LILCO
LONG ISLAND LIGHTING

LONG ISLAND LIGHTING COMPANY
SHOREHAM NUCLEAR POWER STATION
P.O. BOX 618, NORTH COUNTRY ROAD • WADING RIVER, N.Y. 11792

November 23, 1982 SNRC-796

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Safety Evaluation Report Issue No. 8
Dynamic Qualification
Shoreham Nuclear Power Station - Unit 1
Docket No. 50-322

Reference: (1) Letter NRC (A. Schwencer) to LILCO (M. S. Pollock) dated 11/10/82

Dear Mr. Denton:

In response to the reference (1) letter, enclosed please find ten (10) copies of Long Island Lighting Company's response to the concerns generated by the Seismic Qualification Review Team as a result of their plant site audit held from August 31 - September 3, 1982. This information is being submitted in order to facilitate the NRC staff's review and closeout of this SER item. Each concern is addressed separately with the concern restated and the response following. Any responses which require additional documentation have this listed as an attachment.

In accordance with R. L. Tedesco's letter to LILCO, dated January 28, 1981, four copies of this submittal are being forwarded directly to Dr. Morris Reich at Brookhaven National Laboratory. As stated in the Reference 1 letter a response to the audit trip open items was anticipated to be made by LILCO within two weeks after receipt of Reference 1.

In view of this timely response, LILCO requests that the NRC staff review the enclosed information in a manner so as to facilitate final resolution of this SER item.

Very truly yours,

J. L. Smith

J. L. Smith
Manager, Special Projects

WVB:mp

Enclosure

cc: J. Higgins
All parties
Dr. M. Reich (4)

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GENERIC ITEMS

1. Qualification documentation needs to be improved in the following areas:

   a. A "road map" should be provided to define the qualification process for BOP equipment.

   b. Complete test reports should be included in BOP SQRT package.

   c. Single spectra included in SQRT package should be identifed as limiting (worst case) spectra.

RESPONSE

   a. A summary report will be provided which will define the scope of the dynamic qualification program for BOP equipment. The report will describe the basis for including equipment in the program and the specific methodology applied for qualification of equipment. This report will be provided 30 days prior to fuel load.

   b. The vendor supplies qualification documents which normally include complete test reports which are included in the SQRT packages. In a few cases vendors may not have supplied a complete test report as part of their qualification documentation, e.g., for specific items 480V Emergency Switchgear Bus 112 and 480V Motor Control Centers 1R24*MCC1120, in the NRC audit report. In these cases, complete test reports will be requested from the vendor. If the vendor holds them proprietary, LILCO will take action similar to specific items 3 and 4. This effort will be completed by June, 1983.

   c. The single spectra included in the SQRT packages will be identified as limiting (worst case) spectra by fuel load.

2. The latest confirmatory load spectra should be included in all SQRT packages by the end of March 1983.

RESPONSE

The latest confirmatory load spectra will be included in all SQRT packages for floor-mounted equipment by the end of March 1983. Clarification will be provided to the extent necessary to relate confirmatory load spectra to the qualification basis.

All replacement equipment (not in-kind) will be qualified to the confirmatory load spectra.

3. The latest confirmatory loads should be considered for the qualification of pipe mounted equipment, i.e., valves.

   Phase I - Prior to fuel load

   a. Provide verbal description of 30 piping subsystems already analyzed.

   b. Provide a list of pipe mounted equipment by Shoreham valve Mark Nos. in these subsystems.

   c. Demonstrate qualification to confirmatory load values for the valves listed.

   Phase II - Prior to operation above 5% power

   a. Identify all associated pipe mounted equipment for approximately 70 additional piping subsystems.

   b. Assess existing margin of safety for accommodating the upper bound of any load increase that could result from the confirmatory loads.

   c. Where adequate margins of safety are not evident, perform analysis to demonstrate equipment qualification utilizing confirmatory loads.

RESPONSE

LILCO has proposed the following program to evaluate the effect of the hydrodynamic LOCA loads discussed in NUREG 0808 on pipe mounted equipment:

Phase I

In the Shoreham Design Assessment Report (DAR), Rev. 5, Appendix L, LILCO has stated that a representative cross-section of primary and secondary piping was evaluated to the NUREG 0808 Confirmatory Load Definition. This cross-section consisted of thirty (30) piping subsystems (twenty-five (25) of which are attached to the primary containment at locations of high amplitude response spectra). Attachment 1 is a listing of all the pipe mounted equipment on these thirty (30) piping subsystems by Shoreham Mark Number. LILCO has agreed to provide the SQRT qualification level and calculated acceleration for each item based on the NUREG 0808 Confirmatory Load Definition. Should any equipment acceleration levels be found to be above the present qualification levels, computer reanalysis of these pieces of equipment will be performed again, utilizing the NUREG 0808 Confirmatory Load Definition but eliminating simplifying assumptions that have been employed. This approach has been described in SNRC-755, dated 8/20/82 from J. L. Smith to H. R. Denton, and agreed to by the NRC Mechanical Engineering Branch. This analysis will be completed prior to fuel load.

Phase II

In SNRC-755, referenced above, LILCO committed to perform a one-hundred (100) percent reevaluation to the final Mark II long term program load definition (NUREG 0808) of the piping attached to the primary containment at the three (3) additional locations of concern, i.e., 21 ft., 83 ft., and 106 ft. This reevaluation work is considered confirmatory and not required for fuel load and low power testing. During the SQRT audit from August 31 to September 3, 1982, LILCO also committed to the NRC SQRT evaluation team to identify all pipe mounted equipment on these additional piping systems (approximately 70 piping subsystems) and to evaluate that the existing margins of safety are sufficient to accommodate the upper bound of any load increase that could result from the confirmatory NUREG 0808 load definitions. For the set of equipment where adequate margins of safety are not evident, requalification will be performed utilizing the NUREG 0808 Confirmatory Load Definition. This approach is similar to the agreement reached with the NRC Mechanical Engineering Branch for these same additional piping systems. This analysis will be completed prior to exceeding five (5) percent power operation.

4. Commit to establish a maintenance and surveillance program to maintain equipment in qualification status throughout the plant life prior to fuel load.

   Response

   The Shoreham Nuclear Power Station has a surveillance and maintenance program which includes documented program plans, procedures, and results to ensure that the safety-related equipment identified in the dynamic qualification program is maintained in a state of readiness and operability so that it will perform its intended safety functions properly during and after the excitation imposed by the SSE or hydrodynamic loads associated with suppression pool discharges or a combination of the two. The Shoreham surveillance and maintenance program includes information supplied by equipment manufacturers and vendors regarding required equipment maintenance actions and their frequency. The Shoreham dynamic qualification program has not imposed any additional surveillance and maintenance requirements on the equipment included in the program as a result of qualification. However, if any specific requirements were generated they would be incorporated into the existing surveillance and maintenance program.

5. Provide monthly status of equipment summary list and provide justification for the equipment which will be qualified after fuel load.

   Response

   The latest equipment summary lists including BOP and NSSS equipment is provided in Attachment 2. This list will be updated and provided on a monthly basis.

Justification for interim operation for the equipment which will be qualified after fuel load will be provided before the end of December, 1982.

6. NSSS qualification documentation file should be located in Shoreham plant file system by June 1, 1983.

Response

At present, LILCO has on file at the Shoreham site NSSS Dynamic Qualification Summaries for the equipment qualified under the NSSS scope of supply. The summaries provide the requirements, demonstrate equipment capability and provide a rationale for qualification certification along with the Qualification Summary of Equipment (SQRT) forms. However, in order to comply with this NRC concern, LILCO is generating the necessary purchase order agreement to obtain the backup qualification documentation. The detailed NSSS backup qualification documentation will be located in the SQRT documentation packages at the Shoreham site by June, 1983.

7. To satisfy requirements of IEEE 323-1974, provide a written statement that margin to cover uncertainty in manufacturing and test exist for equipment qualified by test.

Response

IEEE Standard 323-1974 states in section 6.3 that for vibration, a margin requirement should be included to account for variations in equipment and reasonable errors in defining satisfactory performance. This standard has been endorsed by the NRC in Regulatory Guide 1.89, "Qualification of Class 1E Equipment for Nuclear Power Plants", dated November 1974. The Shoreham FSAR in Appendix 3B states that Regulatory Guide 1.89 is not applicable to Shoreham since the Shoreham SER (dated February 20, 1970) preceded the implementation date given in Section D of Regulatory Guide 1.89. The FSAR Appendix section goes on to state that an attempt would be made to procure equipment to the standard referenced in RG 1.89. The Shoreham FSAR cites IEEE Standard 323-1971 as the applicable standard for equipment qualification for Shoreham. LILCO feels that conformance to IEEE 323-1971 in addition to the TRS enveloping the RRS and the inherent conservatism used in developing the RRS provides the adequate margin to cover uncertainty in manufacturing and errors for equipment qualified by test.

8. Cycling effects of hydrodynamic load should be addressed prior to fuel load, based on worst case consideration.

   a. For equipment qualified by analysis, cumulative fatigue usage factor should be demonstrated to be less than one. The SQRT may decide to review the adequacy of the analytical model used.

   b. For equipment qualified by testing, the number of equivalent SRV cycle should be adequately defined.

Response

a. For BOP equipment qualified by analysis, a survey will be conducted to identify the most highly stressed equipment in several categories, i.e., pumps, valves, heat exchangers and tanks. Peak stress will be determined by applying a stress intensification factor applicable to the configuration. Cumulative fatigue usage factors will then be determined for each equipment category.

   Vibration fatigue cycle effects for NSSS equipment designed to ASME code requirements was reviewed at GE by NRC consultants from Battelle Pacific Northwest Laboratories on October 7, 1980. The consultants stated satisfaction with the GE approach which encompasses OBE, SRV, thermal and pressure cycles.

   Non-ASME code components qualified by analysis have not been required to address vibration cycle effects. An overall review of non-ASME code components showed that the effect of SRV cycling fatigue did not require further additional analysis.

b. For equipment qualified by testing, the number of equivalent SRV cycles has been defined in the Design Assessment Report, Revision 5, pages 9-11 and 9-12.

9. Provide information of any field modification made to the already qualified and installed equipment prior to fuel load.

Response

Attachment 3 is the current status of field modifications to safety related BOP equipment since September 2, 1982.

As of November 12, 1982, GE records do not indicate any field changes being made to NSSS equipment since September 2, 1982 which would affect seismic qualification as documented in GE SQRT reports.

A revised list of BOP and NSSS equipment will be provided prior to fuel load.

EQUIPMENT SPECIFIC ITEMS

1. Unit Cooler - 1T46*UC-022
   Package No. SH1-276-5

   A static deflection analysis was provided for the fan only. A clearance of .051" was noted between the fan and housing. Provide upgraded calculations to also include the deflection of the housing.

RESPONSE

An analysis of the fan housing has demonstrated a maximum displacement of approximately 0.001 inches. The vendor qualification report provides a maximums static deflection of 0.00306 inches for the fan. A combined maximum displacement of 0.00406 inches for the fan and housing is well within the available clearance of 0.051 inches.

Attachment 4 is a copy of calculation 331-1-CZC which was prepared in response to this request.

2. Permanent Control Rod Storage Rack - 1F16*RAK-23
   Package No. SH1-427-1

   a. The qualification loads report was not available in the SQRT file. Need clarification

   b. Provide evidence of verification for the non-linear analysis code used.

   c. Loads were not properly defined (i.e., a time history was used, but there was no description of what it represented). Provide clarification.

RESPONSE

   a. The qualification loads report is now available in the SQRT file at the site.

   b. Verification of the non-linear code (RACKOE) used by the vendor to calculate rack loads was conducted by showing that the ANSYS code yields similar results for a test problem. Documentation is provided in Appendix E of the Seismic Analysis Report (Attachment 5) and is now included in the SQRT file at the site.

   c. The racks were subjected to horizontal time histories associated with SSE, SRV and LOCA. It was found that SSE was the dominant source of rack loads appearing at the corners where they are attached to the floor embedments. Other loads were insignificant contributors. This is addressed in Appendix A, Section 125F21 of the vendor's loads report.

3. 480 V Emergency Switchgear Bus 112
Package No. SH1-95-1

a. The qualification report should be completed so that it includes a table of contents and sequentially numbered pages.

b. The test reports from test labs should be reviewed as part of the qualification documentation package.

RESPONSE

a. The pages have now been sequentially numbered and a table of contents included. It has been verified with the vendor that the qualification report is complete as filed.

b. The vendor's test report had been reviewed in its entirety prior to acceptance. It will be reviewed again for the purpose of identifying the substance of the test conducted. For example, any test anomalies that may have occurred will be documented and included in the SQRT package on file at the site.

4. 480 V Motor Control Centers - 1R24*MCC 1120
Package No. SH1-115-1

a. Provide resolution to the concern regarding clearance problems between motor control centers MCC1133 and MCC1125, and battery chargers BC-01 and BC-B1 respectively.

b. The test reports from the test labs should be reviewed as part of the qualification package.

RESPONSE

a. Review has indicated that the clearance between Motor Control Centers 1125 and 1133 and the battery chargers is not sufficiently large to assure that these cabinets will not impact during a dynamic event. Accordingly, these cabinets will be rigidly tied to the respective battery chargers and implementation will be complete prior to fuel load.

Tying the battery chargers to the MCCs increases the fundamental horizontal frequency of the MCC above the peak frequency of the Control Building spectra, thus reducing the seismic loading. Therefore, the seismic qualification of the MCCs is not affected.

b. As in the case of 3(b) above, the entire vendor's test report will be reviewed again and anomalies and basis of disposition will be included in the SQRT package on file at the site.

5. Service Water Pumps - 1P41*P-003
Package No. SH1-51-1

a. Provide information regarding the analysis to determine the pump's lowest natural frequency with consideration of the fluid mass.

b. The analysis indicates that fundamental mode natural frequency is less than the pump rotary speed of 30 cps. Provide assurance that no potential problem will arise if the frequencies of high modes are also within the pump speed.

c. Provide justification of decoupling x and y dynamic - degree-of-freedom in the frequency calculations.

RESPONSE

a. The vendor qualification report indicated that the lowest natural frequency of the pump assembly is 22.286 Hz and included fluid mass effects at the pump bowl assembly. A review of the applicable seismic Amplified Response Spectra for this pump assembly indicates rigid range response applies above 10Hz in the horizontal direction and above 12 Hz in the vertical direction. It is concluded that the results of analysis of the pump assembly, including the effects of fluid mass, are representative and acceptably qualify the assembly for seismic response effects.

b. The minimum pump assembly natural frequency (22.286 Hz) is about 14% above the pump rotary speed of 1170 RPM (19.5 Hz). Therefore, there are no natural frequencies of the pump assembly within the operating speed range and the assembly can, therefore, be considered rigid for operating purposes, as well as for seismic considerations as explained previously. Also, these pumps have been operated successfully, confirming that no resonances are excited.

c. An independent multi-degree of freedom dynamic frequency analysis of the pump assembly for a coupled x and y dynamic model has confirmed the natural frequencies of the pump assembly provided by the vendor in his qualification report. Review of the independent analysis results also verifies the original choice of decoupling the x and y dynamic models of the pump assembly.

6. Main Steam Isolation Valve - 1B21*AOV-081

a. Provide justification that the rapid closure of the valve which is not accounted for in qualification has negligible effects on the operability of the MSIV.

b. Assure proper surveillance to insure adequate columns lubrication.

RESPONSE

a. Stress Report 22A6416, (Revision 0, pages 1-4, 7-8, 143-150) provided in Attachment 6 shows all the load combinations considered in the evaluation. The MSIV does not close any faster during the dynamic event as compared to the normal situation. The closure time is controlled by a self-adjusting hydraulic control valve. The effect of the dynamic response of the extended mass of the MSIV actuator was analyzed as part of the piping analysis. The calculated forces and moments were than compared to the allowable and documented in Stress Report 22A6416, Revision 0. Further, to assure each MSIV can withstand rapid closure, each MSIV was tested as part of the production testing sequence.

   The stress in the MSIV seating area is not significantly affected by dynamic loadings. Attachment 7 shows the stress variation at the valve ends. At the seating area, the stress is even lower due to heavier wall thickness.

   The MSIV is routinely stroke for checkout in order to assure the effects of closure have not overstressed the MSIV seating area. The effects of closure are determined by a leak test.

   The impact force for MSIV closure under faulted conditions, with steam helping to close this valve, is not any greater than for the routine checkouts stated above. This is so because the stem and disc motions are controlled by a set of flow control valves and a hydraulic damper. Any excess closing force due to dynamic loads is absorbed by the hydraulic damper.

   The stress at the disc has been analyzed and found to have a maximum stress of 14,550 psi vs. an allowable stress of 19,900 psi @ 575°F.

   Based on the above, so-called "rapid closure" of the valve has a negligible effect on operability.

b. GE does not believe special lubrication of the columns, over and above that recommended in the vendor's maintenance manual is required. This position is based on the fact that this MSIV actuator always closed properly during the seismic test, even though it exhibited some hesitation on opening. Closure of the MSIV is the safety mode, and is aided by the springs designed into the actuator. Opening of the MSIV occurs against the spring force, and accounts for the different behavior in closing vs. opening. Stroking behavior of the MSIV is routinely checked to verify proper operation of the valve.

7. RCIC Turbine - 1E51*TU-005

   a. The turbine in the plant (GS-1) is not the same as the one in the test report (GS-2). Establish dynamic similarity.

   b. Since the qualification is dependent on some modifications, report to the NRC when implementation of the modifications is completed.

RESPONSE

   a. Attachment 8 provides the General Electric memo which establishes dynamic similarity between the tested and installed turbines.

   b. Attachment 8 provides three Field Disposition Instructions (FDIs) which outlines the modifications required on the Shoreham turbine. These FDIs are scheduled for completion prior to fuel load and LILCO believes that these modifications will provide similarity between the tested and the in-plant turbine. Upon completion, the NRC will be notified.

8. Pressure Transmitter - 1C41*PT-002

   a. Field mounting configuration is different than that in the test. Provide assurance that the resulting response spectrum at the equipment mounting location would envelope the required response spectrum at the mounting location in the field.

   b. Documentation that justifies the similarity of the untested models to the tested units should be included in the overall qualification documentation package.

RESPONSE

   a. Attachment 9 provides additional test data which verifies dynamic adequacy of the differential pressure transmitter.

   b. GE PPD numbers 145C3240, 163C1558, 163C1560, 163C1561, 163C1563 and 163C1564 all refer to Rosemount Model 1151 or 1152 differential pressure transmitters. An excerpt from the Rosemount test report 2758 (Attachment 10) states that models 1151 and 1152 are mechanically identical. Differences are due to requirements of material traceability for pressure retaining parts for the 1152 model and the use of non-Teflon wire in the 1152 assembly. Neither of these differences would invalidate the applicability of the test results in the qualification test report to the untested model. Since the 1151 and 1152 models are identical in construction and dimension, LILCO concludes that the 1152 model test results are applicable to the 1151 model. This test report will be included in the SQRT package.

9. 120 Volt Distribution Panel - 1R35*PNL-R2
Package No. SH1-124-1

Field mounting condition is different than that in the test. Provide justification that the qualification is valid from the viewpoint of dynamic similarity.

RESPONSE

The distribution panel was bolted by its four support ears to a fixture mounted to the test table during qualification testing. The fixture consisted of two braced structural members with a full height support plate between them, simulating a typical plant wall. The field mounting of the panel assembly is by bolting through the four support ears to a wall mounted unistrut frame. The natural frequency of the support frame is well above the rigid range of the applicable required response spectra. It is, therefore, concluded that the field installation acceptability simulates the tested condition and will not alter the conclusions of adequacy.

By way of background, the original biaxial multifrequency qualification testing program resulted in test input levels that were generally 60% or more above the required level. The assembly was subsequently fragility tested to even higher levels, which assures the adequacy of these panel assemblies in a very conservative manner.

10. GENERAL

The SQRT disagreed with GE's use of single frequency/single axis testing method to qualify some shipped loose items. The Applicant was requested to provide the description of the items for which this qualification method was used.

RESPONSE

A list of Shoreham equipment qualified by use of single frequency/single axis testing is attached. Those items which are in the category of GE shipped loose items are noted as such. Attachment 11 provides a listing of BOP equipment qualified by this method.

Attachment 12 provides a listing of NSSS equipment qualified by single frequency/single axis testing. The attachment provides the following:

1. C&I devices on Local Panels

See Table 2 from DRF A00.992,
Rev. 1, Local Panels

2. C&I devices on Control Room Panels

See Table 2 from DRF A00-992,
Rev., 1, Control Room Panels

3. C&I Ship Loose Devices

   See table entitled, "Shoreham Ship Loose Devices Qualified by Single Axis/Single Frequency Testing"

   Note that several of the Local Panel and Ship Loose devices are the same device model, as identified by GE PPD Number.

4. Mechanical Equipment

B31-FO31	Limitorque actuator on Recirc Discharge Valve
E32-B001	MSIV LCS Heater

Attachment 1

Generic Item No. 3

Valve Mark No.	Valve Mark No.	Valve Mark No.
1B21*MOV061	1E11*MOV037A	1E32*MOV022D
1B21*MOV062	1E11*MOV037B	1E41*MOV041
1B21*MOV063	1E11*MOV038A	1E41*MOV042
1B21*MOV064	1E11*MOV038B	1E41*MOV047
1B21*MOV068A	1E11*MOV039A	1E41*MOV048
1B21*MOV068B	1E11*MOV039B	1E41*MOV049
1B21*MOV068C	1E11*MOV040A	1E51*MOV031
1B21*MOV068D	1E11*MOV040B	1E51*MOV032
1B21*MOV083	1E11*MOV041A	1E51*MOV041
1B21*MOV084	1E11*MOV042A	1E51*MOV042
1B21*MOV085	1E11*MOV047	1E51*MOV047
1E11*MOV031A	1E11*MOV050	1E51*MOV048
1E11*MOV031C	1E11*MOV053	1P41*MOV033A
1E11*MOV032A	1E11*MOV054	1P41*MOV033B
1E11*MOV032C	1E11*PCV003A	1P41*MOV033C
1E11*MOV033A	1E32*MOV021A	1P41*MOV033D
1E11*MOV034A	1E32*MOV021B	1P41*MOV042A
1E11*MOV035A	1E32*MOV021C	1P41*MOV042B
1E11*MOV036A	1E32*MOV021D	
1E11*MOV036B	1E32*MOV022A	
	1E32*MOV022B	
	1E32*MOV022C	

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JOB [illegible]1600 — 1-SORT — MISCELLANEOUS CATEGORY I EQUIPMENT — RUN TIME 16.14.11
LILCO DOCKET 50-322 — ACTIVE — BOP QUALIFICATION LEVEL (20 ITEMS) — PAGE 1

MARK NUMBER	EQUIPMENT DESCRIPTION	SPEC NO.	DIV. RESP	VENDOR	BLDG ELEV	AVAIL INSP	QUAL REPT	QUAL METH	FREQ	TYPE MTNG	SAFE SHTDN	QUAL STATUS
1C61*PT-011	SVC WTR HDR PRESS	406	CD	ROSEMOUNT	SH	YES	127516	MBT	60+	F	CS,HS	F
1G91*FE-020	DE-004 OUTLET	440	PD	PERMUTIT	RH	YES	N11(B) 220-	SA	100	P	N	F/Z
1P41*HOV031	SERV WATER DIS	197	PD	PRATT	SH020	YES	D-0034-1	SA/SAT	33+	P4	CS,HS	H
1P41*HOV032	SERV WATER HDR IV	197	PD	PRATT	SH033	YES	D-0034-6	SA/SAT	33+	P2	CS,HS	H
1P41*HOV035	T BELOW SUPLY IV	197	PD	PRATT	SH025	YES	D-0034-6	SA/SAT	33+	P2	N	H
1P41*P-003	SERVICE WATER PUMPS	057	PD	BINGHAM-HILL	SH021	YES	230629	SA	28	F4	CS,HS	H
1P41*PNL-FX1	FD AUX RELAY CABINET	125	CD	RELIANCE	SH023	YES	99AX400708	SA/SAT	33+	F	CS,HS	H
1P41*S-001	SERVICE WATER STRAINER	001	PD	RP ADAMS CO	SH026	YES	N07503	DA	17	F4	CS,HS	H
1R24*MCC1110	480 V MOTOR CONT CENTE	115	ED	SQUARE D CO	SH021	YES	100-1.01L2	MBT	8	F	CS,HS	H
1R24*MCC1120	480 V MOTOR CONT CENTE	115	ED	SQUARE D CO	SH021	YES	108-1.01L2	MBT	8	F	CS,HS	H
1R43*P-201	FUEL OIL XFER PU	420	PD	CRANE CO	YD020	YES	HE572	SA	13	F3	CS	H
1R43*P-202	FUEL OIL XFER PU	420	PD	CRANE CO	YD020	YES	HE572	SA	13	F3	CS	H
1R43*RV025	P-202 DISCH	191	CD	LONERGAN	PH024	YES	502644	SA	60	P3		F
1R43*RV026	P-201 DISCH	191	CD	LONERGAN	PH024	YES	502644	SA	60	P3		F
1R43*TK-132	FUEL OIL STORAGE	114	PD	BUFFALO TANK	YD020	YES	N11(B)-22	SA	14	F3	CS	H
1X41*FN-068	SCRIBNELL PURPHSE SUP	270	PD	BUFFALO FORGE	SH034	YES	745-11140	SA	26+	F2	CS,HS	H
1X41*HOD042	FN-68 OUTDOOR AIR	319	CD	POWERS	SH025	YES	44057-1	MBT	21	F2	CS,HS	H
1X41*HOD043	FN-68 EXHAUST AIR	319	CD	POWERS	SH025	YES	44057-1	MBT	21	F2	CS,HS	H
1X41*HOD044	FN-68 RETURN AIR	319	CD	POWERS	SH025	YES	44057-1	MBT	21	F2	CS,HS	H

CS =COLD SHUT DOWN
DA =DYNAMIC ANALYSIS
F =FLOOR MOUNTED
HS =HOT STANDBY
MBT=MULTI-FREQUENCY BIAXIAL TESTING
MST=MULTI-FREQUENCY SINGLE AXIAL TESTING
P =PIPE MOUNTED
PC =PRIMARY CONT.
PL =PEDESTAL
QP = QUALIFIED BY PIPING ANALYSIS
SA =STATIC ANALYSIS
SAT=SINGLE FREQUENCY SINGLE AXIAL TESTING
SBT=SINGLE FREQUENCY BIAXIAL TESTING
SC =SECONDARY CONT.
* =LOCATED ON CONT. WALL
N =NEITHER CS OR HS
Z =PASSIVE ITEM (SORT PAPER NOT REQ'D)

QUALIFICATION MILESTONES
A =REEVALUATION COMPLETE
B =REQUEST FOR QUAL OR BID ISSUED
C =S/H RECOMMENDATION TO LILCO
D =QUAL DOC RECEIVED
E =HARDWARE MODIFICATION REQ'D
F =QUAL DOC APVD & FILED
G =SORT PAPER COMPLETE
H =COPIES OF DOC TO DISTRIBUTION

REVISION 4 -NOVEMBER 1982

NOTE: NUMBER IN 'TYPE MTNG' COLUMN IS QUANTITY OF ITEMS.

Attachment 2
Generic Item No. 5

MARK NUMBER	EQUIPMENT DESCRIPTION	SPEC NO.	DIV. RESP	VENDOR	BLDG ELEV	AVAIL INSP	QUAL REPT	QUAL METH	FREQ	TYPE MTNG	SAFE SHTDN	QUAL STATUS
1X41=TT008	SCRNL PURPHSE TEMP	319	CD	POWERS	SH025	YES	43812-1	HDT	24	F2	N	H

CS =COLD SHUT DOWN
DA =DYNAMIC ANALYSIS
F =FLOOR MOUNTED
HS =HOT STANDBY
MBT=MULTI-FREQUENCY BIAXIAL TESTING
MST=MULTI-FREQUENCY SINGLE AXIAL TESTING

P =PIPE MOUNTED
PC =PRIMARY CONT.
PL =PEDESTAL
QP = QUALIFIED BY PIPING ANALYSIS
SA =STATIC ANALYSIS
SAT=SINGLE FREQUENCY SINGLE AXIAL TESTING

SBT=SINGLE FREQUENCY BIAXIAL TESTING
SC =SECONDARY CONT.
* =LOCATED ON CONT. WALL
N =NEITHER CS OR HS
Z =PASSIVE ITEM (SQRT PAPER NOT REQ'D)

QUALIFICATION MILESTONES
A =REEVALUATION COMPLETE
B =REQUEST FOR QUAL OR BID ISSUED
C =S/H RECOMMENDATION TO LILCO
D =QUAL DOC RECEIVED
E =HARDWARE MODIFICATION REQ'D
F =QUAL DOC APVD & FILED
G =SQRT PAPER COMPLETE
H =COPIES OF DOC TO DISTRIBUTION

REVISION 4 -NOVEMBER 1982

NOTE: NUMBER IN 'TYPE MTNG' COLUMN IS QUANTITY OF ITEMS.

SHOREHA[illegible]
JOB NUMBER [illegible]00
LILCO DOCKET 50-322

RB LIST
3-SORT
ACTIVE

STONE & WEBSTER ENGINEER[illegible]RPORATION
REACTOR BUILDING CATEGORY I FLOOR-MOUNTED EQUIPMENT
BOP QUALIFICATION LEVEL (205 ITEMS)

RUN DATE 11/09/82
RUN TIME 16.15.56
PAGE 1

MARK NUMBER	EQUIPMENT DESCRIPTION	SPEC NO.	DIV. RESP	VENDOR	BLDG ELEV	AVAIL INSP	QUAL REPT	QUAL METH	FREQ	TYPE MTNG	SAFE SHTDN	QUAL STATUS
1G41xP-023	FUEL STORAGE POOL COOL	0620	PD	GOULD PUMP	SC151	YES	ME-325	SA	33	F2	M	H
1P42xP-005	RB CLOSED LOOP COOLING	0620	PD	GOULD PUMP	SC151	YES	ME-354	SA	60	F3	HS	H
1T23xTL-002	PRIMARY CONT LINER	075	SD	PDM	PC008	YES	NS(B) - EA56	SA	3	F	M	F/Z
1T46xFN-079	RB EXH BOOSTER FAN	102	PD	BUFFALO FORGE	SC133	YES	795-4249C	SA	51	F2	CS,HS	H
1T46xFLT-01	RBSVS FILTER TRAINS	105	PD	FARR CO	SC112	YES	D-56291	SA/SAT	11	F2	CS,HS	H
1P42xTK-026	RBCLCW HEAD TANK	114	PD	BUFFALO TANK	SC151	YES	MH(B)25-IA	SA		F2	HS	B
1R24xMCC-111M	MTR CNTRL CNTR	115	ED	SQUARE D CO	SC150	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24xMCC-111X	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	SC113	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24xMCC-111Y	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	SC78	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24xMCC-111Z	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	SC78	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24xMCC-112M	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	SC150	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24xMCC-112X	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	SC78	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24xMCC-112Y	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	SC112	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24xMCC1111	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	SC90	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24xMCC1112	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	SC113	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24xMCC1113	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	SC113	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24xMCC1114	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	SC151	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24xMCC1117	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	SC90	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24xMCC1118	480 V MOTOR CONT CENTE	115	ED	SQUARE D CO	SC113	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24xMCC1119	480 V MOTOR CONT CENTE	115	ED	SQUARE D CO	SC90	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24xMCC1121	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	SC90	YES	108-1.01-L2	MBT	4	F	CS,HS	H

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1R24*MCC1122	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	SC79	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24*MCC1123	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	SC113	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24*MCC1124	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	SC151	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24*MCC1127	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	SC40	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24*MCC1128	480 V MOTOR CONT CENTE	115	ED	SQUARE D CO	SC113	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24*MCC1129	480 V MOTOR CONT CENTE	115	ED	SQUARE D CO	SC40	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24*MCC1131	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	SC63	YES	108-1.01-L2	MBT	4	F	CS,HS	H
1R24*PNL-B1	480 VAC CKT BKR	115	ED	SQUARE D CO	SC112	YES	8998-10.09-L23	MBT	20	F	CS,HS	H
1R24*PNL-G1	480 VAC CKT BKR	115	ED	SQUARE D CO	SC112	YES	8998-10.09-L23	MBT	20	F	CS,HS	H
1R24*PNL-R1	480 VAC CKT BKR	115	ED	SQUARE D CO	SC112	YES	8998-10.09-L23	MBT	20	F	CS,HS	H
1R24*PNL-R2	480 VAC CKT BKR	115	ED	SQUARE D CO	SC112	YES	8998-10.09-L23	MBT	20	F	CS,HS	H
1R24*PNL-Y1	480 VAC CKT BKR	115	ED	SQUARE D CO	SC112	YES	8998-10.09-L23	MBT	20	F	CS,HS	H
1R24*PNL-01	480 VAC CKT BKR	115	ED	SQUARE D CO	SC78	YES	8998-10.09-L23	MBT	20	F	CS,HS	H
1R24*PNL-02	480 VAC CKT BKR	115	ED	SQUARE D CO	SC78	YES	8998-10.09-L23	MBT	20	F	CS,HS	H
1R24*PNL-03	480 VAC CKT BKR	115	ED	SQUARE D CO	SC78	YES	8998-10.09-L23	MBT	20	F	CS,HS	H
1R24*PNL-04	480 VAC CNTRL PWR FEED	115	ED	SQUARE D CO	SC112	YES	8998-10.09-L23	MBT	20	F	CS,HS	H
1R35*PNL-B2	EMER 120 V PNL B2-SC	124	ED	SYSTEM CONT	SC112	YES	45322-1	MBT	15	F	CS,HS	H
1R35*PNL-R2	EMER 120 V PNL R2-SC	124	ED	SYSTEM CONT	SC112	YES	45322-1	MBT	15	F	CS,HS	H
1T23*Z-EA1	REACTOR CONT ELEC PEN	134	ED	GEN ELEC CO	PC078	YES	F73919	SAT	24	F	CS,HS	F
1T23*Z-EB1	REACTOR CONT ELEC PEN	134	ED	GEN ELEC CO	PC078	YES	F73919	SAT	24	F	CS,HS	F
1T23*Z-EB2	REACTOR CONT ELEC PEN	134	ED	GEN ELEC CO	PC078	YES	F73919	SAT	24	F	CS,HS	F

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1T23*Z-ED5	REACTOR CONT ELEC PEN	134	ED	GEN ELEC CO	PC078	YES	F73414	SAT	24	F	CS,HS	F
1T23*Z-ED6	REACTOR CONT ELEC PEN	134	ED	GEN ELEC CO	PC078	YES	F73414	SAT	24	F	CS,HS	F
1T23*Z-HB3	REACTOR CONT ELEC PEN	134	ED	GEN ELEC CO	PC078	YES	F73414	SAT	24	F	CS,HS	F
1T23*Z-HB4	REACTOR CONT ELEC PEN	134	ED	GEN ELEC CO	PC078	YES	F73414	SAT	24	F	CS,HS	F
1T23*Z-HC4	REACTOR CONT ELEC PEN	134	ED	GEN ELEC CO	PC078	YES	F73414	SAT	24	F	CS,HS	F
1T23*Z-HD1	REACTOR CONT ELEC PEN	134	ED	GEN ELEC CO	PC078	YES	F73414	SAT	24	F	CS,HS	F
1T23*Z-HD2	REACTOR CONT ELEC PEN	134	ED	GEN ELEC CO	PC078	YES	F73414	SAT	24	F	CS,HS	F
1E11*S-114	H2 ANALYZER STRAINER	148	PD	LESLIE CO	SC112	YES	MH(B) 287-CZC	DA		P2	N	F/Z
1E11*S-139	STEAM DRN R.O. STRN	148	PD	LESLIE	SC90	YES	MH(B) 287-CZC	DA		P	N	F/Z
1E21*S-057	CORE SPRAY LOOP LVL Y	148	PD	LESLIE CO	SC008	YES	MH(B) 287-CZC	DA	60+	P2	CS,HS	F/Z
1E41*S-055	Y STR-HPCI LOOP LEVEL	148	PD	LESLIE CO	SC008	YES	MH(B) 287-CZC	DA	60+	P	N	F/Z
1E51*S-056	Y STR-RCIC LOOP LEVEL	148	PD	LESLIE CO	SC008	YES	MH(B) 287-CZC	DA	60+	P	HS	F/Z
1R42*MCC-0A1	125 VDC MOTOR CONT CEN	168	ED	GEN ELEC	SC90	YES	79GPC005	SAT	100	F	CS,HS	H
1R42*MCC-0A2	125 VDC MOTOR CONT CEN	168	ED	GEN ELEC	SC112	YES	79GPC005	SAT	100	F	CS,HS	H
1R42*MCC-0B1	125 VDC MOTOR CONT CEN	168	ED	GEN ELEC	SC90	YES	79GPC005	SAT	100	F	CS,HS	H
1R42*MCC-0B2	125 VDC MOTOR CONT CEN	168	ED	GEN ELEC	SC112	YES	79GPC005	SAT	100	F	CS,HS	H
1B21*RV 093	VAC RELIEF VALVES	175	PD	AND. GRINN	PC	YES	TR-77-18	SAT	18	F12	N	B
1G41*E-019	FUEL STG POOL HT EXCHA	190	PD	STRUTHERS CO	SC151	YES	70-06-30787	SA	25	F2	CS,HS	H
1P42*E-011	RBCLCW HT EXCHANGER	190	PD	STRUTHERS CO	SC8	YES	70-06-30786	SA	12	F2	CS,HS	H
1P42*E-117	BOOSTER HT EXCH	190	PD	STRUTHERS	SC8	YES	79-06-33475	SA	5+	F2	HS	H
1T23*SHE-01	SHIELD WALL EXTENSION	221	PD	CIVES	PC140	YES	MH(B)129-GD	SA	60+	F	N	D/Z

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JOB NUMBER 11600 — 3-SORT
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STONE & WEBSTER ENGINEERING CORPORATION
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BOP QUALIFICATION LEVEL (205 ITEMS)

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1T23-RB-001	PM RES RADIAL BEAMS	221	PD	CIVES	PCVAR	YES	MMB189-JAA	SA	16	F	CS	D/Z
1E21*P-049	LOOP LEVEL PUMPS	235	PD	GOULD PUMP	SC008	YES	ME-320	SA	60+	F2	CS	H
1E41*P-050	LOOP LEVEL PUMP	235	PD	GOULD PUMP	SC008	YES	ME-320	SA	60+	F	CS	H
1E51*P-051	LOOP LEVEL PUMP	235	PD	GOULD PUMP	SC008	YES	ME-320	SA	60+	F	CS	H
1R35*T-B2	480-120/240V TRANS	248	ED	MAGNETICS	SC112	YES	MYLE93029-1	MBT	9	F	CS,HS	H
1R35*T-R2	480-120/240V TRANS	248	ED	MAGNETICS	SC112	YES	MYLE93029-1	MBT	9	F	CS,HS	H
1T46*FN-003	RB EXH FANS-RBHV3	270	PD	BUFFALO FORGE	SC129	YES	745-11136	SA	15	F3	CS	H
1T46*CLC-05	RBSV3 COOLING COILS	276	PD	BUFFALO FORGE	SC113	YES	80N-27781	SA	5	F2	CS,HS	H
1T46*UC-002	UNIT COOLERS-RBSV3	276	PD	BUFFALO FORGE	SC8	YES	80N-27781	SA	5	F2	CS,HS	H
1T46*UC-003	UNIT COOLERS-RBSV3	276	PD	BUFFALO FORGE	SC008	YES	80N-27781	SA	5	F2	CS,HS	H
1T46*UC-004	UNIT COOLERS-RBSV3	276	PD	BUFFALO FORGE	SC175	YES	80N-27781	SA	5	F2	CS,HS	H
1T46*UC-005	UNIT COOLERS-RBSV3	276	PD	BUFFALO FORGE	SC175	YES	80N-27781	SA	5	F2	CS,HS	H
1T46*UC-020	UNIT COOLERS-HCC IN RB	276	PD	BUFFALO FORGE	SC112	YES	80N-27781	SA	5	F2	CS,HS	H
1T46*UC-021	UNIT COOLERS	276	PD	BUFFALO FORGE	SC150	YES	80N-27781	SA	5	F2	CS,HS	H
1T46*UC-022	UNIT COOLERS - RBSV3	276	PD	BUFFALO FORGE	SC161	YES	80N-27781	SA	5	F2	CS,HS	H
1T46*UC-023	UNIT COOLER HCC RB	276	PD	BUFFALO FORGE	SC090	YES	80N-27903-6	SA	5	F	N	H
1T48*PIL-48	HYD RECOMB POWER CABIN	289	PD	ATOMICS INT	SC112	YES	58083	MBT	14	F2	N	H
1T48*RC-002	HYD RECOMB UNIT	289	PD	ATOMICS INT	SC112	YES	54591-2	MBT	14	F2	N	H
1T46*AOD040	RB REFUEL LVL EXHAUST	319	CD	POWERS REGUL	SC159	YES	44540-1	SA/SAT	40	F2	CS	H
1T46*AOD041	RB POT CONTAH AREA EXH	319	CD	POWERS REGUL	SC112	YES	43812-1	SA/SAT	24	F2	CS,HS	H
1T46*FT 004	RBSV3 EXH AIR FLOW	319	CD	POWERS REGUL	SC112	YES	43812-1	SA/SAT	24	F2	N	H

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1T46*ME 002	FLT-1 MOISTURE	319	CD	POWERS REGUL	SC112	YES	43012-1	SA/SAT	24	F2	N	N
1T46*MD0031	RBSVS INLET TO MIX PLN	319	CD	POWERS REGUL	SC135	YES	43012-1	SA/SAT	24	F2	CS,HS	N
1T46*MD0034	RBSVS FILTER TRAIN DCH	319	CD	POWERS REGUL	SC102	YES	44540-1	SA/SAT	60	F2	CS	N
1T46*MD0036	FN-3 DISCHARGE AIR	319	CD	POWERS REGUL	SC126	YES	43012-1	SA/SAT	24	F3	CS,HS	N
1T46*MD0047	FN-79 DISCHARGE AIR	319	CD	POWERS REGUL	SC112	YES	43012-1	SA/SAT	24	F2	N	N
1T46*MD0048	FLT-1 INLET AIR	319	CD	POWERS REGUL	SC112	YES	43012-1	SA/SAT	24	F2	N	N
1T46*PDS045	FN-3 DIFF PRESSURE	319	CD	POWERS REGUL	SC112	YES	43012-1	SA/SAT	24	F2	CS,HS	N
1T46*PDS046	FN-3 DIFF PRESSURE	319	CD	POWERS REGUL	SC112	YES	43012-1	SA/SAT	24	F3	CS,HS	N
1D11*PNL061	CON DH MON	332	PD	NAC	SC112	YES	45493-1	HBT	12	F	N	N
1E41*RD-001	RUPTURE DISK	340	PD	LYONS IND/BS&B	SC18	YES	NR-1	SAT	60+	F	N	F/Z
1E41*RD-002	RUPTURE DISK	340	PD	LYONS IND/BS&B	SC19	YES	NR-1	SAT	60+	F	N	F/Z
1E51*RD-003	RUPTURE DISK	340	PD	LYONS IND/BS&B	SC16	YES	NR-1	SAT	60+	F	HS	F/Z
1E51*RD-004	RUPTURE DISK	340	PD	LYONS IND/BS&B	SC13	YES	NR-1	SAT	60+	F	HS	F/Z
1T48*PIL-68	GAS ANALYZER-DRYWELL	344	PD	DELPHI IND	SC112	YES	1035-1	HBT	18	F2	N	N
1T48*PIL-69	GAS ANALYZER-SUPPR CHM	344	PD	DELPHI IND	SC112	YES	1035-1	HBT	18	F2	N	N
1P42*PS 021	PUMP 1P42*P005C DISCH	348	ED	ASCO	SC153	YES	178	SAT	60+	F3	HS	N
1P42*PS 022	PUMP 1P42*P005B DISCH	348	ED	ASCO	SC153	YES	178	SAT	60+	F3	HS	N
1P42*PS 046	PUMP 1P42*P005A DISCH	348	ED	ASCO	SC151	YES	178	SAT	60+	F3	HS	N
1P50*PS 105	SERV AIR HDR PRESS	348	ED	ASCO	SC102		178	SAT	60+	F2	CS,HS	N
1P50*PS 113	SERV AIR HDR NORH SUP	348	ED	ASCO	SC102		178	SAT	60+	F2	CS,HS	N
1B21*PT 153	RV092 MONITOR	406	CD	ROSEMOUNT	SC090	YES	127516	HBT	60+	F11	CS,HS	N

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REACTOR BUILDING CATEGORY I FLOOR-MOUNTED EQUIPMENT
BOP QUALIFICATION LEVEL (205 ITEMS)

RUN DATE 11/04/82
RUN TIME 16.15.56

MARK NUMBER	EQUIPMENT DESCRIPTION	SPEC NO.	DIV. RESP	VENDOR	BLDG ELEV	AVAIL INSP	QUAL REPT	QUAL METH	FREQ	TYPE MTNG	SAFE SHTDN	QUAL STATUS
1B21*TE 147	MST PA STEAM LN DET	406	CD	ROSEMOUNT	SC078	YES	2767	SAT	60+	F2	CS,HS	H
1C61*LT 026	SUPP POOL	406	CD	ROSEMOUNT	SC008	YES	127516	MBT	60+	F	CS,HS	H
1C61*PT 012	DRYWELL PRESS	406	CD	ROSEMOUNT	SC098	YES	127516	MBT	60+	F	CS,HS	H
1C61*PT 104	SAFETY REL VALVE	406	CD	ROSEMOUNT	SC101	YES	127516	MBT	60+	F	CS,HS	H
1C61*TE 021	DRYWELL TEMP	406	CD	ROSEMOUNT	SC150	YES	2767	SAT	60+	F	CS,HS	F
1C61*TE 022	SUPP POOL TEMP	406	CD	ROSEMOUNT	SC028	YES		MBT		F2	CS,HS	B
1E91*PT 142	TO LUBE OIL COOLER	406	CD	ROSEMOUNT	SC8	YES	127516	MBT	60+	F	CS,HS	H
1E51*PT 142	TO LUBE OIL COOLER	406	CD	ROSEMOUNT	SC8	YES	127516	MBT	60+	F	CS,HS	H
1G11*FT 647	SUPP POOL PUMP BACK	406	CD	ROSEMOUNT	SC008	YES	127516	MBT	60+	F3	CS,HS	H
1P41*FT 146	RBCLCW HX SERV WATER	406	CD	ROSEMOUNT	SC024	YES	127516	MBT	60+	F2	CS,HS	H
1P41*FT 151	RAD MON SAMPLE	406	CD	ROSEMOUNT	SC008	YES	127516	MBT	60+	F2	CS,HS	H
1P50*PT 111	ADS ACCUMULATOR	406	CD	ROSEMOUNT	SC101	YES	127516	MBT	60+	F2	CS,HS	H
1P50*PT 116	SERV AIR HDR PRESS	406	CD	ROSEMOUNT	SC101	YES	127516	MBT	60+	F2	CS,HS	H
1T46*PDT003	FLT-1A DIFF PRESSURE	406	CD	ROSEMOUNT	SC112	YES	127516	MBT	60+	F2	CS,HS	H
1T46*PDT093	REACTOR BLDG DIFF	406	CD	ROSEMOUNT	SC220	YES	127516	MBT	60+	F2	CS,HS	H
1T46*TE 001	RBSVS RECIRC AIR TEMP	406	CD	ROSEMOUNT	SC144	YES	2767	SAT	60+	F2	CS,HS	H
1T46*TE 022	AIR RETURN TO UC-2	406	CD	ROSEMOUNT	SC10	YES	2767	SAT	60+	F2	CS,HS	H
1T46*TE 023	AIR RETURN TO UC-3	406	CD	ROSEMOUNT	SC42	YES	2767	SAT	60+	F2	CS,HS	H
1T46*TE 024	AIR RETURN TO UC-4	406	CD	ROSEMOUNT	SC220	YES	2767	SAT	60+	F2	CS,HS	H
1T46*TE 025	AIR RETURN TO UC-5	406	CD	ROSEMOUNT	SC220	YES	2767	SAT	60+	F2	CS,HS	H
1T46*TE 028	HCC RM UNIT COOLER	406	CD	ROSEMOUNT	SC128	YES	2767	SAT	60+	F2	CS,HS	H

CS =COLD SHUT DOWN
D =DUCT MOUNTED
DA =DYNAMIC ANALYSIS
F =FLOOR MOUNTED
HS =HOT STANDBY
MBT=MULTI-FREQUENCY BIAXIAL TESTING
MST=MULTI-FREQUENCY SINGLE AXIAL TESTING

P =PIPE MOUNTED
PC =PRIMARY CONT.
PL =PEDESTAL
QP = QUALIFIED BY PIPING ANALYSIS
SA =STATIC ANALYSIS
SAT=SINGLE FREQUENCY SINGLE AXIAL TESTING

SBT=SINGLE FREQUENCY BIAXIAL TESTING
SC =SECONDARY CONT.
/ =LOCATED ON CONT. WALL
N =NEITHER CS OR HS
Z =PASSIVE ITEM (SQRT PAPER NOT REQ'D)

QUALIFICATION MILESTONES
A =REEVALUATION COMPLETE
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REVISION 9 -NOVEMBER 1982

NOTE: NUMBER IN 'TYPE MTNG' COLUMN IS QUANTITY OF ITEMS.

SHOREHAM UNIT 1 — RB LIST — STONE & WEBSTER ENGINEERING CORPORATION — RUN DATE 11/09/82
JOB NUMBER 11600 — 3-SORT — REACTOR BUILDING CATEGORY I FLOOR-MOUNTED EQUIPMENT — RUN TIME 16.15.56
LILCO DOCKET 50-322 — ACTIVE — BOP QUALIFICATION LEVEL (205 ITEMS) — PAGE 7

PARM NUMBER	EQUIPMENT DESCRIPTION	SPEC NO.	DIV. RESP	VENDOR	BLDG ELEV	AVAIL INSP	QUAL REPT	QUAL METH	FREQ	TYPE MTNG	SAFE SHTDN	QUAL STATUS
1T46*TE 059	*UC-21 UNIT CLR	406	CD	ROSEMOUNT	SC155	YES	2767	SAT	60+	F2	CS,HS	H
1T46*TE 060	*UC-22 UNIT CLR	406	CD	ROSEMOUNT	SC160	YES	2767	SAT	60+	F2	CS,HS	H
1T48*FT 005N	HEPA FILTER INLET	406	CD	ROSEMOUNT	SC113	YES	127516	SAT	60+	F2	CS,HS	H
1Z93*LT 001	SUPPRESSION POOL LEVEL	406	CD	ROSEMOUNT	SC8	YES	127516	SAT	60+	F2	CS,HS	H
1Z93*PT 003	DRYWELL PRESSURE	406	CD	ROSEMOUNT	SC98	YES	108025	MBT	60+	F2	CS,HS	H
1Z93*PT 004	SUPP POOL PRESS	406	CD	ROSEMOUNT	SC40	YES	108028	MBT	60+	F2	CS,HS	H
1Z93*TE 110	RV092ACL DISCHARGE-1FT	406	CD	ROSEMOUNT	PL28			MBT		F4	N	B
1Z93*TE 111	RV092BDE DISCHARGE-1FT	406	CD	ROSEMOUNT	PL28			MBT		F4	N	B
1Z93*TE 112	RV092HG DISCHARGE-1FT	406	CD	ROSEMOUNT	PL28			MBT		F4	N	B
1Z93*TE 113	RV092FHJ DISCHARGE-1FT	406	CD	ROSEMOUNT	PL28			MBT		F4	N	B
1Z93*TE 132	RV092ACL DISCHARGE-2FT	406	CD	ROSEMOUNT	PL28			MBT		F2	N	B
1Z93*TE 133	RV092BDE DISCHARGE-2FT	406	CD	ROSEMOUNT	PL28			MBT		F2	N	B
1Z93*TE 134	RV092HG DISCHARGE-2FT	406	CD	ROSEMOUNT	PL28			MBT		F2	N	B
1Z93*TE 135	RV092FHJ DISCHARGE-2FT	406	CD	ROSEMOUNT	PL28			MBT		F2	N	B
1P42*LS 012	RBCLCW TK-026	407	CD	MAGNETROL	SC160	YES	43235-1	MBT	17	F2	HS	H
1P42*LS 013	RBCLCW TK-026	407	CD	MAGNETROL	SC160	YES	43235-1	MBT	17	F2	HS	H
1T48*LS 061	COND LEVEL	407	CD	MAGNETROL	SC73	YES	43235-1	MBT	17	F2	HS	H
1F16*RAK-22	HI DENSITY SPNT FUEL R	427	PD	MACHTER	SC137	YES	LIL-T-151	DA	10	F29	N	H
1F16*RAK-23	PERM CR STOR RACKS	427	PD	MACHTER	SC137	YES	LIL-T-151	DA	10	F	N	H
1F16*RAK-24	TEMP CR STOR RACKS	427	PD	MACHTER	SC137	YES	LIL-T-151	DA	10	F2	N	H
1R24*TRS111X	LCPI ATS	438	ED	ASCO	SC112	YES	19606	MBT	13	F	CS,HS	H

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REVISION 4 -NOVEMBER 1982

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SHOREHAM UNIT 1 — RB LIST
JOB NUMBER 11400 — 3-SORT
LILCO DOCKET 50-322 — ACTIVE

STONE & WEBSTER ENGINEERING CORPORATION
REACTOR BUILDING CATEGORY I FLOOR-MOUNTED EQUIPMENT
BOP QUALIFICATION LEVEL (205 ITEMS)

RUN DATE 11/09/82
RUN TIME 16.15.56

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1R24*TRS112T	LCPI ATS	438	ED	ASCO	SC112	YES	19606	MBT	13	F	CS,HS	H
1R24*MG-111	LPCI MG SET	439	ED	LOUIS ALLIS	SC150	YES	ME698	SA	27	F	N	H
1R24*MG-112	LPCI MG SET	439	ED	LOUIS ALLIS	SC150	YES	ME698	SA	27	F	N	H
1R24*MG-113	LPCI MG SET	439	ED	LOUIS ALLIS	SC150	YES	ME698	SA	27	F2	N	H
1R24*PNL-111	LPCI SIP PNL	439	ED	LOUIS ALLIS	SC150		84-66829	MBT	27	F	N	B
1R24*PNL-112	LPCI SIP PNL	439	ED	LOUIS ALLIS	SC150		84-66829	MBT	27	F	N	B
1R24*PNL-113	LPCI SIP PNL	439	ED	LOUIS ALLIS	SC150		84-66829	MBT	27	F2	N	B
1E11*FE 006	RHR HX SERV WATER INLE	440	CD	PENNUTIT	SC33	YES	NH(B) 220-CZC	SA	60+	P2	CS,HS	F/Z
1E11*RO 140	RHR PUMP MIN FLOW BYPA	440	CD	PENNUTIT	SC14	YES	NH(B) 220-CZC	SA	60+	P4	CS,HS	F/Z
1E11*RO 158	RHR PUMP DISCH	440	CD	PENNUTIT	SC16	YES	NH(B) 220-CZC	SA	60+	P4	CS,HS	F/Z
1E11*RO 159	STEAM LINE DRAINS	440	CD	PENNUTIT	SC53	YES	NH(B) 220-CZC	SA	60+	P	N	F/Z
1E11*RO 160	VAC BREAKER LINE	440	CD	PENNUTIT	SC28	YES	NH(B) 220-CZC	SA	60+	P	N	F/Z
1E21*RO 094	CORE SPARY PUMP RECIRC	440	CD	PENNUTIT	SC101	YES	NH(B) 220-CZC	SA	60+	P2	CS	F/Z
1E21*RO 095	CORE SPRAY PUMP RECIRC	440	CD	PENNUTIT	SC14	YES	NH(B) 220-CZC	SA	60+	P2	CS	F/Z
1E21*RO 097	CORE SPRAY/RHR LEVEL 3	440	CD	PENNUTIT	SC12	YES	NH(B) 220-CZC	SA	60+	P2	CS,HS	F/Z
1E41*RO 131	HPCI PUMP MIN FLOW BYP	440	CD	PENNUTIT	SC17	YES	NH(B) 220-CZC	SA	60+	P	N	F/Z
1E41*RO 132	HPCI P DIS TO COND STO	440	CD	PENNUTIT	SC18	YES	NH(B) 220-CZC	SA	60+	P	N	F/Z
1E41*RO 133	TO BAROMETRIC CONDENSE	440	CD	PENNUTIT	SC13	YES	NH(B) 220-CZC	SA	60+	P	N	F/Z
1E41*RO 134	LUBE OIL COOLER DISCH	440	CD	PENNUTIT	SC11	YES	NH(B) 220-CZC	SA	60+	P	N	F/Z
1E41*RO 135	RUPTURE DISH BLEED OFF	440	CD	PENNUTIT	SC24	YES	NH(B) 220-CZC	SA	60+	P	N	F/Z
1E41*RO 136A	STOP VALVE DRAIN	440	CD	PENNUTIT	SC14	YES	NH(B) 220-CZC	SA	60+	P	N	F/Z

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REVISION 4 -NOVEMBER 1982

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SHOREHAM UNIT 1 — RB LIST
JOB NUMBER 11600 — 3-SORT
LILCO DOCKET 50-322 — ACTIVE

STONE & WEBSTER ENGINEERING CORPORATION
REACTOR BUILDING CATEGORY I FLOOR-MOUNTED EQUIPMENT
BOP QUALIFICATION LEVEL (205 ITEMS)

RUN DATE 11/04/82
RUN TIME 16.15.56

MARK NUMBER	EQUIPMENT DESCRIPTION	SPEC NO.	DIV. RESP	VENDOR	BLDG ELEV	AVAIL INSP	QUAL REPT	QUAL METH	TYPE FREQ	TYPE HTNG	SAFE SHTDN	QUAL STATUS
1E41*RO 136C	CONTROL VALVE DRAIN	440	CD	PERMUTIT	SC15	YES	NH(B) 220-CZC	SA	60+	P	N	F/Z
1E41*RO 136D	TURBINE DRAIN	440	CD	PERMUTIT	SC11	YES	NH(B) 220-CZC	SA	60+	P	N	F/Z
1E41*RO 136E	TURBINE DRAIN	440	CD	PERMUTIT	SC11	YES	NH(B) 220-CZC	SA	60+	P	N	F/Z
1E41*RO 137	HPCI LEVEL P-50	440	CD	PERMUTIT	SC11	YES	NH(B) 220-CZC	SA	60	-	N	F/Z
1E41*RO 138	TO BAROMETRIC CONDENSO	440	CD	PERMUTIT	SC9	YES	NH(B) 220-CZC	SA	60+	P	N	F/Z
1E41*RO 153	RUPTURE DISK BLEED OFF	440	CD	PERMUTIT	SC024	YES	NH(B) 220-CZC	SA	60+	P	N	F/Z
1E51*FE 099	RCICLOOP LVL*P-051	440	CD	PERMUTIT	SC13	YES	NH(B) 220-CZC	SA	60+	P	N	F/Z
1E51*RO 131	RCIC PUMP MIN FLOW BYP	440	CD	PERMUTIT	SC19	YES	NH(B) 220-CZC	SA	60+	P	HS	F/Z
1E51*RO 132	RCIC P DIS TO COND STR	440	CD	PERMUTIT	SC20	YES	NH(B) 220-CZC	SA	60+	P	N	F/Z
1E51*RO 135	RUPTURE DISK BLEED OFF	440	CD	PERMUTIT	SC20	YES	NH(B) 220-CZC	SA	60+	P	N	F/Z
1E51*RO 136	STOP VALVE DRAIN	440	CD	PERMUTIT	SC15	YES	NH(B) 220-CZC	SA	60+	P	HS	F/Z
1E51*RO 137	RCIC LEVEL P-51	440	CD	PERMUTIT	SC16	YES	NH(B) 220-CZC	SA	60+	P	HS	F/Z
1E51*RO 138	TO BAROMETRIC COND	440	CD	PERMUTIT	SC9	YES	NH(B) 220-CZC	SA	60+	P	HS	F/Z
1E51*RO 153	RUPTURE DISK BLEED OFF	440	CD	PERMUTIT	SC20	YES	NH(B) 220-CZC	SA	60+	P	N	F/Z
1G33*RO 109	P-19 DISCH CHK V.BYPS	440	CD	PERMUTIT	SC120	YES	NH(B) 220-CZC	SA	60+	P2	N	F/Z
1G41*FE 027	SPENT FUEL POOL COOLIN	440	CD	PERMUTIT	SC166	YES	NH(B) 220-CZC	SA	60+	P2	N	F/Z
11150*FE 062	RB STANDBY VENT UC-2	440	CD	PERMUTIT	SC13	YES	NH(B) 220-CZC	SA	60+	P2	CS	F/Z
11150*FE 063	RB STANDBY VENT UC-3	440	CD	PERMUTIT	SC11	YES	NH(B) 220-CZC	SA	60+	P2	CS	F/Z
11150*FE 064	RB STANDBY VENT UC-4	440	CD	PERMUTIT	SC224	YES	NH(B) 220-CZC	SA	60+	P2	CS	F/Z
11150*FE 065	RB STANDBY VENT UC-5	440	CD	PERMUTIT	SC223	YES	NH(B) 220-CZC	SA	60+	P2	CS	F/Z
11150*FE 066	RB STANDBY VENT UC-6	440	CD	PERMUTIT	SC136	YES	NH(B) 220-CZC	SA	60+	P2	CS	F/Z

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REVISION 4 -NOVEMBER 1982

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MARK NUMBER	EQUIPMENT DESCRIPTION	SPEC NO.	DIV. RESP	VENDOR	BLDG ELEV	AVAIL INSP	QUAL REPT	QUAL METH	TYPE FREQ	TYPE MTNG	SAFE SHTDN	QUAL STATUS
1H50*RO 072	RB STANDBY VENT UC-2	440	CD	PERMUTIT	SC11	YES	NH(B) 220-CZC	SA	60+	P2	CS	F/Z
1H50*RO 073	RB STANDBY VENT UC-3	440	CD	PERMUTIT	SC13	YES	NH(B) 220-CZC	SA	60+	P2	CS	F/Z
1H50*RO 074	RB STANDBY VENT UC-4	440	CD	PERMUTIT	SC222	YES	NH(B) 220-CZC	SA	60+	P2	CS	F/Z
1H50*RO 075	RB STANDBY VENT UC-5	440	CD	PERMUTIT	SC222	YES	NH(B) 220-CZC	SA	60+	P2	CS	F/Z
1H50*RO 076	RB STANDBY VENT UC-6	440	CD	PERMUTIT	SC135	YES	NH(B) 220-CZC	SA	60+	P2	CS	F/Z
1P42*FE 017	FUEL POOL HX E-19A DIS	440	CD	PERMUTIT	SC157	YES	NH(B) 220-CZC	SA	60+	P2	N	F/Z
1P42*FE 018	RECIRC PUMP COOLERS	440	CD	PERMUTIT	SC67	YES	NH(B) 220-CZC	SA	60+	P2	N	F/Z
1P42*FE 046	RHR PUMP SEAL CLR A	440	CD	PERMUTIT	SC13	YES	NH(B) 220-CZC	SA	60+	P2	N	F/Z
1T48*FE 005	HEPA FILTER INLET	440	CD	PERMUTIT	SC114	YES	NH(B) 220-CZC	SA	60+	P	N	F/Z
1T48*FE 048	WATER SUPPLY TO *RC-00	440	CD	PERMUTIT	SC113	YES	NH(B) 220-CZC	SA	60+	P	N	F/Z
1B21*QEIH001	MS SRV QHCHRS	447	PD	SARGENT	PC008	YES	R-S-10078000	DA	9	F11	CS,HS	F
1T48*EXJ-49	HYD RECOMB INLET EX JT	462	PD	TEMP FLEX	SC114			SA		F2	N	B/Z
1T48*EXJ-50	HYD-RECOMB INLET EX JT	462	PD	TEMP FLEX	SC114			SA		F2	N	B/Z
1G11*LE 692	RB FLOOR LEVEL	473	CD	DELAVAL	SC008			DA		F		B
1G11*LE 695	RB FLOOD LEVEL	473	CD	DELAVAL	SC008	YES		SAT		F4		B
1D21*RE 085	RAD MONITOR	475	CD	KAMAN	PC074					F2		B

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SHOREHA[illegible]1
JOB NUM[illegible]00
LILCO DOCKET 50-322

CB LIST
3-SORT
ACTIVE

STONE & WEBSTER ENGINEERI[illegible]RPORATION
CONTROL BUILDING CATEGOR[illegible]QUIPMENT
DQP QUALIFICATION LEVEL (220 ITEMS)

RUN DATE 11/09/82
RUN TIME 16.15.55
PAGE 1

MARK NUMBER	EQUIPMENT DESCRIPTION	SPEC NO.	DIV. RESP	VENDOR	BLDG ELEV	AVAIL INSP	QUAL REPT	QUAL METH	FREQ	TYPE MTNG	SAFE SHTDN	QUAL STATUS
1R22*SHG-101	4.16KV EMER BUS 101	39	ED	GEN ELEC CO	025	YES	300-91059	DA/SAT	8	F	CS,HS	H
1R22*SHG-102	4.16KV EMER BUS 102	39	ED	GEN ELEC CO	025	YES	300-91059	DA/SAT	8	F	CS,HS	H
1R22*SHG-103	4.16KV EMER BUS 103	39	ED	GEN ELEC CO	025	YES	300-91059	DA/SAT	8	F	CS,HS	H
1X91*DMPF	FIRE DAMPERS	54	PD	AIR BALANCE	044	YES	AB1-SH-009	SAT	9+	F30	CS,HS	H
1X41*DMPF	FIRE DAMPERS	54	PD	AIR BALANCE	063	YES	AB1-SH-009	SAT	9+	F8	CS,HS	H
1H50*P-137	RBSVS & CRAC CH PUMPS	62B	PD	GOULD PUMPS	063	YES	ME-326	SA	81	F2	CS,HS	H
1H50*P-138	RBSVS & CRAC CH PUMPS	62G	PD	GOULD PUMPS	063	YES	ME-326	SA	81	F2	CS,HS	H
1H50*P-139	RBSVS & CRAC COND PUMP	62H	PD	NORTHINGTON	063	YES	DHA-000047	SA	31	F2	CS,HS	H
1H50*P-140	RBSVS & CRAC COND PUMP	62H	PD	NORTHINGTON	063	YES	DHA-000047	SA	31	F2	CS,HS	H
1M11*HOV031	2ND STAGE REHEAT STM	88V	PD	VELAN	051	YES	SR-6262	SA/SAT	33+	P2	HS	H
1M11*HOV036	MISC STM FROM HDR ISO	88V	PD	VELAN	051	YES	SR-6262	SA/SAT	33+	P	HS	H
1M11*HOV041	AUXILIARY STEAM SUPPLY	88V	PD	VELAN	051	YES	SR-6181	SA/SAT	33+	P	CS	H
1R43*G-101	EMER DIESEL GENERATOR	89	ED	DE LAVAL	025	YES	11001	DA	4	F18	CS,HS	H
1R43*G-102	EMER DIESEL GENERATOR	89	ED	DE LAVAL	025	YES	11001	SAT	4	F18	CS,HS	H
1R43*G-103	EMER DIESEL GENERATOR	89	ED	DE LAVAL	025	YES	11001	SAT	4	F18	CS,HS	H
1R23*SHG-111	480V EMER SHGR BUS 111	95	ED	ITE	025	YES	33-48359	MBT	5	F	CS,HS	H
1R23*SHG-112	480V EMER SHGR BUS 112	95	ED	ITE	025	YES	33-48359	MBT	5	F	CS,HS	H
1R23*SHG-113	480V EMER SHGR BUS 113	95	ED	ITE	025	YES	33-48359	MBT	5	F	CS,HS	H
1R42*SHG-A1	125 VDC SHG BATTERY BU	95	ED	ITE	025	YES	33-51266	MBT	5	F	CS,HS	H
1R42*SHG-B1	125 VDC SHG BATTERY BU	95	ED	ITE	025	YES	33-51266	MBT	5	F	CS,HS	H
1R42*SHG-C1	125 VDC SHG BATTERY BU	95	ED	ITE	025	YES	33-51266	MBT	5	F	CS,HS	H

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REVISION 4 -NOVEMBER 1982

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SHOREHAM UNIT 1
JOB NUMBER 11400
LILCO DOCKET 50-322

CB LIST
3-SORT
ACTIVE

STONE & WEBSTER ENGINEERING CORPORATION
CONTROL BUILDING CATEGORY I EQUIPMENT
BOP QUALIFICATION LEVEL (220 ITEMS)

RUN DATE 11/09/82
RUN TIME 16.15.55

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1X61*FN-02S	CONTROL ROOM BOOSTER F	102	PD	BUFFALO FORGE	063	YES	745-4234A	SA	27	F2	CS,HS	H
1X61*FLT-02	CRAC FILTER TRAINS	105	PD	FARR CO	063	YES	D-56302	SA/SAT	17	F2	CS,HS	H
1H50*PNL-03	CHILLER CONTROL PANEL	106	PD	TRANE CO	063	YES	MUC-102	SA	13	F2	CS,HS	H
1H50*PNL-04	CHILLER CONTROL PANEL	106	PD	TRANE	063	YES	MUC-102	SA	13	F2	CS,HS	H
1H50*HC-003	RBSVS & CRAC HTR CHILL	106	PD	TRANE CO	063	YES	MUC-102	SA	31	F2	CS,HS	H
1H50*HC-004	RBSVS & CRAC HTR CHOLL	106	PD	TRANE CO	063	YES	MUC-102	SA	31	F2	CS,HS	H
1X61*AOV036	CNTRL RM ISOL	111	PD	FISHER	063	YES	CD75-35	SA/SAT	17+	P2	CS	H
1X61*AOV038	CNTRL RM ISOL	111	PD	FISHER	073	YES	CD75-35	SA/SAT	21	P2	CS	H
1X61*AOV039	CNTRL RM ISOL	111	PD	FISHER	063	YES	CD75-35	SA/SAT	21	P2	CS	H
1X61*MOV031	CNTRL RM ISOL	111	PD	FISHER	063	YES	CD75-35	SA/SAT	22+	P2	CS	H
1X61*MOV032	CNTRL RM ISOL	111	PD	FISHER	063	YES	CD75-35	SA/SAT	22+	P2	CS	H
1H50*TK-008	RBSVS & CRAC-SURGE TAN	114	PD	BUFFALO TANK	063	YES	MH(B)-122-IA	SA	45	F2	CS,HS	H
1R43*TK-13S	FUEL OIL DAY	114	PD	BUFFALO TANK	044	YES	MH(B)-134-IA	SA	27	F3	CS	H
1R24*MCC111S	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	025	YES	108-1.01 L2	MBT	4	F	CS,HS	H
1R24*MCC1116	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	025	YES	108-1.01 L2	MBT	4	F	CS,HS	H
1R24*MCC112S	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	025	YES	108-1.01 L2	MBT	4	F	CS,HS	H
1R24*MCC1126	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	025	YES	108-1.01 L2	MBT	4	F	CS,HS	H
1R24*MCC1133	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	025	YES	108-1.01 L2	MBT	4	F	CS,HS	H
1R24*MCC1134	MOTOR CONT CNTR, BUS 1	115	ED	SQUARE D CO	025	YES	108-1.01 L2	MBT	4	F	CS,HS	H
1R42*BA-A1	125VOLT BATTERY	116	ED	GOULD INC	025	YES	42795	MBT	40+	F	CS,HS	H
1R42*BA-B1	125VOLT BATTERY	116	ED	GOULD INC	025	YES	42795	MBT	40+	F	CS,HS	H

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1R42*BA-C1	125VOLT BATTERY	116	ED	GOULD INC	025	YES	42795	MBT	40*	F	CS,HS	H
1R42*BC-A1	125VOLT BATTERY CHARGE	118	ED	SOLIDSTATE	025	YES	3/29/76	SAT	8	F	CS,HS	H
1R42*BC-B1	125VOLT BATTERY CHARGE	118	ED	SOLIDSTATE	025	YES	3/29/76	SAT	8	F	CS,HS	H
1R42*BC-C1	125VOLT BATTERY CHARGE	118	ED	SOLIDSTATE	025	YES	3/29/76	SAT	8	F	CS,HS	H
1H11*MCB-01	MAIN CONTROL BOARD	120	CD	RELIANCE	063	YES	93331-1	SA/MST	16	F	CS,HS	H
1R35*PNL-B1	EMER 120V PNL B1-REL R	124	ED	SYSTEM CONT	044	YES	15074	SAT	21	F	CS,HS	H
1R35*PNL-B3	EMER 120/240V PANEL	124	ED	SYSTEM CONT	020	YES	15074	SAT	21	F	CS,HS	H
1R35*PNL-R1	EMER 120V PNL R1-REL R	124	ED	SYSTEM CONT	044	YES	15074	SAT	21	F	CS,HS	H
1R35*PNL-R3	EMER 120/240V PANEL	124	ED	SYSTEM CONT	020	YES	15074	SAT	21	F	CS,HS	H
1R35*PNL-01	EMER 120V PNL 01-REL R	124	ED	SYSTEM CONT	044	YES	15074	SAT	21	F	CS,HS	H
1R35*PNL-02	EMER 120/240V PANEL	124	ED	SYSTEM CONT	020	YES	15074	SAT	21	F	CS,HS	H
1R42*PNL-A1	125 VDC DIST PANEL BUS	124	ED	SYSTEM CONT	025	YES	15074	SAT	21	F	CS,HS	H
1R42*PNL-A2	125 VDC DIST PANEL BUS	124	ED	SYSTEM CONT	044	YES	15074	SAT	21	F	CS,HS	H
1R42*PNL-B1	125 VDC DIST PANEL BUS	124	ED	SYSTEM CONT	025	YES	15074	SAT	21	F	CS,HS	H
1R42*PNL-B2	125 VDC DIST PANEL BUS	124	ED	SYSTEM CONT	044	YES	15074*	SAT	21	F	CS,HS	H
1R42*PNL-C1	125 VDC DIST PANEL BUS	124	ED	SYSTEM CONT	025	YES	15074	SAT	21	F	CS,HS	H
1R42*PNL-C4	125 VDC DST PNL-BLK-B5	124	ED	SYSTEM CONT	025	YES	15074	SAT	21	F	CS,HS	H
1H11*PNL-AC1	H2&O2 ANAL&PST ACC SAM	125	CD	RELIANCE	063		RCAP-001-0	SA	13	F	CS	B
1H11*PNL-AC2	H2&O2 ANAL&PST ACC SAM	125	CD	RELIANCE	063		RCAP-001-0	SA	13	F	CS	B
1H11*PNL-BR1	BUFFER RELAY CAB	125	CD	RELIANCE	044	YES	99AX900536	SA/MST	37	F	CS,HS	B
1H11*PNL-HCP	MISC CONTROL PANEL	125	CD	RELIANCE	063	YES	99AX900590	SA/MST	17	F	CS,HS	B

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STONE & WEBSTER ENGINEERING CORPORATION
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BOP QUALIFICATION LEVEL (220 ITEMS)

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RUN TIME 16.15.55

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1H11*PNL-PCM	PRI CONT MONITOR PANEL	125	CD	RELIANCE	063	YES	99AX900666	SA/HST	14	F	N	B
1H11*PNL-VC1	TB & MISC VENT	125	CD	RELIANCE	063	YES	99AX900536	SA/HST	17	F	CS	B
1H11*PNL-VC2	RB VENT	125	CD	RELIANCE	063	YES	99AX900536	SA/HST	17	F	CS	B
1H21*PNL-AX1	AUX RELAY	125	CD	RELIANCE	044	YES	99AX900590	SA/HST	32	F	CS,HS	B
1H21*PNL-AX2	AUX RELAY	125	CD	RELIANCE	044	YES	99AX900590	SA/HST	32	F	CS,HS	B
1H21*PNL-AX3	AUX RELAY PANEL AX3	125	CD	RELIANCE	063	YES	AAI-131	SA/HST	22	F	CS,HS	B
1H21*PNL-AX5	AUX RELAY PANEL AX5	125	CD	RELIANCE	063	YES	AAI-131	SA/HST	22	F	CS,HS	B
1H21*PNL-AX6	AUX RELAY PANEL AX6	125	CD	RELIANCE	063	YES	AAI-131	SA/HST	22	F	CS,HS	B
1H21*PNL-VX1	VENT AUX RELAY	125	CD	RELIANCE	044	YES	99AX0536-VX1	SA/HST	34	F	CS,HS	B
1H21*PNL-VX2	VENT AUX RELAY	125	CD	RELIANCE	044	YES	99AX0536-VX1	SA/HST	34	F	CS,HS	B
1H21*PNL-VX3	VENT AUX RELAY	125	CD	RELIANCE	044	YES	99AX0536-VX1	SA/HST	23	F	CS,HS	B
1H21*PNL-060	ELEC ANAL INSTR RM	125	CD	RELIANCE	044	YES	99AX900679	SA/HST	33	F	CS,HS	H
1P23*PNL-001	480V LOAD RESET PANEL1	125	CD	RELIANCE	025	YES	AA1-125	SA/SAT	24	F	CS,HS	B
1R23*PNL-002	480V LOAD RESET PANEL2	125	CD	RELIANCE	025	YES	AA1-125	SA/SAT	24	F	CS,HS	B
1Z23*PNL-003	480V LOAD RESET PANEL3	125	CD	RELIANCE	025	YES	AA1-125	SA/SAT	24	F	CS,HS	B
1T48*PNL-ACM	PC ATM CNTRL	125	CD	RELIANCE	063	YES	99AX900600	SA/SAT	19	F	N	B
1Z95*ENCSX1	SXS ENCLOSURE	125	CD	RELIANCE	044		99AX900827	SA	61	F		B
1Z95*ENCSX2	SXS ENCLOSURE	125	CD	RELIANCE	044		99AX900827	SA	61	F		B
1Z95*ENCSX3	SXS ENCLOSURE	125	CD	RELIANCE	044		99AX900827	SA	61	F		B
1Z95*ENCSX4	SXS ENCLOSURE	125	CD	RELIANCE	044		99AX900827	SA	61	F		B
1Z97*PNLER1	MULTIPLEX CAB	125	CD	RELIANCE	044		99AX901437	SA	14	F		B

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STONE & WEBSTER ENGINEERING CORPORATION
CONTROL BUILDING CATEGORY I EQUIPMENT
BOP QUALIFICATION LEVEL (220 ITEMS)

RUN DATE 11/09/82
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MAPH NUMBER	EQUIPMENT DESCRIPTION	SPEC NO.	DIV. RESP	VENDOR	BLDG ELEV	AVAIL INSP	QUAL REPT	QUAL METH	FREQ	TYPE MTNG	SAFE SHTDN	QUAL STATUS
1Z97*PNLER2	MULTIPLEX CAB	125	CD	RELIANCE	044		99AX901437	SA	14	F		B
1Z97*PNLER3	MULTIPLEX CAB	125	CD	RELIANCEV	044		99AX901437	SA	14	F		D
1HS0*RV091	CHILLED H2O SURGE TK89	191	CD	LONERGAN	072	YES	502694	SA	60	P2		F
1P91*RV 019	OUTLET DIESEL HX-13	191	CD	LONERGAN	028	YES	502694	SA	60	P3		F
1P91*RV 064	CNTRL RM & RBSVS HC-3	191	CD	LONERGAN	072	YES	502694	SA	60	P2	HS	H
1P91*RV 065	CNTRL RM & RBSVS HC-4B	191	CD	LONERGAN	072	YES	502694	SA	60	P2	HS	H
1HS6*MOV031	CH RETURN	197	PD	PRATT	071	YES	D-0034-7	SA	394	P2	CS,HS	H
1HS0*MOV032	CH SUPPLY	197	PD	PRATT	075	YES	D-0034-7	SA	394	P2	CS,HS	H
1HS0*MOV033	CH RETURN CROSSOVER	197	PD	PRATT	071	YES	D-0034-7	SA	394	P2	CS,HS	H
1HS0*MOV034	CH SUPPLY CROSSOVER	197	PD	PRATT	075	YES	D-0034-7	SA	394	P2	CS,HS	H
1P91*MOV036A	VT CHILL WTR SPLY ISOL	197	PD	PRATT	012	YES	D-0034-3	SA	33+	P	CS,HS	H
1P91*MOV036B	VT CHILL WTR SPLY ISOL	197	PD	PRATT	012	YES	D-0034-3	SA	33+	P	CS,HS	H
1P91*MOV036C	VT CHILL WTR SPLY ISOL	197	PD	PRATT	050	YES	D-0034-4	SA	297	P	CS,HS	H
1H93*PNL-C01	C02 DETEC PNL RELAY R1	238	PD	RELIANCE	044	YES	44204-1	MBT	17	F2	N	H
1H93*PNL-C02	C02 SUPVR PNL BATTERY	238	PD	RELIANCE	025	YES	44204-1	MBT	17	F	N	H
1H93*PNL-C03	C02 SUPVR PNL BATTRY R	238	PD	RELIANCE	025	YES	44204-1	MBT	17	F	N	H
1H93*PNL-C04	C02 SUPVR PNL BATTRY R	238	PD	RELIANCE	025	YES	44204-1	MBT	17	F	N	H
1H93*PNL-C05	C02 SUPVR PNL DSL RM 1	238	PD	RELIANCE	015	YES	44204-1	MBT	17	F	N	H
1H93*PNL-C06	C02 SUPVR PNL DSL RM 1	238	PD	RELIANCE	015	YES	44204-1	MBT	17	F	N	H
1H93*PNL-C07	C02 SUPVR PNL DSL RM 1	238	PD	RELIANCE	015	YES	44204-1	MBT	17	F	N	H
1H93*PNL-C08	C02 SUPVR PNL EMER SHG	238	PD	RELIANCE	025	YES	44204-1	MBT	17	F	N	H

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1HA3*PNL-C09	CO2 SUPVR PNL EMER SHG	238	PD	RELIANCE	025	YES	44204-1	MBT	17	F	N	H
1HA3*PNL-C10	CO2 SUPVR PNL EMER SHG	238	PD	RELIANCE	025	YES	44204-1	MBT	17	F	N	H
1HA3*PNL-C11	CO2 SUPVR PNL COMPUTER	238	PD	RELIANCE	044	YES	44204-1	MBT	17	F	N	H
1X91*ACU-14	COMP, RELAY&EM SHGR RM	240	PD	BAHNSON CO	044	YES	A-47-75-01	SA	39	F2	CS,HS	H
1X61*ACU-07	CONTROL ROOM A/C UNITS	240	PD	BAHNSON CO	063	YES	A-47-75-01	SA	39	F2	CS,HS	H
1R35*T-B1	XFMR-EMER 120V PNL B1	248	ED	MAGNETICS	025	YES	43424-1	MBT	9	F	CS,HS	F
1R35*T-B3	XFMR-EMER 120V PNL B3	248	ED	MAGNETICS	025	YES	43424-1	MBT	9	F	CS,HS	F
1R35*T-R1	XFMR-EMER 120V PNL R1	248	ED	MAGNETICS	025	YES	43424-1	MBT	9	F	CS,HS	F
1R35*T-R3	XFMR-EMER 120V PNL R3	248	ED	MAGNETICS	025	YES	43424-1	MBT	9	F	CS,HS	F
1R35*T-01	XFMR-EMER 120V PNL 01	248	ED	MAGNETICS	025	YES	43424-1	MBT	9	F	CS,HS	F
1R35*T-02	XFMR-EMER 120V PNL 02	248	ED	MAGNETICS	025	YES	43424-1	MBT	9	F	CS,HS	F
1R35*T-201	XFR-HTR SPACE HTR-BUS	248	ED	MAGNETICS	025	YES	43424-1	MBT	9	F	CS,HS	F
1R35*T-202	XFR-HTR SPACE HTR-BUS	248	ED	MAGNETICS	025	YES	43424-1	MBT	9	F	CS,HS	F
1R35*T-203	XFR-HTR SPACE HTR-BUS	248	ED	MAGNETICS	025	YES	43424-1	MBT	9	F	CS,HS	F
1R81*T-012	HT TRACING TRANSFMR	248	ED	MAGNETICS	025		43424-1	MBT	9	F2	CS,HS	F
1X41*FN-029	RELAY&EMER SHGR RET FN	270	PD	BUFFALO FORGE	053	YES	745-11139	SA	26	F2	CS,HS	H
1X91*FN-039	CR CHILL EQUIP RM EXH	270	PD	BUFFALO FORGE	067	YES	745-11140A	SA	57	F2	CS,HS	H
1X41*FN-072	BATTERY RM VENTILATION	270	PD	BUFFALO FORGE	035	YES	745-11140C	SA	105	F3	CS,HS	H
1X40*FN-028	DIESEL GEN RM SUPPLY F	270	PD	BUFFALO FORGE	040	YES	745-11138	SA	20	F3	CS,HS	H
1T48*PNL-A2	HYD RECOMBINER CONT CA	289	PD	ATOMICS INT	063	YES	50591-A	MBT	6	F2	N	H
1H50*PCV019	RBSV H50 DIFF PRESS	310	CD	FISHER CONTROL	063	YES	2-29451	SA/SAT	25	P2	CS	H

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REVISION 4 -NOVEMBER 1982

NOTE: NUMBER IN 'TYPE HTNG' COLUMN IS QUANTITY OF ITEMS.

SHOREHAM UNIT 1 — CB LIST
JOB NUMBER 11600 — 3-SORT
LILCO DOCKET 50-322 — ACTIVE

STONE & WEBSTER ENGINEERING CORPORATION
CONTROL BUILDING CATEGORY I EQUIPMENT
BOP QUALIFICATION LEVEL (220 ITEMS)

RUN DATE 11/04/82
RUN TIME 16.15.55

HARM NUMBER	EQUIPMENT DESCRIPTION	SPEC NO.	DIV. RESP	VENDOR	BLDG ELEV	AVAIL INSP	QUAL REPT	QUAL METH	FREQ	TYPE HTNG	SAFE SHTDN	QUAL STATUS
1P91*TCV065	CNTRL RM & RBSVS HC-3	310	CD	FISHER CONT.	063	YES	CD76-20	SA	40	P6	CS,HS	H
1P91*TCV060	CNTRL RM & RBSVS HC-4	310	CD	FISHER CONT.	063	YES	CD76-20	SA	40	P6	CS,HS	H
1X91*TCV021	ACU-1A COOLING COIL	310	CD	FISHER CONT.	053	YES	2-24951	SA	25	P2	CS	H
1X61*TCV021	ACU-7A COOLING UNIT	310	CD	FISHER CONT.	071	YES	2-24951	SA	25	P2	CS	H
1H50*AOV068	CHILLED WTR ISO BY	318	CD	COPES VULCAN	071	YES	10.3.115	SA	124	P2	CS,HS	H
1H50*AOV069	CHILLED WTR ISO BY	318	CD	COPES VULCAN	075	YES	10.3.115	SA	124	P2	CS,HS	H
1H50*LCV025	CH SYSTEM A MAKEUP	318	CD	COPES VULCAN	072	YES	10.3.115	SA	124	P2	CS,HS	H
1M93*HS003	FIRE DET SM STA	319	ED	POWERS REG	044	YES	43812-1	MBT	24	F3	CS,HS	H
1M93*HS006	FIRE DET SM STA	319	ED	POWERS REG	025	YES	43812-1	MBT	24	F3	CS,HS	H
1X91*FS 013	ACU-1A AIR FLOW	319	ED	POWERS REG	031	YES	43812-1	MBT	24	F2	CS,HS	H
1X91*FS 017	FN-29 AIR FLOW	319	ED	POWERS REG	044	YES	43812-1	MBT	24	F2	CS,HS	H
1X91*HE 021	ACU-1A COOLING CNTRL	319	ED	POWERS REG	044	YES	43812-1	MBT	24	F2	CS,HS	H
1X91*HIT021	ACU-1A COOLING CNTRL	319	ED	POWERS REG	049	YES	43812-1	MBT	24	F2	CS,HS	H
1X91*HOD031	FN-039 OUTDOOR AIR	319	ED	POWERS REG	063	YES	43812-1	MBT	24	F2	CS,HS	H
1X91*HOD032	FN-039 EXHAUST AIR	319	ED	POWERS REG	064	YES	44540-1	MBT	27	F2	CS,HS	H
1X91*HOD035	ACU-1AA DISCHARGE AIR	319	ED	POWERS REG	044	YES	43812-1	MBT	24	F2	CS,HS	H
1X91*HOD036	CH FAN FN-29A& B	319	ED	POWERS REG	044	YES	43812-1	MBT	24	F2	CS,HS	H
1X91*HOD039	FN-72 OUTDOOR AIR	319	ED	POWERS REG	037	YES	44057-1	MBT	21	F3	CS,HS	H
1X91*HOD040	FN-72 EXHAUST AIR	319	ED	POWERS REG	041	YES	44057-1	MBT	21	F3	CS,HS	H
1X91*HOD041	FN-72 RETURN AIR	319	ED	POWERS REG	035	YES	44057-1	MBT	21	F3	CS,HS	H
1X91*HOD059	RELAY & CNTR RM TEMP	319	MD	POWERS REG	044	YES	44057-1	MBT	21	F2	CS,HS	H

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REVISION 4 -NOVEMBER 1982

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STONE & WEBSTER ENGINEERING CORPORATION
CONTROL BUILDING CATEGORY I EQUIPMENT
BOP QUALIFICATION LEVEL (220 ITEMS)

MARK NUMBER	EQUIPMENT DESCRIPTION	SPEC NO.	DIV. RESP	VENDOR	BLDG ELEV	AVAIL INSP	QUAL REPT	QUAL METH	FREQ	TYPE MTNG	SAFE SHTDN	QUAL STATUS
1X41*PNLVC16	VENT CONTROL PANEL	319	ED	POWERS REG	025	YES	1001-6	SA/SAT	24	F	N	H
1X41*PNLVC17	VENT CONTROL PANEL	319	ED	POWERS REG	025	YES	1001-6	SA/SAT	24	F	N	H
1X41*PNLVC18	VENT CONTROL PANEL	319	ED	POWERS REG	025	YES	1001-6	SA/SAT	24	F	N	H
1X41*PNLVC19	VENT CONTROL PANEL	319	ED	POWERS REG	025	YES	1001-6	SA/SAT	24	F	CS,HS	H
1X41*PNLVC20	VENT CONTROL PANEL	319	ED	POWERS REG	025	YES	1001-6	SA/SAT	24	F	CS,HS	H
1X41*PNLVC21	VENT CONTROL PANEL	319	ED	POWERS REG	044	YES	1001-6	SA/SAT	24	F	CS,HS	H
1X41*TE 018	FN-78 DAMPER CONTROL	319	ED	POWERS REG	030	YES	43812-1	MBT	24	F3	CS,HS	H
1X41*TI9031	FN-39 CONTROL	319	ED	POWERS REG	068	YES	43812-1	MBT	24	F2	CS,HS	H
1X41*TT-001	RM TEMP IND	319	ED	POWERS REG	025	YES	43812-1	MBT	24	F2	N	H
1X41*TT-002	RM TEMP IND	319	ED	POWERS REG	025	YES	43812-1	MBT	24	F2	N	H
1X41*TT-003	RM TEMP IND	319	ED	POWERS REG	025	YES	43812-1	MBT	24	F2	N	H
1X41*TT-004	RM TEMP IND	319	ED	POWERS REG	044	YES	43812-1	MBT	24	F2	N	H
1X41*TT-005	RM TEMP IND	319	ED	POWERS REG	044	YES	43812-1	MBT	24	F2	N	H
1X41*TT-006	CHILLER EQUIP RM TEMP	319	ED	POWERS REG	068	YES	43812-1	MBT	24	F2	N	H
1X41*TT-007	BAT RM TEMP	319	ED	POWERS REG	039	YES	43812-1	MBT	24	F2	N	H
1X41*TT-009	COMPUTER RM TEMP	319	ED	POWERS REG	044	YES	43812-1	MBT	24	F2	N	H
1X60*MOD031	FN-28 OUTDOOR AIR	319	ED	POWERS REG	038	YES	44057-1	MBT	21	F3	CS	H
1X60*MOD032	FN-39 HOT DAMPER	319	ED	POWERS REG	030	YES	44057-1	MBT	21	F3	CS	H
1X60*MOD033	FN-28 RETURN AIR	319	ED	POWERS REG	038	YES	44057-1	MBT	21	F3	CS	H
1X60*PNLVC13	VENT CONTROL PANEL	319	ED	POWERS REG	025	YES	1001-6	SA/SAT	24	F	CS,HS	H
1X60*PNLVC14	VENT CONTROL PANEL	319	ED	POWERS REG	025	YES	1001-6	SA/SAT	24	F	CS,HS	H

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REVISION 4 -NOVEMBER 1982

NOTE: NUMBER IN 'TYPE MTNG' COLUMN IS QUANTITY OF ITEMS.

SHOREHAM UNIT 1 — CB LIST — STONE & WEBSTER ENGINEERING CORPORATION — RUN DATE 11/09/82
JOB NUMBER 11600 — 3-SORT — CONTROL BUILDING CATEGORY I EQUIPMENT — RUN TIME 16.15.55
LILCO DOCKET 50-322 — ACTIVE — BOP QUALIFICATION LEVEL (220 ITEMS) — PAGE 9

MARK NUMBER	EQUIPMENT DESCRIPTION	SPEC NO.	DIV. RESP	VENDOR	BLDG ELEV	AVAIL INSP	QUAL REPT	QUAL METH	FREQ	TYPE MTNG	SAFE SHTDN	QUAL STATUS
1X60*PNLVC15	VENT CONTROL PANEL	319	ED	POWERS REG	025	YES	1001-6	SA/SAT	24	F	CS,HS	H
1X61*AOD037	CNTRL RM ISOL	319	ED	POWERS REG	063	YES	44540-1	MBT	27	F3	CS,HS	H
1X61*FS 011	FN-25 CNTRL	319	ED	POWERS REG	063	YES	43812-1	MBT	24	F2	CS,HS	H
1X61*FS 012	ACU-7 AIR FLOW	319	ED	POWERS REG	063	YES	43812-1	MBT	24	F3	CS,HS	H
1X61*MS 038	1X61*AOV038 CONTROL	319	ED	POWERS REG	066	YES	43812-1	MBT	24	F2	CS,HS	H
1X61*ME-021	ACU-7 CNTRL	319	ED	POWERS REG	063	YES	43812-1	MBT	24	F2	CS,HS	H
1X61*MOD033	FN-25 DISCH AIR	319	ED	POWERS REG	063	YES	44540-1	MBT	27	F2	N	H
1X61*MOD034	ACU-7 DISCHARGE AIR	319	ED	POWERS REG	063	YES	43812-1	MBT	24	F2	CS,HS	H
1D11*PNL-021	RBSBVS MONITORING PANE	332	PD	NMC	063	YES	45493-1	MBT	13	F	N	H
1D11*PNL-022	RBSBVS MONITORING PANE	332	PD	NMC	063	YES	45493-1	MBT	13	F	N	H
1D11*PNL-025	CONT ROOM MONITOR PNL	332	PD	NMC	044	YES	45493-1	MBT	14	F2	N	H
1D11*PNL-026	CONT ROOM MONITOR PNL	332	PD	NMC	044	YES	45493-1	MBT	14	F2	N	H
1D11*PNL-027	CONT RM VENT MONIT PNL	332	PD	NMC	063	YES	45493-1	MBT	13	F	N	H
1D11*PNL-066	POST ACCDNT MON	332	PD	NMC	063	YES	45493-1	MBT	14	F	N	H
1D11*PNL-067	POST ACCDNT MONITORS	332	PD	NMC	063	YES	45493-1	MBT	14	F	N	H
1D11*PNL-068	POST ACCDNT MONITORS	332	PD	NMC	063	YES	45493-1	MBT	14	F	N	H
1D11*PNL-069	POST ACCDNT MONITORS	332	PD	NMC	063	YES	45493-1	MBT	14	F	N	H
1D11*PNL-080	RAD MON PNL	332	PD	NMC	063	YES	45493-1	MBT	6	F2	N	H
1D11*RN-027	CR ATM NOZZLE	332	PD	NMC	CB063			MBT		F	CS,HS	D/Z
1T48*RK-25	HYDRO RECORD CONT CABI	344	ED	DELPHI IND	063	YES	1035-5	SA/SAT	29	F2	N	H
1T48*RK-26	HYDRO RECORD CONT CABI	344	ED	DELPHI IND	063	YES	1035-5	SA/SAT	29	F2	N	H

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REVISION 9 -NOVEMBER 1982

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SHOREHAM UNIT 1 — CB LIST
JOB NUMBER 11600 — 3-SORT
LILCO DOCKET 50-322 — ACTIVE

STONE & WEBSTER ENGINEERING CORPORATION
CONTROL BUILDING CATEGORY I EQUIPMENT
BOP QUALIFICATION LEVEL (220 ITEMS)

RUN DATE 11/09/82
RUN TIME 16.15.55

MARK NUMBER	EQUIPMENT DESCRIPTION	SPEC NO.	DIV. RESP	VENDOR	BLDG ELEV	AVAIL INSP	QUAL REPT	QUAL METH	FREQ	TYPE MTNG	SAFE SHTDN	QUAL STATUS
1P41*PS 006	SUCTION 1HS0*P-139B	348	CD	ASCO	063	YES	178	SAT	50+	F2	CS,HS	H
1P41*PS 009	SUCTION 1HS0*P-140B	348	CD	ASCO	063	YES	178	SAT	50+	F2	CS,HS	H
1B21*TE-037	MN STH LINE TURB AREA	406	CD	ROSEMONT	092	YES	2767	SAT	35+	F4	CS,HS	H
1HS0*FT-043	MC-3 EVAP	406	CD	ROSEMONT	063	YES	127516	SBT	50	F2	CS,HS	H
1HS0*FT-053	MC-4 EVAP	406	CD	ROSEMONT	063	YES	127516	SBT	50	F2	CS,HS	H
1HS0*PDT019	RBSVS HS0 DIF PR	406	CD	ROSEMONT	063	YES	127516	SBT	50	F2	CS,HS	H
1HS0*TE 089	RBSVS CHILLED WTR SYS	406	CD	ROSEMOUNT	078	YES	2767	SAT	35+	F2	CS,HS	H
1P41*FT 054	MC-3 COND HTR IN	406	CD	ROSEMONT	063	YES	127516	MBT	60+	F2	CS,HS	H
1P41*FT 059	MC-4 COND HTR IN	406	CD	ROSEMONT	063	YES	127516	MBT	60+	F2	CS,HS	H
1P41*TE 055	CNTRL RM & RBSVS MC-3	406	CD	ROSEMOUNT	068	YES	2767	SAT	35+	F2	CS,HS	H
1P41*TE 060	CNTRL RM & RBSVS MC-4	406	CD	ROSEMOUNT	068	YES	2767	SAT	35+	F2	CS,HS	H
1X41*TE 021	ACU-14 COOLING CONT	406	CD	ROSEMOUNT	094	YES	2767	SAT	35+	F2	CS,HS	H
1X61*TE 021	ACU COOLING CONT	406	CD	ROSEMOUNT	067	YES	2767	SAT	35+	F2	CS,HS	H
1HS0*LS 002	ISOL BYP V AOV68A,69A	407	CD	MAGNETROL	063	YES	43235-1	MBT	17	F2	HS	H
1HS0*LS 025	CH SYSTEM A MAKEUP	407	CD	MAGNETROL	063	YES	43235-1	MBT	17	F2	HS	H
1R43*LS 004	FUEL OIL AUX DAY TK	407	CD	MAGNETROL	022	YES	43235-1	SAT	17	F3	N	H
1R43*LS 007	FUEL OIL AUX DAY TK	407	CD	MAGNETROL	022	YES	43235-1	SAT	17	F3	N	H
1HS0*AOV062	RBSVS & CRAC	423	CD	FISHER	071	YES	C076-02	SAT	23	P2	CS,HS	H
1HS0*AOV063	RBSVS & CRAC	423	CD	FISHER	071	YES	C076-02	SAT	23	P2	CS,HS	H
1P41*AOV016	DIESEL HX E-13A OUTLET	423	CD	FISHER	025	YES	C076-02	SA	23	P3	CS	H
1HS0*FE-043	CHILLER DISCH	440	CD	PERKUTIT	CB072	YES	MH(B)-220-CZC	SA	60+	P2	CS	F/Z

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STONE & WEBSTER ENGINEERING CORPORATION
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BOP QUALIFICATION LEVEL (220 ITEMS)

RUN DATE 11/04/82
RUN TIME 16.15.55

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1P91*FE 018	OUTLET DIESEL HX E-13A	440	CD	PERMUTIT	CB027	YES	NH(B) 220-CZC	SA	33+	P3	CS	F/Z
1P91*FE 059	COND HC-3 RETURN	440	CD	PERMUTIT	CB069	YES	NH(B) 220-CZC	SA	33+	P2	CS,HS	F/Z
1P91*FE 059	COND HC-4 INLET	440	CD	PERMUTIT	CB072	YES	NH(B) 220-CZC	SA	33+	P2	CS,HS	F/Z
1G11*LTS-642	TMS4 LEVEL	473	CD	DELAVAL	063					F		B
1G11*LTS-645	RB FLOOD LEVEL	473	CD	DELAVAL	063					F2		B
1D11*PNL-117	RAD MON SYS IND	475	PD	KAMAN	063					F2		B
1D11*PNL-126	STA VENT MONITOR	475	PD	KAMAN	063	YES	16935	MBT	4	F	N	H
1D11*PNL-134	RB SVS MONITOR	475	PD	KAMAN	113	YES	16935	MBT	4	F	N	H
1D11*PNL-135	MICROCOMP FOR PNL126	475	PD	KAMAN	063	YES	16935-A	MBT	19	F	N	H
1D11*PNL-137	MICROCOMP FOR PNL134	475	PD	KAMAN	063	YES	16935-A	MBT	19	F	N	H

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1 MARK NUMBER	PIPE SIZE	2 QUAL REPT	3 SPEC NO.	4 LOC.	5 OPER LOAD-G'S HOR	VER	OPERATOR 6 SUPPLIER	MODEL NO.	7 QUAL YONE	8 STATUS OPER
1T46*AOV035A	12	R-1062-01	111	SC	2.7	.6	BETTIS	T-316 SR2-M3	H	H
1T46*AOV035B	12	R-1062-01	111	SC	5.2	.6	BETTIS	T-316 SR2-M3	H	H
1T46*AOV037A	12	CD75-35	111	SC	1.0	.7	BETTIS	T-316 SR2-M3	H	H
1T46*AOV037B	12	CD75-35	111	SC	.8	.9	BETTIS	T-316 SR2-M3	H	H
1T46*AOV038A	10	CD76-02	172	PC	2.2	1.2	BETTIS	722C-SR-M3	H	H
1T46*AOV038B	10	CD76-02	172	SC	1.2	1.1	BETTIS	722C-SR-M3	H	H
1T46*AOV038C	10	CD76-02	172	SC	1.0	1.3	BETTIS	722C-SR-M3	H	H
1T46*AOV038D	10	CD76-02	172	SC	1.3	1.2	BETTIS	722C-SR-M3	H	H
1T46*AOV039A	10	CD76-02	172	PC	2.2	1.2	BETTIS	722C-SR-M3	H	H
1T46*AOV039B	10	CD76-02	172	SC	1.2	1.1	BETTIS	722C-SR-M3	H	H
1T46*AOV039C	10	CD76-02	172	SC	2.3	.8	BETTIS	722C-SR-M3	H	H
1T46*AOV039D	10	CD76-02	172	SC	1.0	.8	BETTIS	722C-SR-M3	H	H
1C91*RV021A	1.5	502699	191	SC	1.5	1.3	___	___	F	-
1C91*RV021B	1.5	502699	191	SC	1.5	1.3	___	___	F	-
1E11*RV151A	1	502699	191	SC	1.5	1.3	___	___	F	-
1E11*RV151B	1	502699	191	SC	1.5	1.3	___	___	F	-
1E11*RV151C	1	502699	191	SC	1.5	1.3	___	___	F	-
1E11*RV151D	1	502699	191	SC	1.5	1.3	___	___	F	-
1E11*RV152A	4	502699	191	SC	1.3	1.0	___	___	F	-

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5. PRESENT QUALIFICATION VALID FOR OPERATOR LOADS < OR = 3 G'S HORIZONTAL AND VERTICAL(FAULTED)
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REVISION 4 -NOVEMBER 1982

1 MARK NUMBER	PIPE SIZE	2 QUAL REPT	3 SPEC NO.	4 LOC.	5 OPER LOAD-G'S HOR	VER	OPERATOR 6 SUPPLIER	MODEL NO.	7 QUAL YOKE	8 STATUS OPER
1E11*RV152B	4	502699	191	SC	4.0	2.3	---	---	F	-
1E11*RV153A	1	502699	191	SC	1.5	1.3	---	---	F	-
1E11*RV153B	1	502699	191	SC	1.5	1.3	---	---	F	-
1E11*RV154	1	502699	191	SC	1.5	1.3	---	---	F	-
1E11*RV155	2	502699	191	SC	1.5	1.3	---	---	F	-
1E11*RV162A	1	502699	191	SC	1.5	1.3	---	---	F	-
1E11*RV162B	1	502699	191	SC	1.5	1.3	---	---	F	-
1E11*RV163	.75	502699	191	SC	1.5	1.3	---	---	F	-
1E11*RV164	.75	502699	191	SC	1.5	1.3	---	---	F	-
1E21*RV092A	.75	502699	191	SC	1.5	1.3	---	---	F	-
1E21*RV092B	.75	502699	191	SC	1.5	1.3	---	---	F	-
1E21*RV093A	1.5	502699	191	SC	1.5	1.3	---	---	F	-
1E21*RV093B	1.5	502699	191	SC	1.5	1.3	---	---	F	-
1E21*RV096A	.75	502699	191	SC	1.5	1.3	---	---	F	-
1E21*RV096B	.75	502699	191	SC	1.5	1.3	---	---	F	-
1E91*RV145	.75	502699	191	SC	1.5	1.3	---	---	F	-
1E91*RV146	1.5	502699	191	SC	1.5	1.3	---	---	F	-
1E91*RV147	1.25	502699	191	SC	1.5	1.3	---	---	F	-
1E91*RV149	.75	502699	191	SC	1.5	1.3	---	---	F	-

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REVISION 4 -NOVEMBER 1982

1 HWPH NUMBER	PIPE SIZE	2 QUAL REPT	3 SPEC NO.	4 LOC.	5 OPER LOAD-G'S HOR	VER	OPERATOR 6 SUPPLIER	MODEL NO.	7 QUAL YOKE	8 STATUS OPER
1E51*RV 145	.75	502699	191	SC	.6	.2	___	___	H	-
1E51*RV 146	.75	502699	191	SC	.6	.2	___	___	H	-
1E51*RV 147	1.25	502699	191	SC	.6	.2	___	___	H	-
1E51*RV 149	.75	502699	191	SC	.6	.2	___	___	H	-
1G33*RV093	.75	502699	191	SC	1.5	1.3	___	___	F	-
1G33*RV095A	.75	502699	191	SC	1.5	1.3	___	___	F	-
1G33*RV095B	.75	502699	191	SC	1.5	1.3	___	___	F	-
1G41*RV019A	1	502699	191	SC	1.5	1.3	___	___	F	-
1G41*RV019B	1	502699	191	SC	1.5	1.3	___	___	F	-
1G41*RV024	1	502699	191	SC	1.5	1.3	___	___	F	-
1G41*RV025	1	502699	191	SC	1.5	1.3	___	___	F	-
1P41*RV029A	1	502699	191	SC	1.5	1.3	___	___	F	-
1P41*RV029B	1	502699	191	SC	1.5	1.3	___	___	F	-
1P41*RV110A	.75	502699	191	SC	1.5	1.3	___	___	F	-
1P41*RV110B	.75	502699	191	SC	1.5	1.3	___	___	F	-
1P41*RV119	.75	502699	191	SC	1.5	1.3	___	___	F	-
1P41*RV130A	.75	502699	191	SC	1.5	1.3	___	___	F	-
1P41*RV130B	.75	502699	191	SC	1.5	1.3	___	___	F	-
1P42*RV079A	1	502699	191	SC	1.5	1.3	___	___	F	-

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REVISION 4 -NOVEMBER 1982

SHOREHAM UNIT 1
JOB NUMBER 11600
LILCO DOCKET 50-322

RDPH LIST
3-SORT
ACTIVE

STONE & WEBSTER ENGINEERING CORPORATION
REACTOR BUILDING CATEGORY I PIPE MOUNTED EQUIPMENT
BOP QUALIFICATION LEVEL (393 ITEMS)

RUN DATE 11/09/82
RUN TIME 16.17.19
PAGE 4

1 MARK NUMBER	PIPE SIZE	2 QUAL REPT	3 SPEC NO.	4 LOC.	5 OPER LOAD-G'S HOR	VER	OPERATOR 6 SUPPLIER	MODEL NO.	7 8 QUAL STATUS YOKE	OPER
1P42*RV079B	1	502699	191	SC	1.5	1.3	----	----	F	-
1P42*RV080A	1	502699	191	SC	1.5	1.3	----	----	F	-
1P42*RV080B	1	502699	191	SC	1.5	1.3	----	----	F	-
1P42*RV080C	1	502699	191	SC	1.5	1.3	----	----	F	-
1P42*RV080D	1	502699	191	SC	1.5	1.3	----	----	F	-
1P42*RV091A	1	502699	191	PC	6.9	3.0	----	----	F	-
1P42*RV091B	1	502699	191	PC	6.9	3.0	----	----	F	-
1P42*RV291A	.75	502699	191	PC	6.9	3.0	----	----	F	-
1P42*RV291B	.75	502699	191	PC	6.9	3.0	----	----	F	-
1T23*RV021A	.75	502699	191	SC	1.5	1.3	----	----	F	-
1T23*RV021B	.75	502699	191	SC	1.5	1.3	----	----	F	-
1T47*RV037	.75	502699	191	PC	6.9	3.0	----	----	F	-
1T47*RV038	.75	502699	191	PC	6.9	3.0	----	----	F	-
1T48*RV017A	3	502699	191	SC	3.7	3.0	----	----	F	-
1T48*RV017B	3	502699	191	SC	1.9	.7	----	----	F	-
1P41*MOV033A	20	D-0039-8	197	SC	.8	.8	LIMITORQUE	M2BC/SMB0010	H	H
1P41*MOV033B	20	D-0039-8	197	SC	.7	.5	LIMITORQUE	M2BC/SMB0010	H	H
1P41*MOV033C	20	D-0039-5	197	SC	1.0	.5	LIMITORQUE	M2DC/SMD0005	H	H
1P41*MOV033D	20	D-0039-5	197	SC	.7	.8	LIMITORQUE	M2DC/SMD0005	H	H

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REVISION 4 -NOVEMBER 1982

SHOREHAM UNIT 1
JOB NUMBER 11600
LILCO DOCKET 50-322

RBPM LIST
3-SORT
ACTIVE

STONE & WEBSTER ENGINEERING CORPORATION
REACTOR BUILDING CATEGORY I PIPE MOUNTED EQUIPMENT
BOP QUALIFICATION LEVEL (393 ITEMS)

RUN DATE 11/09/82
RUN TIME 16.17.19

1 MARK NUMBER	PIPE SIZE	2 QUAL REPT	3 SPEC NO.	4 LOC.	5 OPER LOAD-0'S HOR	VER	OPERATOR 6 SUPPLIER	MODEL NO.	7 QUAL STATUS YOKE	8 OPER
1P41*MOV039A	20	D-0039-8	197	SC	.1	.1	LIMITORQUE	H2BC/SMB010	H	H
1P41*MOV039B	20	D-0039-8	197	SC	.6	.5	LIMITORQUE	H2BC/SMB010	H	H
1P41*MOV037A	16	D-0039-2	197	SC	.7	.5	LIMITORQUE	H2BC/SMB005	H	H
1P41*MOV037B	16	D-0039-2	197	SC	.8	.8	LIMITORQUE	H2BC/SMB005	H	H
1P41*MOV042A	6	D-0039-9	197	SC	1.2	2.1	LIMITORQUE	H0BC/SMB002	H	H
1P41*MOV042B	6	D-0039-9	197	SC	1.0	1.8	LIMITORQUE	H0BC/SMB002	H	H
1G41*MOV032A	6	1891-1	203	SC	1.3	.9	LIMITORQUE	SMB-00-10	H	H
1G41*MOV032B	6	1891-1	203	SC	.7	.6	LIMITORQUE	SMB-00-10	H	H
1P41*MOV039A	1/3	1891-1	203	SC	1.5	1.3	LIMITORQUE	SMB-000-2	H	H
1P41*MOV039B	1/3	1891-1	203	SC	1.5	1.3	LIMITORQUE	SMB-000-2	H	H
1P41*MOV043	1/3	1891-1	203	SC	1.5	1.3	LIMITORQUE	SMB-000-2	H	H
1P41*MOV102A	1/3	1891-1	203	SC	1.5	1.3	LIMITORQUE	SMB-000-2	H	H
1P41*MOV102B	1/3	1891-1	203	SC	1.5	1.3	LIMITORQUE	SMB-000-2	H	H
1P50*MOV103A	1.5/2	SR-6189	214	SC	1.5	1.3	LIMITORQUE	SMB-000-5	H	H
1P50*MOV103B	1.5/2	SR-6189	214	SC	1.5	1.3	LIMITORQUE	SMB-000-5	H	H
1P50*MOV104	1		214	SC	1.5	1.3	LIMITORQUE	SMB-000-2	B	F
1P50*MOV105A	1.5/2		214	PC	6.9	3.0	LIMITORQUE	SMB-000-5	B	F
1P50*MOV105B	1.5/2		214	PC	6.9	3.0	LIMITORQUE	SMB-000-5	B	F
1P50*MOV106	1		214	SC	1.5	1.3	LIMITORQUE	SMB-000-2	B	F

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REVISION 4 -NOVEMBER 1982

SHOREHAM UNIT 1
JOB NUMBER 11606
LILCO DOCKET 50-322

RDPH LIST
3-SORT
ACTIVE

STONE & WEBSTER ENGINEERING CORPORATION
REACTOR BUILDING CATEGORY I PIPE MOUNTED EQUIPMENT
DOP QUALIFICATION LEVEL (393 ITEMS)

RUN DATE 11/09/82
RUN TIME 16.17.19
PAGE 6

1 MARK NUMBER	PIPE SIZE	2 QUAL REPT	3 SPEC NO.	4 LOC.	5 OPER LOAD-G'S HOR	5 OPER LOAD-G'S VER	6 OPERATOR SUPPLIER	6 OPERATOR MODEL NO.	7 QUAL STATUS YOKE	8 QUAL STATUS OPER
1P50*MOV113A	1		219	SC	1.5	1.3	LIMITORQUE	SMB-000-5	B	F
1P50*MOV113B	1		219	SC	1.5	1.3	LIMITORQUE	SMB-000-5	B	F
1P50*MOV119A	1		219	SC	1.5	1.3	LIMITORQUE	SMB-000-5	B	F
1P50*MOV119B	1		219	SC	1.5	1.3	LIMITORQUE	SMB-000-5	B	F
1T23*MOV031A	.5	SR-6341	219	SC	1.5	1.3	LIMITORQUE	SMB-000-2	H	H
1T23*MOV031B	.5	SR-6341	253	SC	1.8	1.0	LIMITORQUE	SMB-000-2	H	H
1B21*MOV061	2/1		253	SC	1.4	1.7	LIMITORQUE	SMB-00-10	B	F
1B21*MOV062	2/1		253	SC	2.0	1.2	LIMITORQUE	SMB-00-10	B	F
1B21*MOV063	2/1		253	SC	1.8	1.2	LIMITORQUE	SMB-00-10	B	F
1B21*MOV064	2/1		253	SC	1.4	.9	LIMITORQUE	SMB-00-10	B	F
1B21*MOV068A	2/1	SR-6188	253	SC	1.4	1.8	LIMITORQUE	SMB-000-5	H	H
1B21*MOV068B	2/1	SR-6188	253	SC	1.8	.9	LIMITORQUE	SMB-000-5	H	H
1B21*MOV068C	2/1	SR-6188	253	SC	1.4	1.1	LIMITORQUE	SMB-000-5	H	H
1B21*MOV068D	2/1	SR-6188	253	PC	2.0	1.2	LIMITORQUE	SMB-000-5	H	H
1B21*MOV083	2/1	SR-6188	253	PC	1.6	1.2	LIMITORQUE	SMB-000-5	H	H
1B21*MOV084	2/1	SR-6188	253	PC	1.8	1.5	LIMITORQUE	SMB-000-2	B	F
1B21*MOV085	2/1	SR-6188	253	PC	6.9	3.0	LIMITORQUE	SMB-000-2	B	F
1D11*MOV032A	1		253	SC	1.5	1.3				
1D11*MOV032B	1									

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REVISION 4 -NOVEMBER 1982

SHOREHAM UNIT 1 — RDPH LIST
JOB NUMBER 11600 — 3-SORT
LILCO DOCKET 50-322 — ACTIVE

STONE & WEBSTER ENGINEERING CORPORATION
REACTOR BUILDING CATEGORY I PIPE MOUNTED EQUIPMENT
BOP QUALIFICATION LEVEL (393 ITEMS)

RUN DATE 11/09/82
RUN TIME 16.17.19

1 MARK NUMBER	PIPE SIZE	2 QUAL REPT	3 SPEC NO.	4 LOC.	5 OPER LOAD-G'S HOR	5 OPER LOAD-G'S VER	OPERATOR 6 SUPPLIER	OPERATOR 6 MODEL NO.	7 QUAL STATUS YOKE	8 QUAL STATUS OPER
1D11*MOV033A	1		253	PC	6.9	3.0	LIMITORQUE	SMB-000-2	B	F
1D11*MOV033B	1		253	SC	1.5	1.3	LIMITORQUE	SMB-000-2	B	F
1E11*MOV[illegible]A	1	SR-6190	253	SC	1.5	1.3	LIMITORQUE	SMB-000-2	H	H
1E11*[illegible]B	1	SR-6190	253	SC	1.5	1.3	LIMITORQUE	SMB-000-2	H	H
1E11*MOV056A	1	SR-6190	253	SC	1.5	1.3	LIMITORQUE	SMB-000-2	H	H
1E11*MOV056B	1	SR-6190	253	SC	1.5	1.3	LIMITORQUE	SMB-000-2	H	H
1E11*MOV057A	1		253	SC	1.5	1.3	LIMITORQUE	SMB-000-2	B	F
1E11*MOV057B	1		253	SC	1.5	1.3	LIMITORQUE	SMB-000-2	B	F
1E32*MOV021A	1.5/1		253	SC	2.5	1.3	LIMITORQUE	SMC-09-5	B	F
1E32*MOV021B	1.5/1		253	SC	2.8	1.9	LIMITORQUE	SMC-09-5	B	F
1E32*MOV021C	1.5/1		253	SC	2.5	2.4	LIMITORQUE	SMC-09-5	B	F
1E32*MOV021D	1.5/1		253	SC	2.4	1.5	LIMITORQUE	SMC-09-5	B	F
1E32*MOV022A	1.5/2		253	SC	2.3	1.5	LIMITORQUE	SMC-09-3	B	F
1E32*MOV022B	1.5/2		253	SC	2.0	1.7	LIMITORQUE	SMC-09-3	B	F
1E32*MOV022C	1.5/2		253	SC	2.2	2.7	LIMITORQUE	SMC-09-3	B	F
1E32*MOV022D	1.5/2		253	SC	2.4	.8	LIMITORQUE	SMC-09-3	B	F
1E32*MOV023A	1.5/2		253	SC	1.5	1.3	LIMITORQUE	SMC-09-3	B	F
1E32*MOV023B	1.5/2		253	SC	1.5	1.3	LIMITORQUE	SMC-09-3	B	F
1E32*MOV023C	1.5/2		253	SC	1.5	1.3	LIMITORQUE	SMC-09-3	B	F

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REVISION 9 -NOVEMBER 1982

SHOREHAM UNIT 1
JOB NUMBER 11600
LILCO DOCKET 50-322

BOPH LIST
3-SORT
ACTIVE

STONE & WEBSTER ENGINEERING CORPORATION
REACTOR BUILDING CATEGORY I PIPE MOUNTED EQUIPMENT
BOP QUALIFICATION LEVEL (393 ITEMS)

RUN DATE 11/09/82
RUN TIME 16.17.19

1 MARK NUMBER	PIPE SIZE	2 QUAL REPT	3 SPEC NO.	4 LOC.	5 OPER LOAD-G'S HOR	VER	OPERATOR 6 SUPPLIER	MODEL NO.	7 QUAL	8 STATUS OPER
1E32*MOV023D	1.5/2		253	SC	1.5	1.3	LIMITORQUE	SMC-09-3	B	F
1E32*MOV024	2/2	SR-6188	253	SC	2.1	1.2	LIMITORQUE	SMB-000-5	H	H
1E32*MOV025	2/2	SR-6188	253	SC	1.5	1.3	LIMITORQUE	SMB-000-5	H	H
1E32*MOV026	2/2	SR-6188	253	SC	1.4	.9	LIMITORQUE	SMB-000-5	H	H
1E32*MOV027	2/2	SR-6188	253	SC	1.5	1.3	LIMITORQUE	SMB-000-5	H	H
1E41*MOV039	2/2	SR-6188	253	SC	1.5	1.3	LIMITORQUE	SMB-00-5 *	H	H
1E41*MOV047	1/1	SR-6190	253	PC	4.0	.5	LIMITORQUE	SMB-000-2	H	H
1E41*MOV048	1/1	SR-6190	253	SC	.9	2.0	LIMITORQUE	SMD-000-2*	H	H
1E41*MOV049	2/2	SR-6188	253	SC	1.9	3.0	LIMITORQUE	SMD-000-2*	H	H
1E51*MOV036	2/2	SR-6188	253	SC	1.5	1.3	LIMITORQUE	SMB-000-5 *	H	H
1E51*MOV038	2/2	SR-6188	253	SC	1.5	1.3	LIMITORQUE	SMD-000-5 *	H	H
1E51*MOV046	2/2	SR-6188	253	SC	1.5	1.3	LIMITORQUE	SMD-000-2 *	H	H
1E51*MOV047	1/1	SR-6190	253	PC	5.3	1.6	LIMITORQUE	SMB-000-2	H	H
1E51*MOV048	1/1	SR-6190	253	SC	8.7	2.0	LIMITORQUE	SMB-000-2 *	D	F
1E51*MOV049	1.5/2	SR-6189	253	SC	1.5	1.3	LIMITORQUE	SMD-000-2 *	H	H
1T48*MOV004	1		253	SC	1.5	1.3	LIMITORQUE	SMD-000-2	B	F
1P41*MOV129A	10	15938	281	SC	1.1	1.4	LIMITORQUE	H1BC/SMB0002	F	F
1P41*MOV129B	10	15938	281	SC	1.9	1.8	LIMITORQUE	H1BC/SMB0002	F	F
1E41*PCV142	2/2	2-29951	310	SC	1.5	1.3	BECK	14-101-ES	H	H

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REVISION 4 -NOVEMBER 1982

SHOREHAM UNIT 1 — RDPM LIST
JOB NUMBER 11600 — 3-SORT
LILCO DOCKET 50-322 — ACTIVE

STONE & WEBSTER ENGINEERING CORPORATION
REACTOR BUILDING CATEGORY I PIPE MOUNTED EQUIPMENT
BOP QUALIFICATION LEVEL (393 ITEMS)

RUN DATE 11/04/82
RUN TIME 16.17.19

1 HARM NUMBER	PIPE SIZE	2 QUAL REPT	3 SPEC NO.	4 LOC.	5 OPER LOAD-G'S HOR	VER	OPERATOR 6 SUPPLIER	MODEL NO.	7 QUAL YOKE	8 STATUS OPER
1E51*PCV142	2/2	2-29451	310	SC	1.5	1.3	BECK	10-101-DBQ	H	H
1T46*TCV-022A	4	2-29451	310	SC	1.2	.6	BECK	10-101-ES	H	H
1T46*TCV-022B	4	2-29451	310	SC	1.0	.5	BECK	10-101-ES	H	H
1T46*TCV-023A	4	2-29451	310	SC	1.1	.2	BECK	10-101-ES	H	H
1T46*TCV-023B	4	2-29451	310	SC	.8	.8	BECK	10-101-ES	H	H
1T46*TCV-024A	4	2-29451	310	SC	.9	.6	BECK	10-101-ES	H	H
1T46*TCV-024B	4	2-29451	310	SC	1.1	.6	BECK	10-101-ES	H	H
1T46*TCV-025A	4	2-29451	310	SC	1.2	.7	BECK	10-101-ES	H	H
1T46*TCV-025B	4	2-29451	310	SC	.9	.5	BECK	10-101-ES	H	H
1T46*TCV-026A	4	2-29451	310	SC	.8	.1	BECK	10-101-ES	H	H
1T46*TCV-026B	4	2-29451	310	SC	.7	.5	BECK	10-101-ES	H	H
1T46*TCV-028A	2/3	2-29451	310	SC	1.5	1.3	BECK	10-101-ES	H	H
1T46*TCV-028B	2/3	2-29451	310	SC	1.5	1.3	BECK	10-101-ES	H	H
1T46*TCV059A	2/3	2-29451A	310	SC	1.1	.6	BECK	10-101-ES	H	H
1T46*TCV059B	2/3	2-29451A	310	SC	1.5	1.3	BECK	10-101-ES	H	H
1T46*TCV060A	2/3	2-29451A	310	SC	.6	.7	BECK	10-101-ES	H	H
1T46*TCV060B	2/3	2-29451A	310	SC	1.5	1.3	BECK	10-101-ES	H	H
1B31*AOV081	.75	10.3.115	318	PC	1.0	2.5	COPES	D-100-60	H	H
1B31*AOV082	.75	10.3.115	318	SC	.6	.6	COPES	D-100-60	H	H

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REVISION 9 -NOVEMBER 1982

STONE & WEBSTER ENGINEERING CORPORATION
REACTOR BUILDING CATEGORY I PIPE MOUNTED EQUIPMENT
BOP QUALIFICATION LEVEL (393 ITEMS)

1 MARK NUMBER	PIPE SIZE	2 QUAL REPT	3 SPEC NO.	4 LOC.	5 OPER LOAD-G'S HOR	VER	OPERATOR 6 SUPPLIER	MODEL NO.	7 QUAL STATUS YOKE	8 OPER
1E11*AOV061A	.75	10.3.115	318	SC	1.5	1.3	COPES	D-100-60	H	H
1E11*AOV061B	.75	10.3.115	318	SC	1.5	1.3	COPES	D-100-60	H	H
1E11*AOV062A	.75	10.3.115	318	SC	1.5	1.3	COPES	D-100-60	H	H
1E11*AOV062B	.75	10.3.115	318	SC	1.5	1.3	COPES	D-100-60	H	H
1E11*PCV003A	10	10.3.115	318	SC	2.9	3.0	COPES	D-100-160	H	H
1E11*PCV003B	10	10.3.115	318	SC	.9	.6	COPES	D-100-160	H	H
1E11*PCV007A	4	10.3.115	318	SC	1.2	.9	COPES	D-100-100	H	H
1E11*PCV007B	4	10.3.115	318	SC	.6	1.3	COPES	D-100-100	H	H
1E41*AOV081	1	10.3.115	318	SC	1.5	1.3	COPES	D-100-60	H	H
1E41*AOV082	1	10.3.115	318	SC	1.5	1.3	COPES	D-100-60	H	H
1E41*AOV083	1	10.3.115	318	SC	1.5	1.3	COPES	D-100-60	H	H
1E41*LCV-091	1	10.3.115	318	SC	1.5	1.3	COPES	D-100-60	H	H
1E41*LCV095	1	10.3.115	318	SC	1.5	1.3	COPES	D-100-60	H	H
1E51*AOV081	1	10.3.115	318	SC	1.5	1.3	COPES	D-100-60	H	H
1E51*AOV082	1	10.3.115	318	SC	1.5	1.3	COPES	D-100-60	H	H
1E51*AOV083	1	10.3.115	318	SC	1.5	1.3	COPES	D-100-60	H	H
1E51*LCV091	1	10.3.115	318	SC	1.5	1.3	COPES	D-100-60	H	H
1E51*LCV095	1	10.3.115	318	SC	1.5	1.3	COPES	D-100-60	H	H
1P42*PCV071	6	10.3.115	318	SC	1.2	.5	COPES	D-100-60	H	H

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REVISION 4 -NOVEMBER 1982

SHOREHAM UNIT 1
JOB NUMBER 11600
LILCO DOCKET 50-322

RBPH LIST
3-SORT
ACTIVE

STONE & WEBSTER ENGINEERING CORPORATION
REACTOR BUILDING CATEGORY I PIPE MOUNTED EQUIPMENT
EQP QUALIFICATION LEVEL (393 ITEMS)

RUN DATE 11/09/82
RUN TIME 16.17.19

1 MARK NUMBER	PIPE SIZE	2 QUAL REPT	3 SPEC NO.	4 LOC.	5 OPER LOAD-G'S HOR	5 OPER LOAD-G'S VER	OPERATOR 6 SUPPLIER	OPERATOR 6 MODEL NO.	7 QUAL STATUS YOKE	8 QUAL STATUS OPER
1T29*AOV001A	4	10.3.151	318	SC	6.8	3.6	COPES	D-100-100	F	F
1T29*AOV001B	4	10.3.151	318	SC	2.9	3.7	COPES	D-100-100	F	F
1T29*AOV004A	4	10.3.151	318	SC	1.9	1.2	COPES	D-100-100	F	F
1T29*AOV004B	4	10.3.151	318	SC	3.2	2.2	COPES	D-100-100	F	F
1T46*AOV078A	6	10.3.145	318	PC	2.5	1.5	COPES	D-100-100	H	H
1T46*AOV078B	6	10.3.145	318	SC	2.3	1.3	COPES	D-100-100	H	H
1T46*AOV079A	6	10.3.151	318	SC	3.7	1.4	COPES	D-100-100	H	H
1T46*AOV079B	6	10.3.151	318	SC	2.4	1.9	COPES	D-100-100	H	H
1P42*TCV001H	12	CD76-82	423	SC	1.6	1.6	FISHER	656-60	H	H
1P42*TCV001X	10	CD76-82	423	SC	1.3	3.1	FISHER	656-60	H	H
1P42*TCV001Y	12	CD76-82	423	SC	1.9	1.6	FISHER	656-60	H	H
1P42*TCV001Z	10	CD76-82	423	SC	2.0	1.8	FISHER	656-60	H	H
1T48*PCV143A	.25		492	SC	1.5	1.3	----	----	B	-
1T48*PCV143B	.25		492	SC	1.5	1.3	----	----	B	-
1T48*PCV143C	.25		492	SC	1.5	1.3	----	----	B	-
1T48*PCV143D	.25		492	SC	1.5	1.3	----	----	B	-
1T48*PCV144A	.25		492	SC	1.5	1.3	----	----	B	-
1T48*PCV144B	.25		492	SC	1.5	1.3	----	----	B	-
1T48*PCV145A	.25		492	SC	1.5	1.3	----	----	B	-

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JOB NUMBER 11600
LILCO DOCKET 50-322

RDPH LIST
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STONE & WEBSTER ENGINEERING CORPORATION
REACTOR BUILDING CATEGORY I PIPE MOUNTED EQUIPMENT
BOP QUALIFICATION LEVEL (393 ITEMS)

RUN DATE 11/09/82
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1 MARK NUMBER	PIPE SIZE	2 QUAL REPT	3 SPEC NO.	4 LOC.	5 OPER LOAD-G'S HOR	VER	OPERATOR 6 SUPPLIER	MODEL NO.	7 QUAL STATUS YOKE	8 OPER
1T48*PCV145B	.25		492	SC	1.5	1.3	—	—	B	-
1T48*PCV145C	.25		492	SC	1.5	1.3	—	—	B	-
1T48*PCV145D	.25		492	SC	1.5	1.3	—	—	B	-
1T48*PCV146A	.25		492	SC	1.5	1.3	—	—	B	-
1T48*PCV146B	.25		492	SC	1.5	1.3	—	—	B	-
1Z93*PCV010A	.25		492	SC	1.5	1.3	—	—	B	-
1Z93*PCV010B	.25		492	SC	1.5	1.3	—	—	B	-
1Z93*PCV011A	.25		493	SC	1.5	1.3	—	—	B	-
1Z93*PCV011B	.25		493	SC	1.5	1.3	—	—	B	-
1B21*SOV313A	.75	HR5265683271	600	SC	1.5	1.3	—	—	H	-
1B21*SOV313B	.75	HR5265683271	600	SC	1.5	1.3	—	—	H	-
1B21*SOV314A	.75	HR5265683271	600	SC	1.5	1.3	—	—	H	-
1B21*SOV314B	.75	HR5265683271	600	SC	1.5	1.3	—	—	H	-
1E11*SOV166A	.75	HR5265683271	600	SC	1.5	1.3	—	—	H	-
1E11*SOV166B	.75	HR5265683271	600	SC	1.5	1.3	—	—	H	-
1E11*SOV167A	.75	HR5265683271	600	SC	1.5	1.3	—	—	H	-
1E11*SOV167B	.75	HR5265683271	600	SC	1.5	1.3	—	—	H	-
1E11*SOV168	.75	HR5265683271	600	SC	1.5	1.3	—	—	H	-
1E11*SOV169	.75	HR5265683271	600	SC	1.5	1.3	—	—	H	-

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1T48*SOV124A	.75	MR5265683271	600	SC	1.5	1.3	___	___	H	-
1T48*SOV124B	.75	MR5265683271	600	SC	1.5	1.3	___	___	H	-
1T48*SOV127A	.75	MR5265683271	600	SC	1.5	1.3	___	___	H	-
1T48*SOV127B	.75	MR5265683271	600	SC	1.5	1.3	___	___	H	-
1T48*SOV128A	.75	MR5265683271	600	SC	1.5	1.3	___	___	H	-
1T48*SOV128B	.75	MR5265683271	600	SC	1.5	1.3	___	___	H	-
1T48*SOV129A	.75	MR5265683271	600	SC	1.5	1.3	___	___	H	-
1T48*SOV129B	.75	MR5265683271	600	SC	1.5	1.3	___	___	H	-
1T48*SOV130	.75	MR5265683271	600	SC	1.5	1.3	___	___	H	-
1T48*SOV131	.75	MR5265683271	600	SC	1.5	1.3	___	___	H	-
1T48*SOV136A	.75	MR5265683271	600	SC	1.5	1.3	___	___	H	-
1T48*SOV136B	.75	MR5265683271	600	SC	1.5	1.3	___	___	H	-
1T48*SOV137A	.75	MR5265683271	600	SC	1.5	1.3	___	___	H	-
1T48*SOV137B	.75	MR5265683271	600	SC	1.5	1.3	___	___	H	-
1B21*MOV035A	20/1	20-1500GL09	88AD	SC	9.8	2.4	LIMITORQUE	SMB-1-40	H	H
1B21*MOV035B	20/1	20-1500GL09	88AD	SC	7.5	3.5	LIMITORQUE	SMB-1-40	H	H
1E11*MOV031A	20	E5836-1.2	88AD	SC	7.6	1.1	LIMITORQUE	SMB-0-40	H	H
1E11*MOV031B	20	E5836-1.2	88AD	SC	6.0	.5	LIMITORQUE	SMB-0-40	H	H
1E11*MOV031C	20	E5836-1.2	88AD	SC	5.3	.5	LIMITORQUE	SMB-0-40	H	H

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1E11*MOV031D	20	E5836-1,2	88AD	SC	5.8	.5	LIMITORQUE	SMB-0-40	H	H
1E11*MOV032A	20	E5836-1,2	88AD	SC	6.1	1.6	LIMITORQUE	SMB-0-40	H	H
1E11*MOV032B	20	E5836-1,2	88AD	SC	4.9	7.2	LIMITORQUE	SMB-0-40	H	H
1E11*MOV032C	20	E5836-1,2	88AD	SC	4.1	5.8	LIMITORQUE	SMD-0-40	H	H
1E11*MOV032D	20	E5836-1,2	88AD	SC	5.2	6.5	LIMITORQUE	SMB-0-40	H	H
1E11*MOV034A	18	18-300A	88AD	SC	1.0	1.0	LIMITORQUE	SMB-3-150	H	H
1E11*MOV034B	18	18-300A	88AD	SC	1.5	1.9	LIMITORQUE	SMD-3-150	H	H
1E11*MOV036A	24	E5836-19	88AD	SC	3.2	2.9	LIMITORQUE	SMB-4-200	H	H
1E11*MOV036B	24	E5836-19	88AD	SC	4.9	2.2	LIMITORQUE	SMB-4-200	H	H
1E11*MOV037A	24/1	2422900GT07	88AD	SC	3.7	5.6	LIMITORQUE	SB-4-200	H	H
1E11*MOV037B	24/1	2422900GT07	88AD	SC	4.3	5.1	LIMITORQUE	SB-4-200	H	H
1E11*MOV038A	10	E5836-20	88AD	SC	5.8	1.3	LIMITORQUE	SMD-2-60	H	H
1E11*MOV038B	10	E5836-20	88AD	SC	4.3	1.5	LIMITORQUE	SMD-2-60	H	H
1E11*MOV042A	16	E5836-4	88AD	SC	3.2	4.1	LIMITORQUE	SMB-3-80	H	H
1E11*MOV042B	16	E5836-4	88AD	SC	3.3	4.8	LIMITORQUE	SMD-3-00	H	H
1E11*MOV047	20/1	20900-GT06	88AD	PC	4.9	3.3	LIMITORQUE	SB-2-60	H	H
1E11*MOV048	20/1	20900-GT06	88AD	SC	4.4	3.8	LIMITORQUE	SB-2-60 *	H	H
1E21*MOV031A	14	E5836-7	88AD	SC	3.6	2.5	LIMITORQUE	SMD-000-5	H	H
1E21*MOV031B	14	E5836-7	88AD	SC	3.5	.6	LIMITORQUE	SMD-000-5	H	H

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3. CL 1 VALVES < OR = 1 IN. ARE FLOOR-MOUNTED (EMTG-5)
4. 2/1 = 2 IN. CLASS 1
5. PRESENT QUALIFICATION VALID FOR OPERATOR LOADS < OR = 3 G'S HORIZONTAL AND VERTICAL(FAULTED)
6. IF ONLY ONE LOAD IS GIVEN FOR THE OPERATOR, IT IS THE MAXIMUM

REVISION 4 -NOVEMBER 1982

1 MARK NUMBER	PIPE SIZE	2 QUAL REPT	3 SPEC NO.	4 LOC.	5 OPER LOAD-G'S HOR	VER	OPERATOR 6 SUPPLIER	MODEL NO.	7 QUAL YOKE	8 STATUS OPER
1E21*MOV035A	10	10-300GL	88AD	SC	1.3	2.7	LIMITORQUE	SMB-1-40	H	H
1E21*MOV035B	10	10-300GL	88AD	SC	1.3	2.7	LIMITORQUE	SMB-1-40	H	H
1E41*MOV035	14/1	14500-GT05	88AD	SC	7.3	3.3	LIMITORQUE	SMB-3-100 *	H	H
1B21*MOV031	3/1	SR-6060	88V	PC	2.9	1.1	LIMITORQUE	SMB-00-10	H	H
1B21*MOV032	3/1	SR-6060	88V	SC	3.2	1.3	LIMITORQUE	SMB-000-5 *	H	H
1B21*MOV034	3	SR-6060	88V	SC	1.2	1.4	LIMITORQUE	SMB-00-7.5	H	H
1E11*MOV033A	16	SR-6266	88V	SC	3.6	1.7	LIMITORQUE	SMD-1-60	H	H
1E11*MOV033B	16	SR-6266	88V	SC	4.2	2.6	LIMITORQUE	SMD-1-60	H	H
1E11*MOV035A	16	SR-6266	88V	SC	2.3	1.8	LIMITORQUE	SMB-1-60	H	H
1E11*MOV035B	16	SR-6266	88V	SC	3.0	4.0	LIMITORQUE	SMB-1-60	H	H
1E11*MOV039A	10	SR-6082	88V	SC	10.8	1.2	LIMITORQUE	SMD-0-25	B	B
1E11*MOV039B	10	SR-6082	88V	SC	4.2	5.4	LIMITORQUE	SMB-0-25	H	H
1E11*MOV040A	16	SR-6266	88V	SC	9.3	7.3	LIMITORQUE	SMB-1-60	H	H
1E11*MOV040B	16	SR-6266	88V	SC	9.8	4.0	LIMITORQUE	SMD-1-60	H	H
1E11*MOV041A	6	SR-6177	88V	SC	5.6	2.3	LIMITORQUE	SMB-00-15	H	H
1E11*MOV041B	6	SR-6177	88V	SC	6.6	2.3	LIMITORQUE	SMD-00-15	F	F
1E11*MOV043A	4	SR-6180	88V	SC	1.2	.6	LIMITORQUE	SMB-00-15	H	H
1E11*MOV043B	4	SR-6180	88V	SC	1.6	1.0	LIMITORQUE	SMD-00-15	H	H
1E11*MOV044A	4	SR-6180	88V	SC	1.6	.6	LIMITORQUE	SMD-00-15	H	H

QUALIFICATION MILESTONES

A =REEVALUATION COMPLETE
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C =S/H RECOMMENDATION TO LILCO
D =QUAL DOC RECEIVED
E=HARDWARE MODIFICATION REQ'D
F =QUAL DOC APVD & FILED
G =SORT PAPER COMPLETE
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REVISION 4 -NOVEMBER 1992

SHOREHAM UNIT 1
JOB NUMBER 11600
LILCO DOCKET 50-322

RBPH LIST
3-SORT
ACTIVE

STONE & WEBSTER ENGINEERING CORPORATION
REACTOR BUILDING CATEGORY I PIPE MOUNTED EQUIPMENT
BOP QUALIFICATION LEVEL (393 ITEMS)

RUN DATE 11/09/82
RUN TIME 16.17.19

1 MARK NUMBER	PIPE SIZE	2 QUAL REPT	3 SPEC NO.	4 LOC.	5 OPER LOAD-G'S HOR	VER	OPERATOR 6 SUPPLIER	MODEL NO.		7 QUAL YOKE	8 STATUS OPER
1E11*MOV048B	4	SR-6180	88V	SC	2.4	1.8	LIMITORQUE	SMB-00-15		H	H
1E11*MOV048A	4	SR-6180	88V	SC	1.4	1.1	LIMITORQUE	SMB-000-5		H	H
1E11*MOV048B	4	SR-6180	88V	SC	2.8	2.2	LIMITORQUE	SMB-000-5		H	H
1E11*MOV049	10	SR-6260	88V	SC	1.9	3.0	LIMITORQUE	SMB-2-80		H	H
1E11*MOV050	20	SR-6270	88V	SC	9.9	4.5	LIMITORQUE	SMB-2-60		B	F
1E11*MOV051	4	SR-6180	88V	SC	1.5	1.5	LIMITORQUE	SMB-00-7 1/2	*	H	H
1E11*MOV052	4	SR-6180	88V	SC	2.0	1.3	LIMITORQUE	SMB-00-10		H	H
1E11*MOV053	4	SR-6068	88V	SC	2.4	2.6	LIMITORQUE	SMB-00-10 *		H	H
1E11*MOV054	4/1	SR-6068	88V	PC	3.1	2.9	LIMITORQUE	SMB-00-15		H	H
1E21*MOV033A	10/1	SR-6259	88V	SC	7.9	2.1	LIMITORQUE	SMB-2-80		H	H
1E21*MOV033B	10/1	SR-6259	88V	SC	7.9	1.3	LIMITORQUE	SMB-2-80		H	H
1E21*MOV039A	3	SR-6183	88V	SC	1.6	.8	LIMITORQUE	SMB-000-5		H	H
1E21*MOV039B	3	SR-6183	88V	SC	1.2	.4	LIMITORQUE	SMB-000-5		H	H
1E41*MOV031	16	SR-6266	88V	SC	10.4	2.4	LIMITORQUE	SMB-0-25 *		B	B
1E41*MOV032	16	SR-6266	88V	SC	4.5	1.3	LIMITORQUE	SMB-0-25 *		H	H
1E41*MOV034	14	SR-6267	88V	SC	7.7	2.4	LIMITORQUE	SMB-2-60 *		H	H
1E41*MOV036	4	SR-6068	88V	SC	3.1	1.3	LIMITORQUE	SMB-00-10 *		H	H
1E41*MOV037	8	SR-6349	88V	SC	2.7	.9	LIMITORQUE	SMB-1-25 *		H	H
1E41*MOV038	10	SR-6262	88V	SC	2.0	1.5	LIMITORQUE	SMB-1-90 *		H	H

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REVISION 4 -NOVEMBER 1982

SHOREHAM UNIT 1
JOB NUMBER 11600
LILCO DOCKET 50-322

RDPH LIST
3-SORT
ACTIVE

STONE & WEBSTER ENGINEERING CORPORATION
REACTOR BUILDING CATEGORY I PIPE MOUNTED EQUIPMENT
BOP QUALIFICATION LEVEL (393 ITEMS)

RUN DATE 11/09/82
RUN TIME 16.17.19
PAGE 17

1 MARK NUMBER	PIPE SIZE	2 QUAL REPT	3 SPEC NO.	4 LOC.	5 OPER LOAD-G'S HOR	VER	OPERATOR 6 SUPPLIER	MODEL NO.	7 QUAL STATUS YOKE	8 OPER
1E41*MOV041	10/1	SR-6259	88V	PC	4.8	2.0	LIMITORQUE	SMB-3-80	H	H
1E41*MOV042	10/1	SR-6264	88V	SC	2.4	.8	LIMITORQUE	SMB-1-60 *	H	H
1E41*MOV043	10	SR-6262	88V	SC	.7	.5	LIMITORQUE	SMB-1-60 *	H	H
1E41*MOV044	10	SR-6270	88V	SC	2.3	2.6	LIMITORQUE	SMB-0-15 *	H	H
1E51*MOV031	6	SR-6177	88V	SC	7.4	3.9	LIMITORQUE	SMB-00-5 *	H	H
1E51*MOV032	6	SR-6177	88V	SC	4.4	2.1	LIMITORQUE	SMB-00-5 *	H	H
1E51*MOV034	4	SR-6068	88V	SC	1.4	3.3	LIMITORQUE	SMB-00-10 *	H	H
1E51*MOV035	6/1	SR-6574	88V	SC	6.4	5.2	LIMITORQUE	SMB-00-25 *	F	F
1E51*MOV037	4	SR-6068	88V	SC	2.2	.9	LIMITORQUE	SMB-00-10 *	H	H
1E51*MOV041	3/1	SR-6060	88V	PC	2.5	2.1	LIMITORQUE	SMB-00-10	H	H
1E51*MOV042	3/1	SR-6060	88V	SC	4.8	1.2	LIMITORQUE	SMB-00-7 1/2 *	H	H
1E51*MOV043	3	SR-6060	88V	SC	1.2	.8	LIMITORQUE	SMB-00-7 1/2 *	H	H
1E51*MOV045	8	SR-6078	88V	SC	4.4	3.6	LIMITORQUE	SMB-000-5 *	H	H
1G11*MOV246	4	SR-6180	88V	SC	4.3	2.7	LIMITORQUE	SMB-000-5	H	H
1G11*MOV247	4	SR-6180	88V	SC	3.6	5.9	LIMITORQUE	SMB-000-5	H	H
1G11*MOV248	3	SR-6183	88V	SC	1.7	1.3	LIMITORQUE	SMB-000-5	H	H
1G11*MOV249	3	SR-6183	88V	SC	2.5	1.2	LIMITORQUE	SMB-000-5	H	H
1G11*MOV639	3	SR-6977	88V	SC	.6	.5	LIMITORQUE	SMB-000-5	H	H
1G33*MOV030A	4/1	SR-6068	88V	PC	3.6	1.9	LIMITORQUE	SMB-00-15	H	H

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REVISION 4 -NOVEMBER 1982

SHOREHAM UNIT 1
JOB NUMBER 11600
LILCO DOCKET 50-322

RBMI LIST
3-SORT
ACTIVE

STONE & WEBSTER ENGINEERING CORPORATION
REACTOR BUILDING CATEGORY I PIPE MOUNTED EQUIPMENT
DOP QUALIFICATION LEVEL (393 ITEMS)

RUN DATE 11/09/82
RUN TIME 16.17.19

1 MARK NUMBER	PIPE SIZE	2 QUAL REPT	3 SPEC NO.	4 LOC.	5 OPER LOAD-G'S HOR	5 OPER LOAD-G'S VER	OPERATOR 6 SUPPLIER	OPERATOR 6 MODEL NO.	7 QUAL STATUS YOKE	8 QUAL STATUS OPER
1G33*MOV030B	4/1	SR-6068	88V	PC	7.4	3.3	LIMITORQUE	SMB-00-15	M	M
1G33*MOV031	6/1	SR-6181	88V	PC	5.5	2.5	LIMITORQUE	SMB-0-40	M	M
1G33*MOV032	4/1	SR-6068	88V	PC	6.5	1.4	LIMITORQUE	SMB-00-10	M	M
1G33*MOV033	6/1	SR-6181	88V	PC	8.0	.4	LIMITORQUE	SMB-00-25	M	M
1G33*MOV034	6/1	SR-6181	88V	SC	4.6	2.4	LIMITORQUE	SMB-00-15 *	M	M
1G33*MOV035	4	SR-6353	88V	SC	1.8	.8	LIMITORQUE	SMB-0-15	M	M
1G33*MOV036	4	SR-6353	88V	SC	.9	.5	LIMITORQUE	SMB-0-15	M	M
1G33*MOV037	4	SR-6353	88V	SC	.7	.8	LIMITORQUE	SMB-0-15	M	M
1G33*MOV038	4	SR-6068	88V	SC	.7	.7	LIMITORQUE	SMB-00-15	M	M
1G33*MOV039	4	SR-6068	88V	SC	.6	.6	LIMITORQUE	SMB-00-15	M	M
1G33*MOV040	4	SR-6353	88V	SC	1.4	1.1	LIMITORQUE	SMB-0-15	M	M
1G33*MOV041	6/1	SR-6574	88V	SC	5.1	3.9	LIMITORQUE	SMB-1-25	M	M
1G41*MOV033A	6	SR-6177	88V	SC	1.5	1.5	LIMITORQUE	SMB-000-5	M	M
1G41*MOV033B	6	SR-6177	88V	SC	1.0	1.0	LIMITORQUE	SMB-000-5	M	M
1G41*MOV034A	10	SR-6082	88V	SC	5.0	1.0	LIMITORQUE	SMB-0-7 1/2	M	M
1G41*MOV034B	10	SR-6082	88V	SC	3.4	.8	LIMITORQUE	SMB-0-7 1/2	M	M
1P42*MOV031A	8	SR-6186	88V	SC	1.7	.3	LIMITORQUE	SMD-000-5	M	M
1P42*MOV031B	8	SR-6186	88V	SC	1.8	.5	LIMITORQUE	SMB-000-5	M	M
1P42*MOV032A	8	SR-6186	88V	SC	.6	.5	LIMITORQUE	SMD-000-5	M	M

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REVISION 4 -NOVEMBER 1982

SHOREHAM UNIT 1 — RDPH LIST — STONE & WEBSTER ENGINEERING CORPORATION — RUN DATE 11/09/82
JOB NUMBER 11600 — 3-SORT — REACTOR BUILDING CATEGORY I PIPE MOUNTED EQUIPMENT — RUN TIME 16.17.19
LILCO DOCKET 50-322 — ACTIVE — BOP QUALIFICATION LEVEL (393 ITEMS) — PAGE 19

1 MARK NUMBER	PIPE SIZE	2 QUAL REPT	3 SPEC NO.	4 LOC.	5 OPER LOAD-G'S HOR	5 OPER LOAD-G'S VER	OPERATOR 6 SUPPLIER	OPERATOR 6 MODEL NO.	7 QUAL STATUS YOKE	8 QUAL STATUS OPER
1P42*HOV032B	8	SR-6186	88V	SC	.6	.6	LIMITORQUE	SMB-000-5	H	H
1P42*HOV033A	6	SR-6199	88V	SC	.6	1.0	LIMITORQUE	SMB-000-5	H	H
1P42*HOV033B	6	SR-6199	88V	SC	.7	1.0	LIMITORQUE	SMB-000-5	H	H
1P42*HOV034A	6	SR-6199	88V	SC	1.3	1.1	LIMITORQUE	SMB-000-5	H	H
1P42*HOV034B	6	SR-6199	88V	SC	1.2	1.1	LIMITORQUE	SMB-000-5	H	H
1P42*HOV035	4	SR-6180	88V	SC	4.6	3.8	LIMITORQUE	SMB-000-5	H	H
1P42*HOV036	4	SR-6180	88V	SC	4.6	2.3	LIMITORQUE	SMB-000-5	H	H
1P42*HOV041A	14	SR-6265	88V	SC	2.6	2.4	LIMITORQUE	SMB-0-25	H	H
1P42*HOV041B	14	SR-6265	88V	SC	2.1	2.0	LIMITORQUE	SMB-0-25	H	H
1P42*HOV042A	14	SR-6265	88V	SC	1.6	2.7	LIMITORQUE	SMB-0-25	H	H
1P42*HOV042B	14	SR-6265	88V	SC	1.6	2.2	LIMITORQUE	SMB-0-25	H	H
1P42*HOV043A	8	SR-6186	88V	SC	1.1	.4	LIMITORQUE	SMB-000-5	H	H
1P42*HOV043B	8	SR-6186	88V	SC	3.0	.6	LIMITORQUE	SMB-000-5	H	H
1P42*HOV044A	8	SR-6186	88V	SC	1.0	.6	LIMITORQUE	SMB-000-5	H	H
1P42*HOV044B	8	SR-6186	88V	SC	2.9	1.4	LIMITORQUE	SMB-000-5	H	H
1P42*HOV047	4	SR-6180	88V	SC	3.7	4.2	LIMITORQUE	SMB-000-5	H	H
1P42*HOV048	4	SR-6180	88V	SC	4.0	3.1	LIMITORQUE	SMB-000-5	H	H
1P42*HOV147	4	SR-6180	88V	PC	4.3	.9	LIMITORQUE	SMB-000-5	H	H
1P42*HOV148	4	SR-6180	88V	PC	4.2	1.0	LIMITORQUE	SMB-000-5	H	H

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REVISION 4 -NOVEMBER 1982

SHOREHAM UNIT 1
JOB NUMBER 11600
LILCO DOCKET 50-322

RBPM LIST
3-SORT
ACTIVE

STONE & WEBSTER ENGINEERING CORPORATION
REACTOR BUILDING CATEGORY I PIPE MOUNTED EQUIPMENT
BOP QUALIFICATION LEVEL (393 ITEMS)

RUN DATE 11/04/82
RUN TIME 16.17.19

1 MARK NUMBER	PIPE SIZE	2 QUAL REPT	3 SPEC NO.	4 LOC.	5 OPER LOAD-G'S HOR	VER	OPERATOR 6 SUPPLIER	MODEL NO.	7 QUAL STATUS YOKE	OPER
1P42*MOV231	4	SR-6180	88V	SC	1.0	.8	LIMITORQUE	SMB-000-5	H	H
1P42*MOV232	3	SR-6183	88V	SC	3.5	7.1	LIMITORQUE	SMB-000-5	H	H
1P42*MOV233	3	SR-6183	88V	SC	4.4	9.8	LIMITORQUE	SMB-000-5	H	H
1P42*MOV234	3	SR-6183	88V	SC	5.4	9.5	LIMITORQUE	SMB-000-5	H	H
1P42*MOV235	3	SR-6183	88V	SC	5.9	7.9	LIMITORQUE	SMB-000-5	H	H
1P42*MOV236	4	SR-6180	88V	SC	6.4	3.6	LIMITORQUE	SMB-000-5	H	H
1P42*MOV237	3	SR-6183	88V	SC	4.0	2.5	LIMITORQUE	SMB-000-5	H	H
1P42*MOV238	3	SR-6183	88V	SC	4.5	1.6	LIMITORQUE	SMB-000-5	H	H
1P42*MOV239	3	SR-6183	88V	SC	7.6	2.2	LIMITORQUE	SMB-000-5	H	H
1P42*MOV240	3	SR-6183	88V	SC	3.8	1.7	LIMITORQUE	SMB-000-5	H	H
1T48*MOV031A	6	SR-6177	88V	PC	2.9	1.3	LIMITORQUE	SMB-00-5	H	H
1T48*MOV031B	6	SR-6177	88V	PC	6.4	3.4	LIMITORQUE	SMB-00-5	H	H
1T48*MOV032A	6	SR-6177	88V	PC	3.7	2.7	LIMITORQUE	SMB-00-7 1/2	H	H
1T48*MOV032B	6	SR-6177	88V	PC	5.4	4.1	LIMITORQUE	SMB-00-7 1/2	H	H
1T48*MOV033A	6	SR-6177	88V	SC	4.2	1.5	LIMITORQUE	SMB-00-5	H	H
1T48*MOV033B	6	SR-6177	88V	SC	4.0	1.8	LIMITORQUE	SMB-00-5	H	H
1T48*MOV034A	6	SR-6177	88V	SC	3.7	1.8	LIMITORQUE	SMB-00-7 1/2	H	H
1T48*MOV034B	6	SR-6177	88V	SC	3.2	1.5	LIMITORQUE	SMB-00-7 1/2	H	H
1T48*MOV035A	4	SR-6180	88V	SC	4.2	2.8	LIMITORQUE	SMB-000-5	H	H

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REVISION 4 -NOVEMBER 1982

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1T48*MOV035B	4	SR-6180	88V	SC	4.2	2.1	LIMITORQUE	SMB-000-5	H	H
1T48*MOV037A	6	SR-6177	88V	SC	3.9	3.5	LIMITORQUE	SMB-00-7 1/2	H	H
1T48*MOV037B	6	SR-6177	88V	SC	2.7	2.6	LIMITORQUE	SMB-00-7 1/2	H	H
1T48*MOV038A	4	SR-6180	88V	SC	4.1	2.0	LIMITORQUE	SMB-000-5	H	H
1T48*MOV038B	4	SR-6180	88V	SC	4.2	1.7	LIMITORQUE	SMB-000-5	H	H
1T48*MOV040A	6	SR-6177	88V	SC	4.1	1.1	LIMITORQUE	SMB-00-7 1/2	H	H
1T48*MOV040B	6	SR-6177	88V	SC	3.2	1.8	LIMITORQUE	SMB-00-7 1/2	H	H
1T48*MOV041	4	SR-6180	88V	SC	1.4	.9	LIMITORQUE	SMB-000-5	H	H
1T48*MOV042	4	SR-6180	88V	SC	.9	2.0	LIMITORQUE	SMB-000-5	H	H
1T48*MOV043A	4	SR-6180	88V	SC	2.9	2.5	LIMITORQUE	SMB-000-5	H	H
1T48*MOV043B	4	SR-6180	88V	SC	4.8	3.0	LIMITORQUE	SMB-000-5	H	H
1T48*MOV044A	4	SR-6180	88V	SC	6.0	1.9	LIMITORQUE	SMB-000-5	H	H
1T48*MOV044B	4	SR-6180	88V	SC	4.8	1.9	LIMITORQUE	SMB-000-5	H	H

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NOTES

1. CL 2 AND 3 VALVES < OR = 2 IN. ARE FLOOR-MOUNTED (EMTG- 5)
2. * = DC MOTOR. ALL OTHERS ARE AC
3. CL 1 VALVES < OR = 1 IN. ARE FLOOR-MOUNTED (EMTG-5)
4. 2/1 = 2 IN. CLASS 1
5. PRESENT QUALIFICATION VALID FOR OPERATOR LOADS < OR = 3 G'S HORIZONTAL AND VERTICAL(FAULTED)
6. IF ONLY ONE LOAD IS GIVEN FOR THE OPERATOR, IT IS THE MAXIMUM

REVISION 4 -NOVEMBER 1982

SHOREH/ T 1 | GE LIST | STONE & WEBSTER ENGINE CORPORATION | RUN DATE 11/04/82
JOB NO. 409 | 3-SORT | GENERAL ELECTRIC CATEG I EQUIPMENT | RUN TIME 16.16.43
LILCO DOCKET 50-322 | ACTIVE | NSSS QUALIFICATION LEVEL(151 ITEMS) | PAGE 1

MARK NUMBER	EQUIPMENT DESCRIPTION	GE NO.	VENDOR	BLDG ELEV	AVAIL INSP	QUAL REPT	QUAL METH	FREQ	TYPE MTNG	SAFETY FUNC	QUAL STATUS
1B21*D-003	CONDENSING CHAMBER	B21D002	GE	SC080	YES	DRF-A00794-11	SA	60+	P	HS,CS	G
1B21*D-004	CONDENSING CHAMBERS	B21D004	GE	SC080	YES	DRF-A00794-11	SA	60+	P2	HS,CS	G
1B21*D-005	CONDENSING CHAMBERS	B21D006	GE	SC080	YES	DRF-A00794-11	SA	60+	P16	HS,CS	G
1B21*RV 092	RELIEF VALVE	B21F013	TARG ROCK	PC099	YES	VPF-5485-3-1	MBT	60+	P11	CS	G
1B21*AOV081	ISOLATION VALVE-MS	B21F022	ROCKWELL	SC082	YES	NEDE-24122-2	SA	8	P4	CS,HS	G
1B21*AOV082	ISOLATION VALVE-MS	B21F028	ROCKWELL	SC082	YES	NEDE-24122-2	SA	8	P4	CS,HS	G
1B21*FE 002	FLOW ELEMENT	B21N005	PERMUTIT	SC087	YES		SA		P4	N	B/Z
1B21*TE 043Y	TEMPERATURE ELEMENT	B21N010	PYCO	T082	YES	DV145C3004	SAT	60+	F4	N	D
1B21*TE 059	TEMPERATURE ELEMENT	B21N014	PYCO	T059	YES	DV145C3224	SAT	60+	F4	N	D
1B21*P3 028	PRESSURE SWITCH	B21N015	BARKSDALE	CB037	YES	DV164C5359	SAT	33+	F4	N	D
1B21*TE 043X	TEMPERATURE ELEMENT	B21N016	PYCO	T059	YES	DV164C5359	SAT	60+	F4	N	D
1B21*TE 003	TEMPERATURE ELEMENT	B21N040	CROUSE-HI	T083	YES	DV159C4520	SAT	100	P	N	D
1B31*P- 001	RECIRC PUMP & MOTOR	B31C001	BJ/GE	PC070	YES	206B33C001-MS-1	SA	60+	P2	N	G
1B31*MOV031	RECIRC SUCTION VALVE	B31F023	ANCHOR	SC017	YES	385HA661	SA	41	P2	N	G
1B31*MOV032	RECIRC DISCHARGE VALVE	B31F031	ANCHOR	SC014	YES		SA/DA		P2	N	B
1D31*FE 010	RECIRC FLOW ELEM	B31N013	BIF	SC080	YES		SA		P2	N	B/Z
1B31*TE 025	TEMPERATURE ELEMENT	B31N023	CROUSE-HI	PC065	YES	DV159C4520	SAT	10	P2	N	D
1C11*HCU-01	CRD HYDRA CONT UNIT	C11D001	GE	SC078	YES	383HA353	MST	2	137	CS,HS	B
1C11*SOV044	HCU SOLENOID VALVE	C11F009	ASCO	SC063					P	CS,HS	B

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REVISION 4 -NOVEMBER 1982

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1C11*AOV001	HCU DIAPHRAGH VALVE	C11F010	MOH	SC078	YES		SA		P	CS,HS	B
1C11*AOV002	HCU DIAPHRAGH VALVE	C11F011	MOH	SC078	YES		SA		P	CS,HS	B
1C11*LS 099	LEVEL SWITCH	C11N013	MAGNETROL	SC078	YES	SHIP LOOSE	SAT	30+	F2		F
1C11*LS 095	LEVEL SWITCH	C11N013	MAGNETROL	SC078	YES	DV159C9361	SAT	30+	F6	N	D
1C41*TK-003	SLC STORAGE TANK	C41A001	LAHCO	SC113	YES	RA542/C41-22	SA	59	F	N	G
1C41*TK-150	SLC ACCUMULATORS	C41A003	HYDRA CON	SC097	YES	DRF C41-22	SA	N/A	P2	N	G
1C41*P-024	STDBY LIQ PUMP&MTR	C41C001	UNION PUM	SC113	YES	VPF-5517-2-2	SBT	60+	F2	N	G
1C41*EV 010	EXPLOSIVE VALVE	C41F004	CONAX	SC112	YES	VPF3394-36-2	SBT	35+	P2	N	G
1C41*TS001A	TEMP SWITCH	C41N003	MEED INST	SC112		SHIP LOOSE	SAT	60+	F		D/Z
1C41*PT 002	PRESSURE TRANSMITTER	C41N004	ROSEMOUNT	SC112	YES	DV163C1563	SAT	3	F	N	D
1C41*PI 002	PRESSURE INDICATOR	C41R003	ROBT SHAW	SC112	YES	DV163C1184	SAT	33+	F	N	D
1C51*TIP-004	TIP VALVE GUIDE T	C51J004	GE	SC073	YES	DRF-A00992-M	SAT	60+	F4	N	D
1C61*PT 001	DIFF PRESS XMTR	C61N001	ROSEMOUNT	SC008	YES	DV163C1560	SAT	30	F	N	D
1C61*PT 006	PRESS TRANS	C61N006	BAILEY	SC079	YES	DV163C1186	SAT	33+	F	N	D
1C61*CE 016	COND TRANSMITTER	C61N008	BALLSBAUG	SC030	YES	DV163C1544	SAT	3	P	N	D
1C61*PNL-R3P	REMOTE SHT DN PNL	C61P001	GE	SC063	YES	SAI-029QA80PA-B	MBT	14	F	N	D
1C71*PS 003	PRESSURE SWITCH	C71N003	BARKSDALE	CB037	YES	DV164C5359	SAT	33+	F4	N	D
1E11*E-034	RHR HEAT EXCHANGERS	E11B001	PERFEX CP	SC008	YES	DRF E11-1	DA	14	F2	HS,CS	G
1E11*P-014	RHR PUMPS &MOTORS	E11C002	BJ/GE	SC008	YES	DRF E11-11	DA	10	F4	HS,CS	G

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1E11*FT 006	DIFF PRESS TRANS	E11N007	ROSEMOUNT	SC008	YES	DV163C1560	SAT	50	F2	N	D
1E11*LT 002	LEVEL XMTR	E11N008	BARTON	SC024	YES	DV145C3156	SAT	100	F2	N	D
1E11*TE 014	TEMP ELEMENT	E11N009	PYCO	SC023	YES	DV145C3224	SAT	60+	F2	N	D
1E11*FE 004	RHR FLOW ORIFICE	E11N012	VICK SIMS	SC093	YES	SAI-SQRT-DJC5	SA	60+	P	CS	F/Z
1E11*FT 004	DIFF PRESS XMTR	E11N013	ROSEMOUNT	SC078	YES	DV163C1560	SAT	50	F	N	D
1E11*FE 001	RHR FLOW ORIFICE	E11N014	VICK SIMS	SC057	YES	SAI-DJC2	SA	60+	P2	HS,CS	F/Z
1E11*PS 134	PRESSURE SWITCH	E11N016	BARKSDALE	SC008	YES	SHIP LOOSE	SAT	33+	F4	N	D
1E11*PS 135	PRESSURE SWITCH	E11N020	BARKSDALE	SC008	YES	SHIP LOOSE	SAT	33+	F4	N	D
1E11*TE 015	TEMP ELEMENT	E11N030	PYCO	SC023	YES	DV145C3224	SAT	60+	F2	N	D
1E21*P-013	CS PUMPS & MOTORS	E21C001	BJ/GE	SC008	YES	DRF E21-53	DA	12	F2	CS	G
1E21*FE 002	CS FLOW ORIFICE	E21N002	VICK SIMS	SC047	YES	SAI-DJC4	SA	60+	P2	CS	F/Z
1E21*PS 012	PRESSURE SWITCH	E21N008	BARKSDALE	SC008	YES	SHIP LOOSE	SAT	33+	F2	N	G
1E21*PS013	PRESSURE SWITCH	E21N009	BARKSDALE	SC008	YES	SHIP LOOSE	SAT	33+	F2	N	G
1E21*PIS098	PRESS INDIC SWITCH	E21N010	ROBT SHAW	SC008	YES	DV163C1185	SAT	33+	F2	N	G
1E32*HC-053	MSIV LCS HTR	E32B001	GE	SC078			MBT		P4	N	B
1E32*BLO-14	INBD MSIV LCS BLOWER	E32C001	GE	SC076	YES	VPF3830-14-1	SBT	60+	F	N	G
1E32*BLO-13	OUTBD MSIV LCS BLOWER	E32C002	GE	SC076	YES	VPF3830-14-1	SBT	60+	F2	N	G
1E32*FE 037	MSIV LEAK TO LPM	E32N006	S & K INS	SC067		DV163C110707	SAT	3	P4	N	D/Z1
1E32*FE037	FLOW METER	E32N006	S&K	SC065		SHIP LOOSE		30+	P4		D

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REVISION 4 -NOVEMBER 1982

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SHOREHAM UNIT 1
JOB NUMBER 11600
LILCO DOCKET 50-322

GE LIST
3-SORT
ACTIVE

STONE & WEBSTER ENGINEERING CORPORATION
GENERAL ELECTRIC CATEGORY I EQUIPMENT
NSSS QUALIFICATION LEVEL(151 ITEMS)

RUN DATE 11/09/82
RUN TIME 16.16.43

MARK NUMBER	EQUIPMENT DESCRIPTION	GE NO.	VENDOR	BLDG ELEV	AVAIL INSP	QUAL REPT	QUAL METH	FREQ	TYPE MTNG	SAFETY FUNC	QUAL STATUS
1E32*PT 033	GAGE PRESS TRANS	E32N055	ROSEMOUNT	SC063	YES	DV163C1549	SAT	50	F	N	D
1E32*PT 034	ABS PRESS TRANS	E32N056	ROSEMOUNT	SC063	YES	DV163C1550	SAT	50	F	N	D
1E32*PDT035	DIFF PRESS TRANS	E32N059	ROSEMOUNT	SC063	YES	DV163C1561	SAT	50	F	N	D
1E41*P-016	HPCI PUMP&BOOSTER	E41C001	PACIFIC P	SC008	YES	VPF-2740-180-1	DA	23	F	N	G
1E41*TU-002	HPCI TURBINE	E41C002	TERRY	SC008	YES		MBT		F	N	B
1E41*LS093A	LEVEL SWITCH	E41N002	MAGNETROL	YARD	YES	DV159C4294	SAT	1	F	N	D
1E41*LS093B	LEVEL SWITCH	E41N003	MAGNETROL	YARD	YES	DV159C4294	SAT	1	F	N	D
1E41*FE 003	FLOW ORIFICE	E41N007	VICK SIMS	SC021	YES	SAI-DJC3	SA	60+	P	N	F/Z
1E41*LS091	LEVEL SWITCH	E41N014	MAGNETROL	SC016	YES	DV159C4361	SAT	4	F	N	D
1E41*LS092	LEVEL SWITCH	E41N015	MAGNETROL	SC027	YES	DV159C4294	SAT	1	F2	N	D
1E41*TE053	TEMPERATURE ELEMENT	E41N024	PYCO	SC034	YES	DV145C3224	SAT	60+	F2	N	D
1E41*TE054	TEMPERATURE ELEMENT	E41N028	PYCO	SC025	YES	DV145C3224	SAT	60+	F2	N	D
1E41*TE055	TEMPERATURE ELEMENT	E41N029	PYCO	SC017	YES	DV145C3224	SAT	60+	F2	N	D
1E41*TE056	TEMPERATURE ELEMENT	E41N030	PYCO	SC063	YES	DV145C3224	SAT	60+	F2	N	D
1E41*TI141	TEMP INDICATOR	E41R002	HEED	SC008	YES	DV145C3103	SAT	100	P	N	D
1E51*P-015	RCIC PUMP	E51C001	BINGHAM	SC008	YES	ORF E51C00112	SA	24	F	HS	G
1E51*TU-005	RCIC TURBINE	E51C002	TERRY	SC008	YES	VPF3622-79(1)-2	SA/MBT	15	F	HS	G
1E51*FE 003	FLOW ORIFICE	E51N001	VICK SIMS	SC018	YES	SAI-DJC1	SA	60+	P	HS	F/Z
1E51*LS091	LEVEL SWITCH	E51N010	MAGNETROL	SC008	YES	DV159C4361	SAT	4	F	N	D

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1ES1*TE052	TEMPERATURE ELEMENT	E51N011	PYCO	SC025	YES	DV145C3224	SAT	60+	F2	N	D
1ES1*TE053	TEMPERATURE ELEMENT	E51N022	PYCO	SC027	YES	DV145C3224	SAT	60+	F2	N	D
1ES1*TE054	TEMPERATURE ELEMENT	E51N023	PYCO	SC063	YES	DV145C3224	SAT	60+	F2	N	D
1ES1*TE055	TEMPERATURE ELEMENT	E51N025	PYCO	SC066	YES	DV145C3224	SAT	60+	F4	N	D
1ES1*TE056	TEMPERATURE ELEMENT	E51N026	PYCO	SC066	YES	DV145C3224	SAT	60+	F4	N	D
1ES1*TI141	THERMOMETER	E51R005	ROBT SHAW	SC008		DV145C3103	SAT	100	P	N	D
1F11*TO-005	FUEL PREP MACHINE	F11E001	GE	SC176	YES	DRF F0000002-3	DA	N/A	F2	N	G
1F11*TO-008	GEN PURPOSE GRAPPLE	F11E011	GE	SC176	YES	DRF139F11E011L	SA	N/A	F3	N	G
1F13*SL-001	DRYER&SEP SLING	F13E008	CAL PAC	SC176	YES	DRF F13-9	SA	N/A	F	N	G
1F13*TO-016	HEAD STRONGBACK	F13E009	LAMCO	SC176	YES	DRF F13-11	SA	N/A	F	N	G
1F14*TO-029	CONT ROD GRAPPLE	F14E002	GE	SC176	YES	DRF139F14E002K	SA	N/A	F	N	G
1F15*CRN-009	REFUEL PLTF ASSY	F15E003	STERN ROG	SC176	YES	DRFF00000022	DA	N/A	F	N	G
1F16*RAK-10	STRG RACK(CR&DEF F)	F16E004	GE	SC137	YES	DRF F16-0003	DA	13	F3	N	G
1F16*RAK-09	FUEL RACK(IN VESSL)	F16E006	VOTAM	SC176			DA		F2	N	B
1F16*RAK-11	NEW FUEL STRG RACKS	F16E007	GE	SC151	YES	DRF F00-00002	DA	N/A	F17	N	G
1F16*CSK-01	DEF F STRG CONTAIN	F16E009	GE	SC151	YES	139F16E009K1	DA	1	F8	N	G
1F16*RAK-025	POISON CURTAIN	F16E015	DNP	SC151	YES	DRF F16-00009-1	DA	1	F14	N	G
1G33*FE 013	ORIFICE FLANGE	G33N011	VICK SIMS	SC		SHIP LOOSE	SA	60+	P		F/Z
1G33*TE071	TEMPERATURE ELEMENT	G33N016	PYCO	SC136	YES	DV145C3224	SAT	60+	F6	N	D

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MARK NUMBER	EQUIPMENT DESCRIPTION	GE NO.	VENDOR	BLDG ELEV	AVAIL INSP	QUAL REPT	QUAL METH	FREQ	TYPE MTNG	SAFETY FUNC	QUAL STATUS
1B33*FE 011	ORIFICE FLANGE	G33N035	VICK SIMS	SC		SHIP LOOSE	SA	60+	P		F/Z
1B33*FE012	ORIFICE FLANGE	G33N040	CK SIMS	SC		SHIP LOOSE	SA	60+	P		F/Z
1B33*FT012	DIFF PRESS TRANS	G33N041	ROSEMOUNT	SC100	YES	DV145C3240	SAT	50	F	M	D
1B33*TE020E	TEMPERATURE ELEMENT	G33N042	PYCO	PC97	YES	SHIP LOOSE	SAT	10	F	N	D
1H11*PNL-601	REAC&CORE COOL BB	H11P601	GE	CB063	YES	SAI-029QA80PA-B	MBT	14	F	HS,CS	G
1H11*PNL-602	RWCU & RECIRC BM	H11P602	GE	CB063	YES	SAI-029QA80PA-B	MBT	14	F	HS,CS	G
1H11*PNL-603	REACTOR CONTROL B	H11P603	GE	CB063	YES	SAI-029QA80PA-B	MBT	14	F	HS,CS	G
1H11*PNL-608	PWR RANGE NEUT CA	H11P608	GE	CB063	YES		MBT		F	N	B
1H11*PNL-609	TRIP SYS A RPS VB	H11P609	GE	CB063	YES	SAI-029QA80PA-B	MBT	22	F	HS,CS	G
1H11*PNL-611	TRIP SYS B RPS VB	H11P611	GE	CB063	YES	SAI-029QA80PA-B	MBT	22	F	HS,CS	G
1H11*PNL-612	FW & RECIRC INSTR	H11P612	GE	CB063	YES	SAI-029QA80PA-B	MBT	19	F	N	G
1H11*PNL-613	PROCESS INSTR CAB	H11P613	GE	CB063	YES	SAI-029QA80PA-B	MBT	14	F	HS,CS	G
1H11*PNL-614	NSS TEMP LK DET VB	H11P614	GE	CB063	YES	SAI-029QA80PA-B	MBT	22	F	N	G
1H11*PNL-617	DIV 1 RHR RELAY VB	H11P617	GE	CB044	YES	SAI-029QA80PA-B	MBT	19	F	HS,CS	G
1H11*PNL-618	RHR RELAY VB	H11P618	GE	CB044	YES	SAI-029QA80PA-B	MBT	19	F	HS,CS	G
1H11*PNL-620	HPCI RELAY VERT BD	H11P620	GE	CB044	YES	SAI-029QA80PA-B	MBT	14	F	N	G
1H11*PNL-621	IC RELAY VERT BD	H11P621	GE	CB044	YES	SAI-029QA80PA-B	MBT	14	F	HS,CS	G
1H11*PNL-622	INBD ISO V RELAY VB	H11P622	GE	CB044	YES	SAI-029QA80PA-B	MBT	21	F	CS	G
1H11*PNL-623	OUTBD ISO V REL VB	H11P623	GE	CB044	YES	SAI-029QA80PA-B	MBT	21	F	CS	G

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REVISION 4 -NOVEMBER 1982

NOTE: NUMBER IN 'TYPE MTNG' COLUMN IS QUANTITY OF ITEMS.

SHOREHAM UNIT 1 | GE LIST | STONE & WEBSTER ENGINEERING CORPORATION | RUN DATE 11/09/82
JOB NUMBER 11600 | 3-SORT | GENERAL ELECTRIC CATEGORY I EQUIPMENT | RUN TIME 16.16.43
LILCO DOCKET 50-322 | ACTIVE | NSSS QUALIFICATION LEVEL(151 ITEMS) | PAGE 7

MARK NUMBER	EQUIPMENT DESCRIPTION	GE NO.	VENDOR	BLDG ELEV	AVAIL INSP	QUAL REPT	QUAL METH	FREQ	TYPE MTNG	SAFETY FUNC	QUAL STATUS
1H11*PNL-626	DIV 1 COR SP REL VB	H11P626	GE	CB044	YES	SAI-029QA80PA-B	MBT	14	F	CS	G
1H11*PNL-627	DIV 2 COR SP REL VB	H11P627	GE	CB044	YES	SAI-029QA80PA-B	MBT	14	F	CS	G
1H11*PNL-628	AUTO BLOWDWN REL VB	H11P628	GE	CB044	YES	SAI-029QA80PA-B	MBT	14	F	CS	G
1H11*PNL-631	AUTO DEPRESS	H11P631	GE	CB044	YES	SAI-029QA80PA-B	MBT	14	F	CS	G
1H11*PNL-635	DIV 1 RAD MONITOR	H11P635	GE	CB063	YES	SAI-029QA80PA-B	MBT	21	F	N	G
1H11*PNL-636	DIV 2 RAD MONITOR	H11P636	GE	CB063	YES	SAI-029QA80PA-B	MBT	21	F	N	G
1H11*PNL-654	MSIL LISPMCAGE	H11P654	GE	CB063	YES	SAI-029QA80PA-B	MBT	19	F	N	G
1H11*PNL-655	MISL LISMCAGE	H11P655	GE	CB063	YES	SAI-029QA80PA-B	MBT	21	F	N	G
1H21*PNL-01	CORE SPRAY RM CH A	H21P001	GE	SC008	YES	SAI-029QA80PA	MBT	11	F	CS	G
1H21*PNL-02	RHCU SYSTEM INST	H21P002	GE	SC151	YES	SAI-029QA80PA	MBT	8	F	N	G
1H21*PNL-04	RX VES L & P RACK	H21P004	GE	SC079	YES	SAI-029QA80PA	MBT	8	F	HS,CS	G
1H21*PNL-05	RX VES L & P RACK	H21P005	GE	SC079	YES	SAI-029QA80PA	MBT	8	F	HS,CS	G
1H21*PNL-06	RECIRC PUMP A RAC	H21P006	GE	SC040	YES	SAI-029QA80PA	MBT	11	F	N	G
1H21*PNL-09	JET PUMP A	H21P009	GE	SC079	YES	SAI-029QA80PA	MBT	11	F	N	G
1H21*PNL-10	JET PUMP INST RM	H21P010	GE	SC079	YES	SAI-029QA80PA	MBT	11	F	N	G
1H21*PNL-14	HPCI INST RACK	H21P014	GE	SC008	YES	SAI-029QA80PA	MBT	8	F	N	G
1H21*PNL-15	MAIN STM FLOW RM A	H21P015	GE	SC040	YES	SAI-029QA80PA	MBT	8	F	N	G
1H21*PNL-16	CS/HPCI LK DET I	H21P016	GE	SC008	YES	SAI-029QA80PA	MBT	11	F	N	G
1H21*PNL-17	RCIC INST RACK	H21P017	GE	SC008	YES	SAI-029QA80PA	MBT	8	F	HS	G

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REVISION 4 -NOVEMBER 1982

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SHOREHAM UNIT 1
JOB NUMBER 11600
LILCO DOCKET 50-322

GE LIST
3-SORT
ACTIVE

STONE & WEBSTER ENGINEERING CORPORATION
GENERAL ELECTRIC CATEGORY I EQUIPMENT
NSSS QUALIFICATION LEVEL(151 ITEMS)

RUN DATE 11/09/82
RUN TIME 16.16.43

MARK NUMBER	EQUIPMENT DESCRIPTION	GE NO.	VENDOR	BLDG ELEV	AVAIL INSP	QUAL REPT	QUAL METH	FREQ	TYPE MTNG	SAFETY FUNC	QUAL STATUS
1H21*PNL-18	RHR INST RACK CH	H21P018	GE	SC008	YES	SAI-029QA80PA	MBT	8	F	MS,CS	G
1H21*PNL-19	CORE SPRAY RK CH	H21P019	GE	SC008	YES	SAI-029QA80PA	MBT	11	F	CS	G
1H21*PNL-21	RHR INST RACK CH	H21P021	GE	SC008	YES	SAI-029QA80PA	MBT	8	F	MS,CS	G
1H21*PNL-22	RECIRC PUMP B RAC	H21P022	GE	SC040	YES	SAI-029QA80PA	MBT	8	F	N	G
1H21*PNL-25	MAIN STM FLOW RK	H21P025	GE	SC040	YES	SAI-029QA80PA	MBT	11	F	N	G
1H21*PNL-26	RV LV & PRES RK	H21P026	GE	SC079	YES	SAI-029QA80PA	MBT	11	F	MS,CS	G
1H21*PNL-30	SRM/IRM PREAMP RK	H21P030	GE	SC079	YES	DRF A00-799-16	MBT	4	F	N	G
1H21*PNL-31	SRM/IRM PREAMP RK	H21P031	GE	SC079	YES	DRF A00-799-16	MBT	4	F	N	G
1H21*PNL-32	SRM/IRM PREAMP RK	H21P032	GE	SC079	YES	DRF A00-799-16	MBT	4	F	N	G
1H21*PNL-33	SRM/IRM PREAMP RK	H21P033	GE	SC079	YES	DRF A00-799-16	MBT	4	F	N	G
1H21*PNL-34	HPCI LEAK DET RK	H21P034	GE	SC008	YES	SAI-029QA80PA	MBT	25	F	N	G
1H21*PNL-35	CS/RCIC LK DET I	H21P035	GE	SC040	YES	SAI-029QA80PA	MBT	11	F	N	G
1H21*PNL-36	HPCI LEAK DET RK	H21P036	GE	SC008	YES	SAI-029QA80PA	MBT	11	F	N	G
1H21*PNL-37	RCIC LEAK DET RK	H21P037	GE	SC008	YES	SAI-029QA80PA	MBT	25	F	N	G
1H21*PNL-38	RCIC LEAK DET RK	H21P038	GE	SC040	YES	SAI-029QA80PA	MBT	11	F	N	G
1H21*PNL-41	MN STEAM FLOW IR	H21P041	GE	SC040	YES	SAI-029QA80PA	MBT	11	F	N	G
1H21*PNL-73	MSIV LEAKAGE RK	H21P073	GE	SC063	YES	SAI-029QA80PA	MBT	11	F	N	G
1H21*PNL-74	MSIV LEAKAGE RK	H21P074	GE	SC063	YES	SAI-029QA80PA	MBT	8	F	N	G

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REVISION 4 -NOVEMBER 1982

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AS OF 09-01-82

SHOREHAM NUCLEAR POWER STATION

SHOREHAM CATEGORY I EQUIPMENT CHANGE RECORD
STONE AND WEBSTER ENGINEERING CORPORATION

CURRENT DATE 11-15-82

DOCUMENT #	DATE OF ISSUE	EQUIP. EFFECTED	NATURE OF CHANGE	EFFECT ON SEISMIC QUAL.
F-92213	09-08-82	1H21*PNL-060	ADDITIONAL RELAYS TO BE ADDED TO CAT.I PANEL	MASS OF ADDED RELAYS NEGLIGIBLE-NONE
F-90926J	09-09-82	1D11*PNL-021	ATTACHMENTS TO SKID /RAD. MONITOR. SYS.	MASS OF ATTACHMENTS NEGLIGIBLE-NONE
P-39301	09-27-82	1H21*RK-90,91	CLEARANCE PROB. FOR O2 BOTTLE RACKS	MODIFICATION INCORPORATED INTO CALCULATION-NONE
F-92625	09-30-82	1Z97*PNLER1-6	ADDITIONAL SUPPORT FOR MODULE CASES TO CONFORM WITH TEST MOUNTING CONDITIONS-CAT. 1 PANEL	ADDED MASS OF UNISTRUT FRAME WILL STIFFEN PANEL -NONE
F-3930L	10-05-82	1H21*RK-90,91	SUPPORT OF 'MARANITE I' FIRE BARRIER	SMALL PLATES ADDED TO FRAME -NO IMPACT TO QUALIFICATION
F-18681B	10-07-82	1R29*MCC-1119	ATTACHMENT OF 1" DIAMETER CONDUIT	MASS OF ADDED CONDUIT NEGLIGIBLE- NONE
F-93193	10-26-82	1T97*UC-17A,B	NOZZLE SUPPORT FOR UNIT COOLER	APPROVED BY CALCULATION
F-39452E	11-04-82	1D11*PNL-21,22	1" DIAMETER CONDUIT ATTACHMENT TO CAT. I PANELS	FLEX CONDUIT USED ON ALL CONNECTIONS-NONE
F-92697	IN PROGRESS	1H11*MCB-01	BATTERY CHARGE/DISCHARGE AMMETERS ADDED TO MAIN CONTROL BOARD	
F-29608A	IN PROGRESS	1P50*PS-113A *PS-113B *PS-105A *PS-105B 1P50*PT-116A *PT-116B *PT-111A *PT-111B 1C61*PT-106	INSTR. STAND ATTACHED TO STRUCTURAL PLATFORM	

Attachment 3
Generic Item No. 9

Attachment 4 Specific Item No. 1

CALCULATION SUMMARY

STONE & WEBSTER ENGINEERING CORPORATION

SHI-276

J.O./W.O./CALCULATION NO.	REVISION	PAGE
11600.02-331-1-CEC	0	1 OF 4

A5010.62

CLIENT/PROJECT	QA CATEGORY/CODE CLASS
LILCO / SHOREHAM UNIT 1	1

SUBJECT/TITLE

DEFLECTION OF HOUSING IN UNIT COOLERS 1T46 * UC 021A,B; 022A,B

FOR SQRT AUDIT No 2 FINDINGS, ITEM B.1

OBJECTIVE OF CALCULATION

THE OBJECTIVE OF THIS CALCULATION IS TO CALCULATE THE DEFLECTION OF THE UNIT COOLER HOUSING, DUE TO SEISMIC ACCELERATIONS.

CALCULATION METHOD/ASSUMPTIONS

1. HAND CALCULATIONS FROM STANDARD ENGINEERING TEXTBOOKS ARE USED TO DETERMINE THE HOUSING DEFLECTION.

2. SINCE THE HOUSING HAS A VERTICAL ORIENTATION, ONLY THE DEFLECTION FROM LATERAL SEISMIC ACCELERATIONS IS CONSIDERED.

SOURCES OF DATA/EQUATIONS

1. BUFFALO FORGE SEISMIC ANALYSIS REPORT 12072 UNIT COOLER #SON-27781, DTD. 1/81, PART 1 OF REPORT 78L-26392

2. S+W DWG. No. 11600.02-10.64-42B

3. MECHANICS OF MATERIALS, TIMOSHENKO AND GERE, 1972, TABLE 11-4, p. 372.

CONCLUSIONS

THE RESULTS OF THIS CALCULATION SHOW THE DEFLECTION OF THE HOUSING, IS 4.0×10^{-3} IN.

REVIEWER(S) COMMENTS

PREPARER: N. RIKELMAN	DATE: 10/30/82
REVIEWER/CHECKER: C. R. HAHN	DATE: 11/15/82
INDEPENDENT REVIEWER: NOT REQUIRED FOR CATEGORY 1	DATE

STONE & WEBSTER ENGINEERING CORPORATION

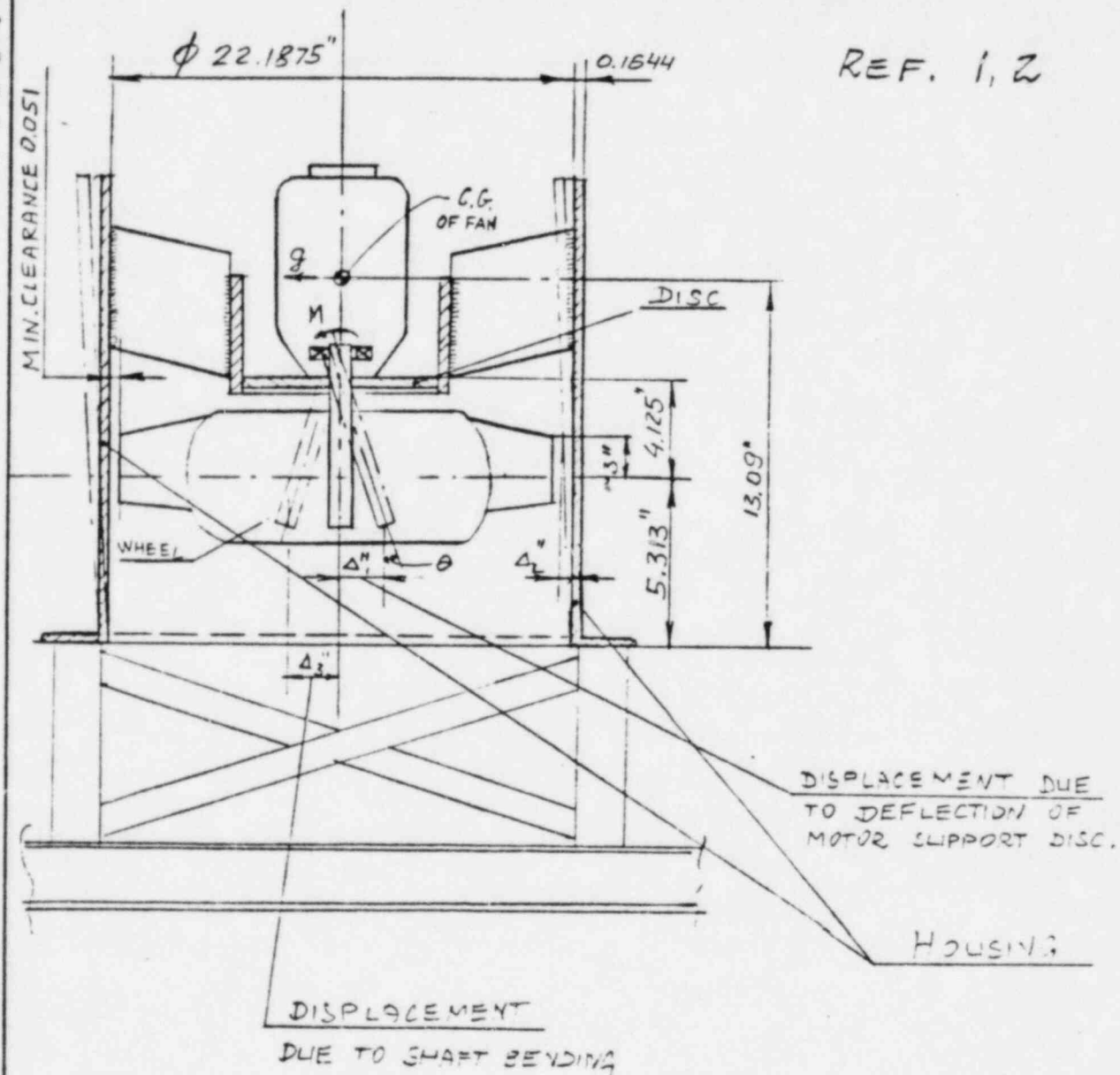
CALCULATION SHEET

▲ 5010.65

CALCULATION IDENTIFICATION NUMBER				
J.O. OR W.O. NO.	DIVISION & GROUP	CALCULATION NO.	OPTIONAL TASK CODE	PAGE 2
11322.02	N1A13)	333-1	CZC	

DISPLACEMENT OF THE FAN HOUSING DURING SEISMIC EVENT

REF. 1, 2



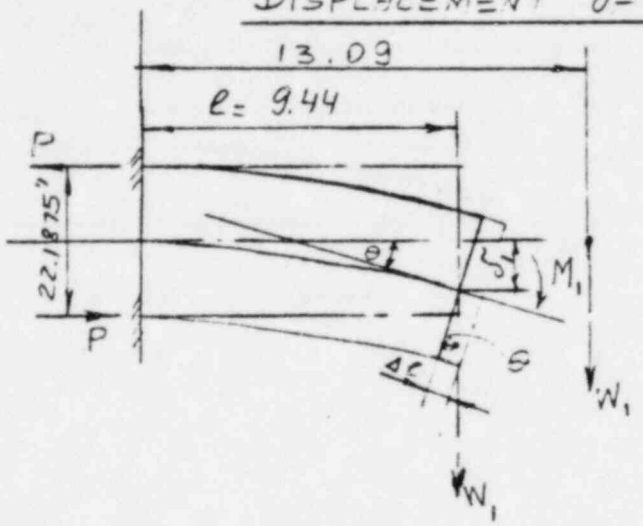
STONE & WEBSTER ENGINEERING CORPORATION

CALCULATION SHEET

▲ 5010.65

CALCULATION IDENTIFICATION NUMBER				
J.O. OR W.O. NO.	DIVISION & GROUP	CALCULATION NO.	OPTIONAL TASK CODE	PAGE 3
11607.02	NM(B)	331-1	CZC	

DISPLACEMENT OF HOUSING



$W_1 = W \times g \times 1.05 =$

$425 \times 1.2 \times 1.05 = 536^{\#}$

WHERE W = TOTAL WEIGHT OF THE FAN (CONSERVATIVE)

g = HORIZONTAL SEISMIC ACCELERATION FOR DBE (REF. 1, PART 1, PG. 6, 8)

DISPLACEMENT DUE TO MOMENT M_1

$$\theta = \frac{\Delta \ell}{22.1875/2} = \frac{\delta}{\ell/2}; \qquad \ell = 5.315" + 4.125" = 9.44" \text{ (CONSERVAT.)}$$

$$\Delta \ell = \frac{P \ell}{AE}; \quad P = \frac{M_1}{22.1875"} = \frac{W_1 \times (13.09 - 9.44)}{22.1875}$$

$A = 2\pi R t = 2\pi \times 11.099" \times 0.1644" = 11.46\ IN^2$

$E = 29 \times 10^6\ PSI$; $I = t\pi R^3 = 0.1644 \times \pi \times 11.099^3 = IN^4$

$$\delta_1 = \frac{\frac{\ell}{2} \times \Delta \ell}{22.1875/2} = \frac{W_1 \times (13.09 - 9.44) \times 9.44 \times \frac{9.44}{2}}{11.46 \times 29 \times 10^6 \times 22.1875} = 1.2 \times 10^{-5}\ IN$$

DISPLACEMENT DUE TO FORCE W_1:

$$\delta_2 = \frac{W \ell^3}{3EI} = \frac{536 \times 9.44^3}{3 \times 29 \times 10^6 \times 5.7} = 0.0009"$$

SHEAR DEFLECTION OF THE HOUSING:

STONE & WEBSTER ENGINEERING CORPORATION

CALCULATION SHEET

A 5010 65

CALCULATION IDENTIFICATION NUMBER				PAGE 4
J.O. OR W.O. NO. 11600.02	DIVISION & GROUP NM(3)	CALCULATION NO. 331-1	OPTIONAL TASK CODE CZC	

$$\delta_3 = \frac{f_s P \ell}{GA}$$

WHERE f_s - FORM FACTOR FOR A THIN TUBULAR SECTION

$f_s = 2$; (REF. 3)

FOR THE SHEAR DEFLECTION ASSUME THAT A CONCENTRATED LOAD V_1 ACTING AT THE DISTANCE 9.44" FROM THE SUPPORT OF THE HOUSING.

G - SHEAR MODULUS OF ELASTICITY: $G = \frac{1}{3} E = 14.5 \times 10^6$ psi.

$$\delta_3 = \frac{2 \times 536 \times 9.44}{14.5 \times 10^6 \times 11.46} = 6.1 \times 10^{-5}$$

TOTAL DISPLACEMENT OF THE HOUSING:

$$\Delta_2 = \delta_1 + \delta_2 + \delta_3 = 1.2 \times 10^{-5} + 9 \times 10^{-4} + 6.1 \times 10^{-5}$$

$$\Delta_2 \simeq 1 \times 10^{-3}"$$

THE AVAILABLE CLEARANCE BETWEEN WHEEL AND HOUSING - 0.051" REF. 1, IX, PG 11

APPENDIX E
DESCRIPTION AND VERIFICATION OF THE NON-LINEAR IMPACT ANALYSIS

E.1 OBJECTIVE AND OVERVIEW

The purpose of this appendix is to describe and provide verification for a special purpose computer program (called RACKOE*) developed primarily to analyze fuel rack behavior resulting from seismic disturbances.

The fuel is considered to rest in the rack at its center with a simple support (hinge) between the two. With the seismic disturbance, the clearances between the fuel and the box walls lead to impacts, thus making the analysis a non-linear one.

The space between the fuel and the rack wall is filled with water so that as the fuel and the box wall move relative to each other, hydrodynamic forces are set up due to the acceleration of the water. These forces are exerted on the fuel and rack structure. Methods described by Fritz (E1) and Dong (E2) are used to determine these hydrodynamic forces.

Certain special features or options of RACKOE are discussed in attachments to this appendix. For example, calculation of the structural damping matrix is described in Attachment E-1. Friction with sliding behavior is another such option for fuel racks that are not tied-down to the ground (i.e. pool floor) or for fuel that is allowed some translation within the confines of the box walls. The formalism used allows RACKOE to treat multi-stick models without loss of generality. The input preparation for the connection matrix, however, is more complicated for these models, so these multi-stick models deserve special attention in the attachments. The plastic element option is also described separately.

The following sections describe the basic feature of RACKOE.

The input to the model is an acceleration time history having points at typical time intervals of 0.01 sec. The displacement and velocity

*RACKOE is an acronym for rack analysis considering kinetics of earthquakes, a non-linear finite element program developed for Wachter Associates by Prof. W. F. Stokey of Carnegie-Mellon University, Pittsburgh.

of the ground are found by integrating the acceleration curve twice, however, these two quantities are not needed for the determination of the structural forces and displacements. A verification of the basic one-stick fuel model with fluid coupling and fuel to rack clearances with contact springs is given. This verification consists of a comparison between ANSYS (Ref. E3) and RACKOE results using identical models and input.

E.2 MODEL DESCRIPTION

For the sake of discussion, the 8 mass model used for ANSYS verification is described as an example. This model is illustrated in Figure E-1. The numbered and circled masses (m_i) typically represent the following:

Mass No.	Parts
1	1/7 rack mass, 1/7 fuel mass, base mass
2-4	2/7 rack mass
5-7	2/7 fuel mass
8	rotary inertia of the fuel

Some fluid or entrained water mass may be included in these masses, but here they are considered to be included in the hydrodynamic mass matrix. The terms in this fluid mass matrix will be outlined assuming the above masses are "dry" masses.

The numbered and lettered squares in Fig. E-1 refer to flexible elements. The CTAC formulation is used to find the stiffness matrix for the numbered elements.

Flexibility	Representation
1-3	Bending and shear flexibility of the rack
4-6	Bending and shear flexibility of the fuel
a-f	Local flexibility of the rack and fuel elements where they meet. No forces are exerted on these "springs" until the relative displacements of the masses exceeds the clearance distances.
7-9	Local support flexibilities

E.3 THEORY

The governing equations will be written explicitly for a two mass system and then extended to a general multi-mass system in matrix form:

$$m_1\ddot{x}_1 = -k_{11}x_1 - k_{12}x_2 + F_{s1} + F_{11}\ddot{x}_1 + F_{12}\ddot{x}_2 + F_{w1}\ddot{Z} - C_{11}\dot{x}_1 - C_{12}\dot{x}_2 \qquad \text{(E-1)}$$

$$m_2\ddot{x}_2 = -k_{21}x_1 - k_{22}x_2 + F_{s2} + F_{21}\ddot{x}_1 + F_{22}\ddot{x}_2 + F_{w2}\ddot{Z} - C_{21}\dot{x}_1 - C_{22}\dot{x}_2 \qquad \text{(E-2)}$$

where

m_i = mass i

x_i = displacement of mass i

$-k_{ij}$ = the force exerted by the structure on mass i due to a unit displacement of mass j

F_{ij} = hydrodynamic force exerted on mass i due to a unit acceleration of mass j, described e.g. in Fritz (loc. cit.). (F_{ii} usually negative, others positive.)

F_{wi} = fluid force exterted on mass i due to a unit acceleration of the wall.

$-C_{ij}$ = damping force exerted by the structure on mass i due to a unit velocity of mass j.

F_{si} = force exerted on mass i by the gap spring

Z = ground displacement

In matrix form equations (E-1) and (E-2) are

$$\begin{bmatrix} m_1 - F_{11} & -F_{12} \\ -F_{21} & m_2 - F_{22} \end{bmatrix} \begin{Bmatrix} \ddot{x}_1 \\ \ddot{x}_2 \end{Bmatrix} = \begin{bmatrix} -k_{11} & -k_{12} \\ -k_{21} & -k_{22} \end{bmatrix} \begin{Bmatrix} x_1 \\ x_2 \end{Bmatrix} + \begin{Bmatrix} F_{s1} \\ F_{s2} \end{Bmatrix} + \begin{Bmatrix} F_{w1} \\ F_{w2} \end{Bmatrix} \ddot{Z} + \begin{bmatrix} -C_{11} & -C_{12} \\ -C_{21} & -C_{22} \end{bmatrix} \begin{Bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{Bmatrix} \qquad \text{(E-3)}$$

Solving for the accelerations yields:

$$\begin{Bmatrix} \ddot{X}_1 \\ \ddot{X}_2 \end{Bmatrix} = \begin{bmatrix} m - F_{11} & -F_{12} \\ -F_{21} & m_2 - F_{22} \end{bmatrix}^{-1} \left\{ - \begin{bmatrix} K_{11} & K_{12} \\ K_{21} & K_{22} \end{bmatrix} \begin{Bmatrix} X_1 \\ X_2 \end{Bmatrix} + \begin{Bmatrix} F_{s1} \\ F_{s2} \end{Bmatrix} + \begin{Bmatrix} F_{w1} \\ F_{w2} \end{Bmatrix} \ddot{Z} + \begin{bmatrix} C_{11} & C_{12} \\ C_{21} & C_{22} \end{bmatrix} \begin{Bmatrix} \dot{X}_1 \\ \dot{X}_2 \end{Bmatrix} \right\} \quad \text{(E-4)}$$

For a multi-mass system, the matrix form of this equation can be written as:

$$\left\{ \ddot{X} \right\} = \left[M-F \right]^{-1} \left\{ \left[-K \right] \left\{ X \right\} + \left\{ F_s \right\} + \left\{ F_w \right\} \ddot{Z} - \left[C \right] \left\{ \dot{X} \right\} \right\} \quad \text{(E-5)}$$

where $\{\ \}$ represents a column matrix with N entries, N being the number of masses, and $[\ ]$ represents an N x N square (and in these cases) symmetric matrix.

In the fluid coupling matrix $[-F_{ij}]$, there are two effects considered; (1) fluid coupling between the fuel and the rack walls, and (2) coupling between the rack walls and the pool walls. In general, the fluid coupling matrix may be full; however, it is reasonable to assume that only the pairs (2,5), (3,6), and (4,7), in the example given, will have non-zero off-diagonal entries. Following the guidelines laid down by Fritz (Ref. E1) and assuming that the pool walls move with the pool floor, the terms in the fluid mass matrix will be as follows:

$$\begin{aligned} -F_{11} &= 1/7 \left(M_H^{rw} + M_{ent} \right) \\ -F_{22} &= 2/7 \left(M_H^{rw} + M_H^{rf} + M_1^f + M_2^r \right) \\ F_{22} &= F_{33} = F_{44} \\ F_{25} &= 2/7 \left(M_H^{rf} + M_1^f \right) \\ F_{25} &= F_{52} = F_{36} = F_{63} = F_{47} = F_{74} \\ F_{55} &= 2/7 \left(M_H^{rf} \right) \\ F_{55} &= F_{66} = F_{77} \end{aligned} \quad \text{(E-6)}$$

where

M_H^{rw} is the total rack to wall hydrodynamic mass

M_H^{rf} is the total rack to fuel hydrodynamic mass

M_i^f is the water mass displaced by the fuel

M_2^r is the water mass contained within the rack in the absence of the fuel (includes water or poison box water)

M_{ent} is the mass of the water entrained within the (inside boundaries of the) rack and the (outside boundaries of the) fuel ($=M_2^r - M_1^f$).

The remaining fluid effects in F_w are

$$F_{w1} = 1/7 \left(M_1^r + M_H^{rw} \right)$$

$$F_{w2} = F_{w3} = F_{w4} = 2F_{w1} \qquad \text{(E-7)}$$

$$F_{w5} = F_{w6} = F_{w7} = 0$$

where M_i^r is the mass of water displaced by (the outside boundaries of) the rack.

Since the racks contain flow holes for coolant, no hydrodynamic mass effects are considered for mass 8.

Expressions for M_H^{rw} are given in Appendix C for horizontal and vertical fluid flow. For M_H^{rf}, Dong (Ref. E2) recommends the "added mass" approach, $M_H^{rf} = C_m M_i^f$, where C_m is of order unity for uncanned fuel assemblies. For the example considered, C_m was chosen to be 2.75. For typical LWR fuel with pitch to diameter ratios $\sim$ 1.3, a lower bound on C_m of 1.5 would be a reasonable estimate. With the close proximity of the box walls, the assumed value is probably more reasonable. For channeled fuel assemblies, C_m would be quite high. In the limit $C_m \rightarrow \infty$, the rack and fuel will move together and the analysis can be shown to degenerate into a linear one.

E.4 METHOD OF SOLUTION

In the program RACKOE, equation (E-5) is solved in the following manner:

1. Using displacements and velocities from the n^{th} time step, Kx and $C\dot{x}$ are determined. (Determination of the C matrix is discussed in Attachment E-1.)

2. The spring forces F_s are calculated for each clearance by first finding the difference between the deflections of the masses involved. If the difference is less than this clearance, the force is zero. Otherwise a non-zero $K(\Delta x)$ is calculated for F_s.

3. These three structural forces are added together and premultiplied by the inverted mass-fluid matrix $[M - F]^{-1}$.

4. The constant vector $[M - F]^{-1} \{F_w\}$ is multiplied by the input (or interpolated) ground acceleration and added to the previous result.

5. The absolute accelerations $\ddot{X}_n$ are now known for each mass m_i. Although written in terms of the absolute displacements and velocities, the terms Kx and $C\dot{x}$ (and also F_s) only require relative displacements ($y = x - z$) and velocities ($\dot{y} = \dot{x} - \dot{z}$). The relative accelerations are found by subtracting the ground acceleration

$$\ddot{Y}_n = \ddot{x}_n - \ddot{z}_n$$

The relative velocities are then updated

$$\dot{Y}_{n+1} = \dot{Y}_n + (\ddot{Y}_n)(\Delta t)$$

and these are used to find the relative displacements

$$Y_{n+1} = Y_n + (\dot{Y}_{n+1})(\Delta t)$$

The calculational time step Δt is chosen small enough that x and its derivatives change very little over the interval. Accuracy can be checked by changing Δt to $\Delta t/2$ (for example); typically, a calculational time step 0.1 times the input ground acceleration time interval is sufficient for one-stick models. Thus, with ground accelerations specified every 0.01 sec, a calculational time step of 0.001 sec is usually sufficient. However, smaller time steps are often necessary for multi-stick

models. It should be noted that using the updated velocity to find the displacement (instead of the velocity from the previous time interval) improves the numerical stability.

6. Steps 1 through 5 are now repeated using the velocities, displacements, and ground accelerations for the n+1 time step.

E.5 VERIFICATION

Figure E-1 shows the model used for checking RACKOE against the more general structural analysis program ANSYS (Ref. E3). To verify the essential feature of RACKOE everything except structural damping in eq. (E-5) , ANSYS was run only until and slightly after a fuel contact occurred. As input, both programs used the input ground acceleration shown in Fig. E-2. For completeness, the absolute ground displacement is shown.

In addition to the input ground acceleration, the following summarizes the relavent input data:

M_1 = 12,714 lbs.

$M_2 = M_3 = M_4$ = 3,689 lbs.

$M_5 = M_6 = M_7$ = 17,691 lbs.

and

M_8 = 29,866,000 lb-in^2 (which represents the mk^2 rotary inertia of the fuel.)

There were six gaps (3 to the left of the fuel, 3 to the right of the fuel), each with 0.3 inch initial clearance. Each gap spring is assumed to have a stiffness $K_a = \cdots = K_f$ = 2.31 x 10 lb/in. (For the problem modeled, this stiffness would be representatively high; a good check on numerical stability probably results by assuming a stiff value here since a short duration fuel impact would be implied.)

The non-zero fluid effect matrix terms were as follows:

$-F_{11}$ = 12,879 lbs.

$-F_{22} = -F_{33} = -F_{44}$ = 38,121 lbs.

$-F_{55} = -F_{66} = -F_{77}$ = 4,804 lbs.

$F_{25} = F_{52} = F_{36} = F_{63} = F_{47} = F_{74}$ = 6,560 lbs.

and for the wall coupling terms,

F_{w1} = 17,392 lbs.

$F_{w2} = F_{w3} = F_{w4}$ = 34,784 lbs.

The support springs were specified by

$K_8 = K_9 = 5.0 \times 10^6$ lb/in

for the vertical ones, spaced 30 and -30 inches, respectively, from the center of the rack.

For the horizontal spring

$K_7 = 2.041 \times 10^6$ lb/in.

The flexible elements 1 thru 6 are "beams" with shear and bending degrees of freedom, specified by E (Young's modulus), I (section inertia), G (shear modulus), A_s (shear area), and ℓ (length). For each element, the values $E = 27.76 \times 10^6$ psi, $G = E/2.6$, and $\ell = 48.3$ inches were assumed. Rack elements 1 thru 3 were taken to have $A_s = 176.6$ in^2 and $I = 117{,}351$ in^4. For fuel elements 4 thru 6, $A_s = 278.6$ in^2 and $I = 27$ in^4. (Realistically, $E = 13 \times 10^6$ psi should be assumed for zircaloy, but EI as chosen corresponds to a fuel bundle natural frequency estimate of 3 cps.) Additionally, a shear factor (of 1.0) is specified for all elements.

Input ground accelerations were given every 0.01 sec and the RACKOE calculational time step was 0.001 sec. The equivalent ANSYS time step used was 0.0025 sec. (NITTER = 4). Apart from this difference, input preparation was essentially identical.

Figures E-3 thru E-6 illustrate the significant results of the comparison runs. Fig. E-3 shows the fuel (top and middle) displacements relative to ground. Since the ground displacement is initially positive, the displacements are negative. The top of the fuel contacts at 0.44 sec and remains in contact for approximately 0.01 sec. As top contact occurs, the middle fuel mass slows down. As shown in Fig. E-4, the top of the rack moves very little until the

impact occurs. The peak displacement predicted by ANSYS is slightly less than that predicted by RACKOE. This discrepancy is probably explained by RACKOE'S finer time step. The horizontal shear force at the bottom of the rack (proportional to the displacement) is shown in Fig. E-5. Note the small positive pulse at contact followed by a larger negative pulse due to fuel rebound. Again RACKOE picked-up the extreme not resolved by the longer time-step used in ANSYS. Finally, Fig. E-6 details the vertical support forces (or base moment). Again a contact-rebound effect is evident. Based on the RACKOE results, the peak horizontal force occurs 0.015 sec before the peak vertical force.

Considering the detailed agreement between ANSYS and RACKOE in this comparison run, the basic one stick fuel impact model is considered verified. Various options of RACKOE are discussed and justified in attachments to this appendix.

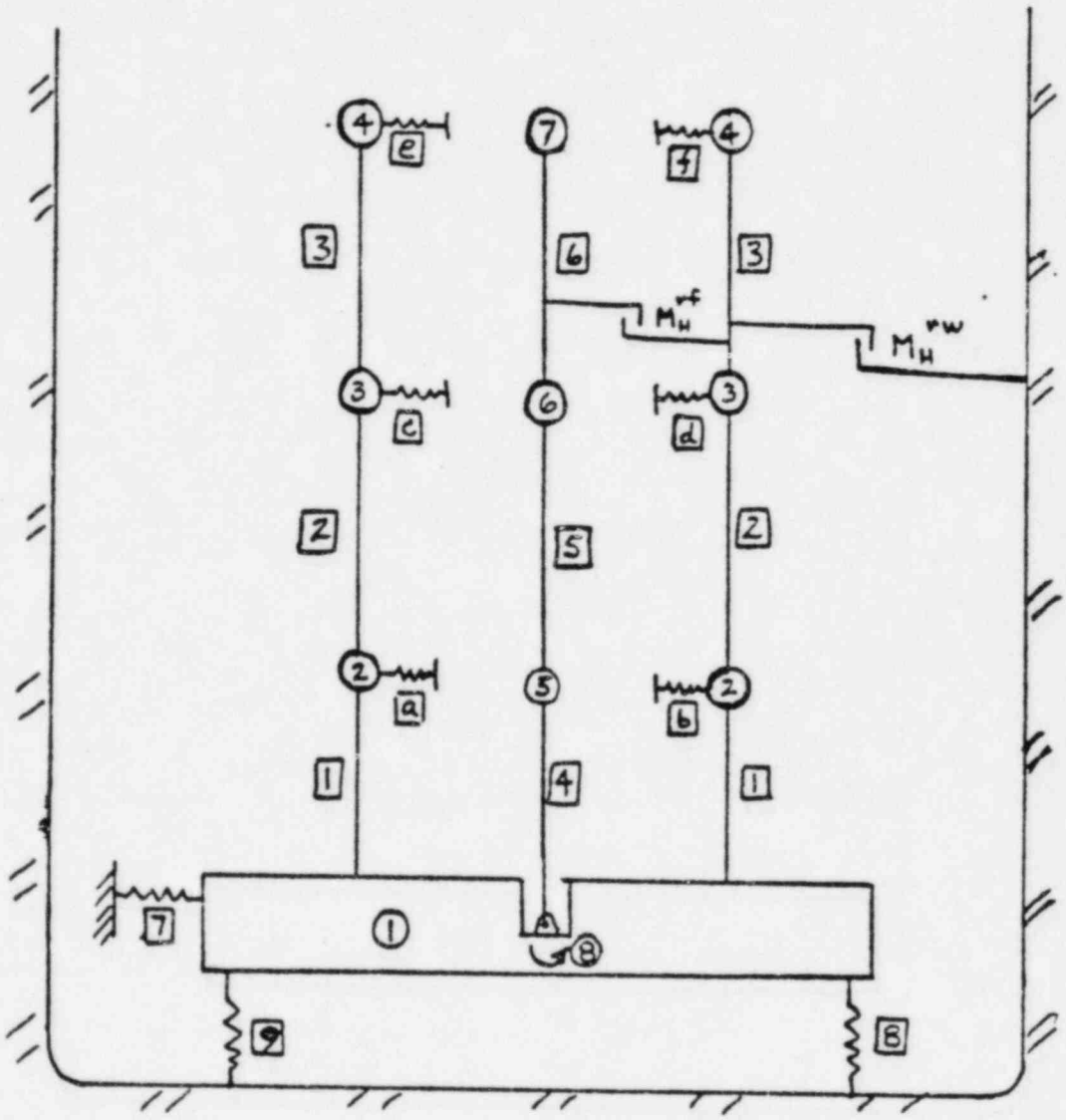


Fig. E-1 RACKOE Model used for ANSYS Comparison

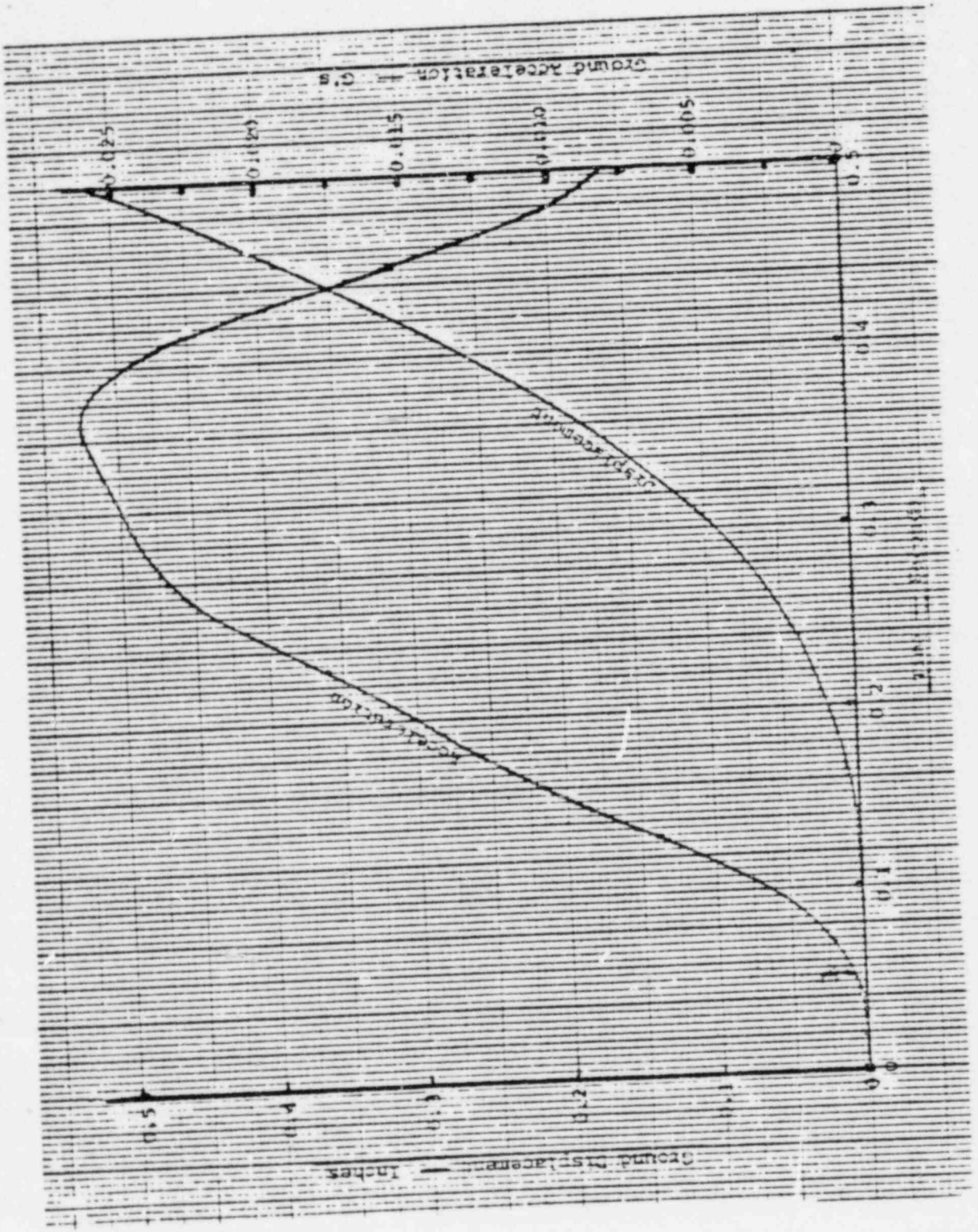


Fig. E-2 Horizontal Ground Response Time History for ANSYS Verification of RACKOE

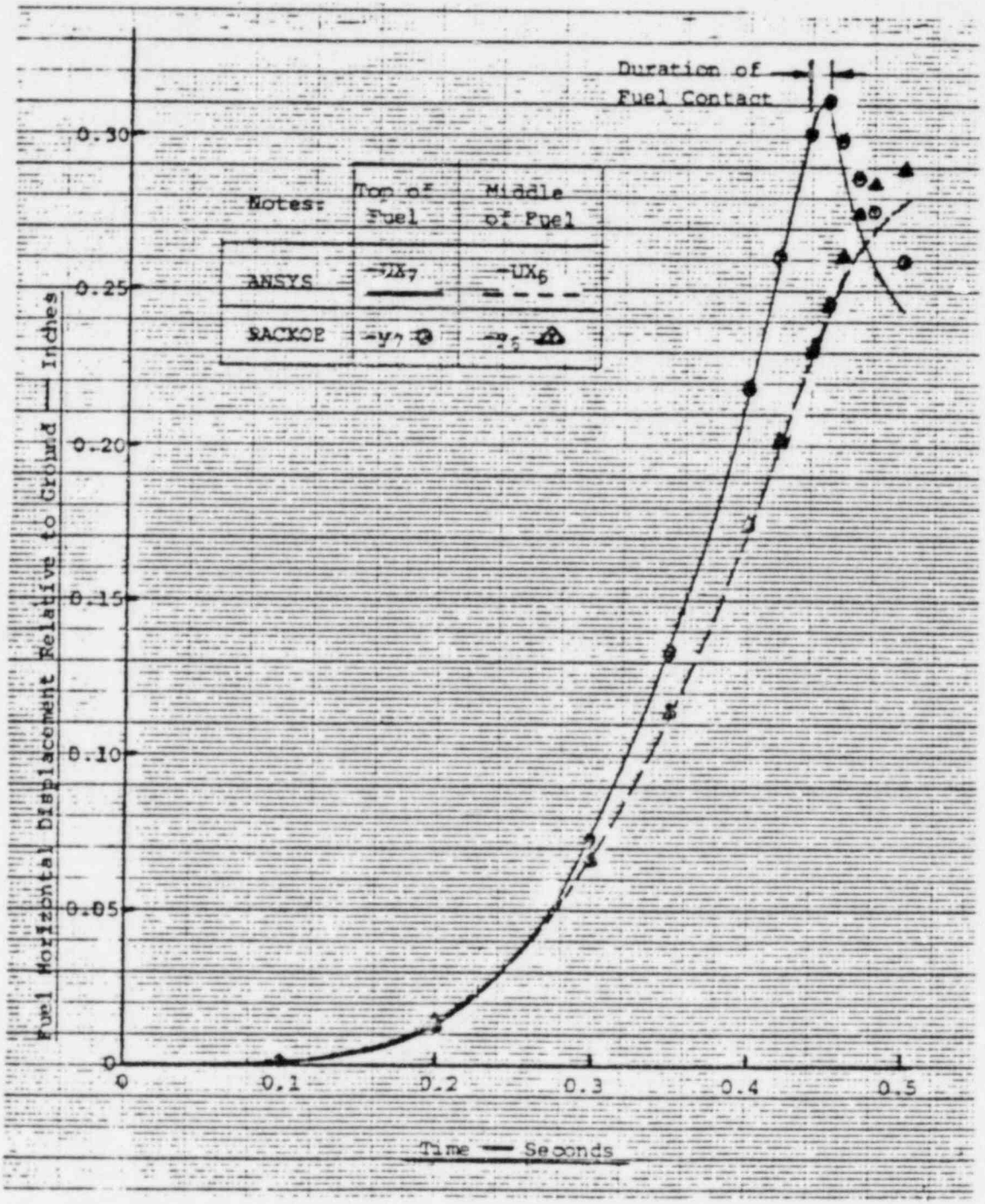


Fig. E-3 Comparison of Fuel Motions Predicted by ANSYS and RACKOE. The initial fuel to box wall gap = 0.? inch.

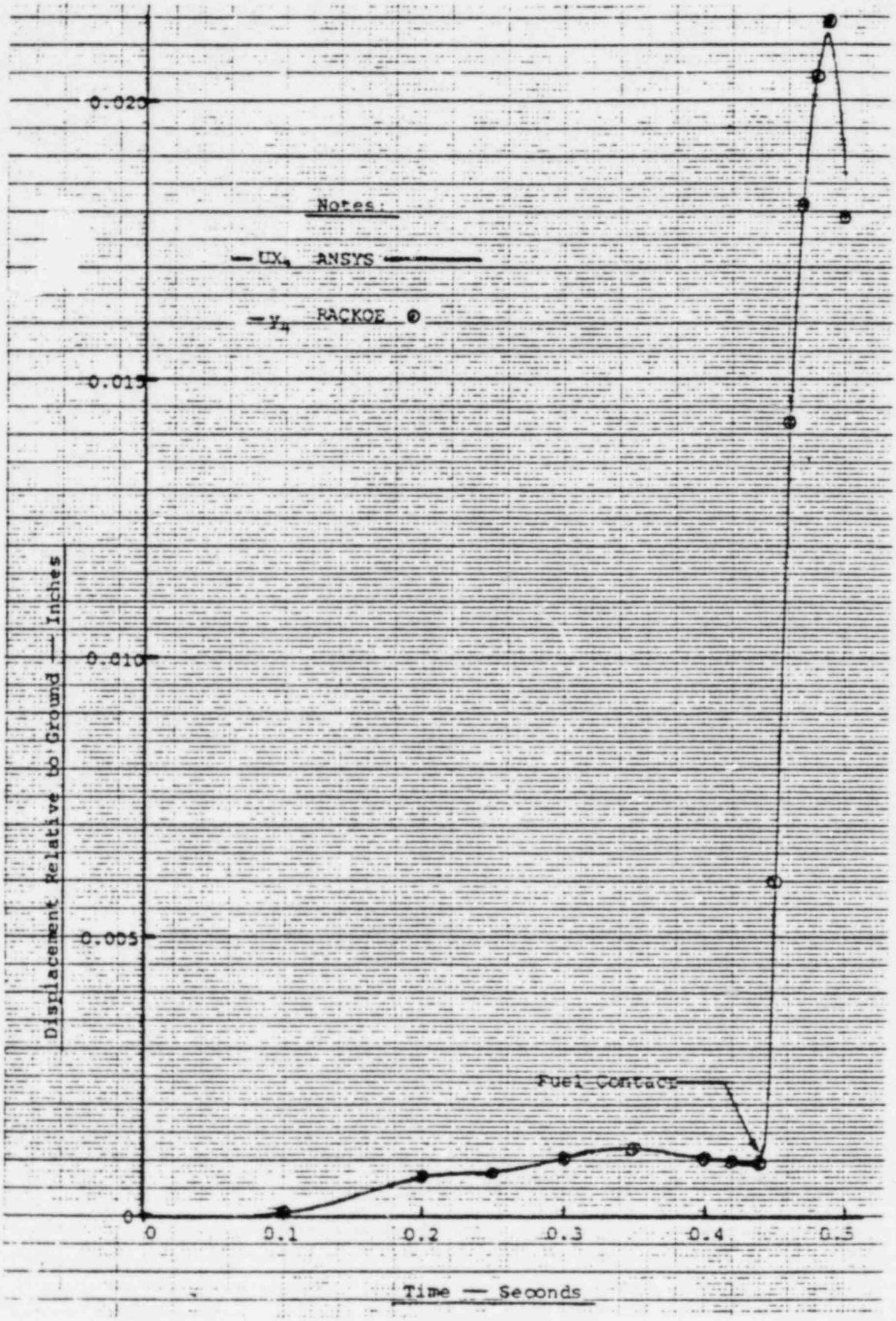


Fig. E-4 Displacement of the Top of the Fuel Rack as Predicted by ANSYS and RACKOE.

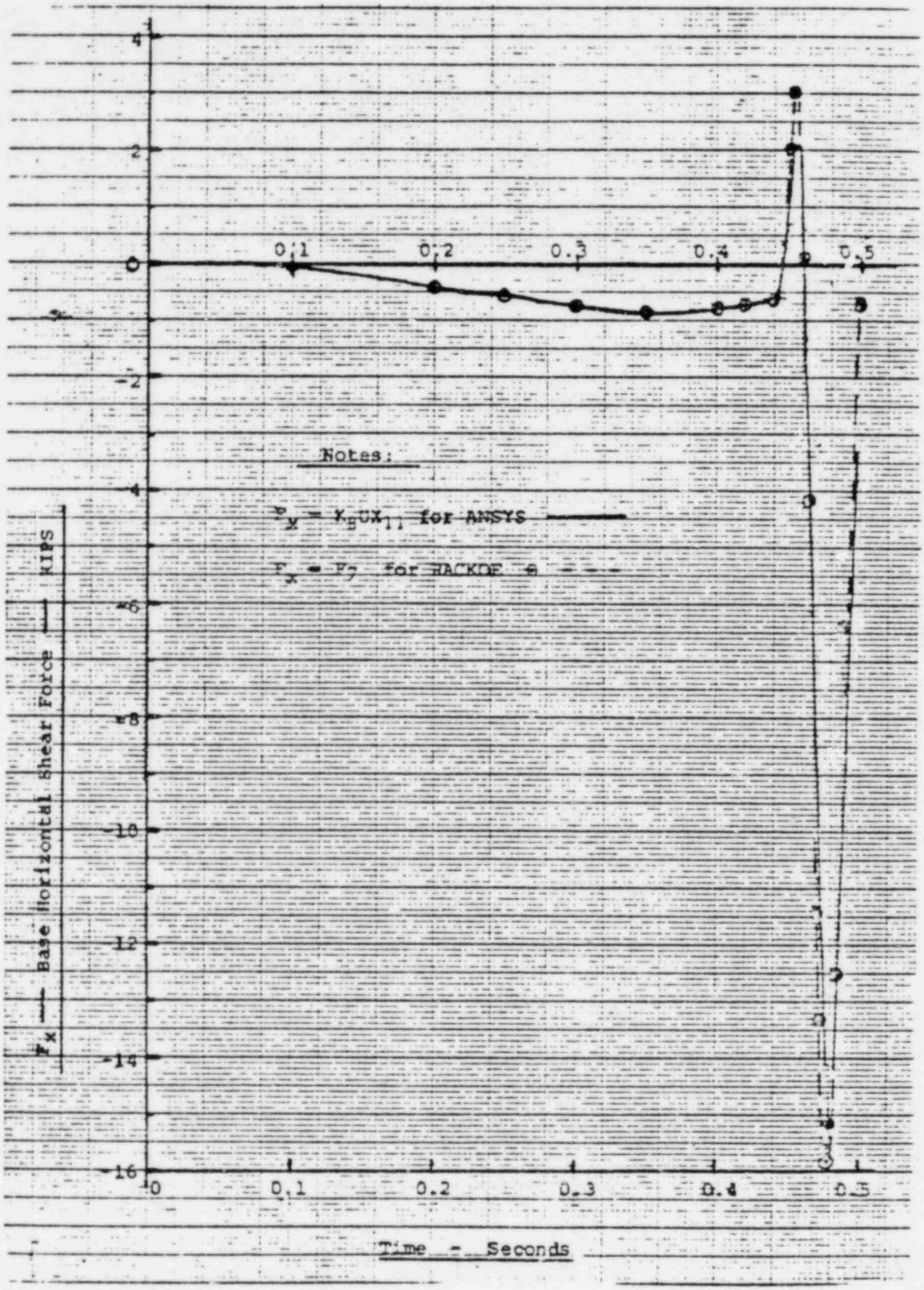


Fig. E-5 Comparison of ANSYS and RACKOE Base Horizontal Shear Forces

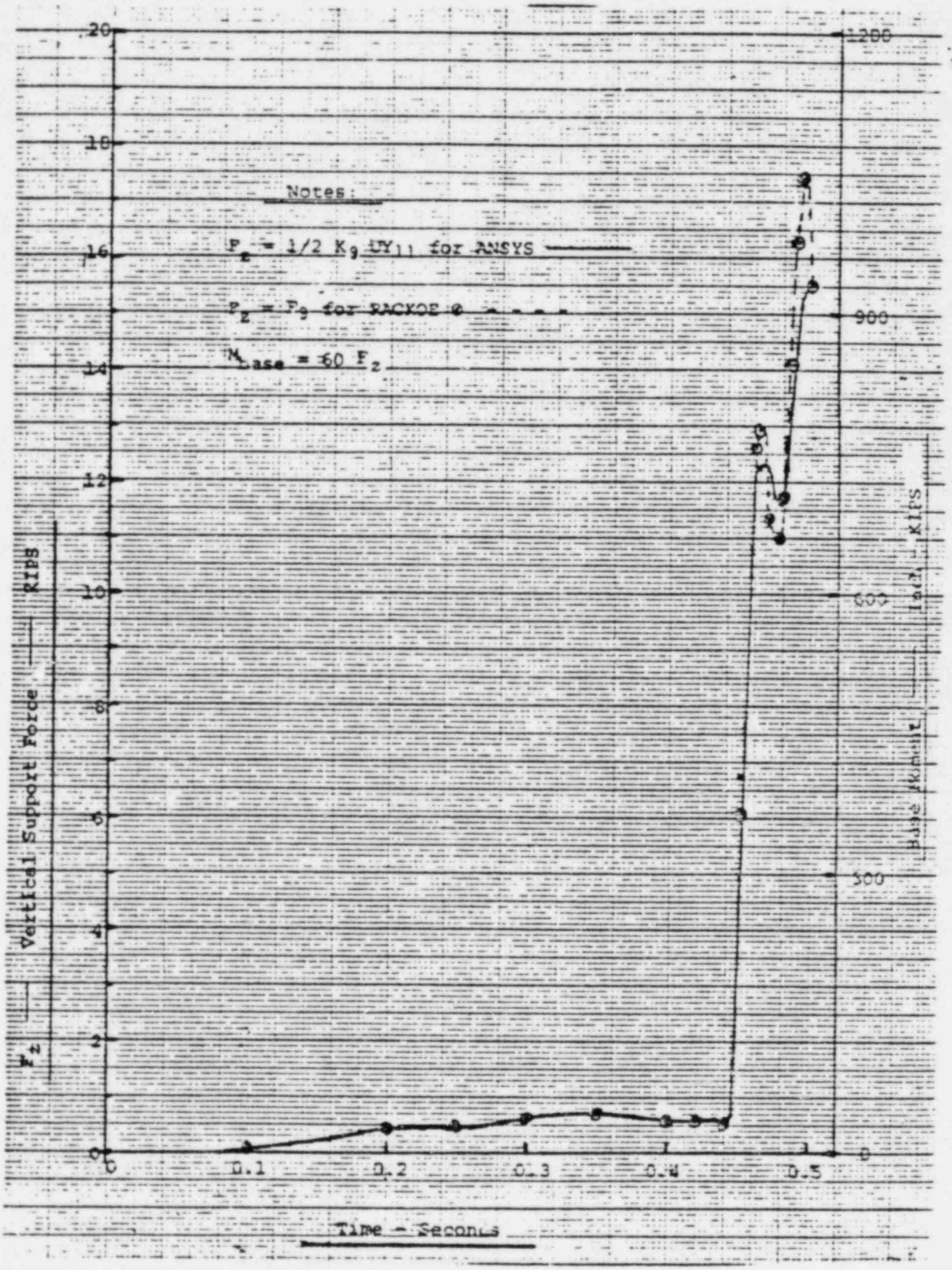


Fig. E-6 Comparison of ANSYS and RACKOE for Vertical Support Forces and Base Moments

E.6 REFERENCES

E1. Fritz, R. J., "The Effects of Liquids on the Dynamic Motions of Immersed Solids," ASME Trans., Journal of Engineering for Industry, February 1972, p. 167.

E2. Dong, R. G., "Effective Mass and Damping of Submerged Structures," UCRL-52342, L.L.L., April 1978.

E3. ANSYS Runs and Restarts

a. AQEUQSR - main run containing time history accelerations and model input data. Output includes
   1. UX11, UY11 "corner of rack" displacements
   2. UX6 "middle of fuel" displacement
   3. UX7 "top of fuel" displacement
   4. UX4 "top of rack" displacement
   5. UX12 "ground" displacement

b. AQEVC4R - element forces on bottom elements of fuel and rack

c. AQERLEF - element stiffness matricies

d. AQE3N43
   1. UX1 thru 4 "rack" displacements
   2. UY1 and 14 bottom of rack and fuel (no relative vert. motion)

These runs were made possible by P. H. Titus of Stone and Webster Engineering Corporation, Boston (noted 1/7/80 and 1/9/80). Wachter Associates acknowledges Stone and Webster's disclaimer stated in their March 24, 1980 letter (LIL-R-231 - transmitting AQEUQSR and AQEVC4R) and restated in their August 3, 1981 letter (LIL-R-269 - transmitting microfiche for all ANSYS runs and post-process runs listed above).

ATTACHMENT 6

SPECIFIC ITEM NO. 6

EIS IDENT: PIP, M/S, INTERF & EQUIP LDS

GENERAL ELECTRIC

REVISION STATUS SHEET

NUCLEAR ENERGY DIVISION

22A6416

CONT ON SHEET 2 SH NO 1

DOCUMENT TITLE PIPING, MAIN STEAM, INTERFACE AND EQUIPMENT LOADS

☐ SPECIFICATION ☐ DRAWING ☑ OTHER TYPE STRESS REPORT

FMF NUCLEAR BOILER SYSTEM

LEGEND OR DESCRIPTION OF GROUPS

MPL No. N/A

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PRINTS TO

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L HANCOCK 12-12-88	AS HERLEAR, P.E. 3/17/89	NEED	SAN JOSE
CHKD BY T LEWIS	ISSUED BY DG ROBERTS APR 24 1979	CONT ON SHEET 2	SH NO

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GENERAL ELECTRIC
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REV. 0	

STRESS REPORT

INTERFACE AND EQUIPMENT LOADS

MAIN STEAM PIPING

VOLUME 6

SHOREHAM NUCLEAR POWER PLANT

DATE March 12, 1979

PREPARED BY: _____
AS HERLEKAR, P.E.

DESIGN COMPLIANCE BY: _____
CY NIEH, P.E.

VERIFIED BY: _____
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APPROVED BY: _____
JL THOMPSON, Acting Manager
Piping Stress Analysis

BOILING WATER REACTOR SYSTEMS ENGINEERING DEPARTMENT

MECHANICAL EQUIPMENT DESIGN SECTION

PIPING DESIGN SUBSECTION

TABLE OF CONTENTS

APPENDICES

10. PIPE BRANCH CONNECTION INTERFACE (APPENDIX G)

10.1 Thermal expansion deflections at drain lines and for elbow taps are given in this appendix. No dynamic information is provided for drains and elbow taps, as it is assumed the piping is sufficiently supported at these points to limit the dynamic loads applied at the branch connections.

11. TERMINOLOGY FOR LOAD DESIGNATION

11.1 The following designation is used in all appendices to describe the types of loads.

AP_I = Annulus Pressurization Loads (Inertia Effect)

AP_D = Annulus Pressurization Loads (Anchor Displacement Loads)

$CHUG_I$ = Chugging Load (Inertia Effect)

$CHUG_D$ = Chugging Load (Anchor Displacement Loads)

$COND_I$ = Condensation Oscillation (Inertia Effect)

$COND_D$ = Condensation Oscillation (Anchor Displacement Loads)

OBE_I = Operating Basis Earthquake (Inertia Effect)

OBE_D = Operating Basis Earthquake (Anchor Displacement Loads)

P_O = Operating Pressure

P_D = Design Pressure

P_P = Peak Pressure

RV1 = Safety Relief Valve Opening Loads (Acoustic Wave)

$RV2_I^{ALL}$ = Safety Relief Valve Basemat Acceleration Loads (Inertia Effect)

$RV2_D^{ALL}$ = Safety Relief Valve Basemat Acceleration Loads (Anchor Displacement Loads)

$RV2_I^{ADS}$ = Safety Relief Valve Basemat Acceleration Due to Automatic Depressurization System (ADS) Valve (Inertia Effect)

$RV2_D^{ADS}$ = Safety Relief Valve Basemat Acceleration Due to Automatic Depressurization System (ADS) (Anchor Displacement Loads)

11.1 (Continued)

SSE_I = Safe Shutdown Earthquake (Inertia Effect)

SSE_D = Safe Shutdown Earthquake (Anchor Displacement Loads)

TE = Thermal Expansion

TSVC = Turbine Stop Valve Closure Loads

VLC_I = Vent Line Clearing Loads (Inertia Effect)

VLC_D = Vent Line Clearing Loads (Anchor Displacement Loads)

W = Dead Weight

11.2 For piping analysis an orthogonal coordinate system is used. This system consists of primary and auxiliary subsystems as follows:

a. The primary coordinate system (global) identifies "X", "Y" and "Z" directions as shown on the stress analysis diagrams where:

"X" is horizontal, positive in the 0° direction

"Y" is vertical (also called "elevation"), positive is up from the reactor pressure vessel invert.

"Z" is horizontal, positive in the 90° direction

Moments about above axes are positive in the directions shown.

b. The auxiliary coordinate system (normalized) identifies "A", "B" and "C" directions at nozzles as shown on the stress analysis diagrams. "A" is always axial along the direction of a pipe run. Where the nozzle is horizontal or inclined, the direction of the "B" axis lies in the plane containing the "Y" axis such that the projection on the "Y" axis is positive. Where the nozzle is vertical, the direction of the "A" axis is parallel to the "Y" axis and the "B" axis is set parallel to the "Z" axis.

12. REFERENCES

12.1 See Volume 1, Section 5 for all references cited.

TABLE D1 PIPE MOUNTED EQUIPMENT - MSIV HIGHEST LOAD/STRESS SUMMARY

SERVICE LEVEL	ITEM EVALUATED	CALCULATED VALUES	ALLOWABLE VALUE	RATIO (ACTUAL/ALLOW)	GOVERNING (1) GENERIC LOAD COMBINATION	IDENTIFICATION OF EQUIPMENT WITH HIGHEST VALUES	
DESIGN	Axial	6,111 psi	13,431 psi	0.455	1	Inner MSIV Inlet for M.S.D.	PIPE JUNCTION
	Bending	1,112 psi		0.083	1	Inner MSIV Inlet for M.S.D.	
	Torsion	605 psi		0.0450	1	Inner MSIV Inlet for M.S.D.	
OTHERS	Axial	6,510 psi	35,816 psi	0.1818	4	Inner MSIV Outlet for M.S.B.	
	Bending	2,945 psi		0.0822	7	Outer MSIV Outlet for M.S.D.	
	Torsion	732 psi		0.0204	4	Inner MSIV Inlet for M.S.D.	
DESIGN	Axial	5,454 lb	10,200 lb	0.53	1	Inner MSIV - M.S.B.	BONNET
	Bending	307,101 in-lb	678,700 in-lb	0.45	1	Inner MSIV - M.S.B.	
	Torsion	44,100 in-lb	678,700 in-lb	0.06	1	Inner MSIV - M.S.B.	
OTHERS	Axial	5,434 *lb	10,200 lb	0.53	8	Inner MSIV - M.S.B.	
	Bending	547,662 in-lb	678,700 in-lb	0.81	8	Inner MSIV - M.S.B.	
	Torsion	64,306 in-lb	678,700 in-lb	0.10	8	Inner MSIV - M.S.B.	

(1) Load Combinations of 1 through 9 are evaluated.

* Weight force is taken out of this combination.

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NOTES ON TABLE D1 LOAD COMBINATION AND ACCEPTANCE CRITERIA FOR NSSS PIPING AND PIPE MOUNTED EQUIPMENT

NO.	LOAD COMBINATIONS	SERVICE LEVELS
1	Normal Operating and Operating Basis Earthquake	Design Condition
2	Normal Operating, Operating Basis Earthquake, Operating Transients	A and B
3	Normal Operating and Operating Transients and Operating Basis Earthquake	C
4	Normal Operating and Small Break Loss-of-Coolant Accident and Associated Operating Transients	C
5	Normal Operating and Infrequent Operating Transient	C
6	Normal Operating and Operating Transients and Safe Shutdown Earthquake	D
7	Normal Operating and Large Break Loss-of-Coolant Accident and Safe Shutdown Earthquake	D
8	Normal Operating and Intermediate Loss-of-Coolant Accident and Associated Operating Transients and Safe Shutdown Earthquake	D
9	Normal Operating and Large Break Loss-of-Coolant Accident	D

TABLE D2 MSIV INLET AND OUTLET CONNECTIONS - LOAD CRITERIA

SERVICE LEVEL	NO.	LOAD COMBINATION	ACCEPTANCE CRITERIA
A	1	$TE + W$	$0.75\ S_m$
B	1	$TE + W + \left[(OBE_I + OBE_D)^2 + (TSVC)^2\right]^{1/2}$	
	2	$TE + W + \left[(OBE_I + OBE_D)^2 + (RV1)^2\right]^{1/2}$	
	3	$TE + W + \left[(OBE_I + OBE_D)^2 + (RV2_I^{ALL} + RV2_D^{ALL})^2\right]^{1/2}$	
C	1	$TE + W + \left[(CHUG_I + CHUG_D)^2 + (RV1)^2\right]^{1/2}$	$2.0\ S_m$
	2	$TE + W + \left[(COND_I + COND_D)^2 + (RV1)^2\right]^{1/2}$	
	3	$TE + W + \left[(CHUG_I + CHUG_D)^2 + (RV2_I^{ADS} + RV2_D^{ADS})^2\right]^{1/2}$	
	4	$TE + W + \left[(COND_I + COND_D)^2 + (RV2_I^{ADS} + RV2_D^{ADS})^2\right]^{1/2}$	

TABLE D2 (Continued)

SERVICE LEVEL	NO.	LOAD COMBINATION	ACCEPTANCE CRITERIA
D	1	$TE + W + \left[(SSE_I + SSE_D)^2 + (TSVC)^2\right]^{1/2}$	$2.0\ S_m$
	2	$TE + W + \left[(SSE_I + SSE_D)^2 + (RV2_I^{ALL} + RV2_D^{ALL})^2\right]^{1/2}$	
	3	$TE + W + \left[(SSE_I + SSE_D)^2 + (CHUG_I + CHUG_D)^2 + (RV2_I^{ADS} + RV2_D^{ADS})^2\right]^{1/2}$	
	4	$TE + W + \left[(SSE_I + SSE_D)^2 + (COND_I + COND_D)^2 + (RV2_I^{ADS} + RV2_D^{ADS})^2\right]^{1/2}$	
	5	$TE + W + \left[(SSE_I + SSE_D)^2 + (VLC_I + VLC_D)^2\right]^{1/2}$	
	6	$TE + W + \left[(SSE_I + SSE_D)^2 + (CHUG_I + CHUG_D)^2 + (RV1)^2\right]^{1/2}$	
	7	$TE + W + \left[(SSE_I + SSE_D)^2 + (COND_I + COND_D)^2 + (RV1)^2\right]^{1/2}$	
	8	$TE + W + \left[(AP_I + AP_D)^2 + (SSE_I + SSE_D)^2\right]^{1/2}$	

TABLE D2 (Continued)

LOAD CRITERIA	CRITERIA FOR PIPE ($S_{PRIM} + S_{SECOND}$)	MSIV CRITERIA
Service Level A	$\frac{M_A}{2Z_p} \leq 0.75\ S_m$ (Torsion) $\frac{\sqrt{M_B^2 + M_C^2}}{Z_p} \leq 0.75\ S_m$ (Bending) $\frac{F_A + P_A}{A_p} \leq 0.75\ S_m$ (Axial)	Leakage Limit
Service Levels B, C, and D	$\frac{M_A}{2Z_p} \leq 2.0\ S_m$ (Torsion) $\frac{\sqrt{M_B^2 + M_C^2}}{Z_p} \leq 2.0\ S_m$ (Bending) $\frac{F_A + P_A}{A_p} \leq 2.0\ S_m$ (Axial)	Operability Limit

TABLE D2 (Continued)

NOTATION:

F_A	Axial loading due to pipe reactions	Combined values for various levels as shown in this table.
M_A	Torsion load about A axis	
M_B	Bending load about B axis	
M_C	Bending load about C axis	
Z_p	Section modulus of pipe	
P_A	Axial load due to pipe's internal pressure	
A_p	Pipe metal cross-sectional area	
S_{PRIM}	Primary stresses	
S_{SECOND}	Secondary stresses	
S_m	ASME Code value for carbon steel pipe at design temperature	

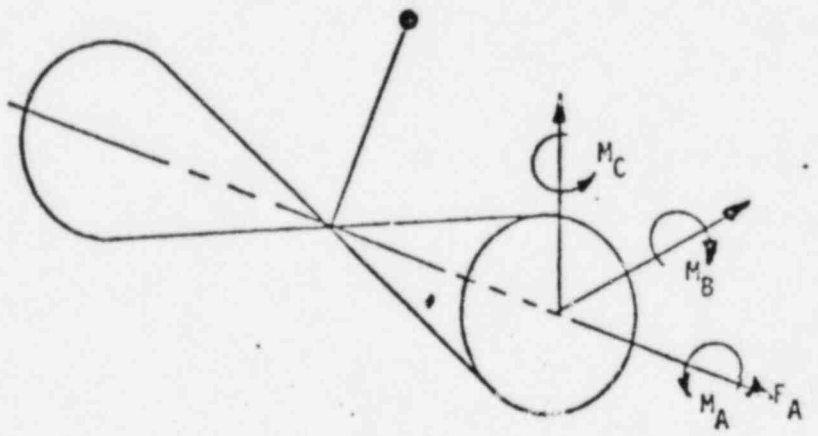


TABLE D3 MSIV BONNET FLANGE - LOAD CRITERIA

SERVICE LEVEL	NO.	LOAD COMBINATION	ACCEPTANCE CRITERIA
B	1	$\left[(OBE_I)^2 + (TSVC)^2\right]^{1/2}$	678,700 IN-LB ON COVER PLATE FOR BENDING AND TORSION PLUS 10,200-LB AXIAL FORCE
	2	$\left[(OBE_I)^2 + (RV1)^2\right]^{1/2}$	
	3	$\left[(OBE_I)^2 + (RV2_I^{ALL})^2\right]^{1/2}$	
C	1	$\left[(CHUG_I)^2 + (RV1)^2\right]^{1/2}$	
	2	$\left[(COND_I)^2 + (RV1)^2\right]^{1/2}$	
	3	$\left[(CHUG_I)^2 + (RV2_I^{ADS})^2\right]^{1/2}$	
	4	$\left[(COND_I)^2 + (RV2_I^{ADS})^2\right]^{1/2}$	

TABLE D3 (Continued)

SERVICE LEVEL	NO.	LOAD COMBINATION	ACCEPTANCE CRITERIA
D	1	$\left[(SSE_I)^2 + (TSVC)^2\right]^{1/2}$	678,700 IN-LB ON COVER PLATE FOR BENDING AND TORSION PLUS 10,200-LB AXIAL FORCE
	2	$\left[(SSE_I)^2 + (RV2_I^{ALL})^2\right]^{1/2}$	
	3	$\left[(SSE_I)^2 + (CHUG_I)^2 + (RV2_I^{ADS})^2\right]^{1/2}$	
	4	$\left[(SSE_I)^2 + (COND_I)^2 + (RV2_I^{ADS})^2\right]^{1/2}$	
	5	$\left[(SSE_I)^2 + (CHUG_I)^2 + (RV1)^2\right]^{1/2}$	
	6	$\left[(SSE_I)^2 + (COND_I)^2 + (RV1)^2\right]^{1/2}$	
	7	$\left[(SSE_I)^2 + (VLC_I)^2\right]^{1/2}$	
	8	$\left[(AP_I)^2 + (SSE_I)^2\right]^{1/2}$	

TABLE 16-B FSAR MSIV INLET/OUTLET
HIGHEST STRESS SUMMARY
SHOREHAM - MAIN STEAM LINE B
LOAD COMBINATIONS

Item Evaluated		Highest Calculated Load	Allowable Limits	Ratio	Governing Load (1) Comb. No.	Identification of Equipment with Highest Load
STRESS DUE TO AXIAL	LEVEL A	6086	15375	.396	1	Node 97
	LEVEL B	6120	41000	.150	2	Node 103
	LEVEL C	6172	41000	.15	4	Node 103
	LEVEL D	6198	41000	.15	8	Node 103
STRESS DUE TO BENDING MOMENT	LEVEL A	1155	15375	.076	1	Node 97
	LEVEL B	1396	41000	.034	2	Node 97
	LEVEL C	1417	41000	.035	4	Node 121
	LEVEL D	1845	41000	.045	8	Node 121

Attachment 7
Specific Item No. 6

TABLE 16C FSAR MSIV INLET/OUTLET
HIGHEST STRESS SUMMARY
SHOREHAM - MAIN STEAM LINE C

Item Evaluated		Highest Calculated Load	Allowable Limits	Ratio	Governing Load (1) Comb. No.	Identification of Equipment with Highest Loads
STRESS DUE TO AXIAL	LEVEL A	6036	15375	.393	1	Node 91 & 85
	LEVEL B	6172	41000	.15	2	Node 91
	LEVEL C	6720	41000	.16	4	Node 91
	LEVEL D	6864	41000	.17	8	Node 91
STRESS DUE TO BENDING MOMENT	LEVEL A	543	15375	.035	1	Node 107
	LEVEL B	911	41000	.022	2	Node 107
	LEVEL C	1339	41000	.033	4	Node 107
	LEVEL D	1542	41000	.038	8	Node 107

NUCLEAR POWER SYSTEMS ENGINEERING DEPARTMENT MEMO

TO: G.I. Samstad R.W. Hardy
R.L. Lebre

Attachment 8

Specific Item No. 7

DATE: August 27, 1982

REQUIRED RESPONSE DATE:

FROM: J.C. Kelso/E. Intrator

FOR: ACTION ☐
DECISION ☐
INFORMATION ☒

SUBJECT: SHOREHAM RCIC TURBINE SEISMIC SIMILARITY ANALYSIS

PWA 2613KS Rev. OC requested, for the SQRT program, a similarity analysis between the Shoreham RCIC turbine and the turbines that were dynamically tested. This letter presents the results of this analysis.

In order to properly support the similarity claim, submitted drawings and other design information were extensively reviewed for identifying the differences between the Shoreham RCIC turbine and the turbines which were tested. Also, during several visits to the turbine vendor's facility, detailed "bills of material" and other proprietary manufacturing drawings were reviewed. The results of these reviews confirm that many areas of the turbines are identical in design. There are, however, specific differences between the turbines, some totally insignificant, such as changes in the oil well cover plate design, while others require engineering judgment or analytical efforts to justify the claim for similarity. These latter areas are specifically identified below, with justification offered for similarity claim or recommendations for corrective action.

Base Plate Design (Refer Turbine Outline Drawing 65818E Versus 96553E, and the Proprietary Base Plate Drawing 65983C Versus 67517C)

The coupling end pedestal for the Shoreham RCIC turbine consists of two square columns, whereas the tested turbines had a solid rectangular section for the coupling end pedestal. An analysis of the Shoreham type base plate by Science Applications Incorporated (Marvin Cohn, dated August 28, 1980) confirmed its capability of withstanding the required dynamic loads.

There are other differences in the respective base plate designs which do not affect dynamic capability, such as grout hole locations, oil filter orientation, and a minor change in the location of the anchor bolts.

The SAI analysis also concludes that the #8 taper pins used for coupling end alignment are adequate, but marginal. The first qualification test program was conducted on a turbine using #8 taper pins, one of which failed after 31 tests and an accumulated test time of almost 15 minutes (refer VPF 3622-79(1)-2, Tab 2, response to NOD-7 for more information). The turbine used in the second test program used #9 taper pins and lock plates for the pedestal bolting. No problems were encountered, but it should be noted that total test time was only 6.5 minutes (refer VPF 3622-527-1 for more information).

ACTION: Consideration should be given to the modification to install #9 pins and pedestal bolt lock plates. FDI 114-88524 will be issued to define this installation.

CC: C.W. Dillmann, J.S. Mokri, M.P. Patel

Lower Half Turbine Case

The Shoreham lower half turbine case is essentially the same as those used on the test turbines. There have been minor changes in machining for improved productivity. These changes are judged to have no effect on dynamic characteristics.

Upper Half Turbine Case

The GSI RCIC turbine has lower half steam admission only. As such, the upper half turbine case does not have a high pressure steam ring (refer section drawing 77322E vs. 99019E).

The casing is rigid, but with less mass, resulting in less dynamic loading on the support pedestals.

Turbine Shaft

The machining of the Shoreham turbine shaft outboard of the governor end bearing has minor differences from that on the test turbines due to different overspeed trip designs (refer section drawing 77322E vs. 99019E). These differences do not affect the dynamic characteristics of the turbine shaft.

Overspeed Trip Design

The Shoreham turbine uses a "disc type" mechanical overspeed trip design whereas the test turbines used a "pin type" design (refer drawing 656388 vs. 98501D).

Externally, the trip assembly components are essentially the same, with minor differences in the stem length on the tappet-ball holder, the connecting rod length, and the bracket design for the limit switch attachment.

The major difference is internal, i.e., the trip actuating device -- disc versus pin. As is evident from the referenced drawings, the trip devices are spring loaded, small mass components which are judged to be insensitive to external dynamic loads. In the unlikely event that an overspeed transient occurred simultaneously with a seismic (or other dynamic loading) phenomena, it is possible that the actual trip speed would be lower than design. However, this possibility would probably occur with both trip devices.

ACTION: No action is deemed necessary. However, if the customer is concerned, the turbine shaft could be modified to accept conversion to the "pin type" trip device.

Governor Valve

The governor valve on the Shoreham RCIC turbine is smaller than the valves used on the test turbines. The valve internal design is also different (refer drawing 77336D vs. 101180D).

The steam forces associated with governor valve operation are judged to be substantially greater than the forces related to external dynamic loads, thereby rendering the external loads as insignificant. The operability of both valve designs has been demonstrated by test and by actual operating experience.

Finally, with the smaller, but rigid valve body, the forces associated with external dynamic loads are inherently less at the valve/turbine interface.

Trip and Throttle (T&T) Valve

The Shoreham RCIC turbine uses a 3" - 900# Schutte and Koerting T&T valve, with overall dimensions (inlet centerline to top) of 40-1/4" and face to face (inlet to outlet) dimension of 15-1/2". The test turbines used a 4" - 900# Gimpel T&T valve, with comparable dimensions of 41-3/8" and 17-7/8", respectively (refer drawing 69-XE-41 vs. 89621E).

Review of the referenced drawings substantiates the claim for similarity between the two valves. The only major (but judged to be inconsequential) difference is that the Shoreham valve uses a G.E. trip solenoid -- push to trip, whereas the test turbines use a Thrombetta trip solenoid -- pull to trip. The actual trip mechanism is essentially identical on both valves.

One area which could not be verified in the record search was the stiffness of the spring used on the trip latch assembly on the S&K valve. During the first qual test program, we found it necessary to increase spring stiffness to 25#/inch in order to prevent trip latch separation during the resonance search tests (refer to VPF 3622-79(1)-2, Tab 2, response to NOD-2 for detailed information).

ACTION: Verify stiffness of the trip latch spring used on the S&K valve. If necessary, replace with a spring having a stiffness coefficient of 25#/inch FDI 114-88524 will be issued to define this inspection activity.

Turbine Electronic Controls

The electronic and electrical/hydraulic controls used on the test turbines included:

Power supply (dropping resistor)	- WW8270-281
Ramp generator/signal converter	- WW8271-083 and WW 8271-590
EGM Control Box	- WW8271-236
Hydraulic Actuator	- WW8250-133
Hydraulic Servo	- WW8250-190

Our records indicate that the following comparable equipment was originally installed on the Shoreham RCIC turbine:

Power supply (dropping resistor)	- WW8270-281
Ramp generator/signal converter	- WW 8271-083
EGM Control Box	- WW8270-849
Hydraulic Actuator	- WWA8250-133
Hydraulic Servo	- WW8250-190

The only difference between the controls of the Shoreham turbine and the tested turbines is the EGM Control Box. Purchase Order 205-YC852 has been issued to replace the Shoreham EGM Control Box by Model 8271-236. In addition, this P.O. also provides replacement of the RGSC by Models 9903-091 or 8271-590, both qualified. FDI 113-88524 has been prepared to define the installation of the new components.

ACTION: Already taken.

Turbine Oil Piping

The turbine oil piping is the most difficult area to define design similarity. Unfortunately, the RCIC turbine oil piping was installed via a flow diagram only, without the use of an arrangement drawing. As a result, each RCIC turbine has a more or less unique piping arrangement. However, each arrangement presumably has adequate support to satisfy the minimum criteria defined in the seismic analysis (refer VPF 2757-35-1). However, with the criteria for new load evaluation moving the frequency range of interest up to 60 Hz and beyond, additional piping review is recommended.

ACTION: FDI 121-88524 has been issued to define the required piping review and the addition of piping supports.

The above information completes the required response to PWA 2613KS, Revision OC, Task 6.

Support information will be maintained in Design Record File #E51-88.

J.C. Kelso
Reactor Assembly & Plant
Equipment Qualification
MC-750, X51819

E. Intrator
Reactor Assembly & Plant
Equipment Qualification
MC-750, X51776

eqn

GENERAL ELECTRIC

FIELD DISPOSITION INSTRUCTION

5/6/82

SEP 29 1982

R.W. HARDY

FDI NO. 113-88524

REVISION 0

SHEET 1 OF 4

PROJECT Shoreham UNIT 1

EQUIPMENT HPCI and RCIC Turbine Control Electronics

MPL NO. E41-C002 and E51-C002

DATE OF ISSUE
ISSUED BY PD & RQ
DATE 5-14-82

ECN/IR/DDR FDDR

KS-01-1042

DESCRIPTION OF TASK

Purpose of Instruction

The project has committed to upgrading critical electrical/electronic components to the qualification standards of Class 1E equipment. It is therefore necessary to replace existing electronic control components on the HPCI and RCIC turbine with new equipment, equivalent to that qualified by test. This new equipment has internal design improvements which enhance overall operability; externally the new equipment will be a "one for one" replacement with the existing equipment, except for terminal designations.

Required Documents

HPCI Turbine Instruction Manual, at site

RCIC Turbine Instruction Manual, at site

Woodward Plant System Wiring Diagram 9976-717 (VPF 3622-25-2), included

Material Required

The new electronic control components include:

Woodward Governor EGM Control Box for the HPCI Turbine,
Model #9903-109 (Terry Corp. Piece #890004A04)

Woodward Governor EGM Control Box for the RCIC Turbine,
Model #8271-236 (Terry Corp. Piece #075850A03)

Woodward Governor Ramp Generator/Signal Converter
Model #9903-091 or 8271-590 (Terry Corp. Piece #890005A02 or 075925A02)

This material has been requested via MR #YC852, with delivery direct to site.

APPROVALS	DATE
J.C. Kelso, FDI ORIGINATOR	9/30/82
E.W. Ziebell, QUALITY	9/30/82
N/A per JCK	
C.R. Dittmann, MATL APPL ENGR	9/13/82
J.C. Kelso, ENGR MANAGER	9/30/82
[illegible], DIRECT MANAGER	5/12/82

APPROVALS	DATE

THIS EQUIPMENT IS SAFETY RELATED [X] YES [ ] NO
SAFETY FUNCTION IS AFFECTED [X] YES [ ] NO

FIELD WORK ORDER NO.

COMPLETION RECORD REQUIRED BY R.E.
YES [X] NO [ ]

DISTRIBUTION CODE

INTERNAL	EXTERNAL
R.T. Kern MC 432	
MC 750L	

FDI TASK COMPLETED DATE

SITE QUALITY CONTROL

FIELD MANAGER

NEDG 663 (12/80)

DESCRIPTION OF TASK

Procedure

Caution: Verify proper terminal identification on wiring prior to its removal.

HPCI Turbine Control Component Upgrade

Reference the mounting panel drawing 95414C (Section 15-M-17 of the Turbine Instruction Manual), remove the existing EG-M control box and the ramp generator/ signal converter module from the turbine control panel.

Note: The original equipment may be returned to Woodward Governor Co. for upgrading.

Install the new, upgraded EGM control box (Model #9903-109) and ramp generator/ signal converter module (Model #9903-091 or 8271-590) onto the existing turbine control panel. The equipment interfaces (new versus original) are identical, and no panel modifications are required.

The external terminal designations on the new equipment are the same as those on EGM Control Box Model #8270-811 and ramp generator/signal converter module Model #8271-083. Therefore, install interconnecting wiring in accordance with the Woodward Plant Wiring Diagram 9976-705, contained in Section 8 of the Turbine Instruction Manual.

RCIC Turbine Control Component Upgrade

Reference mounting panel drawing 95517C (Section 14-M-13 of the Turbine Instruction Manual), remove the existing EG-M control box and the ramp generator/signal converter module from the turbine control panel.

Note: 1) The original equipment supplied may have included an EGM Control Box Model #8271-236. If so, do not remove, as this is the required upgraded unit.

2) Removed equipment may be returned to Woodward Governor Co. for upgrading.

Install the new upgraded EGM control box (Model #8271-236) and ramp generator/ signal converter (Model #9903-091 or 8271-590) onto the existing turbine control panel. The equipment interfaces (new versus original) are identical, and no panel modifications are required.

Install interconnecting wiring in accordance with the Woodward Plant System Wiring Diagram 9976-717 (included with FDI). Note changes in terminal designation, compared with existing diagrams in Section 8 of the Turbine Instruction Manual.

DESCRIPTION OF TASK

Quality Control Requirements

Site Quality Control personnel shall inspect final equipment installation, and shall verify "terminal to terminal" wiring in accordance with the applicable plant system wiring diagram.

Equipment Calibration

The new electronic control modules shall be calibrated in accordance with the procedures contained in Section 8 of the Turbine Instruction Manual and Service Information Letter (SIL) #351.

Schedule for Implementation

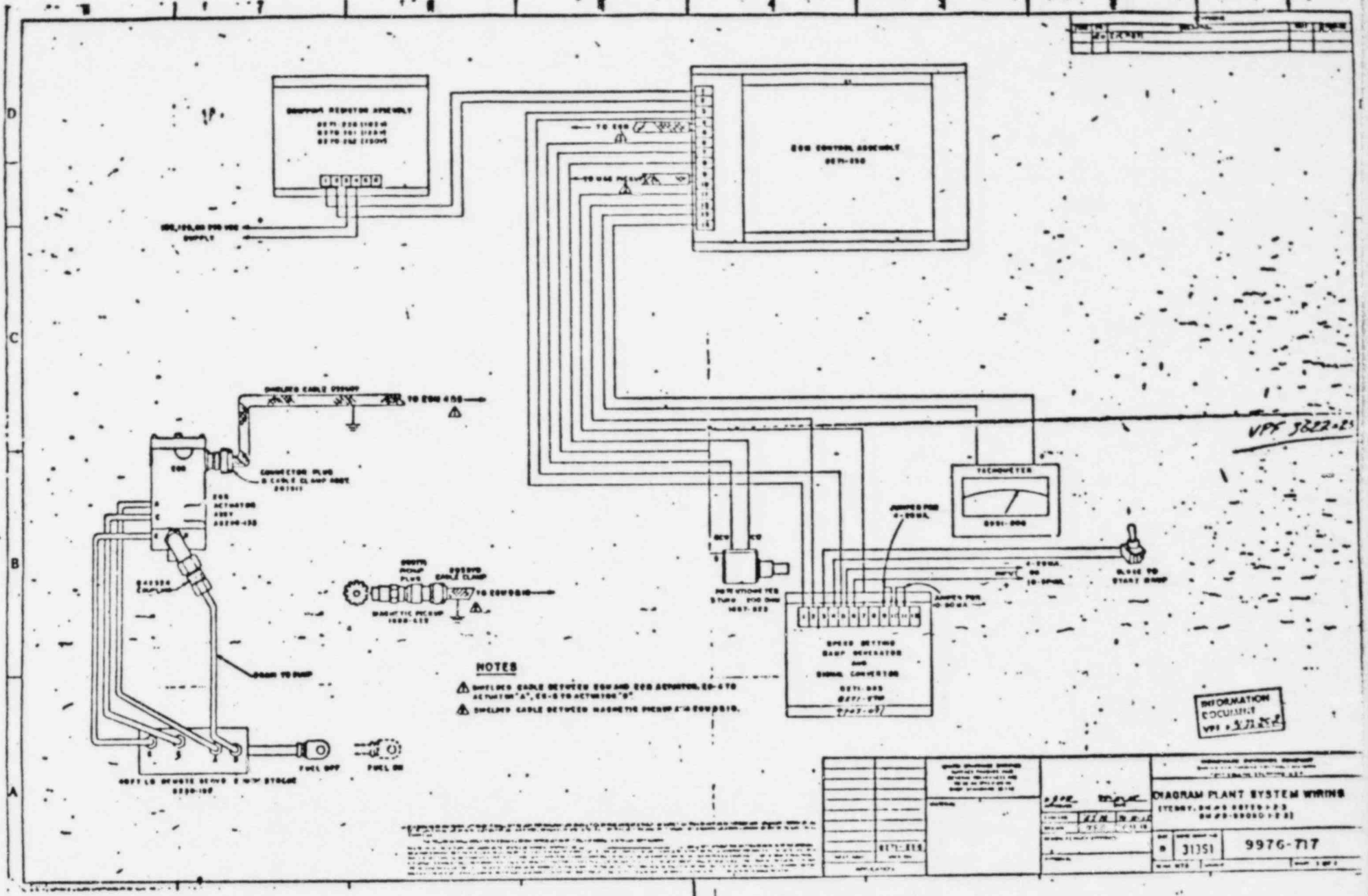
This FDI should be implemented as soon as the replacement equipment is available on site, and definitely prior to plant/system startup testing.

NOTE: 1) This FDI defines installation of upgraded electronic control equipment, while maintaining the existing 4 to 20 mA signal input from the system flow controller. Due to a potential "ground loop" problem associated with the Bailly flow controller and the turbine control system, a separate FDI will be issued by C&IE, defining conversion from the existing 4 to 20 mA flow controller output signal to a 1 to 5 VDC signal. The impact on the installation of the new ramp generator/ signal converter module will be to remove the external jumper across terminals 9 and 10, and to move the existing wire on terminal 6 to terminal 10. This effort must be coordinated with the implementation of the C&IE FDI.

2) The turbine specification(s) will be revised to identify the conversion from the existing 4 to 20 mA control signal to the new 1 to 5 VDC control signal, in accordance with ECA 800801-1, Revision 1. Appropriate MR/PO revisions will then be issued, requesting required changes to the applicable vendor control system wiring diagrams.

3) Implementation of this FDI shall result in superseding previously approved FDDR KS-01-1042.

FDI 113-88524
Rev 0
Sheet 4 of 4



INFORMATION DOCUMENT
VPF 3822.25

DIAGRAM PLANT SYSTEM WIRING

B	31351	9976-717

GENERAL ELECTRIC

FIELD DISPOSITION INSTRUCTION

REA[illegible]

SEP 29 1982

R.W. HARDY

FDI NO. 114-88524

REVISION 0

SHEET 1 OF 7

DATE OF ISSUE
ISSUED BY PD & RC
DATE 9-3-82 TS

ECN/IR/DDR/FDDR
N/A QCK 8/6/82

PROJECT Shoreham UNIT 1

EQUIPMENT RCIC Turbine, IEEE Upgrade

MPL NO. E51-C002

DESCRIPTION OF TASK

Purpose of Instruction

Two qualification test programs have been conducted on the GS-2N RCIC turbine assembly provided by Terry Corporation. The first program was a seismic qualification test in accordance with IEEE-344-1975, with test results and report retrievable from Vendor Print File (VPF) #3622-79(1)-2. The second program was a complete environmental qualification test in accordance with IEEE-323-1974, with test results and report retrievable from VPF #3622-527-1.

The first program identified several areas where design changes were required in order to positively assure that the turbine assembly could withstand the conservative seismic test requirements. The adequacy of these design changes was successfully demonstrated during the second test program.

The purpose of this FDI is to specifically address each area of potential concern, and define the necessary inspection and possible corrective action required. The items identified in this FDI do not affect GE documents, and ECA/ECN's are not applicable.

Required Documents

RCIC Turbine Instruction Manual, at site
Vendor Drawing 111904C, Lockplate Assembly, enclosed

Material Requirements

The material required for this instruction is specifically identified in the following procedures for each task. The material can be obtained locally by site personnel, purchased directly from Terry Corporation, or ordered through the General Electric Company.

APPROVALS	DATE
J.C. Kelso	8/27/82
E.H. Liebau	8/27/82
QUALITY N/A QCK	8/27/82
E.H. Uhlmann	8/30/82
ENGG MANAGER J.C. Kelso	8/30/82
FIELD SERVICE MANAGER	9/1/82

APPROVALS	DATE

DISTRIBUTION CODE

INTERNAL	EXTERNAL
726A	
750L	

THIS EQUIPMENT IS SAFETY RELATED ☒ YES ☐ NO
SAFETY FUNCTION IS AFFECTED ☐ YES ☐ NO

FIELD WORK ORDER NO.

COMPLETION RECORD REQUIRED BY R. E. YES ☒ NO ☐

FDI TASK COMPLETED — DATE

SITE QUALITY CONTROL

FIELD MANAGER

NEDG 663 112/801

GENERAL ELECTRIC

FIELD DISPOSITION INSTRUCTION

FDI NO. 114-88524

REVISION 0

SHEET 2 OF 7

DESCRIPTION OF TASK

Procedure

Detailed information follows, defining each area of potential concern, the required inspection, and the necessary corrective action, if applicable. There are no special tools or handling equipment required in implementing these instructions. If vendor assistance is desired, arrangements for a service representative can be made through the Project Manager, or directly with:

Terry Corporation
P.O. Box 555
Windsor, CT 06095

Attn: Robert Theroux, Service Manager
Tel. (203) 688-6211

Item 1 - RCIC Turbine - Trip and Throttle Valve Latch Spring
(Refer Drawing 69-XE-41 in Section 14-M-10 in the Turbine Instruction Manual)

During the first (seismic qualification) test program, the initial test activity resulted in inadvertent, unacceptable closure of the trip and throttle valve. The attached photograph identifies the partial separation of the latching lever assembly at the completion of one of the seismic tests.

The original latching spring was replaced with one having a higher spring coefficient. The operability of the solenoid trip mechanism and the mechanical overspeed trip mechanism were verified after the installation of the stiffer latch spring, and proved to be acceptable. The seismic qualification test program was then successfully completed. The second (environmental qualification) test program, including dynamic testing, was also successfully completed.

Corrective Action

Remove the latch spring from the trip and throttle valve assembly, and measure its spring constant, which should be 25 lb/inch, $\pm$10%. If the installed spring does not satisfy this value, it must be replaced. The appropriate replacement spring is Terry piece number 105594A10, a 0.845 inch diameter spring with a free length of 2.75 inches. The installed spring, resting against the "jam nut" on the valve body and the washer in the latch lever, will have the proper compression. No adjustment is necessary. The spring "load" in the valve latched position is 32.5 pounds. $\pm$

GENERAL ELECTRIC

FIELD DISPOSITION INSTRUCTION

FDI NO. 114-88524

REVISION 0

SHEET 3 OF 7

DESCRIPTION OF TASK

Item 2 - RCIC Turbine - Coupling End Pedestal Assembly

During the first (seismic qualification) test program, the entire turbine assembly was subjected to a total of 33 tests with an accumulated test time of 905 seconds. Approximately one-third of the way through the test program, turbine structural bolting began to loosen. The test facility did not have adequate tools to properly retorque the turbine bolting. Finally, after 31 tests with an accumulated test time of 875 seconds, one of the alignment dowel pins in the coupling end bearing pedestal failed, and the second pin had an offset distortion of approximately 1/16 inch. Both conditions were attributed to bending loads on the dowel pins due to loosened pedestal bolting.

The design of subsequent turbines was modified to use #9 tapered dowel pins in lieu of the original #8 pins for alignment control, and to use a positive "lock tab" for the pedestal bolting. The second (environmental qualification) test program, utilizing these design improvements, was successfully completed.

Corrective Action

With reference to vendor drawing 111904C, attached, inspect the turbine assembly for installation of the #9 taper pins and use of the positive lock tabs on the coupling end bearing pedestal holddown bolts. If not in compliance, the following corrective action is required:

Material: Flat washer, 2 each, Terry Piece #75778A07
Locking Plate, 2 each, Terry Piece #111903B
* Threaded Taper Pin, 2 each, Terry Piece #111284B
Taper Pin Nut, 2 each, Terry Piece #75238A05

Note: (a) To avoid possible disturbance of the turbine alignment, the following procedure is to be carried out on one side of the coupling end bearing pedestal at a time.

(b) Should it be necessary to realign the turbine, this should be accomplished before fitting the new dowel pins. (Refer to Section 4 of the Turbine Instruction Manual for alignment definition.)

(c) Numbers in ( ) are the item numbers identified on assembly drawing 111904C.

* Caution: This is a special 17-4PH stainless steel pin - DO NOT SUBSTITUTE!

GENERAL ELECTRIC

FIELD DISPOSITION INSTRUCTION

FDI NO. 114-88524

REVISION 0

SHEET 4 OF 7

DESCRIPTION OF TASK

1. Remove the existing tapered dowel pin (3). If this pin is smaller than #9, drill 1/2 inch diameter pilot hole and ream for fitting the required #9 pin.

2. Remove the pedestal holddown bolt (5).

3. Locate flat spacer washer (1) on the machined spot facing around the pedestal holddown bolt hole. The washer must sit flat with full face-to-face contact. Any rocking or interference must be eliminated.

4. Place locking plate (2) on top of the flat washer (1), and align holes for the dowel pin (3) and the holddown bolt (5). It may be necessary to enlarge the holes in the locking plate to assure no interference with the dowel pin or the holddown bolt.

5. With the holes in the locking plate aligned, install the #9 tapered dowel pin (3) firmly in position. Assure that the pin extracting nut (4) is threaded back sufficiently to allow the pin to seat fully into its hole. The shoulder of the installed tapered dowel pin should be approximately 1/16 inch below the edge of its reamed hole (refer Dwg. 111904C).

6. Apply Fel-Pro "Hi-Temp" C5-A lubricant (or equivalent) to the threads of the pedestal holddown bolt (5), install, and torque to 310 to 340 ft-lbs, such that one flat of the bolt head is aligned to facilitate lock plate bending (refer to Section A-A of Drawing 111904C and the attached photo for acceptable orientation).

7. Using a blunt-ended tool (brass or wood), bend the end of the locking plate (2) against the flat of the pedestal holddown bolt (5). The bending line should have a small radius, as opposed to a square edge which could result in cracking.

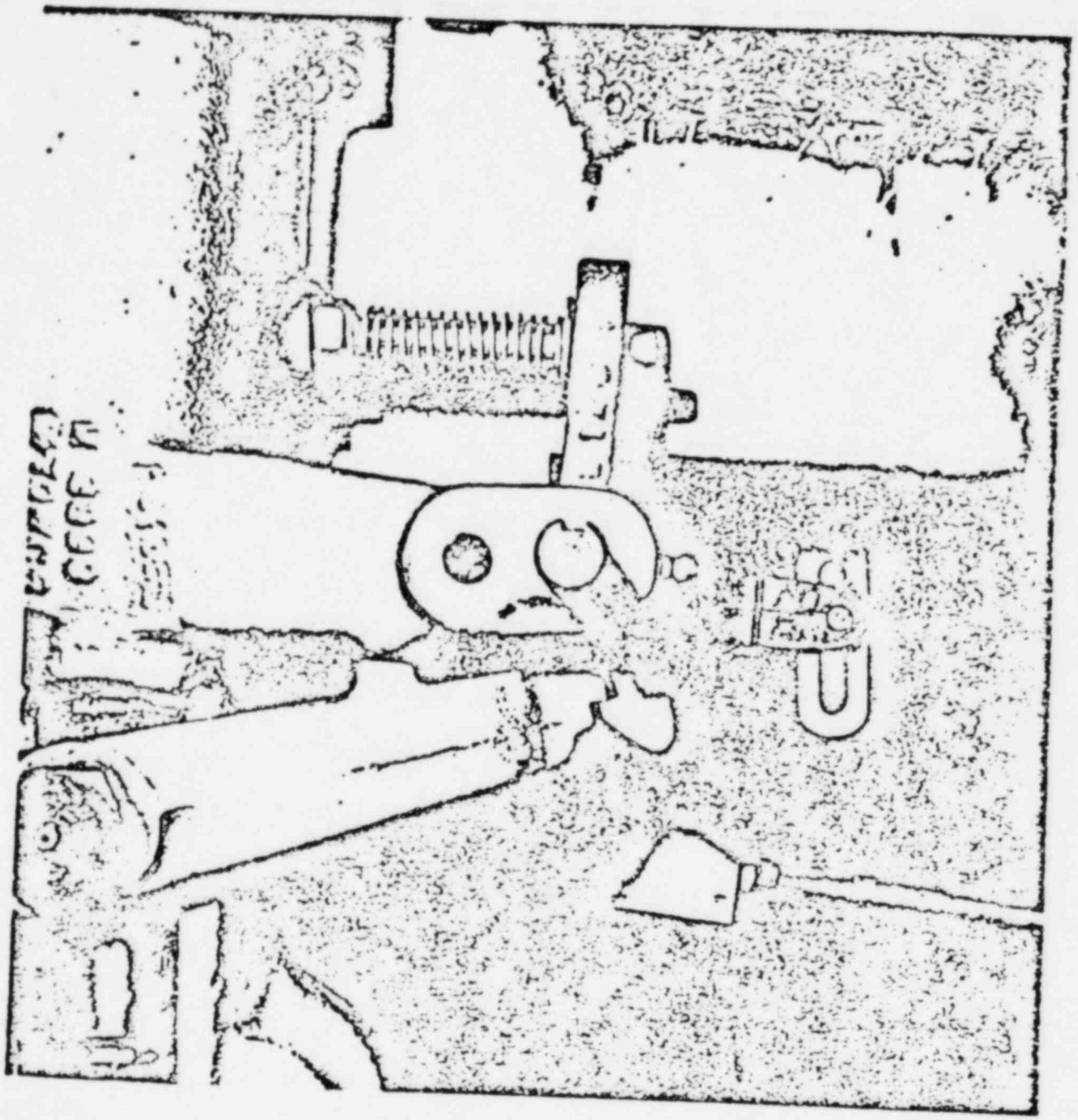
Quality Control Requirements

Standard site quality control procedures shall be used in implementing this FDI. Particular emphasis shall be used in assuring that adequate procedures are used in conducting the inspections defined above, and assuring proper completion of the defined corrective actions.

Schedule for Implementation

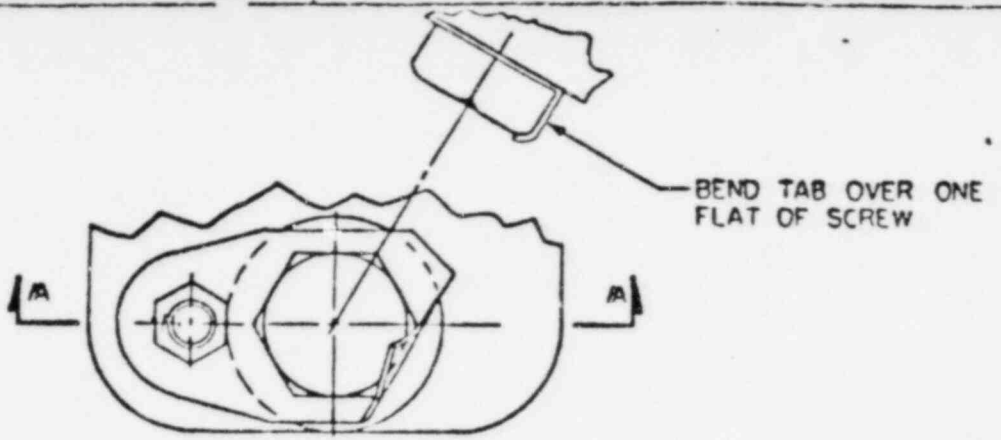
This FDI should be completed prior to the startup test activity on the RCIC system.

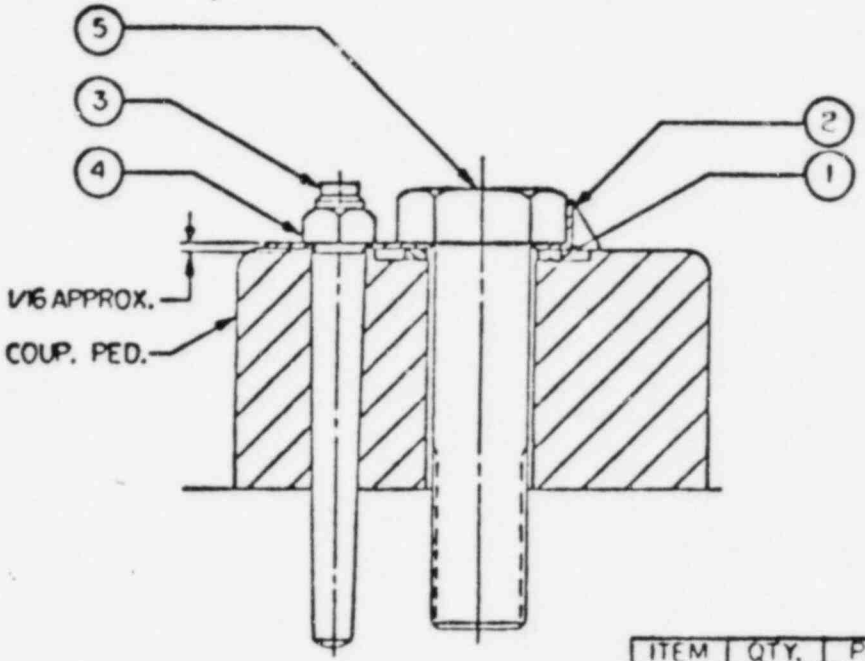
NOTE: FDI 121-88524 defines the required additional supports for the lube oil piping.



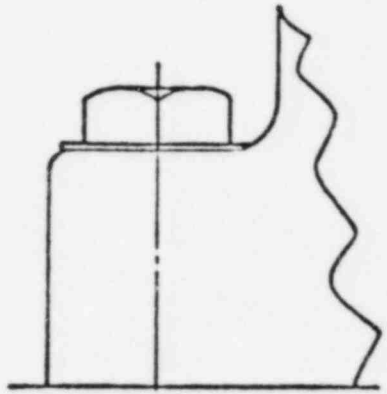
VALVE LATCH SPRING

REVISION					
LTR	SYMB	DESCRIPTION	DATE	APPROVED	ECN
A		[illegible] LOCK PLATE	1/24/78	I.L.	[illegible]





SECTION A-A



FDI 114-88524
REVISION O
SHEET 6 OF 7

ITEM	QTY.	PIECE NO.	DESCRIPTION
1 *	2	75778A07	WASHER, FLAT
2 *	2	1119038	PLATE, LOCKING
3 *	2	1112948	PIN, TAPERED TAPER
4 *	2	75225A05	NUT, [illegible]
5	2	75PE-A13	SCREW, [illegible] HEX HD. CAP

* ITEMS REFERENCED ARE THOSE SUPPLIED IN THE DESIGN IMPROVEMENT KIT FOR THE UNITS INSTALLED IN THE FIELD

FAMILY NO 107 | LOCATION K52

TERRY CORPORATION

TITLE
ASSY, COUP. PED. SCR. LOCK PLATE

STANDARD PRACTICE

SCALE FULL SIZE | DATE 5-1-77

DRAWN I.L. | CHECKED S.E. | APPROVED [illegible]

ENGINEERING APPROVAL

SIGNED [illegible] DATE [illegible]

TYPE G52N | OFF PARD NO

DRAWING NO 111904C | SHEET 1 OF 1

111904C

D.I. NO. 3

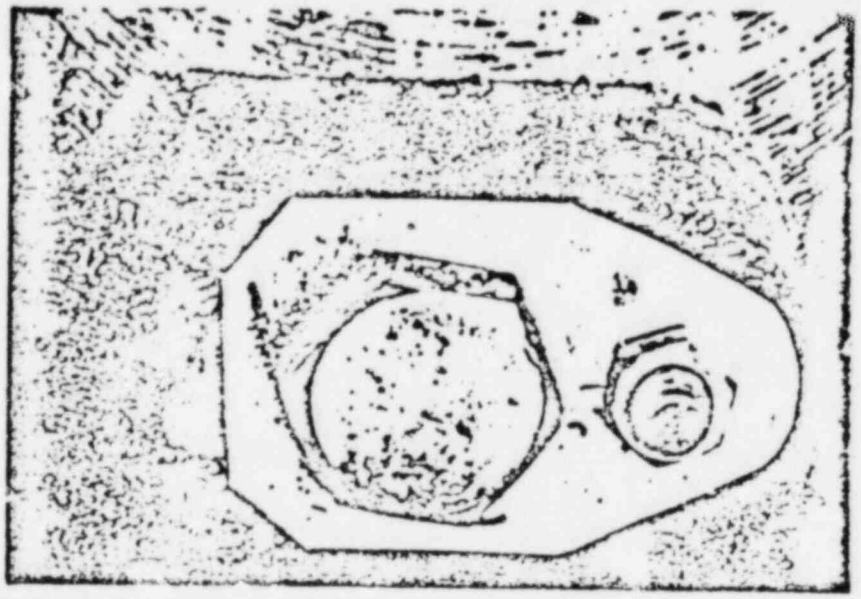


FIG. 1. LOCKING PLATE IN POSITION ON COUPLING END PEDESTAL FOOT BEFORE LOCKING

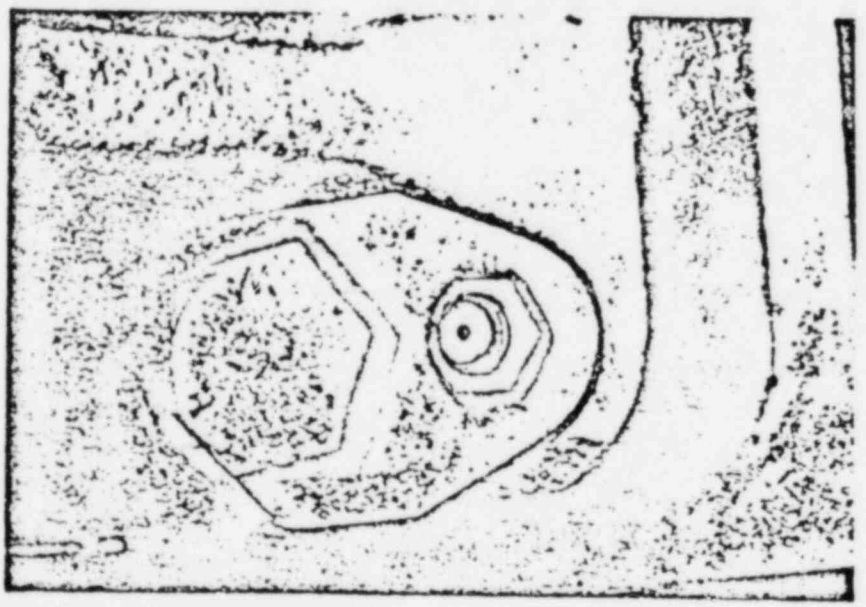


FIG. 2. HOLD DOWN BOLT FULLY TORQUED AND LOCKING PLATE TAB BENT TO FULLY CONTACT ONE SIDE OF BOLT HEAD.

BEING REVISED

FIELD DISPOSITION INSTRUCTION

SEP 29 1982

FDI NO. 121-88524

REVISION 1

SHEET 1 OF 1

PROJECT SHOREHAM UNIT R.W. HARDY 1

EQUIPMENT RCIC TURBINE

MFL NO. E51-C002

DATE OF ISSUE
ISSUED BY PD & RC
DATE 9-23-82

ECN/IR/DDR/FDDR
N/A

DESCRIPTION OF TASK

This FDI supercedes Rev. 0.
The purpose of this FDI is to improve the load carrying capability required for confirmatory loads of the lube oil piping assembly by adding supports to the existing pipe assembly.

1.0 Required Documents

GE document 213A8273, Rev. 1.

2.0 Material Required

The material required in this instruction is a 2x2x3/8 angle (A-36), Plate (A-36) and U bolts as identified in the attached sketches for each support. The material shall be obtained by site personnel.

3.0 Procedure

Locate and install lube oil pipe supports in accordance with the attached document.

4.0 Quality Control Requirements

Standard site quality control procedures shall be used in implementing this FDI, including site QC verification of above work.

APPROVALS	DATE
MP PATEL	9/22/82
FDI ORIGINATOR JM DYER	9/20/82
QUALITY N/A	
MATL APPL ENG JS MOKRI	9/20/82
JC KELSH	9/20/82
RESPONSIBLE ENGINEER	9/20/82

APPROVALS	DATE

THIS EQUIPMENT IS SAFETY RELATED ☒ YES ☐ NO
SAFETY FUNCTION IS AFFECTED ☒ YES ☐ NO

FIELD WORK ORDER NO.

COMPLETION RECORD REQUIRED BY R. E.
YES ☐ NO ☒

DISTRIBUTION CODE

INTERNAL	EXTERNAL

FDI TASK COMPLETED DATE

SITE QUALITY CONTROL

FIELD MANAGER

Attachment 9

Specific Item No. 8

SHOREHAM NUCLEAR POWER STATION UNIT 1

SEISMIC QUALIFICATION REEVALUATION

CLASS 1E EQUIPMENT

COMPONENT NAME: 'DIFFERENTIAL PRESSURE TRANSMITTER

PPD. NO.: 145C3240, 163C1558, 163C1560, 163C1561, 163C1563, 163C1564

MPL REFERENCE: C41-N004

GE DRF A00-992, VOLUME 3
SUPPLEMENT 1

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 10/6/82

ORGANIZATION: GENERAL ELECTRIC CO., CONTROL ROOM DESIGN ENGINEERING

REVIEWED BY: R.W.HARDY R W Hardy DATE 10/6/82
SQRT PROGRAM MANAGER

APPROVED BY: N.LURIA, N G Luria DATE 10/6/82
QUALIFICATION ENGINEERING MGR.

GENERAL ELECTRIC

11951-3

QUALIFICATION SUMMARY

1. Component Name: DIFFERENTIAL PRESSURE TRANSMITTER

2. MPL or EDL Item No.: C41-N004, (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. 116.00.02 File No. 930., GEA-2815	9/2/82	Required Accelerations for Stand Mounted Equipment, SNPS-1
3.	GE DRF A00-794-10	1980	Seismic Test of Ceneric 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

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

2. Model Number: Rosemount 1151 Quantity: 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 device list for each system.
[ ] 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..

12/80

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

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): Attached

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.

12/80

**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. 930, GEA-2815 dated 9/2/82.

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 = N/A
   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:

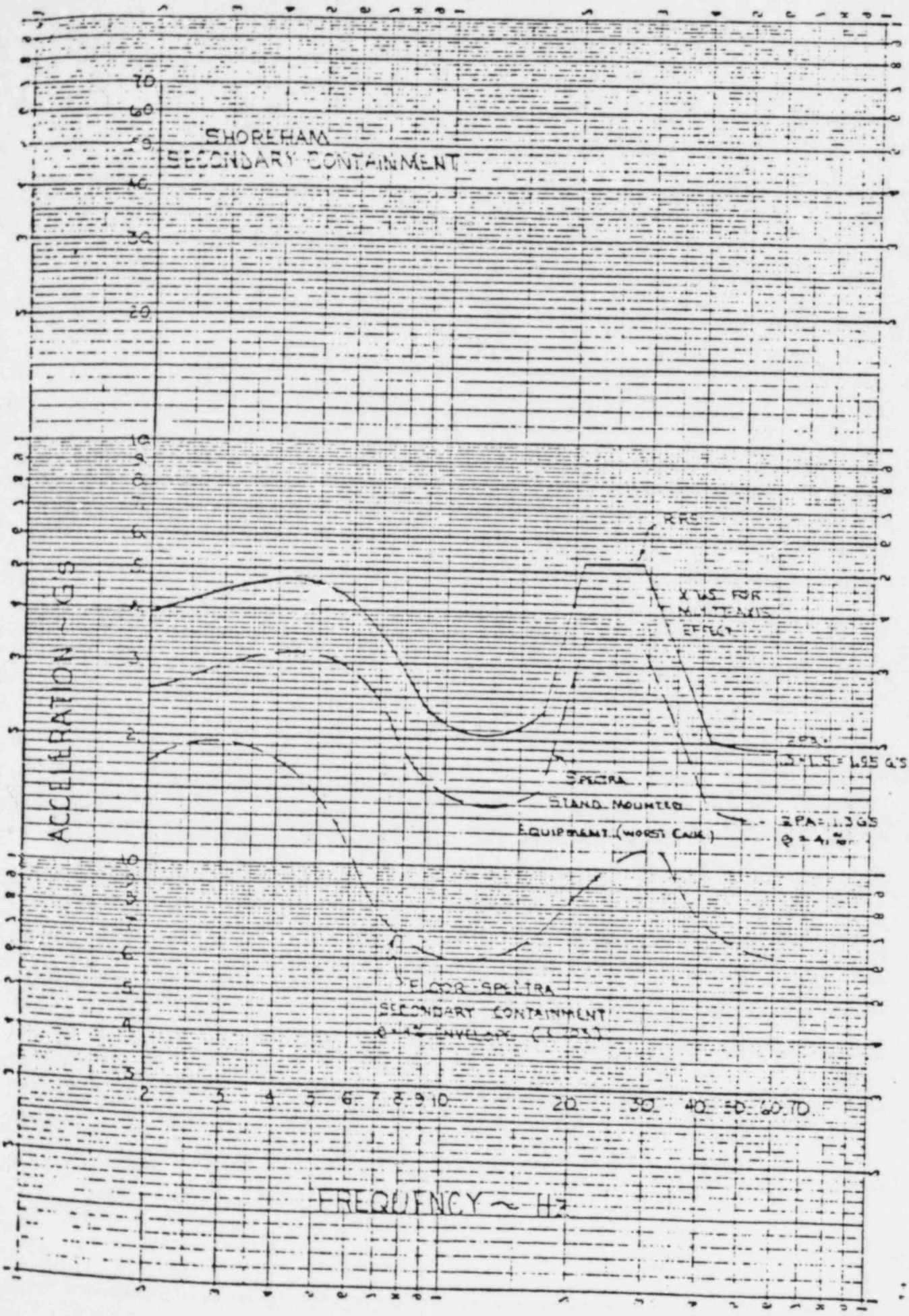
A. Identification	Location	Governing Load or Reponse Combination	Seismic Stress	Total Stress	Stress Allowable

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

SEISMIC QUALIFICATION REEVALUATION OF NUCLEAR SAFETY RELATED EQUIPMENT

SH GP MPL REFERENCE: C41-5110 TITLE: STDBY LIQ CON LCL INSTR : PL 328X158TFG001
REQUIRED FOR: ( )HOT STANDBY, ( )COLD SHUTDOWN, ( )BOTH, (X)NEITHER : REV 1

DESCRIPTION		E:	SEISMIC CAPABILITY/ MALFUNCTION LIMIT			MAXIMUM EXPECTED ACCELERATION AT LOC.			NATURAL FREQ. (Hz)	
EQUIPMENT NAME / MPL NUMBER	IDENTIFICATION	C:	F-B	S-S	V	F-B	S-S	V	MTG.	INSTR.
TEMPERATURE SWITCH	157C4629P001	P:	----	----	----	----	----	----	----------	
C41 N003			S.A.	S.A.	S.A.					
INDICATOR, PRESSURE	163C1184P017	P:	----	----	----	----	----	----	----------	
C41 R003			15.0	15.0	15.0	1.0	1.0	1.0	6	100+
TRANSMITTER, GAGE PRESS	163C1563P912203	P:	----	----	----	----	----	----	----------	
→ C41 N004			Ø3.Ø	Ø3.Ø	Ø3.Ø	1.0	1.0	1.0	6	50


SHOREHAM
SECONDARY CONTAINMENT
RRS
X VS FOR
N-1 TEAXIS
EFFECT
2%
SPECTRA
STAND MOUNTED
EQUIPMENT (WORST CASE)
ZPA = 1.3 GS
ZPA = 1.95 GS
FLOOR SPECTRA
SECONDARY CONTAINMENT
ENVELOPE
ACCELERATION IN G'S
FREQUENCY ~ HZ

AS-BUILT REVIEW OF EQUIPMENT

I. Plant Name: Shoreham Type: BWR 4 Mk II

1. Utility: LILCO
2. NSSS: GE 3. A/E: Stone and Webster

II. Equipment Identification (to be completed before field inspection)

Scope: BOP

1. Name: Pressure Transmitter
2. Vendor (manufacturer if different) and model number:
   Rousemount, Model 1151
3. S&W Mark number: 1C41*PT002
4. Drawing number: 7.62-133J (Vendor or S&W file)
5. Location given by S&W records:
   Building SC Elevation 112 ft Source S&W Dwg. 11600.02-RR-1H

III. Installation Review (to be completed during field inspection)

1. Actual location: Bldg SC Elev 112 ft Col. No. 9
2. If not installed:
   Reason: N/A Present location
3. Mounting: [X] Floor [ ] Pipe* [ ] Other
   (See Section VI, Supplemental Remarks) (Describe)

Describe the welding or bolting for:

Drawing (4) 1/4 in. dia bolts (SH1-343, Sketch K-243-2)

Field (4) 1/4 in. dia bolts

If different, give E&DCR No. and date N/A (attach copy)

* to valve bonnet for operators

4. Equipment matches the drawing [X].

If not, describe differences N/A

5. Base Configuration

Wedge Anchors(4) 1/2 in. O.D. each baseplate

Embedments ____

Supplementary Steel ____ Description:

IV. Nameplate Review (to be completed during field inspection)

1. Location on equipment Top

2. Type [X] Metal plate bonded or riveted to equipment

[ ] If not, describe ____

3. Nameplate contains the following information:

[X] Equipment Name Pressure Transmitter

[X] S&W Mark Number 1C41*PT002

[X] Name of Vendor (manufacturer if different) Rosemount

[X] Vendor Model No. 1151

V. Photographic Record

Take photographs of the mounting. If the equipment is mounted on a support structure such as a duct or instrument stand, take photographs of the support structure and the equipment together. On the back of all prints, stamp with your "noted" stamp (approximate date photo was taken) and show the equipment mark number.

VI. Supplemental Remarks

(As-Built Loads) Yes X No

Instrument mounted on double leg floor stand. (SH1-343)

Reviewers Stamp: NOTED MAR 26 1982 C.HAHN CL
Initials

Distribution: -- Original to the As-Built Record
-- Copy to the Seismic File
-- Photos in the Equipment Album (pasted)
-- Central File Package (at site)

Attachment 10
Specific Item No. 8

TWX: 910-576-3103. TELEX 20-0183

SEISMIC QUALIFICATION TEST
FOR
1151/1152 PRESSURE TRANSMITTER WITH STAINLESS STEEL ELECTRONIC HOUSING

RMT Report 2758

Ismail Ismail

SEISMIC QUALIFICATION TEST
FOR
1151/1152 PRESSURE TRANSMITTER WITH STAINLESS STEEL ELECTRONIC HOUSING

RMT Report 2758

1. SCOPE AND SUMMARY

This report covers a seismic test on a Rosemount Pressure Transmitter model 1151/1152 with stainless steel (SST) electronic housing. The test was performed at Environ Laboratories, 9725 Girard Avenue South, Minneapolis, MN 55431. Two configurations were tested, namely solid mount and with panel mount mounting bracket (RMT No. 01151-0036-0004). The data obtained shows minimal effect due to the given seismic vibration input on the transmitter performances. A fragility limit of 3 g was established for the bracket assembly and in excess of 4 g's for solid mount.

2. TESTING

2.1 General

The seismic qualifications of Rosemount model 1151/1152* is intended to demonstrate the equipment's ability to perform its function and within its specified accuracy during and after the time it is subjected to the forces resulting from a prespecified seismic spectrum. The transmitter is subjected to the seismic tests while simulating the operating conditions as proof testing and to determine the transmitter (with SST housing) capabilities during such test.

*Model 1151 is mechanically identical to model 1152. Model 1152 has the requirements of material traceability of pressure retaining parts and the use of non Teflon wire in its assembly.

Attachment 11
Specific Item No. 10

SHOREHAM EQUIPMENT QUALIFIED BY
SINGLE FREQUENCY/SINGLE AXIS TEST

Spec Item	Equipment Description	No. Items
39-1	4.16 kV Metal-Clad Switchgear	3
54-1	Fire Dampers	38
89-1	Aux Skid & Accessor.	24
89-2	Gen & Exctr Control Panel	3
89-4	Engine Control Panel	3
89-5	Diesel Engine	3
89-6	Starting Air Rec'ver	12
89-7	Starting Air Compressor	6
105-1	Cont. Rm. AC Filter Trains (El Comp Only)	2
105-2	RBSVS Filter Trains (Elec Comp Only)	2
111-1	AOV (Limit Switch)	6
	(Solenoid)	6
111-3	AOV (Solenoid)	4
	(Limit Switch)	4
118A-1	125 V Static Battery Chargers	3
120-1	B.O.P. Main Control Board (Elec Comp Only)	1
124-2	Dist Panel Board	12
134-1	Reactor Cont. Elec. Penetration	10
172-1	AOV (Limit Switch)	8
	(Solenoid)	8
310-1	Mtr Operated Control Valves (Actuator)	4
310-2	Mtr Operated Cntrl Valves (Actuator)	20
310-3	Mtr Operated Cntrl Valves (Actuator)	12
318-1	AOV (Solenoid)	2
318-2	AOV (Solenoid)	2
318-3	AOV (Solenoid)	2
	(Limit Switch)	2
318-4	AOV (Solenoid)	2
	(Limit Switch)	2
318-5	AOV (Solenoid)	17
	(Limit Switch)	17
318-6	AOV (Solenoid)	6
	(Limit Switch)	6
318-7	AOV (Solenoid)	4
	(Limit Switch)	4
319-3	Cntrl Pnl (Pnl Only)	9
348-1	Press - Temp Switch	4
348-2	Press - Temp Switch	15
406-1	Resist.Temp.Detector	18
		14
423-1	Chilled & Service Wtr AOV (Solenoid)	7
	(Limit Switch)	7
423-2	Temp Control Valve (Solenoid)	2
	(Limit Switch)	2
423-3	Temp Control Valve (Solenoid)	2
	(Limit Switch)	2
GRP-1	Limitorque Oprtors	165
GRP-2	Limitorque Oprtors	54
GRP-3	Limitorque Oprtors	4
GRP-4	Limitorque Oprtors	12

Attachment 12

Specific Item No. 10

SHOREHAM SQRT DRF# A00-992

Rev. 1
5/6/81

SHOREHAM NUCLEAR POWER STATION UNIT 1

SEISMIC QUALIFICATION REEVALUATION CLASS IE EQUIPMENT

LOCAL PANELS

SAI # 029-QA-80-PA Rev.2

Prepared by: E. S. RAMADAS

Date: April 3, 1981

Organization: SCIENCE APPLICATIONS, INC.
5 Palo Alto Square, Suite 200
Palo Alto, California 94304

GENERAL ELECTRIC

Table 2

SHOREHAM NUCLEAR POWER STATION
NSSS CLASS 1E LOCAL PANEL DEVICES WITH SINGLE AXIS MALFUNCTION LIMITS EXCEEDING MAXIMUM EXPECTED ACCELERATION AT MOUNTING LOCATION.

MPL #	GE PPD DWG#	IEEE 344-71 CAPABILITY (MAX.ACCN ON TESTED PANELS)			MAX. EXPECTED ACC. AT ANY LOCATION ON SHOREHAM PANELS		
		f-b	s-s	v	f-b	s-s	v
B31-N018,E11-N021,E21-N06, E41-N06,E51-N02	145C3008	15.0	15.0	15.0	3.0	5.4	1.41
B21-N06-N09,N021;B31-N019-N022;E21-N04,N05;E41-N01, N04,N0[illegible] E51-N018,N017	145C3009	11.0	11.0	11.0	3.0	6.8	1.41
E41-N010,E51-N06,N08,N019	145C3011	15.0	15.0	15.0	3.0	6.8	1.41
C71-N02,E11-N010,N011; E41-N012,N021;E51-N09, N012,N030	145C3046	13	13	10	3.0	5.4	1.41
C71-N04	158C7055	5	10	10	3.0	4.5	1.41
B21-N037	159C4383	10	10	10	3.0	5.4	1.41
B21-N024,N026,N031,N042	159C4384	10.0	10.0	10.0	3.0	4.5	1.41
B21-N025	159C4445	15.0	5.0	10	3.0	4.5	1.41
E21-N07	159C4606	29.0	29.0	29.0	3.0	5.4	1.41
B21-R04;E11-R02,R03; E21-R01,E41-R01,R03-R05; E51-R01-R04	163C1184	15.0	15.0	15.0	3.0	5.4	1.41
E11-N022,E51-N031	163C1185	15.0	15.0	15.0	3.0	4.5	1.41
C32-N05,N08;E11-N026 N028,E21-N01;E41-N09,N013, N016,N019,E51-N04,N05	163C1186	10	10	10	3.0	5.4	1.41
B21-N055	163C1292	5.5	5.5	3.7	3.0	4.5	1.41
B21-N02,N020,N021,N023, N039,N045,B31-N018,E41-N017,N027	164C5359	15.0	15.0	15.0	3.0	5.4	1.41

TABLE - 2

Shoreham Nuclear Power Station Control Room Panels Class 1E Devices Qualified With Single Axis Malfunction Limits at Least 1.5 Times Expected Acceleration at Mounting Location.

MPL	GE PPD Dwg #	IEEE-344-1971 Tested Malfunction Limits f-b	s-s	v	Maximum Expected Accn at any location on Shoreham Panels. f-b	s-s	v
B21M-S, B31A-S, E11A-S, E21A-S, E41A-S, E51A-S	272A8270	25	25	25	3.0	2.0	1.0
E41A-S	272A8272	25	25	25	1.0	1.2	1.3
E11A-S, E21A-S, E41A-S, E51A-S	272A8274	10	10	10	2.5	2.0	1.6
E41A-S	272A8275	10	10	10	1.0	1.2	1.3
E41A-S	272A9052	25	25	25	2.5	2.0	2.0

*The malfunction limits shown are for a chatter detector timing of 10 milisecs.

△The max malfunction limit in f-b is the accn this device was subjected to on tested panel RPS Division B1 & B2 Logic Vertical Board, Lasalle H13-P611.

SHOREHAM SQRT DRF# A00-992

Rev. 1
5/6/81

SHOREHAM NUCLEAR POWER STATION UNIT 1

SAI -029-QA-80-PA-B REV 2

SEISMIC QUALIFICATION REEVALUATION CLASS 1E EQUIPMENT

Control Room Panels

Prepared by: E. S. RAMADAS

Date: April 3, 1981

Organization: SCIENCE APPLICATIONS, INC.
UNION BANK BLDG., SUITE 900
99 ALMADEN BLVD.
SAN JOSE, CALIFORNIA 95113

GENERAL ELECTRIC

TABLE - 2

Shoreham Nuclear Power Station Control Room Panels Class 1E Devices Qualified With Single Axis Malfunction Limits at Least 1.5 Times Expected Acceleration at Mounting Location.

MPL	GE PPD Dwg #	IEEE-344-1971 Tested Malfunction Limits f-b	s-s	v	Maximum Expected Accn at any location on Shoreham Panels. f-b	s-s	v
B21C-K, B21H-K, C71A-K E11A-K, E21A-K, E21B-K, E41A-K, E51A-K	136B3137	8.4	11	7.5	5	6.5	0.8*
E21A-S,B21C-S,B21A-S B21H-S,E51A-S	145C3040	20	20	20	2.7	8.8	5.0
E11A-K	145C3041	25	25	25	2.0	1.0	0.5
E41-K603 E51-K603	145C3027	15	15	10	1.6	1.0	1.0
B21A-K, B21C-K, B21H-K, C71A-K, E11A-K, E51A-K	145C3035	25	25	25	5	6.5	0.8
C71A-K	145C3209	12	12	12	5	1.2	0.8
C71A-S	159C4282	10	10	10	3	3.2	3.2
E32-N650, N651, N655, N656, N658-N661	159C4660	13	13	13	1.6	1.0	1.0
B21 B-Z	163C1285	8.5	9.0	8.0	3.0	2.2	0.6
E32-R651, R652, R654-R658	164C5288	8	18	7	3.0	2.0	1.0
E32-R601	164C5630	8	8	8	1.6	1.0	1.0
E11A-S, E21A-S, E41A-S	234A9327	25	25	25	2.5	8.8	5.0
B21H-S, E11A-S	234A9329	25	25	25	3.0	2.0	1.6
B21H-S	234A9337	25	25	25	3.0	2.0	2.0
B21H-S	262A6023	25	25	25	1.2	1.0	1.3
E51A-S	262A6824	25	25	25	1.0	1.2	1.3
E11A-S	272A8268	25	25	25	1.0	1.2	1.3

SHOREHAM SHIP LOOSE DEVICES QUALIFIED BY SINGLE AXIS/SINGLE FREQUENCY TESTING

IDENTIFICATION	NAME	SEISMIC CAPABILITY/ MALFUNCTION LIMIT F-B	S-S	V	REMARKS (GE REFERENCES)
145C3224	TEMPERATURE ELEMENT	05.0	05.0	05.0	A00-1084-91
145C3249	DIFF PRESS TRANSMITTER	03.0	03.0	03.0	A001084101W
159C4606	PRESSURE SWITCH	29.0	29.0	29.0	A001084-141
163C1107	FLOW METER	03.0	03.0	02.0	A001084-150
163C1184	INDICATOR, PRESSURE	15.0	15.0	15.0	H22-11,TR17
163C1185	SWITCH, PRESS INDICATING	15.0	15.0	15.0	H22-12,TR 7
163C1186	TRANSMITTER, PRESSURE	10.0	10.0	10.0	A001084-152
163C1560	TRANSMITTER, DIFF PRESS	03.0	03.0	03.0	A001084101W
163C1563	TRANSMITTER, GAGE PRESS	03.0	03.0	03.0	A001084101W
164C5359	SWITCH, PRESSURE	15.0	15.0	15.0	A001084-215
163C1558	TRANSMITTER, ABS PRESS	03.0	03.0	03.0	A001084101W
163C1561	TRANSMITTER, DIFF PRESS	03.0	03.0	03.0	A001084101W
163C1564	TRANSMITTER, GAGE PRESS	03.0	03.0	03.0	A001084101W