



GE Nuclear Energy

Technical Services Business

General Electric Company, 175 Curtner Avenue, San Jose, CA 95125

NEDO-24157

Revision 2

Class I

June 1994

**INFORMATION ON REACTOR VESSEL
MATERIAL SURVEILLANCE PROGRAM**

**BRUNSWICK
STEAM ELECTRIC PLANT
UNIT 2**

Prepared for
Carolina Power and Light Company

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CONTENTS OF THIS REPORT
PLEASE READ CAREFULLY**

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1.0 INTRODUCTION

The original version of this report was issued in 1978. That report was furnished in response to a request for information concerning the reactor vessel material surveillance program (Reference 1).

This revision contains several changes to report presentation and content. In order to make this report more complete, the bases information from which this summary was derived is contained in the appendices. In addition, for ease of use, the information has been reformatted to a more tabular format. And lastly, fluence, EFPY, and RTndt shift estimates were deleted. Since this information changes with time, it is more appropriate that this information be contained within reports specific to withdrawn surveillance capsules.

2.0 RPV SUPPLIER AND SPECIFICATIONS

The Brunswick 2 RPV was purchased from Chicago Bridge and Iron Company, Birmingham, Alabama (GE Purchase Order No. 205-H1332, CB&I Contract No. 68-2472). The RPV is designed and constructed in accordance with the following codes and specifications:

- a. ASME Boiler and Pressure Vessel Code - Section III, 1965 Edition and Addenda through Summer 1967 Addenda.
- b. "Standard Requirements for Reactor Pressure Vessel", General Electric APED Specification No. 21A1100, Rev. 0 with Data Sheet 21A1100AR, Rev. 12.

3.0 VESSEL BELTLINE MATERIAL

3.1 PLATE AND WELD LOCATIONS

Materials in the RPV beltline region (as defined in 10CFR50, Appendix G, Section II) are identified below and are as shown in Figure 1.

3.2 PLATES/FORGINGS AND WELDS

- a. All shell plate material is SA-533-65 Gr. B., Class 1; CB&I Specification MS-1, Rev. 1; and provided by Lukens Steel Company, Coatesville, Pennsylvania.
- b. Nozzles N16A and N16B material is A-508, Class II; CB&I Specification MS-2, and provided by Lenape Forge Division - Bonney Forge and Foundry Inc., West Chester, Pennsylvania.
- c. Weld Materials and Process:

Electrode:	Coated Electrodes	Flux Electrode Combinations	
	Filler Metal Type E8018G/NM	Adcom INMM/Linde 124	RACO INMM/Linde 124
Trade Name:	Alloy Rods E8018NM	Adcom INMM	RACO INMM
Supplier:	Alloy Rods Co., Division of Chematron Corp., York, Pennsylvania	Adcom Metals Co. Inc., Atlanta, Georgia	Reid-Avery Company Baltimore, MD
Weld Process:	Shielded Metal Arc	Submerged Arc	Submerged Arc

3.2.1 Lower Shell Course (Assembly Piece No. 1200, Ring No. 1)

(1) Plates (2) - 201 and 251

<u>Piece No.</u>	<u>Heat No.</u>	<u>Slab No.</u>
201	C4500	2
251	C4550	2

ASSEMBLY Pc NO.	CB&I DRAWING NO.	
1600	63	FINAL VESSEL ASSEMBLY
1200	12	SHELL PLATE ASSEMBLY NO 1 HALF RING - Pc Mk NO. 200 PLATE PART NO. 201 - EXCLUDING NOZZLES AND NOZZLE WELDS
1200	13	SHELL PLATE ASSEMBLY NO 1 HALF RING - Pc Mk NO. 250 PLATE PART NO. 251 - EXCLUDING NOZZLES AND NOZZLE WELDS
1300	14	SHELL PLATE ASSEMBLY NO 2 RING PLATE PART NOS. 301 AND 351
	43	N16A/B NOZZLE ASSEMBLY - ASSEMBLY PART NO. 302 TO NO. 2 SHELL
	6	SEAM DETAILS
		SEAMS F AND G - SHELL VERTICAL SEAMS
		SEAM FG - SHELL GIRTH SEAM
	7	SEAM BC FOR N16 NOZZLES

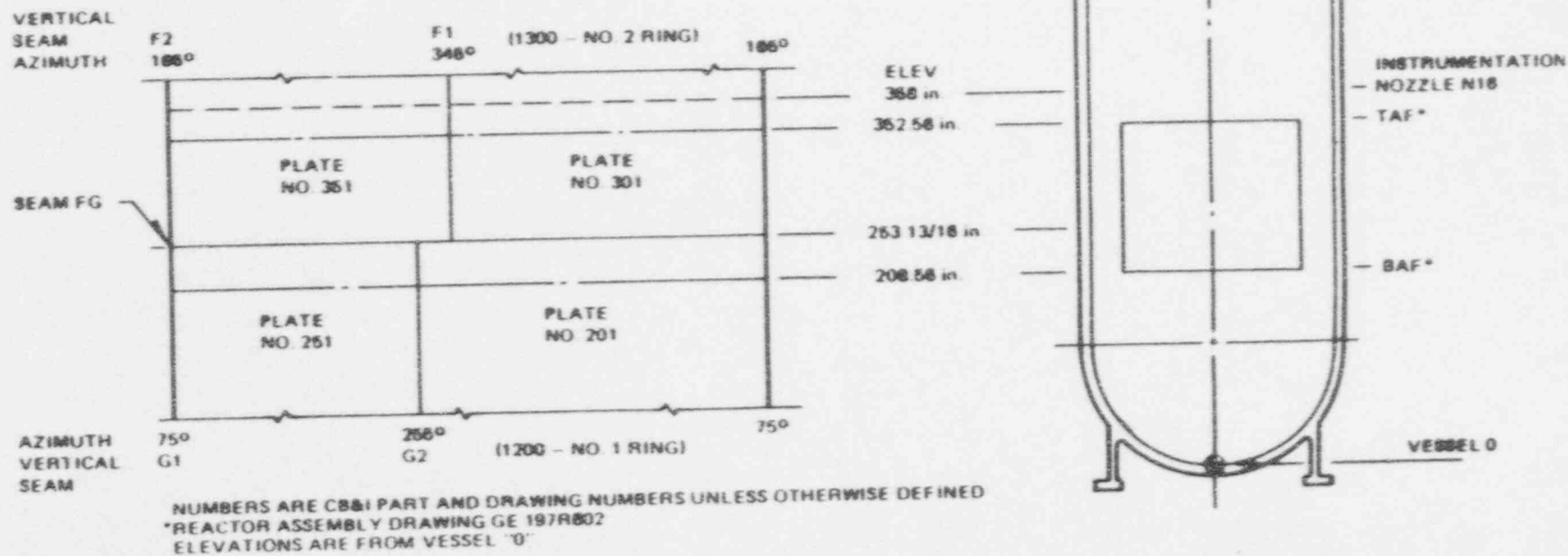


Figure 1. Brunswick RPV Beltline Region Welds and Plates

(2) Vertical Seam Welds (G1 and G2)

- (a) Coated Electrodes - Type E8018G/NM
Reference Specification - SA-316

<u>Heat No.</u>	<u>Lot No.</u>	<u>CB&I Weld Spec.</u>	<u>Traveler</u> <u>Card Set</u>	<u>Sequence</u>
08R481	J908A27A	GRP1-Rev 1	1200-R-12	6A (repair)
01R496	S925A27A	GRP1-Rev 1	1200-R-14/13	6A (repair)
		WPS-323-2F4F6 Rev 2	1200	2A (G1 root pass)
		WPS-323-2F4F6 Rev 1	1200	2B (G2 root pass)
82D913	D908A27A	GRP1-Rev 1	1200-R-13	6A (repair)
88E081	F920A27A	GRP1-Rev 1	1200-R-19	6A (repair)
05R938	A020A27A	GRP1-Rev 1	1200-R-19	6A (repair)

- (b) Flux Electrode Combinations - Adcom/INMM-Type Linde 124

<u>Heat No.</u>	<u>Lot No.</u>	<u>Run No.</u>	<u>CB&I Weld Spec.</u>	<u>Traveler Card Set</u>	<u>Sequence</u>
S3986	3876	934	WPS-323-2F4F6, Rev. 2	1200	2M,N,E,F

3.2.2 Lower Intermediate Shell Course (Assembly Piece No. 1300, Ring 2)

(1) Plates - 301 and 351

<u>Piece No.</u>	<u>Heat No.</u>	<u>Slab No.</u>
301	C4489	1
351	C4521	2

(2) Vertical Weld Seams (F1 and F2)

- (a) Coated Electrodes - Filler Metal Type E8018G/NM
Reference Specification - SA-316

<u>Heat No.</u>	<u>Lot No.</u>	<u>CB&I Weld Spec.</u>	<u>Traveler</u> <u>Card Set</u>	<u>Sequence</u>
977987	J802A27A	WPS 323-1F6	1300	5C & 5B
88E081	F920A27A	GRP-1, Rev 1	1450R26	6A
654W539	S823A27A	GRP-1, Rev 1	301-R1/R2	6A/B, 6 (repairs)
601221	E916A27A	GRP-1, Rev 1	1300-R4	6

- (b) Flux Electrode Combinations - Adcom/INMM - Type Linde 124

<u>Heat No.</u>	<u>Lot No.</u>	<u>Run No.</u>	<u>CB&I Weld Spec.</u>	<u>Traveler Card Set</u>	<u>Sequence</u>
S3986	3876	934	WPS 323-1F6	1300	5F, P, G, Q

(3) Girth Weld Seam - FG - Assembly Piece No. 1600

(a) Coated Electrodes - Filler Metal Type E8018G/NM

<u>Heat No.</u>	<u>Lot No.</u>	<u>CB&I Weld Spec.</u>	<u>Traveler Card Set</u>	<u>Sequence</u>
C3L46C	J020A27A	WPS 323-2F4F6, Rev. 2	1600	4A
432A2671	H019A27A	WPS 323-2F4F6, Rev. 2	1600	4A
662A746	H013A27A	GRP-1 Rev 1	1600R-57	6A

(b) Flux Electrode Combination - RACO 1NMM - Type 124

<u>Heat No.</u>	<u>Lot No.</u>	<u>Run No.</u>	<u>CB&I Weld Spec.</u>	<u>Traveler Card Set</u>	<u>Sequence</u>
3P4000	3932		WPS 323-2F4F6, Rev. 2	1600	4A

(c) Overlay Seam Weld

Type:	E309-15	E308L-15
Trade Name:	Arcaloy 309 Lime	Arcaloy 308ELC Lime
Supplier:	Alloy Rods Company	Chemetron Corporation

<u>Type</u>	<u>Heat No.</u>	<u>Lot No.</u>	<u>CB&I Weld Spec.</u>	<u>Traveler Card Set</u>	<u>Sequence</u>
E309-15	W73594	3A922H5C	GRP 2, Rev. 2	1600 R57	8
E308L-15	X47214	K019H2C	GRP 2, Rev. 2	1600 R57	8

3.2.3 Nozzles N16A and N16B - Nozzle (Assembly Piece No. 302) to Shell (Assembly Piece No. 1300, Ring No. 2) Forgings

(1) Forgings

<u>Nozzle</u>	<u>Piece No.</u>	<u>Heat No.</u>	<u>Forging No.</u>
N16A	302	Q2Q1VW	247P-3A
N16B	302	Q2Q1VW	247P-3B

(2) Nozzle to Vessel Weld Seam

(a) Coated Electrodes - Type E8018G/NM

<u>Heat No.</u>	<u>Lot No.</u>	<u>CB&I Weld Spec.</u>	<u>Traveler Card Set</u>	<u>Sequence</u>
82D913	D908A27A	WPS 303-1F4, Rev. 1	1300	23B&O&A-E,F
601221	E916A27A	WPS 303-1F4, Rev. 1	1300	23A-23E
01R496	S925A27A	WPS 303-1F4, Rev. 1	1300	23A-23E, 23N
85D766	D909A27A	WPS 303-1F4, Rev. 1	1300	23A-23E, 23N

3.3 HEAT TREATMENT

3.3.1 Plates and Test Specimens

All plates and test specimens were heated $1650^{\circ}\text{F} \pm 25^{\circ}\text{F}$, held 1 hr/in. minimum and water quenched for approximately 23 minutes. They were then tempered $1220^{\circ}\text{F} \pm 10^{\circ}\text{F}$, held 1 hr/in. minimum and air cooled.

Plates were gas cut hot, stress relieved at $1150^{\circ}\text{F} (+25/-50^{\circ}\text{F})$, held for 30 min/in. minimum and air cooled.

Test specimens were stress relieved by heating within a rate of 72°F/hr to $1150^{\circ}\text{F} (+25/-50^{\circ}\text{F})$, held for 50 hours, furnace cooled within a rate of 90°F/hr to 600°F and air cooled.

CB&I reported the following heat treatment for the plates:

	<u>201</u>	<u>251</u>	<u>301</u>	<u>351</u>
<u>Q&T</u>				
1650°F	5 hr 42 min	5 hr 50 min	5 hr 35 min	5 hr 45 min
1220°F	5 hr 45 min	5 hr 40 min	5 hr 35 min	6 hr 5 min
<u>Total Accumulative Stress Relief Time</u>				
1150°F	32 hr 55 min	32 hr 42 min	30 hr 28 min	30 hr 33 min

The nozzle heat treatments were:

$1675^{\circ}\text{F} \pm 25^{\circ}\text{F}$, 1 hr/in, air cooled
 $1560^{\circ}\text{F} \pm 25^{\circ}\text{F}$, 1 hr/in, water quench
 $1290^{\circ}\text{F} \pm 25^{\circ}\text{F}$, 1 hr/in, air cooled
 Tests stress relieved at $1150^{\circ}\text{F} \pm 25^{\circ}\text{F}$ for 50 hours.

3.3.2 Post-Weld Heat Treatment

Location	Temperature	Duration
Lower Shell Course Vertical Weld Seams G1 and G2	1100°F to 1175°F	22 hr 50 min
Lower Intermediate Shell Course Vertical Weld Seams F1 and F2	1100°F to 1175°F	26 hr 23 min
Girth Seam Weld FG	1100°F to 1175°F	6 hr 10 min
N16A/B Nozzle to Vessel Seams	1100°F to 1175°F	15 hr 43 min

3.4 CHEMICAL ANALYSES

At the time of construction for these pressure vessels, the only requirements for chemical composition were those contained in the ASME material specifications (A533 Grade B for plate; and A233, A298, A316 or A371 for weld electrodes and rods). The elements reported in these specifications did not include copper (Cu). The available chemistry certifications are provided, but values for the copper contents of these materials are not directly available from these certifications.

By tracing the heat numbers for the beltline plates and nozzle N16A/B forgings back to the suppliers (Lukens Steel and Lenape Forge, respectively), the copper contents for the plates and forgings were obtained. The ladle analysis for % Cu was measured and retained by the suppliers even though it was not required by the purchase specification.

The copper content of the welds was provided by the supplier, though not required, except in the case of nozzle-to-vessel weld. Items marked N/R were not reported.

(a) The chemical analyses for vessel beltline plate/forging material are as follows:

<u>Description</u>	<u>Plate</u>	<u>Heat</u>	<u>C</u>	<u>Mn</u>	<u>P</u>	<u>S</u>	<u>Cu</u>	<u>Si</u>	<u>Ni</u>	<u>Mo</u>
Lower Shell	201	C4500-2	0.23	1.20	0.012	0.016	0.15	0.27	0.54	0.55
	251	C4550-2	0.22	1.35	0.010	0.014	0.11	0.21	0.60	0.56
Lower Inter. Shell	301	C4489-1	0.25	1.40	0.007	0.016	0.12	0.27	0.60	0.56
	351	C4521-2	0.23	1.43	0.009	0.015	0.12	0.26	0.57	0.54
Nozzles N16A/B	N16A/B	Q2Q1VW	0.21	0.75	0.010	0.015	0.16*	0.23	0.80	0.69
			0.16	0.71	0.006	0.013	N/R	0.24	0.81	0.60

* from product analysis

(b) The chemical analyses for the vessel beltline welds are as follows:

<u>Test</u>	<u>Heat</u>	<u>Lot No.</u>	<u>C</u>	<u>Mn</u>	<u>P</u>	<u>S</u>	<u>Cu</u>	<u>Si</u>	<u>Ni</u>	<u>Mo</u>
Coated Electrodes - Type E8018G/NM										
AI396CX/CZ	08R481	J908A27A	0.04	0.93	0.019	0.016	0.02	0.37	0.87	0.52
AI380DX/DZ	01R496	S925A27A	0.05	1.11	0.020	0.017	0.02	0.48	0.92	0.54
5Z-3Z/5X	82D913	D908A27A	0.063	1.06	0.009	0.018	0.03	0.39	0.80	0.45
AI304BX/Z	88E081	F920A27A	0.06	1.10	0.017	0.014	0.02	0.27	0.93	0.51
511	05R938	A020A27A	0.077	0.94	0.018	0.017	0.02	0.40	0.91	0.57
PT164S	977987	J802A27A	0.042	1.04	0.016	0.022	0.03	0.47	1.04	0.59
PT164N	654W539	S823A27A	0.041	0.95	0.015	0.020	0.04	0.38	1.09	0.58
AN239CX/Z	601221	E916A27A	0.041	1.05	0.018	0.015	0.03	0.35	0.88	0.49
875	C3L46C	J020A27A	0.063	0.96	0.019	0.017	0.02	0.32	0.87	0.53
800	432A2671	H019A27A	0.057	1.22	0.019	0.014	0.04	0.44	1.08	0.51
WO No.11-D	662A746	H013A27A	0.060	0.96	0.021	0.017	0.03	0.38	0.88	0.52
5Z-3Z/X	85D766	D909A27A	0.063	1.22	0.008	0.010	0.02	0.44	1.08	0.44
Flux Electrode Combinations - INMM Type Linde 124										
PT200	S3986	3876	0.080	1.42	0.019	0.016	0.05	0.36	0.96	0.52
WO No.14-D	3P4000	3932	0.046	1.35	0.015	0.012	0.02	0.37	0.90	0.45
Nozzle to Vessel Overlay Seam - Type E309-15										
M281C	W73594	3A922H5C	0.05	1.79	0.020	0.011	N/R	0.54	12.79	NR
Nozzle to Vessel Overlay Seam - Type E308L-15										
RQ-6474	X47214	K019H2C	0.03	1.69	0.02	0.02	N/R	0.72	9.26	N/R

3.5 TENSILE PROPERTIES (UNIRRADIATED)

<u>Plates</u>	<u>Heat No.</u>	<u>Slab No.</u>	<u>Yield Strength, ksi</u>	<u>Ultimate Strength, ksi</u>	<u>Elongation (% in 2 inches)</u>
Lower Shell Course	C4500	2	63.8/63.0	89.4/89.9	25./28.
	C4550	2	70.1/68.9	94.1/94.5	22./22.
Lower Inter. Shell Course	C4489	1	69.5/70.5	95.6/97.0	24./25.
	C4521	2	71.6/71.7	94.5/94.5	25./25.
Nozzles N16A/B, Forgings 247P-3A,3B	Q2Q1VW	(0°)	69.0	88.65	22.5
		(180°)	69.75	88.5	24.5

<u>Welds</u>	<u>Heat No.</u>	<u>Lot No.</u>	<u>Yield Strength, ksi</u>	<u>Ultimate Strength, ksi</u>	<u>Elongation (% in 2 inches)</u>
Type E8018G/NM	08R481	J908A27A	80.5	90.5	28.0
	01R496	S925A27A	84.0	92.5	26.0
	82D913	D908A27A	78.0	86.5	28.0
	88E081	F920A27A	83.0	93.2	27.0
	05R938	A020A27A	76.3	94.0	26.0
	977987	J802A27A	71.2	85.1	26.0
	654W539	S823A27A	74.0	84.1	28.0
	601221	E916A27A	79.0	89.5	27.0
	C3L46C	J020A27A	80.4	91.0	26.0
	432A2671	H019A27A	80.5	93.0	28.0
	662A746	H013A27A	80.0	91.0	26.0
	85D766	D909A27A	82.5	90.0	28.0
	Adcom/INMM - Linde 124	S3986	3876	71.8	86.5
RACO/INMM - Linde 124	3P4000	3932	72.5	84.5	28.0
E309-15	W73594	3A922H5C	N/R	N/R	N/R
E308L-15	X47214	K019H2C	N/R	N/R	N/R

3.6 FRACTURE TOUGHNESS PROPERTIES (UNIRRADIATED)

The Brunswick 2 reactor pressure vessel was ordered prior to the issuance of Appendix G, 10CFR Part 50. The ferritic pressure boundary material was qualified by drop weight testing for the shell plate and CVN testing for the weld material. Test results are shown in the following tables.

<u>Plates/Forgings</u>	<u>Plates</u>	<u>Heat/Slab</u>	<u>Drop Weight NDTT</u>	<u>Charpy Test Values</u>	<u>Test Temperature</u>
Lower Shell Course	201	C4500-2	+10°F or less	46, 48, 61	10°F
No. 1200	251	C4550-2	+10°F or less	43, 35, 64	10°F
Lower Inter. Shell	301	C4489-1	+10°F	38, 45, 38	10°F
Course No. 1300	351	C4521-2	+10°F	42, 45, 48	10°F
Nozzle N16A/B	(0°)	Q2Q1VW	+40°F	116, 110, 112	40°F
	(180°)	Q2Q1VW	+40°F	133, 74, 141	40°F

<u>Beltline Welds</u>	<u>Heat</u>	<u>Lot No.</u>	<u>Charpy Test Values</u>	<u>Test Temperature</u>
Type E8018G/NM	08R481	J908A27A	81, 81, 82	+10°F
	01R496	S925A27A	62, 64, 68	+10°F
	82D913	D908A27A	80, 94, 83, 81, 82	+10°F
	88E081	F920A27A	85, 90, 91	+10°F
	05R938	A020A27A	66, 84, 86	+10°F
	977987	J802A27A	105, 109, 73	+10°F
	654W539	S823A27A	181, 144, 171	+10°F
	601221	E916A27A	107, 108, 108	+10°F
	C3L46C	J020A27A	35, 39, 40	+10°F
	432A2671	H019A27A	31, 31, 33	+10°F
	662A746	H013A27A	89, 82, 95	-20°F
	85D766	D909A27A	87, 69, 73, 71, 75	+10°F
Flux Electrode	S3986	3876	46, 51, 49	+10°F
	3P4000	3932	97, 95, 88	+10°F
E309-15	W73594	3A922H5C	N/R	N/R
E308L-15	X47214	K019H2C	N/R	N/R

4.0 VESSEL MATERIAL SURVEILLANCE PROGRAM

4.1 PLATE MATERIAL

The plate material used in the surveillance program (Assembly 2613) was cut from piece 301, Heat C4489, Slab 1. The post-weld heat treatment of the plate specimen was at 1150°F (+25/-50°F) for a total of 50 hours. All information pertaining to the surveillance plate material is contained in Section 3.

4.2 WELDS

CB&I files do not contain information on the weld material used in the surveillance program. The plate material joined by this weld was from piece 301, Heat C4489, Slab 1. CB&I performed the welding in accordance with the weld procedure in WPS-323-1-F6. The post-weld heat treatment of the welded piece was at 1150°F(+25/-50°F) for a total of 50 hours.

4.3 DOCUMENTATION

A copy of the surveillance program drawings, and the surveillance test specimen preparation procedure No. STP-3 are attached to this report.

5.0 REFERENCES

1. Letter to Carolina Power & Light Company from A. Schwencer, USNRC, May 23, 1977.

APPENDIX A

As-Built Fabrication Drawing



STILL

1. THE DMC² AND THE INTERPOLATED ALTERNATES
2. THE DMC² IS FOR MARKING, IS A 1
3. ALL MARKING, MARK ARE APPROXIMATE
4. ALL MARKING, IS 1. REPORTS, MARK IS
5. MARK, MARK, MARK, MARK, MARK

$$= \frac{1}{2} \frac{d \ln C}{d \ln \lambda} \left(\frac{1}{C} \frac{dC}{d \ln \lambda} \right) \left(\frac{1}{C} \frac{dC}{d \ln \lambda} \right) \left(\frac{1}{C} \frac{dC}{d \ln \lambda} \right)$$
[illegible]

4 ALL CAPSULED UNIT REPORTS NAME

2 THERMOCOUPLE M40 (YFM)
M1A7 N13 B9050
CLIP M7
IN M40 501.000

THE UNIVERSITY OF CHICAGO

[illegible]

CONFIDENTIAL & LEGAL MATTERS

HAT & HITCHING RECORD
SEAM MARKINGS FOR WHITE
BIRD, ASSUMPTIONS & FLAMES

68-2472
SEARCHED BY **WILLIAM J. ALLEN**
INDEXED BY **J. L. ALLEN**
SERIALIZED BY **J. L. ALLEN**
FILED BY **J. L. ALLEN**
FBI - NEW YORK
JAN 10 1968

CONFIDENTIAL & LEGAL MATTERS

APPENDIX B

Plate and Forgings CTRs

PURCHASER:

12 Chicago Bridge & Iron Co.
James C Thompson, Pur.Mgr
P.O. Box 277
Birmingham, Ala. 35202

LUKENS STEEL COMPANY

COAT E, PA. 19320

TEST CERTIFICATE

MILL ORDER NO.

27474-3

CUSTOMER P.O.

2471-Sheet 1 GR 73168 SR

Revised Copy 12-14-68

DATE: 9-20-68

FILE: 1543

CONSIGNEE:

Same
Boyles, Ala.

SEP 25 1968

SPECIFICATIONS:

SA-533-C, Gr.B Class 1 Mod.by CB & I MS-1, Rev. 1 Fbx. 80000

Sheet #1 of 2

BEND TEST O.K. HOMOGENEITY TEST O.K.

CHEMICAL ANALYSIS

MELT NO.	C	MN	P	S	Cu	Si	Ni	Cr	Mo	V	M	Al	B	Basic Process
C4500	23	1.20	012	016		27	54		55					F.G.P.&V.I.P.Steel
C4500-2														Electric
														Grain Size after stress relieved 6 - 8

PHYSICAL PROPERTIES

MELT NO.	SLAB NO.	YIELD PSI X100	TENSILE PSI X100	% ELONG. IN 2	% R.A.	BH&I	IMPACTS V-Notch +10°F.	Fracture Appearance	DESCRIPTION
C4500	2	638 630	894 899	25 28			46 48 61 .038 .050 .037	40% shear	1-360 x 145-1/2 x 5-9/16"
<p>N.D.T. is +10°F, or under.</p> <p>Tested in accordance to C.B. & I. procedure TPC-1 Rev. 1</p> <p>Test location C.B. & I. MTP-1.</p> <p>Homogeneity test satisfactory.</p> <p>Bend test satisfactory - Location transverse - top middle of plate Radius of curvature less than 1-1/2 inches.</p>									

We hereby certify the above figures are correct as contained in the records of the company.

SUPERVISOR TESTING

C. H. Line (6)

PURCHASER:

2 Chicago Bridge & Iron Co.
James C Thompson, Pur.Mgr.

LUKENS STEEL COMPANY

COATESVILLE 19320

TEST CERTIFICATE

MILL ORDER NO.

27474-3

CUSTOMER P.O.

2471-Sheet 1

DATE:

9-20-68

FILE NO.

1543

CONSIGNEE:

Same
Boyles, Ala.

SPECIFICATIONS:

Same

BEND TEST

HOMOGENEOUS

Sheet #2 of 2

CHEMICAL ANALYSIS

MELT NO.	C	Mn	P	S	Cu	Si	Ni	Cr	Mo	V	Ti	Al	B		
C4500-2															

PHYSICAL PROPERTIES

MELT NO.	SLAB NO.	YIELD PSI X100	TENSILE PSI X100	% ELONG. IN	% R.A.	BHN	IMPACTS	DESCRIPTION
Plates and tests heated 1650°F, ⁺²⁵ -25°F., held 1 hr. per inch min. and W.Q. for 23 minutes. Then tempered 1220°F, ⁺¹⁰ -10°F., held 1 hr. per inch min. and air cooled.								
Plates gas cut hot and stress relieved 1150°F, ⁺²⁵ -50°F., held 1/2 hr. per inch min. and air cooled.								
Tests stress relieved by heating within a rate of 72°F. per hr. to 1150°F, ⁺²⁵ -50°F., held 50 hrs. and furnace cooled within a rate of 90°F. per hr. to 600°F. and air cooled.								
Produced in accordance with inspection system requirements of MIL-S-45208A.								

We hereby certify the above figures are correct as contained in the records of the company.

SUPERVISOR: TESTING

⑥

PURCHASER:

Chicago Bridge & Iron Co.
12 James C. Thompson, Pur. Mgr.

LUKENS STEEL COMPANY

COATES PA

TEST CERTIFICATE

DATE 8-27-69
CONSIGNEE

FILE NO

3

MILL ORDER NO

27474-3

CUSTOMER P.O.

2471-Sheet 1

Same
Boyles, Ala.

SPECIFICATIONS:

Same

Addendum to Report 12-24-68 Sheet #3

BEND TEST

HOMOGENEITY TEST

CHEMICAL ANALYSIS

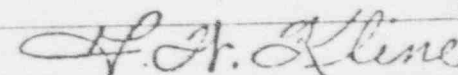
MELT NO	C	MN	P	S	CU	SI	NI	CR	MO	V	TI	AL	B		

PHYSICAL PROPERTIES

MELT NO.	SLAB NO	YIELD PSI X100	TENSILE PSI X100	% ELONG IN 2	% R.A.	BHN	IMPACTS			DESCRIPTION	
c4500	2	680	880	24						Bottom Transverse Tests	

We hereby certify the above figures are correct as contained in the records of the company.

SUPERVISOR TESTING




⑤
L. H. Stone

PURCHASER

Chicago Bridge & Iron Co.

LUKENS STEEL COMPANY

COATESVILLE, PA. 19320

TEST CERTIFICATE

DATE: 10-22-68
CONSIGNEE:

FILE NO.

1243

MILL ORDER NO.

27474-4

CUSTOMER P.O.

2471 Sheet 1

Same
Boyles, Ala.

SPECIFICATIONS:

Same

BEND TEST

HOMOGENEITY TEST

Sheet # 2 of 2

CHEMICAL ANALYSIS

MELT NO.	C	MN	P	S	Cu	Si	Ni	Cr	Mo	V	Ti	Al	B		
04550-2															

PHYSICAL PROPERTIES

MELT NO.	SLAB NO.	YIELD PSI X100	TENSILE PSI X100	% ELONG. IN	% R.A.	BHN	IMPACTS	DESCRIPTION
Plates and tests heated 1650°F. ^{+25°F.} , held 1 hr. per inch min. and W.Q. for 22 minutes.								
Then tempered 1220°F. ^{+10°F.} , held 1 hr. per inch min. and air cooled.								
Plates gas cut hot and stress relieved 1150°F. ^{+25°F.} , ^{-50°F.} , held 1/2 hr. per inch min.								
and air cooled.								
Tests stress relieved by heating within a rate of 72°F. per hr. to 1150°F. ^{+25°F.} , ^{-50°F.} ,								
held 50 hrs. and furnace cooled within a rate of 90°F. per hr. to 600°F. and air cooled.								
Produced in accordance with inspection system requirements of MIL-I-45208A.								

The above figures are correct as contained in the records of the company.

SUPERVISOR TESTING

⑤

Chicago Bridge & Iron Co.
James C. Thompson, Pur. Mgr.

COATESVILLE, PA.

TEST CERTIFICATE

DATE 8-27-69

FILE NO 1

CONSIGNEE

BILL ORDER NO.

27474-4

CUSTOMER P O

2471 Sheet 1

Same
Boyles, Ala.

PECIFICATIONS

me

Addendum to Report 12-24-68

Sheet #3

BEND TEST

HOMOGENEITY TEST

CHEMICAL ANALYSIS

[illegible]

PHYSICAL PROPERTIES

PHYSICAL PROPERTIES										
MELT NO.	SLAB NO.	YIELD PSI X100	TENSILE PSI X100	% ELONG IN 2	% R.A.	BHN	IMPACTS			DESCRIPTION
4550	2	673	905	24						Bottom Transverse Tests
										</

SUPERVISOR TESTING

or is represented or contained in the records of the company.

PURCHASER:

Chicago Bridge & Iron Co.

2

LUKENS STEEL COMPANY

COATESVILLE, PA. 19320

TEST CERTIFICATE

MILL ORDER NO.

27475-2

CUSTOMER P.O.

2471 Sheet 2

MB 72568 LR

Revised Copy 9-27-68

DATE: 8-21-68

FILE NO.

1043

CONSIGNEE

Same
Boyles, Ala.

SPECIFICATIONS:

SA-533-65 Gr. B Class 1 Mod. by C.B. & I. MS-1, Rev. 1 Fbx. 80000

BEND TEST

O.K.

HOMOGENEITY TEST

O.K.

Sheet # 1 of 2

CHEMICAL ANALYSIS

MELT NO.	C	MN	P	S	Cu	Si	Ni	Cr	Mo	V	★	★	★	Basic Process
24489	25	1.40	007	016		27	60		56					F.G.F. V.I.P. Steel
Grain Size after stress relieved 6 - 8														
Electric														

PHYSICAL PROPERTIES

PHYSICAL PROPERTIES											
MELT NO.	SLAB NO	YIELD PSI X100	TENSILE PSI X100	% ELONG IN 2 "	% R.A.	BHN	IMPACTS			Fracture Appearance	DESCRIPTION
							V-Notch -110°F.				
C4489	1	695 705	956 970	24 25			38	45	38	30% Shear	1-396 x 145-1/2 x 5-9/16"
							Lateral Expansion in inches				
							.030	.036	.034		
N.D.T. is -110°F.											
Tested in accordance to C.B. & I. Procedure TPC-1 Rev. 1											
Test location C.B. & I. MTP-1											
Homogeneity test satisfactory.											
Bend test satisfactory - Location transverse - top middle of plate											
Radius of curvature less than 1-1/2 inches											
2. 2											

The above figures are correct as contained in the records of the company.

SUPERVISOR TESTING

H. A. Kline

⑦

PURCHASER:

Chicago Bridge & Iron Co.
12 James C Thompson, Pur. Mgr.

LUKENS STEEL COMPANY

COATESVILLE, PA. 19320

TEST CERTIFICATE

MILL ORDER NO.

27475-2

CUSTOMER P.O.

2471 Sheet 2

DATE:

8-21-68

FILE NO. 1

CONSIGNEE:

Same
Boyles, Ala.

SPECIFICATIONS:

Same

Sheet #2 of 2

BEND TEST

HOMOGENEITY TEST

CHEMICAL ANALYSIS

MELT NO.	C	Mn	P	S	Cu	Si	Ni	Cr	Mo	V	Ti	Al	B		
c4489-1															

PHYSICAL PROPERTIES

MELT NO.	SLAB NO.	YIELD PSI X100	TENSILE PSI X100	% ELONG IN	% R.A.	BHN	IMPACTS	DESCRIPTION
Plate and tests heated 1650°F., +25°F., held 1 hr. per inch min. and W.Q. for 23 minutes. Plate and tests were then tempered 1220°F., -10°F., held 1 hr. per inch min. and air cooled.								
Pls gas cut hot and stress relieved 1150°F., +25°F., held 1/2 hr. per inch min. and air cooled.								
Tests stress relieved by heating within a rate of 72°F. per hr. to 1150°F., +25°F., held 50 hours and furnace cooled within a rate of 90°F. per hr. to 600°F. and air								
Produced in accordance with inspection system requirements of MIL-I-45208A.								

We hereby certify the above figures are correct as contained in the records of the company.

SUPERVISOR TESTING

H. H. Kline

⑦

PURCHASER:

Chicago Bridge & Iron Co.
James C. Thompson, Pur.Mgr.

LUKENS STEEL COMPANY

COATESVILLE, PA.

TEST CERTIFICATE

DATE: 8-27-69

FILE NO. 1, J

CONSIGNEE

MILL ORDER NO.

CUSTOMER P.O.

27475-2

2471 Sheet 2

Same
Boyles, Ala.

SPECIFICATIONS

me

BEND TEST

HOMOGENEITY TEST

Addendum to Report 9-27-68

Sheet #3

CHEMICAL ANALYSIS

MELT NO.	C	MN	P	S	Cu	Si	Ni	Cr	Mo	V	Ti	Al	B		

PHYSICAL PROPERTIES

MELT NO.	SLAB NO.	YIELD PSI X100	TENSILE PSI X100	% ELONG IN 2"	% R.A.	BHN	IMPACTS			DESCRIPTION	
4489	1	724	945	24						Bottom Transverse Tests	

WIT: hereby certify the above figures are correct as contained in the records of the company.

SUPERVISOR TESTING

H. H. Kline

⑦

Chicago Bridge & Iron Co.

COATESVILLE, PA. 19320

TEST CERTIFICATE

MILL ORDER NO.

27475-2

CUSTOMER P.O.

2471 Sheet 2

MB 72568 LR

Supplementary Copy 14-22-68

DATE: 8-21-68

FILE NO

-543

CONSIGNEE

Same
Boyles, Ala.

SPECIFICATIONS:

BEND TEST

HOMOGENEITY TEST

CHEMICAL ANALYSIS

[illegible]

PHYSICAL PROPERTIES

PHYSICAL PROPERTIES									
MELT NO.	SLAB NO.	YIELD PSI X100	TENSILE PSI X100	% ELONG IN	% R.A.	BHN	IMPACTS		DESCRIPTION
C4489	1			<u>Drop Weight Tests</u> 1 Test at 0°F. - Failed 2 Test at +20°F.- Passed 2 Test at +50°F.- Passed N.D.T. is +10°F.					

John. Brown ⑦

We hereby certify the above figures are correct as contained in the records of the company.

SUPERVISOR TESTS

John Burns ⑦

PURCHASER:

Chicago Bridge & Iron Co.

LUKENS STEEL COMPANY

COATESVILLE 19320

TEST CERTIFICATE

Revised Copy 9-27-68

DATE 9-5-68

FILE NO.

543

CONSIGNEE

Same
Boyles, Ala.

MILL ORDER NO.

27475-3

CUSTOMER P.O.

2471 Sheet 2

MR 72968 LR
8168

SPECIFICATIONS:

SA-533-65 Gr. B Class 1 Mod. by C B & I MS-1 Rev. 1 Fbx. 80000

BEND TEST O.K. HOMOGENEITY TEST O.K.

Sheet # 1 of 2

CHEMICAL ANALYSIS

CHEMICAL ANALYSIS															Basic Process
MELT NO	C	Mn	P	S	Cu	Si	Ni	Cr	Mo	V	Al	Fe	Other		
B845	22	1.45	013	016		24	58		55					F.G.P. V.I.P. Steel	Electric
C4521	23	1.43	009	015		26	57		54						
Grain size after stress relieved															
								7 - 8							
								7 - 8							
B8496-1															
C4521-2															

PHYSICAL PROPERTIES

MELT NO.	SLAB NO.	YIELD PSI X100	TENSILE PSI X100	% ELONG IN 2"	% R.A.	BHN	IMPACTS V-Notch +10°F.			Fracture Appearance	DESCRIPTION
B8496	1	685 687	944 940	25 24			42	42	40	30% Shear	1-360 x 145-1/2 x 5-9/16"
							Lateral Expansion in inches				
							.035	.034	.028		
C4521	2	716 717	945 945	25 25			42	45	48	30% Shear	1- "
							Lateral Expansion in inches				
							.033	.038	.032		
N.D.T. is +10°F. Tested in accordance to C.B. & I. Procedure TPC-1 Rev. 1 Test location C.B. & I. MTP-1 Homogeneity test satisfactory. Bend test satisfactory. - Location transverse - top middle of plate Radius of curvature less than 1-1/2 inches											

We hereby certify the above figures are correct as contained in the records of the company.

SUPERVISOR TESTING

J. H. Kline

⑧

PURCHASER:

Chicago Bridge & Iron Co.

LUKENS STEEL COMPANY

COATESVILLE 9320

TEST CERTIFICATE

DATE 9-5-68

FILE NO

13

CONSIGNEE

Same
Boyles, Ala.

MILL ORDER NO.

27475-3

CUSTOMER P.O.

2471-Sheet 2

SPECIFICATIONS:

Same

Sheet # 2 of 2

BEND TEST

HOMOGENEITY TEST

CHEMICAL ANALYSIS

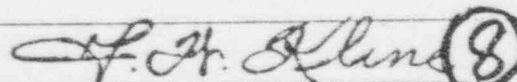
MELT NO.	C	MN	P	S	CU	SI	NI	CR	MO	V	TI	AL	B		
B6-46-1															
C4521-2															

PHYSICAL PROPERTIES

MELT NO.	SLAB NO.	YIELD PSI X100	TENSILE PSI X100	% ELONG IN	% R.A.	BHN	IMPACTS	DESCRIPTION
plates and tests heated 1650°F. ^{+25°F.} held 1 hr. per inch min. and W.Q. or 22 minutes. Plates and tests were then tempered 1220°F. ^{+10°F.} held 1 hr. per inch min. and air cooled.								
plates gas cut hot and stress relieved 1150°F. ^{+25°F.} ^{-50°F.} held 1/2 hr. per inch in and air cooled.								
tests stress relieved by heating within a rate of 72°F. per hr. to 1150°F. ^{+25°F.} ^{-50°F.} held 50 hrs. and furnace cooled within a rate of 90°F. per hr. to 600°F. and air cooled.								
produced in accordance with inspection system requirements of MIL-I-45208A.								

We hereby certify the above figures are correct as contained in the records of the company.

SUPERVISOR TESTING



PURCHASER:

2 * Chicago Bridge & Iron Co.
James C. Thompson, Pur. Mgr.

LUKENS STEEL COMPANY

COATES PA

TEST CERTIFICATE

DATE 8-27-69

FILE NO.

3

CONSIGNEE

MILL ORDER NO.

27475-3

CUSTOMER P.O.

2471 Sheet 2

Same
Boyles, Ala.

SPECIFICATIONS:

Name

BEND TEST

HOMOGENEITY TEST

Addendum to Report 9-27-68

Sheet #3

CHEMICAL ANALYSIS

MELT NO.	C	MN	P	S	CU	SI	NI	CR	MO	V	TI	AL	B		

PHYSICAL PROPERTIES

MELT NO.	SLAB NO.	YIELD PSI X100	TENSILE PSI X100	% ELONG IN 2"	% R.A.	BHN	IMPACTS			DESCRIPTION					
38496	1	726	945	24						{ Bottom Transverse Tests					
4521	2	730	956	25											

We hereby certify the above figures are correct as contained in the records of the company.

SUPERVISOR TESTING

⑧

PURCHASER

Chicago Bridge & Iron Co.

LUKENS STEEL COMPANY

COATESVILLE 19320

TEST CERTIFICATE

Supplementary Copy 1'-22-68

DATE 9-5-68

FILE NO.

43

CONSIGNEE

Same
Boyles, Ala.

MILL ORDER NO.

27475-3

CUSTOMER P.O.

2471 Sheet 2 MR 72968 LR
8168

SPECIFICATIONS:

Sheet # 2 of 2

BEND TEST

HOMOGENEITY TEST

CHEMICAL ANALYSIS

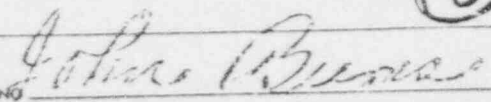
MELT NO.	C	Mn	P	S	Cu	Si	Ni	Cr	Mo	V	Ti	Al	B		

PHYSICAL PROPERTIES

MELT NO.	SLAB NO.	YIELD PSI X100	TENSILE PSI X100	% ELONG IN	% R.A.	BHN	IMPACTS	DESCRIPTION
C4521✓	2						<u>Drop Weight Tests</u> 1 Test at -30°F. - Failed 1 Test at -10°F. - Passed 1 Test at -10°F. - Failed 1 Test at +10°F. - Passed 1 Test at +10°F. - Failed 2 Test at +20°F. - Passed N.D.T. 1s +10°F.	

We hereby certify the above figures are correct as contained in the records of the company.

SUPERVISOR TESTING



(8)

MATERIALS DIVISION

Donney Forge & Iron Inc.
MATERIAL TEST REPORT

10/3/69 (for 48-2774)
DATE July 3, 1968

S.O. No. 4068-8

Purchaser Chicago Bridge and Iron Company

Distributor C. I. Crais Co., Inc.

Purchaser's Order No. Tag: P.O. B52504-2471U, Contract 68-2471U

Distributor's Order No. 4949

ITEM NO.	QTY.	PRODUCT	SPEC.	HEAT OR CODE NO.	FORGING NO.	HEAT TREATMENT	FCE CHARTS ATTACHED	
							YES	NO
2	2	2" Dia. Special Welding Stubs per Dwg. M13, Rev. 2	CB&I Spec. MS 2, Rev. 3 of 5/8/68 (ASTM-A508-2) MS2, Par. 3.13.1	Q2Q1VW	247P-3A, 3B	1675+ 25°F. 1 Hr/in Air Cool 1560+ 25°F. 1 Hr/in Water Quench 1290+ 25°F. 1 Hr/in Air Cool Tests stress relieved at: 1150+ 25°F. for 50 hours	X	

CHEMICAL ANALYSIS AND MECHANICAL PROPERTIES

FORGING NO.	HEAT NO.	C	MN	P	S	SI	CR	NI	MO	V		NDT REPORTS ATTACHED			REMARKS
												U.T.	M.P.	D.P.	
247P-3A, 3B	Q2Q1VW	.21 .16	.75 .71	.010 .006	.015 .013	.23 .24	.37 .36	.80 .81	.69 .60	.05 .03	Ladle Check	X	X	X	2 Dropweights - no break +50°F. Ferritic Grain Size 9

FORGING NO.	HEAT NO.	TEST TEMP.	TENSILE PSI x 1000	YIELD PSI x 1000	ELONG. % in 2"	R.A. %	B.H.N.	(V-Notch at +40°F.) IMPACT TESTS (Keyhole Ⓢ)		
								ENERGY (ft lbs.)	LATERAL EXP. (in")	% SHEAR
247P-3A, 3B	Q2Q1VW 0°	Room Temp	88.65	69.0	22.5	66.5		116-100-112	.081-.074-.080	90-80-95
	180°	Room Temp	88.5	69.75	24.5	69.5		133-74-141	.085-.065-.087	95-60-95

CORRECTED TEST REPORT - Please destroy copy dated January 8, 1969.

"We hereby certify the above results are correct and that all requirements of above referenced specifications and the purchase order have been fulfilled."

Eugene La Regaudiere

We hereby certify the above results to be correct as contained in the records of the Company.

(5)

Lenape Forge, Inc.
1280 West Chester Rd.
West Chester, Pa. 19382

March 14, 1989

Carolina Power & Light Co.
Box 1551
Raleigh, North Carolina 27602

Attn: Mr. Sam Grant

Gentlemen,

The following information is being provided for your information and is applicable to Lenape Forge, Inc. Heat Code Q2Q1V. A508-2 material melted by Sharon Steel Co. and received by Lenape Forge Inc. in June of 1988.

Ladle Analysis:	C	Mn	P	S	Si	Cr	Ni	Mo	Cu
(Wt %)	.21	.75	.010	.015	.23	.37	.80	.69	
Product Analysis	.21	.75	.010	.014	.24	.37	.82	.69	.18
(Wt %)									

Drop Wt. Test Results Reported On Material Forged From Heat Code Q2Q1V.
(Testing performed using P-3 specimens per ASTM E 208)

Material Heat Treated Condition:

Normalized at 1850 F	- cooled in air
Austenitized at 1560 F	- water quenched
Tempered at 1290 F	- cooled in air
Stress Relieved at 1150 F 30 Hrs.	

Drop weight test results: -20 F, -10 F, 0 F : Break
0 F, +10 F, +10 F: No Break

Please note, test results presented have been obtained by processing (forging and heat treating) starting stock selected from Lenape Forge Heat Code Q2Q1V. The above results are not intended to be used to certify any particular forgings in your possession. For specific forgings of concern, please refer to the applicable MTR (Material Test Report) supplied with forging shipment.

Sincerely,

R. D. Trout

R. Douglass Trout
Plant Metallurgist

APPENDIX C

Weld CTRs

ALLOY RODS COMPANY
Division of Chemetron Corporation

Certificate of Analysis

Chicago Bridge & Iron Co.
2700 Channel Ave.
Memphis, Tenn.
P.O. M81808-69-4824-, 4962, 5128

Customer Order No. 3129 & 3130

Order No. 55990

Shipped 11/7/69

This material conforms to Specification SA 316

Test No. AI 396 CX
AI 396 CZ

Type E 8018G

This electrode meets the requirements of Part 511.3 of ASME Section III Nuclear Code.

Mechanical Tests

Test specimen P. W. ht @ 1100°F. to 1150°F.
for 62 1/2 hrs.

Tensile Properties

Specimen Type .505"

UTS 90,500 Psi

YLP 80,500 Psi

% Elongation in 2 inches 28%

Reduction of Area 72.3%

Impact Properties

Specimen Type Charpy Vee Notch

Test Temperature Plus 10°F.

Ft. -lbs. 81, 81, 82

Lateral Expansion 59, 58, 63

% Shear Area 70, 70, 70

Other Tests

Concentricity 4%

Moisture @ 1800°F. 0.14%

We certify that the welded material test plate were subjected to the heat treatment as stated in the attached report dated April 2, 1969 of "Heat Treatment Cycle for Nuclear (ASME, Code."

This is to certify that the original copy of this report has been properly signed and notarized.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 14th day of November 1969

SEAL

[Signature]
Notary Public

My commission expires: 5/8/72

Witnessed by R. Stallman, Q. C. Engr.

ALLOY RODS COMPANY
Division of Chemetron Corporation

BY

[Signature]
J. Harbold

INTER-OFFICE CORRESPONDENCE



ALLOY RODS COMPANY

YORK, PENNSYLVANIA

TO:

DATE: April 2, 1969

COPIES:

FROM:

SUBJECT:

Heat Treatment Cycle for Nuclear (ASME) Boiler Code

Recorder
Recorder Range
Primary Element
Recorder Chart Speed

Speedomax H Round Chart

0 - 2500° F.

Platinum - Platinum 10% Rhodium Thermocouple

One cycle - 24 hr

Program Duration

Start at

125° F. + 50° F.

Increase to

1125° F.

in 4 hr (250° F/hr)

Maintain at

1125° F. + 25° F.

for 62-1/2 hr

Decrease to

600° F.

@ 100° F. per hr max

Air Quench

Gear on Motor Shaft

Unmarked

Gear on Auxiliary Shaft

"A"

Cam Cycle Time

150 hr (each Cam division = 2-1/2 hr)

Time (hr)	Temperature Degrees F.	Tolerance Degrees F.	Percentage of Cam *
0	125	+50	3
1	375		11
2	625		19
3	875		28
4	1125	+25	33
66-1/2	1125		38
67-1/2	1025		34
68-1/2	925		30
69-1/2	825		26
70-1/2	725		22
71-1/2	625		18
72	600		17

*From this position on Cam, subtract 3/16".

ALLOY RODS COMPANY
Division of Chemetron Corporation

Certificate of Analysis

Chicago Bridge Iron Co.
2700 Channel Ave.
Memphis, Tenn.
P.O. M92204-3262/3780

Customer Order No. 3229
Order No. 56335
Shipped 10/28/69

This material conforms to Specification SA 316
Test No. AI 380 DX
AI 380 DZ Type E 8018G

Trade Name: Atom Arc 8018NM
Diameter Size: 3/16
5,250 Lbs.
Lot Number: S925A27A
Heat Number: 01R496

Carbon .05
Manganese 1.11
Chromium
Nickel .92
Silicon .48
Columbium
Tantalum
Molybdenum .54
Tungsten
Copper .02
Titanium
Phosphorus .020
Sulphur .017
Vanadium
Iron
Ferrite

This electrode meets the requirements of Par.
N 511.3 of ASME Section III Nuclear Code.
Mechanical Tests

Test Specimen P.W. @ 1100°F. to 1150°F.
for 62 1/2 hrs.

Tensile Properties

Specimen Type .505"
UTS 92,500 Psi
YLP 84,000 Psi
% Elongation in 2 inches 26%
Reduction of Area 71.4%

Impact Properties

Specimen Type Charpy Vee Notch
Test Temperature Plus 10°F.
Ft-Lbs. 62, 64, 68
Lateral Expansion 49, 48.54
% Shear 40, 50, 50

Other Tests

Concentricity 3%
Moisture @ 1800°F. 0.17%

We certify that the welded material test plates
were subjected to the heat treatment as stated
in the attached report dated April 2, 1969 of
"Heat Treatment Cycle for Nuclear (ASME)
Boiler Code."

This is to certify that the original copy
of this report has been properly signed
and notarized.

State of Penna. 1 SS
County of York 1

Subscribed and sworn to before me
this 19th day of November 19 69

SEAL

Garrett H. Florent
Notary Public

My commission expires: 5/8/72

The undersigned certifies that this report is
correct and that no significant change has
been made in any of the elements described
in the qualification approval.

ALLOY RODS COMPANY
Division of Chemetron Corporation

BY

J. Harbold
J. Harbold
(80)

INTER-OFFICE CORRESPONDENCE



ALLOY RODS COMPANY

YORK, PENNSYLVANIA

TO:

DATE: April 2, 1969

COPIES:

FROM:

SUBJECT: Heat Treatment Cycle for Nuclear (ASME) Boiler Code

Recorder
Recorder Range
Primary Element
Recorder Chart Speed

Speedomax H Round Chart
0 - 2500° F.
Platinum - Platinum 10% Rhodium Thermocouple
One cycle - 24 hr

Program Duration

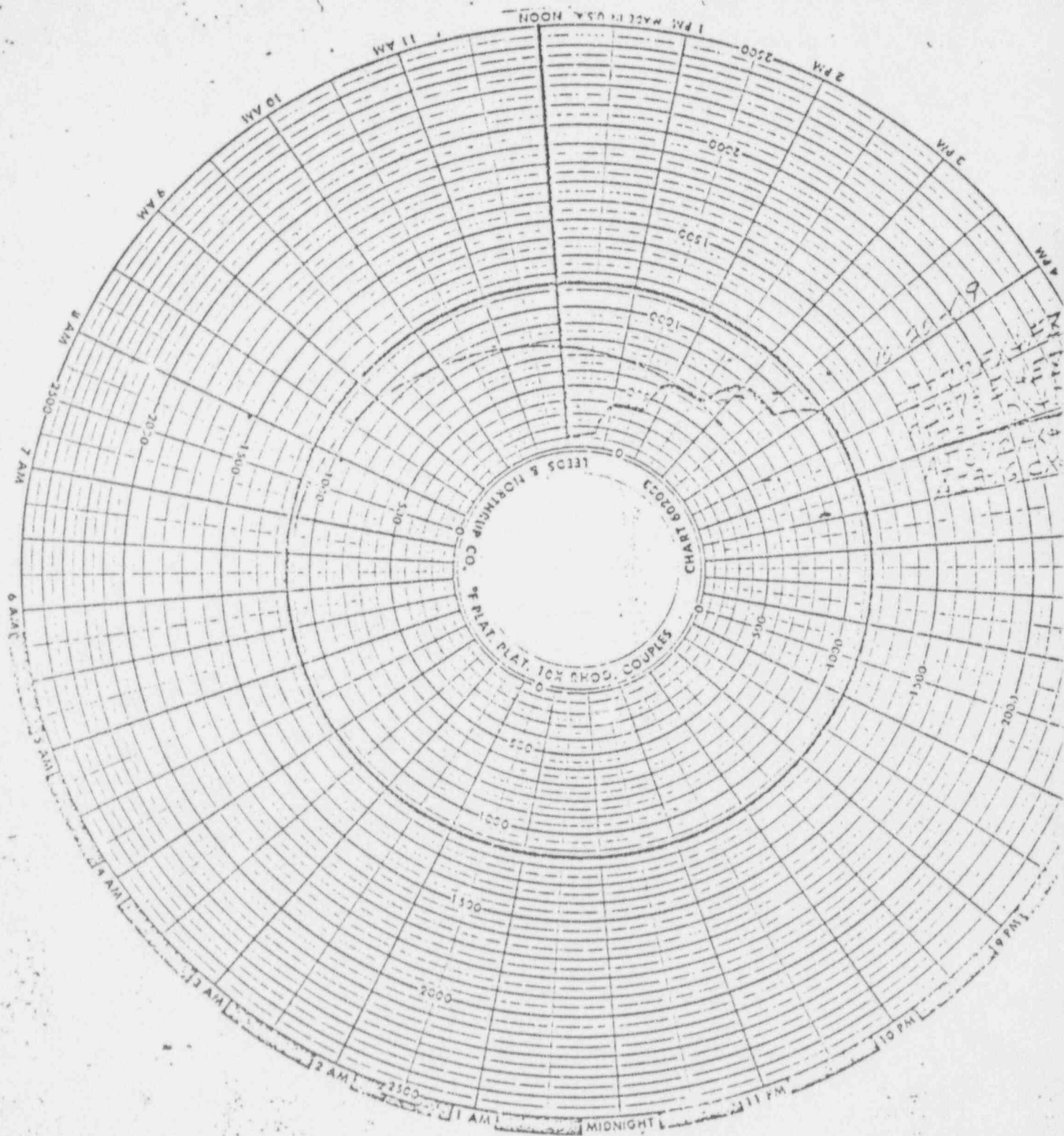
Start at	125° F. + 50° F.	
Increase to	1125° F.	in 4 hr (250° F/hr)
Maintain at	1125° F. + 25° F.	for 62-1/2 hr
Decrease to	600° F.	@ 100° F. per hr max
Air Quench		

Gear on Motor Shaft
Gear on Auxiliary Shaft
Cam Cycle Time

Unmarked
"A"
150 hr (each Cam. division = 2-1/2 hr)

Time (hr)	Temperature Degrees F.	Tolerance Degrees F.	Percentage of Cam *
0	125	+50	3
1	375		11
2	625		19
3	875		28
4	1125	+25	38
66-1/2	1125		38
67-1/2	1025		34
68-1/2	925		30
69-1/2	825		26
70-1/2	725		22
71-1/2	625		18
72	600		17

*From this position on Cam, subtract 3/16", o



ALLOY RODS COMPANY

Division of Chemetron Corporation

Certificate of Analysis

Chicago Bridge & Iron
2700 Channel Ave.
Memphis, Tenn.

Customer Order No. M30402-683262/80

Order No. 54274

Shipped 4/22/69

This material conforms to Specification SA-316

Test No. 5Z 3Z
5Z 5X

Type E8018-G

Trade Name: Atom Arc 8018NM

This electrode meets the requirements of Par. N511.3 of ASME, Section III, Nuclear Code.

Diameter Size: 1/4
28,050 lbs.
Lot Number: D908A27A
Heat Number: 82D913

Mechanical Tests

Test Specimens P.W.H.T. at 1100° F. to 1150° F. for 62 1/2 hours.

Carbon .063
Manganese 1.06
Chromium
Nickel .80
Silicon .39
Columbium
Tantalum
Molybdenum .45
Tungsten
Copper .03
Titanium
Phosphorus .009
Sulphur .018
Vanadium
Iron
Ferrite

Tensile Properties

Specimen Type: .505" Q
UTS 86,500
YLP 78,000
% Elongation in 2 inches-28%
% Reduction of Area-72.5%

Impact Properties

Specimen Type: Charpy Vee Notch
Test Temperature Plus 10° F.
Foot-lb 80, 94, 83, 81, 82
Lateral Expansion 76, 67, 68, 63, 60
% Shear 60, 60, 50, 50, 50

Other Tests

Concentricity 4%
Moisture @ 1800° F. 0.09%

We certify that the welded material test plates were subjected to the heat treatment as stated in the attached report dated April 2 of "Heat Treat Cycle for Nuclear (ASME) Boiler Code.

State of Penna.)
County of York) SS

The undersigned certifies that this report is correct and that no significant change has been made in any of the elements described in the qualification approval.

Subscribed and sworn to before me
this 20th day of May 19 69

ALLOY RODS COMPANY
Division of Chemetron Corporation

SEAL

Conan H. Alcorn
Notary Public

My commission expires: 5/8/72

Witnessed by R. Stallman, Q.C. Engr.

BY

J. Harbold
J. Harbold

INTER - OFFICE CORRESPONDENCE



ALLOY RODS COMPANY

YORK, PENNSYLVANIA

TO:

DATE: April 2, 1969

COPIES:

FROM:

SUBJECT: Heat Treatment Cycle for Nuclear (ASME) Boiler Code

Recorder
Recorder Range
Primary Element
Recorder Chart Speed

Speedomax H Round Chart
0 - 2500° F.
Platinum - Platinum 10% Rhodium Thermocouple
One cycle - 24 hr

Program Duration

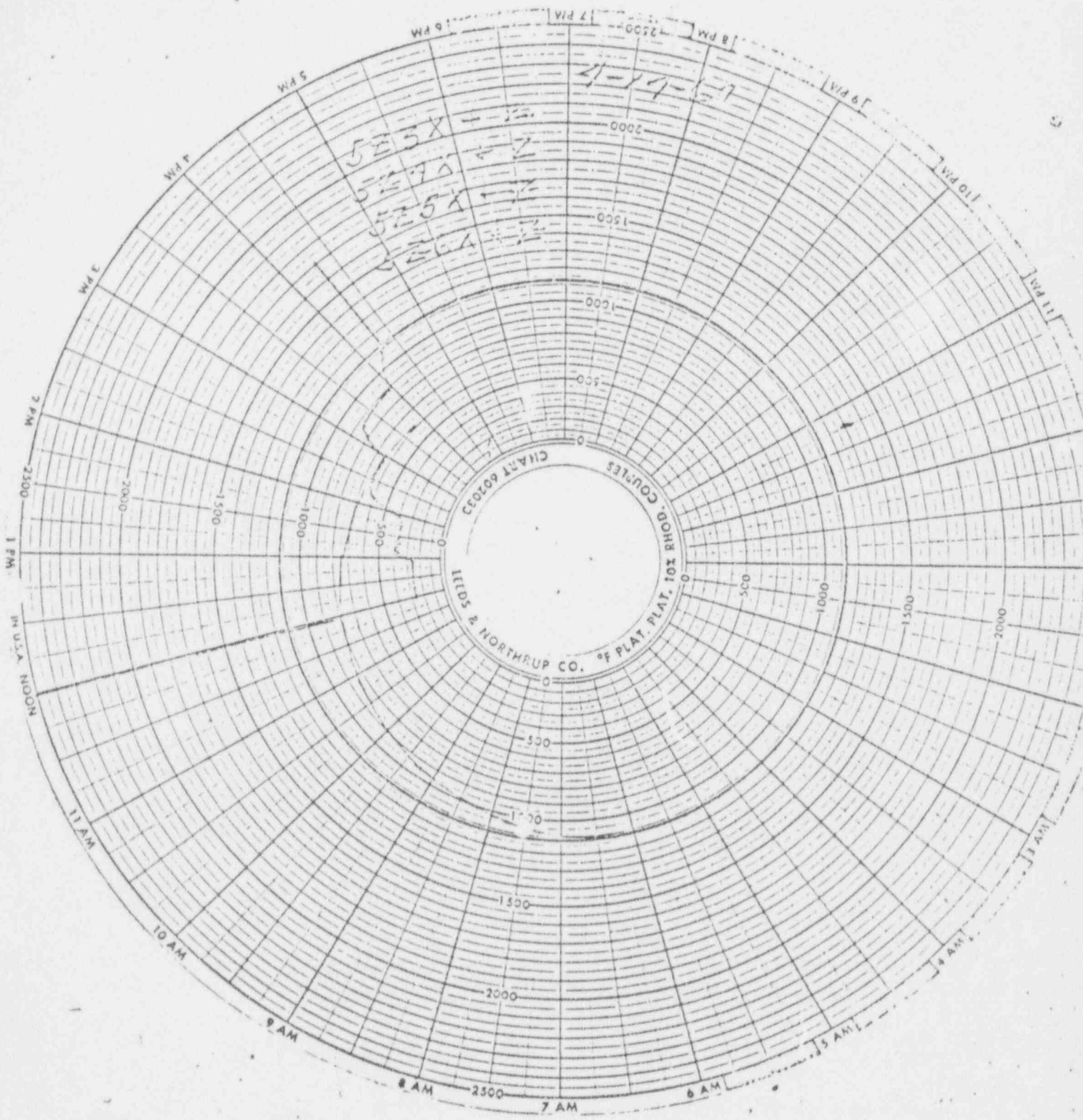
Start at	125° F.	+ 50° F.	
Increase to	1125° F.		in 4 hr (250° F/hr)
Maintain at	1125° F.	+25° F.	for 62-1/2 hr
Decrease to	600° F.		@ 100° F. per hr max
Air Quench			

Gear on Motor Shaft
Gear on Auxiliary Shaft
Cam Cycle Time

Unmarked
"A"
150 hr (each Cam division = 2-1/2 hr)

Time (hr)	Temperature Degrees F.	Tolerance Degrees F.	Percentage of Cam *
0	125	+50	3
1	375		11
2	625		19
3	875		28
4	1125	+25	38
66-1/2	1125		38
67-1/2	1025		34
68-1/2	925		30
69-1/2	825		26
70-1/2	725		22
71-1/2	625		18
72	600		17

*From this position on Cam, subtract 3/16", or 6"



ALLOY RODS COMPANY
Division of Chemetron Corporation

Certificate of Analysis

Chicago Bridge & Iron
2700 Channel Ave.
Memphis, Tenn.

P.O.
Customer Order No. M-61904-3262, 3780
Order No. 55451
Shipped 8/5/69

This material conforms to Specification SA-316
Test No. AI 304 BX
AI 304 BZ Type E 8018-G

Trade Name: Atom Arc 8018 NM
Diameter Size: 1/8
2,500 lbs.
Lot Number: F920A27A
Heat Number: 88E081

Carbon	.06
Manganese	1.10
Chromium	
Nickel	.93
Silicon	.27
Columbium	
Tantalum	
Molybdenum	.51
Tungsten	
Copper	.02
Titanium	
Phosphorus	.017
Sulphur	.014
Vanadium	
Iron	
Ferrite	

This is to certify that the original copy
of this report has been properly signed
and notarized.

This electrode meets the requirements of Par.
N511.3 of ASME Section III Nuclear Code.

Mechanical Tests

Test Specimen P.W. Ht @ 1100°F. to 1150°F.
for 62 1/2 hrs.

Tensile Properties

Specimen Type .505"

UTS 93,200 Psi

YLP 83,000 Psi

% Elongation in 2 inches 27%

% Reduction of Area 68.3%

Impacts Properties

Specimen Type Charpy Vee Notch

Test Temperature Plus 10°F.

Ft.-lbs. 85, 90, 91

Lateral Expansion 72, 67, 69

% Shear 70, 80, 80

Other Tests

Concentricity 3%

Moisture @ 1800°F. .13

We certify that the welded material test plates
were subjected to the heat treatment as stated
in the attached report dated April 2, 1969 of
"Heat Treatment Cycle for Nuclear (ASME)
Boiler Code"

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 7th day of August

19 69

SEAL

Notary Public

My commission expires: 5/8/72

Witnessed by R. Stallman, Q. C. Engr.

The undersigned certifies that this report is
correct and that no significant change has
been made in any of the elements described
in the qualification approval.

ALLOY RODS COMPANY
Division of Chemetron Corporation

BY

J. Harbold

INTER-OFFICE CORRESPONDENCE



ALLOY RODS COMPANY

YORK, PENNSYLVANIA

TO: DATE: April 2, 1969

COPIES:

FROM:

SUBJECT: Heat Treatment Cycle for Nuclear (ASME) Boiler Code

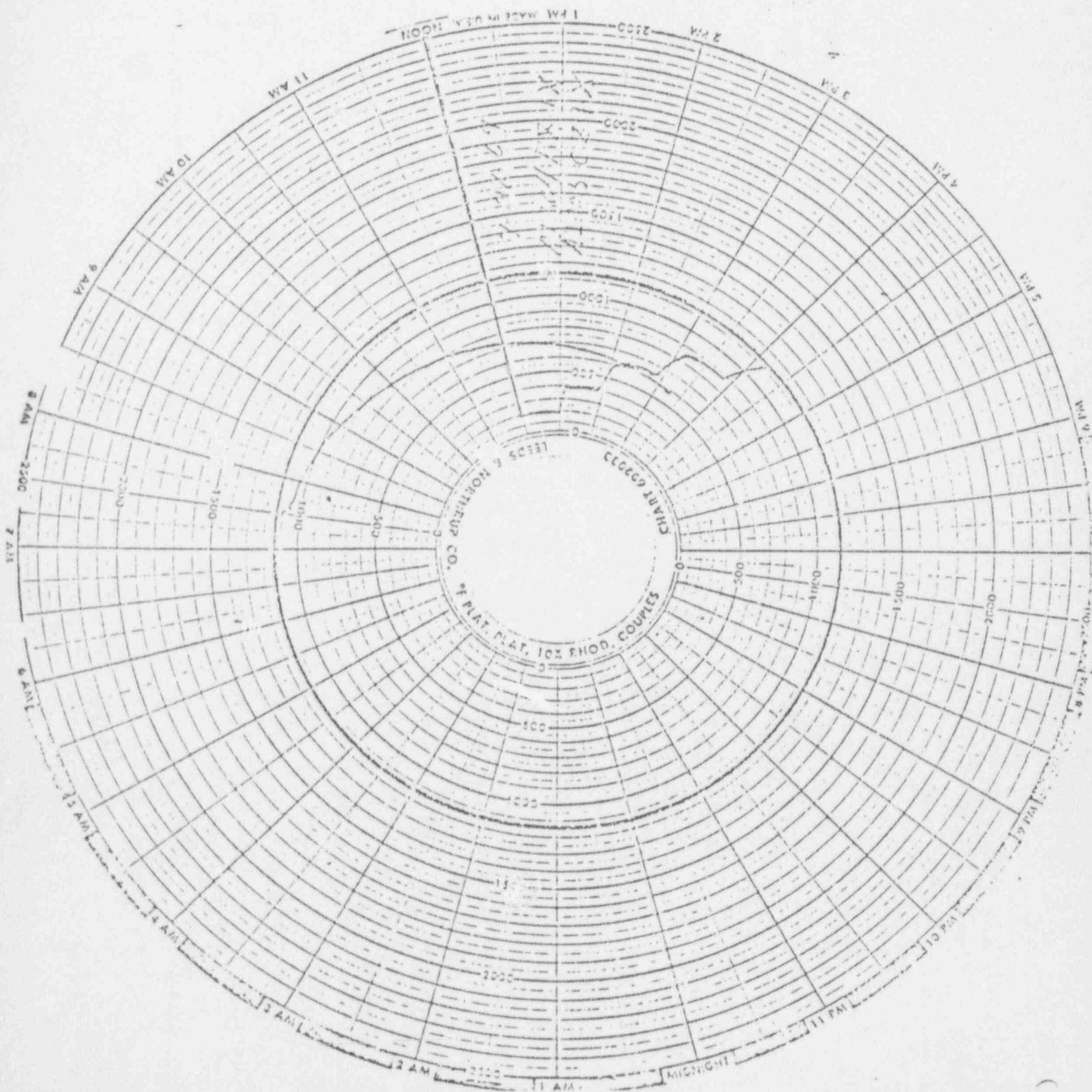
Recorder Speedomax H Round Chart
 Recorder Range 0 - 2500° F.
 Primary Element Platinum - Platinum 10% Rhodium Thermocouple
 Recorder Chart Speed One cycle - 24 hr

Program Duration
 Start at 125° F. \pm 50° F.
 Increase to 1125° F. in 4 hr (250° F/hr)
 Maintain at 1125° F. \pm 25° F. for 62-1/2 hr
 Decrease to 600° F. @ 100° F. per hr max
 Air Quench

Gear on Motor Shaft Unmarked
 Gear on Auxiliary Shaft "A"
 Cam Cycle Time 150 hr (each Cam division = 2-1/2 hr)

Time (hr)	Temperature Degrees F.	Tolerance Degrees F.	Percentage of Cam "
0	125	\pm 50	3
1	375		11
2	625		19
3	875		28
4	1125	\pm 25	38
66-1/2	1125		30
67-1/2	1025		34
68-1/2	925		30
69-1/2	825		26
70-1/2	725		22
71-1/2	625		18
72	600		17

*From this position on Cam, subtract 3/16", c



CHEMETRON CORPORATION
ARC PRODUCTS MANUFACTURING DIVISION

Certificate of Analysis

Chicago Bridge & Iron
2700 Channel Ave.
Memphis, Tenn.
P.O. MC1703-0416-30

Customer Order No. 3440

Order No. 57744

Shipped 2/27/70

This material conforms to Specification SA 316
Test No. 511

Trade Name: Atom Arc 8018NM

Diameter Size: 3/16
2,500 Lbs.

Lot Number: A020A27A
Heat Number: 05R938

Carbon	.077
Manganese	.94
Chromium	
Nickel	.91
Silicon	.40
Columbium	
Tantalum	
Molybdenum	.57
Tungsten	
Copper	.02
Titanium	
Phosphorus	.018
Sulphur	.017
Vanadium	
Iron	
Ferrite	

Type E-8018G

This electrode meets the requirements of Par
N511.3 of ASME Section III Nuclear Code.

Mechanical Tests

Test Specimen P. W ht @ 1100° F. to 1150° F.
for 62 1/2 hrs.

Tensile Properties

Specimen Type .505"
UTS 94,000 Psi
YLP 76,300 Psi
Elongation in 2 inches 26%
Red. of Area 66.7%

Impacts Properties

Specimen Type Charpy Vee Notch
Test Temperature plus 10° F.
Ft-lbs. 66, 84, 86
Lateral Expansion 54, 67, 66
% Shear 80, 90, 90

Other Tests

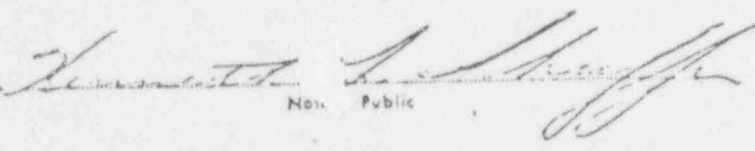
Concentricity 3%
Moisture @ 1800° F. 0.16%

We certify that the welded material test plate
were subjected to the heat treatment cycle as
stated in the attached report dated April 2, 1970
of "Heat Treatment Cycle for Nuclear (ASME
Boiler Code."

This is to certify that the original copy
of this report has been properly signed
and notarized.

State of Penna)
County of York) SS

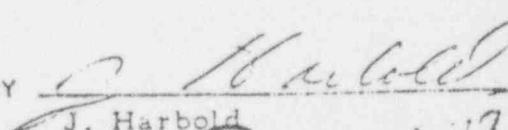
Subscribed and sworn to before me
this 4th day of March 1970

SEAL  Notary Public

My commission expires: 12/4/72

The undersigned certifies that this report is
correct and that no significant change has
been made in any of the elements described
in the qualification approval.

CHEMETRON CORPORATION
ARC PRODUCTS MANUFACTURING DIVISION

BY 
J. Harbold
(RT)

CHICAGO BRIDGE & IRON COMPANY

1500 N. 50TH ST. P. O. BOX 277, BIRMINGHAM, ALABAMA 35202

TWX 810-733-3654

Western Union-WUX

Area Code: 205 595-1191

CERTIFICATE OF ANALYSIS

PURCHASE ORDER NUMBER:

Test Number: PT164S
Type Electrode: E8018G
Trade Name: Alloy Rods E8018NM
Diameter: 3/16"Ø
Lot Number: J802A27A
Heat Number: 977987

MECHANICAL TESTS

Heat Treatment 1125/1150°F-50 Hours

Tensile Properties

Type: .505"Ø
UTS 85,100
YLP 71,200
% Elongation in 2 inches=26.0
% Reduction of Area.-72.4

CHEMICAL TESTS

Carbon. . . . 0.042
Manganese. . . 1.04
Chromium. . . . 0.03
Nickel. 1.04
Silicon. 0.47
Columbium. . . . ----
Tantalum. . . . ----
Molybdenum... 0.59
Tungsten. . . . ----
Copper. 0.03
Titanium. . . . ----
Phosphorus... 0.016
Sulfur. 0.022
Vanadium. . . . ----
Iron. ----
Schaeffler Ferrite. . ----

Impact Properties

Type: Charpy Vee Notch
Orientation: Perpend. to Weld Direc
Test Temperature -Plus 10°F
Foot- lbs. 105, 109, 73
% Shear 60, 65, 45
Lateral Expansion 82, 84, 59

This material conforms to Section III of the ASME CODE,
Paragraph N511.3

CHICAGO BRIDGE AND IRON COMPANY
Birmingham Materials Laboratory

By Howard Gray Date 4-17-69
In charge of Testing for Materials Evaluation

ALLOY RODS COMPANY
Division of Chemetron Corporation

Certificate of Analysis

Post Welding Supply Co.
P.O. Box 2111
1300 Seventh Ave., North
Birmingham, Alabama

Customer Order No. B53011-2471/72W

Order No. 52240

Shipped 10/10/68

This material conforms to Specification AWS A 5.5-64T, ASTM A 316-64T

Type _____

Trade Name: Atom Arc 8018 NM

Diameter Size: 3/16
3600 lbs.
Lot Number: J802A27A
Heat Number: 977987

422W1601
F813A27A

Carbon .05
Manganese .90
Chromium
Nickel .95
Silicon .40
Columbium
Tantalum
Molybdenum .52
Tungsten
Copper
Titanium
Phosphorus .02
Sulphur .02
Vanadium .01
Iron
Ferrite

State of Penna.
County of York

Subscribed and sworn to before me
this 9th day of December 19 68

SEAL

William A. LeCompte
Notary Public

My commission expires: 5/8/72

The undersigned certifies that this report is correct and that no significant change has been made in any of the elements described in the qualification approval.

ALLOY RODS COMPANY
Division of Chemetron Corporation

BY

J. K. K. K.

W.H.C.

CHICAGO BRIDGE & IRON COMPANY

1500 N. 50TH ST. P.O. BOX 277, BIRMINGHAM, ALABAMA 35202

TWX 810-733-3654

Western Union-WUX

Area Code 205 595-1191

CERTIFICATE OF ANALYSIS

PURCHASE ORDER NUMBER:

Test Number: PT164N
Type Electrode: E8018G
Trade Name: Alloy Rods E8018NM
Diameter: 1/8"Ø
Lot Number: S823A27A
Heat Number: 654W539

MECHANICAL TESTS

Heat Treatment 1125/1150°F-50 Hou

Tensile Properties

Type: .505"Ø

UTS 84,100

YLP 74,000

% Elongation in 2 inches=28%

% Reduction of Area.=75%

CHEMICAL TESTS *

Carbon. . . . 0.041
Manganese. . . 0.95
Chromium. . . 0.02
Nickel. . . . 1.09
Silicon. . . . 0.38
Columbium. . . .
Tantalum. . . .
Molybdenum. . . 0.58
Tungsten. . . .
Copper. . . . 0.04
Titanium. . . .
Phosphorus. . . 0.015
Sulfur. . . . 0.020
Vanadium. . . 0.020
Iron. . . .
Schaeffler Ferrite. . ----

Impact Properties

Type: Charpy Vee Notch

Orientation: Perpend. to Weld Direc

Test Temperature Plus 10°F

Foot- lbs. 181-144-171

% Shear 100-80-100

Lateral Expansion 88-89-95

*Per L-248

This material conforms to Section III of the ASME CODE,
Paragraph N511.3

CHICAGO BRIDGE AND IRON COMPANY
Birmingham Materials Laboratory

By Harold Gray Date 4-17-69
In charge of Testing for Materials Evaluation

(33)

ALLOY RODS COMPANY

Division of Chemetron Corporation

Certificate of Analysis

Post Welding Supply Co.
P.O. Box 2111
1300 Seventh Ave., North
Birmingham, Alabama

Customer Order No. B53011-2471/72WOrder No. 52240Shipped 10/10/68This material conforms to Specification AWS A 5.5-64T, ASTM A 316-64T

Type _____

Trade Name: Atom Arc 8018 NM

Diameter Size: 1/8
1000 lbs.
Lot Number: S823A27A
Heat Number: 654W539

Carbon	.05
Manganese	.90
Chromium	
Nickel	.95
Silicon	.40
Columbium	
Tantalum	
Molybdenum	.52
Tungsten	
Copper	
Titanium	
Phosphorus	.02
Sulphur	.02
Vanadium	.01
Iron	
Ferrite	

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 9th day of December 19 68

SEAL

Amos H. LeCompte
Notary Public

My commission expires: 5/8/72

The undersigned certifies that this report is
correct and that no significant change has
been made in any of the elements described
in the qualification approval.

ALLOY RODS COMPANY
Division of Chemetron Corporation

BY

J. Harold

ALLOY RODS COMPANY
Division of Chemetron Corporation

Certificate of Analysis

Chicago Bridge & Iron
1500 North 50th St.
Birmingham, Ala.

Customer Order No. M30402-683262/80

Order No. 54890

Shipped 5/27/69

This material conforms to Specification SA-316

Test No. AN239CX

AN239CZ

Type E8018-G

Trade Name: Atom Arc 8018NM

This electrode meets the requirements of Par.
N511.3 of ASME Section III, Nuclear Code.

Diameter Size: 5/32
2,300 lbs.
Lot Number: E916A27A
Heat Number: 601221

Mechanical Tests

Test specimen P.W.H.T. at 1100°F. to 1150°F
for 62 1/2 hrs.

Tensile Properties

Specimen Type, .505"

UTS 89,500 Psi

YLP 79,000 Psi

% Elongation in 2 inches 27%

% Reduction of Area 72.7%

Impact Properties

Specimen Type Charpy Vee Notch

Test Temperature Plus 10°F.

Ft. lbs. 107, 108, 108

Lateral Expansion 78, 66, 80

% Shear 80, 80, 80

Other Tests

Concentricity 3%

Moisture @ 1800°F. .12

We certify that the welded material test plates w
subjected to the heat treatment as stated in the
attached report dated April 2 of "Heat Treatmen
Cycle for Nuclear (ASME) Boiler Code."

State of Penna.)
County of York)

Subscribed and sworn to before me
this 12th day of June

19 69

The undersigned certifies that this report is
correct and that no significant change has
been made in any of the elements described
in the qualification approval.

SEAL

Arthur H. Alcometti
Notary Public

My commission expires: 5/8/72

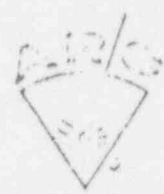
Witnessed by R. Stallman, Q. C. Engr.

ALLOY RODS COMPANY
Division of Chemetron Corporation

BY

J. Harold
Harold

INTER - OFFICE CORRESPONDENCE



ALLOY RODS COMPANY

YORK, PENNSYLVANIA

TO:

DATE: April 2, 1969

COPIES:

FROM:

SUBJECT:

Heat Treatment Cycle for Nuclear (ASME) Boiler Code

Recorder
Recorder Range
Primary Element
Recorder Chart Speed

Speedomax: H Round Chart

0 - 2500° F.

Platinum - Platinum 10% Rhodium Thermocouple

One cycle - 24 hr

Program Duration

Start at

125° F. + 50° F.

Increase to

1125° F.

in 4 hr (250° F/hr)

Maintain at

1125° F. +25° F.

for 62-1/2 hr

Decrease to

600° F.

@ 100° F. per hr max

Air Quench

Gear on Motor Shaft

Unmarked

Gear on Auxiliary Shaft

"A"

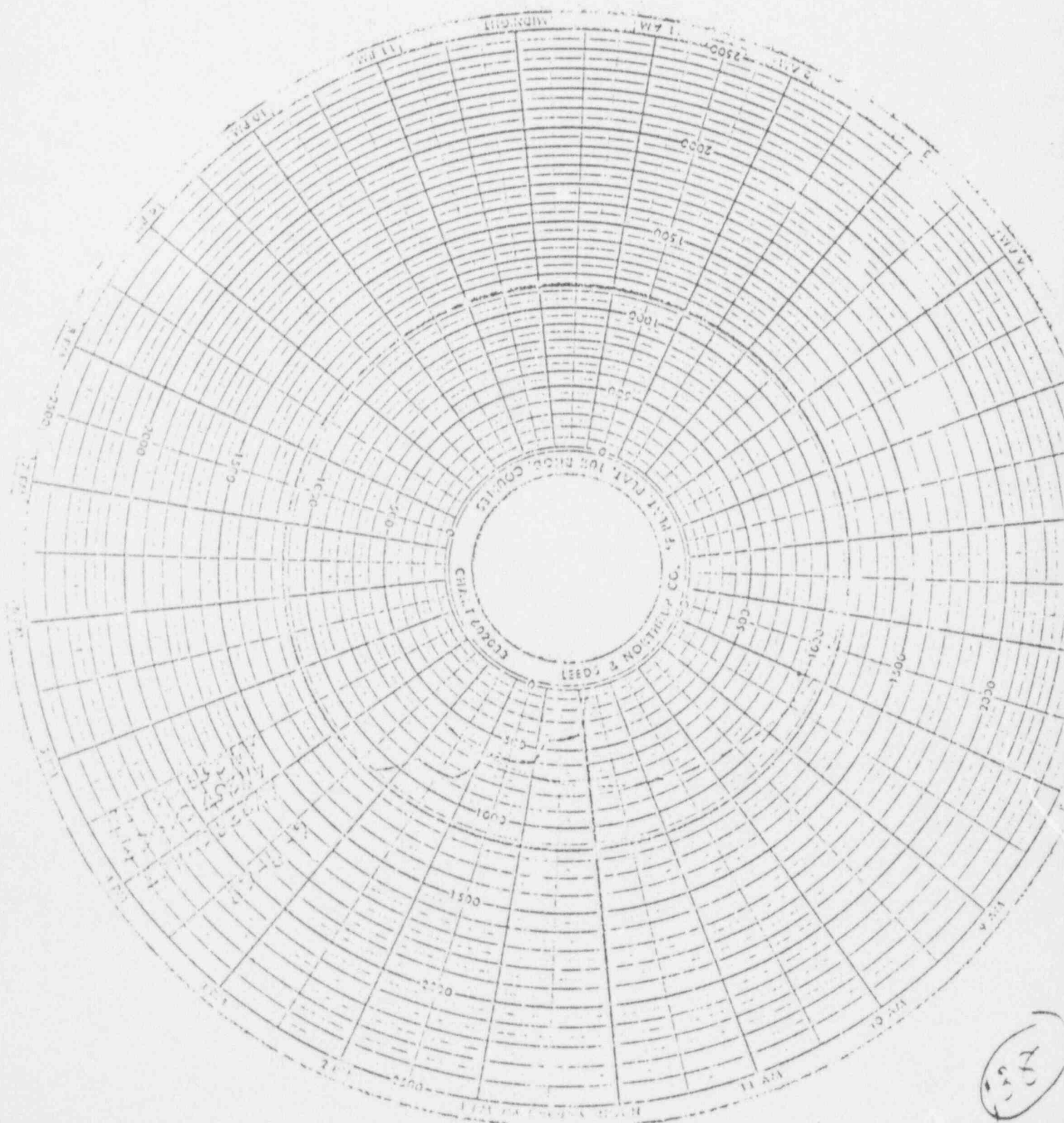
Cam Cycle Time

150 hr (each Cam division = 2-1/2 hr)

Time (hr)	Temperature Degrees F.	Tolerance Degrees F.	Percentage of Cam *
0	125	+50	3
1	375		11
2	625		19
3	875		28
4	1125	+25	38
66-1/2	1125		38
67-1/2	1025		34
68-1/2	925		30
69-1/2	825		26
70-1/2	725		22
71-1/2	625		18
72	600		17

*From this position on Cam, subtract 3/16", on 3"

139



537

Certificate of Analysis

Chicago Bridge & Iron
2700 Channel Ave.
Memphis, Tenn.

Customer Order No. 24897

Order No. 61999

Shipped 12/4/70

This material conforms to Specification ASME SA 316

Test No. 875

Type E8018G

Trade Name: Atom Arc 8018NM

This electrode meets the requirements of
Par N511.3 of ASME Section III Nuclear Code.

Diameter Size: 7/32

Mechanical Tests
Test Specimen PW ht @ 1100°F. to 1150°F.
for 62 1/2 hrs.

Lot Number: J020A27A

Tensile Properties
Specimen Type .505"

Heat Number: C3L46C

UTS 91,000 Psi

Carbon .063

YLP 80,400 Psi

Manganese .96

Elongation in 2 inches 26%

Chromium

Red. of Area 64.1%

Nickel .87

Impact Properties

Silicon .32

Specimen Type Charpy Vee Notch

Columbium

Test Temp plus 10°F.

Tantalum

Ft. Lbs. 35, 39, 40

Molybdenum .53

Lateral Expansion 34, 39, 39

Tungsten

% Shear 60, 60, 60

Copper .02

Other Tests

Titanium

Concentricity 4%

Phosphorus .019

Moisture @ 1800°F. 0.15%

Sulphur .017

We certify that the welded material test plate
were subjected to the heat treatment cycle as
stated in the attached report dated April 2,
1969 of "Heat Treatment Cycle for Nuclear
(ASME) Boiler Code."

Vanadium

Iron

Ferrite

This is to certify that the original copy
of this report has been properly signed
and notarized.

State of Penna.)
County of York) SS

The undersigned certifies that this report is
correct and that no significant change has
been made in any of the elements described
in the qualification approval.

Subscribed and sworn to before me
this 3rd. day of December 19 70

SEAL

Robert H. Bloom
Notary Public

My commission expires: 5/8/72

CHEMETRON CORPORATION
ARC PRODUCTS MANUFACTURING DIVISION

BY

R. R. Bloom
R. R. Bloom

11-2-70

Certificate of Analysis

Chicago Bridge & Iron Co.
2700 Channel Ave.
Memphis, Tenn.
P.O. M72102041630

Customer Order No. 4033
Order No. 61685
Shipped 9/25/70

This material conforms to Specification ASME SA 316

Test No. 800

Trade Name: Atom Arc 8018NM

Diameter Size: 1/8
2,500 Lbs.
Lot Number: H019A27A
Heat Number: 432A2671

Carbon .057 ✓
Manganese 1.22 ✓
Chromium
Nickel 1.08 ✓
Silicon .44 ✓
Columbium
Tantalum
Molybdenum .51 ✓
Tungsten
Copper .04 ✓
Titanium
Phosphorus .019 ✓
Sulphur .014 ✓
Vanadium
Iron
Ferrite

Type E 8018C

This electrode meets the requirements of Par. N511. 3 of ASME Section III Nuclear Code.

Mechanical Tests

Test Specimen PW ht @ 1100° to 1150° F for 62 1/2 Hrs.

Tensile Properties

Specimen Type .505"

UTS 93,000 Psi ✓

YLP 80,500 Psi

Elongation in 2 inches 28% ✓

Red of Area 72.6%

Impact Properties

Specimen Type Charpy V Notch

Test Temp plus 10° F.

Ft. Lbs. 31, 31, 33

Lateral Expansion 30, 32, 30

% Shear 30, 30, 30

Other Tests

Concentricity 4%

Moisture @ 1800° F. 0.18%

We certify that the welded material test plates were subjected to the heat treatment cycle as stated in the attached report dated April 2, 1966 of "Heat Treatment Cycle for Nuclear (ASME) Boiler Code."

This is to certify that the original copy of this report has been properly signed and notarized.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 27th day of October

19 70

SEAL

Notary Public

My commission expires: 12/4/72

The undersigned certifies that this report is correct and that no significant change has been made in any of the elements described in the qualification approval.

CHEMETRON CORPORATION
ARC PRODUCTS MANUFACTURING DIVISION

BY

G. W. Folcomer III

46

CHICAGO BRIDGE & IRON COMPANY

P. O. BOX 13308, MEMPHIS, TENNESSEE 38113

CERTIFICATE OF ANALYSIS

901947

Purchase Order Number: M72102041630

MECHANICAL TEST RESULTS

Test Number: WO #11-D

Type Electrode: E8018NM

Trade Name: Atom Arc 8018NM

Electrode Diameter: 5/32

Lot Number: H013A27A

Heat Number: 662A746

Flux Batch Number:

Heat Treatment 1100-1150°F for
62 1/2 Hrs

Tensile Properties (CTR)

Type: .505

UTS 91,000 PSI

YLP 80,000 PSI

% Elongation in 2 inches = 26%

% Reduction of Area = 70.5%

CHEMICAL TEST RESULTS (CTR)

Carbon..... .060

Manganese..... .96

Chromium.....

Nickel..... .88

Silicon..... .38

Columbium.....

Tantalum.....

Molybdenum..... .52

Tungsten.....

Copper..... .03

Titanium.....

Phosphorus..... .021

Sulfur..... .017

Vanadium.....

Iron.....

Schaeffler Ferrite..

Impact Properties

Type: Charpy Vee Notch

Orientation: \perp to Weld Direction

Test Temperature -20°F

Foot - Lbs. 89, 82, 95

% Shear 45, 40, 65

Lateral Expansion 69, 64, 68

This material conforms to SECTION
III of the ASME CODE, Paragraph N511.3

K8
4/12/71

CHICAGO BRIDGE & IRON COMPANY

BY

R. A. Fennia

DATE

April 6, 1971

61

Certificate of Analysis

Chicago Bridge & Iron
2700 Channel Ave.
Memphis, Tenn.
P.O. M72102041630

Customer Order No. 4033
Order No. 61685
Shipped 9/25/70

This material conforms to Specification ASME SA 316

Test No. 792

Type E 8018G

Trade Name: Atom Arc 8018NM

This electrode meets the requirements of Part
N511.3 of ASME Section III Nuclear Code.

Diameter Size: 5/32
5,000 Lbs.
Lot Number: H013A27A
Heat Number: 662A746

Mechanical Tests
Test Specimen PW ht @ 1100° to 1150° F. for
62 1/2 Hrs.

Tensile Properties
Specimen Type .505"

UTS 91,000 Psi
YLP 80,000 Psi
Elongation in 2 inches 26%
Red. of Area 70.5%

Impact Properties
Specimen Type Charpy V Notch
Test Temp plus 10° F.

Ft. Lbs 35, 38, 47
Lateral Expansion 35, 31, 43
% Shear 50, 50, 50

Other Tests
Concentricity 4%
Moisture @ 1800° F. 0.16%

We certify that the welded material test plat
were subjected to the heat treatment cycle a
stated in the attached report dated April 2,
of "Heat Treatment Cycle for Nuclear (ASM
Boiler Code."

This is to certify that the original copy
of this report has been properly signed
and notarized.

Carbon .060 ✓
Manganese .96 ✓
Chromium
Nickel .88 ✓
Silicon .38 ✓
Columbium
Tantalum
Molybdenum .52 ✓
Tungsten
Copper .03 ✓
Titanium
Phosphorus .021 ✓
Sulphur .017 ✓
Vanadium
Iron
Ferrite

BR
10-30-70

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 27th day of Oct.

1970

The undersigned certifies that this report is
correct and that no significant change has
been made in any of the elements described
in the qualification approval.

SEAL [Signature]
Notary Public

My commission expires: 12/4/70

CHEMETRON CORPORATION
ARC PRODUCTS MANUFACTURING DIVISION

BY [Signature]
G. W. Folcomer III

ALLOY RODS COMPANY

Division of Chemetron Corporation

Certificate of Analysis

ALL

Chicago Bridge & Iron
2700 Channel Ave.
Memphis, Tenn.

Customer Order No. M30402-683262/80

Order No. 54273, 54274

Shipped 4, 22/69

This material conforms to Specification 31-316

Test No. 5232

523N

Type 3013-G

Trade Name: Atom Arc 3013NM

This electrode meets the requirements of Par. N511.3 of ASME, Section III, Nuclear Code.

Diameter Size: 7/32
5,000 lbs.
Lot Number: D909A27A
Heat Number: 850766

Mechanical Tests

Test Specimens P.W.H.T. at 1100° F. to 1150° F. for 62 1/2 hours.

Carbon .063
Manganese 1.22
Chromium
Nickel 1.03
Silicon .44
Columbium
Tantalum
Molybdenum .44
Tungsten
Copper .02
Titanium
Phosphorus .003
Sulphur .010
Vanadium
Iron
Ferrite

Tensile Properties

Specimen Type: .505" Ø
UTS 90,000 Psi
YLP 82,500 Psi
% Elongation in 2 inches-28%
% Reduction of Area-63.6%

Impact Properties

Specimen Type: Charpy Vee Notch
Test Temperature Plus 10° F.
Foot-lbs. 87, 69, 73, 71, 75
Lateral Expansion 52, 70, 56, 54, 57
% Shear 60, 40, 40, 50, 50

Other Tests

% Concentricity 4%
Moisture 1300° F. 0.12%

We certify that the welded material test plates were subjected to the heat treatment as stated in the attached report dated April 2 of '69 at Treatment Cycle for Nuclear (ASME) Boiler Code

State of Penna.) SS
County of York)

Subscribed and sworn to before me
this 20th day of May 19 69

The undersigned certifies that this report is correct and that no significant change has been made in any of the elements described in the qualification approval.

SEAL

Orman H. Holcomb III
Notary Public

My commission expires: 5/8/72

Witnessed by R. Stallman, O.C. Engr.

ALLOY RODS COMPANY
Division of Chemetron Corporation

BY

J. Harbold
J. Harbold
HR

INTER - OFFICE CORRESPONDENCE



ALLOY RODS COMPANY

YORK, PENNSYLVANIA

TO:

DATE: April 2, 1969

COPIES:

FROM:

SUBJECT: Heat Treatment Cycle for Nuclear (ASME) Boiler Code

Recorder
Recorder Range
Primary Element
Recorder Chart Speed

Speedomax H Round Chart
0 - 2500° F.
Platinum - Platinum 10% Rhodium Thermocouple
One cycle - 24 hr

Program Duration

Start at	125° F. + 50° F.	
Increase to	1125° F.	in 4 hr (250° F/hr)
Maintain at	1125° F. + 25° F.	for 62-1/2 hr
Decrease to	600° F.	@ 100° F. per hr max
Air Quench		

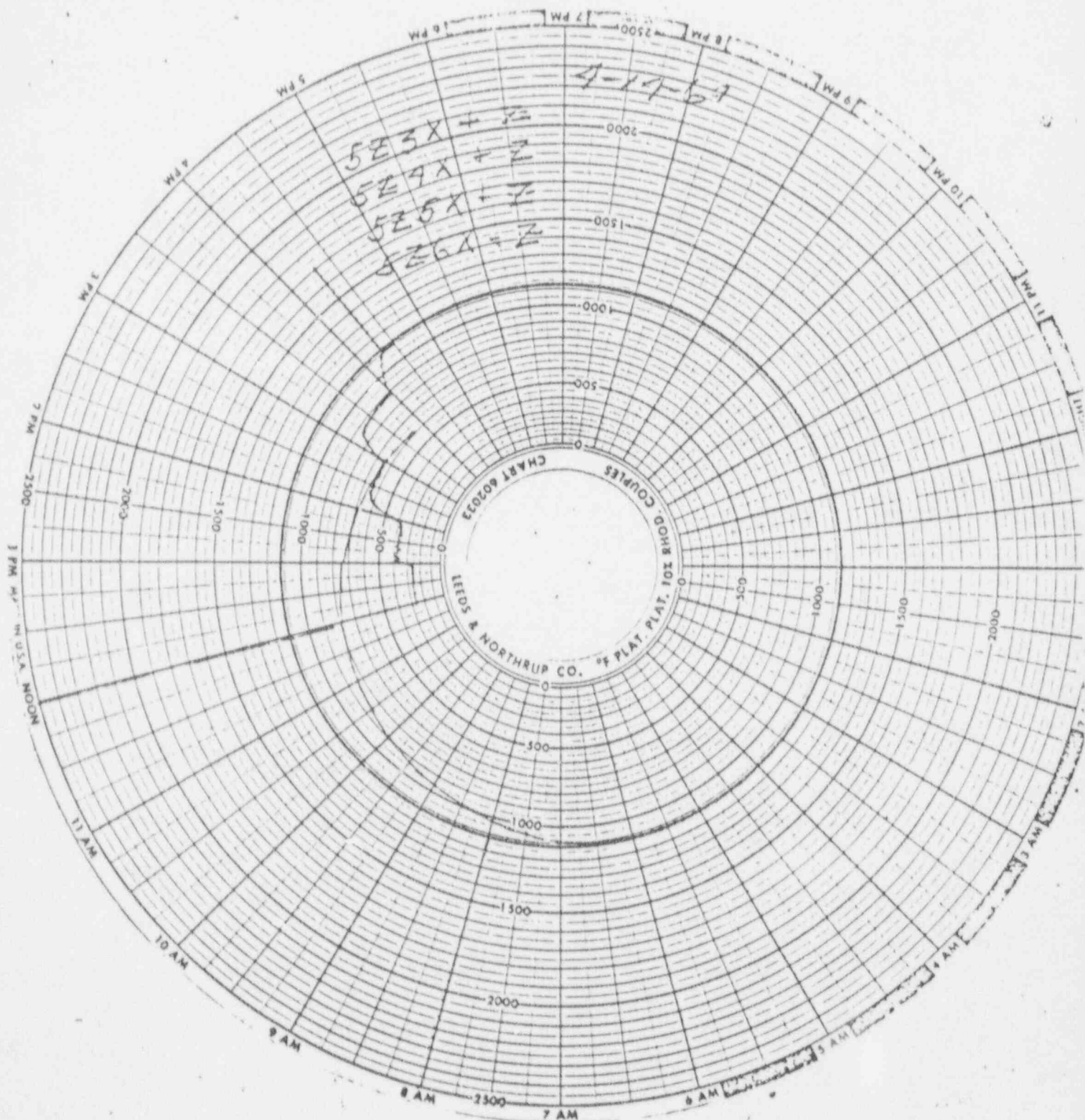
Gear on Motor Shaft
Gear on Auxiliary Shaft
Cam Cycle Time

Unmarked
"A"
150 hr (each Cam division = 2-1/2 hr)

Time (hr)	Temperature Degrees F.	Tolerance Degrees F.	Percentage of Cam *
0	125	+50	3
1	375		11
2	625		19
3	875		28
4	1125	+25	38
66-1/2	1125		38
67-1/2	1025		34
68-1/2	925		30
69-1/2	825		26
70-1/2	725		22
71-1/2	625		18
72	600		17

*From this position on Cam, subtract 3/16", or 6%

97



LINDE DIVISION
UNION CARBIDE CORPORATION
P. O. Box 550, Niagara Falls, N.Y.

CERTIFICATE OF ACCEPTANCE INSPECTION

Shipped to: Chicago Bridge and Iron Company
2700 Channel Avenue
Memphis, Tennessee

Shipper No.: 027092
Quantity Shipped: 84,000 Lb.
Date Shipped: 3-24-69

Your Order No.: A-2284

REPORT OF TESTS OF GRADE 124 UNIONMELT WELDING COMPOSITION

Identification of Material Tested: Grade 124, Size 20 x 150,
Lot 3876, Run 934.

This certifies that the Welding Composition identified above has been tested for conforming to specifications as follows:

Sizing:	<u>20 Mesh</u>	<u>Minus 150 Mesh</u>	
	<u>1.3%</u>	<u>3.5%</u>	
	<u>2.5%</u>	<u>10.0%</u>	
Uniformity:	<u>SiO₂</u>	<u>CaO</u>	<u>Al₂O₃</u>
	<u>32.07%</u>	<u>21.11%</u>	<u>14.50%</u>
	<u>29-38%</u>	<u>18-23%</u>	<u>11-17%</u>

Lower line gives specification limits - single values are maximum.

State of New York
County of Niagara

Sworn to before me this
19th day of December, 19 69

Raymond L. Bucke

R. E. Skelton
Materials Quality - Electric Welding

Adcom Metals Company, Inc.

February 4, 1969

1117 ALBERT AVE. N.E.
ATLANTA GEORGIA 30316

SHIPPED TO: Chicago Bridge & Iron
P.O. Box 277
Birmingham, Ala. 35202

DATE SHIPPED: 1-17-69

CUSTOMER ORDER #B52815-2471/72U

ADCOM ORDER # 867

Gentlemen:

We hereby certify that material referred to conforms to the physical and tests as follows and is in accordance with specifications.

Material Marked 3/16" 1MMM Consisting of 60-70# coils 14

Heat	C	Mn	P	S	Si	Ni	Cr	Mo	Va
S-3986	.16	1.97	.010	.012	.07	1.07	.010	.55	
	Al	Ti	Cu						
	.006		.05						

T.S.

Y.S.

Elon.

Pro.Si.

Rockwell

CHICAGO BRIDGE & IRON COMPANY

1500 N. 50TH ST. P.O. BOX 277, BIRMINGHAM, ALABAMA 35202

TWX 810-733-3654
Western Union-WUX
Area Code: 205 593-1191

CERTIFICATE OF ANALYSIS

PURCHASE ORDER NUMBER:

MECHANICAL TESTS

Test Number: PT#200-Single Wire
Type Electrode: Adcom Inmm/Linde 124
Trade Name: Adcom Inmm Wire
Diameter: 3/16" ϕ
Lot Number: Run #934 For Linde 124
Heat Number: S-3986

Heat Treatment 62-1/2 hours @ 1125/115

Tensile Properties At Room Temperature

Type: 0.505" ϕ

UTS 86,500

YLP 71,800

% Elongation in 2 inches = 30.0%

% Reduction of Area = 68.6%

CHEMICAL TESTS

Carbon. . . . 0.080

Manganese. . . 1.42

Chromium. . . 0.07

Nickel. . . . 0.96

Silicon. . . . 0.36

Columbium. . .

Tantalum. . .

Molybdenum. . . 0.52

Tungsten. . .

Copper. . . . 0.05

Titanium. . .

Phosphorus. . . 0.017

Sulfur. . . . 0.016

Vanadium. . .

Iron. . . .

Schaeffler Ferrite. .

Impact Properties

Type: Charpy Vee Notch

Orientation: 1 to Weld Direction

Test Temperature Plus 10°F

Foot-lbs. 46-51-49

% Shear 40-40-40

Lateral Expansion 38-44-43

This material conforms to Section III of the ASME CODE,
Paragraph N511.3

CHICAGO BRIDGE AND IRON COMPANY
Birmingham Materials Laboratory

By HAROLD GRAY Date 5-12-69
In charge of Testing for Materials Evaluation.

165

THE REID-AVERY COMPANY
BALTIMORE, DUNDALK, MARYLAND
QUALITY ASSURANCE TEST REPORT

DATE April 13, 1971

SOLD TO: Chicago Bridge & Iron Co.
2700 Channel Avenue
P. O. Box 13308
Memphis, Tennessee 38113
P.O. NO. - H30502-0416-30

SHIPPED TO: same

RECEIVED DATE SHIPPED: 2/23/71
MEMPHIS, TENN.

APR 15 1971

SPECIFICATION:					
ITEM	POUNDS	SIZE	TYPE	LOT NO.	HEAT NO.
1.	24,185	3/16	Raco 11331	60# Coils	3P4000
2.					
3.					
4.					
5.					
6.					

CHEMICAL ANALYSIS OF WIRE OR WELD METAL

ITEM	C	MN	P	S	SI	CR	NI	MO	CU	VA
1.	.13	1.86	.007	.014	.09	.05	.27	.48	.02	.005
2.										
3.										
4.										
5.										
6.										

ADDITIONAL TEST RESULTS

KS 4/15/71
[Signature]

State of _____
City of _____
Subscribed and sworn to before me this _____ day
of _____ 19 _____

Notary Public

I certify the chemical analysis and physical or mechanical test results reported above meet the specifications on the described material and are correct as contained in the records of the company.

[Signature]

(100)

CHICAGO BRIDGE & IRON COMPANY

P. O. BOX 13308, MEMPHIS, TENNESSEE 38113

CERTIFICATE OF ANALYSIS

901947-31

Purchase Order Number: M80502-0416-30 MECHANICAL TEST RESULTS
M20504-0416-30

Test Number: W.O. #14D (Single Wire)

Heat Treatment 1150°F +25° -50°F
for 62 1/2 Hours

Type Electrode: RACO 1NMM/Linde 124
(20 x 150) Flux

Tensile Properties

Trade Name: RACO 1NMM

Type: .505"φ

Electrode Diameter: 3/16"

UTS 84,500

Lot Number: ---

YLP 72,500

Heat Number: 3P4000

% Elongation in 2 inches = 28%

Flux Batch Number: Lot 3932
Run 989

% Reduction of Area = 69.3%

CHEMICAL TEST RESULTS

Impact Properties

Carbon..... .046

Type: Charpy Vee Notch

Manganese..... 1.35

Orientation: L to Weld Direction

Chromium..... .04

Test Temperature +10°F

Nickel..... .90

Foot - Lbs. 97, 95, 88

Silicon..... .37

% Shear 80, 80, 70

Columbium.....

Lateral Expansion 85, 82, 64

Tantalum.....

Molybdenum.... .45

Tungsten.....

Copper..... .02

This material conforms to SECTION
III of the ASME CODE, Paragraph N511.3

Titanium.....

Phosphorus.... .015

Sulfur..... .012

Vanadium.....

Iron.....

Schaeffler Ferrite..

CHICAGO BRIDGE & IRON COMPANY

BY

R. A. Dennis

DATE

April 15, 1971

KS
4/22/71

(161)

T-615-613

UNION CARBIDE CORPORATION
LINDE DIVISION
P.O. Box 66, Niagara Falls, New York 14302

CERTIFICATE OF ACCEPTANCE INSPECTION

Shipped to: Chicago Bridge and Iron
2700 Channel Avenue
Memphis, Tennessee 38113

Shipper's No.: 066919A
Quantity Shipped: 75,000 lbs.
Date Shipped: 2-17-71

RECEIVED
MEMPHIS, TENN.

FEB 22 1971

KS 2/22/71

Your Order No.: B-1000

REPORT OF TESTS OF GRADE 124 UNIONMELT WELDING COMPOSITION

Identification of Material Tested - Grade 124, Size 20 x 150,

Lot 3932, Run 989.

This certifies that the Welding Composition identified above has been tested for conforming to specifications as follows:

Sizing:	<u>20</u> Mesh	Minus <u>150</u> Mesh		
	<u>0%</u>	<u>6.1%</u>		
	<u>2.5%</u>	<u>10%</u>		
Uniformity:	<u>SiO₂</u>	<u>CaO</u>	<u>Al₂O₃</u>	<u>P</u>
	<u>33.06%</u>	<u>20.21%</u>	<u>13.93%</u>	<u>0.010%</u>
	<u>29-38%</u>	<u>18-23%</u>	<u>11-17%</u>	<u>0.025%</u>

Lower line gives specification limits - single values are maximum.

State of New York
County of Niagara

Sworn to before me this
19th day of February, 1971

Raymond T. Burke

A.E. Marshall
Consumables Quality - Electric Welding

Printed Name
Signature
Date
Notary Public for the State of New York

52

ALLOY RODS COMPANY
Division of Chemetron Corporation

Certificate of Analysis

Chicago Bridge & Iron Co.
P. O. Box 277
Birmingham, Ala.

Customer Order No. B111503-2471/72

Order No. _____

Shipped 3/17/69

This material conforms to Specification _____

Type E309-15

Trade Name: Arcaloy 309 Lime

This test material conforms to specification
SA 298 (ASME Section II Part A) and to
paragraph N-511.3 ASME Code Section III

Diameter Size: 3/16

4,080 lbs.

Lot Number: 3A922H5C

Heat Number: W73594

Carbon .05

Manganese 1.79

Chromium 23.51

Nickel 12.79

Silicon .54

Columbium

Tantalum

Molybdenum

Tungsten

Copper

Titanium

Phosphorus .020

Sulphur .011

Vanadium

Iron

Ferrite 7%

This is to certify that the original copy
of this report has been properly signed
and notarized.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 23rd day of June

19 69

The undersigned certifies that this report is
correct and that no significant change has
been made in any of the elements described
in the qualification approval.

ALLOY RODS COMPANY
Division of Chemetron Corporation

SEAL

Conrad J. Salcometti
Notary Public

My commission expires: 5/8/72

Witnessed by R. Stallman, Q. C. Engr.

BY

J. Harbold
J. Harbold

CHICAGO BRIDGE & IRON COMPANY

P. O. BOX 13308, MEMPHIS, TENNESSEE 38113

CERTIFICATE OF ANALYSIS

801 847-31

Purchase Order Number: B111503-
2471/72

Test Number: M281C

Type Electrode: E309-15 (SA-298)

Trade Name: Alloy Rods Co.

Electrode Diameter: 3/16"

Lot Number: 3A922H5C

Heat Number: W73594

Flux Batch Number:

CHEMICAL TEST RESULTS

Carbon,.....
Manganese,.....
Chromium,.....
Nickel,.....
Silicon,.....
Columbium,.....
Tantalum,.....
Molybdenum,....
Tungsten,.....
Copper,.....
Titanium,.....
Phosphorus,....
Sulfur,.....
Vanadium,.....
Iron,.....
Schaeffler Ferrite..
Cobalt,..... .090

MECHANICAL TEST RESULTS

Heat Treatment

Tensile Properties

Type:

UTS

YLP

% Elongation in _____ inches =

% Reduction of Area =

Impact Properties

Type: Charpy Vee Notch

Orientation: _ to Weld Direction

Test Temperature

Foot - Lbs.

% Shear

Lateral Expansion

This material conforms to SECTION
III of the ASME CODE, Paragraph N511.3

CHICAGO BRIDGE & IRON COMPANY

BY R. A. Dennis DATE May 14, 1970

CHEMETRON CORPORATION

ABC PRODUCTS MANUFACTURING DIVISION

Certificate of Analysis

Chicago Bridge & Iron
2700 Channel Ave.
Memphis, Tenn

Customer Order No. 24897

Order No. 61999

Shipped 12/4/70

This material conforms to Specification ASME SA 298 Par N511.3 Section III

Test No. RQ-6474

Type E308L-15

Trade Name: Arcaloy 308ELC Lime

Diameter Size: 3/16
4,000 Lbs.

Lot Number: K019H2C

Heat Number: X47214

These electrodes conform to ASME specification SA 298, type E308L-15 and were tested in accordance with the requirements of Par N511.3 of ASME Section III Nuclear Code.

We certify that this material is in compliance with Appendix IX Section III, ASME Code. (1968 Edition)

Carbon	.03
Manganese	1.69
Chromium	19.15
Nickel	9.26
Silicon	.72
Columbium	
Tantalum	
Molybdenum	
Tungsten	
Copper	
Titanium	
Phosphorus	.02
Sulphur	.02
Vanadium	
Iron	
Ferrite	6%
Cobalt	.19

This is to certify that the original copy of this report has been properly signed and notarized.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 3rd, day of December 19 70

SEAL

Barbara H. L. [Signature]
Notary Public

My commission expires: 5/8/72

The undersigned certifies that this report is correct and that no significant change has been made in any of the elements described in the qualification approval.

CHEMETRON CORPORATION
ABC PRODUCTS MANUFACTURING DIVISION

BY

R. R. Bloom
R. R. Bloom

(57)

APPENDIX D

Weld Logs

Contract No. 62-2472
 Beam or Nozzle No. Beam SCAM G2
(Nozzle)

[illegible]

MEMPHIS WA. FACTURING

Traveler Card Set 1200R-11
Sequence No. 6-6

Contract No. 61-7472
 Beam or Nozzle No. Dip. 1 and B.

[illegible]

[illegible]

SIGN-OFF DATE 2-19-20

Q. 151112

Sl. Ring, 17.54

Contract No. 68-2472
 Spec Identification 61" TENSION

SIGN-OFF DATE 2-29-20

INSIDE

Seam Identification "C2" Inset
Sequence No. 2

2-3-10

Name Of Nozzle No. 2119-3-1-2[illegible]

Beam or Nozzle No. 9

[illegible]

Seam Or Nozzle No. R-67-1 ⁵⁰⁰⁰¹²

[REDACTED] THAT I WOULD HAVE
 [REDACTED] AND MAY
 [REDACTED] TO
 [REDACTED] THE [REDACTED] CARD
 [REDACTED]

17.21.79

SEAM OR NOZZLE NO. R2A-R2B FI-020

[illegible]

STOW-OPP DATE 7-17-69

Seam Identification P119#2 SEAMF-1
Sequence No. SEAMF-122-1

[illegible]

[illegible]

THERMAL HISTORY FOR:

PC MK: 201	PC MK: 251	PC MK:	PC MK: SAFE END ER	PC MK:	PC MK: SAFE END ER
#1 H-2 RING	#1 H-2 RING	NO. 11	NO. 11	NO. 11	NO. 11
VENDOR: LUKENS	VENDOR: LUKENS	VENDOR:	VENDOR:	VENDOR:	VENDOR:
Q & T	Q & T	Q & T	Q & T	Q & T	Q & T
1650-5HR 20M	1650-5HR 20M				
1220-5HR 25M	1220-5HR 25M				
STRESS RELIEF	STRESS RELIEF	STRESS RELIEF	STRESS RELIEF	STRESS RELIEF	STRESS RELIEF
LUKENS	LUKENS				
2A	2A				
50M	50M				
10M-1150	10M-1150				

CB&I HEAT TREATMENT

OPERATION	DATE	ACCUM	OPERATION	DATE	ACCUM	OPERATION	DATE	ACCUM	OPERATION	DATE	ACCUM
TIME @ TEMP	TIME @ TEMP	TIME	TIME @ TEMP	TIME @ TEMP	TIME	TIME @ TEMP	TIME @ TEMP	TIME	TIME @ TEMP	TIME @ TEMP	TIME
5-14-69	4HR	20M	5-14-69	4HR	20M	5-14-69	4HR	20M	5-14-69	4HR	20M
1200-5	✓		1200-5	✓		1200-5	✓		1200-5	✓	
3-22-70	2HR		3-22-70	2HR		3-22-70	2HR		3-22-70	2HR	
24HR @ 1175	40MIN		24HR @ 1175	40MIN		24HR @ 1175	40MIN		24HR @ 1175	40MIN	
6-17-69	6HR	20M	6-17-69	6HR	20M	6-17-69	6HR	20M	6-17-69	6HR	20M
1200-9	✓		1200-9	✓		1200-9	✓		1200-9	✓	
3-22-70	5HR		3-22-70	5HR		3-22-70	5HR		3-22-70	5HR	
24HR @ 1175	25MIN		24HR @ 1175	25MIN		24HR @ 1175	25MIN		24HR @ 1175	25MIN	
8-18-69	7HR	30MIN	8-18-69	7HR	30MIN	8-18-69	7HR	30MIN	8-18-69	7HR	30MIN
1200-19	✓		1200-19	✓		1200-19	✓		1200-19	✓	
4-22-70	7HR		4-22-70	7HR		4-22-70	7HR		4-22-70	7HR	
24HR @ 1175	40MIN		24HR @ 1175	40MIN		24HR @ 1175	40MIN		24HR @ 1175	40MIN	
1200-5	✓		1200-5	✓		1200-5	✓		1200-5	✓	
3-22-70	10HR		3-22-70	10HR		3-22-70	10HR		3-22-70	10HR	
24HR @ 1175	30MIN		24HR @ 1175	30MIN		24HR @ 1175	30MIN		24HR @ 1175	30MIN	
1200-9	✓		1200-9	✓		1200-9	✓		1200-9	✓	
3-22-70	13HR		3-22-70	13HR		3-22-70	13HR		3-22-70	13HR	
24HR @ 1175	12MIN		24HR @ 1175	12MIN		24HR @ 1175	12MIN		24HR @ 1175	12MIN	
1200-19	✓		1200-19	✓		1200-19	✓		1200-19	✓	
4-22-70	15HR		4-22-70	15HR		4-22-70	15HR		4-22-70	15HR	
24HR @ 1175	30MIN		24HR @ 1175	30MIN		24HR @ 1175	30MIN		24HR @ 1175	30MIN	
1250-6	✓		1250-6	✓		1250-6	✓		1250-6	✓	
5-25-70	17HR		5-25-70	17HR		5-25-70	17HR		5-25-70	17HR	
1250-48	✓		1250-48	✓		1250-48	✓		1250-48	✓	
1250-48	15MIN		1250-48	15MIN		1250-48	15MIN		1250-48	15MIN	
LUKENS			LUKENS			LUKENS			LUKENS		
ADJUSTED			ADJUSTED			ADJUSTED			ADJUSTED		
2HR 15MIN	30MIN		2HR 15MIN	30MIN		2HR 15MIN	30MIN		2HR 15MIN	30MIN	
1250-40	✓		1250-40	✓		1250-40	✓		1250-40	✓	
6-19-70	20HR		6-19-70	20HR		6-19-70	20HR		6-19-70	20HR	
1HR @ 1175	30MIN		1HR @ 1175	30MIN		1HR @ 1175	30MIN		1HR @ 1175	30MIN	
1250-48	✓		1250-48	✓		1250-48	✓		1250-48	✓	
8-6-70	26HR		8-6-70	26HR		8-6-70	26HR		8-6-70	26HR	
64HR @ 1175	45MIN		64HR @ 1175	45MIN		64HR @ 1175	45MIN		64HR @ 1175	45MIN	
1600-9	✓		1600-9	✓		1600-9	✓		1600-9	✓	
9-9-71	32HR		9-9-71	32HR		9-9-71	32HR		9-9-71	32HR	
64HR @ 1175	55MIN		64HR @ 1175	55MIN		64HR @ 1175	55MIN		64HR @ 1175	55MIN	

DESCRIPTION OF ASSEMBLY

SECTION #2 (H-2 RING)

CONTRACT 68-2422 SHEET 11 of 29

CERTIFICATION

CB&I AAM DATE: 7-72 CUSTOMER DATE CODE DATE DWG REV

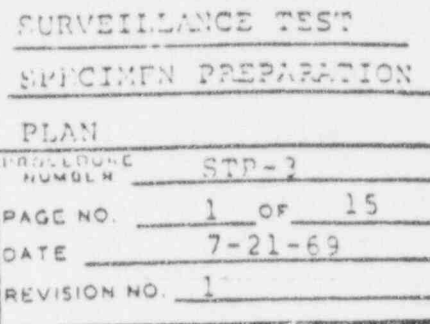
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Section 2 (2 Small Pools)

CB & I Ann DATE 11-7-72 CUSTOMER DATE CODE DATE DWG REV

APPENDIX F

Surveillance Test Specimen Plan



FORMER	GENERAL ELECTRIC COMPANY
PRODUCT	BOILING WATER NUCLEAR REACTOR
ASSEMBLY	
DESCRIPTION	

THIS PLAN APPLIES TO THE THREE (3) REACTORS FOR CAROLINA POWER AND LIGHT COMPANY, CONTRACT NUMBERS 68-2471/72/73.

- 1.1 All final cutting shall be done by machining.
- 1.2 Specimen marking and mark orientation are of utmost importance. In case of a mistake, or if uncertain about the marking on a blank, DO NOT use it for a finished specimen.
- 1.3 Material must be used cautiously since there is no replacement material.
- 1.4 Material to be heat treated at 1150°F plus 25°F or minus 50°F for a total of 50 hours, less any heat treating time after tempering.

- 2.1 Arrange each group of like specimens in serial order so they will remain in serial order during shipment.
- 2.2 Adequately crate or box specimens for protection during shipment.

Approved September 4, 1969 by Eugene O'Connor. Received from G.E. ER #S939 dated 9-8-69, VPF #2478-291-1

			OB	OB	OB	OB	OB	NUS	OB	RIG	RFG	MFC	MFC	DIST		BT	CAT
DR	EXP	NON	ENGR	FIELD	INSP	CC			NU	MIC	MFG	CONST	CONG	Subst.	Unde	0-7	0-1

SURVEILLANCE TEST

SPECIMEN PREPARATION

PLAN

PROBLEM STP-2

PAGE NO. 2 OF 15

DATE 7-21-69

REVISION NO. 1

GENERAL ELECTRIC COMPANY
 PRODUCT BOILING WATER NUCLEAR REACTOR
 ASSEMBLY
 DESCRIPTION

- 2.3 The X-ray films of the welded seams in the surveillance test plates and 4 copies of all metallurgical data and documents including Drawings T-5 through T-13, (Certified Test Reports) of plate, heat treatment records and nondestructive test reports shall be packed in the same box as the test specimens. Two reproducible prints of above metallurgical data and documents shall be submitted by mail within five days of the shipment. The covering letter shall include the date of shipment, the route and all shipping documents.

3.0 BASE METAL MATERIAL

- 3.1 The base metal shall be taken from Test Plate marked (2607), which shall be cut from shell Plate marked (301), as shown on Drawing T-5. Plate (301) is a plate opposite the Active Fuel Zone in the Core Region.
- 3.2 Test Plate (2607), Drawing T-5, shall be given a stress relief in accordance with paragraph 1.4 to simulate the stress relief of the Core Region Plates (301 and 351). X-rays of the weld must be sent to the customer (see paragraph 2.3).

4.0 BASE METAL TEST PLATE SHIPPED TO GENERAL ELECTRIC

- 4.1 Stencil base metal Test Plate marked (2610) cut from shell Plate marked (301) as follows:
 (Use symbols at least 1/4" high)

G.E. BASE METAL

MILL ROLLING DIRECTION

HEAT NUMBER

SLAB NUMBER

CONTRACT NUMBER

Documents shall be supplied to General Electric showing the source, chemistry and all heat treatment of the plate.

- 4.2 The above Test Plate marked (2610) shall be shipped to General Electric.



SURVEILLANCE TEST

SPECIMEN PREPARATION

PLAN

CLIENT GENERAL ELECTRIC COMPANY
PROJECT BOILING WATER NUCLEAR REACTOR
ASSEMBLY _____
DESCRIPTION _____

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5.0 BASE METAL TEST PLATE USED BY CHICAGO BRIDGE & IRON TO MAKE
BASE METAL MECHANICAL TEST SPECIMENS

Plate (2607) cut from shell Plate (201) shall be used to make Mechanical Test Specimens required by Drawings T-6, T-7 and T-8.

6.0 BASE METAL CHARPY SPECIMENS

6.1 Specimen Requirements

6.1.1 Prepare the Charpy Impact Specimens in accordance with Drawings T-6 and T-7.

6.1.2 The specimens shall be taken from 1/4 thickness position in the plate. The long axis of the specimen shall be parallel to the plate rolling direction. The specimen notch shall be perpendicular to the original plate surface and shall be controlled by the orientation of the red markings on the specimen blanks.

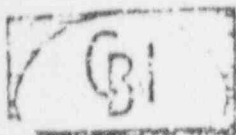
6.2 Specimen Preparation

6.2.1 Power band saw two (2) 2 1/2" x 5 5/8" x 12" sub-blocks and stencil them DMC-A and DMC-B as indicated on Drawing T-6.

6.2.2 Finish machine entire side to be marked and stencil each specimen blank location as shown on Drawing T-7 before dividing the sub-blocks into slabs and specimen blanks. The top of the marking symbols are perpendicular to the original plate surface; therefore the top of the three digits will indicate the notched side of the specimen as shown in Detail D.

6.2.3 Power band saw the DMC-A sub-block into nineteen (19) 1/2" x 2 1/2" x 5 5/8" slabs, as indicated by Detail A.

6.2.4 Power band saw the DMC-B sub-block into 1/2" x 2 1/2" x 5 5/8" slabs, as indicated by Detail B. The remainder of this sub-block shall be stored.



OWNER GENERAL ELECTRIC COMPANY
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ASSEMBLY _____
DESCRIPTION _____

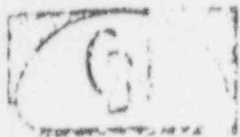
SURVEILLANCE TEST

SPECIMEN PREPARATION

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- 6.2.5 Machine both 5 5/8" x 2 1/2" surfaces of each slab to a thickness of 0.400" $\pm .005$ ".
-0
- 6.2.6 Power band saw the 2 1/2" x 0.400" x 5 5/8" slabs into specimen blanks as shown in Detail C.
- 6.2.7 Machine both 2 1/2" x 0.400" surfaces of each specimen to a thickness of 0.400" $\pm .005$ ", as indicated in Detail D.
-0
- 6.2.8 Place fifty-three (53) specimen blanks (2K1 through 2MJ for 68-2471; 361 through 3AJ for 68-2472; 5L6 through 5MR and JAL through JAY for 68-2473) in separate serially marked envelopes and prepare them in accordance with the following paragraphs 6.2.8.1 through 6.2.8.7.
- 6.2.8.1 Machine and finish grind the 2 1/2" x 0.400" surfaces to a thickness of .394", as indicated in Detail E. Place each blank in its serially marked individual envelope for further processing.
- 6.2.8.2 Mark with pen, an arrow on the notch side of the specimen blank (indicating the proper mark orientation). See Detail E.
- 6.2.8.3 Finish unmarked end of each specimen in accordance with Detail F, and return specimen to its envelope.
- 6.2.8.4 Remark the designated marked end of each finished specimen with its corresponding envelope serial number if its original mark is destroyed. Start with the lowest marked envelope and proceed serially.
- 6.2.8.5 Finish the specimen in accordance with Detail F



SURVEILLANCE TEST

SPECIMEN PREPARATION

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CLIENT GENERAL ELECTRIC COMPANY
PRODUCT BOILING WATER NUCLEAR REACTOR
ASSEMBLY
DESCRIPTION

6.2.8.6 100% dimensionally inspect, clean and dip each specimen in "Dip Seal Plastic" DS 300 Clear, or equal.

6.2.8.7 Package fifty-three (53) specimens in accordance with shipment instructions, Paragraph 2.0 of this plan. The specimens shall be sent to General Electric's Plant at San Jose, California.

6.2.9 Extra specimens are to be placed in serially marked envelopes and retained by GEF for possible dimensional rejects. In the cases where extra specimens are not provided, dimensional rejects will be discarded and their mark numbers will be used on replacement specimens taken from the extra material. Care must be taken to insure proper specimen orientation and source.

7.0 BASIC METAL TENSILE SPECIMENS

7.1 Specimens Required As

7.1.1 Prepare the tensile specimens in accordance with Drawings T-6 and T-8.

7.1.2 The specimens shall be taken from 1/4 thickness positions in the plate. The long axes of the specimens shall be parallel to the plate rolling direction.

7.2 Specimen Preparation

7.2.1 Power band saw one (1) 3 1/2" x 5 5/8" x 12" sub-block and stencil it BNF as indicated on Drawing T-6.

7.2.2 Stencil each specimen blank location as shown on Drawing T-8 before dividing the sub-block into slabs and specimen blanks.

7.2.3 Power band saw the 3 1/2" x 5 5/8" x 12" sub-block into ten (10) 5/8" x 3 1/2" x 5 5/8" slabs, as indicated by Detail A.



SURVEILLANCE TEST

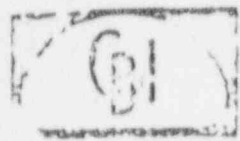
SPECIMEN PREPARATION

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OWNER GENERAL ELECTRIC COMPANY
PRODUCT BOILING WATER NUCLEAR REACTOR
ASSEMBLY _____
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- 7.2.4 Power band saw the ten (10) 5/8" x 3 1/2" x 5 5/8" slabs into specimen blanks, as shown in Detail B.
- 7.2.5 Place fourteen (14) specimen blanks (331 through 33K for 68-2471; 5J1 through 5JK for 68-2472; 625 through 62T for 68-2473) in separate serially marked envelopes and prepare them in accordance with the following paragraphs 7.2.5.1 through 7.2.5.4.
- 7.2.5.1 Finish each specimen in accordance with Detail D, Drawing T-8 and return it to its envelope.
- 7.2.5.2 Remark one end of each finished specimen with its corresponding envelope serial number if its original mark is destroyed. Start with the lowest marked envelope and proceed serially.
- 7.2.5.3 100% dimensionally inspect, clean and dip each specimen in "Dip Seal Plastic" DS 300 Clear, or equal.
- 7.2.5.4 Package fourteen (14) specimens in accordance with shipment instructions, Paragraph 2.0 of this plan. The specimens shall be sent to General Electric's Plant at San Jose, California.
- 7.2.6 Extra specimens are to be placed in serially marked envelopes and retained by GE&I for possible dimensional rejects. In the cases where extra specimens are not furnished, dimensional rejects will be discarded and their mark numbers will be used on replacement specimens taken from the extra material provided. Care must be taken to insure proper specimen orientation and source.



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PRODUCT _____ BOILING WATER NUCLEAR REACTOR
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DESCRIPTION _____

8.0 WELD & HEAT AFFECTED ZONE MATERIAL

- 8.1 The weld and heat affected zone metal shall be taken from Plate marked (2608), cut from shell Plate marked (301), with a central weld which is similar to the reactor vessel longitudinal weld. (See Drawing T-5).
- 8.2 Test Plate (2608), Drawing T-5, shall be given a stress relief in accordance with Paragraph 1.4 to simulate the stress relief of the Core Region Plates (301 and 351). X-rays of the weld must be sent to the customer (See Paragraph 2.3).

9.0 WELDED TEST PLATE SHIPPED TO GENERAL ELECTRIC

- 9.1 Stencil welded Test Plate marked (2609) cut from shell Plate marked (301) as follows: (Use symbols at least 1/4" high)

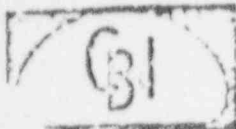
G.E. WELD METAL
MILL ROLLING DIRECTION
HEAT NUMBER
SLAB NUMBER
CONTRACT NUMBER

Documents shall be supplied to General Electric showing the source, chemistry and heat treatment of the plate.

- 9.2 The above welded test Plate marked (2609) shall be shipped to General Electric in accordance with Paragraph 2.0.

10.0 WELDED TEST PLATE USED BY CHICAGO BRIDGE & IRON TO MAKE WELD AND HEAT AFFECTED ZONE MECHANICAL TEST SPECIMENS

- 10.1 Plate (2608) cut from shell Plate (301) shall be used to make the Mechanical Test Specimens required by Drawings T-9 through T-13.
- 10.2 Test Plate (2608) shall be cut into four (4) control blocks as indicated on Drawing T-9. (Stencil all excess material and control blocks as indicated)



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DESCRIPTION

11.0 WELD METAL CHARPY SPECIMENS (WC)

11.1 Specimen Requirements

11.1.1 Prepare the Charpy Impact Specimens in accordance with Drawings T-9 and T-10.

11.1.2 The long axis of the specimen shall be perpendicular to the weld direction and parallel to the plate surface, with the middle of the specimen at the mid-plane of the weld as shown in Drawing T-10. The notch shall be perpendicular to the plate surface.

11.2 Specimen Preparation

11.2.1 Power band saw the central weld section 5 1/2" x 5 5/8" x 2 1/2", marked WC, with the weld center plane at the center of the weld block indicated in Detail B, Drawing T-9.

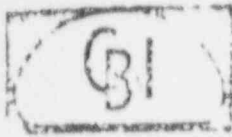
11.2.2 Finish machine end face side to be marked and stencil each specimen blank location as shown on Drawing T-10 before dividing the central weld section into slabs and specimen blanks. The top of the marking symbols are on a line perpendicular to the plate surface; therefore, the top of the three digits will indicate the notched side of the specimen as shown in Detail D, Drawing T-10. THIS IS VERY IMPORTANT.

11.2.3 Power band saw the 5 1/2" x 5 5/8" x 2 1/2" weld control block (WC) into nine (9) 1/2" x 5 5/8" x 2 1/2" slabs.

11.2.4 Machine both 5 5/8" x 2 1/2" surfaces of each slab to get a thickness of 0.400" $\begin{smallmatrix} +.005 \\ -0 \end{smallmatrix}$. (Drawing T-10, Detail B).

11.2.5 Power band saw the nine (9) 5 5/8" x 0.400" x 2 1/2" slabs into specimen blanks.

11.2.6 Machine both 2 1/2" x 0.400" surfaces of each specimen to a thickness of 0.400" $\begin{smallmatrix} +.005 \\ -0 \end{smallmatrix}$, as indicated in Detail C, Drawing T-10.



SURVEILLANCE TEST

SPECIMEN PREPARATION

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TOWER GENERAL ELECTRIC COMPANY
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11.2.7 Place fifty-three (53) specimen blanks (2P1 through 2UJ for 68-2471; 3AK through 3D6 for 68-2472; 5MU through 5UD for 68-2473) in separate serially marked envelopes and prepare them in accordance with the following Paragraphs 11.2.7.1 through 11.2.7.6.

11.2.7.1 Machine and finish grind the 2 1/2" x 0.400" surfaces to a thickness of .394", as indicated in Detail D, Drawing T-10. Place each blank in its serially marked individual envelope for further processing.

11.2.7.2 Finish grind the unmarked end as indicated in Detail D, Drawing T-10.

11.2.7.3 Mark with pen, an arrow on the notched side of the specimen blank per Detail D, Drawing T-10. Remark the designated end of each blank with its corresponding envelope number if its original mark is destroyed. Use the arrow to orient the mark number properly.

11.2.7.4 Finish the specimen in accordance with Detail E, Drawing T-10.

11.2.7.5 100% dimensionally inspect, clean and dip the specimens in "Dip Seal Plastic" DS 300 Clear, or equal, for protection against rust and mechanical damage.

11.2.7.6 Package fifty-three (53) specimens in accordance with shipment instructions, Paragraph 2.0 of this plan. The specimens shall be sent to General Electric at San Jose, California.

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11.2.0 Extra specimens are to be placed in serially marked envelopes and retained by C&I for possible dimensional rejects. In the cases where extra specimens are not furnished, dimensional rejects will be discarded and their mark numbers will be used on replacement specimens taken from the extra material provided. Care must be taken to insure proper specimen orientation and source.

WELD METAL TENSILE SPECIMENS

12.1 Specimen Requirements

- 12.1.1 Prepare the weld metal tensile specimens in accordance with Drawings T-9 and T-11.
- 12.1.2 The long axis of the specimens shall be parallel to the length of the weld and parallel to the top surface of the plate. The 3/8" length of the specimens shall be of weld deposit metal only. The threaded ends of the specimens may include base metal.

12.2 Specimen Preparation

- 12.2.1 Power band saw the central weld section 14 3/8" x 5/8" x 5 3/8" per Detail A, Drawing T-9.
- 12.2.2 Mark the top of the central weld section sub-block with 1/4" x 3/8" x 5/8" with 4 arrows to indicate the location of the mark number and power band saw it into four (4) 3 1/2" x 5/8" x 5 5/8" slabs per Detail A, Drawing T-11.
- 12.2.3 Stencil each specimen blank location per Detail B, Drawing T-11, before dividing the slabs into specimen blanks.
- 12.2.4 Power band saw the four (4) slabs into specimen blanks as indicated in Detail B, Drawing T-11, and place each in its envelope.

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12.2.5 Place thirteen (13) specimen blanks (13) through 103 for 68-2471, 51M through 58A for 68-2472, 61U through 63D for 68-2473 in separate serially marked envelopes and prepare them in accordance with the following Paragraphs 12.2.5.1 through 12.2.5.5.

12.2.5.1 Mark with pen, an arrow on the top side of the specimen blank indicating the proper marking orientation - see Detail C, Drawing T-11 and finish the blank ends to obtain the proper specimen length. (See Detail D, Drawing T-11).

12.2.5.2 Remark the designated marked end of each specimen with its corresponding envelope serial number if its original mark is destroyed. Use the marked arrow to orient the mark number properly. Sort with the lowest marked envelope and proceed serially.

12.2.5.3 Finish each specimen in accordance with Detail D, Drawing T-11.

12.2.5.4 100% dimensionally inspect, clean and dip each specimen in "Dip Seal Plastic" DS 300 Clear, or equal.

12.2.6 Extra specimens are to be placed in serially marked envelopes and retained by C&I for possible dimensional rejects. In the cases where extra specimens are not furnished, dimensional rejects will be discarded and their mark numbers will be used on replacement specimens taken from the extra material provided. Care must be taken to insure proper specimen orientation and source.

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13.2.8 Place fifty-three (53) specimen blanks (311 through 322 for 68-2111, 307 through 317 for 68-2472, 308 through 318 for 68-2473) in separate serially marked envelopes and prepare them in accordance with Paragraphs 13.2.8.1 through 13.2.8.4.

13.2.8.1 Machine and finish grind the 4" x 0.400" surfaces to a thickness of .394", as indicated in Detail D, Drawing T-12. Place each blank in its serially marked envelope for further processing.

13.2.8.2 Mark with pen, an arrow on the notched side of the specimen to indicate the location of the marking series and remark the designated end of each blank with its corresponding envelope mark number if its original mark is destroyed. Use the marked arrow to orient the mark number properly.

13.2.8.3 Finish the specimen in accordance with Detail E, Drawing T-12.

13.2.8.4 100% dimensionally inspect, clean and dip the specimens in "Dip Seal Plastic" DS 300 Clear, or equal, for protection against rust and mechanical damage. Package fifty-three (53) specimens in accordance with shipment instructions. Paragraph 2.0 of this plan. The specimens shall be sent to General Electric's plant at San Jose, California.

13.2.9 Extra specimens are to be placed in serially marked envelopes and retained by GEl for possible dimensional rejects. In the cases where extra specimens are not furnished, dimensional rejects will be discarded and their mark numbers will be used on replacement specimens taken from the extra material provided. Care must be taken to insure proper specimen orientation and source.

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13.0 HEAT AFFECTED ZONE CHARPY SPECIMENS

13.1 Specimen Requirements

13.1.1 Prepare the Charpy Impact Specimens in accordance with Drawings T-9 and T-12.

13.1.2 The long axis of the specimen shall be perpendicular to the length of the weld and parallel to the top surface of the plate. The radius of the notch of the specimen shall be at the edge of the weld. The axis of the notch shall be perpendicular to the original plate surface. The notch orientation shall be controlled by the marking orientation.

13.2 Specimen Preparation

13.2.1 Power band saw the central weld section 5 1/2" x 5/8" x 1", marked IAC, per Detail C, Drawing T-8.

13.2.2 Stencil each specimen blank location before dividing the central weld section into slabs and specimen blanks. The top of the marking symbols are on a line perpendicular to the plate surface and thus the top of the three digits will indicate the notched side of the specimen as shown in Detail D, Drawing T-12. THIS IS VERY IMPORTANT.

13.2.3 Lightly acid etch both 5 5/8" x 4" surfaces to locate the heat affected zone of each specimen blank to be made from the slab.

13.2.4 Power band saw the 5 1/2" x 5 5/8" x 4" weld control block, marked IAC, into seven (7) 1/2" x 5 1/2" x 4" slabs, as shown in Detail A, Drawing T-12.

13.2.5 Machine both 5 1/2" x 4" surfaces of each slab to get a thickness of 0.400" ± .005.

13.2.6 Power band saw the seven (7) slabs into specimen blanks.

13.2.7 Machine both 4" x 0.400" surfaces of each specimen to a thickness of 0.400" ± .005, as indicated in Detail C, Drawing T-12.

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14.0 HEAT AFFECTED ZONE TENSILE SPECIMENS

14.1 Specimen Requirements

14.1.1 Prepare the Heat Affected Zone Tensile Specimens in accordance with Drawings T-9 and T-13.

14.1.2 The long axes of the specimens shall be perpendicular to the length of the weld and parallel to the top surface of the plate. The center of the specimen shall be in the Heat Affected Zone adjacent to the edge of the weld metal.

14.2 Specimen Preparation

14.2.1 Power band saw the $2 \frac{7}{8}$ " x $5 \frac{5}{8}$ " x 5" central weld section, marked (HAT), with the weld center plane located as indicated in Detail D, Drawing T-9. Stencil the sub-block (HAT) as shown on Drawing T-9.

14.2.2 Stencil each specimen blank location as shown on Drawing T-13 before dividing the sub-block into slabs and specimen blanks.

14.2.3 Lightly acid etch both $5 \frac{5}{8}$ " x 5" surfaces to locate the Heat Affected Zone of each specimen blank to be made from the slab.

14.2.4 Power band saw six (6) $5 \frac{5}{8}$ " x $2 \frac{7}{8}$ " x 5" slabs as shown in Detail A, Drawing T-13.

14.2.5 Power band saw specimen blanks from the six (6) slabs as indicated in Detail B, Drawing T-13.

14.2.6 Place thirteen (13) specimen blanks (351 through 353 for 68-2471; 540 through 543 for 68-2472; 632 through 644 for 68-2473) in separate serially marked envelopes and prepare them in accordance with Paragraphs 14.2.5.1 through 14.2.5.5.

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14.2.6.1 Mark with pen, an arrow on the top side of the specimen blank to indicate the proper marking orientation and finish the blank ends obtaining the proper specimen length. (See Drawing T-13).

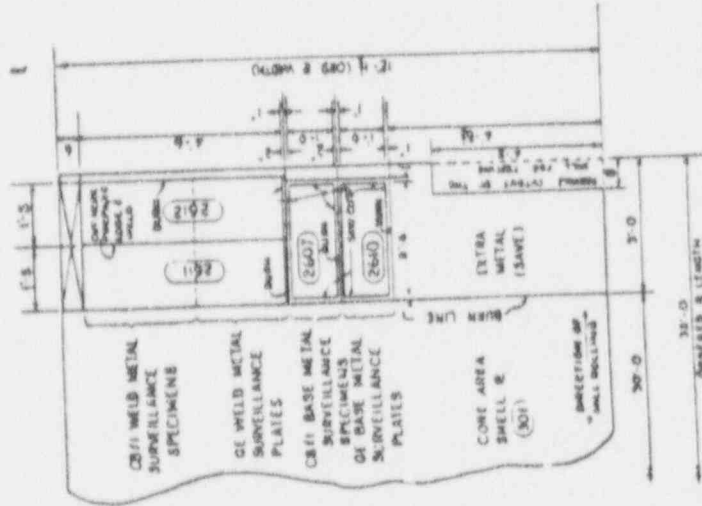
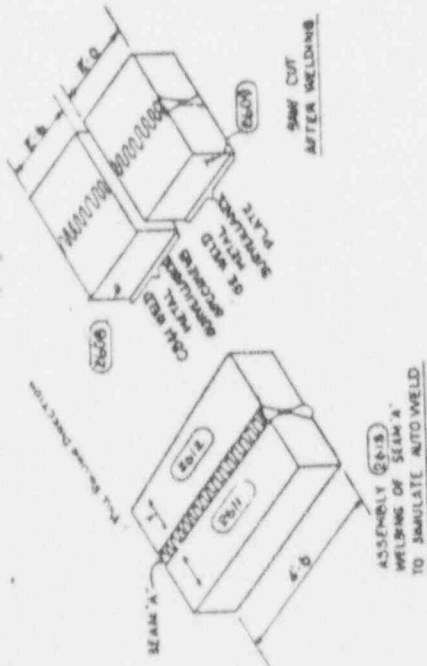
14.2.6.2 Remark the designated marked end of each specimen with its corresponding envelope serial number. If its original mark is destroyed, start with the lowest marked envelope and proceed serially.

14.2.6.3 Finish each specimen in accordance with Detail E, Drawing T-13.

14.2.6.4 100% dimensionally inspect, clean and dip each specimen in "Dip Seal Plastic" DS 300 Clear, or equal.

14.2.6.5 Package thirteen (13) specimens in accordance with shipment instructions, Paragraph 2.0, of this plan. The specimens shall be sent to General Electric's plant at San Jose, California.

14.2.7 Extra specimens are to be placed in serially marked envelopes and retained by GNEI for possible dimensional rejects. In the cases where extra specimens are not furnished, dimensional rejects will be discarded and their mark numbers will be used on replacement specimens taken from the extra material provided. Care must be taken to insure proper orientation and source.



10. 8 MATERIAL IS PER C841 C. SPEC. HB-1 REV. 1 (SA533 CL1 GRADE B FIREBOR)
11. SEE STP-3 (SPECIMEN PREPARATION PLAN) FOR ADDITIONAL INFORMATION REGARDING THE SURVEILLANCE SPECIMENS
12. USE SAME WELDING PROCEDURES AS USED ON CORE AREA R'S (301 AND 551).

1. RE MARK (2610) TO BE WELDED TOGETHER AS SHOWN AND DIVIDED INTO PIECES MARKED (2609) & (2608) TO BE DIVIDED INTO SURVEILLANCE TEST SPECIMENS PER DETAILS SHOWN ON DWGS T8 THROUGH T14 ALL SPECIMENS SHIP TO GE CO FOR THEIR USE.
2. PLATE MARKED (2609) TO BE SHIPPED TO GE CO FOR THEIR TEST
3. 2 MARKED (2607) TO BE DIVIDED INTO BASE METAL SURVEILLANCE TEST SPECIMENS PER DETAILS ON DWGS T6 THROUGH T8 ALL SPECIMENS SHIPPED TO GE CO FOR THEIR USE
4. 2 MARKED (2610) TO BE SHIPPED DIRECT TO GE CO FOR THEIR TEST PROGRAM

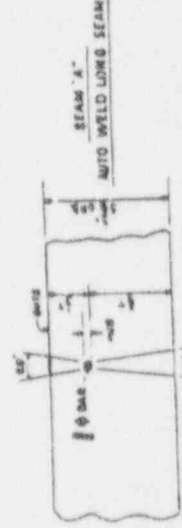
STENCIL PLATES AS FOLLOWS:

(2607)	(2608)	(2609)	(2610)
WELD METAL SURVEILLANCE	WELD METAL SURVEILLANCE	WELD METAL SURVEILLANCE	WELD METAL SURVEILLANCE
BASE METAL SURVEILLANCE	BASE METAL SURVEILLANCE	BASE METAL SURVEILLANCE	BASE METAL SURVEILLANCE
WELD METAL SURVEILLANCE	WELD METAL SURVEILLANCE	WELD METAL SURVEILLANCE	WELD METAL SURVEILLANCE
BASE METAL SURVEILLANCE	BASE METAL SURVEILLANCE	BASE METAL SURVEILLANCE	BASE METAL SURVEILLANCE

7. PWHT @ 450°F PLUS 25°F OR MINUS 50°F FOR 50 HOURS TOTAL (LESS ANY HT TIME AFTER TEMPERING).

8. ULTRASONIC TESTING OF ALL TEST SPECIMEN PLATE MATERIAL TO BE PERFORMED THE SAME AS REQ'D FOR VESSEL PLATE MATL. ULTRASONIC RADIOGRAPHY AND MAGNETIC PARTICLE TESTING OF TEST SPECIMEN WELD JOINTS TO BE PERFORMED THE SAME AS REQUIRED FOR VESSEL WELD JOINTS.

CUTTING ARRANGEMENT SURVEILLANCE TEST PROGRAM
(SEE SPECIFICATION 21-A-1010, REV. 0 SEC. 5, OR DA 31-111-10-30)



FORM 10-1 (Rev. 10-64)

1. PROJECT NAME: _____

2. DRAWING NO.: _____

3. DATE: _____

4. BY: _____

5. CHECKED BY: _____

6. APPROVED BY: _____

