WCAP 8587

"Equipment Qualification Data Packages"

Supplement 1

EQDP-HE-4

SAFETY RELATED LIMITORQUE VALVE ELECTRIC MOTOR OPERATORS
(Qualification Group B)

Revision 4

Instruction Sheet

The following instructional information and checklist is being furnished to help insert the following into WCAP-8587 Supplement 1 EQDP-HE-4 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)	Insert (Front/Back)
Cover sheet/--	Cover sheet/--
--/--	NRC Letter/NRC Letter
--/--	Table 1/Table 1
page 2/3	page 2/3
8/9	8/9
10/11	10/11
15/--	15/--

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.

SAFETY RELATED LIMITORQUE VALVE ELECTRIC MOTOR OPERATORS

(Qualification Group B)

APPROVED: _____
for E. P. Rahe, Manager
Nuclear Safety Department

Westinghouse Electric Corporation
Nuclear Energy Systems
P.O. Box 355
Pittsburgh, Pennsylvania 15230

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).

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 receptical 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)/9750 (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

Equipment Description	Reports Accepted by NRC	
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	Revision 4
	EQTR-A01A	Revision 2
Large Motors	EQDP-AE-2	Revision 5
	EQTR-A02A	Revision 2
Canned Motors	EQDP-AE-3	Revision 5
	EQTR-A03A	Revision 3
Pressure Transmitters Group A	EQDP-ESE-1A	Revision 4 (Barton)
	EQTR-E01A	Revision 2 (Barton)
	EQDP-ESE-1B	Revision 1 (Veritrak)
	EQTR-E01B	Revision 1 (Veritrak)
Pressure Transmitters Group B	EQDP-ESE-2	Revision 5
	EQTR-E02A	Revision 2 (Barton)
	EQTR-E02B	Revision 2 (Veritrak)
DP Transmitters Group A	EQDP-ESE-3A	Revision 4 (Barton)
	EQTR-E03A	Revision 2 (Barton)
	EQDP-ESE-3B	Revision 1 (Veritrak)
	EQTR-E03B	Revision 1 (Veritrak)
DP Transmitters Group B	EQDP-ESE-4	Revision 6
	EQTR-E04A	Revision 2 (Barton)
	EQTR-E04B	Revision 3 (Veritrak)
RTD's-RCS Bypass Manifold	EQDP-ESE-5	Revision 4
	EQTR-E05A	Revision 2
RTD's Well Mounted	EQDP-ESE-6	Revision 5
	EQTR-E06A	Revision 3
RTD's - Fast Response	EQDP-ESE-7	Revision 5
	EQTR-E07A	Revision 3
Nuclear Instrumentation	EQDP-ESE-10	Revision 5
	EQTR-E10A	Revision 2
Indicators	EQDP-ESE-14	Revision 4
	EQTR-E14A	Revision 2
Recorders	EQDP-ESE-15	Revision 4
	EQTR-E15A	Revision 1

TABLE 1 (Cont'd)

Equipment Description	NRC Revision Accepted	
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-ESE-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: 460 VAC 3 Phase
1.1.2 Frequency: 60 Hz
1.1.3 Load:
1.1.4 Electromagnetic Interference: N/A
1.1.5 Other: Integral Limit Switches & Torque Switch
Voltage - 120 VAC Nominal
Load - < 5 amps
Frequency - 60 Hz Nominal

1.2 Installation Requirements: The generic design family of Limitorque operators identified in Table 1 of Reference 2 are qualified by this testing for any mounting position as noted in the applicable valve drawings. The orientation used during seismic testing; is with the motor and handwheel shafts in the horizontal position and the limit switch cover either horizontal or vertically up. The applicable valve assembly drawings which includes the motor operator, describes the orientation and specifies any mounting restrictions that apply to that valve and motor operator assembly. In all cases, the qualification testing described herein is applicable for all these valve and motor operator assemblies. Applicability on a per plant basis will be established with an auditable link document. 4 3

Deviations from the above described test position may necessitate an evaluation on a case by case basis by Westinghouse. Bolt sizes and torquing are in accordance with the applicable valve maintenance manual/drawing.

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. 4

The Limitorque recommended Lubrication and Inspection Procedure & Data (LC-8) is included an Attachment 3 of Reference 2. Supplementary information is included in the Limitorque Standard Maintenance and Instruction Manual for each model type of the generic families qualified.

1.5 Design Life: 40 years

1.6 Operating Cycles (Expected number of cycles during design life, including test): 2000 cycles

2.7 Measured Variables

This section identifies the parameters required to be measured during the test sequence(s).

		Required	Not Required
2.7.1	Category I - Environment		
2.7.1.1	Temperature	B	A,C,D
2.7.1.2	Pressure		A,B,C,D
2.7.1.3	Moisture		A,B,C,D
2.7.1.4	Composition		A,B,C,D
2.7.1.5	Seismic Acceleration	C	A,B,D
2.7.1.6	Time	A,B,C,D	
2.7.2	Category II - Input Electrical Characteristics		
2.7.2.1	Voltage	A,B,C	D
2.7.2.2	Current	A,B,C	D
2.7.2.3	Frequency		A,B,C,D
2.7.2.4	Power	A,B,C	D
2.7.2.5	Other		A,B,C,D
2.7.3	Category III - Fluid Characteristics		
2.7.3.1	Chemical Composition		A,B,C,D
2.7.3.2	Flow Rate		A,B,C,D
2.7.3.3	Spray		A,B,C,D
2.7.3.4	Temperature		A,B,C,D
2.7.4	Category IV - Radiological Features		
2.7.4.1	Energy Type	D	A,B,C
2.7.4.2	Energy Level	D	A,B,C
2.7.4.3	Dose Rate	D	A,B,C
2.7.4.4	Integrated Dose	D	A,B,C

4

			Required	Not Required
2.7.5	Category V - Electrical Characteristics			
	2.7.5.1	Insulation Resistance	A,C	B,D
	2.7.5.2	Output Voltage		A,B,C,D
	2.7.5.3	Output Current		A,B,C,D
	2.7.5.4	Output Power		A,B,C,D
	2.7.5.5	Response Time		A,B,C,D
	2.7.5.6	Frequency Characteristics		A,B,C,D
	2.7.5.7	Simulated Load	A,B,C	D
2.7.6	Category VI - Mechanical Characteristics			
	2.7.6.1	Thrust	A,B,C	D
	2.7.6.2	Torque	A,B,C	D
	2.7.6.3	Time	A,B,C	D
	2.7.6.4	Load Profile	A,B,C	D
2.7.7	Category VII - Auxiliary Equipment			

A. Performance Test
B. Environmental Aging Test
C. Vibration - Seismic Test
D. Radiation Test

2.8 Test Sequence Preferred

This section identifies the preferred test sequences as specified in IEEE-323-74

2.8.1 Inspection of Test Item
2.8.2 Operation (Normal Condition)
2.8.3 Operation (Performance Specifications Extremes, Section 1)
2.8.4 Simulated Aging
2.8.5 Vibration
2.8.6 Disassembly and Inspection

4

2.9 Test Sequence Actual

The sample operators were type tested in accordance with the sequence identified in Section 2.8.

2.10 Type Test Data

2.10.1 Objective

The objective of this test program is to demonstrate, employing the recommended practices of Reg. Guide 1.89 (IEEE-323-1974), Reg. Guide 1.100 (IEEE 344-1975) and Reg. Guide 1.73 (IEEE 382-1972), the capability of the Limitorque Electric Motor Operators to complete their safety-related function(s) described in EQDP Section 1.7 while exposed to the applicable environments defined in EQDP Section 1.8.

2.10.2 Equipment Tested

4 Sample components from the generic group were identified and type tested. The generic components consist of the basic gear box design but with motors from different manufacturers. Manufacturing processes, production tests and material of construction for the generic components are monitored and controlled and a quality release provided.

2.10.3 Test Summary

2.10.3.1 The generic components were performance tested to establish the base-line that each unit is to meet.

2.10.3.2 Two generic components were selected and type tested for the entire sequence of tests identified in Section 2.8

2.10.3.3 Both generic components were thermally aged in an oven for a time period and at an elevated temperature equivalent to a qualified life of 40 years. The Limitorque Electric Motor Operators were cycled at least ten percent of mechanical life during aging.

TABLE 1

ACTUAL QUALIFICATION TEST CONDITIONS

EQUIPMENT (1) SYSTEM/CATEGORY	LOCATION STRUCTURAL/AREA	MANUFACTURER TYPE/MODEL	ABNORMAL/ACCIDENT ENVIRONMENTAL EXTREMES PARAMETER	SPECIFIED (2)	QUALIFIED	OPERABILITY REQ	OPERABILITY DEM	ACCURACY(%) REQ	ACCURACY(%) DEM	QUAL LIFE	QUAL METHOD	QUAL REF	QUAL PROGRAM STATUS
Valve motor operators/ CVCS, SIS, CCS/ Category d	Miscellaneous outside containment	Limitorque SMB-000-2 through SMB-5-500 and SB-000-2 through SB-3-175 SBD-0015 SBD-3-150	Temperature		130°F	1 yr. Post LOCA	1 yr Post LOCA	N/A	N/A	40 yrs.	Seq. Test	HE-4	Completed
			Pressure		Atmos.								
			Rel. humidity		95%								
			Radiation		$4 \times 10^6 R(\gamma)$								
			Chemistry		None								

NOTES:

1. For definition of the category letters, refer to NUREG 0588 "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment", Appendix E, Section 2.

2. Plant specific environmental parameters are to be inserted by the applicant.