

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.

Remove
(Front/Back)

Cover sheet/--
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NRC Letter/NRC Letter
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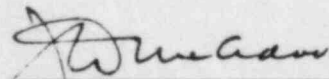
EQUIPMENT QUALIFICATION DATA PACKAGE

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

**** THIS DOCUMENT HAS BEEN ****
REVIEWED AND ACCEPTED BY THE
NRC IN ACCORDANCE WITH WCAP 8587
"METHODODOLOGY", REVISION 6

APPROVED:


for E. P. Rahe, Manager
Nuclear Safety Department

Westinghouse Electric Corporation
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P.O. Box 355
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

NOV 10 1983

Mr. E. P. Rahe, Jr., Manager
Nuclear Safety Department
Westinghouse Electric Corporation
P. O. Box 355
Pittsburgh, Pennsylvania 15230

Dear Mr. Rahe:

Subject: Acceptance for Referencing of Licensing Topical Reports WCAP-8587, Revision 6 (NP), "Methodology for Qualifying Westinghouse WRD Supplied NSSS Safety Related Electrical Equipment," and WCAP-9714 (P)/9750 (NP), "Methodology for the Seismic Qualification of Westinghouse WRD Supplied Equipment"

We have completed our review of the subject topical reports submitted by Westinghouse Electric Corporation. We find these reports are acceptable for referencing in license applications to the extent specified and under the limitations described in the attached Safety Evaluation Report (SER). The SER defines the bases for acceptance of these reports.

The topical reports accepted for referencing are WCAP-8587, Revision 6 (NP), "Methodology for Qualifying Westinghouse WRD Supplied NSSS Safety Related Electrical Equipment" and WCAP-9714 (P)/9750 (NP), "Methodology for the Seismic Qualification of Westinghouse WRD Supplied Equipment." In addition, numerous equipment-specific non-proprietary Equipment Qualification Data Packages (EQDPs) and proprietary Equipment Qualification Test Reports (EQTRs) have been reviewed and accepted. Table 1 gives a complete list of all of the reports reviewed and accepted and their submittal dates.

The EQDPs and EQTRs have been reviewed and accepted by the staff according to the methodologies in WCAP-8587, Revision 6 (NP) and WCAP-9714 (P), respectively. The EQDPs and EQTRs have unique equipment-specific alphanumeric numbering systems. In order to differentiate the accepted EQDPs and EQTRs from those under review, Westinghouse is requested to mark the cover sheet of the accepted EQDPs and EQTRs with the statement "Accepted for Referencing in Licensing Actions Based on Conformance with WCAP-8587, Revision 6-A (NP), and WCAP-9714 A (P)/9750 A (NP)."

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The accepted EQDPs go into Supplement 1 of WCAP-8587 which is the receptacle for non-proprietary data packages, and the accepted EQTRs go into Supplement 2 of WCAP-8687. (The Westinghouse Topical Report identification number WCAP-8687 is designated as a receptacle for the proprietary accepted EQTRs).

Since the Westinghouse qualification program is an expansive program, additional reviews of equipment-specific documents will be necessary in the future. Due to the physical size of the SERs related to these reviews, it is not practical to incorporate the SER in the front of each of the EQTRs and EQDPs. Therefore, Westinghouse is requested to publish Supplement 2 to WCAP-8587, which will be the receptacle for NRC acceptance letters, associated Safety Evaluation Reports, and lists of accepted documents. A copy of this acceptance letter should be published and incorporated within the first few pages of each accepted EQDP and EQTR.

When an accepted document appears as a reference in license applications, we do not intend to repeat our review of the matters described therein and found acceptable except to assure that the material presented is applicable to the specific plant involved. Our acceptance applies only to the matters described in each accepted report.

In accordance with procedures established in NUREG-0390, it is requested that Westinghouse publish accepted versions of these reports, proprietary and non-proprietary as outlined below and within three months of receipt of this letter.

The accepted versions of WCAP-8587 (NP), Revision 6 and WCAP-9714 (P)/3750 (NP) should incorporate this letter between the title page and the abstract. The accepted versions of the above mentioned WCAPs shall include a -A (designating accepted) following the report identification symbol.

Should our criteria or regulations change such that our conclusions as to the acceptability are invalidated, Westinghouse and/or the applicants referencing the subject documents will be expected to revise and resubmit their respective documentation, or submit justification for the continued effective applicability of the documents without revision of their respective documentation.

Sincerely,

Cecil O. Thomas

Cecil O. Thomas, Chief
Standardization & Special
Projects Branch
Division of Licensing

Enclosures:

1. List of Accepted Documents
2. Safety Evaluation Report

TABLE 1

<u>Equipment Description</u>	<u>Reports Accepted by NRC</u>	
WCAP-8587, Methodology	Methodology for Qualifying Westinghouse WRD Supplied NSSS Safety Related Electrical Equipment, Revision 6	
WCAP-9714/9750	Methodology for the Seismic Qualification of Westinghouse WRD Supplied Equipment, May 1980	
Medium Pump Motors	EQDP-AE-1 EQTR-A01A	Revision 4 Revision 2
Large Motors	EQDP-AE-2 EQTR-A02A	Revision 5 Revision 2
Canned Motors	EQDP-AE-3 EQTR-A03A	Revision 5 Revision 3
Pressure Transmitters Group A	EQDP-ESE-1A EQTR-E01A EQDP-ESE-1B EQTR-E01B	Revision 4 (Barton) Revision 2 (Barton) Revision 1 (Veritrak) Revision 1 (Veritrak)
Pressure Transmitters Group B	EQDP-ESE-2 EQTR-E02A EQTR-E02B	Revision 5 Revision 2 (Barton) Revision 2 (Veritrak)
DP Transmitters Group A	EQDP-ESE-3A EQTR-E03A EQDP-ESE-3B EQTR-E03B	Revision 4 (Barton) Revision 2 (Barton) Revision 1 (Veritrak) Revision 1 (Veritrak)
DP Transmitters Group B	EQDP-ESE-4 EQTR-E04A EQTR-E04B	Revision 6 Revision 2 (Barton) Revision 3 (Veritrak)
RTD's-RCS Bypass Manifold	EQDP-ESE-5 EQTR-E05A	Revision 4 Revision 2
RTD's Well Mounted	EQDP-ESE-6 EQTR-E06A	Revision 5 Revision 3
RTD's - Fast Response	EQDP-ESE-7 EQTR-E07A	Revision 5 Revision 3
Nuclear Instrumentation	EQDP-ESE-10 EQTR-E10A	Revision 5 Revision 2
Indicators	EQDP-ESE-14 EQTR-E14A	Revision 4 Revision 2
Recorders	EQDP-ESE-15 EQTR-E15A	Revision 4 Revision 1

TABLE 1 (Cont'd)

<u>Equipment Description</u>	<u>NRC Revision Accepted</u>	
Solid State Protection System	EQDP-ESE-16	Revision 5
	EQTR-E16A	Revision 2
	EQTR-E16B	Revision 2
	EQTR-E16C	Revision 0
SSPS - 3 Train	EQDP-FSE-17	Revision 3
	EQTR-E17A	Revision 0
	EQTR-E17B	Revision 0
Static Inverter	EQDP-ESE-18	Revision 5
	EQTR-E18A	Revision 1
Instrument Bus Distribution Panels	EQDP-ESE19	Revision 4
	EQTR-E19A	Revision 1
Pressure Sensor	EQDP-ESE-21	Revision 4
	EQTR-E21A	Revision 2
Power Range 4-Section Excore Detector	EQDP-ESE-22	Revision 4
	EQTR-E22A	Revision 2
Solenoid Valves (One Report)	EQDP-HE2/HE5	Revision 4
	EQTR-H02A/H05A	Revision 2
Limit Switch (One Report)	EQDP-HE3/HE6	Revision 4
	EQTR-H03A/H06A	Revision 2
Motor Operators	EQDP-HE4	Revision 4
	EQTR-H04A	Revision 2

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 $\pm$ 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.

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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.

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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

1.8 Environmental Conditions for Same Function (b)

1.8.1 Temperature (°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, C20A (Reference 1).

1.10 Remarks: None

WESTINGHOUSE CLASS 3
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 test 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

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)