DUKE POWER COMPANY
POWER BUILDING
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WILLIAM O. PARKER, JR.
VICE PRESIDENT
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TELEPHONE: AREA 704
373-4083

June 30, 1982

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

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

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

Dear Mr. Denton:

Attached are 15 copies of our updated response to NUREG-0588 for McGuire Nuclear Station. Major changes to previous submittals are:

1) Inclusion of Unit 2 information
2) Addition of information on equipment in annulus
3) Revised format to improve usability of the document
4) Addition of Main Steam Isolation System as noted in McGuire Unit 1 Equipment Qualification SER, Paragraph 3.1.

The accident environments indicated for each equipment type are the worst cases for Units 1 and 2. Where specific differences exist between Unit 1 and 2 equipment, separate entries have been made for each unit.

Please advise if there are additional questions regarding this matter.

Very truly yours,

William O. Parker, Jr.

GAC/php
Attachments

cc: (w/attachment)
Mr. James P. O'Reilly
Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Mr. P. R. Bemis
Senior Resident Inspector
McGuire Nuclear Station

A048
1/15 on Shelf

Limited Distribution

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Section File: MC-801.01

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McGuire Nuclear Station - Unit 1 and Unit 2
Environmental Qualification of Class 1E Equipment

NRC letters dated October 15, 1979 and February 15, 1980 concerning the environmental qualification of Class 1E equipment defined the NRC Staff's requirements with respect to NUREG 0588, Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment. Basically, the Staff's requirements were as follows:

1) Provide a table listing by generic type all Class 1E equipment including the appropriate qualification data for the equipment. The information requirements were provided in the Staff's October 15, 1979 letter.

2) Review the adequacy of the environmental qualification for the equipment identified in Item 1 above with respect to the Staff's position described in NUREG 0588, document the degree of conformance, and justify any deviations.

Further, the NRC issued a Memorandum and Order on May 23, 1980 establishing NUREG 0588 as the requirement which applicants must meet in order to satisfy General Design Criterion 4 relating to the environmental qualification of Class 1E equipment.

In response to the NRC Staff's requests for information in this matter, Duke Power Company is providing the following:

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

Attachment 6 - Comparison of the Environmental Qualification of Class 1E Equipment Located Inside Containment to the Duke Position on the Category II Guidelines of NUREG 0588

Attachment 7 - Comparison of the Environmental Qualification of Class 1E Equipment Located in the Annulus to the Duke Position on the Category II Guidelines of NUREG 0588

Attachment 8 - Comparison of the Environmental Qualification of Class 1E Equipment Located Outside Containment and Exposed to HELB Environment to the Duke Position on the Category II Guidelines of NUREG 0588

Attachment 9 - Comparison of the Environmental Qualification of Class 1E Equipment Located Outside Containment and Exposed to the Post-LOCA Recirculation Radiation Environment to the Duke Position on the Category II Guidelines of NUREG 0588

Attachments 1, 2, 3, and 4 provide the tabular listing of Class 1E equipment exposed to a harsh environment and includes appropriate qualification data for the equipment. Attachments 5, 6, 7, 8, and 9 document the degree of conformance of the equipment qualification programs with the Category II guidelines of NUREG 0588.

ATTACHMENT 1

SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT

LOCATED INSIDE CONTAINMENT

Page	Rev.	Page	Rev.	Page	Rev.
1	0				
2	0				
3	0				
4	0				
5	0				
6	0				
7	0				
8	0				
9	1				
10	1				
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35	0				
36	0				
37	0				
38	0				

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

MANUFACTURER: Barton

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 (4): WCAP 9885

METHOD: Test

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

MANUFACTURER: Barton

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 (4): WCAP 9885

METHOD: Test

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

MANUFACTURER: Barton

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 (4): WCAP 9885

METHOD: Test

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

MANUFACTURER: Veritrak

MODEL #: 59DP

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.

QUALIFICATION REPORT (4): N/A

METHOD: N/A

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

MANUFACTURER: Barton

MODEL #: 763 (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	(Note 6)	SI Initiation (<5 min.)	(Note 6)	+10%	(Note 6)

QUALIFICATION REPORT (4): (Note 6)

METHOD: (Note 6)

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 2)

MANUFACTURER: Barton

MODEL #: 764 (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.	(Note 6)	2 weeks post DBE	(Note 6)	±25%	(Note 6)

QUALIFICATION REPORT (4): (Note 6)

METHOD: (Note 6)

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

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

MANUFACTURER: Barton

MODEL #: 764 (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.	(Note 6)	Reactor trip (<5 Minutes) Plus 4 months post DBE	(Note 6)	Trip Function: +5% (5 Minutes) PAM Function: ±25% (4 months)	(Note 6)

QUALIFICATION REPORT (4): (Note 6)

METHOD: (Note 6)

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.

QUALIFICATION REPORT (4): N/A

METHOD: N/A

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

MANUFACTURER: Rosemount

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 (4): WCAP 9157 and Duke letter Parker to Denton dated December 19, 1979

METHOD: Test/Analysis

NOTE: These RTD's will be replaced on Unit 1 within 10 years unless it can be shown that EPR is a non-critical material. (See DPCo's response to Supplement 5 of the McGuire Unit 1 SER). | 1

EQUIPMENT ID: (1) RTD - RCS Temperature (WR) (Lower Containment) MANUFACTURER: Rosemount 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 (4): WCAP 9157 and Duke letter Parker to Denton dated December 19, 1979

METHOD: Comparison to Model 176 KF, Test/Analysis

NOTE: Duke Power Company will replace the Unit 1 RTD's during the first refueling outage. (See DPCo's response to Supplement 5 of the McGuire Unit 1 SER).

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

MANUFACTURER: W IGTD

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.					

QUALIFICATION REPORT (4): N/A

METHOD: N/A

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

MANUFACTURER: W Sturtevant

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: $8.1X10^7R$ Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 309°F Press: 62 psig RH: 100% Rad: $2X10^8R$ 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 (4): WCAP 7820 and Supplements 1-4, WCAP 7709-L and Supplements 1-4

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: 7.6×10^7R Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 330°F Press: 85 psig RH: 100% Rad: 1×10^9R 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 (4): Test Report FF-14282 and Supplemental Technical Paper TA-4081, Test Report X-604, Test Report NUC-9, and Supplement 4/14/80

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: 330°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 (4): Test Report FF-14282 and Supplemental Technical paper TA-4081, Test Report X-604, Test Report NUC-9 and Supplement 4/14/80

METHOD: Test

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

MANUFACTURER: Rotork

MODEL #: 7 NA1, 11 NA1, 14 NA1, 16 NA1, 90 NA1

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: 75 psig RH: 100% Rad: $2X10^8R$ Chem Spray: Boric acid and sodium hydroxide soln. 10,000 ppm Boric acid 7-9pH	5 min. (Notes 7 and 8)	30 days post DBE	N/A	N/A

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

METHOD: Test

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

MANUFACTURER: Limitorque

MODEL #: SMB

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 (4): Limitorque Test Report: B0058, January 11, 1980

METHOD: Test

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

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 (4): Test Reports QR-52600-515 and QR-57300-5220-1-1, October 31, 1977 and May 15, 1979

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: $7.5X10^7$R Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 346°F Press: 113 psig RH: 100% Rad: $2X10^8$R Chem Spray: Boric acid and sodium hydroxide soln. 1720-2200 ppm Boric acid 9.5-10.5 pH	Operate upon receipt of a safety signal	31 days post DBE	N/A	N/A

QUALIFICATION REPORT (4): Test Reports QR-52600-515, Rev. B; QR-70900-21-1, Rev. A; MR-70905-21-3-1

METHOD: Test & similarity

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. 10,000 ppm Boric acid, 7-9 pH	5 min. (max) post DBE	30 days post DBE	N/A	N/A

QUALIFICATION REPORT (4): Test Report N11/4, December 1970; Test Report TR116, October 1973

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: $7.5X10^7R$ Chem Spray: N/A	Temp: 346°F Press: 110 psig RH: 100% Rad: $2X10^8R$ Chem Spray: Boric acid and sodium hydroxide soln. 3000 ppm Boron. 9.5-10.5 pH	Operate upon receipt of safety signal	30 days post DBL	N/A	N/A

QUALIFICATION REPORT (4): Test Report AQS21678/TR

METHOD: Test

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

MANUFACTURER: Target Rock

MODEL #: 77CC Model

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: Boric acid and hydrazine 5200 ppm Boric acid 8.6-10 pH	(Note 9)	14 days post DBE	N/A	N/A

QUALIFICATION REPORT (4): Test Report 2375, 9/26/79

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: $8.1X10^5$R Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 150°F Press: 15 psig RH: 100% Rad: $2.1X10^6$R 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 (4): Test Report A293-80, Test Report A294-80

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 (4): Test Reports ER-247, ER-252, and ER-227

METHOD: Test/Analysis

EQUIPMENT ID: (1) Cable Control, Instrumentation, and 2KV power (Lower Containment)

MANUFACTURER: Okonite

MODEL #: EP Insulation

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: 345°F Press: 104 psig RH: 100% Rad: $2X10^8R$ 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 (4): Test Reports FN-1, N-1, G-3, 110E, and 141

METHOD: Test

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

MANUFACTURER: Okonite

MODEL #: Tefzel 280 Insulation

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 (4): Test Report K-0-1, September 1979

METHOD: Test

EQUIPMENT ID: Cable - Control and 2KV Power (Lower Containment)

MANUFACTURER: Anaconda

MODEL #: EP Insulation and EP/Hypalon Insulation

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 (4): Test Reports F-C4350-2 and F-C4350-3, and Supplement

METHOD: Test

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

MANUFACTURER: Brand Rex

MODEL #: XLPE Insulation

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 (4): Test Reports FC5120-1 and FC5120-3

METHOD: Test

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

MANUFACTURER: Samuel Moore

MODEL #: EP/Hypalon Insulation

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 (4): Test Report F-C3683

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 (4): Test Reports F-C4033-3 and 71100

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: $6.7X10^7R$ Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 340°F Press: 63 psig RH: 100% Rad: $2X10^8R$ 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 (4): Namco Test Reports dated September 5, 1978 and February 22, 1979

METHOD: Test

EQUIPMENT ID: (1) Seal Material for Cable Entrance 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: $6.7X10^7$R Chem Spray: Boric acid and sodium tetraborate soln.	Temp: 340°F Press: 15 psig RH: 100% Rad: $2X10^8$R Chem Spray: Boric acid and sodium hydroxide soln. 4000 ppm Boron, pH not available	24 hours	12 days post DBE	N/A	N/A

QUALIFICATION REPORT (4): Test Report 44390-1, Rev. A

METHOD: Test/Analysis

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

MANUFACTURER: General Atomic

MODEL #: RD-23 Ionization 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 (4): Test Report E-254-960 dated May 1, 1981

METHOD: Test/Analysis

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

MANUFACTURER: Rockbestos

MODEL #: RSS-6-104

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 (4): Test Report E-254-960 dated May 1, 1981, (Note 15)

METHOD: Test

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

MANUFACTURER: TEC

MODEL #: 1414

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.	(Note 16)	2 weeks post DBE	(Note 16)	N/A	(Note 16)

QUALIFICATION REPORT (4): (Note 16)

METHOD: (Note 16)

EQUIPMENT ID: (1) Reactor Vessel Level Instrumentation System (Lower Containment)

MANUFACTURER: Westinghouse

MODEL #: RVLIS

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

The qualification information for the In-Containment portions of this system will be provided in a future revision of this submittal following review by Duke Power Company.

QUALIFICATION REPORT (4): N/A

METHOD: N/A

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, specifically in the lower compartment except for the electric hydrogen recombiner, containment air return fan motors, hydrogen skimmer fan motors, containment air return isolation damper motors, differential pressure switches for damper control, Limitorque valve motor operators and cables associated with these devices.

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 (except for the narrow-range and wide-range RTD's).

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. 25).

Note 4

Environmental Qualification test reports for the following equipment have previously been submitted to the NRC Staff:

Transmitter-Barton (by Westinghouse)
RTD's-Rosemount (by Westinghouse)
Electric Hydrogen Recombiner (by Westinghouse)
Containment Air Return Fan Motors (by Duke)
Hydrogen Skimmer Fan Motors (by Duke)
Solenoid Operators-Valcor (by Duke)
Electric Penetrations (by Duke)
Cable Termination/Splice Material (by Duke)
Stem-Mounted Limit Switches (by Duke)
Cable Entrance Seal Material (by Duke)

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

This equipment is located in Unit 2 which is scheduled for operation in 1983. Qualification information will be provided in a future revision to this submittal following review by Duke Power Company.

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, 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

Subsequent testing by the manufacturer showed a failure of a sample of cable at a higher temperature. Duke Power Company will replace the existing cable by June 1982 with a cable having a higher temperature qualification.

Note 16

This equipment has been installed per NRC requirements stated in NUREG0737. Qualification information will be provided in a future revision to this submittal following review by Duke Power Company.

Attachment 2

Summary of Environmental Qualification
of Class 1E Equipment
Located in the Annulus

ATTACHMENT 2

SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT

LOCATED IN THE ANNULUS

Page	Rev.	Page	Rev.	Page	Rev.
1	0				
2	0				
3	0				
4	0				
5	0				
6	0				
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16	0				
17	0				
18	0				
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21	0				
22	0				
23	0				

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: $4.5X10^7R$	Temp: 160°F RH: 100% Rad: $2X10^8R$	4 months post DBE	1 year post DBE	± 25%	-22%

QUALIFICATION REPORT: Wyle Test Report 43904-1, Rev. C

METHOD: Test

EQUIPMENT ID: Transmitter-RCS Pressure (WR) 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: $1.2X10^7$R	Temp: 350°F RH: 100% Rad: $4X10^7$R	2 weeks post DBE	1 year post DBE	± 10%	± 8% Upper Range

QUALIFICATION REPORT: Test Report RMT Report #3788, Rev. A

METHOD: Similarity & Type Test

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

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	(Note 4)	2 weeks post DBE	(Note 4)	± 10%	(Note 4)

QUALIFICATION REPORT: (Note 4)

METHOD: (Note 4)

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	5 minutes post DBE (Note 3)	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Test Reports QR-52600-515-Rev. B; QR-70900-21-1-Rev. A; MR7095-21-3-1

METHOD: Test/Analysis

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: $1X10^4$R	Temp: 346°F RH: 100% Rad: $2X10^8$R	5 minutes post DBE (Note 3)	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Test Report AQS21676/TR

METHOD: Test

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

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

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-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, TR-3025 dated 4/80

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: 340°F RH: 100% Rad: $2X10^8R$	5 minutes post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: NAMCO Test Report for EA-180, dated 9/5/78

METHOD: Test

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

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)
Temp: 142°F RH: 100% Rad: $4.8X10^6$R	Temp: 199°F RH: 100% Rad: $1X10^7$R	30 days post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Report LTR-24407

METHOD: Analysis

EQUIPMENT ID: Cable - Instrumentation MANUFACTURER: Boston Insulated MODEL #: XLPE

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: 194°F RH: 100% Rad: $2X10^8$R (Note 5)	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: B.I.W. Test B912

METHOD: Test

EQUIPMENT ID: Cable - Instrumentation MANUFACTURER: Brand Rex MODEL #: XLPE

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: 194°F RH: 100% Rad: $2X10^8$R (Note 5)	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Brand Rex Test FC4113

METHOD: Test

EQUIPMENT ID: Cable - Instrumentation MANUFACTURER: Samuel Moore MODEL #: EP/HYP

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: 194°F RH: 100% Rad: $2X10^8$R (Note 5)	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Samuel Moore Test FC3683

METHOD: Test

EQUIPMENT ID: Cable - Instrumentation MANUFACTURER: Samuel Moore MODEL #: PVC

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: 194°F RH: 100% Rad: $5X10^7R$ (Note 5)	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Duke Test TR017

METHOD: Test

EQUIPMENT ID: Cable - Instrumentation MANUFACTURER: Brand Rex MODEL #: PVC

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: 194°F RH: 100% Rad: $5X10^7$R (Note 5)	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Duke Test TR017

METHOD: Test

EQUIPMENT ID: Cable - Instrumentation MANUFACTURER: Okonite MODEL #: Hypalon

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: 194°F RH: 100% Rad: $3.5X10^7$R (Note 5)	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: ER 110E

METHOD: Test

EQUIPMENT ID: Cable - Instrumentation MANUFACTURER: Okonite MODEL #: EP

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: 194°F RH: 100% Rad: $2X10^8R$ (Note 5)	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Okonite Test Reports N1, FN1 & G3

METHOD: Test

EQUIPMENT ID: Cable - Control MANUFACTURER: Okonite MODEL #: EP/HYP

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: 194°F RH: 100% Rad: $2X10^8$R (Note 5)	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Okonite Test Reports N1, FN1 & G3

METHOD: Test

EQUIPMENT ID: Cable - Control MANUFACTURER: Samuel Moore MODEL #: EP/HYP

ACCIDENT ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED FOR ACCIDENT ENVIRONMENT	OPERABILITY DEMONSTRATED (2)	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 142°F RH: 100% Rad: $3X10^7$R	Temp: 194°F RH: 100% Rad: $2X10^8$R (Note 5)	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Samuel Moore Test FC3683

METHOD: Test

EQUIPMENT ID: Cable - Control MANUFACTURER: Anaconda MODEL #: EP/HYP

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: 194°F RH: 100% Rad: $2X10^8$R (Note 5)	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Anaconda Test FC4350-2, FC4350-3 and Supplements

METHOD: Test

EQUIPMENT ID: Cable - Power MANUFACTURER: Anaconda MODEL #: EP/HYP

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: 194°F RH: 100% Rad: $2X10^8$R (Note 5)	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Anaconda Test FC4350-2, FC4350-3 and Supplements

METHOD: Test

EQUIPMENT ID: Cable - Power MANUFACTURER: Okonite MODEL #: EP/HYP

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: 194°F RH: 100% Rad: $2X10^8$R (Note 5)	4 months post DBE	1 year post DBE	N/A	N/A

QUALIFICATION REPORT: Okonite Test Reports N1, FN1 & G3

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-1223.14-00-0016.

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

This transmitter is located in Unit 2 which is scheduled for operation in 1983. Qualification information will be provided in a future revision to this submittal following review by Duke Power Company.

Note 5

The qualified temperature is based on the insulation rating of the cable. The temperature of the insulation is a function of the cable conductor temperature and the ambient temperature.

Attachment 3

Summary of Environmental Qualification
of Class 1E Equipment
Located Outside Containment and Exposed to HELB Environment

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

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

MANUFACTURER: Westinghouse, Buffalo

MODEL #: 73F69618-1S75, 73F69618-2S75, 73F69618-3S75, 73F69618-4S75

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 and Duke analyses of Westinghouse testing: MCC 1381.05-00-0101, MCC 1381.05-00-0102

METHOD: Test and Analysis

EQUIPMENT ID: Centrifugal Charging Pump Motors

MANUFACTURER: Westinghouse, Buffalo

MODEL #: 72F44587-1S73, 72F44587-2S73, 72F44587-3S73 72F44587-4S73

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 and Duke analyses of Westinghouse testing: MCC 1381.05-00-0101, MCC 1381.05-00-0102

METHOD: Test and Analysis

EQUIPMENT ID: Nuclear Service Water Pump Motors

MANUFACTURER: Westinghouse, Buffalo

MODEL #: 72F36530-1S75, 72F36531-1S75, 72L10936-1S75, 72L10937-1S75

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, and Duke analyses of Westinghouse testing: 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)

The change in ground water sump level is gradual enough to allow repair or replacement of the pump motor after the environment has returned to normal.

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

METHOD: Analysis

EQUIPMENT ID: Component Cooling Pump Motors

MANUFACTURER: Westinghouse, Buffalo

MODEL #: 72F44689-1S74, 72F44689-2S74, 72F44689-3S74, 72F44689-4S74, 72F44690-1S74, 72F44690-2S74, 72F44690-3S74, 72F44690-4S74

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, and Duke analyses on Westinghouse testing: 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: Boron Injection Recirc Pump Motors

MANUFACTURER: Chempump/ Westinghouse

MODEL #: Chempump Model GVH-3K-751H-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: Spent Fuel 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: 132.4°F	Temp: 145°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: WCAP 8754 and Duke analysis of Westinghouse testing: 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 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: 132.4°F	Temp: 150°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: M L Ward letter to file, MCM 1320.00 dated 7/17/80

METHOD: Analysis

EQUIPMENT ID: Annulus Ventilation Filter Unit AVF-1A, 1B, 2A, & 2B

MANUFACTURER: Farr

MODEL #:

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 Damper Actuators

MANUFACTURER: Rotork

MODEL #: 7A/3MW

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 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 #:

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 #: 8006-6CS

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: Limotorque

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, 1/11/80

METHOD: Test

EQUIPMENT ID: Valve Motor Operators MANUFACTURER: Limotorque MODEL #: SMB Order Numbers: 383584-A & 391179-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: 340°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Limitorque Test Report: B0058, 1/11/80

METHOD: Test

EQUIPMENT ID: Valve Motor Operators MANUFACTURER: Rotork MODEL #: 7NA2 11NA2, 14NA2, 16NA2 30NA2, 40NA2, 70NA2, 90NA2, 93NA2

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)	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Rotork Test Reports N11/4, December 1970; TR116, October 1973; TR222, June 1975; TR3025, April 1980

METHOD: Test

EQUIPMENT ID: Valve Motor Operators MANUFACTURER: Rotork MODEL #: 7NA1, 11NA1, 14NA1, 16NA1, 30NA1

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

METHOD: Test

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; QR52600-515 Rev. B; MR70905-21-3-1

METHOD: Test & Similarity

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	Tem_t: 346°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Test Report: AQS21678/TR

METHOD: Test

EQUIPMENT ID: Valve Operator - MSIV 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: 330°F	Temp: 340°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Test Report Procedure No. 20139500 dated 5/1/79

METHOD: Test

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

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 QR56200-515, dated 10/31/77

METHOD: Test

EQUIPMENT ID: Valve Operator FWIV MANUFACTURER: Borg Warner MODEL #: 12" Gate w/Elect Hyd. Oper.

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: 330°F	Continuous	Continuous (Note 4)	N/A	N/A

QUALIFICATION REPORT: Test Report Nos. 1785 & 1779, dated 11/12/79

METHOD: Test

EQUIPMENT ID: Level Switch 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)
Temp: 240°F	(Note 5)	Continuous	(Note 5)	N/A	N/A

QUALIFICATION REPORT: (Note 5)

METHOD: (Note 5)

EQUIPMENT ID: Limit Switch 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 Reports dated 9/5/78 & 2/22/79

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

METHOD: Test

EQUIPMENT ID: Cable - Control MANUFACTURER: Brand Rex MODEL #: XLPE Insulation

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 FC5120-1 and FC5120-3

METHOD: Test

EQUIPMENT ID: Cable - Instrumentation MANUFACTURER: Samuel Moore MODEL #: EP/Hypalon Insulation

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

METHOD: Test

EQUIPMENT ID: Cable - Control, Instrumentation, and 2KV power

MANUFACTURER: Okonite

MODEL #: EP Insulation

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: 345°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Test Reports FN-1, N-1, G-3, 110E and 141

METHOD: Test

EQUIPMENT ID: Cable - Instrumentation MANUFACTURER: Okonite MODEL #: Tefzel 280 Insulation

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)

METHOD: Test

EQUIPMENT ID: Cable - Control and 2KV Power

MANUFACTURER: Anaconda

MODEL #: EP Insulation and EP/Hypalon Insulation

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 and F-C4350-3, and Supplement

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: Derate per manufacturer's curve, ESSEM III-A-4

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

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

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

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: 240°F (worst case)	Temp: 255°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: QTF Report TR-010

METHOD: Test

EQUIPMENT ID: Optical Isolator (Note 7)

MANUFACTURER: E-Max

MODEL #: 175D127

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	N/A (Note 9)	N/A (Note 9)

QUALIFICATION REPORT: E-Max Specification, CNM-1338.00-002

METHOD: Analysis

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

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

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: 240°F (worst case)	Temp: 255°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: QTF Report TR-010

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: 240°F (worst case)	Temp: 255°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: QTF Report TR-010

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; File: GS-640.00

METHOD: Test/Analysis

EQUIPMENT ID: Relay (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	N/A	N/A

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: QTF Report TR-010

METHOD: Test

EQUIPMENT ID: 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: 240°F (worst case)	Temp: 255°F	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: QTF Report TR-010

METHOD: Test

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

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

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

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

METHOD: Test

EQUIPMENT ID: Transmitter - signal (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: Littel fuse derating curve, ESSEM III-A-7

METHOD: Analysis

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 and 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 HELB environment is assumed to exist for 2½ hours based on 30 minutes at the peak temperature after which action by the operator isolates the break and allows Auxiliary Building temperature to decrease to normal ambient in 2 hours.

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.

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

A qualification program is currently being developed for these components. The result of this program will be reported upon completion. Test completion is expected by 6/30/82.

Note 6

The HELB analysis has identified pipe breaks resulting in higher temperatures; however, there are no cables exposed to temperatures above 330°F.

Note 7

The components listed are general application devices. These components are installed in metal enclosures and depending on their specific design application, may be located in various areas of the Auxiliary Building. This table addresses the qualfication of these components with respect to the worst-case pipe break environment applicable to the components

location.

Note 8

The qualified operating temperature is based on the maximum current flowing through the fuse or resistor and appropriate fuse or resistor derating.

Note 9

The only requirement of the optical isolator is to retain its input integrity during the accident.

Note 10

Accuracy demonstrated is the shift in the actual resistance due to the change in temperature during the accident.

Attachment 4

Summary of Environmental Qualification
of Class 1E Equipment
Located Outside Containment and Exposed to the
Post-LOCA Recirculation Radiation Environment

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

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) Boron Injection Recirculation Pump Motors

MANUFACTURER: Chempump/Westinghouse

MODEL #: Chempump Model GUH-3K-751H-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 MANUFACTURER: Westinghouse, Buffalo MODEL #: 72F44587-1S73, 72F44587-2S73, 72F44587-3S73, 72F44587-4S73

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$6.9X10^4$RAD	$2X10^8$RAD

QUALIFICATION REPORT: WCAP 8754 Rev. 1, WCAP 7829

METHOD: Test and Analysis

EQUIPMENT ID: (1) Containment Spray Pump Motors 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, WCAP 7829

METHOD: Test and Analysis

EQUIPMENT ID: Fuel Pool Cooling Pump Motors (1) 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, WCAP 7829

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)
$5.2X10^5$RAD	$2X10^8$RAD

QUALIFICATION REPORT: WCAP 8754 Rev. 1, WCAP 7829

METHOD: Test and Analysis

EQUIPMENT ID: (1) RHR and Containment Spray Rooms Sump Pump Motors MANUFACTURER: Allis Chalmers MODEL #: S/N: 1-5133-56450-2-3

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$9.1X10^4$RAD	$1X10^5$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 MANUFACTURER: Westinghouse, Buffalo MODEL #: 73F69618-1S75, 73F69618-2S75, 73F69618-3S75, 73F69618-4S75

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

QUALIFICATION REPORT: WCAP 8754 Rev. 1, WCAP 7829

METHOD: Test and Analysis

EQUIPMENT ID: (1) Annulus Ventilation System Fan Motors

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)
	$5X10^4$RAD	$2X10^8$RAD

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

METHOD: Analysis

EQUIPMENT ID: Diesel Generator Ventilation Fan Motors (1)

MANUFACTURER: Joy/Reliance

MODEL #: 1YF-273608

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

MANUFACTURER: Reliance

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

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

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 Motors & Spares

MANUFACTURER: Reliance

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

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$7X10^5$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) MANUFACTURER: Gould MODEL #: K-Line
Worst case: 1ELXD & 2ELXD

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

QUALIFICATION REPORT: Report MCM-1312.03-165

METHOD: Test and Analysis (Note 3)

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: MCC-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 RCD-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 dated 1/11/80

METHOD: Test

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

	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 dated 1/11/80

METHOD: Test

EQUIPMENT ID: Valve Motor Operators (1)

MANUFACTURER: Rotork

MODEL #: 7NA2, 11NA2, 14NA2, 16NA2, 30NA2, 40NA2, 70NA2, 90NA2, 93NA2

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

METHOD: Test

EQUIPMENT ID: Valve Motor Operators (1)

MANUFACTURER: Rotork

MODEL #: 7NA1, 11NA1, 14NA1, 16NA1, 30NA1

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

METHOD: Test

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

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-52600-515, dated 10/31/77

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)
	$1.6X10^6$RAD (worst case)	$2X10^8$RAD

QUALIFICATION REPORT: Valcor Test Report QR-70900-21-1 Rev. A; QR-52600-515, Rev. B; MR70905-21-3-1

METHOD: Similarity and Test

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

	RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
	$1.6X10^6$RAD (worst case)	$2X10^8$RAD

QUALIFICATION REPORT: ASCO Test Report AQS21678/TR

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

METHOD: Test

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

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

QUALIFICATION REPORT: NAMCO Reports dated 2/22/79 and 9/5/78

METHOD: Test

EQUIPMENT ID: Motor Operated Dampers (1) MANUFACTURER: Rotork MODEL #: 7A/3MW

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

QUALIFICATION REPORT: Rotork Test Reports N11/4, dated 12/70 and TR-116, dated 10/73

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)
	$5X10^5$RAD	(Note 5)

QUALIFICATION REPORT: (Note 5)

METHOD: (Note 5)

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

MANUFACTURER: Farr

MODEL #:

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

These panels will be relocated to an area exposed to a total integrated dose of less than 1×10^3 RAD by December 1982. 1

QUALIFICATION REPORT: N/A

METHOD: N/A

EQUIPMENT ID: ABFU Control Panels (1)

MANUFACTURER: Allison

MODEL #:

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

These panels will be modified to change their safety related control function to a non-safety alarm function.

QUALIFICATION REPORT: N/A

METHOD: N/A

EQUIPMENT ID: (1) Proportional Temperature Controller

MANUFACTURER: Love Controls

MODEL #: 54, 834, 838, 8134, 8160, 8165, 8173 & 8174

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

QUALIFICATION REPORT: (Note 5)

METHOD: (Note 5)

EQUIPMENT ID: (1) High Temperature Detection Thermostat

MANUFACTURER: United Electric

MODEL #: 8006-6CS

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

QUALIFICATION REPORT: (Note 5)

METHOD: (Note 5)

EQUIPMENT ID: Resistance Temperature Detector (1) MANUFACTURER: Weed MODEL #: 101-1.2N-A-3-C-6-2-1

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

QUALIFICATION REPORT: (Note 5)

METHOD: (Note 5)

EQUIPMENT ID: Differential Pressure Switch (1) MANUFACTURER: Solon MODEL #: 7PS1DW

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

QUALIFICATION REPORT: (Note 5)

METHOD: (Note 5)

EQUIPMENT ID: Differential Pressure Switch (1) MANUFACTURER: Solon MODEL #: 7PS1ADW

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

QUALIFICATION REPORT: (Note 5)

METHOD: (Note 5)

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

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

QUALIFICATION REPORT: Micro Switch Report LTR 24407

METHOD: Test

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

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

QUALIFICATION REPORT: (Note 5)

METHOD: (Note 5)

EQUIPMENT ID: Control and 2KV Power Cable (1)

MANUFACTURER: Anaconda

MODEL #: EP Insulation and EP/Hypalon Insulation

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

QUALIFICATION REPORT: Anaconda Test Reports F-C4350-2 and F-C4350-3

METHOD: Test

EQUIPMENT ID: Control Cable (1) MANUFACTURER: Brand Rex MODEL #: XLPE

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

QUALIFICATION REPORT: Brand Rex Test Report FC5120-1 and FC5120-3

METHOD: Test

EQUIPMENT ID: (1) Control, Instrumentation Cable

MANUFACTURER: Okonite

MODEL #: EP Insulation

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

QUALIFICATION REPORT: Okonite Test Reports FN-1, G-3, N-1, 110E and 141

METHOD: Test

EQUIPMENT ID: Instrumentation Cable (1)

MANUFACTURER: Okonite

MODEL #: Hypalon

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

QUALIFICATION REPORT: Okonite Test Report 110E

METHOD: Test

EQUIPMENT ID: Instrumentation Cable (1) MANUFACTURER: Brand Rex MODEL #: PVC

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

QUALIFICATION REPORT: Duke Test Report TR017

METHOD: Test

EQUIPMENT ID: Instrumentation Cable (1) MANUFACTURER: Okonite MODEL #: Tefzel 280

	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

METHOD: Test

EQUIPMENT ID: Instrumentation Cable (1) MANUFACTURER: Samuel Moore MODEL #: EP/Hypalon Insulation

	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

METHOD: Test

EQUIPMENT ID: Instrumentation Cable (1) MANUFACTURER: Samuel Moore MODEL #: PVC

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

QUALIFICATION REPORT: Duke Test Report TR017

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: QTF Report TR-040

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: 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: 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: 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: QTF Report TR-040

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: QTF Report TR-040

METHOD: Test

EQUIPMENT ID: Relay (1) (Note 6)

MANUFACTURER: Cutler-Hammer

MODEL #: D26

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
1.1×10^3 RAD (worst case)	1.1×10^3 RAD (Note 7)

QUALIFICATION REPORT: QTF Report TR-040

METHOD: Test

EQUIPMENT ID: Surge Suppressor (1) (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, ESSEM File III-C-1

METHOD: Analysis

EQUIPMENT ID: Selector Switch (1) (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: QTF Report TR-040

METHOD: Test

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

MANUFACTURER: States

MODEL #: ZWM

RECIRCULATION RADIATION ENVIRONMENT (TID) (2)	RADIATION LEVEL TO WHICH QUALIFIED (TID)
$1.8X10^6$RAD (worst case)	$2.6X10^7$RAD

QUALIFICATION REPORT: ESSEM File IV-B-4 & IV-B-5

METHOD: Analysis

EQUIPMENT ID: Switch and Indicating Light (1) (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: QTF Report TR-040

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: 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)	$3x10^5$RAD

QUALIFICATION REPORT: ESSEM File IV-B-1

METHOD: Analysis

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)	(Note 7)

QUALIFICATION REPORT: (Note 7)

METHOD: (Note 7)

MCGUIRE NUCLEAR STATION - UNITS 1 AND 2

ENVIRONMENTAL QUALFICATION OF CLASS 1E EQUIPMENT
LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO POST-LOCA
RECIRCULATION RADIATION ENVIRONMENT

Note 1

Class 1E equipment that is exposed to the post-LOCA recirculation radiation environment has been evaluated for proper radiation qualification and is included in this table if it is exposed to a total integrated dose equal to or greater than 1×10^3RAD. A total integrated dose (i.e., forty year normal plus one year accident radiation dose) of less than 1×10^3RAD is considered negligible since no materials have been identified at McGuire that exhibit a significant aging mechanism when exposed to less than $1x10^3$RAD.

Note 2

The recirculation radiation environment consists of the forty year normal operating radiation dose plus the dose received from one year of post-LOCA reactor coolant recirculation.

Note 3

The McGuire 600 volt load centers are qualified by similarity to 600 volt load centers at Oconee Nuclear Station as reported in Report Number OM-301-80.

Note 4

Radiation testing of this equipment is not required for levels below $1x10^4$RAD per Section 8.1 of IEEE 535-1979.

Note 5

A qualification program is currently in progress for these components. The results of this program will be reported upon receipt and review of the qualification documentation, which is expected in August 1982.

Note 6

The components listed are general application devices. These components are installed in metal type enclosures and depending on their specific design application, may be located in various areas of the Auxiliary Building. This table addresses the qualification of these components with respect to the worst-case radiation environment (40 year normal dose plus 1 year post-LOCA) applicable to the components location.

Note 7

These components are located in enclosures in both Units 1 and 2. Presently, the components exposed to a post-LOCA recirculation radiation greater than $1x10^3$RAD and used in Unit 1 Class 1E circuitry are qualified by TR-040. The radiation qualification of Unit 2 components is in progress. The results of this qualification program will be provided upon completion by Duke Power Company.

Attachment 5

Duke Power Company Position
on the Category II Guidelines of NUREG 0588

ATTACHMENT 5

DUKE POWER COMPANY POSITION

ON THE CATEGORY II GUIDELINES OF NUREG 0588

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19	1				
20	0				
21	1				
22	0				

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 envelopes to which equipment 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 qualificatcn 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 envelope 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 genric qualification.
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 operating 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 2.1.6 b.

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
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

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1.4.8 (Continued)	(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.	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 assesing 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

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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
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 radiaiton 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.	

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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
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.	1

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.	1
	b. For the equipment not required to operate in a harsh accident environment, environmental qualification 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 2 2 2
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. 1 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 analysis, 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. 1
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 of the equipment would have been an obvious failure (i.e., equipment would not function). Margin is discussed in Section 3.0.

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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.	1 2
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 has been identified as a Category I item under NUREG-0585 "TMI-2 Lessons Learned Task Force Final Report" and will be resolved as part of the action plan set up to address Recommendation #9. Additionally, the subject of non safety-related control systems was addressed in IE Information Notice 79-22.	
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.	1

NUREG 0588 CATEGORY II GUIDELINES	DUKE POWER COMPANY POSITION	
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.	1
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 recirculation radiation environment.	1
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.	1
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 envelopes the environmental conditions resulting from any design basis event during any mode of plant operation (e.g., a profile that envelopes 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, HELP, or post-LOCA recirculation radiation environment, the equipment performance before, during (where practical) and after exposure to the simulated event is verified. 1
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. 1
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 envelopes 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 consideres 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 separate effects testing. Separate 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 | 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.	1
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.	1 1
		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.	1

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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 to an equivalent of 40 years of service 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) Duke Power Company is evaluating the in-containment Class 1E equipment and will report at the time of discovery any equipment for which significant aging mechanisms are identified including the justification for continued use and/or reasonable alternative action. This on-going investigation will necessarily be very time consuming and will rely heavily on EPRI research, NRC studies, NPRDS information, IE Bulletins and Circulars, and industry research and testing.
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. 1
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

Attachment 6

Comparison of the Environmental Qualification
of Class 1E Equipment Located Inside Containment to the
Duke Position on the Category II Guidelines of NUREG 0588

ATTACHMENT 6

COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT

LOCATED INSIDE CONTAINMENT

TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

Page	Rev.	Page	Rev.	Page	Rev.
1	0				
2	0				
3	0				
4	0				
5	0				
6	0				
7	0				
8	0				
9	0				
10	0				
11	0				

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED INSIDE CONTAINMENT TO THE DUKE POSITION OF THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Transmitters (Barton Lot 2)	Transmitters (Barton Lot [illegible])	Transmitters Flow (Barton 764 & Veritrak 59DP)
NUREG 0588			
Item 2.1.1 a	C	(2)	N/A
2.1.1 b	N/A	(2)	C
2.1.2	C	(2)	N/A
2.1.3	C	(2)	N/A
2.1.3 a	C	(2)	N/A
2.1.3 b	C	(2)	N/A
2.1.3 c	N/A	(2)	C
2.1.4	N/A	(2)	N/A
2.2.1	C	(2)	N/A
2.2.2	C	(2)	N/A
2.2.3	C	(2)	N/A
2.2.4	C	(2)	N/A
2.2.5	C	(2)	N/A
2.2.6	C	(2)	N/A
2.2.7	C	(2)	N/A
2.2.8	C	(2)	N/A
2.2.9	C	(2)	N/A
2.2.10	C	(2)	N/A
2.2.11	C	(2)	C
2.2.12	C	(2)	N/A
2.3.1	C	(2)	N/A
2.3.2	C	(2)	N/A
2.3.3	C	(2)	N/A
2.3.4	C	(2)	N/A
2.4	C	(2)	N/A
3.1	C	(2)	N/A
3.2	C	(2)	N/A
3.3	C	(2)	N/A
3.4 a	(1)	(2)	N/A
3.4 b	C	(2)	N/A
4.1	N/A	(2)	N/A
4.2	C	(2)	N/A
5.1	C	(2)	C
5.2	C	(2)	N/A

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED INSIDE CONTAINMENT TO THE DUKE POSITION OF THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	RTDs (Rosemount)
NUREG 0588	
Item 2.1.1 a	C
2.1.1 b	N/A
2.1.2	(3)
2.1.3	C
2.1.3 a	C
2.1.3 b	C
2.1.3 c	N/A
2.1.4	N/A
2.2.1	C
2.2.2	C
2.2.3	C
2.2.4	C
2.2.5	C
2.2.6	C
2.2.7	C
2.2.8	C
2.2.9	C
2.2.10	C
2.2.11	C
2.2.12	C
2.3.1	C
2.3.2	C
2.3.3	C
2.3.4	C
2.4	C
3.1	C
3.2	C
3.3	C
3.4 a	C
3.4 b	C
4.1	N/A
4.2	C
5.1	C
5.2	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED INSIDE CONTAINMENT TO THE DUKE POSITION OF THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Neutron Detectors (WIGTD)	H_2 Recombiner (5) (W Sturtevant A)	Cont. Air Return and H_2 Skim Fan Motors
NUREG 0588			
Item 2.1.1 a	N/A	C	C
2.1.1 b	C	N/A	N/A
2.1.2	N/A	C	C
2.1.3	N/A	C	C
2.1.3 a	N/A	C	C
2.1.3 b	(4)	C	C
2.1.3 c	N/A	N/A	N/A
2.1.4	N/A	N/A	N/A
2.2.1	N/A	C	C
2.2.2	N/A	C	C
2.2.3	N/A	C	C
2.2.4	N/A	C	C
2.2.5	C	C	C
2.2.6	N/A	C	C
2.2.7	N/A	C	C
2.2.8	N/A	C	C
2.2.9	N/A	C	C
2.2.10	N/A	C	C
2.2.11	C	C	C
2.2.12	N/A	C	C
2.3.1	N/A	C	(6)
2.3.2	N/A	C	C
2.3.3	N/A	C	C
2.3.4	N/A	C	(6)
2.4	N/A	C	C
3.1	N/A	C	C
3.2	N/A	C	C
3.3	N/A	C	C
3.4 a	N/A	N/A	N/A
3.4 b	N/A	C	C
4.1	N/A	N/A	C
4.2	N/A	C	N/A
5.1	C	C	C
5.2	N/A	C	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED INSIDE CONTAINMENT TO THE DUKE POSITION OF THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Valve Motor Operators (Limitorque and Rotork)
NUREG 0588	
Item 2.1.1 a	C
2.1.1 b	N/A
2.1.2	C
2.1.3	C
2.1.3 a	C
2.1.3 b	C
2.1.3 c	C
2.1.4	N/A
2.2.1	C
2.2.2	C
2.2.3	C
2.2.4	C
2.2.5	C
2.2.6	C
2.2.7	C
2.2.8	C
2.2.9	C
2.2.10	C
2.2.11	C
2.2.12	C
2.3.1	C
2.3.2	C
2.3.3	C
2.3.4	C
2.4	C
3.1	C
3.2	C
3.3	C
3.4 a	C
3.4 b	C
4.1	C
4.2	N/A
5.1	C
5.2	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS
1E EQUIPMENT LOCATED INSIDE CONTAINMENT TO THE DUKE POSITION OF THE
CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Valve Solenoid Operators (Valcor, Asco, Target Rock)	Damper Motors (Rotork)	Diff. Press Switches (Solon)	Electrical Penetrations (D.G. O'Brien)
NUREG 0588				
Item 2.1.1 a	C	C	C	C
2.1.1 b	N/A	N/A	N/A	N/A
2.1.2	C	C	C	C
2.1.3	C	C	C	C
2.1.3 a	C	C	C	C
2.1.3 b	C	C	C	C
2.1.3 c	C	N/A	N/A	N/A
2.1.4	N/A	N/A	N/A	N/A
2.2.1	C	C	C	C
2.2.2	C	C	C	C
2.2.3	C	C	C	C
2.2.4	C	C	C	C
2.2.5	C	C	C	C
2.2.6	C	C	C	C
2.2.7	C	C	C	C
2.2.8	C	C	C	C
2.2.9	C	C	C	C
2.2.10	C	C	C	N/A
2.2.11	C	C	C	C
2.2.12	C	C	C	C
2.3.1	C	C	C	(7)
2.3.2	C	C	C	C
2.3.3	C	C	C	C
2.3.4	C	C	C	(7)
2.4	C	C	C	C
3.1	C	C	C	C
3.2	C	C	C	C
3.3	C	C	C	C
3.4 a	C	C	C	C
3.4 b	C	C	N/A	C
4.1	C	C	N/A	N/A
4.2	N/A	N/A	C	C
5.1	C	C	C	C
5.2	C	C	C	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED INSIDE CONTAINMENT TO THE DUKE POSITION OF THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Cables (All Suppliers)	Cable Term/ Splice Material (Raychem)	Stem-Mounted Limit Switches (Namco)	Seal Material (3M)
NUREG 0588				
Item 2.1.1 a	C	C	C	C
2.1.1 b	C	N/A	N/A	N/A
2.1.2	C	C	C	C
2.1.3	C	C	C	C
2.1.3 a	C	C	C	C
2.1.3 b	C	C	C	C
2.1.3 c	N/A	N/A	C	N/A
2.1.4	N/A	N/A	N/A	N/A
2.2.1	C	C	C	C
2.2.2	C	C	C	C
2.2.3	C	C	C	C
2.2.4	C	C	C	C
2.2.5	C	C	C	C
2.2.6	C	C	C	C
2.2.7	C	C	C	C
2.2.8	C	C	C	C
2.2.9	C	C	C	C
2.2.10	N/A	N/A	C	N/A
2.2.11	C	C	C	C
2.2.12	C	C	C	C
2.3.1	C	C	C	C
2.3.2	C	C	C	C
2.3.3	C	C	C	C
2.3.4	C	C	C	C
2.4	C	C	N/A	C
3.1	C	C	C	C
3.2	C	C	C	C
3.3	C	C	C	C
3.4 a	C	C	C	C
3.4 b	C	C	C	C
4.1	N/A	N/A	N/A	N/A
4.2	C	C	C	C
5.1	C	C	C	C
5.2	C	C	C	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED INSIDE CONTAINMENT TO THE DUKE POSITION OF THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Cont'mt Rad Mon (High Range)	Cont'mt Rad Mon Cable	Acoustical Valve Position Monitor
NUREG 0588			
Item 2.1.1 a	N/A	(8)	C
2.1.1 b	C	(8)	C
2.1.2	C	(8)	C
2.1.3	C	(8)	C
2.1.3 a	C	(8)	C
2.1.3 b	N/A	(8)	N/A
2.1.3 c	C	(8)	N/A
2.1.4	C	(8)	C
2.2.1	C	(8)	C
2.2.2	C	(8)	C
2.2.3	C	(8)	C
2.2.4	C	(8)	C
2.2.5	C	(8)	C
2.2.6	C	(8)	C
2.2.7	C	(8)	C
2.2.8	C	(8)	C
2.2.9	C	(8)	C
2.2.10	C	(8)	C
2.2.11	C	(8)	C
2.2.12	C	(8)	C
2.3.1	C	(8)	C
2.3.2	C	(8)	C
2.3.3	C	(8)	C
2.3.4	C	(8)	C
2.4	N/A	(8)	N/A
3.1	C	(8)	C
3.2	C	(8)	C
3.3	N/A	(8)	C
3.4 a	N/A	(8)	C
3.4 b	C	(8)	N/A
4.1	N/A	(8)	N/A
4.2	C	(8)	C
5.1	C	(8)	C
5.2	C	(8)	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED INSIDE CONTAINMENT TO THE DUKE POSITION OF THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Reactor Vessel Level Inst. Sys
NUREG 0588	
Item 2.1.1 a	(8)
2.1.1 b	(8)
2.1.2	(8)
2.1.3	(8)
2.1.3 a	(8)
2.1.3 b	(8)
2.1.3 c	(8)
2.1.4	(8)
2.2.1	(8)
2.2.2	(8)
2.2.3	(8)
2.2.4	(8)
2.2.5	(8)
2.2.6	(8)
2.2.7	(8)
2.2.8	(8)
2.2.9	(8)
2.2.10	(8)
2.2.11	(8)
2.2.12	(8)
2.3.1	(8)
2.3.2	(8)
2.3.3	(8)
2.3.4	(8)
2.4	(8)
3.1	(8)
3.2	(8)
3.3	(8)
3.4 a	(8)
3.4 b	(8)
4.1	(8)
4.2	(8)
5.1	(8)
5.2	(8)

MCGUIRE NUCLEAR STATION - UNITS 1 AND 2

COMPARISON OF THE ENVIRONMENTAL QUALFICATION OF
CLASS 1E EQUIPMENT LOCATED INSIDE CONTAINMENT TO THE
DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

Note 1

Certain Barton transmitters are claimed for short-term functions, that is until the containment pressure reaches the point at which safety injection is initiated by high containment pressure. A conservative estimate indicated that these transmitters are required to perform their short term functions until a containment pressure change of 8 psig has occurred. This pressure corresponds to a maximum containment temperture of 280°F and would occur no later than 3 minutes following the initiation of the break inside containment. Thus, Westinghouse specifies a trip accuracy of ±10% for up to 5 minutes as a conservative qualfication requirement. The Westinghouse qualification program did not demonstrate in all cases an additional 1 hour while maintaining the specified trip accuracy.

The 1 hour margin requirement has been introduced by the Staff due to concerns over the consequences of transmitter failures after a few minutes into the accident scenario. In particular, that such failures could lead to negation of the safety function of generate information that could mislead the operator. These concerns are not valid in this case due to the manner in which these transmitters are employed and qualified:

Trip Function

The qualification tests demonstrate that the trip accuracy requirement is maintained for up to 5 minutes and that the requisite trip signal will be generated. Once the signal is generated the signal is "locked-in" by the protection system and will not reset should the transmitter fail to continue to generate the trip signal at some time after 5 minutes. Thus, all automatic protective actions will proceed irrespective of the performance of the transmitter after 5 minutes.

Information to Operator

The transmitter qualification verifies that equipment failures do not occur in a period up to 1 hour and 5 minutes after initiation of the accident. In fact, the qualification verifies that the transmitters will continue to operate for at least 4 months post-accident while maintaining the accuracy requirement specified for post-accident monitoring instrumentation.

Note 2

This equipment is located in Unit 2 which is scheduled for operation in 1983. Qualification information will be provided in a future revision to this submittal following review by Duke Power Company.

Note 3

The only difference between the RTD models supplied by Rosemount is in the length of the stainless steel element housings; therefore, the environmental results reported in WCAP-9157 for Rosemount 176KF are equally applicable to the Rosemount 176KS.

Note 4

The power range neutron detectors are not required to perform any safety functions in an adverse accident environment. However, Westinghouse investigations into potential system interaction scenarios resulting from adverse accident environments identified a possible scenario in which an adverse accident environment resulting from an intermediate steamline break inside the containment could cause a malfunction of the power range neutron detectors. This interaction scenario is one of four which were the subject of IE Information Notice 79-22.

Duke Power Company has analyzed the effects of an adverse accident environment on the power range detectors and has concluded that there are no credible failures of these detectors that could result in unsafe plant conditions.

Note 5

The referenced topical reports, WCAP-7709L (Proprietary) through Supplement 4, and WCAP-7820 (Non-Proprietory) through Supplement 4 which summarize the Westinghouse qualification tests on the Model A Hydrogen Recombiner to IEEE 323-1971, have been reviewed and approved by the NRC as indicated in a letter from D. B. Vassallo to C. E. Eicheldinger dated May 1, 1975. This evaluation indicates that that Staff will not require any further review of these documents except to verify the plant specific applicability of the qualification parameters.

Note 6

NRC letter dated March 7, 1980 requested Duke to provide justification for the acceptability of separate effects testing for the containment air return and hydrogen skimmer fan motors. Specifically, the NRC Staff's concern was that although the motor insulation system and other motor components are qualified for a radiation environment in excess of the calculated normal plus accident radiation environment, the Motorette testing did not include exposure to a steam environment following exposure to radiation.

Duke Power Company has reviewed the design and testing of these fan motors. We have determined that the combined effects of a radiation environment and a steam environment were previously included in the qualification testing on a complete motor assembly. The motor assembly tested was a valve motor operator composed of materials identified in Reliance Electric Company Report NUC-9 which are similar to the materials composing the McGuire containment air return and hydrogen skimmer fan motors. This valve motor operator (ID No. 2Y267074A1EZ) was irradiated and examined as reported by Reliance in NUC-9 and then shipped to the

Limitorque Corporation where it was successfully tested in a steam environment in accordance with IEEE 382-1972 as reported in Limitorque Test Report 600456. The radiation and steam environmental parameters used in the Reliance and Limitorque tests envelope the accident conditions for the McGuire fan motors. Duke Power Company therefore concludes that in addition to the environmental testing described in Joy Manufacturing Company Test Report X-604, the environmental testing described above further assures the capability of the McGuire containment air return and hydrogen skimmer fan motors to function in the postulated McGuire accident environment.

Note 7

Separate effects radiation testing was performed on the McGuire electrical penetrations. The only effects of the irradiation were a slight increase in the hardness of the elastomeric grommets that provide the environmental seal in the plug and cable assemblies and a color change in the epoxy fiberglass insulators. These effects produced no measureable change in the electrical or mechanical performance of the penetration assemblies; therefore, separate effects testing for radiation is considered acceptable.

Note 8

The review of this equipment will be completed in a future revision of this submittal.

Attachment 7

Comparison of the Environmental Qualification
of Class 1E Equipment Located in the Annulus to the
Duke Position on the Category II Guidelines of NUREG 0588

ATTACHMENT 7

COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT

LOCATED IN THE ANNULUS

TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

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McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED IN THE ANNULUS TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Cont Sump Level Xmitter (Barton)	RC Wide Range Pressure (Rosemount)	RC Wide Range Pressure (Barton Lot 2)
NUREG 0588			
Item 2.1.1 a	C	C	C
2.1.1 b	N/A	N/A	N/A
2.1.2	C	C	C
2.1.3	C	C	C
2.1.3 a	C	C	C
2.1.3 b	N/A	N/A	C
2.1.3 c	N/A	N/A	N/A
2.1.4	N/A	C	N/A
2.2.1	C	C	C
2.2.2	C	C	C
2.2.3	C	C	C
2.2.4	N/A	N/A	N/A
2.2.5	N/A	N/A	N/A
2.2.6	N/A	C	C
2.2.7	C	C	C
2.2.8	N/A	N/A	N/A
2.2.9	C	C	C
2.2.10	C	C	C
2.2.11	C	C	C
2.2.12	C	C	C
2.3.1	N/A	C	C
2.3.2	C	C	C
2.3.3	C	C	C
2.3.4	N/A	C	C
2.4	C	C	C
3.1	C	C	C
3.2	C	C	C
3.3	N/A	N/A	N/A
3.4 a	N/A	N/A	C
3.4 b	C	C	C
4.1	N/A	N/A	N/A
4.2	C	C	C
5.1	C	C	C
5.2	C	C	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED IN THE ANNULUS TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Valve Solenoid Operators (Valcor, ASCO)
NUREG 0588	
Item 2.1.1 a	C
2.1.1 b	N/A
2.1.2	C
2.1.3	C
2.1.3 a	C
2.1.3 b	C
2.1.3 c	C
2.1.4	N/A
2.2.1	C
2.2.2	C
2.2.3	C
2.2.4	N/A
2.2.5	N/A
2.2.6	C
2.2.7	C
2.2.8	N/A
2.2.9	C
2.2.10	C
2.2.11	C
2.2.12	C
2.3.1	N/A
2.3.2	C
2.3.3	C
2.3.4	N/A
2.4	C
3.1	C
3.2	C
3.3	N/A
3.4 a	N/A
3.4 b	C
4.1	N/A
4.2	C
5.1	C
5.2	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED IN THE ANNULUS TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Valve Motor Operators (Rotork)	Limit Switches (Namco)	Cables (All Suppliers)
NUREG 0588			
Item 2.1.1 a	C	C	C
2.1.1 b	N/A	N/A	N/A
2.1.2	C	C	C
2.1.3	C	C	C
2.1.3 a	C	C	C
2.1.3 b	C	C	C
2.1.3 c	C	C	C
2.1.4	N/A	N/A	N/A
2.2.1	C	C	C
2.2.2	C	C	C
2.2.3	C	C	C
2.2.4	N/A	N/A	N/A
2.2.5	N/A	N/A	N/A
2.2.6	C	C	N/A
2.2.7	C	C	
2.2.8	N/A	N/A	N/A
2.2.9	C	C	C
2.2.10	C	C	C
2.2.11	C	C	C
2.2.12	C	C	C
2.3.1	N/A	N/A	N/A
2.3.2	C	C	C
2.3.3	C	C	C
2.3.4	N/A	N/A	N/A
2.4	C	C	C
3.1	C	C	C
3.2	C	C	C
3.3	N/A	N/A	N/A
3.4 a	N/A	N/A	N/A
3.4 b	C	C	C
4.1	N/A	N/A	N/A
4.2	C	C	C
5.1	C	C	C
5.2	C	C	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED IN THE ANNULUS TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	RC Wide Range Pressure (Barton Lot 5)	Limit Switches (Microswitch)
NUREG 0588		
Item 2.1.1 a	(1)	C
2.1.1 b	(1)	N/A
2.1.2	(1)	C
2.1.3	(1)	C
2.1.3 a	(1)	C
2.1.3 b	(1)	N/A
2.1.3 c	(1)	N/A
2.1.4	(1)	C
2.2.1	(1)	C
2.2.2	(1)	C
2.2.3	(1)	C
2.2.4	(1)	N/A
2.2.5	(1)	N/A
2.2.6	(1)	N/A
2.2.7	(1)	N/A
2.2.8	(1)	N/A
2.2.9	(1)	C
2.2.10	(1)	C
2.2.11	(1)	C
2.2.12	(1)	C
2.3.1	(1)	N/A
2.3.2	(1)	C
2.3.3	(1)	C
2.3.4	(1)	N/A
2.4	(1)	C
3.1	(1)	C
3.2	(1)	C
3.3	(1)	N/A
3.4 a	(1)	N/A
3.4 b	(1)	C
4.1	(1)	N/A
4.2	(1)	C
5.1	(1)	C
5.2	(1)	C

MCGUIRE NUCLEAR STATION - UNITS 1 AND 2

COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED IN THE ANNULUS TO THE DUKE POSITION ON CATEGORY II GUIDELINES OF NUREG 0588

Note 1

This equipment is located in Unit 2 which is scheduled for operation in 1983. Qualification information will be provided in a future revision to this submittal following review by Duke Power Company.

Attachment 8

Comparison of the Environmental Qualification
of Class 1E Equipment
Located Outside Containment and Exposed to HELB Environment
to the Duke Position on the Category II Guidelines of NUREG 0588

ATTACHMENT 8

COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO HELB ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

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McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO THE HELB ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Cont. Spray Pump Motors	RHR Pump Motors	SI Pump Motors	Cent. Chg. Pump Motors
NUREG 0588				
Item 2.1.1 a	N/A	N/A	C	C
2.1.1 b	C	C	N/A	N/A
2.1.2	N/A	N/A	C	C
2.1.3	N/A	N/A	C	C
2.1.3 a	N/A	N/A	C	C
2.1.3 b	N/A	N/A	N/A	N/A
2.1.3 c	C	C	N/A	N/A
2.1.4	C	C	C	C
2.2.1	N/A	N/A	C	C
2.2.2	C	C	C	C
2.2.3	N/A	N/A	C	C
2.2.4	N/A	N/A	N/A	N/A
2.2.5	N/A	N/A	N/A	N/A
2.2.6	N/A	N/A	C	C
2.2.7	N/A	N/A	C	C
2.2.8	N/A	N/A	N/A	N/A
2.2.9	N/A	N/A	C	C
2.2.10	N/A	N/A	C	C
2.2.11	C	C	C	C
2.2.12	(1)	(1)	(1)	(1)
2.3.1	N/A	N/A	C	C
2.3.2	N/A	N/A	C	C
2.3.3	N/A	N/A	C	C
2.3.4	N/A	N/A	C	C
2.4	N/A	N/A	C	C
3.1	N/A	N/A	C	C
3.2	N/A	N/A	C	C
3.3	N/A	N/A	N/A	N/A
3.4 a	N/A	N/A	N/A	N/A
3.4 b	N/A	N/A	C	C
4.1	N/A	N/A	N/A	N/A
4.2	N/A	N/A	C	C
5.1	C	C	C	C
5.2	N/A	N/A	C	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO THE HELB ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	NSW Pump Motors	GWD Sump Pump Motors	Comp. Cool Pump Motors	Bat Pump Motors
NUREG 0588				
Item 2.1.1 a	C	N/A	C	N/A
2.1.1 b	N/A	C	N/A	C
2.1.2	C	N/A	C	N/A
2.1.3	C	N/A	C	N/A
2.1.3 a	C	N/A	C	N/A
2.1.3 b	N/A	N/A	N/A	N/A
2.1.3 c	N/A	C	N/A	C
2.1.4	C	C	C	C
2.2.1	C	N/A	C	N/A
2.2.2	C	C	C	C
2.2.3	C	N/A	C	N/A
2.2.4	N/A	N/A	N/A	N/A
2.2.5	N/A	N/A	N/A	N/A
2.2.6	C	N/A	C	N/A
2.2.7	C	N/A	C	N/A
2.2.8	N/A	N/A	N/A	N/A
2.2.9	C	N/A	C	N/A
2.2.10	C	N/A	C	N/A
2.2.11	C	C	C	C
2.2.12	(1)	(1)	(1)	(1)
2.3.1	C	N/A	C	N/A
2.3.2	C	N/A	C	N/A
2.3.3	C	N/A	C	N/A
2.3.4	C	N/A	C	N/A
2.4	C	N/A	C	N/A
3.1	C	N/A	C	N/A
3.2	C	N/A	C	N/A
3.3	N/A	N/A	N/A	N/A
3.4 a	N/A	N/A	N/A	N/A
3.4 b	C	N/A	C	N/A
4.1	N/A	N/A	N/A	N/A
4.2	C	N/A	C	N/A
5.1	C	C	C	C
5.2	C	N/A	C	N/A

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS
1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO THE HELB ENVIRONMENT
TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	BIR Pump Motors
NUREG 0588	
Item 2.1.1 a	N/A
2.1.1 b	C
2.1.2	N/A
2.1.3	N/A
2.1.3 a	N/A
2.1.3 b	N/A
2.1.3 c	C
2.1.4	C
2.2.1	N/A
2.2.2	C
2.2.3	N/A
2.2.4	N/A
2.2.5	N/A
2.2.6	N/A
2.2.7	N/A
2.2.8	N/A
2.2.9	N/A
2.2.10	N/A
2.2.11	C
2.2.12	(1)
2.3.1	N/A
2.3.2	N/A
2.3.3	N/A
2.3.4	N/A
2.4	N/A
3.1	N/A
3.2	N/A
3.3	N/A
3.4 a	N/A
3.4 b	N/A
4.1	N/A
4.2	N/A
5.1	C
5.2	N/A

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS
1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO THE HELB ENVIRONMENT
TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	FP Cooling Pump Motors	RHR and CS AHU Motors	FP AHU Motors	Transzorb Surge Suppressors
NUREG 0588				
Item 2.1.1 a	C	N/A	C	C
2.1.1 b	N/A	C	N/A	N/A
2.1.2	C	N/A	C	C
2.1.3	C	N/A	C	C
2.1.3 a	C	N/A	C	C
2.1.3 b	N/A	N/A	N/A	C
2.1.3 c	N/A	C	N/A	C
2.1.4	C	C	C	N/A
2.2.1	C	N/A	C	C
2.2.2	C	C	C	C
2.2.3	C	N/A	C	C
2.2.4	N/A	N/A	N/A	N/A
2.2.5	N/A	N/A	N/A	N/A
2.2.6	C	N/A	N/A	N/A
2.2.7	C	N/A	N/A	N/A
2.2.8	N/A	N/A	N/A	N/A
2.2.9	C	N/A	N/A	N/A
2.2.10	C	N/A	C	N/A
2.2.11	C	C	C	C
2.2.12	(1)	(1)	(1)	(1)
2.3.1	C	N/A	N/A	N/A
2.3.2	C	N/A	N/A	N/A
2.3.3	C	N/A	N/A	C
2.3.4	C	N/A	N/A	N/A
2.4	C	N/A	C	C
3.1	C	N/A	N/A	C
3.2	C	N/A	N/A	C
3.3	N/A	N/A	N/A	N/A
3.4 a	N/A	N/A	N/A	C
3.4 b	C	N/A	N/A	C
4.1	N/A	N/A	N/A	N/A
4.2	C	N/A	C	C
5.1	C	C	C	C
5.2	C	N/A	N/A	N/A

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO THE HELB ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Buchanan, States & Stanwick Term Blocks	Bussman Fuseblocks (2808, 2809, 3792, 3839, 4439, 4575)	C-H Relays (D23, D26)
NUREG 0588			
Item 2.1.1 a	C	C	C
2.1.1 b	N/A	N/A	N/A
2.1.2	C	C	C
2.1.3	C	C	C
2.1.3 a	C	C	C
2.1.3 b	C	C	C
2.1.3 c	C	C	C
2.1.4	N/A	N/A	N/A
2.2.1	C	C	C
2.2.2	C	C	C
2.2.3	C	C	C
2.2.4	N/A	N/A	N/A
2.2.5	N/A	N/A	N/A
2.2.6	C	N/A	C
2.2.7	C	N/A	C
2.2.8	N/A	N/A	N/A
2.2.9	C	N/A	C
2.2.10	C	N/A	C
2.2.11	C	C	C
2.2.12	(1)	(1)	(1)
2.3.1	N/A	N/A	C
2.3.2	N/A	N/A	C
2.3.3	C	C	C
2.3.4	C	N/A	C
2.4	C	C	C
3.1	C	C	C
3.2	C	C	C
3.3	C	N/A	C
3.4 a	C	C	C
3.4 b	C	C	C
4.1	N/A	N/A	N/A
4.2	C	C	C
5.1	C	C	C
5.2	C	N/A	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO THE HELB ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	C-H SW & Ind. Lights (E29, E30, 10250T)	E-Max Analog OP Isol	SD Relays	AHU Diff Press Sw.
NUREG 0588				
Item 2.1.1 a	C	C	C	N/A
2.1.1 b	N/A	N/A	N/A	C
2.1.2	C	C	C	N/A
2.1.3	C	C	C	N/A
2.1.3 a	C	C	C	N/A
2.1.3 b	C	N/A	N/A	N/A
2.1.3 c	C	N/A	N/A	C
2.1.4	N/A	N/A	N/A	C
2.2.1	C	C	C	N/A
2.2.2	C	C	C	C
2.2.3	C	C	C	N/A
2.2.4	N/A	N/A	N/A	N/A
2.2.5	N/A	N/A	N/A	N/A
2.2.6	C	N/A	C	N/A
2.2.7	C	N/A	C	N/A
2.2.8	N/A	N/A	N/A	N/A
2.2.9	C	N/A	C	N/A
2.2.10	C	N/A	C	N/A
2.2.11	C	C	C	C
2.2.12	(1)	N/A	N/A	(1)
2.3.1	C	N/A	C	N/A
2.3.2	C	N/A	C	N/A
2.3.3	C	C	C	N/A
2.3.4	C	N/A	C	N/A
2.4	C	C	C	N/A
3.1	C	C	C	N/A
3.2	C	C	C	N/A
3.3	C	N/A	C	N/A
3.4 a	C	N/A	C	N/A
3.4 b	C	C	C	N/A
4.1	N/A	N/A	N/A	N/A
4.2	C	C	C	N/A
5.1	C	C	C	C
5.2	C	N/A	C	N/A

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS
1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO THE HELB ENVIRONMENT
TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Firestat Temp Sw	RIS Volt/Current Alarm	ABFXF-CP 1A, 1B, 2A & 2B	Lambda Power Supply
NUREG 0588				
Item 2.1.1 a	N/A	C	N/A	C
2.1.1 b	C	N/A	C	N/A
2.1.2	N/A	C	N/A	C
2.1.3	N/A	C	N/A	C
2.1.3 a	N/A	C	N/A	C
2.1.3 b	N/A	N/A	N/A	C
2.1.3 c	C	N/A	C	C
2.1.4	C	N/A	C	N/A
2.2.1	N/A	C	N/A	C
2.2.2	C	C	C	C
2.2.3	N/A	C	N/A	C
2.2.4	N/A	N/A	N/A	N/A
2.2.5	N/A	N/A	N/A	N/A
2.2.6	N/A	N/A	N/A	N/A
2.2.7	N/A	N/A	N/A	N/A
2.2.8	N/A	N/A	N/A	N/A
2.2.9	N/A	N/A	N/A	N/A
2.2.10	N/A	N/A	N/A	N/A
2.2.11	C	C	C	C
2.2.12	(1)	N/A	(1)	N/A
2.3.1	N/A	N/A	N/A	N/A
2.3.2	N/A	N/A	N/A	N/A
2.3.3	N/A	C	N/A	C
2.3.4	N/A	N/A	N/A	N/A
2.4	N/A	C	N/A	C
3.1	N/A	C	N/A	C
3.2	N/A	C	N/A	C
3.3	N/A	N/A	N/A	N/A
3.4 a	N/A	N/A	N/A	C
3.4 b	N/A	C	N/A	C
4.1	N/A	N/A	N/A	N/A
4.2	N/A	C	N/A	C
5.1	C	C	C	C
5.2	N/A	N/A	N/A	N/A

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO THE HELB ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	ABFXF Motors	AV Filter Units	Annulus Vent Fan Motor	Annulus Vent Damper Motors
NUREG 0588				
Item 2.1.1 a	N/A	N/A	N/A	N/A
2.1.1 b	C	C	C	C
2.1.2	N/A	N/A	N/A	N/A
2.1.3	N/A	N/A	N/A	N/A
2.1.3 a	N/A	N/A	N/A	N/A
2.1.3 b	N/A	N/A	N/A	N/A
2.1.3 c	C	C	C	C
2.1.4	C	C	C	C
2.2.1	N/A	N/A	N/A	N/A
2.2.2	C	C	C	C
2.2.3	N/A	N/A	N/A	N/A
2.2.4	N/A	N/A	N/A	N/A
2.2.5	N/A	N/A	N/A	N/A
2.2.6	N/A	N/A	N/A	N/A
2.2.7	N/A	N/A	N/A	N/A
2.2.8	N/A	N/A	N/A	N/A
2.2.9	N/A	N/A	N/A	N/A
2.2.10	N/A	N/A	N/A	N/A
2.2.11	C	C	C	C
2.2.12	(1)	(1)	(1)	(1)
2.3.1	N/A	N/A	N/A	N/A
2.3.2	N/A	N/A	N/A	N/A
2.3.3	N/A	N/A	N/A	N/A
2.3.4	N/A	N/A	N/A	N/A
2.4	N/A	N/A	N/A	N/A
3.1	N/A	N/A	N/A	N/A
3.2	N/A	N/A	N/A	N/A
3.3	N/A	N/A	N/A	N/A
3.4 a	N/A	N/A	N/A	N/A
3.4 b	N/A	N/A	N/A	N/A
4.1	N/A	N/A	N/A	N/A
4.2	N/A	N/A	N/A	N/A
5.1	C	C	C	C
5.2	N/A	N/A	N/A	N/A

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO THE HELB ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Starter/Contactor W A201 J3CA	Valve Solenoid Operators (Valcor, ASCO)	Valve Motor Operators (Limitorque, Rotork)
NUREG 0588			
Item 2.1.1 a	N/A	C	C
2.1.1 b	C	N/A	N/A
2.1.2	N/A	C	C
2.1.3	N/A	C	C
2.1.3 a	N/A	C	(2)
2.1.3 b	N/A	C	C
2.1.3 c	C	C	C
2.1.4	C	N/A	N/A
2.2.1	N/A	C	C
2.2.2	C	C	(2)
2.2.3	N/A	C	C
2.2.4	N/A	N/A	N/A
2.2.5	N/A	N/A	N/A
2.2.6	N/A	C	C
2.2.7	N/A	C	(2)
2.2.8	N/A	N/A	N/A
2.2.9	N/A	C	C
2.2.10	N/A	C	C
2.2.11	C	C	C
2.2.12	(1)	(1)	(1)
2.3.1	N/A	C	C
2.3.2	N/A	C	C
2.3.3	N/A	C	C
2.3.4	N/A	C	C
2.4	N/A	C	N/A
3.1	N/A	C	C
3.2	N/A	C	C
3.3	N/A	C	C
3.4 a	N/A	C	(2)
3.4 b	N/A	C	(2)
4.1	N/A	C	C
4.2	N/A	C	C
5.1	C	C	C
5.2	N/A	C	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS
1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO THE HELB ENVIRONMENT
TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Limit Switches (Namco)	Cables (All Suppliers)
NUREG 0588		
Item 2.1.1 a	C	C
2.1.1 b	N/A	N/A
2.1.2	C	C
2.1.3	C	C
2.1.3 a	C	C
2.1.3 b	C	C
2.1.3 c	C	C
2.1.4	N/A	C
2.2.1	C	N/A
2.2.2	C	C
2.2.3	C	C
2.2.4	N/A	N/A
2.2.5	N/A	N/A
2.2.6	C	C
2.2.7	C	C
2.2.8	N/A	N/A
2.2.9	C	C
2.2.10	C	N/A
2.2.11	C	C
2.2.12	(1)	(1)
2.3.1	C	C
2.3.2	C	C
2.3.3	C	C
2.3.4	C	C
2.4	N/A	N/A
3.1	C	C
3.2	C	C
3.3	C	C
3.4 a	C	C
3.4 b	C	C
4.1	N/A	C
4.2	C	C
5.1	C	C
5.2	C	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO THE HELB ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Main Steam Isolation Valves	Feedwater Isolation Valves	Bussmann Fuses (FNA, KTK)
NUREG 0588			
Item 2.1.1 a	C	C	C
2.1.1 b	N/A	N/A	N/A
2.1.2	C	C	C
2.1.3	C	C	C
2.1.3 a	C	C	C
2.1.3 b	C	C	C
2.1.3 c	N/A	N/A	C
2.1.4	C	C	N/A
2.2.1	C	C	C
2.2.2	C	C	C
2.2.3	C	C	C
2.2.4	N/A	N/A	N/A
2.2.5	N/A	N/A	N/A
2.2.6	C	C	N/A
2.2.7	N/A	N/A	N/A
2.2.8	N/A	N/A	N/A
2.2.9	C	C	N/A
2.2.10	C	C	N/A
2.2.11	C	C	C
2.2.12	(1)	(1)	(1)
2.3.1	C	C	N/A
2.3.2	C	C	N/A
2.3.3	C	C	C
2.3.4	C	C	N/A
2.4	N/A	C	C
3.1	C	C	C
3.2	C	C	C
3.3	N/A	N/A	N/A
3.4 a	C	C	C
3.4 b	N/A	N/A	C
4.1	C	(3)	N/A
4.2	N/A	N/A	C
5.1	C	C	C
5.2	C	C	N/A

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS
1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO THE HELB ENVIRONMENT
TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Agastat Relay (7000 Series)	Ohmite Resistors (Brown Devil & Dividohm)	RIS Signal Transmitter
NUREG 0588			
Item 2.1.1 a	C	C	C
2.1.1 b	N/A	N/A	N/A
2.1.2	C	C	C
2.1.3	C	C	C
2.1.3 a	C	C	C
2.1.3 b	C	C	C
2.1.3 c	C	C	C
2.1.4	N/A	N/A	N/A
2.2.1	C	C	C
2.2.2	C	C	C
2.2.3	C	C	C
2.2.4	N/A	N/A	N/A
2.2.5	N/A	N/A	N/A
2.2.6	N/A	N/A	N/A
2.2.7	N/A	N/A	N/A
2.2.8	N/A	N/A	N/A
2.2.9	N/A	N/A	N/A
2.2.10	N/A	N/A	N/A
2.2.11	C	C	C
2.2.12	N/A	N/A	N/A
2.3.1	N/A	N/A	N/A
2.3.2	N/A	N/A	N/A
2.3.3	C	C	C
2.3.4	N/A	N/A	N/A
2.4	C	C	C
3.1	C	C	C
3.2	C	C	C
3.3	N/A	N/A	N/A
3.4 a	C	C	C
3.4 b	C	C	C
4.1	N/A	N/A	N/A
4.2	C	C	C
5.1	C	C	C
5.2	N/A	N/A	N/A

MCGUIRE NUCLEAR STATION - UNITS 1 AND 2

COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF
CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED
TO THE HELB ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES
OF NUREG 0588

Note 1

The radiation qualification information required in response to NUREG 0588 and Item 2.1.6.b of NUREG 0578 is provided in Attachment 4 and Attachment 9.

Note 2

Rotork Test Report TR-3025 shows that when the qualfied temperature for these valves is exceeded, the torque switches may fail on the next operation of the valve. 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.

Note 3

No specific aging test was performed on these operators. However, based on engineering evaluation of the components in these operators, there is reasonable assurance that aging is not a major factor based on similarity to other qualified valve operator materials.

Attachment 9

Comparison of the Environmental Qualification of Class 1E Equipment
Located Outside Containment and Exposed to the
Post-LOCA Recirculation Radiation Environment to the
Duke Position on the Category II Guidelines of NUREG 0588

ATTACHMENT 9

COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT

LOCATED OUTSIDE CONTAINMENT

AND EXPOSED TO THE POST-LOCA RECIRCULATION RADIATION ENVIRONMENT

TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

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8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO POST-LOCA RECIRCULATION RADIATION ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Boric Acid Transfer Pump Motors	Boron Inj. Recirc. Pump Motors	Cent. Chg. Pump Motors
NUREG 0588			
Item 2.1.1 a	N/A	N/A	C
2.1.1 b	C	C	N/A
2.1.2	N/A	N/A	C
2.1.3	N/A	N/A	C
2.1.3 a	N/A	N/A	C
2.1.3 b	N/A	N/A	N/A
2.1.3 c	C	C	N/A
2.1.4	C	C	C
2.2.1	N/A	N/A	C
2.2.2	C	C	C
2.2.3	N/A	N/A	C
2.2.4	N/A	N/A	N/A
2.2.5	N/A	N/A	N/A
2.2.6	N/A	N/A	N/A
2.2.7	N/A	N/A	C
2.2.8	N/A	N/A	N/A
2.2.9	N/A	N/A	C
2.2.10	N/A	N/A	C
2.2.11	C	C	C
2.2.12	N/A	N/A	C
2.3.1	N/A	N/A	C
2.3.2	N/A	N/A	C
2.3.3	N/A	N/A	C
2.3.4	N/A	N/A	N/A
2.4	N/A	N/A	C
3.1	N/A	N/A	C
3.2	N/A	N/A	C
3.3	N/A	N/A	N/A
3.4 a	N/A	N/A	N/A
3.4 b	N/A	N/A	C
4.1	N/A	N/A	N/A
4.2	N/A	N/A	C
5.1	C	C	C
5.2	N/A	N/A	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO POST-LOCA RECIRCULATION RADIATION ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Cont. Spray Pump Motors
NUREG 0588	
Item 2.1.1 a	C
2.1.1 b	N/A
2.1.2	C
2.1.3	C
2.1.3 a	C
2.1.3 b	N/A
2.1.3 c	N/A
2.1.4	C
2.2.1	C
2.2.2	C
2.2.3	C
2.2.4	N/A
2.2.5	N/A
2.2.6	N/A
2.2.7	C
2.2.8	N/A
2.2.9	C
2.2.10	C
2.2.11	C
2.2.12	C
2.3.1	C
2.3.2	C
2.3.3	C
2.3.4	N/A
2.4	C
3.1	C
3.2	C
3.3	N/A
3.4 a	N/A
3.4 b	C
4.1	N/A
4.2	C
5.1	C
5.2	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO POST-LOCA RECIRCULATION RADIATION ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Fuel Pool Cooling Pump Motors	RHR Pump Motors	RHR&CS Rooms Sump Pump Motors
NUREG 0588			
Item 2.1.1 a	C	C	C
2.1.1 b	N/A	N/A	N/A
2.1.2	C	C	C
2.1.3	C	C	C
2.1.3 a	C	C	C
2.1.3 b	N/A	N/A	N/A
2.1.3 c	N/A	N/A	N/A
2.1.4	C	C	C
2.2.1	C	C	C
2.2.2	C	C	C
2.2.3	C	C	C
2.2.4	N/A	N/A	N/A
2.2.5	N/A	N/A	N/A
2.2.6	N/A	N/A	N/A
2.2.7	C	C	C
2.2.8	N/A	N/A	N/A
2.2.9	C	C	C
2.2.10	C	C	C
2.2.11	C	C	C
2.2.12	C	C	C
2.3.1	C	C	C
2.3.2	C	C	C
2.3.3	C	C	C
2.3.4	N/A	N/A	N/A
2.4	C	C	C
3.1	C	C	C
3.2	C	C	C
3.3	N/A	N/A	N/A
3.4 a	N/A	N/A	N/A
3.4 b	C	C	C
4.1	N/A	N/A	N/A
4.2	C	C	C
5.1	C	C	C
5.2	C	C	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO POST-LOCA RECIRCULATION RADIATION ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	SI Pump Motors	Annulus Vent Fan Motors	Aux Bldg Filtered Exh Fan Motors	DG Vent Fan Motors
NUREG 0588				
Item 2.1.1 a	C	C	C	C
2.1.1 b	N/A	N/A	N/A	N/A
2.1.2	C	C	C	C
2.1.3	C	C	C	C
2.1.3 a	C	C	C	C
2.1.3 b	N/A	N/A	N/A	N/A
2.1.3 c	N/A	N/A	N/A	N/A
2.1.4	C	C	C	C
2.2.1	C	C	C	C
2.2.2	C	C	C	C
2.2.3	C	C	C	C
2.2.4	N/A	N/A	N/A	N/A
2.2.5	N/A	N/A	N/A	N/A
2.2.6	N/A	N/A	N/A	N/A
2.2.7	C	C	C	C
2.2.8	N/A	N/A	N/A	N/A
2.2.9	C	C	C	C
2.2.10	C	C	C	C
2.2.11	C	C	C	C
2.2.12	C	C	C	C
2.3.1	C	C	C	C
2.3.2	C	C	C	C
2.3.3	C	C	C	C
2.3.4	N/A	N/A	N/A	N/A
2.4	C	C	C	C
3.1	C	C	C	C
3.2	C	C	C	C
3.3	N/A	N/A	N/A	N/A
3.4 a	N/A	N/A	N/A	N/A
3.4 b	C	C	C	C
4.1	N/A	N/A	N/A	N/A
4.2	C	C	C	C
5.1	C	C	C	C
5.2	C	C	C	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO POST-LOCA RECIRCULATION RADIATION ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	FP Cooling Pump AHU Motors	RHR Pump AHU Motors	600 Volt Load Centers
NUREG 0588			
Item 2.1.1 a	C	C	C
2.1.1 b	N/A	N/A	N/A
2.1.2	C	C	C
2.1.3	C	C	C
2.1.3 a	C	C	C
2.1.3 b	N/A	N/A	N/A
2.1.3 c	N/A	N/A	N/A
2.1.4	C	C	N/A
2.2.1	C	C	C
2.2.2	C	C	C
2.2.3	C	C	C
2.2.4	N/A	N/A	N/A
2.2.5	N/A	N/A	N/A
2.2.6	N/A	N/A	N/A
2.2.7	C	C	C
2.2.8	N/A	N/A	N/A
2.2.9	C	C	C
2.2.10	C	C	C
2.2.11	C	C	C
2.2.12	C	C	C
2.3.1	C	C	N/A
2.3.2	C	C	C
2.3.3	C	C	C
2.3.4	N/A	N/A	N/A
2.4	C	C	C
3.1	C	C	C
3.2	C	C	C
3.3	N/A	N/A	N/A
3.4 a	N/A	N/A	N/A
3.4 b	C	C	C
4.1	N/A	N/A	N/A
4.2	C	C	C
5.1	C	C	C
5.2	C	C	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO POST-LOCA RECIRCULATION RADIATION ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	600 Volt Motor Control Ctrs	Diesel Battery	Diesel Battery Chgr	RCP SWGR Pot. Transformer
NUREG 0588				
Item 2.1.1 a	C	(1)	(1)	C
2.1.1 b	N/A	(1)	(1)	N/A
2.1.2	C	(1)	(1)	C
2.1.3	C	(1)	(1)	C
2.1.3 a	C	(1)	(1)	C
2.1.3 b	N/A	(1)	(1)	N/A
2.1.3 c	N/A	(1)	(1)	N/A
2.1.4	N/A	(1)	(1)	N/A
2.2.1	C	(1)	(1)	C
2.2.2	C	(1)	(1)	C
2.2.3	C	(1)	(1)	C
2.2.4	N/A	(1)	(1)	N/A
2.2.5	N/A	(1)	(1)	N/A
2.2.6	N/A	(1)	(1)	N/A
2.2.7	C	(1)	(1)	C
2.2.8	N/A	(1)	(1)	N/A
2.2.9	C	(1)	(1)	C
2.2.10	C	(1)	(1)	C
2.2.11	C	(1)	(1)	C
2.2.12	C	(1)	(1)	C
2.3.1	N/A	(1)	(1)	N/A
2.3.2	C	(1)	(1)	C
2.3.3	C	(1)	(1)	C
2.3.4	N/A	(1)	(1)	N/A
2.4	C	(1)	(1)	C
3.1	C	(1)	(1)	C
3.2	C	(1)	(1)	C
3.3	N/A	(1)	(1)	N/A
3.4 a	N/A	(1)	(1)	N/A
3.4 b	C	(1)	(1)	C
4.1	N/A	(1)	(1)	N/A
4.2	C	(1)	(1)	C
5.1	C	(1)	(1)	C
5.2	C	(1)	(1)	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO POST-LOCA RECIRCULATION RADIATION ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Valve Motor Operators (Limitorque, Rotork)	Valve Solenoid Operators (Valcor, ASCO)	Limit Switches (Namco)
NUREG 0588			
Item 2.1.1 a	C	C	C
2.1.1 b	N/A	N/A	N/A
2.1.2	C	C	C
2.1.3	C	C	C
2.1.3 a	C	C	C
2.1.3 b	C	C	C
2.1.3 c	C	C	C
2.1.4	N/A	N/A	N/A
2.2.1	C	C	C
2.2.2	C	C	C
2.2.3	C	C	C
2.2.4	N/A	N/A	N/A
2.2.5	N/A	N/A	N/A
2.2.6	N/A	N/A	N/A
2.2.7	C	C	C
2.2.8	N/A	N/A	N/A
2.2.9	C	C	C
2.2.10	C	C	C
2.2.11	C	C	C
2.2.12	C	C	C
2.3.1	N/A	N/A	N/A
2.3.2	C	C	C
2.3.3	C	C	C
2.3.4	N/A	N/A	N/A
2.4	N/A	N/A	N/A
3.1	C	C	C
3.2	C	C	C
3.3	N/A	N/A	N/A
3.4 a	N/A	N/A	N/A
3.4 b	C	C	C
4.1	C	C	C
4.2	N/A	N/A	N/A
5.1	C	C	C
5.2	C	C	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO POST-LOCA RECIRCULATION RADIATION ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	HVAC Damper Motors	HVAC 3-Way Solenoid Valve	Prop Temp Controller	High Temp Thermostat
NUREG 0588				
Item 2.1.1 a	C	(2)	(2)	(2)
2.1.1 b	N/A	(2)	(2)	(2)
2.1.2	C	(2)	(2)	(2)
2.1.3	C	(2)	(2)	(2)
2.1.3 a	C	(2)	(2)	(2)
2.1.3 b	N/A	(2)	(2)	(2)
2.1.3 c	N/A	(2)	(2)	(2)
2.1.4	N/A	(2)	(2)	(2)
2.2.1	C	(2)	(2)	(2)
2.2.2	C	(2)	(2)	(2)
2.2.3	C	(2)	(2)	(2)
2.2.4	N/A	(2)	(2)	(2)
2.2.5	N/A	(2)	(2)	(2)
2.2.6	N/A	(2)	(2)	(2)
2.2.7	C	(2)	(2)	(2)
2.2.8	N/A	(2)	(2)	(2)
2.2.9	C	(2)	(2)	(2)
2.2.10	C	(2)	(2)	(2)
2.2.11	C	(2)	(2)	(2)
2.2.12	C	(2)	(2)	(2)
2.3.1	N/A	(2)	(2)	(2)
2.3.2	C	(2)	(2)	(2)
2.3.3	C	(2)	(2)	(2)
2.3.4	N/A	(2)	(2)	(2)
2.4	C	(2)	(2)	(2)
3.1	C	(2)	(2)	(2)
3.2	C	(2)	(2)	(2)
3.3	N/A	(2)	(2)	(2)
3.4 a	N/A	(2)	(2)	(2)
3.4 b	C	(2)	(2)	(2)
4.1	N/A	(2)	(2)	(2)
4.2	C	(2)	(2)	(2)
5.1	C	(2)	(2)	(2)
5.2	C	(2)	(2)	(2)

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO POST-LOCA RECIRCULATION RADIATION ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	RTD (Weed)	Diff. Press. Switch	Limit Switch (Micro Switch)
NUREG 0588			
Item 2.1.1 a	(2)	(2)	C
2.1.1 b	(2)	(2)	N/A
2.1.2	(2)	(2)	C
2.1.3	(2)	(2)	C
2.1.3 a	(2)	(2)	C
2.1.3 b	(2)	(2)	N/A
2.1.3 c	(2)	(2)	N/A
2.1.4	(2)	(2)	N/A
2.2.1	(2)	(2)	C
2.2.2	(2)	(2)	C
2.2.3	(2)	(2)	C
2.2.4	(2)	(2)	N/A
2.2.5	(2)	(2)	N/A
2.2.6	(2)	(2)	N/A
2.2.7	(2)	(2)	C
2.2.8	(2)	(2)	N/A
2.2.9	(2)	(2)	C
2.2.10	(2)	(2)	C
2.2.11	(2)	(2)	C
2.2.12	(2)	(2)	C
2.3.1	(2)	(2)	N/A
2.3.2	(2)	(2)	C
2.3.3	(2)	(2)	C
2.3.4	(2)	(2)	N/A
2.4	(2)	(2)	C
3.1	(2)	(2)	C
3.2	(2)	(2)	C
3.3	(2)	(2)	N/A
3.4 a	(2)	(2)	N/A
3.4 b	(2)	(2)	C
4.1	(2)	(2)	N/A
4.2	(2)	(2)	C
5.1	(2)	(2)	C
5.2	(2)	(2)	C

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COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO POST-LOCA RECIRCULATION RADIATION ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Cables (All Suppliers)	Bussmann Fuse (FNA)	Bussmann Fuse Blocks (2808,3792,4439&4575)
NUREG 0588			
Item 2.1.1 a	C	C	C
2.1.1 b	N/A	N/A	N/A
2.1.2	C	C	C
2.1.3	C	C	C
2.1.3 a	C	C	C
2.1.3 b	C	C	C
2.1.3 c	C	C	C
2.1.4	N/A	N/A	N/A
2.2.1	C	C	C
2.2.2	C	C	C
2.2.3	C	C	C
2.2.4	N/A	N/A	N/A
2.2.5	N/A	N/A	N/A
2.2.6	N/A	N/A	N/A
2.2.7	C	C	N/A
2.2.8	N/A	N/A	N/A
2.2.9	C	C	N/A
2.2.10	C	C	N/A
2.2.11	C	C	C
2.2.12	C	C	N/A
2.3.1	N/A	C	N/A
2.3.2	C	C	N/A
2.3.3	C	C	C
2.3.4	N/A	N/A	N/A
2.4	C	C	C
3.1	C	C	C
3.2	C	C	C
3.3	N/A	N/A	N/A
3.4 a	N/A	C	C
3.4 b	C	C	C
4.1	N/A	N/A	N/A
4.2	C	C	C
5.1	C	C	C
5.2	C	C	N/A

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO POST-LOCA RECIRCULATION RADIATION ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	C-H Ind. Light (E29)
NUREG 0588	
Item 2.1.1 a	C
2.1.1 b	N/A
2.1.2	C
2.1.3	C
2.1.3 a	C
2.1.3 b	C
2.1.3 c	C
2.1.4	N/A
2.2.1	C
2.2.2	C
2.2.3	C
2.2.4	N/A
2.2.5	N/A
2.2.6	N/A
2.2.7	C
2.2.8	N/A
2.2.9	C
2.2.10	C
2.2.11	C
2.2.12	C
2.3.1	C
2.3.2	C
2.3.3	C
2.3.4	N/A
2.4	C
3.1	C
3.2	C
3.3	N/A
3.4 a	C
3.4 b	C
4.1	N/A
4.2	C
5.1	C
5.2	C

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COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO POST-LOCA RECIRCULATION RADIATION ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	C-H Relays (3) (D23, D26)	G.S. Surge Suppressor (Transzorb)	C-H Selector Switch (10250T)
NUREG 0588			
Item 2.1.1 a	C	C	C
2.1.1 b	N/A	N/A	N/A
2.1.2	C	C	C
2.1.3	C	C	C
2.1.3 a	C	C	C
2.1.3 b	C	C	C
2.1.3 c	C	C	C
2.1.4	N/A	N/A	N/A
2.2.1	C	C	C
2.2.2	C	C	C
2.2.3	C	C	C
2.2.4	N/A	N/A	N/A
2.2.5	N/A	N/A	N/A
2.2.6	N/A	N/A	N/A
2.2.7	C	N/A	C
2.2.8	N/A	N/A	N/A
2.2.9	C	N/A	C
2.2.10	C	N/A	C
2.2.11	C	C	C
2.2.12	C	N/A	C
2.3.1	C	N/A	C
2.3.2	C	N/A	C
2.3.3	C	C	C
2.3.4	N/A	N/A	N/A
2.4	C	C	C
3.1	C	C	C
3.2	C	C	C
3.3	N/A	N/A	N/A
3.4 a	C	C	C
3.4 b	C	C	C
4.1	N/A	N/A	N/A
4.2	C	C	C
5.1	C	C	C
5.2	C	N/A	C

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COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO POST-LOCA RECIRCULATION RADIATION ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	States ZWM Term Block	C-H Switch Indicating Lights (E30)
NUREG 0588		
Item 2.1.1 a	C	C
2.1.1 b	N/A	N/A
2.1.2	C	C
2.1.3	C	C
2.1.3 a	C	C
2.1.3 b	C	C
2.1.3 c	C	C
2.1.4	N/A	N/A
2.2.1	C	C
2.2.2	C	C
2.2.3	C	C
2.2.4	N/A	N/A
2.2.5	N/A	N/A
2.2.6	N/A	N/A
2.2.7	N/A	C
2.2.8	N/A	N/A
2.2.9	N/A	C
2.2.10	N/A	C
2.2.11	C	C
2.2.12	N/A	C
2.3.1	N/A	C
2.3.2	N/A	C
2.3.3	C	C
2.3.4	N/A	N/A
2.4	C	C
3.1	C	C
3.2	C	C
3.3	N/A	N/A
3.4 a	C	C
3.4 b	C	C
4.1	N/A	N/A
4.2	C	C
5.1	C	C
5.2	N/A	C

McGUIRE NUCLEAR STATION - UNITS 1 AND 2
COMPARISON OF THE ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO POST-LOCA RECIRCULATION RADIATION ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

EQUIPMENT IDENTIFICATION	Stanwick Term Block	Littelfuse Fuse (Slo-Blo)
NUREG 0588		
Item 2.1.1 a	(4)	(4)
2.1.1 b	(4)	(4)
2.1.2	(4)	(4)
2.1.3	(4)	(4)
2.1.3 a	(4)	(4)
2.1.3 b	(4)	(4)
2.1.3 c	(4)	(4)
2.1.4	(4)	(4)
2.2.1	(4)	(4)
2.2.2	(4)	(4)
2.2.3	(4)	(4)
2.2.4	(4)	(4)
2.2.5	(4)	(4)
2.2.6	(4)	(4)
2.2.7	(4)	(4)
2.2.8	(4)	(4)
2.2.9	(4)	(4)
2.2.10	(4)	(4)
2.2.11	(4)	(4)
2.2.12	(4)	(4)
2.3.1	(4)	(4)
2.3.2	(4)	(4)
2.3.3	(4)	(4)
2.3.4	(4)	(4)
2.4	(4)	(4)
3.1	(4)	(4)
3.2	(4)	(4)
3.3	(4)	(4)
3.4 a	(4)	(4)
3.4 b	(4)	(4)
4.1	(4)	(4)
4.2	(4)	(4)
5.1	(4)	(4)
5.2	(4)	(4)

MCGUIRE NUCLEAR STATION - UNITS 1 AND 2

COMPARISON OF THE ENVIRONMENTAL QUALFICATION OF CLASS 1E EQUIPMENT LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO POST-LOCA RECIRCULATION RADIATION ENVIRONMENT TO THE DUKE POSITION ON THE CATEGORY II GUIDELINES OF NUREG 0588

Note 1

Radiation testing of this equipment is not required for levels below $1x10^4$RAD per Section 8.1 of IEEE 535-1979.

Note 2

A qualification program is currently in progress for these components. The results of this program will be reported upon completion.

Note 3

This comparison does not cover Cutler-Hammer D26 relays located in Unit 2. The comparison will be performed as a part of the Unit 2 qualification program.

Note 4

These components are used in Class 1E circuitry and exposed to greater than $1x10^3$RAD in Unit 2 only. The radiation qualification of Unit 2 components is in progress. The results of this qualification program will be provided upon completion by Duke Power Company.