SHOREHAM NUCLEAR POWER STATION UNIT 1

SEISMIC QUALIFICATION REEVALUATION

CLASS 1E EQUIPMENT

COMPONENT NAME: DIFFERENTIAL PRESSURE TRANSMITTER

PPD. NO.: 145C3240; 163C1558, 1560, 1561, 1563, 1564

MPL REFERENCE: C41-N004, C61-N001, E11-N007AB, N013; E32-N055, N056, N059; G33-N041

THE SEISMIC QUALIFICATION REPORT(S) IDENTIFIED HEREIN HAVE BEEN EVALUATED AND REQUALIFIED WHERE NECESSARY TO SHOW THAT THE ABOVE-MENTIONED COMPONENT IS CAPABLE OF MEETING THE NUCLEAR REGULATORY COMMISSION SEISMIC QUALIFICATION REVIEW TEAM (SQRT) REQUIREMENTS.

PREPARED BY: W.C. SHERBIN W C Sherbin DATE 1/12/83

ORGANIZATION: GENERAL ELECTRIC CO., CONTROL ROOM DESIGN ENGINEERING

REVIEWED BY: R.W.HARDY R W Hardy DATE 2/8/83
SQRT PROGRAM MANAGER

APPROVED BY: N.LURIA, N Luria DATE 1/12/83
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GENERAL ELECTRIC

11951-3

QUALIFICATION SUMMARY

1. Component Name: DIFFERENTIAL PRESSURE TRANSMITTER

2. MPL or EDL Item No.: C41-N004, C61-N001, E11-N007AB, N013, E32-N055, N056, N059, G33-N041 (GE Identification Numbers; 163C1558, 163C1560, 163C1561, 163C1563, 163C1564 & 145C3240)

3. Qualification Documentation

A. Qualification summary of equipment (SQRT form) including required response spectra.

Attached

B. Reference Documents

Reference Number	Document Identification	Revision or Date	Title/Subject
1.	GE DRF A00-1084-101	1981	Seismic Test of Rosemount 1151.
2.	S&W J.O. No. 11600.02 File No. 9.26J, GEA-2975	12/13/82	Required Accelerations for Stand Mounted Equipment, SNPS-1
3.	GE DRF A00-794-10	1980	Seismic Test of Generic H22 Local Panels.

C. Additional Supporting Documents

1. As - Built Reviews of Equipment
2. Shipping Group MPL References

4. Requirements

This device is required to maintain its structual integrity and operate when subjected to the seismic and hydrodynamic loads as specified in reference 2 and shown on each Shipping Group MPL Reference Sheet.

5. Demonstrated Capability

1. Single axis, single frequency vibration tests with a frequency scan of 4 to 70 hertz and a 2g input were run in all three axes. Output voltage was monitored during each 30 minute test. Resonant dwells of 30 seconds each were held at the resonant frequencies. Thoughout each test the output was continuously monitored on a strip chart recorder. Output voltage showed no deviation. See A00-1084-101, K for a detailed description of the test.

2. Another single axis, single frequency test sequence in three axes was performed from 1 to 30 hertz with a 3g input. The cycling time was 30 minutes per axis, and 30 seconds of dwell at each resonant frequency was performed. There were no electrical shifts observed or mechanical failures noted. See A00-1084-101, L for test details.

3. A multi-axis, multi-frequency vibration test was conducted as shown in reference 3. The test input ZPA was 7.0g's over a frequency range of 1 to 260 hz. Although the device was mounted on a local rack, the test indicates that the unit can operate satisfactorily during a multi-frequency, multi-axis seismic test.

6. Rationale for Qualification

Since the maximum expected acceleration for this device at the Shoreham site is less than the tested capability of 2g's over the 70 hertz range, the device is qualified to SQRT criteria. The dual axis test noted in Reference 3 further supports the qualification for mult-axis affects.

Qualification Summary of Equipment

145C3240, 163C1558, 163C1560, 163C1561, 163C1563 163C1564
(GE PPD Number)

I. Plant Name: Shoreham Type:

1. Utility: Long Island Lighting Co. PWR _____

2. NSSS: GE 3. A/E: Stone & Webster BWR- 4 Mk II

II. Component Name Differential Pressure Transmitter

1. Scope: [X] NSSS [ ] BOP

2. Model Number: Rosemount 1151 Quantity:

145C3240;1
163C1558;1
163C1560;3
163C1561;1
163C1563;1
163C1564;1

3. Vendor: Rosemount

4. If the component is a cabinet or panel, name and model No. of the devices included: N/A

5. Physical Description a. Appearance Electronics housing attached to pressure sensor.

b. Dimensions 4.5" diameter x 9" high

c. Weight Approx. 11 LB

6. Location: Building: See attached "As Built Review of Equipment", line III.1.

Elevation: See attached "As Built Review of Equipment", line III.1.

7. Field Mounting Conditions [ ] Bolt (No. ____, Size ____)
[ ] Weld (Length ____)
[x] See attached "As Built Review of Equipment", line III.3.

8. a. System in which located: See device list for system in which each device is located.

b. Functional Description: Instruments perform 1E function in the system indicated on device lists

c. Is the equipment required for [ ] Hot Standby [ ] Cold Shutdown
See Table 2, Appendix
[ ] Both [ ] Neither

9. Pertinent Reference Design Specifications: PPD # 145C3240, 163C1558 163C1560, 163C1561, 163C1563 163C15654.

NOTE: 163C1558, 163C1560, 163C1561, 163C1563, and 163C1564 are qualified by similarity to the tested 145C3240..

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III. Is Equipment Available for Inspection in the Plant: [x] Yes [ ] No

IV. Equipment Qualification Method:

[x] Test [ ] Analysis [ ] Combination of Test and Analysis

Qualification Report*: GE DRF A00-1084-101,K

(No., Title and Date) Seismic Test of Rosemount Model 1151, 9/11/72

Company that Prepared Report: Rosemount

Company that Reviewed Report: GE

V. Vibration Input:

1. Loads considered: a. [ ] Seismic only

b. [ ] Hydrodynamic only

c. [x] Combination of (a) and (b)

2. Method of Combining RRS: [ ] Absolute Sum [x] SRSS [ ] _____ (other, specify)

3. Required Response Spectra (attach the graphs): See Figure 1, Appendix

4. Damping Corresponding to RRS: OBE N/A SSE 4%

5. Required Acceleration in Each Direction: [ ] ZPA [x] Other At location (specify)

OBE	S/S =	N/A	F/B =	N/A	V =	N/A
SSE	S/S =	**	F/B =	**	V =	**

6. Were fatigue effects or other vibration loads considered?

[ ] Yes [x] No

If yes, describe loads considered and how they were treated in overall qualification program: N/A

*NOTE: If more than one report complete items IV thru VII for each report.

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**See device list for individual component required accelerations. Required accelerations were provided by Stone and Webster. [Reference: Stone and Webster J.O. No. 11600.02, File No. 9.26J, GEA-2975 dated 12/13/82.

VI. If Qualification by Test, then Complete*:

1. [X] Single Frequency [ ] Multi-Frequency
   [ ] random
   [ ] sine beat
   [x] resonance search

2. [X] Single Axis [ ] Multi-Axis

3. No. of Qualification Tests: OBE N/A SSE N/A Other (specify) Resonance search (2g, 4-70 hz) and malfunction limit test (3g, 1-30 Hz). Device was subjected to 5 OBE's and 1 SSE while mounted on a GE local rack. See A00-794-10.

4. Frequency Range: 4-70 Hz

5. Natural Frequencies in Each Direction (Side/Side, Front/Back, Vertical):

   S/S = 62 Hz F/B = 7 (minor),50,68, Hz V = 70 Hz

6. Method of Determining Natural Frequencies

   [x] Lab Test [ ] In-Situ Test [ ] Analysis

7. TRS enveloping RRS using Multi-Frequency Test [ ] Yes (Attach TRS & RRS graphs)
   2 g. accel is greater than the ZPA of the RRS [x] No

8. Input g-level Test: OBE S/S = N/A F/B = N/A V = N/A

   SSE S/S = N/A F/B = N/A V = N/A
   OTHER(specify) S/S = 2 g 's F/B = 2 g's V = 2 g's
   Also an input of 3 g's @ 1-30 Hz was applied during a subsequent test see GE DRF A00-1084-101 for 2g and 3g tests.

9. Laboratory Mounting:

   1. [ ] Bolt (No. _____, Size _____) [ ] Weld (Length _____) [ ]
   Transmitter was mounted to a pipe which was clamped to the table (resonance test)

   Transmitter was mounted on a local rack for OBE and SSE test.

10. Functional operability verified: [x] Yes [ ] No [ ] Not Applicable

11. Test Results including modifications made: Test results were satisfactory.

12. Other test performed (such as aging or fragility test, including results):

    N/A

*Note: If qualification by a combination of test and analysis also complete Item VII.

VII. If Qualification by Analysis, then complete:

1. Method of Analysis:

[ ] Static Analysis [ ] Equivalent Static Analysis

[ ] Dynamic Analysis: [ ] Time-History [ ] Response Spectrum

2. Natural Frequencies in Each Direction (Side/Side, Front/Back, Vertical):

S/S = _____ F/B = _____ V = _____

3. Model Type: [ ] 3D [ ] 2D [ ] 1D

[ ] Finite Element [ ] Beam [ ] Closed Form Solution

4. [ ] Computer Codes: _____

Frequency Range and No. of modes considered: _____

[ ] Hand Calculations

5. Method of Combining Dynamic Responses: [ ] Absolute Sum [ ] SRSS
[ ] Other: _____
(specify)

6. Damping: OBE _____ SSE _____ Basis for the damping used: _____

7. Support Considerations in the model: _____

8. Critical Structural Elements:

A. Identification	Location	Governing Load or Reponse Combination	Seismic Stress	Total Stress	Stress Allowable

B. Max. Critical Deflection _____ Location _____ Maximum Allowable Deflection to Assure Functional Operability _____

TABLE 1 (CONT'D)

SHOREHAM SHIP LOOSE

SQRT MPL WORK SHEET

MPL NUMBER	NOTE	EQUIPMENT IDENTIFICATION	EQUIPMENT NAME	SHIP GROUP MPL	(5) E C	ACCELERATION (g's) EXPECTED HORIZ.	EXPECTED VERT.	CAPABILITY HORIZ.	CAPABILITY VERT.
E41 R002		169C8974P03051	TEMPERATURE INDICATOR	E41-5110	B	1.0	1.0	30.0	30.0
E51 N010	(1)	159C4361P006	LEVEL SWITCH	E51-5110	B	2.1	2.3	4.6	3.6
E51 N011 AB		145C3224P001	TEMPERATURE ELEMENT	E51-5110	A	1.0	1.0	3.0	3.0
E51 N022 AB		145C3224P001	TEMPERATURE ELEMENT	E51-5110	A	1.0	1.0	3.0	3.0
E51 N023 AB		145C3224P001	TEMPERATURE ELEMENT	E51-5110	A	1.0	1.0	3.0	3.0
E51 N025 AD		145C3224P001	TEMPERATURE ELEMENT	E51-5110	A	1.0	1.0	3.0	3.0
E51 N026 AD		145C3224P001	TEMPERATURE ELEMENT	E51-5110	A	1.0	1.0	3.0	3.0
E51 R005		145C3103P003	THERMOMETER	E51-5110	B	1.0	1.0	30.0	30.0
E51A-C01	(4)	209A6156P008	CAPACITOR	E51-5110	A				
G33 N011	(2)	169C8733P012	ORIFICE FLANGE	G33-5110	B				
G33 N011 001	(2)	145C3227P004	PLATE,ORIFICE	G33-5110	B				
G33 N016 AF		145C3224P001	TEMPERATURE ELEMENT	G33-5110	A	1.0	1.0	3.0	3.0
G33 N035	(2)	169C8733P011	ORIFICE FLANGE	G33-5110	B				
G33 N035 001	(2)	145C3227P005	PLATE,ORIFICE	G33-5110	B				
G33 N040	(2)	169C8733P011	ORIFICE FLANGE	G33-5110	B				
G33 N040 001	(2)	145C3227P006	PLATE,ORIFICE	G33-5110	B				
G33 N041		145C3240P006	DIFF PRESS TRANSMITTER	G33-5110	A	1.0	1.0	2.0	2.0
G33 N042		117C3485P083	TEMPERATURE ELEMENT	B21-5120	B	4.7	3.0	30.0	30.0
C11 N013 AD	(1)	159C4361P004	LEVEL SWITCH	C11-5110	A	2.1	2.3	4.6	3.6
C11 N013 EF	(1)	159C4361P005	LEVEL SWITCH	C11-5110	A	2.1	2.3	4.6	3.6
C11 N013 GH	(1)	159C4361P006	LEVEL SWITCH	C11-5110	A	2.1	2.3	4.6	3.6
E32 N055		163C1564P611203	TRANSMITTER, GAGE PRESS	E32-5110	A	1.0	1.0	2.0	2.0
E32 N056		163C1558P511203	TRANSMITTER, ABS PRESS	E32-5110	A	1.0	1.0	2.0	2.0
E32 N059		163C1561P411203	TRANSMITTER, DIFF PRESS	E32-5110	A	1.0	1.0	2.0	2.0

NOTES:

(1) QUALIFICATION LEVELS FOR LEVEL SWITCHES 159C4361 AND 159C4294 ARE BASED ON 130 ms CONTACT CHANGE OF STATE.

(2) ORIFICE FLANGE 169C8733 AND ORIFICE PLATE 145C3227 STRESS ANALYSES TRANSMITTED TO LILCO. SQRT EVALUATION AND DOCUMENTATION PERFORMED BY STONE & WEBSTER.

(3) PRESSURE SWITCH 164C5359 IS USED AS A SPARE IN SHIPPING GROUP B21-5110.

(4) BEING DELETED.

(5) A = ACTIVE ESSENTIAL, B = PASSIVE ESSENTIAL

DATE 07/31/82