SNUPPS

Standardized Nuclear Unit
Power Plant System

5 Choke Cherry Road
Rockville, Maryland 20850
(301) 869-8010

Nicholas A. Petrick
Executive Director

August 17, 1981

SLNRC 81-71 FILE: 0278
SUBJ: NRC Request for Information - Materials Engineering

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Docket Nos. STN 50-482, STN 50-483, and STN 50-486

Dear Mr. Denton:

The attached information was requested by Mr. J. Halapatz of the NRC's Materials Engineering Branch.

Very truly yours,

R S Wright for

Nicholas A. Petrick

RLS/mtk

Attachment (62-sheets)

cc: J. K. Bryan UE
D. F. Schnell UE
G. L. Koester KGE
D. T. McPhee KCPL
W. Hansen NRC/CAL
T. E. Vandel NRC/WC

B001
s
1/1

E634-2-1

BANCHOK DARLING VALVE COMPANY

INSPECTION RECORD

E634-2	218667		6	C16451	
CLASS A	VALVE DESCRIPTION 3"x4"x 900 ASTM			PART DESCRIPTION DISC	Cone + Seal

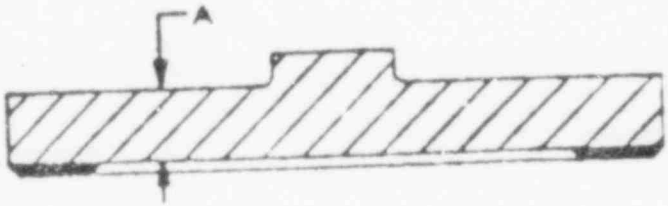
INSPECTION OPERATIONS	INSPECTOR IDENTIFICATION AND DATE	WITNESS OR HOLD	
Material Certified to Code Requirements	QA 03 1-23-79	BECHTEL 284	1-23-79
Rec. Insp. to MOCS-17, Rev. 5	QA 10 LEVEL II 2-10-79		
Final L.P. Hardfacing to MOCS-85, Rev. A	QA 02 LEVEL II 5-11-79		
Final Dim. Insp. to MOCS-94, Rev. A	QA 86 5-11-79		
Final Visual Insp. to MOCS-86, Rev. 0	QA 86 5-11-79		
		BECHTEL 284	

E6134-2-1

ATTACHMENT II

GATE VALVE DISC

S.N. E-6134
ITEM 2
HEAT 218665
SERIAL 6



THOROUGHLY SCAN & RECORD ONLY THE MINIMUM THICKNESS READING OBSERVED IN EACH ZONE.

A 3.835

Minimum Measurement 3.835

Remarks:

Inspected by QA86 Level II

Date 5-11-79

BECHTEL
284

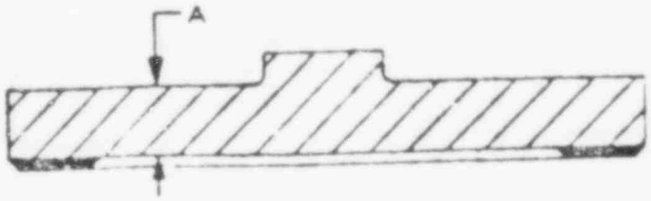
MCCS - 84-2

E6134-24

ATTACHMENT II

GATE VALVE DISC

S.O. E6134
ITEM 7
HEAT A18660
SERIAL 8



THOROUGHLY SCAN & RECORD ONLY THE MINIMUM THICKNESS READING OBSERVED IN EACH ZONE.

A 3.840

Minimum Measurement 3.840

Remarks:

Inspected by [illegible]

Date 6/14/79

BECHTEL 284

MQCS - 94 - B

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

As Required by the Provisions of the ASME Code Rules

INPUT

1. Manufactured by Anchor/Darling Valve Co.
701 First St., Williamsport, PA 17701 (Name & Address of Manufacturer) Order No. E-6134

2. Manufactured for Bechtel Power Corporation
P.O. Box 607, 15740 Shady Grove Rd.
Gaithersburg, MD (Name and Address) Order No. 10466 M-628

3. Owner Union Electic Co.

4. Location of Plant Callaway Plant, Unit #1, Portland, Missouri

5. Pump or Valve Identification E-6134-2-1

28" x 24" x 28" 900# MCTV
(Brief description of service for which equipment was designed)

(a) Drawing No. 94-14105 R D Prepared by Anchor/Darling Valve Co.

(b) National Board No. N/A

6. Design Conditions 2160 (Pressure) psi 100 (Temperature) F

7. The material, design, construction and workmanship complies with ASME Code Section III, Class 2

Edition 1974 Addenda Date 1974 Winter Case No. 1557, 1558

Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings			
BODY HT.# 40456-1 S/N NN28767	SA216-WCB	NEWPORT NEWS	
BONNET HT.# 52330-2 S/N NN28836	SA216-WCB	NEWPORT NEWS	
(b) Forgings			
DISC HT.# 218667 S/N 6 and S/N 8	SA105	CANN AND SAUL STEEL	
PIPE CAP HT.# BPB5	SA105	CAPITOL PIPE AND STEEL CO.	

*Supplemental sheets in form of lists, sketches or drawings may be used provided (1) size is 8½" x 11", (2) information in items 1, 2, 3a and 3b 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.

BONNET STUDS HT. # 54931	SA193-B7	R.E.E. CORPORATION
BONNET NUTS HT. # 63315	SA194-2	WM. DYSON AND SONS, INC.
10 Other Parts: DRAIN PIPE HT. # Y92361	SA106 B	MARMON/KEYSTONE CORPORATION

Hydrostatic test 3250 psi.

CERTIFICATION OF DESIGN

Design information on file at Bechtel Power Corp., P.O. Box 5[illegible], 15740 Shady Grove Rd., Gaithersburg, MD.

Stress analysis report on file at N/A

Design specifications certified by Naranjan P. Goel — Prof. Eng. State Kansas Reg. No. 7118

Stress analysis report certified by N/A — Prof. Eng. State ____ Reg. No. ____

(1) Signature not required. List name only.

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

Date August 22 1979 Signed Anchor/Darling Valve Co. (Manufacturer) By D. H. Phillips
D. H. Phillips
Q. A. Engineer

Certificate of Authorization No. N-712 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 employed by Commercial Union Ins. Co. of the State of Pennsylvania and have inspected the equipment described in this Data Report on 7-23 thru 8-23 1979 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 8 23 1979

Russell E. Montgomery (Inspector)

Commissions Pennsylvania #6677 (National Board, State, Province and No.)

This form (E32) is obtainable from the ASME, 345 E. 47th St., New York, N.Y. 10017

Price $1.00 (1972)

Newport News Shipbuilding

MATERIAL TEST REPORT

Date March 8, 1979

Anchor Darling Valve Company

Purchase P.O. No. P-2288

NNI Job Order No. 1357-H

Purchase Order No. 3359A

Description 28 x 24 x 28 900 W.V. MSIV Body

Specification ASME Code, Sect. III, Class 2

Rev. A

PC No. 1

Part No. 288904

Serial No. (if required) N/A

Heat No. 4045B-1

Applicable ASME Boiler and Pressure Vessel Code Section III Yr. 1974 Addenda Winter 1974

Rev. 1974 w/Winter 1974 addenda

Material Specification SA 216

Material Grade WCB

Made under QA program meeting ASME Code, Sect. III, Art. NA-3700

Melting Process Electric Furnace

Heat Treatment Condition Normalized, Quenched, & Tempered Temp. See* Time See*

Hydrostatic Test Pressure NA

Chemical Analysis (values in maximum % or specific notes)

Element	C	Mn	P	S	Si	Residual Elements - See
Specification	0.30	1.00	0.04	0.045	0.60	Attached Metallurgical
Actual	0.24	0.89	0.016	0.014	0.44	Inspection Report

Mechanical Tests (all values minimum)

Specimen	Tensile KSI	Yield Point KSI	% Elongation in 2 Inches	% Reduction in Area	Charpy Impact - See
Specification	70.0	36.0	22.0	35.0	attached Metallurgical
Actual	88.1	65.5	28.0	57.3	Inspection Report

Weld Repairs (see attached section) Procedure NNI-19.3, Rev. A

Weld & Material Identification E7018 Electrode 3/16" and 5/32" Dia.

Log Identification No. for 3/16" is 78NNI027 Identification of Weld Repair See Tech. Report

Log Identification No. for 3/16" is 79NNI037 Identification of Weld Repair See Tech. Report

Log Identification No. for 5/32" is 77NNI607 Identification of Weld Repair See Tech. Report

Post Weld Repair Heat Treatment NNI-19.902, Rev. A Temp. 1175 ± 25° Time 3 hours

Not performed RT Proc. N-540 Rev. A5, PCDS NN Procedure 885 MT Proc. N-320/330, Rev. C6

☐ UT ☒ MT ☐ PT ☒ RT RT No. NN28787 MT #267

Visual Inspection Standard (if applicable) MCS-SP-55

* Designates analysis, tests, examinations or other requirements which were not performed but were required by the material specification.

Explanation NA

* Designates variances between material specification and code requirements.

Explanation In addition to material specification requirement of normalizing and tempering operations, a quenching operation was performed; see attached material test report supplement.

Certification: Newport News Shipbuilding certifies that all requirements of the material specification and subsequently applicable specifications as noted, and that the data contained herein is correct and accurate, supported by appropriate records on file in the company.

Inspection records are filed in the company.

A. S. West

Date 3/9/79

Leader of Quality Assurance

BECHTEL

(1)

MATERIAL TEST REPORT SUPPLEMENT

Heat Treatment Requirement - 1.02.7359A (1357-X)

Dwg. 288904 - Body Casting Heat #40458-1

Normalizing

Temperature 1700 ± 25°F
Time Soak 6 hours

Water Quench

Temperature 1700 ± 25°F
Time Soak 6 hours

Temper

Temperature [illegible] ± 25°F
Time Soak 8 hours

The above heat treatments were performed in accordance with Procedure [illegible], Rev. A.

for L. G. West 3/9/79
T. Clark, Jr.
Manager of Quality Assurance

RECEIVED
J71

Page 2

METALLURGICAL INSPECTION REPORT

NEWPORT NEWS SHIPBUILDING AND DRY DOCK COMPANY
NEWPORT NEWS, VIRGINIA

Cast Steel — .505" Dia. Tensile — INSPECTION: Y[illegible] — DATE: March 8, 1979

Lab. No.	Pcs.	Item	Bag.	Carbon	Chrome	Mang	Nickel	Moly	Copper	Silicon	Phos.	Sul.	Specification	Y.P. Lbs./Sq.In.	T.S. Lbs./Sq.In.	Elong. %	R.A. %	Co Sul.
4201-5	1	1	288904	.24	.16	.89	.28	.09	.09	.44	.016	.014	ASME SA-216 Gr. WCB	65500	88100	28.0	57.3	

Impact (Casting Condition)

Sample No.	Temp. °F	Ft./Lbs.	Mils	%	Fibrous
1	+30	43	31	9.4	20
2	+30	41	31	9.4	20
3	+30	58	49	12.4	25

Additional Post Weld Heat Treatment

Sample No.	Temp. °F	Ft./Lbs.	Mils	%	Fibrous
1	+30	47	42	10.7	35
2	+30	37	34	8.6	35
3	+30	41	36	9.1	35

Y.P. 59140 — T.S. 7[illegible]000 — Elong. 30.0 — R.A. 64.7

Newport News Industrial Corporation Job Order 1357-N (NNS J.O. 7359-A) Anchor-Darling Valve Company
Customer Order No. P-2288, Anchor-Darling Pattern No. 1-28F-12A

	Date Cast	X-Ray No.	MT No.
1 - 28" - 900 D.V. - Valve Body	1-11-79	NN28787	267

BECHTEL
387

A. E. Nace
A. E. Nace
MRC Supervisor, Laboratory Services

J. H. Arthur, Jr.
J. H. Arthur, Jr.
Section Manager, Laboratory Services

Newport News Shipbuilding

MATERIAL MILL REPORT

Anchor Darling Valve Company — DATE April 18, 1979

PURCHASE ORDER NO. P-2288

SUBORDER NO. 7359-A — NNS JOB ORDER NO. 1357-N

DESCRIPTION 28" x 900 D.V. MSIV Bonnet

CODE DESIGNATION ASME Code, Sect. III, Class 2

DRAWING NO. 288905 — REV. A — PC NO. 1

HEAT NO. 32300-2 — SERIAL NO. NA

EFFECTIVE ASME BOILER AND PRESSURE VESSEL CODE SECTION III — YR. 1974 — ADDENDA Winter 1974

MATERIAL SPECIFICATION SA 216 — REV. 1974 w/ Winter 1974 Addenda

MATERIAL GRADE WCB

Mfg. under QA Program meeting ASME Code Section III ART. NA3700

FURNACE PROCESS Electric Furnace

HEAT TREATMENT CONDITION Normalized, Quenched, & Tempered — See * — See *

HYDROSTATIC TEST PRESSURE NA

CHEMICAL ANALYSIS

ELEMENT	C	Mn	P	S	Si	Residual Elements - See
SPECIFICATION	0.30	1.00	0.04	0.045	0.60	Attache' Metallurgical
ACTUAL	0.18	0.94	0.014	0.008	0.52	Inspection Report

MECHANICAL TESTS

	TENSILE	YIELD			Charpy Impact - See
SPECIFICATION	70.0	36.0	22.0	35.0	Attached Metallurgical
ACTUAL	81.7	60.7	27.0	54.7	Inspection Report

WELD REPAIRS — Procedure NNI-19.3, Rev. A

WELDING MATERIAL SPECIFICATION E7018 Electrode 3/16" and 5/32" dia.

LOT IDENTIFICATION NO. for 3/16" is 79NN1037 — See Tech. Report

LOT IDENTIFICATION NO. for 5/32" is 77NN1607 — See Tech. Report

LOT IDENTIFICATION NO.

POST WELD REPAIR HEAT TREATMENT NNI-19.902, Rev. A — 1175 ± 25° — 3 hours

NOT PERFORMED RT Proc. N-540 Rev. A5, RSES NN Proposed #86, MT Proc. N-320/420, Rev. C6

☐ UT ☐ RT ☐ PT ☒ MT — NN 28836 — MT #277

VISUAL INSPECTION STANDARD MSS-SP-55

Designation NA

Explanation In addition to material specification requirement of normalizing and tempering operations, a quenching operation was performed; see attached material test report supplement.

CERTIFICATION

Signature L.T. [illegible] — DATE 4-18-9

MANAGER OF QUALITY ASSURANCE

RECEIVED 5-13-79

MATERIAL TEST REPORT SUPPLEMENT

Heat Treatment Requirement # J.O. 13368 (0357-M)

Drawing No. 238905, Rev. A - Bonnet Casting Heat #52300-4

Normalizing

Temperature 1700 ± 25°F
Time (Soak) 6 hours

Water Quench

Temperature 1700 ± 25°F
Time (Soak) 7 hours

Temper 1st Cycle

Temperature 1225 ± 25°F
Time (Soak) 8 hours

Temper 2nd Cycle

Temperature 1250 ± 25°F
Time (Soak) 16 hours

The above heat treatments were performed in accordance with Procedure NNI-15 [illegible]2, Rev. A

R. T. Clark, JR 4-18-9
Manager of Quality Assurance

BECHTEL
387

A/D PO#
P. 2288

(2)

N.D. P.
P-2288

3

METALLURGICAL INSPECTION REPORT

NEWPORT NEWS SHIPBUILDING AND DRY DOCK COMPANY
NEWPORT NEWS, VIRGINIA

Carbon Steel — .505" Dia. Tensile — INSPECTION: Yard — DATE: April 5, 1979

Heat No.	Lot No.	Item	Dwg.	Carbon	Chrome	Manganese	Nickel	Moly	Copper	Silicon	Phos.	Sul.	Specification ASME	Y.P. Lbs/Sq.In.	T.S. Lbs/Sq.In.	Elong. %	R.A. %	Cold Bend
1725-8	1	1	288905	.18	.13	.94	.42	.11	.13	.52	.014	.008	SA-216 Gr. WCB	60700	81700	27.0	54.7	

Impact (Casting Condition)

Sample No.	Temp. °F	Ft./Lbs.	Mils	%	%Shear
1	+30	58	46	11.7	30
2	+30	54	43	10.7	25
3	+30	61	49	12.4	30

Additional Post Weld Heat Treatment

Sample No.	Temp. °F	Ft./Lbs.	Mils	%	%Shear
1	+30	60	47	12.0	30	58500	82100	27.0	54.9
2	+30	55	43	11.0	25
3	+30	68	54	13.7	30

Newport News Industrial Corporation Job Order 1357-N (NNS J.O. 7359-A) Anchor-Darling Valve Company
Customer Order No. P-2288, Anchor-Darling Pattern No.

	Date Cast	X-Ray No.	MT No.
8" 900 B.V. Bonnet	2-6-79	NN28836	277

BECHTEL 387

R. W. Joyner / for
A... Pace
MRC Supervisor, Laboratory Services

J. H. Arthur Jr.
J. H. Arthur, Jr.
Section Manager, Laboratory Services

CANN & SAUL STEEL CO.

SOMERFORD, PA. 18488

Report of Physical Tests and/or Chemical Compositions

Date 1/17/79

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

Customer's Order No. P-2366
S.O. #E-6134

Cann & Saul Order No. 50415

Attention PURCHASING DEPT.

CHEMICAL COMPOSITIONS

HEAT NO.	C	MN	P	S	SI	CR	NI	MO	CB
218667	.27	.85	.009	.021	.24				

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.
				YS	YS .2%						
Forging	50415	1	.505	10,300	51,500	16,100	90,000	34.0	.063	87.5	
Charpy Impacts			50 44 49 Mils Lat. Exp. @ +30°F								
"V" Notch			67 63 66 Ft. Lbs.								
			10 10 10 percent shear								

OTHER TESTS

BRINELL 137/174

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

Customer's Specification: ASME SA105
CHARPY "V" IMPACT 25 MILS @ +30°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:

16 - 24" 900 DISC FORGINGS FOR DWG. C-16451 (APF)
Forgings serialized #1 thru 16

(6) (8)

BECHTEL
284

CANN & SAUL STEEL COMPANY
Inspection

Inspector

MD 1-23-79

CANN & SAUL STEEL CO.

Mgr. of Tests

CERTIFICATE OF ANALYSIS AND TESTS

E6/346

To: Bechtel Power
Anchor/Darling Valve Company
701 First Street
Williamsport, PA 17701

Date: Nov. 27, 1978
Cust. Order No. 2373
Our Order No. 2474

DESCRIPTION OF MATERIAL AND SPECIFICATIONS

Studs - ASME SA 193, Gr. B7:

Item 1: 2-1/2" - 8 x 14-1/4". M-587. Trace Code AR. Qty. 200 pcs.

Material per ASME SECT. III, Class 2, 1974 Edition thru Winter 1974 Addendum.

"We hereby certify that the material supplied fully conforms to the specifications as outlined in your order and drawings indicated."

CHEMICAL ANALYSIS

Manufacturer	Heat Number	Carbon %	Manganese %	Phosphorus %	Sulphur %	Silicon %	Chromium %	Molybdenum %		
Copperweld 2-1/2"	S4931	.40	.97	.011	.019	.27		.90	.20	

MECHANICAL PROPERTIES

0.2% Yield Lbs./Sq. In.	Tensile Strength Lbs./Sq. In.	Elongation %	Reduction of Area %	Hardness	Impact Ft. Lbs.	Tempering Temp.
124,000	138,000	20.0	61.1	BHN [illegible]		1100 F.

SPECIAL TESTS

Test Temp. Plus 10 F.

CHARPY IMPACT TEST:	#1	#2	#3	REQ'D.		
SAAC 6701						
Lat. Expansion	41	43	41	25 min.		BECHTEL 284

We hereby certify that the foregoing data is a true copy of the data furnished us by the producing mill or testing laboratory.

R. E. C. CORPORATION

Lois A. Wallace

R. E. C. CORPORATION 47 CEDAR ST., NEW ROCHELLE, N. Y.

G 2619	052178	1 1	14 JUNE	7/9/78	33405

TERMS OF PAYMENT: 10 DAYS - 30 DAYS

NBP

BAR X

PAY CORPORATION
SHERATON PLAZA
NEW ROCHELLE, NEW YORK 10801

KB

SHIP TO: REC CORPORATION
47 CEDAR STREET
NEW ROCHELLE, NEW YORK 10801

140,000	2 1/2" Ø	X	PURPOSE: MACHINING	

RT KS SR EXT TEST (2.5)

269/321 BHN

ASTM-A-193-87 1977A

.0005 MAX.

COPPERWELD STEEL COMPANY
P.O. BOX 81 / WARREN, OHIO 44481

TEST REPORT

ORDER NUMBER: CUSTOMER / COPPERWELD 33405

DATE: 9/11/78

4140

HEAT NO.	C	Mn	P	S	Si	Ni	Cr	Mo	Cu	Pb	Al		GRAIN SIZE
64931	.40	.97	.011	.019	.27		.99	.20					6-8

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	20	24	28	32	36
57	56	56	50	56	55	54	54	53	52		40		47		45	42	41	40	40	

YIELD PSI	TENSILE PSI	OFFSET %	ELONG %	R.A. %	HARDNESS*
124,000	133,500	.2	20.0	61.1	302

OTHER DATA

Quench - 1600 - 2 Hrs.
Temper - 1100 - 2 Hrs.
Stress - 1100 - 2 Hrs.
Impacts 37/35/40 ft. #
"Mercury is not used during the testing or production of Copperweld steel products".

a Copperweld product

THIS CERTIFICATE NOTARIZED WHEN REQUIRED

a Notary Public do hereby certify that
was subscribed and sworn to before me by a duly authorized
of Copperweld Steel Company.

day of

NOTARY PUBLIC

BECHTEL
284

We hereby certify that the above data are correct as contained in the records of Copperweld Steel Company.

SUPV. MET LAB.

Supv Met Lab

CERTIFIED TEST REPORT

Page 1 of 1
Report Date 12-7-78

DATE SHIPPED	DYSON ORDER NUMBER	CUSTOMER ORDER NUMBER
11-22-78	N-7740	P-74011

JOS. DYSON & SONS INC. 83 FREEDOM RD., PAINESVILLE, OHIO 44077 • 216-946-38[illegible] 216-352-44[illegible]

Customer: Anchor/Darling Valve Co.
701 First Street
Williamsport, Pennsylvania 17701

Quantity: 192 Pcs.
Description: 2-1/2" - 8 ASTM S.F. Hex FN

RE[illegible]

Specification: SA-194 Gr. 7, ASME Sec. III, 1974 Edition including 1974 Winter Addenda NA-3700

Dwg & Rev

DEC 04 1978
PURCHASING DEPT.

Chemical Data

Code #	Lot	Heat #	C	Mn	P	S	Si	Ni	Cr	Mo		Cu
D740		83315	.45	.88	.011	.014	.39		1.00	.18		

Mechanical Data

Lot #	Tensile Strength PSI	Yield Strength PSI	% Elong in 2"	% Red of Area	BHN Hardness	Bend Test	Min. Tempering Temperature
			Per Para 7.1.5.1		302		
			Per Para 7.1.5.2		277		

Impact Data @ +30°F 25 Mils L.E. NC-2300

Code #	Lot #	Temp	Impact Strength Ft Lbs Pc 1	Pc 2	Pc 3	Lateral Expansion in Pc 1	Pc 2	Pc 3	% Shear Pc 1	Pc 2	Pc 3
D740			35	32	27	[illegible]	[illegible]	[illegible]	25	[illegible]	50

ADDITIONAL NOTES OR TEST DATA

HEAT TREAT DATA:

Austenitized at 1550°F 2-1/2 Hrs. at Heat - Oil Quenched
Tempered at 1100°F 2-1/2 Hrs. at Heat - Air Cooled

BECHTEL
284

The above tests conform to the requirements of the specifications listed. We hereby certify that the foregoing data is a true copy of the data furnished us by the producing mill or the data resulting from tests performed at Dyson or Vendor Laboratory facilities.

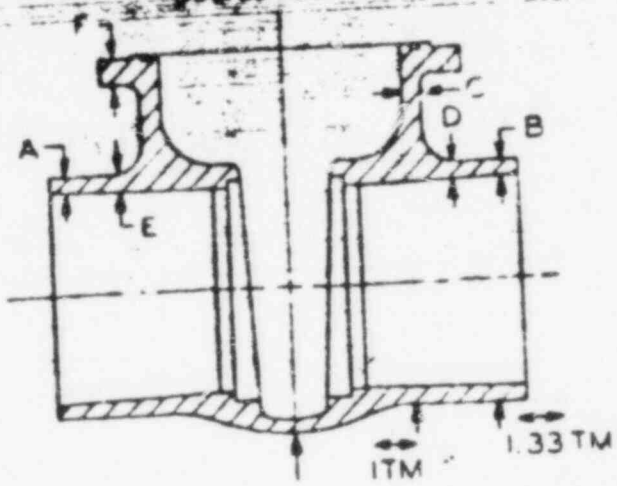
JOS DYSON & SONS INC

Authorized Q.A. Agent

Bill Sullivan Dir.
Art Mazzarella - Q.A. Manager

E6134-2-1

GATE VALVE
BODY
BOLTED BONNET



S.O. E6134 ITEM 2 HEAT 404FB-1 SERIAL NN60787

VALVE DESCRIPTION 28 x 24 x 28" 900# RTJ (Size & Pressure Rating) DWG. NO. & REV. FF1C5 R1

SPECIFICATION MIN. 2.737

APPLICABLE CODE & CLASS II

ZONE	12 O'clock	3 O'clock	6 O'clock	9 O'clock
A	2.960	2.900	3.000	2.820
B	2.950	2.880	2.810	2.860
C	3.000	4.656	2.890	4.275
D	3.240	3.360	3.365	3.471
E	3.410	3.660	3.740	3.700
F	6 5/8	6 5/8	6 5/8	6 5/8

QA 89 LEL 11 2-79

BODY:

Port "A" Min. 2.820

Port "B" Min. 2.810

Bowl Min. 2.750

Neck Min. 2.890

Flange Min. 6 5/8

METHOD OF INSPECTION:

Mechanical Equipment ☒

U. T. Process ☐

INSPECTOR QA 72 LETER 11 DATE 7-2-79

Q.A. ENGR. D W Phillips DATE 8/22/79

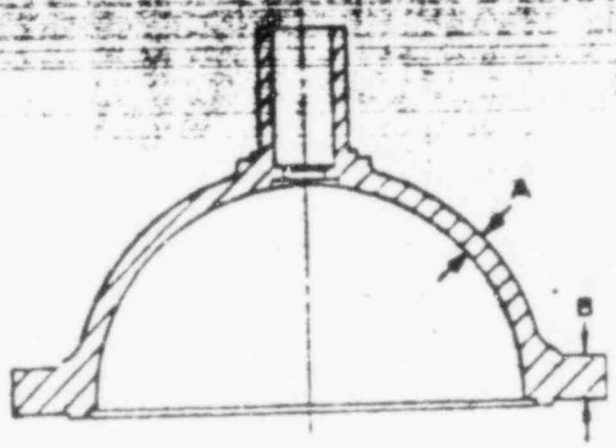
VALVE WALL THICKNESS PROCEDURE NO. MQCS 71 REV. B

BECHTEL 284

ATTACHMENT 1A

E6134-2-1

BOLTED BONNET



S.O. E6134 ITEM 2 HEAT 5230C-2 SERIAL NN28836

VALVE DESCRIPTION 24" 900 (Size & Pressure Rating) DWG. NO. & REV. F5105 R/0

APPLICABLE CODE & CLASS II SPECIFICATION MIN. 2.737

ZONE	12 O'Clock	3 O'clock	6 O'clock	9 O'clock
A	2 13/16"	2 13/16"	2 13/16"	2 13/16"
B	7 1/4	7 1/4	7 1/4	7 1/4
C				
D				
E				
F				

BONNET:

Minimum Scan 2 13/16

Flange Min. 7 1/4

METHOD OF INSPECTION:

Mechanical Equipment ☒

U. T. Process ☐

BECHTEL 284

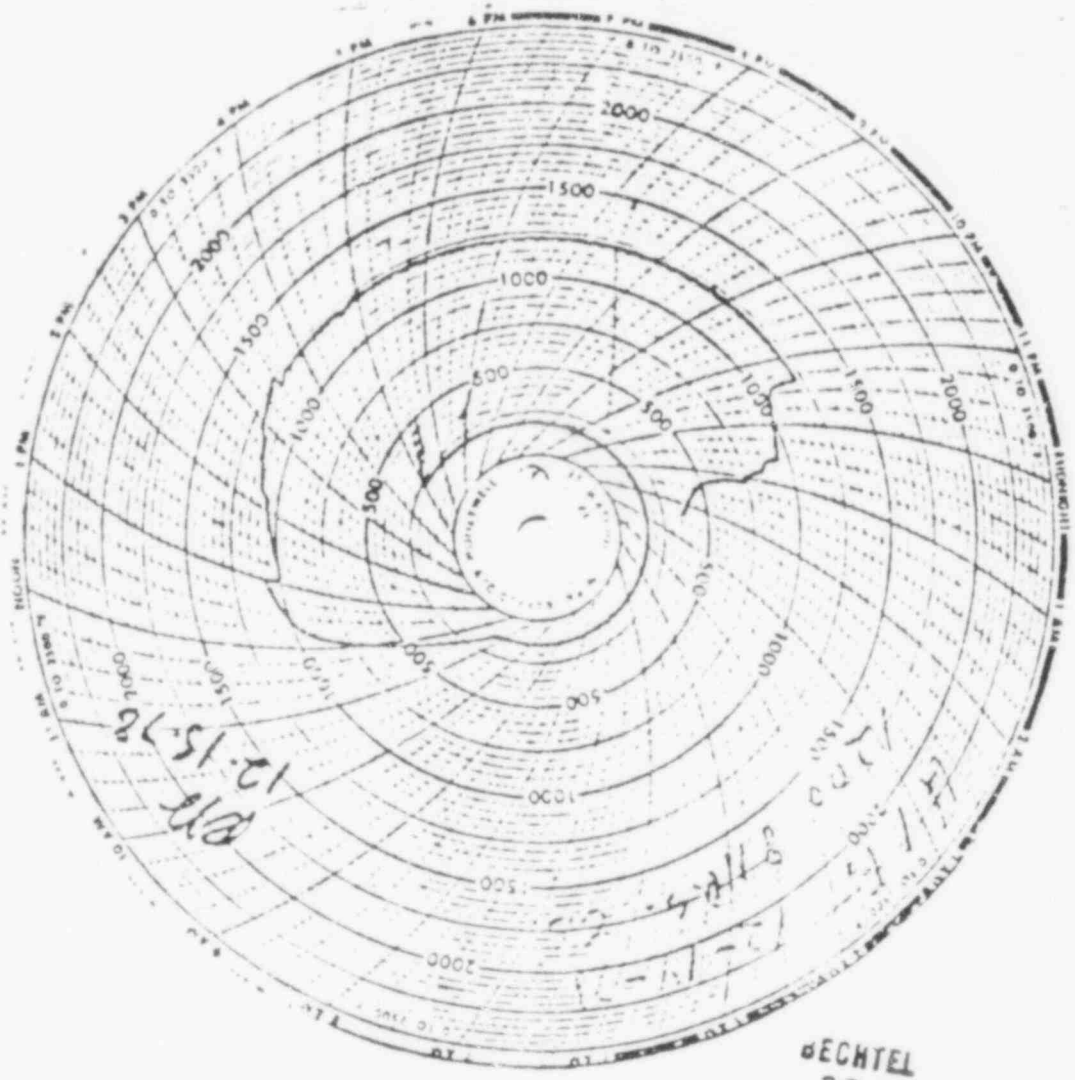
INSPECTOR QA 23 DATE 8-8-79

Q.A. ENGR. D. A. Phillips DATE 8/22/79

VALVE WALL THICKNESS PROCEDURE NO. MQCS 71 REV. B

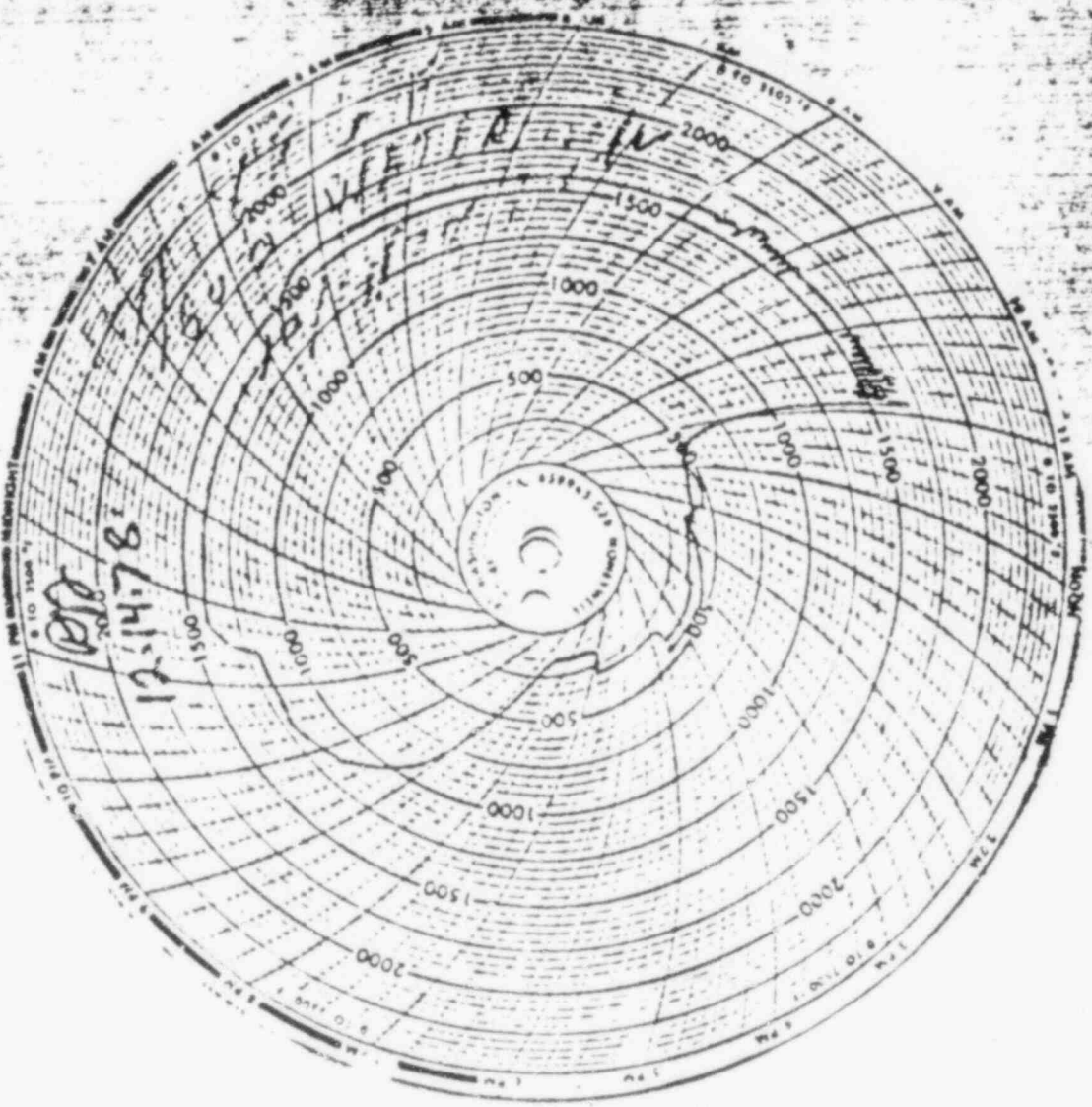
ATTACHMENT 2A

Anchor/Darlin; Valve Co.
P-2366 S.O. VE-6134
16 - 24" 900 Disc Forgings for Dwg. C-16451(APF)
Forgings serialized #1 thru 16
Heat No. 218667



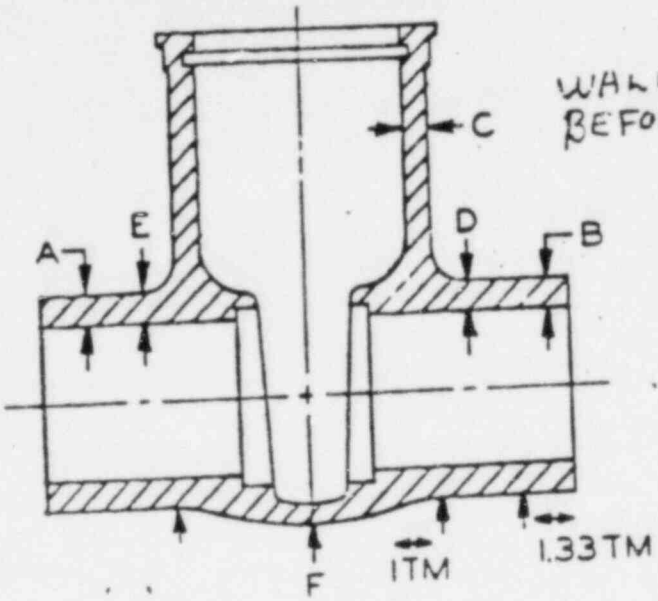
BECHTEL
284

[illegible] Disc Forgings for Dwg. C-16451(APF)
Forgings serialized #1 thru 16
Heat No. 218667



BECHTEL
284

GATE VALVE
BODY
PRESSURE SEAL



WALL THICKNESS BEFORE CLADDING.
1.670 QA 23 LEVEL 1 1-13-79

S.O. E6181 ITEM 1 HEAT 5734E SERIAL R3536

VALVE DESCRIPTION 14X10X14 900 Body (Size & Pressure Rating) DWG. NO. & REV. F4633 R/A

C 1.150
D,E 2.265

APPLICABLE CODE & CLASS II SPECIFICATION MIN. A54F 1.750

ZONE	12 O'clock	3 O'clock	6 O'clock	9 O'clock
A	2.250	2.200	2.200	2.100
B	2.200	2.050	2.250	2.150
C	1.950	2.050	1.750	2.070
D	2.300	2.300	2.500	2.450
E	2.500	2.550	2.600	2.550
F	N/A	1.950	2.500	1.950

BODY:

Port "A" Min. 2.100
Port "B" Min. 2.050
Bowl Min. 1.950
Neck Min. 1.750

METHOD OF INSPECTION:

Mechanical Equipment ☒
U. T. Process ☐

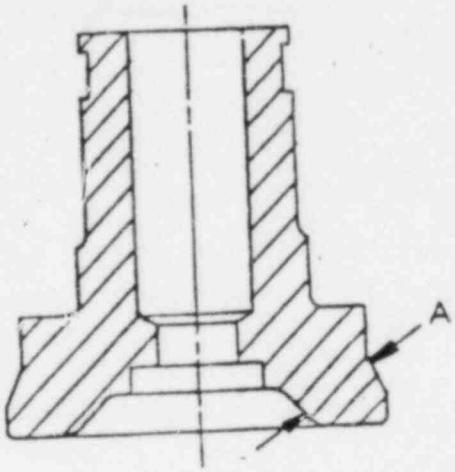
BECHTEL
284

INSPECTOR QA 1.2 LEVEL II DATE 9/7/78
Q.A. ENGR. R P Walter DATE 2/26/79

VALVE WALL THICKNESS PROCEDURE NO. MQCS71 REV. 3

ATTACHMENT 1

GATE VALVE
BONNET
PRESSURE SEAL



S.O. E 6181 ITEM 1 HEAT 217327 SERIAL 3

VALVE DESCRIPTION 10" 900-D.D. BONNET (Size & Pressure Rating) DWG. NO. & REV. D-9158 — A

APPLICABLE CODE & CLASS II SPECIFICATION MIN. 1.750

ZONE	12 O'Clock	3 O'clock	6 O'clock	9 O'clock
A	1.780	1.770	1.780	1.780
B				
C				
D				
E				
F				

12:00 AT HT + SN.

BONNET:

Minimum Scan 1.770

BECHTEL
284

METHOD OF INSPECTION:

Mechanical Equipment ☒

U. T. Process ☐

INSPECTOR (QA 87) LEVEL II DATE 8-11-78

Q.A. ENGR. R.P. Walter DATE 2-26-79

VALVE WALL THICKNESS PROCEDURE NO. MQCS-71 REV. B

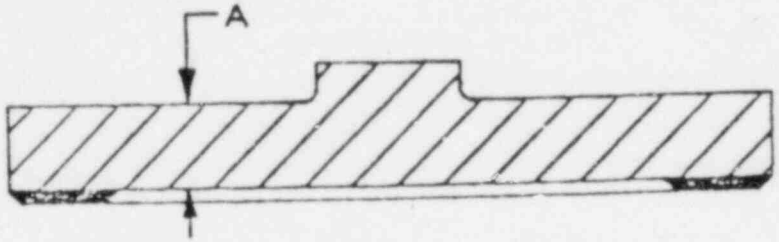
ATTACHMENT 2

✓

ATTACHMENT II

GATE VALVE DISC

S.O. E-6181
ITEM 1
HEAT 85374
SERIAL 2



THOROUGHLY SCAN & RECORD ONLY THE MINIMUM THICKNESS READING OBSERVED IN EACH ZONE.

A 2.070

Minimum Measurement 2.070

Remarks:

Inspected by QA 86 lew II

Date 9-19-78

BECHTEL
284

MQCS - 94- 2

LEBANON STEEL FOUNDRY
LEBANON, PENNSYLVANIA 17042

REPORT CHEMICAL ANALYSIS AND PHYSICAL PROPERTIES

CUSTOMER ORDER NO. M1606

PATTERN NO. F4633

CUSTOMER: ANCHOR DARLING VALVE CO.
701 FIRST STREET
WILLIAMSPORT, PA. 17701

101006 FILE NO. F820-10 DESIGNATION WCB

SUBMITTED BY Purchasing Dept. SPECIFICATION ASME SA216 GR WCB DATE 3/10/77

HEAT NO.	C	Si	Mn	P	S	Cr	Ni	Mo	Cu	Cb/Ta	YIELD P.S.I.	TENSILE P.S.I.	ELONG. PERCENT	RED. OF AREA PERCENT	CSTG. SER. #		PCS SHIPPED
															AY66		
5734E	.28	.58	.45	.010	.011						59,000	84,500	33.0	58.6	AY59		2

Heat Treatment--N 1625°F.--1675°F.--3 Hrs. W.Q.
T 1260°F.--1290°F.--3 Hrs. A.C.

"V" Notch Charpy Impact Value at plus 30°F.

			Lateral Expansion	Fibrous Fractur
47 Ft. Lbs.	45 Ft. Lbs.	5 Ft. Lbs.	.042	60%
			.041	60%
			.042	60%

All castings were produced in accordance with ASME SECT. III 1974 Edition including Summer 1975 Add.

REMARKS
1of

NO WELDING

LSF-HTR-WCB-NUC Rev. 3 and HT Addendum #1

Two (2) bars with shipment

CORRECTED COPIES

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

THIS DAY OF 19

BECHTEL 284

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

LEBANON STEEL FOUNDRY

BY David P. Kreider

ANCHOR/DARLING VALVE COMPANY
WILLIAMSPORT, PENNSYLVANIA 17701
(717) 323-6121

Anchor DARLING

CERTIFICATE OF MECHANICAL TESTS

S.O. NO. E-6181-2	P.O. NO.	DATE 9/21/78
LABORATORY NO. 452	HEAT NUMBER	5734E, Lebanon
MATERIAL SPECIFICATION AND GRADE	SA216-WCB	

TENSILE TESTS

PWHT 1150 ± 50°F for 8 hours.

YIELD POINT POUNDS/Sq. INCH	TENSILE STRENGTH POUNDS Sq. INCH	ELONGATION IN 2 INCHES PERCENT	REDUCTION OF AREA, PERCENT
62700	82700	32.6	57.3

CHARPY V NOTCH IMPACT TESTS

TEST TEMPERATURE DEGREES F	ABSORBED ENERGY FOOT POUNDS	LATERAL EXPANSION MILS	SHEAR FRACTURE PERCENT
+30	54.4, 51.0, 56.5	50,44,51	50,50,50

BECHTEL
284

HARDNESS TESTS

SCALE	HARDNESS VALUES

I certify the above information to be correct to the best of my knowledge and belief.
ANCHOR/DARLING VALVE COMPANY

By [signature]

Form MLTS-2-3

Form T-14

CANN & SAUL STEEL CO.

ROYERSFORD, PA. 19468

Report of Physical Tests and/or Chemical Compositions

Date 6/20/78

Customer's Order No. N-2007 S.O. #E-61881-02

Cann & Saul Order No. 45577

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

Attention PURCHSING DEPT.

CHEMICAL COMPOSITIONS

HEAT NO.	C	MN	P	S	SI	CR	NI	MO	CB
217327	.29	.71	.011	.018	.21				

PHYSICAL TESTS

Lab. No.

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.
			YS	YS .2%						
Forging	45577 1	.505	9,800	49,000	15,600	78,000	36.0	.056	72.0	
Charpy Impacts "V" Notch	85 80 77 Mils Lat. Exp. @ +30°F 157 142 125 Ft. Lbs. 100 80 70 percent shear									

RECEIVED
JUN 23 1978
PURCHASING DEPT.

OTHER TESTS

BRINELL 170/174
Heat Treat. Proc. #5D

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

Customer's Specifications: ASME SA105
CHARPY "V" IMPACT 25 MILS LAT. EXP. @ +30°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:

4 - 10" 900 BONNET FORGINGS PER DRAWING D-9158
Forgings serialized #1 thru 4

ANCHOR/DARLING VALVE CO.
L. B. SNYDER
QA 81 - DATE 6-27-78

BECHTEL 284

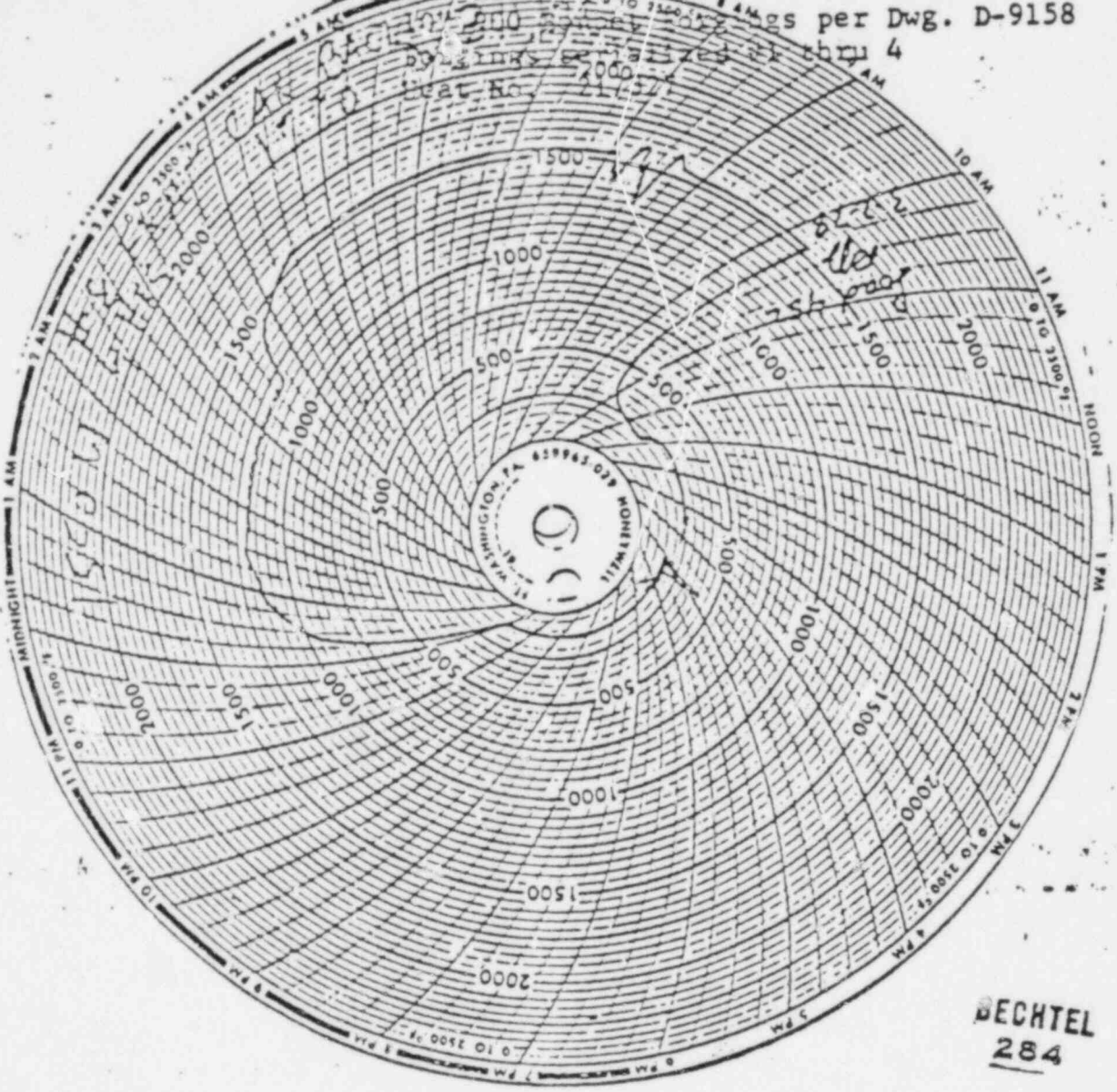
CANN & SAUL STEEL COMPANY
Inspection

Inspector

CANN & SAUL STEEL CO.

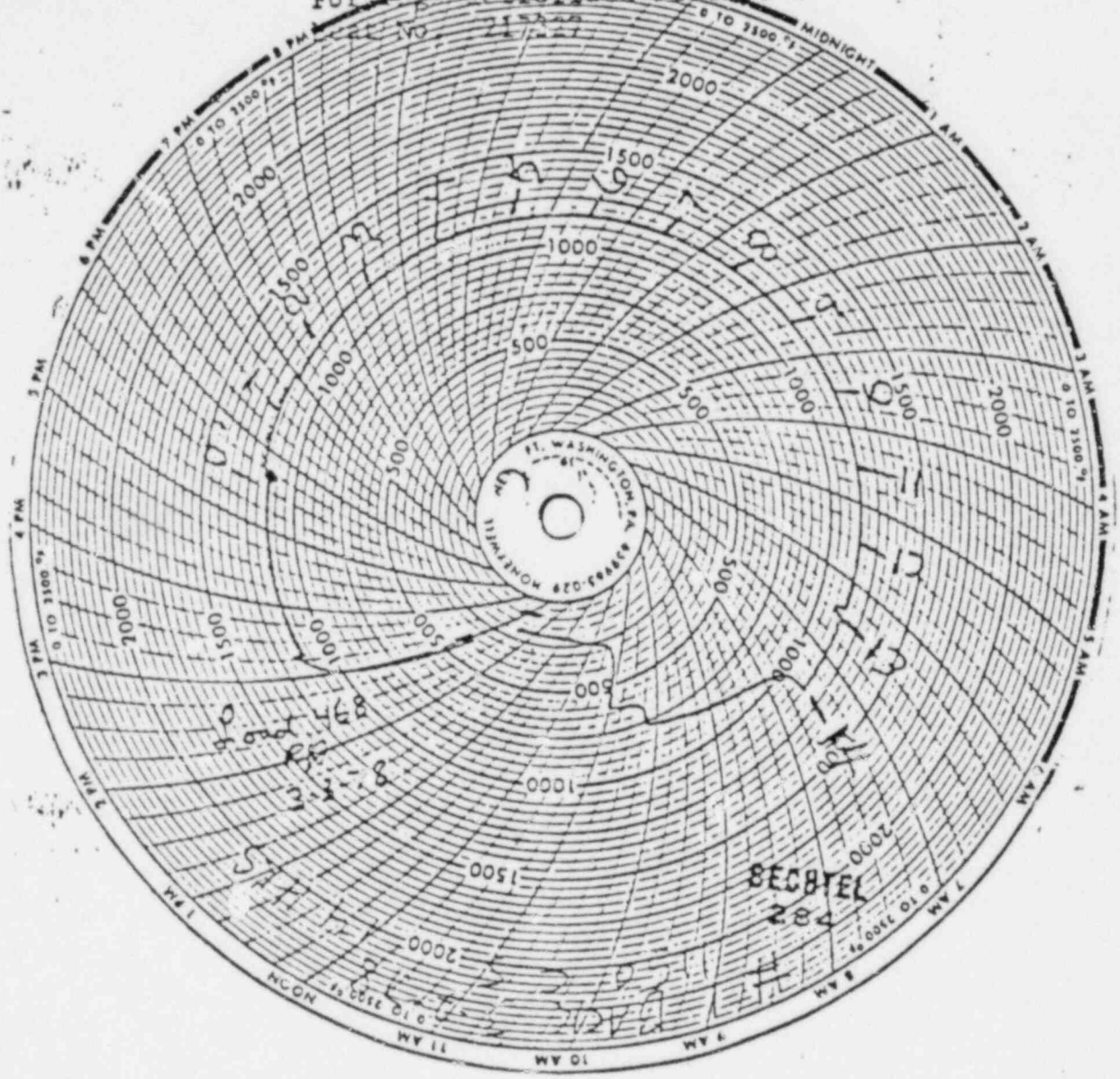
M E Baltimore
Mgr. of Tests

Heat Treat. Proc. #5D
Anchor/Darling Valve Co.
N-20[illegible] C.O. [illegible]181-02
[illegible] 200 [illegible] gs per Dwg. D-9158
[illegible] thru 4
[illegible] Heat No. [illegible]



BECHTEL
284

Heat Treat. Proc. #5D
Anchor/Darling Valve Co.
N-2007 S.O. #E-6181-02
4 - 10" 900 Bonnet Forgings per Dwg. D-9158
Forgings Normalized 1 thru 4



CANN & SAUL STEEL CO.

ROYERSFORD, PA. 19468

Report of Physical Tests and/or Chemical Compositions

Date 5/23/78

Customer's Order No.

Cann & Saul Order No. 45578

Customer ANCHOR/DARLING VALVE CO. N-2007

Address 701 FIRST STREET S.O.#E 6181-02
WILLIAMSPORT, PA. 17701

Attention PURCHASING DEPT.

CHEMICAL COMPOSITIONS

HEAT NO.	C	MN	P	S	SI	CR	NI	MO	CU
85374	.26	.89	.011	.023	.30				

PHYSICAL TESTS

Lab. No.

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 45578 1		.505	YS 10,500	YS .2% 52,500	16,600	83,000	32.0	.072	64.0	
Charpy Impacts "V" Notch		41 37 43 Mils Lat. Exp. @ 430°F 54 44 56 Ft. Lbs. 60 50 70 Percent Shear								

OTHER TESTS

BRINELL : 179/183

Heat Treat Proc. 5D

We certify the material meets ASME Sec. III, 1974 Ed. thru and incl. 1975 Summer add.

Customer's Specifications: ASME SA105

CHAPRY "V"D 25 MILS LAT. EXP. @ + 30°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:

8 - 10" 900 DISC FORGINGS FOR DRAWING C-14172
Forgings serialized #1 thru 8

BECHTEL
284

CANN & SAUL STEEL COMPANY
Inspector

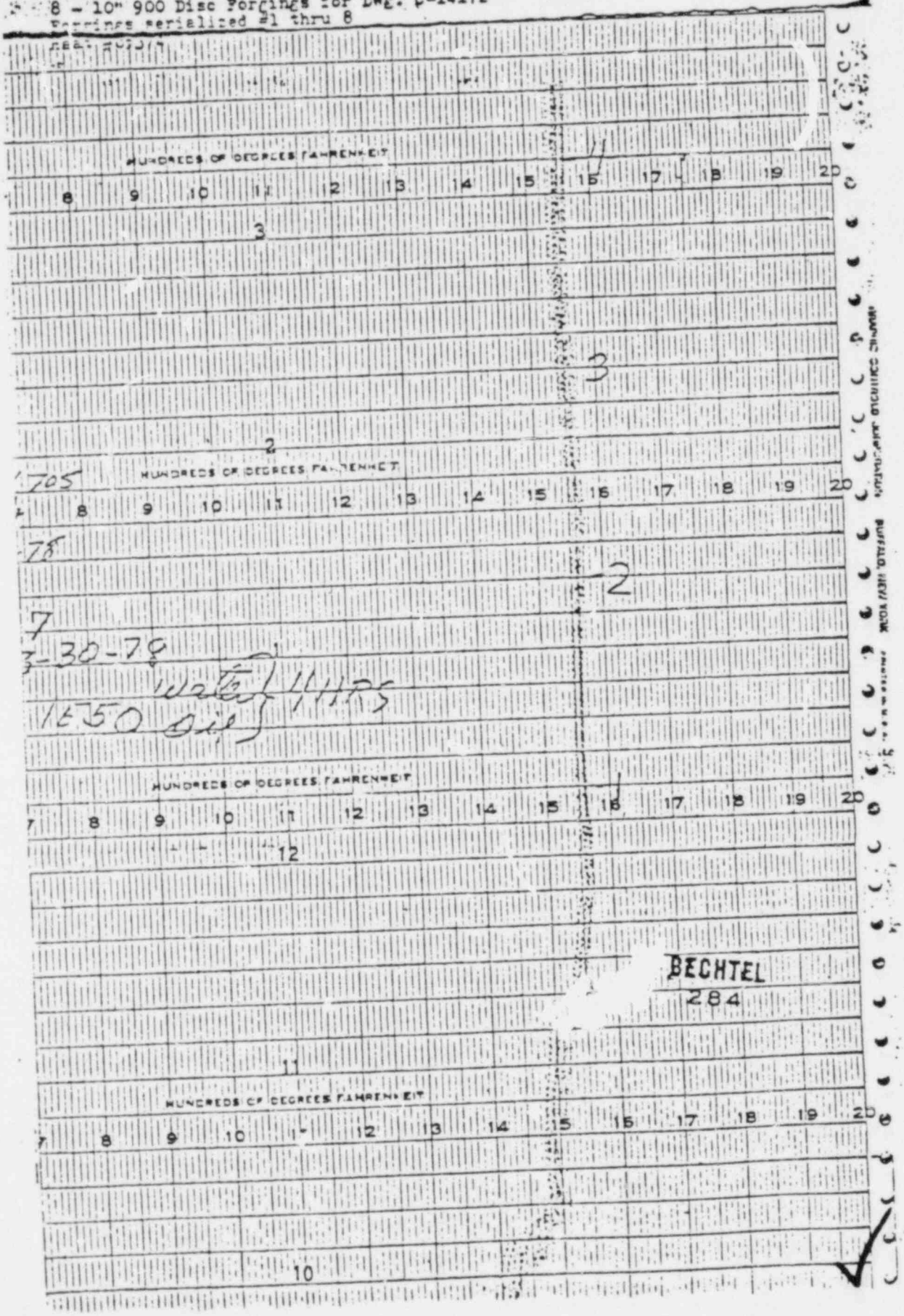
ANCHOR/DARLING VALVE CO.
L. B. SNYDER
Q.A. 81
DATE 6/1/78

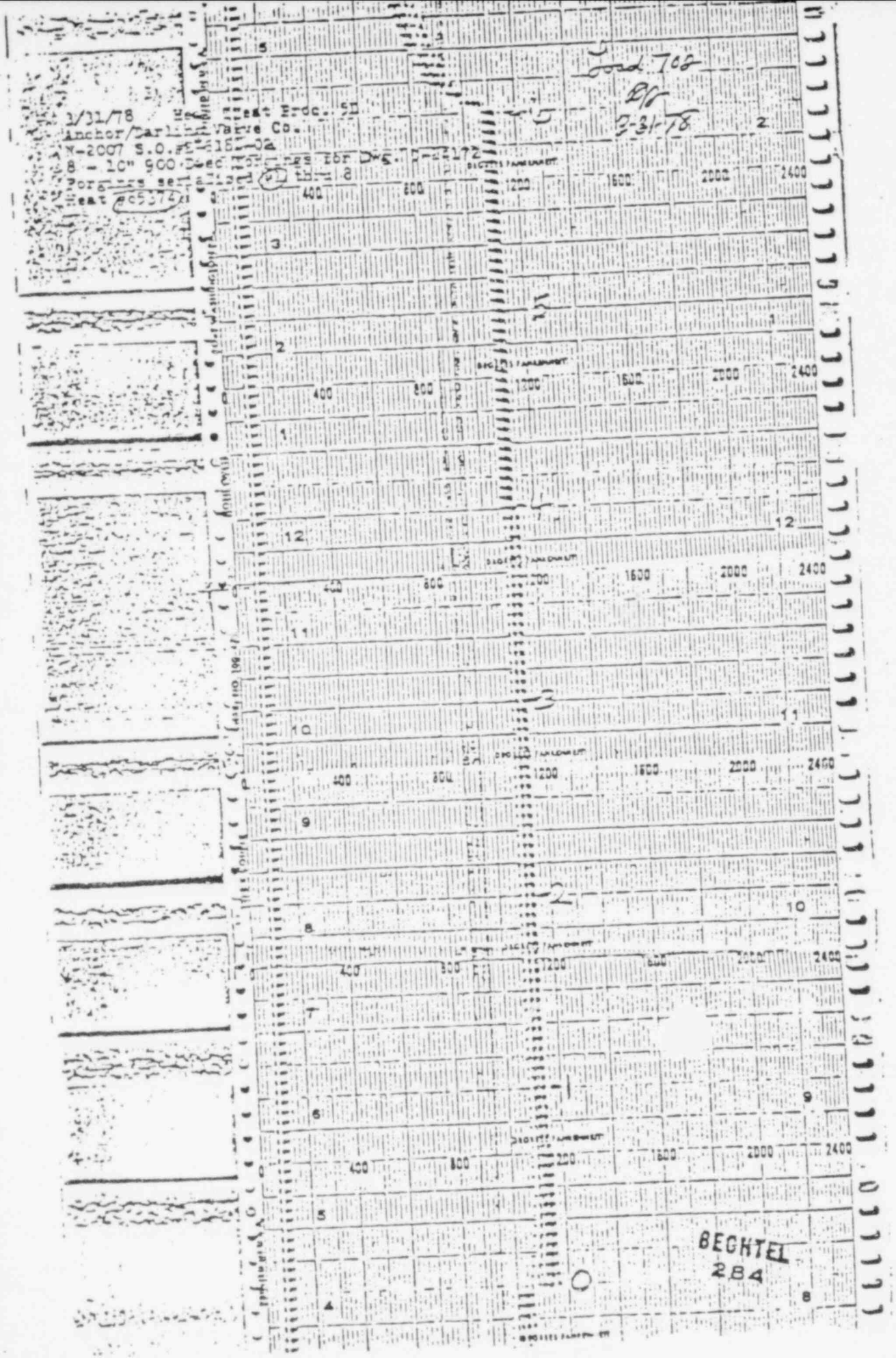
CANN & SAUL STEEL CO.

Mgr. of Tests

Inspector

3/30/78 Heat Treat Proc. 5D
Anchor/Darling Valve Company
N-2007 S.O.#E-6181-02
8 - 10" 900 Disc Forgings for Dwg. C-14172
Forgings serialized #1 thru 8
Heat #07317




1/31/78
Anchor/Darling Valve Co.
N-2007 S.O.
8 - 10" 900
Heat
BECHTEL
284

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

As Required by the Provisions of the ASME Code Rules

1. Manufactured by Anchor/Darling Valve Company, 701 First St., Williamsport, PA 17701 (Name & Address of Manufacturer) Order No. E-6181

2. Manufactured for Bechtel Power Corporation, P.O. Box 607, 15740 Shady Grove R.D., Gaithersburg, MD (Name and Address) Order No. 10466-M-630

3. Owner Union Electric Co.

4. Location of Plant Callaway Plant, Unit #1, Portland, Missouri

5. Pump or Valve Identification E-6181-2-4

14" x 10" x 14" 900# FWIV
(Brief description of service for which equipment was designed)

(a) Drawing No. 94-14174 R/G Prepared by Anchor/Darling Valve Co.

(b) National Board No. N/A

6. Design Conditions 2160 / 1955 (Pressure) psi 100 / 450 (Temperature) °F or Pressure Class N/A (1)

7. The material, design, construction, and workmanship complies with ASME Code Section III. Class 2

Edition 1974, Addenda Date 1975 Summer, Case No. 1567, 1622, 1682

Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings			
BODY HT. # 5734F S/N R3536	SA216-WCB	LEBANON STEEL FOUNDRY	
(b) Forgings			
BONNET HT.# 217327 S/N 3	SA105	CANN & SAUL STEEL CO.	
DISC HT.# 85374 S/N 2	SA105	CANN & SAUL STEEL CO.	
" HT.# 45211 S/N 7	SA105	CANN & SAUL STEEL CO.	
GAS. RET.RING HT.# 6046321	SA105	CANN & SAUL STEEL CO.	
PIPE CAP HT.# N11403	SA105	CAPITOL MANUFACTURING CO.	

(1) Manually operated valves only.

Mark No.	Material Spec. No.	Manufacturer	Remarks
(c) Bolting			
N/A			
(d) Other Parts			
DRAIN PIPE HT.# T27627	SA106-B	UNITED STATES STEEL CORP.	

8. Hydrostatic test 3250 psi.

CERTIFICATION OF DESIGN

Design information on file at Anchor/Darling Valve Co., Williamsport, PA 17701

Stress analysis report on file at N/A

Design specifications certified by Naranjan P. Goel (1) Prof. Eng. State MD Reg. No. E14976

Stress analysis report certified by N/A (1) Prof. Eng. State ______ Reg. No. ______

(1) Signature not required. List name only.

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

Date 7-10 1979 Signed Anchor/Darling Valve Co (Manufacturer) By R P Walter

R.P. Walter
Q. A. Engineer

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 ~~XXXXXXX~~ Pennsylvania and employed by Commercial Union Insurance Co. of Boston, Mass. have inspected the equipment described in this Data Report on 5-23-77 thru 7-10 1979, 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 7-10 1979

Russell E Montgomery (Inspector)
Russell E. Montgomery

Commissions Pennsylvania WC972 (National Board, State, Province and No.)

Printed in U.S.A. (7/71)

This form (E37) is obtainable from the ASME, 345 E. 47th St., New York, N.Y. 10017

PHONE (512) 63[illegible] 1200

CUSTOMER DRAVO CORP.

CUSTOMER ORDER NO E3000-185

PACKING LIST NO P03745-46

OUR ORDER NO 12046

SPECIFICATION NO [illegible]

HEAT TREATMENT [illegible] SECT. VIII DIV. 2
1974 [illegible] NOTE WINTER
1976 ADDENDA & PER
SPEC P25 E3000-E3009
P1-A REV. 4
HOT FORMED TO 197 MIN PRINTED [illegible]
PAR. 6.1.1
RAW MATERIAL: ASME SA515 GR. 70

DESCRIPTION	ORDER NO.	HEAT SYMBOL	MILL HEAT NO.	PHYSICAL PROPERTIES: YIELD STRENGTH PSI	TENSILE STRENGTH PSI	ELONG. %	RED. OF AREA %	CHEMICAL ANALYSIS: C	Mn	P	S	Si	Mo	Cr	Ni
ITEM	ITEM														
10 - 18" SCH 80 CAP IND PER DWG. E3000/3009-9000 ITEM 1 12:05PM TELECON 8/3/81 PER. ABRAHAM (TAYLOR-FORGE) TAYLOR-FORGE FORMS ABOVE UPPER CRITICAL ~ 1700°F	401	EPZJ	T83881	43600	81200	24.0		.30	.79	.013	.022	.22			

REMARKS: We certify that the contents of this report are correct and accurate and that all test results and operations performed are in compliance with the material specifications and all the applicable requirements designated by the purchase order. Material has been manufactured/processed in accordance with a quality program approved by Dravo Corp. on March 23, 1979 as conforming to NCA-3800. (Quality Program Rev. #16.)
Parts manufactured at Taylor Forge, Cicero, Ill.
Tensile test from plate-type specimen.

SUBSCRIBED AND SWORN TO BEFORE ME

THIS 15 th DAY OF OCT. 19 79

NOTARY PUBLIC ILLINOIS
MY COMMISSION EXPIRES DEC. 18 1979
ISSUED BY THE ILLINOIS BONDED ASSOC.

QUALITY CONTROL

MANAGER

5 of 29

Q. A. APPROVED

BETHLEHEM STEEL CORPORATION
METALLURGICAL DEPARTMENT
REPORT OF TEST AND ANALYSIS

PLANT	SHIPMENT NO.	DATE SHIPPED	CAR OR VEHICLE NO.	PG 1 LAST
SPARROWS PT.	409- 14304	08/31/77	GTRC GEORGE TFR	

SOLD TO
MILLS-ALLOY STEEL CO
1 W INTERSTATE RD
BEDFORD OH 44014

SHIP TO
MILLS-ALLOY STEEL CO
1 W INTERSTATE RD
BEDFORD OH 44014

INPUT 12/14/78

B11.01 B03627

NO	SERIAL NUMBER	PAT NO	HEAT NUMBER	SIZE AND QUANTITY: NO. PCS	THICKNESS	WIDTH OR DIA	LENGTH	WEIGHT	YIELD KSI	TENSILE STRENGTH KSI	ELONG IN %	ELONG IN %	RED %	AT
						160B6940	GD# 015-2950			6861/0221952				
	CO# 672C5													
	2884		ASME SA516 GR 70 PVQ WINTER 74 ADD											
	PLTS & TEST PCS NORM AT 1650 DEG & HELD 1/2 HR PER INCH OF THICKNESS													
01	B 29677		401B3131	1	1	96	240	6534	47.3	74.0	8	23		
02	B 32036		402B3991	2	3/ 4	96	240	9802	48.8	71.4	8	30		
04	B 33643		401B5571	2	3/ 8	96	240	4900	50.4	75.4	8	25		

B

CH-V SA2035 L 15FTLD AT M40F INFO L MILSSSHR AT M40F BEND TEST SA20514

Pullman Power Products
P.O. 1000-95-1 Line 2 2pcs 3/4 x 96 x 120

SERIAL NUMBER	PAT NO	HEAT NUMBER	THICKNESS	HEAT TREAT	TYPE	SIZE	CR	TEST TEMP	CHARPY IMPACT ENERGY FT LBS 1	2	3	AVG	DUCTILITY TEST 1	2	3	BAT STR IN % 1	2	3
B029677		401B3131			V10X10		L	-040	27	27	31		50	98	70	25	48	42
B032036		402B3991			V10X10		L	-040	15	24	40		50	60	85	20	27	39
B033643		401B5571			V10X75		L	-040	25	20	17		80	85	80	24	13	50.

DISTRIBUTED BY 265

PULLMAN POWER PRODUCTS
QUALITY ASSURANCE
CITR APPROVED
8/9/78 BY
8/9/78 BY

CHEMICAL ANALYSIS

HEAT NUMBER	C	Mn	P	S	Si	Cu	Ni	Cr	Mo
401B3131	.22	1.07	.007	.015	.240				
402B3991	.22	1.08	.006	.024	.270				
401B5571	.22	1.08	.011	.023	.220				

C. B. Shelly

THIS MATERIAL CERTIFIED TO
1974 ASME CODE
Win 74 ... A.
SECTION II
PULLMAN POWER PRODUCTS
QUALITY ASSURANCE DEPARTMENT
BY ... DATE 8/9/78

I HEREBY CERTIFY THE ABOVE RESULTS TO BE CORRECT AS CONTAINED IN THE RECORDS OF THE BETHLEHEM STEEL CORPORATION

SUBSCRIBED AND SWORN TO BEFORE ME THIS 1 DAY OF ... 19
NOTARY PUBLIC MY COMMISSION EXPIRES 7/1/80

E. D. SHELLY
CHIEF METALLURGIST

DUPLICATE

B11.01 1

B03178

116

5741

Q. A. APPROVED

BETHLEHEM STEEL CORPORATION

REPORT OF TEST AND ANALYSIS

BEAVERDAM PL.	409-1 15703	07/07/77	BTBC DEPOT TER

PG 1

SOLD TO
WILLS-ALLOY STEEL CO
1 W INTERSTATE RD
BEDFORD OH 44014

SHIP TO
WILLS-ALLOY STEEL CO
1 W INTERSTATE RD
BEDFORD OH 44014

CO# 67205						16087267		GD3 015-2958A		6061			
2884	ASME SA516 GR 70 PVQ WINTER 74 ADD [illegible]												
PLTS & TEST	CS NORM AT 1650 DEG & HELD 1/2 HR PER INCH OF THICKNESS												
B1	B214095	40287591	1	1	1/2	96	240	9801	47.0	74.0	2	26	
B1	B214097	40287591	1	1	1/2	96	240	9801	46.7	70.7	2	27	

THIS MATERIAL CERTIFIED TO
ASME CODE
ADDENDA,
SECTION II
PULLMAN POWER PRODUCTS
QUALITY ASSURANCE DEPARTMENT
BY _____ DATE _____

CH-V SA203S L 15FTLB AT 45DF INFO L 40LBSSHR AT 45DF BEND TEST SA203S14

Pullman Power Products

PO 1000095-1 Dim 4 Pcs 1-1/2 x 96 x 120

B214095	40287591																
B214097	40287591				10X10	L-030	20	30	32		30	40	40	75	12		
					10X10	L-030	26	27	22		40	40	45	70	70		

BEGMTE. 284

	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Cb	N	Al		
40287591	.21	1.07	.018	.029	.250										

PULLMAN POWER PRODUCTS
QUALITY ASSURANCE
CMTR APPROVED
10/10/77 BY KS
11/11/77 BY FM

E. B. Shelly

SUBSCRIBED AND SWORN TO BEFORE ME THIS 7 DAY OF SEPT
NOTARY PUBLIC MY COMMISSION EXPIRES 7/1/

B10530

L.W. SHELLY

LADISH CO.

CUDAHY • WISCONSIN • 53110

Pullman Power Products
Division of Pullman Inc.
P. O. Box 3308
Williamsport, Pa. 17701

METALLURGICAL MATERIAL ANALYSIS REPORT

CUSTOMER ORDER NO.	LADISH ORDER NO.	LADISH INVOICE NO.
8256-203	E60953A	P55912

NAME OF CUSTOMER'S NAME AND ORDER REFERENCE USED ETC.
Marking Per IV-2 dated 3-17-79

DATE SHIPPED: 3-28-80 | DATE OF REPORT: 3-24-80

ITEM	PCS	SPECIFICATION	DESCRIPTION	CODE	HEAT NO.
1	2	ASME SA234 WPB Per *	18" S/80 Cap	JW4NS	801C21220

C	Mn	P	S	Si	Ni	Cr	Mo	Cu	V	N	YIELD KSI	ULTIMATE KSI	% EL.	% RED
.27	.75	.016	.022	.23							39.3	75.5	30	57

*ASME Section III Class 2 1974 Edition thru Winter 1974 Addenda & PP IV-226-W74 dated 12-1-78
PP Item #N3104

ITEM	PCS.	SPECIFICATION	DESCRIPTION	CODE	HEAT NO.

C	Mn	Cr	Mo	Cu	V	N	YIELD KSI	ULTIMATE KSI	% EL.	% RED

PULLMAN POWER PRODUCTS
QUALITY ASSURANCE
CMTR APPROVED
1-3-80 BY
4/7/80 BY

PULLMAN POWER PRODUCTS
RECEIVED
APR 7 1980
QUALITY CONTROL

ITEM	PCS	SPECIFICATION	DESCRIPTION	HEAT NO.

C	Mn	Cr	Mo	Cu	V	N	YIELD KSI	ULTIMATE KSI	% EL.	% RED

PULLMAN POWER PRODUCTS
QUALITY ASSURANCE
MATERIAL CERTIFIED
1974 ASME CC
W74 ADD. SEC
DATE 4-3-80 BY

ITEM	CHARPY	SIZE	NOTCH	TEMP °F	FOOT POUNDS	% SHEAR	LATERAL EXPANSION

This material was produced under the Quality System Program approved by Pullman Power on 3-2-77 as conforming to the requirements of ASME Section III Sub-Article NCA-3800.

1 STARTING MATERIAL CONFORMS TO CHEMICAL AND TENSILE PROPERTIES OF ASME SA515 Gr. 70 Plate
1 FITTINGS HAVE A MAXIMUM HARDNESS OF 197 BHN
FITTINGS CONFORM TO THE REQUIREMENTS OF MSS-SP75
STARTING MATERIAL CONFORMS TO
MAGNETIC PARTICLE INSPECTED AND ACCEPTED PER LADISH PROC.
ULTRASONICALLY INSPECTED AND ACCEPTED PER LADISH PROC.
LIQUID PENETRANT INSPECTED AND ACCEPTED PER LADISH PROC.
WELDS RADIOGRAPHICALLY INSPECTED AND ACCEPTED PER
FITTINGS ARE CAPABLE OF CONFORMING TO HYDROSTATIC TEST REQUIREMENTS XXX
1 & bursting strength of ANSI B16.9
NOTES

ITEM	TENSILE SPECIMEN
1	STD RD
	FULL SEC
	STRIP

ITEM	HEAT TREATMENT
	HOT REQUIRED
	STRESS RELIEVE
1	NORM 650°F
	NORM 1750°F
	TEMPER 1300°F
	WATER QUENCH 650°F
	TEMPER
	WATER QUENCH 650°F
	TEMPER 1300°F

BECHTEL
265

I hereby certify that to the best of my knowledge and belief this material and its results are true and correct.

Sworn and subscribed to before me this _____ day _____ 19 _____

My commission expires _____

05-20-1994 BP T-313 T-403 T-441 T657, T-660

WORK NO. 1AE-05-S-004/165	E252 JOB NO.	F-762 SHEET NO.	30 REV.
SYSTEM "1" "AE" FEEDWATER			
REF. DWGS. M-CEFEDS REV. 2			

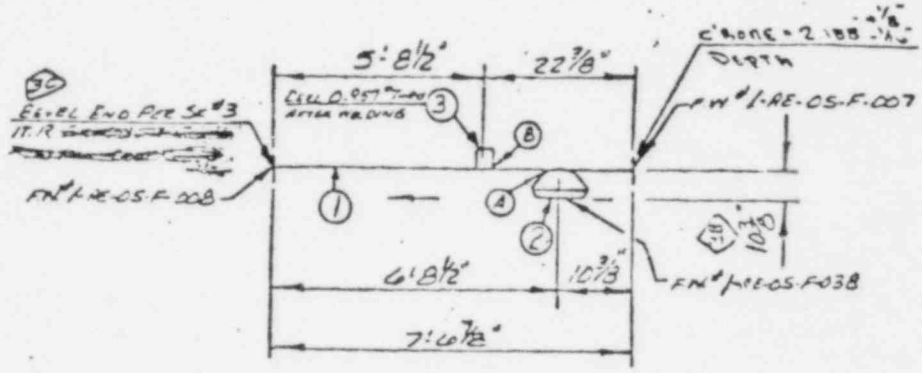
INSPECTION	EST. WT.	BEVEL ENDS	CLEAN	FAB SPEC.
DIST.	1145#	SEE NOTE #10	[illegible]	JS-205

NOTES

ASME CODE PLATE DATA

1. PULLMAN POWER PRODUCTS SERIAL NO. 1-AE-05-S-004/165 CLASS 2 19 — 30

2. Quality Assurance Req'd.
3. All procedures must be from 8251 - 8260 Project Procedure Manual
4. ~~Butwelds~~
   ~~A.) K-Insert~~
   ~~B.) G.T.A.~~
   ~~C.) Weld To Have Argon Purge Back-Up~~
5. Radiograph All ~~Butwelds~~
   ~~Radiograph Nozz. Welds over 4" N.P.S.~~
6. Pf or MT all external and accessible internal Weld Surfaces on 4"NPS & smaller Nozz. Welds.
   ~~Pf or MT all compressure welds.~~
   ~~Pf all GTA Root Pass or passes when finished weld will exceed 3/4" compressor rib.~~
7. ~~Welding Materials & all contain Sulfur Harrier in range of 5-25%.~~
8. ~~Delta Ferrite on Production Welds shall be at least 5% (Avg. four readings on one weld) per 15-205.~~
9. Protect Field End Preps with Denkalumnite.
10. 14" ENDS PER SK #3, IT-E. ALSO NOTE #2 EXC. AS NOTED. 4" END AS SK #4
11. IN SERVICE INSPECTION



BECHTEL 353

3D	[illegible]		ADDED CLASS 2 TO CODE STAMP
3C	[illegible]		SEE REPAIR ITEM NOTE ITEM
3B	[illegible]		10⅞" WAS 9"

PIPING CLASS "ELB"

WOLF CREEK UNIT 1

STANDARD NUCLEAR UNIT POWER PLANT SYSTEM

3	[illegible]	[illegible]	ADD NOTE #11 [illegible] TO END PREPS
2	8-3-77	[illegible]	REVISION FOR CONTRACT REV 2
REV	DATE	BY	DESCRIPTION

14" PIPE ASSEMBLY
COLOR CODE:
SPOTS-BAND

	DRAWN	CHK'D.	APP'D.
	[illegible]	[illegible]	
	8-3-77	[illegible]	

Pullman Kellogg

CARBON STEEL ASS'Y

MATERIAL

ITEM	QUAN.	DESCRIPTION	SPEC.	SOURCE	UNIT	TOTAL	DIST'C.	DET
1	1	14" Sch 20 PIPE E-E = 7'-6⅞"	[illegible]	[illegible]		HT	68505	
2	1	14" Sch 20 x 4" Sch 80 WELD O-LET	SA-105	[illegible]		HT	10AA	
3	1	1" - 3000# SW HALF CPLG		377-11A-G		HT	AAC	
4	2	14" End Protector with 16 units of Silica Gel per JS-205		STOCK				
5	1	4" End Protector with 10 units of Silica Gel per JS-205		STOCK				

QUAN.	SIZE	DESCRIPTION			PRICE PER PIECE
		LABOR			TOTAL PRICE THIS SHEET

PRICING DETAIL

1A-1012-578

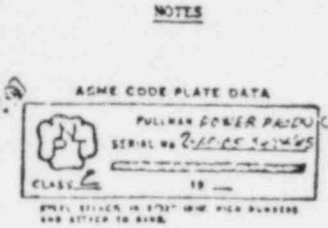
T-549, T-1(2) T-14 / T-856 T-621 ---

MARK NO. 2-RE-05-S-[illegible]/145	E251	F-762	30
SYSTEM "1" RE FEEDWATER	JOB NO.	SHEET NO.	REV.
REF. DWGS. M-03-F-05	REV. 2 0		

INSPECTION	EST. WT.	BEVEL ENDS	CLEAN	PAR. SPEC.
CUST.	1145#	[illegible] #10	[illegible] - I.D.	JS-205

NOTES

1. ASME CODE PLATE DATA



STEEL STAMP IN 1/32" HIGH FIGS PLACED AND ATTACH TO BAND.

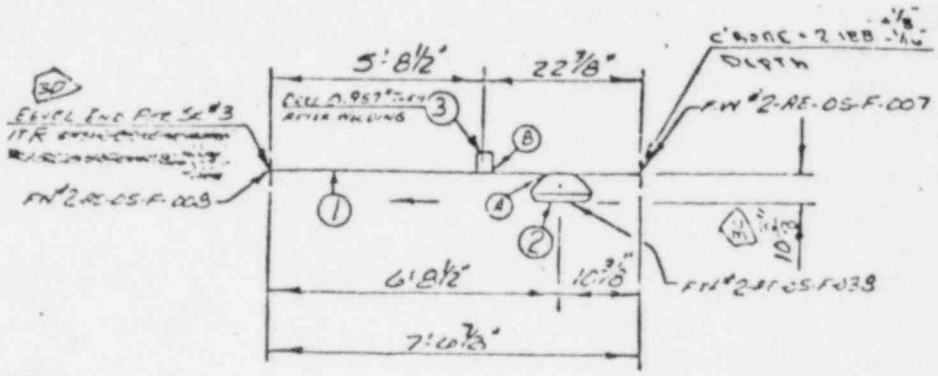
11. INSERVICE INSPECTION

2. Quality Assurance Req'd.
3. All procedures must be from 8251 - 8260 Project Procedure Manual
4. ~~Butt welds~~
   ~~A.) R-Inspect~~
   ~~B.) G.T.A.~~
   ~~C.) Welds In Pipe Argon Purge Back-Up~~
5. ~~Radiograph All butt welds~~

   ~~Radiograph Butt Welds over [illegible] P.S.~~
6. PT or MT all external and accessible internal Weld Surfaces on 4"NPS & smaller Horz. Welds.

   ~~PT or MT all non-pressure welds.~~

   ~~PT all 67A Root Pass or passes when finished weld will exceed [illegible] in wall thk.~~
7. ~~Nozzle materials shall contain [illegible] range of [illegible]~~
8. ~~Delta Ferrite in Production Welds shall be at least [illegible] (by fast readings on the weld) per JS-205.~~
9. Protect Field End Preps with Duralumnite.
10. 14" ENDS PER SK #3, ITEM E, AND NOTE #2 EXC. AS NOTED. 4" END PER SK #4



BECHTEL
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PIPING CLASS - "ELO"

CALLAWAY UNIT #1

REV	DATE	BY	DESCRIPTION
4	6-7-79	[illegible]	[illegible]
3	12-7-78	[illegible]	[illegible]
2	12-7-78	[illegible]	[illegible]
1	11-9-78	[illegible]	[illegible]
2	8-3-77	[illegible]	[illegible]

14" PIPE ASSEMBLY
COLOR CODE: _____
_____ SPOTS-BAND

STANDARD NUCLEAR UNIT POWER PLANT SYSTEM

Fullman Kellogg

CARBON STEEL ASS'Y MATERIAL

ITEM	QUAN.	DESCRIPTION	SPEC.	SOURCE	PRICING DETAIL: UNIT	TOTAL	DISC.	NET
1	1	14" Sch 80 PIPE E-E: 7'-6⅞"	[illegible]	[illegible]	HT- 67790		✓	
2	1	14" Sch 80 x 4" Sch 80 WELDOLET	[illegible]	[illegible]	HT- 102AA		✓	
3	1	1" 3000# SW HALF CPLG	↓	S77-11A	6 HT- AAC		✓	
4	2	14" End Protector with 10 units of Silica Gel per JS-205		STOCK				
5	1	4" End Protector with 10 units of Silica Gel per JS-205		STOCK				

QUAN.	SIZE	DESCRIPTION	PRICE PER PIECE
		LABOR	TOTAL PRICE THIS SHEET

N-01-8-575

PHOENIX STEEL CORPORATION

TUBE DIVISION
PHOENIXVILLE, PENNA.

8251-171 + N1133

CERTIFICATE OF INSPECTION AND TESTS

DATE: 9-6-77	DATE SHIPPED: 9-6-77	MILL ORDER NO. T-3676-C	SHIPPING LIST NO. 78
SOLD TO: Capitol Pipe & Steel Prod. Co.		CUSTOMER ORDER NO. 84068-00	
		CAR NO.	
		MATERIAL: SEAMLESS ☐ PIPE ☒ TUBE, HOT FINISHED	
SHIP TO: Pullman Power Prod.		SPECIFICATION: ASTM A-333-75, ASME SA-333 Gr.6 (O.H.)	

NO. PCS.	OD	WALL	LENGTH	TOTAL FT.	TOTAL WT.	HEAT NO.
	14.000" x 1.094"					67790

Longitudinal Vee Notch Charpy at Minus 50°F. (10mm x 10mm)

Ft.Lbs.	Lateral Expansion	Percent Shear
31-52-46	.035-.052-.047	20-30-30

PULLMAN KELLOGG
QUALITY ASSURANCE
CMTR APPROVED
9/7/77 BY
9/8/77 BY

HEAT NO.	C	Mn.	P.	S.	Si.	Cu.	Ni.	V.
67790	.13	1.21	.013	.022	.22	Ladle Analysis		
67790	.14	1.22	.013	.022	.22	Product Analysis		
67790	.13	1.22	.013	.021	.22	Product Analysis		

THIS MATERIAL CERTIFIED TO
1974 ASME CODE,
Jan '74 ADDENDA,
SECTION II
PULLMAN KELLOGG
QUALITY ASSURANCE DEPARTMENT
HARDNESS
BRINELL 9/7/77

HEAT NO.	TENSILE (KSI)	YIELD (KSI) ( )	% ELONG. IN 2"	% RA	HARDNESS ROCKWELL B	HARDNESS BRINELL	HARDNESS ROCKWELL C
67790	67.8	47.5	34.00				

Normalized at 1650°F. Equalized. Plus 50°F. Minus 0°F. Held for 1 hour and air cooled.

SWORN TO AND SUBSCRIBED BEFORE ME THIS 6TH DAY OF SEPTEMBER 1977.

DOROTHY J. TAYLOR, NOTARY PUBLIC
PHOENIXVILLE BOROUGH, CHESTER COUNTY
MY COMMISSION EXPIRES SEPT. 3, 1979

BECHTEL
353

JOMINY DISTANCE - 16TH	ROCKWELL C	FLATTENING OK	HYDROSTATIC PSI 2800
1 2 4 6 8 10 12 14 16 20 24 28 32			

THE PHOENIX STEEL CORPORATION HEREBY CERTIFIES THAT THE ABOVE MATERIALS HAVE BEEN INSPECTED AND TESTED IN ACCORDANCE WITH THE METHODS PRESCRIBED IN THE APPLICABLE SPECIFICATIONS AND THE RESULTS OF SUCH INSPECTION AND TESTS AS CONTAINED IN THE COMPANY'S RECORDS ARE AS SHOWN ABOVE. FOR PROPERTIES OR CHARACTERISTICS FOR WHICH NO METHODS OF INSPECTION OR TESTING ARE PRESCRIBED BY SAID SPECIFICATIONS, THE STANDARD MILL INSPECTION AND TESTING PRACTICES OF THE PHOENIX STEEL CORPORATION HAVE BEEN APPLIED. BASED UPON SUCH INSPECTION AND TESTS, THE ABOVE MATERIALS HAVE BEEN APPROVED AS FULFILLING THE REQUIREMENTS OF SAID SPECIFICATION.

SEP 7 1977

ENGINEER OF TESTS

FORM IST-0153-R4 (12/76)

Log No. _____ Page 1 of 1

GW Bonney Forge Division
Energy Products Group
CARLINVILLE, ILLINOIS

PHONE 217/854-9511

CUSTOMER: Power Piping
CUSTOMER'S Order No. 8251-176
SHIPPED TO:

Date October 3, 1977
Bonney Order No. KP 8673 K
Mark

Item No.	Quantity No.	Bonney Lot No.	Grade or Specification No. Chemical Analysis, Physical Properties, Remarks
			ASME SA105
VII 30 1	8	102AA	14 S/120 (1.093) x 4 S/80 (.337) Weldolet Ladle Analysis: C.25 Mn.81 P.009 S.014 Si.23 T/S 76,730 Y/S 43,390 El 26 Ra 49.9 Mill Heat No: B34420 Brinell Hardness: 143

THIS MATERIAL CERTIFIED TO 1974 ASME CODE with ADDENDA, SECTION II
PULLMAN POWER PRODUCTS, QUALITY ASSURANCE DEPARTMENT
BY KD DATE 10/11/77
10/11/77

PULLMAN POWER PRODUCTS QUALITY ASSURANCE CMTR APPROVED
10/11/77 BY KD
10/11/77 BY

The above fittings are in accordance with ASME SA105.

This certifies that the fittings supplied were Normalized by heating to within 1625°F and 1675°F for 3/4 hr. per inch of thickness (1 hr.min.) followed by cooling in still air.

BECHTEL
353

Bonney Forge Division
Energy Products Group
Carlinville, Illinois

by Phil Simpson
QUALITY ASSURANCE MANAGER
PHIL SIMPSON

OCT 1977

FORM 2188A

PHOENIX STEEL CORPORATION

(8251-1374-1-2-1)

TUBE DIVISION
PHOENIXVILLE, PENNA.

CERTIFICATE OF INSPECTION AND TESTS

9-6-77	DATE SHIPPED: 9-6-77	MILL ORDER NO. T-3676-C	SHIPPING LIST NO. 18
		CUSTOMER ORDER NO. 84068-00	
Capitol Pipe & Steel Prod. Co.		CAR NO.	
		MATERIAL: SEAMLESS ☐ PIPE ☒ TUBE, HOT FINISHED	
Pullman Power Prod.		SPECIFICATION: ASTM A-333-75, ASME SA-333 Gr.6 (Q.H.)	

O. PCS.	OD	WALL	LENGTH	TOTAL FT.	TOTAL WT.	HEAT NO.
—	14.000" x 1.094"					67790

Longitudinal Vee Notch Charpy at Minus 50°F. (10mm x 10mm)

t.lbs.	Lateral Expansion	Percent Shear
1-52-46	.035-.052-.047	20-30-30

PULLMAN KELLOGG
QUALITY ASSURANCE
CMTR APPROVED
9/8/77 BY KS
9/8/77 BY [illegible]

EAT NO.	C	MN.	P.	S.	SI.	CU.	NI.	CR.	MO.	V.
7790	.13	1.21	.013	.022	.22	Ladle Analysis				
7790	.14	1.22	.013	.022	.22	Product Analysis				
7790	.13	1.22	.013	.021	.22	Product Analysis				

BECHTEL
284

THIS MATERIAL CERTIFIED TO
1974 ASME CODE,
(11/74) ADDENDA,
SECTION II

PULLMAN KELLOGG
QUALITY ASSURANCE DEPARTMENT
BY: KS ROCKWELL C [illegible] BRINELL DATE: 9/8/77

EAT NO.	TENSILE (KSI)	YIELD (KSI)( )	% ELONG. IN 2"	% RA
7790	67.8	47.5	34.00	

Normalized at 1650°F. Equalized. Plus 50°F. Minus 0°F. Held for 1 hour and air cooled.

WORN TO AND SUBSCRIBED BEFORE
E THIS 6TH DAY OF SEPTEMBER 1977.

OROTHY J. TAYLOR, NOTARY PUBLIC
HOENIXVILLE BOROUGH, CHESTER COUNTY
Y COMMISSION EXPIRES SEPT. 3, 1979

OMINY DISTANCE 1/16TH ROCKWELL C FLATTENING OK HYDROSTATIC PSI 2800

1 2 4 6 8 10 12 14 16 20 24 28 32

HE PHOENIX STEEL CORPORATION HEREBY CERTIFIES THAT THE ABOVE MATERIALS HAVE BEEN INSPECTED AND TESTED IN ACCORDANCE WITH THE ETHODS PRESCRIBED IN THE APPLICABLE SPECIFICATIONS AND THE RESULTS OF SUCH INSPECTION AND TESTS AS CONTAINED IN THE COMPANY'S ECORDS ARE AS SHOWN ABOVE. FOR PROPERTIES OR CHARACTERISTICS FOR WHICH NO METHODS OF INSPECTION OR TESTING ARE PRESCRIBED BY AID SPECIFICATIONS, THE STANDARD MILL INSPECTION AND TESTING PRACTICES OF THE PHOENIX STEEL CORPORATION HAVE BEEN APPLIED. ASED UPON SUCH INSPECTION AND TESTS, THE ABOVE MATERIALS HAVE BEEN APPROVED AS FULFILLING THE REQUIREMENTS OF SAID SPECIFICATION.

SEP 7 1977

ENGINEER OF TESTS

CIVIL CMTRS REQUIRED pmm

PER MEETING W/ NRC
ON 4/27/81 IN 2B9

ITEM	BECHTEL PENE. NO.	WALL THICK	CBI SUB-ASSM.	CBI SHIP ASSM.	CBI SPEC. No.	CMTR No.
EQUIP. HATCH	L-2	3"	—	10466-C151-400-06 440-A	11	440-1
MAIN STM LINE	P-1	2 3/8"	406-AR	10466-C151-809-6 433-AR	6	409-1
RHR PUMP SUCT.	P-52	SCH. 100	404-A	10466-C151-810-5 436-C	9	410-9

APPLICABLE CBI DWGS.:

TITLE	CBI NO.	BECHTEL NO.
PENETRATION SCHEDULE	PS-1:0	C151-8015-03
" "	PS-2:0	C151-8016-03
20' ϕ EQUIP HATCH DOOR	440:0	C151-400-06
PIPE PENE. ASSEMBLY	406:0	C151-806-06
PENETRATION "	404:0	C151-804-09

BECHTEL DWGS.:

C-OL2904	REACTOR	BLDG.	LINER	PL	PENE. SCH.	SH. 1
C-OL2916	"	"	"	"	"	" 2
C-OL2906	"	"	"	"	PERSONNEL ACCESS HATCH	
C-OL2907	"	"	"	"	EQUIP HATCH	
C-OL2918	"	"	"	"	PENE. DETS. SH. 2	

PURCHASER:
12 CHICAGO BRIDGE & IRON CO.
BIRMINGHAM, ALA. 35202

LUKENS STEEL COMPANY

COATESVILLE, PA. 19320

TEST CERTIFICATE

MILL ORDER NO.	CUSTOMER P.O.	
70592-1	3750 SHEET 48	MP 6576 DM 4/7

DATE: 6-10-76 FILE NO. 1540-02-04

CONSIGNEE:
CHICAGO BRIDGE & IRON CO.
BOYLES, ALA. 35202

THIS MATERIAL HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH PURCHASE ORDER REQUIREMENTS AND SPECIFICATION(S):

CBI SPEC MS-5167 AOC DTD 4/15/75 QAS-3000 AOA SA-516 GR. 70 ASME CODE SECT. II & III SUB NE 1974 EDITION N-1160 8/4/78

BEND TEST O.K. HOMOGENEITY TEST

CHEMICAL ANALYSIS

MELT NO.	C	MN	P	S	CU	SI	NI	CR	MO	V	TI	AL	B		GRAIN SIZE
D2587	25	93	003	022		23									7-8
	2 pcs		per MIC	4109-1											

PHYSICAL PROPERTIES

MELT NO.	SLAB NO.	YIELD PSI X100	TENSILE PSI X100	% ELONG. IN 2"	% R.A.	BHN	IMPACTS LV -30°F.			FRACTURE APPEARANCE % SHEAR	DESCRIPTION
D2587	6A	610	810	29							2-3/8" X 124 X 268
		625	810	27			40	40	40	40-40-40	
					LATERAL EXPANSION IN INCHES		.037	.038	.038		

PLATE AND TESTS HEATED 1625-1675°F., HELD 1/2 HR. PER INCH MIN. AND WATER QUENCHED, THEN TEMPERED 1280°F., HELD 1/2 HR. PER INCH MIN. AND WATER QUENCHED.

TESTS STRESS RELIEVED BY HEATING WITHIN A RATE OF 168°F. PER HR. TO 1150°F., HELD 8 HRS. AND FURNACE COOLED WITHIN A RATE OF 168°F. PER HR. TO 800°F.

We hereby certify the above information is correct.

SUPERVISOR TESTING H. R. Kline

PURCHASER:
8. CHICAGO BRIDGE & IRON CO.
BIRMINGHAM, ALA. 35202

LUKENS STEEL COMPANY

COATESVILLE, PA. 19320

TEST CERTIFICATE

DATE: 4-26-76 FILE NO. 1540-C2-04

CONSIGNEE:
CHICAGO BRIDGE & IRON CO.
BOYLES, ALA. 35202

MILL ORDER NO.	CUSTOMER P.O.	
69955-1	3750 SHEET 36	MP 41776 DM 1/25

HIS MATERIAL HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH PURCHASE ORDER REQUIREMENTS AND SPECIFICATION(S):

CB&I MS-5167 AOF 6/24/75 QAS 3000 AOA SA-516 GR. 70 ASME CODE SECT. II & III SUB NE 1974 EDITION N-1160 8/4/78

BEND TEST O.K. HOMOGENEITY TEST

CHEMICAL ANALYSIS

MELT NO.	C	MN	P	S	CU	SI	NI	CR	MO	V	TI	AL	B		GRAIN SIZE
D2816	23	93	011	022		22									7-8
	2 pcs		P.C. MK		440-1										

PHYSICAL PROPERTIES

MELT NO.	SLAB. NO.	YIELD PSI X100	TENSILE PSI X100	% ELONG. IN 2"	% R.A.	BHN	IMPACTS LV -45°F.			FRACTURE APPEARANCE % SHEAR	DESCRIPTION
D2816	6	545	800	25							1- 3" X 76 X 390
		535	795	30			46	48	51	50-50-50	
					LATERAL EXPANSION IN INCHES		.047	.044	.046		

PLATE AND TESTS HEATED 1625-1675°F., HELD 1/2 HR. PER INCH MIN. AND WATER QUENCHED, THEN TEMPERED 1240°F., HELD 1/2 HR. PER INCH MIN. AND WATER QUENCHED.

TESTS STRESS RELIEVED BY HEATING WITHIN A RATE OF 133°F. PER HR. TO 1150°F., HELD 8 HRS. AND FURNACE COOLED WITHIN A RATE OF 133°F. PER HR. TO 800°F.

We hereby certify the above information is correct.

SUPERVISOR TESTING

CAPITOL PIPE

WORLD-WIDE

NUCLEAR PRODUCTS DIVISION OF Capitol PIPE & STEEL PRODUCTS, INC.

(BW)

CAPITOL PIPE CERTIFICATE OF COMPLIANCE

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS) NUMBER N-930

EXPIRATION DATE: JANUARY 6, 1978

MATERIALS: 24" SCH 100 ASME SA-333 GR-6.

HEAT NO: L1442 2 pcs [illegible] 910-7

MANUFACTURER: CAMERON IRON WORKS, INC.

This Certification affirms that the content of the attached report (s) is correct and accurate and that all test results and operations performed are in compliance with the below listed Specifications:

1) We Certify that the above listed material conforms to the requirements of ASME SA-333 GR-6 and CB&I Specifications MS-3336 AOB AND QAS-3000 AOA.

2) Marking Requirements:
   Mfgr Name
   Specifications
   Size, Sch Heat# LT-15
   Seamless H.F.
   PO# B-31851-3750
   CONTRACT# 74-3750

REFERENCE:
CHICAGO BRIDGE & IRON CO. P.O.# B-31851-3750
CAPITOL S.O.# AN-6085-A
ITEM# 3

Sworn to and subscribed before me
[illegible] 1979

Murray Herbert Feldman

MURRAY HERBERT FELDMAN
Notary Public, State of New Jersey
My Commission Expires Jan. 10, 1977

Brian Kirkpatrick
QUALITY ASSURANCE

✓ (9)

WE HEREBY CERTIFY THAT THIS IS
A TRUE COPY OF THE ORIGINAL MILL
TEST CERTIFICATE
CARBON STEEL
PRODUCED BY U.S. OF F.A.S. INT., INC.
SIGNED [signature] DATE 6-2-76

7LC
6-9-76

IRON WORKS, INC
P. O. BOX 1212
HOUSTON, TEXAS 7700

Date 30 January 1975

Customer Order No.	C.J.W. Sales Order No.	Specification
A 03063RM	F-14722	ASME SA333 Gr. 6 W/CK. Analysis per Para. 8 & Impacts @ +35°F. per ASME Sec. III Cl. 1 Component

Description of Material D.D. 24" x I.D. x WALL SCH. 100

C.J.W. Part No. 86-4722-240-210

Chicago Bridge & Iron
PO# B31851-3750
SO# AN-6085-A
Ch# H-78970
Item# 3

Heat No.	Location or Serial No.	C	MN	P	S	SI	CR	NI	MO
		CHEMICAL ANALYSIS							
K 4687		.19	1.25	.005	.011	.32			
	Check Anal.	.19	1.20	.007	.013	.33			
	Check Anal.	.19	1.23	.007	.013	.34			
L 1442		.18	1.15	.011	.014	.26			
	Check Anal.	.18	1.15	.011	.023	.26			

Each length of pipe 100% ultrasonically inspected per Para. NB 2552 of ASME Sec. III using a 5% reference notch and found acceptable.

Quantity or Pl No.	Heat No.	Test Loc.	Tensile PSI	Yield Point % Offset Yield PSI	% Elong. In. 2"	% Red. Area	Macro Etch	Bend Test	Flattening Test	Specimen Size	Test Lot#
			MECHANICAL PROPERTIES								
5	K 4687	Trans.	76,600	53,200	41.4	64.4			OK	.495	537
		Trans.	76,600	55,400	31.1	63.8			OK	.505	538
1	L 1442	Trans.	71,100	48,400	33.1	68.4			OK	.505	538

Forg. Ser.#	Heat#	Test Lot#
20978	K 4687	537
20979	K 4687	537
20980	K 4687	537
20981	K 4687	538
20982	K 4687	538
20983	L 1442	538

Each length of pipe hydrostatically tested at 2679 psi for 5 sec. and found acceptable.
Hydrostatic Test

Heat Treatment: Normalized. 1700°F., hold 2 hrs. at temp. Air cooled.

Test Impact Test Results:

Heat#	Temp.	Ft.Lbs.	Lat. Exp.	%D/F	Test Lot#
K 4687	-50°F.	91.0	.071	40%	537
	-50°F.	82.0	.076	39	
	-50°F.	77.5	.074	38	
	+35°F.	166.0	.089	100%	
	+35°F.	166.0	.091	100	
	+35°F.	175.0	.085	100	
	-50°F.	80.0	.068	39%	538
	-50°F.	57.0	.058	24	
	-50°F.	72.0	.063	22	
	+35°F.	158.0	.088	86	
	+35°F.	144.0	.087	80	
	+35°F.	167.0	.087	100	
L 1442	-50°F.	57.0	.053	24	538
	-50°F.	62.0	.061	29	
	-50°F.	100.0	.083	42	
	+35°F.	169.0	.078	100	
	+35°F.	139.0	.085	70	
	+35°F.	160.0	.085	100	

Subscribed and Sworn to before me this 30th Day of January 1975.

Notary Public
G. A. TOUCHTON
CAMERON COUNTY, Texas
My Commission Expires June 1, 1975

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

Metallurgical Representative H. O. WRIGHT.

9

Metallurgical Testing Laboratories

2524 Sutherland, Houston, Texas 77023
(713) 923-7761

FCP
6-4-76

CHARPY IMPACT TEST RESULTS

TO Capitol Pipe & Steel Products

DATE 5-19-76 LAB NO. 1065-76 P.O. L-80423-02

MATERIAL SPECIFICATION 24" S/100 Smls., ASME SA 333 Gr 6, Heat L1442

TEST RESULTS CONFORM TO SPECIFICATION: ☐ YES ☐ NO ☒ NOT APPLICABLE

IDENTIFICATION Coupon RF TEST TEMP. -15°F

SPECIMEN TYPE Charpy V-Notch SPECIMEN SIZE 10 x 10mm

HEAT TREATMENT Stress Relieved at 1150°F for 3 hours; Heating and cooling rate 250°F/hour maximum above 800°F.

COMMENTS TAG: CBI H78970 AN-6085 PO #B31851-3750 Item #. 3; Longitudinal Impact Specimens

Capacity of impact machine is 264 foot pounds with a striking velocity of 16.8 feet per second.

IDENTIFICATION	IMPACT VALUE (ft.-lbs.)	% Shear	Lat Exp(in)
RF-1	84.0	45	.068
RF-2	35.0	25	.033
RF-3	75.0	40	.060

Chicago Bridge & Iron
PO# B31851-3750
SO# AN-6085-A
Ch# H-78970

Item# 3

WE HEREBY CERTIFY THAT THIS IS
A TRUE COPY [illegible] ORIGINAL MILL
TEST C[illegible]
CAPITO[illegible] PIPE
PRODU[illegible]
SIGNED [illegible] T.A.S. INT., INC.
DATE 6-7-76

METALLON, Incorporated

Donald R. McGehee, P.E.

OF TEST ON PIPE MATERIAL 2/3/77

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

C-W ENERGY PRODUCTS GROUP
ENGINEERED SYSTEMS DIVISION
P. O. BOX B
PAOLA, KS 66071

Date 7 January 1977

Customer Order No.	C.I.W. Sales Order No.	Specification
8-7919	F-5901	ASME SA106 Gr. C with ASME Sec. III, Class II Components thru Winter '74 Addenda with Impacts at +30°F.

Description of Material O.D. _____ x I.D. 24.803" x WALL 1.663" M.W.

* Material has been vacuum degassed.

C.I.W. Part No. 86-5901-286-250

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS) NO. N-1261 EXPIRES 10-27-78.

CHEMICAL ANALYSIS

Heat No.	Location or Serial No.	C	MN	P	S	SI	CR	NI	MO
3466	KJLF	.24	.87	.010	.015	.21		AS-3	AS-4
3476	KJLE	.22	.95	.008	.016	.23		AS-2	
3479	KJLD	.26	1.00	.012	.010	.24		AS-1	

AS-1 thru 4 Job 802125

AT-1 802126

MATERIAL ACCEPTED BY

mm DATE 2-8-77

MECHANICAL PROPERTIES

Quantity or Serial No.	Heat No.	Test Loc.	Tensile PSI	.2 % Offset Yield PSI	% Elong. In.	% Red. Area	Macro Etch	Bend Test	Flattening Test	Specimen Size	Test Lot#
3	L 3466	Trans.	71,700	47,300	32.0	56.1			OK	.250	521
1	L 3476	Trans.	76,200	50,100	30.0	59.7			OK	.252	580
1	L 3479	Trans.	80,600	52,100	31.0	62.2			OK	.252	577

V-Notch Charpy Impact Tests at+30°F.:

Forg. Ser.#	Heat#	Test Lot#	Test Lot#	Heat#	Ft.Lbs.	MIL Lat. Exp.	% D/F
27559	L 3479	577	#521	L 3466	61.0	62	57%
27562	L 3476	580			43.0	41	44
27564	L 3466	521			64.0	54	57
27565	L 3466	521	#580	L 3476	92.0	75	80
27566	L 3466	521			95.0	75	77
					97.0	75	75
			#577	L 3479	73.0	53	57
					65.0	57	63
					77.0	58	65

* Charpy Test run in accordance with Paragraph NC-2300.

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

Heat Treatment:

1700°F. hold 2 hrs. at temp. Air cooled.

Subscribed and Sworn to before me this 7th day of January 1977

Notary Public

Harris County, Texas

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

Metallurgical Representative R. O. WRIGHT.

CAMERON 1088 4/70

SA-106-C
ASME Section III Cl. 2 1974 Winter 74

P.O. Box B
Paola, Kansas 66071

ENERGY PRODUCTS GROUP
ENGINEERED SYSTEMS DIVISION

TOMER Dravo Corporation
Pipe Fabrication Div.
1115 Gilman Ave
Marietta, OHIO 45750

SPECIFICATION NO. Sabs. Per MPS-21

HEAT TREATMENT Norm. Header Per MPS-21

TOMER ORDER NO. 53000-27

OUR ORDER NO. E-802125

KING LIST NO. 02379

NUCLEAR

HEAT NUMBER	PHYSICAL PROPERTIES: YIELD POINT OR YIELD STRENGTH AT 0.2 % OFFSET PSI	TENSILE STRENGTH PSI	ELONG. IN 1" %	RED. OF AREA %	CHEMICAL ANALYSIS: C	MN	P	S	SI	MO	CR	NI	DESCRIPTION
		Item 4 - (ONE) 24.803" ID x 30' 9" lg. Main Steam Header											
GLF	47300	71700	32.0	56.1	.24	.87	.010	.015	.21				1.663 Min. Wall AS-4
	Cameron Iron Works Heat No.				L 3466								
Specimen Size .250		Transverse Test											Charpy Test Per Para. NC-2300 Charpy W+30 F:
													Ft. Lbs 64-43-64 / Mils Lat. 62-41-54 / %Shear 57-44-57
attening Test OK													
ch length of pipe hydrostatically tested at 2800 psig for 5 sec. and found acceptable													
teria, has been vacuum degassed.													

REMARKS:

SUBSCRIBED AND SWORN TO BEFORE ME

THIS 25th DAY OF March 1977

[illegible]

Phone: (215) 793-1500
TWX 510-663-0372
Telex 83-5453
Telecopier: (215) 793-1500 Ext. 264

...IAL TEST REPORT

S. O. No. 2732-7 LENAPE, PA., 6-3 19 77

...HASER Drayo Corp. DISTRIBUTOR

...RCHASER'S ORDER NO. E3002-76 DISTRIBUTOR'S ORDER NO.

...EM ...O.	QTY.	PRODUCT	SPEC.	HEAT OR CODE NO.	REMARKS
	20	6" x 900# x 12" L.W. Neck, F&D Sch. 120 Bore	SA105 sect III cl. 2, per cust P.O. Winter 74 Add.	A574N	M/O 831V
		MATERIAL INCLUDED ON THIS TEST REPORT WAS MANUFACTURED UNDER ASME QUALITY SYSTEMS CERTIFICATE (MATERIALS) NO. N-552 EXPIRES OCTOBER 28, 1977.			

CHEMICAL ANALYSIS AND MECHANICAL PROPERTIES

...EAT NO.	C	MN	P	S	SI	CR	NI	MO			REMARKS
...574N	.30	.92	.011	.013	.19	Ladle					Heat Treatment 1645°F- for 3½ hrs. air cool

...EAT NO.	TENSILE R.T.	YIELD	ELONG % IN 2"	R.A. %	B.H.N.	IMPACT	REMARKS
...574N	84,426	55,093	26.5	59.8			

...hereby certify the above results to be correct

...tor Forge Division
...& WESTERN INDUSTRIAL PRODUCTS COMPANY
P.O. Box 485 Chicago, Illinois 60690

SUBSCRIBED AND SWORN TO BEFORE ME THIS 24 DAY OF ... 19 77
QUALITY CONTROL — NOTARY PUBLIC

DATE ENTERED	PAGE	PACKING LIST	OUR INVOICE NO.
	2	312273	120078

...-3002-71 ... 09 072

...ER NO.	ITEM NO	PRODUCT NO		QUANTITY	DESCRIPTION
120078 F-7 E2 6-10-77	401	HT-	801S144	4 0	12" SCH 80 LOW TEMP SERV CAPS END PER DWG. E-SNUPPS-9000 REV.2 TYPE 1 PER ASME SA420-PL6 & ASME SECT. III CL 2 1974 EDITION INC THE WINTER 1974 ADDENDA & DRAVO SPEC E-3000-3009- P1 -2 SNUPPS P1-4205
					NO REPAIR WELDING PERMITTED PER TRAIL CARD END PROTECTOR REQ'D
					CHG. NO. #225
					ITEM 1

...TF ...TEM NO.	HEAT SYMBOL	...ILL HEAT NO.	PHYSICAL PROPERTIES: YIELD STRENGTH PSI	TENSILE STRENGTH PSI	ELONG IN 2" %	RED OF AREA %	CHEMICAL ANALYSIS: C	Mn	P	S	Si	Mo	Cr	Ni
01	–	801S144	10											
		"	55820	79240	31.0	58.0	.26	1.04	.015	.018	.22			

Charpy Impact Test, V-Notch, Plus 30 F. Full Size:

Ft. Lbs.	%Shear Fracture	Mils Lateral Expansion	%Lateral Expansion
27-34-31	55-80-70	24-28-24	6.1-7.1-6.1

12 00 NW 0

TUBE DIVISION
PHOENIXVILLE, PENNA.

CERTIFICATE OF INSPECTION AND TESTS

2-27-78	DATE SHIPPED: 2-27-78	MILL ORDER NO. T-4389-C	SHIPPING LIST NO. 143D
		CUSTOMER ORDER NO. 88597-00	
Capitol Pipe & Steel Products Co.		CAR NO. MP 614267	
		MATERIAL: SEAMLESS ☐ PIPE ☒ TUBE, HOT FINISHED	
Bravo Corporation P.O.#E 3002-152 S.O.#RN-1579-A Item 1 H92382		SPECIFICATION: ASTM A-333-76a, ASME SA-333 Gr.6 (O.H.	

PCS.	OD	WALL	LENGTH	TOTAL FT.	TOTAL WT.	HEAT NO.
	12.750" x .688"					68505

Longitudinal Vee Notch Charpy at Minus 50°F. (10 mm x 10 mm)

Ft. Lbs.	Lateral Expansion	Percent Shear
168-96-98	.092-.082-.037	100-50-50

HEAT NO.	C	MN.	P.	S.	SI.	CU.	NI.	CR.	MO.	V
505	.13	1.23	.012	.025	.20	Ladle Analysis				
505	.12	1.21	.012	.023	.21	Product Analysis				
505	.11	1.22	.012	.025	.21	Product Analysis				

HEAT NO.	TENSILE (KSI)	YIELD (KSI) ( )	% ELONG. IN 2"	% RA	HARDNESS ROCKWELL	HARDNESS BRINELL	GRAIN SIZE
8505	63.2	44.8	51.00				

Normalized at 1700°F. Equalized. Plus 50°F Minus 0°F. Held for 2 hours and air cooled

SWORN TO AND SUBSCRIBED BEFORE
ME, THIS 27TH DAY OF FEBRUARY 1978.
Carolyn J. Taylor
CAROLYN J. TAYLOR, NOTARY PUBLIC
PHOENIXVILLE BOROUGH, CHESTER COUNTY
MY COMMISSION EXPIRES SEPT. 3, 1979

CAPITOL PIPE & STEEL PRODUCTS
QUALITY ASSURANCE
APPROVED
By D. Mana
Date 3-6-78

HYDROSTATIC PSI 2300

FLATTENING OK

ROWING DISTANCE - 16TH ROCKWELL C

1 2 4 6 8 10 12 14 16 20 24 28 32

THE PHOENIX STEEL CORPORATION HEREBY CERTIFIES THAT THE ABOVE MATERIALS HAVE BEEN INSPECTED AND TESTED IN ACCORDANCE WITH THE [illegible] SPECIFIED IN THE APPLICABLE SPECIFICATIONS AND THE RESULTS OF SUCH INSPECTION AND TESTS AS CONTAINED IN THE COMPANY'S RECORDS AS SHOWN ABOVE. FOR PROPERTIES OR CHARACTERISTICS FOR WHICH NO METHODS OF INSPECTION OR TESTING ARE PRESCRIBED IN THE STANDARD MILL INSPECTION AND TESTING PRACTICES OF THE PHOENIX STEEL CORPORATION HAVE BEEN ATTAINED. AND SPECIFICATIONS, THE STANDARD MILL INSPECTION AND TESTING PRACTICES OF THE PHOENIX STEEL CORPORATION HAVE BEEN APPROVED AS FULFILLING THE REQUIREMENTS OF SAID SPECIFICATIONS. BASED UPON SUCH INSPECTION AND TESTS, THE ABOVE MATERIALS HAVE BEEN APPROVED AS FULFILLING THE REQUIREMENTS OF SAID SPECIFICATIONS.

ENGINEER OF TESTS

CERTIFICATE OF TEST ON PIPE MATERIAL

* SUPPLEMENTARY REPORT
2/3/77

Cameron
IRON WORKS, INC
P. O. BOX 1212
HOUSTON, TEXAS 7700

SOLD TO

G+W ENERGY PRODUCTS GROUP
ENGINEERED SYSTEMS DIVISION
P. O. BOX B
PAOLA, KS 66071

Date 19 January 1977

Customer Order No.	C.I.W. Sales Order No.	Specification
-7319	F-5901	ASME SA106 Gr. C with ASME Sec. III, Class II Components thru Winter '74 Addenda with Impacts at +30°F.

Description of Material O.D. _____ x I.D. 24.803" x WALL 1.663" N.W.

* Material has been vacuum degassed.

C.I.W. Part No. 86-5901-286-250

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS) NO. N-1261 EXPIRES 10-27-78.

Heat No.	Location or Serial No.	C	MN	P	S	SI	CR	NI	MO	
		CHEMICAL ANALYSIS								
3476		.22	.95	.008	.016	.23		KJLE	AT-4	
3479		.25	1.00	.012	.010	.24		KJLD	AT-2	AT-3

Quantity or Serial No.	Heat No.	Test Loc.	Tensile PSI	.2 % Offset Yield PS.	% Elong. 1 In.	% Red. Area	Macro Etch	Bend Test	Flattening Test	Specimen Size	Test Lot#
			MECHANICAL PROPERTIES								
1	L 3476	Trans.	76,200	50,100	30.0	59.7	-	-	OK	.252	580
2	L 3479	Trans.	80,600	52,100	31.0	62.2			OK	.252	577

V-Notch Charpy Impact tests at +30°F.:

Forg. Ser.#	Heat#	Test Lot#	Test Lot#	Heat#	Ft.Lbs.	Lat Exp. MILS	% D/F
#27560	L 3479	577	580	L 3476	92.0	75	80%
					95.0	75	77
27561	L 3479	577			97.0	75	75
27563	L 3476	580	577	L 3479	73.0	53	57
					65.0	57	63
					77.0	58	65

* Charpy Test run in accordance with Paragraph NC-2300.

NUCLEAR

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

Heat Treatment: 1700°F. hold 2 hrs. at temp. Air cooled.

Subscribed and Sworn to before me this 19th Day of January 1977

Notary Public
G. A. Tomlinson

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

Metallurgical Representative H. O. WRIGHT

CUSTOMER Dravo Corp.

H. TAYLOR FORGE/CICERO DIVISION
DIRECT WELDED MANUFACTURING COMPANY
P.O. Box 405
Cicero, Illinois 60650

SPECIFICATION NO. ASME SA420-WPL6
4300F., ASME Sect.
III Class 2, 1974
1974 Winter Addend
Dravo E3000/09 PIA
PI 420

HEAT TREATMENT

CUSTOMER ORDER NO. E-3001-56

OUR ORDER NO. 120139

PACKING LIST NO. 313092

Normalized 1650oF. - 1 hr - Air cooled.

DESCRIPTION	CHARGE NO. TF Item	HEAT SYMBOL	MILL HEAT NO.	PHYSICAL PROPERTIES: YIELD STRENGTH PSI	TENSILE STRENGTH PSI	ELONG. IN 2" %	RED OF AREA %	CHEMICAL ANALYSIS: C	MN	P	S	SI	MO	CR	NI
- 12" Sch 80 Caps. Ends per Dwg. E-SMIPPS-9000 Rev. 3	401	EGWG	801S12529					.22	1.09	.009	.023	.23			
Type 1		"	"	57390	77440	28.0	57.1								
Item 1		"	"	Charpy Impact Test, V-Notch, Plus 30oF., Full Size, Transverse:											
Heat Treat Charge No. 422				Ft. Lbs	% Shear Fracture			Mils Lateral Expansion					% Lateral Expansion		
				33-34-33	90-90-90			28-31-29					7.1-7.9-7.4		

REMARKS: Raw Material: ASME SA516 Gr. 70. Parts are capable of withstanding a hydrostatic test referenced in ASME SA23 Parts have been visually and dimensionally examined and are in full compliance with purchase order and specificat requirements. Tensile test: standard round 2" gage length. TF Certificate of Authorization No: N-991 expires 3-3-78. We certify that the contents of this report are correct and accurate and that all test results and operations performed are in compliance with the material specification and all the applicable requirements designated by the purchase order.

SUBSCRIBED AND SWORN TO BEFORE ME

THIS 17th DAY OF Nov. 19 77

NOTARY PUBLIC STATE OF ILLINOIS
MY COMMISSION EXPIRES DEC. 18 1979

QUALITY CONTROL

SOLD TO 1115 Gilman Ave.
Marietta, Ohio 45750

TUBE TURNS
DIVISION OF GILMORE CORPORATION

Replaces DAR dated 10/6/77

HOUSTON, TEXAS 1/20/78 bh

TUBE TURNS ORDER NO. H 4 91710

CUSTOMERS' ORDER NO. E3001-55

SHIP TO Dravo Corp.
1115 Gilman Ave.
Marietta, Ohio 45750

DESCRIPTION	PHYSICALS OF MATERIALS FROM WHICH MADE					CHEMICAL ANALYSIS									HEAT OR LOT NO.	SPECIFICATION OF MATERIAL FROM WHICH MADE
	** HEAT TREATMENT	YIELD POINT PER SQUARE INCH	TENSILE STRENGTH PER SQUARE INCH	PERCENT ELONGATION IN 2"	PERCENT REDUCTION IN AREA	C	MN	P	S	SI	CR	NI	MO	CU		
Item 001 20 Pieces	1	52,750	79,800	38.2	59.0	.24	.76	.008	.024	.20	.06	.12	.02	.02	78257	SA-105
6" Special 900# Long Neck														V .035		
RF Flg. B/SCH 120 SA105																
ASME III Class 2, Bevel per																
9000 Type 1 per TT Dwg.																
77.761 B1 Rev. 1																
Customer Code 105-50																

* STANDARD ROUND TEST SPECIMEN ** 1=NORMALIZED 2=ANNEALED 3=HEAT TREATED PER ORDER SPECIFICATION.

SUBSCRIBED AND SWORN TO BEFORE ME THIS 20th DAY OF January 19 78.

Isabella Bailey
NOTARY PUBLIC

ISABELLA BAILEY
Notary Public in and for Harris County, Texas
My Commission Expires September 1, 1979

I HEREBY CERTIFY THIS REPORT TO BE TRUE AND CORRECT ACCORDING TO RECORDS IN THE POSSESSION OF THIS CORPORATION

R. Avera, Quality Control Engr.

DRAVO CORPORATION - PIPE FABRICATION DIVISION, MARIETTA, OHIO

DRAWING NUMBER E-3000-503

CUSTOMER BECHTEL - SNUPPS UNIT #1 DWG REF M-03AB01 (7)

SYSTEM MAIN STEAM SYSTEM (50) SHOP CODE 250

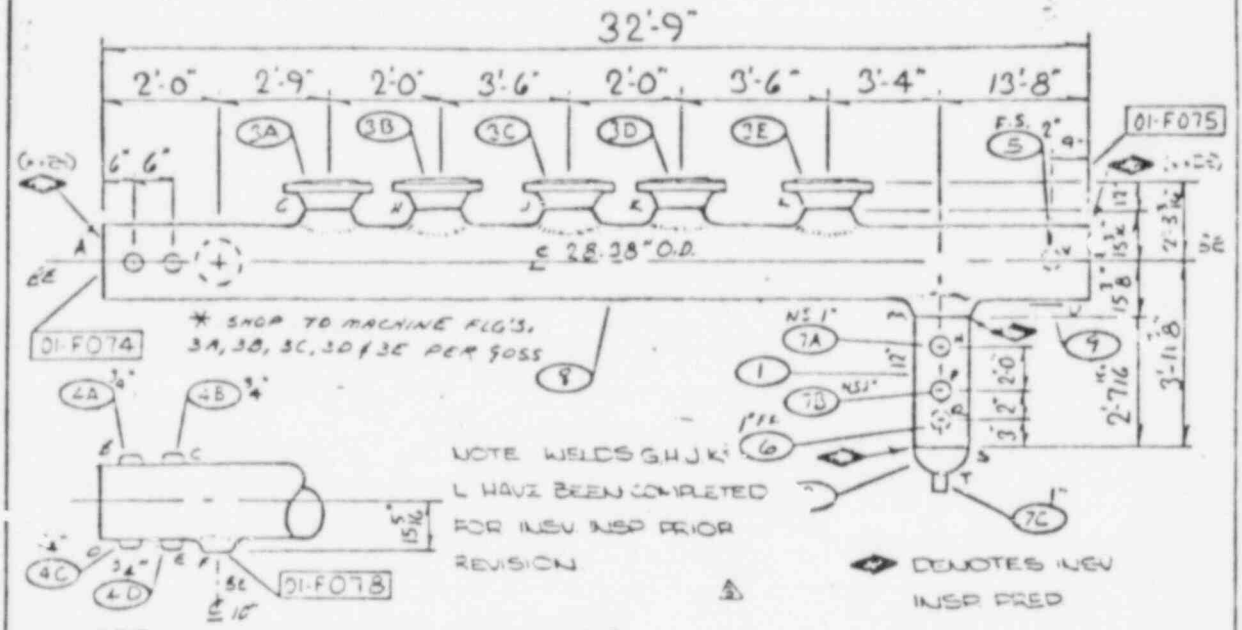
DES COND 1185 PSIG 650 °F AREA 5 ISO NO ——— SPEC CLASS DLB ASME SECT VIII CL 2

PC MK NO 1-AB-01-5046/145 TOTAL WGT 14720 LBS PIPE WGT ——— LBS. N PT SERIAL NUMBER 15153

STANDARDIZED NUCLEAR UNIT
POWER PLANT SYSTEM
PO NR 10466-M-201 A Q

M-201A-672-

For Engineering Information Only							
DRAWING APPLICABLE TO UNITS							
1	2	3	4	5	6	7	8



NOTE: NO ADDITIONAL SHOP WELDS WITHOUT APPROVAL FROM ENGINEERING.

NOTE: INSTALL CODE PLATE PE 9020

HEAVY LIFT

FAB PROC NO SNUPPS SP-1 (2)
SHOP REV 9000 (3) TYPE 1
FIELD REV 9000 (3) TYPE 1

☒ INSERTS
☒ PAINT SP. 1 (12)
☒ SPC'L CLEAN LEV 3 SP. 4 (5)
☐ SAND BLAST I.D./O.D. SP. (△)
☒ GRIT BLAST I.D. SP. 4 (5)
☒ INSV INSP PREP (NO NOTE) SP. 1 (12)
☒ SHIPPING PREP SP. 6 (3)
☐ FERRITE MEAS SP. (△)
☐ STD PRIME TYPE OXIDE/LACQUER
☐ SPC'L PAINT TYPE ——— SP. (△)
☐ BEND HOT/COLD SP. (△)
☐ VERIFY BEND THICKNESS SP. (△)
☒ MIN WALL MEAS SP. 1 (12)

NDE	PROCEDURE	REQUIRED WELDS
☒ MT	ASME III MT (6)	B,C,D,E,N,P,R,T,U,V
☒ RT	ASME III RT (10)	G,H,J,K,L,M,S
☐ UT	(△)	

WELD FILLER METAL REQ'D: ☐ YELLOW ACTUAL ☒ RED ACTUAL WITH CHARPY @ -50 °F ☐ SPECIAL SEE WELD ENGINEER

QUAN		DESCRIPTION	SPEC.	B M	HT NOS.	CODE'S	N	REMARKS
2.7'5"	(1)	12 SCH 80 SMLS OR WELDED PIPE	SA-333 Gr 6	SI-2	459928	12	8'5	
1	(2)	12 SCH 80 W/CAP	SA-420 w/FLG	SI-3	15 2	13	154	
1	(3A)	6 CL 900 RF LG/NECK FLG (126)	SA 105	SI-4	78257	49	178	
1	(3B)	6" CL 900 RF LG/NECK FLG (126)	SA-105	SI-4	78257	50	178	
1	(3C)	6" CL 900 RF LG/NECK FLG (126)	SA-105	SI-4	78257	51	178	
1	(3D)	6" CL 900 RF LG/NECK FLG (126)	SA-105	SI-4	78257	52	178	
1	(3E)	6" CL 900 RF LG/NECK FLG (126)	SA-105	SI-4	78257	53	178	
1	(4A)	3/4" 3000# S/W N.O.L 4½ LG PE.	SA-105	SI-5	BM49	V5	167	
1	(4B)	3/4" 3000# S/W N.O.L 4½ LG PE.	SA-105	SI-5	BM49	V5	167	
1	(4C)	3/4" 3000# S/W N.O.L 4½ LG PE	SA-105	SI-5	BM49	V5	167	
1	(4D)	3/4" 3000# S/W N.O.L 4½ LG. PE.	SA-105	SI-5	BM49	V5	167	
1	(5)	2" 3000# S/W ESM DB-1 BOSS	SA-105	SI-5	ARA	V5	196	
1	(7A)	1" 6000# S/W ESM DB-1 BOSS	SA-105	SI-5	ARA	V5	371	
1	(7B)	1" 6000# S/W ESM DB-1 BOSS	SA-105	SI-5	ARA	V5	371	
1	(7C)	1" 6000# S/W ESM DB-1 BOSS	SA-105	SI-5	ARA	V5	371	
1	(8)	28.38" O.D. HANDLER PER W-PP-7017	SA-106-C	SI-1	KILE	14	143	
1	(9)	NUCLEAR CODE PLATE ESM-CP-1	C.S.	1	NA	NA	NISA	

REV	DATE	DESCRIPTION OF REVISION						
2	2-27-79	[illegible]						
1	8-8-77	REV. NOW 4 PC [illegible]						
0	2-8-77	ISSUED FOR FABRICATION		3	4-17-78	REVISED [illegible]		
				2A	4-7-78	ADDED MACH. NOTE FOR FLG'S.		

MDP-1 SHEET 2 OF 2

2/11

TUBE DIVISION
PHOENIXVILLE, PENNA.

CERTIFICATE OF INSPECTION AND TESTS

Page 1 of 2
*Supplemantary Test Report 7-22-76

DATE: 3-10-76	DATE SHIPPED: 3-8-76	MILL ORDER NO. T-9630-C (9C)
SOLD TO: Cayon Alloys, Inc.		CUSTOMER ORDER NO. A-13289-N
		CAR NO. PC 564657
		MATERIAL: SEAMLESS ☐ PIPE ☒ TUBE, HOT FINISHED
SHIP TO: Dravo Corp. PO# E-3000-34		SPECIFICATION: ASTM A-333 Gr. 1, A-333 Gr. 6 (O.H.) ASME SA-333 Gr. 1, SA-333 Gr. 6 (O.H.)

NO. PCS.	OD	WALL	LENGTH	TOTAL FT.	TOTAL WT.	HEAT NO.
	12.750"	x .688"	12" 2/80			

Longitudinal Vee Kotch Charpy at minus 50°F. (10mm x 10mm)

Heat No.	Foot lbs.	Lateral Expansion	Percent Shear
45067	73-74-72	.064 - .071 - .068	40-50-40
45928	62-73-92	.057 - .067 - .078	40-40-50

HEAT NO.	C	Mn.	P.	S.	Si.	Cu.	Ni.	Cr.	Mo.	V.
45067	.13	1.24	.012	.020	.23	Ladle Analysis				
45067	.15	1.25	.012	.025	.24	Product Analysis				
45067	.14	1.21	.012	.022	.23	Product Analysis				
45928	.14	1.04	.012	.021	.19	Ladle Analysis				
45928	.14	1.05	.012	.022	.20	Product Analysis				
45928	.13	1.05	.012	.021	.20	Product Analysis				

HEAT NO.	TENSILE (KSI)	YIELD (KSI) ( )	% ELONG. IN 2"	% RA	HARDNESS ROCKWELL	HARDNESS BRINELL	GRAIN SIZE
45067	67.3	46.4	48.00				
45928	60.4	40.0	50.00				

*Normalized. Equalized at 1700°F. plus or minus 25°F. Held for 1 hour and air cooled.

SWORN TO AND SUBSCRIBED BEFORE ME THIS 22ND DAY OF JULY 1976

[illegible] 1979

Q.A. APPROVED
BY: [illegible] DATE: 7/22/76
CAYON ALLOYS, INC

JOMINY DISTANCE 16TH	ROCKWELL C	FLATTENING OK	HYDROSTATIC PSI 2500
1 2 4 6 8 10 12 14 16 20 24 28 32			

THE PHOENIX STEEL CORPORATION HEREBY CERTIFIES THAT THE ABOVE MATERIALS HAVE BEEN INSPECTED AND TESTED IN ACCORDANCE WITH THE METHODS PRESCRIBED IN THE APPLICABLE SPECIFICATIONS AND THE RESULTS OF SUCH INSPECTION AND TESTS AS CONTAINED IN THE COMPANY'S RECORDS ARE AS SHOWN ABOVE. FOR PROPERTIES OR CHARACTERISTICS FOR WHICH NO METHODS OF INSPECTION OR TESTING ARE PRESCRIBED BY SAID SPECIFICATIONS, THE STANDARD MILL INSPECTION AND TESTING PRACTICES OF THE PHOENIX STEEL CORPORATION HAVE BEEN APPLIED. BASED UPON SUCH INSPECTION AND TESTS, THE ABOVE MATERIALS HAVE BEEN APPROVED AS FULFILLING THE REQUIREMENTS OF SAID SPECIFICATION.

[illegible]
ENGINEER OF TESTS

FORM TAC-0153-R3 (10/72)

LADISH CO.
Material Analysis Report

METALLURGICAL DEPARTMENT

PURCHASER Dravo Corp. - Pipe Fabrication Dept.

CUDAHY, WIS., January 31, 19 79

PURCHASER'S ORDER NO. E3000-132

LSO NO. G51209A

ADDRESS P.O. Box 581 - Marietta, Ohio 45750

INVOICE NO. P 48054

REVISED REPORT

NO. PCS.	DESCRIPTION AND SPECIFICATION	HEAT NO. AND CODE	CHEMICAL COMPOSITION C	MN	P	S	SI	NI	CR	MO	PHYSICAL PROPERTIES YIELD STRENGTH KSI	ULTIMATE STRENGTH KSI	ELONG. %	RED OF AREA
	Item 1													
4	10" S/80 90° L.R. Ell	N76411 ZZ3LH	.24	.91	.009	.010	.17				54.3	77.3	34	79

VEE notch Charpy impacts at +30°F. - full size

225 - 235 - 201 Ft. Lbs. 220.3 Average
100 - 100 - 100 % Shear
.082 - .072 - .082 Lateral expansion

ASME SA 420 WPL 6 per ASME Section III Class 2 1974 Edition thru Winter 1974 & Dravo PI E3000/09 PI-A & PI-420

Starting material conforms to chemical and tensile properties of ASME SA 333 Grade 6 seamless pipe.

Tensile specimen size - standard round.

Impacts were taken with their longitudinal axis parallel to the longitudinal axis of the fitting, centered on wall. The axis of the notch is perpendicular to the surface.

Test material and fittings were heat treated per (L) Procedure 13-F-455 by water quenching from 1650°F. after holding for 30 minutes at color. Followed with a temper of 1200°F. Held at temper for 1.5 hrs. Air cool.

SUBSCRIBED AND SWORN TO BEFORE ME THIS

31st DAY OF January 19 79

Lorraine Bajar
NOTARY PUBLIC

MY COMMISSION EXPIRES August 17, 1980

I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THE ABOVE REPORT IS TRUE AND CORRECT.

LCO 1016 R2

PHOENIX STEEL CORP.

TUBE DIVISION

PHOENIXVILLE, PENNA.

CERTIFICATE OF INSPECTION AND TESTS

DATE:	DATE SHIPPED:	MILL ORDER NO.	SHIPPING LIST
4-28-78	4-26-78	T-4432-C	144F

CUSTOMER ORDER NO. A-20244-N

CAR NO. PC 577699

MATERIAL: SEAMLESS ☐ PIPE ☒ TUBE, HOT FINISHED

Guyon Alloys, Inc.

DRAVO CORP. Item #1
PO# E 3000-136

10" S/80

SPECIFICATION:
ASTM A-333-76a, ASME SA-333 Gr. 6 (O.H
ASTM A-333-76a, ASME SA-333 Gr. 1 (O.H

NO. PCS.	OD	WALL	LENGTH	TOTAL FT.	TOTAL WT.	HEAT NO.
	10.750"	x .594"				68534B

Longitudinal Vee Notch Charpy at Minus 50°F. (10mm x 10mm)

Ft. Lbs.	Lateral Expansion	Percent Shear
64-73-60	.060-.067-.055	40-50-40

HEAT NO.	C	Mn.	P.	S.	Si.	Cu.	Ni.	Cr.	Mo.
68534B	.12	1.06	.011	.022	.20	Ladle Analysis			
68534B	.13	1.05	.012	.023	.20	Product Analysis			
68534B	.12	.92	.012	.023	.20	Product Analysis			

Phoenix manufacturing and testing procedures have been audited and approved by Guyon Q. A.

HEAT NO.	TENSILE (KSI)	YIELD (KSI)( )	% ELONG. IN 2"	% RA	HARDNESS ROCKWELL	HARDNESS BRINELL	GRAIN SIZE
68534B	66.4	44.8	50.00	Normalized at 1700°F. Held for 2 hours and air cooled.			

SWORN TO AND SUBSCRIBED BEFORE
ME THIS 28TH DAY OF APRIL 1978
Dorothy M. DeWalt
DOROTHY M. DEWALT, NOTARY PUBLIC
PHOENIXVILLE BOROUGH, CHESTER COUNTY
MY COMMISSION EXPIRES MARCH 9, 1981.

Q. A. APPROVED
BY: [illegible] DATE: 5-8-78
GUYON ALLOYS, INC.

JOMINY DISTANCE - 16TH ROCKWELL C FLATTENING OK HYDROSTATIC PSI 2325

1 2 4 6 8 10 12 14 16 20 24 28 32

THE PHOENIX STEEL CORPORATION HEREBY CERTIFIES THAT THE ABOVE MATERIALS HAVE BEEN INSPECTED AND TESTED IN ACCORDANCE WITH THE METHODS PRESCRIBED IN THE APPLICABLE SPECIFICATIONS AND THE RESULTS OF SUCH INSPECTION AND TESTS AS CONTAINED IN THE COMPANY RECORDS ARE AS SHOWN ABOVE. FOR PROPERTIES OR CHARACTERISTICS FOR WHICH NO METHODS OF INSPECTION OR TESTING ARE PRESCRIBED SAID SPECIFICATIONS, THE STANDARD MILL INSPECTION AND TESTING PRACTICES OF THE PHOENIX STEEL CORPORATION HAVE BEEN APPLIED. BASED UPON SUCH INSPECTION AND TESTS, THE ABOVE MATERIALS HAVE BEEN APPROVED AS FULFILLING THE REQUIREMENTS OF SAID SPECIFICATION.

[illegible]
ENGINEER OF TESTS

IRON WORKS

P. O. BOX 1212
HOUSTON, TEXAS 77001

RGENT INDUSTRIES
RITE DIVISION
00 EAST GRAND AVENUE
. SEGUNDO, CA 90245

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1261, EXPIRES OCT. 27, 1978.

DATE 21 Nov. 1977

P ORDER NO.	C.I.W. SALES ORDER NO.	SPECIFICATION
244	F-18363-02	NI,Cr,Mo Alloy Steel in accordance with ASME B & PV Code, Sec. II, SA508, Class 2, ASME Sec. III, Div. I, Class 2, 1974 Edition, to and including Summer 1976 Addenda, except; no Magnetic Particle nor Ultrasonic Inspection was performed @ CIW.

'TION Flued Heat Dwg.# 1047014-01

ALS

T NUMBER 60640-10

CHEMICAL ANALYSIS

Q	LOCATION OR SERIAL NO.	C	MN	P	S	SI	CR	NI	MO	V
08		.19	.73	.005	.009	.21	.39	.88	.66	.01
	Ser.# 0003	.19	.73	.007	.009	.22	.40	.89	.66	.01

MECHANICAL PROPERTIES

ITY NO.	HEAT NO.	Test Loc.	Tensile PSI	.2 % Offset Yield PSI	% Elong. 1 in.	% Red. Area	Grain Size Avg.#
03	J 6708	T1	86,200	72,600	30.0	69.1	7
		T2	88,200	70,500	29.0	73.4	

rpy V-Notch Impact Test Reports:

Loc.	Temp.	Ft.Lbs.	Lat.Exp.	D/F%
C1	40°F.	79.0	55 MILS	68%
C2	40°	62.0	51	59
C3	40°	104.0	77	100
C4	40°	62.0	47	63
C5	40°	87.0	65	88
C6	40°	100.0	71	90
C7	30°	58.0	49	61
C8	30°	58.0	46	60
C9	30°	67.0	52	65

REVIEWED
QUALITY CONTROL
AP 17 QC
STAMP

TREATMENT: 1650°F., held 5 hrs. at temp. Air Cooled.
1550°F., held 5 hrs. at temp. Water Quenched.
1280°F., held 10 hrs. at temp. Air Cooled.
1280°F., held 10 hrs. at temp. Air Cooled.

MATERIAL CODE
No. 923

I CERTIFY THESE TESTS TO BE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY.

SWORN TO BEFORE ME THIS 21st DAY OF NOV. 1977

NOTARY PUBLIC

My Commission Expires June 1, 1979

METALLURGICAL REPRESENTATIVE H.O. WRIGHT, TC

BECHTEL
194
1-25-78

BECHTEL POWER CORPORATION
PURCHASE ORDER, 10466-M-203-1, REV. 3
FLUED HEAD FITTING
PENETRATION NUMBER P-1, SERIAL NUMBER 0002
AIRITE PART NUMBER 1047011-01
AIRITE SERIAL NUMBER 0003
ITEM NUMBER 1.01
DOCUMENTATION/CERTIFICATION PACKAGE
SARGENT INDUSTRIES/AIRITE DIVISION

IRON WORKS, INC.

P. O. BOX 1212
HOUSTON, TEXAS 77001

GENT INDUSTRIES
ITE DIVISION
0 EAST GRAND AVENUE
SEGUNDO, CA 90245

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1261, EXPIRES OCT. 27, 1978.

DATE 21 Nov. 1977

ORDER NO.	C.I.W. SALES ORDER NO.	SPECIFICATION
4	F-18363-02	NI,Cr,Mo Alloy Steel in accordance with ASME B & PV Code, Sec. II, SA508, Class 2, ASME Sec. III, Div. 1, Class 2, 1974 Edition, to and including Summer 1976 Addenda, except; no Magnetic Particle nor Ultrasonic Inspection was performed @ CIW.

ION
Flved Heat Dwg.# 1047014-01
S

UMBER 60640-10

LOCATION OR SERIAL NO.	CHEMICAL ANALYSIS C	MN	P	S	SI	CR	NI	MO	V
	.19	.73	.005	.009	.21	.39	.88	.66	.01
r.# 0003	.19	.73	.007	.009	.22	.40	.89	.66	.01

HEAT NO.	Test Loc.	MECHANICAL PROPERTIES Tensile PSI	.2 % Offset Yield PSI	% Elong. 1 In.	% Red. Area	Grain Size Avg.#
J 6708	T1	86,200	72,600	30.0	69.1	7
	T2	88,200	70,500	29.0	73.4	

V-Notch Impact Test Reports:

Loc.	Temp.	Ft.Lbs.	Lat.Exp.	D/F%
C1	40°F.	79.0	55 MILS	68%
C2	40°	62.0	51	59
C3	40°	104.0	77	100
C4	40°	62.0	47	63
C5	40°	87.0	65	88
C6	40°	100.0	71	90
C7	30°	58.0	49	61
C8	30°	58.0	46	60
C9	30°	67.0	52	65

REVIEWED
QUALITY CONTROL
AP 17 QC
STAMP

ATMENT: 1650°F., held 5 hrs. at temp. Air Cooled.
1550°F., held 5 hrs. at temp. Water Quenched.
1280°F., held 10 hrs. at temp. Air Cooled.
1280°F., held 10 hrs. at temp. Air Cooled.

MATERIAL CODE
No. 923

D AND SWORN TO BEFORE ME THIS
t DAY OF Nov. 1977

NOTARY PUBLIC
My Commission Expires June 1, 1979

BECHTEL
194
R
1-25-78

I CERTIFY THESE TESTS TO BE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY.

METALLURGICAL REPRESENTATIVE H.O. WRIGHT, TCI

DATE INSTALLATION TOLLERANCES FOR THE REACTOR BLDG. PENETRATIONS. ADDITIONAL FIELD WELD LOCATIONS FOR MAKE-UP PURPOSES MUST BE COORDINATED WITH BECHTEL ENGINEERING AS REQUIRED BY 10466-M-204Q.