

WCAP 8587

"Equipment Qualification Data Packages"

Supplement 1

EQDP-ESE-19

Instrument Bus Distribution Panel

Revision 4

Instruction Sheet

The following instructional information and checklist is being furnished to help insert the following into WCAP-8587 Supplement 1 EQDP-ESE-19 Class 3 (Non-Proprietary). Discard the old sheet and insert the new sheets as listed below. Revised information is indicated by a bar and number 4 on the outside margin of the page.

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March, 1983

EQUIPMENT QUALIFICATION DATA PACKAGE

This document contains information, relative to the qualification of the equipment identified below, in accordance with the methodology of WCAP 8587. The Specification section (Section 1) defines the assumed limits for the equipment qualification and constitute interface requirements to the user.

Instrument Bus Distribution Panel

APPROVED:

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SECTION 1 - SPECIFICATIONS

1.0 PERFORMANCE SPECIFICATIONS

1.1 Electrical Requirements

- 1.1.1 Voltage: 118 VAC, $\pm 2\%$ single phase
- 1.1.2 Frequency: 60 Hz ± 1 Hz
- 1.1.3 Load: 7.5 KVA Max. Total
- 1.1.4 Electromagnetic Interference: N/A
- 1.1.5 Other: None

1.2 Installation Requirements: W NES Dwg 1143E61 Rev. 2

1.3 Auxiliary Devices: None

1.4 Preventative Maintenance Schedule: Per the Westinghouse Equipment Qualification test program, no preventive maintenance is required to support the equipment qualified life. This does not preclude development of a preventive maintenance program designed to enhance equipment performance and identify unanticipated equipment degradation as long as this program does not compromise the qualification status of the equipment. Surveillance activities may also be considered to support the basis for/and a possible extension of the qualified life.

1.5 Design Life: 40 years

1.6 Operating Cycles (Expected number of cycles during design life, including test): 120 (Estimate of 3 per year). The three cycles per year is an average of the possible cycles of operation per year, i.e., considering its potential use as a service switch, maintenance function, or for isolation for repairs.

1.7 Performance Requirements for^(b):

Parameter	Normal Conditions	Abnormal Conditions	Containment Test Conditions	DBE Conditions ^(a)			Post DBE Conditions ^(a)		
				FLB/SLB	LOCA	Seismic	FLB/SLB	LOCA	Seismic
1.7.1 Time requirement	Continuous	12 Hrs.	N/A	Event duration	Event duration	Event duration	Continuous	Continuous	Continuous
1.7.2 Performance requirement	To supply 7.5 KVA Max. to connected Load ^(d)	As normal	As normal	As normal	As normal	As normal	As normal	As normal	As normal

1.8 Environmental Conditions for Same Function^(b)

1.8.1 Temperature(^o F)	60 - 104	Note C	Ambient Conditions	Ambient Conditions	Ambient Conditions	Ambient Conditions	Ambient Conditions	Ambient Conditions	Ambient Conditions
1.8.2 Pressure (psig)	0	0				0			
1.8.3 Humidity (% RH)	20 - 70	Note C				Ambient Conditions			
1.8.4 Radiation (R)	<400	None				None			
1.8.5 Chemicals	None	None				None			
1.8.6 Vibration	None	None				None			
1.8.7 Acceleration (g)	None	None				See Section 2.10.3.2			

Notes: a: DBE is the Design Basis Event.

b: Margin is not included in the parameters of this section.

c: Figure 1, Envelope 3. However, for plants having Class 1E HVAC for the area in which the distribution panels are located, the abnormal extremes are the same as the normal specified above.

d: The purpose of these panels is to pass current, not to interrupt current.

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1.9 Qualified Life: The currently demonstrated qualified life is 5 years. This is based on WCAP-8687, Supplement 2, Appendices A1 and A2 (Material Aging) References 4 and 5 in conjunction with the mechanical aging discussed in WCAP-8687, Supplement 2, E20A (Reference 1).

1.10 Remarks: None

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SECTION 2 - QUALIFICATION BY TEST

2.0 TEST PLAN

2.1 Equipment Description: 7.5 KVA Instrument Bus Distribution Panel
Model Number (WEB-1-PH/2-W)

2.2 Number Tested: Type test on two (2) units

2.3 Mounting: As per Section 1.2

2.4 Connections: Power 118 VAC, 60 Hz, Single phase

2.5 Aging Simulation Procedure

By a separate component text program as described by Subprogram C of
Appendix B to WCAP-8587.

accordance with the procedures recommended by Reg. guide 1.100 (IEEE 344-1975). The seismic testing which has been performed and demonstrates the transition from IEEE-344-71 testing to IEEE-344-75 requirements is reported in Reference 5. The generic seismic test level contains significant margin with respect to any single plant application referencing this program.(1)

2.10.3.2 Normal and Abnormal Environment Testing

Westinghouse requires that the Instrument Bus Distribution Panel be located such that it does not experience a consequent adverse environment when required to operate following a high energy line break either inside or outside containment. Therefore the only environmental testing required is to demonstrate equipment capability under normal and abnormal environmental extremes.

Reference 4 summarizes the results of available radiation testing of organic and inorganic materials and justifies that, for radiation doses less than 10⁴ rads, no deterioration in material structural properties is detectable. As a consequence, a radiation simulation is not required on this equipment, since estimated in-service radiation doses will not prejudice the capability of the equipment to perform under design basis event (i.e., seismic event) conditions.

The environmental testing reported in Reference 1 is designed to demonstrate the capability of the Instrument Bus Distribution Panel to meet the safety-related performance requirements specified in EQDP Section 1.7 when exposed to the variations in temperature, humidity, voltage and frequency specified by EQDP Figure 3. The testing successfully demonstrated the specified safety-related requirements. Additional margin was, furthermore, included in this test by submitting the

equipment to a double cycle of electrical and environmental extremes as described by EQDP Figure 2. This test is considered to satisfactorily demonstrate the Instrument Bus Distribution Panel capability to meet its safety-related functional requirements when exposed to the specified normal and abnormal environments (EQDP Section 1.7) and the permitted range of frequency and voltage variations (EQDP Section 1.1) in accordance with IEEE 323-1974 Section 6.3.2(2) and (3).

2.10.3.3 Aging Evaluation

4 | Subprogram C of the Westinghouse Aging Evaluation Program (Appendix B, WCAP 8587) will incorporate a representative sample of components from the Instrument Bus Distribution Panel. This program is reported in WCAP-8687, Supplement 2, Appendix A (Proprietary) Reference 6. The objective of Subprogram C is to demonstrate that during the qualified life there are no in-service aging mechanisms capable of reducing the capability of the Instrument Bus Distribution Panel to perform during or after a seismic event. As a consequence, the seismic testing on the un-aged Instrument Bus Distribution Panel described above, is not prejudiced by any in-service aging mechanism.

2.10.4 Conclusion

The demonstrated qualified life of the Instrument Bus Distribution Panel will be established by Subprogram C of the Westinghouse Aging Evaluation Program. The results of the aging program, together with the seismic and environmental testing described herein, demonstrate the qualification of the Instrument Bus Distribution Panel employing the practices recommended by Reg. Guide 1.89 and 1.100.

2.11 Section 2 Notes

- (1) The generic tests completed by Westinghouse employ parameters designed to envelope a number of plant applications. Margin is a plant specific parameter and will be established by the applicant.

2.12 References

1. Yalich, M. "Equipment Qualification Test Report Instrument Bus Distribution Panel (Normal and Abnormal Temperature and Humidity Testing)." WCAP-8687 Supplement 2 ESE-19A (Proprietary), WCAP-8587 Supplement 3 ESE-19A (Non-Proprietary).
2. Figenbaum, E. K., "Seismic Testing of Electrical and Control Equipment Static Inverter and Instrument Bus Distribution Panel" WCAP-7821 Supplement 2 Addendum 1 (Non-Proprietary), October 1975.
3. Vogeding, E. L., "Seismic Testing of Electrical and Control Equipment to High Seismic Plants" WCAP-7821 Supplement 5. (Non-Proprietary) September 1976.

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4. Damerow, F. W., "Effects of Gamma Radiation Doses Below 10^4 Rads on Mechanical Properties of Materials." WCAP-8587 Appendix C, (Non- Proprietary).
5. Chang, S. M., "Seismic Evaluation of the Single Frequency Sine-Beat Test Inputs Employed During 1971 Qualification Testing," ST-STA-218 (Proprietary) in progress.
6. "Equipment Qualification Test Report Material Aging Analysis", WCAP-8687, Supplement 2, Appendix A2 (Proprietary)

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