ENVIRONMENTAL QUALIFICATIONS

Response to I.E. Bulletin 79-01B Supplement 3

Indian Point Unit No. 3
Docket No. 50-286
February 2, 1981

8102120295

TABLE OF CONTENTS

LIST OF ABBREVIATIONS
APPENDIX I - COLD SHUTDOWN
APPENDIX II - TMI ACTION PLAN
NOTES
REFERENCES

PARAMETER ABBREVIATIONS

Temp - Temperature in degrees fahrenheit

Press - Pressure in pounds per square inch gauge

R H - Relative Humidity in percent

Chem - Containment Chemical Spray

Rad - Integrated Radiation Dose

Sub - Submerged

Spec - Specifications

Qual - Qualifications

Ref - Reference

LOCATION ABBREVIATIONS

C - Inside containment

PP - Pipe penetration area outside of containment adjacent to auxiliary building

AP - Auxiliary pump room

SP - Steam and feedline penetration areas

SI - Safety injection pump room

RH - Residual heat removal pump room

APPENDIX I

QUALIFICATION INFORMATION FOR ELECTRICAL EQUIPMENT
(EXPOSED TO EXTREME ENVIRONMENTAL PARAMETERS)
USED FOR ATTAINING COLD SHUTDOWN

Equipment Type	Loc.	Time Needed	Environment			Qual. Method	Reference	
Transmitters			Parameter	Spec.	Qual.			
Residual Heat Removal Recirculation Flow T-946 A-D Barton Type 386	C	30 min	Temp	258	288	Separate	(3),(1)	Note (c),(h)
			Press	40	60			
			R H	100	100			
			Chem	Yes	Yes			
			Rad	$2X10^6$	$2X10^8$			
			Sub	No				

INDIAN POINT UNIT 3

Equipment Type Motors	Loc.	Time Needed	Environment Parameter	Spec.	Qual.	Qual. Method	Reference
Residual Heat Removal Pump Motor Westinghouse-Buffalo Frame No. 509 UPZ	RH	30 days	Temp	AMB		Separate	(10)
			Press	AMB			
			R H	AMB			
			Chem	No			
			Rad	2.6×10^6	2×10^8		
			Sub	No			

INDIAN POINT UNIT 3

Equipment Type Motor Operators	Loc.	Time Needed	Environment Parameter	Spec.	Qual.	Qual. Method	Reference	
Residual Heat Removal Pump Suction Valves MOV 730 & 731 Limitorque SMB-1 B-Insulation	C	30 days	Temp Press R H Chem Rad Sub	258 40 100 Yes $2x10^7$ No		Separate	(1) (19) (25)	(Y)
Residual Heat Removal Return Lines MOV 883 Limitorque SMB 0 B-Insulation	PP	30 days	Temp Press R H Chem Rad Sub	AMB AMB AMB No $2.6x10^6$ No	$2x10^8$	Separate	(1) (19)	

INDIAN POINT UNIT 3

Equipment Type Solenoid Valves	Loc.	Time Needed	Environment Parameter	Spec.	Qual.	Qual. Method	Reference
Charging Line Isolation Valves 204 A & B ASCO LB8316	C	30 days	Temp	258		Analysis	(4), (5) Note (aa)
			Press	40			
			R H	100			
			Chem	Yes			
			Rad	$2x10^7$	$6x10^6$		
			Sub	No			
Power Operated Relief Valves PCV 455C & 456 NP 8316	C	30 days	Temp	258	340	Sequential	(8)
			Press	40	70		
			R H	100	100		
			Chem	Yes	Yes		
			Rad	$2x10^7$	$2x10^8$		
			Sub	No			

INDIAN POINT UNIT 3

Equipment Type Limit Switches	Loc.	Time Needed	Environment Parameter	Spec.	Qual.	Qual. Method	Reference
Charging Line Isolation Valves 04 A & B NAMCO D2400X	C	30 days	Temp	258		Analysis	
			Press	40			
			R H	100			
			Chem	Yes			
			Rad	$2x10^7$	$1.8x10^7$	Design Spec.	Note (k)
			Sub	No			
Pressurizer Spray Valves PCV 455 A & B NAMCO D2400X	C	30 days	Temp	258		Analysis	
			Press	40			
			R H	100			
			Chem	Yes			
			Rad	$2x10^7$	$1.8x10^7$	Design Spec.	Note (k)
			Sub	No			
Power Operated Relief Valves PCV 455C & 456 NAMCO EA 180 with Connax Connectors	C	30 days	Temp	258	340	Sequential	(9)
			Press	40	70		
			R H	100	100		
			Chem	Yes	Yes		
			Rad	$2x10^7$	$2x10^8$		
			Sub	No			

INDIAN POINT UNT 3

Equipment Type Electro-Pneumatic Tranducer	Loc.	Time Needed	Environment Parameter	Spec.	Qual.	Qual. Method	Reference
Pressurizer Spray Valves PCV 455 A&B Fisher Governor Type 546	C	30 days	Temp	258	320	Analysis	Note (z)
			Press	40	75		
			R H	100	100		
			Chem	Yes			
			Rad	$2x10^7$			
			Sub	No			
Main Steam Atmospheric Relief PCV 1134, 1135, 1136 & 1137 Fisher Governor Type 546	SP	30 min.	Temp	Neg.	320	Separate	(13)
			Press	0.42	75		
			R H	AMB	100		Note (b)
			Chem	No			
			Rad	No			
			Sub	No			

Equipment Type Motor Operators	Loc.	Time Needed	Environment Parameter	Spec.	Qual.	Qual. Method	Reference
Residual Heat Removal Isolation Valve MOV-744 Limitorque SMB-1 H-Insulation	PP	30 days	Temp	AMB			
			Press	AMB			
			R H	AMB			
			Chem	No			
			Rad	$2.6X10^6$	$2X10^8$	Separate	(1),(19)
			Sub	No			
Recirculation Spray Valves MOV-889 A & B Limitorque SMB-0 H-Insulation	C	30 days	Temp	258	300	Sequential	(1), (2),(20),(21)
			Press	40	70		
			R H	100	100		
			Chem	Yes	Yes		
			Rad	$2X10^7$	$2X10^8$		
			Sub	No			
Recirculation Pump Discharge Valves MOV-1802 A & B Limitorque SMB-00 H-Insulation	C	30 days	Temp	258	300	Sequential	(1), (2),(20),(21)
			Press	40	70		
			R H	100	100		
			Chem	Yes	Yes		
			Rad	$2X10^7$	$2X10^8$		
			Sub	No			
Residual Heat Exchanger Isolation Valves MOV-746, 747, 899 A & B Limitorque SMB-3 H-Insulation	C	30 days	Temp	258	300	Sequential	(1), (2),(20,(21)
			Press	40	70		
			R H	100	100		
			Chem	Yes	Yes		
			Rad	$2X10^7$	$2X10^8$		
			Sub	No			
High Head Recirculation Valve MOV-888 A & B Limitorque SMB-00 H-Insulation	PP	30 days	Temp	AMB			
			Press	AMB			
			R H	AMB			
			Chem	No			
			Rad	$2.6x10^6$	$2X10^8$	Separate	(1),(19)
			Sub	No			

Equipment Type Motor Operators	Loc.	Time Needed	Environment Parameter	Spec.	Qual.	Qual. Method	Reference	
Residual Heat Exchanger Cooling Water Supply Valves MOV-822 A & B SMB-00 Limitorque B Insulation	PP	30 days	Temp	AMB				
			Press	AMB				
			R H	AMB				
			Chem	No				
			Rad	$2.6X10^6$	$2X10^8$	Separate	(1),(19)	
			Sub	No				
Residual Heat Exchanger Isolation Valves MOV-745 A & B Limitorque SMB-00 H-Insulation	C	30 days	Temp	258	300	Sequential	(1), (2),(20),(21)	
			Press	40	70			
			R H	100	100			
			Chem	Yes	Yes			
			Rad	$2X10^7$	$2X10^8$			
			Sub	No				
Residual Heat Removal Flow Control Valves 1369 A & B Limitorque SMB 00 Insulation	C	30 days	Temp	262	300	Sequential	(1) (2) (20) (21)	
			Press	41	70			
			R.H.	100	100			
			Chem	Yes	Yes			
			Rad	$2X10^7$	$2X10^8$			
			Sub	No				
Residual Heat Removal Loop Flow Control Valves HCV-638 & 640 Limitorque SMB-00 B-Insulation	C	<8 Hrs	Temp	258	286	Separate	(1),(19)	Note (y)
			Press	40	60			
			R H	100	100			
			Chem	Yes	Yes			
			Rad	$2X10^7$	$2X10^8$			
			Sub	No				
Boron Injection Tank Inlet Valves MOV-1852 A & B Limitorque SMB-0 B-Insulation	SI	30 days	Temp	AMB				
			Press	AMB				
			R H	AMB				
			Chem	No				
			Rad	$1.3X10^6$	$2X10^8$	Separate	(1),(19)	
			Sub	No				

INDIAN POINT UNIT 3

Equipment Type Motor Operators	Loc.	Time Needed	Environment Parameter	Spec.	Qual.	Qual. Method	Reference
* Refueling Water Storage Tank Discharge Valve MOV-1810 Limitorque SMB-00 B-Insulation	SI	30 days	Temp	AMB			
			Press	AMB			
			R H	AMB			
			Chem	No			
			Rad	$1.3X10^6$	$2X10^8$	Separate	(1),(19)
			Sub	No			
* Boron Injection Tank Discharge Valves MOV-1835 A & B Limitorque SMB-0 B-Insulation	PP	30 days	Temp	AMB			
			Press	AMB			
			R H	AMB			
			Chem	No			
			Rad	$2.6X10^6$	$2X10^8$	Separate	(1),(19)
			Sub	No			

INDIAN POINT UNT 3

Equipment Type Electrical Cable	Loc.	Time Needed	Environment Parameter	Spec.	Qual.	Qual. Method	Reference
* 600 volt Power Cable 1 conductor #8 kerite cable with kerite HT Insulation and FR Jacket	C	30 days	Temp	258	330°F	Sequential	(26)
			Press	40	85		
			R·H	100	100		
			Chem	Yes	No		
			Rad	$2x10^7$	$2.7x10^7$		
			Sub	No	No		
*Electrical Cabling & Splices Single Conductor Silicone Rubber Insulation Asbestos Braid Jacket 350 MCM, 4/0 #4, #8, #10, #12 Raychem Splices	C	30 days	Temp	262	300	Sequential	(1) (22) (23)
			Press	41	80		
			RH	100	100		
			Chem	Yes	Yes		Note (x)
			Rad	$2X10^7$	$2X10^8$		
			Sub	Yes	No		
600 V Power Cable Single Conductor, Silicone Rubber Insulation Asbestos Braid Jacket #12, #10, #8, #4, #410, #350 MCM Raychem Splices	C	30 days	Temp	262	300	Sequential	(1) (22) (23)
			Press	41	80		
			RH	100	100		
			Chem	Yes	Yes		Note (x)
			Rad	$2X10^7$	$2X10^8$		
			Sub	Yes	No		
600 V Power & Control Multi-Conductor #12 Kerite Insulation with Pair Braid Zinc, Tape, Kerite Jacket overall Raychem Splices	C	30 days	Temp	262	300	Sequential	(1) (22) (23)
			Press	41	80		
			RH	100	100		
			Chem	Yes	Yes		Note (x)
			Rad	$2X10^7$	$2X10^8$		
			Sub	Yes	No		

APPENDIX II

QUALIFICATION INFORMATION OF ELECTRICAL EQUIPMENT ASSOCIATED WITH THE TMI ACTION PLAN.

INDIAN POINT UNT 3

Equipment Type Solenoid Valves	Loc.	Time Needed	Environment Parameter	Spec.	Qual.	Qual. Method	Reference
Containment Isolation Va ves 1610, 550, DW1 & DW2 ASCO NP831655E	P.P.	30 days	Temp	AMB	340	Sequential	(8) Note (bb)
			Press	AMB	70		
			R H	AMB	100		
			Chem	No	Yes		
			Rad	2.6×10^6	2×10^8		
			Sub	No			
ost-Accident ampling System SCO 8262-C-6							Note (dd)

INDIAN POINT UNT 3

Equipment Type Limit Switches	Loc.	Time Needed	Environment Parameter	Spec.	Qual.	Qual. Method	Reference
Containment Isolation Valves 1610, 550, DW1 & DW2 NAMCO EA-180	P.P.	30 days	Temp	AMB	340	Sequential	(9) Note (bb)
			Press	AMB	70		
			RH	AMB	100		
			Chem	No	Yes		
			Rad	2.6×10^6	2×10^8		
			Sub	No			

INDIAN POINT UNT 3

Equipment Type Instrument	Loc.	Time Needed	Environment Parameter	Spec.	Qual.	Qual. Method	Reference	
Acoustical Monitoring System	C	30 days	Temp	258	265	Sequential	(27)	(cc)
TEC Model 500			Press	40	50			
Piezoelectric			R H	100	100			
Accelerometer			Chem	Yes	Yes			
			Rad	$2x10^7$	$2.1x10^8$			
			Sub	No	No			

INDIAN POINT UNT 3

Equipment Type Electrical Cables	Loc.	Time Needed	Environment Parameter	Spec.	Qual.	Qual. Method	Reference
Containment Isolation Valves Power & Control Cables Rockbestos Cable Various Conductors and sizes	PP	30 days	Temp	AMB	300	Sequential	(28)
			Press	AMB	47		
			R H	AMB	100		
			Chem	No	Yes		
			Rad	2.6×10^6	2×10^8		
			Sub	No			
Acoustical Monitoring System Power Cable Rockbestos Firewall III 2/C #16 Twisted Shielded with flame resistant neoprene jacket	C	30 days	Temp	258	300°	Sequential	(29)
			Press	40	47		
			R H	100	100		
			Chem	Yes	Yes		
			Rad	2×10^7	2×10^8		
			Sub	No	No		

Notes

(a) Valve tested in environment and acceptable for 8 hrs. Valve not normally used during an accident. If adjustment for flow is required it will be done immediately following switchover to recirculation. Failure does not cause the valve to change position.

(b) Pressure and temperature changes at approximate ambient conditions.

(c) Will be replaced with sequentially qualified Barton transmitter per NRC meeting on April 3, 1980.

(f) Valve will close (its' safe position) for all potential modes of failure.

(h) Flows will be established and adjusted following change over to recirculation. No further need to monitor flow after this event.

(k) Limit switch is for position indication only, valves are closed on SI and/or containment isolation signal. Once the valve is closed there is no known failure that would cause the valve to open.

(x) Review of cabling is continuing, cabling and splices outside the containment in the hostile service areas has been analyzed relative to materials that would be affected by the environment and none were found.

(y) This equipment will be changed upon arrival of replacement equipment and an outage of sufficient duration.

(z) A review of Fisher-Governor drawings indicates that there is no material that would be substantially affected by the radiation level.

(aa) The valve will open (its' safe position) for all potential modes of failure.

(bb) The valves were installed with qualified solenoids and limit switches during the 1980 outage. The remaining containment isolation valves are presently on order.

(cc) The Technology for Energy Corporation test report is only a draft. The final report is expected in the near future.

(dd) The solenoid valves are located in a lead shielded area at elevation 41' in the Primary Auxiliary Buildings. The valves are used to process the sample for analysis and radiological counting. The solenoid valves are not safety related and furthermore they are not exposed to harsh external environmental parameters. Further review is presently underway to determine the applicability of the environmental qualification program to these solenoid valves and other electrical components in the sampling system.

REFERENCES

1. Westinghouse Electric Corp. WCAP 7410-L, Volume I & II, Tropical Report: Environmental Testing of Engineered Safety Features Related Equipment, J. Locante, December 1970.

2. Limitorque Corporation, Nuclear Power Station Qualification Type Test report. Limitorque valve actuators for PWR service project #600456, W. Sykes, December 1975.

3. Result of NRC staff meeting on April 3, 1980.

4. Westinghouse Electric Corporation, letter NS-CE-755. Potential mode of failure identified for solenoid valves. C. Eischeldinger to Vassalo, August 15, 1975.

5. ASCO solenoid valves contain nylon with a sensitivity of 5×10^7 (per reactor shielding design manual, first edition. D. Van Norstrand Company Inc. "Group 7" Plastics). Buna N with a sensitivity of 6×10^6 (per ASCO Company).

8. Automatic Switch Co. Test Report No. A0521678/TR. Qualification tests of solenoid valves, March 1978.

9. ACME Cleveland Development Co. Test Report. Qualification of series EA-180 and EA-740 switches, August 1977.

10. Westinghouse Electric Corp., WCAP-8754 Topical report: Environmental Qualification of Class 1E Motors for Nuclear Out-Of-Containment use. I. Rodens and R.H. DeLisle, June 1976.

13. Fisher Controls Co. , Pr. 72AR28, Prob. 1531, Report 4, June 12, 1973.

19. Limitorque Corporation, Qualification Type Test Report. Limitorque Valve Actuators for Class 1E service outside Primary Containment #B0003.

20. Westinghouse Electric Corp., letter NS-CE-692 from C. Eicheldinger to D.B. Vassalo, July 10, 1975.

21. Westinghouse Electric Corp., letter NS-CE-756 from C. Escheldinger to D.B. Vassalo, August 15, 1975.

22. Conduit & Cable Schedule, United Engineers & Constructors, Dwg. No. 9321-LL-30039 & 30103.

23. Raychem Test Report #71100.

25. Limitorque Test Report B00058, Limitorque Valve Actuator Qualification for Nuclear Power Station Service. Test conducted per IEEE 382-1972, 323-1974, 344-1975. Prepared by Limitorque Corporation, J.B. Drab, 1-11-80.

REFERENCES (CONTINUED)

26. Franklin Report F-C2442-02, April, 1969. Test of Kerite Cables Samples under Simulated Post-Accident Reactor Containment Conditions.

27. Technology for Energy Corporation Test Report 517-TR-03. Qualification Test Report for Environmental and Seismic Testing of the TEC. (Draft) (Proprietary) December 1980.

28. Rockbestos Certified Test Report for UE&C Specification #6604-001-113-2.

29. Rockbestos Certified Test Report for UE&C Specification #6604-001-113-3.

Qualification of Firewall III Class 1E Electric Cables. The Rocksbestos Company July 7, 1977.