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STN-50-529 Palo Verde Nuclear Station, Unit 2, Arizona Publi 05000529
STN-50-530 Palo Verde Nuclear Station, Unit 3, Arizona Publi 05000530
AUTH.NAME AUTHOR AFFILIATION
VAN BRUNT,E.E. Arizona Public Service Co.
RECIP.NAME RECIPIENT AFFILIATION
TEDESCO,R.H. Assistant Director for Licensing

SUBJECT: Forwards matl test repts reviewed by NRC during 810723-24 site visit. Submits results of review of containment pressure boundary matls w/low metal svc temp in compliance w/GDC 51.

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Standardized Plant.1 cy:C Grimes 05000529
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INTERNAL:	ACCID EVAL BR	26	1	1	AUX SYS BR	27	1	1
	CHEM ENG BR	11	1	1	CONT SYS BR	09	1	1
	CORE PERF BR	10	1	1	EFF TR SYS BR	12	1	1
	ELD		1	0	EQUIP QUAL BR	13	3	3
	GEOSCIENCES	28	2	2	HUM FACT ENG	40	1	1
	HYD/GEO BR	30	2	2	I&C SYS BR	16	1	1
	I&E	06	3	3	IE/EPDB	35	1	1
	IE/EPLB	36	3	3	LIC GUID BR	33	1	1
	LIC QUAL BR	32	1	1	MATL ENG BR	17	1	1
	MECH ENG BR	18	1	1	MPA		1	0
	OP LIC BR	34	1	1	POWER SYS BR	19	1	1
	PROC/TST REV	20	1	1	QA BR	21	1	1
	RAD ASSESS BR	22	1	1	REAC SYS BR	23	1	1
	REG FILE	04	1	1	SIT ANAL BR	24	1	1
	STRUCT ENG BR	25	1	1				
EXTERNAL:	ACRS	41	16	16	BNL(AMDTS ONLY)		1	1
	FEMA-REP DIV	39	1	1	LPDR	03	1	1
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	NTIS		1	1				

OCT 28 1981

MAH

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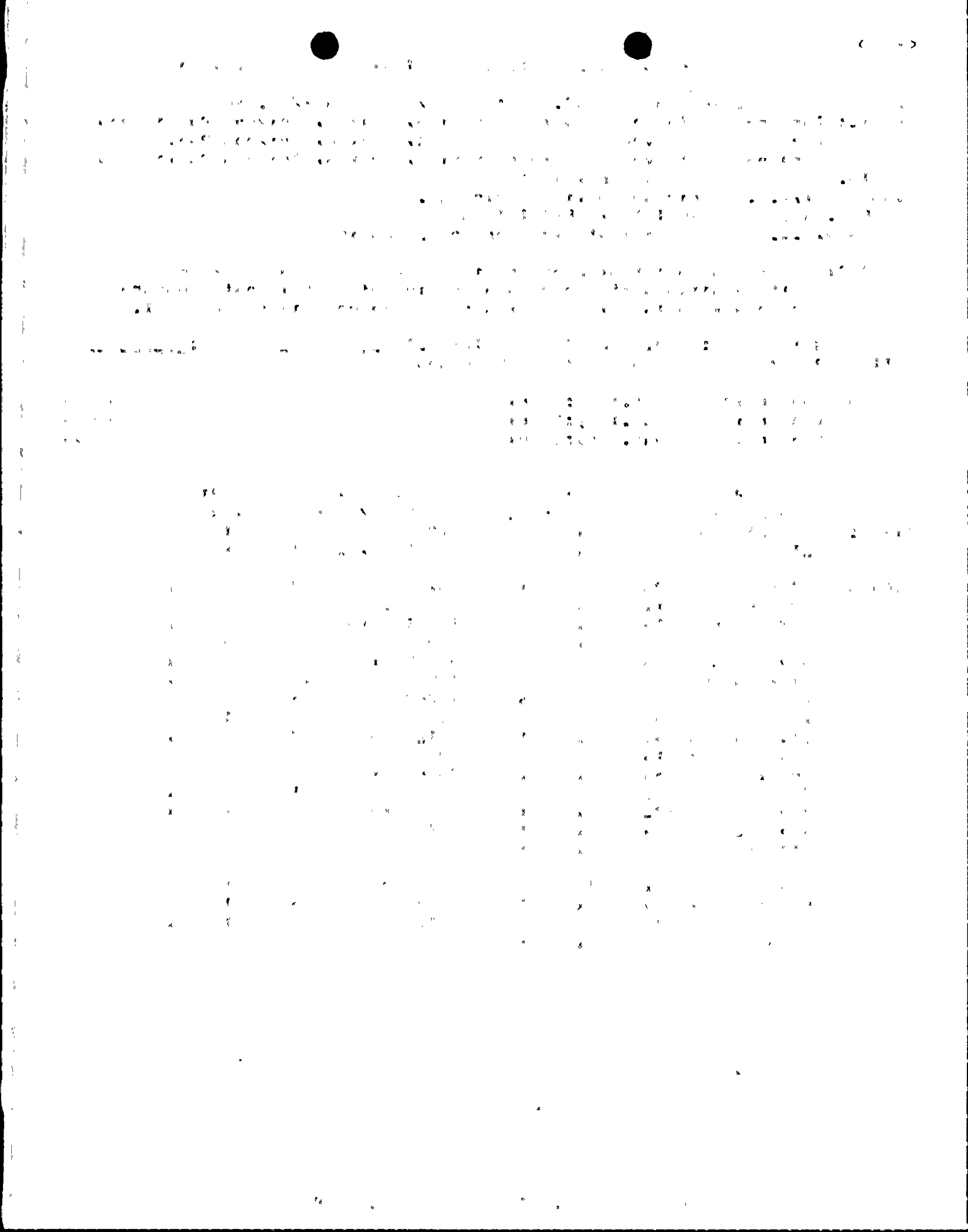


ARIZONA PUBLIC SERVICE COMPANY

STA. _____ P.O. BOX 21666 - PHOENIX, ARIZONA 85036

October 20, 1981
ANPP-19195 - JMA/WFQ

Mr. R. L. Tedesco
Assistant Director for Licensing
Division of Licensing
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Palo Verde Generating Station (PVNGS) Units 1, 2 and 3
Docket Nos. STN-50-528/529/530
File: 81-056-026; G.1.10

Reference: Letter from R. L. Tedesco, NRC, to E. E. Van Brunt, Jr. dated July 14, 1981--Subject: GDC 51 Compliance

Dear Mr. Tedesco:

One copy of the material test reports reviewed by NRC at the PVNGS site visit on July 23-24, 1981 (GDC 51) is provided as Attachment 1. In addition, the following information is submitted in response to our compliance with GDC 51 as discussed at the July 23-24, 1981 meeting.

As a result of NRC's review of PVNGS containment pressure boundary materials, the following list of lowest metal service temperatures (LMST) was generated:

Personnel Air Lock	+50° F
Penetrations	+30° F
Flued Head (Main Steam and Main Feed)	+53° F
Main Steam Piping	+40° F
Main Feed Piping	+30° F
Main Steam Isolation Valve	+73° F
Main Feed Isolation Valve	+70° F

For PVNGS the environment inside the containment for materials which are subjected to the fracture toughness requirements of ASME B & PV Code, Section III, Sub-section NE-2331 will not be lower than 50° F. This is based on the following conservative assumptions:

a) The plant is at the end of a refueling outage.
b) The reactor coolant pumps are not in operation.
c) The containment purge system is in operation.

B001
S-1

d) The minimum outdoor ambient temperature is 28° F.
e) The outdoor wind velocity is 15 mph.
f) The containment normal heating coils are available for use to ensure that the minimum ambient temperature is 50° F inside the containment.

Similarly, the minimum ambient temperature inside the Auxiliary Building is maintained at 50° F with the use of duct heaters in the HVAC system.

The following will address the items which have been identified by NRC in the proceeding list:

1. The Personnel Air Lock is located inside the Auxiliary Building at EL. 143'-10", therefore the minimum temperature of 50° F can be met.

2. Even though NRC has stipulated a minimum temperature of 30° F for Penetrations, we believe that the minimum outside temperature of 28° F for a short duration should not affect the penetration materials since the inside temperature is at least 50° F and we therefore believe a short term deviation of less than 2° F should be acceptable. Additional information is listed in the attached table.

3. The Flued Heads for Main Steam and Main Feedwater Piping are inside the containment. We believe the minimum temperature of 50° F inside the containment should be acceptable since the remaining portion of each flue head is partly embedded in concrete, partly sheltered in a recessed area, and therefore is not fully exposed to the outside environmental temperature. Additional information is listed in the attached table.

4. For Main Steam Piping, Main Feedwater Piping, Main Steam Isolation Valves, and Main Feedwater Isolation Valves which have minimum stipulated temperatures of 40° F, 30° F, 73° F, and 70° F respectively, we do not foresee any difficulty in meeting these temperatures if the pipe and valve insulations are left intact and undisturbed during plant shutdown. Should any section of the insulation be removed for component inspection or repair when the pressure-retaining capability is required, then portable space heaters in conjunction with temporary shelters will be used to maintain the required environmental

temperatures stipulated by Mr. Halapatz. For Main Steam and Main Feedwater Isolation Valves, additional information is listed on the attached table.

E. E. Van Brunt, Jr.
APS Vice President,
Nuclear Projects
ANPP Project Director

EEVBJr/WFQ/sam
Attachments

cc: J. Kerrigan (NRC) w/a
J. Halapatz (NRC MTEB) w/a
P. Hourihan w/a
A. Gehr w/a

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, Edwin E. Van Brunt, Jr., represent that I am Vice President Nuclear Projects of Arizona Public Service Company, that the foregoing document has been signed by me on behalf of Arizona Public Service Company with full authority so to do, that I have read such document and know its contents, and that to the best of my knowledge and belief, the statements made therein are true.

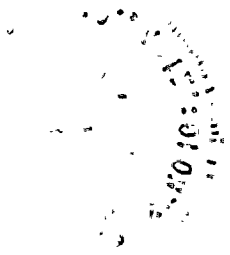
Edwin E. Van Brunt, Jr.

Sworn to before me this 20th day of October, 1981

Connie Lou Armstrong
Notary Public

My Commission expires:

June 24, 1983



ATTACHMENT 1

EQUIPMENT ACCESS HATCH COVER

PURCHASER: R334

KAISER STEEL CORP.
FABR. DIV.
PUR. AGENT
P.O. BOX 95
FONTANA, CALIF. 92335

LUKENS STEEL COMPANY
COATESVILLE, PA. 19320
TEST CERTIFICATE

DATE: 1/25/77 FILE NO. 4205-02-01

CONSIGNEE:
KAISER STEEL CORP.
PLANT #1
13032 SLOVER AVE.
KAISER, CA

MILL ORDER NO.	CUSTOMER P.O.	
73135 1	25131302	12277 JW

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

SA-516 GR. 70 ASME CODE SECTION II & III SUB NE 1974 EDITION THRU SUMMER 1974 ADDENDA
N-1160 8/4/78

BEND TEST O-K HOMOGENEITY TEST

CHEMICAL ANALYSIS

MELT NO.	C	MN	P	S	CU	SI	NI	CR	MO	V	TI	AL	B	GRAIN SIZE
03849	.26	1.05	.012	.023		.23								7-8

MURDOCK INC.
LOT # A23593-M
JOB # WOL 3-1663-01
DATE 5-24-7
EC 335-03-04

PA OK 3/23/77

PLATES 2 PCS 4 1/2 X 93/4 X 137 1/4 R X 194 1/8

PHYSICAL PROPERTIES

MELT NO	SLAB NO	YIELD PSI X100	TENSILE PSI X100	% ELONG. IN 2"	% R.A.	BHN XXX	IMPACTS LOC	V	0 F		FRACTURE APPEARANCE % SHEAR	DESCRIPTION
03849	2	515	803	30			T	40	38	40	40-40-40	1- 4-1/2 X 44 X 240
		498	784	29			L	96	94	90	90-90-90	
						LATERAL EXPANSION IN INCHES						
							T	.038	.035	.035		
							L	.084	.089	.091		

PLATE AND TESTS HEATED TO 1625 F./1675 F., HELD 1/2 HR. PER INCH MIN., AND WATER QUENCHED, THEN TEMPERED 1220 F., HELD 1/2 HR. PER INCH MIN., AND WATER QUENCHED.

TESTS STRESS RELIEVED BY HEATING WITHIN A RATE OF 100 F. PER HR. TO 1100 F./1200 F., HELD 30 HRS. AND FURNACE COOLED WITHIN A RATE OF 500 F. PER HR. TO 800 F.

NUCLEAR

M.T.R. REVIEWED AND ACCEPTED

13

We hereby certify the above information is correct.

Reviewed by

SUPERVISOR

EQUIPMENT ACCESS HATCH COVER

PURCHASER: CC

8 • KAISER STEEL CORP.
FABR. DIV.
PUR. AGENT
P.O. BOX 95
FONTANA, CALIF. 92335

LUKENS STEEL COMPANY

COATESVILLE, PA. 19320

TEST CERTIFICATE

MILL ORDER NO.	CUSTOMER P.O.	
73135 1	25131302	2277 DD

DATE: 2/03/77 FILE NO. 1205-02-01

CONSIGNEE: KAISER STEEL CORP.
PLANT #1
13032 SLOVER AVE.
KAISER, CALIF.

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

SA-516 GR. 70 ASME CODE SECT. II & III SUB NE 1974 EDITION THRU SUMMER 1974 ADDENDA
N-1160 8/4/78

BEND TEST O.K. HOMOGENEITY TEST

CHEMICAL ANALYSIS

MELT NO.	C	MN	P	S	CU	SI	NI	CR	MO	V	TI	AL	B	GRAIN SIZE
03950	.25	.98	.007	.023		.25								7-8

MURDOCK INC.
LOT # A2393-3
JOB # 1101 3-1663-851
DATE 5-24-7

PHYSICAL PROPERTIES

EC 355-07 IPC 4½x95/4x137½Q x-19 a½ CHORD

MELT NO.	SLAB NO.	YIELD PSI X1000	TENSILE PSI X1000	% ELONG. IN 2"	% R.A.	BHN	IMPACTS			FRACTURE APPEARANCE % SHEAR	DESCRIPTION
03950	2B	518	804	30			T 26	28	28	30-30-30	1- 4-1/2 X 44 X 240
		530	810	30			L 66	64	58	60-60-60	
					LATERAL EXPANSION IN INCHES						
							T .022	.020	.024		
							L .052	.061	.062		

BPC & CAE

REQUITEL 3.4.4 3/23/78

NUCLEAR

M.T.R. REVIEWED AND ACCEPTED KF 5

19 FEB 07 811

PLATE AND TESTS HEATED TO 1625 F./1675 F., HELD 1/2 HR. PER INCH MIN. AND WATER QUENCHED, THEN TEMPERED 1220 F., HELD 1/2 HR. PER INCH MIN. AND WATER QUENCHED.
Tests stress relieved by heating within a rate of 100°F. per hr. to 1100°F./1200°F., held 30 hrs. and furnace cooled within a rate of 100°F. per hr. to 800°F.

We hereby cert. the above information is correct.

BODY RING HATCH COVER

KAISER STEEL CORP.
FABR. DIV.
PUR. AGENT
P.O. BOX 95
FONTANA, CALIF. 92335

LUKENS STEEL COMPANY
COATESVILLE, PA. 19320

TEST CERTIFICATE

DATE: 2/15/77 FILE NO. 5-02-01

CONSIGNEE:
KAISER STEEL CORP.
KAISER, CA

MILL ORDER NO.	CUSTOMER P.O.	
73135 3	251.31.302	21477 JW

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

SA-516 GR. 70 ASME CODE SECTION II & III SUB NE 1974 EDITION THRU SUMMER 1974 ADDENDA
N-1160 8/4/78

BEND TEST O.K. HOMOGENEITY TEST

CHEMICAL ANALYSIS

MELT NO.	C	MN	P	S	CU	SI	NI	CR	MO	V	TI	AL	B	GRAIN SIZE
C7606	.25	1.06	.006	.016		.21								7-8

MURDOCK INC.
LOT # A22976-1
JOB # W04 3-1663-01
DATE 4-13-77

4-14-77

PHYSICAL PROPERTIES

IPC EC340-04 LR13

MELT NO.	SLAB NO.	YIELD PSI X100	TENSILE PSI X100	% ELONG. IN 2"	% R.A.	BHN XXX	IMPACTS V 0 F			FRACTURE APPEARANCE % SHEAR	DESCRIPTION
						LOC.					
C7606	4	490	750	29		T	28	26	30	30-30-30	1- 3-1/2 X 70 X 238
	PC 10					L	38	42	40	40-40-40	
					LATERAL EXPANSION IN INCHES						
						T	.027	.022	.025		
						L	.036	.039	.034		

M.T.R. REVIEWED AND ACCEPTED
29 FEB 22 1977

NUCLEAR

PLATE AND TESTS NORM. 1625 F./1675 F., HELD 1/2 HR. PER INCH MIN., AND AIR COOLED.

TESTS STRESS RELIEVED BY HEATING WITHIN A RATE OF 100 F. PER HR. TO 1100 F./1200 F., HELD 30 HRS. AND FURNACE COOLED WITHIN A RATE OF 100 F. PER HR. TO 800 F.

RECNTEL 3/23/78

KSC JOB: 1313
ITEM: EC340-04

We hereby certify the above information is correct.

SUPERVISOR-TESTING L. H. Kline

27189

R935

PURCHASER: BODY RING HATCH COVER

KAISER STEEL CORP.
FABR. DIV.
PUR. AGENT
P.O. BOX 95
FONTANA, CALIF. 92335

LUKENS STEEL COMPANY

COATESVILLE, PA. 19320

TEST CERTIFICATE

DATE: 1/13/77 FILE NO. 4205-02-01

CONSIGNEE:
KAISER STEEL CORP.
PLANT #1
13032 SLOVER AVENUE
KAISER, CALIF.

MILL ORDER NO.	CUSTOMER P.O.	
73135 3	25131302	11277 WM

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

SA-516 GR. 70 ASME CODE SECT II & III SUB NE 1974 EDITION THRU SUMMER 1974 ADDENDA
N-1160 8/4/78

BEND TEST O.K. HOMOGENEITY TEST

CHEMICAL ANALYSIS

MELT NO.	C	MN	P	S	CU	SI	NI	CR	MO	V	TI	AL	B	GRAIN SIZE
D3968	.23	1.04	.011	.004		.20								7-8

MURDOCK INC.
LOT. # A22976-1
JOB # WOL 3-1663-01
DATE 4-13-7

4-14-77

PHYSICAL PROPERTIES IPC EC340-05

MELT NO.	SLAB NO.	YIELD PSI X100	TENSILE PSI X100	% ELONG. IN 2"	% R.A.	BHN	IMPACTS V 0 F			FRACTURE APPEARANCE % SHEAR	DESCRIPTION
D3968	3	458	740	32			T 56	58	58	50-50-50	2- 3-1/2 X 70 X 238
	Ac 1						L 72	66	68	70-70-70	
					LATERAL EXPANSION IN INCHES						
							.050	.052	.053		
							.062	.060	.068		

NORM. PLATES AND TESTS NORM., 1625 F./1675 F., HELD 1/2 HR. PER INCH MN. AND AIR COOLED.

TESTS STRESS RELIEVED BY HEATING WITHIN A RATE OF 100 F. PER HR. TO 1100 F./1200 F., HELD 30 HRS. AND FURNACE COOLED WITHIN A RATE OF 100 F. PER HR. TO 800 F.

M.T.R. REVIEWED AND ACCEPTED
JAN 22 1977
NUCLEAR

BECHTEL 344 2/23/77

KSC JOB: 1313
ITEM: EC340-05

We hereby certify the above information is correct.

SUPERVISOR

27189

BODY RING HATCH COVER

PURCHASER:
KAISER STEEL CORP.
FABR. DIV.
PUR. AGENT
P.O. BOX 95
FONTANA, CALIF. 92335

LUKENS STEEL COMPANY
COATESVILLE, PA. 19320
TEST CERTIFICATE

MILL ORDER NO.	CUSTOMER P.O.	
73135 3	25131302	12277 JW

DATE: 1/25/77 FILE NO 4205-02-01
CONSIGNEE:
KAISER STEEL CORP.
KAISER, CA

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

SA-516 GR. 70 ASME CODE SECTION II & III SUB NE 1974 EDITION THRU SUMMER 1974 ADDENDA
N-1160 8/4/78

BEND TEST O.K. HOMOGENEITY TEST

CHEMICAL ANALYSIS

MELT NO.	C	MN	P	S	CU	SI	NI	CR	MO	V	TI	AL	B	GRAIN SIZE
C7606	.25	1.06	.006	.016		.21								7-8

MURDOCK INC.
LOT # A23976-1
JOB # W0L3-1663-01
DATE 4-13-77

4-14-77

PHYSICAL PROPERTIES

IPC EC340-01 1313

MELT NO.	SLAB NO.	YIELD PSI X100	TENSILE PSI X100	% ELONG. IN 2"	% R.A.	BHN XXX	IMPACTS V O F			FRACTURE APPEARANCE % SHEAR	DESCRIPTION
						LOC.					
C7606	5	477	743	24		T	22	20	22	20-20-20	2- 3-1/2 X 70 X 238
	Pc 2					L	28	30	30	30-30-30	
					LATERAL EXPANSION IN INCHES						
						T	.017	.019	.018		
						L	.026	.025	.027		
C7606	3	505	780	30		T	30	30	28	30-30-30	1- "
						L	42	50	46	40-40-40	
					LATERAL EXPANSION IN INCHES						
						T	.022	.026	.025		
						L	.042	.045	.038		

PLATES AND TESTS NORM. 1625 F./1675 F., HELD 1/2 HR. PER INCH MIN., AND AIR COOLED.

TESTS STRESS RELIEVED BY HEATING WITHIN A RATE OF 100 F. PER HR. TO 1100 F./1200 F., HELD 30 HRS. AND FURNACE COOLED WITHIN A RATE OF 100 F. PER HR. TO 800 F.

NUCLEAR

M.T.R. REVIEWED AND ACCEPTED

RECHTEL 844 3/22/78

14 FEB 01 1977

KF 2589

R335(1)

We hereby certify the above information is correct.

KSC JOB: 1313

SUPERVISOR-TESTING L. H. Kline

PURCHASER: PERSONNEL AIR LOCKS
KAISER STEEL CORP.
FABR. DIV.
PUR. AGENT
P.O. BOX 95
FONTANA, CALIF. 92335

LUKENS STEEL COMPANY
COATESVILLE, PA. 19320

TEST CERTIFICATE

DATE: 2/15/77 FILE NO. [illegible]-02-01
CONSIGNEE:
KAISER STEEL CORP.
KAISER, CA

MILL ORDER NO.	CUSTOMER P.O.	
73135 2	25131302	21477 JW

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

SA-516 GR. 70 ASME CODE SECTION II & III SUB NE 1974 EDITION THRU SUMMER 1974 ADDENDA
N-1160 8/4/76

BEND TEST O.K. HOMOGENEITY TEST

CHEMICAL ANALYSIS

MELT NO.	C	MN	P	S	CU	SI	NI	CR	MO	V	TI	AL	B	GRAIN SIZE
A5599	.25	1.03	.007	.022		.25								7-8

JUL 2 0 1978

MURDOCK INC.
LOT # M22-844-1
JOB # WO# 3-1665-01
DATE 4-8-7
2 PCS ITEM 2.3
LOT RANGE PIECES (4)

PHYSICAL PROPERTIES

MELT NO.	SLAB NO.	YIELD PSI X100	TENSILE PSI X100	% ELONG IN 2"	% R.A.	IMPACTS	XXX	V	O	F	FRACTURE APPEARANCE % SHEAR	DESCRIPTION
A5599	1	533	822	28		LOC						
						T		22	20	22	20-20-20	2- 4 X 56 X 330
						L		32	32	30	20-20-20	
						LATERAL EXPANSION IN INCHES						
						T		.017	.015	.018		
						L		.025	.027	.027		

NUCLEAR
LL-6174
MEETS NUCLEAR REQUIREMENTS WINTER 1974 ADDENDA

PLATES AND TESTS NORM. 1625 F./1675 F., HELD 1/2 HR. PER INCH MIN., AND AIR COOLED.

TESTS STRESS RELIEVED BY HEATING WITHIN A RATE OF 100 F. PER HR. TO 1100 F./1200 F., HELD 30 MIN. AND FURNACE COOLED WITHIN A RATE OF 100 F. PER HR. TO 600 F.

We hereby certify the above information is correct.

A.I. REVIEW [illegible] 4-7-78

SUPERVISOR-TESTING [illegible]

SOLD TO: KAISER STEEL CORP.
FABR. DIV.
PUR. AGENT
P.O. BOX 95
FONTANA, CALIF. 92335

PERSONNEL AIR LOCKS

LUKENS STEEL COMPANY
COATESVILLE, PA. 19320

TEST CERTIFICATE

MILL ORDER NO.	CUSTOMER P.O.	
73135 2	25131302	21477 JW

DATE: 2/15/77 FILE NO. 5-02-01

CONSIGNEE: KAISER STEEL CORP.
KAISER, CA

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

SA-516 GR. 70 ASME CODE SECTION II & III SUB NE 1974 EDITION THRU SUMMER 1974 ADDENDA
N-1160. 8/4/78

SEND TEST O.K. HOMOGENEITY TEST

MEETS 1974 Ed. WINTER 1974 ADD.

CHEMICAL ANALYSIS

MELT NO.	C	MN	P	S	CU	SI	NI	CR	MO	V	TI	AL	B	GRAIN SIZE
A5599	.25	1.03	.007	.022		.25								

MURDOCK INC.
LOT # A22873
JOB # WQL 3-1665-01
DATE 4-8-7

16 PCS ITEM 23
1 LOT REMNANT MATERIAL

PHYSICAL PROPERTIES

MELT NO.	SLAB NO.	YIELD PSI X100	TENSILE PSI X100	% ELONG. IN 2"	% R.A.	DIR. XXX LOC	IMPACTS V	IMPACTS 0	IMPACTS F	FRACTURE APPEARANCE % SHEAR	DESCRIPTION
A5599	1	533	622	28		T	22	20	22	20-20-20	2- 4 X 56 X 330
						L	32	32	30	20-20-20	
						LATERAL EXPANSION IN INCHES					
						T	.017	.015	.016		
						L	.025	.027	.027		

M.T.R. REVIEWED AND ACCEPTED

28 FEB 22 1977

PLATES AND TESTS NORM. 1625 F./1675 F., HELD 1/2 HR. PER INCH MIN., AND AIR COOLED.

TESTS STRESS RELIEVED BY HEATING WITHIN A RATE OF 100 F. PER HR. TO 1150 F./1200 F., HELD 30 HRS. AND FURNACE COOLED WITHIN A RATE OF 100 F. PER HR. TO 800 F.

NUCLEAR

We hereby certify the above information is correct.

A.I. REVIEW

SUPERVISOR-TESTING

United States Steel Corporation

01.000.0772 PENETRATION #10

Test Report

AP-414-FT

CONTRACT NO.	P. O. DATE	PURCHASE ORDER NO.
		MA-936-NUCLEAR 12/15/76

SHIPPERS NO.	MILL ORDER NO.	INVOICE NO.
HO1136 3/31/77	AM61175	136-66741

VEHICLE IDENTITY UPC 9358

GARY WORKS
GARY, INDIANA 46402

SOUTHERN BOILER & TANK WKS INC
P O BOX 7274
MEMPHIS TENN 38107

SHIP TO: SOUTHERN BOILER & TANK WKS INC
1199 THOMAS
MEMPHIS TENN

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

BY SIGNATURE D. A. HAYES
MGR QUALITY ASSURANCE

DATE 4-20-77

PLATE CARBON ASME SA516-74A WINTER 74 ADDENDA GRADE
TO PRESSURE VESSEL QUALITY NORMALIZE PLATE STRESS
RELIEVE TEST SPECIMENS ONLY AT 1100/1200 DEG F FOR
1 HOUR PER INCH IN ACCORDANCE WITH NE-4620 QUALITY * SEE BELOW
SUBJ TO INSP & EXPEDITING BY SS/T AND/OR BECHTEL CORP CERT TO NF-2
INC T/PS TO SLC TO ATTN PURCH MGR AND GARY WORKS MUST CERTIFY MATL
PRODUCED IN ACCORDANCE WITH MA-3700

MATERIAL DESCRIPTION: THICKNESS OR SECTION	WIDTH, DIA. OR FT. WT.	LENGTH	QUANTITY	WEIGHT	HEAT NO.	TEST OR PIECE IDENTITY	YIELD PT. PSI	TENSILE STR. PSI	ELONGATION % IN 8"	ELONGATION % IN 2"	% RED. OF AREA	BE...
1 1/4	100.0	304	1	10919	Y52333	1 W3	*54700	75600		33.0		OK

FULL SIZE CHARPY IMPACTS FT LBS 50-47-47 % SHEAR 20-25-25 LATERAL EXPANSION MILS 39-45-41

LATERAL EXPANSION AND PERCENT SHEAR FOR INFORMATION ONLY.

BECHTEL P.O./SPEC. NO 10407-3-CM-52
DOCUMENT CATEGORY NO: 6/17.1

*ASSURANCE CERT REQ CHARPY V-NOTCH LONGITUDINAL IMPACT TESTS EACH PLATE AS HEAT TREATED 20/15 FT LBS AT 0 DEG F MATERIAL IN ACCORDANCE WITH ASME SECTION 3 SUMMER 75 ADDENDA CLASS MC SUB SECTION NE TO SUB ARTICLES NE-2100 NE-2200 NE-2300 NE-2400 NE-2500 NE-2600 NE-2700 TO THOSE PARAGRAPHS APPLICABLE TO PLATE PRODUCTS

NO	TYPE	C	MN	P	S	SI	CU	NI	CR	MO	SN	AL	N	V	B	TI	CB	CO
333	HEAT	24	106	C09	G15	25												*.SBUL-0.5%

AV GR SIZ 08

BECHTEL 313

RETENTION TIME 5 YRS

R18/6

SS) USS a Stacco Steel Corporation — Test Report

.000.0772 PENETRATION # 1 & 2

J.O. CONTRACT NO.	P.O. DATE	PURCHASE ORDER NO.
		NA-036-NUCLEAR 12/16/76

SHIPPERS NO.	MILL ORDER NO.	INVOICE NO.
100119 6/29/77	2HS1025	154-8574

VEHICLE IDENTITY 38L-1209

GARY WORKS
GARY, INDIANA 46402

SOUTHERN BOILER & TANK WKS INC
P O BOX 7274
MEMPHIS TENN 38107

SOUTHERN BOILER & TANK WKS INC
1198 THOMAS
MEMPHIS TENN

SHIP TO

BECHTEL NUCLEAR

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

BY: (1) SIGNATURE [signature]
MGR QUALITY ASSURANCE
DATE 5-13-77

AP-414

C. PLATE CARBON ASME SA516-70A WINTER 78 ADDENDA GRADE
SP. 70 PRESSURE VESSEL QUALITY NORMALIZE PLATE STRESS
RELIEVE TEST SPECIMENS ONLY AT 1100/1200 DEG F FOR
1 HOUR PER INCH IN ACCORDANCE WITH NE-4620 QUALITY +SEE BELOW
SP: SUBJ TO INSP & EXPEDITING BY SB/T AND/OR BECHTEL CORP CERT TO NE-2
ISC T/SS TO SLC TO ATTN PURCH MGR AND GARY WORKS MUST CERTIFY MATL
PRODUCED IN ACCORDANCE WITH NA-3700

ITEM NO.	MATERIAL DESCRIPTION: THICKNESS OR SECTION	WIDTH, DIA. OR PT. WT.	LENGTH	QUANTITY	WEIGHT	HEAT NO.	TEST OR PIECE IDENTITY	YIELD PT. PSI	TENSILE STR. PSI	ELONGATION % IN 8"	ELONGATION % IN 2"	% RED. OF AREA
5	1 5/8	109.0	546	1	17320	Y52333	3 W1	*52900	78900		30.0	

FULL SIZE CHARPY IMPACTS FT LBS - 42-45-42 % SHEAR 15-20-15 LATERAL EXPANSION MILS 41-39-40

LATERAL EXPANSION AND PERCENT SHEAR FOR INFORMATION ONLY.

*ASSURANCE CERT REQ CHARPY V-NOTCH LONGITUDINAL IMPACT TESTS EACH PLATE AS HEAT TREATED 20/15 FT LBS AT 0 DEG F - CLASS MC SUB SECTION NE TO SUB ARTICLES NE-2100 - NE-2200 - NE-2300 - NE-2400 - NE-2500 - NE-2600 NE-2700 TO THOSE PARAGRAPHS APPLICABLE TO PLATE PRODUCTS

BECHTEL P.O./SPEC. NO. 10607 13-CM-152
DOCUMENT CATEGORY NO. 6/17.1

*YSEUL 0.5%

HEAT NO.	TYPE	C	MN	P	S	SI	CU	NI	CR	MO	SN	AL	N	V	B	TI	CB	CO
Y52333	HEAT	24	108	005	013	25												

AVG GR SIZ 08

RETENTION TIME 5 YRS

BECHTEL 31

AG17-154 1201 74-008915 FGKY

CST CC03 PAGE 1

EARLE M. JORGENSEN CO. MAR NO. 22227 PT.

FLUED HEAD PENETRATION #1

STEEL

RETENTION TIME 20 YRS.

FORGE DIVISION

8531 E. MARGINAL WAY SOUTH • PHONE 762-1100 (AREA 206)
MAILING ADDRESS: P. O. BOX 24026
SEATTLE, WASHINGTON 98124

R485 ①

CERTIFIED TEST REPORT

CUSTOMER

AMETEK/STRAZA
P O BOX 668
EL CAJON, CA 92021

ATT: C B HENDRIKSEN

Date 12-23-76
Customer's Order No. N92757-4
Our Invoice No. 7385 FS
Contract No.

HEAT NO.	MATERIAL	DESCRIPTION	SPECS.
17296/ 20091	1027	1 PENETRATION FORGING ROUGH TURNED PER DWG #7-050054-2 REV B 7-050054-2 FORGING SN F-3	ASME SA 350 LF 2 - ASME SECT III NC 2300 - ASME B & PV CODE SECT III, 1974 ED.
	MAKES	7-050054-1	
		PEN # 1 SITE 1 SN 223	

INCL ADDENDA THRU SUMMER 1975 FOR CLASS 2

CHEMICAL ANALYSIS

HEAT NO.	MATERIAL	C	MN	P	S	SI	NI	CR	MO	V	CU	SN			O/S
17296/ 20091	1027	.28	1.33	.011	.025	.20									

HARDENABILITY – ROCKWELL "C" IN 16th OF AN INCH

HEAT NO.	MATERIAL	1	2	3	4	5	6	8	10	12	14	16	20	24	28	32	HARDNESS SURFACE

MECHANICAL PROPERTIES

CHARPY V @ 0°

TEST NO.	HEAT NO.	MATERIAL	YIELD LBS./SQ. IN.	TENSILE LBS./SQ. IN.	ELONG. % IN.	REDUCT. OF AREA %	FRACTURE	BEND	MACRO	IMPACT
LMW 0°	17296/ 20091	1027	56,500	76,500	34.0	70.1	CUP			45-48-52 ft#
							%SHEAR FRACTURE.....			35-35-40
							LAT EXP IN MILS.....			41-46-50
LMW 180°	17296/ 20091	1027								80-94-75 ft#
							%SHEAR FRACTURE.....			50-60-50
							LAT EXP IN MILS.....			72-73-72

REMARKS:

NORMALIZE	1600 DEG F	31 HRS	
TEMPER	1200	30	

INSPECTOR

DPC & QAE

QE-5

RECEIVED 368 5/5/77

12/29/77

SUBSCRIBED AND SWORN TO BEFORE ME

THIS _____ DAY OF _____, 19____

_____
NOTARY PUBLIC—SEATTLE

WE CERTIFY THAT THE MATERIAL COVERED BY THIS REPORT HAS BEEN INSPECTED & TESTED IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS DESCRIBED HEREIN AND TEST REPORTS ARE ON FILE SUBJECT TO EXAMINATION

EARLE M. JORGENSEN CO.

BY _____

FORM 91 FS-1 REV 10M 4-76

United States Steel Corporation

MRR NO. 17997 CW AD 11-2-77

~~R175~~ (E) National Works

PENETRATION #21

STANDARD SWORN TEST REPORT

TUBULAR PRODUCTS

RETENTION TIME 2½ YRS

1-27-76 DATE

MATERIAL: Seamless Pressure Pipe

GRADE: 6 ASME SA333

6 ASTM A333

TREATMENT: Normalized 1600°F for 91 min. (Aircooled)

CUSTOMER NAME: Capitol Pipe and Steel Products, Inc.

CUSTOMER'S ORDER NO.: 75908-00

ADDRESS:

U.S. STEEL ORDER NO.: KC 10365

CITY AND STATE:

INVOICE NO.: 356-00231

Longitudinal tensile tests

CUST. LOT NO.	SIZE O.D.	NOMINAL OR WALL THICKNESS		HEAT NUMBER	HYDRO. TEST PRESSURE MIN. P.S.I.	MECHANICAL PROPERTIES: YIELD STRENGTH P.S.I.	TENSILE STRENGTH P.S.I.	ELONG. IN 2" OR 1½"	CHEMICAL ANALYSIS (%): C	Mn	P	S	Si	Mo	
4669	24"	.688		A04102	1200	47870	68450	52.5	.15	1.19	.011	.018	.16	check	
				A04102	1200	51370	70000	49.0	.15	1.19	.011	.018	.16	check	
									.17	1.15	.012	.019	.16	ladle	

Flattening tests satisfactory

Full size longitudinal C.V.N. impacts at minus - 50°F

		Ft. Lbs.	% Shear	Lat. Exp.
A04102		54	48	.048
		60	51	.055
		61	51	.055

8-31-76

8/27/76

BECHTEL 313.

BPC & QAE

Southern Boiler & Tank
P.O.# NA-014
S.O.# AN-6232-A
Ch# H-80290
Item# 12

BECHTEL P.O./SPEC. NO. 10407-1 - CM - 152
DOCUMENT CATEGORY NO. 8.1.2.1.

PENNSYLVANIA } SS
ALLEGHENY

SUBSCRIBED TO BEFORE ME THIS 27th DAY OF January 19 76

NOTARY PUBLIC

Notarial Seal
Jean Ann Peters
Notary Public
City of Pittsburgh, Allegheny County
My Commission Expires Jan 3, 1979

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

PRODUCTION DEPARTMENT

Chief Metallurgist

United States Steel Corporation, National Tubular Works

FLUED HEAD PENETRATION #46

EARLE M. JORGENSEN CO.

STEEL
FORGE DIVISION
10650 SO. ALAMEDA STREET • PHONE 567-1122 (Area Code 213)
MAILING ADDRESS: P.O. Box 54633
LOS ANGELES, CALIFORNIA 90054

(6) - P

INVOICE NO. 7429 FL

SHIPPED 10-11-78
TYED BY DEV TIME

LOS ANGELES DELIVERY RECEIPT 528
TEST REPORT R
INVOICE NO. 7429 FL
MRR NO. 36194

7429 FL

CUSTOMER ORDER—REQ NO	DATE ENTERED	ENTERED BY	ORDERED BY
R-92766-4	1/13/78	PATE	HENRIKSEN

SOLD TO
AMETEK/STRAZA
P O BOX 666
EL CAJON CA 92021
35-1046641

RETENTION TIME 10 YRS

SN-E-5

SHIP TO
790 GREENFIELD DRIVE

MARKS 7-050063-1

CODE SN # 365 PEN # 46 SITE 3

SHIP VIA: OUR TRUCK	WILL CALL	CARRIER	F O B	DEST. FREIGHT PPD.	OUR PLANT FREIGHT COLL.	O/P PREPAID CHARGE ENT.	O/P COLLECT ALLOW ENT.
XX		EMJ WHSE		XX			

QUANTITY AND DESCRIPTION	WEIGHT	HEAT NO
ASME SA-182 F22 AND ASME BSPV CODE SECTION 3, 1974 EDITION AND ADDENDA THRU SUMMER 1975 FOR CLASS 2 COMPONENTS.		
FORGED OVERSIZE TO ALLOW FOR FINISH		
NORMALIZED, WATER QUENCHED AND TEMPERED		
ROUGH MACHINED COMPLETE TO DWG 7-050063-2 REV "C" TOLERANCE SHOWN, INCLUDING ID; 250 RMS OR BETTER		
ULTRASONIC INSPECTED PER NB-2542		
GRAY WITH GREEN STRIPE		
212201		
NUCLEAR		
2 PCS P/N-7-050063-2 REV "C" BHN 179	2090#	B1-20984 TBI-11
PEN# 46 AND 47		
MECHANICAL TESTING REQD AND INCL IN PRICE.		
REQUITEL 368		
BAY 9		

CERTIFIED TEST REPORT

We certify that the material covered by this report has been inspected and tested in accordance with the applicable requirements described hereon and test results are on file subject to examination. Earl Bratton 10-11-7

By Clarence Rogers
SHIPPING CLERK

ASME QUALITY SYSTEM
CERTIFICATE NUMBER N-1707
EXPIRES APRIL 15 1980

SUBSCRIBED AND SWORN TO BEFORE ME THIS

11 DAY OF OCTOBER 1978

OFFICIAL SEAL
R. HAROLD ELSTON
NOTARY PUBLIC - CALIFORNIA
LOS ANGELES COUNTY
My Commission Expires May 6, 1979

NOTARY PUBLIC

HEAT NO	YIELD	TENSILE	% IN INCHES	% R OF A

ACTUAL PHYSICAL CERTS ATTACHED

C	MN	P	S	SIL	NI	CR	MO	V				MILL	HEAT NO
.13	.47	.017	.014	.32		2.48	.94					EMJ-SEA	20984

HARDENABILITY ROCKWELL C

1	4	5	8	10	16	20

ALL OTHER TESTING CERTS ATTACHED

CERTIFICATE OF TEST ON PIPE MATERIAL

1-SG-205-S001
EW

PULLMAN POWER PRODUCTS
P. O. BOX 909
PARAMOUNT, CA 90723

Combustion Engineering, Inc.
P. O. BOX 1212
HOUSTON, TEXAS 77001

Date 26 September 1977

Customer Order No.	C.I.W. Sales Order No.	Specification
205-19 JT. 131	F-9125	ASME SA105 Gr. C ASME SECTION III, Class 2 Components 1974 Edition Thru Summer 1975 Addenda as modified by Customer P.O. with Impacts at +40°F.

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

C.I.W. Part No. 86-9125-240-210

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NO. N-1251 EXPIRES 10-27-78

Heat No.	Location or Serial No.	CHEMICAL ANALYSIS C	MN	P	S	SI	CR	NI	MO
6587		.23	.79	.011	.019	.24			

Piece No.	Heat No.	Test Loc.	MECHANICAL PROPERTIES Tensile PSI	2" % Offset Yield PSI	% Elong. In. 2"	% Red. Area	Test Temp.	Lot Acceptance Bend Test	Flat Bend Test	V-Notch Impact +40°F Ft. Lbs.	Lat. Exp.	% Shear
2	J 6587	Trans.	70,200	46,700	30.8	52.9	-310	OK	90.0	80	MILS	66
									71.0	60		61
									105.0	80		76

Org. Ser. #	Test Lot #
29507Y	310
29507Z	310

Tensile specimen Size: .510

Pullman Power Products
Division of Pullman Incorporated
QVR IDENTIFICATION
2F05-19.1 JT. 131 W
3.1.12 @ARIC-3

REDITEL 210

APPROVED BY Q.A.
Date 11-10-77
MS

Hydrostatic Test: Each length of pipe hydrostatically tested at 7800 psi for 5 sec. and found acceptable.

Heat Treatment: Pipe has been heat treated in accordance with CIW Approved Procedure PH-8, Rev. 'C'. 1600°F., held 1 hr. at temp. Air cooled.

Sworn and Subscribed before me this 6th Day of September 1977

Notary Public [illegible] Texas

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

Metallurgical Representative

1-SG-205-S001 FW

UNITED STATES STEEL CORP.
CHRISTY PARK WORKS
McKEESPORT, PA.

QUALITY CONTROL SYSTEM
RECORD OF TESTS 2825-

DATE 11-6-78

MFG'S ORDER NUMBER EG-20210 CUSTOMER Guyon Alloys Inc. CONTRACT NUMBER A-22955

ASTM A106 - ASME SA106

GRADE "C" O.D. 24" WALL 1.531" HEAT TREATMENT "Normalize" 1550°F - 2.5 Hrs at Temp

HEAT NUMBER 70C543 HEAT CODE B13 TEST IDENTITY 4901 FURNACE CHARGE NUMBER C3610

TEST NO.	DIMENSIONS	AREA	YIELD STRENGTH BEAM POUNDS	YIELD STRENGTH POUNDS PER SQ. IN.	TENSILE STRENGTH BEAM POUNDS	TENSILE STRENGTH POUNDS PER SQ. IN	ELONGATION IN 2 INS.	ELONGATION %	REDUC. DIMENSIONS	REDUC. AREA	REDUC IN AREA, %
4901	5.05	2.003	100.50	50175	153.50	76635	64	32.0	3.01	.0712	64.4
	Hydro Tested to 2800 PSI										
PTC				40000		70000		20%			

	TEST TEMP °F	RESULTS
CHARPY IMPACT TEST	+40°F	1. 38.0 2. 42.0 3. 46.0
DROP WEIGHT TEST	-	-
FLATTENING TEST	12.3"	OK TO 11"

Material was manufactured in accordance with the quality system audited and approved by Guyon Alloys Inc. as conforming with the requirements of ASME Sect III Subarticle NCA-3800

CHEMICAL ANALYSIS

	C.	Mn.	P.	S.	Si	V.
TABLE	.25	.87	.006	.025	.25	-
Check	.27	.87	.007	.026	.26	.09
Check	.24	.82	.007	.024	.24	.09

APPROVES PIPE NUMBERS

4901A 4922A 4931A

RECEIVED

Pullman Power Products Paramount, Calif.
Q.A. APPROVAL
By
Date 3/6/79

Test results which were not witnessed have been reviewed and meet order requirements.

Third Party Inspector

Q. A. APPROVED
BY: C Burgan DATE: 1-10-79
GUYON ALLOYS, INC.

We hereby certify that the above figures are correct, as contained in records maintained at the above address.

Chief Metallurgist R. J. Faircloth

1-SG-205-S001 FW

CP-QC 4529
UNITED STATES STEEL CORP.
CHRISTY PARK WORKS
McKEESPORT, PA.

QUALITY CONTROL SYSTEM

RECORD OF CHARPY IMPACT TESTS

7-3 TURN
DATE: 11-7-75

Agency Number _____ Customer _____ Contract Number _____

Mill Order _____ O.D. .74" Wall 1.531" Grade "C" A25M A106-ASME SA106 Heat Treatment NORMALIZE

Heat Number 70C543 Heat Code B13 Test Number # 4-901

Remarks: _____

LONGITUDINAL IMPACTS 1/2" Below OD Surface

Specimen No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Code	RB/LV																				
Temp.	+40	+40	+40																		
Ft. lbs.	38.0	42.0	46.0																		
% Shear	40.0	40.0	40.0																		
Lat. Exp.	45.0	43.0	46.0																		
"RC"	82.0	79.0	79.0																		
Code																					
Temp.																					
Ft. lbs.																					
%Shear																					
Lat. Exp.																					
"RC"																					
Code																					
Temp.																					
Ft. lbs.																					
% Shear																					
Lat. Exp.																					
"RC"																					
Code																					
Temp.																					
Ft. lbs.																					
% Shear																					
Lat. Exp.																					
"RC"																					

Q.A. APPROVED
BY _____ DATE 7-10-75
GUY JN ALLEGHENY, INC.

SEC EL. 37.0

Pullman Power Products
Paramount, Calif.
Q.A. APPROVAL
By _____
Date 3/16/77

Rockwell Testing Machine # 1033 Y checked out OK 35.1 R.C. Test Block 35.1 + 1.0

Frank B Stamp
20532

1-SG-206-S001

PAGE 1 OF 2

Log No. 29-8 660-3 Page 1 of 2

Bonney Forge Division
Energy Products Group
GULF+WESTERN MANUFACTURING COMPANY
ALLENTOWN PENNSYLVANIA 18105

AREA CODE 215
TELEPHONE 264-6101
TWX 510-651-0056
TELEX 84-2403

CORRECTED CERTIFICATIONS 12/19/78

CUSTOMER: PULLMAN POWER PROD
CUSTOMER'S Order No.: 2805-71
SHIPPED TO: PULLMAN POWER PROD
PO BOX 912
14507 S PARAMOUNT BLVD
PARAMOUNT CA 90723

RECEIVED
JAN 2 1979
PULLMAN POWER PRODUCTS

NOVEMBER 13, 1978
Bonney Order No. 67034
2805-71
RETENTION TIME 1 YRS.

R 6704 B

Item No.	Quantity No.	Bonney Lot No.	Grade or Specification No. Chemical Analysis, Physical Properties, Remarks
			SA420-WPL6
681	4	P557	28 (1.750mw) x 12 (.843) Sweepolet C.22 Mn 1.28 P.018 S.022 Si.28 T/S 84,600 Y/S 54,000 El 31 Ra 69 Charpy +40°F.: 58.6 - 67.0 - 81.4 ave. 69.0 (ft lbs) L.E. (mils): 58 - 65 - 78 Shear (%): 90 - 90 - 90 Charpy -50°F.: 13.9 - 15.6 - 35.3 ave. 21.6 (ft lbs) L.E. (mils): 17 - 19 - 34 Shear (%): 10 - 20 - 30

This is to certify that:

1. The fittings supplied were normalized by heating to within 1625°F. and 1675°F. for 3/4 hr. per inch of thickness (1 HR. MIN.) followed by cooling in still air.

2. The fittings supplied are in complete accordance with the ASME Boiler and Pressure Vessel Code, Section III, Class 2, 1974 Ed. Thru Winter 1975 Addenda, SA420-WPL6 and the Purchase Order.

3. The Charpy V-Notch Impact Test was performed at +40°F. in accordance with ASME E370 & SA420-WPL6 & ASME NC-2331-1.

4. The Charpy V-Notch Impact Test was performed at -50°F. in accordance with ASME E370 & SA420-WPL6.

We certify that the data in this report is true and correct as contained in the records of the manufacturer and is certified by authorized quality control personnel.

Bonney Forge Division
Energy Products Group
Gulf+Western Manufacturing Co.
Allentown, Pennsylvania 18105

F. M. Landes Jager
QUALITY ASSURANCE MANAGER

APPROVED BY Q. A.
Date 1/3/79
By MS
BECHTEL 149

FORM C-17A

1-SG-206-S001

ALPHA
ENERGY PRODUCTS GROUP

BONNEY FORGE

AREA CODE 215
TELEPHONE 435 9611
TWX 510-651-3752
TELEX 847453

CORRECTED CERTIFICATIONS 12/19/78

CUSTOMER: PULLMAN POWER PROD
Date DECEMBER 19, 1978
CUSTOMER'S Order No.: 2805-71
Sonney Order No. 67034

Item No.	Quantity No.	Sonney Lot No.	Grade or Specification No. Chemical Analysis, Physical Properties, Remarks:
			RETENTION TIME 1 YEAR

R67048

5. The Charpy V-Notch test specimen was taken from a separate test forging that was approximately 2 3/4 square by 13" long. The test specimens are removed along the 13" longitudinal axis which is parallel to the direction of working.

BECHTEL
149

APPROVED
BY Q. A.
Date 1/3/79
By MS

We certify that the data on this sheet is a true copy taken from our records of material furnished us by the production mill or as obtained by additional laboratory tests

ENERGY PRODUCTS GROUP
Cedar and Meadow Streets, P. O. Box 359
Allentown, Pennsylvania 18105

by _____
QUALITY ASSURANCE MANAGER

1-SG-206-S001

RETENTION TIME

WEST JERSEY MANUFACTURING CO.

Williamstown, N.J.

OUR ORDER NUMBER 6029-A CUSTOMER'S ORDER NUMBER 2805-32

TEST RECORD OF SA105 Sec. III Class 2 STEEL

DATE January 17 19 78

FURNISHED Pullman Power Products

HEAT NO.	CHEMICAL ANALYSIS C	Mn	P	S	Si	Cr	Ni	Mo	ITEM	TENSILE STRENGTH, p.s.i.	YIELD POINT p.s.i.	ELONGATION % 2"	% REDUCTION OF AREA	TEST OR CODE NO.	REPRESENTS
L6010782	.24	.80	.006	.032	.19	.04	.09	.01	235	79,800	53,600	38.2	57.6	L6010782	20-6" 1500# Large Female Long WN flange per Sk.# 2805-6.

Heated to 1650°F, and he ½ hr. per inch of max. s removed from furnace and cooled in still air.

APPROVED BY Q. A. Date 2/1/78 By K.T.

BECHTEL 250

We certify that these flanges conform to the general conditions and restrictions of ASME SA1 Note: No non-destructive testing required.

ENG QAE

WEST JERSEY MANUFACTURING CO.

Joseph Walker

JOSEPH WALKER

RETENTION TIME 5 YRS.

RP-5316

1-SG-206-S001

MILL TEST CERTIFICATE

PITT GREEN CORPORATION
WELDING PRODUCTS DIVISION
PRINCETON, KY.

SOLD TO Pullman Power Products
Parsippany, NJ

SHIP TO

Direct Sale

OUR ORDER NO. PP-2[illegible]

DATE June 29, 1979
REVISED 11-9-79
REVISED 7-25-79

CUSTOMER'S ORDER NO.

DESCRIPTION OF FITTING	PHYSICAL PROPERTIES FITTING MATERIAL				CHEMICAL ANALYSIS									HEAT CODE OR HEAT NO.	SPECIFICATION FITTING MATERIAL
	HEAT TREATMENT	YIELD POINT P. S. I.	TENSILE STRENGTH P.S.I.	ELONG. IN 2" %	C	MN	P	S	SI						
ASME SA-155 Class 1 KCF-70															A-516 GR. 7
28" OD x 1.750" M/d x					(Ladle)										
8' 2-5/8" Length Pipe	A	47400	71700	#27.0	.20	1.06	.010	.009	.25					RDWH*	Item #6hA
	Transverse	Weld Tensile			(Check)										
		46500	73500*	#29.7	.21	1.05	.010	.010	.24						
RE# 7039A*															
RE# 7038A*	Full Size Charpy V-Notch @ Plus 40° Longitudinal Body & Orientation and location per														
RE# 7038B	Foot Lbs. - 98, 105, 82 Average = 95														NB-2322 and Para. 1,
RE# 7039B	% Shear - 90, 100, 90; Average = 93														
	Lateral Expansion - .07[illegible], .073, .070; Average = .071														
	Full Size Charpy V-Notch @ Minus 50° Longitudinal Body & Orientation and location per														
	Foot Lbs. - 47, 49, 46; Average = 47.3														NB-2322 and Para. 4
	% Shear - 20, 20, 20; Average = 20														
	Lateral Expansion - .03[illegible], .035, .030; Average = .033														

Weld repair preheat treated to 300°F. RE# 7038A, RE# 7039A.
Weld repair to be stress relieved upon installation. See Page 2 of 2 for location of weld repair. RE# 7038A, RE# 7039
The above pipe was manufactured and tested in strict compliance with ASME Section III, 1974 Edition,
Class 2 through the 1975 Summer Addenda.
Band Test: OK
The above pipe was hydro tested at 2800 lbs. PSI and found acceptable.
The above pipe was normalized for 2 hrs. at 1650 + 0 in accordance with Procedure #350-5.
The above pipe was radiographically examined in accordance with ASME Section I, PW-51 and found acceptable. Approved Procedure I-SP-181-10 and SS-158D or XTE-11.
*Standard round test specimen used for tensile properties.

Pullman Power Products
Parsippany, N.J.
Q.A. APPROVAL
By [illegible]
Date 8/7/80

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

SUBSCRIBED AND SWORN TO BEFORE ME

THIS _____ DAY OF _____ 19____

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

MAIN STEAM ISOLATION VALVE UNIT 1

A/D pg 31
P-1941

METALLURGICAL INSPECTION REPORT

NEWPORT NEWS SHIPBUILDING AND DRY DOCK COMPANY
NEWPORT NEWS, VIRGINIA
FORM 120-C

MATERIAL: CAST STEEL .505" Dia. Tensile | INSPECTION: Yard | DATE: May 9, 1979

HEAT NO.	Lab. NO.	NO. PCS.	ITEM	DWG.	CARBON	CHROME	MANG	NICKEL	MOLY	COPPER	SILICON	PHOS.	SUL.	SPECIFICATION ASME	Y.P. LBS./SQ.IN.	T.S. LBS./SQ.IN.	ELONG. %	R.A. %	COLD BEND
2416C2	2553-S	1	1	288901	.22	.19	1.23	.42	.11	.12	.37	.012	.006	SA-216. Gr. WCC, Cl. 2	54000	78200	28.0	63.5	●
						Impact (Casting Condition)													
				Sample No.		Temp. °F					Ft./Lbs.			Lat. Exp. Mils %	% Shear.				
				-1			+40		117		74		18.8	50					
				2			+40		122		74		18.8	50					
				3			+40		132		81		20.6	65					
						Additional Post Weld Heat Treatment													
				1			+40		130		73		18.5	50	52500	77350	32.0	68.8	
				2			+40		115		75		19.0	50					
				3			+40		115		69		17.5	75					●

REMARKS: Newport News Industrial Corporation J.O. 1326-N (NN J.O. 5058-A), Anchor-Darling Valve Company Customer Order No. P-1841, Anchor-Darling Pattern No. F-5089

	Date Cast	X-Ray No.	MT No.
1-Valve Body (BPV III QAE)	3-14-79	NN28895	302

R.W.H. Bachtel

A. E. Nace
MRC Supervisor, Laboratory Services

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

MAIN STEAM ISOLATION VALVE UNIT 1

Newport News Shipbuilding
4101 WASHINGTON AVE.
NEWPORT NEWS, VIRGINIA 23607

MATERIAL TEST REPORT

FOR Anchor Darling Valve Company DATE May 9, 1979 P.B98(1)

CUSTOMER P.O. NO. P-1841

NNS JOB ORDER NO. 5058-A NNI JOB ORDER NO. 1326-N

DESCRIPTION 28 x 24 x 28, 900 MSIV Body Casting

SERVICE DESIGNATION ASME Code, Sect. III, Class 2

DRAWING NO. 288901 REV. None PC NO. 1

HEAT NO. 5246C-2 SERIAL NO. (if required) NA

EFFECTIVE ASME BOILER AND PRESSURE VESSEL CODE SECTION III YR. 1977 ADDENDA Summer 1977

MATERIAL SPECIFICATION SA216 REV. 1977 w/Summer 1977 Addenda

MATERIAL GRADE WCC

Mfg. under QA program meeting ASME Code, Sect. III, ART. NCA 3800

FURNACE PROCESS Electric Furnace

HEAT TREATMENT CONDITION Normalized, Quenched, & Tempered* TEMP. See* TIME See*

HYDROSTATIC TEST PRESSURE NA

CHEMICAL ANALYSIS (values in maximum % or specific range)

ELEMENT	C	Mn	P	S	Si	Residual Elements-See
SPECIFICATION	0.25	1.28	0.04	0.045	0.60	Attached Metallurgical
ACTUAL	0.22	1.23	0.012	0.006	0.37	Inspection Report

MECHANICAL TESTS (all values minimum)

	TENSILE KSI	YIELD POINT KSI	% ELONGATION IN 2 INCHES	% REDUCTION IN AREA	Charpy Impact - See
SPECIFICATION	70 to 95	40	22.0	35.0	Attached Metallurgical
ACTUAL	78.2	54.0	28.0	63.5	Inspection Report

WELD REPAIRS (see attached sketch) Procedure NNI-19.2, Rev. A

WELDING MATERIAL IDENTIFICATION 5/32" and 3/16" E7018 Electrode

LOT IDENTIFICATION NO. for 5/32" is 77NNI607 IDENTIFICATION OF WELD REPAIR See T.R.Report

LOT IDENTIFICATION NO. for 3/16" is 90128Y001 IDENTIFICATION OF WELD REPAIR See T.R.Report

LOT IDENTIFICATION NO. _____ IDENTIFICATION OF WELD REPAIR _____

POST WELD REPAIR HEAT TREATMENT NNI-19.901, Rev. A TEMP. 1175°F ±25° TIME 3 hours

NDT PERFORMED RT Proc. N-540, Rev. A4, RSSS Proposed #84, Rev. A, MT Proc. N-320/420, Rev. C6

☐ UT ☒ MT ☐ PT ☒ RT RT No. NN 28895 MT No. 302

VISUAL INSPECTION STANDARD (if applicable) MSS-SP-55

* Designates analyses, tests, examinations or heat treatments which were not performed but were required by the material specification.

Explanation: NA

Designates conflicts between material specifications and code requirements.

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

CERTIFICATION

Newport News Shipbuilding certifies that all required tests of the material specified have been satisfactorily met, except as so noted, and that the data contained herein is correct and accurately compiled by appropriate inspection records on file in the company.

EPC 17 QAE

REVIEWED SECTION III N.G.

DATE 5-9-79

VENDOR QUALITY ASSURANCE

(1)

MAIN STEAM ISOLATION VALVE UNIT 1

RETENTION TIME LT YRS. MATERIAL CLASS 61414

R-12850

MATERIAL TEST REPORT SUPPLEMENT

Heat Treatment Requirement - J.O. 5058-A (1326-N)

Drawing No. 288901, Rev. None, Body Casting, Heat #5246C-2

Normalizing

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

Water Quench

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

Temper

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

The above heat treatments were performed in accordance with Procedure NNI-19.901, Rev. A.

R. T. Clark, Jr. 5-9-79
Manager of Quality Assurance

A.W.S. BECHTEL

EPC 17 QAE

A/D P.O.# P-1841

(2)

Form 4 MAIN STEAM ISOLATION VALVE UNIT 1

414

K1809

CUSTOMER: Anchor/Darling Valve Co. 701 First Street Williamsport, Pa. 17701 CUST. CODE 050	SHIP TO: Same MAIL FOR P.O.

PREPAID	COLLECT XX	VIA Truck		TERMS Net 30 days

CUSTOMER: Anchor/Darling Valve Co. - Pa.	SHIP DATE	D.F. ORDER NO. 2-06077 1-3

QUANTITY	C.O.	PATTERN NO.	CUSTOMER ORDER NO.
8		F-5091 (28"x24"x28" Bonnet)	P-1840

MFR. NO.	MOLDED	B/P NO.	UNIT WGT.	TOTAL WGT.		OPER.
		F-5091	4140	33120		25

ORD. EXTENDED	CUSTOMER SPECIFICATION	METAL	M.T. CODE	ROUTING CODE
9/27/78	SA216-WCC, VT-MSS-SP55, No weld	Spec.	C10	128

SALESMAN		TEST BARS
04		5 K.B.

BUYER

CUST. REQ. DEL.: Sample ASAP 2-10/30/78 Bal. 1 per month

INSTRUCTIONS: (2) 3 copies T.R. & Docu., Subm. 4 t/b heat (8) Melt & Lab use melt procedure MP 1.20, use 120 for gates, Charpy @ 40°F + 40 M.L.E., Arc air visual defects as per Dodge's no weld specification. No weld - Nucl., H.I. 2N&T, H.T. Chart req., PWHT 15 hrs. @1150°F, Subm. sample and obtain RT results before production

CERTIFICATIONS OF CHEMICAL & PHYSICAL TESTS – HEAT TREATMENT – N.D.E. TESTS

HEAT NO.	SERIAL NO'S.	QUANTITY IN HEAT	DATE POURED
4495	(AH-2665)	1	1/19/79

CHEMICAL ANALYSIS – MAT. SPEC. SA216 WCC

C	MN	SI	P	S	CR	NI	MO	AL	CU		
.16	.83	.49	.021	.015	.33	.27	.16	.037	.09		

WELD METAL CHEMICAL ANALYSIS — WELDING PROCEDURE NUMBER

Filler Metal Spec.	Lot Number	C	MN	SI	CR	NI	MO			Welder's I.D.

TENSILE PROPERTIES OF CASTING

T.S. P.S.I.	Y.P. P.S.I.	Y.S. P.S.I.	EL. %	R.A. %	BHN RANGE
71,900	55,600		26%	67.0	163

TENSILE PROPERTIES OF WELDING ELECTRODE

T.S. P.S.I.	Y.P. P.S.I.	Y.S. P.S.I.	EL. %	R.A. %	BHN RANGE

IMPACT TEST

TEMP 40 FO	1	2	3	AVG.
(FT. LBS.)	74	86	83	81
(M.L.E.)	65	82	74	74
SHEAR. %	70	90	80	80

BEND TEST

Specification

TYPE | DEG. | AGE | No.

RESULTS

CORROSION TEST

SPEC. | TYPE | TEMP. | RESULTS

Ferrite Content %

Measured by

HEAT TREATMENT

TYPE	TEMP. FO	TOT. HRS.	LOAD NO.	CHART AM.
HOMOGENIZE				
NORMALIZE	1650°A	7	3273	✓
NORMALIZE	1600°F	7 1/4	3275	✓
TEMPER	1250°F	7 1/4	3068	✓
WATER QUENCH				
OIL QUENCH				

Heat treat Procedure 48.05 dated 4/21/77 and 48.04 Rev. 1 - 6/15/78

PWHT TB 1150°F 15 ✓

REPORTS ATTACHED

N.D.E. SPECIFICATIONS	SER. No.	APP'D	DATE
VT PER MSS-SP55	2665	OK	1/79
MT-LPT PER			
RT PER			

REPORTS ATTACHED	
HEAT TREATMENT CHART	✓
RT FILM & READER & SHOOTING SKETCH	
WELD REPAIR MAP	REQUIRED
SNT-TC-1A CERTIFICATE	364
WELDING PROCEDURE - QUALIFICATION TEST	
WELDER'S QUALIFICATION TEST	

REMARKS:
Casting were manufactured in accordance with A/DV SPI PUR-2, Rev. B, ASME Section III, 1977 Edition including 1977 Summer Addenda

24562, 24563-25

SEE ATTACHED REPORT 1/4 ROUGH TESTBARS

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

William M Kusnik 2/1/79
Quality Assurance Date

DODGE FOUNDRY & MACHINE CO.
701 STATE ROAD, PHILA., PA. 19135

BEC 17 QAE

MAIN STEAM ISOLATION VALVE UNIT 1 LT YRS. 61-14P

P12730

Ramball Testlab

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

LABORATORY REPORT

Date: January 26, 1979
P.O.# M-2129

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

Heat # 4495, PO# P-1840
Material: ASME-SA-216, WCC

TENSILE TEST

Lab # 24582

YIELD STRENGTH	55,600 psi
TENSILE STRENGTH	71,900 psi
ELONGATION	36 %
REDUCTION OF AREA	67 %

0.505" diameter tensile specimen, 2" gauge length.

CHARPY IMPACT TEST

LAB #	FOOT POUNDS	MILS LATERAL EXPANSION	% SHEAR
24583	74	65	80
24584	86	82	90
24585	83	74	80
Average	81	74	83

1.0 cm x 1.0 cm Charpy Specimen.

The above test specimens were heat treated similar to production castings. The test bars only were given an additional stress relief heat treatment at 1150 degrees F for 15 hours. The Charpy V-Notch Impact Test was performed at +40 degrees F.

D. K. Ramball

Metallurgist

BECHTEL
364

BPC 17 CAE

MAIN STEAM ISOLATION VALVE UNIT 1

RETENTION TIME MONTHS

MAIN STEAM ISOLATION VALVE UNIT 1

10/2/78 Heat Treat Proc. 1007, rev. 1 (11/9/77)
Anchor/Darling Valve Co.
P-900-3-0.500-F190-Y
16" 24" 900 Disc Forgings for Dwg. C-10390
Forgings serialized #1 thru 50
Year 1978

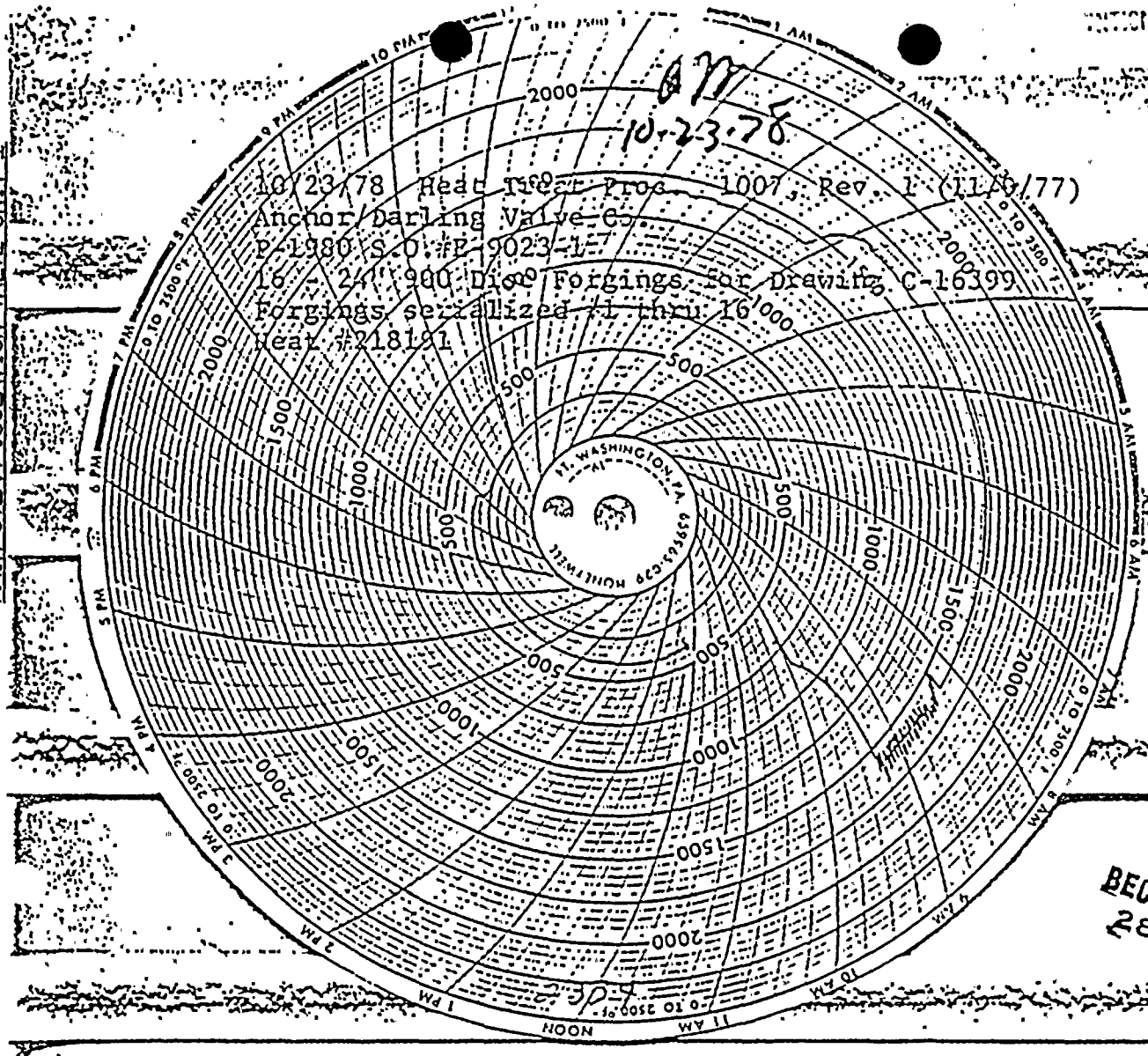
BECHTEL
284

BPC
QAE

MAIN STEAM ISOLATION VALVE UNIT 1

AM
10-23-78

10/23/78 Heat Treat Proc. 1007, Rev. 1 (11/10/77)
Anchor/Darling Valve Co.
P-1980 S.O. #P-9023-1-7
16" 2500# 900 Disc Forgings for Drawing C-16399
Forgings serialized #1 thru 16
Heat #218191



BECHTEL
284

BPC
17
OAE

MAIN STEAM ISOLATION VALVE UNIT 1

RETENTION TIME 17 YRS. MRR AD. NO. 61414

R1230

Form T-14

CANN & SAUL STEEL CO.

ROYERSFORD, PA. 19468

Report of Physical Tests and/or Chemical Compositions

Date 11/20/78

Customer ANCHOR/DARLING VALVE CO.

Address 701 FIRST ST. WILLIAMSPORT, PA. 17701

Customer's Order No. P-1930 S.O.#E-9023-1

Cann & Saul Order No. 49771

Attention PURCHASING DEPT.

CHEMICAL COMPOSITIONS

HEAT NO.	C	MN	P	S	SI	CR	NI	MO	CB		
218191	.23	.91	.009	.017	.21						

Lab. No.

PHYSICAL TESTS

CUT FROM	TEST NUMBER	GAUGE	YIELD PT. LBS.	YIELD PER Square In Lbs.	BROKE AT LBS.	ULTIMATE TENSILE LBS.	ELONG %	REDUCED AREA	Reduction %	B.H.N.
			YS	YS .2%						
Forging	49771 1	.505	11,600	58,000	18,000	90,000	29.0	.076	62.0	
Charpy Impacts - V" Notch		42 46	44 Mils Lat. Exp. @ +40°F							
		59 59	58 Ft. Lbs.							
		20 10	10 percent shear							

OTHER TESTS

BRINELL 167/174

We certify that the material meets the ASME Code, Section III, 1977 Edition thru 1977 summer Addenda.

Customer's Specifications: ASME SA105
CHARPY "V" IMPACT 40 MILS LAT. EXP. @ + 40°F

26/35 CARBON B.H.N. 187 MAX.

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

THE ABOVE TESTS COVER THE FOLLOWING MATERIAL:

16 - 24" 900 DISC FORGINGS FOR DRAWING C-16399 (14)
Forgings serialized #1 thru 16

BECHTEL 284

BECHTEL
ARIZONA, PUBLIC SERVICE & A/DV
Inspection

Inspector

11-22-78

CANN & SAUL STEEL CO.

Dept of Tests

BPC 17 QAE

MAIN STEAM ISOLATION VALVE UNIT 1 RETENTION TIME

NUTS Incorporated

R123

PHILADELPHIA
Routes 724 & 23
Phoenixville, Pennsylvania 19460
Phone: (215) 935-2330

CLEVELAND
24272 Detroit Road
Cleveland, Ohio 44145
Phone: (216) 835-0660

CERTIFICATE OF ANALYSIS AND TESTS 12/20/78

TO: Anchor/Darling Valve Company
701 First Street
Williamsport, Pa. 17701

YOUR ORDER # P-2225

DATE: Heavy Hex Nuts; ASME-SA-194, Grade 7, B & P.V. Code Section III 1977 Edition thru Winter 1977 Addenda with Impact Tests At -150°F.: Traceability

TYPE: Stamping "N2A"
P/N W-3199

DESCRIPTION OF MATERIAL AND SPECIFICATIONS 2"-8 (240 pcs.)

Heat No. 51262 7608

CHEMICAL ANALYSIS

Carbon	(C)	.40	Molybdenum	(Mo)	.18
Manganese	(Mn)	.90	Columbium	(Cb)	
Phosphorus	(P)	.010	Copper	(Cu)	
Sulfur	(S)	.022	Cobalt	(Co)	
Silicon	(Si)	.29	Tin	(Sn)	
Chromium	(Cr)	.99	Iron	(Fe)	
Nickel	(Ni)		Tungsten	(W)	

Impact Test Data attached

PHYSICAL ANALYSIS

Hardness: Rb
Rc 31/32
Brinell 284 BECHILL

Hardness after 24 hours @ 1100°F.: BHN 235

SPECIAL TESTS

Min. Tempering Temp.: 1100°F.

Subscribed and sworn to before me this
[illegible] day of [illegible] 19[illegible]

George W. Read, Jr., Notary Public
East Pikeland Township, Chester County
My Commission Expires June 23, 1980
Member, Pennsylvania Association of Notaries

QA 91

1-2-79

****** We Certify that the material used in the manufacture of this order is in accordance with the above specifications. ******

BY: John Wallace
V.P.Q.C.
DATE: 12/20/78

BPC 17 QAE

CERTIFICATE OF ANALYSIS AND TESTS

RECEPTION TIME MIN. NO.

MAIN STEAM ISOLATION VALVE UNIT 1

TO:

Anchor Darling Valve Company
701 First Street
Williamsport, PA 17701
Attn:G.Brubaker

DATE: Nov. 27, 1978

CUST. ORDER NO. P 2223

OUR ORDER NO. 2387

DESCRIPTION OF MATERIAL AND SPECIFICATIONS

1. Studs - ASME SA 193, Gr. B7:

Item 1: 2-1/4" - 8 x 13-3/4". W-4342. Trace AD.

2.

3. Material per ASME SECT. III, CLASS 2, 1977 Edition thru Winter 1977 Addendum.

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

CHEMICAL ANALYSIS

Manufacturer	Heat Number	Carbon	Manq.	Phos.	Sulphur	Silicon	Nickel	Chromium	Moly.	ITEM:
1.										
2. Republic 2-1/4"	8085368	.460	.92	.007	.026	.23		.96	.21	(1)
3.										
4.										

MECHANICAL PROPERTIES

Yield Lbs./Sq. In.	Tensile Strength Lbs./Sq. In.	Elongation % in	Reduction of Area %	Hardness	Bend Test ITEM.	TEMPERING TEMP.
1.						
2. 116,700	142,600	17.5	58.4	BHN 302/311	(1)	1100 F.
3.						
4.						

CHARPY IMPACT TEST — SPECIAL TESTS — Test. Temp. Plus 40 F.

SPECIMEN:	#1	#2	#3	REQ:		
1.						
2. Lateral Expan.	38	39	40	25 min.		
3.						
4.						

~~Sworn and Subscribed to before me this day of 19~~

QA 91 1-3-79

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

R. E. C. CORPORATION

BECHTEL 284

Lois A. Grieco

BPC 17 QAE

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

MAIN STEAM ISOLATION VALVE UNIT 1

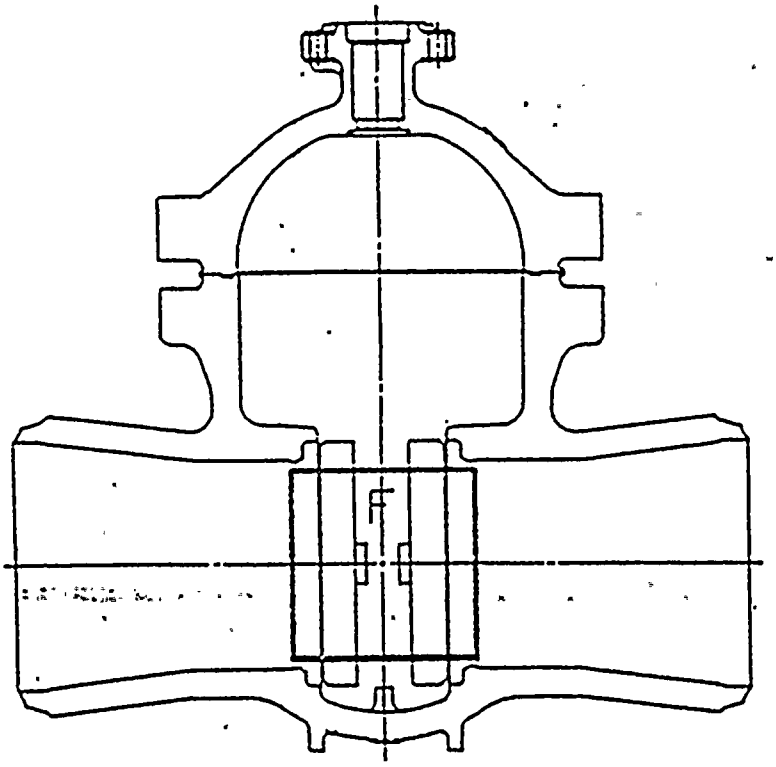
E9023-1-4 AD

RETENTION TIME MRR NO.

LT. YRS. 6 1414

R1273

MIN. DIMENSIONAL RECORD
MQCS-44



Record A & B after machining these areas.
Record C & D at Receiving.

Record E at Receiving Inspection.
Record F at completion of final machining.

Thoroughly scan the zones required and record only one dim. per zone.

The one recorded dim. shall be the min. thickness reading observed in that zone.

FOR USE ON DISCS ONLY:

Shop Order/Item E-9023-1

Heat/Serial No. HT-218191 S/N-14

Min. Dimension "F" Zone 3.840

Date & Stamp. QAEG Level III 2-20-79

BECHTEL
284

BPC 17 QAE

MQCS-44-3

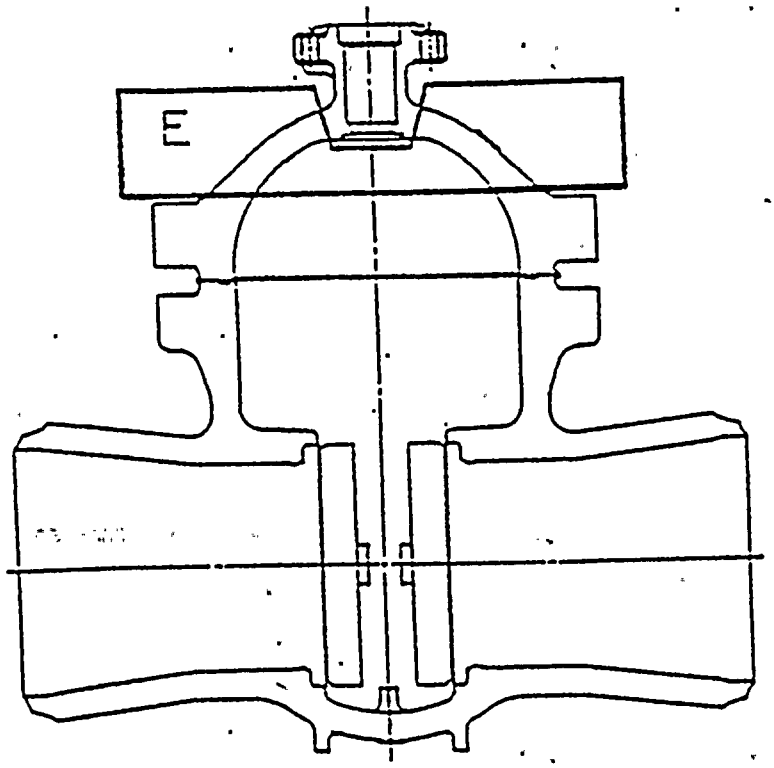
Fig. 3

MAIN STEAM ISOLATION VALVE UNIT 1

E9023-1-4 AD

RETENTION TIME LT YRS. 61414 MRR NO. R12730

MIN. DIMENSIONAL RECORD
MQCS-44



Record A & B after machining these areas.
Record C & D at Receiving.

Record E at Receiving Inspection.
Record F at completion of final machining.

Thoroughly scan the zones required and record only one dim. per zone.

The one recorded dim. shall be the min. thickness reading observed in that zone.

FOR USE ON BONNETS ONLY:

Shop Order/Item E9023-1-4

Heat/Serial No. HT-4495 S/N-K1809

Min. Dimension "E" Zone 2.906

Date & Stamp 5-3-79
QA 85
LEVEL II

BECHTEL
284

BPC 17 QAE

MQCS-44-2

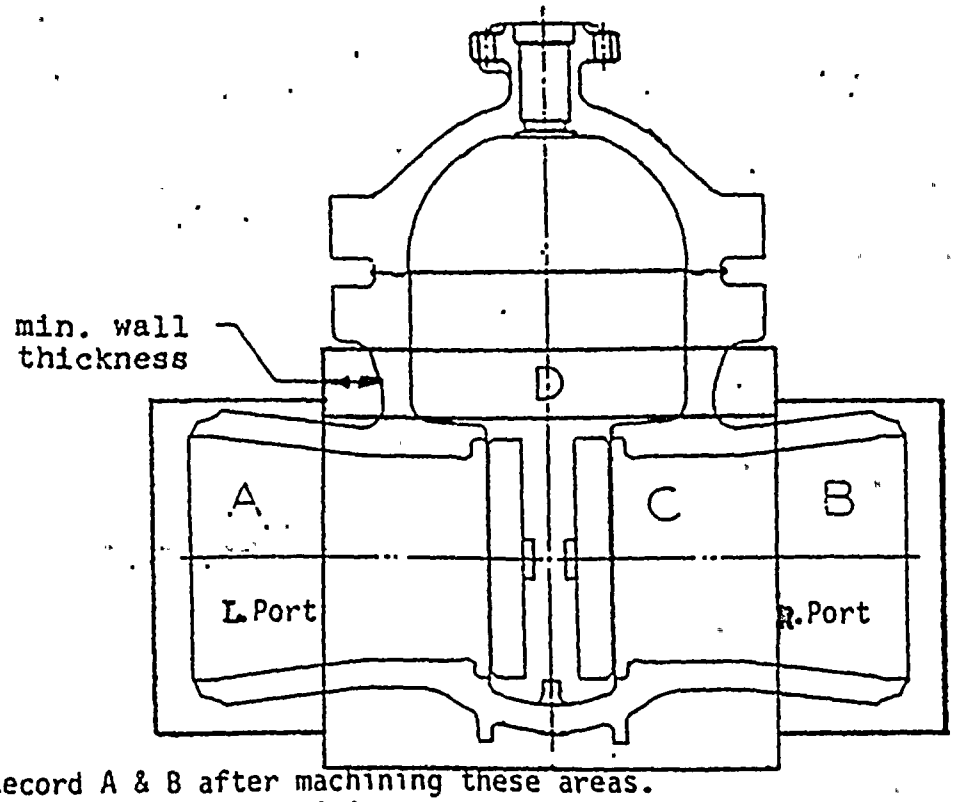
Fig. 2.

MAIN STEAM ISOLATION VALVE UNIT 1

RETENTION TIME LTR YRS. MRR NO. 61414

R1279

MIN. DIMENSIONAL RECORD
MQCS-44



Record A & B after machining these areas.
Record C & D at Receiving.

Record E at Receiving Inspection.
Record F at completion of final machining.

Thoroughly scan the zones required and record only one dim. per zone.

The one recorded dim. shall be the min. thickness reading observed in that zone.

FOR USE ON BODIES ONLY: 28"X24"X28"

Shop Order/Item E9023-1

Heat/Serial No. HT5246C2 S/N NN28895

Min. Dimension "A" Zone 3.300

Min. Dimension "B" Zone 3.300 Date & Stamp 6-14-79 QA 14 LEVEL II

Min. Dimension "C" Zone 3.060

Min. Dimension "D" Zone 2 13/16" Date & Stamp 6-14-79 QA 14 LEVEL II

MQCS-44-1

Fig. 1

BECHTEL 284

B&W QAE

MAIN FEEDWATER ISOLATION VALVE UNIT 1

CUSTOMER: Anchor/Darling Valve Co.
701 First Street
Williamsport, Pa. 17701

CUST. CODE: 050

SHIP TO: Same ✓

MARK FOR P.O.: K1814

MDR NO. TK 1314

PREPAID | COLLECT XX | VIA Truck | TERMS Net 30 days

CUSTOMER: Anchor/Darling Valve Co. - Pa.

SHIP DATE:

D.P. ORDER NO.: 1-06077 2-3

QUANTITY	C.O.	PATTERN NO.	CUSTOMER ORDER NO.
8		F-5078 (24x22x24 900# FWIV Body)	P-1840 See below

PAT. REQ.	MOLDS	B/P NO.	UNIT WGT.	TOTAL WGT.	OPER.
1	8	F-5078, Rev. A att.	6700	53600	25

ORD. ENTERED	CUSTOMER SPECIFICATION	METAL	H.T. CODE	ROUTING CODE
9/8/78	VT-MSS-SP55, No weld - Nucl. SA216 WCC	Spec.	C10	128

SALESMAN: 04

BUYER: Louden.

CUST. REQ. DEL.: 1 Sam. ASAP 2-10/30/78 Bal. 1 per month

INSTRUCTIONS:
(2) 3 copies T.R. & Docu., Subm. 4 rgh TB/heat
(8) Melt & Lab use Melt Procedure MP 1.20, use 120 for gates, Charpy @ 40°F +40 M.L.E. Arc air visual defects as per Dodge's no weld spec. No weld - Nuc H.T. 2N&T, H.T. Chart req. PWHT 15 hrs. @1150°F, Subm. sample and obtain RT results before prod.

TEST BARS: 5 K.B.

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

HEAT NO. 4218 | SERIAL NO'S. KK-2253 | QUANTITY IN HEAT 1 | DATE POURED 11/22/78

CHEMICAL ANALYSIS – MAT. SPEC. SA216 WCC

C	MN	SI	P	S	CR	NI	MO	AL	CU		
.18	.80	.43	.015	.016	.25	.26	.14	.062	.08		

WELD METAL CHEMICAL ANALYSIS | WELDING PROCEDURE NUMBER

Filler Metal Spec.	Lot Number	C	MN	SI	CR	NI	MO			Welder's I.D.

TENSILE PROPERTIES OF CASTING

T.S. P.S.I.	Y.P. P.S.I.	Y.S. P.S.I.	EL. %	R.A. %	BHN RANGE
76,400	54,100		32%	59.0	163

TENSILE PROPERTIES OF WELDING ELECTRODE

T.S. P.S.I.	Y.P. P.S.I.	Y.S. P.S.I.	EL. %	R.A. %	BHN RANGE

IMPACT TEST

TEMP. 40°F	1	2	3	AVG.
(FT. LBS.)	34	55	39	43
(M.L.E.)	40	49	41	43
SHEAR. %	40	40	50	43

BEND TEST: Specification | TYPE | DEG. | AGE | No. | RESULTS

CORROSION TEST: SPEC. | TYPE | TEMP. | RESULTS | Ferrite Content % | Measured by

HEAT TREATMENT

TYPE	TEMP. °F	TOT HRS.	LOAD NO	CHART ATT.
HOMOGENIZE				
NORMALIZE	1650°F	8	3097	✓
NORMALIZE	1600°F	8 1/4	3099	✓
TEMPER	1250°F	8	2966	✓
WATER QUENCH:				
OIL QUENCH				

Heat Treat Procedure 48.05 dated 4/21/77 and 48.04, Rev. 1 dated 6/15/78

PWHT TB 1150°F 15 ✓

N.D.E. SPECIFICATIONS

	SER. No.	APP'D	DATE
VT PER MSS-SP55	2253	OK	11/78
MT-LPT PER			
RT PER			

REPORTS ATTACHED
- HEAT TREATMENT CHART ✓
- RT FILM & READER & SHOOTING SKETCH
- WELD REPAIR MAP
- SNT-TC-1A CERTIFICATE
- WELDING PROCEDURE - QUALIFICATION TEST
- WELDER'S QUALIFICATION TEST

REMARKS:
Castings were manufactured in accordance with A/DV SPI PUR-2, Rev. B, ASME Section III, 1977 Edition including 1977 Summer Addenda 23612, 23678-80
SEE ATTACHED REPORT
RAMBALL TESTLAB
4 ROUGH TESTBARS
BECHTEL
454

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

Quality [illegible] 12/5/78 Date

DODGE FOUNDRY & MACHINE CO.
6501 STATE ROAD., PHILA., PA. 19135

MAIN FEEDWATER ISOLATION VALVE UNIT 1

6114

R1278D

Ramball Testlab

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

LABORATORY REPORT

Date: December 5, 1978
P.O.# M-2129

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

Heat # 4218, PO# P-1840
Material: ASME-SA-216, WCB

TENSILE TEST

Lab # 23612

YIELD STRENGTH	54,100 psi
TENSILE STRENGTH	76,400 psi
ELONGATION	32 %
REDUCTION OF AREA	59 %

0.505" diameter tensile specimen, 2" gauge length.

CHARPY IMPACT TEST

LAB #	FOOT POUNDS	MILS LATERAL EXPANSION	% SHEAR
23678	34	40	40
23679	55	49	40
23680	39	41	50
Average	43	43	43

1.0 cm x 1.0 cm Charpy Specimen.

The above test specimens were heat treated similar to production castings. The test bars only were given an additional stress relief heat treatment at 1150 degrees F for 15 hours. The Charpy V-Notch Impact Test was performed at +40 degrees F.

L. G. Ramball

Metallurgist

BECHTEL
454

FORM 2 MAIN FEEDWATER ISOLATION VALVE UNIT 1

CUSTOMER: Anchor/Darling Valve Co.
701 First Street
Williamsport, Pa. 17701

CUST. ORD. 050

SHIP TO: Same ✓ U.S.A. TK
K1823

MARK FOR P.O.

PREPAID	COLLECT XX	VIA Truck	TERMS Net 30 days

CUSTOMER	SHIP DATE	D.F. ORDER NO.
Anchor/Darling Valve Co. - Pa.	See Below	1-06077 3-3

QUANTITY	C.O.	PATTERN NO.	CUSTOMER ORDER NO.
8	1	F-5080 (24x22x24 900# FWIV Bonnet)	P-1840

PAT. PER	MOLDS	B/P NO.	UNIT WGT.	TOTAL WGT.	OPER.
1	8	F-5080 Rev. A att.	4050	32499	25

ORD. ENTERED	CUSTOMER SPECIFICATION	METAL	H.T. CODE	ROUTING CODE
9/8/78	VT-MSS-SP55, No weld - Nucl. SA216-WCC	Spec.	C10	128

SALESMAN	BUYER	CUST. REQ. DEL.
04	Louden.	1 samp.ASAP 2-10/30/78 Bal. 1 per month

INSTRUCTIONS
(2) 3 copies T.R. & Docu., Subm. 4 rgh TB/heat
(8) Melt & Lab use Melt Procedure MP 1.20, use 12u for gates, Charpy @40°F -40 M.L.E., Arc air visual defects as per Dodge's no weld spec. No weld - Nucl H.T. 2N&T, H.T.-Chart req. PWHT 15 hrs. @1150°F, Subm. sample and obtain RT results before prod.

TEST BARS: 5 K.B.

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

HEAT NO.	SERIAL NO'S.	QUANTITY IN HEAT	DATE POURED
4192	KD-2246	1	11/16/78

CHEMICAL ANALYSIS – MAT. SPEC. SA216-WCC

C	MN	SI	P	S	CR	NI	MO	AL	CU		
.16	1.00	.48	.019	.015	.37	.28	.12	.050	.09		

WELD METAL CHEMICAL ANALYSIS — WELDING PROCEDURE NUMBER

Filler Metal Spec.	Lot Number	C	MN	SI	CR	NI	MO			Welder's I.D.

TENSILE PROPERTIES OF CASTING

T.S. P.S.I.	Y.P. P.S.I.	Y.S. P.S.I.	EL. %	R.A. %	BHN RANGE
82,400	55,400		36%	64.0	170

TENSILE PROPERTIES OF WELDING ELECTRODE

T.S. P.S.I.	Y.P. P.S.I.	Y.S. P.S.I.	EL. %	R.A. %	BHN RANGE

IMPACT TEST	1	2	3	AVG.
TEMP. -40°F				
(FT. LBS.)	66	61	62	63
(M.L.E.)	56	56	54	55
SHEAR. %	80	80	80	80

BEND TEST: Specification | TYPE | DEG. | AGE | No. | RESULTS

CORROSION TEST: SPEC. | TYPE | TEMP. | RESULTS | Ferrite Content % | Measured by

HEAT TREATMENT

TYPE	TEMP. °F	TOT. HRS.	LOADING	CHART ATT.
HOMOGENIZE				
NORMALIZE	1650°F	5	3085	✓
NORMALIZE	1600°F	5	3087	✓
TEMPER	1250°F	5 3/4	2960	✓
WATER QUENCH				
OIL QUENCH				
Heat Treat Procedure 48.05 dated 4/21/77 and 48.04 Rev. 1 dated 6/15/78				
PWHT TB	1150°F	15		✓

N.D.E. SPECIFICATIONS	SCR. No.	APPD	DATE
VT PER MSS-SP55	2246	OK	11/78
MT-LPT PER			
RT PER			

REPORTS ATTACHED
- HEAT TREATMENT CHART ✓
- RT FILM & READER & SHOOTING SKETCH
- WELD REPAIR MAP
- SNT-TC 1A CERTIFICATE
- WELDING PROCEDURE - QUALIFICATION TEST
- WELDER'S QUALIFICATION TEST

REMARKS:
Castings were manufactured in accordance with ASME Section III, including NCA-3800 1977 Edition including 1977 Summer Addenda
22543, 22544-46
SEE ATTACHED REPORT
RAMBALL TESTLAB
4 ROUGH TESTBARS

BECHTEL
454

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

Quality Assurance — Date 11/30/78

DODGE FOUNDRY & MACHINE CO.
6501 STATE ROAD., PHILA., PA. 19135

BPC 17 QAE

MAIN FEEDWATER ISOLATI VALVE UNIT 1 17 YES 61414

R22(1)

Ramball Testlab

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

LABORATORY REPORT

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

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

Heat # (4192) PO# P-1840
Material: ASME-SA-216, WCC

TENSILE TEST

Lab # 23543

YIELD STRENGTH	55,400 psi
TENSILE STRENGTH	82,400 psi
ELONGATION	36 %
REDUCTION OF AREA	64 %

0.505" diameter tensile specimen, 2" gauge length.

CHARPY IMPACT TEST

LAB #	FOOT POUNDS	MILS LATERAL EXPANSION	% SHEAR
23544	66	56	80
23545	61	56	80
23546	62	54	80
Average	63	55	80

1.0 cm x 1.0 cm Charpy Specimen.

The above test specimens were heat treated similar to production castings. The test bars only were given an additional stress relief heat treatment at 1150 degrees F for 15 hours. The Charpy V-Notch Impact Test was performed at +40 degrees F.

Metallurgist

BECHTEL
454

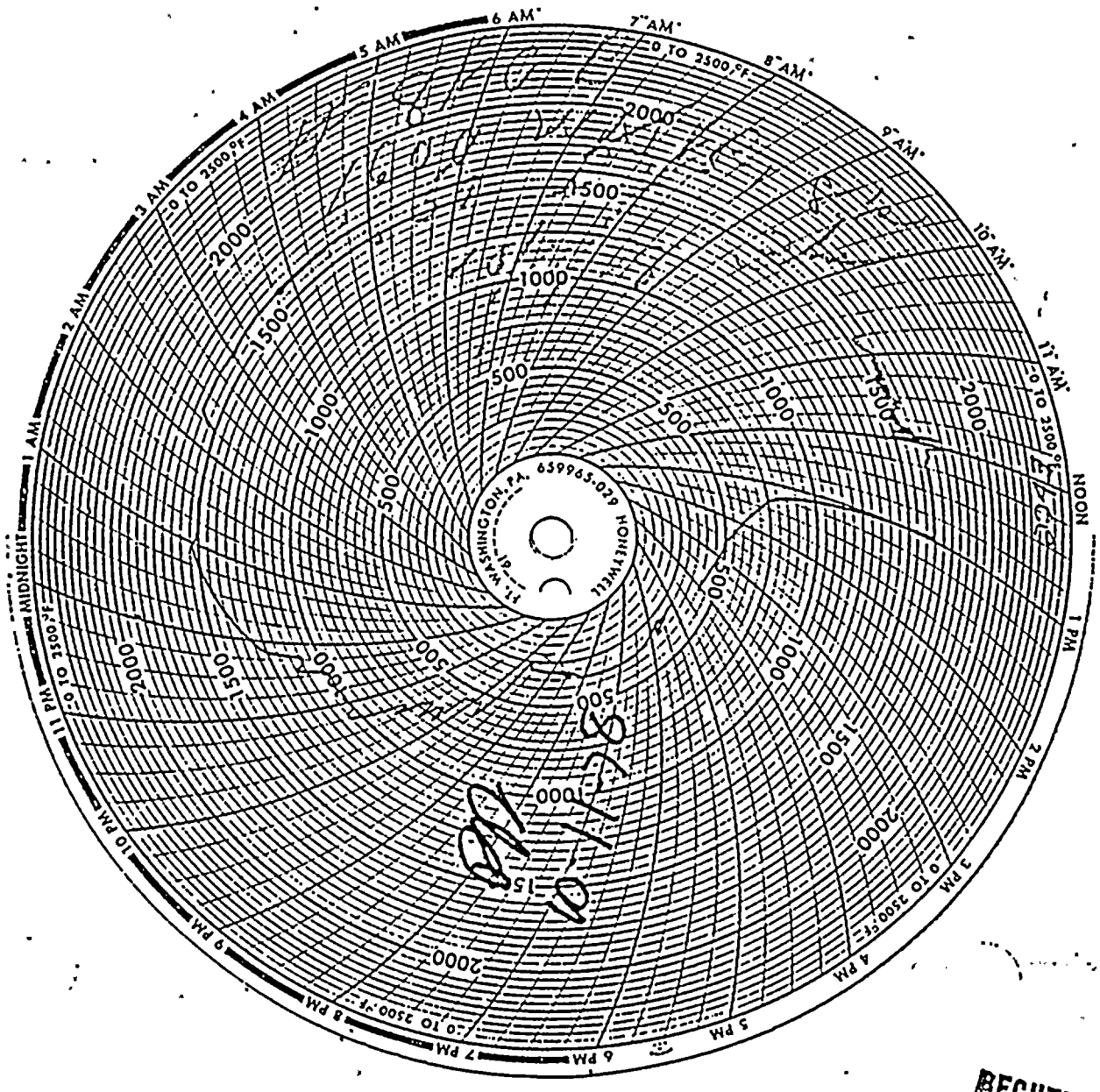
BDC 17 QAE

MAIN FEEDWATER ISOLATION VALVE UNIT 1

K12&9

RETENTION TIME | MRR NO.
TK
LT YRS. 61414

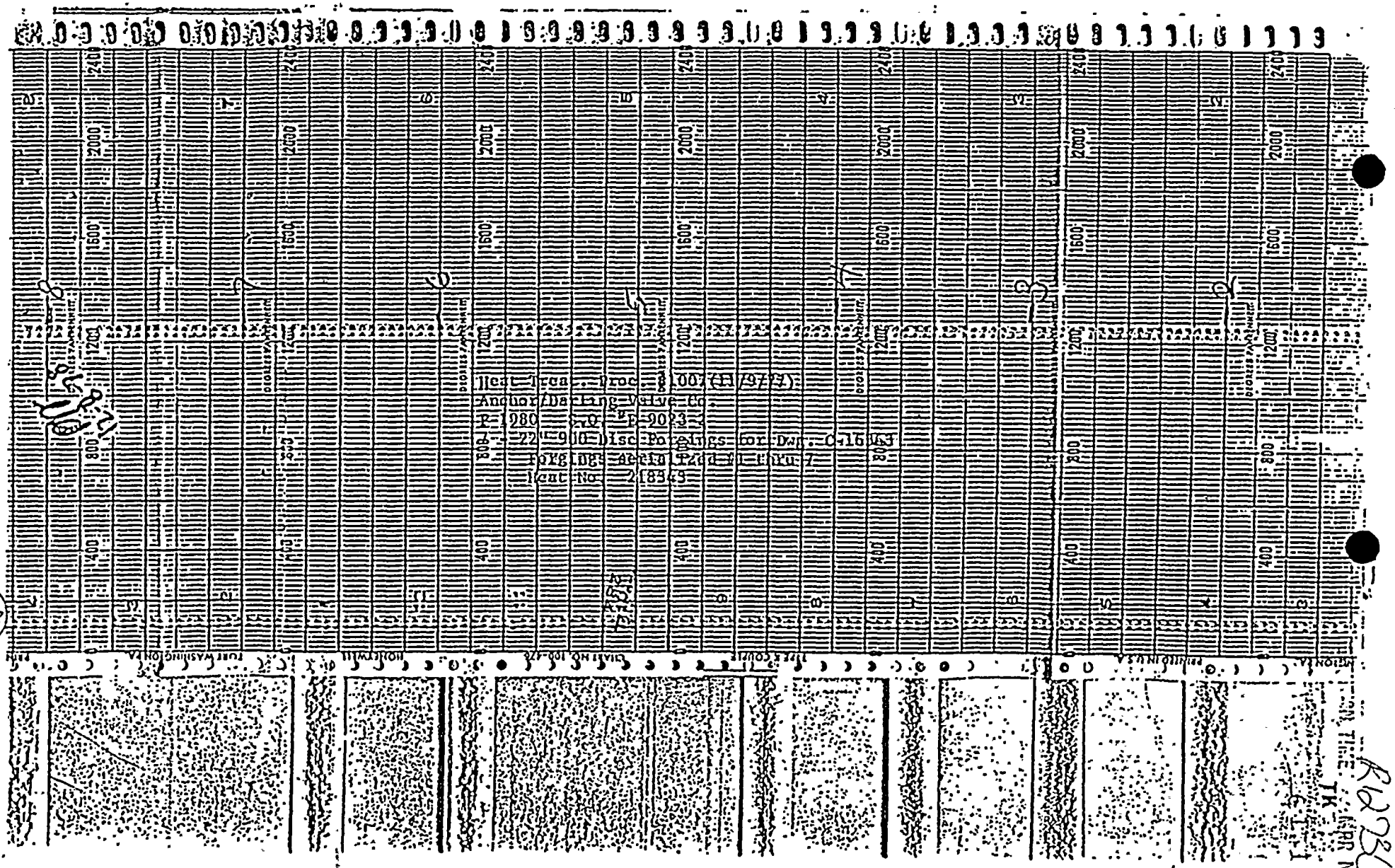
Heat Treat. Proc. #1007(11/9/77)
Anchor/Darling Valve Co.
P-1980 S.O. #E-9023-2
7 - 22" 900 Disc Forgings for Dwg. C-16363
Forgings serialized #1 thru 7 (5+6)
Heat No. 218343



BECHTEL
284

BPC 17 QAE

MAIN FEEDWATER ISOLATION VALVE UNIT 1



THIS AREA FOR REV. NO.

TK
RB / L

NUTS Incorporated

PHILADELPHIA
Routes 724 & 23
Phoenixville, Pennsylvania 19460
Phone: (215) 935-2330

CLEVELAND
24272 Detroit Road
Cleveland, Ohio 44145
Phone: (216) 835-0660

MAIN FEEDWATER ISOLATION VALVE UNIT 1

CERTIFICATE OF ANALYSIS AND TESTS 12/21/78

TO: Anchor/Darling Valve Company
701 First Street
Williamsport, Pa. 17701

YOUR ORDER # P-2225

DATE: Heavy Hex Nuts; ASME-SA-194, Grade 7 B & P.V.. Code Section III 1977 Edition thru Winter 1977 Addenda with Impact Tests @ -150°F. Traceability

TYPE: stamping "N1A"
P/N W-3288

DESCRIPTION OF MATERIAL AND SPECIFICATIONS 2 1/2-8 (162 pcs.)

Heat No. 87254

7608

CHEMICAL ANALYSIS

Carbon	(C)	.41	Molybdenum	(Mo)	.17
Manganese	(Mn)	.85	Columbium	(Cb)	
Phosphorus	(P)	.011	Copper	(Cu)	
Sulfur	(S)	.019	Cobalt	(Co)	
Silicon	(Si)	.28	Tin	(Sn)	
Chromium	(Cr)	.93	Iron	(Fe)	
Nickel	(Ni)		Tungsten	(W)	

Impact Test Data attached

BECHTEL
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PHYSICAL ANALYSIS

Hardness: Rb
Rc 27/28
Brinell

Hardness after 24 hours @ 1100°F.: BHN 255

SPECIAL TESTS

Min. Tempering Temp.: 1100°F.

Subscribed and sworn to before me this
[illegible] day of [illegible] 19[illegible]

George W. Reed, Jr., Notary Public
East Pikeland Township, Chester County
My Commission Expires June 23, 1980
Member, Pennsylvania Association of Notaries

QA 91

12-7-78

****** We Certify that the material used in the manufacture of this order is in accordance with above specifications. ******

BY: John Wallace
V.P.Q.C.
DATE: 12/21/78

RRC 12 QAE

CERTIFICATE OF ANALYSIS AND TESTS

MAIN FEEDWATER ISOLATION VALVE UNIT 1

RETENTION TIME TK MRR NO.

To:
Anchor Darling Valve Company
701 First Street
Williamsport, PA 17701
Attn:G.Brubaker

DATE LTRS. Nov. 27, 1978
CUST. ORDER NO. P 2223
OUR ORDER NO. 2387

61414

DESCRIPTION OF MATERIAL AND SPECIFICATIONS

1. Studs - ASME SA 193, Gr. B7:

Item 2 : 2-1/2" - 8 x 13-3/4". (W-3320) Trace (All)

2.

3. Material per ASME SECT. III, CLASS 2, 1977 Edition thru Winter 1977 Addendum.

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

CHEMICAL ANALYSIS

	Manufacturer	Heat Number	Carbon	Mang.	Phos.	Sulphur	Silicon	Nickel	Chromium	Moly.	ITEM
1.											
2.	Copperweld 2-1/2"	64931	.40	.97	.011	.019	.27		.99	.20	(2)
3.											
4.											

MECHANICAL PROPERTIES

	Yield Lbs./Sq. In.	Tensile Strength Lbs./Sq. In.	Elongation % in	Reduction of Area %	Hardness	Bend Test ITEM	TEMPERING TEMP.
1.							
2.	124,000	138,500	20.0	61.1	BHN 302	(2)	1100 F.
3.							
4.							

CHARPY IMPACT TEST — SPECIAL TESTS — Test. Temp. Plus 40 F.

SPECIMEN:	#1	#2	#3	REQ:		
1.						
2. Lateral Expan.	41	43	41	25 min.		BECHTEL 284
3.						
4.						

~~Sworn and Subscribed to before me~~
~~this day of~~

QA 81 1-3-79

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

R. E. C. CORPORATION

Lois A. Grieco

BPC 17 DATE

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

MAIN FEEDWATER ISOLATION VALVE UNIT 1

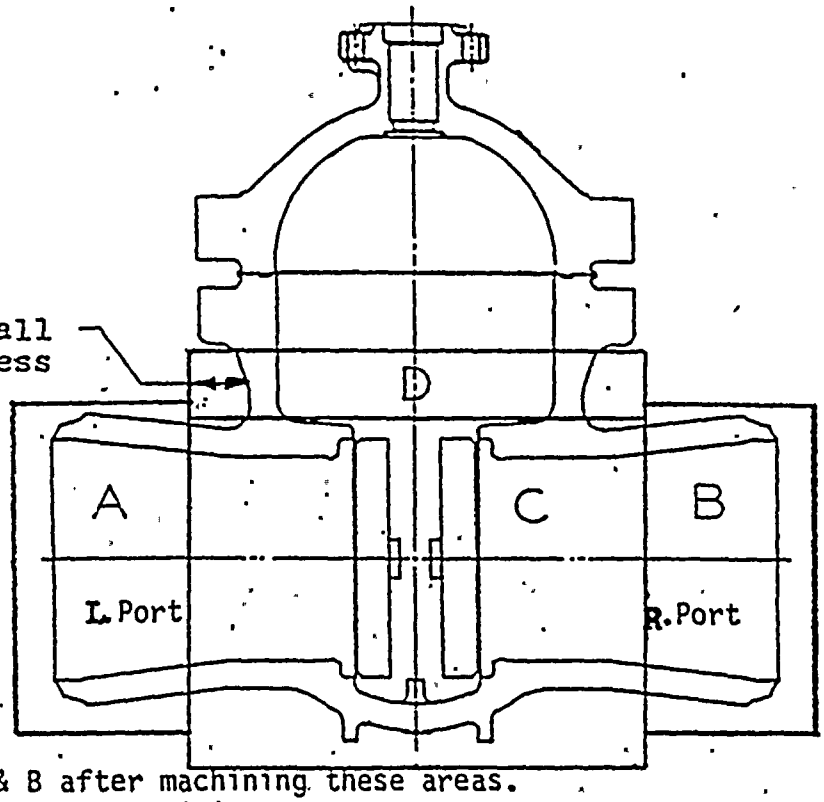
E9023-2-2
TK

RETENTION TIME MRR NO.

LT YRS. 6 1 4 1 4

R1373(1)

MIN. DIMENSIONAL RECORD
MQCS-44



Record A & B after machining these areas.
Record C & D at Receiving.

Record E at Receiving Inspection.
Record F at completion of final machining.

Thoroughly scan the zones required and record only one dim. per zone.

The one recorded dim. shall be the min. thickness reading observed in that zone.

FOR USE ON BODIES ONLY:

Shop Order/Item E9023-2-2

Heat/Serial No. HT-4218 S/N-K1814

Min. Dimension "A" Zone 3.050

Min. Dimension "B" Zone 3.040 Date & Stamp QA 83 LVL II APR 28 1979

Min. Dimension "C" Zone 2.670

Min. Dimension "D" Zone 2.750 Date & Stamp BECHTEL 284

AEA QA85 Level III 5-1-79

MQCS-44-1

Fig. 1

BPC IT QAE

E9023-2-2

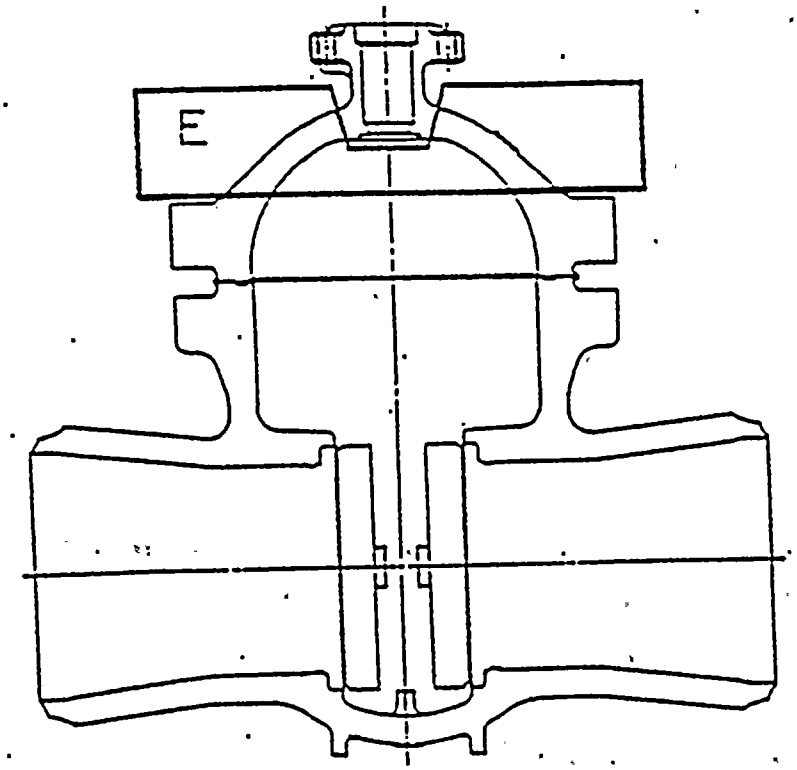
MAIN FEEDWATER ISOLATION VALVE UNIT 1

MIN. DIMENSIONAL RECORD
MQCS-44

RETENTION TIME TK MRR NO.

LT YRS. 6 1 4

P-1275C



Record A & B after machining these areas.
Record C & D at Receiving.

Record E at Receiving Inspection.
Record F at completion of final machining.

Thoroughly scan the zones required and record only one dim. per zone.

The one recorded dim. shall be the min. thickness reading observed in that zone.

FOR USE ON BONNETS ONLY:

Shop Order/Item E9023-2-2

Heat/Serial No. HT-4198 S/N-K1823.

Min. Dimension "E" Zone 2.390.

Date & Stamp QA 85 LEVEL II 3-7-79

BECHTEL 284

BPC 17 QAE

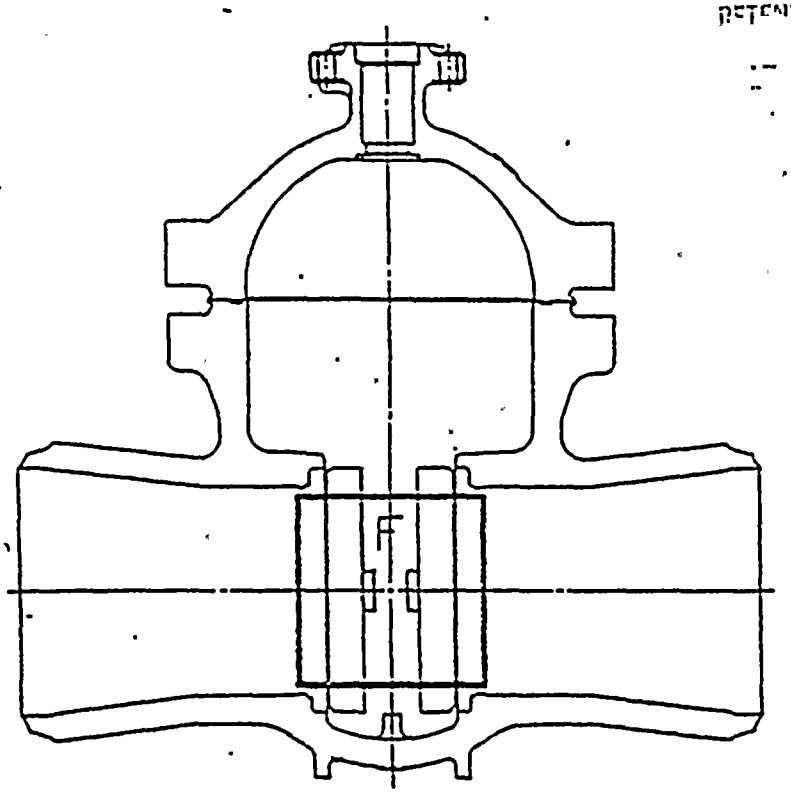
MQCS-44-2

Fig. 2.

MAIN FEEDWATER ISOLATION VALVE UNIT 1

MIN. DIMENSIONAL RECORD
MQCS-44

E9023-2-2
TK
RETENTION TIME MRR NO.
YRS. 61414
R1273(1)



Record A & B after machining these areas.
Record C & D at Receiving.

Record E at Receiving Inspection.
Record F at completion of final machining.

Thoroughly scan the zones required and record only one dim. per zone.

The one recorded dim. shall be the min. thickness reading observed in that zone.

FOR USE ON DISCS ONLY:

Shop Order/Item E-9023 - 2-7

Heat/Serial No. HT-218343 S/N-5

Min. Dimension "F" Zone 3.830

Date & Stamp QA Eng Level II 3-7-79

BECHTEL 284

BPC 17 QAE

Fig. 3

ATTACHMENT 2

ITEM	PENETRATION CAPS			MAIN STEAM & MAIN FEEDWATER FLUED HEAD PENETRATION				MAIN STEAM ISOLATION VALVE MAIN FEEDWATER ISOLATION VALVES	
	Pene.	Thickness	LSMT	Pene.	Thickness	LSMT	Pipe Size		
1. NRC Proposed LSMT.	1	1.5"	$53^{o}F$	1	5.5"	$53^{o}F$	28"	6 Valves: Various parts at various thickness.	UV-170
	2	1.5"		2	5.5"		28"		UV-180
	3	1.5"		3	5.5"		28"		UV-171
	4	1.5"		4	5.5"		28"		UV-181
	8	1.5"	$53^{o}F$	8	5.5"	$53^{o}F$	24"		UV-132
	10	1.5"		10	5.5"		24"		UV-137
2. Normal Operation	(See Item No. 5 below)			Flued heads for both main steam and main feedwater penetrations are at normal operating system fluid temperatures which are well above the proposed LSMT's.				(See Item No. 5 below)	
3. Maintenance and testing	(See Item No. 5 below)			Main Steam A. Hot Standby - For these conditions the flued head will be at system fluid temperatures which are greater than LSMT's. B. Cold Shutdown - (See Item No. 5 below)				Main Feedwater A. Hot Standby - The motor-driven startup auxiliary feedwater pump will be used for hot standby conditions. The warm feedwater will keep the flued head well above the LSMT. B. Cold Shutdown - (See Item No. 5 below)	(See Item No. 5 below)

ITEM	PENETRATION CAPS	MAIN STEAM & MAIN FEEDWATER FLUED HEAD PENETRATION		MAIN STEAM ISOLATION VALVE MAIN FEEDWATER ISOLATION VALVES
4. Postulated Accidents	(See Item No. 5 below)	A. For DBAs normal operating temperatures and pressures are assumed as initial conditions (see 2 above). B. For potential accident at other initial conditions (see 3 above)	A. For DBAs (see 4A for main steam) B. For other conditions (see 4B for main steam)	(See Item No. 5 below)
5. Remarks	A. The design of the penetration caps listed above has been reviewed and the current design shows that they are properly sized to fulfill their function; i.e., design thickness is more than sufficient to maintain containment function. B. However, it has been noted that to fulfill the same function the minimum required wall thickness is less than 1.5 inches. Under code requirements, material of this thickness need not be impact tested. Therefore, caps with a minimum required wall	A. For the Cold Shutdown condition, pipe break loads would not be induced on the main steam flued head. Therefore an analysis can be performed to determine the minimum required wall thickness. The thickness would be less than 5.5 inches. B. Pipebreak loads are the largest loads on the flued heads and are the controlling factors in establishing the flued head dimension. C. The limiting temperature condition on the flued head occurs during the hydrostatic	A. (See Item No. 5A for Main Steam) B. (See Item No. 5B for Main Steam)	A. MSIV's and MFIV's are similar to flued heads (see Item Nos. 5A and 5B under main steam and main under feedwater flued heads).

ITEM	PENETRATION CAPS	MAIN STEAM & MAIN FEEDWATER FLUED HEAD PENETRATION	MAIN STEAM ISOLATION VALVE MAIN FEEDWATER ISOLATION VALVES
5. Cont'd	thickness of approximately 1.5" will maintain containment function for all temperatures.	test of the steam generators. For this test, temperatures should be maintained above 60°F. This is a limiting condition under which the material of interest is called upon to provide a pressure boundary during the performance of the containment function.	