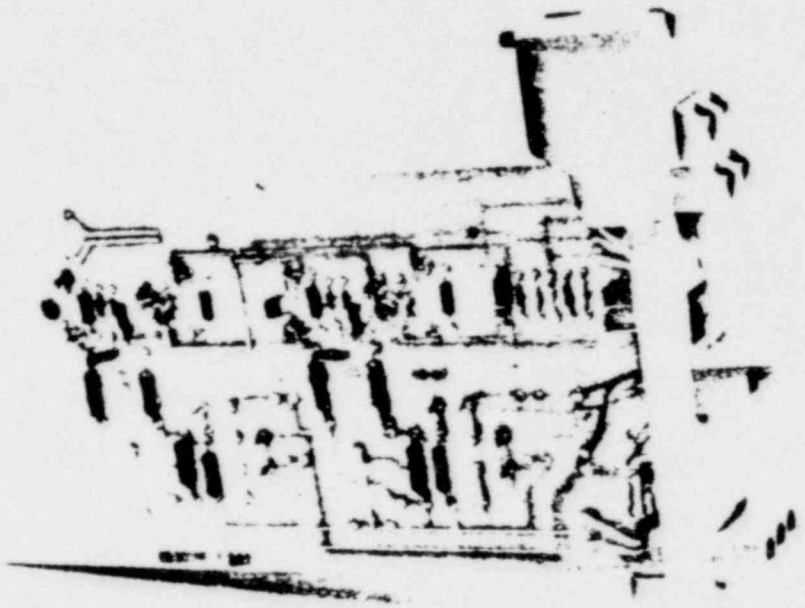
The Foxboro Company
Corporate Quality Assurance Laboratory
Type Test Report

Q0AAB13
REV C

2AI-I3V STYLE A CS-N/SRC
CURRENT PRODUCTION AND STYLE A
NATURALLY AGED CURRENT-TO-VOLTAGE CONVERTERS



POOR ORIGINAL

	Pre-Seismic	Seismic	Post-Seismic
DATE OF TEST*:	JUL 77 FEB 78	JAN 78 JUL 78	APR 78 AUG 78
TEST ENG./TECH.*:	G.M. Karol E.D. Wardyga, Jr.	R.L. Andrews R.L. Andrews	E.D. Wardyga, Jr. E.D. Wardyga, Jr.

APPROVED: L W Hewey Date: 11/27/78
L.W. Hewey, Supervisor, Corp. Qual. Assurance Lab.

*First date or name refers to current production module, second date or name refers to naturally aged module.

FOXBORO®

®Registered Trademark

Printed in U.S.A.

8104210456

THE FOXBORO COMPANY
CORPORATE QUALITY ASSURANCE LABORATORY
TYPE TEST REPORT

EXPLANATION OF LATEST REVISION

Modified notes on Pages 18 and 19; added voltage source to Sections III. G.1.b., G.2.a., and G.2.b.

REVISION STATUS OF PAGES

PAGE NO.	REV
Title	C
1 - 17	A
18 - 19	C
20	A

NOTE

SPEC 200 is a Trademark of The Foxboro Company

PRODUCT TESTED

MODEL	DATE OF MANUFACTURE	STYLE
2AI-[illegible]	Week 26, 1977	A
2A[illegible]	Week 30, 1973	A

PRODUCT QUALIFIED

MODEL	STYLE	CERTIFICATION CODE
2AI-I3V	A	CS-N/SBC CS-N/SBD

REFERENCE DOCUMENTS

1. Q0AAB01, Demonstration/Analysis of Qualified Life
2. Q0AAA20, Parts 1 and 2, Seismic Test Reports
3. IEEE[1] 323-1974 and IEEE 344-1975
4. ISA[2]-S51.1-1976, Process Instrumentation Terminology
5. Q0AAA02, Performance Tests and Operating Influence Tests for Rack-Mounted Modules

REVISION HISTORY

REV	DATE
A	3 NOV 78
B	9 MAR 79
C	7 APR 80

[1]Institute of Electrical and Electronic Engineers, Incorporated
[2]Instrument Society of America

I. TEST OBJECTIVE

To verify the Class 1E performance characteristics and the operating influences of specified service conditions on module performance per Qualification Procedures of IEEE 323-1974 and IEEE 344-1975. The enclosed specifications for environmental influences of service conditions reflect pre-seismic acceptance criteria; relative to post-seismic data they represent target acceptance criteria. Specifications for seismic influence also reflect target acceptance criteria since the end user must ultimately define the acceptance criteria for each application.

Data is provided to support the qualification of the Style A model of current production. Data is also provided herein on the Style A naturally aged unit for reference in Report Q0AAB01. Q0AAB01 provides the user with consolidated information which can be used in estimating qualified life of the SPEC 200 product line.

II. SUMMARY AND CONCLUSIONS

Both the current production and naturally aged 2AI-I3V Current-to-Voltage Converters, when enclosed in a 2ANU-D Nest, performed within specification during pre-seismic and post-seismic type tests.

Performance was also within target acceptance criteria during and after seismic tests.

Both modules maintained their structural integrity throughout seismic tests.

III. SUMMARY OF TEST RESULTS

Measurement equipment accuracy for this test was 0.05%, therefore, all data is reported to that tolerance.

A. Calibration Characteristics

Reference Conditions: Temperature 23 ±2°C
Relative Humidity 40 ±5%
Supply Voltage +15, -15 V dc ±0.1%

Specification: Accuracy ±0.25%

1. Current Production Module

	Error in % of Input Span			
	Pre-Seismic		Post-Seismic	
	Channel A	Channel B	Channel A	Channel B
Measured Accuracy	<0.05	<0.05	<0.05	+0.05
	<0.05	-0.10	-0.05	-0.05
Zero Error	<0.05	<0.05	<0.05	+0.05
Span Error	<0.05	<0.05	-0.05	-0.10
Repeatability	<0.05	<0.05	<0.05	<0.05
Hysteresis	<0.05	<0.05	0.05	<0.05
Linearity (Independent)	<±0.05	<±0.05	<±0.05	<±0.05

2. Naturally Aged Module

	Error in % of Input Span			
	Pre-Seismic		Post-Seismic	
	Channel A	Channel B	Channel A	Channel B
Measured Accuracy	+0.20	+0.20	<0.05	+0.05
	-0.10	+0.15	-0.05	<0.05
Zero Error	+0.20	+0.20	<0.05	<0.05
Span Error	-0.10	-0.05	-0.05	<0.05
Repeatability	<0.05	0.05	<0.05	<0.05
Hysteresis	<0.05	0.05	<0.05	<0.05
Linearity (Independent)	<±0.05	<±0.05	<±0.05	<±0.05

III. SUMMARY OF TEST RESULTS (Continued)

B. Supply Voltage Effects

Reference Conditions: Temperature 23 ±2°C
Relative Humidity 40 ±10%
Supply Voltage +15, -15 V dc ±0.1%

Specification: The supply voltage error will be no more than ±0.2% for a ±5% shift in the +15, -15 V dc.

1. Current Production Module

Supply Voltage (V dc)		Output Shift (% of Span)							
		Pre-Seismic				Post-Seismic			
		Channel A		Channel B		Channel A		Channel B	
+	-	0%	100%	0%	100%	0%	100%	0%	100%
15.00	15.00	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
15.75	15.75	<0.05	<0.05	<0.05	<0.05	-0.05	<0.05	-0.05	-0.05
14.25	14.25	<0.05	<0.05	<0.05	+0.05	+0.05	<0.05	+0.05	<0.05
15.75	14.25	<0.05	<0.05	<0.05	+0.05	+0.05	<0.05	+0.05	<0.05
14.25	15.75	<0.05	<0.05	<0.05	<0.05	-0.05	<0.05	-0.05	-0.05

2. Naturally Aged Module

Supply Voltage (V dc)		Output Shift (% of Span)							
		Pre-Seismic				Post-Seismic			
		Channel A		Channel B		Channel A		Channel B	
+	-	0%	100%	0%	100%	0%	100%	0%	100%
15.00	15.00	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
15.75	15.75	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
14.25	14.25	<0.05	+0.05	<0.05	+0.05	<0.05	<0.05	<0.05	<0.05
15.75	14.25	<0.05	+0.05	<0.05	+0.05	<0.05	<0.05	<0.05	<0.05
14.25	15.75	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

III. SUMMARY OF TEST RESULTS (Continued)

C. Ambient Temperature Effects

Reference Conditions: Temperature 27 ±2°C
Relative Humidity 40 ±10%
Supply Voltage +15, -15 V dc ±0.1%

Specification: The maximum error for a change in ambient temperature of 28°C within the normal operating limits of 5 and 50°C will not exceed ±0.5%.

1. Current Production Module

	Output Shift (% of Span)							
	Pre-Seismic				Post-Seismic			
Ambient	Channel A		Channel B		Channel A		Channel B	
Temperature (°C)	0%	100%	0%	100%	0%	100%	0%	100%
27	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
4	<0.05	<0.05	<0.05	<0.05	+0.10	+0.10	<0.05	<0.05
27	<0.05	<0.05	<0.05	<0.05	+0.05	<0.05	<0.05	<0.05
50	-0.05	<0.05	-0.05	+0.05	-0.10	-0.10	<0.05	<0.05
60	-0.10	<0.05	-0.05	+0.10	+0.15	-0.15	<0.05	<0.05
27	-0.05	+0.10	<0.05	+0.05	<0.05	<0.05	<0.05	<0.05

2. Naturally Aged Module

	Output Shift (% of Span)							
	Pre-Seismic				Post-Seismic			
Ambient	Channel A		Channel B		Channel A		Channel B	
Temperature (°C)	0%	100%	0%	100%	0%	100%	0%	100%
27	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
27	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
50	<0.05	<0.05	<0.05	<0.05	<0.05	-0.05	<0.05	-0.05
60	<0.05	<0.05	<0.05	<0.05	<0.05	-0.05	<0.05	-0.10
27	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

III. SUMMARY OF TEST RESULTS (Continued)

D. Relative Humidity Effects

Reference Conditions: Temperature 23 ±2°C
Relative Humidity 50 ±5%
Supply Voltage +15, -15 V dc ±0.1%

Specification: The error due to an exposure to an atmosphere of 95% relative humidity at a maximum wet bulb of 30°C when referenced to 50% relative humidity will be no greater than ±0.5%.

1. Current Production Module

	Output Shift (% of Span)							
	Pre-Seismic				Post-Seismic			
	Channel A		Channel B		Channel A		Channel B	
Relative Humidity (%)	0%	100%	0%	100%	0%	100%	0%	100%
50	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
95	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
50	<0.05	<0.05	<0.05	<0.05	-0.05	<0.05	<0.05	<0.05

2. Naturally Aged Module

	Output Shift (% of Span)							
	Pre-Seismic				Post-Seismic			
	Channel A		Channel B		Channel A		Channel B	
Relative Humidity (%)	0%	100%	0%	100%	0%	100%	0%	100%
50	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
95	<0.05	-0.05	+0.15	+0.30	<0.05	<0.05	<0.05	<0.05
50	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

III. SUMMARY OF TEST RESULTS (Continued)

E. Response Time

Reference Conditions: Temperature 23 ±2°C
Relative Humidity 40 ±10%
Supply Voltage +15, -15 V dc ±0.1%

Specification: When excited by an 80% input step (10 to 90% change), the time required for the output to reach 90% of the final steady-state value is 37 milliseconds nominal and 50 milliseconds maximum for the 10 Hz filter.

1. Current Production Module (Tested with 10 Hz Filter)

a. 10% Step (45 to 55%)

	Pre-Seismic				Post-Seismic			
	Channel A		Channel B		Channel A		Channel B	
	Step Up	Step Down	Step Up	Step Down	Step Up	Step Down	Step Up	Step Down
Dead Time, ms	<1	<1	<1	<1	<1	<1	<1	<1
50% Response Time, ms	12	10	10	9	10	11	11	12
90% Response Time, ms	36	34	35	35	31	32	31	32

b. 80% Step (10 to 90%)

	Pre-Seismic				Post-Seismic			
	Channel A		Channel B		Channel A		Channel B	
	Step Up	Step Down	Step Up	Step Down	Step Up	Step Down	Step Up	Step Down
Dead Time, ms	<1	<1	<1	<1	<1	<1	<1	<1
50% Response Time, ms	10	10	11	11	11	10	10	10
90% Response Time, ms	36	35	36	36	34	31	31	31

III. SUMMARY OF TEST RESULTS (Continued)
E. Response Time (Continued)

2. Naturally Aged Module

a. 10% Step (45 to 55%)

	Pre-Seismic				Post-Seismic			
	Channel A		Channel B		Channel A		Channel B	
	Step Up	Step Down	Step Up	Step Down	Step Up	Step Down	Step Up	Step Down
Dead Time, ms	<1	<1	<1	<1	<1	<1	<1	<1
50% Response Time, ms	12	11	12	11	12	14	12	13
90% Response Time, ms	38	39	38	40	39	40	40	39

b. 80% Step (10 to 90%)

	Pre-Seismic				Post-Seismic			
	Channel A		Channel B		Channel A		Channel B	
	Step Up	Step Down	Step Up	Step Down	Step Up	Step Down	Step Up	Step Down
Dead Time, ms	<1	<1	<1	<1	<1	<1	<1	<1
50% Response Time, ms	16	15	14	15	16	15	14	16
90% Response Time, ms	40	41	39	40	42	43	38	43

III. SUMMARY OF TEST RESULTS (Continued)

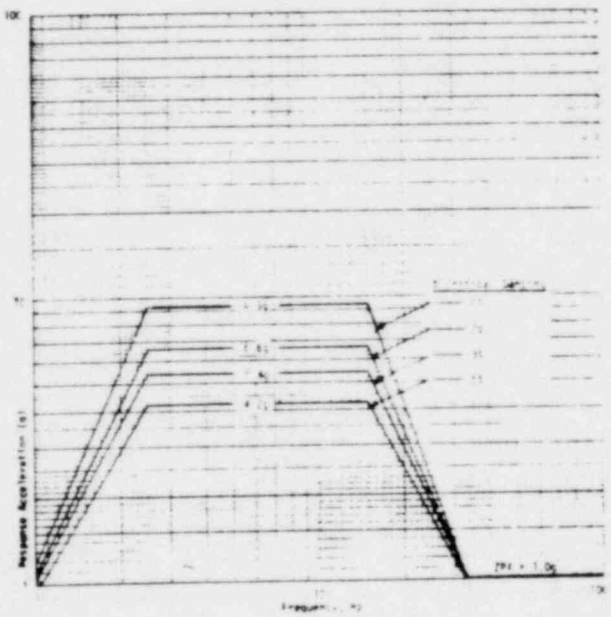
F. Seismic Vibration Effects

1. Test Facility

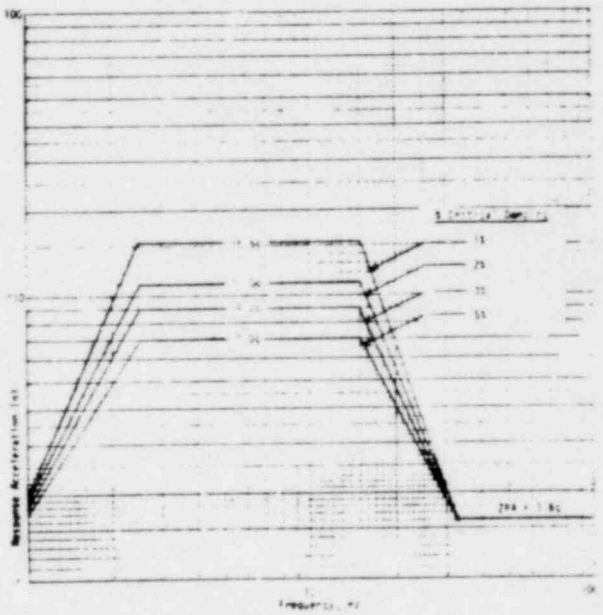
Acton Environmental Testing Laboratory, Acton, MA

2. Test Objective

To demonstrate that both the current production and naturally aged modules will perform their Class 1E functions as mounted in an N-2ES Rack which is loaded in accordance with established rack-loading guidelines and is subjected to floor-level inputs of magnitude equal to or exceeded by those defined by the Foxboro[3] Generic Response Spectra for Floor-Mounted Equipment, shown in the following.



OPERATING BASIS EARTHQUAKE (OBE)



SAFE SHUTDOWN EARTHQUAKE (SSE)

GENERIC REQUIRED RESPONSE SPECTRA (RRS) FOR QUALIFICATION OF FLOOR-MOUNTED CONTROL ROOM EQUIPMENT - HORIZONTAL AND VERTICAL

[3]The Foxboro Company

III. SUMMARY OF TEST RESULTS (Continued)
F. Seismic Vibration Effects (Continued)

3. Test Procedure

With either module mounted in Level 1 (top level) of a N-2ES Rack, a series of tests were performed with band-limited white noise (random) inputs applied at the base of the rack for a duration of 30 seconds. Inputs as determined by the Test Response Spectra (TRS) of the test table exceeded the OBE and SSE levels for floor mounted equipment defined in Section III.F.2., with the objective of producing TRS's at the module mounting location which enveloped the GENERIC REQUIRED RESPONSE SPECTRA FOR QUALIFICATION OF RACK-MOUNTED MODULES. Five tests at the OBE level and one at the SSE level were performed in each of four planes, front-to-back and vertical, back-to-front and vertical, left-to-right and vertical, and right-to-left and vertical with horizontal and vertical inputs applied simultaneously and in phase.

TRS's were generated from accelerometers on the table and at the module mounting location for 1, 2.5, and 5% damping during OBE and SSE tests. The module was energized and functioning during all tests, and its primary performance functions were monitored during and immediately after each SSE and each series of OBE tests.

III. SUMMARY OF TEST RESULTS (Continued)
F. Seismic Vibration Effects (Cotninued)

4. Seismic, Summary and Conclusions

The 2AI-I3V Module from current production was tested in Nest No. 2*. The naturally aged unit was tested in Nest No. 1A*.

All one-third octave response points achieved in testing of the naturally aged unit enveloped the target GENERIC REQUIRED RESPONSE SPECTRA FOR QUALIFICATION OF RACK-MOUNTED MODULES (Refer to Section III.F.5.b.).

Relative to the target RRS's, undertesting occurred at eight of 168 one-third octave response points in testing of the module from current production. Of these, five points occurred at 1.25 or 1.6 Hz, having resulted from test table velocity limitations at low frequencies. These points are not considered to be significant, since input accelerations are comparatively low and rack amplification is essentially 1:1 at these frequencies.

Undertesting occurred in the vertical response at a single 12.5 Hz response point (TRS - Right-to-Left and Vertical), and in the horizontal response at two 20 Hz response points (TRS - Back-to-Front and Vertical; TRS - Front-to-Back and Vertical). The latter deficiencies resulted from difficulty in producing the desired test table response at 20 Hz during the testing of Nest No. 2 (Refer to Section III.F.5.a.).

Overall, the TRS's obtained in testing of the 2AI-I3V module from current production are considered to constitute a successful result with respect to the objective of enveloping the target GENERIC REQUIRED RESPONSE SPECTRA FOR QUALIFICATION OF RACK-MOUNTED MODULES.

*Reference Q0AAA20, Parts 1 and 2, Seismic Test Reports.

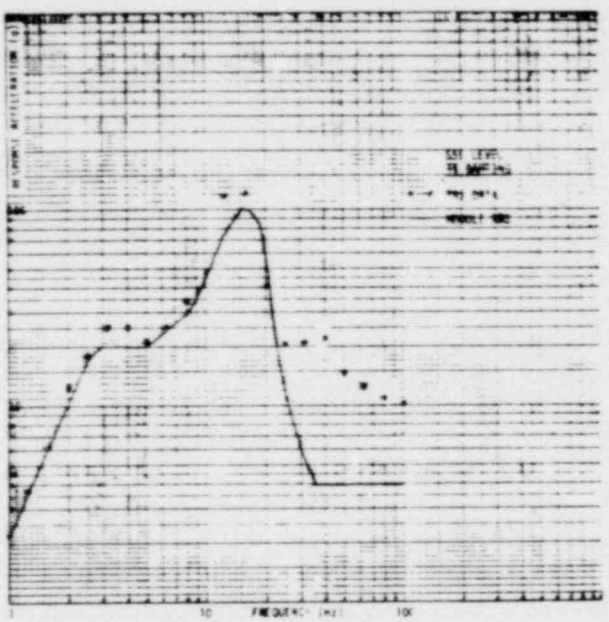
III. SUMMARY OF TEST RESULTS (Continued)
F. Seismic Vibration Effects (Continued)

5. Test Results (Seismic Response)

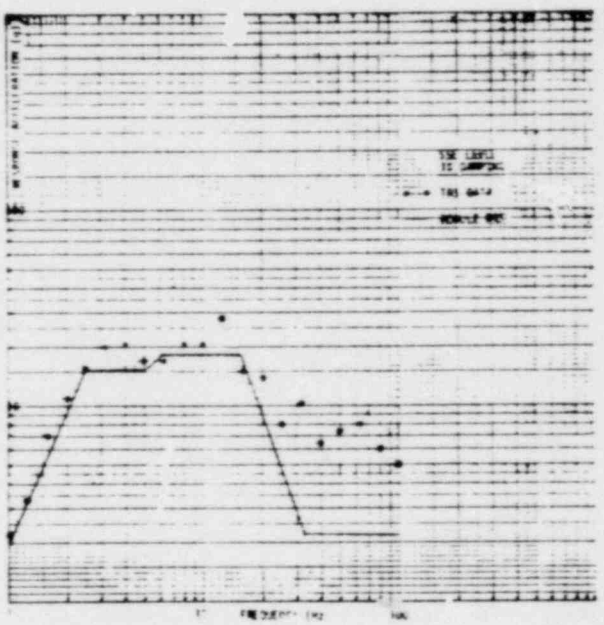
1% damped Test Response Spectra are plotted below at one-third octave intervals for each of the four SSE tests, as obtained at the module mounting location (see dots). GENERIC REQUIRED RESPONSE SPECTRA FOR QUALIFICATION OF RACK-MOUNTED MODULES are also shown on the same plots (solid line) to permit a direct comparison of the two plots.

a. Current Production Module

TBS - Front-to-Back/Vertical Plane



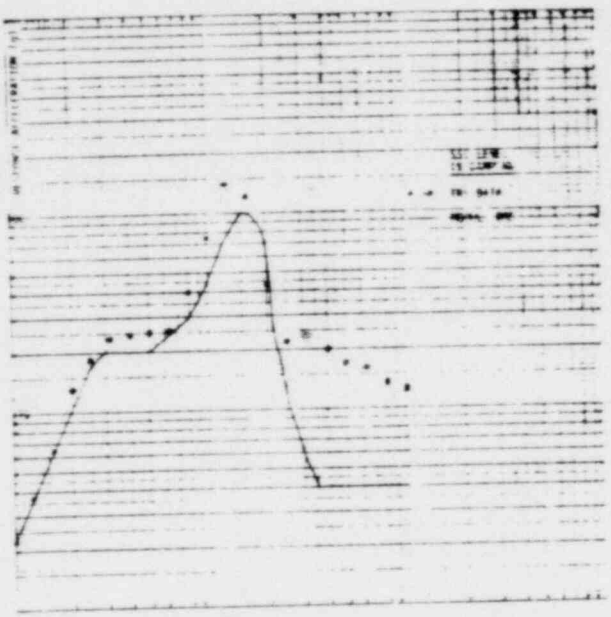
Front-to-Back Response



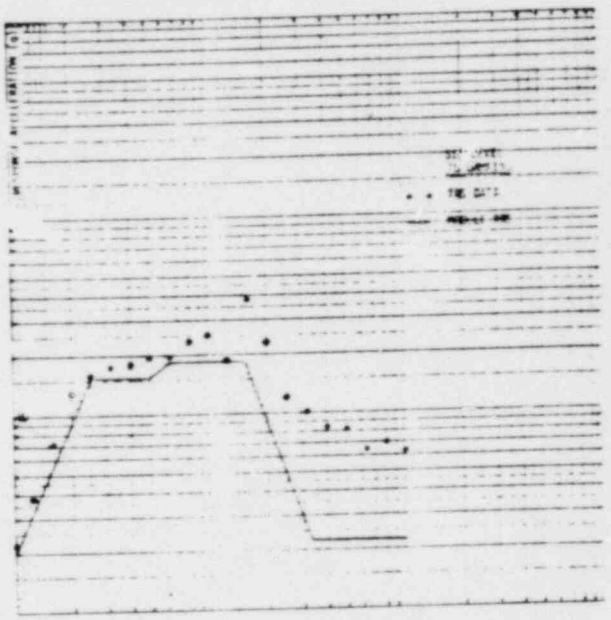
Vertical Response

III. SUMMARY OF TEST RESULTS (Continued)
P. Seismic Vibration Effects (Continued)
5. Test Results (Seismic Response) (Continued)
a. Current Production Module (Continued)

TRS - Back-to-Front/Vertical Plane

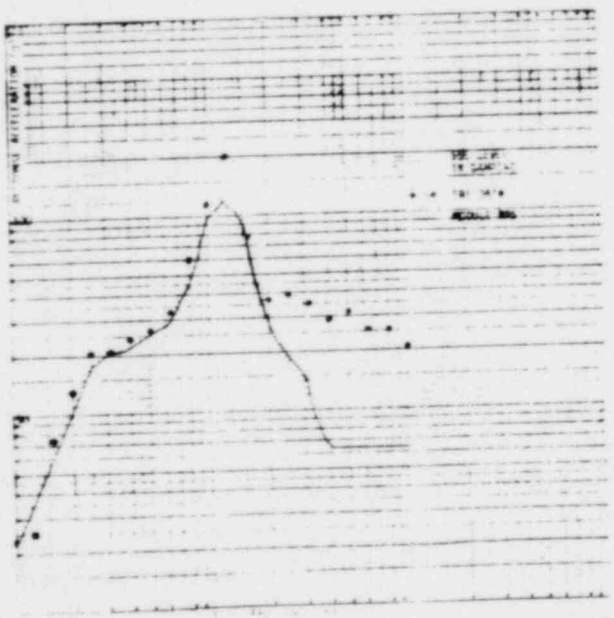


Back-to-Front Response

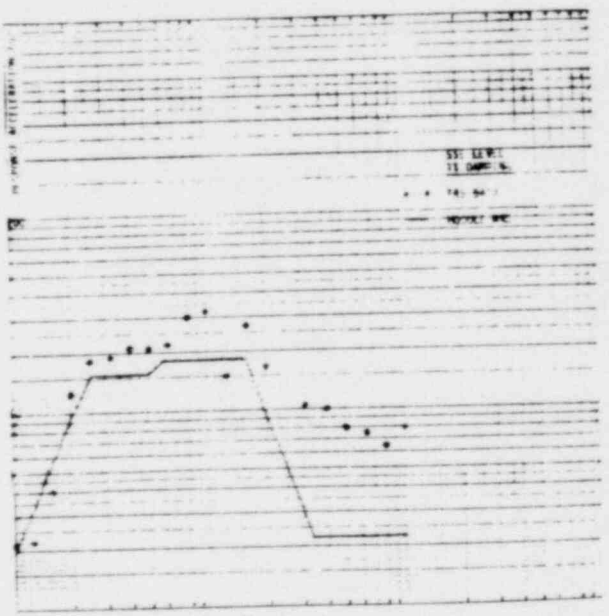


Vertical Response

TRS - Right-to-Left/Vertical Plane



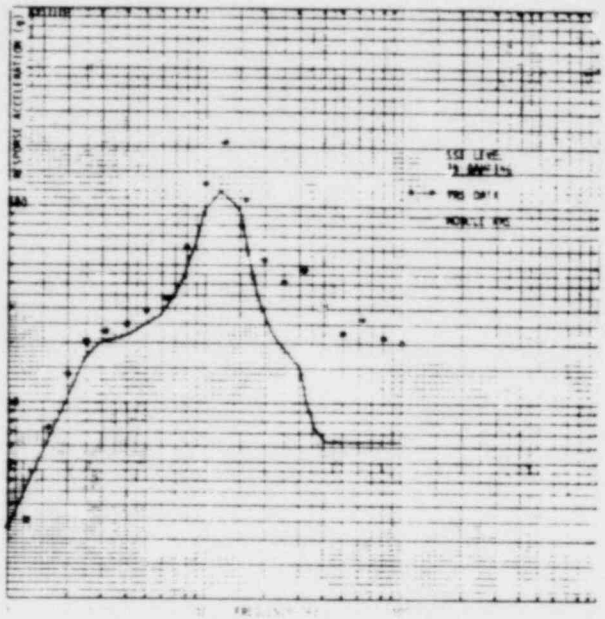
Right-to-Left Response



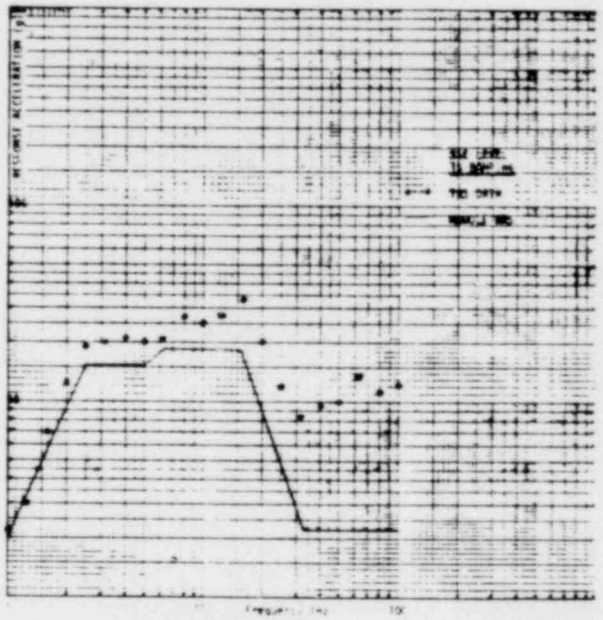
Vertical Response

III. SUMMARY OF TEST RESULTS (Continued)
F. Seismic Vibration Effects (Continued)
5. Test Results (Seismic Response) (Continued)
a. Current Production Module (Continued)

TRS - Left-to-Right/Vertical Plane



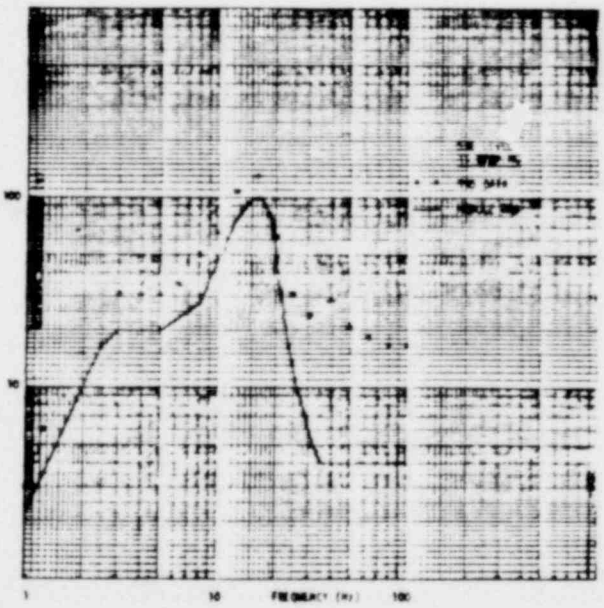
Left-to-Right Response



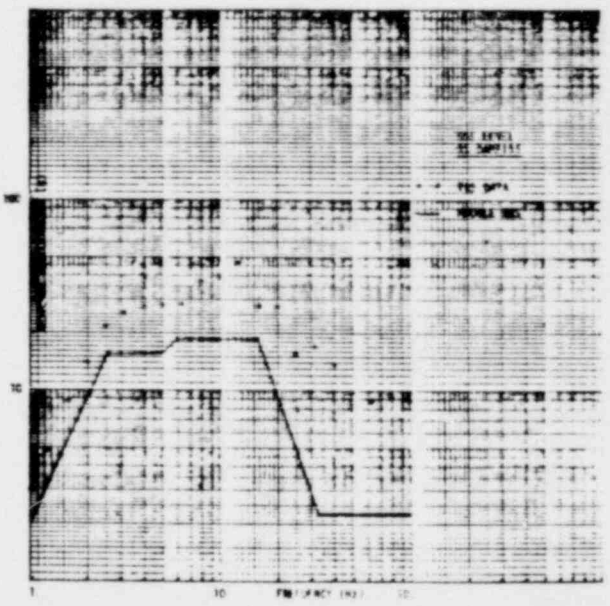
Vertical Response

b. Naturally Aged Module

TRS - Front-to-Back/Vertical Plane



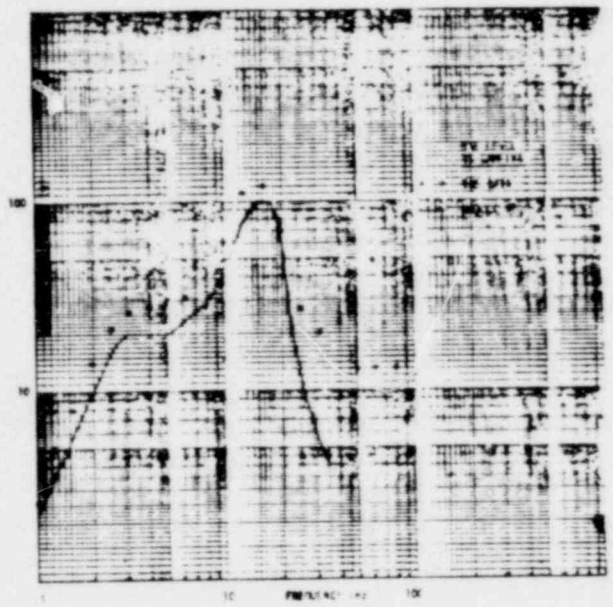
Front-to-Back Response



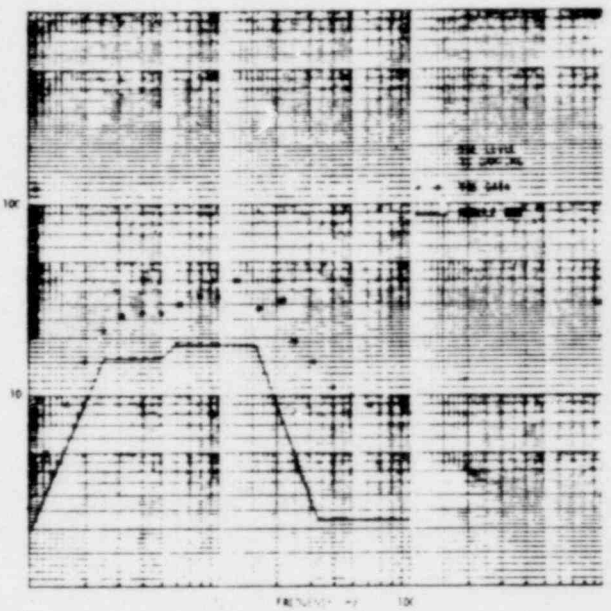
Vertical

III. SUMMARY OF TEST RESULTS (Continued)
F. Seismic Vibration Effects (Continued)
5. Test Results (Seismic Response) (Continued)
b. Naturally Aged Module (Continued)

TRS - Back-to-Front/Vertical Plane

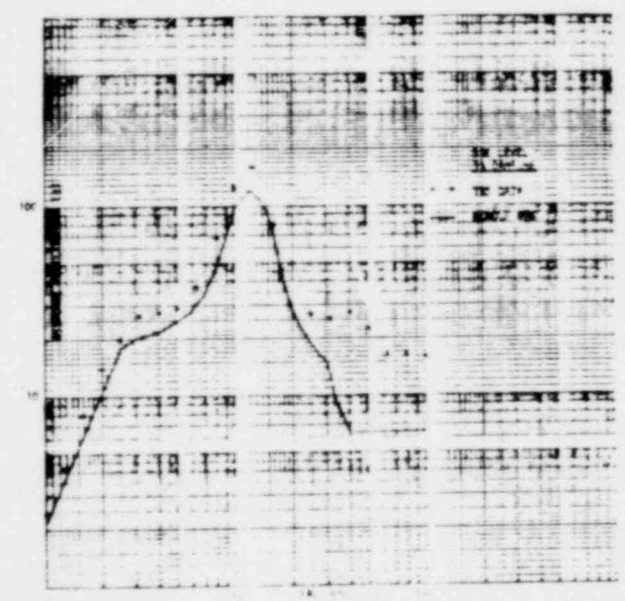


Back-to-Front Response

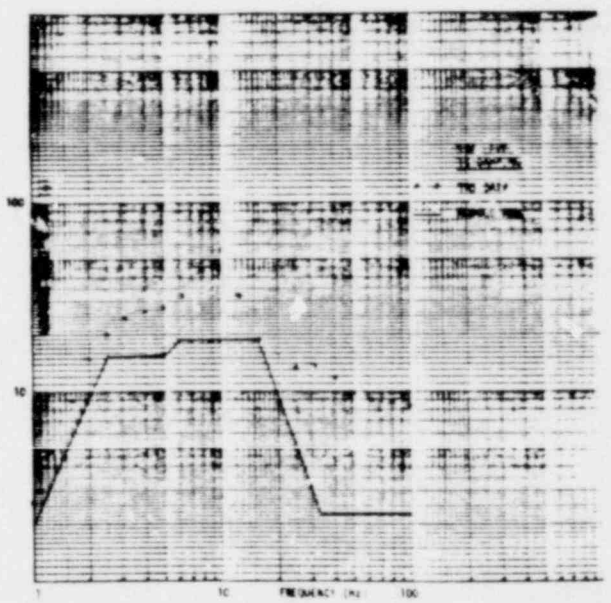


Vertical Response

TRS - Right-to-Left/Vertical Plane



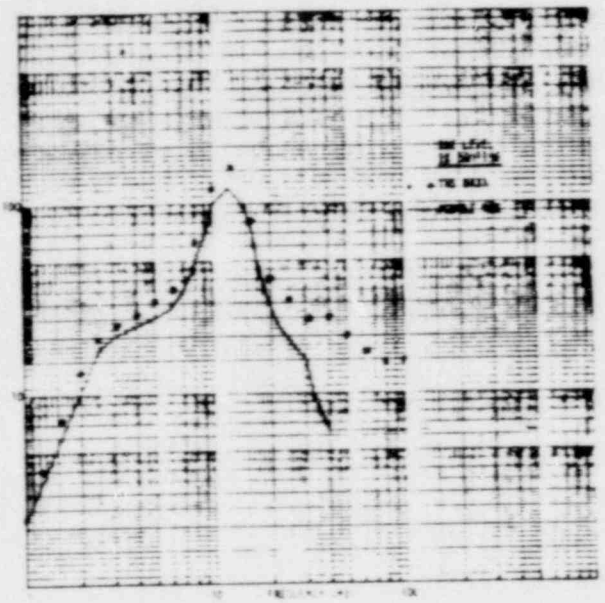
Right-to-Left Response



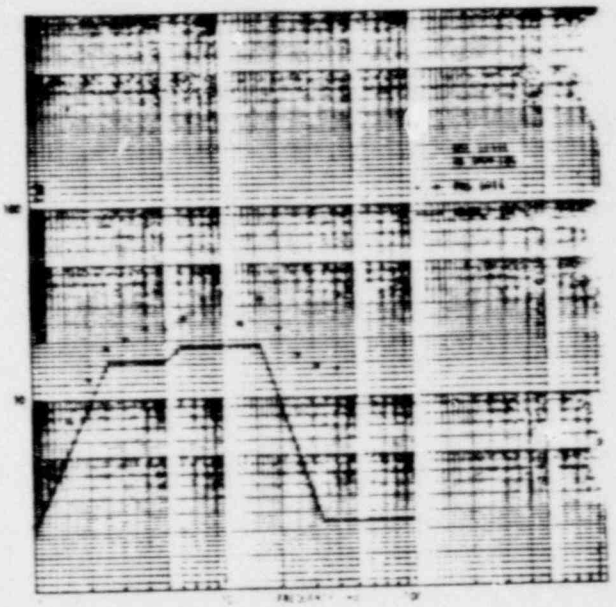
Vertical Response

III. SUMMARY OF TEST RESULTS (Continued)
F. Seismic Vibration Effects (Continued)
5. Test Results (Seismic Response) (Continued)
b. Naturally Aged Module (Continued)

TRS - Left-to-Right/Vertical Plane



Left-to-Right Response



Vertical Response

III. SUMMARY OF TEST RESULTS (Continued)
F. Seismic Vibration Effects (Continued)

6. Test Results (Module Performance/Target Acceptance Criteria)

Note: Measurement Equipment Accuracy during and after seismic tests was 0.25 and 0.1%, respectively.

Target Acceptance Criteria: The 2AO-V3I output will shift no more than ±0.25% during seismic tests.

a. Current Production Module

1. 5 OBE Tests

	Output Shift, % of Span					
	During Test		After Test			
	50%		0%		100%	
Plane of Vibration	Section A	Section B	Section A	Section B	Section A	Section B
Front-to-Back	<0.25	<0.25	<0.1	<0.1	<0.1	<0.1
Back-to-Front	<0.25	<0.25	<0.1	<0.1	<0.1	<0.1
Left-to-Right	<0.25	<0.25	<0.1	<0.1	<0.1	<0.1
Right-to-Left	<0.25	<0.25	<0.1	<0.1	<0.1	<0.1

2. SSE Test

	Output Shift, % of Span					
	During Test		After Test			
	50%		0%		100%	
Plane of Vibration	Section A	Section B	Section A	Section B	Section A	Section B
Right-to-Left	<0.25	<0.25	<0.1	<0.1	<0.1	<0.1
Left-to-Right	<0.25	<0.25	<0.1	<0.1	<0.1	<0.1
Back-to-Front	<0.25	<0.25	<0.1	<0.1	<0.1	<0.1
Front-to-Back	<0.25	<0.25	<0.1	<0.1	<0.1	<0.1

III. SUMMARY OF TEST RESULTS (Continued)
F. Seismic Vibration Effects (Continued)
6. Test Results (Continued)

b. Naturally Aged Module

1. 5 OBE Tests

	Output Shift, % of Span					
	During Test		After Test			
	50%		0%		100%	
Plane of Vibration	Section A	Section B	Section A	Section B	Section A	Section B
Front-to-Back	<0.25	<0.25	<0.1	<0.1	<0.1	<0.1
Back-to-Front	<0.25	<0.25	<0.1	<0.1	<0.1	<0.1
Right-to-Left	<0.25	<0.25	<0.1	<0.1	<0.1	<0.1
Left-to-Right	<0.25	<0.25	<0.1	<0.1	<0.1	<0.1

2. SSE Test

	Output Shift, % of Span					
	During Test		After Test			
	50%		0%		100%	
Plane of Vibration	Section A	Section B	Section A	Section B	Section A	Section B
Left-to-Right	<0.25	<0.25	<0.1	<0.1	<0.1	<0.1
Right-to-Left	<0.25	<0.25	<0.1	<0.1	<0.1	<0.1
Back-to-Front	<0.25	<0.25	<0.1	<0.1	<0.1	<0.1
Front-to-Back	<0.25	<0.25	<0.1	<0.1	<0.1	<0.1

7. Module Mass and Center of Gravity

	Mass		Height		Width		Depth	
Model	lb	g	in.	cm	in.	cm	in.	cm
2AI-I3V	0.80	365	4.4	11.0	1.0	2.5	1.0	2.5

Note: Reference for height, width, and depth measurements was the lower left rear of the front plate.

III. SUMMARY OF TEST RESULTS (Continued)

G. Test Equipment

1. Pre-Seismic

a. Current Production Module

Instrument	Manufacturer	Model	Serial	Calibration Information Last Date	Date Due
Environmental Chamber	Blue M[5]	FR-366PCX	AA-324	2/77	11/77
Voltage/Current Reference Source	PAR[6]	TC-100.2	157	7/76	1/78
DVM	Data Tech.[7]	350	A9644	4/77	10/77
Power Supply	H-P[8]	60155C	1135A01536	6/76	12/77
Dual Power Supply	H-P	6227B	1146A00880	2/76	8/77
Environmental Chamber	Tenney[9]	TR-40-100250	7397	5/77	2/78
Storage Oscilloscope	H-P	184A	1316A00705	1/77	10/77
Precision dc Current Source	EDC[10]	CR-100	4717	4/77	10/77
Precision dc Current Source	EDC	CR-100	4852	7/77	1/78

b. Naturally Aged Module

Instrument	Manufacturer	Model	Serial	Calibration Information Last Date	Date Due
Automatic Test System	H-P	---	AT-2*	*	---
Environmental Chamber	Tenney	TTUFR-40240	4709	11/77	8/78
Precision dc Voltage Source	EDC	HV-100N	3968	9/77	3/78
Voltage Source	EDC	HV100	3113	4/78	11/78

*Note: "AT-2" is an automatic test and data reduction system using an H-P 9825A Desktop Computer. Calibration of the system equipment is checked with a portable standard (EDC Precision Voltage Source serial number 3113 listed above) at the time of test. A complete listing of equipment and capabilities are available from The Foxboro Company.

[5]Blue M Electric Company
[6]Princeton Applied Research
[7]Data Technology Corporation
[8]Hewlett-Packard Company
[9]Tenney Engineering Company
[10]Electronic Development Company

III. SUMMARY OF TEST RESULTS (Continued)
G. Test Equipment (Continued)

2. Post-Seismic

a. Current Production Module

Instrument	Manufacturer	Model	Serial	Calibration Information Last Date	Date Due
Automatic Test System	H-P	N/A	AT-2*	N/A	N/A
Environmental Chamber	Tenney	TTUPR-40240	4709	11/77	5/78
Function Generator	H-P	3310A	1151A07203	9/77	6/78
DVM	Data Tech.	350	18222	2/78	9/78
Power Supply	Lambda[11]	LCD-4-33	C87458	N/A	N/A
Storage Oscilloscope	Tektronix[12]	564	7413	2/78	8/78
Voltage Source	EDC	MV100	3113	4/78	11/78

b. Naturally Aged Module

Instrument	Manufacturer	Model	Serial	Calibration Information Last Date	Date Due
Automatic Test System	H-P	---	AT-2*	*	---
Environmental Chamber	Blue M	FR366PCX	AA-310	5/78	11/78
Precision Current Source	EDC	CR-100	4718	5/78	11/78
Precision Current Source	EDC	CR-100	4857	8/78	2/79
Storage Oscilloscope	H-P	184A	1316A00705	8/78	5/79
Voltage Source	EDC	MV100	3113	4/78	11/78

*Note: "AT-2" is an automatic test and data reduction system using an H-P 9825A Desktop Computer. Calibration of the system equipment is checked with a portable standard (EDC Precision Voltage Source serial number 3113 listed above) at the time of test. A complete listing of equipment and capabilities are available from The Foxboro Company.

[11]Lambda Electronics, Division of VEECO Instruments, Incorporated
[12]Tektronix, Incorporated

III. SUMMARY OF TEST RESULTS (Continued)
G. Test Equipment (Continued)

3. Seismic

a. Current Production Module

Instrument	Manufacturer	Model	Serial	Calibration Information Last Date	Date Due
Power Supply	H-P	60155C	1135A01536	6/76	1/78
Current Source	EDC	CR100	4851	7/77	2/78
DVM	Data Tech.	350	18611	1/78	7/78
Recorder	H-P	7414A	1244A00932	12/77	9/78

b. Naturally Aged Module

Instrument	Manufacturer	Model	Serial	Calibration Information Last Date	Date Due
Power Supply	H-P	60155C	1135A01505	3/78	9/79
Current Source	Foxboro[13]	386	N/A	N/A	N/A
DVM	Data Tech.	350	1864	4/78	10/78
Recorder	H-P	7702B	1102A01250	5/78	11/78

boro Company