CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9802060051 DOC.DATE: 98/01/26 NOTARIZED: NO DOCKET #
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AUTH.NAME AUTHOR AFFILIATION
MCCOLLUM,W.R. Duke Power Co.
RECIP.NAME RECIPIENT AFFILIATION
Document Control Branch (Document Control Desk)

SUBJECT: Provides response to request for addl info re results of SG insp,performed during Unit 1 end of Cycle 17 refueling outage.

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CATEGORY 1 DOCUMENT

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Duke Power
A Duke Energy Company

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A Duke Energy Company
Oconee Nuclear Site
P.O. Box 1439
Seneca, SC 29679

(864) 885-3107 OFFICE
(864) 885-3564 FAX

W. R. McCollum, Jr.
Vice President

January 26, 1998

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

Subject: Oconee Nuclear Station
Docket No. 50-269
Response to Request for Additional Information
on Steam Generator Inspections

In a letter dated December 2, 1997, the NRC requested additional information regarding the results of the steam generator inspections that were performed during the Oconee Unit 1 end of cycle 17 refueling outage. Specifically, the NRC requested that Duke Energy (Duke) submit (1) an optical disk containing the eddy current inspection data for the inside diameter (ID) intergranular attack (IGA) indications in the pulled tube specimens; (2) files on the optical disk with the setup used by the analyst for examining the indications; (3) a drawing or description of the standard used to calibrate the acquisition system; (4) eddy current data from 20 randomly selected tubes that contain ID IGA indications; and (5) a listing of the dimensions of the ID IGA indications as determined from the destructive examination of the pulled tube specimens. In addition, the NRC requested that the format for the eddy current data be compatible with Eddynet95 analysis software.

In response to this request, Duke provides the attached information. Attachment 1 contains a list of over 20 randomly selected tubes which have eddy current data supplied on the optical disk. The randomly selected tubes are circled on the list. A listing of the dimensions of the ID IGA indications as determined from the destructive examination of the pulled tube specimens is contained in Attachment 2. A drawing of the standard used to calibrate the acquisition system is provided in Attachment 3. Attachment 4 contains an optical disk with the eddy current data for the randomly selected tubes and the pulled tube

specimens. The optical disk contains the setup used by the analyst for examining the tube indications and is in a format which is compatible with Eddynet95 analysis software.

If there are any questions regarding this submittal, please contact Michael Bailey at (864) 885-4390.

Very truly yours,

W. R. McCollum, Jr.
Site Vice President
Oconee Nuclear Station

MEB

Attachments (4)

cc w/o optical disk:

L. A. Reyes, Regional Administrator
Region II

M. A. Scott, Senior Resident Inspector
Oconee Nuclear Site

cc with optical disk:

D. E. LaBarge, Project Manager
NRR

ATTACHMENT 1

LIST OF THE RANDOMLY SELECTED TUBES

FTI TUBAN II (Version 2.4) 12/09/1997 13:21:31

Oconee Nuclear Station - Unit One

S/G B

09/97 RFO

ROLL TRANSITION,TUBE PULL REV. -MRPC

QRY: 12/09/1997 13:13:54

TEST	TYPE	ROW	COL	IND	%TW	VOLTS	CHN	DEG	LOCATION		EXTENT1	EXTENT2	LEG	TAPE#	PROBE	COMMENTS	OPTICAL DK
ROLL	TRANSITI	88	100	SAI		2.51	P 1	26	UTE	-0.75	UTE	UTE	UTE	108	520		
ROLL	TRANSITI	89	82	VOL		0.97	P 1	12	UTE	-0.67	UTE	UTE	UTE	108	520		
ROLL	TRANSITI	89	86	VOL		0.91	P 1	17	UTE	-0.58	UTE	UTE	UTE	108	520		
ROLL	TRANSITI	89	88	VOL		0.67	P 1	28	UTE	-0.70	UTE	UTE	UTE	108	520		
ROLL	TRANSITI	91	83	VOL		0.57	P 1	9	UTE	-1.02	UTE	UTE	UTE	108	520		
ROLL	TRANSITI	87	86	VOL		0.38	P 1	34	UTE	-3.41	UTE	UTE	UTE	114	520		
ROLL	TRANSITI	88	100	SAI		2.39	P 1	30	UTE	-1.02	UTE	UTE	UTE	114	520		
ROLL	TRANSITI	86	95	SAI		1.50	P 1	16	UTE	-1.00	UTE	UTE	UTE	117	520		
ROLL	TRANSITI	86	102	VOL		0.46	5	37	UTE	-2.60	UTE	UTE	UTE	118	520		
ROLL	TRANSITI	81	82	SAI		0.81	P 1	30	UTE	-1.29	UTE	UTE	UTE	157	520		
ROLL	TRANSITI	79	117	VOL		0.21	P 1	30	UTE	-1.28	UTE	UTE	UTE	161	520		
ROLL	TRANSITI	84	131	VOL		0.79	P 2	18	UTE	-2.06	UTE	UTE	UTE	164	520		
ROLL	TRANSITI			VOL		1.10	P 2	17	UTE	-1.77	UTE	UTE	UTE	164	520		
ROLL	TRANSITI			VOL		1.22	P 2	25	UTE	-1.47	UTE	UTE	UTE	164	520		
ROLL	TRANSITI	55	87	SAI		1.70	P 1	35	UTE	-1.24	UTE	UTE	UTE	178	520		
ROLL	TRANSITI	56	82	MAI		2.06	P 1	38	UTE	-1.09	UTE	UTE	UTE	178	520		
ROLL	TRANSITI	56	94	VOL		0.61	5	24	UTE	-2.77	UTE	UTE	UTE	178	520		
ROLL	TRANSITI	56	96	VOL		0.62	P 2	24	UTE	-2.37	UTE	UTE	UTE	178	520		
ROLL	TRANSITI	55	110	VOL		0.33	P 1	103	UTE	-0.78	UTE	UTE	UTE	179	520	L3R	
ROLL	TRANSITI	58	79	SAI		1.53	1	31	UTE	-1.07	UTE	UTE	UTE	180	520		
ROLL	TRANSITI	59	77	MAI		1.22	1	34	UTE	-1.61	UTE	UTE	UTE	180	520		
ROLL	TRANSITI			VOL		1.22	P 2	14	UTE	-1.46	UTE	UTE	UTE	180	520		
ROLL	TRANSITI	57	82	VOL		0.53	P 1	57	UTE	-2.26	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	59	76	VOL		1.13	P 1	21	UTE	-1.35	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	59	78	VOL		0.53	P 2	34	UTE	-1.51	UTE	UTE	UTE	181	520		
ROLL	TRANSITI			VOL		0.92	P 2	22	UTE	-1.06	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	59	80	VOL		0.90	P 1	31	UTE	-1.06	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	59	88	VOL		1.61	P 2	30	UTE	-1.71	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	59	90	VOL		0.56	P 1	34	UTE	-2.58	UTE	UTE	UTE	181	520		
ROLL	TRANSITI			VOL		0.97	P 1	27	UTE	-2.20	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	59	102	VOL		0.49	P 1	50	UTE	-1.47	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	59	106	VOL		0.95	P 1	27	UTE	-1.55	UTE	UTE	UTE	181	520		
ROLL	TRANSITI			VOL		1.34	P 1	26	UTE	-1.23	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	59	110	SAI		2.05	P 1	35	UTE	-1.18	UTE	UTE	UTE	181	520		
ROLL	TRANSITI			VOL		1.01	P 1	21	UTE	-1.50	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	59	121	VOL		0.90	P 1	18	UTE	-1.06	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	60	94	VOL		0.75	P 1	21	UTE	-2.59	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	60	96	VOL		0.65	P 1	28	UTE	-1.80	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	63	88	VOL		1.30	P 1	201	UTE	-1.29	UTE	UTE	UTE	182	520		
ROLL	TRANSITI	63	120	MAI		0.39	P 1	52	UTE	-1.83	UTE	UTE	UTE	182	520		
ROLL	TRANSITI	63	122	MAI		0.83	P 1	45	UTE	-1.56	UTE	UTE	UTE	182	520		
ROLL	TRANSITI	64	97	VOL		0.80	5	193	UTE	-2.04	UTE	UTE	UTE	182	520		
ROLL	TRANSITI	64	122	VOL		1.73	5	29	UTE	-1.34	UTE	UTE	UTE	182	520		
ROLL	TRANSITI	63	99	VOL		3.80	1	3	UTE	-1.26	UTE	UTE	UTE	183	520		
ROLL	TRANSITI	63	107	VOL		0.63	1	15	UTE	-2.10	UTE	UTE	UTE	183	520		
ROLL	TRANSITI	64	100	VOL		1.19	1	22	UTE	-1.21	UTE	UTE	UTE	183	520		
ROLL	TRANSITI	64	114	VOL		0.95	1	29	UTE	-1.58	UTE	UTE	UTE	183	520		
ROLL	TRANSITI	64	116	VOL		1.84	1	27	UTE	-1.34	UTE	UTE	UTE	183	520		
ROLL	TRANSITI	64	120	VOL		1.13	1	32	UTE	-1.20	UTE	UTE	UTE	183	520		
ROLL	TRANSITI	65	113	VOL		1.11	1	31	UTE	-1.53	UTE	UTE	UTE	183	520		
ROLL	TRANSITI	65	121	VOL		1.63	1	26	UTE	-1.38	UTE	UTE	UTE	183	520		
ROLL	TRANSITI	73	106	VOL		0.60	1	26	UTE	-1.07	UTE	UTE	UTE	185	520		
ROLL	TRANSITI	73	115	VOL		0.58	1	29	UTE	-0.65	UTE	UTE	UTE	185	520		
ROLL	TRANSITI	75	96	VOL		0.88	P 1	40	UTE	-1.09	UTE	UTE	UTE	185	520		
ROLL	TRANSITI	75	104	VOL		0.92	P 1	26	UTE	-1.35	UTE	UTE	UTE	185	520		
ROLL	TRANSITI	75	112	VOL		1.58	P 2	34	UTE	-1.02	UTE	UTE	UTE	185	520		
ROLL	TRANSITI	71	97	VOL		0.31	P 2	46	UTE	-2.33	UTE	UTE	UTE	186	520		
ROLL	TRANSITI	72	113	VOL		0.40	P 1	40	UTE	-2.06	UTE	UTE	UTE	186	520		
ROLL	TRANSITI	66	122	SAI		1.28	P 1	24	UTE	-1.52	UTE	UTE	UTE	188	520		
ROLL	TRANSITI	63	85	VOL		2.18	P 1	27	UTE	-1.78	UTE	UTE	UTE	190	520		

Total Indications Found = 60
Total Tubes Found = 52
Total Tubes in Input File = 53

ATTACHMENT 2

LISTING OF DIMENSIONS FOR INDICATIONS IN THE PULLED TUBE SPECIMENS

OCONEE-1 DEPTH DATA FOR TUBES R59T82 AND R65T111

TUBE	LOCATION	DEPTH (% throughwall)	LENGTH (inches)	WIDTH (inches)
R65T111	120°, AREA 1	46%	.20 .20	.10 .13
R65T111	210°, AREA 2	35%	.04	.05
R65T111	330°, AREA 1	19%	.16	.1
R65T111	330°, AREA 2	32%	.11	.09
R59T82	180°, AREA 1	46%	.21	.14
R59T82	20°, AREA 2	46%	.18	.08
R59T82	10°, AREA 1	35%	.24	.05
R59T82	230°, AREA 2	22%	.09	.20

NOTE: THERE ARE TWO PATCHES OF IGA AT 120° ON TUBE R65T111, WITHIN AREA 1, WHICH BOTH DISAPPEAR AFTER 46% TW

PATCH CLOSET TO THE TUBE END IS .20 X .10
PATCH JUST BELOW IS .20 X .13

NOTE: THE LENGTH AND WIDTH OF THE IGA IS GIVEN AFTER APPROXIMATELY 8% TW (0.003 INCHES BELOW THE ID SURFACE)

NOTE: THE TWO PATCHES OF IGA AT 10° AND 20° FROM TUBE R59T82 COULD COME FROM THE SAME AREA OF DEGRADATION

ATTACHMENT 3

DRAWING OF THE CALIBRATION STANDARD

DWG NO 1252966B

FLAW LABEL	FLAW DESCRIPTION	SIDE	AXIAL LOCATION	AZIMUTHAL LOCATION	LENGTH	WIDTH OR DIAMETER	DEPTH IN INCHES	DEPTH IN %TW
A	GROOVE	ID	2.000"	ALL	.0615"	N/A	.0075"	19 %TW
B	GROOVE	OD	3.000"	ALL	.124"	N/A	.0045"	11 %TW
C	4 FBH'S	OD	4.000"	0°90°180°270°	N/A	ø.114"	*.008"	*20 %TW
D	FBH	OD	4.750"	0°	N/A	ø.093"	.0155"	39 %TW
E	FBH	OD	5.500"	0°	N/A	ø.077"	.0235"	59 %TW
F	FBH	OD	6.250"	0°	N/A	ø.063"	.031"	78 %TW
G	HOLE	OD	7.000"	0°	N/A	ø.048"	THROUGH	100 %TW
H	DENT	OD	8.000"	0°	.062"	(.475")	.003"	N/A
I	NDD & BROACHED TSP	OD	9.750"	N/A	1.500"	N/A	N/A	N/A
J	WEAR & BROACHED TSP	OD	12.250"	0°	1.500"	.125"	.0095"	24 %TW
K	WEAR & BROACHED TSP	OD	12.250"	120°	1.500"	.124"	.0225"	57 %TW
L	NDD & DRILLED TSP	OD	14.375"	N/A	.750"	N/A	N/A	N/A
AA	AX EDM	OD	16.000"	0°	.312"	.006"	.008"	20 %TW
BB	CI EDM	OD	16.000"	90°	60°	.006"	.008"	20 %TW
CC	AX EDM	ID	16.000"	180°	.312"	.005"	.008"	20 %TW
DD	CI EDM	ID	16.000"	270°	60°	.005"	.008"	20 %TW
EE	AX EDM	OD	16.750"	0°	.312"	.006"	.015"	38 %TW
FF	CI EDM	OD	16.750"	90°	60°	.006"	.015"	38 %TW
GG	AX EDM	ID	16.750"	180°	.312"	.005"	.016"	41 %TW
HH	CI EDM	ID	16.750"	270°	60°	.005"	.015"	38 %TW
II	AX EDM	OD	17.500"	0°	.312"	.006"	.023"	58 %TW
JJ	CI EDM	OD	17.500"	90°	60°	.006"	.023"	58 %TW
KK	AX EDM	ID	17.500"	180°	.312"	.005"	.023"	58 %TW
LL	CI EDM	ID	17.500"	270°	60°	.005"	.023"	58 %TW
MM	AX EDM	OD	18.250"	0°	.312"	.006"	THROUGH	100 %TW
NN	CI EDM	OD	18.500"	240°	60°	.006"	THROUGH	100 %TW
OO	AX EDM IN EXPANSION	OD	LEFT TRANSITION	0°	.312"	.006"	.015"	38 %TW
PP	CI EDM IN EXPANSION	OD	LEFT TRANSITION	90°	60°	.006"	.015"	38 %TW
QQ	AX EDM IN EXPANSION	ID	RIGHT TRANSITION	180°	.312"	.006"	.015"	38 %TW
RR	CI EDM IN EXPANSION	ID	RIGHT TRANSITION	270°	.287"	.006"	.015"	38 %TW

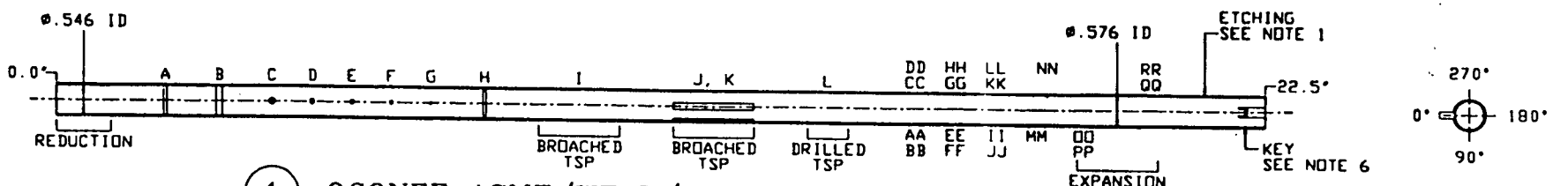
* AVERAGE OF FOUR HOLES

FRAMATOME TECHNOLOGIES

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	

NOTES:

1. THE MATERIAL HEAT NUMBER, HT 93452 LOT 5060, AND THE AS BUILT NUMBER, 1252966B, ARE ETCHED AT THE RIGHT TUBE END.
2. THIS STANDARD WAS MADE VIA PA 83-791232 REV 00 & 01, AND WORK ORDER 4986, FROM DESIGN DRAWING 1252875D-2, FOR DUKE POWER COMPANY.
3. THE AS BUILT DIMENSIONS WERE OBTAINED FROM SPIS SHOP DATA SHEETS AND QCIR 96-285.
4. EACH FLAW IS CENTERED ABOUT THE SPECIFIED AXIAL AND AZIMUTHAL LOCATIONS.
5. THE DEPTHS IN PERCENT THROUGH WALL (%TW) ARE BASED UPON THE ACTUAL MEAN WALL THICKNESS (MWT) OF THE TUBE, .0395".
6. WHEN PLACED IN HOLDER (1252876E-0), A DRILLED TSP IS CENTERED AT LOCATION L, AND BROACHED TSP'S ARE CENTERED AT LOCATIONS "I" AND "J,K" USING THE KEY AT THE TUBE END.
7. PER DUKE POWER, THIS STANDARD CONTAINS A HALF LENGTH DRILLED TSP, AND TRADITIONAL FBH'S WHOSE DIAMETERS ARE SOMEWHAT SMALLER THAN TYPICAL ASME CODE DIAMETERS.



QA CONDITION 1

(1) OCONEE ASME/WEAR/EDM CALIBRATION STANDARD

MAT'L: ASME SB-163 ALLOY 600, .629" AVERAGE OD, .550" AVERAGE ID, .0395" AVERAGE WALL.

FILENAME: 1252966B.DWG
DISK No.: OPTICAL

DWN BY L.K. HOLM
PASSED BY
CHK'D BY ELLINGER
APP'D BY

OCONEE ASME/WEAR/EDM CALIBRATION STANDARD AS BUILT DRAWING

SCALE 0.5X
DATE 04/01/96
DWG NO 1252966 B- 0

22159 (12/95)

DWG NO 1268327B

FLAW LABEL	FLAW DESCRIPTION	SURFACE OF ORIGIN	AXIAL LOCATION	AZIMUTHAL LOCATION	LENGTH +.000/-.010	WIDTH OR DIAMETER	DEPTH IN INCHES	DEPTH IN %TW
A	AX EDM	ID	1.750"	0°	.376"	.005"	.024"	63 %TW
B	AX EDM	ID	1.750"	120°	.376"	.005"	.013"	34 %TW
C	AX EDM	ID	1.750"	240°	.376"	.005"	.009"	24 %TW
D	AX EDM	OD	2.500"	0°	.375"	.005"	.021"	55 %TW
E	AX EDM	OD	2.500"	120°	.375"	.004"	.014"	37 %TW
F	AX EDM	OD	2.500"	240°	.375"	.005"	.0065"	17 %TW
G	AX EDM	OD	3.250"	0°	.375"	.005"	THROUGH	100 %TW
H	CI EDM	OD	4.002"	180°	.375"	.005"	THROUGH	100 %TW
I	CI EDM	ID	4.750"	0°	.376"	.005"	.022"	58 %TW
J	CI EDM	OD	4.750"	180°	.375"	.005"	.020"	53 %TW
K	CI EDM	ID	5.500"	0°	.376"	.005"	.0145"	38 %TW
L	CI EDM	OD	5.500"	180°	.375"	.005"	.014"	37 %TW
M	CI EDM	ID	6.250"	0°	.376"	.005"	.008"	21 %TW
N	CI EDM	OD	6.250"	180°	.375"	.004"	.007"	18 %TW
O	AX EDM IN EXPANSION	ID	7.375"	0°	.251"	.005"	.015"	40 %TW
P	CI EDM IN EXPANSION	ID	7.375"	180°	.251"	.005"	.016"	43 %TW
Q	AX EDM IN EXPANSION	OD	8.625"	0°	.250"	.004"	.014"	37 %TW
R	CI EDM IN EXPANSION	OD	8.625"	180°	.250"	.005"	.0145"	38 %TW
S	DENT	OD	12.250"	0°	.063"	.400"	.004"	N/A
T1	FBH	OD	13.251"	0°	N/A	Ø.115"	.0075"	20 %TW
T2	FBH	OD	13.251"	90°	N/A	Ø.115"	.0065"	17 %TW
T3	FBH	OD	13.251"	180°	N/A	Ø.115"	.007"	18 %TW
T4	FBH	OD	13.251"	270°	N/A	Ø.115"	.007"	18 %TW
U	FBH	OD	14.002"	0°	N/A	Ø.093"	.014"	37 %TW
V	FBH	OD	14.751"	0°	N/A	Ø.080"	.021"	55 %TW
W	FBH	OD	15.500"	0°	N/A	Ø.061"	.028"	74 %TW
X	HOLE	OD	16.250"	0°	N/A	Ø.051"	THROUGH	100 %TW
AA	NOD & BROACHED TSP	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BB	WEAR & BROACHED TSP	OD	19.091"	120°	.689"	.124"	.010"	26 %TW
CC	WEAR & BROACHED TSP	OD	19.091"	240°	.689"	.124"	.021"	55 %TW
DD	GROOVE	OD	20.373"	360°	.124"	N/A	.003"	8 %TW
EE	NOD & DRILLED TSP	OD	N/A	N/A	N/A	N/A	N/A	N/A
FF	GROOVE	ID	23.000"	360°	.065"	N/A	.0076"	20 %TW

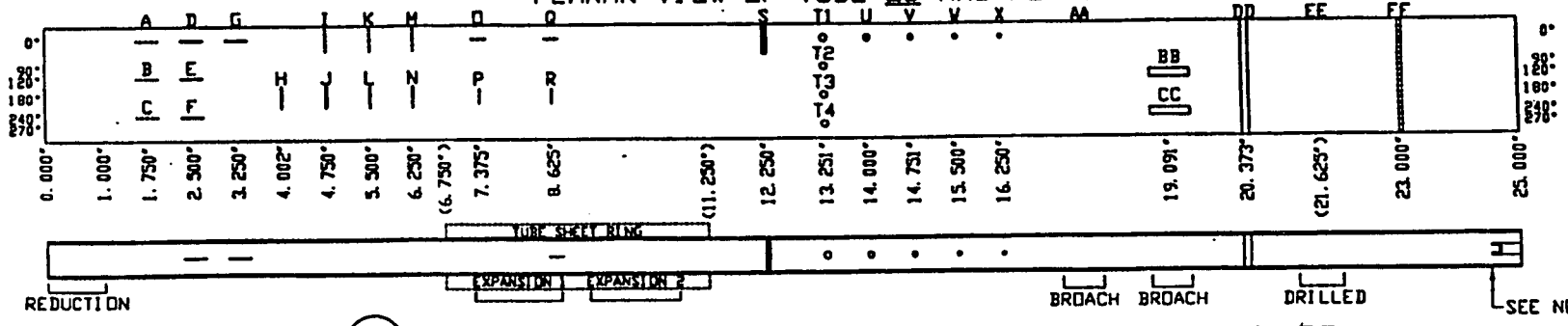
FRAMATOME TECHNOLOGIES

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	

NOTES:

1. THE MATERIAL HEAT NUMBER, HT 93500 LOT 5022, AND THE AS BUILT NUMBER, 1268327B, ARE ETCHED AT THE RIGHT TUBE END.
2. THIS STANDARD WAS MADE VIA PA 83-795481-03, PA 83-795515-00 AND FTI WO 8373, FROM DESIGN DRAWING 1268313D-1, FOR DUKE POWER COMPANY.
3. THE AS BUILT DIMENSIONS WERE OBTAINED FROM FTI SHOP DATA SHEETS AND QCIR 97-00774.
4. EACH FLAW IS CENTERED ABOUT THE SPECIFIED AXIAL AND AZIMUTHAL LOCATIONS.
5. THE DEPTHS IN PERCENT THROUGH WALL (%TW) ARE BASED UPON THE ACTUAL MEAN WALL THICKNESS (MWT) OF THE TUBING, .038".
6. WHEN THE STANDARD IS PLACED IN ITS HOLDER (1268314E-1), A DRILLED TUBE SUPPORT PLATE (TSP) SIMULATOR WILL BE CENTERED NEAR LOCATION EE. BROACHED TSP'S WILL BE CENTERED NEAR LOCATIONS AA AND BB/CC. WEAR PATCHES BB AND CC WILL BE LOCATED WITH TWO LAND REGIONS OF THEIR BROACHED TSP.
7. ID FLAW DIMENSIONS ARE OBTAINED FROM MACHINING EQUIPMENT.

PLANAR VIEW OF TUBE OD AND FLAWS



(1) OCONEE EDM/ASME/WEAR CALIBRATION STANDARD

MAT'L: ASME SB-163 ALLOY 600, .630" OD, .554" ID, .038" WALL.

FILENAME: 1268327B.DWG
DISK No.: OPTICAL

DWN BY [illegible] CHKD BY [illegible]
ENGR BY [illegible] APPD BY [illegible]
PASSED BY [illegible] QA QM [illegible]
R.L. [illegible]

OCONEE EDM/ASME/WEAR CALIBRATION STANDARD AS BUILT DRAWING

SCALE 1/2 DATE 09/09/97
DWG NO. 1268327 B - 0

22159 (12/93)

1268326B DN DAS

FLAW LABEL	FLAW DESCRIPTION	SURFACE OF ORIGIN	AXIAL LOCATION	AZIMUTHAL LOCATION	LENGTH +.000/+.010	WIDTH OR DIAMETER	DEPTH IN INCHES	DEPTH IN %TW
A	AX EDM	ID	1.750"	0°	.376"	.005"	.024"	63 %TW
B	AX EDM	ID	1.750"	120°	.376"	.005"	.013"	34 %TW
C	AX EDM	ID	1.750"	240°	.376"	.005"	.008"	21 %TW
D	AX EDM	OD	2.500"	0°	.375"	.005"	.022"	58 %TW
E	AX EDM	OD	2.500"	120°	.376"	.005"	.014"	37 %TW
F	AX EDM	OD	2.500"	240°	.375"	.005"	.007"	18 %TW
G	AX EDM	OD	3.250"	0°	.376"	.005"	THROUGH	100 %TW
H	CI EDM	OD	4.000"	180°	.375"	.005"	THROUGH	100 %TW
I	CI EDM	ID	4.750"	0°	.376"	.005"	.022"	58 %TW
J	CI EDM	OD	4.750"	180°	.375"	.005"	.020"	53 %TW
K	CI EDM	ID	5.500"	0°	.376"	.005"	.015"	40 %TW
L	CI EDM	OD	5.500"	180°	.375"	.005"	.014"	37 %TW
M	CI EDM	ID	6.250"	0°	.376"	.005"	.009"	24 %TW
N	CI EDM	OD	6.250"	180°	.375"	.005"	.007"	18 %TW
O	AX EDM IN EXPANSION	ID	7.375"	0°	.251"	.005"	.014"	37 %TW
P	CI EDM IN EXPANSION	ID	7.375"	180°	.251"	.005"	.016"	42 %TW
Q	AX EDM IN EXPANSION	OD	8.625"	0°	.250"	.005"	.015"	40 %TW
R	CI EDM IN EXPANSION	OD	8.625"	180°	.250"	.005"	.0145"	38 %TW
S	DENT	OD	12.250"	0°	.063"	.400"	.004"	N/A
T1	FBH	OD	13.250"	0°	N/A	ø.115"	.007"	18 %TW
T2	FBH	OD	13.250"	90°	N/A	ø.115"	.008"	21 %TW
T3	FBH	OD	13.250"	180°	N/A	ø.116"	.007"	18 %TW
T4	FBH	OD	13.250"	270°	N/A	ø.115"	.007"	18 %TW
U	FBH	OD	14.000"	0°	N/A	ø.096"	.014"	37 %TW
V	FBH	OD	14.750"	0°	N/A	ø.080"	.022"	58 %TW
W	FBH	OD	15.500"	0°	N/A	ø.062"	.030"	79 %TW
X	HOLE	OD	16.250"	0°	N/A	ø.050"	THROUGH	100 %TW
AA	NOD & BROACHED TSP	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BB	WEAR & BROACHED TSP	OD	19.090"	120°	.690"	.184"	.010"	26 %TW
CC	WEAR & BROACHED TSP	OD	19.091"	240°	.125"	.184"	.020"	53 %TW
DD	GROOVE	OD	20.373"	360°	.125"	N/A	.003"	8 %TW
EE	NOD & DRILLED TSP	OD	N/A	N/A	N/A	N/A	N/A	N/A
FF	GROOVE	ID	23.000"	360°	.065"	N/A	.0076"	20 %TW

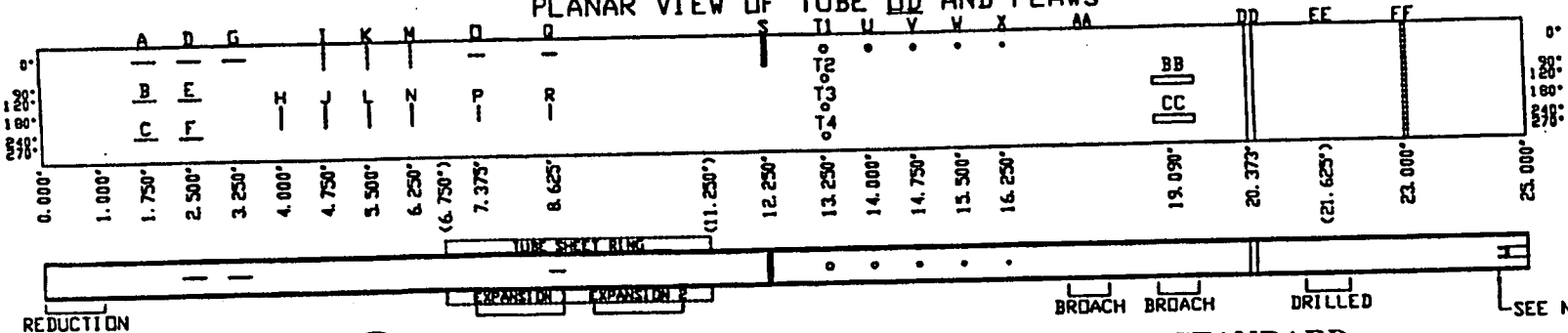
FRAMATOME TECHNOLOGIES

REVISIONS			
REV	DESCRIPTION	DATE	APPROVAL

NOTES:

1. THE MATERIAL HEAT NUMBER, HT 93500 LOT 5022, AND THE AS BUILT NUMBER, 1268326B, ARE ETCHED AT THE RIGHT TUBE END.
2. THIS STANDARD WAS MADE VIA PA 83-795481-03, PA 83-795515-00 AND FTI WO 8373, FROM DESIGN DRAWING 1268313D-1, FOR DUKE POWER COMPANY.
3. THE AS BUILT DIMENSIONS WERE OBTAINED FROM FTI SHOP DATA SHEETS AND QCIR 97-00773.
4. EACH FLAW IS CENTERED ABOUT THE SPECIFIED AXIAL AND AZIMUTHAL LOCATIONS.
5. THE DEPTHS IN PERCENT THROUGH WALL (%TW) ARE BASED UPON THE ACTUAL MEAN WALL THICKNESS (MWT) OF THE TUBING, .038".
6. WHEN THE STANDARD IS PLACED IN ITS HOLDER (1268314E-1), A DRILLED TUBE SUPPORT PLATE (TSP) SIMULATOR WILL BE CENTERED NEAR LOCATION EE. BROACHED TSP'S WILL BE CENTERED NEAR LOCATIONS AA AND BB/CC. WEAR PATCHES BB AND CC WILL BE LOCATED WITH TWO LAND REGIONS OF THEIR BROACHED TSP.
7. ID FLAW DIMENSIONS ARE OBTAINED FROM MACHINING EQUIPMENT.

PLANAR VIEW OF TUBE OD AND FLAWS



(1) OCONEE EDM/ASME/WEAR CALIBRATION STANDARD

MAT'L: ASME SB-163 ALLOY 600, .629" OD, .554" ID, .038" WALL

FILENAME: 1268326B.DWG
DISK No.: OPTICAL

DRAWN	CHECKED	OCONEE EDM/ASME/WEAR CALIBRATION STANDARD AS BUILT DRAWING	SCALE 1/2	DATE 09/09/97
			SIZE	DWG NO 1268326 B - 0

88159 (12/95)

1268321B DWG NO

FLAW LABEL	FLAW DESCRIPTION	SURFACE OF ORIGIN	AXIAL LOCATION	AZIMUTHAL LOCATION	LENGTH +.000/+.010	WIDTH OR DIAMETER	DEPTH IN INCHES	DEPTH IN %TW
A	AX EDM	ID	1.750"	0°	.375"	.006"	.022"	60 %TW
B	AX EDM	ID	1.750"	120°	.375"	.005"	.015"	41 %TW
C	AX EDM	ID	1.750"	240°	.375"	.005"	.0075"	20 %TW
D	AX EDM	OD	2.500"	0°	.375"	.005"	.021"	57 %TW
E	AX EDM	OD	2.500"	120°	.375"	.005"	.015"	41 %TW
F	AX EDM	OD	2.500"	240°	.375"	.006"	.007"	19 %TW
G	AX EDM	OD	3.250"	0°	.375"	.006"	THROUGH	100 %TW
H	CI EDM	OD	4.000"	180°	.375"	.006"	THROUGH	100 %TW
I	CI EDM	ID	4.750"	0°	.375"	.006"	.022"	60 %TW
J	CI EDM	OD	4.750"	180°	.375"	.005"	.021"	57 %TW
K	CI EDM	ID	5.500"	0°	.375"	.005"	.015"	41 %TW
L	CI EDM	OD	5.500"	180°	.375"	.005"	.014"	38 %TW
M	CI EDM	ID	6.250"	0°	.375"	.005"	.0075"	20 %TW
N	CI EDM	OD	6.250"	180°	.375"	.006"	.007"	19 %TW
O	AX EDM IN EXPANSION	ID	7.375"	0°	.250"	.005"	.015"	41 %TW
P	CI EDM IN EXPANSION	ID	7.375"	180°	.250"	.005"	.015"	41 %TW
Q	AX EDM IN EXPANSION	OD	8.625"	0°	.250"	.005"	.014"	38 %TW
R	CI EDM IN EXPANSION	OD	8.625"	180°	.250"	.005"	.014"	38 %TW
S	DENT	OD	12.250"	0°	.063"	.420"	.003"	8 %TW
T1	FBH	OD	13.250"	0°	N/A	ø.015"	.007"	19 %TW
T2	FBH	OD	13.250"	90°	N/A	ø.016"	.008"	22 %TW
T3	FBH	OD	13.250"	180°	N/A	ø.015"	.007"	19 %TW
T4	FBH	OD	13.250"	270°	N/A	ø.015"	.007"	19 %TW
U	FBH	OD	14.000"	0°	N/A	ø.093"	.014"	38 %TW
V	FBH	OD	14.750"	0°	N/A	ø.080"	.021"	57 %TW
W	FBH	OD	15.500"	0°	N/A	ø.063"	.028"	76 %TW
X	HOLE	OD	16.250"	0°	N/A	ø.050"	THROUGH	100 %TW
AA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BB	WEAR & BROACHED TSP	OD	19.095"	120°	.690"	.124"	.010"	27 %TW
CC	WEAR & BROACHED TSP	OD	19.095"	240°	.690"	.124"	.021"	57 %TW
DD	GROOVE	OD	20.375"	ALL	.125"	N/A	.003"	8 %TW
EE	N/A	OD	N/A	N/A	N/A	N/A	N/A	N/A
FF	GROOVE	ID	23.000"	360°	.062"	N/A	.0075"	20 %TW

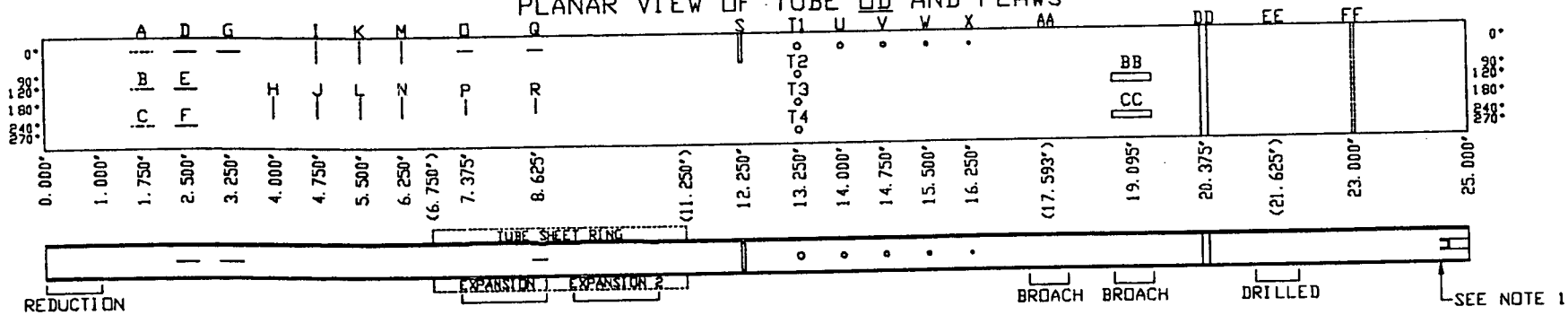
FRAMATOME TECHNOLOGIES

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	

NOTES:

1. THE MATERIAL HEAT NUMBER, HT 93500 LOT 5022, AND THE AS BUILT NUMBER, 1268321B, ARE ETCHED AT THE RIGHT TUBE END.
2. THIS STANDARD WAS MADE VIA PA 83-795437-02 AND FTI WO 8285, FROM DESIGN DRAWING 1268313D-1, FOR DUKE POWER COMPANY.
3. THE AS BUILT DIMENSIONS WERE OBTAINED FROM FTI SHOP DATA SHEETS AND QCIR 97-00769.
4. EACH FLAW IS CENTERED ABOUT THE SPECIFIED AXIAL AND AZIMUTHAL LOCATIONS.
5. THE DEPTHS IN PERCENT THROUGH WALL (%TW) ARE BASED UPON THE ACTUAL MEAN WALL THICKNESS (MWT) OF THE TUBING, .037".
6. WHEN THE STANDARD IS PLACED IN ITS HOLDER (1268314E-1), A DRILLED TUBE SUPPORT PLATE (TSP) SIMULATOR WILL BE CENTERED NEAR LOCATION EE. BROACHED TSP'S WILL BE CENTERED NEAR LOCATIONS AA AND BB/CC. WEAR PATCHES BB AND CC WILL BE LOCATED WITH TWO LAND REGIONS OF THEIR BROACHED TSP.

PLANAR VIEW OF TUBE OD AND FLAWS



(1) OCONEE EDM/ASME/WEAR CALIBRATION STANDARD

MAT'L: ASME SB-163 ALLOY 600, .629" OD, .554" ID, .037" WALL.

FILENAME: 1268321B.DWG
DISK No.: OPTICAL

DWN BY C.M. FIELDS
PASSED BY T.A. BRADY
CHK'D BY C. D. PALMER
APP'D BY R.A. COE

OCONEE EDM/ASME/WEAR CALIBRATION STANDARD AS BUILT DRAWING

SCALE 1/2 DATE 09/09/97
DWG NO. 1268321B - 0

22159 (12/95)

1268319B ON 9A0

FLAW LABEL	FLAW DESCRIPTION	SURFACE OF ORIGIN	AXIAL LOCATION	AZIMUTHAL LOCATION	LENGTH -.000/+.010	WIDTH OR DIAMETER	DEPTH IN INCHES	DEPTH IN %TW
A	AX EDM	ID	1.750"	0°	.375"	.005"	.022"	60 %TW
B	AX EDM	ID	1.750"	120°	.375"	.005"	.015"	41 %TW
C	AX EDM	ID	1.750"	240°	.375"	.005"	.0075"	20 %TW
D	AX EDM	OD	2.500"	0°	.375"	.005"	.021"	57 %TW
E	AX EDM	OD	2.500"	120°	.375"	.005"	.014"	38 %TW
F	AX EDM	OD	2.500"	240°	.375"	.005"	.007"	19 %TW
G	AX EDM	OD	3.250"	0°	.375"	.006"	THROUGH	100 %TW
H	CI EDM	OD	4.000"	180°	.375"	.005"	THROUGH	100 %TW
I	CI EDM	ID	4.750"	0°	.375"	.006"	.022"	60 %TW
J	CI EDM	OD	4.750"	180°	.375"	.005"	.014"	38 %TW
K	CI EDM	ID	5.500"	0°	.375"	.005"	.015"	41 %TW
L	CI EDM	OD	5.500"	180°	.375"	.005"	.015"	41 %TW
M	CI EDM	ID	6.250"	0°	.375"	.005"	.0075"	20 %TW
N	CI EDM	OD	6.250"	180°	.375"	.005"	.007"	19 %TW
O	AX EDM IN EXPANSION	ID	7.375"	0°	.250"	.005"	.015"	41 %TW
P	CI EDM IN EXPANSION	ID	7.375"	180°	.250"	.005"	.015"	41 %TW
Q	AX EDM IN EXPANSION	OD	8.622"	0°	.250"	.004"	.014"	38 %TW
R	CI EDM IN EXPANSION	OD	8.625"	180°	.250"	.006"	.015"	41 %TW
S	DENT	OD	12.250"	0°	.062"	.400"	.004"	11 %TW
T1	FBH	OD	13.250"	0°	N/A	ø.015"	.007"	19 %TW
T2	FBH	OD	13.250"	90°	N/A	ø.016"	.007"	19 %TW
T3	FBH	OD	13.250"	180°	N/A	ø.015"	.007"	19 %TW
T4	FBH	OD	13.250"	270°	N/A	ø.015"	.006"	16 %TW
U	FBH	OD	14.000"	0°	N/A	ø.093"	.014"	38 %TW
V	FBH	OD	14.750"	0°	N/A	ø.079"	.021"	57 %TW
W	FBH	OD	15.500"	0°	N/A	ø.061"	.028"	76 %TW
X	HOLE	OD	16.250"	0°	N/A	ø.050"	THROUGH	100 %TW
AA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BB	WEAR & BROACHED TSP	OD	19.093"	120°	.689"	.125"	.010"	27 %TW
CC	WEAR & BROACHED TSP	OD	19.093"	240°	.691"	.125"	.023"	62 %TW
DD	GROOVE	OD	20.380"	ALL	.184"	N/A	.003"	8 %TW
EE	N/A	OD	N/A	N/A	N/A	N/A	N/A	N/A
FF	GROOVE	ID	23.000"	360°	.062"	N/A	.0075"	20 %TW

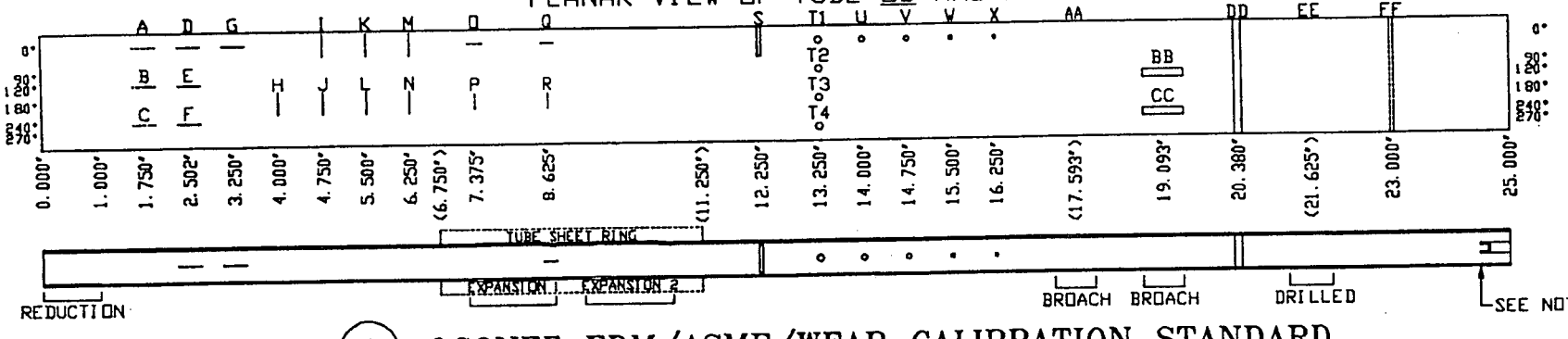
FRAMATOME TECHNOLOGIES

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	

NOTES:

1. THE MATERIAL HEAT NUMBER, HT 93500 LOT 5022, AND THE AS BUILT NUMBER, 1268319B, ARE ETCHED AT THE RIGHT TUBE END.
2. THIS STANDARD WAS MADE VIA PA 83-795437-02 AND FTI WO 8285, FROM DESIGN DRAWING 1268313D-1, FOR DUKE POWER COMPANY.
3. THE AS BUILT DIMENSIONS WERE OBTAINED FROM FTI SHOP DATA SHEETS AND QCIR 97-00769.
4. EACH FLAW IS CENTERED ABOUT THE SPECIFIED AXIAL AND AZIMUTHAL LOCATIONS.
5. THE DEPTHS IN PERCENT THROUGH WALL (%TW) ARE BASED UPON THE ACTUAL MEAN WALL THICKNESS (MWT) OF THE TUBING, .037".
6. WHEN THE STANDARD IS PLACED IN ITS HOLDER (1268314E-1), A DRILLED TUBE SUPPORT PLATE (TSP) SIMULATOR WILL BE CENTERED NEAR LOCATION EE. BROACHED TSP'S WILL BE CENTERED NEAR LOCATIONS AA AND BB/CC. WEAR PATCHES BB AND CC WILL BE LOCATED WITH TWO LAND REGIONS OF THEIR BROACHED TSP.

PLANAR VIEW OF TUBE OD AND FLAWS



(1) OCONEE EDM/ASME/WEAR CALIBRATION STANDARD

MAT'L: ASME SB-163 ALLOY 600, .630" OD, .554" ID, .037" WALL.

FILENAME: 1268319B.DWG
DISK No.: OPTICAL

DWN BY	CHK'D BY	OCONEE EDM/ASME/WEAR CALIBRATION STANDARD AS BUILT DRAWING	SCALE 1/2	DATE 09/09/97
C.W. DILDY	C.D. PALMER		DWG NO. 1268319	REV B - 0
PASSED BY	APP'D BY			
R.A. BRANIC	R.A. COE			

82159 (12/95)

1268320B ON PAD

FLAW LABEL	FLAW DESCRIPTION	SURFACE OF ORIGIN	AXIAL LOCATION	AZIMUTHAL LOCATION	LENGTH +.000/-.010	WIDTH OR DIAMETER	DEPTH IN INCHES	DEPTH IN %TW
A	AX EDM	ID	1.750"	0°	.375"	.006"	.022"	60 %TW
B	AX EDM	ID	1.750"	120°	.375"	.005"	.015"	41 %TW
C	AX EDM	ID	1.750"	240°	.375"	.005"	.0075"	20 %TW
D	AX EDM	OD	2.500"	0°	.375"	.005"	.022"	60 %TW
E	AX EDM	OD	2.500"	120°	.375"	.005"	.015"	41 %TW
F	AX EDM	OD	2.500"	240°	.375"	.004"	.007"	19 %TW
G	AX EDM	OD	3.250"	0°	.375"	.005"	THROUGH	100 %TW
H	CI EDM	OD	4.000"	180°	.375"	.006"	THROUGH	100 %TW
I	CI EDM	ID	4.750"	0°	.375"	.006"	.022"	60 %TW
J	CI EDM	OD	4.750"	180°	.375"	.005"	.0205"	55 %TW
K	CI EDM	ID	5.500"	0°	.375"	.005"	.015"	41 %TW
L	CI EDM	OD	5.500"	180°	.375"	.005"	.014"	38 %TW
M	CI EDM	ID	6.250"	0°	.375"	.005"	.0075"	20 %TW
N	CI EDM	OD	6.250"	180°	.375"	.004"	.007"	19 %TW
O	AX EDM IN EXPANSION	ID	7.375"	0°	.250"	.005"	.015"	41 %TW
P	CI EDM IN EXPANSION	ID	7.375"	180°	.250"	.005"	.015"	41 %TW
Q	AX EDM IN EXPANSION	OD	8.625"	0°	.250"	.004"	.013"	35 %TW
R	CI EDM IN EXPANSION	OD	8.625"	180°	.250"	.005"	.014"	38 %TW
S	DENT	OD	12.250"	0°	.062"	.400"	.003"	N/A
T1	FBH	OD	13.250"	0°	N/A	ø.115"	.007"	19 %TW
T2	FBH	OD	13.250"	90°	N/A	ø.116"	.007"	19 %TW
T3	FBH	OD	13.250"	180°	N/A	ø.115"	.007"	19 %TW
T4	FBH	OD	13.250"	270°	N/A	ø.115"	.007"	19 %TW
U	FBH	OD	14.002"	0°	N/A	ø.092"	.014"	38 %TW
V	FBH	OD	14.750"	0°	N/A	ø.077"	.022"	60 %TW
W	FBH	OD	15.500"	0°	N/A	ø.061"	.028"	76 %TW
X	HOLE	OD	16.252"	0°	N/A	ø.050"	THROUGH	100 %TW
AA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BB	WEAR & BROACHED TSP	OD	19.095"	120°	.689"	.125"	.012"	32 %TW
CC	WEAR & BROACHED TSP	OD	19.095"	240°	.690"	.125"	.023"	62 %TW
DD	GROOVE	OD	20.375"	ALL	.125"	N/A	.003"	8 %TW
EE	N/A	OD	N/A	N/A	N/A	N/A	N/A	N/A
FF	GROOVE	ID	23.000"	360°	.062"	N/A	.0075"	20 %TW

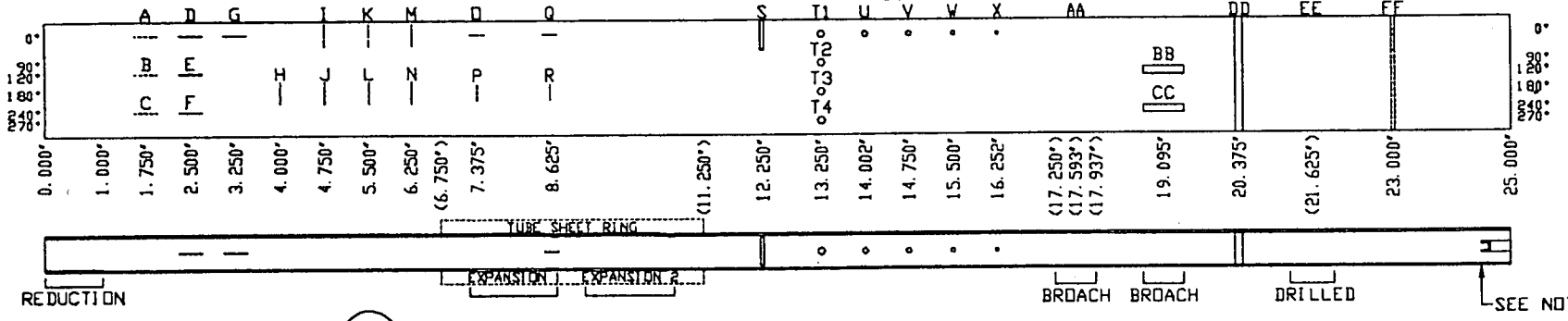
FRAMATOME TECHNOLOGIES

REVISIONS				NF
REV	DESCRIPTION	DATE	APPROVAL	

NOTES:

1. THE MATERIAL HEAT NUMBER, HT 93500 LOT 5022, AND THE AS BUILT NUMBER, 1268320B, ARE ETCHED AT THE RIGHT TUBE END.
2. THIS STANDARD WAS MADE VIA PA 83-795437-02 AND FTI WO 8285, FROM DESIGN DRAWING 1268313D-1, FOR DUKE POWER COMPANY.
3. THE AS BUILT DIMENSIONS WERE OBTAINED FROM FTI SHOP DATA SHEETS AND QCIR 97-00769.
4. EACH FLAW IS CENTERED ABOUT THE SPECIFIED AXIAL AND AZIMUTHAL LOCATIONS.
5. THE DEPTHS IN PERCENT THROUGH WALL (%TW) ARE BASED UPON THE ACTUAL MEAN WALL THICKNESS (MWT) OF THE TUBING, .037".
6. WHEN THE STANDARD IS PLACED IN ITS HOLDER (1268314E-1), A DRILLED TUBE SUPPORT PLATE (TSP) SIMULATOR WILL BE CENTERED NEAR LOCATION EE. BROACHED TSP'S WILL BE CENTERED NEAR LOCATIONS AA AND BB/CC. WEAR PATCHES BB AND CC WILL BE LOCATED WITH TWO LAND REGIONS OF THEIR BROACHED TSP.

PLANAR VIEW OF TUBE OD AND FLAWS



1 OCONEE EDM/ASME/WEAR CALIBRATION STANDARD

MAT'L: ASME SB-163 ALLOY 600, .629" OD, .555" ID, .037" WALL.

FILENAME: 1268320B.DWG
DISK No.: OPTICAL

DWN BY	CHK'D BY	OCONEE EDM/ASME/WEAR CALIBRATION STANDARD AS BUILT DRAWING	SCALE 1/2	DATE 09/09/97
C.W. DEVOE	K.B. PALMER		DWG NO. 1268320 B - 0	
PASSED BY	APP'D BY			
T.A. ABBATIS	R.A. COE			

22159 (12/93)

ATTACHMENT 4

OPTICAL DISK WITH EDDY CURRENT DATA

Duke Power
A Duke Energy Company

W. R. McCollum, Jr.
Vice President

Duke Power Company
A Duke Energy Company
Oconee Nuclear Site
P.O. Box 1439
Seneca, SC 29679

(864) 885-3107 OFFICE
(864) 885-3564 FAX

January 26, 1998

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

Subject: Oconee Nuclear Station
Docket No. 50-269
Response to Request for Additional Information
on Steam Generator Inspections

In a letter dated December 2, 1997, the NRC requested additional information regarding the results of the steam generator inspections that were performed during the Oconee Unit 1 end of cycle 17 refueling outage. Specifically, the NRC requested that Duke Energy (Duke) submit (1) an optical disk containing the eddy current inspection data for the inside diameter (ID) intergranular attack (IGA) indications in the pulled tube specimens; (2) files on the optical disk with the setup used by the analyst for examining the indications; (3) a drawing or description of the standard used to calibrate the acquisition system; (4) eddy current data from 20 randomly selected tubes that contain ID IGA indications; and (5) a listing of the dimensions of the ID IGA indications as determined from the destructive examination of the pulled tube specimens. In addition, the NRC requested that the format for the eddy current data be compatible with Eddynet95 analysis software.

In response to this request, Duke provides the attached information. Attachment 1 contains a list of over 20 randomly selected tubes which have eddy current data supplied on the optical disk. The randomly selected tubes are circled on the list. A listing of the dimensions of the ID IGA indications as determined from the destructive examination of the pulled tube specimens is contained in Attachment 2. A drawing of the standard used to calibrate the acquisition system is provided in Attachment 3. Attachment 4 contains an optical disk with the eddy current data for the randomly selected tubes and the pulled tube

bcc:

B. L. Peele
M. K. Nazar
W. W. Foster
J. E. Burchfield
M. T. Cash
M. S. Kitlan
R. L. Gill
L. A. Keller
M. E. Bailey
B. B. Lowery
P. R. Newton
T. J. Pettit
W. M. Sample
J. H. Batton
D. B. Mayes
NSRB
ELL

specimens. The optical disk contains the setup used by the analyst for examining the tube indications and is in a format which is compatible with Eddynet95 analysis software.

If there are any questions regarding this submittal, please contact Michael Bailey at (864) 885-4390.

Very truly yours,

W. R. McCollum, Jr.
Site Vice President
Oconee Nuclear Station

MEB

Attachments (4)

cc w/o optical disk:

L. A. Reyes, Regional Administrator
Region II

M. A. Scott, Senior Resident Inspector
Oconee Nuclear Site

cc with optical disk:

D. E. LaBarge, Project Manager
NRR

ATTACHMENT 1

LIST OF THE RANDOMLY SELECTED TUBES

FTI TUBAN II (Version 2.4) 12/09/1997 13:21:31
Oconee Nuclear Station - Unit One
S/G B
09/97 RFO
ROLL TRANSITION,TUBE PULL REV. -MRPC

QRY: 12/09/1997 13:13:54

TEST	TYPE	ROW	COL	IND	%TW	VOLTS	CHN	DEG	LOCATION		EXTENT1	EXTENT2	LEG	TAPE#	PROBE	COMMENTS	OPTICAL DK
ROLL	TRANSITI	88	100	SAI		2.51	P 1	26	UTE	-0.75	UTE	UTE	UTE	108	520		
ROLL	TRANSITI	89	82	VOL		0.97	P 1	12	UTE	-0.67	UTE	UTE	UTE	108	520		
ROLL	TRANSITI	89	86	VOL		0.91	P 1	17	UTE	-0.58	UTE	UTE	UTE	108	520		
ROLL	TRANSITI	89	88	VOL		0.67	P 1	28	UTE	-0.70	UTE	UTE	UTE	108	520		
ROLL	TRANSITI	91	83	VOL		0.57	P 1	9	UTE	-1.02	UTE	UTE	UTE	108	520		
ROLL	TRANSITI	87	86	VOL		0.38	P 1	34	UTE	-3.41	UTE	UTE	UTE	114	520		
ROLL	TRANSITI	88	100	SAI		2.39	P 1	30	UTE	-1.02	UTE	UTE	UTE	114	520		
ROLL	TRANSITI	86	95	SAI		1.50	P 1	16	UTE	-1.00	UTE	UTE	UTE	117	520		
ROLL	TRANSITI	86	102	VOL		0.46	5	37	UTE	-2.60	UTE	UTE	UTE	118	520		
ROLL	TRANSITI	81	82	SAI		0.81	P 1	30	UTE	-1.29	UTE	UTE	UTE	157	520		
ROLL	TRANSITI	79	117	VOL		0.21	P 1	30	UTE	-1.28	UTE	UTE	UTE	161	520		
ROLL	TRANSITI	84	131	VOL		0.79	P 2	18	UTE	-2.06	UTE	UTE	UTE	164	520		
ROLL	TRANSITI			VOL		1.10	P 2	17	UTE	-1.77	UTE	UTE	UTE	164	520		
ROLL	TRANSITI			VOL		1.22	P 2	25	UTE	-1.47	UTE	UTE	UTE	164	520		
ROLL	TRANSITI	55	87	SAI		1.70	P 1	35	UTE	-1.24	UTE	UTE	UTE	178	520		
ROLL	TRANSITI	56	82	MAI		2.06	P 1	38	UTE	-1.09	UTE	UTE	UTE	178	520		
ROLL	TRANSITI	56	94	VOL		0.61	5	24	UTE	-2.77	UTE	UTE	UTE	178	520		
ROLL	TRANSITI	56	96	VOL		0.62	P 2	24	UTE	-2.37	UTE	UTE	UTE	178	520		
ROLL	TRANSITI	55	110	VOL		0.33	P 1	103	UTE	-0.78	UTE	UTE	UTE	179	520	L3R	
ROLL	TRANSITI	58	79	SAI		1.53	1	31	UTE	-1.07	UTE	UTE	UTE	180	520		
ROLL	TRANSITI	59	77	MAI		1.22	1	34	UTE	-1.61	UTE	UTE	UTE	180	520		
ROLL	TRANSITI			VOL		1.22	P 2	14	UTE	-1.46	UTE	UTE	UTE	180	520		
ROLL	TRANSITI	57	82	VOL		0.53	P 1	57	UTE	-2.26	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	59	76	VOL		1.13	P 1	21	UTE	-1.35	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	59	78	VOL		0.53	P 2	34	UTE	-1.51	UTE	UTE	UTE	181	520		
ROLL	TRANSITI			VOL		0.92	P 2	22	UTE	-1.06	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	59	80	VOL		0.90	P 1	31	UTE	-1.06	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	59	88	VOL		1.61	P 2	30	UTE	-1.71	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	59	90	VOL		0.56	P 1	34	UTE	-2.58	UTE	UTE	UTE	181	520		
ROLL	TRANSITI			VOL		0.97	P 1	27	UTE	-2.20	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	59	102	VOL		0.49	P 1	50	UTE	-1.47	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	59	106	VOL		0.95	P 1	27	UTE	-1.55	UTE	UTE	UTE	181	520		
ROLL	TRANSITI			VOL		1.34	P 1	26	UTE	-1.23	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	59	110	SAI		2.05	P 1	35	UTE	-1.18	UTE	UTE	UTE	181	520		
ROLL	TRANSITI			VOL		1.01	P 1	21	UTE	-1.50	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	59	121	VOL		0.90	P 1	18	UTE	-1.06	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	60	94	VOL		0.75	P 1	21	UTE	-2.59	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	60	96	VOL		0.65	P 1	28	UTE	-1.80	UTE	UTE	UTE	181	520		
ROLL	TRANSITI	63	88	VOL		1.30	P 1	201	UTE	-1.29	UTE	UTE	UTE	182	520		
ROLL	TRANSITI	63	120	MAI		0.39	P 1	52	UTE	-1.83	UTE	UTE	UTE	182	520		
ROLL	TRANSITI	63	122	MAI		0.83	P 1	45	UTE	-1.56	UTE	UTE	UTE	182	520		
ROLL	TRANSITI	64	97	VOL		0.80	5	193	UTE	-2.04	UTE	UTE	UTE	182	520		
ROLL	TRANSITI	64	122	VOL		1.73	5	29	UTE	-1.34	UTE	UTE	UTE	182	520		
ROLL	TRANSITI	63	99	VOL		3.80	1	3	UTE	-1.26	UTE	UTE	UTE	183	520		
ROLL	TRANSITI	63	107	VOL		0.63	1	15	UTE	-2.10	UTE	UTE	UTE	183	520		
ROLL	TRANSITI	64	100	VOL		1.19	1	22	UTE	-1.21	UTE	UTE	UTE	183	520		
ROLL	TRANSITI	64	114	VOL		0.95	1	29	UTE	-1.58	UTE	UTE	UTE	183	520		
ROLL	TRANSITI	64	116	VOL		1.84	1	27	UTE	-1.34	UTE	UTE	UTE	183	520		
ROLL	TRANSITI	64	120	VOL		1.13	1	32	UTE	-1.20	UTE	UTE	UTE	183	520		
ROLL	TRANSITI	65	113	VOL		1.11	1	31	UTE	-1.53	UTE	UTE	UTE	183	520		
ROLL	TRANSITI	65	121	VOL		1.63	1	26	UTE	-1.38	UTE	UTE	UTE	183	520		
ROLL	TRANSITI	73	106	VOL		0.60	1	26	UTE	-1.07	UTE	UTE	UTE	185	520		
ROLL	TRANSITI	73	115	VOL		0.58	1	29	UTE	-0.65	UTE	UTE	UTE	185	520		
ROLL	TRANSITI	75	96	VOL		0.88	P 1	40	UTE	-1.09	UTE	UTE	UTE	185	520		
ROLL	TRANSITI	75	104	VOL		0.92	P 1	26	UTE	-1.35	UTE	UTE	UTE	185	520		
ROLL	TRANSITI	75	112	VOL		1.58	P 2	34	UTE	-1.02	UTE	UTE	UTE	185	520		
ROLL	TRANSITI	71	97	VOL		0.31	P 2	46	UTE	-2.33	UTE	UTE	UTE	186	520		
ROLL	TRANSITI	72	113	VOL		0.40	P 1	40	UTE	-2.06	UTE	UTE	UTE	186	520		
ROLL	TRANSITI	66	122	SAI		1.28	P 1	24	UTE	-1.52	UTE	UTE	UTE	188	520		
ROLL	TRANSITI	63	85	VOL		2.18	P 1	27	UTE	-1.78	UTE	UTE	UTE	190	520		

Total Indications Found = 60
Total Tubes Found = 52
Total Tubes in Input File = 53

ATTACHMENT 2

LISTING OF DIMENSIONS FOR INDICATIONS
IN THE PULLED TUBE SPECIMENS

OCONEE-1 DEPTH DATA FOR TUBES R59T82 AND R65T111

TUBE	LOCATION	DEPTH (% throughwall)	LENGTH (inches)	WIDTH (inches)
R65T111	120°, AREA 1	46%	.20 .20	.10 .13
R65T111	210°, AREA 2	35%	.04	.05
R65T111	330°, AREA 1	19%	.16	.1
R65T111	330°, AREA 2	32%	.11	.09
R59T82	180°, AREA 1	46%	.21	.14
R59T82	20°, AREA 2	46%	.18	.08
R59T82	10°, AREA 1	35%	.24	.05
R59T82	230°, AREA 2	22%	.09	.20

NOTE: THERE ARE TWO PATCHES OF IGA AT 120° ON TUBE R65T111, WITHIN AREA 1, WHICH BOTH DISAPPEAR AFTER 46% TW

PATCH CLOSET TO THE TUBE END IS .20 X .10
PATCH JUST BELOW IS .20 X .13

NOTE: THE LENGTH AND WIDTH OF THE IGA IS GIVEN AFTER APPROXIMATELY 8% TW (0.003 INCHES BELOW THE ID SURFACE)

NOTE: THE TWO PATCHES OF IGA AT 10° AND 20° FROM TUBE R59T82 COULD COME FROM THE SAME AREA OF DEGRADATION

ATTACHMENT 3

DRAWING OF THE CALIBRATION STANDARD

1252966B ON DAC

FLAW LABEL	FLAW DESCRIPTION	SIDE	AXIAL LOCATION	AZIMUTHAL LOCATION	LENGTH	WIDTH OR DIAMETER	DEPTH IN INCHES	DEPTH IN %TW
A	GROOVE	ID	2.000"	ALL	.0615"	N/A	.0075"	19 %TW
B	GROOVE	OD	3.000"	ALL	.124"	N/A	.0045"	11 %TW
C	4 FBH'S	OD	4.000"	0°90°180°270°	N/A	ø.114"	✱.008"	✱20 %TW
D	FBH	OD	4.750"	0°	N/A	ø.093"	.0155"	39 %TW
E	FBH	OD	5.500"	0°	N/A	ø.077"	.0235"	59 %TW
F	FBH	OD	6.250"	0°	N/A	ø.063"	.031"	78 %TW
G	HOLE	OD	7.000"	0°	N/A	ø.048"	THROUGH	100 %TW
H	DENT	OD	8.000"	0°	.062"	(.475")	.003"	N/A
I	NDD & BROACHED TSP	OD	9.750"	N/A	1.500"	N/A	N/A	N/A
J	WEAR & BROACHED TSP	OD	12.250"	0°	1.500"	.125"	.0095"	24 %TW
K	WEAR & BROACHED TSP	OD	12.250"	120°	1.500"	.124"	.0225"	57 %TW
L	NDD & DRILLED TSP	OD	14.375"	N/A	.750"	N/A	N/A	N/A
AA	AX EDM	OD	16.000"	0°	.312"	.006"	.008"	20 %TW
BB	CI EDM	OD	16.000"	90°	60°	.006"	.008"	20 %TW
CC	AX EDM	ID	16.000"	180°	.312"	.005"	.008"	20 %TW
DD	CI EDM	ID	16.000"	270°	60°	.005"	.008"	20 %TW
EE	AX EDM	OD	16.750"	0°	.312"	.006"	.015"	38 %TW
FF	CI EDM	OD	16.750"	90°	60°	.006"	.015"	38 %TW
GG	AX EDM	ID	16.750"	180°	.312"	.005"	.016"	41 %TW
HH	CI EDM	ID	16.750"	270°	60°	.005"	.015"	38 %TW
II	AX EDM	OD	17.500"	0°	.312"	.006"	.023"	58 %TW
JJ	CI EDM	OD	17.500"	90°	60°	.006"	.023"	58 %TW
KK	AX EDM	ID	17.500"	180°	.312"	.005"	.023"	58 %TW
LL	CI EDM	ID	17.500"	270°	60°	.005"	.023"	58 %TW
MM	AX EDM	OD	18.250"	0°	.312"	.006"	THROUGH	100 %TW
NN	CI EDM	OD	18.500"	240°	60°	.006"	THROUGH	100 %TW
OO	AX EDM IN EXPANSION	OD	LEFT TRANSITION	0°	.312"	.006"	.015"	38 %TW
PP	CI EDM IN EXPANSION	OD	LEFT TRANSITION	90°	60°	.006"	.015"	38 %TW
QQ	AX EDM IN EXPANSION	ID	RIGHT TRANSITION	180°	.312"	.006"	.015"	38 %TW
RR	CI EDM IN EXPANSION	ID	RIGHT TRANSITION	270°	.287"	.006"	.015"	38 %TW

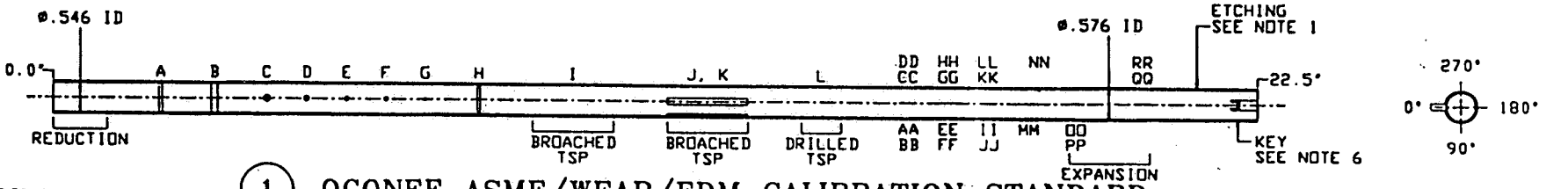
✱ AVERAGE OF FOUR HOLES

FRAMATOME TECHNOLOGIES

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	

NOTES:

1. THE MATERIAL HEAT NUMBER, HT 93452 LOT 5060, AND THE AS BUILT NUMBER, 1252966B, ARE ETCHED AT THE RIGHT TUBE END.
2. THIS STANDARD WAS MADE VIA PA 83-791232 REV 00 & 01, AND WORK ORDER 4986, FROM DESIGN DRAWING 1252875D-2, FOR DUKE POWER COMPANY.
3. THE AS BUILT DIMENSIONS WERE OBTAINED FROM SPIS SHOP DATA SHEETS AND QCIR 96-285.
4. EACH FLAW IS CENTERED ABOUT THE SPECIFIED AXIAL AND AZIMUTHAL LOCATIONS.
5. THE DEPTHS IN PERCENT THROUGH WALL (%TW) ARE BASED UPON THE ACTUAL MEAN WALL THICKNESS (MWT) OF THE TUBE, .0395".
6. WHEN PLACED IN HOLDER (1252876E-0), A DRILLED TSP IS CENTERED AT LOCATION L, AND BROACHED TSP'S ARE CENTERED AT LOCATIONS "I" AND "J,K" USING THE KEY AT THE TUBE END.
7. PER DUKE POWER, THIS STANDARD CONTAINS A HALF LENGTH DRILLED TSP, AND TRADITIONAL FBH'S WHOSE DIAMETERS ARE SOMEWHAT SMALLER THAN TYPICAL ASME CODE DIAMETERS.



QA CONDITION 1

(1) OCONEE ASME/WEAR/EDM CALIBRATION STANDARD

MAT'L: ASME SB-163 ALLOY 600, .629" AVERAGE OD, .550" AVERAGE ID, .0395" AVERAGE WALL.

FILENAME: 1252966B.DWG
DISK No.: OPTICAL

DWN BY	CHK'D BY	OCONEE ASME/WEAR/EDM CALIBRATION STANDARD AS BUILT DRAWING	SCALE 0.5x	DATE 04/01/96
PASSED BY	APP'D BY		DWG NO. 1252966 B - 0	

22159 (12/95)

1268327B ON BAR

FLAW LABEL	FLAW DESCRIPTION	SURFACE OF ORIGIN	AXIAL LOCATION	AZIMUTHAL LOCATION	LENGTH +.000/-.010	WIDTH OR DIAMETER	DEPTH IN INCHES	DEPTH IN %TW
A	AX EDM	ID	1.750"	0°	.376"	.005"	.024"	63 %TW
B	AX EDM	ID	1.750"	120°	.376"	.005"	.013"	34 %TW
C	AX EDM	ID	1.750"	240°	.376"	.005"	.009"	24 %TW
D	AX EDM	OD	2.500"	0°	.375"	.005"	.021"	55 %TW
E	AX EDM	OD	2.500"	120°	.375"	.004"	.014"	37 %TW
F	AX EDM	OD	2.500"	240°	.375"	.005"	.0065"	17 %TW
G	AX EDM	OD	3.250"	0°	.375"	.005"	THROUGH	100 %TW
H	CI EDM	OD	4.002"	180°	.375"	.005"	THROUGH	100 %TW
I	CI EDM	ID	4.750"	0°	.376"	.005"	.022"	58 %TW
J	CI EDM	OD	4.750"	180°	.375"	.005"	.020"	53 %TW
K	CI EDM	ID	5.500"	0°	.376"	.005"	.0145"	38 %TW
L	CI EDM	OD	5.500"	180°	.375"	.005"	.014"	37 %TW
M	CI EDM	ID	6.250"	0°	.376"	.005"	.008"	21 %TW
N	CI EDM	OD	6.250"	180°	.375"	.004"	.007"	18 %TW
O	AX EDM IN EXPANSION	ID	7.375"	0°	.251"	.005"	.015"	40 %TW
P	CI EDM IN EXPANSION	ID	7.375"	180°	.251"	.005"	.016"	43 %TW
Q	AX EDM IN EXPANSION	OD	8.625"	0°	.250"	.004"	.014"	37 %TW
R	CI EDM IN EXPANSION	OD	8.625"	180°	.250"	.005"	.0145"	38 %TW
S	DENT	OD	12.250"	0°	.063"	.400"	.004"	N/A
T1	FBH	OD	13.251"	0°	N/A	0.115"	.0075"	20 %TW
T2	FBH	OD	13.251"	90°	N/A	0.115"	.0065"	17 %TW
T3	FBH	OD	13.251"	180°	N/A	0.115"	.007"	18 %TW
T4	FBH	OD	13.251"	270°	N/A	0.115"	.007"	18 %TW
U	FBH	OD	14.002"	0°	N/A	0.093"	.014"	37 %TW
V	FBH	OD	14.751"	0°	N/A	0.080"	.021"	55 %TW
W	FBH	OD	15.500"	0°	N/A	0.061"	.028"	74 %TW
X	HOLE	OD	16.250"	0°	N/A	0.051"	THROUGH	100 %TW
AA	MOD 6 BROACHED TSP	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BB	WEAR 6 BROACHED TSP	OD	19.091"	120°	.689"	.124"	.010"	26 %TW
CC	WEAR 6 BROACHED TSP	OD	19.091"	240°	.689"	.124"	.021"	55 %TW
DD	GROOVE	OD	20.373"	360°	.124"	N/A	.003"	8 %TW
EE	MOD 6 DRILLED TSP	OD	N/A	N/A	N/A	N/A	N/A	N/A
FF	GROOVE	ID	23.000"	360°	.865"	N/A	.0076"	20 %TW

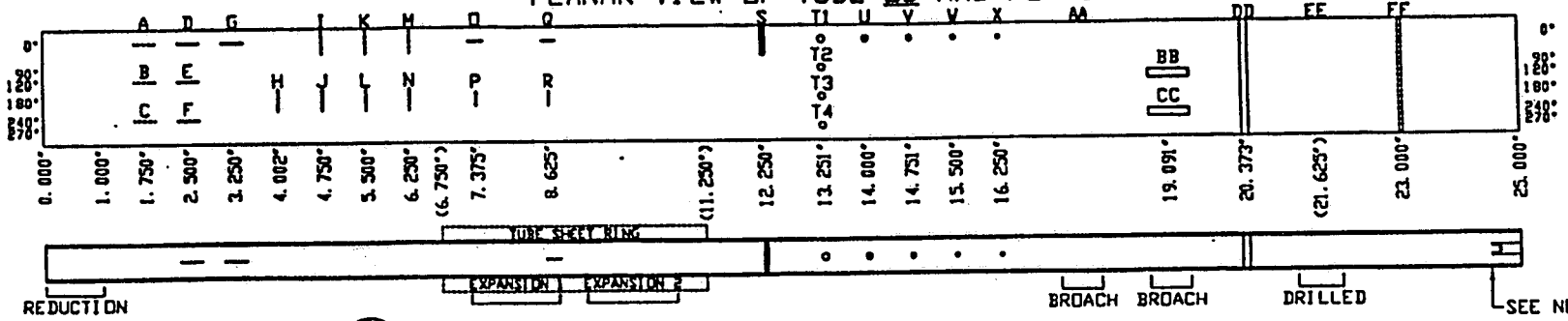
FRAMATOME TECHNOLOGIES

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	

NOTES:

1. THE MATERIAL HEAT NUMBER, HT 93500 LOT 5022, AND THE AS BUILT NUMBER, 1268327B, ARE ETCHED AT THE RIGHT TUBE END.
2. THIS STANDARD WAS MADE VIA PA 83-795481-03, PA 83-795515-00 AND FTI WO 8373, FROM DESIGN DRAWING 1268313D-1, FOR DUKE POWER COMPANY.
3. THE AS BUILT DIMENSIONS WERE OBTAINED FROM FTI SHOP DATA SHEETS AND QCIR 97-00774.
4. EACH FLAW IS CENTERED ABOUT THE SPECIFIED AXIAL AND AZIMUTHAL LOCATIONS.
5. THE DEPTHS IN PERCENT THROUGH WALL (%TW) ARE BASED UPON THE ACTUAL MEAN WALL THICKNESS (MWT) OF THE TUBING, .038".
6. WHEN THE STANDARD IS PLACED IN ITS HOLDER (1268314E-1), A DRILLED TUBE SUPPORT PLATE (TSP) SIMULATOR WILL BE CENTERED NEAR LOCATION EE. BROACHED TSP'S WILL BE CENTERED NEAR LOCATIONS AA AND BB/CC. WEAR PATCHES BB AND CC WILL BE LOCATED WITH TWO LAND REGIONS OF THEIR BROACHED TSP.
7. ID FLAW DIMENSIONS ARE OBTAINED FROM MACHINING EQUIPMENT.

PLANAR VIEW OF TUBE OD AND FLAWS



(1) OCONEE EDM/ASME/WEAR CALIBRATION STANDARD

MAT'L: ASME SB-163 ALLOY 600, .630" OD, .554" ID, .038" WALL.

FILENAME: 1268327B.DWG
DISK No.: OPTICAL

DWN BY [illegible] CHK'D BY [illegible]
PASSED BY [illegible] APPD BY [illegible]

OCONEE EDM/ASME/WEAR CALIBRATION STANDARD AS BUILT DRAWING

SCALE 1/2 DATE 09/09/97
DWG NO. 1268327B-0

22159 (12/95)

23-5000631-00

1268326B DN BAR

FLAW LABEL	FLAW DESCRIPTION	SURFACE OF ORIGIN	AXIAL LOCATION	AZIMUTHAL LOCATION	LENGTH +.000/-.010	WIDTH OR DIAMETER	DEPTH IN INCHES	DEPTH IN %TW
A	AX EDM	ID	1.750"	0°	.376"	.005"	.024"	63 %TW
B	AX EDM	ID	1.750"	120°	.376"	.005"	.013"	34 %TW
C	AX EDM	ID	1.750"	240°	.376"	.005"	.008"	21 %TW
D	AX EDM	OD	2.500"	0°	.375"	.005"	.022"	58 %TW
E	AX EDM	OD	2.500"	120°	.376"	.005"	.014"	37 %TW
F	AX EDM	OD	2.500"	240°	.375"	.005"	.007"	18 %TW
G	AX EDM	OD	3.250"	0°	.376"	.005"	THROUGH	100 %TW
H	CI EDM	OD	4.000"	180°	.375"	.005"	THROUGH	100 %TW
I	CI EDM	ID	4.750"	0°	.376"	.005"	.022"	58 %TW
J	CI EDM	OD	4.750"	180°	.375"	.005"	.020"	53 %TW
K	CI EDM	ID	5.500"	0°	.376"	.005"	.015"	40 %TW
L	CI EDM	OD	5.500"	180°	.375"	.005"	.014"	37 %TW
M	CI EDM	ID	6.250"	0°	.376"	.005"	.009"	24 %TW
N	CI EDM	OD	6.250"	180°	.375"	.005"	.007"	18 %TW
O	AX EDM IN EXPANSION	ID	7.375"	0°	.251"	.005"	.014"	37 %TW
P	CI EDM IN EXPANSION	ID	7.375"	180°	.251"	.005"	.016"	42 %TW
Q	AX EDM IN EXPANSION	OD	8.625"	0°	.250"	.005"	.015"	40 %TW
R	CI EDM IN EXPANSION	OD	8.625"	180°	.250"	.005"	.0145"	38 %TW
S	DENT	OD	12.250"	0°	.063"	.400"	.004"	N/A
T1	FBH	OD	13.250"	0°	N/A	@.115"	.007"	18 %TW
T2	FBH	OD	13.250"	90°	N/A	@.115"	.008"	21 %TW
T3	FBH	OD	13.250"	180°	N/A	@.116"	.007"	18 %TW
T4	FBH	OD	13.250"	270°	N/A	@.115"	.007"	18 %TW
U	FBH	OD	14.000"	0°	N/A	@.096"	.014"	37 %TW
V	FBH	OD	14.750"	0°	N/A	@.080"	.022"	58 %TW
W	FBH	OD	15.500"	0°	N/A	@.062"	.030"	79 %TW
X	HOLE	OD	16.250"	0°	N/A	@.050"	THROUGH	100 %TW
AA	ROD & BROACHED TSP	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BB	WEAR & BROACHED TSP	OD	19.090"	120°	.690"	.124"	.010"	26 %TW
CC	WEAR & BROACHED TSP	OD	19.091"	240°	.125"	.124"	.020"	53 %TW
DD	GROOVE	OD	20.373"	360°	.125"	N/A	.003"	8 %TW
EE	ROD & DRILLED TSP	OD	N/A	N/A	N/A	N/A	N/A	N/A
FF	GROOVE	ID	23.000"	360°	.065"	N/A	.0076"	20 %TW

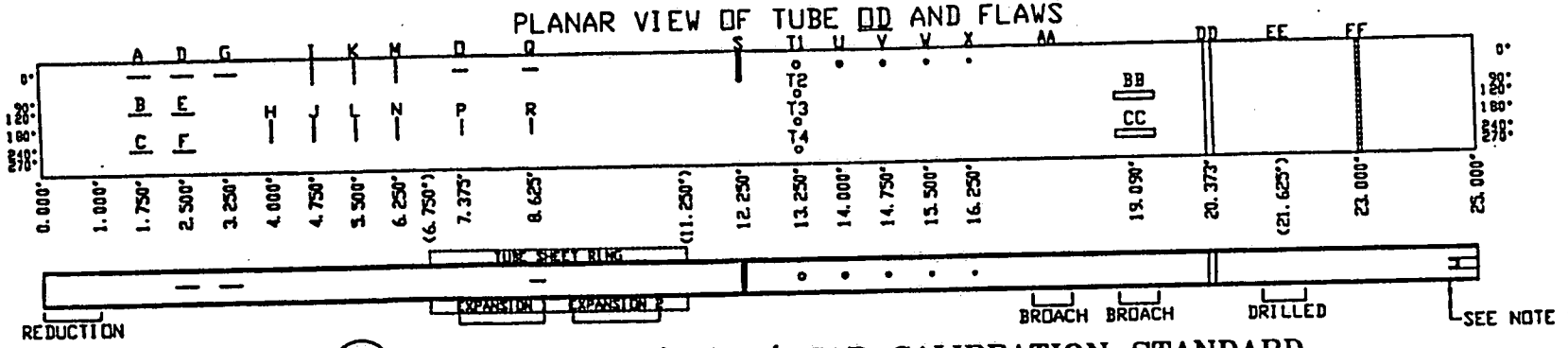
FRAMATOME TECHNOLOGIES

REVISIONS			
REV	DESCRIPTION	DATE	APPROVAL

NOTES:

1. THE MATERIAL HEAT NUMBER, HT 93500 LOT 5022, AND THE AS BUILT NUMBER, 1268326B, ARE ETCHED AT THE RIGHT TUBE END.
2. THIS STANDARD WAS MADE VIA PA 83-795481-03, PA 83-795515-00 AND FTI WO 8373, FROM DESIGN DRAWING 1268313D-1, FOR DUKE POWER COMPANY.
3. THE AS BUILT DIMENSIONS WERE OBTAINED FROM FTI SHOP DATA SHEETS AND QCIR 97-00773.
4. EACH FLAW IS CENTERED ABOUT THE SPECIFIED AXIAL AND AZIMUTHAL LOCATIONS.
5. THE DEPTHS IN PERCENT THROUGH WALL (%TW) ARE BASED UPON THE ACTUAL MEAN WALL THICKNESS (MWT) OF THE TUBING, .038".
6. WHEN THE STANDARD IS PLACED IN ITS HOLDER (1268314E-1), A DRILLED TUBE SUPPORT PLATE (TSP) SIMULATOR WILL BE CENTERED NEAR LOCATION EE. BROACHED TSP'S WILL BE CENTERED NEAR LOCATIONS AA AND BB/CC. WEAR PATCHES BB AND CC WILL BE LOCATED WITH TWO LAND REGIONS OF THEIR BROACHED TSP.
7. ID FLAW DIMENSIONS ARE OBTAINED FROM MACHINING EQUIPMENT.

PLANAR VIEW OF TUBE OD AND FLAWS



(1) OCONEE EDM/ASME/WEAR CALIBRATION STANDARD

MAT'L: ASME SB-163 ALLOY 600, .629" OD, .554" ID, .038" WALL.

FILENAME: 1268326B.DWG
DISK No.: OPTICAL

DRAWN BY		OCONEE EDM/ASME/WEAR CALIBRATION STANDARD AS BUILT DRAWING	SCALE 1/2
CHECKED BY			DATE 09/09/97
APPROVED BY			SIZE 1268326 B - 0

82159 (12/95)

1268321B ON DAC

FLAW LABEL	FLAW DESCRIPTION	SURFACE OF ORIGIN	AXIAL LOCATION	AZIMUTHAL LOCATION	LENGTH +.000/-.010	WIDTH OR DIAMETER	DEPTH IN INCHES	DEPTH IN %TW
A	AX EDM	ID	1.750"	0°	.375"	.006"	.022"	60 %TW
B	AX EDM	ID	1.750"	120°	.375"	.005"	.015"	41 %TW
C	AX EDM	ID	1.750"	240°	.375"	.005"	.0075"	20 %TW
D	AX EDM	OD	2.500"	0°	.375"	.005"	.021"	57 %TW
E	AX EDM	OD	2.500"	120°	.375"	.005"	.015"	41 %TW
F	AX EDM	OD	2.500"	240°	.375"	.006"	.007"	19 %TW
G	AX EDM	OD	3.250"	0°	.375"	.006"	THROUGH	100 %TW
H	CI EDM	OD	4.000"	180°	.375"	.006"	THROUGH	100 %TW
I	CI EDM	ID	4.750"	0°	.375"	.006"	.022"	60 %TW
J	CI EDM	OD	4.750"	180°	.375"	.005"	.021"	57 %TW
K	CI EDM	ID	5.500"	0°	.375"	.005"	.015"	41 %TW
L	CI EDM	OD	5.500"	180°	.375"	.005"	.014"	38 %TW
M	CI EDM	ID	6.250"	0°	.375"	.005"	.0075"	20 %TW
N	CI EDM	OD	6.250"	180°	.375"	.006"	.007"	19 %TW
O	AX EDM IN EXPANSION	ID	7.375"	0°	.250"	.005"	.015"	41 %TW
P	CI EDM IN EXPANSION	ID	7.375"	180°	.250"	.005"	.015"	41 %TW
Q	AX EDM IN EXPANSION	OD	8.625"	0°	.250"	.005"	.014"	38 %TW
R	CI EDM IN EXPANSION	OD	8.625"	180°	.250"	.005"	.014"	38 %TW
S	DENT	OD	12.250"	0°	.063"	.420"	.003"	8 %TW
T1	FBH	OD	13.250"	0°	N/A	ø.015"	.007"	19 %TW
T2	FBH	OD	13.250"	90°	N/A	ø.016"	.008"	22 %TW
T3	FBH	OD	13.250"	180°	N/A	ø.015"	.007"	19 %TW
T4	FBH	OD	13.250"	270°	N/A	ø.015"	.007"	19 %TW
U	FBH	OD	14.000"	0°	N/A	ø.093"	.014"	38 %TW
V	FBH	OD	14.750"	0°	N/A	ø.080"	.021"	57 %TW
W	FBH	OD	15.500"	0°	N/A	ø.063"	.028"	76 %TW
X	HOLE	OD	16.250"	0°	N/A	ø.050"	THROUGH	100 %TW
AA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BB	WEAR & BROACHED TSP	OD	19.095"	120°	.690"	.124"	.010"	27 %TW
CC	WEAR & BROACHED TSP	OD	19.095"	240°	.690"	.124"	.021"	57 %TW
DD	GROOVE	OD	20.375"	ALL	.185"	N/A	.003"	8 %TW
EE	N/A	OD	N/A	N/A	N/A	N/A	N/A	N/A
FF	GROOVE	ID	23.000"	360°	.062"	N/A	.0075"	20 %TW

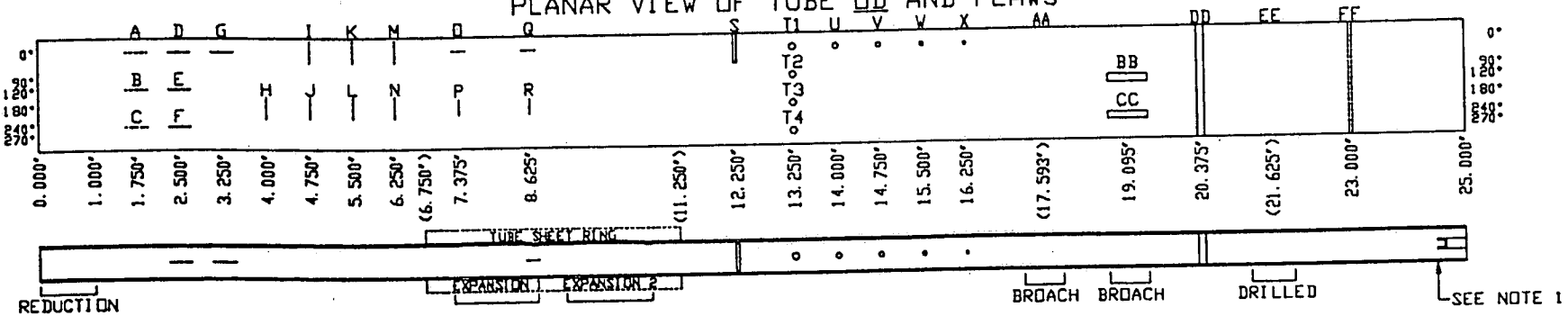
FRAMATOME TECHNOLOGIES

REVISIONS			
REV	DESCRIPTION	DATE	APPROVAL

NOTES:

1. THE MATERIAL HEAT NUMBER, HT 93500 LOT 5022, AND THE AS BUILT NUMBER, 1268321B, ARE ETCHED AT THE RIGHT TUBE END.
2. THIS STANDARD WAS MADE VIA PA 83-795437-02 AND FTI WO 8285, FROM DESIGN DRAWING 1268313D-1, FOR DUKE POWER COMPANY.
3. THE AS BUILT DIMENSIONS WERE OBTAINED FROM FTI SHOP DATA SHEETS AND QCIR 97-00769.
4. EACH FLAW IS CENTERED ABOUT THE SPECIFIED AXIAL AND AZIMUTHAL LOCATIONS.
5. THE DEPTHS IN PERCENT THROUGH WALL (%TW) ARE BASED UPON THE ACTUAL MEAN WALL THICKNESS (MWT) OF THE TUBING, .037".
6. WHEN THE STANDARD IS PLACED IN ITS HOLDER (1268314E-1), A DRILLED TUBE SUPPORT PLATE (TSP) SIMULATOR WILL BE CENTERED NEAR LOCATION EE. BROACHED TSP'S WILL BE CENTERED NEAR LOCATIONS AA AND BB/CC. WEAR PATCHES BB AND CC WILL BE LOCATED WITH TWO LAND REGIONS OF THEIR BROACHED TSP.

PLANAR VIEW OF TUBE OD AND FLAWS



(1) OCONEE EDM/ASME/WEAR CALIBRATION STANDARD

MAT'L: ASME SB-163 ALLOY 600, .629" OD, .554" ID, .037" WALL.

FILENAME: 1268321B.DWG
DISK No.: OPTICAL

DWN BY C.M. DAVIS
PASSED BY T.A. BRANCH
CHK'D BY C.B. PALMER
APP'D BY R.A. COX

OCONEE EDM/ASME/WEAR CALIBRATION STANDARD AS BUILT DRAWING

SCALE 1/2 DATE 09/09/97
DWG NO. 1268321B - 0

22159 (12/95)

DWG NO 1268319B

FLAW LABEL	FLAW DESCRIPTION	SURFACE OF ORIGIN	AXIAL LOCATION	AZIMUTHAL LOCATION	LENGTH -.000/+.010	WIDTH OR DIAMETER	DEPTH IN INCHES	DEPTH IN %TW
A	AX EDM	ID	1.750"	0°	.375"	.005"	.022"	60 %TW
B	AX EDM	ID	1.750"	120°	.375"	.005"	.015"	41 %TW
C	AX EDM	ID	1.750"	240°	.375"	.005"	.0075"	20 %TW
D	AX EDM	OD	2.500"	0°	.375"	.005"	.021"	57 %TW
E	AX EDM	OD	2.500"	120°	.375"	.005"	.014"	38 %TW
F	AX EDM	OD	2.500"	240°	.375"	.005"	.007"	19 %TW
G	AX EDM	OD	3.250"	0°	.375"	.006"	THROUGH	100 %TW
H	CI EDM	OD	4.000"	180°	.375"	.005"	THROUGH	100 %TW
I	CI EDM	ID	4.750"	0°	.375"	.006"	.022"	60 %TW
J	CI EDM	OD	4.750"	180°	.375"	.005"	.014"	38 %TW
K	CI EDM	ID	5.500"	0°	.375"	.005"	.015"	41 %TW
L	CI EDM	OD	5.500"	180°	.375"	.005"	.015"	41 %TW
M	CI EDM	ID	6.250"	0°	.375"	.005"	.0075"	20 %TW
N	CI EDM	OD	6.250"	180°	.375"	.005"	.007"	19 %TW
O	AX EDM IN EXPANSION	ID	7.375"	0°	.250"	.005"	.015"	41 %TW
P	CI EDM IN EXPANSION	ID	7.375"	180°	.250"	.005"	.015"	41 %TW
Q	AX EDM IN EXPANSION	OD	8.622"	0°	.250"	.004"	.014"	38 %TW
R	CI EDM IN EXPANSION	OD	8.625"	180°	.250"	.006"	.015"	41 %TW
S	DENT	OD	12.250"	0°	.062"	.400"	.004"	11 %TW
T1	FBH	OD	13.250"	0°	N/A	ø.015"	.007"	19 %TW
T2	FBH	OD	13.250"	90°	N/A	ø.016"	.007"	19 %TW
T3	FBH	OD	13.250"	180°	N/A	ø.015"	.007"	19 %TW
T4	FBH	OD	13.250"	270°	N/A	ø.015"	.006"	16 %TW
U	FBH	OD	14.000"	0°	N/A	ø.093"	.014"	38 %TW
V	FBH	OD	14.750"	0°	N/A	ø.079"	.021"	57 %TW
W	FBH	OD	15.500"	0°	N/A	ø.061"	.028"	76 %TW
X	HOLE	OD	16.250"	0°	N/A	ø.050"	THROUGH	100 %TW
AA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BB	WEAR & BROACHED TSP	OD	19.093"	120°	.689"	.125"	.010"	27 %TW
CC	WEAR & BROACHED TSP	OD	19.093"	240°	.691"	.125"	.023"	62 %TW
DD	GROOVE	OD	20.380"	ALL	.124"	N/A	.003"	8 %TW
EE	N/A	OD	N/A	N/A	N/A	N/A	N/A	N/A
FF	GROOVE	ID	23.000"	360°	.062"	N/A	.0075"	20 %TW

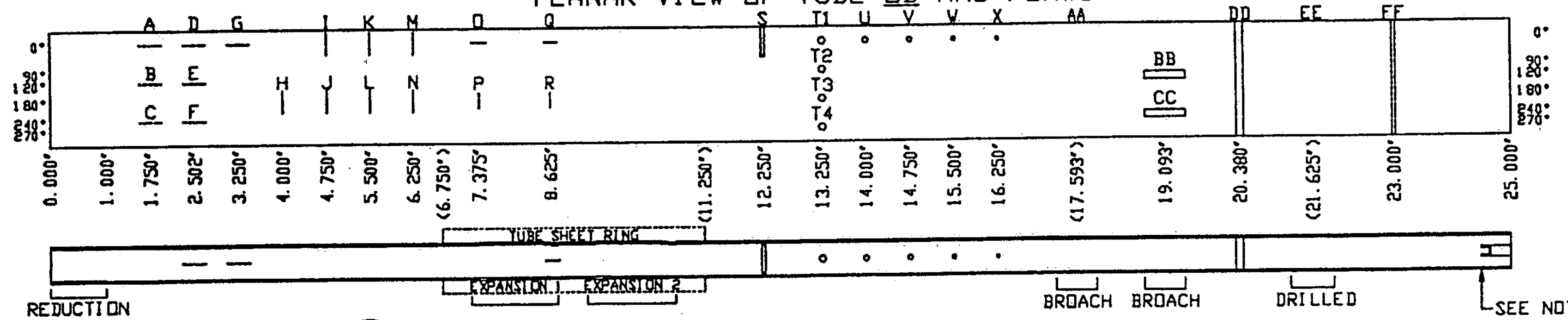
FRAMATOME TECHNOLOGIES

REVISIONS			
REV	DESCRIPTION	DATE	APPROVAL

NOTES:

1. THE MATERIAL HEAT NUMBER, HT 93500 LOT 5022, AND THE AS BUILT NUMBER, 1268319B, ARE ETCHED AT THE RIGHT TUBE END.
2. THIS STANDARD WAS MADE VIA PA 83-795437-02 AND FTI WO 8285, FROM DESIGN DRAWING 1268313D-1, FOR DUKE POWER COMPANY.
3. THE AS BUILT DIMENSIONS WERE OBTAINED FROM FTI SHOP DATA SHEETS AND QCIR 97-00769.
4. EACH FLAW IS CENTERED ABOUT THE SPECIFIED AXIAL AND AZIMUTHAL LOCATIONS.
5. THE DEPTHS IN PERCENT THROUGH WALL (%TW) ARE BASED UPON THE ACTUAL MEAN WALL THICKNESS (MWT) OF THE TUBING, .037".
6. WHEN THE STANDARD IS PLACED IN ITS HOLDER (1268314E-1), A DRILLED TUBE SUPPORT PLATE (TSP) SIMULATOR WILL BE CENTERED NEAR LOCATION EE. BROACHED TSP'S WILL BE CENTERED NEAR LOCATIONS AA AND BB/CC. WEAR PATCHES BB AND CC WILL BE LOCATED WITH TWO LAND REGIONS OF THEIR BROACHED TSP.

PLANAR VIEW OF TUBE OD AND FLAWS



1 OCONEE EDM/ASME/WEAR CALIBRATION STANDARD

MAT'L: ASME SB-163 ALLOY 600, .630" OD, .554" ID, .037" WALL.

FILENAME: 1268319B.DWG
DISK No.: OPTICAL

DWN BY G.W. DELOS	CHK'D BY G.D. PALMER	OCONEE EDM/ASME/WEAR CALIBRATION STANDARD AS BUILT DRAWING	SCALE 1/2	DATE 09/09/97
PASSED BY T.A. BIBARIC	APP'D BY R.A. COX		DWG NO. 1268319	B-0

22159 (12/95)

1268320B ON PAG

FLAW LABEL	FLAW DESCRIPTION	SURFACE OF ORIGIN	AXIAL LOCATION	AZIMUTHAL LOCATION	LENGTH -.000/+.010	WIDTH OR DIAMETER	DEPTH IN INCHES	DEPTH IN %TW
A	AX EDM	ID	1.750"	0°	.375"	.006"	.022"	60 %TW
B	AX EDM	ID	1.750"	120°	.375"	.005"	.015"	41 %TW
C	AX EDM	ID	1.750"	240°	.375"	.005"	.0075"	20 %TW
D	AX EDM	OD	2.500"	0°	.375"	.005"	.022"	60 %TW
E	AX EDM	OD	2.500"	120°	.375"	.005"	.015"	41 %TW
F	AX EDM	OD	2.500"	240°	.375"	.004"	.007"	19 %TW
G	AX EDM	OD	3.250"	0°	.375"	.005"	THROUGH	100 %TW
H	CI EDM	OD	4.000"	180°	.375"	.006"	THROUGH	100 %TW
I	CI EDM	ID	4.750"	0°	.375"	.006"	.022"	60 %TW
J	CI EDM	OD	4.750"	180°	.375"	.005"	.0205"	55 %TW
K	CI EDM	ID	5.500"	0°	.375"	.005"	.015"	41 %TW
L	CI EDM	OD	5.500"	180°	.375"	.005"	.014"	38 %TW
M	CI EDM	ID	6.850"	0°	.375"	.005"	.0075"	20 %TW
N	CI EDM	OD	6.250"	180°	.375"	.004"	.007"	19 %TW
O	AX EDM IN EXPANSION	ID	7.375"	0°	.250"	.005"	.015"	41 %TW
P	CI EDM IN EXPANSION	ID	7.375"	180°	.250"	.005"	.015"	41 %TW
Q	AX EDM IN EXPANSION	OD	8.625"	0°	.250"	.004"	.013"	35 %TW
R	CI EDM IN EXPANSION	OD	8.625"	180°	.250"	.005"	.014"	38 %TW
S	DENT	OD	12.250"	0°	.062"	.400"	.003"	N/A
T1	FBH	OD	13.250"	0°	N/A	ø.115"	.007"	19 %TW
T2	FBH	OD	13.250"	90°	N/A	ø.116"	.007"	19 %TW
T3	FBH	OD	13.250"	180°	N/A	ø.115"	.007"	19 %TW
T4	FBH	OD	13.250"	270°	N/A	ø.115"	.007"	19 %TW
U	FBH	OD	14.002"	0°	N/A	ø.092"	.014"	38 %TW
V	FBH	OD	14.750"	0°	N/A	ø.077"	.022"	60 %TW
W	FBH	OD	15.500"	0°	N/A	ø.061"	.028"	76 %TW
X	HOLE	OD	16.252"	0°	N/A	ø.050"	THROUGH	100 %TW
AA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BB	WEAR & BROACHED TSP	OD	19.095"	120°	.689"	.125"	.012"	32 %TW
CC	WEAR & BROACHED TSP	OD	19.095"	240°	.690"	.125"	.023"	62 %TW
DD	GROOVE	OD	20.375"	ALL	.125"	N/A	.003"	8 %TW
EE	N/A	OD	N/A	N/A	N/A	N/A	N/A	N/A
FF	GROOVE	ID	23.000"	360°	.062"	N/A	.0075"	20 %TW

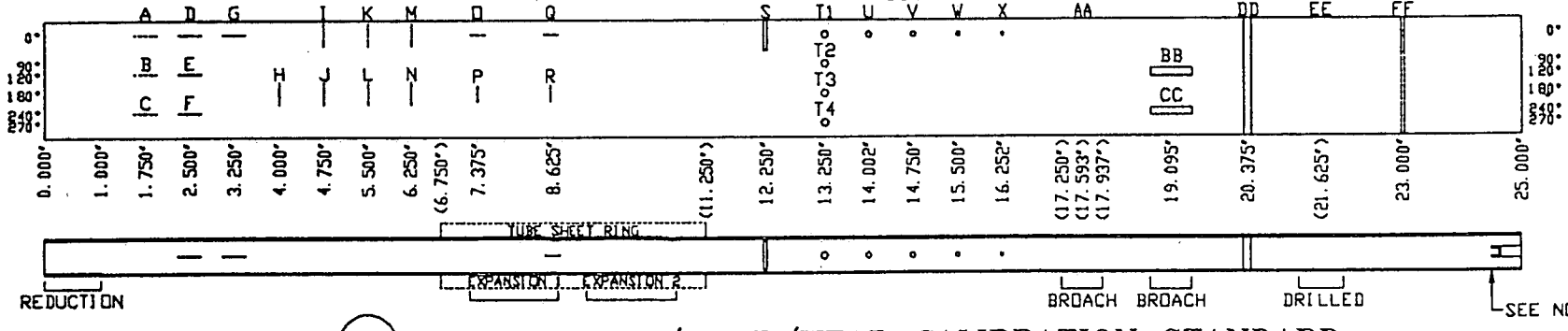
FRAMATOME TECHNOLOGIES

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	

NOTES:

1. THE MATERIAL HEAT NUMBER, HT 93500 LOT 5022, AND THE AS BUILT NUMBER, 1268320B, ARE ETCHED AT THE RIGHT TUBE END.
2. THIS STANDARD WAS MADE VIA PA 83-795437-02 AND FTI WO 8285, FROM DESIGN DRAWING 1268313D-1, FOR DUKE POWER COMPANY.
3. THE AS BUILT DIMENSIONS WERE OBTAINED FROM FTI SHOP DATA SHEETS AND QCIR 97-00769.
4. EACH FLAW IS CENTERED ABOUT THE SPECIFIED AXIAL AND AZIMUTHAL LOCATIONS.
5. THE DEPTHS IN PERCENT THROUGH WALL (%TW) ARE BASED UPON THE ACTUAL MEAN WALL THICKNESS (MWT) OF THE TUBING, .037".
6. WHEN THE STANDARD IS PLACED IN ITS HOLDER (1268314E-1), A DRILLED TUBE SUPPORT PLATE (TSP) SIMULATOR WILL BE CENTERED NEAR LOCATION EE. BROACHED TSP'S WILL BE CENTERED NEAR LOCATIONS AA AND BB/CC. WEAR PATCHES BB AND CC WILL BE LOCATED WITH TWO LAND REGIONS OF THEIR BROACHED TSP.

PLANAR VIEW OF TUBE OD AND FLAWS



(1) OCONEE EDM/ASME/WEAR CALIBRATION STANDARD

MAT'L: ASME SB-163 ALLOY 600, .629" OD, .555" ID, .037" WALL.

FILENAME: 1268320B.DWG
DISK No.: OPTICAL

DWN BY C.W. NELLIS for CWE
PASSED BY T.A. BRABETZ
CHK'D BY K.D. PALMER
APP'D BY R.A. DOE

OCONEE EDM/ASME/WEAR CALIBRATION STANDARD AS BUILT DRAWING

SCALE 1/2 DATE 09/09/97
DWG NO. 1268320 B - 0

22159 (12/95)

ATTACHMENT 4

OPTICAL DISK WITH EDDY CURRENT DATA