

CAROLINA POWER & LIGHT COMPANY

ROBINSON NUCLEAR POWER PLANT

UNIT 2

EDDY CURRENT EXAMINATION REPORT

October 1993

DOCUMENT NO. IR-ISI-142

ASEA BROWN BOVERI
COMBUSTION ENGINEERING, INC.
NUCLEAR POWER BUSINESSES
OUTAGE SERVICES

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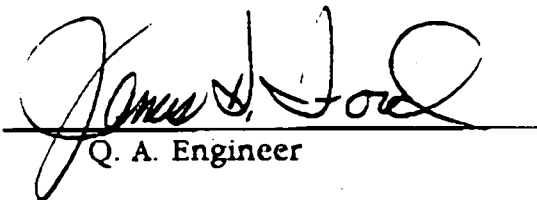
DATE

TO: Carolina Power & Light Co.

CERTIFICATE OF PERFORMANCE

Carolina Power & Light Co.
H.B. Robinson Plant, Unit 2
Steam Generator Eddy Current Examination

Combustion Engineering, Inc., hereby certifies that the Robinson Unit 2 steam generator eddy current examinations performed during September/October 1993 were in compliance with CP&L Purchase Order XM 10370000/WA# XS 10370006. Documentation attesting to this conformance is contained within the data of this QC Records Package.


Q. A. Engineer

ABSTRACT

This document summarizes the examination program, results, and presents information concerning examination procedures, personnel and equipment used for inspection at the H.B. Robinson Unit 2 RFO 15 1993 outage.

The eddy current examination outage included eddy current inspections utilizing the Zetec bobbin probes for defect examination. Rotating Pancake coil (MRPC) examinations were performed on approximately 20% of the inlet (hot) side manufacturing buff marks, both from historic data previous to the 1993 inspection, and from the 1993 inspection. The same tubes inspected with the pancake coil at buff-mark locations were also examined at the top-of-tubesheet intersection. A full-length bobbin probe examination was performed in steam generator's "A", "B" and "C", except for row 1 tubes which were examined from 6C to HTE. The bobbin probe inspection (~40%) included all tubes which have not been inspected since the baseline 100% inspection of 1984. One tube was plugged in steam generator "A", (Row 2 Column 6). This tube was obstructed to a .610" probe at the U-bend. Details are contained in the text of this document.

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- 2 All Data on all Tubes sorted in Row - Column order.
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- 4 Eddy Current Calibration Sheets.

STEAM GENERATOR #B EXAMINATION DATA

Tab

- 1 Preliminary report transmittal and CP&L receipt acknowledgement.
- 2 All Data on all Tubes sorted in Row - Column order.
- 3 Final DDA-4 Report Printouts and Lissajous Printouts for all Data sorted by reel number.
- 4 Eddy Current Calibration Sheets.

STEAM GENERATOR #C EXAMINATION DATA

Tab

- 1 Preliminary report transmittal and CP&L receipt acknowledgement.
- 2 All Data on all Tubes sorted in Row - Column order.
- 3 Final DDA-4 Report Printouts and Lissajous Printouts for all Data sorted by reel number.
- 4 Eddy Current Calibration Sheets.

INTRODUCTION

Combustion Engineering, Inc. conducted an in-service eddy current examination of the steam generator (S/G) tubing at Carolina Power & Light (CP&L) Robinson Unit 2 Nuclear Power Plant in September/October 1993. The purpose of the examination was to assess the condition of the S/G's, identify tubes requiring repair and to provide the necessary information needed to fulfill Technical Specification requirements.

The examination program included multi-frequency bobbin coil and motorized rotating pancake coil (MRPC) testing for indications of degradation, dents, and deposits.

The examinations were conducted in accordance with Combustion Engineering Procedure No. ROB-410-004 Rev. 5 in compliance with the USNRC Regulatory Guide 1.83 "Inservice Inspection of PWR Steam Generator Tubes", Revision 1, dated July, 1975 and the ASME Boiler and Pressure Vessel Code, Section XI "Rules for Inservice Inspection of Nuclear Power Plant Components", 1986 Edition, with no Addenda, and the Robinson Unit 2 Technical Specifications.

The eddy current data analysis variables were established in accordance with the Procedure No. ROB-410-005 Rev. 4 "Eddy Current Data Analysis Procedure, Evaluation of Westinghouse Steam Generator Tubing", and the attached Guideline, H.B. Robinson Eddy Current Analysis Supplement. The data was independently analyzed by two groups of certified Level IIA (minimum) data analysts. Discrepancies between the two sets of evaluation results were reviewed by a Lead Level III eddy current examiner.

WORK SCOPE

The examination program was conducted to meet all the necessary requirements of the Plant Technical Specifications. A examination was performed utilizing bobbin probe testing which completed examination of all tubes not previously examined since the 1984 baseline 100% inspection. This inspection equaled approximately 40% of all tubes in the steam generators.

Component: SG #A**Steam Generator Inspection Summary**

No. Exams:	Extent:	<20%	20-39%	>= 40%	Probe:
4	1H FBH	0	0	0	B720MRPC
2	1H HTS	0	0	0	B720MRPC
5	2H 1H	0	0	0	B720MRPC
3	3H 2H	0	0	0	B720MRPC
1	4H 3H	0	0	0	B720MRPC
5	5H 4H	0	0	0	B720MRPC
2	6H 5H	0	0	0	B720MRPC
21	HTS+2	0	0	0	B720MRPC
1	6H	0	0	0	A680SFRM
27	6C	0	0	0	A680SFRM
2	CTE	0	0	0	A620SFRM
45	CTE	0	0	0	A680SFRM
119	CTE	1	0	0	A700SFRM
918	CTE	1	2	0	A720MULC
TOTALS:		LT20	GE 20-40	GE 40	
1155	EXAMINATIONS PERFORMED				
1123	Tubes Examined				
NUMBER OF INDICATIONS:		2	2	0	

Component: SG #B**Steam Generator Inspection Summary**

No. Exams:	Extent:	<20%	20-39%	>= 40%	Probe:
8	2H 1H	0	0	0	B720MRPC
10	3H 2H	0	0	0	B720MRPC
11	4H 3H	0	0	0	B720MRPC
6	5H 4H	0	0	0	B720MRPC
5	6H 5H	0	0	0	B720MRPC
2	FBHHTS	0	0	0	B720MRPC
36	HTS+2	0	0	0	B720MRPC
37	6C	0	0	0	A680SFRM
45	CTE	0	0	0	A680SFRM
129	CTE	0	0	0	A700SFRM
1013	CTE	8	6	0	A720MULC
TOTALS:		LT20	GE 20-40	GE 40	
1302	EXAMINATIONS PERFORMED				
1243	Tubes Examined				
NUMBER OF INDICATIONS:		8	6	0	

Component: SG #C**Steam Generator Inspection Summary**

No. Exams:	Extent:	<20%	20-39%	>= 40%	Probe:
3	2H 1H	0	0	0	B720MRPC
2	3H 2H	0	0	0	B720MRPC
3	4H 3H	0	0	0	B720MRPC
9	5H 4H	0	0	0	B720MRPC
6	6H 5H	0	0	0	B720MRPC
21	HTS+2	0	0	0	B720MRPC
33	6C	0	0	0	A680SFRM
32	CTE	0	0	0	A680SFRM
59	CTE	0	0	0	A700SFRM
992	CTE	25	3	0	A720MULC
TOTALS:		LT20	GE 20-40	GE 40	
1160	EXAMINATIONS PERFORMED				
1130	Tubes Examined				
NUMBER OF INDICATIONS:		25	3	0	

Summary

Full length bobbin coil eddy current examinations were conducted as summarized in the previous section of this report. The scan plan was provided by ABB/CE and approved by CP&L, and depicted a 40% (approx) sample of tubes throughout the 3 steam generators, including tubes referenced as "previous indication" tubes. The "previous indication" tube examination results were compared against the 1992, 1990, 1988, 1987, and baseline outage (where possible) for indication of degradation progression.

None of the flaw-type signals reported during this inspection indicated any growth of previous indications, attributing further conclusions that the previous indications are indicative of manufacturing blemishes. The results from the previous four outages (1987, 1988, 1990, 1992) are shown for these tubes along with 1993 tube data. This data can be found along with the tube-sheet graphics displays behind tabs "A", "B" and "C". You will note that some of the shallow depth (<20%) flaws have been updated to Manufacturing Buff Mark (MBM). Previous indication tubes from the 1992 inspection may not be included since some indications were changed to MBM during the 1992 examination. Included with the listings for previous indications are lists of all MBM (Manufacturing Buff Marks) as recorded during the 1993 examination. Any corresponding information from previous inspections is also shown with each tube, if data was collected during previous inspections through 1987.

Indications were reported in the <20% range and ≥ 20 to 39% range in S/G's A, B & C. A summary of the 1993 outage % Through-wall indications (including previous indications) is as follows:

COMPONENT: SG #A									
ALL % THROUGH-WALL INDICATIONS									
Row/Col	Reel	Volts	CH	%TWD	Indication	Probe	Extent		
				Location		Tested			
3	38	AH015	0.9	1 19	1H	+20.39	A700SFRM	CTE	
27	29	AH005	0.9	1 19	6H	+74.89	A720MULC	CTE	
7	3	AH001	0.4	1 23	1C	+25.69	A720MULC	CTE	
9	74	AH011	0.7	1 37	2H	+44.85	A720MULC	CTE	

COMPONENT: SG #B
ALL % THROUGH-WALL INDICATIONS

Row/Col	Reel	Volts	CH	%TWD	Indication Location	Probe	Extent Tested
25	26	BH003	3.9	1	5	4C +17.02	A720MULC CTE
42	34	BH005	1.8	1	6	5C +45.74	A720MULC CTE
20	87	BH014	0.7	1	9	5C +34.87	A720MULC CTE
9	9	BH001	1.3	1	11	CTS + 3.73	A720MULC CTE
10	25	BH003	0.6	1	11	HTS + 5.57	A720MULC CTE
25	26	BH003	2.5	1	13	3C +41.26	A720MULC CTE
34	30	BH004	0.7	1	14	HTS + 1.80	A720MULC CTE
19	46	BH006	1.4	1	15	CTS +13.57	A720MULC CTE
25	26	BH003	1.4	1	23	4H +46.13	A720MULC CTE
36	33	BH005	0.6	1	24	5C +46.46	A720MULC CTE
18	32	BH004	1.4	2	25	4H +19.01	A720MULC CTE
32	39	BH005	0.3	1	29	5H +46.83	A720MULC CTE
36	62	BH010	0.3	1	37	2C +12.24	A720MULC CTE
41	30	BH004	0.3	1	39	5H +20.23	A720MULC CTE

COMPONENT: SG #C
ALL % THROUGH-WALL INDICATIONS

Row/Col	Reel	Volts	CH	%TWD	Indication Location	Probe	Extent Tested
10	55	CH009	2.5	1	1	CTS + 6.96	A720MULC CTE
13	4	CH001	4.5	1	2	CTS +17.55	A720MULC CTE
25	81	CH013	3.8	1	2	5C +40.05	A720MULC CTE
13	4	CH001	3.6	1	3	CTS +16.35	A720MULC CTE
		CH001	4.7	1	4	CTS +21.33	A720MULC CTE
		CH001	2.5	1	6	CTS +11.25	A720MULC CTE
10	62	CH010	1.7	1	7	CTS + 8.65	A720MULC CTE
10	54	CH009	0.9	1	7	CTS + 2.54	A720MULC CTE
13	4	CH001	4.6	1	7	CTS +20.16	A720MULC CTE
10	10	CH001	0.6	P 1	7	CTS +15.45	A720MULC CTE
10	58	CH009	1.3	1	7	CTS + 3.49	A720MULC CTE
9	60	CH009	1.1	1	8	CTS + 9.20	A720MULC CTE
10	55	CH009	1.2	1	8	CTS + 5.75	A720MULC CTE
10	11	CH001	1.2	1	8	CTS + 3.38	A720MULC CTE
11	57	CH009	2.3	1	9	CTS + 7.04	A720MULC CTE
13	4	CH001	0.9	1	10	CTS +15.68	A720MULC CTE
19	6	CH001	1.2	1	10	FBC + 1.41	A720MULC CTE
10	11	CH001	0.8	1	11	CTS + 4.47	A720MULC CTE
13	4	CH001	1.9	1	11	CTS +10.05	A720MULC CTE
10	58	CH009	0.8	1	12	CTS + 2.26	A720MULC CTE
23	17	CH002	1.8	1	12	CTS + 1.22	A720MULC CTE
10	10	CH001	0.6	P 1	14	CTS +16.62	A720MULC CTE
10	62	CH010	1.0	1	17	CTS + 7.62	A720MULC CTE
13	3	CH001	1.5	1	17	CTS +12.46	A720MULC CTE
		CH001	1.1	1	19	CTS +11.41	A720MULC CTE
10	55	CH009	0.6	1	22	3C +11.01	A720MULC CTE
13	4	CH001	0.7	1	23	CTS +14.53	A720MULC CTE
35	65	CH010	1.1	1	30	5H +37.94	A720MULC CTE

Steam generator "A" Row 2 Column 6 was preventively plugged due to an obstruction at the U-bend. Various bobbin probes of decreasing size down to 0.610" dia. were implemented but were unable to pass the obstruction. Finally a probe head was removed from the 3/8" diameter poly shaft and run into the tube. The poly shaft did not pass through the restriction. This tube was preventively plugged. Two adjacent tubes; row 2 column 5, and row 2 column 7 were examined to insure no similar damage occurred in the surrounding area. No further damage was detected.

Upon reviewing the 1984 base-line data on tube Row 2 Column 6, it indicated an obstruction with a 0.720 probe and was not examined further, but left in service. The baseline *report* indicates a completed exam, and therefore disagrees with the actual base-line raw data as reviewed in 1993. The data indicates the obstruction was most likely present since the steam generator was installed. See Volume II Tab 1 of Steam Generator "A" Examination Data for more details on tube row 2 Column 6.

Another aspect of this outage, was the inspection of previous indications classified as manufacturing buff marks (MBM). Due to an inaccurate analysis of a true flaw as a buff mark indication at a similar plant, it was desirable to demonstrate that a similar situation did not occur at H. B. Robinson. A sample of approximately 20% of all historic hot leg buff marks were examined with the 3-coil MRPC probe. Any "new" buff marks recorded during the 1993 RFO 15 inspection were also sampled for further evaluation.

The results of the special MRPC examination indicated no recordable flaw indications, only confirmation of buff-mark anomalies. A sample of these indications is shown as follows:

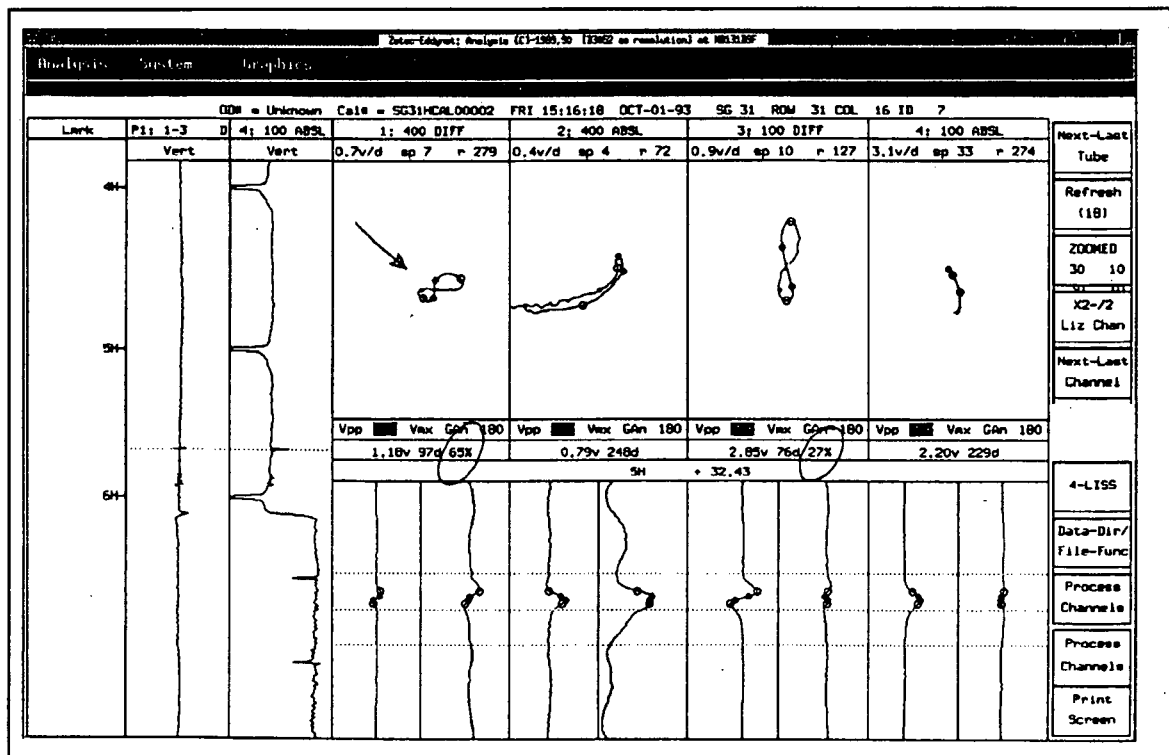


Figure 1

As you can see by this graphic display, (figure 1) a buff mark can first appear as a deep indication on the primary (400 KHz) channel. However you will note the 100 KHz differential channel does not correlate well with the 400 KHz differential channel. Also, the strip charts show a long indication, representative of a buff mark. If the indications were true flaws, more correlation would be evident (see figure 6).

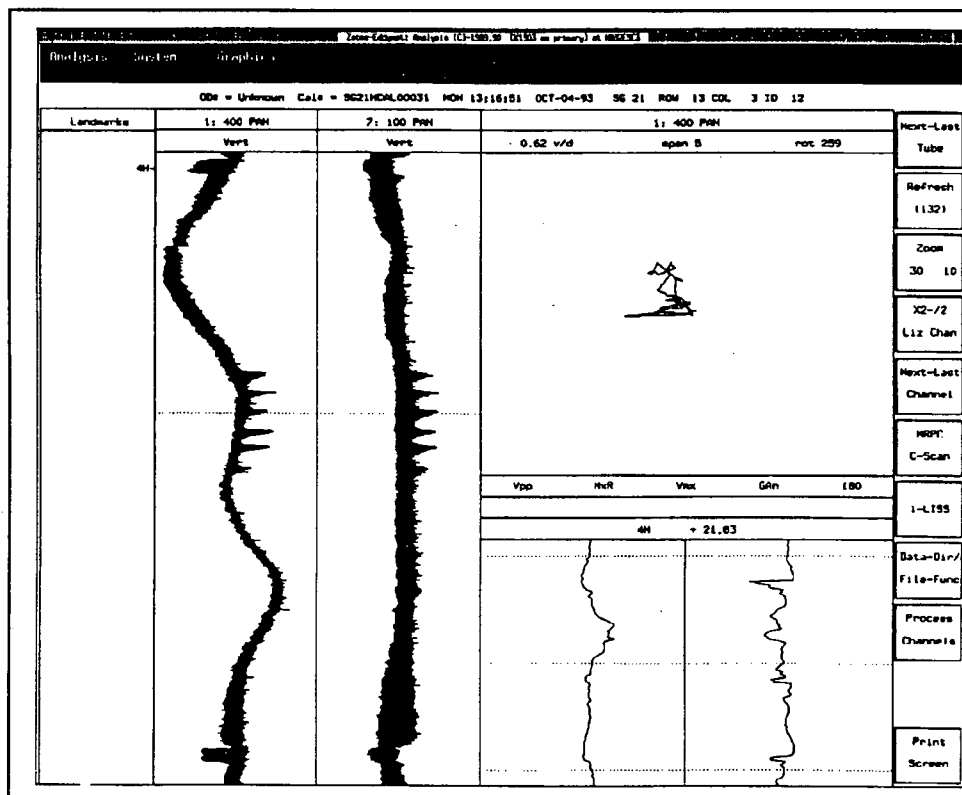


Figure 2

Figure 2 shows the display from a tube which was examined with the MRPC probe. This particular tube has multiple buff marks in the same area.

As you can see in figure 3 (the same tube as shown in figure 2), the shape of the indications are rounded, indicating a buff mark, and not a flaw of recordable depth or linear shape.

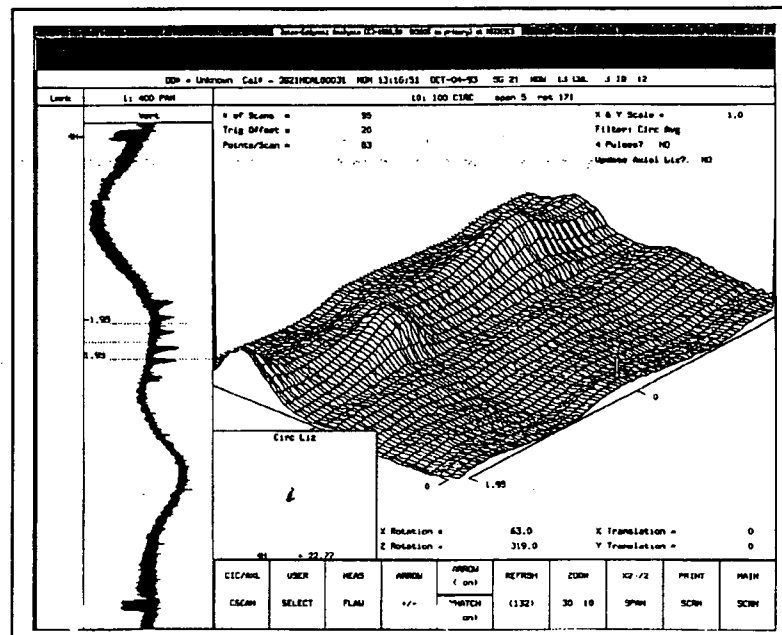


Figure 3

Figure 4 shows the same MBM indications as figure 3, but from a top view called a "clip plot". You will once again note the rounded shape of the indications.

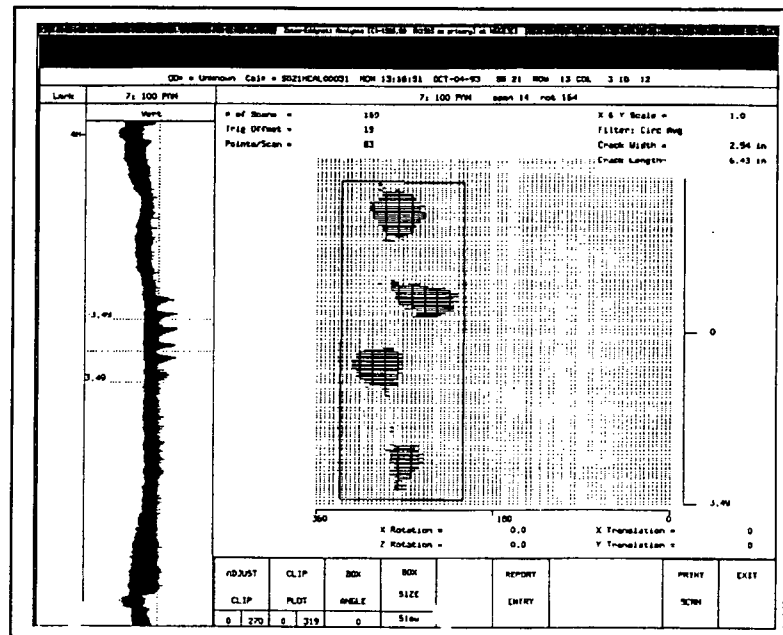


Figure 5

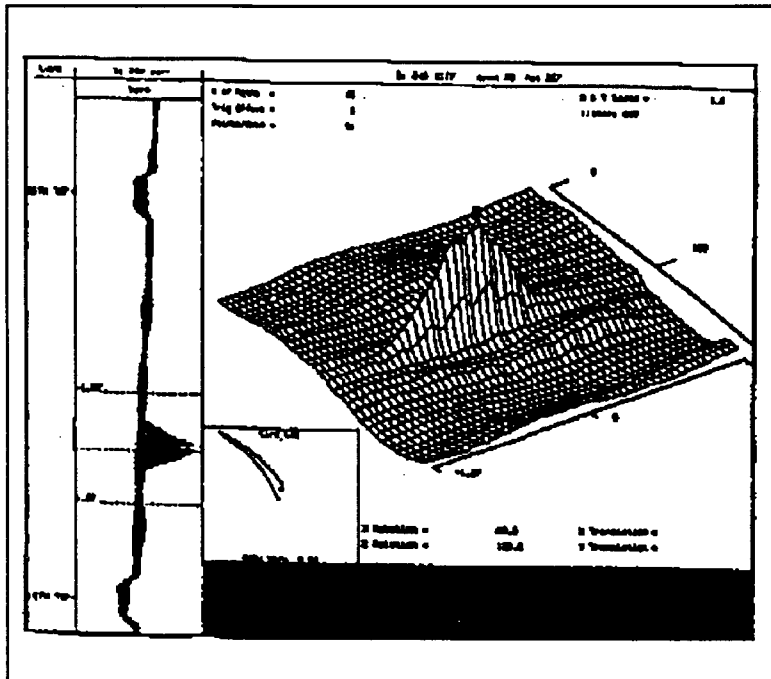


Figure 6

Unlike the indications at H.B. Robinson, this graphic from another plant (figure 5) shows the MRPC display from a long flaw which was originally resolved as a buff mark. You can see the linear shape of the indication, verifying a crack-like flaw.

As in Figure 5, Figure 6 shows the indication incorrectly reported as a buff mark. You can see how each frequency confirms the indication as having a depth indicative of a true flaw.

This type of indication was not found during the H.B. Robinson RFO 15 inspection outage.

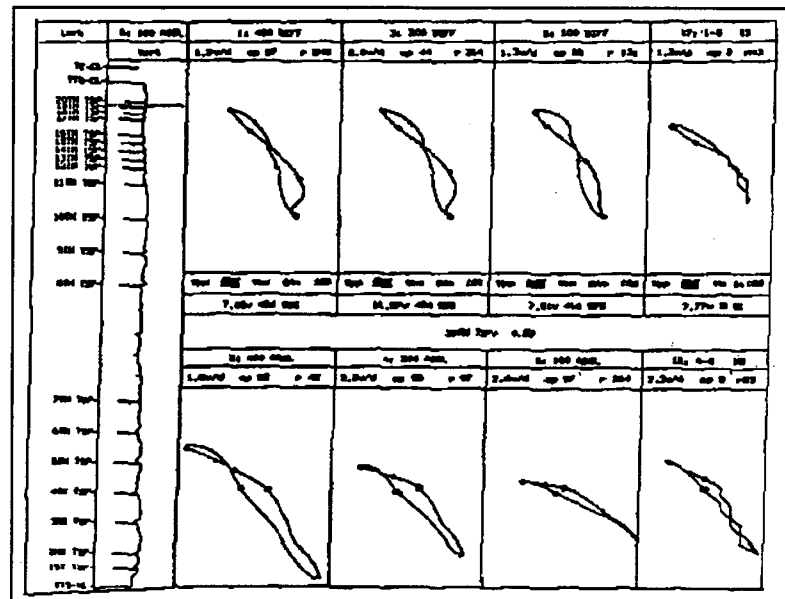


Figure 6

In addition to the buff mark indications, each tube examined with the MRPC probe also received an examination at the top-of-tubesheet expansion transition. This test was performed to sample tubes for possible expansion transition PWSCC (cracking). No PWSCC indications were found in the sample as indicated.

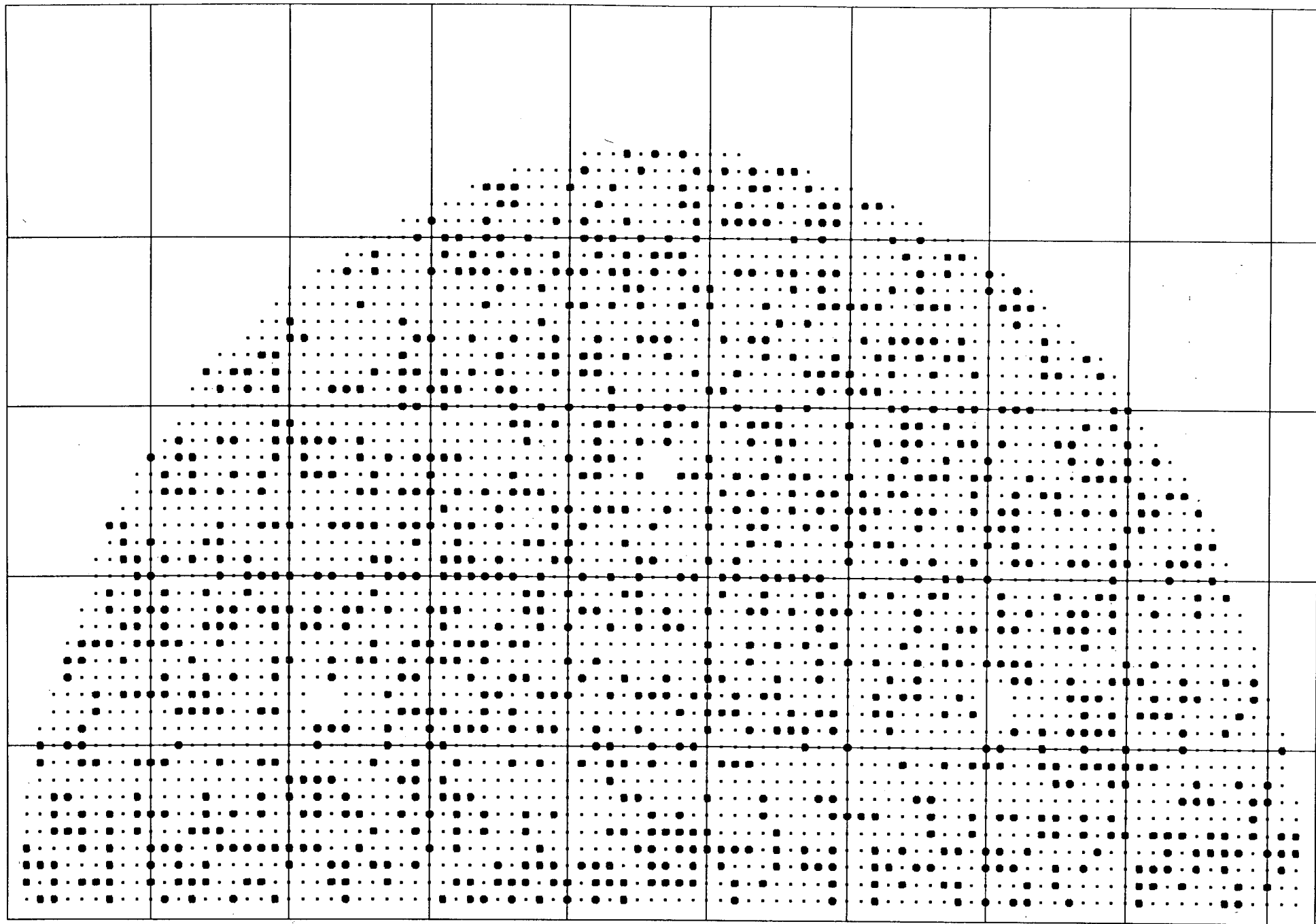
Additional information may be found by reviewing the graphic tube-sheet maps found in the following sections. These include:

All tubes examined with Bobbin Probes

All tubes examined with MRPC Probes

Tubes with % through-wall indications

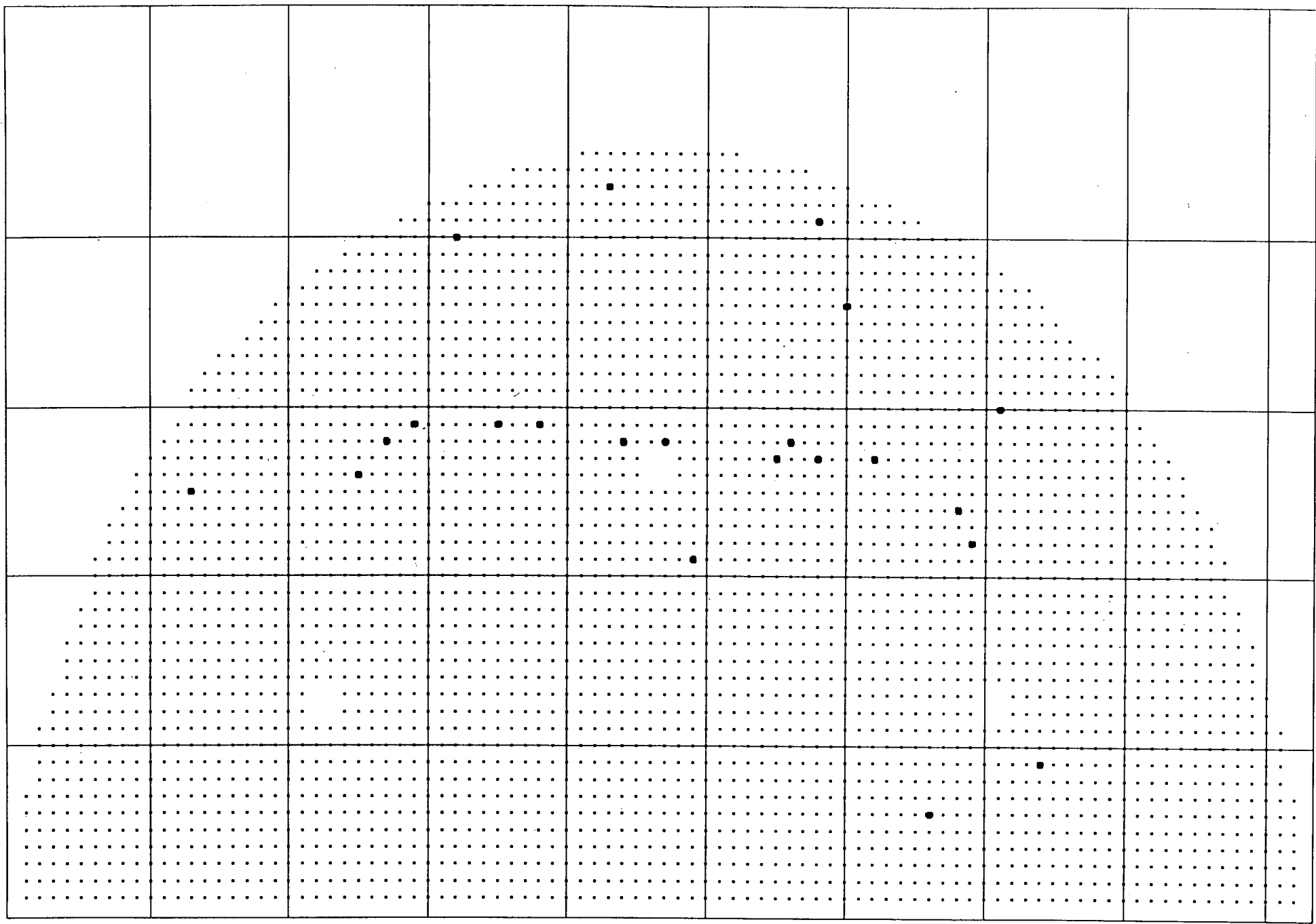
Obstructed tube Row 2 Column 6 (S/G "A" - plugged this outage)



COL 10 20 30 40 50 60 70 80 90
1112: Bobbin Tubes Examined

H.B. ROBINSON Unit 2
S/G #A 10/20/93
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ACRI IS Tubes



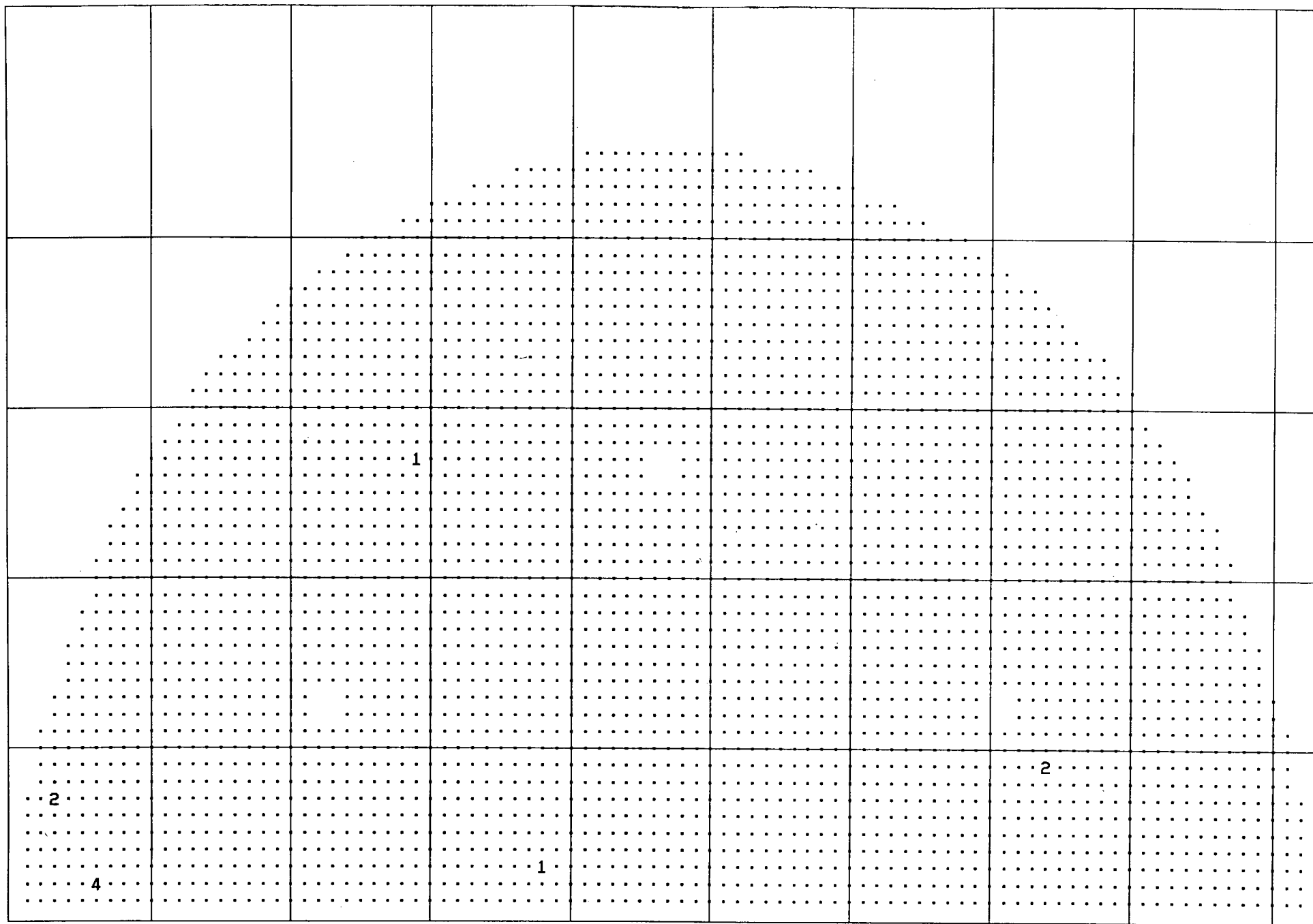
COL 10 20 30 40 50 60 70 80 90

22: MRPC Tubes Examined

H.B. ROBINSON Unit 2
S/G #A 10/20/93
ABB-Combustion Engineering

ACRI IS Tubes

10



90

- | COL | 10 | 20 |
|-----|---------------------------|------|
| 1: | 2: Tubes with indications | >0% |
| 2: | 2: Tubes with indications | >19% |
| 3: | 0: Tubes with indications | >39% |
| 4: | 1: Obstructed Tubes | |

H.B. ROBINSON Unit 2
S/G #A 10/20/93
ABB-Combustion Engineering

ACRI IS Tubes

C P & L
H. B. ROBINSON
COMPONENT: S/G #A
OUTAGE: 9309

Date: 10/05/93
Page: 1

ALL EXAMS BY TUBE FOR PERCENT THRUWALL INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
3 38								
	93 DATA	AH015	0.9	1	19	1H +20.4	A700SFRM	CTE
	92 DATA	AH12	0.9	1	25	1H +20.7	A700SFRM	CTEHTE
	92 DATA	AH12	4.0	8	SLG	CTS +1.6	A720MULC	CTEHTE
	92 DATA	AH12	7.9	8	SLG	HTS +0.6	A720MULC	CTEHTE
7 3								
	93 DATA	AH001	0.4	1	23	1C +25.7	A720MULC	CTE
9 74								
	93 DATA	AH011	0.7	1	37	2H +44.8	A720MULC	CTE
	93 DATA	AH022					B720MRPC	H3 H2
27 29								
	93 DATA	AH005	0.9	1	19	6H +74.9	A720MULC	CTE

Number of Tubes: 4
Number of Indications: 4

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
3 3								
	93 DATA	AH015	1.6	2	MBM	5H +42.9	A700SFRM	CTE
4 49								
	93 DATA	AH015	1.2	2	MBM	1C +30.7	A700SFRM	CTE
5 7								
	93 DATA	AH023	1.4	2	MBM	2C +32.0	A700SFRM	CTE
6 7								
	93 DATA	AH001	1.1	2	MBM	1C +34.5	A720MULC	CTE
6 66								
	93 DATA	AH010	1.5	2	MBM	HTS +26.7	A720MULC	CTE
	93 DATA	AH021	1.4	1	MBM	HTS +26.8	B720MRPC	1H HTS
	93 DATA	AH021					B720MRPC	HTS+2
7 4								
	93 DATA	AH001	0.6	2	MBM	5H +15.1	A720MULC	CTE
7 44								
	93 DATA	AH007	1.5	2	MBM	CTS +43.5	A720MULC	CTE
8 22								
	93 DATA	AH003	0.9	2	MBM	FBH +11.6	A720MULC	CTE
9 11								
	93 DATA	AH001	1.1	2	MBM	2C +30.3	A720MULC	CTE
9 19								
	93 DATA	AH002	0.7	2	MBM	1H +23.1	A720MULC	CTE
	93 DATA	AH002	1.4	2	MBM	2H +14.1	A720MULC	CTE
9 46								
	93 DATA	AH007	1.1	2	MBM	5H +6.0	A720MULC	CTE
10 4								
	93 DATA	AH001	0.8	2	MBM	4H +33.7	A720MULC	CTE
12 19								
	93 DATA	AH002	0.8	2	MBM	2C +26.3	A720MULC	CTE
12 29								
	93 DATA	AH005	1.6	2	MBM	6H +2.3	A720MULC	CTE
12 30								
	93 DATA	AH005	0.6	2	MBM	HTS +47.0	A720MULC	CTE

C P & L
H. B. ROBINSON
COMPONENT: S/G #A
OUTAGE: 9309

Date: 10/05/93
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ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
12 31	93 DATA	AH005	0.8	2	MBM	1H +48.5	A720MULC	CTE
	93 DATA	AH005	0.7	2	MBM	HTS +50.3	A720MULC	CTE
	93 DATA	AH005	0.4	2	MBM	2H +30.5	A720MULC	CTE
12 34	93 DATA	AH006	0.6	2	MBM	CTS +12.6	A720MULC	CTE
	93 DATA	AH006	0.6	2	MBM	2C +27.6	A720MULC	CTE
13 6	93 DATA	AH001	0.6	2	MBM	4C +14.0	A720MULC	CTE
13 82	93 DATA	AH012	1.1	2	MBM	5C +30.3	A720MULC	CTE
14 11	93 DATA	AH001	0.9	2	MBM	5C +42.8	A720MULC	CTE
14 63	93 DATA	AH010	0.3	2	MBM	4H +16.4	A720MULC	CTE
	90 DATA	AH01					B720MRPC	HTS+2
14 65	93 DATA	AH010	1.2	2	MBM	2H +18.3	A720MULC	CTE
15 34	93 DATA	AH006	0.3	2	MBM	2C +21.6	A720MULC	CTE
15 40	93 DATA	AH006	1.1	2	MBM	2C +20.8	A720MULC	CTE
15 42	93 DATA	AH007	0.6	2	MBM	CTS +45.8	A720MULC	CTE
15 53	93 DATA	AH009	1.2	P 3	MBM	4C +2.6	A720MULC	CTE
	93 DATA	AH009	0.9	P 3	MBM	2C -0.8	A720MULC	CTE
	93 DATA	AH009	0.7	2	MBM	4C +18.3	A720MULC	CTE
16 33	93 DATA	AH006	0.5	2	MBM	4C +42.3	A720MULC	CTE
16 37	93 DATA	AH006	0.4	2	MBM	1C +36.0	A720MULC	CTE
	93 DATA	AH006	0.7	2	MBM	3C +16.6	A720MULC	CTE
	93 DATA	AH006	0.8	2	MBM	3C +8.0	A720MULC	CTE
	93 DATA	AH006	1.0	2	MBM	CTS +9.5	A720MULC	CTE
	93 DATA	AH006	0.4	2	MBM	CTS +17.0	A720MULC	CTE
	93 DATA	AH006	0.8	2	MBM	5C +27.7	A720MULC	CTE

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
16 55								
	93 DATA	AH009	1.7	P 3	MBM	2H -0.6	A720MULC	CTE
17 16								
	93 DATA	AH002	0.5	2	MBM	1C +4.6	A720MULC	CTE
18 15								
	93 DATA	AH001	1.0	2	MBM	2H +28.8	A720MULC	CTE
18 16								
	93 DATA	AH002	1.0	2	MBM	5H +10.6	A720MULC	CTE
	93 DATA	AH002	0.5	2	MBM	2C +19.1	A720MULC	CTE
20 22								
	93 DATA	AH003	0.4	2	MBM	3H +13.2	A720MULC	CTE
21 9								
	93 DATA	AH001	1.1	2	MBM	5C +25.3	A720MULC	CTE
21 26								
	93 DATA	AH005	0.7	2	MBM	1C +39.4	A720MULC	CTE
21 27								
	93 DATA	AH005	0.9	2	MBM	3C +39.5	A720MULC	CTE
21 31								
	93 DATA	AH005	0.9	2	MBM	3C +42.5	A720MULC	CTE
21 49								
	93 DATA	AH021	1.8	1	MBM	1H +47.6	B720MRPC	2H 1H
	93 DATA	AH021					B720MRPC	HTS+2
	90 DATA	AH02	6.5	4	MBM	2H -4.6	A720MULC	CTE
22 69								
	93 DATA	AH021	0.7	1	MBM	2H +30.3	B720MRPC	3H 2H
	93 DATA	AH021					B720MRPC	HTS+2
	92 DATA	AH10	8.0	4	MBM	2H +31.0	A720MULC	CTENTE
23 23								
	93 DATA	AH003	0.7	2	MBM	FBH +22.4	A720MULC	CTE
23 28								
	93 DATA	AH005	0.8	2	MBM	2H +48.8	A720MULC	CTE
24 68								
	93 DATA	AH021	1.7	1	MBM	FBH +13.5	B720MRPC	1H FBH
	93 DATA	AH021					B720MRPC	HTS+2
	90 DATA	AH12	7.3	4	MBM	FBH +13.6	A720MULC	CTE

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
25 13								
	93 DATA	AH001	1.1	2	MBM	HTS +4.4	A720MULC	CTE
	93 DATA	AH001	0.8	2	MBM	2C +49.2	A720MULC	CTE
	93 DATA	AH022					B720MRPC	HTS+2
	93 DATA	AH022	0.8	5	MBM	HTS +4.1	B720MRPC	1H HTS
25 15								
	93 DATA	AH001	1.6	2	MBM	FBC +19.1	A720MULC	CTE
25 26								
	93 DATA	AH005	1.0	2	MBM	3C +43.4	A720MULC	CTE
25 28								
	93 DATA	AH005	1.0	2	MBM	4H +15.2	A720MULC	CTE
25 32								
	93 DATA	AH005	1.6	2	MBM	2H +27.8	A720MULC	CTE
26 18								
	93 DATA	AH002	1.0	2	MBM	FBH +2.6	A720MULC	CTE
26 23								
	93 DATA	AH003	1.9	2	MBM	5C +8.7	A720MULC	CTE
26 25								
	93 DATA	AH022	1.5	1	MBM	FBH +25.6	B720MRPC	1H FBH
	93 DATA	AH022					B720MRPC	HTS+2
	90 DATA	AH05	6.3	4	MBM	FBH +24.8	A720MULC	CTE
26 30								
	93 DATA	AH005	0.8	2	MBM	3H +18.6	A720MULC	CTE
	93 DATA	AH005	0.8	2	MBM	4H +21.7	A720MULC	CTE
	93 DATA	AH005	0.6	2	MBM	1H +12.0	A720MULC	CTE
	93 DATA	AH005	1.3	2	MBM	1H +40.3	A720MULC	CTE
	93 DATA	AH005	0.8	2	MBM	4C +1.4	A720MULC	CTE
26 42								
	93 DATA	AH007	0.7	2	MBM	5C +17.4	A720MULC	CTE
	93 DATA	AH007	0.5	2	MBM	1C +26.5	A720MULC	CTE
26 60								
	93 DATA	AH009	1.0	2	MBM	6H +82.8	A720MULC	CTE
26 65								
	93 DATA	AH010	2.0	2	MBM	4C +37.8	A720MULC	CTE
26 73								
	93 DATA	AH011	1.6	2	MBM	4C +32.5	A720MULC	CTE
27 10								
	93 DATA	AH001	0.7	2	MBM	5H +21.4	A720MULC	CTE

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
27 12								
	93 DATA	AH001	1.4	2	MBM	5C +14.6	A720MULC	CTE
	93 DATA	AH001	1.2	2	MBM	5H +24.4	A720MULC	CTE
27 27								
	93 DATA	AH005	1.8	2	MBM	1H +11.1	A720MULC	CTE
27 55								
	93 DATA	AH009	0.5	2	MBM	1H +40.2	A720MULC	CTE
	93 DATA	AH021	1.9	1	MBM	1H +40.5	B720MRPC	2H 1H
	93 DATA	AH021					B720MRPC	HTS+2
27 58								
	93 DATA	AH021	0.9	7	MBM	1H +18.5	B720MRPC	2H 1H
	93 DATA	AH021					B720MRPC	HTS+2
	92 DATA	AH07	5.1	4	MBM	1H +18.5	A720MULC	CTEHTE
	92 DATA	AH07	6.2	8	SLG	HTS +1.6	A720MULC	CTEHTE
28 25								
	93 DATA	AH004	0.9	2	MBM	1C +12.0	A720MULC	CTE
28 27								
	93 DATA	AH022	1.1	1	MBM	3H +42.5	B720MRPC	4H 3H
	93 DATA	AH022					B720MRPC	HTS+2
	90 DATA	AH05	5.3	4	MBM	3H +42.5	A720MULC	CTE
28 44								
	93 DATA	AH022	1.0	1	MBM	4H +24.0	B720MRPC	1H FBH
	93 DATA	AH022					B720MRPC	HTS+2
	92 DATA	AH05	5.4	4	MBM	FBH +26.6	A720MULC	CTEHTE
28 47								
	93 DATA	AH008	0.9	2	MBM	5H +11.6	A720MULC	CTE
	93 DATA	AH021					B720MRPC	6H 5H
	93 DATA	AH021					B720MRPC	HTS+2
28 55								
	93 DATA	AH009	1.5	2	MBM	CTS +12.6	A720MULC	CTE
	93 DATA	AH009	0.9	2	MBM	3A +14.9	A720MULC	CTE
	90 DATA	AH01					B720MRPC	HTS+2
28 56								
	93 DATA	AH009	0.5	2	MBM	1H +28.4	A720MULC	CTE
	93 DATA	AH021	1.3	1	MBM	1H +28.0	B720MRPC	2H 1H
	93 DATA	AH021					B720MRPC	HTS+2
29 35								
	93 DATA	AH022	1.3	1	MBM	4H +37.8	B720MRPC	5H 4H
	93 DATA	AH022					B720MRPC	HTS+2
	92 DATA	AH04	5.1	4	MBM	4H +38.7	A720MULC	CTEHTE
29 38								
	93 DATA	AH022	1.0	1	MBM	4H +29.5	B720MRPC	2H 1H

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
	93 DATA	AH022					B720MRPC	HTS+2
	92 DATA	AH04	5.8	4	MBM	1H +29.5	A720MULC	CTEHTE
	92 DATA	AH04	5.0	4	MBM	3C +14.8	A720MULC	CTEHTE
29 49								
	93 DATA	AH008	1.2	2	MBM	FBC +10.2	A720MULC	CTE
30 31								
	93 DATA	AH005	0.4	2	MBM	2H +2.2	A720MULC	CTE
	93 DATA	AH005	0.7	2	MBM	1H +11.3	A720MULC	CTE
	93 DATA	AH005	0.5	2	MBM	3C +30.6	A720MULC	CTE
30 52								
	93 DATA	AH008	1.4	2	MBM	CTS +18.8	A720MULC	CTE
30 71								
	93 DATA	AH011	2.7	2	MBM	5H +12.1	A720MULC	CTE
	93 DATA	AH021	5.2	4	MBM	5H +12.7	B720MRPC	6H 5H
	93 DATA	AH021					B720MRPC	HTS+2
31 30								
	93 DATA	AH005	0.8	2	MBM	4H +24.8	A720MULC	CTE
31 31								
	93 DATA	AH005	1.5	2	MBM	3A +15.5	A720MULC	CTE
31 58								
	93 DATA	AH009	0.4	2	MBM	FBH +24.4	A720MULC	CTE
31 60								
	93 DATA	AH009	0.6	2	MBM	FBH +7.7	A720MULC	CTE
31 62								
	93 DATA	AH010	0.6	2	MBM	1C +45.0	A720MULC	CTE
32 39								
	93 DATA	AH006	1.9	2	MBM	FBH +13.4	A720MULC	CTE
33 63								
	93 DATA	AH010	0.5	2	MBM	5H +20.4	A720MULC	CTE
33 67								
	93 DATA	AH010	0.5	2	MBM	1C +29.6	A720MULC	CTE
34 30								
	93 DATA	AH005	0.5	2	MBM	5H +7.8	A720MULC	CTE
34 51								
	93 DATA	AH008	1.1	2	MBM	FBC +22.1	A720MULC	CTE

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
35 55								
	93 DATA	AH009	1.8	P 3	MBM	1A +0.6	A720MULC	CTE
36 60								
	93 DATA	AH009	1.7	2	MBM	4H +47.5	A720MULC	CTE
	93 DATA	AH021	2.4	1	MBM	4H +47.6	B720MRPC	5H 4H
	93 DATA	AH021					B720MRPC	HTS+2
36 62								
	93 DATA	AH010	1.4	2	MBM	5H +26.1	A720MULC	CTE
36 66								
	93 DATA	AH010	1.7	2	MBM	3A +24.4	A720MULC	CTE
37 35								
	93 DATA	AH006	1.1	2	MBM	2C +43.7	A720MULC	CTE
37 72								
	93 DATA	AH011	0.6	2	MBM	3C +13.7	A720MULC	CTE
39 26								
	93 DATA	AH005	1.0	2	MBM	1H +20.9	A720MULC	CTE
40 32								
	93 DATA	AH005	1.2	2	MBM	4H +17.6	A720MULC	CTE
	93 DATA	AH022	0.9	1	MBM	4H +17.0	B720MRPC	5H 4H
	93 DATA	AH022					B720MRPC	HTS+2
40 42								
	93 DATA	AH007	0.5	2	MBM	3H +30.2	A720MULC	CTE
40 49								
	93 DATA	AH008	0.4	2	MBM	5C +26.4	A720MULC	CTE
	92 DATA	AH07	0.5	1	32	5C +26.4	A720MULC	CTE CTEHTE
40 58								
	93 DATA	AH009	0.7	2	MBM	2H +13.6	A720MULC	CTE
	93 DATA	AH009	0.7	2	MBM	2C +24.7	A720MULC	CTE
	93 DATA	AH009	1.2	2	MBM	2H +16.4	A720MULC	CTE
	93 DATA	AH009	0.6	2	MBM	3C +30.6	A720MULC	CTE
40 63								
	93 DATA	AH010	0.9	2	MBM	4H +48.8	A720MULC	CTE
41 58								
	93 DATA	AH009	1.7	2	MBM	2H +12.5	A720MULC	CTE
	93 DATA	AH021	1.3	1	MBM	2H +12.1	B720MRPC	3H 2H
	93 DATA	AH021					B720MRPC	HTS+2
42 52								
	93 DATA	AH008	0.5	2	MBM	1C +28.0	A720MULC	CTE

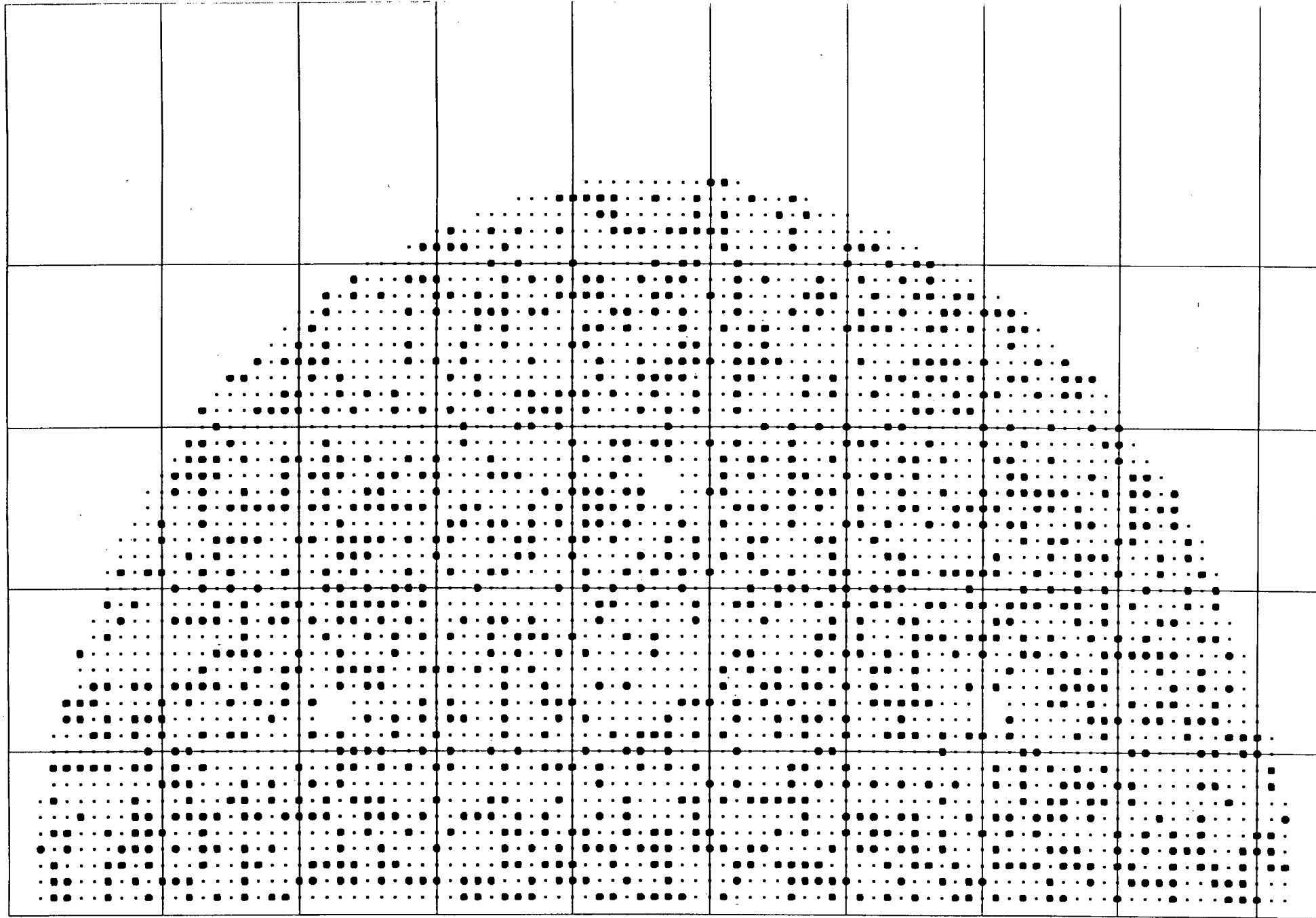
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H. B. ROBINSON
COMPONENT: S/G #A
OUTAGE: 9309

Date: 10/05/93
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ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
42 59								
	93 DATA	AH009	1.3	2	MBM	FBC +16.7	A720MULC	CTE
43 34								
	93 DATA	AH006	0.9	2	MBM	5C +39.2	A720MULC	CTE
43 43								
	93 DATA	AH007	1.6	2	MBM	4H +43.3	A720MULC	CTE
	93 DATA	AH022	1.4	1	MBM	4H +43.0	B720MRPC	5H 4H
	93 DATA	AH022					B720MRPC	HTS+2
43 50								
	93 DATA	AH008	1.1	2	MBM	5H +12.0	A720MULC	CTE
44 41								
	93 DATA	AH007	0.7	2	MBM	4H +49.8	A720MULC	CTE
44 49								
	93 DATA	AH008	0.6	2	MBM	1C +19.7	A720MULC	CTE
	93 DATA	AH008	1.5	2	MBM	3H +27.0	A720MULC	CTE
44 51								
	93 DATA	AH008	0.7	2	MBM	4C +43.7	A720MULC	CTE
44 53								
	93 DATA	AH009	1.2	2	MBM	1H +49.8	A720MULC	CTE
45 46								
	93 DATA	AH007	1.2	2	MBM	3C +21.0	A720MULC	CTE

Number of Tubes: 105
Number of Indications: 140



ROW

40

30

20

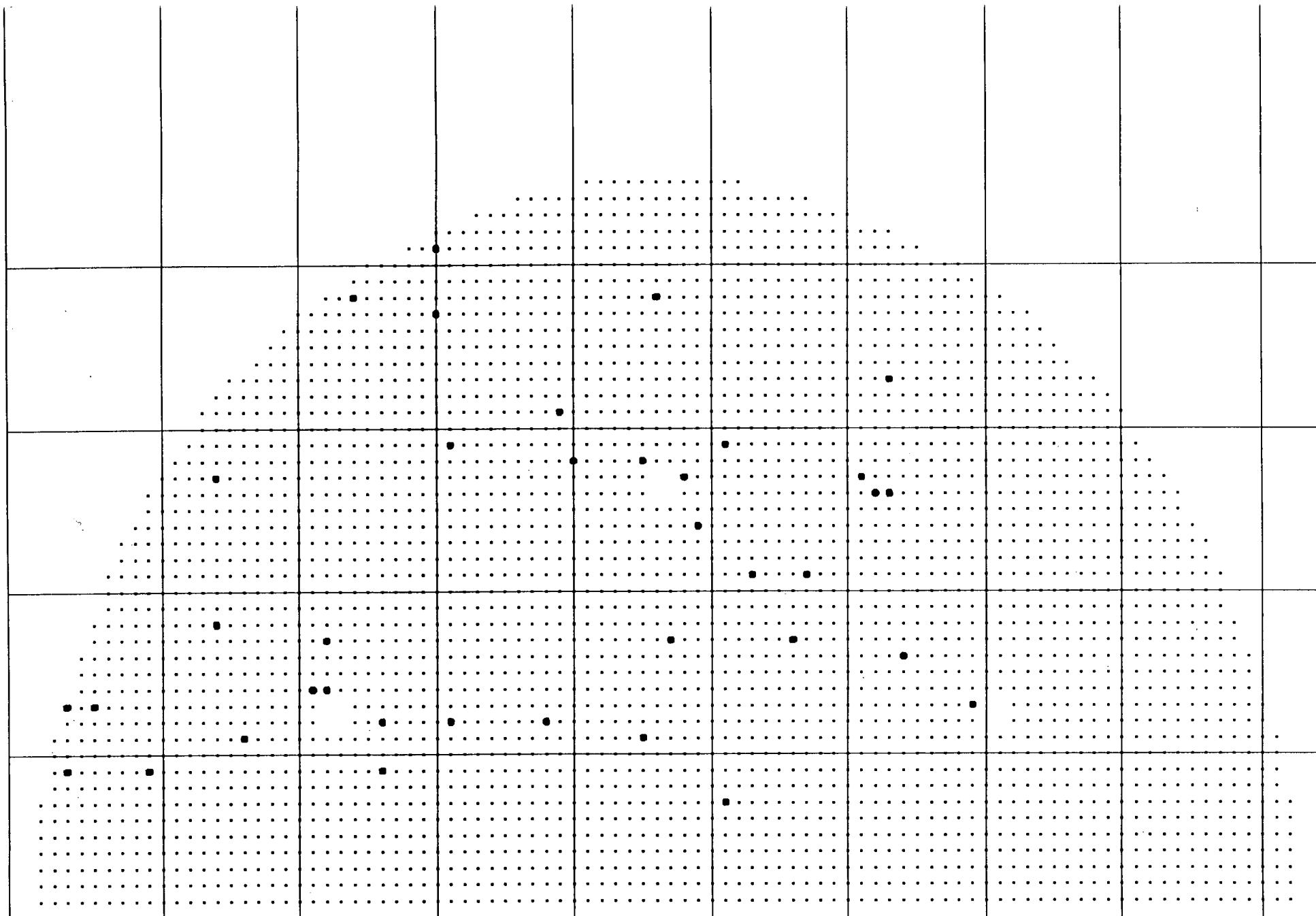
10

COL 1224: Bobbin Tubes Examined

H.B. ROBINSON Unit 2
S/G #B 10/20/93
ABB-Combustion Engineering

ACRI IS Tubes

10



H.B. ROBINSON Unit 2
S/G #B 10/20/93
ABB-Combustion Engineering

ACRI IS Tubes

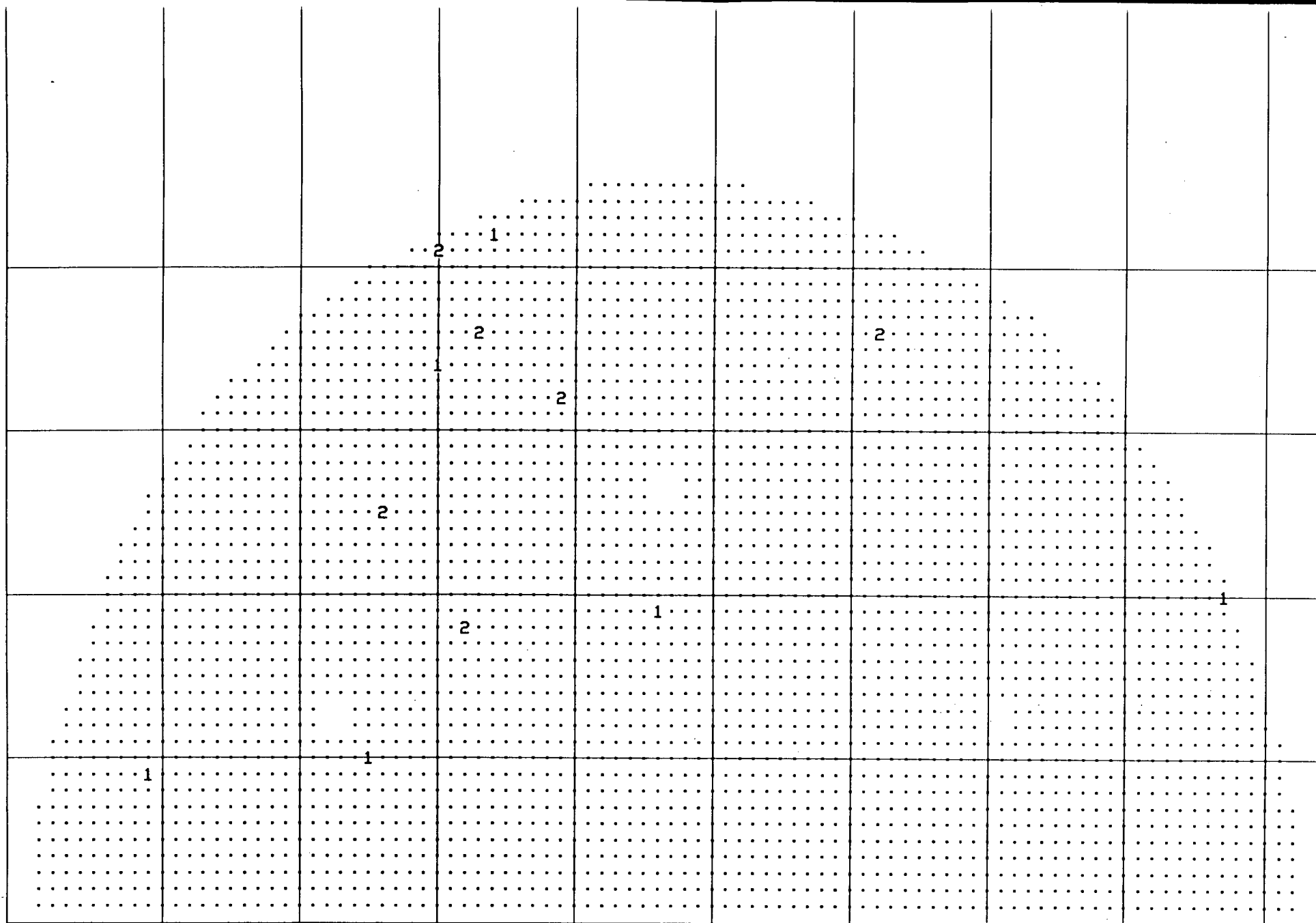
ROW

40

30

20

10



COL

10

20

30

40

50

60

70

80

90

1: 6: Tubes with Indications >0%
 2: 6: Tubes with Indications >19%
 3: 0: Tubes with Indications >39%
 4: 0: Tubes with Obstructions

H.B. ROBINSON Unit 2
 S/G #B 10/20/93
 ABB-Combustion Engineering

ACRI IS Tubes

ALL EXAMS BY TUBE FOR PERCENT THRUWALL INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
9	9							
	93 DATA	BH001	1.0	2	MBM	3H +16.5	A720MULC	CTE
	93 DATA	BH001	1.3	1		11 CTS +3.7	A720MULC	CTE
	93 DATA	BH028					B720MRPC	HTS+2
	93 DATA	BH028	2.4	1	MBM	3H +16.4	B720MRPC	4H 3H
10	25							
	93 DATA	BH003	0.6	1		11 HTS +5.6	A720MULC	CTE
18	32							
	93 DATA	BH004	1.4	2		25 4H +19.0	A720MULC	CTE
	93 DATA	BH004	0.6	2	MBM	3C +45.3	A720MULC	CTE
19	46							
	93 DATA	BH006	1.4	1		15 CTS +13.6	A720MULC	CTE
20	87							
	93 DATA	BH014	0.7	1		9 5C +34.9	A720MULC	CTE
	92 DATA	BH07	0.6	1		15 5C +34.9	A720MULC	CTE
	90 DATA	BH11			RND		A720MULC	CTE
	90 DATA	BH13	6.8	1	DNT	HTS +9.4	A720MULC	CTE
	90 DATA	BH13	3.3	1	DNT	5C +5.1	A720MULC	CTE
	90 DATA	BH13	8.4	1	DNT	5C +31.8	A720MULC	CTE
	90 DATA	BH13	9.3	1	DNT	HTS +20.9	A720MULC	CTE
	90 DATA	BH13	5.0	1	DNT	HTS +8.3	A720MULC	CTE
	90 DATA	BH13	4.1	1	DNT	5C +30.6	A720MULC	CTE
	90 DATA	BH13	0.9	1		11 5C +35.8	A720MULC	CTE
	88 DATA	BH09	7.8	M 1	DNT	5C +31.6	A720SFRM	CTE
	88 DATA	BH09	3.5	M 1	DNT	5C +4.9	A720SFRM	CTE
	88 DATA	BH09	8.6	M 1	DNT	5C +31.8	A720SFRM	CTE
25	26							
	93 DATA	BH003	3.9	1		5 4C +17.0	A720MULC	CTE
	93 DATA	BH003	2.5	1		13 3C +41.3	A720MULC	CTE
	93 DATA	BH003	1.4	1		23 4H +46.1	A720MULC	CTE
	92 DATA	BH04	4.4	1		6 4C +17.0	A720MULC	CTE
	92 DATA	BH04	2.8	1		17 3C +40.6	A720MULC	CTE
	92 DATA	BH04	1.4	1		24 4H +46.6	A720MULC	CTE
	90 DATA	BH05	5.6	4	MBM	FBH +10.6	A720MULC	CTE
	90 DATA	BH05	1.5	1		26 4H +46.0	A720MULC	CTE
	90 DATA	BH05	7.8	4	MBM	4C +16.8	A720MULC	CTE
	90 DATA	BH05	2.8	1		17 3C +41.2	A720MULC	CTE
32	39							
	93 DATA	BH005	0.3	1		29 5H +46.8	A720MULC	CTE
34	30							
	93 DATA	BH004	0.7	1		14 HTS +1.8	A720MULC	CTE
	92 DATA	BH04	0.9	1		19 HTS +1.9	A720MULC	CTE
36	33							
	93 DATA	BH005	0.6	1		24 5C +46.5	A720MULC	CTE
36	62							
	93 DATA	BH010	0.3	1		37 2C +12.2	A720MULC	CTE

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H. B. ROBINSON
COMPONENT: S/G #8
OUTAGE: 9309

Date: 10/05/93
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ALL EXAMS BY TUBE FOR PERCENT THRUWALL INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
	93 DATA	BH010	1.7	2	MBM	4C +45.8	A720MULC	CTE
41 30								
	93 DATA	BH004	0.3	1	39	5H +20.2	A720MULC	CTE
	93 DATA	BH004	17.3	P 1	DNT	6H -0.9	A720MULC	CTE
	93 DATA	BH004	8.8	P 1	DNT	6H +0.3	A720MULC	CTE
	93 DATA	BH029	2.0	1	DNG	5H +20.6	B720MRPC	6H 5H
42 34								
	93 DATA	BH005	7.9	P 1	DNT	6H +0.2	A720MULC	CTE
	93 DATA	BH005	1.8	1	6	5C +45.7	A720MULC	CTE
	93 DATA	BH005	21.8	1	DNT	5H +47.5	A720MULC	CTE

Number of Tubes: 12
Number of Indications: 14

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H. B. ROBINSON
COMPONENT: S/G #8
OUTAGE: 9309

Date: 10/05/93
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ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
3 24								
	93 DATA	BH019	2.3	2	MBM	1H +12.0	A700SFRM	CTE
3 81								
	93 DATA	BH018	1.6	2	MBM	4C +32.2	A700SFRM	CTE
6 13								
	93 DATA	BH001	4.4	2	MBM	FBH +2.7	A720MULC	CTE
7 2								
	93 DATA	BH001	0.9	2	MBM	3C +49.5	A720MULC	CTE
7 8								
	93 DATA	BH001	0.7	2	MBM	1C +33.4	A720MULC	CTE
7 49								
	93 DATA	BH008	0.5	2	MBM	4C +22.5	A720MULC	CTE
	93 DATA	BH008	7.9	1	CUD	CTS +2.7	A720MULC	CTE
	93 DATA	BH008	0.7	2	MBM	CTS +40.9	A720MULC	CTE
	93 DATA	BH008	0.7	2	MBM	CTS +40.9	A720MULC	CTE
7 51								
	93 DATA	BH008	1.4	2	MBM	5C +12.4	A720MULC	CTE
	93 DATA	BH008	0.6	1	CUD	HTS +1.5	A720MULC	CTE
	93 DATA	BH008	16.4	1	CUD	CTS +1.3	A720MULC	CTE
	93 DATA	BH008	0.7	2	MBM	2H +5.0	A720MULC	CTE
	93 DATA	BH029					B720MRPC	HTS+2
	93 DATA	BH030	1.2	1	MBM	2H +4.6	B720MRPC	3H 2H
7 56								
	93 DATA	BH009	18.0	1	CUD	CTS +1.3	A720MULC	CTE
	93 DATA	BH009	1.0	2	MBM	1C +12.3	A720MULC	CTE
9 3								
	93 DATA	BH001	0.8	2	MBM	1H +25.9	A720MULC	CTE
	93 DATA	BH028					B720MRPC	HTS+2
	93 DATA	BH028					B720MRPC	2H 1H
9 4								
	93 DATA	BH001	0.9	2	MBM	3H +32.0	A720MULC	CTE
9 5								
	93 DATA	BH001	2.8	2	MBM	3C +24.6	A720MULC	CTE
9 6								
	93 DATA	BH001	0.4	2	MBM	2H +42.0	A720MULC	CTE
9 9								
	93 DATA	BH001	1.0	2	MBM	3H +16.5	A720MULC	CTE

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
9 24	93 DATA	BH001	1.3	1	11	CTS +3.7	A720MULC	CTE
	93 DATA	BH028					B720MRPC	HTS+2
	93 DATA	BH028	2.4	1 MBM		3H +16.4	B720MRPC	4H 3H
9 26	93 DATA	BH002	1.2	2 MBM		5C +45.1	A720MULC	CTE
	93 DATA	BH003	1.2	2 MBM		2H +22.4	A720MULC	CTE
	93 DATA	BH028	1.4	1 MBM		2H +22.3	B720MRPC	3H 2H
9 38	93 DATA	BH028					B720MRPC	HTS+2
	93 DATA	BH005	1.1	2 MBM		3H +51.2	A720MULC	CTE
	93 DATA	BH002	1.0	2 MBM		5H +43.4	A720MULC	CTE
10 23	93 DATA	BH001	3.3	2 MBM		3C +28.1	A720MULC	CTE
	93 DATA	BH001	1.5	2 MBM		1C +49.2	A720MULC	CTE
	93 DATA	BH001	1.0	2 MBM		HTS +21.3	A720MULC	CTE
11 13	93 DATA	BH002	1.6	2 MBM		4C +28.6	A720MULC	CTE
	93 DATA	BH002	0.9	2 MBM		3H +18.4	A720MULC	CTE
	93 DATA	BH028	0.7	1 MBM		3H +18.4	B720MRPC	HTS+2
11 15	93 DATA	BH028					B720MRPC	4H 3H
	93 DATA	BH006	1.6	2 MBM		4C +48.7	A720MULC	CTE
	93 DATA	BH006	1.4	2 MBM		4H +13.4	A720MULC	CTE
11 16	93 DATA	BH029					B720MRPC	HTS+2
	93 DATA	BH029	1.5	1 MBM		4H +13.4	B720MRPC	5H 4H
	93 DATA	BH008	1.4	1 CUD		CTS +2.2	A720MULC	CTE
11 49	93 DATA	BH008	1.2	2 MBM		5H +39.8	A720MULC	CTE
	93 DATA	BH008	2.6	1 CUD		HTS +1.6	A720MULC	CTE
	93 DATA	BH001	2.1	2 MBM		CTS +18.9	A720MULC	CTE
12 3	93 DATA	BH001	1.1	2 MBM		4C +35.0	A720MULC	CTE
	93 DATA	BH003	2.3	2 MBM		2C +33.7	A720MULC	CTE
	93 DATA	BH028	0.9	1 MBM		1H +3.4	B720MRPC	2H 1H

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
12 29	93 DATA	BH028					B720MRPC	HTS+2
	90 DATA	BH04	6.3	4	MBM	1H +3.3	A720MULC	CTE
12 31	93 DATA	BH003	0.6	2	MBM	1H +9.9	A720MULC	CTE
	93 DATA	BH004	0.6	2	MBM	2C +10.7	A720MULC	CTE
12 32	93 DATA	BH004	1.6	P 3	MBM	1C -0.8	A720MULC	CTE
	93 DATA	BH004	0.6	2	MBM	1H +16.9	A720MULC	CTE
	93 DATA	BH028					B720MRPC	HTS+2
	93 DATA	BH028	1.1	1	MBM	1H +16.6	B720MRPC	2H 1H
	93 DATA	BH004	0.6	2	MBM	3C +34.5	A720MULC	CTE
12 38	93 DATA	BH004	1.1	2	MBM	CTS +6.3	A720MULC	CTE
	93 DATA	BH029	3.1	1	MBM	3H +22.3	B720MRPC	4H 3H
12 82	93 DATA	BH029					B720MRPC	HTS+2
	92 DATA	BH03	10.6	4	MBM	3H +22.3	A720MULC	CTEHTS
	92 DATA	BH03	3.6	1	CUD	HTS +1.0	A720MULC	CTEHTS
	92 DATA	BH03	19.3	8	SLG	CTS +0.9	A720MULC	CTEHTS
13 3	93 DATA	BH013	3.0	2	MBM	FBC +9.8	A720MULC	CTE
	93 DATA	BH001	0.6	1	MBM	4H +24.8	A720MULC	CTE
13 5	93 DATA	BH001	0.6	1	MBM	4H +23.5	A720MULC	CTE
	93 DATA	BH001	0.5	1	MBM	4H +21.8	A720MULC	CTE
	93 DATA	BH001	0.8	1	MBM	4H +18.4	A720MULC	CTE
	93 DATA	BH001	0.9	2	MBM	2H +2.6	A720MULC	CTE
	93 DATA	BH001	0.4	1	MBM	4H +20.1	A720MULC	CTE
	93 DATA	BH031					B720MRPC	HTS+2
	93 DATA	BH031	0.6	1	MBM	2H +3.9	B720MRPC	3H 2H
	93 DATA	BH031	0.7	1	MBM	2H +2.5	B720MRPC	3H 2H
	93 DATA	BH031	1.3	1	MBM	4H +18.4	B720MRPC	5H 4H
	93 DATA	BH031	0.8	1	MBM	4H +20.1	B720MRPC	5H 4H
	93 DATA	BH031	1.1	1	MBM	4H +21.7	B720MRPC	5H 4H
	93 DATA	BH031	1.6	1	MBM	4H +23.4	B720MRPC	5H 4H
	93 DATA	BH031	1.2	1	MBM	4H +24.7	B720MRPC	5H 4H
	93 DATA	BH031	1.4	1	MBM	4H +26.8	B720MRPC	5H 4H
	93 DATA	BH001	1.1	2	MBM	1H +36.9	A720MULC	CTE
	93 DATA	BH028					B720MRPC	2H 1H
	93 DATA	BH028					B720MRPC	HTS+2
13 10	93 DATA	BH001	0.6	2	MBM	5C +6.9	A720MULC	CTE
	93 DATA	BH002	1.4	2	MBM	1H +34.4	A720MULC	CTE

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
	93 DATA	BH002	0.6	2	MBM	1C +5.2	A720MULC	CTE
	93 DATA	BH002	1.5	2	MBM	2H +29.2	A720MULC	CTE
13 31								
	93 DATA	BH004	0.8	2	MBM	CTS +4.2	A720MULC	CTE
	93 DATA	BH004	1.0	2	MBM	2H +31.8	A720MULC	CTE
	93 DATA	BH004	0.8	2	MBM	2H +33.4	A720MULC	CTE
	93 DATA	BH004	0.7	2	MBM	1C +5.2	A720MULC	CTE
	93 DATA	BH004	0.5	2	MBM	CTS +3.1	A720MULC	CTE
	93 DATA	BH004	0.8	2	MBM	1C +6.9	A720MULC	CTE
	93 DATA	BH004	0.8	2	MBM	2H +30.6	A720MULC	CTE
13 52								
	93 DATA	BH009	1.4	1	CUD	HTS +0.6	A720MULC	CTE
	93 DATA	BH009	1.6	2	MBM	3H +5.3	A720MULC	CTE
13 56								
	93 DATA	BH009	3.1	2	MBM	4C +22.6	A720MULC	CTE
	93 DATA	BH009	1.2	2	MBM	HTS +22.0	A720MULC	CTE
13 69								
	93 DATA	BH027	1.9	1	MBM	3H +12.0	B720MRPC	4H 3H
	93 DATA	BH027					B720MRPC	HTS+2
	90 DATA	BH11	7.1	4	MBM	3H +12.3	A720MULC	CTE
14 21								
	93 DATA	BH028	1.4	1	MBM	2H +44.6	B720MRPC	3H 2H
	93 DATA	BH028					B720MRPC	HTS+2
	90 DATA	BH04	7.2	4	MBM	3H -8.5	A720MULC	CTE
14 22								
	93 DATA	BH028	0.7	1	MBM	HTS +4.3	B720MRPC	FBHHTS
	93 DATA	BH028	1.2	1	MBM	3H +16.3	B720MRPC	4H 3H
	93 DATA	BH028					B720MRPC	HTS+2
	92 DATA	BH02	5.7	4	MBM	1C +8.4	A720MULC	CTEHTE
	92 DATA	BH02	11.1	4	MBM	3H +15.7	A720MULC	CTEHTE
	92 DATA	BH02	13.4	4	MBM	FBC +8.1	A720MULC	CTEHTE
	90 DATA	BH04	8.1	4	MBM	3H +16.0	A720MULC	CTE
	90 DATA	BH04	15.0	4	MBM	5C +32.6	A720MULC	CTE
	90 DATA	BH04	5.1	4	MBM	HTS +4.6	A720MULC	CTE
	90 DATA	BH04	9.4	4	MBM	FBC +7.9	A720MULC	CTE
	88 DATA	BH02	0.9	1	MBM	3H +15.6	A720SFRM	CTE
	88 DATA	BH02	8.0	M 1	DNT	5C +30.1	A720SFRM	CTE
14 25								
	93 DATA	BH003	1.2	2	MBM	3H +23.9	A720MULC	CTE
	93 DATA	BH003	1.3	2	MBM	1H +9.0	A720MULC	CTE
	93 DATA	BH003	1.7	2	MBM	4C +37.0	A720MULC	CTE
	90 DATA	BH03					B720MRPC	HTS+2
14 54								
	93 DATA	BH009	14.8	1	CUD	HTS +0.1	A720MULC	CTE
	93 DATA	BH009	1.8	2	MBM	1H +38.3	A720MULC	CTE
14 76								
	93 DATA	BH013	0.9	2	MBM	5C +33.0	A720MULC	CTE

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
15 24	93 DATA	BH013	0.8	2	MBM	2C +47.6	A720MULC	CTE
15 33	93 DATA	BH002	1.3	2	MBM	5H +22.0	A720MULC	CTE
16 16	93 DATA	BH005	2.2	2	MBM	HTS +18.4	A720MULC	CTE
16 20	93 DATA	BH002	3.1	2	MBM	1H +49.0	A720MULC	CTE
16 23	93 DATA	BH002	1.4	2	MBM	4H +8.6	A720MULC	CTE
16 58	93 DATA	BH002	1.1	2	MBM	5H +14.5	A720MULC	CTE
16 58	93 DATA	BH002	1.3	2	MBM	5C +26.1	A720MULC	CTE
16 64	93 DATA	BH010	0.6	2	MBM	CTS +43.8	A720MULC	CTE
17 22	93 DATA	BH031	2.0	1	MBM	5H +28.1	B720MRPC	6H 5H
17 22	93 DATA	BH031					B720MRPC	HTS+2
17 22	92 DATA	BH06	9.2	4	MBM	5H +26.0	A720MULC	CTEHTE
17 22	92 DATA	BH06	10.1	1	CUD	HTS +0.2	A720MULC	CTEHTE
17 22	92 DATA	BH06	12.3	8	SLG	CTS +0.7	A720MULC	CTEHTE
17 22	90 DATA	BH11	6.2	4	MBM	5H +26.0	A720MULC	CTE
17 22	88 DATA	BH07A					A720SFRM	CTE
17 25	93 DATA	BH002	0.9	2	MBM	4H +29.8	A720MULC	CTE
17 25	93 DATA	BH028	1.7	1	MBM	3H +29.7	B720MRPC	4H 3H
17 25	93 DATA	BH028					B720MRPC	HTS+2
17 31	93 DATA	BH003	0.7	2	MBM	4C +49.0	A720MULC	CTE
17 47	93 DATA	BH004	1.5	2	MBM	3C +1.1	A720MULC	CTE
17 47	93 DATA	BH004	0.8	2	MBM	3C +40.5	A720MULC	CTE
18 11	93 DATA	BH029	1.1	1	MBM	5H +19.6	B720MRPC	6H 5H
18 11	93 DATA	BH029					B720MRPC	HTS+2
18 11	90 DATA	BH01	6.9	4	MBM	5H +18.3	A720MULC	CTE
18 11	90 DATA	BH01	5.9	4	MBM	4C +28.9	A720MULC	CTE
18 11	93 DATA	BH001	0.5	2	MBM	4C +45.3	A720MULC	CTE
18 11	93 DATA	BH001	0.9	2	MBM	4H +35.0	A720MULC	CTE

C P & L
H. B. ROBINSON
COMPONENT: S/G #B
OUTAGE: 9309

Date: 10/05/93
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ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
18 12								
	93 DATA	BH001	1.6	2	MBM	4C +15.6	A720MULC	CTE
	93 DATA	BH001	1.0	2	MBM	2C +23.6	A720MULC	CTE
18 14								
	93 DATA	BH001	0.5	2	MBM	3H +15.7	A720MULC	CTE
	93 DATA	BH001	0.6	2	MBM	1C +16.3	A720MULC	CTE
	93 DATA	BH028	2.3	1	MBM	3H +15.6	B720MRPC	4H 3H
	93 DATA	BH028					B720MRPC	HTS+2
18 32								
	93 DATA	BH004	1.4	2		25 4H +19.0	A720MULC	CTE
	93 DATA	BH004	0.6	2	MBM	3C +45.3	A720MULC	CTE
19 6								
	93 DATA	BH001	0.6	2	MBM	5H +30.3	A720MULC	CTE
19 23								
	93 DATA	BH002	1.1	2	MBM	3H +23.8	A720MULC	CTE
19 27								
	93 DATA	BH003	1.1	2	MBM	1C +50.2	A720MULC	CTE
19 43								
	93 DATA	BH006	1.9	2	MBM	2C +38.6	A720MULC	CTE
19 52								
	93 DATA	BH009	1.6	2	MBM	1H +27.0	A720MULC	CTE
19 76								
	93 DATA	BH013	1.3	2	MBM	2H +12.9	A720MULC	CTE
20 17								
	93 DATA	BH002	0.4	2	MBM	5C +8.1	A720MULC	CTE
20 27								
	93 DATA	BH003	1.9	2	MBM	1C +25.2	A720MULC	CTE
20 28								
	93 DATA	BH003	0.8	2	MBM	5H +30.3	A720MULC	CTE
20 79								
	93 DATA	BH013	1.3	2	MBM	2H +13.9	A720MULC	CTE
21 9								
	93 DATA	BH001	1.1	2	MBM	2C +39.5	A720MULC	CTE
21 28								
	93 DATA	BH003	1.9	2	MBM	CTS +9.7	A720MULC	CTE
	90 DATA	BH03					B720MRPC	HTS+2

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
21 50								
	93 DATA	BH008	0.9	2	MBM	3H +31.3	A720MULC	CTE
21 53								
	93 DATA	BH029	1.5	1	MBM	2H +19.0	B720MRPC	3H 2H
	93 DATA	BH030					B720MRPC	HTS+2
	90 DATA	BH01	6.5	4	MBM	2H +19.0	A720MULC	CTE
21 54								
	93 DATA	BH009	0.5	2	MBM	2H +33.7	A720MULC	CTE
	90 DATA	BH03					B720MRPC	HTS+2
21 57								
	93 DATA	BH030	1.1	1	MBM	3H +20.1	B720MRPC	4H 3H
	93 DATA	BH030					B720MRPC	HTS+2
	90 DATA	BH01	6.8	4	MBM	3H +20.0	A720MULC	CTE
22 12								
	93 DATA	BH001	1.7	2	MBM	3C +5.6	A720MULC	CTE
23 37								
	93 DATA	BH005	1.1	2	MBM	2H +12.0	A720MULC	CTE
23 47								
	93 DATA	BH007	1.0	2	MBM	1H +49.2	A720MULC	CTE
23 85								
	93 DATA	BH014	1.8	2	MBM	2H +2.2	A720MULC	CTE
24 10								
	93 DATA	BH001	0.7	2	MBM	2C +17.0	A720MULC	CTE
24 41								
	93 DATA	BH006	0.8	2	MBM	5C +28.7	A720MULC	CTE
24 48								
	93 DATA	BH008	1.2	2	MBM	HTS +6.8	A720MULC	CTE
24 49								
	93 DATA	BH029	0.9	1	MBM	2H +23.6	B720MRPC	3H 2H
	93 DATA	BH029					B720MRPC	HTS+2
	90 DATA	BH01	5.3	4	MBM	2H +23.6	A720MULC	CTE
24 51								
	93 DATA	BH009	2.0	2	MBM	1C +6.9	A720MULC	CTE
	93 DATA	BH009	0.8	2	MBM	HTS +13.8	A720MULC	CTE
24 60								
	93 DATA	BH010	0.8	2	MBM	2C +8.6	A720MULC	CTE

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
24 61								
	93 DATA	BH010	0.6	2	MBM	4H +6.8	A720MULC	CTE
	93 DATA	BH010	0.3	2	MBM	4C +1.6	A720MULC	CTE
	93 DATA	BH010	1.0	2	MBM	5H +12.1	A720MULC	CTE
	93 DATA	BH010	0.8	2	MBM	FBC +10.9	A720MULC	CTE
25 17								
	93 DATA	BH002	0.5	2	MBM	1C +18.3	A720MULC	CTE
25 18								
	93 DATA	BH002	2.0	2	MBM	3C +38.2	A720MULC	CTE
	93 DATA	BH002	0.6	2	MBM	2C +34.0	A720MULC	CTE
25 19								
	93 DATA	BH002	0.6	2	MBM	1C +11.7	A720MULC	CTE
25 27								
	93 DATA	BH003	1.5	2	MBM	1C +37.9	A720MULC	CTE
	93 DATA	BH003	1.2	2	MBM	1C +22.2	A720MULC	CTE
	93 DATA	BH003	2.1	2	MBM	1C +45.7	A720MULC	CTE
25 28								
	93 DATA	BH003	0.9	2	MBM	3H +29.5	A720MULC	CTE
25 29								
	93 DATA	BH003	0.6	2	MBM	2C +12.8	A720MULC	CTE
	90 DATA	BH03					B720MRPC	HTS+2
25 41								
	93 DATA	BH006	1.8	2	MBM	3H +2.3	A720MULC	CTE
25 54								
	93 DATA	BH009	0.5	2	MBM	5H +11.8	A720MULC	CTE
26 11								
	93 DATA	BH001	0.7	2	MBM	4C +49.9	A720MULC	CTE
26 13								
	93 DATA	BH001	0.7	2	MBM	CTS +25.6	A720MULC	CTE
26 16								
	93 DATA	BH002	1.3	2	MBM	4H +32.8	A720MULC	CTE
26 42								
	93 DATA	BH006	4.2	2	MBM	3A +15.6	A720MULC	CTE
	90 DATA	BH03					B720MRPC	HTS+2
26 45								
	93 DATA	BH006	1.1	2	MBM	5H +19.1	A720MULC	CTE

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
26 62	93 DATA	BH006	1.7	2	MBM	3C +1.8	A720MULC	CTE
	93 DATA	BH031	0.6	1	MBM	4H +21.4	B720MRPC	5H 4H
	93 DATA	BH031					B720MRPC	HTS+2
	90 DATA	BH12	5.3	4	MBM	4H +22.0	A720MULC	CTE
26 73	93 DATA	BH012	1.4	2	MBM	5C +39.1	A720MULC	CTE
27 14	93 DATA	BH001	0.8	2	MBM	1H +46.3	A720MULC	CTE
	93 DATA	BH001	1.0	2	MBM	FBC +3.0	A720MULC	CTE
	93 DATA	BH028					B720MRPC	HTS+2
	93 DATA	BH028	1.8	1	MBM	1H +46.8	B720MRPC	2H 1H
27 26	93 DATA	BH003	0.6	2	MBM	3H +44.4	A720MULC	CTE
	93 DATA	BH003	2.5	2	MBM	6H +18.7	A720MULC	CTE
	93 DATA	BH003	1.5	2	MBM	6H +12.3	A720MULC	CTE
	93 DATA	BH003	1.4	2	MBM	1C +13.3	A720MULC	CTE
	93 DATA	BH003	1.1	2	MBM	5H +3.1	A720MULC	CTE
	93 DATA	BH003	1.7	2	MBM	1A -0.0	A720MULC	CTE
27 36	93 DATA	BH005	1.8	2	MBM	2C +2.8	A720MULC	CTE
	93 DATA	BH005	0.6	2	MBM	5C +33.5	A720MULC	CTE
27 48	93 DATA	BH029	2.2	1	MBM	2H +10.7	B720MRPC	3H 2H
	93 DATA	BH029					B720MRPC	HTS+2
	92 DATA	BH08	8.1	4	MBM	2H +13.9	A720MULC	CTE+TE
27 61	93 DATA	BH030	1.3	1	MBM	2H +29.0	B720MRPC	3H 2H
	93 DATA	BH030	2.6	1	MBM	4H +35.0	B720MRPC	5H 4H
	93 DATA	BH030					B720MRPC	HTS+2
	90 DATA	BH12	5.7	4	MBM	2H +29.8	A720MULC	CTE
	90 DATA	BH12	8.1	4	MBM	4H +34.9	A720MULC	CTE
28 40	93 DATA	BH029	0.7	1	MBM	HTS +15.0	B720MRPC	FBHHTS
	93 DATA	BH029	1.9	1	MBM	4H +4.3	B720MRPC	5H 4H
	93 DATA	BH029					B720MRPC	HTS+2
	92 DATA	BH05	6.2	4	MBM	HTS +14.6	A720MULC	CTE+TE
	92 DATA	BH05	8.9	4	MBM	4H +4.7	A720MULC	CTE+TE
	92 DATA	BH05	17.1	8	SLG	HTS +0.5	A720MULC	CTE+TE
28 45	93 DATA	BH029	0.9	1	MBM	1H +28.3	B720MRPC	2H 1H
	93 DATA	BH029	0.6	1	MBM	1H +12.5	B720MRPC	2H 1H
	93 DATA	BH029					B720MRPC	HTS+2
	92 DATA	BH05	8.9	4	MBM	1H +28.8	A720MULC	CTE+TE
	92 DATA	BH05	7.4	4	MBM	1H +14.3	A720MULC	CTE+TE

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
28 51								
	93 DATA	BH009	1.4	2	MBM	1C +18.7	A720MULC	CTE
	90 DATA	BH03					B720MRPC	HTS+2
28 53								
	93 DATA	BH009	0.7	1	CUD	HTS +0.6	A720MULC	CTE
	93 DATA	BH009	0.4	2	MBM	5C +19.5	A720MULC	CTE
29 12								
	93 DATA	BH001	0.5	2	MBM	3H +21.7	A720MULC	CTE
	93 DATA	BH001	0.5	2	MBM	5C +20.6	A720MULC	CTE
29 31								
	93 DATA	BH029	0.8	1	MBM	1H +27.5	B720MRPC	2H 1H
	93 DATA	BH029	1.0	1	MBM	1H +12.6	B720MRPC	2H 1H
	93 DATA	BH029					B720MRPC	HTS+2
	92 DATA	BH04	5.3	4	MBM	1H +27.6	A720MULC	CTEHTE
	92 DATA	BH04	5.8	4	MBM	1H +13.1	A720MULC	CTEHTE
29 46								
	93 DATA	BH006	2.6	2	MBM	2C +50.1	A720MULC	CTE
29 47								
	93 DATA	BH007	0.9	2	MBM	5H +22.7	A720MULC	CTE
29 51								
	93 DATA	BH029	3.3	1	MBM	4H +26.1	B720MRPC	5H 4H
	93 DATA	BH029					B720MRPC	HTS+2
	90 DATA	BH06	5.5	4	MBM	4H +25.9	A720MULC	CTE
30 32								
	93 DATA	BH004	0.6	2	MBM	3H +8.8	A720MULC	CTE
30 54								
	93 DATA	BH009	0.6	2	MBM	4C +15.4	A720MULC	CTE
	93 DATA	BH009	0.5	2	MBM	1C +34.3	A720MULC	CTE
	93 DATA	BH009	0.3	2	MBM	1H +50.9	A720MULC	CTE
30 58								
	93 DATA	BH010	0.7	2	MBM	1C +28.2	A720MULC	CTE
31 18								
	93 DATA	BH002	0.7	2	MBM	3C +36.6	A720MULC	CTE
31 19								
	93 DATA	BH002	0.6	2	MBM	4C +6.1	A720MULC	CTE
	93 DATA	BH002	0.5	2	MBM	3H +38.1	A720MULC	CTE
31 24								
	93 DATA	BH002	0.8	2	MBM	1A +13.5	A720MULC	CTE

ALL EXAMS BY TUBE FOR MBM INDICATIONS

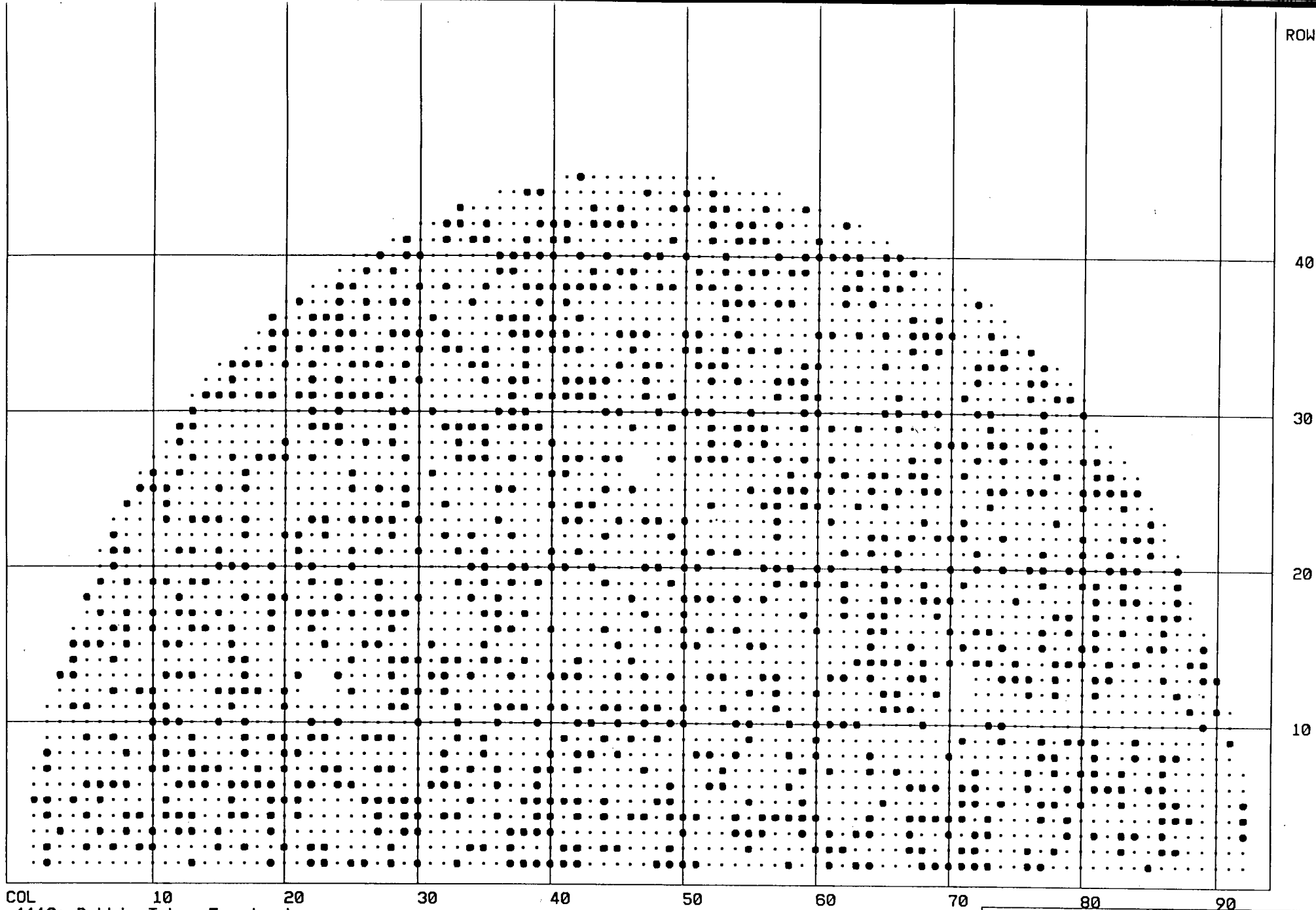
Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
31 27								
	93 DATA	BH003	1.1	2	MBM	3C +45.3	A720MULC	CTE
31 29								
	93 DATA	BH003	1.6	2	MBM	1H +32.1	A720MULC	CTE
31 39								
	93 DATA	BH005	0.7	2	MBM	3H +41.6	A720MULC	CTE
	93 DATA	BH029	2.2	1	MBM	3H +41.7	8720MRPC	4H 3H
	93 DATA	BH029					8720MRPC	HTS+2
31 47								
	93 DATA	BH007	1.5	2	MBM	1C +47.3	A720MULC	CTE
32 27								
	93 DATA	BH003	0.9	2	MBM	4C +30.9	A720MULC	CTE
33 63								
	93 DATA	BH010	2.5	2	MBM	5H +34.2	A720MULC	CTE
	93 DATA	BH027					8720MRPC	6H 5H
	93 DATA	BH027					8720MRPC	HTS+2
34 21								
	93 DATA	BH002	2.4	2	MBM	1C +16.3	A720MULC	CTE
34 32								
	93 DATA	BH004	0.6	P 3	MBM	2C +17.5	A720MULC	CTE
34 48								
	93 DATA	BH008	1.7	2	MBM	5H +28.2	A720MULC	CTE
34 52								
	93 DATA	BH009	0.7	2	MBM	1C +11.2	A720MULC	CTE
34 54								
	93 DATA	BH009	0.6	2	MBM	1C +29.9	A720MULC	CTE
	93 DATA	BH009	0.5	2	MBM	2C +27.1	A720MULC	CTE
35 28								
	93 DATA	BH003	0.5	2	MBM	1C +8.6	A720MULC	CTE
	93 DATA	BH003	0.8	2	MBM	1C +26.8	A720MULC	CTE
35 35								
	93 DATA	BH005	1.1	2	MBM	6H +43.6	A720MULC	CTE
35 52								
	93 DATA	BH009	0.6	2	MBM	4C +37.3	A720MULC	CTE
35 54								
	93 DATA	BH009	1.8	2	MBM	FBC +11.5	A720MULC	CTE

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
36 53	93 DATA	BH009	1.1	2	MBM	3C +12.3	A720MULC	CTE
36 54	93 DATA	BH009	0.7	2	MBM	5C +4.1	A720MULC	CTE
	93 DATA	BH009	0.7	2	MBM	4H +3.3	A720MULC	CTE
	93 DATA	BH009	0.6	2	MBM	3H +20.0	A720MULC	CTE
	93 DATA	BH009	0.5	2	MBM	5H +29.1	A720MULC	CTE
	93 DATA	BH009	0.9	2	MBM	4H +12.8	A720MULC	CTE
	93 DATA	BH009	1.1	2	MBM	1H +46.5	A720MULC	CTE
36 57	93 DATA	BH009	1.4	2	MBM	3H +24.2	A720MULC	CTE
36 62	93 DATA	BH010	0.3	1		37 2C +12.2	A720MULC	CTE
	93 DATA	BH010	1.7	2	MBM	4C +45.8	A720MULC	CTE
36 63	93 DATA	BH010	1.0	1	CUD	CTS +3.7	A720MULC	CTE
	93 DATA	BH010	1.4	2	MBM	4C +5.1	A720MULC	CTE
37 28	93 DATA	BH003	2.3	P 1	DNT	6H -0.9	A720MULC	CTE
	93 DATA	BH003	1.1	2	MBM	3H +41.9	A720MULC	CTE
	93 DATA	BH003	1.4	2	ADR	FBC +6.5	A720MULC	CTE
37 30	93 DATA	BH004	0.6	2	MBM	2H +7.4	A720MULC	CTE
	93 DATA	BH004	0.5	2	MBM	5H +13.3	A720MULC	CTE
	93 DATA	BH004	3.6	P 1	DNT	6H -0.7	A720MULC	CTE
	93 DATA	BH028					B720MRPC	HTS+2
	93 DATA	BH028	1.6	1	MBM	2H +7.0	B720MRPC	3H 2H
	93 DATA	BH028	1.1	1	MBM	5H +13.3	B720MRPC	6H 5H
37 43	93 DATA	BH006	1.4	2	MBM	CTS +9.1	A720MULC	CTE
38 24	93 DATA	BH002	0.8	2	MBM	3H +8.9	A720MULC	CTE
	93 DATA	BH002	0.5	2	MBM	3H +17.4	A720MULC	CTE
	93 DATA	BH002	3.6	P 1	DNT	6H -0.9	A720MULC	CTE
	93 DATA	BH028					B720MRPC	HTS+2
	93 DATA	BH028	0.9	1	MBM	3H +17.4	B720MRPC	4H 3H
	93 DATA	BH028	1.8	1	MBM	3H +8.9	B720MRPC	4H 3H
38 46	93 DATA	BH006	0.8	2	MBM	3H +7.7	A720MULC	CTE
	93 DATA	BH029	1.4	1	MBM	3H +7.7	B720MRPC	4H 3H
	93 DATA	BH029					B720MRPC	HTS+2
39 28	93 DATA	BH003	10.3	P 1	DNT	6H -0.8	A720MULC	CTE

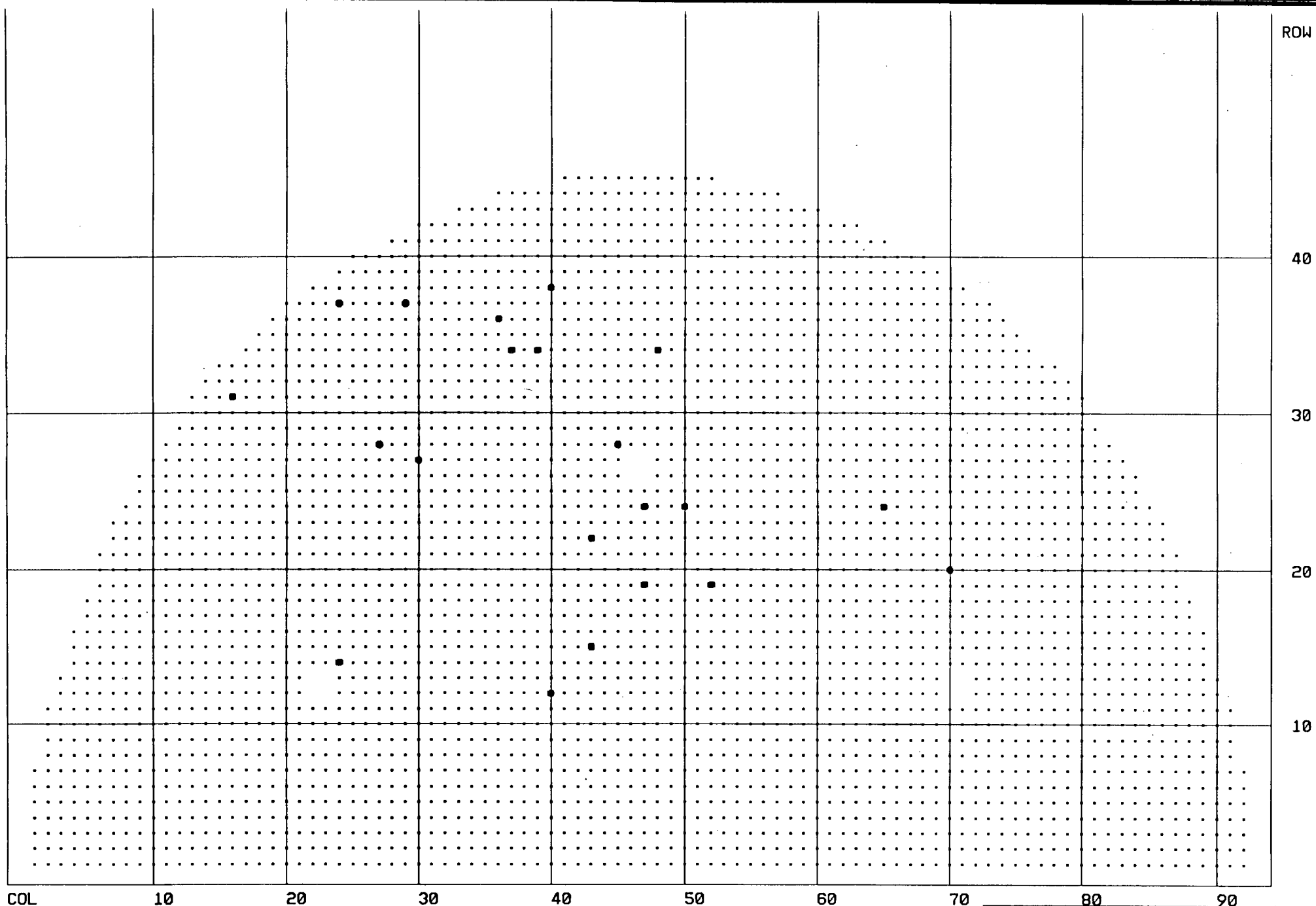
ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
39 29	93 DATA	BH003	0.6	2	MBM	3C +15.7	A720MULC	CTE
	93 DATA	BH003	15.9	P 1	DNT	6H -0.9	A720MULC	CTE
	93 DATA	BH003	0.9	2	MBM	3H +40.3	A720MULC	CTE
	93 DATA	BH003	5.8	P 1	DNT	6H +0.2	A720MULC	CTE
39 48	93 DATA	BH007	2.7	2	MBM	4H +8.4	A720MULC	CTE
40 36	93 DATA	BH005	1.1	2	MBM	5C +29.1	A720MULC	CTE
	93 DATA	BH005	6.7	P 1	DNT	6H -0.9	A720MULC	CTE
	93 DATA	BH005	1.8	2	MBM	3C +25.6	A720MULC	CTE
	93 DATA	BH005	0.9	2	MBM	5C +9.8	A720MULC	CTE
	93 DATA	BH005	1.2	2	MBM	5H +26.5	A720MULC	CTE
41 51	93 DATA	BH009	5.7	P 1	DNT	5H +47.3	A720MULC	CTE
	93 DATA	BH009	0.5	2	MBM	1C +19.3	A720MULC	CTE
	93 DATA	BH009	1.3	P 3	MBM	5C +0.8	A720MULC	CTE
	93 DATA	BH009	0.8	2	MBM	2H +33.3	A720MULC	CTE
	93 DATA	BH009	3.6	P 1	DNT	6H +0.2	A720MULC	CTE
	93 DATA	BH009	0.7	2	MBM	1C +9.7	A720MULC	CTE
41 56	93 DATA	BH009	0.6	2	MBM	1C +31.9	A720MULC	CTE
41 61	93 DATA	BH010	0.8	2	MBM	3A +3.7	A720MULC	CTE
42 50	93 DATA	BH008	7.2	P 1	DNT	6H -0.6	A720MULC	CTE
	93 DATA	BH008	0.6	2	MBM	4H +44.7	A720MULC	CTE
	93 DATA	BH008	3.2	P 1	DNT	6H +0.1	A720MULC	CTE
	93 DATA	BH008	2.1	2	MBM	FBH +6.4	A720MULC	CTE
43 42	93 DATA	BH006	7.8	P 1	DNT	6H -0.9	A720MULC	CTE
	93 DATA	BH006	1.2	2	MBM	2C +17.2	A720MULC	CTE
44 53	93 DATA	BH009	2.8	P 1	DNT	5H +47.4	A720MULC	CTE
	93 DATA	BH009	1.1	2	MBM	3H +3.3	A720MULC	CTE
	93 DATA	BH009	2.3	P 1	DNT	6H +0.2	A720MULC	CTE
	93 DATA	BH009	0.5	2	MBM	2H +4.8	A720MULC	CTE
45 50	93 DATA	BH008	1.3	2	MBM	3C +25.7	A720MULC	CTE
	93 DATA	BH008	4.7	P 1	DNT	6H -0.8	A720MULC	CTE
	93 DATA	BH008	0.9	2	MBM	2C +16.1	A720MULC	CTE
	93 DATA	BH008	7.2	P 1	DNT	6H +0.3	A720MULC	CTE



H.B. ROBINSON Unit 2
S/G #C 10/20/93
ABB-Combustion Engineering

ACRI IS ubes



COL 10 20 30 40 50 60 70 80 90
21: MRPC Tubes Examined

H.B. ROBINSON Unit 2
S/G #C 10/20/93
ABB-Combustion Engineering

ACRI IS Tubes

ALL EXAMS BY TUBE FOR PERCENT THRUWALL INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
9 60								
	93 DATA	CH009	1.1	1	8	CTS +9.2	A720MULC	CTE
	93 DATA	CH009	1.2	P 2 MBM		3C +51.2	A720MULC	CTE
10 10								
	93 DATA	CH001	0.6	P 1	14	CTS +16.6	A720MULC	CTE
	93 DATA	CH001	0.6	P 1	7	CTS +15.4	A720MULC	CTE
	92 DATA	CH01	0.6	1	14	CTS +15.2	A720MULC	CTEHTE
	92 DATA	CH01	0.7	1	17	CTS +16.3	A720MULC	CTEHTE
10 11								
	93 DATA	CH001	1.2	1	8	CTS +3.4	A720MULC	CTE
	93 DATA	CH001	0.8	1	11	CTS +4.5	A720MULC	CTE
	92 DATA	CH01	1.1	1	11	CTS +3.3	A720MULC	CTEHTE
	92 DATA	CH01	1.0	1	10	CTS +4.4	A720MULC	CTEHTE
	90 DATA	CH05	1.2	1	8	CTS +3.1	A720MULC	CTE
10 54								
	93 DATA	CH009	0.9	1	7	CTS +2.5	A720MULC	CTE
	92 DATA	CH07	0.6	P 1	9	CTS +1.3	A720MULC	CTEHTE
	92 DATA	CH07	0.9	1	10	CTS +2.3	A720MULC	CTEHTE
	92 DATA	CH07	16.5	8 SLG		CTS +1.4	A720MULC	CTEHTE
	92 DATA	CH07	19.0	8 SLG		HTS +1.6	A720MULC	CTEHTE
	90 DATA	CH01	0.8	1	8	CTS +2.4	A720MULC	CTE
	90 DATA	CH01	0.6	1	15	CTS +1.2	A720MULC	CTE
10 55								
	93 DATA	CH009	1.2	1	8	CTS +5.8	A720MULC	CTE
	93 DATA	CH009	0.6	1	22	3C +11.0	A720MULC	CTE
	93 DATA	CH009	2.5	1	1	CTS +7.0	A720MULC	CTE
	92 DATA	CH07	2.0	1	6	CTS +6.7	A720MULC	CTEHTE
	92 DATA	CH07	2.1	1	10	CTS +5.6	A720MULC	CTEHTE
	92 DATA	CH07	1.3	1	20	3C +11.0	A720MULC	CTEHTE
	92 DATA	CH07	2.1	1 CUD		HTS +1.5	A720MULC	CTEHTE
	92 DATA	CH07	16.6	8 SLG		CTS +1.5	A720MULC	CTEHTE
	92 DATA	CH07	19.1	8 SLG		HTS +1.5	A720MULC	CTEHTE
	90 DATA	CH01	2.4	1 DNT		1C +40.0	A720MULC	CTE
	90 DATA	CH01	1.0	1	16	3C +11.0	A720MULC	CTE
	90 DATA	CH01	2.2	1	2	CTS +7.1	A720MULC	CTE
	90 DATA	CH01	1.7	1	5	CTS +6.0	A720MULC	CTE
	88 DATA	CH07	1.5	M 1 DNT		1C +39.4	A720SFRM	CTE
10 58								
	93 DATA	CH009	0.8	1	12	CTS +2.3	A720MULC	CTE
	93 DATA	CH009	1.3	1	7	CTS +3.5	A720MULC	CTE
10 62								
	93 DATA	CH010	1.0	1	17	CTS +7.6	A720MULC	CTE
	93 DATA	CH010	1.7	1	7	CTS +8.6	A720MULC	CTE
11 57								
	93 DATA	CH009	2.3	1	9	CTS +7.0	A720MULC	CTE
13 3								
	93 DATA	CH001	1.1	1	19	CTS +11.4	A720MULC	CTE

ALL EXAMS BY TUBE FOR PERCENT THRUWALL INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
	93 DATA	CH001	1.5	1	17	CTS +12.5	A720MULC	CTE
	92 DATA	CH01	1.1	1	17	CTS +11.3	A720MULC	CTE/TE
	92 DATA	CH01	1.5	1	16	CTS +12.3	A720MULC	CTE/TE
	90 DATA	CH04	1.3	1	21	CTS +11.3	A720MULC	CTE
	90 DATA	CH04	1.4	1	15	CTS +12.3	A720MULC	CTE
	88 DATA	CH02	0.9	1	18	CTS +11.3	A720SFRM	CTE
	88 DATA	CH02	1.1	1	17	CTS +12.3	A720SFRM	CTE
13	4							
	93 DATA	CH001	0.9	1	10	CTS +15.7	A720MULC	CTE
	93 DATA	CH001	4.6	1	7	CTS +20.2	A720MULC	CTE
	93 DATA	CH001	4.5	1	2	CTS +17.5	A720MULC	CTE
	93 DATA	CH001	3.6	1	3	CTS +16.4	A720MULC	CTE
	93 DATA	CH001	1.9	1	11	CTS +10.1	A720MULC	CTE
	93 DATA	CH001	0.7	1	23	CTS +14.5	A720MULC	CTE
	93 DATA	CH001	2.5	1	6	CTS +11.3	A720MULC	CTE
	93 DATA	CH001	4.7	1	4	CTS +21.3	A720MULC	CTE
	92 DATA	CH01	0.9	1	19	CTS +15.5	A720MULC	CTE/TE
	92 DATA	CH01	4.6	1	9	CTS +20.0	A720MULC	CTE/TE
	92 DATA	CH01	4.5	1	5	CTS +17.3	A720MULC	CTE/TE
	92 DATA	CH01	3.6	1	7	CTS +16.2	A720MULC	CTE/TE
	92 DATA	CH01	1.8	1	13	CTS +10.0	A720MULC	CTE/TE
	92 DATA	CH01	0.7	1	22	CTS +14.4	A720MULC	CTE/TE
	92 DATA	CH01	2.6	1	9	CTS +11.1	A720MULC	CTE/TE
	92 DATA	CH01	4.8	1	8	CTS +21.1	A720MULC	CTE/TE
	90 DATA	CH04	0.9	1	14	CTS +15.5	A720MULC	CTE
	90 DATA	CH04	5.2	1	8	CTS +19.9	A720MULC	CTE
	90 DATA	CH04	4.1	1	3	CTS +17.3	A720MULC	CTE
	90 DATA	CH04	4.3	1	6	CTS +16.2	A720MULC	CTE
	90 DATA	CH04	2.5	1	DNT	HTS +21.8	A720MULC	CTE
	90 DATA	CH04	0.9	1	18	CTS +14.2	A720MULC	CTE
	90 DATA	CH04	2.3	1	8	CTS +11.1	A720MULC	CTE
	90 DATA	CH04	2.1	1	13	CTS +10.0	A720MULC	CTE
	90 DATA	CH04	4.3	1	6	CTS +21.0	A720MULC	CTE
19	6							
	93 DATA	CH001	1.2	1	10	FBC +1.4	A720MULC	CTE
	92 DATA	CH01	1.1	1	12	FBC +1.4	A720MULC	CTE/TE
	90 DATA	CH04	1.3	1	13	FBC +1.4	A720MULC	CTE
23	17							
	93 DATA	CH002	1.8	1	12	CTS +1.2	A720MULC	CTE
25	81							
	93 DATA	CH013	3.8	1	2	5C +40.0	A720MULC	CTE
35	65							
	93 DATA	CH010	1.1	1	30	5H +37.9	A720MULC	CTE

Number of Tubes: 14
Number of Indications: 28

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
3 30								
	93 DATA	CH015	0.5	2	MBM	CTS +50.1	A720MULC	CTE
4 50								
	93 DATA	CH014	1.0	2	MBM	CTS +27.7	A700MULC	CTE
5 27								
	93 DATA	CH015	1.7	2	MBM	4H +4.7	A720MULC	CTE
	93 DATA	CH015	2.4	2	MBM	3H +19.2	A720MULC	CTE
	93 DATA	CH015	0.9	2	MBM	CTS +41.1	A720MULC	CTE
	93 DATA	CH015	1.6	2	MBM	3H +5.4	A720MULC	CTE
5 72								
	93 DATA	CH014	1.6	2	MBM	HTS +17.6	A700MULC	CTE
7 36								
	93 DATA	CH004	2.3	P 3	MBM	4C -0.7	A720MULC	CTE
7 83								
	93 DATA	CH013	3.2	2	MBM	FBH +5.8	A720MULC	CTE
9 10								
	93 DATA	CH001	0.8	2	MBM	3C +10.2	A720MULC	CTE
	93 DATA	CH001	0.6	2	MBM	2C +8.7	A720MULC	CTE
	93 DATA	CH001	0.6	2	MBM	3C +21.5	A720MULC	CTE
	93 DATA	CH001	0.5	2	MBM	3C +16.4	A720MULC	CTE
	93 DATA	CH001	1.1	2	MBM	1C +43.0	A720MULC	CTE
9 13								
	93 DATA	CH001	1.0	2	MBM	2C +16.1	A720MULC	CTE
9 60								
	93 DATA	CH009	1.1	1	8	CTS +9.2	A720MULC	CTE
	93 DATA	CH009	1.2	P 2	MBM	3C +51.2	A720MULC	CTE
12 17								
	93 DATA	CH002	2.6	2	MBM	FBC +24.4	A720MULC	CTE
12 40								
	93 DATA	CH019	1.5	1	MBM	4H +24.3	B720MRPC	5H 4H
	93 DATA	CH019					B720MRPC	HTS+2
	90 DATA	CH11	5.3	4	MBM	4H +23.1	A720MULC	CTE
	90 DATA	CH11	6.4	4	MBM	4C +48.9	A720MULC	CTE
13 21								
	93 DATA	CH002	0.7	2	MBM	FBC +24.7	A720MULC	CTE
13 42								
	93 DATA	CH007	2.4	2	MBM	1H +21.5	A720MULC	CTE

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
13 52								
	93 DATA	CH008	2.5	2	MBM	4C +13.6	A720MULC	CTE
14 24								
	93 DATA	CH019	1.0	1	MBM	1H +31.7	B720MRPC	2H 1H
	93 DATA	CH019					B720MRPC	HTS+2
	92 DATA	CH02	7.8	4	MBM	1H +30.6	A720MULC	CTEHTE
14 38								
	93 DATA	CH004	2.2	2	MBM	CTS +5.3	A720MULC	CTE
	93 DATA	CH004	1.0	2	MBM	CTS +39.1	A720MULC	CTE
15 5								
	93 DATA	CH001	2.8	2	MBM	2H +21.6	A720MULC	CTE
15 43								
	93 DATA	CH019	1.6	1	MBM	5H +24.1	B720MRPC	6H 5H
	93 DATA	CH019					B720MRPC	HTS+2
	92 DATA	CH04	8.6	4	MBM	5H +23.9	A720MULC	CTEHTE
	92 DATA	CH04	12.6	8	SLG	HTS +0.8	A720MULC	CTEHTE
	92 DATA	CH04	14.2	8	SLG	CTS +1.6	A720MULC	CTEHTE
	90 DATA	CH11	6.7	4	MBM	5H +23.6	A720MULC	CTE
	90 DATA	CH11	2.8	1	DNT	4H +7.9	A720MULC	CTE
	88 DATA	CH04					A720SFRM	CTE
15 85								
	93 DATA	CH013	1.7	2	MBM	2H +2.7	A720MULC	CTE
15 89								
	93 DATA	CH013	2.8	2	MBM	FBH +12.0	A720MULC	CTE
	88 DATA	CH12					A720SFRM	1H
17 78								
	93 DATA	CH013	2.7	2	MBM	2C +35.2	A720MULC	CTE
19 10								
	93 DATA	CH001	1.0	2	MBM	5H +12.1	A720MULC	CTE
19 47								
	93 DATA	CH019	1.0	1	MBM	3H +43.0	B720MRPC	4H 3H
	93 DATA	CH019					B720MRPC	HTS+2
	90 DATA	CH01	5.9	4	MBM	4C +4.9	A720MULC	CTE
	90 DATA	CH01	5.7	4	MBM	3H +42.9	A720MULC	CTE
19 52								
	93 DATA	CH019	1.0	1	MBM	4H +38.1	B720MRPC	5H 4H
	93 DATA	CH019					B720MRPC	HTS+2
	92 DATA	CH07	6.0	4	MBM	4H +38.0	A720MULC	CTEHTE
	92 DATA	CH07	22.4	8	SLG	HTS +0.5	A720MULC	CTEHTE
20 70								
	93 DATA	CH011	0.5	2	MBM	5H +5.0	A720MULC	CTE

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
	93 DATA	CH020	1.4	1	MBM	5H +4.9	B720MRPC	6H 5H
	93 DATA	CH020					B720MRPC	HTS+2
20 72								
	93 DATA	CH012	0.7	2	MBM	1C +11.8	A720MULC	CTE
	93 DATA	CH012	0.3	2	MBM	1C +23.2	A720MULC	CTE
21 7								
	93 DATA	CH001	1.7	2	MBM	3A +9.9	A720MULC	CTE
21 8								
	93 DATA	CH001	0.8	2	MBM	5C +31.2	A720MULC	CTE
21 15								
	93 DATA	CH001	0.4	2	MBM	4C +11.4	A720MULC	CTE
21 21								
	93 DATA	CH002	1.1	2	MBM	5H +26.0	A720MULC	CTE
21 33								
	93 DATA	CH004	1.4	2	MBM	CTS +21.8	A720MULC	CTE
21 35								
	93 DATA	CH004	0.8	2	MBM	2C +30.5	A720MULC	CTE
	93 DATA	CH004	1.9	2	MBM	1C +25.4	A720MULC	CTE
	93 DATA	CH004	0.7	2	MBM	4C +33.1	A720MULC	CTE
21 52								
	93 DATA	CH008	1.4	2	MBM	1C +16.7	A720MULC	CTE
21 62								
	93 DATA	CH010	0.9	2	MBM	3H +33.1	A720MULC	CTE
21 80								
	93 DATA	CH013	0.8	2	MBM	5H +33.6	A720MULC	CTE
22 43								
	93 DATA	CH019	3.5	1	MBM	5H +36.1	B720MRPC	6H 5H
	93 DATA	CH019					B720MRPC	HTS+2
	92 DATA	CH04	5.5	4	MBM	5H +35.4	A720MULC	CTEHTE
22 70								
	93 DATA	CH011	1.6	2	MBM	3H +18.5	A720MULC	CTE
22 71								
	93 DATA	CH011	1.3	2	MBM	4C +16.4	A720MULC	CTE
	93 DATA	CH011	1.1	2	MBM	6H +56.2	A720MULC	CTE
22 83								
	93 DATA	CH013	1.3	2	MBM	3H +39.0	A720MULC	CTE

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
22 84								
	93 DATA	CH013	1.5	2	MBM	5C +30.5	A720MULC	CTE
	93 DATA	CH013	1.0	2	MBM	1H +44.7	A720MULC	CTE
23 71								
	93 DATA	CH011	0.5	2	MBM	FBC +2.3	A720MULC	CTE
24 11								
	93 DATA	CH001	1.6	2	MBM	1C +34.1	A720MULC	CTE
24 29								
	93 DATA	CH003	1.7	2	MBM	4A +4.7	A720MULC	CTE
24 47								
	93 DATA	CH019	1.8	1	MBM	5H +25.4	B720MRPC	6H 5H
	93 DATA	CH019	1.1	1	MBM	5H +37.2	B720MRPC	6H 5H
	93 DATA	CH019	0.6	1	MBM	4H +12.1	B720MRPC	5H 4H
	93 DATA	CH019					B720MRPC	HTS+2
	92 DATA	CH07	5.5	4	MBM	4C +46.3	A720MULC	CTEHTE
	92 DATA	CH07	6.0	4	MBM	5H +25.5	A720MULC	CTEHTE
	92 DATA	CH07	5.8	4	MBM	5H +36.8	A720MULC	CTEHTE
	92 DATA	CH07	5.3	4	MBM	5C +5.7	A720MULC	CTEHTE
	92 DATA	CH07	5.8	4	MBM	FBC +13.0	A720MULC	CTEHTE
	92 DATA	CH07	5.1	4	MBM	3C +29.6	A720MULC	CTEHTE
	92 DATA	CH07	5.1	4	MBM	1C +19.5	A720MULC	CTEHTE
	92 DATA	CH07	5.2	4	MBM	1C +7.9	A720MULC	CTEHTE
	92 DATA	CH07	5.8	4	MBM	4H +12.0	A720MULC	CTEHTE
24 50								
	93 DATA	CH019	1.3	1	MBM	3H +43.1	B720MRPC	4H 3H
	93 DATA	CH019					B720MRPC	HTS+2
	92 DATA	CH07	5.1	4	MBM	3H +42.9	A720MULC	CTEHTE
24 65								
	93 DATA	CH010	1.1	2	MBM	4H +12.8	A720MULC	CTE
	93 DATA	CH020	1.8	1	MBM	4H +11.9	B720MRPC	5H 4H
	93 DATA	CH020					B720MRPC	HTS+2
26 68								
	93 DATA	CH010	1.0	P 3	MBM	4H +22.5	A720MULC	CTE
27 30								
	93 DATA	CH019	3.6	1	MBM	3H +33.0	B720MRPC	4H 3H
	93 DATA	CH019					B720MRPC	HTS+2
	90 DATA	CH06A	5.8	4	MBM	3H +34.3	A720MULC	CTE
	90 DATA	CH06A	5.4	4	MBM	1C +12.1	A720MULC	CTE
28 27								
	93 DATA	CH019	1.6	1	MBM	4H +13.6	B720MRPC	5H 4H
	93 DATA	CH019					B720MRPC	HTS+2
	90 DATA	CH06A	5.7	4	MBM	5H +12.7	A720MULC	CTE
28 45								
	93 DATA	CH019	1.3	1	MBM	1H +8.8	B720MRPC	2H 1H

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
28 54	93 DATA	CH019					B720MRPC	HTS+2
	90 DATA	CH05	5.6	4	MBM	1H +8.5	A720MULC	CTE
30 28	93 DATA	CH009	0.5	2	MBM	3C +49.8	A720MULC	CTE
	93 DATA	CH003	0.7	2	MBM	2H +36.9	A720MULC	CTE
30 29	93 DATA	CH003	1.0	2	MBM	5C +6.9	A720MULC	CTE
	93 DATA	CH003	0.6	2	MBM	1C +32.3	A720MULC	CTE
30 80	93 DATA	CH013	0.4	2	MBM	2H +22.5	A720MULC	CTE
	93 DATA	CH002	1.3	2	MBM	5H +32.5	A720MULC	CTE
31 16	93 DATA	CH019	1.9	1	MBM	5H +42.8	B720MRPC	HTS+2
	93 DATA	CH021	0.9	1	MBM	5H +34.6	B720MRPC	6H 5H
31 21	93 DATA	CH002	1.9	2	MBM	6C -0.9	A720MULC	CTE
	93 DATA	CH009	2.0	2	MBM	FBC +17.1	A720MULC	CTE
31 57	93 DATA	CH009	0.9	2	MBM	FBC +6.6	A720MULC	CTE
	93 DATA	CH009	0.6	2	MBM	FBC +20.4	A720MULC	CTE
31 60	93 DATA	CH009	1.4	2	MBM	1C +42.5	A720MULC	CTE
	93 DATA	CH009	0.9	2	MBM	CTS +13.6	A720MULC	CTE
31 71	93 DATA	CH009	1.6	2	MBM	3C +18.2	A720MULC	CTE
	93 DATA	CH011	0.8	2	MBM	FBC +13.5	A720MULC	CTE
32 16	93 DATA	CH011	0.6	2	MBM	FBC +15.2	A720MULC	CTE
	93 DATA	CH002	0.5	2	MBM	5C +37.6	A720MULC	CTE
32 24	93 DATA	CH002	0.9	2	MBM	5C +38.6	A720MULC	CTE
	93 DATA	CH002	0.9	2	MBM	5C +4.1	A720MULC	CTE
34 24	93 DATA	CH002	2.3	2	MBM	HTS +6.3	A720MULC	CTE
	93 DATA	CH003	0.9	2	MBM	1C +3.5	A720MULC	CTE

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
34 37								
	93 DATA	CH019	1.6	1	MBM	4H +42.9	B720MRPC	5H 4H
	93 DATA	CH019					B720MRPC	HTS+2
	92 DATA	CH05	6.5	4	MBM	1A +17.6	A720MULC	CTEHTE
	92 DATA	CH05	7.1	4	MBM	4H +43.7	A720MULC	CTEHTE
	90 DATA	CH03	5.9	4	MBM	1A +17.6	A720MULC	CTE
	90 DATA	CH03	6.8	4	MBM	4H +42.6	A720MULC	CTE
	88 DATA	CH04					A720SFRM	CTE
34 39								
	93 DATA	CH019	1.1	1	MBM	4H +39.5	B720MRPC	5H 4H
	93 DATA	CH019					B720MRPC	HTS+2
	90 DATA	CH03	6.0	4	MBM	4H +39.9	A720MULC	CTE
34 41								
	93 DATA	CH007	0.9	2	MBM	1C +50.1	A720MULC	CTE
34 48								
	93 DATA	CH019	1.2	1	MBM	4H +33.7	B720MRPC	5H 4H
	93 DATA	CH019					B720MRPC	HTS+2
	92 DATA	CH10	11.6	4	MBM	3A +13.8	A720MULC	CTEHTE
	92 DATA	CH10	6.0	4	MBM	4H +33.5	A720MULC	CTEHTE
34 57								
	93 DATA	CH009	0.8	2	MBM	1C +31.4	A720MULC	CTE
34 67								
	93 DATA	CH010	0.7	2	MBM	CTS +14.8	A720MULC	CTE
35 38								
	93 DATA	CH004	0.9	2	MBM	5H +11.1	A720MULC	CTE
	93 DATA	CH004	1.2	2	MBM	5C +37.1	A720MULC	CTE
	93 DATA	CH004	1.5	2	MBM	4H +22.9	A720MULC	CTE
35 60								
	93 DATA	CH009	7.6	2	MBM	2H +36.8	A720MULC	CTE
35 61								
	93 DATA	CH010	1.7	2	MBM	2A +0.0	A720MULC	CTE
36 36								
	93 DATA	CH004	0.8	2	MBM	4H +21.1	A720MULC	CTE
	93 DATA	CH020					B720MRPC	5H 4H
	93 DATA	CH020					B720MRPC	HTS+2
36 53								
	93 DATA	CH009	1.6	2	MBM	3A +18.1	A720MULC	CTE
	93 DATA	CH009	1.5	2	MBM	6H +24.4	A720MULC	CTE
37 24								
	93 DATA	CH002	0.6	2	MBM	1H +24.5	A720MULC	CTE

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
	93 DATA	CH002	1.1	2	MBM	5H +28.1	A720MULC	CTE
	93 DATA	CH002	0.8	2	MBM	1A +10.1	A720MULC	CTE
	93 DATA	CH002	0.6	2	MBM	2C +46.6	A720MULC	CTE
	93 DATA	CH020					B720MRPC	HTS+2
	93 DATA	CH020	0.8	1	MBM	1H +25.6	B720MRPC	2H 1H
	93 DATA	CH020	2.3	1	MBM	5H +29.2	B720MRPC	6H 5H
37 26								
	93 DATA	CH003	1.0	2	MBM	2C +22.1	A720MULC	CTE
37 29								
	93 DATA	CH003	1.0	2	MBM	2H +38.2	A720MULC	CTE
	93 DATA	CH020	1.0	1	MBM	2H +37.8	B720MRPC	3H 2H
	93 DATA	CH020					B720MRPC	HTS+2
37 34								
	93 DATA	CH004	0.4	2	MBM	3C +18.5	A720MULC	CTE
37 39								
	93 DATA	CH004	1.3	2	MBM	2C +27.0	A720MULC	CTE
	93 DATA	CH004	0.6	2	MBM	5C +5.4	A720MULC	CTE
37 55								
	93 DATA	CH009	1.8	2	MBM	FBC +12.4	A720MULC	CTE
37 57								
	93 DATA	CH009	1.0	2	MBM	1C +30.1	A720MULC	CTE
38 40								
	93 DATA	CH005	1.4	2	MBM	2H +5.3	A720MULC	CTE
	93 DATA	CH020	1.1	1	MBM	2H +4.9	B720MRPC	3H 2H
	93 DATA	CH020					B720MRPC	HTS+2
39 26								
	93 DATA	CH003	0.5	2	MBM	5H +36.2	A720MULC	CTE
39 43								
	93 DATA	CH007	0.6	2	MBM	4A +0.4	A720MULC	CTE
40 29								
	93 DATA	CH003	0.5	2	MBM	2C +2.0	A720MULC	CTE
40 53								
	93 DATA	CH009	4.1	2	MBM	3C +24.4	A720MULC	CTE
41 38								
	93 DATA	CH004	1.0	2	MBM	2C +28.9	A720MULC	CTE
	93 DATA	CH004	0.9	2	MBM	1C +40.6	A720MULC	CTE
	93 DATA	CH004	0.4	2	MBM	5H +38.1	A720MULC	CTE
44 39								
	93 DATA	CH004	0.9	2	MBM	1C +38.1	A720MULC	CTE

C P & L
H. B. ROBINSON
COMPONENT: S/G #C
OUTAGE: 9309

Date: 10/05/93
Page: 8

ALL EXAMS BY TUBE FOR MBM INDICATIONS

Row/Col	Year Examined	Reel	Voltage	CH	Ind. %TWD Desc.	Indication Location	Probe	Extent Tested
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44 52

93 DATA	CH008	1.4	P 3	MBM	3C	+0.8	A720MULC	CTE
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Number of Tubes: 89
Number of Indications: 128

MULTI-FREQUENCY EDDY CURRENT INSPECTION

SET UP INSTRUCTIONS

MIZ-18

MIZ-18A

SITE H.B. ROBINSON	UNIT # 2	COMPONENT S/G # A,B,C	SIDE HOT OR COLD	DATE 10 / 2 / 93
PROBE TYPE A700 MULL A700SFRM, A600SFRM		CALIBRATION STANDARD (CIRCLE OR DESCRIBE OTHER) <u>ASME</u> OTHER Z-8554, Z-8555, Z-8556		
PROCEDURE RUB-410-007 RS		TEST PURPOSE BUBBIN PROBE LOW-ROW TUBES		

MIZ-18 MIZ-18A CONFIGURATION

NUMBER: AS REQ.
NAME--: AS REQ.

SAMPLES PER SEC: 400

FREQUENCY SEQUENCE		PROBE CHANNEL SELECT							
#	FREQUENCY	COIL 1	COIL 2	COIL 3	COIL 4	COIL 5	COIL 6	COIL 7	COIL 8
1	400 kHz	✓				✓			
2	100 kHz	✓				✓			
3	600 kHz	✓				✓			
4	10 kHz	✓				✓			

SPECIAL NOTES TO OPERATOR / ANALYST

1) MAXIMUM SPEED 14"/SEC - NOMINAL 12"/SEC

SEE APPENDIX A FOR SETUP INSTRUCTIONS.

PREPARED BY: Thomas A. Burt LEVEL III DATE 10-2-93
APPROVED BY: James A. Shock LEVEL II DATE 10-2-93

COMBUSTION ENGINEERING

MULTI-FREQUENCY EDDY CURRENT INSPECTION

SET UP INSTRUCTIONS

MIZ-18

MIZ-18A

SITE H.B. ROBINSON	UNIT # 2	COMPONENT S/G # A,B,C	SIDE HOT & COLD	DATE 09/28/93					
PROBE TYPE A720 MULL A7005FRM, A6805FRM		CALIBRATION STANDARD (CIRCLE OR DESCRIBE OTHER) <u>ASME</u> OTHER Z-8554, Z-8555, Z-8556							
PROCEDURE ROB-410-004 RS		TEST PURPOSE BOBBIN PROBE EXAM							
MIZ-18 MIZ-18A CONFIGURATION									
NUMBER: AS REQUIRED		SAMPLES PER SEC: 800							
NAME--: AS REQUIRED									
FREQUENCY SEQUENCE		PROBE CHANNEL SELECT							
#	FREQUENCY	COIL 1	COIL 2	COIL 3	COIL 4	COIL 5	COIL 6	COIL 7	COIL 8
1	400 kHz	X				X			
2	100 kHz	X				X			
3	600 kHz	X				X			
4	10 kHz	X				X			
SPECIAL NOTES TO OPERATOR / ANALYST									
1) MAXIMUM SPEED 24"/SEC - NOMINAL 22"/SEC									
SEE APPENDIX <u>A</u> FOR SETUP INSTRUCTIONS.									
PREPARED BY: <u>Thomas W. Brien</u>		LEVEL <u>III</u>		DATE <u>9-28-93</u>					
APPROVED BY: <u>Jamuel A. Shuck</u>		LEVEL <u>II</u>		DATE <u>9-28-93</u>					

MULTI-FREQUENCY EDDY CURRENT INSPECTION

SET UP INSTRUCTIONS

MIZ-18

MIZ-18A

SITE H.B. ROBINSON	UNIT # 2	COMPONENT S/G # A, B, C	SIDE HOT OR COLD	DATE 09/28/93					
PROBE TYPE B720 MRPCPH B700 MRPCPH, B680 MRPLPH		CALIBRATION STANDARD (CIRCLE OR DESCRIBE OTHER) <u>ASME</u> OTHER Z-8554, Z-8555, Z-8556							
PROCEDURE RUB-410-004 R5		TEST PURPOSE MRPC FOR INDICATION CURIFICATION							
MIZ-18 MIZ-18A CONFIGURATION									
NUMBER: AS REQUIRED		SAMPLES PER SEC: 400							
NAME--: AS REQUIRED									
FREQUENCY SEQUENCE		PROBE CHANNEL SELECT							
#	FREQUENCY	COIL 1	COIL 2	COIL 3	COIL 4	COIL 5	COIL 6	COIL 7	COIL 8
1	400 kHz	X				X		X	
2	300 kHz	X				X		X	
3	100 kHz	X			X	X		X	
4	10 kHz	X							
SPECIAL NOTES TO OPERATOR / ANALYST									
<p>1) PROBE SPEED 0.2"/SEC X 300 RPM</p> <p>2) RECORD AT ~ 4"/SEC PULLING OUT OF TUBE AFTER REQUIRED EXTENT IS TESTED - TO VERIFY LOCATION.</p>									
SEE APPENDIX <u>B</u> FOR SETUP INSTRUCTIONS.									
PREPARED BY: <u>Thomas W. Bain</u>		LEVEL <u>III</u>		DATE <u>09/28/93</u>					
APPROVED BY: <u>Samuel A. Shook</u>		LEVEL <u>II</u>		DATE <u>9-28-93</u>					

LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
1	2	RANDOM	1	3	RANDOM
1	11	RANDOM	1	13	RANDOM
1	19	RANDOM	1	24	RANDOM
1	33	RANDOM	1	34	RANDOM
1	38	RANDOM	1	40	RANDOM
1	44	RANDOM	1	52	RANDOM
1	62	RANDOM	1	68	RANDOM
1	72	RANDOM	1	73	RANDOM
1	81	RANDOM	1	87	RANDOM
2	1	RANDOM	2	3	RANDOM
2	6	RANDOM	2	7	RANDOM
2	12	RANDOM	2	13	RANDOM
2	17	RANDOM	2	18	RANDOM
2	24	RANDOM	2	27	RANDOM
2	33	RANDOM	2	35	RANDOM
2	37	RANDOM	2	39	RANDOM
2	42	RANDOM	2	43	RANDOM
2	46	RANDOM	2	47	RANDOM
2	49	RANDOM	2	52	RANDOM
2	59	RANDOM	2	62	RANDOM
2	67	RANDOM	2	68	RANDOM
2	75	RANDOM	2	81	RANDOM
2	84	RANDOM	2	88	RANDOM
3	1	RANDOM	3	2	RANDOM
3	7	RANDOM	3	10	RANDOM
3	14	RANDOM	3	20	RANDOM
3	24	RANDOM	3	26	RANDOM
3	29	RANDOM	3	35	RANDOM
3	38	PREV. IND.	3	39	RANDOM
3	42	RANDOM	3	43	RANDOM
3	47	RANDOM	3	49	RANDOM
3	55	RANDOM	3	57	RANDOM
3	59	RANDOM	3	62	RANDOM
3	65	RANDOM	3	66	RANDOM
3	71	RANDOM	3	72	RANDOM
3	77	RANDOM	3	81	RANDOM
3	83	RANDOM	3	85	RANDOM
3	91	RANDOM	4	1	RANDOM
4	7	RANDOM	4	10	RANDOM
4	12	RANDOM	4	15	RANDOM
4	17	RANDOM	4	18	RANDOM
4	20	RANDOM	4	21	RANDOM
4	25	RANDOM	4	30	RANDOM
4	38	RANDOM	4	45	RANDOM
4	48	RANDOM	4	49	RANDOM
4	51	RANDOM	4	52	RANDOM
4	55	RANDOM	4	57	RANDOM
4	62	RANDOM	4	64	RANDOM
4	68	RANDOM	4	70	RANDOM
4	73	RANDOM	4	78	RANDOM
4	85	RANDOM	4	86	RANDOM
4	88	RANDOM	4	90	RANDOM
4	92	RANDOM	5	3	RANDOM
5	5	RANDOM	5	7	RANDOM
5	13	RANDOM	5	14	RANDOM
5	26	RANDOM	5	29	RANDOM
5	34	RANDOM	5	37	RANDOM
7	1	RANDOM	7	3	RANDOM
7	16	RANDOM	7	12	RANDOM
7	31	RANDOM	7	23	RANDOM
7	36	RANDOM	7	27	RANDOM
7	42	RANDOM	7	37	RANDOM
7	59	RANDOM	7	41	RANDOM
7	70	RANDOM	7	46	RANDOM
7	76	RANDOM	7	51	RANDOM
7	88	RANDOM	7	58	RANDOM
7	5	RANDOM	7	63	RANDOM
7	10	RANDOM	7	70	RANDOM
7	14	RANDOM	7	75	RANDOM
7	23	RANDOM	7	82	RANDOM
7	32	RANDOM	7	87	RANDOM
7	36	RANDOM	8	5	RANDOM
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7	44	RANDOM	8	16	RANDOM
7	48	RANDOM	8	19	RANDOM
7	54	RANDOM	8	22	RANDOM
7	64	RANDOM	8	32	RANDOM
7	73	RANDOM	8	46	RANDOM
7	82	RANDOM	8	50	RANDOM
7	90	RANDOM	8	53	RANDOM
7	3	RANDOM	8	59	RANDOM
7	12	RANDOM	8	67	RANDOM
7	23	RANDOM	8	71	RANDOM
7	27	RANDOM	8	83	RANDOM
7	37	RANDOM	8	87	RANDOM
7	41	RANDOM	9	4	RANDOM
7	46	RANDOM	9	9	RANDOM
7	51	RANDOM	9	15	RANDOM
7	58	RANDOM	9	32	RANDOM
7	63	RANDOM	9	43	RANDOM
7	70	RANDOM			
7	75	RANDOM			
7	82	RANDOM			
7	87	RANDOM			
7	91	RANDOM			

LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
5	44	RANDOM	5	46	RANDOM
5	48	RANDOM	5	49	RANDOM
5	55	RANDOM	5	66	RANDOM
5	74	RANDOM	5	75	RANDOM
5	79	RANDOM	5	80	RANDOM
5	83	RANDOM	5	84	RANDOM
5	87	RANDOM	5	89	RANDOM
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6	7	RANDOM	6	9	RANDOM
6	11	RANDOM	6	14	RANDOM
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6	24	RANDOM	6	25	RANDOM
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6	37	RANDOM	6	39	RANDOM
6	48	RANDOM	6	54	RANDOM
6	60	RANDOM	6	61	RANDOM
6	66	RANDOM	6	69	RANDOM
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6	77	RANDOM	6	79	RANDOM
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7	54	RANDOM	7	58	RANDOM
7	65	RANDOM	7	66	RANDOM
7	85	RANDOM	7	86	RANDOM
7	90	RANDOM	8	20	RANDOM
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8	29	RANDOM	8	31	RANDOM
8	75	RANDOM	8	76	RANDOM
8	80	RANDOM	8	85	RANDOM
8	90	RANDOM	9	2	RANDOM
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9	41	RANDOM	9	43	RANDOM
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9	71	RANDOM	9	74	RANDOM
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			5	50	RANDOM
			5	69	RANDOM
			5	77	RANDOM
			5	82	RANDOM
			5	86	RANDOM
			5	91	RANDOM
			6	5	RANDOM
			6	10	RANDOM
			6	16	RANDOM
			6	22	RANDOM
			6	28	RANDOM
			6	34	RANDOM
			6	46	RANDOM
			6	59	RANDOM
			6	62	RANDOM
			6	71	RANDOM
			6	75	RANDOM
			6	89	RANDOM
			7	9	RANDOM
			7	20	RANDOM
			7	29	RANDOM
			7	33	RANDOM
			7	50	RANDOM
			7	59	RANDOM
			7	84	RANDOM
			7	89	RANDOM
			8	21	RANDOM
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			8	43	RANDOM
			8	79	RANDOM
			8	88	RANDOM
			9	5	RANDOM
			9	10	RANDOM
			9	18	RANDOM
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			9	44	RANDOM
			9	51	RANDOM
			9	64	RANDOM
			9	70	RANDOM
			9	75	RANDOM
			9	79	RANDOM
			9	82	RANDOM
			10	5	RANDOM
			10	27	RANDOM
			10	42	RANDOM
			10	48	RANDOM
			10	60	RANDOM
			10	74	RANDOM
			10	84	RANDOM
			11	22	RANDOM
			11	27	RANDOM
			11	33	RANDOM
			11	38	RANDOM
			11	45	RANDOM
			11	55	RANDOM

LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
11	56	RANDOM	11	57	RANDOM
11	63	RANDOM	11	72	RANDOM
11	76	RANDOM	11	77	RANDOM
11	79	RANDOM	11	84	RANDOM
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12	14	RANDOM	12	15	RANDOM
12	19	RANDOM	12	28	RANDOM
12	30	RANDOM	12	31	RANDOM
12	36	RANDOM	12	48	RANDOM
12	51	RANDOM	12	52	RANDOM
12	58	RANDOM	12	59	RANDOM
12	63	RANDOM	12	67	RANDOM
12	77	RANDOM	12	79	RANDOM
12	82	RANDOM	12	83	RANDOM
13	6	RANDOM	13	8	RANDOM
13	10	RANDOM	13	11	RANDOM
13	14	RANDOM	13	27	RANDOM
13	35	RANDOM	13	38	RANDOM
13	40	RANDOM	13	43	RANDOM
13	46	RANDOM	13	47	RANDOM
13	50	RANDOM	13	52	RANDOM
13	55	RANDOM	13	62	RANDOM
13	65	RANDOM	13	68	RANDOM
13	77	RANDOM	13	78	RANDOM
13	84	RANDOM	13	85	RANDOM
14	4	RANDOM	14	11	RANDOM
14	16	RANDOM	14	19	RANDOM
14	28	RANDOM	14	29	RANDOM
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14	44	RANDOM	14	47	RANDOM
14	51	RANDOM	14	55	RANDOM
14	63	RANDOM	14	65	RANDOM
14	73	RANDOM	14	76	RANDOM
14	80	RANDOM	14	81	RANDOM
14	87	RANDOM	14	89	RANDOM
15	5	RANDOM	15	8	RANDOM
15	19	RANDOM	15	20	RANDOM
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15	50	RANDOM	15	53	RANDOM
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15	67	RANDOM	15	68	RANDOM
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15	80	RANDOM	15	82	RANDOM
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16	57	RANDOM	16	59	RANDOM
16	67	RANDOM	16	77	RANDOM
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17	15	RANDOM	17	16	RANDOM
17	21	RANDOM	17	22	RANDOM
17	31	RANDOM	17	35	RANDOM
11	59	RANDOM			
11	74	RANDOM			
11	78	RANDOM			
11	87	RANDOM			
12	13	RANDOM			
12	18	RANDOM			
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12	62	RANDOM			
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14	33	RANDOM			
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14	50	RANDOM			
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14	79	RANDOM			
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15	73	RANDOM			
16	5	RANDOM			
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16	12	RANDOM			
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16	33	RANDOM			
16	37	RANDOM			
16	55	RANDOM			
16	64	RANDOM			
17	8	RANDOM			
17	14	RANDOM			
17	19	RANDOM			
17	24	RANDOM			
17	38	RANDOM			

LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
17 40	RANDOM	17 43	RANDOM	17 45	RANDOM
17 47	RANDOM	17 48	RANDOM	17 58	RANDOM
17 65	RANDOM	17 68	RANDOM	17 69	RANDOM
17 71	RANDOM	17 72	RANDOM	17 75	RANDOM
17 76	RANDOM	17 77	RANDOM	17 79	RANDOM
18 7	RANDOM	18 9	RANDOM	18 10	RANDOM
18 11	RANDOM	18 15	RANDOM	18 16	RANDOM
18 18	RANDOM	18 19	RANDOM	18 20	RANDOM
18 22	RANDOM	18 24	RANDOM	18 25	RANDOM
18 27	RANDOM	18 30	RANDOM	18 31	RANDOM
18 32	RANDOM	18 37	RANDOM	18 38	RANDOM
18 41	RANDOM	18 42	RANDOM	18 45	RANDOM
18 47	RANDOM	18 50	RANDOM	18 53	RANDOM
18 54	RANDOM	18 56	RANDOM	18 58	RANDOM
18 59	RANDOM	18 60	RANDOM	18 65	RANDOM
18 71	RANDOM	18 73	RANDOM	18 76	RANDOM
18 77	RANDOM	18 79	RANDOM	18 82	RANDOM
18 85	RANDOM	19 7	RANDOM	19 9	RANDOM
19 11	RANDOM	19 14	RANDOM	19 17	RANDOM
19 26	RANDOM	19 37	RANDOM	19 38	RANDOM
19 40	RANDOM	19 44	RANDOM	19 45	RANDOM
19 51	RANDOM	19 54	RANDOM	19 58	RANDOM
19 61	RANDOM	19 63	RANDOM	19 66	RANDOM
19 67	RANDOM	19 71	RANDOM	19 75	RANDOM
19 78	RANDOM	19 79	RANDOM	19 81	RANDOM
19 85	RANDOM	19 87	RANDOM	20 9	RANDOM
20 10	RANDOM	20 15	RANDOM	20 17	RANDOM
20 18	RANDOM	20 19	RANDOM	20 20	RANDOM
20 22	RANDOM	20 23	RANDOM	20 25	RANDOM
20 27	RANDOM	20 28	RANDOM	20 29	RANDOM
20 31	RANDOM	20 32	RANDOM	20 33	RANDOM
20 34	RANDOM	20 35	RANDOM	20 36	RANDOM
20 38	RANDOM	20 41	RANDOM	20 43	RANDOM
20 45	RANDOM	20 48	RANDOM	20 49	RANDOM
20 51	RANDOM	20 52	RANDOM	20 54	RANDOM
20 55	RANDOM	20 56	RANDOM	20 57	RANDOM
20 58	RANDOM	20 65	RANDOM	20 67	RANDOM
20 68	RANDOM	20 70	RANDOM	20 79	RANDOM
20 83	RANDOM	20 86	RANDOM	21 8	RANDOM
21 9	RANDOM	21 11	RANDOM	21 13	RANDOM
21 15	RANDOM	21 17	RANDOM	21 26	RANDOM
21 27	RANDOM	21 31	RANDOM	21 32	RANDOM
21 33	RANDOM	21 35	RANDOM	21 39	RANDOM
21 40	RANDOM	21 45	RANDOM	21 46	RANDOM
21 50	RANDOM	21 52	RANDOM	21 60	RANDOM
21 64	RANDOM	21 66	RANDOM	21 69	RANDOM
21 72	RANDOM	21 73	RANDOM	21 76	RANDOM
21 77	RANDOM	21 79	RANDOM	21 80	RANDOM
21 83	RANDOM	21 84	RANDOM	21 85	RANDOM
22 8	RANDOM	22 10	RANDOM	22 14	RANDOM
22 15	RANDOM	22 29	RANDOM	22 32	RANDOM
22 37	RANDOM	22 38	RANDOM	22 40	RANDOM
22 44	RANDOM	22 53	RANDOM	22 55	RANDOM
22 60	RANDOM	22 62	RANDOM	22 63	RANDOM
22 70	RANDOM	22 72	RANDOM	22 79	RANDOM
22 85	RANDOM	22 86	RANDOM	23 7	RANDOM
23 8	RANDOM	23 15	RANDOM	23 18	RANDOM

Carolina Power & Light
H. B. Robinson Unit 2
Component: S/G #A
Outage: September 1993
Data Set: Bobbin Probe

Date: 10/20/93
Page: 5

LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
23	19	RANDOM	23	20	RANDOM
23	24	RANDOM	23	25	RANDOM
23	28	RANDOM	23	29	RANDOM
23	32	RANDOM	23	33	RANDOM
23	39	RANDOM	23	41	RANDOM
23	50	RANDOM	23	53	RANDOM
23	57	RANDOM	23	59	RANDOM
23	65	RANDOM	23	68	RANDOM
23	71	RANDOM	23	72	RANDOM
23	81	RANDOM	24	31	RANDOM
24	39	RANDOM	24	40	RANDOM
24	43	RANDOM	24	44	RANDOM
24	50	RANDOM	24	52	RANDOM
24	56	RANDOM	24	58	RANDOM
24	61	RANDOM	24	62	RANDOM
24	66	RANDOM	24	69	RANDOM
24	72	RANDOM	24	75	RANDOM
24	79	RANDOM	24	81	RANDOM
24	85	RANDOM	25	11	RANDOM
25	13	RANDOM	25	15	RANDOM
25	25	RANDOM	25	26	RANDOM
25	29	RANDOM	25	30	RANDOM
25	34	RANDOM	25	36	RANDOM
25	38	RANDOM	25	51	RANDOM
25	56	RANDOM	25	58	RANDOM
25	61	RANDOM	25	63	RANDOM
25	69	RANDOM	25	72	RANDOM
25	75	RANDOM	25	81	RANDOM
25	84	RANDOM	26	11	RANDOM
26	16	RANDOM	26	18	RANDOM
26	22	RANDOM	26	23	RANDOM
26	30	RANDOM	26	36	RANDOM
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26	54	RANDOM	26	56	RANDOM
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27	27	RANDOM	27	29	RANDOM
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28	71	RANDOM	28	71	RANDOM
28	80	RANDOM	28	80	RANDOM
29	36	RANDOM	29	36	RANDOM
29	42	RANDOM	29	42	RANDOM

LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
29 43	RANDOM	29 47	RANDOM	29 49	RANDOM
29 51	RANDOM	29 53	RANDOM	29 54	RANDOM
29 55	RANDOM	29 60	RANDOM	29 64	RANDOM
29 65	RANDOM	29 67	RANDOM	29 77	RANDOM
29 79	RANDOM	30 28	RANDOM	30 29	RANDOM
30 31	RANDOM	30 36	RANDOM	30 38	RANDOM
30 40	RANDOM	30 43	RANDOM	30 45	RANDOM
30 47	RANDOM	30 48	RANDOM	30 52	RANDOM
30 55	RANDOM	30 57	RANDOM	30 63	RANDOM
30 64	RANDOM	30 66	RANDOM	30 68	RANDOM
30 69	RANDOM	30 71	RANDOM	30 72	RANDOM
30 73	RANDOM	30 79	RANDOM	30 80	RANDOM
31 15	RANDOM	31 17	RANDOM	31 19	RANDOM
31 23	RANDOM	31 24	RANDOM	31 25	RANDOM
31 28	RANDOM	31 30	RANDOM	31 31	RANDOM
31 32	RANDOM	31 35	RANDOM	31 36	RANDOM
31 43	RANDOM	31 50	RANDOM	31 51	RANDOM
31 58	RANDOM	31 60	RANDOM	31 61	RANDOM
31 62	RANDOM	32 14	RANDOM	32 16	RANDOM
32 17	RANDOM	32 19	RANDOM	32 26	RANDOM
32 28	RANDOM	32 29	RANDOM	32 31	RANDOM
32 33	RANDOM	32 35	RANDOM	32 39	RANDOM
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32 52	RANDOM	32 57	RANDOM	32 58	RANDOM
32 59	RANDOM	32 60	RANDOM	32 63	RANDOM
32 66	RANDOM	32 69	RANDOM	32 74	RANDOM
32 75	RANDOM	32 78	RANDOM	33 18	RANDOM
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33 62	RANDOM	33 63	RANDOM	33 65	RANDOM
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34 65	RANDOM	34 66	RANDOM	34 68	RANDOM
34 74	RANDOM	35 20	RANDOM	35 28	RANDOM
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35 57	RANDOM	35 72	RANDOM	36 25	RANDOM
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36 43	RANDOM	36 45	RANDOM	36 48	RANDOM
36 50	RANDOM	36 54	RANDOM	36 58	RANDOM
36 59	RANDOM	36 60	RANDOM	36 61	RANDOM
36 62	RANDOM	36 65	RANDOM	36 66	RANDOM
36 67	RANDOM	36 71	RANDOM	36 72	RANDOM
36 73	RANDOM	37 35	RANDOM	37 38	RANDOM
37 44	RANDOM	37 45	RANDOM	37 49	RANDOM
37 50	RANDOM	37 56	RANDOM	37 58	RANDOM
37 63	RANDOM	37 65	RANDOM	37 70	RANDOM
37 72	RANDOM	38 24	RANDOM	38 26	RANDOM
38 30	RANDOM	38 32	RANDOM	38 33	RANDOM
38 34	RANDOM	38 36	RANDOM	38 37	RANDOM
38 39	RANDOM	38 40	RANDOM	38 41	RANDOM

Carolina Power & Light
H. B. Robinson Unit 2
Component: S/G #A
Outage: September 1993
Data Set: Bobbin Probe

Date: 10/20/93
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LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
38 43	RANDOM	38 44	RANDOM	38 46	RANDOM
38 48	RANDOM	38 52	RANDOM	38 53	RANDOM
38 55	RANDOM	38 56	RANDOM	38 58	RANDOM
38 59	RANDOM	38 65	RANDOM	38 67	RANDOM
38 70	RANDOM	39 26	RANDOM	39 31	RANDOM
39 33	RANDOM	39 35	RANDOM	39 39	RANDOM
39 42	RANDOM	39 44	RANDOM	39 46	RANDOM
39 47	RANDOM	39 48	RANDOM	39 64	RANDOM
39 67	RANDOM	39 68	RANDOM	40 29	RANDOM
40 31	RANDOM	40 32	RANDOM	40 34	RANDOM
40 35	RANDOM	40 37	RANDOM	40 41	RANDOM
40 42	RANDOM	40 43	RANDOM	40 45	RANDOM
40 47	RANDOM	40 49	PREV. IND.	40 56	RANDOM
40 58	RANDOM	40 63	RANDOM	40 65	RANDOM
41 30	RANDOM	41 34	RANDOM	41 39	RANDOM
41 41	RANDOM	41 44	RANDOM	41 49	RANDOM
41 51	RANDOM	41 52	RANDOM	41 53	RANDOM
41 54	RANDOM	41 57	RANDOM	41 58	RANDOM
41 59	RANDOM	42 35	RANDOM	42 36	RANDOM
42 42	RANDOM	42 48	RANDOM	42 49	RANDOM
42 52	RANDOM	42 55	RANDOM	42 58	RANDOM
42 59	RANDOM	42 61	RANDOM	42 62	RANDOM
43 34	RANDOM	43 35	RANDOM	43 36	RANDOM
43 40	RANDOM	43 43	RANDOM	43 48	RANDOM
43 50	RANDOM	43 53	RANDOM	43 54	RANDOM
43 57	RANDOM	44 41	RANDOM	44 45	RANDOM
44 49	RANDOM	44 51	RANDOM	44 53	RANDOM
44 55	RANDOM	44 56	RANDOM	45 44	RANDOM
45 46	RANDOM	45 48	RANDOM		

Number of Tubes:

1,112

Carolina Power & Light
H. B. Robinson Unit 2
Component: S/G #B
Outage: September 1993
Data Set: Bobbin Probe

Date: 10/20/93
Page: 1

LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
1 2	RANDOM	1 3	RANDOM	1 6	RANDOM
1 9	RANDOM	1 12	RANDOM	1 14	RANDOM
1 16	RANDOM	1 18	RANDOM	1 19	RANDOM
1 32	RANDOM	1 33	RANDOM	1 35	RANDOM
1 36	RANDOM	1 37	RANDOM	1 42	RANDOM
1 43	RANDOM	1 45	RANDOM	1 46	RANDOM
1 47	RANDOM	1 48	RANDOM	1 51	RANDOM
1 56	RANDOM	1 59	RANDOM	1 61	RANDOM
1 63	RANDOM	1 65	RANDOM	1 68	RANDOM
1 69	RANDOM	1 71	RANDOM	1 73	RANDOM
1 75	RANDOM	1 76	RANDOM	1 80	RANDOM
1 84	RANDOM	1 88	RANDOM	1 89	RANDOM
1 90	RANDOM	2 2	RANDOM	2 3	RANDOM
2 6	RANDOM	2 8	RANDOM	2 10	RANDOM
2 11	RANDOM	2 12	RANDOM	2 16	RANDOM
2 20	RANDOM	2 21	RANDOM	2 23	RANDOM
2 24	RANDOM	2 26	RANDOM	2 28	RANDOM
2 29	RANDOM	2 30	RANDOM	2 32	RANDOM
2 33	RANDOM	2 34	RANDOM	2 37	RANDOM
2 39	RANDOM	2 40	RANDOM	2 41	RANDOM
2 44	RANDOM	2 47	RANDOM	2 52	RANDOM
2 56	RANDOM	2 57	RANDOM	2 58	RANDOM
2 59	RANDOM	2 60	RANDOM	2 64	RANDOM
2 67	RANDOM	2 69	RANDOM	2 70	RANDOM
2 75	RANDOM	2 78	RANDOM	2 81	RANDOM
2 82	RANDOM	2 83	RANDOM	2 84	RANDOM
2 87	RANDOM	2 88	RANDOM	2 89	RANDOM
3 2	RANDOM	3 6	RANDOM	3 7	RANDOM
3 9	RANDOM	3 13	RANDOM	3 16	RANDOM
3 17	RANDOM	3 21	RANDOM	3 22	RANDOM
3 23	RANDOM	3 24	RANDOM	3 26	RANDOM
3 27	RANDOM	3 35	RANDOM	3 36	RANDOM
3 38	RANDOM	3 39	RANDOM	3 40	RANDOM
3 43	RANDOM	3 46	RANDOM	3 47	RANDOM
3 52	RANDOM	3 53	RANDOM	3 55	RANDOM
3 56	RANDOM	3 57	RANDOM	3 58	RANDOM
3 63	RANDOM	3 65	RANDOM	3 66	RANDOM
3 68	RANDOM	3 71	RANDOM	3 72	RANDOM
3 73	RANDOM	3 74	RANDOM	3 76	RANDOM
3 77	RANDOM	3 78	RANDOM	3 80	RANDOM
3 81	RANDOM	3 84	RANDOM	3 86	RANDOM
3 87	RANDOM	3 89	RANDOM	3 91	RANDOM
3 92	RANDOM	4 1	RANDOM	4 3	RANDOM
4 7	RANDOM	4 8	RANDOM	4 9	RANDOM
4 11	RANDOM	4 13	RANDOM	4 14	RANDOM
4 16	RANDOM	4 18	RANDOM	4 23	RANDOM
4 26	RANDOM	4 30	RANDOM	4 35	RANDOM
4 37	RANDOM	4 39	RANDOM	4 41	RANDOM
4 42	RANDOM	4 43	RANDOM	4 45	RANDOM
4 46	RANDOM	4 47	RANDOM	4 49	RANDOM
4 50	RANDOM	4 51	RANDOM	4 53	RANDOM
4 54	RANDOM	4 59	RANDOM	4 61	RANDOM
4 62	RANDOM	4 64	RANDOM	4 65	RANDOM
4 67	RANDOM	4 71	RANDOM	4 75	RANDOM
4 76	RANDOM	4 77	RANDOM	4 80	RANDOM
4 82	RANDOM	4 84	RANDOM	4 85	RANDOM
4 86	RANDOM	4 89	RANDOM	4 90	RANDOM

Carolina Power & Light
H. B. Robinson Unit 2
Component: S/G #B
Outage: September 1993
Data Set: Bobbin Probe

Date: 10/20/93
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LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
4 91	RANDOM	5 2	RANDOM	5 3	RANDOM
5 6	RANDOM	5 8	RANDOM	5 9	RANDOM
5 10	RANDOM	5 13	RANDOM	5 23	RANDOM
5 25	RANDOM	5 28	RANDOM	5 31	RANDOM
5 35	RANDOM	5 36	RANDOM	5 38	RANDOM
5 40	RANDOM	5 41	RANDOM	5 44	RANDOM
5 46	RANDOM	5 47	RANDOM	5 49	RANDOM
5 50	RANDOM	5 55	RANDOM	5 57	RANDOM
5 60	RANDOM	5 62	RANDOM	5 63	RANDOM
5 65	RANDOM	5 67	RANDOM	5 70	RANDOM
5 72	RANDOM	5 74	RANDOM	5 80	RANDOM
5 82	RANDOM	5 84	RANDOM	5 86	RANDOM
5 90	RANDOM	5 91	RANDOM	6 4	RANDOM
6 8	RANDOM	6 9	RANDOM	6 11	RANDOM
6 12	RANDOM	6 13	RANDOM	6 14	RANDOM
6 16	RANDOM	6 17	RANDOM	6 19	RANDOM
6 20	RANDOM	6 21	RANDOM	6 22	RANDOM
6 25	RANDOM	6 26	RANDOM	6 27	RANDOM
6 29	RANDOM	6 32	RANDOM	6 33	RANDOM
6 34	RANDOM	6 36	RANDOM	6 38	RANDOM
6 42	RANDOM	6 44	RANDOM	6 49	RANDOM
6 57	RANDOM	6 60	RANDOM	6 61	RANDOM
6 62	RANDOM	6 64	RANDOM	6 65	RANDOM
6 69	RANDOM	6 71	RANDOM	6 72	RANDOM
6 74	RANDOM	6 75	RANDOM	6 76	RANDOM
6 78	RANDOM	6 83	RANDOM	6 86	RANDOM
6 92	RANDOM	7 2	RANDOM	7 8	RANDOM
7 12	RANDOM	7 15	RANDOM	7 16	RANDOM
7 18	RANDOM	7 20	RANDOM	7 22	RANDOM
7 24	RANDOM	7 25	RANDOM	7 26	RANDOM
7 30	RANDOM	7 34	RANDOM	7 35	RANDOM
7 39	RANDOM	7 44	RANDOM	7 48	RANDOM
7 49	RANDOM	7 51	RANDOM	7 53	RANDOM
7 54	RANDOM	7 55	RANDOM	7 56	RANDOM
7 57	RANDOM	7 67	RANDOM	7 73	RANDOM
7 75	RANDOM	7 76	RANDOM	7 78	RANDOM
7 79	RANDOM	7 81	RANDOM	7 88	RANDOM
8 10	RANDOM	8 11	RANDOM	8 12	RANDOM
8 16	RANDOM	8 18	RANDOM	8 21	RANDOM
8 23	RANDOM	8 42	RANDOM	8 50	RANDOM
8 52	RANDOM	8 56	RANDOM	8 58	RANDOM
8 60	RANDOM	8 62	RANDOM	8 64	RANDOM
8 66	RANDOM	8 68	RANDOM	8 71	RANDOM
8 73	RANDOM	8 76	RANDOM	8 77	RANDOM
8 78	RANDOM	8 80	RANDOM	8 81	RANDOM
8 86	RANDOM	8 87	RANDOM	8 91	RANDOM
9 2	RANDOM	9 3	RANDOM	9 4	RANDOM
9 5	RANDOM	9 6	RANDOM	9 8	RANDOM
9 9	RANDOM	9 11	RANDOM	9 13	RANDOM
9 20	RANDOM	9 23	RANDOM	9 24	RANDOM
9 26	RANDOM	9 28	RANDOM	9 30	RANDOM
9 31	RANDOM	9 35	RANDOM	9 38	RANDOM
9 39	RANDOM	9 40	RANDOM	9 42	RANDOM
9 45	RANDOM	9 47	RANDOM	9 49	RANDOM
9 56	RANDOM	9 57	RANDOM	9 60	RANDOM
9 71	RANDOM	9 73	RANDOM	9 75	RANDOM
9 77	RANDOM	9 79	RANDOM	9 91	RANDOM

LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
10	9	RANDOM	10	11	RANDOM
10	23	RANDOM	10	24	RANDOM
10	26	RANDOM	10	29	RANDOM
10	34	RANDOM	10	36	RANDOM
10	44	RANDOM	10	45	RANDOM
10	52	RANDOM	10	58	RANDOM
10	67	RANDOM	10	73	RANDOM
10	81	RANDOM	10	82	RANDOM
10	87	RANDOM	10	89	RANDOM
11	5	RANDOM	11	6	RANDOM
11	10	RANDOM	11	13	RANDOM
11	16	RANDOM	11	21	RANDOM
11	27	RANDOM	11	30	RANDOM
11	38	RANDOM	11	43	RANDOM
11	46	RANDOM	11	47	RANDOM
11	51	RANDOM	11	55	RANDOM
11	60	RANDOM	11	63	RANDOM
11	65	RANDOM	11	67	RANDOM
11	70	RANDOM	11	72	RANDOM
11	79	RANDOM	11	85	RANDOM
11	89	RANDOM	11	90	RANDOM
12	4	RANDOM	12	6	RANDOM
12	9	RANDOM	12	10	RANDOM
12	25	RANDOM	12	27	RANDOM
12	31	RANDOM	12	32	RANDOM
12	39	RANDOM	12	41	RANDOM
12	52	RANDOM	12	55	RANDOM
12	58	RANDOM	12	60	RANDOM
12	72	RANDOM	12	78	RANDOM
12	80	RANDOM	12	82	RANDOM
12	85	RANDOM	12	86	RANDOM
13	3	RANDOM	13	4	RANDOM
13	10	RANDOM	13	12	RANDOM
13	17	RANDOM	13	19	RANDOM
13	29	RANDOM	13	31	RANDOM
13	38	RANDOM	13	39	RANDOM
13	48	RANDOM	13	49	RANDOM
13	52	RANDOM	13	54	RANDOM
13	59	RANDOM	13	62	RANDOM
13	64	RANDOM	13	65	RANDOM
13	75	RANDOM	13	76	RANDOM
13	81	RANDOM	13	83	RANDOM
13	87	RANDOM	14	5	RANDOM
14	8	RANDOM	14	9	RANDOM
14	12	RANDOM	14	13	RANDOM
14	16	RANDOM	14	19	RANDOM
14	25	RANDOM	14	26	RANDOM
14	38	RANDOM	14	42	RANDOM
14	51	RANDOM	14	54	RANDOM
14	57	RANDOM	14	58	RANDOM
14	62	RANDOM	14	65	RANDOM
14	71	RANDOM	14	76	RANDOM
14	78	RANDOM	14	79	RANDOM
14	86	RANDOM	14	88	RANDOM
15	17	RANDOM	15	19	RANDOM
15	23	RANDOM	15	24	RANDOM
15	26	RANDOM	15	29	RANDOM
10	12	RANDOM	10	25	RANDOM
10	31	RANDOM	10	41	RANDOM
10	47	RANDOM	10	59	RANDOM
10	74	RANDOM	10	86	RANDOM
10	90	RANDOM	11	8	RANDOM
11	15	RANDOM	11	23	RANDOM
11	35	RANDOM	11	45	RANDOM
11	49	RANDOM	11	57	RANDOM
11	64	RANDOM	11	69	RANDOM
11	77	RANDOM	11	88	RANDOM
12	3	RANDOM	12	8	RANDOM
12	18	RANDOM	12	29	RANDOM
12	35	RANDOM	12	47	RANDOM
12	57	RANDOM	12	64	RANDOM
12	79	RANDOM	12	83	RANDOM
12	87	RANDOM	13	5	RANDOM
13	15	RANDOM	13	21	RANDOM
13	35	RANDOM	13	40	RANDOM
13	50	RANDOM	13	56	RANDOM
13	63	RANDOM	13	66	RANDOM
13	78	RANDOM	13	84	RANDOM
14	6	RANDOM	14	11	RANDOM
14	14	RANDOM	14	23	RANDOM
14	35	RANDOM	14	44	RANDOM
14	55	RANDOM	14	60	RANDOM
14	69	RANDOM	14	77	RANDOM
14	84	RANDOM	15	13	RANDOM
15	20	RANDOM	15	25	RANDOM
15	30	RANDOM			

LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
15 31	RANDOM	15 33	RANDOM	15 35	RANDOM
15 37	RANDOM	15 51	RANDOM	15 53	RANDOM
15 55	RANDOM	15 57	RANDOM	15 59	RANDOM
15 62	RANDOM	15 63	RANDOM	15 65	RANDOM
15 72	RANDOM	15 75	RANDOM	15 77	RANDOM
15 79	RANDOM	15 83	RANDOM	15 86	RANDOM
16 4	RANDOM	16 14	RANDOM	16 15	RANDOM
16 16	RANDOM	16 17	RANDOM	16 20	RANDOM
16 23	RANDOM	16 27	RANDOM	16 34	RANDOM
16 36	RANDOM	16 39	RANDOM	16 41	RANDOM
16 46	RANDOM	16 52	RANDOM	16 53	RANDOM
16 58	RANDOM	16 60	RANDOM	16 61	RANDOM
16 63	RANDOM	16 65	RANDOM	16 68	RANDOM
16 70	RANDOM	16 73	RANDOM	16 74	RANDOM
16 76	RANDOM	16 79	RANDOM	16 80	RANDOM
16 81	RANDOM	16 82	RANDOM	16 83	RANDOM
16 84	RANDOM	16 88	RANDOM	17 6	RANDOM
17 16	RANDOM	17 22	RANDOM	17 25	RANDOM
17 27	RANDOM	17 29	RANDOM	17 31	RANDOM
17 34	RANDOM	17 36	RANDOM	17 37	RANDOM
17 38	RANDOM	17 40	RANDOM	17 44	RANDOM
17 46	RANDOM	17 58	RANDOM	17 59	RANDOM
17 61	RANDOM	17 65	RANDOM	17 66	RANDOM
17 67	RANDOM	17 69	RANDOM	17 70	RANDOM
17 71	RANDOM	17 73	RANDOM	17 75	RANDOM
17 78	RANDOM	17 80	RANDOM	17 82	RANDOM
17 86	RANDOM	17 87	RANDOM	18 7	RANDOM
18 11	RANDOM	18 12	RANDOM	18 13	RANDOM
18 14	RANDOM	18 16	RANDOM	18 18	RANDOM
18 19	RANDOM	18 21	RANDOM	18 23	RANDOM
18 24	RANDOM	18 26	RANDOM	18 28	RANDOM
18 32	RANDOM	18 34	RANDOM	18 35	RANDOM
18 37	RANDOM	18 42	RANDOM	18 49	RANDOM
18 54	RANDOM	18 59	RANDOM	18 61	RANDOM
18 64	RANDOM	18 65	RANDOM	18 71	RANDOM
18 72	RANDOM	18 77	RANDOM	18 79	RANDOM
18 83	RANDOM	18 84	RANDOM	19 6	RANDOM
19 8	RANDOM	19 14	RANDOM	19 16	RANDOM
19 19	RANDOM	19 20	RANDOM	19 23	RANDOM
19 24	RANDOM	19 25	RANDOM	19 26	RANDOM
19 27	RANDOM	19 29	RANDOM	19 42	RANDOM
19 43	RANDOM	19 46	RANDOM	19 49	RANDOM
19 52	RANDOM	19 53	RANDOM	19 55	RANDOM
19 58	RANDOM	19 60	RANDOM	19 62	RANDOM
19 63	RANDOM	19 66	RANDOM	19 67	RANDOM
19 69	RANDOM	19 70	RANDOM	19 72	RANDOM
19 73	RANDOM	19 74	RANDOM	19 76	RANDOM
19 77	RANDOM	19 79	RANDOM	19 81	RANDOM
19 85	RANDOM	19 87	RANDOM	20 11	RANDOM
20 13	RANDOM	20 15	RANDOM	20 17	RANDOM
20 22	RANDOM	20 23	RANDOM	20 25	RANDOM
20 27	RANDOM	20 28	RANDOM	20 29	RANDOM
20 33	RANDOM	20 39	RANDOM	20 41	RANDOM
20 43	RANDOM	20 45	RANDOM	20 48	RANDOM
20 53	RANDOM	20 55	RANDOM	20 56	RANDOM
20 57	RANDOM	20 59	RANDOM	20 60	RANDOM
20 62	RANDOM	20 63	RANDOM	20 64	RANDOM

LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
20 69	RANDOM	20 73	RANDOM	20 75	RANDOM
20 77	RANDOM	20 79	RANDOM	20 82	RANDOM
20 85	RANDOM	20 87	PREV. IND.	21 7	RANDOM
21 9	RANDOM	21 10	RANDOM	21 13	RANDOM
21 15	RANDOM	21 19	RANDOM	21 22	RANDOM
21 24	RANDOM	21 28	RANDOM	21 31	RANDOM
21 34	RANDOM	21 35	RANDOM	21 41	RANDOM
21 44	RANDOM	21 46	RANDOM	21 48	RANDOM
21 50	RANDOM	21 54	RANDOM	21 56	RANDOM
21 59	RANDOM	21 60	RANDOM	21 64	RANDOM
21 65	RANDOM	21 67	RANDOM	21 68	RANDOM
21 69	RANDOM	21 70	RANDOM	21 71	RANDOM
21 74	RANDOM	21 77	RANDOM	21 80	RANDOM
21 83	RANDOM	21 86	RANDOM	22 12	RANDOM
22 14	RANDOM	22 23	RANDOM	22 24	RANDOM
22 25	RANDOM	22 30	RANDOM	22 36	RANDOM
22 37	RANDOM	22 40	RANDOM	22 45	RANDOM
22 47	RANDOM	22 49	RANDOM	22 51	RANDOM
22 53	RANDOM	22 59	RANDOM	22 63	RANDOM
22 64	RANDOM	22 71	RANDOM	22 75	RANDOM
22 77	RANDOM	22 78	RANDOM	22 79	RANDOM
22 83	RANDOM	22 85	RANDOM	23 10	RANDOM
23 14	RANDOM	23 15	RANDOM	23 16	RANDOM
23 17	RANDOM	23 20	RANDOM	23 21	RANDOM
23 23	RANDOM	23 24	RANDOM	23 25	RANDOM
23 26	RANDOM	23 28	RANDOM	23 30	RANDOM
23 31	RANDOM	23 34	RANDOM	23 36	RANDOM
23 37	RANDOM	23 40	RANDOM	23 41	RANDOM
23 43	RANDOM	23 47	RANDOM	23 49	RANDOM
23 53	RANDOM	23 54	RANDOM	23 58	RANDOM
23 59	RANDOM	23 62	RANDOM	23 73	RANDOM
23 75	RANDOM	23 76	RANDOM	23 80	RANDOM
23 81	RANDOM	23 85	RANDOM	24 10	RANDOM
24 13	RANDOM	24 23	RANDOM	24 31	RANDOM
24 32	RANDOM	24 34	RANDOM	24 35	RANDOM
24 37	RANDOM	24 39	RANDOM	24 41	RANDOM
24 42	RANDOM	24 44	RANDOM	24 48	RANDOM
24 51	RANDOM	24 56	RANDOM	24 60	RANDOM
24 61	RANDOM	24 63	RANDOM	24 66	RANDOM
24 68	RANDOM	24 70	RANDOM	24 72	RANDOM
24 73	RANDOM	24 77	RANDOM	24 78	RANDOM
24 81	RANDOM	24 82	RANDOM	24 84	RANDOM
25 13	RANDOM	25 15	RANDOM	25 16	RANDOM
25 17	RANDOM	25 18	RANDOM	25 19	RANDOM
25 21	RANDOM	25 22	RANDOM	25 24	RANDOM
25 25	RANDOM	25 26	PREV. IND.	25 27	RANDOM
25 28	RANDOM	25 29	RANDOM	25 32	RANDOM
25 33	RANDOM	25 37	RANDOM	25 39	RANDOM
25 41	RANDOM	25 42	RANDOM	25 43	RANDOM
25 45	RANDOM	25 47	RANDOM	25 52	RANDOM
25 53	RANDOM	25 54	RANDOM	25 56	RANDOM
25 58	RANDOM	25 61	RANDOM	25 64	RANDOM
25 65	RANDOM	25 68	RANDOM	25 69	RANDOM
25 70	RANDOM	25 71	RANDOM	25 74	RANDOM
25 75	RANDOM	25 77	RANDOM	25 81	RANDOM
25 83	RANDOM	25 84	RANDOM	26 11	RANDOM
26 13	RANDOM	26 16	RANDOM	26 19	RANDOM

LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
26	22	RANDOM	26	25	RANDOM
26	30	RANDOM	26	38	RANDOM
26	41	RANDOM	26	42	RANDOM
26	45	RANDOM	26	50	RANDOM
26	56	RANDOM	26	58	RANDOM
26	61	RANDOM	26	64	RANDOM
26	70	RANDOM	26	72	RANDOM
26	74	RANDOM	26	75	RANDOM
26	79	RANDOM	26	81	RANDOM
26	84	RANDOM	27	11	RANDOM
27	13	RANDOM	27	14	RANDOM
27	21	RANDOM	27	22	RANDOM
27	26	RANDOM	27	27	RANDOM
27	30	RANDOM	27	34	RANDOM
27	36	RANDOM	27	40	RANDOM
27	51	RANDOM	27	53	RANDOM
27	57	RANDOM	27	60	RANDOM
27	63	RANDOM	27	65	RANDOM
27	73	RANDOM	27	78	RANDOM
27	82	RANDOM	28	12	RANDOM
28	14	RANDOM	28	16	RANDOM
28	20	RANDOM	28	22	RANDOM
28	25	RANDOM	28	28	RANDOM
28	34	RANDOM	28	41	RANDOM
28	47	RANDOM	28	51	RANDOM
28	54	RANDOM	28	56	RANDOM
28	64	RANDOM	28	65	RANDOM
28	71	RANDOM	28	72	RANDOM
28	80	RANDOM	29	12	RANDOM
29	15	RANDOM	29	22	RANDOM
29	40	RANDOM	29	43	RANDOM
29	46	RANDOM	29	47	RANDOM
29	52	RANDOM	29	56	RANDOM
29	61	RANDOM	29	62	RANDOM
29	70	RANDOM	29	73	RANDOM
29	80	RANDOM	30	14	RANDOM
30	36	RANDOM	30	37	RANDOM
30	47	RANDOM	30	54	RANDOM
30	58	RANDOM	30	60	RANDOM
30	64	RANDOM	30	70	RANDOM
30	75	RANDOM	30	78	RANDOM
31	13	RANDOM	31	17	RANDOM
31	19	RANDOM	31	20	RANDOM
31	24	RANDOM	31	27	RANDOM
31	31	RANDOM	31	34	RANDOM
31	38	RANDOM	31	39	RANDOM
31	45	RANDOM	31	47	RANDOM
31	52	RANDOM	31	65	RANDOM
31	68	RANDOM	31	69	RANDOM
32	20	RANDOM	32	23	RANDOM
32	27	RANDOM	32	33	RANDOM
32	37	RANDOM	32	39	RANDOM
32	41	RANDOM	32	43	RANDOM
32	49	RANDOM	32	52	RANDOM
32	59	RANDOM	32	62	RANDOM
32	68	RANDOM	32	70	RANDOM
32	74	RANDOM	32	76	RANDOM
26	26	RANDOM	26	26	RANDOM
26	40	RANDOM	26	40	RANDOM
26	44	RANDOM	26	44	RANDOM
26	51	RANDOM	26	51	RANDOM
26	59	RANDOM	26	59	RANDOM
26	67	RANDOM	26	67	RANDOM
26	73	RANDOM	26	73	RANDOM
26	76	RANDOM	26	76	RANDOM
26	82	RANDOM	26	82	RANDOM
27	12	RANDOM	27	12	RANDOM
27	19	RANDOM	27	19	RANDOM
27	23	RANDOM	27	23	RANDOM
27	29	RANDOM	27	29	RANDOM
27	35	RANDOM	27	35	RANDOM
27	43	RANDOM	27	43	RANDOM
27	56	RANDOM	27	56	RANDOM
27	62	RANDOM	27	62	RANDOM
27	72	RANDOM	27	72	RANDOM
27	81	RANDOM	27	81	RANDOM
28	13	RANDOM	28	13	RANDOM
28	19	RANDOM	28	19	RANDOM
28	23	RANDOM	28	23	RANDOM
28	30	RANDOM	28	30	RANDOM
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28	53	RANDOM	28	53	RANDOM
28	59	RANDOM	28	59	RANDOM
28	67	RANDOM	28	67	RANDOM
28	75	RANDOM	28	75	RANDOM
29	13	RANDOM	29	13	RANDOM
29	32	RANDOM	29	32	RANDOM
29	44	RANDOM	29	44	RANDOM
29	50	RANDOM	29	50	RANDOM
29	60	RANDOM	29	60	RANDOM
29	66	RANDOM	29	66	RANDOM
29	79	RANDOM	29	79	RANDOM
30	32	RANDOM	30	32	RANDOM
30	39	RANDOM	30	39	RANDOM
30	56	RANDOM	30	56	RANDOM
30	63	RANDOM	30	63	RANDOM
30	72	RANDOM	30	72	RANDOM
30	80	RANDOM	30	80	RANDOM
31	18	RANDOM	31	18	RANDOM
31	22	RANDOM	31	22	RANDOM
31	29	RANDOM	31	29	RANDOM
31	37	RANDOM	31	37	RANDOM
31	41	RANDOM	31	41	RANDOM
31	49	RANDOM	31	49	RANDOM
31	66	RANDOM	31	66	RANDOM
32	19	RANDOM	32	19	RANDOM
32	25	RANDOM	32	25	RANDOM
32	36	RANDOM	32	36	RANDOM
32	40	RANDOM	32	40	RANDOM
32	46	RANDOM	32	46	RANDOM
32	57	RANDOM	32	57	RANDOM
32	65	RANDOM	32	65	RANDOM
32	71	RANDOM	32	71	RANDOM
32	77	RANDOM	32	77	RANDOM

Carolina Power & Light
H. B. Robinson Unit 2
Component: S/G #B
Outage: September 1993
Data Set: Bobbin Probe

Date: 10/20/93
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LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
33	15	RANDOM	33	16	RANDOM
33	23	RANDOM	33	31	RANDOM
33	42	RANDOM	33	45	RANDOM
33	47	RANDOM	33	48	RANDOM
33	53	RANDOM	33	57	RANDOM
33	63	RANDOM	33	64	RANDOM
33	67	RANDOM	33	69	RANDOM
33	73	RANDOM	33	76	RANDOM
33	78	RANDOM	34	17	RANDOM
34	20	RANDOM	34	21	RANDOM
34	28	RANDOM	34	30	PREV. IND.
34	37	RANDOM	34	42	RANDOM
34	47	RANDOM	34	48	RANDOM
34	50	RANDOM	34	52	RANDOM
34	54	RANDOM	34	55	RANDOM
34	65	RANDOM	34	66	RANDOM
34	68	RANDOM	34	70	RANDOM
34	76	RANDOM	35	20	RANDOM
35	28	RANDOM	35	32	RANDOM
35	40	RANDOM	35	41	RANDOM
35	49	RANDOM	35	52	RANDOM
35	72	RANDOM	36	21	RANDOM
36	35	RANDOM	36	41	RANDOM
36	44	RANDOM	36	48	RANDOM
36	53	RANDOM	36	54	RANDOM
36	60	RANDOM	36	61	RANDOM
36	63	RANDOM	36	66	RANDOM
36	69	RANDOM	36	72	RANDOM
37	22	RANDOM	37	28	RANDOM
37	33	RANDOM	37	34	RANDOM
37	37	RANDOM	37	38	RANDOM
37	44	RANDOM	37	46	RANDOM
37	52	RANDOM	37	56	RANDOM
37	61	RANDOM	37	64	RANDOM
37	68	RANDOM	37	70	RANDOM
37	72	RANDOM	38	22	RANDOM
38	26	RANDOM	38	30	RANDOM
38	33	RANDOM	38	35	RANDOM
38	40	RANDOM	38	41	RANDOM
38	46	RANDOM	38	47	RANDOM
38	52	RANDOM	38	57	RANDOM
38	59	RANDOM	38	62	RANDOM
38	66	RANDOM	38	68	RANDOM
39	24	RANDOM	39	28	RANDOM
39	30	RANDOM	39	35	RANDOM
39	39	RANDOM	39	41	RANDOM
39	45	RANDOM	39	47	RANDOM
39	52	RANDOM	39	54	RANDOM
39	61	RANDOM	39	64	RANDOM
40	34	RANDOM	40	36	RANDOM
40	46	RANDOM	40	48	RANDOM
40	52	RANDOM	40	60	RANDOM
40	65	RANDOM	40	66	RANDOM
41	30	RANDOM	41	31	RANDOM
41	35	RANDOM	41	51	RANDOM
41	60	RANDOM	41	61	RANDOM
42	31	RANDOM	42	34	RANDOM
33	21	RANDOM	33	33	RANDOM
33	46	RANDOM	33	52	RANDOM
33	59	RANDOM	33	66	RANDOM
33	72	RANDOM	33	77	RANDOM
34	19	RANDOM	34	22	RANDOM
34	32	RANDOM	34	45	RANDOM
34	49	RANDOM	34	53	RANDOM
34	61	RANDOM	34	67	RANDOM
34	74	RANDOM	35	22	RANDOM
35	35	RANDOM	35	48	RANDOM
35	54	RANDOM	35	54	RANDOM
36	33	RANDOM	36	42	RANDOM
36	51	RANDOM	36	57	RANDOM
36	62	RANDOM	36	67	RANDOM
36	73	RANDOM	37	30	RANDOM
37	35	RANDOM	37	43	RANDOM
37	48	RANDOM	37	58	RANDOM
37	67	RANDOM	37	71	RANDOM
38	24	RANDOM	38	31	RANDOM
38	39	RANDOM	38	42	RANDOM
38	50	RANDOM	38	58	RANDOM
38	65	RANDOM	38	69	RANDOM
39	29	RANDOM	39	37	RANDOM
39	42	RANDOM	39	48	RANDOM
39	58	RANDOM	39	66	RANDOM
40	40	RANDOM	40	49	RANDOM
40	63	RANDOM	41	29	RANDOM
41	32	RANDOM	41	56	RANDOM
41	62	RANDOM	42	36	RANDOM

Carolina Power & Light
H. B. Robinson Unit 2
Component: S/G #B
Outage: September 1993
Data Set: Bobbin Probe

Date: 10/20/93
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LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
42 39	RANDOM	42 43	RANDOM	42 44	RANDOM
42 45	RANDOM	42 47	RANDOM	42 48	RANDOM
42 49	RANDOM	42 50	RANDOM	42 51	RANDOM
42 56	RANDOM	43 42	RANDOM	43 43	RANDOM
43 49	RANDOM	43 51	RANDOM	43 55	RANDOM
43 57	RANDOM	44 39	RANDOM	44 40	RANDOM
44 41	RANDOM	44 42	RANDOM	44 43	RANDOM
44 46	RANDOM	44 49	RANDOM	44 53	RANDOM
44 56	RANDOM	45 50	RANDOM	45 51	RANDOM

Number of Tubes: 1,224

Carolina Power & Light
H. B. Robinson Unit 2
Component: S/G #C
Outage: September 1993
Data Set: Bobbin Probe

Date: 10/20/93
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LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
1 2	RANDOM	1 13	RANDOM	1 19	RANDOM
1 22	RANDOM	1 23	RANDOM	1 25	RANDOM
1 26	RANDOM	1 28	RANDOM	1 30	RANDOM
1 33	RANDOM	1 37	RANDOM	1 38	RANDOM
1 39	RANDOM	1 40	RANDOM	1 41	RANDOM
1 42	RANDOM	1 48	RANDOM	1 49	RANDOM
1 50	RANDOM	1 51	RANDOM	1 58	RANDOM
1 61	RANDOM	1 63	RANDOM	1 64	RANDOM
1 68	RANDOM	1 69	RANDOM	1 70	RANDOM
1 71	RANDOM	1 72	RANDOM	1 73	RANDOM
1 76	RANDOM	1 77	RANDOM	1 85	RANDOM
2 2	RANDOM	2 5	RANDOM	2 7	RANDOM
2 9	RANDOM	2 10	RANDOM	2 15	RANDOM
2 17	RANDOM	2 20	RANDOM	2 22	RANDOM
2 23	RANDOM	2 28	RANDOM	2 34	RANDOM
2 35	RANDOM	2 37	RANDOM	2 41	RANDOM
2 42	RANDOM	2 44	RANDOM	2 45	RANDOM
2 49	RANDOM	2 55	RANDOM	2 60	RANDOM
2 61	RANDOM	2 62	RANDOM	2 67	RANDOM
2 68	RANDOM	2 71	RANDOM	2 72	RANDOM
2 76	RANDOM	2 78	RANDOM	2 83	RANDOM
2 86	RANDOM	2 87	RANDOM	3 3	RANDOM
3 6	RANDOM	3 8	RANDOM	3 10	RANDOM
3 12	RANDOM	3 13	RANDOM	3 15	RANDOM
3 19	RANDOM	3 27	RANDOM	3 29	RANDOM
3 30	RANDOM	3 37	RANDOM	3 38	RANDOM
3 39	RANDOM	3 40	RANDOM	3 50	RANDOM
3 54	RANDOM	3 55	RANDOM	3 56	RANDOM
3 59	RANDOM	3 61	RANDOM	3 63	RANDOM
3 64	RANDOM	3 67	RANDOM	3 70	RANDOM
3 72	RANDOM	3 73	RANDOM	3 79	RANDOM
3 81	RANDOM	3 83	RANDOM	3 84	RANDOM
3 86	RANDOM	3 92	RANDOM	4 2	RANDOM
4 5	RANDOM	4 8	RANDOM	4 9	RANDOM
4 11	RANDOM	4 12	RANDOM	4 13	RANDOM
4 16	RANDOM	4 17	RANDOM	4 19	RANDOM
4 21	RANDOM	4 27	RANDOM	4 29	RANDOM
4 30	RANDOM	4 32	RANDOM	4 33	RANDOM
4 36	RANDOM	4 39	RANDOM	4 40	RANDOM
4 42	RANDOM	4 44	RANDOM	4 46	RANDOM
4 47	RANDOM	4 49	RANDOM	4 50	RANDOM
4 51	RANDOM	4 54	RANDOM	4 56	RANDOM
4 57	RANDOM	4 58	RANDOM	4 59	RANDOM
4 60	RANDOM	4 64	RANDOM	4 67	RANDOM
4 68	RANDOM	4 69	RANDOM	4 70	RANDOM
4 71	RANDOM	4 73	RANDOM	4 77	RANDOM
4 79	RANDOM	4 86	RANDOM	4 87	RANDOM
4 88	RANDOM	4 92	RANDOM	5 1	RANDOM
5 2	RANDOM	5 4	RANDOM	5 6	RANDOM
5 11	RANDOM	5 16	RANDOM	5 19	RANDOM
5 20	RANDOM	5 21	RANDOM	5 26	RANDOM
5 27	RANDOM	5 28	RANDOM	5 29	RANDOM
5 30	RANDOM	5 34	RANDOM	5 38	RANDOM
5 39	RANDOM	5 40	RANDOM	5 41	RANDOM
5 42	RANDOM	5 44	RANDOM	5 48	RANDOM
5 49	RANDOM	5 55	RANDOM	5 59	RANDOM
5 65	RANDOM	5 71	RANDOM	5 72	RANDOM

LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
5	74	RANDOM	5	77	RANDOM
5	80	RANDOM	5	83	RANDOM
5	87	RANDOM	5	92	RANDOM
6	6	RANDOM	6	7	RANDOM
6	12	RANDOM	6	13	RANDOM
6	16	RANDOM	6	17	RANDOM
6	19	RANDOM	6	21	RANDOM
6	24	RANDOM	6	25	RANDOM
6	32	RANDOM	6	33	RANDOM
6	39	RANDOM	6	49	RANDOM
6	53	RANDOM	6	58	RANDOM
6	68	RANDOM	6	69	RANDOM
6	72	RANDOM	6	76	RANDOM
6	81	RANDOM	6	82	RANDOM
6	85	RANDOM	6	86	RANDOM
7	10	RANDOM	7	11	RANDOM
7	14	RANDOM	7	15	RANDOM
7	20	RANDOM	7	23	RANDOM
7	27	RANDOM	7	28	RANDOM
7	34	RANDOM	7	36	RANDOM
7	40	RANDOM	7	42	RANDOM
7	53	RANDOM	7	59	RANDOM
7	64	RANDOM	7	66	RANDOM
7	76	RANDOM	7	78	RANDOM
7	81	RANDOM	7	83	RANDOM
8	2	RANDOM	8	8	RANDOM
8	13	RANDOM	8	17	RANDOM
8	21	RANDOM	8	32	RANDOM
8	40	RANDOM	8	42	RANDOM
8	45	RANDOM	8	51	RANDOM
8	54	RANDOM	8	58	RANDOM
8	64	RANDOM	8	70	RANDOM
8	78	RANDOM	8	81	RANDOM
8	86	RANDOM	8	87	RANDOM
9	7	RANDOM	9	10	RANDOM
9	17	RANDOM	9	19	RANDOM
9	22	RANDOM	9	23	RANDOM
9	27	RANDOM	9	28	RANDOM
9	35	RANDOM	9	41	RANDOM
9	46	RANDOM	9	48	RANDOM
9	60	RANDOM	9	71	RANDOM
9	77	RANDOM	9	79	RANDOM
9	81	RANDOM	9	84	RANDOM
10	10	PREV. IND.	10	11	PREV. IND.
10	15	RANDOM	10	17	RANDOM
10	24	RANDOM	10	30	RANDOM
10	36	RANDOM	10	39	RANDOM
10	43	RANDOM	10	45	RANDOM
10	49	RANDOM	10	50	RANDOM
10	55	PREV. IND.	10	58	RANDOM
10	61	RANDOM	10	62	RANDOM
10	68	RANDOM	10	73	RANDOM
10	89	RANDOM	11	4	RANDOM
11	10	RANDOM	11	11	RANDOM
11	20	RANDOM	11	28	RANDOM
11	33	RANDOM	11	36	RANDOM
11	38	RANDOM	11	40	RANDOM
5	78	RANDOM	5	86	RANDOM
6	5	RANDOM	6	8	RANDOM
6	14	RANDOM	6	18	RANDOM
6	22	RANDOM	6	31	RANDOM
6	36	RANDOM	6	52	RANDOM
6	67	RANDOM	6	71	RANDOM
6	79	RANDOM	6	83	RANDOM
7	2	RANDOM	7	13	RANDOM
7	18	RANDOM	7	24	RANDOM
7	32	RANDOM	7	39	RANDOM
7	47	RANDOM	7	61	RANDOM
7	72	RANDOM	7	80	RANDOM
7	86	RANDOM	8	11	RANDOM
8	20	RANDOM	8	35	RANDOM
8	43	RANDOM	8	52	RANDOM
8	60	RANDOM	8	77	RANDOM
8	84	RANDOM	9	5	RANDOM
9	13	RANDOM	9	20	RANDOM
9	26	RANDOM	9	33	RANDOM
9	44	RANDOM	9	55	RANDOM
9	74	RANDOM	9	80	RANDOM
9	91	RANDOM	10	12	RANDOM
10	22	RANDOM	10	33	RANDOM
10	42	RANDOM	10	47	RANDOM
10	54	PREV. IND.	10	60	RANDOM
10	63	RANDOM	10	74	RANDOM
11	5	RANDOM	11	16	RANDOM
11	29	RANDOM	11	37	RANDOM
11	41	RANDOM			

LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
11 44	RANDOM	11 45	RANDOM	11 47	RANDOM
11 48	RANDOM	11 50	RANDOM	11 53	RANDOM
11 57	RANDOM	11 65	RANDOM	11 66	RANDOM
11 67	RANDOM	11 88	RANDOM	11 90	RANDOM
12 7	RANDOM	12 9	RANDOM	12 10	RANDOM
12 15	RANDOM	12 16	RANDOM	12 17	RANDOM
12 18	RANDOM	12 20	RANDOM	12 25	RANDOM
12 29	RANDOM	12 30	RANDOM	12 32	RANDOM
12 55	RANDOM	12 57	RANDOM	12 60	RANDOM
12 65	RANDOM	12 66	RANDOM	12 69	RANDOM
12 76	RANDOM	12 78	RANDOM	12 81	RANDOM
12 87	RANDOM	13 3	PREV. IND.	13 4	PREV. IND.
13 11	RANDOM	13 12	RANDOM	13 13	RANDOM
13 17	RANDOM	13 21	RANDOM	13 24	RANDOM
13 28	RANDOM	13 31	RANDOM	13 32	RANDOM
13 34	RANDOM	13 37	RANDOM	13 40	RANDOM
13 41	RANDOM	13 42	RANDOM	13 45	RANDOM
13 47	RANDOM	13 49	RANDOM	13 52	RANDOM
13 53	RANDOM	13 56	RANDOM	13 57	RANDOM
13 61	RANDOM	13 62	RANDOM	13 64	RANDOM
13 67	RANDOM	13 68	RANDOM	13 74	RANDOM
13 75	RANDOM	13 76	RANDOM	13 78	RANDOM
13 81	RANDOM	13 82	RANDOM	13 86	RANDOM
13 89	RANDOM	13 90	RANDOM	14 4	RANDOM
14 7	RANDOM	14 16	RANDOM	14 17	RANDOM
14 25	RANDOM	14 28	RANDOM	14 29	RANDOM
14 30	RANDOM	14 32	RANDOM	14 33	RANDOM
14 35	RANDOM	14 36	RANDOM	14 38	RANDOM
14 42	RANDOM	14 46	RANDOM	14 63	RANDOM
14 64	RANDOM	14 65	RANDOM	14 66	RANDOM
14 68	RANDOM	14 70	RANDOM	14 72	RANDOM
14 73	RANDOM	14 75	RANDOM	14 78	RANDOM
14 79	RANDOM	14 80	RANDOM	14 82	RANDOM
14 84	RANDOM	14 88	RANDOM	14 89	RANDOM
15 4	RANDOM	15 5	RANDOM	15 6	RANDOM
15 8	RANDOM	15 11	RANDOM	15 12	RANDOM
15 16	RANDOM	15 23	RANDOM	15 26	RANDOM
15 27	RANDOM	15 31	RANDOM	15 35	RANDOM
15 45	RANDOM	15 50	RANDOM	15 51	RANDOM
15 55	RANDOM	15 56	RANDOM	15 64	RANDOM
15 67	RANDOM	15 71	RANDOM	15 74	RANDOM
15 77	RANDOM	15 80	RANDOM	15 81	RANDOM
15 85	RANDOM	15 86	RANDOM	15 89	RANDOM
16 7	RANDOM	16 8	RANDOM	16 10	RANDOM
16 13	RANDOM	16 14	RANDOM	16 16	RANDOM
16 19	RANDOM	16 22	RANDOM	16 28	RANDOM
16 36	RANDOM	16 37	RANDOM	16 40	RANDOM
16 44	RANDOM	16 48	RANDOM	16 50	RANDOM
16 52	RANDOM	16 54	RANDOM	16 60	RANDOM
16 64	RANDOM	16 65	RANDOM	16 70	RANDOM
16 72	RANDOM	16 73	RANDOM	16 77	RANDOM
16 79	RANDOM	16 81	RANDOM	16 83	RANDOM
16 86	RANDOM	17 6	RANDOM	17 8	RANDOM
17 10	RANDOM	17 12	RANDOM	17 13	RANDOM
17 15	RANDOM	17 19	RANDOM	17 21	RANDOM
17 22	RANDOM	17 23	RANDOM	17 25	RANDOM
17 27	RANDOM	17 28	RANDOM	17 29	RANDOM

Carolina Power & Light
H. B. Robinson Unit 2
Component: S/G #C
Outage: September 1993
Data Set: Bobbin Probe

Date: 10/20/93
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LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
17 35	RANDOM	17 36	RANDOM	17 38	RANDOM
17 47	RANDOM	17 50	RANDOM	17 59	RANDOM
17 62	RANDOM	17 64	RANDOM	17 65	RANDOM
17 69	RANDOM	17 78	RANDOM	17 79	RANDOM
17 81	RANDOM	17 85	RANDOM	17 86	RANDOM
17 87	RANDOM	18 5	RANDOM	18 12	RANDOM
18 17	RANDOM	18 19	RANDOM	18 20	RANDOM
18 24	RANDOM	18 27	RANDOM	18 30	RANDOM
18 34	RANDOM	18 36	RANDOM	18 46	RANDOM
18 50	RANDOM	18 51	RANDOM	18 52	RANDOM
18 54	RANDOM	18 56	RANDOM	18 62	RANDOM
18 65	RANDOM	18 66	RANDOM	18 68	RANDOM
18 69	RANDOM	18 70	RANDOM	18 75	RANDOM
18 81	RANDOM	18 83	RANDOM	18 84	RANDOM
18 87	RANDOM	19 6	PREV. IND.	19 8	RANDOM
19 10	RANDOM	19 11	RANDOM	19 13	RANDOM
19 14	RANDOM	19 22	RANDOM	19 24	RANDOM
19 27	RANDOM	19 33	RANDOM	19 35	RANDOM
19 37	RANDOM	19 39	RANDOM	19 44	RANDOM
19 49	RANDOM	19 57	RANDOM	19 59	RANDOM
19 60	RANDOM	19 62	RANDOM	19 65	RANDOM
19 68	RANDOM	19 71	RANDOM	19 77	RANDOM
19 80	RANDOM	19 81	RANDOM	19 83	RANDOM
19 87	RANDOM	20 7	RANDOM	20 15	RANDOM
20 16	RANDOM	20 17	RANDOM	20 19	RANDOM
20 21	RANDOM	20 22	RANDOM	20 25	RANDOM
20 34	RANDOM	20 35	RANDOM	20 37	RANDOM
20 38	RANDOM	20 40	RANDOM	20 41	RANDOM
20 43	RANDOM	20 47	RANDOM	20 48	RANDOM
20 50	RANDOM	20 51	RANDOM	20 56	RANDOM
20 57	RANDOM	20 58	RANDOM	20 60	RANDOM
20 61	RANDOM	20 65	RANDOM	20 66	RANDOM
20 70	RANDOM	20 72	RANDOM	20 74	RANDOM
20 76	RANDOM	20 77	RANDOM	20 79	RANDOM
20 80	RANDOM	20 82	RANDOM	20 83	RANDOM
20 84	RANDOM	20 87	RANDOM	21 7	RANDOM
21 8	RANDOM	21 12	RANDOM	21 13	RANDOM
21 15	RANDOM	21 21	RANDOM	21 25	RANDOM
21 27	RANDOM	21 30	RANDOM	21 33	RANDOM
21 35	RANDOM	21 40	RANDOM	21 42	RANDOM
21 50	RANDOM	21 52	RANDOM	21 54	RANDOM
21 62	RANDOM	21 64	RANDOM	21 66	RANDOM
21 72	RANDOM	21 77	RANDOM	21 80	RANDOM
21 82	RANDOM	21 85	RANDOM	22 7	RANDOM
22 17	RANDOM	22 20	RANDOM	22 21	RANDOM
22 23	RANDOM	22 28	RANDOM	22 32	RANDOM
22 34	RANDOM	22 37	RANDOM	22 44	RANDOM
22 49	RANDOM	22 57	RANDOM	22 64	RANDOM
22 65	RANDOM	22 67	RANDOM	22 69	RANDOM
22 70	RANDOM	22 71	RANDOM	22 74	RANDOM
22 80	RANDOM	22 83	RANDOM	22 84	RANDOM
22 85	RANDOM	23 11	RANDOM	23 13	RANDOM
23 14	RANDOM	23 15	RANDOM	23 17	RANDOM
23 22	RANDOM	23 23	RANDOM	23 25	RANDOM
23 26	RANDOM	23 27	RANDOM	23 28	RANDOM
23 30	RANDOM	23 36	RANDOM	23 41	RANDOM
23 42	RANDOM	23 45	RANDOM	23 47	RANDOM

LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
23 48	RANDOM	23 50	RANDOM	23 57	RANDOM
23 61	RANDOM	23 68	RANDOM	23 71	RANDOM
23 78	RANDOM	23 85	RANDOM	24 8	RANDOM
24 11	RANDOM	24 29	RANDOM	24 32	RANDOM
24 40	RANDOM	24 42	RANDOM	24 43	RANDOM
24 52	RANDOM	24 56	RANDOM	24 57	RANDOM
24 59	RANDOM	24 60	RANDOM	24 63	RANDOM
24 65	RANDOM	24 73	RANDOM	24 80	RANDOM
24 83	RANDOM	25 9	RANDOM	25 10	RANDOM
25 11	RANDOM	25 15	RANDOM	25 17	RANDOM
25 25	RANDOM	25 27	RANDOM	25 29	RANDOM
25 36	RANDOM	25 37	RANDOM	25 44	RANDOM
25 46	RANDOM	25 55	RANDOM	25 57	RANDOM
25 58	RANDOM	25 59	RANDOM	25 61	RANDOM
25 64	RANDOM	25 66	RANDOM	25 68	RANDOM
25 69	RANDOM	25 73	RANDOM	25 74	RANDOM
25 76	RANDOM	25 77	RANDOM	25 80	RANDOM
25 81	RANDOM	25 82	RANDOM	25 83	RANDOM
25 84	RANDOM	26 10	RANDOM	26 12	RANDOM
26 17	RANDOM	26 25	RANDOM	26 31	RANDOM
26 40	RANDOM	26 41	RANDOM	26 58	RANDOM
26 60	RANDOM	26 62	RANDOM	26 64	RANDOM
26 65	RANDOM	26 67	RANDOM	26 68	RANDOM
26 71	RANDOM	26 78	RANDOM	26 81	RANDOM
26 82	RANDOM	27 13	RANDOM	27 16	RANDOM
27 18	RANDOM	27 19	RANDOM	27 20	RANDOM
27 22	RANDOM	27 29	RANDOM	27 33	RANDOM
27 34	RANDOM	27 35	RANDOM	27 37	RANDOM
27 39	RANDOM	27 41	RANDOM	27 42	RANDOM
27 44	RANDOM	27 45	RANDOM	27 49	RANDOM
27 51	RANDOM	27 52	RANDOM	27 53	RANDOM
27 55	RANDOM	27 57	RANDOM	27 59	RANDOM
27 61	RANDOM	27 67	RANDOM	27 69	RANDOM
27 72	RANDOM	27 74	RANDOM	27 77	RANDOM
27 80	RANDOM	27 81	RANDOM	28 12	RANDOM
28 20	RANDOM	28 24	RANDOM	28 26	RANDOM
28 28	RANDOM	28 33	RANDOM	28 35	RANDOM
28 40	RANDOM	28 52	RANDOM	28 54	RANDOM
28 56	RANDOM	28 69	RANDOM	28 70	RANDOM
28 71	RANDOM	28 73	RANDOM	28 74	RANDOM
28 76	RANDOM	28 77	RANDOM	29 12	RANDOM
29 13	RANDOM	29 22	RANDOM	29 23	RANDOM
29 24	RANDOM	29 28	RANDOM	29 32	RANDOM
29 33	RANDOM	29 34	RANDOM	29 35	RANDOM
29 37	RANDOM	29 38	RANDOM	29 39	RANDOM
29 46	RANDOM	29 49	RANDOM	29 52	RANDOM
29 54	RANDOM	29 55	RANDOM	29 56	RANDOM
29 59	RANDOM	29 61	RANDOM	29 63	RANDOM
29 66	RANDOM	29 73	RANDOM	29 77	RANDOM
30 13	RANDOM	30 22	RANDOM	30 24	RANDOM
30 28	RANDOM	30 29	RANDOM	30 31	RANDOM
30 36	RANDOM	30 37	RANDOM	30 38	RANDOM
30 44	RANDOM	30 45	RANDOM	30 48	RANDOM
30 50	RANDOM	30 51	RANDOM	30 52	RANDOM
30 55	RANDOM	30 59	RANDOM	30 60	RANDOM
30 65	RANDOM	30 66	RANDOM	30 68	RANDOM
30 69	RANDOM	30 72	RANDOM	30 73	RANDOM

LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
30	77	RANDOM	30	80	RANDOM
31	15	RANDOM	31	16	RANDOM
31	19	RANDOM	31	21	RANDOM
31	24	RANDOM	31	25	RANDOM
31	27	RANDOM	31	37	RANDOM
31	40	RANDOM	31	41	RANDOM
31	43	RANDOM	31	47	RANDOM
31	57	RANDOM	31	59	RANDOM
31	66	RANDOM	31	71	RANDOM
31	78	RANDOM	31	79	RANDOM
32	22	RANDOM	32	24	RANDOM
32	30	RANDOM	32	35	RANDOM
32	38	RANDOM	32	41	RANDOM
32	43	RANDOM	32	44	RANDOM
32	52	RANDOM	32	54	RANDOM
32	58	RANDOM	32	59	RANDOM
32	76	RANDOM	32	77	RANDOM
33	17	RANDOM	33	18	RANDOM
33	22	RANDOM	33	25	RANDOM
33	27	RANDOM	33	29	RANDOM
33	35	RANDOM	33	38	RANDOM
33	47	RANDOM	33	48	RANDOM
33	52	RANDOM	33	53	RANDOM
33	60	RANDOM	33	65	RANDOM
33	72	RANDOM	33	73	RANDOM
33	77	RANDOM	34	19	RANDOM
34	23	RANDOM	34	24	RANDOM
34	30	RANDOM	34	32	RANDOM
34	35	RANDOM	34	38	RANDOM
34	41	RANDOM	34	42	RANDOM
34	50	RANDOM	34	51	RANDOM
34	55	RANDOM	34	57	RANDOM
34	69	RANDOM	34	74	RANDOM
35	19	RANDOM	35	20	RANDOM
35	24	RANDOM	35	25	RANDOM
35	29	RANDOM	35	30	RANDOM
35	37	RANDOM	35	38	RANDOM
35	40	RANDOM	35	41	RANDOM
35	46	RANDOM	35	47	RANDOM
35	51	RANDOM	35	54	RANDOM
35	61	RANDOM	35	63	RANDOM
35	67	RANDOM	35	68	RANDOM
35	70	RANDOM	35	73	RANDOM
36	22	RANDOM	36	23	RANDOM
36	26	RANDOM	36	31	RANDOM
36	37	RANDOM	36	38	RANDOM
36	42	RANDOM	36	53	RANDOM
36	69	RANDOM	37	21	RANDOM
37	26	RANDOM	37	28	RANDOM
37	34	RANDOM	37	39	RANDOM
37	53	RANDOM	37	54	RANDOM
37	57	RANDOM	37	58	RANDOM
37	64	RANDOM	37	72	RANDOM
38	25	RANDOM	38	30	RANDOM
38	35	RANDOM	38	38	RANDOM
38	40	RANDOM	38	41	RANDOM
38	43	RANDOM	38	44	RANDOM
31	14	RANDOM	31	18	RANDOM
31	22	RANDOM	31	26	RANDOM
31	39	RANDOM	31	42	RANDOM
31	49	RANDOM	31	60	RANDOM
31	76	RANDOM	32	16	RANDOM
32	28	RANDOM	32	37	RANDOM
32	42	RANDOM	32	47	RANDOM
32	57	RANDOM	32	72	RANDOM
33	16	RANDOM	33	20	RANDOM
33	26	RANDOM	33	34	RANDOM
33	45	RANDOM	33	51	RANDOM
33	59	RANDOM	33	68	RANDOM
33	74	RANDOM	34	21	RANDOM
34	27	RANDOM	34	33	RANDOM
34	40	RANDOM	34	46	RANDOM
34	53	RANDOM	34	67	RANDOM
34	76	RANDOM	35	22	RANDOM
35	28	RANDOM	35	32	RANDOM
35	39	RANDOM	35	45	RANDOM
35	50	RANDOM	35	60	RANDOM
35	65	RANDOM	35	69	RANDOM
36	19	RANDOM	36	24	RANDOM
36	36	RANDOM	36	40	RANDOM
36	67	RANDOM	37	24	RANDOM
37	29	RANDOM	37	41	RANDOM
37	55	RANDOM	37	62	RANDOM
38	24	RANDOM	38	32	RANDOM
38	39	RANDOM	38	42	RANDOM
38	46	RANDOM			

LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
38 48	RANDOM	38 49	RANDOM	38 51	RANDOM
38 52	RANDOM	38 54	RANDOM	38 62	RANDOM
38 63	RANDOM	38 65	RANDOM	38 66	RANDOM
39 26	RANDOM	39 28	RANDOM	39 36	RANDOM
39 37	RANDOM	39 43	RANDOM	39 45	RANDOM
39 46	RANDOM	39 51	RANDOM	39 53	RANDOM
39 55	RANDOM	39 56	RANDOM	39 58	RANDOM
39 59	RANDOM	39 63	RANDOM	39 65	RANDOM
39 67	RANDOM	40 27	RANDOM	40 29	RANDOM
40 30	RANDOM	40 36	RANDOM	40 37	RANDOM
40 38	RANDOM	40 39	RANDOM	40 40	RANDOM
40 42	RANDOM	40 44	RANDOM	40 47	RANDOM
40 48	RANDOM	40 50	RANDOM	40 53	RANDOM
40 57	RANDOM	40 59	RANDOM	40 60	RANDOM
40 61	RANDOM	40 62	RANDOM	40 63	RANDOM
40 65	RANDOM	40 66	RANDOM	41 29	RANDOM
41 32	RANDOM	41 34	RANDOM	41 35	RANDOM
41 38	RANDOM	41 40	RANDOM	41 41	RANDOM
41 49	RANDOM	41 52	RANDOM	41 54	RANDOM
41 55	RANDOM	41 56	RANDOM	41 60	RANDOM
42 32	RANDOM	42 33	RANDOM	42 35	RANDOM
42 39	RANDOM	42 40	RANDOM	42 41	RANDOM
42 43	RANDOM	42 44	RANDOM	42 45	RANDOM
42 46	RANDOM	42 52	RANDOM	42 54	RANDOM
42 55	RANDOM	42 57	RANDOM	42 62	RANDOM
43 33	RANDOM	43 43	RANDOM	43 45	RANDOM
43 49	RANDOM	43 50	RANDOM	43 52	RANDOM
43 53	RANDOM	43 56	RANDOM	43 59	RANDOM
44 38	RANDOM	44 39	RANDOM	44 47	RANDOM
44 50	RANDOM	44 52	RANDOM	45 42	RANDOM

Number of Tubes:

1,116

Carolina Power & Light
H. B. Robinson Unit 2
Component: S/G #A
Outage: September 1993
Data Set: MBM Exam

Date: 10/20/93
Page: 1

LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
6 66	MBM EXAM	9 74	MBM EXAM	21 49	MBM EXAM
22 69	MBM EXAM	24 68	MBM EXAM	25 13	MBM EXAM
26 25	MBM EXAM	27 55	MBM EXAM	27 58	MBM EXAM
27 62	MBM EXAM	28 27	MBM EXAM	28 44	MBM EXAM
28 47	MBM EXAM	28 56	MBM EXAM	29 29	MBM EXAM
29 35	MBM EXAM	29 38	MBM EXAM	30 71	MBM EXAM
36 60	MBM EXAM	40 32	MBM EXAM	41 58	MBM EXAM
43 43	MBM EXAM				

Number of Tubes:

22

Carolina Power & Light
H. B. Robinson Unit 2
Component: S/G #B
Outage: September 1993
Data Set: MBM Exam

Date: 10/20/93
Page: 1

LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
7 51	MBM EXAM	9 3	MBM EXAM	9 9	MBM EXAM
9 26	MBM EXAM	11 16	MBM EXAM	11 45	MBM EXAM
12 26	MBM EXAM	12 31	MBM EXAM	12 38	MBM EXAM
13 3	MBM EXAM	13 5	MBM EXAM	13 69	MBM EXAM
14 21	MBM EXAM	14 22	MBM EXAM	16 64	MBM EXAM
17 22	MBM EXAM	17 47	MBM EXAM	17 56	MBM EXAM
18 14	MBM EXAM	21 53	MBM EXAM	21 57	MBM EXAM
24 49	MBM EXAM	26 62	MBM EXAM	26 63	MBM EXAM
27 14	MBM EXAM	27 48	MBM EXAM	27 61	MBM EXAM
28 40	MBM EXAM	28 45	MBM EXAM	29 31	MBM EXAM
29 51	MBM EXAM	31 39	MBM EXAM	33 63	MBM EXAM
37 30	MBM EXAM	38 24	MBM EXAM	38 46	MBM EXAM
41 30	MBM EXAM				

Number of Tubes:

37

Carolina Power & Light
H. B. Robinson Unit 2
Component: S/G #C
Outage: September 1993
Data Set: MBM Exam

Date: 10/20/93
Page: 1

LIST OF SCHEDULED EXAMS

Row/Col	Description	Row/Col	Description	Row/Col	Description
12 40	MBM EXAM	14 24	MBM EXAM	15 43	MBM EXAM
19 47	MBM EXAM	19 52	MBM EXAM	20 70	MBM EXAM
22 43	MBM EXAM	24 47	MBM EXAM	24 50	MBM EXAM
24 65	MBM EXAM	27 30	MBM EXAM	28 27	MBM EXAM
28 45	MBM EXAM	31 16	MBM EXAM	34 37	MBM EXAM
34 39	MBM EXAM	34 48	MBM EXAM	36 36	MBM EXAM
37 24	MBM EXAM	37 29	MBM EXAM	38 40	MBM EXAM

Number of Tubes:

21

CAROLINA POWER AND LIGHT COMPANY
H. B. ROBINSON SEG PLANT

SPECIAL PROCEDURE
SP-1240
STEAM GENERATOR EDDY CURRENT
TESTING DURING RFO 15

REVISION 0

Effective Date 9/24/93

Expiration Date 3/23/94

RECOMMENDED BY: William J. Zett 9/15/93
Manager - NSSS Date

APPROVED BY: Samuel P. Cleary 21 SEPT 93
Manager - Technical Support Date

CONTROLLED
RECIPIENT
ID 307

LIST OF EFFECTIVE PAGES

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8.5	Control of Eddy Current Data for Use with Multiforth or Eddynet Acquisition Systems
8.6	Test and Equipment Accountability
8.7	Procedure Review and Certification Form

1.0

PURPOSE

1.1

The purpose of this procedure is to provide guidance for Eddy Current inspection of the RNP Steam Generator tubes. Specific iterations/topics covered within this procedure include:

- Installation of SG nozzle covers.
- Installation and checkout of the SG remote manipulator.
- Actual performance of SG Eddy Current testing, including analysis guidelines and control of data.

The NSSS contractor (ABB/CE has been tasked with set up and performance of Eddy Current testing of the RNP Steam Generators during RFO 15. Generally, this SP controls Eddy Current testing and related activities by incorporating the pertinent vendor's procedures (see Attachments 8.1 through 8.6). Generally, the vendor procedures utilized within this procedure are organized in chronological order. However, several of these vendor procedures are for both installation and restoration of a given evolution (i.e., installation and removal of nozzle dams). Therefore, this special procedure is not intended to be performed strictly in the order in which the procedure performance sections or Attachments are presented. Within the constraints listed in Section 4 (Precautions and Limitations) these sections are to be performed in the order which best supports the Eddy Current test effort.

2.0

REFERENCES

2.1

Westinghouse Vertical Steam Generator Technical Manual
(CP&L # 728-208-63)

2.2

PLP-037, "Conduct of Infrequently Performed Tests and Evolutions"

2.3

AG&P 7-02, RNP Outage Management Manual

2.4

RNP Technical Specification 4.2, "Primary System Surveillance"

3.0

PREREQUISITES

3.1

The unit is in cold shutdown for scheduled refueling operations.

3.0 PREREQUISITES (Continued)

3.2 A valid RWP has been obtained for work to be performed in the Radiation Control Area.

3.3 This revision is the latest revision and has been verified against the Revision Status List.

Samuel A. Shock 9-29-93
Test Coordinator (Test Technician) Date

3.4 The Shift Supervisor has been appraised of the scope of this procedure, and has given his permission to proceed under its direction. Shaw 9/29/93
Shift Supervisor Date

3.5 This procedure has been evaluated against the requirements of PLP-037; that review has determined that PLP-037 is not applicable to this procedure.

3.6 Work controlled by this procedure is subject to the requirements of the Outage Management Manual, (AG&P 7-02).

4.0 PRECAUTIONS AND LIMITATIONS

4.1 The principles of ALARA shall be used when planning and performing work in the Radiation Control Area.

4.2 Steps not applicable shall be marked "N/A".

4.3 The performance of this procedure must be coordinated with other plant evolutions such that the minimum equipment operability requirements of Technical Specifications are met.

4.4 The Steam Generators are not specifically listed as being Foreign Material Exclusion Areas by PLP-047. However, strict materials accountability is required for all work in the SGs and is governed by CE procedure STD-CFS-059, Rev. 2 (Attachment 1).

To preclude the introduction of foreign material into the RCS, nozzle covers will be installed in the Steam Generator channel heads prior to introduction of any other tools, equipment, components, etc. These will remain installed until all work is done and tools, equipment, etc., are removed from the SGs. In general, these covers are the first items into the SGs and the last items to be removed.

5.0 SPECIAL TOOLS AND EQUIPMENT

5.1 All special tools and equipment are as noted in the attached CE procedure(s).

6.0 ACCEPTANCE CRITERIA

6.1 The work accomplished via this SP is largely defined and controlled by the ABB/CE procedures incorporated within (see attachments). Acceptance criteria relevant to this work is as specified within that (those) CE procedure(s). Specific Eddy Current test requirements are also delineated within Technical Specification 4.2. These requirements are not repeated herein, but the System Engineer shall resolve the test effort to Technical Specification requirements within the comments section on the Test Review and Certification Form.

7.0 PROCEDURE

INITIALS

7.1 Initial Conditions

7.1.1 Ensure all Prerequisites are met and all Precautions and Limitations are reviewed and understood.

DD 9/29/93
Tech.

7.2 Setup/Performance of SG Eddy Current Testing

7.2.1 Verify that SG Primary Manway covers are removed and nozzle covers are installed. (Ref. Attachment 8.1 for installation of nozzle covers).

DD 9/30/93
Tech.

7.2.2 Install SM-20 tool manipulator in accordance with Attachment 8.2.

DD 9/30/93
Tech.

7.2.3 Conduct Eddy Current testing in accordance with Attachments 8.3, 8.4, 8.5 and 8.6.

DD 10/4/93
Tech.

7.2.4 Remove the SM-20 tool manipulator in accordance with Attachment 8.2.

DD 10/4/93
Tech.

7.2.5 Remove the SG nozzle covers in accordance with Attachment 8.1.

DD 10/5/93
Tech.

7.0 PROCEDURE (Continued)

INITIALS

7.2.6 Review vendor Steam Generator Eddy Current test reports and enter appropriate comments in Attachment 8.7, Test Review and Certification Form.

SAS 10-6-93
Tech.

7.2.7 System Engineer to review Steam Generator Eddy Current test reports and enter comments on Attachment 8.7, Test Review and Certification Form. These comments must resolve, as a minimum, compliance with Technical Specification 4.2 requirements.

RS 12/7/83
Tech.

7.3 Records

7.3.1 Upon completion of applicable steps of this special procedure (including attachments), it shall be transmitted to the records vault for storage as a permanent record under file number 3005.

8.0 ATTACHMENTS

8.1 Installation and Removal of Temporary Nozzle Covers

8.2 Installation, Calibration and Removal of SM-10/20 Manipulator Utilizing the Eddynet System

8.3 Eddy Current Examination of Nonferromagnetic Steam Generator Tubing Using MIZ-18A Equipment

8.4 Eddy Current Analysis Procedure (Evaluation of Westinghouse Steam Generator Tubing)

8.5 Control of Eddy Current Data with Multiforth or Eddynet Acquisition Systems

8.6 Tool and Equipment Accountability

8.7 Procedure Review and Certification Form

PROCEDURE FOR THE INSTALLATION AND REMOVAL
OF TEMPORARY NOZZLE COVERS

H.B. ROBINSON

UNIT TWO

PROCEDURE NO.

ROB-410-008

OUTAGE SERVICES DEPARTMENT
NUCLEAR POWER SYSTEMS
ABB/COMBUSTION ENGINEERING
WINDSOR, CONNECTICUT
CHATTANOOGA, TENNESSEE

PREPARED BY: Leonard A. Foster DATE: 9/12/90
APPROVED BY: Darrell D. Weber DATE: 9/11/90
E.T. Level III
APPROVED BY: James D. Judd DATE: 9/12/90
Quality Assurance
APPROVED BY: Ray N. Brown DATE: 9-13-90
Nondestructive Program Manager Examination Services
ORIGINAL ISSUE DATE: April 3, 1987 REVISION: 1
DATE: 9-13-90

08-11-1993 10:08AM FROM ABB REACTOR VESSEL GROUP TO 918033395259 P.03
PROCEDURE NO.: ROB-410-008
REVISION NO: 1
PAGE: 2 OF 5

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2.0	REFERENCES
3.0	PERSONNEL REQUIREMENTS
4.0	PRECAUTIONS AND PREREQUISITIES
5.0	EQUIPMENT
6.0	INSTALLATION OF NOZZLE COVERS
7.0	CLEANLINESS VERIFICATION
8.0	NOZZLE COVER REMOVAL

PROCEDURE NO.: ROB-410-008

REVISION NO: 1

PAGE: 3 OF 5

Attachment 8.1

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1.0 OBJECTIVE

This procedure will establish a set of guidelines to be utilized by the nozzle cover worker with the intent of providing a safe and consistent method for installing and removing nozzle covers in the channel heads of the steam generators.

NOTE: It should be noted that the nozzle cover is the first item into the channel head and the last item removed from the channel head.

2.0 REFERENCES

2.1 Combustion Engineering, Inc. Nuclear Power Businesses Nuclear QA Manual.

2.2 Combustion Engineering, Inc. Quality Procedures (QAP).

2.3 Combustion Engineering, Inc. Power Systems Group, Operating Procedures Manual.

3.0 PERSONNEL REQUIREMENTS

The personnel performing nozzle cover installations will have received documented training and mock-up practice prior to performing installations.

4.0 PRECAUTIONS AND PREREQUISITES

4.1 It is expected that very high levels of radiation may be encountered inside and adjacent to the primary head of the steam generators. Utmost care shall be taken in the setup to minimize personnel exposure to ionizing radiation and radioactive contamination.

4.2 Personnel engaged in the nozzle cover installation shall be indoctrinated in the radiation protection rules, guidelines, protective clothing and equipment requirements in effect at the plant site as required.

4.3 The steam generator shall be open on the primary side dried and ventilated in such a manner as to provide proper temperature and humidity for personnel safety and comfort to prevent heat and moisture damage to equipment.

4.4 The secondary side of the steam generator shall be cooled down to the extent that the temperature of the tubes and tube sheet are 120 deg. F or less.

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REVISION NO: 1

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Attachment 8.1

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- 4.5 Provisions must be made for personnel and equipment entry into and exit from the steam generator (i.e., ladders, scaffolds or staging, platforms, lighting inside and outside the steam generator, breathing air supply, 120 VAC electricity, etc.).
- 4.6 Health Physics coverage shall be maintained at the steam generator during any personnel entry into the steam generator as required.
- 4.7 A communication system may be setup and operating between the control point and the steam generator platform.

5.0 EQUIPMENT

For installation and removal of nozzle covers the following equipment is required.

- 5.1 Nozzle covers - (1) for each nozzle to be covered.
- 5.2 Rope (lanyard) to tie off covers - (1) for each cover.
- 5.3 Safety light for inside generator.
- 5.4 Installation Pole.
- 5.5 Pully and tackle (optional).

6.0 INSTALLATION OF NOZZLE COVERS

- 6.1 Ensure that all equipment is at the work area and is in proper working condition.
- 6.2 Secure the safety light, then insert into the channel head through the manway opening to ensure proper lighting.
- 6.3 Secure one end of the lanyard to a safe supporting structure outside the generator. Secure the other end of the lanyard to the handle on the manway cover.

NOTE: Securing the cover in this fashion must be done to insure the cover does not fall deep into the nozzle.

- 6.4 In the folded position insert the cover into the channel head through the manway opening and unfold it before releasing.
- 6.5 Depending on accessibility around the manway and radiation level, the worker now has one of three installation options for installing the cover. The installation technique must be evaluated and pre-planned prior to starting the installation process.

- 6.5.1 Utilize a pole to invert the unfolded cover and push it into place over the nozzle.
- 6.5.2 Utilize a pully and tackle device clamped to the tubesheet from which the cover will be attached to a rope so as to lift the unfolded cover and lower it into place while guiding it with the long handle pole. After the nozzle cover is installed, remove the pully and tackle and secure the rope outside the generator.
- 6.5.3 Install the cover manually by entering the channel head through the manway opening. This is a generator entry and must be coordinated with Health Physics personnel.

7.0 CLEANLINESS VERIFICATION

The platform worker shall verify that all tools, equipment and debris is removed from the channel head prior to removing the nozzle cover. If any items are in the channel head, they must be removed prior to the nozzle cover removal.

8.0 NOZZLE COVER REMOVAL

- 8.1 Ensure the lanyard is still securely tied at both ends.
- 8.2 Using the rope and/or pole, pull the cover to the manway opening.
- 8.3 Reach through the manway and fold up the cover.
- 8.4 Pull the folded cover out of the manway.
- 8.5 Verify that no foreign object has been left in the channel head.

THE INSTALLATION, CALIBRATION AND REMOVAL
OF SM-10/20 MANIPULATOR
UTILIZING THE EDDYNET SYSTEM

H. B. ROBINSON NUCLEAR PLANT

PROCEDURE NO.

ROB-410-009, REV. 0

ABB COMBUSTION ENGINEERING NUCLEAR SERVICES

APPROVED BY:


Quality Operations

DATE:

3/10/93

APPROVED BY:


Cognizant Supervisor

DATE:

3-1-93

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1.0 OBJECTIVE

- 1.1 This procedure provides the general instruction for Installation, Calibration and Removal of the SM-10/20 Manipulator. Actions are the same for the SM-10 and the SM-20 except where noted.

2.0 REFERENCE

- 2.1 ZETEC SM-10/20 Installation and Operating Guide
- 2.2 NPB Nuclear Quality Assurance Manual, QAM-100, Third Edition, Revision 0.
- 2.3 Zetec EDDYNET Software revision's 18 and 20.

3.0 PREREQUISITE

- 3.1 Steam generator primary manway cover(s) and stud bolts have been removed (as required).
- 3.2 The steam generator shall be at an acceptable level of dryness. A Hepa system shall be installed and operating on one leg of the generator at all times.
- 3.3 Prior to installation, the steam generator channel heads, should be cooled down to a proper temperature to prevent heat damage to equipment (approximately 90 degrees F).
- 3.4 Provisions must be made for personnel and equipment entry into and exit from the steam generator (i.e., ladders, scaffolds, or staging platform, lighting inside and outside the steam generator, breathing air supply, 120 VAC electricity, etc.).
- 3.5 An area near the S/G suitable for the setup and installation of the equipment will be made available and cleared.
- 3.6 Nozzle covers have been installed over the hot and cold leg nozzles of opened channel heads (as required).
- 3.7 It is expected that very high levels of radiation will be encountered inside and adjacent to the primary head of the steam generators. Utmost care shall be taken in the set-up and performance of the examination to minimize personnel exposure to ionizing radiation and radioactive contamination.
- 3.8 Personnel engaged in the eddy current examination program shall be indoctrinated in the radiation protection rules, guidelines, protective clothing and equipment requirements in effect at the plant site.

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4.0 PROCEDURE: INSTALLATION AND SET-UP

4.1 General Outline

- 4.1.1 The installation and set-up for the SM-10/20 will involve hooking up fixture cables to the appropriate locations on the SM-10/20 control box; booting the EDDYNET ACQUISITION and FIXTURE CONTROL software; mounting the trunk assembly to the manway; setting an encoder offset; installing the arm assembly; installing the guide tube with conduit attached; leveling the arm assembly inside the steam generator; and calibrating the fixture.

4.2 Computer Interface

- 4.2.1 It is good practice to remove power from all instruments, with the exception of the controlling computer, when connecting or disconnecting cables.
- 4.2.2 The SM-10/20 can operate with or without the MIZ-18 eddy current instrument. When operating alone, connect the interface cable, P/N 5-8103, directly to the SM-10/20 "computer" connector. Connect another interface cable to the LAN BOX. The LAN BOX then uses two RG-58 cables, up to 600 feet each total length, one cable to connect to the EDDYNET system and one to connect to the system KILL switch.
- 4.2.3 When operating in conjunction with the MIZ-18, the SM-10/20 controller and the MIZ-18 are "daisy-chained" in series to the interface cable. The cable will attach to the "computer" connector of either instrument and a second cable will attach from the "auxillary" connector of the first instrument to the "computer" connector of the second instrument. Any length cable can separate the two instruments. The LAN BOX should be located near the MIZ-18 or the SM-10/20, the total length for RG-58 cable is 600 feet.

4.3 Fixture Interface

- 4.3.1 The SM-10/20 Controller can be located up to 100 feet from the fixture. It is connected with extension cables, which can be "daisy-chained" as required.
- 4.3.2 Connect the three connectors of the extension cable assembly, P/N 4-008005, to the encoder, motor, and trunk connectors on the SM-10/20. Connect the opposite end of the cable to the encoder and motor connectors on the fixture harness, and to the trunk connector, located on the manway mount.

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4.4 Video

- 4.4.1 Connect the video monitor with coaxial cable to the "monitor" connector on the controller. The fixture camera is connected via the motor connector.
- 4.4.2 Should it be required to use a camera separate from the one located on the fixture, an auxiliary camera input is available on the controller. When using this input, the fixture camera will need to be disconnected.

4.5 Powering Up

- 4.5.1 Assure that the 115/230 V selector plug is in the proper orientation.
- 4.5.2 Plug unit in. There is no power switch.
- 4.5.3 Plug LAN BOX in. There is no power switch. SM-10/20 is now ready for computer control.

4.6 Initial Check-Out

- 4.6.1 Apply power to all components of the system.
- 4.6.2 The system will display a flat grey screen when booted up and a HP Term window. Utilizing the mouse select EDDYNET MENU. The EDDYNET GOLBAL MENU and MENU BAR will appear.
- 4.6.3 Select ACQUISITION, SET LAN, type in Lan ID#, select USE.
- 4.6.4 Select ACQUISITION, FIXTURE CONTROL. This will Initilize control of the fixture.
- 4.6.5 Select TOOLS, ENABLE CONTROL. This will establish control of the fixture. Press the LAN RESET BUTTON.

Note: ENABLE CONTROL must be accomplished prior to any other control function.
- 4.6.6 Select FILE, MODIFY SETUP, enter values required, select USE after required values have been entered.
- 4.6.7 Select UTILITIES, GRAPHICS, the GENERATOR-FIXTURE LAYOUT window will be displayed.

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- 4.6.8 Using the LIFT, ARM and POLE utilizing the mouse, click on the appropriate arrow, ensure that the motors operate correctly. Verify proper camera focus with the guide tube prior to performing step 4.6.9.

NOTE: Normally this "check-out" sequence is done in an area away from the steam generators, and afterward the fixture is carried up to the platform for installation.

- 4.6.9 Fold the camera arm up over the pole, until it reaches its mechanical limit. To facilitate guide tube pick-up at a later time, it is critical to ensure that the arm is folded in such a way that it will be able to rotate towards the divider plate after installation (e.g., if the divider plate is to the left of the manway, the arm should be able to rotate clockwise from the mechanical stop; if the divider plate is to the right of the manway, the arm should be able to rotate counter-clockwise from the mechanical stop).

- 4.6.10 Operating the LAN BOX kill switch, will control the SM-10/20 as follows:

- A. All motor power supplies will turn off.
- B. All internal registers within the Controller will be reset to the motor off condition.

- 4.6.11 Remove AC power from SM-10/20 controller before disconnecting cables. The fixture cables can be disconnected at this point, and the fixture can be transported to the steam generator platform for installation.

4.7 Sequence of Installation of SM-10/20 Into Steam Generator

- 4.7.1 The sequence of installation steps is shown in Figures 1a through 7a for the SM-10 and Figures 1b through 6b for the SM-20.
- 4.7.2 SM-20: Loosen the two socket bolts. Determine which side of the trunk the divider plate is located on and swing the trunk until it touches the stop pin on the divider plate side. Re-tighten the two socket bolts.

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- 4.7.3 SM-10: Slide the trunk assembly through the manway (flat side down) until the manway mount reaches the manway (see Figure 1a).

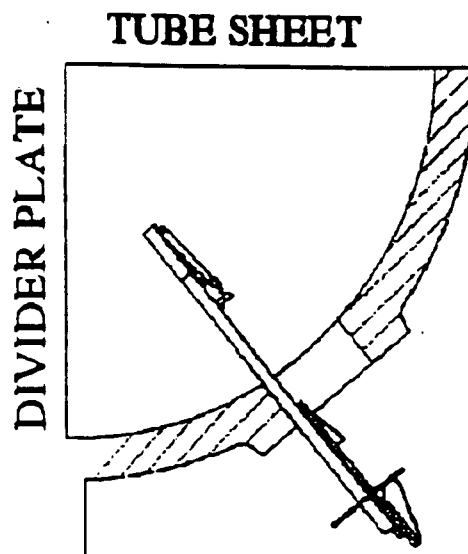


Figure 1a

- SM-20: Slide the trunk through the manway on its side using the stainless steel rail until the manway mount is flush with the manway flange (see Figure 1b).

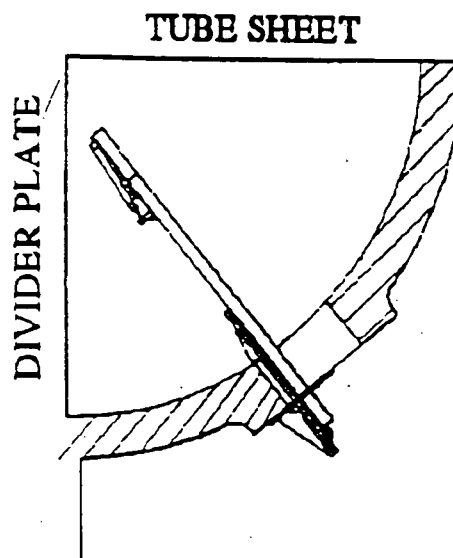


Figure 1b

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4.7.4 SM-10: Rotate the trunk 180° (flat side up). See Figure 2a.

SM-20: Rotate the trunk 90°. See Figure 2b.

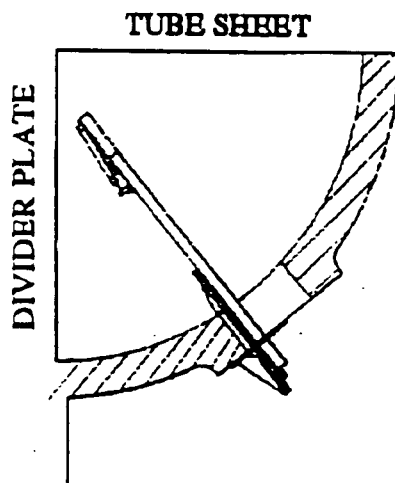


FIGURE 2a

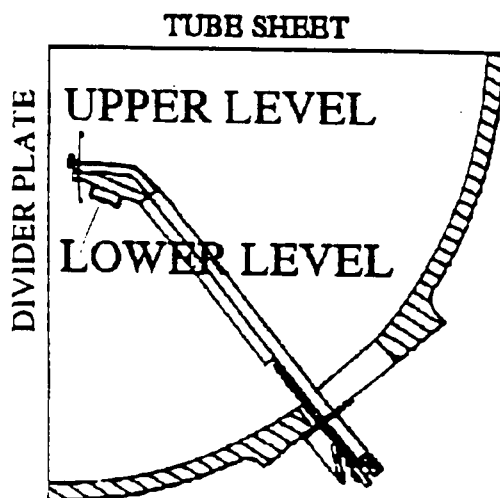
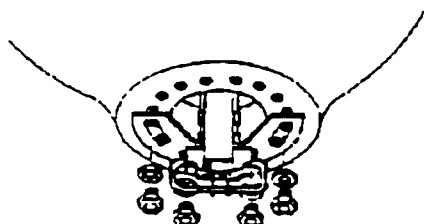


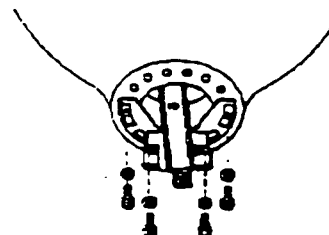
Figure 2b

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- 4.7.5 Install the four manway bolts and washers, and hand-tighten them so that the manway mount remains flush with the manway flange. See Figures 3 and 4.

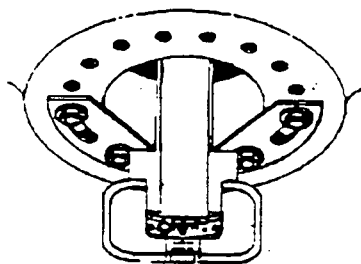


SM-10

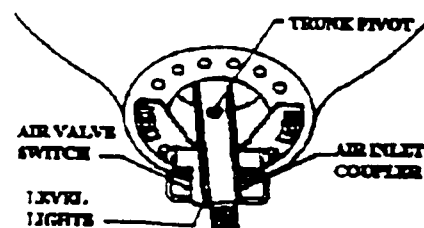


SM-20

Figure 3 a & b



SM-10



SM-20

Figure 4 a & b

- 4.7.6 Re-connect the trunk extension cable. Apply AC power to the SM-10/20 controller.
- 4.7.7 SM-10: Rotate the manway mount until the green light on the lower set of three indication lights comes on.
SM-20: Rotate the trunk a few degrees either way until the LOWER green light comes on.
- 4.7.8 Install the manway clamp approximately over the pivot point (see Figure 4), ensuring that the top of the clamp assembly securely contacts the curved surface of the manway. Adjust the clamp as necessary so that it fits quite firmly when the lever is pushed all the way up. Verify that the green light and trunk wheels are tight against the bottom of the manway

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4.7.9 Tighten the four manway bolts evenly, starting with the two bottom bolts, using a spanner or large screwdriver. The LOWER green light may flash on and off during this tightening process.

4.7.10 When the tightening is complete, the LOWER green light should be steady. If it is not, loosen the bolts, remove the clamp, and repeat steps 4.7.7, 4.7.8 and 4.7.9. The trunk is not correctly installed until the clamp is in, the bolts are tightened, and the LOWER green light is lit, and the trunk wheels are tight.

NOTE: NEVER fully tighten the manway bolts unless the manway clamp is securely installed. The clamp simulates stress, and provides support for the entire trunk.

4.7.11 SM-10: Remove manway clamp. The track assembly must now be moved far enough from the divider plate to allow the upper track to tilt to its level position. The track position is adjusted after loosening the three set screws located on the track increment scale above the lights. The track should be placed so that it rests against the divider plate, and then backed off enough distance so the upper track can reach a level state. This distance is about six (6) increments. Tighten the three set screws after track position is established. Make sure the green indicator light is still on. If not, then rotate the manway mount until the light comes on. The track position increment reading should be documented for future use.

SM-20: A level adjustment knob is provided at the manway end of the trunk for use in adjusting the level state of the upper platform on the trunk. Turn the knob to its maximum clockwise position. This puts the trunk in its uppermost position, and provides a red-light condition. (The trunk is brought down to a level mode after installing the arm assembly - step 4.7.25.

4.7.12 SM-20: Attach air line, 80 to 100 psi, to right side of trunk. Verify that the solenoid switch is in the unlocked position (down).

4.7.13 Select FILE, ARCHIVE, REMOVE SETUP.

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4.7.14 SM-10: Fold the arm up over the top of the pole and against the mechanical stop. The arm assembly should be folded such that when you reopen the arm from the pole, the arm moves towards the divider plate. Select TOOLS and then OFFSET. This will set an offset for the arm encoder. Estimate an offset for the pole encoder so that the picture on the display closely approximates the respective positions of the arm and pole inside the bowl. The offset for the pole encoder will be recalculated at the end of the calibration.

SM-20: If the arm is still rotated against its mechanical stop (see step 4.6.7), select TOOLS and then OFFSET. New variables will be stored to the Inspection Plan Map disk.

NOTE: If the arm is not against its mechanical stop, repeat the procedure(s) in Initial Check-Out until it is. An accurate calibration CANNOT be achieved unless the OFFSET has been selected while the arm is against its stop.

4.7.15 SM-10: Install the arm assembly on the track rails and insert it through the manway. Slide the arm assembly until it locks into place. See Figure 5a.

SM-20: Remove the manway clamp.

4.7.16 SM-10: Install the manway clamp. Go to step 4.7.18.

SM-20: Check to see that carriage assembly is rotated so that the lock pin will engage at the top of the trunk (see Figure 5b). Then engage the camera/arm wheels in the track and carefully slide the arm up the track. Ensure that the cables feed smoothly into the manway.

4.7.17 SM-20: When the camera arm reaches the lower latch, push the camera arm up just until the lower latch takes hold. Reposition yourself and push and lift the arm until the carriage is past the first latch. Let the arm slide back against the latch, coming to rest on the lower latch and raised up 3 to 4 inches on the end closest to manway. This will allow the arm to clear the bowl. Tug on the arm to ensure that the lower latch is supporting the camera arm (see Figure 5b). Push the ball in on the end of the arm using the utility stick.

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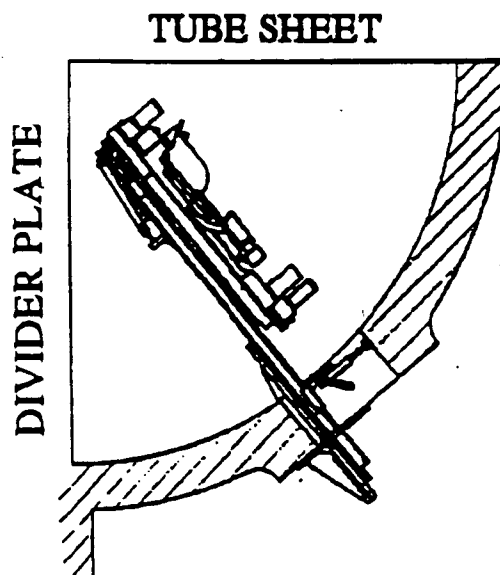


Figure 5a

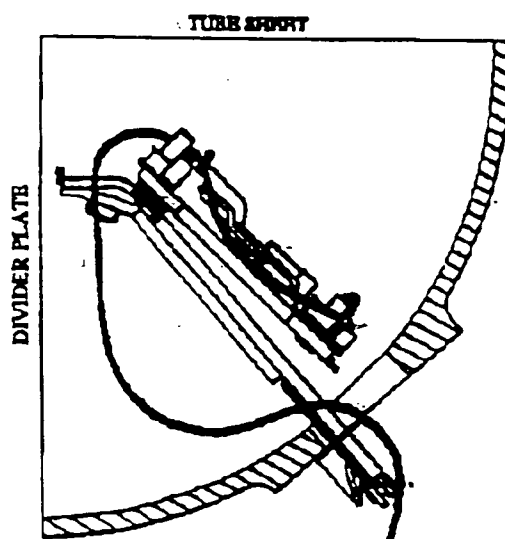


Figure 5b

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- 4.7.18 Position the fixture manually to receive guide tube.
- 4.7.19 When the fixture is in position, reach just inside the manway and attach the guide tube and conduit assembly. Insert enough cable and conduit into the steam generator to allow full movement of the fixture.
- 4.7.20 SM-10: Reposition the fixture to it's level position. The green light on the upper set of three indicating lights will come on when the upper track has reached a level state. The lights may flicker between red and green when it hits a level state. See Figures 6a and 7. Go to 4.7.26.

Caution: If the upper track has been raised manually above the level position, the upper track will raise until the guide tube makes contact with the tube sheet. The track must then be lowered below the level position before leveling may begin.
- 4.7.21 SM-20: Reposition manually, attach the utility stick to the ball stud located on the end of the camera arm. Be sure that the utility stick is securely attached.
- 4.7.22 SM-20: Push the arm up and over the curved ramp until it latches securely in the top latch. The camera arm should be parallel to the tubesheet.
- 4.7.23 SM-20: Activate the air solenoid to lock the camera arm in position. The switch should be toggled to the "LOCK" position.
- 4.7.24 SM-20: Remove the utility stick from the camera arm.
- 4.7.25 SM-20: Install the manway clamp. Pass sufficient cabling and conduit through the manway at this time (Figure 6b). We recommend running the cables and conduit on the side of the manway clamp which is opposite the divider plate. Then rotate the leveling knob counter-clockwise until the upper red light goes out and the upper green light comes on.
- 4.7.26 Proceed with the calibration process.

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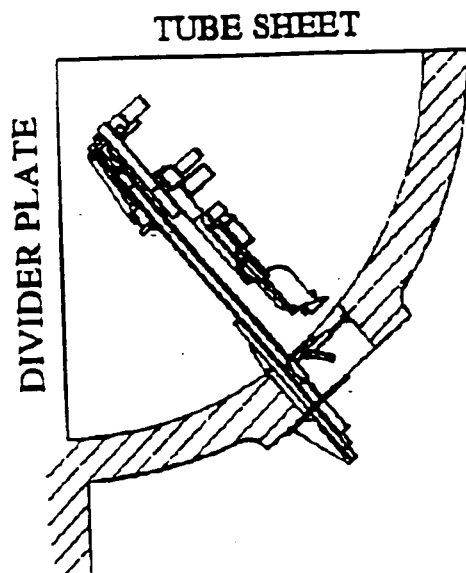


Figure 6a
TUBE SHEET

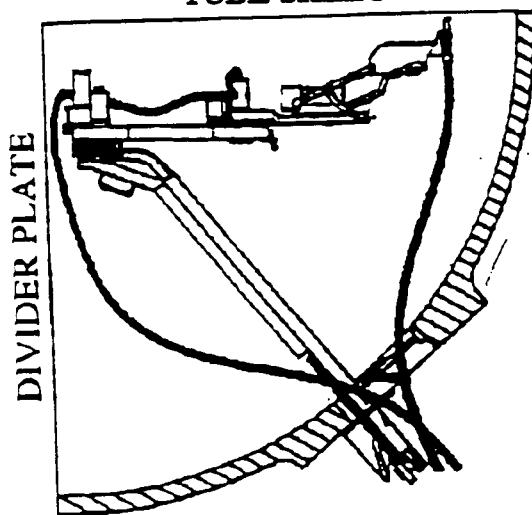


Figure 6b

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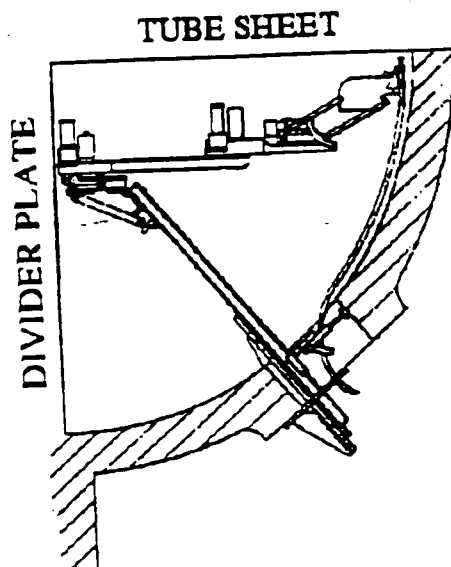


Figure 7

IBRATION

- 1 Select Lift up arrow, bring the guide tube closer to the tubesheet.
- 2 Using the ARM and POLE control buttons, position the guide tube under the first calibration point. When guide tube is directly under the tube select TOOLS, ADD CAL POINT. Enter the information required and select USE.
- 3 Position the guide tube under the second calibration point. Repeat steps in 5.2.
- 4 "Break" the arm by bringing the camera end out of the corner first.
- 5 Continue to the other side of the generator and position the guide tube under the third calibration point. Repeat steps in 5.2.
- 6 Position the guide tube under the fourth calibration point. Repeat steps in 5.2.
- 7 The computer computation will begin. The display will update and show the proper orientation of the fixture position.

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6.0 MANUAL OPERATION EXAMINATIONS

- 6.1 In the FIXTURE CONTROL WINDOW Select MODE, MANUAL, this will allow the operator to inspect each tube manually.
- 6.2 Input the required information for the tube to be tested using the appropriate arrow keys or keyboard input.
- 6.3 Select MOVE FIXTURE.
- 6.4 If required use the JOG buttons to center the guide tube under the tube to be examined.
- 6.5 Select NODE, FREE RUN for manual mode movement using the camera arm and pivot pole keys.

7.0 REMOVAL OF FIXTURE

- 7.1 Select NODE, FREE RUN for manual mode movement using the camera arm and pivot pole keys. Position the fixture for guide tube removal.

NOTE: If the arm is not on the correct side of the generator, you will need to break the arm.
- 7.2 When the fixture is in position, remove the manway clamp.

SM-10: Remove guide tube. Go to step 7.7.

SM-20: Attach the utility stick to the ball stud on the end of the camera arm. Turn air solenoid switch to the "UNLOCK" position.
- 7.3 SM-20: Release the upper latch by pulling the release trigger on the left side of the trunk. Lift the release trigger up so that it is locked in the release mode.
- 7.4 SM-20: Position yourself in such a way that you can use both hands on the utility stick to carefully roll the camera arm down to the lower latch.
- 7.5 SM-20: Remove the utility stick from the camera arm. Select NODE, FREE RUN, manually position the fixture so the guide tube is front of the manway.
- 7.6 SM-20: When the fixture has stopped, remove the guide tube.
- 7.7 Position the fixture for removal.

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- 7.8 Reach inside the manway and grasp the end of the pole (DO NOT HOLD IT ON TOP OF THE MOTOR OR YOU WILL PINCH YOUR HAND ON THE MANWAY WHEN IT COMES DOWN THE TRUNK). With the other hand, pull the lock release ring located on the right side of the trunk. Hold the release until the carriage is past the latch.
- 7.9 Slowly lower the camera arm down the trunk, making sure the cable does not hang up on the end of the trunk.
- 7.10 SM-10: Disconnect the fixture cables.

SM-20: Disengage the wheels from the track and set the camera arm aside. Remove trunk extension cable and air line.
- 7.11 Remove the manway bolts.
- 7.12 Rotate the trunk 90° (on edge), and slide it out of the generator.

8.0 EMERGENCY REMOVAL

The SM-10/20 fixture has been designed for removal in the event that a motor or gearbox should fail with the fixture installed.

- 8.1 Remove the manway clamp.
- 8.2 Align the camera arm assembly over the trunk.

SM-20: Attach the utility stick to the camera arm and release the upper latch (on the left side of the trunk). Turn the solenoid switch to the "UNLOCKED" position. It may be necessary to swing the arm from side to side to relax the air pistons.
- 8.3 Roll the camera arm down to the lower latch.

SM-20: Disconnect the utility stick from the camera arm.
- 8.4 If the lift assembly is up, it will be necessary to place the fixture into the approximate guide tube position. To remove the lift, loosen the draw bolt using a 1/4" nut driver. You may now slide the lift assembly away from the secondary pivot and remove it through the manway. Once the lift assembly has been removed, fold the fixture back up over the trunk.
- 8.5 Release the lower latch (on the right side of the trunk) and remove the camera arm from the steam generator.

NOTE: The primary and secondary rotation assemblies may be rotated manually in the event of a failure. If sufficient physical pressure is applied to either the primary pivot (which rotates the pole) or secondary pivot (which rotates the arm), the clutches will slip and allow free rotation of the pivot receiving the force.

MAJOR REVISION

PROCEDURE FOR MULTIFREQUENCY
EDDY CURRENT EXAMINATION OF NONFERROMAGNETIC
STEAM GENERATOR TUBING USING MIZ-18A EQUIPMENT

H.B. ROBINSON

UNIT 2

PROCEDURE NO.

ROB-410-004

OUTAGE SERVICES DEPARTMENT
ABB-COMBUSTION ENGINEERING NUCLEAR SERVICES
WINDSOR, CONNECTICUT
CHATTANOOGA, TENNESSEE

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Quality Assurance

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MAJOR REVISION

PROCEDURE FOR MULTIFREQUENCY
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1.0 OBJECTIVE:

Eddy current examination of steam generator tubing is performed to assess the reactor coolant pressure boundary integrity. The results of this examination are permanently recorded and used for comparison with the results of past and/or subsequent steam generator tubing inspections. The eddy current equipment operator is responsible for proper equipment interconnection equipment setup and collection of eddy current data. The shift supervisor will provide additional technical support during all these activities.

2.0 SCOPE:

This procedure, when used in accordance with the eddy current system setup and calibration parameters established in the specific appendices, meets the intent of the requirements of the USNRC Regulatory Guide 1.83 *Inservice Inspection of PWR Steam Generator Tubes*, Revision 1, dated July, 1975 and the ASME Boiler and Pressure Vessel Code, Section XI *Rules for Inservice Inspection of Nuclear Power Plant Components*, 1986 Edition.

3.0 REFERENCES:

- 3.1 ABB Combustion Engineering Nuclear Services, Quality Assurance Manual (QAM-100).
- 3.2 ABB Combustion Engineering Nuclear Power, Quality Assurance Procedure Manual (QAM-101).
- 3.3 Zetec DDA-4 System Operating Guideline.
- 3.4 Zetec Eddynet Acquisition Operation Guideline.
- 3.5 Zetec Operating Guide to System Disc 200/300 Series, Edition 18.7, latest revision.
- 3.6 Procedure for control of Eddy Current Data for use with Multiforth or EDDYNET Acquisition Systems, ROB-410-006, latest revision.
- 3.7 ASME Code Case N-401-1; Use of Digital Equipment.
- 3.8 Eddy Current Data Analysis Procedure Evaluation of Westinghouse Steam Generator Tubing, ROB-410-005, latest revision.

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4.0 PERSONNEL REQUIREMENTS:

ABB Combustion Engineering (ABB-CE) personnel shall be certified in accordance with ABB Combustion Engineering Procedure QAP 2.4 contained in Reference 3.2. If examiners are supplied by the purchaser, the purchaser will be responsible for their certification. In the event ABB-CE utilizes a subcontractor, ABB-CE will be responsible for certification either by examination to the requirements of QAP 2.4 or by auditing and accepting the subcontractor(s) written practice.

- 4.1 A Level I may perform specific calibrations and specific tests according to written instructions (procedure), and record the results. He shall receive the necessary guidance or supervision from a certified ET Level II or III.
- 4.2 A Level I trainee shall work with a certified individual (minimum Level I) while operating the eddy current test equipment (i.e. MIZ-18A).
- 4.3 The initial equipment set-up at the start of the test program shall be verified by a certified ET Level II or III.
- 4.4 The evaluation of the results of the eddy current examination must be conducted by a Data Analyst qualified to at least ET Level II with specific training for the evaluation of data from nonferromagnetic steam generator tubing.

5.0 PRECAUTIONS AND PREREQUISITES:

- 5.1 It is expected that very high levels of radiation may be encountered inside and adjacent to the primary head of the steam generators. Utmost care shall be taken in the setup and performance of the examination to minimize personnel exposure to ionizing radiation and radioactive contamination.
- 5.2 Personnel engaged in the eddy current examination program shall be indoctrinated in the radiation protection rules, guidelines, protective clothing and equipment requirements in effect at the plant site as required.
- 5.3 The eddy current test equipment shall be set up in an area designated by the ABB-CE Shift Supervisor and approved by site personnel. All equipment set-ups will be at the direction of the ABB-CE Shift Supervisor or his designee. Figure 1 is an example of a typical ECT equipment set-up.

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- 5.3.1 If the Remote Data Acquisition and Analysis Trailer (RDAAT) is utilized, all data acquisition equipment, video equipment and communication equipment may be located in this trailer.
- 5.4 The steam generator shall be open on the primary side, dried and ventilated in such a manner as to provide proper temperature and humidity for personnel safety and comfort, and to prevent heat and moisture damage to equipment (approximately 90° F or less).
- 5.5 The secondary side of the steam generator shall be cooled down to the extent that the temperature of the tubes and tubesheet are 120° F or less.
- 5.6 Provisions must be made for personnel and equipment entry into and exit from the steam generator (i.e., ladders, scaffolds or staging, platforms, lighting inside and outside the steam generator, breathing air supply, 120 VAC electricity, etc.).
- 5.7 Health Physics coverage shall be maintained at the steam generator during any personnel entry into the steam generator as required.
- 5.8 The Eddy Current Examination Sheets (Exhibit A) shall list all the tubes that are to be inspected. The Eddy Current Test Operator shall initial and date the sheet after each tube inspection. If a tube cannot be inspected (or only partially tested), the disposition shall be noted in the comment section of the examination sheet, and in a message on the recording tape (DDA-4 system) or on the optical disc (Eddynet system). Data control is maintained in accordance with Reference 3.6 or as applicable.
- 5.9 All examination/inspection forms, records, and examination sheets shall be dated and signed where required. 'NA' shall be written or typed in all blanks that are not applicable to the document. Black ink is required and the use of 'white out' or correction fluid is forbidden. Changes will be single lined through, initialed and dated indicating no further action was taken.
- 5.10 A communication system shall be set up between the Eddy Current Instrument Operator, the steam generator platform, and health physics personnel (containment).

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- 5.11 The primary piping nozzle openings shall have been secured by the installation of a barrier prior to installing ECT equipment in the steam generator.

6.0 CALIBRATION STANDARDS:

- 6.1 The calibration standard shall be fabricated from a length of tubing of the same alloy, nominal outside diameter, and nominal wall thickness as that in the steam generator. It may also contain secondary side features such as carbon steel support rings, copper rings, and other features as needed to provide signals for subsequent multi-parameter frequency mixing by the data analyst. Fabrication of the calibration standards shall meet the requirements given in Article IV-3000 of ASME Boiler and Pressure Vessel Code, Section XI.

- 6.2 Documentation shall include an as-built drawing of the calibration standard, a mill test report, serial number and manufacturer's heat treat number for tube material used in the calibration standard.

- 6.3 The ASME calibration standard shall typically contain the following artificial discontinuities as a minimum, but other designs may be used as required for specific applications. See Figure 2 for a typical standard. Use as-built drawing of actual standard for specific details.

- 6.3.1 Single hole drilled 100% through wall ^{0.067}~~0.052~~ in. diameter. *Don 7/2/93*
ENB 9-2-93
- 6.3.2 Flat-bottomed drill hole 5/64 in. diameter x 80% through from the outer tube wall surface.
- 6.3.3 Flat-bottomed drill hole 7/64 in. diameter x 60% through from the outer tube wall surface.
- 6.3.4 Flat-bottomed drill hole 3/16 in. diameter x 40% through from the outer tube wall surface.
- 6.3.5 Four flat-bottomed drill hole 3/16 in. diameter, spaced 90 deg. apart around the tube circumference, 20% through from the outer tube wall surface.
- 6.3.6 1/16 in. wide 360 deg. circumferential groove. 20% through from the inner tube wall surface.
- 6.3.7 1/8 in. wide 360 degrees circumferential groove. 10% through from the outer tube wall surface.

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6.3.8 Carbon steel ring, simulated support plate.

6.4 Other special calibration standards (when used) shall contain a variety of notches, holes and grooves for calibration of special setups such as high resolution bobbin and rotating probes.

7.0

EQUIPMENT:

All eddy current test equipment provided by ABB Combustion Engineering shall be certified to be equivalent or exceed the applicable requirements of the ASME Code, Section XI, Appendix IV, paragraph IV-3100, with Code Case N-401 addressing the use of digital examination equipment. ABB Combustion Engineering may utilize equipment provided by subcontractors that is certified to the above requirements. Documentation of calibration will be provided prior to the start of the inspection. A typical equipment list is provided below.

- 7.1 HP 9836A Computer or equivalent with MIZ-18A Data Acquisition System Disks (latest revision) and a supply of 5-1/4" floppy disks or equivalent. (DDA-4 Acquisition Only)
- 7.2 HP Server Work Station 400 or 700 series computer or equivalent with hard drive, Eddynet Acquisition Installation Disc and Eddynet Acquisition Module. (Eddynet Acquisition Only)
- 7.3 Data Cartridge Recorder HCD-757 or equivalent and a supply of preformatted magnetic recording tape cassettes. (DDA-4 Acquisition Only)
- 7.4 Optical Disc Drive HP model 650/A or equivalent and a supply of properly formatted optical disks. (Eddynet Acquisition Only)
- 7.5 MIZ-18A Remote Data Acquisition Unit. Certificate of Calibration required.
- 7.6 HP-IB Interface Box. (DDA-4 Acquisition Only)
- 7.7 LAN Interface Box. (Eddynet Acquisition Only)
- 7.8 Eddy Current test/reference probes. See appropriate appendix for probe size and type.
- 7.9 Remote controlled manipulator (optional), eg. SM-4, SM-10, Genesis.
- 7.10 Mechanical probe pusher and flexible probe guide material (optional).

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- 7.11 A calibration and reference standard (hand held or in-line).
- 7.12 Eddy Current Examination Sheets.
- 7.13 Closed circuit television system.
- 7.14 Communication system.

8.0 EQUIPMENT SETUP:

- 8.1 Satisfy applicable requirements specified in Section 5.0 (Precautions and Prerequisites).
- 8.2 Set up communications between steam generator platform and data station as required.
- 8.3 Install the remote manipulator into the steam generator primary head as required.
- 8.4 Attach guide tube with flexible guide material between remote manipulator and the probe driver.
- 8.5 Interconnect the acquisition system as shown in Figures 1 and 3 described as follows: (DDA-4 Acquisition Only)
 - 8.5.1 Connect the General Purpose Input Output (GPIO) interface card on the Acquisition Computer System (ACS) [address 12] to the Data Cartridge Recorder with an appropriate cable. (When duplicating tapes, connect a second GPIO Interface Card at address 11 for the duplicate)
 - 8.5.2 Connect the acquisition computer system (ACS) to the ACS/RDAU interface (HPIB or equiv.) with an appropriate cable.
 - 8.5.3 Connect the ACS/RDAU Interface to the RDAU remote Unit with the desired lengths (500' to 1000' typical) of cable(s). The appropriate (IEEE-488 type) connector of the RDAU should be used. Interconnect the probe controller to the RDAU if the automated (Zetec 4D) probe pusher is used.
 - 8.5.4 An appropriate probe splitter/adaptor connected to the PROBE connector on the RDAU is used to adapt the test probe to the RDAU.
- 8.6 Interconnect the acquisition system as shown in Figure 1 and 4 described as follows: (Eddyner Acquisition Only)

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- 8.6.1 Connect the monitor to the rear of the system processing unit (SPU) by using the appropriate cable and attaching it to the video card on the SPU.
- 8.6.2 Connect the mouse to the keyboard, then connect the keyboard to the SPU with the appropriate cable.
- 8.6.3 Connect the Eddynet Acquisition Module.
- 8.6.4 Connect the hard drive to the SPU with the small computer systems interface (SCSI) cable. (Required if the hard drive is separate from the SPU)
- 8.6.5 Connect the Optical Disc Drive to the SCSI interface card on the SPU with the SCSI cables. The SCSI bus must be terminated by placing a terminator at the appropriate location.
- 8.6.6 Connect the Local Area Network (LAN) connector on the rear of the SPU to the LAN Interface Box with desired lengths (500 ft. or 1000 ft. typical) of approved LAN interconnecting BNC-BNC cables. (RG-58/U type or equivalent)
- 8.6.7 Install Termination Caps on each end of the LAN at appropriate locations.
- 8.6.8 Connect the LAN Interface Box to the remote data acquisition unit (RDAU) using the appropriate (IEEE-488 type) connector and cables. Interconnect the probe pusher controller to the RDAU if the automated (Zetec 4D) probe pusher is used.
- 8.6.9 An appropriate probe splitter/adaptor connected to the probe connector on the RDAU is used to adapt the test probe to the RDAU.
- 8.6.10 If data is to be spooled from the acquisition station to the analysis station, use appropriate LAN cable or Fibre-Optics cable to interconnect both systems.
- 8.7 Should absolute data be desired, the probe splitter/adaptor must have at least two probes; one probe attached to the connector labeled 'probe' and one probe attached to the connector labeled 'ref'. The reference probe shall be placed in a reference tube. Ten foot extension cables or longer may be

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used as required.

9.0 EQUIPMENT OPERATION AND CALIBRATION:

The following will describe the typical equipment calibration sequence with the specific calibration technique requirements described in Appendix A thru C. The appropriate Appendix will be selected based on the particular type of inspection. The operator will be provided written instruction by the shift supervisor with the issue of a completed "Set Up Instruction" Form. See Exhibit B.

9.1 Zetec DDA-4 Data Acquisition System.

- 9.1.1 Load data acquisition software into the right disk drive and a blank diskette into left disk drive.
- 9.1.2 Turn power on. Turn display intensity to maximum.
- 9.1.3 The system will prompt the user into the set clock and date mode. Also load the data cartridge into the data cartridge recorder.
- 9.1.4 Set all appropriate time and date settings. Use 24 hour mode if available.
- 9.1.5 Initialize (format) the blank diskette. (If not previously initialized).
- 9.1.6 Insure the disk backup (left drive) is enabled through user-selectable menu options.
- 9.1.7 Change the acquisition setup parameters to the appropriate settings for the identification of system variables. e.g; S/G designator, Row and Line designators, printer enable, printer type, etc.
- 9.1.8 Configure system frequencies and operating modes (absolute or differential) as required by the appropriate appendix as directed by the shift supervisor. Be sure to set the configuration for MIZ-18 or MIZ-18A as required, and input the appropriate samples rate. Changes to the test frequencies, sampling rate and probe pusher speed may be accomplished through the initiation of the Set Up Instruction Form (Exhibit B).
- 9.1.9 Pull the probe through the calibration standard and adjust spans and rotations for

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all channels as described in the appendix utilized in para. 9.1.8.

NOTE: If utilizing the Zetec 4D probe pusher (or equivalent) the appropriate menu options should be selected. Be sure to check the setup menu options to insure proper pull speeds, rotation speeds, etc.

- 9.1.10 Complete the summary with the following plant specific information supplied by the shift supervisor and by documenting the equipment being utilized.

Owner	Calibration Standard
Plant and Unit No.	S/N(S)
Date	Procedure/Revision No.
Component ID & Side	ET Operator Name/Cert.
Recording Tape No.	Level
or equivalent)	Company Affiliation
Computer S/N	Tubing Size
Probe ID, Size and	RDAU S/N
Length	Length of Cables (as required)

NOTE: (DDA-4 system only) When completing the line item 'plant', identify by initials only. The Plant field should include an abbreviated owner/plant designation and DD-WXYY (DD is for Data Disk with the W representing the S/G designation (A,B), X representing the Hot (H) or Cold (C) side, the YY representing the tape number.
EXAMPLE: HBR DD-AH01

When completing the line 'ET Operator Name' use the operator's last name followed by the operator's initials. EXAMPLE: Jones JR
For consistency, no punctuation should be used.

- 9.1.11 Record data from the calibration standard onto the data cartridge (or equivalent) at the speed required for the examination as defined in the applicable appendix.

- 9.1.12 Complete the eddy current calibration sheet and cartridge label (or equivalent) recording the appropriate information and calibration time (See Exhibit C & D).

9.2 Zetec Eddynet Data Acquisition System

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NOTE: HP-UX and EDDYNET files must be installed on the system hard drive before starting eddynet data acquisition. Refer to the appropriate Zetec operation guidelines for installation instructions.

- 9.2.1 Power up the CPU in attended mode and select the appropriate bootable system code number (eg. 1h). The login: prompt will appear.
- 9.2.2 If data is to be spooled from the acquisition station to the analysis station via a LAN cable it will be necessary for the server stations at both locations to recognize each other. This can be accomplished when the analysis server or the acquisition server are brought up in the attended mode. Both analysis and acquisition servers need to do this procedure, either one first, with the server selecting the bootable system on the hard disc drive by typing the appropriate bootable system code (ie. 1H, 2H etc.).

Other server stations which need to recognize and share information with the acquisition system (excluding clustered workstation nodes) should also be brought up in this manner, one at a time. Other methods which accomplish this same procedure are acceptable.

- 9.2.3 Insert the optical storage disc into the optical disc drive. Insure that the optical storage disc is not write protected.
- 9.2.4 Enter the X-Windows environment. (At the console login: prompt, type USER1 [Return]).
- 9.2.5 With the mouse, open a new window by clicking and dragging the left button.
- 9.2.6 Next type su [Return] at the \$ prompt to become a super user. At the # prompt, type cd/ [Return] followed by cd adm_scripts [Return] to enter the adm_scripts directory.
- 9.2.7 Type ./ad_win & [Return] to start the mount widget. Using the mouse, click on MOUNT DEVICE to bring up the optical drive mounting widget.
- 9.2.8 Choose the scsi device and rod number to be mounted by clicking in the appropriate boxes. (Example: scsi150100 rod1)

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- 9.2.9 Click on MOUNT R/N.
- 9.2.10 Exit the mount widget and iconify the ad_win widget.
- 9.2.11 Change to the MIZ18 directory. In the X11 window at the # prompt, type cd/MIZ18 [Return].
- 9.2.12 Establish contact to the LAN Interface Hub by typing ./acquire X & [Return]. The 'X' represents the serial number of the LAN interface hub which is on the back of the hub unit (eg. 4, 5, 6 etc.).
- 9.2.13 The Main Screen contains several boxes which when clicked on perform various functions. These include: Process Channels, Message Form, Summary Form, Zoom, Refresh, Next-Last Tube, Start Acquiring, File Functions, System Config and Print-FF Screen. Refer to the appropriate Zetec Operation Guidelines for information on using these functions.
- 9.2.14 Follow steps in paragraph 9.1.7 through 9.1.12.

NOTE: When completing the summary information in step 9.1.10, specific information on labeling optical disks and reporting CAL groups will be provided by cognizant data management personnel prior to starting data acquisition.

10.0 PROBE SPEED VERIFICATION:

- 10.1 Insert the probe into the tube to a known position.
- 10.2 Retract the probe at test speed with acquisition system on, but not recording to the data storage device.
- 10.3 Use the applicable steam generator drawing dimensions for the distance between tube support structures.
- 10.4 Determine the travel time for the probe between two desired tube support structures using the strip chart display on the acquisition system (marked at 1 second intervals).
- 10.5 Probe speed shall not exceed 24 in./sec. Probe speed should be adjusted to approximately 12

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in./sec. for testing row 1 and row 2 tubes, or as required by the appendix utilized in paragraph 9.1.8.

11.0 CALIBRATION VERIFICATION: (Span and Rotation Settings)

A calibration check must be recorded at the following intervals:

- 11.1 Within 4 hours of the previous calibration check.
- 11.2 At the beginning and end of each data cartridge recording tape (DDA-4 system) or calibration group, when recording data to an optical disk. (Eddynet System)
- 11.3 Whenever test components are changed, loss of power, malfunction is suspected, or the operator deems it necessary.
- 11.4 The shift supervisor or a designee shall initial the appropriate section of the eddy current calibration sheet verifying compliance of calibration.
- 11.5 If a discrepancy in calibration should occur in Section 11.1 - 11.3 the shift supervisor or an eddy current Level II or III shall identify the discrepant condition on the eddy current calibration sheet. The ECT Level III shall initial indicating acceptance of the disposition.
- 11.6 In the event that calibrations cannot be performed because of building evacuations, equipment malfunctions, etc., a calibration shall be made upon reentry or repair/replacement and will suffice as the four hour calibration.

NOTE: If discrepancies are found with the calibration as defined above, re-calibration will be required. The re-calibration information shall be forwarded to the data analyst(s). The Data Analyst shall determine which tubes, if any, shall be reinspected.

12.0 EXAMINATION:

- 12.1 Position the manipulator at the location of the first tube.
- 12.2 Activate the acquisition computer system.
- 12.3 Properly identify tube location on the acquisition system.

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- 12.4 Insert the probe into the tube to the desired elevation as defined by the Eddy Current Examination Sheets.
- 12.5 Retract the probe while recording the entire length of tube to be inspected on tape or equivalent recording medium. Take special care not to start the probe retraction or stop the data recording device too quickly (this may result in an incomplete examination). See the appropriate operating guidelines for details of operation (DDA-4 or Eddynet).
- 12.6 Insure the tubes to be tested are indicated as completed on the Eddy Current Examination Sheet. If a tube or portion of a tube is not inspectable, note any apparent cause on the Eddy Current Examination Sheet and on the acquisition system message area.

The message area should be used to note any conditions which may arise, such as incomplete or obstructed tubes, tubes which are unreachable, operator changes, probe changes, etc. Keep messages to a minimum.

- 12.7 Position the probe at the next tube to be examined.
- 12.8 Repeat paragraph 12.3 through 12.7 for each tube to be examined.

13.0 OPERATING PRACTICES:

- 13.1 The acquisition system has a message capability that is provided for recording information about the testing. Notations such as operator changes, probe changes and other description of testing should be included. (see 12.6)
- 13.2 During the examinations, cycling through the channels during data collection is recommended to ensure proper operation of all coils. This should be done in the review mode occasionally to ensure the quality of the data being recorded. Extreme care must be exercised when utilizing the review mode. Improper use of the review mode could cause a loss of data.
- 13.3 Care should be taken to ensure similar probes are used as reference probes to avoid an impedance mismatch.
- 13.4 The data cartridges shall be labeled appropriately utilizing the data cartridge label (Exhibit D). These shall be attached to the data cartridge

container and cartridge respectively. (DDA-4 System)

- 13.5 The optical disks shall be labeled as directed by the cognizant data management personnel. (Eddynet System)
- 13.6 The S/G identification system will be a two digit number with the first digit indicating the S/G and the second digit indicating the inlet or outlet side of the generator eq. S/G 11 = S/G #A on the inlet side eq. S/G 20 = S/G #B on the outlet side, etc.
- 13.7 The row and line numbers shall be set to Row 999 Lin 999 for all calibration checks.
- 13.8 Typically whenever a calibration is required, three calibration pulls are recorded. Certain tests (eg. MRPC), may not require three calibration pulls due to factors, such as, radiation dose to platform worker, etc.

14.0 MANIPULATOR POSITION VERIFICATION:

- 14.1 Position verification shall be done upon the installation of the remote fixture and before relocation of the fixture in the generator. Verification for tube locations shall be recorded on examination sheets similar to Exhibit A. The position of the fixture shall be verified by sending the fixture to a known location in the generator. Once the operator has visually verified the correct tube location with the fixture camera (or with the tube sheet camera) and the computer read-out, an entry shall be made on the Examination Sheet (See Exhibit A). Verifications need only be made at required verifications points (see 14.2).
- 14.2 Position verification is required:
 - a. Prior to eddy current work in the generator.
 - b. Upon concluding eddy current work in the generator.
- 14.3 Position verification is recommended:
 - a. At the beginning or end of an eddy current examination sheet.
 - b. When returning to the tube sheet after lowering the arm to the manway.
 - c. When 'breaking the arm' to the opposite side of the plenum.
 - d. Whenever the operator has doubt of the tube location.

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NOTE: Position verifications are entered on the examination sheet(s). Care should be taken to insure operator knowledge of verification points when there is an operator change, shift change, or other similar situations.

- 14.4 In the instance where the location has been incorrectly identified and a position verification cannot be made from the last tube tested, all tubes tested from the last position verification recorded on the examination sheet must be reexamined.

15.0 RECORDING CRITERIA:

- 15.1 All data from the examination shall be recorded on the appropriate recording medium. The recording medium will contain at a minimum the information defined in paragraph 9.1.10.

16.0 EVALUATION:

- 16.1 The data analysis shall be conducted in accordance with Reference 3.8.

17.0 REPORTING CRITERIA:

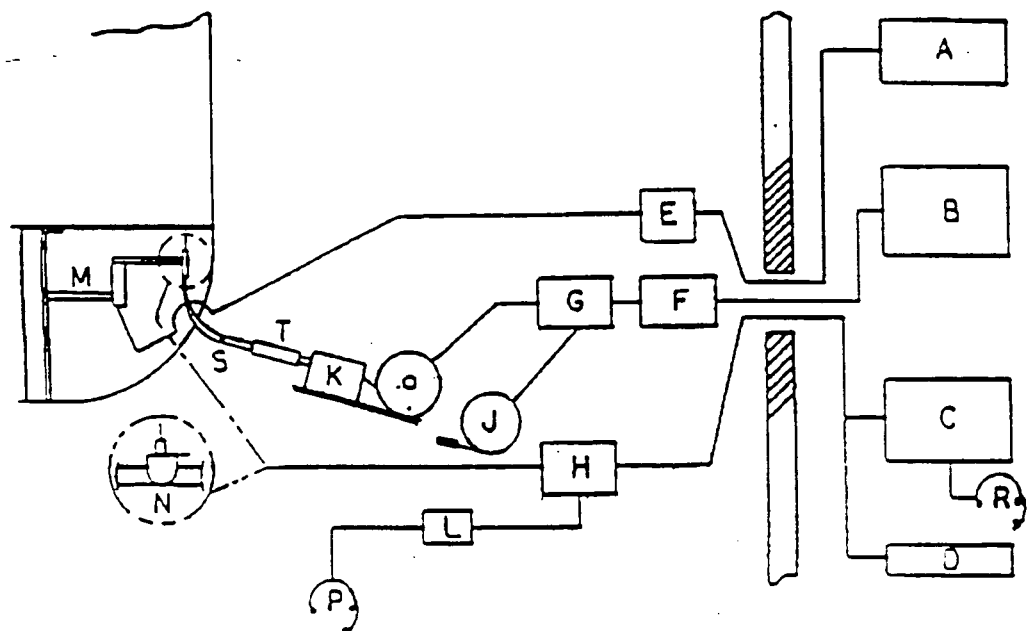
The report of the inspection results supplied to the customer will contain the following at a minimum.

- 17.1 All detectable tube wall degradations.
- 17.2 All detectable tube dents known to obstruct probe passage.
- 17.3 Any detectable loose part indication
- 17.4 Any additional conditions that the data analyst deems necessary.

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FIGURE 1

TYPICAL EDDY CURRENT TEST EQUIPMENT SET-UP DIAGRAM



- | | |
|--|--------------------------------|
| A - POSITIONER CONTROLS | K - PROBE PUSHER |
| B - COMPUTER ACQUISITION SYSTEM
(DDDA-4 OR EDDTNET) | L - AUDIO JUNCTION BOX |
| C - AUDIO/VIDEO CONTROLS | M - PROBE POSITIONER |
| D - VCR | N - VIDEO CAMERA |
| E - POSITIONER RELAY BOX | P - PLATFORM HEADSET |
| F - FM-1
(SM-10) | R - CONTROL STATION
HEADSET |
| G - MIX-100 | S - FLEXIBLE COUNTRY |

FIGURE 2
TYPICAL ASME CALIBRATION STANDARD

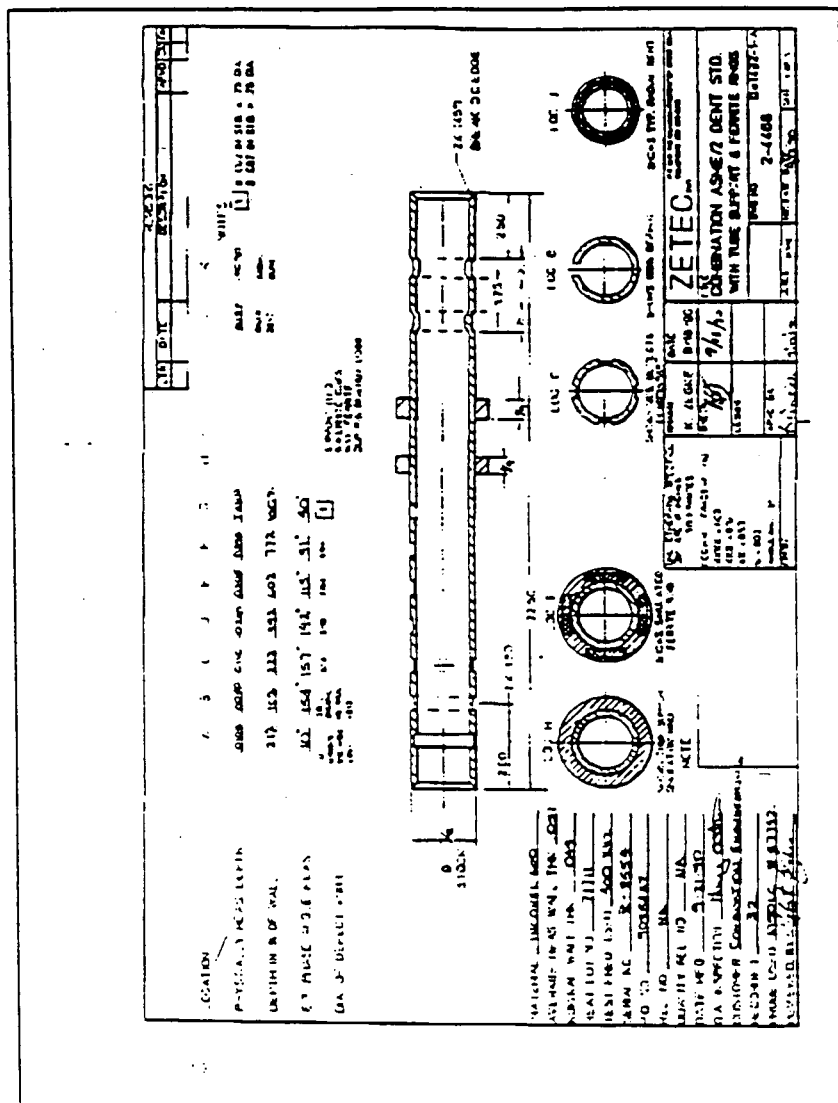


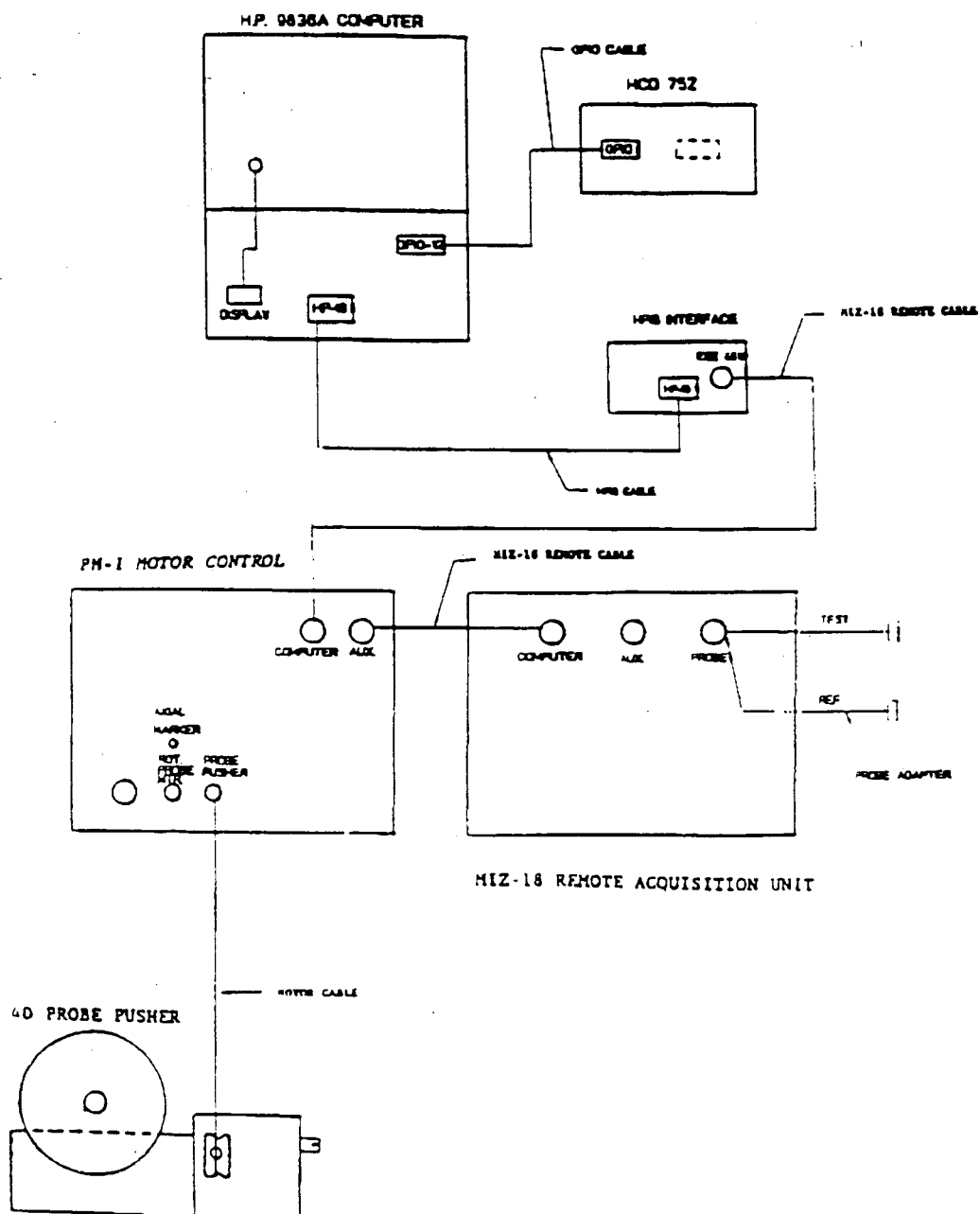
Figure 1

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FIGURE 3

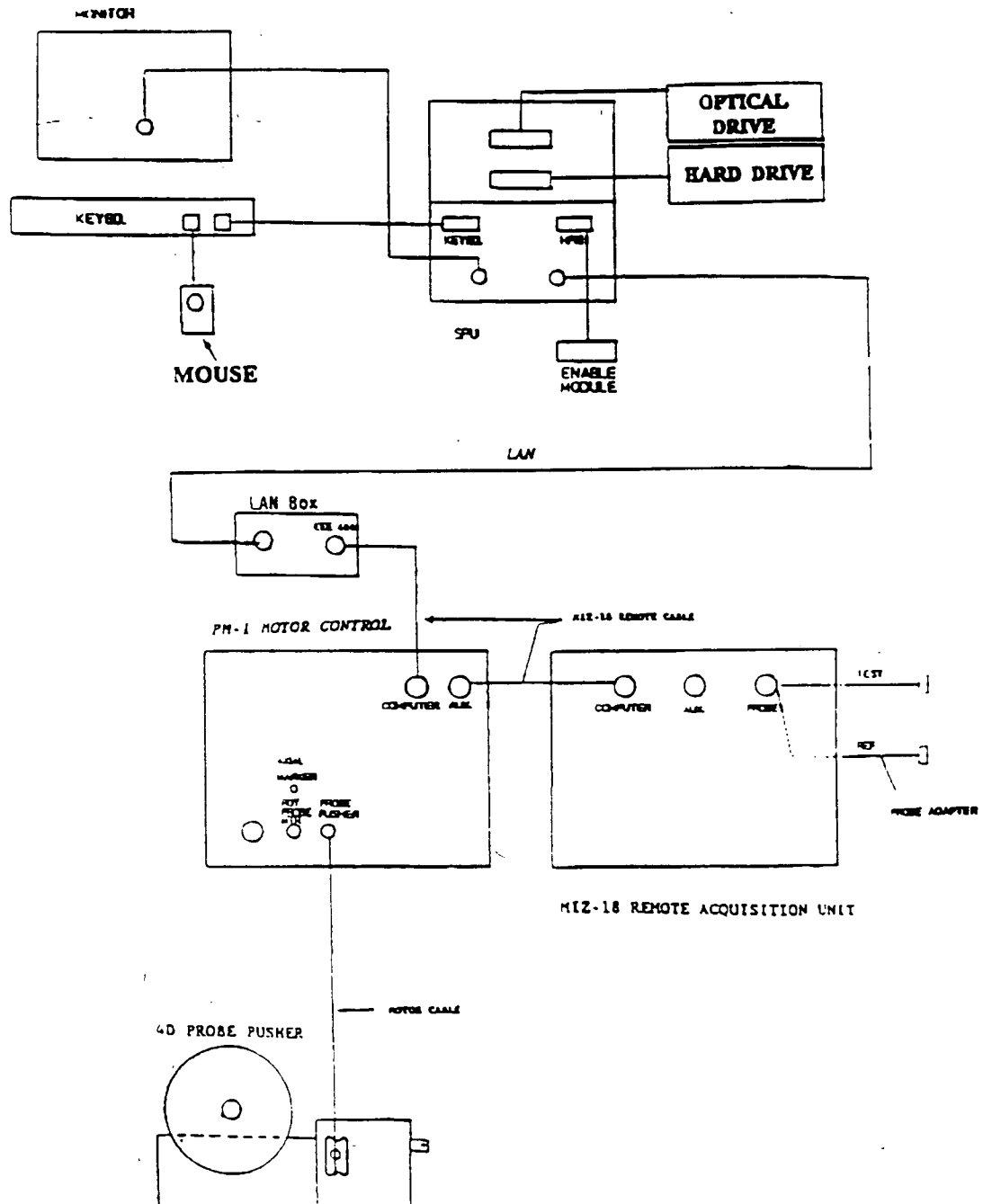
TYPICAL MIZ-18A INTERCONNECTION SCHEMATIC
(DDA-4 SYSTEM)

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FIGURE 4

TYPICAL MIZ-18A INTERCONNECTION SCHEMATIC
(EDDYNET SYSTEM)

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EXHIBIT A

TYPICAL EDDY CURRENT EXAMINATION SHEET

CONSTRUCTION ENGINEERING EDDY CURRENT EXAMINATION SHEET						
						PAGE: 2
OWNER: K L & F			PLANT/UNIT: STP Unit 1		SC 1A	
PROBE: AS108FEM			EXTENT TESTED: CTS-MTE			
PROCEDURE: STP-410-004 R9			LEN: NOT		TEST DATE: 5/2/99	
FREQUENCY: 400/200/100/10 KHz						
ECT DESCRIPTION: Robbin Probe for Defect Examination						
ISIS-ID	ROW	COL	DATA SET	TESTED	REEL #	COMMENTS
5061	3	26	SAMPLE2	/	1 nos	PV
5062	3	27	SAMPLE2	/		
5063	3	28	SAMPLE2	/		
5064	3	29	SAMPLE2	/		
5065	3	30	SAMPLE2	/		
5066	3	31	SAMPLE2	/		
5067	3	32	SAMPLE2	/		
5068	3	33	SAMPLE2	/		
5069	3	34	SAMPLE2	/		
5070	3	35	SAMPLE2	/		Test tested since for previous
5071	3	36	SAMPLE2	/		
5072	3	37	SAMPLE2	/		
5073	3	38	SAMPLE2	/		
5074	3	39	SAMPLE2	/		
5075	3	40	SAMPLE2	/		
5076	3	41	SAMPLE2	/		
5077	3	42	SAMPLE2	/		
5078	3	43	SAMPLE2	/		
5079	3	44	SAMPLE2	/		
5080	3	45	SAMPLE2	/		
5081	3	46	SAMPLE2	/		
5082	3	47	SAMPLE2	/		
5083	3	48	SAMPLE2	/		
5084	3	49	SAMPLE2	/		
5085	3	50	SAMPLE2	/		

Running Total of Exams: 50 This page: 15

Figure 2

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EXHIBIT B

TYPICAL SET UP INSTRUCTION FORM

MULTI-FREQUENCY EDDY CURRENT INSPECTION									
SET UP INSTRUCTIONS									
MIZ-18 MIZ-18A									
SITE	UNIT #	COMPONENT S/C #	SIDE HOT COLD		DATE / /				
PROBE TYPE		CALIBRATION STANDARD (CIRCLE OR DESCRIBE OTHER) ASME OTHER							
PROCEDURE		TEST PURPOSE							
MIZ-18 MIZ-18A CONFIGURATION									
NUMBER: NAME---		SAMPLES PER SEC.							
FREQUENCY SEQUENCE		PROBE CHANNEL SELECT							
#	FREQUENCY	COIL 1	COIL 2	COIL 3	COIL 4	COIL 5	COIL 6	COIL 7	COIL 8
1	KHz								
2	KHz								
3	KHz								
4	KHz								
SPECIAL NOTES TO OPERATOR / ANALYST									
SEE APPENDIX _____ FOR SETUP INSTRUCTIONS.									
PREPARED BY: _____					LEVEL _____		DATE _____		
APPROVED BY: _____					LEVEL _____		DATE _____		

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TYPICAL EDDY CURRENT CALIBRATION SHEET

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EXHIBIT D

TYPICAL DATA CARTRIDGE MARKING LABEL

<input type="checkbox"/> ORIGINAL <input type="checkbox"/> DUPLICATE		ABB ABB		EDDY CURRENT CARTRIDGE		REEL #			
OWNER		SITE/UNIT		COMPONENT S/G A / S/G B H / S		DATE			
PROBE TYPE/SIZE		PROCEDURE/REV		DEFECT STANDARD		OTHER STANDARD			
TEST PURPOSE:									
FREQUENCY SEQUENCE		PROBE CHANNEL SELECT							
	FREQUENCY	COIL 1	COIL 2	COIL 3	COIL 4	COIL 5	COIL 6	COIL 7	COIL 8
1	KHz	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	KHz	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	KHz	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	KHz	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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EXHIBIT E

MIZ-18A CONFIGURATION FOR BOBBIN PROBE

NUMBER: 1		MIZ-18A CONFIGURATION							
NAME: BOB		SAMPLES per SEC: 800							
FREQUENCY SEQUENCE		PROBE CHANNEL SELECT							
	FREQUENCY	COIL 1	COIL 2	COIL 3	COIL 4	COIL 5	COIL 6	COIL 7	COIL 8
1	400 kHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	600 kHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	100 kHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4	18 kHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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EXHIBIT F

MIZ-18A CONFIGURATION FOR ROTATING PROBE

MIZ-18A CONFIGURATION									
NUMBER: 2		SAMPLES per SEC: 400							
NAME: RFPC									
FREQUENCY SEQUENCE		PROBE CHANNEL SELECT							
#	FREQUENCY	COIL COIL		COIL COIL		COIL COIL		COIL COIL	
		1	2	3	4	5	6	7	8
1	400 kHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	800 kHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	1200 kHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	16 kHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

MIZ-18A CONFIGURATION									
NUMBER: 3		SAMPLES per SEC: 400							
NAME: COIL RFPC									
FREQUENCY SEQUENCE		PROBE CHANNEL SELECT							
#	FREQUENCY	COIL COIL		COIL COIL		COIL COIL		COIL COIL	
		1	2	3	4	5	6	7	8
1	400 kHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	800 kHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	1200 kHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	16 kHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

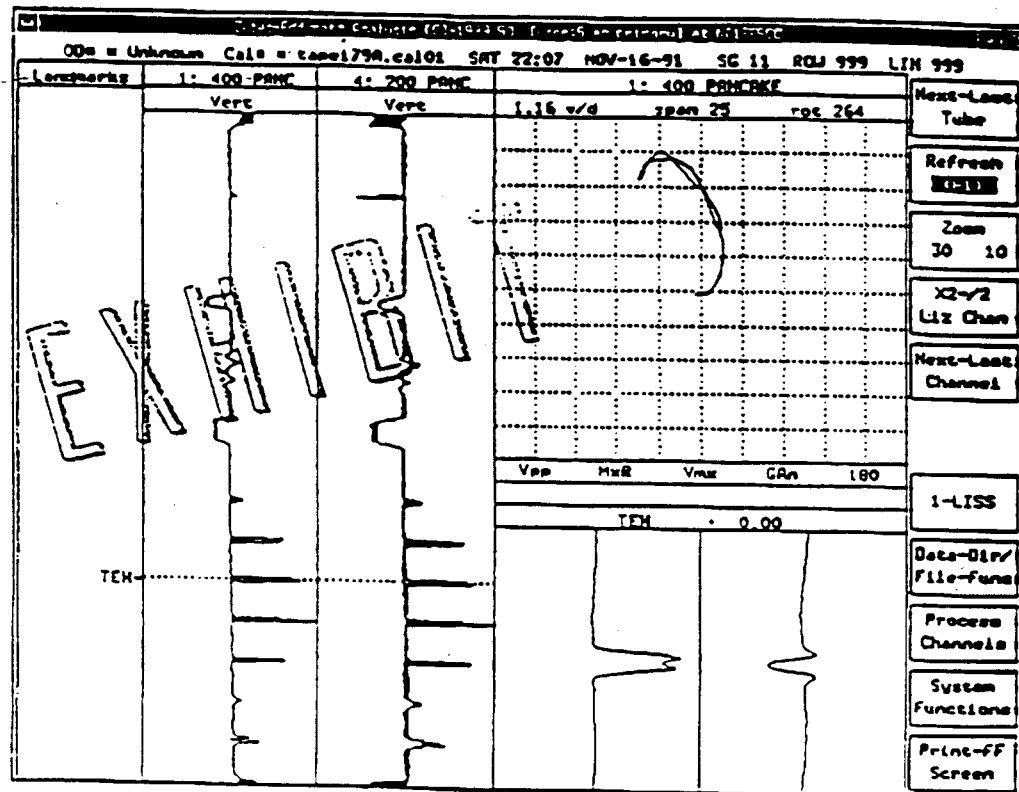
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EXHIBIT G

ROTATING PROBE CALIBRATION INFORMATION

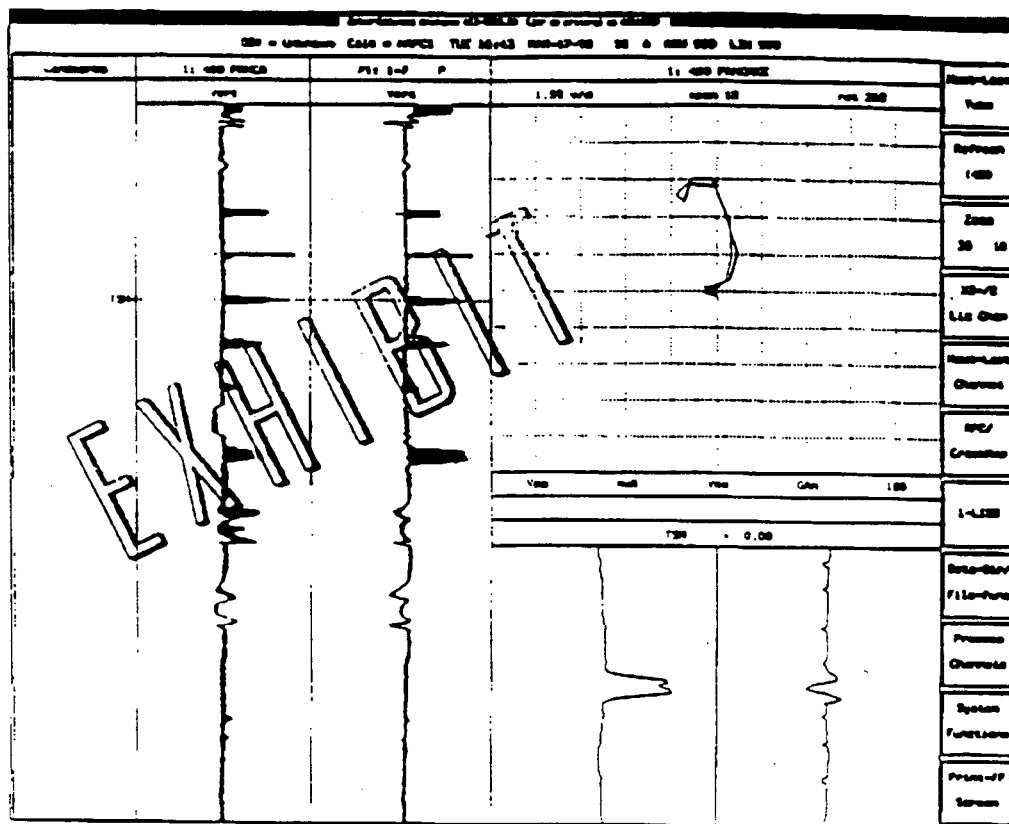


60% ASME flaw set with probe motion horizontal and flaw at 4 screen divisions

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ROTATING PROBE SLIP RING INFORMATION



60% O.D. flaw clearly evident above slip ring noise

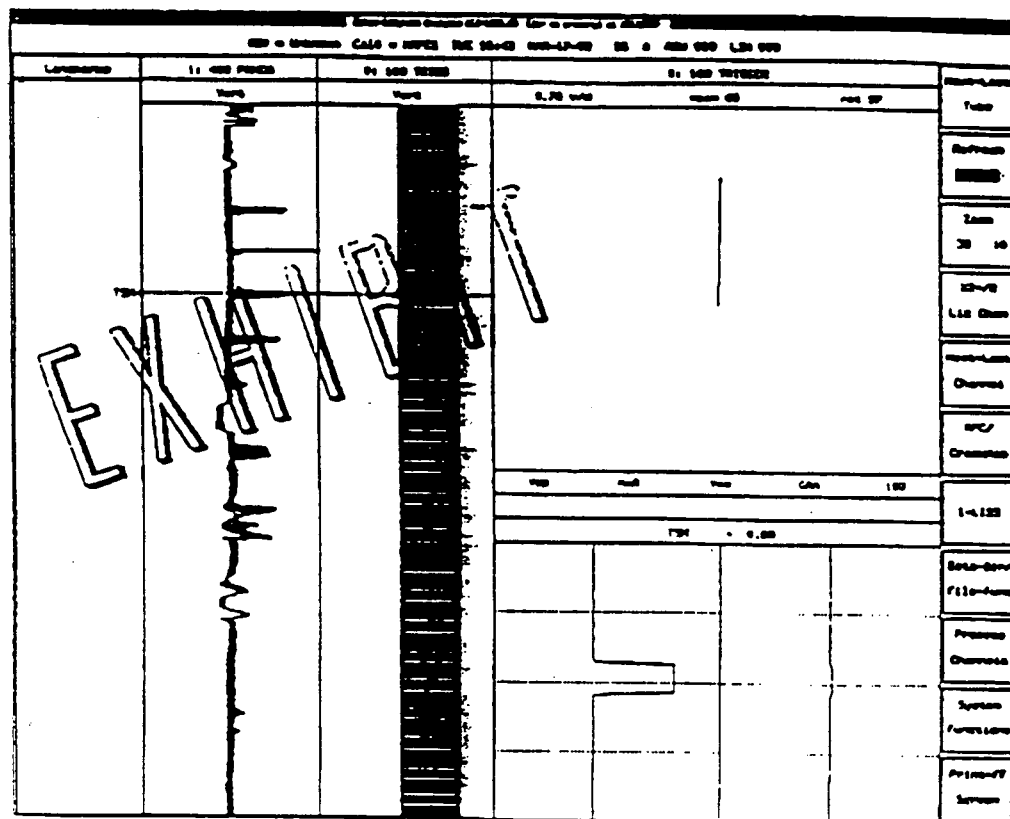
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EXHIBIT I

ROTATING PROBE PULSE INFORMATION



Rotation pulse set at approximately 90 degrees with signal below screen saturation

EXHIBIT J

MIZ-18A CONFIGURATION FOR HIGH RESOLUTION BOBBIN PROBE

MIZ-18A CONFIGURATION									
NUMBER: 4		SAMPLES per SEC: 400							
NAME: HRB									
FREQUENCY SEQUENCE		PROBE CHANNEL SELECT							
	FREQUENCY	COIL 1	COIL 2	COIL 3	COIL 4	COIL 5	COIL 6	COIL 7	COIL 8
1	400 kHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	270 kHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	100 kHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4	500 kHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

APPENDIX A

BOBBIN COIL TEST PARAMETERS

I. Tubing

- A. O.D. - 0.875"
- B. Wall - 0.050" Nominal
- C. Material - Inconel 600

II. Test Frequencies

- Channel 1 - 400 KHz Differential and Absolute
- Channel 2 - 100 KHz Differential and Absolute
- Channel 3 - 600 KHz Differential and Absolute
- Channel 4 - 10 KHz Differential and Absolute
- Sample rate of 800 samples/second

III. Mixes

- Mix 1 - 400/100 Tube Support Suppression
- Additional Mixes as required

IV. Probes - Typical

- Normal Bobbin Program - A720 - A680 M/ULC, SF/RM, or as required.

V. Probe Speed Shall Not Exceed 24 Inches Per Second

The above frequencies, mixes and probe requirements may be modified through initiation of Exhibit B by the cognizant ECT Level III.

The following conventions shall be used during data collection:

1. The rotation of all frequencies shall be the such that the 100% through wall hole is at 40° and differential channels form starting down and to the right, absolute channels form up and to the left.
2. Spans of differential channels shall be set such that the amplitude of the 100% through wall signal is at least 50% of screen height. Spans of absolute channels shall be set such that the tube support is not saturated and can be seen.
3. Data Analyst will determine if tubes need to be retested.

APPENDIX B

ROTATING PANCAKE COIL TEST

This examination employs a surface riding pancake coil which is rotated as it traverses the tube axis producing a helical scan. Flaw depths can be evaluated using a phase delay or amplitude curve and the indication topography presented in C-Span graphics.

A. Set-up

- 1) Establish the test configuration as per Exhibit F.
- 2) Set the multiplex rate to 400 samples per second.
- 3) Initialize the MIZ-18A to a 4D probe pusher and the transmission in low gear.
- 4) Set the probe pusher reverse speed to 0.2 inches per second.
- 5) Set the probe head rotation speed to nominal 300 rpm.
- 6) Select lissajous presentation and strip chart presentations as instructed by the cognizant shift supervisor or ECT Level III.

NOTE: The above test frequencies, sampling rate and probe pusher speed may be modified through initiation of Exhibit B by the cognizant ECT Level III.

B. Calibration

- 1) If using a new probe wand, turn on the probe rotator and allow the slip ring assembly to wear in. This process takes approximately 5 to 10 minutes.
- 2) Withdraw the probe through the ASME standard including the tube support ring.
- 3) Null the instrument in a non-defective area of the calibration standard.
- 4) Place the 60% ASME flaw in the display window.
- 5) Adjust the phases and spans of Coil 1 for Frequencies 1, 2, 3 and 4 such that with probe motion horizontal the response from the 60% ASME flaw is up with a span of 4 screen divisions (Exhibit G).

Note: When using 3 coil MRPC probe repeat step 5 for coil 3 and coil 5.

- 6) Place the 60% O.D. flaw in the display window. This signal should be clearly evident above slip ring noise and should resemble Exhibit H. If not, replace either the slip ring assembly or the probe wand.
- 7) Adjust the phase and span of the rotation pulse signal such that the rotation pulses go up first at approximately 90 degrees and the signal is just below screen saturation (see Exhibit I).
- 8) An in-line calibration will consist of recording the MIZ-18A signals as the probe is pulled through the standard and support ring. This will be done at the beginning and end of each tape cartridge and, at a minimum, every four hours.
- 9) Data analyst will determine if retests are necessary.

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APPENDIX CHIGH RESOLUTION BOBBIN SET-UP AND CALIBRATION

A. Set-Up

- 1) In the configuration mode (Exhibit J), set frequency 1 at 400 KHz, frequency 2 at 270 KHz, frequency 3 at 100 KHz and frequency 4 at 600 KHz.
- 2) Coils 1, 3, 5 and 7 should be turned on for all 4 frequencies.
- 3) Test sampling rate is to be set at 400 points per second.
- 4) Adjust probe pusher speed such the test pull speed is approximately 6 inches per second.

NOTE: The above test frequencies, sampling rate and probe pusher speed may be modified through initiation of Exhibit B by the cognizant ECT Level III.

B. Calibration

- 1) Calibrate each coil using the ASME Standard on the pull.
- 2) Record signals of all ASME flaws and support ring for each coil.
- 3) Nulling is to take place in nominal defect for tubing.
- 4) An in-line calibration will consist of recording the MIZ-18A signals as the probe is pulled through standard and support ring for each of the four (4) coils. The calibration standard should be rotated approximately 90° to insure maximum response for each of the four (4) coils. This will be done at the beginning and end of each tape cartridge and, at a minimum, every four hours.
- 5) Probe motion should be set horizontal and the signal response from the O.D. groove should be approximately three screen divisions.
- 6) If the equipment is found to be out of calibration, it shall be recalibrated and noted as such on the calibration sheet.
- 7) Data analyst will determine if retest is necessary.

EDDY CURRENT DATA ANALYSIS PROCEDURE
EVALUATION OF WESTINGHOUSE STEAM GENERATOR TUBING

H. B. ROBINSON

UNIT 2

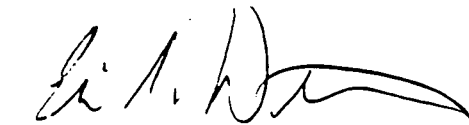
PROCEDURE NO.

ROB-410-005

REVISION 4

ABB COMBUSTION ENGINEERING NUCLEAR SERVICES

APPROVED BY:

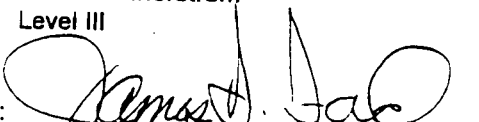


E. G. Wennerstrom
Level III

DATE:

7-30-93

APPROVED BY:



J. D. Ford
Quality Assurance

DATE:

7-30-93

APPROVED BY:



T. U. Bipes
Level III

DATE:

7-30-93

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FIGURE 10	TYPICAL EDDY CURRENT DATA SHEET

ATTACHMENT A CUSTOMER SPECIFIC DATA ANALYSIS REQUIREMENT

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1.0 OBJECTIVE

This procedure will establish a set of guidelines to be utilized by the eddy current Data Analyst with the intent of providing a consistent method for reporting the eddy current results. THIS PROCEDURE IS NOT INTENDED TO BE UTILIZED BY AN INDIVIDUAL WHO HAS NOT HAD PROPER TRAINING IN THE EVALUATION OF EDDY CURRENT DATA. This procedure may be superseded in its entirety or in part by client specific analysis guidelines.

2.0 REFERENCES

- 2.1 ABB/Combustion Engineering Nuclear Power Quality Assurance Manual.
- 2.2 ABB/Combustion Engineering Nuclear Power Businesses, Nuclear Quality Assurance Manual.
- 2.3 Zetec DDA-4 System Operating Guideline.
- 2.4 Procedure for the control of Eddy Current examination data for the personal computer (PC) Data Base System, ROB-410-006, latest revision.
- 2.5 Procedure for multifrequency eddy current examination of nonferromagnetic steam generator tubing using MIZ-18A equipment, ROB-410-004, latest revision.
- 2.6 ASME Code interpretation X1-83-18: 1980 SNT-TC-1A vs. 1975 SNT-TC-1A Certification.
- 2.7 HP-UX/Zetec Eddynet System Operating Guide, latest revision.
- 2.8 ASME Code Case N-401-1, use of digital equipment.

3.0 PERSONNEL REQUIREMENTS

- 3.1 The evaluation of the results of the eddy current examination must be conducted by a Data Analyst qualified to at least ET Level II with specific training for the evaluation of data from nonferromagnetic steam generator tubing.
- 3.2 Each person performing Data Analysis governed by this procedure shall be certified in accordance with SNT-TC-1A 1980 Edition or equivalent. Combustion Engineering personnel shall be certified in accordance with Combustion Engineering written Procedure QAP 2.4 contained in Reference 2.1.

If data analysts are supplied for primary or secondary data review by the purchaser, the purchaser will be responsible for their certification. In the instance when C-E utilized a subcontractor for primary or secondary data review, C-E will be responsible for certification either by examination to the requirements of QAP 2.4 or by auditing and accepting the subcontractor(s) written practice.

- 3.3 The Analyst shall be responsible for evaluating the data and reporting the results of the examination.
- 3.4 The independent data analyst (if used) shall be responsible for evaluating the data provided by the data controller.

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4.0 EQUIPMENT

The equipment required to analyze the eddy current examination data includes but is not limited to the following: (Interconnect as appropriate). If LAN System is used, configuration may differ.

- 4.1 HP 200/300/400/700 Series Computer or equivalent.
- 4.2 Zetec Analysis software or equivalent.
- 4.3 Ample supply of floppy disks, optical disks or applicable media.
- 4.4 Optical Disk Drive C1701A or equivalent media.
- 4.5 Appropriate printer or equivalent device (optional).
- 4.6 Eventide Expressway Intelligent Buffer Model WPB-109 or equivalent (optional).
- 4.7 Appropriate interconnect cables, power cords and peripherals.

5.0 AREA OF INTEREST

The evaluation of data shall include all information recorded on storage media per the requirements of the Data Acquisition operating procedure in use or as specified by the client.

6.0 EVALUATION OF DATA

- 6.1 The data evaluation shall be conducted by viewing the lissajous pattern and the appropriate strip chart presentations on the computer screen for the entire recorded length of each tube. Any abnormal signals will be investigated for determination of location and percent through wall dimension (% TWD) as practical. Attachment A, Client Specific Data Analysis Requirements contains specific direction for analyzing data.
- 6.2 The screening frequencies utilized for the data analysis shall be the optimum defect detection frequencies for the size and wall thickness of the tubing being inspected. These frequencies will be determined by the lead data analyst and documented on Attachment A, Client Specific Data Analysis Requirements. No Field Change Notice (FCN) is required for additions or deletions to Attachment A. Signatures by the ET Level III and the client representative will represent concurrence of the specific requirements.

NOTE: As work progresses, Attachment A's shall be completed as required. The revision number shall be changed in the appropriate section of the Attachment A form.
- 6.3 If the Analyst determines that a condition exists that precludes accurate data analysis, the analyst will submit a list of tubes that have been affected by this condition and those tubes may be retested if required.
- 6.4 Interpretation of test results shall be conducted by certified eddy current data analysts. Test results are interpreted using calibration curves generated from information obtained by passing a test probe through a calibration standard manufactured from a piece of material of the same alloy, nominal outside diameter and nominal wall thickness as the tubing in the steam

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generator containing known, machined, or natural discontinuities ranging from 100% through wall to 20% through wall from the O.D. or as required. Typical calibration standard shown in Figure 2.

- 6.5 The data shall be analyzed using any or all the recorded information necessary to determine the nature and severity of all detectable indications, as required.
- 6.6 All indications analyzed will be categorized using the recommended DDA-4 Notation. These codes are inclusive, but shall not be limited to the listing located in Figure 3.
- 6.7 When the signal of interest is interfered with by a support structure, sludge, dent, noise, or other unwanted responses, a multi-frequency mix may be used to aid in evaluation of the signal. These indications will be evaluated using the appropriate sizing frequency and mixes as needed.
- 6.8 When the signal of interest is interfered with by a support structure, noise, or other indications, including signals of very low voltage, one or more of the following techniques may be utilized to improve the accuracy of classification and sizing.
 - 6.8.1 Other frequencies
 - 6.8.2 Mixes
 - 6.8.3 Special techniques
 - 6.8.3.1 Rotating Eddy Current Probes
 - 6.8.3.2 Magnetic Bias Probes
 - 6.8.3.3 8 x 1 Probes
 - 6.8.3.4 Ultrasonic Inspection
 - 6.8.3.5 D Coils or Segment Bobbin Coil Probes
 - 6.8.3.6 Other

NOTE: Free span flaw like indications, regardless of amplitude or phase angle, should be subjected to the above signal enhancing techniques. There will be no voltage or phase threshold for flaw like indication quantification.

7.0 SIGNAL FORMATION

The initial direction of the signal formation supplies important information about the indication type to the data analyst. Signal formation may be determined by strip chart recordings or by CRT display. Signal phase must be set to a known standard prior to initiation of the data analysis.

- 7.1 Relevant indications in the differential mode shall be phased such that known flaws in the calibration standard form (negative) initially. Relevant absolute signals shall be phased such that flaws in the calibration standard form upward (positive) initially.
- 7.2 Non-relevant indications in the differential mode will normally form upward (positive) initially. Non-relevant indications in the absolute mode will normally form downward (negative) initially.
- 7.3 The data analyst shall be cognizant of the fact that a real flaw (relevant indication) will have appropriate phase and voltage correlation at various frequencies. However no voltage or phase threshold should be used to disqualify an indication from further evaluation.

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8.0 PHASE ANGLE MEASUREMENTS

- 8.1 All phase angle measurements will be compared to the relevant calibration curve to determine percent through wall, utilizing a 3 point fit curve. This curve shall be constructed utilizing the as-built dimension of the calibration standard and actual phase angle or amplitude data obtained from passing the test probe through the calibration standard. (See Figure 4 for a typical curve). The 4.1 curve supplied with the DDA-4 Data Analysis Software will only be utilized if specified in the Customer Specific Data Analysis Requirements.
- 8.2 Phase angle of an indication must be determined by the proper selection of angle points.
- 8.3 Indications that return to calibration point (null point) and have a definite straight line transition between peaks shall be called from straight line peaks. Figure 5.
- 8.4 Any indication that deviates from the calibration point (null point) shall be called from amplitude peak to peak points. Figure 5.

9.0 SIZING MEASUREMENTS

- 9.1 The "set-volts" sizing capability of the DDA-4 should be set to 5.00 volts peak-to-peak on the calibration standard 20% flat bottom hole at 400 kHz. This voltage should then be saved and stored to all other channels.
- 9.2 The lower the frequency, the more the signal penetration, but the smaller the phase separation. Therefore, the lower frequencies are mainly used for detection not sizing. Low frequencies may be used for sludge, loose parts detection, etc.

10.0 AXIAL POSITION LOCATION

All indications representing tube wall degradation shall be recorded with reference to a known structure, i.e., tube support plates, tubesheets, anti-vibration bars.

- 10.1 Determine from as-built drawing, (preferred) design drawings or client supplied information the actual distance between support members.
- 10.2 Calibrate the DDA-4 axial position indicator as described in the System Operating Guideline.
- 10.3 TSP (tube support plate) reference locations shall be conducted using the center of the support as the zero (0) reference point.
- 10.4 Figures 6 and 8 are examples of typical plant layout, S/G sectional views and tube sheet maps. The client will supply the as-built drawings required for the data analyst.

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11.0 DDA-4 FORMAT INFORMATION

All information pertaining to DDA-4 final report format will be typically described below.

- 11.1 The analysis report identification will be typically entered as directed by data management. Parameters should be discussed and mutually agreed prior to examination.
- 11.2 The DDA-4 final report headings shall be typically entered as directed by data management. Special note should be taken for line one as this is used for specific information in the data base system.
- 11.3 Data base software parameters require the generator designator to be the first digit in the "SG" column of the DDA-4 report. The second digit should represent the leg from which the tube is inspected. A "1" is used for the 'hot' side and a "0" for the 'cold' side. Be sure to change the "SG" code if client specific requirements for data acquisition are different.
- 11.4 All notation information of tubes shall be entered in the % column of the final report. Any tube requiring retesting shall contain the letter "R" as the first letter of the three letter code entered in the % TWD column of the DDA-4 Report as shown in Figure 3.
- 11.5 Data analyst shall enter in the extent tested column of DDA-4 final report format, the area of the tube actually tested to the nearest support member actually recorded on the tape. The order of the extent tested column is determined by the direction and extent of the data recording during the data acquisition. The first S/G member noted by the data analyst will identify first on the extent tested column. The last S/G member noted by the data analyst (if utilized) will be identified second in the extent tested column (typically CTE or HTE, cold tube end, hot tube end, etc.)

EXAMPLE: A tube being tested from the cold leg to the hot leg tube end shall be entered as CTEHTE. An optional extent would be CTE if the beginning location is not utilized.

- 11.6 When the DDA-4 final report is completed, the data analyst(s) will sign the report. (See Figure 9).
- 11.7 The analyst should verify the supplement type and revision number of the analysis supplement in the summary section of the DDA-4 report as required by supplementary guidelines.

12.0 RE-EXAMINATIONS

All tubes that require re-examination as a direct result of the evaluation of the data shall be identified by the data analyst. The data analyst is responsible for supplying the row/column number and an explanation for why the re-examination is requested.

13.0 CONFIRMATION OF PLUGGABLE INDICATION

Confirmation of tubes identified for removal from service are usually conducted after completion of the entire eddy current examination or as requested by the client. The intent of this confirmation examination is to verify the indication exists and the data is repeatable in the tube identified to be removed from service. Pluggable limits will be set by plant technical specifications.

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- 13.1 A typical procedure for accomplishing the confirmation is to supply the data acquisition personnel with oscillographs of the pluggable indications for visual verification. The data generated is normally recorded on magnetic tape but is only required at the direct request of client. If the data is recorded and the indication is verified as being correct, the data analyst shall enter the DDA-4 code of "PID" into the data base.
- 13.2 In the event that the "positive identification" examination does not confirm the tube location, resolution is required. Upon completion of the resolution process, the correct tube number shall be noted and all previous data shall be corrected accordingly.

14.0 DATA CONTROL

The lead data management operator shall be responsible for data control of the magnetic tape, oscillographs, printouts, disks, etc. These items shall be turned over to the client upon completion of the examination. Data control shall be in compliance with procedure ROB-410-006, titled "PROCEDURE FOR CONTROL OF EDDY CURRENT DATA FOR USE WITH MULTIFORTH OR EDDYNET ACQUISITION SYSTEMS".

15.0 RECORDING CRITERIA

All indications evaluated to be one of the items identified in Figure 3 recommended DDA-4 notations shall be recorded by the appropriate method. Client specific recording requirements shall augment Figure 3.

16.0 REPORTING CRITERIA

All reportable indications shall be reported to the client on a regular basis. The final report of the inspections results supplied to the client will contain the following at a minimum. Client reporting requirement shall augment this procedure.

- 16.1 All tube wall degradations shall be reported.
- 16.2 All detectable tube dents shall be evaluated.
- 16.3 Any additional condition(s) or abnormalities that the data analyst deems necessary to report shall be reported.

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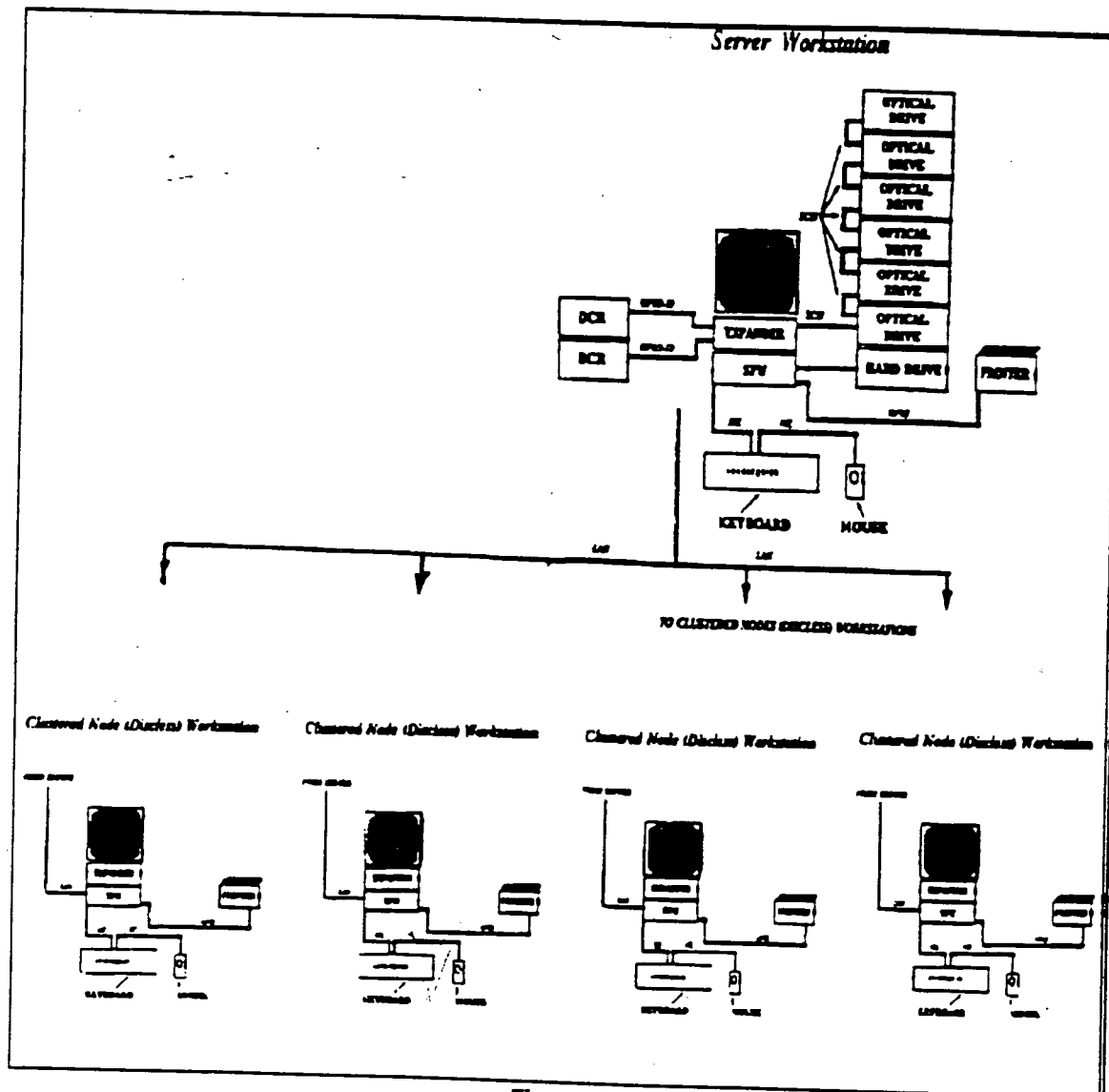


Figure 1

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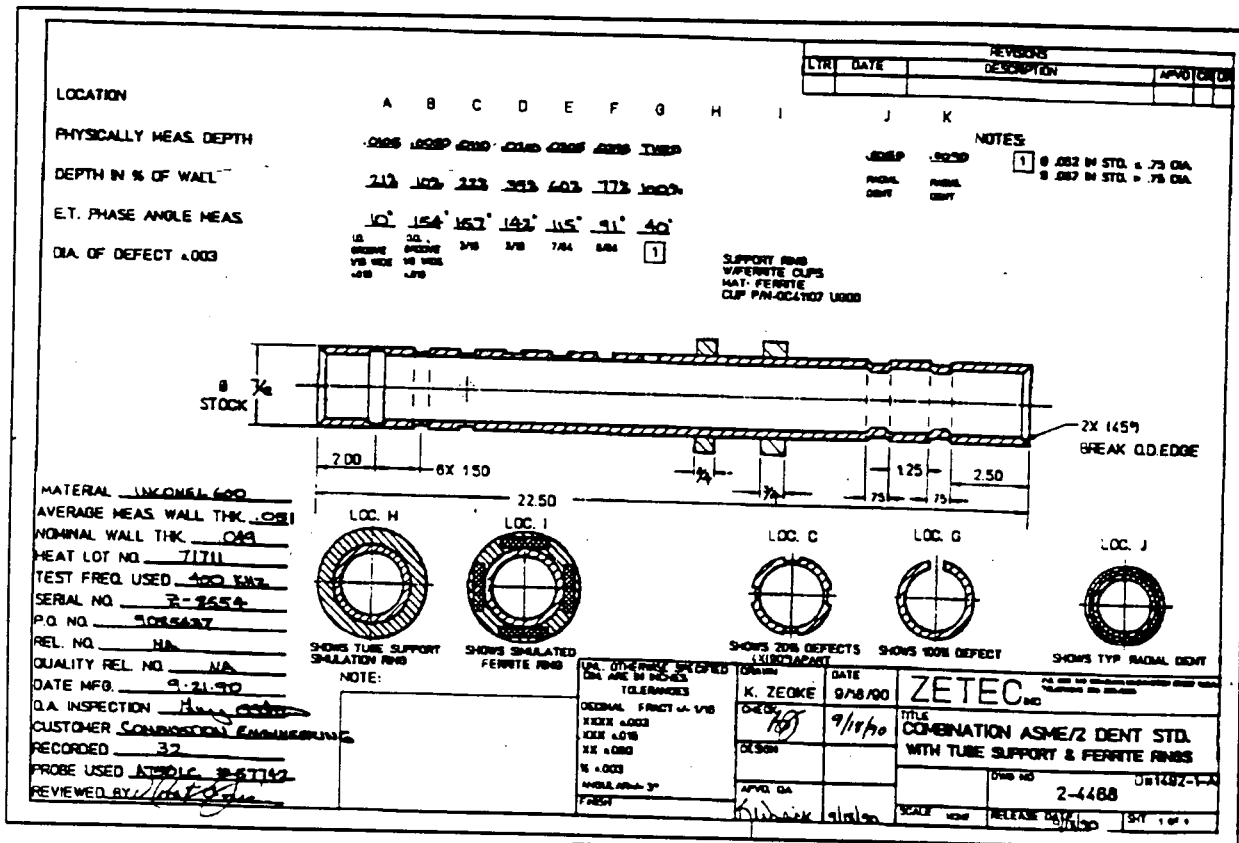


Figure 2

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NOTATIONDESCRIPTION

ADI	ABSOLUTE DRIFT INDICATION
ADR	ABSOLUTE DRIFT
APT	ABSOLUTE POSITIVE TRACE
BLANK	NO INDICATION (NDD)
BLG	BULGE
CUD	COPPER DEPOSIT
DEP	DEPOSIT (NON-COPPER)
DNT	DENT
DRI	DISTORTED ROLL INDICATION
DRT	DISTORTED ROLL TRANSITION
DSI	DISTORTED SUPPORT PLATE INDICATION
DSS	DISTORTED SUPPORT SIGNAL (NO INDICATION)
OTS	DISTORTED TUBESHEET SIGNAL
DTI	DISTORTED TUBESHEET INDICATION
EXP	EXPANSION
HTM	HEAT TREATMENT MARGINAL
HTT	HEAT TREATMENT
IDC	INSIDE DIAMETER CHATTER
IDV	INSIDE DIAMETER VARIATION
INF	INDICATION NOT FOUND
LAR	LEAD ANALYST REVIEW
LPI	LOOSE PART(S) WITH INDICATION
NHT	NO HEAT TREATMENT
NQI	NON QUANTIFIABLE INDICATION
NSY	NOISY TUBE
NTE	NO TUBESHEET EXPANSION
OBS	OBSTRUCTED TUBE
OVR	OVER ROLL ABOVE TOP OF TUBE SHEET (TTS)
EXP	OVER EXPANSION
PHT	POP-UP HEAT TREATMENT
PID	POSITIVE IDENTIFICATION
PLG	PLUG
PLP	POSSIBLE LOOSE PART(S)
PTE	PARTIAL TUBESHEET EXPANSION
PVN	PERMEABILITY VARIATION
RBD	RETEST BAD DATA
RFX	RETEST FIXTURE
RNC	RETEST TUBE NUMBER CHECK
RND	RETEST NO DATA
RPI	RETEST FOR POSITIVE INDICATION
RTI	RETEST TUBE INCOMPLETE
RTP	RETEST TEMPLATE PLUG
SHT	STRAIGHT LEG HEAT TREATMENT
SKR	SKIP ROLLED
SLG	SLUDGE
SLV	SLEEVE
TMR	TOP MAIN ROLL
1PT	ROW 1 PROBE POSITIVE TRACE IN ROW 1 TUBE
2PT	ROW 1 PROBE POSITIVE TRACE IN ROW 2 TUBE
1ST	ROW 1 PROBE SUSPECTED TRACE IN ROW 1 TUBE
2ST	ROW 1 PROBE SUSPECTED TRACE IN ROW 2 TUBE
IDI	INSIDE DIAMETER INDICATION
ODI	OUTSIDE DIAMETER INDICATION
RES	RESTRICTED TUBE (WITH CURRENT PROBE SIZE)
SAI	SINGLE AXIAL INDICATION
MAI	MULTIPLE AXIAL INDICATION
MBM	MANUFACTURING BUFF MARK
REC	RETEST FOR ENCODE CHECK

FIGURE 3
LIST OF APPROVED DDA-4 NOTATIONS

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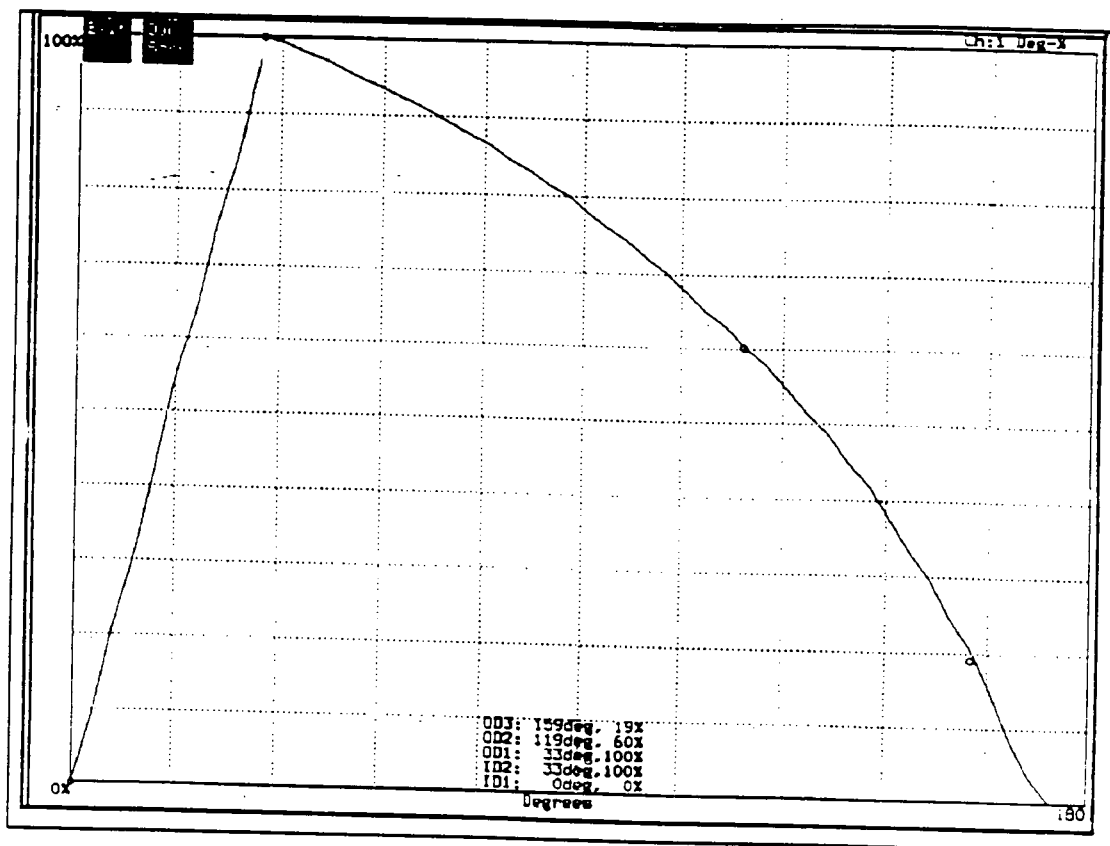


Figure 4

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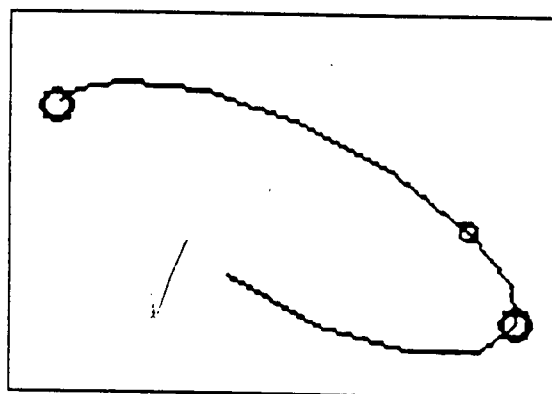
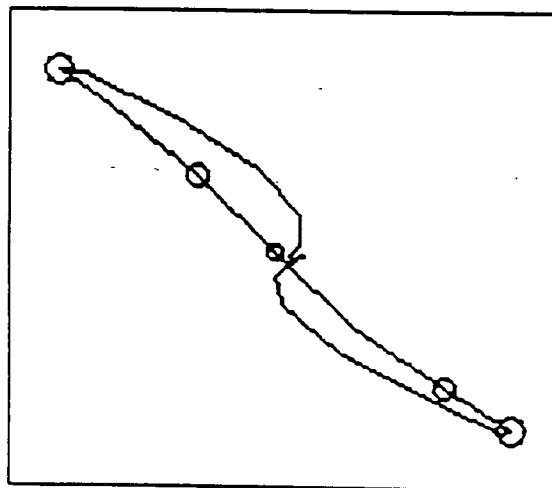


Figure 5

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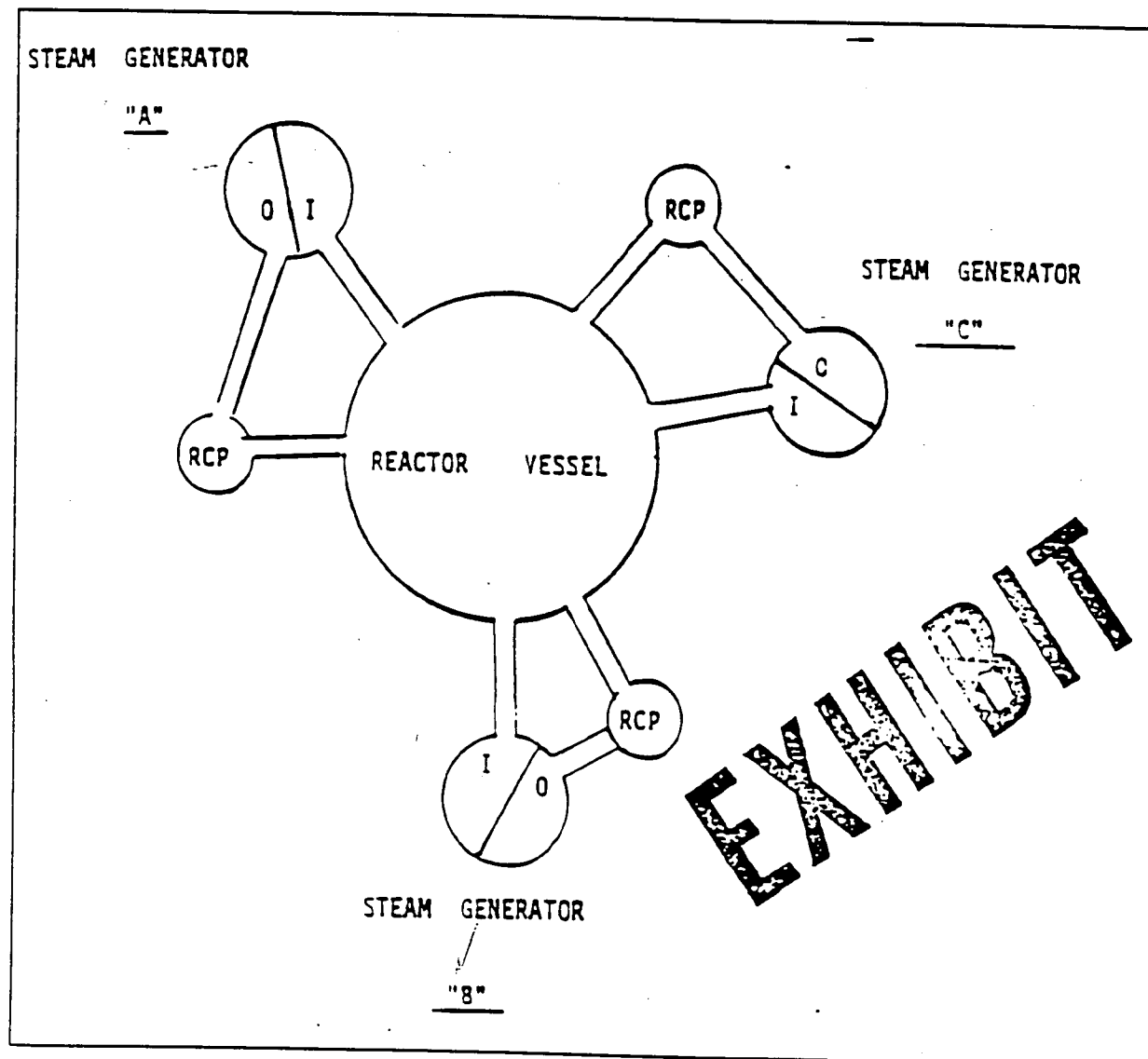


Figure 6

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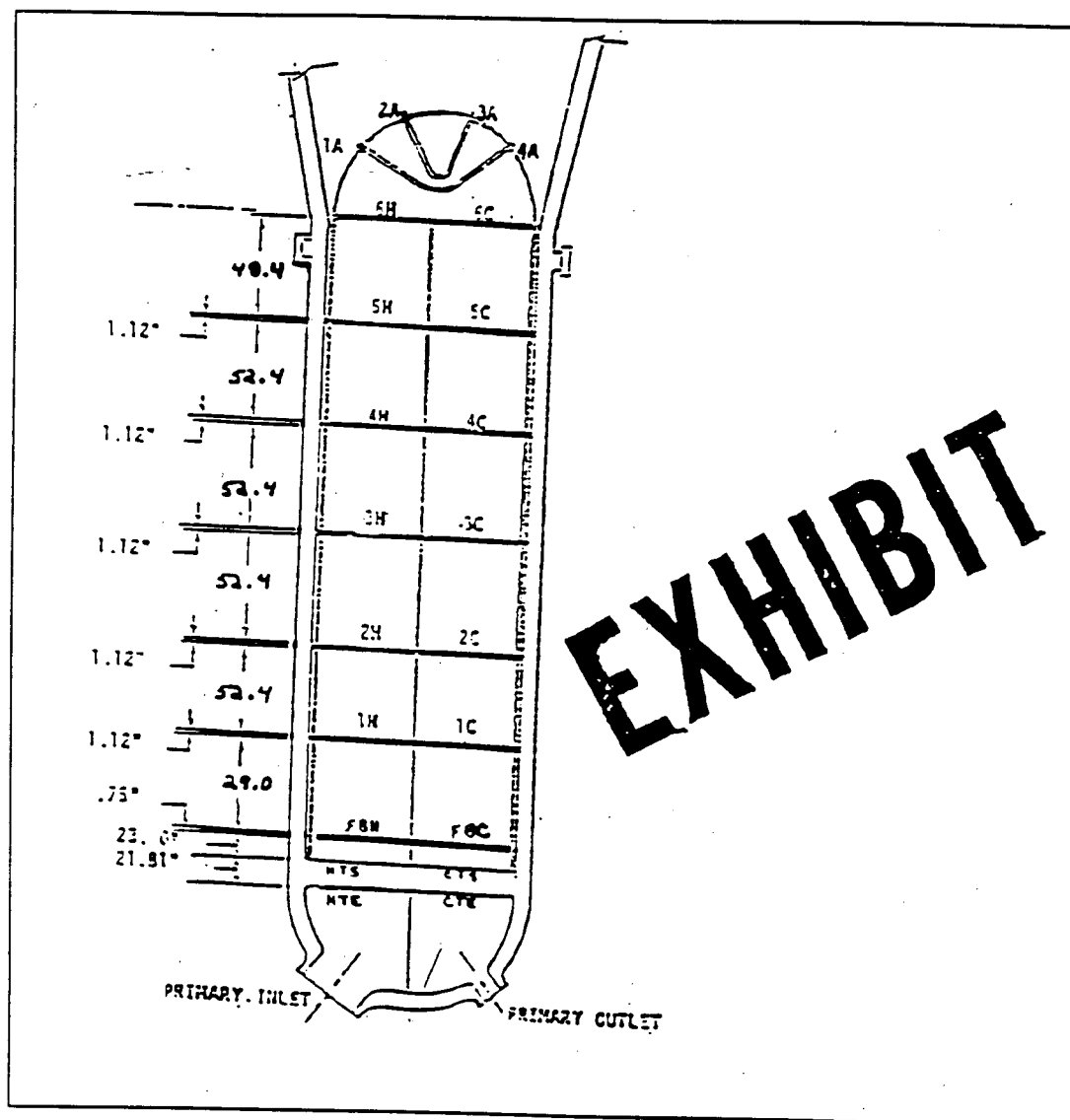


Figure 7

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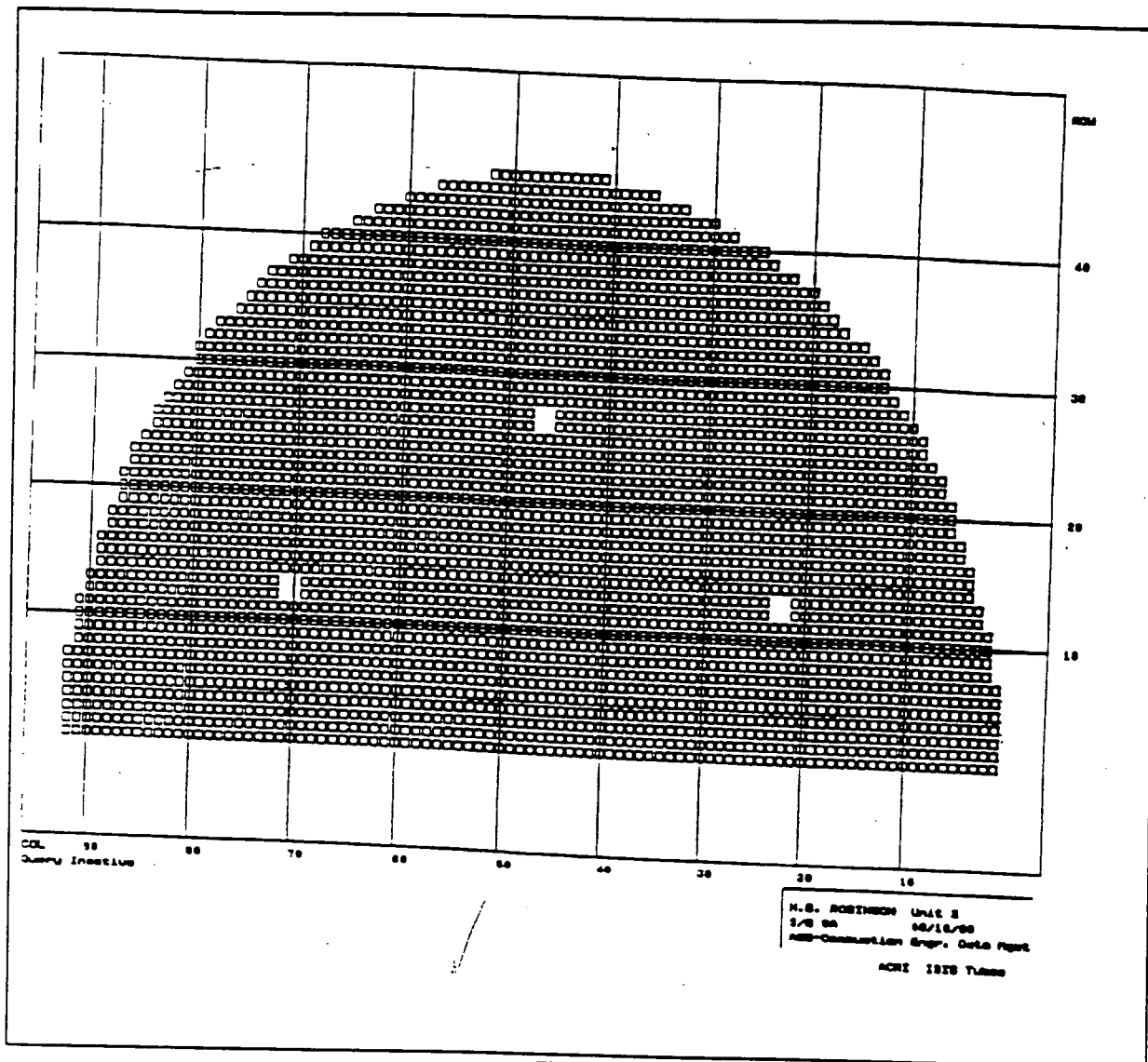


Figure 8

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Sep 18 12:40 1991 /rod3/resolution/tape001A.cal01/gat5028.res Page 1						
File=resolution/tape001A.cal01 User=gat5028 Date=9/18/91 12:40						
Disc Label = DKDB_A05						
20	62	1	TERNING GA	AC01	A510MULC	DB_A05 09/17/91
20	63	1				UTELTE
20	64	1				UTELTE
20	65	1				UTELTE
20	66	1				UTELTE
20	67	1				UTELTE
20	68	1				UTELTE
20	69	1				UTELTE
20	70	1				UTELTE
20	71	1				UTELTE
20	72	1				UTELTE
20	73	1				UTELTE
20	74	1				UTELTE
20	75	1				UTELTE
20	78	1				UTELTE
20	79	1				UTELTE
20	80	1				UTELTE
20	81	1				UTELTE
20	82	1				UTELTE
20	83	1	0.35	77 35	17 015	+ 0.00
20	84	1				UTELTE
20	85	1				UTELTE
20	86	1	0.36	78 S/N	17 013	+ 0.18
20	87	1				UTELTE
20	88	1				UTELTE
20	89	1				UTELTE
20	90	1				UTELTE
20	91	1				UTELTE
20	92	1				UTELTE
20	93	1				UTELTE
20	94	1				UTELTE
20	95	1				UTELTE
20	96	1				UTELTE
20	97	1				UTELTE
20	98	1				UTELTE
20	99	1				UTELTE
20	100	1				UTELTE
20	101	1				UTELTE
20	102	1				UTELTE
20	103	1				UTELTE
20	104	1	11.30	170 DNG	3 UTSP	+ 16.89
20	105	1				UTELTE
20	106	1				UTELTE
20	107	1				UTELTE
20	108	1				UTELTE
20	109	1	1.53	120 MBM	3 006	+ 31.37
20	110	1				UTELTE
20	111	1	2.96	123 MBM	3 008	+ 1.74
20	111	1	0.90	78 S/N	17 008	- 0.24
20	112	1	1.16	115 MBM	3 015	+ 13.61
END TAPE						

Figure 9

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ABB-COMBUSTION ENGINEERING EDDY CURRENT EXAMINATION SHEET					
OWNER:					PAGE: 1
PLANT/UNIT:					SG #1
PROCEDURE: 410-004 R2					
PROBE:					
ECT DESCRIPTION: BOBBIN EXAM FOR DEFECT DETECTION					FREQUENCY: 400/600/100/10 KHz
DATASET: ABOBBIN					LEG: HOT
					EXTENT:
ROW	COL	TESTED	DATE	REEL	COMMENTS
1	96				C6
3	96				C6
2	97				C6
1	98				C6
3	98				C6
2	99				C6
1	100				C6
3	100				C6
2	101				C6
1	102				C6
3	102				C6
2	103				C6
1	104				C6
3	104				C6
2	105				C6
1	106				C6
3	106				C6
2	107				C6
1	108				C6
3	108				C6
2	109				C6
1	110				C6
3	110				C6
2	111				C6
1	112				C6
3	112				C6
2	113				C6
1	114				C6
3	114				C6
2	115				C6

Total Exams this Dataset: 30 This page: 30

Figure 10

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See Steam Generator ECT Data Analysis Guideline

C-E ET LEVEL III	DATE	CUSTOMER REPRESENTATIVE	CONCURRENCE	DATE
------------------	------	-------------------------	-------------	------

Attachment A
Data Sheet Documenting
Customer Specific Data Analysis Requirements

MAJOR REVISION


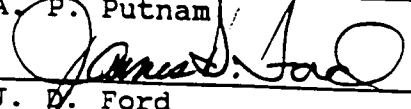
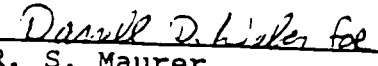
PROCEDURE FOR CONTROL
OF
EDDY CURRENT DATA
FOR
USE WITH MULTIFORTH OR EDDYNET
ACQUISITION SYSTEMS

H.B. ROBINSON

UNIT 2

PROCEDURE NO.
ROB-410-006

OUTAGE SERVICES DEPARTMENT
ABB COMBUSTION ENGINEERING NUCLEAR SERVICES
CHATTANOOGA, TENNESSEE
WINDSOR, CONNECTICUT

PREPARED BY:  DATE: 6/23/93
A. P. Putnam
APPROVED BY:  DATE: 7/1/93
J. P. Ford
Quality Assurance
APPROVED BY:  DATE: 6/30/93
R. S. Maurer
Manager, NDE Technology

REVISION: 2

DATE: 06/10/93

PAGE: 1 OF 15

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5.0	SEQUENCE OF OPERATION
6.0	VERIFICATION OF COMPLETION
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1.0 OBJECTIVE

Eddy Current Data Management is the tracking, control, uploading, and reporting of eddy current data which has been acquired during an eddy current examination. The eddy current data is tracked from the initial receipt of the acquired data in the data management area to the delivery of the final results to Carolina Power and Light. To prevent data management discrepancies, specific forms and procedures will be used to ensure the efficient routing and control of the acquisition media, optical disks, analysis results, and data management reports.

2.0 REFERENCES

- 2.1 ISIS-TUBE Users Reference Manual, Revision 11, January 1992.
- 2.2 Zetec EDDYNET Analysis System Users Guide.
- 2.3 Eddy Current Data Analysis Procedure Evaluation of Westinghouse Steam Generator Tubing, ROB-410-005, latest revision.

3.0 PERSONNEL REQUIREMENTS

Each person performing Data Management duties governed by this procedure shall be trained in the use and operation of the ISIS-TUBE data management system in accordance with Reference 2.1, and the specific requirements of this procedure. In addition, each person performing EDDYNET system administration functions shall be trained in the use and operation of the EDDYNET Analysis System in accordance with Reference 2.2.

- 3.1 The Data Controller shall be responsible for all editing performed within the ISIS-TUBE data management system. The Data Controller will assign specific editing actions to an analyst, trained in accordance with reference 2.3, when edits to the results files are required on the EDDYNET storage media.
- 3.2 Data Management shall be responsible for tracking all eddy current data from the time it is delivered to the data management/analysis center until final reports of analysis results are submitted to the client.

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4.0 PRECAUTIONS AND PREREQUISITES

- 4.1 The eddy current data management equipment will be set up in an area designated by the site personnel and approved by the ABB Combustion Engineering Analysis and Data Management Team.
- 4.2 Data Management checkoff sheets will be used to document tracking of the eddy current data throughout the data management and analysis process.
- 4.3 Checkoff sheets may vary in form to meet specific site requirements or modifications.
- 4.4 The ISIS-TUBE system will be pre-programmed with site specific information prior to the start of data input. This includes, but is not limited to, input of all analysis acronyms, data checks, file specifications, and file header definition.
- 4.5 The ISIS-TUBE system set-up will be verified by the Data Management Shift Coordinator prior to the start of data entry for the inspection. The verification shall be performed in accordance with Section 9.1 and documented on Form DM-6, Figure 6.
- 4.6 The ISIS-TUBE system set-up shall be re-verified under the following conditions and documented on Form DM-6:
 - 4.6.0 Following the restoration of software executables from a backup disk.
 - 4.6.1 Following any software updates.

5.0 SEQUENCE OF OPERATIONS

The following describes the sequence of operations to be followed in order to properly control the eddy current data, and to successfully load completed EDDYNET result files to the ISIS-TUBE data management system.

- 5.1 (Acquisition) Deliver the eddy current data package to the data management area. At a minimum, the eddy current data package shall consist of:
 - 5.1.1 Acquisition to DCR Tape
 - 1. Original DCR tape
 - 2. Original operator examination sheets
 - 3. Calibration Sheet

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5.1.2 Acquisition to Traveling Optical Disk

1. Traveling Optical Disk
2. Traveling Calibration Sheet
3. Operator examination sheets

5.1.3 Acquisition to Remote Optical

Notification of calibration group completion
Notification of data transfer and destination

5.2 (Data Controller) Review the tape/optical labels and calibration sheets to insure that they are properly completed. Take corrective action if necessary.

5.3 (Data Controller/System Administrator) Log in receipt of tapes/calibrations on form DM-1.

5.4 (System Administrator) Transfer raw eddy current data from tape/optical to analysis media and complete appropriate entries on form DM-1.

5.5 (Data Controller) For data acquired to DCR tape or traveling optical, prepare packages for primary and secondary analysis. As a minimum, the package should include:

5.5.1 Operator examination sheets (original to primary and a copy to secondary)

5.5.2 T-list generated from raw data transfer

NOTE: THE FOLLOWING STEPS APPLY TO PRIMARY, SECONDARY, AND FINAL ANALYSIS.

5.6 (Data Analyst) Record initials on form DM-1 at the start of each tape or calibration group analyzed.

5.7 (Data Analysts) Build a report file when analysis is complete for each tape or calibration group. Return the examination sheets and the EDDYNET report printouts to the data management area. Record return of package on form DM-1.

CAUTION: If, after returning the completed data package to the data management area, the analyst determines that changes are necessary to the analysis results, the analyst will identify the changes to data management in order to ensure correct file retrieval from the Local Area Network. All edits

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to FINAL results will be done in accordance with Step 5.9.

NOTE: THE FOLLOWING STEPS APPLY TO FINAL ANALYSIS.

- 5.8 (Data Controller) Review the EDDYNET report printout for correct format and information.
- 5.9 (Data Analyst) If the information is in error, the EDDYNET file will be corrected by the analyst, and a new EDDYNET report printout will be generated. If the error requires tracking, the appropriate information will be recorded on form DM-3.
- 5.10 (Data Controller) When all information is verified, retrieve the EDDYNET data file from the Local Area Network.
- 5.11 (Data Controller) Load the EDDYNET file to the appropriate ISIS-TUBE database and record on form DM-2.
 - 5.11.1 If an error file is generated, the EDDYNET file will be edited as in Step 5.9 and the ISIS-TUBE database will be manually corrected.
- 5.12 (Data Controller) When primary and secondary analysis data has been completed for a given tape or calibration group, prepare the data package for resolution and notify the Lead Analyst. The package should contain both primary and secondary analysis folders.

6.0 VERIFICATION OF COMPLETION

When it has been indicated by Acquisition that the inspection plan in a given steam generator, or a generator subsection, has been completed, the Data Management Shift Coordinator, or a designee, will verify that the requirements of the examination scope have been met prior to approving equipment removal or relocation. The verification process will be tracked using form DM-4. As a minimum, the following conditions will be verified using custom reports, text queries, and graphic queries:

- 6.1 Verify that all tubes in the inspection plan have been tested with the correct probe type.
- 6.2 Verify that all tubes in the inspection plan have been tested and analyzed to the required extent.

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6.3 Verify that no reported retest is outstanding, and that all data necessary to complete each tube requiring a retest exam has been acquired and analyzed.

6.4 Verify that all analysis codes requiring further action, such as examination with another probe, or additional review, have been addressed appropriately.

NOTE: ANALYSIS CODES REQUIRING FURTHER ACTION WILL BE DEFINED IN, AND USED IN ACCORDANCE WITH, REFERENCE 2.3, THE EDDY CURRENT DATA ANALYSIS PROCEDURE EVALUATION OF WESTINGHOUSE STEAM GENERATOR TUBING, ROB-410-005.

6.5 Verify that all technical specification requirements for additional testing have been satisfied.

NOTE: ANY CONDITIONS NOT SATISFIED WILL BE REPORTED IMMEDIATELY TO THE SENIOR ANALYST AND/OR TASK MANAGER FOR CORRECTIVE ACTION.

7.0 REPORTING CRITERIA

Reports of accumulated eddy current data shall be prepared by the Data Controller or a properly trained designee. Status reports and final reports will be generated in a timely fashion, and in accordance with client requirements. Whenever possible, report formats will be established before the start of work.

8.0 DATA MANAGEMENT SHIFT LOG

The Data Management Shift Coordinator shall maintain a log of the events occurring on each shift. Figure 5 displays a typical Data Management Log Sheet. The log book will function as the primary method of disseminating information between shifts. As a guideline, appropriate log book entries may include, but are not limited to, the following:

8.1 Problem and Trouble Shooting Documentation

8.1.1 Document all problems encountered with ISIS-TUBE hardware and software. Whenever possible, include the nature of the problem, problem duration, problem resolution, and action taken to prevent reoccurrence.

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- 8.1.2 Document all problems encountered with custom reports, reporting formats, and report generation.

8.2 Requests for Information

Document any requests for information from outside of data management. Include any specific time commitments, formats, and the requesting party.

8.3 Changes to ISIS Reports or Screen formats

Document any additions or modifications to existing screens, menus, or reports. Include any specific instructions for using reports or input screens.

8.4 Changes Affecting Analysis Result Files

Document any changes to report formats, acronym usage, and report parameters that affect the reporting of results by analysis. This information is to be provided to the Lead Analyst for inclusion in shift turnover in accordance with Reference 2.3.

9.0 Data Base Set-up Verification

- 9.1 Input the correct data acceptance parameters into the ISIS-TUBES system under the DDA4 Data Disk Options menu and document on Form DM-6, Figure 6.

- 9.1.0 Under Select Data Checks, set all flags to <Y> and Disk Encode beginning in column 2. Special Disk Encode should be blank.

- 9.1.1 Define any retest codes listed in Reference 2.3, not beginning with the letter <R> in the Define Retest Codes screen.

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9.1.2 Complete the Field/Attribute Map as follows:

<u>Attribute</u>	<u>Start Column</u>	<u>Length</u>
TUBEROW	5	3
TUBECOL	9	3
EXAIVOLT	13	5
EXAIDEG	19	3
EXAIDEPH	23	3
EXAMCHAN	27	3
EXAILOC1	31	3
EXAILOC3	39	7
EXAILOC4	48	7
EXAMDEXT	56	3
EXAMELEV	59	4

9.1.3 Enter up to 40 analysis flaw codes as listed in Reference 2.3. All defect related codes should have an extent check of to insure that a test extent is reported, as well as the defect location.

NOTE: EVENTS MAY REQUIRE A DEVIATION FROM THE ABOVE SET-UP. PROPOSED CHANGES MUST BE APPROVED BY THE LEAD ANALYST PRIOR TO ADJUSTING THE DATA PARAMETERS. DOCUMENT UPDATES ON FORM DM-6.

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FIGURE 1

EXAMPLE ANALYSIS TRACKING LOG

[illegible]

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FIGURE 3

EXAMPLE ISIS/EDDYNET EDIT TRACKING LOG

ISIS/EDDYNET EDIT TRACKING FORM

OPTICAL DISK:	ISIS EDIT []
CAL GROUP:	EDDYNET FILE []
ROW/COL:	NEW PRINTOUT []
DESCRIPTION OF EDIT:	
	INITIALS:
	DATE/TIME:

OPTICAL DISK:	ISIS EDIT []
CAL GROUP:	EDDYNET FILE []
ROW/COL:	NEW PRINTOUT []
DESCRIPTION OF EDIT:	
	INITIALS:
	DATE/TIME:

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FIGURE 4

EXAMPLE SCOPE VERIFICATION FORM

R.B. ROBINSON
EDDY CURRENT CLOSEOUT WORKSHEET
AUGUST 21, 1993

ZONE	POS.	SCHED	RET	INC	DIAG
1	1	120	10	0	0
2	1	200	0	220	0
3	1	110	0	110	0
4	1	130	0	130	0
5	1	200	0	200	0
6	1	400	0	400	0
7	1	50	0	50	0
8	1,2	35	0	35	0
9	1,2	118	0	118	0
10	1,2	200	0	200	0
11	2	134	0	134	0
12	2	109	0	109	0
13	/ 2	87	0	87	0
14	/ 2	98	0	98	0
15	2	59	0	59	0

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FIGURE 5

EXAMPLE DATA MANAGEMENT SHIFT LOG SHEET

DATA MANAGEMENT SHIFT LOG		DATE:
PREPARED BY:		TIME:
		PAGE OF
DISTRIBUTION:	ANAL ACQ N/A	

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FIGURE 6
EXAMPLE DATA PARAMETER SET-UP VERIFICATION SHEET
DM-6

ISIS Data Parameter Set-up Verification

Component	Version		Revision	
Input Screens	Date	Time	Initials	Printout
Attribute Map	_____	_____	_____	_____
Data Checking	_____	_____	_____	_____
Retest Codes	_____	_____	_____	_____
Analysis Codes	_____	_____	_____	_____
File Header	_____	_____	_____	_____

VERIFICATION REQUIRED FOR:

INITIAL SET-UP ☐
 POST FILE RESTORATION ☐
 POST SOFTWARE UPGRADE ☐
 TEST/DATA CHANGE ☐
 PRINTOUTS ATTACHED ☐

VERIFIED BY: _____

DATE: _____
TIME: _____

TOOL AND EQUIPMENT ACCOUNTABILITY

STD-CFS-059 REV. 2

CHATTANOOGA FIELD SERVICES
COMBUSTION ENGINEERING, INC.

PREPARED BY: W. G. Ware DATE: 11/19/86
COGNIZANT SUPERVISOR APPROVAL: [Signature] DATE: 11/19/86
FIELD OPERATIONS APPROVAL: [Signature] DATE: 11/19/86
Q.A. APPROVAL: [Signature] DATE: 11-19-86

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1.0 PURPOSE

- 1.1 To describe the provisions for control of all items which are used inside a steam generator, reactor vessel or other components where Combustion Engineering is responsible for accountability of tools and equipment in a controlled area.

2.0 REFERENCES

- 2.1 None

3.0 DEFINITIONS

- 3.1 Controlled Area - A controlled area is any area defined by the utility to require material accountability.

4.0 PROCEDURE

4.1 GENERAL

- 4.1.1 This procedure shall be in effect as noted in Paragraph 1.0 above.
- 4.1.2 The CE shift coordinator will ensure that a log keeper is assigned for each shift. The log keeper may be changed during the shift, depending on specific requirements of the particular task. The log keeper will be familiar with the requirements of this procedure.
- 4.1.3 The CE project coordinator shall assure that shift changeover includes assignment of a log keeper and that status of equipment inside the controlled area is clearly understood. Equipment may remain inside as long as the log reflects this status.
- 4.1.4 The accountability log may be kept in the controlled area, or may be kept in a remote area if voice and/or communication is maintained continuously when tools or equipment are being moved into a controlled area.

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- 4.1.5 The log keeper will be responsible for ensuring that the log is properly kept, that all personnel moving tools and equipment into or out of the controlled area are familiar with the requirements of this procedure, and that the log reflects all items entering or leaving the controlled area.
- 4.1.6 If foreign objects are found inside the controlled area and are removed, they shall be noted in the "out" section of the log with an explanatory note including location.

4.2 DETAILED PROCEDURE

- 4.2.1 The log keeper will fill in all information required at the top of the log sheet.
- 4.2.2 As material is moved into the controlled area, the log keeper will identify each item and the initials of a person moving it into the controlled area. This information together with quantity, date and time will be entered in the log.
- 4.2.3 As material is removed from the controlled area and upon completion of examination of the item by the person(s) who removed it, the information shall be recorded on the log.
- 4.2.4 Items which are not in some way securely attached to each other shall be considered separate items and shall be individually identified in the log.
- 4.2.5 Upon completion of work and prior to closing controlled area, the CE job coordinator shall review the log sheets and ensure that all items logged in were also logged out or otherwise accounted for.
- 4.2.6 The CE coordinator shall collect all log sheets once the area has been closed. This information shall be retained in the CE site office until completion of the task, with copies provided to the utility upon request.

TOOL AND MATERIAL ACCOUNTABILITY LOG

UTILITY _____ PROCESS _____

COMPONENT _____ UNIT _____ PAGE _____

[illegible]

PROCEDURE REVIEW AND CERTIFICATION FORM

Test performed by:			
<u>Initials</u>	<u>Name (Print)</u>	<u>Date</u>	

Test complete: Date _____ Time _____

[illegible]

Reviewed by: _____
 Test Technician (Coordinator) _____
 Date _____

Approved by: _____
SG System Engineer _____ Date _____

TOOL AND MATERIAL ACCOUNTABILITY LOG

UTILITY CP+L H.B. ROBINSON

PROCESS _____

COMPONENT UNIT 2 SIGA "HOT"

UNIT UNIT 2

PAGE 1

ITEM

IN

OUT

QTY

DATE/
TIME

CHKD.
BY

LOG
BY

QTY

DATE/
TIME

CHKD.
BY

LOG
BY

TUBE LIGHT

1

9/30/93
0043

(Kw)

1

9/30/93
0050

10/6/93

(Kw)

TACKLE

1

9/30/93
0045

(Kw)

1

9/30/93
0058

10/6/93

(Kw)

NOZZLE COVER

1

9/30/93
0052

(Kw)

1

10-5-93
11.11

10/6/93

(Kw)

Tube LIGHT

1

9/30/93
0052

(Kw)

1

9/30/93
0056

10/6/93

(Kw)

PIN/TILT Camera

1

9-30-93
0421

P&P

1

10-5-93
11.10

10/6/93

(Kw)

* Bowl Sepu performed by Pin & Tilt Camera

Pin to Nozzle Cover Removal (P) 10/5/93

Bowl Sepu Witness by:

ABB/CE QC: Scott Carley 10/6/93

TOOL AND MATERIAL ACCOUNTABILITY LOG

UTILITY CPL

PROCESS Nozzle Cover Installation

COMPONENT S/G A Coln

UNIT 2

PAGE 1

ITEM	IN				OUT			
	QTY	DATE/ TIME	CHKD. BY	LOG BY	QTY	DATE/ TIME	CHKD. BY	LOG BY
Block + Tackle	1	9-30-93 0345		DAP	1	9-30-93 0353	DEC 10/6/93	DAP
Nozzle Cover	1	9-30-93 0349		DAP	1	10-5-93 2130	DEC 10/6/93	7LH
TUBE LIGHT	1	9-30-93 0343		DAP	1	9-30-93 0348	DEC 10/6/93	DAP
PAN + TILT CAMERA	1	9-30-93 0404		DAP	1	9-30-93 0415	DEC 10/6/93	DAP
TUBE LIGHT	1	9-30-93 0350		DAP	1	9-30-93 0353	DEC 10/6/93	DAP
PAN + TILT CAMERA	1	10-5-93 1133		DEC	1	10-5-93 2125	DEC 10/6/93	7LH
* Bowl Scan performed by Pan + Tilt Camera								
Price for Nozzle Cover Removal @ 10/5/93								
OC Witness: David M. White 10/5/93								

PROCEDURE REVIEW AND CERTIFICATION FORM

Test performed by: JWC JOHN W. CROW 10/4/93

Initials Name (Print) Date

Test complete: Date 10/5/93 Time 2200

Comments: See attached summary report. Testing places S/G "A"
in Tech Spec 4.2.1.1.2 category C-1; approved for continued
operation

Reviewed by: Samuel C. Shock 10-6-93

Test Technician (Coordinator) Date

Approved by: [Signature] 10/6/93

SG System Engineer Date

PROCEDURE REVIEW AND CERTIFICATION FORM

Test performed by: DL DARRELL D. Weber 10/4/93
DLP PATTERSON, Douglas L. 10-8-93
BCP PASQUALE, BRIAN C. 10/4/93
DL [Signature] 10/4/93
PK KRIVANEC KARL J. 10/4/93
CD CHARLES DESPAUX 10-8-93
Initials Name (Print) Date

Test complete: Date 10/5/93 Time 2200

Comments:

RCSS
Row 2 Col 6 plugged due to
Restiction, would not pass a .620" Ø
Probe. TUBE plugged per SP-1243.

Reviewed by: Samuel A. Shock 10-6-93
Test Technician (Coordinator) Date

Approved by: [Signature] 10/7/93
SG System Engineer Date

PROCEDURE REVIEW AND CERTIFICATION FORM

Test performed by: FE ED Ericson 10-4-93
MA JOE JACOBS 10-4-93
MC Kimberly Corbitt 10-4-93
28 Thomas W. Binn 10-4-93
DK Leonard D. Kester 10-4-93
DB BLAZEJEWSKI, D.I. 10-4-93
Initials Name (Print) Date

Test complete: Date 10/5/93 Time 2200

Comments: _____

Reviewed by: Samuel A. Shook 10-6-93
Test Technician (Coordinator) Date

Approved by: N/A Qmw 10-27-93
SG System Engineer Date

PROCEDURE REVIEW AND CERTIFICATION FORM

Test performed by: SP SCOTT PYLE 10/4/93
FLH Franklin L. Huttsell 10/4/93
FCM Francis C. Myers 10/4/93
JBG John B. Glenn 10/4/93
RFV Robby F. Varrata 10/4/93
AP ANGELO PASCUCCI 10/4/93
Initials Name (Print) Date

Test complete: Date 10/5/93 Time 2200

Comments: _____

Reviewed by: Samuel A. Shock 10-6-93
Test Technician (Coordinator) Date

Approved by: N/A 10-27-93
SG System Engineer Date

PROCEDURE REVIEW AND CERTIFICATION FORM

Test performed by: LES SHORES, R.J. 10-4-93
SH Darrell Holmes 10-4-93
SP Les R Jones 10-4-93
DS Donald R Smith 10-4-93
SHS SAMUEL A. SHOCK 10-4-93
DMW DAVID M. WINTER 10-27-93
Initials Name (Print) Date

Test complete: Date 10/5/93 Time 2200

Comments: _____

Reviewed by: Samuel A Shock 10-6-93
Test Technician (Coordinator) Date

Approved by: N/A DMW 10-27-93
SG System Engineer Date

PROCEDURE REVIEW AND CERTIFICATION FORM

Test performed by:

<u>JR</u>	<u>John E. Reich</u>	<u>10/4/93</u>
<u>RWH</u>	<u>Ronald W. Hasting</u>	<u>10/4/93</u>
<u>BS</u>	<u>Bart G. Stock</u>	<u>10/4/93</u>
<u>MJ</u>	<u>MICHAEL J. WATROUS</u>	<u>10/4/93</u>
<u>AS</u>	<u>JAMES A. STEARNS</u>	<u>10/4/93</u>

<u>Initials</u>	<u>Name (Print)</u>	<u>Date</u>
-----------------	---------------------	-------------

Test complete: Date 10/5/93 Time 2200

Comments: _____

Reviewed by: James A. Stock 10-6-93
Test Technician (Coordinator) Date

Approved by: N/A Onw 10-27-93
SG System Engineer Date

PROCEDURE REVIEW AND CERTIFICATION FORM

Test performed by: APP ALICE P. PUTNAM 10-4-93

Initials	Name (Print)	Date

Test complete: Date 10/5/93 Time 2200

Comments: _____

Reviewed by: Samuel A. Shuck 10-6-93
Test Technician (Coordinator) Date

Approved by: N/A OMW 10-27-93
SG System Engineer Date

QAP 2.4 - CERTIFICATION PROGRAM FOR
NONDESTRUCTIVE EXAMINATION PERSONNEL

1.0 PURPOSE

To delineate the technical requirements for qualification and certification of Levels I, II and III nondestructive examination (NDE) personnel.

2.0 REFERENCES

- 2.1 ASME Code, Sections I, III, V, VIII, XI and ANSI B31.1.
- 2.2 SNT-TC-1A - 1984, Recommended Practice for Nondestructive Testing Personnel Qualification and Certification.
- 2.3 Nuclear Field Quality Assurance Manual, System N-9.0.
- 2.4 Nuclear Spare Parts Quality Assurance Program Description, System 2.0.
- 2.5 QAP 17.1, Records Retention.

3.0 DEFINITIONS

- 3.1 Activity or Operation - Any part of a technique including but not limited to, film grading, ultrasonic thickness examination, application of penetrant materials, evaluation of examination results, etc.
- 3.2 Certification - Written testimony of qualification.
- 3.3 Certifying Agency - The employer of the personnel being certified.
- 3.4 Employer - The corporate, private or public entity, which employs personnel for wages, salary, fees, or other considerations.
- 3.5 Method - The utilization of a physical principle in NDE in its entirety, i.e., radiography, ultrasonics, liquid penetrant, magnetic particle, eddy current, leak testing, acoustic emission, visual, etc.
- 3.6 Outside Agency - A company or individual that provides NDE Level III services and whose qualifications to provide these services have been reviewed by the employer that engages the company or individual.
- 3.7 Qualification - The demonstrated skill, training, knowledge and experience required for personnel to properly perform the duties of a specific job.

QAP 2.4 - CERTIFICATION PROGRAM FOR
NONDESTRUCTIVE EXAMINATION PERSONNEL

- 3.8 Surveillance - The act of monitoring or observing to verify an item or activity conforms to specified requirements.
- 3.9 Technique - A specific way of utilizing a particular NDE method, i.e., gamma radiography, contact ultrasonics, solvent removable liquid penetrant examination, etc.
- 3.10 Training - The program developed to impart the knowledge and skills necessary for qualification.

4.0 LEVELS OF QUALIFICATION

- 4.1 Trainee - in the process of being qualified and certified to at least NDE Level I, an individual shall be considered a trainee. A trainee shall work with a certified individual and shall not independently conduct any test, interpret or evaluate any results of a test, or write a report of test results.
- 4.2 Level I - shall be qualified to properly perform specific calibrations, specific tests and specific evaluations for acceptance or rejection according to written instructions, and to record the results. He shall receive the necessary guidance or supervision from a certified Level II or III in the same method. Those individuals performing work governed by ASME Code Section XI shall not independently evaluate or accept the results of a nondestructive examination.
- 4.3 Level I Limited - shall be qualified to perform only a specific activity or operation within a particular technique (e.g., application of penetrant materials, etc.).
- 4.4 Level II - shall be qualified to set up and calibrate equipment, and to interpret and evaluate test results with respect to applicable codes, standards and specifications. He shall be able to prepare written instructions and to organize and report nondestructive testing investigations. He shall be familiar with the scope and limitations of the method and shall exercise assigned responsibility for on-the-job training and guidance of trainees and Level I personnel.
- 4.5 Level II A - (Eddy Current Data Analyst for nonferromagnetic steam generator heat exchanger tubing) - satisfies all the requirements for an Eddy Current Level II and in addition, is capable of interpreting and evaluating data taken from eddy current examinations of nonferromagnetic steam generator heat exchanger tubing.

QAP 2.4 - CERTIFICATION PROGRAM FOR
NONDESTRUCTIVE EXAMINATION PERSONNEL

- 4.6 Level II Limited - shall be qualified to perform examinations to a specific technique, activity or operation within a method, (e.g., solvent removable penetrant examination, contact ultrasonic examination, gamma radiography, film interpretation or evaluation of results of a technique or method, etc.).
- 4.7 Level III - shall be capable of and responsible for establishing techniques and procedures, interpreting codes, standards and specifications, and designating the particular test method and technique to be used. The individual shall be capable of evaluating results in terms of existing codes, standards, specifications and shall have sufficient practical background in applicable materials, fabrication or product technology to establish techniques and acceptance criteria where none are otherwise available. The individual shall be responsible for the training and qualification examination of NDE Levels I, II and III candidates. The actual administration and grading of examinations may be delegated in writing, to a duly selected representative of the Level III.
- 4.8 Certifications to the above levels of qualifications issued to NDE personnel prior to adoption of this written practice and based on an approved C-E written practice shall be considered valid for the remainder of the individual's certification period. Future certifications and recertifications shall be in accordance with this written practice.

5.0 EDUCATION, TRAINING AND EXPERIENCE

- 5.1 Level I and II personnel shall satisfy the education, training and experience requirements of Table 2.4-1, as modified below.
 - 5.1.1 For a limited certification, work time experience and classroom training may be reduced for the technique, activity or operation being performed as shown in Table 2.4-2.
 - 5.1.2 For Level IIA certification, an additional 24 hours specific training in eddy current data analysis is required to supplement the ET Level II training requirements as defined in Table 2.4-1. No additional experience is required.

QAP 2.4 - CERTIFICATION PROGRAM FOR
NONDESTRUCTIVE EXAMINATION PERSONNEL

- 5.1.3 Work time experience gained while performing administrative duties shall be considered NDE experience if the duties relate to those covered by certified individuals as defined in Paragraph 4.0.
- 5.1.4 Limitations for individual's certified in accordance with Paragraph 5.1.1 shall be noted on their certification papers.
- 5.2 Level III personnel shall satisfy one of the following education and experience criteria:
 - 5.2.1 Graduate of four (4) year accredited engineering or science college or university with a degree in engineering or science plus one (1) year experience in an assignment comparable to that of a Level II in the applicable method.
 - 5.2.2 Completion, with a passing grade, of at least two years of engineering or science study at an accredited university, college, or technical school plus two (2) years experience comparable to that of a Level II in the applicable method.
 - 5.2.3 Four (4) years experience comparable to that of a Level II in the applicable method.
- 5.3 Organized training shall be completed for all Level I and II individuals seeking certification. For Level III individuals, the training hours shall consist of at least the combined required hours for Levels I and II in the applicable method except when the candidate has been qualified or has held a position certified to that of a Level II, in which case, the requirement for training may be considered met.
- 5.4 To assure that an individual has assimilated the training material presented, he shall satisfy the examination requirements of Paragraph 6.0, as applicable.
- 5.5 Records used to substantiate education, training and experience shall be identified and maintained in accordance with Paragraph 9.0.

QAP 2.4 - CERTIFICATION PROGRAM FOR
NONDESTRUCTIVE EXAMINATION PERSONNEL

6.0 EXAMINATIONS

6.1 The following paragraphs describe the examinations for each qualification level. The written examinations shall be administered without access to reference material (closed book) except that necessary data such as graphs, tables, specifications, procedures and codes may be provided.

6.1.1 Qualification examinations for Levels I and II shall consist of a written General Examination, a written Specific Examination and a documented Practical Examination.

(a) The General Examination shall cover the basic test principles relative to the applicable test method or technique. The minimum number of questions shall be as follows:

<u>METHOD</u>	<u>Level I</u>	<u>Level I Limited</u>	<u>Level II</u>	<u>Level II Limited</u>
Radiography	40	20	40	30
Magnetic Particle	30	15	30	20
Ultrasonics	40	20	40	30
Liquid Penetrant	30	15	30	20
Eddy Current	40	20	40	20
Leak Testing	20	10	20	10
Acoustic Emission	40	20	40	20
Visual	20	10	30	20

QAP 2.4 - CERTIFICATION PROGRAM FOR
NONDESTRUCTIVE EXAMINATION PERSONNEL

- (b) The Specific Examination shall cover the equipment and operating procedures relative to the applicable test method or technique. It shall also cover specifications, codes and acceptance criteria used in the testing procedures. The minimum number of questions shall be as follows:

<u>METHOD</u>	<u>Level I</u>	<u>Level I Limited</u>	<u>Level II</u>	<u>Level II Limited</u>
Radiography	20	10	20	10
Magnetic Particle	20	10	15	10
Ultrasonics	20	10	20	10
Liquid Penetrant	20	10	15	10
Eddy Current	20	10	20	10
Leak Testing	20	10	20	10
1. Bubble Test	15	10	15	10
2. Absolute Pressure Test (Pressure Change)	15	10	15	10
3. Halogen Diode Leak Test	15	10	15	10
4. Mass Spectrometer Leak Test	20	10	40	20
Acoustic Emission	20	10	20	10
Visual	20	10	15	10

- (c) The Practical Examination shall demonstrate to the satisfaction of the examiner that the candidate is familiar with and can operate (except surveillance, see Paragraph 4 below) the necessary test equipment and can interpret and record the resultant information from at least one (1) test specimen. Additional requirements are as follows:

1. At least ten different checkpoints requiring an understanding of the test variables and procedural requirements shall be included in the examination.

QAP 2.4 - CERTIFICATION PROGRAM FOR
NONDESTRUCTIVE EXAMINATION PERSONNEL

2. The description of the specimen(s), the test procedure including checkpoints, and the results of the examination shall be documented.
 3. Level I individuals being certified in accordance with ASME Code Section XI are not required to interpret or evaluate results.
 4. Surveillance personnel shall have a Practical Examination that shall demonstrate to the satisfaction of the examiner that the candidate is familiar with the necessary equipment (except radiography) and can interpret and record the resultant information from at least one (1) test specimen. The requirements listed in Paragraphs 1, 2 and 3 above shall also apply.
- 6.1.2 An Eddy Current Level IIA shall satisfy all of the examination requirements for an Eddy Current Level II and, in addition, shall demonstrate proficiency in evaluating data taken from actual eddy current inspections. The evaluation of data shall be done with regard to the applicable acceptance criteria. At least fifty (50) different items of data shall be included in this examination.
- 6.1.3 Qualification examinations for Level III certification shall consist of written Basic, Method and Specific Examinations.
- (a) The Basic Examination is required only once when examinations for more than one method are taken. The examination shall consist of:
1. At least twenty (20) questions relating to understanding the SNT-TC-1A document (reference 2.2).
 2. At least fifteen (15) questions relating to applicable materials, fabrication and product technology, and

QAP 2.4 - CERTIFICATION PROGRAM FOR
NONDESTRUCTIVE EXAMINATION PERSONNEL

3. At least fifteen (15) questions which are selected from, or are similar to, Level II questions for other appropriate NDE methods.
- (b) The Method Examination shall be administered for each method for which certification is sought and shall consist of:
1. At least thirty (30) questions relating to fundamentals and principles which are selected from, or are similar to, the published ASNT Level III questions for each method, and
 2. At least fifteen (15) questions relating to application and establishment of techniques and procedures which are selected from, or similar to, the published ASNT Level III questions for each method, and
 3. At least twenty (20) questions relating to capability for interpreting codes, standards and specifications relating to the method.
- (c) The Specific Examination shall be administered for each method and shall consist of:
1. At least twenty (20) questions relating to specifications, equipment, techniques and procedures applicable to products and methods utilized by the Combustion Engineering NDE departments and administration of the NDE written practice.
- 6.1.4 The employer, the responsible Level III or his designee shall be responsible for conducting and grading the examinations.
- 6.1.5 A composite passing grade (average of all tests) of 80% or greater is required for examinations administered for qualification. In addition, each individual passing grade (General, Specific, etc.) shall be 70% or greater.

QAP 2.4 - CERTIFICATION PROGRAM FOR
NONDESTRUCTIVE EXAMINATION PERSONNEL

- 6.1.6 If the examinations are administered and graded by an outside agency which issues a pass/fail grade only, a grade value of 80% shall be assigned for each examination administered and successfully passed.
- 6.1.7 When an outside agency other than ASNT or EPRI is used for qualification services, those services rendered shall be in accordance with this written practice. Combustion Engineering shall retain responsibility for the adequacy of the program of the outside agency.
- 6.1.8 A valid endorsement on an ASNT NDE Level III certificate for a specific NDE method may be used to fulfill the Basic and Method examination criteria for Level III certification in the applicable NDE method.
- 6.1.9 Those failing to attain the required grades shall wait at least thirty (30) days or show evidence of having received additional training, as determined by the certifying individual, prior to re-examination.
- 6.1.10 All levels of NDE personnel shall successfully complete an eye examination to assure natural or corrected near vision acuity in at least one eye capable of reading a minimum of Jaeger Number 1 letters on a standard Jaeger test chart at a distance of not less than 12 inches or a near distance test pattern equivalent to a Snellen fraction of 20/20. In addition, when required by Code, contract, specification or standard, personnel shall have natural or corrected far vision acuity equivalent to a Snellen fraction of 20/30.

NDE personnel shall also pass an Ishihara or equivalent color vision examination to show ability to distinguish and differentiate contrasts between colors used in the method for which qualified. When personnel are unable to pass this examination, they shall satisfactorily show ability to distinguish and differentiate contrast between colors as part of their NDE Practical Examination.

- (a) The eye examination shall be given to all NDE personnel on an annual basis.

QAP 2.4 - CERTIFICATION PROGRAM FOR
NONDESTRUCTIVE EXAMINATION PERSONNEL

- (b) Eye examinations shall be performed by a Level III, his designate, or medical personnel.
- (c) The results of the examination shall be recorded on the Eye Examination Record as shown on Exhibit 2.4-1 or equivalent.

7.0 CERTIFICATION

- 7.1 A Level III shall certify Level I and II personnel. Certification of Level III personnel shall be by the responsible department head. All certifications shall be documented on a Certification Record as shown on Exhibit 2.4-2.
- 7.2 The certification period for Levels I and II personnel shall be three (3) years. For Level III personnel, the certification period shall be:
 - (a) three (3) years for personnel performing work governed by ASME Code Section XI, or
 - (b) five (5) years for all other Level III Personnel.
- 7.3 Certification of all levels of NDE personnel shall be based on successful completion of the education, training and experience requirements of Paragraph 5.0 and the required examinations of Paragraph 6.0.
 - 7.3.1 The maximum duration of interrupted service for each NDE method or technique shall be one (1) year. Where evidence of use of the method or technique can not be shown, the individual shall successfully complete the examinations deemed necessary by the responsible Level III or department head prior to reactivating the certification.
- 7.4 New employees having held valid NDE certifications with their former employer may be certified to their former NDE levels provided that:
 - 7.4.1 The employee provides proof of prior certifications, or
 - 7.4.2 The former employer provides documentation substantiating the training and experience qualification obtained by the employee. The qualifications shall meet the requirements of SNT-TC-1A (reference 2.2) and this written practice.

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NOTE: Every attempt shall be made to procure the documentation that substantiates the certification, however

- a. When the former employer will not verify training and experience time, an individual's personal history may be acceptable documentation.
- b. The employee's former training and experience may be verified by telephone. A record of telephone conversation shall be acceptable documentation of an individual's prior training and/or experience when documentation is otherwise unavailable.

7.4.3 The employee was working in the test method within six months of termination and is certified within six months after termination.

- (a) When limits are in excess of those specified above, the employee shall receive additional training, as determined by the certifying individual, prior to certification.

7.4.4 The employee successfully completes the examination requirements, as applicable, of Paragraph 6.0.

7.5 Certification shall be revoked by the responsible Level III or department head by evidence of unsatisfactory performance or termination of employment. Individuals who are separated shall not be considered terminated provided they return to work within one year.

8.0 RECERTIFICATION

8.1 Levels I and II personnel shall be recertified at least every three (3) years by either evidence of continued satisfactory performance or re-examination based on the governing Code and contract requirements.

8.2 Level III personnel shall be recertified at least every:

- (a) three (3) years for personnel performing work governed by ASME Code Section XI, or
- (b) five (5) years for all other Level III personnel.

QAP 2.4 - CERTIFICATION PROGRAM FOR
NONDESTRUCTIVE EXAMINATION PERSONNEL

8.2.1 Recertification shall be by either continued satisfactory performance or re-examination based on the governing Code and contract requirements. When a Level III is recertified by continued satisfactory performance, the recertification shall be based on documented evidence performing Level III duties such as NDE training, procedure development, certification of Level I's and Level II's, test development, etc.

9.0 RECORDS

9.1 The qualification records of the certified individual shall be maintained and shall include the following:

- (a) Name of the certified individual.
- (b) Level of certification and test method.
- (c) Educational background and experience of the certified individual.
- (d) Statement indicating satisfactory completion of training in accordance with this procedure.
- (e) Results of the physical examination prescribed in Paragraph 6.1.10.
- (f) Current examination copy(s) or evidence of successful completion of the examinations.
- (g) Other suitable evidence of satisfactory qualifications when such qualifications are used in lieu of examinations.
- (h) Composite grade(s) or suitable evidence of grades.
- (i) Date of certification and/or recertification and the date of assignment to NDE.
- (j) Signature of employer's designated representative.

9.2 Records shall be maintained by the responsible group or department and become quality records in accordance with QAP 17.1 when an individual has terminated or transferred from the department.

APPROVED:

GS Bloomquist
NDE Level III

MINIMUM TRAINING AND EXPERIENCE

Examination Method	RT		MT		UT		PT		ET		VT		AE		LT							
Level	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I				II			
Technique															BT	PCMT	HOLT	MSLT	BT	PCMT	HOLT	MSLT
Completion with a passing grade of at least 2 years of engineering or science study in a university, college, or technical school					TRAINING (HOURS)																	
	29	35	8	4	24	40	4	4	8	8	2	4	40	35	2	16	8	28	2	12	6	16
High school graduation or equivalent	39	40	12	8	40	40	4	8	12	8	2	4	60	65	2	24	12	40	4	16	8	24
Grammar school graduation, or demonstration proficiency, or additional training	88	80	24	16	40	80	12	16	48	24	4	6	80	85	2	60	24	60	4	80	20	80
			TOTAL WORK TIME EXPERIENCE (MONTHS) PER LEVEL																			
All educational levels as listed above	1	9	1	1	1	9	1	2	1	9	1	2	6	18	1	1 1/2	1 1/2	4	1/2	4	4	6

NOTE:

1. Training shall be as outlined in Reference 2.2. For level II certification, the experience shall consist of time at Level I, or equivalent. If a person is being qualified directly to Level II with no time at Level I, the required experience shall consist of the sum of the times required for level I and Level II and the hours of training required for Level I and Level II in total shall apply. Credit for experience may be gained simultaneously in two or more methods or techniques. The candidate must spend at least 25% of his work time in each method or technique for which experience is being claimed.
2. VT as identified above refers to VT-1 which includes VT of weldments.
3. Work-time experience accumulated in RT, MT, UT, PT, ET or other NDE related methods such as Dimensional, Mechanical, Optical, etc. shall be applied toward not more than 75% of the work time experience required for VT.
4. Training received in the course of qualifying to any NDE Level II, other than VT, will be considered to have met 75% of the training required for VT.
5. One (1) month equals 175 hours.
6. Personnel utilizing methods not covered in Table 2.4-1 above shall be trained and qualified in accordance with SNT-TC-1A and this written practice.
7. BT - Bubble Test
PCMT - Pressure Change/
Measurement Test
HOLT - Halogen Diode Leak Test
MSLT - Mass Spectrometer
Leak Test
= - 2 Hours

TABLE 2.4-1

QAP 2.4 - CERTIFICATION PROGRAM FOR
NONDESTRUCTIVE EXAMINATION PERSONNEL

TRAINING AND EXPERIENCE FOR LIMITED CERTIFICATIONS

TECHNIQUE/ACTIVITY	METHOD	TRAINING (HRS)		EXPERIENCE (HRS)	
		I	II	I	II
Isotope Radiography	RT	N/A	40	N/A	720
Film Evaluation	RT	N/A	20	N/A	520
Data Taking/Equipment	RT	39	N/A	0	N/A
Operation					
Surveillance	RT	N/A	40	2 surveillance trips	
Coil Technique	MT	2	4	40	260
Yoke Technique	MT	1	4	40	260
Prod Technique	MT	1	4	40	260
Evaluation	MT	N/A	4	N/A	130
Data Taking/Equipment	MT	12	N/A	0	N/A
Operation					
Surveillance	MT	N/A	10	1 surveillance trip	
Thickness Readings	UT	10	N/A	240	N/A
Contact Testing	UT	N/A	20	N/A	720
Evaluation	UT	N/A	20	N/A	520
Data Taking/Equipment	UT	40	N/A	0	N/A
Operation					
Surveillance	UT	N/A	40	2 surveillance trips	
Evaluation	PT	N/A	4	N/A	130
Solvent Removable	PT	N/A	4	N/A	130
Data Taking/Equipment	PT	4	N/A	0	N/A
Operation					
Surveillance	PT	N/A	6	1 surveillance trip	
Weldments	VT	1	2	100	175
VT-1	VT	1	2	100	175
Data Taking/Equipment	VT	2	N/A	0	N/A
Operation					
Surveillance	VT	N/A	6	2 surveillances	
trips					
Data Taking/Equipment	ET	12	N/A	0	N/A
Operation					
Surveillance	ET	N/A	12	1 surveillance trip	
Analysis of Fuel Rods	ET	N/A	20	N/A	250

(Note 7)

1. Work experience in RT, MT, UT, PT, ET or other NDE related methods such as Dimensional, Mechanical, Optical, etc. shall be applied to not more than 75% of the work time experience required for VT.
2. Training received in the course of qualifying to any NDE Level II, other than VT, will be considered to have met 75% of the training required for VT of weldments and/or VT-1.
3. Personnel holding limited certifications in data taking/NDE data analysis equipment operation shall work with a certified (unlimited) individual and shall not independently conduct any test, interpret or evaluate any results of a test, or write a report of test results.
4. The above hours are based on a high school graduate or equivalent. For other education levels, the hours will be adjusted in a ratio based upon the hours shown in Table 2.4-1.
5. It is not intended by this written practice that the sum of the hours listed for each method above is required for unlimited certification. See Table 2.4-1 for unlimited certification requirements.
6. For activities for which limited certification training and experience hours are not included in the table above, the responsible Level III shall establish and document the required training and experience hours prior to initiation of qualification and certification activities.
7. Experience for Fuel Rod ET Analysis must be gained during a minimum of two field assignments. A knowledge of fuel rod manufacturing and/or design is also required.

TABLE 2.4-2

QAP 2.4 - CERTIFICATION PROGRAM FOR
NONDESTRUCTIVE EXAMINATION PERSONNEL

COMBUSTION ENGINEERING
POWER SYSTEMS GROUP
1000 Prospect Hill Road
Windsor, Connecticut 06095-0500

EYE EXAMINATION RECORD

NAME: Bruce E. Allbee DATE: 1-18-89

☒ JAEGER #1 ☐ JAEGER #2 ☐ ORTHORATER
☒ SNELLEN ☐ OTHER _____
Please fill in method if not listed

EXAMINATION RESULTS:

NEAR VISION - Jaeger

				Acceptable	Unacceptable
NATURAL:	R <u>1</u> /	L <u>1</u> /	S <u>1</u> /	<input checked="" type="checkbox"/>	<input type="checkbox"/>
CORRECTED:	R <u>1</u> /	L <u>1</u> /	S <u>1</u> /	<input type="checkbox"/>	<input type="checkbox"/>

FAR VISION - Snellen

				Acceptable	Unacceptable
NATURAL:	R $\frac{20}{40}$	L $\frac{20}{40}$	S $\frac{20}{40}$	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CORRECTED:	R $\frac{20}{20}$	L $\frac{20}{15}$	S $\frac{20}{20}$	<input checked="" type="checkbox"/>	<input type="checkbox"/>

COLOR VISION

☒ ISHIMURA ☐ A.O. ☒ OTHER _____
Please fill in color test method if not listed.

CORRECTIVE LENSES OR AIDS ARE REQUIRED WHILE CONDUCTING INSPECTION

NEAR VISION ☐ YES ☒ NO
FAR VISION ☒ YES ☐ NO

ADMINISTERED BY: Virginia Hill
TITLE: R.N.

REVIEWED AND ACCEPTED BY: C. Bloomquist
TITLE: NOE Level III

C-E 0013106 (8/84)

EXHIBIT 2.4-1

QAP 2.4 - CERTIFICATION PROGRAM FOR
NONDESTRUCTIVE EXAMINATION PERSONNEL

COMBUSTION ENGINEERING
POWER SYSTEMS GROUP

CERTIFICATION RECORD

METHOD MAGNETIC PARTICLE

NAME: Gary S. Bloomquist LEVEL: II
SSN/EMP NO: 046-48-2547 CERTIFICATION DATE: 9/10/87
EXPIRATION DATE: 9/10/90

EDUCATION:

William Hall High School, West Hartford, CT - Graduated 1970
Stevens Institute of Technology, Hoboken, NJ - SE in Metallurgy, 1974

TRAINING:

Combustion Engineering, Inc. - December 1982 - 18 hours MT Level I & II
Combustion Engineering, Inc. - September 1984 - 8 hours MT Level II

EXPERIENCE:

Certified and experienced at Combustion Engineering, Inc. as a Level I from January 1980 through September 1984 and as a Level II from September 1984 through September 1987 with additional previous equivalent MT experience between 1977 and 1981 while employed by C-E GQA Dept. Recertified by re-examination.

EXAMINATION RESULTS:

General/Basic	<u>90.0</u>
Specific/Method	<u>93.3</u>
Practical/Specific	<u>93.0</u>
Total	<u>276.3</u> / <u>3</u> = <u>92.1</u> COMPOSITE SCORE

The above named individual has completed the qualification requirements for certification in the above examination method in accordance with Combustion Engineering procedure
QAP 2.4 Revision 0

CERTIFIED BY: *Daniel Miller*
POSITION: MT Level III

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

**CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES**

NAME ALLEN, ANTHONY W. SOCIAL SECURITY NO 412-33-0719 DATE 7-8-93
(of Examination)

HCT 46.7 HGB 15.2 RBC 5.34 WBC 5.8
Platelets 210
DIFF: N63 L29 M5 B1 E2
Urine; negative, PH 6

EYE EXAMINATION

	NATURAL			CORRECTED		
NEAR VISION - JAEGER	R # <u>J1</u>	L # <u>J1</u>	B # <u>J1</u>	R # <u> </u>	L # <u> </u>	B # <u> </u>
FAR VISION - SNELLEN	R <u>20</u> 25	L <u>20</u> 20	B <u>20</u> 18	R <u>20</u>	L <u>20</u>	B <u>20</u>
COLOR VISION	J1 on Jaeger card					

[X] ISHIHARA Normal
[] WOOL (Holmgren)

EYE EXAMINATION
ADMINISTERED BY: S. Magouirk

Eye Examination Results
Reviewed & Accepted By: [Signature]
NDE Department

* Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 72" WEIGHT 187 lbs. BLOOD PRESSURE 140/88 P74
SKIN W EARS W NECK W EYES W
HEAD W HEART W CHEST W LUNGS W

PULMONARY FUNCTION TEST: NORMAL XX ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS / IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES:

LIMITATIONS:

CORRECTIVE LENSES n/a DENTURES n/a OTHER

[Signature]
Signature of Medical Examiner

Dr. James Rimer, M.D.

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

Clinic Location



CERTIFICATION RECORD

METHOD: EDDY CURRENT

NAME: Anthony W. Allen

LEVEL: I

SOC. SEC. NO.: 412-33-0719

CERTIFICATION DATE: 1/25/91

EXPIRATION DATE: 1/17/94

EDUCATION:

Tyner High School, Chattanooga, TN - Grad 1982

TRAINING

ABB Combustion Engineering, Chattanooga, TN - 40 Hours ET U

EXPERIENCE:

Experienced at ABB CE from September 1990 to January 1991.

EXAMINATION RESULTS:

General/Basic: 80.0

Specific/Method: 100.0

Practical/Specific: 91.0

Total: 271.0 / 3 = 90.3 COMPOSITE SCORE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Power procedure QAP 2.4 revision 1.

CERTIFIED BY: Rick S. Mann

POSITION: Eddy Current Level III

CONFIDENTIAL

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

**CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES**

NAME BIPES, THOMAS U. SOCIAL SECURITY NO 475-70-3052 DATE 7-7-93
(of Expiration)

HCT 41.7 HGB 14.2 RBC 4.80 WBC 6.2

Platelets 208

DIFF: N59 L30 M4 B1 E6

Urine; neg. PH 6

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER

R J1 L J1 B J1

R L B

FAR VISION - SNELLEN

R 20 L 20 B 20
25 22 22

R 20 L 20 B 20

COLOR VISION

[X] ISHIHARA Normal

[] WOOL (Holmgren)

Reads J1 on Jaeger card

EYE EXAMINATION

ADMINISTERED BY: S. Magouirk

Eye Examination Results

Reviewed & Accepted By: [Signature]

NDE Department

* Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 69"

WEIGHT 185 lbs.

BLOOD PRESSURE 120/78 P76

SKIN n

EARS n

NECK n

EYES n

HEAD n

HEART hl

CHEST n

LUNGS n

PULMONARY FUNCTION TEST: NORMAL XX

ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES

LIMITATIONS:

CORRECTIVE LENSES n/a

DENTURES n/a

OTHER

[Signature]
Signature of Medical Examiner

Dr. James Rimer, M.D.

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

C-E Medical Department



CERTIFICATION RECORD

METHOD: EDDY CURRENT

NAME: Thomas U. Bipes

LEVEL: III

SOC. SEC. NO.: 475-70-3052

CERTIFICATION DATE: 7/28/93

EXPIRATION DATE: 7/1/94

EDUCATION:

Hutchinson High School, Hutchinson, MN - Grad 1974

Hutchinson Area Vocational Technical Institute, Hutchinson, MN - Certificate in NDT

TRAINING:

Hutchinson Area Vocational Technical Institute - 8.74 to 6/76 - Two years college level courses in NDT, including 150 hours ET theory and Lab

Zetec, Inc., Issaquah, WA - June 1987 - 40 Hours ET LIIA (Data analysis)

- August 1990 - 80 Hours ET LIII

EXPERIENCE:

Certified and experienced at previous employers, ABB CE as a Level II from October 1986 to June 1987, as a LIIA from June 1987 to August 1990 and as a Level III from August 1990 to August 1992 and at Tennessee Valley Authority (TVA) as a Level III from November 1992 to July 1993. Previously experienced at Hutchinson Area Voc. Tech. as an NDT Instructor from August 1980 to September 1986 with emphasis on teaching ET techniques, with an equivalent of 24 months hands-on experience teaching ET Lab courses.

EXAMINATION:

General/Basic: 80.0

Specific/Method: 80.0

Practical/Specific: 86.6

Total: 246.6 / 3 = 82.2 COMPOSITE SCORE

ASNT Level IIIBasic and Method
exams - Passed 7/91

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Services procedure QAP 2.4 revision 1

CERTIFIED BY: Thomas U. Bipes

POSITION: Manager, Primary Support Technology

COMBUSTION ENGINEERING

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

**CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES**

NAME BLAZEJEWSKI, D. I. SOCIAL SECURITY NO 501-50-0468 DATE 1-6-93
(of Examination)

HCT 45.8 HGB 15.9 RBC 5.46 WBC 4.5

Platelets 230

DIFF: N44 L39 M10 B1 E6

Urine; negative, PH 6

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER

R # J7 L # J7 B # J7 R # J1 L # J1 B # J1

FAR VISION - SNELLEN

R 20 L 20 B 20 R 20 L 20 B 20
200 200 200 20 22 20

COLOR VISION

[x] ISHIHARA normal

[] WOOL (Holmgren)

Reads J1 on Jaeger card (correctd)

EYE EXAMINATION

ADMINISTERED BY: S. Magouirk

Eye Examination Results

Reviewed & Accepted By: [Signature]

NOE Department

* Required to be completed for DOE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 6'2"

WEIGHT 235

BLOOD PRESSURE 150/96 P80

SKIN nl

EARS nl

NECK nl

EYES M

HEAD nl

HEART nl

CHEST nl

LUNGS nl

PULMONARY FUNCTION TEST: NORMAL x x ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS / IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICE:

LIMITATIONS:

CORRECTIVE LENSES glasses DENTURES n/a OTHER n/a

[Signature]
Signature of Medical Examiner

Dr. James Rimer, M.D.

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

Clinic Location

**CERTIFICATION RECORD****METHOD:** EDDY CURRENT**NAME:** Donald I. Blazejewski**LEVEL:** IIA**SOC. SEC. NO.:** 501-50-0468**CERTIFICATION DATE:** 8/13/93**EXPIRATION DATE:** 1/9/95**EDUCATION:**

Strandquist Public High School, Strandquist, MN - Grad 1965

University of Minnesota - BS Animal Husbandry - 1974

Hutchinson Area Vocational Technical Institute, Hutchinson, MN - Certificate in NDT - 1988

TRAINING:

ABB Combustion Engineering, Chattanooga, TN - May 1988 - 40 Hours ET LI

- March 1989 - 40 Hours ET LII

Zetec, Inc., Issaquah, WA - July 1990 - 80 Hours ET IIA (Data Analysis)

EXPERIENCE:

Certified and experienced at ABB CE as a Level I-Trainee from May 1988 to January 1989, as a Level I from January 1989 to August 1989, as a Level II from August 1989 to July 1990 and as a Level IIA from July 1990 to July 1993.

EXAMINATION:General/Basic: 95.0Specific/Method: 96.0Practical/Specific: 94.0

Eddy Current Data Analysis

Score: 85%

Total: 285.0 / 3 = 96.0 **COMPOSITE SCORE**

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Services procedure QAP 2.4 revision 1.

CERTIFIED BY: **POSITION:** Eddy Current Level III

ASEA BROWN BOVERI INC.
1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES

NAME Sil Circosta SOCIAL SECURITY NO. 026-34-3934 DATE 2/5/93
(of Examination)

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER R# 1 L# 1 B# 1 R# 1 L# 1 B# 1
FAR VISION - SNELLEN R 20 L 20 B 20 R 20 L 20 B 20
30 25 15

COLOR VISION

[X] ISHIHARA normal

[] WOOL (Holmgren) normal

EYE EXAMINATION

ADMINISTERED BY: Henry A. Lussac, R.N.

Eye Examination Results

Reviewed & Accepted By: [Signature]

NDE Department

*Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 66" WEIGHT 190 lbs. BLOOD PRESSURE 130/90 (65)
SKIN Good EARS normal NECK normal EYES normal
HEAD normal HEART normal CHEST normal LUNGS normal
PULMONARY FUNCTION TEST: NORMAL ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.103 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES:

LIMITATIONS:

CORRECTIVE LENSES 0 DENTURES 0 OTHER 0

RESPIRATOR GLASSES NO

[Signature]
Signature of Medical Examiner

Joseph A. Amato, M.D.

Medical Examiner (Print)

ABB Medical Department
Dept. 5420-1902
1000 Prospect Hill Road
Windsor, CT 06095-0500
(203) 285-3339

Clinic Location

**CERTIFICATION RECORD****METHOD:** EDDY CURRENT**NAME:** Silvestro Circosta
SOC. SEC. NO.: 026-34-3934**LEVEL:** II A
CERTIFICATION DATE: 8/4/93
EXPIRATION DATE: 8/10/98**EDUCATION:**

West Springfield High School, West Springfield, MA - Grad 1966

TRAINING:ABB Combustion Engineering, Windsor, CT - September 1981 - 18 Hours ET LI
- December 1981 - 32 Hours ET LI
- August 1984 - 40 Hours ET LII
Zetec, Inc., Issaquah, WA - March 1985 - 40 Hours ET IIA (Data Analysis)**EXPERIENCE:**

Certified and experienced at ABB CE as a Level I from March 1982 to December 1984, as a Level II from December 1984 to October 1985 and as a Level IIA from October 1985 to July 1993.

EXAMINATION:General/Basic: 95.0
Specific/Method: 94.0
Practical/Specific: 93.0Eddy Current Data Analysis
Score: 91.5%Total: 282.0 / 3 = 94.0 **COMPOSITE SCORE**The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Services procedure QAP 2.4 revision 1.**CERTIFIED BY:****POSITION:***Henry Fabiani*
Eddy Current Level III



CERTIFICATION RECORD

METHOD: EDDY CURRENT

NAME: John W. Crow

LEVEL: I

SOC. SEC. NO.: 417-84-4555

CERTIFICATION DATE: 7/30/93

EXPIRATION DATE: 7/28/96

EDUCATION:

Shades Valley, Birmingham, AL - GED, 1972
Chattanooga State Technical Community College, Chattanooga, TN - ASME Tech., 1993

TRAINING:

ABB Combustion Engineering, Chattanooga, TN - January 1990 - 32 Hours ET LI

EXPERIENCE:

Certified and experienced at ABB CE as a Level I-Trainee from March 1990 to August 1992 and as a Level I from August 1992 to January 1993.

EXAMINATION:

General/Basic:	<u>92.5</u>
Specific/Method:	<u>100.0</u>
Practical/Specific:	<u>88.0</u>

Total: 278.5 / 3 = 92.8 COMPOSITE SCORE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Services procedure QAP 2.4 revision 1.

CERTIFIED BY: [Signature]

POSITION: Eddy Current Level III

7/30/93

CONNECTION ENGINEERING

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

CERTIFICATION FOR FIELD SERVICES ACTIVITIES

NAME CROW, JOHN W. SOCIAL SECURITY NO 417-64-4555 DATE 7-6-93
(of Examination)

WBC 8.1 HCT 44.1 HGB 14.7 RBC 4.70

Platelets 219

DIFF: N67 L24 M6 B1 E2

Urine: negative, PH 6

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER R J1 L J1 B J1 R L B

FAR VISION - SNELLEN R $\frac{20}{29}$ L $\frac{20}{25}$ B $\frac{20}{22}$ R $\frac{20}{ }$ L $\frac{20}{ }$ B $\frac{20}{ }$

COLOR VISION

[X] ISHIHARA normal

[] WOOL (Holmgren)

Reads J1 on Jaeger card

EYE EXAMINATION
ADMINISTERED BY: S. Magouirk

Eye Examination Results
Reviewed & Accepted By: [Signature]
NDE Department

* Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 74" WEIGHT 225 lbs. BLOOD PRESSURE 150/90 P72

SKIN W EARS W NECK W EYES W

HEAD W HEART W CHEST W LUNGS W

PULMONARY FUNCTION TEST: NORMAL XX ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS / IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES:

LIMITATIONS:

CORRECTIVE LENSES n/a DENTURES n/a OTHER

[Signature]
Signature of Medical Examiner

Dr. James Rimer, M.D.

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

Clinic Location

CERTIFICATION FOR FIELD SERVICES ACTIVITIES

A BROWN BOVERI INC.
100 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

NAME Edward Decker

SOCIAL SECURITY NO. 042-54-8090

DATE 3/26/93
(of Examination)

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER

R# 1

L# 1

B# 1

R#

L#

B#

EAR VISION - SNELLEN

R 20
30

L 20
15-1

B 20
13

R 20

L 20

B 20

COLOR VISION

[X] ISHIHARA Normal

[] WOOL (Holmgren)

EYE EXAMINATION
ADMINISTERED BY: Timothy E. Brown, M.D.

Eye Examination Results
Reviewed & Accepted By: Edward Decker

NDE Department

*Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 68"

WEIGHT 168

BLOOD PRESSURE 112/68

SKIN Normal

EARS Normal

NECK Normal

EYES Normal

HEAD Normal

HEART Normal

CHEST Normal

LUNGS Clear

PULMONARY FUNCTION TEST:

NORMAL ✓

ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.103 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES:

LIMITATIONS:

CORRECTIVE LENSES

DENTURES

OTHER

RESPIRATOR GLASSES

Signature of Medical Examiner

JOSEPH A. AMATO, M.D.
A BROWN BOVERI, INC.
1000 PROSPECT HILL ROAD
WINDSOR, CT 06095-0500

Clinic Location



CERTIFICATION RECORD

METHOD: EDDY CURRENTNAME: Edward N. DeckerLEVEL: IIISOC. SEC. NO.: 042-54-8090CERTIFICATION DATE: 1/17/92EXPIRATION DATE: 12/18/94

EDUCATION:

St. Paul Catholic High School. Bristol, CT - Grad 1977

TRAINING:

ABB Combustion Engineering, Windsor, CT - June 1985 - 40 Hours ET L I
- January 1989 - 40 Hours ET L II
- January 1989 - 8 Hours ET L II review

EXPERIENCE:

Certified and experienced at ABB CE as a Level I-Trainee from June 1985 to January 1987, as a Level I January 1987 to January 1989 and as a Level II from January 1989 to January 1992.

EXAMINATION:

General/Basic: 83.0Specific/Method: 88.0Practical/Specific: 98.0Total: 269.0 / 3 = 89.7 COMPOSITE SCORE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Power procedure QAP 2.4 revision 1

CERTIFIED BY: Henry LabrecquePOSITION: Eddy Current Level III

700 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

**CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES**

NAME DESPAUX, CHARLES F. SOCIAL SECURITY NO 261-45-3051 DATE 7-21-93
(of Examination)

HCT 48.0 HGB 16.2 RBC 7.54 WBC 7.5
Platelets 233
DIFF: N63 L25 M7 B1 E4
Urine; negative, PH 6

EYE EXAMINATION

	NATURAL			CORRECTED		
NEAR VISION - JAEGER	R # <u>J1</u>	L # <u>J1</u>	B # <u>J1</u>	R # <u> </u>	L # <u> </u>	B # <u> </u>
FAR VISION - SNELLEN	R <u>20</u> <u>20</u>	L <u>20</u> <u>20</u>	B <u>20</u> <u>20</u>	R <u>20</u>	L <u>20</u>	B <u>20</u>

COLOR VISION

[X] ISHIMARA Normal
[] WOOL (Holmgren)

Reads J1 on Jaeger card

EYE EXAMINATION
ADMINISTERED BY: S. Magouirk

Eye Examination Results: [Signature]
Reviewed & Accepted By: [Signature]
NDE Department

* Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT <u>N</u>	WEIGHT <u> </u>	BLOOD PRESSURE <u> </u>
SKIN <u>nl</u>	EARS <u>nl</u>	NECK <u>nl</u>
HEAD <u>nl</u>	HEART <u>nl</u>	CHEST <u>nl</u>
PULMONARY FUNCTION TEST: NORMAL <u>XX</u>		ABNORMAL <u> </u>
EYES <u>D</u>	LUNGS <u>nl</u>	

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS / IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES:

LIMITATIONS:

CORRECTIVE LENSES n/a DENTURES n/a OTHER

[Signature]
Signature of Medical Examiner

Dr. James Rimer, M.D.

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

Clinic Location



CERTIFICATION RECORD

METHOD: EDDY CURRENTNAME: Charles F. DespauxLEVEL: IISOC. SEC. NO.: 261-45-3051CERTIFICATION DATE: 7/22/93EXPIRATION DATE: 11/5/95

EDUCATION:

Crestview High School, Crestview, FL - Grad. - 1976

TRAINING:

ABB Combustion Engineering, Chattanooga, TN - December 1987 - 40 Hours ET LI

- March 1989 - 40 Hours ET LII

Zetec, Inc., Issaquah, WA - July 1990 - 80 Hours ET LIIA (Data Analysis)

EXPERIENCE:

Certified and experienced at ABB CE as a Level I-Trainee from December 1987 to May 1988, as a Level I from May 1988 to August 1989, as a Level II from August 1989 to July 1990 and as a Level IIA from July 1990 to March 1991 and November 1982 to July 1993.

EXAMINATION:

General/Basic: 88.0Specific/Method: 88.0Practical/Specific: 88.0Total: 262.0 / 3 = 87.3 COMPOSITE SCORE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Services procedure QAP 2.4 revision 1

CERTIFIED BY: Russ S. MannPOSITION: Eddy Current Level III

ASEA BROWN BOVERI INC.
1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

CERTIFICATION FOR FIELD SERVICES ACTIVITIES

NAME Edward Ericson SOCIAL SECURITY NO. 040-54-4963 DATE 1/19/93
(of Examination)

EYE EXAMINATION

	NATURAL			CORRECTED		
NEAR VISION - JAEGER	R#	L#	B#	R#	L#	B#
				<u>1</u>	<u>1</u>	<u>1</u>
FAR VISION - SNELLEN	R 20	L 20	B 20	R 20	L 20	B 20
				<u>20</u>	<u>15</u>	<u>13</u>
COLOR VISION						
<input checked="" type="checkbox"/> ISHIIHARA <u>normal</u>						
<input type="checkbox"/> WOOL (Holmgren)						

EYE EXAMINATION

ADMINISTERED BY: Honey A. Shaw, R.N.

Eye Examination Results

Reviewed & Accepted By: [Signature]

NDE Department

*Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 20' WEIGHT 168 BLOOD PRESSURE 112/80 (64)
SKIN ✓ EARS ✓ NECK ✓ EYES ✓
HEAD ✓ HEART 7-12-12 CHEST ✓ LUNGS clear
PULMONARY FUNCTION TEST: NORMAL ✓ ABNORMAL ✓

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.103 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES:

LIMITATIONS:

CORRECTIVE LENSES yes ^{SAS 9-19-93} DENTURES 0 OTHER 0

RESPIRATOR GLASSES yes

[Signature]
Signature of Medical Examiner

Joseph A. Amato, M.D.

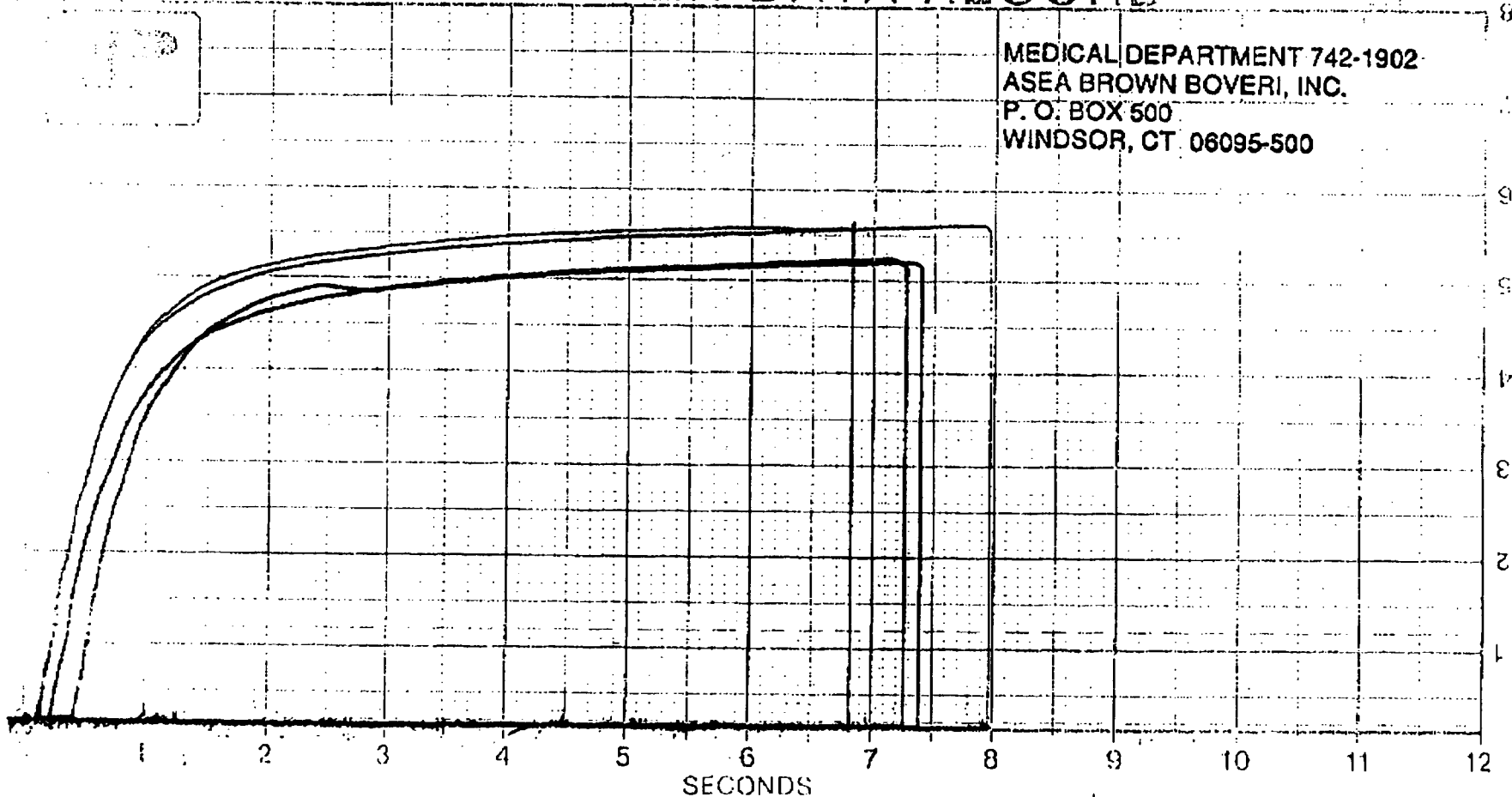
Medical Examiner (Print)

ABB Medical Department
Dept. 5420-1902
1000 Prospect Hill Road
Windsor, CT 06095-0500
(203) 285-3339

Clinic Location

SPIROMETER DATA RECORD

MEDICAL DEPARTMENT 742-1902
 ASEA BROWN BOVERI, INC.
 P. O. BOX 500
 WINDSOR, CT 06095-500



Edward Ericson

040-54-4963

IDENTIFICATION NUMBER

1/20/92

DATE

8:40

TIME

Tom H. H. H.

TESTED BY

RESPIRATORY
 FUNCTION
 TEST

RESPIRATORY
 FUNCTION
 TEST

RESPIRATORY
 FUNCTION
 TEST

RESPIRATORY
 FUNCTION
 TEST

RESPIRATORY
 FUNCTION
 TEST

1/20/92
 Ericson



CERTIFICATION RECORD

METHOD: EDDY CURRENTNAME: Edward R. EricsonLEVEL: II - ASOC. SEC. NO.: 040-54-4963CERTIFICATION DATE: 1/30/92EXPIRATION DATE: 12/20/94

EDUCATION:

Granby High School, Granby, CT - Grad 1973

TRAINING:

ABB Combustion Engineering, Windsor, CT - August 1984 - 40 Hours ET L I
- January 1986 - 40 Hours ET L II
Zetec, Issaquah, WA - March 1985 - 40 Hours ET L IIA (Data Analysis)

EXPERIENCE:

Certified and experienced at ABB CE as a Level I from October 1984 to January 1986 and as a Level II/IIA from January 1986 to January 1992.

EXAMINATION:

General/Basic: 75.0Specific/Method: 94.0Practical/Specific: 99.0Total: 268.0 / 3 = 89.3 COMPOSITE SCORE

Eddy Current Data Analysis
Score: 80%

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Power procedure QAP 2.4 revision 1.

CERTIFIED BY: *Henry Salas*POSITION: Eddy Current Level III

COMBUSTION ENGINEERING

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

**CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES**NAME FOLSOM, DANIELSOCIAL SECURITY NO 473-70-8805DATE 1-13-93

(of Examination)

WBC 4.4 RBC 5.01 HCT 42.0 HGB 15.0
DIFF: N53 L27 M14 (high) B2 E4
Platelets 195
Urine; negative, PH 7.5

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER

R J7L J4B J8R J1L J1B J1

FAR VISION - SNELLEN

R $\frac{20}{200}$ L $\frac{20}{200}$ B $\frac{20}{200}$ R $\frac{20}{20}$ L $\frac{20}{20}$ B $\frac{20}{20}$

COLOR VISION

☒] ISHIHARA Normal☐] WOOL (Holmgren)

Reads J1 on Jaeger (corrected)

EYE EXAMINATION

ADMINISTERED BY: S. Magouirk

Eye Examination Results

Reviewed & Accepted By: [Signature]

NDE Department

* Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATIONHEIGHT 6'5"WEIGHT 245BLOOD PRESSURE 120/100 P88SKIN WNLEARS WNLNECK WNLEYES WNLHEAD WNLHEART WNLCHEST WNLLUNGS WNLPULMONARY FUNCTION TEST: NORMAL XX

ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS / IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES

LIMITATIONS:CORRECTIVE LENSES glassesDENTURES n/a

OTHER

[Signature]
Signature of Medical Examiner

Dr. James Rimer

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

Clinic Location



CERTIFICATION RECORD

METHOD: EDDY CURRENTNAME: Daniel P. FolsomLEVEL: IIASOC. SEC. NO.: 473-70-8805CERTIFICATION DATE: 1/10/92EXPIRATION DATE: 8/4/94

EDUCATION:

Cosmos High School, Cosmos, MN
Hutchinson Area Vocational Technical
Institute, Hutchinson, MN

- Grad. 1976
- Certificate NDE Tech 1987

TRAINING

Hutchinson Area Vocational Technical
Institute
ABB Combustion Engineering,
Chattanooga, TN
Zetec, Inc., Issaquah, WA

- May 1988 - 235 Hours/Eddy Current Test
- Mar. 1989 - 42 hours ET Level II
- Sept. 1988 40 hours ET Level IIA (Data Analysis)

EXPERIENCE:

Certified and experienced at ABB CE as a Level I-Trainee in April 1988, as a Level I from May 1988 to March 1989 and as a Level IIA from March 1989 to January 1992

EXAMINATION RESULTS:

General/Basic: 95.0Specific/Method: 100.0Practical/Specific: 96.0

Eddy Current Data Analysis
Score: 84%

Total: 291.0 / 3 = 97.0 COMPOSITE SCORE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Power procedure QAP 2.4 revision 1.

CERTIFIED BY: R. S. MannPOSITION: Eddy Current Level III

COMBUSTION ENGINEERING

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

**CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES**

NAME Glenn, John SOCIAL SECURITY NO 249-33-9496 DATE 2-18-93
(of Examination)

WBC 6.2 RBC 5.69 HGB 15.9 HCT 45.7 **EYE EXAMINATION**
DIFF: N65 L29 M3 E2 B1
Platelets 197
Urine; negative, PH 6

NEAR VISION - JAEGER

NATURAL CORRECTED
R J1 L J1 B J1 R L B

FAR VISION - SNELLEN

R 20 L 20 B 20 R 20 L 20 B 20

COLOR VISION

[X] ISHIHARA normal[] WOOL (Holmgren)

Reads J1 on Jaeger card

EYE EXAMINATION
ADMINISTERED BY: S. Magouirk

Eye Examination Results

Reviewed & Accepted By: F. B. [Signature]
NOE Department

* Required to be completed for DOE certification only. Not re-
quired for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 71" WEIGHT 245 BLOOD PRESSURE 100/70 P72
SKIN nl EARS nl NECK nl EYES nl
HEAD nl HEART nl CHEST nl LUNGS nl
PULMONARY FUNCTION TEST: NORMAL XX ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS / IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES:

LIMITATIONS:

CORRECTIVE LENSES n/a DENTURES n/a OTHER

[Signature]
Signature of Medical Examiner

Dr. James Rimer, M.D.

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

Clinic Location



CERTIFICATION RECORD

METHOD: EDDY CURRENTNAME: John B. GlennLEVEL: IIISOC. SEC. NO.: 249-33-9496CERTIFICATION DATE: 2/5/92EXPIRATION DATE: 1/22/95

EDUCATION:

Oakway High School, Westminster, SC - Grad 1983

TRAINING:

ABB Combustion Engineering, Chattanooga, TN - May 1989 - 40 Hours ET LI
- Jan 1992 - 40 Hours ET LII

EXPERIENCE:

Certified and experienced at ABB CE as a Level I-Trainee from August 1989 to March 1990 and as a Level I from March 1990 to January 1992.

EXAMINATION:

General/Basic: 98.0Specific/Method: 96.0Practical/Specific: 91.0Total: 285.0 / 3 = 95.0 COMPOSITE SCOREThe above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Power procedure QAP 2.4 revision 1CERTIFIED BY: POSITION: Eddy Current Level III

COMBUSTION ENGINEERING

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

**CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES**

NAME HASTING, RONALD SOCIAL SECURITY NO 413-13-3627 DATE 7-6-93
(of Examination)

WBC 6.3 RBC 4.67 HGB 14.2 HCT 42.1 **EYE EXAMINATION**
Platelets 200
DIFF: N61 L27 M8 E3 B1
Urine: neg; PH 6

NEAR VISION - JAEGER

R J1 L J1 S J1 R L S

FAR VISION - SNELLEN

R 20 L 20 S 20 R 20 L 20 S 20
33 29 33 18 20 17

COLOR VISION

[☒] ISHIMARA NORMAL[☐] WOOL (Helmgren)

Reads J1 on Jaeger card

EYE EXAMINATION

ADMINISTERED BY: S. MagouirkEye Examination Results
Reviewed & Accepted By: [Signature]

NRC Department

* Required to be completed for NRC certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATIONHEIGHT 70" WEIGHT 190 BLOOD PRESSURE 122/80 P72

SKIN hl EARS hl NECK hl EYES hl
HEAD hl HEART hl CHEST hl LUNGS hl

PULMONARY FUNCTION TEST: NORMAL XX ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS/ IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES.

LIMITATIONS:CORRECTIVE LENSES glasses DENTURES n/a OTHER [Signature]
Signature of Medical Examiner

Dr. James Rimer, M.D.

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

C/E Location

CERTIFICATION RECORD

METHOD: EDDY CURRENT

NAME: Ronald W. Hasting

LEVEL: I

SOC. SEC. NO.: 413-13-3627

CERTIFICATION DATE: 10/19/92

EXPIRATION DATE: 7/20/95

EDUCATION:

Hixson High School, Hixson, TN - Grad, 1975

Chattanooga State University, Chattanooga, TN - AS, 1984

TRAINING:

ABB Combustion Engineering, Chattanooga, TN - July 1992 - 65 Hours ET LI

EXPERIENCE:

Certified and experienced at ABB CE as a Level I-Trainee from August 1992 to October 1992.

EXAMINATION

General/Basic: 85.0

Specific/Method: 95.0

Practical/Specific: 81.0

Total: 261.0 / 3 = 87.0 COMPOSITE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Services procedure QAP 2.4 revision 1.

CERTIFIED BY: Rick S. Mann

POSITION: Eddy Current Level III



CERTIFICATION RECORD

METHOD: EDDY CURRENTNAME: William J. Hinson, Jr.LEVEL: I-TraineeSOC. SEC. NO.: 291-82-7422CERTIFICATION DATE: 7/27/93EXPIRATION DATE: 7/28/98

EDUCATION:

Elda High School, Elda, OH - Grad 1984

TRAINING:

ABB Combustion Engineering, Chattanooga, TN - January 1980 - 32 Hours ET.U

EXPERIENCE:

Certified and experienced at ABB CE as a Level I-Trainee from March 1980 to January 1993.

EXAMINATION:

General/Basic: 85.0Specific/Method: 95.0Practical/Specific: 93.0Total: 273.0 / 3 = 91.0 COMPOSITE SCORE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Services procedure QAP 2.4 revision 1.

CERTIFIED BY: POSITION: Eddy Current Level III

7/20/93 4/10/92

COMBUSTION ENGINEERING

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0600

**CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES**NAME HINSON, WILLIAMSOCIAL SECURITY NO 291-62-7422DATE 11-12-92

(of Examination)

WBC 4.9 RBC 5.74 HCT 47.4 HGB 16.3

Platelets 279

DIFF: N44 low L33 M15 high B2 B6

Urine negative, PH 6

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER

R J1 L J1 B J1R L B

FAR VISION - SNELLEN

R 20
20L 20
20B 20
20R 20 L 20 B 20

COLOR VISION

[x] ISHIMARA Normal

[] WOOL (Malmgren)

Reads J1 on Jaeger card

EYE EXAMINATION

ADMINISTERED BY: S. Magouirk

Eye Examination Results

Reviewed & Accepted By: [Signature]

NCE Department

* Required to be completed for NCE certification only. Not re-
quired for certification in other respiratory protection devices.

PHYSICAL EXAMINATIONHEIGHT WEIGHT BLOOD PRESSURE 100/60SKIN WNLEARS WNLNECK WNLEYES WNLHEAD WNLHEART RRRCHEST CTALUNGS CTA

PULMONARY FUNCTION TEST:

NORMAL XABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS / IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES:

LIMITATIONS:CORRECTIVE LENSES n/aDENTURES n/aOTHER

Signature of Medical Examiner

Dr. L. James Rimer, M.D.

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

Clinic Location

COMBUSTION ENGINEERING

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

**CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES**

NAME HOLMES, DARRELL E. SOCIAL SECURITY NO 412-33-9464 DATE 1-20-93
(of Examination)

WBC 8.7 RBC 4.54 HCT 43.2 HGB 14.9
DIFF: N51 L35 M6 B2 E6
Platelets 258
Urine; negative, PH 6

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER R / J1 L / J1 B / J1 R / L / B /

FAR VISION - SNELLEN R 20 L 20 B 20 R 20 L 20 B 20
20 20 20

COLOR VISION

[X] ISHIHARA Normal

[] WOOL (Holmgren)

Reads J1 on Jaeger card

EYE EXAMINATION

ADMINISTERED BY: S. Macquirk

Eye Examination Results

Reviewed & Accepted By: [Signature]

NDE Department

* Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 5'11" WEIGHT 137 BLOOD PRESSURE 90/66 P 72
SKIN WNL EARS WNL NECK WNL EYES WNL
HEAD WNL HEART WN CHEST WNL LUNGS WNL
PULMONARY FUNCTION TEST: NORMAL XX ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS / IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES:

LIMITATIONS:

CORRECTIVE LENSES n/a DENTURES n/a OTHER

[Signature]
Signature of Medical Examiner

Dr. James Rimer, M.D.

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

Clinic Location



CERTIFICATION RECORD

METHOD: EDDY CURRENT

NAME: Darrell E. Holmes

LEVEL: II

SOC. SEC. NO.: 412-33-8484

CERTIFICATION DATE: 1/7/93

EXPIRATION DATE: 1/22/95

EDUCATION:

Central High School, Harrison, TN - Grad 1984

TRAINING:

ABB Combustion Engineering, Chattanooga, TN - July 1990 - 84 Hours ET LI
- January 1992 - 40 ET LII

EXPERIENCE:

Certified and experienced at ABB CE as a Level I-Trainee from September 1990 to August 1991
and as a Level I from September to January 1993.

EXAMINATION:

General/Basic: 98.0

Specific/Method: 98.0

Practical/Specific: 87.0

Total: 281.0 / 3 93.7 **COMPOSITE SCORE**

The above named individual has completed the qualification/training requirements for certification
in the above examination method in accordance with ABB Combustion Engineering Nuclear
Services procedure OAP 2.4 revision 1

CERTIFIED BY: R. D. Mann

POSITION: Eddy Current Level III

203 285 9538

10 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

**CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES**

NAME HUTSELL, FRANK SOCIAL SECURITY NO 408-29-6570 DATE 1-6-93
(of Examination)

WBC 5.7 RBC 5.71 HCT 47.7 HGB 16.8

DIFF: N48 L42 M6 B 0 E4

Platelets 206

Urine, negative, PH 6

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER

R # J2 L # J1 B # J1 R # L # B #

FAR VISION - SNELLEN

R 20 L 20 B 20 R 20 L 20 B 20
29 22 25

Reads J1 on Jaeger card

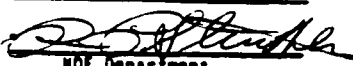
COLOR VISION

☐ ISHIHARA ☒ WOOL (Holmgren) red, green,
yellow, blue

EYE EXAMINATION

ADMINISTERED BY: S. Magouirk

Eye Examination Results

Reviewed & Accepted By: 

NDE Department

* Required to be completed for NDE certification only. Not re-
quired for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATIONHEIGHT 5'8" WEIGHT 169 BLOOD PRESSURE 110/70 P72SKIN WNL EARS WNL NECK WNL EYES WNLHEAD WNL HEART RRR S4 S8 CHEST WNL LUNGS CTAPULMONARY FUNCTION TEST: NORMAL XXX ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES:

LIMITATIONS:CORRECTIVE LENSES n/a DENTURES n/a OTHER 
Signature of Medical Examiner

Dr. James Rimer, M.D.

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

Clinic Location



CERTIFICATION RECORD

METHOD: EDDY CURRENTNAME: Frank L. HutsellLEVEL: IISOC. SEC. NO.: 408-29-6570CERTIFICATION DATE: 1/24/92EXPIRATION DATE: 1/22/95

EDUCATION:

Tyner High School, Chattanooga, TN - Grad 1983

TRAINING

ABB Combustion Engineering, Chattanooga, TN - Dec 1989 - 72 Hours ET LI
- Jan 1992 - 40 Hours ET LII

EXPERIENCE:

Certified and experienced at ABB CE as a Level I-Trainee from January 1989 to March 1990 and as a Level I from March 1990 to January 1992.

EXAMINATION RESULTS:

General/Basic: 100.0Specific/Method: 84.0Practical/Specific: 88.0Total: 272.0 / 3 = 90.6 COMPOSITE SCOREThe above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Power procedure OAP 2.4 revision 1.CERTIFIED BY: POSITION: Eddy Current Level III

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

CERTIFICATION FOR FIELD SERVICES ACTIVITIES

NAME IRWIN, WILLIAM E. SOCIAL SECURITY NO 415-78-6670 DATE 7-20-93
(of Examination)

HCT 39.2 HGB 13.6 RBC 4.58 WBC 4.8
Platelets 203
DIFF: N58 L29 M9 B1 E3
Urine; negative, PH 6

EYE EXAMINATION

	NATURAL			CORRECTED		
NEAR VISION - JAEGER	R #	L #	B #	R # <u>J1</u>	L # <u>J1</u>	B # <u>J1</u> CONTACTS
FAR VISION - SNELLEN	R <u>20</u>	L <u>20</u>	B <u>20</u>	R <u>20</u>	L <u>20</u>	B <u>20</u> CONTACTS
COLOR VISION			Reads J1 on Jaeger card (corrected)			
<input checked="" type="checkbox"/> ISHIHARA <u>Normal</u>			EYE EXAMINATION ADMINISTERED BY: <u>S. Magouirk</u>			
<input type="checkbox"/> WOOL (Holmgren)			Eye Examination Results Reviewed & Accepted By: <u>[Signature]</u> NDE Department			

* Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT	<u>68"</u>	WEIGHT	<u>201 lbs.</u>	BLOOD PRESSURE	<u>140/94</u>	<u>P88</u>	
SKIN	<u>N</u>	EARS	<u>W</u>	NECK	<u>W</u>	EYES	<u>N</u>
HEAD	<u>W</u>	HEART	<u>W</u>	CHEST	<u>W</u>	LUNGS	<u>W</u>
PULMONARY FUNCTION TEST:				<u>NORMAL</u>	<u>XX</u>	<u>ABNORMAL</u>	

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS / IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES

LIMITATIONS:

CORRECTIVE LENSES CONTACTS DENTURES n/a OTHER

[Signature]
Signature of Medical Examiner

Dr. James Rimer, M.D.

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

Clinic Location



CERTIFICATION RECORD

METHOD: EDDY CURRENT

NAME: William E. Irwin

LEVEL: II

SOC. SEC. NO.: 415-78-6670

CERTIFICATION DATE: 7/24/93

EXPIRATION DATE: 1/22/95

EDUCATION:

Brainerd High School, Chattanooga, TN - Grad 1965

TRAINING:

ABB Combustion Engineering, Chattanooga, TN - September 1986 - 40 Hours ET LI

- March 1989 - 40 Hours ET LII

Zetec, Inc., Issaquah, WA - July 1990 - 80 Hours ET LIIA (Data Analysis)

EXPERIENCE:

Certified and experienced at ABB CE as a Level I-Trainee from January 1987 to July 1988, as a Level I from July 1988 to January 1992 and as a Level IIA from January 1992 to July 1993.

EXAMINATION:

General/Basic: 93.0

Specific/Method: 96.0

Practical/Specific: 80.0

Total: 269.0 / 3 = 89.7 COMPOSITE SCORE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Services procedure QAP 2.4 revision 1.

CERTIFIED BY: *Henry J. [Signature]*

POSITION: Eddy Current Level III

COMBUSTION ENGINEERING

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

**CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES**

NAME JOSEPH F JACOBS SOCIAL SECURITY NO 475-78-5670 DATE 3-3-93
(of Examination)

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER

R 1+ L 1+ B 1+R 1+ L 1+ B 1+

FAR VISION - SNELLEN

R 20
30L 20
30B 20
30R 20
20L 20
20B 20
15

COLOR VISION

[X] ISHIHARA Normal

[] WOOL (Holmgren)

EYE EXAMINATION

ADMINISTERED BY: Bachman EN

Eye Examination Results

Reviewed & Accepted By: [Signature]

NDE Department

* Required to be completed for NDE certification only. Not re-
quired for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATIONHEIGHT 67 ³/₄ WEIGHT 163 ³/₄ BLOOD PRESSURE 122/80SKIN clear EARS clear NECK supple EYES PERLAHEAD nl HEART clear CHEST clear LUNGS clearPULMONARY FUNCTION TEST: NORMAL ☒ ABNORMAL ☐

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS / IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES

LIMITATIONS:CORRECTIVE LENSES yes DENTURES OTHER [Signature]
Signature of Medical ExaminerTEO J AKERS
Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

Clinic Location



CERTIFICATION RECORD

*Corrected Cert 10/15/91

METHOD: EDDY CURRENTNAME: Joseph F. JacobsLEVEL: II - ASOC. SEC. NO.: 475-78-5670CERTIFICATION DATE: 8/6/91EXPIRATION DATE: 8/4/94

EDUCATION:

Kimball High School, Kimball, MN - Grad 1976

Hutchinson Area Vocational Technical Institute, Hutchinson, MN - Certificate in NDT - 1978*

TRAINING:

Hutchinson Area Vocational Technical Inst. - April 1978 - Two College Level Courses in ET I & II

Babcock & Wilcox, Copely, OH - August 1978 - 12 Hours ET

NPGD, Lynchburg, VA - October 1979 - 16 Hours ET

ABB Combustion Engineering, Chattanooga, TN - September 1988 - 40 Hours ET L II

Zetec, Issaquah, WA - September 1988 - 40 Hours ET LIIA (Data Analysis)

EXPERIENCE:

Certified and experienced at previous employer, Babcock & Wilcox, as a ET Level I & II from August 1978 to September 1980. Certified and experienced at ABB CE as a ET Level IIA from October 1988 to August 1991.

EXAMINATION:

General/Basic: 100.0Specific/Method: 96.0Practical/Specific: 97.0Total: 293.0 / 3 = 97.7Eddy Current Level IIA (Data Analysis)
Score: 92%

COMPOSITE SCORE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Power procedure QAP 2.4 revision 1CERTIFIED BY: R. M. S. MannPOSITION: Eddy Current Level III

1000 Prospect Hill Road
Post Office Box 500
Windoor, Connecticut 06095-0500

CERTIFICATION FOR FIELD SERVICES ACTIVITIES

NAME JONES, ROBERT L. SOCIAL SECURITY NO 306-66-7147 DATE 8-3-93
(of Examinee)

HCT 45.2 HGB 15.6 RBC 5.24 WBC 7.8

Platelets 196

DIFF: N57 L33 M5-B1 E4

Urine; negative, PH 6

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER

R J1 L J1 B J1 R L B

FAR VISION - SNELLEN

R 20/67 L 20/67 B 20/67 R 20/22 L 20/20 B 20/17

COLOR VISION

[] ISHIHARA

[x] WOOL (Holmgren) red, green,
yellow, blue

Reads J1 on Jaeger

EYE EXAMINATION

ADMINISTERED BY: S. Magouirk

Eye Examination Results

Reviewed & Accepted By: [Signature]
HDE Department

* Required to be completed for HDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 69"

WEIGHT 170

BLOOD PRESSURE 110/80 P80

SKIN W EARS W NECK W EYES W
HEAD W HEART W CHEST W LUNGS W

PULMONARY FUNCTION TEST: NORMAL XX ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.11 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS / IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES

LIMITATIONS:

CORRECTIVE LENSES glasses DENTURES OTHER

[Signature]
Signature of Medical Examiner

Dr. James H. Hines, M.D.
Physician License #0000000000

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615) 262-7212

CER-100-1000



CERTIFICATION RECORD

METHOD: EDDY CURRENTNAME: Leslie R. JonesLEVEL: IISOC. SEC. NO.: 306-66-7147CERTIFICATION DATE: 1/22/92EXPIRATION DATE: 1/9/95

EDUCATION:

Clinton High School, Clinton, IN - Grad 1976

TRAINING

ABB Combustion Engineering, Chattanooga, TN - Dec 1989 - 72 Hours ET LI
- Jan 1992 - 40 Hours ET LII

EXPERIENCE:

Certified and experienced at ABB CE as a Level I-Trainee from January 1990 to August 1990 and as a Level I from August 1990 to January 1992.

EXAMINATION RESULTS:

General/Basic: 78.0Specific/Method: 95.0Practical/Specific: 88.0Total: 261.0 / 3 = 87.0 COMPOSITE SCORE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Power procedure OAP 2.4 revision 1.

CERTIFIED BY: *Vester Roy*POSITION: Eddy Current Level III

COMBUSTION ENGINEERING

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

CERTIFICATION FOR FIELD SERVICES ACTIVITIES

NAME KESTER, LEONARD SOCIAL SECURITY NO 441-48-1903 DATE 8-20-93
(of Examination)

WBC 5.4 RBC 5.09 HCT 43.4 HGB 14.9

Platelets 226

DIFF: N58 L29 M9 B1 E3

Urine; negative, PH 6

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER

R # L # S #

R # J1 L # J1 S # J1

FAR VISION - SNELLEN

R 20 L 20 S 20

R 20 L 20 S 20
20 20 20

COLOR VISION

[x] ISHIMARA normal

[] WOOL (Holmgren)

J1 on Jaeger (corrected)

EYE EXAMINATION

ADMINISTERED BY: S. Magouirk

Eye Examination Results

Reviewed & Accepted By: [Signature]

NSE Department

- Required to be completed for NRC certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 5'9"

WEIGHT 249

BLOOD PRESSURE 140/90 P84

SKIN N

EARS N

NECK N

EYES N

HEAD N

HEART N

CHEST N

LUNGS N

PULMONARY FUNCTION TEST: NORMAL XX ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS / IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES

LIMITATIONS:

CORRECTIVE LENSES glasses

DENTURES

OTHER

[Signature]
Signature of Medical Examiner

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

Clinic Location

**CERTIFICATION RECORD****METHOD:** EDDY CURRENT**NAME:** Leonard D. Kester**LEVEL:** II - A**SOC. SEC. NO.:** 441-48-1903**CERTIFICATION DATE:** 7/21/93**EXPIRATION DATE:** 8/4/94**EDUCATION:**

Kingfisher High School, Kingfisher, OK - Grad 1968

TRAINING:

Babcock & Wilcox, Lynchburg, VA - January 1985 - 40 Hours ET LI
- January 1985 - 36 Hours MIZ-18
- April 1986 - 40 Hours ET LII

ABB Combustion Engineering, Chattanooga, TN - September 1987 - 30 Hours ET LII
Zetec, Issaquah, WA - October 1988 - 40 Hours ET LIIA (data analysis)

EXPERIENCE:

Certified and experienced at previous employers, Allen Nuclear and CE as a ET platform worker from June 1984 to September 1984, Babcock & Wilcox as a Level I from January 1985 to September 1985, CE as a Level I from October 1985 to January 1986, Universal Testing as a Level II from February 1986 to March 1986, Babcock & Wilcox as a Level II from March 1986 to September 1987 and at ABB CE as a Level II from September 1987 to October 1988 and as a Level IIA from October 1988 to July 1993.

EXAMINATION:General/Basic: 97.5Specific/Method: 100.0Practical/Specific: 100.0

Eddy Current Data Analysis

Score: 97%

Total: 297.5 / 3 = 99.2 COMPOSITE SCORE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Services procedure QAP 2.4 revision 1.

CERTIFIED BY: Henry J. L...POSITION: ET Level III

ASEA BROWN BOVERI INC.
1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES

NAME Karl Krivanec SOCIAL SECURITY NO. 049-64-7433 DATE 8/10/93
(of Examination)

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER

R# 1

L# 1

B# 1

R#

L#

B#

EAR VISION - SNELLEN

R 20
15-2

L 20
15

B 20
13

R 20

L 20

B 20

COLOR VISION

[X] ISHIHARA normal

[] WOOL (Holmgren)

EYE EXAMINATION

ADMINISTERED BY: Harvey A. Sherry, C.N.

Eye Examination Results

Reviewed & Accepted By: Joseph A. Amato

NDE Department

*Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 71"

WEIGHT 172 lbs.

BLOOD PRESSURE 130/82 (76)

SKIN normal

EARS normal

NECK 0

EYES normal

HEAD normal

HEART normal

CHEST 0

LUNGS clear

PULMONARY FUNCTION TEST:

NORMAL ✓

ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.103 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES:

LIMITATIONS:

CORRECTIVE LENSES 0

DENTURES 0

OTHER

RESPIRATOR GLASSES 0

Joseph A. Amato
Signature of Medical Examiner

Joseph A. Amato, M.D.

Medical Examiner (Print)

ABB Medical Department
Dept. 5420-1902
1000 Prospect Hill Road
Windsor, CT 06095-0500
(203) 285-3339

Clinic Location

**CERTIFICATION RECORD****METHOD:** EDDY CURENT**NAME:** Karl J. Krivanec**LEVEL:** I**SOC. SEC. NO.:** 049-64-7433**CERTIFICATION DATE:** 7/23/93**EXPIRATION DATE:** 7/22/96**EDUCATION:**

East Catholic High School, Manchester, CT - Grad 1980

TRAINING:

ABB Combustion Engineering, Windsor, CT - July 1990 - 40 Hours ET LI

EXPERIENCE:

Certified and experienced at ABB CE as an ET Level I-Trainee from July 1990 to October 1991 and as a Level I from October 1991 to July 1993.

EXAMINATION:

General/Basic:	<u>80.0</u>
Specific/Method:	<u>100.0</u>
Practical/Specific:	<u>93.0</u>

Total: 273.0 / 3 = 91.0 COMPOSITE SCORE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Services procedure QAP 2.4 revision 1.

CERTIFIED BY: Henry LaLonde**POSITION:** Eddy Current Level III

ASEA BROWN BOVERI INC.
000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

CERTIFICATION FOR FIELD SERVICES ACTIVITIES

NAME Francis Myers SOCIAL SECURITY NO. 236-64-8335 DATE 3/9/93
(of Examination)

EYE EXAMINATION

	NATURAL			CORRECTED		
NEAR VISION - JAEGER	R# <u> </u>	L# <u> </u>	B# <u> </u>	R# <u> 1 </u>	L# <u> 1 </u>	B# <u> 1 </u>
FAR VISION - SNELLEN	R <u>20</u> <u>20.2</u>	L <u>20</u> <u>20.5</u>	B <u>20</u> <u>20</u>	R <u>20</u> <u>15</u>	L <u>20</u> <u>20</u>	B <u>20</u> <u>15</u>

COLOR VISION

☒ ISHIHARA normal

☐ WOOL (Holmgren)

EYE EXAMINATION
ADMINISTERED BY: Henry A. Sims, C.O.
Eye Examination Results
Reviewed & Accepted By: Henry A. Sims, C.O.
NDE Department

*Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 6' 3 3/4" WEIGHT 191 BLOOD PRESSURE 120/64 (64)
SKIN normal EARS NECK thyroid 545 EYES 22
HEAD normal HEART 95 12 CHEST depression LUNGS clear
PULMONARY FUNCTION TEST: NORMAL ☒ ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.103 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES:

LIMITATIONS:

CORRECTIVE LENSES + DENTURES OTHER

RESPIRATOR GLASSES +

Joseph A. Amato, M.D.
Signature of Medical Examiner

Joseph A. Amato, M.D.
Medical Examiner (Print)

ABB Medical Department
Dept. 5420-1902
1000 Prospect Hill Road
Windsor, CT 06095-0500
(203) 285-3339

Clinic Location

**CERTIFICATION RECORD****METHOD:** EDDY CURRENT**NAME:** Francis C. Myers**LEVEL:** I**SOC. SEC. NO.:** 236-64-8335**CERTIFICATION DATE:** 6/18/93**EXPIRATION DATE:** 6/18/96**EDUCATION:**

Frankfort High School, Ridgeley, WV - Grad 1959

TRAINING:ABB Combustion Engineering, Windsor, CT - August 1984 - 40 Hours ET LI
- July 1990 - 40 Hours ET LI**EXPERIENCE:**

Certified and experienced at ABB CE as a Level I-Trainee from August 1984 to November 1986 and as a Level I from July 1990 to June 1993.

EXAMINATION:General/Basic: 70.0Specific/Method: 88.0Practical/Specific: 97.0Total: 255.0 / 3 = 85.0 COMPOSITE SCOREThe above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Services procedure OAP 2.4 revision 1.**CERTIFIED BY:** Henry J. [Signature]**POSITION:** Eddy Current Level III

~~CONFIDENTIAL~~

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

CERTIFICATION FOR FIELD SERVICES ACTIVITIES

NAME ORTLOFF, WAYNE A. SOCIAL SECURITY NO 469-56-7047 DATE 8-4-93
(of Examination)

WBC 5.7 RBC 5.06 HCT 43.1 HGB 14.5
Platelets 225
DIFF: N54 L28 M11 B1 E6
Urine: negative, PH 6

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER

R L B

R J1 L J1 B J1

FAR VISION - SNELLEN

R 20 L 20 B 20

R 20 L 20 B 20
29 29 29

Reads J1 on Jaeger (corrected)

COLOR VISION

[XX] ISHIHARA normal

[] WOOL (Holmgren)

EYE EXAMINATION

ADMINISTERED BY: S. Magouirk

Eye Examination Results

Reviewed & Accepted By: [Signature]

NDE Department

* Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 71" WEIGHT 211 BLOOD PRESSURE 140/90 P80
SKIN Rough, dry, cracked EARS W NECK W EYES W
HEAD W HEART W CHEST W LUNGS W

PULMONARY FUNCTION TEST: NORMAL XX ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS / IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICE

LIMITATIONS:

CORRECTIVE LENSES glasses DENTURES OTHER

[Signature]
Signature of Medical Examiner

Dr. James Rimer, M.D.

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

Cite Location



CERTIFICATION RECORD

METHOD: EDDY CURRENT

NAME: Wayne A. Ortloff

LEVEL: II

SOC. SEC. NO.: 469-56-7047

CERTIFICATION DATE: 7/29/92

EXPIRATION DATE: 7/28/95

EDUCATION:

Hutchinson High School, Hutchinson, MN - Grad 1980

Hutchinson Area Vocational Technical Institute, Hutchinson, MN - Certificate in NDT, May 1990

TRAINING:

ABB Combustion Engineering, Chattanooga, TN - January 1991 - 40 Hours ET LI
- July 1992 - 40 Hours ET LII

EXPERIENCE:

Experienced at ABB CE from December 1990 to February 1991 and certified as a Level I from February 1991 to July 1992.

EXAMINATION

General/Basic: 95.0

Specific/Method: 92.0

Practical/Specific: 97.0

Total: 284.0 / 3 = 94.7 COMPOSITE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Services procedure QAP 2.4 revision 1.

CERTIFIED BY: Richard S. Mann

POSITION: Eddy Current Level III

CONNECTION ENGINEERING

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

**CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES**

NAME PASCUCCI, ANGELO

SOCIAL SECURITY NO 287-48-4577

DATE 5-19-93

(of Examination)

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER

R J3

L J3

B J3

R

L

B

FAV VISION - SNELLEN

R 20/20

L 20/20

B 20/20

R 20

L 20

B 20

COLOR VISION

[X] ISHIHARA Normal

[] WOOL (Holmgren)

Reads J1 on Jaeger card

EYE EXAMINATION
ADMINISTERED BY: S. Magouirk

Eye Examination Results
Reviewed & Accepted By: [Signature]

NOT REPEATABLE

* Required to be completed for all certification only. Not required for certification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 6'2"

WEIGHT 190 lbs.

BLOOD PRESSURE 130/84 P.88

SKIN nl

EARS nl

NECK nl

EYES nl

HEAD nl

HEART nl

CHEST nl

LUNGS CTA

PULMONARY FUNCTION TEST: NORMAL X

ABNORMAL nl

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposure to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NIOSH-8041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS / IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES:

LIMITATIONS:

CORRECTIVE LENSES glasses

DENTURES

OTHER

[Signature]
Signature of Medical Examiner

Dr. James R. Hux, M.D.
Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)782-7812

Cite Location

**CERTIFICATION RECORD****METHOD:** EDDY CURRENT**NAME:** Angelo Pascucci**LEVEL:** II - A**SOC. SEC. NO.:** 287-48-4577**CERTIFICATION DATE:** 8/13/93**EXPIRATION DATE:** 8/10/96**EDUCATION:**

Hoban High School, Akron, OH - Grad 1967

TRAINING:

Babcock & Wilcox, Lynchburg, VA - November 1985 - 40 Hours ET LI

- January 1986 - 24 Hours ET LII

Zetec, Inc., Issaquah, WA - June 1987 - 40 Hours ET LIIA (Data Analysis)

EXPERIENCE:

Certified and experienced at Babcock & Wilcox as a Level IIA (Data Analysis) from January 1986 to April 1987 with additional ET experience from 1984 to 1985 consisting of design and maintenance of ET equipment and development of ET techniques for U-bend indication detection and sizing and ET data acquisition. Certified and experienced at ABB CE as a Level IIA from August 1987 to August 1993.

EXAMINATION:General/Basic: 97.5Specific/Method: 96.0Practical/Specific: 99.0

Eddy Current Data Analysis

Score: 81.7

Total: 292.5 / 3 = 97.5 COMPOSITE SCORE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Services procedure QAP 2.4 revision 1.

CERTIFIED BY: POSITION: Eddy Current Level III

ASEA BROWN BOVERI INC.
1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES

NAME Brian Pasquale SOCIAL SECURITY NO. 203-40-4976 DATE 7/23/93
(of Examination)

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER R# 1 L# 1 B# 1 R# L# B#
FAR VISION - SNELLEN R 20 L 20 B 20 R 20 L 20 B 20

COLOR VISION

☒ ISHIHARA None

☐ WOOL (Holmgren)

EYE EXAMINATION

ADMINISTERED BY: Henry A. Shuman, M.D.

Eye Examination Results

Reviewed & Accepted By: [Signature]

NDE Department

*Required to be completed for NDB certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 70" WEIGHT 194 1/2" BLOOD PRESSURE 120/80 (60)
SKIN clear EARS ✓ NECK clear EYES Normal
HEAD clear HEART h.c. 12 CHEST clear LUNGS clear
PULMONARY FUNCTION TEST: NORMAL ✓ ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.103 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES:

LIMITATIONS:

CORRECTIVE LENSES + DENTURES + OTHER

RESPIRATOR GLASSES +

[Signature]
Signature of Medical Examiner

Joseph A. Amato, M.D.

Medical Examiner (Print)

ABB Medical Department
Dept. 3420-1902
1000 Prospect Hill Road
Windsor, CT 06095-0500
(203) 285-3339

Clinic Location

**CERTIFICATION RECORD****METHOD:** EDDY CURRENT**NAME:** Brian C. Pasquale**LEVEL:** II**SOC. SEC. NO.:** 203-40-4976**CERTIFICATION DATE:** 7/22/93**EXPIRATION DATE:** 7/21/96**EDUCATION:**

New Brighton High School, New Brighton, PA - Grad 1970

TRAINING:

Scientific Technologies, Madison, CT - June 1988 - 40 Hours ET LI

- September 1988 - 40 Hours ET LII

Wetingshouse, Pittsburg, PA - August 1989 - 90 Hours ET Data Analysis

Zetec, Inc., Issaquah, WA - December 1990 - 80 Hours ET IIA (Data Analysis)

EXPERIENCE:

Certified and/or experienced at previous employer, Scientific Technologies, from January 1988 to December 1989 and Certified and experienced at ABB CE as a Level II from July 1990 to December 1990 and as a Level IIA from December 1990 to July 1993.

EXAMINATION:General/Basic: 75.0Specific/Method: 81.0Practical/Specific: 85.0Total: 241.0 / 3 = 80.3 COMPOSITE SCORE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Services procedure QAP 2.4 revision 1.

CERTIFIED BY: Henry Salame**POSITION:** Eddy Current Level III

COMBUSTION ENGINEERING

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

**CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES**

NAME PATTERSON, DOUGLAS SOCIAL SECURITY NO 411-96-7094 DATE 02-06-93
(of Examination)

HCT 52.3 HGB 17.6 RBC 6.11 (high)
WBC 15.0 (high) Platelets 246
DIFF: N69 L19 M5 B1 E6
Urine; negative, PH 6

EYE EXAMINATION

	NATURAL			CORRECTED		
NEAR VISION - JAEGER	R <u>J1</u>	L <u>J1</u>	B <u>J1</u>	R <u> </u>	L <u> </u>	B <u> </u>
FAR VISION - SNELLEN	R $\frac{20}{29}$	L $\frac{20}{33}$	B $\frac{20}{29}$	R $\frac{20}{20}$	L $\frac{20}{22}$	B $\frac{20}{20}$

COLOR VISION

[X] ISHIHARA normal

[] WOOL (Holmgren)

J1 on Jaeger card

EYE EXAMINATION

ADMINISTERED BY: S. Magouirk

Eye Examination Results

Reviewed & Accepted By: [Signature]

NDE DEPARTMENT

* Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 5'7" WEIGHT 160 BLOOD PRESSURE 120/74

SKIN [initials] EARS [initials] NECK [initials] EYES [initials]

HEAD [initials] HEART [initials] CHEST [initials] LUNGS [initials]

PULMONARY FUNCTION TEST: NORMAL XX ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS Y IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES

LIMITATIONS:

CORRECTIVE LENSES glasses DENTURES OTHER

[Signature]
Signature of Medical Examiner

Dr. James Rimer, M.D.

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

Clinic Location



CERTIFICATION RECORD

METHOD: EDDY CURRENTNAME: Douglas L. Patterson
SOC. SEC. NO.: 414-96-7094LEVEL: II
CERTIFICATION DATE: 1/23/92
EXPIRATION DATE: 1/22/95

EDUCATION:

Hixson High School, Hixson, TN - Grad 1981


TRAINING

ABB Combustion Engineering, Chattanooga, TN - May 1989 - 40 Hours ET LI
- Jan 1992 - 40 Hours ET LII

EXPERIENCE:

Certified and experienced at ABB CE as a Level I-Trainee from June 1989 to March 1990 and as a Level I from March 1990 to January 1992.

EXAMINATION RESULTS:

General/Basic: 78.0
Specific/Method: 88.0
Practical/Specific: 84.0Total: 250.0 / 3 = 83.3 COMPOSITE SCOREThe above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Power procedure QAP 2.4 revision 1.CERTIFIED BY: 
POSITION: Eddy Current Level III

~~CONFIDENTIAL~~

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

**CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES**

NAME PLYE, SCOTT SOCIAL SECURITY NO 411-98-7265 DATE 7-13-93
(of Examination)

HCT 46.0 HGB 16.2 RBC 5.29 WBC 5.4
Platelets 213
DIFF: N62 L28 M8 B0 E2
Urine; negative, PH 6

EYE EXAMINATION

	NATURAL			CORRECTED		
NEAR VISION - JAEGER	R # <u>J1</u>	L # <u>J1</u>	B # <u>J1</u>	R # <u> </u>	L # <u> </u>	B # <u> </u>
FAR VISION - SNELLEN	R <u>20</u> <u>22</u>	L <u>20</u> <u>25</u>	B <u>20</u> <u>22</u>	R <u>20</u>	L <u>20</u>	B <u>20</u>

COLOR VISION

☒ ISHIMARA Normal
☐ WOOL (Holmgren)

J1 on Jaeger card
EYE EXAMINATION
ADMINISTERED BY: S. Magouirk

Eye Examination Results
Reviewed & Accepted By: [Signature]

NDE Department

* Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 74" WEIGHT 210 BLOOD PRESSURE 118/80 P72

SKIN <u>N</u>	EARS <u>N</u>	NECK <u>N</u>	EYES <u>N</u>
HEAD <u>N</u>	HEART <u>N</u>	CHEST <u>N</u>	LUNGS <u>N</u>

PULMONARY FUNCTION TEST: NORMAL XX ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES

LIMITATIONS:

CORRECTIVE LENSES n/a DENTURES n/a OTHER

[Signature]
Signature of Medical Examiner
Dr. James Rimer, M.D.

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

Clinic Location



CERTIFICATION RECORD

METHOD: EDDY CURRENTNAME: Scott L. Pyle
SOC. SEC. NO.: 411-98-7265LEVEL: IIA
CERTIFICATION DATE: 11/10/92
EXPIRATION DATE: 2/28/94

EDUCATION:

Central High School, Harrison, TN - Grad 1973

TRAINING:

ABB Combustion Engineering, Chattanooga, TN - September 1986 - 40 Hours ET LI
- May 1988 - 40 Hours ET LI
Universal Testing Laboratories - September 1988 - 24 Hours ET LII
Zetec, Inc, Issaquah, WA - February 1991 - 80 Hours ET LIIA (Data analysis)

EXPERIENCE:

Certified and experienced at previous employers, ABB CE as Level I-Trainee from January 1987 to May 1988 and as a Level I from May 1988 to August 1988 and as a Level II and IIA at Siemens Nuclear Power Services from September 1988 to September 1992.

EXAMINATION:

General/Basic: 80.0
Specific/Method: 86.0
Practical/Specific: 92.0

Eddy Current Data Analysis
Score: 90%

Total: 258.0 / 3 86.0 COMPOSITE SCORE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Services procedure QAP 2.4 revision 1.

CERTIFIED BY: Rich L. Mann
POSITION: Eddy Current Level III

COMBUSTION ENGINEERING

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

**CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES**

NAME REICH, JOHN SOCIAL SECURITY NO 306-46-9824 DATE 1-25-93
(of Examination)

HCT 41.6 HGB 14.5 RBC 4.82 WBC 4.5
Platelets 228
DIFF: N39 L41 M7 B2 E1
Urine; negative, PH 6

EYE EXAMINATION

	NATURAL			CORRECTED		
NEAR VISION - JAEGER	R <u>J3</u>	L <u>J3</u>	B <u>J1</u>	R <u> </u>	L <u> </u>	B <u> </u>
FAR VISION - SNELLEN	R <u>20/20</u>	L <u>20/20</u>	B <u>20/20</u>	R <u>20</u>	L <u>20</u>	B <u>20</u>

COLOR VISION

☒ ISHIHARA Normal
☐ WOOL (Holmgren)

Reads J1 on Jaeger card

EYE EXAMINATION
ADMINISTERED BY: S. Magouirk

Eye Examination Results
Reviewed & Accepted By: [Signature]

NDE Department

* Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 5'8" WEIGHT 216 BLOOD PRESSURE 130/80 P76
SKIN WNL EARS WNL NECK WNL EYES WNL
HEAD WNL HEART WNL CHEST WNL LUNGS WNL
PULMONARY FUNCTION TEST: NORMAL XX ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES:

LIMITATIONS:

CORRECTIVE LENSES N/A DENTURES n/a OTHER

[Signature]
Signature of Medical Examiner

Dr. James Rimer, M.D.

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

Clinic Location

**CERTIFICATION RECORD****METHOD:** EDDY CURRENT**NAME:** John E. Reich, Jr.**LEVEL:** II**SOC. SEC. NO.:** 306-46-9824**CERTIFICATION DATE:** 1/17/92**EXPIRATION DATE:** 1/22/95**EDUCATION:**Mt. Vernon High School, Mt. Vernon, IN- Grad. 1964**TRAINING**

Babcock & Wilcox Co., Lynchburg, VA - January 1984 - 40 hours ET Level I
ABB Combustion Engineering, Windsor, CT - January 1986 - 32 hours ET Level II
- January 1989 - 10 hours ET Level II

EXPERIENCE:

Certified at Babcock & Wilcox Co. as a Level I-Trainee from February 1984 to May 1984 and as a Level I from May 1984 to January 1986 with experience in ET examinations and data analysis of steam generator tubing. Certified at ABB CE as a Level II from January 1986 to January 1992.

EXAMINATION RESULTS:**General/Basic:** 80.0**Specific/Method:** 80.0**Practical/Specific:** 91.0**Total:** 251.0 / 3 = 83.6 **COMPOSITE SCORE**

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Power procedure QAP 2.4 revision 1.

CERTIFIED BY: Russ S. Mann**POSITION:** Eddy Current Level III

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

**CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES**

NAME SHOCK, SAMUEL A. SOCIAL SECURITY NO 408-04-8460 DATE 8-3-93
(of Examination)

WBC 4.1 RBC 5.36 HGB 15.4 HCT 43.5
Platelets 198
DIFF: N49 L33 M10 E6 B2
Urine; negative PH 6

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER

R J1 L J1 B J1 R L B

FAR VISION - SNELLEN

R 20
18 L 20
18 B 20
17 R 20 L 20 B 20
17 Reads J1 on Jaeger card

COLOR VISION

[X] ISHIHARA normal

[] WOOL (Holmgren)

EYE EXAMINATION
ADMINISTERED BY: S. Magouirk

Eye Examination Results
Reviewed & Accepted By: [Signature]
NDE Department

* Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 73" WEIGHT 187 BLOOD PRESSURE 120/78 P72
SKIN N EARS N NECK N EYES N
HEAD N HEART N CHEST N LUNGS N
PULMONARY FUNCTION TEST: NORMAL XX ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS / IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICE:

LIMITATIONS:

CORRECTIVE LENSES N/A DENTURES OTHER

[Signature]
Signature of Medical Examiner

Dr. James Rimer, M.D.

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

C/E Site Location

**CERTIFICATION RECORD****METHOD:** EDDY CURRENT**NAME:** Samuel A. Shock**LEVEL:** IIA**SOC. SEC. NO.:** 408-04-8460**CERTIFICATION DATE:** 3/30/83**EXPIRATION DATE:** 3/30/96**EDUCATION:**

Lookout Valley High School, Chattanooga, TN - Grad 1980
University of Tennessee, Chattanooga, TN - BSME

TRAINING:

ABB Combustion Engineering, Chattanooga, TN - September 1988 - 42 Hours ET LI
- November 1989 - 56 Hours ET LII
Zetec Inc., Issaquah, WA - January 1990 - 80 Hours ET LIIA (Data Analysis)

EXPERIENCE:

Certified and experienced at ABB CE as a Level I-Trainee from September 1988 to January 1989,
as a Level I from January 1989 to August 1991 and as a Level IIA from August 1991 to
November 1992.

EXAMINATION:

General/Basic: 98.0
Specific/Method: 100.0
Practical/Specific: 99.0

Eddy Current Data Analysis
Score: 90%

Total: 297.0 / 3 99.0 COMPOSITE SCORE

The above named individual has completed the qualification/training requirements for certification
in the above examination method in accordance with ABB Combustion Engineering Nuclear
Services procedure QAP 2.4 revision 1.

CERTIFIED BY: Lawrence J. Edwards**POSITION:** Eddy Current Level III

ASEA BROWN BOVERI INC.
1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES

NAME Robert J. Shutes SOCIAL SECURITY NO. 224-17-4422 DATE 2/23/93
(of Examination)

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER R# 1 L# 1 B# 1 R# L# B#
EAR VISION - SNELLEN R 20 L 20 B 20 R 20 L 20 B 20
15-1 13 10

COLOR VISION

[X] ISHIHARA Normal

[] WOOL (Holmgren)

EYE EXAMINATION

ADMINISTERED BY: Timothy K. Kavanagh, MD

Eye Examination Results

Reviewed & Accepted By: [Signature]

NDE Department

*Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 71" WEIGHT 179 BLOOD PRESSURE 124/76 P. 80
SKIN Normal EARS na NECK Normal EYES Normal
HEAD Normal HEART Normal CHEST na LUNGS Clear
PULMONARY FUNCTION TEST: NORMAL ✓ ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.103 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES:

LIMITATIONS:

CORRECTIVE LENSES DENTURES OTHER
RESPIRATOR GLASSES

[Signature]
Signature of Medical Examiner

Joseph A. Amato, M.D.
Medical Examiner (Print)

ABB Medical Department
Dept. 5420-1902
1000 Prospect Hill Road
Windsor, CT 06095-0500
(203) 285-3339

Clinic Location



ASEA BROWN BOVERI

CERTIFICATION RECORD

METHOD: EDDY CURRENTNAME: Robert J. ShutesLEVEL: IISOC. SEC. NO.: 224-17-4422CERTIFICATION DATE: 6/28/93EXPIRATION DATE: 12/18/94

EDUCATION:

Virginia High School, Bristol, VA - Grad 1981

TRAINING:

ABB Combustion Engineering, Windsor, CT - March 1988 - 40 Hours ET L I

Zetec, Issaquah, WA - January 1989 - 40 Hours ET L II

- June 1990 - 80 Hours ET IIA (Data Analysis)

EXPERIENCE:

Certified and experienced at ABB CE as a Level I-Trainee from March 1988 to August 1988, as a Level I from August 1988 to August 1989, as a Level II from August 1989 to June 1990 and as a Level IIA from June 1990 to June 1993.

EXAMINATION:

General/Basic: 90.0Specific/Method: 73.0Practical/Specific: 100.0Total: 263.0 / 3 = 87.7 COMPOSITE SCORE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Services procedure QAP 2.4 revision 1.

CERTIFIED BY: Henry LabadiePOSITION: Eddy Current Level III

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

**CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES**

NAME DONALD R. SMITH SOCIAL SECURITY NO 289-76-9536 DATE 7-2-93
(of Examinat: _____)

WBC 5.6 RBC 4.92 HGB 15.4 HCT 45.4

Platelets 229

DIFF: N48 L34 M13 E4 B1

Urine; negative, PH 8

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER

R # J1 L # J1 B # J1R # L # B #

FAR VISION - SNELLEN

R 20
22L 20
29B 20
25R 20 L 20 B 20

COLOR VISION

☒ ISHIHARA normal☐ WOOL (Holmgren)

Reads J1 on Jaeger card

EYE EXAMINATION

ADMINISTERED BY: S. Magouirk

Eye Examination Results

Reviewed & Accepted By: [Signature]

NOT Department

* Required to be completed for MDI certification only. Not re-
quired for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATIONHEIGHT 69"WEIGHT 245 lbs.BLOOD PRESSURE 124/80 P80SKIN nl EARS nl NECK nl EYES nl HEAD nl HEART RR 3/4CHEST nl LUNGS clear PULMONARY FUNCTION TEST: NORMAL ☒ ABNORMAL ☐

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.10 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES
LIMITATIONS:

CORRECTIVE LENSES n/a DENTURES upper partial OTHER

[Signature] MD
Signature of Medical Examiner

Dr. Mark Simpson, M.D.

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

Clinic Location



CERTIFICATION RECORD

METHOD: EDDY CURRENTNAME: Donald R. SmithLEVEL: IISOC. SEC. NO.: 289-76-9536CERTIFICATION DATE: 3/18/93EXPIRATION DATE: 7/28/95

EDUCATION:

Hickman County High School, Centerville, TN - Grad 1984

TRAINING:

ABB Combustion Engineering, Chattanooga, TN - December 1989 - 72 hours ET I

ABB Combustion Engineering, Chattanooga, TN - July 1992 - 40 hours ET II

EXPERIENCE:

Certified and experienced at ABB CE as a Level I trainee from August 1989 to March 1990 and as a Level I from March 1990 to March 1993.

EXAMINATION

General/Basic: 75.0Specific/Method: 82.0Practical/Specific: 89.0Total: 246.0 / 3 = 82.0 COMPOSITE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Services procedure QAP 2.4 revision 1.

CERTIFIED BY: *Henry J. Coleman*POSITION: ET Level III

COMBUSTION ENGINEERING

0 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

CERTIFICATION FOR FIELD SERVICES ACTIVITIES

NAME STEGALL, ALLEN SOCIAL SECURITY NO 414-96-8969 DATE 8-9-93
(of Examination)

WBC 5.9 RBC 5.11 HCT 43.1 HGB 14.6
Platelets 293
DIFF: N54 L35 M7 B1 E3
Urine; negative, Ph 6

EYE EXAMINATION

	NATURAL			CORRECTED		
NEAR VISION - JAEGER	R # <u>J1</u>	L # <u>J1</u>	B # <u>J1</u>	R # <u> </u>	L # <u> </u>	B # <u> </u>
FAR VISION - SNELLEN	R <u>20</u> 20	L <u>20</u> 22	B <u>20</u> 17	R <u>20</u>	L <u>20</u>	B <u>20</u>

COLOR VISION

[X] ISHIHARA Normal
[] WOOL (Holmgren)

Reads J1 on Jaeger card (

EYE EXAMINATION
ADMINISTERED BY: S. Magouirk

Eye Examination Results
Reviewed & Accepted By: Thomas J. III
NDE Department

* Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 70" WEIGHT 165 BLOOD PRESSURE 124/80 P.76

SKIN Normal EARS Normal NECK Normal EYES Normal
HEAD Normal HEART Regular & full CHEST Normal LUNGS Clear

PULMONARY FUNCTION TEST: NORMAL XX ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS / IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES:

LIMITATIONS:

CORRECTIVE LENSES n/a DENTURES n/a OTHER

Joseph Sentef Jr.
Signature of Medical Examiner

Dr. Joe Sentef

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402
(615)752-7212

Clinic Location



CERTIFICATION RECORD

METHOD: EDDY CURRENT

NAME: James A. Steagall
SOC. SEC. NO.: 414-96-8969

LEVEL: II
CERTIFICATION DATE: 7/23/93
EXPIRATION DATE: 12/14/95

EDUCATION:

Hixson High School, Hixson, TN - Grad.

TRAINING:

ABB Combustion Engineering, Chattanooga, TN - May 1988 - 40 Hours ET LI
- November 1989 - 56 Hours ET LII
Zetec, Inc., Issaquah, WA - July 1990 - 80 Hours ET LLIA (Data Analysis)

EXPERIENCE:

Certified and experienced at ABB CE as a Level I Trainee from May 1988 to January 1989, as a Level I from January 1989 to March 1990, as a Level II from March 1990 to July 1990 and as a Level IIA from July 1990 to July 1993.

EXAMINATION:

General/Basic:	<u>88.0</u>				
Specific/Method:	<u>96.0</u>				
Practical/Specific:	<u>99.0</u>				
Total:	<u>283.0</u>	/	<u>3</u>	=	<u>94.3</u> COMPOSITE SCORE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Services procedure QAP 2.4 revision 1.

CERTIFIED BY: *Henry J. L. L...*

POSITION: Eddy Current Level III

MASTER-LEE ENERGY SERVICES CORPORATION

NDE CERTIFICATION RECORD

Name: Steele, B.SSN: 224-90-1899Method/Level ET/I

Education/Experience:

High School Equivalency (G.E.D.)

1977

Experience:

See Attached Resume

Statement of Training:

ET/I 48 Hours Training, Master-Lee Energy Services

1/92

Examination Date: 1/14/92

Examination and Grade

General

90.4% X wht. 0.3

Specific

88% X wht. 0.3

Practical

86% X wht. 0.4

Total

88%

Certification Limitation:

Remarks:

All NDE Training Completed in Accordance With Master-Lee Energy Services QA Procedure ML-QAP-2.2 Unless Otherwise Specified.

Certification Date: 1/23/92

Certification Updated: 7/21/92

Expiration Date: 1/13/95

Certified By: *Ray Steele*Date: 1/23/92

FAMILY PHYSICIANS OF SPARTANBURG, P.A.

1250 REIDVILLE ROAD
SPARTANBURG, SOUTH CAROLINA 29301
(803) 576-8201

LEE B. TAYLOR, JR., M.D.

MARK A. KNIPFER, M.D.

STEPHEN A. YOST, M.D.

CERTIFICATE OF EYE EXAMINATION

MASTER-LEE ENERGY SERVICES CORPORATION

NAME Bert Stule

SSN

224-90-1899

DOB

1-8-58

EXAMINATION DATE

6-14-93

NEAR VISION ACUITY

ACCEPTABLE

YES ☒NO ☐

CORRECTIVE LENSES REQUIRED

YES ☐NO ☒NATURAL OR CORRECTED NEAR VISION
ACUITY IN AT LEAST ONE EYE TO J-1
AT NOT LESS THAN 12 INCHES. ORTHO
-RATER NUMBER TEN (10) TEST PATTERNOR TITMUS SNELLEN TEST EQUIVALENTS
OF 14/14 SHALL ALSO BE ACCEPTABLE.

FAR VISION ACUITY

ACCEPTABLE

YES ☒NO ☐

CORRECTIVE LENSES REQUIRED

YES ☐NO ☒NATURAL OR CORRECTED FAR VISION
ACUITY IN AT LEAST ONE EYE TO
TITMUS SNELLEN TEST EQUIVALENT
OF 20/30.

COLOR VISION

ACCEPTABLE

YES ☒NO ☐SATISFACTORY COLOR VISION AS
DEMONSTRATED BY ISHIHARA TEST
PATTERNS OR EQUIVALENT.

MEDICAL EXAMINER'S SIGNATURE

Lee B. Taylor

EXAMINER'S NAME (PRINT)

6-14-93

DATE

1250 Reidville Rd

CITY, STATE, ZIP CODE

Spartanburg SC 29306

**MASTER-LEE ENERGY SERVICES CORPORATION****MASTER-LEE ENERGY SERVICES
CERTIFICATION OF EYE EXAMINATION**NAME: Robby F. Varrato SSN: 161-52-9238 DOB: 3/26/58EXAMINATION DATE: 11-24-92**NEAR VISION ACUITY**

ACCEPTABLE

YES ☒ NO ☐

CORRECTIVE LENSES REQUIRED

YES ☒ NO ☐NATURAL OR CORRECTED NEAR VISION ACUITY IN
AT LEAST ONE EYE TO JAEGER-1 AT NOT LESS
THAN 12 INCHES.

OR EQUIVALENT ORTHO-RATTER TEST PATTERN

OR TITMUS SNELLEN TEST EQUIVALENTS OF 14/14
SHALL BE ACCEPTABLE.**FAR VISION ACUITY**

ACCEPTABLE

YES ☒ NO ☐

CORRECTIVE LENSES REQUIRED

YES ☒ NO ☐NATURAL OR CORRECTED FAR VISION ACUITY IN
AT LEAST ONE EYE TO SNELLEN TEST EQUIVALENT
OF 20/25.**COLOR VISION**

ACCEPTABLE

YES ☒ NO ☐SATISFACTORY COLOR VISION AS DEMONSTRATED
BY ISHIHARA TEST PATTERNS OR EQUIVALENT.TWP.
MEDICAL EXAMINER'S SIGNATURE11-24-92
DATETHOMAS W. PIFFERETTI, M.D.
M.D.-039874L

EXAMINER'S NAME (PRINT)

Mt. View Med-Care
R.D. # 8 Box 130M
Greensburg, PA 15601

CITY, STATE, ZIP CODE

1639 Clearview Drive

Latrobe, Pennsylvania 15650

(412) 539-8060

FAX: (412) 537-9285

MASTER-LEE ENERGY SERVICES CORPORATION

NDE CERTIFICATION RECORD

Name: Varrato, R. SSN: 161-52-9238 Method/Level ET/IIA

Education/Experience:

Graduated Blairsville High School, Blairsville Pa.

1976

Experience:

See Attached Resume

Statement of Training:

ET/I 40 Hours Training, Westinghouse/Echoram Technologies Inc. 6/86

ET/II 40 Hours Training, Universal Testing Laboratories Inc. 9/88

ET/II 40 Hours Training, Master-Lee Energy Services Corp. 7/89

ET/IIA 136 Hours Training, ET Data Analysis,
Master-Lee Energy Services Corp. 12/90Examination Date: 11/30/90

Examination and Grade

General	Specific	Practical IIA Composite	Total
82.3% X wht. 0.3	88% X wht. 0.3	81.4% X wht. 0.4	83.7%

Certification Limitation:

Remarks:

All NDE Training Completed In Accordance With Master-Lee Energy Services QA Procedure ML-QAP-2.2 Unless Otherwise Specified.

Certification Date: 1/29/91

Certification Updated: 7/21/92

Expiration Date: 11/29/93

Certified By: Mary Gurt
Level IIIDate: 2/21/92

CERTIFICATION
FOR
FIELD SERVICES ACTIVITIESTEA BROWN BOVERI INC.
0 Prospect Hill Road
1st Office Box 500
Windsor, Connecticut 06095-0500NAME MICHAEL WATROUSSOCIAL SECURITY NO. 047-54-9071DATE 6/1/93

(of Examination)

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER

R# L# B# R# 1L# 1B# 1

FAR VISION - SNELLEN

R 20L 20B 20R 20
20L 20
20B 20
15

COLOR VISION

☒ ISHIHARA normal☐ WOOL (Holmgren)

EYE EXAMINATION

ADMINISTERED BY: Wendy A. Jones, R.N.

Eye Examination Results

Reviewed & Accepted By: [Signature]

NDE Department

*Required to be completed for NDE certification only. Not required for qualification to wear respiratory protection devices.

PHYSICAL EXAMINATION

HEIGHT 66"WEIGHT 223 lbs.BLOOD PRESSURE 120/72 (72)SKIN WNLEARS WNLNECK WNLEYES WNLHEAD WNLHEART WNLCHEST WNLLUNGS WNL

PULMONARY FUNCTION TEST:

NORMAL ✓ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.103 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES:

LIMITATIONS:

CORRECTIVE LENSES yesDENTURES noOTHER RESPIRATOR GLASSES yes

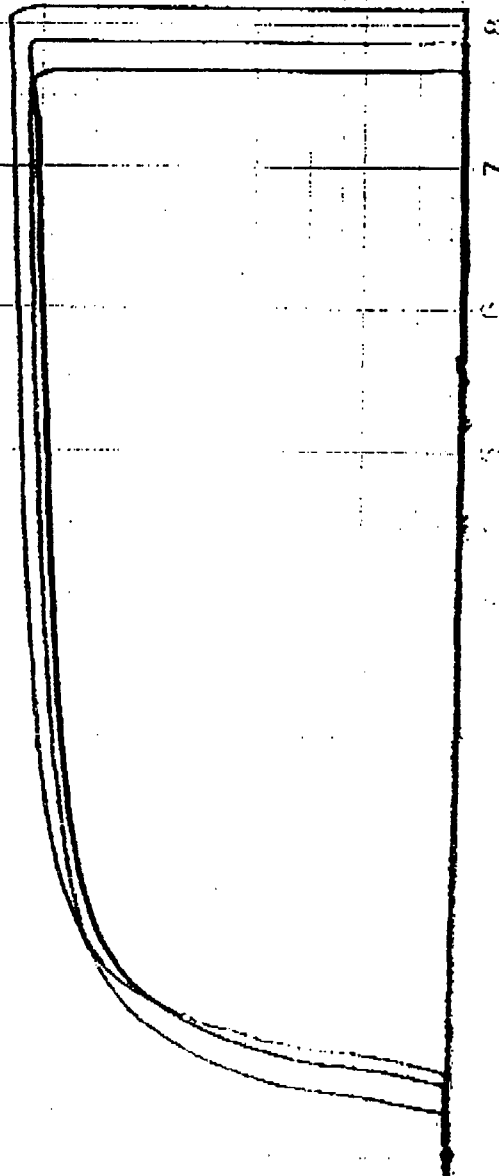
Signature of Medical Examiner

Medical Examiner (Print)

Industrial Health Care Company
1080 Day Hill Road
Windsor, CT 06095

Clinic Location

MEDICAL DEPARTMENT 5420-1902
 ASEA BROWN BOVERI, INC.
 P.O. BOX 500
 WINDSOR, CT 06095-500



MICHAEL WATROUS

047-54-3071

6/1/93

10:05 AM

Perry & Jones

SUMMARY REPORT
 DATE: 6/1/93

SEX: MALE
 AGE: 32.8
 HGT.(IN): 66.8
 PRES MMHG: 76.0
 TEMP.(F): 77.5
 BT25
 FACTOR: 1.87

ACT. PRED. ZPR
 FUC: TRIAL#2
 4.77 4.59 106
 FEU1: TRIAL#2
 3.88 3.65 106
 ZFEU1:
 81.2 84.5 96.
 FEU2: TRIAL#2
 4.44 4.32 102
 FEF2575: TRIAL#2
 4.84 4.68 86.
 REF: TRIAL#2
 9.85 8.64 104

VARIABILITY:
 FUC: 4.182
 FEU1: 4.842

PRED REF :

VARIABILITY:
 FUC: 4.182
 FEU1: 4.842

VARIABILITY:
 FUC: 4.392
 FEU1: 5.482
 HEIGHT(IN) 66
 AGE: 32
 SEX: MALE



CERTIFICATION RECORD

METHOD: EDDY CURRENTNAME: Michael J. VatrousLEVEL: 1SOC. SEC. NO.: 047-54-9071CERTIFICATION DATE: 11/12/91EXPIRATION DATE: 11/9/93

EDUCATION:

New Britain High School, New Britain, CT - Grad 1979

TRAINING:

ABB Combustion Engineering, Windsor, CT - November 1990 - 40 Hours ET LI

EXPERIENCE:

Certified and experienced a. ABB CE as a Level I-Trainee from November 1990 to November 1991.

EXAMINATION:

General/Basic: 91 3Specific/Method: 100 0Practical/Specific: 97 0Total: 288 3 / 3 = 96.1 COMPOSITE SCORE

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Power procedure QAP 2.4 revision 1.

CERTIFIED BY: POSITION: Eddy Current Level III

COMBUSTION ENGINEERING

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

**CERTIFICATION
FOR
FIELD SERVICES ACTIVITIES**

NAME WEBBER, DARRELL SOCIAL SECURITY NO 472-70-9568 DATE 11-02-92
(of Expiration)

WBC 4.3 RBC 5.02 HCT 42.7 HGB 14.8

DIFF: N54 L32 M6 B1 E7 (high)

Platelets 157

Urine; negative; PH 6

EYE EXAMINATION

NATURAL

CORRECTED

NEAR VISION - JAEGER

R J10 L J8 S J7R J1 L J1 S J1

FAR VISION - SNELLEN

R 20 L 20 S 20R 20 L 20 S 20
25 22 20**COLOR VISION**[☒] ISHIMARA Normal[☐] WOOL (Holmgren)

Reads J1 on Jaeger (corrected)

EYE EXAMINATION

ADMINISTERED BY:

S. Magouirk

Eye Examination Results

Reviewed & Accepted By:

[Signature]

NOC DEPARTMENT

* Required to be completed for DOE certification only. Not re-
quired for modification to wear respiratory protection devices.

PHYSICAL EXAMINATIONHEIGHT 5'10"WEIGHT 157BLOOD PRESSURE 120/76 P80SKIN 2EARS 2NECK 2EYES 2HEAD 2HEART 2CHEST 2LUNGS Clear

PULMONARY FUNCTION TEST: NORMAL @ 74.8%

ABNORMAL

This is to certify that this individual has been examined and no evidence has been found of any physical condition which might be aggravated by, or attributed to, occupational exposure to ionizing radiation. This individual has no history or evidence of previous radiation injury and has no history of exceeding the limits of 10 CFR 20.101 and is found to be physically qualified to perform duties involving occupational exposures to ionizing radiation.

This examination has also revealed no indications of aberrant behavior.

This individual has been examined in accordance with NUREG-0041 Section 7.4 and no evidence has been found of any physical or mental conditions in which the use of respiratory protection devices are considered contraindicated.

THE ABOVE INDIVIDUAL IS IS NOT QUALIFIED FOR WORK INVOLVING RESPIRATORY PROTECTION DEVICES:

LIMITATIONS:

CORRECTIVE LENSES

glasses

DENTURES

n/a

OTHER

n/a[Signature]
Signature of Medical ExaminerThomas Buttram M.D.

Medical Examiner (Print)

C-E Medical Department
Chattanooga Division
911 W. Main Street
Chattanooga, TN 37402

(615)752-7212

Clinic Location



CERTIFICATION RECORD

METHOD: EDDY CURRENTNAME: Darrell D. WeberLEVEL: IIISOC. SEC. NO.: 472-70-9568CERTIFICATION DATE: 4/5/93EXPIRATION DATE: 4/5/96

EDUCATION:

Eden Valley-Watkins High School, Eden Valley, MN - Grad 1973

Hutchinson Area Vocational Technical Institute, Hutchinson, MN - AS in NDT, 1975

TRAINING:

Hutchinson Area Vocational Technical Institute - 1975 - 180 Hours ET Theory and Laboratory

Babcock & Wilcox, Lynchburg, VA - July 1981 - 8 Hours ET

- 1983 - 40 Hours ET Data Analysis

ABB Combustion Engineering, Chattanooga, TN - January 1986 - 32 Hours ET Level II

EXPERIENCE:

Certified and experienced at Southwest Research Institute as a Level II from October 1976 to October 1977, at Babcock & Wilcox as a Level II from July 1978 to September 1983 and as a Level III from September 1983 to January 1986 and at ABB Combustion Engineering as a Level IIA from January 1986 to January 1987 and as a Level III from January 1987 to January 1993.

EXAMINATION:

General/Basic: 83.3Specific/Method: 78.4Practical/Specific: 84.2Total: 245.9 / 3 81.9 COMPOSITE SCORE

Eddy Current Data Analysis

Score: 93.6%

The above named individual has completed the qualification/training requirements for certification in the above examination method in accordance with ABB Combustion Engineering Nuclear Services procedure OAP 2.4 revision 1.

CERTIFIED BY: *[Signature]*POSITION: Manager, Component Services

14020401 ERP 6/16/92

H.B. Robinson - RFO 15
ABB Steam Generator Personnel Certification Matrix

	Name	Certification	Expiration Date	Date of Physical	Comments	Acceptable
1	Allen	I	1/94	7/8/93		Y
2	Bipes	III	7/94	7/7/93		Y
3	Blazejewski	IIA	1/95	1/6/93		Y
4	Circosta	IIA	6/96	2/5/93		Y
5	Crow	I	7/96	7/6/93		Y
6	Decker	II	12/94	3/26/93		Y
7	Despoux	II	11/95	7/21/93		Y
8	Ericson	IIA	12/94	1/19/93		Y
9	Folsom	IIA	8/94	1/13/93		Y
10	Glenn	II	1/95	2/18/93		Y
11	Hastings	I	7/95	7/6/93		Y
12	Hinson	I-T	7/95	11/12/92		Y
13	Holmes	II	1/95	1/20/93		Y
14	Hutsell	II	1/95	1/6/93	Color Deficiency	Y
15	Irwin	II	1/95	7/20/93		Y
16	Jacobs	IIA	8/94	3/3/93		Y
17	Jones	II	1/95	8/3/93	Color Deficiency	Y
18	Kester	IIA	8/94	8/20/93		Y
19	Krivanec	I	7/96	8/10/93		Y
20	Myers	I	6/96	3/9/93		Y
21	Ortloff	II	7/95	8/4/93		Y
22	Pascucci	IIA	8/96	5/19/93		Y
23	Pasquale	II	7/96	7/23/93		Y
24	Patterson	II	1/95	2/6/93		Y
25	Pyle	IIA	2/94	7/13/93		Y
26	Reich	II	1/95	1/25/93		Y
27	Shock	IIA	3/96	8/3/93		Y
28	Shutes	II	12/94	2/23/93		Y
29	Smith	II	7/95	7/2/93		Y
30	Steele	I	1/95	6/14/93	Master - Lee	Y
31	Steagall	II	12/95	8/9/93		Y
32	Varrato	II	11/93	11/24/92	Master - Lee	Y
33	Watrous	I	11/93	6/1/93		Y
34	Webber	III	4/96	11/2/92		Y

Reviewed by:

 9/24/93

CONDITION CODE: B

OWNER: ABB COMBUSTION ENGINEERING

Zetec, Incorporated hereby certifies that the following
instrument meets or exceeds all manufacturer's specifications.

Instrument: MIZ-18A RDAU

Serial Number: 020


The calibration of this instrument is controlled by approved,
documented procedures which meet or exceed ASME Section XI,
Appendix IV and ASME Section V Article 8. Appendix I, through
1989 Edition December 1990 Addenda.

Calibration has been performed using standards whose accuracies
are traceable to the National Institute of Standards and
Technology.

STANDARDS USED: / 021 / 056 / 1523 / 2501 /

CALIBRATION DATE: 14 Sep 1993

CALIBRATED BY: TIM ELLIS


TECHNICIAN

CERTIFICATION DATE: 14 Sep 1993

EXPIRATION DATE: 14 Mar 1994

CERTIFIED BY: WILL REYNOLDS


QUALITY ASSURANCE

COMMENTS:

CERTIFICATE NUMBER A: 53872



1570 NW Mill St • PO Box 140
Issaquah, WA 98027-0140 USA
(800) 843-1771 • (206) 382-6316

Z-QA 8A REV. 2

CONDITION CODE: B

OWNER: ABB COMBUSTION ENGINEERING

Zetec, Incorporated hereby certifies that the following
instrument meets or exceeds all manufacturer's specifications.

Instrument: MIZ-18A RDAU

Serial Number: 023

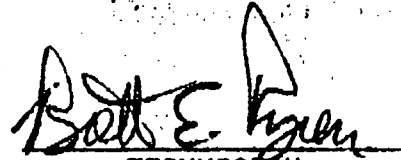
The calibration of this instrument is controlled by approved,
documented procedures which meet or exceed ASME Section XI,
Appendix IV and ASME Section V Article 8, Appendix I, through
1989 Edition December 1990 Addenda.

Calibration has been performed using standards whose accuracies
are traceable to the National Institute of Standards and
Technology.

STANDARDS USED: / 055 / 1732 / 1809 / 1817 /

CALIBRATION DATE: 8 Jun 1993

CALIBRATED BY: BRETT E. PYREN


TECHNICIAN

CERTIFICATION DATE: 8 Jun 1993

EXPIRATION DATE: 8 Dec 1993

CERTIFIED BY: TIM ELLIS


QUALITY ASSURANCE

COMMENTS:

CERTIFICATE NUMBER A: 53550

1370 NW Mall St. • PO Box 140
Issaquah, WA 98207-0140 USA
(800) 843-1771 • (206) 302-6318
FAX • (206) 302-2088

Z-QA 8A REV. 2

CONDITION CODE: B

OWNER: ABB COMBUSTION ENGINEERING

Zetec, Incorporated hereby certifies that the following
instrument meets or exceeds all manufacturer's specifications.

Instrument: MIZ-18A RDAU

Serial Number: 056

The calibration of this instrument is controlled by approved,
documented procedures which meet or exceed ASME Section XI,
Appendix IV and ASME Section V Article 8, Appendix I, through
1989 Edition December 1990 Addenda.

Calibration has been performed using standards whose accuracies
are traceable to the National Institute of Standards and
Technology.

STANDARDS USED: / 1524 / 1523 / 087 / 021 /

CALIBRATION DATE: 11 Aug 1993

CALIBRATED BY: GRIFF NUTTALL


TECHNICIAN


CERTIFICATION DATE: 11 Aug 1993

EXPIRATION DATE: ~~11 Aug 1994~~

11 Feb. 1994

NIC ABB QC
10/1/93

CERTIFIED BY: TIM ELLIS


QUALITY ASSURANCE

COMMENTS:

CERTIFICATE NUMBER A: 53790

LOCATION

PHYSICALLY MEAS. DEPTH

DEPTH IN % OF WALL

E.T. PHASE ANGLE MEAS.

DIA OF DEFECT .003

A B C D E F G H I J K

.0095 .0045 .0100 .0120 .0300 .0395 THRU

19% 9% 20% 39% 59% 77% 100%

9° 152° 156° 134° 106° 83° 40°

LD GROOVE
1/16 WIDE
+010

OD GROOVE
1/8 WIDE
+010

3/16

3/16

7/64

5/64

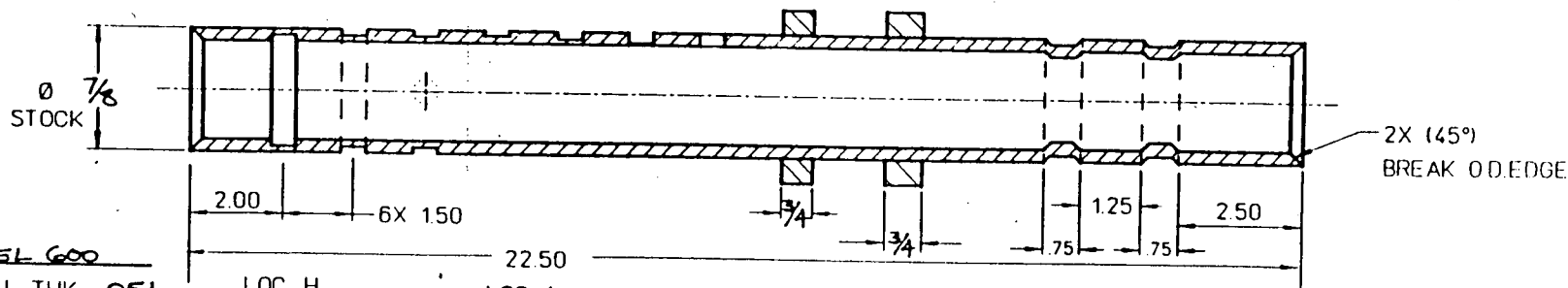
1

SUPPORT RING
W/FERRITE CUPS
MAT: FERRITE
CUP P/N-OC41107 UG00

NOTES:

1 Ø .052 IN STD. ≤ 75 DIA
Ø .067 IN STD. > 75 DIA

.0040 .0015
RADIAL DENT RADIAL DENT



MATERIAL INCONEL 600

AVERAGE MEAS. WALL THK. .051

NOMINAL WALL THK. .049

HEAT LOT NO. 71711

TEST FREQ. USED 400 KHZ

SERIAL NO. Z-8556

P.O. NO. 9085437

REL. NO. NA

QUALITY REL. NO. NA

DATE MFG. 9-21-90

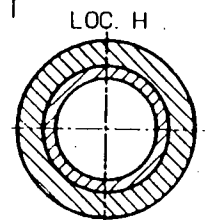
O.A. INSPECTION Hung

CUSTOMER COMBUSTION ENGINEERING

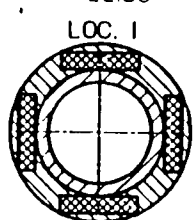
RECORDED 32

PROBE USED A750LC #57742

REVIEWED BY Robert



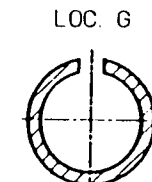
LOC. H
SHOWS TUBE SUPPORT
SIMULATION RING



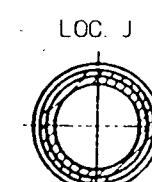
LOC. I
SHOWS SIMULATED
FERRITE RING



LOC. C
SHOWS 20% DEFECTS
4X(90°) APART



LOC. G
SHOWS 100% DEFECT



LOC. J
SHOWS TYP. RADIAL DENT

NOTE:

UNL. OTHERWISE SPECIFIED
DIM. ARE IN INCHES
TOLERANCES
DECIMAL FRACT. +/- 1/16
XXXX .003
XXX .015
XX .050
% .003
ANGULAR +/- 3°
FINISH

DRAWN
K. ZEGKE
CHECK
DESIGN
APPROVA
DATE
9/18/90

ZETEC INC
P.O. BOX 140 ISSAQUAH, WA 98027 U.S.A.
TELEPHONE 206 307-5710
TITLE
COMBINATION ASME/2 DENT STD.
WITH TUBE SUPPORT & FERRITE RINGS
DWG NO
2-4468
DIN 1492-1-A
SCALE NONE
RELEASE DATE
9/18/90
SHEET 1 OF 1

LOCATION

PHYSICALLY MEAS DEPTH

DEPTH IN % OF WALL

E.T. PHASE ANGLE MEAS.

DIA OF DEFECT .003

A B C D E F G H I J K

.0105 .0050 .0110 .0200 .0305 .0395 THERO

212 102 222 392 602 772 1007.

10° 154° 157° 142° 115° 91° 40°

LD GROOVE 1/16 WIDE .010
OD GROOVE 1/8 WIDE .010

3/16 3/16 7/8 5/8

1

SUPPORT RING
W/FERRITE CUPS
MAT: FERRITE
CUP P/N-0C41107 UG00

REVISIONS			
LTR	DATE	DESCRIPTION	APPROV

NOTES:

.0050

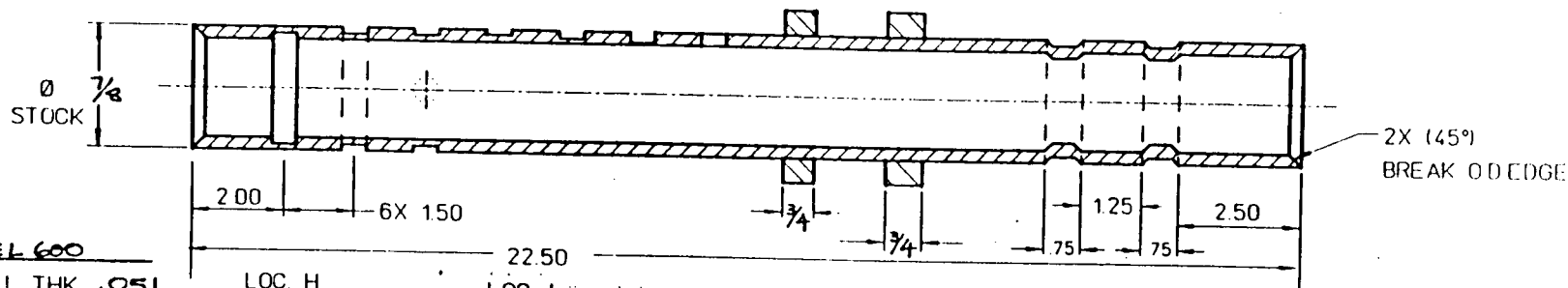
.0090

1

Ø .052 IN STD < .75 DIA
Ø .067 IN STD > .75 DIA

RADIAL
DENT

RADIAL
DENT



MATERIAL INCONEL 600

AVERAGE MEAS. WALL THK. .051

NOMINAL WALL THK. .049

HEAT LOT NO 71711

TEST FREQ. USED 400 KHZ

SERIAL NO. Z-8554

P.O. NO. 9085437

REL. NO. NA

QUALITY REL. NO. NA

DATE MFG. 9-21-90

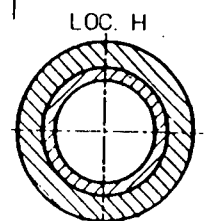
O.A. INSPECTION Aug 08/90

CUSTOMER COMBUSTION ENGINEERING

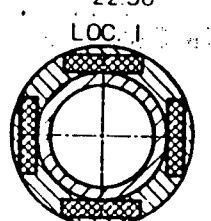
RECORDED 32

PROBE USED AT50LC #57742

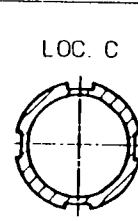
REVIEWED BY [Signature]



SHOWS TUBE SUPPORT
SIMULATION RING



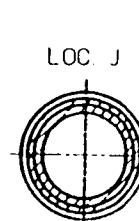
SHOWS SIMULATED
FERRITE RING



SHOWS 20% DEFECTS
4X(90°) APART



SHOWS 100% DEFECT



SHOWS TYP. RADIAL DENT

NOTE:

UNL. OTHERWISE SPECIFIED
DIM. ARE IN INCHES
TOLERANCES

DECIMAL FRACT. +/- 1/16

XXXX .003

XXX .015

XX .050

% .003

ANGULAR +/- 3°

FINISH

DRAWN

K. ZEGKE

CHECK

DESIGN

APPROV

DATE

9/18/90

9/18/90

9/18/90

DATE

9/18/90

9/18/90

9/18/90

9/18/90

9/18/90

9/18/90

9/18/90

9/18/90

ZETEC INC

P.O. BOX 140 ISSAQUAH, WA 98027 U.S.A.
TELEPHONE 206 307-5310

TITLE
COMBINATION ASME/2 DENT STD.
WITH TUBE SUPPORT & FERRITE RINGS

DWG NO

2-4468

SCALE NONE

RELEASE DATE

9/18/90

DR 1492-1-A

2-4468

9/18/90

9/18/90

9/18/90

DR 1492-1-A

2-4468

9/18/90

9/18/90

9/18/90

REVISIONS				
LTR	DATE	DESCRIPTION	APVD	CHK

LOCATION

A B C D E F G H I J K

PHYSICALLY MEAS DEPTH

.0115 .0050 .0105 .0200 .0300 .0395 THRU

DEPTH IN % OF WALL

23% 10% 21% 39% 59% 77% 100%

E.T. PHASE ANGLE MEAS

11° 153° 158° 143° 116° 91° 40°

DIA OF DEFECT .003

LD. GROOVE
1/16 WIDE
.010

OD. GROOVE
1/8 WIDE
.010

3/16 3/16 7/8 5/8

1

.0035 .0015

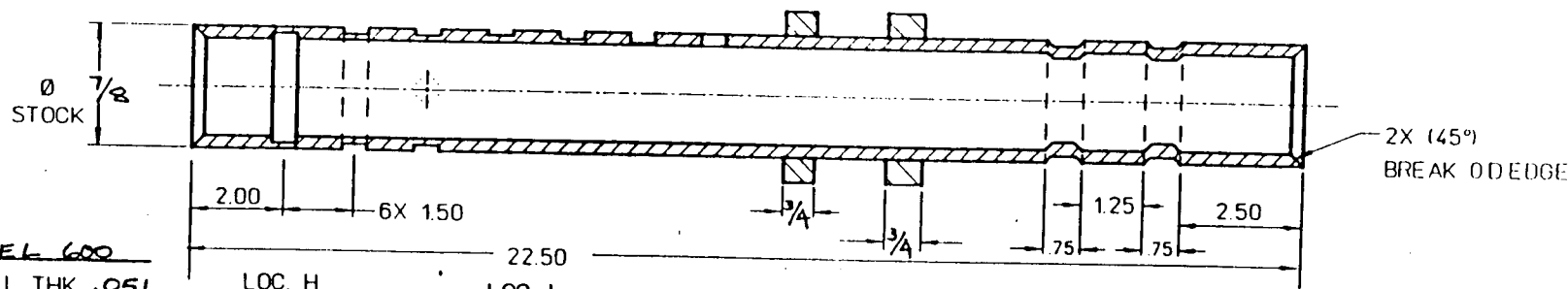
RADIAL
DENT

RADIAL
DENT

NOTES:

1 0.052 IN STD 5 75 DIA
0.067 IN STD 5 75 DIA

SUPPORT RING
W/FERRITE CUPS
MAT: FERRITE
CUP P/N: OC41107 UG00



MATERIAL INCONEL 600

AVERAGE MEAS. WALL THK. .051

NOMINAL WALL THK. .049

HEAT LOT NO. 71711

TEST FREQ. USED 400 KHz

SERIAL NO. Z-8555

P.O. NO. 9035437

REL. NO. NA

QUALITY REL. NO. NA

DATE MFG. 9-21-90

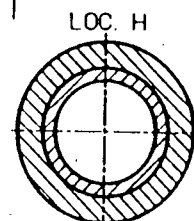
Q.A. INSPECTION Aug 21/90

CUSTOMER COMBUSTION ENGINEERING

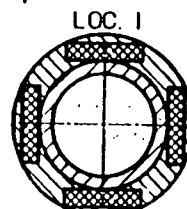
RECORDED 32

PROBE USED ALSOIC #57742

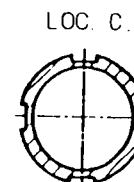
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LOC. H
SHOWS TUBE SUPPORT
SIMULATION RING



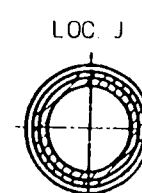
LOC. I
SHOWS SIMULATED
FERRITE RING



LOC. C
SHOWS 20% DEFECTS
4X(90°)APART



LOC. G
SHOWS 100% DEFECT



LOC. J
SHOWS TYP. RADIAL DENT

NOTE:

UNL OTHERWISE SPECIFIED
DIM. ARE IN INCHES
TOLERANCES

DECIMAL FRACT. +/- 1/16
XXXX .003
XXX .015
XX .050
% .003
ANGULAR +/- 3°
FINISH

DRAWN
K. ZEGKE
DATE
9/18/90
CHECK
DESIGN
APVD OA
9/18/90

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TELEPHONE 206 307-5310
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DWG NO
2-4468
Dwg 1492-1-A
SCALE NOTE
RELEASE DATE
9/18/90
SHEET 1 OF 1