CP&L

Carolina Power & Light Company
PO Box 10429
Southport, NC 28461-0429

C. S. Hinnant
Vice President
Brunswick Steam Electric Plant

June 17, 1997

SERIAL: BSEP 97-0261

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 AND 50-324/LICENSE NOS. DPR-71 AND DPR-62
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
SEISMIC QUALIFICATION OF MECHANICAL AND ELECTRICAL EQUIPMENT
(NRC TAC NOS. M69433 AND M69434)

Gentlemen:

By letter dated March 12, 1997, the NRC requested that Carolina Power & Light (CP&L) Company provide additional information to support the NRC staff's review of the plant-specific summary report on resolution of the Unresolved Safety Issue (USI) A-46 program for the Brunswick Steam Electric Plant, Unit Nos. 1 and 2. CP&L's responses to the NRC staff's questions are provided in Enclosure 1 to this letter. There are no regulatory commitments contained in this submittal.

Please refer any questions regarding this submittal to Mr. Keith Jury, Manager - Regulatory Affairs, at (910) 457-2783.

Sincerely,

C S Hinnant

C. S. Hinnant

WRM/wrm

Enclosures:
1. Response To Request For Additional Information

A035
1/1

C. S. Hinnant, having been first duly sworn, did depose and say that the information contained herein is true and correct to the best of his information, knowledge and belief; and the sources of his information are officers, employees, and agents of Carolina Power & Light Company.

Dean L. Mason
Notary (Seal)

My commission expires: August 21, 1999

pc (with enclosures):

U. S. Nuclear Regulatory Commission, Region II
ATTN.: Mr. Luis A. Reyes, Regional Administrator
Atlanta Federal Center
61 Forsyth Street, SW, Suite 23T85
Atlanta, GA 30303

U. S. Nuclear Regulatory Commission
ATTN: Mr. C. A. Patterson, NRC Senior Resident Inspector
8470 River Road
Southport, NC 28461

U. S. Nuclear Regulatory Commission
ATTN.: Mr. David C. Trimble, Jr. (Mail Stop OWFN 14H22)
11555 Rockville Pike
Rockville, MD 20852-2738

The Honorable J. A. Sanford
Chairman - North Carolina Utilities Commission
P.O. Box 29510
Raleigh, NC 27626-0510

ENCLOSURE 1

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
NRC DOCKET NOS. 50-325 AND 50-324
OPERATING LICENSE NOS. DPR-71 AND DPR-62
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
SEISMIC QUALIFICATION OF MECHANICAL AND ELECTRICAL EQUIPMENT
(NRC TAC NOS. M69433 AND M69434)

NRC QUESTION #1:

Appendix D of Enclosure 1 of the referenced letter provides a summary of instances where the intent rather than the letter of certain caveats, as described in Appendix B of the Generic Implementation Procedure, Revision 2 (GIP-2) was met. Based on the information provided by the licensee, it is unclear as to how some equipment was determined to meet the intent of the stated caveat. Listed below are specific areas that fall in this category for which we are requesting additional information:

a. Provide additional information to demonstrate that the adjacent Cabinets 2-2PA and 2-2PB would not respond out of phase to one another and impact each other during an earthquake, as described in the Bounding Spectrum Caveat 3 of Appendix B of the GIP-2.

b. Describe how the referenced CP&L calculation 01534A-281 was performed for Transformers 2-2A-SW-XFMR and 2-2B-SW-XFMR to ensure that the earthquake loadings can be transferred to the anchorage, as described in the Bounding Spectrum Caveat 7 of the Appendix B of the GIP-2.

c. For Backup N2 Discharge Valves and Pressure Relief Valves 1-RNA-PCV5247 and 5248, 2-RNA-PCV-5247 and 5248, 1-RNA-SV-5482 and 5251, and 1-RNA-PRV-5256, 5258, and 5260, are the valve, the operator, and the pipe anchored to the same support structure as described in the Bounding Spectrum Caveat 4 of Appendix B of the GIP-2? If not, provide additional information to demonstrate that the specific piping system configuration would not cause an overstressed condition.

d. For Moisture Controller/Control Valves 1-VA-MC-1026-1 and 2-VA-MC-1028-1, the licensee identified them as meeting the intent but not the letter of four caveats, 1, 2, 4, and 5. However, based on the information provided by the licensee, it is unclear as to how the intents of Caveats 1, 2, and 4 as described in Appendix B of GIP-2 were met. The staff's specific concerns include applicability of equipment class, seismic stress in the valve body due to piping loads, and piping stress adjacent to the valve. The licensee is requested to provide additional information to address these concerns. In addition, provide additional information to demonstrate that the combination of these four deviations would not reduce the equipment seismic capability to an unacceptable condition even though the intent of each caveat may individually be considered to be met.

e. For Scraw Outlet Isolation Valves 2-C12-CV-127, are the valve, the operator, and the pipe anchored to the same support structure as described in the Bounding Spectrum Caveat 4 of Appendix B of GIP-2? If not, provide additional information to demonstrate that the specific piping system configuration would not cause an overstressed condition.

f. Describe the details of the unique mechanical linkage of Turbine Control Valve 2-E-41-V9 to justify how it meets the intents of Caveats 1 and 5.

g. Provide additional information to justify how Valve 2-MUD-TCV-2193 meets the intent of Caveat 3. Specifically, demonstrate that the yoke stress is low if the yoke is indeed cast iron.

h. Provide additional information or a sketch of the Engineered Safeguards Vertical Board 1-H12-P601 to show how the intent of Caveat 5 was met for this panel, i.e., the adjacent cabinets or panels would not respond out of phase to one another and impact each other during an earthquake. Also, the reference of "Caveat 3" in the report is a typographical error and it should be "Caveat 5" instead.

i Similar to above, provide additional information or sketches of the Relay Boards/Instrument Cabinets 1-H-12-P617, 1-XU-53, 2-HI2-P601, 2-H12-P603, and 2-XU-25 to show how the intent of Caveat 5 was met.

CP&L RESPONSE:

Part a

Motor Control Centers identified in question 1a are GE Model 7700 Units installed on the grade elevation of the Service Water Intake Structure. MCC 2-2PA includes 7 adjacent bays divided into 2 sections of 5 and 2 bays each. MCC 2-2PB includes 8 adjacent bays divided into 2 sections of 5 and 3 bays each. The bays in each section are bolted together, and the sections are anchored at the base and braced to the Service Water Building at the tops. The Seismic Review Team judged the bracing adequate to preclude impact as described in the caveat.

Part b

Seismic qualification testing was performed for the transformers that accurately included the existing load path. Vibration test levels exceeded design basis requirements. The referenced CP&L calculation verifies that the seismic qualification testing is appropriate for the mounting arrangements in various plant locations.

Part c

The valve, operator and pipe are anchored to the same support.

Part d

These components were used to add steam to the Control Room supply duct for humidity control. These components have now been taken out of service and their function eliminated.

Revised pages are included in Attachment 1 of this Enclosure for the elimination of 1-VA-MC-1026-1 and 2-VA-MC-1028-1 from Appendix B, C and D of the Seismic Evaluation Report.

Part e

The valve, operator and pipe are anchored to the same support structure.

Part f

This valve was included by mistake in Appendix D, "Instances of Meeting the Intent but not the Letter of the Caveat." The Unit 2 Turbine Control Valve (2-E41-V9) is an integral part of the Unit 2 High Pressure Coolant Injection (HPCI) turbine and is accepted by the "Rule of the Box" like the comparable valve for Unit 1. Further evaluation of the intent of the caveat is not required.

A revised page is included in Attachment 1 of this Enclosure for the elimination of 2-E41-V9 from Appendix D of the Seismic Evaluation Report.

Part g

The valve yoke is cast stainless steel, type 18-8 Series 300. Yield strength, tensile strength and elongation are approximately 30 ksi, 70 ksi and 35%, respectively. Therefore, caveat 3 is satisfied.

Part h

The Control Room Benchboards are typically bolted together at 8 locations. The cabinet sections are bolted near the base, 1/4 height, 3/4 height and at the top on both faces. Additionally, the bench section is bolted to the adjacent bench section in 4 places. In this case, one of the top bolts between 1-H12-P601 and the adjacent cabinet, 1-H12-P603, was missing. Based on review of existing bolting, the condition was judged sufficient to preclude impact between adjacent cabinets. It should be noted that missing hardware conditions, such as this, are typically repaired regardless of the analytical results. This particular condition was corrected in the last outage.

The typographical error has been corrected on the revised page included in Attachment 1 of this Enclosure.

Part i

1-H12-P617 and 1-XU-53

From south to north, 1-H12-P617 and 1-XU-53 are the third and sixth cabinets in a row of 8 cabinets in the Control Room. The cabinet on the north end (#8) has a gap of at least 1/4-inch and was judged adequate to preclude pounding due to the stiffness of the cabinets in the line-up. The cabinet on the south end is attached to the line-up by a 6-inch by 6-inch rigid wireway on top of the cabinets via conduit connections.

2-H12-P601, P603

Cabinets 2-H12-P601, P603, 2-XU-1, XU-2, XU-3, XU-51, and XU-4 are all bolted together. However, cabinet 2-XU-80 is not bolted to 2-XU-4. 2-XU-80 is located at the extreme opposite end of the cabinet group from 2-H12-P601 and P603, which are the only cabinets in the group containing SSEL relays. The two 2-H12-P601 and P603 are about 40 feet from 2-XU-80 through the 2-XU-1, 2-XU-2, 2-XU-51 and 2-XU-4 cabinet group. The cabinet group has a 90 degree turn at 2-XU-1. All the intervening XU cabinets are well anchored, structurally stiff and heavily loaded with cable. The unbolted condition of 2-XU-80 was judged acceptable as the response of cabinet 2-XU-4 to any possible pounding from 2-XU-80 will be attenuated through 2-XU-51, 2-XU-3, 2-XU-2 and 2-XU-1 prior to reaching 2-H12-P603 and P601.

2-XU-25

From south to north, 2-XU-25 and 2-CAC-TY-4426-2 are the fourth and fifth in a row of five cabinets. All interfaces are bolted together except between 2-XU-25 and 2-CAC-TY-4426-2. The gap at the top of this interface is at least 3/4 inch. The frequency of these cabinets can be estimated to be at least 8 hertz. Assuming single-degree-of-freedom characteristics and acceleration of 1.2 g, a gap of 3/4 inch is adequate. Note: This acceleration exceeds 1.5 times both the design basis and Seismic Margins in-structure spectra for this frequency.

NRC QUESTION #2:

In Appendix E1 of Enclosure 1, section 4, Certification, it appears that the word "out" is a typographical error and that it should be "our" instead.

CP&L RESPONSE:

The identified typographical error is corrected on the appropriate pages in Attachment 2 of this Enclosure.

NRC QUESTION #3:

Provide a justification to ensure that the proposed schedule for resolving all the identified outliers or open items by the end of Spring 1998, does not lead to a potential safety significant scenario.

CP&L RESPONSE:

All items identified in Appendix E1, E2, F1, F2 and G were evaluated by the Seismic Review Team for safety system functionality as they were identified during the walkdown inspections. For any condition where functionality was questioned, further evaluation in accordance with plant procedures was performed. All walkdown considerations and subsequent evaluations included consideration of cumulative effects. Additionally, conditions resulting from corrosion or similar progressive degradation were evaluated to ensure that appropriate monitoring was performed, or the condition was repaired. The only changes that have taken place to the identified outliers or open items has been to repair or upgrade the items. Therefore, the walkdown assessments and subsequent evaluations which conclude that the identified

conditions do not lead to a potential safety significant scenario remain valid through the Spring of 1998.

NRC QUESTION #4:

Appendix E of Enclosure 2 of the referenced letter provides a summary table for the amplification factors (AFs) for cabinets and panels used for the Brunswick USI A-46 evaluation. It stated that the AFs used assume that all anchorage, load path, and interaction issue (i.e., unbolted adjacent cabinets and cable tray/conduit and conduit supports) have been resolved. Confirm that, for those cases for which the AF values listed in Appendix E were used, all anchorage, load path, and interaction issue, if any, were indeed resolved and were not identified as the unresolved outliers or open items in Enclosure 1 of the referenced letter.

CP&L RESPONSE:

The anchorage, load path and interaction issues assumed to be resolved for determination of amplification values in the Relay Evaluation Report are the same issues identified as outliers or open items in the Seismic Evaluation Report. These issues are not completely resolved.

The effects of these outliers and open items are considered to be more significant as seismic interaction issues than as building response amplification issues. However, resolution of these conditions includes consideration of changes to the dynamic characteristics of the cabinet. Many of these issues have been resolved; however, completion of this activity is scheduled as addressed in Enclosure 1 to Reference 1.

NRC QUESTION #5:

It is noted that in the licensee's relay system consequence reviews, a large number of essential relays were screened out by stating that either chatter or operator action were acceptable. It is also noted that in the Third Party Audit Report, Appendix H of Enclosure 1 of the reference letter, the peer reviewers indicated that in the control room area, the support configurations used for the transition of the top entry conduits or cables into various panels and cabinets have numerous interferences with the overhead distributed systems and commodities. The audit report further recommended that the relay system consequence reviewers should strive to minimize the number of essential relays by showing that chatter is acceptable or that operator actions may be taken to recover from the consequences of inadvertent chatter. The staff agrees with that recommendation. Describe the measures taken to address this finding. In addition, the licensee is requested to confirm that a proceduralized and prioritized operator action procedure exists and it will preclude any conflicting or competing events which could lead the operator to not perform timely actions.

CP&L RESPONSE:

The approach outlined in the Third Party Audit Report for resolution of the Control Room cabinet interaction issue is being pursued. Although the information is still considered preliminary, the results indicate that relays affected by interaction in the Control Room have no chatter consequences or can be reset/corrected by use of operator actions contained in

multiple, existing procedures. The approach used for evaluation of these relays is as described in the Relay Evaluation Report submitted previously as Enclosure 2 to Reference 1.

NRC QUESTION #6:

Describe any corrective measure taken to address the peer reviewers comments concerning the corrosion problem in the mechanical HVAC room, as described in the Third Party Audit Report.

CP&L RESPONSE:

Condensation accumulation at the floor supports for equipment in this area has been eliminated by proper insulation and drainage of HVAC equipment. The floor mounted equipment was clean and painted, and some sheetmetal components located near the floor have been replaced. Replacement anchorage has been provided for the chiller units.

NRC QUESTION #7:

Referring to the in-structure response spectra provided in your 120-day response to the NRC's request in Supplement No. 1 to Generic Letter (GL) 87-02, dated May 22, 1992, the following information is requested:

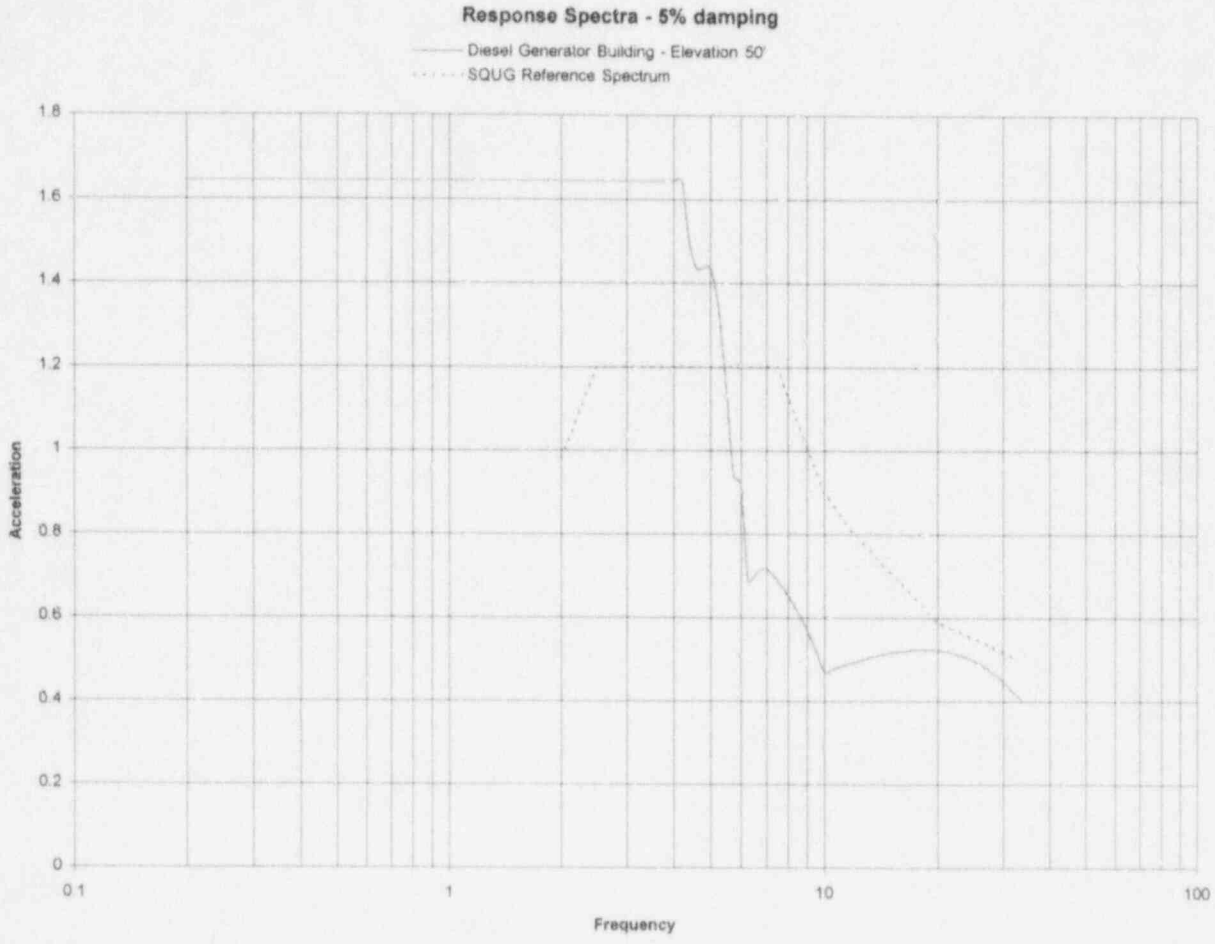
a. Identify structure(s) that have in-structure response spectra (5% critical damping) for elevations within 40-feet above the effective grade that are higher in amplitude than 1.5 times the SQUG Bounding Spectrum.

b. With respect to the comparison of equipment seismic capacity and seismic demand, indicate which method in Table 4-1 of GIP-2 was used to evaluate the seismic adequacy for equipment installed on the corresponding floors in the structure(s) identified in Item (a) above. If you have elected to use method A in Table 4-1 of the GIP-2, provide a technical justification for not using the in-structure response spectra provide in your 120-day response. It appears that some licensees are making an incorrect comparison between their plant's safe shutdown earthquake (SSE) ground motion response spectrum and the SQUG Bounding Spectrum. The SSE ground motion response spectrum for most nuclear power plants is defined at the plant foundation level. The SQUG Bounding Spectrum is defined at the free field ground surface. For plants founded on deep soil or rock, there may not be a significant difference between the ground motion amplitudes at the foundation level and those at the ground surface. However, for sites where a structure is founded on shallow soil, the amplification of the ground motion from the foundation level to the ground surface may be significant.

c. For the structure(s) identified in Item (a) above, provide the in-structure response spectra designated according to the height above the effective grade. If the in-structure response spectra identified in the 120-day response to Supplement No. 1 to GL 87-02 were not used, provide the response spectra that were actually used to verify the seismic adequacy of equipment within the structures identified in Item (a) above. Also, provide a comparison of these spectra to 1.5 times the Bounding Spectrum.

CP&L RESPONSE:

Original design information for Brunswick did not include 5% damped response spectra. In-structure spectra used for A-46 walkdown inspections and evaluations was generated for the Diesel Generator Building and the Control Building with a conservative damping conversion routine. This conservatism caused some in-structure spectra to exceed the Reference Spectrum as indicated in Table 5-1 of the Seismic Evaluation Report (Enclosure 1 to Reference 1). However, the Diesel Generator Building Elevation 23', the Diesel Generator Pedestal Elevation 23 foot and Elevation 50 foot are the only locations less than 40 feet above effective grade. By converting the damping using the method included in the GIP-2 Part 2 Section 4.4.3, only the in-structure response spectra for elevation 50 foot of the Diesel Generator Building is less than 40 feet above grade and exceeds the Reference Spectrum (plot included below). The shape of the Diesel Generator Building response spectra indicates that the cut-off frequency is more appropriately represented by 33 hertz than 20 hertz as implied in the GIP-2. Therefore, 33 hertz was used instead of 20 hertz in the GIP-2 damping conversion. The frequency range in which the Reference Spectrum is exceeded is less than 8 hertz. Since application of GIP-2 Method A.1 requires the equipment to have natural frequencies of at least 8 hertz, Method B.1 is also applicable using the same restriction. Therefore, all equipment in the Diesel Generator Building at elevation 50' is evaluated to methods other than the GIP-2 Method A.1. The frequency determinations made during the screening walkdowns or those being performed as part of outlier resolutions justify use of Method B.1.



REFERENCES:

1. CP&L letter Serial: BSEP 95-0485 dated September 15, 1995.

ENCLOSURE 1

ATTACHMENT 1
Revised pages for Reference 1 Enclosure 1
Appendices B, C, and D

APPENDIX B
SAFE SHUTDOWN EQUIPMENT LIST
UNIT 1 AND COMMON

E.C.	Equipment ID Number	Description	Bldg.	Floor Elev.	Location	A-46	IPEEE	Train	Unit
10	2-VA-CB-FDMP-82	FIRE DAMPER	CB	049	C RM	1	1		0
20	2-XU-29	DG3 ESS LOGIC CABINET	CB	049	C RM	1	1		0
20	2-XU-30	DG4 ESS LOGIC CABINET	CB	049	C RM	1	1		0
20	2-XU-41	DIV-I TERM CAB FOR EB & ED SYSTEMS	CB	049	C RM	1	1		0
20	2-XU-42	DIV-II TERM CAB FOR RTGB XU-2	CB	049	C RM	1	1		0
20	EGH	TURBINE CONTROLLER	CB	049	C RM	1	1		1
14	1-11A	DISTRIBUTION PANEL 11A	CB	053	NW LC/9C	1	1	A	1
14	1-11B	DISTRIBUTION PANEL 11B	CB	053	NE NC/10C	2	2	B	1
14	1-3A	DISTRIBUTION PANEL 3A	CB	053	NE NC/10C	1	1	A	1
14	1-3AB	DISTRIBUTION PANEL 3AB	CB	053	NE NC/10C	1	1	A/B	1
14	1-3B	DISTRIBUTION PANEL 3B	CB	053	NW LC/8	2	2	B	1
20	1-VA-TY-1026A	C RM THERMOSTAT	CB	055	NE NC/10C	1	1		0
20	2-VA-TY-1028A	C RM THERMOSTAT	CB	055	SE NC/15C	1	1		0
11	1-VA-1A-CC-CB	COOLING COIL - UNIT 1	CB	070	MECH EQ RM	1	1		0
10	1-VA-1A-D-CB	AO DAMPER	CB	070	MECH EQ RM	1	1		0
0	1-VA-1A-EHE-CB	ELECTRIC HTR COIL - UNIT 1	CB	070	MECH EQ RM	1	1		0
10	1-VA-1A-SH-CB	STEAM HUMIDIFIER	CB	070	MECH EQ RM	1	1		0
10	1-VA-1D-CU-CB	AIR COOLED CONDENSER	CB	070	MECH EQ RM	1	1		0
21	1-VA-1D-HX-CB	HX	CB	070	MECH EQ RM	1	1		0
11	1-VA-1D-SCDU-CB	SUBCOOLING CONDENSER	CB	070	MECH EQ RM	1	1		0
09	1-VA-1D-SF-CB	AC SUPPLY FAN - UNIT 1	CB	070	MECH EQ RM	1	1		0
10	1-VA-1H-D-CB	AO DAMPER - UNIT 1	CB	070	MECH EQ RM	1	1		0
10	1-VA-ISOL-DMP-CB	SUPPLY ISOL DAMPER	CB	070	MECH EQ RM	1	1		0
18	1-VA-PS-1026	COOLING UNIT PRESSURE SWITCH	CB	070	SW LC/13	1	1		0
08b	1-VA-SV-1026	SUPPLY FAN SOL VALVES	CB	070	SW LC/13	1	1		0
08b	1-VA-SV-1026A	SOL VALVE FOR KS 1026	CB	070	SW LC/13	1	1		0
0	1-VA-TC-1026	TEMP CONTROLLER	CB	070	SW LC/13	1	1		0
07	1-VA-V023	ISOL VALVE	CB	070	MECH EQ RM	1	1		0
11	2-VA-2A-CC-CB	COOLING COIL - UNIT 2	CB	070	MECH EQ RM	1	1		0

APPENDIX B
SAFE SHUTDOWN EQUIPMENT LIST
UNIT 1 AND COMMON

E.C.	Equipment ID Number	Description	Bldg.	Floor Elev.	Location	A-46	IPEEE	Train	Unit
10	2-VA-2A-D-CB	AO DAMPER	CB	070	MECH EQ RM	1	1		0
0	2-VA-2A-EHE-CB	ELECTRIC HTR COIL - UNIT 2	CB	070	MECH EQ RM	1	1		0
R	2-VA-2A-RAF-CB	ROLL TYPE FILTER	CB	070	MECH EQ RM	1	1		0
10	2-VA-2A-SH-CB	STEAM HUMIDIFIER	CB	070	MECH EQ RM	1	1		0
11	2-VA-2B-CC-CB	COOLING COIL - UNITS 1 & 2	CB	070	MECH EQ RM	2	2		0
0	2-VA-2B-EHE-CB	ELECTRIC HTR COIL - UNIT 1 & 2	CB	070	MECH EQ RM	2	2		0
10	2-VA-2D-CU-CB	AIR COOLED CONDENSER	CB	070	MECH EQ RM	1	1		0
21	2-VA-2D-HX-CB	HX	CB	070	MECH EQ RM	1	1		0
11	2-VA-2D-SCDU-CB	SUBCOOLING CONDENSER	CB	070	MECH EQ RM	1	1		0
09	2-VA-2D-SF-CB	AC SUPPLY FAN - UNIT 2	CB	070	MECH EQ RM	1	1		0
10	2-VA-2E-CU-CB	AIR COOLED CONDENSER	CB	070	MECH EQ RM	2	2		0
21	2-VA-2E-HX-CB	HX	CB	070	MECH EQ RM	2	2		0
11	2-VA-2E-SCDU-CB	SUBCOOLING CONDENSER	CB	070	MECH EQ RM	2	2		0
09	2-VA-2E-SF-CB	AC SUPPLY FAN - UNIT 1 & 2	CB	070	MECH EQ RM	2	2		0
10	2-VA-2I-D-CB	AO DAMPER - UNIT 2	CB	070	MECH EQ RM	1	1		0
10	2-VA-ISOL-SHP-CB	SUPPLY ISOL DAMPER	CB	070	MECH EQ RM	1	1		0
18	2-VA-M1-CB	CONTROL PANEL	CB	070	SW LC/13	1	1		0
18	2-VA-PS-1026A	COOLING UNIT PRESSURE SWITCH	CB	070	SW LC/13	1	1		0
18	2-VA-PS-1027	COOLING UNIT PRESSURE SWITCH	CB	070	2-VA-M1-CB	2	2		0
18	2-VA-PS-1027A	COOLING UNIT PRESSURE SWITCH	CB	070	2-VA-M1-CB	2	2		0
18	2-VA-PS-1028	COOLING UNIT PRESSURE SWITCH	CB	070	2-VA-M1-CB	1	1		0
18	2-VA-PS-1028A	COOLING UNIT PRESSURE SWITCH	CB	070	2-VA-M1-CB	1	1		0
18	2-VA-PS-1632	'A' AIR COMPRESSOR PRESS SWITCH	CB	070	MECH EQ RM	1	1		0
18	2-VA-PS-1633	'B' AIR COMPRESSOR PRESS SWITCH	CB	070	MECH EQ RM	2	2		0
18	2-VA-PSL-1646	INSTRUMENT AIR LOW PRESS	CB	070	MECH EQ RM	1	1		0
08b	2-VA-SV-1027	SUPPLY FAN SOL VALVES	CB	070	2-VA-M1-CB	2	2		0
08b	2-VA-SV-1027A	SOL VALVE FOR KS 1027	CB	070	SW LC/13	2	2		0
08b	2-VA-SV-1028	SUPPLY FAN SOL VALVES	CB	070	2-VA-M1-CB	1	1		0
08b	2-VA-SV-1028A	SOL VALVE FOR KS 1028	CB	070	SW LC/13	1	1		0

Equip Class	Equipment ID No.	System/Equipment Description	Bldg.	Floor Elev.	Room or Row/Col	Elev. of Seismic Input	Below 40' above grade?	Seismic Capacity based on?	Seismic Demand based on?	Capacity greater than Demand?	Bounding Spectrum Caveats OK?	Anchor-age OK?	Inter-actions OK?	Overall OK?
00	1-C11-A001A-N2	NITROGEN BOTTLE & REGULATOR	RB	020	1-C11-A001	N/A	N/A	N/A	N/A	No	N/A	No	No	No
00	1-D12-RE-N006A	ION DETECTOR	RB/PIT	050	WW L/5R	050	Yes	ABS	CRS	Yes	No	Yes	Yes	No
00	1-D12-RE-N006B	ION DETECTOR	RB/PIT	050	WW L/5R	050	Yes	ABS	CRS	Yes	No	Yes	Yes	No
00	1-D12-RE-N006C	ION DETECTOR	RB/PIT	050	WW L/5R	050	Yes	ABS	CRS	Yes	No	Yes	Yes	No
00	1-D12-RE-N006D	ION DETECTOR	RB/PIT	050	WW L/5R	050	Yes	ABS	CRS	Yes	No	Yes	Yes	No
00	1-E11-S1	SP STRAINER	RB/SP	-009	SU-AZ135	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	1-E21-S2A	CS STRAINER SUCTION LINE	RB/SP	-009	SU-AZ045	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	1-E41-PSE-D003	TURBINE EXHAUST RUPTURE DIAPHRAM	RB	-017	EE T/4R	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	1-E41-PSE-D004	TURBINE EXHAUST RUPTURE DIAPHRAM	RB	-017	EE T/4R	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	1-E41-S2	HPCI/SP STRAINER	RB/SP	-009	SU-AZ180	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	1-RNA-DIV-I-N2-TANKS	N2 BOTTLES	RB	050	NN N/4R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
00	1-RNA-DIV-II-N2-TANKS	DIV II N2 BACKUP BOTTLE RACK	RB	050		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
00	1-RNA-FLT-103	BACKUP N2 INLINE FILTER	RB	056	SW M/6R	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	1-RNA-FLT-104	BACKUP N2 IN LINE FILTER	RB	056	NN N/4R	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	1-RNA-PSE-101	BACKUP N2 DISCHARGE RUPTURE DIAPHRAM	RB	050	SS M/6R	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	1-RNA-PSE-102	DIV I BACKUP N2 HDR RUPTURE DIAPHRAM	RB	050		N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	1-SW-1A-LUBE-PMP-STR	NSW LUBE WATER PUMP 1A SUCTION STRAINER	SWB	-011	NW	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	1-SW-1A-NUC-CYC-SEP	NSW 1A CYCLONE SEPARATOR	SWB	025	NE	N/A	N/A	N/A	N/A	Yes	N/A	N/A	Yes	Yes
00	1-SW-1A-NUC-PMP-STR	NSW PUMP 1A STRAINER	SWB	025	NE	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	1-SW-1B-LUBE-PMP-STR	NSW LUBE WATER PUMP 1B SUCTION STRAINER	SWB	-011	NW	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	1-SW-1B-NUC-CYC-SEP	NSW 1B CYCLONE SEPARATOR	SWB	025	NE	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	1-SW-1B-NUC-PMP-STR	NSW PUMP 1B STRAINER	SWB	025	NE	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	1-VA-1A-BFIV-RB	RB DAMPERS	RB	099	WW L/5R	99 FT.	No	ABS	CRS	Yes	Yes	N/A	Yes	No
00	1-VA-1A-EHE-CB	ELECTRIC HTR COIL - UNIT 1	CB	070	MECH EQ RM	N/A	N/A	N/A	N/A	No	N/A	No	Yes	No
00	1-VA-1B-BFIV-RB	RB DAMPERS	RB	099	WW L/5R	99 FT.	No	ABS	CRS	Yes	Yes	N/A	No	No

Equip Class	Equipment ID No.	System/Equipment Description	Bldg.	Flour Elev.	Room or Row/Col	Elev. of Seismic Input	Below 40' above grade?	Seismic Capacity based on?	Seismic Demand based on?	Capacity greater than Demand?	Bounding Spectrum Caveats OK?	Anchor-age OK?	Inter-actions OK?	Overall OK?
00	2-LO-TCV-1463	DG1 LUBE OIL TCV	DG	023	NW V/9D	N/A	N/A	N/A	N/A	Yes	N/A	N/A	Yes	Yes
00	2-LO-TCV-2054	DG2 LUBE OIL TCV (rule of the box - 2-DG2-GEN)	DG	023	WW V/10D	N/A	N/A	N/A	N/A		N/A			Yes
00	2-LO-TCV-2077	DG3 LUBE OIL TCV	DG	023	WW V/11D	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	2-LO-TCV-2100	DG4 LUBE OIL TCV	DG	023	SW V/12D	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	2-LO-V446	DG1 LUBE OIL STRAINER W/XFER VALVE	DG	023	NW V/9D	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	2-LO-V447	DG2 LUBE OIL STRAINER W/XFER VALVE (rule of the box - 2-DG2-GEN)	DG	023	WW V/10D	N/A	N/A	N/A	N/A		N/A			Yes
00	2-LO-V448	DG3 LUBE OIL STRAINER W/XFER VALVE	DG	023	WW V/11D	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	2-LO-V449	DG4 LUBE OIL STRAINER W/XFER VALVE	DG	023	SW V/12D	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	2-RNA-DIVI-N2-TANKS	N2 BOTTLES	RB	050	NN N/21R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
00	2-RNA-DIVII-N2-TANK	N2 BOTTLES	RB	050	SW M/22R	N/A	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes
00	2-RNA-FLT103	BACKUP N2 INLINE FILTER	RB	050	SW M/22R	N/A	N/A	N/A	N/A	Yes	N/A	N/A	Yes	Yes
00	2-RNA-FLT104	BACKUP N2 INLINE FILTER	RB	050	EE S/22R	N/A	N/A	N/A	N/A	Yes	N/A	N/A	Yes	Yes
00	2-RNA-PSE-101	BACKUP N2 DISCHARGE RUPTURE DIAPHRAM	RB	056	SS M/22R	N/A	N/A	N/A	N/A	Yes	N/A	N/A	Yes	Yes
00	2-RNA-PSE-102	BACKUP N2 DISCHARGE RUPTURE DIAPHRAM	RB	056	EE S/22R	N/A	N/A	N/A	N/A	Yes	N/A	N/A	Yes	Yes
00	2-SW-2A-NUC-PMP-STR	NSW 2A SELF CLEANING STRAINER, MOTOR OPERATED	SWB	025	SE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
00	2-SW-2B-NUC-PMP-STR	NSW 2B SELF CLEANING STRAINER, MOTOR OPERATED	SWB	020	SE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
00	2-VA-2A-BFIV-RB	RB DAMPERS	RB	099	WW L/21R	N/A	N/A	N/A	N/A	No	N/A	Yes	Yes	No
00	2-VA-2A-EHE-CB	ELECTRIC HTR COIL - UNIT 2	CB	070	MECH EQ RM	N/A	N/A	N/A	N/A	No	N/A	No	Yes	No
00	2-VA-2B-BFIV-RB	RB DAMPERS	RB	099	WW L/21R	N/A	N/A	N/A	N/A	No	N/A	Yes	Yes	No
00	2-VA-2B-EHE-CB	ELECTRIC HTR COIL - UNIT 1 & 2	CB	070	MECH EQUIP	N/A	N/A	N/A	N/A	No	N/A	No	Yes	No
00	2-VA-2C-BFIV-RB	RB DAMPERS	RB	170	WW M/21R	N/A	N/A	N/A	N/A	No	N/A	Yes	Yes	No
00	2-VA-2D-BFIV-RB	RB DAMPERS	RB	170	WW M/21R	N/A	N/A	N/A	N/A	No	N/A	Yes	Yes	No

APPENDIX D
INSTANCES OF MEETING THE INTENT BUT NOT THE LETTER OF THE CAVEAT

E.C.	Equipment ID No.	Description	Deviation and Acceptability
07	2-C12-CV-127	137 SCRAM OUTLET ISOLATION VALVES	Bounding Spectrum Caveat 4 (Pipe size): The valve is supported at the top by a bracket and at the bottom by a stiff pipe.
07	2-C12-CV-F011	CRD DRAIN VALVES	Bounding Spectrum Caveat 7 (Independent Bracing): The bumper-type restraint of the actuator is not considered independent bracing.

APPENDIX D
INSTANCES OF MEETING THE INTENT BUT NOT THE LETTER OF THE CAVEAT

E.C.	Equipment ID No.	Description	Deviation and Acceptability
10	1-VA-1A-D-CB 2-VA-2I-D-CB	AO DAMPER AO DAMPER - UNIT 2	Bounding Spectrum Caveat 1 (Database Representation): The damper is mounted in-line but it is attached to a stiff support and is at least as well supported as it would be if attached to an air handler.
10	2-VA-ISOL-DMP-CB	SUPPLY ISOL DAMPER	Bounding Spectrum Caveat 1 (Database Representation): The damper is mounted in-line but it is well attached and has a low mass.
18	1-VA-ZS-1026 2-VA-ZS-1027-A 2-VA-ZS-1027-B 2-VA-ZS-1028	SUPPLY FAN LIMIT SWITCH SUPPLY FAN LIMIT SWITCH SUPPLY FAN LIMIT SWITCH SUPPLY FAN LIMIT SWITCH	Bounding Spectrum Caveat 1 (Database Representation): The switch is mounted on a duct which is rigidly supported within 2 ft. of the attachment.
19	2-VA-TT-1299-2	TEMPERATURE TRANSMITTER	Bounding Spectrum Caveat 1 (Database Representation): The switch is mounted on a duct which is well supported.
20	1-H12-P601	ENGINEERED SAFEGUARDS VERT BRD	Bounding Spectrum Caveat 5 (Adjacent Cabinets Bolted): One top bolt is missing and the panel butts against the control room wall but the lateral rigidity of the panel and the location of essential relays within the panel make this acceptable.
20	1-H12-P617	RHR A RELAY VERTICAL BOARD	Bounding Spectrum Caveat 5 (Adjacent Cabinets Bolted): The entire line-up is bolted except at the far south, which is attached through the rigid wireway on top, and the far north, which has a large enough gap and enough stiffness to preclude pounding.
20	1-XU-51 1-XU-75 1-XU-79 2-XU-51 2-XU-75	BOP RTG BOARD POST-ACCIDENT MISC INSTRUMENT CAB DIV-I POST-ACCIDENT MISC INSTRUMENT CABINET BOP RTG BOARD POST-ACCIDENT MISC INSTRUMENT CAB, DIV-I	Bounding Spectrum Caveat 3 (Strip Chart Recorders): All cantilevered devices are well supported.

ENCLOSURE 1

ATTACHMENT 2
Revised pages for Reference 1 Enclosure 1
Appendices E1 and F1

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 01

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTICNAL)

a. Define proposed method(s) for resolving outlier.

Existing plant documentation and available industry information will be reviewed for possible acceptance of ion detectors as is.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO PRAGHOLU Print or Type Name	Leo S. Pragholu Signature	4-17-95 Date
Ronald L. Knott Print or Type Name	Ronald L. Knott Signature	4-14-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 02

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Additional evaluation is required to assess the ruggedness of these Butterfly Valves.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO BRAGANZA Print or Type Name	Signature	9.12.95 Date
RONALD L. KNOTT Print or Type Name	Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 03

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Additional evaluation is required to consider acceptability of edge distance less than four bolt diameters.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

HCLPF calculation 52213-C-045 addresses the anchorage and operability of these MCCs. Also calculation 0SEIS-0004 provides weight and frequency estimate.

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

Leo BRAGAGNOLO Print or Type Name	Leo J Bragagnolo Signature	9.13.95 Date
Ronald L. Kuehl Print or Type Name	Ronald L. Kuehl Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 04

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Additional analysis is required to show that the gap is adequate to prevent impact or that the impact will be non-damaging.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

HCLPF calculation 52213-C-045 addresses the anchorage and operability of the MCC. Also calculation 0SEIS-0004 provides weight and frequency estimate.

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO BRADY NUCLEAR Print or Type Name	Leo J. Brady Signature	9-13-95 Date
RONALD L. KNOTT Print or Type Name	Ronald L. Knott Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 05A

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Further anchorage analysis is required.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

HCLPF calculation 52213-C-047 has been performed to address anchorage of these panels.

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO BRAGAGNOLO Print or Type Name	Signature	9.13.95 Date
RINALD L. KNOTT Print or Type Name	Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 05B

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Further anchorage analysis is required.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

HCLPF calculation 52213-C-049 has been performed to address anchorage of these panels.

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO BRAGAGNOLO Print or Type Name	Leo J Bragagnolo Signature	9.13.95 Date
RONALD L. KNOTT Print or Type Name	Ronald L. Knott Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 06

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Additional evaluation of load path is required. Analysis to include embedded steel, bounding spectra caveats, and bounding spectra exceedences for the DGB 23' (i.e. frequency determination required for transformer).

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

See hard copy as-built anchorage sketch in A-46 file. Photos are Polaroid. See calculation 0480VDS-0002 for additional information.

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO BRAGAGNOLO Print or Type Name	Signature	9.13.95 Date
RONALD L. KNOFT Print or Type Name	Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 07

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

A frequency analysis may show that the fundamental frequency is outside the range of bounding spectra exceedances. Otherwise the inherent ruggedness of these items will be assessed.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

These are Hytork valves and are duct mounted. These items can be considered at least as well supported as when attached to an air handler.

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO BRAGNOLO Print or Type Name	Leo Bragnolo Signature	9.13.95 Date
RONALD L. KNOTT Print or Type Name	Ronald L. Knott Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 08

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Review of existing qualification data is recommended to augment earthquake experience data

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

HCLPF Cal. No. 52213-C-048 was performed. Calculation QMSIV-001 demonstrates that the yoke assembly is adequate to resist seismic loads postulated by the piping analysis (0.65g vertical and 2.18g combined horizontal).

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy.

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO BRAGAGNOLO Print or Type Name	Leo J Bragagnolo Signature	4.13.95 Date
RONALD L. KNOTT Print or Type Name	Ronald L. Knott Signature	9-18-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 09

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

A frequency analysis may demonstrate the bounding spectra to be enveloping for frequencies of interest. Otherwise, the inherent ruggedness of these items will be assessed. Stresses on the threaded connections must also be evaluated for the FOVs.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO BRAGAGNOLO Print or Type Name	Signature	9.13.95 Date
RONALD L. KNOTT Print or Type Name	Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 10

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Analysis of yoke capacity considering the as-built information is required. Evaluation of the frequency for the valves mentioned is required to show that they are outside the range of exceedances.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

Several of the yokes were as-built to facilitate this analysis. See 2-E11-F002A and 1-SW-V20MO as examples.

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO BRAGAGNOLO Print or Type Name	Signature	9.13.95 Date
RONALD L. KNOTT Print or Type Name	Signature	9-19-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 11

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Static analysis of operator height and weight.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

As-built properties for the valve yoke / operator have been included with walkdown information. Several of these valves were evaluated on the walkdown as acceptable and are included in this list because of similarity with others. Reference to walkdown evaluations will resolve some.

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO BOSNOLO Print or Type Name	Signature	9.13.95 Date
RONALD L. KNOTT Print or Type Name	Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 12

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Evaluation of pipe stress due to eccentricity of operator will resolve this outlier.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO BRAGAGNOLO Print or Type Name	Signature	9 13 95 Date
RONALD L. KNOTT Print or Type Name	Signature	9-18-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 13

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Frequency evaluations are needed to demonstrate that they do not fall within the Bounding Spectrum exceedance range. Otherwise, the inherent ruggedness of these components will be assessed.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two or the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO BRAGNOLO Print or Type Name	Signature	9.13.95 Date
RONALD L. KNOTT Print or Type Name	Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 14

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Evaluation for frequency to assess capacity vs. demand and anchorage evaluation should be performed.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

Anchorage has been as-built in the SEWS forms. Additional anchorage information is also available for DG fans in MOD 88-018. specifically sketch SK-S-88-018-77.

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO FRAGNOLI Print or Type Name	Signature	9.13.95 Date
RONALD L. KNOTT Print or Type Name	Signature	9-18-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 16

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Evaluation of ¾" bolt and ¾ inch thick pad will resolve outlier. Also, a frequency evaluation is required to resolve the capacity versus demand concerns.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO PRACAGNOLO Print or Type Name	Signature	9.13.95 Date
RONALD L. KNOTT Print or Type Name	Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 17

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Further anchorage evaluation is required to resolve outlier.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

Sketches are provided in SEWS form. Additionally, both passed a tug test.

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO ERAGAGNOLO Print or Type Name	Leo J. Bragagnolo Signature	9-13-95 Date
RONALD L KNOTT Print or Type Name	Ronald L. Knott Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 18

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Evaluate the straps for the saddle tanks.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

4. CERTIFICATION:

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Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO BRAGAGNOLO Print or Type Name	Signature	9.13.95 Date
RONALD L. KNOTT Print or Type Name	Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 19

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Outlier resolution to address the frequency of the support with respect to the bounding spectra exceedances. An evaluation of the anchorage for 1-SW-TY-4790 is also required.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

Many of these were judged to be well supported by the SRT. An anchorage evaluation of 2-SW-PS-1995 through 1999 is included in calculation 52213-C-031.

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO BRAGAGNOLO Print or Type Name	Signature	9.13.95 Date
RONALD L. KNOTT Print or Type Name	Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 21

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Evaluation for differential movement is required.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

Modification for rack and conduit support upgrade has been performed. Refer to the evaluation for this modification. Additionally, note that this rack is included in the walkdown as optional equipment.

4. CERTIFICATION:

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Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO BRAGANDLO Print or Type Name	Signature	9.13.95 Date
RONALD L. KNOTT Print or Type Name	Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 22/23

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Evaluation of conditions addressed above.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

HCLPF calculation 52213-C-050 was performed for anchorage.

4. CERTIFICATION:

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Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO BRAGAGNOLO Print or Type Name	Signature	9.13.95 Date
RONALD L. KNOTT Print or Type Name	Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 24

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Evaluation of strip chart recorders to satisfy Bounding Spectra caveats.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

4. CERTIFICATION:

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Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO BRAGAGNOLO Print or Type Name	Signature	9.13.95 Date
RONALD L KNOTT Print or Type Name	Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix E1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 25

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

4. CERTIFICATION:

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LEO BRAGANZA Print or Type Name	Signature	9.13.95 Date
RONALD L KNOTT Print or Type Name	Ronald L. Knott Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix F1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 26

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Evaluation of the accumulator connection to the frame is required. Calc 86-109-01 and -02 should be reviewed to ensure that the top connection of outer HCU row frames to the braced inner row frames has sufficient capacity. Additionally, the corrosion at the base of the frames should be addressed.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

The frame bracing has been evaluated per calculation 86-109-02. Total HCU weight is 785 lbs per FP-5096.

4. CERTIFICATION:

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Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO BRAGAGNOLO Print or Type Name	Leo Bragagnolo Signature	9.13.95 Date
RONALD L. KNOTT Print or Type Name	Ronald L. Knott Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix F1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 27

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

4. CERTIFICATION:

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LEO BRAGAGNOLO Print or Type Name	Signature	9.13.95 Date
RONALD L KNOTT Print or Type Name	Signature	9-14-95 Date
Print or Type Name	Signature	Date

Appendix F1
OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
Outlier 28

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

HCLPF calculation 52213-C-053 was performed. Anchorage was being modified at time of inspection. The 2B HX was inspected as optional equipment.

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

LEO BRAGAGNOLO Print or Type Name	Leo J. Bragagnolo Signature	9.13.95 Date
RONALD L. KNOTT Print or Type Name	Ronald L. Knott Signature	9-14-95 Date
Print or Type Name	Signature	Date