

CLINTON POWER STATION - UNIT 1
"FRACTURE PREVENTION OF CONTAINMENT PRESSURE BOUNDARY"
GDC-51

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INTRODUCTION

The enclosed documentation tabulates the fracture toughness data in response to a Nuclear Regulatory Commission request at a meeting held May 12, 1981 in Sargent & Lundy's offices.

During this meeting the NRC specified the following components, which form part of the containment boundary, will require material certification to justify the lowest service metal temperature:

Penetrations - only the thickest wall penetration for each type material.

Head fittings - only the thickest head fitting for each type head fitting design and each type material.

Personnel and equipment hatches - only the thickest section of the hatch assembly.

Piping - only MS and FW typical spool sections from inside the containment penetration through the first isolation valve.

The lowest service metal temperature specified for each component above was based on the following logic:

1. Results of an acceptable fracture toughness in accordance with NC-2300;

or

2. Derived from Table NC-2311(a)-1, ASME Code, Section III for the particular material and heat treatment plus the temperature adjustment for thickness;

or

3. Derived from NUREG-0577. An NDT temperature was obtained for the particular material and heat treatment in the NDT $+1.3\sigma$ column of Table 4.4, and to this value was added the temperature adjustment for thickness from Figure NC-2311(a)-1 of ASME Section III.

Several components in the containment boundary are exempt from material certification requirements because of size or the fact they are fabricated from austenitic stainless steel. See Section II for the exemptions allowed by the ASME Code, Section III.

FRACTURE TOUGHNESS EXEMPTIONS
PER ASME SECTION III
1977 SUMMER - 1977 ADDENDA

1. Material with a nominal section thickness of 5/8 inch and less - ASME Section III 1977, Summer 1977, NC-2311(a)(1).
2. Bolting, including studs, nuts, and bolts, with a nominal size of 1 inch and less - ASME Section III 1977, Summer 1977, NC-2311(a)(2)
3. Bar with a nominal cross-sectional area of 1 square inch and less - ASME Section III 1977, Summer 1977, NC-2311(a)(3).
4. All thicknesses of material for pipe, tube, fittings, pumps, and valves with a nominal pipe size of 6 inches in diameter and smaller - ASME Section III 1977, Summer 1977, NC-2311(a)(4).
5. Material for pumps, valves, and fittings with all piping connections of 5/8 inch nominal wall thickness and less - ASME Section III 1977, Summer 1977, NC-2311(a)(5).
6. Austenitic stainless steel - ASME Section III 1977, Summer 1977, NC-2311(a)(6).
7. Nonferrous materials - ASME Section III 1977, Summer 1977, NC-2311(a)(7).

PENETRATIONS

Component Number	Drawing/ Document	Description	Material	Thickness	Impact Test Temp.	Test Data		Derived LSMT	Exempt	Notes
						Charpy V-notch	Mils Lateral			
MC11	S27-1911	34"Ø	SA240 Gr304	.500"	--	--	--	--	NC2311(a)(6)	
MC28	S27-1911	14"Ø	SA312 TP304	1.406"	--	--	--	--	NC2311(a)(6)	
MC86	S27-1911	10"Ø	SA333 Gr1	.593"	--	--	--	--	NC2311(a)(4)	
MC05	S27-1911	42"Ø	SA516 Gr70	1.500"	-30°F	17-26-48 ft/lbs	.025-.036-.050 in	--	--	per #1
MC42	S27-1911	18"Ø	SA333 Gr6	.937"	-50°F	104-79-95 ft/lbs	.086-.067-.082 in	--	--	per #1

BETHLEHEM STEEL CORPORATION
METALLURGY DEPARTMENT
REPORT OF TESTS AND ANALYSIS

65 file

PLANT DUINS HARBOR	SHIPMENT NO. 43-2312	DATE SHIPPED 11-1-75	CAR OR VEHICLE NO. CSS 100	FI 091578	PAGE 2
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CHICAGO BRIDGE & IRON CO
BOX 774
PANNAKEE IL 60971

SHIP TO
CHICAGO BRIDGE & IRON CO
TRAC #A1
INDIAN DAKS IL

DESCRIPTION & SPECIFICATION CUSTOMER ORDER NO. BSCO ORDER NO.	SERIAL NUMBER	HEAT NUMBER	SIZE & QUANTITY				YIELD STRENGTH	TENSILE STRENGTH	ELONG. IN. %	BEND	HARDNESS	
			No. Pcs.	Thickness	Width	Length					Type	Value
PLATE PLATES- MS-5-55 REV 2 & QAS-354 REV 0 ASME 73 ADD LONG V 2 FT LB AT MINUS 30 74-2433F-6 GH 7-31-8369												
			1	1- 1/2	59	127- 7/ 8	32.6	46100	74700	8	27	OK
			1	1- 1/2	59	127- 7/ 8	32.6	46100	74700	8	27	OK
			1	1- 1/2	59	127- 7/ 8	32.6	46100	74700	8	27	OK
			1	1- 1/2	59	127- 7/ 8	32.6	46100	74700	8	27	OK
			1	1- 3/ 8	59	115- 5/ 8	26.57	48900	77200	8	25	OK
			1	1- 3/ 8	59	115- 5/ 8	26.57	48900	77200	8	25	OK



We certify that the requirements of the specification numbers shown hereon have been met.

PLATES NORMALIZED AND STAMPED MT

HEAT NUMBER	CHEMICAL ANALYSIS										McQUAD GRAIN SI	
	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V		Ti
10157	0.22	1.10	0.017	0.15	0.23							
10158	0.22	1.18	0.015	0.30	0.23							

89B HSB

10-MC-5

I certify the above results to be correct as contained in the records of the Bethlehem Steel Corporation. C.W. ROE
CHIEF METALLURGIST

J. Lockard

IMPACT PROPERTIES

[Handwritten Signature]

CUSTOMER: Chicago Bridge and Iron Company

PAGE 2 ATTACHMENT
SHIPMENT NO. 803-20312
DATE SHIPPED 11/2/75

LONGITUDINAL CHARPY V-NOTCH TESTED @ -30 °F

SERIAL NUMBER	HEAT NUMBER	CHARPY SIZE	FT. LBS.	% DUCTILE FRACTURE AREA	LATERAL EXPANSION (IN)
T 31466(1-4)	802T53670	FULL	17-26-48	36-36-47	.025-.036-.050
T 10197(1-2)	821S34920	FULL	25-24-25	50-50-50	.032-.030-.031

[Handwritten calculations]
17
26
48

3101
3



mc-5

RECORD OF HEAT TREATMENT

CUSTOMER: Chicago Bridge and Iron Company

PAGE 2 ATTACHMENT
SHIPMENT NO. 803-20312
DATE SHIPPED 10/2/75



<u>SERIAL NUMBER</u>	<u>HEAT NUMBER</u>	<u>PLATE NORMALIZING CYCLE</u>		<u>COOLING</u>
		<u>FURNACE</u> <u>TEMP °F</u>	<u>TIME</u> <u>(MIN)</u>	
T 31466(1-4)	802T53670	1700/1720	51 ✓	AIR COOL
T 10197(1-2)	821S34920	1700/1720	47	AIR COOL

mc-5

PLATES AND TEST SPECIMENS NORMALIZED PER PROCEDURE PM300.

TEST SPECIMENS NOT REMOVED UNTIL AFTER PLATE NORMALIZED.

7CHI BRIDGE I

CFGUYON-HOU

CHICAGO BRIDGE * IRON

KANKAKEE, ILLINOIS

7-1-76

1-MC-42



mail to
Kankakee

TELEGRAM-URGENT

[Handwritten signature]

ATTN: MS. SHIRLEY HERBERGER

REF: P.O. # C-111832-2653

PER OUR DISCUSSION THIS DATE PLEASE USE THIS AS YOUR AUTHORIZATION
TO STENCIL THE FOLLOWING:

ASME SA-333 GR.6 PIPE

(A) 18" S/80 HT.NO. B16328 (U.S.S.)

STENCIL THE IMPACT TEST TEMPERATURE OF "LT-50" TO
THIS MATERIAL.

(B) 20" XH HT.NO. A01247 (U.S.S.)

STENCIL THE LETTERS U.S.S. (UNITED STATES STEEL)
AND HF (HOT FINISHED) TO THIS MATERIAL.

SORRY FOR ANY INCONVENIENCE.

LARRY G. FULCHER/CF

MGR. Q.A.

GUYON ALLOYS, INC.

HOUSTON, TEXAS



Line No. 27
Folder No. 3



United States Steel Corporation

Sheet 1 of 3

STANDARD SWORN TEST REPORT
TUBULAR PRODUCTS

MC42

Smith
11-1-76

National WORKS

11-14-75 DATE

MATERIAL: Seamless Pressure Pipe
TREATMENT: Normalized 1600°F - 113 min. (Aircooled) ✓
BASE: Guyon Alloys, Inc.
ADDRESS: [blacked out]
CITY AND STATE: [blacked out]

Longitudinal tensile tests

GRADE: 1-6 ASME SA 333 ✓
1-6 ASTMA 333 ✓
CUSTOMER'S ORDER NO.: A-13203M
U.S. STEEL ORDER NO.: E3 42920
INVOICE NO.: 356-06624

Q. T. NO.	CODE OF LOT NO.	SIZE O. D.	WT. OF WALL THICKNESS	HEAT NUMBER	HYDRO. TEST PRESSURE MIN. P. S. I.	MECHANICAL PROPERTIES			CHEMICAL ANALYSIS (%)					
						YIELD STRENGTH P. S. I.	TENSILE STRENGTH P. S. I.	ELONG. IN. PER IN. AT BREAK	C	Mn	P	S	Si	Mo
01	4396	18"	.938	A03779	2200	46070	69990	47.5	.17	1.14	.009	.013	.14	check
				A03779	2200	47650	68070	47.5	.17	1.19	.015	.013	.12	check
				B16328	2300	45170	69000	53.0	.17	1.19	.015	.016	.12	check
				B16328	2300	44870	70350	50.0	.15	1.25	.013	.017	.14	check
									.19	1.13	.012	.015	.14	ladie
									.19	1.14	.013	.016	.12	ladie
Flattening tests satisfactory ✓														
Full size longitudinal C.V.N. impacts at minus - 50°F ✓														
						Ft. Lbs. % Shear	Lat. Exp.							
						104	71	.086						
						79	53	.067						
						95	62	.082						
						31	30	.028						
						81	59	.071						
						56	42	.046						
Chicago Bridge & Iron C.O. #C-111832-2653														



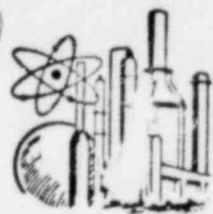
Q.A. APPROVED
BY: *D. H. [signature]* DATE: 11/19/75
GUYON ALLOYS, INC.

STATE OF PENNSYLVANIA
COUNTY OF ALLEGHENY
SUBSCRIBED AND SWORN TO BEFORE ME THIS
14th DAY OF NOVEMBER, 1975
[Signature]

BEING DULY SWORN ACCORDING TO
LAW, DEPOSES AND SAYS THAT THE FIGURES SET FORTH ABOVE ARE CORRECT AS
CONTAINED IN THE RECORDS OF THE COMPANY.
[Signature]
[Signature]

GUYON ALLOYS, INC.

15042



TUBULAR PRODUCTS FOR THE ENERGY INDUSTRIES

950 South Fourth Street
 Harrison, N.J. 07029
 Phone (201) 485-5050
 TWX (710) 995-4549

P.O. Box 42345
 Houston, Texas 77042
 (713) 783-3710
 (910) 881-3767

530 E. Swedesford Road
 Wayne, Pa. 19087
 (215) 687-3770
 (510) 668-3991

1633-26th Street
 Santa Monica, Cal. 90404
 (213) 829-7401
 (910) 343-7402

MATERIAL CERTIFICATION

JH

*Smith
7-14-76*

Subject: Chicago Bridge & Iron Co.
 Purchase Order Number C-111832-2653 ✓

- Description: ASME SA 333 Grade 6 ✓
- (a) 6" S/40 Ht. No. 152749 (Armco) ✓
 - (b) 10" STD. Ht. No. A03616 (U.S.S.) ✓
 - 10" " " " B14811 (U.S.S.) ✓
 - (c) 12" STD. Ht. No. A03480 (U.S.S.) ✓
 - 12" " " " A02577 (U.S.S.) ✓
 - (d) 14" STD. Ht. No. 145106 (Armco) ✓
 - (e) 18" S/80 Ht. No. B16328 (U.S.S.) ✓
 - (f) 10" S/80 Ht. No. 45928 (Phoenix) ✓
 - (g) 12" XH Ht. No. 44827 (Phoenix) ✓
 - (h) 18" STD. Ht. No. B16355 (U.S.S.) ✓
 - 18" " " " B13612 (U.S.S.) ✓
 - (i) 20" XH Ht. No. A01247 (U.S.S.) ✓
 - (j) 16" STD. Ht. No. A03616 (U.S.S.) ✓



CERTIFICATION: This certifies that the piping material described herein is in accordance with ASME SA 333 Section II of the ASME Boiler and Pressure Vessel Code, 1971 Edition through the Summer 1973 Addenda and Chicago Bridge & Iron Specification QAS 354 (REV 0), and MS 764 (REV 1), as applicable.

✓ ✓ ✓ ✓ ✓ ✓

Larry B. Fulcher
 Larry B. Fulcher
 Manager, Quality Assurance

Date: June 21, 1976

Quality System Certificate (Matl) # N-934-2

LGF:dv
cc: J. Dowhin

Expiration Date: 1-6-78

Line No. 21
 Folder No. 3

HEAD FITTINGS

Component Number	Drawing/ Document	Description	Material	Thickness	Impact Test Temp.	Test Data		Derived LSMT	Exempt	Notes
						Charpy V-notch	Mils Lateral			
MC11	M06-1000-4	Forged	SA182 GrF316	2.000"	--	--	--	--	NC2311 (a) (6)	
MC06	M06-1000-3	Forged	SA350 GrLF2	3.500"	+60°F	135-126-128 ft/lbs	48-104-74	--	--	per #1
MC09	M06-1000-4	Forged	SA350 GrLF1	3.500"	+10°F	36-36-24 ft/lbs	29-23-22	41°F	--	N,Q,T, #3
MC53	EMD Report 4536-IPC-0682	Flat-plate	SA240 Gr304	1.750"	--	--	--	--	NC2311 (a) (6)	
MC16	EMD Report 4536-IPC-0682	Flat-plate	SA516 Gr60	2.000"	+10°F	42-45-44 ft/lbs	29-31-30	25°F	--	N, #3
MC44	EMD Report 4536-IPC-0682	Flat-plate	SA516 Gr70	.750"	+10°F	68-71-70 ft/lbs	51-55-52	--	--	per #1

77

CUSTOMER Southwest Fabr & Welding Co.

TAYLOR FORGE/CICERO DIVISION
GULF WESTERN MANUFACTURING COMPANY
P.O. Box 425
Cicero, Illinois 60091

ENERGY PRODUCTS GROUP

SPECIFICATION NO. See Below

CUSTOMER ORDER NO. Q 5243N-3

OUR ORDER NO. 107795

PACKING LIST NO. 310304-05

RECEIVED
AUG 19 1977
SOUTHWEST FABRICATING & WELDING CO. INC.

HEAT TREATMENT
25.80" ID Head Fitting
SA 350 LF-2

DESCRIPTION	CHARGE NO. TF Item	HEAT SYMBOL	MILL HEAT NO.	PHYSICAL PROPERTIES				CHEMICAL ANALYSIS											
				YIELD STRENGTH PSI	TENSILE STRENGTH PSI	ELONG. IN 2" %	RED OF AREA %	C	MN	P	S	SI	CO	CR	CU	V	AL		
<div style="border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block; margin-bottom: 10px;">MC-6</div> 6 - 25.80" ID x 36.00" OD x 8.50" Thick Head Fitting 250 RMS Surface Finish Per Wag. Sheet M-7623	601	EPZZ	6054205	63660	77500	33.07	4.2	.25	.73	.10	.017	.17							
				ASME SA350-1 ^{1/2} Per ASME Sect. III Cl. 1, 1974 Edit. Incl. 1975 Summer Addenda, S.W. Fab. Form QA-20 Dtd 10-11-74, G.E. QRL No. 207 Rev. 1 & G.E. NL No. 207 Rev. 0 & G.E. H50YP159 Incl. Change Notice NE 80046 Dtd 8-2-76. Heat treatment: 1700°F. - 5 hrs - Air cooled. 1650°F. - 5 hrs - Water quenched. 1225°F. - 9 hrs - Air cooled.				Check Analysis Grain Size: 8 - 10				SN .006 AS .01 Antimony .003							
Serial No. Charge No. UTH1877-1 46 -2 462A UTH1977-3 462B UTH1877-5 462D -7 462F -8 462G				Plus 600°F.: 135-126-128 Minus 500°F.: 70-58-72															

REMARKS: Tensile, impact tests and check analysis taken from test ring parted from product per heat per heat treat charge or continuation charge. Parts are capable of withstanding the hydrostatic test referenced in ASME SA350. Parts have been ultrasonic examined per TF 41.223 Dtd 2/12/75 Rev. 1 and were found to be satisfactory. Parts have been magnetic particle examined per TF 41.111 Dtd 2-7-75 Rev 1 Dtd 2-7-75 and were found to be satisfactory. NDE Reports attached. Heat treatment charts attached. NDE Personnell qualification list and Eye Examination reports attached. Parts have been manufactured in compliance with the subject specifications and all special requirements of your purchase order have been met.

SUBSCRIBED AND SWORN TO BEFORE ME Certificate of Authorization No. N-991 Expires 3-3-78.

THIS 20th DAY OF May 19 77

Theresa Schindler
NOTARY PUBLIC OF ILLINOIS
MY COMMISSION EXPIRES DEC. 18 1978
ISSUED THROUGH ILLINOIS NOTARY ASSOC

Josephine Schindler
QUALITY CONTROL

CPB
DE 19 77

CPB 5 '78

CUSTOMER SOUTHWEST FAB. & WELDING CO.

HEAD FITTING Feed/Water

SPECIFICATION NO. ASME SECT. III-CL. NC-1974 EDIT.
 INCL APPENDA THRU SUMMER 1974 AND
 Q.A. PURCHASING NOTES 1,3, & 4 PER
 QA-20 DTD. 10/11/74

CUSTOMER ORDER NO. 4301N-138

OUR ORDER NO. 120260

PACKING LIST NO. F01766-67

low Temp
SA350 L.F. 1

HEAT TREATMENT:
 NORMALIZED- 1700°F. - 6 hrs - Air cooled.
 QUENCHED - 1650°F. - 6 hrs - Water Quenched.
 TEMPERED - 1250°F. - 10 hrs - Air cooled.

DESCRIPTION	CHARGE NO.	HEAT SYMBOL	MILL HLAT NO.	PHYSICAL PROPERTIES				CHEMICAL ANALYSIS										
				YIELD STRENGTH PSI	TENSILE STRENGTH PSI	ELONG. IN. 2	RED OF AREA %	C	MN	P	S	SI	MO	CR	NI			
- 22.96" ID X 38.00" OD X 10" THICK LOW TEMP SERV FEED WATER HEAD FITTINGS PER DWG. MO6-1000 MEET 4 REV. A DETAIL A	401	ERVD	82879					.25	.87	.021	.026	.21						
				TENSILE TEST RING PER FORGING - (TANGENTIAL DIRECTION)														
				SERIAL #1	46490	70995	33.0	60.8										
				SERIAL #2	50735	71030	32.0	58.8										
				TEST RING PER FORGING - V-NOTCH TANGENTIAL DIRECTION				CHARPY TEST RESULTS @ + 10°F. FULL SIZE										
				FT. LBS.		% SHEAR FRACTURE		MILS. LAT EXP.		% MILS LAT EXP.								
				SERIAL #1	36-36-24	20-10-10	29-23-22	7.4-5.8-5.6										
				SERIAL #2	28-32-31	10-10-10	26-28-28	6.6-7.1-7.1										

1 PC. IMC-9
 1 PC. IMC-10

ITEM 1
 CHARGE NO. 171
 SERIAL NOS. 11978-1
 11978-2

RIR
 10421



HEAT TREAT CHARTS ATTACHED.

REMARKS: PARTS COVERED BY THIS REPORT ARE IN FULL COMPLIANCE WITH THE SPECIFICATIONS & PURCHASE ORDER REQUIREMENTS. PARTS COVERED BY THIS REPORT HAVE BEEN ULTRASONIC EXAMINED PER TF. SPEC. 41.223 DTD 2/12/75 REV. 2, COPIES ATTACHED. PARTS HAVE BEEN VISUALLY AND DIMENSIONALLY EXAMINED AND ARE IN FULL COMPLIANCE WITH PURCHASE ORDER AND SPECIFICATION REQUIREMENTS (PER SPEC. SA350-1). PARTS HAVE BEEN MAGNETIC PARTICLE EXAMINED. COPIES ATTACHED. ALL OF THE ABOVE EXAMINATIONS WERE FOUND TO BE SATISFACTORY. DOMESTIC MADE MATERIAL USED. ALL TEST MATERIAL WAS STRESS RELIEVED @ 1150°F. ± 25°F. FOR 9 HOURS. NDE DOCUMENTATION & NDE PERSONEL QUALIFICATION TO ASNT-TCIA WITH CURRENT SUBSCRIBED AND SWORN TO BEFORE ME EYE EXAMINATIONS FURNISHED. - NDE PROCEDURES WERE SUBMITTED AND APPROVED BY SW FABR & WELDING

THIS 8th DAY OF Dec. 19 78

C. R. ...
 NOTARY PUBLIC
 NOTARY PUBLIC STATE OF ILLINOIS
 My Comm. Expires June 15, 1979

[Signature]

MC-16
Flat Plate head fitting mat

PURCHASER:
CHARBON STEEL PROD. CORP.
 803 JULIA STREET
 ELIZABETH, N.J.
 07201

LUKENS STEEL COMPANY
 COATESVILLE, PA. 19320
TEST CERTIFICATE

DATE: 2/01/80 FILE NO. 1420-01-01
 CONSIGNEE:

MILL ORDER NO. 33169 2	CUSTOMER P.O. 10531-C	12080 DG L 13080
---------------------------	--------------------------	---------------------

THIS MATERIAL HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH PURCHASE ORDER REQUIREMENTS AND SPECIFICATIONS:
 SA-516 GR. 70 A-516 GR. 70 ASME CODE SECT. II & III SUB NC 1974 EDITION THRU SUMMER
 1974 ADDENDA N-1160 8/4/81
 BEND TEST O.K. - HOMOGENEITY TEST

CHEMICAL ANALYSIS														GRAIN SIZE
MELT NO.	C	MN	P	S	CU	SI	NI	CR	MO	V	TI	AL	B	
D9346	.26	1.00	.005	.025		.28								7-8
C1997	.20	1.00	.012	.016		.20								7-8

RIR
S-91804

Baldwin Associates
 2 pcs. 2" x 47 x 47"
 2 pcs. 2" x 27 x 27"



PHYSICAL PROPERTIES										DESCRIPTION
MELT NO.	SLAB NO.	YIELD PSI AT 100	TENSILE PSI AT 100	% ELONG IN 2"	% R.A.	BHN	IMPACTS			
D9346	1B	500	832	24						(1- 2 X 55 X 220 1- 2 X 69 X 165)
C1997	4C	470	715	29						1- 2 X 80 X 147

BALDWIN ASSOCIATES
 RECEIVED
 LIR 11 1980
 DOCUMENT RECORDS CENTER
 REC'D BY R. WIRTON

Plates and tests norm. 1625°F./1675°F., held 1/2 hr. per inch min. and air cooled.

LUKENS STEEL COMPANY
 This report to which this stamp is affixed is a copy of the original purchaser's test report. There is indicated not only a specific identification of this material but also a report of the test results in accordance with specification requirements. Where applicable, shown in this report, those items which are listed as you are listed as being pertinent. We certify to you that the material supplied to you is completely identifiable by this document.
 Doc. No. # 0-21482-75763
 Inv. # 44934
 Date 2/6/80
 Signed Ronald Campa
 FOR THE QUALITY CONTROL DEPARTMENT

KR

City Testing & Research Laboratories, Inc.



250 WEST 54th STREET 212 Circle 5-4393 NEW YORK, N. Y. 10019

REPORT OF TESTS

Reference No. S-56321

MATERIAL Carbon Steel Plate (2 inch)
FROM Carbon Steel Products Corp.
Elizabeth, N.J. 07201

Your Order No. 625

Specification No. ASME SA516,
Grade 70 and
Sect. III, NE 222

Specimen Number	2 inch Carbon Steel Plate				
Marked	Heat No.	D 9346, Slab 1B, Lukens			
	S.O.	35637			
	Re:	Baldwin Associates, P.O. C21480-75763			
<u>Charpy Impact Test</u>					
Specimen Type	"V" Notch				
Specimen Size	10 x 10 mm				
Test Temperature	Plus 10°F				
<u>Orientation and Location</u>					
The specimens were removed with the longitudinal axis located one-quarter thickness below the surface in the longitudinal direction. The notch was normal to the surface.					
Specimen No.	1	2	3	Average	Required
Impact values, ft.-lbs.	42	45	44	44	20 Minimum
Lateral Expansion, mils	29	31	30	-	-
Shear Fracture, percent	30	30	30	-	-
			R I R	BALDWIN ASSOCIATES RECEIVED	
			S - 9180	FEB 11 1980	

9150

REMARKS

KR

DOCUMENT RECORDS CENTER
REC'D BY K. BURTON

The submitted plate conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material

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

Tests by H. Goldenberg, P.E. Date Feb. 5, 1980 Witnessed by _____
Asst. Technical Director

01 000 0772

EQ. JOB, CONTRACT NO.
 VENDOR SOLD TO
 HOMESTEAD WORKS
 HOMESTEAD, PA. 15120
 CARBON STEEL PRODUCTS CORP
 883 JULIA STREET
 ELIZABETH N J 07201

P.O. DATE PURCHASE ORDER NO.
 8/15/78 8007710
 SHIPERS NO. MILL ORDER NO. INVOICE NO.
 87787 8/15/78 8007710 163-52174
 VEHICLE IDENTITY 103761 160

CARBON STEEL PRODUCTS CORP
 883 JULIA STREET
 ELIZABETH N J

WE HEREBY CERTIFY THAT THE CHEMICAL ANALYSES AND/OR TEST RESULTS SHOWN IN THIS REPORT ARE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY.

SIGNATURE *M.W. MAXSON, CH. MPT.* DATE 06/17/78

SPEC. & INSP. ASME SA-516 WINTER 1977 ADDENDA GRADE 70 & ASME SEC III WINTER 1977 ADDENDA ARTICLE NF COMPONENT SUPPORTS WITH APPLICABLE PARA TO PLATE PRODUCT OF SUBARTICLES NF-2130 & NF-2150, QUAL ASSUR (SEE DRD) PLATES
 HILL CERTIFIED T/R - ANALYSIS TO SOLD TO ATTN J GREENBAUM

Baldwin Assoc.
1 pc. 3/4" x 90 x 54"

CARBON STEEL PRODUCTS CORP.
 This report to which this stamp is attached, is a copy of the original supplier's test report. This report indicates not only the complete identification of this material but also a report of tests made in accordance with the applicable requirements. If several items are shown in this report, those items which we shipped to you are listed as being pertinent. We certify herewith that the material shown here-with is completely identifiable by this document.

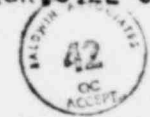
ITEM NO.	MATERIAL DESCRIPTION			QUANTITY	WEIGHT	HEAT NO.	TEST OR PIECE IDENTITY	YIELD ST. KSI	TENSILE STR. KSI	ELONGATION %	
	THICKNESS OR SECTION	WIDTH, DIA. OR FT. WT.	LENGTH							IN 8"	IN 2"
02	1.0000	90	306	1	7810	66D256	73394A	BC+ 52.5	79.3	27.5	
02	1.0000	90	306	1	7810	66D256	73399B	BC+ 52.5	79.3	27.5	
04	5/8	90	306	1	4881	66D256	73114B	BC+ 53.8	79.2	22.5	
05	3/4	90	306	1	5858	66D256	73113B	BC+ 47.8	78.8	20.0	

SPEC: QUAL. ASSUR. CERTIFICATION REQD. PER NA-3700 PRESSURE VESSEL QUALITY NORMALIZE.

*YSEUL @ .0050 EXT.

HEAT NO.	TYPE	C	MN	P	S	SI	CU	NI	CR	MO	SN	AL	N	V	B	TI	CB	CO
66D256	HEAT	24	119	005	023	24												

AVG. GR. SIZE 08 GS 5 OR FINE



BALDWIN ASSOCIATES RECEIVED

SEP 7 1978

DOCUMENT RECORD CENTER BARB BAUSCH

Your P. O. # C-13099-67471

Our Inv. #

Date

Signed *Mary Gallagher*

FOR THE QUALITY CONTROL DEPARTMENT

RIR S-4228

MC-44 Flat Plate head setting material

City Testing & Research Laboratories, Inc.

WEST 54th STREET 212 Circle 5-4393 NEW YORK, N.Y. 10019



REPORT OF TESTS

Reference No. C-56063

MATERIAL Carbon Steel Plate (5/8")

Your Order No. 603

FROM Carbon Steel Products Corp.
Elizabeth, N.J. 07201

Specification No. AISC 360
Grade 50
Sect. 17

Specimen Number	5/8 inch Carbon Steel Plate				
Marked	Heat No.	662256, Lab 73114B, U.S.S.			
	S.O.	35637			
	RE:	Baldwin Associates; P.O. C-21480-75763			
<u>Charpy Impact Test</u>					
Specimen Type	V Notch				
Specimen Size	10 x 10 mm				
Test Temperature	Plus 10°F				
<u>Orientation & Location</u>					
	The specimens were removed with the longitudinal axis located one-quarter thickness below the surface in the longitudinal direction. The Vee Notch was normal to the surface.				
Specimen No.	<u>1</u>	<u>2</u>	<u>3</u>	<u>Average</u>	<u>Required</u>
Impact Values, ft.-lbs.	68	71	70	- 70	15 Minimum 20 Minimum
Lateral Expansion, mils	51	55	52	-	-
Char Fracture, percent	95	95	95	-	-



S-8736

BALDWIN ASSOCIATES
RECEIVED

REMARKS

The submitted plate conforms to the requirements noted.

DOCUMENT RECORD CENTER

We certify that this report is a true report of results obtained from one of our laboratories.



Submitted and return to before me this day of 19

Tests by *[Signature]* Columbus, P.E. Date Dec. 12, 1979. Witnessed by _____
Asst. Technical Director

MC 44

EQUIPMENT AND PERSONNEL HATCHES

Component Number	Drawing/ Document	Description	Material	Thickness	Impact Test Temp.	Test Data		Derived LSMT	Exempt	Notes
						Charpy V-notch	Mils Lateral			
51-3	74-2653 #50	Equipment Hatch Dish Head	SA516 Gr70	1.00"	-30°F	38-38-45 ft/lbs	.038-.037-.045	--	--	per #1
52-1	74-2653 #50	Equipment Hatch Cantilever Flange	SA516 Gr70	3.00"	-30°F	82-100-70 ft/lbs	.056-.075-.064	--	--	per #1
52-4	74-2653 #50	Equipment Hatch Barrel	SA516 Gr70	.750"	-30°F	30-30-31 ft/lbs	.026-.029-.033	--	--	per #1
150-1	74-2653 #150	Personnel Lock Barrel	SA516 Gr70	5/8"	--	--	--	--	NC2311(a)(1)	
154-1	74-2653 #151	Personnel Lock Head Plate	SA516 Gr70	1.00"	-30°F	16-29-20 ft/lbs	12-22-20	30°F	--	N, per #2
156-1	74-2653 #156	Personnel Lock Door	SA516 Gr70	1.50"	-30°F	31-45-51 ft/lbs	28-39-43	--	--	per #1

POMK 51-3

BETHLEHEM STEEL CORPORATION
METALLURGICAL DEPARTMENT
REPORT OF TESTS AND ANALYSIS

200

74-2653
WS
20

PLANT BURNS HARBOR	SHIPMENT NO. 803-25660	DATE SHIPPED 12-31-79	CAR OR VEHICLE NO. CSS ICG	MP 825006	PAGE 2
-----------------------	---------------------------	--------------------------	-------------------------------	--------------	-----------

SHIP TO CHICAGO BRIDGE & IRON CO BOX 774 KANKAKEE IL 60901	SHIP TO CHICAGO BRIDGE & IRON CO TRACK #A1 INDIAN OAKS IL
---	--



DESCRIPTION & SPECIFICATION CUSTOMER ORDER NO. BSCC ORDER NO.	SERIAL NUMBER	HEAT NUMBER	SIZE & QUANTITY				YIELD STRENGTH	TENSILE STRENGTH	ELONG. IN. %	BEND	HARDNESS		RED. %
			No. Pcs	Thickness	Width	Gr					Type	Value	
73 ADD LONG V 20 FT LB AT MINUS 30 DEG F PER NE-2300 GH 021-0529A	MS-5065	33497-01802T79800	1	1	113	1/4	425	13636	48200	72000	8 23	OK	

PLATES NORMALIZED AND STAMPED MT

We certify that the requirements of the specification numbers shown herein have been met.

HEAT NUMBER	CHEMICAL ANALYSIS											McQ. NO. & GRAIN SIZE	
	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Ti		
33497-01802T79800	.23	1.09	.008	.022	.25								5/8

I certify the above results to be correct as contained in the records of the Bethlehem Steel Corporation.

C. W. ROE
CHIEF METALLURGIST

Roer

7 POK 51-3

JTB

IMPACT PROPERTIES



CUSTOMER: Chicago Bridge and Iron Company

PAGE 2 ATTACHMENT
SHIPMENT NO. 803-25660
DATE SHIPPED 12/31/75

LONGITUDINAL CHARPY V-NOTCH TESTED @ -30 °F

<u>SERIAL NUMBER</u>	<u>HEAT NUMBER</u>	<u>CHARPY SIZE</u>	<u>FT. LBS.</u>	<u>% DUCTILE FRACTURE AREA</u>	<u>LATERAL EXPANSION (IN)</u>
T 33497-1	802179800	FULL	38-38-45	60-41-69	.038-.037-.045

PK MK 51-3

Jpa

26
2

RECORD OF HEAT TREATMENT

CUSTOMER: Chicago Bridge and Iron Company



PAGE 2 ATTACHMENT
SHIPMENT NO. 803-25660
DATE SHIPPED 12/31/75

SERIAL NUMBER

7 33497-1

HEAT NUMBER

802T79800

FURNACE
TEMP °F

1640/1705

PLATE NORMALIZING CYCLE

TIME
(MIN)

36

COOLING

AIR COOL

PLATES AND TEST SPECIMENS NORMALIZED PER PROCEDURE PM300.

TEST SPECIMENS NOT REMOVED UNTIL AFTER PLATE NORMALIZED.

FORM 52-1

BETHLEHEM STEEL CORPORATION
METALLURGICAL DEPARTMENT
REPORT OF TESTS AND ANALYSIS

CORRECTED COPY 1/20/77

74-2653

251
RJR

PLANT BURNS HARBOR	SHIPMENT NO. 803-01970	DATE SHIPPED 1/17/77	CAR OR VEHICLE NO.
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PAGE 2

SOLD TO CHICAGO BRIDGE & IRON CO BOX 774 KANKAKEE IL 60901	SHIP TO CHICAGO BRIDGE & IRON CO SHOP RECEIVING YARD ILLINOIS RT 50 & ST GEORGE RD INDIAN OAKS IL
---	---



36

DESCRIPTION & SPECIFICATION CUSTOMER ORDER NO. BSCO ORDER NO.	SERIAL NUMBER	HEAT NUMBER	SIZE & QUANTITY				YIELD STRENGTH	TENSILE STRENGTH	ELONG. IN. %	BEND	HARDNESS		REC 75
			No. Pcs.	Thickness	Width or Dia.	Length					Weight	Type	
STEEL PLATES-M-6065 REV 2& QAS 354 REV 0 ASME SA516 GR 70 PVQ & ASME SECT 3 SUMMER 73 ADD LONG V 20 FT LB AT MINUS 30 DEG F PER NE2300 MICRO ALLOY ADDITIONS UT A 578 LEVEL 2-100%													
C.O.# C74-2653G-1 GH 21-0529 REP #1 X 10544-1		801X22870	1	3	73	350	21738	45400	71800	2 28	OK		

PLAT. NORMALIZED AND STAMPED MT.

We certify that the requirements of the specification numbers shown hereon have been met.

HEAT NUMBER	CHEMICAL ANALYSIS											MCQUAD-EM GRAIN SIZE	
	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Ti		
801X22870	.21	1.16	.008	.017	.25								5/8

I certify the above results to be correct as contained in the records of the Bethlehem Steel Corporation.

C.W. ROE
CRIP METALLURGIST

[Signature]

mk 52-1

BETHLEHEM STEEL CORPORATION
METALLURGICAL DEPARTMENT
REPORT OF TESTS AND ANALYSIS



PLANT: BURNS HARBOR SHIPMENT NO.: 803-01970 DATE SHIPPED: 1/17/77 CAR OR VEHICLE NO.:

SOLD TO: CHICAGO BRIDGE & IRON CO
BOX 774
KANKAKEE IL 60901

SHIP TO: CHICAGO BRIDGE & IRON CO
SHOP RECEIVING YARD
ILLINOIS RT 50 & ST GEORGE RD
INDIAN OAKS IL

Handwritten initials

Handwritten initials

DESCRIPTION & SPECIFICATION CUSTOMER ORDER NO. BSCO ORDER NO.	SERIAL NUMBER	HEAT NUMBER	SIZE & QUANTITY				YIELD STRENGTH	TENSILE STRENGTH	ELONG. IN. %	BEND	HARDNESS		RED. %
			No. Pcs.	Thickness	Width or Dia.	Length					Weight	Type	
STEEL PLATES-MS-6065 REV 28 QAS 354 REV 0 ASME SA516 GR 70 PVQ & ASME SECT 3 SUMMER 73 ADD LONG V 20 FT LB AT MINUS 30 DEG F PER NE2300 MICRO ALLOY ADDITIONS UT A 578 LEVEL 2-100%	X 10544-1	801X22870	1	3	73	350	21738	45400	71800	2 28	OK		

PLA: NORMALIZED AND STAMPED MT.

We certify that the requirements of the specification numbers shown hereon have been met.

HEAT NUMBER	CHEMICAL ANALYSIS											McQUAID-EHN GRAIN SIZE	
	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Ti		
01X22870	.21	1.16	.008	.017	.25								5/8

I certify the above results to be correct as contained in the records of the Bethlehem Steel Corporation.

C.W. ROE
CHIEF METALLURGIST

Per *Handwritten signature*



PKMK 52-1

RECORD OF HEAT TREATMENT

JM

CUSTOMER: Chicago Bridge & Iron Company

PAGE 2 ATTACHMENT
SHIPMENT NO. 803-01970
DATE SHIPPED 1/17/77

212

PLATE NORMALIZING CYCLE

<u>SERIAL NUMBER</u>	<u>HEAT NUMBER</u>	<u>FURNACE</u>	<u>TIME</u>	<u>COOLING</u>
X 10544-1	801X22870	TEMP °F 1655/1700	(MIN) 170	AIR COOL

TEST COUPON STRESS RELIEVING CYCLE

<u>RATE OF HEATING</u>	<u>HOLDING</u>	<u>TIME</u>	<u>RATE OF</u>
<u>°F PER HOUR</u>	<u>TEMP °F</u>	<u>(MIN)</u>	<u>COOLING</u>
65/95	1150	480	75/115 DEG F PER HOUR

PLATE AND TEST SPECIMENS NORMALIZED PER PROCEDURE PM300.
 TEST SPECIMENS NOT REMOVED UNTIL AFTER PLATE NORMALIZED.
 TEST COUPONS REMOVED FROM NORMALIZED PLATE PWHT PER PROCEDURE PM501A.

PC MK 52-1

IMPACT PROPERTIES



JMB

CUSTOMER: Chicago Bridge and Iron Company

PAGE 2 ATTACHMENT
SHIPMENT NO. 803-01970
DATE SHIPPED 1/17/77

319

LONGITUDINAL CHARPY V-NOTCH TESTED @ -30 °F

<u>SERIAL NUMBER</u>	<u>HEAT NUMBER</u>	<u>CHARPY SIZE</u>	<u>FT. LBS.</u>	<u>Z DUCTILE FRACTURE AREA</u>	<u>LATERAL EXPANSION (IN)</u>
X 10544-1	801X22870	FULL	82-100-70	66-55-63	.056-.075-.064

Bethlehem Steel Corporation

BURNS HARBOR PLANT
BOX 248
CHESTERTON, IND. 46304



January 14, 1977

Chicago Bridge & Iron Company
Box 774
Kankakee, Illinois 60901

Gentlemen:

The following plate has been ultrasonically inspected and found acceptable to ASTM A578-75, Level II.

Equipment: Branson Sonoray 303
Test Method: Contact
Surface: Normalized
Couplant: Water
Transducer: 2.25 MHz., 1" diameter
Bethlehem Manifest Number: 803-01970

<u>Customer Order No.</u>	<u>Item Number</u>	<u>Serial Number</u>	<u>Heat Number</u>	<u>Plate Size</u>	<u>Recordable Indications</u>
C74-2653G-1	IT 1 G3	X 10544-1	801X22870	3 x 73 x 350	See Sketch

Very truly yours,
BETHLEHEM STEEL CORPORATION

P. J. Diffenbach
Metallurgical Supervisor
160" Plate Mill Division



PCMK 52-1

31
6

100" PLATE MILL - METALLURGICAL DEPT.
 ULTRASONIC DEFECTIVE MATERIAL REPORT
 40788 (5-68)



DATE

1-14-77

REPORT NO.

903-01970

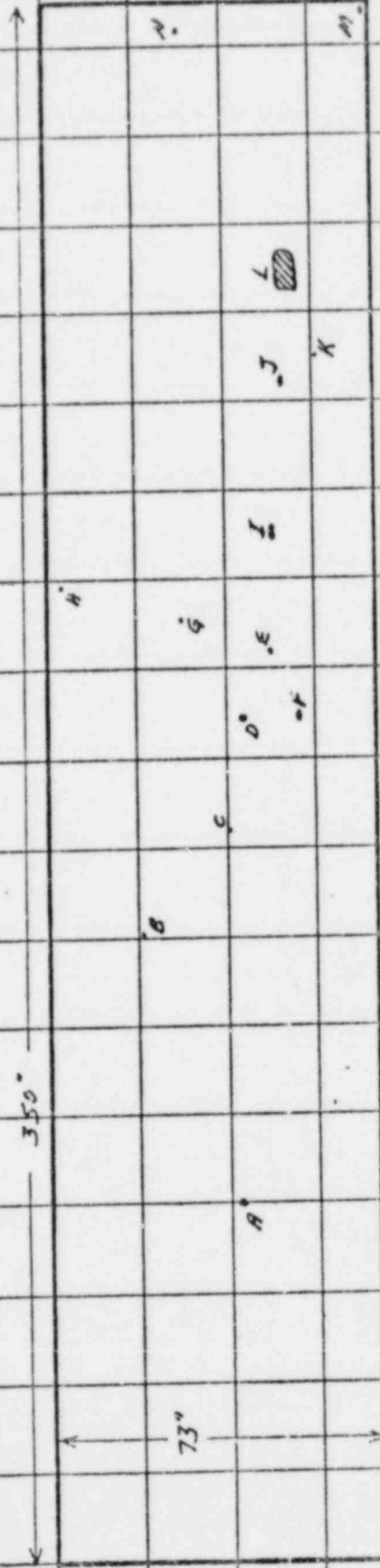
PLATE HEAT NO.

801 X 22 B 70

PLATE SERIAL NO.

X 10544-1

GRID SCALE: 1 BLOCK = 20"



DEFECT SIZES:

- A = 2" x 2" - 79" FROM W. END, 31" FROM S. EDGE
- B = 1" x 1" - 141"
- C = 1" x 1" - 164"
- D = 1 1/2" x 1 1/2" - 161" FROM E. END, 44"
- E = 1 1/2" x 1" - 146"
- F = 2 1/2" x 1 1/2" - 160"
- G = 1" x 1" - 139"
- H = 1" x 1" - 132"
- I = 3" x 1 1/2" - 118"
- J = 2" x 1 1/2" - 84 1/2"
- K = 1" x 1" - 79"
- L = 5" x 9 1/2" - 57"
- M = 2" x 1" - 1 1/2"
- N = 1" x 1" - 6"

PLATE GRAB - 3"

CUSTOMER ORDER NO. - C 74-26536-1

GH NO. - 21-0529

* CLUSTER OF RECORDABLE INDICATIONS

PCmk-52-4

BETHLEHEM STEEL CORPORATION
METALLURGICAL DEPARTMENT
REPORT OF TESTS AND ANALYSIS

[Handwritten Signature]

74-2653
W.S.

PLANT BURND HARBOR	SHIPMENT NO. 803-25149	DATE SHIPPED 12-27-75	CAR OR VEHICLE NO. CSS ICG	PRR 474465	PAGE 5
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SOLD TO
CHICAGO BRIDGE & IRON CO
BOX 774
KANKAKEE IL 60901

SHIP TO
CHICAGO BRIDGE & IRON CO
TRACK #A1
INDIAN OAKS IL



DESCRIPTION & SPECIFICATION CUSTOMER ORDER NO. BSCO ORDER NO.	SERIAL NUMBER	HEAT NUMBER	SIZE & QUANTITY				YIELD STRENGTH	TENSILE STRENGTH	ELONG. IN. %	BEND	HARDNESS		RED. %
			No. Pcs.	Thickness	Width or Dia.	Length					Type	Value	
STEEL PLATES- MS-6065 REV 2 & QAS-354 REV 0 ASME 73 ADD LONG V 20 FT LB AT MINUS 30 CO. 74-2653G-1 GH 021-0529A													
	T 33506-01822T73640		1	3/4	72-1/2	344-1/2	5307	51200	79900	8 25	OK		
	T 33506-02822T73640		1	3/4	72-1/2	344-1/2	5307	51200	79900	8 25	OK		

PLATES NORMALIZED AND STAMPED MT

We certify that the requirements of the specification numbers shown hereon have been met.

HEAT NUMBER	CHEMICAL ANALYSIS											McQUAN-EM GRAIN SIZE	
	C	Mn	P	Si	Cu	Ni	Cr	Mo	V	Ti			
822T73640	.22	1.10	.020	.018	.23								5/8

I certify the above results to be correct as contained in the records of the Bethlehem Steel Corporation.

C. W. ROE
CHIEF METALLURGIST

[Handwritten Signature]

PCMK 52-4

25

RECORD OF HEAT TREATMENT

CUSTOMER: Chicago Bridge and Iron Company



PAGE 5 ATTACHMENT
SHIPMENT NO. 803-25149
DATE SHIPPED 12/27/75

SERIAL NUMBER

T 33506-1 ✓
T 33506-2 ✓

HEAT NUMBER

822T73640 ✓
822T73640 ✓

PLATE NORMALIZING CYCLE

FURNACE

TEMP °F
1680/1700 ✓
1680/1700 ✓

TIME

(MIN)
29 ✓
29 ✓

COOLING

AIR COOL
AIR COOL

PLATES AND TEST SPECIMENS NORMALIZED PER PROCEDURE PM300.

TEST SPECIMENS NOT REMOVED UNTIL AFTER PLATE NORMALIZED.

PCMK 52-4

5
80

IMPACT PROPERTIES

CUSTOMER: Chicago Bridge and Iron Company

PAGE 5 ATTACHMENT
SHIPMENT NO. 803-25149
DATE SHIPPED 12/27/75

LONGITUDINAL CHARPY V-NOTCH TESTED @ -30 °F

<u>SERIAL NUMBER</u>	<u>HEAT NUMBER</u>	<u>CHARPY SIZE</u>	<u>FT. LBS.</u>	<u>% DUCTILE FRACTURE AREA</u>	<u>LATERAL EXPANSION (IN)</u>
T 33506-1	822T73640	FULL	28-34-32	38-44-38	.029-.036-.035
T 33506-2	822T73640	FULL	30-30-31	10-10-15	.026-.029-.033



BURNS HARBOR PLANT

SHIPMENT NO: 303-06040
 DATE SHIPPED: 3-17-78
 CARTRIDGE VOUCHER NO: PC-M13-154-1
 PAGE 2

APR 10 1978

SOLD TO

CHICAGO BRIDGE & IRON CO
 X 277
 BIRMINGHAM AL 35202

SHIP TO

CHICAGO BRIDGE & IRON CO
 SALT LAKE CITY UT

SERIAL NUMBER	PAT NO	HEAT NUMBER	SIZE AND QUANTITY				YIELD POINT PSI	TENSILE STRENGTH PSI	ELONG.		
			NO. PCS	THICKNESS INCHES	WIDTH OR DIA. INCHES	LENGTH INCHES			WEIGHT POUNDS	IN	%
PLATES - NO-3167-ADD REV 0 & GAS-3000-ADD REV 0 ASME SABIG GR 70 PVO & ASME SECT 3 SUMMER 76 ADD CH-V SA2055 MULT L 20FT LB AT -30F INFO L MILSESHR AT -30F && NORMALIZED FLATTENED TO STD 1" UL CO# 73291 SHEET 1 GR 025-8844 PLATES HEAT TREATED WITH TEST SPECIMENS ATTACHED AND YIELD STRENGTH @ .5% E.U.L.											
32290	01	801B20600	1	1 1/2	73	377	11707	44200	70900	8	24
				N 1650 DEG F - 51 MIN							

PL1

Q-QUENCH TEMPERATURE T-TEMPER TEMPERATURE N-NORMALIZE TEMPERATURE

*CUSTOMER HAS PERMISSION TO RESTAMP FROM 801A20600 TO 801B20600

SERIAL NUMBER	PAT NO	HEAT NUMBER	HARD	BEND	THICKNESS INCHES	TYPE	SIZE	DIR	TEST TEMP	CHARPY IMPACT						LAT EXP MILS		
										ENERGY FT. LBS.			SHEAR (%)			1	2	3
32290	1	801B20600			1.500	V	FULL	L	-30	16	29	20	12	19	17	12	22	20



HEAT NUMBER	CHEMICAL ANALYSIS														McQUAY GRAIN SIZE			
	C	Mn	P	S	Si	Co	NE	Cr	Mo	V	Ti	Al	B	Cb		N		
801B20600	.22	1.07	.032	.021	.215													5/8

SUSCRIBED AND SWORN TO BEFORE ME
 THIS 6th DAY OF April 1978
[Signature]
 NOTARY PUBLIC
 PORTER COUNTY INDIANA
 MY COMMISSION EXPIRES JULY 26, 1980

CERTIFY THAT THE ABOVE RESULTS ARE A TRUE AND CORRECT COPY OF RECORDS PREPARED AND MAINTAINED BY BETHLEHEM IN COMPLIANCE WITH THE REQUIREMENTS OF THE SPECIFICATION CITED ABOVE.

R. P. Miller
 CHIEF METALLURGIST
 W. M. Krane

REPORT OF TESTS AND ANALYSES

203-20340

DATE SHIPPED
3-17-78

CAR OR VEHICLE NO
PC-MK-156-1

PAGE 9

SHIP TO CHICAGO BRIDGE & IRON CO
PO BOX 277
BIRMINGHAM AL 35202

SHIP TO CHICAGO BRIDGE & IRON CO
SALT LAKE CITY UT

NOTE	SERIAL NUMBER	PAT. NO.	HEAT NUMBER	SIZE AND QUANTITY				YIELD POINT PSI	TENSILE STRENGTH PSI	ELONG.	
				NO. PCS	THICKNESS INCHES	WIDTH OR DIA. INCHES	LENGTH INCHES			WEIGHT POUNDS	IN
	PLATES		XS-5187-ADD REV 0-8 GAS-3000-ADD REV 0 ASME SA516 GR 70 PVO & ASME SECT 3 SUMMER 76 ADD CH-V SA2055 MULT L 10FT LB AT -30F INFO L MILS&SHR AT -30F & NORMALIZED FLATTENED TO STD TOL								
	CO# 73851		SHEET 1 GR 025-8844E								
	PLATES		HEAT TREATED WITH TEST SPECIMENS ATTACHED AND YIELD STRENGTH & .5% E.O.L.								
	31505	C1	802C33320	1	1 1/2	96	108	4411	42300	73700	8 32
	32009	C1	801C10590	1	1 1/2	84	240	8576	51900	76700	8 22
	10135	C1	E01R28900	1	1	65	96	1770	51600	77100	8 23

PL7
PL9
PL0

Q-QUENCH TEMPERATURE T-TEMPERATURE N-NORMALIZE TEMPERATURE

*CUSTOMER HAS PERMISSION TO RESTAMP FROM 801C33320 TO 802C33320

PL7

SERIAL NUMBER	PAT. NO.	HEAT NUMBER	HARD	BEND	THICKNESS INCHES	TYPE	SIZE	DIR.	TEST TEMP.	CHARPY IMPACT						LAT EXP			MILS
										ENERGY FT. LBS.		SHEAR (%)		LAT EXP					
31505	C1	802C33320			1.500	V	FULL	L	-30	31	45	51	45	50	55	28	39	43	
32009	C1	801C10590			1.500	V	FULL	L	-30	30	31	27	45	42	36	23	24	22	
10135	C1	E01R28900			1.000	V	FULL	L	-30	30	29	28	23	23	23	20	21	20	



HEAT NUMBER	CHEMICAL ANALYSIS																EQUIV. GRAIN SIZE
	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Ti	Al	B	Cb	N		
802C33320	.25	1.09	.016	.013	.199												
801C10590	.23	1.15	.023	.021	.220												
801R28900	.22	1.11	.013	.015	.198												

SUBSCRIBED AND SWORN TO BEFORE ME
THIS 6th DAY OF April 1978
[Signature]
NOTARY PUBLIC
PORTER COUNTY INDIANA
MY COMMISSION EXPIRES JULY 26, 1980



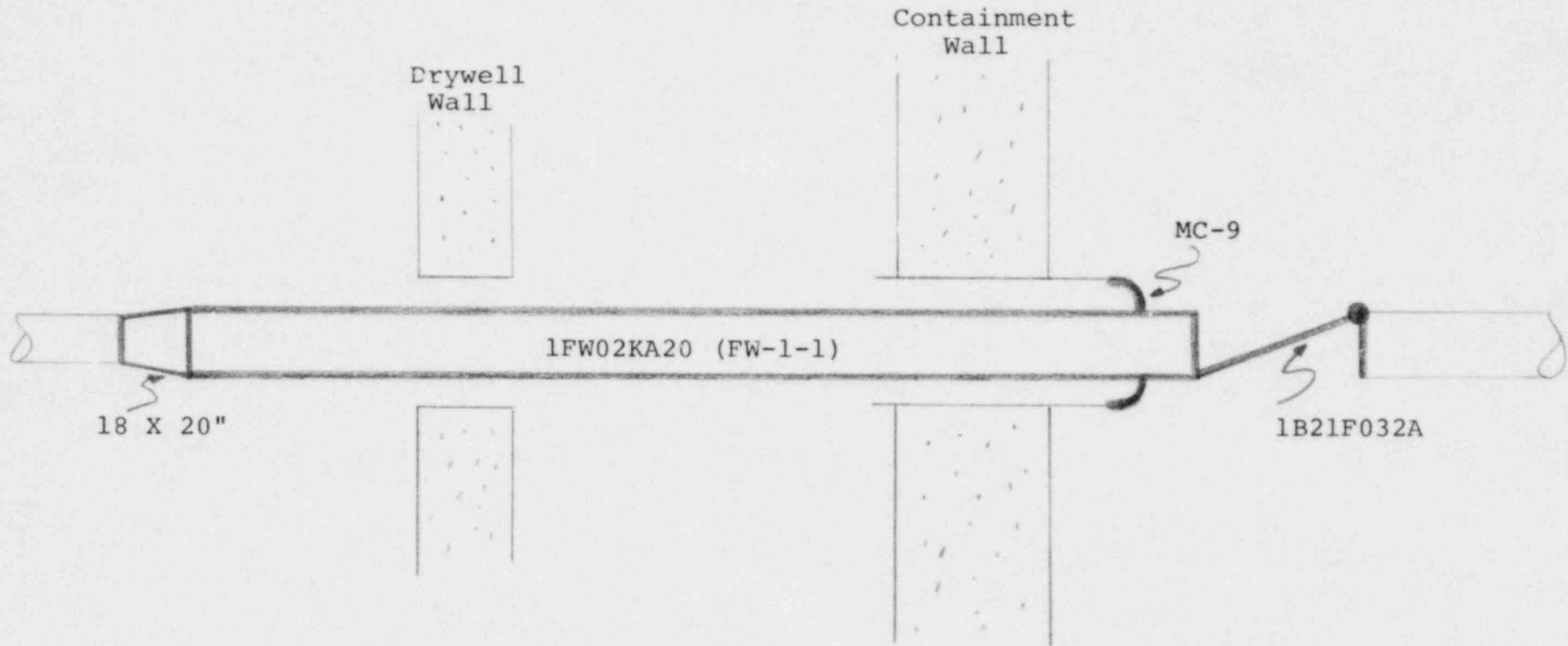
R. L. Miller
CHIEF METALLURGIST

I CERTIFY THAT THE ABOVE RESULTS ARE A TRUE AND CORRECT COPY OF RECORDS PREPARED AND MAINTAINED BY BETHLEHEM IN COMPLIANCE WITH THE REQUIREMENTS OF THE SPECIFICATION CITED ABOVE

FEEDWATER SYSTEM CONTAINMENT BOUNDARY

Component Number	Description	Material	Thickness	Impact Test Temp.	Test Data		Derived LSMT	Exempt	Notes
					Charpy V-notch	Mils Lateral			
1B21F032A	Valve Body	SA216 WCB	3.295"	50°F	85-87-66	68-71-56	54°F	--	N,T, per #3
1B21F032A	Valve Ronnet	SA105	6.000"	40°F	72-78-84	61-63-65	58°F	--	N, per #3
1B21F032A	Valve Disc	SA216 WCB	4.500"	50°F	55-69-63	50-61-59	62°F	--	N,T, per #3
1B21F032A	Shaft Cover	SA105	1-7/8"	40°F	51-68-52	41-56-43	--	--	per #1
1FW02KA20	1-FW-1-1 Pipe Spool	SA106 GrB	1.969"	40°F	85-80-86	58-56-60	--	--	per #1
MC-9	Forge Head Fitting	SA350 GrLF1	3.500"	--	--	--	--	--	See Head Fitting Section
1FW02KA20	18 X 20 Reducer	SA234 WPB	1.969"	40°F	97-73-64	85-70-64	--	--	per #1

FEEEDWATER SYSTEM



B21-F032A

FORM NPV-1 MANUFACTURERS' DATA REPORT FOR NUCLEAR PUMPS OR VALVES*

As Required by the Provisions of the ASME Code Rules

Manufactured by Anchor/Darling Valve Co. 701 First St., Williamsport, PA 17701 Order No. E-6214

Manufactured for Illinois Power Company Clinton Power Station Unit 1 Order No. C-2513

Owner Illinois Power Company

Location of Plant Clinton Power Station, DeWitt County, Illinois

Pump or Valve Identification E-6214-157-1 TAG.# 1B21-F032A

20" 1500# TILTING DISC CHECK VALVE WITH AIR CYLINDER, SOLENOIDS AND LIMIT SWITCHES

(a) Drawing No. 93-15204 R/C Prepared by Anchor/Darling Valve Co.

(b) National Board No. N/A

Design Conditions 3215 psi 100 °F or Pressure Class N/A (1)

The material, design, construction, and workmanship complies with ASME Code Section III. Class 1

Edition 1974, Addenda Date Summer 1975, Case No. 1516.1, 1567, 1622, 1635.1, 1677

Table with 4 columns: Mark No., Material Spec. No., Manufacturer, Remarks. Rows include Castings (Body HT. # 1134, Disc HT. # 7910) and Forgings (Bonnet HT. # 216149, Drain Connections, Gasket Ret. Ring, Shaft Covers HT. # 217937, Drain Cap HT. # L40923).



(1) For Manually Operated Valves Only. Supplemental sheets in form of lists, sketches or drawings may be used provided (1) size is 8 1/2" x 11", (2) information in items, 1, 2, 5a and 5b on this data report is included on each sheet, and (3) each sheet is numbered and number of sheets is recorded at top of this form.

FORM NPV-1 (back)

Mark No.	Material Spec. No.	Manufacturer	Remarks
(c) Bolting			
Cover Studs HT.# 65079	SA193-B7	R.E.C. Corp.	
Cover Nuts HT.# 75467	SA194-7	Nuts, Incorporated	
(d) Other Parts			
Drain Pipe HT.# M02709	SA106-B	Keystone Tubular Service Corp.	

9. Hydrostatic test 5625 psi.

CERTIFICATION OF DESIGN

Design information on file at Anchor/Darling Valve Co. 701 First St., Williamsport, PA 17701
 Stress analysis report on file at Anchor/Darling Valve Co., 701 First St., Williamsport, PA 17701
 Design specifications certified by H. M. Sroka (I) Prof. Eng. State IL Reg. No. 62-23543
 Stress analysis report certified by Robert D. Burns (I) Prof. Eng. State MS Reg. No. 25401
 (I) Signature not required. List name only.

We certify that the statements made in this report are correct.

Date 11-19 19 79 Signed Anchor/Darling Valve Co. H. Yoon
 (Manufacturer) H. Yoon

Certificate of Authorization No. N1712 expires 4/15/80

CERTIFICATE OF SHOP INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State of ~~Massachusetts~~ Pennsylvania and employed by Commercial Union Insurance Co. of Boston, Mass. have inspected the equipment described in this Data Report on 11-28-78 to 11-19, 79, and state that to the best of my knowledge and belief, the Manufacturer has constructed this equipment in accordance with the applicable Subsections of ASME Code, Section III. By signing this certificate, neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the equipment described in this Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date 11-20 19 79



Russell E. Montgomery Commissions Pennsylvania WC972
 (Inspector) (National Board, State, Province and No.)
Russell E. Montgomery

9B21-F032A

Anchor/Darling Valve Co. 701 First Street Williamsport, Pa. 17701		Same
PREPARE	COLLECT XX	TRUCK
CUSTOMER Anchor/Darling Valve Co. - Pa.		TERMS Net 30 days
QUANTITY 2	PATTERN NO. 6529-1-5-1 (20" 1500# TOC Body)	See Telov 2-05315 1-2
1	2	M-2123
1	2	LO-6529-1-5
2/8/78	SA21b-WCB, VT-MSS-SP55 No weld, Nucl.	5436 10872 25
04	Spec.	C10 128
Louden.	(8) Melt & Lab use Melt Proc. MP-1.20, use 120 for gates, Charpy @50°F. 40 M.L.E., Arc air visual defects per Dodge's No weld Spec., No weld. design for nucl. HT, 2 N&T, HT chart req., PWHT 15 hrs. @1150°F, Subm. sample and obtain RT results before prod., Pour one spec. Test Block Patt. DF12 with heat, HT Proc.	5 K.B. special Test Block
2/28/78	Min. wall 3.233	

Body

CERTIFICATION OF CHEMICAL & PHYSICAL TESTS-HEAT TREATMENT-N.D.E. TESTS

1134	AA-1307	DATE 4/25/78
CHEMICAL ANALYSIS-MAT. SPEC. SA21b WCB		
10	90	60
0.02	30	26
15	0.41	0.08
WELDING PROCEDURE NUMBER		
TENSILE PROPERTIES OF CASTING		
TS PSI	Y.P. PSI	EL. %
77,300	54,300	29.570
TENSILE PROPERTIES OF WELDING ELECTRODE		
TS PSI	Y.P. PSI	EL. %
62,710	56,650	65
CORROSION TEST		
RESULTS		

NON-DESTRUCTIVE TESTS AND RELEASE REPORT

N.D.E. SPECIFICATIONS	SER. NO.	APPRO.	DATE	REPORTS ATTACHED
MSS-SP55	1307	OK	5/78	VT V.I.R. DIMENSIONAL LAYOUT DIMENSIONAL CONFORMANCE CERT. MT-HELP WELD REPAIR MAP SNT-TC-1A CERTIFICATES RT WELD REPAIR MAP WELDING PROCEDURE WELDERS QUALIFICATION TEST WFLD MANUFACTURERS CERTIFICATE RT SHOOTING SKETCH & TECH.
REMARKS				RECEIVED
All physical property tests determined after PWHT of T.B.				JAN 9 1980
SEE ATTACHED REPORT				DOCUMENT RECORD CENTER
RAMBALL TESTLAB				REC'D BY S. WHITEHEAD
4 ROUGH TESTBARS				



We hereby certify that the above material has been tested in accordance with the listed specifications and conforms to all applicable requirements thereof.

William A. ...
DODGE FOUNDRY & MACHINE CO.

1B21-F032A
Body

Ramball Testlab

8501 STATE ROAD - PHILADELPHIA, PA. 19135

(215) 332-4011

LABORATORY REPORT

Date: May 10, 1978

P.O.# M-2129

Anchor/Darling Valve Co.
701 First Street
Williamsport, PA 17701

Heat # 1134, PO#N-2123
Material: ASME-SA-216, WCB

TENSILE TEST

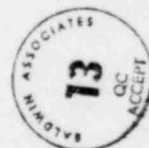
LAB #	20003
YIELD STRENGTH	54,300 psi
TENSILE STRENGTH	77,300 psi
ELONGATION	29 %
REDUCTION OF AREA	57 %
0.505" diameter tensile specimen, 2" gauge length.	

CHARPY IMPACT TEST

LAB #	20004, 20005, 20006		
SPECIMEN #	FOOT POUNDS	MILS LATERAL EXPANSION	% SHEAR
1	85	69	50
2	87	71	55
3	66	56	60
Average	79	65	55

The above test specimens were heat treated with production castings. The test bars only were given an additional stress relief heat treatment at 1150 degrees F for 15 hours. The Charpy V-Notch Impact Test was performed at +50 degrees F.

Louis L. Ramball
Metallurgist



BALDWIN ASSOCIATES
RECEIVED

JAN 29 1980

RECD BY S. WHITEHEAD

CANN & SAUL STEEL CO.

ROYERSFORD, PA. 19468

Report of Physical Tests and/or Chemical Compositions

E6214-157-1
BONNET

Date 3/19/79

Customer ANCHOR/DARLING VALVE CO.
701 FIRST STREET
Address WILLIAMSPORT, PA. 17701

Customer's Order No.
P-2915
S.O.#E-6214-157

Cann & Saul Order No.
50844

1B21-F032A
Bonnet

Attention PURCHASING DEPT.

CHEMICAL COMPOSITIONS

HEAT NO.	C	MN	P	S	SI	CR	NI	MO	CB
216149	.27	.93	.009	.018	.15				

Lab. No.

PHYSICAL TESTS

CUT FROM	TEST NUMBER	GAUGE	YIELD PT. LBS.	YIELD PER Square In Lbs.	BROKE AT LBS.	ULTIMATE TENSILE LBS.	ELONG %	REDUCED AREA	Reduction %	B.H.N.
Forging	50844 1	.505	YS 9,700	YS .2% 48,500	15,500	77,500	33.0	.066	67.0	
Charpy Impacts Notch		61 63	65 Mils Lat. Exp. @ +40°F							
		72 78	84 Ft. Lbs							
		20 20	20 percent shear							

OTHER TESTS

BRINELL 149/179

SONIC A388 R/23 (7/9/75) O.K.
Heat Treat. Proc. #5D(3/5/76)

We certify the material meets the ASME Code, Section III, 1974 Edition thru 1975 summer addenda.



Customer's Specifications: ASME SA105
CHARPY "V" IMPACT 40 MILS LAT. EXP. @ +40°F
26/35 CARBON B.H.N. 187 MAX.

XXX BALDWIN ASSOCIATES
T. 70,000
E. 22%
R. 30%

JAN 29 1980

THE ABOVE TESTS COVER THE FOLLOWING MATERIAL:

2 - 20" 1500 TDC BONNET FORGINGS FOR DRAWING B-51609
Forgings serialized #1 & 2

DOCUMENT RECORD CENTER
REC'D BY S. WHITEHEAD

CANN & SAUL STEEL COMPANY

Inspector

ANCHOR/DARLING VALVE CO.
L. B. SNYDER
Q.A. 81

DATE: 3-23-79

CANN & SAUL STEEL CO.

Eng. of Tests

McBaltus

1B21-F032A
disc

Anchor/Darling Valve Co. 701 First Street Williamsport, Pa. 17701		Same
050		APR 8 1978
PREPARE	COLLECT XX	TRUCK
Anchor/Darling Valve Co. - Pa.		See Below
2	6529-1-5-4 (20" 1500# TDC Dfsc)	N-2123
LO-6529-1-5	550	1100
2/8/78	SA216-WCB, VT-MSS-SP55 No weld - Nucl.	Spec. C10 128
05		
Louden.	INSTRUCTIONS (4) 3 copies IR & Docu., subm. 4 rgn TB/ht. (8) Melt & Lab use Melt Procedure MP-120, use 120 for gates, Charpy @50°F-40 M.L.E., Arc air visual defects as per Dodge's No weld spec. No weld, design for nucl. H.T. 2N&T, H.T. chart req., PWHT 15 hrs @1150 F, Subm. sample and obtain RT results before prod. Pour one spec. test block Patt. DF12 with heat T. Procedure HR 48:03 Rev. 1 is applicable sub. outside inspection upon approval of sample will adv.	
2/28/78		5 K.B. & special Test Block

CERTIFICATION OF CHEMICAL & PHYSICAL TESTS-HEAT TREATMENT-N.D.E. TESTS

TOTAL NO.	7910	SERIAL NO.	05-1053	1	DATE TESTED	3/20/78
CHEMICAL ANALYSIS-MAT SPEC SA216 WCB						
C	T	MN	SI	P	S	CR
.18	.81	.45	.009	.014	.28	.28
WELD METAL CHEMICAL ANALYSIS			WELDING PROCEDURE NUMBER			
TENSILE PROPERTIES OF CASTING						
T.S. PSI	Y.P. PSI	Y.S. PSI	EL. %	R.A. %	BMN RANGE	Ferrite Content %
72200	48900		36%	630	163	
TENSILE PROPERTIES OF WELDING ELECTRODE						
T.S. PSI	Y.P. PSI	Y.S. PSI	EL. %	R.A. %	BMN RANGE	HEAT TREATMENT
						MCNOCENIZED
						NORMALIZE 1700°F 3/4 2425 ✓
						NORMALIZE 1650°F 3/4 2427 ✓
						TEMPER 1250°F 3 2429 ✓
IMPACT TEST						
TEMP	F50	1	2	3	AVG.	Specification
ST. LBS.						
M.L.S.	50	61	59	57		Degrees
HEAR'S						Type
CORROSION TEST						
RESULTS						

NON DESTRUCTIVE TESTS AND RELEASE REPORT						
N.D.E. SPECIFICATIONS	SER. NO.	APPD.	DATE	REPORTS ATTACHED		
MSS-SP55	1053	OK	3/78	VT V.I.R.		
AT-LPT PER	ANCHOR/DARLING VALVE CO.			DIMENSIONAL LAYOUT		
	L.B. SNYDER			DIMENSIONAL PERFORMANCE CLMT		
IT PER				MT-WLT WE. 3 REPAIR MAP		
				SMT TO A CERTIFICATES		
IT PER				MT WLT TO I-100 MAP		
				WELDING QUALIFICATION PLSP		
IT PER				WELD MANUFACTURERS CERTIFICATE		
				BT SHOOTING SKETCH & TECH		
				BT FILM & READER SHEETS		
				CLEANING CERTIFICATION		
				CERTIFICATE OF COMPLIANCE		
				MT COURTYN INSURANCE CERTIFICATE		
				HEAT TREATMENT CHART		
				HEAT TREATMENT CAR LOADING RECORD		

REMARKS All physical property tests determined after PWHT of T.B.

SEE ATTACHED REPORT
RAMBALL TESTLAB

We hereby certify that the above material has been tested in accordance with the listed specifications and conforms to all applicable requirements thereof.

[Signature] 4/4/78
DODGE FOUNDRY & MACHINE CO.



Disc
1821-F032A

Ramball Testlab

6501 STATE ROAD - PHILADELPHIA, PA. 19135
(215) 332-4011

LABORATORY REPORT

Date: March 29, 1978
P.O.# M-2129

Anchor/Darling Valve Co.
701 First Street
Williamsport, PA 17701

Heat # 7910, PO# N-2123
Material: ASME-SA-216, WCB

TENSILE TEST

LAB # 19331

YIELD STRENGTH	43,900	psi
TENSILE STRENGTH	72,200	psi
ELONGATION	36	%
REDUCTION OF AREA	63	%

0.505" diameter tensile specimen, 2" gauge length.

CHARPY IMPACT TEST

LAB # 19332, 19333, 19334

SPECIMEN #	FOOT POUNDS	MILS LATERAL EXPANSION	% SHEAR
1	55	50	35
2	69	61	60
3	63	59	40
Average	63	57	45

The above test specimens were heat treated with production castings. The test bars only were given an additional stress relief heat treatment at 1150 degrees F for 20 hours. The Charpy V-Notch Impact Test was performed at +50 degrees F.

D. Ramball

Metallurgist



CANN & SAUL STEEL CO.

ROYERSFORD, PA. 19488

Report of Physical Tests and/or Chemical Compositions

BALDWIN ASSOCIATES
RECEIVED

Date 2/8/79

Customer ANCHOR/DARLING VALVE CO.
701 FIRST STREET
Address WILLIAMSPORT, PA. 17701

Customer's Order No.
P-2915
S.O.#E-6214-157

Cann & Saul Order No.
JAN 29 1980

DOCUMENT RECORD CENTER
REC'D BY S. WHITEHEAD

Attention PURCHASING DEPT.

CHEMICAL COMPOSITIONS

HEAT NO.	C	MN	P	S	SI	CR	NI	MO	CB
217937	.30	.92	.012	.022	.23				

Lab. No.

PHYSICAL TESTS

CUT FROM	TEST NUMBER	GAUGE	YIELD PT. LBS.	YIELD PER Square In Lbs.	SHOCK AT LBS.	ULTIMATE TENSILE LBS.	ELONG %	REDUCED AREA	Reduction %	B.H.N.
Forging	50845 1	.505	YS 10,200	YS .2% 51,000	16,400	82,000	31.0	.069	65.5	
Charpy Impacts "V" Notch @ +40°F			51 68	52 Ft.Lbs.	43 Mills Lat.Exp.	10 20	10 % Shear			

RECEIVED
FEB 16 1979

PURCHASING DEPT

OTHER TESTS

BRINELL 143/149

SONIC A388 R/23 (7/9/75): O.K.

Heat Treat Proc. #5D (3/5/76)

We certify that the material meets the ASME Code, Section III, 1974 Edition thru summer 1975 Addenda.

Customer's Specifications: ASME SA105
CHARPY "V" IMPACT 40 MILS LAT. EXP. @ +40°F
26/35 CARBON B.H.N. 187 MAX.

XXX 36,000 YS.2%
T. 70,000
E. 22%
R. 30%



THE ABOVE TESTS COVER THE FOLLOWING MATERIAL:

NO
4 - 20" 1500 SHAFT COVER PER DRAWING B-51610, /REV.
Forgings serialized #1 thru 4

CANN & SAUL STEEL COMPANY
Inspector

CANN & SAUL STEEL CO.

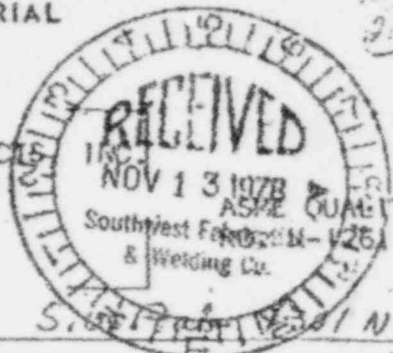
ANCHOR/DARLING VALVE CO.
L. B. SNYDER
QA 31

DATE: 2-19-79

M. S. Saltzman
Eng. of Tests

CERTIFICATE OF TEST ON PIPE MATERIAL

*Recd 7-21-81
002
105
Cameron*



CAPITOL PIPE & STEEL PRODUCTS
2055 S. GESSNER, Suite 130
Houston, TX 77063

IRON WORKS, INC.
P. O. BOX 1212
HOUSTON, TEXAS 77001

ASME QUALITY SYSTEM CERTIFICATE (MANUFACTURER)
EXPIRES 10-27-78.

Date 28 September 1978

Customer Order No. 903-35N C.I.W. Sales Order No. F-9526 Specification ASME SA106 Gr. B ASME Sec. III, Cl. 2; 1974 Edition Thru Summer '74 Addenda

Thickness of wall 20" x I.D. SCH. 160

Part No. 86-9526-200-162

1-EW-1-1 PIPE CERT

Lot No.	Location of Serial No.	CHEMICAL ANALYSIS							
		C	MN	P	S	SI	CR	NI	MO

J7516 .26 .95 .019 .005 .22

ALL OPERATIONS WERE PERFORMED BY CIW & MEET THE REQUIREMENTS OF THE LISTED MATERIAL SPECIFICATION AND SEC. III DIV. 1.

Quantity	Heat No.	Test Loc.	Tensile PSI	.2% Offset Yield PSI	MECHANICAL PROPERTIES				Specimen Size	Test Lot#
					% Elong. 2 in.	Red. Area	Macro Etch	Bend Test		

2 J 7516 A-T 78,900 50,900 30.9 61.8 OK .505 470

V-Notch Impact Test Results at 40°F.:

Reg. Ser. #	Test Lot#	Ft. Lbs.	Lat. Exp.	% D/F
31655	470	85.0	58 MILS	60%
31656	470	80.0	56	55
		86.0	60	70

FROM - S.W. Lab.
ATTN: Mr. Earl Thomas



Hydrostatic Test Each length of pipe hydrostatically tested at 2800 psi for 5 sec. and found acceptable.

Treatment: 1600°F., held 1 hr. at temp. Air cooled.

Witnessed and Sworn to before me this 28th day of September 1978

[Signature]

I certify these tests to be correct as contained in the records of the company.

[Signature]
Metallurgical Representative W. F. GILBERT, 101

Note: Public Safety... Authority...
Quality Control...
Not for Release...

Babcock & Wilcox

Tubular Products Division

P.O. Box 230, Beaver Falls, Pa. 15010

FORM 595-F

FITTINGS & FORGINGS OPERATIONS

20" x 18" 5/160 Reducer
CERTIFICATE OF TESTS

U & H ORDER NO.

11/78

CUSTOMER

SOUTHWEST FABRICATING & WELDING CO., INC.

CUST. ORDER NO.

4301H217

DATE

11/22/78

SPECIFICATION SA 234 WPB NORM. TO SECT 3 CLASS 2 197th EDITION INCLUDING ADDENDA THRU SUMMER 74 SW FAB NOTES 1 & 3 OF QA 20 (10 CFR. 21)

ITEM	PCS.	DESCRIPTION	SPECIFICATION														
3	2	20 x 18" SCH 160 CONC RED	SA 234 WPB NORM. TO SECT 3 CLASS 2 197 th EDITION INCLUDING ADDENDA THRU SUMMER 74 SW FAB NOTES 1 & 3 OF QA 20 (10 CFR. 21)														
R/NO.	HEAT CODE	C	MN	P	S	SI	CR	NI	MO	CU	V	N	ULTIMATE	YIELD	% EL.	% RA.	DHN
	8CCT	.18	.93	.014	.015	.19							70.3 KSI	47.4 KSI	35		
WN	SIZE	TEMP (* F)	FT.-LBS.	% SHEAR	LAT. EXP.	CHEM. & TENSILE PROPERTIES TO					HEAT TREATMENT TO		DHN IN ACCORDANCE WITH				
	F/S	+40	97-73-64	86	085-070-064	A 106 Gr B					NORMALIZE		SA 234 Para 9.1				

ITEM	PCS.	DESCRIPTION	SPECIFICATION														
R/NO.	HEAT CODE	C	MN	P	S	SI	CR	NI	MO	CU	V	N	ULTIMATE	YIELD	% EL.	% RA.	DHN
													KSI	KSI			
WN	SIZE	TEMP (* F)	FT.-LBS.	% SHEAR	LAT. EXP.	CHEM. & TENSILE PROPERTIES TO					HEAT TREATMENT TO		DHN IN ACCORDANCE WITH				

ITEM	PCS.	DESCRIPTION	SPECIFICATION														
R/NO.	HEAT CODE	C	MN	P	S	SI	CR	NI	MO	CU	V	N	ULTIMATE	YIELD	% EL.	% RA.	DHN
													KSI	KSI			
WN	SIZE	TEMP (* F)	FT.-LBS.	% SHEAR	LAT. EXP.	CHEM. & TENSILE PROPERTIES TO					HEAT TREATMENT TO		DHN IN ACCORDANCE WITH				

REGISTRATIONS: RT=ENDS OF MATCH PTSH=PLATE TYPE SCRAPER BARS T/B=TAPER BORED TER TO END

ULTRASONICALLY INSPECTED AND ACCEPTED PER B & W PROCEDURE _____

MAGNETIC PARTICLE INSPECTED AND ACCEPTED PER B & W PROCEDURE _____

LIQUID PENETRANT INSPECTED AND ACCEPTED PER B & W PROCEDURE _____

FITTINGS ARE CAPABLE OF WITHSTANDING A HYDROSTATIC TEST PRESSURE EQUAL TO THE CALCULATED TEST PRESSURE OF THE MATCHING PIPE.

THE BURSTING PRESSURE OF THE FITTINGS IS AT LEAST EQUAL TO THE COMPUTED BURSTING PRESSURE OF THE MATCHING PIPE PER ANSI B16.9 MSS SP-75



TENSILE TEST SPECIMEN TYPE:
1. STRIP TEST OR FULL SECTION
2. STANDARD ROUND

TESTS NOT PERFORMED ON RAW MATERIAL:
 HYDROSTATIC
 FLATTENING
 OTHER _____

SWORN TO AND SUBSCRIBED BEFORE ME:
[Signature] 11/22/78

ACCEPTED
13
S-10421
RIP
34 (MT)

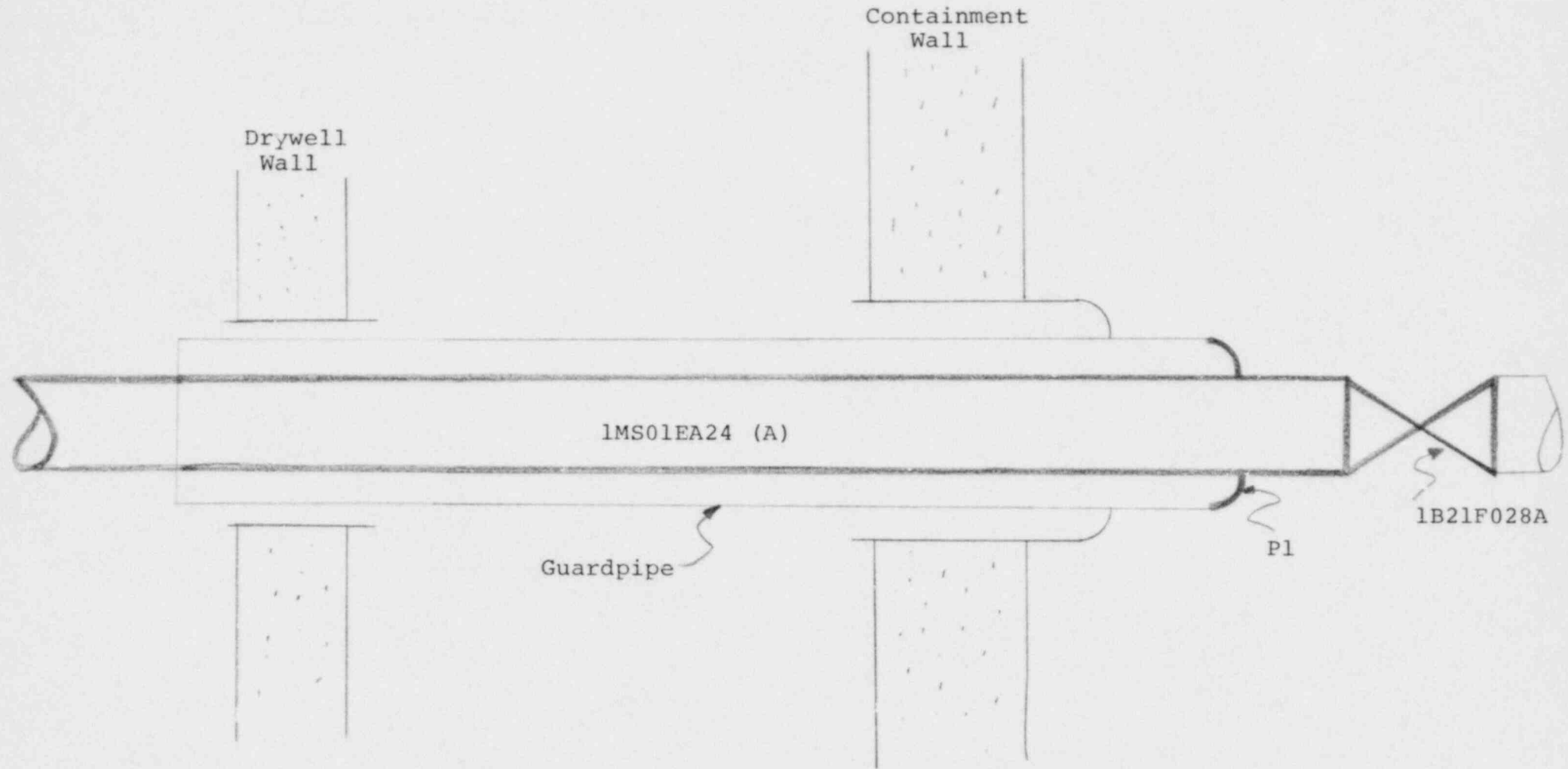
Conrado I. Murrbecher, Notary Public
Borough of Hazel, Beaver Co., PA
My Commission Expires February 1, 1981

I HEREBY CERTIFY THIS REPORT TO BE TRUE AND CORRECT ACCORDING TO THE RECORDS OF THE BABCOCK AND WILCOX COMPANY.
[Signature]
HAROLD G. WARSO TWS

MAIN STEAM SYSTEM CONTAINMENT BOUNDARY

Component Number	Description	Material	Thickness	Impact Test Temp.	Test Data		Derived LSMT	Exempt	Notes
					Charpy V-notch	Mils Lateral			
1B21F028A	Valve Body	SA216 WCB	2.500"	60°F	26-23-26	29-28-29	40°F	--	N,T, per #3
1B21F028A	Valve Poppets	SA350 GrLF2	6.031"	60°F	32-40-48	28-35-36	57°F	--	N,Q, per #3
1B21F028A	Valve Cover	SA105	5.813"	60°F	68-73-71	54-43-50	55°F	--	N,Q, per #3
IMS01EA24	GE Head Fitting "A"	SA350 GrLF2	5.000"	60°F	135-126-128	48-104-74	50°F	--	N, per #3
IMS01EA24	GE Spool "P1"	SA333 Gr6	1.218"	60°F	181-154-142	91-86-82	--	--	per #1

MAIN STEAM SYSTEM



FORM NPV-1 MANUFACTURERS' DATA REPORT FOR NUCLEAR PUMPS OR VALVES*

B-21-F028A

As Required by the Provisions of the ASME Code Rules

1. Manufactured by Atwood & Morrill Co., Inc. Salem, Mass. 01970 Order No. 13562-01
(Name & Address of Manufacturer)

2. Manufactured for General Electric Co., San Jose, California Order No. 205-AF777
(Name and Address)

3. Owner Illinois Power Company

4. Location of Plant Decatur, Illinois

5. Pump or Valve Identification Valve S/N 8-562 24" Main Steam Isolation Valve

for Service in Main Steam Piping System
(Brief description of service for which equipment was designed)

6(a) Drawing No. 13562-01-H Rev. 3 Prepared by Robert J. Knox

6(b) National Board No. N/A

Design Conditions 1375 (Pressure) psi 586 (Temperature) °F

7. The material, design, construction, and workmanship complies with ASME Code Section III, Class 1

8. Edition 1974, Addenda Date N/A, Case No. 1622

Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings			
Body	SA216-WCB	Quaker Alloy	S/N 8-562
RT #PA90			
(b) Forgings			
Poppet	SA350, Gr. LF-2	Cann & Saul	S/N 8-562
Cover	SA105 (QT)	Cann & Saul	S/N 8-562

Additional sheets in form of lists, sketches or drawings may be used provided (1) size is 8 1/2" x 11", (2) information in items, 1, 2, 5a and 7 is included on each sheet, and (3) each sheet is numbered and number of sheets is recorded at top of this form.

Mark No.	Material Spec. No.	Manufacturer	Remarks
(i) Bolting Cover Studs	SA540-Gr. B23 Cl. 5	Jos. Dyson & Sons	Ht. #8094156 Code A56
Cover Nuts	SA540-Gr. B23 Cl. 5	Jos. Dyson & Sons	Ht. #123173 Code A73
(j) Other Parts			
* 3/4 - Nipples	SA106-Gr. B	U.S. Steel	S/N 8-562
* 45° Elbow	SA105	Vogt Mach. Co.	S/N 24-562

* Note: These items comply with the Code for Material Construction and workmanship, but are not included as far as design is concerned.

Hydrostatic test 2175 Body Poppet 1450 psi.

CERTIFICATION OF DESIGN

Design information on file at General Electric Co. San Jose, California
 Stress analysis report on file at Atwood & Morrill Co., Inc., Salem, Mass.
 Design specifications certified by Forrest E. Funk (1) Prof. Eng. State Calif. Reg. No. 14031
 Stress analysis report certified by Herbert Cook (1) Prof. Eng. State Mass. Reg. No. 10981
 (1) Signature not required. List name only.

We certify that the statements made in this report are correct.

Date 6-14-76 19____ Signed Atwood & Morrill Co., Inc. by [Signature]
 (Manufacturer) Quality Control Manager

Certificate of Authorization No. N812 expires May 7, 1977

CERTIFICATE OF SHOP INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State of Province of Massachusetts and employed by Hartford Steam Boiler Insp. & Ins. Co. of Hartford, Conn. have inspected the equipment described in this Data Report on 6-16 19 76, and state that to the best of my knowledge and belief, the Manufacturer has constructed this equipment in accordance with the applicable Subsections of ASME Code, Section III.
 By signing this certificate, neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the equipment described in this Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date 6-16 19 76

[Signature] Commissions Mass. 756
 (Inspector) G.O. Carpenter (National Board, State, Province and No.)

CUSTOMER Atwood & Morrill Co. PURCHASE ORDER AM25354 CONTRACT NO. 205AF777

SHOP ORDER D312-40 Q DESIGNATION Q70 PATTERN NO. 16730-30146-101

MATERIAL SPEC. & GRADE ASME SA216 GR.WCB DESCRIPTION body SIZE 24"

HEAT NO. F7476 CASTING SERIAL NO. F7476-4 R.T. SERIAL NO. P301

NUCLEAR CLASS 1 PCS. COVERED ON THIS REPORT 1 SOURCE INSPECTION Atwood & G.E.

CERTIFIED MATERIAL TEST REPORT

The records enclosed in this folder comprise the certified material test report for the subject material.

1821 F028A
Body

AFFIRMATION

We certify that the contents of this report are correct and accurate and that all test results and operations performed by Quaker Alloy Casting Company or our sub-contractors are in compliance with the material specification and appropriate material requirements of the ASME Code 1974 through n/a

Addenda, Section III, as stipulated in the procurement documents.

Paul P. Petherick 3-24-76
Quaker Alloy Casting Company Date

A&M
R.C.B
A 3-24-76

BWARF.C.C.
J.L.B.
MAR 24 1976

QA1 Rev. 2
11/11/75

APPROVED
BY *J. J. J. J. J.*
DATE 3-30-76
ATWOOD & MORRILL CO. INC.



QUAKER ALLOY CASTING CO.
 A DIVISION OF HARSCO CORP.
 MYERSTOWN, PENNA. 17067

Ref: 13562-01-

Body for 24"-575#

MATERIAL TEST REPORT

205AF777 *SN 5-562*

CUSTOMER ORDER NO.	PATTERN NO.	QUAKER ALLOY DESIGNATION	SPECIFICATION	SHOP ORDER NUMBER	DATE SHIPPED
AM25354	16730-30146-101	Q70	ASME SA216 GR.WCB (74)		3=25=76

CUSTOMER

Atwood and Morrill Co.

APPROVED
 BY *[Signature]*
 DATE *3-30-76*
 ATWOOD & MORRILL CO. INC.

HEAT NO.	C	Mn	Si	P	S	Cr	Ni	Mo			YIELD P.S.I.	TENSILE P.S.I.	ELONG. %	RED. of AREA %	CSTG. SER.#	R.T. SER.#	PCS SHIPPED
F7476	.19	.87	.56	.019	.013						48,000	80,500	27.5	48.9	F7476-4	P301	1
Charpy Impact V Notch Plus 60°F										26-23-26	Foot Pounds						
										29-28-29	lateral expansion						
										30-30-30	% Ductile Fracture						

REMARKS:

Reviewed By: *QEC* Date: *4/7/76*
 R. E. Ciampa, Quality Control Representative
 General Electric Co. - BWR Projects Dept.

A&M
Q.C. 3
3-24-76

MAR 24 1976

CHEMICAL & PHYSICAL
 REPORT CHECKED
 BY *[Signature]*
 DATE *3/29/76*
 ATWOOD & MORRILL CO. INC.

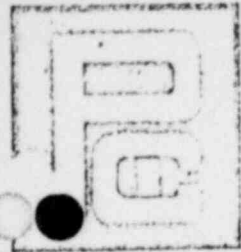
STATE OF PENNSYLVANIA, COUNTY OF LEBANON, S.S.
 SWORN TO AND SUBSCRIBED BEFORE ME

"I CERTIFY THE ABOVE INFORMATION IS CORRECT"

QUAKER ALLOY CASTING CO.

THIS *370 A.M.F.* DAY OF *APRIL* 19 *1976*

BY *[Signature]*
 METALLURGIST



POLY CAST, INC.

800 RICKETT ROAD · P.O. BOX 237

BRIGHTON, MICHIGAN 48116

TELEPHONE 313-229-2934

1821 F02SA
body

N^o 10194

Ref: 5458

SOLD TO • ATWOOD & MORRILL
• 285 Canal Street
• Salem, Mass. 01970

SHIP TO • SAME



INVOICE DATE	2/20/76
SHIPPING DATE	2/20/76
CARRIER	Interstate

CUSTOMER ORDER NO.	DATE	DATE ENTERED	SALESMAN
3219	12/23/75		N/A

FREIGHT PREPAID	FREIGHT COLLECT	FORM	TERMS NET - 30 DAYS
	XXX	Welding Rod	XXX

STATUS OF ORDER	COMPLETE	PARTIAL
	XXX	

LBS. ORDERED	DESCRIPTION	PRICE PER LB.
500#	3/16" dia. x 14" long Poly Cast No. 21 PC-21-MOD-118 Nuclear Gas Quality This material meets AWS A5.13-70 Class RCcCr-X and conforms to Article NB-2000, Section III, ASME Boiler & Pressure Vessel Code and complies with the marking requirements for welding materials of Section III, 1974, thru summer 1975, addenda of ASME Boiler & Pressure Vessel Code, para.	

NET LBS. SHIPPED	PRICE EXTENSION
552#	

RECEIVED
FEB 24 1976
ATWOOD & MORRILL

NA3766.6(B) Color Code: Red CHEMICAL ANALYSIS

HEAT NO.	C	Mn	Si	P	S	Ni	Cr	W	Mo	Fe	Co	Others
PC-21-MOD-118	.22	.30	.70	.015	.018	2.06	27.5	.08	5.11	.84	BAL.	4.50

Certification of quality assurance tests to follow.
Usability Tests Performed.
Poly Cast, Inc. certifies that the content of this report is correct and accurate.

Reviewed By: *R. E. Ciampa* Date: *5/25/76* We hereby certify that the foregoing data is a true copy of the data resulting from tests performed in our laboratory or of the data furnished us by the laboratory performing the tests.
R. E. Ciampa, Quality Control Representative
General Electric Co. - BWR Projects Dept.

DATE February 20, 1976
Subscribed to and sworn before me

William R. Galt
NOTARY PUBLIC
Acting in Livingston Co., Mich.

WILLIAM R. GALT
Notary Public, Washtenaw County, Mich.
My Com. Expires 2-24-77

POLY CAST, INC.
Stephen J. Barkovich
AUTHORIZED AGENT
Stephen J. Barkovich

ALL CLAIMS MUST BE MADE WITHIN 30 DAYS. PRICES SUBJECT TO CHANGE WITHOUT NOTICE

We hereby certify that these goods were produced in compliance with all applicable requirements of Section 6, 7 and 12 of the Fair Labor Standards Act of 1938, as amended and all regulations and orders of the administrator of the Wage and Hour Division issued under Section 14 thereof. Shipments under \$500 go Freight Collect.



STELLITE DIVISION
CABOT CORPORATION
 Kokomo, Indiana 46901

Ref: 5458

CERTIFIED REPORT OF CHEMICAL ANALYSIS AND MECHANICAL TESTS

Suburban Welders Supply
 72 Richardson St.
 Ashland, Mass.

IB21F028A
Body

Atwood & Morrill Co., Inc.
 P.O. AM3739
 240 lbs. 1/4" #21 Coated

SPECIFICATION NO.	ALLOY	CUSTOMER IDENTIFICATION	OUR IDENTIFICATION
OUR SALES ORDER NO.	CUST. PURCHASE ORDER NO.	QUANTITY SHIPPED	DATE SHIPPED
87107	22221	240 lbs.	3/15/76

CHEMICAL ANALYSIS

LOT 31048 NEXT NO.	C	Co	Cr	Cu	Fe	Mn	Mo	Ni	P	S	Si	W
1503	.24	Bal	27.23		.33	.30	5.50	2.34			.49	.06

TESTS AT

HEAT NO.	RUPTURE	ULTIMATE	YIELD STRENGTH, PSI		% ELONGATION		%	ROCKWELL	HARDNESS
	LIFE, HRS.	STRENGTH, PSI	.2% OFFSET	.02% OFFSET	IN	INCHES	R. A.	AS CAST	

This material meets the marking requirements of ASME Boiler and Pressure Vessel Code, Section III, Para MA-3765.6, Para. B, Welding and Brazing Material Identification/

Reviewed By: *REC* Date: *3/26/76*
 R. E. Ciampa, Quality Control Representative
 General Electric Co. - BWR Projects Dept.

CERT. OF COMPLIANCE
 REPORT CHECKED

U. Franconi
 DATE *3-26-76*
 ATWOOD & MORRILL CO. INC.

DATE March 15, 1976 11
 SUBSCRIBED AND SWORN TO, BEFORE ME
[Signature]
 NOTARY PUBLIC

[Signature]
 (AUTHORIZED AGENT)

CANN & SAUL STEEL CO.

S/N 1-562 Th v. 5/11/8502

ROYERSFORD, PA. 19466

Report of Physical Tests and/or Chemical Compositions

3-9-76

Customer **ATWOOD & MORRILL CO., INC.**
285 CANAL ST.
Address SALEM, MASS. 01970

Customer's Order No. AM-1635
REF. #13562-01-002

Cann & Saul Order No. 36150

*POPPETS
1B21 F02BF
Poppets*

Attention PURCHASING DEPT.

CHEMICAL COMPOSITIONS

HEAT NO.	C	MN	P	S	SI	CR	NI	MO	CB
632225	.24	1.20	.024	.030	.25				

PHYSICAL TESTS

CUT FROM	TEST NUMBER	GAUGE	YIELD FT. LBS.	YIELD PER Square In Lbs.	BROKE AT LBS.	ULTIMATE TENSILE LBS.	ELONG %	REDUCED AREA	Reduction %	B.H.N.
Forging	36150 1	.505	YS 9,000	YS. 2% 45,000	114,800	714,000	33.0	.058	71.0	
Charpy Impacts:- "V" Notch			32.0	40.0	48.0 ft. lbs. @ plus 60	F CHEMICAL & PHYSICAL REPORT CHECKED				
			28	35	36 mils lateral expansion	BY: <i>D. Sharp</i>				
			15	20	20 percent shear	DATE: 3/16/76				

OTHER TESTS

SONIC A388, REV. 20 4/11/75 ~~REMOVED~~: - Acceptable
Heat Treat to H.T.Proc. #66 8-14-75:- and Addendum dated 11/25/75
M.P. B&PV #12, REV. 1 (XX 5/7/75) :- Acceptable

We certify that the contents of this report are correct and accurate and that all operations performed by our company or subcontractors are in compliance with the requirements of the materials specification and the ASME Code Sec. III 1974 Edition.

Customer's Specifications: ASME SA350-3, GR. LF-2
CHARPY "V" IMPACT 25 MILS. LAT. EXP. @+60°F

Y. P. 36,000
T. 70,000
E. 22%
R. 30%

B.H.N.

THE ABOVE TESTS COVER THE FOLLOWING MATERIAL:

8 - POPPET FORGINGS PER DWG. 30521-604-D (NO REV.) FOR CODE 30521-604-2974

Forgings serialized #1 thru 8 inclusive

Reviewed By: *R. E. Ciampa* Date: 4/1/76
R. E. Ciampa, Quality Control Representative
General Electric Co. - BWR Projects Dept.
CANN & SAUL STEEL CO.

GE & A & M

W. Ball Level II
3-9-76
3-18-76
S/N 1 thru 8

APPROVED
DATE 3/16/76
BY *R. E. Ciampa*
ATWOOD & MORRILL CO., INC.

C. Bowers
Eng. of Tests

CANN & SAUL STEEL CO.

ROYERSFORD, PA. 19460

Report of Physical Tests and/or Chemical Compositions

Date 4-23-76

REVISED COPIES FOR COPIES DATED 3-29-76

Customer Atwood & Morrill Co., Inc.
285 Canal St.
Address Salem, Ma. 01970

Customer's Order No. AM-1635
Ref. 13562-01-211
G.E. #205-AF-777

Cann & Saul Order No. 36152

Attention Purch. Dept.

Handwritten: 7621 F028A
Signature: [Signature]

CHEMICAL COMPOSITIONS

HEAT NO.	C	MN	P	S	SI	CR	NI	MO	CB
632202	.26	.94	.023	.015	.20				

Lab. No.

PHYSICAL TESTS

CUT FROM	TEST NUMBER	GAUGE	YIELD PT. LBS.	YIELD PER Square In Lbs.	BROKE AT LBS.	ULTIMATE TENSILE LBS.	ELONG %	REDUCED AREA	Reduction %	B.H.N.
Forging	36152 1	.505	9,800	49,000	15,400	77,000	33.0	.066	67.0	170/17
Charpy Impacts:-			68	73	71	ft. lbs. @ plus 60°F				
"V" Notch			54	43	50	mils lateral expansion				
			35	35	35	percent shear				

APPROVED
BY *[Signature]*
DATE 4-27-76
ATWOOD & MORRILL CO. INC.

OTHER TESTS

Sonic to A388 Rev. 20(4-11-75):-Acceptable
Mag. Part E&PV #12 Rev. 1(5-7-75):- Acceptable for A&M information only.
Heat Treatment to C&S Proc. 5B(10-25-74) & Addendum (11-25-75)
We certify that the contents of this report are correct and accurate and that all operations performed by our company or subcontractors are in accordance with the requirements of the materials specification and the ASME Code Sec. III 1974 Edition.

Customer's Specifications: ASME SA105-QT

YK 36,000 YS.2%
T. 70,000
E. 22%
R. 30%

Charpy "V" Impact 25 mils lat. exp. @ plus 60°F

B.H.N. 187 Max.

THE ABOVE TESTS COVER THE FOLLOWING MATERIAL:

2 - Cover Forgings per Dwg. 30861-406-D(No Rev.) for Code 30861-406-2974.
Forgings serialized #6 & 7

Reviewed By *[Signature]* Date 4-27-76
R. E. Ciampa, Quality Control Representative
General Electric Co. - BWR Projects Dept.

G.E. & A&M

A&M
Q.C. 1
A

CHEMICAL & PHYSICAL
REPORT CHECKED

CANN & SAUL STEEL CO.

Inspection

BY *[Signature]*

[Signature]

Inspector

DATE 4-26-76
ATWOOD & MORRILL CO. INC.

Eng. of Tests

(P) A.N.I. for W.F.C. 4/20/76 updated copy #6-502.

75E wacker

POLY CAST, INC.

800 RICKETT ROAD - P.O. BOX 237
 BRIGHTON, MICHIGAN 48116
 TELEPHONE 313-229-2934

Ref: 5458

No 10128

IB21F028A
 [Handwritten signature]

SOLD TO • ATWOOD & MORRILL CO., INC. SHIP TO • SAME
 285 Canal Street
 Salem, MASS. 01970

CHEMICAL & PHYSICAL
 REPORT CHECKED

BY: [Handwritten Signature]
 DATE: 12/12/75
 ATWOOD & MORRILL CO. INC.

INVOICE DATE	12/5/75
SHIPPING DATE	12/5/75
CARRIER	Interstate

CUSTOMER ORDER NO.	DATE	DATE ENTERED	SALESMAN
Am 2906	11/26/75	11/26/75	D. Harrook

FREIGHT PREPAID	FREIGHT COLLECT	FORM	TERMS NET - 30 DAYS	STATUS OF ORDER	COMPLETE	PARTIAL
	XXX	Welding Rod	XXX		XXX	
LBS. ORDERED	DESCRIPTION			NET LBS. SHIPPED	PRICE EXTENSIC	
300#	Material not color coded. 3/16" dia. x 14" long Poly Cast No. 21 PC-21-110 Nuclear Gas Quality MEETS: AWS A5.13-70 Class RCoCr-X Poly Cast, Inc. certifies that the contents of this report are correct and accurate. Poly cast materials comply with the marking requirements for welding materials of Section III, 1974, thru summer 1975 addenda of the ASME Boiler & Pressure Vessel Code.			196#		

CHEMICAL ANALYSIS

HEAT NO.	C	Mn	Si	P	S	Ni	Cr	W	Mo	Fe	Co	Others
PC-21-110	.26	.08	1.02	.011	.016	2.21	27.25		5.70	2.14	BAL.	4.50

Reviewed By: [Signature] Date: 5-26-76
 R. E. Ciampa, Quality Control Representative
 General Electric Co. - BWR Projects Dept.

We hereby certify that the foregoing data is a true copy of the data result from tests performed in our laboratory or of the data furnished us by laboratory performing the tests.

DATE December 5, 1975
 Subscribed to and sworn before me

[Signature]
 NOTARY PUBLIC

Acting in Livingston Co., Mich.

WILLIAM R. CALE

Notary Public, Washtenaw County
 My Commission Expires 2-24-77

[Signature]
 AUTHORIZED AGENT

Stephen G. Barkovich

ALL CLAIMS MUST BE MADE WITHIN 30 DAYS. PRICES SUBJECT TO CHANGE WITHOUT NOTICE

We hereby certify that these goods were produced in compliance with all applicable requirements of Section 6, 7 and 12 of the Fair Labor Standards Act 1938, as amended and all regulations and orders of the administrator of the Wage and Hour Division issued under Section 14 thereof. Shipments under Section 14 go Freight Collect.

SHIPPED TO: Middlesex Welding supply
 2 Rindge Ave.
 Cambridge, Mass. 02140

DATE: 9/11/74 (BA1FO28A)
 AIRCO ORDER NO. A458-673
 CUSTOMER ORDER NO. C-4513

SPECIFICATIONS: Winter Addenda 1973
 Section II - SFA 5.1

ITEM	POUNDS	SIZE	TYPE	HEAT	LOT NO.
1	500	1/8	E7018	432N1871	029B696
2				Certified Material Test Report-Accept	
3				BY <u>St. Louis</u>	

Actual CHEMICAL ANALYSIS OF Weld Deposit DATE: 9/17/74
 AIRWOOD & MORRILL CO. INC.

ITEM	C	Mn	P	S	Si ✓	Ni ✓	Cr ✓	Mo	V
1	.053	.69 ✓	.020	.018	.58	.056	.033	.009	.005
2									
3									

Actual PHYSICAL PROPERTIES OF Weld Deposit

ITEM	TENSILE STRENGTH PSI	YIELD STRENGTH PSI	ELONGATION % IN 2"	REDUCTION IN AREA %	CONDITION
	76,925 ✓	67,800 ✓	34.0 ✓	77.7	As Welded
	71,630	60,530	34.0	77.9	Stress Relieved

*Stress Relieved at 1100°F for 8 hours.

ADDITIONAL TEST RESULTS

The above material meets the paragraphs of NB-2130, NB-2140, NB-2152 and NB-2400 of Section III, 1971. (including addenda thru Winter 1973)

X-Ray results satisfactory to Paragraph 8.1.1 of SFA 5.1
 Fillet Weld Usability Test satisfactory to Paragraph 8.1.4 of SFA 5.1

Each container has a label which gives AWS classification 7018 and diameter and a stamp which indicates Lot Number and Heat of Core Wire.

Impact results for As Welded and Stress Relieved conditions on attached sheet.

STATE OF Massachusetts
 COUNTY OF Worcester
 SUBSCRIBED AND SWORN TO before me this 11th DAY
 OF September 19 74
[Signature]
 NOTARY PUBLIC
 MY COMMISSION EXPIRES July 1, 1978

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.
J. J. Loughman
 Quality Control Expediter

ARCRODS PLANT

1B21FO28A
[Handwritten signature]

CERTIFICATE OF TEST
 CHARPY V-NOTCH IMPACTS

TESTED IN ACCORDANCE WITH SA-370 - Section II of the
 ASME Code including Addenda thru Winter 1973.

Airco Order No. A458-673

Date 9/11/74

Cust. Order No. C-4513

Type	Diameter	Lot No.	Heat No.
E7018	1/8	029B696	432N1871

TEST TEMPERATURE -20°F

As-Welded

<u>Specimen No.</u>	<u>Energy (ft-lbs)</u>	<u>Lateral Expansion (in)</u>	<u>Shear (%)</u>
1	95*	.075	25
2	107	.076	30
3	113*	.079	30
4	113	.078	40
5	108	.078	30
Average	109		

Stress Relieved @ 1100°F for 8 Hours

<u>Specimen No.</u>	<u>Energy (ft-lbs)</u>	<u>Lateral Expansion (in)</u>	<u>Shear (%)</u>
1	240	**	**
2	240	**	**
3	240	**	**
4	240	**	**
5	240	**	**
Average	240		

* The extreme lowest and highest values were disregarded for computing average.

** The specimen failed to fracture at 240 ft-lb the maximum reading for our instrument.

Reviewed By: *RSC* Date: *1/28/76*
 R. E. Ciampa, Quality Control Representative
 General Electric Co. - BWR Projects Dept.

Z. J. Loughman
 Z. J. Loughman
 Quality Control Expediter

77

CUSTOMER Southwest Fabr & Welding Co.

TAYLOR FORGE/CICERO DIVISION
GULF & WESTERN MANUFACTURING COMPANY
P.O. Box 485
Cicero, Illinois 60608



SPECIFICATION NO. See Below

CUSTOMER ORDER NO. Q 5243N-3

OUTER ORDER NO. 107795

HEAT TREATMENT
25.80" ID Head fitting

PACKING LIST NO. 510304-05

SA 350 LF-2



"A"

DESCRIPTION	CHARGE NO. TF Item	HEAT SYMBOL	MILL HEAT NO.	PHYSICAL PROPERTIES				CHEMICAL ANALYSIS															
				YIELD STRENGTH PSI	TENSILE STRENGTH PSI	ELONG. IN 2" %	RED OF AREA %	C	MN	P	S	SI	CO	CR	Cu	V	AL						
6 - 25.80" ID x 36.00" OD x 8.50" Thick Head Fitting 250 RMS Surface Finish Per Dwg. Sheet M-7623	601	EPZZ	6054205	63660	77500	33.07	4.2	.25	.73	.010	.017	.17											
				ASME SA350-1 P2 Per ASME Sect. III Cl. 1, 1974 Ed. Incl. 1975 Summer Addenda, S.W. Fab. Form QA-20 Dtd 10-11-74, G.E. QRL No. 207 Rev. 1 & G.E. NL No. 207 Rev. 0 G.E. H50YP159 Incl. Change Notice NE 80046 Dtd 8-2-76. Heat treatment: 1700°F. - 5 hrs - Air cooled. 1650°F. - 5 hrs - Water quenched. 1225°F. - 9 hrs - Air cooled.				Check Analysis Grain Size: 8 - 10 SN .006 AS .01 Antimony .003															
				Charpy Impact Test, V-Notch, Transverse, Full Size: Ft. lbs. % Shear Fracture Mills Lateral Expansion % Lateral Expansion																			
				Plus 600F.: 135-126-128		95-95-95				18-104-74				12.1-26.4-13.8									
				Minus 500F.: 70-58-72		20-20-30				31-40-52				12.1-10.1-13.2									
Serial No.	Charge No.																						
UT41877-1	462																						
" -2	462A																						
UT41977-3	462B																						
UT41877-5	462D																						
" -7	462F																						
" -8	462G																						

REMARKS: Tensile, impact tests and check analysis taken from test ring parted from product per heat per heat treat charge or continuation charge. Parts are capable of withstanding the hydrostatic test referenced in ASME SA350. Parts have been ultrasonic examined per TF 41.223 Dtd 2/12/75 Rev. 1 and were found to be satisfactory. Parts have been magnetic particle examined per TF 41.41 Dtd 2-7-75 Rev 1 Dtd 2-7-75 and were found to be satisfactory. NDE Reports attached. Heat Treatment charts attached. NDE Personnel qualification list and Eye Examination reports attached. Parts have been manufactured in complete compliance with the subject specifications and all special requirements of your purchase order have been met.

SUBSCRIBED AND SWORN TO BEFORE ME Certificate of Authorization No. N-991 Expires 3-3-78.

THIS 20th DAY OF May 19 77

Notary Public
NOTARY PUBLIC STATE OF ILLINOIS
MY COMMISSION EXPIRES DEC. 18 1979
ISSUED THROUGH ILLINOIS NOTARY ASSOC

CPB
CPB 5-78

S.F. & W. CO.
6 A
711

Jaqueline Head
QUALITY CONTROL

CERTIFICATE OF TEST ON PIPE MATERIAL

77

CIW PIPE & STEEL PRODUCTS, INC.
P. O. BOX 36431
HOUSTON, TX 77066

Pipe: *Cameron*
21.700" ID
1.066"/1.152" ECC MW "A"
LOW TEMP SA 333 GR 6. Date 28 April 1977

IRON WORKS, INC.
P. O. BOX 4212
HOUSTON, TEXAS 77001

Customer Order No. D-82003-30N C.I.W. Sales Order No. F-5949
Specification ASME SA333 GR 6 SEC III CLASS I '1974 EDITION THRU SUMMER 1975 & MODIFIED BY G.E. B50YPL5Z REV. 0

Description of Material O.D. x I.D. x WALL
W/ENG. CHANGE NOTICE #NE-80053 21.700" x WALL 1.066"/1.152" ECC

C.I.W. Part No. 86-5949-241-217 ASME QUALITY SYSTEM CERTIFICATE (MATERIALS) NO. N-1261 EXPIRES 10-27-78.

Heat No.	Locatic. or Serial No.	CHEMICAL ANALYSIS												
		C	MN	P	S	SI	CR	V	Ni	AL	CU	CO	SN	AS
6540		.17	1.22	.010	.016	.33	.11	.01	.026	.08	.010	100ppm	90ppm	25ppm
6541		.19	1.25	.017	.015	.35	.11	.01	.038	.12	.010	100ppm	120ppm	19ppm
6542		.17	1.22	.011	.022	.33	.16	.01	.034	.13	.010	100ppm	80ppm	20ppm
3485		.17	1.22	.012	.016	.30	.11	.01	.028	.13	.01	97ppm	90ppm	16ppm
3710		.18	1.20	.015	.019	.33	.21	.01	.028	.12	.011	100ppm	70ppm	30ppm

Quantity Serial	Heat No.	Tensile PSI	% Offset Yield PSI	MECHANICAL PROPERTIES				
				% Elong. In.	% Red. Area	Macro Etch	Bend Test	Flat-tening Test
3	J 6540	See attachment for mechanical properties.						
5	J 6541							
6	J 6542							
4	L 3485							
4	L 3710							

Southwest Fab & Wld.
PO Q5242N-5
SO ILN-1279-B7
Item # 1

Forging serial numbers attached.

Pipe has been ultrasonically tested in accordance with approved CIW Procedure PU-33 Rev. A w/Add. 5949 and found acceptable. Report attached.

Wall thickness has been verified by ultrasonic method to be equal to or greater than 1.066" at each open end and a four foot interval along each joint.

Pipe has been hydrostatically tested in accordance with approved CIW Procedure PI-15 w/Add. 5949 and found acceptable.

Hydrostatic Test Each length of pipe hydrostatically tested at 1900 psi for 5 sec. and found acceptable.

Heat Treatment: See attachment for heat treatment.

QA-EET
CPB

RWRPD-OC
J.F.B. 6-28-77

Subscribed and Sworn to before me this 28th Day of April 1977

CIW
QA
6

certify these tests to be correct as contained in the records of the company.

Notary Public

Metallurgical Representative
WRIGHT, J.G.

MECHANICAL PROPERTIES:

(A) Heat Treatment: 1650°F., held 1 hr. at temp. Air cooled.

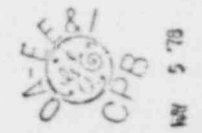
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Test Ser.#	Test Lot#	Tensile PSI	.2% Offset Y.S. psi	% Elong. 1"	% Red. Area	Flattening Test	Grain Size	Tensile Specimen Size
28250	900	74,600	47,200	32.2	64.0	OK	Avg. #8	.505
28252	895	76,100	53,900	31.3	61.1	OK	#8	.505
28253	895	74,900	48,900	30.9	62.1	OK	#8	.505
28255	897	74,900	50,600	29.5	50.3	OK	#9	.505
28260	893	77,400	53,900	29.9	58.3	OK	#8	.505
28262	891	74,600	52,100	31.9	61.1	OK	#8	.505

Test Temp.	Ft. lbs.	Lat. Exp.	% D/F	Test Temp.	Ft. lbs.	Lat. Exp.	% D/F
-50°F.	50.0	40 MILS	45%	+60°F.	181.0	91 MILS	100%
-50	64.0	52	55	+60	154.0	86	100
-50	66.0	52	50	+60	142.0	82	90
28252 -50	46.0	35	45	+60	137.0	83	100
-50	71.0	51	50	+60	127.0	79	100
-50	55.0	46	45	+60	125.0	79	100
28253 -50	70.0	51	55	+60	135.0	82	100
-50	75.0	59	50	+60	135.0	78	100
-50	69.0	50	55	+60	128.0	82	100
28255 -50	94.0	72	65	+60	163.0	86	100
-50	45.0	35	50	+60	132.0	86	100
-50	72.0	59	60	+60	128.0	76	100
28260 -50	49.0	41	40	+60	164.0	89	100
-50	85.0	66	65	+60	155.0	87	100
-50	145.0	94	80	+60	153.0	86	100
28262 -50	100.0	81	70	+60	196.0	91	100
-50	77.0	61	60	+60	160.0	84	100
-50	158.0	98	100	+60	170.0	83	100



6-28-77



CONCLUSION

Based on the fracture toughness data and material test results compiled in this report, Sargent & Lundy concludes the reactor containment pressure boundary meets the intent of General Design Criterion 51, "Fracture Prevention of Containment Pressure Boundary".

This conclusion was derived from either acceptable impact test results or the metallurgical characterizations of this material as specified in NUREG 0577 and ASME Section III, Subsection NC. The components selected for the report included equipment and personnel hatches, penetrations, head fittings, and elements of the main steam and feedwater systems. Also included in this report are the material test results and reference documents from which the components were selected.

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