

Detroit
Edison

2000 Second Avenue
Detroit, Michigan 48226
(313) 237-8000



July 15, 1981

EF2-54,294

Mr. L.L. Kintner
Division of Project Management
Office of Nuclear Regulation
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Reference: Enrico Fermi Atomic Power Plant - Unit 2
NRC Docket No. 50-341

Subject: Appendix G Information Transmittal

Dear Mr. Kintner:

Please find attached (5) copies of information requested in Question 121.17. One copy has been left with F. Litton, NRC Materials Engineering Branch, (7/9/81) for preliminary review.

The information addresses the ferritic materials used in pressure retaining components of the RCPB within Detroit Edison's scope of supply. These materials have been impact tested in accordance with the requirements for Class 1 components of the ASME Code Section III 1971 Edition including Wirtler 1971 Addenda.

The Class 1 portions of the Main Steam Lines contain the only ferritic piping/valve materials not supplied by Detroit Edison. The NSSS vendor will address these materials.

The following information is provided:

- A. Identification of the ferritic materials used in pressure-retaining components of the RCPB:
 - 1. Edison Primary System Hydrostatic Test Diagram 6M721-4536, marked up to show included components.
 - 2. List of ASME Section III, Class 1 piping, greater than 2" NPS.
- B. Typical impact test data for sample material identified above:
 - 1. Edison isometric drawings of pipe lines greater than 6" NPS, one division for redundant lines.

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PDR ADDCK 05000341
A PDR

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S1/S

Encls To:
Reg File - 1
rm-4

Letter to:
Mr. L.L. Kintner

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- a. 6M721-2336-1 Feedwater
 - b. 6M721-2297-1 HPCI Steam Supply
 - c. 6M721-2298-1 RHR Return (Div. I)
 - d. 6M721-2299-1 RHR Supply
 - e. 6M721-3053-1 Core Spray (Div. II)
2. NPP-1 Data Report and Material Test Reports for the following fabricated spool pieces:
- a. 6M721-2336-2
 - 6M721-2336-19
 - b. E41-2297-1
 - E41-2297-3
 - c. E11-2298-1
 - E11-2298-3
 - d. E11-2299-4
 - E11-2299-5
 - e. E21-3053-2
 - E21-3053-4
3. NPP-1 Data Report and Material Test Reports for the process lines and flued heads of the following drywell penetration assemblies:
- a. X-9A
 - b. X-11
 - c. X-13B
 - d. X-12
 - e. X-16A
4. NPV-1 Data Report and Material Test Reports for the body, bonnet and disc of the following valves, included in the lines identified:
- a. V12-2002
 - V12-2004
 - V12-2006
 - V12-2008
 - V8-2194
 - b. V17-2020
 - V17-2021
 - c. V8-2161
 - V8-2163
 - V8-2165
 - d. V8-2090
 - V8-2091

Letter to:
Mr. L.L. Kintner

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V8-2092
V8-3047
e. V8-2021
V8-2023
V8-2025

Very truly yours,



W.F. Colbert
Technical Director
Fermi 2 Project

Written by: K.H. Hagan
/pa

Attachments

cc: W.F. Colbert
J.W. Honkala
D.F. Lehnert
A.K. Lim
A.A. Shoudy
L.E. Schuerman
Doc. Control

ATTACHMENT TO

EF2-5429A

ENRICO FERM1 UNIT 2 - RCFB MATERIALS
 LIST OF ASME SECTION III CLASS 1 FERRITIC PIPING (2" NPS &
 GREATER) WITHIN EDISON'S SCOPE OF SUPPLY

LINE DESCRIPTION	EDISON ISOMETRIC DRAWING 6M721-	PIPING SIZE SCH	MAT'L (NOTE 1)	PENETRATION ASSY		
				PROCESS LINE		NO.
				SIZE SCH	MAT'L (NOTE 1)	
FEEDWATER SUPPLY	2336-1	12" S/100 20" S/100	* *	20" S/100	**	X-9A,E
HPCI RETURN	2336-1	4" S/100	*	HPCI, RCIC, & RWCU RETURNS DO NOT PENETRATE DRYWELL		
RCIC RETURN	2336-1	6" S/100	*			
RWCU RETURN	2336-1	4" S/120	*			
HPCI STEAM SUPPLY	2297-1	10" S/120	**	10" S/120	*	X-11
RCIC STEAM SUPPLY	2192-1	6" S/120	**	4" S/120	*	X-10
RHR SUPPLY	2299-1	20" S/80	**	20" S/80	**	X-12
RHR RETURN I	2298-1	24" S/80 24" S/100	** **	24" S/80	**	X-13B
RHR RETURN II	2327-1					X-13A
RHR HEAD SPRAY	3519-1	6" S/120	**	6" S/120	*	X-17
CORE SPRAY I	3052-1	10" S/120 12" S/100	* *	12" S/100	*	X-16B
CORE SPRAY II	3053-1					X-16A
MAIN STEAM DRAINS	3526-1	3" S/160	**	3" S/160	*	X-8
RWCU SUPPLY	3096-1	2 1/2" S/160 4 & 6" S/120	** *	6" S/120	*	

NOTES

- * SA 333 GR6 (FITTINGS SA420 GRWPL OR SA 350 GR LF2
 ** SA 106 GRB (FITTINGS SA234 GRWPB)
- ALL FLANGES SA 105
 ALL BOLTS SA 193 GR B7
 ALL NUTS SA 194 GR 2H
 ALL PENETRATION FLUED HEADS SA 105 GR2

K.H.
 7/6/81

DOCUMENT/ PAGE PULLED

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OTHER _____

☐ FILMED ON APERTURE CARD NO _____ 01-06

ENRICO FERM1 UNIT 2

FEED WATER "A"

			CHARPY IMPACT TEST RESULTS (FULL SIZE- LONG.)							
DESCRIPTION		MATERIAL SPEC.	HEAT NUMBER	TEMP OF	C _v	ENERGY FT-LB		LAT	EXPANSION MILS	
<u>PC MK N21-2336-2</u>										
20"	S/100	SA 333	233342	-20°	37	46	31	← N/A →		
SMLS PIPE		GR 6		-20°	33	47	20	← N/A →		
20"	S/100	SA 420	EEDN	-20°	38	30	25	35	27	27
SR EL		GR WPL 6								
3/4x2 1/4x4 1/2		SA 516	242	-50°	39	44	44	← N/A →		
HGR LUG		GR 70								
<u>PC MK N21-2336-19</u>										
12"	S/100	SA 333	27727	-20°	47	52	68	43	47	51
SMLS PIPE		GR 6								
12"	S/100	SA 420	EEND	-20°	38	30	25	35	27	27
L.R. EL		GR WPL 6								
5/8x1 1/8x3 3/4		SA 516	348	-50°	15	15	15	28	28	28
HGR LUG		GR 70								
<u>PENETRATION ASSY X-9A</u>										
PROCESS	PIPE		W 4205	-20°	37.5	40	31.5	36	39	33
20"	S/100	SA 106								
SMLS PIPE		GR B								
<u>FLUED HEAD</u>										
40"x 11 3/4"		SA 105	212464	-20°	23	21	18	17	16	13
		GR 2								

N/A = NOT AVAILABLE

N21-2336-2

FORM NPP-1 DATA REPORT FOR FABRICATED NUCLEAR PIPING
(As Required by the Provisions of the ASME Code Rules)

30233-017

1. Fabricated by Dravo Corporation, Marietta, Ohio Order No. E-2733
(Name and Address of Fabricator)
2. Fabricated for Detroit Edison, Detroit, MI Order No. 1C-70105
(Name and Address)
3. Owner Detroit Edison Co 4. Location of Plant Fermi #2 Stony Creek
Monroe County, MI
5. Piping System Identification Feedwater - Inside DryWell (53)
(Brief description of intended use, main coolant, etc.)
(a) Drawing No. E-2733-104 Rev 1 Prepared by Detroit Edison
(b) National Board No. NA
6. Design Conditions of Piping (Pressure) NA (Temp) NA
7. The material, design, construction, and workmanship complies with ASME Code Section III, Class 1
Edition 1971, Addenda Date Summer 1971, Case No. NA
Remarks: Manufacturers' Data Records properly identified and signed by Commissioned Inspectors have been furnished for the following items of this report: NA
(Name of Part - Item number, Manufacturer's name, and identifying stamp)

COPY

8. Shop Hydrostatic Test NA psi.
9. Description of piping inspected: Piece Mark N21-2336-2 Serial 4971
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length)
20" S/100 Smls Pipe SA-333-Gr. 6
- fittings - flanges, etc. 20" S/100 90 SR Ell SA-4D-WPL6
3/4" T x 2-1/4" W x 4-1/2" L Hgr Lug SA-516-70

CERTIFICATION OF DESIGN (When Applicable)

Design information on file at: _____
Stress analysis report on file at: _____
Design specifications certified by: _____ (1) Prof. Eng. _____ State _____ Reg. No. _____
Stress analysis report certified by: _____ (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 7-19-74 Signed Dravo Corporation By L. W. Stiles
(Fabricator) L. W. Stiles, Quality Assurance Supvr
Certificate of Authorization Expires 3-6-76 Certificate of Authorization No. 595

CERTIFICATE OF SHOP INSPECTION

*Hartford Steam Boiler I & I Co
I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province of Ohio and employed by Hartford, CT
have inspected the piping described in this data report on 7-5-74 and state that to the best of my knowledge and belief, the manufacturer has constructed this piping in accordance with the applicable sections of ASME Code, Section III.

By signing this certificate, neither the Inspector nor his employer make any warranty, expressed or implied, concerning the piping 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 7-19-74 By W. P. Smith Ohio 1951 - Penna 1609
(Inspector) (National Board, State, Province and No.)

TEST CERTIFICATE

(DIN 50049 Clause 3 B)

COPY
E-5133-23

POSTANSCHRIFT

MANNESMANNROHRENWERKE AG 4 DUSSELDORF 1 POSTFACH 1104

Manufacturer: Betriebsabteilung Rath

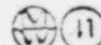
Our Order No: 833/0423

Your Order No: 8 755.101/21 Jan

10270 1-3149

Marking of the Product

Manufacturer's Brand:



Inspector's Brand:

W.S.

Ultrasonic Test:

Product: PLAIN ENDS

Grade of Steel: 5

Specification: ACRB-LA 333, ACRB III Class I and Spec. B-2753-XI-0

Item	Number	Dimensions and Quantity	Test Pressure at psi	Heat No	Sample No
1)	-5-	108'3" 20" x 1.121" wall 27355 lbs	2340	203342	590 591

Result of the Ladle Analysis in %

Heat No	C	Si	Mn	P	S	Cr	Mo	Ni			
203342	.22	.25	.73	.025	.015						

Result: Tensile Test

Result: Impact Test

Sample No	Orientation	Dimensions of Test Piece Width Ø mm thickness	Yield Stress kg/mm ² psi	Tensile Strength kg/mm ² psi	Elong. Lo. 2 %	Impact Value kgm/cm ² ft-lb	Orientation	Impact Value kgm/cm ² ft-lb
590	L	Requirements	43240	71400	35.0	L	37.37 46.29 31.35 34.00	
591	L		42670	70120	35.2	L	33.03 47.01 20.13 31.53	
							30.02 28.93 36.39 26.04	
							40.50 37.61 35.69 47.41	
							37.37 56.42 15.23 40.22	
							31.24 32.33 42.97 17.43	

Results of other Tests on Tubes

Flattening Test: OK Ring Expanding Test:

Ring Tensile Test:

Drift Expanding Test:

Flanging Test:

Visual Inspection and Control of Dimensions:

checked
HEAT TREATMENT: - 30 min. - 1652°F / air cooling

The pipes have been ultrasonically tested in accordance with ACRB III
 and have passed the above mentioned hydraulic pressure test without leakage and have a free passage. The condition of the tubes complies
 with the specification. This is to certify that the material and the tubes comply with the above specification.

Düsseldorf-Rath

3rd Jan. 1973

Phone: 6502 - 446

Beckel Corp
 5-1-73

APPROVED
 DRAVO CORPORATION
 PIPE FABRICATION DIVISION
 QUALITY ASSURANCE DEPARTMENT

MANNESMANNROHREN-WERKE
AKTIENGESELLSCHAFT

Betriebsabteilung Rath

Abnahme

CUSTOMER **Dravo Corp.****GW****Taylor Forge Division**

GULF + WESTERN INDUSTRIAL PRODUCTS COMPANY

P.O. Box 485
Chicago, Illinois 60690SPECIFICATION NO. **ASME SA 420-WPL6**HEAT TREATMENT **ASME Sect. III Cl. 1
Normalized 1650°F. -
1/2 hr per inch of
thkns - Air cooled.**CUSTOMER ORDER NO. **E-2733-7**

OUR ORDER NO.

190303

APPROVED

**(DRAVO) CORPORATION
PIPE FABRICATION DIVISION****QUALITY ASSURANCE DEPARTMENT**PACKING LIST NO. **283433-34, 283529-30***2/27/73
J. M. R. S. P. I.
Bureau*

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	MO	CR	NI		
2 - 20" 90o Sch 100 SR Low Temp Serv Seamless Weldells Heat Treat Charge #147 Item No. 1	601	EEDN	N53001	45310	75180	31.0		.23	.92	.009	.023	.23					
		"	"	Charpy	Impact Test, V-Notch,												
2 - 20" 90o Sch 100 SR Low Temp Serv Seamless Weldells Heat Treat Charge #147 Item No. 2	602	EEDN	N53001														
8 - 12" 90o Sch 100 LR Low Temp Serv Seamless Weldells Heat Treat Charge #153 Item No. 4	604	EEND	L45059	50170	72390	33.0		.20	.97	.009	.024	.21					
		"	"	Charpy	Impact Test, V-Notch,												
8 - 12" 90o Sch 100 LR Low Temp Serv Seamless Weldells Heat Treat Charge #153 Item No. 5	605	EEND	L45059														
4 - 12" 90o Sch 100 LR Low Temp Serv Seamless Weldells Heat Treat Charge #153 Item No. 6	606	EEND	L45059														

Test Data same as above

ALLS INDEXED

DTC:

V M R S P I

DSN:

E-2733-33

Test Data same as above

Test Data same as above

Parts covered by this report were manufactured from seamless tubing conforming to chemical and tensile & impact requirements of ASME SA 420-WPL6. Material is free of mercury contamination. Charpy tests from specimens as indicated. Tensile tests

Tag: Extra Material for Test Samples from Heat EEND
SUBSCRIBED AND SWORN TO BEFORE ME

from standard round .505" DIA test bars. Parts covered by this report have been magnetic particle examined per TF Spec. 41.411 Dtd 10-15-71 and were found to be satisfactory

THIS 13th DAY OF Feb. 19 73*Frank V. Scheid*
NOTARY PUBLIC

My Commission Expires Dec. 18, 1975

John Sims
QUALITY CONTROL

Corrected Copy

The Colonial Machine Company, Inc.

P. O. Box 290 — Pleasantville, Pa. 16341

Dravo Corporation
P. O. Box 581
Marietta, OH 45750

COREY

Page 1 of 2

MATERIAL

CERTIFICATIONS

E2734-820

YOUR ORDER NO.

E2734-155

OUR INVOICE NO.

DATE SHIPPED

ITEM	TYPE	MATERIAL SPEC.	SHIPPED	HEAT NUMBER
		ASPE 34716 GR. 70 NORMALIZED		
1	1/2" Thk. x 1-1/2" Wide Plate per E2734-9110		40°	645J483 (483)
2	1'-0" x 2'-0" x 1/2" Thk. Plate per E2733-FI-3 Rev. 1		1	645J483 (483)
3	1'-0" x 2'-0" x 1/2" Thk. Plate per E2733-FI-3 Rev. 1		1	645J483 (483)
4	5/8" Thk. x 1-7/8" Wide Plate per E2734-9110		40°	650J343 (343)
5	1'-0" x 2'-0" x 5/8" Thk. Plate per E2733-FI-3 Rev. 1		1	650J343 (343)
6	1'-0" x 2'-0" x 5/8" Thk. Plate per E2733-FI-3 Rev. 1		1	650J343 (343)
7	3/4" Thk. x 2-1/4" Wide Plate per E2734-9110		40°	720242 (242)
8	1'-0" x 2'-0" x 3/4" Thk. Plate per E2733-FI-3 Rev. 1		1	720242 (242)
9	1'-0" x 2'-0" x 3/4" Thk. Plate per E2733-FI-3 Rev. 1		1	720242 (242)

ITEM	C	AN	P	S	SI	CR	NI	MO	CU	CB	TI	CO	OTHER ELEMENTS
1, 2	.24	1.13	.011	.021	.21								
4, 5	.18	.96	.012	.027	.20								
7, 8	.23	1.20	.009	.021	.22								

ITEM	TENSILE	2% YIELD	% ELONG.	% R.A.	HARDNESS	HARDEN- ABILITY	REMARKS: 1. 2. 3. 4. 5. 6. ETC.
1, 2	82610	58130	17.8%				
4, 5	78560	42620	37.0				
7, 8	82720	58200	37.0				
Items 1 thru 9 - Bend Test - Satisfactory							

APPROVED
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT

5.22.74

J. Purvis

This is to certify that to the best of our knowledge and belief the above material has been manufactured in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

Bechtel Corp
6-5-74
S. Corwin

By: R. Waychoff
RECEIVED
MAY 10 1974
MATERIALS
DIVISION

The Colonial Machine Company, Inc.

P. O. Box 290 — Pleasantville, Pa. 16341



Dravo Corporation

May 10, 1974

Page 2 of 2

COPY

**MATERIAL
CERTIFICATIONS**

E2734-820

YOUR ORDER NO.

E2734-155

OUR INVOICE NO.

DATE SHIPPED

ITEM	TYPE	MATERIAL SPEC.	SHIPPED	HEAT NUMBER
1, 2 3		Long. Charpy V Notch Impacts of 20 Ft. Lbs. at -50°F.	25-27-28	Avg. 26.7
4, 5 6		Charpy Results 25-28-28 Avg. 26.8, 15 Ft. Lbs. @ -50 Deg. F.		
7, 8 9		Full Size Long. V Notch Impact Test 10 x 10 FH Made @ -50 Deg. F. 37-44-44 Ft. Lbs.		
		All above material per ASTM III Class I.		

ITEM	C	MN	P	S	SI	CR	NI	MO	CU	CS	TI	CO	OTHER ELEMENTS
1, 2 3													The above tests and plates normalized at 1625/1650 Deg. F. held one hour per inch of thickness and air cooled.
4, 5 6													The above tests and plates normalized at 1625/1650 Deg. F. held one hour per inch of thickness and air cooled.
7, 8 9													Plates normalized at 1660 Deg. F. plus or minus 25 Deg. F. Maintained 20 minutes per inch of thickness. Air Cooled.

ITEM	TENSILE	2% YIELD	% ELONG.	% R.A.	HARDNESS	HARDEN- ABILITY	REMARKS: 1. 2. 3. 4. 5. 6. ETC.
	All of the above material has been Ultrasonically Tested per AS 2570. See attached Report Nos. 74-277.						
	Shear Fracture 255 lts. 1 thru 3 -				Direct	Lateral Expansion	
					54°	.028	
					44°	.033	
	Shear Fracture 15 to 205 lts. 4 thru 6 -				54°	.026	
					48°	.024	
	Shear Fracture 8 to 105 lts. 7 thru 9 -				58°	.041	
					48°	.022	
					40°	.018	
					40°	.019	

This is to certify that to the best of our knowledge and belief the above material has been manufactured in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

Bechtel Corp

6-5-74

S. CORONA

By *Ronny R. Waycraft*

DRACO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
5-22-74
J. Burns



PRODUCTION DEPARTMENT - METALLURGICAL

United States Steel Corporation

TEST REPORT OF

PLATES

WORKS HOMESTEAD DISTRICT

U.S. ORDER NO. DA05405

LOAD TALLY OR
INVOICE NO.

16341263

CUSTOMER ORDER NO. 1401-S 2/22/72

CAR OR TRUCK NO. 9640130HIO

SHIPPER NO. & DATE 45281

5/12/72

100

MILLS ALLOY STEEL CO INC
#1 WEST INTERSTATE ST
BEDFORD OHIO 44146

SHIP TO

MILLS ALLOY STEEL CO INC
#1 WEST INTERSTATE ST
BEDFORD OHIOASTM-A-516-70-GRADE-70-PRESSURE-VESSEL-DUAL-NORMALIZED-CHARPY-V-N
CH-LONG-PR-TEST-15FT/LRS-AT-MINUS-50-DEG-F-IN-ACCORD-TO-ASTM-A-300
-88

MILL CERT 17R LADLE TEST RESULTS PER SPEC

008572

WE HEREBY CERTIFY
THAT THE CHEMICAL ANALYSIS
AND/OR TESTS SHOWN IN THIS
REPORT ARE CORRECT AS CON-
TAINED IN THE RECORDS OF
THE COMPANY.

SIGNATURE H. W. MAXSON, CH. MGT.

DATE 05/13/72

ITEM NO	HEAT NO	TEST OR PIECE IDENTITY NO	MATERIAL DESCRIPTION				0603	DATE	05/13/72		% RED OF AREA
			NO PCS	THICKNESS OR SECTION	WIDTH, DIA. OR FT. WT.	LENGTH	WEIGHT	YIELD ST. PSI	TENSILE ST. PSI	ELONGATION %	
03	720242 (242)	70073	1	3/4 ✓	96	252	5320	55800	84300	30.0	
Full Size Longitudinal V Notch Charpy Impact Test 10 X 10 MM Made at minus 50 Deg. F. 39-44-44 Ft. Lbs.											
Plates normalized at 1660 Deg. F. Plus or minus 25 Deg. F. Maintained 20 minutes per inch of thickness. Air Cooled.											
APPROVED DRAVO CORPORATION PIPE FABRICATION DIVISION QUALITY ASSURANCE DEPARTMENT DATE 7-26-78 G. GRAHAM			DRAVO CORP. ORDER E2734-155 ITS. 7 THRU 9				APPROVED KMC		T. J. McAULEY JUL 31 1978 <i>[Signature]</i>		

SPECIMEN SIZE TESTED ACCORDING TO COMPANY RECORDS CONFORMS TO THE REQUIREMENTS OF THE

SPECIMEN SIZE TESTED ACCORDING TO COMPANY RECORDS CONFORMS TO THE REQUIREMENTS OF THE SPECIFICATION LISTED ABOVE

* B OR H INDICATE COMPLIANCE OF BEND OR HOMO TESTS, RESPECTIVELY

720242																		LABL																		23																		120																		009																		022																		23																		Cu																		Ni																		Cr																		Mo																		Sn																		Al																		N																		V																		B																		Ti																		Co																		Co																		Grain Size #8																		FINE GRN																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									

QUALITY CONTROL & ASSURANCE DATA - CRITICAL SYSTEMS

Sht. 1 of 2 E-2733-104

WELDING DATA

WELD IDENT.	FIELD A DETAIL	B	C	D	E	F	G	H	J	K	L	M
WELDER IDENT.	ROOT	35	47	47	47	47	47	47	47	47	47	47
	INTER	35	47	47	47	47	47	47	47	47	47	47
	COMP.	35	47	47	47	47	47	47	47	47	47	47
WELD PROCESS	ROOT	SMW	SMW	SMW	SMW	SMW	SMW	SMW	SMW	SMW	SMW	SMW
	INTER	SMW	—	—	—	—	—	—	—	—	—	—
	COMP.	SMW	SMW	SMW	SMW	SMW	SMW	SMW	SMW	SMW	SMW	SMW
WELD PROCEDURE		A	B	B	B	B	B	B	B	B	B	B
WELD MATERIAL	ROOT	W617	W721	W721	W721	W721	W721	W721	W721	W721	W721	W721
	INTER	W721	—	—	—	—	—	—	—	—	—	—
	COMP.	W413 W547	W689	W689	W689	W689	W689	W689	W689	W689	W689	W689
REPAIR FORM NO.		8	—	—	—	—	—	—	—	—	—	—
FERRITE		—	—	—	—	—	—	—	—	—	—	—
FILM BOX NO.		15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RADIOGRAPHER		JUN	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		800	OD	OD	OD	OD	OD	OD	OD	OD	OD	OD
		37	27	27	27	27	27	27	27	27	27	27

COPY

HEAT TREAT CHART = 5716

MATERIAL DATA			
IDENTITY	HEAT NO.	SERIAL NO.	TALLY
1 20 PIPE	233342	3	1-2
2 20 11 90° EL	EEDN	9	2-8
3 CODE PLATE	MTR363		
4A HANGER LUG	242	273	2-990*
4B HANGER LUG	242	273	2-990*
4C HANGER LUG	242	278	2-990*
4D HANGER LUG	242	273	2-990*
4E HANGER LUG	242	278	2-990*
4F HANGER LUG	242	289	2-990*
4G HANGER LUG	242	287	2-990*
4H HANGER LUG	242	289	2-990*
4J HANGER LUG	242	289	2-990*
4K HANGER LUG	242	289	2-990*
4L HANGER LUG	242	290	2-990*
4M HANGER LUG	242	290	2-990*

WELD PROCEDURE CODE	
A	1-1-A3400-X
B	1-1-H0100-G
C	
D	
E	
F	

REMARKS

INSPECTION & EXAMINATION DATA SHEET REQD
 I.D. WALL THICKNESS CHECK
 OK LHL A&R ENDS

* E2724 TALLY SHEETS

FINAL APPROVAL (CUSTOMER)

DATE

SPC

2-22-74

FINAL APPROVAL (DRAVO)

DATE

O'Brien

7-19-74

N21-2336-19

30233-005

FORM NPP-1 DATA REPORT FOR FABRICATED NUCLEAR PIPING
(As Required by the Provisions of the ASME Code Rules)

1. Fabricated by Dravo Corporation, Marietta, Ohio Order No. E-2733
(Name and Address of Fabricator)

2. Fabricated for Detroit Edison, Detroit Michigan Order No. 1C-70105
(Name and Address)

3. Owner Detroit Edison Co. 4. Location of Plant Fermi #2 Stony Creek
Monroe County, Mich.

5. Piping System Identification Feedwater Inside Drywell (53)
(Brief description of intended use, main coolant, etc.)

6. Drawing No. E-2733-121 Rev. 1 Prepared by Detroit Edison Co.
(b) National Board No. NA

7. Design Conditions of Piping: (Pressure) psi (Temp.) F

8. To: Material, design, construction, and workmanship conform with ASME Code Section III, Class 1
Edition 1971 Addenda Date Summer 1971 Case No. NA

9. Remarks: Manufacturer's Data Records properly identified and signed by Commissioned Inspectors have been furnished for
the following items of this report NA
(Name of Part - Item Number, Manufacturer's name, and identifying stamps)

8. Shop Hydrostatic Test NA psi.

9. Description of piping inspected: Piece Mark NO. N21-2336-19 Serial No. 4847
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length)
12" Sch 100 Smls Pipe SA-333-Gr. 6
- fittings - flanges, etc. -
12" Sch 100 L/R 90 Ell SA-420-WPL6
5/8" T x 1 7/8" W x 3 3/4" L Hgr. Lug SA-516-Gr. 70

~~XXXXXXXXXXXXXXXXXXXX~~ (When Applicable)

~~Design information on file at _____~~
~~Stress analysis report on file at _____~~
~~Design specifications certified by _____ (1) Prof. Eng. _____ State _____ Reg. No. _____~~
~~Stress analysis report certified by _____ (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 6-28-74 Signed Dravo Corporation By [Signature]
(Fabricator) Quality Assurance Supervisor
Certificate of Authorization Expires March 6, 1976 #595

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 or Province of Ohio and employed by Hartford SBI&I of Hartford, CT have inspected the piping described in this data report on 6-14-74 and state that to the best of my knowledge and belief, the manufacturer has constructed this piping in accordance with the applicable sections of ASME Code, Section III.

By signing this certificate, neither the Inspector nor his employer make any warranty, expressed or implied, concerning the piping 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 6-28-74 19
[Signature] Commissions Ohio 1951 Penna 1609
(Inspector) (National Board, State, Province and No.)

CUSTOMER DETROIT EDISON - ENRICO FERMI UNIT 2

DWG. REF.

E-2733-121

SYSTEM FEELWATER INSIDE DRYWELL (F3)

SHOP CODE

CLASS DECO-A

AREA DW

ISO NO. 233

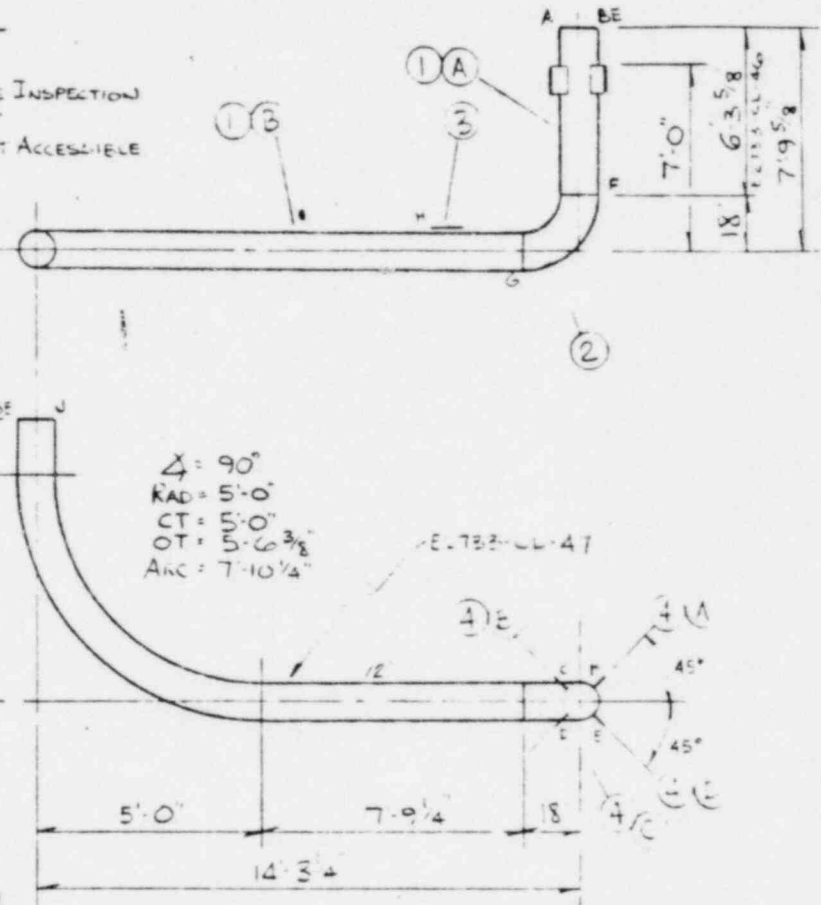
COPY

SERIAL NUMBER 4547

SHOP NOTES:

- 1) SPECIAL REQ'T. FOR INSERVICE INSPECTION PER-SP4 IS APPLICABLE.
- 2) TIG ROOT REQ'D. IF I.D. IS NOT ACCESSIBLE FOR VISUAL INSPECTION.
- 3) THIS PIECE NOT TO HAVE A STRESS RELIEVE HOLD TIME OF OVER 2 HR.
- 4) HEAT STRAIGHTENING REQUIRES FRICK ENGR. APPROVAL.
- 5) NO SHOP WELDS ALLOWED IN BEND AREA.
- 6) REPRESENTATIVE TEST MAT'L. PER E-1733-FI-4 FOR BEND SECTIONS AND/OR STRESS RELIEVED LINES. 5 REQ'D. TEST PIECE FOR BEND SECTION MUST BE SAND FILLED AND PUT IN THE BENDING FURNACE WITH AN ACTUAL BEND.

(EXCEPT ITEM 4)



WELD ROD CONTROL
IMPACT TESTED 0-20°F

COLOR CODE WHITE

ASME SECT. III CL. 1	SHOP BEVEL	PIPE SPEC
OPTIONAL INSERTS	9001	SA 333-GR 6 ONE REQ'D
RED OXIDE	9005	BW FITG SPEC MARK NO
DRUM COATING	FAB PROC NO SP1	SA 420-WF-6
SPEC'L PAINT 6162G YES	M/P TEST SP7 YES	IS FITG SPEC N21-2336-19
SPEC'L CLEAN SP5 YES	RADIOGRAPH SP7 YES	TOTAL WEIGHT
SAND BLAST O.D.	ULTRASONIC	20000 LBS
GRIT BLAST I.D. SP5 YES	STRESS RELIEVE SP3 YES	FLANGE SPEC DESIGN COND
HYDROTEST	HEAT TREAT SP1 YES	1275 PSIG 450°F
QUANTITY	DESCRIPTION	UNIT PRICE NET PRICE
22-338	12" SCH. 100 SMLS PIPE	
1	12" SCH. 100 L/R 90° ELL BBE-9001	
1	13" CODE STAMP PLATE PER-9011 C.S.	
4	14 5/8" T x 1 7/8" W x 3 3/4" L. HANGING LUG PER-9008 S416GR 70	
2	12" MET W/FLYWOOD DISC PER-SPE	
1	16 UNIT BAG SILICA GEL	
1	4 do	
TOTAL MAT'L		
TOTAL LABOR		
TOTAL SKETCH		

QUALITY CONTROL & ASSURANCE DATA - CRITICAL SYSTEMS

E-2733-121

WELDING DATA

WELD IDENT.		FIELD A BEVEL	B	C	D	E	F	G	CODE H PLATE	FIELD J BEVEL	K	L	M
WELDER IDENT	ROOT						20	71	—				
	INTER								—				
	COMP								—				
WELD PROCESS	ROOT								—				
	INTER								—				
	COMP								—				
WELD PROCEDURE													
WELD MATERIAL	ROOT								—				
	INTER								—				
	COMP								—				
REPAIR FORM NO													
FERRITE													
FILM BOX NO													
RADIOGRAPHER													
TACK WELDER													
SECOND O.D.													
OR ROOT													

COPY

HEAT TREAT CHART = 50-9

MATERIAL DATA			
IDENTITY	HEAT NO.	SERIAL NO.	TALLY
1A 12" PIPE	22722	7	1-4
1B 12" PIPE	22721	4	1-4
2 12" 90° EL	22720	4	1-4
3 CODE PLATE	22719		
4A HGR LUG	345	75	3176 *
4B	345	75	2-176 *
4C	345	76	3176 *
4D	345	76	2-176 *

WELD PROCEDURE CODE	
A	1-1-71500-PS
B	1-1-40100-3
C	1-1-41500-14
D	
E	
F	

REMARKS

INSPECTION & EXAMINATION DATA SHEET REQD

M 2 BEND * L 18" 4 DU

2D WALL THICKNESS CHECK

OK DU AS J ENDS

* TALLIES ARE IN E2724 JUE

FINAL APPROVAL (CUSTOMER)

DATE

2-1-1 7-7-74

FINAL APPROVAL (DRAVO)

DATE

12-1-74 6-29-74

WERKSABNAHMEZEUGNIS

(DIN 50049 Abschnitt 3B)

TEST CERTIFICATE

E-2733#24

ANSCHRIFT:

MANNESMANNRÖHRENWERKE AG 4 DÜSSELDORF 1 POSTFACH 1104

MANNESMANN Export AG

4 Düsseldorf

Hersteller: Betriebsabteilung Rath

Manufacturer:

Werksauftrag-Nr.: 836/0425

Our Order No:

Bestell-Nr.:

Your Order No: B 735.101/21 USA

Kennzeichnung des Erzeugnisses

Marking of the Product

Zeichen des Lieferwerks: (SY) 41

Manufacturer's Brand:

Stempel des Sachverständigen: W.S.

Inspector's stamp:

Ultraschallprüfung:

Ultrasonic Test:

Werkstoff:

Grade of Steel: 5

Erzeugnis: SEAMLESS STEEL PIPES WITH PLAIN

Product: ENDS

Lieferbedingung: ASME-III 333/ASME III CLASS I)

Specification:

Rohre 6 a

Pos. Item	Stück Number	V.A.	Abmessung und Menge Dimensions and Quantity	Prüfdruck Test Pressure GPa psi	Schmelze-Nr. Heat-No	Probe-Nr. Sample-No
2)	10		= 298.3" 12 3/4" x .738" 32111 lbs	2400	27727 27743 33467	599 600 601 602 603
HEAT TREATMENT: 30 min. at 1652°F/air cooling						
with inspection by Moody Eng. Co						

The pipes have been ultrasonically tested in accordance with ASME III NB-2552

Die Röhre haben den Wasserinnendruckversuch bestanden, sind dicht, haben freien Durchgang und befinden sich im vorgeschriebenen Lieferzustand.
The tubes have passed the above mentioned hydraulic pressure test without leakage and have a free passage. The condition of the tubes complies with the specification.

Es wird bestätigt, daß der Rohrwerkstoff und die Röhre der oben angeführten Lieferbedingung entsprechen.
This is to certify that the material and the tubes comply with the above specification.

Die gestellten Anforderungen sind lt. Anlage erfüllt.
The test results in the enclosure correspond with the requirements.

Anlagen: Ergebnisse

Enclosure: Results

Düsseldorf - Rath, 29. 2. 1973
Unser Ruf Durchwahl 6502 - 446
Phone

APPROVED
PIPE COOPERATION
QUALITY ASSURANCE DEPARTMENT
J. Burris
5-1-73

MANNESMANNRÖHREN-WERKE
AKTIENGESellschaft
Betriebsabteilung Rath

Abnahme

Wacker
5-2-73



MANNESMANNRÖHREN-WERKE

AKTIENGESELLSCHAFT

A30-06-G-900-QN-001

Mill Order: 836/0426

Customer's Order No.: B 735.101/21 USA

DRAVO No: P 9149

COPY

C E R T I F I C A T E

E-2733 #24

It is certified herewith that test-specimens used for the tensile tests and impact-tests made in respect of the above mentioned works order, item 1,2 and 3 had dimension data as follows:-

A. Tensile Tests

Specimens used : 12,7 mm ϕ , cross-section: 126,7 mm²

Item 1 : Sample No. 590 and 591 Q

" 2 : " 599, 600, 601, 602, 603 and 624 Q

" 3 : " 584, 585, 586 and 587 Q

B. Impact Tests (Charpy V-Notch -20°F)

Specimens used: 8 mm width, 10 mm height, Fo 0,8 cm²

Item 1 : Sample No. 590 and 591 L

" 2 : " 599, 600, 601, 602, 603 and 625 Q

MANNESMANNRÖHREN-WERKE AG
Betriebsabteilung Rath

19.March 1973

Lange
Der Werkssachverständige

ARMS INDEXED

DTG: VM R3PI

DSN: E-2733-24

DEFENSE COOPERATION
PIPE FABRICATING DIVISION
QUALITY ASSURANCE DEPARTMENT

Burns
5-1-73

G. Schreyer
Bechtel Corp
5-2-73

Rohre 11

30 L



Mill Order: 835/0425

COPY

Customer's Order No.: B 735.101/21 USA

DRAVO No: P 9149

5-27-73 #24

C E R T I F I C A T E - APPENDIX

It is certified herewith that the impact test are made in respect of the above mentioned order with following values for per cent Shear Fracture and Lateral Expansion:

Item.	Impact Test Number	Shear Fracture %	Lateral Expansion mm
2	599	90	1,1
		80	1,2
		60	1,3
	600	100	1,0
		90	0,8
		80	1,1
	601	80	0,9
		60	1,5
		60	1,4
	602	90	0,9
		80	1,1
		90	0,8
	603	70	1,1
		80	1,1
		70	1,4

Rohre 11

APPROVED
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT

5-1-73

J. Labady
Bechtel Corp
5-7-73

MANNESMANNROHREN-WERKE AG
Betriebsabteilung Rath

Der Werksachverständige

Seite:
Page -2-

F-2733 #24

991107 L

CUSTOMER **Dravo Corp.****COPY****GW****Taylor Forge Division**

GULF & WESTERN INDUSTRIAL PRODUCTS COMPANY

P.O. Box 485
Chicago, Illinois 60690SPECIFICATION NO. **ASME SA 420-WPL6**HEAT TREATMENT: **ASME Sect. III Cl. I
Normalized 1650oF. -
1/2 hr per inch of
thkns - Air cooled.**CUSTOMER ORDER NO. **E-2733-7**

OUR ORDER NO.

190303

**APPROVED
[DRAVO] CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT**

PACKING LIST NO.

283433-34, 283529-30**2/27/73**
[Signature]

DESCRIPTION	CHARGE NO.	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	MO	CR	NI
2 - 20" 90o Sch 100 SR Low Temp 601 Serv Seamless Weldells Heat Treat Charge #147 Item No. 1	TF Item	EEDN	N53001	45310	75180	31.0		.23	.92	.009	.023	.23			
		"	"	Charpy	Impact Test, V-Notch,										
2 - 20" 90o Sch 100 SR Low Temp 602 Serv Seamless Weldells Heat Treat Charge #147 Item No. 2		EEDN	N53001												
8 - 12" 90o Sch 100 LR Low Temp 604 Serv Seamless Weldells Heat Treat Charge #153 Item No. 4		EEND	L45059	50170	72390	33.0		.20	.97	.009	.024	.21			
		"	"	Charpy	Impact Test, V-Notch,										
8 - 12" 90o Sch 100 LR Low Temp 605 Serv Seamless Weldells Heat Treat Charge #153 Item No. 5		EEND	L45059												
4 - 12" 90o Sch 100 LR Low Temp 606 Serv Seamless Weldells Heat Treat Charge #153 Item No. 6		EEND	L45059												

Test Data same as above

ALLS INDEXED

DTC:

VMRSPI

DSN:

E-2733-33

Test Data same as above

Parts covered by this report were manufactured from seamless tubing conforming to chemical and tensile & impact requirements of ASME SA420-WPL6. Material is free of mercury contamination. Charpy tests from specimens as indicated. Tensile tests

from standard round .505" DIA test bars. Parts covered by this report have been magnetic particle examined per TF Spec. 41.411 Dtd 10-15-71 and were found to be satisfactory

Tag! Extra Material for Test Samples from Heat EEND
SUBSCRIBED AND SWORN TO BEFORE ME

THIS 13th DAY OF Feb.

19 73

[Signature]
NOTARY PUBLIC

My Commission Expires Dec. 18, 1975

[Signature]
QUALITY CONTROL

A30-06-G-900-QN-002

The Colonial Machine Company, Inc.

COPY

P. O. Box 290 — Florence, Pa. 15031

March 24, 1973

MATERIAL

CERTIFICATION

ARMS INDEXED

DTC: VMRSPI

DSN: E-2734 - 101

E-2734 #101

DATE SHIPPED

OUR ORDER NO.

ITEM	TYPE	QUANTITY	REMARKS	DATE	HEAT
12	12-12-12	1	12-12-12	12-12-12	12-12-12
13	13-13-13	1	13-13-13	13-13-13	13-13-13
14	14-14-14	1	14-14-14	14-14-14	14-14-14
15	15-15-15	1	15-15-15	15-15-15	15-15-15
16	16-16-16	1	16-16-16	16-16-16	16-16-16
17	17-17-17	1	17-17-17	17-17-17	17-17-17
18	18-18-18	1	18-18-18	18-18-18	18-18-18
19	19-19-19	1	19-19-19	19-19-19	19-19-19
20	20-20-20	1	20-20-20	20-20-20	20-20-20
21	21-21-21	1	21-21-21	21-21-21	21-21-21
22	22-22-22	1	22-22-22	22-22-22	22-22-22
23	23-23-23	1	23-23-23	23-23-23	23-23-23
24	24-24-24	1	24-24-24	24-24-24	24-24-24
25	25-25-25	1	25-25-25	25-25-25	25-25-25
26	26-26-26	1	26-26-26	26-26-26	26-26-26
27	27-27-27	1	27-27-27	27-27-27	27-27-27
28	28-28-28	1	28-28-28	28-28-28	28-28-28
29	29-29-29	1	29-29-29	29-29-29	29-29-29
30	30-30-30	1	30-30-30	30-30-30	30-30-30
31	31-31-31	1	31-31-31	31-31-31	31-31-31
32	32-32-32	1	32-32-32	32-32-32	32-32-32
33	33-33-33	1	33-33-33	33-33-33	33-33-33
34	34-34-34	1	34-34-34	34-34-34	34-34-34
35	35-35-35	1	35-35-35	35-35-35	35-35-35
36	36-36-36	1	36-36-36	36-36-36	36-36-36
37	37-37-37	1	37-37-37	37-37-37	37-37-37
38	38-38-38	1	38-38-38	38-38-38	38-38-38
39	39-39-39	1	39-39-39	39-39-39	39-39-39
40	40-40-40	1	40-40-40	40-40-40	40-40-40
41	41-41-41	1	41-41-41	41-41-41	41-41-41
42	42-42-42	1	42-42-42	42-42-42	42-42-42
43	43-43-43	1	43-43-43	43-43-43	43-43-43
44	44-44-44	1	44-44-44	44-44-44	44-44-44
45	45-45-45	1	45-45-45	45-45-45	45-45-45
46	46-46-46	1	46-46-46	46-46-46	46-46-46
47	47-47-47	1	47-47-47	47-47-47	47-47-47
48	48-48-48	1	48-48-48	48-48-48	48-48-48
49	49-49-49	1	49-49-49	49-49-49	49-49-49
50	50-50-50	1	50-50-50	50-50-50	50-50-50
51	51-51-51	1	51-51-51	51-51-51	51-51-51
52	52-52-52	1	52-52-52	52-52-52	52-52-52
53	53-53-53	1	53-53-53	53-53-53	53-53-53
54	54-54-54	1	54-54-54	54-54-54	54-54-54
55	55-55-55	1	55-55-55	55-55-55	55-55-55
56	56-56-56	1	56-56-56	56-56-56	56-56-56
57	57-57-57	1	57-57-57	57-57-57	57-57-57
58	58-58-58	1	58-58-58	58-58-58	58-58-58
59	59-59-59	1	59-59-59	59-59-59	59-59-59
60	60-60-60	1	60-60-60	60-60-60	60-60-60
61	61-61-61	1	61-61-61	61-61-61	61-61-61
62	62-62-62	1	62-62-62	62-62-62	62-62-62
63	63-63-63	1	63-63-63	63-63-63	63-63-63
64	64-64-64	1	64-64-64	64-64-64	64-64-64
65	65-65-65	1	65-65-65	65-65-65	65-65-65
66	66-66-66	1	66-66-66	66-66-66	66-66-66
67	67-67-67	1	67-67-67	67-67-67	67-67-67
68	68-68-68	1	68-68-68	68-68-68	68-68-68
69	69-69-69	1	69-69-69	69-69-69	69-69-69
70	70-70-70	1	70-70-70	70-70-70	70-70-70
71	71-71-71	1	71-71-71	71-71-71	71-71-71
72	72-72-72	1	72-72-72	72-72-72	72-72-72
73	73-73-73	1	73-73-73	73-73-73	73-73-73
74	74-74-74	1	74-74-74	74-74-74	74-74-74
75	75-75-75	1	75-75-75	75-75-75	75-75-75
76	76-76-76	1	76-76-76	76-76-76	76-76-76
77	77-77-77	1	77-77-77	77-77-77	77-77-77
78	78-78-78	1	78-78-78	78-78-78	78-78-78
79	79-79-79	1	79-79-79	79-79-79	79-79-79
80	80-80-80	1	80-80-80	80-80-80	80-80-80
81	81-81-81	1	81-81-81	81-81-81	81-81-81
82	82-82-82	1	82-82-82	82-82-82	82-82-82
83	83-83-83	1	83-83-83	83-83-83	83-83-83
84	84-84-84	1	84-84-84	84-84-84	84-84-84
85	85-85-85	1	85-85-85	85-85-85	85-85-85
86	86-86-86	1	86-86-86	86-86-86	86-86-86
87	87-87-87	1	87-87-87	87-87-87	87-87-87
88	88-88-88	1	88-88-88	88-88-88	88-88-88
89	89-89-89	1	89-89-89	89-89-89	89-89-89
90	90-90-90	1	90-90-90	90-90-90	90-90-90
91	91-91-91	1	91-91-91	91-91-91	91-91-91
92	92-92-92	1	92-92-92	92-92-92	92-92-92
93	93-93-93	1	93-93-93	93-93-93	93-93-93
94	94-94-94	1	94-94-94	94-94-94	94-94-94
95	95-95-95	1	95-95-95	95-95-95	95-95-95
96	96-96-96	1	96-96-96	96-96-96	96-96-96
97	97-97-97	1	97-97-97	97-97-97	97-97-97
98	98-98-98	1	98-98-98	98-98-98	98-98-98
99	99-99-99	1	99-99-99	99-99-99	99-99-99
100	100-100-100	1	100-100-100	100-100-100	100-100-100

APPROVED

DRAWN BY

PIPE

GUY

J. Burns

The above material has been examined and found to be in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

ITEM	TENSILE	2% YIELD	% ELONG.	% R.A.	HARDNESS	HARDEN-ADILITY	REMARKS: 1 2 3 4 5 6 ETC.
12	82610	50300	2-5				Will Source - Dethlefsen Steel
13	82610	50300	2-5				Will Source - Dethlefsen Steel
14	82610	50300	2-5				Will Source - Dethlefsen Steel
15	82610	50300	2-5				Will Source - Dethlefsen Steel
16	82610	50300	2-5				Will Source - Dethlefsen Steel
17	82610	50300	2-5				Will Source - Dethlefsen Steel
18	82610	50300	2-5				Will Source - Dethlefsen Steel
19	82610	50300	2-5				Will Source - Dethlefsen Steel
20	82610	50300	2-5				Will Source - Dethlefsen Steel

COPY

March 14, 1973 Page 3 of 3

2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073 2074 2075 2076 2077 2078 2079 2080 2081 2082 2083 2084 2085 2086 2087 2088 2089 2090 2091 2092 2093 2094 2095 2096 2097 2098 2099 2100 2101 2102 2103 2104 2105 2106 2107 2108 2109 2110 2111 2112 2113 2114 2115 2116 2117 2118 2119 2120 2121 2122 2123 2124 2125 2126 2127 2128 2129 2130 2131 2132 2133 2134 2135 2136 2137 2138 2139 2140 2141 2142 2143 2144 2145 2146 2147 2148 2149 2150 2151 2152 2153 2154 2155 2156 2157 2158 2159 2160 2161 2162 2163 2164 2165 2166 2167 2168 2169 2170 2171 2172 2173 2174 2175 2176 2177 2178 2179 2180 2181 2182 2183 2184 2185 2186 2187 2188 2189 2190 2191 2192 2193 2194 2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208 2209 2210 2211 2212 2213 2214 2215 2216 2217 2218 2219 2220 2221 2222 2223 2224 2225 2226 2227 2228 2229 2230 2231 2232 2233 2234 2235 2236 2237 2238 2239 2240 2241 2242 2243 2244 2245 2246 2247 2248 2249 2250 2251 2252 2253 2254 2255 2256 2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2269 2270 2271 2272 2273 2274 2275 2276 2277 2278 2279 2280 2281 2282 2283 2284 2285 2286 2287 2288 2289 2290 2291 2292 2293 2294 2295 2296 2297 2298 2299 2300 2301 2302 2303 2304 2305 2306 2307 2308 2309 2310 2311 2312 2313 2314 2315 2316 2317 2318 2319 2320 2321 2322 2323 2324 2325 2326 2327 2328 2329 2330 2331 2332 2333 2334 2335 2336 2337 2338 2339 2340 2341 2342 2343 2344 2345 2346 2347 2348 2349 2350 2351 2352 2353 2354 2355 2356 2357 2358 2359 2360 2361 2362 2363 2364 2365 2366 2367 2368 2369 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384 2385 2386 2387 2388 2389 2390 2391 2392 2393 2394 2395 2396 2397 2398 2399 2400 2401 2402 2403 2404 2405 2406 2407 2408 2409 2410 2411 2412 2413 2414 2415 2416 2417 2418 2419 2420 2421 2422 2423 2424 2425 2426 2427 2428 2429 2430 2431 2432 2433 2434 2435 2436 2437 2438 2439 2440 2441 2442 2443 2444 2445 2446 2447 2448 2449 2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460 2461 2462 2463 2464 2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477 2478 2479 2480 2481 2482 2483 2484 2485 2486 2487 2488 2489 2490 2491 2492 2493 2494 2495 2496 2497 2498 2499 2500 2501 2502 2503 2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515 2516 2517 2518 2519 2520 2521 2522 2523 2524 2525 2526 2527 2528 2529 2530 2531 2532 2533 2534 2535 2536 2537 2538 2539 2540 2541 2542 2543 2544 2545 2546 2547 2548 2549 2550 2551 2552 2553 2554 2555 2556 2557 2558 2559 2560 2561 2562 2563 2564 2565 2566 2567 2568 2569 2570 2571 2572 2573 2574 2575 2576 2577 2578 2579 2580 2581 2582 2583 2584 2585 2586 2587 2588 2589 2590 2591 2592 2593 2594 2595 2596 2597 2598 2599 2600 2601 2602 2603 2604 2605 2606 2607 2608 2609 2610 2611 2612 2613 2614 2615 2616 2617 2618 2619 2620 2621 2622 2623 2624 2625 2626 2627 2628 2629 2630 2631 2632 2633 2634 2635 2636 2637 2638 2639 2640 2641 2642 2643 2644 2645 2646 2647 2648 2649 2650 2651 2652 2653 2654 2655 2656 2657 2658 2659 2660 2661 2662 2663 2664 2665 2666 2667 2668 2669 2670 2671 2672 2673 2674 2675 2676 2677 2678 2679 2680 2681 2682 2683 2684 2685 2686 2687 2688 2689 2690 2691 2692 2693 2694 2695 2696 2697 2698 2699 2700 2701 2702 2703 2704 2705 2706 2707 2708 2709 2710 2711 2712 2713 2714 2715 2716 2717 2718 2719 2720 2721 2722 2723 2724 2725 2726 2727 2728 2729 2730 2731 2732 2733 2734 2735 2736 2737 2738 2739 2740 2741 2742 2743 2744 2745 2746 2747 2748 2749 2750 2751 2752 2753 2754 2755 2756 2757 2758 2759 2760 2761 2762 2763 2764 2765 2766 2767 2768 2769 2770 2771 2772 2773 2774 2775 2776 2777 2778 2779 2780 2781 2782 2783 2784 2785 2786 2787 2788 2789 2790 2791 2792 2793 2794 2795 2796 2797 2798 2799 2800 2801 2802 2803 2804 2805 2806 2807 2808 2809 2810 2811 2812 2813 2814 2815 2816 2817 2818

E-2734#101

APPROVED
DRAYO CORPORATION
FIRE FIGHTING DIVISION
QUALITY ASSURANCE DEPARTMENT
J. Burris

The above material has been taken from the original and compared by the Inspector, etc., of the Ministry of the Interior, etc., and the results of the investigation are as follows:

*Already in your
possession

This is to certify that to the best of our knowledge and belief the above material has been manufactured in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

By Rosmary A. Wayland

Joshua
Bechtel Corp

4-13-73

Belmont

to obtain the above results to be correct as contained in

TUBE TURNS
PENETRATION
ASSEMBLY

X-9A

FORM NPP-1 DATA REPORT FOR FABRICATED NUCLEAR PIPING SUBASSEMBLIES
(As Required by the Provisions of the ASME Code Rules)

1. Fabricated by Tube Turns, Louisville, KY Order No. 71143-9A
(Name and Address of Fabricator)
2. Fabricated for Detroit Edison Company Order No. IE-84458
(Name and Address)
3. Owner Enrico Fermi Atomic Power Unit, 2 Location of Plant Stoney Creek Michigan
Detroit Edison Co.
5. Piping System Identification Feed Water
(Brief description of intended use, main coolant etc.)
(a) Drawing No. 71143-D4.1 Prepared by Tube Turns
(b) National Board No. NA *Flued head & process pipe Class 1
remainder Class 2. *
6. The material, design, construction, and workmanship complies with ASME Code Section III, Class
Edition 1971, Addenda Date Winter 1971, Case No. _____
Remarks: Manufacturers' Data Reports properly identified and signed by Commissioned Inspectors have been furnished for
the following items of this report NA
(Name of Part - Item number, Manufacturer's name, and identifying stamp)

7. Shop Hydrostatic Test 2815 psi.

8. Description of piping inspected Serial No. 47419 20" x 32" x 40" Penetration Assembly
(Include - mark no. - material spec. - nom. pipe size - schedule or thickness - length

Process Pipe: SA106 Gr. B 20" x 1.281" x 14' 9-3/8" long
- fittings - flanges, etc.)

Guard Pipe: SA155 KCF70 32" x 1.0"W x 13' 9" long

Guard Pipe Butt Weld Ends: SA155 KCF70 32" x 1.0"W x 9" long

Guard Pipe Bellows: SA240 321 32" x .05"W x 3" long

Flued Head: SA105-II 40" x 11-3/4" long

Center Spool: SA516 Gr. 70 40" x .5"W x 20-1/4" long

Nozzle Nipple: SA516 Gr. 70 40" x .5"W x 3" long

Nozzle Bellows: 2 ply SA240 321 40" x .062"W x 13" long

Total length of Completed Assembly: 15' 9-1/8"

*Corrected data report, replaces data report dated May 6, 1976

We certify that the statements made in this report are correct and that the fabrication of the described piping conforms
with the requirements of SECTION III of the ASME BOILER AND PRESSURE VESSEL CODE.

Date 2-2-77 Signed Tube Turns
(Fabricator)

By [Signature]

Certificate of Authorization Expires June 16, 1978 Certificate of Authorization No. N-1111

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 or Province of Kentucky and employed by HSB I&I Co., Hartford, Conn

have inspected the piping described in this Data Report on 2-2-77, and state that to the best of my knowledge
and belief, the Manufacturer has constructed this piping in accordance with the applicable Subsections of ASME Code,
Section III.

By signing this certificate, neither the Inspector nor his employer make any warranty, expressed or implied, concern-
ing the piping 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 Feb 2, 1977

[Signature]
(Inspector)

Commissions KY593
National Board, State, Province and No.

17 Detroit Edison Company
10 6400 Dixie Highway
Stoney Creek, Monro County, Mich.
Enrico Fermi Atomic Power Plant

DETAILED ANALYSIS REPORT
DIVISION OF CHEMISTRY CORPORATION
TUBE TURNS
Page 1 of 2 pages

LOUISVILLE, KY 20 October 1976
TUBE TURNS ORDER NO 71143
CUSTOMERS' ORDER NO IE-84485

DESCRIPTION	PHYSICALS				CHEMICAL ANALYSIS							HEAT OR LOT NO.	MATERIAL OR CHEMICAL ANALYSIS TENSILE PROPERTIES OR SPECIFICATION
	YIELD STRENGTH PSI	TENSILE STRENGTH PSI	PERCENT ELONGATION IN 2 IN	PERCENT ELONGATION IN 4 IN	C	MN	P	S	SI	NI	CR	MO	CB

ANALYSIS											
MN	P	S	SI	NI	CR.	MO	CB	MEAT OR LOT NO.	MATERIAL OR CHEMICAL OR TENSILE PROPERTIES OR SPECIFICATION		
Serial number:											
Penetration assembly number:					47419						
P. I. S. number:					X-9A						
					TT-23-00-X-9A						
It is certified that this assembly was fabricated in accordance with the											
rules of ASME Section III, Articles NB 4000 and 3340(c).											
ENCLOSURES											
1. Bill of Materials											
2. Certified test reports											
3. Weld Control Records											
4. Nondestructive examination reports											
5. NPP-1 Lab Reports											
PROVIDED IN THE COMMON DOCUMENTS PACKAGE											
1. Welder operator qualifications.											
2. H. D. E. operator qualifications.											

20th DAY OF October 1976
SUBSCRIBED AND SWORN TO BEFORE ME THIS
Notary Public, State of Michigan
My Commission expires March 1, 1977
I HEREBY CERTIFY THIS REPORT TO BE TRUE AND CORRECT ACCORDING TO RECORDS IN THE POSSESSION OF THIS CORPORATION

Page 2 of 2 pages.

[illegible]

- * STANDARD ROUND TEST SPECIMEN
** 1 ANNEALED
2 NORMALIZED
3 NORMALIZED AND STRESS RELIEVED
4 STRESS RELIEVED
5 QUENCHED AND TEMPERED
6 HOT FORMED
7 HEAT TREAT PER ORDER SPECIFICATION

SUBSCRIBED AND SWORN TO BEFORE ME THIS

7 DAY OF 2 April

19 76

Notary Public State at Large, My
Commission Expires March 4, 1979

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

RECORDS IN THE POSSESSION OF THIS CORPORATION

Bill Peninger
Bill Peninger, Quality Control

CO
LO
D

S
HT
JO
P

TUBE TURNS
P. O. Box 987
Louisville, Ky.

Tube Turns
718 So. 28th St.
Louisville, Ky.

TUBE TURNS
DIVISION OF CHEMETRON CORPORATION

HOUSTON, TEXAS 4-8-74 jr

TUBE TURNS ORDER NO. HMF-4-94303

CUSTOMERS' ORDER NO. 4-94303

DESCRIPTION	PHYSICALS OF MATERIALS FROM WHICH MADE					CHEMICAL ANALYSIS								HEAT OR LOT NO.	SPECIFICA- TION OF MATERIAL FROM WHICH MADE		
	W & R HEAT TREAT- MENT	YIELD POINT PER SQUARE INCH	TENSILE STRENGTH PER SQUARE INCH	PERCENT ELONGA- TION IN 2	PERCENT REDUCT- TION IN AREA	C	MN	P	S	SI	CR	NI	MO			CB	
Item 009 2 Pieces		47,000	80,000	29.0	47.5	.30	.82	.012	.020	.23					212464	SA-105-2 ✓	
40" (.500) x 32" (1.000) x 20"			Charpy "V" Notch	-20° F.	Specimen Size	.394											
(1.281) Dwg. 72.755 D2R2			23 - 21 - 18	Ft.	Lbs.												
Mat'l. SA105 Gr. II Component			17 - 16 - 13	Mils.	Lateral Expansion												
Spec. CS-F-6B Pen. X9A, X9B			10% - 10% - 10%	Shear													
Tag: 71143 Item 9A, 9B Code J																	
Item 004 1 Piece		48,000	87,000	28.0	47.5	.30	.82	.010	.016	.22					212625	SA-105-2 ✓	
34" (.500) x 27-1/2" (.875)			Charpy "V" Notch	0° F.	Specimen Size	.394											
x 24" (1.218) Dwg. 72.755			31 - 31 - 26	Ft.	Lbs.												
D6R2 Mat'l. SA105 Gr. II			20 - 26 - 25	Mils.	Lateral Expansion												
CS-F-6A Component Spec. Pen.			20% - 10% - 10%	Shear													
X-13B Tag: 71143 Item 13B Code J.			BHN Hardness	146/179													
			1. Ultrasonic Inspection Per TT04-024 Rev. 0-satisfactory.														
			2. Magnetic Particle inspection Per TT06-002 Rev. 1-satisfactory.														

• STANDARD ROUND TEST SPECIMEN • • 1-NORMALIZED 2-ANNEALED 3-HEAT TREATED PER ORDER SPECIFICATION.
SUBSCRIBED AND SWORN TO BEFORE ME THIS 8th DAY OF April 19 74.
LAURA L. GUERRERO
Notary Public in and for Harris County, Texas
My Commission Expires June 1, 1975
I HEREBY CERTIFY THIS REPORT TO BE TRUE AND CORRECT
ACCORDING TO RECORDS IN THE POSSESSION OF THIS CORPORATION
Charles Owen, Q. C. Tech.

S
 H
 T
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 O
 P

Tube Turns
 P. O. Box 987
 Louisville, Ky.

Tube Turns
 718 So. 28th Street
 Louisville, Ky.

DETAILED ANALYSIS REPORT

TUBE TURNS
 DIVISION OF CHEMETRON CORPORATION

HOUSTON, TEXAS 6-12-74 jr

TUBE TURNS ORDER NO. HMF-4-94303

CUSTOMERS' ORDER NO. 4-94303

DESCRIPTION	PHYSICALS OF MATERIALS FROM WHICH MADE					CHEMICAL ANALYSIS								HEAT OR LOT NO.	SPECIFICA- TION OF MATERIAL FROM WHICH MADE
	% HEAT TREAT- MENT	YIELD POINT PER SQUARE INCH	TENSILE STRENGTH PER SQUARE INCH	PERCENT ELONGA- TION IN 2"	PERCENT REDUC- TION IN AREA	C	MN	P	S	SI	CR	NI	MO	CB	
All carbon steel flued head fitting forgings on order 4-94303 were heat treated as follows: Heated at 1650° F. plus or minus 25° F. held one hour per inch of thickness, quenched in water. Tempered at 1150° F. plus or minus 25° F. held one hour per inch of thickness, air cooled.															

* STANDARD ROUND TEST SPECIMEN ** 1-NORMALIZED 2-ANNEALED 3-HEAT TREATED PER ORDER SPECIFICATION.
 SUBSCRIBED AND SWORN TO BEFORE ME THIS 12th DAY OF June 19 74.

LAURA L. GUERRERO
 Notary Public in and for Harris County, Texas
 My Commission Expires June 1, 1975

Charles Owen
 Charles Owen, Q. C. Technician

Laura L. Guerrero
 NOTARY PUBLIC

ENRICO FERMI UNIT 2

HPCI STEAM

DESCRIPTION		MATERIAL SPEC.	HEAT NUMBER	CHARPY IMPACT TEST RESULTS (FULL SIZE- LONG.)						
				TEMP OF	C _V	ENERGY		LAT	EXPANSION	
						FT-LB			MILS	
<u>PC MK E41-2297-1</u>										
10" SMLS	S/120 PIPE	SA 333 GR 6	46493	-50°	165	181	114	84	89	75
10" 900#	W.N. #LG.	SA 105	213212	+10°	180	127	218	94	88	88
4" x 3/4"	HGR. LUG	SA 516 GR 70	366	-50°	15	15	15	20	19	21
3/8" x 1 1/8" x 2 1/4"	HGR. LUG	SA 516 GR 70	320	-50°	48	50	54	← N/A →		
1" PRESS. TAP		SA 105	AAF	-50°	11	11	8	← N/A →		
<u>PC MK E41-2297-3</u>										
10" SMLS	S/120 PIPE	SA 106 GR B	N51802	+10°	24	26	29	← N/A →		
10" LR.	S/120 EL.	SA 234 GR WPB	S-9826	+10°	23	25	35	21	22	29
1" WELD	6000# BOSS	SA 105	AAH	-50°	16.5	23.5	23	← N/A →		
PENETRATION ASSY X-11 PROCESS PIPE:										
10" SMLS	S/120 PIPE	SA 333 GR 6	W-1523	0°	85	118	107	69	84	79
28 x 1 1/2 x 9 3/4	FLUED HEAD	SA 105 GR 2	212728	0°	48	61	32	37	46	44

N/A = NOT AVAILABLE

E41-2297-1

FORM NPP-1 DATA REPORT FOR FABRICATED STEEL PIPING
(As Required by the Provisions of the ASME Code Rules)

1. Fabricated by Dravo Corporation, Marietta, Ohio Order No. E-2734
(Name and Address of Fabricator)
2. Fabricated for Detroit Edison, Detroit, MI Order No. 1C-70105
(Name and Address) Fermi #2 Stony Creek
3. Owner Detroit Edison Co 4. Location of Plant Monroe County, MI
5. Piping System Identification HPCI STEAM
(Brief description of intended use, main coolant, etc.)
(a) Drawing No. E-2734-425 REV 4 Prepared by Detroit Edison
(b) National Board No. NA
6. Design Conditions of Piping: NA psi NA °F
(Pressure) (Temp.)
7. The material, design, construction, and workmanship complies with ASME Code Section III, Class 1
Edition 1971 Addenda Date Summer 1971 Case No. NA
Remarks: Manufacturers' Data Records properly identified and signed by Commissioned Inspectors have been furnished for
the following items of this report: NA
(Name of Part - Item number, Manufacturer's name, and Identifying Stamp)

8. Shop Hydrostatic Test NA psi.
9. Description of piping inspected PC. MK. # E41-2297-1 SERIAL # 5048
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length)
ITEM-1 13' 7 13/16" 10" SCH. 120 SMLS PIPE SA 333 GR 6
- fittings - flanges, etc.
2 QUA 1 10" 900# R/F W/N FLG. SA 105 II
3 QUA 2 1" PRESS/CHEM TAP TYPE X-4 SA 105 II
4 QUA 4 1/4" x 3/4" x 1 1/2" HGR LUG SA 516 70
6 QUA 4 3/8" T x 1 1/8" x 2 1/4" L HGR LUG SA 516 70

CERTIFICATION OF DESIGN (When Applicable)

Design information on file at _____
Stress analysis report on file at _____
Design specifications certified by _____ (1) Prof. Eng. _____ State _____ Reg. No. _____
Stress analysis report certified by _____ (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 3-8-78 Signed Dravo Corporation by [Signature]
(Fabricator) Quality Assurance Department
Certificate of Authorization Expires 3-1-79 Certificate of Authorization No. N1320

CERTIFICATE OF SHOP INSPECTION

*Hartford Steam Boiler I & I Co

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and for
the State or Province of Ohio and employed by * of Hartford, CT
have inspected the piping described in this data report on 3-8-78, and state that to the best of my knowledge
and belief, the manufacturer has constructed this piping in accordance with the applicable sections of ASME Code, Section III.

By signing this certificate, neither the Inspector nor his employer make any warranty, expressed or implied, concerning the
piping 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 3-8-78
W. Smith (Inspector) Commissioned Ohio Comm. Exp. 1/6/79
(National Board, State, Province and No.)

DRAYO CORPORATION - PIPE FABRICATION DEPARTMENT, MARIETTA, OHIO

CUSTOMER DETROIT EDISON - ENRICO FERRARI UNIT 2

SKETCH NUMBER

E. 2734-425 4

SYSTEM HPC I STEAM (22)

DWG. REF.

CLASS DECO-A

AREA DW

SHOP CODE

ISO. NO.

2297

N
PTSERIAL
NUMBER

5048

COPY

SHOP NOTES:

- 1) SPEC'L REQ'T FOR INSERVICE INSPECTION PER SP-5 IS APPLICABLE
- 2) TIG ROOT REQ'D. IF I.D. IS NOT ACCESSIBLE FOR VISUAL INSPE.
- 3) HEAT STRAIGHTENING REQUIRES PRIOR ENGR. APPROVAL.
- 4) THIS PIECE NOT TO HAVE A STRESS RELIEVE HOLD TIME OF OVER 2 HR.
- 5) NO SHOP WELDS ALLOWED IN BEND AREA.
- 6) REPRESENTATIVE TEST MAT'L PER E2732-PI-4 FOR BEND SECTIONS AND/OR STRESS RELIEVE LINE IS REQ'D. TEST PIECE FOR BEND SECTION TO BE SAND FILLED AND PUT IN FURNACE WITH AN ACTUAL BEND. (EXCEPT ITEMS 5 & 10)

WELD ROD CONTROL
IMPACT TESTED @ +10°F

GRIND I.D. SMOOTH
NO B/R ALLOWED

BOLT NUTS TO STRADDLE &

COLOR CODE ~ WHITE

PAINT ON PIPE:
 TAG NO. FE E41-N400,
 BM C1-104E, & Flow
 ARROW

L = 45°
 RAD = 5'-0"
 CT = 2'-0 7/8"
 OT = 2'-3 1/16"
 ARC = 3'-11 1/8"
 CHORD = 3'-3 5/16"

QUAN.	DESCRIPTION	BILL	UNIT PRICE	UNIT	DISC.	NET PRICE
13-7 1/2	10" SCH. 120 SMLS PIPE	13-7 1/2				
1	10" 900° R.F. W/FLG (8-120) BEV 9101 T.F. TYPE 4 SMOOTH FIN	1				
2	1" PRESS/CHEM. TAP TYPE X-4 PER 9101	2				
4	1/8" X 3/16" X 1 1/2" (TXWRL) HGR. LUG PER 9108 (SA-SIG-70)	4				
1	5 CODE STAMP PLATE PER 9111 C.S.	1				
4	3/8" T. X 1 1/8" W. X 2 1/4" L. HGR. LUG PER 9108 (SA-SIG-70)	4				
1	10" MEPP W/PLYWOOD DISC PER SP-5	1				
1	10" FP W/PLYWOOD DISC & R. GASKET PER SP-5	1				
1	4 UNIT BAGS SILICA GEL	1				
1	2 DO	1				
REV'D MAT'L. SPEC. AS NOTED D/L JUL 9-20-77						
A REV'D BEV PER ISO 2297 REV. F 4/1 AM 6-20-74		DR SDZ	8-15-73	TOTAL MAT'L		
2 REV'D PER EFR-25, 411 4/1 AM 4-29-74		CKD JLS	5-1-74	TOTAL LABOR		
A ADDED DIM. PER EFC-20, 737 4/1 AM 10-16-73		SO LDR KLS		TOTAL SKETCH		

ASME SECT. VIII DIV. 1	OPTIONAL
RED OXIDE	NO
SPEC'L. PAINT	YES
SPEC'L. CLEAN	SP-5 YES
SAND BLAST B.D.	NO
GRIT BLAST I.D.	SP-5 YES
HYDROTEST	NO

SHOP BEVEL	9101
FIELD BEVEL	9153 B
FAB. PROC. NO.	SP-1
/M.P. TEST	SP-7 YES
RADIOGRAPH	SP-7 YES
ULTRASONIC	NO
STRESS RELIEVE	SP-3 YES
HEAT TREAT	SP-1 YES

PIPE SPEC	SA-333-86
RW FITT SPEC	
F.S. TIG SPEC	SA-105-II
FLANGE SPEC.	SA-105-II
MARK NO.	1
REQ'D	
MARK NO.	
DESIGN COND.	1250 P.S.I.G. 575
TOTAL WEIGHT	1503 LBS

E-2734.425

WELDING DATA

COPY

HEAT TREAT CHART # 7607 (12-20-77)

[illegible]

TUBE DIVISION
PHOENIXVILLE, PENNA.

CERTIFICATE OF INSPECTION AND TESTS

COPY

DATE: 6-17-77	DATE SHIPPED: 6-16-77	MILL ORDER NO. T-3238-C	SHIPPING LIST 89F
Guyon Alloys, Inc.		CUSTOMER ORDER NO. A-18592-N	
		CAR NO.	
		MATERIAL: SEAMLESS <input type="checkbox"/> PIPE <input checked="" type="checkbox"/> TUBE, HOT FINISHED	
<i>Diario</i> <i>E 2734-234 add #1</i> <i>Item #2</i>		SPECIFICATION:	
		ASTM A333-75, ASME SA-333 Gr.6 (O.H.)	

NO. PCS.	OD	WALL	LENGTH	TOTAL FT.	TOTAL WT.	HEAT NO.
	10.750"	x .844"				46493

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

Ft. Lbs.	Lateral Expansion	Percent Shear
165-181-174	.084-.089-.075	90-50-80

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

HEAT NO.	C	Mn.	P.	S.	Si.	Cu.	Ni.	CR.	Mo.
46493	.13	.96	.012	.021	.18				
46493	.13	1.08	.012	.021	.20				
46493	.13	1.08	.012	.020	.21				

Ladle Analysis
Product Analysis
Product Analysis

Q. & APPROVED
BY: *[Signature]* DATE: *[Signature]*
GUYON ALLOYS, INC.

HEAT NO.	TENSILE (KSI)	YIELD (KSI)	% ELONG. IN 2"	% RA	ROCKWELL C	HARDNESS BRINELL	GRAIN SIZE
46493	65.5	44.0	36.00				

SWORN TO AND SUBSCRIBED BEFORE ME THIS 17TH DAY OF JUNE 1977.

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

T. J. MCAULEY
APR - 5 1978

JOMINY DISTANCE - 16TH	ROCKWELL C	FLATTENING	HYDROSTATIC PSI
		OK	2800

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.

[Signature]
ENGINEER OF TESTS

69

NO-5 2/70

TUBE TURNS

DIVISION OF CHEMETRON CORPORATION

A30-06-G-400-QN-002
HOUSTON, TEXAS 11-29-74 JE

TUBE TURNS
ORDER NO. 11-4-80010

CUSTOMERS' ORDER NO. 7-2734-138

Same

Corrected Copy

2734-905

[illegible]

The Colonial Machine Company **COPY**

P. O. Box 290 — Pleasantville, Pa. 16341



July 30, 1974

Iravo Corporation
P. O. Box 581
Karietta, OH 45750

E-2734 #873

MATERIAL CERTIFICATIONS

YOUR ORDER NO.	OUR INVOICE NO.	DATE SHIPPED
2273-201		

ITEM	TYPE	MATERIAL-SPEC.	SHIPPED	HEAT NUMBER
1		1/4" Thk. x 3/4" Wide Plate per 1273-9110	17'-11"	651366 (366)

ITEM	C	MN	P	S	SI	CR	NI	MO	CU	CB	TI	CO	REMARKS
1	.25	.99	.010	.018	.21								
Charpy Results of 15 Ft. Lbs. 0 - 50 Deg. F. 20-19-21 Avg. 20.0													
The above tests and plates normalized @ 1625/1650 Deg. F. hold one hr. per inch of thickness, air cooled.													
Bend Test - Satisfactory													

Cleared by
Quality Assurance
8-6-74
C.P. Wither

ITEM	TENSILE	2% YIELD	% ELONG in 8"	% R.A.	HARDNESS	HARDEN- ABILITY	REMARKS: 1 2 3 4 5 6 ETC.
1	80220	50000	26.0				The above material has been Ultrasonically Tested as per the attached Report No. 73-15.
Shear Fracture: 60/70%							
Lateral Expansion							
20" .014							
18" .010							
17" .014							
The above results at -20 Deg. F. (1/2 size specimen used) per Para 13-235.							

This is to certify that to the best of our knowledge and belief the above material has been manufactured in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

By *Beckth*
S. Carr
8-24-74

By *Ronney R. Waycroft*

The Colonial Machine Company, Inc.

P. O. Box 290 — Pleasantville, Pa. 16341

Dravo Corporation
P. O. Box 581
Marietta, OH 45750

December 21, 1973

A30-06-6-900-QN-002

MATERIAL CERTIFICATIONS

E-2734-748

YOUR ORDER NO.

12701-103 Itc. 1 thru 14

OUR INVOICE NO.

1 thru 14

DATE SHIPPED

COPY

ITEM	TYPE	MATERIAL SPEC.	SHIPPED	HEAT NUMBER
1		3/4" 3000 S/N H/Cplc. w/450 Rev.	5	607559 (1)
2		1-5/8" U.S. Bolts per 12701-9000	5	607559 (6)
3		2" 3000 S/N H/Cplc. w/450 Rev.	1	8914 (1)
4		1" Solid P/Cplc. each with a 1/8" Dia. hole drilled 1/8" off center per 12727-9027	12	607559 (1)
5		1" Chem/Iress Tap Type 14 per 12734-9120	10	607559 (1)
6		1" Chem/Iress Tap Type 14 per 12734-9120	10	607559 (1)
7		1" Chem/Iress Tap Type 14 per 12734-9120	10	607559 (1)
8		2.250" Thermanall Welding Adapter per 12734-9114	2	607559 (1)

ITEM	C	MN	P	S	SI	CR	NI	MO	CU	CB	TI	CO	OTHER ELEMENTS
1 & 2	.165	.45	.012	.020	.02	1.18		.52					Items 6 & 7 have been Magnetic Particle Tested and approved by Quality Inspection, Inc. of Columbus, Ohio as per their attached Report No. 73-734 and meets the ASME Section III 10-245 Class I Spec.
3	.16	.67	.012	.015	.70	1.50		.63					
4	.265	.67	.006	.020	.27								
5, 6, & 7	.260	.79	.008	.021	.21								
8	.28	.74	.015	.032	.23								

ITEM	TENSILE	2% YIELD	% ELONG.	% RA	HARDNESS	HARDEN-ABILITY	REMARKS: 1. 2. 3. 4. 5. 6. ETC.
1 & 2	82500	57000	29.0	60.7	BHN 179		Mill Source - Republic Steel
3	98000	76000	24.0	52.6	BHN 197		Mill Source - U.S. Steel Corp.
4	77000	53000	30.5	59.9			Mill Source - Republic Steel
5, 6, & 7	79900	60400	28.0	60.3			Mill Source - Republic Steel
8	76000	47000	28.0	50.0			Mill Source - U.S. Steel Supply

This is to certify that to the best of our knowledge and belief the above material has been manufactured in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

APPROVED
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
1-7-74
J. Burris

By

[Signature]
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT

The Colonial Machine Company, Inc.

P. O. Box 290 — Pleasantville, Pa. 16341



Page 2 of 2

December 21, 1973

Dravo Corporation

COPY MATERIAL CERTIFICATIONS

YOUR ORDER NO. **E-2701-103** Item **1 thru 14** OUR INVOICE NO. DATE SHIPPED

ITEM	TYPE	MATERIAL-SPEC.	SHIPPED	HEAT NUMBER
9		ASME SA182 F22 NORMALIZED 2.850" Thermowell holding Adapter per S2 1273-9114	1	67011 (M)
10		ASME SA182 F22 NORMALIZED 2.250" Thermowell holding Adapter per S2 1273-9114	2	6070871 (M)
11		ASME SA182 F22 ANNEALED 2.250" Thermowell holding Adapter per S2 1273-9114	2	6-625 (M)
12		ASME SA182 F22 ANNEALED 3/4" U.S.C. Weld DOMESTIC PER S2 1273-9114	3	6075014 (M)
13		ASME SA182 F22 NORMALIZED 1" 30000 S/S H/PLG. w/45° Bev.	3	6062560 (M)
14		ASME SA182 F22 NORMALIZED 1/2" 60000 S/S H/PLG. w/45° Bev.	1	6062560 (M)

ITEM	C	MN	P	S	SI	CR	NI	MO	CU	CB	TI	CO	OTHER ELEMENTS
9	.12	.57	.008	.023	.31	2.25		.97					
10	.28	.74	.015	.032	.23								
11	.052	1.56	.023	.029	.62	18.7	0.32	.30	.23				
12	.260	.73	.008	.021	.21								
13 & 14	.165	.45	.012	.020	.62	1.18		.52					

Item 6 & 7 meet the required hardness and the material has been normalized and/or normalized and temper as required by the specification per the above.

ITEM	TENSILE	2" YIELD	% ELONG.	% RA	HARDNESS	HARDEN-ABILITY	REMARKS: 1. 2 3 4 5 6 ETC.
9	78500	64000	20.0	72.5	BHN 179		Mill Source - U.S. Steel Supply
10	76000	47000	23.0	50.0			Mill Source - U.S. Steel Supply
11	85000	34000	70.0	79.6	BHN 143/155		Mill Source - Universal Cylinders
12	84400	59900	29.0	59.1			Mill Source - Republic Steel
13 & 14	82500	57000	29.0	68.7	BHN 179		Mill Source - Republic Steel
Item 11 - Treatment - 1950° 1 Hr. Water							

This is to certify that to the best of our knowledge and belief the above material has been manufactured in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

APPROVED
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
1-7-74

By *R. R. Doyle*

J. Burris

CUSTOMER ORDER NUMBER AND DATE
CH 977 12/19/72

ALUMINUM LTR NO. 45 CTN EF

COPY INVOICE NUMBER 513-6866

DATE SHIPPED TO: 32973 VENMAN TRANS

REPUBLIC ORDER NO. 1-75701-303 COLONIAL MACH CO 152-2429
SALES PRODUCT 30-1/2-10

COLONIAL MACHINE CO
20 BOX 290
PLEASANTVILLE PA 16341 / VENMAN CO CO
THE COLONIAL MACHINE CO
140 WEST STATE STREET
PLEASANTVILLE PA 16341 / VENMAN CO CO

E2734-748

Certificate of Tests

ASTM A-105-65 GRD 2 FOR CHEMISTRY AND
MECH PROP GILY SPEC QUAL HR STEEL
BAR MECH REQ NORM MACH STR IMPACT TEST

3-11/16 RD X 13/15 FT
1 LIFT 12 PCS 5 T MX

SHIFT COVD SY INV 313-6864 TO 66 INC

APPROVED 7-26-78
DRAVO CORPORATION GRAHAM
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT

DRAVO E2701-108 ITS. 5 THRU 7

I HEREBY CERTIFY THAT THE MATERIAL LISTED HEREIN HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH THE SPECIFICATIONS AND BASED UPON THE RESULTS OF SUCH INSPECTION AND TESTING HAS BEEN

R. D. SMITH
DIV. CHIEF METALLURGIST - STEEL

BY: *J. L. Scranage*
J. L. SCRANAGE

FRT. COL 284503

ANALYSIS	HEAT NO.	C	SI	PHOS	S	CU	CO	NI	AL	OTHER
	8075014	.250	.75	.006	.021	.21				
	(AAF)									
HEAT TREATED										
	64400	79900	28.0	60.3	149					

CHARPY V-NOTCH AT MINUS 50 DEG - 11-11-8 FT. LBS.
NORMALIZING TEMP 1600 DEG 1-1/2 HRS..

The Colonial Machine Company, Inc.

P. O. Box 290 — Pleasantville, Pa. 16341

Phone (814) 589-1033

APRIL 8, 1977

DRAVO CORPORATION
P. O. BOX 581
MARIETTA, OH 45750

COPY

CERTIFIED MILL TEST REPORT

E2734-1014

ORDER NO.	E2734-233	OUR ORDER NO.	9793	DATE SHIPPED	4/8/77								
TYPE	MATERIAL SPEC.			SHIPPED	HEAT NO.								
	ASME SECTION III CLASS 1				CNC CODE								
	ASME SA516 GR. 70 NORMALIZED												
	3/8" THK. X 1-1/8" WIDE PLATE PER E2734-9110			40'	(20' 649H597 597								
	- DITTO -				(20' 94603-26 326								
	1/4" THK. X 1/2" WIDE PLATE PER E2734-9110			20'	(658E366' E66								
	ASME III, CLASS II			1	A85229 AA2								
	ASME SA105			OTHER ELEMENTS									
	2-1/2" SCH. 40 WELDING ADAPTER PER E2734-9126												
EM	C	MN	P	S	SI	CR	NI	MO	CU	CB	TI	CO	
1A	.22	1.09	.010	.023	.23	ITS. 1A, 1B & 2 - HAVE BEEN ULTRASONIC TESTED							
1B	.09	.90	.012	.016	.17	PER NB2530 AS PER THE ATTACHED							
2	.25	.99	.010	.013	.21	REPORT FROM CONAM INSPECTION,							
4	.32	.67	.015	.019	.13	NO. 73-15, AND 73-481.							
APPROVED 4-20-77													
DRAVO CORPORATION C.P.W.													
PIPE FABRICATION DIVISION													
QUALITY ASSURANCE DEPARTMENT													

ITEM	TENSILE	2% YIELD	% ELONG.	% R.A.	HARDNESS	HARDEN- ABILITY	REMARKS: 1. 2. 3. 4. 5. & ETC.
1A	73530	56090	23.5				MILL SOURCE - BETHLEHEM STEEL
1B	71600	47090	27.2				MILL SOURCE - PHOENIX STEEL
2	80220	56040	26.0				MILL SOURCE - BETHLEHEM STEEL
4	71970	44290	30.5	55.1			MILL SOURCE - U.S. STEEL
ITS. 1A & 2	TESTS AND PLATES NORMALIZED AT 1625/1650 DEG. F. FOR ONE HR. PER INCH						
ITS. 1B	TESTS AND PLATES NORMALIZED AT 1600/1650 DEG. F., FOR ONE HR. PER INCH OF						

We hereby certify that the information contained hereon has been taken from the original mill test report from the producing mill, which is now on file in our office. We also certify that the material and the items as listed above meet the specification and all requirements as covered by the specification and your purchase order.

APR - 5 1978

TWOT

By *Ramsey R. Waycho*

U.R.I

PHOENIX EEL CORPORATION
CLAYMONT, DELAWARE

4710A

E2734-1014

51

SPECIFICATION ASME SA 516 GR 70 PVQ IMPACT TESTED TO A-593 -50 W.G.A.J.

CLAYMONT, DEL. April 19, 1973

CHEMICAL AND PHYSICAL TESTS OF Silicon Quality Steel Class 4 MOD

CUSTOMER'S ORDER NO. 26-16

CHARGED TO Hills Alloy Steel Co.
111 W. Interstate Rd.

MILL ORDER NO. 26245-05

SHIPPED TO Bedford, Ohio 44146

CAR NO. TRUCK

Bend Test	Homogeneity Test
OK	

MELT No.	SLAB No.	SERIAL No.	CHEMICAL ANALYSIS								TEST PIECE		Yield Point lbs. Per Sq. In.	Tensile Strength lbs. Per Sq. In.	% Elong. In 8"	SIZE	
			Carb	Mang	Phos	Sulph	Si	Cu	Vac	Weld	Charpy	Mo.					Thickness
94603-26 (326)	1939	19390 19390	.08	.90	.012	.016	.17			Impact Tested @ -50 deg. F.		.388		48400	71400	27.2	3- 3/8"x96x252
												.400		47000	71600	27.2	3- "

APPROVED
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
DATE 7-26-78 G. GRAHAM

Colonial Machine Co.
Box 290
Pleasantville, Pa.
Verbal Order

Material and test pieces normalized at 1600-1650°F., held for 1 hour per inch of thickness and air cooled.

DRAVO CORP. ORDER E2734-238 IT.

T. J. McAULEY
JUL 31 1979

1-pc 3/8 X 12 3/8 X 96

APPROVED
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
DATE 7-26-78 G. GRAHAM

Colonial Machine Co.
By 290

Pleasantville, Pa.

Verbal Order

1-pc 3/8 X 12 3/8 X 96

APPROVED
KMC
Material and test pieces normalized at 1600-1650°F., held for 1 hour per inch of thickness and air cooled.

DRAVO CORP. ORDER E2734-238 IT.

T. J. McAULEY
JUL 31 1978

SUBSCRIBED AND SWORN TO BEFORE ME

I certify the above figures are correct as contained in the records of the Corporation.

Day of

E. Stoffman

E41-2297-3

FORM NPP-1 DATA REPORT FOR FABRICATED NUCLEAR PIPING

30485-137

(As Required by the Provisions of the ASME Code Rules)

1. Fabricated by Dravo Corporation, Marietta, Ohio Order No. E-2734
(Name and Address of Fabricator)

2. Fabricated for Detroit Edison, Detroit, MI Order No. 1C-70105
(Name and Address) **COPY**

3. Owner Detroit Edison Co 4. Location of Plant Fermi #2 Stony Creek
Monroe County, MI

5. Piping System Identification HPCI Steam (22)
(Brief description of intended use, main coolant, etc.)

(a) Drawing No. E-2734-427 Rev. 2 Prepared by Detroit Edison
 (b) National Board No. - NA

6. Design Conditions of Piping Pressure Temp.

7. The material, design, construction, and workmanship complies with ASME Code Section III, Class 1
 Edition 1971 Addenda Date Summer 1971 Case No. NA

Remarks: Manufacturers' Data Records properly identified and signed by Commissioned Inspectors have been furnished for the following items of this report NA
(Name of Part - Part number, Manufacturer's name, and identifying stamp)

8. Shop Hydrostatic Test NA psi.

9. Description of piping inspected Piece Mark No. E41-2297-3 Serial No. 5038
(include - mark no. - material spec. - num. pipe size - schedule or thickness - length
10" Sch 120 Smls Pipe SA-106-B
- fittings - flanges, etc.
10" Sch 120 L/R 90 Ell SA-234-WPB
1" - 6000# Std Weld Boss SA-105-II

CERTIFICATION OF DESIGN (When Applicable)

Design information on file at _____
 Stress analysis report on file at _____
 Design specifications certified by _____ (1) Prof. Eng. _____ State _____ Reg. No. _____
 Stress analysis report certified by _____ (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 8-16-74 Signed Dravo Corporation By L. W. Stiles
(Fabricator) L. W. Stiles, Quality Assurance Supvr
 Certificate of Authorization Expires 3-6-76 Certificate of Authorization No. 595

CERTIFICATE OF SHOP INSPECTION

*Hartford Steam Boiler I & I Co

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and for the State or Province of Ohio and employed by * of Hartford, CT
 have inspected the piping described in this data report on 8-2-74 and state that to the best of my knowledge and belief, the manufacturer has constructed this piping in accordance with the applicable sections of ASME Code, Section III.

By signing this certificate, neither the Inspector nor his employer make any warranty, expressed or implied, concerning the piping 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 8-16-74 By W R Smith
(Inspector) Commission Expires Ohio 1951 - Penna 1609
(National Board State, Province and No.)

QUALITY CONTROL & ASSURANCE DATA - CRITICAL SYSTEMS

E-2014-1

WELDING DATA

WELD IDENT.		A	B	C	D	E	F	G	H	J	K	L	M
WELDER IDENT.	ROOT		14	—	14								
	INTER		14	—	14								
	COMP.		14	12	14								
WELD PROCESS	ROOT		GTAW	—	GTAW								
	INTER		GTAW	—	—								
	COMP.		GTAW	—	—								
WELD PROCEDURE			A	B	E								
WELD MATERIAL	ROOT		W60	—	W60								
	INTER		W60	—	—								
	COMP.		W60	W60	W60								
REPAIR FORM NO			—	—	—								
FERRITE			100	100	100								
FILM BOX NO			100	100	100								
RADIOGRAPHER			TRG	TRG	TRG								
TACK WELDER IDENT.			04	12	04								
RECORD D.D. OR FOOT			1	1	1								

COPY

HEAT TREAT CHART = 5745

MATERIAL DATA				
IDENTITY	HEAT NO	SERIAL NO	TALLY	
1 10" PIPE	NS1812	10	1-20	✓
2 10" 90° EL	579200	252	2057	✓
3 1" N 8055	AAH	—	2951	✓
1 10" PIPE	NS1812	10	1-20	✓

WELD PROCEDURE CODE	
A	1-1-H1500-N
B	1-1-H1000-G
C	
D	
E	
F	

REMARKS

INSPECTION & EXAMINATION DATA SHEET REQD

1.5" WALL THICKNESS CHECK
OK LHL A/E FND

MP BEND 2.5" LHL

FINAL APPROVAL (CUSTOMER)

DATE

FINAL APPROVAL (DRAVO)

DATE

United States Steel Corporation

COPY

REPORT OF TUBULAR PRODUCTS

U.S. ORDER NO. LE07165

DATE ORDER NO. 10024-1230

SHIPPER NO. & DATE 01/21/73

E2734-38

APPROVED
 DRAVO CORPORATION
 PIPE FABRICATION DIVISION
 QUALITY ASSURANCE DEPARTMENT

2/2/73
[Signature]

DRAVO CORP
 FABRICATED PRODUCTS DIV
 PIPE FABRICATION DEPT
 PO BOX 581 AITM MR V SUTTON
 MARIETTA OHIO 45750

MAIL TO

DRAVO CORP
 FABRICATED PRODUCTS DIV
 PIPE FABRICATION DEPT
 PO BOX 581 AITM MR V SUTTON
 MARIETTA OHIO 45750

WE HEREBY CERTIFY THAT THE FIGURES SET FORTH ABOVE ARE CORRECT, AS CONTAINED IN THE RECORDS OF THE COMPANY.

ALL CERTIFIED

1 1/2 INCH GAUGE WIDTH

F = FULL SECTION GAUGE WIDTH
 3/4 INCH GAUGE WIDTH
 A = 1 INCH GAUGE WIDTH

MATERIAL
 SMLS

SIGNATURE E. L. HART, JR.
 DIV. HIGH QUALITY CONTROL
 DATE 01/27/73

ITEM NUMBER	MATERIAL DESCRIPTION				HEAT NUMBER	MIN. HYDRO TEST PRESSURE P.S.I.	YIELD STRENGTH P.S.I.	TENSILE STRENGTH P.S.I.		ELONGATION	
	U.S. SIZE INCHES	WALL THICKNESS INCHES	GRADE	SPECIFICATION				INCHES	PER CENT		
10	3/4	.044	B	ASME SA106	N33604	2000	43800	70200	2	40	1
	ALSO	.044	B	TO ASTM A106				FLATTENING	TESTS	01	
11	3/4	.044	B	ASME SA106	N51002	2800	46100	76800	2	40	1
	ALSO	.044	B	TO ASTM A106				FLATTENING	TESTS	01	
12	3/4	.031	B	ASME SA106	L41739	2710	47000	72000	2	40	1
	ALSO	.031	B	TO ASTM A106				FLATTENING	TESTS	01	
13	1 1/2	.034	B	ASME SA106	L43295	2800	36500	72000	2	40	1
	ALSO	.034	B	TO ASTM A106				FLATTENING	TESTS	01	

ITEM SIZE TESTED ACCORDING TO COMPANY RECORDS CONFORMS TO THE REQUIREMENTS OF THE SPECIFICATION LISTED ABOVE.

ITEM NO.	TYPE	HEAT NO.	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn	Al	N	V	B	Ti	Ch	Co
10	CHS	N55298	.07	.70	.006	.020	.180												
11	CHS	N33604	.04	.77	.009	.021	.170												
11	CHS	N33604	.05	.83	.010	.021	.190												
11	CHS	N51002	.05	.92	.015	.020	.160												
11	CHS	N51002	.05	.97	.014	.022	.180												
12	CHS	L41739	.03	.73	.012	.021	.150												
12	CHS	L41739	.03	.93	.013	.021	.160												
13	CHS	L43295	.04	.53	.006	.019	.160												
13	CHS	L43295	.04	.50	.002	.018	.180												

Beckley
7-1773



PITTSBURGH TESTING LABORATORY

ESTABLISHED 1901

850 POPLAR STREET, PITTSBURGH, PA. 15220

AS A MUTUAL PROTECTION TO CLIENTS, THE PUBLIC AND OURSELVES, ALL REPORTS
ARE SUBMITTED AS THE CONFIDENTIAL PROPERTY OF CLIENTS, AND AUTHORIZATION
FOR PUBLICATION OF STATEMENTS, CONCLUSIONS OR EXTRACTS FROM OR REGARDING
OUR REPORTS IS RESERVED PENDING OUR WRITTEN APPROVAL.

PLEASE REPLY TO:
P. O. BOX 1646
PITTSBURGH, PA. 152

AREA CODE 412 TELEPHONE 922-4000

CLIENT'S No.

REPORT

LABORATORY No. 736569

ORDER No. PG-9931

Date: 5-22-73

Report of : Charpy Impacts
"V" Notch, plus 10°F

C.C.

E2734-38

Report to : Dravo Corporation
1115 Gilman Avenue
Marietta, Ohio 45750

<u>Specimen Identification</u>	<u>Size of Specimen</u>	<u>Impact Foot Pounds</u>
HT #L23158 2½ SCH160 SA 106 Gr. B		
#1 "	10 MM x 7.5 MM	55
#1 "	10 MM x 7.5 MM	68
#1 "	10 MM x 7.5 MM	46
HT #41739 20" SCH 80 SA 106 Gr. B		
#2 "	10 MM x 10 MM	33
#2 "	10 MM x 10 MM	30
#2 "	10 MM x 10 MM	27
HT #L44587 6" SCH 120 SA 106 Gr. B		
#3 "	10 MM x 10 MM	26
#3 "	10 MM x 10 MM	35
#3 "	10 MM x 10 MM	27
HT #L22202 3" SCH 160 SA 106 Gr. B		
#4 "	10 MM x 10 MM	7
#4 "	10 MM x 10 MM	12
#4 "	10 MM x 10 MM	14
HT #N55258 4" SCH 120 SA 106 Gr. B		
#5 "	10 MM x 10 MM	5
#5 "	10 MM x 10 MM	5
#5 "	10 MM x 10 MM	5

APPROVED
DRAVO CORPORATION
PIPE FABRICATING DIVISION
QUALITY ASSURANCE DEPARTMENT

7-12-73



PITTSBURGH TESTING LABORATORY

ESTABLISHED 1881

850 POPLAR STREET, PITTSBURGH, PA. 15220

AS A MUTUAL PROTECTION TO CLIENTS, THE PUBLIC AND OURSELVES, ALL REPORTS ARE SUBMITTED AS THE CONFIDENTIAL PROPERTY OF CLIENTS, AND AUTHORIZATION FOR PUBLICATION OF STATEMENTS, CONCLUSIONS OR EXTRACTS FROM OR REGARDING OUR REPORTS IS RESERVED PENDING OUR WRITTEN APPROVAL.

FORM 407 REV. 1-73

PLEASE REPLY TO:
P. O. BOX 1645
PITTSBURGH, PA. 15221

CLIENT'S No.

REPORT

LABORATORY No. 736569

ORDER No. PG-9931

Date: 5-22-73

AREA CODE 412 TELEPHONE 922-4000

<u>Specimen Identification</u>	<u>Size of Specimen</u>	<u>Impact Foot Pounds</u>
--------------------------------	-------------------------	---------------------------

HT #N33604 10" SCH 120 SA 106 Gr. B		
#9 "	10 MM x 10 MM	
#9 "	10 MM x 10 MM	
#9 "	10 MM x 10 MM	

19
12
12

do not meet impact test

HT #N51802 10" SCH 120 SA 106 Gr. B		
#10 "	10 MM x 10 MM	
#10 "	10 MM x 10 MM	
#10 "	10 MM x 10 MM	

24
26
29

OK - better copy for RAC 7-27-73

Samples submitted by the client for machining and testing.

PITTSBURGH TESTING LABORATORY

Earl Gallagher, Manager
Physical Testing Department

cc: 3- Client
P.O. Box 581
Marietta, Ohio 45750
Attn: Mr. C. A. Mycoff

cms

ATTACHED
DRAWING
PIPE FABRICATION
QUALITY ASSURANCE DEPARTMENT

7-12-73

Burns

COPY

TUBE TURNS
DIVISION OF CHEMETRON CORPORATION

LOUISVILLE, KY. 10/12/73

TUBE TURNS
ORDER NO. 87904 L-6

CUSTOMERS' ORDER NO. E2734-36

Mark: B2734-36

E-2734*602

DESCRIPTION	PHYSICALS OF MATERIALS FROM WHICH MADE					CHEMICAL ANALYSIS										HEAT OR LOT NO.	MADE FROM MATERIAL OF CHEMISTRY AND TENSILE PROPERTIES OF SPECIFICATION
	** HEAT TREAT- MENT	YIELD STRENGTH PSI	TENSILE STRENGTH PSI	PERCENT ELONGA- TION IN 2"	PERCENT REDUC- TION IN AREA	C	MN	P	S	SI	NI	CR	MO	CB			
Item 19 Only 10 3/120 LR90° W/Ella SA234 WPB per 32734 P1M 142 106-72	6	144,840	73,360	30.0	*	.24	.70	.008	.017	.21					S-9826	SA106 Gr. B	
	Charpy V-Notch @ +10 (.394) 23-25-35 (For Items 18 and 19 Only.)																
	Lateral Expansion in Mils. 21-23-29																
	Shear 30-30-35																
	Magnetic Particle inspection satisfactorily performed per TP-06-002 Rev. 2 in accordance with ASME Section III and found acceptable.																
	It is hereby certified that the above fittings have a maximum hardness of HB 197.																
Bechtel Corp 5-15-74 S. Corcoran	The specific marking that will identify the material to this certification is the Tube Turns, symbol, size, specification, grade and heat or lot number.																
	It is hereby certified that the above material conforms to all requirements of ASME SA234 and to all applicable special requirements of Article III of Section III of the ASME Boiler and Pressure Vessel Code, 1971 edition and addendums through Summer 1971.																
	APPROVED DRAVO CORPORATION PIPE FABRICATION DIVISION QUALITY ASSURANCE DEPARTMENT 10-23-73 J. Burris																

APPROVED
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
10-23-73
A. Burris

- * STANDARD ROUND TEST SPECIMEN
** 1 ANNEALED
2 NORMALIZED
3 NORMALIZED AND STRESS RELIEVED
4 STRESS RELIEVED
5 QUENCHED AND TEMPERED
6 HOT FORMED
7 HEAT TREAT PER ORDER SPECIFICATION

SUBSCRIBED AND SWORN TO BEFORE ME THIS

19 DAY OF October

197

NOTARY PUBLIC

Notary Public, Jefferson County, Ky.
My commission expires Feb. 10, 1974

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

~~L. L. Moore, Product Control Coordinator~~

The Colonial Machine Company, Inc.

O. Box 290 — Pleasantville, Pa. 16341



April 5, 1974

Page 2

Inavo Corporation

MATERIAL CERTIFICATIONS

YOUR ORDER NO.

E274-191

OUR INVOICE NO.

DATE SHIPPED

ITEM	TYPE	MATERIAL SPEC.	SHIPPED	HEAT NUMBER
6	3/4" XKS Sals. Pipe Nipples 6" lg. per	ASME SA350 117 & 112 NORMALIZED	8	607014 (14A)
7	3/4" 6000# Weld Bosses per	ASME SA350 117 & 112 NORMALIZED	16	52193 (C7C)
8	1" 6000# Weld Bosses per	ASME SA350 117 & 112 NORMALIZED	10	6067241 (A4H)
9	3/4" 6000# Weld Bosses per	ASME SA350 117 & 112 NORMALIZED	18	6069039 (A4H)
10	3/4" Chemical/Pressure Tap Type Y3 per	ASME SA350 117 & 112 NORMALIZED	2	60154 (CCT)
11	2.250" Thersowell Welding Adapters per	ASME SA350 117 & 112 NORMALIZED	7	6075571 (A4H)

ITEM	C	MN	P	S	SI	CR	NI	MO	CU	CB	TI	CO	OTHER ELEMENTS
6	.260	.78	.009	.021	.21								It. 6 - Charpy V-notched 5-50° 30, 34, 32 Ft. Normalizing Temp. 1650
7	.23	1.04	.007	.015	.20								Log. It. 6 has been Magnetic Particle Tested as per their attached Report 74-191 and meets ASME Section III Class I.
8	.263	.67	.006	.020	.27								
9	.29	.76	.015	.027	.22								
10	.065	1.94	.024	.024	.63	13.46	8.22	.26	.16			.16	
11	.28	.74	.015	.032	.23								

ITEM	TENSILE	% YIELD	% ELONG.	% RA	HARDNESS	HARDEN-ABILITY	REMARKS: 1 2 3 4 5 & ETC.
6	73900	53900	31.0	66.1			It. 6 - Charpy V-notched Tested 5-50° F. 172, 102, 165 Ft. lbs. It. 7 has been Magnetic Particle Tested as per attached Report No. 7-191 and meets the ASME Sect. III Class I Spec.
7	77000	53250	33.0	74.5			It. 8, 9 & 11 - Meet ASME Sect. III Class I. It. 8, 9 & 11 have been Magnetic Particle Tested as per attached Report No. 74-191. It. 8 Charpy V-notched 5-50° 16.5, 21.5, 21.0 Ft. lbs.
8	77000	51000	30.5	59.9			
9	80000	52000	30.0	55.7			
10	85000	33000	64.4	77.3	MIN 153/1.5		
11	76000	47000	23.0	50.0			

This is to certify that to the best of our knowledge and belief the above material has been manufactured in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

By

Primary
CORROSION
DR. J. E. GARDNER
V. J. GARDNER
J. E. GARDNER

The Colonial Machine Company, Inc.

P. O. Box 290 — Pleasantville, Pa. 16311

April 5, 1974

Fig. 3

Dravo Corporation

MATERIAL CERTIFICATIONS

YOUR ORDER NO.

E273-191

OUR INVOICE NO.

DATE SHIPPED

ITEM	TYPE	MATERIAL-SPEC	SHIPPED	HEAT NUMBER
		It. 9 - Charpy V-Notch Impacts 15 ft./lbs. at min. 50 deg. F; 24, 24, 23		
		It. 11 - Charpy V-Notch Impacts 15 ft./lbs. at min. 50 deg. F; 16, 15, 16		
		It. 10 - Has been Liquid Penetrant Tested per attached Report No. 74-191 and meets the ASTM Section III Class I Spec.		
		It. 10 Treatment - Solution Treated @ 1950° 1 Hr.		
12		5-1/4" O.D. BOLLARD <u>ASTM A 272 NORMALIZED</u>	1	69158 (FLP)

ITEM	C	MN	P	S	SI	CR	NI	MO	CU	CB	TI	CO	OTHER ELEMENTS
12	.10	.48	.010	.016	.39	2.30		1.00					

ITEM	TENSILE	2% YIELD	% ELONG.	% RA	HARDNESS	HARDEN- ABILITY	REMARKS: 1. 2. 3. 4. 5. & ETC.
12	77500	57500	33.0	73.5	BHN 159		

This is to certify that to the best of our knowledge and belief the above material has been manufactured in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

By

Dravo Corporation
DRAVO CORPORATION
PIPE FABRICATING
PURCHASING

RECEIVED

McINNES STEEL CO.

441 EAST MAIN STREET
TORY, PENNSYLVANIA - 16407

MATERIAL CERTIFICATION
SPECIALIZING IN STAINLESS & HIGH TEMPERATURE ALLOY
NUCLEAR - AIRCRAFT - ALLOY - CARBON - FORGINGS

COMPLETE HEAT TREATING, LABORATORY & TESTING FACILITIES
ULTRA SONIC INSPECTION

CUSTOMER'S ORDER NO.	DATE 8-24-72	PRO. NO.
----------------------	-----------------	----------

SOLD TO COLONIAL MACHINE COMPANY PLEASANTVILLE, PENNA.	SHIP TO SAME
--	-----------------

SHIP VIA

CUSTOMER SPECIFICATION A-105, GR. 2	TYPE	NUMBER OF PIECES	WEIGHT
--	------	------------------	--------

SIZE 2-1/4" ROUND	SERIAL NO.
----------------------	------------

CONDITION:

ITEM NO.	HEAT NO. 8067241 (AAH)	CHEMICAL ANALYSIS									
		C	MN	P	S	SI	CR	N	MO	V	AL
		TI	CS	CO	FA	CU	SN				

MECHANICAL PROPERTIES											
ITEM NO.	SERIAL NO.	DIA.	YIELD P.S.I. % OFF SET	ULTIMATE TENSILE P.S.I.	ELONG. %	RED. AREA %	HARDNESS		JOINT HARDEN- ABILITY	GRAIN SIZE	IMPACT FT. LBS.
							BHN	ROCK C			
	CHARTY V NOTCH IMPACTS CONFORMING TO ASTM-A-350, GR. LF01 -50°F										
#1		16.5 FT. LBS.									
#2		23.5 FT. LBS.									
#3		23.0 FT. LBS.									

DRAVO ORDER E2734-151 IT. 8

MELT SOURCE	
ULTRA SONIC INSPECTION	MAGNETIC PARTICLE INSPECTION
MACROETCH	BEND TEST
CLASSIFICATION	RESULT
INTERGRANULAR	LIQUID PENETRANT
CORROSION RESULT	INSPECTION RESULT

TO CERTIFY THAT, TO THE BEST OF OUR KNOWLEDGE AND BELIEF, THE ABOVE MATERIAL HAS BEEN MANUFACTURED IN ACCORDANCE WITH THE DRAWINGS, PURCHASE ORDERS AND SPECIFICATIONS, AND COMPLIES WITH DIMENSIONAL REQUIREMENTS AND WORKMANSHIP.

SWORN AND SUBSCRIBED BEFORE ME THIS 24TH

DAY OF AUGUST 1972

NOTARY PUBLIC

EXPIRES DECEMBER 9, 1974

MCINNES STEEL COMPANY

Mr. W. D. Duple
CHIEF METALLURGIST

(FOR)

TUBE TURNS

PENETRATION

X 11

COPY

FORM NPP-1 DATA REPORT FOR FABRICATED NUCLEAR PIPING SUBASSEMBLIES*

(As Required by the Provisions of the ASME Code Rules)

1. Fabricated by Tube Turns, Louisville, KY Order No. 71143-X11
(Name and Address of Fabricator)

2. Fabricated for Detroit Edison Company Order No. IE 84485
Enrico Fermi Atomic Power Unit No. 2

3. Owner Detroit Edison Co. 4. Location of Plant Stoney Creek, Mich.

5. Piping System Identification STEAM TWO H. P. C. I. TURBINE
(Brief description of intended use, main coolant etc.)

(a) Drawing No. 71143-D3.1 Prepared by Tube Turns
(b) National Board No. N/A

6. The material, design, construction, and workmanship complies with ASME Code Section III, Class 1
Edition 1971, Addenda Date Winter 1971, Case No. N/A
Flued head & process pipe Class 1
remainder Class 2.

Remarks: Manufacturers' Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of this report N/A
(Name of Part - Item number, Manufacturer's name, and identifying stamp)

COPY

7. Shop Hydrostatic Test 1825 psi.

8. Description of piping inspected Serial #47407 10"X22"X28" Penetration Assy.
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length)

Process Pipe: SA333Gr6 10"X.843"WX16' 6" Long
- fittings - flanges, etc.)

Guard Pipe: SA106GrB 22"X.875"WX15' 3 1/8" Long

Guard Pipe Butt Weld Ends: SA106GrB 22"X.875"WX9" Long

Guard Pipe Bellows: SA240 321 22"X.05"WX3" Long

Flued Head: SA105Gr2 28"X.5"WX9-3/4" Long

Center Spool: SA106GrB 28"X.5"WX28-1/4" Long

Nozzle Nipple: SA106GrB 28"X.5"WX3" Long

Nozzle Bellows: 2 Ply SA240 321 28"X.05"WX10" Long

Total Length of Completed Assembly: 17' 3-3/4"

We certify that the statements made in this report are correct and that the fabrication of the described piping conforms with the requirements of SECTION III of the ASME BOILER AND PRESSURE VESSEL CODE.

Date 31 March 75 Signed Tube Turns By Ed G. Lickteig
(Fabricator)

Certificate of Authorization Expires June 20, 1975 Certificate of Authorization No. N473

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 or Province of Kentucky and employed by Hartford Steam Boiler Inspection & Insurance Co., of Hartford, Connecticut have inspected the piping described in this Data Report on 3-31-75 and state that to the best of my knowledge and belief, the Manufacturer has constructed this piping in accordance with the applicable Subsections of ASME Code, Section III, except that the inspection of bellows element covers the material and workmanship only.

By signing this certificate, neither the Inspector nor his employer make any warranty, expressed or implied, concerning the piping 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 31 March 75
John D. Sample
(Inspector)

Commissions KY 491
National Board, State, Province and No.

S
O
T
L
O
D
The Detroit Edison Company
2000 Second Avenue
Detroit, Michigan 48226

S
H
T
I
O
P
The Detroit Edison Company
6400 Dixie Highway
Stoney Creek, Monroe County, Michigan
Enrico Fermi Atomic Power Plant

DETAILED ANALYSIS REPORT

TUBE TURNS

DIVISION OF CHEMETRON CORPORATION

Page 1 of 2 pages

X-11

18 March 1975

LOUISVILLE, KY.

TUBE TURNS
ORDER NO.

71143

CUSTOMERS'
ORDER NO.

IE-84485

DESCRIPTION	PHYSICALS OF MATERIALS FROM WHICH MADE					CHEMICAL ANALYSIS									HEAT OR LOT NO.	MADE FROM MATERIAL OF CHEMISTRY AND T. VSILE PROPERTIES OF SPECIFICATION
	** HEAT TREAT- MENT	YIELD STRENGTH PSI	TENSILE STRENGTH PSI	PERCENT ELONGA- TION IN 2"	PERCENT REDUCT- TION IN AREA	C	MN	P	S	SI	NI	CR.	MO	CB		
						Serial number:						47407				
						Penetration assembly number:			X-11							
						P. I. S. number:						TT-23-00-X11				
						It is certified that this assembly wa									fabricated in accordance with the	
						rules of ASME Section III, Articles NB 4000 and NA 3340(d).										
						<u>ENCLOSURES</u>					<u>PROVIDED IN THE COMMON DOCUMENTS PACKAGE</u>					
						1. Bill of materials					1. Welder operator qualifications					
						2. Certified test reports					2. N. D. E. operator qualifications.					
						3. Weld control records										
						4. Nondestructive examination reports										
						5. NPP-1 Data Reports										

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DETAILED ANALYSIS REPORT

TUBE TURNS

DIVISION OF CHEMETRON CORPORATION

LOUISVILLE, KY. 3/19/75

TUBE TURNS ORDER NO. 71143

X-11

CUSTOMERS' ORDER NO. IE 84485

Page 2 of 2 pages

DESCRIPTION	PHYSICALS OF MATERIALS FROM WHICH MADE					CHEMICAL ANALYSIS									HEAT OR LOT NO.	MADE FROM MATERIAL OF CHEM. STRY AND TENSILE PROPERTIES OF SPECIFICATION
	* HEAT TREAT- MENT	YIELD STRENGTH PSI	TENSILE STRENGTH PSI	PERCENT ELONGA- TION IN 2"	PERCENT REDUC- TION IN AREA	C	MN	P	S	SI	NI	CR.	MO	CB		
						Serial No: 47407										ASTM
						Penetration No: X-11										
						P. I. S. No: TT-25-00-X11										
C - Process Pipe		50,200	68,600	36.0	75.0	.17	.74	.016	.022	.28					W-1523 (258717)	A333-6
						Check Analysis										
						Charpy V-Notch 0°F: 85 - 118 - 107 FT. LBS.										
						Lat. Exp.: 69 - 84 - 79 Mils										
						Per Cent Shear: 80 - 100 - 90										
F - Flued Head Nipple																
G - Center Spool		57,400	82,600	24.0	49.0	.26	.71	.011	.017	.28					W-1527 (730222)	A106/B
H - Nozzle Nipple																

- * STANDARD ROUND TEST SPECIMEN
- ** 1 ANNEALED
- 2 NORMALIZED
- 3 NORMALIZED AND STRESS RELIEVED
- 4 STRESS RELIEVED
- 5 QUENCHED AND TEMPERED
- 6 HOT FORMED
- 7 HEAT TREAT PER ORDER SPECIFICATION

SUBSCRIBED AND SWORN TO BEFORE ME THIS

19th DAY OF March 1975

man J. Jones
NOTARY PUBLIC

Notary Public, State of Large, Ky.
My Comm. Expires Feb. 15, 1977

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

Bill Peninger
Bill Peninger, Quality Control

S
O
L
OTube Turns
P. O. Box 987
Louisville, Ky.S
H
T
I
O
PTube Turns
.718 So. 28th St.
Louisville, Ky.

DETAILED ANALYSIS REPORT

TUBE TURNS

DIVISION OF CHEMETRON CORPORATION

HOUSTON, TEXAS 4-19-74 jr

TUBE TURNS
ORDER NO. HMF-4-94303CUSTOMERS
ORDER NO. 4-94303

DESCRIPTION	PHYSICALS OF MATERIALS FROM WHICH MADE					CHEMICAL ANALYSIS									HEAT OR LOT NO.	SPEC- TIG MAT. FROM MA	
	** HEAT TREAT- MENT	YIELD POINT PER SQUARE INCH	TENSILE STRENGTH PER SQUARE INCH	PERCENT ELONGA- TION IN 2"	PERCENT REDUC- TION IN AREA	C	MN	P	S	SI	CR	NI	MO	CB			
Item 002 1 Piece		45,000	71,000	35%	63.8	.26	.78	.013	.018	.22					212728	SA-105-	
3" (.500) x 22" (.875) x 10"		Charpy "V" Notch at 0° F.					Specimen Size .394										
.843) Dwg. 72.755 D4R2		48 - 61 - 32 Ft. Lbs.															
at1. SA105-2 Component Spec.		37 - 46 - 44 Mils. Lateral Expansion															
S-F-6A Pen. X-11 Tag: 71143 Item		10% - 20% - 10% Shear															
1 Code J.																	
Item 003 1 Piece		50,000	75,000	35%	64.8	.30	.82	.010	.016	.22					212625	SA-105-2	
6" (.500) x 28" (1.000) x 20"		Charpy "V" Notch at 0° F.					Specimen Size .394										
1.031) Dwg. 72.755 D5R2		31 - 28 - 22 Ft. Lbs.															
at1. SA105-2 Component Spec.		26 - 24 - 16 Mils Lateral Expansion															
S-F-6A Pen. X-12 Tag: 71143		10% - 10% - 10% Shear															
Item 12 Code J.																	

* STANDARD ROUND TEST SPECIMEN ** 1-NORMALIZED 2-ANNEALED 3-HEAT TREATED PER ORDER SPECIFICATION
SUBSCRIBED AND SWORN TO BEFORE ME THIS

19th DAY OF April 19 74

Laura L. Guerrero
NOTARY PUBLIC

LAURA L. GUERRERO
Notary Public and Sec. Harris County, Texas
My Comm. Expires 12-31-75

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

Charles Owen, Q. C. Technician

OLD

Tube Turns
P. O. Box 987
Louisville, Ky.

DETAILED ANALYSIS REPORT

TUBE TURNS

DIVISION OF CHEMETRON CORPORATION

HOUSTON, TEXAS 6-12-74 jr

SHIP STOP

Tube Turns
718 So. 28th Street
Louisville, Ky.

TUBE TURNS ORDER NO. HMF-4-94303

CUSTOMERS' ORDER NO. 4-94303

[illegible]

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

SUBSCRIBED AND SWORN TO BEFORE ME THIS

12th DAY OF June 19 74.

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

LAURA L. GUERRERO
Notary Public in and for Harris County, Texas
My Commission Expires June 1, 1975

Charles Owen, Q. C. Technician

FILED IN 90

ENRICO FERMI UNIT 2

RHR RETURN DIV I

DESCRIPTION		MATERIAL SPEC.	HEAT NUMBER	CHARPY IMPACT TEST RESULTS (FULL SIZE- LONG.)							
				TEMP OF	C _V	ENERGY FT-LB	LAT	EXPANSION MILS			
<u>PC MK E11-2298-1</u>											
24" SMLS	S/80 PIPE	SA 106 GR B	N53101	+10°	20.5	26	21.5	19	23	20	
3/4" WELD	6000# BOSS	SA 105 NORMALIZED	HAT-3	← N/A → (S _{YIELD} = 59900 PSI)							
<u>PC MK E11-2298-3</u>											
24" SMLS	S/80 PIPE	SA 106 GR B	N53101	+10°	20.5	26	21.5	19	23	20	
24" L.R.	S/80 EL.	SA 234 GR WPB	W092	+10°	25	22	25	17	19	26	
1/2" x 1/8" x 3" HGR.	LUG	SA 516 GR 70	483	-50°	20	20	20	25	27	28	
3/4" WELD	6000# BOSS	SA 105 NORMALIZED	HAT-3	← N/A →							
<u>PENETRATION ASSY X-13B</u>											
PROCESS	PIPE		N51151	-20°	43	45	30	← N/A →			
24" SMLS	S/80	SA 106 GR B									
FLUVED HEAD		SA 105 GR 2	21265	0°	31	31	26	20	26	25	
34 x 1/2 x 12"											

N/A = NOT AVAILABLE

E11-229 8-1

FORM NPP-1 DATA REPORT FOR FABRICATED NUCLEAR PIPING
(As Required by the Provisions of the ASME Code Rules)

1. Fabricated by Dravo Corporation, Marietta, Ohio Order No. E-2734
(Name and Address of Fabricator)
2. Fabricated for Detroit Edison, Detroit Michigan Order No. 1C-70105
(Name and Address) Fermi #2 Stony Creek
3. Owner Detroit Edison Co. 4. Location of Plant Monroe County, Mich.
5. Piping System Identification RHR Ret. Div. I (20)
(Brief description of intended use, main coolant, etc.)
(a) Drawing No. E-2734-429 Rev. 4 Prepared by Detroit Edison
(b) National Board No. NA
6. Design Conditions of Piping (Pressure) psi (Temp) F
7. The material, design, construction, and workmanship complies with ASME Code Section III, Class 1
Edition 1971 Addenda Date Summer 1971 Case No. NA
Remarks: Manufacturers' Data Records properly identified and signed by Commissioned Inspectors have been furnished for
the following items of this report NA
(Name of Part - Item number, Manufacturer's name, and identifying stamp)

COPY

8. Shop Hydrostatic Test NA psi.
9. Description of piping inspected Piece Mark No. E11-2298-1 Serial No. 4817
(include - mark no. - material spec - nom. pipe size - schedule or thickness - length
24" Sch 80 Smls Pipe SA-1066B
- fittings - flanges, etc.
3/4" - 6000# Std. Weld Boss SA-105-II

XXXXXXXXXXXXXXXXXXXX (When Applicable)

Design information on file at _____
Stress analysis report on file at _____
Design specifications certified by _____ (1) Prof. Eng. _____ State _____ Reg. No. _____
Stress analysis report certified by _____ (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 6-7-74 Signed Dravo Corporation By [Signature]
(Fabricator) Quality Assurance Supervisor
Certificate of Authorization Expires March 6, 1976 #595

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 or Province of Ohio and employed by Hartford SBI&I of Hartford, CT
have inspected the piping described in this data report on 5-24-74 and state that to the best of my knowledge
and belief, the manufacturer has constructed this piping in accordance with the applicable sections of ASME Code, Section III.

By signing this certificate, neither the Inspector nor his employer make any warranty, expressed or implied, concerning the
piping 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 6-7-74 19_____
WPS Smith Commissions Ohio 1951 Penna 1609
(Inspector) (National Board, State, Province and No.)

ATNO NOT FOR RELEASE
INFORMATION ONLY

W-100

DRACO CORPORATION - PIPE FABRICATION DEPARTMENT, MARIETTA, OHIO

CUSTOMER DETROIT EDISON - ENRICO FERMJ UNIT 2

DWG. REF.

SKETCH NUMBER

E-2734-429.4

SYSTEM RWH-2 COT DIV I (20)

SHOP CODE

SS

CLASS DCLD A

AREA

ISO NO

2298



SERIAL NUMBER 4517

COPY

SHOP NOTES

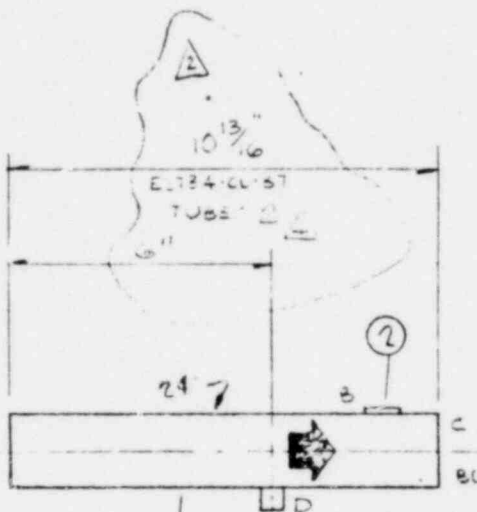
1) SPEC'L REQ'T FOR IN-SERVICE INSPECTION PER SP-5 IS APPLICABLE

2) TIG ROOT IS REQ'D IF I.D. IS NOT ACCESSIBLE FOR VISUAL INSPECTION

3) HEAT STRAIGHTENING REQUIRES PRIOR ENGR APPROVAL

4) THIS PIECE NOT TO HAVE A STRESS RELIEVE HOLD TIME OF OVER 2 HRS.

5) REPRESENTATIVE TEST MAT. FOR 2298-F2-A FOR STRESS RELIEVED LINES IS REQ'D EXCEPT ITEM 3.



SHOP NOTE

CHARGE ALL LABOR & MAT'L FOR REV 2 TO CWO # 7035. SCRAP 10 1/2" LENGTH FROM TUBE #3 ON CL-37 & USE 10 13/16" FROM TUBE #2 ON CL-27.

DRILL THRU ITEM 3 TO MATCH SCH 100 AFTER WELDING.

WELD ROD CONTROL
IMPACT TESTED @ +10°F

WELD ROD CONTROL
ACTUAL ANALYSIS

COLOR CODE WHITE

ASME SECT. III CL. 1		SHOP BEVEL	PIPE SPEC		
OPTIONAL		FIELD BEVEL	SA-202-2	1	REQ'D
BACKING RINGS/INSERTS	YES NO	F.B. PROC. NO.	BW FITG SPEC	MARK NO	
RED OXIDE	YES NO	M.P. TEST	YES NO		
SPEC'L PAINT	YES NO	RADIOGRAPH	YES NO		
SPEC'L CLEAN	YES NO	ULTRASONIC	YES NO		
SAND BLAST O.D.	YES NO	STRESS RELIEVE	YES NO		
GRIT BLAST I.D.	YES NO	HEAT TREAT	YES NO		
HYDROTEST	YES NO				
QUAN.	DESCRIPTION	W. BELL	UNIT PRICE	UNIT	DISC. NET PRICE
1	24" SCH 80 SMLS PIPE	1.00			
1	CODE STAMP PLATE PER SH-105	1.00			
1	32" 16000# STE WELD BOWL PER SH-105	1.00			
2	24" RICH W/PUTWOOD DASH PER SP-5	1.00			
1	2 UNIT BRASS SILICA GEL	1.00			
1	DO	1.00			
REVISIONS					
1	REV. 1 - 1/15/74	SDZ	8-10-73	TOTAL MAT'L	
2	REV. 2 - 1/15/74	SDZ	8-10-73	TOTAL LABOR	
3	REV. 3 - 1/15/74	SDZ	8-10-73	TOTAL SKETCH	



PITTSBURGH TESTING LABORATORY 30269-227

ESTABLISHED 1961

850 POPLAR STREET, PITTSBURGH, PA. 15220

PLEASE REPLY TO:
P. O. BOX 1616
PITTSBURGH, PA. 15

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FOR PUBLICATION OF STATEMENTS, CONCLUSIONS OR EXTRACTS FROM OR REGARDING
OUR REPORTS IS RESERVED PENDING OUR WRITTEN APPROVAL.

AREA CODE 412 TELEPHONE 922-4300

LABORATORY No. 739433

CLIENT'S No. Y8860-1183

ORDER No. PG-9931

REPORT

DATE: August 28, 1973

* Revised - 9/12/73

Report of: Charpy Impact Tests
"V" Notch, Plus 10°P

Report to: Dravo Corporation
1115 Gilman Avenue
Marietta, Ohio 45750

SPECIMEN IDENTIFICATION	SIZE OF SPECIMEN	LATERAL EXPANSION	SHEAR PERCENT	CLEAVAGE PERCENT	IMPACT FT. LBS.
N53101					
A-1	10 mm x 10 mm	.019	10	90	20.5
A-2	10 mm x 10 mm	.023	5	95	26.0
A-3	10 mm x 10 mm	.020	5	95	21.5
L40071					
B-1	10 mm x 10 mm	.026	5	95	22.5
B-2	10 mm x 10 mm	.026	5	95	29.5
B-3	10 mm x 10 mm	.034	5	95	38.0

Samples submitted by the client for machining and testing.

PITTSBURGH TESTING LABORATORY

Earl Gallagher

Earl Gallagher, Manager
Physical Testing Department

cc: 3-Client

APPROVED
DRAVO CORPORATION
FIRE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
9-18-73
W. Burris

*Revised to add Lateral Expansion, Shear Percent & Cleavage Percent

*Revised Aug
D. L. L. L.
10-8-73*

The Colonial Machine Company, Inc.

P. O. Box 290 — Pleasantville, Pa. 16341

December 21, 1973

Travo Corporation
P. O. Box 501
Marietta, GA 30060

MATERIAL CERTIFICATIONS

YOUR ORDER NO.

16733-7307 II.

OUR INVOICE NO.

DATE SHIPPED

B 40

ITEM	TYPE	MATERIAL-SPEC.	SHIPPED	HEAT NUMBER
8		1/4" 6000 S/V 8-70 Bore	20	8075014

ITEM	C	MN	P	S	SI	CR	NI	MO	CU	CB	TI	CO	OTHER ELEMENTS
8	.266	.73	.008	.021	.21								

APPROVED
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
4-17-74
A. Burris

ITEM	TENSILE	2% YIELD	% ELONG.	% RA	HARDNESS	HARDEN- ABILITY	REMARKS: 1 2 3 4 5 6 7 TC
8	84,400	57,500	29.0	2.1	MIN 163		Mill source - Republic Steel

Bechtel Corp
5/14/74
S. Corson

This is to certify that to the best of our knowledge and belief the above material has been manufactured in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

ARMS INDEXED	
DTC:	VMRSPI
DSN:	E2734-B40

RECEIVED
DEC 28 1973
DRAVO CORPORATION
PIPE FABRICATION DIV
PURCHASING

E 11-2298-3

FORM NPP-1 DATA REPORT FOR FABRICATED NUCLEAR PIPING
(As Required by the Provisions of the ASME Code Rules)

COPY

1. Fabricated by Dravo Corporation, Marietta, Ohio Order No. E-2734
(Name and Address of Fabricator)

2. Fabricated for Detroit Edison, Detroit Michigan Order No. 1C-70105
(Name and Address)

3. Owner Detroit Edison Co. 4. Location of Plant Fermi #2 Stony Creek
Monroe County, Mich.

5. Piping System Identification RHR Ret Div I (20)
(Brief description of intended use, main coolant, etc.)

(a) Drawing No. E-2734-431 Rev. 2 Prepared by Detroit Edison
(b) National Board No. NA

6. Design Conditions of Piping _____ psi _____ °F
(Pressure) (Temp.)

7. The material, design, construction, and workmanship complies with ASME Code Section III, Class 1
Edition 1971, Addenda Date Summer 1971, Case No. NA

Remarks: Manufacturers' Data Records properly identified and signed by Commissioned Inspectors have been furnished for
the following items of this report NA
(Name of Part - Item number, Manufacturer's name, and identifying stamp)

8. Shop Hydrostatic Test NA psi

9. Describe piping inspected: Piece Mark No. E11-2298-3 Serial No. 4818
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length
24" Sch 80 Smls Pipe SA-106-B
- fittings - flanges, etc.
24" Sch 80 LR 90 E11 SA-234-WPB
3/4" 6000# Std Weld Boss SA-105-II
1/2" x 1-1/2" x 3" (TxWxL) Hgr Lug SA-516-70

~~XXXXXXXXXXXXXXXXXXXX~~ (When Applicable)

~~Design information on file at _____~~
~~Stress analysis report on file at _____~~
~~Design specifications certified by _____ (1) Prof. Eng. _____ State _____ Reg. No. _____~~
~~Stress analysis report certified by _____ (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 4-23-74 Signed Dravo Corporation By J. B. Burris, Jr.
(Fabricator) Quality Assurance Supervisor
Certificate of Authorization Expires March 6, 1976 #595

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 or Province of Ohio and employed by Hartford SBI&I of Hartford, CT
have inspected the piping described in this data report on 4-9-74 and state that to the best of my knowledge
and belief, the manufacturer has constructed this piping in accordance with the applicable sections of ASME Code, Section III.

By signing this certificate, neither the Inspector nor his employer make any warranty, expressed or implied, concerning the
piping 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 4-23-74 19 _____
W. P. Smith Commissions Ohio 1951 - Penna. 1609
(Inspector) (National Board, State, Province and No.)

CUSTOMER **DETROIT EDISON - ENRICO FERRI UNIT 2**

DWG. REF.

E-2734-431

2

SYSTEM **RHR RET. DIV I (20)**

SHOP CODE

85

CLASS **DECO-A**AREA **DU**

ISO. NO.

2298



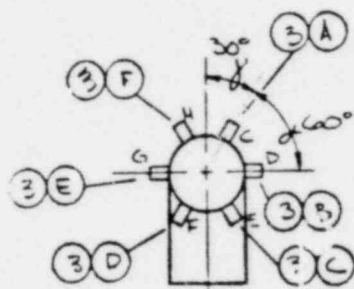
SERIAL NUMBER

4818

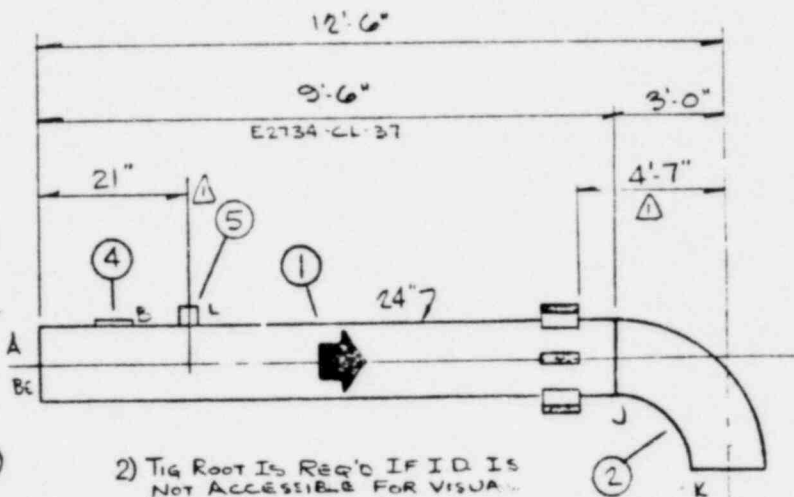
COPY

SHOP NOTES:

SPEC'L REQ'T FOR
INSERVICE INSPECTION
PER SP-5 IS
APPLICABLE



DRILL THRU ITEM 5
TO MATCH SCH. 100
AFTER WELDING.



2) TIG ROOT IS REQ'D IF I.D. IS
NOT ACCESSIBLE FOR VISUAL
INSPECTION.

3) HEAT STRAIGHTENING REQUIRES
PRIOR ENGR. APPROVAL.

4) THIS PIECE NOT TO HAVE A
STRESS RELIEVE HOLD TIME
OF OVER 2 HRS.

5) REPRESENTATIVE TEST MAT'L
PER E-2733-FI-4 FOR STRESS
RELIEVED LINES IS REQ'D.
EXCEPT ITEM 5345.

**WELD ROD CONTROL
IMPACT TESTED @ +10°F**

**WELD ROD CONTROL
ACTUAL ANALYSIS**

COLOR CODE ~ WHITE

ASME SECT. III CL. 1, 1.1		SHOP BEVEL	9101	PIPE SPEC.	SA-106-B	1 REQ'D
BAGGING RINGS/INSERTS		FIELD BEVEL	9105	BW FITTG SPEC	SA-234-WPB	
RED OXIDE		FAB. PROC. NO.	SP.1	FS FITTG SPEC	SA-106-I	MARK NO.
SPEC'L. PAINT		M.P. TEST	SP.7 YES	FLANGE SPEC		EII-2298-3
SPEC'L. CLEAN		RADIOGRAPH	SP.7 YES			TOTAL WEIGHT
SAND BLAST O.D.		ULTRASONIC	NO			4028 LBS
GRIT BLAST I.D.		STRESS RELIEVE	SP.3 YES			DESIGN COND
HYDROTEST		HEAT TREAT	NO			1150 PSIG 575°F
QUAN.	DESCRIPTION	M	UNIT PRICE	UNIT	DISC.	NET PRICE
5'-6"	1) 24" SCH. 80 SMLS PIPE	1				
1	2) 24" SCH. 80 L/R 30° ELL BOE 9101-BOE 9105	1				
6	3) 1/2" x 1/4" x 3" (TRXKL) HGR. LUG PER 9109 (SA-516-70)	6				
1	4) CODE STAMP PLATE PER 9111 C.D.	1				
1	5) 3/4" 6000# STD WELD BOSS PER 9112	1				
2	24" MEPL W/PURWOOD DISC PER SP.5	2				
3	16 UNIT BAGS - SILICA GEL	3				
		DR	22	TOTAL MAT'L		
REV'D. NOTE 5 PER EFR-23, 628 C/L AH 3-11-74		CK'D	PLS	TOTAL LABOR		
REV'D. PER ISO 2298 REV'D C/L AH 12-11-73		SO	LDR 1765	TOTAL SKETCH		

QUALITY CONTROL & ASSURANCE DATA - CRITICAL SYSTEMS

COPY

E-2734-431

WELDING DATA

WELD IDENT.	FIELD A BEVEL	CODE B PLATE	C	D	E	F	G	H	J	FIELD K BEVEL	L	M
WELDER IDENT.	ROOT	—	49	49	49	49	49	49	35		41	
	INTER	—	49	49	49	49	49	49	35		49	
	COMP.	72	49	49	49	49	49	49	35		49	
WELD PROCESS	ROOT	—	SMAW	SMAW	SMAW	SMAW	SMAW	SMAW	SMAW		SMAW	
	INTER	—	—	—	—	—	—	—	SMAW		—	
	COMP.	SMAW	SMAW	SMAW	SMAW	SMAW	SMAW	SMAW	SMAW		SMAW	
WELD PROCEDURE		B	B	B	B	B	B	B	A		B	
WELD MATERIAL	ROOT	—	W692	W692	W692	W692	W692	W692	W617		W692	
	INTER	—	—	—	—	—	—	—	W513		—	
	COMP.	W612	W513	W513	W513	W513	W513	W513	W413		W513	
		W566	W566	W566	W566	W566	W566	W566	W547		W566	
REPAIR FORM NO.		—	—	—	—	—	—	—	143		—	
FERRITE		—	—	—	—	—	—	—	—		—	
FILM BOX NO		NA	NA	NA	NA	NA	NA	NA	108		NA	
RADIOGRAPHER		NA	NA	NA	NA	NA	NA	NA	DR		NA	
TACK WELDER IDENT.		NA	ROOT	ROOT	ROOT	ROOT	ROOT	ROOT	OD		ROOT	
RECORD O.D. OR ROOT		72	72	72	72	72	72	72	72		72	

HEAT TREAT CHART = 5621

MATERIAL DATA			
IDENTITY	HEAT NO.	SERIAL NO.	TALLY
1 24" PIPE	N53101	1	1-1
2 24"-30" ELL	W0192	237	2-738
3A HGR. WLG	483	158	2-693
3B	483	158	2-693
3C	483	158	2-693
3D	483	144	2-693
3E	483	144	2-693
3F	483	144	2-693
4 CODE PLATE	MTR 363		
5 3/4" W/ROSS	HAT-3	—	4-141

WELD PROCEDURE CODE	
A	1-1-A3100-X
B	1-1-H0100-G
C	
D	
E	
F	

REMARKS

INSPECTION & EXAMINATION DATA SHEET REQD
ID & WALL THICKNESS CHECK
OK HFS A & K ENDS

FINAL APPROVAL (CUSTOMER)

DATE

2 - W. C. C.

6-25-74

FINAL APPROVAL (DRAWN)

DATE

C. Burris

4-6-74



PITTSBURGH TESTING LABORATORY 30269-2276

850 POPLAR STREET, PITTSBURGH, PA. 15220

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PLEASE REPLY TO:
P. O. BOX 1016
PITTSBURGH, PA. 15220

AREA CODE 412 TELEPHONE 922-4000

CLIENT'S No. Y8860-1183

REPORT

LABORATORY No. 739433

ORDER No. PG-9931

* Revised - 9/12/73

DATE: August 28, 1973

COPY

Report of: Charpy Impact Tests
"V" Notch, Plus 10°F

Report to: Dravo Corporation
1115 Gilman Avenue
Marietta, Ohio 45750

SPECIMEN IDENTIFICATION	SIZE OF SPECIMEN	LATERAL EXPANSION	SHEAR PERCENT	CLEAVAGE PERCENT	IMPACT FT. LBS.
N53101					
A-1	10 mm x 10 mm	.019	10	90	20.5
A-2	10 mm x 10 mm	.023	5	95	26.0
A-3	10 mm x 10 mm	.020	5	95	21.5
L40071					
B-1	10 mm x 10 mm	.026	5	95	22.5
B-2	10 mm x 10 mm	.026	5	95	29.5
B-3	10 mm x 10 mm	.034	5	95	38.0

Samples submitted by the client for machining and testing.

PITTSBURGH TESTING LABORATORY

Earl Gallagher, Manager
Physical Testing Department

cc: 3-Client

APPROVED
DRAVO CORPORATION
FIVE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
9-18-73
J. Burns

*Revised to add Lateral Expansion, Shear Percent & Cleavage Percent

1.3 Oct. 1st 1973
D.T. Walsh
10-0-73

OT Dravo Corp.
LO 1115 Gilman St.
D Marietta, OH

S
HT
IO
P
SAME

TUBE TURNS
DIVISION OF CHEMETRON CORPORATION

A30-06-6-900-QN-W 9/18/73
LOUISVILLE, KY.

TUBE TURNS
ORDER NO. 87904 1-6

CUSTOMERS'
ORDER NO. E2734-36

E-2734-647

AMMCK INDEXED
DIC: VMRSPI
DSN: E2734-647

DESCRIPTION	PHYSICALS OF MATERIALS FROM WHICH MADE					CHEMICAL ANALYSIS								HEAT OR LOT NO.	MADE FROM MATERIAL OF CHEMISTRY AND TENSILE PROPERTIES OF SPECIFICATION
	** HEAT TREAT- MENT	YIELD STRENGTH PSI	TENSILE STRENGTH PSI	PERCENT ELONGA- TION IN 2"	PERCENT REDUC- TION IN AREA	C	MN	P	S	SI	NI	CR.	MO	CB	
Item 20 Only 20 S/80 LR90° W/Ells a234 WPB (Bevel 9 Rev. 1) Ref. 2734 PBM-143 106 -74	2	40,900	75,000	44.0		.26	.91	.010	.013	.16					W-0343 / H SA106 Gr. B
															Charpy V-Notch @ +10 (.394) 62.0-45.5-75.5 %Shear 60-70-80 Lateral Expansion In Mils. 35-18-42
Item 23 Only 24 S/80 LR90° W/Ells a234 WPB Boe 910 Rev. 1 & Boe 105 Bevel Ref 2 to E2734 PBM 60-75 2-02-0801-07-00-240-000-CFM	6	48,000	76,200	52.5		.22	.95	.013	.016	.22					SA106 W-0192 B Gr. B.
															Charpy V-Notch @ +10 (.394) 25-22-25 Ft. Lbs. Lateral Expansion in Mils. 17-19-26 %Shear 20-20-20
It is hereby certified that the above fittings meet the hardness requirements of 157 Max. HIN Magnetic Particle inspection satisfactorily performed per TT-06-002 Rev. 2 in accordance with ASME Section III and found acceptable. The specific marking that will identify the material to this certification is the Tube Turns symbol, size, specification, grade and heat or lot number. It is hereby certified that the above material conforms to all requirements of ASME SA234 and to all applicable special requirements of Article NB-2000 of Section III of the ASME Boiler and Pressure Vessel Code, 1971 edition and addendas through Summer 1971.															
Invoice No.'s		82822		83913											

APPROVED
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
9-27-73
J. Burns

W. L. Moore
J. T. Moore
10-10-73

- * STANDARD ROUND TEST SPECIMEN
- ** 1 ANNEALED
- 2 NORMALIZED
- 3 NORMALIZED AND STRESS RELIEVED
- 4 STRESS RELIEVED
- 5 QUENCHED AND TEMPERED
- 6 HOT FORMED
- 7 HEAT TREAT PER ORDER SPECIFICATION

SUBSCRIBED AND SWORN TO BEFORE ME THIS

18 DAY OF September 1973

Notary Public

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

L. L. Moore, Product Control Coordinator

Notary Public, Jefferson County, Ky.
My Comm. Expires Feb. 10, 1974

Corrected Copy

The Colonial Machine Company, Inc.



P. O. Box 250 — Pleasantville, Pa. 16341

Dravo Corporation
P. O. Box 531
Marietta, OH 45750

May 10, 1974
Page 1 of 2
COPY
MATERIAL
CERTIFICATIONS
E2734-820

DTG: VMR 5 PI
DSN: E2734-820
ARMS INDEXED

YOUR ORDER NO. E2734-155	OUR INVOICE NO.	DATE SHIPPED
------------------------------------	-----------------	--------------

ITEM	TYPE	MATERIAL-SPEC.	SHIPPED	HEAT NUMBER
		ASTM A276 Gr. 70 UNANNEALED		
1	1/4" THK. x 1-3/4" WIDE PLATE	per E2734-9110	40°	6451493 (483)
2	1'-0" x 2'-0" x 1/2" THK. PLATE	per E2733-FI-3 Rev. 1	1	6451493 (483)
3	1'-0" x 2'-0" x 1/2" THK. PLATE	per E2733-FI-3 Rev. 1	1	6451493 (483)
4	5/8" THK. x 1-7/8" WIDE PLATE	per E2734-9110	40°	6451493 (483)
5	1'-0" x 2'-0" x 1/2" THK. PLATE	per E2733-FI-3 Rev. 1	1	6451493 (483)
6	1'-0" x 2'-0" x 5/8" THK. PLATE	per E2733-FI-3 Rev. 1	1	6451493 (483)
7	3/4" THK. x 2-1/4" WIDE PLATE	per E2734-9110	40°	722242 (242)
8	1'-0" x 2'-0" x 3/4" THK. PLATE	per E2733-FI-3 Rev. 1	1	722242 (242)
9	1'-0" x 2'-0" x 1/2" THK. PLATE	per E2733-FI-3 Rev. 1	1	722242 (242)

ITEM	C	MN	P	S	SI	CR	NI	MO	CU	CS	TI	CO	OTHER ELEMENTS
1, 2	.04	1.13	.012	.021	.01								
4, 5	.13	.06	.012	.027	.03								
7, 8	.03	1.20	.009	.022	.03								

ITEM	TENSILE	% YIELD	% ELONG.	% RA	HARDNESS	HARDEN-ABILITY	REMARKS: 1 2 3 4 5 6 ETC.
1, 2	72610	57120	17.8"	24.5			
4, 5	78560	62620	35.0				
7, 8	76720	60800	35.0				
Items 1 thru 9 - Bend Test - Satisfactory							

APPROVED
DRAVO CORROSION
PIPE-FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
5-22-74
[Signature]

This is to certify that to the best of our knowledge and belief the above material has been manufactured in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

Bechtel Corp
6-5-74
S. Corbett

By: *[Signature]*
R. Waychoff
DRAGO CORP
QUALITY ASSURANCE
DEPARTMENT

The Colonial Machine Company, Inc.

P. O. Box 290 — Pleasantville, Pa. 16341



Dravo Corporation

COPY

May 10, 1974

Page 2 of 2

MATERIAL CERTIFICATIONS

E2734-820

AIR ORDER NO.	OUR INVOICE NO.	DATE SHIPPED
E2734-155		

ITEM	TYPE	MATERIAL-SPEC.	SHIPPED	HEAT NUMBER
1, 2 3		Long. Charpy V Notch Exports of 20 Ft. Lbs. at -50°F.	25-27-28	Avg. 26.7
4, 5 6		Charpy Results 28-25-23 Avg. 23.0, 15 Ft. Lbs. 0-50 Deg. F.		
7, 8 9		Full Size Long. V Notch Impact Test 10 x 10 PSI Made 0-50 Deg. F. 27-24-24 Ft. Lbs.		
		All above material per ASTM III Class L.		

ITEM	C	MN	P	S	SI	CR	NI	MO	CU	CS	TI	CO	OTHER ELEMENTS
1, 2 3													The above tests and plates normalized at 1625/1650 Deg. F. held one hour per inch of thickness and air cooled.
4, 5 6													The above tests and plates normalized at 1625/1650 Deg. F. held one hour per inch of thickness and air cooled.
7, 8 9													Plates normalized at 1660 Deg. F. plus or minus 25 Deg. F. Maintained 20 minutes per inch of thickness, air cooled.

ITEM	TENSILE	% YIELD	% ELONG.	% RA	HARDNESS	HARDEN- ABILITY	REMARKS: 1, 2, 3, 4, 5 & ETC.
	All of the above material has been Ultrasonically Tested per AS 2570. See attached report nos. 74-277.						
	Shear Fracture 254 Plates 1 thru 3 -				Impact	Internal Expansion	
					25.5	.023	
					40.5	.023	
	Shear Fracture 15 to 205 lbs. 4 thru 6 -				45.5	.024	
					89.5	.024	
					98.5	.041	
	Shear Fracture 8 to 105 lbs. 7 thru 9 -				45.5	.022	
					46.5	.013	
					46.5	.019	

APPROVED
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
5-23-74
J. B. [Signature]

This is to certify that to the best of our knowledge and belief the above material has been manufactured in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

Bechtel Corp
6-5-74
S. CORONA

By *R. W. Waycraft*
DRACO
5-23-74

DATE SHIP TO 12/2/72	SHIPMENT NO. 602-11292	CARRIER, INITIAL AND NO. Truck	PLANT Johnstown
-------------------------	---------------------------	-----------------------------------	--------------------

Mills Alloy Steel Co
1 W Interstate Rd
Bedford Oh 44014

2pc
1/2 x 24 x 48

SHIPPED TO Bedford Oh

For UT Report

COPY
Dravo Order
E2734-23
APPROVED

REPORT OF MECHANICAL AND CHEMICAL TESTS

Customer Order No.	Section Spec. or Mill Order No.	Heat No.	Fin.	Gage	Width	Length	Yield Point	Tensile Strength	Elong. % 8"	Red. % G.S.	Bonds	CHEMICAL ANALYSIS					Remarks
												C	Mn	P	S	Si	
C-11302	750557	650J238	1	1/2	70	227	43990	61470	31.0	5-7	OK	.11	.89	.010	.018	.19	OH Steel ASME SA516 Gr. 60 PVQ
H11306	748421	645J531	1	2 1/4	72	144	41270	76750	32.0		OK	.28	.84	.010	.016	.20	ASME SA516 Gr. 65 PVQ
H1 Stock	448079	662J435	1	3/4	96	252	54730	79050	23.5	5-7	"	.24	1.07	.010	.016	.16	ASME SA516 Gr. 70 PVQ
	448078		1	1/2			55100	77600	23.0								to SA593
	448080		1				51890	77840	24.0								
	448081		1				55140	78920	24.5								
	149486	645J483	1				58130	82610	24.5	5-7	"	.24	1.13	.011	.021	.21	J. Mc JUL 3 1973
Long. Charpy V Notch Impacts of 20 ft lbs at -50 deg. F.																	
	448079	29-31-31	Avg.		30.3												
	448078	34-38-35	"		35.7												
	448080	30-27-28	"		28.3												
	448081	26-26-28	"		26.7												
	149486	25-27-28	"		26.7												
Above tests and plates normalized at 1625/1650 deg. F. held one hour per inch of thickness and air cooled.																	
03B11343	750554	650J348	1	1 1/2	96	252	41010	70480	27.5	5-7	OK	.18	.96	.012	.027	.20	ASME SA516 Gr. 60 PVQ
0H11254		661J526	2	1-1/8	72	144	42240	70830	26.5		OK	.18	.86	.016	.024	.	ASTM A36

APPROVED
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
DATE 7-26-78
G. GRAHAM

48 N. 7822nd

A30-06-6 900-0N-002



The Colonial Machine Company, Inc.

P. O. Box 290 — Pleasantville, Pa. 16341

December 21, 1973

Dravo Corporation
P. O. Box 501
Marietta, OH 43750

COPY

MATERIAL CERTIFICATIONS

YOUR ORDER NO. **26733-707 II.** OUR INVOICE NO. **1** DATE SHIPPED **B40**

ITEM	TYPE	MATERIAL-SPEC.	SHIPPED	HEAT NUMBER
8	1/4" 60000 S/W Weld Bolts	A30-06-6 900-0N-002	20	8075014 No. 0001 HAT-3

ITEM	C	MN	P	S	SI	CR	NI	MO	CU	CB	TI	CO	OTHER ELEMENTS
8	.260	.70	.018	.021	.21								

APPROVED
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
4-17-74
J. Burns

ITEM	TENSILE	% YIELD	% ELONG.	% RA	HARDNESS	HARDEN- ABILITY	REMARKS: 1. 2. 3. 4. 5. 6. ETC.
8	84400	59900	29.0	50.1	MIN 163		Mill source - Republic Steel

Bechtel Corp
5/14/74
S. Corwin

This is to certify that to the best of our knowledge and belief the above material has been manufactured in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

ARMS INDEXED

DTC: **VMRSPI**

DSN: **E2734-B40**

RECEIVED
DEC 28 1973
DRAVO CORPORATION
PIPE FABRICATION DIV.
PURCHASING
R. Weychoff

TUBE TURNS

PENETRATION

X 13 B

COPY

FORM NP-1 DATA REPORT FOR FABRICATED NUCLEAR PIPING SUBASSEMBLIES*
(As Required by the Provisions of the ASME Code Rules)

1. Fabricated by Tube Turns, Louisville, Kentucky Order No. 71143-X13B
(Name and Address of Fabricator)
2. Fabricated for Detroit Edison Company Order No. IE 84485
Enrico Fermi Atomic Power Plant No. 2
3. Owner Detroit Edison Co. 4. Location of Plant Stoney Creek, Mich.
5. Piping System Identification R.H.R. RETURN
(Brief description of intended use, main coolant etc.)
- (a) Drawing No. 71143-D3.1 Prepared by Tube Turns
(b) National Board No. N/A Flued head and process pipe Class 1
remainder Class 2.
6. The material, design, construction, and workmanship complies with ASME Code Section III, Class _____
Edition 1971, Addenda Date Winter 1971, Case No. N/A
- Remarks: Manufacturers' Data Reports properly identified and signed by Commissioned Inspectors have been furnished for
the following items of this report N/A
(Name of Part - Item number, Manufacturer's name, and Identifying stamp)
7. Shop Hydrostatic Test 1875 psi.
8. Description of piping inspected Serial #47410 24"X27 1/2"X34" Penetration Assy.
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length

- (fittings - flanges, etc.)

Process Pipe: SA106GrB 24"X1.218"WX14' 9-1/4" Long

Flued Head: SA105Gr2 34"X.5"WX12" Long

Flued Head Nipple: SA333Gr6 34"X.5"WX3" Long

Center Spool: SA333Gr6 34"X.5"WX20" Long

Nozzle Nipple: SA333Gr6 34"X.5"WX3" Long

Nozzle Bellows: 2 Ply SA240321 34"X.05"WX1' 1" Long

Total Length of Completed Assembly: 15' 9-1/4"

We certify that the statements made in this report are correct and that the fabrication of the described piping conforms
with the requirements of SECTION III of the ASME BOILER AND PRESSURE VESSEL CODE.

Date 31 March 75 Signed Tube Turns
(Fabricator)

By Edw. G. Lickteig
Edw. G. Lickteig

Certificate of Authorization Expires June 20, 1975

Certificate of Authorization No. 11473

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 or Province of Kentucky and Hartford Steam Boiler
Inspection & Insurance Co. of Hartford, Connecticut
have inspected the piping described in this Data Report on 31 Mar 75 and state that to the best of my knowledge
and belief, the Manufacturer has constructed this piping in accordance with the applicable Subsection of ASME Code
Section III. except that the inspection of bellows element covers
the material and workmanship only.

By signing this certificate, neither the Inspector nor his employer make any warranty, expressed or implied, concern-
ing the piping 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 31 March 75
J. D. Lunge
(Inspector)

Commission KY 491
National Board, State, Province and No.

S
O
T
L
O
D
The Detroit Edison Company
2000 Second Avenue
Detroit, Michigan 48226

S
H
T
I
C
P
The Detroit Edison Company
6400 Dixie Highway
Stoney Creek, Monroe County, Michigan
Enrico Fermi Atomic Power Plant

DETAILED ANALYSIS REPORT

TUBE TURNS
DIVISION OF CHEMTRON CORPORATION

14 March 1975

LOUISVILLE, KY.

TUBE TURNS
ORDER NO.

71113

CUSTOMERS
ORDER NO.

IE-94185

DESCRIPTION	PHYSICALS OF MATERIALS FROM WHICH MADE					CHEMICAL ANALYSIS								HEAT ON LOT NO.	MADE TO ORDER OR SPECIFICATION
	*2 HEAT TREAT. NO.	YIELD STRENGTH PSI	TENSILE STRENGTH PSI	ELONG. INCH IN 2"	ELONG. PERCENT IN 4"	C	MN	P	S	SI	NI	CR	MO		
						Serial Number: 47410									
						Penetration Number: X-13B									
						P. I. S. No: TT-23-CO-X13B									
It is certified that this assembly was fabricated in accordance with the rules of ASME Section III Articles NB 4000 and NA 3340(c).															
<u>Attachments</u>					<u>Provided in Common Document Package</u>										
1. Bill of materials					1. N. D. E. Operator Qualifications										
2. Certified Test Reports					2. Welder Operator Qualifications										
3. Weld Control Records															
4. Nondestructive Examination Reports															
5. NPP-1 Data Reports															

* STANDARD YOUNG TEST SPECIMEN

- * 1 ANNEALED
- 2 NORMALIZED
- 3 NORMALIZED AND STRESS RELIEVED
- 4 STRESS RELIEVED
- 5 QUENCHED AND TEMPERED
- 6 HOT FORMED
- 7 HEAT TREAT PER ORDER SPECIFICATION

SUBSCRIBED AND SWORN TO BEFORE ME THIS

14

March

75

DAY OF

19

Man J. Sincior
NOTARY PUBLIC

Notary Public, State of Ohio, Ky.

HEREBY CERTIFY THE ABOVE TO BE TRUE AND CORRECT ACCORDING TO RECORDS IN THE POSSESSION OF THIS CORPORATION.

Bill Peringer
Bill Peringer, Metallurgy

S
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O
PTube Turns
P. O. Box 987
Louisville, Ky.Tube Turns
718 So. 28th St.
Louisville, Ky.

DETAILED ANALYSIS REPORT

TUBE TURNS

DIVISION OF CHEMETRON CORPORATION

HOUSTON, TEXAS 4-3-74 jr

TUBE TURNS
ORDER NO. IMF-4-94303CUSTOMERS'
ORDER NO. 4-94303

DESCRIPTION	PHYSICALS OF MATERIALS FROM WHICH MADE					CHEMICAL ANALYSIS								HEAT OR LOT NO.	SPECIFICA- TION OF MATERIAL FROM WHICH MADE		
	** HEAT TREAT- MENT	YIELD POINT PER SQUARE INCH	TENSILE STRENGTH PER SQUARE INCH	PERCENT ELONGA- TION IN 2"	PERCENT REDUC- TION IN AREA	C	MN	P	S	SI	CR	NI	MO			CB	
Item 009 2 Pieces		47,000	80,000	29.0	47.5	.30	.32	.012	.020	.23					212464	SA-105-2	
40" (.500) x 32" (1.000) x 20"			Charpy "V" Notch	-20° F. Specimen Size .394													
(1.201) Dwg. 72.755 D2R2			23 - 21 - 13	Ft. Lbs.													
Mat'l. SA105 Gr. II Component			17 - 16 - 13	Mils. Lateral Expansion													
Spec. CS-F-GB Pen. X9A, X9B			10% - 10% - 10%	Shear													
Tag: 71143 Item 9A, 9B Code J																	
Item 004 1 Piece		48,000	87,000	28.0	47.5	.30	.32	.010	.016	.22					212625	SA-105-2	
34" (.500) x 27-1/2" (.875)			Charpy "V" Notch	0° F. Specimen Size .394													
x 24" (1.218) Dwg. 72.755			31 - 31 - 26	Ft. Lbs.													
D6R2 Mat'l. SA105 Gr. II			20 - 26 - 25	Mils. Lateral Expansion													
CS-F-6A Component Spec. Pen.			20% - 10% - 10%	Shear													
X-13B Tag: 71143 Item 13B Code J.			BHN Hardness 146/179														
			1. Ultrasonic Inspection Per TT04-024 Rev. 0-satisfactory.														
			2. Magnetic Particle Inspection Per TT05-002 Rev. 1-satisfactory.														

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

SUBSCRIBED AND SWORN TO BEFORE ME THIS

3th DAY OF April 19 74

I HEREBY CERTIFY THIS REPORT TO BE TRUE AND CORRECT
ACCORDING TO RECORDS IN THE POSSESSION OF THIS CORPORATIONLaura L. Guerrero
NOTARY PUBLIC

Charles Owen, O. C. Tech.

13B

STO
IO
P

Tube Turns
718 So. 23th Street
Louisville, Ky.

TUBE TURNS

DIVISION OF CHEMETRON CORPORATION

HOUSTON, TEXAS 5-12-74 jr

TUBE TURNS ORDER NO. 17F-4-94303

CUSTOMERS' ORDER NO. 4-94303

\bar{V} -FLLED READ

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

SUBSCRIBED AND SWORN TO BEFORE ME THIS

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

12th DAY OF June 1974

Lucia L. Romero
NOTARY PUBLIC

LAURA L. GUERRERO
Notary Public in and for Harris County, Texas
My Commission Expires June 1, 1975

Charles Owen
Charles Owen, Q. C. Technician

ENRICO FERMI UNIT 2

RHR SUPPLY

DESCRIPTION	MATERIAL SPEC.	HEAT NUMBER	TEMP OF	CHARPY IMPACT TEST RESULTS (FULL SIZE- LONG.)						
				C _V	ENERGY	LAT	EXPANSION			
					FT-LB		MILS			

PC MK E11-2299-4

20" S/80 SMLS PIPE	SA 106 GR B	L41739	+10°	26	35	27	N/A			
-----------------------	----------------	--------	------	----	----	----	-----	--	--	--

20" S/80 L R EL.	SA 234 GR WPB	W0343	+10°	62	45.5	75.5	35	18	42
---------------------	------------------	-------	------	----	------	------	----	----	----

5/8" x 1 7/8" x 3 3/4" HGR. LUG	SA 516 GR 70	348	-50°	15	15	15	28	28	28
------------------------------------	-----------------	-----	------	----	----	----	----	----	----

PC MK E11-2299-5

20" S/80 SMLS PIPE	SA 106 GR B	L41739	+10°	26	35	27	N/A			
-----------------------	----------------	--------	------	----	----	----	-----	--	--	--

3/4" 6000# WELD BOSS	SA 105 NORMALIZED	HAT-2	N/A							
-------------------------	----------------------	-------	-----	--	--	--	--	--	--	--

PENETRATION ASSEMBLY X-12

PROCESS	PIPE									
20" S/80	SA 106 GR B	249769	N/A (SEE EF2-53,641)							

FLUED HEAD 36" x 1 1/2" x 10 1/2"	SA 105 GR 2	212625	0°	31	28	22	26	24	16
--------------------------------------	----------------	--------	----	----	----	----	----	----	----

N/A = NOT AVAILABLE

E11-2299-4

FORM NPP-1 DATA REPORT FOR FABRICATED NUCLEAR PIPING
(As Required by the Provisions of the ASME Code Rules)

1. Fabricated by Dravo Corporation, Marietta, Ohio Order No. 1C-70105
(Name and Address of Fabricator)
2. Fabricated for Detroit Edison, Detroit, MI Order No. Fermi #2 Stony Creek
(Name and Address) Monroe County, MI
3. Owner Detroit Edison Co 4. Location of Plant Monroe County, MI
5. Piping System Identification RHR Supply
(Brief description of intended use, main coolant, etc.)
(a) Drawing No. E-2734-636 Rev. 1 Prepared by Detroit Edison
(b) National Board No. NA
6. Design Conditions of Piping _____ psi _____ °F
(Pressure) (Temp.)
7. The material, design, construction, and workmanship complies with ASME Code Section III, Class 1
Edition 1971, Addenda Date Summer 1971, Case No. NA
Remarks: Manufacturers' Data Records properly identified and signed by Commissioned Inspectors have been furnished for
the following items on this report NA
(Name of Part - Item number, Manufacturer's name, and identifying stamp)

8. Shop Hydrostatic Test NA _____ psi.
9. Description of piping inspected Piece Mark No. E11-2299-4 Serial No. 5027
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length)
20" Sch 80 Smls Pipe SA-106-B
- fittings - flanges, etc.
20" Sch 80 L/R 90 Ell SA-234-WPP
5/8" x 1 7/8" x 3 3/4" (TxWxL) Hgr Lug SA-516-70
20" Sch 80 1/2 R 90 Ell SA-234-WPP

CERTIFICATION OF DESIGN (When Applicable)

Design information on file at _____
Stress analysis report on file at _____
Design specifications certified by _____ (1) Prof. Eng. _____ State _____ Reg. No. _____
Stress analysis report certified by _____ (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 7-22-75 Signed Dravo Corporation By L. W. Stiles
(Fabricator) L. W. Stiles, Quality Assurance Supvr
Certificate of Authorization Expires 3-6-76 Certificate of Authorization No. 595

CERTIFICATE OF SHOP INSPECTION

*Hartford Steam Boiler I & I Co
I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or
the State or Province of Ohio and employed by Hartford, CT
have inspected the piping described in this data report on 11-1-74 and state that to the best of my knowledge
and belief, the manufacturer has constructed this piping in accordance with the applicable sections of ASME Code, Section III.

By signing this certificate, neither the Inspector nor his employer make any warranty, expressed or implied, concerning the
piping 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 7-22-75 19 _____
W.P. Smith Commissions Ohio 1951 - Penna 1609
(Inspector) (National Board, State, Province and No.)

NVC-100

DRAYO CORPORATION - PIPE FABRICATION DEPARTMENT, MARIETTA, OHIO

CUSTOMER DETROIT EDISON - ENRICO FERMI UNIT 2

DWG. REF.

SKETCH NUMBER

SYSTEM CWP SUPPLY (20)

SHOP CODE

E-2734-430

CLASS FIELD-A

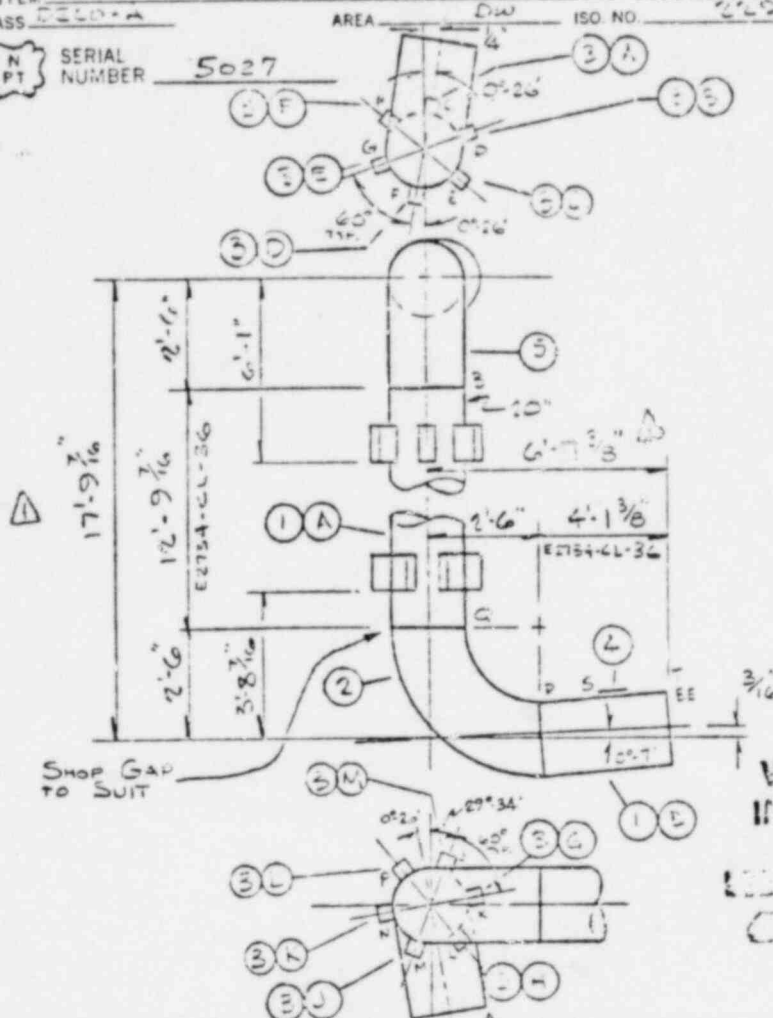
AREA

ISO NO.

SHT 1 OF 2

SERIAL
NUMBER

5027



1) TIG WELDING REQUIRED

2) TIG WELDING REQUIRED IF ID IS NOT ACCESSIBLE FOR VISUAL INSPECTION

3) HEAT STRAIGHTENING REQUIRED PRIOR TO END APPROVAL

4) THIS PIECE NOT TO HAVE A STRESS RELIEVE HOLD TIME OF OVER 2 HR.

5) REPRESENTATIVE TENSILE TESTS FOR E2734-430 REQUIRED EXCEPT FOR 2734-430 EXCEPT FOR 2734-430

WELD ROD CONTROL
IMPACT TESTED 9+10°F

COLOR CODE W/WHITE

ASME SECT. III CL. 1, 2, 3		SHOP BEVEL	3101	PIPE SPEC.	SA-106-B	1 REQ
OPTIONAL		FIELD BEVEL	3105	BW FITG SPEC	SA-234-WF	MARK NO.
FABRICATING/INSERTS YES NO		FAB. PROC. NO.	SP-1	F.S. FITG SPEC		E11-2734-4
RED OXIDE YES NO		ENR/M.P. TEST	SP-7 YES NO	FLANGE SPEC.		TOTAL WEIGHT
SPEC'L. PAINT YES NO		RADIOGRAPH	SP-7 YES NO			5,233 LB
SPEC'L. CLEAN SP-5 YES NO		ULTRASONIC	YES NO			DESIGN COND
SAND BLAST O.D. YES NO		STRESS RELIEVE	SP-3 YES NO			150 PSIG 57
GRIT BLAST I.D. SP-5 YES NO		HEAT TREAT	YES NO			
HYDROTEST YES NO						
QUAN.	DESCRIPTION	M. PILL	UNIT	DISC.	NET WT.	
16-102	20" SCH. 40 SMUS PIPE					
1	20" SCH. 40 L/2 90° ELL E2734-430					
12	5/8" X 1/2" X 3/4" (TXVIR) HO. LUS FOLLOWS (24-SHARD)					
1	CODE STAMP PLATE PER SHI CR					
1	20" SCH. 40 L/2 90° ELL E2734-430					
2	20" SCH. 40 L/2 90° ELL E2734-430					
1	1/4" UNIF. W. STUCKA FILL					
1	4" DO					
REV.	DR. 5000	17-10-70	TOTAL MAT'L			
	SKD 100	17-10-70	TOTAL LABOR			
	NO LTR		TOTAL SHIP			

QUALITY CONTROL & ASSURANCE DATA - CRITICAL SYSTEMS

E-175-1-4

WELDING DATA

WELD IDENT.		A	B	C	D	E	F	G	H	J	K	L	M
WELDER IDENT.	ROOT		35	47	47	47	47	47	47	47	47	47	47
	INTER		35	47	47	47	47	47	47	47	47	47	47
	COMP.		15	47	47	47	47	47	47	47	47	47	47
WELD PROCESS	ROOT		SHAW	SHAW	SHAW	SHAW	SHAW	SHAW	SHAW	SHAW	SHAW	SHAW	SHAW
	INTER		SHAW	-	-	-	-	-	-	-	-	-	-
	COMP.		SHAW	SHAW	SHAW	SHAW	SHAW	SHAW	SHAW	SHAW	SHAW	SHAW	SHAW
WELD PROCEDURE			A	C	C	C	C	C	C	C	C	C	C
WELD MATERIAL	ROOT		W617	W692	W692	W692	W692	W692	W692	W692	W692	W692	W692
	INTER		W692	-	-	-	-	-	-	-	-	-	-
	COMP.		W785	W785	W785	W785	W785	W785	W785	W785	W785	W785	W785
REPAIR FORM NO.			-	-	-	-	-	-	-	-	-	-	-
FERRITE			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FILM BOX NO.			169	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RADIOGRAPHER			JW	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TACK WELDER IDENT. RECORD O.D. OR ROOT			72	44	44	44	44	44	44	72	72	72	72
			Root	OD	OD	OD	OD	OD	OD	OD	OD	OD	OD

COPY

HEAT TREAT CHART # 5822

MATERIAL DATA			
IDENTITY	HEAT NO.	SERIAL NO.	TALLY
1A 20" PIPE	141739	2	1-21
1B 20" PIPE	141739	2	1-21
2 20" 90° EL	W0343	203	2-657
3A W692 LUG	348	259	2-987
3B W692 LUG	348	259	2-987
3C W692 LUG	348	259	2-987
3D W692 LUG	348	259	2-987
3E W692 LUG	348	259	2-987
3F W692 LUG	348	259	2-987
3G W692 LUG	348	259	2-987
3H W692 LUG	348	259	2-987
3I W692 LUG	348	259	2-987
3J W692 LUG	348	259	2-987
3K W692 LUG	348	259	2-987
3L W692 LUG	348	259	2-987
3M W692 LUG	348	259	2-987
3N W692 LUG	348	259	2-987
3O W692 LUG	348	259	2-987
3P W692 LUG	348	259	2-987
3Q W692 LUG	348	259	2-987
3R W692 LUG	348	259	2-987
3S W692 LUG	348	259	2-987
3T W692 LUG	348	259	2-987
3U W692 LUG	348	259	2-987
3V W692 LUG	348	259	2-987
3W W692 LUG	348	259	2-987
3X W692 LUG	348	259	2-987
3Y W692 LUG	348	259	2-987
3Z W692 LUG	348	259	2-987

WELD PROCEDURE CODE	
A	1-1-A3400-X
B	1-1-H1202-J1
C	1-1-H0100-E5
D	
E	
F	

REMARKS

INSPECTION & EXAMINATION DATA SHEET REQD

FINAL APPROVAL (CUSTOMER)

DATE

FINAL APPROVAL (DRAWN)

DATE

7/1/77

S O T L O D
1335 Corp
1115 Gilman St
Marietta, OH

S H T I O P
Sams

DETAILED ANALYSIS REPORT
TUBE TURNS
DIVISION OF CHEMETRON CORPORATION

Marks E-2734-36

E-2734-878

A30-06-G-900-QN-002

LOUISVILLE, KY. 40274

TUBE TURNS
ORDER NO. 00028

CUSTOMERS'
ORDER NO. E-2734-36

DESCRIPTION

PHYSICALS
OF MATERIALS FROM WHICH MADE

** HEAT TREATMENT
YIELD STRENGTH PSI
TENSILE STRENGTH PSI
PERCENT ELONGATION IN 2
PERCENT REDUCTION IN AREA

CHEMICAL ANALYSIS

C MN P S SI NI CR MO CB

HEAT CR LOT NO.

MADE FROM MATERIAL OF CHEMISTRY AND TENSILE PROPERTIES OF SPECIFICATION

Item 1
1 Only 20 each 20 LB 20 W/T11
34234, XTR DOC 9101 Rev 1 Doc
9105 Rev 1 Ref E-2734-878

5 40,900 75,000 44.0 .26 .91 .010 .013 .16

Charpy V-notch @ 10°F (-39°C) 62.0-75.5-75.5

Shear 60-70-80

Lateral Expansion in mils. 15-18-22

Magnetic Particle Inspection satisfactorily performed per T06-002 Rev. 2 in accordance with ASTM Section III and found acceptable.

It is hereby certified that the above fittings have a maximum hardness of HB 177.

The specific marking that will identify the material to this certification is the Tube Turns symbol, size, specification, grade and heat or lot number.

It is hereby certified that the above material conforms to all requirements of ASTM A30234 and to all applicable special requirements of Article NB-2000 of Section III of the ASME Boiler and Pressure Vessel Code, 1971 edition and addenda through October 1971.

Bechtel

S. Combs

8-21-74

Cleared by
Quality Assurance

8-16-74

J. Burris

* STANDARD ROUND TEST SPECIMEN

- ** 1 ANNEALED
2 NORMALIZED
3 NORMALIZED AND STRESS RELIEVED
4 STRESS RELIEVED
5 QUENCHED AND TEMPERED
6 HOT FORMED
7 HEAT TREAT PER ORDER SPECIFICATION

SUBSCRIBED AND SWORN TO BEFORE ME THIS

8 DAY OF August

1974

M. J. Jancie
NOTARY PUBLIC

Notary Public, State of Large, Ky.
My Commission expires Feb. 10, 1978

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

L. L. Mero, Product Control Coordinator



PITTSBURGH TESTING LABORATORY

ESTABLISHED 1891

850 POPLAR STREET, PITTSBURGH, PA. 15220

AS A MUTUAL PROTECTION TO CLIENTS, THE PUBLIC AND OURSELVES, ALL REPORTS ARE SUBMITTED AS THE CONFIDENTIAL PROPERTY OF CLIENTS, AND AUTHORIZATION FOR PUBLICATION OF STATEMENTS, CONCLUSIONS OR EXTRACTS FROM OR REGARDING OUR REPORTS IS RESERVED PENDING OUR WRITTEN APPROVAL.

FORM ACT REV. PG

PLEASE REPLY TO:
P. O. BOX 1646
PITTSBURGH, PA. 15220

CLIENT'S No.

AREA CODE 412 TELEPHONE 922-4000

REPORT

LABORATORY No. 736569

ORDER No. PG-9931

Date: 5-22-73

Report of : Charpy Impacts
"V" Notch, plus 10°F

52734-38

Report to : Dravo Corporation
1115 Gilman Avenue
Marietta, Ohio 45750

COPY

<u>Specimen Identification</u>	<u>Size of Specimen</u>	<u>Impact Foot Pounds</u>
HT #L23158 2½ SCH160 SA 106 Gr. B		
#1 "	10 MM x 7.5 MM	55
#1 "	10 MM x 7.5 MM	68
#1 "	10 MM x 7.5 MM	46
HT #41739 20" SCH 80 SA 106 Gr. B		
#2 "	10 MM x 10 MM	33
#2 "	10 MM x 10 MM	30
#2 "	10 MM x 10 MM	27
HT #L44587 6" SCH 120 SA 106 Gr. B		
#3 "	10 MM x 10 MM	26
#3 "	10 MM x 10 MM	35
#3 "	10 MM x 10 MM	27
HT #L22202 3" SCH 160 SA 106 Gr. B		
#4 "	10 MM x 10 MM	7
#4 "	10 MM x 10 MM	12
#4 "	10 MM x 10 MM	14
HT #N55258 4" SCH 120 SA 106 Gr. B		
#5 "	10 MM x 10 MM	5
#5 "	10 MM x 10 MM	5
#5 "	10 MM x 10 MM	5

APPROVED
DRAVO CORPORATION
PIPE FABRICATING DIVISION
QUALITY ASSURANCE DEPARTMENT

7-12-73
AR



PITTSBURGH TESTING LABORATORY

ESTABLISHED 1901

850 POPLAR STREET, PITTSBURGH, PA. 15220

AS A MUTUAL PROTECTION TO CLIENTS, THE PUBLIC AND OURSELVES, ALL REPORTS ARE SUBMITTED AS THE CONFIDENTIAL PROPERTY OF CLIENTS, AND AUTHORIZATION FOR PUBLICATION OF STATEMENTS, CONCLUSIONS OR EXTRACTS FROM OR REGARDING OUR REPORTS IS RESERVED PENDING OUR WRITTEN APPROVAL.

FORM 407 REV. 1-73

PLEASE REPLY TO:
P. O. BOX 1645
PITTSBURGH, PA. 15220

AREA CODE 412 TELEPHONE 922-4000

CLIENT'S No.

REPORT

LABORATORY No. 736569

ORDER No. PG-9931

Date: 5-22-73

COPY

<u>Specimen Identification</u>	<u>Size of Specimen</u>	<u>Impact Foot Pounds</u>
--------------------------------	-------------------------	---------------------------

HT #N33604	10" SCH 120 SA 106 Gr. B	
#9	10 MM x 10 MM	19
#9	10 MM x 10 MM	12
#9	10 MM x 10 MM	12

do not meet impact test

HT #N51802	10" SCH 120 SA 106 Gr. B	
#10	10 MM x 10 MM	24
#10	10 MM x 10 MM	26
#10	10 MM x 10 MM	29

OK - 3rd test copy for 24 26 29 7-27-73

Samples submitted by the client for machining and testing.

PITTSBURGH TESTING LABORATORY

Earl Gallagher
Earl Gallagher, Manager
Physical Testing Department

cc: 3- Client
P.O. Box 581
Marietta, Ohio 45750
Attn: Mr. C. A. Mycoff

cms

APPROVED
DRAYCO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT

7-12-73
A. Burris

Corrected Copy

The Colonial Machine Company, Inc.



P. O. Box 290 — Pleasantville, Pa. 16241

Dravo Corporation
P. O. Box 581
Marietta, OH 45750

May 10, 1974

Page 1 of 2

MATERIAL

CERTIFICATIONS

E2734-820

DTC: VMR SPT
 DSN: E2734-820
 ARMS INDEXED

YOUR ORDER NO. E2734-155	OUR INVOICE NO.	DATE SHIPPED
------------------------------------	-----------------	--------------

ITEM	TYPE	MATERIAL SPEC.	SHIPPED	HEAT NUMBER
		ASTM A516 Gr. 70 NORMALIZED		
1	1/2" Thk. x 1-1/2" Wide Plate	per E2734-9110	40°	6451493 (483)
2	1'-0" x 2'-0" x 1/2" Thk. Plate	per E2733-PI-3 Rev. 1	1	6451493 (483)
3	1'-0" x 2'-0" x 1/2" Thk. Plate	per E2733-PI-3 Rev. 1	1	6451493 (483)
4	5/8" Thk. x 1-7/8" Wide Plate	per E2734-9110	40°	650J743 (243)
5	1'-0" x 2'-0" x 5/8" Thk. Plate	per E2733-PI-3 Rev. 1	1	650J743 (243)
6	1'-0" x 2'-0" x 5/8" Thk. Plate	per E2733-PI-3 Rev. 1	1	650J743 (243)
7	3/4" Thk. x 2-1/4" Wide Plate	per E2734-9110	40°	720242 (242)
8	1'-0" x 2'-0" x 3/4" Thk. Plate	per E2733-PI-3 Rev. 1	1	720242 (242)
9	1'-0" x 2'-0" x 3/4" Thk. Plate	per E2733-PI-3 Rev. 1	1	720242 (242)

ITEM	C	MN	P	S	SI	CR	NI	MO	CU	CB	TI	CO	OTHER ELEMENTS
1, 2	.24	1.13	.021	.021	.21								
4, 5	.18	.96	.012	.027	.20								
7, 8	.23	1.20	.009	.027	.23								

ITEM	TENSILE	2% YIELD	% ELONG.	% R.A.	HARDNESS	HARDEN-ABILITY	REMARKS: 1. 2. 3. 4. 5. & ETC.
1, 2	82610	58130	$\frac{17.8}{24.5}$				
4, 5	78560	52620	37.0				
7, 8	84720	62200	37.0				
Items 1 thru 9 - Bend Test - Satisfactory							

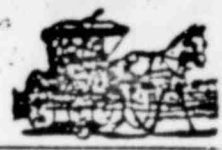
APPROVED
 DRAVO CORPORATION
 PIPE FABRICATION DIVISION
 QUALITY ASSURANCE DEPARTMENT

5.22.74
J. Burris

This is to certify that to the best of our knowledge and belief the above material has been manufactured in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

Bechtel Corp
 6-5-74
 S. Corzina

By: *R. Waychoff*
 APPROVED
 QUALITY ASSURANCE DEPARTMENT



The Colonial Machine Company, Inc.

P. O. Box 290 — Pleasantville, Pa. 16341

May 10, 1974

Page 2 of 2

Dravo Corporation

COPY

**MATERIAL
CERTIFICATIONS**

E2734-820

OUR ORDER NO.	OUR INVOICE NO.	DATE SHIPPED
E2734-155		

ITEM	TYPE	MATERIAL SPEC.	SHIPPED	HEAT NUMBER
1, 2 3		Long. Charpy V Notch Impacts of 20 Ft. Lbs. at -50°F.	25-27-28	Avg. 26.7
4, 5 6		Charpy Results 25-28-28 Avg. 26.8, 15 Ft. Lbs. @ -50 Deg. F.		
7, 8 9		Full Size Long. V Notch Impact Test 10 x 10 PH Rads @ -50 Deg. F. 10-11-11 Ft. Lbs.		
		All above material per ASTM III Class I.		

ITEM	C	MN	P	S	SI	CR	NI	MO	CU	CB	TI	CO	OTHER ELEMENTS
1, 2 3													The above tests and plates normalized at 1625/1650 Deg. F. held one hour per inch of thickness and air cooled.
4, 5 6													The above tests and plates normalized at 1625/1650 Deg. F. held one hour per inch of thickness and air cooled.
7, 8 9													Plates normalized at 1660 Deg. F. plus or minus 25 Deg. F. Maintained 20 minutes per inch of thickness. Air Cooled.

ITEM	TENSILE	2% YIELD	% ELONG.	% R.A.	HARDNESS	HARDEN- ABILITY	REMARKS: 1, 2, 3, 4, 5, 6, ETC.
	All of the above material has been Ultrasonically Tested per AS 2570. See attached Report Nos. 74-277.						
	Shear Fracture 25% Max 1 thru 3 -				Report	Lateral Expansion	
					54.8	.028	
					44.8	.023	
					44.8	.023	
	Shear Fracture 15 to 20% Max. 4 thru 6 -				54.8	.028	
					48.8	.024	
					98.8	.041	
	Shear Fracture 8 to 10% Max. 7 thru 9 -				48.8	.022	
					30.8	.018	
					40.8	.019	

This is to certify that to the best of our knowledge and belief the above material has been manufactured in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

Bechtel Corp
6-5-74
S. CORONA

By R. Waycroft
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
5-22-74
J. Burns

11/1/72
 602-10149
 Truck
 E2734-820
 Johnstown
 50321-50322
 50324
 50321-50322-50324
 50324
 50321-50322-50324

COPY APPROVED
 KMC
 Redford Oh
 3pc 5/8 x 24 x 48
 SUPPLIED TO
 11/1/72

REPORT OF MECHANICAL AND CHEMICAL TESTS									
Specimen	Size	Heat	File	Gage	Width	Length	Tensile	Yield	Brinell
73102	661J424	2	1/2	96	262	49210	78010	31.0	5-7
73103		1			244	48310	77680	26.0	
73104		2			223	48010	76990	27.0	
73105		1				48710	79130	28.0	
73106		1				49310	77900	27.5	
73107		2				48010	76990	27.0	
73108	650J23E	1	5/8	"	200	47010	74100	30.0	5-7
73109	650J24E	1	5/8	56	252	42620	78560	33.0	5-7
73110	(348)								
73111	645J413	1	1/2	55	252	56930	84110	23.0	5-7
73112									
73113	662J313	2	3/4	58	228	36530	56600	34.0	
73114									
73115									

JUL 31 1978
 T. J. MCADLEY
 1978

ASTM A285
 Gr. B PVQ

DRAGO CORPORATION
 PIPE FABRICATION DIVISION
 QUALITY ASSURANCE DEPARTMENT
 DATE 07-26-78
 GRAHAM
 APPROVED
 DRAGO CORPORATION
 PIPE FABRICATION DIVISION
 QUALITY ASSURANCE DEPARTMENT
 DATE 07-26-78
 GRAHAM
 ORDER E2734-155 ITS. 4, THRU 6

E 11-2299-5

FORM NPP-1 DATA REPORT, OR FABRICATED NUCLEAR PIPING
(As Required by the Provisions of the ASME Code Rules)

COPY

1. Fabricated by Dravo Corporation, Marietta, Ohio Order No. E-2734
(Name and Address of Fabricator)

2. Fabricated for Detroit Edison, Detroit, MI Order No. 1C-70105
(Name and Address)

3. Owner Detroit Edison Co 4. Location of Plant Fermi #2 Stony Creek
Monroe County, MI

5. Piping System Identification RHR Supply
(Brief description of intended use, main coolant etc.)

(a) Drawing No. E-2734-439 Rev. 1 Prepared by Detroit Edison
(b) National Board No - NA

6. Design Conditions of Piping _____ psi _____ °F
(Pressure) (Temp.)

7. The material, design, construction, and workmanship complies with ASME Code Section III, Class 1
Edition 1971, Addenda Date Summer 1971, Case No. NA

Remarks: Manufacturers' Data Records properly identified and signed by Commissioned Inspectors have been furnished for
the following items of this report NA
(Name of Part - Item number, Manufacturer's name, and identifying stamp)

8. Shop Hydrostatic Test NA psi.

9. Description of piping inspected Piece Mark No. E11-2299-5 Serial No. 5028
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length
20" Sch 80 Smls Pipe SA-106-B
- fittings - flanges, etc. 3/4" x 60000 Std Weld Bore SA-105-II

CERTIFICATION OF DESIGN (When Applicable)

Design information on file at _____
Stress analysis report on file at _____
Design specifications certified by _____ (1) Prof. Eng. _____ State _____ Reg. No. _____
Stress analysis report certified by _____ (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 7-22-75 Signed Dravo Corporation By L. W. Stiles
(Fabricator) L. W. Stiles, Quality Assurance Supvr
Certificate of Authorization Expires 3-6-76 Certificate of Authorization No. 595

CERTIFICATE OF SHOP INSPECTION

*Hartford Steam Boiler I & I Co

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or
the State or Province of Ohio and employed by * of Hartford, CT
have inspected the piping described in this data report on 6-21-74, and state that to the best of my knowledge
and belief, the manufacturer has constructed this piping in accordance with the applicable sections of ASME Code, Section III.

By signing this certificate, neither the Inspector nor his employer make any warranty, expressed or implied, concerning the
piping 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 7-22-75
Date _____
W. P. Smith _____
(Inspector) (National Board, State, Province and No.)

E-1754-420

[illegible]

5694

[illegible]

A	1-1-H0100-E1
B	
C	
D	
E	
F	

INSPECTION & EXAMINATION DATA SHEET REQD.

DATE _____

741.2



PITTSBURGH TESTING LABORATORY

ESTABLISHED 1931

850 POPLAR STREET, PITTSBURGH, PA. 15220

AS A MUTUAL PROTECTION TO CLIENTS, THE PUBLIC AND OURSELVES, ALL REPORTS ARE SUBMITTED AS THE CONFIDENTIAL PROPERTY OF CLIENTS, AND AUTHORIZATION FOR PUBLICATION OF STATEMENTS, CONCLUSIONS OR EXTRACTS FROM OR REGARDING OUR REPORTS IS RESERVED PENDING OUR WRITTEN APPROVAL.

FORM 407 REV. PG

PLEASE REPLY TO:
P. O. BOX 1646
PITTSBURGH, PA. 1523

CLIENT'S No.

AREA CODE 412 TELEPHONE 922-4000

REPORT

LABORATORY No. 736569

ORDER No. PG-9931

Date: 5-22-73

Report of : Charpy Impacts
"V" Notch, plus 10° F

ED734-38

Report to : Dravo Corporation
1115 Gilman Avenue
Marietta, Ohio 45750

<u>Specimen Identification</u>	<u>Size of Specimen</u>	<u>Impact Foot Pounds</u>
HT #L23158 2½ SCH160 SA 106 Gr. B		
#1 "	10 MM x 7.5 MM	55
#1 "	10 MM x 7.5 MM	68
#1 "	10 MM x 7.5 MM	46
HT #41739 20" SCH 80 SA 106 Gr. B		
#2 "	10 MM x 10 MM	33
#2 "	10 MM x 10 MM	30
#2 "	10 MM x 10 MM	27
HT #L44587 6" SCH 120 SA 106 Gr. B		
#3 "	10 MM x 10 MM	26
#3 "	10 MM x 10 MM	35
#3 "	10 MM x 10 MM	27
HT #L22202 3" SCH 160 SA 106 Gr. B		
#4 "	10 MM x 10 MM	7
#4 "	10 MM x 10 MM	12
#4 "	10 MM x 10 MM	14
HT #N55258 4" SCH 120 SA 106 Gr. B		
#5 "	10 MM x 10 MM	5
#5 "	10 MM x 10 MM	5
#5 "	10 MM x 10 MM	5

APPROVED
DRAVO CORPORATION
PIPE FABRICATING DIVISION
QUALITY ASSURANCE DEPARTMENT

7-12-73



PITTSBURGH TESTING LABORATORY

ESTABLISHED 1881

850 POPLAR STREET, PITTSBURGH, PA. 15220

AS A MUTUAL PROTECTION TO CLIENTS, THE PUBLIC AND OURSELVES, ALL REPORTS ARE SUBMITTED AS THE CONFIDENTIAL PROPERTY OF CLIENTS, AND AUTHORIZATION FOR PUBLICATION OF STATEMENTS, CONCLUSIONS OR EXTRACTS FROM OR REGARDING OUR REPORTS IS RESERVED PENDING OUR WRITTEN APPROVAL.

PLEASE REPLY TO:
P. O. BOX 1545
PITTSBURGH, PA. 15220

AREA CODE 412 TELEPHONE 922-4000

CLIENT'S No.

REPORT

LABORATORY No. 736569

ORDER No. PG-9931

Date: 5-22-73

COPY

Specimen Identification

Size of Specimen

Impact Foot Pounds

HT #N33604 10" SCH 120 SA 106 Gr. B
#9 " 10 MM x 10 MM
#9 " 10 MM x 10 MM
#9 " 10 MM x 10 MM

19 ductile
12 meet impact
12 Test

HT #N51802 10" SCH 120 SA 106 Gr. B
#10 " 10 MM x 10 MM
#10 " 10 MM x 10 MM
#10 " 10 MM x 10 MM

24 OK -
26 Batched copy
29 per spec 7-17-73

Samples submitted by the client for machining and testing.

PITTSBURGH TESTING LABORATORY

Earl Gallagher
Earl Gallagher Manager
Physical Testing Department

cc: 3- Client
P.O. Box 581
Marietta, Ohio 45750
Attn: Mr. C. A. Mycoff

cms

APPROVED
DRAYO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT

7-12-73
A. Burns

130-06-6-900-QN-002



The Colonial Machine Company, Inc.

P. O. Box 290 — Pleasantville, Pa. 16341

July 18, 1973

COPY

Drawo Corporation
P. O. Box 531
Marietta, OH 45750

MATERIAL CERTIFICATIONS

B35

YOUR ORDER NO.	OUR INVOICE NO.	DATE SHIPPED
10733-7732		

ITEM	TYPE	MATERIAL SPEC	SHIPPED	HEAT NUMBER
1	2" 6000 S/W Veld	ASTM A105-71 NORMALIZED	10	8087278
2	3/4" 6000 S/W Veld	Bosses per ASTM A105-71	40	8075014
		ASTM A182 F11 NORMALIZED		
3	2" 6000 S/W Veld	Bosses per ASTM A182 F11	4	94713
		ASTM A182 F22 NORMALIZED		
4	1-1/2" 6000 S/W Veld	Bosses per ASTM A182 F22	6	6011388

ITEM	C	MN	P	S	SI	CR	NI	MO	CU	CB	TI	CO	OTHER ELEMENTS
1	.270	.76	.004	.018	.26								
2	.260	.78	.008	.021	.21								
3	.15	.45	.008	.022	.66	1.27		.51					
4	.115	.46	.010	.024	.25	2.20		.98					

APPROVED
DRAWO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
8-10-73
J. Burns

ITEM	TENSILE	2% YIELD	% ELONG.	% RA	HARDNESS	HARDEN- ABILITY	REMARKS
1	77500	56500	29.0	61.1	MIN 143		Mill Source - Republic Steel
2	77900	49900	31.0	63.5	BIE 131		Mill Source - Republic Steel
3	81500	53000	31.0	68.2	BIE 170		Mill Source - U.S. Steel Corp.
4	84000	53000	27.0	75.5	BIE 179		Mill Source - Republic Steel

Bechtel Corp
J. T. Field
3-6-74

This is to certify that to the best of our knowledge and belief the above material has been manufactured in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

ARMS INDEXED	
DTG	YMRSPI
DN	ED734-B35

TUBE TURNS

PENETRATION

X 12

COPY

FORM NPP-1 DATA REPORT FOR FABRICATED NUCLEAR PIPING SUBASSEMBLIES*
(As Required by the Provisions of the ASME Code Rules)

1. Fabricated by Tube Turns Louisville, KY Order No. 71143-12
(Name and Address of Fabricator)
2. Fabricated for Detroit Edison Company Order No. IE-84485
Enrico Fermi Atomic Power Unit No. 2
3. Owner Detroit Edison Co. 4. Location of Plant Stoney Creek, Mich.
5. Piping System Identification R. H. R. SUPPLY
(Brief description of intended use, main coolant etc.)
(a) Drawing No. 71143-D3.1 Prepared by Tube Turns
(b) National Board No. N/A
Flued head & process pipe Class 1
remainder Class 2.
6. The material, design, construction, and workmanship complies with ASME Code Section III, Class _____
Edition 1971, Addenda Date Winter 1971, Case No. N/A
Remarks: Manufacturers' Data Reports properly identified and signed by Commissioned Inspectors have been furnished for
the following items of this report N/A
(Name of Part - Item number, Manufacturer's name, and identifying stamp)

7. Shop Hydrostatic Test 1825 psi. **COPY**
8. Description of piping inspected Serial #47408 20"X28"X36" Penetration Assy.
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length)
Process Pipe: SA106GrB 20"X1.031"WX13' 4-3/4" Long
- fittings - flanges, etc.)
Guard Pipe: SA155 KCF 70 28"X1.0"WX12' 1-7/8" Long
Guard Pipe Butt Weld Ends: SA155 KCF70 28"x1.0"WX9" Long
Guard Pipe Bellows: SA240-321 28"X.05"WX3" Long
Flued Head: SA105Gr2 36"X.5"WX 10-1/2" Long
Center Spool: SA516Gr70 36"X.5"WX 21-1/2" Long
Nozzle Nipple: SA516Gr70 36"X.5"WX3" Long
Nozzle Bellows: 2 Ply SA240-321 36"X.05"WX13" Long
Total Length of Completed Assembly: 14' 3-1/4"

We certify that the statements made in this report are correct and that the fabrication of the described piping conforms
with the requirements of SECTION III of the ASME BOILER AND PRESSURE VESSEL CODE.
Date 17 Dec 74 Signed Tube Turns By Edw. G. Lickteig
(Fabricator)
Certificate of Authorization Expires June 20, 1975 Certificate of Authorization No. N473

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 or Province of Kentucky and employed by Hartford Steam Boiler
Inspection & Insurance Co. of Hartford, Connecticut
have inspected the piping described in this Data Report on 17 Dec 74 and state that to the best of my knowledge
and belief, the Manufacturer has constructed this piping in accordance with the applicable Subsections of ASME Code,
Section III, except that the inspection of bellows element covers
By signing this certificate, neither the Inspector nor his employer make any warranty, expressed or implied, concern-
ing the piping 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 17 December 1974 Commissions KY 491
(Inspector) National Board, State, Province and No.

OT
LO
D
Tube Turns
P. O. Box 987
Louisville, Ky.

S
HT
IO
P
Tube Turns
718 So. 28th St.
Louisville, Ky.

TUBE TURNS
DIVISION OF CHEMETRON CORPORATION

HOUSTON, TEXAS 4-19-74 jr

TUBE TURNS
ORDER NO. HMF-4-94303

CUSTOMERS'
ORDER NO. 4-94303

DESCRIPTION	PHYSICALS OF MATERIALS FROM WHICH MADE					CHEMICAL ANALYSIS								HEAT OR LOT NO.	SPECIFICA- TION OF MATERIAL FROM WHICH MADE	
	W. R. HEAT TREAT- MENT	YIELD POINT PER SQUARE INCH	TENSILE STRENGTH PER SQUARE INCH	PERCENT ELONGA- TION IN 2"	PERCENT REDUC- TION IN AREA	C	MN	P	S	SI	CR	NI	MO			CB
Item 002 1 Piece		45,000	71,000	35%	63.8	.26	.78	.013	.018	.22					212728	SA-105-2
3" (.500) x 22" (.875) x 10"		Charpy "V" Notch at 0° F.				Specimen Size .394										
.843) Dwg. 72.755 D4R2		48 - 61 - 32 Ft. Lbs.														
at1. SA105-2 Component Spec.		37 - 46 - 44 Mils. Lateral Expansion														
S-F-6A Pen. X-11 Tag: 71143 Item		10% - 20% - 10% Shear														
1 Code J.																
Item 003 1 Piece		50,000	75,000	35%	64.8	.30	.82	.010	.016	.22					212625	SA-105-2
5" (.500) x 28" (1.000) x 20"		Charpy "V" Notch at 0° F.				Specimen Size .394										
1.031) Dwg. 72.755 D5R2		31 - 28 - 22 Ft. Lbs.														
at1. SA105-2 Component Spec.		26 - 24 - 16 Mils Lateral Expansion														
S-F-6A Pen. X-12 Tag: 71143		10% - 10% - 10% Shear														
Item 12 Code J.																

* STANDARD ROUND TEST SPECIMEN ** 1-NORMALIZED 2-ANNEALED 3-HEAT TREATED PER ORDER SPECIFICATION
SUBSCRIBED AND SWORN TO BEFORE ME THIS

19th DAY OF April 19 74

LAURA L. GUERRERO
Notary Public, Licensed for Harris County, Texas
My Comm. Expires June 1, 1975

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

Charles Owen

Charles Owen, Q. C. Technician

Laura L. Guerrero
NOTARY PUBLIC

DETAILED ANALYSIS REPORT

TUBE TURNS
DIVISION OF CHEMETRON CORPORATION

HOUSTON, TEXAS 6-12-74 jr

TUBE TURNS ORDER NO. HMF-4-94303

CUSTOMERS' ORDER NO. 4-94303

S
O
T
L
O
D
 Tube Turns
 P. O. Box 987
 Louisville, Ky.

S
H
I
O
P
 Tube Turns
 718 So. 28th Street
 Louisville, Ky.

STO
P Tube Turns
718 So. 28th Street
Louisville, Ky.

[illegible]

* STANDARD ROUND TEST SPECIMEN ** 1-NORMALIZED 2-ANNEALED 3-HEAT TREATED PER ORDER SPECIFICATION.
SUBSCRIBED AND SWORN TO BEFORE ME THIS I HEREBY CERTIFY

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

12th DAY OF June 19 74

LAURA L. GUERRERO
Notary Public in and for Harris County, Texas
My Commission Expires June 1, 1975

Charles Owen, Q. C. Technician

Laura L Guerrero
NOTARY PUBLIC



MANNESMANNRÖHREN-WERKE

AKTIENGESELLSCHAFT

12

Mannesmann Pipe

PO 6007

SS München
ETA - 1/15/74

TEST CERTIFICATE

(DIN 50049 - 3.1 B)

POSTANSCHRIFT:
MANNESMANNRÖHREN-WERKE AG - 4 DÜSSELDORF 1 - POSTFACH 1104

Manufacturer: Werk Rath

Our Order No: 829/1004

Your Order No: B 722.015/21 USA

Firma

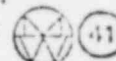
Mannesmann Export AG

(4) Düsseldorf

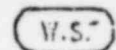
Breite Str. 29/31

Marking of the Product

Manufacturer's Brand:



Inspector's Brand:



Ultrasonic Test:

Product: SEAMLESS STEEL PIPES WITH PLAIN ENDS

Specification: ASTM-A 106

Grade of Steel: GRADE B, BUT WITH
PHYS. PROPERTIES AS GRADE

Item	Number	V.A. 0003	Dimensions and Quantity	Test Pressure XXX psi	Heat No	Sample No
24)	-11-	= 336'8"	20" x 1.031" 58783 lbs	2160	249769	175

W 1725

Result of the Ludle Analysis in %

Heat No	C	Si	Mn	P	S
249769	.26	.28	.95	.028	.017

THESE MILL TEST REPORTS APPLY TO:

YOUR P. O. # 44 114 7
LA BALISE INVOICE # 620 52

Result: Tensile Test

Result: Impact Test

Sample No	Orientation	Dimensions of Test Piece Width D mm thickness	Yield Stress XXX psi - XXX MPa	Tensile Strength XXX psi - XXX MPa	Elong. Lo 2 in	Orientation	Impact Value kg-m/cm ² - ft-lb - J
175	1	Requirements	52770	78800	41.2		

1 - long. q - trans.

Results of other Tests on Tubes

Flattening Test: OK Ring Expanding Test: Ring Tensile Test: Drift Expanding Test: Flanging Test:

Visual Inspection and Control of Dimensions:

checked

C-PROCESS PIPE

The tubes have passed the above mentioned hydraulic pressure test without leakage and have a free passage. The condition of the tubes complies with the specification. This is to certify that the material and the tubes comply with the above specification.

MANNESMANNRÖHREN-WERKE
AKTIENGESELLSCHAFT

Werk Rath

11.12.1973 Po

Disposal test: Date:

NAME _____

DATE _____

CORE SPRAY DIV II

N/A = NOT AVAILABLE

ENRICO FERRI UNIT 2

CORE SPRAY DIV II

DESCRIPTION	MATERIAL SPEC.	HEAT NUMBER	CHARPY IMPACT TEST RESULTS (FULL SIZE- LONG.)							
			TEMP OF	C _V	ENERGY	LAT	EXPANSION			
					FT-LB				MILS	
<u>PC MK E21-3053-4 (CONT'D)</u>										
12" S/100X	SA 420	JCJS	-20°	118	115	115	95	81	91	
10" S/120	GR WPL6									
CONC RED										
5/8x1 1/8x3 3/4	SA 516	3AB	-50°	15	15	15	28	28	28	
HGR LUG	GR 70									
3/4" PRESS TAP	SA 105	ABY				N/A				
3/4" X XS NIPPLE	SA 106	E90455				N/A				
	GR B									
<u>PENETRATION ASSEMBLY X-16A</u>										
PROCESS PIPE										
12" S/100	SA 333	W-1486	-50°	125	101	AC	89	77	30	
SMLS PIPE	GR 6									
FLUED HEAD	SA 105	212728	-20°	24	30	31	25	24	20	
2x20x28x9 3/4	GR 2									

N/A = NOT AVAILABLE

E21-3053-2

FORM NPP-1 DATA REPORT FOR FABRICATED NUCLEAR PIPING
(As Required by the Provisions of the ASME Code Rules)

1. Fabricated by Dravo Corporation, Marietta, Ohio Order No. E-2734
(Name and Address of Fabricator)

2. Fabricated for Detroit Edison, Detroit, MI Order No. 1C-70105
(Name and Address of Institution)

3. Owner Detroit Edison Co 4. Location of Plant Fermi #2 Stony Creek
Monroe County, MI

5. Piping System Identification Core Spray Div. II (21)
(Brief description of intended use, main function, etc.)

6. Drawing No. E-2734-463 Rev. 2 Prepared by Detroit Edison
(b) National Board No - NA

7. Design Conditions of Piping: PS Temp 1
(Pressure) (Temperature)

8. The material, design, construction, and workmanship comply with ASME Code Section III, Class 1
 Edition 1971 Addenda Date Summer 1971 Case No. NA

Remarks: Manufacturers' Data Records properly identified and signed by Commissioned Inspectors have been furnished for the following items of this report: NA
(Name of Part - Part number, Manufacturer's name, and identifying stamp)

COPY

9. Shop Hydrostatic Test NA psi.

10. Description of piping inspected: Piece Mark No. E21-3053-2 Serial No. 5031
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length)
12" Sch 100 SmIs Pipe SA-333-GR6
- fittings - flanges, etc. 12" Sch 100 L/R 90 Ell SA-420-WPL6
1/2" x 1 1/2" x 3" (TxWxL) Hgr Lug SA-516-70
5/8" x 1 7/8" x 3 3/4" (TxWxL) Hgr Lug SA-516-70
12" Sch 100 L/R 90 Ell SA-420-WPL6

CERTIFICATION OF DESIGN (When Applicable)			
Design information on file at: _____			
Stress analysis report on file at: _____			
Design specifications certified by: _____	(1) Prof. Eng. _____	State _____	Reg. No. _____
Stress analysis report certified by: _____	(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 9-20-74 Signed Dravo Corporation By L. W. Stiles, Quality Assurance Supvr
(Fabricator) Certificate of Authorization No. 595
 Certificate of Authorization Expires 3-6-76

CERTIFICATE OF SHOP INSPECTION	
*Hartford Steam Boiler I & I Co	
I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and for the State or Province of <u>Ohio</u> and employed by <u>Hartford, CT</u>	
have inspected the piping described in this data report on <u>9-6-74</u> and state that to the best of my knowledge and belief, the manufacturer has constructed this piping in accordance with the applicable sections of ASME Code, Section III.	
By signing this certificate, neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the piping described in this data report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury, property damage or loss of any kind arising from or connected with this inspection.	
Date <u>9-20-74</u>	<u>W P Smith</u> Ohio 1951 - Penna 1609

RECEIVED NOV 1 1974

DWC REF.

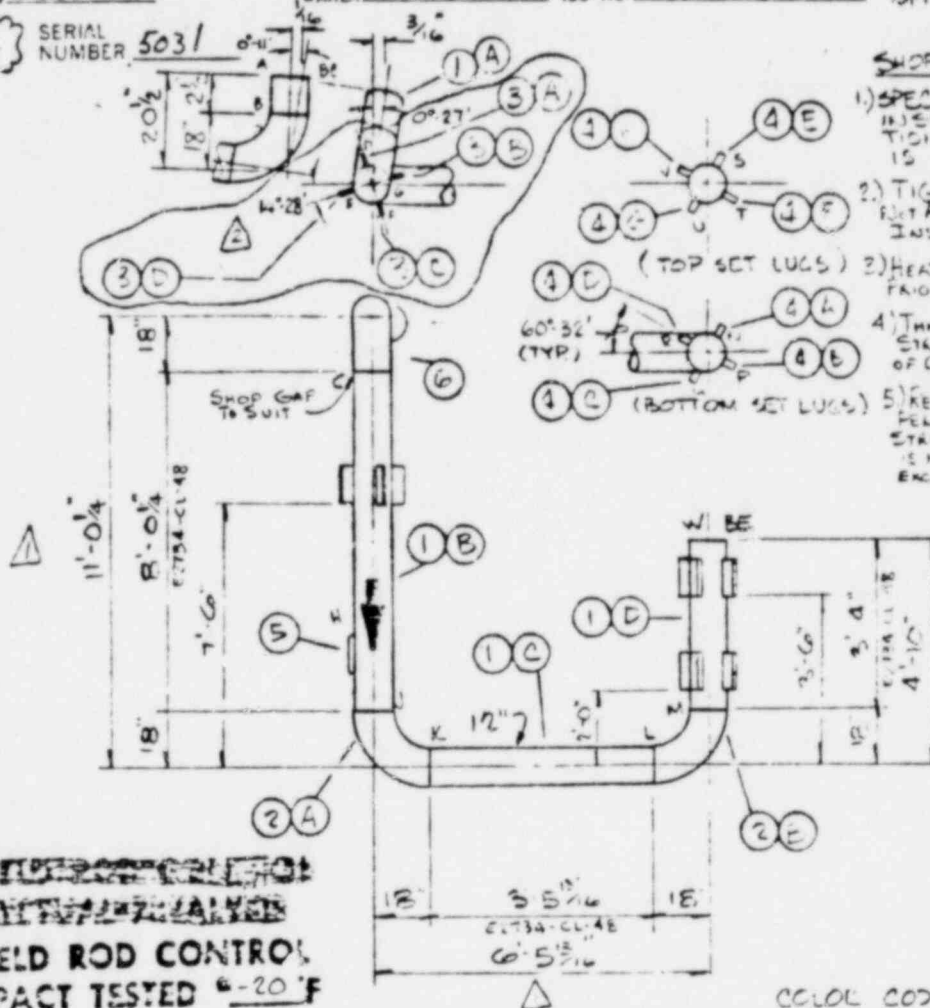
SHOP CODE

ISO NC

E. 2734. 463

SHT. 1 OF 2

 SERIAL
 NUMBER 5031



SHOP NOTES:

- 1) SPELL REQ FOR INSPECTION. INSPECTION REQUIRED IS APPROPRIATE
- 2) TIGHTENING IF ID IS NOT ACCESSIBLE FOR VISUAL INSPECTION.
- 3) HEAT TREATING REQUIRED FROM ENGR. APPROVAL
- 4) THE PIECE NOT TO HAVE A STRESS RELIEVE HOLD TIME OF OVER 2 HRS.
- 5) REPRESENTATIVE TEST MATERIALS FOR STRESS RELIEVE LINES IS NEEDED. ENCEPT FOR ITEM #364

WELD ROD CONTROL
IMPACT TESTED 6-20 F

COLOR CODE ~ WHITE

[illegible]

QUALITY CONTROL & ASSURANCE DATA - CRITICAL SYSTEMS

SHT 100%

E-2734.462

WELDING DATA

WELD IDENT.	FIELD A DEVEL	B	C	D	E	F	G	CODE H PUTE	J	K	L	M
WELDER IDENT.	ROOT	15	15	19	19	19	19	—	18	19	35	15
	INTER	15	15	19	19	19	19	—	52	19	35	15
	COMP	15	15	19	19	19	19	55	18	19	35	15
WELD PROCESS	ROOT	SHAW	SHAW	SHAW	SHAW	SHAW	SHAW	—	SHAW	SHAW	SHAW	SHAW
	INTER	SHAW	SHAW	—	—	—	—	—	SHAW	—	SHAW	SHAW
	COMP	SAW	SAW	SAW	SAW	SAW	SAW	SAW	SAW	SAW	SAW	SAW
WELD PROCEDURE		A	A	C	C	C	C	C	A	B	A	A
WELD MATERIAL	ROOT	W617	W617	W692	W692	W692	W692	—	W617	W685	W617	W617
	INTER	W21	W21	—	—	—	—	—	W21	—	W21	W21
	COMP	W413	W413	W21	W21	W21	W21	W692	W413	W21	W413	W413
		W597	W597	W21	W21	W21	W21	W692	W597	W689	W597	W597
REPAIR FORM NO.		—	—	—	—	—	—	—	193	—	—	199
FERRITE		—	—	—	—	—	—	—	—	—	—	—
FILM BOX NO.		122	122	NA	NA	NA	NA	NA	124	125	120	122
RADIOGRAPHER		JW	JW	NA	NA	NA	NA	NA	DW	JW	JW	MF
TACK WELDER IDENT.		Root	Root	OD	OD	OD	OD	—	Root	Root	Root	Root
RECORD O.D. OR ROOT		39	39	29	29	29	29	NA	39	39	39	39

COPY

HEAT TREAT CHART # 5777

MATERIAL DATA			
IDENTITY	HEAT NO.	SERIAL NO.	TALLY
1A 12" PIPE	27743	8	1-4
1B 12" PIPE	33467	9	1-4
1C 12" PIPE	259155	10	1-13
1D 12" PIPE	27727	1A	1-14
2A 12" 90° ELL	W0480	175	2-772
2B 12" 90° ELL	W0480	176	2-772
3A 402. LUG	483	310	2-1032
3B	483	310	2-1032
3C	483	310	2-1032
3D	483	310	2-1032
4A	348	271	2-987
4B	348	271	2-987
4C	348	271	2-987
4D	348	271	2-987
4E	348	271	2-987
4F	348	271	2-987

WELD PROCEDURE CODE	
A	1-1-A3400-X
B	1-1-H1502-J1
C	1-1-H0100-G
D	
E	
F	

REMARKS

INSPECTION & EXAMINATION DATA SHEET REQD

1/2" WALL THICKNESS CHECK
OK LHL A&W ENDS

E2733 TALLY SHEETS

FINAL APPROVAL (CUSTOMER)

DATE

Mark E. Kottman

9.24.74

FINAL APPROVAL (DRAGO)

DATE

10.1.74

9.21.74

Anlage zum Zeugnis
Enclosure to the Certificate

AKTIEGESELLSCHAFT

20

Werkauftrag-Nr.
Our Order No

005/0405

Seite:
Page -2-

ERGEBNIS DER PRÜFUNGEN
TEST RESULTS

E-2734 #41

COPY

Ergebnis der Schmelzanalyse / Result of the Ladle Analysis: %

Schmelz-Nr. Heat No	C	Si	Mn	P	S	Cr	Mo	Ni				
27727	.19	.32	.69	.014	.025	.30	.034					
27723	.21	.25	.67	.009	.009	.20	.034					
33457	.21	.25	.69	.020	.014	.21	.062					

Ergebnis: Zugversuche
Result: Tensile Test

Ergebnis: Kerbschlagbiegeversuche
Result: Impact Test

Rohre 7

Proben-Sample		Probenabmessung Dimensions of Test Piece		Streckgrenze Yield Stress	Zugfestigkeit Tensile Strength	Dehnung Elong.	Lage* Orientation	Kerbschlagzähigkeit Impact Value		
No	Lage* Orientation	Breite Width	Dicke Thickness	kg/cm ² - psi	kg/cm ² - psi	Low 2" %		CHARTER V-BLOCK TESTING		- 20°C
		Anforderungen: Requirements						ATMOSPHERIC		-
539	L			40360	74670	35.4	L	47.74	52.00	65.71
600	L			44940	74100	35.6	L	33.27	34.72	49.06
601	L			40360	74100	32.0	L	47.01	72.33	57.35
602	L			46000	74100	32.4	L	43.40	49.10	30.33
603	L			48360	74100	34.0	L	49.10	49.10	52.31
<div>APPROVED DRAYC CORPORATION PIPE FABRICATION DIVISION QUALITY ASSURANCE DEPARTMENT <i>J. Barris</i></div>										
* l - längs / long * a - quer / transv										

APPROVED
DRACO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT

J. Burris

* l - longitudinal
* a - transverse

Ergebnis der technologischen Prüfungen
Results of other Tests on Tubes

Ringfaltversuch / Flattening Test: ☒ Ringaufdornversuch / Ring Expanding Test: Ringzugversuch / Ring Tensile Test:
Aufweitversuch / Drift Expanding Test: Bordelversuch / Flanging Test:

Besichtigung und Maßkontrolle:
Visual Inspection and Control of Dimensions

checked

Salvador
Bedard Corp

5-3-73

Sonstige Prüfungen:
Other Tests

991107 L



COPY

Mill Order: 836/0425

Customer's Order No.: B 735.101/21 USA

DRAW No: P 9149

CERTIFICATE

E-2733 #24

It is certified herewith that test-specimens used for the tensile tests and impact-tests made in respect of the above mentioned works order, item 1,2 and 3 had dimension data as follows:-

A. Tensile TestsSpecimens used : 12,7 mm ϕ , cross-section: 126,7 mm²

Item 1 : Sample No. 590 and 591 Q

" 2 : " 599, 600, 601, 602, 603 and 624 Q

" 3 : " 584, 585, 586 and 587 Q

B. Impact Tests (Charpy V-Notch -20°F)Specimens used: 8 mm width, 10 mm height, Fo 0,8 cm²

Item 1 : Sample No. 590 and 591 L

" 2 : " 599, 600, 601, 602, 603 and 625 Q

MANNESMANNROHREN-WERKE AG
Betriebsabteilung Ratn

19.March 1973

Der Werkssachverständige
Lange

ARMS INDEXED

DTC: VMRSPI

DSN: E2733-24

DEVELOPMENT
PIPE FABRICATION DEPARTMENT
QUALITY ASSURANCE DEPARTMENT*Burriss*
5-1-73*Salisbury*
Bechtel Corp
5-2-73

**COPY**

Mill Order: 835/0425

Customer's Order No.: 2 735.101/21 USA

DRAVO No: 9149

E-2733 #24

C E R T I F I C A T E - A P P E N D I X

It is certified herewith that the impact test are made in respect of the above mentioned order with following values for per cent Sheer Fracture and Lateral Expansion:

Item.	Impact Test Number	Sheer Fracture %	Lateral Expansion mm
2	599	90	1,1
		80	1,2
		60	1,3
	600	100	1,0
		90	0,8
		80	1,1
	601	80	0,9
		60	1,5
		60	1,4
	602	90	0,9
		80	1,1
		90	0,8
	603	70	1,1
		80	1,1
		70	1,4

APPROVED
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT

5-1-73

Salasch
Bechtel Corp
5-2-73

MANNESMANNROHREN-WERKE AG
Betriebsabteilung Rath

Der Werksachverständige

WERKSABNAHMEZEUGNIS **COPY**

(DIN 50049 Abschnitt 3B)
TEST CERTIFICATE

E-2733#24

KURZANSCHRIFT

MANNESMANNRÖHRENWERKE AG 4 DÜSSELDORF 1 POSTFACH 1104

MANNESMANN Export AG

4 Düsseldorf

Hersteller: Betriebsabteilung Rath

Manufacturer:

Werksauftrag-Nr.: 836/0425


Our Order No:

Bestell-Nr.: B 735.101/21 USA


Your Order No:

Kennzeichnung des Erzeugnisses

Marking of the Product

Zeichen des Lieferwerks: 

Manufacturer's Brand:

Stempel des Sachverständigen 

Inspector's stamp:

Ultraschallprüfung:

Ultrasonic Test:

Werkstoff: 6

Grade of Steel:

Erzeugnis: SEAMLESS STEEL PIPES WITH PLAIN ENDS
Product:
Lieferbedingung: ASME-SA 333/ASME III CLASS I)
Specification:

Rohre 6 a

Pos. Item	Stück Number	V.A.	Abmessung und Menge Dimensions and Quantity	Prüfdruck Test Pressure psi	Schmelze-Nr. Heat-No	Probe-Nr. Sample-No
2)	-10		= 298 3" 12 3/4" x .730" 32111 lbs	2400	27727 27743 33457	599 600 601 602 603
HEAT TREATMENT: 30 min. at 1652°F/air cooling						
with inspection by Moody Eng. Co						

The pipes have been ultrasonically tested in accordance with ASME III
NB-2552

Die Rohre haben den Wasserinnendruckversuch bestanden, sind dicht, haben freien Durchgang und befinden sich im vorgeschriebenen Lieferzustand.
The tubes have passed the above mentioned hydraulic pressure test without leakage and have a free passage. The condition of the tubes complies with the specification.

Es wird bestätigt, daß der Rohrwerkstoff und die Rohre der oben angeführten Lieferbedingung entsprechen.

This is to certify that the material and the tubes comply with the above specification.

Die gestellten Anforderungen sind lt. Anlage erfüllt.

The test results in the enclosure correspond with the requirements.

Anlagen: Ergebnisse

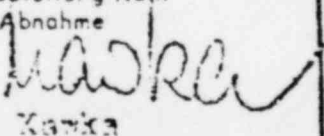
Enclosure: Results

Düsseldorf - Rath, 29. 2. 1973
Unser Ruf Durchwahl 6502 - 446
Phone

APPROVED
DEMAND CORPORATION
PIPE FABRICATING DIVISION
QUALITY ASSURANCE DEPARTMENT
J. Burns
3-1-73

MANNESMANNRÖHREN-WERKE
AKTIENGESELLSCHAFT
Betriebsabteilung Rath

Abnahme


Kanka

Dravo Corporation
1115 Gilman St.
Marietta, Ga

ARMS INDEXED ~~CONFIDENTIAL~~
DIVISION OF CHEMETRON CORPORATION

LOUISVILLE, KY. 9/1/73

DIC: VMRSPI

DSN: E2734-627

~~E-2734 #627 Marked E-2794-50~~

COPY

TUBE TURNS
ORDER NO. 28155

CUSTOMERS' ORDER NO. E2736-50

A30-06-13-900-0N-000

DESCRIPTION	PHYSICALS OF MATERIALS FROM WHICH MADE					CHEMICAL ANALYSIS										HEAT OR LOT NO.	MADE FROM MATERIAL OF CHEMISTRY AND TENSILE PROPERTIES OF SPECIFICATION	
	** HEAT TREAT- MENT	YIELD STRENGTH PSI	TENSILE STRENGTH PSI	PERCENT ELONGA- TION IN 2"	PERCENT REDUC- TION IN AREA	C	MN	P	S	SI	NI	CR.	MO	CB				
12 S/100 LB90 W H11a MPI6 Devel For 9101 Rev. 3 to E2734 PH 147 106-73	2	43,900	81,400	40.0		.26	.97	.012	.029	.20							W-0450 / 4	SA333 Gr. 6
Charpy V-Notch @ -20°F (.39%) 30-31-28 Ft. Lbs.																		
Lateral Expansion In Mils. 28-25-21																		
1/2 Shear 30-20-40																		
It is hereby certified that the above fittings have a maximum hardness of HRI97.																		
The specific marking that will identify the material to this certification is the Tube turns symbol, size, specification, grade and heat or lot number.																		
It is hereby certified that the above material conforms to all requirements of ASME SA234 and to all applicable special requirements of Article III 2000 of Section III of the ASME Boiler and Pressure Vessel Code, 1971 edition and addendums through Summer 1971.																		
Magnetic Particle inspection satisfactorily performed per T106-002 Rev. 2 in accordance with ASME Section III and found acceptable.																		
<div>Drayco Corp. J. J. Walsh 10-4-73</div> <div>APPROVED DRAYCO CORPORATION PIPE FABRICATION DIVISION QUALITY ASSURANCE DEPARTMENT 9-13-73 Burns</div>																		

HARD ROUND TEST SPECIMEN
 HEATED
 NORMALIZED
 NORMALIZED AND STRESS RELIEVED
 STRESS RELIEVED
 STRETCHED AND TEMPERED
 HOT FORMED
 AS TREAT PER ORDER SPECIFICATION

SUBSCRIBED AND SWORN TO BEFORE ME THIS

4 DAY OF September 19 73

Maria D. Jirca
NOTARY PUBLIC

Notary Public, Jefferson County, Ky.
My commission expires Feb. 10, 1974

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

L. L. Moore, Coordinator product Control

ST
LO
D
ST
TO
P

Dravo Corporation
P.O. Box 581
Marietta, GA

Dravo Corporation
1115 Gilman St.
Marietta, GA

UNCLASSIFIED MATERIALS DATA

TUBE TURNS
DIVISION OF CHEMETHON CORPORATION

LOUISVILLE, KY. 8/23/73

TUBE TURNS
ORDER NO. E2734-50

E-2734 #617

Mark: E2734-50

CUSTOMERS' ORDER NO. A30-0664-900-QN-008

DESCRIPTION		PHYSICALS OF MATERIALS FROM WHICH MADE				CHEMICAL ANALYSIS								HEAT OR LOT NO.	MADE FROM MATERIAL OF CHEMISTRY AND TENSILE PROPERTIES OF SPECIFICATION	
** HEAT TREAT- MENT	YIELD STRENGTH P S I	TENSILE STRENGTH P S I	PERCENT ELONGA- TION IN 2"	PERCENT REDUCED THICK- IN AREA	C	MN	P	S	SI	NI	CR.	MO	CB			
Item 6 2 Only 12 1/2" 100 STD W/1111 10420 WFL6 Inval Per 9101 Nov-71 Ref. 3 To 12734 Ref 147 106-72 Ref. 3 to 12734, Ref 145 106-72	6	43,900	61,400	40.0		26	97	102	029	20					10030	SA333 GF
Charpy V-Notch 8-302F (.514) 30-31-21 Ft. Lbs.																
Natural Expansion In Hils. 25-21-23																
Submar 30-26-40																
Hydrostatic Particle Impaction satisfactorily performed per ISO-002 Rev. 2 in accordance with ASME Section III and found acceptable.																
The specific marking that will identify the material to this certification in the Tube Turns symbol, size, specification, grade and heat or lot number.																
It is hereby certified that the above material conforms to all requirements of ASME SA234 and to all applicable special requirements of Article III 3000 of Section III of the ASME Boiler and Pressure Vessel Code, 1971 edition and addendums through Summer 1971.																
ARMS INDEXED																
DTC: VM RSP I																
DSN: E2734-617																

APPROVED
CORPORATION DIVISION
ASSURANCE DEPARTMENT

9-10-73
9-10-73
9-10-73

Dravo

Dravo

APPROVED
DRAVO CORPORATION
PIPE FABRICATION DIVISION
9-10-73
9-10-73
9-10-73

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

SUBSCRIBED AND SWORN TO BEFORE ME THIS

23 DAY OF August 1973
Main J. J. J. J. J.
NOTARY PUBLIC

- STANDARD ROUND TEST SPECIMEN
- 1 ANNEALED
- 2 NORMALIZED
- 3 NORMALIZED AND STRESS RELIEVED
- 4 STRESS RELIEVED
- 5 QUENCHED AND TEMPERED
- 6 HOT FORMED
- 7 HEAT TREAT PER ORDER SPECIFICATION

Notary Public, Jefferson County, Ky.
My commission expires Feb. 10, 1974

Corrected Copy

The Colonial Machine Company, Inc.

P. O. Box 290 — Pleasantville, Pa. 16341

Dravo Corporation
P. O. Box 501
Marietta, OH 45750

May 10, 1974

Page 1 of 2

MATERIAL

CERTIFICATIONS

E2734-820

DTG: VMSPI
DSN: E2734-820
ARMS INDEXED



UR ORDER NO.

E2734-155

OUR INVOICE NO.

DATE SHIPPED

ITEM	TYPE	MATERIAL-SPEC	SHIPPED	HEAT NUMBER
1		ASME 1A16 Gr. 70 INITIALIZED		
2		1/2" Thk. x 1-1/2" Wide Plate per E2734-9110	40°	645J483 (483)
3		1'-0" x 2'-0" x 1/2" Thk. Plate per E2733-PI-3 Rev. 1	1	645J483 (483)
4		1'-0" x 2'-0" x 1/2" Thk. Plate per E2733-PI-3 Rev. 1	1	645J483 (483)
5		5/8" Thk. x 1-7/8" Wide Plate per E2734-9110	40°	650J343 (343)
6		1'-0" x 2'-0" x 5/8" Thk. Plate per E2733-PI-3 Rev. 1	1	650J343 (343)
7		1'-0" x 2'-0" x 5/8" Thk. Plate per E2733-PI-3 Rev. 1	1	650J343 (343)
8		3/4" Thk. x 2-1/4" Wide Plate per E2734-9110	40°	72242 (242)
9		1'-0" x 2'-0" x 3/4" Thk. Plate per E2733-PI-3 Rev. 1	1	72242 (242)
9		1'-0" x 2'-0" x 3/4" Thk. Plate per E2733-PI-3 Rev. 1	1	72242 (242)

ITEM	C	AN	P	S	SI	CR	NI	MO	CU	CB	TI	CO	OTHER ELEMENTS
2	.04	1.13	.011	.021	.21								
3	.18	.96	.012	.027	.20								
5	.23	1.20	.009	.027	.23								

ITEM	TENSILE	YS YIELD	% ELONG.	% R.A.	HARDNESS	HARDEN- ABILITY	REMARKS: 1. 2. 3. 4. 5. 6. ETC.
2	32610	38130	19.8%	24.5			
3	78560	82620	37.0				
5	38720	40000	37.0				
7							
9							
9							
Items 1 thru 9 - Bend Test - Satisfactory							

APPROVED
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT

5-22-74
J. R. R. W.

This is to certify that to the best of our knowledge and belief the above material has been manufactured in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

Bachtel Corp
6-5-74
S. Cozart

By: R. Waychoff
RECORDED
DRAVO
PIPE FABRICATION
DIVISION

The Colonial Machine Company, Inc.

P. O. Box 290 — Pleasantville, Pa. 16341



COPY

May 10, 1974

Page 2 of 2

Dravo Corporation

MATERIAL CERTIFICATIONS

E2734-820

OUR ORDER NO.

E2734-255

OUR INVOICE NO.

DATE SHIPPED

ITEM	TYPE	MATERIAL SPEC.	SHIPPED	HEAT NUMBER
1, 2 8, 3		Long. Charpy V Notch Impact of 20 Ft. Lbs. at -50°F.	25-27-28	Avg. 26.7
4, 5 8, 6		Charpy Results 25-28-28 Avg. 23.8, 15 Ft. Lbs. @ -50 Deg. F.		
7, 8 8, 9		Full Size Long. V Notch Impact Test 10 x 10 PSI Radio @ -50 Deg. F. 30-44-44 Ft. Lbs.		
		All above material per ASTM III Class I.		

ITEM	C	MN	P	S	SE	CR	NI	MO	CU	CS	TI	CO	OTHER ELEMENTS
1, 2 8, 3													The above tests and plates normalized at 1625/1650 Deg. F. held one hour per inch of thickness and air cooled.
4, 5 8, 6													The above tests and plates normalized at 1625/1650 Deg. F. held one hour per inch of thickness and air cooled.
7, 8 8, 9													Plates normalized at 1660 Deg. F. plus or minus 25 Deg. F. Maintained 20 minutes per inch of thickness. Air Cooled.

ITEM	TENSILE	2% YIELD	% ELONG.	% RA	HARDNESS	HARDEN- ABILITY	REMARKS: 1 2 3 4 5 & ETC
	All of the above material has been Ultrasonically Tested per AS 2570. See attached Report Nos. 70-277.						
	Shear Fracture 25% Max 1 thru 3 -				Impact	Lateral Expansion	
					24.8	.026	
					44.8	.023	
	Shear Fracture 15 to 20% Max. 4 thru 6 -				48.8	.026	
					48.8	.024	
	Shear Fracture 8 to 10% Max. 7 thru 9 -				48.8	.041	
					48.8	.022	
					48.8	.015	
					48.8	.019	

This is to certify that to the best of our knowledge and belief the above material has been manufactured in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

Bechtel Corp
6-5-74
S. CORONA

By *R. Waycraft*
GUARD
EX-100-317

APPROVED
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
5-22-74
J. Brown

DRAVO CORP. ORDER E2734-192 IT. 1A

DRACO STEEL CORPORATION
METALLURGICAL DEPARTMENT

DATE SHIP TO

SHIPMENT NO.

CARRIER, INITIAL AND NO.

PLANT

12/2/72

602-11292

Truck

Chemical Machine
P.O. Co-974

Johnstown

Mills Alloy Steel Co
1 W Interstate Rd
Bedford Oh 44014

Dim 37
2pc
1/2 x 24 x 48

SHIPPED TO Bedford Oh

For UT Report

COPY
Dravo Order
E2734-23
APPROVED

REPORT OF MECHANICAL AND CHEMICAL TESTS

Customer Order No.	Spec on Plate or Mill Order No.	Heat No.	Pcs.	Gauge	Width	Length	Yield Tensile	Tensile Strength	Elong. %	Red. %	Bonds	CHEMICAL ANALYSIS					Remarks
												C	Mn	P	S	Si	
61C-11302	750557	650J238	1	1/2	70	227	43990	61470	31.0	5-7	OK	.11	.89	.010	.018	.19	OH Steel ASME SA516 Gr. 60 PVQ
66H11306	748421	645J531	1	2 1/4	72	144	41270	76750	E1.2" 32.0		OK	.28	.84	.010	.016	.20	ASME SA516 Gr. 60 PVQ
61H1 Stock	448079	662J435	1	3/4	96	252	54730	79050	8" 23.5	5-7	"	.24	1.07	.010	.016	.16	ASME SA516 Gr. 70 PVQ to SA593
	448078		1	1/2	✓		55100	77600	23.0								
	448080		1				51090	77840	24.0								
	448081		1				55140	78920	24.5								
	149486	645J483 (483)	1				58130	82610	24.5	5-7	"	.24	1.13	.011	.021	.21	J. McAlister JUL 3 1978
	448079	29-31-31	Avg.		30.3												
	448078	34-38-35	"		35.7												
	448080	30-27-28	"		28.3												
	448081	26-26-28	"		26.7												
	149486	25-27-28	"		26.7												
Long. Charpy V Notch Impacts of 20 ft lbs at -50 deg. F.																	
Above tests and plates normalized at 1625/1650 deg. F. held one hour per inch of thickness and air cooled.																	
103B11343	750554	650J348	1	1 1/2	96	252	41010	70480	27.5	5-7	OK	.18	.96	.012	.027	.20	ASME SA516 Gr. 60 PVQ
85H11254		661J526	2	1-1/8	72	144	42240	70830	26.5		OK	.18	.86	.016	.024	.	ASTM A36

APPROVED
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
DATE 7-26-78
G. F. GRAHAM

Johnstown

50314, 5, 6, 7, 8, 9, 7²⁰
50321 - 50322 - 50324

BETHLEHEM STEEL CORPORATION
STEEL DEPARTMENT

[illegible]

Item 4

1111 Interstate Rd
Bedford, Oh 44014
Hills Alloy Steel Co

Bedford Oh

3000 5/8 x 24 x 48

COPY

APPROVED

KRC

REPORT OF MECHANICAL AND CHEMICAL TESTS

Order No.	Spec. No.	Qty.	Size	Grade	Length	Yield Point	Tensile Strength	Elong. %	Red. %	Rebts	C	P	S	Chemical Analysis	Specification or Remarks
10-11174-5	731102	2	1/2	96	262	49240	78010	31.0	5-7	OK	.18	.90	.010	.015	Oil Steel ASME SA516 Gr. 70 PVQ
	731103	1			244	48340	77680	26.0							
	731104	2			223	48060	76990	27.0							
	731105	1				48710	79130	28.0							
	731106	1				49380	77900	27.5							
	731107	2				48080	76990	27.0							
	731108	1	5/8	96	200	47010	74100	30.0	5-7	"	.11	.89	.010	.018	
	731109	1	5/8	96	252	42620	78560	33.0	5-7	"	.16	.86	.012	.027	
	731110	1	5/8	96	28-23-28	Avg. 28	0.15 ft	lbs	0-50 deg. F.						
	731111	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731112	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731113	2	3/4	58	228	36530	56600	34.0		"	.12	.49	.010	.015	
	731114	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731115	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731116	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731117	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731118	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731119	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731120	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731121	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731122	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731123	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731124	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731125	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731126	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731127	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731128	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731129	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731130	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731131	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731132	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731133	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731134	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731135	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731136	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731137	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731138	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731139	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731140	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731141	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731142	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731143	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731144	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731145	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731146	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731147	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731148	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731149	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731150	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731151	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731152	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731153	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731154	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731155	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731156	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731157	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731158	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731159	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731160	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731161	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731162	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731163	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731164	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731165	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731166	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731167	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731168	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731169	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731170	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731171	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731172	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731173	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731174	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731175	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731176	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731177	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731178	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731179	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731180	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731181	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731182	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731183	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731184	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731185	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731186	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731187	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731188	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731189	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731190	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731191	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731192	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731193	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731194	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731195	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731196	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731197	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731198	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731199	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	
	731200	1	1/2	96	252	58930	84110								

E21-3053-4

FORM NPP-1 DATA REPORT FOR FABRICATED NUCLEAR PIPING

(As Required by the Provisions of the ASME Code Rules)

NPPI SHT 10F2

1. Fabricated by Dravo Corporation, Marietta, Ohio Order No. B-2734
 (Name and Address of Fabricator)
 2. Fabricated for Detroit Edison, Detroit, MI Order No. 1C-70105
 (Name and Address)
 3. Owner Detroit Edison Co 4. Location of Plant Fermi #2 Stony Creek
Monroe County, MI

COPY

5. Piping System Identification CORE SPRAY DIV II
 (Brief description of intended use, main coolant, etc.)

(a) Drawing No. E2734-465 REV. 6 Prepared by Detroit Edison

(b) National Board No. - NA

6. Design Conditions of Piping NA psi NA °F
 (Pressure) (Temp.)

7. The material, design, construction, and workmanship complies with ASME Code Section III, Class 1
 Edition 1971, Addenda Date Summer 1971, Case No. NA

Remarks: Manufacturers' Data Records properly identified and signed by Commissioned Inspectors have been furnished for
 the following items of this report NA
 (Name of Part - item number, Manufacturer's name, and identifying stamp)

8. Shop Hydrostatic Test NA psi.

9. Description of piping inspected PC, MK. # E21-3053-4 SERIAL # 5043
 (include - mark no. - material spec. - nom. pipe size - schedule or thickness - length)

ITEM-1	1'6"	12" SCH 100 SMLS PIPE	SA 333 GR 6
- fittings - flanges, etc.			
2	1'2"	10" SCH 120 SMLS PIPE	SA 333 GR 6
3	1	12" SCH 100 90° LR ELL	SA 420 WPL 6
4	1	12" SCH 100 90° LR ELL	SA 420 WPL 6

CERTIFICATION OF DESIGN (When Applicable)

Design information on file at _____
 Stress analysis report on file at _____
 Design specifications certified by _____ (1) Prof. Eng. _____ State _____ Reg. No. _____
 Stress analysis report certified by _____ (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 8-10-78 Signed Dravo Corporation John Burris
 (Manufacturer) (Quality Assurance Department)
 Certificate of Authorization Expires 1-1-79 Certificate of Authorization No. N1200

CERTIFICATE OF SHOP INSPECTION

*Hartford Steam Boiler I & I Co
 I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and for
 the State or Province of Ohio and employed by Hartford, CT
 have inspected the piping described in this data report on AUG 10 1978 and state that to the best of my knowledge
 and belief, the manufacturer has constructed this piping in accordance with the applicable sections of ASME Code, Section III.

By signing this certificate, neither the Inspector nor his employer make any warranty, expressed or implied, concerning the
 piping 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 AUG 10 1978

W. Smith
 (Inspector)

Commission

OH. COMM.
 PA. 1607

(National Board, State, Province and No.)

INFORMATION ONLY

DRAVO CORPORATION - PIPE FABRICATION DEPARTMENT, MARIETTA, OHIO

CUSTOMER DETROIT EDISON-ENRICO FERRI UNIT 2 DWG REF.SYSTEM CORE SPRAY DIV. II (21)SHOP CODE 134CLASS DECO-A

AREA

ISO NO. 3053

SKETCH NUMBER

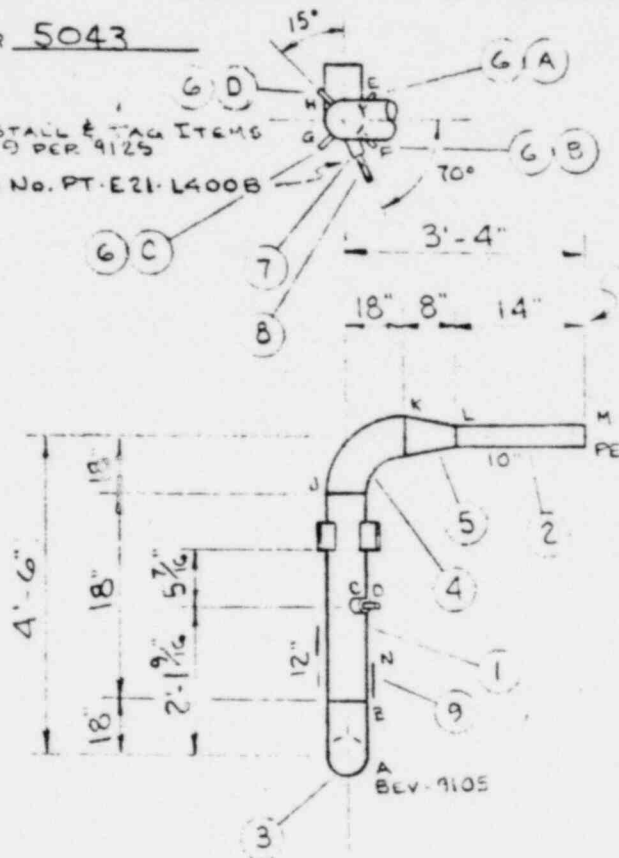
E-2734-465 6SERIAL NUMBER 5043

MARIETTA

COPY

INSTALL & TAG ITEMS
B'S 9 PER 9125

TAG No. PT-E21-L4008

EXCESS ALLOWED
FIELD CUT TO SUIT

SHOP NOTES:

- 1) SPEC'L REQ'T. FOR INSERVICE INSP. PER SP 9 IS APPLICABLE.
- 2) TIG ROOT REQ'D IF I.D. IS NOT ACCESSIBLE FOR VISUAL INSPECTION.
- 3) HEAT STRAIGHTENING REQUIRE PRIOR ENGR. APPROVAL
- 4) THIS PIECE IS NOT TO HAVE A STRESS RELIEVE HOLD TIME OF OVER 2 HR.
- 5) REPRESENTATIVE TEST MAT'L PER E2733-PI-4 FOR STRESS RELIEVED LINES IS REQ'D

WELD ROD CONTROL
IMPACT TESTED @ -20°F

COLOR CODE - WHITE

ASME SECT. III CL. 1, <u>OPTIONAL</u>		SHOP BEVEL	<u>9101</u>	PIPE SPEC.	<u>SA-333-GR 6</u>	ONE REQ'D	
BACKING RINGS/INSERTS	<u>YES</u> NO	FIELD BEVEL	<u>AS NOTED</u>	BW FITTG SPEC	<u>SA-420-WPL-6</u>	MARK NO.	
RED OXIDE	<u>YES</u> NO	FAB. PROC. NO.	<u>SP-1</u>	FS FITTG SPEC	<u>SA-420-WPL-6</u>	E21-3053-4	
SPEC'L PAINT <u>G1636</u>	<u>YES</u> NO	REP./M.P. TEST	<u>SP-7</u> YES NO	FLANGE SPEC		TOTAL WEIGHT	
SPEC'L CLEAN <u>SP-5</u>	<u>YES</u> NO	RADIOGRAPH	<u>SP-7</u> YES NO			520 LBS	
SAND BLAST O.D.	<u>YES</u> NO	ULTRASONIC	<u>YES</u> NO			DESIGN COND	
GRIT BLAST I.D. <u>SP-5</u>	<u>YES</u> NO	STRESS RELIEVE	<u>SP-3</u> YES NO			1250 PSIG 575°F	
HYDROTEST	<u>YES</u> NO	HEAT TREAT	<u>YES</u> NO				
QUAN.	DESCRIPTION						
1'-6"	① 12" SCH. 100 SMLS. PIPE						
1'-2"	② 10" SCH. 120 SMLS. PIPE						
1	③ 12" SCH. 100 90° LR ELL BOE 9101-BOE 9105						
1	④ 12" SCH. 100 90° LR ELL BEE 9101						
1	⑤ 12" X 10" SCH 100 X SCH 120 CONCENTRIC BEE 9101						
4	⑥ 5/8 X 1 1/2 X 3 1/2" (TKWXL) HGR LUG PER 9108 (SA 516 GR 70)						
1	⑦ 3/4" CHEN. PRESS TAP TYPE -Y3 PER 9123						
1	⑧ 3/4" X 5 SMLS. NIPPLE 6" LG PER 9124						
1	⑨ CODE STAMP PLATE PER 9111 C.S.						
1	⑩ 12" MCP W/ PLYWOOD DISC PER SP-5						
1	⑪ 10" do						
1	⑫ 4 UNIT BAG SILICA GEL / 1-2 UNIT BAG SILICA GEL						
A RECOFAM PER MK'D DESIGN DWG. 6/L X 2-10-78							
B ADD'L FIELD TO MOD STAND PER TWK E2-2742-16							
C REV'D PER E2-24-600 6/L AH 3-27-78							
D REV'D PER E2-24-555 6/L AH 3-27-78							
E REV'D PER ISO 3053 REV. 1 6/L AH 2-15-78							
F REV'D PER E2-20-737 6/L AH 10-26-78							
		DR	<u>WJG</u>	2-8-78	TOTAL MAT'L		
		CHKD	<u>RS</u>	2-10-78	TOTAL LABOR		
		NO LDR	<u>JL</u>	3-22	TOTAL SKETCH		

QUALITY CONTROL & ASSURANCE DATA - CRITICAL SYSTEMS

E-2734.465

WELDING DATA

WELD IDENT.		FIELD A BEVEL	B	C	D	E	F	G	H	J	K	L	PLANT M.N. ELEC. R.
WELDER IDENT.	TACK ROOT		91	91	19	91	91	91	91	91	86	91	19
	INTER		31	47	54	47	47	47	47	31	19	31	N
	COMP.		31	47	54	47	47	47	47	31	19	31	N
WELD PROCESS	TACK ROOT		SMW	SMW	SMW	SMW	SMW	SMW	SMW	SMW	SMW	SMW	N
	INTER		GMW	SMW	SMW	SMW	SMW	SMW	SMW	GMW	GMW	GMW	N
	COMP.		SMW	SMW	SMW	SMW	SMW	SMW	SMW	SMW	SMW	SMW	N
WELD PROCEDURE	TACK ROOT		A	A	A	A	A	A	A	A	A	A	N
	INTER		C	A	A	A	A	A	A	B	C	A:B	E
	COMP.		X77	X77	X77	X77	X77	X77	X77	X77	X77	X77	N
WELD MATERIAL	TACK ROOT		X19	X77	X77	X77	X77	X77	X77	X14	X104	X14	N
	INTER		X77	X77	X77	X77	X77	X77	X77	X77	X77	X77	N
	COMP.		W988	X38	X77	X77	X45	X45	X45	X45	W988	W988	W988
REPAIR FORM NO.			297	NA	NA	NA	NA	NA	NA	NA	NA	NA	N
FERRITE			NA							NA	NA	NA	N
FILM BOX NO.			173							173	173	171	N
RADIOGRAPHER			BF							BF	DM	BF	N
TACK WELDER			NA							NE	NA	NA	N
RECORD OD/ROOT			1							1		1	N
Gauge, etc for 1/2" mismatch		NO ENDS	INITIAL							1		1	N
SIZING		NO ENDS	INITIAL							NA		NA	N
BUILDUP		NO ENDS	INITIAL							NA	Y	NA	N

HEAT TREAT CHART # 7841 (7-31-78)

MATERIAL DATA				WELD PROCEDURE CODE	
IDENTITY	HEAT NO.	SERIAL NO.	TALLY	A	B
1 12" PIPE	A03480	4	1-240	1-1-H0100-E11	1
2 10" PIPE	46493	20	1-264	1-1-A3100-G96	2
3 12" 90° ELL	W4965B	232	2-1274	1-1-A1502-P7	3
4 12" 90° ELL	JCCS	202	2-1354	GWS-2	4
5 12" x 10" RED	JKJS	362	2-1358		5
6A HGR. LUG	348	264	2-987		6
6B HGR. LUG	348	264	2-987		7
6C HGR. LUG	348	255	2-987		8
6D HGR. LUG	348	255	2-987		9
7 3/4" TAP	ABV	NA	2-1344		10
8 3/4" NIPPLE	E9045E	NA	2-1381		11
9 CODE R	NA	NS	-		12

REMARKS	
INSPECTION & EXAMINATION DATA SHEET REQD.	
10% WALL THICKNESS CHECK OK	
ENDS A & M	

FINAL APPROVAL (CUSTOMER)

DATE

FINAL APPROVAL (DRAWN)

DATE

M.W. DeLong 8-15-78

Greg. S. Saha

8-15-78



United States Steel Corporation

National WORKS

STANDARD SWORN TEST REPORT TUBULAR PRODUCTS

COPY

10-10-75

DATE

MATERIAL

Seamless Pressure Pipe

TREATMENT

Normalized 1600°F - 107 minutes (Aircooled)

CUSTOMER

NAME

Dravo Corp DT# 27-14377

ADDR

1115 Selman Ave
Marietta Ohio Order# E2734-239

TEST METHOD

Longitudinal tensile tests

GRADE

1-6 ASME SA 333

1-6 ASTM A 333

CUSTOMER'S ORDER NO.

21-27-00109

U.S. STEEL ORDER NO.

AM 15525

INVOICE NO.

356-06169

ITEM NO.	CODE OR LOT NO.	SIZE O.D.	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 2" %	C	Mn	P	S	Si	Mo	
	4002	12 3/4	.844	A03480	2800	46190	69450	52.5	.21	1.12	.010	.024	.15	check	
				A03480	2800	46060	71290	52.0	.22	1.14	.010	.027	.16	check	
									.20	1.08	.009	.024	.16	ladle	
Flattening tests satisfactory															
Full size longitudinal C.V.N. impacts at minus - 50°F															
				A03480		35	30	.031							
						52	38	.044							
						17	28	.022							
Full size longitudinal C.V.N. impacts at minus - 50°F Stress relieved at 1100°F															
				A03480		36	32	.032							
						38	28	.032							
						34	30	.030							

T. J. McAULEY

APR - 5 1975

T.M.D.

Reviewed & Approved
Quality Assurance Dept.
GUTHRIE, INC.
DATE 5-2-75

STATE OF PENNSYLVANIA
COUNTY OF ALLEGHENY

} ss

SUBSCRIBED AND SWORN TO BEFORE ME THIS

10th

DAY OF

October

19 75

E. Kenneth Palmer, Notary Public
MY COMMISSION EXPIRES Jan 2, 1979

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

(SIGNATURE OF DEPONENT)

(DEPONENT'S NAME)

United States Steel Corporation, National Ducting Works

PHOENIX STEEL CORPORATION

TUBE DIVISION
PHOENIXVILLE, PENNA.

COPY

NUCLEAR

CERTIFICATE OF INSPECTION AND TESTS

E2734-1205

DATE: 7-19-77	DATE SHIPPED: 7-18-77	MILL ORDER NO. T-3238-C	SHIPPING LIST NO. 61E
S O L D T O Guyon Alloys, Inc.		CUSTOMER ORDER NO. A-18592-N	
		CAR NO.	
		MATERIAL: SEAMLESS <input type="checkbox"/> PIPE <input checked="" type="checkbox"/> TUBE, HOT FINISHED	
S H I P T O		SPECIFICATION: ASTM A333-75, ASME SA-333 Gr. 6 (O.H.)	
		10" 5/120	

NO. PCS.	OD	WALL	LENGTH	TOTAL FT.	TOTAL WT.	HEAT NO.
	10.750" x .844"					46493 -
Longitudinal Vee Notch Charpy at Minus 50°F. (10mm x 10mm)						
<u>Ft.Lbs.</u>	<u>Lateral Expansion</u>			<u>Percent Shear</u>		
165-181-114	.084-.089-.075			90-50-80		

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

HEAT NO.	C	Mn.	P.	S.	Si.	Cu.	Ni.	Cr.	Mo.	V.
46493	.13	.96	.012	.021	.18					
46493	.13	1.08	.012	.021	.20					

Ladle Analysis
Product Analysis

Dravo Corp.
E2734-280
Item 1

Q. A. APPROVED
BY: *Jerry* DATE: 8-5-77
GUYON ALLOYS, INC.

HEAT NO.	TENSILE (KSI)	YIELD (KSI)	% ELONG. IN 2"	% RA	HARDNESS ROCKWELL	BRINELL	GRAIN SIZE
46493	65.5	44.0	36.00				

Normalized at 1700 F. Held at temperature for 1 hour and discharged.

APPROVED 6-19-78
DRAVO CORPORATION K. MCKENZIE
PIPE FABRICATION DIVISION CL-1
QUALITY ASSURANCE DEPARTMENT

SWORN TO AND SUBSCRIBED BEFORE ME THIS 19TH DAY OF JULY 1977.
DOROTHY J. TAYLOR, NOTARY PUBLIC
PHOENIXVILLE BOROUGH, CHESTER COUNTY
MY COMMISSION EXPIRES SEPT. 3, 1979

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

OK 2800

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.

Ch. W. Parker
ENGINEER OF TESTS

CONFIDENTIAL

MARK: E2734-243

TUBE TURNS
ORDER NO. 040508

CUSTOMERS' ORDER NO. E2734-243

DESCRIPTION

RFF: 1 E2734-M888
1 E2374-M890

SECTION III CLASS 1

Charpy V-Notch @ -50°F (10x10mm)

Fittings were heated to 1650°F for 1 hour per inch of wall thickness, water quenched and tempered @ 1150°F.

Magnetic particle inspection was satisfactorily performed in accordance with TT-06-002 Rev 2, by E. Stone, Level II.

The specific marking that will indentify the material to this certification is the TUBE TURNS symbol, size, specification, grade and heat or lot number.

It is hereby certified that the above material conforms to all requirements of ASME SA420 and to all applicable special requirements of Article NB 2000 of Section III of the ASME Boiler and Pressure Vessel Code, 1971 edition with addenda thru Summer 1971.

ATTACHEMENTS: MP REPORTS

W-4965B

A.333/6

● STANDARD ROUND TEST SPECIMEN

- 1 ANNEALED
- 2 NORMALIZED
- 3 NORMALIZED AND STRESS RELIEVED
- 4 STRESS RELIEVED
- 5 QUENCHED AND TEMPERED
- 6 HOT FORMED
- 7 HEAT TREAT PER ORDER SPECIFICATION

SUBSCRIBED AND SWORN TO BEFORE ME THIS

25th DAY OF July 1977
Robert C. Blackman
JOINT PUBLIC

Notary Public, State at Large, Ky.

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

E. L. Thomas, Quality Control Coordinator

J. Bundren

MILL TEST CERTIFICATE

SOLD TO Dravo CorporationMarietta, OHITT GRINNELL CORPORATION
WELDING PRODUCTS DIVISION
PRINCETON, KY.

Direct Sale

OUR
ORDER NO. IR-31484BRANCH
ORDER NO. E-2734-277

SHIP TO _____

DATE May 30, 1978CUSTOMER'S
ORDER NO. _____**COPY**E2734-1186

DESCRIPTION OF FITTING	PHYSICAL PROPERTIES FITTING MATERIAL				CHEMICAL ANALYSIS								HEAT CODE OR HEAT NO	SPECIFICATION - FITTING MATERIAL
	HEAT TREAT MENT	YIELD POINT P.S.I.	TENSILE STRENGTH P.S.I.	ELONG IN 2" %	C	MN	P	S	SI					
ASME SA-420 WPL-6.														A-333 Gr.6
12" S/100 x 10" S/120 Conc.	C	43700	76400	36.0	.23	.89	.011	.021	.27				JCJS	Item #2
Red.		ME# 1161,		ME# 1162										
Full size, Charpy V-Notch @ Minus 20° Longitudinal Bar per NB-2300 Foot lbs. - 118, 115, 115; Average = 116 % Shea - 60, 60, 60; Average = 60 Lateral Expansion - .095, .081, .091; Average = .089														
APPROVED 6-9-78 DRAVO CORPORATION K.M.K. PIPE FABRICATION DIVISION CL-1 QUALITY ASSURANCE DEPARTMENT														
The above fittings were manufactured and tested in strict compliance with ASME Section III, 1971 Edition, Class 1 through the 1971 Summer Addenda.														
The above fittings were 100% Magnetic particle examined in all accessible areas and found acceptable.														

HEAT TREATMENT - LEGEND - A = NORMALIZED B = NORMALIZED AND TEMPERED C = NORMALIZED, QUENCHED, & TEMPERED D = STRESS RELIEVED

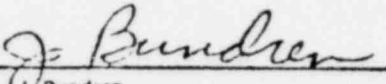
E = HEAT TREATED PER SPECIFICATION ON ORDER F = HOT FORMED BETWEEN 1150 AND 1800°F AND COOLED IN STILL AIR

SUBSCRIBED AND SWORN TO BEFORE ME

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

THIS _____ DAY OF _____ 19____

NOTARY PUBLIC


 J. Bundren
 Q.A. Manager

Corrected Copy

The Colonial Machine Company, Inc.

P. O. Box 290 — Pleasantville, Pa. 6341

Dravo Corporation
P. O. Box 581
Marietta, OH 45750

May 10, 1974

Page 1 of 2
MATERIAL

CERTIFICATIONS

E2734-820

PRY

YOUR ORDER NO.	OUR INVOICE NO.	DATE SHIPPED
E2734-155		

ITEM	TYPE	MATERIAL-SPEC.	SHIPPED	HEAT NUMBER
		ASPE 3456 Gr. 70 NORMALIZED		
1		1/2" Thk. x 1-1/2" Wide Plate per E2734-9110	40°	645J483 (483)
2		1'-0" x 2'-0" x 1/2" Thk. Plate per E2733-PI-3 Rev. 1	1	645J483 (483)
3		1'-0" x 2'-0" x 1/2" Thk. Plate per E2733-PI-3 Rev. 1	1	645J483 (483)
4		5/8" Thk. x 1-7/8" Wide Plate per E2734-9110	40°	650J343 (343)
5		1'-0" x 2'-0" x 5/8" Thk. Plate per E2733-PI-3 Rev. 1	1	650J343 (343)
6		1'-0" x 2'-0" x 5/8" Thk. Plate per E2733-PI-3 Rev. 1	1	650J343 (343)
7		3/4" Thk. x 2-1/4" Wide Plate per E2734-9110	40°	720242 (242)
8		1'-0" x 2'-0" x 3/4" Thk. Plate per E2733-PI-3 Rev. 1	1	720242 (242)
9		1'-0" x 2'-0" x 3/4" Thk. Plate per E2733-PI-3 Rev. 1	1	720242 (242)

ITEM	C	MH	P	S	SI	CR	NI	MO	CU	CS	TI	CO	OTHER ELEMENTS
1, 2	.24	1.13	.021	.021	.21								
4, 5	.18	.96	.012	.027	.20								
7, 8	.23	1.20	.009	.022	.23								

ITEM	TENSILE	2% YIELD	% ELONG.	% R.A.	HARDNESS	HARDEN- ABILITY	REMARKS: 1. 2. 3. 4. 5. 6. ETC.
1, 2	82610	58120	12.8%				
4, 5	78560	52620	11.0				
7, 8	84300	60000	11.0				
Items 1 thru 9 - Bend Test - Satisfactory							

APPROVED
DRAVO CORPORATION
PIPE-FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT

5-22-74
J. Burris

This is to certify that to the best of our knowledge and belief the above material has been manufactured in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

Bechtel Corp
6-5-74
S. Corbett

By: *R. Waychoff*
FORWARDED TO: *OVASO*
IN THE MOUNTAIN
COLUMBIA

The Colonial Machine Company, Inc.

P. O. Box 290 — Pleasantville, Pa. 16341



Drive Corporation

COPY

May 10, 1974

Page 2 of 2

**MATERIAL
CERTIFICATIONS**

E2734-820

OUR ORDER NO.	OUR INVOICE NO.	DATE SHIPPED
E2734-155		

ITEM	TYPE	MATERIAL SPEC.	SHIPPED	HEAT NUMBER
1, 2 3		Long. Charpy V Notch Impacts of 20 Ft. Lbs. at -50° F.	25-27-28	Avg. 26.7
4, 5 6		Charpy Results 25-28-28 Avg. 25.0, 15 Ft. Lbs. @ -50 Deg. F.		
7, 8 9		Full Size Long. V Notch Impact Test 10 x 10 MM Ends @ -50 Deg. F. 30-40-40 Ft. Lbs.		
		All above material per ASME III Class I.		

ITEM	C	MN	P	S	SI	CR	NI	MO	CU	CS	TI	CO	OTHER ELEMENTS
1, 2 3													The above tests and plates normalized at 1625/1650 Deg. F. held one hour per inch of thickness and air cooled.
4, 5 6													The above tests and plates normalized at 1625/1650 Deg. F. held one hour per inch of thickness and air cooled.
7, 8 9													Plates normalized at 1660 Deg. F. plus or minus 25 Deg. F. Maintained 20 minutes per inch of thickness. Air Cooled.

ITEM	TENSILE	2% YIELD	% ELONG.	% RA	HARDNESS	HARDEN- ABILITY	REMARKS: 1. 2. 3. 4. 5. 6. ETC.
	All of the above material has been Ultrasonically Tested per AS 2570. See attached Report Nos. 74-277.						
	Shear Fracture 25% Plate 1 thru 3 -			Direct		Lateral Expansion	
				54°		.028	
				44°		.033	
	Shear Fracture 15 to 20% Pls. 4 thru 6 -			54°		.026	
				48°		.024	
	Shear Fracture 8 to 10% Pls. 7 thru 9 -			54°		.041	
				48°		.032	
				40°		.018	
				40°		.019	

This is to certify that to the best of our knowledge and belief the above material has been manufactured in accordance with the specifications noted. We also certify this is a true copy of the original test report now on file and that the material shipped meets the requirements of the order.

Bechtel Corp
6-5-74
S. CORONA

By *Rosemary R. Waycraft*
APPROVED
DRAYO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
5-22-74
J. B. Davis

50314, 5, 6, 7, 8, 9, 10
50321 - 50322 - 50324

BETHLEHEM METAL CORP. CORPORATION
AL DEPARTMENT

DATE SHIP 11/1/72
SHIPMENT NO. 602-10149
CARRIER INITIAL AND NO. Truck
E2734-820
PLANT Johnstown

Hills Alloy Steel Co
1 W Interstate Rd
Bedford Oh 44014

Item 4
3pc 5/8 x 24 x 48
SHIPPED TO

Bedford Oh

COPY

APPROVED

KMC

REPORT OF MECHANICAL AND CHEMICAL TESTS

Order No.	Spec. or Mat. Order No.	H. S. No.	Tens.	Gage	Width	Length	Yield Point	Tensile Strength	Elong. %	Red. %	Bends	CHEMICAL ANALYSIS					Specifications or Remarks	
												C	Mn	P	S	CI		
5011174-5	731802	661J424	2	1/2	96	262	49240	78010	31.0	5-7	OK	.18	.90	.010	.015	.16	Oil Steel ASME SA516 Gr. 70 PVQ	
	731803		1			244	48340	77680	26.0									
	731807		2			223	48060	76990	27.0									
	731805		1				48780	79130	28.0									
	731806		1				49380	77900	27.5									
	731804		2				48080	76990	27.0									
	140004	650J238	1	5/8	"	200	47010	74100	30.0	5-7	"	.11	.89	.010	.018	.19		
5011147	743883	650J248	1	5/8	96	252	42620	78560	33.0	5-7	"	.18	.96	.012	.027	.20	T. J. MCAULEY JUL 31 1978 MCA	
Charpy Results 28-23-28 Avg. 28.0, 15 ft lbs @ 50 deg. F.																		
5011161	144528	645J483	1	1/2	96	252	58930	84110	23.0	5-7	"	.24	1.13	.010	.021	.22	T. J. MCAULEY JUL 31 1978 MCA	
Charpy Results 44-48-42 Avg. 44.7, 20 ft lbs @ 0 deg. F.																		
Above tests and plates normalized at 1625/1650 deg. F. held one hour per inch of thickness and air cooled.																		
5011185	139817	662J313	2	3/4	58	228	36530	56600	34.0		"	.12	.49	.010	.015		ASTM A285 Gr. B PVQ	
APPROVED DRAVO CORPORATION PIPE FABRICATION DIVISION QUALITY ASSURANCE DEPARTMENT DATE 07-26-78 G. GRAHAM																		
DRAVO CORP. ORDER E2734-155 ITS. 4 THRU 6																		

APPROVED
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
DATE 7-26-78 GRAHAM

DRAVO CORP. ORDER E2734-155 ITS. 4 THRU 6

The Colonial Machine Company, Inc.

P. O. Box 290 — Pleasantville, Pa. 16341

Phone (814) 589-7033

DRAVO CORPORATION
P. O. BOX 581
MARIETTA, OH 45750

MAY 3, 1978

CERTIFIED
MILL TEST REPORT

E2734-1167

YOUR ORDER NO.	E2734-271	OUR ORDER NO.	11168	DATE SHIPPED	5/3/78
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ITEM	TYPE	MATERIAL SPEC.	SHIPPED	HEAT NO.	CMC CODE								
		ASME SECTION III CLASS 1 (1971 EDITION THRU SUMMER 1971) ASME SA105											
1		3/4" CHEM/PRESS TAP, TYPE Y-3, PER 9123 REV. 0	1	52874	ASY								
2		3/4" DITTO	1	52874	ASY								
		ASME SECTION III CLASS 3 (1971 EDITION THRU SUMMER 1971) ASME SA105											
3		1/2" CHEM/PRESS TAP, TYPE Y-1, PER 9123 REV. 0	2	52874	ASY								
		ASME SECTION III CLASS 3 (1971 EDITION THRU SUMMER 1971) ASME SA102 F304 ANNEALED											
4		1/2" CHEM/PRESS TAP, TYPE Y-1, PER 9123 REV. 0	1	G10166	CSI								
ITEM	C	MN	P	S	SI	CR	NI	MO	CU	CS	TI	CO	OTHER ELEMENTS

1	.24	.77	.003	.021	.22								ITEMS 1 AND 2 - HAVE BEEN MAGNETIC PARTICLE TESTED PER ASME SECTION III CLASS 1 PARA. NG-2555 (1971 EDITION THRU SUMMER 1971) NUCLEAR ENERGY SERVICES PROCEDURE 408-MT-320 AS PER THE ATTACHED REPORT NO. 78-269.
4	.052	1.46	.022	.025	.51	18.53	8.32						
MAGNETIC PARTICLE TESTING PROCEDURE 408-MT-320 HAS BEEN APPROVED BY MR. D.S. GILCHRIST ON 4/20/78.													

ITEM	TENSILE	2% YIELD	% ELONG.	% RA.	HARDNESS	HARDEN- ABILITY	REMARKS: 1. 2. 3. 4. 5. 6. ETC.
1 THRU 3	71000	46000	34.0	63.5			T. J. MACAULEY MILL SOURCE - COPPERHELD
4	80100	37500	58.5	75.7			OCT 10 1978 MILL SOURCE - UNIVERSAL-CYCLOPS
IT. 4 - SOLUTION ANNEALED 1950 DEG. F 1 HR. - WATER QUENCHED.							

PA We hereby certify that the information contained hereon has been taken from the original mill test report from the producing mill, which is now on file in our office. We also certify that the material and the items as listed above meet the specification and all requirements as covered by the specification and your purchase order.

APPROVED
DRAVO CORPORATION
PIPE FABRICATION DIVISION
QUALITY ASSURANCE DEPARTMENT
DATES-16-78 G. GRAHAM

By *Rosemary C. W. [Signature]*

MILL TEST CERTIFICATION

E2734-1219

CORPORATE OFFICES • CHARLESTON, WEST VIRGINIA 25322

CUSTOMER Dravo CorpCUSTOMER ORDER NO E 2734-300Pipe Fabrication Dept. Box 581-1115 GilmanINVOICE NO 07-55399-00Marietta, Ohio 45750DATE July 5, 1978

COPY

Item No.	Tag No.	Description	Name of Manufacturer	Mfg. to Specification	Heat No.	Quant Shipped
M1112		3/4" XX Strong Pipe Nipple 6" Long PBE	LTC	ASME SA 106	E90455	4
M1113		3/4" XX Strong Pipe Nipple 6" Long PBE	LTC	ASME SA 106	E90455	4
M1117		3/4" XX Strong Pipe Nipple 6" Long PBE	LTC	ASME SA 106	E90455	2
M1118		3/4" XX Strong Pipe Nipple 6" Long PBE	LTC	ASME SA 106	E90455	2
The above material has been furnished in accordance with						
ASME Sec III CII. The above material was manufactured						
in accordance with the Edition and Addenda in effect at the						
time of its manufacturing. These Edition and Addenda meet or						
exceed the 1971 Edition, Summer 1971 Addenda of the						
ASME Boiler & Pressure Code						

APPROVED 7-18-78
H.M. CH.
DRAVO CORPORATION
PIPE FABRICATION DIVISION

- Materials on this order have been produced under a Quality System Program meeting the requirements of ASME Section III, as approved by McJunkin Corporation.
- Based upon review of documentation in the possession of McJunkin Corporation, the materials described above are in accordance with the requirements of Material Specification ASME SA 106 Gr B defined by ASME Boiler & Pressure Vessel Code, Sect II, Part A. SA 106 is one of the materials listed in Table 1-7.0 of ASME Section III, Nuclear Power Plant Components and as such conforms to Paragraph NC2551 and/or ND2551 ASME Boiler & Pressure Vessel Code, Section III 1971 Edition Summer 1971 Addenda.
- Materials identified have been inspected in accordance with McJunkin Corporation's Quality System Program and Procedures.
- According to records in our possession, materials are furnished in accordance with the following documents:
 - Customer Specification E 2734-9124 Rev. 0 Dated 6-21-78
 - Customer Purchase Order # E 2734-300
- The attached Material Certifications have been reviewed to assure all required references, statements, tests, and test results are within the requirements of documents identified on this Certification.

McJUNKIN CORPORATION
ASME CERTIFICATIONS
N-1029 & N-1029-1
EXPIRES 3-3-81



Signed by Joseph C. Buckworth
Position Quality Assurance Supervisor
Date July 5, 1978

1219

TUBE TURNS

PENETRATION

X 16A

COPY

FORM NPP-1 DATA REPORT FOR FABRICATED NUCLEAR PIPING SUBASSEMBLIES*
(As Required by the Provisions of the ASME Code Rules)

1. Fabricated by Tube Turns, Louisville, KY Order No. 71143-X16A
(Name and Address of Fabricator)

2. Fabricated for Detroit Edison Co. Order No. IE-84485
Enrico Fermi Atomic Power Unit No. 2

3. Owner Detroit Edison Co. 4. Location of Plant Stoeny Creek, Mich.

5. Piping System Identification Core Spray
(Brief description of intended use, main coolant etc.)

(a) Drawing No. 71143-D3.1 Prepared by Tube Turns

(b) National Board No. N/A *Flued head & process pipe Class 1
remainder Class 2.

6. The material, design, construction, and workmanship complies with ASME Code Section III, Class
Edition 1971, Addenda Date Winter 1971, Case No. N/A

Remarks: Manufacturers' Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of this report N/A
(Name of Part - Item number, Manufacturer's name, and identifying stamp)

7. Shop Hydrostatic Test 1875 psi.

8. Description of piping inspected Serial #47411 12"X20"X28" Penetration Assv.
(Include - mark no. - material spec. - nom. pipe size - schedule or thickness - length)

Process Pipe: SA333Gr6 12"X.843WX14' 6-3/16" Long

Guard Pipe: SA106GrB 20"X.812"X13' 3-5/16" Long

Guard Pipe Butt Weld Ends: SA333Gr6 20"X.812"X9" Long

Guard Pipe Bellows: SA240-321 20"X.05"X3" Long

Flued Head: SA105Gr2 12"X20"X28"X9" 3/4" Long

Flued Head Nipple: A106 Gr B 28"X.5"X3" Long

Center Spool: A106 Gr B 28"X.5"X25 1/4" Long

Nozzle Nipple: A106 Gr B 28"X.5"X3" Long

Nozzle Bellows: SA240-321 28"X.05"X14 1/2" Long

Total Length of Completed Assembly: 15' 3-15/16"

We certify that the statements made in this report are correct and that the fabrication of the described piping conforms with the requirements of SECTION III of the ASME BOILER AND PRESSURE VESSEL CODE.

Date 6/27/74 Signed Tube Turns By Edw. G. Lickteig
(Fabricator)

Certificate of Authorization Expires June 20, 1975 Certificate of Authorization No. N473

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 or Province of Kentucky and employed by Hartford Steam Boiler Inspection & Insurance Co. of Hartford, Connecticut have inspected the piping described in this Data Report on 6/27/74 and state that to the best of my knowledge and belief, the Manufacturer has constructed this piping in accordance with the applicable Subsections of ASME Code, Section III.

By signing this certificate, neither the Inspector nor his employer make any warranty, expressed or implied, concerning the piping 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 June 27, 1974 *23 April 1975
(Inspector) Edw. G. Lickteig KY 491
National Board, State, Province and No.

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

Printed in U.S.A. (2/73) This form (En2) is obtainable from the ASME, 345 E. 47th St., New York, N.Y. 10017

S - The Detroit Edison Company
O 2000 Second Avenue
L
D Detroit, Michigan 48226

S The Detroit Edison Company
H 6100 Dixie Highway
I
P Stoney Creek, Monroe County, Michigan
Enrico Fermi Atomic Power Plant

DETAILED ANALYSIS REPORT

TUBE TURNS
DIVISION OF CHEMETRON CORPORATION

Page 1 of 2 pages

X-16A

24 January 1975
LOUISVILLE, KY

TUBE TURNS 71143
ORDER NO. _____

CUSTOMERS' ORDER NO. IE-84495

[illegible]

- * STANDARD ROUND TEST SPECIMEN
** 1 ANNEALED
2 NORMALIZED,
3 NORMALIZED AND STRESS RELIEVED
4 STRESS RELIEVED
5 QUENCHED AND TEMPERED
6 HOT FORMED
7 HEAT TREAT PER ORDER SPECIFICATION

SUBSCRIBED AND SWORN TO BEFORE ME THIS

24 DAY OF January 1975

Marie O. Jancin
NOTARY PUBLIC

NOTARY PUBLIC

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

RECORDS IN THE POSSESSION OF THIS CORPORATION

Bill Peninger

Bill Peninger, Metallurgy

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DETAILED ANALYSIS REPORT

TUBE TURNS

DIVISION OF CHEMETRON CORPORATION

LOUISVILLE, KY. 24 January 1975

TUBE TURNS ORDER NO. 71143

CUSTOMERS' ORDER NO. IE-84495

Page 2 of 2 pages

Corrected copy

X-16A

DESCRIPTION	PHYSICALS OF MATERIALS FROM WHICH MADE					CHEMICAL ANALYSIS										HEAT CR LOT NO.	MADE FROM MATERIAL OF CHEMISTRY AND TENSILE PROPERTIES OF SPECIFICATION
	W. R. HEAT TREAT- MENT	YIELD STRENGTH PSI	TENSILE STRENGTH PSI	PERCENT ELONGA- TION IN 2"	PERCENT REDUC- TION IN AREA	C	MN	P	S	SI	NI	CR.	MO	CB			
						Serial number:						4741			ASTM		
						Penetration assembly number:						X-16A					
						P. I. S. number:						TT-23-00-X16A					
						Supplementary test results											
C-Process pipe		39,400	68,400	34	76	Check analysis:									W-1485 (259155)	A333-5	
		Charpy V-notch, -50°F:				125-101-40 ft-lbs											
		Lateral expansion:				89-77-30											
		Percent shear:				55-55-35											
F-Flued head nipple																	
G-Center spool		57,400	82,600	24	49	Check analysis:									W-1523 (730222)	A106-B	
H-Nozzle nipple																	

- * STANDARD ROUND TEST SPECIMEN
- ** 1 ANNEALED
- 2 NORMALIZED
- 3 NORMALIZED AND STRESS RELIEVED
- 4 STRESS RELIEVED
- 5 QUENCHED AND TEMPERED
- 6 HOT FORMED
- 7 HEAT TREAT PER ORDER SPECIFICATION

SUBSCRIBED AND SWORN TO BEFORE ME THIS

24 DAY OF January 1975

Marie J. Jernigan
NOTARY PUBLIC

City of Louisville, State of Kentucky

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

Bill Peninger
Bill Peninger, Metallurgy

S
O
T
O
D
Tube Turns
P. O. Box 987
Louisville, Ky.

S
H
T
I
O
P
Tube Turns
718 So. 28th St.
Louisville, Ky.

DETAILED ANALYSIS REPORT

TUBE TURNS

DIVISION OF CHEMETRON CORPORATION

HOUSTON, TEXAS 4-18-74 jr

TUBE TURNS
ORDER NO. HMF-4-94303

CUSTOMER'S
ORDER NO. 4-94303

Page 1

Louisville, Ky.

Page 1

DESCRIPTION	PHYSICALS OF MATERIALS FROM WHICH MADE					CHEMICAL ANALYSIS								HEAT OR LOT NO.	SPECIFICA- TION OF MATERIAL FROM WHICH MADE	
	N.W. WEAT- TREAT- MENT	YIELD POINT PER SQUARE INCH	TENSILE STRENGTH PER SQUARE INCH	PERCENT ELONGA- TION IN 2"	PERCENT REDUC- TION IN AREA	C	MN	P	S	SI	CR	NI	MO			CE
Item 004 1 Piece		48,000	37,000	28.0	47.5	.30	.82	.010	.016	.22					212625	SA-105-2
34" (.500) x 27-1/2" (.875)			Charpy "V" Notch 0° F.	Specimen Size	.394											
x 24" (1.218) Dwg. 72.755 D6R2			31 - 31 - 26 Ft. Lbs.													
Matl. SA105-2 CS-F-6A Component			20 - 26 - 25 Mils.	Lateral Expansion												
Spec. Pen. X13A			20% - 10% - 10% Shear													
Tag: 71143 Item 13A Code J.																
Item 005 1 Piece		46,000	74,500	28	52.2	.26	.78	.013	.018	.22					212728	SA-105-2
28" (.500) x 20" (.750) x 12"			Charpy "V" Notch at -20° F.	Specimen Size	.394											
(.843) Dwg. 72.755 D7R Pen.			24 - 30 - 31 Ft. Lbs.													
X16A Matl. SA-105-2			25 - 24 - 20 Mils.	Lateral Expansion												
Component Spec. CS-F-63			10% - 10% - 10% Shear													
tag: 71143 Item 16A Code J.																

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

SUBSCRIBED AND SWORN TO BEFORE ME THIS

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

18th DAY OF April 19 74

LAURA L. GUERRERO

Notary Public in and for the State of Texas

Charles Owen O. C. Technician

SHIP TO

DETAILED ANALYSIS REPORT

TUBE TURNS

DIVISION OF CHEMETHON CORPORATION

HOUSTON, TEXAS 5-12-74 jr

TUBE TURNS 12F-4-04333
ORDER NO.

CUSTOMERS' ORDER NO. 4-91323

* STANDARD RC IN. AT SPECIMEN #* 1-NORMALIZED 2-ANNEALED 3-HEAT TREATED PER ORDER SPECIFICATION.

SUBSCRIBED AND SWORN TO BEFORE ME THIS

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

12th DAY OF June 19 74

LAURA L. GUERRERO
Notary Public in and for Harris County, Texas
My Commission Expires June 1, 2025

Charles Owen
Charles Owen, Q. C. Technician

ENRICO FERMI UNIT 2

FEEDWATER "A"

2336

DESCRIPTION	MATERIAL SPEC.	HEAT NUMBER	TEMP OF	CHARPY IMPACT TEST RESULTS (FULL SIZE - LONG.)				LAT	EXPANSION
				C _v	ENERGY FT-LB				

VALVE VIZ-2002 (20" SWING CHECK)

BODY	SA 352	73B1061	-20°	26	29	28	25	31	29
BONNET	GR LCB								
DISC									

VALVE VIZ-2004 (20" SWING CHECK)

BODY	SA 352	73B1137	-20°	23	23	19	24	29	17
BONNET	GR LCB								
DISC									

VALVE VIZ-2006 (20" GATE)

BODY	SA 350 GR LF1	K3937	-20°	23	74	30	← N/A →		
BONNET	SA 350 GR LF1	210750	-20°	21	22	14	40	44	28
WEDGE	SA 352 GR LCB	A4480	-20°	33	39	36.5	28	34	32

ENRICO FERMI UNIT 2

FEEDWATER "A"

DESCRIPTION	MATERIAL SPEC.	HEAT NUMBER	TEMP OF	CHARPY IMPACT TEST RESULTS (FULL SIZE - LONG.)						
				C _V	ENERGY FT-LB		LAT	EXPANSION MILS		
<u>VALVE V12-2008 (20" SWING CHECK)</u>										
BODY	SA 352 GR LCB	U-245-1	-20°	21	20	23	22	20	24	
COVER	SA 516 GR 70	3W 6221	-50°	35	20	18	← N/A →			
DISC	SA 352 GR LCB	U-245-2	-20°	21	20	23	22	20	24	
<u>VALVE V8-2194 (14" HPLI GATE)</u>										
BODY	SA 352 GR LCB	3463	-20°	23	23.5	25	← N/A →			
BONNET	SA 350 GR LFI	212207-	-20°	88	61	37	← N/A →			
WEDGE	SA 352 GR LCB	A 3629	-20°	25	29	23.5	← N/A →			

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

COPY

As Required by the Provisions of the ASME Code Rules

1. Manufactured by Anchor/Darling Valve Co., Hayward, Cal. Order No. 3020-02
(Name & Address of Manufacturer) Tag No. V-12-2002
2. Manufactured for Detroit Edison Company (DECO) Order No. 1E87859
(Name and Address) Item No. 2
3. Owner Detroit Edison Company (DECO)
4. Location of Plant ENRICO FERMI UNIT NO. 2
5. Pump or Valve Identification Serial No. 1N-076 20" 900# Swing Closing Check

ASME SECTION III

(Brief description of service for which equipment was designed)

Steam and Water Service in a Commercial Nuclear Power Plant

- (a) Drawing No. 2276-3 Prepared by W.S. Kusoman
- (b) National Board No. NA
6. Design Conditions 2160 700
(Pressure) psi (Temperature) °F
7. The material, design, construction, and workmanship complies with ASME Code Section III. Class I
- Edition 1971, Addenda Date Winter 71, Case No. 1516

	Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings				
Body	HT 73B1061 Ser. 2	SA352LCB	Anchor/Darling	Pac Car
Bonnet	HT 73B1061 Ser. 3	SA352LCB	Anchor/Darling	Pac Car
Disc	HT 73B1061 Ser. 2	SA352LCB	Anchor/Darling	Pac Car
(b) Forgings				
Gland Act	HT 94976	SA192-F6	Anchor/Darling	Airco Viking
Stuff Box Act.	HT 211635	SA105GRII	Anchor/Darling	Airco Viking
Stuff Box Ind.	HT 211635	SA105GRII	Anchor/Darling	Airco Viking
Retainer	HT 211635	SA105GRII	Anchor/Darling	Airco Viking

*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.

Mark No.	Material Spec. No.	Manufacturer	Remarks
(c) Bolting			
Studs Gland Bolt Code GC	SA193-B7	Kortick	Jorgensen
Nut Gland Bolt Code HT	SA194-2H	Anchor/Darling	Texas Bolt
Stud Ret Code 30	SA193-B7	Knudtsen	Jorgensen
Nut Ret Code HT	SA194-2H	Anchor/Darling	TEXAS Bolt
Gland Ind. HT 70594	SA193-B7	Anchor/Darling	Copperweld
Crosspin Code 3I	SA193-B7	Knudtsen	Ryerson
(d) Other Parts			
Leakoff HT 209J755	SA106-B	Anchor/Darling	Gulf States Tub
Ret Ring Gask HT 96A711-8-2	SA516-70	Anchor/Darling	US Steel
Gland Flange HT 96A711-8-2	SA516-70	Anchor/Darling	US Steel
Mtg. Plate HT 92A372-11-3	SA516-70	Anchor/Darling	US Steel
Seat Ring HT 67A750-13S	SA516-70	Anchor/Darling	US Steel
Drain Conn. HT KE9564	SA106-B	Anchor/Darling	Gulf States Tub
Gland Ret Ring HT 96A711-8-2	SA516-70	Anchor/Darling	US Steel

8. Hydrostatic test 4175 psi.

COPY

CERTIFICATION OF DESIGN

Design information on file at ENRICO FERMI Unit No. 2 Newport, Mich
 Stress analysis report on file at ENRICO FERMI Unit No. 2 Newport, Mich
 Design specifications certified by S.H. Noitzel (I) Prof. Eng. State Mich Reg. No. 14386
 Stress analysis report certified by W.A. Benning (I) Prof. Eng. State Calif Reg. No. 411474E
 (1) Signature not required. List name only.

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

Date 4-18 19 74 Sign Anchor/Darling Co. By B. J. Zillman
 (Manufacturer)

Certificate of Authorization No. N-781 expires March 4, 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 California and employed by Die Dis of California have inspected the equipment described in this Data Report on 4-11 19 74, 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 4-18 19 74

Ray Zillman Commissions DL5962
 (Inspector) (National Board, State, Province and No.)



PACIFIC CAR AND FOUNDRY CO.

RENTON, WASHINGTON

30428 032

3.1

LABORATORY CERTIFICATE

Date 19 Mar 74

Description of Material Heat 73 B 1061

3108-5-1 Valve Body S/N 2 3020-2

Serial number cast on, heat number die stamped. Heat Treatment 1650°F 5 hrs,
water quench; 1250°F 5 hrs., air cool. Stress relief 1250°F 6 hrs furnace
cool to 700°F air cool

Chemical Analysis:

Actual

Required

Physical Properties:

Actual

Required

C	.21	T.S.	70,000	p.s.i.
S	.012	Y.P.	47,500	
P	.014	Elong.	32.50	%
Si	.43	R. A.	60.1	%
Mn	.84	Charpy	26; 29; 28	Ft. Lbs.
Cr	.07	Temp.	-20°F	
Ni	.09	R./Q.	Lat. Exp. 25; 31; 29	Mils
Mo	.02	B/A/A/	% Shear 10; 20; 20	
V	--			
Ti	--			
Cu	.15			
Al	--	100% MT Proc. 1543-1A	100% RT Proc 1402-1D	

Remarks: We certify that this material meets all the requirements of the material
specification and all applicable special requirements of Article NB 2000 of ASME

Section III Winter 1971 Addenda, that are required to be fulfilled by the Materials
Manufacturer.

Customer Anchor/Darling Valve Co. Specification ASME SA352, Gr. LCB

P. O. 2763 S. O. 20-64056

Body 3020-02

Title

B. J. Bergson
B. J. Bergson
Chief Metallurgist



A DIVISION OF
PACCAR

PACIFIC CAR AND FOUNDRY CO.

TENTON, WASHINGTON

30228 064 5.1

LABORATORY CERTIFICATE

Date 19 Mar 74

Description of Material ASTM B 1061

3108-5-2

Sheet S/N 3

3020-2

Serial number cast Heat number die stamped. Heat treatment 1650°F

5 hrs., water cool. 5 hrs., air cool. Stress relief 1250°F

6 hrs., furnace cool = air cool

Chemical Analysis:

	Actual	Required
C	.21	
S	.012	
P	.014	
Si	.43	
Mn	.84	
Cr	.07	
Ni	.09	
Mo	.02	
V	--	Dwg. 6345-1-1
Ti	--	D.E. I.E. 1-1
Cu	.15	
Al	--	

Physical Properties:

	Actual	Required
T.S.	70,000	p.s.i.
Y.P.	47,500	
Elong.	32.50	%
R. A.	60.1	%
Charpy	26; 29; 20	Ft. Lbs.
Temp.	-20°F	
A.I./C. Lat. Exp.	25; 31; 29	Mils
B.A.A. % Shear	10; 20; 20	
	100% MT Proc 1543-1A	
	100% RT Proc 1402-1D	

Remarks: We certify that the material meets all the requirements of the material specification and all the special requirements of Article NB 2000 of ASME

Section III Winter 1957 Edition that are required to be fulfilled by the Materials Manufacturer

Customer Anchor/ Specification ASME SA352, Gr. LCB

P. O. 2763

S. O. 20-64056

Bonnet 3-22-72

B. J. Bergson
Title B. J. Bergson
Chief Metallurgist



A DIVISION OF
PACCAR

PACIFIC CAR AND FOUNDRY CO.

RENTON, WASHINGTON

LABORATORY CERTIFICATE

Date 19 Mar 74

Description of Material Heat 73 B 1061

3108-5-4

Disc S/N 2

3020-2

Serial number cast on, heat number die stamped. Heat treatment 1650°F 5 hrs.,
water quench; 1250°F 5 hrs., air cool. Stress relief 1250°F 6 hrs., furnace
cool to 700°F air cool

Chemical Analysis:

Actual

Required

Physical Properties:

Actual

Required

C .21

S .012

P .014

Si .43

Mn .84

Cr .07

Ni .09

Mo .02

V -- DWG. 6340-2-5

Ti -- D.E. I.E. 87859

Cu .15

Al --

T.S. 70,000 p.s.i.

Y.P. 47,500

Elong. 32.5 %

R. A. 60.1 %

Charpy 26; 29; 28 Ft. Lbs.

Temp. -20°F

~~R/R/I~~ Lat. Exp. 25; 31; 29 Mils

~~B/H/A~~ % Shear 10; 20; 20

100% MT Proc 1543-1A

100% RT Proc 1402-1D

Remarks: We certify that this material meets all the requirements of the material
specification and all applicable special requirements of Article NB 2000 of ASME
Section III Winter 1971 Addenda, that are required to be fulfilled by the Materials
Manufacturer

Customer Anchor/Darling Valve Co. Specification ASME SA352, Gr. LCB

P. O. 2763

S. O. 20-64056

Disc
3020-02

B. J. Bergson
Title B. J. Bergson
Chief Metallurgist

MASHER

We hereby certify that the material meets requirements of the material specification all the applicable special requirements of A
A52000 of the ASME Section II, the required to be fulfilled by the material's manufacturer.

SHIP TO	U S STEEL SUPPLY DIV. U S STEEL CORP. 15TH & FOLSOM ST % SP SPUR TRACK #820-822 SAN FRANCISCO, CALIF.
---------	--

THIS IS TO CERTIFY THAT
THE CHEMICAL ANALYSIS AND
TESTS SHOWN IN THIS REPORT
ARE CORRECT AS CONTAINED
THE RECORDS OF THE COMPAN

SIGNATURE S. L. NORWOOD, CH. MFR.
DATE 3/4/71

300

LONGITUDINAL CHARPY V-NOTCH 10x1
Q -50°F 17 13 23 FT. LBS.

9. I OR H INDICATE COMPLIANCE OF BIND OR HOLD TESTS. RES:

GRAIN SIZE 5 OR FINER

As Required by the Provisions of the ASME Code Rules

1. Manufactured by Anchor/Darling Valve Co., Hayward, Calif. Order No. 3020-4
(Name & Address of Manufacturer) Tag No. V12-2004
2. Manufactured for Detroit Edison Company (DECO) Order No. 1E-87859
(Name and Address) Item No. 4
3. Owner Detroit Edison Company (DECO)
4. Location of Plant ENRICO FERMI UNIT NO. 2 **COPY**
5. Pump or Valve Identification Serial No. 1N-080 20" 900# Swing Check

(Brief description of service for which equipment was designed)

Steam and Water Service in a Commercial Nuclear Power Plant

- (a) Drawing No. 2230-3 Prepared by W.S. Kuosman
- (b) National Board No. NA
6. Design Conditions 2160 700
2790 100 °F
(Pressure) (Temperature)
7. The material, design, construction, and workmanship complies with ASME Code Section III. Class I
- Edition 1971, Addenda Date Winter 71, Case No. 1516

Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings			
Body HT 73B1137 Ser. 4	SA352LCB	Anchor/Darling	Pac Car
Bonnet HT 73B1137 Ser. 5	SA352LCB	Anchor/Darling	Pac Car
Disc HT 73B1137 Ser. 4	SA352LCB	Anchor/Darling	Pac Car
(b) Forgings			
Act Shaft HT 62818	SA182-F6	Anchor/Darling	Airco Viking
Gland Act HT 50264	SA182-F6	Anchor/Darling	Airco Viking
Stuff Box Act HT 211635	SA105GR11	Anchor/Darling	Airco Viking
Stuff Box Ind HT 211635	SA105GR11	Anchor/Darling	Airco Viking
Retainer PT 211635	SA105GR11	Anchor/Darling	Airco Viking

*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.

Mark No.	Material Spec. No.	Manufacturer	Remarks
(c) Bolting			
Studs Gland Bolt Code GC	SA193-B7	Kortick	Jorgensen
Nut Gland Bolt Code HT	SA194-2H	Anchor/Darling	Texas Bolt
Stud Ret Code 30	SA193-B7	Knudtsen	Jorgensen
Nut Ret Code HT	SA194-2H	Anchor/Darling	Texas Bolt
Gland Ind. HT 70594	SA193-B7	Anchor/Darling	Copperweld
Crosspin Code EQ	SA193-B7	Anchor/Darling	Ryerson
(d) Other Parts			
Leakoff HT 76P059	SA106-B	Anchor/Darling	Gulf States Tube
Ret Ring Gask HT 96A711-8-2	SA516-70	Anchor/Darling	US Steel
Gland Flange HT 96A711-8-2	SA516-70	Anchor/Darling	US Steel
Mtg. Plate HT 92A372-11-3	SA516-70	Anchor/Darling	US Steel
Seat Ring HT 67A750-13S	SA516-70	Anchor/Darling	US Steel
Drain Conn. HT KE9564	SA106-B	Anchor/Darling	Gulf States Tube
Ret Ring Gland HT 96A711-8-2	SA516-70	Anchor/Darling	US Steel

8. Hydrostatic test 4175 psi.

CERTIFICATION OF DESIGN

Design information on file at ENRICO FERMI UNIT NO. 2, Newport, Mich.
 Stress analysis report on file at ENRICO FERMI UNIT NO. 2, Newport, Mich.
 Design specifications certified by S.H. Noitzel (I) Prof. Eng. State Mich Reg. No. 14386
 Stress analysis report certified by W.A. Benning (I) Prof. Eng. State Calif Reg. No. 411474E
 (I) Signature not required. List name only.

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

Date 5-22 19 74 Signed Anchor/Darling Co. By B. J. Tillman
 (Manufacturer)

Certificate of Authorization No. N-781 expires March 4, 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 California and employed by Dir Dis of California

have inspected the equipment described in this Data Report on 5-20 19 74, 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 5-22 19 74

Ray Tillman Commissions D15762
 (Inspector) (National Board, State, Province and No.)



PACIFIC CAR AND FOUNDRY CO.

RENTON, WASHINGTON

30229 176

LABORATORY CERTIFICATE

Date 28 Mar 74

Description of Material 73 B 1137

3108-5-1

Valve Body

3020-4

S/N 4

Serial number cast on, heat number die stamped. Heat Treatment 1650°F 5 hrs, water quench; 1250°F air cool; stress relief 1250°F 6 hours; cool to 700°F air cool; 1200°F 6 hours cool to 700°F; air cool.

Chemical Analysis:

Actual

Required

Physical Properties:

Actual

Required

C	.21		T.S.	68,000	p.s.i.
S	.013		Y.P.	47,500	
P	.014		Elong.	35.0	%
Si	.22		R. A.	64.4	%
Mn	.96		Charpy	23; 28; 19	Ft. Lbs.
Cr	.10		Temp.	-20°F	
Ni	.08		R./Q./ Lat. Exp.	24; 29; 17	Mil-
Mo	.02		% Shear.	10; 10; 10	
V	--	Dwg. 6340-2-5		100% MT Proc 1543-1A	
Ti	--	D.E. IE 87859		100% RT Proc 1402-D and 1548-1	
Cu	.20				
Al	--				

Remarks: We certify that this material meets all the requirements of the material specification and all applicable special requirements of Article NB2000 of ASME

Section III Winter 1971 Addenda that are required to be fulfilled by the Materials Manufacturer.

Customer Anchor/Darling Valve Co. Specification ASME SA352, Gr. LCB

P. O. 2763 S. O. 20-64056

Body 3020-04

Title

B. J. Bergan
B. J. Bergan
Chief Metallurgist



PACIFIC CAR AND FOUNDRY CO.

RENTON, WASHINGTON

LABORATORY CERTIFICATE

Date 28 Mar 74

Description of Material Heat 73 B 1137

3108-5-2

Bonnet

3020-4

S/N 5

Serial number cast on, heat number die stamped. Heat treatment 1650°F 5 hours, water quench; 1250°F air cool; stress relief 1250°F 6 hours; cool to 700°F air cool; 1200°F 6 hours cool to 700°F; air cool.

Chemical Analysis:

Actual

Required

Physical Properties:

Actual

Required

C .21

S .013

P .014

Si .22

Mn .96

Cr .10

Ni .08

Mo .02

V -- Dwg. 6340-2-5

Ti -- D.E. IE 87859

Cu .20

Al --

T.S. 68,000 p.s.i.

Y.P. 47,500

Elong. 35.0 %

R. A. 64.4 %

Charpy 23; 28; 19 Ft. Lbs.

Temp. -20°F

~~WILL~~ Lat. Exp. 2nd, 29, 17 Mils

~~WILL~~ % Shear 10; 10; 10

100% MT Proc 1543-1A

100% RT Proc 1402-D and 1548-1

Remarks: We certify that this material meets all the requirements of the material specification and all applicable special requirements of Article NB 2000 of ASME Section III Winter 1971 Addenda that are required to be fulfilled by the Materials Manufacturer

Customer Anchor/Darling Valve Co. Specification ASME SA352, Gr. LCB

P. O. 2763

S. O. 20-64056

Bonnet 3020-04

B. J. Bergson
Title Chief Metallurgist



A DIVISION OF
PACCAR

PACIFIC CAR AND FOUNDRY CO.

RENTON, WASHINGTON

LABORATORY CERTIFICATE

Date 28 Mar 74

Description of Material Heat 73 B 1137

3108-5-4

Disc

3020-4

S/N 4

Serial number cast on, heat number die stamped. Heat treatment 1650°F 5 hours, water quench; 1250°F air cool; stress relief 1250°F 6 hours; cool to 700°F air cool; 1200°F 6 hours cool to 700°F; air cool.

Chemical Analysis:

Actual Required

Physical Properties:

Actual Required

C	.21		T.S.	68,000	p.s.i.
S	.013		Y.P.	47,500	
P	.014		Elong.	35.0	%
Si	.22		R. A.	64.4	%
Mn	.96		Charpy	23; 28; 19	Ft. Lbs.
Cr	.10		Temp.	-20°F	
Ni	.08		Lat. Exp.	24; 29; 17	Mils
Mo	.02		% Shear	10; 10; 10	
V	--	Dwg. 6340-2-5		100% MT Proc 1543-1A	
Ti	--	D.E. IE 87859		100% RT Proc 1402-D & 1548-1	
Cu	.20				
Al	--				

Remarks: We certify that this material meets all the requirements of the material specification and all applicable special requirements of Article NB2000 of ASME Section III Winter 1971 Addenda that are required to be fulfilled by the Materials Manufacturer

Customer Anchor/Darling Valve Co. Specification ASME SA352, Gr. LCB

P. O. 2763

S. O. 20-64056

Disc 3020-04

B. J. Bergeson
Title Chief Metallurgist

1-1
30265-164

• V12-2006

- COPY**

(b) National Board No. N/A

Edition 1971, Addenda Date Winter 1971, Case No. _____

*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, 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.

Mark No.	Material Spec. No.	Manufacturer	Remarks
(c) Bolting Body-Bonnet	ASME SA 193	W.H. Haskell	Modified for
Studs Lot # CM 2782	Gr. B7 Special	Pawtucket, R.I.	Impact Testing
Studs Lot # CM 2781	ASME SA 193	Bethlehem Steel	Modified for
	Gr. E Special	Lebanon, Pa.	Impact Testing
Nuts Mark #CM 2607, 2608	ASME SA 194	Ryerson Steel	Modified for
2609, 2610, 2611, 2612,	Gr. 7 Special	Cincinnati, Ohio	Impact Testing
2613, 2614, 2615, 2616,			
2617, 2618, 2619, 2620, 2621 & 2622			
(d) Other Parts			
See Attached Sheet			

8. Hydrostatic test 4175 psi.

CERTIFICATION OF DESIGN

Design information on file at The Wm. Powell Co. Cincinnati, Ohio
 Stress analysis report on file at Detroit Edison Co.
 Design specifications certified by Sylvester H. Noitzet (1) Prof. Eng. State Mich Reg. No. 14386
 Stress analysis report certified by R.A. Vance (1) Prof. Eng. State Mich Reg. No. 18860
 (1) Signature not required. List name only.

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

Date May 10, 1974 Signed The Wm. Powell Co. Plt. J.C. Williams
 (Manufacturer) #2 By J.C. Williams
 Certificate of Authorization No. N 719 expires October 30, 1976

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 Ohio and employed by Continental Insurance Co. of Columbus, Ohio have inspected the equipment described in this Data Report on 5/10 1974, 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 May 10 1974
K.H. Lane (Inspector) Commissions Ohio 1609 Ky 270
 (National Board, State, Province and No.)

Detroit Edison P.O. IE 86734 Rel. #1
Powell Order No. 176809

30265-166

ATTACHMENT TO MANUFACTURERS
DATA REPORT FORM NPV-1

Drawing No. 040578-8 & -9 prepared by The Wm. Powell Co.
Valve Serial No. 64721-2

(d) Other Parts

MARK NO.	MAT'L SPEC.	MANUFACTURER	REMARKS
Scm Mark # CM 2592 Heat # 56616	ASTM A564 Gr630	Dayton Forge & Heat Treat Co. Dayton, Ohio	Modified for Impact Testing
Segmental Thrust Ring Mark # CM 2601 Heat # 60642	ASTM A564 Gr630	Dayton Forge & Heat Treat Co. Dayton, Ohio	Modified for Impact Testing
Drain Nipple (Body) Mark # CM 2769 Heat # 2936-II, 2937-II	ASMESA106 Gr B	Gulf States Tube Rosenberg, Texas	
Drain Nipple (Bonnet) Mark # CM 4920 Heat # 3016-II & 3017-II	ASME SA106 Gr B	U.S. Steel Co. Lorain, Ohio	

Cameron

IRON WORKS, INC.

30265-172 7.1-1

BODY CM#3874

P. O. BOX 1212 HOUSTON, TEXAS 77001

CERTIFICATE OF TESTS

Date 29 January 1974

S
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D

T
O

THE W. L. POWELL COMPANY
P. O. BOX 14006
CINCINNATI, OHIO 45214

S
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RECEIVED

FEB 1 1974

I.S.D. BY

Customer Order No.	C.I.W. Sales Order No.	Specification
6523 F	F-12536	Carbon Steel in accordance with ASME SA-350, Gr. 1F1 with Charpy at -20°F. per Powell Spec. P-195-6, Rev. 2 Dtd. 10-6-72, and purchasing Spec. WPPR 2/10106 Dtd. 10-16-72, WPPR 2/10146 Dtd. 2-16-73 & WPPR 2/10154 Rev. 1 Dtd. 6-11-73.
Description of Material		
Gate Valve Body 600# - 900# Dwg. # 107082 Rev. B 20" & 24" X 20" X 24"		

C.I.W. Part Number	Heat No.	CHEMICAL ANALYSIS									
		C	MN	P	S	SI	CR	NI	MO	W	V
66128-05-01	K 3937	.22	.98	.009	.007						

Ultrasonic inspection has been performed in accordance with approved CIW Procedure, U-172, Rev. 1, and parts are found to be acceptable.

C.I.W. Part No. or Size	Quantity	Heat No.	Yield Point	MECHANICAL PROPERTIES				Y-Notch at -20°F
			Yield PSI	Tensile PSI	% Elong. In.	% Red. Area	Charpy Impact	Hardness
66128-05-01	See # 0020	K 3937	47,400	68,600	36.5	71.9	23.0 Ft.Lbs.	
							74.0	
							30.0	

No repair welding was performed on this forging. Magnetic particle inspection has been performed in accordance with approved CIW Procedure, I-59 Rev. D, and parts are found to be acceptable.

C.I.W. Heat No.	Jominy Hardenability	Grain Size
Forging Heat Treatment: 1600°F., held 5 hrs. at temp. Air cooled. 1525°F., held 3 hrs. at temp. Water quenched. 1275°F., held 6 hrs. at temp. Air cooled.		
<i>John R. Riordan</i> <i>Bechtel Corp</i> 1-31-74		

Subscribed and sworn to before me this 4 Day of January 1974

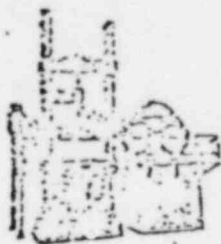
I certify these tests to be correct as conducted FEB 5 1974 in the records of the company.

Notary Public
G. A. TOCHIO
Notary Public in and for Harris County, Texas
CAMERON 435-1 REV. 3/73 Expires June 1, 1975

REVIEWED DOCUMENT

BECHTEL CORPORATION

64721-2
8.1-5



THE UNION
TESTING & RESEARCH LABORATORY

DIVISION OF
THE W.M. POWELL COMPANY

REPORT OF PHYSICAL TESTS

BONNET CH 2479

Analysis No. 2773E

Material furnished by *Powell Plastics*

Invoice No.

For *Star Flyby*

Order No. 12-4

12-5-1953

HEAT NO.	<i>P. 175-6</i>	<i>B. 350</i>	<i>C. 18-1</i>	<i>HT. 210750</i>	<input checked="" type="checkbox"/>
MATERIAL	<i>CH 2479</i>				
Temperature	<i>-20°F</i>				
Length	<i>2.070</i>				
Diameter	<i>.727 in</i>				
Reduced Area/Dim	<i>SA-370</i>				
Elastic Limit per Sq. In.	<i>(A) Linear Velocity of Striking Hammer = 16.8 ft/sec</i>				
Yield Point per Sq. In.					
Tensile Strength per Sq. In.	<i>(B) Specimen fractured completely</i>				
% Elongation					
% R. A.	<i>(C) Type and Model of Machine in which Observed</i>				
B. H. N. 3000 Kg. 500 Kg.	<i>Impact Testing Machine: 111500-3</i>				
Rockwell C D	<i>(D) Specimen broken in accordance with ASTM E-23</i>				
B					
H	<i>(E) Material has med. grain structure and</i>				
Superficial 45N 30N					
45T 30T	<i>(F) 20% Shear Fracture</i>				

Charge *7-11-53* *21* *22* *14*

(G) .040" .044" .028" Total Offsets

Form 105

Inspector

J. J. Longino

Engineer of Tests



DEC 18 1953

REVIEWED DOCUMENT
1700-50-100-100-100-100
GECHTEL CORPORATION

Adirondack Steel Casting Co., Inc.

FOUNDERS AND MACHINISTS
Watervliet, New York

CERTIFIED

ADIRONDACK STEEL CASTING

PHYSICAL AND CHEMICAL TEST REPORT

WEDGE CM #3138

Order No. 7061-F Pattern No. 107132 Specification ASTM A352-70 GR. LCB

Tested for The Wm. Powell Company Contract Date September 14 1971

Inspector E. Hanley

Engineer of

Heat No.	Number of Pieces	Serial Number	Yield Point Lbs. Per Sq. Inch	Tensile Strength Lbs. per Sq. In.	Elongation Per Cent	Reduction in Area Per Cent	BHN	C	Mn	P	S	Si
A4430	6	1	56,500	79,000	27.5	61.1		.18	.63	.025	.032	.47
		2	56,500	79,000	27.5	61.1		.18	.63	.025	.032	.47
		3	56,500	79,000	27.5	61.1		.18	.63	.025	.032	.47
		4	56,500	79,000	27.5	61.1		.18	.63	.025	.032	.47
		5	56,500	79,000	27.5	61.1		.18	.63	.025	.032	.47
		8	56,500	79,000	27.5	61.1		.18	.63	.025	.032	.47
CHARPY V NOTCH @ -20 F.												
Bar			1	2	3							
Ft. Lb.			33	39	36.5	= 36.2 ft. lb. avg.						
Lat. Exp.			.028"	.034"	.032"							
Shear Fract.			54%	59%	56%							

REVIEWED DOCUMENT

Wm. E. P. Hall 4/3/74
BECHTEL CORPORATION

- Heat Treatment:
1. Normalize 1700° F. 4 HRS. @ TEMP. A.C.
 2. Normalize 1700° F. 4 HRS. @ TEMP. WATER
 - Quenched from 1700° F. to Room Temp. Agitated Water Bath
 3. Temper 1225° F. 4 Hrs. @ Temp. A.C.



DEC 4 1973

9.1-2

30266-094

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

As Required by the Provisions of the ASME Code Rules

V12-2008

1. Manufactured by Atwood & Morrill Co., Inc., Salem, Massachusetts Order No. 12763-01
(Name & Address of Manufacturer)
2. Manufactured for Detroit Edison Co., Detroit, Michigan Order No. 1E 87861
(Name and Address)
3. Owner Detroit Edison - Enrico Fermi Nuclear Plant Unit # 11.
4. Location of Plant 6400 N. Dixie Highway, Stony Creek, Monroe County, Michigan
5. Pump or Valve Identification 20" - 900# Weld End Exercisable Check Valves. "L.T.C. Swing
Check Valves for Nuclear Boiler System."
(Brief description of service for which equipment was designed)
S/N 2-763

(a) Drawing No. 21389-H, Rev. 4 Prepared by Atwood & Morrill Co., Inc.(b) National Board No. -----6. Design Conditions 1250 psi 450 °F
(Pressure) (Temperature)7. The material, design, construction, and workmanship complies with ASME Code Section III. Class 1
Edition 1971, Addenda Date Winter 1971, Case No. 1535-2

Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings			
Body	SA352-LCB	Ebasco Services	S/N 2-763
Rt.# S/N 2			
Stuffing Box	SA352-LCB	Ebasco Services	S/N 2-763
Rt.# S/N 6			
Bearing Cover	SA352-LCB	Ebasco Services	S/N 2-763
Rt.# S/N 8			
Disc	SA352-LCB	Ebasco Services	S/N 2-763
Rt.# S/N 4			
(b) Forgings			
Load Key	SB168-70	Huntington Alloy	S/N 2-763

*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.

Mark No.	Material Spec. No.	Manufacturer	Remarks
(c) Bolting			
Studs (brg. cov. & stuff. box)	SA193-B7	Jos. Dyson	Ht. # 8067457
Nuts (brg. cov. & stuff. box)	SA194-Gr. 7	Jos. Dyson	Ht. # 96387H
(d) Other Parts			
Cover	SA516-Gr. 70	U.S. Steel Corp.	S/N 2-763
* Drain Pipe (body)	A106-Gr. B	U.S. Steel Corp.	S/N 2-763
* Leakoff Pipe (stuff. box)	A106-Gr. B	U.S. Steel Corp.	S/N 4-763

NOTE: THESE ITFMS COMPLY WITH THE CODE FOR MATERIAL CONSTRUCTION AND WORKMANSHIP AND ARE NOT INCLUDED AS FAR AS DESIGN IS CONCERNED.

Body / Disc

B. Hydrostatic test 4175 / 2800 psi.

CERTIFICATION OF DESIGN

Design information on file at Detroit Edison Co., Detroit, Michigan
 Stress analysis report on file at Atwood & Morrill Co., Inc., Salem, Massachusetts
 Design specifications certified by S. H. Noetzel (1) Prof. Eng. State Mich. Reg. No. 14386
 Stress analysis report certified by J. M. Cowley (1) Prof. Eng. State Mass. Reg. No. 23160
 (1) Signature not required. List name only.

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

Date Oct. 30th., 1974 Signed Atwood & Morrill Co. (Manufacturer)
W. T. Teneart, O.C. Mgr.
 Certificate of Authorization No. N 812 expires May 7th., 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 or 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 Oct. 30th., 1974, 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 Oct. 30th., 1974

John P. Jones, Jr. (Inspector) Commission # Mass. 755
 (National Board, State, Province and No.)
John Paul Jones, A.I., H.S.B.

SUBMITTED TO

CRANE CO.

INDIAN ORCHARD PLANT

CHEMICAL & MECHANICAL TEST REPORT

Ebasco Services Inc.

CUSTOMER ORDER NO. EML-20007

CHAPMAN ORDER NO. 50102-3-Y

1276301

BODY 20" DATE March 26, 1974

MATERIAL IDENTIFICATION AND HEAT NO.	CHEMICAL ANALYSIS						YIELD POINT LBS. PER SQ. IN.	TENSILE STRENGTH, LBS. PER SQ. IN.	% ELON- GATION IN 2"	% RED. IN AREA	DESCRIPTION OF MATERIAL
	C	MN	P	S	SI						
MOD-CM-171-C (LCB) ASME SA-352											2-20"-900# W'E Body Patt # 16702 Dwg # 302-602-2041
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> APPROVED BY <i>[Signature]</i> DATE <i>10/9/74</i> ATWOOD & MORRILL CO. INC. </div>							Accepted H.C. Bullen H. C. BULLEN QUALITY ADMINISTRATOR 9/13/74				
U-245-1	.24	.75	.021	.019	.50	BY <i>U. Franer</i>	49000	82500	30	55	1
U-256-1	.24	.70	.022	.016	.58	DATE <i>9-13-74</i> ATWOOD & MORRILL CO. INC.	46500	77000	32	59	1
U-245-1 Impact - 20° F.							Ft lbs	21	20	23	
Lateral expansion								.022"	.020"	.024"	
% Ductile Fracture								20%	18%	22%	
(We certify that these castings conform to the requirements of the purchase order.)											
U-256-1 Impact - 50° F.							Ft lbs	23	25	16	
Lateral expansion								.022"	.0205"	.015"	
% Ductile Fracture								20%	18%	12%	

RECEIVED

AUG 15 1974

MATERIALS ENGINEERING

LABORATORY, N. J.

Authorized Insp. H.S.B.

John Paul Jones 10/9/74

RESPECTFULLY SUBMITTED

Dallas Steel

QUALITY CONTROL DEPT.

Page: 56 of 75
MIL 3/4 SN 2

30266103

60-110 G.C. CHECKOFF
ASB (3) 10/9/74
A.C.

A&W
R.C.B.
A

9-6-74

United States Steel Corporation

CORRECTED TEST REPORT 9/10/74

12762-01-005

REPORT OF PLATES

WONESTEAD DISTRICT U.S. ORDER NO. SV10966 LOAD TALLY OR INVOICE NO. 163-59705

A ORDER NO. 3/5/74

PLATE NO. URP 005750 SHIPPER NO. & DATE 28748 7/02/74 160

S/H 1-763

S/H 2-763

SLAB # 700466

U.S. STEEL SUPPLY DIV.
UNITED STATES STEEL CORP.
P.O. BOX 274
BRIGHTON 33 MASS

U.S. STEEL SUPPLY DIV.
UNITED STATES STEEL CORP.
176 LINCOLN STREET
BRIGHTON MASS

WE HEREBY CERTIFY
THAT THE CHEMICAL ANALYSIS
AND/OR TESTS SHOWN IN THIS
REPORT ARE CORRECT AS CON-
TAINED IN THE RECORDS OF
THE COMPANY.

DEG-15-ASME-33515-72-WINTER-ADD-7203-70-2-ASME-SEC-YII-ART-VB21
CST-CVN-LONG-PROTEST-ASME-SAS70-72A-NB2300-0-MINUS-5
DEG-F-320/15-FT-LBS-LONG-UT-100%-SCAN-PER-ASME-SAS70-69-PV-OVAL

011941

RAYON CERT T/R ANALYSIS AND /FG OR CG/ TEST RESULTS PER

SIGNATURE H.W. MAXSON, CH. MET.

DATE

07/03/74

HEAT NO.	TEST OR PIECE IDENTIFY NO.	NO PCS	THICKNESS OR SECTION	NATURAL DESCRIPTION			WEIGHT	YIELD STRENGTH	TENSILE STRENGTH	ELONGATION %		% RED CT AREA
				WIDTH DIA OR FT WT	LENGTH			PSI	PSI	IN 8	IN 2	
346221	106455	BC TC	1	6.0000	96	120	19582	* 46.6	80.7		29.0	
								* 45.6	80.2		29.0	
FULL SIZE LONG. V NOTCH CHARPY IMPACT TEST 10X10MM MADE AT - 50 DEG. F. 35-20-18 FT. LBS.												
AVERAGE IMPACT STRENGTH - 24 PLATE CHARGED COLD. AUSTENITIZED @ 1661 DEG. F. PLUS OR MINUS 25 DEG. F. MTD. 195.0 MINUT												
WATER QUENCHED COLD. TEMPERED @ 1301 DEG. F. MTD. 210.0 MINUTES. AIR COOLED.												
ABOVE VALUES EXPRESSED IN K.S.I.												
346221	106457	UC TC	1	6.0000	96	120	19582	* 52.4	81.4		27.0	
								* 49.1	78.7		29.0	
FULL SIZE LONG. V NOTCH CHARPY IMPACT TEST 10X10MM MADE AT - 50 DEG. F. 55-45-33 FT. LBS.												
AVERAGE IMPACT STRENGTH - 45 PLATE CHARGED COLD. AUSTENITIZED @ 1661 DEG. F. PLUS OR MINUS 25 DEG. F. MTD. 180.0 MINUT												
WATER QUENCHED COLD. TEMPERED @ 1247 DEG. F. MTD. 195.0 MINUTES. AIR COOLED.												
ABOVE VALUES EXPRESSED IN K.S.I.												
ULTRASONIC INSPECTION OK----REPORT ATTACHED.												
YIELD POINT & LOOSE EXT.												

DETILED ATTACHED TO COMPANY RECORDS CONFORMS TO THE REQUIREMENTS OF THE SPECIFICATION LISTED ABOVE

IF S OR H INDICATE COMPLIANCE OF S AND OR HOMO TESTS, RESPECTIVELY

ATWOOD & MORRILL ORDER NO. <u>1M/97719</u>		U.S.S. ORDER NO. <u>BAS 63892</u>		AVG GR SIZE <u>08</u>	
GRADE: <u>ASTM A 516 GR 70</u>		SIZE: <u>6"</u>		CHEMICAL & PHYSICAL	
HEAT NO: <u>346221</u>		AUTH: INSP. <u>H.S.B.</u>		REPORT CHECKED	
DATE: <u>9/24/74</u>		BY: <u>M. Frazer</u>		DATE: <u>9-25-74</u>	
ATWOOD & MORRILL CO. INC.		John Paul Jones 9/25/74			

SUBMITTED TO:

Ebasco Services Inc.

CRANE CO.

INDIAN ORCHARD PLANT

CHEMICAL & MECHANICAL TEST REPORT

12763

CUSTOMER ORDER NO. EML-20007
CHAPMAN ORDER NO. CV#-50101-3-Y

DATE April 8, 1974

MATERIAL IDENTIFICATION AND HEAT NO.	CHEMICAL ANALYSIS								YIELD POINT LBS. PER SQ. IN.	TENSILE STRENGTH, LBS PER SQ. IN.	% ELON- GATION IN 2"	% RED IN AREA	DESCRIPTION OF MATERIAL
	C	Mn	P	S	Si								
ASME SA 352													A1427 1-20"-900 Dirc S/n 4
L.C.B.													Patt # 16699 Dwg# 30545-40-2041
<div>APPROVED BY <u>[Signature]</u> DATE <u>10/12/44</u> ATWOOD & MORRILL CO. INC.</div>													
U-245-2	.24	.75	.021	.019	.50				49000	82500	30	55	1
Impact — 20° F.									Ft lbs.	21	20	23	
Lateral expansion										.022"	.020"	.024"	
% Ductile fracture										20%	18%	22%	
<div>Certified Material Test Report-Accepted BY <u>[Signature]</u> DATE <u>9-13-74</u> ATWOOD & MORRILL CO. INC.</div>													
												Acceptable H Bullen	
												H. C. BULLEN 9/6/7	
												QUALITY ADMINISTRATOR	
We certify that these castings conform to the requirements of the purchase order.													
RECEIVED													

We certify that these castings conform to the requirements of the purchase order.

RECEIVED

AUG 1 1974

MATERIALS ENGINEERING
LABORATORY, N. J.

10/9/74

RESPECTFULLY SUBMITTED

Dallas u. Struck

QUALITY CONTROL DEPT.

Authorized Ins., H.S.B. John'Paul Jones

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

As Required by the Provisions of the ASME Code Rules

78-2194

1. Manufactured by The Wm. Powell Co. 3233 Colerain Ave. Cinti, Ohio Order No. 176809
(Name & Address of Manufacturer)
2. Manufactured for Detroit Edison Co. 2000 2nd Ave, Detroit, Mich Order No. IE 86734
(Name and Address)
3. Owner: Detroit Edison Company
4. Location of Plant 400 North Dixie Highway, Stoney Creek, Monroe County, Mich
5. Pump or Valve Identification Valve Serial No. 64059-1
1-14" Fig. 19023 W.E. Gate Valve
(Brief description of service for which equipment was designed)
High Pressure Coolant Injection System
- (a) Drawing No. 041369-4 & -5 Prepared by The Wm. Powell Co. Plant #2
- (b) National Board No. N/A
6. Design Conditions 1330 psi 420 °F
(Pressure) (Temperature)
7. The material, design, construction, and workmanship complies with ASME Code Section III. Class 1
Edition 1971, Addenda Date Winter 1971, Case No. N/A

COPY

Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings Body-Bonnet			
Body Mark CM 2578	ASME SA 352	Adirondack Steel	Modified for
Heat #A3458	Grade LCB	Watervliet, NY	Impact Testing
3463			
Wedge Mark CM 4010	ASME SA 352	Adirondack Steel	Modified for
Heat # A 3629	Grade LCB	Watervliet, NY	Impact Testing
(b) Forgings			
Bonnet Mark CM 3566	ASME SA350	Dayton Forging	Modified for
Heat #212202	Grade LFI	& Heat Treating Co	Impact Testing
		Dayton, Ohio	

*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.

	Mark No.	Material Spec. No.	Manufacturer	Remarks
(c) Bolting Body-Bonnet				
le AX Body Studs Lot CM 6172		ASME SA 193	Wm. H. Haskell Mfg.	
Heat #78992		Grade B7	Pawtucket, R.I.	
Code AW Bonnet Studs Lot CM 6173		ASME SA 193	Wm. H. Haskell Mfg.	
Heat #78992		Grade B7	Pawtucket, R.I.	
Code CN Nuts Lot CM 7223		ASME SA 194	Texas Bolt Co.	
Heat #34348		Grade 7	Houston, Texas	
(d) Other Parts				
Stem Mark CM 2820		ASTM A564	Dayton Forging	Modified for
Heat #60642		Type 630	& Heat Treating Co	Impact Testing
Segment Thrust Ring		ASTM A564	Dayton Forging	Modified for
Mark #CM 2815		Type 630	& Heat Treating Co	Impact Testing
Heat #60642			Dayton, Ohio	
Bonnet Drain Nipple		ASME SA106	U.S. Steel Co.	
Mark CM 4452		Grade B	Gary, Indiana	
Heat #A64871				

8. Hydrostatic test 4175 psi.

CERTIFICATION OF DESIGN

Design information on file at The Wm Powell Co. Cincinnati, Ohio
 Stress analysis report on file at Detroit Edison Company
 Design specifications certified by Sylvester H. Noetzel (1) Prof. Eng. State Mich Reg No. 14386
 Stress analysis report certified by R.A. Vance (1) Prof. Eng. State Mich Reg. No. 117429
 (1) Signature not required. List name only.

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

Date April 10, 1975 Signed The Wm Powell Co Plt #2 B. J.C. Williams
 (Manufacturer)

Certificate of Authorization No. N719 expires October 30, 1976.

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 Ohio and employed by Hartford Steam Boiler I & I Co of Hartford, Connecticut have inspected the equipment described in this Data Report on 4/10/1975, 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 4/10/1975

Benjamin A. Jeffery
 Benjamin A. Jeffery (Inspector)

Commissions Ohio 1653
 (National Board, State, Province and No.)

APR 11 1915

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64059-1 4
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30231 073
64059-1

8.1-5

BOWSER-MORNER Testing Laboratories, Inc.

Founded 1911

420 DAVIS AVENUE

P.O. BOX 51

DAYTON, OHIO 45401

513-253-8805

January 21, 1974

LABORATORY REPORT

CORRECTED COPY

Brown CM 3566

Report to: Dayton Forging & Heat Treating Company
2323 East First Street - Dayton, Ohio 45403

Laboratory No. 784831
Authorization:

Attn: Mr. Jan E. Knavel

Report on: Samples Submitted for Machining and Impact Testing

SAMPLES SUBMITTED:

Date Submitted - 11-21-73
No. of Samples - 1
Identification - Customer - William Powell Co. - Customer Order No. 744-F-4
Job No. 55676 55677

TEST PROCEDURE: Machining of samples and Charpy V Notch Impact Testing were conducted in accordance with the following test procedure:
ASTM E23. Must average 15 Ft. Lbs. with on one sample less than 10 Ft. Lbs.

TEST RESULTS:

Sample No.	Test Temperature, °F.	Breaking Energy, Ft. Lbs.
1	-20°F	88.0
2	-20°F	61.0
3	-20°F	37.0
	Average	62.0

MAR 11 1975

Respectfully submitted,

BOWSER-MORNER Testing Laboratories, Inc.

James R. Hannahs

James R. Hannahs, Welding Engineer
Manager, Metallurgical Laboratory
Chem-Met Division

3-Client
2-File
1RH/ma

MAR 11 1975



MAR 12 1975
APR 2 1975

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38
APR
AUG 9 1974

ENRICO FERMI UNIT 2

HPCI STEAM

2297

DESCRIPTION	MATERIAL SPEC.	HEAT NUMBER	TEMP OF	CHARPY IMPACT TEST RESULTS (FULL SIZE - LONG.)			
				C _V	ENERGY FT-LB	LAT	EXPANSION MILS
VALVE V17-2020 (10" GATE)							
BODY	SA 216 GR WCB	A3347	0°	27.5	26	28	← N/A →
BONNET	SA 350 GR LF1	6043430	0°	29	32	39	← N/A →
WEDGE	SA 216 GR WCB	9518	-20°	25	29	27	← N/A →
VALVE V17-2021 (10" GATE)							
BODY	SA 216 GR WCB	A3347	}	SEE V17-2020			
BONNET	SA 350 GR LF1	6043430					
WEDGE	SA 216 GR WCB	9518					

117-2020

COPY

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

As Required by the Provisions of the ASME Code Rules

1. Manufactured by The Wm. Powell Company Order No. 176809
(Name & Address of Manufacturer)
2. Manufactured for The Detroit Edison Co., 2000 2nd Ave Detroit, Mich. Order No. 1E 86734
(Name and Address)
3. Owner The Detroit Edison Company
4. Location of Plant 6500 Dixie Highway, Stoney Creek, Monroe County, Michigan
5. Pump or Valve Identification Valve Serial No. 64067-1

Class I Valve for Drywell System

(Brief description of service for which equipment was designed)

- (a) Drawing No. 040279-4 & 5 Prepared by The Wm. Powell Company
- (b) National Board No. _____
6. Design Conditions 1250 (Pressure) psi 575 °F (Temperature)
7. The material, design, construction, and workmanship complies with ASME Code Section III. Class I
- Edition 1971, Addenda Date Winter 1971, Case No. _____

Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings			
Body - Mark #CM 2523	ASME SA216 Gr.	Adirondack	Modified for Impact
Heat No. A3347	WCB Special	Watervliet N.Y.	Testing
Wedge - Mark #CM 886A	ASME SA216 Gr	Howmet Corp.	Modified for Impact
Heat No. 9518	WCB Special	Milwaukee, Wis.	Testing
(b) Forgings			
Bonnet - Mark #CM 2489	ASME SA350	Dayton Forging &	Modified for Impact
Heat No. 6043430	Gr IFI Special	Heat Treat Co.	Testing
		Dayton, Ohio	

*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.

V17-2020

Mark No.	Material Spec. No.	Manufacturer	Remarks
(c) Bolting Body-Bonnet			
Studs Lot #CM 2784	ASME SA193 Gr B7	Bethlehem Steel Lebanon P.A.	
Studs Lot #CM 2788	ASME SA193 Gr B7	Bethlehem Steel Lebanon P.A.	
Nuts - Lot CM #3499	ASME SA194 Gr 2H	Texas Bolt Co. Houston, Texas	
(d) Other Parts			
Stem Mark #CM 2776	ASTM A564 Gr 630	Dayton Forging & Heat Treat Co.	Modified for Impact Testing
Heat #60642			
Segmental Thrust Ring Mark #CM 2804	ASTM A564 Gr 630	Dayton Forging & Heat Treat Co.	Modified for Impact Testing
Heat #60642		Dayton, Ohio	
Drain Nipple - Mark No. #CM 3939	ASME A106 Gr B	U.S. Steel Co. Lorain, Ohio	
Heat No. 3016 II & 3017 II			

B. Hydrostatic test 4175 psi.

CERTIFICATION OF DESIGN

Design information on file at The Wm. Powell Co. Cincinnati, Ohio
 Stress analysis report on file at Detroit Edison Company
 Design specifications certified by Sylvester H. Noetzel (1) Prof. Eng. State Mich. Reg. No. 14386
 Stress analysis report certified by R.A. Vance (1) Prof. Eng. State Mich. Reg. No. 18860
 (1) Signature not required. List name only.

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

Date March 22, 1974 Signed The Wm. Powell Co. Plt. #2 J.C. Williams
 (Manufacturer)

Certificate of Authorization No. N719 expires October 30, 1976

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 Ohio and employed by Continental Insurance Co. of Columbus, Ohio have inspected the equipment described in this Data Report on MARCH 29, 1974, 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 MARCH 29, 1974

David J. Eschen Commissions OHIO, KY #472
 (Inspector) (National Board, State, Province and No.)

Adirondack Steel Casting Co., Inc.

FOUNDERS AND MACHINISTS
Watervliet, New York

PHYSICAL AND CHEMICAL TEST REPORT

Order No. 5635F Pattern No. 80242 Specification ASTM A216 GR WCB -70A
Tested for William Powell Contract _____ Date May 21, 1973
Inspector E. Hanley Engineer of T

Heat No.	Number of Pieces	Serial Number	Yield Point Lbs. Per Sq. Inch	Tensile Strength Lbs. per Sq. In.	Elongation Per Cent	Reduction in Area Per Cent	BHN	Charpy	C	Mn	P	S	Si			
A3347	1	2	44,000	72,000	26.0	56.0		V Notch	.19	.83	.023	.045	.54			
								@ 0° F								
								27.5								
								26.0								
								28.0								
							3 ÷	81.5								
								27.1 Avg.								

CERTIFIED

ADIRONDACK STEEL CASTING

PER

E. Hanley
Off Brown 6/28/73
Bechtel Corp

SEP 25 1973

Heat Treatment

- 1.- Normalize 1700° F 4 Hrs. @ Temp. A.C.
- 2.- Normalize 1700° F 4 Hrs. @ Temp. Water Quenched From 1700° F To Room Temp. Agitated Water Bath
- 3.- Temper 1225° F 4 Hrs. @ Temp. A.C.

POWERS-MORNER Testing Laboratories, Inc.

Founded 1919

41 DAVIS AVENUE

P.O. BOX 51

DAYTON, OHIO 45401

513/253-8803

LABORATORY REPORT

BENNET CM 2489

April 3, 1973

Report to: The Dayton Forging and Heat Treating Company
2312 East Fifth Street - Dayton, Ohio 45403

Attention: Mr. Ray Feld

Laboratory No. 771365

Authorization:

Report on: Three (3) Samples Submitted for Machining and Impact Testing at 0°F.

Customer Name: The William Powell Company
Customer Order No.: 7766-F-4134
Job No.: 30368

SAMPLE IDENTIFICATION:

Three (3) Charpy Impact Samples, numbered 4, 5 and 6 by the Client.

TEST PROCEDURE:

Sample machining, notching and impact testing at 0°F. were conducted in accordance with Standard ASTM Test Procedures.

TEST RESULTS:

<u>Sample No.</u>	<u>Test Temperature</u>	<u>Breaking Energy, Ft./lbs.</u>
4	0°F.	29
5	0°F.	32
6	0°F.	39

TEST COMPLIANCE:

The submitted samples comply with the Client's minimum requirements of 20 ft./lbs. average with no sample less than 15 ft./lbs.

Respectfully submitted,

POWERS-MORNER Testing Laboratories, Inc.

John E. Knauf
John E. Knauf, Manager
Metallurgical Laboratory
Chemical & Metallurgical Division

5-Client

2-Fill

JER/eh

REVIEWED DOCUMENT

BECHTEL CORPORATION

HOWMET

HOWMET CORPORATION CRUCIBLE STEEL CASTING DIVISION

2500 SOUTH 20TH STREET • MILWAUKEE, WISCONSIN 53215 • (414) 645-7700

PHYSICAL TEST REPORT

Date 10/8/73.

Material	STEEL CASTINGS	Code	Pieces	Part No	Order No
Mfg. for	THEWM POWELL CO.	9518	3	53905	5640F
Address	CINCINNATI, OHIO	9518	4	101143	7055F
Attention	MR. R. S. KIELBY	9518	1	106553	5641F
	TECHNICAL SERVICE DEPT.				
Treatment	NORM, QUENCH AND TEMPER WEDGE CM 836A				

Heat No. or Reference	9518			
Physical Serial No.				
Original Dimension	.505			
Original Area in Sq. In.	.200			
Dimension After Fracture	.319			
Area After Fracture, Sq. In.	.0799			
Elastic Limit, Lbs. Actual	9,450			
Maximum Load, Lbs. Actual	14,100			
Elongation in Inches	.62			
Yield Point, per Sq. In.	47,250			
Tensile Strength, per Sq. In.	70,500			
% Elongation in Inches	31.0			
% Reduction in Area	60.1			
Brinell	25.0 FT LBS			
Impact	CHORPY			
	1/4" x 1/2" x 1/4" -20°F			
	29.0 FT LBS			
	27.0 FT LBS			

REVIEWED DOCUMENT

Wm E. McMillan 3/29/74
ECCYTEL CORPORATION



OCT 15 1973

WEDGES
CSL

1751MA 216 70A (MILVCS) SPECIAL	P-200-3	Si	Cr	Ni	Mo	Others
REQUIREMENTS OF						
ASTMA 352-70 1/2" LBS SPECIAL	P 200-9					
Yield Point						
Tensile Strength	9518	.17	.80	.25	.035	.54
Elongation						
Reduction of Area						
Cold Bends						

Subscribed and Sworn before me this 10 day of October 1973

Witnessed By

Wm E. McMillan
Wm E. McMillan

1. Manufactured by The Wm. Powell Co., 3233 Colerain Ave., Cincinnati, Ohio
(Name and Address of N Certificate Holder)
2. Manufactured for Enrico Ferris 2, Detroit Edison Co., 2000 2nd Ave., Detroit, Mich.
(Name and Address of Purchaser or Owner)
3. Location of Installation 6400 Dixie Hwy, Stoney Creek, Monroe County, Michigan
(Name and Address)

4. Purpose of Valve 900# WE Gate Valve Nominal Inlet Size 10" Outlet Size 10"
(inch) (inch)

(a) Model No. (b) N Certificate Holder's (c) Canadian

Series No.
or Type

Serial
No.

Registration
No.

(d) Drawing
No.

(e) Class

(f) Nat'l.
Bd No.

(g) Year
Built

(1) Fig 19023 WE 71283-1 * N/A 048615 8-1 1 N/A 1978

(2)

(3)

(4)

(5)

(6)

(7)

(8)

(9)

(10)

* This NPV-1 form with Serial No. 71283-1 replaces
NPV -1 form with Serial No. 64068-1

COPY

5. HIGH PRESSURE COOLANT INJECTION SYSTEM

Item 177, Tag V17-2621 (Brief description of service for which equipment was designed)

6. Design Conditions 1250 psi 575 °F or Valve Pressure Class N/A (1)
(Pressure) (Temperature)
7. Cold Working Pressure 2790 psi at 100°F.
8. Pressure Retaining Pieces

Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings			
Body CM 2522	ASME SA 216 Gr. WCB	Admiral Steel Co.	Modified for
Heat A3347	Special	Watervliet, N.Y.	Impact Testing
Wedge CM 885A	ASME SA 216 Gr. WCB	Howmet Corp.	Modified for
Heat 9518	Special	Milwaukee, Wisc.	Impact Testing
(b) Forgings			
Bonnet CM 2475	ASME SA 351 Gr. LF1	Dayton Forge Co.	Modified for
Heat 6043430	Special	Dayton, Ohio	Impact Testing
Stem CM 2777	ASTM A 564 Type 630	Dayton Forge Co.	Modified for
Heat 60642		Dayton, Ohio	Impact Testing
Seg. Thrust Ring CM 2805	ASTM A 564 Type 630	Dayton Forge Co.	Modified for
Heat 60642		Dayton, Ohio	Impact Testing

(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 and 5 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.

Adirondack Steel Casting Co., Inc.

FOUNDERS AND MACHINISTS
Watervliet, New York

PHYSICAL AND CHEMICAL TEST REPORT



Order No. 5635P

Pattern No. 80242

Specification ASTM A216 GR WCB -7CH

Tested for William Powell

Contract

Date

May 21,

19 71

Inspector

E. Hanley

Engineer of

Heat No.	Number of Pieces	Serial Number	Yield Point Lbs. Per Sq. Inch	Tensile Strength Lbs. per Sq. In.	Elongation Per Cent	Reduction in Area Per Cent	BHN	Charpy	C	Mn	P	S	Si			
A3347	1	2	44,000	72,000	26.0	56.0		V Notch	.19	.83	.023	.045	.54			
								@ 0° F								
								27.5								
								26.0								
								28.0								
							3 ÷	81.5								
								27.1 Avg.								

CERTIFIED

ADIRONDACK STEEL CASTING

PER

SEP 25 1973

Heat Treatment

- 1.- Normalize 1700° F 4 Hrs. @ Temp. A.C.
- 2.- Normalize 1700° F 4 Hrs. @ Temp. Water Quenched From 1700° F To Room Temp. Agitated Water Bath
- 3.- Temper 1225° F 4 Hrs. @ Temp. A.C.

LABORATORY REPORT

71283-1

April 3, 1973

Report to: The Dayton Forging and Heat Treating Company
2323 East First Street - Dayton, Ohio 45403
Attention: Mr. Ray Feld

Laboratory No. 774465
Authorization:

Report on: Three (3) Samples Submitted for Machining and Impact Testing at 0°F.

Benit CM 2475
Customer Name: The William Powell Company
Customer Order No.: 7766-P-4134
Job No.: 50368

SAMPLE IDENTIFICATION:

Three (3) Charpy Impact Samples, numbered 4, 5 and 6 by the Client.

TEST PROCEDURE:

Sample machining, notching and impact testing at 0°F. were conducted in accordance with Standard ASTM Test Procedures.

TEST RESULTS:

<u>Sample No.</u>	<u>Test Temperature</u>	<u>Breaking Energy, Ft./lbs.</u>
4	0°F.	29
5	0°F.	32
6	0°F.	39

TEST COMPLIANCE:

The submitted samples comply with the Client's minimum requirements of 20 ft./lbs. average with no sample less than 15 ft./lbs.

Respectfully submitted,

BOWSER-MORNER Testing Laboratories, Inc.

John Z. Kravet

John Z. Kravet, Manager
Metallurgical Laboratory
Chemical & Metallurgical Division

5-Client

2-Filb

JEX/zh



MAR 25 1975



HOWMET CORPORATION CRUCIBLE STEEL CASTING DIVISION

2850 SOUTH 20TH STREET • MILWAUKEE, WISCONSIN 53215 • (414) 645-7700

71283-1

71283-1
64068
9-1-2

PHYSICAL TEST REPORT

Date 10/8/73

Material	<u>STEEL CASTINGS</u>	Code	Pieces	Part No	Order No
Mfg for	<u>THE W.M. POWELL CO.</u>	9518	3	52905	5640F
Address	<u>CINCINNATI, OHIO</u>	9518	4	101143	7055F
Attention	<u>MR. A.S. KIELBY</u> <u>TECHNICAL SERVICE DEPT.</u>	9518	1	106553	5641F.
Treatment	<u>NORM, QUENCHING, TEMPER</u>				
	<u>Wedge CM 835A</u>				

Heat No. or Reference	9518				
Physical Serial No.					
Original Dimension	.505				
Original Area in Sq. In.	.200				
Dimension After Fracture	.319				
Area After Fracture, Sq. In.	.0799				
Elastic Limit, Lbs. Actual	9,450				
Maximum Load, Lbs. Actual	14,100				
Elongation in Inches	.62				
Yield Point, per Sq. In.	47,250				
Tensile Strength, per Sq. In.	70,500				
% Elongation in Inches	31.0				
% Reduction in Area	60.1				
Brinell	25.0 H.F. LBS				
Impact	29.0 H.F. LBS				
	27.0 H.F. LBS				



OCT 15 1973

ASTM A 216-70A CRUCIBLE STEELING	MA	25	0.3	Si	Cr	Ni	Mo	Others
REQUIREMENTS OF	12	200	19					
ASTM A 216-70A CRUCIBLE STEELING								
Yield Point								
Tensile Strength	9518	14,800	0.5	0.33	0.54			
Elongation								
Reduction of Area								
Cold Bends								

Subscribed and Sworn before me this OCT - 8 1973 day of

Witnessed By

MAY 25 1975



[Signature]

ENRICO FERMI UNIT 2

RHR RETURN DIV I 2298

DESCRIPTION	MATERIAL SPEC.	HEAT NUMBER	TEMP OF	CHARPY IMPACT TEST RESULTS (FULL SIZE - LONG)						
				C _V	ENERGY FT-LB	LAT EXPANSION MILS				
<u>VALVE V8-2161 (24" GATE)</u>										
BODY	SA350 GR LF1	K3937	-20°	86	101	50	← N/A →			
BONNET	SA350 GR LF1	210750	-20°	21	22	14	40	44	28	
WEDGE	SA352 GR LCB	A4480	-20°	33	39	36.5	28	34	32	
<u>VALVE V8-2163 (24" SWING CHECK)</u>										
BODY	SA352 GR LCB	83M	-20°	25.7	28.7	25.3	25	26	24	
BONNET										
DISC										
<u>VALVE V8-2165 (24" GATE)</u>										
BODY	SA350 GR LF1	55536	-20°	14	24	20	← N/A →			
BONNET	SA350 GR LF1	210750	-20°	21	22	14	40	44	28	
WEDGE	SA352 GR LCB	4480	-20°	33	39	36.5	28	34	32	

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

As Required by the Provisions of the ASME Code Rules

AVF-2161

1. Manufactured by The Wm. Powell Company Order No. 176809
(Name & Address of Manufacturer)

48226

2. Manufactured for Detroit Edison Co. 2000 2nd Ave. Detroit, Mich Order No. IE 86734
(Name and Address)

3. Owner Detroit Edison Co.

4. Location of Plant 6400 Dixie Highway, Stoney Creek, Monroe County, Michigan

5. Pump or Valve Identification 24" Figure 19023 W.E. Gate Valve

Valve Serial No. 64051-1

(Brief description of service for which equipment was designed)

(a) Drawing No. 040538-4 & -5 Prepared by The Wm. Powell Co. Plant #2

(b) National Board No. N/A

6. Design Conditions 1250 (Pressure) psi 575 (Temperature) °F

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

Edition 1971, Addenda Date Winter 1971, Case No. _____

Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings			
Wedge Mark # CM 3139 , Heat # A4480	ASME SA 352 Gr. LCB	Adirondack Steel Watervliet, N.Y.	Modified for Impact Testing
(b) Forgings			
Body Mark # CM 3934 Heat # K3937	ASME SA 350 Gr. LF1 Spec'1	Cameron Iron Works Houston, Texas	Modified for Impact Testing
Bonnet Mark # CM 2478 Heat # 210750	ASME SA 350 Gr. LF1 Spec'1	Dayton Forge & Heat Treat Co. Dayton, Ohio	Modified for Impact Testing

V8-2161

Mark No.	Material Spec. No.	Manufacturer	Remarks
(c) Bolting Body-Bonnet			
Studs Lot # CM 2951	ASME SA 193 Gr. B7 Special	Bethlehem Steel Lebanon, Pa.	Modified for Impact Testing
Studs Lot # CM 3121	ASME SA 193 Gr. B7 Special	Wm. H. Haskell Pawtucket, R.I.	Modified for Impact Testing
Nuts CM 2639 thru 2654	ASME SA 194 Gr. 7 Special	Ryerson Steel Cincinnati, Ohio	Modified for Impact Testing
(d) Other Parts			
See Attached Sheet			

B. Hydrostatic test 4175 psi.

CERTIFICATION OF DESIGN

Design information on file at The Wm. Powell Co. Cincinnati, Ohio
 Stress analysis report on file at Detroit Edison Co.
 Design specifications certified by Sylvester H. Noetzel (1) Prof. Eng. State Mich Reg. No. 14386
 Stress analysis report certified by R.A. Vance (1) Prof. Eng. State Mich Reg. No. 18860
 (1) Signature not required. List name only.

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

Plt #2

Date September 5, 1974 Signed The Wm. Powell Co. By J.C. Williams
 (Manufacturer) J.C. Williams

Certificate of Authorization No. N 719 expires October 30, 1975

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 Ohio and employed by Continental Insurance Co. of Columbus, Ohio have inspected the equipment described in this Data Report on 4-5 10-7-74, 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 Sept 5, 1974

K.H. Lane (Inspector)

Commissions Ohio 1609, Ky 270
 (National Board, State, Province and No.)

64051-1
1-2Detroit Edison P.O. IE 86734 Rel. #1
Powell Order No. 176809

✓ 8-2161

ATTACHMENT TO MANUFACTURER'S DATA REPORTNPV-1

Drawing No. 040538-4 & -5 prepared by The Wm. Powell Co., Valve Serial 64051-1

(D) Other Parts

MARK NO.	MATERIAL SPEC. #	MANUFACTURER	REMARKS
Stem Mark # CM 2588 Heat # 56616	ASTM A 564 Gr 630	Dayton Forge & Heat Treat Co. Dayton, Ohio	Modified for Impact Test.
Segmental Thrust Ring Mark # CM 2596 Heat # 60642	ASTM A564 Gr 630	Dayton Forge & Heat Treat Co. Dayton, Ohio	Modified for Impact Test.
Body Drain Nipple Mark # CM 5186 & 5187 Heat # KD9155	ASME SA106 Gr. B	Gulf States Tube Rosenberg, Texas	
Bonnet Drain Nipple Mark # CM 4437 Heat # A64871	ASME SA 106 Gr B	U.S. Steel Co. Gary, Indiana	

64051-1

7.1-2

CLW WORKS, INC.

P. O. BOX 1212 HOUSTON, TEXAS 77001

CERTIFICATE OF TESTS

Body CM 3934

Date 11 February 1974

SOLD TO THE WM. POWELL COMPANY
P. O. BOX 14006
CINCINNATI, OHIO 45214

SHIP TO

Customer Order No.	C.I.W. Sales Order No.	Description of Material
6521 F	F-12534	Gate Valve Body 600# - 900# Dwg.# 107175 Rev. A 20 + 24" X 20" X 24"

Carbon Steel in accordance with ASME SA-350, Gr. 1, with Charpy at -20°F. per Powell Spec. F-195-6, Rev. 2 Dtd. 10-6-72, and purchasing Spec. WPPR 2/10106 Dtd. 10-16-72, WPPR 2/10146 Dtd. 2-16-73, WPPR 2/10154 Rev. 1 Dtd. 6-11-73.

C.I.W. Part Number	Heat No.	CHEMICAL ANALYSIS										
		C	MN	P	S	SI	CR	NI	MO	W	V	CU
66188-05-05	K 3937	.22	.93	.009	.007	.18						

No repair welding performed on this forging.

C.I.W. Part No. or Size	Quantity	Heat No.	Yield Point	MECHANICAL PROPERTIES					V-Notch at -20°F
			Yield PSI	Tensile PSI	% Elong. In.	% Red. Area	Charpy Impact	Hardness	
65188-05-05	Ser.# 0021	K 3937	45,200	68,100	35.0	69.7	86.0 Ft.Lbs	101.0	50.0

Magnetic particle inspection has been performed in accordance with approved CIW Procedure, I-6 Rev. D, and parts are found to be acceptable.

Ultrasonic inspection has been performed in accordance with approved CIW Procedure, U-175, Rev. 1 and parts are found to be acceptable.

C.I.W. Heat No. Jaminy Hardenability Grain Size

Forging Heat Treatment:

1600°F., held 3 hrs. at temp. Air cooled.
1525°F., held 3 hrs. at temp. Water quenched.
1275°F., held 6 hrs. at temp. Air cooled.

Heat Treat Charts attached.

Subscribed and Sworn to before me this
Day of February 1974

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

FEB 11 1974

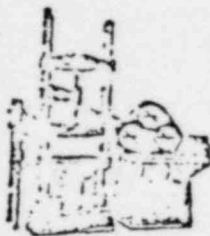


[Signature]
CLW WORKS, INC.
HOUSTON, TEXAS

[Signature]
2-12-74

H. O. WATSON

81-6



THE UNION TESTING & RESEARCH LABORATORY

DIVISION OF
THE WM. POWELL COMPANY

REPORT OF PHYSICAL TESTS

BONNET CM 2478

Analysis No. 2993-II

Material furnished by Powell Plant #2

Invoice No.

For Star Kelly

Order No. 124

12-6-1973

HEA. NO.	A.	B.	C.	-14 210750
MATERIAL	2-175-6	1A 350	1F-1	04T
Temperature	-20°F	Charpy V-Notch	opposite side of "O."	
Length	2.070			
Diameter	.324 in			
Reduced Area/Dim				
Elastic Limit per Sq. In.	(A) Linear Velocity of Striking Hammer = 16.8 ft/sec			
Yield Point per Sq. In.				
Tensile Strength per Sq. In.	(B) Specimen Fractured completely.			
% Elongation				
% R. A.	(C) Type and Model of Machine: Junior Olsen Horizontal			
B. H. N. 3000 Kg.	Ingersoll Testing Machine: 111500-3			
500 Kg.				
Rockwell "C"	(D) Specimen broken in accordance with ASTM F-23			
"A"				
"D"				
"B"				
"F"				
"E"	(E) Material has med. grain structure and			
"H"				
Superficial "45N"				
"30N"				
"45T"	(F) 25% Shear Fracture.			
"30T"				
4000				
Charpy 11 lbs.	21	22	14	
(G)	.040	.044	.028	Latent Expansion

Form 109

Inspector J. J. Simpson

Engineer of Tests

SEP 5 1974



CERTIFIED
ADIRONDACK STEEL CASTING
PER *E. Hanley*

Adirondack Steel Casting Co., Inc.
FOUNDERS AND MACHINISTS
Watervliet, New York



PHYSICAL AND CHEMICAL TEST REPORT

Order No. 7061-F Pattern No. 107132 Specification ASTM A352-70 GR. LCB
Tested for The Wm. Powell Company Contract _____ Date September 14 19 21

Inspector E. Hanley

Engineer of 1

Heat No.	Number of Pieces	Serial Number	Yield Point Lbs. Per Sq. Inch	Tensile Strength Lbs per Sq. In.	Elongation Per Cent	Reduction in Area Per Cent	BHN	C	Mn	P	S	Si
A4480	6	1	56,500	79,000	27.5	61.1		.18	.63	.025	.032	.47
		2	56,500	79,000	27.5	61.1		.18	.63	.025	.032	.47
		3	56,500	79,000	27.5	61.1		.18	.63	.025	.032	.47
		4	56,500	79,000	27.5	61.1		.18	.63	.025	.032	.47
		5	56,500	79,000	27.5	61.1		.18	.63	.025	.032	.47
		8	56,500	79,000	27.5	61.1		.18	.63	.025	.032	.47
CHARPY V NOTCH @ -20 F.												
Bar			1	2	3							
Ft. Lb.			33	39	36.5	= 36.2 ft. lb. avg.						
Lat. Exp.			.028"	.034"	.032"							
Shear Fract.			54%	59%	56%							

Heat Treatment: 1. Normalize 1700° F. 4 HRS. @ TEMP. A.C.
2. Normalize 1700° F. 4 HRS. @ TEMP. WATER
Quenched from 1700° F. to Room Temp. Agitated Water Bath
3. Temper 1225° F. 4 Hrs. @ Temp. A.C.

DEC 4 1973

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

As Required by the Provisions of the ASME Code Rules

COPY

1. Manufactured by Anchor/Darling Valve Co., Hayward, Calif. Order No. 3020-05
(Name & Address of Manufacturer)

T & No. V8-2163

2. Manufactured for Detroit Edison Company (DECO)
(Name and Address)

Order No. 1E87859
Item No. 5

3. Owner Detroit Edison Company (DECO)

4. Location of Plant ENRICO FERMI Unit No. 2

5. Pump or Valve Identification Serial No. 1N-069 24" 900# Swg. Chk.

ASME SECTION III

(Brief description of service for which equipment was designed)

Steam and Water Service in a Commercial Nuclear Power Plant

(a) Drawing No. 2229-3 Prepared by W.S. Kuosman

(b) National Board No. NA

6. Design Conditions 2160 700
2790 100
(Pressure) psi (Temperature) °F

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

Edition 1971, Addenda Date Winter 71, Case No. 1516

	Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings				
Body	HT 83M Ser. B	SA352LCB	Anchor/Darling	DeLaval
Bonnet	HT 83M Ser. A	SA352LCB	Anchor/Darling	DeLaval
Disc	HT 83M Ser. A	SA352LCB	Anchor/Darling	DeLaval
(b) Forgings				
Gland Act	HT 94976	SA182-F6	Anchor/Darling	Airco Viking
Stuff Box Act.	HT 211635	SA105GRII	Anchor/Darling	Airco Viking
Stuff Box Ind.	HT 211635	SA105GRII	Anchor/Darling	Airco Viking
Retainer	HT 211635	SA105GRII	Anchor/Darling	Airco Viking

*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.

3020-05

CUSTOMER:

SHIPMENT



ENGINE AND COMPRESSOR DIVISION DELAVAL CASTING FACILITY

550 - 85TH AVENUE, P.O. Box 2161
OAKLAND, CALIFORNIA 94621

3.1

Order No.
Shipped to

Steel
Anchor Valve Co.
24747 Clawiter Rd.
Hayward, California 94545
Attn. J. M. Johnston

Date March 18, 1974

PHYSICAL TESTS

Specification	ASME SA 352 Gr LCB				
	83 M		Charpy Impact "V" notch @ -20° F.		
HEAT NUMBER			Ft. Lbs.	MILS Lateral Expansion	% Shear
Yield Point -- Lbs. per sq. in. (0.2% offset)	68,600				
Tensile Strength -- Lbs. per sq. in.	86,100	1	25.7	.025	0
		2	28.7	.026	0
Elongation -- percent	24.5	3	25.3	.024	0
Reduction of Area -- percent	40.0	Ave.	26.6	.025	0
Bend Test					
Heat No.	C	Mn	Si	P	S
83 M	19	90	.58	.030	.034
			Cr	Ni	Mo
					Mg

Remarks: Heat No. 83 M Patt. No. 3098-5-1 Pcs. 1 Order No. 2823 (3020-05,06)

- Material is free of Mercury contamination.
- Material has been heat treated and post weld heat treated in accordance with ASME SA 352 as follows:
 - Normalize 1650° F - Hold 8 hours - air cool
 - Normalize 1650° F - Hold 8 hours - air cool
 - Temper 1150° F - Hold 8 hours, 40 min. air cool
 - Temper 1200° F - Hold 6 hours, 45 min. - air cool
 - Post weld heat treat - 1150° F - hold 4 hours - oven cool to 600° F.
- Material was manufactured in accordance with ASME SA 352 Gr LCB.
- Material marked with heat & serial numbers metal stamped with low stress die.
- We hereby certify that this material meets all requirements of the material specification and all applicable special requirements of article NB 2000 of ASME Section III that are required to be fulfilled by the materials manufacturer.
- Radiographic Inspection and Magnetic Particle Inspection not performed.

Witnessed by

Gerald J. Stoll

Quality Control Supervisor

Form FF-23 (R-1) 4/73

Body 3020-03

Respectfully submitted,
DELAVAL Turbine, Inc.
Engine and Compressor Division, Casting Facility

Harold Helgeson

By

METALLURGIST

CUSTOMER

SHIPMENT



ENGINE AND COMPRESSOR DIVISION DELAVAL CASTING FACILITY

550 - 85TH AVENUE, P.O. Box 2161
OAKLAND, CALIFORNIA 94621

51

Specimen
Reported to

Steel

Anchor/Darling Valve Co.
24747 Clawiter Rd.
Hayward, California 94545
Attn. J. M. Johnston

Date March 18, 1974

PHYSICAL TESTS

Specification	ASME SA 352 Gr LCB				
HEAT NUMBER	83 M		Charpy Impact "V" notch @ -20°	MILS Material	
Yield Point - Lbs. per sq. in. (0.2% offset)	68,600		Ft. Lbs.	Expansion	% Sh
Tensile Strength - Lbs. per sq. in.	86,100	1	25.7	.025	0
Elongation - percent	24.5	2	28.7	.026	0
Reduction of Area - percent	40.0	3	25.3	.024	0
Bend Test		Ave	26.6	.025	0
Heat No.	C	Mn	Si	P	S
83 M	.19	.90	.58	.030	.034
			Cr	Ni	Mo
					Mg

Remarks: Heat No. 83 M Patt. No. 3098-5-2 Pcs. 1 Order No. 2823 (3020-05,06)

1. Material is free of Mercury contamination.
2. Material has been heat treated and post weld heat treated in accordance with ASME SA 352 as follows:
 Normalize 1650° F - Hold 8 hours - air cool
 Normalize 1650° F - Hold 8 hours - air cool
 Temper 1150° F - Hold 8 hours, 40 min. air cool
 Temper 1200° F. - Hold 6 hours, 45 min - air cool
 Post weld heat treat - 1150° F. - hold 4 hours - oven cool to 600° F.
3. Material was manufactured in accordance with ASME SA 352 Gr LCB
4. Material marked with heat & serial numbers metal stamped with low stress die.
5. We hereby certify that this material meets all requirements of the material specification and all applicable special requirements of article NB 2000 of ASME Section III that are required to be fulfilled by the materials manufacturer.
6. Radiographic inspection and Magnetic Particle Inspection not performed.

Witnessed by

Gerald J. Stoll

Quality Control Supervisor

Form FF-23 (R-1) 4/73

Respectfully submitted,

DELAVAL Turbine, Inc.

Engine and Compressor Division, Casting Facility

Harold Helgerson

By

METALLURGIST

Bennet 3020-05

CUSTOMER
SHIPMENT



ENGINE AND COMPRESSOR DIVISION
DELAVAL CASTING FACILITY

550 - 85TH AVENUE, P.O. Box 2161
OAKLAND, CALIFORNIA 94621

6.1

Specimen Steel
Reported to Anchor Valve Co.
14747 Clawiter Rd.
Hayward, California 94545
Attn. J. M. Johnston

Date March 18, 1974

PHYSICAL TESTS

Specification			ASME SA 352 Gr LCB						
TEST NUMBER			83 M			Charpy Impact "V" notch @ -20° F.			
Yield Point — Lbs. per sq. in. (0.2% offset)			68,600			<u>Ft. Lbs.</u>	<u>Expansion</u>	<u>% Shear</u>	
Tensile Strength — Lbs. per sq. in.			86,100	1	25.7	.025	0		
				2	28.7	.026	0		
Elongation — percent			24.5	3	25.3	.024	0		
Reduction of Area — percent			40.0	Ave	26.6	.025	0		
Bend Test									
at No.	C	Mn	Si	P	S	Cr	Ni	Mo	Mg
33 M	.19	.90	.58	.030	.034				

marks: Heat No. Patt. No. Pcs. Order No.
Series A 83 M 3098-5-4 1 2823 (3020-05,06)

1. Material is free of Mercury contamination.
2. Material has been heat treated and post weld heat treated in accordance with ASME SA 352 as follows:
Normalize 1650° F. - Hold 8 hours - air cool
Normalize 1650° F. - Hold 8 hours - air cool
Temper 1150° F. - Hold 8 hours, 40 min air cool
Temper 1200° F. - Hold 6 hours, 45 min. air cool
Post weld heat treat - 1150° F. - hold 4 hours - oven cool to 600° F.
3. Material was manufactured in accordance with ASME SA 352 Gr LCB
4. Material marked with heat & serial numbers metal stamped with low stress die.
5. We hereby certify that this material meets all requirements of the material specification & all applicable special requirements of article NB 2000 of ASME Section III that are required to be fulfilled by the materials manufacturer.
6. Radiographic inspection and Magnetic Particle Inspection not performed.

Witnessed by

Gerald J. Stoll
Quality Control Supervisor

Respectfully submitted,
DELAVAL Turbine, Inc.
Engine and Compressor Division, Casting Facility
Harold Helgerson

DISC 3020-05

FORM NPV-1 (back)

Q.	Mark No.	Material Spec. No.	Manufacturer	Remarks
(c)	Boxing Body-Bonnet Studs Lot # CM 2780	ASME SA 193 Gr. B7 Special	Wm. H Haskell Pawtucket, R.I.	Modified for Impact Testing
	Studs Lot # CM 2779	ASME SA 193 Gr. B7 Special	Bethlehem Steel	Modified for Impact Testing
	Nuts - see attached sheet			
(d)	Other Parts			
	See attached sheet			

8. Hydrostatic test 4175 psi.

CERTIFICATION OF DESIGN

Design information on file at The Wm. Powell Co., Cincinnati, Ohio
 Stress analysis report on file at Detroit Edison Company
 Design specifications certified by Sylvester H. Noitzet (1) Prof. Eng. State Mich Reg. No. 14386
 Stress analysis report certified by R.A. Vance (1) Prof. Eng. State Mich Reg. No. 18860
 (1) Signature not required. List name only.

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

Date January 31, 1974 Signed The Wm. Powell Co. ^{Plt} #2 By J.B. Williams
 (Manufacturer)

Certificate of Authorization No. N 719 expires October 30, 1976

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 Ohio and employed by Continental Insurance Co. of Columbus, Ohio have inspected the equipment described in this Data Report on JANUARY 31, 1974, 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 January 31, 1974

David J. Edelman
 (Inspector)

Commissions OHIO, KY #472
 (National Board, State, Province and No.)

ATTACHMENT TO MANUFACTURER'S
DATA REPORT FORM NPV-1

Drawing No. 040547-4 & 5 prepared by The Wm. Powell Co.
Valve Serial No. 64464-1

- (c) Bolting
(d) other parts

MARK NO.	MATERIAL SPEC. #	MANUFACTURER	REMARKS
Nuts Mark # CM 2671, 2672 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 2681, 2682, 2683, 2684, 2685, 2686	ASME SA 194 Gr. 7 Special Nuts	Ryerson Steel Co. Cincinnati, Ohio	Modified for Impact Test- ing
Stem Mark # CM 2587 Heat # 56616	ASTM A 564 Gr. 630	Dayton Forge & Heat Treat Co. Dayton, Ohio	Modified for Impact Test- ing
Segmental Thrust Ring Mark # CM 2598 Heat # 60642	ASTM A 564 Gr. 630	Dayton Forge & Heat Treat Co. Dayton, Ohio	Modified for Impact Test- ing
Drain Nipple- Body Mark # CM 2764 & 2766 Heat # 2936 II & 2937 II	ASME A 106 Gr. B	Gulf States Tube Rosenberg, Texas	
Drain Nipple- Bonnet Mark # CM 3562 Heat # 3016II & 3017 II	ASME A 106 Gr. B	U.S. Steel Co. Lorain, Ohio	

Cameron

39 OCT 17 1973

IRON WORKS, INC.

P. O. BOX 1212 HOUSTON, TEXAS 77001

CERTIFICATE OF TESTS

Date 18 October 1973

SOLD TO
THE W. POWELL COMPANY
P. O. BOX 14006
CINCINNATI, OHIO 45214

SHIP TO

RECEIVED

Customer Order No.	C.I.W. Sales Order No.	Specification
6521 F	F-12534	Carbon Steel in accordance with ASME SA-350, Gr. LF with Charpy at -20°F. per Powell Spec. P-195-6, Rev. 2 Dtd. 10-6-72, and purchasing Spec. WPPR 2/10106 Dtd. 10-16-72, WPPR 2/10145 Dtd. 2-16-73 & WPPR 2/10154 Rev. 1 Dtd. 6-11-73.
Description of Material		
Gate Valve Body 600# - 900# Dwg. 107175 Rev. A 20" X 24" X 20" X 24"		

C.I.W. Part Number	Heat No.	CHEMICAL ANALYSIS										
		C	MN	P	S	SI	CR	NI	MO	W	V	CU
66133-05-05	55536	.20	.76	.010	.006							

Body Code CM 2783

CUSTOMER P.O. IE 86734 Rel. 1

ITEM NO. 45

TAG NO. V8 2165

DESCRIPTION 24" 900# W.E. Gate body
CM #2783

C.I.W. Part No. or Size	Qty	Heat No.	Yield Point	MECHANICAL PROPERTIES/-Notch at -20°F.					
				Yield PSI	Tensile PSI	% Elong. In.	% Red. Area	Charpy Impact	Hardness
66133-05-05	See 1015	55536	43,700	69,600	35.0	73.5	14.0 Ft. Lbs.	24.0	20.0

No repair welding was performed on these forgings. Minor repair welding performed.
Magnetic particle inspection has been performed in accordance with approved Cia Procedure, I-69, Rev. D, and parts are found to be acceptable.
Ultrasonic inspection has been performed in accordance with approved Cia Procedure, U-173, Rev. and parts are found to be acceptable.

C.I.W. Heat No.

Jominy Hardenability

Grain Size

Forging Heat Treatment:

1700°F., held 3 hrs. at temp. Air cooled.
1650°F., held 3 hrs. at temp. Water quenched.
1425°F., held 6 hrs. at temp. Air cooled.

REVIEWED DOCUMENT

Wm. E. Mitchell 10/29/74
BECHTEL CORPORATION

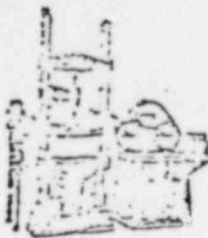
Subscribed and Sworn to before me this
Day of October 1973

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

G. A. TOUCHTON
Notary Public

H. C. WRIGHT
Metallurgist

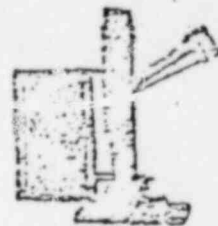
Noted in and for Harris County, Texas
JRSV:J/23
Since June 1, 1975



THE UNION
TESTING & RESEARCH LABORATORY

DIVISION OF
THE WM. POWELL COMPANY

REPORT OF PHYSICAL TESTS



Analysis No. 2973-II

Material furnished by

Powell Plant #2

Invoice No.

For

Steel Rully

Order No.

12-4

12-5-

1973

HEAT NO.	<u>A.</u>	<u>B.</u>	<u>C.</u>	<u>Ref. 210750</u>
MATERIAL	<u>2-195-6</u>	<u>1A</u>	<u>350 LF-1 Q4T</u>	
Temperature	<u>-20°F</u>	<u>Charpy V Notch</u>	<u>opposite side of "O."</u>	
Length	<u>2.070</u>			
Diameter	<u>.374 in</u>			
Reduced Area/Dim				
Elastic Limit per Sq. In.	<u>(A) Linear Velocity of Striking Hammer = 16.8 ft/sec</u>			
Yield Point per Sq. In.				
Tensile Strength per Sq. In.	<u>(B) Specimen Fractured completely.</u>			
% Elongation				
% R. A.	<u>(C) Type and Model of Machine: Junior Olsen Universal</u>			
B. H. N. 3000 Kg.				
500 Kg.	<u>Impact testing Machine: 11 00-3</u>			
Rockwell "C"				
"A"	<u>(D) Specimen broken in accordance with ASTM E-23</u>			
"D"				
"B"				
"F"				
"E"	<u>(E) Material has med. grain structure and</u>			
"H"				
Superficial "45N"				
"30N"				
"45T"	<u>(F) 20% Shear Fracture.</u>			
"30T"				
Charpy ft./lb.	<u>21</u>	<u>22</u>	<u>14</u>	
(G)	<u>.040</u>	<u>.044</u>	<u>.028</u>	<u>Central Specimen</u>

Form 105

Inspe for

E. J. Longino

Engineer of Tests

CUSTOMER P.O. 1E 86734 REL. 1
ITEM NO. 45
TAG NO. V8-2165
DESCRIPTION 24" 910# GATE 80-100T
CM 2470

REVIEWED DOCUMENT

Wm. C. McArthur
12-5-73
ELECTRIC COMPANY

Adirondack Steel Casting Co., Inc.

FOUNDERS AND MACHINISTS
Watervliet, New York

CUSTOMER P.O. 1E 86734 REL:1
ITEM NO. 45
TAG NO. V8-2165
DESCRIPTION 20" 900# GATE DISC
CM 2560

CERTIFIED
ADIRONDACK STEEL CASTING
PER [Signature]

PHYSICAL AND CHEMICAL TEST REPORT

Order No. 7061-F Pattern No. 107132 Specification ASTM A352-70 GR. LCB

Tested for The Wm. Powell Company Contract _____ Date September 14 19 7

Inspector E. Hanley

Engineer of _____

Heat No.	Number of Pieces	Serial Number	Yield Point Lbs. Per Sq. Inch	Tensile Strength Lbs. per Sq. In.	Elongation Per Cent	Reduction in Area Per Cent	BHN		C	Mn	P	S	Si					
A4480	6	1	56,500	79,000	27.5	61.1			.18	.63	.025	.032	.47					
		2	56,500	79,000	27.5	61.1			.18	.63	.025	.032	.47					
		3	56,500	79,000	27.5	61.1			.18	.63	.025	.032	.47					
		4	56,500	79,000	27.5	61.1			.18	.63	.025	.032	.47					
		5	56,500	79,000	27.5	61.1			.18	.63	.025	.032	.47					
		8	56,500	79,000	27.5	61.1			.18	.63	.025	.032	.47					
					CHARPY	V NOTCH @ -20 F.												
Bar					1	2	3											
Ft. Lb.					33	39	36.5	=	36.2	ft. lb. avg.								
Lat. Exp.					.028"	.034"	.032"											
Shear Fract.					54%	59%	56%											

REVIEWED DOCUMENT

Man. S. M. H. 1/22/74

BECHTEL CORPORATION

SEP 26 1973

WEDGE CM 2560

REVIEWED DOCUMENT

Wm. E. McHugh 1/29/74
BECHTEL CORPORATION

38
SEP 26 1973

- Heat Treatment: 1. Normalize 1700° F. 4 HRS. @ TEMP. A.C.
2. Normalize 1700° F. 4 HRS. @ TEMP. WATER
Quenched from 1700° F. to Room Temp. Agitated Water Bath
3. Temper 1225° F. 4 Hrs. @ Temp. A.C.

Reviewed OK
R. Peterson Bechtel Corp
9-21-73

ENRICO FERMI UNIT 2

FHR SUPPLY

2299

CHARPY IMPACT TEST RESULTS
(FULL SIZE - LONG.)

DESCRIPTION	MATERIAL SPEC.	HEAT NUMBER	TEMP OF	C _v	ENERGY			LAT EXPANSION		
					FT-LB			MILS		
<u>VALVE VB-2090 (20" GATE)</u>										
BODY	SA 350 GR LF1	55523	0°	22	19	10	← N/A →			
BONNET	SA 105 GR 2	212062	0°	39.5	37	38.5	← N/A →			
WEDGE	SA 216 GR WCB	A4480	0°	54.5	46.5	52.5	46	42	42	
<u>VALVE VB-2091 (20" GATE)</u>										
BODY	SA 350 GR LF1	55536	0°	17	16	14	← N/A →			
BONNET	SA 105 GR 2	212062	0°	39.5	37	38.5	← N/A →			
WEDGE	SA 216 GR WCB	A4480	0°	54.5	46.5	52.5	46	42	42	

ENRICO FERMI UNIT 2

BHR SUPPLY

2299

CHARPY IMPACT TEST RESULTS
(FULL SIZE - LONG.)

DESCRIPTION	MATERIAL SPEC.	HEAT NUMBER	TEMP OF	ENERGY			LAT EXPANSION		
				C _v	FT-LB			MILS	

VALVE VB-2092 (20" GATE)

BODY	SA 350 GR LFI	K3954	0°	15	10	38	← N/A →		
------	------------------	-------	----	----	----	----	---------	--	--

BONNET	SA 105 GR 2	212062	0°	39.5	37	38.5	← N/A →		
--------	----------------	--------	----	------	----	------	---------	--	--

WEDGE	SA 216 GR WCB	A4480	0°	54.5	46.5	52.5	46	42	42
-------	------------------	-------	----	------	------	------	----	----	----

VALVE VB-3407 (20" GATE)

BODY	SA 350 GR LFI	57020	-20°	55	12	52	43	5	41
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BONNET	SA 105 GR 2	61417	SEE	POWELL LETTER 9/26/78					
--------	----------------	-------	-----	-----------------------	--	--	--	--	--

WEDGE	SA 216 GR WCB	A7734	0°	22.5	21	20	25	24	24
-------	------------------	-------	----	------	----	----	----	----	----

STUD	SA 193 GR BT	90295	-20°	42	46	42	40	42	38
------	-----------------	-------	------	----	----	----	----	----	----

NUT	SA 194 GR 7	41164	-20°	37	38	38	35	36	36
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V8-2090

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

As Required by the Provisions of the ASME Code Rules

COPY

1. Manufactured by The Wm. Powell Company Order No. 176809
(Name & Address of Manufacturer)
2. Manufactured for Detroit Edison Company, 2000 2nd Ave., Detroit, Mich. Order No. 1E 86734
(Name and Address)
3. Owner Detroit Edison Company
4. Location of Plant 6400 Dixie Highway, Stoney Creek, Monroe County, Michigan
5. Pump or Valve Identification Valve Serial No. 64722-1

Class I Valve for Drywell System

(Brief description of service for which equipment was designed)

(a) Drawing No. 040575-8 & 9 Prepared by The Wm. Powell Co. Plt. #2

(b) National Board No. _____

6. Design Conditions 1250 (Pressure) psi 575 °F (Temperature)
7. The material, design, construction, and workmanship complies with ASME Code Section III. Class I
Edition 1971, Addenda Date Winter 1971, Case No. _____

Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings			
Wedge - Mark #CM 3140	ASME SA 216	Adirondack	Modified for
Heat # 4480	Gr WCB Special	Watervliet, N.Y.	Impact Testing
(b) Forgings			
Body - Mark #CM 3133	ASME SA350	Cameron Iron Works	Modified for
Heat # 55523	Gr LFI Special	Houston, Texas	Impact Testing
Bonnet - Mark #CM 31395	ASME SA 105	Dayton Forge &	Modified for
Heat # 217062	Gr 2 Special	Heat Treat Co.	Impact Testing
		Dayton, Ohio	

*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.

V8-2090

Mark No.	Material Spec. No.	Manufacturer	Remarks
(c) Bolting Body-Bonnet	ASME SA193	Wm. H. Haskell	Modified for
Studs Lot #CM 3117	Gr B7 Special	Pawtucket R.I.	Impact Testing
Studs Lot #CM 3123	ASME SA193	Bethlehem Steel	Modified for
	Gr B7 Special	Lebanon, P.A.	Impact Testing
Nuts - See attached sheet			
(d) Other Parts			
See attached sheet			

8. Hydrostatic test 4175 psi.

CERTIFICATION OF DESIGN

Design information on file at The Wm. Powell Co. Cincinnati, Ohio
 Stress analysis report on file at Detroit Edison Company
 Design specifications certified by Sylvester H. Noetzel (1) Prof. Eng. State Mich. Reg. No. 14386
 Stress analysis report certified by R.A. Vance (1) Prof. Eng. State Mich. Reg. No. 18860
 (1) Signature not required. List name only.

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

Date April 24, 1974 Signed The Wm. Powell Co. Plt. #2 J.C. Williams
 (Manufacturer) By

Certificate of Authorization No. N719 expires October 30, 1976

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 Ohio and employed by Continental Insurance Co. of Columbus, Ohio have inspected the equipment described in this Data Report on April 24, 1974, 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 April 24, 1974

David J. Eschman
 (Inspector)

Commissions OHIO, KY #472
 (National Board, State, Province and No.)

ATTACHMENT TO MANUFACTURER'S
DATA REPORT FORM NPV-1

Drawing No. 040575-8 & 9 prepared by The Wm. Powell Company
Valve Serial No. 64722-1

- (C) Bolting
(D) Other Parts

MARK NO.	MATERIAL SPEC. #	MANUFACTURER	REMARKS
Nuts Mark #CM 2703, 2704, 2705, 2706, 2707, 2708, 2709, 2710, 2711, 2712, 2713, 2714, 2715, 2716, 2717, 2718.	ASME SA194 Gr 7 Special Nuts	Ryerson Steel Co. Cincinnati, Ohio	Modified for Impact Testing
Stem Mark #CM 2584 Heat No. 56616	ASTM A564 Gr 630	Dayton Forge & Heat Treat Co. Dayton, Ohio	Modified for Impact Testing
Segmental Thrust Rings Mark #CM 2593 Heat 60642	ASTM A564 Gr 630	Dayton Forge & Heat Treat Co. Dayton, Ohio	Modified for Impact Testing
Drain Nipple - Body Mark #CM 2759 Heat #2936 II & #2937 II	ASME SA106 Gr B	Gulf States Tube Rosenberg, Texas	
Drain Nipple - Bonnet Mark #CM 4408 Heat #A64871	ASME SA106 Gr B	U.S. Steel Co. Gary, Indiana	

Cameron

IRON WORKS, INC.

* SUPPLEMENTARY REPORT

** CORRECTED REPORT

P. O. BOX 1212 HOUSTON, TEXAS 77001

CERTIFICATE OF TESTS

Date 13 November 1973

Corrected 26 April 1974.

S
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O

THE WM. POWELL COMPANY
P. O. BOX 14006
CINCINNATI, OHIO 45214

S
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T
O

CUSTOMER P.O. 1E 86734 RCL #1
ITEM NO. 12
TAG NO. V3 2090

DESCRIPTION 20" 900# W.E. Gate body

Customer Order No.	C.I.W. Sales Order No.	Specification
6522 F	F-12535	Carbon Steel in accordance with ASME SA350-LF1, with Charpy at 0°F. per Powell Spec. #P-195-5, R. ** Dated 11-27-73, and purchasing Spec. WPPR 2/10109 Dated 10-16-72, WPPR 2/10146 Dated 2-16-73 & WPPR 2/10154 Rev. 1 Dated 6-11-73.
Description of Material	Gate Valve Body 600#-900# 20" + 24" X 20" X 24" Dwg # 107082 Rev. B	* Per A. S. Kjelby 11-8-

C.I.W. Part Number	Heat No.	CHEMICAL ANALYSIS									
66188-04-01	55523	C	MN	P	S	SI	CR	NI	MO	W	CU
		.27	.70	.019	.006	.29					
	Body Code 3133										

REVIEWED CUMENT

Arthur R. Smith 5/3/74
BECHTEL CORPORATION

* No repair welding was performed on these forgings.

C.I.W. Part No. or Size	Quantity	Heat No.	Yield Point Yield PSI	MECHANICAL PROPERTIES				V-Notch at 0°F.	
				Tensile PSI	% Elong. In.	% Red. Area	Charpy Impact	Hard- ness	
66188-04-01	Ser. # 0010	55523	44,100	79,000	31.0	64.6	22.0 Ft.Lbs.		
							19.0		
							10.0		

Magnetic particle inspection has been performed in accordance with approved C.I.W. Procedure, FI-69 Rev. D, and parts are found to be acceptable. Report attached.

Ultrasonic inspection has been performed in accordance with approved C.I.W. Procedure, FU-178, Rev. and parts are found to be acceptable. Report attached.

C.I.W. Heat No. Jominy Hardenability Grain Size

Forging Heat Treatment:

Normalized - 1525°F., held 6 hrs. at temp. Air cooled.

Heat Treat Charts attached.

Subscribed and Sworn to before me this
Day of November 1973

G. A. Touchton
G. A. TOUCHTON

Notary Public in and for Harris County, Texas

My Commission Expires June 1, 1975

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

W. F. Gilbert
W. F. GILBERT, Metallurgist

BOWSER-MORNER Testing Laboratories, Inc.

LABORATORY REPORT

December 6, 1973

BONNET CM 3395

Report to: Dayton Forging & Heat Treating Co.
2323 East First Street
Dayton, Ohio 45403 Attn: Jan E. Knave

Laboratory No. 785129
Authorization:

Report on: Samples Submitted for Machining and Impact Testing

SAMPLES SUBMITTED:

Date Submitted - 12-5-73
No. of Samples - One (1)
Identification - See Below

CUSTOMER P.O. *1E 86734 RCL.1*
ITEM NO. *12*
TAG NO. *V8 2090*
DESCRIPTION *20"-900# Gate Bonnet*

TEST PROCEDURE: Machining of samples and Charpy V Notch Impact Testing were conducted in accordance with the following test procedure:
ASTM E23.

TEST RESULTS:

<u>Sample No.</u>	<u>Test Temperature, °F.</u>	<u>Breaking Energy, Ft. Lbs.</u>
212062-1	0°F	39.5
2	0°F	37.
3	0°F	38.5
Average		38.3

Identification: Heat #212062 Quench & Temper
Customer: William Powell Co.
Customer Order No. DF&HT Job No.
9111-F-4134 53502
9212-F-4134 53503
9214-F-4134 53504
9216-F-4134 53505

NOTE: Three Test samples must average 20 Ft. Lbs. with no one sample under 15 Ft. Lbs.

Respectfully submitted,

REVIEWED DOCUMENT

Wm E Mitchell 4/22/74
BECHTEL CORPORATION

BOWSER-MORNER Testing Laboratories, Inc.

James R. Hannahs, Manager
Metallurgical Laboratory
Chem-Met Division

5-Client
2-File
1-173



Adirondack Steel Casting Co., Inc.

FOUNDERS AND MACHINISTS
Watervliet, New York

CUSTOMER P.O. 1E 86734 Rel. 1
ITEM NO. 12
TAG NO. V8 2090
DESCRIPTION 20" 90° WE. CAP WEDGE

WEDGE CM 3140

PHYSICAL AND CHEMICAL TEST REPORT

Order No. 8028-F Pattern No. 107132 Specification ASTM A216-70 GR. WCB

Tested for The Wm. Powell Company Contract _____ Date September 14 1973

Inspector E. Hanley

Engineer of _____

Heat No.	Number of Ranges	Serial Number	Yield Point Lbs. Per Sq. Inch	Tensile Strength Lbs. per Sq. In.	Elongation Per Cent	Reduction in Area Per Cent	BHN		C	Mn	P	S	SI
A4480	3	6-7-9	56,500	79,000	27.5	61.1			.18	.63	.025	.032	.47
							CHARPY V NOTCH @ 0° F.						
							Bar	1	2	3			
							Fr. Lb.	54.5	46.5	52.5	=	51.2	ft. lb. avg.
							Lat. Exp.	.046"	.042"	.042"			
							Shear Fract.	77%	61%	77%			

REVIEWED DOCUMENT
E. Hanley
BECHTEL CORPORATION

CERTIFIED
ADIRONDACK STEEL CASTING
PER E. Hanley

Heat Treatment: 1. Normalize 1700° F. 4 HRS. @ TEMP. A.C.
2. Normalize 1700° F. 4 HRS. @ TEMP. WATER
Quenched from 1700° F. to Room Temp. Agitated Water Bath
3. Temper 1225° F. 4 HRS. @ Temp. A.C.



DEC 4 1973

1. Manufactured by The Wm. Powell Co., 3233 Colerain Ave., Cincinnati, Ohio
(Name and Address of N Certificate Holder)

2. Manufactured for Enrico Ferri II, Detroit Edison Co., 2000 2nd Ave., Detroit, Mich.
(Name and Address of Purchaser or Owner)

3. Location of Installation 6400 Dixie Highway, Stoney Creek, Monroe County, Michigan
(Name and Address)

4. Pump or Valve 900# WE Gate Valve Nominal Inlet Size 20" Outlet Size 20"
(inch) (inch)

(a) Model No. (b) N Certificate Holder's (c) Canadian
 Series No. Serial Registration (d) Drawing (f) Nat'l. (g) Year
 or Type No. No. No. No. (e) Class Bd. No. Built

(1) Fig. 19023 WE 71281-1 * N/A 048614 &-1 1 N/A 1978

(2) _____

(3) _____

(4) * This NPV-1 Form with Serial No. 71281-1 replaces

(5) NPV-1 Form with Serial No. 64042-1

(6) _____

(7) _____

(8) _____

(9) _____

(10) _____

COPY

5. DRYWELL SYSTEM

Item 13, Tag V8-2091 (Brief description of service for which equipment was designed)

6. Design Conditions 1250 psi 575 °F or Valve Pressure Class N/A (1)
(Pressure) (Temperature)

7. Cold Working Pressure 2790 psi at 100°F.

8. Pressure Retaining Pieces

Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings			
Wedge CM 3141	ASME SA 216 Gr. WCB	Adirondack Steel	Modified for
Heat A4480	Special	Watervliet, N.Y.	Impact Testing
(b) Forgings			
Body CM 3161	ASME SA 351 Gr. IF1	Cameron Iron Works	Modified for
Heat 55536	Special	Houston, Texas	Impact Testing
Bonnet CM 3394	ASME SA 105 Gr. 2	Dayton Forge Co.	Modified for
Heat 212062	Special	Dayton, Ohio	Impact Testing
Seg. Thrust Ring	ASTM A 564 Gr. 630	Dayton Forge Co.	Modified for
CM 3594 Ht. 60642		Dayton, Ohio	Impact Testing

(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 and 5 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.

Cameron

IRON WORKS, INC.

■ SUPPLEMENTARY REPORT
■ CORRECTED REPORT

71281-14

P. O. BOX 1212 HOUSTON, TEXAS 77001

CERTIFICATE OF TESTS

15 November 1973

Date
Corrected 26 April 1974

S
O
L
D
T
O
[THE WM. POWELL COMPANY
P. O. BOX 14006
CINCINNATI, OHIO 45214]

S
H
I
P
T
O
[BODY CM 3161]

Customer Order No.	C.I.W. Sales Order No.	Specification
6522 F	F-12535	Carbon Steel in accordance with ASME SA350-LF1, with Charpy at 0°F. per Powell Spec. P-195-5, F
Description of Material	Gate Valve Body 600# - 900# 20" + 24" X 20" X 24" Dwg. # 107082 Rev. B	** Dated 11-27-73, and purchasing Spec. WPPR 2/10105 Dated 10-16-72, WPPR 2/10146 Dated 2-16-73 & WPPR 2/10154 Rev. 1 Dated 6-11-73. * Per A. S. Kjølby 11-8-73

C.I.W. Part Number	Heat No.	CHEMICAL ANALYSIS										
		C	MN	P	S	SI	CR	NI	MO	W	V	CU
66188-04-01	55536	.20	.76	.010	.006	.25						

REVIEWED DOCUMENT

Joe E. Liles 8/22/74
BECHTEL CORPORATION

* No repair welding was performed on these forgings.

C.I.W. Part No. or Size	Quantity	Heat No.	Yield Point Yield PSI	Tensile PSI	MECHANICAL PROPERTIES		V-Notch at 0°F Charpy Impact	Hardness
					% Elong. In.	% Red. Area		
66188-04-01	Ser. # 0014	55536	44,900	79,400	34.5	59.7	17.0 Ft.Lbs	
							16.0	
							14.0	
	# 0016	55536	40,900	67,400	34.5	69.1	13.0 Ft.Lbs	
							20.0	
							37.0	

Magnetic particle inspection has been performed in accordance with approved IW Procedure, FI-69 Rev. D, and parts are found to be acceptable. Report attached.

C.I.W. Heat No. Jominy Hardenability Grain Size

Forging Heat Treatment:

Normalized - 1525°F., hold 6 hrs. at temp. Air cooled.

Heat Treat Charts attached.

Ultrasonic inspection has been performed in accordance with approved CIW Procedure, FU-173, and parts are found to be acceptable. Report attached.

Subscribed and Sworn to before me this
14 Day of November 1973

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

G. A. Touchton
Notary Public

Notary Public in and for Harris County, Texas

CAMERON 455-1 REG. 379501 Expires June 1, 1975

H. O. Wright
H. O. WRIGHT

Metallurgist

BOWER-MORNER Testing Laboratories, Inc.

LABORATORY REPORT

December 6, 1973

BONNET CM 3394

Report to: Dayton Engineering & Heat Treating Co.
 2323 1st First Street
 Dayton Ohio 45403 Attn: Jan E. Knaue
 Report on: Samples Submitted for Machining and Impact Testing

Laboratory No. 785129
 Authorization

SAMPLES SUBMITTED:

Date Submitted - 12-5-73
 No. of Samples - One (1)
 Identification - See Below

TEST PROCEDURE: Machining of samples and Charpy V Notch Impact Testing were conducted in accordance with the following test procedure:
 ASTM E23.

TEST RESULTS:

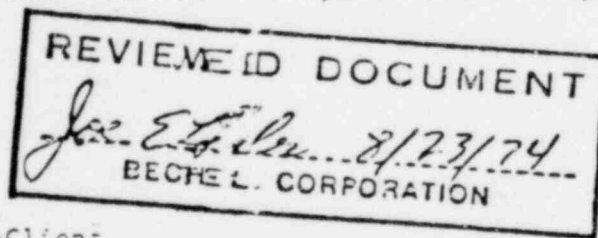
Sample No.	Test Temperature, °F.	Breaking Energy, Ft. Lbs.
2132-1	0°F	39.5
21	0°F	37.
33	0°F	38.5
Average		38.3



Identification Heat #212062 Quench & Temper
 Customer: William Powell Co.
 Customer Order No. DF&HT Job No.
 9111-F-4134 53502
 9212-F-4134 53503
 9214-F-4134 53504
 9216-F-4134 53505

AUG 27 1974

NOTE: Three Charpy samples must average 20 Ft. Lbs. with no one sample under 15 Ft. Lbs.



Respectfully submitted,

BOWER-MORNER Testing Laboratories, Inc.

James B. Hannabys, Manager
 Metallurgical Laboratory
 Chem-Met Division

5-Client
 2-File
 1-1



Adirondack Steel Casting Co., Inc.

FOUNDERS AND MACHINISTS
Watervliet, New York

PHYSICAL AND CHEMICAL TEST REPORT

Order No. 8028-F Pattern No. 107132 Specification ASTM A216-70 GR. WCB

Tested for The Wm. Powell Company Contract Date September 14 1973

Inspector E. Hanley

Engineer of

Heat No.	Number of Pieces	Serial Number	Yield Point Lbs. Per Sq. Inch	Tensile Strength Lbs. per Sq. In.	Elongation Per Cent	Reduction in Area Per Cent	BHN		C	Mn	P	S	Si
A4480	3	6-7-9	56,500	79,000	27.5	61.1			.18	.63	.025	.032	.47
									CHARPY V NOTCH @ 0° F.				
Bar						1	2	3					
Ft. lb.						54.5	46.5	52.5	=	51.2 ft. lb. avg.			
Lat. Exp.						.046"	.042"	.042"					
Shear Fract.						77%	61%	77%					
									CERTIFIED				
									ADIRONDACK STEEL				
									PER <i>E. Hanley</i>				

Heat Treatment: 1. Normalize 1700° F. 4 HRS. @ TEMP. A.C.
2. Normalize 1700° F. 4 HRS. @ TEMP. WATER
Quenched from 1700° F. to Room Temp. Agitated Water Bath
3. Temper 1225° F. 1 HRS. @ Temp. A.C.



DEC 4 1973

REVIEWED DOCUMENT
Joe E. Lube 8/23/74
BECHTEL CORPORATION

WEDGE CM 3141

71281-10

64042-1
G.I-2
13-15

1-1

As Required by the Provisions of the ASME Code Rules

NY-2092

(Brief description of service for which equipment was designed)

*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.

Mark No.	Material Spec. No.	Manufacturer	Remarks
(c) Bolting Body-Bonnet			
Studs Lot #CM 3120 & CM6326	ASME SA 193	Wm H Haskell	Modified for
(7pcs) (1pc)	Gr B 7 Spec'1	Pawtucket R.I.	Impact Testing
Studs Lot # CM 3126	ASME SA 193	Bethlehem Steel	Modified for
	Gr B 7 Spec'1	Lebanon, PA.	Impact Testing
Nuts-CM 2735 thru 2750	ASME SA 194	Ryerson Steel	Modified for
	Gr 7 Special	Cincinnati, OH	Impact Testing
(d) Other Parts			
See Attached Sheet			

B. Hydrostatic test 4175 psi.

CERTIFICATION OF DESIGN

Design information on file as The Wm Powell Company

Stress analysis report on file as Detroit Edison Company

Design specifications certified by Sylvester Noetzel

(1) Prof. Eng. State: MI Reg. No. 14386

Stress analysis report certified by R.A. Vance

(1) Prof. Eng. State: MI Reg. No. 18860

(1) Signature not required. List name only.

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

Date Oct. 25, 1974 Signed The Wm Powell Co Plt#2 By J.C. Williams
(Manufacturer)

Certificate of Authorization No. N719 expires October 30, 1976

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 Ohio and employed by Continental Insurance Co. of Columbus, Ohio

have inspected the equipment described in this Data Report on 10/25 19 74, 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 10/25 19 74

K.H. Lane
(Inspector)

Commissions Ohio 1609 KY 270
(National Board, State, Province and No.)

64043-1

1-2

Detroit Edison P.O. IE 86734 Rel. 1
Powell Order No. 176809

J8-2092

ATTACHMENT TO MANUFACTURER'SDATA REPORT FORM NPV-1Drawing No. 040577-8 & 9 Prepared by The Wm Powell Co.
Valve Serial No. 64043-1

(d) Other Parts

MARK NO.	MATERIAL SPEC #	MANUFACTURER	REMARKS
Stem Mark #CM 2586 Heat No. 56616	ASTM A564 Gr 630	Dayton Forge & Heat Treat Co. Dayton, Ohio	Modified for Impact Testing
Segmental Thrust Ring Mark # CM 2595 Heat # 60642	ASTM A564 Gr 630	Dayton Forge & Heat Treat Co. Dayton, Ohio	Modified for Impact Testing
Body Drain Nipple Mark # CM 2761 Heat # KD 9155	ASME SA 106 Gr B	Gulf States Tube Rosenberg, Texas	
Bonnet Drain Nipple Mark # CM 4450 Heat # A64871	ASME SA 106 Gr B	U.S. Steel Co. Gary, Indiana	

64043-1

7.1-2

THE W. W. POWELL COMPANY

P.O. BOX 1212, CINCINNATI, OHIO 45214

CERTIFICATE OF TESTS

Date 11 February 1974

SOLD TO
THE W. W. POWELL COMPANY
P.O. BOX 1212
CINCINNATI, OHIO 45214

SHIP TO

BODY CM 3976

Customer Order No.	C.I.W. Sales Order No.	Specification
5302 F	F-12533	Carbon Steel in accordance with ASME SA350-4, 1st Ed., 1965, or ASME SA350-4, 2nd Ed., 1973, and purchasing Spec. 2/1014 Rev. 1 Dtd. 6-11-73.
Description of Material	Heat No.	
Gate Valve Body 600# - 900# 20" x 24" x 20" x 24" Dwg. 107082 Rev. B		
C.I.W. Part Number	Heat No.	CHEMICAL ANALYSIS
65188-04-01	K 3954	C .23 .02 .014 .003 .15 Mn P S Si CR NI MO W V CU

* Per A.S. Kjelsby
11-3-73

No repair welding was performed on these forgings.

C.I.W. Part No. or Size	Quantity	Heat No.	Yield Point	MECHANICAL PROPERTIES	Y-torch at 0°F.
65188-04-01	3er. 0018	K 3954	33,400	37.5 75.1	15.0 Ft. Lbs. 10.0 38.0

Magnetic particle inspection has been performed in accordance with approved C.I.W. Procedure, FI-69 Rev. D, and parts are found to be acceptable.
Ultrasonic inspection has been performed in accordance with approved C.I.W. Procedure, FI-173, Rev. 1 and parts are found to be acceptable.

C.I.W. Heat No. Jaminy Hardenability Grain Size

Forging Heat Treatment:
1500°F., held 3 hrs. at temp. Air cooled.
1025°F., held 3 hrs. at temp. Water quenched.
1275°F., held 3 hrs. at temp. Air cooled.
Heat Treat Charts attached.



FEB 14 1974

Signed and Sworn to before me this
Day of February 1974

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

2-12-74

Handwritten signature and initials.

BOWSER-MORNER Testing Laboratories, Inc.

64043-1

81-6

LABORATORY REPORT

December 6, 1973

* BONNET CM 3393 ✓

Report to: Dayton Forging & Heat Treating Co.
2323 East First Street
Dayton, Ohio 45403 Attn: Jan E. Knavel

Report on: Samples Submitted for Machining and Impact Testing

Laboratory No. 77512
Authorization

SAMPLES SUBMITTED:

Date Submitted - 12-5-73
No. of Samples - One (1)
Identification - See Below

TEST PROCEDURE: Machining of samples and Charpy V Notch Impact Testing were conducted in accordance with the following test procedure:
ASTM E23.

TEST RESULTS:

<u>Sample No.</u>	<u>Test Temperature, °F.</u>	<u>Breaking Energy, Ft. Lbs.</u>
212062-1	0°F	39.5
2	0°F	37.
3	0°F	38.5
Average		38.3

Identification:	Heat #212062	Quench & Temper
	Customer: William Powell Co.	
	<u>Customer Order No.</u>	<u>DF&HT Job No.</u>
	9111-F-4134	53502
	9212-F-4134	53503
	9214-F-4134	53504
	9216-F-4134	53505

NOTE: Three Test samples must average 20 Ft. lbs. with no one sample under 15 Ft. lbs.

Respectfully submitted,

BOWSER-MORNER Testing Laboratories, Inc.

James P. Hannahs

James P. Hannahs, Manager
Metallurgical Laboratory
Chem-Met Division

5-Client
2-File
JPH/ma

OCT 23 1974



FOUNDERS AND MACHINISTS
Watervliet, New York

PHYSICAL AND CHEMICAL TEST REPORT

Order No. 8028-F Pattern No. 107132 Specification ASTM A216-70 GR. WCB
Tested for The Wm. Powell Company Contract _____ Date September 14 19__

Inspector P. Hanley

Engineer

[illegible]

Heat Treatment: 1. Normalize 1700° F. 4 HRS. @ TEMP. A.C.
2. Normalize 1700° F. 4 HRS. @ TEMP. WATER
 Quenched from 1700° F. to Room Temp. Agitated Water Bath
3. Temper 1225° F. 4 HRS. @ Temp. A.C.



64043-1
9.1-2

DEC 1 1954

1. Manufactured by The William Powell Co. 2233 Colerain Ave. Cincinnati, Ohio 45215
(Name and Address of N Certificate Holder)
2. Manufactured for Detroit Edison Co. 2000 2nd Ave. Detroit, Michigan
(Name and Address of Purchaser or Owner)
3. Location of Installation Enrico Fermi 2, 400 N. Dixie Highway, Stoney Creek, Monroe County, Mich.
(Name and Address)
4. Pump or Valve 900# Gate Valve Nominal Inlet Size 20" (inch) Outlet Size 20" (inch)

(a) Model No. (b) N Certificate Holder's (c) Canadian

Series No.
or TypeSerial
No.Registration
No.(d) Drawing
No.

(e) Class

(f) Nat'l.
Bd. No.(g) Year
Built

(1) Fig. 19023 WE. 70477-1 N/A 047074-L&S 1 N/A 1978

(2) _____

(3) _____

(4) _____

(5) _____

(6) _____

(7) _____

(8) _____

(9) _____

(10) _____

COPY

5. Residual Heat Removal

Item #146 (Brief description of service for which equipment was designed)
Tag #V8-3407

6. Design Conditions 1250 psi 575 °F or Valve Pressure Class 1 (1)
(Pressure) (Temperature)

7. Cold Working Pressure 2790 psi at 100°F.

Pressure Retaining Pieces

Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings			
Disc CM 3015B	ASME SA 210	Adirondack Steel Cast. Co.	
Heat #A7734	Grade WCB	Watervliet, N.Y.	
(b) Forgings			
Seg. Thrust Ring CM	ASTMA 564	Dayton Forge & H.T. Co.	
2484B, Heat #71436	Grade 630	Dayton, Ohio	
Body CM 3005B	ASME SA 350	Cameron Iron Works	
Heat #57020	Grade LF1	Houston, Texas	
Bonnet CM 3104B	ASME SA 105	Dayton Forge & H.T. Co.	
Heat #61417	Grade 2	Dayton, Ohio	
Stem CM Lot #2859B	ASTMA 564	Dayton Forge & H.T. Co.	
Heat #74463	Grade 630	Dayton, Ohio	

(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 and 5 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.

CERTIFICATE OF TESTS

70477-1

Copy OK 50052
Cameron
IRON WORKS, INC.

P. O. BOX 1212
HOUSTON, TEXAS 77001

THE WM. POWELL COMPANY
P. O. BOX 14006
CINCINNATI, OH 45214

DATE 30 November 1977

CUSTOMER ORDER NO. 483N	C.I.W. SALES ORDER NO. F-18430-1	SPECIFICATION Carbon Steel In accordance with ASME Sec. II SA-350, Gr. LFI with Charpy at -20°F. ASME Sec. III, Div. 1, Cl. 1 ASME Code, 1971 edition thru Winter '71 Addenda.
----------------------------	-------------------------------------	---

DESCRIPTION Gate Valve
OF
MATERIALS Dwg. # 107082

C.I.W. PART NUMBER 66168-05-01

HEAT NO.	LOCATION OR SERIAL NO.	CHEMICAL ANALYSIS							
		C	MN	P	S	SI	CR	NI	MO
57020		.21	.75	.009	.006				

Magnetic particle inspection has been performed in accordance with approved CIW Procedure, FI-69 Rev. D and parts are found to be acceptable. Report attached.

Ultrasonic inspection has been performed in accordance with approved CIW Procedure, FU-178, Rev. Fig. I Rev. H, and parts are found to be acceptable. Report attached.

QTY JR SIAL NO.	HEAT NO.	Test Loc.	MECHANICAL PROPERTIES					Specimen Size
			Tensile PSI	% Offset Yield PSI	% Elong. 2 In.	% Red. Area		
#0028	57020	Trans.	67,400	46,200	35.5	70.1		.505

V-Notch Charpy Impact Results at -20°F.:

Ft.Lbs.	Lat. Exp.	% D/F
55.0	43 MILS	26%
12.0	05	10
52.0	41	40



HEAT TREATMENT: 1600°F., held 3.25 hrs. at temp. Air cooled.
1550°F., held 3.25 hrs. at temp. Water quenched.
1260°F., held 13 hrs. at temp. Air cooled.

1 Test Charts attached.
30th November 1977

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

H. O. Wright
METALLURGICAL REPRESENTATIVE H. O. WRIGHT.

NOTARY PUBLIC
G. A. [Signature]
County, Texas
Notary Public in and for the State of Texas
My Commission Expires June 1, 1979



THE WM. POWELL COMPANY

2503 Spring Grove Avenue, P.O. Box 14006, Cincinnati, Ohio 45211, U.S.A.
513/852-2000

REFERENCE: Powell Order No. 208019

Customer P.O. No. 1546734 EL#4

Description: 20" In. 19023 W5. Gate Valve
Tag # V8-3407 Stem #146
Serial # 70477-1

The above referenced material was supplied certified to ASME SA 105 gradeless Summer 1973 Addenda with Charpy V Notch requirements @ +50°F. (Powell's internal P No. 580).

Representative test specimens of the referenced material were additionally subjected to Charpy V Notch testing @ -20°F. by the Union Testing and Research Laboratory. (Ref. Report No. 3971-II attached).

A review was conducted by the Wm. Powell Metallurgy Group of the suppliers material certification of chemical analysis, mechanical properties, heat treatment and the noted additional Charpy V Notch impact testing results @ -20°F. This is to certify that based on the noted review, the above referenced material does conform to the requirements of ASME SA 105 Grade 2 with Charpy V Notch requirements at 0 F. (Powell's internal P. No. 195-10).

Dudley W. Mowery, Jr.
Dudley W. Mowery Sr. 9/20/78
Manager, Technical Service

RVC:cw



THE WM. POWELL COMPANY

2503 Spring Grove Avenue, P.O. Box 14006, Cincinnati, Ohio 45214, U.S.A.
513/852-2000

REFERENCE: Powell Order No. 208019

Customer P.O. No. 1E86734 CL#6

Description:

*20" fig. 19023 W.C. Gate Valve
Tag # V8-3407, Item #146
Serial # 70477-1*

The above referenced material was supplied, certified to ASME Section III Class 1. This is to certify that the supplier's material certification of chemical analysis, mechanical properties, and heat treatment of the above referenced purchase order have been reviewed by the Wm. Powell Co., Metallurgy Group, and determined that the above referenced material conforms to the requirements of Class I ASME Section III

Dudley W. Mowery, Sr.
Dudley W. Mowery Sr. *2/20/78*
Manager, Technical Service

RNC:cw

FOUNDERS AND MACHINISTS
Watervliet, New York

Order No. 482N Pattern No. 107132 Specification ASME SA 216 GRAVICS
Tested for Wm. POWELL Contract _____ Date 12-13-77 19____
Inspector W.D. MOLLANDER Engineer of _____

Inspector															Engineer of	
Heat No.	Number of Pieces	Serial Number	Yield Point Lbs. Per Sq. Inch	Tensile Strength Lbs. per Sq. In.	Elongation Per Cent	Reduction in Area Per Cent	BHN		C	Mn	P	S	Si			
A7734			46,250	78,000	25.0	45.2			.25	.66	.029	.034	.34			
			CHARPY V			NOTCH @		0°F								
			BAR	FL. 16	L.E.	7.5 F										
		1		22.5		.025"			40							
		2		21		.024"			30							
		3		20		.024"			40							
		AVG		21.2												
															CERTIFIED	
															ADIRONDACK STEEL CASTING	
															PER... W.D. Hallander	

Heat Treatment: _____



MAY 31 1978

Alc. Ch. 3018
70477-1 Dy

TEXAS BOLT COMPANY

Manufacturers of Industrial Fasteners

3233 WEST 11TH ST. • P. O. BOX 1211

HOUSTON, TEXAS 77001

PHONE: 869-7111

AREA CODE 713

CABLE: "TEXBOLT"

Stud CRK Lot #2669B Code EQ20

IMPACT TEST DATA

REPORT NUMBER: 77-84
 CUSTOMER: THE WILLIAM POWELL COMPANY
 CUSTOMER ORDER NUMBER: 3813-2
 DESCRIPTION: 4140 1-1/2" ALL THREAD STUDS
 SPECIFICATIONS: ASME SA193 GRADE B7
 HEAT NUMBER: 90295
 TESTING MACHINE: TINIUS OLSEN MODEL 64
 LINEAR VELOCITY OF HAMMER: 16.5 FEET PER SECOND
 EFFECTIVE ENERGY: 264 FOOT POUNDS
 SPECIMEN TYPE: V-NOTCH
 SPECIMEN SIZE: 10 MM SQ

AUG 03 1977



SAMPLE NUMBER	WIDTH	EFFECTIVE SECTION DEPTH	TEMP. OF	FT. LBS. IMPACT VALUE	LATERAL EXPANSION	DUCTILE FRACTURE
A-1	.394	.315	-20°F.	42	.040	88%
A-2	.394	.315	-20°F.	46	.042	90%
A-3	.394	.315	-20°F.	42	.038	92%

IMPACT TESTING ACCEPTABLE

TEXAS BOLT COMPANY

EJC/db

Edward J. Chianza
 Edward J. Chianza

Rep Test CM Lot # 266813 Code E
TEXAS BOLT COMPANY

F3

Manufacturers of Industrial Fasteners

3233 WEST 11TH ST. • P. O. BOX 1211

HOUSTON, TEXAS 77001

PHONE: 869-7111

AREA CODE 713

CABLE: "TEXBOLT"

Re-Test

IMPACT TEST DATA

REPORT NUMBER: 77-101
CUSTOMER: THE WILLIAM POWELL COMPANY
CUSTOMER ORDER NUMBER: 3813-2
DESCRIPTION: 4140 1-1/2" HEAVY HEX NUTS
SPECIFICATIONS: ASME SA194 GRADE 7
HEAT NUMBER: 41164
TESTING MACHINE: TINIUS OLSEN MODEL 64
LINEAR VELOCITY OF HAMMER: 16.5 FEET PER SECOND
EFFECTIVE ENERGY: 264 FOOT POUNDS
SPECIMEN TYPE: V-NOTCH
SPECIMEN SIZE: 10 MM SQ

SEP 01 1977



SAMPLE NUMBER	WIDTH	EFFECTIVE SECTION DEPTH	TEMP. OF	FT. LBS. IMPACT VALUE	LATERAL EXPANSION	DUCTILE FRACTURE
C-1	.394	.315	-20°F.	37	.035	80%
C-2	.394	.315	-20°F.	38	.036	82%
C-3	.394	.315	-20°F.	38	.036	82%

IMPACT TESTING ACCEPTABLE

TEXAS BOLT COMPANY

EJC/db

Edward J. Charanza
Edward J. Charanza

ENRICO FERMI UNIT 2

CORE SPRAY DIVI

3653

DESCRIPTION	MATERIAL SPEC	HEAT NUMBER	TEMP OF	CHARPY IMPACT TEST RESULTS (FULL SIZE- LONG.)						
				C _V	ENERGY FT-LB	LAT		EXPANSION MILS		
<u>VALVE VB-2021 (12" GATE)</u>										
BODY	SA 352 GR LCB	9516	-20°	20	20	20	← N/A →			
BONNET	SA 350 GR LFI	212202	-20°	88	61	37	← N/A →			
WEDGE	SA 352 GR LCB	9518	-20°	25	29	27	← N/A →			
<u>VALVE VB-2023 (12" SWING CHECK)</u>										
BODY	SA 352 GR LCB	2099E	-20°	30	29	34	37	29	39	
BONNET	SA 181 GR 2	219611	-20°	21.2	23.2	19.7	18	19	18	
DISC	SA 352 GR LCB	2097E	-20°	33	28	30	30	29	33	
<u>VALVE VB-2025 (12" GATE)</u>										
BODY	SA 352 GR LCB	9516	-20°	20	20	20	← N/A →			
BONNET	SA 350 GR LFI	212202	-20°	88	61	57	← N/A →			
WEDGE	SA 352 GR LCB	9518	-20°	25	29	27	← N/A →			

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

As Required by the Provisions of the ASME Code Rules

1. Manufacturer The Wm. Powell Company Order No. 176807
(Name & Address of Manufacturer)

2. Manufactured for Detroit Edison, 2000 2nd Ave, Detroit, Mich. Order No. 1E 86734
(Name and Address)

3. Owner Detroit Edison Company

4. Location of Plant 6400 Dixie Highway, Stoney Creek, Monroe County, Michigan

5. Pump or Valve Identification Valve Serial No. 64041-1

1-12" Figure 19023 W.E. Gate Valve

(Brief description of service for which equipment was designed)

(a) Drawing No. 040280-6 & 7 Prepared by The Wm. Powell Company

(b) National Board No. N/A

6. Design Conditions 1250 (Pressure) psi 575 °F (Temperature)

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

Edition 1971, Addenda Date Winter 1971, Case No. _____

Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings			
Body Mark # CM 856A	ASME SA 352	Howmet Corp.	Modified for Impact
Heat # 9516	Gr LCB Special	Milwaukee Wis.	Testing
Wedge Mark # CM 880A	ASME SA 352	Howmet Corp.	Modified for Impact
Heat # 9518	Gr LCB Special	Milwaukee, Wis,	Testing
(b) Forgings			
Bonnet Mark # CM 3568	ASME SA 350	Dayton Forging &	Modified for Impact
Heat # 212202	Gr LFI Special	Heat Treat Co.	Testing

*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 Body - Bonnet			
Code R Studs Lot # CM 4982	ASME SA 193	Bethlehem Steel	
	Gr B7	Lebanon Pa.	
Studs Lot # CM 55B	ASME SA 193	Bethlehem Steel	
	Gr B7	Lebanon Pa.	
Nuts - Lot CM 4023	ASME SA 194	Wm. H. Haskell Mfg	
	Gr 2H	Pawtucket, R.I.	
(d) Other Parts			
Stem Mark # CM 2817	ASTM A564	Dayton Forging &	Modified for Impact
Heat # 56616	Gr 630	Heat Treat Co.	Testing
Segmental Thrust Ring	ASTM A564	Dayton Forging &	Modified for Impact
Mark # CM 2799	Gr 630	Heat Treat Co.	Testing
Heat # 60642		Dayton, Ohio	
Bonnet Drain Nipple	ASTM A106	U.S. Steel Corp.	
Mark # CM 3935	Gr B	Gary, Ind.	
Heat # D 44375			

8. Hydrostatic test 4175 psi.

CERTIFICATION OF DESIGN

Design information on file at The Wm. Powell Co.
 Stress analysis report on file at Detroit Edison Company
 Design specifications certified by Sylvester H. Noetzel (1) Prof. Eng. State Mich. Reg. No. 14386
 Stress analysis report certified by R.A. Vance (1) Prof. Eng. State Mich. Reg. No. 18860
 (1) Signature not required. List name only.

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

Date June 25, 1974 Signed The Wm. Powell Co. Plt. #2 By J.C. Williams
 (Manufacturer) J.C. Williams, Q.A. Mgr.
 Certificate of Authorization No. N719 expires October 30, 1976

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 Ohio and employed by Continental Insurance Co. of Columbus, Ohio have inspected the equipment described in this Data Report on 6-25 1974, 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 6/25 1974

J.H. Lane
 J.H. Lane (Inspector)

Commissions Ohio 1609 KY 270
 (National Board, State, Province and No.)

BOWSER-MORNER Testing Laboratories, Inc.

8.1-5

Founded 1911

420 DAVIS AVENUE

P.O. BOX 51

DAYTON, OHIO 45401

513 253-8805

January 21, 1974

LABORATORY REPORT

RECEIVED COPY

BONNET CM 3568

Report to: Dayton Forging & Heat Treating Company
2323 East First Street - Dayton, Ohio 45403
Attn: Mr. Jan E. Knevel

Laboratory No. 784831
Authorization:

Report on: Samples Submitted for Machining and Impact Testing

SAMPLES SUBMITTED:

Date Submitted - 11-24-73
No. of Samples - 1
Identification - Customer - William Powell Co. - Customer Order No. 744-F-41
Job No. 55676 55677

TEST PROCEDURE: Machining of samples and Charpy V Notch Impact Testing were conducted in accordance with the following test procedure: ASTM E23. Must average 15 Ft. Lbs. with on one sample less than 10 Ft. Lbs.

TEST RESULTS:

<u>Sample No.</u>	<u>Test Temperature, °F.</u>	<u>Breaking Energy, Ft. Lbs.</u>
1	-20°F	88.0
2	-20°F	61.0
3	-20°F	37.0
	Average	62.0

Respectfully submitted,

BOWSER-MORNER Testing Laboratories, Inc.

James R. Hannahs

James R. Hannahs, Welding Engineer
Manager, Metallurgical Laboratory
Chem-Met Division

-Client
-File
RH/ma

REVIEWED DOCUMENT

Wm. E. McNeil 1/18/74
BECHTEL CORPORATION





HOWMET CORPORATION CRUCIBLE STEEL CASTING DIVISION

2850 SOUTH 20TH STREET • MILWAUKEE, WISCONSIN 53215 • (414) 845-7700

64041-1
9.1-2 ...

PHYSICAL TEST REPORT

Date 10/8/73.

Material <u>STEEL CASTINGS</u>	Code	Pieces	Part No.	Order No.
Mfg. for <u>THE W. M. POWELL CO.</u>	<u>9518</u>	<u>3</u>	<u>53905</u>	<u>5640F</u>
Address <u>CINCINNATI, OHIO</u>	<u>9518</u>	<u>4</u>	<u>101143</u>	<u>7055F</u>
Attention <u>MR. H. S. NISBET</u>	<u>9518</u>	<u>1</u>	<u>106553</u>	<u>5641F.</u>
Treatment <u>NORM. QUENCH & TEMPER WENGE CMSSOA</u>				

Heat No. or Reference	<u>9518</u>			
Physical Serial No.				
Original Dimension	<u>1.505</u>			
Original Area in Sq. In.	<u>1.200</u>			
Dimension After Fracture	<u>1.319</u>			
Area After Fracture, Sq. In.	<u>1.0799</u>			
Elastic Limit, Lbs. Actual	<u>9,450</u>			
Maximum Load, Lbs. Actual	<u>14,100</u>			
Elongation in Inches	<u>1.67</u>			
Yield Point, per Sq. In.	<u>47,250</u>			
Tensile Strength, per Sq. In.	<u>70,500</u>			
% Elongation in Inches	<u>31.0</u>			
% Reduction in Area	<u>60.1</u>			
Brinell	<u>25.0 FT. LBS</u>			
Impact) <u>Temp. -20°F</u>	<u>33.0 FT. LBS</u>			



OCT 15 1973

REQUIREMENTS OF:	Mn	P	S	Si	Cr	Ni	Mu	Others
<u>ASTM A 216-70A 40WCD STEEL</u>								
<u>ASTM A 216-70A 100WCD STEEL</u>								
Yield Point								
Tensile Strength	<u>9518</u>	<u>14,800</u>	<u>5,000</u>	<u>32.54</u>				

Elongation								
Reduction of Area								
Cold Bends								

REVIEWED DOCUMENT
Robert C. ...
BECHTEL CORPORATION

Subscribed and Sworn before me this OCT - 8 1973 day of

Witnessed By _____

[Signature]
Notary Public

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

As Required by the Provisions of the ASME Code Rules

16.0

1. Manufactured by Anchor/Darling Valve Co., Hayward, Calif. Order No. 3020-9
(Name & Address of Manufacturer) Tag No: V8-2023
2. Manufactured for Detroit Edison Company (DECO) Order No. 1E-87859
(Name and Address) Item No: 9
3. Owner Detroit Edison Company (DECO)
4. Location of Plant ENRICO FERMI Unit 2
5. Pump or Valve Identification Serial No: 1N-057 12" 900# Exercisable Sw. Chk

ASME Section III

(Brief description of service for which equipment was designed)

Steam and Water Service in a Commercial Nuclear Power Plant

- (a) Drawing No. 2226-3 Prepared by W.S. Kuosman
- (b) National Board No. NA
2160 700
6. Design Conditions 2790 psi 100 °F
(Pressure) (Temperature)
7. The material, design, construction, and workmanship complies with ASME Code Section III. Class I
Edition 1971, Addenda Date Winter 71, Case No. _____

3071

	Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings				
Body Disc	HT 2099E Ser. 1	SA352LCB	Anchor/Darling	Vulcan
	HT 2097E Ser. 1	SA352LCB	Anchor/Darling	Vulcan
(b) Forgings				
Boiler net	HT 219611	SA181GR11	Anchor/Darling	Airco Viking
Act Shaft	HT 825765	SA182-F6	Anchor/Darling	Coulter
Gland Act	HT 59866	SA182-F6	Anchor/Darling	Airco Viking
Gland Ind	HT 15053	SA182-F6	Anchor/Darling	Airco Viking
Stuff Box	HT 49720	SA182-F6	Anchor/Darling	Airco Viking

*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.

Mark No.	Material Spec. No.	Manufacturer	Remarks
(c) Bolting			
Studs Gland Code 30	SA193-B7	Knudtsen	Jorgensen
Nuts Gland Code HT	SA194-2H	Anchor/Darling	Texas Bolt
Stud Stuff Box Code 30	SA193-B7	Knudtsen	Jorgensen
Nut Stuff Box Code HT	SA194-2H	Anchor/Darling	Texas Bolt
(d) Other Parts			
Gland Flange HT 96A711-11-3	SA516-70	Anchor/Darling	US Steel
Htg. Plate HT 92A372-11-3	SA516-70	Anchor/Darling	US Steel
Seat Ring HT 85856-2-1	SA516-70	Anchor/Darling	US Steel
Ret Ring GASK HT 96A711-8-2	SA516-70	Anchor/Darling	US Steel
Brkt Ind SW. HT 85892-P64382	SA516-70	Anchor/Darling	Armco
Leakoff HT KD 9156	SA106-B	Anchor/Darling	Gulf States

8. Hydrostatic test 4175 psi.

CERTIFICATION OF DESIGN

Design in accordance with file at ENRICO FERMI Unit No. 2 Newport, Mich
 Stress analysis report on file at ENRICO FERMI Unit No. 2 Newport, Mich
 Design specifications certified by S.H. Noitzel (1) Prof. Eng. State Mich Reg. No. 14386
 Stress analysis report certified by W.A. Benning (1) Prof. Eng. State Cal Reg. No. 411474E
 (1) Signature not required. List name only.

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

Date 2-6 19 74 Signed Anchor/Darling Co. By B. J. Tillman
 (Manufacturer)

Certificate of Authorization No. N-282 expires MARCH 9, 1974

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 CALIFORNIA and employed by DIR DIS of CALIFORNIA have inspected the equipment described in this Data Report on 1-22 19 74, 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 2-6 19 74

Ray Tillman
 (Inspector)

Commissions DIS 5762
 (National Board, State, Province and No.)

VULCAN STEEL FOUNDRY CO.

Carbon and Alloy Steel Castings

2909 CHAPMAN STREET • OAKLAND, CALIF. 94601

PHONE (415) 261-5305

MATERIAL TEST REPORT

ANCHOR VALVE CO.
24747 CLAWITER RD.
HAYWARD, CALIFORNIA 94545

DATE: 9-12-73

MATERIAL SPECIFICATION: ASME SA-352 LCB

HEAT NUMBER: 2099 E

PO/JOB NUMBER 2810-3020-9,10 PATTERN NUMBER 6336-1-1 SERIAL NUMBER #1

MATERIAL MARKED BY: Heat and Serial Numbers (Metal Stamp)

NORMALIZED @	1720	°F	1	HRS	30	MIN - AQ - DATE	9-19-73	CH91973
STRESS RELIEVED @	1150	°F	3	HRS	30	MIN - AQ - DATE	10-12-73	CH101273A
SOLUTION ANNEALED @		°F		HRS		MIN - WQ - DATE		
OTHER TEMPER	1225	°F	3		30	DATE	9-19-73	CH91973A

Chemical Properties

.19	Carbon
.99	Manganese
.43	Silicon
.016	Phosphorus
.027	Sulfur
.09	Nickel
.13	Chromium
.05	Molybdenum
	Columbium
	Copper

Mechanical Properties

73,500	Tensile Strength, psi
48,700	Yield Point, psi
25.5	Elongation (%)
46.9	Reduction of Area (%)

Charpy Impact Test
(V-Notch)

Temperature -20° F

1	
30	Ft Lbs
50	Shear
.037	Expansion

2	
29	Ft Lbs
30	Shear
.029	Expansion

3	
34	Ft Lbs
35	Shear
.039	Expansion



We hereby certify that this material meets all requirements of the material specification and all applicable special requirements of (Article N/A of the ASME Pump and Valve Code [Draft]) or (Article NB2000 of the ASME Section III, Boiler and Pressure Vessel Code).

12-12-73
(DATE)

Body

3020-9-1-1

Douglas W. Gibson

QUALITY CONTROL MANAGER

LABORATORY CERTIFICATE

SIGNET TESTING LABORATORIES, INC.

TESTING AND INSPECTION OF CONSTRUCTIONAL AND INDUSTRIAL MATERIALS

ENGINEERS
CHEMISTS
METALLURGISTSREPLY TO
1428 WEST WINTON AVENUE
HAYWARD, CALIFORNIA 94545
782-7919 AREA CODE 415

January 14, 1974

LAB NO.: 12216 Job Nos.: 3020-9, 10, & 15

SUBJECT: Charpy Impact Tests

SAMPLE: One (1) Steel Forging (11" x 8" x 4")
Ht. No. 219611, SA181

DATE RECEIVED: January 11, 1974

REPORT TO: Anchor/Darling Valve Co.
24747 Clawiter Road
Hayward, California 94545

REPORTCHARPY IMPACT TESTS

Specimen Size: 10x10x55mm
Notch: Vee Type
Test Temperature: -20°F

Test No.	Impact Value Ft/lbs	Lateral Expansion Inches	Percent Shear
1	21.2	0.018	0
2	23.2	0.019	0
3	19.7	0.018	0
	<u>21.4</u>	<u>0.018</u>	<u>0</u>

Respectfully submitted,
SIGNET TESTING LABORATORIES, INC.

By 

2cc: Anchor/Darling Valve Co.
ms

Bonnet
3020-9



VULCAN STEEL FOUNDRY CO.

Carbon and Alloy Steel Castings

2909 CHAPMAN STREET • OAKLAND, CALIF. 94601
PHONE (415) 261-5305

6.1

MATERIAL TEST REPORT

ANCHOR VALVE CO.
24717 CLAWITER RD.
HAYWARD, CALIFORNIA 94545

DATE: 9-12-73

MATERIAL SPECIFICATION: ASME SA-352 LCB

HEAT NUMBER: 2097 E

PO/JOB NUMBER 2810-3020-9,10 PATTERN NUMBER 6309-1-4 SERIAL NUMBER #1-2

MATERIAL MARKED BY: Heat and Serial Numbers (Metal Stamp)

NORMALIZED @	1720	°F	1	HRS	30	MIN - AQ - DATE	9-13-73	CH91373A
STRESS RELIEVED @	N/A	°F		HRS		MIN - AQ - DATE		
SOLUTION ANNEALED @		°F		HRS		MIN - WQ - DATE		
OTHER TEMPER	1200		3		30	DATE	9-13-73	CH91373B

Chemical Properties

.19	Carbon
.92	Manganese
.40	Silicon
.018	Phosphorus
.027	Sulfur
.09	Nickel
.15	Chromium
.03	Molybdenum
	Columbium
	Copper

Mechanical Properties

80,600 Tensile Strength, psi
57,600 Yield Point, psi
31.5 Elongation (%)
60.6 Reduction of Area (%)

Charpy Impact Test (V-Notch)

Temperature -20 °F

1
33 Ft Lbs
30 Shear
.03 Expansion

2
28 Ft Lbs
23 Shear
.02 Expansion

3
30 Ft Lbs
28 Shear
.03 Expansion



We hereby certify that this material meets all requirements of the material specification and all applicable special requirements of (Article N/A of the ASME Pump and Valve Code [Draft]) or (Article NB 2000 of the ASME Section III, Boiler and Pressure Vessel Code).

12-12-73
(DATE)

QUALITY CONTROL MANAGER

Disc.
3020-9-4-1

Revised Copy 8-18-80

FORM NPV-1 N CERTIFICATE HOLDERS' DATA REPORT FOR NUCLEAR PUMPS OR VALVES*
As Required by the Provisions of the ASME Code, Section III, Div. 1

1. Manufactured by The Wm. Powell Co. Plant #2 Cincinnati, Ohio
(Name and Address of N Certificate Holder)
2. Manufactured for Enrico Fermi II, Detroit Edison, 2000 2nd Ave., Detroit, Michigan
(Name and Address of Purchaser or Owner)
3. Location of Installation 6400 Dixie Highway, Stoney Creek, Monroe County, Michigan
(Name and Address)
4. Pump or Valve 900# Gate Valve Nominal Inlet Size 12" Outlet Size 12"
(inch) (inch)

	(a) Model No., Series No. or Type	(b) N Certificate Holder's Serial No.	(c) Canadian Registration No.	(d) Drawing No.	(e) Class	(f) Nat'l. Bd. No.	(g) Year Built
(1)	Fig. 19003W.E.	76794-1	NA	040200-6&7	1	NA	1980
(2)							
(3)							
(4)							
(5)							
(6)							
(7)							
(8)							
(9)							
(10)							

COPY

5. Drywell System
(Brief description of service for which equipment was designed)
Tag # V8 2025
6. Design Conditions 1250 psi 575 °F or Valve Pressure Class NA (1)
(Pressure) (Temperature)
7. Cold Working Pressure 2790 psi at 100°F.
8. Pressure Retaining Pieces

Mark No.	Material Spec. No.	Manufacturer	Remarks
(a) Castings			
Body CM 857 A Heat #9516	ASME SA 352 Gr. LCB Special	Howmet Corp. Milwaukee, Wisc.	Modified for Impact Testing
Wedge CM 881 A Heat # 9518	ASME SA 352 Gr. LCB Special	Howmet Corp. Milwaukee, Wisc.	Modified for Impact Testing
(b) Forgings			
Bonnet CM 3567 Heat #212202	ASME SA 350 Gr. LFI Special	Dayton Forging & Heat Treat Co.	Modified for Impact Testing

(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 and 5 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.

BETHNET CORPORATION CRUCIBLE STEEL CASTING DIVISION

2650 SOUTH 20TH STREET • MILWAUKEE, WISCONSIN 53215 • (414) 645 7700

PHYSICAL TEST REPORT

Date 10/8/73

Material <u>Steel Castings</u>	Code	Pieces	Part No	Order No.
Mfg for <u>The Lm. Power Co.</u>	<u>9516</u>	<u>3</u>	<u>106553</u>	<u>5241F.</u>
Address <u>Cincinnati, Ohio</u>				
Attention <u>Mr. J. A. Smith</u>				
Treatment <u>Normalizing</u>	<u>Box # CH 857A</u>			

Heat No. or Reference	9516				
Physical Serial No.					
Original Dimension	.505				
Original Area in Sq. In.	.250				
Dimension After Fracture	.344				
Area After Fracture, Sq. In.	.0929				
Elastic Limit, Lbs. Actual	8,950				
Maximum Load, Lbs. Actual	14,000				
Elongation in Inches	.60				
Yield Point, per Sq. In.	49,750				
Tensile Strength, per Sq. In.	70,000				
% Elongation in Inches	30.0				
% Reduction in Area	53.6				
Brinell	20.0 FT. LBS.				
Impact <u>1/2 IN. Temp. - 20 °F</u>	20.0 FT. LBS.				

REQUIREMENTS OF <u>ASTM A 352 70 LCB</u>	C	Mn	P	S	Si	Cr	Ni	Mo	Others
Yield Point	9516	13.81	0.035	0.02	50				
Tensile Strength									
Elongation									
Reduction of Area									
Cold Bends									

REVIEWED DOCUMENT

Wm. E. Smith 10/1/73

BETHNET CORPORATION

Subscribed and Sworn before me this OCT - 8 1973 day of 19

Witnessed By _____

Notary Public
 My Commission Expires Sept. 25, 1977.

BOWSER-MORNER Testing Laboratories, Inc.

Form 10-11

40 PARK AVENUE

PO BOX 51

DAYTON, OHIO 45401

513.253-8000

January 21, 1974

CORRECTED COPY

LABORATORY REPORT

Bowser CM 3567

Report to: Dayton Forging & Heat Treating Company
2323 East First Street - Dayton, Ohio 45403
Attn: Mr. Jan E. Knave

Laboratory No. 784831

Authorization:

Report on: Samples Submitted for Machining and Impact Testing

SAMPLES SUBMITTED:

Date Submitted - 11-24-73
No. of Samples - 1
Identification - Customer - William Powell Co. - Customer Order No. 744-F-4
Job No. 55676 55677

TEST PROCEDURE: Machining of samples and Charpy V Notch Impact Testing were conducted in accordance with the following test procedure: ASTM E23. Must average 15 Ft. Lbs. with on one sample less than 10 Ft. Lbs.

TEST RESULTS:

<u>Sample No.</u>	<u>Test Temperature, °F.</u>	<u>Breaking Energy, Ft. Lbs.</u>
1	-20°F	88.0
2	-20°F	61.0
3	-20°F	37.0
	Average	62.0

Respectfully submitted,

BOWSER-MORNER Testing Laboratories, Inc.

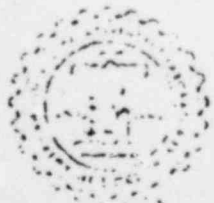
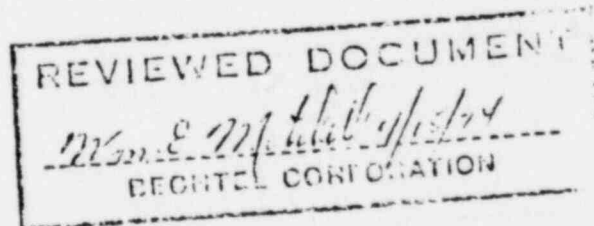
James R. Hannahs

James R. Hannahs, Welding Engineer
Manager, Metallurgical Laboratory
Chem-Met Division



APR 17 1974

3-Client
3-File
18H/ma



HOWMET CORPORATION CRUCIBLE STEEL CASTING DIVISION

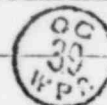
2850 SOUTH 20TH STREET • MILWAUKEE, WISCONSIN 53215 • (414) 645-7700

PHYSICAL TEST REPORT

Date 10/8/73

Material	<u>5500 Cast Steel</u>	Code	<u>9518</u>	Pieces	<u>3</u>	Part No	<u>52705</u>	Order No.	<u>50414</u>
Mfg. for	<u>Tru-Bond Machine Co.</u>		<u>9078</u>		<u>4</u>		<u>101145</u>		<u>2007</u>
Address	<u>Chippewa, Wis.</u>		<u>9078</u>		<u>1</u>		<u>100522</u>		<u>50117</u>
Attention	<u>Mr. J. J. Smith</u>								
Treatment	<u>Alloy Steel - 100% W. 100% C. 100% S. 100% P.</u>								

Heat No. or Reference	<u>9518</u>				
Physical Serial No.					
Original Dimension	<u>.505</u>				
Original Area in Sq. In.	<u>.200</u>				
Dimension After Fracture	<u>.317</u>				
Area After Fracture, Sq. In.	<u>.0799</u>				
Elastic Limit, Lbs. Actual	<u>9,450</u>				
Maximum Load, Lbs. Actual	<u>14,100</u>				
Elongation in Inches	<u>.67</u>				
Yield Point, per Sq. In.	<u>47,250</u>				
Tensile Strength, per Sq. In.	<u>70,500</u>				
% Elongation in Inches	<u>31.0</u>				
% Reduction in Area	<u>60.1</u>				
Brinell	<u>25.00</u>	<u>100</u>			
Impact <u>CHIPP</u>	<u>24.017</u>	<u>100</u>			
Impact <u>Temp. -20 °F</u>	<u>22.017</u>	<u>100</u>			



OCT 15 1973

W. J. E. C. M. E. I. A.

REQUIREMENTS OF:	<u>ASTM A 213 100% CRUCIBLE STEEL</u>	Mn	P	S	Si	Cr	Ni	Mo	Others
Yield Point	<u>9518</u>								
Tensile Strength	<u>9518</u>	<u>19.80</u>	<u>0.008</u>	<u>0.005</u>	<u>0.005</u>				
Elongation									
Reduction of Area									
Cold Bends									

REVIEWED DOCUMENT
W. J. E. C. M. E. I. A.
 METALLURGICAL CORPORATION

Subscribed and Sworn before me this 10 day of October 1973

Witnessed By _____

 Metallurgist

My Commission Expires Sept. 25, 1977

Notary Public