

CALVERT CLIFFS
UNIT I
INSPECTION OF
STEAM GENERATORS 11 AND 12

Final Report

May 1982

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Prepared for
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SUMMARY OF
EDDY CURRENT TEST RESULTS

* PLANT	- SELF EXPLANATORY
* UNIT	- SELF EXPLANATORY
* S/G	- STEAM GENERATOR
* INLET/OUTLET	- SIDE FROM WHICH INSPECTION WAS PERFORMED
* REEL	- DATA REEL NUMBER AS IDENTIFIED ON MAGNETIC TAPE AND/OR CHART PAPER
* SIDE	- SIDE #1 OR #2 IF APPLICABLE, OTHERWISE BLANK
* DATE	- DATE OF DATA COLLECTION
TUBE ID	- TUBE IDENTIFICATION ROW# COLUMN# OR OTHER METHOD
FROM	- THE SIGNAL SOURCE FROM WHICH THE EVALUATION WAS MADE
	(BLANK) INDICATES THAT THE PRIMARY TEST FREQUENCY WAS USED
	"U" " " " " UPPER MIXER SIGNAL " "
	"L" " " " " LOWER MIXER SIGNAL " "
VOLTS P-P	- PEAK TO PEAK VOLTAGE OF THE INDICATION SIGNAL
CURRENT	- THE CURRENT PERCENT THROUGH WALL INDICATION AS EVALUATED
ORIGIN	- THE ORIGIN OF THE REPORTED SIGNAL
	"OD" INDICATES THE SIGNAL ORIGIN TO BE FROM THE OUTSIDE DIAMETER
	"ID" " " " " " " " " " " INSIDE DIAMETER
LOCATION	- THE AXIAL LOCATION OF THE INDICATION
INDEX	- THE TAPE INDEX OF THE REPORTED INDICATION
PAGE OF	- PAGE NUMBER OF EDDY CURRENT TEST RESULTS
	EACH REEL OF DATA SHOULD BEGIN WITH PAGE #1
* EVALUATOR	- SIGNATURE OF DATA EVALUATOR
* NDE LEVEL	- CERTIFICATION LEVEL OF DATA EVALUATOR
* DATE	- DATE OF DATA EVALUATION
(*)	- THESE ITEMS NEED ONLY BE COMPLETED FOR THE FIRST DATA PAGE FROM EACH REEL

TYPES OF ABBREVIATIONS USED

✓	- WHEN USED IN THE "CURRENT" COLUMN, THIS DENOTES THAT NO DETECTABLE INDICATIONS WERE FOUND
PV	- PERMEABILITY VARIATION, NOT A REPORTABLE INDICATION
CU	- COPPER LIKE DEPOSITION, NOT A REPORTABLE INDICATION
DTS	- DISTORTED TUBE SHEET SIGNAL
EP	- EXPLOSIVE PLUG (AS REPORTED ON MAGNETIC TAPE OR CHART PAPER)
MP	- MECHANICAL PLUG " " " " " " " "
WP	- WELDED PLUG " " " " " " " "
ATE	- ABOVE TUBE END
TTS	- TOP OF TUBE SHEET
ATS	- ABOVE TUBESHEET
TSP	- TUBE SUPPORT PLATE
BAF	- BAFFLE
E/C	- EGG CRATE
AVB	- ANTI VIBRATION BAR
V/p-p	- PEAK TO PEAK VOLTAGE
TS	- TUBESHEET
HL	- HOT LEG
CL	- COLD LEG
HG	- HIGH GAIN
LG	- LOW GAIN

OTHER COMMENTS

PT - PARTIAL TEST

RT# - RETESTED ON REEL #

I. INTRODUCTION

Zetec, Inc. was contracted in May 1982 by Baltimore Gas and Electric to provide two people to assist BG&E personnel with the eddy current examination of the Calvert Cliffs Unit I steam generators in Lusby, Maryland. In addition, Zetec, Inc. provided a Level IIA Data Interpreter to evaluate the test results.

II. DISCUSSION

The MIZ-12 Eddy Current System was used to inspect the Calvert Cliffs Unit I Steam Generators 11 and 12. The MIZ-12 uses eddy currents as the probing media to measure variations in effective conductivity and/or permeability of the tube being tested.

An alternating voltage is impressed across the test coil. The magnetic field developed by current flow in the test coil causes eddy currents to flow in the tube wall. The corresponding magnetic field caused by eddy current flow in the tube wall is out of phase with the field developed by the current in the test coil. Since these fields tend to cancel one another, the coil voltage is decreased in proportion to the magnitude of eddy current flow in the test piece. The magnitude of eddy currents in the test piece, thus the coil voltage, is dependent on the electrical properties of the tube being tested. The electrical properties which affect the flow of eddy currents are permeability and conductivity. In non-magnetic materials, such as inconel and 300 series stainless steel, conductivity is usually the only significant variable. When the effective conductivity decreases due to a discontinuity in the tube wall, the coil voltage increases in direct relationship with the effective conductivity change. Thus, the amount of increase in coil voltage is related to the

size of the discontinuity. The coil voltage is sinusoidal, thus it can be described with a single vector having magnitude and phase.

The MIZ-12 is a four-frequency system with signal mixing and manipulation capabilities. This allows simultaneous investigation of a part with up to four frequencies on a single scan of the test probe. In addition, data can be manipulated via a mixer module to reduce or eliminate unwanted signals such as surface noise, fill factor variation, lift off, tube support, tube sheet and other similar signals. With this capability, the system can be considered more multi-parameter since it provides more qualitative and quantitative information than was available in previous systems.

A differential test coil probe having a diameter of .560" was used to inspect Calvert Cliffs Unit I Steam Generators 11 and 12. Channel one of the MIZ-12 tester was set at 400 KHz differential. This is the optimum frequency for defect information. Channel two of the tester was set at 100 KHz differential. Channel three was set at 400 KHz low gain differential for dent magnitude evaluation. For tubes in rows 89 and less, channel three was set at 25 KHz for sludge height measurements. Channel four was set at 100 KHz absolute.

Channel one (400 KHz DIFF) was mixed with channel two (100 KHz DIFF) to suppress unwanted signals originating on the outside of the tube such as supports and tube sheet influences. Channel three, when run at 400 KHz-low gain, was used to evaluate the voltage amplitude of dents observed that were large enough to saturate channel one (400 KHz-high gain).

There were no service induced defects observed in either steam generator. There were three defects of 95% or greater detected which were "burn throughs" from the rim cut -- Line 64 Row 91 in Steam Generator 12, Line 62 Row 95 and Line 23 Row 136 in Steam Generator 11.

Maximum sludge height observed in Steam Generator 12 was approximately 5 inches. Maximum in Steam Generator 11 was approximately 5 inches.

More detailed results can be found in the appendices as outlined below.

- | | |
|--------------|--|
| Appendix I | Contains test results for Steam Generator 11 |
| Appendix II | Contains test results for Steam Generator 12 |
| Appendix III | Contains a listing for all tubes inspected in Steam Generator 11 |
| Appendix IV | Contains a listing for all tubes inspected in Steam Generator 12 |
| Appendix V | Contains a specific calibration sheet and data reduction curves |
| Appendix VI | Contains personnel certifications |

APPENDIX I

Dent Magnitude
Sludge
Eddy Current Test Results
Steam Generator 11

DENT MAGNITUDE
EDDY CURRENT TEST RESULTS

Steam Generator 11

May/June 1982

Line	Row	V/P-P		Quad	Location	Reel
		400 HG	400 LG			
59	100	3.8		1	Between HL and CL bend (middle)	1
44	117	2.0		"	4" above CL bend	2
42	121	10		"	Between 5 and 6 EC	"
30	129	4.0		"	9 Support + 4" - HL	"
23	136	8.0		"	9 Support - HL	"
21	"	4.0		"	9 Support - HL	"
"	"	2.0		"	10 Support - HL	"
20	137	2.0		"	9 Support - HL	"
"	"	2.0		"	10 Support - HL	"
19	136	2.0		"	9 Support - HL	"
18	137	2.0		"	9 Support - HL	"
"	"	2.0		"	9 Support - 10" - CL	"
13	138	2.0		"	10 Support - CL	"
"	"	2.0		"	10 Support - HL	"
12	137	2.0		"	9 Support - HL	"
12	139	2.0		"	9 Support - HL	"
"	"	2.0		"	10 Support - HL	"
9	140	7.0		"	9 Support - HL	3
7	"	12.0		"	9 Support - HL	"
"	"	4.0		"	10 Support - HL	"
46	117	12.0		4	10 Support - HL	4
"	"	12.0		"	10 Support - CL (10" to support)	"
43	120	8		"	#2 Bat Wing	"
61	96	10		"	3 EC - 2"	6
25	92		2.0	"	9 Support - HL	"

DENT MAGNITUDE
EDDY CURRENT TEST RESULTS

Steam Generator 11

June 1982

Line	Row	V/P-P		Quad	Location	Reel
		400 HG	400 LG			
24	93		1.5	4	9 Support - HL	6
25	94		1.8	"	9 Support - HL	"
24	95		.3	"	9 Support - HL	"
25	96		1.8	"	9 Support - HL	"
24	97		2.0	"	9 Support - HL	"
25	98		1.2	"	9 Support - HL	"
24	99		1.3	"	9 Support - HL	"
25	100	5		"	9 Support - HL	"
24	101		1.0	"	9 Support - HL	"
25	102	5		"	9 Support - HL	"
24	103	5		"	9 Support - HL	"
24	105		.8	"	9 Support - HL	"
24	107		.8	"	9 Support - HL	"
24	109		.4	"	9 Support - HL	"
24	113		.5	"	9 Support - HL	"
24	115		.3	"	10 Support - HL	"
24	119	8		"	9 Support - HL	"
23	114		.5	"	9 Support - HL	"
23	110		.5	4	9 Support - HL	7
22	107		2.0	"	9 Support - HL	"
22	105		2.4	"	9 Support - HL	"
21	104		.5	"	9 Support - HL	"
22	103		.5	"	9 Support - HL	"
23	102		.5	"	9 Support - HL	"
22	101		2.0	"	9 Support - HL	"
23	100		2.4	"	9 Support - HL	"
23	98		.5	"	9 Support - HL	"
22	95		1.5	"	9 Support - HL	"
23	94		.5	"	9 Support - HL	"

DENT MAGNITUDE EDDY CURRENT TEST RESULTS

Steam Generator 11

June 1982

Line	Row	V/P-P		Quad	Location	Reel
		400 HG	400 LG			
22	93		2.0	4	9 Support - HL	7
23	92		1.5	"	9 Support - HL	"
22	91		1.8	"	9 Support - HL	"
24	91		2.0	"	9 Support - HL	"
26	91		1.0	"	9 Support - HL	"
28	91		1.0	"	9 Support - HL	"
30	91		1.2	"	9 Support - HL	"
32	91		1.8	"	9 Support - HL	"
35	92		.5	"	9 Support - HL	"
35	94		.5	"	9 Support - HL	"
35	98		.5	"	9 Support - HL	"
35	100		1.0	"	9 Support - HL	"
36	95		.6	"	9 Support - HL	"
36	93		.3	"	9 Support - HL	"
37	100		3.0	"	9 Support - HL	"
38	99		1.5	"	9 Support - HL	"
38	95		1.5	"	9 Support - HL	"
38	93		2.0	"	9 Support - HL	"
38	91		2.0	"	9 Support - HL	"
39	92		3.5	"	9 Support - HL	"
39	96		1.8	"	9 Support - HL	"
39	98		1.8	"	9 Support - HL	"
39	100		1.6	"	9 Support - HL	"
40	91		2.0	"	9 Support - HL	"
40	91		1.8	1	9 Support - HL	8
39	94		2.0	"	9 Support - HL	"
39	92		2.2	"	9 Support - HL	"
38	91		.8	"	9 Support - HL	"
"	"		.8	"	9 Support - CL	"

DENT MAGNITUDE
EDDY CURRENT TEST RESULTS

Steam Generator 11

June 1982

Line	Row	V/P-P		Quad	Location	Reel
		400 HG	400 LG			
38	93		2.0	1	9 Support - HL	8
37	94		.8	"	9 Support - HL	"
30	91		.8	"	9 Support - HL	"
28	91		1.5	"	9 Support - HL	"
26	91		.5	"	9 Support - HL	"
24	91		2.0	"	9 Support - HL	"
22	91		2.0	"	9 Support - HL	"
23	92		1.0	"	9 Support - HL	"
22	93		1.8	"	9 Support - HL	"
23	94		2.0	"	9 Support - HL	"
22	95		1.5	"	9 Support - HL	"
23	96		1.0	"	9 Support - HL	"
22	97		3.0	"	9 Support - HL	"
23	98		.5	"	9 Support - HL	"
22	117		.5	"	10 Support - HL	9
22	119		.5	"	10 Support - HL	9
22	121		.5	"	10 Support - HL	"
22	129	8		"	10 Support - HL	"
46	91		1.6	4	9 Support - HL	9
44	91		2.5	"	9 Support - HL	"
23	96		.5	"	9 Support - HL	"
52	97	10.0		"	9 Support - HL	"
48	91		1.6	"	9 Support - HL	"
42	91		1.2	"	9 Support - HL	"
23	120	10.0		"	10 Support - HL	"
23	122		.5	"	10 Support - HL	"

DENT MAGNITUDE
EDDY CURRENT TEST RESULTS

Steam Generator 11

June 1982

Line	Row	V/P-P		Quad	Location	Reel
		400 HG	400 LG			
3	94		2.0	4	9 Support - HL	10
2	95		1.6	"	9 Support - HL	"
3	98		1.2	"	9 Support - HL	"
2	97		3.5	"	9 Support - HL	"
3	96		3.0	"	9 Support - HL	"
2	99		2.0	"	9 Support - HL	"
3	100		3.0	"	9 Support - HL	"
2	101		1.0	"	9 Support - HL	11
3	102		.5	"	9 Support - HL	"
3	104		.3	"	9 Support - HL	"
2	105		.3	"	9 Support - HL	"
3	108		1.6	"	9 Support - HL	"
2	113	8.0		"	9 Support - HL	"
2	127	2.0		1	9 Support - HL	10
1	122	1.0		"	9 Support - HL	"
2	121	1.0		"	9 Support - HL	"
2	119	2.0		"	9 Support - HL	"
1	110		1.0	"	9 Support - HL	"
2	109		1.0	"	9 Support - HL	"
3	108		1.5	"	9 Support - HL	"
3	106		1.8	"	9 Support - HL	"
1	108		1.2	"	9 Support - HL	"
2	105		.6	"	9 Support - HL	"
3	104		1.2	"	9 Support - HL	"
3	102		.5	"	9 Support - HL	"
1	104	8.0		"	9 Support - HL	"
1	102		.5	"	9 Support - HL	"
2	101		.3	"	9 Support - HL	"
3	100		1.2	"	9 Support - HL	"
3	98		1.6	"	9 Support - HL	"
2	99		2.6	"	9 Support - HL	"

DENT MAGNITUDE
EDDY CURRENT TEST RESULTS

Steam Generator 11

June 1982

Line	Row	V/P-P		Quad	Location	Reel
		400 HG	400 LG			
1	100		2.2	1	9 Support - HL	10
1	98		2.8	"	9 Support - HL	"
2	97		2.4	"	9 Support - HL	"
3	96		2.0	"	9 Support - HL	"
3	94		3.4	"	9 Support - HL	"
2	95		1.6	"	9 Support - HL	"
1	96		2.8	"	9 Support - HL	"
1	94		.5	"	9 Support - HL	"
2	91		1.0	4	9 Support - HL	"
3	92		.5	"	9 Support - HL	"
39	38	10.0		1	4 EC - CL	12
30	65	10.0		"	4 EC - HL	13
23	120	10.0		"	10 Support - HL	14
32	122	10.0		"	10 Support - HL	"
40	3			"	No HL straight	"
41	2			"	No HL straight	"
43	2			"	No HL straight	"
45	2			"	No HL straight	"
47	2			"	No HL straight	"
49	2			"	No HL straight	"
51	2			"	No HL straight	"
53	2			"	No HL straight	"
55	2			"	No HL straight	"
57	2			"	No HL straight	"
59	2			"	No HL straight	"
58	1			"	No HL straight	"
56	1			"	No HL straight	"
54	1			"	No HL straight	"
40	3			"	No HL straight	"
40	1			"	No HL straight	"
42	1			"	No HL straight	"

DENT MAGNITUDE
EDDY CURRENT TEST RESULTS

Steam Generator 11

June 1982

<u>Line</u>	<u>Row</u>	<u>V/P-P</u>		<u>Quad</u>	<u>Location</u>	<u>Reel</u>
		<u>400 HG</u>	<u>400 LG</u>			
44	1			1	No HL straight	14
46	1			"	No HL straight	"
48	1			"	No HL straight	"
50	1			"	No HL straight	"
52	1			"	No HL straight	"

DENT MAGNITUDE
EDDY CURRENT TEST RESULTS

Steam Generator 11

June 1982

<u>Line</u>	<u>Row</u>	<u>V/P-P</u>		<u>Quad</u>	<u>Location</u>	<u>Reel</u>
		<u>400 HG</u>	<u>400 LG</u>			
62	95	95%	Saturated	4	9 Support - CL	5
23	136	95%	Saturated	4	9 Support - HL	7

SLUDGE
EDDY CURRENT TEST RESULTS

Steam Generator 11

June 1982

<u>Line</u>	<u>Row</u>	<u>Inlet</u>	<u>Outlet</u>	<u>Quad</u>	<u>Reel</u>
1	88	$\frac{1}{2}$	$\frac{1}{2}$	1	11
2	37	$\frac{1}{2}$	$\frac{1}{2}$	"	"
1	86	$\frac{1}{2}$	$\frac{1}{2}$	"	"
2	85	$\frac{1}{2}$	$\frac{1}{2}$	"	"
1	84	$\frac{1}{2}$	$\frac{1}{2}$	"	"
2	83	$\frac{1}{2}$	$\frac{1}{2}$	"	"
1	82	1.0	0	"	"
2	81	1.0	$\frac{1}{2}$	"	"
1	80	1.0	0	"	"
2	79	1.0	0	"	"
1	78	2.0	0	"	"
1	76	2.5	0	"	"
2	75	4.0	0	"	"
1	74	4.0	0	"	"
2	73	4.0	$\frac{1}{2}$	"	"
1	72	4.0	0	"	"
2	71	5.0	0	"	"
1	70	3.0	0	"	"
2	69	3.0	0	"	"
1	68	3.0	0	"	"
2	68	2.5	0	"	"
2	67	2.5	0	"	"
1	66	2.0	0	"	"
2	65	2.0	0	"	"
1	64	1.5	0	"	"
2	63	1.0	0	"	"
1	62	1.0	0	"	"
2	61	$\frac{1}{2}$	0	"	"
1	60	$\frac{1}{2}$	0	"	"
41	18	$\frac{1}{2}$	-	"	"

SLUDGE
EDDY CURRENT TEST RESULTS

Steam Generator 11

June 1982

<u>Line</u>	<u>Row</u>	<u>Inlet</u>	<u>Outlet</u>	<u>Quad</u>	<u>Reel</u>
41	16	$\frac{1}{2}$	1.0	1	11
41	14	$\frac{1}{2}$	1.0	"	"
42	13	$\frac{1}{2}$	1.0	"	"
42	15	$\frac{1}{2}$	1.0	"	"
42	17	$\frac{1}{2}$	1.5	"	"
42	19	$\frac{1}{2}$	1.0	"	"
43	18	$\frac{1}{2}$	1.5	"	"
43	16	$\frac{1}{2}$	1.0	"	"
43	14	$\frac{1}{2}$	2.0	"	"
44	13	$\frac{1}{2}$	1.5	"	"
44	15	$\frac{1}{2}$	1.5	"	"
44	17	$\frac{1}{2}$	1.5	"	"
44	19	$\frac{1}{2}$	1.0	"	"
45	18	$\frac{1}{2}$	1.0	"	"
45	16	$\frac{1}{2}$	1.5	"	"
45	14	$\frac{1}{2}$	1.5	"	"
46	13	$\frac{1}{2}$	2.5	"	"
46	15	$\frac{1}{2}$	2.5	"	"
46	17	$\frac{1}{2}$	1.5	"	"
46	19	$\frac{1}{2}$	1.5	"	"
47	18	$\frac{1}{2}$	1.0	"	"
47	16	$\frac{1}{2}$	1.0	"	"
47	14	0	1.5	"	"
48	13	0	1.5	"	"
48	15	0	1.5	"	"
48	17	$\frac{1}{2}$	1.5	"	"
48	19	$\frac{1}{2}$	1.0	"	"
49	18	$\frac{1}{2}$	$\frac{1}{2}$	"	"
"	"	$\frac{1}{2}$	$\frac{1}{2}$	4	12
49	16	$\frac{1}{2}$	1.0	"	"

SLUDGE
EDDY CURRENT TEST RESULTS

Steam Generator 11

June 1982

<u>Line</u>	<u>Row</u>	<u>Inlet</u>	<u>Outlet</u>	<u>Quad</u>	<u>Reel</u>
49	14	0	1½	4	12
50	13	0	1½	"	"
50	15	0	1.0	"	"
50	17	½	½	"	"
50	19	½	½	"	"
51	18	½	½	"	"
51	16	½	½	"	"
51	14	½	1.0	"	"
2	61	½	0	"	"
2	63	1.0	0	"	"
2	65	2.0	0	"	"
2	67	2.0	0	"	"
2	69	2.0	0	"	"
2	71	4.0	0	"	"
2	73	3.5	0	"	"
2	75	3.5	0	"	"
2	79	2.0	0	"	"
3	78	2.0	0	"	"
3	76	3.0	0	"	"
3	74	3.0	0	"	"
4	73	3.0	0	"	"
4	75	3.0	½	"	"
4	77	2.5	½	"	"
4	79	2.0	½	"	"
6	75	2.0	½	"	"
8	73	2½	0	"	"
9	74	2½	0	"	"
51	104	0	0	1	"
60	1	0	0	"	"
41	52	½	½	"	"

SLUDGE
EDDY CURRENT TEST RESULTS

Steam Generator 11

June 1982

<u>Line</u>	<u>Row</u>	<u>Inlet</u>	<u>Outlet</u>	<u>Quad</u>	<u>Reel</u>
41	50	$\frac{1}{2}$	$\frac{1}{2}$	1	12
40	49	$\frac{1}{2}$	$\frac{1}{2}$	"	"
40	45	1.0	$\frac{1}{2}$	"	"
41	44	1.0	$\frac{1}{2}$	"	"
40	43	1.0	$\frac{1}{2}$	"	"
41	40	1.0	$\frac{1}{2}$	"	"
33	34	2.0	$\frac{1}{2}$	"	"
33	36	2.0	$\frac{1}{2}$	"	"
33	38	$1\frac{1}{2}$	$\frac{1}{2}$	"	"
34	39	$1\frac{1}{2}$	$\frac{1}{2}$	"	"
34	35	1.0	$\frac{1}{2}$	"	"
35	34	$\frac{1}{2}$	$\frac{1}{2}$	"	"
35	36	$\frac{1}{2}$	$\frac{1}{2}$	"	"
35	38	1.0	$\frac{1}{2}$	"	"
35	40	1.0	$\frac{1}{2}$	"	"
36	35	$\frac{1}{2}$	$\frac{1}{2}$	"	"
37	38	$1\frac{1}{2}$	$\frac{1}{2}$	"	"
37	40	$1\frac{1}{2}$	$\frac{1}{2}$	"	"
39	34	$\frac{1}{2}$	$\frac{1}{2}$	"	"
39	36	$1\frac{1}{2}$	$\frac{1}{2}$	"	"
39	38	$1\frac{1}{2}$	$\frac{1}{2}$	"	"
40	37	$1\frac{1}{2}$	$\frac{1}{2}$	"	"
40	35	$1\frac{1}{2}$	$\frac{1}{2}$	"	"
40	33	$\frac{1}{2}$	$\frac{1}{2}$	"	"
41	32	1.0	$\frac{1}{2}$	"	"
41	28	1.0	1.0	"	13
40	27	1.0	1.0	"	"
41	26	1.0	1.0	"	"
40	25	$\frac{1}{2}$	1.0	"	"
41	24	$\frac{1}{2}$	1.0	"	"

SLUDGE
EDDY CURRENT TEST RESULTS

Steam Generator 11

June 1982

<u>Line</u>	<u>Row</u>	<u>Inlet</u>	<u>Outlet</u>	<u>Quad</u>	<u>Reel</u>
40	23	$\frac{1}{2}$	1.0	1	13
41	20	$\frac{1}{2}$	1.0	"	"
41	17	$\frac{1}{2}$	$\frac{1}{2}$	"	"
41	16	0	$\frac{1}{2}$	"	"
40	15	0	0	"	"
41	14	0	0	"	"
43	12	0	0	"	"
45	12	0	0	"	"
51	12	0	0	"	"
57	12	0	0	"	"
58	11	0	0	"	"
50	11	0	0	"	"
42	11	0	0	"	"
56	9	0	0	"	"
54	9	0	0	"	"
47	8	0	0	"	"
43	9	0	0	"	"
40	7	0	0	"	"
41	6	0	0	"	"
35	66	0	0	"	"
35	68	0	0	"	"
35	70	0	0	"	"
34	65	$\frac{1}{2}$	$\frac{1}{2}$	"	"
32	65	0	0	"	"
31	70	0	0	"	"
30	69	$\frac{1}{2}$	$\frac{1}{2}$	"	"
29	66	$\frac{1}{2}$	$\frac{1}{2}$	"	"
29	70	$\frac{1}{2}$	$\frac{1}{2}$	"	14
18	137	0	0	"	"
17	134	0	0	"	"
23	120	0	0	"	"

SLUDGE
EDDY CURRENT TEST RESULTS

Steam Generator 11

June 1982

<u>Line</u>	<u>Row</u>	<u>Inlet</u>	<u>Outlet</u>	<u>Quad</u>	<u>Reel</u>
23	126	0	0	1	14
38	125	0	0	"	"
40	5	-	0	"	"
41	4	-	0	"	"
41	2	-	0	"	"
51	2	-	0	"	"
58	1	-	0	"	"

APPENDIX II

Dent Magnitude
Sludge

Eddy Current Test Results
Steam Generator 12

DENT MAGNITUDE
EDDY CURRENT TEST RESULTS

Steam Generator 12

June 1982

<u>Line</u>	<u>Row</u>	<u>V/P-P</u>		<u>Quad</u>	<u>Location</u>	<u>Reel</u>
		<u>400 HG</u>	<u>400 LG</u>			
58	101	(No HL TS)		4	Incomplete test	2
				"		
				"		
35	94	10		"	9 Support - CL 10"	6
36	93		2.8	"	9 Support - HL	"
38	95		2.8	"	9 Support - HL	"
38	93		2.8	"	9 Support - HL	"
38	91		1.4	"	9 Support - HL	"
39	92		1.4	"	9 Support - HL	"
39	94		3.0	"	9 Support - HL	"
42	91		.5	"	9 Support - HL	"
44	91		3.0	"	9 Support - HL	"
46	91		1.8	"	9 Support - HL	"
48	91		2.0	"	9 Support - HL	"
51	94		.5	"	9 Support - HL	"
39	100	8		1	9 Support - HL	8
39	98		1.0	"	9 Support - HL	"
39	96		1.0	"	9 Support - HL	"
39	94		1.5	"	9 Support - HL	"
39	92		2.0	"	9 Support - HL	"
38	93		2.0	"	9 Support - HL	"
38	95		1.5	"	9 Support - HL	9
38	97		1.5	"	9 Support - HL	"
38	99		.6	"	9 Support - HL	"
37	100		2.4	"	9 Support - HL	"
37	98		1.0	"	9 Support - HL	"
37	96		1.2	"	9 Support - HL	"
37	94		.5	"	9 Support - HL	"
36	95		.5	"	9 Support - HL	"
36	99		2.0	"	9 Support - HL	"
35	100		1.0	"	9 Support - HL	"
35	98		1.4	"	9 Support - HL	"

DENT MAGNITUDE
EDDY CURRENT TEST RESULTS

Steam Generator 12

June 1982

Line	Row	V/P-P		Quad	Location	Reel
		400 HG	400 LG			
35	96		2.4	1	9 Support - HL	9
35	94		1.2	"	9 Support - HL	"
35	92		1.4	"	9 Support - HL	"
32	91		1.0	"	9 Support - HL	"
28	91		1.2	"	9 Support - HL	"
26	91		1.0	"	9 Support - HL	"
24	91		1.2	"	9 Support - HL	"
22	91		2.2	"	9 Support - HL	"
23	92		2.0	"	9 Support - HL	"
22	93		1.5	"	9 Support - HL	"
23	94		2.8	"	9 Support - HL	"
22	95		2.0	"	9 Support - HL	"
22	96		2.0	"	9 Support - HL	"
22	97		2.0	"	9 Support - HL	"
23	98		2.0	"	9 Support - HL	"
22	99		2.0	"	9 Support - HL	"
23	100		4.0	"	9 Support - HL	"
22	101		1.8	"	9 Support - HL	"
23	102		.3	"	9 Support - HL	"
22	103		1.2	"	9 Support - HL	"
19	104		.3	"	9 Support - HL	"
17	104		1.6	"	9 Support - HL	"
23	108		.5	"	9 Support - HL	"
22	109		1.6	"	9 Support - HL	"
22	115	4		"	9 Support - HL	"
22	117		1.0	"	10 Support - HL	"
22	119		1.6	"	10 Support - HL	"
2	138	4.5		4	7 EC	10
2	119		.3	1	9 Support - HL	"
1	118		.3	"	9 Support - HL	"
2	117		1.2	"	9 Support - HL	"

DENT MAGNITUDE
EDDY CURRENT TEST RESULTS

Steam Generator 12

June 1982

Line	Row	V/P-P		Quad	Location	Reel
		400 HG	400 LG			
1	116		1.0	1	9 Support - HL	10
2	115		1.6	"	9 Support - HL	"
1	114	10.0		"	9 Support - HL	"
2	113		.8	"	9 Support - HL	"
1	112		.3	"	9 Support - HL	"
1	110		.6	"	9 Support - HL	"
2	109		.3	"	9 Support - HL	"
1	108		.8	"	9 Support - HL	"
1	106		.3	"	9 Support - HL	"
1	105		.3	"	9 Support - HL	"
3	104		2.4	"	9 Support - HL	"
3	102		1.6	"	9 Support - HL	"
2	103		1.0	"	9 Support - HL	"
1	104		1.0	"	9 Support - HL	"
1	102		2.8	"	9 Support - HL	"
2	101		.6	"	9 Support - HL	"
3	100		2.0	"	9 Support - HL	"
3	98		2.6	"	9 Support - HL	"
2	99		.8	"	9 Support - HL	"
1	100		2.2	"	9 Support - HL	"
1	98		1.4	"	9 Support - HL	"
2	97		.3	"	9 Support - HL	"
3	96		2.8	"	9 Support - HL	"
3	94		1.8	"	9 Support - HL	"
2	95		.3	"	9 Support - HL	"
1	96		.3	"	9 Support - HL	"
2	93		2.6	4	9 Support - HL	"
3	94		2.0	"	9 Support - HL	"
2	95		2.4	"	9 Support - HL	"
3	96		1.4	"	9 Support - HL	"
2	97		1.0	"	9 Support - HL	"
3	98		2.4	"	9 Support - HL	"

DENT MAGNITUDE
EDDY CURRENT TEST RESULTS

Steam Generator 12

June 1982

Line	Row	V/P-P		Quad	Location	Reel
		400 HG	400 LG			
2	99		3.0	4	9 Support - HL	11
3	100		2.8	"	9 Support - HL	"
2	101		1.6	"	9 Support - HL	"
3	102		2.0	"	9 Support - HL	"
2	103		1.4	"	9 Support - HL	"
3	104		2.8	"	9 Support - HL	"
2	105		1.2	"	9 Support - HL	"
3	106		2.0	"	9 Support - HL	"
3	108		2.2	"	9 Support - HL	"
2	109		1.2	"	9 Support - HL	"
2	111		1.2	"	9 Support - HL	"
2	113		2.2	"	9 Support - HL	"
2	115		2.0	"	9 Support - HL	"
2	117		1.2	"	9 Support - HL	"
2	119		.3	"	9 Support - HL	"
23	124		.3	"	10 Support - HL	"
23	110		.3	"	9 Support - HL	"
23	108		1.0	"	9 Support - HL	"
23	106		.6	"	9 Support - HL	"
23	104		.6	"	9 Support - HL	"
21	104		2.4	"	9 Support - HL	"
19	104		3.4	"	9 Support - HL	"
23	102		.3	"	9 Support - HL	"
23	100		2.2	"	9 Support - HL	"
23	98		3.0	"	9 Support - HL	"
23	96		2.2	"	9 Support - HL	"
23	94		.8	"	9 Support - HL	"
25	92		2.2	"	9 Support - HL	"
24	93		.3	"	9 Support - HL	"
25	94		2.2	"	9 Support - HL	"
24	97		.3	"	9 Support - HL	"

DENT MAGNITUDE
EDDY CURRENT TEST RESULTS

Steam Generator 12

June 1982

Line	Row	V/P-P		Quad	Location	Reel
		400 HG	400 LG			
25	98		2.6	4	9 Support - HL	11
24	99		3.2	"	9 Support - HL	"
25	100		2.8	"	9 Support - HL	"
24	101		2.2	"	9 Support - HL	"
25	102		2.8	"	9 Support - HL	"
24	103		.8	"	9 Support - HL	"
23	104		1.0	"	9 Support - HL	"
25	104		1.8	"	9 Support - HL	"
25	106		1.4	"	9 Support - HL	"
24	107		1.8	"	9 Support - HL	"
24	111		.3	"	9 Support - HL	"
25	112		1.6	"	9 Support - HL	"
2	73	10 PV		"	4 EC - 4" CL	12
2	75	10 PV		"	4 EC - HL	"
4	73	10 PV		"	4 EC - 4" HL	"
5	74	8		"	7 EC Multiple dents	"
6	73	10 PV		"	4 EC - 4" HL	"
39	36	10 PV		1	2 EC - 4" HL	14
35	36	10 PV		"	2 EC - 4" CL	"
33	38	10 PV		"	1 EC + 4" CL	"

DENT MAGNITUDE
EDDY CURRENT TEST RESULTS

Steam Generator 12

June 1982

<u>Line</u>	<u>Row</u>	<u>V/P-P</u>		<u>Quad</u>	<u>Location</u>	<u>Reel</u>
		<u>400 HG</u>	<u>400 LG</u>			
64	91	95%		4	9 Support - HL	3

SLUDGE
EDDY CURRENT TEST RESULTS

Steam Generator 12

June 1982

<u>Line</u>	<u>Row</u>	<u>Inlet</u>	<u>Outlet</u>	<u>Quad</u>	<u>Reel</u>
1	88	1.0	$\frac{1}{2}$	1	12
2	87	1.0	$\frac{1}{2}$	"	"
2	83	2.0	$\frac{1}{2}$	"	"
1	82	2.5	$\frac{1}{2}$	"	"
2	81	3.0	$\frac{1}{2}$	"	"
1	78	5.0	0	"	"
1	76	4.0	0	"	"
2	71	3.5	0	"	"
1	70	3.5	0	"	"
2	67	2.0	0	"	"
2	65	2.0	0	4	"
2	71	11.0 (or 0)	0	"	"
2	73	12.0 (or 0)	0	"	"
2	75	5.0	0	"	"
3	78	4.0	0	"	"
3	76	5 (or 10)	0	"	"
3	74	5 (or 10)	0	"	"
4	73	10 (?)	0	"	"
4	75	5 (or 10)	0	"	"
4	77	5	0	"	"
4	79	5 (or 10)	0	"	"
5	78	2 $\frac{1}{2}$ (or 10)	0	"	"
6	73	4 $\frac{1}{2}$	0	"	"
6	77	6.0	0	"	"
6	79	2 $\frac{1}{2}$ (or 10)	0	"	"
6	78	2 $\frac{1}{2}$ (or 7)	0	"	"
7	74	3 $\frac{1}{2}$	0	"	"
8	73	3 $\frac{1}{2}$	0	"	"
8	75	3 $\frac{1}{2}$	-	"	13
40	9	0	0	"	"
41	10	0	0	"	"

SLUDGE
EDDY CURRENT TEST RESULTS

Steam Generator 12

June 1982

<u>Line</u>	<u>Row</u>	<u>Inlet</u>	<u>Outlet</u>	<u>Quad</u>	<u>Reel</u>
44	9	0	$\frac{1}{2}$	4	13
44	8	0	$\frac{1}{2}$	"	"
44	9	0	1.0	"	"
47	8	0	1.0	"	"
48	9	0	$1\frac{1}{2}$	"	"
52	9	0	$\frac{1}{2}$	"	"
51	8	0	$\frac{1}{2}$	"	"
59	8	$\frac{1}{2}$	$\frac{1}{2}$	"	"
55	10	$\frac{1}{2}$	$\frac{1}{2}$	"	"
49	10	2.0	1.0	"	"
47	10	0	2.0	"	"
43	10	0	$\frac{1}{2}$	"	"
42	11	0	$\frac{1}{2}$	"	"
46	11	0	2.0	"	"
48	11	0	1.0	"	"
50	11	0	1.0	"	"
58	11	2.0	$\frac{1}{2}$	"	"
59	12	3.5	$\frac{1}{2}$	"	"
57	12	1.0	$\frac{1}{2}$	"	"
53	12	1.0	$\frac{1}{2}$	"	"
43	12	0	1.0	"	"
41	12	0	$\frac{1}{2}$	"	"
46	11	$2\frac{1}{2}$	0	"	"
40	13	$\frac{1}{2}$	1.0	"	"
41	14	0	1.0	"	"
40	15	0	1.0	"	"
41	22	0	$\frac{1}{2}$	"	"
41	24	0	$\frac{1}{2}$	1	"
41	30	1.0	0	"	"
40	31	1.0	0	"	"
41	34	1.0	0	"	"

SLUDGE
EDDY CURRENT TEST RESULTS

Steam Generator 12

June 1982

<u>Line</u>	<u>Row</u>	<u>Inlet</u>	<u>Outlet</u>	<u>Quad</u>	<u>Reel</u>
40	35	1.5	0	1	13
41	38	2½	0	"	"
40	37	2½	0	"	"
39	40	2½	0	"	14
38	35	2.0	0	"	"
38	37	1.5	0	"	"
34	37	1.5	0	"	"
34	39	2.5	0	"	"
40	47	1.0	0	"	"
40	51	1.0	½	"	"
35	66	0	0	"	"
35	68	0	½	"	"
35	70	0	½	"	"
31	70	0	½	"	"
30	67	½	0	"	"
30	65	1.0	0	"	"
29	68	½	0	"	"
29	70	0	0	"	"
40	3	0	0	"	"
41	18	½	1.0	4	"
41	16	0	½	"	"
41	14	0	½	"	"
42	17	½	1.0	"	"
42	19	½	1.0	"	"
43	16	0	1.0	"	"
43	14	0	½	"	"
43	13	0	½	"	"

All Row 1 and 2 of Reel 14 have no sludge

SLUDGE
EDDY CURRENT TEST RESULTS

Steam Generator 12

June 1982

<u>Line</u>	<u>Row</u>	<u>Inlet</u>	<u>Outlet</u>	<u>Quad</u>	<u>Reel</u>
44	17	$\frac{1}{2}$	$\frac{1}{2}$	4	15
44	19	$\frac{1}{2}$	$\frac{1}{2}$	"	"
45	14	0	1.0	"	"
46	13	0	1.0	"	"
46	17	$\frac{1}{2}$	1.0	"	"
46	19	$\frac{1}{2}$	2.0	"	"
49	16	$\frac{1}{2}$	2.0	"	"
49	14	0	2.0	"	"
50	13	0	2.0	"	"
50	15	$\frac{1}{2}$	1.0	"	"
50	17	1.0	1.5	"	"
50	19	1.0	1.0	"	"
51	18	1.0	1.0	"	"
51	14	0	1.0	"	"

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APPENDIX III

Listing of Inspected Tubes
Steam Generator 11

TUBES TESTED IN STEAM GENERATOR NO. 11
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
64	89	1	1				
63	90	1	1	50	113	1	1
64	91	1	1	49	114	1	1
63	92	1	1	48	113	1	1
62	93	1	1	48	115	1	1
61	94	1	1	47	114	1	1
62	95	1	1	47	116	1	1
61	96	1	1	46	115	1	1
60	97	1	1	46	117	1	1
60	99	1	1	45	116	1	1
59	98	1	1	45	118	1	1
59	100	1	1	44	117	1	2
58	99	1	1	44	119	1	2
58	101	1	1	43	118	1	2
57	102	1	1	43	120	1	2
57	104	1	1	42	119	1	2
56	103	1	1	42	121	1	2
54	103	1	1	41	120	1	2
52	103	1	1	41	122	1	2
55	104	1	1	39	120	1	2
56	105	1	1	37	120	1	2
55	106	1	1	35	120	1	2
54	107	1	1	40	121	1	2
53	106	1	1	40	123	1	2
53	108	1	1	39	122	1	2
52	107	1	1	39	124	1	2
52	109	1	1	38	123	1	2
51	110	1	1	38	125	1	2
51	112	1	1	37	126	1	2

TUBES TESTED IN STEAM GENERATOR NO. 11
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
36	125	1	2	20	135	1	2
36	127	1	2	20	137	1	2
35	126	1	2	19	134	1	2
35	128	1	2	19	136	1	2
34	127	1	2	18	135	1	2
34	129	1	2	18	137	1	2 RT14
33	128	1	2	17	134	1	2 RT14
33	130	1	2	17	136	1	2 RT14
32	127	1	2				
32	129	1	2	16	135	1	2
31	128	1	2	16	137	1	2
31	120	1	2				
30	131	1	2	13	136	1	2
30	129	1	2	13	138	1	2
29	130	1	2	12	137	1	2
29	132	1	2	12	139	1	2
28	131	1	2	11	136	1	2
28	133	1	2	11	138	1	2
27	132	1	2	10	137	1	3
27	134	1	2	10	139	1	3
26	131	1	2	9	138	1	3
26	133	1	2	9	140	1	3
25	132	1	2	8	137	1	3
25	134	1	2	8	139	1	3
24	133	1	2	7	138	1	3
24	135	1	2	7	140	1	3
23	134	1	2	6	137	1	3
23	136	1	2	6	139	1	3
22	133	1	2	5	138	1	3
22	135	1	2	5	140	1	3
21	134	1	2	4	137	1	3
21	136	1	2	4	139	1	3

TUBES TESTED IN STEAM GENERATOR NO. 11
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>		<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	
3	138	1	3		16	135	4	3	PT
3	140	1	3		17	134	4	3	PT
2	139	1	3		17	136	4	3	PT
1	140	1	3		17	138	4	3	
1	138	1	3		6	139	4	3	
2	139	4	3		6	137	4	3	
3	138	4	3	RT7	7	138	4	3	
3	140	4	3		5	140	4	3	
4	139	4	3		7	140	4	3	
4	137	4	3		8	139	4	3	
5	138	4	3		8	137	4	3	
5	140	4	3	RT9	9	138	4	3	
6	139	4	3	PT	9	140	4	3	
6	137	4	3	PT	10	139	4	3	
7	138	4	3	PT	10	137	4	3	
8	132	4	3	PT	11	136	4	3	
8	137	4	3	PT	11	138	4	3	
9	138	4	3	PT	12	139	4	3	
9	140	4	3	PT	12	137	4	3	
10	139	4	3	PT	13	138	4	3	
10	137	4	3	PT	13	136	4	3	
11	136	4	3	PT	14	137	4	3	
11	138	4	3	PT	14	135	4	3	
12	139	4	3	PT	15	136	4	3	
12	137	4	3	PT	15	138	4	3	
13	138	4	3	PT	16	137	4	3	
13	136	4	3	PT	16	135	4	4	
14	137	4	3	PT	17	134	4	4	
14	135	4	3	PT	17	136	4	4	
15	138	4	3	PT	17	138	4	4	
16	137	4	3	PT	18	137	4	4	

TUBES TESTED IN STEAM GENERATOR NO. 11
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
18	135	4	4	35	128	4	4
19	134	4	4	35	126	4	4
19	136	4	4	36	127	4	4
20	135	4	4	36	125	4	4
20	137	4	4	37	126	4	4
21	134	4	4	41	120	4	4
21	136	4	4	39	120	4	4
22	133	4	4	42	121	4	4
22	135	4	4	42	119	4	4
23	134	4	4	43	120	4	4
24	133	4	4	43	118	4	4
24	135	4	4	44	119	4	4
25	134	4	4	44	117	4	4
25	132	4	4	45	118	4	4
26	133	4	4	45	116	4	4
26	131	4	4	46	117	4	4
27	132	4	4	46	115	4	4
27	134	4	4	47	116	4	4
28	133	4	4	47	114	4	4
28	131	4	4	48	115	4	4
29	132	4	4	48	113	4	4
29	130	4	4	49	114	4	4
30	131	4	4	49	112	4	4
30	129	4	4	50	113	4	4
31	130	4	4	51	112	4	4
31	128	4	4	50	111	4	4
32	129	4	4	51	110	4	4
32	127	4	4	52	109	4	4
33	128	4	4	52	107	4	4
33	130	4	4	53	108	4	4
34	129	4	4	53	106	4	4
34	127	4	4	54	107	4	4

TUBES TESTED IN STEAM GENERATOR NO. 11
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>		<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	
55	106	4	4		47	90	4	5	RT9
55	104	4	4		48	91	4	5	RT9
53	104	4	5	RT9	49	90	4	5	RT9
51	104	4	5	RT9	50	91	4	5	RT9
56	105	4	5	RT9	51	90	4	5	RT9
56	103	4	5	RT9	51	92	4	5	RT9
35	88	4	5	RT7	51	94	4	5	RT9
35	90	4	5	RT7	51	96	4	5	RT9
35	92	4	5	RT7	51	98	4	5	RT9
35	94	4	5	RT7	52	99	4	5	RT9
36	95	4	5	RT7	52	97	4	5	RT9
36	93	4	5	RT7	52	95	4	5	RT9
36	91	4	5	RT7	52	93	4	5	RT9
36	89	4	5	RT7	52	91	4	5	RT9
37	88	4	5	RT7	53	90	4	5	RT9
37	90	4	5	RT7	54	91	4	5	RT9
37	94	4	5	RT7	23	90	4	5	RT7
38	95	4	5	RT7	24	89	4	5	
38	93	4	5	RT7	24	91	4	5	RT7
38	91	4	5	RT7	25	90	4	5	RT7
38	89	4	5	RT7	23	92	4	5	RT7
39	88	4	5	RT7	23	94	4	5	RT7
39	90	4	5	RT7	23	96	4	5	RT7
39	92	4	5	RT7	23	98	4	5	RT7
39	94	4	5	RT7	23	100	4	5	RT7
40	91	4	5	RT7	23	102	4	5	RT7
41	90	4	5	RT7	55	90	4	5	RT9
42	91	4	5	RT9	56	91	4	5	RT9
43	90	4	5	RT9	57	90	4	5	RT9
44	91	4	5	RT9	58	91	4	5	RT9
45	90	4	5	RT9	59	90	4	5	RT9
46	91	4	5	RT9	60	91	4	5	RT9

TUBES TESTED IN STEAM GENERATOR NO. 11
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>		<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
61	90	4	5	RT10	25	106	4	6
62	91	4	5	RT10	24	107	4	6
64	89	4	5	RT10	25	108	4	6
64	91	4	5	RT10	24	109	4	6
63	90	4	5	RT10	25	110	4	6
63	92	4	5	RT10	24	111	4	6
62	93	4	5	RT10	25	112	4	6
62	95	4	5	RT10	25	113	4	6
61	94	4	5	RT9	25	114	4	6
61	96	4	6		24	115	4	6
60	97	4	6		25	116	4	6
60	99	4	6		24	117	4	6
59	98	4	6		25	118	4	6
59	100	4	6		24	119	4	6
58	99	4	6		25	120	4	6
58	101	4	6		24	121	4	6
57	102	4	6		25	122	4	6
57	104	4	6		24	123	4	6
25	92	4	6		25	124	4	6
24	93	4	6		24	125	4	6
25	94	4	6		25	126	4	6
24	95	4	6		24	127	4	6
25	96	4	6		25	128	4	6
24	97	4	6		24	129	4	6
25	98	4	6		25	130	4	6
24	99	4	6		24	131	4	6
25	100	4	6		23	132	4	6
24	101	4	6		22	131	4	6
25	102	4	6		23	130	4	6
24	103	4	6		22	129	4	6
25	104	4	6		23	128	4	6
24	105	4	6		22	127	4	6

TUBES TESTED IN STEAM GENERATOR NO. 11
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
23	126	4	6	22	97	4	7
22	125	4	6	23	96	4	7 RT9
23	124	4	6	22	95	4	7
22	123	4	6	23	94	4	7
23	122	4	6	22	93	4	7
22	121	4	6	23	92	4	7
23	120	4	6	22	91	4	7
22	119	4	6	23	90	4	7
23	118	4	6	24	91	4	7
22	117	4	6	25	90	4	7
23	116	4	6	26	91	4	7
22	115	4	6	27	90	4	7
23	114	4	6	28	91	4	7
22	113	4	6	29	90	4	7
23	112	4	6	30	91	4	7
22	111	4	7	31	90	4	7
23	110	4	7	32	91	4	7
22	109	4	7	33	90	4	7
23	108	4	7	35	88	4	7
22	107	4	7	35	90	4	7
23	106	4	7	35	92	4	7
22	105	4	7	35	94	4	7
23	104	4	7	35	96	4	7
17	104	4	7	35	98	4	7
19	104	4	7	35	100	4	7
21	104	4	7	36	99	4	7
22	103	4	7	36	95	4	7
23	102	4	7	36	93	4	7
22	101	4	7	36	91	4	7
23	100	4	7	36	89	4	7
22	99	4	7	37	88	4	7
23	98	4	7	37	90	4	7

TUBES TESTED IN STEAM GENERATOR NO. 11
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>		<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
37	94	4	7		40	89	1	8
37	96	4	7		40	91	1	8
37	98	4	7		39	100	1	8
37	100	4	7		39	98	1	8
38	99	4	7		39	96	1	8
38	97	4	7		39	94	1	8
38	95	4	7		39	92	1	8
38	93	4	7		39	90	1	8
38	91	4	7		39	88	1	8
38	89	4	7		38	89	1	8
39	88	4	7		38	91	1	8
39	90	4	7		38	93	1	8
39	92	4	7		38	95	1	8
39	94	4	7		38	97	1	8
39	96	4	7		38	99	1	8
39	98	4	7		37	100	1	8
39	100	4	7		37	98	1	8
40	91	4	7		37	96	1	8
40	89	4	7		37	94	1	8
41	90	4	7		37	90	1	8
3	138	4	7	RT9	37	88	1	8
23	136	4	7		36	91	1	8
38	125	4	7	RT14	36	93	1	8
38	123	4	7		36	95	1	8
39	124	4	7		36	99	1	8
39	122	4	8	RT9	35	100	1	8
40	123	4	8	RT9	35	98	1	8
40	121	4	8	RT9	35	96	1	8
41	122	4	8	RT9	35	94	1	8
37	120	4	8		35	92	1	8
35	120	4	8		35	90	1	8
41	90	1	8		35	88	1	8

TUBES TESTED IN STEAM GENERATOR NO. 11
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
33	90	1	8	22	109	1	8
32	91	1	8	23	110	1	8
31	90	1	8	22	111	1	8
30	91	1	8	23	112	1	8
29	90	1	8	22	113	1	8
28	91	1	8	23	114	1	9
27	90	1	8	22	115	1	9
26	91	1	8	23	116	1	9
25	90	1	8	22	117	1	9
24	91	1	8	22	119	1	9
23	90	1	8	22	121	1	9
22	91	1	8	22	123	1	9
23	92	1	8	22	125	1	9
22	93	1	8	22	127	1	9
23	94	1	8	22	129	1	9
22	95	1	8	23	130	1	9
23	96	1	8	22	131	1	9
22	97	1	8	23	132	1	9
23	98	1	8	23	126	1	9 RT14
22	99	1	8	23	124	1	9 RT14
23	100	1	8	3	138	4	9
22	101	1	8	5	140	4	9
23	102	1	8	46	91	4	9
22	103	1	8	44	91	4	9
21	104	1	8	41	122	4	9
19	104	1	8	40	123	4	9
17	104	1	8	40	121	4	9
23	104	1	8	39	122	4	9
22	105	1	8	23	96	4	9
23	106	1	8	53	104	4	9
22	107	1	8	51	104	4	9
23	108	1	8	56	105	4	9

TUBES TESTED IN STEAM GENERATOR NO. 11
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
56	103	4	9	2	135	1	9
54	91	4	9	1	134	1	9
55	90	4	9	2	133	1	9
56	91	4	9	62	95	4	10
57	90	4	9	62	93	4	10
58	91	4	9	62	92	4	10
59	90	4	9	63	90	4	10
60	91	4	9	64	91	4	10
61	94	4	9	64	89	4	10
53	90	4	9	62	91	4	10
52	91	4	9	61	90	4	10
52	93	4	9	1	132	1	10
52	95	4	9	2	131	1	10
52	97	4	9	1	130	1	10
52	99	4	9	2	129	1	10
51	98	4	9	1	128	1	10
51	96	4	9	2	127	1	10
51	94	4	9	1	126	1	10
51	92	4	9	2	125	1	10
51	90	4	9	1	124	1	10
50	91	4	9	2	123	1	10
49	90	4	9	1	122	1	10
48	91	4	9	2	121	1	10
47	90	4	9	1	120	1	10
45	90	4	9	3	120	1	10
43	90	4	9	2	119	1	10
42	91	4	9	1	118	1	10
23	118	1	9	2	117	1	10
23	120	1	9	1	116	1	10
23	122	1	9	2	115	1	10
23	128	1	9	1	114	1	10
1	136	1	9	2	113	1	10

TUBES TESTED IN STEAM GENERATOR NO. 11
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
1	112	1	10	2	93	4	10
2	111	1	10	3	94	4	10
1	110	1	10	2	95	4	10
2	109	1	10				
3	108	1	10	3	98	4	10
3	106	1	10	2	97	4	10
1	108	1	10	3	96	4	10
1	106	1	10	2	99	4	10
2	105	1	10	3	100	4	10
3	104	1	10	2	101	4	11
3	102	1	10	3	102	4	11
2	103	1	10	2	103	4	11
1	104	1	10	3	104	4	11
1	102	1	10	2	105	4	11
2	101	1	10	3	106	4	11
3	100	1	10	3	108	4	11
3	98	1	10	2	109	4	11
2	99	1	10	2	111	4	11
1	100	1	10	2	113	4	11
1	98	1	10	2	115	4	11
2	97	1	10	2	117	4	11
3	96	1	10	2	119	4	11
3	94	1	10	3	120	4	11
2	95	1	10	2	121	4	11
1	96	1	10	2	123	4	11
1	94	1	10	2	125	4	11
2	91	1	10	2	127	4	11
1	90	1	10	2	129	4	11
2	89	1	10	2	131	4	11
2	89	4	10	2	133	4	11
2	91	4	10	2	135	4	11
3	92	4	10	25	114	4	11

TUBES TESTED IN STEAM GENERATOR NO. 11
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
1	88	1	11	42	13	1	11
2	87	1	11	42	15	1	11
1	86	1	11	42	17	1	11
2	85	1	11	42	19	1	11
1	84	1	11	43	18	1	11
2	83	1	11	43	16	1	11
1	82	1	11	43	14	1	11
2	81	1	11	44	13	1	11
1	80	1	11	44	15	1	11
2	79	1	11	44	17	1	11
1	78	1	11	44	19	1	11
1	76	1	11	45	18	1	11
2	75	1	11	45	16	1	11
1	74	1	11	45	14	1	11
2	73	1	11	46	13	1	11
1	72	1	11	46	15	1	11
2	71	1	11	46	17	1	11
1	70	1	11	46	19	1	11
2	69	1	11	47	18	1	11
1	68	1	11	47	16	1	11
2	67	1	11	47	14	1	11
1	66	1	11	48	13	1	11
2	65	1	11	48	15	1	11
1	64	1	11	48	17	1	11
2	63	1	11	48	19	1	11
1	62	1	11	49	18	1	11
2	61	1	11	49	18	4	12
1	60	1	11	49	16	4	12
41	18	1	11	49	14	4	12
41	16	1	11	50	13	4	12
41	14	1	11	50	15	4	12
				50	17	4	12

TUBES TESTED IN STEAM GENERATOR NO. 11
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
50	19	4	12	8	77	4	12
51	18	4	12	8	79	4	12
51	16	4	12	9	78	4	12
51	14	4	12	9	76	4	12
2	61	4	12	9	74	4	12
2	63	4	12	51	104	1	12
2	65	4	12	53	104	1	12
2	67	4	12	60	1	1	12
2	69	4	12	41	52	1	12
2	71	4	12	40	51	1	12
2	73	4	12	41	50	1	12
2	75	4	12	40	49	1	12
2	79	4	12	41	48	1	12
3	78	4	12	40	47	1	12
3	76	4	12	41	46	1	12
3	74	4	12	40	45	1	12
4	73	4	12	41	44	1	12
4	75	4	12	40	43	1	12
4	77	4	12	41	42	1	12
4	79	4	12	40	41	1	12
5	78	4	12	41	40	1	12
5	76	4	12				
5	74	4	12	33	34	1	12
6	73	4	12	33	36	1	12
6	75	4	12	33	38	1	12
6	77	4	12	33	40	1	12
6	79	4	12	34	39	1	12
7	78	4	12	34	37	1	12
7	76	4	12	34	35	1	12
7	74	4	12	35	34	1	12
8	73	4	12	35	36	1	12
8	75	4	12	35	38	1	12

TUBES TESTED IN STEAM GENERATOR NO. 11
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
35	40	1	12	41	22	1	13
36	39	1	12	40	21	1	13
36	37	1	12	41	20	1	13
36	35	1	12	40	19	1	13
37	34	1	12	41	18	1	13
37	36	1	12	40	17	1	13
37	38	1	12	41	16	1	13
37	40	1	12	40	15	1	13
38	39	1	12	41	14	1	13
38	37	1	12	40	13	1	13
38	35	1	12	40	11	1	13
39	34	1	12	41	12	1	13
39	36	1	12	43	12	1	13
39	38	1	12	45	12	1	13
39	40	1	12	47	12	1	13
40	39	1	12	49	12	1	13
41	38	1	12	51	12	1	13
40	37	1	12	53	12	1	13
41	36	1	12	55	12	1	13
40	35	1	12	57	12	1	13
41	34	1	12	59	12	1	13
40	33	1	12	60	11	1	13
41	32	1	12	58	11	1	13
40	31	1	13	56	11	1	13
41	30	1	13	54	11	1	13
40	29	1	13	52	11	1	13
41	28	1	13	50	11	1	13
40	27	1	13	48	11	1	13
41	26	1	13	46	11	1	13
40	25	1	13	44	11	1	13
41	24	1	13	42	11	1	13
40	23	1	13	41	10	1	13

TUBES TESTED IN STEAM GENERATOR NO. 11
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
43	10	1	13	41	6	1	13
45	10	1	13	40	5	1	13
47	10	1	13	35	66	1	13
49	10	1	13	35	68	1	13
51	10	1	13	35	70	1	13
53	10	1	13	34	69	1	13
55	10	1	13	34	67	1	13
57	10	1	13	34	65	1	13
59	10	1	13	33	66	1	13
60	9	1	13	33	68	1	13
59	8	1	13	33	70	1	13
58	9	1	13	32	69	1	13
57	8	1	13	32	67	1	13
56	9	1	13	32	65	1	13
55	8	1	13	31	66	1	13
54	9	1	13	31	68	1	13
53	8	1	13	31	70	1	13
52	9	1	13	30	69	1	13
51	8	1	13	30	67	1	13
50	9	1	13	30	65	1	13
49	8	1	13	29	66	1	13
48	9	1	13	29	68	1	13
47	8	1	13	29	70	1	14
46	9	1	13	18	137	1	14
45	8	1	13	17	134	1	14
44	9	1	13	17	136	1	14
43	8	1	13	23	118	1	14
42	9	1	13	23	120	1	14
41	10	1	13	23	122	1	14
40	9	1	13	23	124	1	14
41	8	1	13	23	126	1	14
40	7	1	13	38	125	4	14

RT14

TUBES TESTED IN STEAM GENERATOR NO. 11
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>		<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
40	5	1	14					
41	4	1	14					
40	3	1	14	PT				
41	2	1	14	PT				
43	2	1	14	PT				
45	2	1	14	PT				
47	2	1	14	PT				
49	2	1	14	PT				
51	2	1	14	PT				
53	2	1	14	PT				
55	2	1	14	PT				
57	2	1	14	PT				
59	2	1	14	PT				
58	1	1	14	PT				
56	1	1	14	PT				
54	1	1	14	PT				
40	3	1	14	PT				
40	1	1	14	PT				
42	1	1	14	PT				
44	1	1	14	PT				
46	1	1	14	PT				
48	1	1	14	PT				
50	1	1	14	PT				
52	1	1	14	PT				

RT# = Retested on Reel#
PT = Partial Test

APPENDIX IV

Listing of Inspected Tubes
Steam Generator 12

TUBES TESTED IN STEAM GENERATOR NO. 12
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>		<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
69	76	4	1	RT3	16	135	4	1
69	80	4	1	RT3	17	134	4	1
69	78	4	1	RT3	17	136	4	1
1	138	1	1		17	138	4	1
2	139	4	1		18	137	4	1
3	138	4	1		18	135	4	1
3	140	4	1		19	136	4	1
4	139	4	1		19	134	4	1
4	137	4	1		20	137	4	1
5	138	4	1		20	135	4	1
5	140	4	1		21	136	4	1
6	139	4	1		21	134	4	1
6	137	4	1		22	135	4	1
7	138	4	1		22	133	4	1
7	140	4	1		23	136	4	1
8	139	4	1		23	134	4	1
8	137	4	1		24	135	4	1
9	138	4	1		24	133	4	1
9	140	4	1		25	134	4	1
10	139	4	1		25	132	4	1
10	137	4	1		26	133	4	1
11	136	4	1		26	131	4	1
11	138	4	1		27	134	4	1
12	139	4	1		28	133	4	1
12	137	4	1		28	131	4	1
13	138	4	1		29	132	4	1
13	136	4	1		29	130	4	2
14	137	4	1		30	129	4	2
14	135	4	1		30	131	4	2
15	136	4	1		31	130	4	2
15	138	4	1		31	128	4	2
16	137	4	1		32	127	4	2

TUBES TESTED IN STEAM GENERATOR NO. 12
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
32	129	4	2	48	115	4	2
33	130	4	2	48	113	4	2
33	128	4	2	49	114	4	2
34	129	4	2	50	113	4	2
34	127	4	2	50	111	4	2
35	128	4	2	51	112	4	2
35	126	4	2	51	110	4	2
36	127	4	2	52	109	4	2
36	125	4	2	52	107	4	2
37	126	4	2	53	108	4	2
38	125	4	2	53	106	4	2
38	123	4	2	54	107	4	2
39	124	4	2	55	106	4	2
39	122	4	2	56	105	4	2
40	123	4	2	55	104	4	2
40	121	4	2	52	103	4	2
35	120	4	2	54	103	4	2
37	120	4	2	56	103	4	2
39	120	4	2	57	104	4	2
41	122	4	2	57	102	4	2
41	120	4	2	58	99	4	2
42	121	4	2	59	100	4	2
42	119	4	2	58	101	4	2
43	120	4	2	59	100	4	2
43	118	4	2	59	98	4	2
44	119	4	2	60	99	4	2
44	117	4	2	60	97	4	2
45	116	4	2	61	96	4	2
46	117	4	2	62	95	4	2
46	115	4	2	61	94	4	2
47	116	4	2	62	93	4	2
47	114	4	2	69	80	4	3

PT

TUBES TESTED IN STEAM GENERATOR NO. 12
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
69	78	4	3	65	72	4	3
69	76	4	3	65	70	4	3
68	73	4	3	65	68	4	3
68	75	4	3	65	66	4	3
68	77	4	3	64	65	4	3
68	79	4	3	64	67	4	3
68	81	4	3	64	69	4	3
68	83	4	3	64	71	4	3
67	84	4	3	64	73	4	3
67	82	4	3	64	75	4	3
67	80	4	3	64	77	4	3
67	78	4	3	64	79	4	3
67	76	4	3	64	81	4	3
67	74	4	3	64	83	4	3
67	72	4	3	64	85	4	3
66	69	4	3	64	87	4	3
66	71	4	3	64	89	4	3
66	73	4	3	64	91	4	3
66	75	4	3	63	92	4	3
66	77	4	3	63	90	4	3
66	79	4	3	63	88	4	3
66	81	4	3	63	86	4	3
66	83	4	3	63	84	4	3
65	88	4	3	63	82	4	3
66	87	4	3	63	80	4	3
65	86	4	3	63	78	4	3
65	84	4	3	63	76	4	3
65	82	4	3	63	74	4	3
65	80	4	3	63	72	4	3
65	78	4	3	63	70	4	3
65	76	4	3	63	68	4	3
65	74	4	3	63	66	4	3

TUBES TESTED IN STEAM GENERATOR NO. 12
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
63	64	4	3	60	73	4	4
62	65	4	3	60	75	4	4
62	67	4	3	60	77	4	4
62	69	4	3	60	79	4	4
62	71	4	3	60	81	4	4
62	73	4	3	60	83	4	4
62	75	4	3	60	85	4	4
62	77	4	3	60	87	4	4
62	79	4	4	60	89	4	4
62	81	4	4	60	91	4	4
62	83	4	4	60	93	4	4
62	85	4	4	60	95	4	4
62	87	4	4	59	96	4	4
62	89	4	4	59	94	4	4
62	91	4	4	59	92	4	4
61	92	4	4	59	90	4	4
61	90	4	4	59	88	4	4
61	88	4	4	59	86	4	4
61	86	4	4	59	84	4	4
61	84	4	4	59	82	4	4
61	82	4	4	59	80	4	4
61	80	4	4	59	78	4	4
61	78	4	4	59	76	4	4
61	76	4	4	59	74	4	4
61	74	4	4	59	72	4	4
61	72	4	4	59	68	4	4
61	70	4	4	58	69	4	4
61	68	4	4	58	71	4	4
61	66	4	4	58	73	4	4
60	67	4	4	58	75	4	4
60	69	4	4	58	77	4	4
60	71	4	4	58	79	4	4

TUBES TESTED IN STEAM GENERATOR NO. 12
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
58	81	4	4	56	85	4	5
58	83	4	4	56	87	4	5
58	85	4	4	56	89	4	5
58	87	4	4	56	91	4	5
58	89	4	4	56	93	4	5
58	91	4	4	56	95	4	5
58	93	4	4	56	97	4	5
58	95	4	4	56	99	4	5
58	97	4	4	56	101	4	5
57	100	4	4	56	105	4	5
57	98	4	4	55	104	4	5
57	96	4	4	55	102	4	5
57	94	4	4	55	100	4	5
57	92	4	4	55	98	4	5
57	90	4	4	55	96	4	5
57	88	4	4	55	94	4	5
57	86	4	4	55	92	4	5
57	84	4	4	55	90	4	5
57	82	4	4	55	88	4	5
57	80	4	4	55	86	4	5
57	78	4	4	55	84	4	5
57	76	4	4	55	82	4	5
57	74	4	4	55	80	4	5
57	72	4	5	55	78	4	5
57	70	4	5	55	76	4	5
56	71	4	5	55	74	4	5
56	73	4	5	55	72	4	5
56	75	4	5	54	73	4	5
56	77	4	5	54	75	4	5
56	79	4	5	54	77	4	5
56	81	4	5	54	79	4	5
56	83	4	5	54	81	4	5

TUBES TESTED IN STEAM GENERATOR NO. 12
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
54	83	4	5	52	91	4	6
54	85	4	5	52	93	4	6
54	87	4	5	52	95	4	6
54	89	4	5	52	97	4	6
54	91	4	5	52	99	4	6
54	93	4	5	52	101	4	6
54	95	4	5	35	88	4	6
54	97	4	5	35	90	4	6
54	99	4	5	35	92	4	6
54	101	4	5	35	94	4	6
53	102	4	5	36	95	4	6
53	100	4	5	36	93	4	6
53	98	4	5	36	91	4	6
53	96	4	5	36	89	4	6
53	94	4	5	37	88	4	6
53	92	4	5	37	90	4	6
53	90	4	5	37	94	4	6
53	88	4	5	38	95	4	6
53	86	4	5	38	93	4	6
53	84	4	6	38	91	4	6
53	82	4	6	38	89	4	6
53	78	4	6	39	88	4	6
53	76	4	6	39	90	4	6
53	74	4	6	39	92	4	6
52	75	4	6	39	94	4	6
52	77	4	6	40	91	4	6
52	79	4	6	41	90	4	6
52	81	4	6	42	91	4	6
52	83	4	6	43	90	4	6
52	85	4	6	44	91	4	6
52	87	4	6	45	90	4	6
52	89	4	6	46	91	4	6

TUBES TESTED IN STEAM GENERATOR NO. 12
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
47	90	4	6	39	120	1	7
48	91	4	6	37	120	1	7
49	90	4	6	35	120	1	7
50	91	4	6	40	121	1	7
51	90	4	6	40	123	1	7
51	92	4	6	39	122	1	7
51	94	4	6	38	123	1	7
51	96	4	6	38	125	1	7
51	98	4	6	37	126	1	7
51	104	4	6	36	125	1	7
53	104	4	6	36	127	1	7
49	112	4	6	35	126	1	7
45	118	4	6	35	128	1	7
27	132	4	6	34	127	1	7
1	140	1	6	34	129	1	7
2	139	1	6	33	128	1	7
3	140	1	6	33	130	1	7
3	138	1	6	32	127	1	7
4	139	1	6	32	129	1	7
4	137	1	6	31	128	1	7
5	140	1	6	31	130	1	7
5	138	1	6	30	129	1	7
6	139	1	6	30	131	1	7
6	137	1	6	29	130	1	7
7	140	1	6	29	132	1	7
7	138	1	6	28	131	1	7
8	139	1	6	28	133	1	7
8	137	1	6	27	132	1	7
9	140	1	6	27	134	1	7
9	138	1	6	53	104	1	7
41	120	1	7	51	104	1	7
41	122	1	7	26	131	1	7

TUBES TESTED IN STEAM GENERATOR NO. 12
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
26	133	1	7	10	139	1	7
25	132	1	7	41	120	1	8
25	134	1	7	42	121	1	8
24	133	1	7	42	119	1	8
24	135	1	7	43	120	1	8
23	134	1	7	43	118	1	8
23	136	1	7	44	119	1	8
22	133	1	7	45	118	1	8
22	135	1	7	45	116	1	8
21	134	1	7	46	117	1	8
21	136	1	7	46	115	1	8
20	135	1	7	47	116	1	8
20	137	1	7	47	114	1	8
19	134	1	7	48	115	1	8
19	136	1	7	48	113	1	8
18	135	1	7	49	114	1	8
18	137	1	7	50	113	1	8
17	134	1	7	49	112	1	8
17	136	1	7	50	111	1	8
17	138	1	7	51	112	1	8
16	135	1	7	51	110	1	8
16	137	1	7	52	109	1	8
15	136	1	7	52	107	1	8
15	138	1	7	53	108	1	8
14	135	1	7	53	106	1	8
14	137	1	7	54	107	1	8
13	136	1	7	55	106	1	8
13	138	1	7	54	105	1	8
12	137	1	7	56	105	1	8
12	139	1	7	57	104	1	8
11	136	1	7	55	104	1	8
11	138	1	7	54	103	1	8
10	137	1	7				

TUBES TESTED IN STEAM GENERATOR NO. 12
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
52	103	1	8	38	99	1	9
56	103	1	8	37	100	1	9
57	102	1	8	37	98	1	9
58	101	1	8	37	96	1	9
58	99	1	8	37	94	1	9
59	100	1	8	37	90	1	9
59	98	1	8	37	88	1	9
60	99	1	8				
60	97	1	8	36	91	1	9
61	96	1	8	36	93	1	9
62	95	1	8	36	95	1	9
61	94	1	8	36	99	1	9
62	93	1	8	35	100	1	9
63	92	1	8	35	98	1	9
64	91	1	8	35	96	1	9
63	90	1	8	35	94	1	9
64	89	1	8	35	92	1	9
41	90	1	8	35	90	1	9
40	89	1	8	35	88	1	9
40	91	1	8	33	90	1	9
39	100	1	8	32	91	1	9
39	98	1	8	31	90	1	9
39	96	1	8	30	91	1	9
39	94	1	8	29	10	1	9
39	92	1	8	28	91	1	9
39	90	1	8	27	90	1	9
39	88	1	8	26	91	1	9
38	89	1	8	25	90	1	9
38	91	1	8	24	91	1	9
38	93	1	8	23	90	1	9
38	95	1	9	22	91	1	9
38	97	1	9	23	92	1	9

TUBES TESTED IN STEAM GENERATOR NO. 12
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
22	93	1	9	22	121	1	9
23	94	1	9	23	122	1	9
22	95	1	9	22	123	1	9
23	96	1	9	23	124	1	9
22	97	1	9	22	125	1	9
23	98	1	9	23	126	1	9
22	99	1	9	22	127	1	9
23	100	1	9	23	128	1	9
22	101	1	9	22	129	1	9
23	102	1	9	23	130	1	9
22	103	1	9	22	131	1	9
21	104	1	9	23	132	1	9
19	104	1	9	1	136	1	10
17	104	1	9	2	135	4	10
23	104	1	9	1	134	1	10
22	105	1	9	2	133	4	10
23	106	1	9	1	132	1	10
22	107	1	9	2	131	4	10
23	108	1	9	1	130	1	10
23	109	1	9	2	129	4	10
23	110	1	9	1	128	1	10
22	111	1	9	2	127	4	10
23	112	1	9	1	126	1	10
22	113	1	9	2	125	1	10
23	114	1	9	1	124	1	10
22	115	1	9	2	123	1	10
23	116	1	9	1	122	1	10
22	117	1	9	2	121	1	10
23	118	1	9	1	120	1	10
22	119	1	9	3	120	1	10
23	120	1	9	2	119	1	10

TUBES TESTED IN STEAM GENERATOR NO. 12
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
1	118	1	10	2	91	1	10
2	117	1	10	1	90	1	10
1	116	1	10	2	89	1	10
2	115	1	10	2	135	1	10
1	114	1	10	2	133	1	10
2	113	1	10	2	131	1	10
1	112	1	10	2	129	1	10
2	111	1	10	2	127	1	10
1	110	1	10	2	89	4	10
2	109	1	10	2	91	4	10
3	108	1	10	3	92	4	10
3	106	1	10	2	93	4	10
1	108	1	10	3	94	4	10
1	106	1	10	2	95	4	10
2	105	1	10	3	96	4	10
3	104	1	10	2	97	4	10
3	102	1	10	3	98	4	10
2	103	1	10	3	98	4	11
1	104	1	10	2	99	4	11
1	102	1	10	3	100	4	11
2	101	1	10	2	101	4	11
3	100	1	10	3	102	4	11
3	98	1	10	2	103	4	11
2	99	1	10	3	104	4	11
1	100	1	10	2	105	4	11
1	98	1	10	3	106	4	11
2	97	1	10	3	108	4	11
2	96	1	10	2	109	4	11
3	94	1	10	2	111	4	11
2	95	1	10	2	113	4	11
1	96	1	10	2	115	4	11
1	94	1	10	2	117	4	11

TUBES TESTED IN STEAM GENERATOR NO. 12
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
2	119	4	11	25	90	4	11
3	120	4	11	24	91	4	11
2	121	4	11	25	92	4	11
2	123	4	11	24	93	4	11
2	125	4	11	25	94	4	11
23	132	4	11	24	95	4	11
23	130	4	11	25	96	4	11
23	128	4	11	24	97	4	11
23	126	4	11	25	98	4	11
23	124	4	11	24	99	4	11
23	122	4	11	25	100	4	11
23	120	4	11	24	101	4	11
23	118	4	11	25	102	4	11
23	116	4	11	24	103	4	11
23	114	4	11	23	104	4	11
23	112	4	11	25	104	4	11
23	110	4	11	24	105	4	11
23	108	4	11	25	106	4	11
23	106	4	11	24	107	4	11
23	104	4	11	25	108	4	11
21	104	4	11	24	109	4	11
19	104	4	11	25	110	4	11
17	104	4	11	24	111	4	11
23	102	4	11	25	112	4	11
23	100	4	11	24	113	4	12
23	98	4	11	25	114	4	12
23	96	4	11	24	115	4	12
23	94	4	11	25	116	4	12
23	92	4	11	24	117	4	12
23	90	4	11	25	118	4	12
24	89	4	11	24	119	4	12

TUBES TESTED IN STEAM GENERATOR NO. 12
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
25	120	4	12	2	67	1	12
24	121	4	12	1	66	1	12
25	122	4	12	2	65	1	12
24	123	4	12	2	63	1	12
25	124	4	12	2	61	1	12
24	125	4	12	2	65	4	12
25	126	4	12	2	67	4	12
24	127	4	12	2	69	4	12
25	128	4	12	2	71	4	12
24	129	4	12	2	73	4	12
25	130	4	12	2	75	4	12
24	131	4	12	2	79	4	12
1	88	1	12	3	78	4	12
2	87	1	12	3	76	4	12
1	86	1	12	3	74	4	12
2	85	1	12	4	73	4	12
1	84	1	12	4	75	4	12
2	83	1	12	4	77	4	12
1	82	1	12	4	79	4	12
2	81	1	12	5	78	4	12
1	80	1	12	5	76	4	12
2	79	1	12	5	74	4	12
1	78	1	12	6	73	4	12
1	76	1	12	6	75	4	12
2	75	1	12	6	77	4	12
1	74	1	12	6	79	4	12
2	73	1	12	7	78	4	12
1	72	1	12	7	76	4	12
2	71	1	12	7	74	4	12
1	70	1	12	8	73	4	12
2	69	1	12	8	75	4	13
1	68	1	12	8	77	4	13

TUBES TESTED IN STEAM GENERATOR NO. 12
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
8	79	4	13	58	9	1	13
9	78	4	13	59	8	1	13
9	76	4	13	60	9	1	13
9	74	4	13	59	10	1	13
1	62	4	13	57	10	1	13
1	66	4	13	55	10	1	13
2	61	4	13	53	10	1	13
2	63	4	13	51	10	1	13
41	4	1	13	49	10	1	13
40	5	1	13	47	10	1	13
41	6	1	13	45	10	1	13
40	7	1	13	43	10	1	13
41	8	1	13	41	10	1	13
40	9	1	13	42	11	1	13
41	10	1	13	44	11	1	13
42	9	1	13	46	11	1	13
43	8	1	13	48	11	1	13
44	9	1	13	50	11	1	13
45	8	1	13	52	11	1	13
46	9	1	13	54	11	1	13
47	8	1	13	56	11	1	13
48	9	1	13	58	11	1	13
49	8	1	13	60	11	1	13
50	9	1	13	59	12	1	13
51	8	1	13	57	12	1	13
52	9	1	13	55	12	1	13
53	8	1	13	53	12	1	13
54	9	1	13	51	12	1	13
55	8	1	13	49	12	1	13
56	9	1	13	47	12	1	13
57	8	1	13	45	12	1	13

TUBES TESTED IN STEAM GENERATOR NO. 12
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
43	12	1	13	39	38	1	14
41	12	1	13	39	36	1	14
40	11	1	13	39	34	1	14
40	13	1	13	38	35	1	14
41	14	1	13	38	37	1	14
40	15	1	13	38	39	1	14
41	16	1	13	37	40	1	14
40	17	1	13	37	38	1	14
41	18	1	13	37	36	1	14
40	19	1	13	37	34	1	14
41	20	1	13	36	35	1	14
40	21	1	13	36	37	1	14
41	22	1	13	36	39	1	14
40	23	1	13	35	40	1	14
41	24	1	13	35	38	1	14
40	25	1	13	35	36	1	14
41	26	1	13	35	34	1	14
40	27	1	13	34	35	1	14
41	28	1	13	34	37	1	14
40	29	1	13	34	39	1	14
41	30	1	13	33	40	1	14
40	31	1	13	33	38	1	14
41	32	1	13	33	36	1	14
40	33	1	13	33	34	1	14
41	34	1	13	41	40	1	14
40	35	1	13	40	41	1	14
41	36	1	13	41	42	1	14
40	37	1	13	40	43	1	14
41	38	1	13	41	44	1	14
40	39	1	13	40	45	1	14
39	40	1	14	41	46	1	14

TUBES TESTED IN STEAM GENERATOR NO. 12
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>		<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	
40	47	1	14		55	2	1	14	PT
41	48	1	14		54	1	1	14	PT
40	49	1	14		53	2	1	14	PT
41	50	1	14		52	1	1	14	PT
40	51	1	14		51	2	1	14	PT
41	52	1	14		50	1	1	14	PT
35	66	1	14		49	2	1	14	PT
35	68	1	14		48	1	1	14	PT
35	70	1	14		47	2	1	14	PT
34	69	1	14		46	1	1	14	PT
34	67	1	14		45	2	1	14	PT
34	65	1	14		44	1	1	14	PT
33	66	1	14		43	2	1	14	PT
33	68	1	14		42	1	1	14	PT
33	70	1	14		41	2	1	14	PT
32	69	1	14		40	1	1	14	PT
32	67	1	14		40	3	1	14	
32	65	1	14		41	18	4	14	
31	66	1	14		41	16	4	14	
31	68	1	14		41	14	4	14	
31	70	1	14		42	13	4	14	
30	69	1	14		42	15	4	14	
30	67	1	14		42	17	4	14	
30	65	1	14		42	19	4	14	
29	66	1	14		43	18	4	14	
29	68	1	14		43	16	4	14	
29	70	1	14		43	14	4	14	
60	1	1	14	PT	44	13	4	14	
59	2	1	14	PT	44	15	4	14	
58	1	1	14	PT	44	17	4	15	
57	1	1	14	PT	44	19	4	15	
56	1	1	14	PT	45	18	4	15	

TUBES TESTED IN STEAM GENERATOR NO. 12
DURING JUNE 1982 INSPECTION BY REEL NUMBER

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
45	16	4	15				
45	14	4	15				
46	13	4	15				
46	15	4	15				
46	17	4	15				
46	19	4	15				
47	18	4	15				
47	16	4	15				
47	14	4	15				
48	13	4	15				
48	15	4	15				
48	17	4	15				
48	19	4	15				
49	18	4	15				
49	16	4	15				
49	14	4	15				
50	13	4	15				
50	15	4	15				
50	17	4	15				
50	19	4	15				
51	18	4	15				
51	16	4	15				
51	14	4	15				
39	124	1	16				
44	117	1	16				

RT# = Retested on Reel#
PT = Partial Test

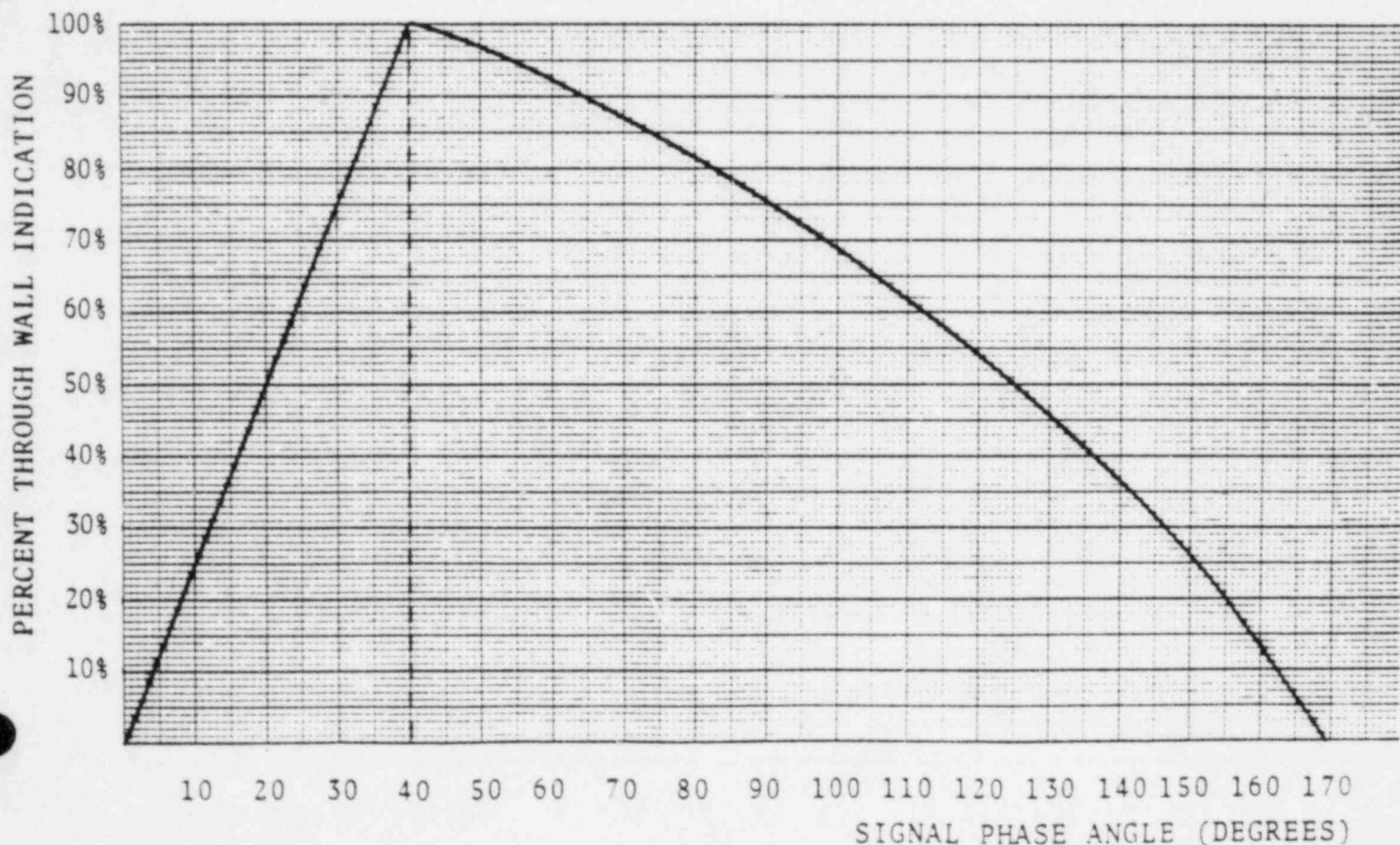
APPENDIX V

Calibration Log

ZETEC INC.CALIBRATION LOG FORM
MIXER SETTINGSTEST FREQUENCIESDATA IDENTIFICATION

CH#1	<u>400</u>	KHZ	<u>DIFF/ABS</u>	LOWER	UPPER	PLANT: <u>Calvert Cliffs</u>
CH#2	<u>100</u>	KHZ	<u>DIFF/ABS</u>	_____	<u>245</u>	UNIT: <u>1</u>
CH#3	<u>400</u>	KHZ	<u>DIFF/ABS LG</u>	_____	<u>250</u>	S/G: <u>11 INLET/OUTLET</u>
CH#4	<u>100</u>	KHZ	<u>DIFF/ABS</u>	_____	<u>8.08 2.78</u>	DATE: <u>5/30/82</u>
				_____	<u>120</u>	REEL# <u>1</u> SIDE# _____
			S1 _____		S1 <u>9, 10</u>	TO _____
			S2 _____		S2 <u>7, 8</u>	REEL# _____ SIDE# _____
						CALIBRATION STD: _____
						TUBE: <u>3/4 OD 050 WALL</u>
						MATERIAL: <u>Inconel 600</u>

	100%	80%	60%	40%	20%	
ACTUAL	<u>100</u> %	<u>77</u> %	<u>57</u> %	<u>32</u> %	_____ %	% THROUGH WALL (4.1)
<u>400</u> KHZ	<u>40</u> °	<u>87</u> °	<u>116</u> °	<u>144</u> °	<u>161</u> °	DEGREES
UPPER MIX	<u>40</u> °	<u>70</u> °	<u>104</u> °	<u>126</u> °	<u>141</u> °	DEGREES
LOWER MIX	_____ °	_____ °	_____ °	_____ °	_____ °	DEGREES



MULTI-FREQUENCY EDDY CURRENT CALIBRATION SHEET

Nondestructive Testing Report No. ISI-82-1-87 S/G#11
 Date 5/82
 Applicable Code TECH SPEC CONVP INVT-1 / NDE CODE SECT XI

I. Material to be Examined: A. Material INCONEL 600
 B. Alloy No. INC 600
 C. Wall Thickness 1.049
 D. Outside Diameter 1.750

II. Eddy Current Instrument

A. Manufacturer DATA

B. Equipment

1. Miz 12 Display S/N E-119971

2. Miz 12 Test Module

	S/N	Freq.	Diff. Phase	Gain	ABS
a. Channel #1	<u>305F</u>	<u>100</u>	<u>45</u>	<u>70</u>	<u>7.55</u>
b. Channel #2	<u>320F</u>	<u>100</u>	<u>327</u>	<u>27</u>	<u>7.55</u>
c. Channel #3	<u>185F</u>	<u>300</u>	<u>55</u>	<u>29</u>	<u>7.55</u>
d. Channel #4	<u>134F</u>	<u>100</u>	<u>230</u>	<u>7</u>	<u>7.55</u>
e. Upper Mix	<u>207</u>	V Phase <u>2.17</u>	H Phase <u>2.11</u>	Out Phase <u>12.1</u>	
		V Gain <u>2.24</u>	H Gain <u>2.80</u>	S1 <u>12.1</u>	S2 <u>2.7</u>
f. Lower Mix		V Phase	H Phase	Out Phase	
		V Gain	H Gain	S1	S2

III. Strip Chart Recorder

A. Manufacturer GOULDModel 240

B. Strip Chart Recorder/Channel

	1	2	3	4	5	6	7
1. S/N	<u>05377</u>	<u>508</u>	<u>1-2</u>				
2. Chart Speed							
3. Channel #1 Sensitivity	<u>0.00</u>						
4. Channel #2 Sensitivity							

IV. Magnetic Tape Recorder

A. Manufacturer DATAModel 4123.12AEB. S/N 004Operational Speed 2.5/1

V. Eddy Current Probe Manipulator

A. Manufacturer DATAModel S/NB. Scanning Speed 1.4 in/sec

C. Hand Probe

Hand Manipulate with Probe Pusher

D. Remote Control Fixture 24-41

Remote Control Fixture with Proo

Pusher DATA

E. Other

VI. Eddy Current Probe

A. Manufacturer DATAModel 4-1000ES/NB. Type of Probe: Differential

Absolute

C. Probe Coil Diameter

Probe Body Diameter 1.010D. Probe Cable Length 100'Probe Extension Cable Length 112'

VII. System Calibration Reference Standard

A. Serial Nos.

#1 4E#2 2-1

#3

B. Material INC 600 Tube Outside Diameter 1.750 Tube Wall Thickness 0.049

C. Hole Size

Slot Width

D. Percent of Wall Penetration 100% (1.750/1.750) 1.000/1.750 1.000/1.750

MULTI-FREQUENCY EDDY CURRENT CALIBRATION SHEET

Nondestructive Testing Report No.

Date 7/82 ISI-82-1-88 5/6/12Applicable Code TECH 9500

I. Material to be Examined:

A. Material INCONEL 600
 B. Alloy No. IN 600
 C. Wall Thickness .049
 D. Outside Diameter .750

II. Eddy Current Instrument

A. Manufacturer DETEC

B. Equipment

1. Miz 12 Display S/N D 042221

2. Miz 12 Test Module

	S/N	Freq.	Phase	Gain	Diff.	ABS
a. Channel #1	S/N <u>002F</u>	Freq. <u>400</u>	Phase <u>0111</u>	Gain <u>54</u>	Diff. <u>710</u>	
b. Channel #2	S/N <u>002F</u>	Freq. <u>100</u>	Phase <u>227</u>	Gain <u>31</u>	Diff. <u>710</u>	
c. Channel #3	S/N <u>004F</u>	Freq. <u>400</u>	Phase <u>010</u>	Gain <u>09</u>	Diff. <u>710</u>	
d. Channel #4	S/N <u>114F</u>	Freq. <u>100</u>	Phase <u>227</u>	Gain <u>14</u>	Diff. <u>710</u>	
e. Upper Mix	S/N <u>050</u>	V Phase <u>247</u>	H Phase <u>244</u>	S1 <u>10/1</u>	S2 <u>0/2</u>	Out Phase <u>120</u>
f. Lower Mix	S/N <u>276</u>	V Phase <u>267</u>	H Phase <u>10/1</u>	S1 <u>10/1</u>	S2 <u>0/2</u>	Out Phase <u>120</u>

III. Strip Chart Recorder

A. Manufacturer GOULD

B. Strip Chart Recorder/Channel

	1	2	3	4	5	6	7	8
1. S/N	<u>05426</u>	<u>500</u>	<u>1-2</u>					
2. Chart Speed	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>
3. Channel #1 Sensitivity	<u>200</u>	<u>200</u>	<u>200</u>	<u>200</u>	<u>200</u>	<u>200</u>	<u>200</u>	<u>200</u>
4. Channel #2 Sensitivity								

IV. Magnetic Tape Recorder

A. Manufacturer DETECB. S/N 001Model 374242Operational Speed 7.5

V. Eddy Current Probe Manipulator

A. Manufacturer DETECB. Scanning Speed 14 in/secModel S/N

C. Hand Probe

D. Remote Control Fixture SM-4 Hand Manipulate with Probe PusherPusher DETEC Remote Control Fixture with ProbeE. Other

VI. Eddy Current Probe

A. Manufacturer DETECB. Type of Probe: DifferentialModel A530 S/N C. Probe Coil Diameter

Absolute

D. Probe Cable Length 100'Probe Body Diameter Probe Extension Cable Length 100'

VII. System Calibration Reference Standard

A. Serial Nos.

B. Material IN 600

C. Hole Size

D. Percent of Wall Penetration 100/20/20/20#1 15 Tube Outside Diameter 252#2 005

#3

Tube Wall Thickness .049

Slot Width

1.00 1.20 2.00

APPENDIX VI

Personnel Certifications

TITLE: PERSONNEL CERTIFICATION
TRANSMITTAL

POST OFFICE BOX 140 · ISSAQUAH, WASHINGTON 98027 · TELEPHONE 206-392-5316

CERTIFICATE OF PERSONNEL QUALIFICATION

(Refer to Quality Assurance Plan and Program Z-QA
Procedure No. Z-QA 101)

NAME: THOMAS S. BEIERS

DATE OF BIRTH: 4/1/41

SOCIAL SECURITY NUMBER: 535-36-5052

TEST METHOD: Eddy Current

HIGHEST LEVEL: III

CERTIFICATION DATE: September 1982 LATEST RE-CERTIFICATION DATE:

EXPERIENCE BACKGROUND:

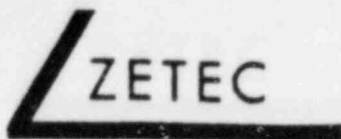
1970-1974	Zetec, Inc.; NDT Technician
1974-1975	Combustion Engineering; NDT Examination Group Eddy Current Specialist
1975-Present	Zetec, Inc.; NDT Technician

EDUCATIONAL BACKGROUND:

2 years	J. M. Perry Institute
April 1970	40 hours formal training for Level I Operator at Zetec
January 1973	24 hours formal training for Level II Operator at Zetec
June 1976	40 hours formal training for Level IIA Operator at Zetec
September 1982	80 hours formal training for Level III Operator at Zetec

PSYCHOLOGICAL EXAMINATION:

METHOD:	Standard psychiatric examination interview and the MMPI psychological test.
DOCTOR:	Hugh M. Castell, M.D.; Kirkland, Washington 98033
DATE:	October 1, 1978



POST OFFICE BOX 140 · ISSAQUAH, WASHINGTON 98027 · TELEPHONE 206-392-5316

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NAME: THOMAS S. BEIERS

PHYSICAL EXAMINATION:

DATE: 1/29/82

DOCTOR: R. W. Enck, M.D., Bellevue, Washington

GENERAL HEALTH: Good

Based on: complete history and physical including a complete
blood count, urinalysis, EKG, chest x-ray and GHS
100 (automated blood profile).

SPIROMETER: See attached

VISION: 1/8/82 - Dr. Freedman

RIGHT EYE

LEFT EYE

SNELLEN

UNCORRECTED..... 20/20 20/20

CORRECTED - -

JAEGER

UNCORRECTED J1 J1

CORRECTED - -

ISHIHARA COLOR PLATES

Normal

Normal

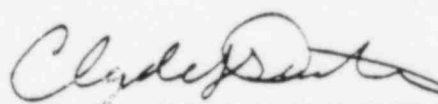
TECHNICAL EXAMINATION:

LEVEL	DATE	GENERAL	SPECIFIC	PRACTICAL	COMPOSITE
I	4/10/70	100	94 . .	100	98
II	6/10/82	100	100	100	100
IIA	6/10/82			96	96
		BASIC	METHOD	SPECIFIC	COMPOSITE
III	9/24/82	88	82	100	90

CERTIFIED BY:

A. L. LUCERO
MANAGER OF QUALITY ASSURANCE
LEVEL III EXAMINER

or


CLYDE J. DENTON
GENERAL MANAGER
LEVEL III EXAMINER

COMMENTS:

To Whom It May Concern:

Thomas S. Beiers has been employed by Zetec, Inc. since October 1975. In our opinion, he is normal psychologically and poses no potential subversive threat to your facility or your personnel.

NAME: TOM BEIERSEX: MAGE: 41HT: 70WT: 170

VI-3

DOCTOR: R. W. EnckTECH: BZDATE: 1/29/82

MEDICATION: _____

DOSAGE: _____

PULMONARY FUNCTION TESTS

Single Breath Test:

	Test 1		Test 2		Test 3	
	Actual	% Pred.	Actual	% Pred.	Actual	% Pred.
PEF	12.2 L/Sec	%	12.6 L/Sec	%	L/Sec	%
FVC	5.55 L	109 %	5.62 L	110 %	L	%
FEV 1.0	4.33 L	112 %	4.47 L	114 %	L	%
% FEV 1.0	78 %	102 %	80 %	104 %	%	%
FEF 25-75%	4.27 L/Sec	108 %	4.77 L/Sec	120 %	L/Sec	%

MVV

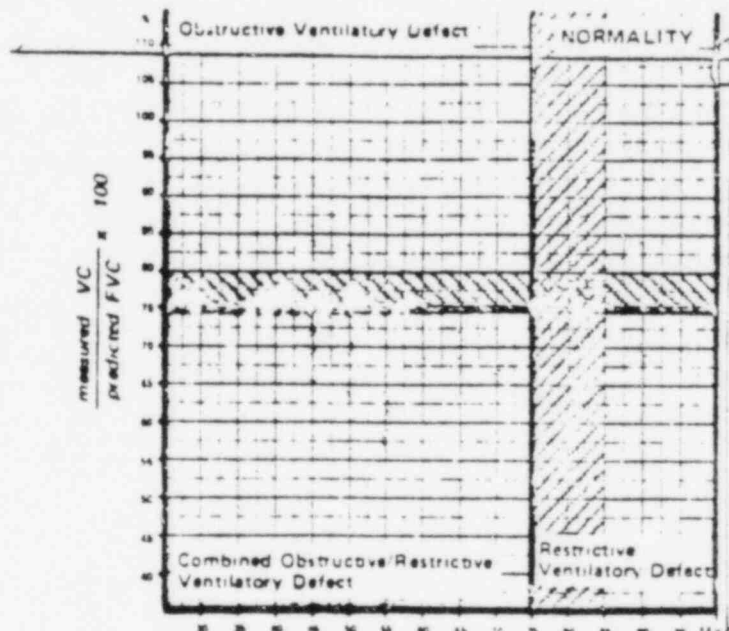
Actual	% Pred.
L/Min	%
L/Min	%

TIDAL VOLUME

PEF	VOL	PEF	VOL
L/Sec	L	L/Sec	L
L/Sec	L	L/Sec	L
L/Sec	L	L/Sec	L

Patient Co-operation: excellent ☒ good _____ fair _____ poor _____Patient Understanding: excellent ☒ good _____ fair _____ poor _____Wheezing: Yes _____ No ☒ Position: Standing ☒ Sitting _____ Nose Clip _____

Remarks, Comments



TITLE: PERSONNEL CERTIFICATION
TRANSMITTAL

POST OFFICE BOX 140 · ISSAQUAH, WASHINGTON 98027 · TELEPHONE 206-392-5316

CERTIFICATE OF PERSONNEL QUALIFICATION

(Refer to Quality Assurance Plan and Program Z-QA
Procedure No. Z-QA 101)

NAME: RAYMOND A. NISSLEY

DATE OF BIRTH: 6/25/54

SOCIAL SECURITY NUMBER: 537-64-2574

TEST METHOD: Eddy Current

HIGHEST LEVEL: II

CERTIFICATION DATE: 8/22/81 LATEST RE-CERTIFICATION DATE:

EXPERIENCE BACKGROUND:

Morris Wood Corp. Car-Mor Hardwoods Chelsia Hardwoods, Inc.	1972-1976	Sawyer, forklift operator, shipping & receiving, quality control
T.R.M. Wood Products Maple Valley, WA	1976-1978	Forklift operator, shipping and receiving
Stephen D. Freegard, Inc., Issaquah, WA	1978-1980	Machinist, construction
Zetec, Inc. Issaquah, WA	10/80-Present	Machinist

EDUCATIONAL BACKGROUND:

1972	Issaquah High School, Issaquah, Washington
November 1980	40 Hours formal training for Level I Operator at Zetec, Inc.
July 1981	40 Hours formal training for Level II Operator at Zetec, Inc.

PSYCHOLOGICAL EXAMINATION:

METHOD:	Standard psychiatric examination interview and the MMPI psychological test.
DOCTOR:	Hugh M. Castell, M.D., Kirkland, Washington
DATE:	December 12, 1980



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PAGE TWO

NAME: RAYMOND A. NISSLEY

PHYSICAL EXAMINATION:

DATE: 2/3/82

DOCTOR: R. W. Enck, M.D., Bellevue, Washington

GENERAL HEALTH: Excellent

Based on: complete history and physical including a complete blood count, urinalysis, EKG, chest x-ray and GHS 100 (automated blood profile).

SPIROMETER: See attached.

VISION:	RIGHT EYE	LEFT EYE
SNELLEN		
UNCORRECTED.....	20/70	20/100
CORRECTED	20/25	20/20
JAEGER		
UNCORRECTED	J1	J1
CORRECTED	-	-
ISHIHARA COLOR PLATES	Normal	Normal

TECHNICAL EXAMINATION:

LEVEL	DATE	GENERAL	SPECIFIC	PRACTICAL	COMPOSITE
I	11/21/80	91%	100%	100%	98%
II	8/22/81	97%	96%	100%	98%

COMMENTS:

To Whom It May Concern:

Raymond Nissley has been employed by Zetec, Inc. since October, 1980. In our opinion, he is normal psychologically and poses no potential subversive threat to your facility or your personnel.

CERTIFIED BY:

A. L. LUCERO
MANAGER OF QUALITY ASSURANCE
LEVEL III EXAMINER

or

CLYDE J. DENTON
GENERAL MANAGER
LEVEL III EXAMINER

NAME: RAY NISSEY
DOCTOR: R.W. Ench

SEX: M AGE: 27 HT: 72 WT: 153
TECH: BZ DATE: 2/3/82

MEDICATION: _____ DOSEAGE: _____

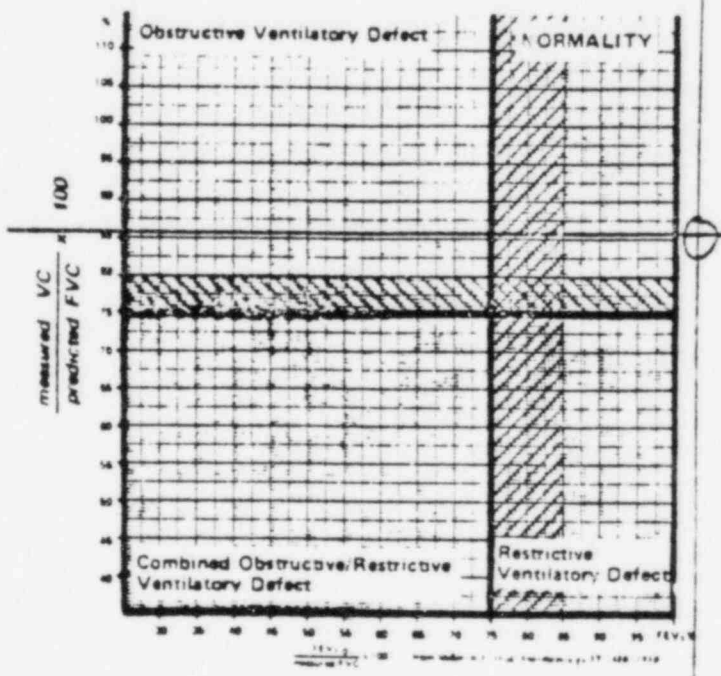
PULMONARY FUNCTION TESTS						
Single Breath Test:						
	Test 1		Test 2		Test 3	
	Actual	% Pred.	Actual	% Pred.	Actual	% Pred.
PEF	13.9 L/Sec	%	14.6 L/Sec	%	14.6 L/Sec	%
FVC	4.98 L	54%	4.90 L	85%	4.96 L	86%
FEV 1.0	4.54 L	31%	4.48 L	100%	4.44 L	99%
% FEV 1.0	91%	90%	91%	115%	90%	113%
FEF 75-75%	5.66 L/Sec	25%	5.84 L/Sec	125%	5.91 L/Sec	126%

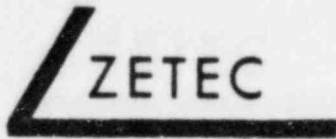
MVV	
Actual	% Pred.
L/Min	%
L/Min	%

TIDAL VOLUME			
PEF	VOL	PEF	VOL
L/Sec	L	L/Sec	L
L/Sec	L	L/Sec	L
L/Sec	L	L/Sec	L

Patient Co-operation: excellent X good _____ fair _____ poor _____
Patient Understanding: excellent X good _____ fair _____ poor _____
Wheezing: Yes _____ No X Position: Standing X Sitting _____ Nose Clip _____

Remarks, Comments



TITLE: PERSONNEL CERTIFICATION
TRANSMITTAL

POST OFFICE BOX 140 · ISSAQUAH, WASHINGTON 98027 · TELEPHONE 206-392-5316

CERTIFICATE OF PERSONNEL QUALIFICATION

(Refer to Quality Assurance Plan and Program Z-QA
Procedure No. Z-QA 101)

NAME: WILLIAM MACS WILLIAMS
DATE OF BIRTH: 5/1/56
SOCIAL SECURITY NUMBER: 544-74-0287
TEST METHOD: Eddy Current
HIGHEST LEVEL: I
CERTIFICATION DATE: 1/8/82 LATEST RE-CERTIFICATION DATE:
EXPERIENCE BACKGROUND:

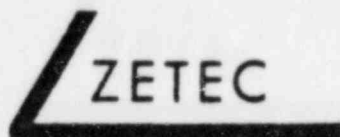
ZETEC, INC.
1981-Present - Technician
WEYERHAEUSER CO.
1979-1981 - Process Control Technician

EDUCATIONAL BACKGROUND:

2 years - J. M. Perry Institute
January 1981 - 40 hours formal training for Eddy Current
Level I at Zetec, Inc.

PSYCHOLOGICAL EXAMINATION:

METHOD: Standard psychiatric examination interview and the MMPI
psychological test.
DOCTOR: Hugh M. Castell, M.D.
DATE: July 31, 1981



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PAGE TWO

NAME: WILLIAM MACS WILLIAMS

PHYSICAL EXAMINATION:

DATE: 9/3/82

DOCTOR: R. W. Enck, M.D., Bellevue, Washington

GENERAL HEALTH: Excellent

Based on: complete history and physical exam, a complete blood count, urinalysis, EKG, chest x-ray and GHS 100 (automated blood profile)

SPIROMETER: Normal (see attached)

VISION:

RIGHT EYE

LEFT EYE

SNELLEN

UNCORRECTED.....	20/30	20/20
CORRECTED	-	-

JAEGER

UNCORRECTED	J1	J1
CORRECTED	-	-

ISHIHARA COLOR PLATES

Normal Normal

TECHNICAL EXAMINATION:

LEVEL	DATE	GENERAL	SPECIFIC	PRACTICAL	COMPOSITE
I	1/8/82	91%	90%	100%	95%

COMMENTS:

To Whom It May Concern:

W. Macs Williams has been employed by Zetec, Inc. since July 1981. In our opinion, he is normal psychologically and poses no potential subversive threat to your facility or your personnel.

CERTIFIED BY:

A. L. LUCERO
MANAGER OF QUALITY ASSURANCE
LEVEL III EXAMINER

OR

CLYDE D. DENTON
GENERAL MANAGER
LEVEL III EXAMINER

NAME: Mac WilliamsSEX: MAGE: 26HT: 70WT: 173DOCTOR: R.W. EnckTECH: J. Layfield DATE: 9 3 82

INDICATION: _____

DOSAGE: _____

PULMONARY FUNCTION TESTS

Single Breath Test:

	Test 1		Test 2		Test 3	
	Actual	% Pred.	Actual	% Pred.	Actual	% Pred.
PEF	10.5 L/Sec	%	12.8 L/Sec	%	L/Sec	%
FVC	5.31 L	100. %	5.43 L	102 %	L	%
FEV 1.0	4.51 L	%	4.80 L	113 %	L	%
% FEV 1.0	85. %	105. %	88 %	109 %	%	%
25-75%	5.12 L/Sec	118. %	6.04 L/Sec	132 %	L/Sec	%

MVV

Actual	% Pred.
L/Min	%
L/Min	%

TIDAL VOLUME

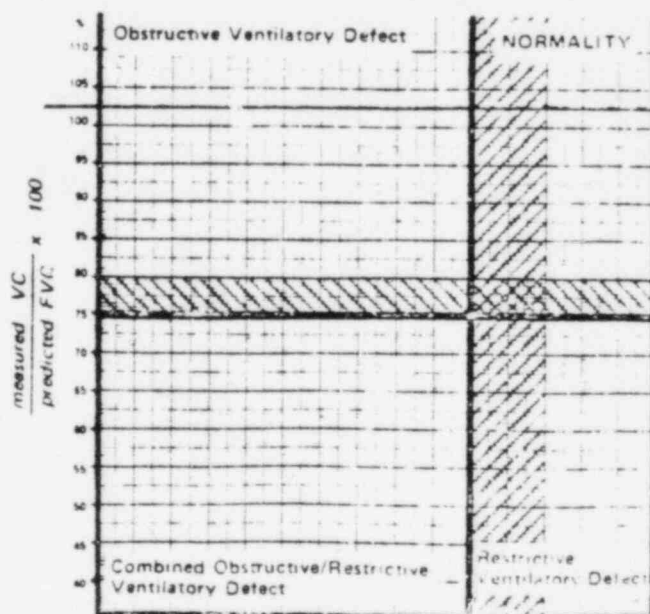
PEF	VOL	PEF	VOL
L/Sec	L	L/Sec	L
L/Sec	L	L/Sec	L
L/Sec	L	L/Sec	L

Patient Co-operation: excellent _____ good _____ fair _____ poor _____

Patient Understanding: excellent _____ good _____ fair _____ poor _____

Wheezing: Yes _____ No _____, Position: Standing _____ Sitting _____, Nose Clip _____

Remarks, Comments



Enclosure



SUPPLEMENT TO
CALVERT CLIFFS
UNIT II
EDDY CURRENT INSPECTION OF
STEAM GENERATOR 21 AND 22
DATED NOVEMBER 1982

ADDITIONAL EDDY CURRENT INSPECTIONS
PERFORMED ON STEAM GENERATOR 21
IN THE AREA OF WELD WIRE FOUND
DURING A SECONDARY SIDE VISUAL INSPECTION
DECEMBER 1982

Evaluation Performed By
T.S. Beiers

Prepared for
Baltimore Gas and Electric Co.

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I.	Introduction	<u>Page</u> 1
II.	Discussion	1
Appendix I	Eddy Current Test Results	
Appendix II	Listing of Tubes Inspected - Steam Generator 21	
Appendix III	Calibration Log & Equipment Certifications	
Appendix IV	Personnel Certification	

I. INTRODUCTION

Following the eddy current inspection program performed in early November 1982 a visual inspection of the secondary side of Steam Generator 21 revealed two welding rods on the top of the tube sheet. These weld rods were located between Line 26 and 25 in Quadrant 4 on the outer periphery of the tube bundle in an area that had not been inspected by eddy current techniques. This supplemental report contains the additional eddy current testing evaluation results of tubes located in this area, tested after discovering the weld wire.

II. DISCUSSION

The M12-12 Eddy Current System was used to inspect the additional tubes in Calvert Cliffs Unit II Steam Generator 21. The frequencies used to inspect these tubes were 400 KHz differential, 100 KHz differential, 100 KHz Absolute, and 200 KHz differential. Channel one (400 KHz DIFF) was mixed with channel two (100 KHz DIFF) to suppress unwanted signals originating on the outside of the tube such as supports and tube sheet influences.

Twenty-Five (25) tubes were tested adjacent to and surrounding the area where the weld rods were located. No indications of tube degradation could be detected at or near the tube sheet in the area of the weld rods. Three tubes tested showed indications greater than 20% through wall. These indications were small in volume and area and did not exceed the Technical Specification plugging limit. The eddy current evaluation results are listed in Appendix I. Appendix II contains a list of the tubes inspected. All tubes were tested from the inlet side from tube sheet to tube sheet.

APPENDIX I

EDDY CURRENT TEST RESULTS

Eddy Current Test Results For
Supplemental Inspection Of
Steam Generator 21

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>TYPE/ % WALL</u>	<u>LOCATION</u>
21	136	3	28% OD	13" Above TS CL Side
22	135	3	28% OD	17" Above TS CL Side
27	132	3	28% OD	Btwn 3 & 4 EC HL Side
			< 20% OD	Btwn 3 & 4 EC HL Side
			< 20% OD	Btwn 3 & 4 EC HL Side

APPENDIX II

LISTING OF TUBES INSPECTED - STEAM GENERATOR 21

Tubes Tested During Supplemental
Inspection Of Steam Generator 21

<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>	<u>LINE</u>	<u>ROW</u>	<u>QUAD</u>	<u>REEL</u>
20	137	3	1-S	28	133	3	1-S
20	135	3	1-S	29	132	3	1-S
21	136	3	1-S	29	130	3	1-S
21	134	3	1-S				
22	133	3	1-S				
22	135	3	1-S				
23	136	3	1-S				
23	134	3	1-S				
23	132	3	1-S				
24	131	3	1-S				
24	133	3	1-S				
24	135	3	1-S				
25	134	3	1-S				
25	132	3	1-S				
25	130	3	1-S				
26	129	3	1-S				
26	131	3	1-S				
26	133	3	1-S				
27	134	3	1-S				
27	132	3	1-S				
27	130	3	1-S				
28	131	3	1-S				

APPENDIX III

CALIBRATION LOG & EQUIPMENT CERTIFICATIONS

/ZETEC INC.

III - 1

TEST FREQUENCIES

CALIBRATION LOG FORM
MIXER SETTINGS

DATA IDENTIFICATION

CH#1 400KHZ DIFF/ABS
 CH#2 100KHZ DIFF/ABS
 CH#3 100KHZ DIFF/ABS
 CH#4 200KHZ DIFF/ABS

LOWER

UPPER

PLANT: CALVERT CLIFF

UNIT: _____

S/G: 2 INLET/OUTLETDATE: 12-82REEL# 1 SIDE# _____

TO

REEL# _____ SIDE# _____

CALIBRATION STD: _____

TUBE: 3/4 OD 0.49 WALLMATERIAL: 100 600PROBE: 5605F

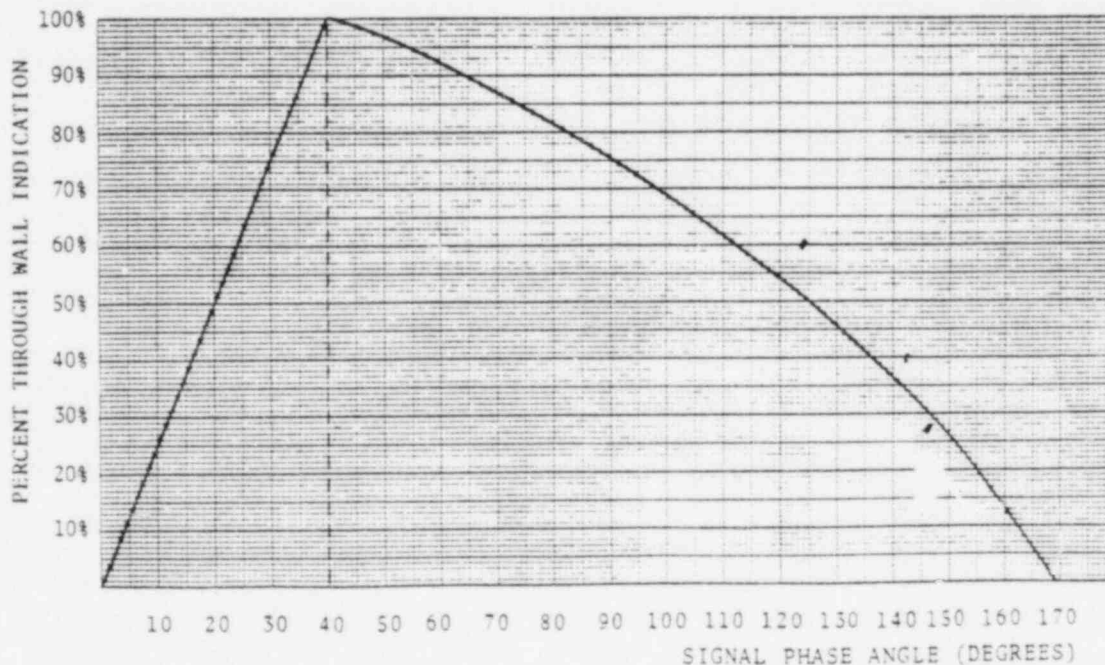
	100%	80%	60%	40%	20%
ACTUAL	<u>100</u>	<u>75</u>	<u>60</u>	<u>40</u>	<u>27</u>
<u>400</u> KHZ	<u>40</u>	<u>90</u>	<u>113</u>	<u>136</u>	<u>149</u>
UPPER MIX	<u>41</u>	<u>102</u>	<u>124</u>	<u>142</u>	<u>146</u>
LOWER MIX <u>200</u> KHZ	<u>40</u>	<u>66</u>	<u>79</u>	<u>96</u>	<u>101</u>

% THROUGH WALL (4.1)

DEGREES

DEGREES

DEGREES



MULTI-FREQUENCY EDDY CURRENT CALIBRATION SHEET

Nondestructive Testing Report No. _____

Date 12/4/82Applicable Code ASME Code Sect II 1974-575

I. Material to be Examined: A. Material INCONEL 600
 B. Alloy No. 600
 C. Wall Thickness .059 mm
 D. Outside Diameter 34"

II. Eddy Current Instrument

A. Manufacturer Zetec

B. Equipment

1. Miz 12 Display S/N 111
 2. Miz 12 Test Module
 a. Channel #1 S/N 329 Freq. 400 Phase 120 Gain 42 Diff. ABS
 b. Channel #2 S/N 195 Freq. 100 Phase 334 Gain 26
 c. Channel #3 S/N 165 Freq. 100 Phase 333 Gain 48
 d. Channel #4 S/N 194 Freq. 200 Phase 256 Gain 40
 e. Upper Mix S/N 208 V Phase 246 H Phase 242 Out Phase 123
 V Gain 6.2 H Gain 2.42 S1 14/9 S2 3/7
 f. Lower Mix S/N _____ V Phase _____ H Phase _____ Out Phase _____
 V Gain _____ H Gain _____ S1 _____ S2 _____

III. Strip Chart Recorder

A. Manufacturer Gould

Model _____

B. Strip Chart Recorder/Channel 1 2 3 4 5 6 7 8
 1. S/N 03628
 2. Chart Speed 5 mm/sec ALL 6
 3. Channel #1 Sensitivity 200 millivolts/div ALL 6
 4. Channel #2 Sensitivity _____

IV. Magnetic Tape Recorder

A. Manufacturer ZetecModel HP3968A2B. S/N 210SA01534 Operational Speed 3 3/4 ips

V. Eddy Current Probe Manipulator

A. Manufacturer ZetecModel SM-4 S/N N/AB. Scanning Speed 2 in/sec

C. Hand Probe _____ Hand Manipulate with Probe Pusher

D. Remote Control Fixture SM-4 Remote Control Fixture with ProbePusher ZETEC DC

E. Other _____

VI. Eddy Current Probe

A. Manufacturer ZetecModel 560 SF S/N _____

B. Type of Probe: Differential _____ Absolute _____

C. Probe Coil Diameter 560 Probe Body Diameter _____D. Probe Cable Length 100' Probe Extension Cable Length 100'

VII. System Calibration Reference Standard

A. Serial Nos. #1 214 #2 HAND WELD #3 _____B. Material INCONEL 600 Tube Outside Diameter 3/4" Tube Wall Thickness .059 mmC. Hole Size .052 Slot Width _____D. Percent of Wall Penetration 100/50/40/20 _____

APPENDIX IV
PERSONNEL CERTIFICATION



TITLE: PERSONNEL CERTIFICATION
TRANSMITTAL

IV - 1

POST OFFICE BOX 140 · ISSAQUAH, WASHINGTON 98027 · TELEPHONE 206-392-5316

CERTIFICATE OF PERSONNEL QUALIFICATION

(Refer to Quality Assurance Plan and Program I-QA
Procedure No. I-QA 101)

NAME: THOMAS S. BEIERS

DATE OF BIRTH: 4/1/41

SOCIAL SECURITY NUMBER: 535-36-5052

TEST METHOD: Eddy Current

HIGHEST LEVEL: III

CERTIFICATION DATE: September 1982 LATEST RE-CERTIFICATION DATE:

EXPERIENCE BACKGROUND:

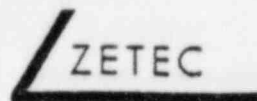
1970-1974	Zetec, Inc.; NDT Technician
1974-1975	Combustion Engineering; NDT Examination Group Eddy Current Specialist
1975-Present	Zetec, Inc.; NDT Technician

EDUCATIONAL BACKGROUND:

2 years	J. M. Perry Institute
April 1970	40 hours formal training for Level I Operator at Zetec
January 1973	24 hours formal training for Level II Operator at Zetec
June 1976	40 hours formal training for Level IIA Operator at Zetec
September 1982	80 hours formal training for Level III Operator at Zetec

PSYCHOLOGICAL EXAMINATION:

METHOD:	Standard psychiatric examination interview and the MMPI psychological test.
DOCTOR:	Hugh M. Castell, M.D.; Kirkland, Washington 98033
DATE:	October 1, 1978



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NAME: THOMAS S. BEIERS

PHYSICAL EXAMINATION:

DATE: 1/29/82

DOCTOR: R. W. Enck, M.D., Bellevue, Washington

GENERAL HEALTH: Good

based on: complete history and physical including a complete blood count, urinalysis, EKG, chest x-ray and GHS 100 (automated blood profile).

SPIROMETER: See attached

VISION: 1/8/82 - Dr. Freedman

SNELLEN

UNCORRECTED.....

RIGHT EYE

LEFT EYE

20/20

CORRECTED.....

-

-

JAEGER

UNCORRECTED.....

J1

J1

CORRECTED.....

-

-

ISHIHARA COLOR PLATES

Normal

Normal


TECHNICAL EXAMINATION:

LEVEL	DATE	GENERAL	SPECIFIC	PRACTICAL	COMPOSITE
I	4/10/70	100	94	100	98
II	6/10/82	100	100	100	100
IIA	6/10/82			96	96
		BASIC	METHOD	SPECIFIC	COMPOSITE
III	9/24/82	88	82	100	90

CERTIFIED BY:

A. L. LUCERO
MANAGER OF QUALITY ASSURANCE
LEVEL III EXAMINER

or


CLYDE J. DENTON
GENERAL MANAGER
LEVEL III EXAMINER

COMMENTS:

To Whom It May Concern:

Thomas S. Beiers has been employed by Zetec, Inc. since October 1975. In our opinion, he is normal psychologically and poses no potential subversive threat to your facility or your personnel.