



**Consumers
Power
Company**

REGULATORY DOCKET FILE COPY

General Offices: 212 West Michigan Avenue, Jackson, Michigan 49201 • Area Code 517 788-0550

April 12, 1978

US NRC
DIST. DIVISION
SERVICES
BRANCH

1978 APR 14 PM 4 06

RECEIVED DISTRIBUTION
SERVICES UNIT

Director, Nuclear Reactor Regulation
Att: Mr Dennis L Ziemann, Chief
Operating Reactors Branch No 2
US Nuclear Regulatory Commission
Washington, DC 20555

DOCKET 50-255 - LICENSE DPR-20 -
PALISADES PLANT - REVISION TO ENVIRONMENTAL
QUALIFICATION LETTER DATED FEBRUARY 24, 1978

Consumers Power submitted a report by letter dated February 24, 1978 to address the Environmental Qualification of Safety-Related Equipment for the Palisades Plant. The attached pages are a revision to that report and are the result of additional review of the February 24 report and plant modifications performed during the 1978 refueling outage.

Although Consumers Power remains convinced that all circuits that contained terminal blocks would operate as required in a post-accident environment, plant modifications were made at the request of the NRC staff. These modifications resulted in the replacement of four terminal blocks in the containment air cooler solenoid valve circuitry and one in the circuitry for Pressure Transmitter PT-0102D.


In response to NRC staff questions, the subject of hydrazine addition during a potential post-LOCA condition was reviewed with respect to chemical environment qualifications. Hydrazine at a low concentration (50 ppm) is not expected to add any additional impact due to its rapid decomposition and reaction with iodine.

Consumers Power responses to IE Bulletins 77-05 and 77-05A, dated December 8, 1977 and April 6, 1978, should be used as additional references to the environmental qualification of safety-related equipment.

781040207

A001
5/1/40

These revisions complete Consumers Power Company's responses to the NRC letter dated December 23, 1977.

A handwritten signature in cursive script, reading "David P. Hoffman". The signature is written in dark ink and is positioned above the typed name and title.

David P Hoffman
Assistant Nuclear Licensing Administrator

CC: JGKeppler, USNRC

ATTACHMENT

Consumers Power Company

April, 1978

Environmental Qualification of Safety-
Related Equipment

The following pages of our February 24, 1978 letter
have been revised:

page 1 of 27	Rev. 1	(4-11-78)
7 of 27	"	"
9 of 27	"	"
13 of 27	"	"
14 of 27	"	"
25 of 27	"	"
page 2 of Footnotes	"	"
page 3 of Footnotes	"	" (new)

Tag No	System	Equipment List (EEQ) Section A Function	Location			Manufacturer/ Model (Type)	Limiting Environmental Qualification Criteria	Environmental Design Qualification					Palisades Sheet 1 of 27 Method of Qualification
			Area	Sub	Room			Pressure Psia	Temperature °F	Humidity %	Radiation Rads	Chemicals	
SV 0861	SWS ESS	Provide Cooling Water to Containment Cooler Recirculating Fans	C	Yes*	143	Automatic SW Co LM-831614	Environment No 1	70	283°	100% RH	1.0 x 10 ⁶ Rads	Footnote 1	FSAR Pages 6-12F Paragraph 6.1.3.2(d) Radiation Qualification by Valve Vendor Certification for Similar Type Valve. Refer to Footnote 3 and 4.
SV 0862	SWS	†	†	Yes	†	†	†	†	†	†	†	†	
SV 0864	SWS	†	†	Yes	†	†	†	†	†	†	†	†	
SV 0865	SWS	†	†	Yes	†	†	†	†	†	†	†	†	
SV 0873	SWS	†	†	Yes	†	†	†	†	†	†	†	†	
SV 0870	SWS	†	†	Yes	†	†	†	†	†	†	†	†	
SV 0867	SWS	†	†	Yes	†	†	†	†	†	†	†	†	
SV 0869	SWS	†	†	Yes	†	†	†	†	†	†	†	†	
J 350	SWS	Junction Box for Control Wiring to Serv. Wtr. CV's for Contain. Air Coolers VHX-1 VHX-3.	C	No		Steel Box W/Gasketed Hinged Cover W/Westinghouse Style No. 805432 Terminal Block	Environment No 1	120	340°	100% RH	2x10 ⁷ Rads	Footnote 1	Box is Standard Off-the-Shelf Item Terminal Blocks are qualified for Westinghouse Report PEN-TR-77-83 dated September 13, 1977 and Northeast Utilities Service Company Report GEE-78-127 dated March 27, 1978. Qualified for radiation by engineering evaluation at Westinghouse Research Laboratories.
J 355	↓	Junction Box for Control Wiring to Service Water CV for Contain. Air Cooler VHX-2	C	No		↓	↓	↓	↓	↓	↓	↓	Same as J350 Above. *Ref Letter Bixel To Purple Date 2/25/76 ECCS Analysis Discussing "Fail-Safe Function"

Tag No	System	Function	Location			Manufacturer/ Model (Type)	Limiting Environmental Qualification Criteria	Environmental Design Qualification					Palisades Sheet <u>7</u> of <u>27</u> Method of Qualification
			Area	Sub	Room			Pressure Psla	Temperature °F	Humidity %	Radi- ation	Chemicals	
PT 0103	RPS	Pressurizer Wide-Range Indicator	C	Yes	142	Foxboro Co Model #611GH	Environment No 1	70	286°	100% RH	<1R/h Over 40 Yr	Footnote 1	Ref: FSAR Pg 6-12c, Para 6.1.3.2(c) Test Model #611 - Added Ref Spec No 70P-010. PS 0103 (PT 0103) Instrument Provides Indication Only; No Control Function. Radia- tion Qualification Data Derived by Purchase Speci- fication Requirement. Refer to Footnote 3. PT-0104 installed during the 1978 refueling outage has a range of 0-600 psig and provides an additional source of pressure indication. PT-0104 is a Rosemont model number 1152 pressure transmitter with design qualifications verified by Rosemont Qualification Test Report No 117415. Meets Environment No 1 requirements with the exception that radiation qualification is to 5x10 ⁶ R.

Rev. 1 (4-11-78)

Tag No	System	Function	Location			Manufacturer/Model (Type)	Limiting Environmental Qualification Criteria	Environmental Design Qualification					Palisades Sheet 9 of 27
			Area	Sub	Room			Pressure Psia	Temperature °F	Humidity %	Radiation	Chemicals	
SV 0507A	MSS	Close Main (Vent) Steam Isolation Valves CV 0510 & 0501	TB	No		R G Laurence Model 125434 WCS	Normal Environment		AMBIENT	CONDITIONS	NA	NA	Reference Special Report #6, Rev 3 Dated 6/30/75. Relocated Outside Main Steam Penetration Room Redundant Set of SVs to SV-0508, 0510, 0514 and 0524 (Para 9.4.1)
SV 0507B	MSS	†		No		†	†		†	†	†	†	†
SV 0505A	MSS	Close Main Steam Isolation Valves CV 0510 & 0501	TB	No					AMBIENT	CONDITIONS	NA	NA	As above except - Redundant set of SVs to SV 0502, 0506, 0512 and 0513 (Para 9.4.1)
SV 0505B	MSS	†		No		†	†		†	†	†	†	†
SV 2113	LTC CVC	† Operates Charging Line Valve	C	No		Automatic Sw Co WPxHVA 202-301-2F	Environment No 2	68	283	100 RH	2x10 ⁷	Boric Acid + pH 5.5-6.5	Ref purchase spec and cert of compliance ASCO form No 2458R1 date 4/13/76, ASCO Engineering Report #112 date 6/4/76.
SV 2115	LTC CVC	† Operates Charging Line Valve	C	No		Automatic Sw Co WPxHVA 202-301-2F	†	68	283	100 RH	2x10 ⁷	Boric Acid + pH 5.5-6.5	As above.
SV 2117	LTC CVC	† Operates Pressurizer Spray Valve	C	No		Automatic Sw Co HTX 8320A 16V	†	68	283	100 RH	2x10 ⁷	Boric Acid + pH 5.5-6.5	Ref purchase spec and cert of compliance ASCO form No 2458R1 date 3/15/76, ASCO Engineering Report #112 date 6/4/76.

Tag No	System	Function	Location			Manufacturer/Model (Type)	Limiting Environmental Qualification Criteria	Environmental Design Qualification					Palisades Sheet 13 of 27
			Area	Sub	Room			Pressure Psia	Temperature °F	Humidity %	Radiation	Chemicals	
PT 0102A	RPS	Pressurizer Press Safety Injection & Reactor Scram Channel	C	Yes		Foxboro Co M611-GM	Environment No 1	70	286°	100% RH	<1R/h Over 40 Yr	Footnote 1	FSAR Pg 6-1E Para 6.1.3.2(c) Radiation Qualification Data Based on Purchase Specification Requirements. Refer to Footnote 3.
PT 0102B	†	†	C	Yes		†	†	†	†	†	†	†	
PT 0102C	†	†	C	Yes		†	†	†	†	†	†	†	
PT 0102D	†	†	C	Yes		†	†	†	†	†	†	†	
J 521	RPS	Junction Box for Control Wiring for PT-0102D	C	No		Steel Box W/Gasketed Hinged Cover W/Westing-house Style No. 805432 Terminal Block	Environment No 1	120	340°	100% RH	2x10 ⁷ Rads	Footnote 1	Same as J350 Above-Page 1.

[illegible]

Cable Code	System	Function	Location			Manufacturer/ Model (Type)	Limiting Environmental Qualification Criteria	Environmental Design Qualification					Palisades Sheet 25 of 27	
			Area	Sub	Room			Pressure Pala	Temperature °F	Humidity %	Radi- ation	Chemicals	Method of Qualification	
XZ2	RPS	PT-0102A	C	Yes		General Elec Company	Environment No 1	70	290	100	2.5 x 10 ⁷ RADS	Footnote 1	Franklin Research Institute Lab Report No F-C2870, Sept 1970	
†	†	PT-0102B	†	Yes		†	†	†	†	†	†	†	†	
†	†	PT-0102C	†	Yes		†	†	†	†	†	†	†	†	
†	†	PT-0102D	†	Yes		†	†	†	†	†	†	†	†	
I62	PCS	PT-0102D*	C	No		American Insulated Wire Co.	Environment No 1	75	340°	100%	5x10 ⁷ Rads	9.5 pH Borated Solution	Franklin Research Institute Reports #F-C 3463 & F-C 4197-1	

*A portion of the cable for PT-0102D
was not included in the original
submittal

aluminum the FSAR assumed no corrosion for hydrogen generation. Some of these transmitters will become submerged at which time failure by seal leakage and internal shorting would be competitive with corrosion. PT-102A through PT-102D will have served their function prior to submergence. PT-0751A — D and PT-0752 A — D are required only for steam line and feed-line break events. The effects of submergence on these pressure transformers is discussed in our March 23, 1977 submittal.

For the cables listed on the attached sheet the known exterior (jacket) materials are polyvinylchloride (PVC) and chlorosulfonated polyethylene (Hypalon). The jacket material for cable ZCX is unknown; the material is not mentioned in the Palisades cable description list or any known purchase specification. For PVC and Hypalon the references mentioned earlier describe both materials as being resistant to dilute alkali and mineral acid solutions. It is inferred from this that these materials would not undergo chemical attack by the sodium hydroxide and boric acid in the spray water.

The cable ZCX, for which the jacket material is unknown, is the coaxial cable for the power range safety channels N005 through N008. It is not possible to offer an opinion on the chemical resistance of this cable. However, again, the protection functions will have been completed prior to initiation of containment sprays.

As mentioned earlier, the chemical resistances were obtained from standard references. Unless a material was listed as being "resistant" or having "excellent resistance" to chemical attack by dilute boric acid or slightly alkaline solutions, it was assumed that failure due to corrosion would occur.

2. The cable testing was conducted at at least 49 psia which is less than the required 67 psia. However, both temperature and relative humidity met design conditions. Since the pertinent qualification criteria are temperature and humidity for cables, it is concluded that the qualification data is acceptable.
3. The radiation qualification data cited in these sections is the result of vendor contact or purchase specification requirements. In no case is it evident that the equipment was actually tested to failure. Thus, it is felt that in all these cases the radiation levels cited are the minimum levels with unspecified margin to failure. Further, for the case of the pressure transmitters (with the exception of PT-103) the safety function is over within the first few minutes and, consequently, they would not be subject to the full LOCA doses.
4. Due to lack of conclusive data relating to the environmental qualification (radiation) of the ASCO valve model number LM-831614 replacement valves have been ordered and will be installed during the next appropriate outage after receipt of the new valves. The failure mode of the existing valves (LM-831614) is identical to the failure mode of ASCO valve model number HT-8316A77 as noted in the Big Rock Point Plant (Docket No. 50-155) Environmental Qualification submittal dated February 24, 1978 (ie. solenoid valve failure will result in the venting of the control valve and the valve will remain open).

5. The nuclear instrument channels are included in the list since they provide a reactor trip function and are used in the accident analysis to terminate a variety of over power transients. A review of the currently effective accident analysis has shown that credit for over-power trip is taken in only one analyzed accident of the type that involves breach of a pressure boundary and the consequent adverse environment. For this incident (rod ejection) the trip occurs less than one second after breach of the pressure boundary and it is anticipated that at the time of actuation the environment at the location of the equipment would still be essentially the normal environment.

The nuclear instruments provide a backup trip for small break accidents, however, current analysis (CENPD-137P) takes credit only for the low pressurizer pressure trip. Although the time frame may be longer than one second these trips also occur relatively early in the incident (see for instance, top of page 131 of CENPD-137P).