since

Omaha Public Power District

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January 30, 1981

Mr. K. V. Seyfrit, Director
U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region IV
611 Ryan Plaza Drive
Suite 1000
Arlington, Texas 76011

Reference: Docket No. 50-285

Dear Mr. Seyfrit:

In response to IE Bulletin 79-01B, Omaha Public Power District's letter dated October 31, 1980, provided information regarding the environmental qualification of safety related equipment required to achieve hot shutdown. To supplement the District's October 31, 1980, letter, the environmental qualification information on equipment required to achieve long term cold shutdown is attached. The attached information is paged for incorporation into the District's October 31, 1980, response. Additionally, Attachments 15 and 20 provide the District's schedule for TMI task submittals and a report on cable splice qualification, respectively.

Sincerely,

W. C. Jones
Division Manager
Production Operations

WCJ/KJM/TLP:jmm

Attach.

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

LeBoeuf, Lamb, Leiby & MacRae
1333 New Hampshire Avenue, N.W.
Washington, D.C. 20036

Facility: Fort Calhoun 1
Docket No.: 50-285

MASTER LIST

SYSTEM: Chemical & Volume Control System

COMPONENTS				
Item Number	Ref.	Description	Location	
			Inside Primary Containment	Outside Primary Containment
LCS-218	1,4	Volume Control Tank Level Controller		X
LCV-218-3		Motor Operated Volume Control Tank Discharge Valve		X
LT-219	1,4	Volume Control Tank Level Transmitter		X
FT-212	1,4	Letdown Flow Transmitter		X
PT103X		Pressurizer Pressure Transmitter	X	
PT103Y		Pressurizer Pressure Transmitter	X	
X/LT101		Pressurizer Level Transmitter	X	
Y/LT101		Pressurizer Level Transmitter	X	
FT-236		Charging Pump Flow		X

MASTER LIST

SYSTEM: High Pressure Safety Injection

COMPONENTS				
Item Number	Ref.	Description	Location	
			Inside Primary Containment	Outside Primary Containment
HCV-349		HPSI Pump 2B Cooled Suction Line Isolation (Solenoid)		X
HCV-349 Limit Switch		Position Indication For HCV-349		X
HCV-350		HPSI Pump 2A Cooled Suction Line Isolation (Solenoid Valve)		X
HCV-350 Limit Switch		Position Indication For HCV-350		X
HCV-2983	1	CVCS Isolation Solenoid Valve (From SI Tank)		X
HCV-2983 Limit Switch	1	Position Indication For HCV-2983		X
HCV-385	1,4	Recirculation From HPSI & LPSI (Solenoid Valve)		X
HCV-385 Limit Switch	1,4	Position Indication For HCV-385		X
HCV-386	1,4	Recirculation From HPSI & LPSI (Solenoid Valve)		X
HCV-386 Limit Switch	1,4	Position Indication For HCV-386		X

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SYSTEN COMPONENT EVALUATON WORK SHEET

Enclosure #5 C-26

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Note 1 Item No.: Note 2	Operating Time	Continuous	Continuous	1	2	Type Test	NONE
	Tempera-ture °F	288°F	340°F	1	2	Type Test	NONE
Component: Limit Switch Manufacturer: NAMCO	Pressure PSIg	60 PSIg	70 PSIg	1	2	Type Test	NONE
Model No.: EA-180-11302	Relative Humidity %	100%	100%	1	2	Type Test	NONE
Function: Position Indication For valves	Chemical Spray	1700 ppm Boric Acid	PH 10-11 Boron	1	2	Type Test	NONE
Accuracy - Spec: N/A Demon: N/A Service: See Function	Radiation	3×10^6R (Air) 3×10^6R/HR (Submerged)	$2.04\,10^8$R	1	2	Type Test	NONE
Location: Containment	Aging	N/A	Note 4	Note 4	Note 4	Type Test	NONE
~~Flood Level Elev: 1000.9'~~ Above Flood Level: See Note 3	Submer-gence	Note 3	Note 3	N/A	N/A	Type Test Note 3	NONE

Documentation References:
1) See Enclosure #1
2) NAMCO Test Report model EA180 September 5, 1978.

NOTES (cont):
4) Switches qualified for 40 years using NAMCO recommended maintenance. NAMCO letter dated 7/16/80.

Notes: 1) Systems: Chemical & Volume Control System, High Pressure Safet Injection System, Component Cooling System, Containment Cooling System, Containment HVAC, Steam Generator Feedwater & Blowdown, Containment Hydrogen Purge, Sampling System, Nitrogen & Hydrogen System

2) Item No.: TCV-202,
HCV-238,239,240, 241, HCV-545,425A,425C,2936,2916,2956,2976,438A,
438C,467A,467C,1107A,1108A,881,882,883A,884A,2504A,2506A,2507A,
2603B,2604B, 1387A,1388A, 864, 865
PCV-2929,2909,2949,2969,742E,742G

3) The underlined components listed above may be subject to submergence. The switches were sealed & tested to 70 PSIg. The District considers them capable of withstanding submergence.

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R2 12/12/80

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Chemical and Volume Control System Item No.: HCV-238, 239 See Enclosure 18 Component: Limit Switch Manufacturer: NAMCO Model No.: EA 180-11302 Function: Position Indication for valves Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Containment	Operating Time	Note 1	Note 1	Note 1	2	Type Test	NONE
	Tempera-ture °F	288°F	340°F	1	2	Type Test	NONE
	Pressure PSIg	60 psig	70 psig	1	2	Type Test	NONE
	Relative Humidity %	100%	100%	1	2	Type Test	NONE
	Chemical Spray	1700 ppm Boric Acid	PH 10-11	1	2	Type Test	NONE
	Radiation	Note	2.04×10^8 R	1	2	Type Test	NONE
	Aging	N/A	40 yrs	40 yrs	3	Type Test	NONE
Flood Level Elev: 1000.9' Above Flood Level: No	Submer-gence	Note 2	Note 2	Note 2	Note 2	Note 2	NONE

Documentation References:
1) Enclosure #1.
2) NAMCO Test Report Moedl EA 180
3) Qualified forty years using NAMCO maintenance program.

Notes:
1) Rad dose 3×10^6 R/HR corrected to 1000 hrs using DOR Guideline Nomogram dose is 3.3×10^7. Limit switches are qualified for long term core cooling.
2) Switches are sealed units submergance dose not effected these.

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SYSTEM COMPONENT EVALUATON WORK SHEET

C-126A

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Chemical and Volume Control System Item No.: HCV-240 See Enclosure 18 Component: Limit Switch Manufacturer: NAMCO Model No.: EA 180-11302 Function: Position Indication for valves Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Containment	Operating Time	Note 1	Note 1	Note 1	2	Type Test	NONE
	Tempera-ture °F	288°F	340°F	1	2	Type Test	NONE
	Pressure PSIg	60 psig	70 psig	1	2	Type Test	NONE
	Relative Humidity %	100%	100%	1	2	Type Test	NONE
	Chemical Spray	1700 ppm Boric Acid	PH 10-11	1	2	Type Test	NONE
	Radiation	1.92×10^7 R	2.04×10^8 R	1	2	Type Test	NONE
	Aging	N/A	40 yrs	3	2	Type Test	NONE
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submer-gence	N/A	N/A	N/A	N/A	N/A	N/A

Documentation References:
1) Enclosure #1.
2) NAMCO Test Report Model EA 180 Sept. 5, 1978
3) Qualified forty years using NAMCO maintenance program.

Notes:
1) Radiation is the time limiting parameter using DOR Guideline Nomograms and sector 0 of enclosure 12.1000 hr dose is expected to be 2.1×10^7. The limit switch should function for long term core cooling.

R-2b

R1 12/12/80

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Note 1 Item No.: Note 2	Operating Time	Note 3	Note 3	1	2	Type Test	NONE
	Temperature °F	288°F	346°F	1	2	Type Test	NONE
Component: Solenoid Manufacturer: ASCO	Pressure PSIg	60 PSIg	110 PSIg	1	2	Type Test	NONE
Model No.: NP8320A185E	Relative Humidity %	100%	100%	1	2	Type Test	NONE
Function: Remote Operation of valves	Chemical Spray	1700 ppm Boric Acid	3000 ppm Boron PH 10	1	2	Type Test	NONE
Accuracy - Spec: N/A Demon: N/A Service: See Function	Radiation	3×10^6 R (Air) 3×10^6 R/HR (Submerged)	2×10^8 R	1	2	Type Test	Note 4
Location: Containment	Aging	N/A	10 yrs	N/A	2	Type Test	Note 5
Flood Level Elev: 1000.9' Above Flood Level: See Note 4	Submergence	Note 4	Note 4	N/A	N/A	Note 4	NONE

Documentation References:
1) Enclosure #1.
2) Asco test report No. AQS21678/TR

NOTES (cont):

4-cont)
All of the above valves are deenergized on receipt of an isolation signal.
5) See Enclosure #12

Notes:
1) Systems: Chemical & Volume Control System, High Pressure Safety Injection System, Component Cooling System, Containment HVAC, Steam Generator Feedwater & Blowdown, Sampling System, Nitrogen & Hydrogen System.
2) Item No.: TCV-202 - 241,2936,2916, 2936, 2956, 2976, 467A,467C,746A, 1387A,1388A,2603B, 2604B, 425A, 425C,204,205, - FCV-742E,742G
3) Open, on receipt of an isolation signal.
4) The underlined components listed above may be subject to submergence. These valves are considered qualified for submergence. ASCO test reports demonstrate that no seat leakage will occur if the valve is deenergized.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Note 1 Item No.: Note 2 Component: Solenoid Manufacturer: ASCO Model No.: NP8320A185E Function: Remote Operation of valves Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Containment	Operating Time	Note 3	Note 3	1	2	Type Test	NONE
	Temperature °F	288°F	346°F	1	2	Type Test	NONE
	Pressure PSIg	60 PSIg	110 PSIg	1	2	Type Test	NONE
	Relative Humidity %	100%	100%	1	2	Type Test	NONE
	Chemical Spray	1700 ppm Boric Acid	3000 ppm Boron PH 10	1	2	Type Test	NONE
	Radiation	3×10^{6} R (Air) 3×10^{6} R/HR (Submerged)	2×10^{8} R	1	2	Type Test	Note 4
	Aging	N/A	10 yrs	N/A	2	Type Test	Note 5
Flood Level Elev: 1000.9' Above Flood Level: See Note 4	Submergence	Note 4	Note 4	N/A	N/A	Note 4	NONE

Documentation References:
1) Enclosure #1.
2) Asco test report No. AQS21678/TR

NOTES (cont):

4-cont)
All of the above valves are deenergized on receipt of an isolation signal. Although the solenoid coil may fail this will not impact the accident function of the valve.
5) See Enclosure #12.

Notes:
1) Systems: Chemical & Volume Control System, High Pressure Safety Injection System, Component Cooling System, Containment HVAC, Steam Generator Feedwater & Blowdown, Sampling System, Nitrogen & Hydrogen System.
2) Item No.: TCV-202 - 241,2936,2916, 2936, 2956, 2976, 467A,467C,746A, 1387A,1388A,2603B, 2604B, 425A, 425C,204,205, - PCV-742E,742G
3) Once, on receipt of an isolation signal.
4) The underlined components listed above may be subject to submergence. These valves are considered qualified for submergence. ASCO test reports demonstrate that no seat leakage will occur if the valve is deenergized.

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R6 1/30/81

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SYSTEM COMPONENT EVALUATON WORK SHEET

C-128A

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Chemical and Volume Control System Item No.: HCV-240 See Enclosure 18 Component: Solenoid Manufacturer: ASCO Model No.: NP 8320A185E Function: Remote Operation of valves Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Containment	Operating Time	Note 1	Note 1	Note 1	2	Type Test	NONE
	Temperature °F	288°F	340°F	1	2	Type Test	NONE
	Pressure PSIg	60 psig	110 psig	1	2	Type Test	NONE
	Relative Humidity	100%	100%	1	2	Type Test	NONE
	Chemical Spray	1700 ppm Boric Acid	3000 ppm PH 10	1	2	Type Test	NONE
	Radiation	1.92×10^7R	2.04×10^8R	1	2	Type Test	NONE
	Aging	N/A	10 yrs	N/A	10 yrs 3	Type Test	NONE
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submer-gence	N/A	N/A	N/A	N/A	N/A	N/A

Documentation References:
1) Enclosure #1.
2) ASCO Test Report Model AQS 21678/TR
3) ASCO letter July 10, 1980

Notes:
1) Radiation is limiting, qualification shown adjusting 1.92×10^6R/HR to 1000 HR using DOR Guideline Nomograms qualification is adequate.

5-4b

R1 12/12/80

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R5-1

SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Chemical & Volume Control System Item No.: LCV-218-3 Component: Motor Operated valve and Limit Switch Manufacturer: Limitorque Company Model No.: SMB 003 Function: Motor Operated Volume Control Tank Discharge Valve Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Room 7	Operating Time	1000 hrs Note 2	Note 1	Note 1	Note 1	Note 1	NONE
	Tempera-ture °F	N/A	N/A	N/A	N/A	N/A	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	N/A	N/A	N/A	N/A	N/A	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	$6x10^7$R	$2x10^7$R	1	2	Sequential Test	NONE
	Aging	N/A	40 yrs	N/A	2	Sequential Test	NONE
Flood Level Elev: NA Above Flood Level:	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1. "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6B Page 17, Figure 4.2-2 (December 1979).
2. Limitorque Corp. Test Lab: #B-0003 and Letter dated March 26, 1979.

Notes:

1. See Enclosure #14.
2. See Enclosure #18.

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R4-0

SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Chemical & Valve Control Item No.: FT 236	Operating Time	Continuous	Continuous	N/A	1		NONE
	Tempera-ture °F	N/A	N/A	N/A	N/A	N/A	NONE
Component: Flow Transmitter	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
Manufacturer: Foxboro Model No.: 637	Relative Humidity %	100%	Note 1	N/A	N/A	N/A	NONE
Function: Charging Flow to RCS	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
Accuracy - Spec: N/A Demon: N/A	Radiation	$4x10^6R$	Note 3	N/A	N/A	Material Analysis	NONE
Service: Location: Room 13	Aging	Note 2	Note 2	Note 2	Note 2	Note 2	NONE
Flood Level Elev: NA Above Flood Level:	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1. General Catalog Page 71

Notes:

1. Provided with weather proof case.
2. See Enclosure #12.
3. Reported under LER 81-001. See Enclosure 13.

6-4c

R1 12/12/80

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Component Cooling	Operating Time	1000 hrs	Note 2	Note 2	Note 2	Note 2	NONE
Item No.: HCV-2808A,2808B,2810A 2810B,2812A,2812B,2813A,2813B	Temperature °F	109°F	Note 1	1	3	Type Test	NONE
Component: Solenoid Valve	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
Manufacturer: Automatic Switch Company Model No.: WPHT 831429	Relative Humidity %	100%	100%	1	3	Type Test	NONE
Function: Valve actuators for inlet & outlet valves for SI & spray pumps bearing coolers.	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
Accuracy - Spec: N/A Demon: N/A Service: See Function	Radiation	7×10^6 R	Note 1	2	4	Material Analysis Type Test	NONE
Location: Room 21 (SI Pumps)	Aging	N/A	Note 4	N/A	Note 3	Note 3	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
4) ASCO Catalog #30 page 37.

Notes:

1) Material Analysis Ref. Isomedix Report #AQS21678 is 4×10^6.
2) Valves are locked open and do not operate during an event. See Enclosure 14,
3) See Enclosure 12.
4) See Enclosure 18.

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SYSTEM COMPONENT EVALUATION WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Component Cooling Item No.: HCV-2808A,2808B,2810A, 2810B,2812A,2812B,2813A,2813B Component: Limit Switch Manufacturer: Fisher Governor Company Model No.: 304 Function: Position Indication for Component Cooling valves Accuracy - Spec: N/A Demon: N/A Service: Component cooling water vv Pos. Ind. Location: Room 21 (HPSI)	Operating Time	1000 hrs	Note 2	Note 2	Note 2	Note 2	NONE
	Temperature °F	109°F	180°F	1	3	Type Test	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	100%	100%	1	3	Type Test	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	7×10^6 R	Note 1	2	3	Material Analysis	NONE
	Aging	N/A	Note 3	N/A	Note 3	Note 3	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) Fisher Controls Co. Bulletin 62.3:304, December 1974.

Notes:

1) Material Analysis 10^6 R
2) See Enclosure 14.
3) See Enclosure 12.
4) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Component Cooling	Operating Time	Note 5 1000 hrs	Note 2	Note 2	Note 2	Note 2	NONE
Item No.: HCV-2809A,2809B,2811A 2811B,2814A,2814B,2815A,2815B	Temperature °F	109°F	Note 3	1	3	Type Test	NONE
Component: Solenoid Valve	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
Manufacturer: Automatic Switch Company Model N .: WPHT 831429	Relative Humidity %	100%	100%	1	3	,pe Test	NONE
Function: Valve actuators for inlet & outlet valves for SI & spray pumps bearing coolers.	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
Accuracy - Spec: N/A Demon: N/A Service: See Function	Radiation	$7x10^6$R	Note 1	2	4	Material Analysis Test Type	NONE
Location: Room 22 (SI Pumps)	Aging	N/A	Note 4	N/A	Note 4	Note 4	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) ASCO Catalog #30 pages 82 and 83.
4) ASCO Catalog #30 page 37.

Notes:

1) Material Analysis $5x10^6$R: Isomedix Report #AQS-21678 rx10 Rads.
2) Valves are locked open and no not operate during an event. See Enclosure 14.
3) Rated at 176°F for U.L. applications, rated at 212°F for non U.L. applications.
4) See Enclosure 12.
5) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Component Cooling Item No.: HCV-2809A,2809B,2811A, 2811B,2814A,2814B,2815A,2815B Component: Limit Switch Manufacturer: Fisher Governor Co. Model No.: 304 Function: Position Indication for Component Cooling vv's Accuracy - Spec: N/A Demon: N/A Service: Component Cooling Wtr vv Pos Ind. Location: Room 22 (HPSI)	Operating Time	1000 Hrs Note 4	Note 2	Note 2	Note 2	Note 2	NONE
	Temperature °F	109°F	180°F	1	3	Type Test	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	100%	100%	1	3	Type Test	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	$7x10^6$R	Note 1	2	3	Material Analysis	NONE
	Aging	N/A	Note 3	N/A	Note 3	Note 3	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:
1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to te NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) Fisher Controls Co. Bulletin 62.3:304, December 1974.

Notes:
1) Material Analysis 10^6R
2) See Enclosure 14
3) See Enclosure 12
4) See Enclosure 18

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Component Cooling Item No.: AC-3A AC-3B AC-3C Component: Motor Manufacturer: Allis Chalmers Company Model No.: 030 Serial No. 1-5111-40025-2-1,2,3 Function: Component Cooling Water Pump Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Room 69	Operating Time	1000 hrs Note 4	Note 1	Note 1	Note 1	Note 1	NONE
	Temperature °F	N/A	N/A	N/A	N/A	N/A	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	N/A	N/A	N/A	N/A	N/A	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	2.5×10^5R	Note 2	1	2	Material Analysis	NONE
	Aging	N/A	Note 3	N/A	Note 3	N/A	NONE
Flood Level Elev: NA Above Flood Level:	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1. "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6B Page 19, Figure 4.2-4 (December 1979).

Notes:

1. See Enclosure #14.
2. Material Analysis 10^5R No credit was taken for motor case.
3. See Enclosure #12.
4. See Enclosure #18.

DELETE

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Containment HVAC Item No.: VA-3A, 3B	Operating Time	Note 1,4	Note 2	2	3	Simultaneous Test	NONE
	Tempera-ture °F	288°F	300°F	1	3	Simultaneous Test	NONE
Component: Reliance Motor For Joy Vane Axial Fan Manufacturer: Reliance	Pressure PSIg	60 PSIg	80 PSIg	1	3	Simultaneous Test	NONE
Model No.: 60-30-1200	Relative Humidity %	100%	100%	1	3	Simultaneous Test	NONE
Function: Containment Area Fan	Chemical Spray	1700 ppm Boric Acid	1000 ppm Boron Note 3	1	3	Simultaneous Test	NONE
Accuracy - Spec: N/A Demon: N/A	Radiation	1.92×10^7R	1×10^8	1	3	Material Analysis & Note 3	NONE
Service: Containment vent. & recirc. fans. Location: Containment	Aging	40 yrs	40 yrs	1	3	Test & Eng. Analysis	NONE
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:
1) Enclosure #1.
2) Contract #763, Tec Spec #17 Para 4.05 pg. H.21-6
3) Joy Manufacturing Test Report No. X-377A

Notes:
1) 0 to 20 min: 288°F, 60 PSIg; 50min: 245°F, 30 PSIg; greater than 50min: Gradual return to normal. several hours.
2) 4 hours at 80 PSig and 300°F; 264 hours at 20 PSIG and 200°F.
3) See Enclosure #7, Footnote 4 and Enclosure #9.
4) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Containment HVAC Item No.: VA-7C & 7D Component: Reliance Motor for Joy Vane Axial Fan Manufacturer: Reliance Model No.: 4830-20-MM Function: Containment Area Fan Accuracy - Spec: N/A Demon: N/A Service: Containment Cooling Units Location: Containment	Operating Time	Note 1,4	Note 2	2	3	Simultaneous Test (Type)	NONE
	Temperature °F	288°F	300°F	1	3	Simultaneous Test (Type)	NONE
	Pressure PSIg	60 psig	70 psig	1	3	Simultaneous Test (Type)	NONE
	Relative Humidity %	100%	100%	1	3	Simultaneous Test (Type)	NONE
	Chemical Spray	1700 ppm Boric Acid	1000 ppm Boron Note 3	1	3	Simultaneous Test (Type)	NONE
	Radiation	1.92 x10^6R	1x10^8R	1	3	Material Analysis & Note 3	NONE
	Aging	40 yrs	40 yrs	-	3	Test Eng. Anal.	NONE
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:
1) Enclosure #1.
2) Contract #763, Tech Spec #17 Para. 4.05 pg. H21-6
3) Joy Manufacturing Test report No. X-377A

Notes:
1) 0 to 20 min: 288°F, 60 PSIG; 50 min: 245°F, 30 PSIG; greater than 50 min: gradual return to normal several hours.
2) 4 hours at 80 PSIG and 300°F; 264 hours at 20 PSIG and 200°F.
3) See Enclosure #7, Footnote 4 and Englosure #9.
4) See Enclsoure 18.

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EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Containment Spray Item No.: SI-3A, SI-3B & SI-3C	Operating Time	Continuous Note 3	Continuous	NONE	4	Engineering Analysis	NONE
	Temperature °F	109°F	122°F	1	4	Engineering Analysis	NONE
Component: Motor Manufacturer: GE	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
Model No.: 5K815526A35	Relative Humidity %	100%	100%	1	3	Type and see note 1	NONE
Function: Containment Spray	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
Accuracy - Spec: N/A Demon: N/A Service: Containment Spray pumps	Radiation	7×10^6 R	1×10^7 R	2	5	Type Test	NONE
Location: Room 21& 22 (HPSI)	Aging	N/A	Note 2	N/A	Note 2	Note 2	NONE
Flood Level Elev: NA Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering Study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) GE Instruction Bulletin GEH-6160F
4) GE application brochure GEZ-6211 and letter from GE Motor and Gen. Dept. to OPPD dated 2/6/78.
5) GE Study for OPPD P.O. 47462

Notes:

1) Enclosure is drip proof and moisture will not condense on windings when operating.
2) See Enclosure 12.
3) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Containment Spray Item No.: HCV-2957 and 2958 Component: Solenoid Valve Manufacturer: Automatic Switch Company Model No.: LB 8316C44 Function: Valve actuators for SI-3A inlet and discharge isolation valves. Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Room 21 (SI Pumps)	Operating Time	Note 5 1000 hrs	Note 2	Note 2	Note 2	Note 2	NONE
	Temperature °F	109°F	248°F (Coil Deenergized)	1	3	Type Test	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	100%	100%	1	Note 3	Eng Anal Note 3	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	7×10^6 R	Note 1	2	4	Material Analysis	NONE
	Aging	N/A	Note 4	N/A	Note 4	Note 4	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) ASCO Catalog #30 pages 82 and 83.
4) ASCO Catalog #30 page 40.

Notes:

1) Qualified for service per ASCO Evaluation Engineering Job 67,446.
2) Valves are locked open and do not operate during an event. See Enclosrue 14.
3) Rated at 176°F for U.L. applications, rated at 212°F for non U.L. applications.
4) See Enclosure 12.
5) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Containment Spray Item No.: HCV-2957 and 2958	Operating Time	1000 hrs Note 4	Note 1	Note 1	Note 1	Note 1	NONE
	Temperature °F	109°F	194°F	1	3	Type Test	NONE
Component: Limit Switch Manufacturer: NAMCO	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
Model No.: D1200G	Relative Humidity %	100%	100%	1	3	Type Test	NONE
Function: Position Indication for HCV-2957 and 2958	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
Accuracy - Spec: N/A Demon: N/A Service: Cont.spray PP SI-3A, Isolation vv Pos.Ind. Location: Room 22 (SI Pumps)	Radiation	$7x10^6$R	Note 3	2	4	Material Analysis	NONE
	Aging	N/A	Note 2	N/A	Note 2	Note 2	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:
1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) NAMCO Controls General Catalog Series EA-79 Page 3.
4) Namco controls letter dated March 11, 1980.

Notes:
1) Valves are locked open and do not operate during an event. See Enclosure #14.
2) See Enclosure #12.
3) Material Analysis - 10^5R
4) See Enclosure 18

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Containment Spray	Operating Time	Note 2 1000 hrs	Note 2	Note 2	Note 2	Note 2	NONE
Item No.: HCV-2967,2968, 2977 and 2978	Temperature °F	109°F	248°F (Coil Deenergized)	1	3	Type Test	NONE
Component: Solenoid Valve	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
Manufacturer: Automatic Switch Company Model No.: LB 8316C44	Relative Humidity %	100%	100%	1	Note 3	Eng Anal Note 3	NONE
Function: Valve actuators for SI-3B and SI-3C inlet and discharge isolation valves.	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
Accuracy - Spec: N/A Demon: N/A Service: See Function	Radiation	7×10^6 R	Note 1	2	4	Material Analysis	NONE
Location: Room 22 (SI Pumps)	Aging	N/A	Note 4	N/A	Note 4	Note 4	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) ASCO Catalog #30 pages 82 and 83.
4) ASCO Catalog #30 page 40.

Notes:

1) Qualified for service per ASCO Evaluation Engineering Job 67,446.
2) Valves are locked open and do not operate during an event. See Enclosrue 14.
3) Rated at 176°F for U.L. applications, rated at 212°F for non U.L. applications.
4) See Enclosure 12.
5) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Containment Spray Item No.: HCV-2967,2968,2977 and 2978 Component: Limit Switch Manufacturer: NAMCO Model No.: D1200G Function: Position Indication Accuracy - Spec: N/A Demon: N/A Service: Cont.spray PP SI-3B,3C Isolation vv Pos.Ind. Location: Room 22 (SI Pumps)	Operating Time	1000 hrs. Note 4	Note 2	Note 2	Note 2	Note 2	NONE
	Temperature °F	109°F	194°F	1	3	Type Test	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	100%	100%	1	3	Type Test	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	$7x10^6$ R	Note 1	2	4	Material Analysis	NONE
	Aging	N/A	Note 3	N/A	Note 3	Note 3	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:
1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) NAMCO Controls General Catalog Series EA-79 Page 3.
4) Namco controls letter dated March 11, 1980.

Notes:
1) Material Analysis 10^5 R
2) Valves are locked open and do not operate during an event. See Enclosure 14
3) See Enclosure 12
4) See Enclosure 18

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R2-5

SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Containment Spray Item No.: HCV-344, 345 Component: Solenoid Valve Manufacturer: Automatic Switch Company Model No.: HT 831429 & HTX 831429 (lea.) Function: Valve Actuators for Containment Spray Header Isolation Valve Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Room 59	Operating Time	1000 hrs Note 4	Note 1	Note 1	Note 1	Note 1	NONE
	Temperature °F	N/A	N/A	N/A	N/A	N/A	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	N/A	N/A	N/A	N/A	N/A	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	$8x10^5$R	Note 2	1	2	Material Analysis	NONE
	Aging	N/A	Note 3	N/A	Note 3	N/A	NONE
Flood Level Elev: NA Above Flood Level:	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1. "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6B Page 18, Figure 4.2-3 (December 1979).
2. ASCO Cat log #30 Page 37.

Notes:

1. See Enclosure #14.
2. Material Analysis $5x10^6$R
3. See Enclosure #12.
4. See Enclosure #18.

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R2-6

SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Containment Spray Item No.: HCV-344 HCV-345 Component: Limit Switch Manufacturer: Fisher Governor Company Model No.: 304 Function: Position Indicator for Containment Spray header Isolation Valves Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Room 59	Operating Time	1000 hrs Note 4	Note 1	Note 1	Note 1	Note 1	NONE
	Temperature °F	N/A	N/A	N/A	N/A	N/A	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	N/A	N/A	N/A	N/A	N/A	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	8×10^5 R	Note 2	1	2	Material Analysis	NONE
	Aging	N/A	Note 3	N/A	Note 3	N/A	NONE
Flood Level Elev: NA Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1. "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6B Page 18, Figure 4.2-3 (December 1979).
2. Fisher Controls Bulletin 62.3: 304, December 1974.

Notes:

1. See Enclosure #14.
2. Material Analysis 10^6 R
3. See Enclosure #12.
4. See Enclosure #18.

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R2-9

SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Containment Spray Item No.: HCV-344 HCV-345 Component: Electro-Pneumatic Transducer Manufacturer: Fisher Governor Company Model No.: 546 Function: Position Signal for Containment Spray Isolation valves Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Room 59	Operating Time	1000 hrs Note 4	Note 1	Note 1	Note 1	Note 1	NONE
	Temperature °F	NA	NA	NA	NA	NA	NONE
	Pressure PSIg	NA	NA	NA	NA	NA	NONE
	Relative Humidity %	NA	NA	NA	NA	NA	NONE
	Chemical Spray	NA	NA	NA	NA	NA	NONE
	Radiation	8×10^5 R	Note 2	1	2	Material Analysis	NONE
	Aging	NA	Note 3	NA	Note 3	NA	NONE
Flood Level Elev: NA Above Flood Level:	Submergence	NA	NA	NA	NA	NA	NONE

Documentation References:

1. "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6B Page 18, Figure 4.2-3 (December 1979).
2. Fisher Controls Co. Bulletin 13.1:546, December 1976.

Notes:

1. See Enclosure #14.
2. Material Analysis 10^6 R
3. See Enclosure #12.
4. See Enclosure #18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

C-3

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Electrical Equipment Item No.: Electrical Containment penetrations Component: All Manufacturer: CONAX Model No.: N/A Function: Power, control & instrument cable penetrations Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Containment	Operating Time	Continuous	Continuous	-	2	Test	NONE
	Tempera-ture °F	288°F	Note 1	1	2	Simultaneous Test	NONE
	Pressure PSIg	60 PSIg	60 PSIg	1	2	Simultaneous Test	NONE
	Relative Humidity %	100%	100%	1	2	Simultaneous Test	NONE
	Chemical Spray	1700 ppm Boric Acid	~~1900 ppm~~ Boric Acid Note 2	1	2	Simultaneous Test	NONE
	Radiation	Note 4	$1x10^8$poly $1x10^7$Tef	1	3 4	Sequential Test	NONE
	Aging	N/A	Note 3	N/A	Note 3	Note 3	NONE
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Enclosure #1.
2) CONAX Corporation - IPS-37 Type qualification test report for Electrical Penetraton Sub-Assemblies - March 8, 1971
3) CONAX Corporation - Gamma Irradiation of Kapton Insulated conductors & polysuflone sealant in CONAX electrical feedthrough assembly (#IPS-27 Dated 3/30/71)
4) CONAX Corporation test report of Gamma Radiation withstand capability of electric penetration feedthrough with TFE Teflon Primary Sealant (#IPS-435 Dated 5/31/79)

Notes:

1) 305°F for 20 minutes, 245°F for an additional 30 minutes and 85°F continuously,
2) See Enclosure #7, Footnote #5.
3) See Enclosure #12.
4) See Enclosure #13.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Electrical Equipment Item No.: Dow-Corning RTV adhesive/sealant Component: N/A Manufacturer: Dow-Corning Model No.: RTV-3144 Function: Sealing of terminal blocks & cable splices Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Containment Flood Level Elev: 1000.9' Above Flood Level: See Note 2	Operating Time	Note 3 Continuous	Continuous	-	2	Simultaneous Test	NONE
	Tempera-ture °F	288°F	320°F	1	2	Simultaneous Test	NONE
	Pressure PSIg	60 PSIg	75.3 PSIg	1	2	Simultaneous Test	NONE
	Relative Humidity %	100%	100%	1	2	Simultaneous Test	NONE
	Chemical Spray	1700 ppm Boric Acid	1700 ppm Boric Acid	1	Note 1	Material Analysis	NONE
	Radiation	$3x10^7$	$2x10^8$	1	3	Sequential Test	NONE
	Aging	N/A	40 yr	N/A	4	Sequential Test	NONE
	Submer-gence	NONE	Yes	NONE	4	Material Analysis	NONE

Documentation References:
1) Enclosure #1.
2) Fisher Controls Company Lab Report Project 71AR19, Report 4 Dated 6/1/72
3) "Elastomer Radiation Results" Lab test data from Dow-Corning
4) Lab test data from Dow-Corning - Ref. - Letter - Dow-Corning to R. Mehaffey of OPPD Dated 3/24/80

Notes:
1) See Enclosure #9, Para. 3
2) RTV.3144 Sealant is used as a sealant through-out the containment. Some areas may be subject to flooding.
3) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Electrical Equipment Item No.: Cable Splices at Elec Penetrations, Valcor Solenoids Component: N/A Manufacturer: N/A Model No.: N/A Function: Splices at elec penetr for sol.vv's, & Instrumentation Accuracy - Spec: N/A Demon: N/A Service: Motor oper.valves sol vv's limit switch & instruments Location: Containment	Operating Time	Note 3 Continuous	Continuous	-	2,4	Eng.Anal.	Test & NONE
	Tempera-ture °F	288°F	286°F	1	2	Simultaneous Test	NONE
	Pressure PSIg	60 PSIg	60 PSIg	1	2	Simultaneous Test	NONE
	Relative Humidity %	100%	100%	1	2	Simultaneous Test	NONE
	Chemical Spray	1700 ppm Boric Acid	1700 ppm Boric Acid	1	2	Simultaneous Test	NONE
	Radiation	1.36×10^7 R	2.5×10^7	1	3(Note 1) 4	Seq.Test & Eng Anal	NONE
	Aging	N/A	Note 2	N/A	Note 2	Note 2	NONE
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:
1) Enclosure #1.
2) Franklin Institute Research Labs Report #F-C3348.
3) Test Report of Gamma radiation withstand capability of electrical penetration feedthrough with TFE teflon primary sealant CONAX #IPS-435.
4) Material analysis of penetration splices to determine radiation qualifications. See Enclosure #8.

Notes:
1) Teflon portion of wire only.
2) See Enclosure #12.
3) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Electrical Equipment Item No.: Cable splices at sole-noid valves & transmitters. Component: Butt splice & heat shrink tube. Manufacturer: AMP & American PAMCOR Model No.: AMP-CAT #321280 AMER.PAMCOR-CAT #603344-1 Function: Cable Splice Accuracy - Spec: N/A Demon: N/A Service: Solenoid & Transmitter leads Location: Containment	Operating Time	Note 3 Continuous	Continuous		2,3	Test	Simultaneous Note 2
	Tempera-ture °F	288°F	320°F	1	2,3	Simultaneous Test	Note 2
	Pressure PSIg	60 psig	75.3 psig	1	2,3	Simultaneous Test	Note 2
	Relative Humidity %	100%	100%	1	2,3	Simultaneous Test	Note 2
	Chemical Spray	1700 ppm Boric Acid	1% Boric Acid by WT	1	3	Simultaneous Test	Note 2
	Radiation	$3x10^7R$	$5x10^7R$	1	4	Material Analysis	Note 2
	Aging	N/A	Note 1	N/A	Note 1	Note 1	Note 2
Flood Level Elev: 1000.9' Above Flood Level: Note 2	Submer-gence	N/A	Note 2	N/A	Note 2	Note 2	Note 2

Documentation References:
1) Enclosure #1.
2) Fisher controls LAB report #4 Project 71AR19.
3) Franklin Institute Report #F-C3279.
4) See Enclosure #8.
5) See RTV 3145 Clear

Notes:
1) See Enclosure #12.
2) Splices Reported to the NRC under LER 80-006. Splices coated with RTV 3145 clear for qualification.
3) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Electrical Equipment Item No.: Cable Splices at 480V-Cont. Vent Fans	Operating Time	Note 3 Continuous	Continuous	-	2	Analysis	Material Note 2
	Tempera-ture °F	288°F	288°F	1	2	Material Analysis	Note 2
Component: N/A	Pressure PSIg	60 PSIg	60 PSIg	1	2	Material Analysis	Note 2
Manufacturer: N/A							
Model No.: N/A	Relative Humidity %	100%	100%	1	2	Material Analysis	Note 2
Function: Feeder Cables for Cont. Vent Fans	Chemical Spray	1700 ppm Boric Acid	1700 ppm Boric Acid	1	2	Material Analysis	Note 2
Accuracy - Spec: N/A Demon: N/A Service: 480V Power for containment vent fans	Radiation	1.92×10^7	1×10^8R	1	2	Material Analysis	Note 2
Location: Containment	Aging	N/A	Note 1	N/A	Note 1	Note 1	Note 2
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submer-gence	N/A	N/A	N/A	N/A	N/A	Note 2

Documentation References:
1) Enclosure #1.
2) Enclosure #9.

Notes:
1) See Enclosure 12
2) OPPD is currently investigating the possibility of conducting Loca tests or replacement of existing splices with new ones utilizing Loca tested splice materials.
3) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Electrical Equipment Item No.: Containment vent fan motor lead splices at the electrical penetrations Component: N/A Manufacturer: N/A Model No.: N/A Function: Motor leads for containment vent fans Accuracy - Spec: N/A Demon: N/A Service: See function Location: Containment	Operating Time	Note 4 Continuous	2		2	2	Note 1
	Temperature °F	288°F	2	1	2	2	Note 1
	Pressure PSIg	60 psig	2	1	2	2	Note 1
	Relative Humidity %	100%	2	1	2	2	Note 1
	Chemical Spray	1700 ppm Boric Acid	2	1	2	2	Note 1
	Radiation	Note 2	2,3	1	2	2	Note 1
	Aging	N/A	2	N/A	2	2	Note 1
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submer-gence	N/A	N/A	N/A	N/A	N/A	Note 1

Documentation References:
1) Enclosure #1.
2) See RTV 3145 Clear.
3) Table C1 79-01B

Notes:
1) Splices consist of GE-IRRASIL Tape - Silicone rubber outer cover with a threshold of 10^6R and GE-IRRATHENE SPT Tape - EPR component with a 10^7 resistant inner cover. Overall is RTV. This should be adequate for a 1.92×10^7R dose.
4) See Enclosure 18. EPR should provide adequate insulation and IRRASIL and RTV provide protection.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Electrical Equipment Item No.: Terminal blocks	Operating Time	Note 4 Continuous	8 days	1	2	Simultaneous Test	NONE
	Tempera-ture °F	288°F	340°F	1	2	Simultaneous Test	NONE
Component: 4,6,8 & 12 Point Blocks Manufacturer: States	Pressure PSIg	60 PSIg	up to 103 PSIg	1	2	Simultaneous Test	NONE
Model No.: M-25014, M-25016 M-25018, M-25112 Function: Control & Instrument terminations	Relative Humidity %	100%	100%	1	2	Simultaneous Test	NONE
	Chemical Spray	1700 ppm Boric Acid	1700 ppm Boric Acid	1	3	Engineering Analysis	NONE
Accuracy - Spec: N/A Demon: N/A Service: Misc. Systems Location: Containment & Balance of Plant	Radiation	Note 3	2.2×10^7 R	1	3	Engineering Analysis	NONE
	Aging	N/A	Note 2	N/A	Note 2	Note 2	NONE
Flood Level Elev: 1000.9' Above Flood Level: No	Submer-gence	NONE	Yes	NONE	Note 1	Note 1	NONE

Documentation References:

1) Enclosure #1.
2) General Electric letter from Mr. J. F. Sherk to Mr. R. Kroll of Metropolitan Edison Company Dated October 10, 1978 (for additonal similar reference, refer to IE Bulletin 79-01 response submittal for Crystal River #3, Florida Power & Light & Three Mile Island Units 1 & 2, Metro Edison)
3) "Radiation Effects on States NT-TYPE Terminal Blocks" Material Analysis - See Enclosure #10)

Notes:

1) All terminal blocks in use within the reactor containment in safety related circuits have been completely sealed with Dow-Corning RTV-3144 sealer
2) See Enclosure #12.
3) Worst case 3×10^7. The District feels qualification is adequate. Terminal blocks are passive devices.
4) See Enclosure 18.

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EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Electrical Equipment Item No.: Terminal boxes	Operating Time		Note 1	Note 1	Note 1	Note 1	NONE
	Temperature °F	286°F	Note 1	1	Note 1	Note 1	NONE
Component: Sheet Steel Boxes in various sizes Manufacturer: Hoffman	Pressure PSIg	60 PSIg	Note 1	1	Note 1	Note 1	NONE
Model No.: N/A	Relative Humidity %	100%	Note 1	1	Note 1	Note 1	NONE
Function: Mechanical Protection of terminal blocks & wire terminations.	Chemical Spray	1700 ppm Boric Acid	Note 1	1	Note 1	Note 1	NONE
Accuracy - Spec: N/A Demon: N/A Service: Misc. All systems using terminal boxes	Radiation	5×10^7R	Note 1	1	Note 1	Note 1	NONE
Location: Containment & Aux Bldg	Aging	N/A	Note 1	Note 1	Note 1	Note 1	NONE
Flood Level Elev: 1000.9' Above Flood Level: See Note 2	Submergence	N/A	Note 1	Note 1	Note 1	Note 1	NONE

Documentation References:
1) See Enclosure #1

Notes:
1) Terminal boxes are listed for reference only. While terminal boxes are gasketed and dripproof and will provide protection from direct sprays, the box is not required to ensure integrity of electrical circuits.
2) Some terminal boxes within the containment may be subject to submergence. No credit is taken for the terminal box in this situation.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Electrical Equipment Item No.: W-57 & W-59 Cable Component: N/A Manufacturer: Cerro Wire & Cable Co. (Rockbestos) Model No.: N/A Function: Instrument cable for temp, flow & press indication Accuracy - Spec: N/A Demon: N/A Service: See function Location: Containment & Aux Bldg.	Operating Time	Note 1,3	Note 1	1,2	2	Sequential	NONE
	Temperature °F	286°F	Same as Oper time	1,2	2	Sequential	NONE
	Pressure PSIg	60 PSIg	60 PSIg	1,2	2	Sequential	NONE
	Relative Humidity %	100%	100%	1,2	2	Sequential	NONE
	Chemical Spray	1900 ppm Boric Acid	1900 ppm Boric Acid	1,2	2	Sequential	NONE
	Radiation	Note 2	$2x10^8$R	1,2	2,3,5	Sequential	NONE
	Aging	N/A	40 yrs	N/A	4	4	NONE
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:
1) Contract #765, Pg H2-11 Para 15.08 & Pg H2-3, Para 4.01 of tech. spec No. 2.
2) Qualification, tech spec #2, Cerro Wire & Cable Co. Dated 9/20/71, pg 2 of qualification - Post Containment Environmental Tests.
3) Franklin Institute Research Lab, Report F-C3050 Dated May, 1971.
4) Rockbestos Co. letter dated 5/19/80.
5) Rockbestos Co. letter dated 10/27/80

Notes:
1) 20 minutes at 286°F, 50 minutes at 240°F and continuous at 122°F.
2) Worst case containment $3x10^7$R. Worst case Aux. Bldg. $7x10^6$R.
3) See Enclsure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Electrical Equipment Item No.: W-37,38,39,40,41 42 Cable	Operating Time	Note 1,3	Note 1	1,2	2	[illegible]ential	NONE
	Tempera-ture °F	286°F	Same as Oper time	1,2	2	Sequential	NONE
Component: N/A	Pressure PSIg	60 PSIg	60 PSIg	1,2	2	Sequential	NONE
Manufacturer: Cerro Wire & Cable Co. (Rockbestos) Model No.: N/A	Relative Humidity %	100%	100%	1,2	2	Sequential	NONE
Function: Control & Indication for valves & limit switches	Chemical Spray	1900 ppm Boric Acid	1900 ppm Boric Acid	1,2	2	Sequential	NONE
Accuracy - Spec: N/A Demon: N/A Service: See function	Radiation	See Note 2	$2x10^8$R	1,2	2,3,5	Sequential	NONE
Location: Containment & Aux Bldg	Aging	N/A	40 yrs	N/A	4	4	NONE
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:
1) Contract #765, Pg H2-11 Para 15.08 & Pg H2-3, Para 4.01 of tech. spec No. 2.
2) Qualification, tech spec #2, Cerro Wire & Cable Co. Dated 9/20/71, pg 2 of qualification - Post Containment Environmental Tests.
3) Franklin Institute Research Lab, Report F-C3050 Dated May, 1971.
4) Rockbestos Co. letter dated 5/19/80.
5) Rockbestos Co. letter dated 10/27/80.

Notes:
1) 20 minutes at 286°F, 50 minutes at 240°F and continuous at 122°F.
2) Worst case containment $3x10^7$R. Worst case Aux Bldg $7x10^6$R.
3) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

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EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Electrical Equipment Item No.: W-14,16,17,18,19 & W-21 Cable	Operating Time	Note 2,5	Note 3	1,2	2 (Note 1)	Sequential	NONE
	Tempera-ture °F	286°F	Same as Oper time	1,2	2	Sequential	NONE
Component: N/A Manufacturer: Cerro Wire & Cable Co. (Rockbestos) Model No.: N/A	Pressure PSIg	60 PSIg	60 PSIg	1,2	2	Sequential	NONE
	Relative Humidity	100%	100%	1,2	2	Sequential	NONE
Function: Power cable to Misc. vv motors & pumps	Chemical Spray	2,00 ppm Boric Acid	1900 ppm Boric Acid	1,2	2	Sequential	NONE
Accuracy - Spec: N/A Demon: N/A Service: See function	Radiation	Note 4	$2x10^8$	1,2	2,3	Sequential	NONE
Location: Containment & Aux Bldg	Aging	N/A	40 yrs	N/A	4	4	NONE
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Contract #765, Pg H2-11 Para 15.08 & Pg H2-3, Para 4.01 of tech. spec No. 2.
2) Qualification, tech spec #2, Cerro Wire & Cable Co. Dated 9/20/71, pg 2 of qualification - Post Containment Environmental Tests.
3) Franklin Institute Research Lab, Report F-C3050 Dated May, 1971.
4) Rockbestos Co. letter dated 5/19/80.
5) Rockestos Co. letter dated 10/27/80.

Notes:

1) Cable is certified for continuous duty at rated current to a max. ambient temp of 122°F. The cable is rated to operate at an emergency overload temp of 240° F for 100 hours/yr or up to 500 hours over the cable life and exhibited no degradation to cable insulation when tested at 286°F.
2) 20 minutes at 286°F, 50 minutes at 240° and continuous at 122°F.

Notes: (Continued)

3) Greater than 20 minutes at 286°F, 500 hours at 240°F and continuous at 120°F.
4) Containment Worst case $3x10^7$R, Aux Bldg. Worst case $7x10^6$R.
5) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Electrical Equipment Item No.: W10 Cable	Operating Time	Note 2,4	Note 3	1,2	2 (Note 1)	Sequential	NONE
	Tempera-ture °F	286°F	Same as Oper time	1,2	2	Sequential	NONE
Component: N/A Manufacturer: Cerro Wire & Cable Co. (Rockbestos) Model No.: N/A	Pressure PSIg	60 PSIg	60 PSIg	1,2	2	Sequential	NONE
	Relative Humidity %	100%	100%	1,2	2	Sequential	NONE
Function: Power cable	Chemical Spray	1900 ppm Boric Acid	1900 ppm Boric Acid	1,2	2	Sequential	NONE
Accuracy - Spec: N/A Demon: N/A Service: Cont.vent. & CLG fans,	Radiation	1.92×10^7	2×10^8R	1,2	2,3,5	Sequential	NONE
Location: Containment	Aging	N/A	40 yrs	N/A	4	4	NONE
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Contract #765, Pg H2-11 Para 15.08 & Pg H2-3, Para 4.01 of tech. spec No. 2.
2) Qualification, tech spec #2, Cerro Wire & Cable Co. Dated 9/20/71, pg 2 of qualification - Post Containment Environmental Tests.
3) Franklin Institute Research Lab, Report F-C3050 Dated May, 1971.
4) Rockbestos Co. letter dated 5/19/80.
5) Rockbestos letter dated 10/27/80.

Notes:

1) Cable is certified for continuous duty at rated current to a max. ambient temp of 122°F. The cable is rated to operate at an emergency overload temp of 240° F for 100 hours/yr or up to 500 hours over the cable life and exhibited no degradation to cable insulation when tested at 286°F.
2) 20 minutes at 286°F, 50 minutes at 240°F and continuous at 122°F.
3) Greater than 20 minutes at 286°F, 500 hours at 240°F and continuous at 120°F.
4) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

C-12A

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Electrical Equipment Item No.: W10 Cable	Operating Time	Note 2,4	Note 3	1,2	2 (Note 1)	Sequential	NONE
	Temperature °F	109°F	Same as Oper time	1,2	2	Sequential	NONE
Component: N/A	Pressure PSIg	NA	60 PSIg	1,2	2	Sequential	NONE
Manufacturer: Cerro Wire & Cable Co. (Rockbestos) Model No.: N/A	Relative Humidity %	100%	100%	1,2	2	Sequential	NONE
Function: Power cable	Chemical Spray	1900 ppm Boric Acid	1900 ppm Boric Acid	1,2	2	Sequential	NONE
Accuracy - Spec: N/A Demon: N/A Service: Cont.vent. & CLG fans,	Radiation	$7x10^6$	$2x10^8$R	1,2	2,3,5	Sequential	NONE
Location: Containment	Aging	N/A	40 yrs	N/A	4	4	NONE
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Contract #765, Pg H2-11 Para 15.08 & Pg H2-3, Para 4.01 of tech. spec No. 2.
2) Qualification, tech spec #2, Cerro Wire & Cable Co. Dated 9/20/71, pg 2 of qualification - Post Containment Environmental Tests.
3) Franklin Institute Research Lab, Report F-C3050 Dated May, 1971.
4) Rockbestos Co. letter dated 5/19/80.
5) Rockbestos letter dated 10/27/80.

Notes:

1) Cable is certified for continuous duty at rated current to a max. ambient temp of 122°F. The cable is rated to operate at an emergency overload temp of 240° F for 100 hours/yr or up to 500 hours over the cable life and exhibited no degradation to cable insulation when tested at 286°F.
2) 20 minutes at 286°F, 50 minutes at 240°F and continuous at 122°F.
3) Greater than 20 minutes at 286°F, 500 hours at 240°F and continuous at 120°F.
4) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Electrical Equipment Item No.: W-3 Cable Component: TRIPLEXED, 1/C-2/0 5KV power cable Manufacturer: Anaconda Wire & Cable Co. Model No.: N/A Function: Power cable Accuracy - Spec: N/A Demon: N/A Service: Lo Press Saf. Inj. PPs & Aux FW pp. Location: Aux. Bldg.	Operating Time	Continuous at 122°F	Note 1,3	1	2,4,6	Sequential Test	NONE
	Tempera-ture °F	109°F	Note 2 212°F	1	2,4,6	Sequential Test	NONE
	Pressure PSIg	NA	113 PSIg	1	2,4,6	Sequential Test	NONE
	Relative Humidity %	100%	100%	1	2,4,6	Sequential Test	NONE
	Chemical Spray	NA	3000 ppm Boron pH 10.5	1	2,4,6	Sequential Test	NONE
	Radiation	$3x10^6$R	$3x10^6$R	1	2,3,4,6	Sequential Test	NONE
	Aging	N/A	40 year	N/A	5	5	NONE
Flood Level Elev: N/A Above Flood Level: Yes	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:
1) Enclosure #1
2) Anaconda certificate of compliance and Test report #12779 as revised, 9/17/71.
3) Franklin Institute Research Labs F-C3033, April, 1971
4) Anaconda letter dated 9/16/71
5) Anaconda letter dated 5/23/80.
6) Franklin Institute Research Labs F-C4350-3, July 1976.

Notes:
1) Cable has been LOCA qualified but has been installed outside the containment. Cable is required to operate in the LPSI pp rooms at an ambient of 122°F, 100% RH and 10^4 RADS/HR.
2) LOCA Test 346°F - 212°F 30 days.
3) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: High Pressure Safety Injection system Item No.: SI-2A, SI-2B & SI-2C	Operating Time	Continuous Note 3	Continuous	NONE	4	Engineering Analysis	NONE
	Temperature °F	109°F	122°F	1	4	Engineering Analysis	NONE
Component: Motor Manufacturer: GE Model No.: 5K815524A51	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	100%	100%	1	3	Type and see note 1	NONE
Function: High Pressure safety Injection pumps	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
Accuracy - Spec: N/A Demon: N/A Service: High Pressure safety Injecton. Location: Room 21& 22 (HPSI)	Radiation	$7x10^6$R	$1x10^7$R	2	5	Type Test	NONE
	Aging	N/A	Note 2	N/A	Note 2	Note 2	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering Study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) GE Instruction Bulletin GEH-6160E
4) GE application brochure GEZ-6211 and letter from GE Motor and Gen. Dept. to OPPD dated 2/6/78.
5) GE Study for OPPD P.O. 47462

Notes:

1) Enclosure is drip proof and moisture will not condense on windings when operating.
2) See Enclosure 12.
3) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

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EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: High Pressure Safety Injection System Item No.: FT 313, FT 316, FT 319, FT 322 Component: Flow Transmitters Manufacturer: Foxboro Model No.: E13DH Function: Flow transmitters HPSI Loops 1A,1B, 2A,2B Accuracy - Spec: N/A Demon: N/A Service: HPSI Flow Indication Location: Containment	Operating Time	Note 4 Continuous	Continuous	1	2,3	Synergistic	NONE
	Tempera-ture °F	288°F	318°F	1	2,6	Synergistic	NONE
	Pressure PSIg	60 PSIg	90 PSIg	1	2,6	Synergistic	NONE
	Relative Humidity %	100%	100%	1	2,6	Synergistic Note 2	NONE
	Chemical Spray	1700 ppm Boric Acid	1700 ppm Boric Acid	1	3,6	Material Analysis	NONE
	Radiation	Note 3 3.3×10^7	2.2×10^8R	1	4	Separate Test	NONE
	Aging	N/A	Note 1	N/A	Note 1	Note 1	NONE
Flood Level Elev: 1000.9' Above Flood Level: No	Submer-gence	Yes	Yes	N/A	5	Separate Test	NONE

Documentation References:
1) Enclosure #1.
2) Foxboro Co. Test Report No. Q9-6005 April 1971
3) Foxboro Co. Test Report No. T3-1013
4) Foxboro Co. Test Report No. T3-1068 August 1973
5) Foxboro Co. Test Report No. T4-6061
6) Foxboro Letter certifying similarity.

Notes:
1) See Enclosure #12.
2) See Enclosure #7 Footnote No. 2
3) 1000HR dose 3.3×10^7R using DOR Guide-line homogram to correct initial hour dose of 3×10^6R/HR
4) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: High Pressure Safety Injection Item No.: HCV-2914,2934,2954, 2974 Component: Motor Operated valve & limit switch Manufacturer: Limitorque Model No.: SMB-0 Function: Open on SIAS for HPSI to Loop 1A,1B,2A,2B Accuracy - Spec: N/A Demon: N/A Service: High Press Saf. Inj. Location: Containment.	Operating Time	Note 1	Note 1	Note 1	2,4	Sequential Test	NONE
	Tempera-ture °F	288°F	325°F	1	2	Sequential Test	NONE
	Pressure PSIg	60 PSIg	90 PSIg	1	2	Sequential Test	NONE
	Relative Humidity %	100%	100% R.H.	1	2	Sequential Test	NONE
	Chemical Spray	1700 ppm Boric Acid	1700 ppm Boric Acid	1	2	Sequential Test	NONE
	Radiation	$3x10^6$R	$2x10^7$R	1	3	Seq.Test & Material Analysis	NONE
	Aging	N/A	40 yrs	N/A	2	Sequential Test	NONE
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:
1) Enclosure 1.
2) Franklin Institute Research Lab: #F-C2232-01
3) Limitorque Corporation Test Lab: #B-0003 & Letter dated March 26, 1979.
4) Safety injection valves in service testing - surveilance test ST-ISI-SI-1

Notes:
1) HCV-2914, 2934,2954,2974 are normally open and locked open. They do not operate after an event.

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SYSTEM COMPONENT EVALUATON WORK SHEET

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EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: High pressure safety Injection Item No.: HCV-311, 312, 314, 315, 317, 318, 320, & 321 Component: Motor Operator Manufacturer: Limitorque Model No.: SMB-0 Function: High Pressure InJection Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Containment	Operating Time	Note 1,2	Note 1	Note 1	2	Sequential Test	NONE
	Temperature °F	288°F	325°F	1	2	Sequential Test	NONE
	Pressure PSIg	60 psig	90 psig	1	2	Sequential Test	NONE
	Relative Humidity %	100%	100%RH	1	2	Sequential Test	NONE
	Chemical Spray	1700 ppm Boric Acid	1700 ppm Boric Acid	1	2	Sequential Test	NONE
	Radiation	9.49×10^6	2×10^7R	1	3	Test & Analysis	NONE
	Aging	N/A	40 yrs	N/A	2	Sequential Test	NONE
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submergence	Note 1	N/A	N/A	N/A	N/A	NONE

Documentation References:
1) Enclosure #1.

Notes:
1) Valves are located in sector F,H,I,J,L, in Containment

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: High Pressure Safety Injection Item No.: HCV-383-3, 383-4 Component: Motor Operated valve & limit switch Manufacturer: Limitorque Model No.: SMB-0 Function: Open on (RAS) to provide suction to HPSI,LPSI & spray pps. Accuracy - Spec: N/A Demon: N/A Service: Containment sump recir to HPSI,LPSI & cont spray Location: Containment	Operating Time	Note 1	Note 1	Note 1	2	Sequential Test	NONE
	Temperature °F	225°F	250°F	1	2	Sequential Test	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	100%	100%	1	2	Sequential Test	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	Note 3	$2x10^7$R	1	2	Sequential Test	NONE
	Aging	N/A	40 yrs	N/A	2	Sequential Test	NONE
Flood Level Elev: 1000.9' Above Flood Level: Note 2	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) For temperature See "Sump Water Temperature"- Enclosure 1, Figure 1. For Radiation, See "Implementation Methods & Schedules for Nureg - 0578" Section 2.1.6b Page 16, 100% Humidity is assumed as a worst case possibility.
2) Limitorque Corporation Test Lab: #B-0003.

Notes:

1) HCV-383-3 & HCV-383-4 are required to open to provide suction to HPSI pumps after SIRWT tank inventory is exhausted. This occurs approximately 20 minutes into the event, & stroke time is 10 seconds.
2) HCV-383-3 &4 are located outside the containment in TK-SI9 & TK-SI-10. They are physically separated by the containment wall from the inside of the containment. TK-SI-9 & 10 are considered an extension of containment for isolation only. TK-SI-9 & 10 are not subject to flooding or containment Loca conditions.
3) See Enclosure 13.

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SYSTEM COMPONENT EVALUATON WORK SHEET

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EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: High Pressure Safety Injection Item No.: HCV-304 and 305 Component: Solenoid Valve Manufacturer: Automatic Switch Company Model No.: HTX 831429 Function: Valve actuators for High Pressure Safety Injections Header isolation valves. Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Room 21 (SI Pumps)	Operating Time	Note 5 1000 hrs	Note 2	Note 2	Note 2	Note 2	NONE
	Temperature °F	109°F	Note 3	1	3	Type Test	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	100%	100%	1	3	Type Test	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	7×10^6 R	Note 1	2	4	Material Analysis	NONE
	Aging	N/A	Note 4	N/A	Note 4	Note 4	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) ASCO Catalog #30 pages 82 and 83.
4) ASCO Catalog #30 page 37.

Notes:

1) Material Analysis 5×10^6 R
2) Valves are locked open and do not operate during an event. The valve is expected to function adequately for long term core cooling. See Enclosure 14.
3) Rated at 176°F for U.L. applications, rated rated at 212°F for non U.L. applications.
4) See Enclosure 12.
5) See Enclosure 18.

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SYSTEM COMPONENT EVALUATION WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: High Pressure Safety Injection Item No.: HCV-304 and 305	Operating Time	Note 4 1000 hrs.	Note 2	Note 2	Note 2	Note 2	NONE
	Temperature °F	109°F	194°F	1	3	Type Test	NONE
Component: Limit Switch	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
Manufacturer: NAMCO	Relative Humidity %	100%	100%	1	3	Type Test	NONE
Model No.: D2400X Function: Position Indication for HCV-304 & 305	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
Accuracy - Spec: N/A Demon: N/A Service: HPSI pp DISCH HDR ISOL vv Pos.Ind. Location: Room 21 (SI Pumps)	Radiation	7×10^6 R	Note 1	2	4	Material Analysis	NONE
	Aging	N/A	Note 3	N/A	Note 3	Note 3	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) NAMCO Controls General Catalog Series EA-79 Page 3.
4) NAMCO Controls Letter Dated March 11, 1980.

Notes:

1) Material Analysis 10^5 R
2) Even though the radiation exceeds the gasket limiting material the limit switch is not expected to fail and impede the operation of the valve. See Enclosure 14.
3) See Enclosure 12.
4) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: High Pressure Safety Injection system Item No.: LCV-383-1 LCV-383-2	Operating Time	1000 hrs. Note 4	Note 2	Note 2	Note 2	Leakage tests Note 2	NONE
	Temperature °F	109°F	176°F	1	3	Factory data UL listing	NONE
Component: Solenoid	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
Manufacturer: Automatic Switch Co.							
Model No.: HTX831429	Relative Humidity %	100%	100%	1	3	Type test (NEMA STD)	NONE
Function: SIRWT Discharge line to spray & safety Injection pump	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
Accuracy - Spec: N/A Demon: N/A	Radiation	$7x10^6$R	Note 1	2	4	Material Analysis	NONE
Service: Closes on RAS signal to realign HPSI pp suction to sump Location: Room 21 (HPSI)	Aging	N/A	Note 3	N/A	Note 3	Note 3	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) ASCO Catalog #30 pages 82 and 83.
4) ASCO Catalog #30 page 37.

Notes:

1) Material Analysis $5x10^6$ R
2) LCV-383-1 & 2 are required to close on receipt of a RAS signal. This occures 20 minutes into the event. Vv's close in 10 seconds. In addition, check vv's are provided to ensure proper operation. These Solenoids are expected to remain functional during the long term core cooling. See Enclosure 14
3) See Enclosure 12.
4) See Enclosure 18.

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SYSTEM COMPONENT EVALUATION WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: High Pressure Safety Injection Item No.: LCV-383-1 LCV-383-2 Component: Limit Switch Manufacturer: Micro Switch Model No.: OP-AR7112 Function: Pos Ind for SIRWT Discharge valves. Accuracy - Spec: N/A Demon: N/A Service: LCV-383-1 & 2 Pos. Ind. Location: Room 21 (HPSI)	Operating Time	Note 5 1000 hrs	Note 4	Note 4	Note 4	Note 4	NONE
	Temperature °F	109°F	160°F	1	4	Manufacturers Data	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	100%	100%	1	3	Eng Anal Note 1	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	7×10^6 R	Note 2	2	3	Material Analysis	NONE
	Aging	N/A	Note 3	N/A	Note 3	Note 3	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979)
3) Microswitch cat #100 "Type OP enclosed switches"
4) Memo - Lakeland Eng. to R. Mehaffey February 27, 1980.

Notes:

1) The OP switch is sealed in a rugged cast aluminum housing, cover & shaft. Seals keep out moisture & other contamination. The radiation limit on the limit switch is not expected to impede valve function.
2) Material Analysis 10^6R.
3) See Enclosure #12.
4) See Enclosure #14.

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SYSTEM COMPONET EVALUATION WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: High Pressure Safety Injection Item No.: HCV-2918 and 2928	Operating Time	Note 5 1000 hrs.	Note 2	Note 2	Note 2	Note 2	NONE
	Temperature °F	109°F	Note 3	1	3	Type Test	NONE
Component: Solenoid Valve	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
Manufacturer: Automatic Switch Company Model No.: HT 8321A5	Relative Humidity %	100%	100%	1	4	Type Test	NONE
Function: Valve actuators for SI-2A & SI-2C discharge isolation valves. Accuracy - Spec: N/A Demon: N/A Service: See Function	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	7×10^6 R	Note 1	2	4	Material Analysis	NONE
Location: Room 21 (SI Pumps)	Aging	N/A	Note 4	N/A	Note 4	Note 4	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) ASCO Catalog #30 pages 82 and 83.
4) ASCO Catalog #30 page 40.

Notes:

1) Qualified for service per ASCO Evaluation Engineering Job 67,446.
2) Valves are locked open and do not operate during an event. See Enclosure 14.
3) Rated at 176°F for U.L. applications, rated at 212°F for non U.L. applications.
4) See Enclosure 12.
5) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: High Pressure safety Injection Item No.: HCV-2918 and 2928 Component: Limit Switch Manufacturer: NAMCO Model No.: D1200G Function: Position Indication for HCV-2918 and 2928 Accuracy - Spec: N/A Demon: N/A Service: SI-2A & 2C DISCH LINE Isolation vv Pos.Ind. Location: Room 21 (SI Pumps)	Operating Time	Note 4 1000 hrs	Note 2	Note 2	Note 2	Note 2	NONE
	Temperature °F	109°F	194°F	1	3	Type Test	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	100%	100%	1	3	Type Test	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	7×10^6 R	Note 1	2	4	Material Analysis	NONE
	Aging	N/A	Note 3	N/A	Note 3	Note 3	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) NAMCO Controls General Catalog Series EA-79 Page 3.
4) NAMCO controls letter dated March 11, 1980.

Notes:

1) Material Analysis 10^5 R
2) Valves are locked open and operate during an event. See Enclosure 14.
3) See Enclosure 12.
4) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: High Pressure Safety Injection Item No.: HCV-2907 Component: Solenoid Valve Manufacturer: Automatic Switch Company Model No.: LB 8316C44 Function: Valve actuators for SI-2B inlet isolation valve. Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Room 22 (SI Pumps)	Operating Time	Note 5 1000 hrs	Note 2	Note 2	Note 2	Note 2	NONE
	Temperature °F	109°F	248°F	1	3	Type Test	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	100%	100%	1	Note 3	Eng Anal Note 3	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	7×10^6 R	Note 1	2	4	Material Analysis	NONE
	Aging	N/A	Note 4	N/A	Note 4	Note 4	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) ASCO "Numerical Listing of Solenoid Valves" page 1.
4) ASCO Catalog #30 page 41.

Notes:

1) Qualified for service per ASCO Evaluation Engineering Job 67,446.
2) Valves are locked open and do not operate during an event. See Enclosure 14.
3) Solenoids are housed in a general purpose enclosure which will prevent condensation on the inside of the switch.
4) See Enclosure 12.
5) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCKIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: High Pressure Safety Injection	Operating Time	Note 5 1000 hrs	Note 2	Note 2	Note 2	Note 2	NONE
Item No.: HCV-2908	Tempera-ture °F	109°F	Note 3	1	3	Type Test	NONE
Component: Solenoid Valve	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
Manufacturer: Automatic Switch Company							
Model No.: HT 8321A5	Relative Humidity %	100%	100%	1	4	Type Test	NONE
Function: Valve actuator for SI-2B discharge isolation valve.	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
Accuracy - Spec: N/A							
Demon: N/A	Radiation	$7x10^6$R	Note 1	2	4	Material Analysis	NONE
Service: See Function							
Location: Room 22 (SI Pumps)	Aging	N/A	Note 4	N/A	Note 4	Note 4	NONE
Flood Level Elev: N/A							
Above Flood Level:	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) ASCO Catalog #30 pages 82 and 83.
4) ASCO Catalog #30 page 40.

Notes:

1) Qualified for service per ASCO Evaluation Engineering Job 67,446.
2) Valves are locked open and do not operate during an event. See Enclosrue 14.
3) Rated at 176°F for U.L. applications, rated at 212°F for non U.L. applications.
4) See Enclosure 12.
5) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: High Pressure Safety Injection system Item No.: HCV-2907 & 2	Operating Time	Note 5 1000 hrs.	Note 2	Note 2	Note 2	Note 2	NONE
	Temperature °F	109°F	*160°F	1	3	Mfg's Data	NONE
Component: Limit Switch	Pressure PSIa	N/A	N/A	N/A	N/A	N/A	NONE
Manufacturer: Micro Switch Model No.: 51ML1	Relative Humidity %	100%	100%	1	3	Eng Anal Note 3	NONE
Function: Position Indication for HCV-2907 & 2908	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
Accuracy - Spec: N/A Demon: N/A	Radiation	7×10^6 R	Note 1	2	Note	Material Analysis	NONE
Service: Pos Ind. for SI PP 2B Isolation vv's Location: Room 22 (SI Pumps)	Aging	N/A	Note 4	N/A	Note 4	Note 4	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) Micro Switch Catalog 100 issue 2 Page C25.
4) Memo - Lakeland Eng. to R. F. Mehaffey 2/27/80

* 160°F from MICRO Switch

Notes:

1) Material Analysis 10^6R
2) Valves are locked open and not operate during an event. See Enclosure 14.
3) Micro Switch type 51ML1 are fully sealed switches rated Nema 4.
4) See Enclosure 12.
5) See Enclosure 18

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SYSTEM COMPONENT EVALUATION WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: High Pressure Safety Injection Item No.: HCV-2917 and 2927 Component: Solenoid Valve Manufacturer: Automatic Switch Company Model No.: LB 8316C44 Function: Solenoid valves for SI-2A & SI-2C inlet isolation valves. Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Room 21 (SI Pumps)	Operating Time	Note 5 1000 hrs	Note 2	Note 2	Note 2	Note 2	NONE
	Temperature °F	109°F	248°F (Coil Deenergized)	1	3	Type Test	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	100%	100%	1	Note 3	Eng Anal Note 3	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	7×10^6 R	Note 1	2	4	Material Analysis	NONE
	Aging	N/A	Note 4	N/A	Note 4	Note 4	NONE
Flood Level Elev: N,A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) ASCO "Numerical Listing of Solenoid Valves" page 1.
4) ASCO Catalog #30 page 41.

Notes:

1) Qualified for service per ASCO Evaluation Engineering Job 67,446.
2) Valves are locked open and do not operate during an event. See Enclosure 14.
3) Solenoids are housed in a general purpose enclosure which will prevent condensation on the inside of the switch.
4) See Enclosure 12.
5) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: High Pressure Safety Injection system Item No.: HCV-2917 & 2927	Operating Time	Note 5	Note 2	Note 2	Note 2	Note 2	NONE
	Temperature °F	109°F	*160°F	1	3	Manufacturers Data	NONE
Component: Limit Switch	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
Manufacturer: Micro Switch Model No.: 51ML1	Relative Humidity %	100%	100%	1	3	Eng Anal (Note 3)	NONE
Function: Position Indication for HCV-2917 & 2927	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
Accuracy - Spec: N/A Demon: N/A Service: Pos IND for SI PP 2A & 2C Isolation vv's Location:Room 21 (SI Pumps)	Radiation	$7x10^6$R	Note 1	2	Note 2	Material Analysis	None
	Aging	N/A	Note 4	N/A	Note 4	Note 4	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:
1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) Micro Switch Catalog 100 issue 2 Page C25.
4) Memo - Lakeland Eng. to R. F. Mchaffey 2/27/80.
* 160°F from MICRO Switch

Notes:
1) Material Aalysis 10^6R
2) Valves are locked open and do not operate during an event. See Enclosure 14
3) Micro Switch type 51ML1 are fully sealed switches rated Nema 4.
4) See enclosure 12
5) See Enclosure 18

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: High Pressure Safety Injection Item No.: HCV-308 Component: Motor Operated Valve and Limit Switch Manufacturer: Limitorque Model No.: SMB-000 Function: Motor Operated Charging System inlet vv to HPSI Header Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Room 13	Operating Time	1000 hrs Note 2	Note 1	1	Note 1	Note 1	NONE
	Temperature °F	N/A	N/A	N/A	N/A	N/A	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	N/A	N/A	N/A	N/A	N/A	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	$4x10^6$R	$2x10^7$R	1	2	Test	NONE
	Aging	N/A	40 yrs.	N/A	2	2	NONE
Flood Level Elev: NA Above Flood Level:	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References.

1. "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6B Page 17, Figure 4.2.2 (December 1979).
2. Limitorquie Corp. Test Lab: #B-0003 & Letter dated March 26, 1979.

Notes:

1. See Enclosure #14.
2. See Enclosure #18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: High Pressure Safety Injection Item No.: HCV349, HCV350	Operating Time	1000 HR	Note 1	Note 1	Note 1	Note 1	NONE
	Tempera-ture °F	NA	NA	NA	NA	NA	NONE
Component: Solenoid Valve	Pressure PSIg	NA	NA	NA	NA	NA	NONE
Manufacturer: ASCO Model No.: WP-HT-831429	Relative Humidity %	NA	NA	NA	NA	NA	NONE
Function: Pilot Operator	Chemical Spray	NA	NA	NA	NA	NA	NONE
Accuracy - Spec: N/A Demon: N/A Service: See Function	Radiation	$4x10^6$R	$5x10^6$	2	1	Material Analysis	NONE
Location: Room 13	Aging	Note 2	Note 2	Note 2	Note 2	Note 2	NONE
Flood Level Elev: N/A Above Flood Level: Yes	Submer-gence	NA	NA	NA	NA	NA	NONE

Documentation References:

1. ASCO letter July 30, 1980
2. Implementation method & schedule NUREG-0578 Section 2.1.6B

Notes:

1. See Enclosure #18
2. See Enclosure #12

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: High Pressure Safety Injection Item No.: HCV349, HCV350 Component: Limit Switch Manufacturer: Fisher Control Co. Model No.: 304 Function: Position Indication Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Room 13	Operating Time	1000 HR	Note 1	Note 1	Note 1	Note 1	NONE
	Temperature °F	NA	NA	NA	NA	NA	NONE
	Pressure PSIg	NA	NA	NA	NA	NA	NONE
	Relative Humidity %	NA	NA	NA	NA	NA	NONE
	Chemical Spray	NA	NA	NA	NA	NA	NONE
	Radiation	$4x10^6R$	10^6	1	NA	Material Analysis	NONE
	Aging	Note 2	Note 2	Note 2	Note 2	Note 2	NONE
Flood Level Elev: N/A Above Flood Level: Yes	Submer-gence	NA	NA	NA	NA	NA	NONE

Documentation References:

1. Implementation method & schedules for NUREG-0578 Section 2.1.6B

Notes:

1. See Enclosure #18
2. See Enclosure #12

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Facility: Fort Calhoun 1
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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Low Pressure Safety Injection Item No.: SI-1A, & SI-1B	Operating Time	Continuous Note 3	Continuous	NONE	4	Engineering Analysis	NONE
	Tempera-ture °F	109°F	122°F	1	4	Engineering Analysis	NONE
Component: Motor Manufacturer: GE	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
Model No.: 5K818837A38	Relative Humidity %	100%	100%	1	3	Type and See note 1	NONE
Function: Low Press Safety Injection pump 1A	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
Accuracy - Spec: N/A Demon: N/A Service: Low pressure Safety Inj	Radiation	$7x10^6$	$1x10^7$R	2	5	Type Test	NONE
Location:Room 21 & 22 (HPSI)	Aging	N/A	Note 2	N/A	Note 2	Note 2	NONE
Flood Level Elev: N/A Above Flood Level:	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident," See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) GE Instruction Bulletin GEH-3160E
4) GE Application Brouchure GEZ-6211 and letter from GE Motor and Gen. Dept. Dated 2/6/78
5) GE study for OPPD PO# 47462.

Notes:

1) Enclosure is drip-proof and moisture will not condense on windings when motor is operating.
2) See Enclosure 12
3) See Enclosure 18

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SYSTEM COMPONENT EVALUATON WORK SHEET

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EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Low Pressure Safety Injection System Item No.: HCV-327,329,331, HCV-3[illegible] Component: Motor operated valves and limit switches Manufacturer: Limitorque Model No.: SMB-0 Function: Open on SIAS for LPSI to Loop 1A,1B,2A,2B Accuracy - Spec: N/A Demon: N/A Service: LO Press SAF.Inj. Location: Containment	Operating Time	Note 1,2	Note 1	Note 1	2,4	Sequential Test	NONE
	Tempera-ture °F	288°F	325°F	1	2	Sequential Test	NONE
	Pressure PSIg	60 PSIg	90 PSIg	1	2	Sequential Test	NONE
	Relative Humidity %	100%	100%	1	2	Sequential Test	NONE
	Chemical Spray	1700 ppm Boric Acid	1700 ppm Boric Acid	1	2	Sequential Test	NONE
	Radiation	9.48×10^6R	2×10^7R	1	3	Sequential Test	NONE
	Aging	N/A	40 yrs	N/A	3	Sequential Test	NONE
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:
1) Enclosure #1.
2) Franklin Institute Research Lab #F-C2232.01
3) Limitorque Corporation Test Lab #B-0003
4) Safety Injection valves inservice testing ST-1SI-SI-1

Notes:
1) Valves are opened immediately after receipt of a safety injection signal - stroke time is 10-12 seconds.
2) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

C-2

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Low Pressure Safety Injection System Item No.: HCV-348 Component: Motor operated valves and limit switches Manufacturer: Limitorque Model No.: SMB-3 Function: Shutdown cooling Line isloaton Accuracy - Spec: N/A Demon: N/A Service: Shutdown Cooling Location: Containment	Operating Time				2,4	Type Test	NONE
	Tempera-ture °F	288°F	325°F	1	2	Type Test	NONE
	Pressure PSIg	60 PSIg	90 PSIg	1	2	Type Test	NONE
	Relative Humidity %	100%	100%	1	2	Type Test	NONE
	Chemical Spray	1700 ppm Boric Acid	1700 ppm Boric Acid	1	2	Type Test	NONE
	Radiation	Note 1	$2x10^7$R	1	3	Type Test	NONE
	Aging	N/A	40 yrs	N/A	3	Type Test	NONE
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:
1) Enclosure #1.
2) Franklin Institute Research Lab #F-C2232.01
3) Limitorque Corporation Test Lab #B-0003

Notes:
1) See Enclosure 13.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Low Pressure Safety Injection	Operating Time	Note 5 1000 hrs	Note 2	Note 2	Note 2	Note 2	NONE
Item No.: HCV-2947 and 2948	Temperature °F	109°F	248°F (Coil Deenergized)	1	3	Type Test	NONE
Component: Solenoid Valve	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
Manufacturer: Automatic Switch Company Model No.: LB 8316C44	Relative Humidity %	100%	100%	1	Note 3	Eng Anal Note 3	NONE
Function: Valve actuators for SI-1A inlet and discharge isolation valves.	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
Accuracy - Spec: N/A Demon: N/A Service: See Function	Radiation	7×10^6 R	Note 1	2	4	Material Analysis	NONE
Location: Room 21 (SI Pumps)	Aging	N/A	Note 4	N/A	Note 4	Note 4	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) ASCO Catalog #30 pages 82 and 83.
4) ASCO Catalog #30 page 40.

Notes:

1) Qualified for service per ASCO Evaluation Engineering Job 67,446.
2) Valves are locked open and do not operate during an event. See Enclosure 14.
3) Rated at 176°F for U.L. applications, rated at 212°F for non U.L. applications.
4) See Enclosure 12.
5) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFI-CATON METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Low Pressure Safety Injection Item No.: HCV-2947 and 2948 Component: Limit Switch Manufacturer: NAMCO Model No.: D1200G Function: Position Indication for HCV-2947 & 2948 Accuracy - Spec: N/A Demon: N/A Service: SI-1A ISOL vv's Pos.Ind. Location: Room 21 (SI Pumps)	Operating Time	Note 4 1000 hrs.	Note 2	Note 2	Note 2	Note 2	NONE
	Temperature °F	109°F	194°F	1	3	Type Test	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	100%	100%	1	3	Type Test	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	7×10^6 R	Note 1	2	4	Material Analysis	NONE
	Aging	N/A	Note 3	N/A	Note 3	Note 3	NONE
Flood Level Elev: N/A Above Flood Level:	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) NAMCO Controls General Catalog Series EA-79 Page 3.
4) NAMCO controls letter dated March 11, 1980.

Notes:

1) Material Analysis 10^5 R
2) Valves are locked open and do not operate during an event. See Enclosure 14.
3) See Enclosure 12.
4) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Low Pressure Safety Injection	Operating Time	Note 5 1000 hrs	Note 2	Note 2	Note 2	Note 2	NONE
Item No.: HCV-2937 and 2938	Temperature °F	109°F	248°F (Coil Deenergized)	1	3	Type Test	NONE
Component: Solenoid Valve	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
Manufacturer: Automatic Switch Company Model No.: LB 8316C44	Relative Humidity %	100%	100%	1	Note 3	Eng Anal Note 3	NONE
Function: Valve actuators for SI-1B inlet and discharge isolation valves.	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
Accuracy - Spec: N/A Demon: N/A Service: See Function	Radiation	$7x10^6$R	Note 1	2	4	Material Analysis	NONE
Location: Room 22 (SI Pumps)	Aging	N/A	Note 4	N/A	Note 4	Note 4	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) ASCO Catalog #30 pages 82 and 83.
4) ASCO Catalog #50 page 40.

Notes:

1) Qualified for service per ASCO Evaluation Engineering Job 67,456.
2) Valves are locked open and do not operate during an event. See Enclosrue 14.
3) Rated at 176°F for U.L. applications, rated at 212°F for non U.L. applications.
4) See Enclosure 12.
5) See Enclosure 18.

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SYSTEM COMPONENT EVALUATION WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Low Pressure Safety Injection Item No.: HCV-2937 and 2938 Component: Limit Switch Manufacturer: NAMCO Model No.: D1200G Function: Position Indication for HCV-2937 & 2938 Accuracy - Spec: N/A Demon: N/A Service: LPSI PP 1B ISOL vv Pos.Ind. Location: Room 22 (SI Pumps)	Operating Time	Note 4 1000 hrs	Note 2	Note 2	Note 2	Note 2	NONE
	Temperature °F	109°F	194°F	1	3	Type Test	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	100%	100%	1	3	Type Test	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	7×10^6	Note 1	2	4	Material Analysis	NONE
	Aging	N/A	Note 3	N/A	Note 3	Note 3	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:
1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) NAMCO Controls General Catalog Series EA-79 Page 3.
4) NAMCO controls Letter Dated March 11, 1980.

Notes:
1) Material Analysis 10^5R
2) Valves are locked open and do not operate during an event. See Enclosure 14
3) See Enclosure 12
4) See Enclosure 18

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Low Pressure Safety Injection Item No.: FCV-326 HCV-341 Component: Solenoid Valve Manufacturer: Automatic Switch Company Model No.: HTX831429 Function: Valve Actuators for Low Pressure Safety Injection Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Room 13	Operating Time	1000 hrs Note 4	Note 1	Note 1	Note 1	Note 1	NONE
	Tempera-ture °F	NA	NA	NA	NA	NA	NONE
	Pressure PSIg	NA	NA	NA	NA	NA	NONE
	Relative Humidity %	NA	NA	NA	NA	NA	NONE
	Chemical Spray	NA	NA	NA	NA	NA	NONE
	Radiation	$4x10^6$R	Note 2	1	2	Material Analysis	NONE
	Aging	NA	Note 3	NA	Note 3	NA	NONE
Flood Level Elev: NA Above Flood Level:	Submer-gence	NA	NA	NA	NA	NA	NONE

Documentation References:

1. "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6B Page 17, Figure 4.2 2 (December 1979).
2. ASCO Catalog #30 Page 37.

Notes:

1. See Enclosure #14.
2. Material Analysis $5x10^6$R
3. See Enclosure #12.
4. See Enclosure #18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Low Pressure Safety Injection Item No.: FCV-326 HCV-341 Component: Limit Switch Manufacturer: Fisher Governor Company Model No.: 304 Function: Position Indicator for Low Pressure Safety Injection vv Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Room 13	Operating Time	1000 hrs	Note 1	Note 1	Note 1	Note 1	NONE
	Tempera-ture °F	NA	NA	NA	NA	NA	NONE
	Pressure PSIg	NA	NA	NA	NA	NA	NONE
	Relative Humidity %	NA	NA	NA	NA	NA	NONE
	Chemical Spray	NA	NA	NA	NA	NA	NONE
	Radiation	$4x10^6$R	Note 2	1	2	Material Analysis	NONE
	Aging	NA	Note 3	NA	Note 3	NA	NONE
Flood Level Elev: NA Above Flood Level:	Submer-gence	NA	NA	NA	NA	NA	NONE

Documentation References:

1. "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6B Page 17, Figure 4.2 2 (December 1979).
2. Fisher Controls Co. Bulletin 62.3:304, December 1974.

Notes:

1. See Enclosure #14.
2. Material Analysis 10^6R
3. See Enclosure #12.
4. See Enclosure #18.

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R1-12

SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Low Pressure Safety Injection Item No.: HCV-347 Component: Motor Operated Valve and Limit Switch Manufacturer: Limitorque Model No.: SMB-2 Function: Motor Operated Shutdown Cooling line isolation valve Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Room 13	Operating Time	1000 hrs Note 2	Note 1	1	Note 1	Note 1	NONE
	Temperature °F	N/A	N/A	N/A	N/A	N/A	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	N/A	N/A	N/A	N/A	N/A	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	$4x10^6$R	$2x10^7$R	1	2	Test	NONE
	Aging	40 yrs.	N/A	N/A	2	2	NONE
Flood Level Elev: NA Above Flood Level:	Submer-gence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1. "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6B Page 17, Figure 4.2.2 (December 1979).
2. Limitorquie Corp. Test Lab: #B-0003 & Letter dated March 26, 1979.

Notes:

1. See Enclosure #14.
2. See Enclosure #18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Low Pressure Safety Injection Item No.: FCV-326 HCV-341 Component: Electro-Pneumatic Transducer Manufacturer: Fisher Governor Company Model No.: 546 Function: Position Signal for Low Pressure Safety Injection valve Accuracy - Spec: N/A Demon: N/A Service: See Function Location: Room 13	Operating Time	1000 hrs Note 4	Note 1	Note 1	Note 1	Note 1	NONE
	Temperature °F	NA	NA	NA	NA	NA	NONE
	Pressure PSIg	NA	NA	NA	NA	NA	NONE
	Relative Humidity %	NA	NA	NA	NA	NA	NONE
	Chemical Spray	NA	NA	NA	NA	NA	NONE
	Radiation	4×10^6 R	Note 2	1	2	Material Analysis	NONE
	Aging	NA	Note 3	NA	Note 3	NA	NONE
Flood Level Elev: NA Above Flood Level:	Submer-gence	NA	NA	NA	NA	NA	NONE

Documentation References:

1. "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6B Page 17, Figure 4.2-2 (December 1979).
2. Fisher Controls Co. Bulletin 13.1:546, December 1976.

Notes:

1. See Enclosure #14.
2. Material Analysis 10^6R. The E/P is expected to be operable for long term cooling.
3. See Enclosure #12.
4. See Enclosure #18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

S-12

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Main Steam Item No.: MS-291, 292	Operating Time	Note 1 Intermittent	cycles	1	2	Type Test	NONE
	Temperature °F	216°F	300°F	1	2	Type Test	NONE
Component: Solenoid Manufacturer: Valcor	Pressure PSIg	1.2 PSIg	60 PSIg	1	2	Type Test	NONE
Model No.: P/N-V70900-21-3 S/N-528	Relative Humidity %	100%	100%	1	2	Type Test	NONE
Function: Main Steam Safety Relief valve operator	Chemical Spray	N/A	3000 PPM Boric Acid	N/A	N/A	N/A	NONE
Accuracy - Spec: N/A Demon: N/A Service: See Function	Radiation	N/A	$1x10^8$ R	N/A	N/A	N/A	NONE
Location: Room 81	Aging	N/A	40 yr	N/A	2	Type Test	NONE
Flood Level Elev: 1037'-4" Above Flood Level: Yes	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) See Enclosure #2.
2) See Report dated November 22, 1977, Rev A Dated June 16, 1978 Title IEEE 323 qualification test report on V70900-21-1 and V70900-21-3. A copy of this report is on file with Valcor Engineering Corporaton. See letter Dated May 17, 1979 from Valcor to Mr. Merl Core of OPPD. VALCOR Exhibit S1410, S1411. These are to be replaced under IE Bulletin 80-23.

Notes:

1. The main steam safeties can be used as an alternate path of decay heat removal using the Aux Feed System and the steam generators. See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Main Steam Item No.: MS-291, 292	Operating Time	Note 4 Continuous	Continuous	N/A	N/A	Note 1	NONE
	Temperature °F	216°F	180°F	1	2 Note 1	Eng Anal Note 1	NONE
Component: Limit Switch Manufacturer: Fisher Controls	Pressure PSIg	1.2 PSIg	Min of 2.6 PSIg	1	2 Note 2	Type Test (NEMA STD)	NONE
Model No.: Type 304	Relative Humidity %	100%	100%	1	2	Type Test Note 2	NONE
Function: Position indication for Main Steam safety relief valve Accuracy - Spec: N/A Demon: N/A Service: See Function	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	N/A	N/A	N/A	N/A	N/A	NONE
Location: Room 81	Aging	N/A	Note 3	N/A	Note 3	Note 3	NONE
Flood Level Elev: 1037'-4" Above Flood Level: Yes	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:
1) See Enclosure #2.
2) Fisher Controls Bulletin 62.3:304

Notes:
1) Limit Switch functions to provide indication only. Switch is designed to operate continuously at 180°F. For the short time the Room-81 temp is 216°F no damage will occur.
2) Based on a watertight enclosure rated to not leak at a static head of 6 foot of water.
3) See Enclosure #12.
4) See Enclosure 18.

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SYSTEM COMPONENT EVALUATON WORK SHEET

I-29

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Raw Water	Operating Time	Note 5 1000 hrs	Note 2	Note 2	Note 2	Note 2	NONE
Item No.: HCV-2809C,2809D,2811C, 2811D,2814C,2814D,2815C,2815D	Temperature °F	109°F	Note 3	1	3	Type Test	NONE
Component: Solenoid Valve	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
Manufacturer: Automatic Switch Company							
Model No.: WPHT 831429	Relative Humidity %	100%	100%	1	3	Type Test	NONE
Function: Valve actuators for inlet & outlet valves for SI & spray pumps bearing coolers.	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
Accuracy - Spec: N/A Demon: N/A	Radiation	$7x10^6$R	Note 1	2	4	Material Analysis Type Test	NONE
Service: See Function							
Location: Room 22 (SI Pumps)	Aging	N/A	Note 4	N/A	Note 4	Note 4	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) ASCO Catalog #30 pages 82 and 83.
4) ASCO Catalog #30 page 37.

Notes:

1) Material Analysis $5x10^6$R: ISOMEDIX Report AQS-21678 $4x10^6$.
2) Valves are locked open and do not operate during an event. See Enclosure 14.
3) Rated at 176°F for U.L. applications, rated at 212°F for non U.L. applications.
4) See Enclosure 12.
5) See Enclosure 18.

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SYSTEM COMPONENT EVALUATION WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Raw Water System Item No.: HCV-2809C,2809D,2811C, 2811D,2814C,2814D,2815C,2815D Component: Limit Switch Manufacturer: Fisher Governor Company Model No.: 304 Function: Position Indication Accuracy - Spec: N/A Demon: N/A Service: Raw Water sys valve Position Indication Location: Room 22 (HPSI)	Operating Time	Note 4 1000 hrs	Note 2	Note 2	Note 2	Note 2	NONE
	Temperature °F	109°F	180°F	1	3	Type Test	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	100%	100%	1	3	Type Test	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	7×10^6 R	Note 1	2	3	Material Analysis	NONE
	Aging	N/A	Note 3	N/A	Note 3	Note 3	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) Fisher Controls Co. Bulletin 62.3:304, December 1974.

Notes:

1) Material Analysis 10^6 R
2) See Enclosure 14.
3) See Enclosure 12.
4) See Enclosure 18.

Facility: Fort Calhoun 1
Docket No.: 50-285

SYSTEM COMPONENT EVALUATON WORK SHEET

I-28

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Raw Water	Operating Time	Note 5 1000 hrs	Note 2	Note 2	Note 2	Note 2	NONE
Item No.: HCV-2808C,2808D,2810C, 2810D,2812C,2812D,2813C,2813D	Temperature °F	109°F	Note 3	1	3	Type Test	NONE
Component: Solenoid Valve	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
Manufacturer: Automatic Switch Company							
Model No.: WPHT 831429	Relative Humidity %	100%	100%	1	3	Type Test	NONE
Function: Valve actuators for inlet & outlet valves for SI & spray pumps bearing coolers.	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
Accuracy - Spec: N/A Demon: N/A	Radiation	7×10^6 R	Note 1	2	4	Material Analysis Type Test	NONE
Service: See Function							
Location: Room 21 (SI Pumps)	Aging	N/A	Note 4	N/A	Note 4	Note 4	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) ASCO Catalog #30 pages 82 and 83.
4) ASCO Catalog #30 page 37.

Notes:

1) Material Analysis 5×10^6R: ISOMEDIX Report AQS-21678 4×10^6
2) Valves are locked open and do not operate during an event. See Enclosure 14
3) Rated at 176°F for U.L. applications, rated at 212°F for non U.L. applications.
4) See Enclosure 12.
5) See Enclosure 18.

Facility: Fort Calhoun 1
Docket No.: 50-285

SYSTEM COMPONENT EVALUATION WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Raw Water System Item No.: HCV-2808C,2808D,2810C, 2810D,2812C,2812D,2813C,2813D Component: Limit Switch Manufacturer: Fisher Governor Company Model No.: 304 Function: Position Indication for Raw Water valves Accuracy - Spec: N/A Demon: N/A Service: Raw Water sys valve Position Indication Location: Room 21 (HPSI)	Operating Time	1000 hrs. Note 4	Note 2	Note 2	Note 2	Note 2	NONE
	Temperature °F	109°F	180°F	1	3	Type Test	NONE
	Pressure PSIg	N/A	N/A	N/A	N/A	N/A	NONE
	Relative Humidity %	100%	100%	1	3	Type Test	NONE
	Chemical Spray	N/A	N/A	N/A	N/A	N/A	NONE
	Radiation	7×10^6 R	Note 1	2	3	Material Analysis	NONE
	Aging	N/A	Note 3	N/A	Note 3	Note 3	NONE
Flood Level Elev: N/A Above Flood Level:	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:

1) Combustion Engineering study "Evaluation of Fort Calhoun Safety Injection Pump Room Temperature following a Loss of Coolant Accident, "See OPPD letter to the NRC dated 9/6/79.
2) "Implementation Methods and Schedules for NUREG-0578" Section 2.1.6b Page 16 Figure 4.2-1 (December 1979).
3) Fisher Controls Co. Bulletin 62.3:304, December 1974.

Notes:

1) Material Analysis 10^6 R
2) See Enclosure 14.
3) See Enclosure 12.
4) See Enclosure 18.

Facility: Fort Calhoun 1
Docket No.: 50-285

SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON REF.		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Reactor Coolant System Item No.: A/B/C/D PT-102	Operating Time	Note 1	Note 1	N/A	2	Test & Analysis	NONE
	Temperature °F	288°F	318°F	1	2,5	Simultaneous Test	NONE
Component: Pressure Transmitter	Pressure PSIg	60 PSIg	90 PSIg	1	2,5	Simultaneous Test	NONE
Manufacturer: Foxboro Model No.: E11GM	Relative Humidity %	100%	100%	1	2,5	Simultaneous Test	NONE
Function: Presurizer Pressure Transmitters	Chemical Spray	1700 ppm Boric Acid	1700 ppm Boric Acid	1	3,5	Mat Anal Note 2	NONE
Accuracy - Spec: 5% Demon: 4% Service: See Function	Radiation	1.3×10^7 R	2.2×10^8 R	1	4	Separate Test	NONE
Location: Containment	Aging	N/A	Note 3	N/A	Note 3	Note 3	NONE
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:
1) Enclosure #1.
2) Foxboro Company Test Report No. Q9-6005 April, 1971
3) Foxboro Company Test Report No. T3-1013
4) Foxboro Company Test Report No. T3-1068 August, 1973
5) Foxboro letter certifying similarity.

Notes:
1) 1000 hrs continuous
2) See Enclosure 7, Footnote #2.
3) See Enclosure #12.
4) Worst case Radiation on containment level for 1000 hours.

Facility: Fort Calhoun 1
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SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Specification	Qualification	Specification	Qualification		
System: Reactor Coolant System Item No.: Pressurizer Heaters	Operating Time	Note 2 Continuous	Note 1	1	Note 1	Note 1	Eng Anal NONE
	Temperature °F	288°F	Note 1	1	Note 1	Eng Anal Note 1	NONE
Component: Pressurizer Heaters	Pressure PSIg	60 PSIg	Note 1	1	Note 1	Eng Anal Note 1	NONE
Manufacturer: E. L. Wiegand Co.	Relative Humidity %	100%	Note 1	1	Note 1	Eng Anal Note 1	NONE
Model No.: Cartridge Heater	Chemical Spray	1700 ppm Boric Acid	Note 1	1	Note 1	Eng Anal Note 1	NONE
Function: Controls pressurizer Pressure	Radiation	$3x10^6$R	Note 1	1	Note 1	Eng Anal Note 1	NONE
Accuracy - Spec: N/A Demon: N/A Service: See Function	Aging	N/A	40 yr	N/A	Note 1	Mat. Anal.	NONE
Location: Containment							
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submergence	N/A	N/A	N/A	N/A	N/A	NONE

Documentation References:
1) Enclosure #1.

Notes:
1) Heater operates in an environment of 600°F maximum which is far greater than containment maximum temperature. Connection materials are either solid brass, steel or copper and are located beneath the pressurizer which protects them from containment spray.
2) See Enclosure 18.
3) Required only if RCS remains pressurized for natural circulation. Not used in large break LOCA where pressurizer is emptied.

Facility: Fort Calhoun 1
Docket No.: 50-285

C-150

SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Reactor Coolant Item No.: HCV-150, HCV-151	Operating Time	Note 1	Note 1	1	1	Sequential	NONE
	Tempera-ture °F	Note 1	250°F	1	1	Sequential	NONE
Component: Valve Operator Manufacturer: Limitorque	Pressure PSIg	Note 1	25 psig	1	1	Sequential	NONE
Model No.: SMB00	Relative Humidity %	Note 1	100%	1	1	Sequential Test	NONE
Function: PORV Isolation	Chemical Spray	Note 1 1700 ppm	Note 2	Note 2 1	Note 2 1	Note 2	NONE
Accuracy - Spec: N/A Demon: N/A Service: See Function	Radiation	Note 1 1.92×10^7	2x10R	1	1	Sequential Test	NONE
Location: Containment	Aging	Note 1	40 yrs	1	1	Sequential Test	NONE
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submer-gence	N/A	N/A	N/A	N/A	N/A	N/A

Documentation References:
1) Limitorque Corp Test B0003

Notes:
1) See Enclosure 18.
2) The motor and limit switches are totally enclosed. Chemical spray should not effect operation.

6-113a

R1 12/12/80

Facility: Fort Calhoun 1
Docket No.: 50-285

SYSTEM COMPONENT EVALUATON WORK SHEET

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATON		QUALIFI-CATION METHOD	OUTSTAND-ING ITEMS
	Parameter	Specifi-cation	Qualif-cation	Specifi-cation	Qualifi-cation		
System: Reactor Coolant Item No.: PCV-102-1, PCV-102-2 Component: Power Operated Relief valve Manufacturer: Dresser Order No.: 30-58448-0 Function: Reactor Pressure Protection Accuracy - Spec: N/A Demon: N/A Service: See Function Location:	Operating Time	Note 1	Note 2				Note 3
	Temperature °F	Note 1	Note 2				Note 3
	Pressure PSIg	Note 1	Note 2				Note 3
	Relative Humidity %	Note 1	Note 2				Note 3
	Chemical Spray	Note 1	Note 2				Note 3
	Radiation	Note 1	Note 2				Note 3
	Aging	Note 1	Note 2			Sequential	Note 3
Flood Level Elev: 1000.9' Above Flood Level: Yes	Submer-gence	N/A	N/A	N/A	N/A	N/A	N/A

Documentation References:
1) Enclosure 2.

Notes:
1) See Enclosure 18.
2) See Enclosure 19.
3) See Enclosure 13.

ENCLOSURE #11

RADIATION LEVELS

1.	Sector A + A'	6.06×10^5R
2.	Sector B	7.50×10^5R
3.	Sector C + C'	6.06×10^5R
4.	Sector D	1.01×10^6R
5.	Sector E	9.90×10^5R
6.	Sector F + G	1.12×10^6R
7.	Sector G + H	1.09×10^6R
8.	Sector H + I	1.36×10^6R
9.	Sector I + J	1.05×10^6R
10.	Sector J + K	1.05×10^6R
11.	Sector K + L	9.49×10^5R
12.	Sector M	1.02×10^6R
13.	Sector N	9.90×10^5R
14.	Sector O	1.92×10^6R
15.	F	5.3×10^5R
16.	G	5.1×10^5R
17.	H	6.06×10^5R
18.	I	8.225×10^5R
19.	J	6.07×10^5R
20.	K	4.74×10^5R
21.	L	4.87×10^5R

ENCLOSURE 13

OUTSTANDING ITEMS

1. See enclosure 20 regarding cable splices. This item will be completed during the 1981 refueling outage and the results forwarded to the NRC by January 15, 1982.

2. The aging program will be fully implemented by June 1982.

3. Radiation data for HCV348, HCV-383-3 and HCV-383-4 is being refined for long term cooling. This information will be supplied to the NRC by March 15, 1981.

4. FT-236 will be replaced with a qualified transmitter by the end of the 1981 refueling outage.

5. Work on the analysis of the PORV qualification will be completed and forwarded to the NRC by May 1, 1981.

6. As part of the District's continuing investigation of cable splices and the cold shutdown work for IE Bulletin 79-01B, some question has been raised concerning the documentation of the radiation effects on the Teflon seals and pigtails of Fort Calhoun low voltage power, control and instrument penetrations. The penetration vendor, the Conax Corporation, supplied the District with their report, IPS-435, which summarized the testing of Teflon penetrations and indicated qualification to the District Specifications. However, recent discussions with the manufacturer indicated that at present no supporting evidence for the report summary can be located. A materials test information review by the District and its consultant, Wyle Laboratories, has yielded limited evidence to substantiate this testing.

   To resolve this issue, the District has initiated a records search with the vendor, Conax Corporation, to locate any supporting evidence and clarify all organic materials used in the penetrations. This should be completed by March 1, 1981.

7. The qualification of HCV 233 and HCV 239 is still under review. The information will be supplied to the NRC by March 1, 1981. (This information will be supplied as page 5-4a).

ENCLOSURE 15

Inclusion of NUREG 0578 Equipment

Supplement No. 2 to IE Bulletin 79-01B directs that equipment to be installed under NUREG 0578 be included as part of the electrical equipment qualification submittal. The District will not be able to provide this information to meet the requirements of IE Bulletin 79-01B.

The District is presently in the design and procurement phase of the 0578 category B items. The equipment has not been delivered and no test reports are available. In addition, some of the equipment is presently being qualified and thus not available. The installed category A items either did not require qualification, are presently being qualified, or are in a state of qualification upgrade to the latest standards.

Based on the above discussion, it would be extremely difficult to provide a master list of components since some designs are still being finalized and bids being let. In addition, little, if any, supporting documents could be provided which would permit an SER on that equipment.

The District is well aware of the importance of the qualification of electrical equipment with regard to the 0578 installations. Every effort is being made to insure the qualification of all equipment which must be accident qualified as defined in 0578.

It is the District's intention to supplement the present 79-01B submittal with an 0578 equipment package when all designs are finalized and all documentation is available for audit by the District. The following table provides the schedule which the District presently feels it can meet in providing the Commission with the Lessors Learned documentation.

Table 1

LESSONS LEARNED QUALIFICATION SCHEDULE

II.D.3	PORV Safety Valve Position Indication, June 30, 1981
II E.1.2	Auto Initiation of Auxiliary Feedwater, November 30, 1981
II.F.2	Containment Pressure, November 30, 1981
III.D.1.1	Sump Level, January 30, 1982
II.G.1	Pressurizer Level, November 30, 1981
II.B.2	SI Pump Leakage Detection System, January 30, 1982
II.F.1	Containment High Radiation Monitors, March 30, 1981
	Containment Hydrogen Monitor, February 28, 1982
II.B.1	Reactor Coolant Vent, February 28, 1982

ENCLOSURE 18

LONG TERM CORE COOLING

The long term core cooling for Fort Calhoun Station is based on the equipment required in EP-5, EP-5A, and EP-5B emergency procedures. Also included are the required supporting auxiliaries which are located in the harsh environment.

The EPs operator guidance is based on primary system pressure. Above 700 psia the heat removal path is that of the steam generators with a backup using the pressurizer power operated relief valves. Below 700 psia, the high pressure safety injection and auxiliary pressurizer spray line are used for long term core cooling. In addition, the shutdown cooling (low pressure safety injection and cold leg suction) and containment spray are included to insure reactor shut down.

The environmental parameters for the equipment remain as outlined in Enclosures 1, 11, and 14. The only change made was the use throughout of a 1000 hour radiation dose. As explained in Enclosure 14, the 1000 hours represents the primary dose contribution time, with little increase expected beyond this value.

Since the same source terms were used throughout this investigation, the "Dose Correction For Time Required To Remain Functional" nomogram of the DOR Guidelines was used to adjust the dose for submerged equipment in the containment. The auxiliary building was reported with the 1000 hour numbers.

Table 1 is an index of the equipment required in the EPs. Table 2 is a tabulation of the required supporting electrical equipment. These tables may then be cross referenced to the master list in Enclosure 4.

It is expected that long term core cooling will be initiated approximately 24 hours following an accident. The District feels the discussions made in Enclosure 14 are still valid, even though the radiation levels will continue to remain at the post accident levels.

Note, the steam generator heat removal path requires the auxiliary feedwater system. This system is being installed and upgraded as part of Lessons Learned and will be submitted with that information.

Table 1

Long Term Core Cooling Equipment List

Equipment	Master List Location
RCS Below 700 PSIA	
SI Pump Rm Sumps - TMI Lessons Learned	
HCV383-1	4-56
HCV383-2	4-56
HCV383-3	4-57
HCV383-4	4-57
HCV349	4-58
HCV350	4-58
HCV385	4-58
HCV386	4-58
HCV308	4-50
HCV312	4-51
HCV314	4-50
HCV315	4-50
HCV317	4-50
HCV320	4-50
HCV321	4-51
FI313	4-59
FI316	4-59
FI319	4-59
FI322	4-59
HCV305	4-49
SI-2A	4-48
SI-2B	4-48
SI-2C	4-49
HCV341	4-65
HCV347	4-64
HCV348	4-65
HCV238	4-3
HCV239	4-4
HCV240	4-4
HCV480	4-13
HCV481	4-14
HCV484	4-13
HCV485	4-14
HCV482A	4-78
HCV483A	4-78
HCV482B	4-78
HCV483B	4-78
LCV218-3	4-9
EIP344	4-30
EIP345	4-30
HCV344	4-30
HCV345	4-30
Above 700 PSIA	
Aux. Feedwater - TMI Lessons Learned Installation	
MS-291	4-68
MS-292	4-68
PCV-102-1	4-92
PCV-102-2	4-92
HCV150	4-92
HCV151	4-92
Low Pressure Safety Injection	
SI-1A	4-62
SI-1B	4-62
Containment Spray	
SI-3A	4-28
SI-3B	4-28
SI-3C	4-29

Table 2

Support Equipment

Equipment	Master List Location	Equipment	Master List Location
HCV2917	4-49	HCV2814A	4-18
HCV2927	4-48	HCV2814B	4-18
HCV2907	4-48	HCV2815A	4-18
HCV2908	4-49	HCV2815B	4-18
HCV2957	4-28	HCV2808C	4-79
HCV2958	4-28	HCV2808D	4-79
HCV2967	4-28	HCV2810C	4-80
HCV2968	4-28	HCV2810D	4-80
HCV2977	4-29	HCV2812C	4-81
HCV2978	4-29	HCV2812D	4-81
HCV2937	4-62	HCV2813C	4-81
HCV2938	4-63	HCV2813D	4-81
HCV2918	4-49	HCV2809C	4-79
HCV2928	4-48	HCV2809D	4-79
HCV2947	4-62	HCV2811C	4-80
HCV2948	4-62	HCV2811D	4-80
HCV327	4-64	HCV2814C	4-82
HCV329	4-63	HCV2814D	4-82
HCV331	4-64	HCV2815C	4-82
HCV333	4-64	HCV2815D	4-82
HCV2914	4-52	AC3A	4-10
HCV2934	4-53	AC3B	4-10
HCV2954	4-53	AC3C	4-10
HCV2974	4-53	APT-102	4-91
HCV2808A	4-15	BPT-102	4-91
HCV2808B	4-15	CPT-102	4-91
HCV2810A	4-16	DPT-102	4-91
HCV2810B	4-16	Pressurizer Heaters	4-90
HCV2812A	4-17	Cable Splices	4-47
HCV2812B	4-17	Penetration Splices	4-47
HCV2813A	4-17	RTV3145	4-47
HCV2813B	4-17	Terminal Blocks	4-47
HCV2809A	4-15	Terminal Boxes	4-47
HCV2809B	4-15	Electrical Cables	4-43, 4-44 4-45, 4-46
HCV2811A	4-16		
HCV2811B	4-16	Penetrations	4-47
FT-342	4-57		
FT-343	4-57		

ENCLOSURE 19

POWER OPERATED RELIEF VALVES
PORV BLOCK VALVES
PRESSURIZER HEATERS

The Power Operated Relief Valves and motor operated PORV Block Valves are to be used for long term cooling only, in the event the steam generators are not available and the reactor coolant system is above 700 psia. Under the conditions described above, the containment atmosphere will be much less severe. The pressure in containment would not go much above the 4.5 psig initiation pressure of the spray. The sprays would maintain a low pressure and temperature in containment.

The block valves have been tested (see the work sheet) to parameters which exceed the expected containment conditions. Present information indicates the PORV solenoids use a Kapton insulation and are coated with a glyptol moisture barrier. The Kapton insulation is the same as used in the containment ventilation fans. The District is continuing its investigation of these solenoids, see Enclosure 13.

Flow indication will be provided by acoustic monitors which are being LOCA qualified as part of the Lessons Learned program.

The pressurizer heaters are being used in conjunction with the steam generators to maintain natural circulation. As in the PORV case, the environment is expected to be less severe and more likely to be normal. The heaters can only be used when inventory in the pressurizer can be maintained.

The heaters have no moving parts and are presently designed to provide a heat gradient from the approximately 600°F pressurizer to the connection of the cable. With the protective boot, effects of spray and steam are remote.

The District feels the PORVs, block valves, and pressurizer heaters should be adequated to shut down the unit, if needed.

Attachment 20

Cable Splice Evaluation

In its November 1, 1980 submittal regarding IE Bulletin 79-01B, the District committed to providing beta radiation data for cable splices. Attached is the Wyle Laboratories Preliminary Assessment Report on Cable Splices Inside Containment For Fort Calhoun Station Unit No. 1.

The report provides a comprehensive preliminary summary of all harsh environmental parameters, including beta radiation effects.

The report is considered preliminary for two primary reasons. The first is that several assumptions, as listed in the report, were required. It will be necessary to do some in containment verification of the assumptions. The second is that a qualified life/radiation study is still being conducted to determine overall qualification.

The District feels the assumptions made are consistent with available documents and "common plant knowledge" during construction. Based on information in the report, the District feels that continued safe operation is justified. A final report will be issued after verification and evaluation has been completed during the fall 1981 outage.

ANALYSIS REPORT

WYLE LABORATORIES — SCIENTIFIC SERVICES & SYSTEMS GROUP, WESTERN OPERATIONS, NORCO FACILITY

REPORT NO. 26333-02
OUR JOB NO. 26333
CONTRACT
YOUR P. O. NO. 50843

OMAHA PUBLIC POWER DISTRICT
1623 Harney Street
Omaha, NE 68102

Attention: Mr. Robert F. Mehaffey

21-Page Report

DATE 29 January 1981

PRELIMINARY ASSESSMENT REPORT ON

CABLE SPLICES

INSIDE CONTAINMENT

FOR

FORT CALHOUN STATION, UNIT 1

REGISTERED PROFESSIONAL ENGINEER
ERNEST J. GERLOFF
NO. 1,586
NUCLEAR
STATE OF CALIFORNIA

STATE OF CALIFORNIA }
COUNTY OF RIVERSIDE } ss.

_____, being duly sworn, deposes and says: That the information contained in this report is the result of complete and carefully conducted tests and is to the best of his knowledge true and correct in all respects.

_____

SUBSCRIBED and sworn to before me this ____ day of _____, 19____

_____
Notary Public in and for the County of Riverside, State of California

My Commission expires _____, 19____

NUCLEAR ENGINEERING SERVICES DEPARTMENT

PROJECT ENGINEER B. Lim

PROGRAM MANAGER E. Gerloff

DEPARTMENT MGR. G. Shipway

QUALITY CONTROL _____

W-867B

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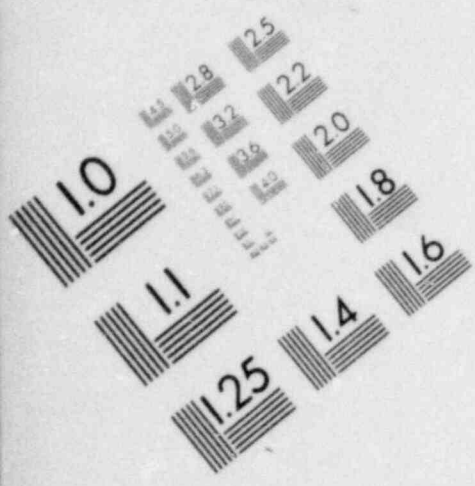

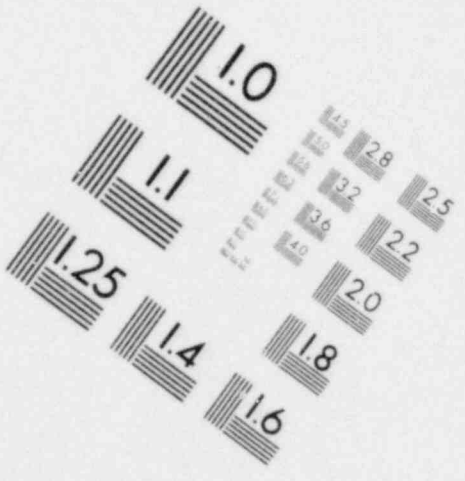

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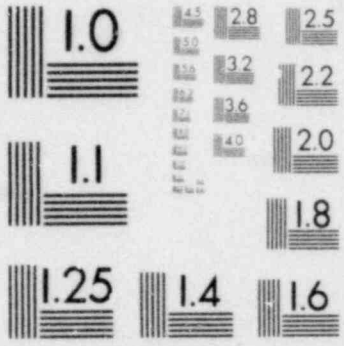
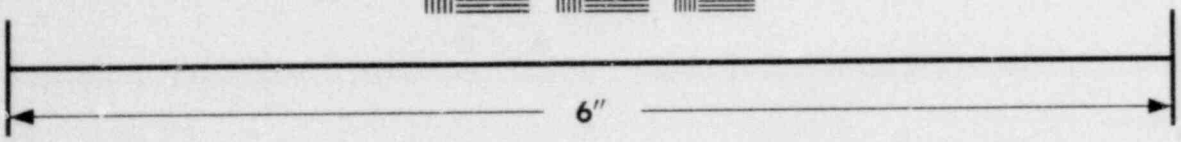
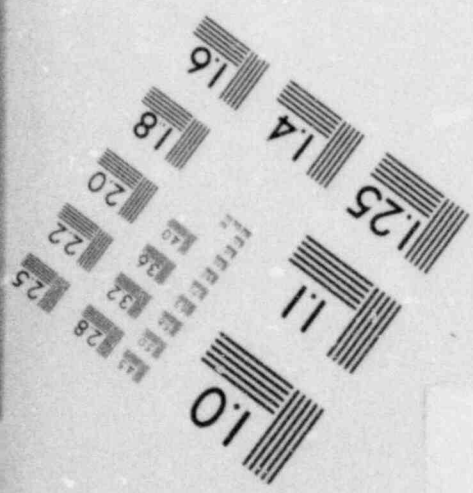
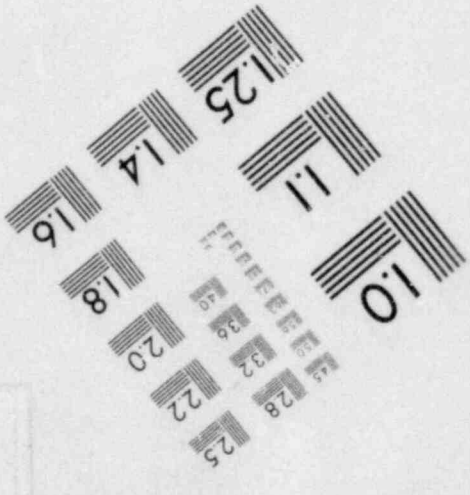
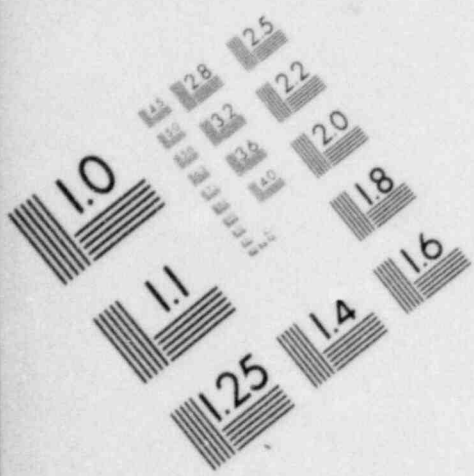










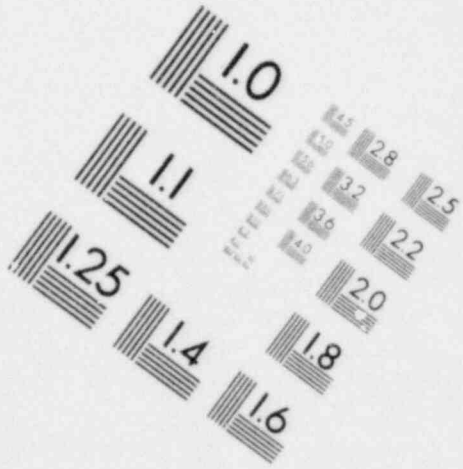
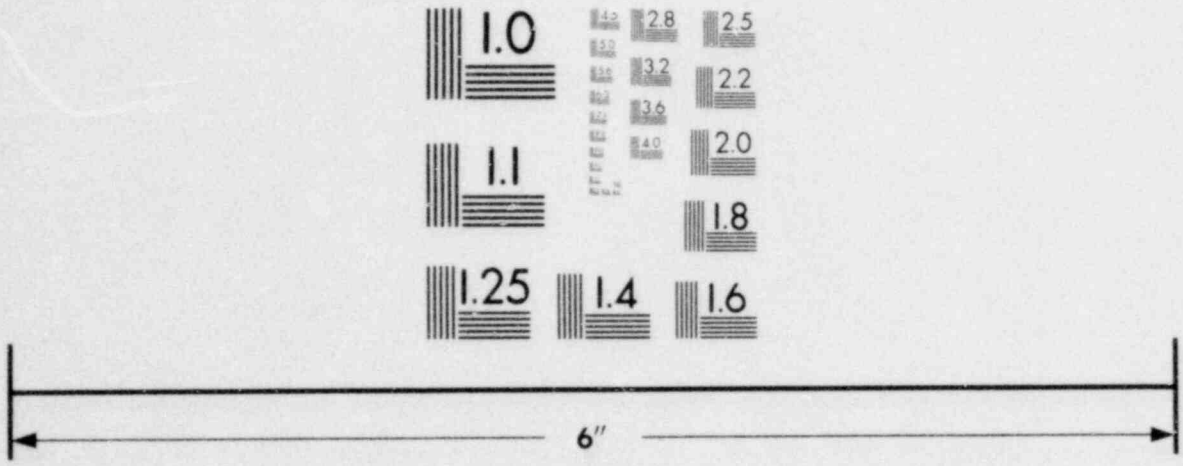
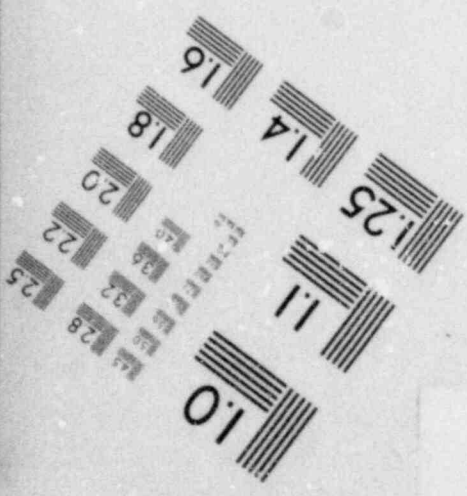
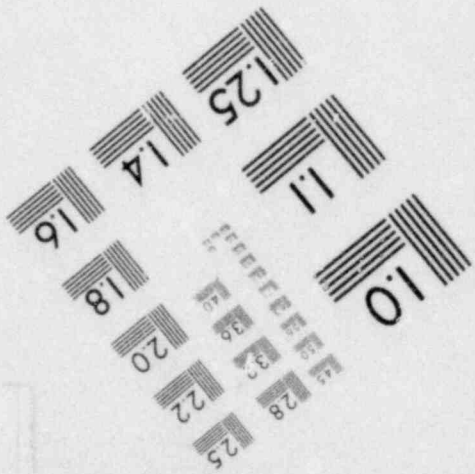


IMAGE EVALUATION TEST TARGET (MT-3)







1.0 PURPOSE

The purpose of this report is to present the Preliminary Engineering Report regarding critical assessment of safety-related cable splices installed in a harsh environment for use in Fort Calhoun Station, Unit 1. This document is prepared by Wyle Laboratories for Omaha Public Power District (OPPD), hereinafter referred to as the District for use in Fort Calhoun Station, Unit 1, under Technical Services Agreement No. 50843.

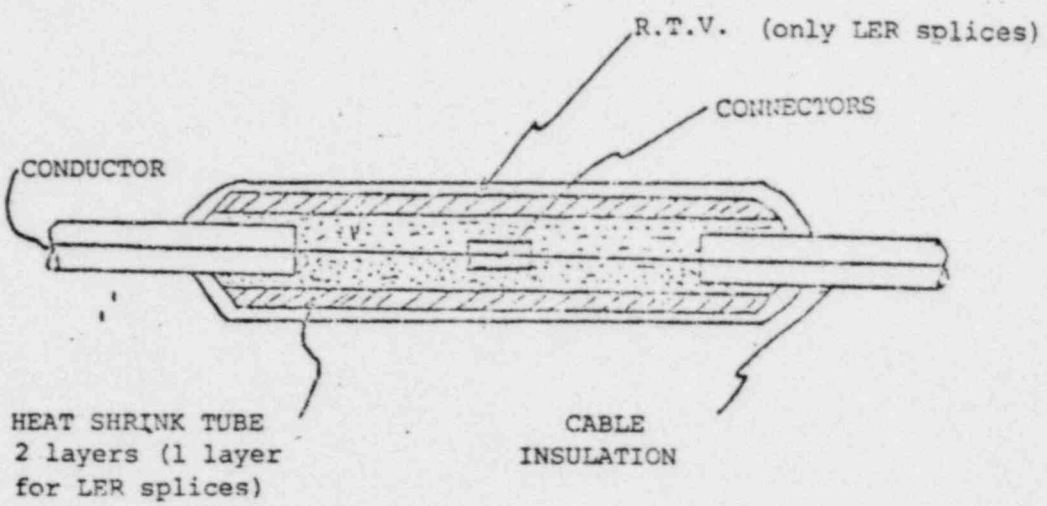
2.0 SUMMARY

Four different types of cable splices at the containment penetration for seven electrical cable sizes inside containment were evaluated. The evaluation reviewed the equipment's safety-related functions, component materials and rating, all environmental parameters including beta radiation effects, and desired qualified life. During the evaluation, extensive discussions took place with personnel from Gibbs Hill, Franklin Research Institute, AMP, Penntube, Dow Corning, Common Wealth and the District. However, this report is considered preliminary for two primary reasons. The first is that several assumptions, as listed in the report, were required. It will be necessary to do some in-containment verification of the assumptions. The second is that a qualified life/radiation study is still being conducted to determine overall qualification. A final report will be issued after verification and evaluation include confirmation of these assumptions.

3.0 EQUIPMENT DESCRIPTION

The subject equipment consists of four types of cable splices for seven (7) types of electrical cables with typical construction illustrated below. For a detailed description of cable splices see Tables 1 and 2 in the Appendix with a more detailed description of one particular splice in Figure 1.

HEAT SHRINK TYPE SPLICE:



3.1 SAFETY-RELATED FUNCTIONS

The safety classification of this equipment is Class 1E. The subject equipment provides essential services in support of emergency reactor shutdown, containment isolation, reactor core cooling, and containment and reactor heat removal, or is otherwise necessary in providing support to prevent significant release of radioactive material into the environment.

3.1 (continued)

The specific safety-related functions of the components are described in the following paragraphs:

- o Cable Splice: provides the electrical paths for safety-related electrical circuits.
- o Insulation: provides the necessary electrical isolations to eliminate unwanted electrical paths.
- o Heat Shrink Tubing: provides a moisture and chemical seal covering the insulation of the cable and connectors. For certain splices, heat shrink tubing is also insulation.
- o RTV Rubber: provides a moisture and chemical barrier covering the heat shrink tubing of the cable splice.

3.2 SERVICE CONDITIONS

Normal Operating Conditions

o Temperature:	46°C (115°F)
o Relative Humidity:	90 ± 5%
o Pressure:	Atmospheric

FSAR Accident Conditions

o Temperature:	Maximum 288°F (142°C)*
o Pressure:	Maximum 60 psig*
o Humidity:	100% Relative Humidity
o Chemical Spray:	Boric Acid Solution (1700 PPM Boron)
o Radiation:	1.36×10^7 rads, gamma (total integrated dose of 40 years plus accident, plus margins)

* see Figure 2

4.0 ASSUMPTIONS

Because of insufficient information in certain areas, it was necessary to make five (5) assumptions. It should be pointed out that in a telephone discussion with the contractors involved with cable splice design, construction, manufacture, and testing, personnel verbally confirmed these assumptions even though the documentation was unavailable. Accordingly, these assumptions need to be confirmed to ensure a credible analysis. However, it should be pointed out that confirming Assumptions 3 and 5 at this time appears to entail an in-site, in-containment inspection and verification process of the selected cable splices at Fort Calhoun.

Assumptions are as follows:

1. Based on recent discussions with the Fort Calhoun Station, Unit 1, architect-engineer, Gibbs Hill, personnel, a similarity analysis had been performed. This analysis, although unavailable, demonstrated that selection of test specimens represented the limiting or worst case test splice for each category of cable splice used inside containment.

2. Two layers of heat shrink tubing were applied per splice in the April 1972 Franklin Tests, Reference 8.

3. Two layers of heat shrink tubing are installed at Fort Calhoun Station, Unit 1.

4. The February 1972 Franklin tests, Reference 7, utilized one layer of heat shrink tubing of which test specimen W-41 failed.

5. The same construction procedures used to make the April 1972 test specimens were used to make the "E" series cable splices inside containment.

5.0 ANALYSIS

The approach for the analysis considers the following issues:

A. Adequacy of test condition

B. Aging Analysis

C. LOCA Analysis

D. Beta Radiation Effects

E. Failure Analysis on Test Data

5.1 ADEQUACY OF TEST CONDITION

The conditions of the test put in section of test exceeded the service conditions specified in Enclosure 1 of the Fort Calhoun sumbittal.

5.2 AGING ANALYSIS

The aging analysis was made using non-metallic materials (Polymeric) considering time/temperature, humidity, and radiation of gamma.

Normal temperature conditions coupled with time create an aging mechanism known as time/temperature effects. As noted in Reference 19, "The Exposure of polymers to the influence of environmental factors over a period of time generally leads to deterioration in physical properties."

The time/temperature effects analysis was performed using Reference 20, Wyle Report, OPPD 26333-03.

The non-metallic materials are listed in Tables 2 and 4.

5.2.1 Time/Temperature Effects

The calculation was performed using Reference 20.

I. D.	NON-METALLIC MATERIALS	AGING TIME	AGING TEMP.	QUALIFIED LIFE
330 323	Polyolefin	100 hours	@ 150°C	40 years @ 46°C
319A	Scotch Tape #70 Bishop Tape #3 Scotch Tape #88 * Scotch Tape #70 RTV Dow Corning #3144	100 hours	@ 130°C	40 years @ 46°C
319B	Irrathane SPT Tape Irrasil Tape * RTV Dow Corning #3145	100 hours	@ 130°C	40 years @ 46°C
323 325 328 330 331	Polyolefin Neoprene	286 hours	@ 120°C	40 years @ 46°C
N/A	R.T.V.	300 hours	@ 150°C	40 years @ 46°C

* Silicone Material Per Manufacturer

5.2.2. Radiation Effects of Gamma

To evaluate radiation effects, the threshold level for radiation induced damage was determined for each element of each component depending on the material of which it was found to be constructed.

In this study Table 4 identifies the material, the threshold level for radiation damage of the material and the reference for establishing the threshold level.

A review of Table 4 indicates all materials are capable of radiation doses in excess of that specified.

5.2.3 Humidity Effects

Relative humidity is not considered an aging mechanism for the subject equipment. For insulation systems, its effect is usually not the primary failure mechanism. As noted in Reference 25, with respect to motor insulations; "However, in most cases, moisture plays only a secondary role in the failure. It does not produce the damage in the insulation; the insulation wears away or cracks for other reasons. Moisture merely provides a direct electrical pathway between these matured devices and ground." Therefore, no humidity effect is considered in this report.

5.3 LOCA ANALYSIS

5.3.1 Time/Temperature Profile

The test data, as shown in Table 3, was adequately qualified for Fort Calhoun Specifications. The results are shown in Table 4.

5.3.2 Chemical Spray

Items 1 and 2 in Table 2 are exempt from analysis. There is no significant effect due to chemical spray because these cable splices are located in an inside conduit and motor junction which has a shielding effect. Items 3 and 4 are only exposed to the containment atmosphere.

Silicone materials are good resistance for strong acid and base per Reference 26. Therefore, it is considered as no significant effect on Boric acid (1700 PPM Boron).

5.4 BETA RADIATION EFFECTS

Items 1 and 2 in Table 2 are exempted from Beta radiation because these cable splices are located in an inside conduit and motor junction which has a shielding effect.

Items 3 and 4 have no significant effect from Beta radiation because of the R.T.V. covering. The entire splice was at least 1/8-inch thick (Reference 27). Since the R.T.V. is 1/8-inch thick, or 125 mils, the Beta dose is reduced by a factor of 1000 (Reference 28). The beta dose is then 2×10^5 rads.

This shielded Beta radiation is less, or equal to ten percent of the cable splices qualified gamma dose, as specified in Table 3 (10^8 rads, gamma).

5.5 FAILURE ANALYSIS ON TEST DATA

The failure analysis was made on the W-59 cable splice by Franklin Laboratories, as specified in Reference 8. The results indicate that it was improperly installed (i.e., the drain wire to the penetration conductor was not covered by any insulation and there was a puncture about 1/16-inch long in the insulation through which the bare No. 16 conductor was visible).

Therefore, it is considered that this cable splice was improperly installed and not considered for material failure.

5.6 TEST SPECIMENS

Considering industry experience regarding cable splice qualification of Assumption 1, it is judged that testing a multi-conductor splice appears to be a more severe condition than testing a single conductor or lesser number of conductors.

6.0 CONCLUSION

The following conclusion was based on the assumption that these cable splices were properly applied.

1. Items proposed to confirm applicable assumptions of Section 4.0:

   a. Inspection and statistical sample of splices takes care of assumptions 2, 3, 4 and 5. (Or have documentation regarding location and type of splice.)

   b. If a and b above do not fully succeed to show two layers, and that W-41 failure may be common mode, then use R.T.V. in the test program on cable splices.

2. Heat shrink tube appears to be a configuration dependent, i.e., shrunk over multi-conductor rather than just cable size dependent.

3. No significant effect on Beta radiation for cable splices because of R.T.V. as shielding effect.

4. Thermal aging and LOCA effects on cable splices were adequately qualified based on materials data as shown in Table 4.

5. Use of R.T.V. appears to be good engineering judgment.

6. W-10 cable splices appear to need further investigation necessary for the qualification because of insufficient data. (See LER 80-007)

7. Further information provided by the District indicates insignificant Beta radiation effects on penetration splices.

APPLICABLE DOCUMENTS

- IE Bulletin No. 79-01B, "Environmental Qualification of Class 1E Equipment," January 14, 1980.
- DOR Guidelines for Evaluating Qualification of Class 1E Electrical Equipment in Operating Reactors, November 13, 1979.
- NUREG-0588, "Staff Position on Environmental Qualification of Safety-Related Electrical Equipment," December, 1979.
- Commission Memorandum and Order No. CLI-8021, May 23, 1980.
- Nuclear Regulatory Commission's letter to Omaha Public Power District, "Environmental Qualification of Electrical Equipment," Docket No. 50-285, August 29, 1980.

REFERENCES

1. Class 1E Qualification of Raychem Splices for Marble Hill Nuclear Generating Station, Units 1 and 2, The Rockbestos Company, New Haven, Conn. 06504, April 14, 1978.

2. IEEE Transactions on Power Apparatus Systems, Volume PAS-88, No. 5, May, 1969.

3. Bowmen, R.E., "How Radiation Affects Engineering Materials," M/DE, No. 173, 7/60, page 131.

4. Bonzon, Lloyd L., "An Experimental Investigation of Synergisms in Class 1 Components Subjected to LOCA Type Tests," NUREG/CR-0275, SAND78-0067 R2, August, 1978.

5. G. E. Wire and Cords - Life Data.

6. Wyle NEQ Report 17435-18, September 24, 1980.

7. Franklin Labs Report F-C3279, February, 1972.

8. Franklin Labs Report F-C3348, April, 1972.

9. Wyle Test Report 58442-1, May 15, 1980.

10. Wyle NEQ Report 17435-9, September 5, 1980.

11. Dow Corning Letter, September 23, 1980.

12. Dow Corning Letter, July 9, 1980.

13. Dow Corning Letter, March 24, 1980.

14. Dall, Frederic C., "Evaluating the Radiation Resistance of Silicone Rubber for Wire and Cable Application," 10th Electrical Insulation Conference, September 20-23, 1971, for Dow Corning Corporation, Midland, Michigan.

15. REIC Report No. 21, September, 1961.

16. Wyle Aging Library, No. 27.-80.

17. REIC Report No. 46, June 16, 1969.

18. Enclosures 8 and 9 of Report on IE Bulletin 79-01B submittal by OPPD, dated April 17, 1980.

REFERENCES (Continued)

19. Leo Reich, et. al., Elements of Polymer Degradation, McGraw-Hill Book Company, New York, 1977.

20. Wyle Report, OPPD 26333-03.

Scotch Tape Product Data, 3M Company.

22. OPPD, LER 80-007, dated April 30, 1980.

23. Fort Calhoun Station Unit, File No. 11405-E-150, 151, Cable and Conduit Schedule, Fort Calhoun.

24. Fort Calhoun File No. FC-765-2617, dated May 18, 1972, "Insulation of "E" Cable Connection," Drawing No. XA-545-E462.

25. Rejda, L.J., and Neville, Kris, Industrial Motor Users Handbook of Insulation for Rewinds, Elsevier, 1977, Wyle Library Code 255-80.

26. Elastomeric Materials, The International Plastic Selector, Inc., 1977.

27. Fort Calhoun File No. FC-643-80, dated June 6, 1980.

28. Wyle Report, OPPD 26333-01.

29. Kircher, John et. al., Effects of Radiation on Materials and Components, 1964, Wyle Library

APPENDIX C

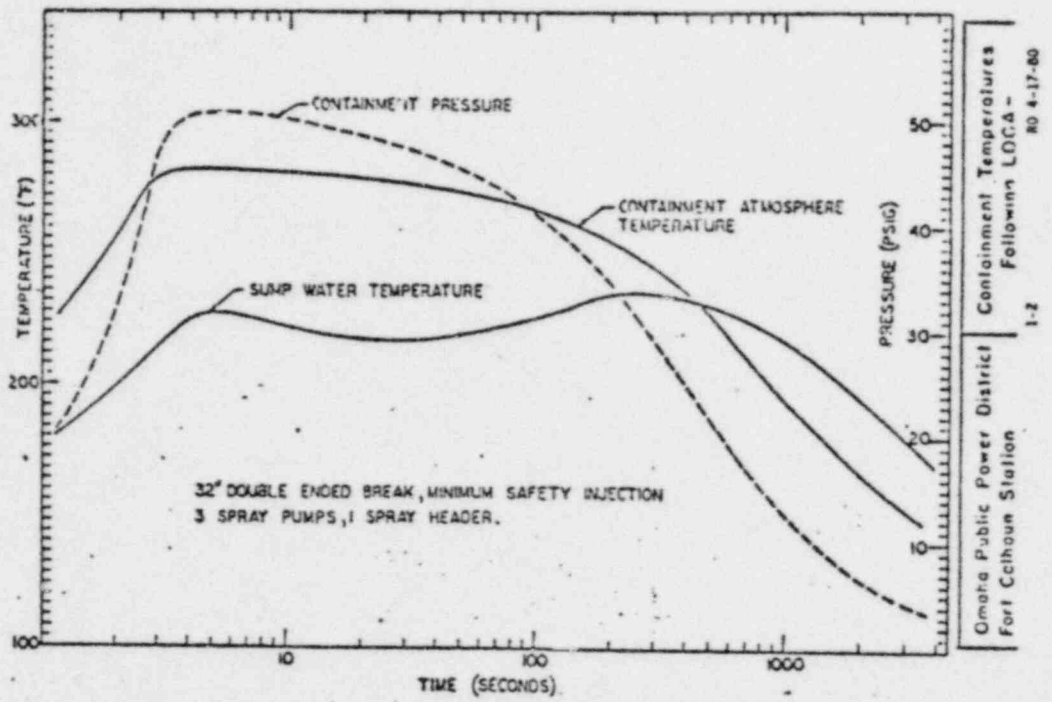
CONTACT REPORT

Contact Report By: B. Lim B. Lim Telephone x Visit —

Date of Contact: 10/8/80 through 10/16/80

J/N 26333 - OPPD

ACTION	REMARKS
1. Brian Mahoney-Amp Special Insulation 215/647-1000 x306	1. Requested documentation of cable splices for OPPD. Brian stated he has cable splice procedure but, does not have any record for OPPD.
2. Ira Clemont-Pentube 215/622-2300	2. Inquired about data on OPPD cable splices. Mr. Clemont stated that he did not have any record for OPPD and never sold for Nuclear Power Plant application.
3. Larry O'Brient-Gibbs Hill 212/760-4000	3. Inquired about information on OPPD cable splices. Mr. O'Brient stated that he did not have any documentation for OPPD cable splices.
4. Joe Braun, Technical Specialist Dow Corning Corp. 517/496-4824	4. Inquired about testing data on RTV 3145. Joe stated that the test data is available under UL Report E-40195 A & B. This test was performed per ASTM D-1830. The aging time is 18 months at 240 C to 300 C. The failure times were 15,120 hrs. @ 240 C, 8904 hrs. @ 260 C, 900 hrs. @ 280 C, 400 hrs. @ 300 C. Joe will send a detailed report on test data and test sample preparation procedure. B. Lim has calculated activation energy of RTV based on the above information.
5. Dave Paulson-The Franklin Institute Research Labs.-215/448-1582	5. Response on some of the questions posed by Wyle during the telephone conversation 10/10/80. Dave stated Franklin did not prepare a test speciment and did not have any addendum on F-C3348 report. Dave suggested Wyle contact Commonwealth Electric Co. (George Bawl-402/426-4621) regarding cable splice problem. E. Gerloff/B. Lim to contact Commonwealth Electric Company.
6. T.C. Ball- Commonwealth Electric Co. 402/474-1341	6. Inquired about cable splice information on OPPD. Mr. Ball stated he believes that OPPD cable splices were installed according to the manufacturer's procedure and doesn't have any information. He recalled that he was asked the same question by OPPD. B. Lim to contact Amp to inquire about procedure. (See Remark No. 1)
7. J. P. Kelly-Gibbs Hill 412, [illegible]-3130	7. Inquired about some information on OPPD cable splice procedure. Mr. Kelly stated that OPPD should have procedure on cable splices and test samples on Franklin Report. I explained that we do not have any document for supporting a similarity between installed one and test specimen. Mr. Kelly will contact Mr. Marvin Blair, Gibbs Hill to see about any documentation available.



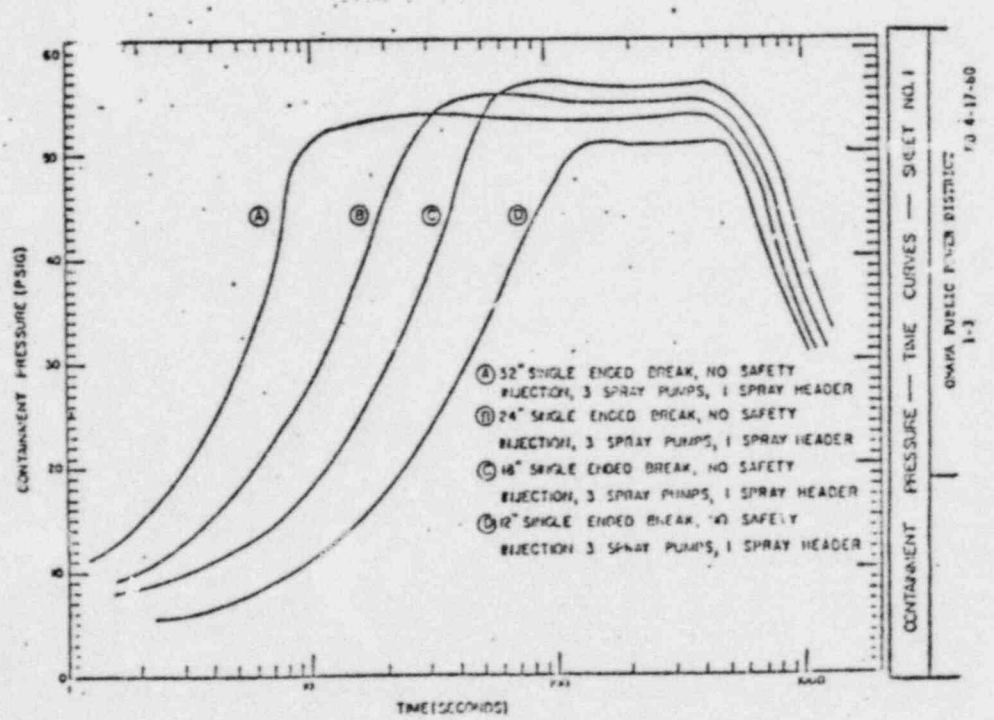


FIGURE 3

LOCA PROFILES

TABLE 1

CABLE DESCRIPTION

I. D. NO.	CABLE		FUNCTION
	NO.	TYPE	
319	W-10	1/C 300 MCM	Containment Vent Fan Motors
323	W-17	1/C #6	Pressurizer Heaters
325	W-21	3/C #10	480 V, 3 Ø Power for Motor Operated Valves (MOV)
328	W-38	3/C #12	120 V, 1 Ø Control for MOV and 120 VDC on PC1849
330	W-40	4/C #12	120 VDC Control to Solenoids and Limit Switches
331	W-41	7/C #12	120 V, 1 Ø Control for MOV and HCV 1107A and HCV 1108A
323	W-57	2/C #14 TS Pair	Drain Wire Using all Instruments

TABLE 2

SAMPLE IDENTIFICATION

I. D. NO.	(CABLE SPLICES) NON-METALLIC MATERIALS	CABLE NO. TYPE	(CABLE SPLICES) DESCRIPTION	(CABLE SPLICES) MANUFACTURER	EXPOSURE TO CONTAINMENT ATMOSPHERE***	PAGE NO.
330 323	Polyolefin	W-40 4/C #12 W-57 2/C #14 TS Pair	Cable Splices at Solenoid Valves & Transmitter Leads	AMP & America PAMCOR	NO *	6-50 (Enc.#8 LER8-006)
319A	1.Scotch Tape #70 2.Bishop Tape #3 3.Scotch Tape #88 4.Scotch Tape #70 5.RTV Dow Corning #3144	W-10 1/C 300 MCM	Cable Splices at 480 V-Cont. Ven Fans (VA-3A, 3B, 7C, 7D)	3M Company	NO **	6-51 (Enc.#9)
319B	1.Irrathane SPT Tape 2.Irrasil Tape 3.RTV Dow Corning #3145	W-10 1/C 300 MCM	Cable Splices at Containment Ven Fan, Motor Lead Splices at the Electrical Penetration	General Electric	YES	6-52 (LER 80-007)
323 325 328 330 331 323	Polyolefin Neoprene	W-17 1/C #6 W-21 3/C #10 W-38 2/C #12 W-40 4/C #12 W-41 7/C #12 W-57 2/C #14 TS Pair	Cable Splices at Electrical Penetrations, Valcore Solenoids and Limit Switch	Amp & Penntube	YES	6-49 (Enc.#8 XA-5452 -462)

* Inside Conduit
** Inside Motor Junction Box
*** Reference 23

TABLE 3

SUMMARY OF TEST DATA

NON-METALLIC MATERIAL	CABLE NO.	CABLE TYPE	THERMAL AGING TEMP. (°C)	THERMAL AGING DURATION (HRS)	GAMMA RADIATION (RADS)	LOCA TEST CONDITION TEMP. / PSIG	LOCA TEST CONDITION DURATION	LOCA TEST CONDITION CHEMICAL SPRAY	REMARKS	REF.
[illegible]yolefin	N/A	1/C #12	150C 302F	850 Hrs.	2×10^8	340F / 104	30 days	3000 PPM Boron PH: 11 24 Hrs.	Certified Polyolefin as cable splices will function at least 40 years at 90C & 2×10^8 rads + LOCA.	1
Silicone	N/A	2/C #16	272C	500 Hrs.	1×10^8	298F / No Data	7 days	No Data	Cables performed satisfactorily.	4,5
[illegible]ilicone	N/A	14/C #16	200C	168 Hrs.	1×10^8	276F / -	7.5 days	No Data	Cables performed satisfactorily.	4
Silicone	N/A	7/C #12 2/C #16	150C	168 Hrs.	1×10^8	346F / -	30 days	No Data	Cables performed satisfactorily.	4
Silicone, Crosslinked Polyethylene, Neoprene, Asbestos	N/A	7/C #12 5/C #12	-	-	2×10^8	295F / -	7.5 days	No Data	Cables performed satisfactorily.	4
Crosslinked Polyethlene, Neoprene, Silicone	N/A	7/C #12 2/C #16	66C (@ 100% R.H.)	6 Hrs.	$\times 10^7$	340F (2h) / -	14 Hrs.	No Data	Cables performed satisfactorily.	4
Crosslinked Polyethlene, Neoprene, Silicone, Asbestos	N/A	1/C #10 3/C #10	105C (100% R.H. for 6 Hrs.)	168 Hrs.	$5 \times 1[illegible]^8$	340F / -	16 days	No Data	Some of the cables performed satisfactorily.	4
Crosslinked Polyethlene, Neoprene	N/A	2/C #16 T.S.	121C 158C	7 days 7 days	No Data	No Data	No Data	No Data	-	6
Polyolefin and Neoprene	W-21 W-42 W-59 W-63	3/C #10 12/C #12 3/C #14 3 Pair #4	No Data	No Data	No Data	286F / -	3 Hrs.	1% Boric Acid PH: 95	W-42, W-63 Failed W-59 Failed Only	7 8
Polyolefin and Neoprene (assumed)	N/A	1/C #12	150C	1500 Hrs.	2.9×10^8	385F / -	30 days	6200 PPM Boron	The splice system performed satisfactorily.	9
G. E. RTV	N/A	N/A	260C	300 Hrs.	2×10^6	N/A	N/A	N/A	-	10
Dow Corning RTV	N/A	N/A	240-300	18 Mos.	2.5×10^7	N/A	N/A	N/A	-	10,11, 12,13, 14

TABLE 4

MATERIAL ANALYSIS MATRIX

I. D. NO.	CABLE NO.	CABLE TYPE	NON-METALLIC MATERIALS	ACTIVATION ENERGY (eV)	THRESHOLD FOR RADIATION DAMAGE (RADS)	TEST CONDITION ENVELOPED TO OPPD SERVICE CONDITION: RADIATION TIME/TEMP	LOCA: TEMP / PSIG	LOCA: TIME / CHEM	REMARKS
330 323	W-40 W-57	4/C#12 2/C#14 TS Pair	Polyolefin	1.4 eV (Ref.2)	5×10^8 (Ref.17)	yes yes	yes yes	yes yes	
329A	W-10	1/C 300 MCM	Silicone	1.73 eV (Ref.5)	3.6×10^7 (Ref. 29)	yes yes	yes -	yes -	
329B	W-10	1/C 300 MCM	Silicone	1.73 eV (Ref.5)	3.6×10^7 (Ref. 29)	yes yes	yes -	yes -	
323 325 328 330 331 323	W-17 W-21 W-38 W-40 W-41 W-57	1/C#6 3/C#10 2/C#12 4/C#14 7/C#12 2/C#14 TSP	Polyolefin Neoprene	1.4 eV (Ref.2) 1.04 eV (Ref.5)	5×10^8 (Ref.17) 10^6 (Ref. 17)	yes yes	yes -	yes yes	
N/A	N/A	N/A	R.T.V.	.79 eV (Ref.16)	2.5×10^7 (Ref. 13)	yes yes	yes	yes	

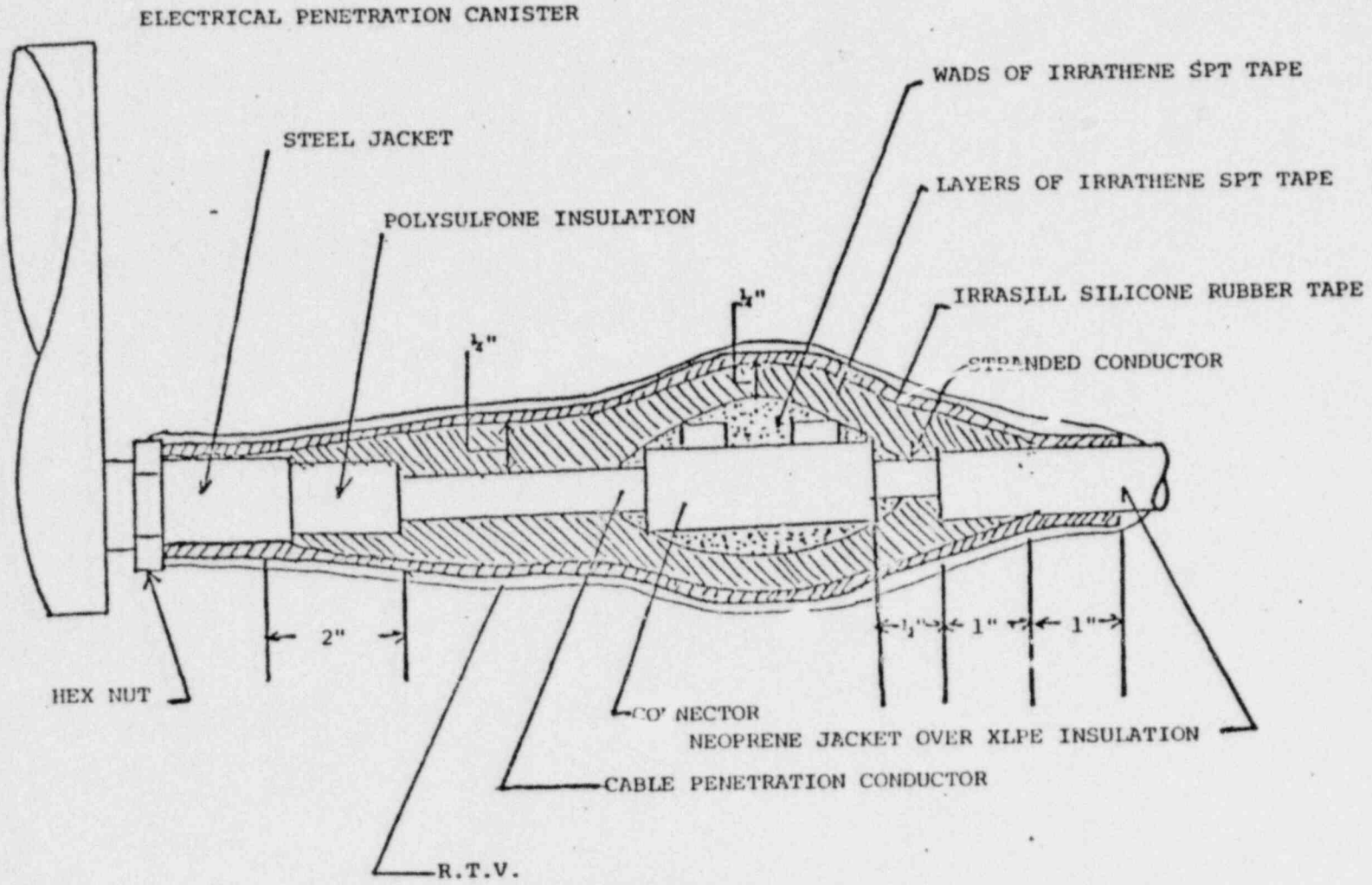


FIGURE 1

INSULATION OF "E" CABLE CONNECTIONS
(Reference 24)

DISTRIBUTION RESPONSES TO

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