Superseded pages per Revision 2 to Equipment Qual. (50-255) Ltr. DTD 6/1/81 Dck. 7-22-81

Index of Changes for Revision 2

Remove page	Insert page
Table of Contents	Table of Contents
Section I 1,2	Section I 1,2
Appendix I	
89, 90	89, 90
91, 92	91, 92
93, 94	93, 94
95, 96	95, 96
98, 99	98, 99
blank, 100	99a, 100
103, 104	103, 104
105, 106	105, 106
107, 108	107, 108
215, 216	215, 216
217, blank	217, blank
218, 219	218, 218a
----------	218b, 218c
----------	218d, 218e
----------	218f, 218g
----------	218h, 218i
----------	218j, 218k
----------	2181, 218m
----------	blank, 219
263, 264	263, 264
267, 268	267, 268
269, 270	269, 270
273, 274	273, 274
275, 276	275, 276
277, 278	277, 278
279, 280	279, 280
281, 282	281, 282
283, 284	283, 284
285, 286	285, 286
287, 288	287, 288
289, 290	289, 290
293, 294	293, 294
299, 300	299, 300
301, 301a	301, 301a
302, 303	302, 303
306, 307	306, 307
308, 309	308, 309
310, 311	310, 311
312, 313	312, 313
319, 320	319, 320

Remove page	Insert page
321, 322	321, 322
323, 324	323, 324
325, 326	325, 326
327, 328	327, 328
331, 332	331, 332
335, 336	335, 336
337, 338	337, 338
339, 340	339, 340
341, 342	341, 342
343, 344	343, 344
345, 346	345, 346
351, 352	351, 352
355, 356	355, 356
361, 362	361, 362
363, 364	363, 364
371, 372	371, 372
379, 380	379, 380
384a, 385	384a, 385
389, 390	389, 390
393, 394	393, 394
397, 398	397, 398
401, 402	401, 402
407, 408	407, 408
411, 412	411, 412
414, 415	414, 415
420, 421	420, 421
429, 430	429, 430
434, 435	434, 435
436, 437	436, 437
438, 439	438, 439
440, blank	440, blank
441, 442	441, 442
443, 444	443, 444
445, 446	445, 446
448, 449	448, 449
450, 451	450, 451
452, 453	452, 453
454, blank	454, blank
463, 464	463, 464
467, 468	467, 468
471, 472	471, 472
473, 474	473, 474
483, 484	483, 484
----------	484a, blank
488, 489	488, 489
494, 495	494, 495
512, 513	512, 513
514, 515	514, 515
516, 517	516, 517
522, 523	522, 523

Remove page	Insert page
526, 527	526, 527
537, 538	537, 538
539, 540	539, 540
542, 543	542, 543
552, 553	552, 553
562, 563	562, 563
566, 567	566, 567
568, 569	568, 569
570, 571	570, 571

Appendix III

Cover sheet	Cover sheet
pages 1 thru 63	----------

Appendix IV

Cover sheet, computer	Cover sheet, computer
report 51, pg 1	report 51, pg 1
pg 2, 3	pg 2, 3
pg 4, 5	pg 4, 5
pg 6, 7	pg 6, 7
pg 8, 9	pg 8, 9
pg 10, 11	pg 10, 11
pg 12, 13	pg 12, 13
pg 14, 15	pg 14, 15
pg 16, report 54, pg 1	pg 16, report 54, pg 1
report 54, pg 2, 3	report 54, pg 2, 3
pg 4, 5	pg 4, 5
pg 6	pg 6

Environmental Qualification of
Safety-Related Electrical Equipment

Table of Contents

SECTION I

INTRODUCTION AND BACKGROUND

Consumers Power Company (CP Co) was requested to address the Environmental Qualification of Safety-Related Electrical Equipment for Palisades Plant by NRC letter dated December 23, 1977. Information requested included identification of electrical equipment required to perform safety functions while subjected to design basis accident environments, definitions of environmental service conditions at equipment locations and status of environmental qualification documentation. In response to this request, CP Co provided information via submittal letters dated February 24, 1978, April 6, 1978, April 12, 1978 and November 30, 1978.

A site visit to the Palisades Plant was conducted by representatives of the NRC and their contractor, Franklin Research Center, on January 21-25, 1980. In this visit, Class 1E systems and components were inspected, Plant operating procedures were discussed with Plant personnel and available qualification documentation was reviewed.

The NRC letter of February 15, 1980 formally transmitted to CP Co two sets of the NRC Guidelines referenced below and requested that a meeting be held with the SEP plant licensees on February 21 to discuss these guidelines. The NRC letters of March 6, 1980 and March 28, 1980 provided further direction - including schedules. Although the review of equipment environmental qualification for Palisades was initiated prior to the February 21, 1980 meeting, it was the NRC intention that the review be conducted with the same guidelines and procedures established for the other SEP plants. (The NRC stated in the February 21 meeting and the March 6 and 28 letters that the Palisades information should be brought to the level of the other SEP plant submittals.)

Enclosure 2 of the NRC March 6, 1980 letter to all SEP licensees defined five categories of information that must be submitted under the SEP qualification program. CP Co was requested to submit (for the Palisades Plant) the information required in these categories:

1. Provide the list of safety-related systems addressed in Reference 2. The emergency procedures have already been provided and need not be resubmitted.

2. Definition of hostile service conditions is being addressed separately in accordance with our March 28, 1980 letter and need not be addressed in this submittal except as needed to complete Category 4.

3. Provide the identification and justification of equipment considered qualified by experience in accordance with Reference 1, Section 4.3.3, Areas Normally Maintained at Room Conditions.

4. Provide the tabulation of safety-related equipment located in a hostile environment, with identification of the service conditions and

qualification testing for each, in the format used for SEP Topic III-12 submittals.

5. Provide the list of equipment in the tabulation of Category 4 that is not qualified in accordance with the specific requirements of Reference 1 together with justification for the deviations from the guidelines.

For guidance in preparing the requested material, the NRC provided three enclosures reflecting reviews performed during the Palisades Plant site visit during January 21-25, 1980. The enclosures were entitled:

1. Palisades Nuclear Plant Systems Needed for Mitigation of Main Steam Line or Feedwater Line Breaks Inside and Outside Containment

2. Palisades Nuclear Plant Systems Needed for Mitigation of Loss of Cooling Accidents

3. Specific Questions Concerning Equipment Qualification Documentation Based on the Palisades Site Visit, January 21-25, 1980

Enclosure 3 provided specific questions concerning equipment qualification test documentation that was reviewed at the site. The questions identify deficiencies in the documentation and requested that CP Co either provide additional qualification reports or justify the adequacy of the existing information.

At the NRC regional meeting to explain the Commission's May 23, 1980 (transmitted by 6/25/80 letter) Memorandum and Order and the implication to ongoing equipment qualification efforts, Category 3 was withdrawn from present consideration.

Categories 1, 2, 4 and 5 information is contained herein. Categories 1, 4 and 5 are addressed in Appendix I. Appendix I is a compilation of equipment qualification packages. Each package contains a qualification work sheet using the IE 79-01B format; a description of the assumptions used to complete the work sheet; a listing demonstrating how the guidelines were met; and, direct responses to the questions raised in Enclosure 3. The listing demonstrating compliance with the guidelines has "DORGR" in the margin followed by statements of compliance. "DORGR" means DOR Guideline Requirement. These requirements are defined in Appendix II. The packages are made up for groups of identical equipment (same manufacturer and model) experiencing the same environment and are listed by system except that the cables, junction boxes, penetrations, terminal blocks and solenoid valves are grouped together. Section II of this report covers the definition, location and environment of the hostile areas. Section III of this report addresses the development of the equipment list. Appendix III presents a matrix which indicates compliance to various DOR Guidelines for each package of equipment. Appendix IV presents two listings of safety-related equipment to be qualified sorted by system and sorted by type.

Component Amphenol Connectors (in junction boxes J320,J324,J325,J329,J326 and J321)

This equipment was qualified in the original CP Co submittal with no objection by Franklin Research Center.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Service Water and Reactor Protect Sys Plant I.D. Number: See Note 2 Component: Junction Boxes and Terminal Blocks Manufacturer: Terminal Board - Westinghouse Model Number: No 805432 Purchase Order Number: - Function/Service: See Note 3 Accuracy: Spec: Demo: Location: Inside Containment Elevation: Various	Operating Time	1 Hour	4 Hours	Section III.B	1, 2	Test and Analysis	
	Temperature (°F)	See Figures 7 & 8	286 (Peak)	Section II.D.1	1, 2	Test and Analysis	
	Pressure (PSIA)	See Figure 9	105.7	Section II.D.1	2	Test and Analysis	
	Relative Humidity (%)	100	100	Section II.D.1	1, 2	Test and Analysis	
	Chemical Spray	Note 1	2640 ppm boric acid	Section II.D.2	1, 2 & 4	Test and Analysis	
	Radiation (Rad)	1.8×10^6	5×10^6	Section II.D.5	3	Test and Analysis	
	Aging	40 Years + LOCA	40 Years + LOCA	Section II.D.8	1	Test and Analysis	
	Submergence	Not subject to submergence					
Flood Level Elevation Above Flood Level: Yes: X No:							

DOCUMENTATION REFERENCES	NOTES
1. Report on Terminal Block/Junction Box Environmental Testing, by Northeast Utilities Service Company, dated March 27, 1978. 2. Test Report on the effect of a LOCA on an electrical performance of four terminal blocks, by Westinghouse Corporation, dated September 13, 1977.	1. 1750 to 2000 ppm boric acid with 50 to 100 ppm N_2H_4 2. J-350, J-355 and J-521 with Westinghouse TB's No 805432

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No.:
Revision:
Date:

DOCUMENTATION REFERENCES (cont)	NOTES (cont)
3. Test report by A P Colaiaco of Westinghouse 4. Letter from C A St Onge of Bechtel to R Marusich of CP Co dated October 3, 1980.	Note : Junction Boxes for Containment Air Coolers and PT-0102

Component Junction Boxes J-350, -355 & -521 and Westinghouse TB's No 805432

2.0 The above components are Nema 4 enclosures and Westinghouse style terminal blocks rated at 600 volts and 40 amperes. They are located above the flood level elevation of 596'-0" and will not be submerged.

The junction box and terminal blocks are used in Class 1E control and instrumentation circuits which are required to be functional for a maximum of one hour during an accident. The junction box with terminal blocks mounted inside is qualified for the given environment inside the containment as below:

a. Per Document Reference 1 the same type of junction box with identical style number of terminal blocks as the one installed in Palisades was tested for aging using Arrhenius techniques at 150°C (302°F) for 171 hours. This simulates a life of 40-year for an ambient of 70°C (158°F).

After thermal aging the specimen was subjected to 5 x 10^6 rads and a chemical spray test with 2640 ppm of boric acid at 286°F at 40 psig for 31 hours. The terminal block was kept energized at 525 volts during LOCA test.

b. Per Document Reference 2, a separate test on the terminal block (with no junction box as enclosure) was tested for 4 hours at 340°F and 90 psig by spraying borated water while the terminal block terminals were energized at 600 V.

c. Document Reference 3 establishes by evaluation that the terminal block can withstand a radiation dose of 2 x 10^7 R. No credit has been taken for this.

d. Document Reference 4 establishes the negligible corrosive effect of chemical spray including hydrazine on the insulating material and the junction box material (sheet steel) which shield the terminal blocks from direct spray and, in addition, hydrazine is highly unstable and will decompose rapidly when chemical spray is released into the containment.

e. No credit has been taken to the following:

1. The test specimens in Document References 1 and 2 were energized at 525 volts and 600 volts, respectively, against the control circuit voltage of 125 V or less to which installed terminal blocks are connected.

2. The shielding effect of junction box on terminal block withstand capability due to radiation is not considered.

f. The following is a summary of the qualification:

1. Paragraphs a, b and d provide evidence of qualification for aging, radiation, temperature, pressure and humidity.

2. Paragraphs b and c provide further evidence on spray, humidity and radiation.

Component Junction Boxes (J-350, -355 & -521) and Terminal Blocks (No 805432)

DORGR 1 Service Conditions Inside Containment for LOCA Conditions

DORGR 1A Temperature and Pressure Steam Conditions

The requirements of the DOR guidelines are complied with. The testing was run at temperature and pressure steam conditions which exceed that given in FSAR and Section II.D.1. See Sheet 2.

DORGR 1B Radiation

Gamma The requirements of the DOR guidelines are complied with as the JB and TB were tested to 5×10^6 R and need only withstand 1.8×10^6 R.

Beta The requirements of the DOR guidelines are complied with as beta radiation is not significant.

DORGR 1C Submergence

Not applicable.

DORGR 1D Containment Sprays

The requirements of the DOR guidelines are complied with as the test included contaiment sprays more harsh as the ones used at Palisades. Also see Sheet 2 for discussion.

DORGR 2 Service Conditions for a PWR Main Steam Line Break Inside Containment

DORGR 2A Temperature and Pressure Steam Conditions

The requirements of DOR guidelines are complied with. Palisades utilizes redundant automatic containment spray systems. Therefore, in accordance with DOR guidelines, Section 4.2, Paragraph 1, qualification for LOCA environment is adequate and additional qualification for main steam line break accident environment is not required.

Refer to DORGR 1A for details of LOCA qualification.

DORGR 2B Radiation

The requirements of DOR guidelihnes are complied with. Refer to response in DORGR 1B.

DORGR 2C Submergence

The requirements of DOR guidelines are complied with. The equipment is mounted above the submergence level.

DORGR 2D Chemical Sprays

The requirements of DOR guidelines are complied with. Refer to response in DORGR 1D.

DORGR 5 Qualification by a Combination of Methods (Test, Evaluation, Analysis)

DORGR 5A Qualification by Evaluation and/or Analysis

The requirements of the DOR guidelines are complied with:

a. Pressure, temperature, humidity, chemical spray, aging and radiation by test and analysis. See Sheet 2.

DORGR 5B Qualification by Type Testing

1. Simulated Service Conditions and Test Duration

The requirements of the DOR guidelines are complied with because the test duration was longer than the time the terminal blocks will be energized and the peak temperatures and pressure exceed the accident conditions.

2. Test Specimen

The requirements of the DOR guidelines are complied with as the test specimens were similar to the ones at Palisades.

3. Test Sequence

The requirements of the DOR guidelines are complied with. See sheet. The sequence of test for test in Document Reference 1 is as follows:

a. Aging

b. Radiation

c. Chemical Spray

4. Test Specimen Aging

The requirements of the DOR guidelines are complied with. Aging was based on an Arrhenius technique. See Sheet 2.

5. Functional Testing and Failure Critieria

The requirements of the DOR guidelines are complied with. The terminal blocks withstood continuous energization during test without fail proving dielectric integrity.

6. Installation Interfaces

The requirements of DOR guidelines are complied with. See Sheet 2. The terminal blocks are mounted inside to junction box as in the case of test specimen.

DORGR 6 Margin

The guidelines of the DOR are complied with. See Sheet 2. Radiation, pressure and aging withstand values for the terminal blocks exceed the requirements.

DORGR 7 Aging

The requirements of DOR guidelines are complied with as the JB and TB were tested at 150°C for 171 hours to simulate 40-year life.

DORGR 8 Documentation

The requirements of DOR guidelines are complied with. Refer to Sheet 1.

Component Junction Boxes (J-350, -355 and -521) and terminal blocks (No 805432)

Reply to questions in Franklin Research Center Technical Evaluation Report dated May 30, 1980.

1. Section 3.3.2.4(a)

   Franklin has not addressed any question in this section. However, the following clarification is in order:

   The test referred in Document Reference 1 meets the requirements of junction box and terminal block for temperature, radiation, humidity and chemical spray. The pressure withstand capability of the terminal blocks was tested per Document Reference 2 at 340°F, 91 psig with borated water spray. The junction box pressure capability is not required to be tested since there is no pressure differential between inside and outside the box due to a drain hole existing. For the time period involved (1 hour jmaximum), the tests demonstrate the integrity of the box/terminal block to meet the postulated accident environment.

2. Section 3.3.2.4(b)

   Franklin has indicated that the radiation withstand level is marginally acceptable. The following will clarify that more than adequate margin is available. As shown in Sheet 1, the radiation level during accident for one hour is 1.8×10^6 R. The tested value is 5×10^6 R per Document Reference 1 which exceeds the requirement by a factor of more than 2.5. Per Document Reference 3 the evaluated withstand value for terminal block is 2×10^7 R even though no credit has been taken for this evaluation as explained in Sheet 2.

3. Section 3.3.2.4(c)

   The thermal aging of 150°C for 171 hours to simulate 40-year life (for an ambient of 70°C) is based on the Arrhenius plot for the terminal block material (wood flour filled phenolic). The normal ambient temperature at Palisades is 40.5°C which is less than the value used for the aging test; i.e., for the given aging test, if 40.5°C is the ambient, then the simulated life will be for more than 40 years.

4. Section 3.3.2.4(d)

   Due to failure of 1 out of 30 terminal points tested, Franklin expressed concern regarding sensitivity of the terminal blocks to mounting procedure and technique. Out of this 30 terminal points, 6 were in the power circuit (energized to 525 volts) and the remaining 24 terminal points were in control circuits (normal voltage 125 volts). No failure occurred on the terminal points in the control circuit. The failure is on the one in the 525 volts circuit. As explained in Sheet 2, the installed terminal blocks at Palisades are connected to control and instruments circuits

where the normal voltage is 125 volts or less. Also, these terminal blocks were installed under strict quality control and supervision.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Miscellaneous Electrical Sys Plant I.D. Number: Cable Code Z63 Component: XLPE Insul Pvc Jack. Manufacturer: General Electric Model Number: Purchase Order Number: 5935-E-23A-AC Function/Service: Transmit Electric Signals Accuracy: Spec: NA Demo: NA Location: Inside Containment Elevation: Various	Operating Time	30 Days	1 Year		1	Test and Analysis	
	Temperature (°F)	See Figures 7 and 8	340	Section II.D.1	1, 2	Test and Analysis	
	Pressure (PSIA)	See Figure 9	117.7	Section II.D.1	1, 2	Test and Analysis	
	Relative Humidity (%)	100	100	Section II.D.1	1, 2	Test and Analysis	
	Chemical Spray	1750-2000 Ppm Boric Acid With 50-100 Ppm N_2H_4	Boric Acid and NaOH at 8.4 pH	Section II.D.2	1, 3	Test and Analysis	
	Radiation (Rad)	See Note 1	1×10^8	Section II.D.5	1.2	Test and Analysis	
	Aging	40 Years Plus LOCA	40 Years Plus LOCA	Section II.D.8	1	Test and Analysis	
	Submergence	No	-	-	-	-	
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. General Electric "Qualification Test Summary - 100 Series Electric Penetration," February 28, 1975. 2. FIRL Final Test Report, F-C4879-1, Apr 1978. 3. Letter from C A St Onge of Bechtel Corp to R Marusich of Consumers Power Co dated 10/3/80.	1. Beta: 2×10^8 R @ surface, 2×10^7 R @ 0.03", 2×10^6 R @ 0.07" (See Sheet 2 for discussion.) Gamma: 2×10^7 R

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Miscellaneous Electrical Sys Plant I.D. Number: Cable Codes Z63, Z66 Component: XLPE Insul PVC Jack Manufacturer: General Electric Model Number: Purchase Order Number: 5935-E-23A-AC Function/Service: Transmit Electric Signals Accuracy: Spec: Demo: Location: Various - Outside Containment (MSLB) Elevation: See Note 1 Various	Operating Time	30 Days	1 Year	Sec III.B	1	Test & Analysis - See Note 2	
	Temperature (°F)	Various - See Note 1	340 (Peak)	Sec II.D.6	1, 2	Test & Analysis - See Note 2	
	Pressure (PSIA)	Atmospheric	117.7 (Peak)	Sec II.D.6	1, 2	Test & Analysis - See Note 2	
	Relative Humidity (%)	Various - See Note 1	100	Sec II.D.6	1, 2	Test & Analysis - See Note 2	
	Chemical Spray	None					
	Radiation (Rad)	Negligible					
	Aging	40 Years Plus MSLB	40 Years Plus LOCA	II.D.8	1	Test & Analysis - See Note 2	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. General Electric "Qualification Test Summary - 100 Series Electric Penetration" February 28, 1975. 2. FIRL Final Test Report, F-C4879-1, April 1978.	1. a) Room 123, MSLB conditions: 212°F for one hour then linear decline to 110°F at 24 hours, and 80% RH.

100

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No.:
Revision:
Date:

DOCUMENTATION REFERENCES (cont)	NOTES (cont)
	b) Room 238, MSLB conditions: $275^{o}F$ for one half hour then linear decline to $110^{o}F$ at 24 hours, and 95% RH. These cables are considered to be qualified for outside containment applications based on the qualification for the more severe "in-containment" use including 40-year life and LOCA. Even though cable Code Z66 is not used inside containment, it has the same type of insulation material and jacket as cable Code Z63 which is used inside the containment. Therefore, for Sheets 2, 3 and 4, refer to component sheets which cover the qualification of cable Code 263, General Electric for use inside containment.

101

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System: Miscellaneous Electrical Sys
Plant I.D. Number: Cable Codes Z63, Z66
Component: XLPE Insul PVC Jack
Manufacturer: General Electric
Model Number:
Purchase Order Number: 5935-E-23A-AC
Function/Service: Transmit Electric Signals
Accuracy: Spec:
Demo:
Location: Various - Outside Containment (LOCA)
Elevation: See Note 1 Various

Flood Level Elevation
Above Flood Level: Yes: No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	1 Year	Sec III.B	1	Test & Analysis - See Note 2	
Temperature (°F)	Various - See Note 1	340 (Peak)	Sec II.D.8	1, 2	Test & Analysis - See Note 2	
Pressure (PSIA)	14.7	117.7	Sec II.D.8	1, 2	Test & Analysis - See Note 2	
Relative Humidity (%)	Various - See Note 1	100	Sec II.D.8	1, 2	Test & Analysis - See Note 2	
Chemical Spray	None					
Radiation (Rad)	Various - See Note 1	1×10^8	II.D.7	1, 2	Test & Analysis - See Note 2	
Aging	40 Years	40 Years Plus LOCA	II.D.8	1	Test & Analysis - See Note 2	
Submergence	Not Subject to Submergence					

DOCUMENTATION REFERENCES

1. General Electric "Qualification Test Summary - 100 Series Electric Penetration," February 28, 1975.
2. FIRL Final Test Report, R-C4879-1, April 1978.

NOTES

1. a) Engineered Safeguard Room:
$135^{o}F$, 1×10^7 RAD gamma and 100% RH.

DOCUMENTATION REFERENCES (cont)	NOTES (cont)
	b) Penetration Areas other than Rooms 123, 238 and 338: 104°F, 5 x 10^5 RAD gamma and 100% RH. c) Room 338: 120°F, 6 x 10^5 RAD gamma and 95% RH. d) Room 123: 104°F, 1 x 10^6 RAD gamma and 80% RH. e) Room 238: 110°F, 5 x 10^5 RAD gamma and 95% RH. 2. These cables are considered to be qualified for outside containment applications based on the qualification for the more severe "in-containment" use including 40-year life and LOCA. Even though cable Code Z66 is not used inside containment, it has the same type of insulation material and jacket as cable Code Z63 which is used inside the containment. Therefore, for Sheets 2, 3 and 4, refer to component sheets which cover the qualification of cable Code Z63, General Electric for use inside containment.

Component General Electric Cable

Cross-Linked Polyethylene (Vulkene) Insulation PVC Jacket 3/C #16 Awg (Code Z63)

A. The above cable is used in Class 1E circuits inside the containment at elevations above the flood level.

B. Document reference 1 is a General Electric Test Summary on 100 series electrical penetrations which includes Vulkene SIS wire (without jacket) in some of the test assemblies. The test demonstrates that the cable is qualified for use inside the containment based on 40-year life and LOCA. The test cycle included the following:

1. Thermal cycling from 50°F to 150°F to 50°F four times a day for thirty days.

2. Gamma radiation exposure of 1×10^8 rad total integrated dose.

3. LOCA simulation test at a peak temperature of 340°F, 100% RH, a peak pressure of 103 psig and with an alkaline environment at a maximum pH value of 8.4 including boric acid and sodium hydroxide.

4. Post-LOCA environmental test of 225°F, 20 psig and 100% RH for one year.

C. Document reference 2 is a Franklin Institute Research Laboratories test report on penetration connector assemblies which included GE cables with cross-linked polyethylene insulation and PVC jackets. This provides further evidence for qualification of cables with materials similar to the supplied cables. The test cycle included the following:

Gamma radiation exposure of 2.6×10^7 rad total integrated dose from a cobalt-60 source.

LOCA simulation test at a peak temperature of 300°F and a peak pressure of 52 psig.

D. The following is a qualification summary:

1. Tests under Paragraph B and C provide evidence of temperature, pressure and humidity qualification.

2. The cables are qualified for chemical spray based on the following:

a. Chemical spray content was not defined in the test described in Paragraph B but the test environment included boric acid and

Sodium Hydroxide and was alkaline for over 8 days starting with a pH of 8.4 and eventually dropping to a pH of 7.5.

b. Although the operating time requirement is 30 days, analysis of containment parameters shows that, following a LOCA, temperature and pressure conditions return to ambient in about 11 days. Therefore, following an accident, the containment spray is not likely to continue beyond 11 days.

c. Even though the pH range of 7-8.3 was maintained for 8 days only (against the requirement of 11 days), it is concluded that the spray requirements have been fully met, based on the following factors:

(1) Other parameters, such as peak pressure and temperature, were exceeded by wide margins.

(2) Post-LOCA environmental test at 225°F, 20 psig and 100% RH was continued for 370 days against the maximum requirement of 30 days.

d. Analysis, document ref (3), indicates that spray chemicals, including hydrazine in low concentrations have no corrosive effect on cable insulation material. In addition, hydrazine is highly unstable and will decompose rapidly when chemical spray is released into containment.

3. The cables have been qualified to 1×10^8 rad gamma per testing under Paragraph B compared to the requirement of 2×10^7 rad gamma and 2×10^8 rad beta at the outer surface. It is concluded that the cables are qualified to Palisades requirements based on the following evaluation:

a. The test radiation dose of 1×10^8 rad gamma exceeds the requirements of 2×10^7 rad gamma.

b. Almost all cable installations inside containment are enclosed in cable trays or conduit which shield the cables from beta radiation. In addition, cable jackets also provide further shielding from beta radiation. The conductor insulation will, therefore, be exposed to reduced beta doses only.

4. The cables are qualified for 40-year life based on the following evaluation:

a. The initial step of the test under Paragraph B is a thermal cycle from 50°F to 150°F to 50°F four times a day for thirty days.

b. The LOCA test under Paragraph B included high temperature, pressure and humidity conditions lasting for more than 370 days compared to the 30-day requirement. This far exceeded the required LOCA test so that this test contributed to aging the cable specimen. The aging process on the cables would have continued (while the LOCA test was in progress) for 370 days. Analysis indicates that the combined effect of aging and LOCA test at 225°F under steam conditions for 370 days is not less severe than the effect of normal thermal aging and LOCA done in sequence. Further, it is an established fact that the same type of insulation, cross-linked polyethylene, has been fully qualified by several major cable vendors per IEEE-383, including 40-year life and LOCA.

E. The similarity between the supplied cables and the tested cables (see Paragraphs B and C for test references) is based on the following:

1. General Electric is the cable manufacturer in both cases.

2. Cross-linked polyethylene (Vulkene) is the insulating material in both cases.

Component General Electric Cables (Code Z63)

DORGR 1 Service Conditions Inside Containment for LOCA Conditions

DORGR 1A Temperature and Pressure Steam Conditions

The test was run at temperature and pressure steam conditions which exceed those given in the FSAR and Section II.D.1. This complies with the requirements.

DORGR 1B Radiation

Gamma The cables were tested to 1×10^8 rads which is much greater than the dose at the insulation surface which is about 2×10^7 rads.

DORGR 1C Submergence

These cables are located above the flood level inside containment. This complies with the requirements.

DORGR 1D Containment Sprays

The chemical spray used has a pH greater than that at Palisades and, as such, complies with the requirements (discussed in Sheet 2).

DORGR 2 Service Conditions for a PWR Main Steam Line Break Inside Containment

DORGR 2A Temperature and Pressure steam Conditions

Palisades utilizes redundant automatic containment spray systems. Therefore, in accordance with DOR Guidelines, Section 4.2, Paragraph 1, qualifications for LOCA environment is adequate and additional qualification for main steam line break accident environment is not required. Refer to DORGR 1A for details of LOCA qualification.

DORGR 2B Radiation

Refer to response in DORGR 1B.

DORGR 2C Submergence

Refer to response in DORGR 1C.

DORGR 2D Chemical Sprays

Refer to response in DORGR 1D.

DORGR 4 Qualification Methods

DORGR 4A Selection of Qualification Method

Qualification is by evaluation of type test and analysis. This complies with the requirements.

DORGR 5 Qualification by a Combination of Methods (Test, Evaluation, Analysis)

This guideline is complied with as follows:

DORGR 5A Qualification by Evaluation and/or Analysis

Requirements complied with as follows:

1. Temperature, pressure, humidity, spray qualification (except hydrazine), aging and radiation by evaluation of type test results on similar cables as shown in Sheet 2.

2. Hydrazine withstand capability by analysis as given in Sheet 2.

DORGR 5B Qualification by Type Testing

1. Simulated Service Conditions and Test Duration

   The test lasted over one year for the LOCA events. This complies with the requirements except for chemical spray duration (justification in Sheet 2).

2. Test Specimen

   Reference document 1 and the discussion on similarity in Sheet 2 (including reference document 2) shows the similarity between the test specimen and the installed cables.

3. Test Sequence

   a. Thermal Cycle

   b. Radiation Exposure

Component 600 Volts Instrumentation Cable (Code Z-62)

DORGR 1 Service Conditions Inside Containment for LOCA conditions

DORGR 1A Temperature and Pressure Steam Conditions

The requirements of DOR guidelines are complied with. See Sheet 2. The test was run at temperature and pressure steam conditions which exceed that given in FSAR and Section II.D.1. This complies with the requirements of the guidelines.

DORGR 1B Radiation

Gamma The cable specimens were subjected to a total radiation dose of 5×10^8 R which exceeds the combined gamma and beta radiation dose requirement of 2.2×10^8. The requirements of the guidelines are complied with. See Sheet 2.

Beta The requirements of the DOR guidelines are complied with. See Sheet 2.

DORGR 1C Submergence

At certain locations inside the containment, portions of these cables could get submerged during LOCA conditions. This complies with the requirements of the guidelines as explained in Sheet 2.

DORGR 1D Containment Sprays

The chemical sprays used during LOCA testing meet all the requirements except that hydrazine was not present. This complies with the requirements of the guidelines as explained in Sheet 2.

DORGR 2 Service Conditions for a PWR Main Steam Line Break Inside Containment

DORGR 2A Temperature and Pressure Steam Conditions

The requirements of DOR guidelines are complied with.

Palisades Plant utilizes redundant automatic containment spray systems. Therefore, in accordance with DOR Guidelines, Section 4.2, Paragraph 1, qualification for LOCA environment is adequate and additional qualification for main steam line break accident environment is not required. Refer to DORGR 1A for details of LOCA qualification.

DORGR 2B Radiation

The requirements of DOR guidelines are complied with. Refer to response in DORGR 1B.

DORGR 2C Submergence

The requirements of DOR guidelines are complied with. Refer to response in DORGR 1C.

DORGR 2D Chemical Sprays

The requirements of DOR guidelines are complied with. Refer to response in DORGR 1D.

DORGR 5 Qualification by a Combination of Methods (Test, Evaluation, Analysis)

DORGR 5A Qualification by Evaluation and/or Analysis

Requirements of DOR guidelines are complied with as follows:

1. Temperature, pressure, aging, chemical spray (except hydrazine), humidity and submergence be evaluation of type tests results on cables with same type of insulation. This is discussed in Sheet 2.

2. Hydrazine withstand capability of cable by analysis as discussed in Sheet 2.

DORGR 5B Qualification by Type Testing

1. Simulated Service Conditions and Test Duration

The test duration of 30 days covers the entire time until the conditions in the containment return to essentially ambient. The test profile is that required by IEEE 383 (1974). This complies with the guidelines and is explained in Sheet 2.

2. Test Specimen

This complies with the DOR guidelines. The test specimens have same type of insulation (XLP) as the installed cable. See Sheet 2.

3. Test Sequence

The requirements of DOR guidelines are complied with. Also the test sequence meets IEEE-383 (1974) requirements as below:

a. Thermal aging

b. Radiation

c. LOCA & chemical spray

d. Post LOCA Test (dielectrics)

4. Test Specimen Aging

The cables have undergone aging tests as explained in Sheet 2. Therefore, the requirements of the DOR guidelines are met.

5. Functional Testing and Failure Criteria

The requirements of the DOR guidelines are complied with. Passed dielectric tests at 80 V ac/mil (with a minimum of 2.2 kV for 1 minute) after aging, LOCA and long-term moisture absorption tests.

6. Installation Interfaces

Mounting arrangement of the test specimen during qualification testing was similar to the installed equipment at the Palisades Plant. This complies with the requirements of the guidelines.

DORGR 6 Margin

The requirements of DOR guidelines are complied with. Test parameters exceed the Palisades environment.

DORGR 7 Aging

The requirements of DOR guidelines are complied with as explained in DORGR 5.B.4.

DORGR 8 Documentation

The requirements of DOR guidelines are complied with. Refer to Sheet 1.

Component _____

Franklin Research Center had no comments concerning this cable.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION
System: Miscellaneous Electrical System
Plant I.D. Number: Cable Codes X21 Thru X25
Component: Electrical Cables XLPE Insu & PVC Jkt
Manufacturer: Rome Cable Corp Rome, NY
Model Number:
Purchase Order Number: 5935-E-22-B
Function/Service: Transmit Electrical Signals/Power & Control
Accuracy: Spec: Demo:
Location: Inside Containment
Elevation: Various
Flood Level Elevation 596'-0" Above Flood Level: Yes: No: *See Note 2

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	12 Days See Sheet 2	Section III.B	2, 3	Test & Analysis	
Temperature (°F)	See Figures 7, 8	303°F	Section II.D.1	2, 3	Test & Analysis	
Pressure (PSIA)	See Figure 9	80	Section II.D.1	1, 2, 3	Test & Analysis	
Relative Humidity (%)	100	100	Section II.D.1	1, 2, 3	Test & Analysis	
Chemical Spray	1750 to 2000 Ppm Boric Acid With 50 - 100 ppm N_2H_4	Boric Acid 2000 Ppm, NaOH Solution To Maintain pH of 9	Section II.D.2	2, 3, 4	Test & Analysis	
Radiation (Rad)	Note 1	5×10^8	Section II.D.5	2, 3	Test & Analysis	
Aging	40 Years Plus LOCA	40 Years Plus LOCA	Section II.D.8	2, 3	Test & Analysis	
Submergence	Yes	Yes	Section II.D.3	2, 3	Test & Analysis	

DOCUMENTATION REFERENCES	NOTES
1. Franklin Institute Research Laboratories Final Report F-C2870 September, 1970.	1. Gamma: 2×10^7 R; beta: 2×10^8 R at surface, 2×10^7 R at 0.03", 2×10^6 R at 0.07".
2. Franklin Institute Research Laboratories Final Report F-C3016 June, 1971 and Addendum dated August 4, 1971.	2. Portions of cables are submerged. See Sheet 2 for discussion.

Component Cable ZCX

This cable was not included in the November 1978 CP Co submittal and, therefore, was not addressed in the Franklin Research Center report.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Primary Coolant System Plant I.D. Number: SV-1910-1911 Component: Solenoid Valve Manufacturer: ASCO Model Number: HT8320A22 Purchase Order Number: Function/Service: NSSS Sample Containment Isolation Valves Accuracy: Spec: Demo: Location: Above Room 121A Elevation: 606'-9"	Operating Time	30 Days	See Sheet 2	Sec III.B	See Sh 2	Evaluation	
	Temperature (°F)	135	See Sheet 2	Sec II.D.8	See Sh 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Sec II.D.8	See Sh 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Sec II.D.8	See Sh 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	1.0E07	4.4E06	Sec II.D.7	1	Evaluation	
	Aging	40 Years Plus LOCA	See Sheet 2	Sec II.D.8	See Sh 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. The Effects of Nuclear Radiation on Elastomeric and Plastic Components and Materials, et al, REIC Report #21.	

Component ASCO Solenoid Valves SV-1910, 1911

These valves provide the containment isolation function for the NSSS sample line. The isolation signal is either CHP or CHR and occur prior to the room becoming a hostile area. The solenoids de-energize to their on-the-shelf state on the isolation signal, closing the control valves.

Another function to provide sampling has been imposed on these valves. This would require the valves to operate in the higher temperature and radiation environment on a periodic basis. The sample valves inside containment are not qualifiable in the post-accident containment environment; therefore, these isolation valves need not function for sampling until qualified replacements are obtained for the sample valves. The valves will be replaced by 1/1/82 to meet the post-TMI action plan requirements.

Component ASCO Solenoid Valves SV-1910, 1911

DORGR 3 Service Conditions Outside of Containment

DORGR 3B Areas Where Fluids Are Recirculated From Inside Containment To Accomplish Long-Term Core Cooling Following a LOCA

The service conditions for the 30-day post-accident period are T = 135°F P = 14.7 psia, RH = 100%, radiation = 1.0E07 rads and lifetime 40 years plus LOCA. The presnt required function of the valves to operate on CHP or CHR occurs prior to the higher temperatures and radiation occurs.

DORGR 5 Qualification by a Combination of Methods (Test, Evaluation, Analysis)

DORGR 5A Qualification by Evaluation and/or Analysis

The methodology for calculating the radiation dose is discussed in Section II.D.5. The does is assumed to result from pipes in the area carrying liquid from the containment sump. Reference 1 provides the basis for the radiation qualification to a 25% compression set. Although the TID exceeds the qualification dose, the valve only is presently required to operate on CHP or CHR and is not required thereafter.

DORGR 7 Aging

The effects of accelerated aging due to elevated temperatures and higher than normal radiation will be experienced by the valves. They, however, will operate (on CHP or CHR) prior to the area becoming harsh. No subsequent operating of the valve is presently required and it will remain in its de-energized on-the-shelf position. Requirements of NUREG 0588 and the post TMI action plan require a sampling system for which these valves will be required to operate. To satisfy these requirements, the valves will be replaced by 1/1/82.

DORGR 8 Documentation

References 1 proves the documentation.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System:
Service Water System
Plant I.D. Number:
SV-0825
Component:
Solenoid Valve
Manufacturer:
ASCO
Model Number:
WPHT-8300B61-RF
Purchase Order Number:

Function/Service:
Service Water to ESS Room Cooler

Accuracy: Spec:
Demo:
Location:
Room 123 - See Note 1
Elevation:
597'-6"

Flood Level Elevation Above Flood Level:
Yes: No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	30 Days	Section III.B	See Sheet 2	Evaluation	
Temperature (°F)	104	104	Section II.D.8	See Sheet 2	Evaluation	
Pressure (PSIA)	14.7	14.7	Section II.D.8	See Sheet 2	Evaluation	
Relative Humidity (%)	80	80	Section II.D.8	See Sheet 2	Evaluation	
Chemical Spray	None					
Radiation (Rad)	3.0×10^4	7.0×10^6	Section II.D.7	1	Evaluation	
Aging	40 Years + LOCA	40 Years + LOCA	Section II.D.8	See Sheet 2	Evaluation	
Submergence						

DOCUMENTATION REFERENCES

1. The effect of nuclear radiation on elastomeric and plastic components and materials, R W King, et al, REIC Report #21.

NOTES

1. This component is required for a LOCA and/or MSLB inside containment only; although Room 123 will experience harsh environmental conditions in the event of an MSLP, this equipment is not required for this accident (see Section II.D.6). The valve is located 30 feet from the containment wall.

G-0858-01A

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Service Water System Plant I.D. Number: SV-0878 Component: Solenoid Valve Manufacturer: ASCO Model Number: WPHT-8300B61-RF Purchase Order Number: Function/Service: Service Water to ESS Room Cooler Accuracy: Spec: Demo: Location: Room 123 - See Note 1 Elevation: 596'-11"	Operating Time	30 Days	30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	104	104	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	80	80	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	4.0×10^4	7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA	40 Years + LOCA	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. The effect of nuclear radiation on elastomeric and plastic components and materials, R W King, et al, REIC Report #21.	1. This component is required for a LOCA and/or MSLB inside containment only; although Room 123 will experience harsh environmental conditions in the event of an MSLB, this equipment is not required for this accident (see Section II.D.6). The valve is located 20 feet from the containment wall.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT		DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident / Qualification	Accident	Qual		
System: Service Water System Plant I.D. Number: SV-0847 Component: Solenoid Valve Manufacturer: ASCO Model Number: LB-831614 Purchase Order Number: Function/Service: Service Water for Containment Air Coolers Accuracy: Spec: Demo: Location: Room 123 - See Note 1 Elevation: 610'-1" Flood Level Elevation Above Flood Level: Yes: No:	Operating Time	30 Days / 30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	104 / 104	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7 / 14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	80 / 80	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None				
	Radiation (Rad)	4.0×10^4 / 7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA / 40 Years + LOCA	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence				

DOCUMENTATION REFERENCES	NOTES
1. The effect of nuclear radiation on elastomeric and plastic components and materials, R W King, et al, REIC Report #21.	1. This component is required for a LOCA and/or an MSLB inside containment only; although Room 123 will experience harsh environmental conditions in the event of an MSLB, this equipment is not required for this accident (see Section II.D.6). The valve is located 20 feet from the containment wall.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT		DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident / Qualification	Accident	Qual		
System: Component Cooling System Plant I.D. Number: SV-0910,-0911,-0940 Component: Solenoid Valve Manufacturer: ASCO Model Number: LB-831614 Purchase Order Number: Function/Service: Isolation Valves on Component Cooling Water System Accuracy: Spec: Demo: Location: Room 123 - See Note 1 Elevation: 604'-3"	Operating Time	30 Days / 30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	104 / 104	Section II.D.6	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7 / 14.7	Section II.D.6	See Sheet 2	Evaluation	
	Relative Humidity (%)	80 / 80	Section II.D.6	See Sheet 2	Evaluation	
	Chemical Spray	None				
	Radiation (Rad)	1.0×10^6 / 7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA / 40 Years + LOCA	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence				
Flood Level Elevation Above Flood Level: Yes: No:						

DOCUMENTATION REFERENCES	NOTES
1. The effect of nuclear radiation on elastomeric and plastic components and materials, R W King, et al, REIC Report #21.	1. These components are required for a LOCA and/or MSLB inside containment only; although Room 123 will experience harsh environmental conditions in the event of an MSLB, this equipment is not required for this accident (see Section II.D.6). These valves are located 2 to 5 feet from the containment wal

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Component Cooling System Plant I.D. Number: SV-0937,-0938 Component: Solenoid Valves Manufacturer: ASCO Model Number: LB-831614 Purchase Order Number: Function/Service: Component Cooling Water to Shutdown HX Accuracy: Spec: Demo: Location: Room 123 - See Note 1 Elevation: 602'-2"	Operating Time	30 Days	30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	104	104	Section II.D.6	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D.6	See Sheet 2	Evaluation	
	Relative Humidity (%)	80	80	Section II.D.6	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	3.0×10^4	7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA	40 Years + LOCA	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. The effect of nuclear radiation on elastomeric and plastic components and materials, R W King, et al, REIC Report #21.	1. These components are required for a LOCA and/or MSLB inside containment only; although Room 123 will experience harsh environmental conditions in the event of an MSLB, this equipment is not required for this accident (see Section II.D.6). These valves are located 25 feet from the containment wall.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Shield Cooling Plant I.D. Number: SV-0939 Component: Solenoid Valve Manufacturer: ASCO Model Number: WPHT-8300B61-RF Purchase Order Number: Function/Service: Shield Cooling Makeup Containment Isolation Accuracy: Spec: Demo: Location: Room 123 - See Note 1 Elevation: 602'-9"	Operating Time	30 Days	30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	104	104	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	80	80	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	4.0×10^4	7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA	40 Years + LOCA	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. The effect of nuclear radiation on elastomeric and plastic components and materials, R W King, et al, REIC Report #21.	1. This component is required for a LOCA and/or an MSLB inside containment only; although Room 123 will experience harsh environmental conditions in the event of an MSLB, this equipment is not required for this accident (see Section II.D.6). The valve is located 20 feet from the containment wall.

278

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Component Cooling System Plant I.D. Number: SV-0944A Component: Solenoid Valves Manufacturer: ASCO Model Number: LB-831614 Purchase Order Number: Function/Service: CCW to Radwaste and Fuel Pool CLG Accuracy: Spec: Demo: Location: Room 123 - See Note 1 Elevation:	Operating Time	30 Days	30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	104	104	Section II.D.6	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D.6	See Sheet 2	Evaluation	
	Relative Humidity (%)	80	80	Section II.D.6	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	4.0×10^4	7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA	40 Years + LOCA	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. The effect of nuclear radiation on elastomeric and plastic components and materials, R W King, et al, REIC Report #21.	1. These components are required for a LOCA and/or MSLB inside containment only; although Room 123 will experience harsh environmental conditions in the event of an MSLB, this equipment is not required for this accident (see Section II.D.6). The valves are located 20 feet from the containment wall.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Component Cooling System Plant I.D. Number: SV-0945,-0946 Component: Solenoid Valves Manufacturer: ASCO Model Number: LB-831614 Purchase Order Number: Function/Service: Component Cooling Water Valves Accuracy: Spec: Demo: Location: Room 123 - See Note 1 Elevation: 594'-6"	Operating Time	30 Days	30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	104	104	Section II.D.6	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D.6	See Sheet 2	Evaluation	
	Relative Humidity (%)	80	80	Section II.D.6	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	2.5×10^4	7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA	40 Years + LOCA	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. The effect of nuclear radiation on elastomeric and plastic components and materials, R W King, et al, REIC Report #21.	1. These components are required for a LOCA and/or MSLB inside containment only; although Room 123 will experience harsh environmental conditions in the event of an MSLB, this equipment is not required for this accident (see Section II.D.6). These valves are located 30 feet from the containment wall.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT		DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident / Qualification	Accident	Qual		
System: Radwaste System Plant I.D. Number: See Note 1 Component: Solenoid Valve Manufacturer: ASCO Model Number: WPHT-8300B61-RF Purchase Order Number: Function/Service: PSDT and CWRT Containment Isolation Valve Accuracy: Spec: Demo: Location: Room 150 - Note 2 Elevation: 606'-8"	Operating Time	30 Days / 30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	92 / 92	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7 / 14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	80 / 80	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None				
	Radiation (Rad)	4.0×10^4 / 7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA / 40 Years + LOCA	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence				
Flood Level Elevation Above Flood Level: Yes: No:						

DOCUMENTATION REFERENCES	NOTES
1. The effect of nuclear radiation on elastomeric and plastic components and materials, R W King, et al, REIC Report #21.	1. SV-1001, -1004, -1037, -1064 and -1065. 2. These valves are located 1 to 5 feet from the containment wall.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT		DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident / Qualification	Accident	Qual		
System: Radwaste System Plant I.D. Number: SV-1002,-1007,-1036 Component: Solenoid Valve Manufacturer: ASCO Model Number: WPHT-8300B61-RF Purchase Order Number: Function/Service: PSDT and CWRT Containment Isolation Valves Accuracy: Spec: Demo: Location: Room 118 - Note 1 Elevation: 596'-0"	Operating Time	30 Days / 30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	80 / 80	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7 / 14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	80 / 80	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None				
	Radiation (Rad)	4.0×10^5 / 7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA / 40 Years + LOCA	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence				
Flood Level Elevation Above Flood Level: Yes: No:						

DOCUMENTATION REFERENCES	NOTES
1. The effect of nuclear radiation on elastomeric and plastic components and materials, R W King, et al, REIC Report #21.	1. These valves are located 2 feet from the containment wall.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Radwaste System Plant I.D. Number: SV-1038,-1044,-1045 Component: Solenoid Valve Manufacturer: ASCO Model Number: WPHT-8500B61-RF Purchase Order Number: Function/Service: CWRT Containment Isolation Valves Accuracy: Spec: Demo: Location: Room 118 - Note 1 Elevation: 595'-0"	Operating Time	30 Days	30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	92	92	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	80	80	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	3.0×10^5	7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA	40 Years + LOCA	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. The effect of nuclear radiation on elastomeric and plastic components and materials, R W King, et al, REIC Report #21.	1. These valves are located 3 feet from the containment wall.

G-0858-01A

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Waste Gas System Plant I.D. Number: SV-1101, 1102 Component: Solenoid Valve Manufacturer: ASCO Model Number: WPHT-8300B61-RF Purchase Order Number: Function/Service: DWDT Containment Isolation Valves Accuracy: Spec: Demo: Location: Room 150 - Note 1 Elevation: 606'-4"	Operating Time	30 Days	30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	92	92	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	80	80	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	4.0×10^4	7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA	40 Years + LOCA	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. The effect of nuclear radiation on elastomeric and plastic components and materials, R W King, et al, REIC Report #21.	1. The valves are located 4 to 5 feet from the containment wall.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT		DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident / Qualification	Accident	Qual		
System: Radwaste System Plant I.D. Number: SV-1103, 1104 Component: Solenoid Valve Manufacturer: ASCO Model Number: WPHT-8300B61-RF Purchase Order Number: Function/Service: Containment Sump Drain Isolation Valves Accuracy: Spec: Demo: Location: See Note 1 Elevation: Flood Level Elevation Above Flood Level: Yes: No:	Operating Time	30 Days / 30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	80 / 80	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7 / 14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	80 / 80	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None				
	Radiation (Rad)	1.0×10^6 / 7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA / 40 Years + LOCA	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence				

DOCUMENTATION REFERENCES	NOTES
1. The effect of nuclear radiation on elastomeric and plastic components and materials, R W King, et al, REIC Report #21.	1. Next to ESF room near 4" containment penetration.

G-0858-01A

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT		DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident / Qualification	Accident	Qual		
System: Miscellaneous Gas Supply Plant I.D. Number: SV-1358 Component: Solenoid Valve Manufacturer: ASCO Model Number: WPHT-8300B61-RF Purchase Order Number: Function/Service: Nitrogen Isolation Valve Accuracy: Spec: Demo: Location: Room R150 Note 1 Elevation: 605'-7"	Operating Time	30 Days / 30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	92 / 92	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7 / 14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	80 / 80	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None				
	Radiation (Rad)	2.0×10^4 / 7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA / 40 Years + LOCA	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence				
Flood Level Elevation Above Flood Level: Yes: No:						

DOCUMENTATION REFERENCES	NOTES
1. The effect of nuclear radiation on elastomeric and plastic components and materials, R W King, et al, REIC Report #21.	1. The valve is located ten feet from the containment wall.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT		DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident / Qualification	Accident	Qual		
System: Heating, Ventilating and Air Conditioning Plant I.D. Number: SV-1501, 1502, 1503 Component: Solenoid Valve Manufacturer: ASCO Model Number: WPHT-8300B61-RF Purchase Order Number: Function/Service: Steam Heat Containment Isolation Valves Accuracy: Spec: Demo: Location: Room 150 Note 1 Elevation: 605'-10"	Operating Time	30 Days / 30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	92 / 92	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7 / 14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	80 / 80	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None				
	Radiation (Rad)	4.0×10^4 / 7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA / 40 Years + LOCA	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence				
Flood Level Elevation Above Flood Level: Yes: No:						

DOCUMENTATION REFERENCES	NOTES
1. The effect of nuclear radiation on elastomeric and plastic components and materials, R W King, et al, REIC Report #21.	1. The valves are located 5 feet from the containment wall.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT		DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident / Qualification	Accident	Qual		
System: Heating, Ventilating and Air Conditioning Plant I.D. Number: SV-1813, 1814 Component: Solenoid Valve Manufacturer: ASCO Model Number: LB 831624 Purchase Order Number: Function/Service: Air Room Purge Containment Isolation Valves Accuracy: Spec: Demo: Location: Room 150 Note 1 Elevation: 604'-0"	Operating Time	30 Days / 30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	92 / 92	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7 / 14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	80 / 80	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None				
	Radiation (Rad)	3.0×10^4 / 7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA / 40 Years + LOCA	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence				
Flood Level Elevation Above Flood Level: Yes: No:						

DOCUMENTATION REFERENCES	NOTES
1. The effect of nuclear radiation on elastomeric and plastic components and materials, R W King, et al, REIC Report #21.	1. The valves are located 7 feet from the containment wall.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT		DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident / Qualification	Accident	Qual		
System: Chemical Volume Control Plant I.D. Number: SV-2009, 2083 Component: Solenoid Valve Manufacturer: ASCO Model Number: WPHT-8300B61-RF Purchase Order Number: Function/Service: PC Letdown and PC Pump Controlled Bleed Off Isolation Accuracy: Spec: Valves Demo: Location: Room 150 Note 1 Elevation: Flood Level Elevation Above Flood Level: Yes: No:	Operating Time	Accident: 30 Days Qualification: 30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	Accident: 92 Qualification: 92	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	Accident: 14.7 Qualification: 14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	Accident: 80 Qualification: 80	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	Accident: None Qualification:				
	Radiation (Rad)	Accident: 4.0×10^4 Qualification: 7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	Accident: 40 Years + LOCA Qualification: 40 Years + LOCA	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Accident: Not Subject to Submergence Qualification:				

DOCUMENTATION REFERENCES	NOTES
1. The Effect of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REIC Report #21.	1. The valves are located 1 to 5 feet from the containment wall.

Component ASCO Solenoid Valves

This equipment is required for LOCA and/or MSLB inside containment only.

The area is maintained at normal, nonharsh, environmental conditions with respect to temperature, pressure and humidity. Therefore, this equipment does not experience significant stress due to a change in service conditions during an accident and the guidelines are met for these three parameters. The accident radiation dose has been calculated for the valve(s) based on its location from the containment wall and its location with respect to containment penetrations, reference Section II.D.7. The qualification radiation dose at which the most susceptible elastomer becomes degraded (25% compression set) has been determined from Reference 1. The qualification of the valves, with respect to the radiation dose is based on the reference data exceeding the calculated dose value. Age sensitive materials will be replaced in valves as necessary and then inspected per manufacturer's instructions. Initial inspection and replacement of parts will be completed by June 30, 1982.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System:
Chemical and Volume Control
Plant I.D. Number:
SV-2113, -2115
Component:
Solenoid Valve
Manufacturer:
ASCO
Model Number:
WPXHVA2023012F
Purchase Order Number:
16J56
Function/Service:
Charging System Stop Valves
Accuracy: Spec:
Demo:
Location:
Containment
Elevation:
608'-6"
Flood Level Elevation 596'-0"
Above Flood Level:
Yes: X No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	30 Days	Section III.B.	1	Test	
Temperature (°F)	278 Note 1	346	Section II.D.1	1	Test	
Pressure (PSIA)	70 Note 2	125	Section II.D.1	1	Test	
Relative Humidity (%)	100	100	Section II.D.1	1	Test	
Chemical Spray	1750 to 2000 ppm Boric Acid With 50-100 ppm N_2H_4	Boric Acid See Sheet 2	Section	1	Test	
Radiation (Rad)	2×10^7	2×10^8	Section II.D.5	1	Test	
Aging	40 Years Plus LOCA	18 Years Plus LOCA	Section II.D.8	1, 2	Test & Analysis	
Submergence	None					

DOCUMENTATION REFERENCES	NOTES
1. ASCO Test Report No AQS21678/TR, Rev A. 2. ASCO letter with attached interoffice correspondence W M Brown to M R Wade dated September 16, 1980.	1. For LOCA, 278°F; for MSLB, 380°F. See Section II, Figures 7, 8 and 10. 2. See Figures 9 and 10.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Chemical and Volume Control Plant I.D. Number: SV-2117 Component: Solenoid Valve Manufacturer: ASCO Model Number: HTX-8320A16V Purchase Order Number: Function/Service: Pressurizer Auxiliary Spray Valve Accuracy: Spec: Demo: Location: Containment Elevation: 608'-6"	Operating Time	30 Days	30 Days	Section III.B	1	Test	
	Temperature (°F)	278 Note 1	346	Section II.D.1	1	Test	
	Pressure (PSIA)	70 Note 2	125	Section II.D.1	1	Test	
	Relative Humidity (%)	100	100	Section II.D.1	1	Test	
	Chemical Spray	1750 to 2000 ppm Boric Acid With 50-100 ppm N_2H_4	Boric Acid See Sheet 2	Section II.D.2	1	Test	
	Radiation (Rad)	2.0×10^7	2.0×10^8	Section II.D.5	1	Test	
	Aging	40 Years Plus LOCA	18 Years Plus LOCA	Section II.D.8	1, 2	Test & Analysis	
	Submergence	None					
Flood Level Elevation 596'-0" Above Flood Level: Yes: X No:							

DOCUMENTATION REFERENCES	NOTES
1. ASCO Test Report No ACS21678/TR, Rev A. 2. ASCO letter with attached interoffice memo, W M Brown to M R Wade dated September 16, 1980.	1. For LOCA, 278°F; for MSLB, 380°F. See Section II, Figures 7, 8 and 10. 2. See Figures 9 and 10.

G-0858-01A

Sheet 4

Component Solenoid Valves for Charging System and Pressurizer Aux Spray Valves

The solenoid valves were part of the November 1978 CP Co submittal. Franklin Institute's comments on Page 9, Item 3, and Item 3.3.3.1, Page 22, are responded to below.

Based on the Franklin review to Engineering Report 112, it was concluded there was no basis to qualify the 202-301 model valve and since Report 110 was not available, there was no documentation to support any qualification for the 8320 model valve. Also, as stated by Franklin, the Report 112, which is identical to Report 110 except for the valve tested, does not provide required qualification as only temperature and seismic testing were done and radiation, humidity, chemical spray and pressure qualification was based on analysis and knowledge of materials as well as previous testing. ASCO has stated the subject valves contain materials identical to those in the valves tested identified in Test Report AQS21678/TR, Revision A. The enclosures for the subject valves are similar or less protective than the enclosures for the tested valves. Because of the similarity, the qualification test which provided thermal, radiation, wear aging, seismic simulation, vibration endurance, accident radiation and simulated LOCA is the basis for the qualification of the subject valves to the guideline requirements.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT		DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident / Qualification	Accident	Qual		
System: Engineered Safeguards System Plant I.D. Number: SV-3001, -3002 Component: Solenoid Valve Manufacturer: ASCO Model Number: WPHT-8300B61-RF Purchase Order Number: Function/Service: Containment Spray Valves Accuracy: Spec: Demo: Location: Room 121A Elevation: 605'-1"	Operating Time	30 Days / See Sheet 2	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	135 / See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7 / 14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	100 / See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None				
	Radiation (Rad)	10×10^7 / 7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA / See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence				
Flood Level Elevation Above Flood Level: Yes: No:						

DOCUMENTATION REFERENCES	NOTES
1. The Effects of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REIC Report #21.	

300

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT		DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident / Qualification	Accident	Qual		
System: Engineered Safeguards System Plant I.D. Number: SV-3018, 3036, 3059 3070, 3071 Component: Solenoid Valve Manufacturer: ASCO Model Number: LB-8316C-44 Purchase Order Number: Function/Service: Safety Injection and Shutdown Cooling Valves Accuracy: Spec: Demo: Location: ESF Room Elevation: Approx 576'	Operating Time	30 Days / See Sheet 2	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	135 / See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7 / 14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	100 / See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None				
	Radiation (Rad)	1×10^7 / 7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA / See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence				
Flood Level Elevation Above Flood Level: Yes: No:						

DOCUMENTATION REFERENCES	NOTES
1. The Effects of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REIC Report #21.	

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT		DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident / Qualification	Accident	Qual		
System: Engineered Safeguards System Plant I.D. Number: SV-3027A Component: Solenoid Valve Manufacturer: ASCO Model Number: LB-8316C-34 Purchase Order Number: Function/Service: SIRW Tank Level Controlled Valve Accuracy: Spec: Demo: Location: ESF Room Elevation: 578'-1"	Operating Time	30 Days / See Sheet 2	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	135 / See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7 / 14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	100 / See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None				
	Radiation (Rad)	1.0×10^7 / 7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA / See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence				
Flood Level Elevation Above Flood Level: Yes: No:						

DOCUMENTATION REFERENCES	NOTES
1. The Effects of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REIC Report #21.	

301a

0858-01A

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System:
Engineered Safeguards System

Plant I.D. Number:
SV-3027B, 3029A, 3030A, 3031A

Component:
Solenoid Valve

Manufacturer:
ASCO

Model Number:
LB-8316C-36

Purchase Order Number:

Function/Service:
SIRW Tank Level Controlled Valves

Accuracy: Spec:
Demo:

Location:
ESF Room

Elevation:
578'-1"

Flood Level Elevation Above Flood Level:
Yes: No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	See Sheet 2	Section III.B	See Sheet 2	Evaluation	
Temperature (°F)	135	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
Pressure (PSIA)	14.7	14.7	Section II.D.8	See Sheet 2	Evaluation	
Relative Humidity (%)	100	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
Chemical Spray	None					
Radiation (Rad)	1.0×10^7	7.0×10^6	Section II.D.7	1	Evaluation	
Aging	40 Years + LOCA	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
Submergence	Not Subject to Submergence					

DOCUMENTATION REFERENCES	NOTES
1. The Effects of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REIC Report #21.	

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System:
Engineered Safeguards System

Plant I.D. Number:
SV-3029B, 3031B, 3057B

Component:
Solenoid Valve

Manufacturer:
ASCO

Model Number:
LB 8316C46

Purchase Order Number:

Function/Service:
SIRW Tank Level Controlled Valves

Accuracy: Spec:
Demo:

Location:
ESF Room

Elevation:
583'-4"

Flood Level Elevation Above Flood Level:
Yes: No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	See Sheet 2	Section III.B	See Sheet 2	Evaluation	
Temperature (°F)	135	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
Pressure (PSIA)	14.7	14.7	Section II.D.8	See Sheet 2	Evaluation	
Relative Humidity (%)	100	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
Chemical Spray	None					
Radiation (Rad)	1.0×10^7	7.0×10^6	Section II.D.7	1	Evaluation	
Aging	40 Years + LOCA	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
Submergence	Not Subject to Submergence					

DOCUMENTATION REFERENCES	NOTES
1. The Effects of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REIC Report #21.	

858-01A

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT		DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident / Qualification	Accident	Qual		
System: Engineered Safeguards System Plant I.D. Number: SV-3055B Component: Solenoid Valve Manufacturer: ASCO Model Number: LB-8316C-34 Purchase Order Number: Function/Service: Shutdown Cooling Heat Exchanger Isolation Valve Accuracy: Spec: Demo: Location: ESF Room Elevation: 578'-6"	Operating Time	30 Days / See Sheet 2	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	135 / See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7 / 14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	100 / See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None				
	Radiation (Rad)	1.0×10^7 / 7.0×10^6	Section II.D.7	See Sheet 2	Evaluation	
	Aging	40 Years + LOCA / See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence				
Flood Level Elevation Above Flood Level: Yes: No:						

DOCUMENTATION REFERENCES	NOTES
1. The Effects of Nuclear Radiation on Elastomeric and Plastics Components and Materials, R W King, et al, REIC Report #21.	

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Engineered Safeguards System Plant I.D. Number: SV-3056A, B,-3057A Component: Solenoid Valve Manufacturer: ASCO Model Number: LB 8316C-34 Purchase Order Number: Function/Service: SIRW Tank Level Controlled Valves Accuracy: Spec: Demo: Location: ESF Room Elevation: 582'-9"	Operating Time	30 Days	See Sheet 2	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	135	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	1.0×10^7	7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. The Effects of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REIC Report #21.	

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT		DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter / Accident / Qualification		Accident	Qual		
System: Engineered Safeguards System Plant I.D. Number: SV-3213A Component: Solenoid Valve Manufacturer: ASCO Model Number: LB-8316C-46 Purchase Order Number: Function/Service: Safety Injection and Shutdown Cooling Valves Accuracy: Spec: Demo: Location: ESF Room Elevation: 578'-0"	Operating Time	30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	135	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None				
	Radiation (Rad)	1.0×10^7	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence				
Flood Level Elevation Above Flood Level: Yes: No:						

DOCUMENTATION REFERENCES	NOTES
1. The Effects of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REIC Report #21.	

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Engineered Safeguards System Plant I.D. Number: See Note 1 Component: Solenoid Valve Manufacturer: ASCO Model Number: LB-8316C-34 Purchase Order Number: Function/Service: Safety Injection and Shutdown Cooling Valves Accuracy: Spec: Demo: Location: ESF Rooms Elevation: 581'-11"	Operating Time	30 Days	See Sheet 2	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	135	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	1.0×10^7	7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. The Effects of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REIC Report #21.	1. SV-3212B, -3213B, -3223A, B, -3224B, and -3037.

309

C-0858-01A

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Engineered Safeguards System Plant I.D. Number: SV-3212A, 3224A Component: Solenoid Valve Manufacturer: ASCO Model Number: LB-8316C-36 Purchase Order Number: Function/Service: Safety Injection and Shutdown Cooling Valves Accuracy: Spec: Demo: Location: ESF Room Elevation: 578'-3"	Operating Time	30 Days	See Sheet 2	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	135	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	1.0×10^7	7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. The Effects of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REIC Report #21.	

Component ASCO Solenoid Valves - SV-3001, -3002, -3018, -3027, -3029, -3030, -3031, -3036, -3037, -3055, -3056, -3057, -3059, -3070, -3071, -3212, -3213, -3223, -3224

All these valves are in the engineered safety system. The valves that are required to operate (containment spray, and SIRW level controlled valves), do so before the room becomes a hostile area, ie, prior to recirculation of the containment sump water. Once the valves do operate, they are not required to operate again. Several valves are electrically locked open or closed to provide proper alignment of the safety injection system. These valves are in their de-energized on the shelf positions and will remain in these positions. The remaining valves (SV-3070 and 3071) are also not required to operate from their de-energized on the shelf positions.

No qualification information for these valves could be located. Should a failure occur which would result in a position change from the normal position the operator would detect it and would secure the air to the valve. However, all valves will be replaced by June 30, 1982.

DORGR 3 Service Conditions Outside of Containment

DORGR 3A Areas Subject to a Severe Environment as a Result of a High-Energy Line Break (HELB)

DORGR 3B Areas Where Fluids Are Recirculated from Inside Containment to Accomplish Long-Term Core Cooling Following a LOCA

The service conditions are as follows: 135°F, atmospheric pressure, 100% relative humidity, 1×10^7 Rads TID Radiation Dose, and 40 years plus LOCA aging. The areas do not become hostile until after recirculation begins. All valves have been aligned at this point and no further operation of the valves is necessary. The valves are not qualified to operate in the hostile environment and will be replaced. See Sheet 2.

Radiation is discussed in DORGR 5 and aging in DORGR 7.

DORGR 3C Areas Normally Maintained at Room Conditions

DORGR 5 Qualification by a Combination of Methods (Test, Evaluation, Analysis)

DORGR 5A Qualification by Evaluation and/or Analysis

The 30-day radiation dose is calculated using the recirculating piping in the areas as radiation sources. The methodology is discussed in Section II.D.7. The referenced dose where the valve elastomers become degraded by 25% compression set is exceeded by the TID. The valves will be replaced.

Sheet 4

Component Solenoid Valves

The components were not included in the November 1978 CP Co submittal and, therefore, were not addressed by the Franklin Research Center report.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System: Critical Service Water
Plant I.D. Number: See Note 1.
Component: Solenoid Valve
Manufacturer: ASCO
Model Number: NP-831654E
Purchase Order Number:
Function/Service: Service Water for Containment Air Coolers
Accuracy: Spec: Demo:
Location: Containment
Elevation: 591'-0"
Flood Level Elevation 596'-0"
Above Flood Level: Yes: No: X

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	30 Days	Section III.B	1	Test	
Temperature (°F)	278 Note 2	346	Section II.D.1	1	Test	
Pressure (PSIA)	70	125	Section II.D.1	1	Test	
Relative Humidity (%)	100	100	Section II.D.1	1	Test	
Chemical Spray	Boric Acid	Boric Acid	Section II.D.2	1	Test	
Radiation (Rad)	2.0×10^7	2.0×10^8	Section II.D.5	1	Test	
Aging	40 Years Plus LOCA	18 Years Plus LOCA	Section II.D.8	1, 2	Test & Analysis	
Submergence	Yes	No	Section II.D.3	See Sheet 2	-	

DOCUMENTATION REFERENCES

1. ASCO Test Report AQS21678/TR, Revision A.
2. ASCO letter with attached interoffice correspondence, W M Brown to M R Wade dated September 16, 1980.

NOTES

1. SV-0861, -0862, -0864, -0865, -0867, -0869, -0870 and -0873.
2. For LOCA 278°F; for MSLB 380°F. See Section II, Figures 7, 8 and 10.

858-01A

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No.:
Revision:
Date:

DOCUMENTATION REFERENCES (cont)	NOTES (cont)
	3. Refer to Figures 9 and 10.

Sheet 2

Component Solenoid Valves to Containment Air Cooler Service Water Valves

The ASCO solenoid valve Models NP-831654E is qualified for use in the containment accident environment by the type test described in ASCO Test Report AQS21678/TR, Revision A. The test was based on suggestions contained in IEEE 323-1974, IEEE 382-1972, IEEE 344-1975 and IEEE 382/ANSI N278.2.1, Draft 3, Revision 1, June 1977. Seven valves were tested representing six generic families of ASCO solenoid valves and are qualified by adequately passing the test. The testing subjected the sample valves to thermal, radiation, wear aging, seismic simulation, vibration endurance, accident radiation and a 30-day LOCA simulation, complete with chemical spray.

The operating time required for the solenoid valves to operate is within seconds following a safety injection signal (SIS). SIS initiates tripping of the containment air cooler "B" fans which, in turn, de-energize the solenoid valves and the control valves open providing additional cooling water to the "A" fan coolers. The solenoid valves remain de-energized throughout the incident.

The containment temperature and pressure curves in Figures 7, 8, 9 and 10 in Section II provide the environmental requirements for the solenoid valves. The test LOCA simulation enveloped these pressure and temperature curves except for the peak temperature following an MSLB. This is discussed in DORGR 2A.

100% relative humidity was provided in the steam environment in the LOCA simulation. The boric acid spray during the 30-day LOCA simulation provided test qualification of the solenoid valves.

Both aging and accident radiation were subjected to the valves for a total dose of 2.0×10^8 rads of gamma radiation.

The aging criteria was determined based on preaging of the valves at 268°F for 12 days to simulate 4.4 years at 140°F. The normal operating temperature the valves are in is 104°F. The qualified life calculated form the 10°C rule is 18 years.

The solenoid valves have not been qualified to operate when submerged. However, the valves are not required to operate while submerged. Qualification is discussed under DORGR 1C. The valves will be moved to a location where submergence will not occur as a preventative measure.

Sheet 3

Component Solenoid Valves to Containment Air Cooler Service Water Valves

DORGR 1 Service Conditions Inside Containment for a LOCA

DORGR 1A Temperature and Pressure Steam Conditions

The ASCO qualification test exceeded the maximum temperature, pressure steam conditions and duration for the FSAR LOCA analysis.

DORGR 1B Radiation

Gamma The total integrated dose for equipment inside containment is 2×10^7 rads. The test provided, in two stages, a total dose of 2×10^8 rads of gamma radiation. The guidelines are met.

Beta Although the solenoid valves become submerged, the valve will operate, de-energize and vent off air from the control valve prior to being subjected to any beta dose.

DORGR 1C Submergence

The valves are located such that they become submerged. However, as stated on Sheet 2, the valves have de-energized on a signal following a trip of the "B" containment air cooler fans which are tripped by SIS (initiated by CHP or steam generator low level). The flooding of the lowest solenoid will occur after sufficient time for the solenoid valves to de-energize and vent air from the control valve cylinder and open the control valve. Refer to Table 2, Section II, and Sheet D of Appendix A. See Sheet 2.

DORGR 1D Containment Sprays

The Palisades containment sprays are boric acid (1,750 to 2,000 ppm boron) and 50 to 100 ppm hydrazine. Sodium hydroxide may be added as a pH buffer. ASCO's test consisted of sprays of boric acid (3,000 ppm boron) in solution with 0.064 molar sodium hydroxide to a pH between 9 and 11 at room temperature. The boric acid in the test is a higher concentration of acid and considered to be more detrimental to the valves. Hydrazine addition in the Palisades sprays is for a short period of time and does not remain in solution as hydrazine for any appreciable amount of time; therefore, the ASCO test without hydrazine is considered acceptable.

The solenoid valves also have operated before the containment sprays are on and are not required to operate subsequent to this.

DORGR 2 Service Conditions for a PWR MSLB Inside Containment

DORGR 2A Temperature and Pressure Steam Conditions

The ASCO test envelops the Palisades containment MSLB response shown on Figure 10 of Section II, except for the peak temperature of 380°F. The duration of time in which the Palisades transient exceeds the test peak temperature of 346°F at 110 psig is about 20 seconds (from 48 to 68 seconds on curve, Figure 4). The duration is then very short and because of this will have very little or no effect on the equipment.

Also, being that the valves operate prior to the temperature exceeding the test temperature, the higher assumed MSLB temperature will have no effect on the operability of the valves.

The guidelines are met by these valves as the requirements are met for LOCA, and Palisades is equipped with automatic containment sprays that are not subject to disabling single failure.

DORGR 2B Radiation

See DORGR 1B above.

DORGR 2C Submergence

See DORGR 1C above.

DORGR 2D Chemical Sprays

See DORGR 1D above.

DORGR 4 Qualification Methods

DORGR 4A Selection of Qualification Method

Qualification is by test. ASCO Test Report AQS21678/TR, Revision A.

DORGR 4B Qualification by Type Testing

1. Simulated Service Conditions and Test Duration

The simulated LOCA envloped the Palisades LOCA and MSLB analysis as explained above. It included a steam environment with chemical sprays and pretest irradiation. The simulated LOCA duration was 30 days. The conditions and test duration meet the guideline requirements.

2. Test Specimen

The test specimen was one of a generic family of valves which includes the installed solenoid valve. The materials are identical and only the enclosure was different. The test specimen meets the guideline requirements.

3. Test Sequence

Radiation was applied prior to the simulated LOCA environment. The test sequence meets the guideline requirements.

4. Test Specimen Aging

The test specimen was preaged using Arrhenius techniques to simulate a lifetime of 4.4 years at 140°F. The preaging exposed the valves to 268°F for 12 days. The guideline requirements for aging are satisfied.

5. Functional Testing and Failure Criteria

The valves operated during and following the LOCA simulation and all valves passed the test. The test met the guideline requirements.

6. Installation Interfaces

The valve is designed to operate in any position and no particular emphasis was applied in how to install the in-plant solenoid valves. The intent of the guidelines is met.

DORGR 6 Margin

Meeting the guidelines of DORGR 4 satisfies the margin requirements.

DORGR 7 Aging

Maintenance schedules will require replacement of all nonmetallic components, including coil, every 18 years.

DORGR 8 Documentation

References 1 and 2 provide the documentation.

Sheet 4

Component Solenoid Valves to Containment Air Cooler Service Water Valves

These solenoid valves were part of the November 1978 CP Co submittal. Franklin Institute's comments on Section 3.3.2.2 are responded to below.

a. A detailed test report, ASCO Test Report AQS21678/TR, Revision A, has been obtained which describes the qualification testing for the subject valves.

b. The test conducted by ASCO tested seven valves representing six generic families of solenoid valves. The valve tested, from the generic family for the installed valves, has but two insignificant differences. They differ in pipe size fitting and type of enclosure which is explosionproof and watertight as opposed to only watertight. All other valve parts materials, design of the valve and construction are the same for both the tested and installed valves.

c. Submergence is discussed on Sheet 3, Item DORGR 1C.

d. Qualified life for the valve based on the testing and information supplied by ASCO based on the Arrhenius equation and based on a normal ambient temperature of 104°F provides for a qualified lifetime of 18 years plus 1 LOCA. As stated earlier, the preventative maintenance program will be updated to show replacement of nonmetallic components that are due within the 18-year period.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System: Engineered Safeguard System
Plant I.D. Number: See Note 1
Component: Solenoid Valve
Manufacturer: ASCO
Model Number: WPHT8300B61-RF
Purchase Order Number:
Function/Service: Safety Injection Tank Valves
Accuracy: Spec: Demo:
Location: Inside Containment
Elevation: 608'-6"
Flood Level Elevation 596'-0" Above Flood Level: Yes: X No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	3 Hours	See Sheet 2	See Sheet 2	See Sheet 2	Evaluation	
Temperature (°F)	See Figures 7 & 8	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
Pressure (PSIA)	See Figure 9	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
Relative Humidity (%)	100	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
Chemical Spray	1750 to 2000 ppm Boric Acid With 50-100 ppm N_2H_4	See Sheet 2	Section II.D.2	See Sheet 2	Evaluation	
Radiation (Rad)	2.5×10^6	7.0×10^6	Section II.D.5	1	Evaluation	
Aging	40 Years + LOCA	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
Submergence	Not Subject to Submergence					

DOCUMENTATION REFERENCES	NOTES
1. The Effects of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REIC Report #21	1. SV-3069, -0338, -0342, -0346 and -0347

Sheet 2

Component ASCO Solenoid Valves

The safety injection tank check valve leakage isolation valves, SV-0338, -0342, -0346, -0347 and -3069 all close on SIS which is very early in the event. All but SV-3069 are de-energized to their on-the-shelf position. The SIT vent valves will remain closed at all times during the event. Procedures state to vent the nitrogen in three hours, but it is not a necessity. The vent valve solenoids are in their de-energized, on-the-shelf state. The valves are not qualifiable for the hostile containment atmosphere. But since the valves are not required to operate except on SIS, and SV-3069 only serves as a redundant valve isolation valve, they will not jeopardize the operation of the system. After core recovery and injection of the safety injection tank, none of the valves are required any longer. To provide guideline qualification of the solenoid valves, they will be replaced.

See writeup on E/P-0338, -0342, -0346 and -0347.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Component Cooling System Plant I.D. Number: See Note 1 Component: Solenoid Valve Manufacturer: ASCO Model Number: WPHT-8300-B61-RF Purchase Order Number: Function/Service: Component Cooling and Shutdown Heat Exchanger Accuracy: Spec: Demo: Location: ESF Room Elevation:	Operating Time	30 Days	See Sheet 2	Sec III.B	See Sh 2	Evaluation	
	Temperature (°F)	135	See Sheet 2	Sec II.D.8	See Sh 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Sec II.D.8	See Sh 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Sec II.D.8	See Sh 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	1.0×10^6	7.0×10^6	Sec II.D.7	1	Evaluation	
	Aging	40 Years Plus LOCA		Sec II.D.8	See Sh 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. The effect of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REK Report #21.	1. SV-0947, -0948, -0949, -0950 and -0951.

Component ASCO Solenoid Valves SV-0947, -0948, -0949, -0950 and -0951

For breaks inside containment which would, following RAS, make this a hostile area, only one valve SV-0950 operates. It receives an SIS signal and opens to allow cooling to the ESS pumps. Following this operation, which is prior to RAS, the valves are not required to operate for these breaks. For an HELB outside containment, which would render the component cooling water pumps inoperable, SV-0950 would have to be manually closed and SV-0951 manually opened. For this event though, the area is not hostile because cooling of the primary coolant system will be accomplished using the auxiliary feedwater system. The safeguard pumps can operate for awhile without cooling water. If they should fail, the core will still remain covered and filling of the primary coolant system will be accomplished with the charging pumps. Because operation occurs prior to the area becoming hostile and the valves remain in their de-energized on-the-shelf positions, operation of the systems is not jeopardized. The valves, however, are not qualified for the hostile environments and do not meet the guideline requirements. Due to this, they will be replaced or moved by June 30, 1982.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System:
Chemical and Volume Control

Plant I.D. Number:
SV-2117

Component:
Solenoid Valve

Manufacturer:
ASCO

Model Number:
HTX-8320A16V

Purchase Order Number:

Function/Service:
Pressurizer Auxiliary Spray Valve

Accuracy: Spec:
Demo:

Location:
Containment

Elevation:
608'-6"

Flood Level Elevation 596'-0"
Above Flood Level: Yes: X No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	30 Days	Section III.B	1	Test	
Temperature (°F)	278 Note 1	346	Section II.D.1	1	Test	
Pressure (PSIA)	70 Note 2	125	Section II.D.1	1	Test	
Relative Humidity (%)	100	100	Section II.D.1	1	Test	
Chemical Spray	Boric Acid	Boric Acid	Section II.D.2	1	Test	
Radiation (Rad)	2.0E07	2.0E08	Section II.D.5	1	Test	
Aging	40 Years Plus LOCA	18 Years Plus LOCA	Section II.D.8	1, 2	Test & Analysis	
Submergence	None		Section II.D.3			

DOCUMENTATION REFERENCES

1. ASCO Test Report No ACS21678/TR, Rev A.
2. ASCO letter with attached interoffice memo, W M Brown to M R Wade dated September 16, 1980.

NOTES

1. For LOCA, 278°F; for MSLB, 380°F. See Section II, Figures 7, 8 and 10.
2. See Figures 9 and 10.

G-0858-01A

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System:
Chemical and Volume Control

Plant I.D. Number:
SV-2113, -2115

Component:
Solenoid Valve

Manufacturer:
ASCO

Model Number:
WPXHVA2023012F

Purchase Order Number:
16J56

Function/Service:
Charging System Stop Valves

Accuracy: Spec:
Demo:

Location:
Containment

Elevation:
608'-6"

Flood Level Elevation 596'-0" Above Flood Level: Yes: X No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	30 Days	Section III.B	1	Test	
Temperature (°F)	278 Note 1	346	Section II.D.1	1	Test	
Pressure (PSIA)	70 Note 2	125	Section II.D.1	1	Test	
Relative Humidity (%)	100	100	Section II.D.1	1	Test	
Chemical Spray	Boric Acid	Boric Acid	Section II.D.2	1	Test	
Radiation (Rad)	2E07	2E08	Section II.D.5	1	Test	
Aging	40 Years Plus LOCA	18 Years Plus LOCA	Section II.D.8	1, 2	Test & Analysis	
Submergence	None		Section II.D.3			

DOCUMENTATION REFERENCES

1. ASCO Test Report No AQS21678/TR, Rev A.
2. ASCO letter with attached interoffice correspondence, W M Brown to M R Wade dated September 16, 1980.

NOTES

1. For LOCA, 278°F; for MSLB, 380°F. See Section II, Figures 7, 8 and 10.
2. See Figures 9 and 10.

858-01A

Sheet 2

Component Solenoid Valves for Charging System and Pressurizer Aux Spray Valves

ASCO solenoid valves Models WPXHVA-2023012F and HTS-8320A16V are qualified by similarity to solenoid valves tested and qualified in Test Report AQS21678/TR, Revision A. These model valves are manufactured using the identical materials used in the valves qualified in the test report. Their only difference is in the enclosures which provide similar or greater protection than those tested.

With the exception of operating time and submergence, the qualification explanation of these solenoid valves are the same as those used for SV-0861, et al, in the service water system. These valves do not become submerged and may be required to operate at any time following a LOCA. Via the test and the similarity, the valves are qualified to operate for 30 days in post-LOCA conditions.

The qualification test subjected the sample valves to thermal, radiation, wear aging, seismic simulation, vibration endurance, accident radiation and finally a 30-day LOCA simulation with chemical spray. Qualification to meet the guidelines is discussed on Sheet 3.

Sheet 3

Component Solenoid Valves for Charging System and Pressurizer Aux Spray Valves

DORGR 1 Service Conditions Inside Containment for a LOCA

DORGR 1A Temperature and Pressure Steam Conditions

The ASCO qualification test (Test Report AQS21678/TR, Revision A) exceeded the maximum temperature, pressure steam conditions and duration for the FSAR LOCA analysis.

DORGR 1B Radiation

Gamma The total integrated dose for equipment inside containment is 2×10^7 rads. The test provided, in two stages, a total dose of 2×10^8 rads of gamma radiation. The guidelines are met.

Beta

DORGR 1C Submergence

The valves will not become submerged.

DORGR 1D Containment Sprays

The Palisades containment sprays are boric acid (1,750 to 2,000 ppm boron) and 50 to 100 ppm hydrazine. Sodium hydroxide may be added as a pH buffer. ASCO's test consisted of sprays of boric acid (3,000 ppm boron) in solution with 0.064 moles of sodium hydroxide to a pH between 9 and 11 at room temperature. The boric acid in the test is a higher concentration of acid and considered to be more detrimental to the valves. Hydrazine addition in the Palisades sprays is for a short period of time and does not remain in solution as hydrazine for any appreciable amount of time. The ASCO test without the hydrazine is considered acceptable.

DORGR 2 Service Conditions for a PWR MSLB Inside Containment

DORGR 2A Temperature and Pressure Steam Conditions

The ASCO test envelops the Palisades containment MSLB response except for the peak temperature of 380°F. The test was conducted with a maximum temperature of 346°F at 110 psig. The duration of time the Palisades transient exceeds the test peak temperature is about 20 seconds. Since this duration is then very short, it will have little or no effect on the equipment.

Sheet 3 (Contd)

DORGR 2B Radiation

See DORGR 1B above.

DORGR 2C Submergence

See DORGR 1C above.

DORGR 2D Chemical Sprays

See DORGR 1D above.

DORGR 4 Qualification Methods

DORGR 4A Selection of Qualification Method

Qualification is by test. ASCO Test Report AQS21678/TR, Revision A, is applicable based on the similarity of these valves and those tested using identical materials and similar or less protected enclosures.

DORGR 4B Qualification by Type Testing

1. Simulated Service Conditions and Test Duration

The simulated LOCA envloped the Palisades LOCA and MSLB analysis as explained above. It included a steam environment with chemical sprays and a pretest irradiation. The simulated LOCA duration was 30 days. The conditions and test duration met the guideline requirements.

2. Test Specimen

The tested valves and those installed have identical materials and are of similar design and methods of construction.

3. Test Sequence

Radiation and thermal aging were accomplished prior to testing in the simulated LOCA environment.

4. Test Specimen Aging

The test specimen was preaged using Arrhenius techniques to simulate a lifetime of 4.4 years at 104°F. The preaging exposed the valves to 268°F for 12 days.

Sheet 3 (Contd)

5. Functional Testing and Failure Criteria

The valves operated during and following the LOCA simulation and all valves passed the test.

6. Installation Interfaces

SV-2113 and -2115 are mounted in a upright position with the solenoid vertical. SV-2117 may be mounted in any position. These are the specified mounting installation requirements, and the valves are mounted as required meeting the intent of the guideline.

DORGR 6 Margin

Meeting the guidelines of DORGR 4 satisfies the margin requirements.

DORGR 7 Aging

Maintenance schedules will require replacement of all nonmetallic components including the coil every 18 years based on ASCO information and the Arrhenius equation.

DORGR 8 Documentation

References 1 and 2 provide the documentation.

Sheet 4

Component Solenoid Valves for Charging System and Pressurizer Aux Spray Valves

The solenoid valves were part of the November 1978 CP Co submittal. Franklin Institute's comments on Page 9, Item 3, and Item 3.3.3.1, Page 22, are responded to below.

Based on the Franklin review to Engineering Report 112, it was concluded there was no basis to qualify the 202-301 model valve and since Report 110 was not available, there was no documentation to support any qualification for the 8320 model valve. Also, as stated by Franklin, the Report 112, which is identical to Report 110 except for the valve tested, does not provide required qualification as only temperature and seismic testing were done and radiation, humidity, chemical spray and pressure qualification was based on analysis and knowledge of materials as well as previous testing. ASCO has stated the subject valves contain materials identical to those in the valves tested identified in Test Report AQS21678/TR, Revision A. The enclosures for the subject valves are similar or less protective than the enclosures for the tested valves. Because of the similarity, the qualification test which provided thermal, radiation, wear aging, seismic simulation, vibration endurance, accident radiation and simulated LOCA is the basis for the qualification of the subject valves to the guideline requirements.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Service Water System Plant I.D. Number: SV-0844 Component: Solenoid Valve Manufacturer: ASCO Model Number: LM 831614 Purchase Order Number: Function/Service: Service Water Shut-off and Crosstie Accuracy: Spec: Demo: Location: Room 123 - Note 2 Elevation: 593'-2"	Operating Time	30 Days	30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	See Note 1	See Sheet 2	Section II.D.6	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D.6	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Section II.D.6	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	1.0×10^5	7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + Accident	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

342

DOCUMENTATION REFERENCES	NOTES
1. The Effect of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REIC Report #21	1. For LOCA 104°F, for MSLB Outside Containment 212°F for One Hour Then Linear Decline to T=104°F at 24 Hours 2. The Valve is Located 10 Feet From the Containment Wall

0858-01A

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Service Water System Plant I.D. Number: SV-0845 Component: Solenoid Valve Manufacturer: ASCO Model Number: LB-831614 Purchase Order Number: Function/Service: Service Water Shut-off and Crosstie Accuracy: Spec: Demo: Location: Room 123 - Note 2 Elevation: 593'-4"	Operating Time	30 Days	30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	See Note 1	See Sheet 2	Section II.D.6	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D.6	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Section II.D 6	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	3.0×10^4	7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + Accident	SeetSheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. The Effect of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REIC Report #21	1. For LOCA 104°F, for MSLB Outside Containment 212°F for One Hour Then Linear Decline to T=104°F at 24 Hours 2. The Valve is Located 30 Feet From the Containment Wall

G-0858-01A

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Service Water System Plant I.D. Number: SV-0846 Component: Solenoid Valve Manufacturer: ASCO Model Number: FT-8316C-14 Purchase Order Number: Function/Service: Service Water Shut-off and Crosstie Accuracy: Spec: Demo: Location: Room 123 - Note 2 Elevation: 594'-6"	Operating Time	30 Days	30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	See Note 1	See Sheet 2	Section II.D.6	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D.6	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Section II.D.6	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	4.0×10^4	4.4×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + Accident	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. The Effect of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REIC Report #21	1. For LOCA 104°F, for MSLB Outside Containment 212°F for One Hour Then Linear Decline to T=104°F at 24 Hours 2. The Valve is Located 25 Feet From the Containment Wall

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Service Water System Plant I.D. Number: SV-0857 Component: Solenoid Valve Manufacturer: ASCO Model Number: LM-831614 Purchase Order Number: Function/Service: Service Water Shut-off and Crosstie Accuracy: Spec: Demo: Location: Room 123 - Note 2 Elevation: 593'-1"	Operating Time	30 Days	30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	See Note 1	See Sheet 2	Section II.D.6	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D.6	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Section II.D.6	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	4.0×10^4	7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + Accident	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. The Effect of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REIC Report #21	1. For LOCA 104°F, for MSLB Outside Containment 212°F for One Hour Then Linear Decline to T=104°F at 24 Hours 2. The Valve is Located 20 Feet From the Containment Wall

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Service Water System Plant I.D. Number: SV-0876 Component: Solenoid Valve Manufacturer: ASCO Model Number: LB-831614 Purchase Order Number: Function/Service: Cooling to Diesels Accuracy: Spec: Demo: Location: Room 123 - Note 2 Elevation: 596'-0"	Operating Time	30 Days	30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	See Note 1	See Sheet 2	Section II.D.6	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D 6	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Section II.D.6	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	3.0×10^4	7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. The Effect of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REIC Report #21	1. For LOCA 104°F, for MSLB Outside Containment 212°F for One Hour Then Linear Decline to T=104°F for 24 Hours 2. This Valve is Located 30 Feet From the Containment Wall

Sheet 4

Component ASCO Solenoid Valves SV-0844, -0845, -0846, -0857, -0876, -0877

This equipment was not included in the November 1978 CP Co Submittal and, therefore, was not addressed by the Franklin Research Center Report.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Service Water Plant I.D. Number: SV-0824 Component: Solenoid Valve Manufacturer: Asco Model Number: LB831612 Purchase Order Number: Function/Service: Shutoff to Service Water to Containment Air Coolers Accuracy: Spec: Demo: Location: ESF Room 3 Elevation:	Operating Time	30 Days	See Sheet 2	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	135	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	1.0×10^7	7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + LOCA	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. The Effect of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REIC Report #21	

352

Component ASCO Solenoid Valve SV-0824

This valve was not included in the November 1978 CP Co submittal and was, therefore, not addressed by the Franklin Research Center Report.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Service Water System Plant I.D. Number: SV-0879, 0880 Component: Solenoid Valve Manufacturer: ASCO Model Number: WPHT 83000B61-RF Purchase Order Number: Function/Service: Service Water Backup to Cool ESF Pumps Accuracy: Spec: Demo: Location: Room 123 - Note 2 Elevation: 595'-4"	Operating Time	30 Days	30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	See Note 1	See Sheet 2	Section II.D.6	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D.6	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Section II.D.6	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	4.0×10^4	7.0×10^6	Section II.D.7	1	Evaluation	
	Aging	40 Years + Accident	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. The Effect of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REIC Report #21	1. For LOCA 104°F, for MSLB Outside Containment 212°F for One Hour Then Linear Decline to T=104°F at 24 24 Hours 2. These Valves are Located 20 Feet From the Containment Wall

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT		DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident / Qualification	Accident	Qual		
System: Primary Coolant System Plant I.D. Number: SV-1910, -1911 Component: Solenoid Valve Manufacturer: ASCO Model Number: HT8320A22 Purchase Order Number: Function/Service: NSSS Sample Containment Isolation Valves Accuracy: Spec: Demo: Location: Above Room 121A Elevation: 606'-9"	Operating Time	30 Days / See Sheet 2	Sec III.B	See Sh 2	Evaluation	
	Temperature (°F)	135 / See Sheet 2	Sec II.D.8	See Sh 2	Evaluation	
	Pressure (PSIA)	14.7 / 14.7	Sec II.D.8	See Sh 2	Evaluation	
	Relative Humidity (%)	100 / See Sheet 2	Sec II.D.8	See Sh 2	Evaluation	
	Chemical Spray	None				
	Radiation (Rad)	1.0×10^7 / 4.4×10^7	Sec II.D.7	1	Evaluation	
	Aging	40 Years Plus LOCA / See Sheet 2	Sec II.D.8	See Sh 2	Evaluation	
	Submergence	Not Subject to Submergence				
Flood Level Elevation Above Flood Level: Yes: No:						

DOCUMENTATION REFERENCES	NOTES
1. The Effects of Nuclear Radiation on Elastomeric and Plastic Components and Materials, et al, REIC Report #21.	

Component ASCO Solenoid Valves SV-1910, 1911

These valves provide the containment isolation function for the NSSS sample line. The isolation signal is either CHP or CHR and occur prior to the room becoming a hostile area. The solenoids de-energize to their on-the-shelf state on the isolation signal, closing the control valves.

Another function to provide sampling has been imposed on these valves. This would require the valves to operate in the higher temperature and radiation environment on a periodic basis. The sample valves inside containment are not qualifiable in the post-accident containment environment; therefore, these valves need not function for sampling until qualified replacements are obtained for the sample valves. The valves will be replaced before June 1982 to meet the post TMI action plan requirements.

Component ASCO Solenoid Valves SV-1910, 1911

DORGR 3 Service Conditions Outside of Containment

DORGR 3B Areas Where Fluids Are Recirculated From Inside Containment To Accomplish Long-Term Core Cooling Following a LOCA

The service conditions for the 30-day post-accident period are T = 135°F P = 14.7 psia, RH = 100%, radiation = 1.0×10^7 rads and lifetime 40 years plus LOCA. The present required function of the valves to operate on CHP or CHR occurs prior to the higher temperatures and radiation occurs.

DORGR 5 Qualification by a Combination of Methods (Test, Evaluation, Analysis)

DORGR 5A Qualification by Evaluation and/or Analysis

The methodology for calculating the radiation dose is discussed in Section II.D.5. The dose is assumed to result from pipes in the area carrying liquid from the containment sump. Reference 1 provides the basis for the radiation qualification to a 25% compression set. Although the TID exceeds the qualification dose, the valve only is presently required to operate on CHP or CHR and is not required thereafter.

DORGR 7 Aging

The effects of accelerated aging due to elevated temperatures and higher than normal radiation will be experienced by the valves. They, however, will operate (on CHP or CHR) prior to the area becoming harsh. No subsequent operating of the valve is presently required and it will remain in its de-energized on-the-shelf position. Requirements of NUREG 0588 and the post TMI action plan require a sampling system for which these valves will be required to operate. To satisfy these requirements, the valves will be replaced before June 1982.

DORGR 8 Documentation

References 1 proves the documentation.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Primary Coolant System Plant I.D. Number: SV-1901,2,3,4,5 Component: Solenoid Valve Manufacturer: ASCO Model Number: HT8320A22 Purchase Order Number: Function/Service: NSSS Sampling Valves Accuracy: Spec: Demo: Location: Inside Containment Elevation:	Operating Time	30 Days	See Sheet 2	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	See Figures 7&8	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Pressure (PSIA)	See Figure 9	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Chemical Spray	1750 to 2000 ppm Boric Acid With 50-100 Ppm N_2H_4	See Sheet 2	Section II.D.2	See Sheet 2	Evaluation	
	Radiation (Rad)	2.0×10^7	4.4×10^6	Section II.D.5	1	Evaluation	
	Aging	40 Years + LOCA	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject To Submergence					
Flood Level Elevation Above Flood Level: Yes: X No:							

DOCUMENTATION REFERENCES	NOTES
1. The Effects of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REI Report #21.	

In the case of a small break LOCA or MSLB, analysis indicates that the containment temperature may attain a value up to 190°F at a pressure of 5 psig for a duration not exceeding 36 seconds prior to the initiation of containment high-pressure trip. The coaxial cables will be required to remain functional for the above duration only under the above stated environmental parameters.

It is concluded that the coaxial cables are qualified to function satisfactorily in the excore flux detector applications based on the following reasons:

a. The total radiation exposure for the coaxial cables will not exceed 1.8×10^6 rads over a 40-year period including post-accident exposure for one hour. Discussion under Paragraphs 2.1.1 and 2.1.2 indicates that the cable can withstand up to at least 1×10^7 rads.

b. Discussion under Paragraph 2.1.2 indicates that the cable is suitable for continuous operation at 212°F. Even though this does not provide conclusive evidence of 40-year life qualification, it is obvious that normal operation at 104°F is not likely to lead to degradation of insulation.

c. Since submergence is preceded by containment spray which, in turn, is preceded by containment high-pressure trip, the requirement for functional capability of the coaxial cables would have terminated before submergence occurs. Therefore, submergence qualification is not required.

d. These cables are required to be functional for a very short duration only, following a LOCA and it is extremely unlikely that catastrophic failure can occur within a short time due to peak pressure of 51 psig or peak temperature of 278°F. The heat sink effect of the containment, combined with the thermal time constants, will protect the cable from immediate failure due to peak temperatures.

e. Discussion under 2.1.4 concludes that the cable is qualified for the chemical spray environment. However, as discussed under Paragraph c earlier, the cables will be required to remain operational for a short duration only, following the spray initiation.

f. Even if it is assumed that some degree of aging degradation might occur, analysis indicates that the result is likely to be a decline in mechanical strength. Such decline cannot be directly correlated with electrical properties and the insulation is likely to remain serviceable with relatively minor changes in electrical properties during periods of declining mechanical strength. Reducing

mechanical strength is not a concern since these cables are already in service and not subject to cable pull operations, etc.

The power range control channels may be required to remain functional for a slightly longer duration compared to safety channels. However, the service voltage on the control channels is about five volts only and under these conditions, since the electrical stresses on the insulation are reduced to insignificant levels, dielectric failure is highly unlikely.

Sheet 4

Component ASCO Solenoid Valve SV-0522A

This equipment was not included in the November 1978 CP Co submittal and was, therefore, not addressed by the Franklin Research Center report.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System:
Main Steam System

Plant I.D. Number:
SV-0738, -0739, -0767, -0768, -0770, -0771

Component:
Solenoid Valve

Manufacturer:
ASCO

Model Number:
WPHT 8300B61-RF

Purchase Order Number:

Function/Service:
Steam Generator Blowdown Isolation Valves

Accuracy: Spec:
Demo:

Location:
Room 238 See Note 1

Elevation:

Flood Level Elevation
Above Flood Level:
Yes: No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	30 Days	Section III.B	See Sheet 2	Evaluation	
Temperature (°F)	110	110	Section II.D.8	See Sheet 2	Evaluation	
Pressure (PSIA)	14.7	14.7	Section II.D.8	See Sheet 2	Evaluation	
Relative Humidity (%)	95	95	Section II.D.8	See Sheet 2	Evaluation	
Chemical Spray	None					
Radiation (Rad)	4.0×10^4	7.0×10^6	Section II.D.7	1	Evaluation	
Aging	40 Years + LOCA	40 Years + LOCA	Section	See	Evaluation	
Submergence	Not Subject to Submergence					

DOCUMENTATION REFERENCES

1. The Effect of Nuclear Radiation on Elastomeric and Plastic Components and Materials, R W King, et al, REIC Report #21

NOTES

1. These Components are Required for a LOCA and/or MSLB Inside Containment Only; Although Room 238 Will Experience Harsh Environmental Conditions in the Event of a MSLB, This Equipment is not Required for This Accident (See Section II.D.6). These Valves are Located 1 to 7 Feet From the Containment Wall

Component ASCO Solenoid Valves SV-0438A, B

This equipment was not included in the November 1978 CP Co submittal and, therefore, was not addressed by the Franklin Research Center Report.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System:
Component Cooling System

Plant I.D. Number:
EMA-1208, 1116, 1109

Component:
Motor

Manufacturer:
Louis-Allis

Model Number:
8289252001,2,3 COGX

Purchase Order Number:
5935-M34

Function/Service:
Component Cooling Motor

Accuracy: Spec:
Demo:

Location:
Room 123 - See Note 1

Elevation:
590'-0"

Flood Level Elevation
Above Flood Level:
Yes: No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	30 Days	Section III.B	1	Evaluation	
Temperature (°F)	104	104	Section II.D.8	1	Evaluation	
Pressure (PSIA)	14.7	14.7	Section II.D.8	1	Evaluation	
Relative Humidity (%)	80	100	Section II.D.8	1,2	Evaluation	
Chemical Spray	None					
Radiation (Rad)	$6x10^5$	See Sheet 2	Section II.D.7	6	Evaluation	
Aging	40 Years	See Sheet 2	Section II.D.8	6	Evaluation	
Submergence	Not Subject to Submergence					

DOCUMENTATION REFERENCES

1. Electric Motor Data Sheet for Component Cooling Motors Submitted by Louis-Allis
2. Letter From Mr Schreiber of Louis-Allis to C St Onge of Bechtel, Dated September 17, 1980

NOTES

1. These motors will be affected by Main Steam Line Break outside containment but are not required to operate for that break.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Engineering safeguards system Plant I.D. Number: See Note 1 Component: Electro-Pneumatic Transducer Manufacturer: Fischer Controls Co Model Number: E/P-546 Purchase Order Number: M-233 Function/Service: Safety Injection Tank T-82A,B,C,D Valves Accuracy: Spec: Demo: Location: Inside Containment Elevation: Note 2 Flood Level Elevation 596'-0" Above Flood Level: Yes: X No:	Operating Time	1 Hour		Section III.B			
	Temperature (°F)	See Figures 7 & 8	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Pressure (PSIA)	See Figure 9	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Chemical Spray	1750 to 2000 ppm Boric Acid with 50 to 100 ppm N_2H_4	See Sheet 2	Section II.D.2	See Sheet 2	Evaluation	
	Radiation (Rad)	2.5×10^6	See Sheet 2	Section II.D.5	See Sheet 2	Evaluation	
	Aging	40 Years + LOCA	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					

385

Rev 2

DOCUMENTATION REFERENCES	NOTES
1. Laboratory Report, "Operational Tests of the Fischer Type 546 Electropneumatic Transducer for Nuclear Reactor Containment Vessel Service," June 12, 1973. 2. Letter from H Douglas Waldron, Harley Company, to W. G. Cooper, Consumers Power Company, January 24, 1978.	1. E/P-0338, E/P-0342, E/P-0346, E/P-0347 2. Respective elevations: 615'-6", 615'-6", 618'-6", 615'-6"

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Engineering safeguards system Plant I.D. Number: E/P-3025 Component: Electro pneumatic positioner Manufacturer: Masoneilan Model Number: 8012 Purchase Order Number: M-233 Function/Service: Lineup & monitor shutdown clg flow Accuracy: Spec: Demo: Location: ESF room Elevation: 570'-0"	Operating Time	30 days	30	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	135	135	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	100	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	1×10^7	1×10^7	Section II.D.7	1	Evaluation	
	Aging	40 years + LOCA	Yes	Section II.D.8	1	Evaluation	
	Submergence	Not subject to submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. Letter from Jeffrey Waal, Masoneilan, to K Toner, Consumers Power Company, August 28, 1980.	

Sheet 2

Component Masoneilan electro-pneumatic positioner

With respect to pressure and relative humidity, the required values (atmospheric and 100% rh) are benign conditions and do not expose the component to stress.

With respect to temperature, 135F is designated as a harsh or hostile environment; however, the equipment is considered adequate for 30-day operation at 135F. Metallic parts, in particular, are not susceptible to degradation at 135F, and nonmetallic parts are generally adequate to 150F. This is based on broad industrial and power plant applications.

Qualification to aging and radiation is provided in Reference 1. The manufacturer is testing models "similar in design and construction with respect to components that are susceptible to thermal aging and radiation." These tests have shown that after 1×10^7 R and 99°C for 45 days, no detrimental effects have occurred.

Sheet 4

Component Masoneilan electro-pneumatic positioner

This positioner was not included in the November 30, 1978, CPCo submittal; therefore, it was not reviewed by Franklin Research Center.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System:
Engineering Safeguards System

Plant I.D. Number:
PT-0306

Component:
Pressure Transmitter

Manufacturer:
Fischer Porter

Model Number:
50EP1072A

Purchase Order Number:
M206

Function/Service:
LP Safety Inj Discharge Press Ind

Accuracy: Spec:
Demo:

Location:
Room 123

Elevation:
594'-0"

Flood Level Elevation
Above Flood Level:
Yes: No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	30 Days	Sec III.B	See Sh 2	Evaluation	
Temperature (°F)	See Note 1	212	Sec II.D.6	See Sh 2	Evaluation	
Pressure (PSIA)	14.7	14.7	Sec II.D.6	See Sh 2	Evaluation	
Relative Humidity (%)	80	80	Sec II.D.6	See Sh 2	Evaluation	
Chemical Spray	None					
Radiation (Rad)	Negligible	Yes	Sec II.D.4	See Sh 2	Evaluation	
Aging	40 Years Plus LOCA		Sec II.D.8			
Submergence	Not Subject to Submergence					

DOCUMENTATION REFERENCES	NOTES
1. Fischer-Porter Instruction Bulletin 50EP1000.	1. 212°F for one hour, then linear decline to T = 110°F at 24 hours.

Sheet 4

Component Pressure Transmitter (PT-0306)

The component was not included in the November 1978 CP Co submittal and, therefore, was not addressed by the Franklin Research Center Report.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION
System: Safety injection
Plant I.D. Number: See Note 1
Component: Pressure transmitter
Manufacturer: Fischer & Porter
Model Number: 50EP1042A
Purchase Order Number: M-206
Function/Service: Safety injection tank pressure
Accuracy: Spec: Demo:
Location: Inside containment
Elevation: 615'-0"
Flood Level Elevation 596'-0" Above Flood Level: Yes: X No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	1 hour	1 hour	Section II.B.5	1 See Sheet 2	Test	
Temperature (°F)	See Figures 7&8	320	Section II.D.1	1 See Sheet 2	Test	
Pressure (PSIA)	See Figure 9	90	Section II.D.1	1 See Sheet 2	Test	
Relative Humidity (%)	100	100	Section II.D.1	1 See Sheet 2	Test	
Chemical Spray	1,750 to 2,000 ppm boric acid with 50 to 100 N_2H_4	Yes	Section II.D.2	See Sheet 2	Evaluation	
Radiation (Rad)	1.8×10^6	Yes	Section II.D.5	See Sheet 2	Test	
Aging	40 years + LOCA	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
Submergence	Not subject to submergence					

DOCUMENTATION REFERENCES	NOTES
1. Fischer & Porter Report DP-2204-51-B-006, dated 12/2/68, Special High Temperature Steam Application 2. Fischer & Porter Report DP-2224-1 #002	2. PT-0338, PT-0342, PT-0346, PT-0347

Sheet 3

Component Fischer & Porter safety injection system pressure transmitters

DORGR 1 Service Conditions Inside Containment for LOCA Conditions

DORGR 1A Temperature and Pressure Steam Conditions

Figures 7, 8, and 9 of the report define the service conditions and the test conditions exceeded the service conditions. The guidelines are met as discussed in Sheet 2.

DORGR 1B Radiation

Gamma

The guidelines are met as the radiation received is less than the qualified level.

Beta

DORGR 1C Submergence

These transmitters are located at elevation 615'-0", which is well above the flood level of 596'-0"; therefore, the guidelines are met for submergence.

DORGR 1D Containment Sprays

The guidelines are met. Equipment is qualified for chemical spray by evaluation as presented in Sheet 2.

Sheet 3 (continued)

DORGR 2 Service Conditions for a PWR Main Steam Line Break Inside Containment

DORGR 2A Temperature and Pressure Steam Conditions

Use of the LOCA conditions is acceptable because CPCo and NUREG-0458 recognize that although the peak temperature and pressure for an MSLB inside containment are greater than that for a LOCA, the duration is short and the effect will be minimal.

DORGR 2B Radiation

Same statement as DORGR 1B

DORGR 2C Submergence

Same statement as DORGR 1C

DORGR 2D Chemical Sprays

Same statement as DORGR 1D

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Engineered safeguards system Plant I.D. Number: LS-1105; LS-1108 Component: Mechanical alternator Manufacturer: Square "D" Company Model Number: Class 9038, Type AW-1 Purchase Order Number: 5935-M-22 Function/Service: Actuates ESF room sump pumps Accuracy: Spec: Demo: Location: ESF room Elevation: 570'-0"	Operating Time	30 days		Section III.B			
	Temperature (°F)	135	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	5×10^6	See Sheet 2	Section II.D.7	See Sheet 2	Evaluation	
	Aging	40 years	Greater than 40 years	Section II.D.8	1	Evaluation	
	Submergence	Not subject to submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

DOCUMENTATION REFERENCES	NOTES
1. Final Report on Consulting Services for Engineering Support on LS-1105 and LS-1108. Nuclear Environmental Qualification Report, Wyle Laboratories.	

407

Sheet 2

Component Square D Mechanical Alternator

These alternators are used to turn on the sump pumps in the ESF rooms should they be needed. Qualification data has been located. The materials have a qualified life of over 40 years but are not qualified for the total radiation dose which will be received. They are qualified for $1x10^5R$ and the accident will result in $5x10^6R$. Should these switches fail due to radiation damage, the operator can ascertain the ESF room level by the indication and alarm from LT-1107 and LT-1110 and manually actuate the sump pumps.

Since it would be better if the operator could be freed from having to manually start the sump pumps, these switches will be replaced with qualified switches by June 1982 assuming no procurement problems.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Engineered Safeguards System Plant I.D. Number: LT-0358, LT-0359 Component: Level Transmitter Manufacturer: Fischer & Porter Model Number: 10B24655ECBB1 Purchase Order Number: M206(97) Function/Service: Containment Sump Level Accuracy: Spec: Demo: Location: Inside Containment Elevation: 680'-2"	Operating Time	30 Days	See Sheet 2	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	See Figures 7 & 8	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Pressure (PSIA)	See Figure 9	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Chemical Spray	1,750 to 2,000 ppm Boric Acid With 50 to 100 ppm N_2H_4	See Sheet 2	Section II.D.2	See Sheet 2	Evaluation	
	Radiation (Rad)	2×10^7	See Sheet 2	Section II.D.5	See Sheet 2		
	Aging	40 Years Plus LOCA	See Sheet 2	Section II.D.8			
	Submergence	Not Subject To Submergence					
Flood Level Elevation Above Flood Level: Yes: X No:							

DOCUMENTATION REFERENCES	NOTES

G-0858-01A

Component Containment Sump Level Transmitter LT-0358, LT-0359

No qualification data for the containment sump level transmitter could be located. These instruments provide indication of the containment sump level. Since there is no way to drain the majority of the sump water during the LOCA and since the functioning of these transmitters was not considered in the FSAR safety analysis, qualification is not required. However, these transmitters will be replaced with qualified transmitters as it is believed that sump level indication may prove to be informative for breaks which result in little level increase.

Sheet 4

Component Containment Sump Level Transmitter LT-0358, LT-0359

This equipment qualification was not reviewed by Franklin Research Center.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System:
Engineered Safety System

Plant I.D. Number:
EMA-1210, 1112, 1114

Component:
Motor

Manufacturer:
Louis-Allis

Model Number:
B289086001, 2, 3 COGS

Purchase Order Number:
5935-M8

Function/Service:
Containment Spray Pump Motor

Accuracy: Spec:
Demo:

Location:
ESF Room

Elevation:
570'-0"

Flood Level Elevation Above Flood Level:
Yes: No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	30 Days	Section III.B	1	Evaluation	
Temperature (°F)	135	135	Section II.D.8	1	Evaluation	
Pressure (PSIA)	14.7	14.7	SSection II.D.8	2	Evaluation	
Relative Humidity (%)	100	100	Section II.D.8	2	Evaluation	
Chemical Spray	None					
Radiation (Rad)	5×10^6	See Sheet 2	Section II.D.7	6	Evaluation	
Aging	40 Years	See Sheet 2	Section II.D.8	6	Evaluation	
Submergence	Not Subject to Submergence					

DOCUMENTATION REFERENCES	NOTES
1. Electric Motor Data Sheet for Containment Spray Pump Motors Supplied by Louis-Allis 2. Letter from Mr Schreiber of Louis-Allis to C St Onge of Bechtel, dated September 17, 1980 3. Letter from C St Onge of Bechtel to Mr Schreiber of Louis-Allis, dated September 9, 1980	

Component Containment Spray Pump Motors (EMA-1210,1112,1114)

These components were not included in the November 1978 CP Co Submittal and, therefore, were not addressed by the Franklin Center Report.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System:
Engineered safeguards system
Plant I.D. Number:
EMA-1113,-1207,-1209
Component:
Motor
Manufacturer:
Westinghouse
Model Number:
68F13512
Purchase Order Number:
5935-M-1
Function/Service:
Hp safety injection pump motor
Accuracy: Spec:
Demo:
Location:
ESF room
Elevation:
570'-0"

Flood Level Elevation Above Flood Level:
Yes: No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 days	30 days	Section III.B	1, 2	Test and Evaluation	
Temperature (°F)	135	140	Section II.D.8	1, 2	Test and Evaluation	
Pressure (PSIA)	14.7	14.7	Section II.D.8	1, 2	Test and Evaluation	
Relative Humidity (%)	100	100	Section II.D.8	1	Test and Evaluation	
Chemical Spray	None					
Radiation (Rad)	5×10^6	2×10^8	Section II.D.7	2, 3	Test and Evaluation	
Aging	40 years + LOCA	40 years + LOCA	Section II.D.8	2, 3		
Submergence	Not subject to submergence					

DOCUMENTATION REFERENCES	NOTES
1. Westinghouse data sheet for HPSI motor giving temperature rise and insulation 2. Environmental Qualification of Class 1E Motors for Nuclear Out-of-Containment Use, dated 6/76	

Sheet 4

Component High-pressure safety injection pump motors

This equipment was not included in the November 1978 CPCo submittal and, therefore, was not addressed by the Franklin Research Center report.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System:
Engineered Safety System

Plant I.D. Number:
EMA-12062-1111

Component:
Motor

Manufacturer:
General Electric

Model Number:
5KB18847A100

Purchase Order Number:
5935-M-1

Function/Service:
Low Pressure Safety Injection Pump Motor

Accuracy: Spec:
Demo:

Location:
ESF Room

Elevation:
570'-0"

Flood Level Elevation Above Flood Level:
Yes: No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	30 Days	Section III.B	1, 2	Evaluation	
Temperature (°F)	135	140	Section II.D.8	1, 2	Evaluation	
Pressure (PSIA)	14.7	14.7	Section II.D.8	1, 2	Evaluation	
Relative Humidity (%)	100	100	Section II.D.8	1, 2	Evaluation	
Chemical Spray	None					
Radiation (Rad)	5×10^6	5×10^6	Section II.D.7		Analysis	
Aging	40 Years + LOCA	40 Years + LOCA	Section II.D.8		Analysis	
Submergence	Not Subject to Submergence					

DOCUMENTATION REFERENCES	NOTES
1. General Electric Co data sheet for LPSI motor giving temperature rise and insulation class level. 2. Letter dated August 21, 1980 from J M Allen of Mobil Oil Corp to J H Knoblach of Wyle Lab regarding lubricating oil.	

0858-01A

Sheet 4

Component GE LPSI Pump Motors (EMA-1206 and -1111)

This equipment was not included in the November 1978 CP Co submittal and was, therefore, not addressed by the Franklin Research Center report.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System:
Engineered Safeguards System

Plant I.D. Number:
See Note 1

Component:
Motor-Operated Valve

Manufacturer:
Limitorque (Rel) Ac Motor

Model Number:
SMB-00-15

Purchase Order Number:

Function/Service:
See Note 1

Accuracy: Spec:
Demo:

Location:
Inside Containment

Elevation:
Approx 597'-0"

Flood Level Elevation 596'-0"
Above Flood Level: Yes: X No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	30 Days	Section III.B	1, 3	Simultaneous Test	
Temperature (°F)	See Figures 7 & 8	300	Section II.D.1	1, 3	Simultaneous Test	
Pressure (PSIA)	See Figure 9	84.7	Section II.D.1	1, 3	Simultaneous Test	
Relative Humidity (%)	100	100	Section II.D.1	1, 3	Simultaneous Test	
Chemical Spray	1750 to 2000 ppm Boric Acid With 50 to 100 ppm N_2H_4	Boron Water, Sodium Thiosulfate and Solution of NaOH	Section II.D.2	1, 2, 3	Simultaneous Test	
Radiation (Rad)	2×10^7	2.04×10^8	Section II.D.5	1, 3	Sequential Test	
Aging	40 Years Plus LOCA	100 Hours at 180°C Plus LOCA	Section II.D.8	1, 3	Sequential Test	
Submergence	Not Subject To Submergence					

DOCUMENTATION REFERENCES

1. Test Report 600456, Nuclear Power Station Qualification Type Test Report, Limitorque Valve Actuators for PWR Service

NOTES

1. High-pressure injection valves MO-3007, -3009, -3011 and -3013; redundant high-pressure injection valves MO-3062, -3064, -3066 and -3068.

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No.:
Revision:
Date:

DOCUMENTATION REFERENCES (cont)	NOTES (cont)
2. BLC-7999, R L Castleberry (Bechtel) to R C Bauman (CP Co), dated August 13, 1979. 3. Report B0058, Limitorque Valve Actuator Qualification for Nuclear Power Station Service.	

Sheet 2

Component Limitorque Valve Actuators

These units were tested using the type test method described in IEEE Std 382-72. Test Report 600456 and Appendices A through F describe the results of the test performed on a typical Limitorque valve actuator (SMB-0) with a 40-foot-pound motor (SMB-0-40). A typical unit was used because the only difference in units is size (Reference 3). All materials used are the same as in Model SMB-00-15. The unit was mechanically aged to approximately 40 years of service life. The motor was thermally aged for 100 hours at 180°C. The unit was also radiation aged at 4 megarads plus an accident dose of 200 megarads (2.04×10^8) radiation aging. LOCA testing was performed at Limitorque's environmental test facility. The LOCA test consisted of the dual spike with maximum temperature attained in 15.2 and 13.8 seconds, respectively. Chemical spray was maintained at a pH of 10.5 using a mixture which is primarily a sodium thiosulfate solution (in accordance with Table 1 of IEEE Std 382-72). This is more caustic than the 7 to 8.3 pH solution of hydrazine solution used at the Palisades Plant (Reference 2). The first spike of 300 degrees and 84.7 psia was maintained for 33 minutes, then reduced to the 120°F starting point. The second transient was attained with a dwell of 30 minutes at 300°F and 84.7 psia. The chamber temperature was then reduced to 250°F and 44.7 psia and maintained at these conditions for 96 hours. Temperature and pressure were again reduced to 200°F and 24.7 psia and maintained for the duration of the test. Chemical spray was maintained at an average pH of 10.5, and relative humidity was maintained at 100% by keeping the condensate at the bottom of the tank at the same temperature as the air/vapor mixture by periodic injection of steam. The equipment operated satisfactorily before, during and after the above test.

The valve operators are located inside containment at elevation 597'-0" (approximately), which is above the 596'-0" flood level; therefore, they are not subject to submergence.

Sheet 3

Component Limitorque Valve Actuators

DORGR 1 Service Conditions Inside Containment for LOCA Conditions

DORGR 1A Temperature and Pressure Steam Conditions

The test was run at temperature and pressure steam conditions which exceed that given in the FSAR and the report, Section II.D.1; therefore, the guidelines are met.

DORGR 1B Radiation

Gamma The valve actuator was subjected to a radiation dose of 4 megarads plus an accident dose of 200 megarads for a total dose of 204 megarads (2.04×10^8), which exceeds the 2×10^7 rad requirement; therefore, the guidelines are met.

Beta

DORGR 1C Submergence

These valve operators are at an elevation of approximately 597'-0"; they are, thus, above the 596'-0" flood level. Therefore, the guidelines are met.

DORGR 1D Containment Sprays

Chemical sprays used were in accordance with IEEE Std 382-72, which consisted of boron water, sodium thiosulfate and sodium hydroxide to a pH of 10.5. This solution is more caustic than the boron water, hydrazine and sodium hydroxide at a pH of 7 to 8.3 used at the Palisades Plant (Reference 2); therefore, the guidelines are met.

DORGR 2 Service Conditions for a PWR Main Steam Line Break Inside Containment

DORGR 2A Temperature and Pressure Steam Conditions

Use of the LOCA conditions is acceptable for main steam line break (MSLB) qualification because CP Co and NUREG-0458 recognize that although the peak temperature and pressure for an MSLB inside containment is greater than that for a LOCA, its duration is short and the effect will be minimal. Use of more realistic assumptions results in a temperature profile that is within the LOCA profile; therefore, the guidelines are met.

Sheet 3 (Contd)

DORGR 2B Radiation

The valve operators were subjected to a total operational and accident dose of 2.04×10^8 rads, which exceeds the required 2×10^7 rad dose for this accident; therefore, the guidelines are met.

DORGR 2C Submergence

Same statement as in DORGR 1C.

DORGR 2D Chemical Sprays

Same statement as in DORGR 1D.

DORGR 4 Qualification Methods

DORGR 4A Selection of Qualification Method

Type testing was selected.

DORGR 4B Qualification by Type Testing

1. Simulated Service Conditions and Test Duration

The test duration was 30 days, and the test profile was the dual spike given in IEEE Std 382-72, which satisfies the 30-day requirement; therefore, the guidelines are met.

2. Test Specimen

Typical Limitorque valve operator SMB-0-40 was tested and is similar to SMB-00-15 (Reference 3); therefore, the guidelines are met.

3. Test Sequence

The test sequence was as follows: aging (thermal, mechanical and radiation), seismic (not discussed), radiation exposure and LOCA simulation and is discussed in Sheet 2; therefore, the guidelines are met.

4. Test Specimen Aging

Thermal - 100 Hours at 180°C

Sheet 3 (Contd)

Mechanical - 1,208 Operations

Radiation - 2.04×10^8 Total Dose Gamma

These conditions satisfy the 40-year operating life plus the LOCA requirement; therefore, the guidelines are met.

5. Functional Testing and Failure Critieria

The test specimen was successfully operated during the LOCA test of 30 days and did not fail; therefore, the guidelines are met.

6. Installation Interfaces

The existing valves and the test valve have the same installation orientation; therefore, the guidelines are met.

DORGR 6 Margin

The guidelines of DORGR 4 are satisfied and no margin factors are required.

DORGR 7 Aging

See DORGR 4B.

DORGR 8 Documentation

References 1, 2 and 3 form the documentation.

Sheet 4

Component Limitorque Valve Actuators

The qualification test that was referenced in the CP Co submittal of November 1978 is not the test normally provided by Limitorque for pressurized water reactor (PWR) units. Franklin Institute's comment on this submittal, which states that the test specimen was not exactly the same as that being qualified, is true. However, all Limitorque valve operators are the same except for size; ie, materials are identical (Reference 3). This fact is also true for the Reliance motors which, together with the Limitorque units, compose the motorized valve operator.

The test profile of Test Report 600456 in which the Limitorque valve operator and Reliance motor are tested as a unit more closely follows that required by the Palisades FSAR and Figures 7 and 8 for the 30-day period. For these reasons, Test Report 600456 is sufficient qualification for Limitorque/ Reliance motor-operated valves with Class H insulation in a LOCA environment.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System:
Engineered Safeguards System

Plant I.D. Number:
MO-3012, MO-3010, MO-3014

Component:
Motor-Operated Valve

Manufacturer:
Limitorque (Rel) Ac Motor

Model Number:
SMB-3-100

Purchase Order Number:

Function/Service:
Low-Pressure Injection Valve

Accuracy: Spec:
Demo:

Location:
Inside Containment

Elevation:
597'-0"

Flood Level Elevation 596'-0"
Above Flood Level: Yes: X No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	30 Days	Section III.B	1, 3	Simultaneous Test	
Temperature (°F)	See Figures 7 & 8	300	Section II.D.1	1, 3	Simultaneous Test	
Pressure (PSIA)	See Figure 9	84.7	Section II.D.1	1, 3	Simultaneous Test	
Relative Humidity (%)	100	100	Section II.D.1	1, 3	Simultaneous Test	
Chemical Spray	1750 to 2000 ppm Boric Acid With 50 to 100 ppm N_2H_4	Boron Water, Sodium Thiosulfate and Solution of NaOH	Section II.D.2	1, 2, 3	Simultaneous Test	
Radiation (Rad)	2×10^7	2.04×10^8	Section II.D.5	1, 3	Sequential Test	
Aging	40 Years Plus LOCA	100 Hours at 180°C Plus LOCA	Section II.D.8	1, 3	Sequential Test	
Submergence	Not Subject To Submergence					

DOCUMENTATION REFERENCES	NOTES
1. Test Report 600456, Nuclear Power Station Qualification Type Test Report, Limitorque Valve Actuators for PWR Service	

442

0858-01A

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No.:
Revision:
Date:

DOCUMENTATION REFERENCES (cont)	NOTES (cont)
2. BLC-7999, R L Castleberry (Bechtel) to R C Bauman (CP Co), dated August 13, 1979. 3. Report B0058, Limitorque Valve Actuator Qualification for Nuclear Power Station Service.	

Sheet 2

Component Limitorque Valve Actuators

This unit was tested using the type testing method described in IEEE Std 382-72. Test Report 600456 and Appendices A through F describe the results of the test performed on a typical Limitorque valve actuator (SMB-0) with a 40-foot-pound motor (SMB-0-40). A typical unit was used because the only difference in units is size (Reference 3). All materials used are the same as in Model SMB-3-100. The unit was mechanically aged to approximately 40 years of service life. The motor was thermally aged for 100 hours at 180°C. The unit was also radiation aged at 4 megarads plus an accident dose of 200 megarads for a total dose of 204 megarads (2.04×10^8) radiation aging. LOCA testing was performed at Limitorque's environmental test facility. The LOCA test consisted of the dual spike (referenced in IEEE Std 382-72) with maximum temperature attained in 15.2 and 13.8 seconds, respectively. Chemical spray was maintained at a pH of 10.5 using a mixture which is primarily a sodium thiosulfate solution (in accordance with Table 1 of IEEE Std 382-72). This is more caustic than the 7 to 8.3 pH solution of hydrazine solution used at the Palisades Plant (Reference 2). The first spike of 300 degrees and 84.7 psia was maintained for 33 minutes, then reduced to the 120°F starting point. The second transient was attained with a dwell of 30 minutes at 300°F and 84.7 psia. The chamber temperature was then reduced to 250°F and 44.7 psia and maintained at these conditions for 96 hours. Temperature and pressure were again reduced to 200°F and 24.7 psia and maintained for the duration of the test. Chemical spray was maintained at an average pH of 10.5, and relative humidity was maintained at 100% by keeping the condensate at the bottom of the tank at the same temperature as the air/vapor mixture by periodic injection of steam. The equipment operated satisfactorily before, during and after the above test.

The valve operators are located inside containment at an elevation of 597'-0", which is above the 596'-0" flood level; therefore, they are not subject to submergence.

Sheet 3

Component Limitorque Valve Actuators

DORGR 1 Service Conditions Inside Containment for LOCA Conditions

DORGR 1A Temperature and Pressure Steam Conditions

The test was run at temperature and pressure steam conditions which exceed that given in the FSAR and the report, Section II.D.1; therefore, the guidelines are met.

DORGR 1B Radiation

Gamma The valve actuator was subject to a radiation dose of 4 megarads plus an accident dose of 200 megarads for a total dose of 204 megarads (2.04×10^8), which exceeds the 2×10^7 rad requirement; therefore, the guidelines are met.

Beta

DORGR 1C Submergence

The valve operators are at an elevation of 597'-0" which is above the 596'-0" flood level; therefore, the guidelines are met.

DORGR 1D Containment Sprays

Chemical sprays used were in accordance with IEEE Std 382-72, which consisted of boron water, sodium thiosulfate and sodium hydroxide to a pH of 10.5. This solution is more caustic than the boron water, hydrazine and sodium hydroxide at a pH of 7 to 8.3 used at the Palisades Plant (Reference 2); therefore, the guidelines are met.

DORGR 2 Service Conditions for a PWR Main Steam Line Break Inside Containment

DORGR 2A Temperature and Pressure Steam Conditions

Use of the LOCA conditions is acceptable for main steam line break (MSLB) qualification because CP Co and NUREG-0458 recognize that although the peak temperature and pressure for an MSLB inside containment is greater than that for a LOCA, its duration is short and the effect will be minimal. Use of more realistic assumptions results in a temperature profile that is within the LOCA profile; therefore, the guidelines are met.

Sheet 3 (Contd)

DORGR 2B Radiation

The valve operators were subjected to a total operational and accident dose of 2.04×10^8 rads, which exceeds the required 2×10^6 rad dose for this accident; therefore, the guidelines are met.

DORGR 2C Submergence

Same statement as in DORGR 1C.

DORGR 2D Chemical Sprays

Same statement as in DORGR 1D.

DORGR 4 Qualification Methods

DORGR 4A Selection of Qualification Method

Qualification was by test.

DORGR 4B Qualification by Type Testing

1. Simulated Service Conditions and Test Duration

The test duration was 30 days, and the test profile was the dual spike given in IEEE Std 382-72, which satisfies the 30-day requirement; therefore, the guidelines are met.

2. Test Specimen

Typical Limitorque valve operator SMB-0-40 was tested and is similar to SMB-3-100 (Reference 3); therefore, the guidelines are met.

3. Test Sequence

The test sequence was as follows: aging (thermal, mechanical and radiation), seismic (not discussed), radiation exposure and LOCA simulation as discussed in Sheet 2; therefore, the guidelines are met.

4. Test Specimen Aging

Thermal - 100 Hours at 180°C

Sheet 4

Component Limitorque Valve Actuators

The qualification test that was referenced in the CP Co submittal of November 1978 is not the test normally provided by Limitorque for pressurized water reactor (PWR) units. Franklin Institute's comment on this submittal, which states that the test specimen was not exactly the same as that being qualified, is true. However, all Limitorque valve operators are the same except for size; ie, materials are identical (Reference 3). This fact is also true for the Reliance motors which, together with the Limitorque units, compose the motorized valve operator.

The test profile of Test Report 600456 in which the Limitorque valve operator and Reliance motor are tested as a unit more closely follows that required by the Palisades FSAR and Figures 7 and 8 for the 30-day period. For these reasons, Test Report 600456 is sufficient qualification for Limitorque/ Reliance motor-operated valves with Class H insulation in a LOCA environment.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System:
Engineered Safeguards System

Plant I.D. Number:
MO-3015, MO-3016

Component:
Motor-Operated Valve

Manufacturer:
Limitorque (Rel) Ac Motor

Model Number:
SMB-2-60

Purchase Order Number:

Function/Service:
Shutdown Clg From Primary & Clg Water Return

Accuracy: Spec:
Demo:

Location:
Inside Containment

Elevation:
607'-0"

Flood Level Elevation 596'-0"
Above Flood Level: Yes: X No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	30 Days	Section III.B	1, 3	Simultaneous Test	
Temperature (°F)	See Figures 7 & 8	300	Section II.D.1	1, 3	Simultaneous Test	
Pressure (PSIA)	See Figure 9	84.7	Section II.D.1	1, 3	Simultaneous Test	
Relative Humidity (%)	100	100	Section II.D.1	1, 3	Simultaneous Test	
Chemical Spray	1750 to 2000 ppm Boric Acid With 50 to 100 ppm N_2H_4	Boron Water, Sodium Thiosulfate and Solution of NaOH	Section II.D.2	1, 2, 3	Simultaneous Test	
Radiation (Rad)	2×10^7	2.04×10^8	Section II.D.5	1, 3	Sequential Test	
Aging	40 Years Plus LOCA	100 Hours at 180°C Plus LOCA	Section II.D.8	1, 3	Sequential Test	
Submergence	Not Subject To Submergence					

DOCUMENTATION REFERENCES	NOTES
1. Test Report 600456, Nuclear Power Station Qualification Type Test Report Limitorque Valve Actuators for PWR Service.	

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

EQUIPMENT QUALIFICATION REPORT

Component Sheet No.:
Revision:
Date:

DOCUMENTATION REFERENCES (cont)	NOTES (cont)
2. BLC-7999, R L Castleberry (Bechtel) to R C Bauman (CP Co), dated August 13, 1979. 3. Report B0058, Limitorque Valve Actuator Qualification for Nuclear Power Station Service.	

Sheet 2

Component Limitorque Valve Actuators

These units were tested using the type test method described in IEEE Std 382-72. Test Report 600456 and Appendices A through F describe the results of the test performed on a typical Limitorque valve actuator (SMB-0) with a 40-foot-pound motor (SMB-0-40). A typical unit was used because the only difference in units is size (Reference 3). All materials used are the same as in Model SMB-2-60. The unit was mechanically aged to approximately 40 years of service life. The motor was thermally aged for 100 hours at 180°C. The unit was also radiation aged at 4 megarads plus an accident dose of 200 megarads (2.04×10^8) radiation aging. LOCA testing was performed at Limitorque's environmental test facility. The LOCA test consisted of the dual spike (referenced in IEEE Std 382-72) with maximum temperature attained in 15.2 and 13.8 seconds, respectively. Chemical spray was maintained at a pH of 10.5 using a mixture which is primarily a sodium thiosulfate solution (in accordance with Table 1 of IEEE Std 382-72). This is more caustic than the 7 to 8.3 pH solution of hydrazine solution used at the Palisades Plant (Reference 2). The first spike of 300 degrees and 84.7 psia was maintained for 33 minutes, then reduced to the 120°F starting point. The second transient was attained with a dwell of 30 minutes at 300°F and 84.7 psia. The chamber temperature was then reduced to 250°F and 44.7 psia and maintained at these conditions for 96 hours. Temperature and pressure were again reduced to 200°F and 24.7 psia and maintained for the duration of the test. Chemical spray was maintained at an average pH of 10.5, and relative humidity was maintained at 100% by keeping the condensate at the bottom of the tank at the same temperature as the air/vapor mixture by periodic injection of steam. The equipment operated satisfactorily before, during and after the above test.

The valve operators are located inside containment at elevation 607'-0", which is above the 596'-0" flood level; therefore, they are not subject to submergence.

Sheet 3

Component Limitorque Valve Actuators

DORGR 1 Service Conditions Inside Containment for LOCA Conditions

DORGR 1A Temperature and Pressure Steam Conditions

The test was run at temperature and pressure steam conditions which exceed that given in the FSAR and the report, Section II.D.1; therefore, the guidelines are met.

DORGR 1B Radiation

Gamma The valve actuator was subjected to a radiation dose of 4 megarads plus an accident dose of 200 megarads for a total dose of 204 megarads (2.04×10^8), which exceeds the 2×10^7 rad requirement; therefore, the guidelines are met.

Beta

DORGR 1C Submergence

The valve operators are at an elevation of 607'-0"; they are, thus, above the 596'-0" flood level. Therefore, the guidelines are met.

DORGR 1D Containment Sprays

Chemical sprays used were in accordance with IEEE Std 382-72, which consisted of boron water, sodium thiosulfate and sodium hydroxide to a pH of 10.5. This solution is more caustic than the boron water, hydrazine and sodium hydroxide at a pH of 7 to 8.3 used at the Palisades Plant (Reference 2); therefore, the guidelines are met.

DORGR 2 Service Conditions for a PWR Main Steam Line Break Inside Containment

DORGR 2A Temperature and Pressure Steam Conditions

Use of the LOCA conditions is acceptable for main steam line break (MSLB) qualification because NUREG-0458 recognizes that although the peak temperature and pressure for an MSLB inside containment is greater than that for a LOCA, its duration is short and the effect will be minimal. Use of more realistic assumptions results in a temperature profile that is within the LOCA profile; therefore, the guidelines are met.

Sheet 3 (Contd)

DORGR 2B Radiation

The valve operators were subjected to a total operational and accident dose of 2.04×10^8 rads, which exceeds the required 2×10^6 rad dose for this accident; therefore, the guidelines are met.

DORGR 2C Submergence

Same statement as in DORGR 1C.

DORGR 2D Chemical Sprays

Same statement as in DORGR 1D.

DORGR 4 Qualification Methods

DORGR 4A Selection of Qualification Method

Qualification was by test.

DORGR 4B Qualification by Type Testing

1. Simulated Service Conditions and Test Duration

The test duration was 30 days, and the test profile was the dual spike given in IEEE Std 382-72, which satisfies the 30-day requirement; therefore, the guidelines are met.

2. Test Specimen

Typical Limitorque valve operator SMB-0-40 was tested and is similar to SMB-2-60 (Reference 3); therefore, the guidelines are met.

3. Test Sequence

The test sequence was as follows: aging (thermal, mechanical and radiation), seismic (not discussed), radiation exposure and LOCA simulation as discussed in Sheet 2; therefore, the guidelines are met.

4. Test Specimen Aging

Thermal - 100 Hours at 180°C

Sheet 3 (Contd)

Mechanical - 1,208 Operations

Radiation - 2.04×10^8 Total Dose Gamma

These conditions satisfy the aging requirement of a 40-year operating life plus LOCA; therefore, the guidelines are met.

5. Functional Testing and Failure Critieria

The test specimen was successfully operated during the LOCA test of 30 days and did not fail; therefore, the guidelines are met.

6. Installation Interfaces

The existing valves and the test valve have the same installation orientation; therefore, the guidelines are met.

DORGR 6 Margin

The guidelines of DORGR 4 are satisfied and no margin factors are required.

DORGR 7 Aging

See DORGR 4B.

DORGR 8 Documentation

References 1, 2 and 3 form the documentation.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System: Feedwater

Plant I.D. Number: LT-0751A, B, C, D

Component: Level Transmitter

Manufacturer: Foxboro

Model Number: 613 DM

Purchase Order Number: M-1

Function/Service: Steam Generators Level - Reactor Trip Alarm & Indicat

Accuracy: Spec:
Demo:

Location: Inside Containment

Elevation: 595'-7"

Flood Level Elevation 596'
Above Flood Level: Yes: No: x

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	30 Days See Sheet 2	Section III.B	See Sheet 2	Evaluation	
Temperature (°F)	See Figures 7 & 8	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
Pressure (PSIA)	See Figure 9	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
Relative Humidity (%)	100	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
Chemical Spray	1,750 to 2,000 ppm boric acid with 50 to 100 ppm wt N_2H_4	See Sheet 2	Section II.D.2	See Sheet 2	Evaluation	
Radiation (Rad)	2×10^7	See Sheet 2	Section II.D.5	See Sheet 2	Evaluation	
Aging	40 Years + LOCA	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
Submergence	Subject to Submergence	See Sheet 2	Section II.D.3	See Sheet 2	Evaluation	

DOCUMENTATION REFERENCES	NOTES

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Feedwater Plant I.D. Number: LT-0752A, B, C, D Component: Level Transmitter Manufacturer: Foxboro Model Number: 613 DM Purchase Order Number: M-1 Function/Service: Steam Generator Level - Reactor Trip Alarm & Indication Accuracy: Spec: Demo: Location: Inside Containment Elevation: 597'-8"	Operating Time	30 Days	30 Days See Sheet 2	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	See Figures 7 & 8	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Pressure (PSIA)	See Figure 9	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Chemical Spray	1,750 to 2,000 ppm boric acid with 50 to 100 ppm N_2H_4	See Sheet 2	Section II.D.2	See Sheet 2	Evaluation	
	Radiation (Rad)	2×10^7	See Sheet 2	Section II.D.5	See Sheet 2	Evaluation	
	Aging	40 Years + LOCA	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Subject to Submergence					
Flood Level Elevation 596' Above Flood Level: Yes: X No:							

DOCUMENTATION REFERENCES	NOTES

464

0858-01A

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Feedwater Plant I.D. Number: See Note 2 Component: Level Transmitters Manufacturer: Fischer & Porter Model Number: See Note 2 Purchase Order Number: ICE-31 Function/Service: SG Level and Pressure for Feedwater Control Accuracy: Spec: Demo: Location: Inside Containment Elevation: 596'-0" (See Note 1) Flood Level Elevation Above Flood Level: Yes: No: X	Operating Time	1 Hour		Section III.B.5			
	Temperature (°F)	See Figures 7 & 8	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Pressure (PSIA)	See Figure 9	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Chemical Spray	1750 to 2000 Ppm Boric Acid With 50 to 100 N_2H_4	See Sheet 2	Section II.D.2	See Sheet 2	Evaluation	
	Radiation (Rad)	1.8×10^6	See Sheet 2	Section II.D.5	See Sheet 2	Evaluation	
	Aging	40 Years Plus LOCA	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Yes	See Sheet 2	Section II.D.3	See Sheet 2	Evaluation	

DOCUMENTATION REFERENCES	NOTES
	1. Three at 593'-3" and one at 592'-8". 2. Level transmitters are Model 13D2465BA and Plant tag numbers LT-0701 through LT-0704. Pressure transmitters are 50EP1031B and Plant tag numbers PT-0702 and PT-0704.

G-0858-01A

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Feedwater Plant I.D. Number: FT-0701 Thru FT-0704 Component: Flow Transmitter Manufacturer: Fischer & Porter Model Number: 10B2466AAAB1 Purchase Order Number: See Note 1 Function/Service: See Note 2 Accuracy: Spec: Demo: Location: Inside Containment Elevation: 590'-0"	Operating Time	1 Hour		Section II.D.5			
	Temperature (°F)	See Figures 7 & 8	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Pressure (PSIA)	See Figure 9	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Chemical Spray	1750 to 2000 Ppm Boric Acid With 50 to 100 Ppm N_2H_4	See Sheet 2	Section II.D.2	See Sheet 2	Evaluation	
	Radiation (Rad)	1.8×10^6	See Sheet 2	Section II.D.5	See Sheet 2	Evaluation	
	Aging	40 Years Plus LOCA	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Yes	See Sheet 2	Section II.D.3	See Sheet 2	Evaluation	
Flood Level Elevation Above Flood Level: Yes: No: X							

DOCUMENTATION REFERENCES	NOTES
	1. PO 9801527 (CE) for FT-0701 and FT-0702 only; PO ICE-B1-9801527 for FT-0703 and FT-0704 only. 2. Steam generator flow for FT-0703 and FT-070r; feedwater flow for FT-0701 and FT-0702.

Sheet 4

Component Fischer & Porter Level, Pressure and Flow Transmitters

This equipment qualification was not reviewed by Franklin Research Center.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System: Feedwater

Plant I.D. Number: PT-0752A, B, C & D
PT-0751A, B, C & D

Component: Pressure transmitter

Manufacturer: Foxboro

Model Number: 611GM

Purchase Order Number: M-1

Function/Service: See Note 1

Accuracy: Spec:
Demo:

Location: Inside containment

Elevation: 597'-0"

Flood Level Elevation 596'-0"
Above Flood Level: Yes: X No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 days	See Sheet 2	Section III.B	See Sheet 2	Test	
Temperature (°F)	See Figures 7 & 8	See Sheet 2	Section II.D.1	See Sheet 2	Test	
Pressure (PSIA)	See Figure 9	See Sheet 2	Section II.D.1	See Sheet 2	Test	
Relative Humidity (%)	100	See Sheet 2	Section II.D.1	See Sheet 2	Test	
Chemical Spray	1,750 to 2,000 ppm boric acid with 50-100 ppm N_2H_4	See Sheet 2	Section II.D.2	See Sheet 2	Evaluation	
Radiation (Rad)	2×10^7	See Sheet 2	Section II.D.5	See Sheet 2	Evaluation	
Aging	40 years + LOCA	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
Submergence	Not subject to submergence					

DOCUMENTATION REFERENCES

1. Letter from R.J. Breen (Foxboro) to A.M. Yuile (Combustion Engineering), dated 5/7/69
2. Letter, R J Breen (Foxboro) to M R Wade, Consumers Power Company, April 7, 1980
3. Letter, V C Hall (Combustion Engineering) to R L Haueter (Consumers Power Company)

NOTES

1. Steam generator pressure - 2/4 logic and reactor trip

Sheet 2

Component Foxboro Pressure Transmitters

Reference 1 provides a description and results of the test performed on transmitter Models 613DM and 611GM. The cable connecting the transmitters to other associated equipment will be qualified separately.

A saturated steam-air mixture was applied to the test chamber for the first hour at a pressure of 90 psig and a temperature of 318°F. Pressure was then reduced to 60 psig and temperature to 288°F for a period of 12 hours with the steam-air still being used. At the end of this period, pressure and temperature were reduced to 0 psig and 75°F, respectively, with a relative humidity of less than 50%. During testing, output of the cells was monitored and calibration checked at each test condition and at the conclusion of testing. All transmitters were tested with integral amplifiers. The transmitters operated satisfactorily at the end of the 13-hour test.

With respect to chemical spray, the corrosion rate on the housing from chemical spray conditions is negligible. Because the housing protects the transmitter internals, chemical spray is not a consideration.

Reference 2 states that Foxboro believes that these transmitters will withstand 1×10^6 rads TID if fitted with the MCA kits. Reference 3 shows that these were kitted. 1×10^6 rads TID will occur within the first hour if 100% core melt at initiation is assumed and much later if lesser amounts of damage occur. No aging information could be located for these transmitters.

These transmitters are required to provide reactor trip on low steam generator pressure should an MSLB occur and for steam generator pressure indication during a LOCA. During the main steam line break, the low steam generator pressure trip will occur at or before high containment pressure trip or high containment radiation trip so that the transmitters only need be qualified for 190°F, 5 psig and 20 R/h until trip (high radiation set point is 20 R/h. The transmitters are qualified for these conditions as shown by the test and the evaluation of the ability to withstand radiation. Since the time elapsed until actuation is short, the effects of accelerated aging will be insignificant. No aging data could be located for these transmitters which would demonstrate qualification for long-term post-LOCA steam generator monitoring. Should these monitors fail, steam generator pressure could not be monitored; however, plant shutdown could still proceed in an orderly fashion as steam generator pressure indication is not central for a LOCA.

However, since CP Co believes this to be of some value to the operator, these transmitters will be replaced with qualified transmitters by June, 1982 assuming no procurement problems.

Sheet 3

Component Foxboro Pressure Transmitters

Refer to Sheet 2 for discussion of this equipment.

Sheet 4

Component Thermostats TS-1849, -1850, -1851, -1852, -1856, -1857,-1858, -1859

This equipment was not included in the November 1978 CP Co submittal and, therefore, was not addressed by the Fraklin Research Center report.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System: HVAC

Plant I.D. Number: See Note 1

Component: Pressure Switch

Manufacturer: United Electric

Model Number: J302-553

Purchase Order Number: 98994

Function/Service: Containment High-Pressure Switches

Accuracy: Spec: Demo:

Location: Rooms 118 & 123

Elevation:

Flood Level Elevation Above Flood Level: Yes: No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	30 Days	Section III.B	See Sheet 2	Evaluation	
Temperature (°F)	104 See Note 2	104	Section II.D.8	See Sheet 2	Evaluation	
Pressure (PSIA)	14.7	14.7	Section II.D.8	See Sheet 2	Evaluation	
Relative Humidity (%)	80	80	Section II.D.8	See Sheet 2	Evaluation	
Chemical Spray	None					
Radiation (Rad)	1.3×10^4	3.0×10^4	Section II.D.7	1.	Evaluation	
Aging	40 Years Plus LOCA	40 Years Plus LOCA	Section II.D.8	1.	Evaluation	
Submergence	Not Subject to Submergence					

DOCUMENTATION REFERENCES

1. Wyle NEQ Report No 17435-1 dated August 4, 1980.

NOTES

1. PS-1801, -1801A, -1802, -1802A, -1803, -1803A, -1804 and -1804A.
2. Temperature for Room 123 is 104°F; for Room 118 is 80°F.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Heating, Ventilation and Air Conditioning Plant I.D. Number: PT-1812,-1815 Component: Transmitter Manufacturer: Fischer & Porter Model Number: 50EP 1071 ACX Purchase Order Number: 5935-M-206 Function/Service: Containment Pressure Accuracy: Spec: Demo: Location: Room 123-See Note 1 Elevation: 596'-0" Flood Level Elevation Above Flood Level: Yes: No:	Operating Time	30 Days	30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	104	212	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	80	80	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	Negligible	Yes	Section II.D.7	See Sheet 2	Evaluation	
	Aging	40 Years + LOCA	Yes	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					

DOCUMENTATION REFERENCES	NOTES
1. Instruction Bulletin 50EP1000, Rev 1 Fischer & Porter 2204-51-B-006	1. These components are required for a LOCA only; although Room 123 will experience harsh environmental conditions in the event of an MSLB, this equipment is not required for this accident (see Section II.D.6).

G-0858-01A

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Heating, Ventilation and Air Conditioning Plant I.D. Number: PT-1805 & PT-1814 Component: Transmitter Manufacturer: Fischer & Porter Model Number: 50EP 1071 ACX Purchase Order Number: 5935-M-206 Function/Service: Containment Pressure Accuracy: Spec: Demo: Location: See Notes 1 and 2 Elevation: 596'-0"	Operating Time	30 Days	30 Days	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	80	212	Section II.D.8	See Sheet 2	Evaluation	
	Pressure (PSIA)	14.7	14.7	Section II.D.8	See Sheet 2	Evaluation	
	Relative Humidity (%)	80	80	Section II.D.8	See Sheet 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	Negligible	Yes	Section II.D.7	See Sheet 2	Evaluation	
	Aging	40 Years + LOCA	Yes	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: No:							

489

DOCUMENTATION REFERENCES	NOTES
1. Instruction Bulletin 50EP1000, Rev 1. 2. Fischer & Porter Engineering Report #DP-2204-51-B-006, Dated December 2, 1968	1. PT-1805 and PT-1814 are located in the corridor near Room 118 behind a 1'-6" thick wall.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Heating, Ventilating and Air Conditioning Plant I.D. Number: EMB-0131, 0133, 0211 & 0221 Component: Motor Manufacturer: General Electric Model Number: 5K256YK161 Purchase Order Number: 5035-M-59 Function/Service: Room Air Cooler Motor Accuracy: Spec: Demo: Location: ESF Rooms Elevation: Above 584'-7"	Operating Time	30 Days	See Sheet 2	Sec III.B.	See Sh 2	Evaluation	
	Temperature (°F)	135	See Sheet 2	Sec II.D.1	See Sh 2	Evaluation	
	Pressure (PSIA)	14.7	See Sheet 2	Sec II.D.1	See Sh 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Sec II.D.1	See Sh 2	Evaluation	
	Chemical Spray	None					
	Radiation (Rad)	1×10^7	See Sheet 2	Sec II.D.5	See Sh 2	Evaluation	
	Aging	40 Years Plus LOCA	See Sheet 2	Sec II.D.8	See Sh 2	Evaluation	
	Submergence	Not Subject to Submergence					
Flood Level Elevation Above Flood Level: Yes: X No:							

DOCUMENTATION REFERENCES	NOTES

G-0858-01A

Sheet 2

Component ESF Room Air Cooler Motors

The Engineered Safeguards Room air cooler motors are required for cooling after a LOCA. No qualification data could be located for these motors. The motors are qualified for temperature, pressure and humidity by virtue of being Class H insulation. However, qualification to aging and radiation are unknown. The temperature and radiation dose comes from the assumption that all of the safeguards' pumps are working and all of the piping is full of hot water. This is not always the case during the LOCA. There is a 46% safety factor in the heat load calculation for the room. The plant emergency procedures state that the LPSI pumps will be stopped at the time at which switchover to recirculation is reached (20 minutes for large LOCAs). That will decrease the heat load about 10% of the load (including safety factor) initially and more as the LPSI piping cools. If one of the fan motors should fail, there is a redundant one already working. If more than one cooler motor fails, the motor will still be operating within the rating. The operator can open the doors and hatches to the room and also override the high radiation trip on the damper of the normal ESF room ventilation duct. These motors, however, will still be replaced with qualified motors by June 1982, provided no procurement problems arise.

Component Reuter Stokes neutron detectors

Franklin Research had no questions on these monitors.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

513

EQUIPMENT DESCRIPTION

System:
Primary coolant system
Plant I.D. Number:
MO-1042A,MO-1043A
Component:
Motor-operated valves
Manufacturer:
Limitorque (Rel) ac motor
Model Number:
SMB-000
Purchase Order Number:

Function/Service:
Isolation for pressure relief valves
Accuracy: Spec:
Demo:
Location:
Inside containment
Elevation:
649'-0"

Flood Level Elevation 596'-0"
Above Flood Level:
Yes: x No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 days	30 days	Section III.B	1, 3	Simultaneous test	
Temperature (°F)	See Figures 7&8	300	Section II.D.1	1, 3	Simultaneous test	
Pressure (PSIA)	See Figure 9	84.7	Section II.D.1	1, 3	Simultaneous test	
Relative Humidity (%)	100	100	Section II.D.1	1, 3	Simultaneous test	
Chemical Spray	1,750 to 2,000 ppm boric acid with 50 to 100 ppm N_2H_4	Boron water, sodium thiosulfate, and solution of NaOH	Section II.D.2	1, 2, 3	Simultaneous test	
Radiation (Rad)	2×10^7	2.04×10^8	Section II.D.5	1, 3	Sequential test	
Aging	40 years + LOCA	100 hours at 180C + LOCA	Section II.D.8	1, 3	Sequential test	
Submergence	Not subject to submergence					

DOCUMENTATION REFERENCES	NOTES
1. Test Report 600456, Nuclear Power Station Qualification Type Test Report, Limitorque Valve Actuators for PWR Service	

G-0858-01A

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No.:
Revision:
Date:

DOCUMENTATION REFERENCES (cont)	NOTES (cont)
2. BLC-7999, R.L. Castleberry (Bechtel) to R.C. Bauman (CPCo), dated 8/13/79 3. Report B0058, Limitorque Valve Actuator Qualification for Nuclear Power Station Service	

Sheet 2

Component Limitorque valve actuators

These units were tested using the type test method described in IEEE Std 382-72. Test Report 600456 and Appendixes A through F describe the results of the test performed on a typical Limitorque valve actuator (SMB-0) with a 40-foot-pound motor (SMB-0-40). A typical unit was used because the only difference in units is size. All materials used are the same as in Model SMB-000. The unit was mechanically aged to approximately 40 years of service life. The motor was thermally aged for 100 hours at 180C. The unit was also radiation-aged at 4 megarads plus an accident dose of 200 megarads for a total dose of 204 megarads (2.04×10^8) radiation aging. LOCA testing was performed at Limitorque's environmental test facility. The LOCA test consisted of the dual spike (referenced in IEEE Std 382-72) with maximum temperature attained in 15.2 and 13.8 seconds, respectively. Chemical spray was maintained at a pH of 10.5 using a mixture which is primarily a sodium thiosulfate solution (in accordance with Table 1 of IEEE Std 382-72). This is more caustic than the 7 to 8.3 pH solution of hydrazine solution used at the Palisades plant (Reference 2). The first spike of 300 degrees and 84.7 psia was maintained for 33 minutes, then reduced to the 120F starting point. The second transient was attained with a dwell of 30 minutes at 300F and 84.7 psia. The chamber temperature was then reduced to 250F and 44.7 psia and maintained at these conditions for 96 hours. Temperature and pressure were again reduced to 200F and 24.7 psia and maintained for the duration of the test. Chemical spray was maintained at an average pH of 10.5, and relative humidity was maintained at 100% by keeping the condensate at the bottom of the tank at the same temperature as the air/vapor mixture by periodic injection of the steam. The equipment operated satisfactorily before, during, and after the above test.

The valve operators are located inside containment at an elevation of 649'-0", which is well above the 596'-0" flood level; therefore, they are not subject to submergence.

Sheet 3

Component Limitorque valve actuators

DORGR 1 Service Conditions Inside Containment for LOCA Conditions

DORGR 1A Temperature and Pressure Steam Conditions

The test was run at temperature and pressure steam conditions which exceed that given in the FSAR and the report, Section II.D.1; therefore, the guidelines are met.

DORGR 1B Radiation

Gamma

The value actuator was subjected to a radiation dose of 4 megarads plus an accident dose of 200 megarads for a total dose of 204 megarads (2.04×10^8), which exceeds the 2×10^7 rad requirement; therefore, the guidelines are met.

Beta

DORGR 1C Submergence

These valve operators are at an elevation of 649'-0", which is well above the 596'-0" flood level; therefore, the guidelines are met.

DORGR 1D Containment Sprays

Chemical sprays used were in accordance with IEEE Std 382-72, which consisted of boron water, sodium thiosulfate, and sodium hydroxide to a pH of 10.5. This solution is more caustic than the boron water, hydrazine, and sodium hydroxide at a pH of 7 to 8.3 used at the Palisades plant (Reference 2); therefore, the guidelines are met.

Sheet 3 (continued)

DORGR 2 Service Conditions for a PWR Main Steam Line Break Inside Containment

DORGR 2A Temperature and Pressure Steam Conditions

Use of the LOCA conditions is acceptable for main steam line break (MSLB) qualification because CPCo and NUREG-0458 recognize that although the peak temperature and pressure for an MSLB inside containment is greater than that for a LOCA, its duration is short and the effect will be minimal. Use of more realistic assumptions results in a temperature profile that is within the LOCA profile; therefore, the guidelines are met.

DORGR 2B Radiation

The valve operators were subjected to a total operational and accident dose of 2.04×10^8 rads, which exceeds the required 2×10^6 rad dose for this accident; therefore, the guidelines are met.

DORGR 2C Submergence

Same statement as in DORGR 1C

DORGR 2D Chemical Sprays

Same statement as in DORGR 1D

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: PCS Plant I.D. Number: LT-0103 Component: Level Transmitter Manufacturer: Foxboro Model Number: 613 HM Purchase Order Number: MIPB Function/Service: Pressurizer Level Accuracy: Spec: Demo: Partial Location: Cont Elevation: 592	Operating Time	30 Days		Section III.B.5	See Sheet 2	Evaluation	
	Temperature (°F)	Fig 7 and 8	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Pressure (PSIA)	Fig 9	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Chemical Spray	1,750 to 2,000 ppm Boric Acid, 50 to 100 ppm N_2H_4	See Sheet 2	Section II.D.2	See Sheet 2	Evaluation	
	Radiation (Rad)	$2x10^7$R	See Sheet 2	Section II.D.5	See Sheet 2	Evaluation	
	Aging	40 Years + ACC	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
	Submergence	Yes	See Sheet 2	Section II.D.3	See Sheet 2	Evaluation	
Flood Level Elevation 596 Above Flood Level: Yes: No: X							

DOCUMENTATION REFERENCES	NOTES

Component Foxboro Level Transmitter

No qualification data could be located for this transmitter. This transmitter provides for wide range pressurizer level indication. Pressurizer level indication is not required for safe shutdown of the plant following LOCAs or MSLBs as evidenced by the fact that the procedures do not mention the use of pressurizer level indication.

Since pressurizer level indication may prove to be useful, qualified level transmitter will be purchased and installed in place of this transmitter by June 30, 1982.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Primary Coolant System Plant I.D. Number: PT-0103 Component: Pressure Transmitter Manufacturer: Foxboro Model Number: 611GH Purchase Order Number: M-1 Function/Service: Pressurizer T-72 Pressure Indication Accuracy: Spec: Demo: Location: Inside Containment Elevation: 591'-0"	Operating Time	30 Days	See Sheet 2	Section III.B	See Sheet 2	Evaluation	
	Temperature (°F)	See Figures 7 & 8	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Pressure (PSIA)	See Figure 9	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Relative Humidity (%)	100	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
	Chemical Spray	1,750 to 2,000 ppm Boric Acid With 50-100 ppm N_2H_4	See Sheet 2	Section II.D.2	See Sheet 2	Evaluation	
	Radiation (Rad)	2×10^7	See Sheet 2	Section II.D.5	See Sheet 2		
	Aging	40 Years Plus LOCA	See Sheet 2	Section II.D.8	See Sheet 2		
	Submergence	Yes	See Sheet 2	Section II.D.3	See Sheet 2	Evaluation	
Flood Level Elevation 596'-0" Above Flood Level: Yes: No: X							

DOCUMENTATION REFERENCES	NOTES
1. Qualification Test Report for Rosemount Pressure Transmitter Model 11J3A. Rmt Rpt 3788, Rev A, March 1980.	

Component Foxboro Pressure Transmitter

No qualification data could be found concerning these transmitters. These transmitters are used to monitor pressurizer pressure on a wide range. The plant has just installed Rosemount 1153A pressure transmitters for wide-range pressure signal and indication for the subcooling meter. These transmitters will be used to monitor primary system pressure wide range.

The Rosemount pressure transmitter 1153A has been tested for LOCA environment per IEEE 323 (1971) (Reference 1). The tests included:

a. Temperature pressure and humidity test.

1. Rise to 350F and 120 psig.
2. Hold for 10 minutes and add chemical spray.
3. Let cool; then rise to 350F and 120 psig and hold for 10 minutes.
4. Let cool to 303F and 55 psig and hold for 8 hours.
5. Let cool to 250F, 15 psig and hold for 56 hours.
6. Chemical spray during Steps 3, 4 and 16 hours of Step 5.
7. Let cool.

b. No aging test. This is satisfactory as the transmitters are brand new and, thus, have had no degradation should there be a LOCA in this interim period.

c. Radiation at 0.5 Mrads/h until 44 Mrad is reached (4.4×10^6).

d. No submergence data is required as these are mounted above the submergence level.

These transmitters will operate throughout the LOCA for the following reasons:

The temperature in the LOCA after 64 hours (total test time) is about 140F. Conditions will return to ambient at t = 11 days. Since the transmitter is new, it will withstand the additional agency obtained from 64 hours to 11 days. Detailed calculations show that the containment atmosphere is 1.1×10^7 TID for 30 days. The transmitter is mounted on a 2-ft thick wall very close to two other thick walls which are perpendicular to the one on which the transmitter is mounted. As a result the dose is reduced by a factor of 4 (ie, 1/4 of an infinite cloud of radioactivity will affect the valve).

Sheet 4 (Contd)

Frankline: The guidelines require that equipment which is exposed to chemical sprays must be qualified for the most severe chemical environment by either test or analysis. In addition, the effects of enclosure pressure boundary integrity and fluid in-leakage must be considered. The licensee has stated that the transmitters have aluminum top covers, and some of the transmitters will become submerged, at which time seal leakage would become competitive with corrosion. Documentation providing evicence (in the form of either testing or analysis) that the performance of this equipment due to containment spray should be provided.

Response: As discussed in Sheet 2, the equipment will perform its function prior to submergence; therefore, degradation due to submergence is not a consideration. Also, the corrosion rate due to the chemical spray environment of aluminum is insignificant over the time interval involved. Thus, the instrumentation inside the housing is protected from the spray, and degradation due to chemical spray is not a consideration.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System: Primary coolant

Plant I.D. Number: See Notes 1&2

Component: Resistance temperature detector

Manufacturer: Rosemount

Model Number: 104 VCX

Purchase Order Number: 1703781

Function/Service: Hot-cold leg coolant temp

Accuracy: Spec:
Demo:

Location: Inside containment

Elevation: 602'-0"

Flood Level Elevation 596'-0"
Above Flood Level: Yes: X No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 days	See Sheet 2	Section III.B	See Sh 2	Evaluation	
Temperature (°F)	See Figures 7&8	See Sheet 2	Section II.D.1	See Sh 2	Evaluation	
Pressure (PSIA)	See Figure 9	See Sheet 2	Section II.D.1	See Sh 2	Evaluation	
Relative Humidity (%)	100	See Sheet 2	Section II.D.1	See Sh 2	Evaluation	
Chemical Spray	1,750 to 2,000 ppm boric acid with 50 to 100 ppm N_2H_4	See Sheet 2	Section II.D.2			
Radiation (Rad)	2×10^7	See Sheet 2	Section II.D.5	See Sh 2	Evaluation	
Aging	40 years + LOCA	See Sheet 2	Section II.D.8	See Sh 2	Evaluation	
Submergence	Not subject to submergence					

DOCUMENTATION REFERENCES

NOTES

1. Plant identification numbers are as follows:

TE-0112CA	TE-0112HA	TE-0122CA	TE-0122HA
TE-0112CB	TE-0112HB	TE-0122CB	TE-0122HB
TE-0112CC	TE-0112HC	TE-0122CC	TE-0122HC
TE-0112CD	TE-0122HD	TE-0122CD	TE-0122HD

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No.:
Revision:
Date:

DOCUMENTATION REFERENCES (cont)	NOTES (cont)
	The elevation of the above resistant temperature detectors is 602 feet. 2. Plant identification numbers are as follows: TE-0111A TE-0111H TE-0121A TE-0121H TE-0111B TE-0121B The elevation of the above resistance temperature detectors is 625 feet.

Sheet 2

Component Rosemount Primary Coolant Temperature Detectors

The primary loop temperature elements are used to provide input to the steam dump and bypass valves' regulators after trip to provide subcooling indication and to provide input to the thermal margin/low-pressure trip. Qualification information concerning these elements could not be located; however, should these elements fail and that failure be in an unsafe direction, safe shutdown could still be achieved and off-site doses minimized.

Failure of temperature elements TE-0111A, TE-0111B, TE-0111H, TE-0121A, TE-0121B or TE-0121H may result in the steam atmospheric dump valves opening. The failure would have to be in a specific direction and may require more than one element to fail, depending on the severity of the failure. Should this happen, the operator will definitely hear the open valve (from plant experience) and close it. There are four ways to close the valve and these are located in three areas of the plant. This action was submitted as short-term resolution of problems put forth in I&E Information Notice 79-22 (letter Bixel to Ziemann, October 9, 1979). These elements will be replaced with qualified elements by June 1982 if no procurement problems occur.

The other temperature elements are used as input to the subcooling meter and Thermal Margin/Low-Pressure (TM/LP) trip. The TM/LP trip is not needed during high energy line breaks inside containment. Failure of one channel of subcooling indication would still leave one channel functioning and also leave the ability to determine subcooling using the two channels of TM/CP which are not part of the subcooling indication.

Failure of both subcooling channels would still leave indication possible by use of the remaining TM/LP elements. Should all temperature elements fail, subcooling determination is still possible with use of the in-core thermocouples. Voids could be detected by erratic behavior of the ex-core neutron detectors or in-core thermocouples. Also, the safety analysis presented in the FSAR showed acceptable consequences with no credit taken for the subcooling meter. As part of the work to comply with NUREG-0578, an order will be placed to purchase qualified temperature elements in November 1980.

Sheet 4

Component Rosemount Primary Coolant Temperature Detector

These components were not included in the November 1978 CP Co submittal and were therefore not addressed in the Franklin Research Center report.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System: Primary Coolant Sys

Plant I.D. Number: E/P 1057, 1059

Component: Electropneumatic Trans

Manufacturer: Fischer Controls

Model Number: E/P-546

Purchase Order Number: 68553

Function/Service: Pressurizer Spray Valves

Accuracy: Spec:
Demo:

Location: Inside Containment

Elevation: 649'

Flood Level Elevation 596'
Above Flood Level: Yes: X No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days		Section III.B			
Temperature (°F)	See Figures 7 & 8	320F	Section II.D.1	1	Test	
Pressure (PSIA)	See Figure 9	75 psig	Section II.D.1	1	Test	
Relative Humidity (%)	100	100%	Section II.D.1	1	Test	
Chemical Spray	1750 to 2000 ppm boric acid with 50-100 ppm N_2H_4	See Sheet 2	Section II.D.2	See Sheet 2	Evaluation	
Radiation (Rad)	2×10^7	2×10^7	Section II.D.5	2, 4	Evaluation	
Aging	40 Years + LOCA	See Sheet 2	Section II.D.8	3, 4	Evaluation	
Submergence	Not Subject to Submergence					

DOCUMENTATION REFERENCES	NOTES
1. Laboratory Report, "Operational Tests of the Fischer Type 546 Electropneumatic Transducer for Nuclear Reactor Containment Vessel Service," June 12, 1973. 2. Letter H Douglas Waldron, Harley Company, to W C Cooper, Consumers Power Co, Jan 24, 1978. 3. Telephone contact between S McLagon, Fischer Control[illegible]d J Lewis, Wyle Laboratories, on Sept 12, 1980.	

Sheet 2 (continued)

Component Containment radiation monitors

These monitors are used to provide containment isolation on high radiation. These monitors need only be qualified for conditions under which might require a high radiation trip but no high containment pressure trip. These conditions are 5 psig, 170°F (saturation at 5 psig) and 20 R (set point is 20 R/hr). Conditions more severe than this would result in containment isolation on high containment pressure or radiation. The environmental test covered the pressure, temperature and humidity and all materials can withstand 20 R.

No aging data could be located concerning these monitors. However, the normal environment is 104°F which is a nonhostile environment. During the accident the effects of accelerated aging will not be significant due to the short time required for operator, the sealed heavy wall container shielding the monitor from the temperature increase and the very low radiation levels. It is believed that these monitors are qualified with respect to aging.

These monitors are, however, scheduled to be replaced with qualified monitors.

Sheet 3

Component Containment radiation monitors

DORGR 1 Service Conditions Inside Containment for LOCA Conditions

DORGR 1A Temperature and Pressure Steam Conditions

The test parameters exceed the environment to which it must be qualified. See Sheet 2.

DORGR 1B Radiation

Gamma

The monitors will receive a dose of 20 R. All materials can withstand this dose.

Beta -

DORGR 1C Submergence

The monitors will most likely actuate prior to becoming submerged. If this is not the case, then only one monitor may fail due to submergence but the other three will be able to function.

DORGR 1D Containment Sprays

Equipment is qualified for chemical sprays by evaluation as presented in Sheet 2; therefore, the guidelines are met.

Sheet 4

Component Fischer & Porter Level Transmitters

This equipment was not included in the November 1978 CP Co submittal and, therefore, was not addressed by the Franklin Research Center Report.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION

System:
Radwaste System

Plant I.D. Number:
EMB-0155, -0165, -0245 & -0255

Component:
Motor

Manufacturer:
General Electric Co

Model Number:
5K143DL2348

Purchase Order Number:
5935-M-22BC

Function/Service:
Injection Room Sump Pump Motor

Accuracy: Spec:
Demo:

Location:
ESF Rooms

Elevation:
570'-0"

Flood Level Elevation
Above Flood Level:
Yes: No:

ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
Parameter	Accident	Qualification	Accident	Qual		
Operating Time	30 Days	See Sheet 2	Section III.B	See Sheet 2	Evaluation	
Temperature (°F)	135	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
Pressure (PSIA)	14.7	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
Relative Humidity (%)	100	See Sheet 2	Section II.D.1	See Sheet 2	Evaluation	
Chemical Spray	None					
Radiation (Rad)	5×10^6	See Sheet 2	Section II.D.5	See Sheet 2	Evaluation	
Aging	40 Years Plus LOCA	See Sheet 2	Section II.D.8	See Sheet 2	Evaluation	
Submergence	Not Subject To Submergence					

DOCUMENTATION REFERENCES	NOTES

Sheet 4

Component GE Room Sump Pump Motors

Franklin Research Center has not reviewed this equipment for qualification.

EQUIPMENT QUALIFICATION REPORT

Owner: Consumers Power Company
Facility: Palisades
Docket: 50-255

Component Sheet No:
Revision:
Date:

EQUIPMENT DESCRIPTION	ENVIRONMENT			DOCUMENTATION REFERENCES		QUALIFICATION METHOD	OUTSTANDING ITEMS
	Parameter	Accident	Qualification	Accident	Qual		
System: Waste Gas Plant I.D. Number: M69A, M69B Component: Hydrogen Recombiner Manufacturer: Westinghouse Model Number: Model A Purchase Order Number: Function/Service: Hydrogen Recombination Accuracy: Spec: Demo: Location: Containment Elevation: 649'-0"	Operating Time	30 Days	30 Days	Section III.B	1, 2	-	
	Temperature (°F)	278	750	Section II.D.1	1, 2	Test	
	Pressure (PSIA)	70	85	Section II.D.1	1, 2	Test	
	Relative Humidity (%)	100	100	Section II.D.1	1, 2	Test	
	Chemical Spray	1750 to 2000 ppm Boric Acid With 50 to 100 ppm N_2H_4	2500 ppm Boron as Boric Acid With NaOH for pH of 10	Section II.D.2	1, 2	Test	
	Radiation (Rad)	2.0×10^7	2.0×10^8	Section II.D.5	1, 2	Test	
	Aging	40 Years Plus LOCA	40 Years Plus LOCA	Section II.D.8	1, 2	Test	
	Submergence	None					
Flood Level Elevation 596'-0" Above Flood Level: Yes: X No:							

DOCUMENTATION REFERENCES	NOTES
1. WCAP-7709-L and Supplements 1 through 6, "Electrical Hydrogen Recombiner for Water Containments," Westinghouse Electric Corporation. 2. Letter W G Bohl, Westinghouse Electric Corporation, to J L Kuemin, CP Co, dated July 29, 1980.	

858-01A

Component M69A, B Hydrogen Recombiners

WCAP-7709-L and Supplements 1 through 6 provide descriptions and results of several tests performed on the Model A electric hydrogen recombiners. The recombiners consist of heater elements and bus bar. The cable will be separately qualified. The controls are outside of containment. One test sequence was first energize heaters to 40 kW, then a rapid injection of steam to pressurize the chamber to 69 psia in 10 seconds and then inject sodium tetraborate spray (2,500 ppm boron as boric acid with NaOH to a pH of 10). Hold at 69 psia for 4 hours, reduce to 25 psia for 20 hours and then 35 psia for 1 hour. Another separate test was also run in which steam was used to pressurize the test vessel. The test sequence was to increase pressure to 85 psia and hold for 4 hours, then reduce the pressure to 20 psia and hold for 21 days (vessel temperature held at 155°F during the 21-day period). During this test, at 24 hours, the heaters were fully energized and achieved a temperature of 750°F which was maintained throughout the test. This can be seen to envelop the Palisades conditions. During all of these tests, the heaters were energized although in only one test is the actual heater temperature noted. Sodium tetraborate was injected into the test chamber during two of the tests. The sodium tetraborate addition resulted in a spray which contained 2,500 ppm boron as boric acid and sodium hydrozide to give a pH of 10. Both of these spray parameters are more severe than those at Palisades. The recombiners are at the Elevation 649'-0" level which is far above the submergence level of Elevation 596'-0". Qualification for aging was demonstrated through an aging test which consisted of 80 heat-up and cooldown cycles. After the seven LOCA tests, the entire unit was irradiated to 2×10^8 Rads gamma. The equipment oeprated satisfactorily during and/or after all of these tests as described in the report. The report and its Supplements 1 through 4 have been reviewed by the NRC and satisfied the criteria for topical reports and was accepted. Reference 2 provided verification that the recombiners at Palisades were the same as those which were tested.

The hydrogen recombiners are only required for LOCA; therefore, MSLB need not be addressed.

Component M69A, B Hydrogen Recombiners

DORGR 1 Service Conditions Inside Containment for LOCA Conditions

DORGR 1A Temperature and Pressure Steam Conditions

The test was run at temperature and pressure steam conditions which exceed that given in the FSAR and the report, Section II.D.1; therefore, the guidelines are met.

DORGR 1B Radiation

Gamma The recombiner was subjected to a radiation dose of 200 megarads which exceeds the 20 megarad (2.0×10^7) requirement; therefore, the guidelines are met.

Beta Beta doses will not affect the recombiner which, except for cable, are all metallic. Cable will be addressed elsewhere.

DORGR 1C Submergence

The recombiners are located above the flood level; therefore, the guidelines are met.

DORGR 1D Containment Sprays

The containment sprays as discussed on Sheet 2 are considered more caustic than the spray water used at Palisades; therefore, the guidelines are met.

DORGR 4 Qualification Methods

DORGR 4A Selection of Qualification Method

Qualification of the recombiners is by testing.

DORGR 4B Qualification by Type Testing

1. Simulated Service Conditions and Test Duration

The recombiner tests were a series of tests which eventually lead to an accepted topical report and qualification to IEEE 323-1974. The simulated service conditions exceed those environments at the Palisades Plant. Duration of testing in some cases may not cover the total time of the accident. Sufficient testing has been done to meet the guideline requirement.

2. Test Specimen

The test specimen was the same model recombiner as those installed at Palisades.

3. Test Sequence

The radiation was applied after the aging test and the seven LOCA tests. The recombiners have no parts which are age sensitive, so this sequence is acceptable and the guidelines are met.

4. Test Specimen Aging

To qualify the recombiner for a 40-year life, it was estimated two test cycles per year would be required of the valve. Eighty cycle tests were initially performed to demonstrate that, if significant aging would have taken place, the recombiners could have withstood the effects. The guidelines are met.

5. Functional Testing and Failure Criteria

The test specimen operated during all phases of testing and did not fail; therefore, the guidelines are met.

6. Installation Interfaces

The test installation and the existing recombiners have the same orientation.

DORGR 6 Margin

DORGR 4 of the guidelines are met; therefore, the margin requirements are met.

DORGR 7 Aging

See DORGR 4B.

DORGR 8 Documentation

References 1 and 2 form the documentation.

Environmental Qualification of
Safety-Related Electrical Equipment

Palisades Plant
October 1980

Consumers Power Company
Bechtel Associates Professional Corporation

Appendix II

DOR Guideline Definitions

DOR GUIDELINES

DORGR 1

Service Conditions Inside Containment for a Loss of Coolant Accident (LOCA)

DORGR 1A

Temperature and Pressure Steam Conditions - In general, the containment temperature and pressure conditions as a function of time should be based on the analyses in the FSAR. In the specific case of pressure suppression type containments, the following minimum high-temperature conditions should be used: (1) BWR Drywells - 340°F for 6 hours; and (2) PWR Ice Condenser Lower Compartments - 340°F for 3 hours.

DORGR 1B

Radiation - When specifying radiation service conditions for equipment exposed to radiation during normal operating and accident conditions, the normal operating dose should be added to the dose received during the course of an accident. Guidelines for evaluating beta and gamma radiation service conditions for general areas inside containment are provided below. Radiation service conditions for equipment located directly above the containment sump, in the vicinity of filters, or submerged in contaminated liquids must be evaluated on a case-by-case basis. Guidelines for these evaluations are not provided in this document.

Gamma Radiation Doses - A total gamma dose radiation service condition of 2×10^7 rads is acceptable for Class IE equipment located in general areas inside containment for PWRs with dry type containments. Where a dose less than this value has been specified, an application specific evaluation must be performed to determine if the dose specified is acceptable. Procedures for evaluating radiation service conditions in such cases are provided in Appendix B. The procedures in Appendix B are based on the calculation for a typical PWR reported in Appendix D of NUREG-0588.[1]

Gamma dose radiation service conditions for BWRs and PWRs with ice condenser containments must be evaluated on a case-by-case basis. Since the procedures in Appendix B are based on a calculation for a typical PWR with a dry type containment, they are not directly applicable to BWRs and other containment types. However, doses for these other plant configurations may be evaluated using similar procedures with conservative dose assumptions and adjustment factors developed on a case-by-case basis.

1. NUREG-0588, Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment, December 1979.

Environmental Qualification of
Safety-Related Electrical Equipment

Palisades Plant
October 1980

Consumers Power Company
Bechtel Associates Professional Corporation

Appendix IV

Computer Output Listing of Equipment
Found in Hostile Areas

TYPE	COMP ID	REQ NO	MANUFACTURER	MODEL	LOC	SERVICE
PAL	CCS					
MOTOR	EMA-1109	M- 34	LOUIS ALLIS CO	COGX	03/590	COMPONENT COOLING PUMP P-52A
MOTOR	EMA-1116	M- 34	LOUIS ALLIS CO	COGX	03/590	COMPONENT COOLING PUMP P-52C
MOTOR	EMA-1208	M- 34	LOUIS ALLIS CO	COGX	03/590	COMPONENT COOLING PUMP P-52B
VALVE	SV -0910	M-240	AUTOMATIC SWITCH COM	LB-831614	R123	COMP. CLG. WATER INLET TO CONTAINMENT
VALVE	SV -0911	M-240	AUTOMATIC SWITCH COM	LB-831614	R123	COMP. CLG. WATER DISCH. FROM CONTAIN. CKT1
VALVE	SV -0913	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	R123	COMPONENT COOLING&SHUTDN HEAT EXCH.VALVES2
VALVE	SV -0937	M-240	AUTOMATIC SWITCH COM	LB-831614	R123	COMPONENT COOLING&SHUTDN HEAT EXCH.VALVES2
VALVE	SV -0938	M-240	AUTOMATIC SWITCH COM	LB-831614	R123	COMPONENT COOLING&SHUTDN HEAT EXCH.VALVES1
VALVE	SV -0940	M-240	AUTOMATIC SWITCH COM	LB-831614	R123	COMP. CLG. WATER DISCH. FROM CONTAIN. CKT2
VALVE	SV -0944A	M-354	AUTOMATIC SWITCH COM	THT-8344-A1	R123	COMPONENT COOLING&SHUTDN HEAT EXCH.VALVES2
VALVE	SV -0945	M-240	AUTOMATIC SWITCH COM	LB831614	R123	COMPONENT COOLING&SHUTDN HEAT EXCH.VALVES2
VALVE	SV -0946	M-240	AUTOMATIC SWITCH COM	LB831614	R123	COMPONENT COOLING&SHUTDN HEAT EXCH.VALVES1
VALVE	SV -0947	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	03/570	COMPONENT COOLING&SHUTDN HEAT EXCH.VALVES2
VALVE	SV -0948	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	03/570	COMPONENT COOLING&SHUTDN HEAT EXCH.VALVES1
VALVE	SV -0949	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	03/570	COMPONENT COOLING&SHUTDN HEAT EXCH.VALVES1
VALVE	SV -0950	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	03/570	COMPONENT COOLING&SHUTDN HEAT EXCH.VALVES2
VALVE	SV -0951	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	03/570	COMPONENT COOLING&SHUTDN HEAT EXCH.VALVES1

TYPE	COMP ID	REQ NO	MANUFACTURER	MODEL	LOC	SERVICE
PAL	CIS					
PENETR	EZ -0110	E- 20	VIKING INDUSTRIES	P4 23-0024-0000		FANS V2A & V4A CANISTER
PENETR	EZ -0101	E- 20	VIKING INDUSTRIES	P1 23-0048-0000		PR1. COOLANT PP. P50B CANISTER
PENETR	EZ -0102	E- 20	VIKING INDUSTRIES	P1 23-0049-0000		SPARE CANISTER
PENETR	EZ -0103	E- 20	VIKING INDUSTRIES	P1 23-0050-0000		PR1. COOLANT PP. P50C CANISTER
PENETR	EZ -0104	E- 20	VIKING INDUSTRIES	P1 23-0051-0000		PR1. COOLANT PP. P50B CANISTER
PENETR	EZ -0105	E- 20	VIKING INDUSTRIES	P1 23-0052-0000		PR1. COOLANT PP. P50A CANISTER
PENETR	EZ -0106	E- 20	VIKING INDUSTRIES	P2 23-0020-0000		SPARE CANISTER
PENETR	EZ -0107	E- 20	VIKING INDUSTRIES	P2 23-0021-0000		LOAD CENTER B-15 FEEDER CANISTER
PENETR	EZ -0108	E- 20	VIKING INDUSTRIES	P2 23-0022-0000		LOAD CENTER B-16 FEEDER CANISTER
PENETR	EZ -0109	E- 20	VIKING INDUSTRIES	P3 23-0023-0000		MCC NO.9 FEEDER CANISTER
PENETR	EZ -0111	E- 20	VIKING INDUSTRIES	P5 23-0026-0000		MOV,MOTORS & MISC. CANISTER
PENETR	EZ -0112	E- 20	VIKING INDUSTRIES	P5 23-0027-0000		MOV, MOTORS & MISC. CANISTER
PENETR	EZ -0121	E- 20	VIKING INDUSTRIES	C-1A 23-0029-0000		CONTROL CANISTER
PENETR	EZ -0141	E- 20	VIKING INDUSTRIES	N-1A 23-0042-0000		NUCLEAR INSTR. CANISTER
PENETR	EZ -0142	E- 20	VIKING INDUSTRIES	N-1A 23-0043-0000		NUCLEAR INSTR. CANISTER
PENETR	EZ -0143	E- 20	VIKING INDUSTRIES	I-1A 23-0038-0000		INSTRUMENTS CANISTER
PENETR	EZ -0146	E- 20	VIKING INDUSTRIES	I-3A 23-0046-0000		INSTRUMENTS & MISC. CANISTER
PENETR	EZ -0210	E- 20	VIKING INDUSTRIES	P4 23-0025-0000		FANS V1A & V3A CANISTER
PENETR	EZ -0211	E- 20	VIKING INDUSTRIES	P6 23-0028-0000		MOV,MOTORS & MISC. CANISTER
PENETR	EZ -0221	E- 20	VIKING INDUSTRIES	C-1B 23-0030-0000		CONTROL CANISTER
PENETR	EZ -0222	E- 20	VIKING INDUSTRIES	C-1B 23-0031-0000		CONTROL CANISTER
PENETR	EZ -0223	E- 20	VIKING INDUSTRIES	C-2 23-0032-0000		ROD DRIVE MECH. CONTROL CANISTER
PENETR	EZ -0224	E- 20	VIKING INDUSTRIES	C-2 23-0033-0000		ROD DRIVE MECH. CONTROL CANISTER
PENETR	EZ -0225	E- 20	VIKING INDUSTRIES	C-2 23-0034-0000		ROD DRIVE MECH. CONTROL CANISTER
PENETR	EZ -0226	E- 20	VIKING INDUSTRIES	C-2 23-0035-0000		SEC. ROD POS. IND. SYSTEM CANISTER
PENETR	EZ -0227	E- 20	VIKING INDUSTRIES	C-2 23-0036-0000		SEC. ROD POS. IND. SYSTEM CANISTER
PENETR	EZ -0228	E- 20	VIKING INDUSTRIES	C-2 23-0037-0000		SEC. ROD POS. IND.SYSTEM CANISTER
PENETR	EZ -0241	E- 20	VIKING INDUSTRIES	N-1B 23-0044-0000		NUCLEAR INSTRU. CANISTER
PENETR	EZ -0242	E- 20	VIKING INDUSTRIES	N-1B 23-0045-0000		NUCLEAR INSTRU. CANISTER
PENETR	EZ -0243	E- 20	VIKING INDUSTRIES	I-1B 23-0039-0000		INSTRUMENTS CANISTER
PENETR	EZ -0244	E- 20	VIKING INDUSTRIES	I-2 23-0040-0000		IN-CORE MONITOR CANISTER
PENETR	EZ -0245	E- 20	VIKING INDUSTRIES	I-2 23-0041-0000		IN-CORE MONITOR CANISTER
PENETR	EZ -0246			I-3B 23-0047-0000		INSTRUMENTS & MISC. CANISTER

TYPE	COMP ID	REQ NO	MANUFACTURER	MODEL	LOC	SERVICE
PAL	CVC					
VALVE	SV -2113	M-234	AUTOMATIC SWITCH COM	WPXHVA2023012F	CONT	CHARGING DISTRIBUTION STOP VALVES
VALVE	SV -2115	M- 1NC	AUTOMATIC SWITCH COM	WPXHVA2023012F	CONT	CHARGING DISTRIBUTION STOP VALVES
VALVE	SV -2117	M- 1NC	AUTOMATIC SWITCH COM	HTX8320A16V	CONT	AUXILIARY SPRAY STOP VALVE
VALVE	SV -2009	M-234	AUTOMATIC SWITCH COM	WPHT8300B61-RF	R150	PRIMARY COOLANT LETDOWN ISOLATION VALVE
VALVE	SV -2083	M-234	AUTOMATIC SWITCH COM	WPHT8300B61-RF	R150	PRI. COOL. PUMP CONTROLLED BLEED-OFF VALVE

TYPE	COMP ID	REQ NO	MANUFACTURER	MODEL	LOC	SERVICE
PAL	ESS					
INSTRU	E/P-0338	M-233-88	FISHER CONTROLS CO.	546	CONT	SAFETY INJECTION TANK T-82D
INSTRU	E/P-0342	M-233-87	FISHER CONTROLS CO.	546	CONT	SAFETY INJECTION TANK T-82A
INSTRU	E/P-0346	M-233-87	FISHER CONTROLS CO.	546	CONT	SAFETY INJECTION TANK T-82B
INSTRU	E/P-0347	M-233-88	FISHER CONTROLS CO.	546	CONT	SAFETY INJECTION TANK T-82C
INSTRU	LT -0358	M-206-97	FISCHER & PORTER CO.	10B2495JB	CONT	CONTAINMENT SUMP
INSTRU	LT -0359	M-206-98	FISCHER & PORTER CO.	10B24655ECBB1	CONT	CONTAINMENT SUMP
INSTRU	PT -0338	M-206-4	FISCHER & PORTER CO.	50EP1042A	CONT	SAFETY INJECTION TANK T-82D
INSTRU	PT -0342	M-206-1	FISCHER & PORTER CO.	50EP1041ACXANS	CONT	SAFETY INJECTION TANK T-82A
INSTRU	PT -0346	M-206-2	FISCHER & PORTER CO.	50EP1042A	CONT	SAFETY INJECTION TANK T-82B
INSTRU	PT -0347	M-206-3	FISCHER & PORTER CO.	50EP1042A	CONT	SAFETY INJECTION TANK T-82C
INSTRU	PT -0306	M-206-8	FISCHER & PORTER CO.	50EP1072A	R123	SAFETY INJ. PUMP DISCH. PRESS. CKT 2
INSTRU	E/P-3025	M-233-103	MASONEILAN INTERNATI	8012	03/570	SHUTDOWN COOLING FLOW CONTROL
MOTOR	EMB-0137		RELIANCE ELECTRIC CO	447063 LT	01/590	S.I.H P VALVE MO3007
MOTOR	EMB-0141		RELIANCE ELECTRIC CO	Y220107A4 BU	01/590	S.I.L.P. VALVE MO3008
MOTOR	EMB-0147		RELIANCE ELECTRIC CO	Y220107A4 BU	01/590	S.I.L.P. VALVE MO3010
MOTOR	EMB-0151		RELIANCE ELECTRIC CO	447063 LT	01/590	S.I.H.P. MO-3063.
MOTOR	EMB-0157		RELIANCE ELECTRIC CO	447063 LT	01/590	S.I.H.P. MO-3011.
MOTOR	EMB-0197		RELIANCE ELECTRIC CO	447063 LT	01/590	S.I.H P VALVE MO3009
MOTOR	EMB-0237		RELIANCE ELECTRIC CO	447063 LT	01/590	S.I.H.P. MO-3064.
MOTOR	EMB-0241		RELIANCE ELECTRIC CO	447063 LT	01/590	S.I.H.P. MO-3062.
MOTOR	EMB-0247		RELIANCE ELECTRIC CO	Y274033A6PA	01/590	S.I.L.P. VALVE MO3012
MOTOR	EMB-0251		RELIANCE ELECTRIC CO	Y220107A2	01/590	S.I.L.P. VALVE MO3014
MOTOR	EMB-0257		RELIANCE ELECTRIC CO	447063 LT	01/590	S.I.H P VALVE MO3066
MOTOR	EMB-0261		RELIANCE ELECTRIC CO	447063 LT	01/590	S.I.H P VALVE MO3068
MOTOR	EMB-0167		RELIANCE ELECTRIC CO	447063LT	01/607	PRIMARY LOOP COOLING VALVE MO-3015
MOTOR	EMB-0271		RELIANCE ELECTRIC CO	704799 FX	01/607	S.D. COOLING VALVE MO3016
MOTOR	EMA-1206	M- 1	GENERAL ELECTRIC CO.	5K8818849C56	02/570	LOW PRESSURE SAFETY INJECTION PUMP P-67A
MOTOR	EMA-1207	M- 1	WESTINGHOUSE ELECTRI	68F13512	02/570	HIGH PRESSURE SAFETY INJECTION PUMP P-66A
MOTOR	EMA-1210	M- 8	LOUIS ALLIS CO	COGS	02/570	CONTAINMENT SPRAY PUMP P-54A
MOTOR	EMA-1111	M- 1	GENERAL ELECTRIC CO.	5K818847A100	03/570	LOW PRESSURE SAFETY INJECTION PUMP P-67B
MOTOR	EMA-1112	M- 8	LOUIS ALLIS CO	COGS	03/570	CONTAINMENT SPRAY PUMP P-54B
MOTOR	EMA-1113	M- 1	WESTINGHOUSE ELECTRI	68F13512	03/570	HIGH PRESSURE SAFETY INJECTION PUMP P-66B
MOTOR	EMA-1114	M- 8	LOUIS ALLIS CO	COGS	03/570	CONTAINMENT SPRAY PUMP P-54C
MOTOR	EMA-1209	M- 1	WESTINGHOUSE ELECTRI	68F13512	03/570	HIGH PRESSURE SAFETY INJECTION PUMP P-66C
VALVE	SV -0338	M-234-11	AUTOMATIC SWITCH COM	WPHT 8300B61RF	CONT	SAFETY INJECTION TANK T-82D VALVES
VALVE	SV -0342	M-234-11	AUTOMATIC SWITCH COM	WPHT 8300B61-RF	CONT	SAFETY INJECTION TANK T-82A VALVES
VALVE	SV -0346	M-234-11	AUTOMATIC SWITCH COM	WPHT-8300B61RF	CONT	SAFETY INJECTION TANK T-82B VALVES
VALVE	SV -0347	M-234-11	AUTOMATIC SWITCH COM	WPHT 8300B61-RF	CONT	SAFETY INJECTION TANK T-82C
VALVE	SV -3069	M-234	AUTOMATIC SWITCH COM	WPHT 8300B61-RF	CONT	SAFETY INJ.&SHUTDN COOLING VALVES CIRCUIT2
VALVE	SV -3001	M-234	AUTOMATIC SWITCH COM	WPHT8300B61-RF	R121A	CONTAINMENT SPRAY VALVES
VALVE	SV -3002	M-234	AUTOMATIC SWITCH COM	WPHT8300B61-RF	R121A	CONTAINMENT SPRAY VALVES
VALVE	SV -0438A	M-336	AUTOMATIC SWITCH COM	HTX 8320A-22V	R238	IODINE REMOVAL SYSTEM VALVES
VALVE	SV -0438B	M-336	AUTOMATIC SWITCH COM	HTX 8320A-22V	R238	IODINE REMOVAL SYSTEM VALVES
VALVE	SV -3029A	M-241	AUTOMATIC SWITCH COM	LB 8316C-36	02/570	SIRW TANK LEVEL CONTROLLED VLVS.CIRCUIT #2
VALVE	SV -3029B	M-241	AUTOMATIC SWITCH COM	LB8316C46	02/570	SIRW TANK LEVEL CONTROLLED VLVS.CIRCUIT #2
VALVE	SV -3036	M-241	AUTOMATIC SWITCH COM	LB 8316C-44	02/570	SAFETY INJ.&SHUTDN COOLING VALVES CIRCUIT2
VALVE	SV -3037	M-241	AUTOMATIC SWITCH COM	LB 8316C-34	02/570	SAFETY INJ.&SHUTDN COOLING VALVES CIRCUIT2
VALVE	SV -3071	M-241	AUTOMATIC SWITCH COM	LB8316C44	02/570	SAFETY INJ.&SHUTDN COOLING VALVES CIRCUIT2
VALVE	SV -3018	M-241	AUTOMATIC SWITCH COM	LB8316C44	03/570	SAFETY INJ.&SHUTDN COOLING VALVES CIRCUIT1
VALVE	SV -3027A	M-241	AUTOMATIC SWITCH COM	LB 8316C-34	03/570	SIRW TANK LEVEL CONTROLLED VLVS.CIRCUIT #1
VALVE	SV -3027B	M-241	AUTOMATIC SWITCH COM	LB 8316C-36	03/570	SIRW TANK LEVEL CONTROLLED VLVS.CIRCUIT #1
VALVE	SV -3030A	M-241	AUTOMATIC SWITCH COM	LB 8316C-36	03/570	SIRW TANK LEVEL CONTROLLED VLVS.CIRCUIT #1

TYPE	COMP ID	REQ NO.	MANUFACTURER	MODEL	LOC	SERVICE
PAL	ESS					
VALVE	SV -3030B	M-241	AUTOMATIC SWITCH COM	LB8316C44	03/570	SIRW TANK LEVEL CONTROLLED VLVS.CIRCUIT #1
VALVE	SV -3031A	M-241	AUTOMATIC SWITCH COM	LB 8316C-36	03/570	SIRW TANK LEVEL CONTROLLED VLVS.CIRCUIT #1
VALVE	SV -3031B	M-241	AUTOMATIC SWITCH COM	LB 8316C-46	03/570	SIRW TANK LEVEL CONTROLLED VLVS.CIRCUIT #1
VALVE	SV -3055A	M-241	AUTOMATIC SWITCH COM	LB 8316C-36	03/570	SHUTDOWN COOLING HEAT EXH. ISOLATING VALVE
VALVE	SV -3055B	M-241	AUTOMATIC SWITCH COM	LB 8316C-34	03/570	SHUTDOWN COOLING HEAT EXH. ISOLATING VALVE
VALVE	SV -3056A	M-241	AUTOMATIC SWITCH COM	LB 8316C-34	03/570	SIRW TANK LEVEL CONTROLLED VLVS.CIRCUIT #2
VALVE	SV -3056B	M-241	AUTOMATIC SWITCH COM	LB8316C34	03/570	SIRW TANK LEVEL CONTROLLED VLVS.CIRCUIT #2
VALVE	SV -3057A	M-241	AUTOMATIC SWITCH COM	LB 8316C-34	03/570	SIRW TANK LEVEL CONTROLLED VLVS.CIRCUIT #2
VALVE	SV -3057B	M-241	AUTOMATIC SWITCH COM	LB8316C46	03/570	SIRW TANK LEVEL CONTROLLED VLVS.CIRCUIT #2
VALVE	SV -3059	M-241	AUTOMATIC SWITCH COM	LB 8316C-44	03/570	SAFETY INJ.&SHUTDN COOLING VALVES CIRCUIT1
VALVE	SV -3070	M-241	AUTOMATIC SWITCH COM	LB-8316C-44	03/570	SAFETY INJ.&SHUTDN COOLING VALVES CIRCUIT1
VALVE	SV -3212A	M-241	AUTOMATIC SWITCH COM	LB-8316C-36	03/570	SAFETY INJ.&SHUTDN COOLING VALVES CIRCUIT2
VALVE	SV -3212B	M-241	AUTOMATIC SWITCH COM	LB-8316C-34	03/570	SAFETY INJ.&SHUTDN COOLING VALVES CIRCUIT2
VALVE	SV -3213A	M-241	AUTOMATIC SWITCH COM	LB-8316C-46	03/570	SAFETY INJ.&SHUTDN COOLING VALVES CIRCUIT2
VALVE	SV -3213B	M-241	AUTOMATIC SWITCH COM	LB-8316C-34	03/570	SAFETY INJ.&SHUTDN COOLING VALVES CIRCUIT2
VALVE	SV -3223A	M-241	AUTOMATIC SWITCH COM	LB8316C34	03/570	SAFETY INJ.&SHUTDN COOLING VALVES CIRCUIT1
VALVE	SV -3223B	M-241	AUTOMATIC SWITCH COM	LB8316C34	03/570	SAFETY INJ.&SHUTDN COOLING VALVES CIRCUIT1
VALVE	SV -3224A	M-241	AUTOMATIC SWITCH COM	LB-8316C-36	03/570	SAFETY INJ.&SHUTDN COOLING VALVES CIRCUIT1
VALVE	SV -3224B	M-241	AUTOMATIC SWITCH COM	LB-8316C-34	03/570	SAFETY INJ.&SHUTDN COOLING VALVES CIRCUIT1
VALVOP	VOP-3007	M- 1	LIMITORQUE CORP.	SMB-00-15	CONT	H P SAFE. INJ TO REACT. COOL. LOOP 1A 3002
VALVOP	VOP-3008	M- 1NA	LIMITORQUE CORP.	SMB-3-100	CONT	L P SAFE. INJ TO REACT. COOL. LOOP 1A 3002
VALVOP	VOP-3009	M- 1NA	LIMITORQUE CORP.	SMB-00-15	CONT	HP INJECTION
VALVOP	VOP-3010	M- 1NA	LIMITORQUE CORP.	SMB-3-100	CONT	LP INJECTION
VALVOP	VOP-3011	M- 1NA	LIMITORQUE CORP.	SMB-00-15	CONT	HP INJECTION
VALVOP	VOP-3012	M- 1NA	LIMITORQUE CORP.	SMB-3-100	CONT	LP INJECTION
VALVOP	VOP-3013	M- 1NA	LIMITORQUE CORP.	SMB-00-15	CONT	HP INJECTION
VALVOP	VOP-3014	M- 1NA	LIMITORQUE CORP.	SMB-3-100	CONT	L P INJ. TO REACTOR COOLANT LOOP 2B 3003
VALVOP	VOP-3015	M- 1NA	LIMITORQUE CORP.	SMB-2-60	CONT	SHUTDOWN COOLING FROM PRIMARY LOOP 2 3004
VALVOP	VOP-3016	M- 1NA	LIMITORQUE CORP.	SMB-2-60	CONT	SHUTDN CLG WTR. RETURN

TYPE	COMP ID	REQ NO	MANUFACTURER	MODEL	LOC	SERVICE
PAL	FWS					
INSTRU	FT -0701	M- 1	FISCHER & PORTER CO.	10B2466AAAB1	CONT	STEAM GEN. E-50A-FEEDWATER FLOW
INSTRU	FT -0703	M- 1	FISCHER & PORTER CO.	10B2466AAAB1	CONT	STEAM GEN. E-50B-FEEDWATER FLOW
INSTRU	LT -0701	M- 1	FISCHER & PORTER CO.	13D2465BA	CONT	STEAM GEN. E-50A-DOWN COMER
INSTRU	LT -0702	M- 1	FISCHER & PORTER CO.	13D2465BA	CONT	STEAM GEN. E-50A
INSTRU	LT -0703	M- 1	FISCHER & PORTER CO.	13D2465BA	CONT	STEAM GEN. E-50B-DOWN COMER
INSTRU	LT -0704	M- 1	FISCHER & PORTER CO.	13D2465BA	CONT	STEAM GEN. E-50B
INSTRU	LT -0751A	M- 1	FOXBORO CO., THE	613DM	CONT	STEAM GENERATOR E-50A LOW LEVEL
INSTRU	LT -0751B	M- 1	FOXBORO CO., THE	613DM	CONT	STEAM GENERATOR E-50A LOW LEVEL
INSTRU	LT -0751C	M- 1	FOXBORO CO., THE	613DM	CONT	STEAM GENERATOR E-50A LOW LEVEL
INSTRU	LT -0751D	M- 1	FOXBORO CO., THE	613DM	CONT	STEAM GENERATOR E-50A LOW LEVEL
INSTRU	LT -0752A	M- 1	FOXBORO CO., THE	613DM	CONT	STEAM GENERATOR E-50B LOW LEVEL
INSTRU	LT -0752B	M- 1	FOXBORO CO., THE	613DM	CONT	STEAM GENERATOR E-50B LOW LEVEL
INSTRU	LT -0752C	M- 1	FOXBORO CO., THE	613DM	CONT	STEAM GENERATOR E-50B LOW LEVEL
INSTRU	LT -0752D	M- 1	FOXBORO CO., THE	613DM	CONT	STEAM GENERATOR E-50B LOW LEVEL
INSTRU	PT -0751A	M- 1	FOXBORO CO., THE	611GM	CONT	STEAM GENERATOR E-50A LOW PRESSURE-CKT 1
INSTRU	PT -0751B	M- 1	FOXBORO CO., THE	611GM	CONT	STEAM GENERATOR E-50A LOW PRESSURE-CKT 2
INSTRU	PT -0751C	M- 1	FOXBORO CO., THE	611GM	CONT	STEAM GENERATOR E-50A LOW PRESSURE-CKT 3
INSTRU	PT -0751D	M- 1	FOXBORO CO., THE	611GM	CONT	STEAM GENERATOR E-50A LOW PRESSURE-CKT 4
INSTRU	PT -0752A	M- 1	FOXBORO CO., THE	611GM	CONT	STEAM GENERATOR E-50B LOW PRESSURE-CKT 1
INSTRU	PT -0752B	M- 1	FOXBORO CO., THE	611GM	CONT	STEAM GENERATOR E-50B LOW PRESSURE-CKT 2
INSTRU	PT -0752C	M- 1	FOXBORO CO., THE	611GM	CONT	STEAM GENERATOR E-50B LOW PRESSURE-CKT 3
INSTRU	PT -0752D	M- 1	FOXBORO CO., THE	611GM	CONT	STEAM GENERATOR E-50B LOW PRESSURE-CKT 4
INSTRU	E/P-0736	M-233-96	HONEYWELL CORPORATIO	685435	03/570	STEAM GEN. E-50B AUX. FEEDWATER CONTROL
INSTRU	E/P-0737	M-233-97	HONEYWELL CORPORATIO	685435	03/570	STEAM GEN. E-50A AUX. FEEDWATER CONTROL

TYPE	COMP ID	REQ NO	MANUFACTURER	MODEL	LOC	SERVICE
PAL	MGS					
VALVE	SV -1358	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	R150	NITROGEN ISOLATION VALVE

TYPE	COMP ID	REQ NO	MANUFACTURER	MODEL	LOC	SERVICE
PAL	MSS					
INSTRU	FT -0702		FISCHER & PORTER CO.	10B2466AAAB1	CONT	STEAM GEN. E-50A-STEAM FLOW
INSTRU	FT -0704	M- 1	FISCHER & PORTER CO.	10B2466AAAB1	CONT	STEAM GEN. E-50B-STEAM FLOW
INSTRU	PT -0702	M- 1	FISCHER & PORTER CO.	50EP1031B	CONT	STEAM GEN. E-50A
INSTRU	PT -0704	M- 1	FISCHER & PORTER CO.	50EP1031B	CONT	STEAM GEN. E-50B
VALVE	SV -0739	M-234	AUTOMATIC SWITCH COM	WPHT8300B61-RF	R123	STEAM GEN. E-50B TOP BLOWDOWN ISOL. VALVE
VALVE	SV -0522A	M-234		HPX8320A26	R238	MAIN STEAM ISOLATION VALVE CIRCUIT NO.2
VALVE	SV -0738	M-234	AUTOMATIC SWITCH COM	WPHT8300B61-RF	R238	STEAM GEN. E-50B TOP BLOWDOWN ISOL. VALVE
VALVE	SV -0767	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	R238	STEAM GEN. E-50A BOTTOM BLOWDN ISOL. VALVE
VALVE	SV -0768	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	R238	STEAM GEN. E-50B BOTTOM BLOWDN ISOL. VALVE
VALVE	SV -0770	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	R238	STEAM GEN. E-50B BOTTOM BLOWDN ISOL. VALVE
VALVE	SV -0771	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	R238	STEAM GEN. E-50A BOTTOM BLOWDN ISOL. VALVE

TYPE	COMP ID	REQ NO	MANUFACTURER	MODEL	LOC	SERVICE
PAL	NMS					
INSTRU	NI - 5	M- 1RA	GULF GENERAL ATOMIC,	NP-6	CONT	POWER RANGE SAFETY CHANNEL
INSTRU	NI - 6	M- 1RA	GULF GENERAL ATOMIC,	NP-6	CONT	POWER RANGE SAFETY CHANNEL
INSTRU	NI - 7	M- 1RA	GULF GENERAL ATOMIC,	NP-6	CONT	POWER RANGE SAFETY CHANNEL
INSTRU	NI - 8	M- 1RA	GULF GENERAL ATOMIC,	NP-6	CONT	POWER RANGE SAFETY CHANNEL
INSTRU	NI - 9		GULF GENERAL ATOMIC,		CONT	POWER RANGE NEUTRON CHANNEL
INSTRU	NI - 10		GULF GENERAL ATOMIC,		CONT	POWER RANGE NEUTRON CHANNEL

TYPE	COMP ID	REQ NO	MANUFACTURER	MODEL	LOC	SERVICE
PAL	PCS					
INSTRU	E/P-1057		FISHER CONTROLS CO.	546	CONT	PRESSURIZER SPRAY
INSTRU	E/P-1059		FISHER CONTROLS CO.	546	CONT	PRESSURIZER SPRAY
INSTRU	LT -0103	M- 1	FOXBORO CO., THE	613HM	CONT	PRESSURIZER WIDE RANGE LEVEL IND.
INSTRU	PT -0102A	M- 1	FOXBORO CO., THE	611GM	CONT	PRESSURIZER PRESS. S.I. CHANNEL - CKT 1
INSTRU	PT -0102B	M- 1	FOXBORO CO., THE	611GM	CONT	PRESSURIZER PRESS. S.I. CHANNEL - CKT 2
INSTRU	PT -0102C	M- 1	FOXBORO CO., THE	611GM	CONT	PRESSURIZER PRESS. S.I. CHANNEL - CKT 3
INSTRU	PT -0102D	M- 1	FOXBORO CO., THE	611GM	CONT	PRESSURIZER PRESS. S.I. CHANNEL - CKT 4
INSTRU	PT -0103	M- 1	FOXBORO CO., THE	611GH	CONT	PRESSURIZER WIDE RANGE PRESS. IND.
INSTRU	TE -0111A	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. LOOP MEASUREMENT CHANNEL 1
INSTRU	TE -0111B	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. LOOP MEASUREMENT CHANNEL 1
INSTRU	TE -0111H	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. LOOP MEASUREMENT CHANNEL 1
INSTRU	TE -0112CA	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. SYS. TEMP. PROTECTIVE CHANNEL A
INSTRU	TE -0112CB	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. SYS. TEMP. PROTECTIVE CHANNEL B
INSTRU	TE -0112CC	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. SYS. TEMP. PROTECTIVE CHANNEL C
INSTRU	TE -0112CD	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. SYS. TEMP. PROTECTIVE CHANNEL D
INSTRU	TE -0112HA	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. SYS. TEMP. PROTECTIVE CHANNEL A
INSTRU	TE -0112HB	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. SYS. TEMP. PROTECTIVE CHANNEL B
INSTRU	TE -0112HC	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. SYS. TEMP. PROTECTIVE CHANNEL C
INSTRU	TE -0112HD	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. SYS. TEMP. PROTECTIVE CHANNEL D
INSTRU	TE -0121A	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. LOOP MEASUREMENT CHANNEL 2
INSTRU	TE -0121B	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. LOOP MEASUREMENT CHANNEL 2
INSTRU	TE -0121H	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. LOOP MEASUREMENT CHANNEL 2
INSTRU	TE -0122CA	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. SYS. TEMP. PROTECTIVE CHANNEL A
INSTRU	TE -0122CB	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. SYS. TEMP. PROTECTIVE CHANNEL B
INSTRU	TE -0122CC	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. SYS. TEMP. PROTECTIVE CHANNEL C
INSTRU	TE -0122CD	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. SYS. TEMP. PROTECTIVE CHANNEL D
INSTRU	TE -0122HA	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. SYS. TEMP. PROTECTIVE CHANNEL A
INSTRU	TE -0122HB	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. SYS. TEMP. PROTECTIVE CHANNEL B
INSTRU	TE -0122HC	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. SYS. TEMP. PROTECTIVE CHANNEL C
INSTRU	TE -0122HD	M- 1	ROSEMOUNT, INC.	104VCX	CONT	PRI. SYS. TEMP. PROTECTIVE CHANNEL D
MOTOR	EMB-0177	M-241B	RELIANCE ELECTRIC CO	444567-KT	01/649	PRESS.RELIEF ISOL.VLV.MO1042A
MOTOR	EMB-0281		RELIANCE ELECTRIC CO	444567-KT	01/649	PRESS.RELIEF ISOL.VLV.MO1043A
VALVE	SV -1901	M-211	AUTOMATIC SWITCH COM	HT8320A22	CONT	STEAM GENERATOR BLOWDOWN MONITORING
VALVE	SV -1902	M-211	AUTOMATIC SWITCH COM	HT8320A22	CONT	STEAM GENERATOR BLOWDOWN MONITORING
VALVE	SV -1903	M-211	AUTOMATIC SWITCH COM	HT8320A22	CONT	STEAM GENERATOR BLOWDOWN MONITORING
VALVE	SV -1904	M-211	AUTOMATIC SWITCH COM	HT8320A22	CONT	QUENCH TANK LIQUID PHASE
VALVE	SV -1905	M-211	AUTOMATIC SWITCH COM	HT8320A22	CONT	STEAM GENERATOR BLOWDOWN MONITORING
VALVE	SV -1910	M-211	AUTOMATIC SWITCH COM	HT8320A22	R150	PRIMARY SYSTEM SAMPLING ISOLATION
VALVE	SV -1911	M-211	AUTOMATIC SWITCH COM	HT8320A22	R150	PRIMARY SYSTEM SAMPLING ISOLATION
VALVE	SV -0155	M-234-2	AUTOMATIC SWITCH COM	WPHT 8300B61-RF	R238	DEMINERALIZER WATER QUENCH TANK VALVE
VALVOP	VOP-1042A	M-241B	PHILADELPHIA GEAR CO	334065	CONT	PER POWER RELIEF ISOL
VALVOP	VOP-1043A	M-241B	PHILADELPHIA GEAR CO	34065	CONT	PER POWER RELIEF ISOL

TYPE	COMP ID	REQ NO	MANUFACTURER	MODEL	LOC	SERVICE
PAL	RIA					
INSTRU	RE -1805	M-217	VICTOREEN INSTRUMENT	848-4+E12749	CONT	CONTAINMENT ISOLATION MONITOR
INSTRU	RE -1806	M-217	VICTOREEN INSTRUMENT	848-4+E12749	CONT	CONTAINMENT ISOLATION MONITOR
INSTRU	RE -1807	M-217	VICTOREEN INSTRUMENT	848-4+E12749	CONT	CONTAINMENT ISOLATION MONITOR
INSTRU	RE -1808	M-217	VICTOREEN INSTRUMENT	848-4+E12749	CONT	CONTAINMENT ISOLATION MONITOR

TYPE	COMP ID	REQ NO	MANUFACTURER	MODEL	LOC	SERVICE	
PAL	RWS						
INSTRU	LT -1107	M-206-114	FISCHER & PORTER CO.	10B2466EC	R123	SAFETY INJ. RM SUMP T-78B	
INSTRU	LS -1105	M- 22BC	SQUARE D CO	CLASS9038	03/570	ENGINEERED SAFEGRD RO	1102
INSTRU	LS -1108	M- 22BC	SQUARE D CO	CLASS9038	03/570	ENGINEERED SAFGRD RM SUMP T-78A WEST	1103
MOTOR	EMB-0155	M- 22BC	GENERAL ELECTRIC CO.	5K143DL2348	02/570	INJECTION ROOM SUMP PUMP P-72B	
MOTOR	EMB-0165	M- 22BC	GENERAL ELECTRIC CO.	5K143DL2348	03/570	INJECTION ROOM SUMP PUMP P-73B	
MOTOR	EMB-0245	M- 22BC	GENERAL ELECTRIC CO.	5K143DL2348	03/570	INJECTION ROOM SUMP PUMP P-73A	
MOTOR	EMB-0255	M- 22BC	GENERAL ELECTRIC CO.	5K143DL2348	03/570	INJECTION ROOM SUMP PUMP P-72A	
VALVE	SV -1002	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	R118	PRIMARY SYSTEM DRAIN TANK VALVE	
VALVE	SV -1007	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	R118	PRIMARY SYSTEM DRAIN TANK VALVE	
VALVE	SV -1036	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	R118	CLEAN WASTE RECEIVER TANK ISOLATION	
VALVE	SV -1038	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	R118	CLEAN WASTE RECEIVER TANK ISOLATION	
VALVE	SV -1044	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	R118	CLEAN WASTE RECEIVER TANK PUMP ISOLATION	
VALVE	SV -1045	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	R118	CLEAN WASTE RECEIVER TANK PUMP ISOLATION	
VALVE	SV -1001	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	R150	PRI. SYSTEM DRAIN TANK ISOLATION VALVE	
VALVE	SV -1004	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61RF	R150	CLEAN WASTE RECEIVER TK. ISOL. VALVE	
VALVE	SV -1037	M-234	AUTOMATIC SWITCH COM	WPHT8300B61-RF	R150	CLEAN WASTE RECEIVER TK. ISOL. VALVE	
VALVE	SV -1064	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61RF	R150	CLEAN WASTE RECEIVER TANK VENT	
VALVE	SV -1065	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61RF	R150	CLEAN WASTE RECEIVER TANK VENT	
VALVE	SV -1103	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	R150	CONTAINMENT SUMP DRAIN ISOLATION VALVE	
VALVE	SV -1104	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	R150	CONTAINMENT SUMP DRAIN ISOLATION VALVE	

TYPE	COMP ID	REQ NO	MANUFACTURER	MODEL	LOC	SERVICE
PAL	SCS					
VALVE	SV -0939	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61RF	R123	SHIELD COOLING SURGE TANK VALVE

TYPE	COMP ID	REQ NO	MANUFACTURER	MODEL	LOC	SERVICE	
PAL	SWS						
VALVE	SV -0861	M-240	AUTOMATIC SWITCH COM	NP-831654E	CONT	CONTAINMENT AIR COOLER VHX-1	0808
VALVE	SV -0862	M-240	AUTOMATIC SWITCH COM	NP-831654E	CONT	CONTAINMENT AIR COOLER VHX-1	0808
VALVE	SV -0864	M-240	AUTOMATIC SWITCH COM	NP-831654E	CONT	CONT A.C. VHX2 SERV WTR ON-OFF CONTRO	0809
VALVE	SV -0865	M-240	AUTOMATIC SWITCH COM	NP-831654E	CONT	CONT A.C. VHX2 SERV WTR ON-OFF CONTRO	0809
VALVE	SV -0867	M-240	AUTOMATIC SWITCH COM	NP-831654E	CONT	SERVICE WATER DISCHARGE-RECIRC. FAN V-4A	
VALVE	SV -0869	M-240	AUTOMATIC SWITCH COM	NP-831654E	CONT	SERVICE WATER INLET-RECIRC. FAN V-4A	
VALVE	SV -0870	M-240	AUTOMATIC SWITCH COM	NP-831654E	CONT	CONT A.C. VHX3 SER WTR ON-OFF CONTROL	0810
VALVE	SV -0873	M-240	AUTOMATIC SWITCH COM	NP-831654E	CONT	CONT A.C. VHX3 SER WTR ON-OFF CONTROL	0811
VALVE	SV -0823A		MAGNETROL, INC.	18AR43A	R123	SERVICE WATER VALVES CIRCUIT 2	
VALVE	SV -0823B		MAGNETROL, INC.	18A43A	R123	SERVICE WATER VALVES CIRCUIT 2	
VALVE	SV -0825	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61-RF	R123	SERVICE WATER VALVES CIRCUIT 2	
VALVE	SV -0826A		MAGNETROL, INC.	18AR43A	R123	SERVICE WATER VALVES CIRCUIT 1	
VALVE	SV -0826B		MAGNETROL, INC.	18A43A	R123	SERVICE WATER VALVES CIRCUIT 1	
VALVE	SV -0844	M-240	AUTOMATIC SWITCH COM	LM831614	R123	SERVICE WATER VALVES CIRCUIT 1	
VALVE	SV -0845	M-240	AUTOMATIC SWITCH COM	LB831614	R123	SERVICE WATER VALVES CIRCUIT 2	
VALVE	SV -0846	M-240	AUTOMATIC SWITCH COM	FT8316C-14	R123	SERVICE WATER VALVES CIRCUIT 2	
VALVE	SV -0857	M-240	AUTOMATIC SWITCH COM	LM-831614	R123	SERVICE WATER VALVES CIRCUIT 1	
VALVE	SV -0876	M-240	AUTOMATIC SWITCH COM	LB-831614	R123	SERVICE WATER VALVES CIRCUIT 2	
VALVE	SV -0877	M-240	AUTOMATIC SWITCH COM	LB-831614	R123	SERVICE WATER VALVES CIRCUIT 1	
VALVE	SV -0878	M-234	AUTOMATIC SWITCH COM	WPHT8300B61-RF	R123	SERVICE WATER VALVES CIRCUIT 1	
VALVE	SV -0879	M-234	AUTOMATIC SWITCH COM	WHPT-8300B61-RF	R123	SERVICE WATER VALVES CIRCUIT 2	
VALVE	SV -0880	M-234	AUTOMATIC SWITCH COM	WHPT-8300B61-RF	R123	SERVICE WATER VALVES CIRCUIT 1	
VALVE	SV -0824	M-240	AUTOMATIC SWITCH COM	LM831612	R238	SERVICE WATER VALVES CIRCUIT 1	
VALVE	SV -0847	M-240	AUTOMATIC SWITCH COM	LB831614	R238	SERVICE WATER VALVES CIRCUIT 1	

TYPE	COMP ID	REQ NO	MANUFACTURER	MODEL	LOC	SERVICE
PAL	VAS					
INSTRU	PS -1801	M-274-23	UNITED ELECTRIC CONT	J302(553)	R118	CONT.HP&HR SIRW TK.LOW LEV.DET.CHANNEL NO1
INSTRU	PS -1801A	FIELD	UNITED ELECTRIC CONT	J302(553)	R118	CONT.ISOL.H.P. OR H.R.
INSTRU	PS -1803	M-274-24	UNITED ELECTRIC CONT	J302(553)	R118	CONT.HP&HR SIRW TK.LOW LEV.DET.CHANNEL NO3
INSTRU	PS -1803A	FIELD	UNITED ELECTRIC CONT	J302(553)	R118	CONT.ISOL.H.P. OR H.R.
INSTRU	PT -1805	M-206-52	FISCHER & PORTER CO.	50EP1071ACXANS	R118	CONTAINMENT BLDG PRESS.
INSTRU	PT -1814	M-206-54	FISCHER & PORTER CO.	50EP1071ACXANS	R118	CONTAINMENT BLDG
INSTRU	PS -1802	M-274-23	UNITED ELECTRIC CONT	J302(553)	R123	CONT.HP&HR SIRW TK.LOW LEV.DET.CHANNEL NO2
INSTRU	PS -1802A	FIELD	UNITED ELECTRIC CONT	J302(553)	R123	CONT.ISOL.H.P. OR H.R.
INSTRU	PS -1804	M-274-24	UNITED ELECTRIC CONT	J302(553)	R123	CONT.HP&HR SIRW TK.LOW LEV.DET.CHANNEL NO4
INSTRU	PS -1804A	FIELD	UNITED ELECTRIC CONT	J302(553)	R123	CONTAINMENT PRESSURE 1801
INSTRU	PT -1812	M-206-53	FISCHER & PORTER CO.	50EP1071ACXANS	R123	CONTAINMENT BLDG PRESS.
INSTRU	PT -1815	M-206-55	FISCHER & PORTER CO.	50EP1071ACXANS	R123	CONTAINMENT BLDG
INSTRU	TS -1856	M- 55	JOHNSON CONTROLS INC	T-7170	02/570	ENGINEERED SAFEGUARDS ROOM COOLER V-27C
INSTRU	TS -1857	M- 55	JOHNSON CONTROLS INC	T-7170	02/570	ENGINEERED SAFEGUARDS ROOM COOLER V-27C
INSTRU	TS -1858	M- 55	JOHNSON CONTROLS INC	T-7170	02/570	ENGINEERED SAFEGUARDS ROOM COOLER V-27D
INSTRU	TS -1859	M- 55	JOHNSON CONTROLS INC	T-7170	02/570	ENGINEERED SAFEGUARDS ROOM COOLER V-27D
INSTRU	TS -1849	M- 55	JOHNSON CONTROLS INC	T-7170	03/570	ENGINEERED SAFEGUARDS ROOM COOLER V-27A
INSTRU	TS -1850	M- 55	JOHNSON CONTROLS INC	T-7170	03/570	ENGINEERED SAFEGUARDS ROOM COOLER V-27A
INSTRU	TS -1851	M- 55	JOHNSON CONTROLS INC	T-7170	03/570	ENGINEERED SAFEGUARDS ROOM COOLER V-27B
INSTRU	TS -1852	M- 55	JOHNSON CONTROLS INC	T-7170	03/570	ENGINEERED SAFEGUARDS ROOM COOLER V-27B
MOTOR	EMB-1208	M- 59	GENERAL ELECTRIC CO.	5 K 405 YK 239	01/590	CONTAINMENT COOLER RECIRC. FAN V-1A
MOTOR	EMB-1209	M- 59	GENERAL ELECTRIC CO.	5K405YK239	01/590	CONTAINMENT COOLER RECIRC. FAN V-2A
MOTOR	EMB-1210	M- 59	GENERAL ELECTRIC CO.	5K405YK239	01/590	CONTAINMENT COOLER RECIRC. FAN V-3A
MOTOR	EMB-0131	M- 59	GENERAL ELECTRIC CO.	5 K 256 YK 161	02/570	ENGINEERED SAFEGUARDS ROOM COOLER V-27A
MOTOR	EMB-0211	M- 59	GENERAL ELECTRIC CO.	5 K 256 Y 161	02/570	ENGINEERED SAFEGUARDS ROOM COOLER V-27B
MOTOR	EMB-0133	M- 59	GENERAL ELECTRIC CO.	5 K 256 YK 161	03/570	ENGINEERED SAFEGUARDS ROOM COOLER V-27C
MOTOR	EMB-0221	M- 59	GENERAL ELECTRIC CO.	5 K 256 YK 161	03/570	ENGINEERED SAFEGUARDS ROOM COOLER V-27D
VALVE	SV -1501	M-234	AUTOMATIC SWITCH COM	WP-HT8300B61RF	R150	CONTAINMENT BLDG. STEAM DISCHARGE
VALVE	SV -1502	M-234	AUTOMATIC SWITCH COM	WP-HT8300B61RF	R150	CONTAINMENT BLDG. STEAM DISCHARGE
VALVE	SV -1503	M-234	AUTOMATIC SWITCH COM	WP-HT8300B61RF	R150	CONTAINMENT STEAM HEAT ISOLATION VALVE
VALVE	SV -1813	M-239	AUTOMATIC SWITCH COM	LB831624	R150	CONTA&AIR RM.PURGE ISOL.VALVE CIRCUIT NO.2
VALVE	SV -1814	M-239	AUTOMATIC SWITCH COM	LB831624	R150	CONTA&AIR RM.PURGE ISOL.VALVE CIRCUIT NO.1

TYPE	COMP ID	REQ NO	MANUFACTURER	MODEL	LOC	SERVICE
PAL	WGS					
RECOMB	M - 69A	M-296	WESTINGHOUSE ELECTRI	546-CXR-190931-BN	01/659	HYDROGEN RECOMBINER
RECOMB	M - 69B	M-296	WESTINGHOUSE ELECTRI	546-CXR-190931-BN	01/659	HYDROGEN RECOMBINER
VALVE	SV -1101	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61RF	R150	CONTAINMENT WASTE GAS INLET
VALVE	SV -1102	M-234	AUTOMATIC SWITCH COM	WPHT-8300B61RF	R150	CONTAINMENT WASTE GAS INLET

TYPE	COMP ID	Q(AE/B/POCSX)	PID	REQ NO	MANUFACTURER	LOC	MODEL	SERIAL
PAL								
INSTRU	E/P-0338	Q -1/Q/-N-N-	M-203 D-4	M-233-88	FISHER CONTROLS CO.	CONT	546	
INSTRU	E/P-0342	Q -1/Q/-N-N-	M-203 D-7	M-233-87	FISHER CONTROLS CO.	CONT	546	
INSTRU	E/P-0346	Q -1/Q/-N-N-	M-203 D-6	M-233-87	FISHER CONTROLS CO.	CONT	546	
INSTRU	E/P-0347	Q -1/Q/-N-N-	M-203 D-5	M-233-88	FISHER CONTROLS CO.	CONT	546	
INSTRU	E/P-0736	Q -1/Q/-Q-Q-	M-207 STMGENE50B	M-233-96	HONEYWELL CORPORATIO	03/570	685435	
INSTRU	E/P-0737	Q -1/Q/-Q-Q-	M-207 STMGENE50B	M-233-97	HONEYWELL CORPORATIO	03/570	685435	
INSTRU	E/P-1057	Q -1/Q/-N-N-	M-201 E-4		FISHER CONTROLS CO.	CONT	546	
INSTRU	E/P-1059	Q -1/Q/-N-N-	M-201 E-5		FISHER CONTROLS CO.	CONT	546	
INSTRU	E/P-3025	Q -1/Q/-Q- -	M-204 D-7	M-233-103	MASONEILAN INTERNATI	03/570	8012	
INSTRU	FT -0701	Q -1/Q/-N-N-	M-207 STMGENE50B	M- 1	FISCHER & PORTER CO.	CONT	10B2466AAAB1	
INSTRU	FT -0702	Q -1/Q/-N-N-	M-207 STMGENE50A		FISCHER & PORTER CO.	CONT	10B2466AAAB1	
INSTRU	FT -0703	Q -1/Q/-N-N-	M-207 HEATER E6A	M- 1	FISCHER & PORTER CO.	CONT	10B2466AAAB1	
INSTRU	FT -0704	Q -1/Q/-N-N-	M-207 STMGENE50B	M- 1	FISCHER & PORTER CO.	CONT	10B2466AAAB1	
INSTRU	LS -1105	Q -1/Q/-N-N-	M-211 SUMP-PUMPS	M- 22BC	SQUARE D CO	03/570	CLASS9038	
INSTRU	LS -1108	Q -1/Q/-N-N-	M-211 SUMP-PUMPS	M- 22BC	SQUARE D CO	03/570	CLASS9038	
INSTRU	LT -0103	Q -1/Q/-Q- -	M-201 F-3	M- 1	FOXBORO CO., THE	CONT	613HM	
INSTRU	LT -0358	Q -1/Q/-N-N-	M-204 C-2	M-206-97	FISCHER & PORTER CO.	CONT	10B2495JB	
INSTRU	LT -0359	Q -1/Q/-N-N-	M-204 C-2	M-206-98	FISCHER & PORTER CO.	CONT	10B24655ECBB1	
INSTRU	LT -0701	Q -1/Q/-N-N-	M-207 STMGENE50B	M- 1	FISCHER & PORTER CO.	CONT	13D2465BA	
INSTRU	LT -0702	Q -1/Q/-N-N-	M-207 STMGENE50B	M- 1	FISCHER & PORTER CO.	CONT	13D2465BA	
INSTRU	LT -0703	Q -1/Q/-N-N-	M-207 STMGENE50B	M- 1	FISCHER & PORTER CO.	CONT	13D2465BA	
INSTRU	LT -0704	Q -1/Q/-N-N-	M-207 STMGENE50B	M- 1	FISCHER & PORTER CO.	CONT	13D2465BA	
INSTRU	LT -0751A	Q -1/Q/-Q- -	M-207 STMGENE50B	M- 1	FOXBORO CO., THE	CONT	613DM	
INSTRU	LT -0751B	Q -1/Q/-Q- -	M-207 STMGENE50B	M- 1	FOXBORO CO., THE	CONT	613DM	
INSTRU	LT -0751C	Q -1/Q/-Q- -	M-207 STMGENE50B	M- 1	FOXBORO CO., THE	CONT	613DM	
INSTRU	LT -0751D	Q -1/Q/-Q- -	M-207 STMGENE50B	M- 1	FOXBORO CO., THE	CONT	613DM	
INSTRU	LT -0752A	Q -1/Q/-Q- -	M-207 F-6	M- 1	FOXBORO CO., THE	CONT	613DM	
INSTRU	LT -0752B	Q -1/Q/-Q- -	M-207 STMGENE50B	M- 1	FOXBORO CO., THE	CONT	613DM	
INSTRU	LT -0752C	Q -1/Q/-Q- -	M-207 STMGENE50B	M- 1	FOXBORO CO., THE	CONT	613DM	
INSTRU	LT -0752D	Q -1/Q/-Q- -	M-207 STMGENE50B	M- 1	FOXBORO CO., THE	CONT	613DM	
INSTRU	LT -1107	Q -1/Q/-N-N-	M-211 SUMP-PUMPS	M-206-114	FISCHER & PORTER CO.	R123	10B2466EC	6807A1092A70
INSTRU	NI - 5	Q -1/Q/-Q- -	-	M- 1RA	GULF GENERAL ATOMIC,	CONT	NP-6	
INSTRU	NI - 6	Q -1/Q/-Q- -	-	M- 1RA	GULF GENERAL ATOMIC,	CONT	NP-6	
INSTRU	NI - 7	Q -1/Q/-Q- -	-	M- 1RA	GULF GENERAL ATOMIC,	CONT	NP-6	
INSTRU	NI - 8	Q -1/Q/-Q- -	-	M- 1RA	GULF GENERAL ATOMIC,	CONT	NP-6	
INSTRU	NI - 9	Q -1/Q/-N-N-	-		GULF GENERAL ATOMIC,	CONT		
INSTRU	NI - 10	Q -1/Q/-N-N-	-		GULF GENERAL ATOMIC,	CONT		
INSTRU	PS -1801	Q -1/Q/-Q- -	M-218CNTACIRUFAN	M-274-23	UNITED ELECTRIC CONT	R118	J302(553)	
INSTRU	PS -1801A	Q -1/Q/-Q- -	M-218CNTACIRUFAN	FIELD	UNITED ELECTRIC CONT	R118	J302(553)	
INSTRU	PS -1802	Q -1/Q/-Q- -	M-218CNTACIRUFAN	M-274-23	UNITED ELECTRIC CONT	R123	J302(553)	
INSTRU	PS -1802A	Q -1/Q/-Q- -	M-218CNTACIRUFAN	FIELD	UNITED ELECTRIC CONT	R123	J302(553)	
INSTRU	PS -1803	Q -1/Q/-Q- -	M-218CNTACIRUFAN	M-274-24	UNITED ELECTRIC CONT	R118	J302(553)	
INSTRU	PS -1803A	Q -1/Q/-Q- -	M-218CNTACIRUFAN	FIELD	UNITED ELECTRIC CONT	R118	J302(553)	
INSTRU	PS -1804	Q -1/Q/-Q- -	M-218CONTACIRFAN	M-274-24	UNITED ELECTRIC CONT	R123	J302(553)	
INSTRU	PS -1804A	Q -1/Q/-Q- -	M-218CNTACIRUFAN	FIELD	UNITED ELECTRIC CONT	R123	J302(553)	
INSTRU	PT -0102A	Q -1/Q/-Q- -	M-201 F-4	M- 1	FOXBORO CO., THE	CONT	611GM	
INSTRU	PT -0102B	Q -1/Q/-Q- -	M-201 F-4	M- 1	FOXBORO CO., THE	CONT	611GM	
INSTRU	PT -0102C	Q -1/Q/-Q- -	M-201 F-3	M- 1	FOXBORO CO., THE	CONT	611GM	
INSTRU	PT -0102D	Q -1/Q/-Q- -	M-201 F-3	M- 1	FOXBORO CO., THE	CONT	611GM	
INSTRU	PT -0103	Q -1/Q/-Q- -	M-201 F-3	M- 1	FOXBORO CO., THE	CONT	611GH	
INSTRU	PT -0306	Q -1/Q/-N-N-	M-204 D-6	M-206-8	FISCHER & PORTER CO.	R123	50EP1072A	
INSTRU	PT -0338	Q -1/Q/-N-N-	M-203 D-4	M-206-4	FISCHER & PORTER CO.	CONT	50EP1042A	
INSTRU	PT -0342	Q -1/Q/-N-N-	M-203 D-7	M-206-1	FISCHER & PORTER CO.	CONT	50EP1041ACXANS	
INSTRU	PT -0346	Q -1/Q/-N-N-	M-203 D-6	M-206-2	FISCHER & PORTER CO.	CONT	50EP1042A	

	TYPE	COMP ID	Q(AE/B/POCSX)	PID	REQ NO	MANUFACTURER	LOC	MODEL	SERIAL
1									
2	PAL								
3									
4	INSTRU	PT -0347	Q -1/Q/-N-N-	M-203 D-5	M-206-3	FISCHER & PORTER CO.	CONT	50EP1042A	
5	INSTRU	PT -0702	Q -1/Q/-N-N-	M-207 STMGENE50A	M- 1	FISCHER & PORTER CO.	CONT	50EP1031B	
6	INSTRU	PT -0704	Q -1/Q/-N-N-	M-207 STMGENE50B	M- 1	FISCHER & PORTER CO.	CONT	50EP1031B	
7	INSTRU	PT -0751A	Q -1/Q/-Q- -	M-207 STMGENE50B	M- 1	FOXBORO CO., THE	CONT	611GM	
8	INSTRU	PT -0751B	Q -1/Q/-Q- -	M-207 STMGENE50B	M- 1	FOXBORO CO., THE	CONT	611GM	
9	INSTRU	PT -0751C	Q -1/Q/-Q- -	M-207 STMGENE50B	M- 1	FOXBORO CO., THE	CONT	611GM	
10	INSTRU	PT -0751D	Q -1/Q/-Q- -	M-207 STMGENE50B	M- 1	FOXBORO CO., THE	CONT	611GM	
11	INSTRU	PT -0752A	Q -1/Q/-Q- -	M-207 STMGENE50B	M- 1	FOXBORO CO., THE	CONT	611GM	
12	INSTRU	PT -0752B	Q -1/Q/-Q- -	M-207 STMGENE50B	M- 1	FOXBORO CO., THE	CONT	611GM	
13	INSTRU	PT -0752C	Q -1/Q/-Q- -	M-207 STMGENE50B	M- 1	FOXBORO CO., THE	CONT	611GM	
14	INSTRU	PT -0752D	Q -1/Q/-Q- -	M-207 STMGENE50B	M- 1	FOXBORO CO., THE	CONT	611GM	
15	INSTRU	PT -1805	Q -1/Q/-N-N-	M-218CNTACIRUFAN	M-206-52	FISCHER & PORTER CO.	R118	50EP1071ACXANS	
16	INSTRU	PT -1812	Q -1/Q/-N-N-	M-218CNTACIRUFAN	M-206-53	FISCHER & PORTER CO.	R123	50EP1071ACXANS	
17	INSTRU	PT -1814	Q -1/Q/-N-N-	M-218CNTACIRUFAN	M-206-54	FISCHER & PORTER CO.	R118	50EP1071ACXANS	
18	INSTRU	PT -1815	Q -1/Q/-N-N-	M-218CNTACIRUFAN	M-206-55	FISCHER & PORTER CO.	R123	50EP1071ACXANS	
19	INSTRU	RE -1805	Q -1/Q/-Q- -	M-218H1,M-223D2	M-217	VICTOREEN INSTRUMENT	CONT	848-4+E12749	155
20	INSTRU	RE -1806	Q -1/Q/-Q- -	M-218H1,M-223D2	M-217	VICTOREEN INSTRUMENT	CONT	848-4+E12749	510
21	INSTRU	RE -1807	Q -1/Q/-Q- -	M-218H1,M-223C2	M-217	VICTOREEN INSTRUMENT	CONT	848-4+E12749	
22	INSTRU	RE -1808	Q -1/Q/-Q- -	M-218H2,M-223C2	M-217	VICTOREEN INSTRUMENT	CONT	848-4+E12749	
23	INSTRU	TE -0111A	Q -1/Q/-Q- -	M-201 C-3	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
24	INSTRU	TE -0111B	Q -1/Q/-Q- -	M-201 D-3	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
25	INSTRU	TE -0111H	Q -1/Q/-N-N-	M-201 C-3	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
26	INSTRU	TE -0112CA	Q -1/Q/-Q- -	M-201 D-2	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
27	INSTRU	TE -0112CB	Q -1/Q/-Q- -	M-201 B-2	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
28	INSTRU	TE -0112CC	Q -1/Q/-Q- -	M-201 B-3	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
29	INSTRU	TE -0112CD	Q -1/Q/-Q- -	M-201 B-3	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
30	INSTRU	TE -0112HA	Q -1/Q/-Q- -	M-201 C-2	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
31	INSTRU	TE -0112HB	Q -1/Q/-Q- -	M-201 C-2	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
32	INSTRU	TE -0112HC	Q -1/Q/-Q- -	M-201 C-3	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
33	INSTRU	TE -0112HD	Q -1/Q/-Q- -	M-201 C-3	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
34	INSTRU	TE -0121A	Q -1/Q/-Q- -	M-201 B-6	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
35	INSTRU	TE -0121B	Q -1/Q/-Q- -	M-201 D-6	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
36	INSTRU	TE -0121H	Q -1/Q/-N-N-	M-201 C-5	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
37	INSTRU	TE -0122CA	Q -1/Q/-Q- -	M-201 B-7	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
38	INSTRU	TE -0122CB	Q -1/Q/-Q- -	M-201 D-7	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
39	INSTRU	TE -0122CC	Q -1/Q/-Q- -	M-201 A-6	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
40	INSTRU	TE -0122CD	Q -1/Q/-Q- -	M-201 D-6	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
41	INSTRU	TE -0122HA	Q -1/Q/-Q- -	M-201 C-7	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
42	INSTRU	TE -0122HB	Q -1/Q/-Q- -	M-201 C-7	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
43	INSTRU	TE -0122HC	Q -1/Q/-Q- -	M-201 C-6	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
44	INSTRU	TE -0122HD	Q -1/Q/-Q- -	M-201 C-6	M- 1	ROSEMOUNT, INC.	CONT	104VCX	
45	INSTRU	TS -1849	Q -1/Q/-N-N-	M-218 A-6	M- 55	JOHNSON CONTROLS INC	03/570	T-7170	
46	INSTRU	TS -1850	Q -1/Q/-N-N-	M-218 A-6	M- 55	JOHNSON CONTROLS INC	03/570	T-7170	
47	INSTRU	TS -1851	Q -1/Q/-N-N-	M-218 A-6	M- 55	JOHNSON CONTROLS INC	03/570	T-7170	
48	INSTRU	TS -1852	Q -1/Q/-N-N-	M-218 A-6	M- 55	JOHNSON CONTROLS INC	03/570	T-7170	
49	INSTRU	TS -1856	Q -1/Q/-N-N-	M-218 A-6	M- 55	JOHNSON CONTROLS INC	02/570	T-7170	
50	INSTRU	TS -1857	Q -1/Q/-N-N-	M-218 A-6	M- 55	JOHNSON CONTROLS INC	02/570	T-7170	
51	INSTRU	TS -1858	Q -1/Q/-N-N-	M-218 A-6	M- 55	JOHNSON CONTROLS INC	02/570	T-7170	
52	INSTRU	TS -1859	Q -1/Q/-N-N-	M-218 A-6	M- 55	JOHNSON CONTROLS INC	02/570	T-7170	
53									
54	MOTOR	EMA-1109	Q -1/Q/-Q- -	E- 3 F-6	M- 34	LOUIS ALLIS CO	03/590	COGX	8289252003
55	MOTOR	EMA-1111	Q -1/Q/-Q- -	E- 3 F-5	M- 1	GENERAL ELECTRIC CO.	03/570	5K818847A100	FD8367477
56	MOTOR	EMA-1112	Q -1/Q/-Q- -	E- 3 F-5	M- 8	LOUIS ALLIS CO	03/570	COGS	8289086003
57	MOTOR	EMA-1113	Q -1/Q/-Q- -	E- 3 F-4	M- 1	WESTINGHOUSE ELECTRI	03/570	68F13512	35-68

	TYPE	COMP ID	Q(AE/B/POCSX) PID	REQ NO	MANUFACTURER	LOC	MODEL	SERIAL
1								
2	PAL							
3								
4	MOTOR	EMA-1114	Q -1/Q/-Q- - E- 3 F-4	M- 8	LOUIS ALLIS CO	03/570	COGS	8289086001
5	MOTOR	EMA-1116	Q -1/Q/-Q- - E- 3 F-3	M- 34	LOUIS ALLIS CO	03/590	COGX	8289252001
6	MOTOR	EMA-1206	Q -1/Q/-Q- - E- 3 D-7	M- 1	GENERAL ELECTRIC CO.	02/570	5K8818849C56	FD8367478
7	MOTOR	EMA-1207	Q -1/Q/-Q- - E- 3 D-6	M- 1	WESTINGHOUSE ELECTRI	02/570	68F13512	15-68
8	MOTOR	EMA-1208	Q -1/Q/-Q- - E- 3 D-6	M- 34	LOUIS ALLIS CO	03/590	COGX	8289252002
9	MOTOR	EMA-1209	Q -1/Q/-Q- - E- 3 D-5	M- 1	WESTINGHOUSE ELECTRI	03/570	68F13512	25-68
10	MOTOR	EMA-1210	Q -1/Q/-Q- - E- 3 D-5	M- 8	LOUIS ALLIS CO	02/570	COGS	8289086002
11	MOTOR	EMB-0131	Q -1/Q/-Q- - E- 5-1 H-5	M- 59	GENERAL ELECTRIC CO.	02/570	5 K 256 YK 161	6032003
12	MOTOR	EMB-0133	Q -1/Q/-Q- - E- 5-1 H-5	M- 59	GENERAL ELECTRIC CO.	03/570	5 K 256 YK 161	6032006
13	MOTOR	EMB-0137	Q -1/Q/-Q- - E- 5 H-4		RELIANCE ELECTRIC CO	01/590	447063 LT	
14	MOTOR	EMB-0141	Q -1/Q/-Q- - E- 5 H-4		RELIANCE ELECTRIC CO	01/590	Y220107A4 BU	
15	MOTOR	EMB-0147	Q -1/Q/-Q- - E- 5 H-3		RELIANCE ELECTRIC CO	01/590	Y220107A4 BU	
16	MOTOR	EMB-0151	Q -1/Q/-Q- - E- 5 H-3		RELIANCE ELECTRIC CO	01/590	447063 LT	
17	MOTOR	EMB-0155	Q -1/Q/-Q- - E- 5 F-8	M- 22BC	GENERAL ELECTRIC CO.	02/570	5K143DL2348	
18	MOTOR	EMB-0157	Q -1/Q/-Q- - E- 5 F-8		RELIANCE ELECTRIC CO	01/590	447063 LT	
19	MOTOR	EMB-0165	Q -1/Q/-Q- - E- 5 F-7	M- 22BC	GENERAL ELECTRIC CO.	03/570	5K143DL2348	HHJ830445
20	MOTOR	EMB-0167	Q -1/Q/-Q- - E- 5 F-7		RELIANCE ELECTRIC CO	01/607	447063LT	
21	MOTOR	EMB-0177	Q -1/Q/-Q- - E- 5 F-5	M-241B	RELIANCE ELECTRIC CO	01/649	444567-KT	
22	MOTOR	EMB-0197	Q -1/Q/-Q- - E- 5 F-3		RELIANCE ELECTRIC CO	01/590	447063 LT	
23	MOTOR	EMB-0211	Q -1/Q/-Q- - E- 5-1 D-8	M- 59	GENERAL ELECTRIC CO.	02/570	5 K 256 Y 161	6032004
24	MOTOR	EMB-0221	Q -1/Q/-Q- - E- 5-1 D-7	M- 59	GENERAL ELECTRIC CO.	03/570	5 K 256 YK 161	6032005
25	MOTOR	EMB-0237	Q -1/Q/-Q- - E- 5-1 D-4		RELIANCE ELECTRIC CO	01/590	447063 LT	
26	MOTOR	EMB-0241	Q -1/Q/-Q- - E- 5-1 D-4		RELIANCE ELECTRIC CO	01/590	447063 LT	
27	MOTOR	EMB-0245	Q -1/Q/-Q- - E- 5-1 D-4	M- 22BC	GENERAL ELECTRIC CO.	03/570	5K143DL2348	
28	MOTOR	EMB-0247	Q -1/Q/-Q- - E- 5-1 D-3		RELIANCE ELECTRIC CO	01/590	Y274033A6PA	
29	MOTOR	EMB-0251	Q -1/Q/-Q- - E- 5-1 D-3		RELIANCE ELECTRIC CO	01/590	Y220107A2	
30	MOTOR	EMB-0255	Q -1/Q/-Q- - E- 5-1 D-2	M- 22BC	GENERAL ELECTRIC CO.	03/570	5K143DL2348	
31	MOTOR	EMB-0257	Q -1/Q/-Q- - -		RELIANCE ELECTRIC CO	01/590	447063 LT	
32	MOTOR	EMB-0261	Q -1/Q/-Q- - E- 5-1 D-2		RELIANCE ELECTRIC CO	01/590	447063 LT	
33	MOTOR	EMB-0271	Q -1/Q/-Q- - E- 5-1 B-7		RELIANCE ELECTRIC CO	01/607	704799 FX	
34	MOTOR	EMB-0281	Q -1/Q/-Q- - E- 5-1 B-6		RELIANCE ELECTRIC CO	01/649	444567-KT	
35	MOTOR	EMB-1208	Q -1/Q/-Q- - E- 4 E-5	M- 59	GENERAL ELECTRIC CO.	01/590	5 K 405 YK 239	LE 453034
36	MOTOR	EMB-1209	Q -1/Q/-Q- - E- 4 E-5	M- 59	GENERAL ELECTRIC CO.	01/590	5K405YK239	LE 453035
37	MOTOR	EMB-1210	Q -1/Q/-Q- - E- 4 E-5	M- 59	GENERAL ELECTRIC CO.	01/590	5K405YK239	LE453036
38								
39	PENETR	EZ -0101	Q 1/ /Q--Q-	E- 20	VIKING INDUSTRIES		P1 23-0048-0000	-
40	PENETR	EZ -0102	Q 1/ /Q--Q-	E- 20	VIKING INDUSTRIES		P1 23-0049-0000	-
41	PENETR	EZ -0103	Q 1/ /Q--Q-	E- 20	VIKING INDUSTRIES		P1 23-0050-0000	-
42	PENETR	EZ -0104	Q 1/ /Q--Q-	E- 20	VIKING INDUSTRIES		P1 23-0051-0000	-
43	PENETR	EZ -0105	Q 1/ /Q--Q-	E- 20	VIKING INDUSTRIES		P1 23-0052-0000	-
44	PENETR	EZ -0106	Q 1/ /Q--Q-	E- 20	VIKING INDUSTRIES		P2 23-0020-0000	-
45	PENETR	EZ -0107	Q 1/ /Q--Q-	E- 20	VIKING INDUSTRIES		P2 23-0021-0000	-
46	PENETR	EZ -0108	Q 1/ /Q--Q-	E- 20	VIKING INDUSTRIES		P2 23-0022-0000	-
47	PENETR	EZ -0109	Q 1/ /Q--Q-	E- 20	VIKING INDUSTRIES		P3 23-0023-0000	-
48	PENETR	EZ -0110	/ / -	E- 20	VIKING INDUSTRIES		P4 23-0024-0000	-
49	PENETR	EZ -0111	Q 1/ /Q--Q-	E- 20	VIKING INDUSTRIES		P5 23-0026-0000	-
50	PENETR	EZ -0112	Q 1/ /Q--Q-	E- 20	VIKING INDUSTRIES		P5 23-0027-0000	-
51	PENETR	EZ -0121	Q 1/ /Q--Q-	E- 20	VIKING INDUSTRIES		C-1A 23-0029-0000	-
52	PENETR	EZ -0141	Q 1/ /Q--Q-	E- 20	VIKING INDUSTRIES		N-1A 23-0042-0000	-
53	PENETR	EZ -0142	Q 1/ /Q--Q-	E- 20	VIKING INDUSTRIES		N-1A 23-0043-0000	-
54	PENETR	EZ -0143	Q 1/ /Q--Q-	E- 20	VIKING INDUSTRIES		I-1A 23-0038-0000	-
55	PENETR	EZ -0146	Q 1/ /Q--Q-	E- 20	VIKING INDUSTRIES		I-3A 23-0046-0000	-
56	PENETR	EZ -0210	Q 1/ /Q--Q- E- 4 E-5	E- 20	VIKING INDUSTRIES		P4 23-0025-0000	-
57	PENETR	EZ -0211	Q 1/ /Q--Q- E- 4 F-6	E- 20	VIKING INDUSTRIES		P6 23-0028-0000	-

TYPE	COMP ID	Q(AE/B/POCSX)	PID	REQ NO	MANUFACTURER	LOC	MODEL	SERIAL
PAL								
PENETR	EZ -0221	Q 1/ /Q--Q-		E- 20	VIKING INDUSTRIES		C-1B 23-0030-0000	-
PENETR	EZ -0222	Q 1/ /Q--Q-		E- 20	VIKING INDUSTRIES		C-1B 23-0031-0000	-
PENETR	EZ -0223	Q 1/ /Q--Q-		E- 20	VIKING INDUSTRIES		C-2 23-0032-0000	-
PENETR	EZ -0224	Q 1/ /Q--Q-		E- 20	VIKING INDUSTRIES		C-2 23-0033-0000	-
PENETR	EZ -0225	Q 1/ /Q--Q-		E- 20	VIKING INDUSTRIES		C-2 23-0034-0000	-
PENETR	EZ -0226	Q 1/ /Q--Q-		E- 20	VIKING INDUSTRIES		C-2 23-0035-0000	-
PENETR	EZ -0227	Q 1/ /Q--Q-		E- 20	VIKING INDUSTRIES		C-2 23-0036-0000	-
PENETR	EZ -0228	Q 1/ /Q--Q-		E- 20	VIKING INDUSTRIES		C-2 23-0037-0000	-
PENETR	EZ -0241	Q 1/ /Q--Q-		E- 20	VIKING INDUSTRIES		N-1B 23-0044-0000	-
PENETR	EZ -0242	Q 1/ /Q--Q-		E- 20	VIKING INDUSTRIES		N-1B 23-0045-0000	-
PENETR	EZ -0243	Q 1/ /Q--Q-		E- 20	VIKING INDUSTRIES		I-1B 23-0039-0000	-
PENETR	EZ -0244	Q 1/ /Q--Q-		E- 20	VIKING INDUSTRIES		I-2 23-0040-0000	-
PENETR	EZ -0245	Q 1/ /Q--Q-		E- 20	VIKING INDUSTRIES		I-2 23-0041-0000	-
PENETR	EZ -0246	Q 1/ /Q--Q-					I-3B 23-0047-0000	-
RECOMB	M - 69A	Q 1/Q/ - -	M-224D3,M-218H5	M-296	WESTINGHOUSE ELECTRI	01/659	546-CXR-190931-BN	12
RECOMB	M - 69B	Q 1/Q/ - -	M-224D2,M-218H5	M-296	WESTINGHOUSE ELECTRI	01/659	546-CXR-190931-BN	13
VALVE	SV -0155	Q 1/Q/ -	M-201 H-7	M-234-2	AUTOMATIC SWITCH COM	R238	WPHT 8300B61-RF	81170R2
VALVE	SV -0338	Q -1/Q/ -	M-203 D-4	M-234-11	AUTOMATIC SWITCH COM	CONT	WPHT 8300B61RF	81170R2
VALVE	SV -0342	Q -1/Q/ -	M-203 D-7	M-234-11	AUTOMATIC SWITCH COM	CONT	WPHT 8300B61-RF	81170R2
VALVE	SV -0346	Q -1/Q/ -	M-203 D-6	M-234-11	AUTOMATIC SWITCH COM	CONT	WPHT-8300B61RF	81170R2
VALVE	SV -0347	Q -1/Q/ -	M-203 D-5	M-234-11	AUTOMATIC SWITCH COM	CONT	WPHT 8300B61-RF	81170R2
VALVE	SV -0438A	Q 1/Q/ -	M-204 F-1	M-336	AUTOMATIC SWITCH COM	R238	HTX 8320A-22V	12580B
VALVE	SV -0438B	Q 1/Q/ -	M-204 F-1	M-336	AUTOMATIC SWITCH COM	R238	HTX 8320A-22V	12580B
VALVE	SV -0522A	Q -1/Q/-QNQ-	M-205 F-8	M-234		R238	HPX8320A26	30506B
VALVE	SV -0738	Q 1/Q/ -	M-226 FLASH T-29	M-234	AUTOMATIC SWITCH COM	R238	WPHT8300B61-RF	81170R2
VALVE	SV -0739	Q 1/Q/ -	M-226 FLASH T-29	M-234	AUTOMATIC SWITCH COM	R123	WPHT8300B61-RF	81170R2
VALVE	SV -0767	Q 1/Q/ -	M-226 FLASH T-29	M-234	AUTOMATIC SWITCH COM	R238	WPHT-8300B61-RF	21514T
VALVE	SV -0768	Q 1/Q/ -	M-226 FLASH T-29	M-234	AUTOMATIC SWITCH COM	R238	WPHT-8300B61-RF	21514T
VALVE	SV -0770	Q 1/Q/ -	M-226 FLASH T-29	M-234	AUTOMATIC SWITCH COM	R238	WPHT-8300B61-RF	81170R2
VALVE	SV -0771	Q 1/Q/ -	M-226 FLASH T-29	M-234	AUTOMATIC SWITCH COM	R238	WPHT-8300B61-RF	81170R2
VALVE	SV -0823A	Q 1/Q/ -	M-208 D-4		MAGNETROL, INC.	R123	18AR43A	
VALVE	SV -0823B	Q 1/Q/ -	M-208 D-4		MAGNETROL, INC.	R123	18A43A	
VALVE	SV -0824	Q 1/Q/ -	M-208 B-5	M-240	AUTOMATIC SWITCH COM	R238	LM831612	
VALVE	SV -0825	Q 1/Q/ -	M-208 C-3	M-234	AUTOMATIC SWITCH COM	R123	WPHT-8300B61-RF	81170R2
VALVE	SV -0826A	Q 1/Q/ -	M-208 COMCOLHETX		MAGNETROL, INC.	R123	18AR43A	
VALVE	SV -0826B	Q 1/Q/ -	M-208 COMCOLHETX		MAGNETROL, INC.	R123	18A43A	
VALVE	SV -0844	Q 1/Q/NNNN-	M-208 E,F-1,2	M-240	AUTOMATIC SWITCH COM	R123	LM831614	24882T
VALVE	SV -0845	Q 1/Q/NNNN-	M-208 E,F-1,2	M-240	AUTOMATIC SWITCH COM	R123	LB831614	2482T
VALVE	SV -0846	Q 1/Q/NNNN-	M-208 E,F-1,2	M-240	AUTOMATIC SWITCH COM	R123	FT8316C-14	1200D
VALVE	SV -0847	Q 1/Q/ -	M-208 COMCOLHETX	M-240	AUTOMATIC SWITCH COM	R238	LB831614	2482T
VALVE	SV -0857	Q 1/Q/NNNN-	M-208 E,F-1,2	M-240	AUTOMATIC SWITCH COM	R123	LM-831614	2482T
VALVE	SV -0861	Q 1/Q/ -	M-208 CONTAIRCOL	M-240	AUTOMATIC SWITCH COM	CONT	NP-831654E	2482T
VALVE	SV -0862	Q 1/Q/NNNN-	M-208 CONTAIRCOL	M-240	AUTOMATIC SWITCH COM	CONT	NP-831654E	2482T
VALVE	SV -0864	Q 1/Q/ -	M-208 CONTAIRCOL	M-240	AUTOMATIC SWITCH COM	CONT	NP-831654E	2482T
VALVE	SV -0865	Q 1/Q/NNNN-	M-208 CONTAIRCOL	M-240	AUTOMATIC SWITCH COM	CONT	NP-831654E	2482T
VALVE	SV -0867	Q 1/Q/ -	M-208 CONTAIRCOL	M-240	AUTOMATIC SWITCH COM	CONT	NP-831654E	2482T
VALVE	SV -0869	Q 1/Q/NNNN-	M-208 CONTAIRCOL	M-240	AUTOMATIC SWITCH COM	CONT	NP-831654E	2482T
VALVE	SV -0870	Q 1/Q/NNNN-	M-208 CONTAIRCOL	M-240	AUTOMATIC SWITCH COM	CONT	NP-831654E	2482T
VALVE	SV -0873	Q 1/Q/ -	M-208 CONTAIRCOL	M-240	AUTOMATIC SWITCH COM	CONT	NP-831654E	2482T
VALVE	SV -0876	Q 1/Q/NNNN-	M-208 E,F-1,2	M-240	AUTOMATIC SWITCH COM	R123	LB-831614	2482T
VALVE	SV -0877	Q 1/Q/NNNN-	M-208 E,F-1,2	M-240	AUTOMATIC SWITCH COM	R123	LB-831614	2482T
VALVE	SV -0878	Q 1/Q/ -	M-208 B,C-1,2	M-234	AUTOMATIC SWITCH COM	R123	WPHT8300B61-RF	81170R2

	TYPE	COMP ID	Q	(AE/B/POCSX)	PID	REQ NO	MANUFACTURER	LOC	MODEL	SERIAL
2	PAL									
4	VALVE	SV -0879	Q	1/Q/NNNN-	M-208 COMCOLHETX	M-234	AUTOMATIC SWITCH COM	R123	WHPT-8300B61-RF	81170R2
5	VALVE	SV -0880	Q	1/Q/ -	M-208 COMCOLHETX	M-234	AUTOMATIC SWITCH COM	R123	WHPT-8300B61-RF	81170R2
6	VALVE	SV -0910	Q	1/Q/ -	M-209 F-3-5	M-240	AUTOMATIC SWITCH COM	R123	LB-831614	2482T
7	VALVE	SV -0911	Q	1/Q/ -	M-209 B,C-5	M-240	AUTOMATIC SWITCH COM	R123	LB-831614	2482T
8	VALVE	SV -0913	Q	1/Q/ -	M-209 PMPCOOLSYS	M-234	AUTOMATIC SWITCH COM	R123	WPHT-8300B61-RF	81170R2
9	VALVE	SV -0937	Q	1/Q/ -	M-209 G-H-3,4	M-240	AUTOMATIC SWITCH COM	R123	LB-831614	2482T
10	VALVE	SV -0938	Q	1/Q/ -	M-209 G,H-3,4	M-240	AUTOMATIC SWITCH COM	R123	LB-831614	2482T
11	VALVE	SV -0939	Q	N1/Q/NNNN-	M-221FUELPOOLSYS	M-234	AUTOMATIC SWITCH COM	R123	WPHT-8300B61RF	81170R2
12	VALVE	SV -0940	Q	1/Q/ -	M-209 B,C-5	M-240	AUTOMATIC SWITCH COM	R123	LB-831614	2482T
13	VALVE	SV -0944A	Q	1/Q/ -	M-209 CHRPMPCOOL	M-354	AUTOMATIC SWITCH COM	R123	THT-8344-A1	77684A
14	VALVE	SV -0945	Q	1/Q/ -	M-209COMPCOLHETX	M-240	AUTOMATIC SWITCH COM	R123	LB831614	2482T
15	VALVE	SV -0946	Q	1/Q/ -	M-209COMPCOLHETX	M-240	AUTOMATIC SWITCH COM	R123	LB831614	2482T
16	VALVE	SV -0947	Q	1/Q/ -	M-209 PMPCOOLSYS	M-234	AUTOMATIC SWITCH COM	03/570	WPHT-8300B61-RF	81170R2
17	VALVE	SV -0948	Q	1/Q/ -	M-209 PMPCOOLSYS	M-234	AUTOMATIC SWITCH COM	03/570	WPHT-8300B61-RF	81170R2
18	VALVE	SV -0949	Q	1/Q/NNNN-	M-209 PMPCOOLSYS	M-234	AUTOMATIC SWITCH COM	03/570	WPHT-8300B61-RF	81170R2
19	VALVE	SV -0950	Q	1/Q/ -	M-209B,C-5	M-234	AUTOMATIC SWITCH COM	03/570	WPHT-8300B61-RF	81170R2
20	VALVE	SV -0951	Q	1/Q/ -	M-209 B,C-5	M-234	AUTOMATIC SWITCH COM	03/570	WPHT-8300B61-RF	81170R2
21	VALVE	SV -1001	Q	1/Q/ -	M-210 G-7	M-234	AUTOMATIC SWITCH COM	R150	WPHT-8300B61-RF	81170R2
22	VALVE	SV -1002	Q	1/Q/ -	M-210 F-7	M-234	AUTOMATIC SWITCH COM	R118	WPHT-8300B61-RF	81170R2
23	VALVE	SV -1004	Q	1/Q/ -	M-210 H-5	M-234	AUTOMATIC SWITCH COM	R150	WPHT-8300B61RF	81170R2
24	VALVE	SV -1007	Q	1/Q/ -	M-210 F-7	M-234	AUTOMATIC SWITCH COM	R118	WPHT-8300B61-RF	81170R2
25	VALVE	SV -1036	Q	1/Q/ -	M-210 E-1	M-234	AUTOMATIC SWITCH COM	R118	WPHT-8300B61-RF	81170R2
26	VALVE	SV -1037	Q	1/Q/ -	M-210 E-1	M-234	AUTOMATIC SWITCH COM	R150	WPHT8300B61-RF	81170R2
27	VALVE	SV -1038	Q	1/Q/ -	M-210 E-1	M-234	AUTOMATIC SWITCH COM	R118	WPHT-8300B61-RF	81170R2
28	VALVE	SV -1044	Q	1/Q/ -	M-210 E-2	M-234	AUTOMATIC SWITCH COM	R118	WPHT-8300B61-RF	81170R2
29	VALVE	SV -1045	Q	1/Q/ -	M-210 E-2	M-234	AUTOMATIC SWITCH COM	R118	WPHT-8300B61-RF	81170R2
30	VALVE	SV -1064	Q	1/Q/ -	M-210 G-1	M-234	AUTOMATIC SWITCH COM	R150	WPHT-8300B61RF	81170R2
31	VALVE	SV -1065	Q	1/Q/ -	M-210 G-1	M-234	AUTOMATIC SWITCH COM	R150	WPHT-8300B61RF	81170R2
32	VALVE	SV -1101	Q	1/Q/NQN -	M-211 TANK T-67	M-234	AUTOMATIC SWITCH COM	R150	WPHT-8300B61RF	81170R2
33	VALVE	SV -1102	Q	1/Q/NQN -	M-211 TANK T-67	M-234	AUTOMATIC SWITCH COM	R150	WPHT-8300B61RF	81170R2
34	VALVE	SV -1103	Q	1/Q/ -	M-211 E-7	M-234	AUTOMATIC SWITCH COM	R150	WPHT-8300B61-RF	81170R2
35	VALVE	SV -1104	Q	1/Q/ -	M-211 E-7	M-234	AUTOMATIC SWITCH COM	R150	WPHT-8300B61-RF	81170R2
36	VALVE	SV -1358	Q	1/Q/ -	M-222 N2 SYSTEM	M-234	AUTOMATIC SWITCH COM	R150	WPHT-8300B61-RF	215147
37	VALVE	SV -1501	Q	1/Q/ -	M-215 G,H-1,2	M-234	AUTOMATIC SWITCH COM	R150	WP-HT8300B61RF	81170R2
38	VALVE	SV -1502	Q	1/Q/ -	M-215 G,H-1,2	M-234	AUTOMATIC SWITCH COM	R150	WP-HT8300B61RF	81170R2
39	VALVE	SV -1503	Q	1/Q/ -	M-215 G,H-1,2	M-234	AUTOMATIC SWITCH COM	R150	WP-HT8300B61RF	81170R2
40	VALVE	SV -1813	Q	1/Q/ -	M-218PURGE SUPLY	M-239	AUTOMATIC SWITCH COM	R150	LB831624	80166R1
41	VALVE	SV -1814	Q	1/Q/ -	M-218PURGE SUPLY	M-239	AUTOMATIC SWITCH COM	R150	LB831624	80166R1
42	VALVE	SV -1901	Q	1/Q/NNNN-	M-219 H-8	M-211	AUTOMATIC SWITCH COM	CONT	HT8320A22	20100T
43	VALVE	SV -1902	Q	1/Q/NNNN-	M-219 H-7	M-211	AUTOMATIC SWITCH COM	CONT	HT8320A22	20100T
44	VALVE	SV -1903	Q	1/Q/NNNN-	M-219NSSS SAMPLN	M-211	AUTOMATIC SWITCH COM	CONT	HT8320A22	20100T
45	VALVE	SV -1904	Q	1/Q/NNNN-	M-219 H-7	M-211	AUTOMATIC SWITCH COM	CONT	HT8320A22	20100T
46	VALVE	SV -1905	Q	1/Q/NNNN-	M-219 H-7	M-211	AUTOMATIC SWITCH COM	CONT	HT8320A22	20100T
47	VALVE	SV -1910	Q	1/Q/ -	M-219 F-7	M-211	AUTOMATIC SWITCH COM	R150	HT8320A22	20100T
48	VALVE	SV -1911	Q	1/Q/ -	M-219 F-7	M-211	AUTOMATIC SWITCH COM	R150	HT8320A22	20100T
49	VALVE	SV -2009	Q	1/Q/- -	M-202 H-6	M-234	AUTOMATIC SWITCH COM	R150	WPHT8300B61-RF	81170R2
50	VALVE	SV -2083	Q	1/Q/ -	M-202 G-6	M-234	AUTOMATIC SWITCH COM	R150	WPHT8300B61-RF	81170R2
51	VALVE	SV -2113	Q	1/Q/NNNN-	M-202 C-7	M-234	AUTOMATIC SWITCH COM	CONT	WPXHVA2023012F	52108D3
52	VALVE	SV -2115	Q	1/Q/NNNN-	M-202 C-7	M- INC	AUTOMATIC SWITCH COM	CONT	WPXHVA2023012F	52108D3
53	VALVE	SV -2117	Q	1/Q/NNNN-	M-202 B-7	M- INC	AUTOMATIC SWITCH COM	CONT	HTX8320A16V	52109D
54	VALVE	SV -3001	Q	-1/Q/ -	M-203 H-2	M-234	AUTOMATIC SWITCH COM	R121A	WPHT8300B61-RF	21514T
55	VALVE	SV -3002	Q	-1/Q/ -	M-203 G-2	M-234	AUTOMATIC SWITCH COM	R121A	WPHT8300B61-RF	21514T
56	VALVE	[redacted]3018	Q	1/Q/ -	M-225 B-8	M-241	AUTOMA[redacted]SWITCH COM	03/570	LB8316C44	96284T2
57	VALVE	[redacted]3027A	Q	1/Q/ -	M-225 B-6	M-241	AUTOMA[redacted]SWITCH COM	03/570	LB 8316C-34	96284T4

TYPE	COMP ID	Q(AE/B/POCSX)	PID	REQ NO	MANUFACTURER	LOC	MODEL	SERIAL
PAL								
VALVE	SV -3027B	Q 1/Q/	- M-225 B-6	M-241	AUTOMATIC SWITCH COM	03/570	LB 8316C-36	96284T3
VALVE	SV -3029A	Q 1/Q/	- M-225 G-4	M-241	AUTOMATIC SWITCH COM	02/570	LB 8316C-36	96284T3
VALVE	SV -3029B	Q 1/Q/	- M-225 G-4	M-241	AUTOMATIC SWITCH COM	02/570	LB8316C46	85882A1
VALVE	SV -3030A	Q 1/Q/	- M-225 G-6	M-241	AUTOMATIC SWITCH COM	03/570	LB 8316C-36	96284T3
VALVE	SV -3030B	Q 1/Q/	- M-225 G-6	M-241	AUTOMATIC SWITCH COM	03/570	LB8316C44	85882A1
VALVE	SV -3031A	Q 1/Q/	- M-225 H-5	M-241	AUTOMATIC SWITCH COM	03/570	LB 8316C-36	96284T3
VALVE	SV -3031B	Q 1/Q/	- M-225 H-5	M-241	AUTOMATIC SWITCH COM	03/570	LB 8316C-46	85882A2
VALVE	SV -3036	Q 1/Q/	- M-225 F-4	M-241	AUTOMATIC SWITCH COM	02/570	LB 8316C-44	96284T2
VALVE	SV -3037	Q 1/Q/	- M-225 E-4	M-241	AUTOMATIC SWITCH COM	02/570	LB 8316C-34	98284T4
VALVE	SV -3055A	Q 1/Q/	- M-225 F-6	M-241	AUTOMATIC SWITCH COM	03/570	LB 8316C-36	96284T3
VALVE	SV -3055B	Q 1/Q/	- M-225 F-6	M-241	AUTOMATIC SWITCH COM	03/570	LB 8316C-34	96284T4
VALVE	SV -3056A	Q 1/Q/	- M-225 B-6	M-241	AUTOMATIC SWITCH COM	03/570	LB 8316C-34	96284T3
VALVE	SV -3056B	Q 1/Q/	- M-225 B-6	M-241	AUTOMATIC SWITCH COM	03/570	LB8316C34	96284T4
VALVE	SV -3057A	Q 1/Q/	- M-225 H-4	M-241	AUTOMATIC SWITCH COM	03/570	LB 8316C-34	96284T4
VALVE	SV -3057B	Q 1/Q/	- M-225 H-4	M-241	AUTOMATIC SWITCH COM	03/570	LB8316C46	85882A2
VALVE	SV -3059	Q 1/Q/	- M-225 B-8	M-241	AUTOMATIC SWITCH COM	03/570	LB 8316C-44	96284T2
VALVE	SV -3069	Q -1/Q/	- M-203 D-8	M-234	AUTOMATIC SWITCH COM	CONT	WPHT 8300B61-RF	81170R2
VALVE	SV -3070	Q 1/Q/	- M-225 C-8	M-241	AUTOMATIC SWITCH COM	03/570	LB-8316C-44	96284T-2
VALVE	SV -3071	Q 1/Q/	- M-225 E-4	M-241	AUTOMATIC SWITCH COM	02/570	LB8316C44	96284T2
VALVE	SV -3212A	Q 1/Q/	- M-225 D-6	M-241	AUTOMATIC SWITCH COM	03/570	LB-8316C-36	96284T3
VALVE	SV -3212B	Q 1/Q/	- M-225 D-6	M-241	AUTOMATIC SWITCH COM	03/570	LB-8316C-34	96284T4
VALVE	SV -3213A	Q 1/Q/	- M-225 C-6	M-241	AUTOMATIC SWITCH COM	03/570	LB-8316C-46	96284T1
VALVE	SV -3213B	Q 1/Q/	- M-225 C-6	M-241	AUTOMATIC SWITCH COM	03/570	LB-8316C-34	96284T4
VALVE	SV -3223A	Q 1/Q/	- M-225 E-6	M-241	AUTOMATIC SWITCH COM	03/570	LB8316C34	96284T4
VALVE	SV -3223B	Q 1/Q/	- M-225 E-6	M-241	AUTOMATIC SWITCH COM	03/570	LB8316C34	96284T3
VALVE	SV -3224A	Q 1/Q/	- M-225 E-6	M-241	AUTOMATIC SWITCH COM	03/570	LB-8316C-36	96284T3
VALVE	SV -3224B	Q 1/Q/	- M-225 E-6	M-241	AUTOMATIC SWITCH COM	03/570	LB-8316C-34	96284T4
VALVOP	VOP-1042A	Q 1/Q/NNNN-	M-201 G-5	M-241B	PHILADELPHIA GEAR CO	CONT	334065	89202A
VALVOP	VOP-1043A	Q 1/Q/NNNN-	M-201 G-5	M-241B	PHILADELPHIA GEAR CO	CONT	34065	89202A
VALVOP	VOP-3007	Q 1/Q/	- M-203 F-3	M- 1	LIMITORQUE CORP.	CONT	SMB-00-15	92381A
VALVOP	VOP-3008	Q 1/Q/	- M-203 E-2	M- 1NA	LIMITORQUE CORP.	CONT	SMB-3-100	95590A
VALVOP	VOP-3009	Q 1/Q/	- M-203 E-3	M- 1NA	LIMITORQUE CORP.	CONT	SMB-00-15	92383A
VALVOP	VOP-3010	Q 1/Q/	- M-203 D-3	M- 1NA	LIMITORQUE CORP.	CONT	SMB-3-100	95588A
VALVOP	VOP-3011	Q 1/Q/	- M-203 C-3	M- 1NA	LIMITORQUE CORP.	CONT	SMB-00-15	
VALVOP	VOP-3012	Q 1/Q/	- M-203 C-3	M- 1NA	LIMITORQUE CORP.	CONT	SMB-3-100	
VALVOP	VOP-3013	Q 1/Q/	- M-203 B-3	M- 1NA	LIMITORQUE CORP.	CONT	SMB-00-15	92379A
VALVOP	VOP-3014	Q 1/Q/	- M-203 A-3	M- 1NA	LIMITORQUE CORP.	CONT	SMB-3-100	95591A
VALVOP	VOP-3015	Q 1/Q/	- M-204 E-1	M- 1NA	LIMITORQUE CORP.	CONT	SMB-2-60	90769A
VALVOP	VOP-3016	Q 1/Q/	- M-204 D-2	M- 1NA	LIMITORQUE CORP.	CONT	SMB-2-60	90768A