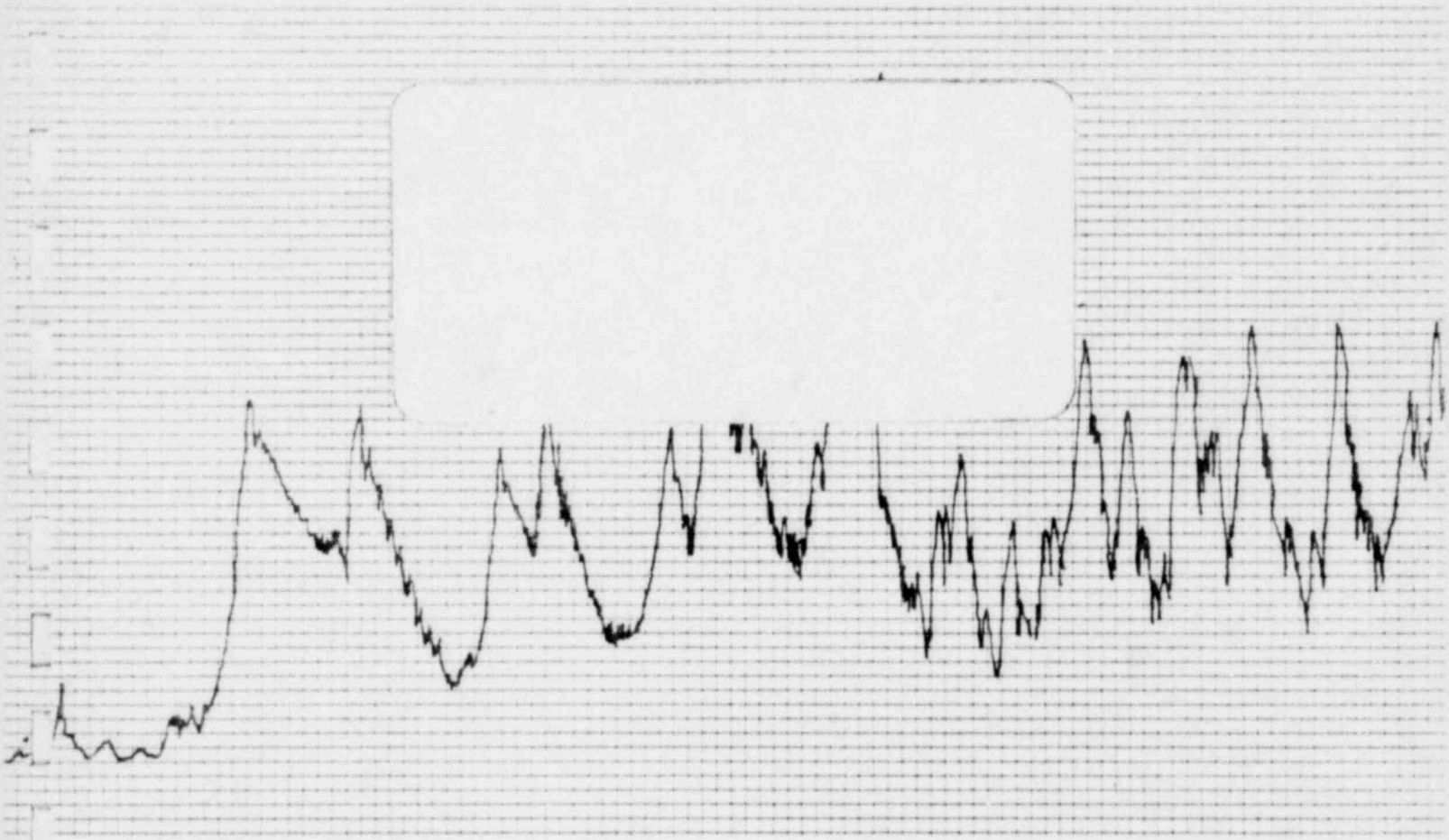
WYLE LABORATORIES
SCIENTIFIC SERVICES AND SYSTEMS GROUP



test REPORT

8004140358

REVISIONS

REVISION C

REPORT NO. 43904-1

DATE: July 6, 1978

WYLE LABORATORIES
SCIENTIFIC SERVICES AND SYSTEMS GROUP

REV NO	DATE	PAGES AFFECTED	BY	APPL	DESCRIPTION OF CHANGES
A	7/6/78	VOLUME II: Pg VIII-2	EC		Delete sentence in discussion of
					Test Item #3.
		Pg X-5	EC		Change description.
B	7/25/78	VOL. II: Pg. X-5	EC		Change Table I - Thermal Effects
C	2/5/79	VOL. II: Pgs.VI-2,	EC		Change data to reflect true temps.
		3, 4, 5, 10, 11, 12,	EC		Data transcribed from Data Logger
		13	EC		Tape in error.

QUALIFICATION TEST REPORT

ON

THREE MODEL 386A
DIFFERENTIAL PRESSURE TRANSMITTERS
AND REMOTE SENSORS

VOLUME II OF II

FOR

DUKE POWER COMPANY
CHARLOTTE, NORTH CAROLINA

Wyle shall have no liability for damages of any kind to person or property, including special or consequential damages, resulting from Wyle's providing the services covered by this report.

SECTION I

PRETEST DATA

DATA SHEET

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 4.2
S/N 101, 102 & 103
GSI

Amb. Temp. 70°F
Photo
Test Med. G.W.
Specimen Temp. Room

WYLE LABORATORIES
Job No. 43904
Report No.
Start Date 2-9-78

Test Title PRE-TEST CALIBRATION INITIAL

TEST ITEM #1

Pressure	Volts-DC	INDICATION ONLY ma ~ DC	REMARKS
0 psig	3.546	11	
-5 psig	2.001	8	
0 psig	3.546	11	
20 psig	10.005	25	
0 psig	3.546	11	

TEST ITEM #2

Pressure	Volts-DC	INDICATION ONLY ma ~ DC	REMARKS
0 psig	3.603	9	
-5 psig	2.002	4	
0 psig	3.592	9	
20 psig	9.986	24	
0 psig	3.605	9	

TEST ITEM #3

Pressure	Volts-DC	INDICATION ONLY ma ~ DC	REMARKS
0" H_2O	2.008	6	
60" H_2O	9.999	24	
0" H_2O	2.008	6	

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By J. Brown Date: 2-9-78
Witness C. B. Schwerer Date: 2-9-78
Sheet No. 1 of 4
Approved Earl K. Campbell

CALIBRATION LABORATORY
MAINTENANCE WORK ORDER

WYLE NUMBER (1 2 3 4 5 6): 9 9 9 9 9 9 NOMINCLATURE: Resistors

JOB NUMBER (7 8 9 10 11 12 13): 4 3 9 0 4 CUSTOMER: Duke Power

REQUESTOR (14 15 16 17 18 19 20 21 22 23): A C G E F MFG:

MODEL:

DATE IN: 2-6-78

SERVICE AND DATE REQUIRED:
Measure & Mark Resistors (3) #1 500.38 #2 499.83 #3 499.08

DATE CALIB (24 25 26 27 28 29): MO 02 DAY 06 YR 78

STD'S USED (30 31 32 33 34 35): .003% of Reading 1 1 2 / 0

WORK PERFORMED (36 37 38): X BY (39 40 41 42): 5579

ESTM. M.H.: 2 ACT. M.H. (43 44): 2 MAT'L. (45 46 47 48):

CAL. INTERVAL (61 62 63): 9 9 9 CATAGORY (64 65): DELETE (30):

SERVICE PERFORMED: AS Read ON meter

SECTION II

BASELINE FUNCTIONAL DATA

DATA SHEET

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 5.2
S/N 101
GSI

Amb. Temp. 70°F
Photo YES
Test Med. Gas
Specimen Temp. Room Amb

WYLE LABORATORIES
Job No. 43904
Report No.
Start Date 2-9-78

Test Title FUNCTIONAL INITIAL

TEST ITEM #1

#1 Pressure	Volts-DC	INDICATION ONLY ma - DC	#2 Volts-DC	INDICATION ONLY ma - DC	#3 Volts-DC	INDICATION ONLY ma - DC
0 psig	3.547	11	3.550	11	3.549	11
-5 psig	2.001	8	2.001	8	2.002	8
0 psig	3.547	11	3.546	11	3.542	11
5 psig	5.151	14	5.152	14	5.153	14
10 psig	6.786	18	6.784	18	6.783	18
15 psig	8.414	21	8.412	21	8.412	21
20 psig	10.010	24	10.004	24	10.012	24
15 psig	8.415	21	8.410	21	8.410	21
10 psig	6.785	18	6.785	18	6.785	18
5 psig	5.152	14	5.150	14	5.151	14
0 psig	3.550	11	3.549	11	3.548	11

REMARKS

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By [illegible] Date
Witness C Blackwell Date 2-9-78
Sheet No. 1 of 3
Approved Earl R Campbell 2/9/78

WH-01-A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 5.2
S/N 102
GSI NA

Amb. Temp. 70
Photo YES
Test Med. GN_2
Specimen Temp. Room Amb

Job No. 43904
Report No.
Start Date 2-9-78

Test Title FUNCTIONAL INITIAL

TEST ITEM #2

#1 Pressure	Volts-DC	INDICATION ONLY ma - DC	#2 Volts-DC	INDICATION ONLY ma - DC	#3 Volts-DC	INDICATION ONLY ma - DC
0 psig	3.606	9	3.610	9	3.609	9
-5 psig	2.020	4	2.021	4	2.027	4
0 psig	3.606	9	3.609	9	3.610	9
5 psig	5.206	13	5.199	13	5.203	13
10 psig	6.800	17	6.806	17	6.809	17
15 psig	8.411	20	8.410	20	8.409	20
20 psig	9.999	24	10.000	24	10.003	24
15 psig	8.407	20	8.412	20	8.408	20
10 psig	6.807	17	6.809	17	6.808	17
5 psig	5.207	13	5.209	13	5.211	13
0 psig	3.610	9	3.609	9	3.611	9

REMARKS

Specimen Failed
Specimen Passed ✓
NCA Written

Tested By [illegible] Date:
Witness C Blackwell Date: 2-9-78
Sheet No. 3 of 3
Approved Earl R Campbell 2/9/78

WH-614A

DATA SHEET

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 5.2
S. N 103
GSI

Amb. Temp. 70
Photo VET
Test Med. GN_2
Specimen Temp. Room Amb

WYLE LABORATORIES
Job No. 43904
Report No.
Start Date 2-9-78

Test Title FUNCTIONAL INITIAL

TEST ITEM #3

#1 Pressure	Volts-DC	INDICATION ONLY ma-DC	#2 Volts-DC	INDICATION ONLY ma-DC	#3 Volts-DC	INDICATION ONLY ma-DC
0" H_2O	2.003	6	2.006	6	2.008	6
15" H_2O	3.965	11	3.985	11	3.984	11
30" H_2O	5.976	15	5.978	15	5.977	15
45" H_2O	7.986	20	7.990	20	7.991	20
60" H_2O	10.000	24	9.998	24	9.999	24
45" H_2O	7.984	20	7.982	20	7.983	20
30" H_2O	5.984	15	5.985	15	5.986	15
15" H_2O	3.985	11	3.987	11	3.990	11
0" H_2O	2.006	6	2.008	6	2.022	6

REMARKS

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By [illegible] Date:
Witness C Blackwell Date: 2-9-78
Sheet No. #2 3 of 3
Approved Earl R Campbell 2/9/78

WH-614A

INSTRUMENTATION EQUIPMENT SHEET

Date 2/9/78 Job No. 43904 Test Area Clean Room

Technician McKenzie Customer DUKE POWER Type Test Baseline Formation

No.	Instrument	Manufacturer	Model No.	Serial No.	Wyle or Gov't No.	Range	Accuracy	Calibration On	Calibration Due
1	Manometer	Meriam Inst. Co.	A-286	J1 935B	80699	0-100"	± .1"	2-6-78	8-6-78
2	Manometer	Meriam Inst. Co.	30EB25	5532015	81272	0-60"	± .1"	2-3-78	2-3-79
3	Gague Pressure	Wallace + Tiernan	FA145181	BD12507	98794	35 psig	± .1%	1-9-78	7-9-78
4	Digital Multimeter	H P	3465A	A01511	96393	1000V	± .02%	1-12-78	7-12-78
5	D.C. Power Supply	Kepco	SM160-2	C63102	97871	0-160V	± 1%	2-8-78	8-8-78

Instrument Test Engineer J. McGee Checked & Received By Earl R Campbell

WH-1029

SECTION III

RADIATION EXPOSURE DATA

DATA SHEET

Customer: Duke Power
Specimen: Differential Pressure Transmitters
Part No.: 386A
Spec.: 545/6960/ES
Para.: 6.0
S/N:
GSI:

Amb. Temp.:
Photo: ✓
Test Med.: COBALT 60 & AIR
Specimen Temp.:

WYLE LABORATORIES
Job No: 43904
Report No.:
Start Date:

Test Title: COMBINED RADIATION EXPOSURE

TEST ITEM #1

Time	Pressure	Volts-DC	ma - DC	Radiation Dose Rate
1330	12.49 ~~12.58~~ psig	7.575	14	
Date 1.10	12.5	7.575	16	
0934	12.63	7.623	18.5	
1034	12.60	7.600	18.0	
1134	12.65	7.617	18.0	
1534	12.57	7.564	20.2	
2-16 0915	12.52	7.526	16.8	
2-16 1015	12.60	7.505	17.2	
2-16 1320	12.72	7.570	17.1	
2-16 1420	12.50	7.480	17.0	
2-16 1620	12.62	7.530	17.0	
2-17 0830	12.62	7.454	17.0	
2-17 1130	12.57	7.477	17.0	
2-17 1330	12.57	7.470	17.0	
2-20 0900	12.47	7.320	17.0	
2-20 1100	12.61	7.385	17.0	
2-20 1300	12.62	7.410	17.0	
" 1430	12.69	7.422	17.5	

Specimen Failed:
Specimen Passed: ✓
NOA Written:

Tested By: GA. TECH Date:
Witness: Date:
Sheet No. 1 of 3
Approved: Earl Campbell 3/4/78

WH-614A

DATA SHEET

Customer: Duke Power
Specimen: Differential Pressure Transmitters
Part No.: 386A
Spec.: 545/6960/ES
Para.: 6.0
S/N:
GSI:

Amb. Temp.:
Photo: ✓
Test Med.: COBALT 60 & AIR
Specimen Temp.:

WYLE LABORATORIES
Job No.: 43904
Report No.:
Start Date:

Test Title: COMBINED RADIATION EXPOSURE

TEST ITEM #1

Date	Time	Pressure	Volts-DC	ma - DC	Radiation Dose Rate
		12:50 psig			
2-21	0800	12.47	7.371	17.0	
"	1330	12.58	7.429	16.8	
"	1530	12.60	7.448	17.6	
"	1630	12.62	7.456	17.7	
2-22	0830	12.33	7.326	17.0	
2-22	0800	12.43	7.364	17.2	
2-26	1530	12.50	7.579	18.0	
2-27	0930	12.65	7.518	18.0	
2-27	1130	12.62	7.488	17.8	
2-27	1430	12.45	7.390	17.8	
2-27	1530	12.44	7.380	17.8	
2-28	0800	12.33	7.356	17.0	
2-28	1030	12.38	7.394	17.8	
2-28	1430	12.47	7.414	18.0	
2-28	1530	12.48	7.441	18.0	
3-1	0900	12.60	7.514	18.0	
3-1	1430	12.48	7.482	18.0	
3-1	1530	12.48	7.544	18.0	

Specimen Failed:
Specimen Passed: ✓
NOA Written:

Tested By: GA. TECH Date:
Witness: Date:
Sheet No. 2 of 3
Approved: Earl R Campbell 3/4/78

WH-614A

DATA SHEET

Customer: Duke Power
Specimen: Differential Pressure Transmitters
Part No.: 386A
Spec.: 545/6960/ES
Para.: 6.0
S/N:
GSI:

Amb. Temp.:
Photo: ✓
Test Med.: COBALT 60 & AIR
Specimen Temp.:

WYLE LABORATORIES
Job No.: 43904
Report No.:
Start Date: 3-2-78

Test Title: COMBINED RADIATION EXPOSURE

TEST ITEM #1

	Time	Pressure	Volts-DC	ma - DC	Radiation Dose Rate
3-2	0900	12.4	7.496	18.0	
3-2	1000	12.43	7.504	18.0	
3-2	1100	12.45	7.544	18.0	
3-2	1400	12.48	7.554	18.0	

Specimen Failed:
Specimen Passed: ✓
NOA Written:

Tested By: GA. TECH. Date:
Witness: Date:
Sheet No. 3 of 3
Approved: Earl R Campbell 3/4/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 6.0
S.N
GSI

Amb. Temp.
Photo ✓
Test Med. Cobalt Co & Air
Specimen Temp.

Job No. 43904
Report No.
Start Date

Test Title COMBINED RADIATION EXPOSURE

TEST ITEM #2

Date	Time	Pressure	Volts-DC	ma - DC	Radiation Dose Rate
	1330	12.50	7.525	19 MA	
	0934	12.63	7.655	20	
	1234	12.60	7.640	22	
	1134	12.65	7.650	19.75	
	1534	12.57	7.598	19.8	
2-16	0815	12.65	7.591	19.0	
"	1015	12.60	7.560	19.4	
2-16	1320	12.52	7.562	19.0	
2-16	1420	12.48	7.551	19.0	
2-16	1620	12.62	7.615	19.0	
2-17	0930	12.54	7.594	19.5	
2-19	1130	12.57	7.598	19.5	
2-17	1330	12.57	7.582	19.5	
2-20	0900	12.47	7.555	19.5	
2-20	1100	12.61	7.640	19.6	
2-20	1300	12.62	7.636	19.5	
"	1430	12.69	7.654	19.5	

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By GA. TECH Date:
Witness Date:
Sheet No. 1 of 3
Approved Earl E. Campbell 3/4/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 6.0
S/N
GSI

Amb. Temp.
Photo ✓
Test Med. COBALT 60 & AIR
Specimen Temp.

Job No. 43904
Report No.
Start Date

Test Title COMBINED RADIATION EXPOSURE

TEST ITEM #2

Dt.	Time	Pressure	Volts-DC	ma - DC	Radiation Dose Rate
		12.50			
2-21	0900	12.47	7.548	19.0	
2-21	1330	12.58	7.580	19.2	
"	1530	12.60	7.586	19.0	
"	1630	12.62	7.606	19.0	
2-22	0830	12.33	7.469	19.0	
2-22	0800	12.43	7.634	19.2	
2-26	1530	12.50	7.532	19.0	
2-27	0830	12.65	7.665	19.6	
2-27	1130	12.62	7.652	19.4	
2-27	1430	12.45	7.570	19.2	
2-27	1530	12.44	7.582	19.0	
2-28	0900	12.33	7.502	19.0	
2-28	1030	12.38	7.515	19.0	
2-28	1430	12.47	7.575	19.0	
"	1530	12.48	7.569	19.0	
3-1	0900	12.60	7.544	19.0	
3-1	1430	12.48	7.528	19.0	
3-1	1530	12.48	7.502	19.0	

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By GA. TECH Date:
Witness Date:
Sheet No. 2 of 3
Approved Earl K. Campbell 3/4/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer: Duke Power
Specimen: Differential Pressure Transmitters
Part No.: 386A
Spec.: 545/6960/ES
Para.: 6.0
S/N:
GSI:

Amb. Temp.:
Photo: ✓
Test Med.: COBALT 60 & Air
Specimen Temp.:

Job No.: 43904
Report No.:
Start Date: 3-2-78

Test Title: COMBINED RADIATION EXPOSURE

TEST ITEM #2				
Time	Pressure	Volts-DC	ma - DC	Radiation Dose Rate
3-2 0900	12.4	7.393	19.0	
3-2 1000	12.43	7.394	19.0	
3-2 1100	12.45	7.425	19.0	
3-2 1400	12.48	7.431	19.0	

Specimen Failed:
Specimen Passed: ✓
NOA Written:

Tested By: GA. TECH. Date:
Witness: Date:
Sheet No. 3 of 3
Approved: Earl R Campbell 3/4/78

WH-614A

DATA SHEET

Customer: Duke Power
Specimen: Differential Pressure Transmitters
Part No.: 386A
Spec.: 545/6960/ES
Para.: 6.0
S/N:
GSI:
Amb. Temp.:
Photo: ✓
Test Med.: Cobalt 60 & Air
Specimen Temp.:

WYLE LABORATORIES
Job No.: 43904
Report No.:
Start Date:

Test Title: COMBINED RADIATION EXPOSURE

TEST ITEM #3

Time	Pressure	Volts-DC	ma - DC	Radiation Dose Rate
1330	1.5 PSI	9.466	23 ma	
—	—	—	—	—
0934	1.5 psig	8.805	22 ma	
1034	1.5 "	8.818	22	
1134	1.5 "	8.516	21.5	
1534	1.5 "	8.354	20.1	
2-16 0915	1.5 "	9.332	23.0	
" 1015	1.5	9.444	23.0	
2-16 1320	1.5	9.122	22.0	
" 1420	1.5	8.281	20.0	
2-16 1620	1.5	8.420	20.2	
2-17 0930	1.5	8.360	20.1	
2-17 1130	1.5	8.297	20.1	
2-17 1330	1.5	8.272	20.0	
2-20 0900	1.5	8.000	19.8	
2-20 1100	1.5	8.091	20.0	
2-20 1300	1.5	8.083	20.1	
" 1430	1.51	8.115	20.0	

Specimen Failed:
Specimen Passed: ✓
NCA Written:

Tested By: GA TECH Date:
Witness: Date:
Sheet No. 1 of 3
Approved: Earl R Campbell 3/4/78

WH-614A

DATA SHEET

Customer: Duke Power
Specimen: Differential Pressure Transmitters
Part No.: 386A
Spec.: 545/6960/ES
Para.: 6.0
S/N:
GSI:

Amb. Temp.:
Photo: ✓
Test Med.: Cobalt 60 & Air
Specimen Temp.:

WYLE LABORATORIES
Job No.: 43904
Report No.:
Start Date: 2-21-78

Test Title: COMBINED RADIATION EXPOSURE

TEST ITEM #3

DT	Time	Pressure	Volts-DC	ma - DC	Radiation Dose Rate
2-21	0900	1.5	7.797	19.6	
2-21	1330	1.5	7.860	19.8	
"	1530	1.5	7.847	19.8	
"	1630	1.5	7.809	19.8	
2-22	0830	1.5	7.568	19.0	
2-22	0900	1.5	7.513	19.0	
2-26	1530	1.5	8.215	24.0	
2-27	0930	1.5	7.774	21.0	
2-27	1130	1.5	7.899	21.0	
2-27	1430	1.5	7.605	20.8	
2-27	1530	1.5	7.672	20.1	
2-28	0900	1.5	12.035	31.0	
"	1030	1.5	7.720	21.0	
"	1430	1.5	7.784	21.0	
"	1530	1.5	7.752	21.0	
3-1	0900	1.5	7.774	21.0	
3-1	1430	1.5	7.703	21.0	
3-1	1530	1.5	7.806	21.0	

Specimen Failed:
Specimen Passed: ✓
NCA Written:

Tested By: GA. TECH Date:
Witness: Date:
Sheet No. 2 of 3
Approved: Earl R Campbell 3/4/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 6.0
S/N
GSI

Amb. Temp.
Photo ✓
Test Med. Cobalt 60 & Air
Specimen Temp.

Job No. 43904
Report No.
Start Date 3-2-78

Test Title COMBINED RADIATION EXPOSURE

TEST ITEM #3

	Time	Pressure	Volts-DC	ma - DC	Radiation Dose Rate
3-2	0900	1.5	6.662	18.3	
3-2	1000	1.5	6.778	18.4	
3-2	1100	1.5	6.813	18.5	
3-2	1400	1.5	6.801	18.3	

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By GA. TECH Date:
Witness Date:
Sheet No. 3 of 3
Approved Earl Campbell 3/4/78

WH-614A

SECTION IV

POST RADIATION FUNCTIONAL DATA

DATA SHEET

WYLE LABORATORIES

Customer: Duke Power
Specimen: Differential Pressure Transmitters
Part No.: 386A
Spec.: 545/6960/ES
Para.: 6.2
S/N: 101, 102, 103
GSI:

Amb. Temp.: 68
Photo: NO
Test Med.: GN2
Specimen Temp.: Room

Job No.: 43904
Report No.:
Start Date: 3-3-78

Test Title: POST-RADIATION FUNCTIONAL

TEST ITEM #1

#1 Pressure	Volts-DC	ma - DC	#2 Volts-DC	ma - DC	#3 Volts-DC	ma - DC
0 psig	3.09	7	3.09	7	3.09	7
-5 psig	1.71	4	1.71	4	1.71	4
0 psig	3.08	7	3.10	7	3.09	7
5 psig	4.70	11	4.70	11	4.68	11
10 psig	6.28	14	6.28	14	6.28	14
15 psig	7.89	18	7.88	18	7.89	18
20 psig	9.48	21	9.47	21	9.46	21
15 psig	7.89	18	7.88	18	7.89	18
10 psig	6.29	14	6.28	14	6.29	14
5 psig	4.70	11	4.69	11	4.69	11
0 psig	3.09	7	3.09	7	3.09	7

REMARKS

All mA. readings are for reference only.

Specimen Failed:
Specimen Passed: ✓
NOA Written:

Tested By: Wayne Ricketts Date: 3/3/8
Witness: [illegible] Date: 3-3-8
Sheet No. 1 of 3
Approved: Earl Capbell 3/4/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer: Duke Power
Specimen: Differential Pressure Transmitters
Part No.: 386A
Spec.: 545/6960/ES
Para.: 6.2
S/N: 101, 102, 103
GSI: NO

Amb. Temp.: 68
Photo: NO
Test Med.: GN_2
Specimen Temp.: Room

Job No.: 43904
Report No.:
Start Date: 3-3-78

Test Title: POST-RADIATION FUNCTIONAL

TEST ITEM #2

#1 Pressure	Volts-DC	ma - DC	#2 Volts-DC	ma - DC	#3 Volts-DC	ma - DC
0 psig	3.29	9	3.36	7	3.35	9
-5 psig	1.84	3	1.83	3	1.84	3
0 psig	3.29	9	3.32	9	3.33	9
~~10~~ 5 psig	4.78	12	4.80	12	4.81	12
~~15~~ 10 psig	6.04	15	6.10	15	6.13	15
~~20~~ 15 psig	6.95	17	6.99	17	7.04	17
20	7.71	19	7.76	19	7.79	19
15 psig	6.94	17	6.99	17	7.02	17
10 psig	6.05	15	6.10	15	6.11	15
5 psig	4.78	12	4.83	12	4.82	12
0 psig	3.36	9	3.35	9	3.35	9

REMARKS

All ma readings are for reference only.

Specimen Failed:
Specimen Passed: ✓
NOA Written:

Tested By: Wayne Rickatts Date: 3/3/8
Witness: A Blackburn Date: 3-3-8
Sheet No. 2 of 3
Approved: Earl Campbell 3/4/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 6.2
S/N 101 1278103
GSI 10A

Amb. Temp. 68
Photo NO
Test Med. GN_2
Specimen Temp. Room

Job No. 43904
Report No.
Start Date 3-3-78

Test Title POST-RADIATION FUNCTIONAL

TEST ITEM #3

#1 Pressure	Volts-DC	ma - DC	#2 Volts-DC	ma - DC	#3 Volts-DC	ma - DC
0" H_2O	2.09	4	2.09	4	2.09	4
15" H_2O	3.73	8	3.73	8	3.75	8
30" H_2O	5.42	12	5.43	12	5.43	12
45" H_2O	7.11	16	7.11	16	7.11	16
60" H_2O	8.78	20	8.78	20	8.79	20
45" H_2O	7.10	16	7.09	16	7.10	16
30" H_2O	5.42	12	5.42	12	5.42	12
15" H_2O	3.73	8	3.76	8	3.75	8
0" H_2O	2.09	4	2.09	4	2.11	4

REMARKS

All ma. readings are for reference only.

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By Wayne Ricketts Date: 3/3/8
Witness R.B. Lachman Date: 3-3-8
Sheet No. 3 of 3
Approved Earl Campbell 3/4/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 5.2
S.N 101
GSI

Amb. Temp. 72°F
Photo
Test Med. GAS
Specimen Temp. Room AMB.

Job No. 43904
Report No.
Start Date 3-4-78

Test Title FUNCTIONAL #2 After RADIATION

TEST ITEM #1

#1 Pressure	Volts-DC	ma - DC	#2 Volts-DC	ma - DC	#3 Volts-DC	ma - DC
0 psig	3.132	8	3.138			
-5 psig	1.717	6				
0 psig	3.131	8				
5 psig	4.733	12				
10 psig	6.336					
15 psig	7.933					
20 psig	~~9.488~~ 9.505	22	9.514	22		
15 psig	7.940	18				
10 psig	6.335	10				
5 psig	4.727	8				
0 psig	3.139	6	3.137			

REMARKS

Specimen powered up for 24 hrs. EC

Specimen Failed
Specimen Passed ✓
NCA Written

Tested By [illegible] Date: 3-4-78
Witness E. Campbell Date: 3/4/78
Sheet No. 1 of 3
Approved Earl Campbell 3/4/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 5.2
S/N 102
GSI

Amb. Temp. 72°F
Photo
Test Med. GN2
Specimen Temp. Room Amb.

Job No. 43904
Report No.
Start Date 3-4-78

Test Title FUNCTIONAL #2 AFTER RADIATION

TEST ITEM #2

#1 Pressure	Volts-DC	ma - DC	#2 Volts-DC	ma - DC	#3 Volts-DC	ma - DC
0 psig	3.376	8	3.354			
-5 psig	1.850	7				
0 psig	3.360	8				
5 psig	4.850	13				
10 psig	6.310					
15 psig	7.433					
20 psig	8.226	20	8.234	20		
15 psig	7.419	18				
10 psig	6.326	12				
5 psig	4.853	8				
0 psig	3.377	6	3.375			

REMARKS

Specimen powered up for 24 hrs. cc

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By C. Blackburn Date: 3-4-78
Witness E. Campbell Date: 3/4/78
Sheet No. 2 of 3
Approved Earl Campbell 3/4/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer: Duke Power
Specimen: Differential Pressure Transmitters
Part No.: 386A
Spec.: 545/6960/ES
Para.: 5.2
S/N: 103
GSI:

Amb. Temp.: 72°F
Photo:
Test Med.: GN2
Specimen Temp.: Room Amb

Job No.: 43904
Report No.:
Start Date: 3-4-78

Test Title: FUNCTIONAL #2 AFTER RADIATION

TEST ITEM #3

#1 Pressure	Volts-DC	ma - DC	#2 Volts-DC	ma - DC	#3 Volts-DC	ma - DC
0" H_2O	2.155	45				
15" H_2O	3.811					
30" H_2O	5.502					
45" H_2O	7.195					
60" H_2O	8.883					
45" H_2O	7.194					
30" H_2O	5.496					
15" H_2O	3.809					
0" H_2O	2.156 ~~2.162~~					

REMARKS

Specimen powered up for 24 hours, &c

Specimen Failed:
Specimen Passed: ✓
NOA Written:

Tested By: C.B. Bloghus Date: 3-4-78
Witness: E. Campbell Date: 3/4/78
Sheet No. 3 of 3
Approved: Earl Campbell 3/4/78

WH-614A

SECTION V

POST SEISMIC FUNCTIONAL DATA

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 8.0
S/N 101
GSI NC

Amb. Temp. 68°F
Photo NO
Test Med. GN_2
Specimen Temp. Room

Job No. 43904
Report No.
Start Date 3-7-78

Test Title POST-SEISMIC FUNCTIONAL

TEST ITEM #1

#1 Pressure	Volts-DC	ma - DC	#2 Volts-DC	ma - DC	#3 Volts-DC	ma - DC
0 psig	2.986	8	2.990	8	2.990	8
-5 psig	1.723	4	1.723	4	1.723	4
0 psig	2.987	8	2.995	8	2.991	8
5 psig	4.585	11	4.585	11	4.589	11
10 psig	6.180	14	6.181	14	6.182	14
15 psig	7.781 ~~7.805~~ CB 3-7-78	18	7.789	18	7.790	18
20 psig	9.375	21	9.380	21	9.374	21
15 psig	7.784	18	7.785	18	7.785	18
10 psig	6.180	14	6.180	14	6.181	14
5 psig	4.573	18	4.574	11	4.575	11
0 psig	2.990	8	2.990	8	2.991	8

REMARKS

MA Readings for reference only. CC

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By Lloyd Self Date 3-7-78
Witness C. Blackwell Date 3-7-78
Sheet No. 1 of 3
Approved Earl Campbell 3/7/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 8.0
S/N [illegible]
GSI N/A

Amb. Temp. 68°F
Photo N/A
Test Med. GN_2
Specimen Temp. Room

Job No. 43904
Report No.
Start Date 3-7-78

Test Title POST-SEISMIC FUNCTIONAL

TEST ITEM #2

#1 Pressure	Volts-DC	ma - DC	#2 Volts-DC	ma - DC	#3 Volts-DC	ma - DC
0 psig	3.415	8	3.450	8	3.453	8
-5 psig	1.393	4	1.911	4	1.906	4
0 psig	3.408	8	3.450	8	3.446	8
5 psig	4.906	12	4.943	12	4.947	12
10 psig	6.405	16	6.432	16	6.431	16
15 psig	7.885	20	7.900	20	7.901	20
20 psig	9.012	22	9.043	22	9.059	22
15 psig	7.894	20	7.904	20	7.896	20
10 psig	6.430	16	6.444	16	6.445	16
5 psig	4.941	18	4.950	11	4.955	11
0 psig	3.450	8	3.453	8	3.460	8

REMARKS

N.A. Readings for reference only. EC

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By Floyd Self Date: 3-7-78
Witness C. Blackwell Date: 3-7-78
Sheet No. 2 of 3
Approved Earl Campbell 3/7/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 8.0
S/N 103
GSI NO

Amb. Temp. 63°F
Photo NO
Test Med. GW
Specimen Temp. Room

Job No. 43904
Report No.
Start Date 3-7-78

Test Title POST-SEISMIC FUNCTIONAL

TEST ITEM #3

#1 Pressure	Volts-DC	ma - DC	#2 Volts-DC	ma - DC	#3 Volts-DC	ma - DC
0" H_2O	1.928	4	1.928	4	1.929	4
15" H_2O	3.270	6	3.276	6	3.278	6
30" H_2O	4.728	10	4.745	10	4.743	10
45" H_2O	6.241	13	6.242	13	6.248	13
60" H_2O	7.770	17	7.772	17	7.771	17
45" H_2O	6.228	13	6.230	13	6.226	13
30" H_2O	4.726	10	4.728	10	4.729	10
15" H_2O	3.268	6	3.269	6	3.268	6
0" H_2O	1.928	4	1.929	4	1.931	4

REMARKS

MA readings for reference only.

Specimen Failed
Specimen Passed ✓
NCA Written

Tested By Floyd Self Date: 3-7-78
Witness C B Clarkwell Date: 3-7-78
Sheet No 3 of 3
Approved Earl Campbell 3/7/78

WH-614A

SECTION VI

ACCIDENT (LOCA) DATA

DATA SHEET

WYLE LABORATORIES

Customer: Duke Power
Specimen: Differential Pressure Transmitters
Part No.: 386A
Spec.: 545/6960/ES
Para.: 9.0
S/N:
GSI:

Amb. Temp.:
Photo:
Test Med.: STEAM
Specimen Temp.:

Job No.: 43904
Report No.:
Start Date: 3/10/78

Test Title: DESIGN BASIS ACCIDENT TEST

TEST ITEM #1

Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
	12.50 psig						
19:13:16		144.4	339.8	0	1.3332	7.171	17.8
20:16:50		172.1	339.7	0	1.3404	7.324	17.5
20:46:50		172.3	339.8	0	1.3409	7.363	17.0
21:16:50		171.1	340.6	0	1.3731	7.419	17.5

Specimen Failed:
Specimen Passed: ✓
NOA Written:

Tested By: Lloyd Self Date: 3-10-78
Witness: Date:
Sheet No. 1 of 8
Approved: Earl Campbell 3/10/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

Job No. 43904
Report No.
Start Date

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #1 Chan 3

Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
21:46.51	-12.50 psig	172.7	340.1	0	1.3455	7.432	18.0
22:16.50	-12.5	172.9	339.6	0	1.3677	7.379	18.0
22:46:50	-12.5	172.2	339.5	0	1.3388	7.369	17.5
23:16	-12.5	173.8	341.2	0	1.3661	7.441	17.5
23:46	-12.5	173.8	341.2	0	1.3931	7.444	18.0
00:16	-12.5	172.7	341.8	0	1.3987	7.435	18.0
00:46	-12.5	172.6	339.4	0	1.3735	7.485	17.9
01:16	-12.2	170.7	340.6	0	1.3564	7.388	17.9
01:46	-12.4	172.5	340.5	0	1.3842	7.389	17.5
02:16	-12.4	173.0	340.4	0	1.3780	7.406	17.5
02:46	-12.5	172.8	341.8	0	1.4106	7.479	17.5
03:16	-12.5	171.0	341.9	0	1.3898	7.498	18.0
03:46	-12.5	172.3	341.0	0	1.3987	7.484	17.5
04:16	-12.5	172.2	342.6	0	1.3981	7.525	17.5
04:46	-12.5	171.2	340.8	0	1.3994	7.502	17.5
05:16	-12.5	172.7	342.1	0	1.4008	7.501	17.5
05:46	-12.5	172.2	341.8	0	1.3967	7.534	18.0
06:16	-12.5	172.5	341.1	0	1.4090	7.597	18.0

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By Lloyd Self Date: 3-19-78
Witness Date:
Sheet No. 2 of 8
Approved Earl Campbell 3/19/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

Job No. 43904
Report No.
Start Date

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #1 Chan. 3

Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
	12.50 psig	0	1			3	
06:44	12.50	172.5	341.3	0	1.3988	7.572	16.0
07:16	12.50	171.6	339.4	0	1.3694	7.468	16.2
07:46	12.5	167.0	310.2	0	09053	6.976	18.0
08:19	12.5	172.9	340.6	0	1.4417	7.544	18.0
08:49	12.5	173.1	340.2	0	1.4157	7.555	18.0
09:19	12.5	172.5	340.8	0	1.4268	7.564	18.0
09:49	12.5	172.9	340.4	0	1.4319	7.578	18.0
10:19	12.5	173.1	341.9	0	1.4463	7.558	18.0
10:49	12.5	172.8	341.3	0	1.4344	7.462	18.0
11:19	12.5	172.6	340.5	0	1.4388	7.521	18.0
11:49	12.5	172.3	340.8	0	1.4505	7.496	18.0
12:19	12.5	171.7	341.0	0	1.4515	7.466	18.0
12:49	12.5	172.3	342.6	0	1.4895	7.616	18.0
13:19	12.5	173.6	341.0	0	1.4635	7.647	18.0
13:49	12.5	173.1	340.3	0	1.4390	7.481	18.0
14:19	12.5	173.4	341.7	0	1.4925	7.520	18.0
14:49	12.5	173.4	340.9	0	1.4604	7.595	18.0

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By [illegible] Date: 3/11/78
Witness Date:
Sheet No. 3 of 8
Approved Earl Copelell 3/11/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

Job No. 43904
Report No.
Start Date

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #1 CHAN 3

Time	Mid-Range Pressure	0 X-Mitter Chamber Temp °F	1 Sensor Chamber Temp °F	X-Mitter Chamber Pressure	2 Sensor Chamber Pressure	3 Volts-DC	ma - DC
	12.50 psig						
15:19	12.50	172.9	341.6	0	1.4769	7.547	18.0
15:49	12.50	172.7	342.0	0	1.4600	7.547	18.0
16:19	12.50	173.1	343.2	0	1.4889	7.605	18.0
16:49	12.50	173.6	341.0	0	1.4511	7.506	18.0
17:19	12.50	173.0	342.4	0	1.4704	7.609	18.0
17:49	12.50	172.0	341.4	0	1.4566	7.534	18.0
18:10		Started	At	187°F			
18:42	12.50	172.5	187.2	0	0.8540	7.502	18.0
19:24	12.50	171.9	186.7	0	0.8539	7.530	18.0
			NO DATA 3-12-78				
3-13-78							
07:12	12.50	171.4	184.6	0	.8782	7.598	18.0
[illegible]	[illegible]	[illegible]	[illegible]	0	—	7.664	18.0
16:00	12.5	171.0	187°F	0	—	7.541	18.0
3/14/78							
0700	12.5	171.0	186°F	0	—	7.581	18.2

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By J. McKenzie Date: 3/11/78
Witness Date:
Sheet No. 4 of 8
Approved Earl Campbell 3/14/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

Job No. 43904
Report No.
Start Date 3/14/78

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #1

Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
13:00	12.50 psig	172°F	185°F	—	—	7.628	18
3/15 78		/					
0:750	12:50	173°F	185°F	-	—	7.557	18
16:30	12.50	174°F	185°F	—	—	7.572	18
12:00	12.5	174°F	185°F	—	—	7.561	18
14:15	12.5	174°F	185°F	—	—	7.572	18
16:00	12.5	174°F	185°F	—	—	7.577	18
3/16/78							
07:15	12.5	171°F	184°F	—	—	7.600	18
10:00	12.5	172°F	186°F	—	—	7.663	18
1200	12.5	171°F	185°F	—	—	7.653	18
14:30	12.5	171°F	183°F	—	—	7.657	18
16:00	12.5	171°F	186°F	—	—	7.662	18
3/17/78				—	-	~~7.665~~	~~18~~
0715	12.5	171°F	187°F	—	—	7.665	18
10:45	12.5	172°F	188°F	—	—	7.676	18
13:45	12.5	173°F	188°F	—	—	7.673	18
15:45	12.5	173°F	188°F	-	-	7.678	18

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By Lloyd Self Date: 3-17-78
Witness Date:
Sheet No. 5 of 8
Approved Earl Campbell 3/17/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

Job No. 43904
Report No.
Start Date

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #1

Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
21:00	12.50 psig	172°F	187°F	—	—	7.676	18
3/18/78							
07:40	12.5	172°F	188°F	—	—	7.698	18
13:00	12.5	172°F	187°F	—	—	7.697	18
1400	12.5	172°F	187°F	—	—	7.698	18
3/19							
0930	12.5	172°F	187°F	—	—	7.705	18
[illegible]							
[illegible]	[illegible]	172°	187°	—	—	7.874	19
11:00	12.5	172°F	187°F	—	—	7.703	19
13:00	12.5	172°F	187°F	—	—	7.701	19
15:10	12.5	172°F	187°F	—	—	7.698	19
3/21							
08:30	12.5	172°	187°			7.701	18.5
12:30	12.5	172°	187°			7.760	18.5
15:30	12.5	172°	187°	—	—	7.708	18.5

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By Lloyd Self Date: 3-21-78
Witness Date:
Sheet No. 6 of 8
Approved Earl Campbell 3/21/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

Job No. 43904
Report No.
Start Date

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #1

	Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
3/22	11:25	12.50 psig	172°F	187°F	—	—	7.708	18
	1500	12.5	172°F	188°F	-	—	7.699	18
	22:30	12.5	172°F	187°F	—	—	7.704	18
3/23	07:30	12.5	172°F	187°F	—	—	7.713	18
	10:15	12.5	172°F	187°F	—	—	7.709	18
	12:50	12.5	174°F	187°F	—	—	7.707	18
	15:30	12.5	173°F	187°F	—	—	7.703	18
	22:20	12.5	172°F	187°F	—	—	7.701	18
3/24	02:30	12.5	173°F	187°F	—	—	7.685	18
	10:05	12.5	172°F	187°F	—	—	~~7.715~~ 7.688	18
	17:45	12.5	173°F	187°F	—	—	7.684	18
3/27	08:00	12.5	172°	187°	—	—	7.688	20
	10:00	12.5	172°	187°	—	—	7.666	18.5
	11:30	12.5	172°F	187°F	—	—	7.701	18.0
	13:40	12.5	172°F	187°F	—	—	7.702	18.0
	17:15	12.5	172°	187°	—	—	7.704	18.5

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By Lloyd Self Date: 3-27-78
Witness Date:
Sheet No. 7 of 8
Approved Earl Campbell 3/27/78

WH-614A

DATA SHEET

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med.
Specimen Temp.

WYLE LABORATORIES
Job No. 43904
Report No.
Start Date

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #1

	Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
3/28	[illegible]	12.50 psig	[illegible]	[illegible]	—	—	7.686	18
	16:15	12.5	173	187	—	—	8.065	19
3/29	07:05	12.5	173°	187°	—	—	7.625	18.5
	11:00	12.5	173°	187°	—	—	7.692	18
3/30	06:30	12.5	173°	187°	—	—	7.535	17.5
4/3	08:20	12.5	173°	187°	—	—	7.668	17
	11:45	12.5	173°	187°	—	—	7.637	17.5
4/4	14:45	12.5	173°	187°	—	—	7.490	17.5
	17:00	12.5	173°	187°	—	—	7.560	17.5
4/6	07:30	12.5	173°	187°	—	—	7.563	17.5
	15:35	12.5	173°	187°	—	—	7.886	18.0
4/9	07:35	12.4	173°	187°	—	—	6.367	18.1
4/10	07:50	12.5	173°	187°	—	—	7.599	18.0
	09:20	12.5	173°	187°	—	—	7.655	19.0
	15:45	12.5	173°	187°	—	—	7.615	18.0
	17:52	12.5	173°	187°	—	—	7.717	18.0
		Test	Terminated	EOC				

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By Lloyd Self Date: 4-10-78
Witness Date:
Sheet No. 8 of 8
Approved Earl Campbell 4/10/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer: Duke Power
Specimen: Differential Pressure Transmitters
Part No.: 386A
Spec.: 545/6960/ES
Para.: 9.0
S/N:
GSI:
Amb. Temp.:
Photo:
Test Med.: Steam
Specimen Temp.:
Job No.: 43904
Report No.:
Start Date: 3/10/78

Test Title: DESIGN BASIS ACCIDENT TEST

TEST ITEM #2 Item 4

Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
	12.50 psig						
15:19:16	12.5	144.4	339.8	0	1.3332	7.541	19.5
20:16:50	12.5	~~174.1~~ 175.1	339.7	0	1.3404	7.655	20.0
20:46:50	12.5	172.3	339.8	0	1.3409	7.651	19.0
21:16:50	12.5	171.3	340.6	0	1.3731	7.661	19.0

Specimen Failed:
Specimen Passed: ✓
NOA Written:

Tested By: Lloyd Self Date: 3-10-78
Witness: Date:
Sheet No. 1 of 8
Approved: Earl Campbell 3/10/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

Job No. 43904
Report No.
Start Date

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #2 CH 4

Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
21:46:51	12.50 psig	172.7	340.1	0	1.3455	7.650	19.5
22:16:50	12.5	172.9	339.6	0	1.3677	7.605	19.5
22:46:50	12.5	172.2	339.5	0	1.3388	7.577	19.0
23:16	12.5	173.8	341.2	0	1.3661	7.625	19.0
23:46	12.5	173.8	341.2	0	1.3931	7.642	19.5
3/11/78 00:16	12.5	172.7	341.8	0	1.3987	7.610	19.5
00:46	12.5	172.6	339.4	0	1.3735	7.660	19.5
01:16	12.2	170.7	340.6	0	1.3564	7.553	19.5
01:46	12.4	172.5	340.5	0	1.3842	7.553	19.5
02:16	12.4	173.0	340.4	0	1.3780	7.573	19.5
02:46	12.5	172.8	341.8	0	1.4106	7.621	19.5
03:16	12.5	171.0	341.9	0	1.3898	7.645	19.5
03:46	12.5	172.3	341.0	0	1.3987	7.633	19.5
04:16	12.5	172.2	342.6	0	1.3981	7.658	19.5
04:46	12.5	171.2	340.8	0	1.3994	7.646	19.5
05:16	12.5	172.7	342.1	0	1.4008	7.651	19.5
05:46	12.5	172.2	341.8	0	1.3967	7.678	19.9
06:16	12.5	172.5	341.1	0	1.4090	7.751	20.0

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By Lloyd Self Date: 3-11-78
Witness Date:
Sheet No. 2 of 8
Approved Earl Campbell 3/11/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

Job No. 43904
Report No.
Start Date

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #2 CHAN 4

Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
	12.50 psig	0	1		2	4	
06:46	12.5	172.5	341.3	0	1.3988 ~~139.88~~ Ec	7.711	18.0
07:16	12.5	171.6	339.4	0	1.3694 ~~136.94~~ Ec	7.611	20.0
07:46	12.5	167.0	310.2	0	0.9053	7.141	20.0
08:19	12.5	172.9	340.6	0	1.44.17	7.694	19.0
08:49	12.5	173.1	340.2	0	1.41.57	7.689	19.0
09:19	12.5	172.5	340.8	0	1.42.68	7.699	19.0
09:49	12.5	172.9	340.4	0	1.43.19	7.721	20.0
10:19	12.5	173.1	341.9	0	1.44.63	7.683	20.0
10:49	12.5	172.8	341.3	0	1.4344	7.594	20.0
11:19	12.5	172.6	340.5	0	1.4388	7.655	19.5
11:49	12.5	172.3	340.8	0	1.4505	7.634	19.5
12:19	12.5	171.7	341.0	0	1.4515	7.587	19.0
12:49	12.5	172.3	342.6	0	1.4895	7.727	20.0
13:19	12.5	173.6	341.0	0	1.4635	7.752	20.0
13:49	12.5	173.1	340.3	0	1.4390	7.601	20.0
14:19	12.5	173.4	341.7	0	1.4925	7.654	20.0
14:49	12.5	173.4	340.9	0	1.4604	7.709	20.0

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By J. McKenzie Date: 3/11/78
Witness Date:
Sheet No. 3 of 8
Approved Earl Campbell 3/14/78

WH-614A

DATA SHEET

REVISION C
WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

Job No. 43904
Report No.
Start Date

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #2 CHAN-4

Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
	12.50 psig						
15:19	12.50	172.9	341.6	0	1.4769	7.654	20.0
15:49	12.50	172.7	342.0	0	1.4600	7.654	20.0
16:19	12.50	173.1	342.2	0	1.4888	7.713	20.0
16:49	12.5	173.6	341.0	0	1.4511	7.613	20.0
17:19	12.5	173.0	342.4	0	1.4704	7.693	20
17:49	12.5	172.0	341.4	0	1.4566	7.626	20
18:10	started at		187°F				
18:42	12.50	172.5	187.2	0	0.8540	7.586	20
19:24	12.50	171.9	186.7	0	0.8539	7.617	20
		NO	DATA	3/12/78			
3/13/78							
07:12	12.50	171.4	184.6	0	.8782	7.661	20
14:30	12.50	170.0	190.0	0	—	7.660	20
16:00	12.50	171°F	187°F	0	—	7.589	20
3/14/78							
0700	12.50	171°F	186°F	0	—	7.597	20

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By J. McKenzie Date: 3/11/78
Witness Date:
Sheet No. 4 of 8
Approved Earl Campbell 3/13/78

WH-614A

DATA SHEET

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

WYLE LABORATORIES
Job No. 43904
Report No.
Start Date 3/14/78

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #2							
Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
13:00	12.50 psig	172°F	185°	—	—	7.612	19
10:30	12.50	174°F	185°F	—	—	7.610	19.5
12:00	12.50	174°F	185°F	—	—	7.603	19.5
14:15	12.50	174°F	185°F	—	—	7.608	20.0
16:00	12.5	174°F	185°F	—	—	7.608	20.0
3/16/78							
07:15	12.5	171°F	184°F	—	—	7.615	20.0
10:00	12.5	172°F	186°F	—	—	7.624	20.00
12:00	12.5	171°F	185°F	—	—	7.602	19.5
14:30	12.5	171°F	183°F	—	—	7.656	19.5
16:00	12.5	171°F	186°F	—	—	7.625	19.5
3/17/78	~~12.5~~			—	—		
07:15	12.5	171°F	187°F	—	—	7.669	20.0
10:45	12.5	172°F	188°F	—	—	7.613	20.0
13:45	12.5	173°F	188°F	—	—	7.605	20.0
15:45	12.5	173°F	188°F	—	—	7.599	20.0

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By Floyd Self Date: 3-17-78
Witness Date:
Sheet No. 5 of 8
Approved Earl Campbell 3/17/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

Job No. 43904
Report No.
Start Date 3/17/78

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #2

Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
21:00	12.50 psig	172°F	187°F	—	—	7.591	20
3/18/78							
07:40	12.5	172°F	188°F	—	—	7.604	20
13:00	12.5	172°F	187°F	—	—	7.615	20
14:00	12.5	172°F	187°F	—	—	7.608	20
3/19							
0930	12.5	172°F	187°F	—	—	7.613	20
[illegible]							
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]
11:00	12.5	172°F	187°F	—	—	7.609	20
13:00	12.5	173°F	187°F	—	—	7.596	20
15:10	12.5	172°F	187°F	—	—	7.598	20
3-21							
08:30	12.5	172°	187°	—	—	7.602	20
12:30	12.5	172°	187°	—	—	7.688	20
19:30	12.5	172°	187°	—	—	7.649	19.5

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By Lloyd Self Date: 3-21-78
Witness Date:
Sheet No. 6 of 8
Approved Earl Campbell 3/21/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

Job No. 43904
Report No.
Start Date

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #2

Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
11:25	12.50 psig	172°F	187°F	—	—	7.656	20
1500	12.5	172°F	188°F	—	—	7.655	20
22:30	12.5	172°F	187°F	—	—	7.653	20
07:30	12.5	172°F	187°F	—	—	7.664	19
10:15	12.5	172°F	187°F	—	—	7.654	19
12:50	12.5	174°F	187°F	—	—	7.656	19
15:30	12.5	173°F	187°F	—	—	7.649	19
22:20	12.5	172°F	187°F	—	—	7.650	19
02:30	12.5	173°F	187°F	—	—	7.648	19
[illegible]	12.5	[illegible]	[illegible]	—	—	7.650	19
[illegible]	[illegible]	[illegible]	[illegible]	—	—	7.656	19
0:600	12.5	172°	187°	—	—	7.679	20
10:00	12.5	172°	187°	—	—	7.655	20
[illegible]	[illegible]	172°F	187°F	—	—	7.685	[illegible]
13:40	12.5	172°F	187°F	—	—	7.687	20
17:15	12.5	172	187	—	—	7.681	20

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By Lloyd Self Date: 3-27-78
Witness Date:
Sheet No. 7 of 8
Approved Earl Campbell 3/27/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

Job No. 43904
Report No.
Start Date

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #2

	Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
16	[illegible]	12.50 psig	[illegible]	[illegible]	—	—	7.694	20
	16:15	12.5	173°	187°	—	—	7.895	20
4/24	07:05	12.5	173°	187°	—	—	7.555	19
29	11:00	12.5	173°	187°	—	—	7.665	20
2/20	06:30	12.5	173°	187°	—	—	7.504	18.5
3	08:20	12.5	173°	187°	—	—	7.669	19
4/3	11:45	12.5	173°	187°	—	—	7.645	19
4	07:35	12.5	173°	187°			7.585	19
	14:45	12.5	173°	187°	—	—	7.504	19
	17:00	12.5	173°	187°	—	—	7.549	19
4/5	07:30	12.5	173°	187°	—	—	7.544	19
	15:35	12.5	173°	187°	—	—	7.968	20
10	07:50	12.5	173°	187°	—	—	7.910	20
	09:20	12.5	173°	187°	—	—	7.970	20
	15:45	12.5	173°	187°	—	—	7.569	19.5
	17:52	12.5	173°	187°	—	—	7.690	19.5
		Test Terminated						

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By Floyd Self Date: 4-10-78
Witness Date:
Sheet No. 8 of 8
Approved Earl Campbell 4/10/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

Job No. 43904
Report No.
Start Date

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #3 5

Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
	30" H_2O		N/A		N/A		
19:13:16	30"	144.4	~~239.8~~	0	~~133.2~~	5.436	13.5
20:16:50	30"	172.1	~~239.7~~	0	NA	6.976	16.0
20:46:50	30"	172.3	NA	0	NA	7.090	16.0
21:16:50	30"	171.1	NA	0	NA	7.122	16.0

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By Lloyd Self Date 3-10-78
Witness Date
Sheet No. 1 of 8
Approved Earl Campbell 3/10/78

WH-514A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

Job No. 43904
Report No.
Start Date

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #3 (5)

Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
21:46:51	30" H_2O	172.7	N/A	0	N/A	7.008	16.0
22:16.56	30"	172.9	NA	0	NA	7.053	16.5
22:46	30"	172.9	NA	0	NA	7.037	16.0
23:16	30"	173.8	NA	0	NA	7.269	16.5
23:46	30"	173.8	NA	0	NA	7.948	18.0
00:16	30"	172.7	NA	0	NA	6.866	15.5
00:46	30"	172.6	NA	0	NA	6.775	15.5
01:16	30"	170.7	NA	0	NA	6.871	15.5
01:46	30"	172.5	NA	0	NA	7.283	16.5
02:16	30"	173.0	NA	0	NA	6.853	15.5
02:46	30"	172.8	NA	0	NA	6.936	15.5
03:16	30"	171.0	NA	0	NA	6.904	15.5
03:46	30"	172.3	NA	0	NA	7.075	16.0
04:16	30"	172.2	NA	0	NA	7.011	15.9
04:46	30"	171.2	NA	0	NA	7.082	16.0
05:16	30"	172.7	NA	0	NA	7.211	16.0
05:46	30"	172.2	NA	0	NA	7.296	16.5
06:16	31	172.5	NA	0	NA	7.247	16.0

Specimen Failed
Specimen Passed ✓
NDA Written

Tested By Lloyd Self Date: 3-11-78
Witness Date:
Sheet No. 2 of 8
Approved Earl Campbell 3/11/78

AH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

Job No. 43904
Report No.
Start Date

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #3 #5

Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
	30" H_2O		N/A		N/A		
15:19	30"	172.9	N/A	0	N/A	6.963	16.0
15:49	29.95"	172.7	N/A	0	N/A	7.200	16.0
16:19	30.0"	173.1	N/A	0	N/A	7.231	16.0
16:49	30.0"	173.6	N/A	0	N/A	6.955	16.0
17:19	30.0"	173.0	N/A	0	N/A	6.976	16.0
17:49	29.95	172.0	N/A	0	N/A	6.910	16.0
18:10	Started At	187°F					
19:42	30.0"	172.5	N/A	0	N/A	6.924	16.0
19:24	30.0"	171.9	N/A	0	N/A	7.060	16.0
		No DATA 3/12/78					
3/13/78							
07:10	29.95	171.4	N/A	0	N/A	7.088	16.0
[illegible]	[illegible]	[illegible]	—	0	—	7.021	[illegible]
16:00	30.00	171°F	—	0	—	4.680	10.0
3/14/78			—	~~0~~ cc	—	~~4.776~~ cc	
07:00	30.00"	171°F	—	0	—	4.776	11.0

Specimen Failed
Specimen Passed
NOA Written

Tested By J. M. S. Kenyon Date: 3/11/78
Witness Date:
Sheet No. 4 of 8
Approved Earl Campbell 3/14/78

WH-614A

POOR ORIGINAL

DATA SHEET

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

WYLE LABORATORIES

Job No. 43904
Report No.
Start Date

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #3 #5

Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	(5) Volts-DC	ma - DC
	30" H_2O		N/A		N/A		
06:4	31"	172.5	N/A	0	N/A	7.380	16.0
07:16	31	17 6	N/A	0	N/A	7.234	16.0
07:46	31.4	167.0	N/A	0	N/A	7.205	16.0
08:19	30.2	172.9	N/A	0	N/A	7.154	16.0
08:49	30.3	173.1	N/A	0	N/A	7.153	16.0
09:19	30.4	172.5	N/A	0	N/A	7.239	16.0
09:49	30.6	172.9	N/A	0	N/A	7.289	16.0
10:19	30"	173.1	N/A	0	N/A	6.973	16.0
10:49	30.1"	172.8	N/A	0	N/A	6.956	16.0
11:19	30."	172.6	N/A	0	N/A	6.974	16.0
11:49	30.1"	172.3	N/A	0	N/A	6.964	16.0
12:19	30.0"	171.7	N/A	0	N/A	7.020	16.0
12:49	29.9"	172.3	N/A	0	N/A	7.001	16.0
13:19	30.1"	173.6	N/A	0	N/A	7.205	16.0
13:49	30.2"	173.1	N/A	0	N/A	7.339	16.0
14:19	30.4"	175.4	N/A	0	N/A	7.145	16.0
14:49	30.0"	173.4	N/A	0	N/A	X 6.977	16.0

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By J McKeogh Date: 3/11/78
Witness Date:
Sheet No. 3 of 8
Approved Earl Campbell 3/11/78

WH-614A

POOR ORIGINAL

DATA SHEET

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

WYLE LABORATORIES
Job No. 43904
Report No.
Start Date 3/14/78

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #3							
Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
13:00	30" H_2O	172°F	N/A	—	N/A	4.825	10
			—	—	—		
10:30	29.5	174°F	—	—	—	4.727	11.5
12:00	30"	174°F	—	—	—	4.776	12.0
14:15	30"	174°F	—	—	—	4.801	12.0
16:00	30"	174°F	—	—	—	4.894	12.0
3/16/78							
07:15	30"	171°F	—	—	—	6.162	14.0
10:00	30.1"	172°F	—	—	—	22.77	50.0
1200	30"	171°F	—	—	—	4.881	11.5
14:30	30"	171°F	—	—	—	4.838	11.5
16:00	30"	171°F	—	—	—	4.931	11.5
3/17/78						~~5.171~~	~~12.0~~
07:15	29.9	171°F	—	—	—	5.171	12.0
10:45	29.9	172°F	—	—	—	5.044	12.0
13:45	30"	173°F	—	—	—	4.937	12.0
15:45	30"	173°F	—	—	—	4.895	12.0

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By Lloyd Self Date: 3-17-78
Witness Date:
Sheet No. 5 of 8
Approved Earl Campbell 3/17/78

WH-614A

POOR ORIGINAL

DATA SHEET

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

WYLE LABORATORIES
Job No. 43904
Report No.
Start Date 3/17/78

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #3

Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
21:00	30" H_2O	172°F	N/A	—	N/A	4.952	12
3/18/78							
07:40	30" H_2O	172°F	—	—	—	5.718	14
13:00	30.1" H_2O	172°F	—	—	—	5.453	13.5
14:00	30" H_2O	172°F	—	—	—	5.644	14
3/19							
09:30	30"	172°F	—	—	—	5.728	14
[illegible]							
[illegible]	[illegible]	[illegible]	—	—	—	[illegible]	—
11:00	30"	172°F	—	—	—	5.372	14
13:00	30"	172°F	—	—	—	5.463	14
15:10	30"	172°F	—	—	—	5.462	14
3/21							
08:30	30"	172°	—	—	—	5.529	14
12:30	30"	172°	—	—	—	6.563	17
19:30	30"	172°				6.543	7

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By Lloyd Self Date: 3-21-78
Witness Date:
Sheet No. 6 of 8
Approved Earl Campbell 3/21/78

WH-614A

POOR ORIGINAL

DATA SHEET

WYLE LABORATORIES

Customer Duke Power

Specimen Differential Pressure Transmitters

Part No. 386A | Amb. Temp. | Job No. 43904

Spec. 545/6960/ES | Photo | Report No.

Para. 9.0 | Test Med. Steam | Start Date

S/N | Specimen Temp.

GSI

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #3

	Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
3/22	11:25	30" H_2O	172°F	N/A	—	N/A	6.635	17
	15:00	30" H_2O	172°F	—	—	—	6.456	16
	22:30	30"	172°F	—	—	—	6.615	16
23	07:30	30"	172°F	—	—	—	~~7.662~~ 6.582	16
	10:15	30"	172°F	—	—	—	6.555	16
	12:50	30"	174°F	—	—	—	6.397	16
	15:30	30"	173°F	—	—	—	6.480	16
	22:20	30"	172°F	—	—	—	6.292	16
3/24	02:30	30"	173°F	—	—	—	6.490	16
	16:[illegible]		[illegible]	—	—	—	6.468	16
	14:[illegible]	[illegible]	173°F	—	—	—	6.446	16
3/27	08:00	30"	173°	—	—	—	6.704	16.5
	10:00	30"	172°	—	—	—	6.723	16.5
	[illegible]	[illegible]	172°F	—	—	—	6.768	16.6
	13:40	30"	172°F	—	—	—	6.755	16.0
	17:15	30	172°	—	—	—	6.453	16.0

Specimen Failed

Specimen Passed ✓

NOA Written

Tested By Lloyd Self Date: 3-27-78

Witness Date:

Sheet No. 7 of 8

Approved Earl Campbell 3/27/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer Duke Power
Specimen Differential Pressure Transmitters
Part No. 386A
Spec. 545/6960/ES
Para. 9.0
S/N
GSI

Amb. Temp.
Photo
Test Med. Steam
Specimen Temp.

Job No. 43904
Report No.
Start Date

Test Title DESIGN BASIS ACCIDENT TEST

TEST ITEM #3							
Time	Mid-Range Pressure	X-Mitter Chamber Temp °F	Sensor Chamber Temp °F	X-Mitter Chamber Pressure	Sensor Chamber Pressure	Volts-DC	ma - DC
128	30" H_2O		N/A	—	N/A	6.8[illegible]	16
16:15	30	173°	—	—	—	6.966	17
3/29 07:05	30"	173°	—	—	—	6.608	16
11:00	30"	173°	—	—	—	6.400	16
3/30 06:30	30"	173°	—	—	—	4.565	11.5
4/3 08120	30"	173°	—	—	—	6.413	16
11:45	30"	173°				6.468	16
4/4 14:45	30"	173°	—	—	—	6.372	16
17:00	30"	173°	—	—	—	6.485	16
4/6 07:30	30"	173°	—	—	—	6.413	16
15:35	30"	173°	—	—	—	6.685	18
4/10 07:50	30"	173°	—	—	—	10.165	25
09:20	30"	173°	—	—	—	11.262	27
15:45	30"	173°	—	—	—	11.264	27
17:52	30"	173°				10.911	27
	Test Terminated						

Specimen Failed
Specimen Passed ✓
NOA Written

Tested By Floyd Self Date: 4-10-78
Witness Date:
Sheet No. 8 of 8
Approved Earl Campbell 4/10/78

WH-614A

SECTION VII

POST ACCIDENT (LOCA) FUNCTIONAL DATA

DATA SHEET

WYLE LABORATORIES

Customer: Duke Power
Specimen: Differential Pressure Transmitters
Part No.: 386A
Spec.: 545/6960/ES
Para.: 10.0
S/N: 101
GSI:

Amb. Temp.: 70°F
Photo:
Test Med.: GN_2
Specimen Temp.: Rm. Amb

Job No.: 43904
Report No.:
Start Date: 4-11-78

Test Title: POST-ACCIDENT FUNCTIONAL

TEST ITEM #1

#1 Pressure	Volts-DC	ma - DC	#2 Volts-DC	ma - DC	#3 Volts-DC	ma - DC
0 psig	3.352	8.0	3.344	9.0	3.345	9.0
* -5 psig	3.340	9.0	3.338	9.0	3.341	9.0
0 psig	3.348	9.0	3.344	9.0	3.343	9.0
5 psig	4.927	12.0	4.926	12.0	4.923	12.0
10 psig	6.526	15.5	6.524	15.5	6.523	16.0
15 psig	8.135	19.0	8.132	19.0	8.137	19.0
20 psig	9.740	22.0	9.741	22.5	9.748	22.0
15 psig	8.137	19.0	8.138	19.0	8.139	19.0
10 psig	6.525	15.5	6.524	16.0	6.521	15.5
5 psig	4.920	12.0	4.921	12.0	4.926	12.0
0 psig	3.347	9.0	3.347	9.0	3.343	8.5

REMARKS

* DATA NOT VALID BECAUSE OF MISSING PIPE PLUG ON L.P. SIDE OF INSTRUMENT. SC

Specimen Failed:
Specimen Passed: ✓
NOA Written:

Tested By: L. Self Date: 4/11/78
Witness: E. Campbell Date: 4/11/78
Sheet No. 1 of 2
Approved: Earl Campbell 4/11/78

WH-014A

DATA SHEET

Customer: Duke Power
Specimen: Differential Pressure Transmitters
Part No.: 386A
Spec.: 545/6960/ES
Para.: 10.0
S/N: ~~[illegible]~~ 101
GSI:

Amb. Temp.: 70°F
Photo:
Test Med.: GN_2
Specimen Temp.: Rm Amb

WYLE LABORATORIES
Job No.: 43904
Report No.:
Start Date: 4-11-78

Test Title: POST-ACCIDENT FUNCTIONAL

TEST ITEM #1

#1 Pressure	Volts-DC	ma - DC	#2 Volts-DC	ma - DC	#3 Volts-DC	ma - DC
0 psig	3.350	9.0	3.348	9.5	3.346	9.0
-5 psig	1.801	4.0	1.802	4.5	1.804	5.0
0 psig	3.349	9.0	3.344	9.0	3.347	9.0
5 psig						
10 psig						
15 psig						
20 psig						
15 psig						
10 psig						
5 psig						
0 psig						

REMARKS

DATA POINTS RE-TAKEN AFTER PIPE PLUGS REPLACED. EC

Specimen Failed:
Specimen Passed: ✓
NCA Written:

Tested By: E. Campbell Date: 4/11/78
Witness: Date:
Sheet No. 2 of 2
Approved: Earl Campbell 4/11/78

WH-514A

DATA SHEET

WYLE LABORATORIES

Customer: Duke Power
Specimen: Differential Pressure Transmitters
Part No.: 386A
Spec.: 545/6960/ES
Para.: 10.0
S/N: 102
GSI:

Amb. Temp.: 70°F
Photo:
Test Med.: GN2
Specimen Temp.: Rm. Amb.

Job No.: 43904
Report No.:
Start Date: 4-11-78

Test Title: POST-ACCIDENT FUNCTIONAL

TEST ITEM #2

#1 Pressure	Volts-DC	ma - DC	#2 Volts-DC	ma - DC	#3 Volts-DC	ma - DC
0 psig	3.517	10.0	3.544	10.0	3.557	10.0
* -5 psig	3.192	9.0	3.214	9.0	3.229	9.0
0 psig	3.536	10.0	3.535	9.5	3.547	10.0
5 psig	5.081	13.0	5.062	13.0	5.083	13.5
10 psig	6.605	17.0	6.591	16.5	6.609	17.0
15 psig	8.122	20.5	8.120	20.5	8.138	20.5
20 psig	9.624	24.0	9.614	24.0	9.637	24.0
15 psig	8.125	20.5	8.117	20.5	8.147	20.1
10 psig	6.603	17.0	6.604	17.0	6.615	17.0
5 psig	5.078	13.0	5.087	13.0	5.111	13.5
0 psig	3.542	10.0	3.556	10.0	3.565	9.0

REMARKS

* DATA NOT VALID BECAUSE OF MISSING PIPE PLUG ON L.P. SIDE OF INSTRUMENT. EC

Specimen Failed:
Specimen Passed: ✓
NOA Written:

Tested By: L. Solf Date: 4-11-78
Witness: E. Campbell Date: 4/11/78
Sheet No. 1 of 2
Approved: Earl Campbell 4/11/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer: Duke Power
Specimen: Differential Pressure Transmitters
Part No.: 386A
Spec.: 545/6960/ES
Para.: 10.0
S/N: 102
GSI:

Amb. Temp.: 70°F
Photo:
Test Med.: GN_2
Specimen Temp.: Rm. Amb.

Job No.: 43904
Report No.:
Start Date: 4-11-78

Test Title: POST-ACCIDENT FUNCTIONAL

TEST ITEM #2

#1 Pressure	Volts-DC	ma - DC	#2 Volts-DC	ma - DC	#3 Volts-DC	ma - DC
0 psig	3.516	9.5	3.516	10.0	3.508	9.5
-5 psig	~~1.993~~ 1.973 EC	4.5	1.973	5.0	~~1.957~~ 1.970 EC	5.0
0 psig	3.522	9.5	3.519	10.0	3.518	9.5
5 psig						
10 psig						
15 psig						
20 psig						
15 psig						
10 psig						
5 psig						
0 psig						

REMARKS

DATA POINTS RE-TAKEN AFTER PIPE PLUGS REPLACED. EC

Specimen Failed:
Specimen Passed: ✓
NOA Written:

Tested By: E. Campbell Date: 4/11/78
Witness: Date:
Sheet No. 2 of 8
Approved: Earl Campbell 4/11/78

WH-614A

DATA SHEET

WYLE LABORATORIES

Customer: Duke Power
Specimen: Differential Pressure Transmitters
Part No.: 386A
Spec.: 545/6960/ES
Para.: 10.0
S/N: 103
GSI:

Amb. Temp.: 70°F
Photo:
Test Med.: GN_2
Specimen Temp.: Rm. Amb.

Job No.: 43904
Report No.:
Start Date: 4-11-78

Test Title: POST-ACCIDENT FUNCTIONAL

TEST ITEM #3

#1 Pressure	Volts-DC	ma - DC	#2 Volts-DC	ma - DC	#3 Volts-DC	ma - DC
0" H_2O	2.046	6.0	2.051	6.0	2.051	6.0
15" H_2O	3.311	9.0	3.310	9.0	3.312	9.0
30" H_2O	4.925	13.0	4.927	13.0	4.926	13.0
45" H_2O	6.567	16.5	6.562	16.5	6.55~~6~~7	16.5
60" H_2O	8.230	20.0	8.202	20.0	8.214	20.0
45" H_2O	6.547	16.5	6.548	16.5	6.545	16.5
30" H_2O	4.912	13.0	4.914	13.0	4.913	13.0
15" H_2O	3.306	9.0	3.301	9.0	3.296	9.0
0" H_2O	2.052	6.0	2.048	6.0	2.047	6.0

REMARKS

Specimen Failed:
Specimen Passed: ✓
NOA Written:

Tested By: L. Self Date: 4-11-78
Witness: E. Campbell Date: 4/11/78
Sheet No. 1 of 1
Approved: Earl Campbell 4/11/78

WH-614A

SECTION VIII

POST TEST INSPECTION DATA

DATA SHEET

WYLE LABORATORIES

Customer: Duke Power
Specimen: Differential Pressure Transmitters
Part No.: 386A
Spec.: 545/6960/ES
Para.: 10.0
S/N:
GSI:
Amb. Temp.: 70°F
Photo:
Test Med.:
Specimen Temp.: Rm. Amb.
Job No.: 43904
Report No.:
Start Date: 4-11-78

Test Title: POST-TEST INSPECTION

TEST ITEM #1 S/N 101 REMARKS:

Seals in good shape. Cracks are evident in P/C board coating. Terminal lug insulation shows discoloration & shrinkage. Epoxy potting on Span & Zero screws swollen markedly. Leads from case severely cracked. (Internally). P/C board coating has an apparent foggy appearance

TEST ITEM #2 S/N 102 REMARKS:

Seals in good shape. Evidence of cracks in P/C board coating. Terminal lugs show coating out of a brownish material as in S/N 103. Potting on Span & Zero screws swollen markedly. Leads from the case look good internally.

TEST ITEM #3 S/N 103 REMARKS:

Seals in good shape. Evidence of material coated out on terminal screws. Epoxy coating covering the Span & Zero adjustments shows marked swelling. Insulation on terminal lugs shows evidence of charring & shrinkage. No evidence of loose screws or fasteners.

Numerous cracks are evident in the coating on the P/C board. Eight cracks evident on internal wires entering instrument case.

Specimen Failed:
Specimen Passed: ✓
NCA Written:

Tested By: L. Self Date: 4-11-78
Witness: E. Campbell Date: 4/11/78
Sheet No. 1 of 1
Approved: Earl Campbell 4/11/78

WH-614A

SECTION IX

MISCELLANEOUS DATA

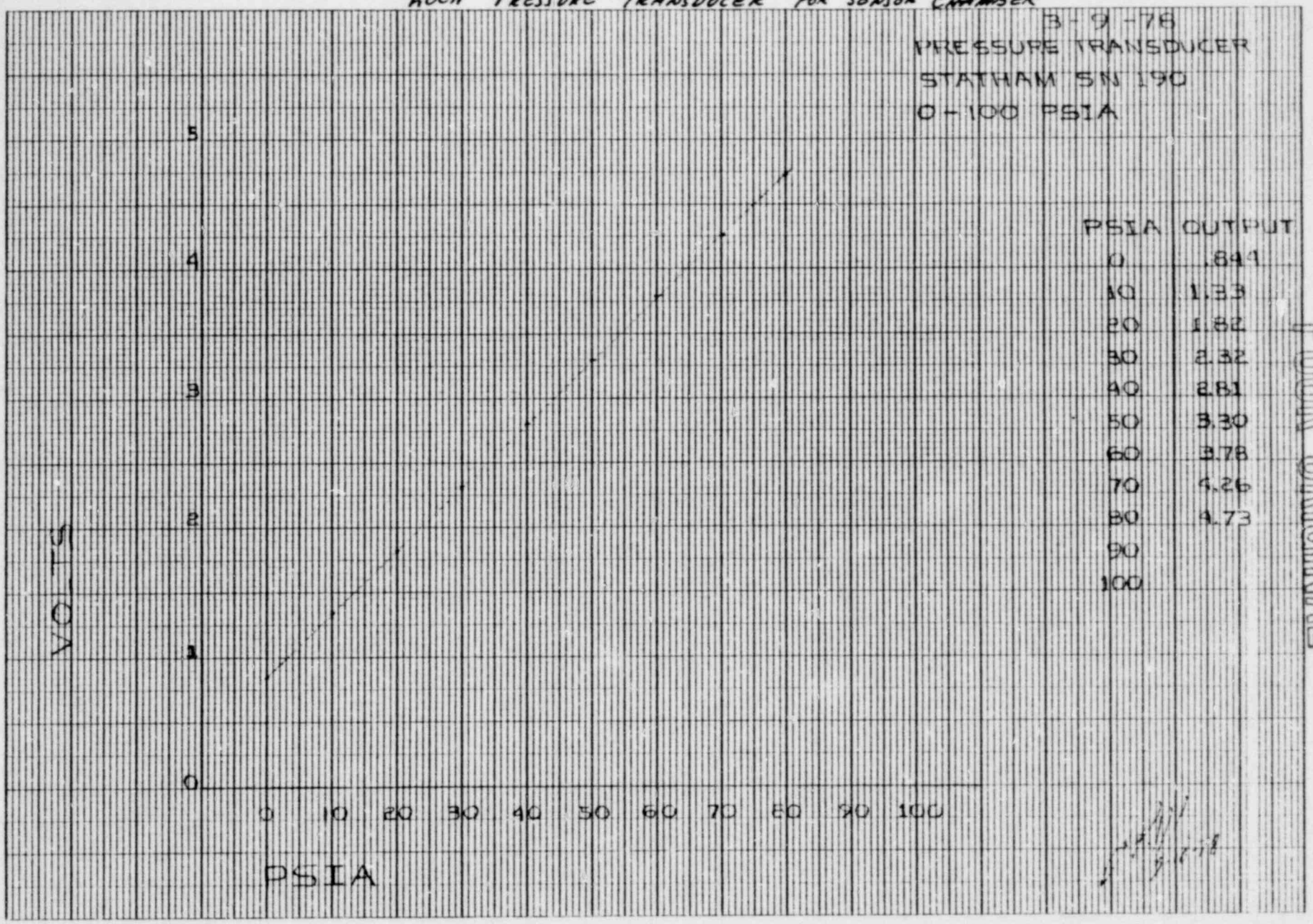
(Data Sheets, Charts, Photographs, and Calibration Curves)

K•E 10 X 10 TO ½ INCH 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A. 46 1323

LOCA PRESSURE TRANSDUCER FOR SENSOR CHAMBER

B-9-78

PRESSURE TRANSDUCER
STATHAM SN 190
0-100 PSIA

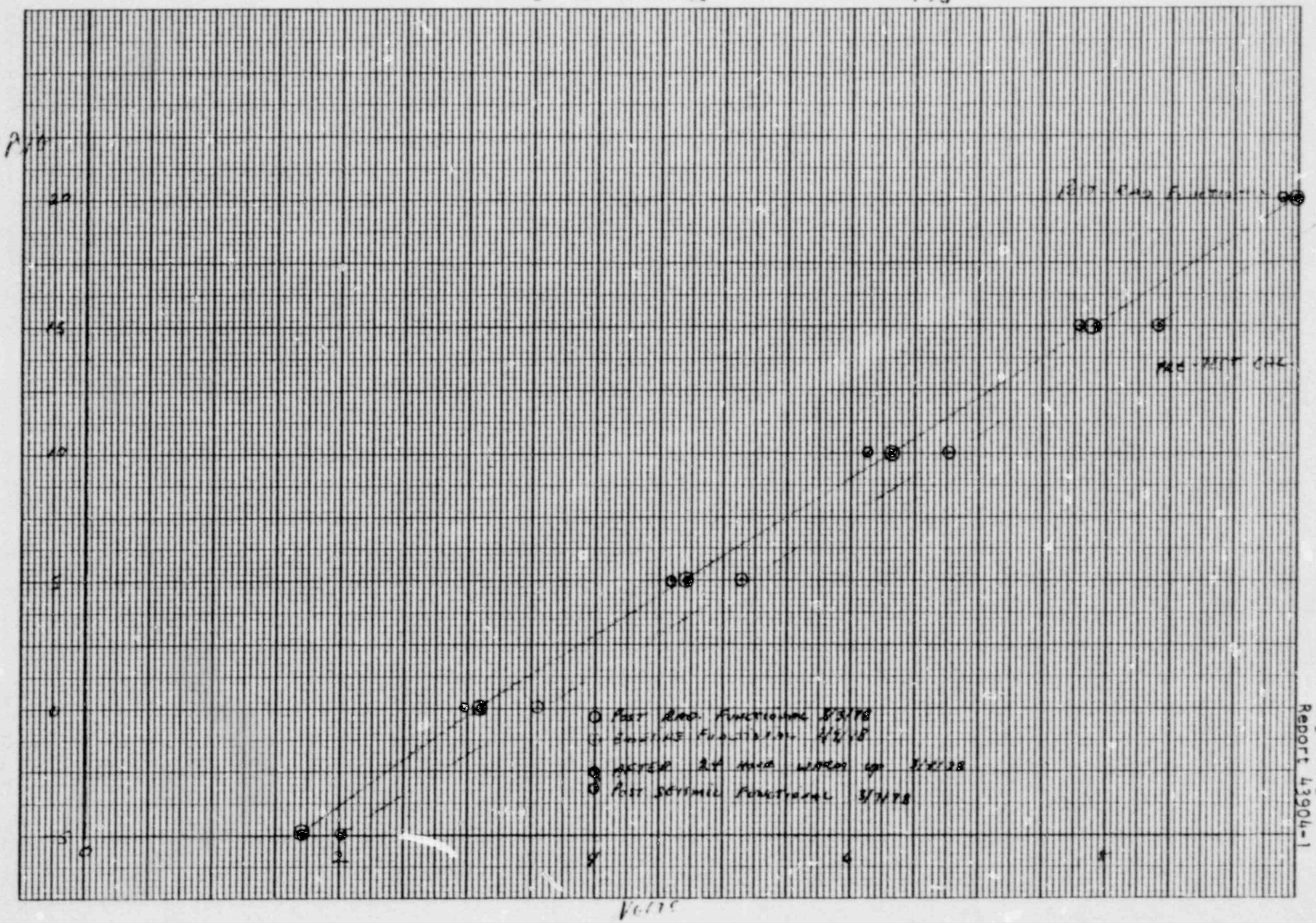


PSIA	OUTPUT
0	.844
10	1.33
20	1.82
30	2.32
40	2.81
50	3.30
60	3.78
70	4.26
80	4.73
90	
100	

POOR ORIGINAL

K·E 10 X 10 TO ½ INCH 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A. 46 1323

S/N - 101 DIKE POWER 3/6/78

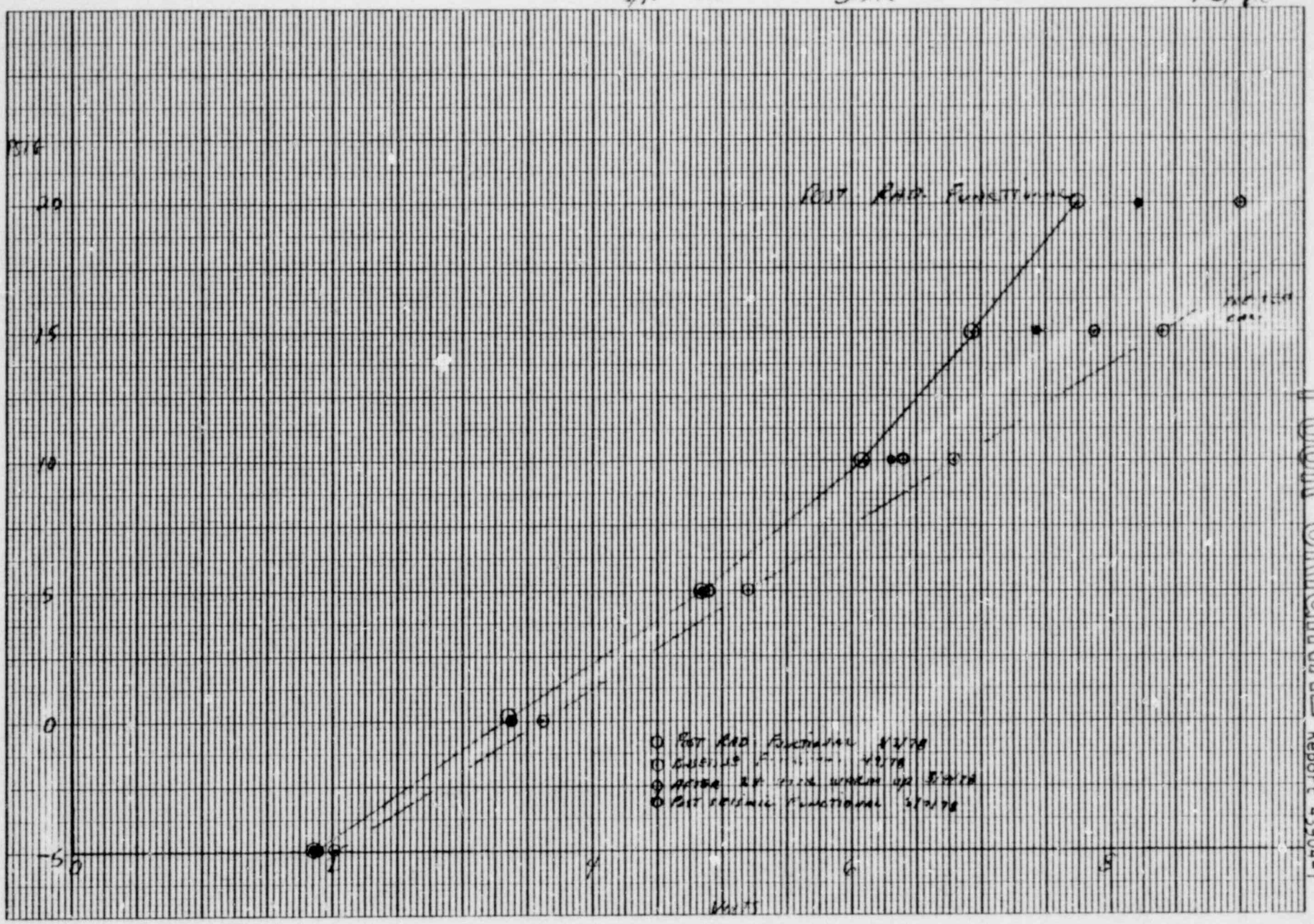


POOR ORIGINAL

K·E 10 X 10 TO ½ INCH 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

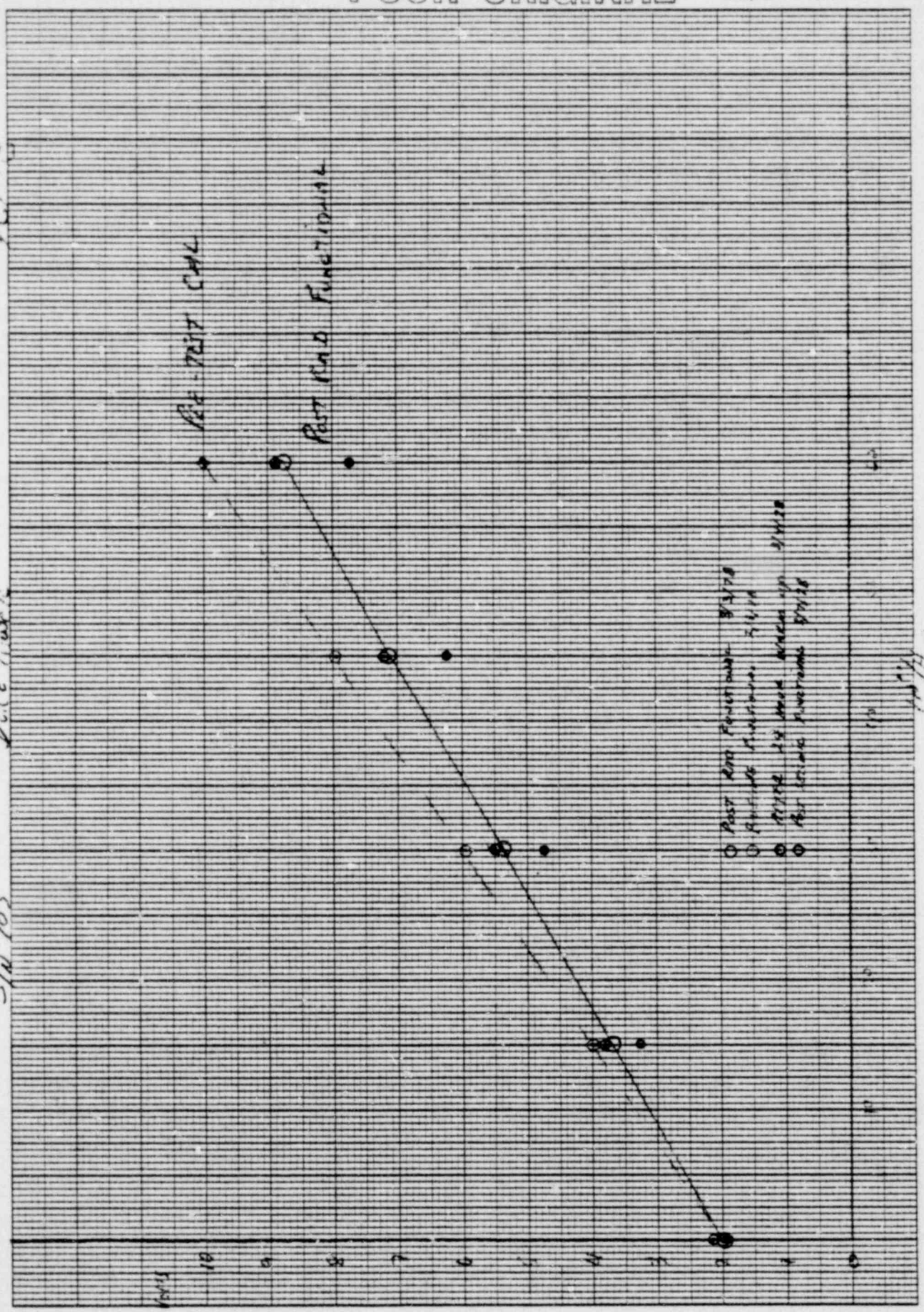
46 1323

S/N [illegible] Duke Power 3/6/78



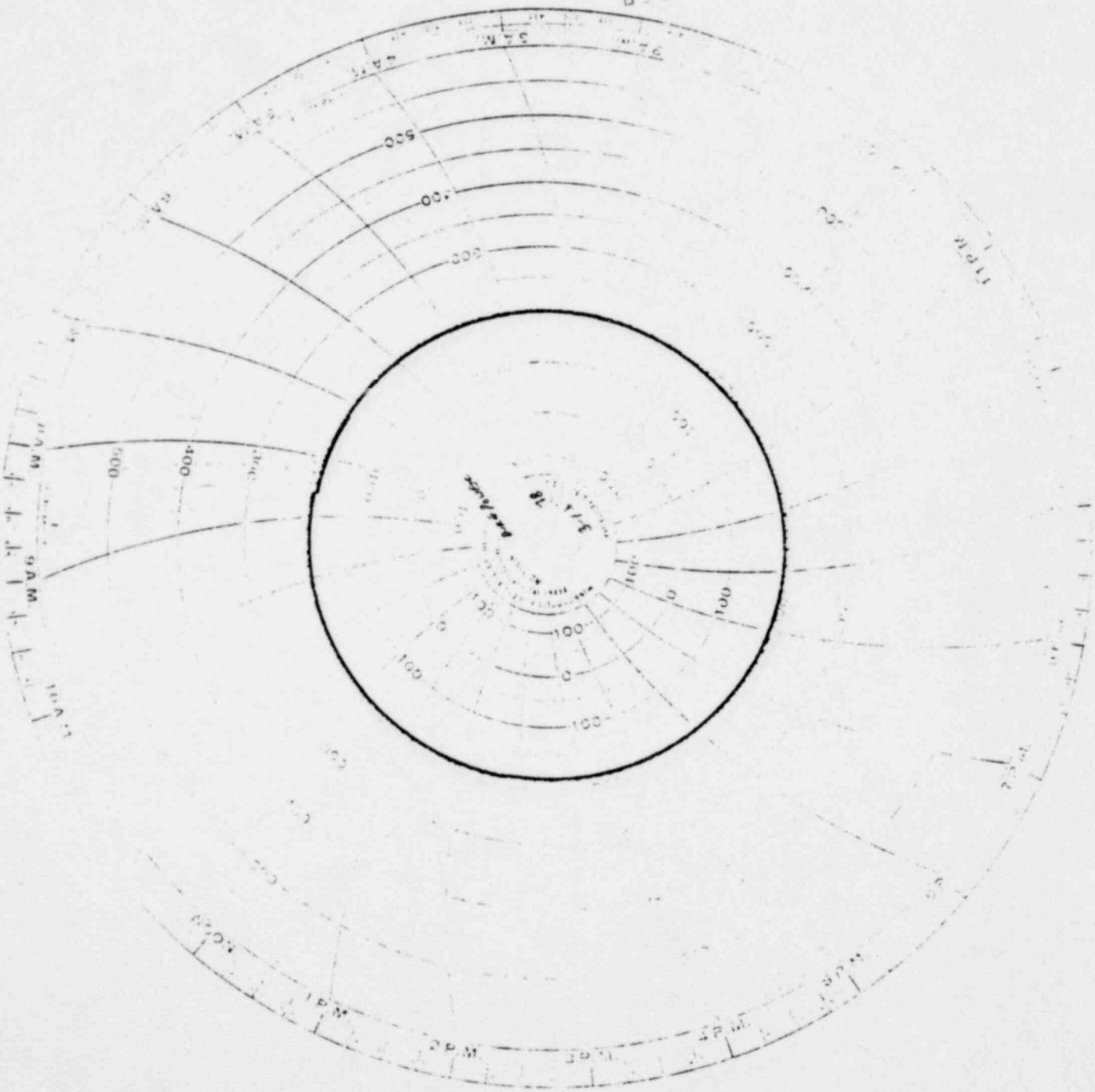
POOR ORIGINAL

POOR ORIGINAL

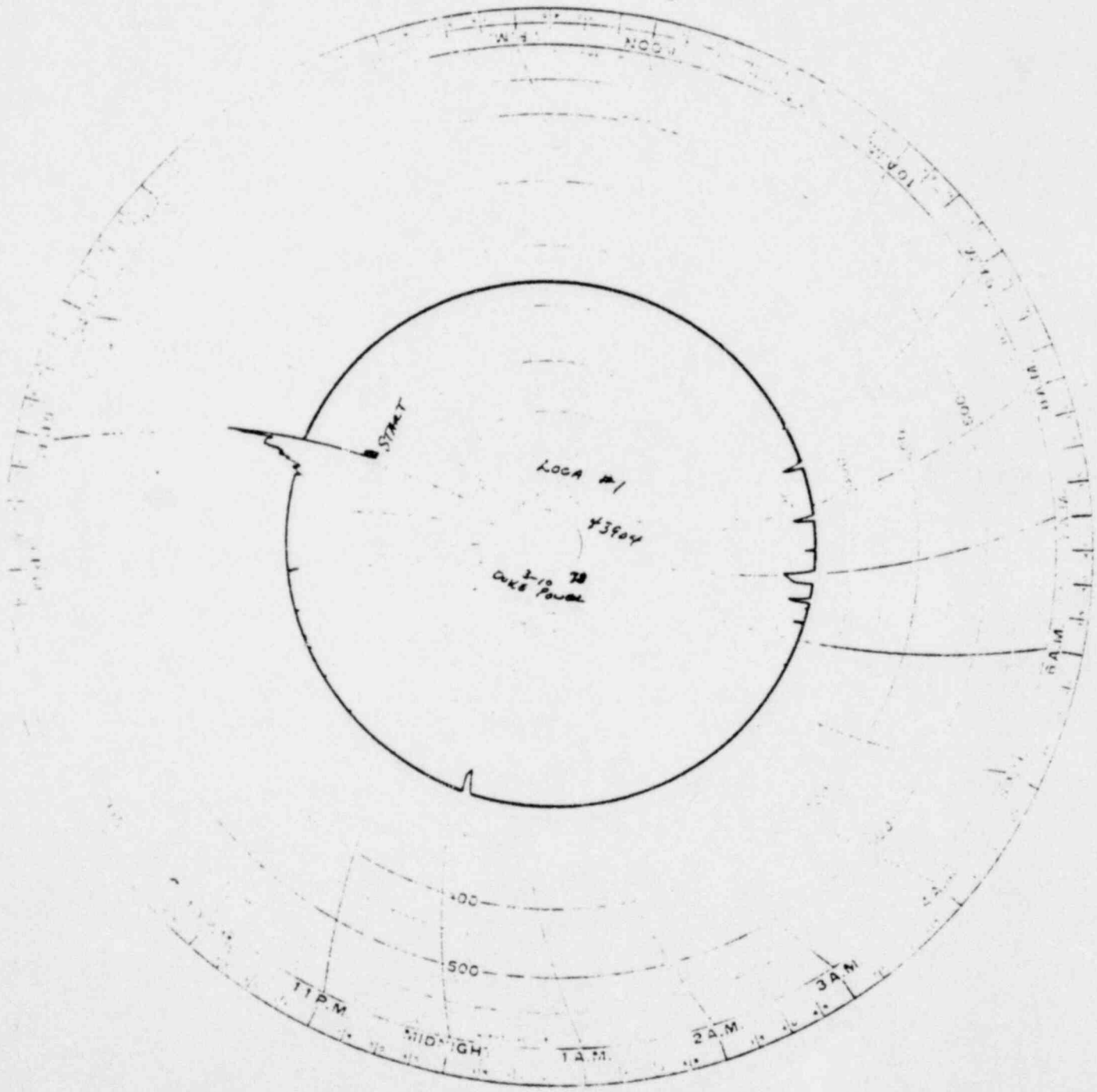


K+E 10 X 10 TO ½ INCH 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.
46 1323

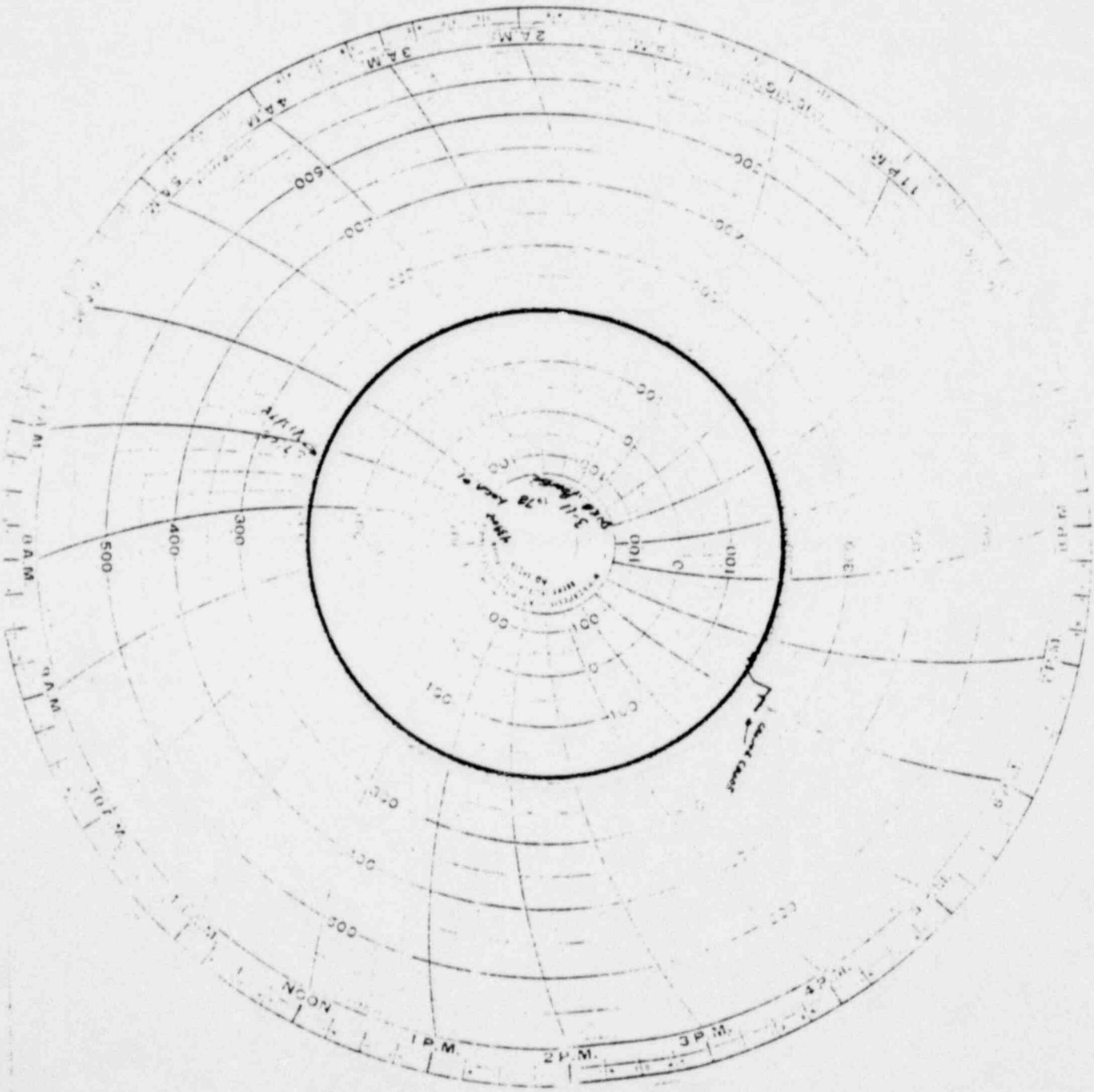
POOR ORIGINAL

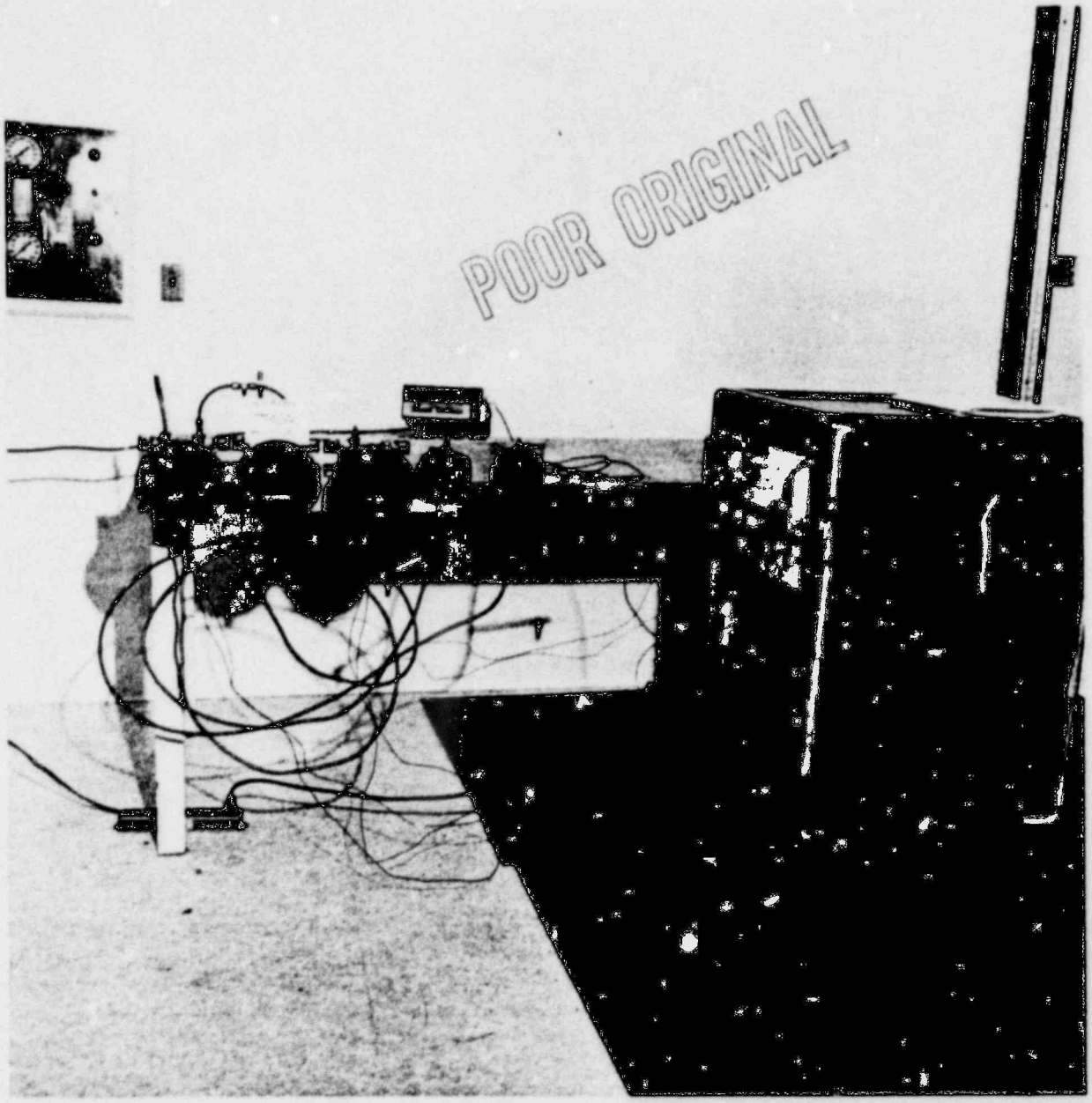


POOR ORIGINAL



POOR ORIGINAL





POOR ORIGINAL

PHOTOGRAPH #1

TYPICAL CALIBRATION & FUNCTIONAL TEST SETUP

SECTION X

WYLE LABORATORIES
TEST PROCEDURE
545/6960/ES

POOR ORIGINAL

TEST PROCEDURE

WYLE LABORATORIES
SCIENTIFIC SERVICES AND SYSTEMS GROUP
P. O. BOX 1008 • HUNTSVILLE, ALABAMA 35807
TWX (810) 726-2225 • TELEPHONE (205) 837-4411

TEST PROCEDURE NO. 545/6960/ES

DATE: January 24, 1978

TEST PROCEDURE

FOR

PRESSURE TRANSMITTERS
AND
REMOTE SENSORS

FOR

DUKE POWER COMPANY
CHARLOTTE, NORTH CAROLINA

APPROVED BY: _____ APPROVED BY
FOR: _____ PROJECT MANAGER: C. R. Farrell

APPROVED BY: _____ APPROVED BY
FOR: _____ QUALITY ENGINEER: _____

APPROVED BY: James W. Forman PREPARED BY
FOR: SEISMIC PROJECTS PROJECT ENGINEER: A J Hatmaker

REVISIONS

FORM 1054-1 Rev. 4/74

REV. NO.	DATE	PAGES AFFECTED	BY	APP'L.	DESCRIPTION OF CHANGES

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WYLE LABORATORIES
SCIENTIFIC SERVICES AND SYSTEMS GROUP

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1.0 SCOPE

1.1 This Test Procedure outlines the steps to be taken by Wyle Laboratories to perform a Qualification Test of an ITT Barton Model 386A High-Temperature, Pressure Sealed Differential Pressure Electronic Transmitter for use in Pressurized Water Reactor (PWR) Nuclear Power Generating Plants. The test items are described in Paragraph 2.0. Testing will be performed to meet the requirements of Duke Power Company Specification No. MCS-1393.01-00-0001, dated October 30, 1977, and Duke Power Company Specification No. MCS-1393.00-1, dated August 17, 1973.

Testing will be performed in the following sequence:

- Pre-Test Inspection
- Pre-Test Calibration
- Functional Tests
- Radiation Exposure with Specimen Operational
- Post-Radiation Functional Tests
- Seismic Qualification Tests
- Post-Seismic Functional Tests
- Accident Tests (LOCA)
- Post-Accident Functional Tests
- Post-Test Inspection

2.0 TEST ITEM DESCRIPTION

2.1 The Barton Differential Pressure Transmitter consists of a fluid-filled, bellows-type sensor and an electro-mechanical transmitter. A total of three items will be tested. Two units have remote sensors and have a range of -5 to 20 psig. The third unit has no remote sensor and has a range of 0" to 60" H_2O.

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2.0 TEST ITEM DESCRIPTION (CONTINUED)

2.1 Continued

Characteristics of each test item are shown in the following table:

TABLE I

	#1	#2	#3	
Nomenclature	Differential Pressure Transmitter	Differential Pressure Transmitter	Differential Pressure Transmitter	
Model	386A	386A	386A	
Range	-5 to 20 psig	-5 to 20 psig	0" - 60" H_2O	
Thermal Effects				B
Accuracy: 80-130°F	± 0.5% F.S.	± 0.5% F.S.	± 0.5% F.S.	B
130-280°F	± 10% F.S.	± 10% F.S.	± 10% F.S.	B
280-320°F	± 25% F.S.	± 25% F.S.	± 25% F.S.	B
Repeatability	± 0.2% F.S.	± 0.2% F.S.	± 0.2% F.S.	A
Sensitivity	± .01% F.S.	± .01% F.S.	± .01% F.S.	A
Temperature Range	40°F to 300°F	40°F to 300°F	40°F to 300°F	A
Humidity Range	0 to 100%	0 to 100%	0 to 100%	
Input Voltage	40 VDC	40 VDC	40 VDC	
Output Current	4 to 20 ma	4 to 20 ma	4 to 20 ma	

NOTE: Throughout this procedure test item serial numbers 101, 102, and 103 shall be designated as test items 1, 2, and 3, respectively.

3.0 TEST EQUIPMENT REQUIRED

3.1 The following equipment is required to perform calibration and functional tests of the Transmitter:

1. Resistor Decade Box: . 1%, 1/2W, 0 to 20KΩ, 0.1
2. Digital Voltmeter, DC (DVM): . ± 0.02%
3. Power Supply, DC: . 0 to 80 volts DC, 60 ma min
   . Regulation 3%
   . Ripple 1%
4. Precision Load Resistors: . 500 ohms ± .01%, 1 watt
5. Pressure Source: . Air or GN_2 to provide zero to full scale pressure, 0 to 20 psig, or 0" to 60" H_2O
6. Pressure Readout Accuracy: . 0" to 60" H_2O ± 0.5" H_2O
   . 0 to 20 ± 0.5" Hg
7. Milliammeter: . 0 to 30 ma - 0.5 full scale

4.0 PRE-TEST INSPECTION AND CALIBRATION

4.1 Pre-Test Inspection

A visual inspection will be performed on each test item upon its delivery to Wyle Laboratories to insure that the test item has not been damaged due to shipping or handling since manufacture.

4.2 Pre-Test Calibration

4.2.1 Test Items 1 & 2: -5 psig to 20 psig Transmitters

4.2.1.1 Electrically and pneumatically connect the Transmitter to be tested as shown in Figure 1 and adjust the DC power supply to 40 VDC. Allow the equipment to stabilize for 30 minutes.

NOTE: The Transmitter and Sensor must be mounted at the same height ± 1/2".

4.2.1.2 Record the initial output from the transmitter at 0 psig.

4.2.1.3 Connect the pressure source, as shown in Figure 1, to the LP side of the Transmitter and apply 5 psig. Record the output from the Transmitter as shown on the digital voltmeter. Adjust, as needed, the zero potentiometer to obtain a 2.000-volt output. Reduce the pressure to 0 psig. Disconnect the pressure source. Note: +5 psig applied to the LP side of the Transmitter simulates -5 psig at the Remote Sensor.

4.0 PRE-TEST INSPECTION AND CALIBRATION (CONTINUED)

4.2 Pre-Test Calibration (Continued)

4.2.1 Test Items 1 & 2: -5 psig to 20 psig Transmitters (Continued)

4.2.1.4 Connect the pressure source, as shown in Figure 1, to the Remote Sensor. Record the Transmitter output as shown on the digital voltmeter. Apply 20 psig to the Sensor. Adjust, as needed, the Span potentiometer to obtain an output reading of 10.000 volts as shown on the digital voltmeter. Note: If the Span potentiometer is adjusted, repeat Paragraphs 4.2.1.3 and 4.2.1.4 in sequence until no adjustment is required in Paragraph 4.2.1.4.

The instrument is now calibrated.

4.2.2 Test Item 3: 0" to 60" H_2O Transmitter

4.2.2.1 Electrically and pneumatically connect the Transmitter to be tested as shown in Figure 1 and adjust the DC power supply to 40 VDC. Allow the equipment to stabilize for 30 minutes.

4.2.2.2 Connect the pressure source to the HP side of the Transmitter. Apply 0" H_2O pressure and record the initial output from the Transmitter as shown on the digital voltmeter. Adjust the zero potentiometer, as needed, to obtain an output of 2.000 volts as shown on the digital voltmeter.

4.2.2.3 Apply a pressure of 60" H_2O and record the output from the Transmitter as shown on the digital voltmeter. Adjust, as needed, the Span potentiometer to obtain an output of 10.000 volts as shown on the digital voltmeter. Note: If the Span potentiometer is adjusted, repeat Paragraphs 4.2.2.2 and 4.2.2.3 in sequence until no adjustment is required in Paragraph 4.2.2.3.

The instrument is now calibrated.

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5.0 TEST REQUIREMENTS AND PROCEDURES

5.1 Requirements

5.1.1 The test items shall demonstrate the ability to activate or de-activate interface equipment or not to cause spurious activation or de-activation throughout the qualification testing. The test items shall be operational at mid-range pressures and data recorded as applicable during radiation testing, seismic testing, and accident testing. Pressure boundaries shall remain intact throughout qualification testing. Failure of any Transmitter to demonstrate its design capabilities, as shown on Table I, Page 4, during qualification testing shall constitute failure of that unit.

5.2 Procedures

5.2.1 Functional Test: Test Items 1 & 2 - 5 to 20 psig

5.2.1.1 Connect the test specimen electrically and pneumatically as shown in Figure 1. Ascertain pressure gage PG1 will indicate 0 to 20 psig.

5.2.1.2 Apply 40 VDC to the Transmitter and allow 30 minutes for stabilization.

5.2.1.3 Record the initial output from the Transmitter at 0 psig as shown on the digital voltmeter. Record current in milliamps as shown on the milliammeter.

5.2.1.4 Open valve V1 and valve V2, close valve V3 (see Figure 1).

5.2.1.5 Apply 5 psig to the LP side of the Transmitter as shown on pressure gage PG1 (Figure 1). This step simulates -5 psig at the Sensor. Record the output from the Transmitter and the current from the milliammeter. Reduce the pressure to 0 psig.

5.2.1.6 Repeat Paragraph 5.2.1.3.

5.2.1.7 Close valve V2 and open valve V3.

5.2.1.8 Apply 5 psig to the Sensor. Record the output from the Transmitter and the current from the milliammeter.

5.2.1.9 Repeat Paragraph 5.2.1.8, increasing the pressure 5 psig per step, until 20 psig is applied to the Sensor. Record the data each step.

5.2.1.10 Reduce the pressure to 15 psig. Record the output from the Transmitter and the current from the milliammeter.

5.2.1.11 Repeat Paragraph 5.2.1.10, decreasing the pressure 5 psig per step until 0 psig is applied to the Transmitter. Record the data each step.

5.2.1.12 Repeat Paragraphs 5.2.1.3 through 5.2.1.11 for a total of three (3) times.

5.0 TEST REQUIREMENTS AND PROCEDURES (CONTINUED)

5.2 Procedures (Continued)

5.2.1 Functional Test: Test Items 1 & 2 - 5 to 20 psig (Continued)

5.2.1.13 Close valves V1 and V3. Remove the 40 VDC from the Transmitter.

5.2.2 Functional Test: Test Item 3 - 0" to 60" H_2O

5.2.2.1 Connect the test specimen electrically and pneumatically as shown in Figure 1. Ascertain pressure gage PG1 (Figure 1) will indicate 0" to 60" H_2O. Disregard valve V3 as this Transmitter had no remote Sensor.

5.2.2.2 Apply 40 VDC to the Transmitter and allow 30 minutes for stabilization.

5.2.2.3 Record the initial output from the Transmitter at 0" H_2O as shown on the digital voltmeter. Record the current in milliamps as shown on the milliammeter.

5.2.2.4 Open valves V1 and V2 (Figure 1).

5.2.2.5 Apply 15" H_2O to the HP side of the Transmitter as shown on pressure gage PG1 (Figure 1). Record the output from the Transmitter and the current from the milliammeter.

5.2.2.6 Repeat Paragraph 5.2.2.5 increasing the pressure 15" H_2O each step until 60" H_2O is applied to the HP side of the Transmitter. Record the data each step.

5.2.2.7 Decrease the pressure to 45" H_2O and record the output from the Transmitter. Record the current from the milliammeter.

5.2.2.8 Repeat Paragraph 5.2.2.7, decreasing the pressure 15" H_2O each step until 0" H_2O is applied to the HP side of the Transmitter. Record the data each step.

5.2.2.9 Repeat Paragraphs 5.2.2.3 through 5.2.2.8 for a total of three (3) times.

5.2.2.10 Close valves V1 and V2 and remove the 40 VDC from the Transmitter.

6.0 COMBINED BACKGROUND AND POST-ACCIDENT RADIATION EXPOSURE

6.1 The test item assemblies will be uniformly exposed to a source of Cobalt-60 for a period that will yield an equivalent air dose of gamma radiation simulating the combined background and accident radiation doses. The combined dose will be 2×10^8 RADS and the maximum dose rate will be 5×10^6 RADS per hour.

The test items will be installed in the Hot Cell (Gamma) as shown in Figure 2. Mid-scale pressure will be applied to the test items and data recorded and logged each hour as applicable.

6.2 Post-Radiation Functional Tests

6.2.1 Perform functional tests as described in Paragraphs 5.2.1.1 through 5.2.2.10.

7.0 SEISMIC QUALIFICATION TESTS

7.1 Specimen Mounting and Orientation

The specimens, as described in Paragraph 2.0, shall be mounted on Wyle-fabricated test fixture(s). The test fixture(s) shall be placed on the Wyle Multiaxis Seismic Simulator Table such that the longitudinal axis of the specimens shall be colinear with the longitudinal axis of the test table. For the second axis of tests, the specimens shall be rotated 90 degrees in the horizontal plane. The specimen mountings shall simulate the in-service mounting configuration as closely as practical.

7.2 Specimen Tie-Down

The specimens shall be rigidly mounted on Wyle-fabricated test fixture(s) using commercially available bolts, nuts, and washers. The test fixture(s) shall, in turn, be welded to the test table.

7.3 Excitation

7.3.1 Simultaneous Axes Excitation

Each horizontal axis shall be excited separately, but each one shall be excited simultaneously with the vertical axis (longitudinal simultaneously with vertical, then lateral simultaneously with vertical). The specimens shall be operational at mid-range pressures during the seismic qualification. Data shall be logged as applicable.

7.4 Exploratory Search

7.4.1 A low-level (approximately 0.2 g both horizontally and 0.1 vertically) multi-axis sine sweep from 1 Hz to 40 Hz shall be performed to establish major resonances. The sweep rate shall be 1 octave per minute.

7.0 SEISMIC QUALIFICATION TESTS (CONTINUED)

7.5 Multi-Frequency Tests

7.5.1 The specimens shall be subjected to simultaneous horizontal and vertical input of random motion consisting of frequencies spaced 1/3 octave apart over the range of 0.5 Hz to 40 Hz. The amplitude of each 1/3 octave frequency will be independently adjusted in each axis until the Test Response Spectra (TRS) envelopes the Required Response Spectra (RRS). The RRS for the horizontal OBE and SSE tests shall be an envelope of the applicable curves shown in Figures 6 through 10. The vertical RRS will be 2/3 of the horizontal RRS. A 10 percent conservatism margin will be added to the RRS. Five (5) seismic tests at the OBE level, plus one test at the SSE level, will be performed in each test axis. The duration of each test will be a minimum of 30 seconds. In addition to the required tests, calibration tests will be performed. The zero period amplitude of the RRS's could be exceeded in order to meet the peaks of the spectrums.

7.6 Instrumentation

7.6.1 Excitation Control

7.6.1.1 Control accelerometers will be mounted on the table at locations near the base of the test fixture(s).

7.6.2 Specimen Response

7.6.2.1 Ten (10) specimen-mounted piezo-electric accelerometers (2 each Transmitter and 2 per Sensor) shall be located on the specimens under test. The placement of the accelerometers shall be at the discretion of the Duke Power Technical Representative. An FM tape and oscillograph recorder will provide a record of each accelerometer response. A response spectrum plot from each specimen response accelerometer from the SSE test shall be analyzed at a damping of 1%. Transmissibility plots of the exploratory search shall be provided.

7.6.3 Electrical Power

7.6.3.1 Electrical power of 110 VAC, 60 Hz, single-phase, will be provided by Wyle Laboratories.

7.7 In-Process Inspection

7.7.1 The records shall be checked for equality of performance after each test.

The specimen shall be examined for possible damage following all violent tests, such as at a severe structural resonance.

All important vibration effects shall be logged.

Photographs shall be taken of any noticeable physical damage that may occur.

7.0 SEISMIC QUALIFICATION TESTS (CONTINUED)

7.8 Certification Report

7.8.1 Ten (10) copies of a certification-type test report will be issued subsequent to completion of testing. This report will be signed by a Registered Professional Engineer and will summarize the testing, details and recommendations concerning deficiencies and repairs, photographs of test setups, accelerometers, failures, electrical monitoring results, a list of test equipment used, and calibration records.

8.0 POST-SEISMIC FUNCTIONAL TESTS

8.1 Perform functional tests as described in Paragraphs 5.2.1.1 through 5.2.2.10.

9.0 ACCIDENT TESTS (LOCA)

9.1 Design Basis Accident (DBA) Test

9.1.1 The test items shall be subjected to a Design Basis Accident (DBA) simulation, with the Transmitters and Sensors installed in separate chambers, as shown in Figure 3. The Transmitter will be subjected to an environment of 160°F (72°C) steam at a peak pressure of 20 psig. Simultaneously, the Sensors will be subjected to an environment of 340°F (172°C) steam at a peak pressure of 20 psig.

The Design Basis Accident profiles are shown in Figures 4 and 5. The test items will be operational at mid-range pressures while the DBA test is performed. Data shall be logged on data sheets each hour as applicable.

10.0 POST-ACCIDENT FUNCTIONAL TEST

10.1 Perform functional tests as described in Paragraphs 5.2.1.1 through 5.2.2.10.

11.0 POST-TEST INSPECTION

Upon completion of all testing, each test item assembly shall be dismantled to the extent that all parts can be visually inspected. The condition of insulation, mechanical parts, lubricants, electrical contacts, wiring, and other related components shall be recorded.

12.0 TEST REPORT

Ten (10) copies of a certification-type report will be furnished upon completion of the test program. This report will be signed by a Registered Professional Engineer and will summarize the results of the testing. Included in the report will be the results of the environmental tests, including environmental conditions, results and conclusions, and photographs of test setups, failures, etc. The report will also contain a list of test equipment used, calibrations, and Instrumentation Log Sheets.

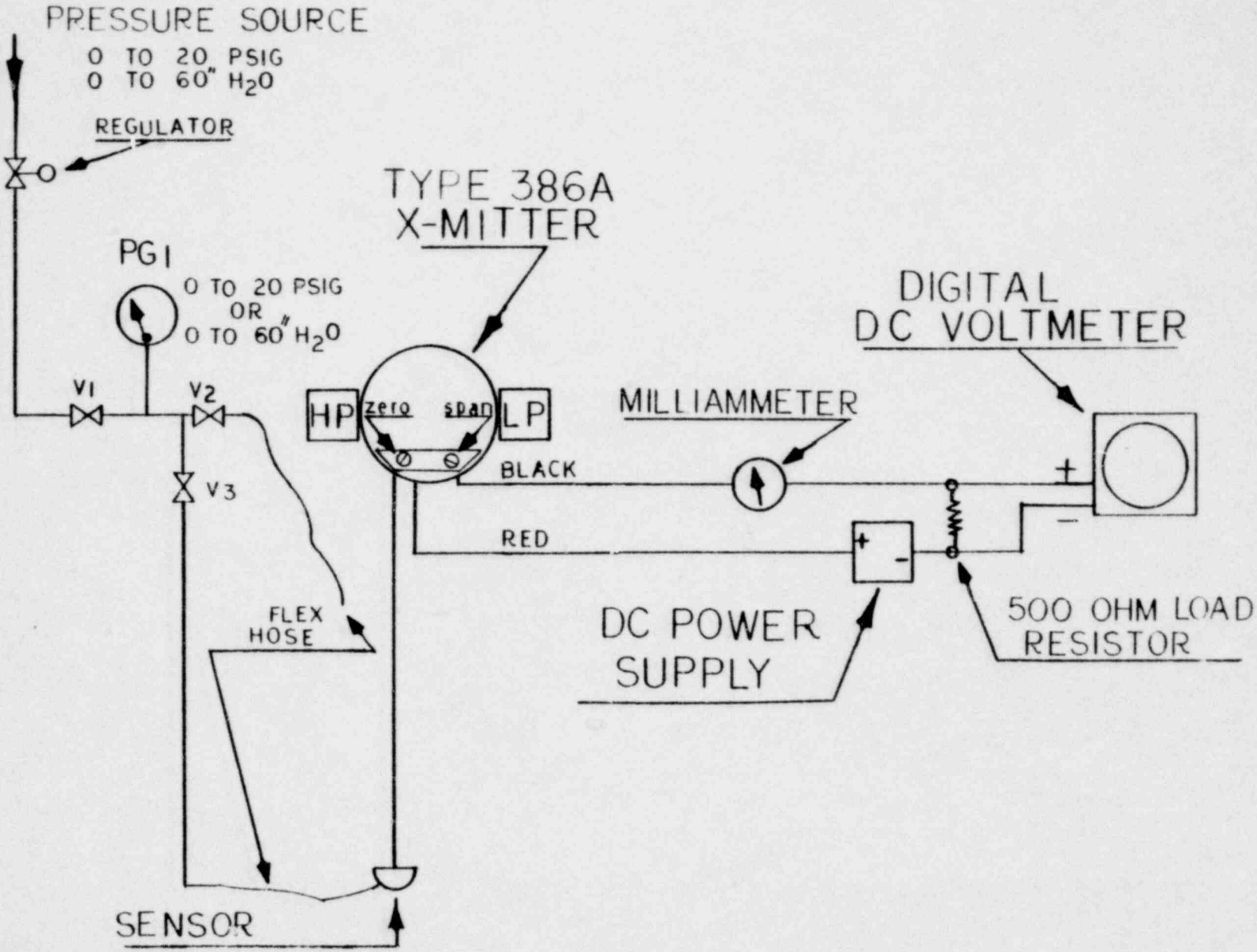


FIG.-1

CALIBRATION AND FUNCTIONAL SETUP

Note 1: 2 Transmitters have Remote Sensors.
1 Transmitter has no Sensor.

Note 2: Pressure gauge to be capable of indicating 0" to 60" H_2O or 0 to 20 psig.

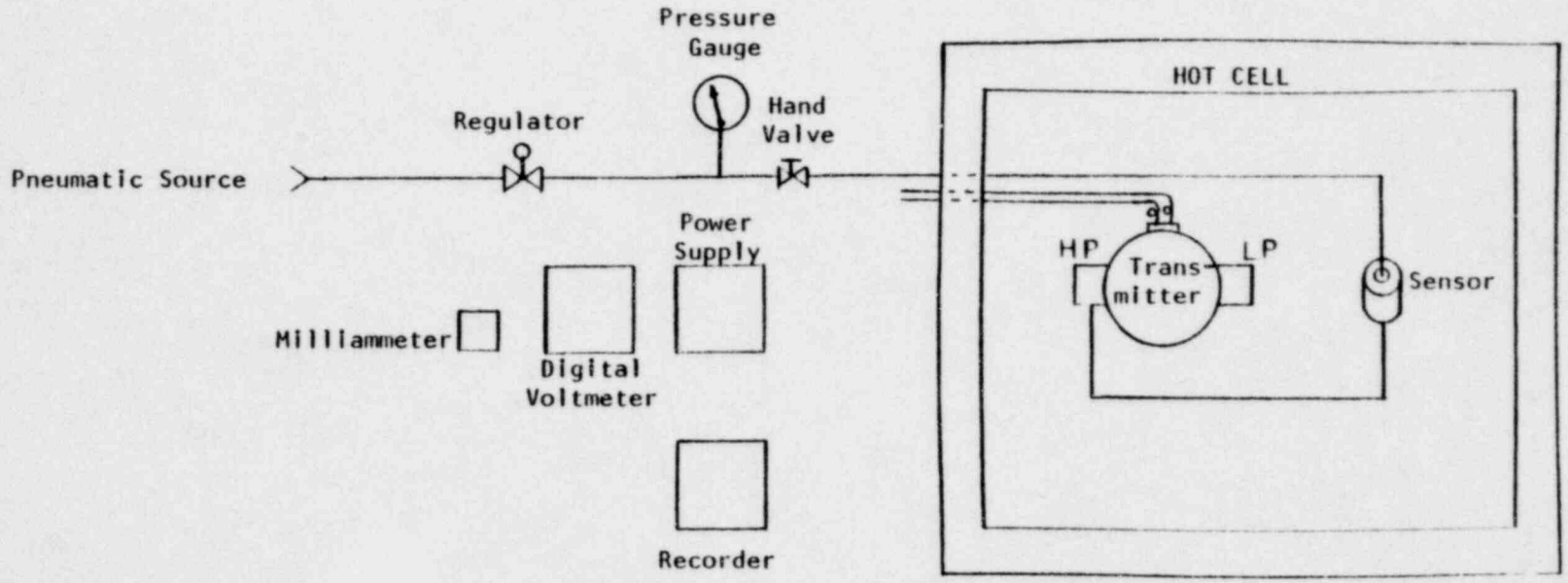


FIG. 2

RADIATION TEST SETUP

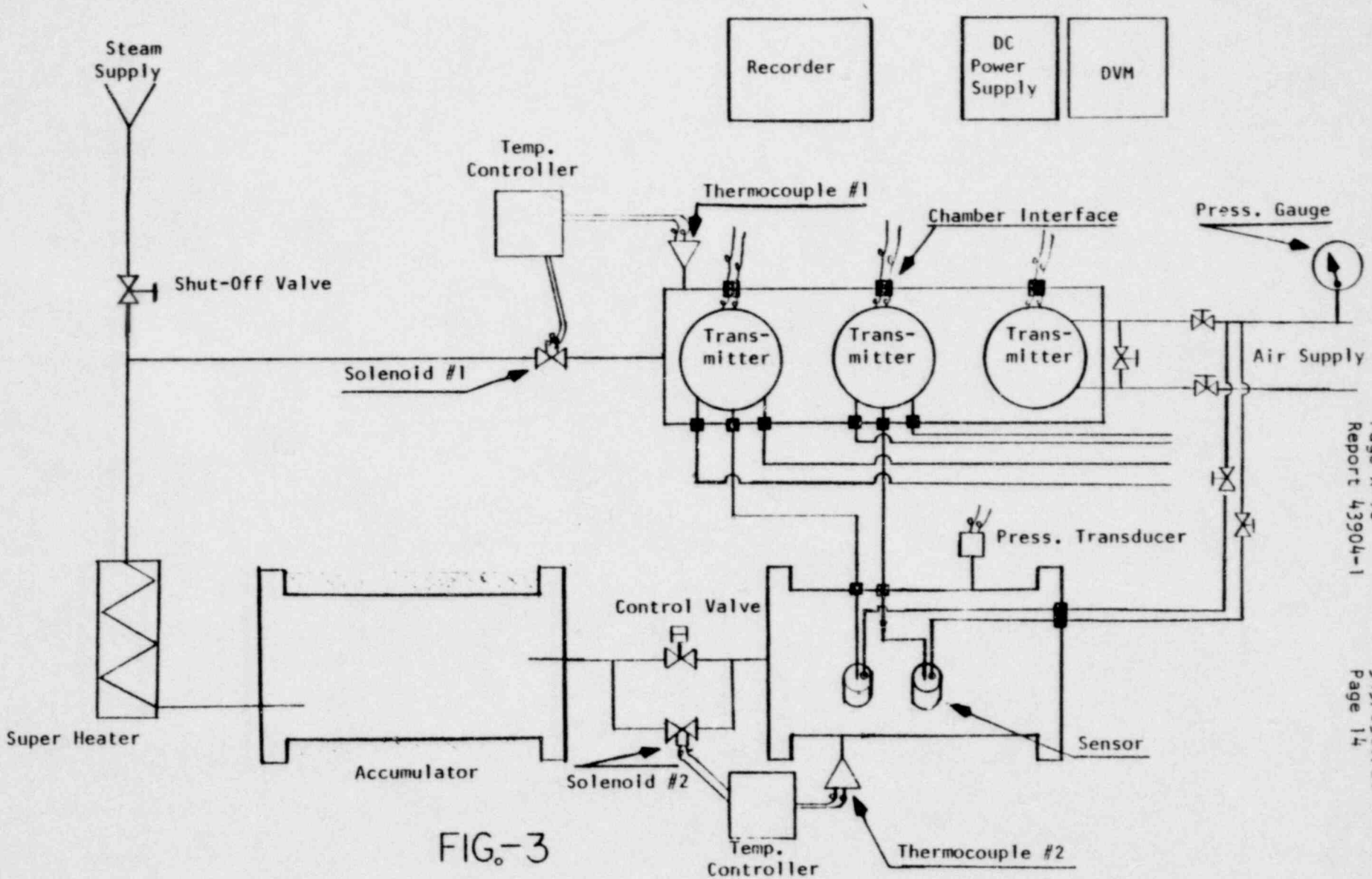


FIG.-3

LOCA SETUP

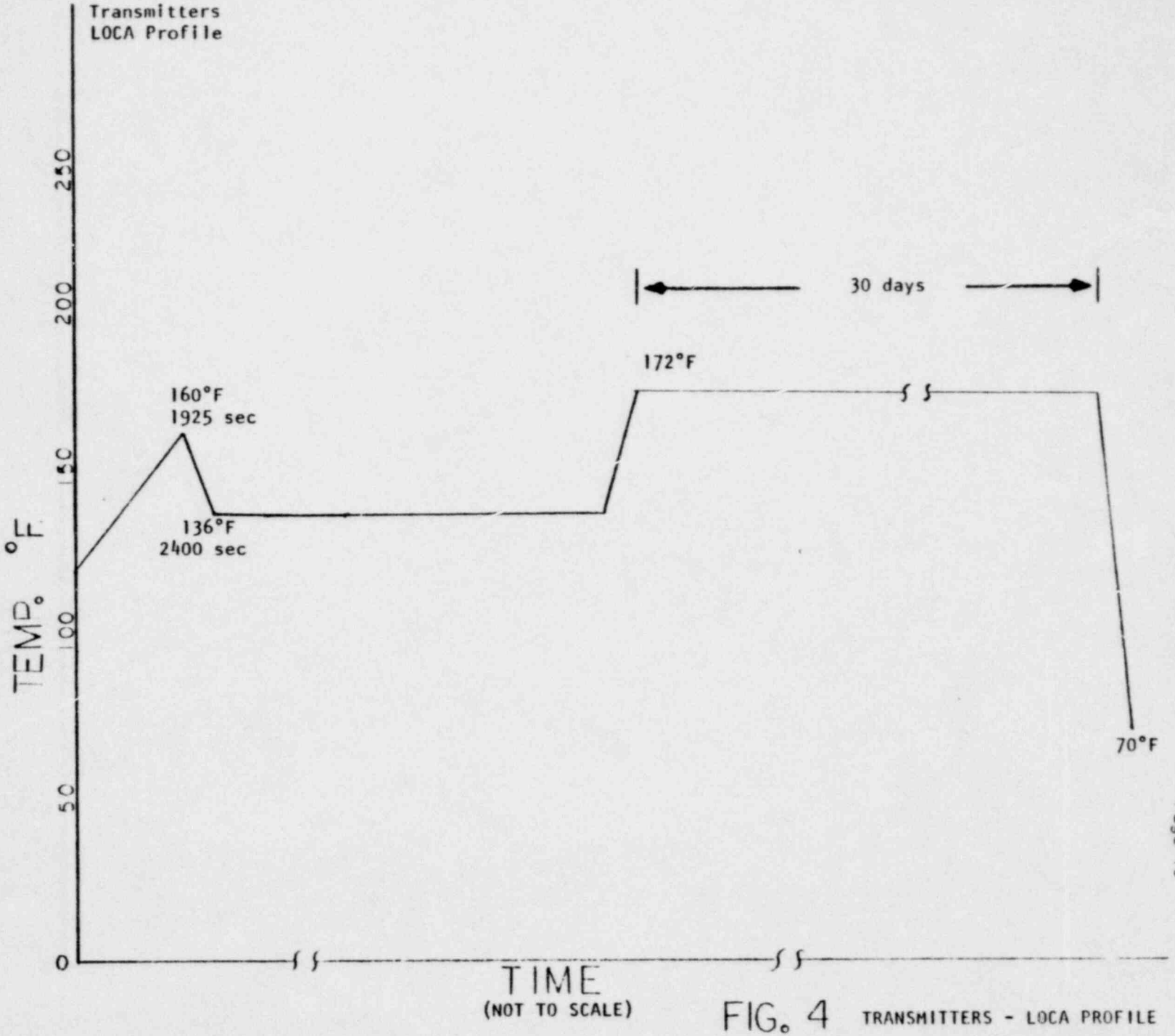


FIG. 4 TRANSMITTERS - LOCA PROFILE

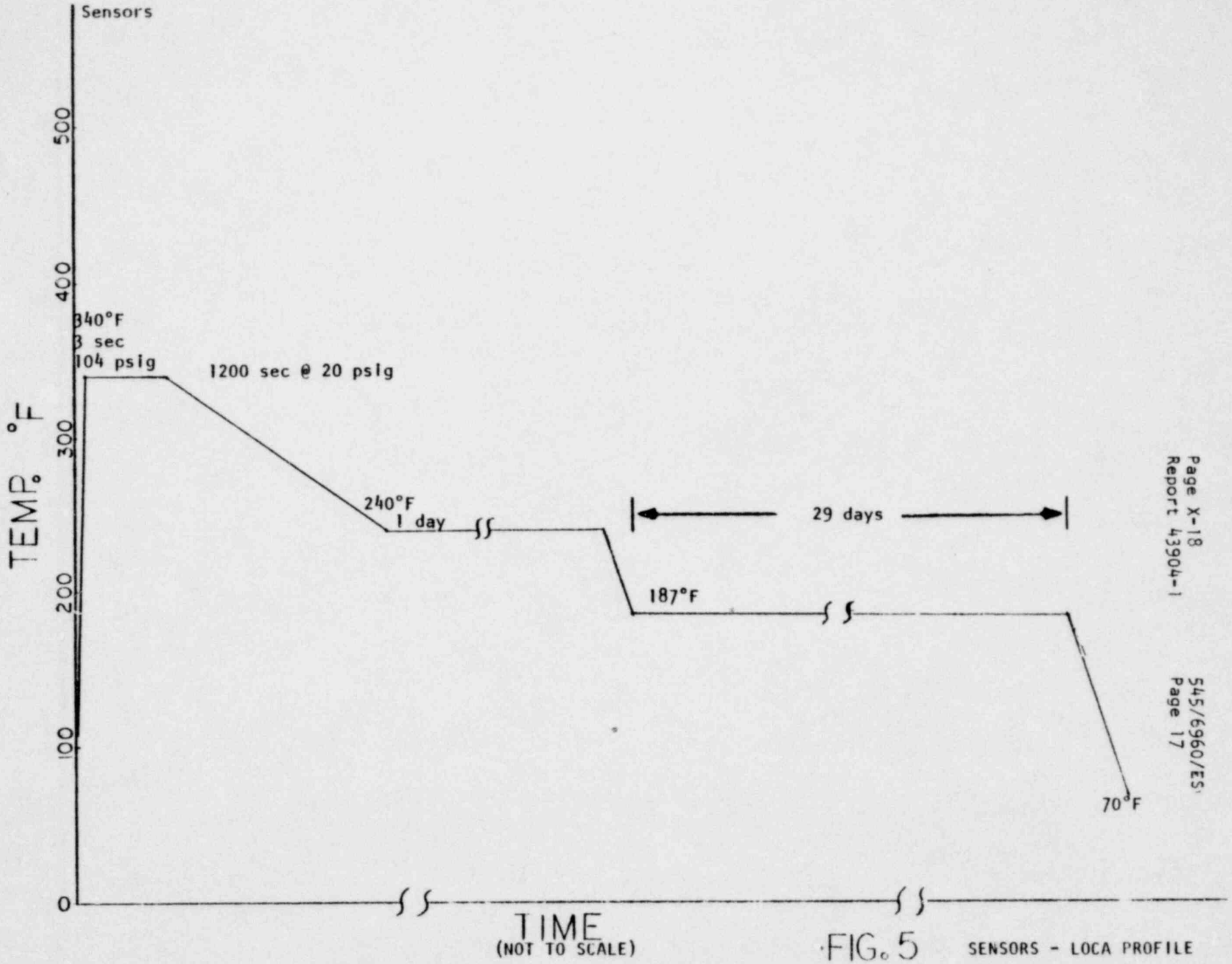
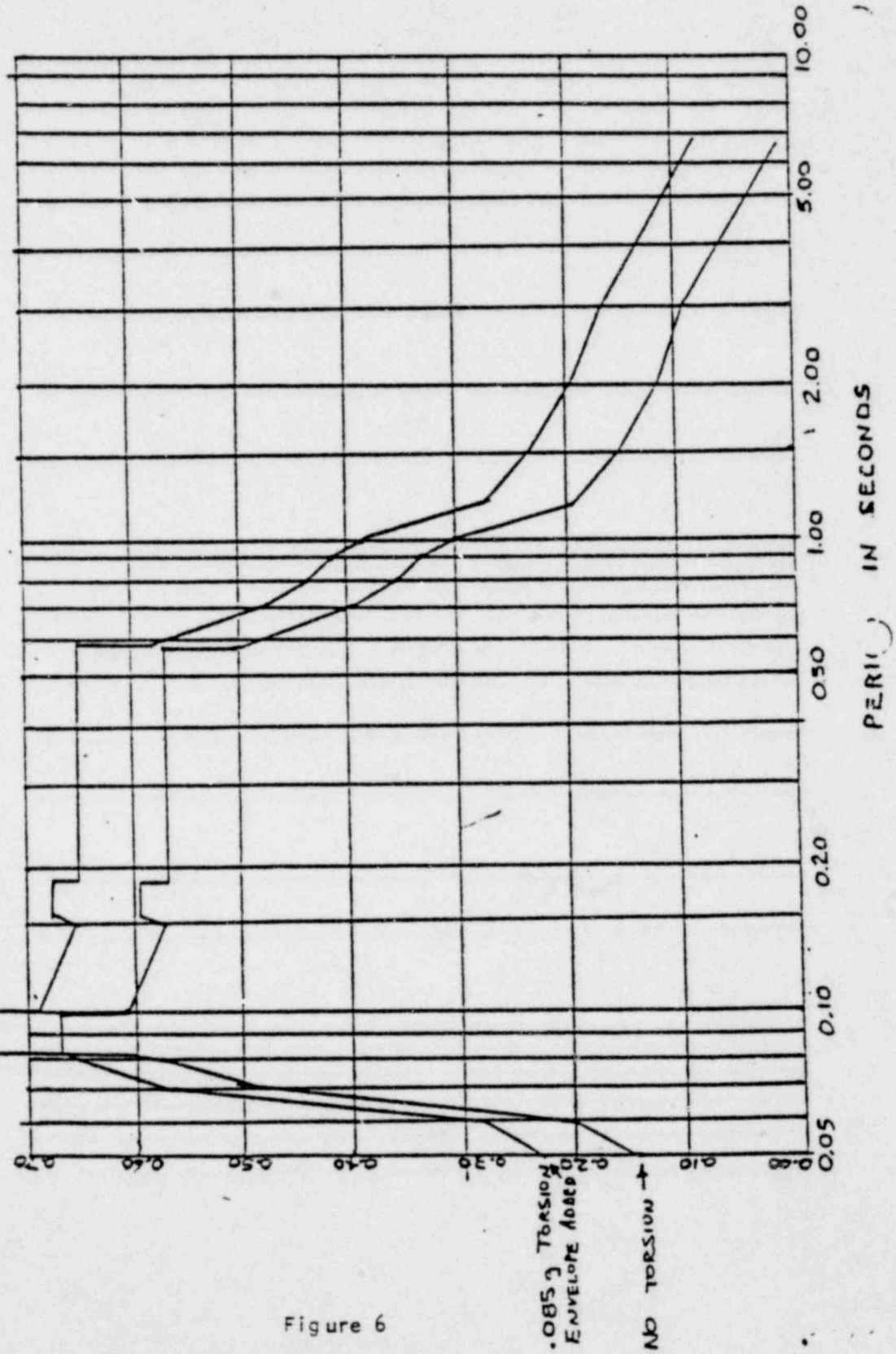


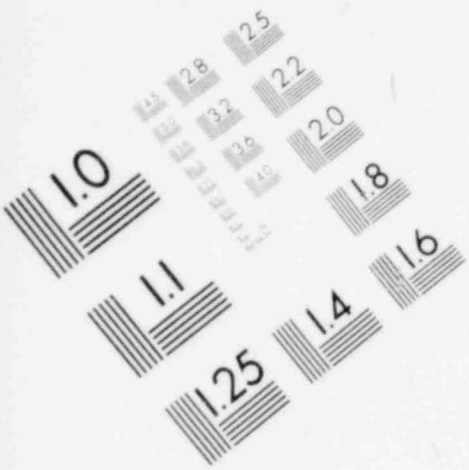
FIG. 5 SENSORS - LOCA PROFILE

These curves are for the operating basis earthquake (OBE). For the design basis earthquake (DBE) multiply these values by the ratio of (.015/.008)



MCGUIRE & CATAWBA OBE 1% Composite Reponse Spectra for McGuire 733 and Catawba 560 Elevations in both N-S & E-W directions in Auxiliary Building.

Figure 6



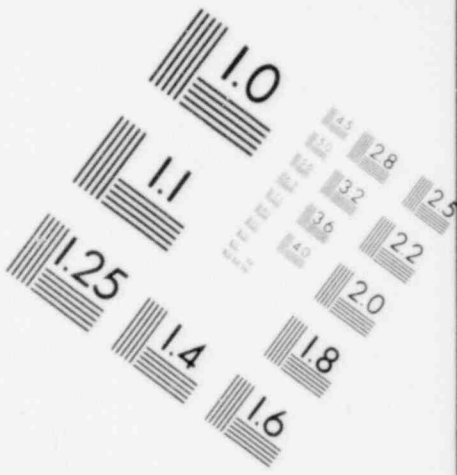
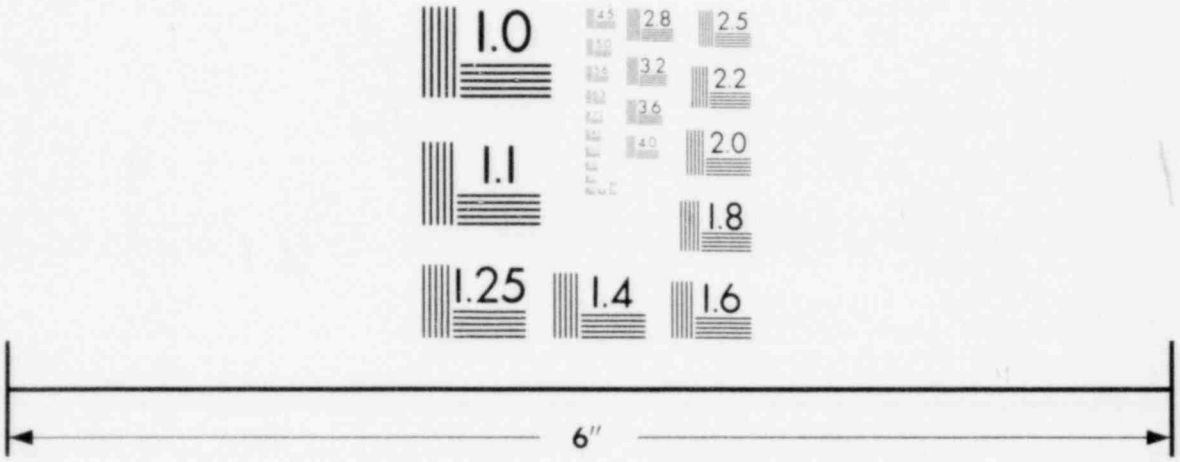
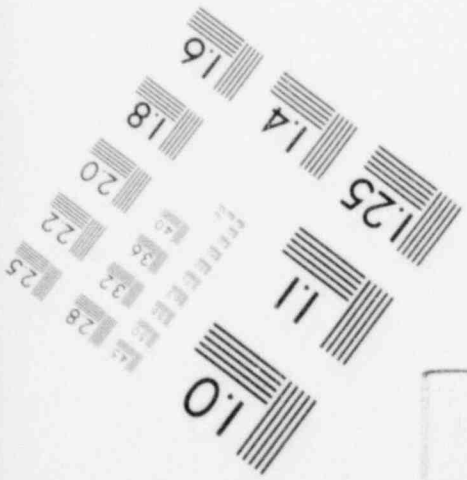
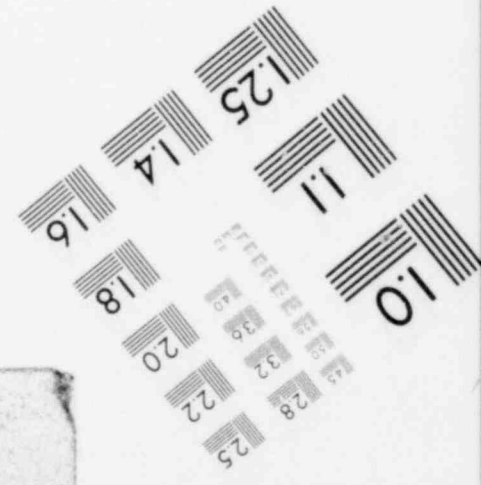


IMAGE EVALUATION
TEST TARGET (MT-3)



MICROCOPY RESOLUTION TEST CHART





MCGUIRE & CATAWBA OBE 1% Composite Response Spectra for all McGuire 750' (& below) and Catawba 577 (& below) elevations in both N-S and E-W directions in Auxiliary Building,

These curves are for the operating basis earthquake (OBE). for the design basis earthquake (DBE) multiply these values by the ratio of (.015/.008)

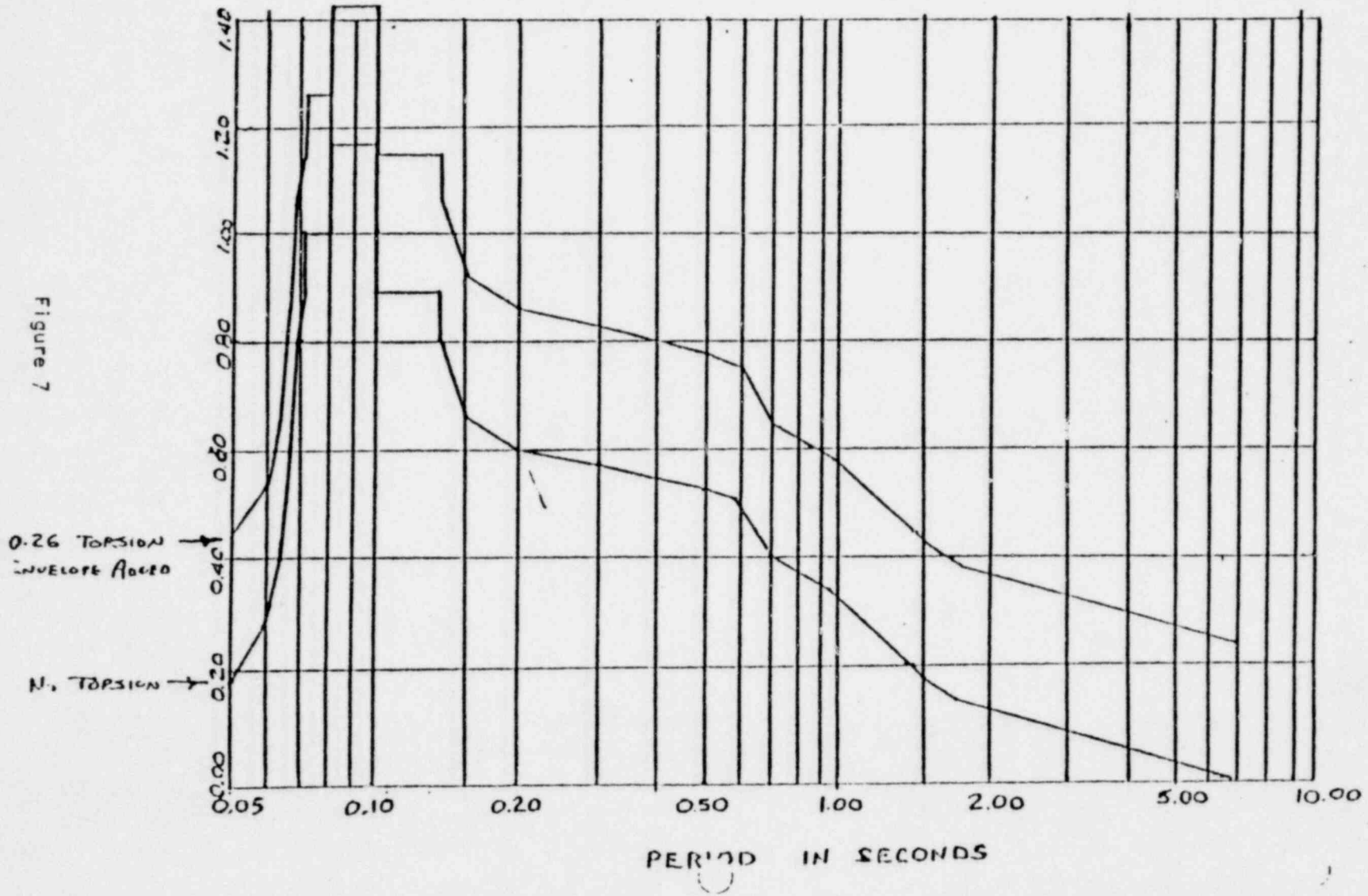


Figure 7

MCGUIRE & CATAWBA OBE 1% Composite Response Spectra for all McGuire 767 (and below) and Catawba 594' (and below) elevations in both N-S and E-W directions in Auxiliary Building.

These curves are for the operating basis earthquake (OBE). For the design basis earthquake (DBE) multiply these values by the ratio of (.015/.008)

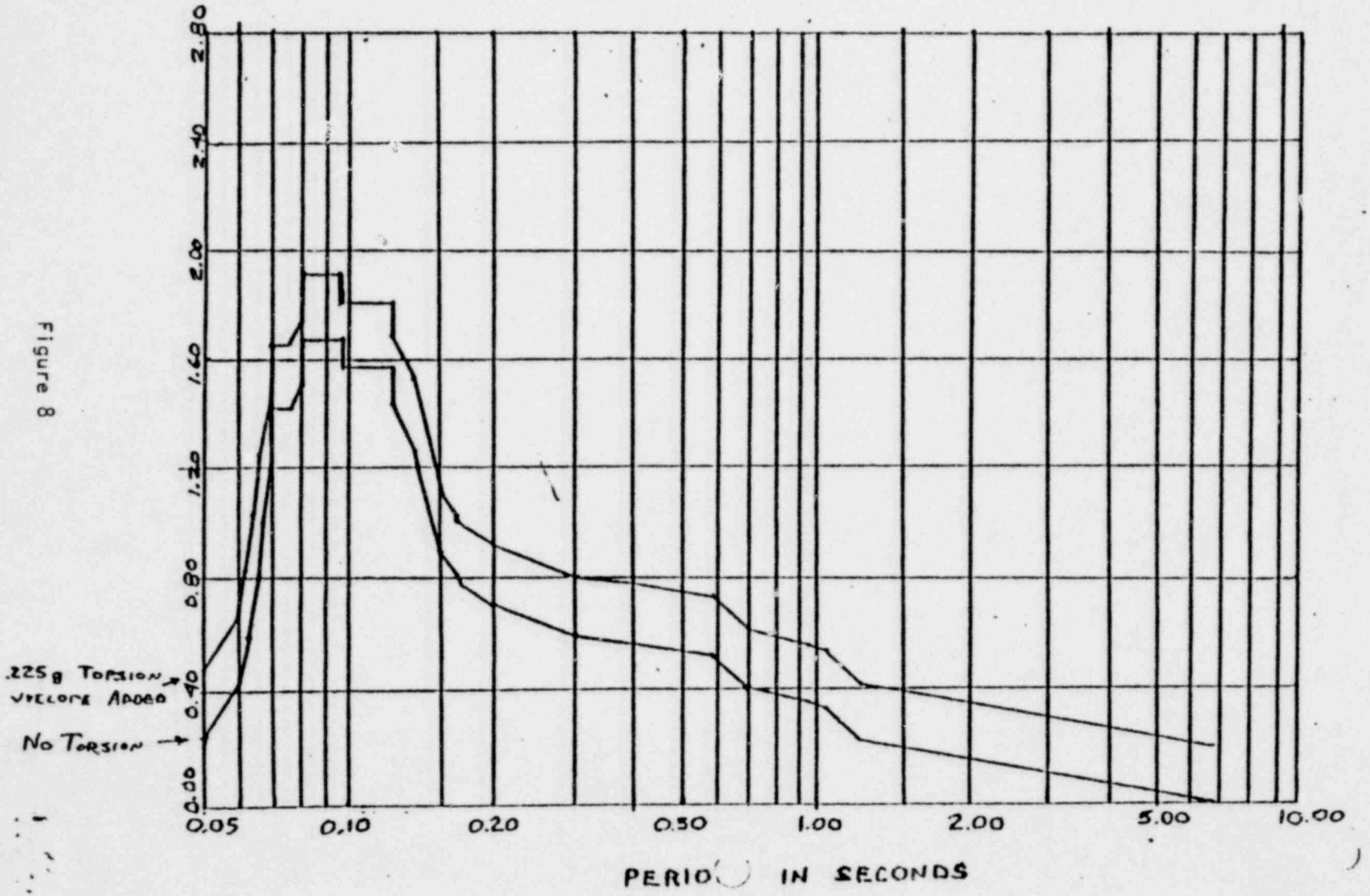
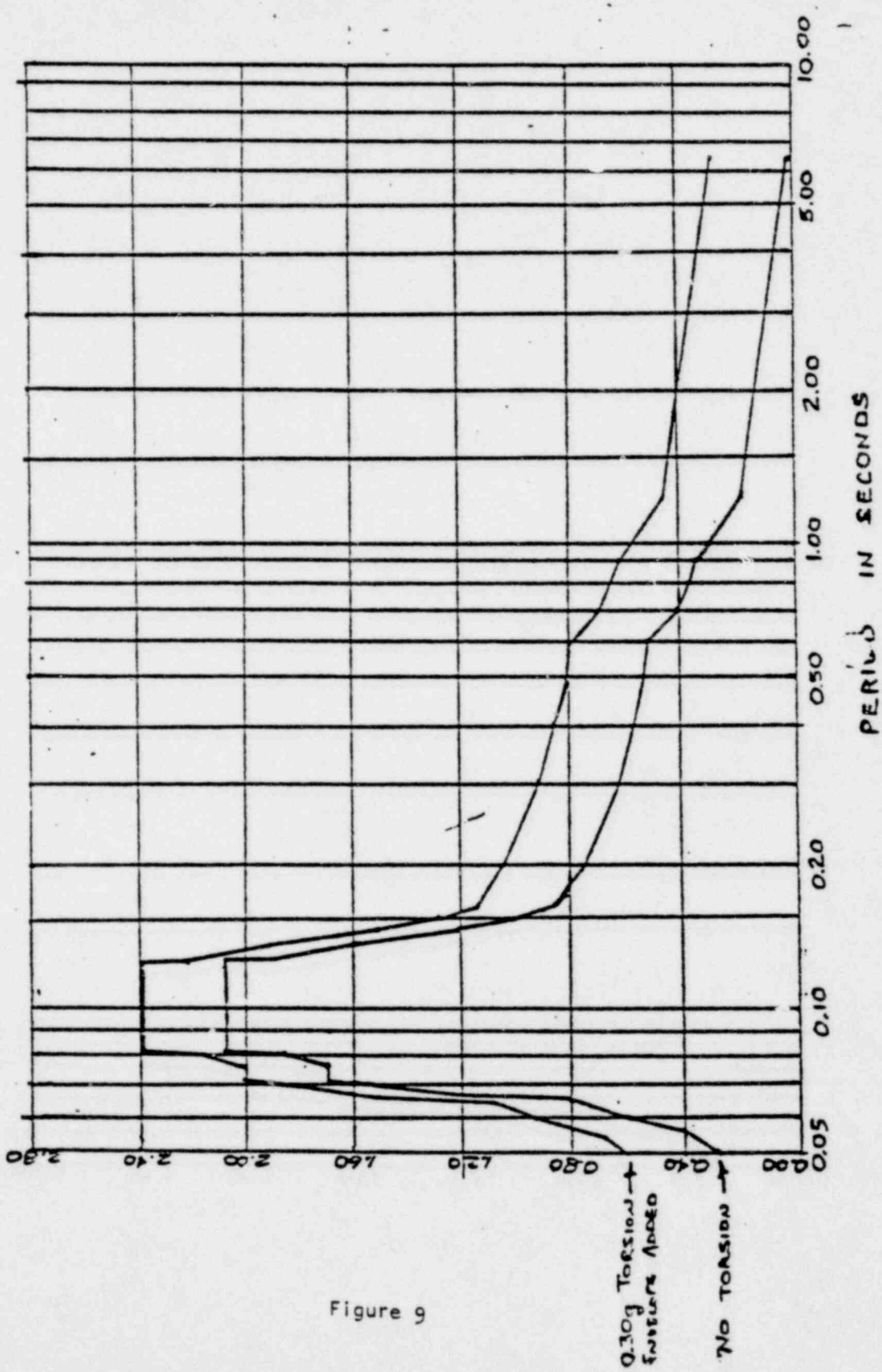


Figure 8

These curves are for the operating basis earthquake (OBE). For the design basis earthquake (DBE) multiply these values by the ratio of (.015/.008)



MCGUIRE & CATAWBA OBE 1% Composite Response Spectra for all McGuire 784' (and below) & Catawba 611' (and below) elevations in both N-S and E-W direction in Auxiliary Building

Figure 9

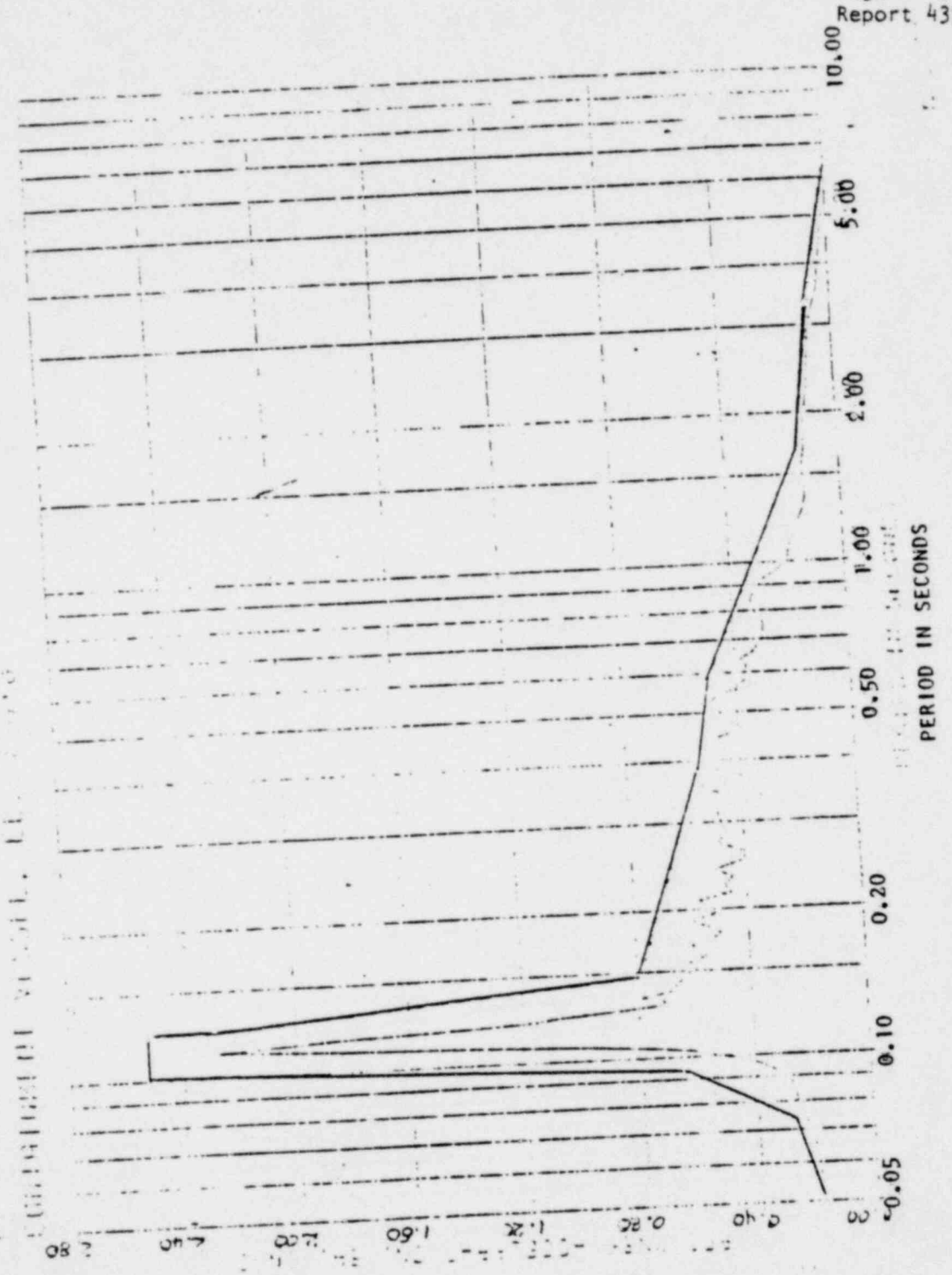

10.00
5.00
2.00
1.00
0.50
0.20
0.10
0.05
PERIOD IN SECONDS
0.0
0.40
0.80
1.20
1.60
2.00
2.40
2.80

Figure 10