

DUKE POWER COMPANY

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HAL B. TUCKER  
VICE PRESIDENT  
NUCLEAR PRODUCTION

September 4, 1984

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

Re: Catawba Nuclear Station, Units 1 and 2  
Docket Nos. 50-413 and 50-414

Dear Mr. O'Reilly:

Please find attached a supplemental report concerning Significant Deficiency  
No. 413-414/84-16.

Very truly yours,

*Hal B. Tucker*  
EXT

Hal B. Tucker

LTP:slb

Attachment

cc: Director  
Office of Inspection & Enforcement  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

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Washington, D. C. 20555

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DUKE POWER COMPANY  
CATAWBA NUCLEAR STATION

Report Number: 413-414/84-16, Supplement I

Report Date: August 31, 1984

Facility: Catawba Nuclear Station Units 1 and 2

IDENTIFICATION OF DEFICIENCY: Unconsidered effects of superheated steam generated by steam generator for Main Steam Line Break analysis results in increased doghouse temperatures outside containment. This could possibly preclude safety related components from performing their intended safety function. The potential deficiency was initially identified May 11, 1984.

Initial Report: On June 8, 1984, Mr. Kerry Landis, NRC Region II, Atlanta, Georgia, was notified by telephone of the subject deficiency by L. M. Coggins and R. R. Weidler of Duke Power Company, Charlotte, N. C. 28242. Subsequently, deficiency report (413-414/84-16) as submitted on July 9, 1984.

Component and/or Supplier: Duke Power Company is responsible for the doghouse environmental analysis. The MSLB analysis is accomplished utilizing input information supplied by Westinghouse Electric Corporation, Water Reactor Division.

Description of Deficiency: Revised information has been received from Westinghouse giving mass/energy release rates for a Main Steam Line Break (MSLB) inside containment. The original Westinghouse information indicated a saturated steam condition from the steam generators; however, revised information identifies steam generator tube uncover and the formation of superheated steam.

Duke Power had previously assumed the same saturated steam condition for a MSLB in the doghouses located outside containment. Equipment important to safety for mitigating an MSLB in the doghouses has been identified (see list in corrective action below). Environmental qualification parameters for the doghouses are currently based on original analysis results of 330°F. Utilizing the new data from Westinghouse, revised Duke Power environmental analysis with superheated steam conditions indicates an increase in doghouse temperature from the present 330°F parameter to a 440°F maximum doghouse temperature.

ANALYSIS OF SAFETY IMPLICATIONS: A study has been conducted by Duke Power with assistance from Westinghouse to determine if subjecting safety related components to temperatures higher than the qualification basis of 330°F could possibly preclude components from performing their intended safety functions following a postulated MSLB in either doghouse. The results of these studies are presented under "Corrective Action", below.

Corrective Action: The analyses performed by Duke Power Company and Westinghouse demonstrate that no required safety related components are precluded from performing their safety function prior to the on-set of adverse temperature effects and, therefore, no safety implications exist to prevent safe shutdown of the plant. Safety related equipment potentially impacted by MSLB temperatures higher than the equipment qualification envelopes identified in report 413-414/84-16 have been addressed in this report. See Attachment 1.

The following is a description of the results of the analysis work performed to resolve this deficiency. Westinghouse has performed a steamline break analysis for a spectrum of break sizes and power levels (full power, 70%, 30% and 0%) to determine associated protection system actuation times and predicted superheat initiation times. The analysis was performed using safety analysis assumptions of initial conditions and protection system time responses to provide a conservatively early prediction of steam generator tube bundle uncover and, therefore, the earliest superheat initiation time. This analysis was used to verify that required safety system actuations (in the doghouse) will be completed before adverse temperature effects due to increased doghouse temperatures occur. In the case of certain breaks (see discussion under "Small Break"), tube bundle uncover does not occur, and consequently no superheat is initiated.

Results of the Westinghouse analysis are as described in the following paragraphs:

#### Large Break

Typical response to large breaks approximately 0.5 ft.<sup>2</sup> and greater (power level affects the cut-off of break size) in the doghouse main steam line will be as follows:

- \* Reactor trip will occur on overpower  $\Delta T$ , low steam line pressure, or low steam generator level.
- \* Main feedwater isolation valve (MFIV) closure will occur due to reactor trip and low Tavg or safety injection signal. See Attachment 1 for a list of other valves that close on feedwater isolation signal.
- \* Safety injection will be initiated upon receipt of a low pressurizer pressure signal or low steam line pressure signal.
- \* The motor driven auxiliary feedwater pumps (MDAFP's) will start upon receipt of the safety injection signal or low-low steam generator level.
- \* The turbine driven auxiliary feedwater pump (TDAFP) is not required for this break since one MDAFP can supply adequate flow if the other MDAFP fails to start.
- \* Low steam pressure in the faulted steam generator causes main steam isolation valve (MSIV) closure. See Attachment 1 for a list of other valves that close on main steam isolation signal.

All the above functions will occur before the temperature in the Doghouse exceeds equipment qualification temperatures. Isolation of auxiliary feedwater to the faulted steam generator may be accomplished by the operator by closing the motor operated valves located in the doghouse, or by closing the control valves from the control room or manual isolation valves located in the auxiliary feedwater pump room.

### Intermediate Break

For intermediate breaks, approximately 0.3 ft.<sup>2</sup> to 0.5 ft.<sup>2</sup> (power level affects the range of break sizes), response will be as follows:

- \* Reactor trip will occur on low-low steam generator level. Note that all steam generators will approach low-low level at approximately the same time.
- \* MDAFP's will start upon receipt of first low-low level signal. TDAFP will start upon receipt of the second low-low level signal.
- \* MFIV closure will occur due to reactor trip and low Tavg.
- \* Safety injection will occur due to low pressurizer pressure.
- \* Main steam isolation will occur due to low steam line pressure; this may actually happen after tube uncover. However, Duke analysis using revised Westinghouse mass-energy release data shows that main steam isolation will occur before temperatures in the higher elevations of the doghouses (where the main steam isolation valves are located) exceed the current equipment qualification parameter of 330°F.

Faulted steam generator isolation is accomplished as described for the large break.

### Small Break

Depending on exact break size and power level, small break (less than approximately 0.3 ft.<sup>2</sup>) response will be as described for intermediate breaks, or as follows. For a narrow band of break sizes within this category (approximately 0.1 to 0.2 ft.<sup>2</sup>), the feedwater control system will automatically increase feedwater flow and prevent reactor trip and tube uncover. Blowdown through the break will be limited to saturated conditions. The operator will initiate reactor trip and position valves from the control room. Faulted steam generator isolation is accomplished as described for the large break.

### All Breaks

The only post-accident monitoring instruments located in the doghouse are the auxiliary feedwater flow transmitters, which are not required to mitigate the consequences of a doghouse MSLB. Although these may fail under this environment, post-accident monitoring of the auxiliary feedwater function can be accomplished by the steam generator level transmitters which will not be affected by a steamline break in the doghouse.

Water level instrumentation in the doghouses is not required to function in the event of a doghouse MSLB.

Duke has also analyzed the potential consequences if the temperature in the doghouses exceeds the qualification temperature after the equipment has performed its intended safety functions described above. The analysis has shown that, because of electrical circuit design features such as isolation, interlocks, and protective devices, valves will not reposition after actuation. The necessary revisions to the Catawba Nuclear Station NUREG-0588 submittal which reflect the results of the current MSLB analyses are shown in Attachment 2.



A study has also been conducted to determine the effects of the MSLB on structural steel and concrete in the doghouses. For the resulting temperature time history in the doghouse compartments, all reinforced concrete structural members would continue to perform their intended function. Structural and miscellaneous steel used to support grating for personnel access could experience some local instability or local yielding, but would not collapse. Also, there will be no adverse effects on pipe rupture device or support/restraint structural steel in the doghouses. The connection and structural configurations of associated steel allow members to expand.

SUMMARY:

This evaluation has shown that for an MSLB outside containment, all required safety functions are completed before adverse temperature effects due to increased doghouse temperatures occur. Spurious actuation of components following initial positioning has also been evaluated and it has been determined that this will not occur. Thus, Duke Power has concluded that plant safety would not be adversely affected in the event of a main steam line break in the doghouse.

ATTACHMENT 1

Doghouse Valves Impacted by Higher MSLB Temperatures

<u>Valve</u>	<u>Signal for Actuation</u>	<u>Remarks</u>
Main Steam Isolation	Main Steam Isolation Signal	See Report actuation description
Main Steam Isolation Bypass	Main Steam Isolation Signal	See Report actuation description
Steam Generator PORV's	Main Steam Isolation Signal	See Report actuation description
Feedwater Isolation	Feedwater Isolation Signal	See Report actuation description
Feedwater Purge	Feedwater Isolation Signal	See Report actuation description
Feedwater Supply to Upper Nozzle	Feedwater Isolation Signal	See Report actuation description
Tempering Isolation	Feedwater Isolation Signal	See Report actuation description
Auxiliary Feedwater Isolation	Manual Initiation	Control Valves in Pump Room can be used if motor operated valves are not available
Steam Generator PORV Isolation	Manual Initiation	Valve operator not required to function before or after MSLB
Main Steam Low Point Drain Isolation	Manual Initiation	Drain is orificed to prevent excess steam flow and will not spuriously close due to adverse environment.
Steam Generator Blowdown Isolation	Auto Start Aux. Feedwater Pumps	See Report for description of Auxiliary Feedwater Pump Start
Steam Generator Blowdown Isolation Bypass	Auto Start Aux. Feedwater Pumps	See report for description of Auxiliary Feedwater Pump Start
Auxiliary Feedwater Pump Turbine Steam Supply Isolation	2/4 steam generator low low level signal	Valves required to open for some small breaks, combined with most limiting single failure. Signal will be generated before tube uncover for small breaks. Valves will not spuriously close in adverse environment.

ATTACHMENT 2

NUREG-0588 Summary of Environmental Qualification  
of Class 1E Equipment Revision for Doghouse MSLB.

ATTACHMENT 3

SUMMARY OF ENVIRONMENTAL QUALIFICATION OF CLASS 1E EQUIPMENT  
LOCATED OUTSIDE CONTAINMENT AND EXPOSED TO PIPE RUPTURE ENVIRONMENT

<u>Page</u>	<u>Rev.</u>	<u>Page</u>	<u>Rev.</u>	<u>Page</u>	<u>Rev.</u>
1	2	35	4	63	2
2	D	36	5	64	1
3	4	36a	0	65	1
4	4	37	4	66	1
5	4	38	4	67	1
6	4	39	D	68	1
7	4	40	5	69	1
8	4	40a	0	70	1
9	4	41	D	71	1
10	4	42	5	72	1
11	4	42a	0	73	1
12	D	43	5	74	1
13	4	43a	0	75	1
14	4	44	5	76	1
15	D	44a	0	77	D
16	D	45	5	78	D
17	4	45a	0	79	1
18	4	46	5	PRN-1	5
19	4	46a	0		
20	3	47	5		
21	3	47a	0		
22	4	48	5		
23	4	48a	0		
24	4	49	5		
25	4	49a	0		
26	1	50	5		
27	4	51	5		
28	D	52	5		
29	4	53	5		
30	4	53a	0		
31	D	54	5		
32	4	54a	0		
33	4	55	D		
34	4	56	4		
		57	2		
		58	2		
		59	2		
		60	2		
		61	D		
		62	D		

\*D - Deleted: It has been determined that this equipment is not in the scope of 10CFR50.49 due to plant/system design changes, relocation to a mild environment area, or review of function and failure mode with respect to the event causing the harsh environment.



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

Page 6  
 Rev. 5

EQUIPMENT ID: Transmitter-  
 Aux. FW Flow  
 (Doghouse)

MANUFACTURER: Barton

MODEL #: 764  
 (lot 7)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
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The Auxiliary Feedwater flow transmitters are not required to mitigate the consequences of a main steam line break in the doghouse.

QUALIFICATION REPORT: N/A

METHOD: N/A

REPLACEMENT INTERVAL: N/A

MPIC

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

Page 32  
 Rev. 5

EQUIPMENT ID: Main Steam Isolation Valve (Doghouse)      MANUFACTURER: Atwood and Morrill      MODEL #: MSI Valve Actuator Assembly

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 325°F* Press: 8.85 psig RH: 100%	Temp: 340°F Press: 110 psig RH: 100%	5.6 min.	5.9 min.	N/A	N/A

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

QUALIFICATION REPORT: Procedure 201-39500, Test Report STR-060578-1 (CNM-1205.12-0009)

METHOD: Test

REPLACEMENT INTERVAL: SLND & Elastomers - 5 years

MEQP

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

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 Rev. 5

EQUIPMENT ID: Feedwater Isolation Valve (Doghouse)      MANUFACTURER: Borg-Warner (NVD)      MODEL #: Pneumatic-Hydraulic Operator P/N 38991

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 300°F* Press: 8.85 psig RH: 100%	Temp: 340°F Press: 110 psig RH: 100%	2.6 min.	5.9 min.	N/A	N/A

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

QUALIFICATION REPORT: 1736 (CNM-1205.12-0014)

METHOD: Test

REPLACEMENT INTERVAL: N/A

MEQP

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

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Rev. 5

EQUIPMENT ID: Valve Motor Operators  
(Doghouse)

MANUFACTURER: Limitorque

MODEL #: SMB RH Insulation

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PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
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The Limitorque Valve Motor Operators located in the Doghouse are not required for mitigation of the consequences of a MSLB in the Doghouse.

QUALIFICATION REPORT: N/A

METHOD:

REPLACEMENT INTERVAL: N/A

MEQP

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

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 Rev. 0

EQUIPMENT ID: Valve Motor Operators

MANUFACTURER: Limitorque

MODEL #: SMB RH Insulation

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 262°F RH: 100%	Temp: 340°F RH: 100%	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: 600-376-A, September 1972; 600-456, December 1975 (CNM-1205.19-0001)

METHOD: Test

REPLACEMENT INTERVAL: N/A

MEQP



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

Page 36  
 Rev. 5

EQUIPMENT ID: Valve Motor Operators  
 (Doghouse)

MANUFACTURER: Rotork

MODEL #: NA-1

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 300°F* Press: 8.85 psig RH: 100%	Temp: 340°F Press: 70 psig RH: 100%	3.8 min.	5.9 min.	N/A	N/A

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

QUALIFICATION REPORT: N 11/4, December 1970; TR116, October 1973; TR222, June 1975 (CNM-1205.19)

METHOD: Test

REPLACEMENT INTERVAL: N/A

MEQP

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

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 Rev. 5

EQUIPMENT ID: Valve Solenoid Operators  
 (Doghouse)

MANUFACTURER: Valcor

MODEL #: V70900-21-3

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 300°F* Press: 8.85 psig RH: 100%	Temp: 346°F Press: 87 psig RH: 100%	2.6 min.	6.0 min.	N/A	N/A

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

QUALIFICATION REPORT: QR-70900-21-1 Rev. A; QR-52600-515 Rev. B, MR-70905-21-3-1 (CNM-1210.04-253 254 & MCM-1210.04-119)

METHOD: Test/Analysis

REPLACEMENT INTERVAL: 5 Years

MPIC

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

Page 40a  
Rev. 0

EQUIPMENT ID: Valve Solenoid Operators

MANUFACTURER: Valcor

MODEL #: V70900-21-3

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 262°F RH: 100%	Temp: 346°F RH: 100%	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: QR-70900-21-1 Rev. A; QR-52600-515 Rev. B, MR-70905-21-3-1 (CNM-1210.04-253 254 & MCM-1210.04-119)

METHOD: Test/Analysis

REPLACEMENT INTERVAL: 5 Years

MPIC

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

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 Rev. 5

EQUIPMENT ID: Cable -  
 Hookup Wire  
 (Doghouse)

MANUFACTURER: Anaconda

MODEL #: FR-EPR  
 Insulation (Procurement  
 Spec: CNS-1354.04-00-0006)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 325°F* Press: 8.85 psig RH: 100%	Temp: 385°F Press: 66 psig RH: 100%	5.6 min.	7.2 min.	N/A	N/A

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

QUALIFICATION REPORT: 80205-1 (CNM-1354.00-0019)

METHOD: Test/Analysis

REPLACEMENT INTERVAL: N/A

EPSS

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

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 Rev. 0

EQUIPMENT ID: Cable -  
 Hookup Wire

MANUFACTURER: Anaconda

MODEL #: FR-EPR  
 Insulation (Procurement  
 Spec: CNS-1354.04-00-0006)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 252°F RH: 100%	Temp: 385°F RH: 100%	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: 80205-1 (CNM-1354.00-0019)

METHOD: Test/Analysis

REPLACEMENT INTERVAL: N/A

EPSS



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

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 Rev. 5

EQUIPMENT ID: Cable -  
 Medium Voltage Power  
 (Doghouse)

MANUFACTURER: Anaconda

MODEL #: EPR  
 Insulation (Procurement  
 Specs: CNS-1354.01-00-0001  
 & 0003)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 325°F* Press: 8.85 psig RH: 100%	Temp: 346°F Press: 113 psig RH: 100%	5.6 min.	6.0 min.	N/A	N/A

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

QUALIFICATION REPORT: 80205-1 (CNM-1354.00-0019)

METHOD: Test/Analysis

REPLACEMENT INTERVAL: N/A

EPSS

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

Page 43a  
 Rev. 0

EQUIPMENT ID: Cable -  
 Medium Voltage Power

MANUFACTURER: Anaconda

MODEL #: EPR  
 Insulation (Procurement  
 Specs: CNS-1354.01-00-0001  
 & 0003)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 26°F RH: 10%	Temp: 346°F RH: 100%	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: 80205-1 (CNM-1354.00-0019)

METHOD: Test/Analysis

REPLACEMENT INTERVAL: N/A

EPSS

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

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 Rev. 5

EQUIPMENT ID: Cable -  
 Control  
 (Doghouse)

MANUFACTURER: Anaconda

MODEL #: FR-EPR  
 Insulation (Procurement  
 Specs: CNS-1354.02-00-0001  
 & 0002)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 325°F* Press: 8.85 psig RH: 100%	Temp: 385°F Press: 113 psig RH: 100%	5.6 min.	7.2 min.	N/A	N/A

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

QUALIFICATION REPORT: 80205-1 (CNM-1354.00-0019)

METHOD: Test/Analysis

REPLACEMENT INTERVAL: N/A

EPSS

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

Page 44a  
 Rev. 0

EQUIPMENT ID: Cable -  
 Control

MANUFACTURER: Anaconda

MODEL #: FR-EPR  
 Insulation (Procurement  
 Specs: CNS-1354.02-00-0001  
 & 0002)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 262°F RH: 100%	Temp: 385°F RH: 100%	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: 80205-1 (CNM-1354.00-0019)

METHOD: Test/Analysis

REPLACEMENT INTERVAL: N/A

EPSS

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

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 Rev. 5

EQUIPMENT ID: Cable -  
 Instrumentation and Control  
 (Doghouse)

MANUFACTURER: Anaconda

MODEL #: FR-EPR  
 Insulation (Procurement  
 Specs: CNS-1354.03-00-0001,  
 0002 & 0003)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 325°F* Press: 8.85 psig RH: 100%	Temp: 385°F Press: 66 psig RH: 100%	5.6 min.	7.2 min.	N/A	N/A

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

QUALIFICATION REPORT: F-C4836-2 (CNM-1354.00-0020)

METHOD: Test/Analysis

REPLACEMENT INTERVAL: N/A

EPSS



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

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 Rev. 0

EQUIPMENT ID: Cable -  
 Instrumentation and Control

MANUFACTURER: Anaconda

MODEL #: FR-EPR  
 Insulation (Procurement  
 Specs: CNS-1354.03-00-0001,  
 0002 & 0003)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 262°F RH: 100%	Temp: 385°F RH: 100%	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: F-C4836-2 (CNM-1354.00-0020)

METHOD: Test/Analysis

REPLACEMENT INTERVAL: N/A

EPSS

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

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 Rev. 5

EQUIPMENT ID: Cable -  
 Low Voltage Power  
 (Doghouse)

MANUFACTURER: Anaconda

MODEL #: FR-EPR  
 Insulation (Procurement  
 Specs: CNS-1354.01-00-0001  
 & 0003)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 325°F* Press: 8.85 psig RH: 100%	Temp: 385°F Press: 113 psig RH: 100%	5.6 min.	7.2 min.	N/A	N/A

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

QUALIFICATION REPORT: 80205-1 (CNM-1354.00-0019)

METHOD: Test

REPLACEMENT INTERVAL: N/A

EPSS

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

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 Rev. 0

EQUIPMENT ID: Cable -  
 Low Voltage Power

MANUFACTURER: Anaconda

MODEL #: FR-EPR  
 Insulation (Procurement  
 Specs: CNS-1354.01-00-0001  
 & 0003)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 262°F RH: 100%	Temp: 385°F RH: 100%	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: 80205-1 (CNM-1354.00-0019)

METHOD: Test

REPLACEMENT INTERVAL: N/A

EPSS

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

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 Rev. 5

EQUIPMENT ID: Cable -  
 Control  
 (Doghouse)

MANUFACTURER: Brand-Rex

MODEL #: XLPE  
 Insulation (Procurement  
 Specs: CNS-1354.02-00-0001  
 & 0002)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 325°F* Press: 8 35 psig RH: 100%	Temp: 385°F Press: 113 psig RH: 100%	5.6 min.	7.2 min.	N/A	N/A

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

QUALIFICATION REPORT: FC-5120-1 and FC-5120-3 (CNM-1354.00-0023) and CNM-1354.00-0024

METHOD: Test

REPLACEMENT INTERVAL: N/A

EPSS

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

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 Rev. 0

EQUIPMENT ID: Cable -  
 Control

MANUFACTURER: Brand-Rex

MODEL #: XLPE  
 Insulation (Procurement  
 Specs: CNS-1354.02-00-0001  
 & 0002)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 262°F RH: 100%	Temp: 385°F RH: 100%	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: FC-5120-1 and FC-5120-3 (CNM-1354.00-0023) and CNM-1354.00-0024

METHOD: Test

REPLACEMENT INTERVAL: N/A

EPSS

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

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 Rev. 5

EQUIPMENT ID: Cable -  
 Coaxial  
 (Doghouse)

MANUFACTURER: Brand-Rex

MODEL #: XLPE  
 Insulation (Procurement  
 Spec: CNS-1354.04-00-0004)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 325°F* Press: 8.85 psig RH: 100%	Temp: 385°F Press: 113 psig RH: 100%	5.6 min.	7.2 min.	N/A	N/A

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

QUALIFICATION REPORT: FC-5120-2 and FC-5120-3 (CNM-1354.00-0021 and CNM-1354.00-0024)

METHOD: Test

REPLACEMENT INTERVAL: N/A

EPSS



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

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 Rev. 0

EQUIPMENT ID: Cable -  
 Coaxial

MANUFACTURER: Brand-Rex

MODEL #: XLPE  
 Insulation (Procurement  
 Spec: CNS-1354.04-00-0004)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 262°F RH: 100%	Temp: 385°F RH: 100%	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: FC-5120-2 and FC-5120-3 (CNM-1354.00-0021 and CNM-1354.00-0024)

METHOD: Test

REPLACEMENT INTERVAL: N/A

EPSS

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

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 Rev. 5

EQUIPMENT ID: Cable -  
 Instrumentation and Control  
 (Doghouse)

MANUFACTURER: Eaton

MODEL #: FR-EPDM  
 Insulation (Procurement Specs:  
 CNS-1354.03-00-0001, 0002 & 0003)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT (2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 325°F* Press: 8.85 psig RH: 100%	Temp: 430°F Press: 15 psig RH: 100%	5.6 min.	7.4 min.	N/A	N/A

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

QUALIFICATION REPORT: Qualification test of electrical cables by Isomedix (CNM-1354.00-0035).

METHOD: Test/Analysis

REPLACEMENT INTERVAL: N/A

EPSS

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

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 Rev. 0

EQUIPMENT ID: Cable -  
 Instrumentation and Control

MANUFACTURER: Eaton

MODEL #: FR-EPDM  
 Insulation (Procurement Specs:  
 CNS-1354.03-00-0001, 0002 & 0003)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 262°F RH: 100%	Temp: 430°F RH: 100%	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Qualification test of electrical cables by Iscomedix (CNM-1354.00-0035).

METHOD: Test/Analysis

REPLACEMENT INTERVAL: N/A

EPSS

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

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 Rev. 5

EQUIPMENT ID: Cable -  
 Medium Voltage  
 (Doghouse)

MANUFACTURER: Okonite

MODEL #: EPR  
 Insulation (Procurement  
 Specs: CNS-1354.01-00-0001  
 & 0003)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 440°F Press: 8.85 psig RH: 100%	Temp: 455°F Press: 32 psig RH: 100%	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Okonite Report #355 (CNM-1354.00-0022)

METHOD: Test

REPLACEMENT INTERVAL: N/A

EPSS

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

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 Rev. 0

EQUIPMENT ID: Cable -  
 Medium Voltage

MANUFACTURER: Okonite

MODEL #: EPR  
 Insulation (Procurement  
 Specs: CNS-1354.01-00-0001  
 & 0003)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 262°F RH: 100%	Temp: 455°F RH: 100%	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Okonite Report #355 (CNM-1354.00-0022)

METHOD: Test

REPLACEMENT INTERVAL: N/A

EPSS

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

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 Rev. 5

EQUIPMENT ID: Cable -  
 Control  
 (Doghouse)

MANUFACTURER: Okonite

MODEL #: FR-EPR  
 Insulation (Procurement  
 Specs: CNS-1354.02-00-0001  
 & 0002)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 440°F Press: 8.85 psig RH: 100%	Temp: 455°F Press: 32 psig RH: 100%	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Okonite Report #355 (CNM-1354.00-0022)

METHOD: Test

REPLACEMENT INTERVAL: N/A

EPSS



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

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 Rev. 5

EQUIPMENT ID: Cable -  
 Hookup Wire  
 (Doghouse)

MANUFACTURER: Okonite

MODEL #: Tefzel  
 Insulation (Procurement  
 Spec: CNS-1354.04-00-0006)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 440°F Press: 8.85 psig RH: 100%	Temp: 455°F Press: 32, psig RH: 100%	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: Okonite Report #344 (CNM-1354.00-0026)

METHOD: Test

REPLACEMENT INTERVAL: N/A

EPSS

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

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 Rev. 5

EQUIPMENT ID: Cable Termination  
 Splice Material  
 (Doghouse)

MANUFACTURER: Ray Chem

MODEL #: WCSF-N

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 325°F* Press: 8.85 psig RH: 100%	Temp: 360°F Press: 70 psig RH: 100%	5.6 min.	6.3 min.	N/A	N/A

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

QUALIFICATION REPORT: 71100 & F-C4033-3 (CNM-1367.01-0001 & 2)

METHOD: Test

REPLACEMENT INTERVAL: N/A

EPSS

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

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 Rev. 0

EQUIPMENT ID: Cable Termination  
 Splice Material

MANUFACTURER: Ray Chem

MODEL #: WCSF-N

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 262°F RH: 100%	Temp: 360°F RH: 100%	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: 71100 & F-C4033-3 (CNM-1367.01-0001 & 2)

METHOD: Test

REPLACEMENT INTERVAL: N/A

EPSS

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

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 Rev. 5

EQUIPMENT ID: Seal Material for Cable Entrance Fittings (Doghouse)      MANUFACTURER: 3M      MODEL #: Scotch Cast 9 Epoxy (XR-5240)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 325°F* Press: 8.85 psig RH: 100%	Temp: 350°F Press: 18 psig RH: 100%	5.6 min.	6.2 min.	N/A	N/A

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

QUALIFICATION REPORT: CNC-1381.05-00-0039 and Wyle Report #44390-1, Rev. A (CNM-1364.00-0001)

METHOD: Test/Analysis

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

Page 54a  
 Rev. 0

EQUIPMENT ID: Seal Material for Cable  
 Entrance Fittings

MANUFACTURER: 3M

MODEL #: Scotch Cast 9 Epoxy  
 (XR-5240)

PIPE RUPTURE ENVIRONMENT (1)	ENVIRONMENT TO WHICH QUALIFIED	OPERABILITY REQUIRED IN PIPE RUPTURE ENVIRONMENT(2)	OPERABILITY DEMONSTRATED	ACCURACY REQUIRED (% OF SPAN)	ACCURACY DEMONSTRATED (% OF SPAN)
Temp: 262°F RH: 100%	Temp: 350°F RH: 100%	Continuous	Continuous	N/A	N/A

QUALIFICATION REPORT: CNC-1381.05-00-0039 and Wyle Report #44390-1, Rev. A (CNM-1364.00-0001)

METHOD: Test/Analysis

EPSS

CATAWBA NUCLEAR STATION - UNITS 1 AND 2  
ENVIRONMENTAL QUALIFICATION OF CLASS 1E ELECTRICAL  
EQUIPMENT LOCATED OUTSIDE CONTAINMENT EXPOSED TO  
PIPE RUPTURE ENVIRONMENT

Note 1

The methods employed to evaluate pipebreaks and to determine the resulting environmental parameters are discussed in Section 3.6 of the Catawba FSAR.

Note 2

The pipe rupture environment is assumed to exist for 2 1/2 hours (except for one area of the Auxiliary Building, Elevation 543' which exists for 2 5/6 hours) based on 30 minutes at the peak temperature after which action by the operator isolated the break and allows the Auxiliary Building temperature to decrease to normal in 2 hours. Use of the term "Continuous" indicates operability required/demonstrated throughout the pipe rupture period.

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

Pressure: Not a significant qualification parameter for pipe rupture outside the containment since all locations outside containment are open areas not susceptible to pressure build-up. It should be noted that the pressure in the doghouse is a spike (8.85 psig) of less than 1 sec. duration.

Relative Humidity: For outside containment ruptures of piping systems operating at temperatures less than 200°F, area relative humidity is not a significant qualification parameter. This pipe rupture temperature precludes flashing of the liquid which could significantly increase area relative humidity. Additionally, evaporation of the liquid does not significantly increase area relative humidity due to the large open areas in which the pipe rupture occurs and the relative short duration of the pipe rupture.

Radiation: There is no significant increase in radiation levels outside the containment as a result of a pipe rupture outside the containment.

Chemical Spray: Not a qualification parameter for pipe rupture outside the containment since there is no chemical spray outside the containment.



Submergence: Based on analysis performed by Duke Power Company, it has been determined that there is no safety-related electrical equipment, required to mitigate the event causing the flood (e.g., pipe rupture) or required to bring the plant to a safe shutdown condition given a flood event, located below the postulated flood levels.

Note 3

The equipment listed is a NEMA 4 enclosure containing general application devices (e.g., relays, switches, terminal blocks, etc.). The qualified environment is dictated by the single limiting device contained in the enclosure. The enclosure and device qualification is documented in calculation CNC-1381.05-00-0054.