceptable alternative in lieu of using plant-specific containment temperature and pressure design profiles unless plant-specific analysis is provided to verify the adequacy of those profiles.	Plant specific profiles are the basis for McGuire equipment qualification testing. It should be noted that the IEEE 323-1974, Appendix A temperature and pressure profiles envelope the worst-case McGuire containment accident temperature and pressure conditions and have been used by some manufacturers for generic qualifications.
1.2.5 Where qualification has been completed but only LOCA conditions were considered, then it must be demonstrated that the LOCA qualification conditions exceed or are equivalent to the maximum calculated MSLB conditions.	The environmental qualification tests for equipment installed inside the containment at McGuire that is required to function during and following a MSLB envelope the maximum calculated MSLB conditions.
1.3 Effects of Chemical Spray	
1.3.1 The effects of caustic spray should be addressed for the equipment qualification. The concentration of caustics used for qualification should be equivalent to or more severe than those used in the plant containment spray system.	Chemical spray is included in qualification tests for equipment located inside the containment provided the equipment is required to operate in the spray environment.
1.3.2 If the chemical composition of the caustic spray can be affected by equipment malfunctions, the most severe caustic spray environment that results from a single failure in the spray system should be assumed. See SRP Section 6.5.2 (NUREG-75/087), Paragraph II, Item (e) for caustic spray solution guidelines.	In the McGuire containment spray system, no single failure can occur that will result in a more severe spray solution composition than the anticipated composition.

NUREG 0588 CATEGORY II GUIDELINES	DUKE POWER COMPANY POSITION
1.4 Radiation Conditions Inside and Outside Containment	
The radiation environment for qualification of equipment should be based on the normally expected radiation environment over the equipment qualified life, plus that associated with the most severe design basis accident (DBA) during or following which that equipment must remain functional. It should be assumed that the DBA-related environmental conditions occur at the end of the equipment qualified life.	The calculated radiation environment is based on the 40 year normal operation dose plus the appropriate DBA dose.
The sample calculations in Appendix D and the following positions provide an acceptable approach for establishing radiation limits for qualification. Additional radiation margins identified in Section 6.3.1.5 of IEEE Std. 323-1974 for qualification type testing are not required if these methods are used.	
1.4.1 The source term to be used in determining the radiation environment associated with the design basis LOCA should be taken as an instantaneous release from the fuel to the atmosphere of 100 percent of the noble gases, 50 percent of the iodines, and 1 percent of the remaining fission products. For all other non-LOCA design basis accident conditions, a source term involving an instantaneous release from the fuel to the atmosphere of 10 percent of the noble gases (except Kr-85 for which a release of 30 percent should be assumed) and 10 percent of the iodines is acceptable.	The radiation environments throughout the station following a DBA LOCA are determined assuming instantaneous release from the fuel to the containment of 100% of the noble gas inventory, 50% of the core iodine inventory, and 1% of the remaining core fission product inventory. This source term is used to derive radiation levels for all equipment requiring radiation qualification. The release fractions are consistent with TID-14844 and NUREG 0578, Item 2.1.6b.

	NUREG 0588 CATEGORY II GUIDELINES	DUKE POWER COMPANY POSITION
1.4.2	The calculation of the radiation environment associated with design basis accidents should take into account the time-dependent transport of released fission products within various regions of containment and auxiliary structures.	All radioactivity released initially remains within the containment. For conservatism airborne radioactivity is assumed to be homogeneously distributed throughout the containment at the initiation of the accident. Recirculation of water from the containment sump is assumed to begin at 10 minutes into the accident. Prior to initiation of recirculation, normal radiation environments are assumed to exist throughout the station outside containment. The time-dependent transport mechanisms considered are consistent with NUREG 0578, Item 2.1.6b.
1.4.3	The initial distribution of activity within the containment should be based on a mechanistically rational assumption. Hence, for compartmented containments, such as in a BWR, a large portion of the source should be assumed to be initially contained in the drywell. The assumption of uniform distribution of activity throughout the containment at time zero is not appropriate.	See the response to 1.4.2 above.
1.4.4	Effects of ESF Systems, such as containment sprays and containment ventilation and filtration systems, which act to remove airborne activity and redistribute activity within containment, should be calculated using the same assumptions used in the calculation of offsite dose. See SRP Section 15.6.5 (NUREG-75/087) and the related sections referenced in the Appendices to that section.	To increase the conservatism of the calculated radiation values, no credit is taken for removal processes such as containment spray, filters, or natural deposition. The only removal mechanism considered is radioactive decay.

NUREG 0588 CATEGORY II GUIDELINES	DUKE POWER COMPANY POSITION
1.4.5 Natural deposition (i.e., plate-out) of airborne activity should be determined using a mechanistic model and best estimates for the model parameters. The assumption of 50 percent instantaneous plate-out of the iodine released from the core should not be made. Removal of iodine from surfaces by steam condensate flow or washoff by the containment spray may be assumed if such effects can be justified and quantified by analysis or experiment.	The assumption of an instantaneous plate-out of 50% of the iodine released from the core is not used. As stated above, natural deposition is not used in the development of post-LOCA radiation levels.
1.4.6 For unshielded equipment located in the containment, the gamma dose and dose rate should be equal to the dose and dose rate at the centerpoint of the containment plus the contribution from location dependent sources such as the sump water and plate-out, unless it can be shown by analyses that location and shielding of the equipment reduces the dose and dose rate.	The gamma dose in containment is that dose calculated at the centerpoint of the containment. Shielding effects are considered for equipment located outside the crane wall and in the accumulator rooms.
1.4.7 For unshielded equipment, the beta doses at the surface of the equipment should be the sum of the airborne and plate-out sources. The airborne beta dose should be taken as the beta dose calculated for a point at the containment center.	Beta dose calculations are consistent with the gamma dose calculations as discussed above. Also see the response to 1.4.8 below.
1.4.8 Shielded components need be qualified only to the gamma radiation levels required, provided an analysis or test shows that the sensitive portions of the	All Class 1E equipment located inside containment that is required to mitigate a LOCA, MSLB, or HELB inside the containment has sufficient shielding to prevent the exposure of

	NUREG 0588 CATEGORY II GUIDELINES	DUKE POWER COMPANY POSITION
1.4.8	(Continued) component or equipment are not exposed to beta radiation or that the effects of beta radiation heating and ionization have no deleterious effects on component performance.	(Continued) any organic materials associated with this equipment to a beta radiation environment.
1.4.9	Cables arranged in cable trays in the containment should be assumed to be exposed to half the beta radiation dose calculated for a point at the center of the containment plus the gamma ray dose calculated in accordance with Section 1.4(6). This reduction in beta dose is allowed because of the localized shielding by other cables plus the cable tray itself.	See the response to 1.4.8 above. Additionally, armored cables are used in safety-related applications inside containment at McGuire; therefore, beta radiation effects on cable insulation is considered negligible.
1.4.10	Paints and coatings should be assumed to be exposed to both beta and gamma rays in assessing their resistance to radiation. Plate-out activity should be assumed to remain on the equipment surface unless the effects of the removal mechanisms, such as spray wash-off or steam condensate flow, can be justified and quantified by analysis or experiment.	See the response to 1.4.6 and 1.4.7 above.
1.4.11	Components of the emergency core cooling system (ECCS) located outside containment (e.g., pumps, valves, seals, and electrical equipment) should be qualified to withstand the radiation	Radiation levels outside containment following a design basis LOCA are based on the release fractions discussed in 1.4.1 above. This released activity is assumed to be retained in and diluted by water from safety

NUREG 0588 CATEGORY II GUIDELINES		DUKE POWER COMPANY POSITION
1.4.11	(Continued) equivalent to that penetrating the containment, plus the exposure from the sump fluid using assumptions consistent with the requirements stated in Appendix K to 10 CFR Part 50.	(Continued) injection and ice bed melt. Where appropriate, radiation penetrating the containment is included. This analysis is consistent with that required by NUREG 0578, Item 2.1.6b.
1.4.12	Equipment that may be exposed to radiation doses below 10^4 rads should not be considered to be exempt from radiation qualification, unless analysis supported by test data is provided to verify that these levels will not degrade the operability of the equipment below acceptable values.	Class 1E equipment that is exposed to a radiation environment is evaluated for proper radiation qualification.
1.4.13	The Staff will accept a given component to be qualified provided it can be shown that the component has been qualified to integrated beta and gamma doses which are equal to or higher than those levels resulting from an analysis similar in nature and scope to that included in Appendix D (which uses the source term given in Item (1) above), and that the component incorporates appropriate factors pertinent to the plant design and operating characteristics, as given in these general guidelines.	The calculated radiation environments for McGuire are comparable to those values presented in Appendix D.
1.4.14	When a conservative analysis has not been provided by the applicant for Staff review, the Staff will use the radiation environment guidelines contained in Appendix D, suitably corrected for the differences in reactor power level, type, containment size, and other appropriate factors.	See the response to 1.4.13 above.

NUREG 0588 CATEGORY II GUIDELINES	DUKE POWER COMPANY POSITION
1.5 Environmental Conditions For Out-Side Containment	
1.5.1 Equipment located outside containment that could be subjected to high-energy pipe breaks should be qualified to the conditions resulting from the accident for the duration required. The techniques to calculate the environmental parameters described in Sections 1.1 through 1.4 (Category II) above should be applied.	Equipment located outside the containment that could be subjected to a postulated pipe break environment and that is required to either mitigate the break or bring the unit to a safe shutdown condition is qualified for the pipe break environment. The methods employed to evaluate pipe breaks and to determine the resulting environmental parameters are discussed in Duke Power Company Report MDS/PDG - 77 - 1, The Evaluation of the Effects of Postulated Pipe Failures Outside Containment for McGuire Nuclear Station.
1.5.2 Equipment located in general plant areas outside containment where equipment is not subjected to a design basis accident environment should be qualified to the normal and abnormal range of environmental conditions postulated to occur at the equipment location.	Equipment located in general plant areas outside containment and not exposed to a DBA environment is designed and/or qualified for the environmental conditions postulated to occur at the equipment location as derived from the Plant environmental design basis.
1.5.3 Same as Category I; or, there may be designs where a loss of the environmental support system may expose some equipment to environments that exceed the qualified limits. For these designs, appropriate monitoring devices should be provided to alert the operator that abnormal conditions exist and to permit an assessment of the conditions that occurred in order to determine if corrective action, such as replacing any affected equipment, is warranted.	For general plant areas outside containment where the area temperature could be postulated to exceed the design temperature of the equipment in that area, a temperature monitoring system is provided.

NUREG 0588 CATEGORY II GUIDELINES	DUKE POWER COMPANY POSITION
2.0 QUALIFICATION METHODS	
2.1 Selection of Methods	
2.1.1 Qualification methods should conform to the requirements defined in IEEE Std. 323-1971.	a. For equipment required to perform a safety function in a postulated LOCA, MSLB, HELB, or post-LOCA recirculation radiation environment, the environmental qualification methods meet the intent of IEEE 323-1971 requirements. b. For the equipment not required to operate in a harsh accident environment, environmental qualfification per IEEE 323-1971 was not required. Rather, the equipment was designed and analyzed to assure that it maintains its required performance capability for the environmental conditions postulated to occur at the equipment location as derived from the environmental design basis. In general, factory performance/functional testing at ambient conditions is completed on equipment prior to shipping and, for some items of equipment, a production unit may be tested at the specified maximum ambient temperature. These production tests, together with the design specification for the equipment, which specifies the environmental design parameters and engineering analysis, provides sufficient assurance of equipment capability in accordance with the Staff position under Item 2.1.4.
2.1.2 The choice of the methods selected is largely a matter of technical judgement and availability of information that supports the conclusions reached. Experience has shown that qualification of equipment subjected to an accident envi-	For equipment located inside containment that is required to perform a safety function in a postulated LOCA, MSLB, or HELB environment, environmental qualification is in general by testing. For equipment located outside containment

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2.1.2 (Continued)	(Continued)
ronment without test data is not adequate to demonstrate functional operability. In general, the staff will not accept analysis in lieu of test data unless (a) testing of the component is impractical due to size limitations, and (b) partial type test data is provided to support the analytical assumptions and conclusions reached.	that is required to perform a safety function in a postulated HELB or post-LOCA recirculation radiation environment, qualification is in general by testing, analysis, manufacturer's specific design, and/or combinations of these methods. The qualification method is provided in the equipment tables.
2.1.3 The environmental qualification of equipment exposed to DBA environments should conform to the following positions:	
The basis should be provided for the time interval required for operability of this equipment.	The required duration of operability is based on assumptions in the FSAR accident anlaysis, system requirements, and/or the time the environment is expected to remain outside its normal range following a DBA. The required and demonstrated duration of the safety function of equipment subject to a LOCA, MSLB, HELB, or post-LOCA recirculation radiation environment is provided in the equipment tables.
The operability and failure criteria should be specified and the safety margins defined.	The primary purpose of equipment qualification is to reduce the potential for common-mode failures due to postulated environmental conditions. Equipment will therefore be considered to have failed the test and/or analysis if the functional requirements identified in the attached tables cannot be met, unless an investigation can establish that the failure mechanism is not of common-mode origin or that plant specific analyses can demonstrate that the reduced capability is acceptable. In certain cases, failure criteria, per se, was not specified prior to qualification testing; however, the failure

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2.1.3 (Continued)	(Continued)
	of the equipment would have been an obvious failure (i.e., equipment would not function).
	Margin is discussed in Section 3.0.
2.1.3a Equipment that must function in order to mitigate any accident should be qualified by test to demonstrate its operability for the time required in the environmental conditions resulting from that accident.	Equipment that must perform a safety function in a LOCA, MSLB, HELB, or post-LOCA recirculation radiation environment, is qualified by test and/or analysis. The acceptance criteria for the test and/or analysis is that the safety-related function must be demonstrated for the specified duration of operability in the postulated accident environment.
2.1.3b Any equipment (safety-related or non-safety-related) that need not function in order to mitigate any accident, but that must not fail in a manner detrimental to plant safety should be qualified by test to demonstrate its capability to withstand any accident environment for the time during which it must not fail.	In general, the failure of safety-related equipment that is not required to perform a safety function in a postulated harsh accident environment is not detrimental to plant safety. The effects and consequences of adverse environments on non-safety-related equipment is discussed in a February 23, 1983 Duke Power Company letter from Tucker to Denton.
2.1.3c Equipment that need not function in order to mitigate any accident and whose failure in any mode in any accident environment is not detrimental to plant safety need only be qualified for its non-accident service environment. Although actual type testing is preferred, other methods when justified may be found acceptable. The bases should be provided for concluding that such equipment is not required to function in order to mitigate any accident, and that its failure in any mode in any accident environment is not detrimental to plant safety.	Where an item of safety-related equipment is located in an area such that it may be exposed to a LOCA, MSLB, HELB, or post-LOCA recirculation radiation environment but is not required to perform any safety-function as a result of the breaks, the failure of such equipment, due to the adverse environment, has been determined not to prejudice the safety functions of other equipment claimed in the accident analysis.

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2.1.4 For environmental qualification of equipment subject to events other than a DBA, which result in abnormal environmental conditions, actual type testing is preferred. However, analysis or operating history, or any applicable combination thereof, coupled with partial type test data may be found acceptable, subject to the applicability and detail of information provided.	As stated in the response to Item 2.1.1b, the design specification requirements for equipment not required to function in a harsh environment together with factory performance/ functional tests and engineering analyses (including some cases where the testing is performed at maximum ambient conditions) provide the requisite assurance for equipment capability.
2.2 Qualification by Test	
2.2.1 The failure criteria should be established prior to testing.	The response to Item 2.1.3 is applicable for equipment required to operate in a LOCA, MSLB, HELB, or post-LOCA reicruclation radiation environment.
2.2.2 Test results should demonstrate that the equipment can perform its required function for all service conditions postulated (with margin) during its installed life.	As stated in Item 2.1.1a environmental qualification demonstrates the capability of equipment to perform safety-related functions when subject to the consequential adverse environment of LOCA, MSLB, HELB, or post-LOCA recirculation radiation. For equipment not required to operate in a harsh environment, the response to Item 2.1.1b applies. The requirement to demonstrate this capability during the installed life implies an addressment of aging. This subject is discussed under Item 4. The subject of margin is discussed under Item 3.
2.2.3 The items described in Section 5.2 of IEEE Std. 323-1971 supplemented by Items (4) through (12) below constitute acceptable guidelines for establishing test procedures.	The Duke Power Company position with respect to Section 5 of IEEE 323-1971 is provided in the response to Item 2.3.3.

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2.2.4 When establishing the simulated environmental profile for qualifying equipment located inside containment, it is preferred that a single profile be used that envelops the environmental conditions resulting from any design basis event during any mode of plant operation (e.g., a profile that envelops the conditions produced by the main steamline break and loss-of-coolant accidents).	In general, a single profile, enveloping both MSLB and LOCA, is used for qualification of equipment located inside containment which is required to perform a safety function to mitigate a LOCA or MSLB. The exceptions to the use of a single qualification envelope for LOCA and MSLB are, in general, when: (a) A component is only required to mitigate against either the LOCA or MSLB. In such a case, qualification has been completed to conditions enveloping the possible consequences inside containment from the single event and, additionally, it is verified that failure of the component in any other more limiting environment will not prejudice any safety-related function. (b) The resulting test conditions would unjustifiably exceed acceptable conservatism.
2.2.5 Equipment should be located above flood level or protected against submergence by locating the equipment in qualified watertight enclosures. Where equipment is located in watertight enclosures, qualification by test or analysis should be used to demonstrate the adequacy of such protection. Where equipment could be submerged, it should be identified and demonstrated to be qualified by test for the duration required.	In general, safety-related equipment is located above the maximum post-LOCA water level. The exceptions to this design philosophy are certain motor operated valves and associated cables. The submerged valves are discussed in FSAR Section 15.4.1.3.

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2.2.6	The temperature to which equipment is qualified, when exposed to the simulated accident environment, should be defined by thermocouple readings on or as close as practical to the surface of the component being qualified. If there were no thermocouples located near the equipment during the tests, heat transfer analysis should be used to determine the temperature at the component. (Acceptable heat transfer analysis methods are provided in Appendix B.)	In performing qualification tests for equipment exposed to a LOCA, MSLB, or HELB environment, the external environment temperature is measured as close to the equipment surface as practicable.
2.2.7	Performance characteristics of equipment should be verified before, after, and periodically during testing throughout its range of required operability.	Where the safety-related function of the equipment requires operation in the LOCA, MSLB, HELB, or post-LOCA recirculation radiation environment, the equipment performance before, during (where practical) and after exposure to the simulated event is verified.
2.2.8	Caustic spray should be incorporated during simulated event testing at the maximum pressure and at the temperature conditions that would occur when the onsite spray systems actuate.	The response to Item 1.3.1 is applicable for equipment located inside containment and qualified by test to operate in the LOCA or MSLB environment.
2.2.9	The operability status of equipment should be monitored continuously during testing. For long-term testing, however, monitoring at discrete intervals should be justified if used.	The response to Item 2.2.7 is applicable.
2.2.10	Expected extremes in power supply voltage range and frequency should be applied during simulated event environmental testing.	Class 1E equipment is supplied by guaranteed stabilized power supplies. As a consequence, the range of the electrical parameters is considered to be within equipment capability.

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2.2.11 Dust environments should be addressed when establishing qualification service conditions.	Duke has implemented housekeeping procedures to preclude adverse dust conditions at McGuire. Therefore, dust environments are not required as a qualification parameter.
2.2.12 Cobalt-60 is an acceptable gamma radiation source for environmental qualification.	In general, Cobalt-60 sources are used to simulate the effects of gamma radiation for equipment qualified by test to operate in a LOCA/MSLB or post-LOCA recirculation radiation environment.
2.3 Test Sequence	
2.3.1 Justification of the adequacy of the test sequence selected should be provided.	In general, when testing is used to qualify equipment required to perform a safety function in a LOCA, MSLB, or HELB environment, the following test sequence is employed: 1. The equipment is subjected to a calibration and/or verification test at ambient conditions. This test included verification of safety-related functions. 2. No specific abnormal tests are required since the accident environment envelops the abnormal condition with margin. 3. The equipment is irradiated, using a Cobalt-60 source, to the estimated worst case gamma dose obtained from in-service operation and required accident and post-accident performance. 4. The same equipment is tested to verify equipment capability during a simulated seismic event.

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2.3.1 (Continued)	(Continued) 5. The same equipment is tested under applicable simulated accident and post-accident conditions. Completion of the above test sequence gives assurance that the equipment can perform safety-related functions under normal, abnormal and design basis event conditions. The design basis event testing applies extremes of radiation, vibration (seismic), temperature, humidity and chemical spray in a conservative sequence and verifies that the equipment being qualified is not marginal with respect to these parameters. The subject of margin and aging are discussed under Items 3 and 4, respectively.
2.3.2 The test should simulate as closely as practicable the postulated environment.	For equipment that is qualified by testing, the test environment simulates as closely as practicable the postulated environment.
2.3.3 The test procedures should conform to the guidelines described in Section 5 of IEEE Std. 323-1971.	In general, the qualification testing of safety-related equipment at McGuire conforms to the guidelines of IEEE 323-1971. The Duke position with respect to the documentation requirements of IEEE 323-1971 is provided in the response to Item 5.2.
2.3.4 The Staff considers that, for vital electrical equipment such as penetrations, connectors, cables, valves and motors, and transmitters located inside containment or exposed to hostile steam environments outside containment; separate effects testing for the most part is not an acceptable qualification method. The testing of such equipment should be conducted in a manner that subjects the same piece of equipment to radiation and the hostile steam environment sequentially.	For equipment which is qualified by testing and which is required to perform a safety function in a LOCA, MSLB, or HELB environment, the test sequence identified in the response to Item 2.3.1 is generally employed and as a consequence does not, in general, employ effects testing, if used, is justified.

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2.4 Other Qualification Methods	
Qualification by analysis or operating experience implemented, as described in IEEE Std. 323-1971 and other ancillary standards, may be found acceptable. The adequacy of these methods will be evaluated on the basis of the quality and detail of the information submitted in support of the assumptions made and the specific function and location of the equipment. These methods are most suitable for equipment where testing is precluded by physical size of the equipment being qualified. It is required that, when these methods are employed, some partial type tests on vital components of the equipment be provided in support of these methods.	Duke does not necessarily rely on operating experience to establish the qualification of safety-related equipment, rather, operating experience may be included in support of qualification by test and/or analysis. The equipment tables identify the qualification methodology employed for each item of safety-related equipment.
3.0 MARGINS	
3.1 Quantified margins should be applied to the design parameters discussed in Section 1 to assure that the postulated accident conditions have been enveloped during testing. These margins should be applied in addition to any margins (conservatism) applied during the derivation of the specified plant parameters.	For most plant specific applications, margins are available between the qualification parameters and the plant specific requirements. Margins are as shown in the equipment tables.
3.2 The margins provided in the design will be evaluated on a case-by-case basis. Factors that should be considered in quantifying margins are (a) the environmental stress levels induced during testing, (b) the duration of the stress, (c) the number of items tested and the number of tests performed in the hostile environment, (d) the performance characteristics of the equipment while subjected to the environmental stresses, and (e) the specified function of the equipment.	Same as 3.1.

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3.3	When the qualification envelope in Appendix C is used, the only required margins are those accounting for the inaccuracies in the test equipment. Sufficient conservatism has already been included to account for uncertainties such as production errors and errors associated with defining satisfactory performance (e.g., when only a small number of units are tested).	This generic envelope is not specifically employed by Westinghouse or Duke for qualification testing. It should be noted that a given manufacturer's test curve may approximate this generic curve.
3.4a	Some equipment may be required by the design to only perform its safety function within a short time period into the event (i.e., within seconds or minutes), and, once its function is complete, subsequent failures are shown not to be detrimental to plant safety. Other equipment may not be required to perform a safety function but must not fail within a short time period into the event, and subsequent failures are also shown not to be detrimental to plant safety. Equipment in these categories is required to remain functional in the accident environment for a period of at least 1 hour in excess of the time assumed in the accident analysis.	In general, equipment required to operate in a harsh accident environment is qualified to perform its safety function over a considerable period in excess of the calculated worst case time to perform the safety functions as derived from the accident analysis. The arbitrary additional one hour time requirement has not been applied to all equipment. The time margins indicated in the equipment tables are considered acceptable.
3.4b	For all other equipment (e.g., post-accident monitoring, recombiners, etc.), the 10 percent time margin identified in Section 6.3.1.5 of IEEE Std. 323-1974 may be used.	In qualifying equipment required to operate in a LOCA, MSLB, HELB, or post-LOCA recirculation radiation environment, margin is included in qualification testing by selecting conservative qualification parameters and/or test sequences. Some of the areas where margin is usually implicit in a test sequence is as follows: 1. The full radiation dose, simulating effects of in-service and accident radiation doses, is applied in a single step prior to seismic and HELB test simulations.

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3.4b (Continued)	(Continued) 2. The seismic event simulation applies significant mechanical stress to the equipment prior to the HELB simulation. 3. The single envelope normally employed for HELB simulation, not only encompasses the effects of LOCA and MSLB accidents, but a whole spectrum of break sizes and locations within these accident definitions. As a consequence, the envelope employed invariably contains significant margin with respect to the transient for any single break size and location. 4. The single HELB simulation normally employed combines the high irradiation dose associated with the LOCA with the high temperature associated with the MSLB.
4.0 AGING	
4.1 Qualification programs that are committed to conform to the requirements of IEEE Std. 382-1972 (for valve operators) and IEEE Std. 334-1971 (for motors) should consider the effects of aging. For this equipment, the Category I positions of Section 4 are applicable.	Safety-related valve operators (motor and solenoid) located inside containment and continuous duty motors located inside containment have been mechanically, thermally, and radiation aged in accordance with IEEE 382-1972 and IEEE 334-1971, respectively.
4.2 For other equipment, the qualification programs should address aging only to the extent that equipment that is composed, in part, of materials susceptible to aging effects should be identified, and a schedule for periodically replacing the equipment and/or materials should be established. During individual case reviews, the Staff will require that the effects	Addressment of aging was not a requirement in qualification programs for Category II equipment. However, with the wealth of in-service experience covering a variety of equipment types, no significant in-service aging mechanisms have been identified which could prejudice the qualification tests performed on new equipment within a few years from start-up.

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4.2	(Continued) of aging be accounted for on selected equipment if operating experience or testing indicates that the equipment may exhibit deleterious aging mechanisms.	(Continued) Inservice degradation is addressed through preventative maintenance and surveillance programs with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation. These programs are based on test results, manufacturer's recommendations, operating experience, and/or sound engineering practices. Additionally, EPRI research, NRC studies, NPRDS information, IE Bulletins and Information Notices, and industry research and testing will be used to augment this program.
5.0	QUALIFICATION DOCUMENTATION	
5.1	The Staff endorses the requirements stated in IEEE Std. 323-1974 that, "The qualification documentation shall verify that each type of electrical equipment is qualified for its application and meets its specified performance requirements. The basis of qualification shall be explained to show the relationship of all facets of proof needed to support adequacy of the complete equipment." "Data used to demonstrate the qualification of the equipment shall be pertinent to the application and organized in an auditable form."	Duke Power Company has arranged and will maintain in an auditable form sufficient qualification documentation that will support the qualification that is required for each type of safety-related electrical equipment.
5.2	The guidelines for documentation in IEEE Std. 323-1971 are acceptable. The documentation should include sufficient information to address the required information identified in Appendix E. A certificate of conformance by itself is not acceptable unless it is accompanied by test data and information on the qualification program.	The qualification test reports referenced in the equipment tables for equipment qualified to operate in an accident environment, in general, meet the requirements of Section 5 to IEEE 323-1971 by providing certain essential information. For example: - safety-related functional requirements to be demonstrated

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5.2 (Continued)	(Continued) - range of applicable environmental parameters to be considered - identification of the test unit - description of the test facility and monitoring instrumentation - description of test unit mounting and interfaces - summary of the test procedures - summary of the test results