

DUKE POWER COMPANY

P.O. BOX 33189
CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

June 28, 1984

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

Attention: Ms. E. G. Adensam, Chief
Licensing Branch No. 4

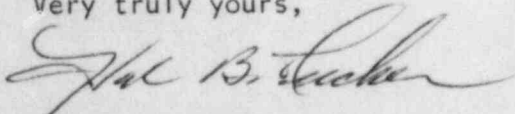
Re: Catawba Nuclear Station
Docket Nos. 50-413 and 50-414

Dear Mr. Denton:

Ms. E. G. Adensam's letter of June 18, 1984 transmitted a request for additional information in regards to compliance with GDC 51 "Fracture Prevention of Containment Pressure Boundary".

Attached is a response to that request.

Very truly yours,



Hal B. Tucker

ROS/rhs

Attachment

cc: (w/Enclosure 1 only)

Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

NRC Resident Inspector
Catawba Nuclear Station

Mr. Robert Guild, Esq.
Attorney-at-Law
P. O. Box 12097
Charleston, South Carolina 29412

Palmetto Alliance
2135½ Devine Street
Columbia, South Carolina 29205

Mr. Jesse L. Riley
Carolina Environmental Study Group
854 Henley Place
Charlotte, North Carolina 28207

8407030353 84062E
PDR ADOCK 05000413
A PDR

*13001
1/1
Limited
Dist*

CATAWBA NUCLEAR STATION
COMPLIANCE WITH GDC-51

Response to E. G. Adensam's Letter of June 18, 1984

Per the above referenced letter, the NRC Materials Engineering Branch (MTEB) concluded the information supplied in Enclosure 1 of Duke's May 23, 1984 submittal for compliance with GDC-51 was incomplete in that the following items were not provided:

- 1) The limiting materials by specification and location
- 2) The limiting environmental conditions under which the limiting materials are called upon to provide a pressure boundary during operating, maintenance, testing, and postulated accident conditions as cited by GDC-51
- 3) The limiting material test certifications to confirm their presence

In response to the above concerns, Duke submits the following:

The lowest service metal temperature is identified as the limiting temperature which will be experienced by the limiting materials of the containment pressure boundary when they are providing a pressure boundary during the performance of the containment function under operating, maintenance, testing and postulated accident conditions, as cited by GDC-51. Pressure retaining integrity of the limiting materials does not apply during maintenance and testing operations, since the Equipment Hatch is normally open. The limiting materials (those with a Permissible Lowest Service Metal Temperature (PLSMT) of 107°F) are described as follows:

- 1) Main Steam and Feedwater Penetration Flued Heads - SA 105; annealed, 2" design axial thickness (see Attachment 1 - June 23, 1983 letter by D. L. Caldwell). NUREG-0577, Table 4.4 assigns a (NDT + 1.3T) NDT of 67°F/77°F to this material. Given the 5½" design axial thickness, the Summer 1977 Addenda Class 2 rules would assign a PLSMT of 125°F/135°F to the material. However, Duke's analysis states the flued heads are part of a floating penetration assembly, which would require a < 2" axial thickness under the limiting condition. Given a 2" axial thickness, the Summer 1977 addenda Class 2 rules would assign a PLSMT of 107°F. The LSMT of this material is above 107°F and therefore meets the requirements of GDC 51.
- 2) Main Steam Penetration Process Pipe - SA 106 Grade C; 1.510" min. wall. NUREG-0577, Table 4.4 assigns a (NDT + 1.3T) NDT of 77°F. Summer Addenda Class 2 rules assign a PLSMT of 107°F. The LSMT of this material is above 107°F and therefore meets the requirements of GDC-51.
- 3) Main Steam Process Pipe - SA 106 Grade C; 31.438" ID x 1.75" min. wall and 31.438" ID x 1.375" min. wall. NUREG-0577, Table 4.4 would assign a (NDT + 1.3T) NDT of 67°F/77°F to this material. Summer 1977 Addenda Class 2 rules would assign a PLSMT of 97°F/107°F to the material. The LSMT is above this temperature and therefore meets the requirements of GDC-51.

- 4) Main Steam Process Pipe Fittings - SA 234; WPC (SA 106 Grade C) 31.625" ID x 1.75" min wall, 31.625" ID x 1.375" min wall, and 31.5" ID x 2.375" min. wall. NUREG-0577, Table 4.4 would assign a (NDT + 1.3T) NDT of 67°F to this material. Summer 1977 Addenda Class 2 rules would assign a PLSMT 97°F/107°F to this material. The LSMT is above this temperature and therefore meets the requirements of GDC-51.

From the above analysis, Duke concludes that the limiting materials identified above each have limiting environmental conditions which are not below the PLSMT of 107°F when called upon to provide a pressure boundary.

In addition, the requested CMTRs of the limiting materials are found in Attachments 2 and 3.

Attachment 3

CMTR's for Process Piping

→ CN-SA-83-438

June 23, 1983

C. C. Rolfe

Attention: T. A. Ford

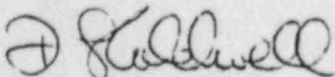
Re: Catawba Unit 1
Main Steam and Feedwater Penetrations
GDC-51
File: CN-1206.02-58

This letter is in response to questions raised by the NRC concerning the design thickness of the Main Steam and Feedwater Systems Flued Heads.

These flued heads are a part of floating penetration assemblies. The penetrations are not anchored to the Reactor Building shell wall but "float" on bellows assemblies on both sides of the wall. Because of this arrangement, the only significant loads on the flued head will be due to pressure in the event of a pipebreak.

The longitudinal thickness of the Main Steam Flued Head is 5½". The longitudinal thickness of the Feedwater Flued Head is 4". The required thickness of the Main Steam Flued Head and the Feedwater Flued Head is less than 2" thick.

Please call J. D. Duncan at 6246 if you have questions.



D. L. Caldwell
Supervising Design Engineer

JDD/eam

cc: R. W. Bonsall
S. S. Lefler
W. R. Selden

FORM 402

(2)

DATE REC'D <u>1/2/75</u>		ASSOCIATED PIPING & ENGINEERING CORP.		SHEET 1 OF 9			
DATE REQ'D <u>PER "MESS"</u>		PRODUCTION TRAVELER		REVISION 0			
		1974 EDITION THRU SUMMER '74 ADDENDA					
S.S./DWG#	<u>D-23503</u>	PC.MK/S/N#	<u>1-M113</u>	APPL. ASME CODE: SECTION III	CLASS: 2 ASME S/N: H-6854		
CUSTOMER: <u>DUKE POWER COMPANY</u>		DESCRIPTION: TYPE I		CUST. DWG# <u>CH-1678-1</u>			
PROJECT: <u>STATION: CATAWBA-1</u>		PROCESS PIPE SUB-ASSEMBLY		CUST. SPEC# <u>CNS-1206.00-3.0</u>			
JOB # <u>T-5191</u>		OPERATION: ACCUMULATION OF MATERIAL		CUST. P.O.# <u>C-22523</u>			
CODE INSP: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> NOTICE IN ADVANCE N/A HOURS			SOURCE INSP: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> NOTICE IN ADVANCE 120 HOURS				
DEPT.	OPR. NO.	OPERATION DESCRIPTION	DATE	OPR.	Q.C. ACC.	SOURCE INSP.	CODE INSP.
PR	M1.0	ITEM-1, FLUED HEAD 50" x 40" x 34".	5-3-77	99			
QC	M1.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER.	5-4-77		99		
PR	M2.0	ITEM-2, PROCESS PIPE 31.250" I.D. x 1.510" MIN. WL.	5-3-77	99			
QC	M2.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER. 255194	5-4-77		99		
PR	M3.0	ITEM-3, GUARD PIPE 36.750" I.D. x 1.625" MIN. WL.	5-3-77	99			
QC	M3.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER. 25536	5-4-77		99		
PR	M4.0	ITEM-4, INSULATION.					
QC	M4.1	VERIFY MATERIAL CONFORMANCE.					
PR	M5.0	ITEM-5, END COVER, .020" THK.	5-3-77	99			
QC	M5.1	VERIFY CERTIFIED MATERIAL TEST REPORT.	5-4-77		99		
PR	M6.0	ITEM-6, COVER, .020" THK.	5-3-77	99			
QC	M6.1	VERIFY CERTIFIED MATERIAL TEST REPORT.	5-4-77		99		
REVISION APPROVAL		RECEIVED					
<i>[Signature]</i> 4/27/77		<i>[Signature]</i> 4/27/77		<i>[Signature]</i> PROJECT ENGINEER			
Q.C. MANAGER APPROVAL		TEMP FILE		AUTHORIZED INSPECTOR REVIEW			

ARMCO STEEL CORPORATION

MACHINERY & EQUIPMENT DIVISION

CK-524
J-5191-T

STATION: CATAWBA 1-2
DP CO. ITEM NO.: 1206.00-3:1
MPS CO-ORDER NO. C-12523



CHECKED
8-5-76
AM

ADDRESS REPLY TO
1524 BORDER AVENUE
TORRANCE, CALIF. 90509

CERTIFICATE OF COMPLIANCE

Customer Associated Piping & Engrg. P.O. No. 42249 - 5 item 1
Heat No. 522370-B2 Armco Order No. 28287-2
Part No. H-6861 Item No. _____
Part Name (1) Flued Head 54 x 40 x 34 APN NO. 613

Armco Steel Corporation certifies that the material covered by this certification was manufactured in accordance with the requirements of the purchase order. In addition, we certify that the material has been tested and that the results conform to the requirements of the specifications listed below.

Applicable Documents:

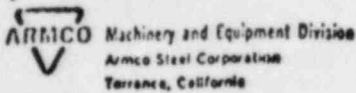
1. ASME Boiler and Pressure Vessel Code, Section III, Subsection NC, 1974 Edition including Summer 1974 Addenda.
2. ASME-SA-105, ASME Boiler and Pressure Vessel Code, Section II, 1974 Edition including Summer 1974 Addenda,
3. Duke Power Specification CNS-1206.00-3.0.

DUKE POWER COMPANY
QA RECORDS APPROVED
J. L. Jones
QA REPRESENTATIVE
DATE 5/10/77

APPROVED
AP & E
QC. DEPT.
DATE 8/11/76
SIGNED J. P. Adams

J. A. Visher

Title Quality Assurance Analyst
Date July 29, 1976



LABORATORY REPORT

CUSTOMER Associated Piping & Engrg. Corp.

CUSTOMER'S PURCHASE ORDER NO. 42240

NSCO SALES REGISTER NO. IPN-28287 -2

SPECIFICATION NO. ASME-SA-105

DATE 7-29-76 BY J. A. Vehce

PART NAME (1) Flued Head (54 x 40 x 34)

APN No. 613
PART NO. H-6861

CUSTOMER'S DRG. NO. _____

NSCO DRG. NO. 151066-10

COUPON IDENTIFICATION	TENSILE TEST					HARDNESS		IMPACT TEST	
	LONGITUDINAL		ULTIMATE STRENGTH P.S.I.	TRANSVERSE		BRINELL	ROCKWELL	LONG.	TRANS.
	PL. JOG STRESS P.S.I.	YIELD STRENGTH P.S.I.		ELONG. %	REDUCT. %			1700 FT. LBS.	CHARPY FT. LBS.
<u>522370-B2</u>	54,100 ✓		82,200 ✓	27.0 ✓	54.5 ✓				
HEAT TREATMENT <u>Anneal</u> 1600°F (21 Hrs.) Furnace Cool. STATION: CATAWBA 1-2 DP CO. ITEM NO.: 1206.00-3.1 MPS CO. ORDER NO. C-12523					TEST LOCATION The above test results were obtained from a forged test coupon that was heat treated with the part.				
REQUIRED	36,000		70,000	22.0	30.0				

APPROVED
AP & E
QC. DEPT.
DATE 8/1/76
SIGNED J. A. Vehce

HEAT NO.	CHEMICAL ANALYSIS										A. S. T. GRAIN S
	C.	MN.	SI.	P.	S.	CR.	VA.	NI.	MO.		
<u>522370</u>	.25 ✓	.95 ✓	.27 ✓	.018 ✓	.017 ✓						
REQUIRED	MAX. .35	1.05	.35	.04	.05						
	MIN. .22	.60									

The chemical, physical, or mechanical tests reported above are correct as contained in the records of the Corporation.
ARMCO STEEL CORPORATION
J. A. Vehce
James A. Vehce

CK-031
030

CERTIFICATE OF TEST ON PIPE MATERIAL

Cameron

IRON WORKS, INC.

P. O. BOX 1212
HOUSTON, TEXAS 77002

SOLD TO
ASSOCIATED PIPING & ENGINEERING CORP.
P. O. BOX 43
COMPTON, CA 90220

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

Date 23 April 1975

Customer Order No. 42939 Item 2 C.I.W. Sales Order No. F-5565 Specification ASME-SA106-GR. C AND ASME-SECTION III THRU SUMMER 1974 ADDENDA, CLASS 2 COMPONENTS.

Description of Material O.D. _____ I.D. 31.250" WALL 1.510" M.W.

C.I.W. Part No. 86-5565-345-312

Heat No.	Location or Serial No.	CHEMICAL ANALYSIS							
		C	MN	P	S	SI	CR	NI	MO
L 2463		.25	1.00	.011	.018	.21	CK-031		
L 2743		.24	.94	.012	.008	.26	CK-030		

APPROVED
AP&E
Q.C. DEPT.

DATE 6/1/75
SIGNED J. J. Giviere

J-5191-T

Quantity or Serial No.	Heat No.	Test Lot#	Tensile PSI	.2% Offset Yield PSI	MECHANICAL PROPERTIES			Macro Etch	Bend Test	Flattening Test	Bar Size	Test Loc.
					% Elong. In. 2"	% Red. Area						
6	L 2743	#013	77,400	53,100	30.6	57.8			OK	.505	Trans.	
1	L 2463	022	80,200	56,200	28.0	53.7			OK	.500	Trans.	

Forg. Ser. #	Test Lot#	Heat#	V-Notch Charpy Impact Test at 20°F.			
			Test Lot#	Ft. Lbs.	Lat. Exp.	D/F%
#25517Y	013	L 2743	#013	93.0	.068	59%
25517Z	"	"	"	82.0	.060	54%
25518Y	"	"	"	79.0	.060	55%
25518Z	"	"	#022	87.0	.063	66%
25519Y	"	"	"	77.0	.059	69%
25519Z	"	"	"	80.0	.059	65%
25520Z	022	L 2463				

STATION: CATAWBA 1-2
DP CO. ITEM NO.: 1206.00-3.1
MPS CQ. ORDER NO. C-12523

DUKE POWER COMPANY
QA RECORDS APPROVED
J. J. Giviere
DATE 5/13/77

Hydrostatic Test Each length of pipe hydrostatically tested at 2100 psi for pressure and sound acceptance.

Heat Treatment:
1700°F., held 2 hrs. at temp. Air Cooled.
1575°F., held 1 hr. at temp. Air Cooled.

Subscribed and Sworn to before me this
23rd Day of April 1976
[Signature]
Notary Public
C. A. TOUCHTON

I certify these tests to be correct as contained in the records of the company.
[Signature]
Metallurgical Representative
M. O. WRIGHT

Notary Public in and for Harris County, Texas
CAMERON Quality Commission Expires June 1, 1978

CERTIFICATE OF TEST ON PIPE MATERIAL

Camelton

IRON WORKS, INC.

P. O. BOX 1212

HOUSTON, TEXAS 77001

ASSOCIATED PIPING & ENGINEERING CORP.
P. O. BOX 4309
COMPTON, CA 90220

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

Date 28 April 1976

Customer Order No. 42939 *item 1* C.I.W. Sales Order No. F-5564 ASME-SA106 Gr. C and ^{ASME}Section III Thru Summary 1974 Addenda, Class 2 Components

Description of Material: S.D. _____ I.D. 36.750" WALL 1.625" U.V.

C.I.W. Part No. 86-5564-403-368

Heat No.	Location or Serial No.	CHEMICAL ANALYSIS							
		C	MN	P	S	SI	CR	NI	MO
L 2772		.23	.99	.009	.017	.24			
L 2773		.25	.92	.007	.012	.24			

J-5191-T
132

STATION: CATAWBA I-2
DP CO. ITEM NO.: I206.00-3.1
MPS CO. ORDER NO. C-12523

Quantity or Serial No.	Heat No.	Test Loc.	Tensile PSI	.2% Offset Yield PSI	MECHANICAL PROPERTIES			Specimen Size	Test Lot#
					% Elong.	% Red. Area	Impact Test		
4	L 2772	Trans.	74,900	46,900	28.7	56.0	OK	.505	037
	L 2772	Trans.	74,900	48,900	29.5	56.8	OK	.505	039
3	L 2773	Trans.	74,900	50,900	28.5	56.5	OK	.505	039

V-Notch Impact Test at 20°F.:

Heat#	Test Lot#	Ft.Lbs.	Ductile Fracture	Lateral expansion
CK-028	L 2772	037	47.5	50%
			62.0	60
			60.5	90
039	L 2772	039	66.0	45
			64.0	65
			57.5	55
CK-029	L 2773	039	59.0	60
			69.0	60
			66.0	60

APPROVE
AP & E
Q.C. DEPT.
DATE 6/2/76
SIGNED [Signature]

Forg. Ser. #	Heat#	Test Lot#	Forg. Ser. #	Heat#	Test Lot#
25533	L 2772	037	25538	L 2773	039
25534	L 2772	037	25539	L 2773	039
25536	L 2772	037	25540	L 2773	039
25537	L 2772	039			

Hydrostatic Test: Each length of pipe hydrostatically tested at 2000 psi for 5 sec. and found acceptable.

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

Subscriber and Owner to before me on this 28th Day of April 1976

[Signature]
G. A. TOUCHTON

DUKE POWER COMPANY
QA RECORDS APPROVED
[Signature]
QA REPRESENTATIVE
DATE 5/13/77

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

[Signature]
O. WRIGHT, 1976

(8)

ASSOCIATED PIPING & ENGINEERING CORP PRODUCTION

SHEET 1 OF 9
REVISION 0

DATE REC'D 1/2/75
DATE REQ'D PER "MFS"

1974 EDITION THRU SUMMER '74 ADDENDA

CLASS: 2 ASME S/N: H-6858

S.S./DWG# D-23755 PC.MK/S/N# 2-M113

APPL. ASME CODE: SECTION III

CUST. DWG# CN-1678-1

CUSTOMER: DUKE POWER COMPANY
PROJECT: STATION: CATAWBA-2
JOB # T-5191

DESCRIPTION: TYPE I
PROCESS PIPE SUB-ASSEMBLY
OPERATION: ACCUMULATION OF MATERIAL

CUST. SPEC# CNS-1206.00-3.0
CUST. P.O.# C-12523

CODE INSP: YES NO NOTICE IN ADVANCE N/A HOURS
SOURCE INSP: YES NO NOTICE IN ADVANCE 120 HOURS

DEPT.	OPR. NO.	OPERATION DESCRIPTION	DATE	OPR.	Q.C. ACC.	SOURCE INSP.	CGDE INSP.
PR	M1.0	ITEM-1, FLUED HEAD 50" x 40" x 34".	5-3-77	PP			
QC	M1.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER.	5-4-77		01		
PR	M2.0	ITEM-2, PROCESS PIPE 31.250" I.D. x 1.510" MIN. WL.	5-3-77	PP			
QC	M2.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER.	5-4-77		01		
PR	M3.0	ITEM-3, GUARD PIPE 36.750" I.D. x 1.625" MIN. WL.	5-3-77	PP			
QC	M3.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER.	5-4-77		01		
PR	M4.0	ITEM-4, INSULATION.					
QC	M4.1	VERIFY MATERIAL CONFORMANCE.					
PR	M5.0	ITEM-5, END COVER, .020" THK.	5-3-77	PP			
QC	M5.1	VERIFY CERTIFIED MATERIAL TEST REPORT.	5-4-77		01		
PR	M6.0	ITEM-6, COVER, .020" THK.	5-3-77	PP			
QC	M6.1	VERIFY CERTIFIED MATERIAL TEST REPORT.	5-4-77		01		

REVISION APPROVAL

4/27/77
2.8. MANAGER APPROVAL

RECEIVED

APR 29 1977

4/27/77
AUTHORIZED INSPECTOR REVIEW

Golden Helen Taylor
PROJECT ENGINEER

RETURN TO QUALITY CONTROL CHIEF INSPECTOR

ARMCO STEEL CORPORATION

MACHINERY & EQUIPMENT DIVISION

MATERIAL CODE CP-024
JOB NO. OR ACCT. NO. 5191



ADDRESS REPLY TO
1824 BORDER AVENUE
TORRANCE, CALIF. 90508

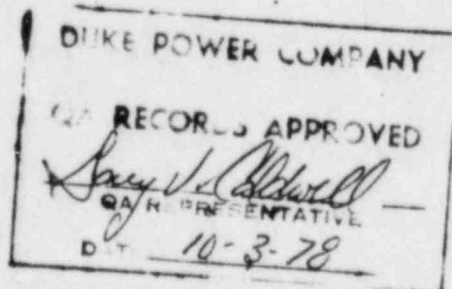
CERTIFICATE OF COMPLIANCE

Customer Associated Piping & Engrg. P.O. No. 42249 *item 1*
Heat No. 522369-B1 Armco Order No. 28287-2
Part No. H-6858 Item No. _____
Part Name (1) Flued Head APN NO. 610

Armco Steel Corporation certifies that the material covered by this certification was manufactured in accordance with the requirements of the purchase order. In addition, we certify that the material has been tested and that the results conform to the requirements of the specifications listed below, except for attached approved deviation.

Applicable Documents:

1. ASME Boiler and Pressure Vessel Code, Section III, Subsection NC, 1974 Edition including Summer 1974 Addenda.
2. ASME-SA-105, ASME Boiler and Pressure Vessel Code, Section II, 1974 Edition including Summer 1974 Addenda.
3. Duke Power Specification CNS-1206.00-3.0.



APPROVED
AP&E
Q.C. DEPT.
DATE 3/30/77
SIGNED J. A. Weber

J. A. Weber

Title Quality Assurance Analyst

Date March 18, 1977

TEMP FLEX®
EXPANSION JOINTS
PARENT COMPANY:
ASSOCIATED PIPING & ENGINEERING CORP.



1707 W. COMPTON BLVD., COMPTON, CALIF. 90224
TELEPHONE 631-5106 TWX 910-348-7028
TELEX 69-1301

March 9, 1977

CODE CPO24

Armco Steel Corporation
1524 Border Avenue
Torrance, Calif. 90509

Attn: Mr. Nicolas Yallouris
Sales Engineer

Subj: P.O. No. 42249
Armco Sales Order No. IPN-28287-2

Ref: Our Job No. T-5191
Duke Power Company

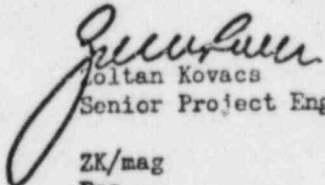
Dear Mr. Yallouris:

Your Deviation Request pertaining to the Type I Main Steam Penetration Flued Head with Temp Flex Serial No. H-6858, is accepted as requested.

A copy of our sketch SK-5191-4B, Rev. 0 is attached for your information.

Very truly yours,

TEMP FLEX COMPANY


Milton Kovacs
Senior Project Engineer

ZK/mag
Enc.

cc: Quality Control

Orig. + 1: G. J. Gunderson
Xc: J. G. Abraham
D. W. Crowell
G. H. Nelson/J. A. Vehec w/sketch
File

APPROVED
AP & E
Q.C. DEPT.
DATE 3/30/77
SIGNED 

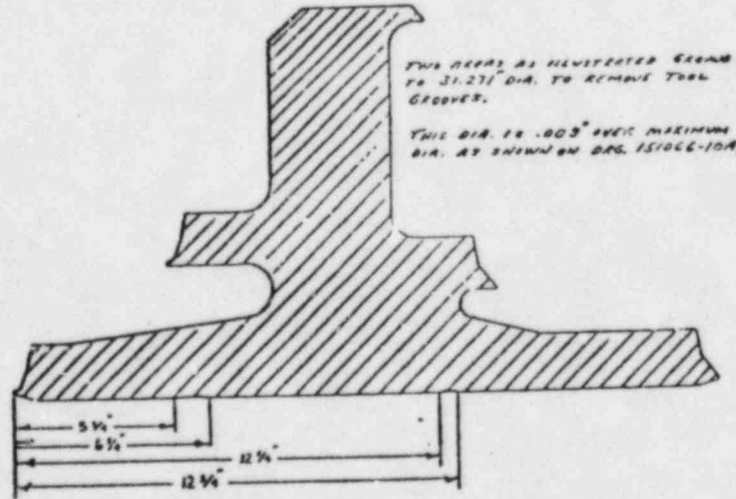


DEVIATION REQUEST

Date Nov. 30, 1976
 Customer ASSOCIATED PILING & ENGRG. P.O. No. 42249
 Sales Order No. IPN 28287-2 S.O. No. 84238
 Heat Number 522369-B1 APN No. 610
 Part Name FLUED HEAD (54x40x34) Part No. H-6858 Dwg. No. 151066

Description of Non-Conformance:
 (attach drawing or sketch if necessary)

CODE CP024



Proposed Disposition:
To Use As Is.

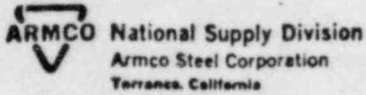
Signature Paul Demus Department Inspection

Customer Disposition:

APPROVED
 AP & E
 Q.C. DEPT.
 DATE 3/30/77
 SIGNED [Signature]

Industrial Product Sales

By Nicol Gallucci Date 12-2-76



LABORATORY REPORT

CUSTOMER Associated Piping & Engrg. Corp.
Compton, California

CUSTOMER'S PURCHASE ORDER NO. 42249

NSCO SALES REGISTER NO. IPN-28287-2

SPECIFICATION NO. ASME-SA-105

DATE 3-17-77 BY D. A. Bender

PART NAME (1) Flued Head (54" x 40" x 34" x 20-1/2" Long)

APN NO. - 610

PART NO. H-6858

CUSTOMER'S DRG. NO. _____

NSCO DRG. NO. 151066-10

COUPON IDENTIFICATION	TENSILE TEST					LONGITUDINAL		X	HARDNESS		IMPACT TEST	
	PROOF STRESS		P.S.I.	X	ULTIMATE STRENGTH	ELONG.	REDUCT.		BRINELL	ROCKWELL	SHORE	LONG.
	YIELD STRENGTH	YIELD POINT						P.S.I.				P.S.I.
<u>522369-B1</u>	54,900 ✓			81,400 ✓	28.0	58.1 ✓						
	HEAT TREATMENT Anneal ✓ 1600°F (21 Hrs.) Furnace Cool.					TEST LOCATION The above test results were obtained from a forged test coupon that was heat treated with the part.						
	CODE <u>CPO24</u>					<div style="border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block;"> <p>APPROVED AP & E Q.C. DEPT. DATE <u>3/30/77</u> SIGNED <u>D.A. Bender</u></p> </div>						
REQUIRED	36,000			70,000	22.0	30.0						

HEAT NO.	CHEMICAL ANALYSIS										A. S. T. GRAIN SI
	C.	MN.	SI.	P.	S.	CR.	VA.	NI.	MO.		
<u>522369</u>	.23 ✓	.93 ✓	.29 ✓	.015 ✓	.019 ✓						
REQUIRED	MAX. .35	1.05	.35	.04	.05						
	MIN. .22	.60									

The chemical, physical, or mechanical tests reported above are correct as contained in the records of the Corporation.

ARMCO STEEL CORPORATION

David A. Bender
(signed)

David A. Bender

CK-031
030

CERTIFICATE OF TEST ON PIPE MATERIAL

Cameron

IRON WORKS, INC.
P. O. BOX 1212
HOUSTON, TEXAS 77002

SOLD TO
ASSOCIATED PIPING & ENGINEERING CORP.
P. O. BOX 43
COMPTON, CA 90220

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

Date 23 April 1976

Customer Order No. 42939 Item 2 C.I.W. Sales Order No. F-5565 Specification ASME-SA106-GR. C AND ASME-SECTION III THRU SUPPLEMENT 1974 ADDENDA, CLASS 2 COMPONENTS.

Description of Material O.D. _____ I.D. 31.250" WALL 1.510" M.W.

C.I.W. Part No. 86-5565-345-312

Heat No.	Location or Serial No.	CHEMICAL ANALYSIS							MO
		C	MN	P	S	SI	CR	NI	
L 2463		.25	1.00	.011	.018	.21			CK-031
L 2743		.24	.94	.012	.008	.26			CK-030

APPROVED
AP & E
Q.C. DEPT.
DATE 6/3/76
SIGNED [Signature]

J-5191-T

Quantity or Serial No.	Heat No.	Test Lot#	Tensile PSI	.2% Offset Yield PSI	MECHANICAL PROPERTIES			Macro Etch	Bend Test	Flattening Test	Bar Size	Test Loc.
					% Elong. In. 2"	% Red. Area						
6	L 2743	#013	77,400	53,100	30.6	57.8				OK	.505	Trans.
1	L 2463	022	80,200	56,200	28.0	53.7				OK	.500	Trans.

V-Notch Charpy Impact Test at 20°F.:

Forg. Ser. #	Test Lot#	Heat#	Test Lot#	Ft. Lbs.	Lat. Exp.	D/F%
#25517Y	013	L 2743	#013	93.0	.068	59%
25517Z	"	"	"	82.0	.060	54%
25518Y	"	"	"	79.0	.060	55%
25518Z	"	"	#022	87.0	.063	66%
25519Y	"	"	"	77.0	.059	69%
25519Z	"	"	"	80.0	.059	65%
25520Z	022	L 2463	"			

STATION: CATAWBA 1-2
DP CO. ITEM NO.: 1206.00-3.1
MPS CQ. ORDER NO. C-12523

DUKE POWER COMPANY
QA RECORDS APPROVED
[Signature]
for acceptance and record acceptance
DATE 5/13/77

Hydrostatic Test Each length of pipe hydrostatically tested at 2100 psi

Heat Treatment:
1700°F., held 2 hrs. at temp. Air Cooled.
1575°F., held 1 hr. at temp. Air Cooled.

Subscribed and Sworn to before me this
23rd Day of April 1976

[Signature]
Notary Public
C. A. TOUCHTON

Notary Public in and for Harris County, Texas

CAMERON 1000 by Commission Expires June 1, 1977

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

[Signature]
Metallurgical Representative
O. WRIGHT

CERTIFICATE OF TEST ON PIPE MATERIAL

Cameron

IRON WORKS, INC.

P. O. BOX 1212
HOUSTON, TEXAS 77001

ASSOCIATED PIPING & ENGINEERING CORP.
P. O. BOX 4309
COMPTON, CA 90220

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

Date 28 April 1976

Customer Order No. 42939 *item* C.I.W. Order No. F-5564 ASME-SA106 Gr. C and ASME-Section III Thru Summary 1974 Addenda, Class 2 Components

Description of Material: S.D. I.D. 36.750" WALL 1.625" U.S.

C.I.W. Part No. 86-5564-403-368

Heat No.	Location of Sample No.	CHEMICAL ANALYSIS							
		C	MN	P	S	SI	CR	NI	MO
L 2772		.23	.99	.009	.017	.24			
L 2773		.25	.92	.007	.012	.24			

J-5191-T
132

STATION: CATAWBA 1-2
DP CO. ITEM NO.: I206.00-3.1
MPS CO. ORDER NO. C-12523

Quantity of Sample No.	Heat No.	Test Loc.	Tensile Psi	MECHANICAL PROPERTIES						Specimen Size	Test Lot#
				.2% Offset Yield Psi	Elongation	% Red. Area	Charpy	Ball	Flatt. Test		
4	L 2772	Trans.	74,900	46,900	28.7	56.0			OK	.505	037
		Trans.	74,900	48,900	29.5	56.8			OK	.505	039
3	L 2773	Trans.	74,900	50,900	28.5	56.5			OK	.505	039

V-Notch Impact Test at 20°F.:

Heat#	Test Lot#	Ft. Lbs.	Ductile Fracture	lateral expansion
CK-028 L 2772	037	47.5	50	.028
		62.0	60	.056
039	039	60.5	90	.058
		66.0	45	.004
CK-029 L 2773	039	64.0	65	.059
		57.5	55	.060
039	039	59.0	60	.054
		69.0	60	.063
		66.0	60	.058

Forg. Ser. #	Heat #	Test Lot #	Forg. Ser. #	Heat #	Test Lot #
25533	L 2772	037	25538	L 2773	039
25534	L 2772	037	25539	L 2773	039
25536	L 2772	037	25540	L 2773	039
25537	L 2772	039			

APPROVE
AP & E
Q.C. DEPT.
DATE 6/2/76
SIGNED *[Signature]*

Hydrostatic: Each length of pipe hydrostatically tested at 2000 psi for 5 sec. and found acceptable.

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

Subscribed and sworn to before me this 28th Day of April 1976

[Signature]
Notary Public

G. A. TOUCHTON

DUKE POWER COMPANY
QA RECORDS APPROVED
[Signature]
DATE 5/13/77

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

[Signature]
O. WRIGHT, 1st

By Cameron Iron Works, Inc. Houston, Texas
Cameron Iron Works, Inc. Houston, Texas

REC'D 1/2/75
 DATE REQ'D PER "MESS"

ASSOCIATED PIPING & ENGINEERING CORP.
 PRODUCTION TRAVELER
 1974 EDITION THRU SUMMER '74 ADDENDA

PRODUCTION SHEET 1 OF 9
 REVISION 0

S.S./DWG# L-23511 PC.MK/S/N# 1-M261 APPL. ASME CODE: SECTION III CLASS: 2 ASME S/N: B-6855

CUSTOMER: DUKE POWER COMPANY	DESCRIPTION: TYPE I	CUST. DWG# CH-1678-1
PROJECT: STATION: CATAWBA-1	PROCESS PIPE SUB-ASSEMBLY	CUST. SPEC# CNS-1206.00-3.0
JOB # T-5191	OPERATION: ACCUMULATION OF MATERIAL.	CUST. P.O.# C-12523

CODE INSP: YES NO NOTICE IN ADVANCE N/A HOURS SOURCE INSP: YES NO NOTICE IN ADVANCE 120 HOURS

DEPT.	OPR. NO.	OPERATION DESCRIPTION	DATE	OPR.	Q.C. ACC.	SOURCE INSP.	CODE INSP.
PR	M1.0	ITEM-1, FLUED HEAD 50" x 40" x 34".	5-3-77	99			2
QC	M1.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER.	5-4-77		39		3
PR	M2.0	ITEM-2, PROCESS PIPE 31.250" I.D. x 1.510" MIN. WL.	5-3-77	99			2
QC	M2.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER.	5-4-77		39		3
PR	M3.0	ITEM-3, GUARD PIPE 36.750" I.D. x 1.625" MIN. WL.	5-3-77	99			2
QC	M3.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER.	5-4-77		39		3
PR	M4.0	ITEM-4, INSULATION.					
QC	M4.1	VERIFY MATERIAL CONFORMANCE.					
PR	M5.0	ITEM-5, END COVER, .020" THK.	5-3-77	99			2
QC	M5.1	VERIFY CERTIFIED MATERIAL TEST REPORT.	5-4-77		39		3
PR	M6.0	ITEM-6, COVER, .020" THK.	5-3-77	99			2
QC	M6.1	VERIFY CERTIFIED MATERIAL TEST REPORT.	5-4-77		39		3

REVISION APPROVAL

RECEIVED

[Signature] 4/27/77
 Q.C. MANAGER APPROVAL

[Signature] 4/27/77
 AUTHORIZED INSPECTOR REVIEW

[Signature] 4/27/77
 PROJECT ENGINEER

NOTE: AFTER COMPLETION RETURN TO QUALITY CONTROL CHIEF INSPECTOR

ARMCO STEEL CORPORATION

MACHINERY & EQUIPMENT DIVISION

STATION: CATAWBA 1-2
DP CO. ITEM NO.: 1206.00-3.1
MPS CO. ORDER NO. C-12523



CHECKED
8-5-76
AK

ADDRESS REPLY TO
1824 BORDER AVENUE
TORRANCE, CALIF. 90508

CK-525
J-5191-T
132

CERTIFICATE OF COMPLIANCE

Customer Associated Piping & Engrg. P.O. No. 42249-5 item 1
Heat No. 522368-B1 Armco Order No. 28287 -1
Part No. H-6855 Item No. _____
Part Name (1) Flued Head 54 x 40 x 34 APN NO. 607

Armco Steel Corporation certifies that the material covered by this certification was manufactured in accordance with the requirements of the purchase order. In addition, we certify that the material has been tested and that the results conform to the requirements of the specifications listed below.

Applicable Documents:

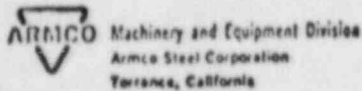
1. ASME Boiler and Pressure Vessel Code, Section III, Subsection NC, 1974 Edition including Summer 1974 Addenda.
2. ASME-SA-105, ASME Boiler and Pressure Vessel Code, Section II, 1974 Edition including Summer 1974 Addenda,
3. Duke Power Specification CNS-1206.00-3.0.

DUKE POWER COMPANY
QA RECORDS APPROVED
J. L. Garner
QA REPRESENTATIVE
DATE 5/10/77

APPROVED
AP & E
Q.C. DEPT.
DATE 8/10/76
SIGNED [Signature]

J. A. Kline

Title Quality Assurance Analyst
Date July 29, 1976



LABORATORY REPORT

CUSTOMER Associated Piping & Engrg. Corp.

CUSTOMER'S PURCHASE ORDER NO. 42240

NSCO SALES REGISTER NO. IPN-28287-1

SPECIFICATION NO. ASME-SA-105

DATE 7-29-76 By J. A. Vehec

PART NAME (1) Flued Head (54 x 40 x 34)

APN No. 607

PART NO. H-6855

CUSTOMER'S DRG. NO. _____

NSCO DRG. NO. 151066-10

COUPON IDENTIFICATION	TENSILE TEST				LONGITUDINAL		X	HARDNESS		IMPACT TEST	
	PROOF STRESS P.S.I.		ULTIMATE STRENGTH P.S.I.	ELONG. %	REDUCT. %	BRINELL		ROCKWELL	SHORE	LONG.	TRANS.
	YIELD STRENGTH P.S.I.	YIELD POINT P.S.I. X					FT. LBS.			FT. LBS.	
<u>522368-B1</u>	57,200 ✓		87,000	28.0	55.6						
	<u>HEAT TREATMENT</u> Anneal 1600°F (21 Hrs.) Furnace Cool. STATION: CATAWBA 1-2 DP CO. ITEM NO.: 1206.00-3.1 MPS CO. ORDER NO. C-12528				<u>TEST LOCATION</u> The above test results were obtained from a forged test coupon that was heat treated with the part.						
REQUIRED	36,000		70,000	22.0	30.0						

APPROVED
 AP & E
 Q.C. DEPT.
 DATE 8/1/76
 SIGNED [Signature]

HEAT NO.	CHEMICAL ANALYSIS										A. S. T. M. GRAIN SIZE
	C	MN	SI	P	S	CA	VA	NI	MO		
<u>522368</u>	.23 ✓	.92 ✓	.28 ✓	.015 ✓	.014 ✓						
REQUIRED	MAX. .35	1.05	.35	.04	.05						
	MIN. .22	.60									

The chemical, physical, or mechanical tests reported above are correct as contained in the records of the Corporation.
ARMCO STEEL CORPORATION
[Signature]
 James A. Vehec

K-031
030

CERTIFICATE OF TEST ON PIPE MATERIAL

Cameron

IRON WORKS, I.
P. O. BOX 1212
HOUSTON, TEXAS 77

SOLD TO ASSOCIATED PIPING & ENGINEERING CORP.
P. O. BOX 43
COMPTON, CA 90220

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

Date 23 April 1976

Customer Order No. 42939 Item 2 C.I.W. Sales Order No. F-5565 Specification ASME-SA106-GR. C AND ASME-SECTION III THRU SUMM 1974 ADDENDA, CLASS 2 COMPONENTS.

Description of Material O.D. 31.250" WALL 1.510" M.W.

C.I.W. Part No. 86-5565-345-312

Heat No.	Location or Serial No.	CHEMICAL ANALYSIS							
		C	MN	P	S	SI	CR	NI	MO
L 2463		.25	1.00	.011	.018	.21	CK-031		
L 2743		.24	.94	.012	.008	.26	CK-030		

APPROVED
AP & E
Q.C. DEPT.
DATE 6/2/76
SIGNED J. J. Joire

J-5191-T

Quantity or Serial No.	Heat No.	Test Lot#	Tensile PSI	.2% Offset Yield PSI	MECHANICAL PROPERTIES			Flattening Test	Bar Size	Test Loc.
					% Elong. 2"	% Red. Area	Macro Etch			
6	L 2743	#013	77,400	53,100	30.6	57.8		OK	.505	Trans.
1	L 2463	022	80,200	56,200	28.0	53.7		OK	.500	Trans.

Forg. Ser. #	Test Lot#	Heat#	V-Notch Charpy Impact Test at 20°F.±			
			Test Lot#	Ft. Lbs.	Lat. Exp.	D/F%
25517Y	013	L 2743	#013	93.0	.068	59%
25517Z	"	"	"	82.0	.060	54%
25518Y	"	"	"	79.0	.060	55%
25518Z	"	"	#022	87.0	.063	66%
25519Y	"	"	"	77.0	.059	69%
25519Z	"	"	"	80.0	.059	65%
25520Z	022	L 2463				

STATION: CATAWBA 1-2
DP CO. ITEM NO.: 1206.00-3.1
MPS CO. ORDER NO. C-12523

DUKE POWER COMPANY
QA RECORDS APPROVED
J. J. Joire
DATE 5/13/77

Hydrostatic Test Each length of pipe hydrostatically tested at 2100 psi for 30 days and found acceptable

Heat Treatment: 1700°F., held 2 hrs. at temp. Air Cooled. 1575°F., held 1 hr. at temp. Air Cooled.

Subscribed and Sworn to before me this 23rd Day of April 1976
C. A. TOUCHTON
Notary Public in and for Harris County, Texas
CAMERON Iron Works Commission Expires June 1, 1972

I certify these tests to be correct as contained in the records of the company.
Metallurgical Representative: O. WRIGHT

CERTIFICATE OF TEST ON PIPE MATERIAL

Cameron

IRON WORKS, INC.

P. O. BOX 1212
HOUSTON, TEXAS 77001

ASSOCIATED PIPING & ENGINEERING CORP.
P. O. BOX 4309
COMPTON, CA 90220

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

Date 28 April 1978

Customer Order No. (42939) item C.I.W. Order No. F-5564 ASME-SA106 Gr. C and ASME Section III Thru Subpart 3
1974 Addenda, Class 2 Components

Description of Material: I.D. 36.750" WALL 1.625" U.S.

C.I.W. Part No. 86-5564-403-368

Heat No. Serial No.	CHEMICAL ANALYSIS							
	C	MN	P	S	SI	CR	NI	MO
L 2772	.23	.99	.009	.017	.24			
L 2773	.25	.92	.007	.012	.24			

J-5191-T
132

STATION: CATAWBA 1-2
DP CO. ITEM NO.: I206.00-3.1
MPS CO. ORDER NO. C-12523

Quantity or Serial No.	Heat#	Test Loc.	Tensile PSI	.2% Offset Yield PSI	MECHANICAL PROPERTIES			Flat Test	Specimen Size	Test Lot#
					Yield	Red. Area	Elong.			
4	L 2772	Trans.	74,900	46,900	28.7	56.0		OK	.505	037
		Trans.	74,900	48,900	29.5	56.8		OK	.505	039
3	L 2773	Trans.	74,900	50,900	28.5	56.5		OK	.505	039

V-Notch Impact Test at 20°F.:

Heat#	Test Lot#	Ft. Lbs.	Ductile Fracture	Lateral Expansion		
CK-028	L 2772	037	47.5	50%	.028	
			62.0	60	.056	
			60.5	90	.056	
039			66.0	45	.064	
			64.0	65	.059	
			57.5	55	.060	
			59.0	60	.054	
CK-029	L 2773	039		69.0	60	.063
				66.0	60	.058
				66.0	60	

APPROVE
AP & E
Q.C. DEPT.
DATE 6/2/78
SIGNED [Signature]

Form. Ser. #	Heat#	Test Lot#	Form. Ser. #	Heat#	Test Lot#
25533	L 2772	037	25538	L 2773	039
25534	L 2772	037	25539	L 2773	039
25536	L 2772	037	25540	L 2773	039
25537	L 2772	039			

Hydrostatic Test: Each length of pipe hydrostatically tested at 2000 psi for 5 sec. and found acceptable.

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

Subscribed and sworn to before me this 28th Day of April 1978

[Signature]
G. A. TOUCHTON

DUKE POWER COMPANY
QA RECORDS APPROVED
[Signature]
QA REPRESENTATIVE
DATE 5/13/77

[Signature]
O. BRIGG, 1st

FORM 402

(1)

DATE REC'D 1/2/75
DATE REQ'D PER "MESS"

ASSOCIATED PIPING & ENGINEERING CORP.
PRODUCTION TRAVELER
1974 EDITION THRU SUMMER '74 ADDENDA

PRODUCTION

SHEET 1 OF 9
REVISION 0

S.S./DWG# D-23763 PC.MK/S/N# 2-M261 APPL. ASME CODE: SECTION III CLASS: 2 ASME S/N: H-6859

CUSTOMER: DUKE POWER COMPANY
PROJECT: STATION: CATAWBA-2
JOB # T-5191

DESCRIPTION: TYPE I
PROCESS PIPE SUB-ASSEMBLY
OPERATION: ACCUMULATION OF MATERIAL

CUST. DWG# CN-1678-1
CUST. SPEC# CNS-1206.00-3.0
CUST. P.O.# C-12523

CODE INSP: YES NO NOTICE IN ADVANCE N/A HOURS SOURCE INSP: YES NO NOTICE IN ADVANCE 120 HOURS

DEPT.	OPR. NO.	OPERATION DESCRIPTION	DATE	OPR.	Q.C. ACC.	SOURCE INSP.	CODE INSP.
PR	M1.0	ITEM-1, FLUED HEAD 50" x 40" x 34". <i>CK526</i>	5-3-77	<i>PP</i>			
QC	M1.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER.	5-4-77		<i>139</i>		<i>7</i>
PR	M2.0	ITEM-2, PROCESS PIPE 31.250" I.D. x 1.510" MIN. WL. <i>CK030</i>	5-3-77	<i>PP</i>			
QC	M2.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER. <i>255197</i>	5-4-77		<i>81</i>		<i>7</i>
PR	M3.0	ITEM-3, GUARD PIPE 36.750" I.D. x 1.625" MIN. WL. <i>CK029</i>	5-3-77	<i>PP</i>			
QC	M3.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER. <i>255387</i>	5-4-77		<i>139</i>		<i>7</i>
PR	M4.0	ITEM-4, INSULATION.					
QC	M4.1	VERIFY MATERIAL CONFORMANCE.					
PR	M5.0	ITEM-5, END COVER, .020" THK. <i>CM216</i>	5-3-77	<i>PP</i>			
QC	M5.1	VERIFY CERTIFIED MATERIAL TEST REPORT.	5-4-77		<i>87</i>		<i>7</i>
PR	M6.0	ITEM-6, COVER, .020" THK. <i>CM216</i>	5-3-77	<i>PP</i>			
QC	M6.1	VERIFY CERTIFIED MATERIAL TEST REPORT.	5-4-77		<i>89</i>		<i>7</i>

REVISION APPROVAL

RECEIVED

[Signature] 4/27/77
Q.C. MANAGER APPROVAL

[Signature] 4/27/77
AUTHORIZED INSPECTOR REVIEW

[Signature]
PROJECT ENGINEER

ARMCO STEEL CORPORATION
MACHINERY & EQUIPMENT DIVISION

CK-526
J-5191-

STATION: CATAWBA 1-2
DP CO. ITEM NO.: 1206.00-3.1
MPS CO. ORDER NO. C-12523



CHECKED
8-5-76
AW

ADDRESS REPLY TO
1524 BORDER AVENUE
TORRANCE, CALIF. 90509

CERTIFICATE OF COMPLIANCE

Customer Associated Piping & Engrg. P.O. No. 42249-5 item 1
Heat No. 522369-B2 Armco Order No. 28287-2
Part No. H-6859 Item No. _____
Part Name (1) Flued Head 54 x 40 x 3/4 APN NO. 611

Armco Steel Corporation certifies that the material covered by this certification was manufactured in accordance with the requirements of the purchase order. In addition, we certify that the material has been tested and that the results conform to the requirements of the specifications listed below.

Applicable Documents:

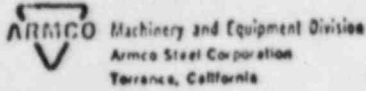
1. ASME Boiler and Pressure Vessel Code, Section III, Subsection NC, 1974 Edition including Summer 1974 Addenda.
2. ASME-SA-105, ASME Boiler and Pressure Vessel Code, Section II, 1974 Edition including Summer 1974 Addenda,
3. Duke Power Specification CNS-1206.00-3.0.

DUKE POWER COMPANY
QA RECORDS APPROVED
J. L. Jones
QA REPRESENTATIVE
DATE 5/10/77

APPROVED
AP & E
Q.C. DEPT.
DATE 8/10/76
SIGNED *J. L. Adams*

J. A. Kheer

Title Quality Assurance Analyst
Date July 29, 1976



LABORATORY REPORT

CUSTOMER Associated Piping & Engrg. Corp.

CUSTOMER'S PURCHASE ORDER NO. 42240

NSCO SALES REGISTER NO. IPN-28287-2

SPECIFICATION NO. ASME-SA-105

DATE 7-29-76 BY J. A. Vehec

PART NAME (1) Flued Head (54 x 40 x 34)

APN No. 611

PART NO. H-6859

CUSTOMER'S DRG. NO. _____

NSCO DRG. NO. 151066-10

COUPON IDENTIFICATION	TENSILE TEST					LONGITUDINAL		HARDNESS	IMPACT TEST		
	PROOF STRESS P.S.I.		ULTIMATE STRENGTH P.S.I.	ELONG.		REDUCT.	BRINELL		LONG.		TRANS.
	YIELD STRENGTH P.S.I.			%	%			ROCKWELL	FT. LBS.		
	YIELD POINT P.S.I. X					%	%		SHORE	FT. LBS.	
<u>522369-B2</u>	54,900 ✓		81,400 ✓	28.0 ✓	58.1 ✓						
<u>HEAT TREATMENT</u> Anneal 1600°F (21 Hrs.) Furnace Cool. STATION: CATAWBA 1-2 DP CO. ITEM NO.: 1206.00-3.1 MPS CO. ORDER NO. C-12523					<u>TEST LOCATION</u> The above test results were obtained from a forged test coupon that was heat treated with the part.						
REQUIRED	36,000		70,000	22.0	30.0						

APPROVED
 AP & E
 Q.C. DEPT.
 DATE 8/1/76
 SIGNED J. A. Vehec

HEAT NO.	CHEMICAL ANALYSIS										A. S. T. M. GRAIN SIZE
	C.	MN.	SI.	P.	S.	CK.	VA.	NI.	MO.		
<u>522369</u>	.23 ✓	.93 ✓	.29 ✓	.015 ✓	.019 ✓						
REQUIRED	MAX. .35	1.05	.35	.04	.05						
	MIN. .22	.60									

The chemical, physical, or mechanical tests reported above are correct as contained in the records of the Corporation.
ARMCO STEEL CORPORATION
James A. Vehec
 (Signed)
 James A. Vehec

CERTIFICATE OF TEST ON PIPE MATERIAL

Commercial

ASSOCIATED PIPING & ENGINEERING CORP.
P. O. BOX 4309
COMPTON, CA 90220

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

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

DATE: 28 April 1978

Customer Order No. 42939 Item item 1 C. I. M. Order No. F-5564 ASME-SA106 Gr. C and ASME-Section III Thru Summary 1974 Addenda, Class 2 Components

Designation: SA-106 Gr. C ID: 36.750" WALL: 1.625" U.S.

C.I.M. Part No. 86-5564-403-368

Spec. No.	Location of Sample No.	CHEMICAL ANALYSIS							
		C	MN	P	S	SI	CR	NI	MO
L 2772		.23	.99	.009	.017	.24			
L 2773		.25	.92	.007	.012	.24			

J-5191-T
132

STATION: CATAWBA 1-2
DP CO. ITEM NO.: I206.00-3.1
MPS CO. ORDER NO. C-12523

Quantity of Sample No.	Heat#	Test Loc.	Tensile Ft.	MECHANICAL PROPERTIES				Flg. Test	Specimen Size	Test Lot#
				2% Elong. Min.	2% Elong. Max.	Yield Avg.	Hardness			
4	L 2772	Trans.	74,900	46,900	28.7	56.0	OK	.505	037	
		Trans.	74,900	48,900	29.5	56.8	OK	.505	039	
3	L 2773	Trans.	74,900	50,900	28.5	56.3	OK	.505	039	

V-Notch Impact Test at 20°F.:

Heat#	Test Lot#	Ft. Lbs.	Ductile fracture	lateral expansion
CK-028	L 2772	037	47.5	50
			62.0	60
			60.5	90
CK-029	L 2773	039	66.0	45
			64.0	65
			57.5	55
			59.0	60
		69.0	60	
		66.0	60	

APPROVE
AP&E
QC. DEPT.
DATE: 4/11/78
SIGNED: [Signature]

Form. Ser. #	Heat#	Test Lot#	Form. Ser. #	Heat#	Test Lot#
25533	L 2772	037	25533	L 2772	037
25534	L 2772	037	25539	L 2773	039
25536	L 2772	037	25540	L 2773	039
25537	L 2772	039			

Each length of pipe hydrostatically tested at 2000 psi for 5 sec. and found acceptable.

1650°F., held 1 hr. at temp. Air cooled.

Subject has been tested in accordance with the requirements of ASME Section III, Subpart B, and found acceptable.

G. A. TOUCHTON
28th April 1978

DUKE POWER COMPANY
QA RECORDS APPROVED
DATE: 5/13/77

[Signature]
O. WRIGHT

(2)

SHEET 1 OF 9
REVISION 0

ASSOCIATED PIPING & ENGINEERING CORP.
PRODUCTION

1974 EDITION THERM SOWER 174 ADDENDA
APPL. ASME CODE: SECTION III CLASS: 2 ASME S/N: E-6861

DATE REC'D 1/2/75
DATE REQ'D PER 1/2/75

S.S./DWG# D-23179 PC.MX/S/N 2-4423
CUST. DWG# CM-1678-1
CUST. SPEC# CMS-1205.00-1.0
CUST. P.O.# C-12523

CUSTOMER: DINE POWER COMPANY
PROJECT: STATION: CATARAUGUS
JOB # T-5101

DESCRIPTION: TYPE I
PROCESS PIPE SUB-ASSEMBLY
OPERATION: ACCUMULATION OF MATERIAL

CODE INSP: YES NO NOTICE IN ADVANCE M/A HOURS SOURCE INSP: YES NO NOTICE IN ADVANCE 120 HOURS

DEPT. NO.	OPERATION DESCRIPTION	DATE	OPR.	Q.C. ACC.	SOURCE INSP.	CODE
FR 01.0	ITEM-1, FLUID HEAD 50" x 40" x 3/4".	5-3-77	99			
QC 01.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER.	5-4-77		01		
FR 02.0	ITEM-2, PROCESS PIPE 31.250" I.D. x 1.510" MIN. WT.	5-8-77	99			
QC 02.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER. 25520Y	5-8-77		01		
FR 03.0	ITEM-3, GROUND PIPE 36.750" I.D. x 1.625" MIN. WT.	5-3-77	99			
QC 03.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER. 25535	5-4-77		01		
FR 04.0	ITEM-4, INSULATION.					
QC 04.1	VERIFY MATERIAL CONFORMANCE.					
FR 05.0	ITEM-5, END COVER, .000" THK.	5-3-77	99			
QC 05.1	VERIFY CERTIFIED MATERIAL TEST REPORT.	5-4-77		01		
FR 06.0	ITEM-6, COVER, .000" THK.	5-3-77	99			
QC 06.1	VERIFY CERTIFIED MATERIAL TEST REPORT.	5-4-77		01		

REVISION APPROVAL

MANAGER APPROVAL 4/27/77
AUTHORIZED INSPECTOR REVIEW 4/27/77
PROJECT ENGINEER
CHIEF INSPECTOR

ARMCO STEEL CORPORATION
MACHINERY & EQUIPMENT DIVISION

CK-524
J-5-1

STATION: CATAWBA 1-2
DP CO. ITEM NO.: 1206.00 3.1
MPS CO. ORDER NO. C-12523



CHCUC 12
B-A 5-70

ADDRESS REPLY TO
1824 BORDER AVENUE
TORRANCE, CALIF. 90509

CERTIFICATE OF COMPLIANCE

Customer Associated Piping & Engrg. P.O. No. 42249-5 item 1
Heat No. 522370-B1 Armco Order No. 28287-2
Part No. H-6860 Item No. _____
Part Name (1) Flued Head 54 x 40 x 34 APN NO. 612

Armco Steel Corporation certifies that the material covered by this certification was manufactured in accordance with the requirements of the purchase order. In addition, we certify that the material has been tested and that the results conform to the requirements of the specifications listed below.

Applicable Documents:

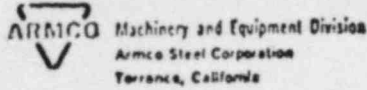
1. ASME Boiler and Pressure Vessel Code, Section III, Subsection NC, 1974 Edition including Summer 1974 Addenda.
2. ASME-SA-105, ASME Boiler and Pressure Vessel Code, Section II, 1974 Edition including Summer 1974 Addenda,
3. Duke Power Specification CNS-1206.00-3.0.

DUKE POWER COMPANY
QA RECORDS APPROVED
J. L. Joiner
QA REPRESENTATIVE
DATE 5/10/77

APPROVED
AP & E
QC. DEPT.
DATE 8/11/76
SIGNED [Signature]

J. A. Vheer

Title Quality Assurance Analyst
Date July 29, 1976



LABORATORY REPORT

CUSTOMER Associated Piping & Engrg. Corp.

CUSTOMER'S PURCHASE ORDER NO. 42240

NSCO SALES REGISTER NO. IPN-28287-2

SPECIFICATION NO. ASME-SA-105

DATE 7-29-76 BY J. A. Vehec

PART NAME (1) Flued Head (54 x 40 x 34)

APN No. 612

PART NO. H-6860

CUSTOMER'S DRG. NO. _____

NSCO DRG. NO. 151066-10

COUPON IDENTIFICATION	TENSILE TEST					LONGITUDINAL		X	HARDNESS		IMPACT TEST	
	PROOF STRESS P.S.I.	YIELD STRENGTH P.S.I.	YIELD POINT P.S.I.	X	ULTIMATE STRENGTH P.S.I.	TRANSVERSE			BRINELL	ROCKWELL	SHORE	LONG.
						ELONG. %	REDUCT. %	IZOD FT. LBS.				CHARPY FT. LBS.
<u>522370-B1</u>	54,100 ✓				82,200 ✓	27.0 ✓	54.5 ✓					
<u>HEAT TREATMENT</u> Anneal 1600°F (21 Hrs.) Furnace Cool. STATION: CATAWBA 1-2 DP CO. ITEM NO.: 1206.00.3.1 MPS CO. ORDER NO. C-12523					<u>TEST LOCATION</u> The above test results were obtained from a forged test coupon that was heat treated with the part.							
REQUIRED	36,000				70,000	22.0	30.0					
HEAT NO.	CHEMICAL ANALYSIS										A. S. T. GRAIN S	
	C	MN.	SI.	P.	S.	CR.	VA.	NL.	MO.			
<u>522370</u>	.25 ✓	.95 ✓	.27 ✓	.018 ✓	.017 ✓							
<div style="text-align: center;"> <p>APPROVED</p> <p>P & E QC. DEPT.</p> <p>DATE <u>7/29/76</u></p> <p>SIGN <u>J. A. Vehec</u></p> </div> <div style="text-align: right;"> <p>The chemical, physical, or mechanical tests reported above are correct as contained in the records of the Corporation.</p> <p>ARMCO STEEL CORPORATION</p> <p><u>James A. Vehec</u> (signed)</p> <p>James A. Vehec</p> </div>												
REQUIRED	MAX.	.35	1.05	.35	.04	.05						
	MIN.	.22	.60									

CERTIFICATE OF TEST ON PIPE MATERIAL

5/19/77
OK

Cameron

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

SOLD TO
ASSOCIATED PIPING & ENGINEERING CORP.
P. O. BOX 43
COMPTON, CA 90220

(Handwritten initials in a circle)

Date 28 April 1977

Customer Order No. 42939 C.I.W. Sales Order No. F-5565 ASME-SA106-Gr. C and Section I'1 Thru Summer 1974 Addenda, Class 2 Components.

Description of Material O.D. 31.250" WALL 1.510" M.W.

C.I.W. Part No. 86-5565-345-312

Heat No.	Location or Serial No.	CHEMICAL ANALYSIS							
		C	MN	P	S	SI	CR	NI	MO
L 2463		.25	1.00	.011	.016	.21			

MATERIAL CODE CP-521
JOB NO. OR ACCT. NO. 5191-T
P.O. 42939 Item 2 132

Quantity or Serial No.	Heat No.	Test Loc.	Tensile PSI	.2% Offset Yield PSI	MECHANICAL PROPERTIES					Test Lot#	
					% Elong. In.	% Red. Area	Macro Etch	Bend Test	Flattening Test		
1	L 2463	Trans.	80,200	56,200	28.0	53.7			OK	.500	022

Forn. Ser. #	Test Lot#	Test Lot#	V-Notch Charpy Impact Test at 20°F.:	Ft. Lbs.	Lat. Exp.	D/F%
#25520Y	022	022	67.0	63	MILS	66%
			77.0	59		69
			80.0	59		65

DUKE POWER COMPANY
QA RECORDS APPROVED
Sally U. Caldwell
QA REPRESENTATIVE
DATE 10-13-78

Item
5-18-77

APPROVED
AP&E
Q.C. DEPT.
DATE 5/6/77
SIGNED *(Signature)*

After Weld Repaired ✓
Pipe hydrostatically tested at 2100 psi for 5 sec. and found acceptable. ✓

Heat Treatment:
1700°F., held 2 hrs. at temp. Air cooled. ✓
1575°F., held 1 hr. at temp. Air cooled. ✓
1150°F., held .50 hr. at temp. Furnace cooled. ✓

Subscribed and Sworn to before me this
28th Day of April 1977
(Signature)
Notary Public

I certify these tests to be correct as contained in the records of the company.
(Signature)
Metallurgical Representative

CERTIFICATE OF TEST ON PIPE MATERIAL

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NO. N-1261 EXPIRES 10-27-71

Cameron

IRON WORKS, INC.

P. O. BOX 1212
HOUSTON, TEXAS 77001

S
O
L
D
T
O

ASSOCIATED PIPING & ENGINEERING CORP.
P. O. Box 4309
COMPTON, CA 90220

Date 7 May 1976

Customer Order No. 42939 *item 1* C.I.W. Sales Order No. F-5564 ASME-SA106 Gr. C AND "ASME" SECTION III THRU SUMMER 1974 ADDENDA, CLASS 2 COMPONENTS

Description of Material O.D. _____ x I.D. 36.750" x WALL 1.625" M.W.

C.I.W. Part No. 86-5564-403-368

Heat No.	Location or Serial No.	CHEMICAL ANALYSIS							
		C	MN	P	S	SI	CR	NI	MO
L 2772		.23	.99	.009	.017	.24			

CK-009

J-5191-T
130

MAY 25 1976

Quantity or Serial No.	Heat No.	Test Loc.	Tensile PSI	.2% Offset Yield PSI	MECHANICAL PROPERTIES			Macro Etch	Bend Test	Flattening Test	Specimen Size	Test Lot#
					% Elong. 2 In.	% Red. Area						
1	L 2772	Trans.	74,900	46,900	28.7	56.0				OK	.505	037

V-Notch Impact Test at 20°F.:

Test Lot#	Ft.Lbs.	Ductile Fracture	Lateral expansion
037	47.5	50%	.048
	62.0	60	.056
	60.5	50	.056

Forg. Ser. # 25535 Test Lot# 037

STATION: CATAWBA 1-2
DP CO. ITEM NO.: 1206.00-3.1
MPS CO. ORDER NO. C-12523

APPROVED
AP&E
Q.C. DEPT.
DATE 6/2/76
SIGNED *[Signature]*

Hydrostatic Test Each length of pipe hydrostatically tested at 2000 psi for 5 sec. and found acceptable

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

Subscribed and Sworn to before me this 7th Day of May 1976

[Signature]
Notary Public
G. A. TOUCHTON
Notary Public in and for Harris County, Texas
CAMERON Examination Expires June 1, 1972

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

[Signature]
Metallurgical Representative U. WRIGHT, Jr.

DUKE POWER COMPANY
QA RECORDS APPROVED
[Signature]
QA REPRESENTATIVE
DATE 5/13/77

FORM 402

(2)

DATE REC'D 1/2/75
DATE REQ'D PER "MESS"

ASSOCIATED PIPING & ENGINEERING CORP.
PRODUCTION TRAVELER
1974 EDITION THRU SUMMER '74 ADDENDA

PRODUCTION SHEET 1 OF 9
REVISION 0

S.S./DWG# D-23527 PC.MK/S/N# 1-M423 APPL. ASME CODE: SECTION III CLASS: 2 ASME S/N: H-6857

CUSTOMER: <u>DUKE POWER COMPANY</u>	DESCRIPTION: <u>TYPE I</u>	CUST. DWG# <u>CN-1678-1</u>
PROJECT: <u>STATION: CATAWBA-1</u>	<u>PROCESS PIPE SUB-ASSEMBLY</u>	CUST. SPEC# <u>CNS-1206.00-3.0</u>
JOB # <u>T-5191</u>	OPERATION: <u>ACCUMULATION OF MATERIAL</u>	CUST. P.O.# <u>C-12523</u>

CODE INSP: YES NO NOTICE IN ADVANCE N/A HOURS SOURCE INSP: YES NO NOTICE IN ADVANCE 120 HOURS

DEPT.	OPR. NO.	OPERATION DESCRIPTION	DATE	OPR.	Q.C. ACC.	SOURCE INSP.	CODE INSP.
PR	M1.0	ITEM-1, FLUEL HEAD 50" x 40" x 34".	5-3-77	99			
QC	M1.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER.	5-4-77		01		
PR	M2.0	ITEM-2, PROCESS PIPE 31.250" I.D. x 1.510" MIN. WL.	5-3-77	99			
QC	M2.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER. 255202	5-4-77		01		
PR	M3.0	ITEM-3, GUARD PIPE 36.750" I.D. x 1.625" MIN. WL.	5-3-77	99			
QC	M3.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER. 25533	5-4-77		01		
PR	M4.0	ITEM-4, INSULATION.					
QC	M4.1	VERIFY MATERIAL CONFORMANCE.					
PR	M5.0	ITEM-5, END COVER, .020" THK.	5-3-77	99			
QC	M5.1	VERIFY CERTIFIED MATERIAL TEST REPORT.	5-4-77		01		
PR	M6.0	ITEM-6, COVER, .020" THK.	5-3-77	99			
QC	M6.1	VERIFY CERTIFIED MATERIAL TEST REPORT.	5-4-77		01		

REVISION APPROVAL

RECEIVED

E. J. ... 4/27/77
Q.C. MANAGER APPROVAL

TEMP FILE

J. H. ... 4/27/77
AUTHORIZED INSPECTOR REVIEW

Golden ...
PROJECT ENGINEER

ARMCO STEEL CORPORATION

MACHINERY & EQUIPMENT DIVISION

STATION, CATAWBA 1-2
DP CO. ITEM NO.: 1206.00-3.1
MPS CO. ORDER NO. C-12523



CHECKED
8-5-76
AM

ADDRESS REPLY TO
1824 BORDER AVENUE
TORRANCE, CALIF. 90508

CK-525

J-5191-7

132

CERTIFICATE OF COMPLIANCE

Customer Associated Piping & Engrg. P.O. No. 42249-5 stem 1
Heat No. 522368-B1 Armco Order No. 28287 -1
Part No. H-6855 Item No. _____
Part Name (1) Flued Head 54 x 40 x 34 APN NO. 607

Armco Steel Corporation certifies that the material covered by this certification was manufactured in accordance with the requirements of the purchase order. In addition, we certify that the material has been tested and that the results conform to the requirements of the specifications listed below.

Applicable Documents:

1. ASME Boiler and Pressure Vessel Code, Section III, Subsection NC, 1974 Edition including Summer 1974 Addenda.
2. ASME-SA-105, ASME Boiler and Pressure Vessel Code, Section II, 1974 Edition including Summer 1974 Addenda,
3. Duke Power Specification CNS-1206.00-3.0.

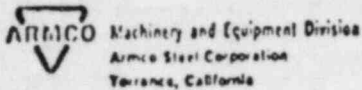
DUKE POWER COMPANY
QA RECORDS APPROVED
J. L. Garner
QA REPRESENTATIVE
DATE 5/10/77

APPROVED
AP&E
QC. DEPT.
DATE 5/11/76
SIGNED [Signature]

J. A. [Signature]

Title Quality Assurance Analyst

Date July 29, 1976



LABORATORY REPORT

CUSTOMER Associated Piping & Engrg. Corp.

CUSTOMER'S PURCHASE ORDER NO. 42240

NSCO SALES REGISTER NO. IPN-28287-1

SPECIFICATION NO. ASME-SA-105

DATE 7-29-76 BY J. A. Vehec

PART NAME (1) Flued Head (54 x 40 x 34)

APN No. 607

PART NO. H-6855

CUSTOMER'S DRG. NO. _____

NSCO DRG. NO. 151066-10

COUPON IDENTIFICATION	TENSILE TEST				LONGITUDINAL		HARDNESS	IMPACT TEST	
	PROOF STRESS P.S.I.	YIELD STRENGTH P.S.I.	YIELD POINT P.S.I. X	ULTIMATE STRENGTH P.S.I.	TRANSVERSE			BRINELL	LONG.
					ELONG. %	REDUCT. %	ROCKWELL		
522368-B1	57,200 ✓			87,000	28.0	55.6			
HEAT TREATMENT <u>Anneal</u> 1600°F (21 Hrs.) Furnace Cool.				TEST LOCATION The above test results were obtained from a forged test coupon that was heat treated with the part.					
STATION: CATAWBA 1-2		DP CO. ITEM NO.: 1206.00-31		MPS CO. ORDER NO. C-1252B					
REQUIRED	36,000			70,000	22.0	30.0			

APPROVED
AP & E
Q.C. DEPT.
DATE 8/11/76
SIGNED J. A. Vehec

HEAT NO.	CHEMICAL ANALYSIS										A. S. T. GRAIN SI
	C	MN	SI	P	S	CR	VA	NI	MO		
522368	.23 ✓	.92 ✓	.28 ✓	.015 ✓	.014 ✓						
REQUIRED	MAX. .35	1.05	.35	.04	.05						
	MIN. .22	.60									

The chemical, physical, or mechanical tests reported above are correct as contained in the records of the Corporation.
ARMCO STEEL CORPORATION
James A. Vehec
SIGNED
James A. Vehec

030

CERTIFICATE OF TEST ON PIPE MATERIAL

Cameron

IRON WORKS

P. O. BOX 1212 HOUSTON, TEXAS

SOLD TO

ASSOCIATED PIPING & ENGINEERING CORP. P. O. BOX 43 COMPTON, CA 90220

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

Date 23 April 1976

System Order No. 42939 Item 2 C.I.W. Sales Order No. F-5565 Specification ASME-SA106-GR. C AND ASME-SECTION III THRU SUPP. 1974 ADDENDA, CLASS 2 COMPONENTS.

Description of Material O.D. 31.250" WALL 1.510" M.W.

C.I.W. Part No. 86-5565-345-312

Table with columns: Heat No., Location or Serial No., C, MN, P, S, SI, CR, NI, MO. Rows include L 2463 and L 2743 with chemical analysis values.

APPROVED AP&E QC DEPT. DATE 4/28/76 SIGNED [Signature]

J-5191-T

Table with columns: Quantity or Serial No., Heat No., Test Lot#, Tensile PSI, 2% Offset Yield PSI, % Elong. in 2", % Red. Area, Macro Etch, Bend Test, Flattening Test, Bar Size, Test Loc. Rows include L 2743 and L 2463.

V-Notch Charpy Impact Test at 20°F. Table with columns: Forg. Ser. #, Test Lot #, Heat #, Test Lot # Bars, Ft. Lbs., Lat. Exp., D/F%. Rows include 25517Y, 25517Z, 25518Y, 25518Z, 25519Y, 25519Z, 25520Z.

STATION: CATAWBA 1-2 DP CO. ITEM NO.: 1206.00-3.1 MPS CO. ORDER NO. C-12523

DUKE POWER COMPANY OR RECORDS APPROVED J. J. Givins DATE 5/13/77

Hydrostatic Test Each length of pipe hydrostatically tested at 2100 psi for 30 min. and accepted.

Heat Treatment: 1700°F., held 2 hrs. at temp. Air Cooled. 1575°F., held 1 hr. at temp. Air Cooled.

Subscribed and Sworn to before me this 23rd Day of April, 1976

[Signature] C. A. TOUCHTON

Notary Public in and for Harris County, Texas

CAMERON Quality Commission Expires June 3, 1972

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

[Signature] C. WRIGHT, Metallurgical Representative

CERTIFICATE OF TEST ON PIPE MATERIAL

Caterpillar

ASSOCIATED PIPING & ENGINEERING CORP.
P. O. BOX 4309
COMPTON, CA 90220

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

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

APR 28 April 1976

System Item No. 42939 *item* C.I. W. Order No. F-5564 ASME-SA 106 Gr. C and Section III Thru Sub 1974 Addenda, Class 2 Components

Designation: 36.750" O.D. 1.625" WALL

C.I. W. Part No. 86-5564-403-368

Heat#	CHEMICAL ANALYSIS						
	MM	P	S	SI	CR	NI	MO
L 2772	.23	.99	.009	.017	.24		
L 2773	.25	.92	.007	.012	.24		

J-5191-T
132

STATION: CATAWBA 1-2
DP CO. ITEM NO.: I206.00-3.1
MPS CO. ORDER NO. C-12523

Quantity	Heat#	Test Loc.	MECHANICAL PROPERTIES							Flaw Test	Specimen Size	Test Lot#
			Tensile P _s	2 in. Elong. P _s	2 in. Elong. %	Red. Area	Hardness	Charpy	Temp.			
4	L 2772	Trans.	74,900	46,900	28.7	56.0			OK	.505	037	
		Trans.	74,900	48,900	29.5	56.8			OK	.505	039	
3	L 2773	Trans.	74,900	50,900	28.5	56.5			OK	.505	039	

V-Notch Impact Test at 20°F.:

Heat#	Test Lot#	Ft. Lbs.	Ductile Fracture	Lateral Expansion
CK-028	L 2772	037	47.5	50%
			62.0	60
			60.5	90
CK-029	L 2773	039	66.0	45
			64.0	65
			57.5	55
			59.0	60
		69.0	60	.063
		66.0	60	.058

APPROVE
AP&E
Q.C. DEPT.
DATE 6/2/76
SIGNED [Signature]

Forg. Ser. #	Heat#	Test Lot#	Forg. Ser. #	Heat#	Test Lot#
25533	L 2772	037	25538	L 2773	039
25534	L 2772	037	25539	L 2773	039
25536	L 2772	037	25540	L 2773	039
25557	L 2772	039			

Each length of pipe hydrostatically tested at 2000 psi for 5 sec. and found acceptable.

1650°F., held 1 hr. at temp. Air cooled.

Subscribed and sworn to before me this 28th day of April 1976

[Signature]
E. A. TOUCHTON

DUKE POWER COMPANY
QA RECORDS APPROVED
[Signature]
QA REPRESENTATIVE
DATE 5/13/77

[Signature]
D. O. WRIGHT, 1st

FOR 462

(1)

DATE REC'D <u>1/2/75</u>	ASSOCIATED PIPING & ENGINEERING CORP PRODUCTION TRAVELER 1974 EDITION THRU SUMMER '74 ADDENDA	SHEET 1 OF 9 REVISION 0
DATE REQ'D <u>PER "MESS"</u>	PRODUCTION	
S.S./DWG# <u>D-23519</u>	PC.MK/S/N# <u>1-M393</u>	APPL. ASME CODE: SECTION-III CLASS: 2 ASME S/N: H-6856
CUSTOMER: <u>DUKE POWER COMPANY</u>	DESCRIPTION: <u>TYPE I</u>	CUST. DWG# <u>CN-1678-1</u>
PROJECT: <u>STATION: CATAWBA-1</u>	<u>PROCESS PIPE SUB-ASSEMBLY</u>	CUST. SPEC# <u>CHS-1206.00-3.0</u>
JOB # <u>T-5191</u>	OPERATION: <u>ACCUMULATION OF MATERIAL</u>	CUST. P.O.# <u>C-12523</u>

CODE INSP: YES NO NOTICE IN ADVANCE N/A HOURS SOURCE INSP: YES NO NOTICE IN ADVANCE 120 HOURS

DEPT.	OPR. NO.	OPERATION DESCRIPTION	DATE	OPR.	Q.C. ACC.	SOURCE INSP.	CODE INSP.
PR	M1.0	ITEM-1, FLUED HEAD 50" x 40" x 34". CK525	5-3-77	99			
QC	M1.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER.	5-4-77		31		
PR	M2.0	ITEM-2, PROCESS PIPE 31.250" I.D. x 1.510" MIN. WL. CK030	5-3-77	99			
QC	M2.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER. 25518 Z	5-4-77		31		
PR	M3.0	ITEM-3, GUARD PIPE 36.750" I.D. x 1.625" MIN. WL. CK028	5-3-77	99			
QC	M3.1	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER. 25537	5-4-77		01		
PR	M4.0	ITEM-4, INSULATION.					
QC	M4.1	VERIFY MATERIAL CONFORMANCE.					
PR	M5.0	ITEM-5, END COVER, .020" THK. CM216	5-3-77	99			
QC	M5.1	VERIFY CERTIFIED MATERIAL TEST REPORT.	5-4-77		31		
PR	M6.0	ITEM-6, COVER, .020" THK. CM216	5-3-77	99			
QC	M6.1	VERIFY CERTIFIED MATERIAL TEST REPORT.	5-4-77		31		

REVISION APPROVAL	RECEIVED	
<u>[Signature]</u> 4/27/77 Q.C. MANAGER APPROVAL	TEMP FILE	<u>[Signature]</u> 4/27/77 AUTHORIZED INSPECTOR REVIEW
		<u>[Signature]</u> PROJECT ENGINEER

NOTE: AFTER COMPLETION RETURN TO QUALITY CONTROL CHIEF INSPECTOR

ARMCO STEEL CORPORATION

MACHINERY & EQUIPMENT DIVISION

STATION: CATAWBA 1-2
DP CO. ITEM NO.: 1206.00-3.1
MPS CO. ORDER NO. C-12523



CHECKED
8-5-76
AS

CK-525
J-5191-T
132

ADDRESS REPLY TO
1524 BORDER AVENUE
TORRANCE, CALIF. 90508

CERTIFICATE OF COMPLIANCE

Customer Associated Piping & Engrg. P.O. No. 42249-5 item 1
Heat No. 522368-B1 Armco Order No. 28287 -1
Part No. H-6855 Item No. _____
Part Name (1) Flued Head 5 1/4 x 40 x 3 1/4 APN NO. 607

Armco Steel Corporation certifies that the material covered by this certification was manufactured in accordance with the requirements of the purchase order. In addition, we certify that the material has been tested and that the results conform to the requirements of the specifications listed below.

Applicable Documents:

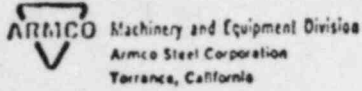
1. ASME Boiler and Pressure Vessel Code, Section III, Subsection NC, 1974 Edition including Summer 1974 Addenda.
2. ASME-SA-105, ASME Boiler and Pressure Vessel Code, Section II, 1974 Edition including Summer 1974 Addenda,
3. Duke Power Specification CNS-1206.00-3.0.

DUKE POWER COMPANY
QA RECORDS APPROVED
J. L. Joiner
QA REPRESENTATIVE
DATE 5/10/77

APPROVED
AP & E
Q.C. DEPT.
DATE 8/11/76
SIGNED [Signature]

J. A. Wheeler

Title Quality Assurance Analyst
Date July 29, 1976



CUSTOMER Associated Piping & Engrg. Corp.

LABORATORY REPORT

CUSTOMER'S PURCHASE ORDER NO. 42240

DATE 7-29-76 BY J. A. Vehec

NSCO SALES REGISTER NO. IPN-28287-1

SPECIFICATION NO. ASME-SA-105

PART NAME (1) Flued Head (54 x 40 x 34)

APN No. 607

PART NO. H-6855

CUSTOMER'S DRG. NO. _____

NSCO DRG. NO. 151066-10

COUPON IDENTIFICATION	TENSILE TEST				LONGITUDINAL		X	HARDNESS		IMPACT TEST	
	PROOF STRESS	P.S.I.	ULTIMATE STRENGTH	P.S.I.	ELONG.	REDUCT.		BRINELL		LONG	TRANS.
	YIELD STRENGTH	P.S.I.			%	%	ROCKWELL		IZOD	FT. LBS.	
<u>522368-B1</u>	57,200 ✓		87,000		28.0	55.6					
	<u>HEAT TREATMENT</u>				<u>TEST LOCATION</u>		<p>APPROVED AP & E Q.C. DEPT. DATE <u>8/11/76</u> SIGNED <u>J.A. Vehec</u></p> <p>The above test results were obtained from a forged test coupon that was heat treated with the part:</p>				
	<p>Anneal 1600°F (21 Hrs.) Furnace Cool.</p> <p>STATION: CATAWBA 1-2 DP CO. ITEM NO.: 1206.00-3.1 MPS CO. ORDER NO. C-12528</p>										
REQUIRED	36,000		70,000		22.0	30.0					

HEAT NO.	CHEMICAL ANALYSIS										A. S. T. M GRAIN SIZE
	C	MN.	SI.	P.	S.	CR.	VA.	NI.	MO.		
<u>522368</u>	.23 ✓	.92 ✓	.28 ✓	.015 ✓	.014 ✓						
REQUIRED	MAX. .35	1.05	.35	.04	.05						
	MIN. .22	.60									

The chemical, physical, or mechanical tests reported above are correct as contained in the records of the Corporation.

ARMCO STEEL CORPORATION

James A. Vehec

James A. Vehec

CK-031
030

CERTIFICATE OF TEST ON PIPE MATERIAL

Cameron

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

SOLD TO
ASSOCIATED PIPING & ENGINEERING CORP.
P. O. BOX 43
COMPTON, CA 90220

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

Date 23 April 1976

Customer Order No. 42939 *item 2* C.I.W. Sales Order No. F-5565 Specification ASME-SA106-GR. C AND ASME-SECTION III THRU SUMM 1974 ADDENDA, CLASS 2 COMPONENTS.

Description of Material O.D. _____ I.D. 31.250" WALL 1.510" M.W.

C.I.W. Part No. 86-5565-345-312

Heat No.	Location or Serial No.	CHEMICAL ANALYSIS							
		C	MN	P	S	SI	CR	NI	MO
L 2463		.25	1.00	.011	.018	.21	CK-031		
L 2743		.24	.94	.012	.008	.26	CK-030		

APPROVED
AP & E
Q.C. DEPT.
DATE 6/2/76
SIGNED [Signature]

J-5191-T

Quantity or Serial No.	Heat No.	Test Lot#	Tensile PSI	.2% Offset Yield PSI	MECHANICAL PROPERTIES			Flat-tening Test	Bar Size	Test Loc.
					% Elong. 2"	% Red. Area	Macro Etch			
6	L 2743	#013	77,400	53,100	30.6	57.8	OK	.505	Trans.	
1	L 2463	022	80,200	56,200	28.0	53.7	OK	.500	Trans.	

Forg. Ser. #	Test Lot#	Heat#	V-Notch Charpy Impact Test at 20°F.:			
			Test Lot#	Ft. Lbs.	Lat. Exp.	D/F%
#25517Y	013	L 2743	#013	93.0	.068	59%
25517Z	"	"	"	82.0	.060	54%
25518Y	"	"	"	79.0	.060	55%
25518Z	"	"	#022	87.0	.063	66%
25519Y	"	"	"	77.0	.059	69%
25519Z	"	"	"	80.0	.059	65%
25520Z	022	L 2463				

STATION: CATAWBA 1-2
DP CO. ITEM NO.: 1206.00-3.1
MPS CO. ORDER NO. C-12523

DUKE POWER COMPANY
QA RECORDS APPROVED
J. J. Joire
for [Signature] and found acceptable
DATE 5/13/77

Hydrostatic Test Each length of pipe hydrostatically tested at 2100 psi for [Signature] and found acceptable

Heat Treatment:
1700°F., held 2 hrs. at temp. Air Cooled.
1575°F., held 1 hr. at temp. Air Cooled.

Subscribed and Sworn to before me this
23rd Day of April 1976
[Signature]
Notary Public
C. A. TOUCHTON
Notary Public in and for Harris County, Texas
CAMERON 100th Anniversary Expires June 1, 1972

I certify these tests to be correct as contained in the records of the company.
[Signature]
Metallurgical Representative
O. WRIGHT

CERTIFICATE OF TEST ON PIPE MATERIAL

Commercial

ASSOCIATED PIPING & ENGINEERING CORP.
P. O. BOX 4309
COMPTON, CA 90220

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

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

DATE 28 April 1976

Customer Order No. 42939 *item* ASME-SA106 Gr. C and ASME Section III Thru Sub 1974 Addenda, Class 2 Components
C.I.M. Order No. F-5564

Material Description: ID. 36.750" WALL 1.625" U.S.

C.I.M. Part No. 86-5564-403-368

Heat No.	Location of Sample No.	CHEMICAL ANALYSIS							
		C	MN	P	S	SI	CR	NI	MO
L 2772		.23	.99	.009	.017	.24			
L 2773		.25	.92	.007	.012	.24			

J-5191-T
132

STATION: CATAWBA 1-2
DP CO. ITEM NO.: I206.00-3.1
MPS CO. ORDER NO. C-12523

Qty. or Sample No.	Heat No.	Test Loc.	MECHANICAL PROPERTIES							Flaw Test	Specimen Size	Test Lot#
			Tensile P.S.I.	.2 in. Offset Yield P.S.I.	Elongation %	Red. Area %	Impact	Charpy				
4	L 2772	Trans.	74,900	46,900	28.7	56.0			OK	.505	037	
		Trans.	74,900	48,900	29.5	56.8			OK	.505	039	
3	L 2773	Trans.	74,900	50,900	28.5	56.5			OK	.505	039	

V-Notch Impact Test at 20°F.:

Heat#	Test Lot#	Ft. Lbs.	Ductile Fracture	Lateral Expansion
CK-028	L 2772	037	47.5	50%
			62.0	60
			60.5	90
039			66.0	45
			64.0	65
			57.5	55
CK-029	L 2773	039	59.0	60
			69.0	60
			66.0	60

APPROVE
AP & E
Q.C. DEPT.
DATE 6/2/76
SIGNED [Signature]

Forg. Ser. #	Heat#	Test Lot#	Forg. Ser. #	Heat#	Test Lot#
25533	L 2772	037	25538	L 2773	039
25534	L 2772	057	25539	L 2773	039
25536	L 2772	057	25540	L 2773	039
25537	L 2772	039			

Each length of pipe hydrostatically tested at 2000 psi for 5 sec. and found acceptable.

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

Subscribed and sworn to before me this 28th Day of April 1976

[Signature]
G. A. TOUCHTON

DUKE POWER COMPANY
QA RECORDS APPROVED
[Signature]
QA REPRESENTATIVE
DATE 5/13/77

[Signature]
O. WRIGHT, 1st

(1)

DATE REC'D 1/2/75 ASSOCIATED PIPING & ENGINEERING CORP **PRODUCTION** SHEET 1 CF 9
 DATE REQ'D PR "MESS" PRODUCTION TRAVELER REVISION 0
 1974 EDITION THRU SUMMER '74 ADDENDA
 S.S./DWG# D-23771 PC.MK/S/N# 2-M393 APPL. ASME CODE: SECTION III CLASS: 2 ASME S/N: H-6860

CUSTOMER: DUKE POWER COMPANY DESCRIPTION: TYPE I
 PROJECT: STATION: CATAWBA-2 PROCESS PIPE SUB-ASSEMBLY
 JOB # T-5191 OPERATION: ACCUMULATION OF MATERIAL
 CUST. DWG# CM-1678-1
 CUST. SPEC# CM-1206.CO-3.0
 CUST. P.O.# C-12523

CODE INSP: YES NO NOTICE IN ADVANCE N/A HOURS SOURCE INSP: YES NO NOTICE IN ADVANCE 120 HOURS

DEPT.	OPR. NO.	OPERATION DESCRIPTION	DATE	OPR.	Q.C. ACC.	SOURCE INSP.	CODE INSP.
	M1.0	ITEM-1, FLUED HEAD 50" x 40" x 34".	5-3-77	99			
	QC	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER.	5-4-77		09		
	M2.0	ITEM-2, PROCESS PIPE 31.250" I.D. x 1.510" MIN. WL.	5-3-77	99			
	QC	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER. <u>25518Y</u>	5-4-77		09		
	M3.0	ITEM-3, GUARD PIPE 36.750" I.D. x 1.625" MIN. WL.	5-3-77	99			
	QC	VERIFY CERTIFIED MATERIAL TEST REPORT. NOTIFY CUSTOMER. <u>25539</u>	5-4-77		09		
	M4.0	ITEM-4, INSULATION.					
	QC	VERIFY MATERIAL CONFORMANCE.					
	M5.0	ITEM-5, END COVER, .020" THK.	5-3-77	99			
	QC	VERIFY CERTIFIED MATERIAL TEST REPORT.	5-4-77		09		
	M5.0	ITEM-6, COVER, .020" THK.	5-3-77	99			
	QC	VERIFY CERTIFIED MATERIAL TEST REPORT.	5-4-77		09		

REVISION APPROVAL RECEIVED

[Signature] 4/27/77 Q.C. MANAGER APPROVAL TEMP FILE
[Signature] 4/27/77 AUTHORIZED INSPECTOR REVIEW
[Signature] PROJECT ENGINEER

NOTE: AFTER COMPLETION RETURN TO QUALITY CONTROL CHIEF INSPECTOR

CK-524
J-5191-T

ARMCO STEEL CORPORATION
MACHINERY & EQUIPMENT DIVISION

STATION: CATAWBA 1-2
DP CO. ITEM NO.: 1206.00-3:1
MPS CO-ORDER NO. C-12523



CHECKED
8-5-76
AM

ADDRESS REPLY TO
1524 BORDER AVENUE
TORRANCE, CALIF. 90508

CERTIFICATE OF COMPLIANCE

Customer Associated Piping & Engrg. P.O. No. 42249 - 5 item 1
Heat No. 522370-B2 Armco Order No. 28287-2
Part No. H-6861 Item No. _____
Part Name (1) Flued Head 54 x 40 x 34 APN NO. 613

Armco Steel Corporation certifies that the material covered by this certification was manufactured in accordance with the requirements of the purchase order. In addition, we certify that the material has been tested and that the results conform to the requirements of the specifications listed below.

Applicable Documents:

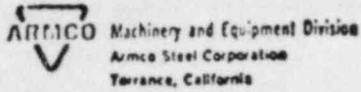
1. ASME Boiler and Pressure Vessel Code, Section III, Subsection NC, 1974 Edition including Summer 1974 Addenda.
2. ASME-SA-105, ASME Boiler and Pressure Vessel Code, Section II, 1974 Edition including Summer 1974 Addenda,
3. Duke Power Specification CNS-1206.00-3.0.

DUKE POWER COMPANY
QA RECORDS APPROVED
J. L. Janner
QA REPRESENTATIVE
DATE 5/10/77

APPROVED
AP & E
Q.C. DEPT.
DATE 8/11/76
SIGNED [Signature]

J. A. Vheer

Title Quality Assurance Analyst
Date July 29, 1976



LABORATORY REPORT

CUSTOMER Associated Piping & Engrg. Corp.

CUSTOMER'S PURCHASE ORDER NO. 42240

NSCO SALES REGISTER NO. IPN-28287 -2

SPECIFICATION NO. ASME-SA-105

DATE 7-29-76 BY J. A. Vehec

PART NAME (1) Flued Head (54 x 40 x 34)

APN No. 613
PART NO. H-6861

CUSTOMER'S DRG. NO. _____

NSCO DRG. NO. 151066-10

COUPON IDENTIFICATION	TENSILE TEST					LONGITUDINAL		X	HARDNESS		IMPACT TEST	
	PROOF STRESS	P.S.I.	ULTIMATE STRENGTH	ELONG.	REDUCT.	BRINELL	ROCKWELL		SHORE	LONG.	TRANS.	
	YIELD STRENGTH	P.S.I.		P.S.I.	%			%		IZOD	FT. LBS.	
	YIELD POINT	P.S.I.	X						CHARPY	FT. LBS.		
<u>522370-B2</u>	54,100 ✓			27.0 ✓	54.5 ✓							
<p><u>HEAT TREATMENT</u></p> <p>Anneal 1600°F (21 Hrs.) Furnace Cool.</p> <p>STATION: CATAWBA 1-2 OP CO. ITEM NO.: 1206.00-3.1 MPS CO. ORDER NO. C-12523</p>						<p><u>TEST LOCATION</u></p> <p>The above test results were obtained from a forged test coupon that was heat treated with the part.</p>						
REQUIRED	36,000			70,000	22.0	30.0						
HEAT NO.	CHEMICAL ANALYSIS										A. S. T. GRAIN S	
	C.	MN.	SI.	P.	S.	CR.	VA.	NI.	MO.			
<u>522370</u>	.25 ✓	.95 ✓	.27 ✓	.018	.017							
REQUIRED	MAX. .35	1.05	.35	.04	.05							
	MIN. .22	.60										

APPROVED
AP & E
Q.C. DEPT.
DATE 8/1/76
SIGN'D J. A. Vehec

The chemical, physical, or mechanical tests reported above are correct as contained in the records of the Corporation.
ARMCO STEEL CORPORATION
James A. Vehec
(signed)
James A. Vehec

CK-030
030

CERTIFICATE OF TEST ON PIPE MATERIAL

Cameron

IRON WORKS
P. O. BOX 1212
HOUSTON, TEXAS

SOLD TO
ASSOCIATED PIPING & ENGINEERING CORP.
P. O. BOX 43
COMPTON, CA 90220

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

Date 23 April 1976

Customer Order No. 42939 Item 2 C.I.W. Sales Order No. F-5565 Specification ASME-SA106-GR. C AND ASME-SECTION III THRU SUPP. 1974 ADDENDA, CLASS 2 COMPONENTS.

Description of Material: O.D. _____ I.D. 31.250" WALL 1.510" M.W.

C.I.W. Part No. 86-5565-345-312

Heat No.	Location or Serial No.	CHEMICAL ANALYSIS							
		C	MN	P	S	SI	CR	NI	MO
L 2463		.25	1.00	.011	.018	.21	CK-031		
L 2743		.24	.94	.012	.008	.26	CK-030		

APPROVED
AP&E
QC DEPT.
DATE 4/26/76
SIGNED J. J. Givins

J-5191-T

Quantity or Serial No.	Heat No.	Test Lot#	Tensile PSI	.2% Offset Yield PSI	MECHANICAL PROPERTIES			Macro Etch	Band Test	Flattening Test	Bar Size	Test Loc.
					% Elong. In. 2"	% Red. Area						
6	L 2743	#013	77,400	53,100	30.6	57.8			OK	.505	Trans	
1	L 2463	022	80,200	56,200	28.0	53.7			OK	.500	Trans	

Forg. Ser. #	Test Lot#	Heat#	V-Notch Charpy Impact Test at 20°F.:			
			Test Lot#	Energy Ft. Lbs.	Lat. Exp.	D/F%
#25517Y	013	L 2743	#013	93.0	.068	59%
25517Z	"	"	"	82.0	.060	54%
25518Y	"	"	"	79.0	.060	55%
25518Z	"	"	#022	87.0	.063	66%
25519Y	"	"	"	77.0	.059	69%
25519Z	"	"	"	80.0	.059	65%
25520Z	022	L 2463				

STATION: CATAWBA 1-2
DP CO. ITEM NO.: 1206.00-3.1
MPS CO. ORDER NO. C-12523

DUKE POWER COMPANY
QA RECORDS APPROVED
J. J. Givins
DATE 5/13/77

Hydrostatic Test Each length of pipe hydrostatically tested at 2100 psi for _____ and _____

Heat Treatment:
1700°F., held 2 hrs. at temp. Air Cooled.
1575°F., held 1 hr. at temp. Air Cooled.

Subscribed and Sworn to before me this
23rd Day of April 1976
[Signature]
Notary Public
L. K. TOUCHTON
Notary Public in and for Harris County, Texas
CAMERON 1965 by Commission Expires June 1, 1972

I certify these tests to be correct as conducted in the presence of the company.
[Signature]
Metallurgical Representative
O. WRIGHT

CERTIFICATE OF TEST ON PIPE MATERIAL

Cameron

ASSOCIATED PIPING & ENGINEERING CORP.
P. O. BOX 4309
COMPTON, CA 90220

IRON WORKS
P. O. BOX 1212
HOUSTON, TEXAS

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

Rev 28 April 1976

Customer Order No. (42939) item 1 Job Order No. F-5564 ASME-SA106 Gr. C and Section III Thru Sub 1974 Addenda, Class 2 Components

Material: 304 SS I.D. 36.750" WALL 1.625" U.S.

C.I.M. Number 06-5564-403-368

Spec. No.	Location	CHEMICAL ANALYSIS							
		C	MN	P	S	SI	CR	NI	MO
<u>L 2772</u>		.23	.99	.009	.017	.24			
<u>L 2773</u>		.25	.92	.007	.012	.24			

J-5191-T
132

STATION: CATAWBA 1-2
DP CO. ITEM NO.: I206.00-3.1
MPS CO. ORDER NO. C-12523

Quantity	Heat#	Test Loc.	MECHANICAL PROPERTIES							Flam. Test	Specimen Size	Test Lot
			Tensile PS	2% Offset Yield PS	Elong. %	Red. Area	Charpy	Ball	Hardness			
4	<u>L 2772</u>	Trans.	74,900	46,900	28.7	56.0			OK	.505	037	
		Trans.	74,900	48,900	29.5	56.8			OK	.505	039	
3	<u>L 2773</u>	Trans.	74,900	50,900	28.5	56.5			OK	.505	039	

V-Notch Impact Test at 20°F.:

Heat#	Test Lot#	Ft. Lbs.	Ductile Fracture	Lateral Expansion
<u>CK-028 L 2772</u>	037	47.5	50	.028
		62.0	60	.056
		60.5	90	.058
<u>CK-029 L 2773</u>	039	66.0	45	.064
		64.0	63	.059
		57.5	55	.060
		59.0	60	.054
		69.0	60	.063
		66.0	60	.058

APPROVED
AP & E
Q.C. DEPT.
DATE 6/2/76
SIGNED [Signature]

Forq. Ser. #	Heat#	Test Lot#	Forq. Ser. #	Heat#	Test Lot#
25533	L 2772	037	25538	L 2773	039
25534	L 2772	037	25539	L 2773	039
25536	L 2772	037	25540	L 2773	039
25537	L 2772	039			

Each length of pipe hydrostatically tested at 2000 psi for 5 sec. and found acceptable.

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

Subscribed and sworn to before me on the 28th Day of April 1976

[Signature]
G. A. TOUCHTON
Cameron Iron Works

DUKE POWER COMPANY
QA RECORDS APPROVED
[Signature]
QA REPRESENTATIVE
DATE 5/13/77

[Signature]
O. WRIGHT

DUKE POWER COMPANY
QUALITY ASSURANCE DEPARTMENT
SUPPLIER QUALITY ASSURANCE CERTIFICATION

Name of Supplier ITT Grinnell Ind. Piping, Inc. Date 3-23-78
Address of Supplier Plant Kernersville, NC Mill Power Order No. C-12517
Duke Item or Req. No. 1206.00-1.0
Spec. No. CNS-1206.00-1.0 Rev. _____

Supplier ID Nos. _____

Description of Component(s) or Material(s) Fabricated Piping Assembly
CT-SM-4A

Attached Documentation covers all Components/Materials on Mill Power Order.
 Attached Documentation covers partial shipment of Components/Materials on Mill Power Order.

The following listed tests, inspections and reports have been completed as required by the specification:

- | | | |
|--|--|---|
| <input checked="" type="checkbox"/> Physical & Chemical Analysis | <input type="checkbox"/> Major Repair Records & Charts | |
| <input type="checkbox"/> Hydro (Test Pressure - PSIG _____) | <input checked="" type="checkbox"/> Personnel Qualifications on Record | |
| <input type="checkbox"/> Design Report | <input type="checkbox"/> Stress Report | <input checked="" type="checkbox"/> Heat Treatment |
| <input checked="" type="checkbox"/> Radiographic Test | <input type="checkbox"/> Ultrasonic Test | <input checked="" type="checkbox"/> Magnetic Particle |
| <input checked="" type="checkbox"/> Penetrant Test | <input type="checkbox"/> Repair NDE | <input checked="" type="checkbox"/> Cleanliness |
| <input type="checkbox"/> Operating Test | <input type="checkbox"/> Performance Curve | <input checked="" type="checkbox"/> ASME Data Report |
| <input checked="" type="checkbox"/> Dimensional Check | <input type="checkbox"/> Deviation Record # _____ | |

- 1) _____
- 2) _____
- 3) _____

This certifies that the listed Component(s) or Material(s) conform to the requirements of the above referenced Duke Power documents including all codes, standards, test requirements and Quality Assurance requirements invoked therein.

DUKE POWER COMPANY
QA RECORDS APPROVED
Gary L. Keener
QA REPRESENTATIVE
DATE 4/27/78

Thomas A. Smith
Supplier Representative Authorized Signature
Title Mgr. of Doc Date 3-23-78

(See Instructions)

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

1. Fabricated by ITT Grinnell Ind. Piping, Inc., Kernersville Order No. 7127
(Name and Address of Fabricator) NC

2. Fabricated for Duke Power Company, Charlotte, NC Order No. C 12517
(Name and Address)

3. Owner Duke Power Company 4. Location of Plant Newport, SC

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

(a) Drawing No. CT-01-SX Prepared by ITT GRINNELL INDUSTRIAL PIPING INC.
(b) National Board No. N/A

6. The material, design, construction, and workmanship complies with ASME Code Section III, Class N-2
Edition 1974, Addenda Date Winter 1974, 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)

Supplemental Sheets 2 ---Drawings
3 ---Bill (s) of Material

7. Shop Hydrostatic Test Field psi.

8. Description of piping inspected Piece Mark Number CT-5M-4A
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length
See Attached Sheets
- fittings - flanges, etc.)

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 3-28-78 Signed ITT Grinnell Ind. Piping, Inc. By Thomas A. Smith
(Fabricator)

Certificate of Authorization Expires 7-16-79 Certificate of Authorization No. N-1456

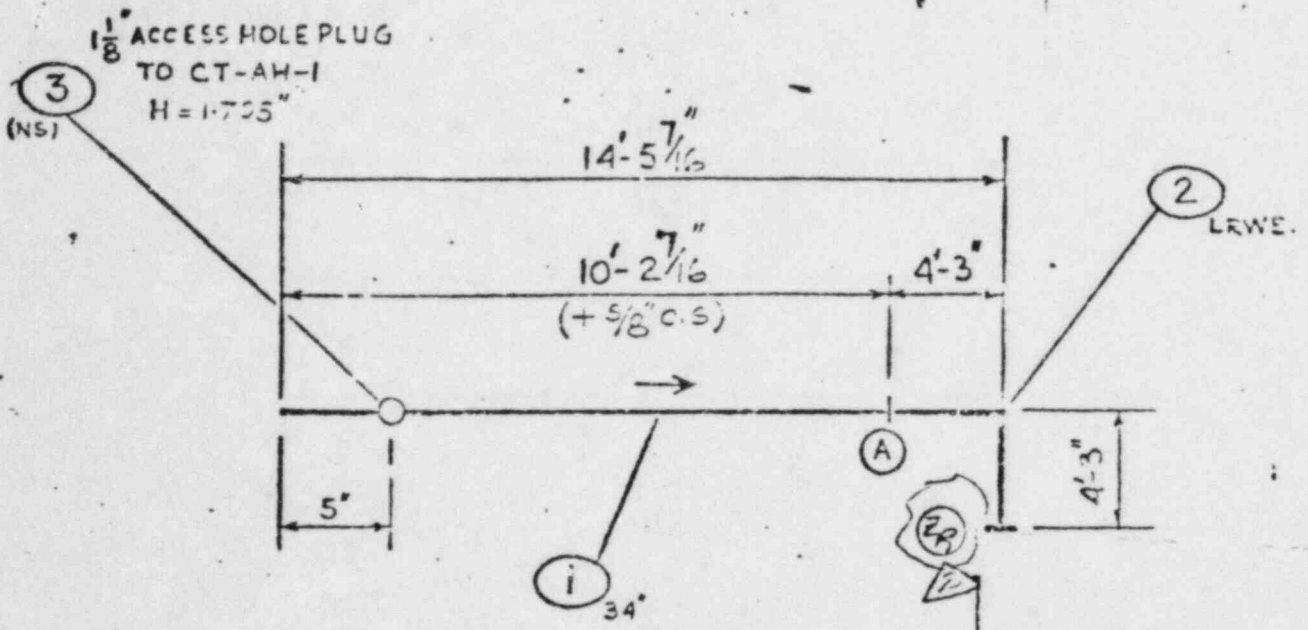
CERTIFICATE OF SHOP INSPECTION
I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province of N.C. and employed by HARTFORD CT. of HARTFORD CT. have inspected the piping described in this Data Report on 3-29-78, and 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. THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE CO.
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 3-29-78 Barry K. Bore
(Inspector) Commissions N.C. - No. 878
National Board, State, Province and No.

* 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 in Item 7, "Remarks".
Printed in U.S.A. (2/73) This form (E62) is obtainable from the ASME, 345 E. 47th St., New York, N.Y. 10017

CONT. NO. 7127
NAME: DUKE POWER COMPANY
LOCATION: CATAWBA UNIT #1
Charlotte NC.
P.O. C12517

→ REDRAWN 10-28-77 ✓
REV. ① 12-14-77 ✓
REV. ② 2-2-78 ✓
REV. _____ ✓

LENGTH OF ACCESS HOLE PLUG SHALL
BE ± 1/16" OF ACTUAL WALL THICK.
SHOP SHALL GRIND TO FIT—IF REQUIRED.



REVISION

PIPE: 31-436 I.D X 1-375 MW,
SA-106C.
FLG:
B. W. FTTG: SA-234 WFB-W OR
F. S. FTTG: SA-234 WPC.
SA-105.

PAINT FLOW ARROWS

MACHINE ENDS
PER SKETCH CT-D-2

Nuclear Safety Related

CLASS DUKE B LINE SPEC. PS 1500.5 (a) APP. CODE 200-50 III, CL 2 NO. REQ'D. 1

• Radiography (RT) ✓	• Special Marking	• Preheat ✓	• Cert. of Compliance
• Mag. Particle (MT) ✓	• Special Cleaning ✓	• Heat Treat	• Mill Test Reports ✓
• Dye Penetrant (PT)	• Painting ✓	• Code Stamp ✓	• Data Reports ✓

SYSTEM MAIN STEAM (SM) FAB. SPEC. J.S. 116
REF. DRWG NO. CN-149A-SM003 (REV2) PRESS. 1135 ST. TEMP. 600 °F. WT. 8546 LBS
RECE MARK CT-SM-4A REGISTER CT-01-5X

GRINNELL INDUSTRIAL PIPING, INC.

KERNERSVILLE N.C.

FORM EN-102 REV 3/78
C.A. FORM N2.1F

H.P.

Register No. CT-01-5X

**MATERIALS RECORD
PRODUCTION PLANNER**

Sheet B of B

Piece Mark CT-SM-4A

Job Name **DUKE POWER COMPANY
CATAWBA UNIT #1**

Revision No. _____ Revision Date _____

Contract No. 7127 Location _____

ITEM	PART NUMBER	DESCRIPTION	QUAN OR LENG	QUALITY CONTROL			ACCOUNTING/MATERIAL				
				HEAT NUMBER	DOCUMENT IN PRC	TEST	STATUS	U/M	UNIT PRICE P.O.	DIS. VENDOR	NET
1	PERCT-EP-1 CT-01-11-1	3.4 31.433" I.D X 1.375" MW SMLS CS PIPE TO ASME SA-106 GR.C	1	L313018 W-266-20	2/21/78	2/21/78	Q.C. 751	F	14.78		
	L.AAT C-17-1 CT-01-17-1	3.4 31.433" T.D X 1.375" MW 90LRWE TO SA-234WPB-W, MADE FROM SA-515 GR.70 PLATE, (70,000 PSI TENSILE), OR SA-234WPC SEAMLESS, ENDS PER DETAIL CT-D-2.	1	ARAR-1	Bluff	10/21/78		E			1023
	1.12 CT-01-12-1	1" ACCESS HOLE PLUG PER CT-A11-1, SA-105, H=1.705	1	ABF	H	2/22/78	Q.C. 751	E	F236		EX 2 R 7/2/78
	3.4	SP END PROT. PERCT-EP-1	2					E			
	3.4	SPIDER BRACING PERCT-ES-1	2					E			12/19 BOM

Code Amc. Sec. III, Cl. 2

Class DUKE B

Nuclear Safety Related

Job Supplement

JSUB

MEG Code

CONTRACT 7127 CLASS 3 SPECIFICATION 351166 SUPPLEMENT 51172

WELD DATA

DATE	SCUT		INTERMEDIATE		FINAL		RT DATE
	WELDER I.D.	WELD MAT'L	WELDER I.D.	WELD MAT'L	WELDER I.D.	WELD MAT'L	
1-43-3	PROC C321	1-43-3	PROC C321	1-13-5	PROC 1-13-5	Q.C. APPROVED	Q.C. APPROVED
5174 065118	PROC C312	065118	PROC C312	1ACD*	PROC 065118	Q.C. APPROVED	Q.C. APPROVED
2-21-78 10013	PROC 10013	10013	PROC 10013	10013	PROC 10013	Q.C. APPROVED	Q.C. APPROVED
1-43-3	PROC C321	1-43-3	PROC C321	1-13-5	PROC 1-13-5	Q.C. APPROVED	Q.C. APPROVED
5174 065118	PROC C312	065118	PROC C312	1ACD*	PROC 065118	Q.C. APPROVED	Q.C. APPROVED
2-21-78 10013	PROC 10013	10013	PROC 10013	10013	PROC 10013	Q.C. APPROVED	Q.C. APPROVED
3-14-78	PROC 3-14-78	3-14-78	PROC 3-14-78	3-14-78	PROC 3-14-78	Q.C. APPROVED	Q.C. APPROVED

Q.C. DOC. APPROVAL
 3/28/78
 Q.C. APPROVAL
 3/28/78
 Q.C. APPROVAL
 3/28/78

SPECIAL OPERATIONS:
 C DIM. N/A
 WALL THK. N/A
 OTHER N/A

FINAL INSPECTION: 3/28/78
 Q.C. APPROVAL
 3/28/78

DATE DATE: 3/14/78
 3/15/78

Req. No. D-32

ITT GRINNELL INDUSTRIAL PIPING, INC.

5B B-3

In-Process

Repair

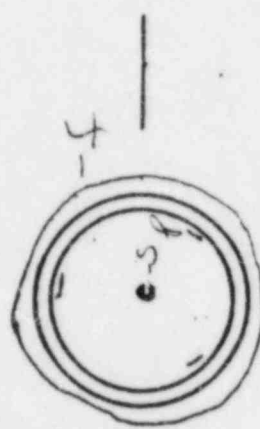
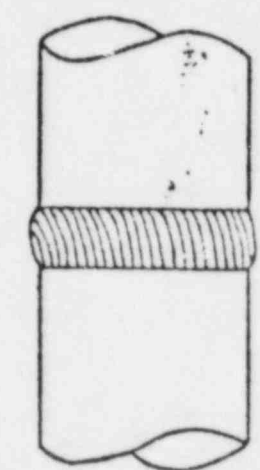
RADIOLOGIC DEFLECTION CURVE

Form N6.3A

Standard Hours

Date 3-8-74

Station or Register No. <u>CT-01-5X</u>	Block No. <u>4A</u>	Field No. <u>AGL</u>	Pipe Size and Schedule <u>3" x 1/2" (C-205)</u>	Material <u>C-205</u>
Flux <u>FR192</u>	Defect Type	Development	Exposure	Development
Source Curie or KVP & WL <u>50</u>	LP	SP	UT	VC
Source Size at Focal Spot <u>1/2"</u>	A	B	C	CR
Source Film Distance <u>17"</u>				
Time <u>3-15</u>				
Actual Weld Thickness <u>1.437</u>				
Penetrometer <u>30</u>				
Nonlinearity <u>37</u>				
Thin Thickness <u>0.62</u>				
Film Size <u>7x17</u>				
Film Type <u>R</u>				
Viewing Technique <input checked="" type="checkbox"/> Double <input type="checkbox"/> Single				
Screen	Front	Back	68" End of Pipe	Automatic
Development				
Welding Procedure				



Customer Duke Power Co. Location Catawba Unit 1 & 2

Contract 7147/1500 Job No. _____

Inspection Standard ASME Section V Radiographic Standard ASME Section V

Customer's Approval - Date _____

Inspector's Approval - Date 3/10/74 by Allyson

Station 310-18 by Allyson

Station 310-18 by Allyson

Hawford 3/10/74 (RS)

REVERSE SIDE FOR WELD REPAIR

Req. No. C-910
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.
S.B.B.3

In-Process
 Repair

Form N6.3A

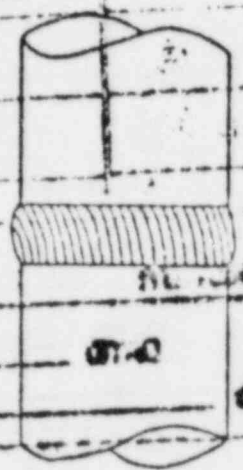
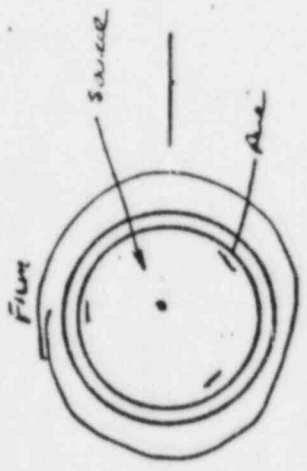
Standard Hours 3-3-78

Date 3-3-78

LABORATORY DESCRIPTION REPORT

Specimen or Reference No. <u>CT-01-5X</u>		Pipe No. <u>CT-5M-4A</u>		Weld No. <u>A</u>		Film Size and Exposure <u>1108 1108 1108 1108</u>		Holder No. <u>C-3101 C-3124 C-1463</u>	
View	1	Source	$\frac{1}{4}$ 142	Defect Type	UC	UC	UC	UC	UC
Source Curves or SFD & WL	100	Source Size at Focal Spot	.142	SP	UC	UC	UC	UC	UC
Source Film Distance	17	Source Film Distance	17	CR	UC	UC	UC	UC	UC
Time	2:45	Time	2:45	CT	UC	UC	UC	UC	UC
Actual Weld Thickness	1.437	Actual Weld Thickness	1.437	CS	UC	UC	UC	UC	UC
Penetrant	30	Penetrant	30	CC	UC	UC	UC	UC	UC
Sensitivity	2T	Sensitivity	2T	CB	UC	UC	UC	UC	UC
Thin Thickness	.002	Thin Thickness	.002	CC	UC	UC	UC	UC	UC
Film Size	7 X 17	Film Size	7 X 17	CC	UC	UC	UC	UC	UC
Film Type	70	Film Type	70	CC	UC	UC	UC	UC	UC
Viewing Technique	Single <input checked="" type="checkbox"/> Double <input type="checkbox"/>	Viewing Technique	Single <input checked="" type="checkbox"/> Double <input type="checkbox"/>	CC	UC	UC	UC	UC	UC
Screen	Front .010	Screen	Front .010	CC	UC	UC	UC	UC	UC
Development	40' ends 8 min.	Development	40' ends 8 min.	CC	UC	UC	UC	UC	UC
Welding Procedure	Automatic	Welding Procedure	Automatic	CC	UC	UC	UC	UC	UC
	1-43-78		1-43-78	CC	UC	UC	UC	UC	UC
	1-13-78		1-13-78	CC	UC	UC	UC	UC	UC

SP - Lack of Penetration UC - Under Cut
 SC - Lack of Fusion CC - Crater
 CB - Crack CC - Crack
 CC - Crack CC - Crack
 CC - Crack CC - Crack
 CC - Crack CC - Crack
 CC - Crack CC - Crack



Customer ITT GRINNELL CO.
 Contract 11277798
 Inspection Standard ISA 181-10
 Radiographer - Date 3-6-78 By [Signature]
 Interpretation - Date 3-6-78 By [Signature]
 Approval - Date 3-6-78 By [Signature]

DELIVERED - SIDE FOR WELD REPAIR

WELD REPAIR REQUESTION

REPAIR PROCEDURE: ES-1068 (530)

WELDING PROCEDURE	WELDER	HEAT/LOT NO.	D. C. VE
<input type="checkbox"/> 1-4-3-3 (150)	C205		065155 WW24 (150) 3-7-78
<input type="checkbox"/> 1-1-3-5 (150)	1205		*FACE W 70 *VIA LL W 27M *VIA LF W 31 (150) 3-7-78

(150)

PTP-1-0
PE GOUGE AREA EN ACCEPT REJECT

DATE

REPAIR COMPLETED 3/2/78

* 421A1061/02-1-E705P
 ** 402B1441/02-3-S719K
 *** 431A0451/03-1-G719J

Req. No. C-911
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.

SB B-3

In-Process
 Repair

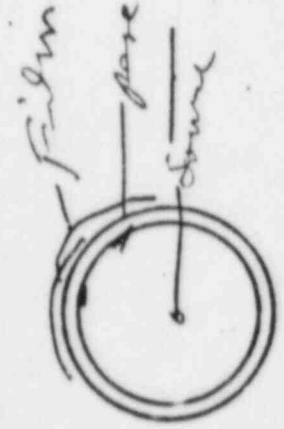
Form N6.3A

Standard Hours

Date 3-3-78

BARBARUS INSPECTION SERVICE

Specimen or Inventory No. <u>CT-61-5A</u>		Spec No. <u>Bk 2R</u>	Roll No. <u>11.775</u>	Order No. <u>C-428R13</u>
Spec No. <u>CT-JM-4A</u>		Roll No. <u>Bk 2R</u>	Spec No. <u>11.775</u>	Order No. <u>C-428R13</u>
Form	<u>1</u>	Defect Type		
Source	<u>IR-192</u>	SP		
Source Code of IR 68	<u>56</u>	PT		
Source Size of Focal Spot	<u>142</u>	US		
Source Film Distance	<u>17</u>	C		
Time	<u>1:05</u>	CR		
Actual Weld Thickness	<u>.250</u>	Y		
Penetration	<u>5</u>	AS		
Sensitivity	<u>4T</u>			
Exposure	<u>.250</u>			
Film Size	<u>9 1/2 X 17</u>			
Film Type	<u>55</u>			
Developing Procedure	<input checked="" type="checkbox"/> Single <input type="checkbox"/> Double			
Screen	Front <u>.010</u>			
	Back <u>.010</u>			
Development	<u>60' Endicott</u>			
	Automatic <u>X</u>			
Working Procedure	<u>1-6-3-3-R13</u>			
Comments <u>PROV. TECHNICALS SUR</u>				
* (X-RAY REPAIR LIP) AS MARKED)				



Customer Duke Power Co. Location Catawba Unit 1 & 2
 Contract 71077 Job No. _____
 Inspection Standard ASME B31.1 Inspector's Standard _____
 Customer Approval - Date _____ By Hartford 3/6/78
 Inspector's Signature [Signature] Inspector's Standard ASME B31.1

LIQUID PENETRANT EXAMINATION REPORT

Customer: DIKE PWR Register No.: CT-01-5X

Contract/P.O. No.: 7128 Piece Mark: CT-SM-4A

System: MAIN STM

Examination Method: SOLVENT REMOVABLE- VISABLE DYE

Penetrant Batch No. CF890 Manufacture: SPOT CHECK
 Developer Batch No. 07A005 Procedure: PTP-1-0
 Cleaner Batch No. G0048 Acceptance: PTA-1-0

ITEM IDENTIFICATION WELD/SERIAL/HT. NO.	SIZE AND THICKNESS	AREA EXAMINED ROOT, INTERMEDIATE FINAL WELD OR MATERIAL	INTERPETATION
<u>A</u>	<u>3/4 x 1.375</u>	<u>WELD (REPAIR)</u>	<u>1-2 CC</u>

EXAMINATION PERFORMED BY: ROBERT E. STRADER DATE: 3-7-78
 NDT Level: II

INTERPRETATION PERFORMED BY: R. E. Strader DATE: [Signature]
 NDT Level: II

MAGNETIC PARTICLE EXAMINATION REPORT

Custome: Duke Pur. Register No.: CT-015x
 Contract/P.O. NO.: 7127 Piece Mark: CT-Sm-4A
 System: Main line
 Examination Method: DC Prods AC Yoke Other
 Equipment Type: Magna Flux Model No.: Y-6
 Procedure: MTP-1-1 Acceptance: MTP-1-0

ITEM IDENTIFICATION WELD/SERIAL/HT. NO.	SIZE AND THICKNESS	AREA EXAMINED INDICATE, ROOT, INTERMEDIATE, FINAL WELD OR MATERIAL AS APPLICABLE	RESULTS
<u>ZP</u>	<u>34" x 325"</u> <u>code plate</u>	<u>B/U &</u> <u>Fillet</u>	<u>accept</u> <u>✓</u>

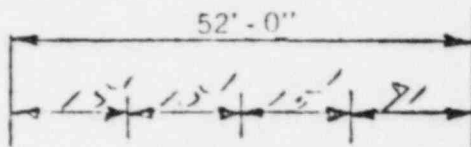
EXAMINATION PERFORMED BY: T. Smith DATE: 3-15-78
 NDT Level: II
 INTERPRETATION PERFORMED BY: T. Smith DATE: 3-15-78
 NDT Level: II

Load Number _____

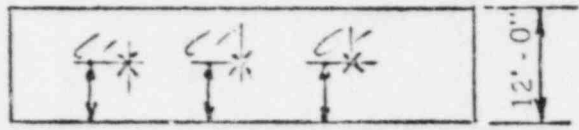
FURNACE LOAD SHEET

Date 3-14-78

REGISTER NO.	SKETCH NO.	TYPE MATERIAL	WEIGHT	TEMP. REQD.*	RATE OF HT PER HR	HOLD TIME	RATE OF COOLING PER HOUR	SPEC. NO.	TIME IN	TIME OUT
CT	01-5X	406 C	8546	1150 ^{±25}	400'	2 hrs	20°	S-III	34"	1.375
CT	01-18X	"	12081	"	400'		down S-III		34"	1.750
CT	01-27X	"	12081	"	1150°		20°	S-III	34"	1.750
CW	01-19X	"	12081	"			600°	S-III	34"	1.750
CW	01-7X	"	12081	"				S-III	34"	1.750
CW	01-41X	"	12081	"				S-III	34"	1.750
WH	04-17	406 B	6755	"				131.1	164	526
WP	3-8	XC6004	15092	"				11	34"	0.85
			90798							



PLAN



ELEVATION

THERMOCOUPLE LOCATIONS

1/2 INCH EQUALS 100MM
S/N RECORDER AND PROGRAM
C70-5346-1-1 1013-973

TIME TO REACH TEMP 4 1/2 HRS
TIME AT TEMP 2 HRS
TIME TO COOL 5 1/4 HRS

- Copy 1 - Shop File
- 2 - Q. C.
- 3 - Billing
- 4 - Master Log Clerk

* Temperature variation within any 15 foot interval of weld length shall not exceed 250 degrees F

Load Inspection to insure against local flame impingement
Q. C. Stamp 3-14-78

DEG FAHR

600

1000

1200

1400

1600

1800

12:00
PM

CT CI - 5-X
 CT CI - 78-X
 CT CI - 27-X
 CW CI - 14-X
 CW CI - 7-X
 CW CI - 41-X
 MH 4-17
 WP 3-8

600

800

1000

1200

1600

1800

2000

1:00
PM

400
 350
 300

DEG FAHR

1000

1200

1400

1600

1800

2000

TIME TO REACH TEMP AT 1/2 HRS
 TIME AT TEMP 1/2 HRS
 TIME TO COOL 5/4 HRS

3/8 INCH EQUALS 3MM
 S/N RECORDER AND PROG RAM
 C70-53463-1-1 S0333976001

4:00 PM 3-14-78
 LOAD SHEET 0806

CERTIFICATE OF TEST ON PIPE MATERIAL

Cameron

IRON WORKS, INC.

P. O. BOX 1212

HOUSTON, TEXAS 77001

ITT GRINNELL INDUSTRIAL PIPING, INC.
KERRISVILLE, NC 27284

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

Date 22 July 1976

Customer Order No. **KER-2853-P** C.I.W. Sales Order No. **F-5693** ASME-SA106 Gr. C and ASME Section III, Class 2 Thru Summer 1974 Addenda

Description of Material O.D. _____ x I.D. **31.438"** x WALL **1.375" M.W.**

C.I.W. Part No. **86-5693-345-314**

Heat No.	Location or Serial No.	CHEMICAL ANALYSIS							
		C	MN	P	S	SI	CR	NI	MO
L 3117		.24	.89	.012	.021	.23			
L 3120		.25	.86	.018	.014	.23			
L 3130		.24	.96	.011	.015	.23			

Quantity or Serial No.	Heat No.	Test Loc.	Yield Point		MECHANICAL PROPERTIES					Specimen Size	Test Lot#
			Tensile PSI	% Offset Yield PSI	2% Elong. In.	% Red. Area	Macro Etch	Bend Test	Flattening Test		
4	L 3117	Trans.	79,900	44,700	25.0	45.8			OK	.505	17
2	L 3120	Trans.	85,600	48,700	23.8	44.0			OK	.505	20
4	L 3130	Trans.	77,900	40,200	27.9	50.8			OK	.505	30

Forq. Ser. #	Heat #	Test Lot #
26614Z	L 3120	20
26616Z	L 3120	20
26619H	L 3130	30
26619Y	L 3130	30
26620X	L 3130	30
26620Z	L 3130	30
26621T	L 3117	17
26621U	L 3117	17
26621Y	L 3117	17
26624Z	L 3117	17

CATAWBA
P# 8



Hydrostatic Test: Each length of pipe hydrostatically tested at 1200 psi for 5 sec. and found acceptable.
Heat Treatment:

Subscribed and Sworn to before me this
22nd Day of July 1976
Notary Public
Harris County, Texas
My Commission Expires June 1, 1977

I certify these tests to be correct as contained in the records of the company.
Metallurgical Representative
WRIGHT, /st

WELD TEST CERTIFICATE

SOLD TO ITT Grinnell Corporation
Kernersville, N.C.
 SHIP TO Same for Duke Power

ITT GRINNELL CORPORATION
 WELDING PRODUCTS DIVISION
 PRINCETON, KY.

Kernersville

OUR ORDER NO. 62935
 BRANCH ORDER NO. List 2833
 CUSTOMER'S ORDER NO. _____

DATE November 15, 1976

DESCRIPTION OF FITTING	PHYSICAL PROPERTIES FITTING MATERIAL				CHEMICAL ANALYSIS							HEAT CCODE 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-234 WPC													A-106C
3.525 x 1.375 Min. wall	F	44900	82400	25.0	.25	.98	.013	.011	.22			CT-01-17-1	ARAP
LR 90° Ell												CW-01-17-1	
-Ditto-	F	40900	79900	27.7	.26	1.02	.010	.011	.25			" "	ARAR
-Ditto-	F	45900	85100	27.9	.25	1.01	.009	.021	.23			" "	ARBT
<div style="border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block; margin-bottom: 10px;"> <i>Catana</i> <i>BWF-16</i> </div>													
*Standard round test specimen used for tensile properties. The above fittings were manufactured and tested in strict compliance with ASME Section III, 1974 Edition, Class 2 through the 1974 Summer Addenda.													
We certify that the fittings listed herein comply with the requirements of ASME Section III, SA234. They were produced in accordance with the tests by manufacturers Quality Systems Program, directed by the American Society of Mechanical Engineers as evidenced by the issuance of Quality Systems Certificate (Certificate Number 1114).													

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

The Colonial Machine Company, Inc.

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

Phone (814) 539-7033

SEPT. 20, 1977

ITT GRINNELL INDUSTRIAL PIPING, INC.
P. O. BOX 566
KERNERSVILLE, NC 27284

CERTIFIED MILL TEST REPORT

CT
AP-4

YOUR ORDER NO. KER 8630-B	OUR ORDER NO. 10457	DATE SHIPPED 9/20/77
-------------------------------------	-------------------------------	--------------------------------

ITEM	TYPE	MATERIAL-SPEC.	SHIPPED	HEAT NO.	CMC
		ASME SECTION III CLASS 2 (1974 ADDENDA THRU WINTER 1974) ASME SA105			
1 (89590)		1.13" ACCESS HOLE PLUGS PER CT-AH-1, H = 2.188" PART NO. CT-4012-1	12	78849	ABF
2 (89591)		1.13" DITTO H = 1.705" PART CT-4012-2	25	78849	ABF
3 (89592)		1.13" DITTO H = 2.609" PART CT-4012-3	16	78849	ABF
4 (89593)		1.13" ACCESS HOLE PLUGS PER CT-AH-2, H = 1.705", PART CT-4012-4 (SQUARE HEAD)	30	78849	ABF

ITEM	C	MN	P	S	SI	CR	NI	MO	CU	CB	TI	CO	OTHER ELEMENTS
1 THRU 4	.26	.71	.013	.025	.23								

ITT G IPI
QA OK
YCN
DATE 9-28-77

ITEM	TENSILE	2% YIELD	% ELONG.	% R.A.	HARDNESS	HARDEN- ABILITY	REMARKS: 1. 2. 3. 4. 5. 6. ETC.
1 THRU 4	75000	48500	32.0	58.6			MILL SOURCE - COPPERWELD

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.

By *[Signature]*



UNION CARBIDE CORPORATION
LINDE DIVISION
 WELDING MATERIALS
 P.O. BOX 710, ASHTABULA, OHIO 44004

CT
 WW13

July 15, 1977

CUSTOMER: Industrial Welding Supply
 2501 Champagne
 Ashboro, N.C. 27203
 (For: ITT Grinnell)

YOUR ORDER NO.: 11-476
LINDE S.O. NO.: 011476 U
QUANTITY: 420 lbs.

MATERIAL: Linde 65 - Heat No. 065118 - 1/8" Diameter x 36" Straight Lengths

This is to certify that Linde 65, Class E70S-2, as supplied under the above order number, shipped from one heat number, has been tested using the test assembly specified in Fig. 5 of AWS A5.18-69, and ASME SFA5.18 specifications. The wire met all the mechanical and impact property requirements of these specifications using the gas-tungsten arc welding process with Argon shielding gas. During the manufacturing processes, tests, and inspection the materials furnished under this contract have not come in direct contact with mercury or any of its compounds nor with any mercury-containing device employing a single boundary of containment.

<u>MECHANICAL PROPERTIES OF WELD(S) PER TABLE 3 -</u>	<u>AS-WELDED</u>	<u>* STRESS RELIEVED</u>	<u>REQUIRED</u>
Weld Test Number	G0524-1	G0526-1	
All-Weld Metal Tensile			
Yield Strength, psi	69,400	70,900	60,000 min
Ultimate Strength, psi	79,700	83,900	72,000 min
Elongation in 2", %	32.5	30.0	22 min
Reduction of Area, %	79.0	74.1	-----

CHARPY V-NOTCH IMPACT
STRENGTH @ -20°F (ft./lbs.)

As-Welded	*S.R.
126.5	130.0
101.5	95.0
120.5	97.5
100.0	66.0
79.5	132.5
107.3 (Ave. 3)	107.5 (Ave. 3)

LATERAL EXPANSION
(INCHES)

As-Welded	* S.R.
.076	.085
.074	.067
.080	.072
.073	.055
.063	.085

DUCTILE FRACTURE AREA
(PERCENT)

As-Welded	* S.R.
60	50
50	50
60	50
50	40
35	

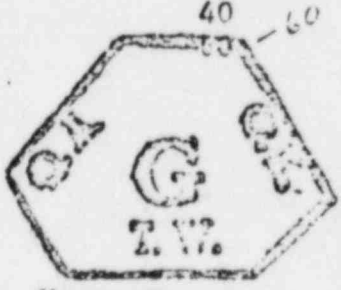
* Required 20 ft./lbs.

RADIOGRAPHIC TESTS: X-ray(s) met the requirements of Fig. 1
APPLICATION CONDITIONS: 230 Amps, 15 Volts, 5/6 Inches Per Minute

CHEMICAL ANALYSIS:

C	Mn	P	S	Si	Al	Ti	Zr	Ni	Cr	Mo	V	Cu
.04	1.11	<.01	.017	.55	.11	.06	.03	.03	.01	<.01	<.01	.01
.06	.90	.025	.035	.40	.05	.05	.02	---	---	---	---	---
max.	1.40	max.	max.	.70	.15	.15	.12	---	---	---	---	---

- Actual
 - Required
 < = less than



* Weldment Stress Relieved at 1125°F, plus or minus 25°F, for 8 hours. Cooling rate 100°F/hr. to 500°F, then air cooled.

Sworn to before me this
 day of July 1977

R. J. McDonato
 Materials Standards Specialist

PAUL E. TAYLOR
 Henry Ford, Ashland, Ohio

CERTIFIED MATERIALS TEST REPORT

CATAWBA
WW-29

National Welders Supply
P.O. Box N-93
3011 N. Liberty Street
Winston Salem, N.C. 27105

Customer Order No. 4365 Re1.14-42

Order No. 711093-2

Shipped _____

This material conforms to Specification
ITT Spec. ES 1073-
SFA 5.1 Sec. III

Trade Name or Trademark: Atom Arc 7018
Diameter Size: 3/32"
19,650 lbs.
Lot Number: 02-1-J728P
Heat Number: 411B6841

Type E 7018
Test No. 650
X-Rays Satisfactory
Control No. MMM074

Moisture @1800°F. 0.29%
Concentricity 4%
Type Steel A-285

Test No.	Full	Split	Volts	Amps
Tensiles & Impacts	1	6	22	110

Test Results:	As Welded 8 hrs. @1150°F.	Stress Relieved
Yield	73,100	65,400
Tensile	80,000	75,900
Elongation	28.0%	30.0%
Red. of Area	76.0%	77.9%

Charpy V-Notch Impacts Tested @-20°F.
Impacts 42-58-63-72-82 68-72-80-92-98
Lat. Exp. 38-48-52-59-68 58-61-67-78-83
%Shear 20-20-20-20-30 20-30-30-30-30

Filletts: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIAL)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1977

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

Carbon	.04
Manganese	1.06
Chromium	.03
Nickel	.02
Silicon	.48
Columbium + Tantalum	
Molybdenum	.01
Tungsten	
Copper	.02
Titanium	
Phosphorus	.012
Sulphur	.016
Vanadium	.03

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE DEC. 22 1977
SHEET 1 OF 1

Rec. Report #647

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 21st day of November 1977

SEAL *Anneta G. Ramsey*
Notary Public

My commission expires: 8/21/78

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

BY *D. G. Flohr*
D. G. Flohr

ITT Grinnell

Industrial Piping Inc.

CT
WW-23

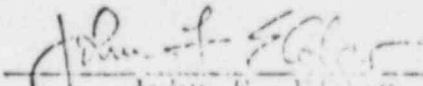
SUBJECT: Welding Filler Materials
WIRE: RACO 128, Heat No. 517715
FLUX: Linde 80; Lot 0575, Con. No. C8290

This is to certify that the subject materials were welded into test plates as shown in SFA 5-1, that the test results shown in Taussig Associates, Inc. Report 21547 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III, Cl. 1 material in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This material may not be used on impact-tested fabrication.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the Winter of 1975 Addendum.

ITT & IPI
CA OK
TCM
DATE OCT. 26 1977


John F. Elder
Materials Engineer

Date: 10/26/77

Spanning Associates Inc.

6955 N. HAMILIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



Report No. 21547 - August 3, 1977

ITT Grinnell Industrial Piping, Inc.
P. O. Box 566 - Hwy 421
Kernersville, North Carolina 27284

Attention: Mr. J. F. Edler

CT
WW 23

SUBJECT

Weld Metal Testing of Two Plates Marked Number 320.

LA & IPI
LA CK
TCW
DATE OCT 26 1977

BACKGROUND:

Two welded plate assemblies were submitted to our laboratory for chemical analysis, impact testing and tension testing of the weld metal. The assemblies were identified as Test Plate #320; RACO 128, heat number 517715; Linde 80 flux; lot 0575. One of the plates was to be tested in the as-welded condition and the second was to be stress relieved before testing.

CT
WW 23

TEST RESULTS:

Chemical Analysis:

The weld metal of one of the submitted plates was drilled in a manner which prevented removal of material from the base metal. These drillings were then cleaned and subjected to a quantitative chemical analysis with the following results:

	<u>#320</u>
Carbon	.04
Manganese	1.38
Phosphorus	.014
Sulfur	.023
Silicon	.51
Nickel	<.05
Chromium	<.05
Molybdenum	.52
Copper	.11
Vanadium	<.01

ITT & IPI
QA OK
TCW
DATE OCT. 26 '57

Heat Treatment:

The plate which was not drilled for chemical analysis was cut to fit into a heat treating furnace. The pieces were heated to 1100°F and held for 16 hours. Cooling was done at 200°F/hr to below 800°F.

Tension Testing:

One, round, all weld metal, tensions test specimen was machined from each plate assembly; as-welded and after heat treatment. Each specimen was subjected to a standard tension test with results as follows:

	<u>As-Welded</u>	<u>Heat Treated</u>
Tensile Strength, psi.	79,700	78,760
Yield Point, psi.	67,570	63,750
% Elongation, in 2"	28	28

Impact Testing:

A total of eleven, full size (10 mm x 10 mm), Charpy V-notch impact test specimens were machined from the two submitted plate assemblies. Three of the specimens were from the as-welded plate and eight were from the heat treated plate. All were notched in the weld metal.

CT
WJ 23

As-Welded:

<u>Test Temperature °F</u>	<u>Absorbed Energy ft-lbs</u>	<u>Mils of Lateral Expansion</u>	<u>Percent Shear</u>
+30	32	31	20
+30	13	17	10
+30	32	32	20

Heat Treated:

+30	42	38	30
+30	46	42	30
+30	40	37	30
-20	19	16	10
-20	30	28	10
-20	30	28	10
-20	25	22	10
-20	28	26	10

Respectfully submitted,

Mark A. Hineman

Mark A. Hineman
Staff Engineer
TAUSSIG ASSOCIATES, INC.

MAIL:ln

ITT G IPI
CA. UK
TOW
DATE OCT 26 1977

~~ITT~~ Grinnell

Industrial Piping Inc.

CT
WW 24

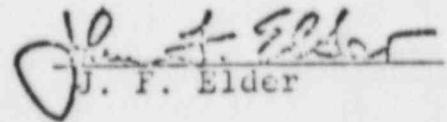
SUBJECT: Welding Filler Materials

WIRE: Linde 65, Heat No. 065155

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 5-2 that the test results shown in Taussig Associates, Inc. Report 22557 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This may also be used on impact tested material with a minimum service temperature of +30 degrees F.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 Edition.


J. F. Elder

ITT 8 197
CA 13
TCW
DATE NOV 17 1977
PAGE 145

Date: 11/16/77



UNION CARBIDE CORPORATION
 LINDE DIVISION
 WELDING MATERIALS
 P.O. BOX 710, ASHTABULA, OHIO 44004

Nov. 11, 1977

CUSTOMER: ITT Grinnell
 Old Highway 421
 Kernersville, N.C. - 27284

YOUR ORDER NO. 11-023
 LINDE S.O. NO. 1023-U

1/8" Dia.
 S/L Red

*CT
 WW-24*

MATERIAL: Linde 65

THIS IS TO CERTIFY THAT THIS MATERIAL WILL CONFORM TO AWS A5.18-60
 ASME SPAS. 18. IT HAS THE FOLLOWING CHEMICAL ANALYSIS MEETING THE
 REQUIREMENTS OF CLASSIFICATION E70S-2:

<u>HEAT NUMBER</u>	-	065155
CARBON	-	.03
MANGANESE	-	1.05
PHOSPHOROUS	-	.006
SULPHUR	-	.018
SILICON	-	.41
Aluminum	-	.07
Titanium	-	.10
Zirconium	-	.04

Ladle Analysis:

Howard Fisher / Ret
 QUALITY ASSURANCE - WELDING MATERIALS PLANT
 UNION CARBIDE CORPORATION - LINDE DIVISION

ITT G IPI
 CA OK
 TCH
 DATE NOV 17 1977
 Page 24

KLR

Jauszig Associates Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



Report No. 22557 - November 11, 1977

ITT Grinnell Industrial Piping, Inc.
P. O. Box 566
Highway 421
Kernersville, North Carolina 27284

Attn: Mr. J. F. Elder

CT
ww 2.4

S U B J E C T

Mechanical and Chemical Testing of the Weld
Metal of Two (2) Plates Marked Nos. 411 and
412.

ITT G IPI
CA OK
TCM
DATE NOV 7 1977
page 3 of 5

BACKGROUND:

Two (2) welded plate assemblies were submitted to our laboratory for chemical analysis, charpy impact and tension testing of the weld metal. The assemblies had been identified as test plate nos. 411 and 412 Linde 65, heat no. 065155; tested as-welded and the other tested after a stress relieving heat treatment.

TEST RESULTS:

Chemical Analysis:

The weld metal of plate no. 411 was drilled in a maner which prevented removal of material from the base metal. These drillings were cleaned and subjected to a quanitative chemical analysis with the following results:

Nickel	<.05%
Chromium	<.05
Molybdenum	<.03
Copper	.08
Vanadium	<.01

CT
WW 24

Heat Treatment:

The plate no. 412 was cut to permit it to fit into a heat treating furnace. These pieces were heated to 1125°F and held for 16 hours at temperature. Cooling was done at a rate of less than 200°F/Hr. to below 800°F.

Tension Testing:

Two, round, all weld metal tension test specimens were machined from plates nos. 411 and 412, as-welded and heat treated. Both specimens were subjected to standard tension testing giving the results as follows:

	<u>No. 411</u>	<u>No. 412</u>
Tensile Strength, psi.	81,600	77,950
Yield Strength, psi. (.2% Offset)	75,900	66,300
% Elongation in 2 inches	26	30
% Reduction of Area	73	81

ITT 3 IPI
CA OK
TCW
DATE 11-17-55
PAGE 4 of 5

Impact Testing:

A total of eleven, full size (10mm x 10mm), Charpy V-notch impact test specimens were machined from the two submitted plate assemblies. Three of the specimens were from the as-welded plate and eight were from the heat treated plate. All were notched in the weld metal.

No. 412 - Heat Treated:

<u>Test Temperature</u>	<u>Absorbed Energy (ft-lbs)</u>	<u>Mils Lateral Expansion</u>	<u>Percent Shear</u>
+30	261	84	100
+30	261	95	100
+30	231	76	100

No. 411 - as-Welded

+30	106	75	100
+30	116	84	100
+30	127	83	100
-20	112	78	80
-20	29	25	30
-20	80	58	60
-20	79	61	60
-20	65	46	50

CT
WW 24

Respectfully submitted,

Mark A. Hineman

Mark A. Hineman
Staff Engineer
TAUSSIG ASSOCIATES, INC.

MAH:i

ITT G IPI
QA CK
TCW
DATE NOV 17 1955
Page 545

CERTIFIED MATERIALS TEST REPORT

*Catalpa
ww 27*

Customer Order No. 4365 Rel.14-4

Order No. 711093-2

National Welders Supply
P.O. Box N-93
3011 N. Liberty Street
Winston Salem, N.C. 27105

Shipped _____

This material conforms to Specification
ITT Spec. ES 1073-1
SFA 5.1 Sec. III

Trade Name or Trademark: Atom Arc 7018

Type E 7018

Diameter Size: 1/8"
15,000 lbs.

Test No. 485
X-Rays Satisfactory
Control #MM4045

Lot Number: 02-3-S719R
Heat Number: 402B1441

Moisture @1800°F. 0.24%
Concentricity 4%
Type Steel A-285

Carbon .03
Manganese .89
Chromium .03
Nickel .02
Silicon .36
Columbium + Tantalum
Molybdenum .01
Tungsten
Copper .02
Titanium
Phosphorus .011
Sulphur .020
Vanadium .02

Test No.	Full	Split	Volts	Amps
Tensiles & Impacts	1	5	25	14

Test Results:	As Welded	Stress Relieved
Yield	64,508	62,048
Tensile	77,000	74,698
Elongation	31.0%	29.0%
Red. of Area	79.9%	78.4%

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE DEC 22 1977
SHEET 1 OF 1

Charpy V-Notch Impacts Tested @-20°F.

Impacts 67-83-84-104-106/84-84-97-111-1
Lat. Exp. 53-67-70-77-79 70-72-77-90-83
% Shear 30-20-30-40-50 30-20-20-40-70

Filletts: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIAL)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978
The undersigned certifies that this report is correct and that no significant change has been made in any of the elements described in the qualification approval.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 21st day of November 1977

SEAL *[Signature]*
Notary Public

My commission expires: 8/21/78

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

BY *[Signature]*

CHEMETRON CORPORATION

WELDING PRODUCTS DIVISION

CERTIFIED MATERIALS TEST REPORT

CERTIFICATE OF ANALYSIS

NER-6174-P

Customer Order No. 4365

Order No. 120315-1

NATIONAL WELDERS
551 NINTH STREET
WINSTON SALEM, N.C. 27105

CT
ww30

Shipped

This material conforms to Specification

ASME SFA5.1

Type E 7018

Test No. 959

X-Ray Satisfactory

Control NO. LLL050

Trade Name or Trademark: Atom Arc 7018

Diameter Size: 3/32"
19,950 lb.

Lot Number: 02-1-E705P

Heat Number: 421A1061

Moisture @1800°F. 0.20%

Concentricity 4%

Type Steel A-285

Carbon	.05
Manganese	1.12
Chromium	.04
Nickel	.02
Silicon	.65
Columbium + Tantalum	
Molybdenum	.01
Tungsten	
Copper	.02
Titanium	
Phosphorus	.011
Sulphur	.023
Vanadium	.02

Test No. Full Split Volts Amp

Tensiles & Impacts 1 7 22 10

Test Results: As Welded Stress Relieved 8 hrs. @1150°F.-1200°F.

Yield	66,500	58,500
Tensile	76,900	72,300
Elongation	25.0%	30.0%
Red. of Area	75.0%	79.0%

Charpy V-Notch Impacts Tested @-20°F.

Impacts	52-88-93-93-99	45-100-115-116-123
Lat. Exp.	53-70-72-77-77	48-78-83-88-90
% Shear	20-20-30-30-40	20-30-30-50-50

Fillets: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

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

State of Penna.)
County of) SS

Subscribed and sworn to before me
this 24th day of June 19 77

SEAL Robert F. Halbert
Notary Public

My commission expires: 9/1/80

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

BY R. W. Bover
R. W. Bover

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE DEC. 22 '77
SHEET 1 OF 1

Rec. Report # 649

CERTIFIED MATERIALS TEST REPORT

Customer Order No. 4365 Rel. 14-243

Order No. 711089-3

NATIONAL WELDERS SUPPLY CO.
551 NINTH STREET
WINSTON-SALEM, NC. 27107

*CT
WW31*

Shipped _____

This material conforms to Specification
ASME SFAS.1
ITT Spec. ES 1073-1

Trade Name or Trademark: Atom Arc 7018
Diameter Size: 5/32"
20,000 lb.
Lot Number: 03-1-G719J
Heat Number: 431A0451

Type E 7018
Test No. 258
X-Ray Satisfactory
Control No. MM1012

Moisture @1800°F. 0.18%
Concentricity 3%
Type Steel A-285

Carbon .04
Manganese 1.04
Chromium .03
Nickel .02
Silicon .36
Columbium + Tantalum
Molybdenum .01
Tungsten
Copper .05
Titanium
Phosphorus .010
Sulphur .015
Vanadium .02

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DEC 22 1977
DATE _____
SHEET 1 OF 1

Rec. Report #646

Test NO.	Full	Split	Volts	Amps
Tensiles & Impacts	1	7	23	160
Test Results:	As Welded	Stress Relieved	8 hrs. @1150-1200°F.	
Yield	71,500	61,800		
Tensile	78,000	74,800		
Elongation	23.0%	31.0%		
Red. of Area	56.4%	78.0%		

Charpy V-Notch Impacts Tested @-20°F.

Impacts	135-136-137-192-200	48-106-164-172
Lat. Exp.	88-84-04-95-88	44-75-04-88-83
% Shear	70-70-70-100-100	20-70-80-90-100

Fillets: OK Vertical Overhead
ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 16th day of August 19 77

SEAL *Amelia E. Conway*
Notary Public

My commission expires: 8-21-78

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION
BY *R. W. Boyer*
R. W. Boyer

MA-6
1-78

ITI GRINNELL INDUSTRIAL PIPING, INC.
FINAL LOADING SHEET

Bill of
Lading No.

Loading Sheet No. 7650 Date Loaded 3/30/78

Customer

Order No. CONTRACT #7127 Date Shipped _____ Routing _____

DUKE POWER COMPANY

P. O. BOX 1339,

Sold to C/O MILL POWER SUPPLY Address CHARLOTTE, N.C. 28201

DUKE POWER COMPANY

CATAWBA NUCLEAR STATION

Ship to C/O D. G. BEAM Address SC HWY. 274, SOUTH CAROLINA

Destination				Car Number	Weight	No. Pcs.	Rate
SC HWY. 274, SOUTH CAROLINA				YARBROUGH #57A	30,756	6	
Kernersville Plant No.				Piece Mark	Weight	Remarks	
C T	10 1		5 X	✓ CT-SM-4A	8546		1
C T	10 1		2 7 X	✓ CT-SM-6C	12081		2
C T	10 4		1 8 X	✓ CT-CF-18	428		3
C T	10 4		1 1 1	CT-CF-111	2162		4
C T	10 7	1 5		CT-CM-15	5304		5
C T	10 7	2 0 4		CT-CM-204	2235		6
							7
							8
							9
							10
				DOC #46			11
							12
							13
							14
							15
							16
							17
							18
							19
							20
							21
							22

DUKE POWER COMPANY
 QUALITY ASSURANCE DEPARTMENT
 SUPPLIER QUALITY ASSURANCE CERTIFICATION

Name of Supplier ITT Grinnell Ind. Piping, Inc. Date 5-26-78
 Address of Supplier Plant Karnersville, NC Mill Power Order No. C-12517
 _____ Duke Item or Req. No. 1206.00-1.0
 _____ Spec. No. CNS-1206.00-1.0 Rev. 2
 Supplier ID Nos. CT-01-15X

Description of Component(s) or Material(s) Fabricated Piping Assembly
CT-5M-AB

Attached Documentation covers all Components/Materials on Mill Power Order.
 Attached Documentation covers partial shipment of Components/Materials on Mill Power Order.

The following listed tests, inspections and reports have been completed as required by the specification:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Physical & Chemical Analysis | <input type="checkbox"/> Major Repair Records & Charts |
| <input type="checkbox"/> Hydro (Test Pressure - PSIG _____) | <input checked="" type="checkbox"/> Personnel Qualifications on Record |
| <input type="checkbox"/> Design Report | <input type="checkbox"/> Stress Report |
| <input checked="" type="checkbox"/> Radiographic Test | <input type="checkbox"/> Ultrasonic Test |
| <input type="checkbox"/> Penetrant Test | <input type="checkbox"/> Repair NDE |
| <input type="checkbox"/> Operating Test | <input type="checkbox"/> Performance Curve |
| <input checked="" type="checkbox"/> Dimensional Check | <input checked="" type="checkbox"/> Deviation Record # <u>IP-1565</u> |
| | <input checked="" type="checkbox"/> Heat Treatment |
| | <input checked="" type="checkbox"/> Magnetic Particle |
| | <input checked="" type="checkbox"/> Cleanliness |
| | <input checked="" type="checkbox"/> ASME Data Report |

- 1) _____
- 2) _____
- 3) _____

This certifies that the listed Component(s) or Material(s) conform to the requirements of the above referenced Duke Power documents including all codes, standards, test requirements and Quality Assurance requirements invoked therein.

DUKE POWER COMPANY
 CA RECORDS APPROVED
Gary J. Keenan
 CA REPRESENTATIVE
 DATE 8/25/78

Thomas A. Smith
 Supplier Representative Authorized Signature
 Title Mgr. of Proc. Date 5-26-78

(See Instructions)

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

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

SHEET 1 of 3

1. Fabricated by ITT Grinnell Ind. Piping, Inc., Kernersville Order No. 7127
(Name and Address of Fabricator)

2. Fabricated for Duke Power Company, Charlotte, NC Order No. C-12517
(Name and Address)

3. Owner Duke Power Company 4. Location of Plant Newport, SC

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

(a) Drawing No. CT-01-15X Prepared by ITT Grinnell Industrial Piping, Inc.

(b) National Board No. N/A

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

Edition 1974, Addenda Date Winter 1974, 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)

Supplemental Sheets 2 ---- Drawings
3 ---- Bill (s) of Material

7. Shop Hydrostatic Test Field psi.

8. Description of piping inspected Piece Mark Number CT-5M-4B
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length - fittings - flanges, etc.)
See Attached Sheets

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 5-26-78 Signed ITT GRINNELL Ind. Piping, Inc. by Thomas A. Smith
(Fabricator)

Certificate of Authorization Expires 7-16-79 Certificate of Authorization No. N-1456

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 N.C. and employed by * of Hartford, CT. have inspected the piping described in this Data Report on 5-27-78, 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. *The Hartford Steam Boiler Inspection and Insurance Co.

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 5-29-78
Barry K. Bobb
(Inspector)

Commission N.C. No. 808
National Board, State, Province and No.

* 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 in item 7, "Remarks".
 Printed in U.S.A. (2/73) This form (E02) is obtainable from the ASME, 345 E. 47th St., New York, N.Y. 10017

ITT Grinnell Industrial Piping Inc.

KERNERSVILLE, N. C.

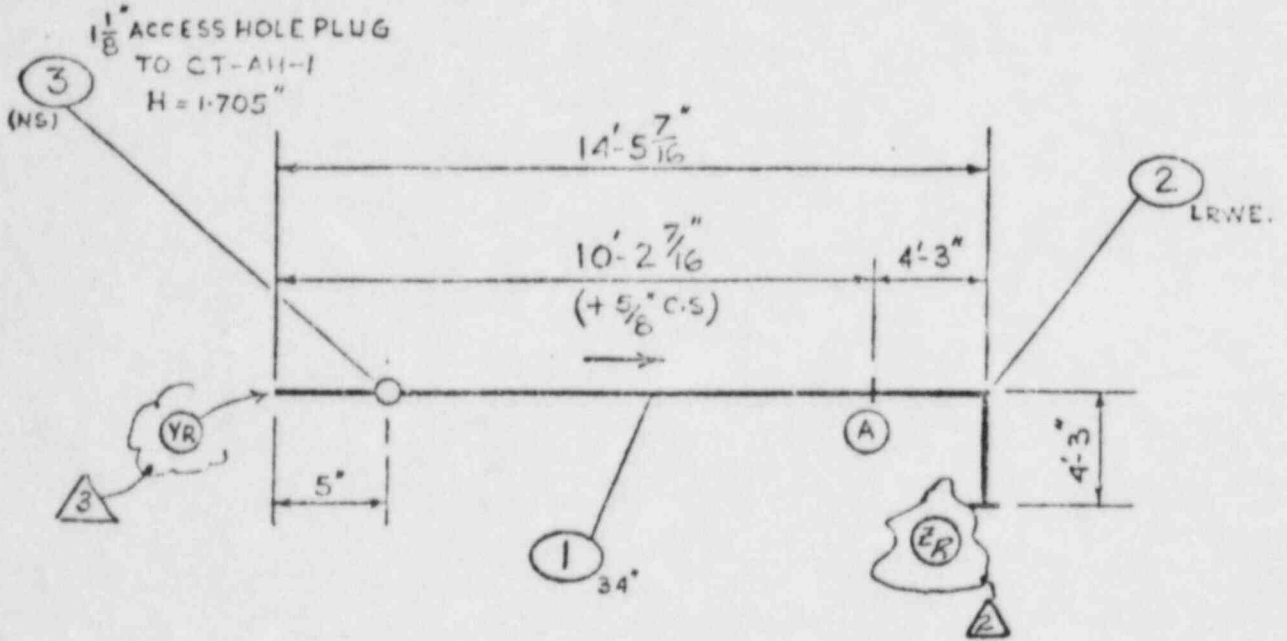
sheet 2 of 2
FORM EN-101 REV 1/77
Q.A. FORM N2.1C

CONT. NO. 7127
NAME DUKE POWER COMPANY
LOCATION CATAWBA UNIT #1
Charlotte, N.C.
C-12517

→ REDRAWN BY J. 10-28-77
REV ① SM 12-14-77
REV ② 763-10-78
REV ③ SM 5-4-78

CHK'D P.C.
CHK'D P.C.
CHK'D P.C.
CHK'D P.C.

LENGTH OF ACCESS HOLE PLUG SHALL
BE ± 1/16" OF ACTUAL WALL THICK.
SHOP SHALL GRIND TO FIT—IF REQUIRED.



PIPE: 31-438 I.D X 1.375 MW.
SA-106C.
FLG:
B. W. FTTG: SA-234 WPB-W OR
SA-234 WPC.
F. S. FTTG: SA-105

QUALITY CONTROL

PAINT FLOW ARROWS

MACHINE ENDS
PER SKETCH CT-D-2

Nuclear Safety Related

CLASS DUKE B LINE SPEC. PS 1500.5 (01) APP. CODE Arms. Sec. III, CL 2 NO. REQ'D 1

Radiography (RT)	✓	Special Marking		Preheat	✓	Cert. of Compliance	
Mag. Particle (MT)	✓	Special Cleaning	✓	Heat Treat		Mill Test Reports	✓
Liq. Penetrant (PT)		Painting	✓	Code Stamp	✓	Data Reports	✓

SYSTEM MAIN STEAM (SM) FAB. SPECS. JS 115
REF. DRWG NO. CN-1491-SM C.O.2 (REV.?) PRESS. 1135 PSI. TEMP. 600 °F. WT. 8546 LBS.
PIECE MARK CT-SM-4B REGISTER CT-01-15X

JAMES GRIMMELL INDUSTRIAL PIPING, INC.

Kerraville, N.C.

Register No. C.T. 01-15X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 3 of 3

DUKE POWER COMPANY

Revision No. _____ Revision Date _____

Job Name CAJAWDA UNIT #1
Cajawda, N.C.

Contract No. 7127 Location _____

Piece Mark C.T. SM-4B

PART NUMBER	DESCRIPTION	QTY	GRADE OR SPEC.	HEAT NUMBER	QUALITY CONTROL DOCUMENT #	PROCESS	STATUS	UNIT PRICE	QTY	TOTAL PRICE	MATERIAL
31-438	31-438 I.D.XI-375 MW. SMLS. 1/2"	1	SA-106								
	CS, PIPE, TO ASME SA-106										
	GRC										
31-439	31-439 I.D.XI-375 MW. 90 LRWE	1	SA-234								
	TO SA-234 WPB-W, MADE										
	FROM SA-515G, R-70 PLATE,										
	(70,000 PSI YIELD), OR										
	SA-234 WPC STAINLESS,										
	ENDS PER DETAIL CT-D-2.										
1-12	1" ACCESS. HOIC PLUG PER	1									
	C.T. AH-1 H-1-705"										
	MAT. TO SA-105										

DUKE GRIMMELL INDUSTRIAL PIPING, INC.

0.5 L 100012

Register No. CT-01-15X Sheet 2 of 2 Revision No. _____ Revision Date _____

Piece Mark CT-SM-4B Job Name CATAWBA UNIT #1 Contract No. 7127 Location _____

MATERIALS RECORD
PRODUCTION PLANNER

DUKE POWER COMPANY

PART NUMBER	DESCRIPTION	QTY	LONG	HEAT NUMBER	QUALITY CONTROL	DOCUMENT IN PROCESS	STATUS	U/M	ACCOUNTING MATERIAL	
									UNIT PRICE P.O.	DIS. VENDOR NET
34	SP. END PROT. PERCT-EPI	2								
34	SP. END BRACING PER CT-E5-1	2								

Case No. 71102 Clerk DUKE B Nuclear Safety Review _____

Job Commitment J5118 MFG. Code _____

11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

1

PROJECT: 7127
CLASS: 2
WELD DATA

| WELD ID | WELD DATA | | WELD DATE | WELD TYPE | WELD MET'L | WELD DATE |
|---------|------------|------------|-----------|-----------|------------|-----------|
| | WELD I.D. | WELD MAT'L | | | | |
| 1-4-2-2 | WOC | W-13-10 | 3/14/78 | WOC | W-13-10 | 3/14/78 |
| 6-5-1-5 | CWS
CWS | W-13-10 | 3/14/78 | WOC | W-13-10 | 3/14/78 |
| 2-8-1-3 | WOC | W-13-10 | 3/14/78 | WOC | W-13-10 | 3/14/78 |
| 1-4-2-2 | WOC | W-13-10 | 3/14/78 | WOC | W-13-10 | 3/14/78 |
| 6-5-1-5 | WOC | W-13-10 | 3/14/78 | WOC | W-13-10 | 3/14/78 |
| 1-4-2-2 | WOC | W-13-10 | 3/14/78 | WOC | W-13-10 | 3/14/78 |
| 6-5-1-5 | WOC | W-13-10 | 3/14/78 | WOC | W-13-10 | 3/14/78 |
| 1-4-2-2 | WOC | W-13-10 | 3/14/78 | WOC | W-13-10 | 3/14/78 |
| 6-5-1-5 | WOC | W-13-10 | 3/14/78 | WOC | W-13-10 | 3/14/78 |

| WELD ID | WELD DATE | WELD TYPE | WELD MET'L | WELD DATE |
|---------|-----------|-----------|------------|-----------|
| 3-30-78 | 3/30/78 | WOC | W-13-10 | 3/30/78 |
| 5-11-78 | 5/11/78 | WOC | W-13-10 | 5/11/78 |
| 5-11-78 | 5/11/78 | WOC | W-13-10 | 5/11/78 |
| 5-11-78 | 5/11/78 | WOC | W-13-10 | 5/11/78 |

ITT Grinnon Industrial Machinery, Inc.

QUALITY CONTROL

FORM NI

FABRICATION NONCONFORMANCE REPORT

REPORT NO. 1P-1505

| | | | |
|---------------------------|----------------------|--------------------------------|---------------------------|
| PROJECT
Dure Power Co. | CONTRACT NO.
7127 | CODE SPEC. # 2
None See III | REGISTER NO.
CT-01-15X |
|---------------------------|----------------------|--------------------------------|---------------------------|

1. DESCRIPTION OF NONCONFORMANCE:

Machined end of Item #1 has damaged lip.
Additional weld metal will be needed for repair.
Area approx. 2" in length and marked with stenciled "O's".

| | | | | |
|------|-------|------------------|--------------|----------------------------|
| SHOP | DATE: | INSP. R. E. Judd | DATE: 4/5/78 | Q.C. J. M. H. DATE: 4/5/78 |
|------|-------|------------------|--------------|----------------------------|

2. RECOMMENDED ACTION:

I.E. route all operations necessary to repair field end of Item #1. Perform all required N.D.E. Document all rework.
~~Engineering~~ Engineering to submit to customer for approval to stress relieve repaired area in field or have I.E. route all operations necessary to stress relieve in house.

Q.C. [Signature] DATE: 4-7-78

3. DISPOSITION:

Return to Q.C. after all rework to close nonconformance report.

REWORK COMPLETED
See Compliance Record for all

| | | |
|------------------------------|-----------------------|--------------|
| NONCONFORMANCE REPORT CLOSED | Q.C. APPROVAL
(iv) | DATE: 5-1-78 |
|------------------------------|-----------------------|--------------|

Grinnell Industrial Piping, Inc.

QUALITY CONTROL

FORM 1

FABRICATION NONCONFORMANCE REPORT

REPORT NO. 9-1505

| | | | |
|--------------------------------|-----------------------------|----------------------------------|----------------------------------|
| PROJECT
<u>to Power Co.</u> | CONTRACT NO.
<u>4117</u> | CODE SPEC.
<u>ASME Sec. I</u> | REGISTER NO.
<u>CT-01-157</u> |
|--------------------------------|-----------------------------|----------------------------------|----------------------------------|

DESCRIPTION OF NONCONFORMANCE:

Machined end of Item #1 has damaged lip.
Additional weld metal will be needed for repair.
Area approx 2" in length and marked with stenciled
'O's.

| | | |
|----------------------|--------------------|-------------------|
| SHOP
<u>DATE:</u> | INSP. <u>DATE:</u> | Q.C. <u>DATE:</u> |
|----------------------|--------------------|-------------------|

RECOMMENDED ACTION:

I.E. route all operations necessary to repair
field end of Item #1. Perform all required M.D.E.
Document all rework.
Engineering to submit to customer
for approval to stress relieve repaired area in field
or have I.E. route all operations necessary to stress
relieve in house.

APPROVED
DUNE POWER CO.
DATE 26 APR 1979
BY CHIEF ENGINEER
MECHANICAL &
INDUSTRIAL DIVISION

10
Q.C. DATE:

DISPOSITION:

to be repaired in house

Req. No. D-332

ITT GRINNELL INDUSTRIAL PIPING, INC.

5B 183

Form N6.3A

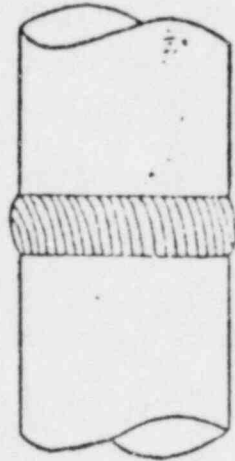
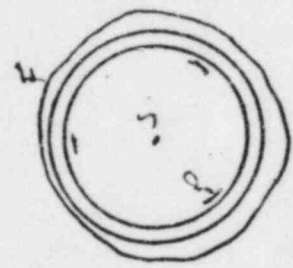
Standard Hours

Date 3-15-78

RADIOGRAPHIC INSPECTION REPORT

| | | | | | | | | | |
|--|--|--|--|-------------------------------------|--|--|--|-----------------------------|--|
| System or
Receiver No. <u>CT-01-15X</u> | | Piece No. <u>CT-57-40</u> | | Weld No. <u>A</u> | | Pipe Size
and Length
<u>20" x 11.75"</u> | | Order No.
<u>C-14688</u> | |
| View | | Film Interval | | Defect Type | | Comments | | Orientation | |
| Source | | AD | | LP, LE, B, P, IT, UC, C, (T, Y, VL) | | Sealed Nut Mks CLR | | X | |
| Source Curve
of KVP & SA | | DG | | | | | | X | |
| Source Size
of Focal Spot | | G-J | | | | | | X | |
| Source Film Distance | | J-M | | | | | | X | |
| Time | | M-P | | | | | | X | |
| Actual Weld
Thickness | | P-S | | | | | | X | |
| Penetrant | | S-V | | | | | | X | |
| Sensitivity | | V-Y | | | | | | X | |
| Beta Thickness | | Y-A | | | | | | X | |
| Film Size | | 7x17 | | | | | | | |
| Film Type | | 70 | | | | | | | |
| Viewing Technique | | Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | | | | | | | |
| Screen | | Front | | | | | | | |
| Development | | Back | | | | | | | |
| Exposure | | 60" Rndt & 40" | | | | | | | |
| Processing | | Automatic | | | | | | | |
| Exposure | | 1.437 | | | | | | | |
| Development | | 2T | | | | | | | |
| Processing | | 30 | | | | | | | |
| Exposure | | 0.02 | | | | | | | |
| Development | | 7x17 | | | | | | | |
| Processing | | 70 | | | | | | | |
| Viewing Technique | | Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | | | | | | | |
| Screen | | Front | | | | | | | |
| Development | | Back | | | | | | | |
| Exposure | | 60" Rndt & 40" | | | | | | | |
| Processing | | Automatic | | | | | | | |
| Exposure | | 1.437 | | | | | | | |
| Development | | 2T | | | | | | | |
| Processing | | 30 | | | | | | | |
| Exposure | | 0.02 | | | | | | | |
| Development | | 7x17 | | | | | | | |
| Processing | | 70 | | | | | | | |

LP - Lack of Penetration
 LE - Lack of Fusion
 B - Burn
 P - Porosity
 IT - Incomplete
 UC - Under Cut
 C - Crater
 C - Crater
 T - Underfill
 VL - Vertical
 Y - Yoke
 A - Acceptable
 B - Rejection
 S - Suspect
 BL - Burn Line



Radiographer - Date 3-16-78 By Wendell J. Ford
 Interpretation - Date 3-16-78 By Allyson Lovel
 Approval - Date 3-16-78 By Allyson
 Customer Electric Power Co. Location Catawba Unit 1
 Contract 100-100000 Job No. 100-100000
 Inspection Standard ASME B31.1 Acceptance Standard
 Customer Approval - Date 3-17-78 By CTB

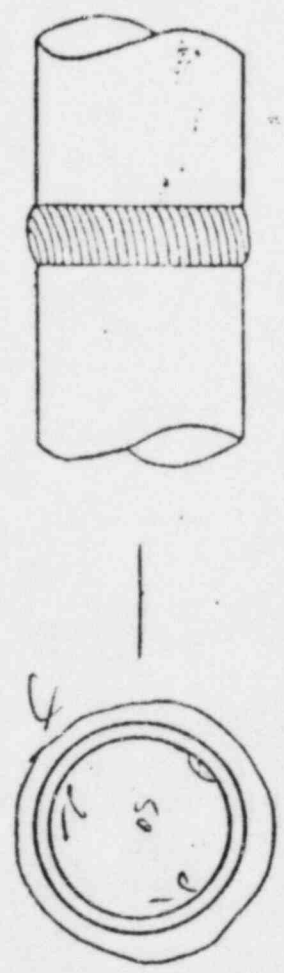
(CTB)
 Hartford

Req. No. D-472
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.
 JAB B-3

In-Process
 Repair

Form N6.3A
 Standard Hours _____
 Date 3-17-74

| | | | | |
|---|---|---|--|---|
| Spec. or
Register No.
<u>C7-01-15X</u> | Spec. No.
<u>CSM-40</u> | Field No.
<u>B-2K</u> | Flaw Size
and Location
<u>FLAW NO. 11225</u> | Flaw No.
<u>C31203</u>
<u>C-22120</u> |
| View
<u>1</u> | Source
<u>ZRRL</u> | Defect Type
LP LK S P ITT VC C CR HL | Comments
<u>SPALLS</u> | MINOR
AVG. <u>X</u> |
| Source Circle
OF STD & RL
<u>80</u> | Source Size
OR Focal Spot
<u>1/2</u> | | | |
| Source Film Distance
<u>17"</u> | Time
<u>:30</u> | | | |
| Actual Weld
Thickness
<u>126</u> | Penetrant
<u>5</u> | | | |
| Sensitivity
<u>15</u> | Expo Thickness
<u>125</u> | | | |
| Film Size
<u>4 1/2 X 17</u> | Film Type
<u>55</u> | | | |
| Viewing Technique
Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | Screen
Front <u>.010</u>
Back <u>.010</u> | | | |
| Development
45° Wash 6 min.
Automatic | Welding Procedure
<u>14-33 RB</u> | | | |



Customer: TRCO Power Co.
 Contract: 15F-181-10
 Inspection Standard: 15F-181-10
 Customer Approval: By _____
 Location: COLUMBUS, OHIO
 Job No.: 15F-1112
 Acceptance Standard: _____
 Radiographer: 316 RT Bantostant
 Date: 3-17-74
 Interpretation: By [Signature]
 Date: 3-20-74
 Approval: By [Signature]
 Date: 3-20-74

Handwritten note: 3/21/74

Req. No. E-946
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.
50 B-3

In-Process
 Repair

Form N6.3A

Standard Hours

Date 5-9-71

RADIOGRAPH INSPECTION REPORT

| | | | | |
|---|--|-------------------------------|--|------------------------------|
| Station or Register No.
<u>CT-01-15X</u> | Spec. No.
<u>CT-511-40</u> | Weld No.
<u>B-4A</u> | Pipe Size and Schedule
<u>3" 40 SCH. 40</u> | Order No.
<u>0-382 RB</u> |
| View | <u>2</u> | Defect Type | Orientation | |
| Source | <u>142</u> | 12 13 14 15 16 17 18 19 20 21 | LOC | |
| Source Curves or RVP & SA | <u>100</u> | | <u>X</u> | |
| Source Size or Focal Spot | <u>.142</u> | | <u>X</u> | |
| Source Film Distance | <u>32 3/4"</u> | | | |
| Time | <u>1:10</u> | | | |
| Actual Weld Thickness | <u>.125</u> | | | |
| Penetrant | <u>5</u> | | | |
| Sensitivity | <u>24T</u> | | | |
| Spin Thickness | <u>.125</u> | | | |
| Film Size | <u>4 1/2 x 10</u> | | | |
| Film Type | <u>55</u> | | | |
| Viewing Technique | Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | | | |
| Screen | Front <u>.010</u>
Back <u>.010</u> | | | |
| Development | <u>40' grade 8 min.</u>
Automatic | | | |
| Welding Procedure | <u>1-K-2.2 K13</u> | | | |

NOTE: WIP RECORD AT A-B + J-J ONLY

Customer DURE PUMP CO. Section Garuda Unit 1 & 2
 Contract 11271728
 Inspection Standard ASME B31.3
 Customer Approval - Date 5-12-71 by [Signature]
 Interpretation - Date 5-16-71 by [Signature]
 Approval - Date 5-16-71 by [Signature]

MAGNETIC PARTICLE EXAMINATION REPORT

Customer: Pulse Power Register No.: CT-01-15X
 Contract/P.O. NO.: 7124 Piece Mark: CT-5B-9B
 System: Main Steam
 Examination Method: DC Prods L AC Yoke _____ Other _____
 Equipment Type: Magna Surf Model No.: M-2000
 Procedure: MTP-1-1 Acceptance: ATH-1-0

| ITEM IDENTIFICATION
WELD/SERIAL/HT. NO. | SIZE AND THICKNESS | AREA EXAMINED INDICATE,
ROOT, INTERMEDIATE, FINAL
WELD OR MATERIAL AS
APPLICABLE | RESULTS |
|--|---|---|---------|
| BW2A | 31.938X1325 ^{5/16} _{AP} | Final | acc |
| core/plate | | Fillet | acc |
| | | | |
| | | | |
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EXAMINATION PERFORMED BY: D. R. Johnson DATE: 3-30-18
 NDT Level: I
 INTERPRETATION PERFORMED BY: D. R. Johnson DATE: 3-30-18
 NDT Level: I

MAGNETIC PARTICLE EXAMINATION REPORT

Custome: Duke PWR Register No.: CT-01-15x

Contract/P.O. NO.: 7127 Piece Mark: CT-SM-4B

System: MN. STM. (S.M)

Examination Method: DC Prods _____ AC Yoke Other _____

Equipment Type: MAGNA FLUX Model No.: Y-6

Procedure: MTP-1-1 Acceptance: MTA-10

| ITEM IDENTIFICATION
WELD/SERIAL/HT. NO. | SIZE AND THICKNESS | AREA EXAMINED INDICATE,
ROOT, INTERMEDIATE, FINAL
WELD OR MATERIAL AS
APPLICABLE | RESULTS |
|--|-----------------------------|---|---------|
| ZR | 31.438" I.D. X 1.375" thick | REPAIR AREAS FINAL | Acc'd |
| FILLET WELDS ON CODE PLATE | | FINAL | Acc'd |
| | | | |
| | | | |
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EXAMINATION PERFORMED BY: J. Andrews DATE: 3-14-78
 NDT Level: II

INTERPRETATION PERFORMED BY: J. Andrews DATE: 3-14-78
 NDT Level: II

MAGNETIC PARTICLE EXAMINATION REPORT

Customer: Duke PWR. Register No.: CT-01-15x

Contract/P.O. NO.: 7127 Piece Mark: CT-SM-4B

System: MH STM

Examination Method: DC Prods _____ AC Yoke Other _____

Equipment Type: MAGNA FLUX Model No.: V-6

Procedure: MTP-1-1 Acceptance: MTA-1-0

| ITEM IDENTIFICATION
WELD/SERIAL/HT. NO. | SIZE AND THICKNESS | AREA EXAMINED INDICATE,
ROOT, INTERMEDIATE, FINAL
WELD OR MATERIAL AS
APPLICABLE | RESULTS |
|--|--------------------|---|---------|
| YR REPAIR AREA 34" O.D x 1.375" wall | | FINAL | Arc'd |
| | | | |
| | | | |
| | | | |
| | | | |
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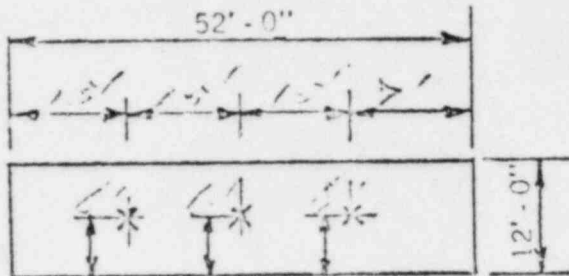
EXAMINATION PERFORMED BY: J. Anderson DATE: 5/9/78
NDT Level: II

INTERPRETATION PERFORMED BY: J. Anderson DATE: 5/9/78
NLT Level: II

Date 3-30-78

Load Number _____ FURNACE LOAD SHEET

| REGISTER NO. | SKETCH NO. | TYPE MATERIAL | WEIGHT | TEMP. REQD.* | RATE OF HT PER HR | HOLD TIME | RATE OF COOLING PER HOUR | SPEC. NO. | TIME IN | TIME OUT |
|--------------|------------|---------------|--------|-------------------|-------------------|-----------|--------------------------|-----------|---------|----------|
| 2W | 01-4X | AA6C | 8546 | 1150 ⁶ | 250 ⁶ | 2 hrs | 250 ⁶ | 711 | 30" | 1:55 |
| 2W | 01-30X | 11 | 12081 | 11 | 11 | | 1 | 711 | 30" | 1:55 |
| PT | 1-15X | 11 | 9546 | 11 | 150 ⁶ | | 1 | 711 | 30" | 1:55 |
| 3D | 1-47 | 11-13 | 10939 | 11 | | | | 711 | 30" | 1:55 |
| MS | 01-53 | 11-20 | 2100 | 11 | | | | 11-21-1 | 26" | 2:35 |
| MS | 07-521 | AA6B | 2518 | 11 | | | | 11 | 11" | 2:20 |
| MS | 1-56 | AA70 | 11702 | 11 | | | | 11 | 21" | 2:30 |
| MS | 01-129 | AA6B | 11035 | 11 | | | | 11 | 21" | 1:20 |
| | | | 1337 | | | | | | | |



PLAN



ELEVATION

THERMOCOUPLE LOCATIONS

1/2 INCH EQUIL 3000
 SYN RECORDER AND PRT 2 VOLT
 C70-53463-1-1 SCJ3057-001
 TIME TO REACH TEMP 3 HRS
 TIME AT TEMP 2 HRS
 TIME TO COOL 5 1/2 HRS

Copy 1 - Shop File
 2 - O. C.
 3 - Piping

* Temperature variation within any 15 foot interval of weld length shall not exceed 250 degrees F

Load Inspection to insure against local flame impingement
 O. C.: amp 40 3-30-78

DEG FAHR

600

800

1000

1200

1400

1600

1800

2000

CW01-4X
 CW01-30X
 CT01-15X
 SD 1-47
 MQ01-53
 MS07-54
 MS 1-56
 MH04-49

8405 109411 S0338976001
 8405 109411 S0338976001
 8405 109411 S0338976001

TIME TO REACH TEMP 3 1/4 HRS
 TIME AT TEMP 2 HRS
 TIME TO COOL 5 1/4 HRS

1-24-50-2-0534

7:00 3-20-78

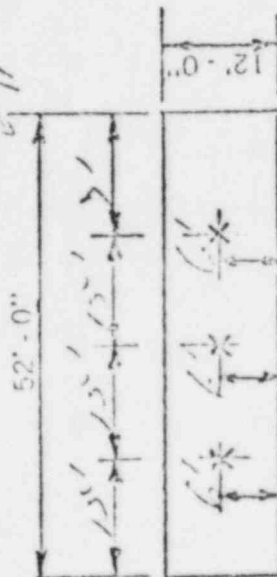
Load Number

FURNACE LOAD SHEET

Date

5-17-78

| REGISTER NO. | SKETCH NO. | TYPE MATERIAL | WEIGHT | TEMP. REQD.* | RATE OF HT PER HR | HOLD TIME | RATE OF COOLING PER HOUR | SPEC. NO. | TIME IN | TIME OUT |
|--------------|------------|---------------|--------|--------------|-------------------|-----------|--------------------------|-----------|---------|----------|
| CW | 01-6X | F106C | 14934 | 1150 | 210° | 2 hrs | 210° | III | 34" | 1.750 |
| CT | 01-15X | " | 8546 | " | " | | Chrom Sulf III | III | 71" | 1.575 |
| CT | 01-57 | KC20 | 8084 | " | 1150° | | 250 | 31.1 | 28" | 1.075 |
| CT | 01-74 | " | 3076 | " | " | | 600° | " | 28" | 1.035 |
| CT | 01-80 | " | 9211 | " | " | | " | " | 24" | 1.550 |
| CT | 04-13C | F106B | 205 | " | " | | " | " | 16" | 5.50 |
| ALS | 1-50 | KC20 | 11638 | " | " | | " | " | 16" | 5.120 |
| ALH | 04-24 | F106B | 5130 | " | " | | " | " | 16" | 5.120 |
| ZH | 08-5X | F106C | 1860 | " | " | | " | " | 16" | 5.120 |
| 69174 | | | | | | | | | | |



PLAN



ELEVATION

THERMOCOUPLE LOCATIONS



1/2 INCH EQUALS 200 IN
 SYN RECORDER AND PROGRAM
 670-5340-1-1 503837-101

TIME TO REACH TEMP. HRS
 TIME AT TEMP. HRS
 TIME TO COOL HRS

* Temperature variation within any 15 foot interval of weld length shall not exceed 250 degrees F

DEG. FAHR.

600 800 1000 1200 1400 1600 1800 2000

CW01-6X
CT01-15X
CT01-57
CT01-74
CT01-80
CT04-136
MS 1-50
MH04-24
ZH48-5X

TIME TO REACH TEMP 3 1/2 HRS
TIME AT TEMP 2 HRS
TIME TO COOL 4 HRS

3/8 INCH EQUALS 30MM
S/N RECORDER AND PROGRAM



MAY 18 1974

600 800 1000 1200 1400 1600 1800 2000

DEG. FAHR.

7 40 11 11

CERTIFICATE OF TEST OF PIPE MATERIAL

Cameron

IRON WORKS, INC.

P. O. BOX 1212
HOUSTON, TEXAS 77001

ITT GRIBBELL INDUSTRIAL PIPING, INC.
KERNERSVILLE, NC 27204

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

Date 22 July 1976

Customer Order No. **KER-2853-P** C.I.W. Sales Order No. **F-5693** Specification **ASME-SA106 Gr. C and ASME-Section III, Class 2 Thru Summer 1974 Addenda**

Description of Material O.D. _____ x I.D. **31.433"** x WALL **1.375" M.W.**

C.I.W. Part No. **86-5693-345-314**

| Heat No. | Location or Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|-----|------|------|-----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |
| L 3117 | | .24 | .89 | .012 | .021 | .23 | | | |
| L 3119 | | .24 | .91 | .011 | .012 | .22 | | | |
| L 3122 | | .26 | .90 | .014 | .010 | .26 | | | |
| L 3123 | | .25 | .93 | .015 | .016 | .25 | | | |
| L 3130 | | .24 | .96 | .011 | .015 | .23 | | | |

| Quantity or Serial No. | Heat No. | Test Loc. | Tensile PSI | Yield Point | | MECHANICAL PROPERTIES | | | | | Specimen Size | Test Lot# |
|------------------------|----------|-----------|-------------|--------------------|----------------|-----------------------|------------|-----------|-----------------|------|---------------|-----------|
| | | | | % Offset Yield PSI | % Elong. 2 In. | % Red. Area | Macro Etch | Bend Test | Flattening Test | | | |
| 1 | L 3117 | Trans. | 79,900 | 44,700 | 25.0 | 45.8 | | | OK | .505 | 17 | |
| 3 | L 3119 | Trans. | 79,900 | 46,400 | 28.2 | 55.7 | | | OK | .505 | 19 | |
| 2 | L 3122 | Trans. | 80,900 | 46,900 | 26.0 | 51.9 | | | OK | .505 | 22 | |
| 3 | L 3123 | Trans. | 78,400 | 41,200 | 28.2 | 50.8 | | | OK | .505 | 23 | |
| 1 | L 3130 | Trans. | 77,900 | 40,200 | 27.9 | 50.8 | | | OK | .505 | 30 | |

| Fero. Ser. # | Heat # | Test Lot # |
|--------------|--------|------------|
| 22608 | L 3122 | 22 |
| 26609 | L 3122 | 22 |
| 26611Z | L 3119 | 19 |
| 26613Y | L 3119 | 19 |
| 26613Z | L 3119 | 19 |
| 26618 | L 3130 | 30 |
| 26622X | L 3123 | 23 |
| 26622Y | L 3123 | 23 |
| 26622Z | L 3123 | 23 |
| 26624Y | L 3117 | 17 |

CATAWBA
PA 8



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

Heat Treatment:

Subscribed and sworn to before me this

22nd day of July 1976

Notary Public

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

Metallurgical Representative *H. O. WRIGHT*

Cameron

IRON WORKS, INC.

P. O. BOX 1212
HOUSTON, TEXAS 77001

ITT CORNHILL INDUSTRIAL PIPING, INC.
KEMERSVILLE, NC 27284

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

Date 22 July 1976

| | | |
|---|---|---|
| Customer Order No.
KER-2853-P | C.I.W. Sales Order No.
F-5692 | ASME-SA106-GR. C and Section III, Class 2
Thru Summer 1974 Addenda |
|---|---|---|

| | | | | | |
|-------------------------|------|--------|----------------|--------|--------------------|
| Description of Material | O.D. | x I.D. | 31.438" | x WALL | 1.375" M.W. |
|-------------------------|------|--------|----------------|--------|--------------------|

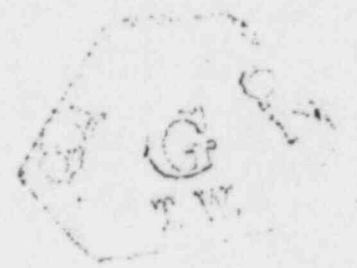
C.I.W. Part No. **86-5692-345-314**

| Heat No. | Location or Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|-----|------|------|-----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |
| L 3117 | | .24 | .89 | .012 | .021 | .23 | | | |
| L 3119 | | .24 | .91 | .011 | .012 | .22 | | | |
| L 3120 | | .25 | .86 | .018 | .014 | .28 | | | |
| L 3122 | | .26 | .90 | .014 | .010 | .26 | | | |
| L 3123 | | .25 | .93 | .015 | .016 | .25 | | | |
| L 3130 | | .24 | .96 | .011 | .015 | .23 | | | |

*CATAWBA
P#8*

| Quantity or Test Lot No. | Heat No. | Test Loc. | Yield Point | | MECHANICAL PROPERTIES | | | | | Specimen Size | Test Lot# |
|--------------------------|----------|-----------|-------------|--------------------|-----------------------|-------------|------------|-----------|------------------|---------------|-----------|
| | | | Tensile PSI | % Offset Yield PSI | % Elong. 2 In. | % Red. Area | Macro Etch | Bend Test | Flat tening Test | | |
| 5 | L 3117 | Trans. | 79,900 | 44,700 | 25.0 | 45.8 | | | OK | .505 | 17 |
| 1 | L 3119 | Trans. | 79,900 | 46,400 | 28.2 | 55.7 | | | OK | .505 | 19 |
| 4 X | L 3120 | Trans. | 85,600 | 48,700 | 23.8 | 44.0 | | | OK | .505 | 20 |
| 2 | L 3122 | Trans. | 80,900 | 46,900 | 26.0 | 51.9 | | | OK | .505 | 22 |
| 4 X | L 3123 | Trans. | 78,400 | 41,200 | 28.2 | 50.8 | | | OK | .505 | 23 |
| 3 | L 3130 | Trans. | 77,900 | 40,200 | 27.9 | 50.8 | | | OK | .505 | 30 |

| Form Ser.# | Heat# | Test Lot# | Form Ser.# | Heat# | Test Lot# |
|------------|--------|-----------|------------|--------|-----------|
| 26607Z | L 3117 | 17 | 26621X | L 3117 | 17 |
| 26611Y | L 3122 | 22 | 26621Z | L 3117 | 17 |
| 26612Y | L 3119 | 19 | 26622Y | L 3123 | 23 |
| 26614Y | L 3120 | 20 | 26623Y | L 3123 | 23 |
| 26615Y | L 3120 | 20 | 26624X | L 3117 | 17 |
| 26613X | L 3120 | 20 | 26623Z | L 3123 | 23 |
| 26617Z | L 3123 | 23 | 26616Y | L 3120 | 20 |
| 26619X | L 3130 | 30 | | | |
| 26619Z | L 3130 | 30 | | | |
| 26610Z | L 3122 | 22 | | | |
| 26620Y | L 3130 | 30 | | | |
| 26621X | L 3117 | 17 | | | |



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

Heat Treatments:

Notary Public

22nd Day of July 1976

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

Metallurgical Representative: *[Signature]* O. WRIGHT, JR.

Cameron

IRON WORKS, INC.

P. O. BOX 1012

HOUSTON, TEXAS 77

ITT GRIBBELL INDUSTRIAL PIPING, INC.
KEMERSVILLE, NC 27204

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

Date 22 July 1976

| | | |
|---|---|--|
| Customer Order No.
KIR-2853-P | C.I.W. Sales Order No.
F-5693 | ASME-SA106 Gr. C and ASME-Section III, Class 2
Thru Summer 1974 Addenda |
|---|---|--|

| | | | | |
|-------------------------|------------|-----------------------|--------------|--------------------|
| Description of Material | O.D. _____ | x I.D. 31.438" | x WALL _____ | 1.375" M.W. |
|-------------------------|------------|-----------------------|--------------|--------------------|

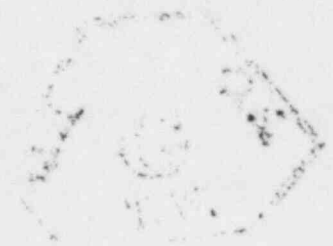
C.I.W. Part No. **86-5693-345-314**

| Heat No. | Location or Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|-----|------|------|-----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |
| L 3118 | | .24 | .89 | .012 | .021 | .23 | | | |
| L 3120 | | .25 | .86 | .018 | .014 | .28 | | | |
| L 3130 | | .24 | .96 | .011 | .015 | .23 | | | |

| Quantity or Serial No. | Heat No. | Test Loc. | YIELD POINT | | MECHANICAL PROPERTIES | | | | | Test Lot# | |
|------------------------|----------|-----------|-------------|--------------------|-----------------------|-------------|------------|-----------|-----------------|-----------|---------------|
| | | | Tensile PSI | % Offset Yield PSI | 2% Elong. In. | % Red. Area | Macro Etch | Bend Test | Flattening Test | | Specimen Size |
| 4 | L 3117 | Trans. | 79,900 | 44,700 | 25.0 | 45.8 | | | OK | .505 | 17 |
| 2 | L 3120 | Trans. | 85,600 | 48,700 | 23.8 | 44.0 | | | OK | .505 | 20 |
| 4 | L 3130 | Trans. | 77,900 | 40,200 | 27.9 | 50.8 | | | OK | .505 | 30 |

| Forg. Ser.# | Heat# | Test Lot# |
|-------------|--------|-----------|
| 26614Z | L 3120 | 20 |
| 26616Z | L 3120 | 20 |
| 26619W | L 3130 | 30 |
| 26619Y | L 3130 | 30 |
| 26620X | L 3130 | 30 |
| 26620Z | L 3130 | 30 |
| 26621T | L 3117 | 17 |
| 26621U | L 3117 | 17 |
| 26621V | L 3117 | 17 |
| 26621Y | L 3117 | 17 |
| 26624Z | L 3117 | 17 |

*CATAWBA
P# 8*



Hydrostatic Test: Each length of pipe hydrostatically tested at 1000 psi for 5 sec. and found acceptable.

Heat Treatment:

Subscribed and sworn to before me this
22nd Day of July 1976

[Signature]
Notary Public
State of Texas, County of _____
My Comm. Expires July 1, 1977

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

[Signature]
Metallurgical Engineer
O. WRIGHT, Jr.

MILL TEST CERTIFICATE

SOLD TO ITT Grinnell Corporation
Kernersville, N.C.

SHIP TO Same for Duke Power

ITT GRINNELL CORPORATION
 WELDING PRODUCTS DIVISION
 PRINCETON, KY. Kernersville

OUR
ORDER NO. 62935

BRANCH
ORDER NO. List 2833

CUSTOMER'S
ORDER NO. _____

DATE November 15, 1976

| 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-234 WPC | | | | | | | | | | | | | | A-106C |
| 31.625 x 1.375 Min. wall | F | 44900 | 82400 | 25.0 | .25 | .98 | .013 | .011 | .22 | | | CT-01-17-1 | ARAP | |
| IR 90° Ell | | | | | | | | | | | | CW-01-17-1 | | |
| -Ditto- | F | 40900 | 79900 | 27.7 | .26 | 1.02 | .010 | .011 | .25 | | | " " | APAR | |
| -Ditto- | F | 45900 | 85100 | 27.9 | .25 | 1.01 | .009 | .021 | .23 | | | " " | ARBT | |
| <div style="border: 1px solid black; border-radius: 50%; padding: 10px; width: fit-content; margin: 0 auto;"> <p><i>Customer
BWF-16</i></p> </div> | | | | | | | | | | | | | | |
| <p>*Standard round test specimen used for tensile properties.</p> <p>The above fittings were manufactured and tested in strict compliance with ASME Section III, 1974 Edition, Class 2 through the 1974 Summer Addenda.</p> | | | | | | | | | | | | | | |
| <p>The fittings manufactured by this Mill Test Report will meet the following requirements of ASME Section III, Class 2, Subsection NB, Paragraphs NB-3000 through NB-3003, as amended, and the ASME Code for Unfired Pressure Vessels, 1974 Edition, Part III, Division 1, Subsection NB, Paragraphs NB-3000 through NB-3003, as amended, and the ASME Code for Unfired Pressure Vessels, 1974 Edition, Part III, Division 1, Subsection NB, Paragraphs NB-3000 through NB-3003, as amended.</p> | | | | | | | | | | | | | | |

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

THIS _____ DAY OF _____ 19__

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

The Colonial Machine Company, Inc.

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

Phone (314) 539-1011

SEPT. 20, 1977

JIT GRINNELL INDUSTRIAL PIPING, INC.
P. O. BOX 566
KERNERSVILLE, NC 27284

CERTIFIED MILL TEST REPORT

CT
AP-4

| | | |
|-------------------------------------|-------------------------------|--------------------------------|
| YOUR ORDER NO.
KER 8630-B | OUR ORDER NO.
10457 | DATE SHIPPED
9/20/77 |
|-------------------------------------|-------------------------------|--------------------------------|

| ITEM | TYPE | MATERIAL-SPEC. | SHIPPED | HEAT NO. | CMC |
|--|------|--|---------|----------|-----|
| ASME SECTION III CLASS 2 (1974 ADDENDA THRU WINTER 1974)
ASME SA105 | | | | | |
| 1 (89590) | | 1.13" ACCESS HOLE PLUGS PER CT-AH-1, H = 2.188"
PART NO. CT-4012-1 | 12 | 78849 | ABF |
| 2 (89591) | | 1.13" DITTO H = 1.705" PART CT-4012-2 | 25 | 78849 | ABF |
| 3 (89592) | | 1.13" DITTO H = 2.609" PART CT-4012-3 | 16 | 78849 | ABF |
| 4 (89593) | | 1.13" ACCESS HOLE PLUGS PER CT-AH-2, H = 1.705",
PART CT-4012-4 (SQUARE HEAD) | 30 | 78849 | ABF |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CB | TI | CO | OTHER ELEMENTS |
|-------------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| 1
THRU 4 | .26 | .71 | .013 | .045 | .23 | | | | | | | | |

LET G 121
OK OK
TON
DATE 9-23-77

| ITEM | TENSILE | 2% YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1. 2. 3. 4. 5. 6. ETC. |
|-------------|---------|----------|----------|--------|----------|--------------------|---------------------------------|
| 1
THRU 4 | 75000 | 48500 | 32.0 | 58.6 | | | MILL SOURCE - COPPERWELD |

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.

By: *George R. Wood*



UNION CARBIDE CORPORATION
 LINDE DIVISION
 WELDING MATERIALS
 P.O. BOX 710, ASHTABULA, OHIO 44004

CT
 WW13

July 15, 1977

CUSTOMER: Industrial Welding Supply
 2501 Champagne
 Ashboro, N.C. 27203
 (For: ITT Grinnell)

YOUR ORDER NO.: 11-476
 LINDE S.O. NO.: 011476 U
 QUANTITY: 420 lbs.

MATERIAL: Linde 65 - Heat No. 065118 - 1/8" Diameter x 36" Straight Lengths

This is to certify that Linde 65, Class E70S-2, as supplied under the above order number, shipped from one heat number, has been tested using the test assembly specified in Fig. 5 of AWS A5.18-69, and ASME SPAS.18 specifications. The wire met all the mechanical and impact property requirements of these specifications using the gas-tungsten arc welding process with Argon shielding gas. During the manufacturing processes, tests, and inspection the materials furnished under this contract have not come in direct contact with mercury or any of its compounds nor with any mercury-containing device employing a single boundary of containment.

| MECHANICAL PROPERTIES OF WELD(S) PER TABLE 3 - | AS-WELDED | * STRESS RELIEVED | REQUIRED |
|--|-----------|-------------------|------------|
| Weld test Number | G0524-1 | G0526-1 | |
| All-Weld Metal Tensile | | | |
| Yield Strength, psi | 69,400 | 70,900 | 60,000 min |
| Ultimate Strength, psi | 79,700 | 83,900 | 72,000 min |
| Elongation in 2", % | 32.5 | 30.0 | 22 min |
| Reduction of Area, % | 79.0 | 74.1 | ----- |

CHARPY V-NOTCH IMPACT
 STRENGTH @ -20°F (ft./lbs.)

| As-Welded | * S.R. |
|----------------|----------------|
| 126.5 | 130.0 |
| 101.5 | 95.0 |
| 120.5 | 97.5 |
| 100.0 | 66.0 |
| 79.5 | 132.5 |
| 107.3 (Ave. 3) | 107.5 (Ave. 3) |

LATERAL EXPANSION
 (INCHES)

| As-Welded | * S.R. |
|-----------|--------|
| .076 | .085 |
| .074 | .067 |
| .080 | .072 |
| .073 | .055 |
| .063 | .085 |

DUCTILE FRACTURE AREA
 (PERCENT)

| As-Welded | * S.R. |
|-----------|--------|
| 60 | 50 |
| 50 | 50 |
| 60 | 50 |
| 50 | 40 |
| 35 | |

Required 20 ft./lbs.

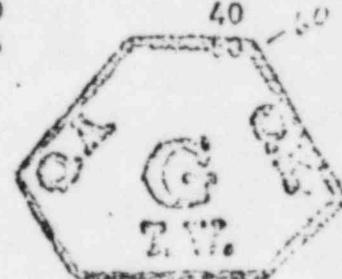
RADIOGRAPHIC TESTS: X-ray(s) met the requirements of Fig. 1

APPLICATION CONDITIONS: 230 Amps, 15 Volts, 5/6 Inches Per Minute

CHEMICAL ANALYSIS:

| C | Mn | P | S | Si | Al | Ti | Zr | Ni | Cr | Mo | V | Cu |
|------|------|------|------|-----|-----|-----|-----|-----|-----|------|------|-----|
| .04 | 1.11 | <.01 | .017 | .55 | .11 | .06 | .03 | .03 | .01 | <.01 | <.01 | .01 |
| .05 | .90 | .025 | .035 | .40 | .05 | .05 | .02 | --- | --- | --- | --- | --- |
| max. | 1.40 | max. | max. | .70 | .15 | .15 | .12 | --- | --- | --- | --- | --- |

< = less than



* Weldment Stress Relieved at 1125°F, plus or minus 25°F, for 8 hours. Cooling rate 100°F/hr to 500°F, then air cooled.

Sworn to before me this

day of July 1977

[Signature]

PAUL E. JARVIS
 Deputy Public Administrator of the
 My Commission Expires 12/31/77

[Signature]
 R. J. DiDonato
 Materials Standards Specialist

CT
WW 24

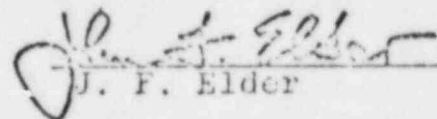
SUBJECT: Welding Filler Materials

WIRE: Linde 65, Heat No. 065155

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 5-2 that the test results shown in Taussig Associates, Inc. Report 22557 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This may also be used on impact tested material with a minimum service temperature of +30 degrees F.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 Edition.


J. F. Elder

ITT & IPI
QA DEK
TCW
DATE NOV 17 1977
PAGE 145



UNION CARBIDE CORPORATION
 LINDE DIVISION
 WELDING MATERIALS
 P.O. BOX 710, ASHTABULA, OHIO 44004

Nov. 11, 1977

CUSTOMER: ITT Grinnell
 Old Highway 421
 Kernersville, N.C. - 27284

YOUR ORDER NO. 11-023
 LINDE S.O. NO. 1023-U

1/8" Dia.
 S/L Rod

*CT
 WW-24*

MATERIAL: Linde 65

THIS IS TO CERTIFY THAT THIS MATERIAL WILL CONFORM TO AWS A5.18-60
 ASME SPAS. 18. IT HAS THE FOLLOWING CHEMICAL ANALYSIS MEETING THE
 REQUIREMENTS OF CLASSIFICATION E70S-2:

| | | |
|--------------------|---|--------|
| <u>HEAT NUMBER</u> | - | 065155 |
| CARBON | - | .03 |
| MANGANESE | - | 1.05 |
| PHOSPHOROUS | - | .006 |
| SULPHUR | - | .018 |
| SILICON | - | .41 |
| Aluminum | - | .07 |
| Titanium | - | .10 |
| Zirconium | - | .04 |

Ladle Analysis:

Howard Jackson Ret
 QUALITY ASSURANCE - WELDING MATERIALS PLANT
 UNION CARBIDE CORPORATION - LINDE DIVISION

KLR

ITT & IRI
 CR OK
 TRW
 DATE NOV 17 1977
 Page 295

Jausseig Associates Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



Report No. 22557 - November 11, 1977

ITT Grinnell Industrial Piping, Inc.
P. O. Box 566
Highway 421
Kernersville, North Carolina 27284

Attn: Mr. J. F. Elder

CT
WW 24

S U B J E C T

Mechanical and Chemical Testing of the Weld
Metal of Two (2) Plates Marked Nos. 411 and
412.

ITT G IPI
CA OK
TCM
DATE NOV 7 1977
page 3 of 5

BACKGROUND:

Two (2) welded plate assemblies were submitted to our laboratory for chemical analysis, Charpy impact and tension testing of the weld metal. The assemblies had been identified as test plate nos. 411 and 412 Linde 65, heat no. 065155; tested as-welded and the other tested after a stress relieving heat treatment.

TEST RESULTS:

Chemical Analysis:

The weld metal of plate no. 411 was drilled in a manner which prevented removal of material from the base metal. These drillings were cleaned and subjected to a quantitative chemical analysis with the following results:

| | |
|------------|-------|
| Nickel | <.05% |
| Chromium | <.05 |
| Molybdenum | <.03 |
| Copper | .08 |
| Vanadium | <.01 |

CT
WW 24

Heat Treatment:

The plate no. 412 was cut to permit it to fit into a heat treating furnace. These pieces were heated to 1125°F and held for 16 hours at temperature. Cooling was done at a rate of less than 200°F/Hr. to below 800°F.

Tension Testing:

Two, round, all weld metal tension test specimens were machined from plates nos. 411 and 412, as-welded and heat treated. Both specimens were subjected to standard tension testing giving the results as follows:

| | <u>No. 411</u> | <u>No. 412</u> |
|--------------------------------------|----------------|----------------|
| Tensile Strength, psi. | 81,600 | 77,950 |
| Yield Strength, psi.
(.2% Offset) | 75,900 | 66,300 |
| % Elongation in 2 inches | 26 | 30 |
| % Reduction of Area | 73 | 81 |

INT 3 191
CA OK
TCW
DATE 1 7 57
PAGE 4 of 5

Impact Testing:

A total of eleven, full size (10mm x 10mm), Charpy V-notch impact test specimens were machined from the two submitted plate assemblies. Three of the specimens were from the as-welded plate and eight were from the heat treated plate. All were notched in the weld metal.

No. 412 - Heat Treated:

| <u>Test Temperature</u> | <u>Absorbed Energy (ft-lbs)</u> | <u>Mils Lateral Expansion</u> | <u>Percent Shear</u> |
|-------------------------|---------------------------------|-------------------------------|----------------------|
| +30 | 261 | 84 | 100 |
| +30 | 261 | 95 | 100 |
| +30 | 231 | 76 | 100 |

No. 411 - as-Welded

| | | | |
|-----|-----|----|-----|
| +30 | 106 | 75 | 100 |
| +30 | 116 | 84 | 100 |
| +30 | 127 | 83 | 100 |
| -20 | 112 | 78 | 80 |
| -20 | 29 | 25 | 30 |
| -20 | 80 | 58 | 60 |
| -20 | 79 | 61 | 60 |
| -20 | 65 | 46 | 50 |

CT
WV 24

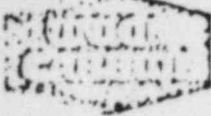
Respectfully submitted,

Mark A. Hineman

Mark A. Hineman
Staff Engineer
TAUSSIG ASSOCIATES, INC.

MAH:i

ITT 6 121
CA CK
TCW
DATE NOV 17 1971
Page 545



UNION CARBIDE CORPORATION
 LINDE DIVISION
 WELDING MATERIALS PLANT
 P.O. BOX 710, ASHTABULA, OHIO 44004

*Control
www-7*
 January 16, 1975

CUSTOMER: Industrial Welding Supply
 P.O. Box 1506
 2501 Champagne
 Ashboro, N. C. 27203

YOUR ORDER NO.: 06-052
 LINDE S.O. NO.: 004033 Q 02
 QUANTITY: 4,020 lbs.
 GRINNELL P.O. NO.: KER-11412-3

MATERIAL: Linde 65 - Heat No. 065033 - 1/8" Diameter x 36" Straight Lengths

This is to certify that Linde 65, Class E70S-2, as supplied under the above order number, shipped from one heat number, has been tested using the test assembly specified in Fig. 5 of AWS A5.18-69, and ASME SFA5.18 specifications. The wire met all the mechanical and impact property requirements of these specifications using the gas-tungsten arc welding process with Argon shielding gas. During the manufacturing processes, tests, and inspection the materials furnished under this contract have not come in direct contact with mercury or any of its compounds nor with any mercury-containing device employing a single boundary of containment.

| MECHANICAL PROPERTIES OF WELD(S) PER TABLE 3 - | AS-WELDED | * STRESS RELIEVED | REQUIRED |
|--|-----------|-------------------|---------------|
| Weld Test Number | E0520-1 | E0528-1 | |
| All-Weld Metal Tensile Yield Strength, psi | 65,600 | 58,100 | ** 58,000 min |
| Ultimate Strength, psi | 74,000 | 72,200 | 72,000 min |
| Elongation in 2", % | 32.5 | 37.5 | 22 min |
| Reduction of Area, % | 82.4 | 80.5 | ----- |

CHARPY V-NOTCH IMPACT STRENGTH @ -20 F (ft./lbs.)

| As-Welded | * S.R. |
|---------------|---------------|
| 238.5 | 239.0 |
| 196.0 | 239.0 |
| 95.0 | 238.5 |
| 239.5 | 239.5 |
| 239.5 | 239.0 |
| 224.6 (Ave 3) | 239.0 (Ave 3) |

LATERAL EXPANSION (INCHES)

| As-Welded | * S.R. |
|-----------|--------|
| *** | *** |
| .090 | *** |
| .069 | *** |
| *** | *** |
| *** | *** |

DUCTILE FRACTURE AREA (PERCENT)

| As-Welded | * S.R. |
|-----------|--------|
| *** | *** |
| 100 | *** |
| 45 | *** |
| *** | *** |
| *** | *** |

Required 20 ft./lbs.

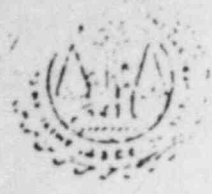
RADIOGRAPHIC TESTS: X-ray(s) met the requirements of Fig. 1
 APPLICATION CONDITIONS: 280 Amps, 16.5 - 18 Volts, 5 - 6 1/2 Inches Per Minute
 CHEMICAL ANALYSIS:

| C | Mn | P | S | Si | Al | Ti | Zr | |
|-----|------|------|------|-----|------|------|------|---------------------------------|
| .05 | 1.27 | .012 | .016 | .55 | .032 | .052 | .018 | - Heat Number 065033 (Actual) |
| .05 | .99 | .025 | .035 | .40 | .05 | .05 | .02 | - Required - Single values max. |
| | 1.30 | | | .70 | .15 | .15 | .12 | |

- * Weldment Stress Relieved at 1125 F for 8 hours.
- ** Per footnote (F) of Table 3, of AWS A5.18-69 and ASME SFA5.18.
- ** Charpy V-notch Impact Specimens did not fracture.

Sworn to before me this
 14 day of January, 1975
[Signature]

[Signature]
 R. J. Adonato
 Materials Standards Specialist



CHICAGO SPECTRO SERVICE LABORATORY, INC.

Spectrographic and Chemical Analysts
Metallurgists

4848 S. KEDZIE AVE. • CHICAGO, ILL. 606

ANALYSIS REPORT FOR:

AREA CODE 312 - 523-7

- ITT Grinnell Industrial Piping, Inc.
- Post Office Box 566 Hwy. 421
- Kernersville, North Carolina 27284
- Attention: Walter Sperko

*Checked
www 7*

PURCHASE ORDER NO. KER-17913-W

DATE September 25, 1975

Report Number: 2299 & 2298-1,

Sample Number: HEAT #065033

| | |
|----------|-------|
| Nickel | 0.10% |
| Chromium | 0.03 |
| Copper | 0.27 |
| Vanadium | <0.01 |

Sample Number:

1-1/4 CR

2-1/4 CR

Chromium

1.17%

0.06 (0.05)
Recheck

CHICAGO SPECTRO SERVICE LABORATORY, INC.

BY

[Handwritten Signature]

CERTIFICATE OF ANALYSIS



UNION CARBIDE CORPORATION
LINDE DIVISION
WELDING MATERIALS
P.O. BOX 710, ASHTABULA, OHIO 44004

1/16/78

CUSTOMER: ITT GRINBELL
OLD HIGHWAY 421
KERNERSVILLE NC 27284

YOUR ORDER NO.: 11-137-KER 9113

LINDE S.O. NO.: _____

*Catawba
ww-34*

MATERIAL: Linde 65

This is to certify that this material will conform to AWS A5.18-69
ASME SFA5.18. It has the following chemical analysis meeting the
requirements of classification E70S-2 :

| | | |
|--------------------|---|--------|
| <u>HEAT NUMBER</u> | - | 065214 |
| Carbon | - | .04 |
| Manganese | - | 1.17 |
| Phosphorous | - | .008 |
| Sulphur | - | .015 |
| Silicon | - | .54 |
| Aluminum | - | .12 |
| Titanium | - | .07 |
| Zirconium | - | .041 |



Ladle Analysis:

Howard Taylor - RIC

Quality Assurance - Welding Materials Plant
Union Carbide Corporation - Linde Division

ITIG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB. 21 1978
SHEET 1 OF 4

Industrial Engineering Inc.

Catawba
WW-34

SUBJECT: Welding Filler Materials

WIRE: Linde 65, Heat No. 065214

This is to certify that the subject material was welded into test plates as shown in SPA 5.1 using WPS 5-2, that the test results shown in Taussig Associates, Inc. Report 23490 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This may also be used on impact-tested material with a minimum service temperature of +30 degrees F.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 Edition.

John F. Elder 2/21/78
J. F. Elder

ITG - IPI
QUALITY CONTROL
APPROVED
T. G. WILSON
DATE FEB 21 1978
SHEET 2 OF 4

MATERIAL TEST REPORT #23490

R & D TEST #435

*Catawba
WW 34*

Linde G5, Heat No. 065214

The following tests were performed in accordance with SFA 5.18, E705-2:

1. All-Weld Metal Tension Test:

As-Welded:

Tensile Strength: 79,200 psi
Yield Point: 74,700
Elongation (%) in 2": 28

Heat-Treated*

Tensile Strength: 76,600
Yield Point: 65,400
Elongation (%) in 2": 30

2. Charpy V-Notch Impact Tests:

As-Welded:

| <u>Temp.</u> | <u>Ft. lbs.</u> | <u>Lat. Exp. (mils)</u> | <u>%Shear</u> |
|--------------|-----------------|-------------------------|---------------|
| -20 | 143 | 91 | 90 |
| -20 | 123 | 79 | 80 |
| -20 | 100 | 69 | 70 |
| -20 | 111 | 75 | 80 |
| -20 | 111 | 80 | 80 |

Heat-Treated*

| <u>Temp.</u> | <u>Ft. lbs.</u> | <u>Lat. Exp. (mils)</u> | <u>%Shear</u> |
|--------------|-----------------|-------------------------|---------------|
| +30 | 80 | 63 | 60 |
| +30 | 97 | 73 | 70 |
| +30 | 107 | 73 | 70 |

3. Chemical Analysis: (additional elements required by ASME Section III, Cl. 1 for information only)

Ni: < 0.05 V : < 0.01
Cr: < 0.05 Cu : 0.12
Mo: < 0.03

4. Radiography Test: Acceptable

ITIG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE: FEB 21 1978
SHEET 3 OF 4

*Heat-treated for 16 hours at 1150 degrees F, cooling to 600 degrees F shall be 300 degrees F/hr. (+ 100 degrees F/hr.)

This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by ITT Grinnell IPI and our subcontractor are in compliance with the requirements of SA 5.18 and the applicable material requirements of B3-2400 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by ITT Grinnell IPI. This report, in conjunction with the Linde Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.

Catawba
WW-34

J. F. Elder
J. F. Elder Date

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB. 21 1976
SHEET 4 OF 4

CERTIFIED MATERIALS TEST REPORT

CATAWBA
WW-29

Customer Order No. 4365 Re1.14-42

Order No. 711093-2

National Welders Supply
P.O. Box N-93
3011 N. Liberty Street
Winston Salem, N.C. 27105

Shipped _____

This material conforms to Specification
ITT Spec. ES 1073-
SFA 5.1 Sec. III

Type E 7018

Trade Name or Trademark: Atom Arc 7018

Test No. 650
X-Rays Satisfactory
Control No. MMM074

Diameter Size: 3/32"
19,650 lbs.

Lot Number: 02-1-J728P
Heat Number: 411B6841

Moisture @1800°F. 0.29%
Concentricity 4%
Type Steel A-285

| | |
|----------------------|------|
| Carbon | .04 |
| Manganese | 1.06 |
| Chromium | .03 |
| Nickel | .02 |
| Silicon | .48 |
| Columbium + Tantalum | |
| Molybdenum | .01 |
| Tungsten | |
| Copper | .02 |
| Titanium | |
| Phosphorus | .012 |
| Sulphur | .016 |
| Vanadium | .03 |

| | | | | |
|--------------------|------|-------|-------|------|
| Test No. | Full | Split | Volts | Amps |
| Tensiles & Impacts | 1 | 6 | 22 | 110 |

| | | |
|---------------|-----------------|-----------------|
| Test Results: | As Welded | Stress Relieved |
| | 8 hrs. @1150°F. | |
| Yield | 73,100 | 65,400 |
| Tensile | 80,000 | 75,900 |
| Elongation | 28.0% | 30.0% |
| Red. of Area | 76.0% | 77.9% |

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE DEC. 22 1977
SHEET 1 OF 1

Charpy V-Notch Impacts Tested @-20°F.
Impacts 42-58-63-72-82 68-72-80-92-98
Lat. Exp. 38-48-52-59-68 58-61-67-78-88
%Shear 20-20-20-20-30 20-30-30-30-30

Fillets: OK Vertical Overhead

State of Penna.)
County of York) SS

ASME QUALITY SYSTEM CERTIFICATE (MATERIAL)
NUMBER N-1224 EXPIRES ON SEPTEMBER 5, 1978
The undersigned certifies that this report is correct and that no significant change has been made in any of the elements described in the qualification approval.

Subscribed and sworn to before me
this 21st day of November 1977

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

SEAL *[Signature]*
Notary Public

My commission expires: 8/21/78

BY *[Signature]*
D. G. Flohr

CERTIFIED MATERIALS TEST REPORT

*Catalina
ww 27*

Customer Order No. 4365 Rel. 14-

Order No. 711093-

Shipped _____

National Welders Supply
P.O. Box N-93
3011 N. Liberty Street
Winston Salem, N.C. 27105

This material conforms to Specification
ITT Spec. ES 1073
SFA 5.1 Sec. III

Trade Name or Trademark: Atom Arc 7018

Type E 7018

Diameter Size: 1/8"
15,000 lbs.

Test No. 485
X-Rays Satisfactory
Control #MM045

Lot Number: 02-3-S719R
Heat Number: 402B1441

Moisture @1800°F. 0.24%
Concentricity 4%
Type Steel A-285

Carbon .03
Manganese .89
Chromium .03
Nickel .02
Silicon .36
Columbium + Tantalum
Molybdenum .01
Tungsten
Copper .02
Titanium
Phosphorus .011
Sulphur .020
Vanadium .02

| Test No. | Full | Split | Volts | A |
|--------------------|------|-------|-------|---|
| Tensiles & Impacts | 1 | 5 | 25 | |

| Test Results: | As Welded | Stress Relieved |
|---------------|-----------|-----------------|
| Yield | 64,508 | 62,048 |
| Tensile | 77,000 | 74,698 |
| Elongation | 31.0% | 29.0% |
| Red. of Area | 79.9% | 78.4% |

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE DEC 22 1977
SHEET 1 OF 1

Charpy V-Notch Impacts Tested @-20°F.
Impacts 67-83-84-104-106/84-84-97-111
Lat. Exp. 53-67-70-77-79 70-72-77-90-8
% Shear 30-20-30-40-50 30-20-20-40-7

Filletts: OK Vertical Overhead

State of Penna.)
County of York) SS

ASME QUALITY SYSTEM CERTIFICATE (MATERIAL)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978
The undersigned certifies that this report is correct and that no significant changes have been made in any of the elements described in the qualification approval.

Subscribed and sworn to before me
this 21st day of November 1977

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

SEAL *[Signature]*
Notary Public

My commission expires: 8/21/78

BY *[Signature]*

W. W. Grinnell

Industrial Piping Inc.

CT
WW-23

SUBJECT: Welding Filler Materials

WIRE: RACO 128, Heat No. 517715

FLUX: Linde 80; Lot 0575, Con. No. C8290

This is to certify that the subject materials were welded into test plates as shown in SFA 5-1, that the test results shown in Taussig Associates, Inc. Report 21547 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III, Cl. 1 material in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This material may not be used on impact-tested fabrication.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the Winter of 1975 Addendum.

INT G 121
QA 81
TCW
DATE OCT. 26 1977

John F. Elder
John F. Elder
Materials Engineer

Date: 10/26/77

Shaw-Walker Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



Report No. 21547 - August 3, 1977

ITT Grinnell Industrial Piping, Inc.
P. O. Box 566 - Hwy 421
Kernersville, North Carolina 27284

Attention: Mr. J. F. Edler

CT
Ww 23

S U B J E C T

Weld Metal Testing of Two Plates Marked Number 320.

1.1 & IMI
LA BK
TGW
DATE OCT 25 1977

BACKGROUND:

Two welded plate assemblies were submitted to our laboratory for chemical analysis, impact testing and tension testing of the weld metal. The assemblies were identified as Test Plate #320; WACO 128, heat number 517715; Linde 80 flux; lot 0575. One of the plates was to be tested in the as-welded condition and the second was to be stress relieved before testing.

CT
WW 23

TEST RESULTS:

Chemical Analysis:

The weld metal of one of the submitted plates was drilled in a manner which prevented removal of material from the base metal. These drillings were then cleaned and subjected to a quantitative chemical analysis with the following results:

| | <u>#320</u> |
|------------|-------------|
| Carbon | .04 |
| Manganese | 1.38 |
| Phosphorus | .014 |
| Sulfur | .023 |
| Silicon | .51 |
| Nickel | <.05 |
| Chromium | <.05 |
| Molybdenum | .52 |
| Copper | .11 |
| Vanadium | <.01 |

INT & IMP
QA OK
TCE
DATE OCT. 26 '77

Heat Treatment:

The plate which was not drilled for chemical analysis was cut to fit into a heat treating furnace. The pieces were heated to 1100°F and held for 16 hours. Cooling was done at 200°F/hr to below 800°F.

Tension Testing:

One, round, all weld metal, tensions test specimen was machined from each plate assembly; as-welded and after heat treatment. Each specimen was subjected to a standard tension test with results as follows:

| | <u>As-Welded</u> | <u>Heat Treated</u> |
|------------------------|------------------|---------------------|
| Tensile Strength, psi. | 79,700 | 78,760 |
| Yield Point, psi. | 67,570 | 63,750 |
| % Elongation, in 2" | 28 | 28 |

Impact Testing:

A total of eleven, full size (10 mm x 10 mm), Charpy V-notch impact test specimens were machined from the two submitted plate assemblies. Three of the specimens were from the as-welded plate and eight were from the heat treated plate. All were notched in the weld metal.

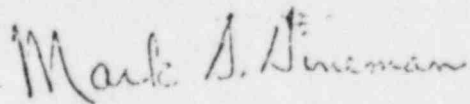
As-Welded:

| <u>Test Temperature, °F</u> | <u>Absorbed Energy ft-lbs</u> | <u>Mils of Lateral Expansion</u> | <u>Percent Shear</u> |
|-----------------------------|-------------------------------|----------------------------------|----------------------|
| +30 | 32 | 31 | 20 |
| +30 | 13 | 17 | 10 |
| +30 | 32 | 32 | 20 |

Heat Treated:

| | | | |
|-----|----|----|----|
| +30 | 42 | 38 | 30 |
| +30 | 46 | 42 | 30 |
| +30 | 40 | 37 | 30 |
| -20 | 19 | 16 | 10 |
| -20 | 30 | 28 | 10 |
| -20 | 30 | 28 | 10 |
| -20 | 25 | 22 | 10 |
| -20 | 28 | 26 | 10 |

Respectfully submitted,



Mark A. Hineman
Staff Engineer
TAUSSIG ASSOCIATES, INC.

MAH:ln

ITT G IPI
CA OK
TGS
DATE OCT 26 1977

DUKE POWER COMPANY
 QUALITY ASSURANCE DEPARTMENT
 SUPPLIER QUALITY ASSURANCE CERTIFICATION

Name of Supplier ITT Grinnell Ind. Piping, Inc. Date 8-9-78
 Address of Supplier Plant Kernersville, NC Mill Power Order No. C-12517
 _____ Duke Item or Req. No. 1206.00-1.0
 _____ Spec. No. CNS-1206.00-1.0 Rev. 2

Supplier ID Nos. CT-01-25x
 Description of Component(s) or Material(s) Fabricated Piping Assembly
CT-SM-4C

Attached Documentation covers all Components/Materials on Mill Power Order.
 Attached Documentation covers partial shipment of Components/Materials on Mill Power Order.

The following listed tests, inspections and reports have been completed as required by the specification:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Physical & Chemical Analysis | <input type="checkbox"/> Major Repair Records & Charts |
| <input type="checkbox"/> Hydro (Test Pressure - PSIG _____) | <input checked="" type="checkbox"/> Personnel Qualifications on Record |
| <input type="checkbox"/> Design Report | <input type="checkbox"/> Stress Report |
| <input checked="" type="checkbox"/> Radiographic Test | <input checked="" type="checkbox"/> Ultrasonic Test |
| <input type="checkbox"/> Penetrant Test | <input type="checkbox"/> Repair NDE |
| <input type="checkbox"/> Operating Test | <input type="checkbox"/> Performance Curve |
| <input checked="" type="checkbox"/> Dimensional Check | <input type="checkbox"/> Deviation Record # _____ |
| | <input checked="" type="checkbox"/> Heat Treatment |
| | <input checked="" type="checkbox"/> Magnetic Particle |
| | <input checked="" type="checkbox"/> Cleanliness |
| | <input checked="" type="checkbox"/> ASME Data Report |

- 1) _____
- 2) _____
- 3) _____

This certifies that the listed Component(s) or Material(s) conform to the requirements of the above referenced Duke Power documents including all codes, standards, test requirements and Quality Assurance requirements invoked therein.

DUKE POWER COMPANY
QA RECORDS APPROVED
S. V. Caldwell
 QA REPRESENTATIVE
 DATE 11-27-78

Thomas A. Smith
 Supplier Representative Authorized Signature
 Title Mgr. of Proc. Date 8-9-78

(See Instructions)

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

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

SHEET 1 of 4

1. Fabricated by ITT Grinnell Ind. Piping, Inc. Kernersville Order No. 7128
(Name and Address of Fabricator)

2. Fabricated for Duke Power Company, Charlotte, NC Order No. C-12517
(Name and Address)

3. Owner Duke Power Company 4. Location of Plant Newport, SC

5. Piping System Identification on MAIN STEAM
(Brief description of intended use, main coolant etc.)

(a) Drawing No. CT-01-25X Prepared by ITT Grinnell Industrial Piping, Inc.
 (b) National Board No. N/A

6. The material, design, construction, and workmanship complies with ASME Code Section III, Class N-2
 Edition 1974, Addenda Date Winter 1974, 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)

Supplemental Sheets 2 --- Drawings
3,4 --- Bill (s) of Material

7. Shop Hydrostatic Test Field psi.

8. Description of piping inspected Piece Mark Number CT-SM-4C
(Include - mark no. - material spec. - nom. pipe size - schedule or thickness - length
See Attached Sheets
- fittings - flanges, etc.)

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 8-10-78 Signed ITT GRINNELL Ind. Piping, Inc. by Thomas A. Smith
(Fabricator)

Certificate of Authorization Expires 7-10-79 Certificate of Authorization No. N-1456

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 N.C. and employed by * of Hartford, CT. have inspected the piping described in this Data Report on 8-14 1978, 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.*The Hartford Steam Boiler Inspection and Insurance Co.
 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 8-14 1978
Benny K. Miller (Inspector) Commission N.C. - No. 878
National Board, State, Province and No.

* 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 numbered consecutively.

ITT Grinnell Industrial Piping Inc.

KERNERSVILLE, N. C.

Sheet
FORM EN-101 REV 1/76
O.A. FORM N2.1C

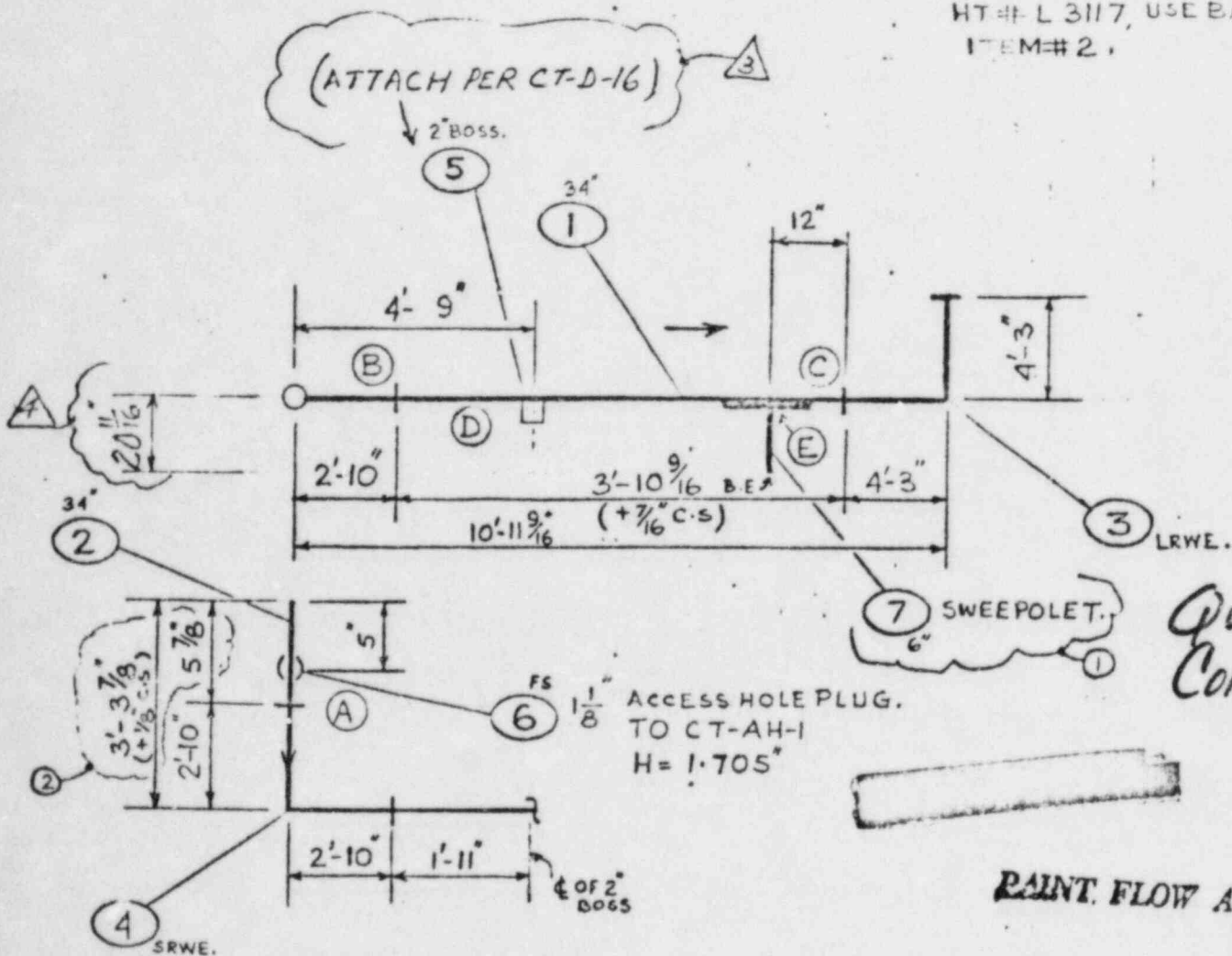
CONT. NO. "7127"
NAME DUKE POWER COMPANY
LOCATION CATAWBA UNIT # 1
Charlotte, N.C.
P.O. C-12517

→ REDRWN EN-78-77 CHK'D PG
REV. ① SM 11-11-77 CHK'D PG
REV. ② SM 12-14-77 CHK'D PG
REV. ③ SM 5-23-78 CHK'D PG
④ 7-5-78 PG

LENGTH OF ACCESS HOLE PLUG SHALL
BE ± 1/16" OF ACTUAL WALL THK.
SHOP SHALL GRIND TO FIT—IF REQUIRED.

**SPECIAL MATERIAL
CHECK ALLOCATION SHEETS
BEFORE CUTTING**

USE 3-10 9/16 FROM BAR# 17 LOT# 4.21
HT # L 3117, USE BALANCE FOR
ITEM# 2.



QUALITY CONTROL



PAINT FLOW ARROWS

MACHINE ENDS
PER SKETCH CT-D-2, EXCEPT AS NOTED.

Nuclear Safety Related

CLASS DUKE B LINE SPEC. PS 1500.5 (01) APP. CODE Ann. Sec. III, Cl. 2 NO. REQ'D 1

| | | | | | | | |
|---------------------|---|------------------|---|------------|---|---------------------|---|
| Radiography (RT) | ✓ | Special Marking | | Preheat | ✓ | Cert. of Compliance | |
| Mag. Particle (MT) | ✓ | Special Cleaning | ✓ | Heat Treat | | Mill Test Reports | ✓ |
| Liq. Penetrant (PT) | | Painting | ✓ | Code Stamp | ✓ | Data Reports | ✓ |

SYSTEM MAIN STEAM (SM) FAB. SPECS. JS 118
REF. DRWG NO. CN-1491-SMOO1 (REV. 2) PRESS. 1185 PSI. TEMP. 600 °F. WT. 7728 LBS.
PIECE MARK CT-SM-4C REGISTER CT-01-25X

GRINNELL INDUSTRIAL PIPING, INC.

FORM EN
O.A. FORM N21

H.P.

Register No. CT-01-25X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 3 Of 4

Piece Mark CT-SM-4C

DUKE POWER COMPANY

Revision No. ASM

Revision Date 5-22-75

Job Name CATAWBA UNIT #1

Contract No. 7127

Location _____

| ITEM | PART NUMBER | DESCRIPTION | QUAN OR LENG | QUALITY CONTROL | | | ACCOUNTING/MATERIAL | | |
|------|---------------------------------|--|------------------------------------|-----------------|----------|-------------------|---------------------|-----------------|-------------|
| | | | | HEAT NUMBER | DOCUMENT | IN PROCESS STATUS | U/M | UNIT PRICE P.O. | DIS. VENDOR |
| 1 | P.B.C.T.C.D.* 3.4
CT-01-11-1 | 31.438" I.D XI-375" MW. SMLS
CS, PIPE TO ASME, SA-106
GR.C.
(USE 3'-10 ⁹ / ₁₆ FROM BAR #17,
LOT # L4121, HT. # L3117.) | 3'-10 ⁹ / ₁₆ | | | | F | | |
| 2 | P.B.C.T.C.D.* 3.4
CT-01-11-1 | — DITTO —
(USE BALANCE FROM ABOVE BAR.) | 0'-5 ⁷ / ₈ | | | | F | | |
| 3 | L.A.A.T.C.* 3.4
CT-01-17-1 | 31.438" I.D XI-375" MW, 90° LRWE
TO SA-234 WFB-W, MADE
FROM SA-515 GR. 70 PLATE,
(70,000 PSI TENSILE), OR SA-234
WPC SEAMLESS, ENDS PER
DETAIL CT-D-2 | 1 | | | | E | | |
| 4 | L.B.A.T.C.* 3.4
CT-01-16-1 | — DITTO — EXCEPT, SRWE | 1 | | | | E | | |
| 5 | Y.*A.M.C.E.* 12
CT-30d2-3 | 2" 3000# CS. SP. WELD BOSS
TO SA-105 PER DET. SK.
CT-WB-1 (ATTACH PER CT-D-16) | 1 | | | | E | | |

*See Attached
Sheets*

GRINNELL IND. PIPING
KENNERSVILLE, N.C.

Code Asme. Sec. III, Cl. 2

Class DUKE B

Nuclear Safety Related

Job Supplement JS 118

MFG. Code _____

GRINNELL INDUSTRIAL PIPING, INC.

FORM EN-102 REV 7/76
O.A. FORM N2.1F

H-T

Register No. CT-01-25X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 21 Of 21

Piece Mark CT-SM-4C

Job Name DUKE POWER COMPANY
CATAWBA UNIT # 1
Charlotte, N.C.

Contract No. 7127

Location _____

Revision No. ASW Revision Date 5-23-78

| ITEM | PART NUMBER | DESCRIPTION | QUAN OR LENG | QUALITY CONTROL | | | ACCOUNTING/MATERIAL | | | | |
|------|------------------------|--|--------------|-----------------|----------|------------|---------------------|-----|-----------------|-------------|-----|
| | | | | HEAT NUMBER | DOCUMENT | IN PROCESS | STATUS | U/M | UNIT PRICE P.O. | DIS. VENDOR | NET |
| 6 | XXXXXX
CT-4012-2 | 1 1/8" ACCESS HOLE PLUG
PER SK. CT-AH-1, TO
ASME, SA-105, H=1.705" | 1 | | | | | E | | | |
| | 3.4 | SP. END PROT. PERCT-EP-1 | 2 | | | | | E | | | |
| | 3.4 | SPIDER BRACING PER
CT-ES-1 | 2 | | | | | E | | | |
| 7 | XBA LCA *
CT-2168-1 | 3.4" x 6" 34" (1.375 MW) X 6" (S-80)
SWEEP OLET, TO SA-105,
WITH 3 1/2" BE | 1 | | | | | E | | | |
| | 6" | END PROT. | 1 | | | | | E | | | |
| | 2" | END PROT.
BY GRINNELL IND. PIPING
KERNERSVILLE, NC | 1 | | | | | E | | | |

Code ASME, Sec. III, Cl. 2

Class DUKE 'B'

Nuclear Safety Related

Job Supplement JS 118

MFG. Code _____

Register No. CT-01-25X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 1 Of 2

Revision No. (2) SM Revision Date 12-14-77

Piece Mark CT-SM-4C

Job Name DUKE POWER COMPANY
CATAWBA UNIT #1

Contract No. 7127

Location _____

| ITEM | PART NUMBER | DESCRIPTION | QUAN
OR
LENG | QUALITY CONTROL | | | ACCOUNTING/MATERIAL | | |
|------|----------------------------|--|--------------------|-----------------|---------------------|---------|---------------------|--------------------|----------------|
| | | | | HEAT
NUMBER | DOCUMENT IN PROCESS | STATUS | U/M | UNIT PRICE
P.O. | DIS.
VENDOR |
| 1 | PBC.T.C.D.*
CT-01-11-1 | 31.438" I.D XI.375" MW. SMLS
CS, PIPE TO ASME, SA-106
GR.C.
(USE 3'-10 3/16" FROM BAR #17,
LOT # 4121, HT. # L3117,) ① | 3'-10 3/16" | L3117 | 266217 | WT 10.1 | F | 5-22-78 | |
| 2 | PBC.T.C.D.*
CT-01-11-1 | — DITTO —
(USE BALANCE FROM ABOVE BAR.) | 0'-5 1/2" | 23117 | 266217 | WT 10.1 | F | 5-22-78 | |
| 3 | LAATC.x.x
CT-01-17-1 | 31.438" I.D XI.375" MW, 90° LRWE
TO SA-234 WPB-W, MADE
FROM SA-515 GR. 70 PLATE,
(70,000 PSI TENSILE), OR SA-234
WPC SEAMLESS, ENDS PER
DETAIL CT-D-2 | | ARAF | 346-16
2317 | WT 6.5 | E | | FX-B |
| 4 | LBATC.x.x
CT-01-16-1 | — DITTO — EXCEPT, SRWE | 1 | ARAF | 346-17
2317 | WT 11.5 | E | | FX-B |
| 5 | Y.X.A.A.C.E.*
CT-3002-3 | 2" 3000# CS, SP WELD BOSS
TO SA-105, PER DET. SK.
CT-WB-1 | 1 | HAI | 346-4
2317 | WT 15.2 | E | | FX-A |

SUPERSEDED

Code Asme. Sec. III, Cl. 2

Class DUKE 'B'

Nuclear Safety Related

Job Supplement JS 11A

MFG. Code _____

GRINNELL INDUSTRIAL PIPING, INC.

FORM EN 102 REV 7/76
O.A. FORM N2.1F

H.P.

Register No. CT-01-25X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 2 of 2

Revision No. (2) SIM Revision Date 12-14-77

Piece Mark CT-EM-4C

Job Name **DUKE POWER COMPANY**
CATAWBA UNIT # 1

Contract No. 7127 Location _____

| ITEM | PART NUMBER | DESCRIPTION | QUAN OR LENG | QUALITY CONTROL | | | ACCOUNTING/MATERIAL | | | |
|------|----------------------|--|--------------|-----------------|---------------------|---------------------------|---------------------|-----------------|-------------|-----|
| | | | | HEAT NUMBER | DOCUMENT IN PROCESS | STATUS | U/M | UNIT PRICE P.O. | DIS. VENDOR | NET |
| 6 | XXXXXX
CT-4012-2 | 1 1/8" ACCESS HOLE PLUG
PER SK. CT-AH-1, TO
ASME, SA-105, H=1.705" | 1 | ABE | HP-4
SIM | | E | Rec. | 5/16 | R/C |
| | 3A | SP. END PROT. PER CT-EP-1 | 2 | | | | E | | | |
| | 3A | SPIDER BRACING PER
CT-ES-1 | 2 | | | | E | | | |
| 7 | XBALCA*
CT-2168-1 | 34" (1.375" MW) X 6" (S-80)
SWEEPolet, TO SA-105,
WITH 37 1/2° BE | 1 | P232 | HP-17
SIM | O.C.
1/11/78
5-2-78 | E | | | |
| | 6" | END PROT. | 1 | | | | E | | | |
| | 2" | END PROT. | 1 | | | | E | | | |

SUPERSEDED

K/2/78

Code Asme, Sec. III, Cl. 2

Class DUKE 'B'

Nuclear Safety Related

Job Supplement J S I I E

MFG. Code _____

PROJECT Duke Power (Cat) CONTRACT 7127 PC. MK# CT-SM-4C REG. ACT. P/I 25
 SYSTEM MAINTeam (SM) CLASS DukeB CL2 SPECIFICATION JS-11B-4 SUPPLEMENT _____

WELD DATA

| WELD | FIT-UP/PREHEAT | | | WELDER I.D. | WELD MAT'L | Q.C. INSP. | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | Q.C. INSP. | RT DATE | | MAG | LF |
|------|----------------|-------------|------------|----------------|------------|------------|-------------|---|-------------|------------|-------------|------------|----------------|------------|---------|----------|------|
| | PROC | WELDER I.D. | WELD MAT'L | | | | | | | | | | | Q.C. INSP. | Q.C. | | |
| A | PROC | 1-4-2-2 | | | | | | | | | | | | | | | |
| | | S190 | 065220 | (Q.C. IPI 150) | C323 | 065214 | C303 | 1ACG * | C124 | 579346 | C401 | 0575-1 | (Q.C. IPI 150) | 7/20/78 | 7/20/78 | APPROVED | - |
| DATE | 5/25/78 | WW207 | 5/25/78 | 5/20/78 | WW206 | 5/20/78 | WW201 | WW202 | 6/27-78 | 6/27/78 | | | | | | | |
| B | PROC | 1-4-2-2 | | | | | | | | | | | | | | | |
| | | S262 | 065220 | (Q.C. IPI 150) | C49 | 065220 | C79 | 1ACG * | C124 | 579346 | C277 | 0575-1 | (Q.C. IPI 150) | 7/20/78 | 7/20/78 | APPROVED | - |
| DATE | 4/4/78 | WW207 | 6/16/78 | 7/16/78 | WW207 | 7/16/78 | WW201 | WW202 | 6-27-78 | 6-27/78 | | | | | | | |
| C | PROC | 1-4-2-2 | | | | | | | | | | | | | | | |
| | | S262 | 065214 | (Q.C. IPI 150) | C512 | 065214 | C512 | 1ACG * | C124 | 579346 | C293 | 0575-1 | (Q.C. IPI 150) | 7/14/78 | 7/14/78 | APPROVED | - |
| DATE | 3/6/78 | WW206 | 5-26-78 | | WW206 | | WW201 | | 6-22-78 | 6-22/78 | | | | | | | |
| D | PROC | 1-4-2-2 | | | | | | | | | | | | | | | |
| | | S262 | 065220 | (Q.C. IPI 150) | C55 | 065220 | C55 | * 1ACG WW201
** 1ACG WW202 | C145 | 1ACH ** | | WW202 | (Q.C. IPI 150) | - | - | - | - |
| DATE | 5/27/78 | WW207 | | | 4/28/78 | | | | 6/27/78 | 6/27/78 | | | | | | | 6/30 |
| E | PROC | 1-4-2-2 | | | | | | | | | | | | | | | |
| | | C214 | 065214 | (Q.C. IPI 150) | C510 | 065220 | C510 | * 1ACG WW201
** 1ACH WW202
*** 1ACG WW203 | C143 | 1ACG | | WW203 | (Q.C. IPI 150) | 7/19/78 | 7/19/78 | APPROVED | - |
| DATE | 5/24/78 | WW206 | 5/25/78 | 5/25/78 | WW207 | 5/25/78 | | | 6/10 | WW203 | | | | | | | |

| | | | | | | | |
|-------------|------------------------|--|-----------------------|---------------------|------------|-----------------------|-------------------------------|
| STRESS DATE | N/A | FINAL INSP. | (Q.C. IPI 150) 8/7/78 | SPECIAL OPERATIONS: | C DIM. N/A | Q.C. DOC. APPROVAL | DDH 8/9/78 |
| SQUARE UP | 6-30-78 (Q.C. IPI 150) | * 41186841/02-1-F728P
** 42185451/02-1-L719R
o 48305101/03-3-BB21K | | WALL THK. | L | A/I STAMP/DATA REPORT | AWI (Q.C. IPI 150)
8-14-78 |
| CLEAN UP | 8-7-78
KNM | CUST INSP | | OTHER | | CUST DOC APPROVAL | |

Req. No. FF 616
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.

In-Process
 Repair

RADIOGRAPHIC INSPECTION REPORT

Form N6.3A

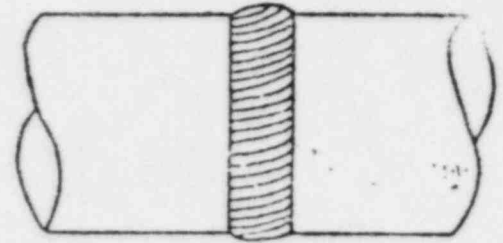
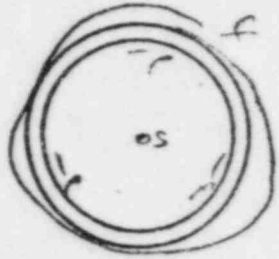
Standard Hours _____

Date 7-6-78

BB A-3

| | | | | | | | | | | | | | | | | | | |
|--|--------------------------------------|-------------------------------------|--|--|--------------------------|--|---|------------------------------------|----|----|----------|----|-------------|----|---------------------------------|--|---|--|
| System or Register No.
<u>CT-01-25X</u> | | Place No.
<u>CT-501-4C</u> | | Weld No.
<u>A</u> | | Pipe Size and Schedule
<u>1.375" MW 34-X 31-433" IX</u> | | Welder No.
<u>C 1245 C 4616</u> | | | | | | | | | | |
| T
E
C
H
N
I
Q
U
E | View | <u>1</u> | | I
N
T
E
R
P
R
E
T
A
T
I
O
N | Defect Type | | | | | | Comments | | Orientation | | | | | |
| | Source | <u>28152</u> | | | LP | LJ | S | P | DT | UC | C | CB | T | RL | <u>(IN) SURFACE X-D (PA)</u> | | X | |
| | Source Curve or EFP & SA | <u>60</u> | | | | | | | | | | | | | <u>" (PA) X-F</u> | | X | |
| | Source Size or Focal Spot | <u>147</u> | | | | | | | | | | | | | <u>(PA) H-X</u> | | X | |
| | Source Film Distance | <u>17"</u> | | | | | | | | | | | | | <u>side BK ox scratches clc</u> | | X | |
| | Time | <u>3:00</u> | | | | | | | | | | | | | <u>SURFACE pipe wall " "</u> | | X | |
| | Actual Weld Thickness | <u>1.437</u> | | | | | | | | | | | | | <u>PROCESS scratches clc</u> | | X | |
| | Penetrator | <u>30</u> | | | | | | | | | | | | | | | X | |
| | Sensitivity | <u>2T</u> | | | | | | | | | | | | | | | X | |
| | Exposure | <u>062</u> | | | | | | | | | | | | | | | | |
| Exposure | <u>2817</u> | | | | | | | | | | | | | | | | | |
| Exposure | <u>70</u> | | | | | | | | | | | | | | | | | |
| Viewing Technique | Single | <input checked="" type="checkbox"/> | | Double | <input type="checkbox"/> | | | | | | | | | | | | | |
| Screen | Front | <u>.010</u> | | | | | | | | | | | | | | | | |
| | Back | <u>.010</u> | | | | | | | | | | | | | | | | |
| Development | 60" Under 8 min. | | | | | | | | | | | | | | | | | |
| | Automatic | <u>X</u> | | | | | | | | | | | | | | | | |
| Welding Procedure | <u>1-1-1-2-2</u>
<u>1-1-1-2-2</u> | | | | | | | | | | | | | | | | | |

LP - Lack of Penetration UC - Under Cut Severity
 LJ - Lack of Fusion C - Crater A - Acceptable
 S - Slag CB - Crack B - Rejection
 P - Porosity T - Tungsten S - Borderline
 DT - Burn Thru RL - High Low



Duke Power Co.

Catawba Unit 1 & 2

Radiographer - Date 7-14-78 By [Signature]
 Interpretation - Date 7-20-78 By [Signature] Level
 Approved - Date 7-20-78 By [Signature]

Customer 71077203 Location _____
 Contract _____ Job No. _____
 Inspection Standard ASME B31.20 Acceptance Standard [Signature]
 Customer Approval - Date _____ By _____

7-20-78 [Signature]
Hartford

Req. No. FF 617
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.

In-Process
 Repair

RADIOGRAPHIC INSPECTION REPORT

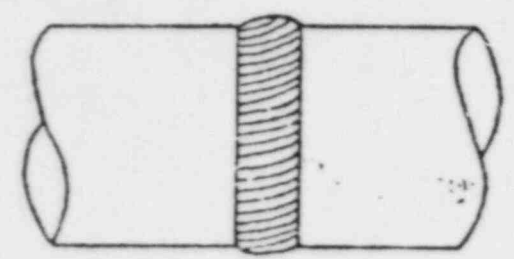
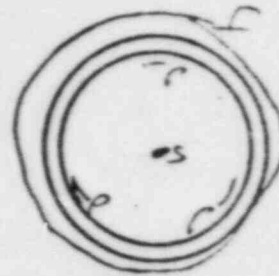
Form N6.3A

Standard Hours _____

Date 7-6-78

BB B3

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|------------------------------|---|--|---|---|---|----|----|---|----|---|--------------------------|----------------|----------------|---------------------|------------|----------------|----------|------------|----------------|--------------|---------------|----------------|----------------|---------------|--|--|--|
| System or Register No.
<u>CT-01-25X</u> | | Plate No.
<u>CT-5M-4L</u> | Field No.
<u>B</u> | Pipe Size and Schedule
<u>1-3/8" MW
34 X 31.438" ID</u> | Holder No.
<u>C49R1
C314R1
C1215</u> | | | | | | | | | | | | | | | | | | | | | | | | |
| TECHNIQUE | View | <u>1</u> | INTERPRETATION | Defect Type | | | | | | | | | | Comments | INTERPRETATION | | | | | | | | | | | | | | |
| | Source | <u>80152</u> | | LP | LP | S | P | UT | UC | C | CB | T | MS | | ACC. | REJ. | | | | | | | | | | | | | |
| | Source Curves or ETP & SA | <u>60</u> | | <u>LD</u> | | | | | | | | | | | | <u>X</u> | | | | | | | | | | | | | |
| | Source Size or Focal Spot | <u>142</u> | | <u>DG</u> | | | | | | | | | | | | <u>X</u> | | | | | | | | | | | | | |
| | Source Film Distance | <u>17"</u> | | <u>GJ</u> | | | | | | | | | | | | <u>X</u> | | | | | | | | | | | | | |
| | Time | <u>3:00</u> | | <u>JM</u> | | | | | | | | | | | | <u>X</u> | | | | | | | | | | | | | |
| | Actual Film Thickness | <u>1.437</u> | | <u>MP</u> | | | | | | | | | | | | <u>X</u> | | | | | | | | | | | | | |
| | Penetrometer | <u>30</u> | | <u>PS</u> | | | | | | | | | | | | <u>X</u> | | | | | | | | | | | | | |
| | Seal-off tip | <u>2T</u> | | <u>SV</u> | | | | | | | | | | | | <u>X</u> | | | | | | | | | | | | | |
| | | | | <u>VY</u> | | | | | | | | | | | | <u>X</u> | | | | | | | | | | | | | |
| | | <u>YL</u> | | | | | | | | | | | <u>X</u> | | | | | | | | | | | | | | | | |
| Disc Thickness | <u>0.62</u> | | <table border="1"> <tr> <td>LP - Lack of Penetration</td> <td>UC - Under Cut</td> <td>Severity</td> </tr> <tr> <td>LF - Lack of Fusion</td> <td>C - Crater</td> <td>A - Acceptable</td> </tr> <tr> <td>S - Slag</td> <td>CB - Crack</td> <td>R - Rejectable</td> </tr> <tr> <td>P - Porosity</td> <td>T - Toughness</td> <td>B - Borderline</td> </tr> <tr> <td>UT - Burn Thru</td> <td>MS - High Low</td> <td></td> </tr> </table> | | | | | | | | | | LP - Lack of Penetration | UC - Under Cut | Severity | LF - Lack of Fusion | C - Crater | A - Acceptable | S - Slag | CB - Crack | R - Rejectable | P - Porosity | T - Toughness | B - Borderline | UT - Burn Thru | MS - High Low | | | |
| LP - Lack of Penetration | UC - Under Cut | Severity | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LF - Lack of Fusion | C - Crater | A - Acceptable | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S - Slag | CB - Crack | R - Rejectable | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P - Porosity | T - Toughness | B - Borderline | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| UT - Burn Thru | MS - High Low | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| File Size | <u>7X17</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| File Type | <u>70</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Viewing Technique | Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Screens | Front | <u>.010</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Back | <u>.010</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Development | 60" Kodak D 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Automatic | <u>X</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Welding Procedure | <u>1-4-2-2-R
1-1-1-7-2
1-2-2-4-13</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Duke Power Co.

Catawba Unit 1 & 2

Radiographer - Date 7-18-78 by [Signature]
 Interpretation - Date 7-10-78 by [Signature] Level II
 Approval - Date 7-10-78 by [Signature] Level II

Customer 712771128
 District 1-SF-181-10
 Inspection Standard _____
 Customer Approval - Date _____ By _____

Location _____
 Job No. _____
 Acceptance Standard 1-SF-1711-2

Req. No. IF 613
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.

In-Process
 Repair

Form N5.3A

Standard Hours

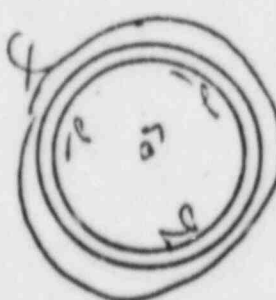
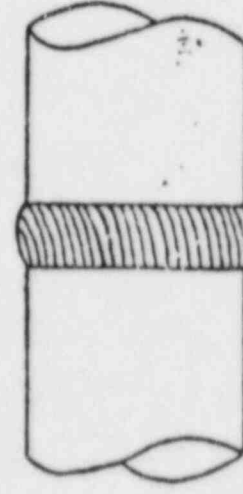
Date 7-6-78

RADIOGRAPHIC INSPECTION REPORT

| | | | | | |
|--|--|----------------------------|-------------------|--|---|
| Source of
Exposure No. <u>CI-01-25X</u> | | Place No. <u>CT-507-4C</u> | Roll No. <u>C</u> | Pipe Size
and Schedule
<u>3 1/2" x 3.1438" STD</u> | Material
<u>C124H512RI</u>
Rolling No. <u>C 2760</u>
<u>C 293B</u> |
| Item | 1 | | | | |
| Source | <u>SP192</u> | | | | |
| Source Center
or ID & SD | <u>65</u> | | | | |
| Source Size
or Field Spot | <u>142</u> | | | | |
| Source Film Distance | <u>17"</u> | | | | |
| Time | <u>3:00</u> | | | | |
| Actual Film
Thickness | <u>1.437</u> | | | | |
| Densitometry | <u>30</u> | | | | |
| Sensitivity | <u>25</u> | | | | |
| Exist. Thickness | <u>0.62</u> | | | | |
| Film Size | <u>2x17</u> | | | | |
| Film Type | <u>20</u> | | | | |
| Viewing Technique | Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | | | | |
| Screens | Front | <u>.010</u> | | | |
| | Back | <u>.010</u> | | | |
| Development | 30" Endicott & Co. | | | | |
| | Automatic | | | | |
| Exposure Parameters | <u>1-4-2-L-A</u>
<u>1-1-1-1-1-1</u> | | | | |

| Film Interval | Defect Type | | | | | | | | | | Remarks | | | | | | | | | | | | |
|---------------|-------------|----|---|---|----|----|---|----|---|----|---------|--|--|--|--|--|--|--|--|--|--|--|--|
| | SP | LZ | S | R | TE | OC | C | CR | Y | SL | | | | | | | | | | | | | |
| <u>AD</u> | | | | | | | | | | | | | | | | | | | | | | | |
| <u>DF</u> | | | | | | | | | | | | | | | | | | | | | | | |
| <u>GI</u> | | | | | | | | | | | | | | | | | | | | | | | |
| <u>JM</u> | | | | | | | | | | | | | | | | | | | | | | | |
| <u>MP</u> | | | | | | | | | | | | | | | | | | | | | | | |
| <u>PS</u> | | | | | | | | | | | | | | | | | | | | | | | |
| <u>SV</u> | | | | | | | | | | | | | | | | | | | | | | | |
| <u>VY</u> | | | | | | | | | | | | | | | | | | | | | | | |
| <u>YA</u> | | | | | | | | | | | | | | | | | | | | | | | |

| | | |
|--------------------------|-----------------|-----------------|
| AP - Lack of Penetration | OC - Under Cut | Severity |
| DF - Lack of Fusion | C - Crater | A - Acceptable |
| S - Porosity | CR - Cracks | B - Suspectable |
| MP - Porosity | Y - Unsharp | C - Rejection |
| PS - Burn Thru | SL - Slight Lam | D - Rejection |

Inspector - 7-20-78 by William Level
 Registration - 719-18 by William Level
 Approval - 7-20-78 by William Level
 Customer - Dubuque Power Co. Location - Ontario Unit 1 & 2
 Contract - 11211123 Job No. _____
 Inspection Standard - 1-SF-181-10 Acceptance Standard - 1-SF-1711-2
 Our Company Approval - 8/12

Reg. No. IF 619
 I.T. GINNELL INDUSTRIAL
 PIPING, INC.

In-Process
 Repair

Form N6.3A

Standard Hours

Date 7-6-78

RADIOGRAPHIC INSPECTION REPORT

| | | | | | | | | | | |
|--|--|------------------------------|----|--------------------------|----|---|---|--|---|----|
| Species or Register No. <u>CT-C1-25A</u> | | Picture No. <u>CT-500-4C</u> | | Roll No. <u>E 500-4C</u> | | Film Size and Schedule <u>11X 314 3343D</u> | | C1430 C510015
X1325%
Exposure No. C276E
Printer No. C512E | | |
| View | <u>6</u> | Film Interval | | Defect Type | | Comorbis | | MINIFICATION | | |
| Source | <u>IR192</u> | LP | LT | SP | IT | SC | C | CR | T | SL |
| Source Collimator or SID & WD | <u>65</u> | | | | | | | | | |
| Source Size or Focal Spot | <u>142</u> | | | | | | | | | |
| Source Film Distance | <u>32.805</u> | | | | | | | | | |
| Time | <u>10.00</u> | | | | | | | | | |
| Actual Film Thickness | <u>1.975 ± 1.437</u> | | | | | | | | | |
| Penetration | <u>30</u> | | | | | | | | | |
| Sensitivity | <u>AS</u> | | | | | | | | | |
| Bath Temperature | <u>2 ± 0.62</u> | | | | | | | | | |
| Film Size | <u>7x17</u> | | | | | | | | | |
| Film Type | <u>20</u> | | | | | | | | | |
| Viewing Technique | Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | | | | | | | | | |
| Exposure | Front | <u>.010</u> | | | | | | | | |
| | Back | <u>.010</u> | | | | | | | | |
| Development | 40° Endon 8 min. | | | | | | | | | |
| Fixing Procedure | Automatic | | | | | | | | | |
| | | | | | | | | | | |

| | | |
|--------------------------|----------------|----------------|
| SP - Lack of Penetration | DC - Under Cut | Severity |
| LP - Lack of Fusion | C - Crater | A - Acceptable |
| IP - Porosity | CB - Crack | B - Rejection |
| BT - Back Thin | S - Shrinkage | C - Burden |
| | SL - Edge Loss | |

NOTE - TO BE 100% COVERAGE
 AS P-A Slot From 00.000
 To Subolet.

Customer Duko Power Co.

Contract 212717128

Inspector SE-181-10

Customer's Approval - Date 7-18-78 by Michael...

Inspector's Approval - Date 7-19-78 by Michael...

Appraiser's Approval - Date 7-19-78 by Michael...

Location Catamba Unit 1 & 2

Job No. ISF-1711-2

Accepted Standard ISF-1711-2

ULTRASONIC THICKNESS EXAMINATION REPORT

Customer: Duke Power Register No.: CT-01-25X

Contract/P.O. No.: 7127 Piece Mark: CT-91-4C

Calibration: Step Block Increments: 200" Micrometer Reading: _____

Ultrasonic Instrument: KrautKramer

Search Unit Type: AMP Frequency: 4mc Size: 3/8"

Couplant: E-jell Procedure: UTP-1-0

| ITEM IDENTIFICATION | SIZE | NOMINAL THICKNESS | MINIMUM THICKNESS | AREA EXAMINED/LOCATION | LOWEST READING | ADJACENT AREA READING |
|---------------------|---------------|-------------------|-------------------|------------------------|----------------|-----------------------|
| <u>item 7</u> | <u>3/4 28</u> | | <u>1.225</u> | <u>1.1 @ C</u> | <u>1.450</u> | <u>1.525</u> |
| | | | | | | |
| | | | | | | |
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| | | | | | | |

COMMENTS/SKETCH/DESCRIPTION: UT good areas
 (AS APPLICABLE) UT OK

EXAMINATION PERFORMED BY: J. Smith DATE: 6-20-78

NDT Level: II

INTERPRETATION PERFORMED BY: J. Smith DATE: 6-20-78

NDT Level: II

MAGNETIC PARTICLE EXAMINATION REPORT

Customer: DUKE PCWR Register No.: CT-01-25X
 Contract/P.O. NO.: 7127 Piece Mark: CT-SM-4C
 System: MAIN STM
 Examination Method: DC Prods AC Yoke _____ Other _____
 Equipment Type: Edon Spint Model No.: M-2000
 Procedure: MTP-1-1 Acceptance: MTA-1-0

| ITEM IDENTIFICATION
WELD/SERIAL/WT. NO. | SIZE AND THICKNESS | AREA EXAMINED INDICATE,
ROOT, INTERMEDIATE, FINAL
WELD OR MATERIAL AS
APPLICABLE | RESULTS |
|--|--------------------|---|---------|
| LIP #3 | 34" x 1.375" 90° | B.U. Repair LIP | ACC |
| LIP #7 | 34" x 6" SWOL | + | + |
| # 4 | 34" x 1.375" 90 | Grind areas | + |
| D | 2" sp. boss | FINAL | ACC |
| CODE PL | _____ | FILLET | ACC |
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EXAMINATION PERFORMED BY: ROBERT E. STRADER DATE: 6-30-78
 NDT Level: II
 INTERPRETATION PERFORMED BY: RF Strader DATE: +
 NDT Level: II

Cameron

IRON WORKS, INC.

P. O. BOX 1212
HOUSTON, TEXAS 77001

O
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D

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O

ITT CORNHILL INDUSTRIAL PIPING, INC.
KERRICKSVILLE, NC 27204

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

Date 22 July 1976

| | | |
|----------------------------------|----------------------------------|---|
| Customer Order No.
KER-2853-P | C.I.W. Sales Order No.
F-5693 | ASME-SA106 Gr. C and ^{Specification} ASME-Section III, Class 2
Thru Surfer 1974 Addenda |
|----------------------------------|----------------------------------|---|

| | | | | | |
|-------------------------|------|--------|---------|--------|-------------|
| Description of Material | O.D. | x I.D. | 31.438" | x WALL | 1.375" M.W. |
|-------------------------|------|--------|---------|--------|-------------|

C.I.W. Part No. 86-5693-345-314

| Heat No. | Location or Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|-----|------|------|-----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |
| L 3117 | | .24 | .89 | .012 | .021 | .23 | | | |
| L 3120 | | .25 | .86 | .013 | .014 | .23 | | | |
| L 3130 | | .24 | .96 | .011 | .015 | .23 | | | |

| Quantity or Serial No. | Heat No. | Test Loc. | Yield Point | | MECHANICAL PROPERTIES | | | | | Specimen Size | Test Lot# |
|------------------------|----------|-----------|-------------|--------------------|-----------------------|-------------|------------|-----------|------------------|---------------|-----------|
| | | | Tensile PSI | % Offset Yield PSI | 2% Elong. In. | % Red. Area | Macro Etch | Bend Test | Flat-tening Test | | |
| 4 | L 3117 | Trans. | 79,900 | 44,700 | 25.0 | 45.8 | | | OK | .505 | 17 |
| 2 | L 3120 | Trans. | 85,600 | 48,700 | 23.8 | 44.0 | | | OK | .505 | 20 |
| 4 | L 3130 | Trans. | 77,900 | 40,200 | 27.9 | 50.8 | | | OK | .505 | 30 |

| Forg. Ser. # | Heat # | Test Lot # |
|--------------|--------|------------|
| 26614Z | L 3120 | 20 |
| 26616Z | L 3120 | 20 |
| 26619W | L 3130 | 30 |
| 26619Y | L 3130 | 30 |
| 26620X | L 3130 | 30 |
| 26620Z | L 3130 | 30 |
| 26621T | L 3117 | 17 |
| 26621U | L 3117 | 17 |
| 26621Y | L 3117 | 17 |
| 26624Z | L 3117 | 17 |

CATAWBA
PH 8



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

Subscribed and sworn to before me this
22nd Day of July 1976
[Signature]
Notary Public
Houston, Texas

I certify these tests to be correct as contained in the records of the company.
[Signature]
Metallurgical Engineer
S. WRIGHT, /at

MILL TEST CERTIFICATE

SOLD TO ITT Grinnell Corporation
Kernersville, N.C.
 SHIP TO Same for Duke Power

ITT GRINNELL CORPORATION
 WELDING PRODUCTS DIVISION
 PRINCETON, KY. Kernersville

CUP
 ORDER NO. 8222
 BRANCH
 ORDER NO. 2155 2021
 CUSTOMER'S
 ORDER NO. _____

DATE November 18, 1976

| DESCRIPTION OF FITTING | PHYSICAL PROPERTIES
FITTING MATERIAL | | | | CHEMICAL ANALYSIS | | | | | | HEAT
CODE
OR
HEAT NO. | SPECIFIC
FITTING MAT. | |
|---|---|--------------------------|-------------------------------|---------------------|-------------------|-----|------|------|-----|--|--------------------------------|--------------------------|--------|
| | HEAT
TREAT-
MENT | YIELD
POINT
P.S.I. | TENSILE
STRENGTH
P.S.I. | ELONG
IN 2"
% | C | Mn | P | S | Si | | | | |
| ASME SA-234 WPC | | | | | | | | | | | | | A-1060 |
| 31.625 x 1.375 Min. wall | F | 44900 | 82400 | 25.0 | .25 | .98 | .013 | .011 | .22 | | 0T-01-16-1 | ABAP | |
| SR 90° Ell | | | | | | | | | | | | | |
| <div style="border: 1px solid black; border-radius: 50%; width: 150px; height: 100px; display: flex; align-items: center; justify-content: center; margin: 0 auto;"> <div style="text-align: left; padding-left: 10px;"> <p><i>Catawba</i></p> <p><i>Box 17</i></p> </div> </div> <p style="text-align: center; margin-top: 20px;">*Standard round test specimen used for tensile properties</p> <p style="text-align: center;">The above fitting was manufactured and tested in strict compliance with ASME
 Section III, 1971 Edition, Class 2 through the 1971 Sinter Addition.</p> <div style="text-align: right; font-size: small; margin-top: 20px;"> <p>We certify that the fittings listed herein comply with the requirements of ASME Section III, Class 2, they were produced in accordance with the ASME Quality System Program, and that the American Society of Mechanical Engineers is a signatory to the Quality Systems Certificate Program.</p> </div> | | | | | | | | | | | | | |
| <p>"The fittings represented by this Metallurgical Report will meet the following requirements as to hardness: Brinell Hardness Number, Max. 187." 10/21/76</p> | | | | | | | | | | | | | |

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 1650°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__

R33

The Colonial Machine Company, Inc.

R. O. Box 290 -- Pleasantville, Pa. 16341

Phone (814) 539-7033

May 31, 1977

ITT Grinnell Industrial Piping Inc.
P. O. Box 566
Kernersville, NC 27284

CERTIFIED MILL TEST REPORT

Order CT
SWF-4

| | | |
|-------------------------------------|-------------------------------|-------------------------------|
| YOUR ORDER NO.
KER 6156-P | OUR ORDER NO.
10038 | DATE SHIPPED
6/1/77 |
|-------------------------------------|-------------------------------|-------------------------------|

| ITEM | TYPE | MATERIAL SPEC. | SHIPPED | HEAT NO. | CMC CO. |
|------|------|--|---------|----------|---------|
| | | ASME SA105 NORMALIZED | | | |
| 1 | | 3/4" S/W Spec. Weld Bosses per SK CT-WB-1
Pt. No. Y*A*SE* CT-3002-1 (Rev. 0 10/14/76) | 40 | N94153 | AUA |
| 2 | | 1" Ditto Pt. No. Y*A*SE* CT-3002-2 | 20 | E87257 | ARA |
| 3 | | 2" Ditto Pt. No. Y*A*SE* CT-3002-3 | 12 | A00070 | AA1 |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CB | TI | CO | OTHER ELEMENTS |
|------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| 1 | .32 | .80 | .006 | .021 | .22 | | | | | | | | |
| 2 | .26 | .78 | .011 | .027 | .24 | | | | | | | | |
| 3 | .32 | .74 | .017 | .026 | .19 | | | | | | | | |



| ITEM | TENSILE | 2% YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1. 2. 3. 4. 5. 6. ETC. |
|------|---------|----------|----------|--------|----------|--------------------|---------------------------------|
| 1 | 76700 | 36800 | 34.0 | 58.2 | | | Mill Source - U.S. Steel |
| 2 | 75000 | 47000 | 32.0 | 61.3 | | | Mill Source - " " |
| 3 | 75360 | 42770 | 31.0 | 52.4 | | | Mill Source " " |

INSPECTION WAIVED PER MR. TOM WILSON ON 5/31/77.

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.

dg

By *Ramona R. Weyant*

The Colonial Machine Company, Inc.

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

Phone (314) 539-7033

SEPT. 20, 1977

ITT CRINNELL INDUSTRIAL PIPING, INC.
P. O. BOX 566
KERNERSVILLE, NC 27284

CERTIFIED MILL TEST REPORT

CT
AP-4

| | | |
|-------------------------------------|-------------------------------|--------------------------------|
| YOUR ORDER NO.
KER 8630-B | OUR ORDER NO.
10457 | DATE SHIPPED
9/20/77 |
|-------------------------------------|-------------------------------|--------------------------------|

| ITEM | TYPE | MATERIAL-SPEC. | SHIPPED | HEAT NO. | CMC C |
|--|------|--|---------|----------|-------|
| ASME SECTION III CLASS 2 (1974 ADDENDA THRU WINTER 1974)
ASME SA105 | | | | | |
| 1 (89590) | | 1.13" ACCESS HOLE PLUGS PER CT-AH-1, H = 2.188"
PART NO. CT-4012-1 | 12 | 78849 | ABF |
| 2 (89591) | | 1.13" DITTO H = 1.705" PART CT-4012-2 | 25 | 78849 | ABF |
| 3 (89592) | | 1.13" DITTO H = 2.609" PART CT-4012-3 | 16 | 78849 | ABF |
| 4 (89593) | | 1.13" ACCESS HOLE PLUGS PER CT-AH-2, H = 1.705",
PART CT-4012-4 (SQUARE HEAD) | 30 | 78849 | ABF |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CB | TI | CO | OTHER ELEMENTS |
|-------------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| 1
THRU 4 | .26 | .71 | .013 | .025 | .23 | | | | | | | | |

ITT & IMI
 ON CH
 TSN
 DATE 9-28-77

| ITEM | TENSILE | 3% YIELD | % ELONG | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1. 2. 3. 4. 5. 6. ETC. |
|-------------|---------|----------|---------|--------|----------|--------------------|---------------------------------|
| 1
THRU 4 | 75000 | 48500 | 32.0 | 58.6 | | | MILL SOURCE - COPPERWELD |

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.

By *Randy W. [Signature]*



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

AREA CODE 215
 TELEPHONE 475-0400
 TWX 810-451-1752
 TELEX 847453

CUSTOMER: ITT GRINNELL CORP.
CUSTOMER'S Order No.: KER 9442-B
SHIPPED TO: ITT GRINNELL CORP.
 PO BOX 566
 HIGHWAY 421
 KERNERSVILLE NC 27284

CT
 Swf-17

Date May 2, 1978
Bonney Order No. 61651
Mark
 KER 9442-B

CT-2168-1

| Item No. | Quantity No. | Bonney Lot No. | Grade or Specification No.
Chemical Analysis, Physical Properties, Remarks: |
|----------|--------------|----------------|--|
| | 4 | P232 | SA105N
34 (1.375MW) x 6 (.432) Sweepolet
C.27 Mn.95 P.012 S.014 Si.26
T/S 85,700 Y/S 54,700 El 32 Ra 59 |

ITTG - IPI
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE MAY 9 1978
 SHEET 1 OF 1

This is to certify that:

- The fittings supplied are in complete accordance with the ASME Boiler and Pressure Vessel Code, Section III, Class 2, 1974 Edition including Winter 1974 Addenda; SA105N And the Purchase Order.
- 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.



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 its contractor, and that no additional laboratory checks.

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

T. C. Wilson

by _____
 QUALITY ASSURANCE MANAGER



UNION CARBIDE CORPORATION
 LINDE DIVISION
 WELDING MATERIALS
 P.O. BOX 710, ASHTABULA, OHIO 44004

Feb. 10, 1978

CUSTOMER: ITT Grinnell
 7 Greensboro Reg. Airport
 Greensboro, N.C. - 27400

YOUR ORDER NO. 11-258 YER 9419

LINDE S.O. NO. 71125CA1

1/8" Dia.
 S/L Rod

WW-2071

MATERIAL: Linde 65

This is to certify that this material will conform to AWS A5.18-69
 ASME SA5.18. It has the following chemical analysis meeting the
 requirements of Classification E70S-2:

| | | |
|--------------------|---|---------------|
| <u>HEAT NUMBER</u> | - | <u>065220</u> |
| Carbon | - | .05 |
| Manganese | - | 1.11 |
| Phosphorous | - | .009 |
| Sulphur | - | .022 |
| Silicon | - | .50 |
| Aluminum | - | .071 |
| Titanium | - | .06 |
| Zirconium | - | .053 |

RECEIVED
1 20

ITTG - IPI
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE MAY 22 1978
 SHEET 1 OF 9

Ladle Analysis

HJT/klr

Howard J. ...
 Quality Assurance - Welding Materials
 Plant - Union Carbide Corporation
 Linde Division

ITTG Grinnell

Industrial Piping Inc.

SUBJECT: Welding Filler Materials
WIRE: Linde 65, Heat No. 065220

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 5-2, that the test results shown in Taussig Associates, Inc. Report 24131 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat-treated condition (total time not to exceed 20 hours). This may also be used on impact-tested material with a minimum service temperature of +30 degrees F.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 Edition.

WW-2071

J. F. Elder 3/29/73
J. F. Elder Date
Materials Engineer

RECITE
130

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 22 1974
SHEET 2 OF 9

MATERIAL TEST REPORT #24131

R & D TEST #460

WW-207

Linde 65, Heat No. 065220

The following tests were performed in accordance with SFA 5.18, E70S-2:

1. All-Weld Metal Tension Test:

As-Welded:

Heat Treated*

| | |
|------------------------------|------------------------------|
| Tensile Strength: 81,850 psi | Tensile Strength: 78,750 psi |
| Yield Point: 68,700 | Yield Point: 70,825 |
| Elongation(%) in 2": 30 | Elongation(%) in 2": 31 |

2. Charpy V-Notch Impact Tests:

As-Welded:

| Temp. | Ft. lbs. | Lat. Exp. (mils) | %Shear |
|-------|----------|------------------|--------|
| -20°F | 49 | 39 | 40 |
| -20 | 17 | 19 | 20 |
| -20 | 44 | 35 | 40 |
| -20 | 63 | 46 | 50 |
| -20 | 76 | 56 | 60 |

Heat-Treated*

| Temp. | Ft. lbs. | Lat. Exp. (mils) | %Shear |
|-------|----------|------------------|--------|
| +30°F | 103 | 66 | 70 |
| +30 | 70 | 59 | 60 |
| +30 | 70 | 51 | 50 |

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 APPROVED
 T. C. WILSON
 DATE MAY 22 1973
 SHEET 3 OF 9

BECITEL
 130

3. Chemical Analysis: (Additional elements required by ASME Section III, Cl. 1 for information only)

| | |
|-------------|------------|
| Ni : < 0.05 | V : < 0.01 |
| Cr : < 0.05 | Cu : 0.10 |
| Mo : < 0.03 | |

4. Radiography: Acceptable

WW-2071

*Heat-treated for 16 hours at 1150 degrees F, cooling to 600 degrees F shall be 300 degrees F/hr. (\pm 100 degrees F/hr.).

This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by ITT Grinnell IPI and our subcontractor are in compliance with the requirements of SFA 5.18 and the applicable material requirements of NB-2400 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by ITT Grinnell IPI. This report, in conjunction with the Linde Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.

J. F. Elder 3/29/78
J. F. Elder Date
Materials Engineer

DECITEL
130

ITTG - IPI
QUALITY CONTROL
★ APPROVED ★
T. C. WILSON
DATE MAY 22 1978
SHEET 4 OF 9

Saussig Associates Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



Report No. 24131 - March 28, 1978

ITT Grinnell Industrial Piping, Inc.
P.O. Box 566 - Hwy 421
Kernersville, North Carolina 27284

Attn: Mr. F. Elder

WW-2071

BECHTEL
120

ITTG - IPI
QUALITY CONTROL
★ APPROVED ★
T. C. WILSON
DATE MAY 22 1978
SHEET 5 OF 9

S U B J E C T

Mechanical and Chemical Testing of the Weld
Metal of Two (2) Plates Marked Test No. 460.
Per Requisition No. 34622.

BACKGROUND:

Two (2) welded plate assemblies were submitted to our laboratory for chemical analysis, charpy impact and tension testing of the weld metal. The assemblies had been identified as plate no. 460, 1/8" Linde 65, Heat no. 065220. One plate was to be tested as-welded and the other tested after a stress relieving heat treatment.

TEST RESULTS:

WW-207

Chemical Analysis:

The weld metal of plate no. 460 was drilled in a manner which prevented removal of material from the base metal. These drillings were cleaned and subjected to a quantitative chemical analysis with the following results:

| | |
|------------|-------|
| Nickel | <.05% |
| Chromium | <.05 |
| Molybdenum | <.03 |
| Vanadium | <.01 |
| Copper | .10 |

ITG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE 12 22 70
SHEET 6 OF 9

Heat Treatment:

The plate no. 460 was cut to permit it to fit into heat treating furnace. The pieces were heated to 1150°F and held for 16 hours at temperature. Cooling was done at a rate of less than 300°F/Hr. to below 600°F.

REC'D
130

Tension Testing:

Two, round, all weld metal tension test specimens were machined from plate no. 460, as-welded and heat treated. Both specimens were subjected to standard tension testing giving the results as follows:

| | <u>Heat Treated</u>
<u>No. 460</u> | <u>As-Received</u>
<u>No. 460</u> |
|---------------------------------|---------------------------------------|--------------------------------------|
| Tensile Strength, psi. | 78,750 | 81,850 |
| Yield Strength, psi.(.2%Offset) | 70,825 | 68,700 |
| % Elongation in 2 inches | 31 | 30 |
| % Reduction of Area | 68 | 70 |

Impact Testing:

A total of eight, full size (10mm x 10mm), Charpy V-notch impact test specimens were machined from the two submitted plate assemblies. Five of the specimens were from the as-welded plate and three were from the heat treated plate. All were notch in the weld metal and removed and oriented per NB 2322 of the ASME Boiler & Pressure Vessel Code.

No. 460 - As-Received:

| <u>Test Temperature</u> | <u>Absorbed Energy (ft-lbs)</u> | <u>Mils Lateral Expansion</u> | <u>Percent Shear</u> |
|-------------------------|---------------------------------|-------------------------------|----------------------|
| - 20°F | 49 | 39 | 40 |
| - 20°F | 17 | 19 | 20 |
| - 20°F | 44 | 35 | 40 |
| - 20°F | 63 | 46 | 50 |
| - 20°F | 76 | 56 | 60 |

No. 460 - Heat Treated:

| | | | |
|--------|-----|----|----|
| + 30°F | 103 | 66 | 70 |
| + 30°F | 70 | 59 | 60 |
| + 30°F | 70 | 51 | 50 |

WW-2071

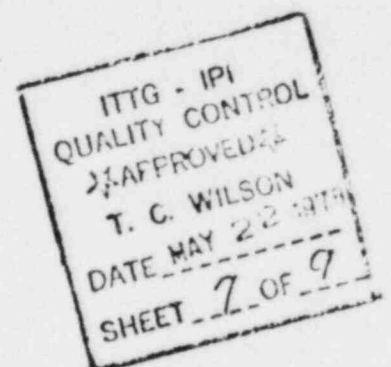
DEC 130

MAH:i

Respectfully submitted,

Mark A. Hineman

Mark A. Hineman
Staff Engineer
TAUSSIG ASSOCIATES, INC.



Taussig Associates Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



PRODUCT TESTING FAILURE INVESTIGATION MATERIAL EVALUATION QUALITY ASSURANCE

TO: ITT Grinnell Industrial Piping
P.O. Box 566 - Hwy 421
Kernersville, N. C. 27284

Report No.: 24131-1a
Date: 5-26-78
Your Order No.:

Attention: Mr. John Elder

SUBJECT: Charpy Impact Testing at the Weld Metal of Test Plate
#460A; 1/8" Linde 65, Heat #065220 - As-Welded.

TEST RESULTS:
Impact Testing:

WW-207

Specimen Size: 10mm x 10mm
Notch Type: V
Test Temperature: + 30°F

RECEIVED
130

| Specimen Number | Absorbed Energy (ft-lbs) | Mils Lateral Expansion | Percent Shear |
|-----------------|--------------------------|------------------------|---------------|
| G1 | 105 | 67 | 60 |
| G2 | 137 | 70 | 70 |
| G3 | 101 | 66 | 60 |

All specimens were removed and oriented in accordance with NB-2332.

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 30 1978
SHEET 8 OF 9

CMC
Corwyn M. Berger
General Manager

TAUSSIG ASSOCIATES, INC.
By *Mark A. Hineman*
Mark A. Hineman
Staff

WW-207

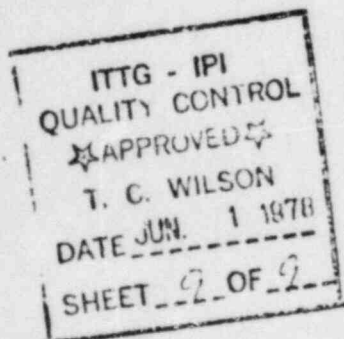
SUBJECT: Welding Filler Materials
WIRE: Linde 65, Heat No. 065220

This is to certify that the subject material was welded into a test plate in accordance with NB-2340 using WPS 5-2. These test results are shown in Taussig Associates, Inc. Report No. 24131-1a and supplement the results shown in Taussig Associates, Inc. Report No. 24131.

Charpy Impacts

| <u>Temp.</u> | <u>Ft.-lbs.</u> | <u>Lat. exp. (mils)</u> | <u>%Shear</u> |
|--------------|-----------------|-------------------------|---------------|
| +30°F | 105 | 67 | 60 |
| +30°F | 137 | 70 | 70 |
| +30°F | 101 | 66 | 60 |

J. F. Elder
J. F. Elder
Materials Engineer



CERTIFICATE OF ANALYSIS



UNION CARBIDE CORPORATION
LINDE DIVISION
WELDING MATERIALS
P.O. BOX 710, ASHTABULA, OHIO 44004

1/16/78

CUSTOMER: ITT GRINNELL
OLD HIGHWAY 421
KERNERSVILLE NC 27284

YOUR ORDER NO.: 11-137-KER 9113
LINDE S.O. NO.: _____

WW-206

MATERIAL: Linde 65

This is to certify that this material will conform to AWS A5.18-69
ASME SFA5.18. It has the following chemical analysis meeting the
requirements of classification E70S-2:

HEAT NUMBER - 065214

| | | |
|-------------|---|------|
| Carbon | - | .04 |
| Manganese | - | 1.17 |
| Phosphorous | - | .008 |
| Sulphur | - | .015 |
| Silicon | - | .54 |
| Aluminum | - | .12 |
| Titanium | - | .07 |
| Zirconium | - | .041 |



Ladle Analysis:

Howard Tucker - All

Quality Assurance - Welding Materials Plant
Union Carbide Corporation - Linde Division

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE: FEB. 21 1978
SHEET 1 OF 4

Industrial Pipe, Inc.

SUBJECT: Welding Filler Materials

WIRE: Linde G5, Heat No. 065214

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 5-2, that the test results shown in Tausig Associates, Inc. Report 23190 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This may also be used on impact-tested material with a minimum service temperature of +30 degrees F.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 Edition.

WW-206

John F. Elder 2/21/78
J. F. Elder

ITIG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB 21 1978
SHEET 2 OF 4

MATERIAL TEST REPORT #23490

R & D TEST #355

Linde G5, Heat No. 065214

WW-206

The following tests were performed in accordance with SFA 5.18, E70S-2:

1. All-Weld Metal Tension Test:

As-Welded:

Tensile Strength: 79,200 psi
 Yield Point: 74,700
 Elongation (%) in 2": 28

Heat-Treated*

Tensile Strength: 76,600
 Yield Point: 66,400
 Elongation (%) in 2": 30

2. Charpy V-Notch Impact Tests:

As-Welded:

| <u>Temp.</u> | <u>Ft. lbs.</u> | <u>Lat. Exp. (mils)</u> | <u>%Shear</u> |
|--------------|-----------------|-------------------------|---------------|
| -20 | 143 | 91 | 90 |
| -20 | 123 | 79 | 80 |
| -20 | 100 | 69 | 70 |
| -20 | 111 | 75 | 80 |
| -20 | 111 | 80 | 80 |

Heat-Treated*

| <u>Temp.</u> | <u>Ft. lbs.</u> | <u>Lat. Exp. (mils)</u> | <u>%Shear</u> |
|--------------|-----------------|-------------------------|---------------|
| +30 | 80 | 63 | 60 |
| +30 | 97 | 73 | 70 |
| +30 | 107 | 73 | 70 |

3. Chemical Analysis: (additional elements required by ASME Section III, Cl. 1 for information only)

Ni: < 0.05 V : < 0.01
 Cr: < 0.05 Cu : 0.12
 Mo: < 0.03

4. Radiography Test: Acceptable

ITTG - IPI
 QUALITY CONTROL
~~APPROVED~~
 T. C. WILSON
 DATE FEB 21 1978
 SHEET 3 OF 4

*Heat-treated for 16 hours at 1150 degrees F, cooling to 600 degrees F shall be 300 degrees F/hr. (+ 100 degrees F/hr.)

This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by ITT Grinnell IPI and our subcontractor are in compliance with the requirements of SFA 5.18 and the applicable material requirements of III-2400 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by ITT Grinnell IPI. This report, in conjunction with the Linde Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.

W-206

J. F. Elger
J. F. Elger Date

ITTG - IPI
QUALITY CONTROL
APPROVED:
T. C. WILSON
DATE FEB. 21 1978
SHEET 4 OF 4

WW-2011

Customer Order No. 4365 Rel.14-4243

Order No. 711093-2

Shipped

National Welders Supply
P.O. Box N-93
3011 N. Liberty Street
Winston Salem, N.C. 27105

This material conforms to Specification
ITT Spec. ES 1073-1
SFA 5.1 Sec.III

E 7018

Trade Name or Trademark: Atom Arc 7018

Type

Diameter Size: 3/32"
19,650 lbs.

Test No. 650
X-Rays Satisfactory
Control No. MMM074

Lot Number: 02-1-J728P
Heat Number: 411B6841

Moisture @1800°F. 0.29%
Concentricity 4%
Type Steel A-285

Carbon .04
Manganese 1.06
Chromium .03
Nickel .02
Silicon .48
Columbium + Tantalum
Molybdenum .01
Tungsten
Copper .02
Titanium
Phosphorus .012
Sulphur .016
Vanadium .03

| Test No. | Full | Split | Volts | Amps |
|--------------------|------|-------|-------|------|
| Tensiles & Impacts | 1 | 6 | 22 | 110 |

| Test Results: | As Welded | Stress Relieved |
|---------------|-----------------|-----------------|
| | 8 hrs. @1150°F. | |
| Yield | 73,100 | 65,400 |
| Tensile | 80,000 | 75,900 |
| Elongation | 28.0% | 30.0% |
| Red. of Area | 76.0% | 77.9% |

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB. 22 1978
SHEET 1 OF 1

Charpy V-Notch Impacts Tested @ 20°F.

| | | |
|-----------|----------------|----------------|
| Impacts | 42-58-63-72-82 | 68-72-80-92-98 |
| Lat. Exp. | 38-48-52-59-68 | 58-61-67-78-83 |
| %Shear | 20-20-20-20-30 | 20-30-30-30-30 |

Filletts: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIAL)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978

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

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 21st day of November 1977

SEAL *[Signature]*
Notary Public

My commission expires: 8/21/78

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

BY *[Signature]*
D. G. Flohr

CERTIFIED MATERIALS TEST REPORT

WV-202

Customer Order No. 4372

Order No. 150310-1

National Welders Supply Co.
Ref. 14-5406
3011 N. Liberty Street
Winston Salem, N.C. 27105

Shipped _____

This material conforms to Specification
ES 1073-3 (SFA 5.1 Sec. II)

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAR 10 1978
SHEET 1 OF 1

Type E 7018

Trade Name
or Trademark:

Atom Arc 7018

Diameter Size:

1/8"
50# sample returned

Test No. 1145
X-Rays Satisfactory
Control No. NNN009

Lot Number:

02-1-L719R

Moisture @1800°F. 0.15%

Heat Number:

421B5451

Concentricity 4%

Type Steel A-285

Carbon .04
Manganese 1.01
Chromium .03
Nickel .03
Silicon .43
Columbium + Tantalum
Molybdenum .01
Tungsten
Copper .02
Titanium
Phosphorus .010
Sulphur .015
Vanadium .02

Test No. Full Split Volts Amps

Tensiles & Impacts 1 5 22 135

Test Results: As Welded Stress Relieved
16 hrs. @1100-1200°F.

Yield 67,000 65,700
Tensile 77,400 76,900
Elongation 28.0% 31.0%
Red. of Area 67.3% 78.1%

Charpy V-Notch Impacts Tested @-20°F.
Impacts 96-106-107-107-121 88-92-94-109-110
Lat. Exp. 72-71-71-75-77 72-71-78-79-81
% Shear 40-50-50-50-50 20-30-20-40-40

Filletts: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 7th day of March 1978

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

SEAL Anneta E. Conway
Notary Public

My commission expires: 8/21/78

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

BY D. J. Jacoby
D. J. Jacoby

CERTIFIED MATERIALS TEST REPORT

WNA-203

Customer Order No. 4374 (14-4631)

Order No. 153016-1

National Welders Supply Co.

Shipped _____

P.O. Box N-93

3011 N. Liberty Street

Winston Salem, N.C. 27105

ITTG - IPI
QUALITY CONTROL
APPROVED
DATE 4-10-78
SHEET 1 OF 1

This material conforms to Specification
ES 1073-3 & ES 1084-4,
ASME SFA 5.1 Sec. III NA37

Type E 7018

Trade Name
or Trademark:

Atom Arc 7018

Diameter Size:

5/32"
20,000 lbs.

Test No. 1149
X-Rays Satisfactory
Control No. NNN050

Lot Number:
Heat Number:

03-3-B821K
482B5101

Moisture @1800°F. 0.11%
Concentricity 3%
Type Steel A-285

| Test No. | Full | Split | Volts | Amps |
|--------------------|------|-------|-------|------|
| Tensiles & Impacts | 1 | 7 | 24 | 170 |

| Test Results: | As Welded | Stress Relieved |
|---------------|-----------------------|-----------------|
| | 16 hrs. @1100-1200°F. | |
| Yield | 68,000 | 62,000 |
| Tensile | 77,500 | 72,700 |
| Elongation | 28.0% | 32.0% |
| Red. of Area | 71.2% | 78.1% |

Charpy V-Notch Impacts Tested @ -20°F.
Impacts 128-138-150-185-214 120-172-180-204-208
Lat. Exp. 85-86-84-82-91 81-80-86-91-85
% Shear 60-60-70-80-80 50-80-80-90-90

Filletts: OK Vertical Overhead
ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 6TH day of April 1978

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

SEAL *Annella E. Ramsey*
Notary Public

My commission expires: 8/21/78

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

BY *D. G. Flohr*
D. G. Flohr

The Reid - Avery Company
Tandah, Baltimore, Md. 21222

QUALITY ASSURANCE
 TEST REPORT
 DATE: 11/11/78

SOLD TO: ITT Grinnel
Old Highway 421
Kernersville, NC 27284

SHIPPED TO: _____

DATE SHIPPED: 11/30/78

P.O. NO.: _____

P.O. NO.: Rec. 6999

SPECIFICATION:

| ITEM | POUNDS | SIZE | TYPE | LOT NO. | HEAT NO. |
|------|--------|------|---------|---------|----------|
| 1. | | 1/8 | 120 RPH | | 510316 |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |

W-2071

CHEMICAL ANALYSIS OF WIRE

| ITEM | C | Mn | P | S | Si | Cr | Ni | Mo | Al | Cu |
|------|-----|------|------|------|-----|------|------|-----|-----|------|
| 1. | .13 | 1.71 | .019 | .013 | .05 | .029 | .040 | .53 | .00 | .041 |
| 2. | | | | | | | | | | |
| 3. | | | | | | | | | | |
| 4. | | | | | | | | | | |
| 5. | | | | | | | | | | |
| 6. | | | | | | | | | | |

DEKTEL
130

ITTG - IPI
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE JUN 13 1978
 SHEET 1 OF 5

ADDITIONAL TEST RESULTS

State of _____

City of _____

Subscribed and sworn to before me this _____ day

of _____ 19 _____

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

Notary Public _____

My commission expires _____

[Signature]
 QUALITY ASSURANCE DEPARTMENT

ITT Grinnell

Industrial Piping Inc.

WOW-209

SUBJECT: Welding Filler Materials
WIRE: RACo 128 HMM: Ht. No. 519346
FLUX: Linde 80; Lot 0575, Con. 8290

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 3-1, that the test results shown in Taussig Associates, Inc. Report 22367-1 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This material shall not be used on impact-tested fabrication.

This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by ITT Grinnell IPI and our Subcontractor are in compliance with the requirements of SFA 5.23 for an F70-EA3-A3 type classification, and the applicable material requirements of NB-2400 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by ITT Grinnell IPI. This report, in conjunction with the RACo Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.

DESITE
130

| |
|---|
| ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE JUN 13 1978
SHEET 2 OF 5 |
|---|

J. F. Elder 2/3/78
J. F. Elder Date

Gaussig Associates Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



Report No. 22867-1 - December 14, 1977

ITT Grinnell Industrial Piping
P. O. Box 566 - Hwy 421
Kernersville, NC 27284

Attn: Mr. J. F. Elder

WW-209

SUBJECT

Mechanical & Chemical Testing of the Weld
Metal of Test Plate #428.

RECEIVED
1978

| |
|--|
| ITTG - IPI
QUALITY CONTROL
★APPROVED★
T. C. WILSON
DATE JUN. 13 1978
SHEET 3 OF 5 |
|--|

Corrections:

3-22-78 - Heat #519346 on page 1.

PRODUCT TESTING FAILURE INVESTIGATION MATERIAL EVALUATION QUALITY ASSURANCE

BACKGROUND:

Two (2) welded plate assemblies were submitted to our laboratory for chemical analysis, charpy impact and tension testing of the weld metal. The assemblies had been identified as plate number 428, PACO 1201MM, Ht. #519346, Linde 80, Lot 0575, Con. 8290. One plate was to be tested as-welded and the other tested after a stress relieving heat treatment.

TEST RESULTS:

Chemical Analysis:

The weld metal of plate number 428 was drilled in a manner which prevented removal of material from the base metal. These drillings were cleaned and subjected to a quantitative chemical analysis with the following results:

| | |
|------------|------|
| Carbon | .05 |
| Manganese | 1.23 |
| Phosphorus | .014 |
| Sulfur | .013 |
| Silicon | .40 |
| Nickel | <.05 |
| Chromium | <.05 |
| Molybdenum | .53 |
| Copper | .15 |
| Vanadium | <.01 |

WW-209

Heat Treatment:

Plate number 428 was cut to permit it to fit into a heat treating furnace. The pieces were heated to 1100°F and held for 16 hours at temperature. Cooling was done at a rate of less than 200°F/Hr. to below 800°F. The pieces were then marked 428H.

Tension Testing:

Two, round, all weld metal tension test specimens were machined from plate number 428, as-welded and heat treated. Both specimens were subjected to standard tension testing giving the results as follows:

RECEIVED
300

| |
|------------------|
| ITTG - IPI |
| QUALITY CONTROL |
| ★ APPROVED ★ |
| T. C. WILSON |
| DATE JUN 13 1978 |
| SHEET 4 OF 5 |

| | No. 428H
Heat Treated | No. 428
As-Welded |
|------------------------|--------------------------|----------------------|
| Tensile Strength, Psi. | 83,875 | 83,325 |
| Yield Strength, Psi. | 68,725 | 70,325 |
| % Elongation in 2" | 27 | 27 |
| % Reduction of Area | 61 | 61 |

Impact Testing:

Five (5), full size (10mm x 10mm), Charpy V-Notch impact test specimens were machined from the heat treated plate assembly. All were notched in the weld metal.

No. 428H - Heat Treated:

| <u>Test Temperature</u> | <u>Absorbed Energy (ft-lbs)</u> | <u>Mils Lateral Expansion</u> | <u>Percent Shear</u> |
|-------------------------|---------------------------------|-------------------------------|----------------------|
| 0°F | 45 | 39 | 40 |
| 0°F | 40 | 36 | 40 |
| 0°F | 42 | 35 | 40 |
| 0°F | 48 | 41 | 40 |
| 0°F | 50 | 41 | 50 |

Respectfully submitted,

Mark A. Hineman

Mark A. Hineman
Staff Engineer

TAUSSIG ASSOCIATES, INC.

WW-2091

MAH:ln

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE JUL 15 1976
SHEET 5 OF 5

DEC 1976
120

QUALITY ASSURANCE DEPARTMENT
 SUPPLIER QUALITY ASSURANCE CERTIFICATION

Name of Supplier ITT Grinnell Ind. Piping, Inc. Date 9-12-78
 Address of Supplier Plant Kernersville, NC Mill Power Order No. C-12517
 _____ Duke Item or Req. No. 1206.00-1.0
 _____ Spec. No. CNS-1206.00-1.0 Rev. 2

Supplier ID Nos. CT-01-34x
 Description of Component(s) or Material(s) Fabricated Piping Assembly
CT-SM-4D

Attached Documentation covers all Components/Materials on Mill Power Order.
 Attached Documentation covers partial shipment of Components/Materials on Mill Power Order.

The following listed tests, inspections and reports have been completed as required by the specification:

- | | | |
|--|--|---|
| <input checked="" type="checkbox"/> Physical & Chemical Analysis | <input type="checkbox"/> Major Repair Records & Charts | |
| <input type="checkbox"/> Hydro (Test Pressure - PSIG _____) | <input checked="" type="checkbox"/> Personnel Qualifications on Record | |
| <input type="checkbox"/> Design Report | <input type="checkbox"/> Stress Report | <input type="checkbox"/> Heat Treatment |
| <input checked="" type="checkbox"/> Radiographic Test | <input type="checkbox"/> Ultrasonic Test | <input checked="" type="checkbox"/> Magnetic Particle |
| <input type="checkbox"/> Penetrant Test | <input type="checkbox"/> Repair NDE | <input checked="" type="checkbox"/> Cleanliness |
| <input type="checkbox"/> Operating Test | <input type="checkbox"/> Performance Curve | <input checked="" type="checkbox"/> ASME Data Report |
| <input checked="" type="checkbox"/> Dimensional Check | <input checked="" type="checkbox"/> Deviation Record # <u>1P-1779</u> | |

- 1) _____
- 2) _____
- 3) _____

This certifies that the listed Component(s) or Material(s) conform to the requirements of the above referenced Duke Power documents including all codes, standards, test requirements and Quality Assurance requirements invoked therein.

DUKE POWER COMPANY
 QA RECORDS APPROVED
S. W. [Signature]
 QA REPRESENTATIVE
 DATE 9-6-79

Thomas A. Smith
 Supplier Representative Authorized Signature
 Title Mgr. of Proc Date 9-12-78

(See Instructions)

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

SHEET 1 OF 4

1. Fabricated by ITT Grinnell Ind. Piping, Inc. Kernersville Order No. 7127 ^{10/13/78} CR-22
(Name and Address of Fabricator)

2. Fabricated for Duke Power Company, Charlotte, NC Order No. C-12517
(Name and Address)

3. Owner Duke Power Company 4. Location of Plant Newport, SC

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

(a) Drawing No. CT-01-34X Prepared by ITT Crinnell Industrial Piping, Inc.
(b) National Board No. N/A

6. The material, design, construction, and workmanship complies with ASME Code Section III, Class N-2
Edition 1974, Addenda Date Winter 1974, 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)

Supplemental Sheets 2 ---- Drawings
3 ---- Bill (s) of Material

7. Shop Hydrostatic Test Field psi.

8. Description of piping inspected Piece Mark Number CT-5M-4D
(Include - mark no. - material spec. - nom. pipe size - schedule or thickness - length - fittings - flanges, etc.)
See Attached Sheets

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

Date 9-12-78 Signed ITT GRINNELL Ind. Piping, Inc. by Thomas A. Smith
(Fabricator)

Certificate of Authorization Expires 7-16-79 Certificate of Authorization No. N-1456

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 N.C. and employed by * of Hartford, CT. have inspected the piping described in this Data Report on 9-15-78, 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. *The Hartford Steam Boiler Inspection and Insurance Co.

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 9-15-78 Barry B. Bello Commissions N.C. - No. 878
(Inspector) National Board, State, Province and No.

* 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 in item 7, "Remarks".
Printed in U.S.A. (2/73)

Grinnell Industrial Piping Inc.

KERNERSVILLE, N. C.

FORM 101 REV 1/76
Q.A. FORM 101.1C
Sheet 2 of 4

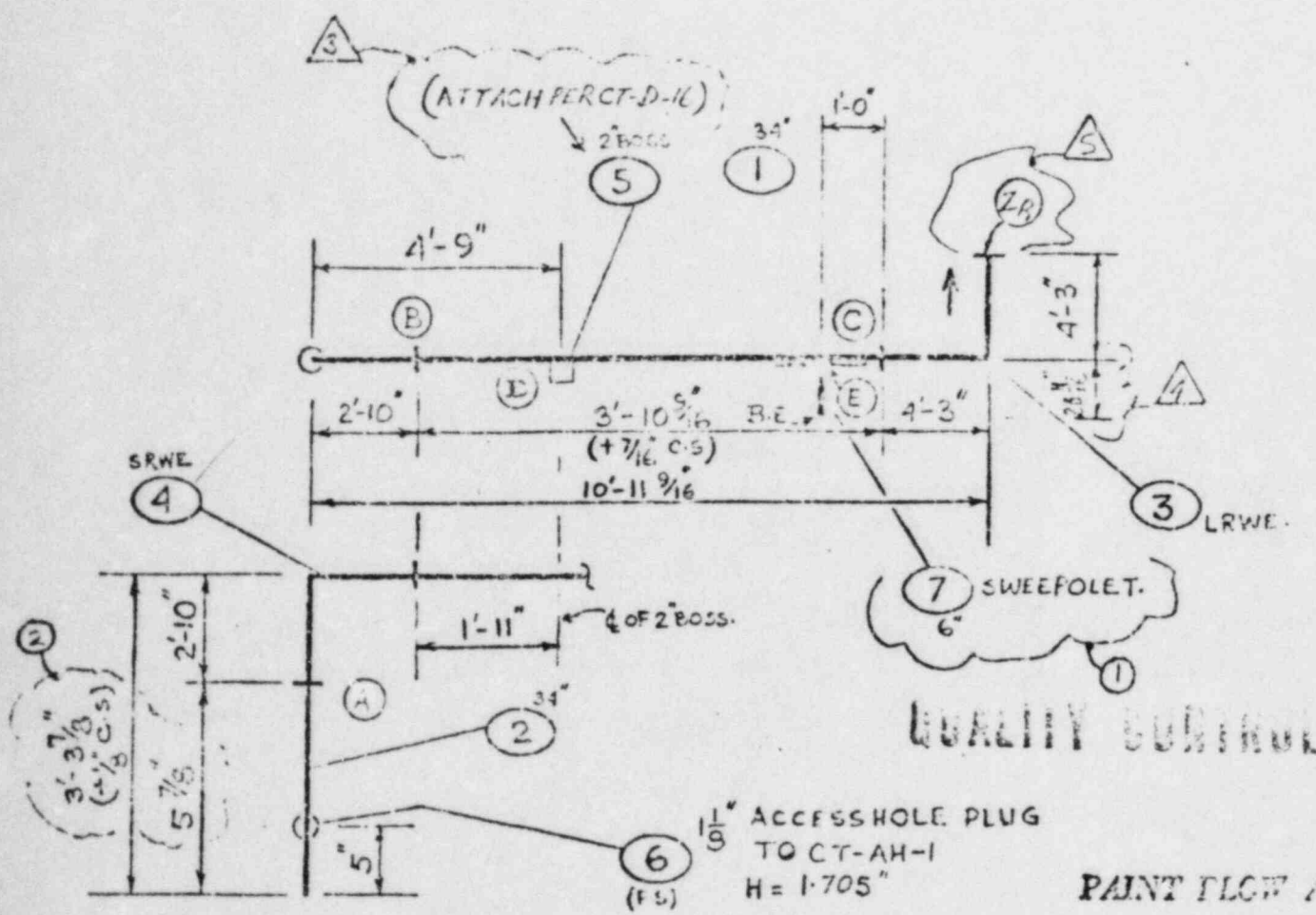
CONT. NO. 7127
 NAME DUKE POWER COMPANY
 LOCATION CATAWBA UNIT #1
 CHARLOTTE, N.C.
 P.O. - C-12517

REDRW'G 10-23-77 CHECK'D PG
 REV. ① SM, 11-11-77 CHECK'D PG
 REV. ② SM, 12-14-77 CHECK'D PG
 REV. ③ SM 5-23-78 CHECK'D PG
 ④ 7/20/78

SPECIAL MATERIAL
 CHECK ALLOCATION SHEETS
 BEFORE CUTTING

LENGTH OF ACCESS HOLE PLUG SHALL
 BE ± 1/16" OF ACTUAL WALL THK.
 SHOP SHALL GRIND TO FIT—IF REQUIRED.

{ USE 3'-10⁹/₁₆" FROM PART # 18, LOT # 4121
 HT. # L 3117, USE BALANCE FOR ITEM # 2.



QUALITY CONTROL

PAINT FLOW ARROWS

MACHINE ENDS
 PER SPEC CT-D-2, EXCEPT AS NOTED.

Nuclear Safety Related

CLASS DUKE D LINE SPEC. PS 1500-5(01) APP. CODE A 2 & S & III, CL 2 NO. REQ'D 1

| | | | | | | |
|--------------------|---|------------------|---|------------|---|---------------------|
| Radiography (RT) | ✓ | Special Marking | | Preheat | ✓ | Cert. of Compliance |
| Mag. Particle (MT) | ✓ | Special Cleaning | ✓ | Heat Treat | | Mill Test Reports |
| Eq. Pressure (PT) | | Painting | ✓ | Code Stamp | ✓ | Data Reports |

SYSTEM MAIN STEAM (M) FAB. SPEC. JS 118
 REF. DRWG NO. CN-1491-36004 (REV 2) PRESS. 185 PSI. TEMP. 600 °F. WT. 7728 LBS.
 ITEM MARK CT-SM-4D REGISTER CT-01-748

Register No. CT-01-34X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 3 of 4

Piece Mark CT-SM-AD Job Name DUKE POWER COMPANY
CATAWBA UNIT #1
Charlotte, N.C. Contract No. 7127 Location _____
P.O. C-12517

| ITEM | PART NUMBER | DESCRIPTION | QUAN OR LENG | QUALITY CONTROL | | | ACCOUNTING/MATERIAL | | | |
|------|-----------------------|---|--------------|-----------------|---------------------|--------|---------------------|-----------------|-------------|--------------------|
| | | | | HEAT NUMBER | DOCUMENT IN PROCESS | STATUS | U/M | UNIT PRICE P.O. | D.S. VENDOR | NET |
| 1 | ESCT001
CT-01-11-1 | 3.4
31.438" I.D X 1.375" MW. SML'S
CS, PIPE TO ASME, SA-106
GR.C. | 3.4 | | | | | F | | |
| 2 | ESCT002
CT-01-11-1 | 3.4
—— DITTO —— | 3.4 | | | | | F | | |
| 3 | LAAT001
CT-01-17-1 | 3.4
31.438" I.D X 1.375" MW, 90° RWE
TO SA-234 WPB-W, MADE
FROM SA-515 GR. 70 PLATE,
(70,000 PSI TENSILE), OR SA-234
WPC SEAMLESS, ENDS PER
DETAIL CT-D-2 | 3.4 | | | | | E | | SEE ATTACHED SHEET |
| 4 | LBAT001
CT-01-16-1 | 3.4
—— DITTO EXCEPT SRWE, | 3.4 | | | | | E | | |
| 5 | YXAA001
CT-002-3 | 2
2" 3000# CS, SP WELD BOSS
TO SA-105, PER DET. SK.
CT-WB-1 (ATTACH III CT-D-11) | 2 | | | | | E | | |

Code Ann. Sec. III, Cl. 2

Class DUKE 'B'

Nuclear Safety Related

Job Supplement JS 118

MFG. Code _____

Register No. CT--DI-34X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 24 of 24

Piece Mark CT-SM-4D

Job Name DUKE POWER COMPANY

Revision No. 1 Revision Date

CATAWBA UNIT #1
CHARLOTTE, N.C.
P.O. C-12517

Contract No. 7127

Location

| ITEM | PART NUMBER | DESCRIPTION | QUAN OR LENG | QUALITY CONTROL | | | ACCOUNTING/MATERIAL | | | |
|------------------|------------------------|------------------------------------|--------------|-----------------|-----------|---------|---------------------|----------|-----------------|---------------------------|
| | | | | HEAT NUMBER | DOCUMENT# | PROCESS | STATUS | U/M | UNIT PRICE P.O. | D.S. VENDOR |
| | <u>SYS. MAIN STEAM</u> | | | | | | | | | |
| <u>XXXXXX</u> | <u>112</u> | <u>1/8" ACCESS HOLE PLUG</u> | <u>1</u> | | | | | <u>E</u> | | |
| <u>CT-4012-2</u> | | <u>PER SK. CT-AH-1, TO</u> | | | | | | | | |
| | | <u>ASME, SA-105, H=1.705"</u> | | | | | | | | |
| | <u>34</u> | <u>SP. END PROT. PERCT-EP-1</u> | <u>2</u> | | | | | <u>E</u> | | |
| | <u>34</u> | <u>SPIDER PEACING PER.</u> | <u>2</u> | | | | | <u>E</u> | | |
| | | <u>CT-ES-1</u> | | | | | | | | |
| <u>XXXXXX</u> | <u>214</u> | <u>2.4" (1.375 MW) X 6" (S-80)</u> | <u>1</u> | | | | | <u>E</u> | | |
| <u>CT-2165-1</u> | | <u>SWEEPolet TO SA-105,</u> | | | | | | | | <u>SEE ATTACHED SHEET</u> |
| | | <u>WITH 3 1/2" RE.</u> | | | | | | | | |
| | <u>6</u> | <u>END PROT.</u> | <u>1</u> | | | | | <u>E</u> | | |
| | <u>2</u> | <u>END PROT.</u> | <u>1</u> | | | | | <u>E</u> | | |
| | | | | | | | | | | |

Code Ann. Sec. III, Cl. 2

Class DUKE 'B'

Nuclear Safety Related

Job Supplement JS118

MFG. Code



ITT Grinnell
Industrial Piping, Inc.

P. O. Box 566
Kernersville, N. C. 27284
(919) - 993-4831
Telex No.: 806439

11-27-78

Duke Power Company
P. O. Box 2173
Charlotte, North Carolina 28201

Attention: Q. A. Manager, Engineering & Services
Quality Assurance Department

Subject: Quality Assurance
Catawba #1 & 2
Duke Power Order No. C-12517
Our Contract 7127 & 7128

Gentlemen:

Attached are requested Quality Assurance Papers on the following:

Duke Spec. No. and Title:

Duke Classification Identification:

GRINNELL Purchase Order Number:

Purchased From: Kernersville

Material Description:

Test Reports attached: FORM 9301 WITH ATTACHMENTS AS INDICATED THERE ON

SEE ATTACHED
SHEET

We have examined these reports and find that the material furnished meets the requirements of the applicable specifications.

Very truly yours,

ITT GRINNELL INDUSTRIAL PIPING, INC.

G. P. Greeson / 82

G. P. Greeson
Project Engineer, IPD

GPG/rc

Enclosures

CT-01-34X / CT-SM-4D B
CT-13-45 / CT-SV-45 F
CT-10-185 / CT-HW-185 G

Doc # 94



ITT Grinnell
Industrial Piping, Inc.

P. O. Box 566
Kernersville, N. C. 27284
(919) - 993-4831
Telex No.: 806439

11-27-78

Duke Power Company
P. O. Box 2178
Charlotte, North Carolina 28201

Attention: Q. A. Manager, Engineering & Services
Quality Assurance Department

Subject: Quality Assurance
Catawba #1
Duke Power Order No. C-12517
Our Contract 7127

Gentlemen:

Attached are requested Quality Assurance Papers on the following:

Duke Spec. No. and Title: (SM) MAIN STEAM

Duke Classification Identification:

B

GRINNELL Purchase Order Number:

Purchased From: Kernersville

Material Description: CT-01-34X / CT-SM-4D

Test Reports attached: X-RAY FILM AND READER SHEETS

We have examined these reports and find that the material furnished meets the requirements of the applicable specifications.

Very truly yours,

ITT GRINNELL INDUSTRIAL PIPING, INC.

G. P. Greenon/81

G. P. Greenon
Project Engineer, IPD

GPG/rc

Enclosures

Executive Offices/Kernersville, North Carolina

Register No. CT-01-34X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 1 of 2

Revision No. (2) SM Revision Date 12-14-77

Piece Mark CT-SM-4D

Job Name DUKE POWER COMPANY
CATAWBA UNIT #1

Contract No. W127

Location _____

| ITEM | PART NUMBER | DESCRIPTION | QUAN OR LENG | QUALITY CONTROL | | | ACCOUNTING/MATERIAL | | | |
|------|-----------------------------|---|--------------|-----------------|---------------------|----------|---------------------|-----------------|-------------|-----|
| | | | | HEAT NUMBER | DOCUMENT IN PROCESS | STATUS | U/M | UNIT PRICE P.O. | DIS. VENDOR | NET |
| 1 | PBCCTCD* 3,4
CT-01-11-1 | 31.438" I.D X 1.375" MW. SML'S
CS, PIPE TO ASME, SA-106
GR.C. | 10 1/16 | L3117 | ✓ | Q.C. 152 | F | 2-S
CCP | | |
| 2 | PBCCTCD* 3,4
CT-01-11-1 | — DITTO — | 0-5/8 | L3117 | ✓ | Q.C. 150 | F | P.S
CCP | | |
| 3 | LAATC*x*x 3,4
CT-01-17-1 | 31.438" I.D X 1.375" MW, 90° LRWE
TO SA-234 WPB-W, MADE
FROM SA-515 GR. 70 PLATE,
(70,000 PSI TENSILE), OR SA-234
WPC SEAMLESS, ENDS PER
DETAIL CT-D-2 | 1 | ARBT | ✓ | Q.C. 150 | E | FY-B | | |
| 4 | LBATC*x*x 3,4
CT-01-16-1 | — DITTO EXCEPT SKWE, — | 1 | ARAF | ✓ | Q.C. 150 | E | FY-B | | |
| 5 | Y*AAACE* 2
CT-002-3 | 2" 3000# CS, SP. WELD BOSS
TO SA-105, PER DET. SK.
CT-WB-1 | 1 | AA1 | ✓ | Q.C. 150 | E | | | |

Code Asme. Sec. III, Cl. 2

Class DUKE 'B'

Nuclear Safety Related

Job Supplement JS118

MFG. Code _____

Register No. CT-01-34X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 2 of 2

Piece Mark CT-SM-4D

Job Name DUKE POWER COMPANY
CATAWBA UNIT # 1

Revision No. (2) SM Revision Date 12-13-77

Contract No. 7127

Location _____

| ITEM | PART NUMBER | DESCRIPTION | QUAN OR LENG | QUALITY CONTROL | | | ACCOUNTING/MATERIAL | | | |
|---------------------|-------------|--|--------------|-----------------|---------------------|--------------|---------------------|-----------------|-------------|-----|
| | | | | HEAT NUMBER | DOCUMENT IN PROCESS | STATUS | U/M | UNIT PRICE P.O. | DIS. VENDOR | NET |
| XXXXXX
CT-4012-2 | 1.2 | 1 1/8" ACCESS HOLE PLUG
PER SK. CT-AH-1, TO
ASME, SA-105, H=1.705" | 1 | ARF | AP-4
3100 | | E | Rec | She 2/11 | |
| | 3.4 | SP. END PROT. PERCT-EP-1 | 2 | | | | E | | | |
| | 3.4 | SPIDER BRACING PER.
CT-ES-1 | 2 | | | | E | | | |
| XBALCA
CT-2168-1 | 3.4 | 34" (1.375 MW) X 6" (S-20)
SWEEPolet TO SA-105,
WITH 3 1/2" BE. | 1 | P237 | 40F317 | (96)
5000 | E | | | |
| | 6" | END PROT. | 1 | | | | E | | | |
| | 2" | END PROT. | 1 | | | | E | | | |

Code ASME, Sec. III, Cl. 2

Class DUKE 'B'

Nuclear Safety Related

Job Supplement JS118

MFG. Code _____

PROJECT Duke Power (Cat) CONTRACT 7127 FC. MK# CT-SM-4D REG. C.T. P. 1 34
 SYSTEM MAINTEAM (SM) CLASS Duke B CL2 SPECIFICATION JS-118-57 SUPPLEMENT 2

WELD DATA

| WELD | FIT-UP/PREHEAT | | | WELDER I.D. | WELD MAT'L | Q.C. INSP. | ROOT | | INTERMEDIATE | | FINAL | | RT DATE | | | MAG | LT |
|------|----------------|------------|----------------|-------------|------------|------------|-------------|------------|--------------|------------|----------------|------------|------------|--------|-----|-----|------|
| | WELDER I.D. | WELD MAT'L | Q.C. INSP. | | | | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | Q.C. INSP. | Q.C. | AI. | | |
| A | PROC | 1-4-2-2 | | | | | PROC | 1-4-2-2 | PROC | 1-1-1-7 | PROC | 1-2-2-4 | | | | | |
| | 5-10 | 065220 | (Q.C. IPI 150) | C438 | 065220 | C438 | C306 | 1ACG* | C124 | 519346 | (Q.C. IPI 150) | 0575201 | 7/6/78 | 7/5/78 | | | |
| DATE | 5/25/78 | WW207 | 5/25/78 | 5/25/78 | WW207 | 5/25/78 | WW207 | WW207 | | | | 6-6-78 | | | | | |
| B | PROC | 1-4-2-2 | | | | | PROC | 1-4-2-2 | PROC | 1-1-1-7 | PROC | 1-2-2-4 | | | | | |
| | C257 | 065214 | (Q.C. IPI 150) | C306 | 065220 | C306 | C442 | 1ACH** | C401 | 519346 | (Q.C. IPI 150) | 0575201 | 7/6/78 | | | | |
| DATE | 4/16/78 | WW206 | 6-12-78 | 6-13-78 | WW207 | 6-13-78 | WW207 | WW207 | | | | 6-14-78 | | | | | |
| C | PROC | 1-4-2-2 | | | | | PROC | 1-4-2-2 | PROC | 1-1-1-7 | PROC | 1-2-2-4 | | | | | |
| | S296 | 065220 | (Q.C. IPI 150) | C314 | 065220 | C306 | C314 | 1ACG* | C124 | 519346 | (Q.C. IPI 150) | 0575201 | 7/6/78 | | | | |
| DATE | 4/26/78 | WW207 | 5-26-78 | 5/26/78 | WW207 | 5/26/78 | WW207 | WW207 | | | | 6-14-78 | | | | | |
| D | PROC | 1-4-2-2 | | | | | PROC | 1-4-2-2 | PROC | 1-1-1-7 | PROC | 1-1-1-7 | | | | | |
| | S262 | 065220 | (Q.C. IPI 150) | C-121 | 065220 | C-121 | C-121 | 1-ACG-* | C-121 | 1-ACH** | (Q.C. IPI 150) | | | | | | |
| DATE | 6/27/78 | WW207 | 6-27-78 | 6-27-78 | WW207 | 6-27-78 | WW207 | WW207 | | | | 6-27-78 | | | | | 9/29 |
| E | PROC | 1-4-2-2 | | | | | PROC | 1-4-2-2 | PROC | 1-1-1-7 | PROC | 1-1-1-7 | | | | | |
| | S190 | 065220 | (Q.C. IPI 150) | C438 | 065220 | C438 | C306 | 1ACG-* | C124 | 519346 | (Q.C. IPI 150) | 1ACG* | 6/21/78 | | | | |
| DATE | 5/26/78 | WW207 | 5-26-78 | 5/26/78 | WW207 | 5/26/78 | WW207 | WW207 | | | | 6-27-78 | | | | | |

| | | | | | | | |
|-------------|------------------------|----------------------|------------------------|---------------------|-----|-----------------------|--------------------|
| STRESS DATE | N/A | FINAL INSP. | 9/14/78 (Q.C. IPI 150) | SPECIAL OPERATIONS: | N/A | Q.C. DOC. APPROVAL | DN 9/14/78 |
| SQUARE UP | 6-29-78 (Q.C. IPI 150) | * 4113451/02-1-PT2SP | ** 421135451/02-1-L7MR | WALL THK. | | A/I STAMP/DATA REPORT | ANI (Q.C. IPI 150) |
| CLEAN UP | | CUST INSP | • 4823510/103-3-B821K | OTHER | | CUST DOC APPROVAL | 9-15-78 |

PROJECT DUKE POWER (CAT) CONTRACT 7127 PC. NO# CT-5M-4D REG. # CT-01-34X
 SYSTEM MAINSTEAM (SM) CLASS DUKEB C2 SPECIFICATION JS-115-7 SUPPLEMENT

WELD DATA

| WELD | FIT-UP/PREHEAT | | | ROOF | INTERMEDIATE | | FINAL | | | PT. DATE | | |
|------|----------------|------------|------------|------|--------------|------------|-------------|------------|------------|----------|-------|--------|
| | WELDER I.D. | WELD MAT'L | Q.C. INSP. | | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | Q.C. INSP. | Q.C. | CUST. | DATE |
| ZR | PROC | 1-4-2-2 | | PROC | | PROC | | PROC | | | | |
| | C-45 | 065214 | (9/13/28) | | | | | | | | | |
| DATE | 9/6/28 | WIN206 | 9/6/28 | | | | | | | | | 9-6-28 |
| | PROC | | | PROC | | PROC | | PROC | | | | |
| DATE | | | | | | | | | | | | |
| | PROC | | | PROC | | PROC | | PROC | | | | |
| DATE | | | | | | | | | | | | |
| | PROC | | | PROC | | PROC | | PROC | | | | |
| DATE | | | | | | | | | | | | |

| | | | | | | | |
|-------------|--------------------|-------------|------------------|---------------------|------------|----------------------|------------|
| STRESS DATE | N/A | FINAL INSP. | 9/9/28 (9/13/28) | SPECIAL OPERATIONS: | C DIM. N/A | Q.C. DOC. APPROVAL | DN 9/14/28 |
| STARTED UP | 9-6-18 (SU 171 20) | | | WALL THK. | | A/I STATEMENT REPORT | ANI (9/3) |
| CLASS UP | | CUST INSP | | OTHER | | | 9-15-28 |

PROJECT DUKE POWER (Cat) CONTRACT 7127 PC. MK# CT-SM-4D REG. # C.T. 01 34
 SYSTEM MAINSTEAM(SM) CLASS DUKEB CL2 SPECIFICATION J5-118-9 SUPPLEMENT _____

WELD DATA

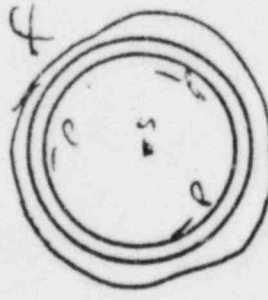
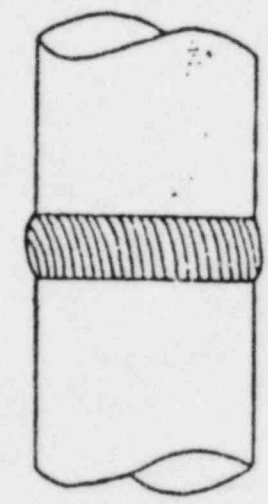
| WELD | FIT-UP/PREHEAT | | | WELDER I.D. | WELD MAT'L | Q.C. INSP. | ROOT | WELDER I.D. | WELD MAT'L | Q.C. INSP. | FINAL | WELDER I.D. | WELD MAT'L | Q.C. INSP. | RT DATE | | ROOT | INSP | |
|--------------|----------------|----------------|--------------|-------------|------------|------------|------|-------------|------------|------------|-------|-------------|------------|------------|---------|-------|------|------|------|
| | WELDER I.D. | WELD MAT'L | Q.C. INSP. | | | | | | | | | | | | Q.C. | CUST. | | | |
| Code | PROC | 1-4-2-2 | | PROC | | | | PROC | | | | PROC | | | | | | | |
| PLATE | 5190 | 065220 | Q.C. IPI 150 | | | | | | | | | | | | | | | | |
| DATE | 5/26/78 | WU207 | 5-2-78 | | | | | | | | | | | | | | | | 9/29 |
| Lifing | PROC | 1-4-2-2 | | PROC | | | | PROC | | | | PROC | | | | | | | |
| LUR Item 27 | 0329 | 065214 | Q.C. IPI 150 | | | | | | | | | | | | | | | | 9/29 |
| DATE | 5-25-78 | WU206 | 5-20-78 | | | | | | | | | | | | | | | | 9/29 |
| Welding | PROC | 1-1-1-7 | | PROC | | | | PROC | | | | PROC | | | | | | | |
| DATE | 0124 | 1ACH*
WU202 | Q.C. IPI 150 | | | | | | | | | | | | | | | | |
| DATE | 6-6-78 | | 6-8-78 | | | | | | | | | | | | | | | | |
| Welding | PROC | 1-1-1-7 | | PROC | | | | PROC | | | | PROC | | | | | | | |
| DATE | 0262 | 1ACG* | Q.C. IPI 150 | | | | | | | | | | | | | | | | |
| DATE | 6-12-78 | WU201 | 6-12-78 | | | | | | | | | | | | | | | | 9/29 |
| Lifing | PROC | 1-4-2-2 | | PROC | | | | PROC | | | | PROC | | | | | | | |
| LIP Item 3+2 | 0314
0310 | 065214 | Q.C. IPI 150 | | | | | | | | | | | | | | | | |
| DATE | 6/8/78 | WU206 | 6/24/78 | | | | | | | | | | | | | | | | 9/29 |

| | | | |
|-------------|-----------------------|---------------------|-----------------------|
| STRESS DATE | FINAL INSP. | SPECIAL OPERATIONS: | Q.C. DOC. APPROVAL |
| N/A | 9/6/78 | C DIM. N/A | DN 9/14/78 |
| SQUARE UP | * 41186841/02-1-572SP | WALL THK. | A/I STATE/DATA REPORT |
| 6-29-78 | ** 42165451/02-1-L7MR | | AWI 9-15-78 |
| CLEAN UP | CUST INSP | OTHER | CUST DOC APPROVAL |

INDUSTRIAL
Repair

Submittal used from Mount

| | | | | |
|--|---|---|---|--|
| Machine No.
CT-01-34X | Plate No.
CT-50-40 | Roll No.
A | Pipe Size and Section
1.375" MW
SAE 31433 EDX | Date
5-21-58 |
| Views
1 | Source Center or RTP & SA
SR192 | Defect Type
LR LR S P UT US C CR Y PL
A | Comments
WALD
" SCHEDULE CR | Magnification
X
X
X
X
X
X
X |
| Source Size at Focal Spot
14/2 | Source Film Distance
17" | Film Interval
1P
1G
G5
J11
MIP
PS
SU
VY
Y-2 | Film Interval
1P
1G
G5
J11
MIP
PS
SU
VY
Y-2 | Severity
UC - Under Cut
C - Crater
CB - Crack
V - Voids
BL - Burn Line
P - Porosity
S - Sing
L - Lack of Fusion
M - Missing
Y - Yellows
B - Birdlines |
| Time
3:00 | Actual Yield Thickness
1.437 | Preoperator
30 | Preoperator
2T | Interpretation
(FSA) A-R
(FSA) A-4-A |
| Sensitivity
062 | Film Size
7X17 | Film Type
70 | Viewing Technique
Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | Interpretation
(FSA) A-R
(FSA) A-4-A |
| Screens
Front .010
Back .010 | Development
M ² Fush 8 min. | Fixing Procedure
1-4-5-7-2-5
1-2-3-4-5 | Interpretation
(FSA) A-R
(FSA) A-4-A | Interpretation
(FSA) A-R
(FSA) A-4-A |



Radiograph - Date **2-5-78** by **Mike James** (w/18)
 Interpretation - Date **2-6-78** by **Mike James** (w/18)
 Approval - Date **2-6-78** by **Mike James** (w/18)

Customer: **Duko Power Co.**
 Center: **T1277128**
 Inspection Standard: **1-SF-161-10**
 Customer Approval - Date: _____

Location: **Catawba Unit 1 & 2**
 Job No.: _____
 Acceptance Standard: **1-SF-1711-2**

Handwritten signature: **Handford 7/5/78**

Req. No. FF 499
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.

In-Process
 Repair

Form N6.3A

Standard Hours

B.B. B.3

Date 6-30-73

| | | | | | |
|--|-------------------|---------------------------|----------------------|--|------------------------|
| Station or Register No. <u>CT. 01-342</u> | | Place No. <u>CT-5M-40</u> | Weld No. <u>C</u> | Pipe Size and Schedule <u>1 3/8" MW C 314 P1</u> | Order No. <u>493 Z</u> |
| View <u>1</u> | | File Interval <u>2 D</u> | Comments | | |
| Source <u>RR142</u> | | <u>6 F</u> | SCAPAL cla
(PA)AL | | |
| Source Current or kVp & W <u>60</u> | | <u>6 J</u> | | | |
| Source Size or Focal Spot <u>1/12</u> | | <u>5 D</u> | | | |
| Source Film Distance <u>17"</u> | | <u>9 P S</u> | | | |
| Time <u>3:00</u> | | <u>5 V</u> | | | |
| Actual Weld Thickness <u>1.437</u> | | <u>V Y</u> | Specification | | |
| Penetration <u>30</u> | | <u>Y L</u> | LVC | | |
| Sensitivity <u>2 F</u> | | | X | | |
| Weld Thickness <u>0.67</u> | | | X | | |
| Film Size <u>2X17</u> | | | X | | |
| Film Type <u>70</u> | | | X | | |
| Viewing Technique Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | | | X | | |
| Screens | Front <u>.010</u> | | | | |
| | Back <u>.010</u> | | | | |
| Development | 60° Endish 8 min. | | | | |
| Automatic | Automatic | | | | |
| Welding Procedure <u>174-3-3-A</u> | | | | | |

Customer DUKO Power Co. Location Catawba Unit I & 2

Contract 11217128 Job No. _____

Inspection Standard ASME-191-10 Acceptance Standard ASME-1711-2

Inspector - Date 7-5-78 By Philip [Signature]

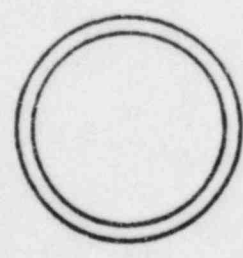
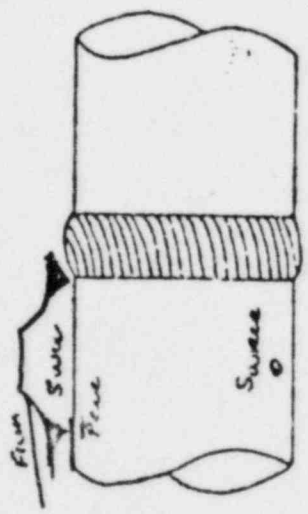
Interpretation - Date 7-6-78 By Allyson [Signature]

Approval Date 7-6-78 By Allyson [Signature]

Doc. 6-20-78

SAFETY INFORMATION SHEET

| | | | | | | | | | |
|--|------------------------------------|---|--|--|---------------------------------------|--|---|--|---|
| Station or Recorder No. CT-01-34X | | Piece No. CT-SM-4D | | Date No. E | | Film Size and Substrate 31.435 ID X 1.375 Substrate X 6 Substru Swell | | Recorder No. C 438 C 49
C 300 C 314 | |
| Views
6 | Source
24[#]192 | Source Current or kVp & SS
100 | Source Size or Focal Spot
.142 | Source Film Distance
32 3/4" | Time
5.00 | Actual Weld Thickness
1.500 | Penetration
30 | Sensitivity
2T | Strip Thickness
.125 |
| Film Size
7x17 | Film Type
70 | Viewing Technique
Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | Front
.010 | Back
.010 | 45° End-on & etc.
Automatic | Development
Automatic | Welding Procedure
1-4-2-2-2-2
1-1-1-1-7-2 | Defect Type
SP <input type="checkbox"/> LP <input type="checkbox"/> P <input type="checkbox"/> UC <input type="checkbox"/> IC <input type="checkbox"/> C <input type="checkbox"/> FB <input type="checkbox"/> Y <input type="checkbox"/> BL | Severity
A - Acceptable
B - Rejection
Y - Discretion
BL - Burn Thru |
| File Interval
R-P
DG
GJ
IM
19
4R | File No. | File No. | File No. | File No. | File No. | File No. | File No. | File No. | File No. |

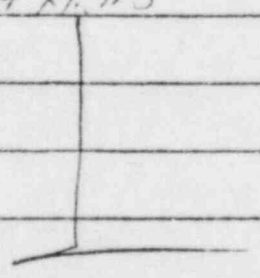
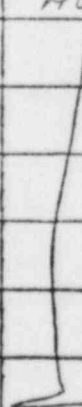
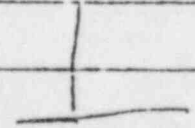
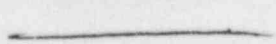


Radiographer - Date **6-20-78** By **Bill Dill II**
 Interpretation - Date **6-11-78** By **Allyson (incl)**
 Approval - Date **6-11-78** By **Allyson II**

Customer **Dana Power Co.** Location **Caterpillar Unit 1 & 2**
 Contract **71277123** Job No. **ISF-1711-2**
 Inspection Standard **AS-101-10** Approval Standard
 Customer Approval - Date _____ By _____

MAGNETIC PARTICLE EXAMINATION REPORT

Customer: DAKE PWR Register No.: CT-CY-34X
 Contract/P.O. NO.: 7127 Piece Mark: CT-SM-4D
 System: MAIN STM
 Examination Method: DC Prods AC Yoke _____ Other _____
 Equipment Type: ~~Magna magne~~ ECONOSPACT Model No.: M-2000 22-5
 Procedure: MTP-1-1 Acceptance: MIA-1-0

| ITEM IDENTIFICATION
WELD/SERIAL/HT. NO. | SIZE AND THICKNESS | AREA EXAMINED INDICATE,
ROOT, INTERMEDIATE, FINAL
WELD OR MATERIAL AS
APPLICABLE | RESULTS | |
|--|--|---|--|---------------|
| ITEM # 2 (LIP) | 34" x 1.375" | Ground areas / ^{1/64} lip | ACC | |
| # 3 (LIP) |  | B.O. LIP |  | |
| # 7 | | Ground areas | | |
| # 4 | |  | | |
| # 3 | | | | |
| D | | | | 2" BOSS FINAL |
| CODE PL | |  | | FILLET |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

EXAMINATION PERFORMED BY: ROBERT E. STRABER DATE: 6-29-71
 NDT Level: II
 INTERPRETATION PERFORMED BY: R. E. Straber DATE:
 NDT Level: II

FABRICATION NONCONFORMANCE REPORT

REPORT NO. 591779

| | | | |
|---------------------------------|-----------------------------|---------------------------------|----------------------------------|
| PROJECT
<i>Two Power Co.</i> | CONTRACT NO.
<i>7137</i> | CODE SPEC.
<i>ASME B31.1</i> | REGISTER NO.
<i>CT-01-54X</i> |
|---------------------------------|-----------------------------|---------------------------------|----------------------------------|

1. DESCRIPTION OF NONCONFORMANCE:

Machined lip on field end of item (3) is damaged and will require the addition of weld metal. Area is approx. $1/2 \times 3/16$ in size located with stenciled on O.D.

| | | | | | |
|------|-------|-----------------------------|----------------------|-----------------|----------------------|
| SHOP | DATE: | INSPECTOR
<i>Whitson</i> | DATE: <i>8-21-78</i> | Q.C. <i>Pen</i> | DATE: <i>8-21-78</i> |
|------|-------|-----------------------------|----------------------|-----------------|----------------------|



2. RECOMMENDED ACTION:

T.E. to route all operations for the addition of weld metal to machined lip of item (3). Perform any necessary N.D.T. - Document all received.

Q.C.: *J. Bennett* DATE: *8-21-78*

3. DISPOSITION:

After completion of all received, forward to Q.C. for closing of fabrication non-conformance report.

REWORK COMPLETED
See Operations Records For Signoff

| | | |
|-------------------------------|-------------------------------|-------------------------|
| NONCONFORMANCE REPORT CLOSED: | Q. C. APPROVAL:
<i>126</i> | DATE:
<i>9-12-78</i> |
|-------------------------------|-------------------------------|-------------------------|

Cameron

IRON WORKS, INC.

P. O. BOX 1212
HOUSTON, TEXAS 77001

ITT GRUJWELL INDUSTRIAL PIPING, INC.
KERNERSVILLE, NC 27284

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

Date 22 July 1976

| | | |
|---|---|---|
| Customer Order No.
KER-2853-P | C.I.W. Sales Order No.
F-5693 | Specification
ASME-SAI05 Gr. C and ASME-Section III, Class 2
Thru Summer 1974 Addenda |
|---|---|---|

Description of Material O.D. _____ x I.D. **31.438"** x WALL **1.375" M.W.**

C.I.W. Part No. **86-5693-345-314**

| Heat No. | Location or Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|-----|------|------|-----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |
| L 3117 | | .24 | .89 | .012 | .021 | .23 | | | |
| L 3119 | | .24 | .91 | .011 | .012 | .22 | | | |
| L 3122 | | .26 | .90 | .014 | .010 | .26 | | | |
| L 3123 | | .25 | .93 | .015 | .016 | .25 | | | |
| L 3130 | | .24 | .96 | .011 | .015 | .23 | | | |

| Quantity or Serial No. | Heat No. | Test Loc. | Tensile PSI | Yield Point | | MECHANICAL PROPERTIES | | | | | Specimen Size | Test Lot# |
|------------------------|----------|-----------|-------------|--------------------|----------------|-----------------------|------------|-----------|-----------------|------|---------------|-----------|
| | | | | % Offset Yield PSI | % Elong. 2 In. | % Red. Area | Macro Etch | Bend Test | Flattening Test | | | |
| 1 | L 3117 | Trans. | 79,900 | 44,700 | 25.0 | 45.8 | | | OK | .505 | 17 | |
| 3 | L 3119 | Trans. | 79,900 | 46,400 | 23.2 | 55.7 | | | OK | .505 | 19 | |
| 2 | L 3122 | Trans. | 80,900 | 46,900 | 26.0 | 51.9 | | | OK | .505 | 22 | |
| 3 | L 3123 | Trans. | 78,400 | 41,200 | 28.2 | 50.8 | | | OK | .505 | 23 | |
| 1 | L 3130 | Trans. | 77,900 | 40,200 | 27.9 | 50.8 | | | OK | .505 | 30 | |

| Forg. Ser. # | Heat # | Test Lot # |
|--------------|--------|------------|
| 26603 | L 3122 | 22 |
| 26609 | L 3122 | 22 |
| 26611Z | L 3119 | 19 |
| 26613Y | L 3119 | 19 |
| 26613Z | L 3119 | 19 |
| 26618 | L 3130 | 30 |
| 26622X | L 3123 | 23 |
| 26622Y | L 3123 | 23 |
| 26622Z | L 3123 | 23 |
| 26624Y | L 3117 | 17 |

CATAWBA
P#8



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

Heat Treatment:

Subscribed and sworn to before me this
22nd day of July 1976
Notary Public

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

[Signature]
Metallurgical Representative **H. O. WRIGHT, /qt**

Camero

IRON WORKS, INC.

ITT GRINNELL INDUSTRIAL PIPING, INC.
KERNERSVILLE, NC 27284

P. O. BOX 1212
HOUSTON, TEXAS 77001

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

Date 22 July 1976

| | | |
|---|---|---|
| Customer Order No.
KER-2853-P | C.I.W. Sales Order No.
F-5692 | ASME-SAI06-GR. C and Section III, Class 2
Thru Summer 1974 Addenda |
| Description of Material | | O.D. 31.438" x WALL 1.375" M.W. |
| C.I.W. Part No. 86-5692-345-314 | | |

| Heat No. | Location of Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|-----|------|------|-----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |
| L 3117 | | .24 | .69 | .012 | .021 | .23 | | | |
| L 3119 | | .24 | .91 | .011 | .012 | .22 | | | |
| L 3120 | | .25 | .66 | .018 | .014 | .28 | | | |
| L 3122 | | .26 | .90 | .014 | .010 | .26 | | | |
| L 3123 | | .25 | .93 | .015 | .016 | .25 | | | |
| L 3130 | | .24 | .96 | .011 | .015 | .23 | | | |

*CATAWBA
P#8*

| Quantity or Serial No. | Heat No. | Test Loc. | Yield Point | | MECHANICAL PROPERTIES | | | | | | | |
|------------------------|----------|-----------|-------------|--------------------|-----------------------|-------------|------------|-----------|-----------------|---------------|-----------|----|
| | | | Tensile PSI | % Offset Yield PSI | % Elong. 2 In. | % Red. Area | Macro Etch | Bend Test | Flattening Test | Specimen Size | Test Lot# | |
| 5 | L 3117 | Trans. | 79,900 | 44,700 | 25.0 | 45.8 | | | | OK | .505 | 17 |
| 1 | L 3119 | Trans. | 79,900 | 46,400 | 28.2 | 55.7 | | | | OK | .505 | 19 |
| 4 X | L 3120 | Trans. | 85,600 | 43,700 | 23.8 | 44.0 | | | | OK | .505 | 20 |
| 2 | L 3122 | Trans. | 80,900 | 46,900 | 26.0 | 51.9 | | | | OK | .505 | 22 |
| 4 X | L 3123 | Trans. | 78,400 | 41,200 | 28.2 | 50.8 | | | | OK | .505 | 23 |
| 3 | L 3130 | Trans. | 77,900 | 40,200 | 27.9 | 50.8 | | | | OK | .505 | 30 |

| Form. Ser. # | Heat # | Test Lot # | Form. Ser. # | Heat # | Test Lot # |
|--------------|--------|------------|--------------|--------|------------|
| 26607Z | L 3117 | 17 | 26621X | L 3117 | 17 |
| 26610Y | L 3122 | 22 | 26621Z | L 3117 | 17 |
| 26612 | L 3119 | 19 | 26623X | L 3123 | 23 |
| 26614Y | L 3120 | 20 | 26623Y | L 3123 | 23 |
| 26615 | L 3120 | 20 | 26624X | L 3117 | 17 |
| 26615X | L 3120 | 20 | 26623Z | L 3123 | 23 |
| 26617Z | L 3123 | 23 | 26616Y | L 3120 | 20 |
| 26619X | L 3130 | 30 | | | |
| 26619Z | L 3130 | 30 | | | |
| 26610Z | L 3122 | 22 | | | |
| 26620Y | L 3130 | 30 | | | |
| 26621W | L 3117 | 17 | | | |



Hydrostatic Test: Each length of pipe hydrostatically tested at 1000 psi for 5 sec. and found acceptable

Heat Treatment:
 I, *[Signature]*, do hereby certify and swear to before me this 22nd Day of July 1976.
 Notary Public

I certify these tests are correct as contained in the records of the company.
[Signature]
 Metallurgical Representative: *[Signature]* 1/97

Cameron
IRON WORKS, INC.

IRON WORKS, INC.

P. O. BOX 1212
HOUSTON, TEXAS 77001

ITT GRIMMILL INDUSTRIAL PIPING, INC.
KERRYSVILLE, NC 27234

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

Date 22 July 1976

| | | |
|----------------------------------|----------------------------------|---|
| Customer Order No.
KER-2853-P | C.I.W. Sales Order No.
F-5693 | ASME-SAI06 Gr. C and ^{SA106} ASME-Section III, Class 2
Thru Summer 1974 Addenda |
|----------------------------------|----------------------------------|---|

Description of Material O.D. _____ x I.D. 31.438" x WALL 1.375" M.W.

C.I.W. Part No. 86-5693-345-314

| Heat No. | Location or Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|-----|------|------|-----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |
| L 3118 | | .24 | .89 | .012 | .021 | .23 | | | |
| L 3120 | | .25 | .86 | .013 | .014 | .23 | | | |
| L 3130 | | .24 | .96 | .011 | .015 | .23 | | | |

| Quantity or Serial No. | Heat No. | Test Loc. | Yield Point | | | MECHANICAL PROPERTIES | | | | | Specimen Size | Test Lot# |
|------------------------|----------|-----------|-------------|--------------------|--------------|-----------------------|------------|-----------|------------------|------|---------------|-----------|
| | | | Tensile PSI | % Offset Yield PSI | % Elong. In. | % Red. Area | Macro Etch | Bend Test | Flat-tening Test | | | |
| 4 | L 3117 | Trans. | 79,900 | 44,700 | 25.0 | 45.8 | | | OK | .505 | 17 | |
| 2 | L 3120 | Trans. | 85,600 | 48,700 | 23.8 | 44.0 | | | OK | .505 | 20 | |
| 4 | L 3130 | Trans. | 77,900 | 40,200 | 27.9 | 50.8 | | | OK | .505 | 30 | |

| Forg. Ser. # | Heat # | Test Lot # |
|-------------------|--------|------------|
| 26614Z | L 3120 | 20 |
| 26616Z | L 3120 | 20 |
| 26619W | L 3130 | 30 |
| 26619Y | L 3130 | 30 |
| 26620X | L 3130 | 30 |
| 26620Z | L 3130 | 30 |
| 26621T | L 3117 | 17 |
| 26621U | L 3117 | 17 |
| 26621V | | |
| 26621Y | L 3117 | 17 |
| 26624Z | L 3117 | 17 |

CATAWBA
P# 8



Hydrostatic Test: Each length of pipe hydrostatically tested at 1000 psi for 5 sec. and found acceptable.
Heat Treatment:

Subscribed and Sworn to before me this
22nd Day of July 1976
[Signature]
Notary Public
W. L. F. ...
Cameron 1069 4770

I certify these tests to be correct as contained in the records of the company.
[Signature]
Metallurgical Representative
S. WRIGHT, /at

MILL TEST CERTIFICATE

SOLD TO ITT Grinnell Corporation
Kernersville, N.C.
 SHIP TO Same for Duke Power

ITT GRINNELL CORPORATION
 WELDING PRODUCTS DIVISION
 PRINCETON, KY.

Kernersville

OUR ORDER NO. 62935
 BRANCH ORDER NO. List 2833
 CUSTOMER'S ORDER NO. _____

DATE November 15, 1976

| 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-234 WPC | | | | | | | | | | | | A-106C |
| 31.625 x 1.375 Min. wall | F | 44900 | 82400 | 25.0 | .25 | .98 | .013 | .011 | .22 | | CT-01-17-1 | ARAP |
| LR 90° Ell | | | | | | | | | | | CW-01-17-1 | |
| -Ditto- | F | 40900 | 79900 | 27.7 | .26 | 1.02 | .010 | .011 | .25 | " " | | ARAR |
| -Ditto- | F | 45900 | 85100 | 27.9 | .25 | 1.01 | .009 | .021 | .23 | " " | | ARBT |
| <p><i>Citation BWF-16</i></p> <p>*Standard round test specimen used for tensile properties.</p> <p>The above fittings were manufactured and tested in strict compliance with ASME Section III, 1974 Edition, Class 2 through the 1974 Summer Addenda.</p> <p>This report will report the following:
 We certify that the fittings listed herein comply with the requirements of ASME Section III, Division 1, Subsection 1. The fittings were produced in accordance with the ASME Code of Quality Systems Certificate of Quality Systems Certificate No. 114.</p> | | | | | | | | | | | | |

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
 THIS _____ DAY OF _____ 19____

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

MILL TEST CERTIFICATE

ITT GRINNELL CORPORATION
WELDING PRODUCTS DIVISION
PRINCETON, KY. Kernersville

OUR ORDER NO. 62934

BRANCH ORDER NO. 21st 2021

CUSTOMER'S ORDER NO. _____

SOLD TO ITT Grinnell Corporation
Kernersville, N.C.
SHIP TO Same for Duke Power

DATE November 16, 1976

| DESCRIPTION OF FITTING | PHYSICAL PROPERTIES
FITTING MATERIAL | | | | CHEMICAL ANALYSIS | | | | | | HEAT
CODE
OR
HEAT NO. | SPECIFICATIO
FITTING MATER | |
|--|---|--------------------------|-------------------------------|---------------------|-------------------|-----|------|------|-----|------------|--------------------------------|-------------------------------|--------|
| | HEAT
TREAT
MENT | YIELD
POINT
P.S.I. | TENSILE
STRENGTH
P.S.I. | ELONG
IN 2"
% | C | Mn | P | S | SI | | | | |
| ASME SA-234 WPC | | | | | | | | | | | | | A-1062 |
| 31.625 x 1.375 Min. wall | F | 44900 | 82400 | 25.0 | .25 | .98 | .013 | .011 | .22 | 07-01-16-1 | A348 | | |
| SR 90° Ell | | | | | | | | | | | | | |
| <p><i>Catumba</i>
<i>But 17</i></p> <p style="text-align: right;"><i>T.W.</i></p> | | | | | | | | | | | | | |
| <p>*Standard round test specimen used for tensile properties</p> <p>The above fitting was manufactured and tested in strict compliance with ASME Section III, 1974 Edition, Class 2 through the 1974 Summer Addenda.</p> | | | | | | | | | | | | | |
| <p>"The fittings represented by this metallurgical report will meet the following requirements as to hardness: Brinell Hardness Number, Max. 157"</p> | | | | | | | | | | | | | |

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 1600 F AND COOLED IN STILL

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__

R3

The Colonial Machine Company, Inc.

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

Phone (814) 539-7033

May 31, 1977

ITT Grinnell Industrial Piping Inc.
P. O. Box 566
Kernersville, NC 27284

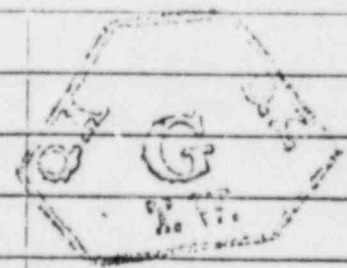
CERTIFIED MILL TEST REPORT

puke CT
SWF-4

| | | |
|-------------------------------------|-------------------------------|-------------------------------|
| YOUR ORDER NO.
KER 6156-P | OUR ORDER NO.
10038 | DATE SHIPPED
6/1/77 |
|-------------------------------------|-------------------------------|-------------------------------|

| ITEM | TYPE | MATERIAL SPEC. | SHIPPED | HEAT NO. | CMC CO. |
|------|------|--|---------|----------|---------|
| | | ASME SA105 NORMALIZED | | | |
| 1 | | 3/4" S/W Spec. Weld Bosses per SK CT-WB-1
Pt. No. Y*A*SE* CT-3002-1 (Rev. 0 10/14/76) | 40 | N94153 | AUA |
| 2 | 1" | Ditto Pt. No. Y*A*SE* CT-3002-2 | 20 | E87257 | ARA |
| 3 | 2" | Ditto Pt. No. Y*A*SE* CT-3002-3 | 12 | A00070 | AA1 |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CB | TI | CO | OTHER ELEMENTS |
|------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| 1 | .32 | .80 | .006 | .021 | .22 | | | | | | | | |
| 2 | .26 | .78 | .011 | .027 | .24 | | | | | | | | |
| 3 | .32 | .74 | .017 | .026 | .19 | | | | | | | | |



| ITEM | TENSILE | 2% YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1. 2. 3. 4. 5. 6. ETC. |
|------|---------|----------|----------|--------|----------|--------------------|---------------------------------|
| 1 | 76700 | 36800 | 34.0 | 58.2 | | | Mill Source - U.S. Steel |
| 2 | 75000 | 47000 | 32.0 | 61.3 | | | Mill Source - " " |
| 3 | 75360 | 42770 | 31.0 | 57.4 | | | Mill Source " " |

INSPECTION WAIVED PER MR. TOM WILSON ON 5/31/77.

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.

dg

By *Rosemary R. Weyers*

The Colonial Machine Company, Inc.

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

Phone (814) 539 7033

SEPT. 20, 1977

ITT GRINNELL INDUSTRIAL PIPING, INC.
P. O. BOX 566
KERNERSVILLE, NC 27284

CERTIFIED MILL TEST REPORT

CT
AP-4

| | | |
|------------------------------|------------------------|-------------------------|
| YOUR ORDER NO.
KER 8630-B | OUR ORDER NO.
10457 | DATE SHIPPED
9/20/77 |
|------------------------------|------------------------|-------------------------|

| ITEM | TYPE | MATERIAL-SPEC | SHIPPED | HEAT NO. | CMC CO |
|-----------|------|--|---------|----------|--------|
| | | ASME SECTION III CLASS 2 (1974 ADDENDA THRU WINTER 1974)
ASME SA105 | | | |
| 1 (89590) | | 1.13" ACCESS HOLE PLUGS PER CT-AH-1, H = 2.188"
PART NO. CT-4012-1 | 12 | 78849 | ABF |
| 2 (89591) | | 1.13" DITTO H = 1.705" PART CT-4012-2 | 25 | 78849 | ABF |
| 3 (89592) | | 1.13" DITTO H = 2.609" PART CT-4012-3 | 16 | 78849 | ABF |
| 4 (89593) | | 1.13" ACCESS HOLE PLUGS PER CT-AH-2, H = 1.705",
PART CT-4012-4 (SQUARE HEAD) | 30 | 78849 | ABF |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CB | TI | CO | OTHER ELEMENTS |
|-------------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| 1
THRU 4 | .26 | .71 | .013 | .025 | .23 | | | | | | | | |

ITT GRINNELL
QA CK
TSM
DATE 9-28-77

| ITEM | TENSILE | 2% YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1. 2. 3. 4. 5. 6. ETC. |
|-------------|---------|----------|----------|--------|----------|--------------------|---------------------------------|
| 1
THRU 4 | 75000 | 48500 | 32.0 | 58.6 | | | MILL SOURCE - COPPERWELD |

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.

By *Ramsey S. W...*



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

AREA
 TELEPHONE
 TWX 810-871-1272
 TELEX 847475

CUSTOMER: ITT GRINNELL CORP.
CUSTOMER'S Order No.: KER 9442-B
SHIPPED TO: ITT GRINNELL CORP.
 PO BOX 566
 HIGHWAY 421
 KERNERSVILLE NC 27284

Date May 2, 1978
Bonney Order No. 61651
Mark
 KER 9442-B

CT
 Swf-17

CT-2168-1

| Item No. | Quantity No. | Bonney Lot No. | Grade or Specification No.
Chemical Analysis, Physical Properties, Remarks: |
|----------|--------------|----------------|--|
| | 4 | P232 | SA105N
34 (1.375MW) x 6 (.432) Sweepolet
C.27 Mn.95 P.012 S.014 Si.26
T/S 85,700 Y/S 54,700 El 32 Ra 59 |

ITTG - IPI
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE MAY 9 1978
 SHEET 1 OF 1

This is to certify that:

The fittings supplied are in complete accordance with the ASME Boiler and Pressure Vessel Code, Section III, Class 2, 1974 Edition including Winter 1974 Addenda; SA105N And the Purchase Order.

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.



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 certified by additional laboratory checks.

Bonney Forge Division
 Energy Products Group
 GULF+WESTERN MANUFACTURING COMPANY
 ALLENTOWN, PENNSYLVANIA 18105
 by *T. C. Wilson*
 QUALITY ASSURANCE MANAGER



UNION CARBIDE CORPORATION
 LINDE DIVISION
 WELDING MATERIALS
 P.O. BOX 710, ASHTABULA, OHIO 44004

Feb. 10, 1978

CUSTOMER: ITT Grinnell
 2 Greensboro Reg. Airport
 Greensboro, N.C. - 27400

YOUR ORDER NO. 11-258 KER 9419

LINDE S.O. NO. 71125CA1

1/8" Dia.
 S/L Rod

WW-207

MATERIAL: Linde 65

This is to certify that this material will conform to AWS A5.18-69
 ASME SPA5.18. It has the following chemical analysis meeting the
 requirements of Classification E705-2:

| | | |
|--------------------|---|---------------|
| <u>HEAT NUMBER</u> | - | <u>065220</u> |
| Carbon | - | .05 |
| Manganese | - | 1.11 |
| Phosphorous | - | .009 |
| Sulphur | - | .022 |
| Silicon | - | .50 |
| Aluminum | - | .071 |
| Titanium | - | .06 |
| Zirconium | - | .053 |

CONTROL
S.O.

ITTG - IPI
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE MAY 22 1978
 SHEET 1 OF 3

Ladle Analysis

HJT/klr

Howard Fisher / det
 Quality Assurance - Welding Materials
 Plant - Union Carbide Corporation
 Linde Division

ITT Grinnell

Industrial Piping Inc.

SUBJECT: Welding Filler Materials
WIRE: Linde 65, Heat No. 065220

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 5-2, that the test results shown in Taussig Associates, Inc. Report 24131 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat-treated condition (total time not to exceed 20 hours). This may also be used on impact-tested material with a minimum service temperature of +30 degrees F.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 Edition.

WW-2071

J. F. Elder 5/29/72
J. F. Elder Date
Materials Engineer

DELETED
130

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 24 1972
SHEET 2 OF 9

MATERIAL TEST REPORT #24131

R & D TEST #460

Linde 65, Heat No. 065220

WV-2071

The following tests were performed in accordance with SFA 5.18, E70S-2:

1. All-Weld Metal Tension Test:

As-Welded:

Heat Treated*

| | |
|------------------------------|------------------------------|
| Tensile Strength: 81,850 psi | Tensile Strength: 78,750 psi |
| Yield Point: 68,700 | Yield Point: 70,825 |
| Elongation(%) in 2": 30 | Elongation(%) in 2": 31 |

2. Charpy V-Notch Impact Tests:

As-Welded:

| <u>Temp.</u> | <u>Ft. lbs.</u> | <u>Lat. Exp. (mils)</u> | <u>%Shear</u> |
|--------------|-----------------|-------------------------|---------------|
| -20°F | 49 | 39 | 40 |
| -20 | 17 | 19 | 20 |
| -20 | 44 | 35 | 40 |
| -20 | 63 | 46 | 50 |
| -20 | 76 | 56 | 60 |

Heat-Treated*

| <u>Temp.</u> | <u>Ft. lbs.</u> | <u>Lat. Exp. (mils)</u> | <u>%Shear</u> |
|--------------|-----------------|-------------------------|---------------|
| +30°F | 103 | 66 | 70 |
| +30 | 70 | 59 | 60 |
| +30 | 70 | 51 | 50 |

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 22 1972
SHEET 3 OF 9

DEC 12 1970

3. Chemical Analysis: (Additional elements required by ASME Section III, Cl. 1 for information only)

Ni : < 0.05 V : < 0.01
Cr : < 0.05 Cu : 0.10
Mo : < 0.03

4. Radiography: "Acceptable"

WW-2071

*Heat-treated for 16 hours at 1150 degrees F, cooling to 600 degrees F shall be 300 degrees F/hr. (\pm 100 degrees F/hr.).

This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by ITT Grinnell IPI and our subcontractor are in compliance with the requirements of SFA 5.18 and the applicable material requirements of NB-2400 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by ITT Grinnell IPI. This report, in conjunction with the Linde Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.

J. F. Elder 3/29/78
J. F. Elder Date
Materials Engineer

REC'D
130

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 22 1978
SHEET 4 OF 9

Tausig Associates Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



Report No. 24131 - March 28, 1978

ITT Grinnell Industrial Piping, Inc.
P.O. Box 566 - Hwy 421
Kernersville, North Carolina 27284

Attn: Mr. J. F. Elder

WW-207

DEGTEL
130

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 24 1978
SHEET 5 OF 9

S U B J E C T

Mechanical and Chemical Testing of the Weld
Metal of Two (2) Plates Marked Test No. 460.
Per Requisition No. 34622.

BACKGROUND:

Two (2) welded plate assemblies were submitted to our laboratory for chemical analysis, charpy impact and tension testing of the weld metal. The assemblies had been identified as plate no. 460, 1/8" Linde 65, Heat no. 065220. One plate was to be tested as-welded and the other tested after a stress relieving heat treatment.

TEST RESULTS:

WW-207

Chemical Analysis:

The weld metal of plate no. 460 was drilled in a manner which prevented removal of material from the base metal. These drillings were cleaned and subjected to a quantitative chemical analysis with the following results:

| | |
|------------|-------|
| Nickel | <.05% |
| Chromium | <.05 |
| Molybdenum | <.03 |
| Vanadium | <.01 |
| Copper | .10 |

ITTG - IPI
QUALITY CONTROL
APPROVED:
T. C. WILSON
DATE 12-20-60
SHEET 6 OF 9

Heat Treatment:

The plate no. 460 was cut to permit it to fit into heat treating furnace. The pieces were heated to 1150°F and held for 16 hours at temperature. Cooling was done at a rate of less than 300°F/Hr. to below 600°F.

RECEIVED
139

Tension Testing:

Two, round, all weld metal tension test specimens were machined from plate no. 460, as-welded and heat treated. Both specimens were subjected to standard tension testing giving the results as follows:

| | Heat Treated
No. 460 | As-Received
No. 460 |
|----------------------------------|-------------------------|------------------------|
| Tensile Strength, psi. | 78,750 | 81,850 |
| Yield Strength, psi.(.2% Offset) | 70,825 | 68,700 |
| % Elongation in 2 inches | 31 | 30 |
| % Reduction of Area | 60 | 70 |

Impact Testing:

A total of eight, full size (10mm x 10mm), Charpy V-notch impact test specimens were machined from the two submitted plate assemblies. Five of the specimens were from the as-welded plate and three were from the heat treated plate. All were notch in the weld metal and removed and oriented per NB 2322 of the ASME Boiler & Pressure Vessel Code.

No. 460 - As-Received:

| <u>Test Temperature</u> | <u>Absorbed Energy (ft-lbs)</u> | <u>Mils Lateral Expansion</u> | <u>Percent Shear</u> |
|-------------------------|---------------------------------|-------------------------------|----------------------|
| - 20°F | 49 | 39 | 40 |
| - 20°F | 17 | 19 | 20 |
| - 20°F | 44 | 35 | 40 |
| - 20°F | 63 | 46 | 50 |
| - 20°F | 76 | 56 | 60 |

No. 460 - Heat Treated:

| | | | |
|--------|-----|----|----|
| + 30°F | 103 | 66 | 70 |
| + 30°F | 70 | 59 | 60 |
| + 30°F | 70 | 51 | 50 |

WW-2071

DEC 130

MAH:1

Respectfully submitted,

Mark A. Hineman

Mark A. Hineman
Staff Engineer
TAUSSIG ASSOCIATES, INC.

ITG - IPI
QUALITY CONTROL
APPROVED
T. G. WILSON
DATE MAY 22 1971
SHEET 7 OF 7

Taussig Associates Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



PRODUCT TESTING FAILURE INVESTIGATION MATERIAL EVALUATION QUALITY ASSURANCE

TO: ITT Grinnell Industrial Piping
P.O. Box 566 - Hwy 421
Kernersville, N. C. 27284

Report No.: 24131-1a
Date: 5-26-78
Your Order No.:

Attention: Mr. John Elder

SUBJECT: Charpy Impact Testing at the Weld Metal of Test Plate
#460A; 1/8" Linde 65, Heat #065220 - As-welded.

TEST RESULTS:
Impact Testing:

WW-207

Specimen Size: 10mm x 10mm
Notch Type: V
Test Temperature: + 30°F

DESIGNED
J 20

| <u>Specimen Number</u> | <u>Absorbed Energy (ft-lbs)</u> | <u>Mils Lateral Expansion</u> | <u>Percent Shear</u> |
|------------------------|---------------------------------|-------------------------------|----------------------|
| G1 | 105 | 67 | 60 |
| G2 | 137 | 70 | 70 |
| G3 | 101 | 66 | 60 |

All specimens were removed and oriented in accordance with NB-2332.

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 30 1978
SHEET 8 OF 9

CM
Corvyn M. Berger
General Manager

TAUSSIG ASSOCIATES, INC.
By *Mark A. Hineman*
Mark A. Hineman
Staff Engineer

WW-207

SUBJECT: Welding Filler Materials
WIRE: Linde 65, Heat No. 065220

This is to certify that the subject material was welded into a test plate in accordance with NB-2340 using WPS 5-2. These test results are shown in Taussig Associates, Inc. Report No. 24131-1a and supplement the results shown in Taussig Associates, Inc. Report No. 24131.

Charpy Impacts

| <u>Temp.</u> | <u>Ft.-lbs.</u> | <u>Lat. exp. (mils)</u> | <u>%Shear</u> |
|--------------|-----------------|-------------------------|---------------|
| +30°F | 105 | 67 | 60 |
| +30°F | 137 | 70 | 70 |
| +30°F | 101 | 66 | 60 |

J. F. Elder
J. F. Elder
Materials Engineer

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE JUN 1 1978
SHEET 2 OF 2

CERTIFICATE OF ANALYSIS



UNION CARBIDE CORPORATION
LINDE DIVISION
WELDING MATERIALS
P.O. BOX 710, ASHTABULA, OHIO 44004

1/16/78

CUSTOMER: ITT GRINNELL
OLD HIGHWAY 421
KERNERSVILLE NC 27284

YOUR ORDER NO.: 11-137-KER 9113
LINDE S.O. NO.: _____

WW-206

MATERIAL: Linde 65

This is to certify that this material will conform to AWS A5.18-69
ASME SPA5.18. It has the following chemical analysis meeting the
requirements of classification E70S-2 :

HEAT NUMBER - 065214

| | | |
|-------------|---|------|
| Carbon | - | .04 |
| Manganese | - | 1.17 |
| Phosphorous | - | .008 |
| Sulphur | - | .015 |
| Silicon | - | .54 |
| Aluminum | - | .12 |
| Titanium | - | .07 |
| Zirconium | - | .041 |

**CENTER
130**



Ladle Analysis:

Howard Taylor - RLC
Quality Assurance - Welding Materials Plant
Union Carbide Corporation - Linde Division

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB. 21 1978
SHEET 1 OF 4

Industrial Group, Inc.

SUBJECT: Welding Filler Materials

WIRE: Linde G5, Heat No. 065214

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 5-2, that the test results shown in Taussig Associates, Inc. Report 23490 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This may also be used on impact-tested material with a minimum service temperature of +30 degrees F.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 Edition.

WW-206

John F. Elder 2/21/78
J. F. Elder

REC'D
190

ITIG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB 21 1978
SHEET 2 OF 4

MATERIAL TEST REPORT #23490

R & D TEST #435

Linde 55, Heat No. 065214

WW-206

The following tests were performed in accordance with SFA 5.18, E70S-2:

1. All-Weld Metal Tension Test:

As-Welded:

Tensile Strength: 79,200 psi
 Yield Point: 74,700
 Elongation (%) in 2": 28

Heat-Treated*

Tensile Strength: 76,600
 Yield Point: 66,400
 Elongation (%) in 2": 30

2. Charpy V-Notch Impact Tests:

As-Welded:

| Temp. | Ft.lbs. | Lat. Exp. (mils) | %Shear |
|-------|---------|------------------|--------|
| -20 | 143 | 91 | 90 |
| -20 | 123 | 79 | 80 |
| -20 | 100 | 69 | 70 |
| -20 | 111 | 75 | 80 |
| -20 | 111 | 80 | 80 |

Heat-Treated*

| Temp. | Ft.lbs. | Lat. Exp. (mils) | %Shear |
|-------|---------|------------------|--------|
| +30 | 80 | 63 | 60 |
| +30 | 97 | 73 | 70 |
| +30 | 107 | 73 | 70 |

DELETED
130

3. Chemical Analysis: (additional elements required by ASME Section III, Cl. 1 for information only)

Ni: < 0.05 V : < 0.01
 Cr: < 0.05 Cu : 0.12
 Mo: < 0.03

4. Radiography Test: Acceptable

ITIG - IPI
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE FEB 21 1978
 SHEET 3 OF 4

*Heat-treated for 16 hours at 1150 degrees F, cooling to 600 degrees F shall be 300 degrees F/hr. (+ 100 degrees F/hr.)

This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by ITT Grinnell IPI and our subcontractor are in compliance with the requirements of SFA 5.18 and the applicable material requirements of IB-2400 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by ITT Grinnell IPI. This report, in conjunction with the Linde Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.

WW-2031

J. F. Elder
J. F. Elder Date

CHECKED
130

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB. 21 1976
SHEET 4 OF 4

CERTIFIED MATERIALS TEST REPORT

WV-2011

Customer Order No. 4365 Rel. 14-4248

711093-2

Order No.

Shipped

National Welders Supply
P.O. Box N-93
3011 N. Liberty Street
Winston Salem, N.C. 27105

This material conforms to Specification
ITT Spec. ES 1073-1,
SFA 5.1 Sec. III

Trade Name or Trademark: Atom Arc 7018
Diameter Size: 3/32"
19,650 lbs.
Lot Number: 02-1-J728P
Heat Number: 411B6841

Type E 7018

Test No. 650
X-Rays Satisfactory
Control No. MMM074

Moisture @1800°F. 0.29%
Concentricity 4%
Type Steel A-285

| Test No. | Full | Split | Volts | Amps |
|--------------------|------|-------|-------|------|
| Tensiles & Impacts | 1 | 6 | 22 | 110 |

| Test Results: | As Welded | Stress Relieved |
|---------------|-----------------|-----------------|
| | 8 hrs. @1150°F. | |
| Yield | 73,100 | 65,400 |
| Tensile | 80,000 | 75,900 |
| Elongation | 28.0% | 30.0% |
| Red. of Area | 76.0% | 77.9% |

Charpy V-Notch Impacts Tested @-20°F.

| | | |
|-----------|----------------|----------------|
| Impacts | 42-58-63-72-82 | 68-72-80-92-98 |
| Lat. Exp. | 38-48-52-59-68 | 58-61-67-78-83 |
| %Shear | 20-20-20-20-30 | 20-30-30-30-30 |

Filletts: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIAL)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1977

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

Carbon .04
Manganese 1.06
Chromium .03
Nickel .02
Silicon .48
Columbium + Tantalum
Molybdenum .01
Tungsten
Copper .02
Titanium
Phosphorus .012
Sulphur .016
Vanadium .03

RESITEL
ADD

ITTG - IPI
QUALITY CONTROL
APPROVED
T. G. WILSON
DATE FEB. 22 1978
SHEET 1 OF 1

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 21st day of November 1977

SEAL *[Signature]*
Notary Public

My commission expires: 8/21/78

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

BY *[Signature]*
D. G. Flohr

CERTIFIED MATERIALS TEST REPORT

WW-202

Customer Order No. 4372

Order No. 150310-1

National Welders Supply Co.
Ref. 14-5406
3011 N. Liberty Street
Winston Salem, N.C. 27105

APPROVED
T.C.W.

Shipped _____

This material conforms to Specification
ES 1073-3 (SFA 5.1 Sec. III)

Type E 7018

Trade Name
or Trademark:

Atom Arc 7018

Diameter Size:

1/8"

50# sample returned

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAR 1 1978
SHEET 1 OF 1

Test No. 1145
X-Rays Satisfactory
Control No. NNN009

Lot Number:

02-1-L719R

Moisture @1800°F. 0.15%

Heat Number:

421B5451

Concentricity 4%

Type Steel A-285

| | |
|----------------------|------|
| Carbon | .04 |
| Manganese | 1.01 |
| Chromium | .03 |
| Nickel | .03 |
| Silicon | .43 |
| Columbium + Tantalum | |
| Molybdenum | .01 |
| Tungsten | |
| Copper | .02 |
| Titanium | |
| Phosphorus | .010 |
| Sulphur | .015 |
| Vanadium | .02 |

| | | | | |
|--------------------|------|-------|-------|------|
| Test No. | Full | Split | Volts | Amps |
| Tensiles & Impacts | 1 | 5 | 22 | 135 |

| | | |
|---------------|------------------------|-----------------|
| Test Results: | As Welded | Stress Relieved |
| | 16 hrs. @ 1100-1200°F. | |

| | | |
|--------------|--------|--------|
| Yield | 67,000 | 65,700 |
| Tensile | 77,400 | 76,900 |
| Elongation | 28.0% | 31.0% |
| Red. of Area | 67.3% | 78.1% |

Charpy V-Notch Impacts Tested @ -20°F.
Impacts 96-106-107-107-121 88-92-94-109-110
Lat. Exp. 72-71-71-75-77 72-71-78-79-81
% Shear 40-50-50-50-50 20-30-20-40-40

Filletts: OK Vertical Overhead
ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 7th day of March 1978

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

SEAL Anneta J. Conway
Notary Public

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

My commission expires: 8/21/78

BY [Signature]

CERTIFIED MATERIALS TEST REPORT

WWS-2031

Customer Order No. 4374 (14-4631)

Order No. 153016-1

National Welders Supply Co.

Shipped _____

P.O. Box N-93

3011 N. Liberty Street

Winston Salem, N.C. 27105

ITTG - IPI
QUALITY CONTROL
APPROVED
DATE 4-10-78
SHEET 1 OF 1

This material conforms to Specification
ES 1073-3 & ES 1084-4,
ASME SFA 5.1 Sec. III NA37

Trade Name
or Trademark:

Atom Arc 7018

Type E 7018

Diameter Size:

5/32"
20,000 lbs.

Test No. 1149
X-Rays Satisfactory
Control No. NNN050

Lot Number:

03-3-B821K

Heat Number:

482B5101

Moisture @1800°F. 0.11%
Concentricity 3%
Type Steel A-285

| | |
|----------------------|------|
| Carbon | .03 |
| Manganese | .92 |
| Chromium | .03 |
| Nickel | .03 |
| Silicon | .28 |
| Columbium + Tantalum | |
| Molybdenum | .01 |
| Tungsten | |
| Copper | .02 |
| Titanium | |
| Phosphorus | .009 |
| Sulphur | .016 |
| Vanadium | .01 |

| | | | | |
|--------------------|------|-------|-------|------|
| Test No. | Full | Split | Volts | Amps |
| Tensiles & Impacts | 1 | 7 | 24 | 170 |

| | | |
|---------------|-----------------------|-----------------|
| Test Results: | As Welded | Stress Relieved |
| | 16 hrs. @1100-1200°F. | |
| Yield | 68,000 | 62,000 |
| Tensile | 77,500 | 72,700 |
| Elongation | 28.0% | 32.0% |
| Red. of Area | 71.2% | 78.1% |

Charpy V-Notch Impacts Tested @ -20°F.
Impacts 128-138-150-185-214 120-172-180-204-208
Lat. Exp. 85-86-84-82-91 81-80-86-91-85
% Shear 60-60-70-80-80 50-80-80-90-90

Fillets: OK Vertical Overhead
ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

State of Penna.)
County of York) SS

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

Subscribed and sworn to before me
this 6TH day of April 1978

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

SEAL [Signature]
Notary Public

My commission expires: 8/21/78

BY [Signature]
D. G. Flohr

The Reid - Avery Company

TEST REPORT

Dundalk, Baltimore, Md. 21222

DATE: 4/11/78

SOLD TO ITT General
01d Highway 421
Kernersville, NC 27284

SHIPPED TO:

DATE SHIPPED: 11/30/78

P.O. NO.:

P.O. NO.: Rec 6999

SPECIFICATION:

| ITEM | POUNDS | SIZE | TYPE | LOT NO | HEAL NO. |
|------|--------|------|---------|--------|----------|
| 1. | | 1/8 | 128 HPH | | 519346 |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |

W/001-2091

CHEMICAL ANALYSIS OF WIRE

| ITEM | C | Mn | P | S | Si | Cr | Ni | Mo | Al | Cu |
|------|-----|------|------|------|-----|------|------|-----|-----|------|
| 1. | .13 | 1.71 | .019 | .013 | .05 | .029 | .049 | .53 | .00 | .041 |
| 2. | | | | | | | | | | |
| 3. | | | | | | | | | | |
| 4. | | | | | | | | | | |
| 5. | | | | | | | | | | |
| 6. | | | | | | | | | | |

DEINTEL
130

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE JUN 13 1978
SHEET 1 OF 5

ADDITIONAL TEST RESULTS

State of _____

City of _____

Subscribed and sworn to before me this _____ day

of _____ 19 _____

Notary Public _____

My commission expires _____

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

[Signature]

QUALITY ASSURANCE DEPARTMENT

Fausig Associates Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



Report No. 22867-1 - December 14, 1977

ITT Grinnell Industrial Piping
P. O. Box 566 - Hwy 421
Kernersville, NC 27284

Attn: Mr. J. F. Elder

WW-20911

S U B J E C T

Mechanical & Chemical Testing of the Weld
Metal of Test Plate #428.

DICTIONARY
120

| |
|--|
| ITTG - IPI
QUALITY CONTROL
★ APPROVED ★
T. C. WILSON
DATE JUN. 13 1978
SHEET 3 OF 5 |
|--|

Corrections:

3-22-78 - Heat #519346 on page 1.

PRODUCT TESTING FAILURE INVESTIGATION MATERIAL EVALUATION QUALITY ASSURANCE

BACKGROUND:

Two (2) welded plate assemblies were submitted to our laboratory for chemical analysis, charpy impact and tension testing of the weld metal. The assemblies had been identified as plate number 428, RACO 128HMM, Ht. #519346, Linde 80, Lot 0575, Con. 8290. One plate was to be tested as-welded and the other tested after a stress relieving heat treatment.

TEST RESULTS:

Chemical Analysis:

The weld metal of plate number 428 was drilled in a manner which prevented removal of material from the base metal. These drillings were cleaned and subjected to a quantitative chemical analysis with the following results:

| | |
|------------|------|
| Carbon | .05 |
| Manganese | 1.23 |
| Phosphorus | .014 |
| Sulfur | .013 |
| Silicon | .40 |
| Nickel | <.05 |
| Chromium | <.05 |
| Molybdenum | .53 |
| Copper | .15 |
| Vanadium | <.01 |

WW-20911

Heat Treatment:

Plate number 428 was cut to permit it to fit into a heat treating furnace. The pieces were heated to 1100°F and held for 16 hours at temperature. Cooling was done at a rate of less than 200°F/Hr. to below 800°F. The pieces were then marked 428H.

Tension Testing:

Two, round, all weld metal tension test specimens were machined from plate number 428, as-welded and heat treated. Both specimens were subjected to standard tension testing giving the results as follows:

RENTS
\$20

| |
|------------------|
| ITTG - IPI |
| QUALITY CONTROL |
| ★ APPROVED ★ |
| T. C. WILSON |
| DATE JUN 13 1978 |
| SHEET 4 OF 5 |

| | No. 428H
<u>Heat Treated</u> | No. 428
<u>As-Welded</u> |
|------------------------|---------------------------------|-----------------------------|
| Tensile Strength, Psi. | 83,875 | 83,325 |
| Yield Strength, Psi. | 68,725 | 70,325 |
| % Elongation in 2" | 27 | 27 |
| % Reduction of Area | 61 | 61 |

Impact Testing:

Five (5), full size (10mm x 10mm), Charpy V-Notch impact test specimens were machined from the heat treated plate assembly. All were notched in the weld metal.

No. 428H - Heat Treated:

| <u>Test Temperature</u> | <u>Absorbed Energy (ft-lbs)</u> | <u>Mils Lateral Expansion</u> | <u>Percent Shear</u> |
|-------------------------|---------------------------------|-------------------------------|----------------------|
| 0°F | 45 | 39 | 40 |
| 0°F | 40 | 36 | 40 |
| 0°F | 42 | 35 | 40 |
| 0°F | 48 | 41 | 40 |
| 0°F | 50 | 41 | 50 |

Respectfully submitted,

Mark A. Hineman

Mark A. Hineman
Staff Engineer

TAUSSIG ASSOCIATES, INC.

WW-20911

MAH:ln

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE JUN. 1 3 1976
SHEET 5 OF 5

DEC 1976
130

Name of Supplier ITT Grinnell Ind. Piping, Inc.

Date 6/26/79

Address of Supplier Plant Ferrisville, NC

Mill Power Order No. G-12517

Duke Item or Req. No. 1206.00-1.0

Spec. No. CNS-1206.00-1.0 Rev. 1

Supplier ID Nos. CT-01-6X

Description of Component(s) or Material(s) Fabricated Piping Assembly

CT-SM-5A

Attached Documentation covers all Components/Materials on Mill Power Order.
 Attached Documentation covers partial shipment of Components/Materials on Mill Power Order.

The following listed tests, inspections and reports have been completed as required by the specification:

Physical & Chemical Analysis
 Hydro (Test Pressure - PSIG _____)

Major Repair Records & Charts
 Personnel Qualifications on Record

Design Report
 Radiographic Test
 Penetrant Test
 Operating Test
 Dimensional Check

Stress Report
 Ultrasonic Test
 Repair NDE
 Performance Curve
 Deviation Record # _____

Heat Treatment
 Magnetic Particle
 Cleanliness
 ASME Data Report

1) _____

2) _____

3) _____

This certifies that the listed Component(s) or Material(s) conform to the requirements of the above referenced Duke Power documents including all codes, standards, test requirements and Quality Assurance requirements invoked therein.

DUKE POWER COMPANY
QA RECORDS APPROVED
S. U. Adwell
 QA REPRESENTATIVE
 DATE 5-14-79

Thomas R. Smith
 Supplier Representative Authorized Signature

Title Mgr. of Proc. Date 6/26/79

(See Instructions)

1. Fabricated by ITT Grinnell Ind. Piping, Inc., Kernersville Order No. 7127
(Name and Address of Fabricator)

2. Fabricated for Duke Power Company, Charlotte, NC Order No. C-12517
(Name and Address)

3. Owner Duke Power Company 4. Location of Plant Newport, SC

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

(a) Drawing No. CT-01-6X Prepared by ITT Grinnell Industrial Piping, Inc.

(b) National Board No. N/A

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

Edition 1974, Addenda Date Winter 1974, 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)

Supplemental Sheets 2 ---- Drawings
344 ---- Bill (s) of Material

7. Shop Hydrostatic Test Field psi.

8. Description of piping inspected Piece Mark Number CT-5M-5A
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length
See Attached Sheets
- fittings - flanges, etc.)

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 6-26-78 Signed ITT GRINNELL Ind. Piping, Inc. by Thomas A. Smith
(Fabricator)

Certificate of Authorization Expires 7-16-79 Certificate of Authorization No. N-1456

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 N.C. and employed by * Hartford, CT.

have inspected the piping described in this Data Report on 6-27-78, 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. *The Hartford Steam Boiler Inspection and Insurance Co.

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 6-27-78
Barry K. Ballew
(Inspector)

Commission N.C. - No. 808
National Board, State, Province and No.

* 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 in item 7, "Remarks".
Printed in U.S.A. (2/73) This form (E62) is obtainable from the ASME, 345 E. 47th St., New York, N.Y. 10017

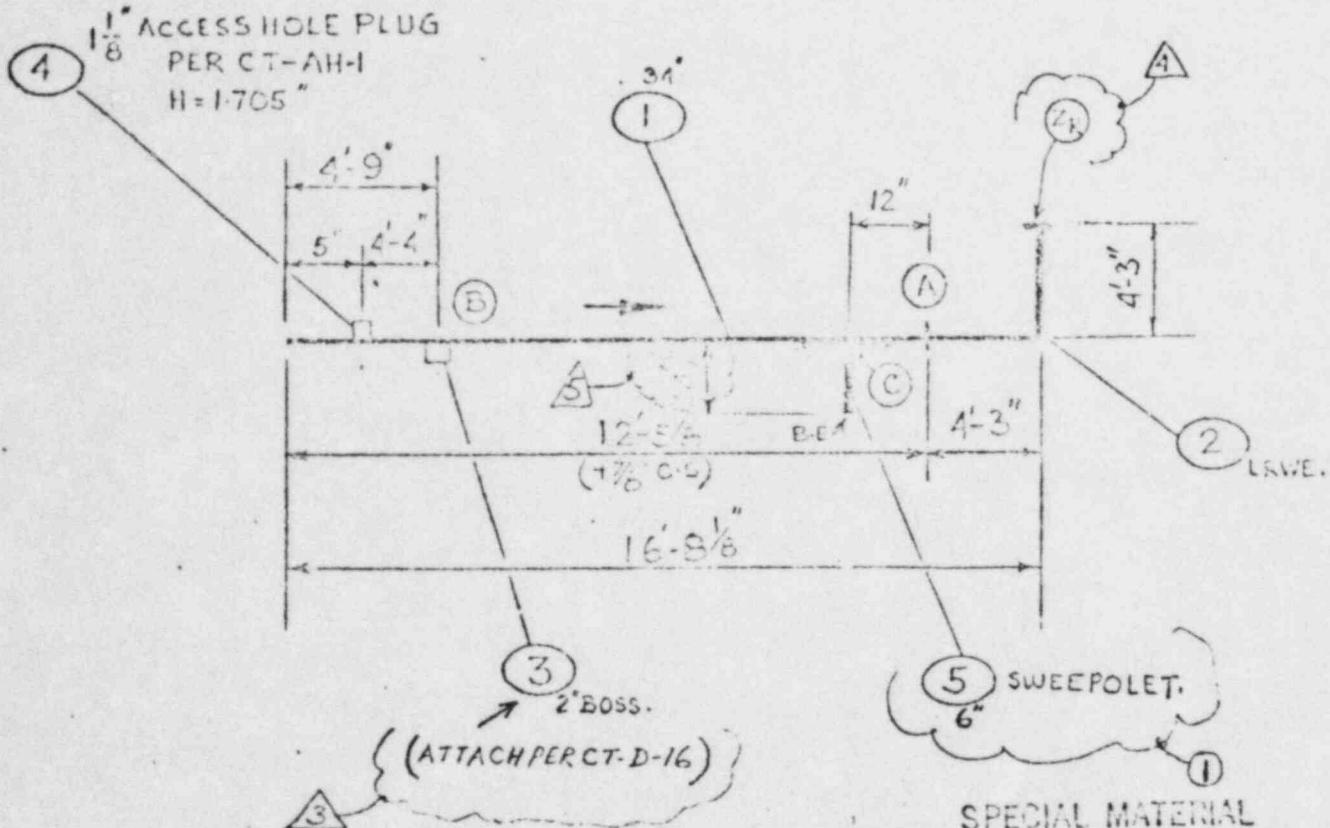
2084

CONT. NO. 7127
 NAME DUKE POWER COMPANY
 LOCATION CATAWBA UNIT #1

Charlotte N.C.
 POC12517

REV. (1) 14, 11-11-77 ✓ CHKD. PG.
 REV. (2) 19, 12-14-77 ✓ CHKD. PG.
 REV. (3) 15, 5-23-78 ✓ CHKD. PG.
 REV. (4) 16, 5-23-78 ✓ PG.
 REV. (5) 17, 6-2-78 ✓ SL

LENGTH OF ACCESS HOLE PLUG SHALL
 BE ± 1/16" OF ACTUAL WALL THICK.
 SHOP SHALL GRIND TO FIT--IF REQUIRED.



SPECIAL MATERIAL
 CHECK ALLOCATION SHEETS
 BEFORE CUTTING

USE BAR #13, LOT # 4121,
 HT. # L3123, (13'-0 1/4)

PAINT FLOW ARROWS

QUALITY CONTROL

MACHINE ENDS
 PER SKETCH CT-D-2,
 EXCEPT AS NOTED.

Nuclear Safety Related

CLASS DUKE B LINE SPEC. PS 1500-5(21) APP. CODE Area 500, III, CL 2 NO. REQ'D. 1

| | | | | | | | |
|---------------------|---|------------------|---|------------|---|---------------------|---|
| Radiography (RT) | ✓ | Special Marking | | Preheat | ✓ | Cert. of Compliance | |
| Mag. Particle (MP) | ✓ | Special Cleaning | ✓ | Heat Treat | | Mill Test Reports | ✓ |
| Leak Penetrant (PT) | | Painting | ✓ | Code Stamp | ✓ | Data Reports | ✓ |

SYSTEM MAIN STEAM (SM) FAB. SPEC. J.S. II B
 REF. DRWG NO. CN-1491-SM.003 (REV 2) PRESS. 1185 PSI. TEMP. 600 °F. WT 10,479 LBS.
 CHECK MARK CT-SM-5A REGISTER CT-01-6X

GRINNELL INDUSTRIAL PIPING, INC.

KERNERSVILLE, NC

REVISION

FORM EN 102 REV 7/70
O.A. FORM N2.17

Register No. CT-01-02

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 3 Of 7

Revision No. ASM Revision Date 5-22-78

Piece Mark CT-SM-5A

Job Name **DUKE POWER COMPANY**
CATAWBA UNIT #1
CHEROKEE

Contract No. 7127

Location _____

| PART NUMBER | DESCRIPTION | DIAM OR LENG | QUALITY CONTROL | | | ACCOUNTING MATERIAL | | | |
|--------------------------------------|---|--------------|-----------------|---------------------|--------|---------------------|-----------------|-------------|-----|
| | | | HEAT NUMBER | DOCUMENT IN PROCESS | STATUS | U/M | UNIT PRICE P.C. | DIS. VENDOR | NET |
| EBC TC D-2
CT-01-11-1 | 31.438" I.D X 1.375" MW. SMLS 12'
CS, PIPE TO ASME, SA-106
GR.C.
USE PAR# 13, LOT# 412, WT# L3123
(14-55) | 12' | | | | F | | | |
| LAAT CAP
CT-01-17-1 | 31.438" I.D X 1.375" MW, 90° LRWE.
TO SA-234 WPB-W, MADE
FROM SA-515 GR. 70 PLATE,
(70,000 PSI TENSILE), OR
SA-234 WPC SEAMLESS,
ENDS PER DETAIL CT-D-2. | 1 | | | | E | | | |
| 2" A/C EN
CT-3002-3 | 2" 3000# CS. SP. WELD
BONDS TO SA-105 PER DET.
SK# CT-WB-1
(ATTACH PER CT-D-16). | 1 | | | | E | | | |
| 1/8" ACCESS HOLE PLUG PER
CT-AH-1 | 1/8" ACCESS HOLE PLUG PER
CT-AH-1, SA-105 "H"=1705 | 1 | | | | E | | | |

John H. ...

Code Zns, Sec. III, Cl. 2

Class DUKE B

Nuclear Safety Related

sch. Supplement TS 118

GRINNELL INDUSTRIAL PIPING, INC.

KERNERSVILLE NC

FORM IN-102 REV 7/73

O.A. FORM N2.1F

H.P

Register No. CT-01-6X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 21 Of 21

Piece Mark CT-SM-5A

Job Name Duke Power Company
CATAWBA UNIT #1
Kernersville NC

Contract No. 7127

Location _____

Revision No. (1) SM Revision Date 11-11-77

| ITEM | PART NUMBER | DESCRIPTION | QUAN OR LENG | QUALITY CONTROL | | | ACCOUNTING/MATERIAL | | |
|------|-------------|---|--------------|-----------------|---------------------|------------|---------------------|-------------|-----|
| | | | | HEAT NUMBER | DOCUMENT IN PROCESS | STATUS U/M | UNIT PRICE P.O. | DIS. VENDOR | NET |
| | 3.4 | SP. END PROTECTORS
PER CT-EP-1 | 2 | | | | | E | |
| | 3.4 | SPIDER BRACING PER
CT-ES-1 | 2 | | | | | E | |
| R | 3.4" x 6" | 34" (1.315" MW) X 6" (S-80)
SWEEPolet, TO SA-105,
37 1/2" B.E | 1 | 7232 | 521F-17 | 523 75 | | E | |
| | 6" | END PROT. | 1 | | | | | E | |
| | 2" | END PROT. | 1 | | | | | E | |

Code Area. Sec. III, Cl. 2

Class DUKE B

Nuclear Safety Related

Job Supplement 15118

MFG. Code _____

GRINNELL INDUSTRIAL PIPING, INC.

FORM EN-102 REV 7-76
O.A. FORM NZ, IF

H.P.

Register No. CT-01-6X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 1 of 2

DUKE POWER COMPANY
Job Name CATAWBA UNIT #1

Revision No. ① GM Revision Date 11-11-77

Piece Mark CT-SM-5A

Contract No. 7127 Location _____

| ITEM | PART NUMBER | DESCRIPTION | QTY OR LENG | HEAT NUMBER | QUALITY CONTROL DOCUMENT NO. | STATUS | UPR | DIS. VENDOR | UNIT PRICE | MATERIAL |
|------|------------------|---|-------------|-------------|------------------------------|--------|---------|-------------|------------|----------|
| | | | | | | | | | | |
| 1 | LEBC CT-01-11-1 | 31-438 I.D.XI-375 MW. SML'S 12"
CS PIPE TO ASME SA-106
GR-C
USE BAR # 15 TO 11 1/2" H. H. L. SIZE
(15-04) | 3/4 | 4512 | 18 | 1 | 5/11/77 | | | |
| 2 | L1A CT-01-11-1 | 31-438 I.D.XI-375 MW, 90 LBWE.
TO SA-234 WPB-W, MADE
FROM SA-515 GR. 70 PLATE,
(70,000 PSI TENSILE), OR
SA-234 WPC SEAMLESS,
ENDS PER DETAIL CT-D-2. | 3/4 | | | 1 | | | | |
| 3 | Y X A CT-01-11-1 | 2" 2000# CS, SP. WELD
BOSS TO SA-105 PER DET.
SK # CT-VB-1 | 2 | | | 1 | | | | |
| 4 | X X X CT-01-11-2 | 1" ACCESS HOLE PLUG PER
CT-AH-1, SA-105, H=1-705 | 1 | | | 1 | | | | |

Code: 2000 Class: DUKE B Nuclear Safety Related

MFG. Code

Job Supplement JS 118

PROJECT DUKE POWER (Co) CONTRACT 7127 FC. MK# 07-5M-5A REC. 10/1/01 6X
 SYSTEM MAN STAIR CLASS DAKE B C12 SPECIFICATION J5-118-7 SUPPLEMENT 1

WELD DATA

| WELD | FIT-UP/PREHEAT | | ROOT | | INTERMEDIATE | | FINAL | | RT DATE | | MAG | LF |
|-------|----------------|------------|-------------|------------|--------------|------------|-------------|------------|---------|--------|-----|----|
| | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | Q.C. | CUST. | | |
| A | PROC | L-4-2-2 | PROC | 1-4-2-2 | PROC | 1-1-1-7 | PROC | 1-2-2-4 | 4/6/78 | 4/6/78 | | |
| DATE | 5/22/78 | 06-5-2-14 | 5/24/78 | 10/6/206 | 5/24/78 | 10/6/206 | 5/27/78 | 0575 | 4/6/78 | 4/6/78 | | |
| B | PROC | L-4-2-2 | PROC | 1-4-2-2 | PROC | 1-1-1-7 | PROC | 1-1-1-7 | | | | |
| DATE | 5/22/78 | 06-5-2-14 | 5/24/78 | 06-5-2-20 | 5/27/78 | 10/6/206 | 5/27/78 | 10/6/206 | | | | |
| C | PROC | L-4-2-2 | PROC | 1-4-2-2 | PROC | 1-1-1-7 | PROC | 1-1-1-7 | | | | |
| DATE | 5/22/78 | 06-5-2-20 | 5/24/78 | 06-5-2-20 | 5/27/78 | 10/6/206 | 5/27/78 | 10/6/206 | | | | |
| Code | PROC | L-4-2-2 | PROC | 1-4-2-2 | PROC | 1-1-1-7 | PROC | 1-1-1-7 | | | | |
| Plate | PROC | End Repair | PROC | 1-4-2-2 | PROC | 1-1-1-7 | PROC | 1-1-1-7 | | | | |
| DATE | 5/22/78 | 06-5-2-14 | 5/24/78 | 10/6/206 | 5/27/78 | 10/6/206 | 5/27/78 | 10/6/206 | | | | |
| ZR | PROC | End Repair | PROC | 1-4-2-2 | PROC | 1-1-1-7 | PROC | 1-1-1-7 | | | | |
| DATE | 5/22/78 | 06-5-2-14 | 5/24/78 | 10/6/206 | 5/27/78 | 10/6/206 | 5/27/78 | 10/6/206 | | | | |

STRESS DATE 1/12 SPECIAL OPERATIONS: N/A Q.C. DOC. APPROVAL 6/2/78
 SQUARE UP 1-8-78 421B5451/02-1-17AR 421B5451/03-3-B321K ANZ (6X) A/I STAMP/DATA REPORT
 CLEAN UP 1-8-78 421B5451/02-1-17AR 421B5451/03-3-G707P 6-27-78 CUST DOC APPROVAL

Req. No. F-862
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.

In-Process
 Repair

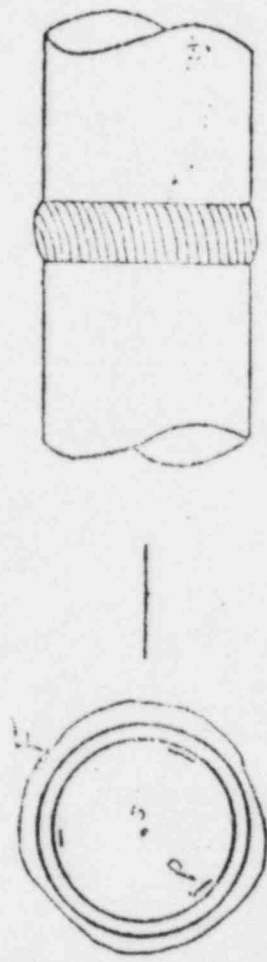
Form N5.3A

Standard Hours

Date 6-8-78

ALLOY/ANALYTICAL DESCRIPTION REPORT

| | | | | | | | | | |
|---------------------------------|---|---------------|----------|----------|----|-------------------------------|-----------------------|------------|----------------------------|
| Order of
Registry No. | CT-01-6X | Plate No. | CT-01-6X | Void No. | A | Film Size
and
Reference | 3 1/2" x 5" 10.11.125 | Volume No. | C-203A
C-422E
C-226B |
| Views | 1 | Film Interval | AD | UC | UC | UC | UC | UC | UC |
| Source | 140 | UC | UC | UC | UC | UC | UC | UC | UC |
| Source Corrosion
or ESD & WA | 40 | UC | UC | UC | UC | UC | UC | UC | UC |
| Source Size
or Focal Spot | 140 | UC | UC | UC | UC | UC | UC | UC | UC |
| Source Film Distance | 17" | UC | UC | UC | UC | UC | UC | UC | UC |
| Time | 3:00 | UC | UC | UC | UC | UC | UC | UC | UC |
| Actual Film
Thickness | 1.437 | UC | UC | UC | UC | UC | UC | UC | UC |
| Penetration | 50 | UC | UC | UC | UC | UC | UC | UC | UC |
| Sensitivity | T | UC | UC | UC | UC | UC | UC | UC | UC |
| Bolt Thickness | 0.62 | UC | UC | UC | UC | UC | UC | UC | UC |
| Film Size | 7017 | UC | UC | UC | UC | UC | UC | UC | UC |
| Film Type | 70 | UC | UC | UC | UC | UC | UC | UC | UC |
| Viewing Technique | Single <input type="checkbox"/> Double <input type="checkbox"/> | UC | UC | UC | UC | UC | UC | UC | UC |
| Screen | Front .010
Back .010 | UC | UC | UC | UC | UC | UC | UC | UC |
| Development | 40" Tank 6 min.
Automatic | UC | UC | UC | UC | UC | UC | UC | UC |
| Rolling Procedure | 140.2.0
140.3.2 | UC | UC | UC | UC | UC | UC | UC | UC |



Customer Unit-1 & 2

Inspector - Date 6-8-78 by Allyson Good
 Interpretation - Date 6-11-78 by Allyson Good
 Approval - Date 6-11-78 by Allyson Good
 Customer - Luiko Power Co.
 Contract - 71217123
 Inspection Standard - ISF-101-10
 Customer Approval - Date _____ by _____

ISF-1711-2

Handwritten signature

Req. No. F-863
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.

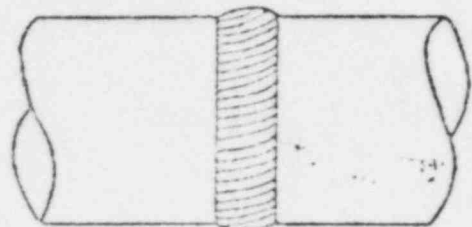
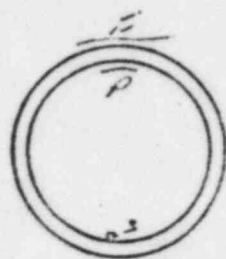
In-Process
 Repair RADIOGRAPHIC INSPECTION REPORT

Form N6.3A Standard Hours _____
 Date 6-8-78

SA B-3

| | | | | | | | | | | | | | | | |
|---------------------------------------|--|---|---------------|--------------------------|---|---|----|--|---|----|---|----------|----------------|---------------------------|-----------|
| System or Register No. <u>CT-016X</u> | | Piece No. <u>CT-SM-5A</u> | | Weld No. <u>C 3-0-02</u> | | Pipe Size and Schedule <u>34(1-275)</u>
<u>1 1/2" / 20</u> | | Holder No. <u>C-312213</u>
<u>C-27243</u>
<u>C-4420 C-2343</u> | | | | | | | |
| View | <u>6</u> | I
N
T
E
R
P
E
N
E
T
I
O
N | File Interval | Defect Type | | | | | | | | Comments | Interpretation | | |
| Source | <u>-1K-192</u> | | LP | LF | S | • | IT | UC | C | CB | T | | BT | Acceptable | Rejection |
| Source Center or ITP & VA | <u>80</u> | | <u>AD</u> | | | <u>AA</u> | | | | | | | | <u>(PASS) C-D</u> | <u>X</u> |
| Source Size or Focal Spot | <u>142</u> | | <u>DG</u> | | | | | | | | | | | <u>SCRATCHES etc</u> | <u>^</u> |
| Source Film Distance | <u>32.025</u> | | <u>GJ</u> | | | <u>A</u> | | | | | | | | <u>(PA)</u> | <u>X</u> |
| View | <u>10</u> | | <u>JM</u> | | | <u>A</u> | | | | | | | | <u>(PA)</u> | <u>X</u> |
| Actual Weld Thickness | <u>1.375</u> | | <u>NP</u> | | | <u>A</u> | | | | | | | | <u>(PA) SCRATCHES etc</u> | <u>X</u> |
| Penetrant | <u>30</u> | | <u>PA</u> | | | <u>A</u> | | | | | | | | <u>(PA)</u> | <u>X</u> |
| Sensitivity | <u>2T</u> | | | | | | | | | | | | | | |
| Shield Thickness | <u>—</u> | | | | | | | | | | | | | | |
| Film Size | <u>7x17</u> | | | | | | | | | | | | | | |
| Film Type | <u>70</u> | | | | | | | | | | | | | | |
| Viewing Technique | Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | | | | | | | | | | | | | | |
| Screen | Front | <u>.010</u> | | | | | | | | | | | | | |
| | Back | <u>.010</u> | | | | | | | | | | | | | |
| Development | 60" Solub Rate | | | | | | | | | | | | | | |
| | Automatic | <u>X</u> | | | | | | | | | | | | | |
| Welding Procedure | <u>W 222</u>
<u>W 1112-3</u> | | | | | | | | | | | | | | |

LP - Lack of Penetration UC - Under Cut S - Spatter
 LF - Lack of Fusion C - Crater A - Acceptable
 N - Slag CB - Crack B - Rejection
 P - Porosity T - Trapdoor R - Borderline
 BT - Burn Thru HL - High Low



Redesigner - Date 6-9-78 By [Signature]
 Interpretation - Date 6-14-78 By [Signature]
 Approval - Date 6-14-78 By [Signature]

Customer Duke Power Co.
 Contract 7127/7102
 Inspection Standard ASME-181-10
 Customer Approval - Date _____ By _____

Location Catawba Unit 1 & 2
 Job No. _____
 Acceptance Standard ISE.1711-2

Req. No. F-864
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.

In-Process
 Repair RADIOGRAPHIC INSPECTION REPORT

Form N6.3A

Standard Hours _____

Date 6-8-78

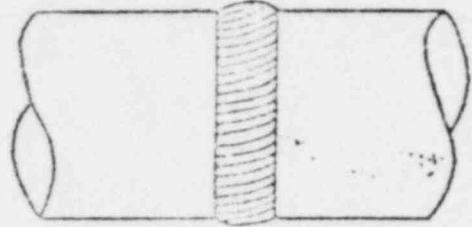
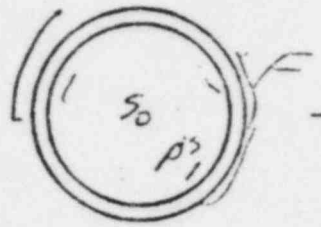
50 2-3

| | | | | | | | | | | | | | | | | | | |
|--|--|---------------------------|---------------|----------------------|----|---|---|---------------------------|----|---|----|---|----|----------------|----------|-------------|---|--|
| System or Register No. <u>CT-01-6X</u> | | Plate No. <u>CT-37-5A</u> | | Weld No. <u>B-2K</u> | | Pipe Size and Schedule <u>71.25 x 10, 11225</u> | | Folder No. <u>C-383 B</u> | | | | | | | | | | |
| View | <u>1</u> | INSPECTION | File Interval | Defect Type | | | | | | | | | | Comments | | Orientation | | |
| Source | <u>IR-192</u> | | <u>A-D</u> | LP | LP | S | P | UT | UC | C | CF | T | MS | <u>SURFACE</u> | | ACC. | W | |
| Source Curves or TYP & VA | <u>50</u> | | <u>K-N</u> | | | | | | | | | | | | <u>"</u> | | | |
| Source Size or Focal Spot | <u>.192</u> | | <u>VY</u> | | | | | | | | | | | | | | | |
| Source Film Distance | <u>17</u> | | | | | | | | | | | | | | | | | |
| TYPE OF FILM | Time | | <u>2:00</u> | | | | | | | | | | | | | | | |
| | Actual Weld Thickness | | <u>.250</u> | | | | | | | | | | | | | | | |
| | Penetrant | | <u>5</u> | | | | | | | | | | | | | | | |
| | Developer | | <u>9T</u> | | | | | | | | | | | | | | | |
| | Wash | | <u>.250</u> | | | | | | | | | | | | | | | |
| Plate Size | <u>9 1/2 x 17</u> | | | | | | | | | | | | | | | | | |
| Plate Type | <u>55</u> | | | | | | | | | | | | | | | | | |
| Viewing Technique | Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | | | | | | | | | | | | | | | | | |
| Screens | Front | <u>.010</u> | | | | | | | | | | | | | | | | |
| | Back | <u>.010</u> | | | | | | | | | | | | | | | | |
| Development | 40" Kodak 6 min. | | | | | | | | | | | | | | | | | |
| | Automatic | <u>X</u> | | | | | | | | | | | | | | | | |
| Welding Procedure | <u>1-220</u> | | | | | | | | | | | | | | | | | |

LP - Lack of Penetration UC - Under Cut
 LF - Lack of Fusion C - Crater
 P - Slag CB - Crack
 S - Porosity T - Tangent
 BT - Burn Thru SL - Slag Lap

Severity
 A - Acceptable
 E - Expectable
 S - Suspectible

(XRAY REPAIR AREAS ONLY)
 AS MARKED LIP



Radiographer - Date 5-8-78 by DR. Anderson
 Interpretation - Date 6-9-78 by Allyson Level
 Approval - Date 6-9-78 by Allyson #

Customer Duke Power Co.
 Contract 7127/7123
 Inspection Standard ASME-191-10
 Customer Approval - Date _____ by _____

Location Catawba Unit 1 & 2
 Job No. _____
 Acceptance Standard ASME-1711-2

Hartford 6/11/78 (RL)

Catawba

IRON WORKS, INC.
P. O. BOX 1211
HOUSTON, TEXAS 77001

IRON PIPE & FLEXIBLE INDUSTRIAL PIPING, INC.
KERRVILLE, MO 27204

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

Date 22 July 1976

Customer Order No. KER-2853-P C.I.W. Sales Order No. F-5693
Specification ASME-SA106 Gr. C and ASME-Section III, Class 2
Third Summer 1974 Addenda

Description of Material O.D. 31.435" x WALL 1.375" H.W.

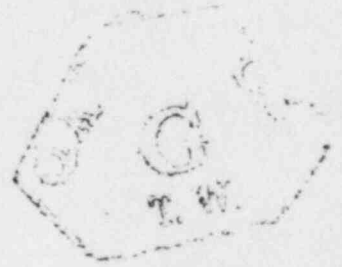
C.I.W. Part No. 85-5693-345-314

| Heat No. | Location or Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|-----|------|------|-----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |
| L 3117 | | .24 | .89 | .012 | .021 | .23 | | | |
| L 3119 | | .24 | .91 | .011 | .012 | .22 | | | |
| L 3122 | | .23 | .90 | .014 | .010 | .25 | | | |
| L 3123 | | .25 | .93 | .015 | .016 | .25 | | | |
| L 3130 | | .24 | .96 | .011 | .015 | .23 | | | |

| Quantity or Serial No. | Heat No. | Test Loc. | Tensile PSI | Yield Point % Offset Yield PSI | MECHANICAL PROPERTIES | | | | Specimen Size | Test Lot# | |
|------------------------|----------|-----------|-------------|--------------------------------|-----------------------|-------------|------------|-----------|---------------|-----------|------------------|
| | | | | | % Elong. 2 In. | % Red. Area | Macro Etch | Bend Test | | | Flat-tening Test |
| 1 | L 3117 | Trans. | 79,900 | 44,700 | 25.0 | 45.8 | | | OK | .505 | 17 |
| 3 | L 3119 | Trans. | 79,900 | 46,400 | 23.2 | 55.7 | | | OK | .505 | 19 |
| 2 | L 3122 | Trans. | 80,900 | 46,900 | 26.0 | 51.9 | | | OK | .505 | 22 |
| 3 | L 3123 | Trans. | 78,400 | 41,200 | 28.2 | 50.8 | | | OK | .505 | 23 |
| 1 | L 3130 | Trans. | 77,900 | 40,200 | 27.9 | 50.8 | | | OK | .505 | 30 |

| Form Ser.# | Heat# | Test Lot# |
|------------|--------|-----------|
| 220803 | L 3122 | 22 |
| 26609 | L 3122 | 22 |
| 26611Z | L 3119 | 19 |
| 26613Y | L 3119 | 19 |
| 26613Z | L 3119 | 19 |
| 26618 | L 3130 | 30 |
| 26622X | L 3123 | 23 |
| 26622Y | L 3123 | 23 |
| 26622Z | L 3123 | 23 |
| 26624Y | L 3117 | 17 |

CATAWBA
P#8



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

Heat Treatment:

Subscribed and sworn to before me this 22nd day of July 1976

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

[Signature]
Notary Public

[Signature]
Metallurgical Representative: H. C. BRIGHT

Camp

2100 WOODVILLE
P.O. BOX 1010
HOUSTON, TEXAS 77001

THE CONNELL INDUSTRIAL PIPING, INC.
KEMERSVILLE, NC 27804

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NO. H-1261 EXPIRES 10-27-75.

Date 22 July 1976

| | | |
|---|---|--|
| Customer Order No.
KIR-2653-P | C.I.W. Sales Order No.
F-5692 | ASME-SA106-GR. C and ASME Section III, Class 2
Thru Summer 1974 Addenda |
|---|---|--|

| | | | | | |
|-------------------------|------|--------|----------------|--------|--------------------|
| Description of Material | O.D. | x I.D. | 31.439" | x WALL | 1.375" M.W. |
|-------------------------|------|--------|----------------|--------|--------------------|

C.I.W. Part No. **86-5692-345-314**

| Heat No. | Location or Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|-----|------|------|-----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |
| L 3117 | | .24 | .89 | .012 | .021 | .23 | | | |
| L 3119 | | .24 | .91 | .011 | .012 | .22 | | | |
| L 3120 | | .25 | .85 | .010 | .014 | .29 | | | |
| L 3122 | | .26 | .90 | .014 | .010 | .26 | | | |
| L 3123 | | .25 | .93 | .015 | .016 | .25 | | | |
| L 3130 | | .24 | .96 | .011 | .015 | .23 | | | |

*CATAWBA
P#8*

| Quantity or Serial No. | Heat No. | Test Loc. | Yield Point | | MECHANICAL PROPERTIES | | | | | Specimen Size | Test Lot |
|------------------------|----------|-----------|-------------|--------------------|-----------------------|-------------|------------|-----------|-----------------|---------------|----------|
| | | | Tensile PSI | % Offset Yield PSI | % Elong. 2 In. | % Red. Area | Macro Etch | Bond Test | Flattening Test | | |
| 5 | L 3117 | Trans. | 79,900 | 44,700 | 25.0 | 45.3 | | | OK | .505 | 17 |
| 1 | L 3119 | Trans. | 79,900 | 46,400 | 28.2 | 55.7 | | | OK | .505 | 19 |
| 4 | L 3120 | Trans. | 85,600 | 49,700 | 23.8 | 44.0 | | | OK | .505 | 20 |
| 2 | L 3122 | Trans. | 80,900 | 46,900 | 26.0 | 51.9 | | | OK | .505 | 22 |
| 4 | L 3123 | Trans. | 78,400 | 41,200 | 28.2 | 50.8 | | | OK | .505 | 23 |
| 3 | L 3130 | Trans. | 77,900 | 40,200 | 27.9 | 50.8 | | | OK | .505 | 30 |

| Form. Ser. # | Heat # | Test Lot # | Form. Ser. # | Heat # | Test Lot # |
|--------------|--------|------------|--------------|--------|------------|
| 208172 | L 3117 | 17 | 208215 | L 3117 | 17 |
| 208173 | L 3119 | 19 | 208216 | L 3117 | 17 |
| 208174 | L 3119 | 19 | 208217 | L 3123 | 23 |
| 208175 | L 3120 | 20 | 208218 | L 3123 | 23 |
| 208176 | L 3120 | 20 | 208219 | L 3123 | 23 |
| 208177 | L 3120 | 20 | 208220 | L 3117 | 17 |
| 208178 | L 3120 | 20 | 208221 | L 3123 | 23 |
| 208179 | L 3120 | 20 | 208222 | L 3123 | 23 |
| 208180 | L 3120 | 20 | 208223 | L 3123 | 23 |
| 208181 | L 3120 | 20 | 208224 | L 3123 | 23 |
| 208182 | L 3120 | 20 | 208225 | L 3123 | 23 |
| 208183 | L 3122 | 22 | 208226 | L 3123 | 23 |
| 208184 | L 3130 | 30 | 208227 | L 3123 | 23 |
| 208185 | L 3130 | 30 | 208228 | L 3123 | 23 |
| 208186 | L 3130 | 30 | 208229 | L 3123 | 23 |
| 208187 | L 3130 | 30 | 208230 | L 3123 | 23 |
| 208188 | L 3130 | 30 | 208231 | L 3123 | 23 |
| 208189 | L 3130 | 30 | 208232 | L 3123 | 23 |
| 208190 | L 3130 | 30 | 208233 | L 3123 | 23 |
| 208191 | L 3130 | 30 | 208234 | L 3123 | 23 |
| 208192 | L 3130 | 30 | 208235 | L 3123 | 23 |
| 208193 | L 3130 | 30 | 208236 | L 3123 | 23 |
| 208194 | L 3130 | 30 | 208237 | L 3123 | 23 |
| 208195 | L 3130 | 30 | 208238 | L 3123 | 23 |
| 208196 | L 3130 | 30 | 208239 | L 3123 | 23 |
| 208197 | L 3130 | 30 | 208240 | L 3123 | 23 |
| 208198 | L 3130 | 30 | 208241 | L 3123 | 23 |
| 208199 | L 3130 | 30 | 208242 | L 3123 | 23 |
| 208200 | L 3130 | 30 | 208243 | L 3123 | 23 |
| 208201 | L 3130 | 30 | 208244 | L 3123 | 23 |
| 208202 | L 3130 | 30 | 208245 | L 3123 | 23 |
| 208203 | L 3130 | 30 | 208246 | L 3123 | 23 |
| 208204 | L 3130 | 30 | 208247 | L 3123 | 23 |
| 208205 | L 3130 | 30 | 208248 | L 3123 | 23 |
| 208206 | L 3130 | 30 | 208249 | L 3123 | 23 |
| 208207 | L 3130 | 30 | 208250 | L 3123 | 23 |
| 208208 | L 3130 | 30 | 208251 | L 3123 | 23 |
| 208209 | L 3130 | 30 | 208252 | L 3123 | 23 |
| 208210 | L 3130 | 30 | 208253 | L 3123 | 23 |
| 208211 | L 3130 | 30 | 208254 | L 3123 | 23 |
| 208212 | L 3130 | 30 | 208255 | L 3123 | 23 |
| 208213 | L 3130 | 30 | 208256 | L 3123 | 23 |
| 208214 | L 3130 | 30 | 208257 | L 3123 | 23 |
| 208215 | L 3130 | 30 | 208258 | L 3123 | 23 |
| 208216 | L 3130 | 30 | 208259 | L 3123 | 23 |
| 208217 | L 3130 | 30 | 208260 | L 3123 | 23 |
| 208218 | L 3130 | 30 | 208261 | L 3123 | 23 |
| 208219 | L 3130 | 30 | 208262 | L 3123 | 23 |
| 208220 | L 3130 | 30 | 208263 | L 3123 | 23 |
| 208221 | L 3130 | 30 | 208264 | L 3123 | 23 |
| 208222 | L 3130 | 30 | 208265 | L 3123 | 23 |
| 208223 | L 3130 | 30 | 208266 | L 3123 | 23 |
| 208224 | L 3130 | 30 | 208267 | L 3123 | 23 |
| 208225 | L 3130 | 30 | 208268 | L 3123 | 23 |
| 208226 | L 3130 | 30 | 208269 | L 3123 | 23 |
| 208227 | L 3130 | 30 | 208270 | L 3123 | 23 |
| 208228 | L 3130 | 30 | 208271 | L 3123 | 23 |
| 208229 | L 3130 | 30 | 208272 | L 3123 | 23 |
| 208230 | L 3130 | 30 | 208273 | L 3123 | 23 |
| 208231 | L 3130 | 30 | 208274 | L 3123 | 23 |
| 208232 | L 3130 | 30 | 208275 | L 3123 | 23 |
| 208233 | L 3130 | 30 | 208276 | L 3123 | 23 |
| 208234 | L 3130 | 30 | 208277 | L 3123 | 23 |
| 208235 | L 3130 | 30 | 208278 | L 3123 | 23 |
| 208236 | L 3130 | 30 | 208279 | L 3123 | 23 |
| 208237 | L 3130 | 30 | 208280 | L 3123 | 23 |
| 208238 | L 3130 | 30 | 208281 | L 3123 | 23 |
| 208239 | L 3130 | 30 | 208282 | L 3123 | 23 |
| 208240 | L 3130 | 30 | 208283 | L 3123 | 23 |
| 208241 | L 3130 | 30 | 208284 | L 3123 | 23 |
| 208242 | L 3130 | 30 | 208285 | L 3123 | 23 |
| 208243 | L 3130 | 30 | 208286 | L 3123 | 23 |
| 208244 | L 3130 | 30 | 208287 | L 3123 | 23 |
| 208245 | L 3130 | 30 | 208288 | L 3123 | 23 |
| 208246 | L 3130 | 30 | 208289 | L 3123 | 23 |
| 208247 | L 3130 | 30 | 208290 | L 3123 | 23 |
| 208248 | L 3130 | 30 | 208291 | L 3123 | 23 |
| 208249 | L 3130 | 30 | 208292 | L 3123 | 23 |
| 208250 | L 3130 | 30 | 208293 | L 3123 | 23 |
| 208251 | L 3130 | 30 | 208294 | L 3123 | 23 |
| 208252 | L 3130 | 30 | 208295 | L 3123 | 23 |
| 208253 | L 3130 | 30 | 208296 | L 3123 | 23 |
| 208254 | L 3130 | 30 | 208297 | L 3123 | 23 |
| 208255 | L 3130 | 30 | 208298 | L 3123 | 23 |
| 208256 | L 3130 | 30 | 208299 | L 3123 | 23 |
| 208257 | L 3130 | 30 | 208300 | L 3123 | 23 |
| 208258 | L 3130 | 30 | 208301 | L 3123 | 23 |
| 208259 | L 3130 | 30 | 208302 | L 3123 | 23 |
| 208260 | L 3130 | 30 | 208303 | L 3123 | 23 |
| 208261 | L 3130 | 30 | 208304 | L 3123 | 23 |
| 208262 | L 3130 | 30 | 208305 | L 3123 | 23 |
| 208263 | L 3130 | 30 | 208306 | L 3123 | 23 |
| 208264 | L 3130 | 30 | 208307 | L 3123 | 23 |
| 208265 | L 3130 | 30 | 208308 | L 3123 | 23 |
| 208266 | L 3130 | 30 | 208309 | L 3123 | 23 |
| 208267 | L 3130 | 30 | 208310 | L 3123 | 23 |
| 208268 | L 3130 | 30 | 208311 | L 3123 | 23 |
| 208269 | L 3130 | 30 | 208312 | L 3123 | 23 |
| 208270 | L 3130 | 30 | 208313 | L 3123 | 23 |
| 208271 | L 3130 | 30 | 208314 | L 3123 | 23 |
| 208272 | L 3130 | 30 | 208315 | L 3123 | 23 |
| 208273 | L 3130 | 30 | 208316 | L 3123 | 23 |
| 208274 | L 3130 | 30 | 208317 | L 3123 | 23 |
| 208275 | L 3130 | 30 | 208318 | L 3123 | 23 |
| 208276 | L 3130 | 30 | 208319 | L 3123 | 23 |
| 208277 | L 3130 | 30 | 208320 | L 3123 | 23 |
| 208278 | L 3130 | 30 | 208321 | L 3123 | 23 |
| 208279 | L 3130 | 30 | 208322 | L 3123 | 23 |
| 208280 | L 3130 | 30 | 208323 | L 3123 | 23 |
| 208281 | L 3130 | 30 | 208324 | L 3123 | 23 |
| 208282 | L 3130 | 30 | 208325 | L 3123 | 23 |
| 208283 | L 3130 | 30 | 208326 | L 3123 | 23 |
| 208284 | L 3130 | 30 | 208327 | L 3123 | 23 |
| 208285 | L 3130 | 30 | 208328 | L 3123 | 23 |
| 208286 | L 3130 | 30 | 208329 | L 3123 | 23 |
| 208287 | L 3130 | 30 | 208330 | L 3123 | 23 |
| 208288 | L 3130 | 30 | 208331 | L 3123 | 23 |
| 208289 | L 3130 | 30 | 208332 | L 3123 | 23 |
| 208290 | L 3130 | 30 | 208333 | L 3123 | 23 |
| 208291 | L 3130 | 30 | 208334 | L 3123 | 23 |
| 208292 | L 3130 | 30 | 208335 | L 3123 | 23 |
| 208293 | L 3130 | 30 | 208336 | L 3123 | 23 |
| 208294 | L 3130 | 30 | 208337 | L 3123 | 23 |
| 208295 | L 3130 | 30 | 208338 | L 3123 | 23 |
| 208296 | L 3130 | 30 | 208339 | L 3123 | 23 |
| 208297 | L 3130 | 30 | 208340 | L 3123 | 23 |
| 208298 | L 3130 | 30 | 208341 | L 3123 | 23 |
| 208299 | L 3130 | 30 | 208342 | L 3123 | 23 |
| 208300 | L 3130 | 30 | 208343 | L 3123 | 23 |
| 208301 | L 3130 | 30 | 208344 | L 3123 | 23 |
| 208302 | L 3130 | 30 | 208345 | L 3123 | 23 |
| 208303 | L 3130 | 30 | 208346 | L 3123 | 23 |
| 208304 | L 3130 | 30 | 208347 | L 3123 | 23 |
| 208305 | L 3130 | 30 | 208348 | L 3123 | 23 |
| 208306 | L 3130 | 30 | 208349 | L 3123 | 23 |
| 208307 | L 3130 | 30 | 208350 | L 3123 | 23 |
| 208308 | L 3130 | 30 | 208351 | L 3123 | 23 |
| 208309 | L 3130 | 30 | 208352 | L 3123 | 23 |
| 208310 | L 3130 | 30 | 208353 | L 3123 | 23 |
| 208311 | L 3130 | 30 | 208354 | L 3123 | 23 |
| 208312 | L 3130 | 30 | 208355 | L 3123 | 23 |
| 208313 | L 3130 | 30 | 208356 | L 3123 | 23 |
| 208314 | L 3130 | 30 | 208357 | L 3123 | 23 |
| 208315 | L 3130 | 30 | 208358 | L 3123 | 23 |
| 208316 | L 3130 | 30 | 208359 | L 3123 | 23 |
| 208317 | L 3130 | 30 | 208360 | L 3123 | 23 |

Catavonia

EDUCATION...
H. O. BOND...
HOUSTON, TEXAS 77001

THE CRIBBELL INDUSTRIAL PIPING, INC.
1115 SHELBYVILLE, MO 64704

ASME QUALITY SYSTEM CERTIFICATE (NATIONALS)
NO. N-1261 EXPIRES 10-27-76.

Date 22 July 1976

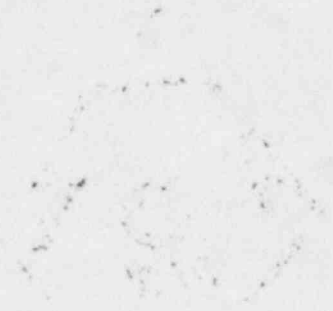
| | | |
|---|---|--|
| Customer Order No.
KER-2053-P | C.I.W. Sales Order No.
F-5693 | ASME-SA106 Gr. C and ASME Section III, Class 2
Thru Summer 1974 Addenda |
| Description of Material
O.D. _____ * I.D. 31.438" * WALL 1.375" M.M. | | |
| C.I.W. Part No. 86-5693-345-314 | | |

| Heat No. | Location or Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|-----|------|------|-----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |
| L 3117 | | .24 | .89 | .012 | .021 | .23 | | | |
| L 3120 | | .25 | .86 | .010 | .014 | .23 | | | |
| L 3130 | | .24 | .95 | .011 | .015 | .23 | | | |

| Quantity or Serial No. | Heat No. | Test Loc. | Yield Point | | MECHANICAL PROPERTIES | | | | | | |
|------------------------|----------|-----------|-------------|--------------------|-----------------------|-------------|-------------|----------|-----------------|-----------|------|
| | | | Tensile PSI | % Offset Yield PSI | % Elong. In. | % Red. Area | Macro Etch. | End Test | Flattening Test | Condition | Temp |
| 4 | L 3117 | Trans. | 79,900 | 44,700 | 25.0 | 45.8 | | | OK | .505 | 17 |
| 2 | L 3120 | Trans. | 85,600 | 48,700 | 23.8 | 44.0 | | | OK | .505 | 20 |
| 4 | L 3130 | Trans. | 77,900 | 40,200 | 27.9 | 50.8 | | | OK | .505 | 30 |

| Form Ser.# | Heat | Test Lot# |
|------------|--------|-----------|
| 20616Z | L 3120 | 20 |
| 20616Z | L 3120 | 20 |
| 20619W | L 3130 | 30 |
| 20619Y | L 3130 | 30 |
| 20620X | L 3130 | 30 |
| 20620Z | L 3130 | 30 |
| 20621T | L 3117 | 17 |
| 20621U | L 3117 | 17 |
| 20621Y | L 3117 | 17 |
| 20624Z | L 3117 | 17 |

CATAWOGA
P# 8



Hydrostatic Test: Each length of pipe hydrostatically tested at 1000 psi for 5 sec. and found satisfactory.

Submitted and signed to release on this
Date July 1976

[Signature]
Metallurgical Engineer

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

[Signature]
Metallurgical Engineer

MILL TEST CERTIFICATE

SOLD TO ITT Grinnell Corporation
Kernersville, N.C.
 SHIP TO Same for Gen. Power

ITT GRINNELL CORPORATION
 WELDING PRODUCTS DIVISION
 PRINCETON, KY.

DATE November 15, 1976

OUR ORDER NO. 60035
 BRANCH ORDER NO. List 2833
 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-234 WPC | | | | | | | | | | | | | | A-1060 |
| 31.625 x 1.375 Min. wall | F | 44900 | 82400 | 25.0 | .25 | .98 | .013 | .011 | .22 | | CT-01-17-1 | ARAP | | |
| LR 90° Ell | | | | | | | | | | | CW-01-17-1 | | | |
| -Ditto- | F | 40900 | 79900 | 27.7 | .26 | 1.02 | .010 | .011 | .25 | " | " | ARAR | | |
| -Ditto- | F | 45900 | 85100 | 27.9 | .25 | 1.01 | .009 | .021 | .23 | " | " | ARBT | | |
| <div style="border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block; margin-bottom: 10px;"> <i>C. Linde</i>
 <i>207-16</i> </div> *Standard round test specimen used for tensile properties.
The above fittings were manufactured and tested in strict compliance with ASME Section III, 1974 Edition, Class 2 through the 1974 Summer Addenda.
All fittings represented by this Metallurgical Report will meet the following: <i>Princel 1, Class 2, Rev. 1974.</i>
We certify that the fittings listed herein comply with the requirements of ASME Section III, 1974 Edition, Class 2 through the 1974 Summer Addenda. This certificate is issued by the American Society of Mechanical Engineers, Inc. in accordance with the American Society of Mechanical Engineers Code of Quality Systems Guidelines. | | | | | | | | | | | | | | |

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 1600°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____

The Colonial Machine Company, Inc.

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

Phone (614) 532-7011

May 31, 1977

15th Grinnell Industrial Piping Inc.
P. O. Box 566
Kernersville, NC 27284

CERTIFIED MILL TEST REPORT

Handwritten: CT
SWF-4

| | | |
|----------------|---------------|--------------|
| YOUR ORDER NO. | OUR ORDER NO. | DATE SHIPPED |
| KER 6156-P | 10038 | 6/1/77 |

| ITEM | TYPE | MATERIAL SPEC. | QUANTITY | SHIPPED | HEAT NO. | CMC |
|------|------|--|----------|---------|----------|-----|
| | | ASME SA105 NORMALIZED | | | | |
| 1 | | 3/4" S/W Spec. Weld Bosses per SK CT-WB-1
Pt. No. Y*A*SE* CT-3002-1 (Rev. 0 10/14/76) | 40 | | N94153 | AM |
| 2 | 1" | Ditto Pt. No. Y*A*SE* CT-3002-2 | 20 | | E87257 | AM |
| 3 | 2" | Ditto Pt. No. Y*A*SE* CT-3002-3 | 12 | | A00070 | AM |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CE | TI | CO | OTHER ELEMENTS |
|------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| 1 | .32 | .80 | .005 | .021 | .22 | | | | | | | | |
| 2 | .26 | .78 | .011 | .027 | .24 | | | | | | | | |
| 3 | .32 | .74 | .017 | .026 | .19 | | | | | | | | |

| ITEM | TENSILE | 2X YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1. 2. 3. 4. 5. 6. ETC. |
|------|---------|----------|----------|--------|----------|--------------------|---------------------------------|
| 1 | 76700 | 36800 | 34.0 | 58.2 | | | Mill Source - U.S. Steel |
| 2 | 75000 | 47000 | 32.0 | 61.3 | | | Mill Source - " " |
| 3 | 75360 | 42770 | 31.0 | 52.4 | | | Mill Source " " |

INSPECTION WAIVED PER MR. TOM WILSON ON 5/31/77.

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.

dg

By *Rosemary R. Woychik*

The Colonial Machine Company, Inc.

P. O. Box 290 Pleasantville, Pa. 16311

Phone (814) 589-7011

SEPT. 20, 1977

ITT GREENELL INDUSTRIAL PIPING, INC.
P. O. BOX 566
KERNERSVILLE, NC 27284

CERTIFIED MILL TEST REPORT

CT
AP-4

| | | |
|----------------|---------------|--------------|
| YOUR ORDER NO. | OUR ORDER NO. | DATE SHIPPED |
| KER 8630-B | 10457 | 9/20/77 |

| ITEM | TYPE | MATERIAL SPEC. | SHIPPED | HEAT NO. | QTY |
|-----------|------|--|---------|----------|-----|
| | | ASME SECTION III CLASS 2 (1974 ADDENDA THRU WINTER 1974)
ASME SA105 | | | |
| 1 (89590) | | 1.13" ACCESS HOLE PLUGS PER CT-AH-1, H = 2.109"
PART NO. CT-4012-1 | 12 | 78849 | AB |
| 2 (89591) | | 1.13" DITTO H = 1.705" PART CT-4012-2 | 25 | 78849 | AB |
| 3 (89592) | | 1.13" DITTO H = 2.609" PART CT-4012-3 | 16 | 78849 | AB |
| 4 (89593) | | 1.13" ACCESS HOLE PLUGS PER CT-AH-2, H = 1.705",
PART CT-4012-4 (SQUARE HEAD) | 30 | 78849 | AB |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CB | TI | CO | OTHER ELEMENTS |
|-------------|-----|-----|------|-----|-----|----|----|----|----|----|----|----|----------------|
| 1
THRU 4 | .26 | .71 | .013 | .02 | .23 | | | | | | | | |

DATE 9-29-77

| ITEM | TENSILE | 2% YIELD | % ELONG | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1. 2. 3. 4. 5. 6. ETC |
|-------------|---------|----------|---------|--------|----------|--------------------|--------------------------------|
| 1
THRU 4 | 75000 | 48500 | 32.0 | 58.6 | | | MILL SOURCE - COPPERWELD |

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.

By *[Signature]*



Bonney Forge Division

Energy Products Group

GULF+WESTERN MANUFACTURING COMPANY

ALLENTOWN, PENNSYLVANIA 18105

TELEPHONE
TWO
TELETYPE

CUSTOMER: ITT GRINNELL CORP.

Date May 2, 1978

CUSTOMER'S Order No.: KER 9442-B

Bonney Order No. 61651

SHIPPED TO: ITT GRINNELL CORP.
PO BOX 566
HIGHWAY 421
KERNERSVILLE NC 27284

CT
Swf-17

Mark

KER 9442-B

CT-2168-1

| Item No. | Quantity No. | Bonney Lot No. | Grade or Specification No.
Chemical Analysis, Physical Properties, Remarks: |
|----------|--------------|----------------|---|
| 4 | 4 | P232 | SA105N

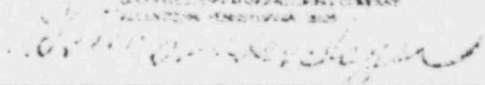
.34 (1.375MW) x 6 (.432) Sweepolet
C.27 Mn.95 P.012 S.014 Si.26
T/S 85,700 Y/S 54,700 El 32 Ra 59 |

ITTG - IPI
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE MAY 9 1978
 SHEET 1 OF 1

This is to certify that:

- The fittings supplied are in complete accordance with the ASME Boiler and Pressure Vessel Code, Section III, Class 2, 1974 Edition including Winter 1974 Addenda; SA105N And the Purchase Order.
- 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.

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 certified by additional laboratory checks.

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

 by _____
 QUALITY ASSURANCE MANAGER

UNION CARBIDE CORPORATION
LINDE DIVISION
WELDING MATERIALS
P.O. BOX 719, ASHLAND, OHIO 44804

1/16/78

CUSTOMER: ITT GRINNELL
OLD HIGHWAY 421
KERRERSVILLE NC 27284

YOUR ORDER NO.: 11-137-MER 9113

LINDE S.O. NO.: _____

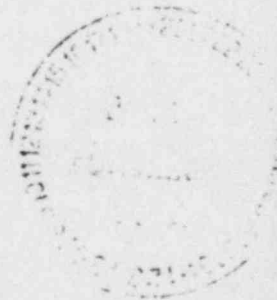
WW-206

MATERIAL: Linde 65

This is to certify that this material will conform to AWS A5.18-69
ASME SPA5.18. It has the following chemical analysis meeting the
requirements of classification E70S-2:

HEAT NUMBER - 065214

| | | |
|-------------|---|------|
| Carbon | - | .04 |
| Manganese | - | 1.17 |
| Phosphorous | - | .008 |
| Sulphur | - | .015 |
| Silicon | - | .54 |
| Aluminum | - | .12 |
| Titanium | - | .07 |
| Zirconium | - | .041 |



Ladle Analysis:

Howard Taylor - R/C

Quality Assurance - Welding Materials Plant
Union Carbide Corporation - Linde Division

ITTG - 171
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB 21 1978
SHEET 1 OF 4

SUBJECT: Welding Filler Materials

WIRE: Linde 65, Heat No. 065214

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 5-2, that the test results shown in Tausig Associates, Inc. Report 23499 were produced from these test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This may also be used on impact-tested material with a minimum service temperature of +30 degrees F.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 Edition.

WIN-206

John F. Elder 2/21/78
J. F. Elder

ITIG - IPI
QUALITY CONTROL
APPROVED: *
T. C. WILSON
DATE FEB 21 1978
SHEET 2 OF 4

MATERIAL TEST REPORT #23400

R & D TEST #135

Linde 65, Heat No. 005214

WW-2061

The following tests were performed in accordance with SFA 5.11, E705-2:

1. All-Weld Metal Tension Test:

As-Welded:

Tensile Strength: 79,200 psi
 Yield Point: 74,700
 Elongation (%) in 2": 28

Heat-Treated*

Tensile Strength: 76,000
 Yield Point: 66,400
 Elongation (%) in 2": 30

2. Charpy V-Notch Impact Tests:

As-Welded:

| <u>Temp.</u> | <u>Ft.lbs.</u> | <u>Lat. Exp. (mils)</u> | <u>%Shear</u> |
|--------------|----------------|-------------------------|---------------|
| -20 | 143 | 91 | 90 |
| -20 | 123 | 79 | 80 |
| -20 | 100 | 69 | 70 |
| -20 | 111 | 75 | 80 |
| -20 | 111 | 80 | 80 |

Heat-Treated*

| <u>Temp.</u> | <u>Ft.lbs.</u> | <u>Lat. Exp. (mils)</u> | <u>%Shear</u> |
|--------------|----------------|-------------------------|---------------|
| +30 | 80 | 63 | 60 |
| +30 | 97 | 73 | 70 |
| +30 | 107 | 73 | 70 |

3. Chemical Analysis: (additional elements required by ASME Section III, Cl. 1 for information only)

Ni: < 0.05 V : < 0.01
 Cr: < 0.05 Cu : 0.12
 Mo: < 0.03

4. Radiography Test: Acceptable

ITTG - IPI
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE: 11/21/77
 SHEET 3 OF 4

*Heat-treated for 16 hours at 1150 degrees F, cooling to 600 degrees F shall be 300 degrees F/hr. (+ 100 degrees F/hr.)

This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by ITG (Intell Inc) and our subcontractor are in compliance with the requirements of SA 5.18 and the applicable material requirements of MB-2400 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by IT Crinnell IPI. This report, in conjunction with the Linde Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.

WWW-2061

J. F. Elder
J. F. Elder Date

ITG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB. 21 1976
SHEET 4 OF 4



UNION CARBIDE CORPORATION
 LINDE DIVISION
 WELDING MATERIALS
 P.O. BOX 710, WENTZVILLE, OHIO 44004

Feb. 10, 1978

CUSTOMER: ITT Grinnell
 7 Greensboro Reg. Airport
 Greensboro, N.C. - 27400

YOUR ORDER NO. 11-258 KER 5419

LINDE S.O. NO. 711258A1

1/8" Dia.
 S/L Rod

WW-207

MATERIAL: Linde 65

This is to certify that this material will conform to AMS A5.18-69
 ASME SA5.18. It has the following chemical analysis meeting the
 requirements of Classification E705-2:

| | | |
|--------------------|---|---------------|
| <u>HEAT NUMBER</u> | - | <u>065220</u> |
| Carbon | - | .05 |
| Manganese | - | 1.11 |
| Phosphorous | - | .009 |
| Sulphur | - | .022 |
| Silicon | - | .50 |
| Aluminum | - | .071 |
| Titanium | - | .06 |
| Zirconium | - | .053 |

ITTG - IP1
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE MAY 22 1978
 SHEET 1 OF 8

Ladle Analysis

HJT/klr

Howard Tucker
 Quality Assurance - Welding Materials
 Plant - Union Carbide Corporation
 Linde Division

IPI Grinnell

Industrial Piping Inc.

SUBJECT: Welding Filler Materials
WIRE: Linde 65, Heat No. 065220

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 5-2, that the test results shown in Taussig Associates, Inc. Report 24131 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat-treated condition (total time not to exceed 20 hours). This may also be used on impact-tested material with a minimum service temperature of +30 degrees F.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 Edition.

WW-207

J. F. Elder 3/29/73
J. F. Elder Date
Materials Engineer

ITG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 22 1973
SHEET 2 OF 8

MATERIAL TEST REPORT #24131

R & D TEST #460

Linde G5, Heat No. 065220

WW-209

The following tests were performed in accordance with SFA 5.18, E70S-2:

1. All-Weld Metal Tension Test:

As-Welded:

Heat Treated*

Tensile Strength: 81,850 psi
Yield Point: 68,700
Elongation(%) in 2": 30

Tensile Strength: 78,750 psi
Yield Point: 70,825
Elongation(%) in 2": 31

2. Charpy V-Notch Impact Tests:

As-Welded:

| <u>Temp.</u> | <u>Ft.lbs.</u> | <u>Lat. Exp. (mils)</u> | <u>%Shear</u> |
|--------------|----------------|-------------------------|---------------|
| -20°F | 49 | 39 | 40 |
| -20 | 17 | 19 | 20 |
| -20 | 44 | 35 | 40 |
| -20 | 63 | 46 | 50 |
| -20 | 76 | 56 | 60 |

Heat-Treated*

| <u>Temp.</u> | <u>Ft.lbs.</u> | <u>Lat. Exp.(mils)</u> | <u>%Shear</u> |
|--------------|----------------|------------------------|---------------|
| +30°F | 103 | 66 | 70 |
| +30 | 70 | 59 | 60 |
| +30 | 70 | 51 | 50 |

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 22 1970
SHEET 3 OF 8

3. Chemical Analysis: (Additional elements required by ASME Section III, Cl. 1 for information only)

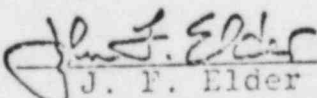
Ni : < 0.05 V : < 0.01
Cr : < 0.05 Cu : 0.10
Mo : < 0.03

4. Radiography: Acceptable

W99-207

*Heat-treated for 16 hours at 1150 degrees F, cooling to 600 degrees F shall be 300 degrees F/hr. (\pm 100 degrees F/hr.).

This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by ITT Grinnell IPI and our subcontractor are in compliance with the requirements of SFA 5.18 and the applicable material requirements of NB-2100 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by ITT Grinnell IPI. This report, in conjunction with the Linde Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.


J. F. Elder 3/29/78
Materials Engineer Date

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 24 1978
SHEET 4 OF 8

ITG
Grinnell Industrial Piping, Inc.

6955N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



Report No. 24131 - March 28, 1978

ITT Grinnell Industrial Piping, Inc.
P.O. Box 566 - Hwy 421
Kornersville, North Carolina 27284

Attn: Mr. J. P. Elder

WW-207

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 20 1978
SHEET 5 OF 8

S U B J E C T

Mechanical and Chemical Testing of the Weld
Metal of Two (2) Plates Marked Test No. 460.
Per Requisition No. 34622.

BACKGROUND:

Two (2) welded plate assemblies were submitted to our laboratory for chemical analysis, charpy impact and tension testing of the weld metal. The assemblies had been identified as plate no. 460, 1/8" Linde 65, Heat no. 065220. One plate was to be tested as-welded and the other tested after a stress relieving heat treatment.

TEST RESULTS:

WMS-207

Chemical Analysis:

The weld metal of plate no. 460 was drilled in a manner which prevented removal of material from the base metal. These drillings were cleaned and subjected to a quantitative chemical analysis with the following results:

| | |
|------------|-------|
| Nickel | <.05% |
| Chromium | <.05 |
| Molybdenum | <.03 |
| Vanadium | <.01 |
| Copper | .10 |

ITG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE 12-2-54
SHEET 6 OF 8

Heat Treatment:

The plate no. 460 was cut to permit it to fit into heat treating furnace. The pieces were heated to 1150°F and held for 16 hours at temperature. Cooling was done at a rate of less than 300°F/Hr. to below 600°F.

Tension Testing:

Two, round, all weld metal tension test specimens were machined from plate no. 460, as-welded and heat treated. Both specimens were subjected to standard tension testing giving the results as follows:

| | <u>Heat Treated</u>
<u>No. 460</u> | <u>As-Received</u>
<u>No. 460</u> |
|---------------------------------|---------------------------------------|--------------------------------------|
| Tensile Strength, psi. | 78,750 | 81,850 |
| Yield Strength, psi.(.2%Offset) | 70,825 | 68,700 |
| % Elongation in 2 inches | 31 | 30 |
| % Reduction of Area | 68 | 70 |

Impact Testing:

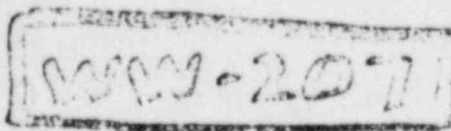
A total of eight, full size (10mm x 10mm), Charpy V-notch impact test specimens were machined from the two submitted plate assemblies. Five of the specimens were from the as-welded plate and three were from the heat treated plate. All were notch in the weld metal and removed and oriented per NB 2322 of the ASME Boiler & Pressure Vessel Code.

No. 460 - As-Received:

| <u>Test Temperature</u> | <u>Absorbed Energy (ft-lbs)</u> | <u>Mils Lateral Expansion</u> | <u>Percent Shear</u> |
|-------------------------|---------------------------------|-------------------------------|----------------------|
| - 20°F | 49 | 39 | 40 |
| - 20°F | 17 | 19 | 20 |
| - 20°F | 44 | 35 | 40 |
| - 20°F | 63 | 46 | 50 |
| - 20°F | 76 | 56 | 60 |

No. 460 - Heat Treated:

| | | | |
|--------|-----|----|----|
| + 30°F | 103 | 66 | 70 |
| + 30°F | 70 | 59 | 60 |
| + 30°F | 70 | 51 | 50 |

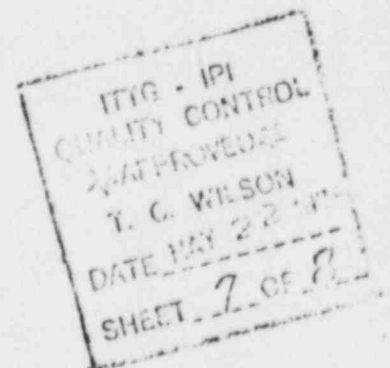


Respectfully submitted,

Mark A. Hineman

Mark A. Hineman
Staff Engineer
TAUSSIG ASSOCIATES, INC.

MAH:i



Taussig Associates Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



PRODUCT TESTING FAILURE INVESTIGATION MATERIAL EVALUATION QUALITY ASSURANCE

TO: ITT Grinnell Industrial Piping
P. O. Box 566 - Hwy 421
Kernersville, N. C. 27284

Report No.: 24131-1a
Date: 5-26-78
Your Order No.:

Attention: Mr. John Elder

SUBJECT: Charpy Impact Testing at the Weld Metal of Test Plate #460A; 1/8" Linde 65, Heat #065220 - As-Welded.

TEST RESULTS:

Impact Testing:

WW-207

Specimen Size: 10mm x 10mm
Notch Type: V
Test Temperature: + 30°F

| <u>Specimen Number</u> | <u>Absorbed Energy (ft-lbs)</u> | <u>Mils Lateral Expansion</u> | <u>Percent Shear</u> |
|------------------------|---------------------------------|-------------------------------|----------------------|
| G1 | 105 | 67 | 60 |
| G2 | 137 | 70 | 70 |
| G3 | 101 | 66 | 60 |

All specimens were removed and oriented in accordance with NB-2332.

ITT - IPI
QUALITY CONTROL
MAINTAINED
T. CARLSON
DATE MAY 30 1978
SHEET 2 OF 8

CMC
Corwyn M. Berger
General Manager

TAUSSIG ASSOCIATES, INC.
By *W. A. Hineman*
Mark A. Hineman
Staff Engineer

CERTIFIED MATERIALS TEST REPORT

WV 2011

Customer Order No. 4365 Re1.14-424

711093-2

Order No.

Shipped

National Welders Supply
P.O. Box N-93
3011 N. Liberty Street
Winston Salem, N.C. 27105

This material conforms to Specification
ITT Spec. ES 1073-1
SFA 5.1 Sec.111

E 7018

Type

Trade Name or Trademark: Atom Arc 7018
Diameter Size: 3/32"
Weight: 19,650 lbs.
Lot Number: 02-1-J728P
Heat Number: 411B6841

Test No. 650
X-Rays Satisfactory
Control No. MMM074

Moisture @1800°F. 0.29%
Concentricity 4%
Type Steel A-285

Carbon .04
Manganese 1.06
Chromium .03
Nickel .02
Silicon .48
Columbium + Tantalum
Molybdenum .01
Tungsten
Copper .02
Titanium
Phosphorus .012
Sulphur .016
Vanadium .03

| Test No. | Full | Split | Volts | Amps |
|--------------------|------|-------|-------|------|
| Tensiles & Impacts | 1 | 6 | 22 | 110 |

| Test Results: | As Welded | Stress Relieved |
|---------------|-----------|-----------------|
| Yield | 73,100 | 65,400 |
| Tensile | 80,000 | 75,900 |
| Elongation | 28.0% | 30.0% |
| Red. of Area | 76.0% | 77.9% |

Charpy V-Notch Impacts Tested @ -20°F.

| | | |
|-----------|----------------|----------------|
| Impacts | 42-58-63-72-82 | 68-72-80-92-98 |
| Lat. Exp. | 38-48-52-59-68 | 58-61-67-78-83 |
| %Shear | 20-20-20-20-30 | 20-30-30-30-30 |

Fillets: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIAL)
NUMBER N-1224 EXPIRES ON SEPTEMBER 5, 1978

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

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 21st day of November 1977

SEAL *[Signature]*
Notary Public

My commission expires: 8/21/78

BY *[Signature]*
D. G. Flohr

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB. 22 1978
SHEET 1 OF 1

CERTIFIED MATERIALS TEST REPORT

WWS-202

Customer Order No. 4372

Order No. 150310-1

National Welders Supply Co.
Ref. 14-5406
3011 N. Liberty Street
Winston Salem, N.C. 27105

Shipped _____

This material conforms to Specification
ES 1073-3 (SFA 5.1 Sec. 1)

ITIG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAR 1 1978
SHEET 1 OF 1

Type E 7018

Test No. 1145
X-Rays Satisfactory
Control No. NNN009

Trade Name
or Trademark:

Atom Arc 7018

Diameter Size:

1/8"
50# sample returned

Lot Number:

02-1-L719R

Heat Number:

421B5451

Moisture @1800°F. 0.15%
Concentricity 4%
Type Steel A-285

Carbon .04
Manganese 1.01
Chromium .03
Nickel .03
Silicon .43
Columbium +
Tantalum
Molybdenum .01
Tungsten
Copper .02
Titanium
Phosphorus .010
Sulphur .015
Vanadium .02

Test No. Full Split Volts Amps

Tensiles & Impacts 1 5 22 135

Test Results: As Welded Stress Relieved
16 hrs. @1100-1200°F.

Yield 67,000 65,700
Tensile 77,400 76,900
Elongation 28.0% 31.0%
Red.of Area 67.3% 78.1%

Charpy V-Notch Impacts Tested @-20°F.
Impacts 96-105-107-107-121 88-92-94-109-110
Lat.Exp. 72-71-71-75-77 72-71-78-79-81
% Shear 40-50-50-50-50 20-30-20-40-40

Fillets: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 7th day of March 1978

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

SEAL

Arthur J. [Signature]
Notary Public

My commission expires: 8/21/78

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

BY *[Signature]*
T. C. Wilson

CERTIFIED MATERIALS TEST REPORT

W-203

Customer Order No. 4374 (14-4631)

Order No. 153016-1

National Welders Supply Co.

Shipped

P.O. Box N-93

3011 N. Liberty Street

Winston Salem, N.C. 27105

ITIG - IPI
QUALITY CONTROL
APPROVED
DATE 4-10-78
SHEET 1 OF 1

This material conforms to Specification
ES 1073-3 & ES 1084-4,
ASME SFA 5.1 Sec. III NAF

Type E 7018

Test No. 1149
X-Rays Satisfactory
Control No. NNN050

Trade Name
or Trademark:

Atom Arc 7018

Diameter Size:

5/32"
20,000 lbs.

Lot Number:

03-3-B821K

Heat Number:

482B5101

Moisture @ 1800°F. 0.11%
Concentricity 3%
Type Steel A-285

Carbon .03
Manganese .92
Chromium .03
Nickel .03
Silicon .28
Columbium +
Tantalum
Molybdenum .01
Tungsten
Copper .02
Titanium
Phosphorus .009
Sulphur .016
Vanadium .01

Test No. Full Split Volts Amps
Tensiles &
Impacts 1 7 24 170

Test Results: As Welded Stress Relieved
16 hrs. @ 1100-1200°F.
Yield 68,000 62,000
Tensile 77,500 72,700
Elongation 28.0% 32.0%
Red. of Area 71.2% 78.1%

Charpy V-Notch Impacts Tested @ -20°F.
Impacts 128-138-150-185-214 120-172-180-204-208
Lat. Exp. 85-86-84-82-91 81-80-86-91-85
& Shear 60-60-70-80-80 50-80-80-90-90

Filletts: OK Vertical Overhead
ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

State of Penna.)
County of York) SS

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

Subscribed and sworn to before me
this 6TH day of April 1978

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

SEAL [Signature]
Notary Public

My commission expires: 8/21/78

BY [Signature]
D. G. Flohr

ITT Crane & Hoisting Co. Inc.
Charlotte, N.C. 28204

DATE: 11/11/77

SOLD TO: **ITT Crane**
Old Highway 121
Kernersville, NC 27284

ORDER NO:

DATE SHIPPED: 11/22/77

P.O. NO.:

ORDER NO. 6099

SPECIFICATION:

| ITEM | POUNDS | SIZE | TYPE | LOT NO. | HEAT NO. |
|------|--------|------|----------|---------|----------|
| 1. | | 1/8 | 120 1200 | | 519366 |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |

CHEMICAL ANALYSIS OF WIRE (PERCENTAGE)

| ITEM | C | Mn | P | S | Si | Cr | N | Mo | Zn | Cu |
|------|-----|------|------|------|-----|------|------|-----|-----|------|
| 1. | .13 | 1.71 | .018 | .013 | .05 | .029 | .010 | .53 | .00 | .011 |
| 2. | | | | | | | | | | |
| 3. | | | | | | | | | | |
| 4. | | | | | | | | | | |
| 5. | | | | | | | | | | |
| 6. | | | | | | | | | | |

ADDITIONAL TEST RESULTS

ITTG - JFI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE JUN 13 1978
SHEET 1 OF 5

State of _____

City of _____

Subscribed and sworn to before me this _____ day

of _____ 19 _____

Notary Public _____

My commission expires _____

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

[Signature]
QUALITY ASSURANCE DEPARTMENT



SUBJECT: Welding Filler Materials
WIRE: RACo 128 HMM: Ht. No. 51934G
FLUX: Linde 80; Lot 0575, Con. 8290

This is to certify that the subject material was welded into test plates as shown in SPA 5.1 using WPS 3-1, that the test results shown in Taussig Associates, Inc. Report 22867-1 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This material shall not be used on impact-tested fabrication.

This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by ITT Grinnell IPI and our Subcontractor are in compliance with the requirements of SPA 5.23 for an F70-EA3-A3 type classification, and the applicable material requirements of NB-2400 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by ITT Grinnell IPI. This report, in conjunction with the RACo Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE JUN 1 3 1978
SHEET 2 OF 5

J. T. Elder 3/3/78
J. T. Elder 1978

Taussig Associates Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



Report No. 22867-1 - December 14, 1977

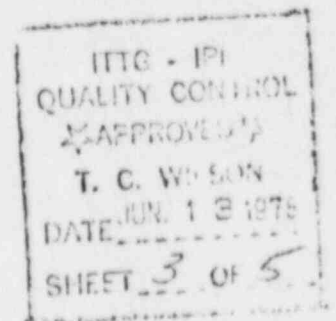
ITT Grinnell Industrial Piping
P. O. Box 566 - Hwy 421
Kernersville, NC 27284

Attn: Mr. J. F. Elder

WV-2091

S U B J E C T

Mechanical & Chemical Testing of the Weld
Metal of Test Plate #428.



Corrections:

3-22-78 - Heat #519346 on page 1.

BACKGROUND:

Two (2) welded plate assemblies were submitted to our laboratory for chemical analysis, charpy impact and tension testing of the weld metal. The assemblies had been identified as plate number 428, PACO 128HMM, Ht. #519346, Linde 40, Lot 0575, con. 4298. One plate was to be tested as-welded and the other tested after a stress relieving heat treatment.

TEST RESULTS:

Chemical Analysis:

The weld metal of plate number 428 was drilled in a manner which prevented removal of material from the base metal. These drillings were cleaned and subjected to a quantitative chemical analysis with the following results:

| | |
|------------|------|
| Carbon | .05 |
| Manganese | 1.23 |
| Phosphorus | .014 |
| Sulfur | .013 |
| Silicon | .40 |
| Nickel | <.05 |
| Chromium | <.05 |
| Molybdenum | .53 |
| Copper | .15 |
| Vanadium | <.01 |

W-208

Heat Treatment:

Plate number 428 was cut to permit it to fit into a heat treating furnace. The pieces were heated to 1100°F and held for 16 hours at temperature. Cooling was done at a rate of less than 200°F/hr. to below 800°F. The pieces were then marked 428H.

Tension Testing:

Two, round, all weld metal tension test specimens were machined from plate number 428, as-welded and heat treated. Both specimens were subjected to standard tension testing giving the results as follows:

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE JUN 1 9 1976
SHEET 4 OF 5

| | No. 428H
Heat Treated | No. 428
As-Welded |
|------------------------|--------------------------|----------------------|
| Tensile Strength, Psi. | 83,875 | 83,325 |
| Yield Strength, Psi. | 68,725 | 70,325 |
| % Elongation in 2" | 27 | 27 |
| % Reduction of Area | 61 | 61 |

Impact Testing:

Five (5), full size (10mm x 10mm), Charpy V-Notch impact test specimens were machined from the heat treated plate assembly. All were notched in the weld metal.

No. 428H - Heat Treated:

| <u>Test Temperature</u> | <u>Absorbed Energy (ft-lbs)</u> | <u>Mils Lateral Expansion</u> | <u>Percent Shear</u> |
|-------------------------|---------------------------------|-------------------------------|----------------------|
| 0°F | 45 | 39 | 40 |
| 0°F | 40 | 36 | 40 |
| 0°F | 42 | 35 | 40 |
| 0°F | 48 | 41 | 40 |
| 0°F | 50 | 41 | 50 |

Respectfully submitted,

Mark A. Hineman

Mark A. Hineman
Staff Engineer

TAUSSIG ASSOCIATES, INC.

WW-209

MAH:ln

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE JUL 1 8 1971
SHEET 5 OF 5

CERTIFIED MATERIALS TEST REPORT

Handwritten initials

Customer Order No. 4365 W-1 14-47

Order No. 711085-3

Shipped _____

NATIONAL WELDERS SUPPLY CO.
551 NORTH STREET
WINSTON-SALEM, N.C. 27107

This material conforms to Specification
ASME SFA5.1
ITT Spec. ES 1073-1

*Catawba
WW-40*

Trade Name or Trademark: Atom Arc 7018

Type E 7018

Diameter Size: 3/16"

Test No. 205
X-Ray Satisfactory
Control No. MN1004

Lot Number: 5,000 lb.
03-2-C707P
Heat Number: 431A0451

Moisture @1800°F. 0.16%
Concentricity 3%
Type Steel A-285

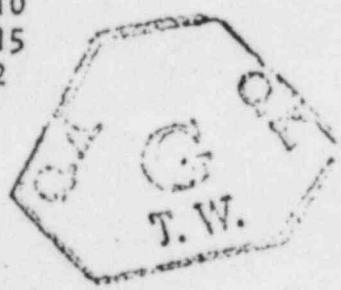
| | |
|----------------------|------|
| Carbon | .04 |
| Manganese | 1.10 |
| Chromium | .03 |
| Nickel | .03 |
| Silicon | .37 |
| Columbium + Tantalum | |
| Molybdenum | .01 |
| Tungsten | |
| Copper | .05 |
| Titanium | |
| Phosphorus | .010 |
| Sulphur | .015 |
| Vanadium | .02 |

| | | | | |
|--------------------|------|-------|-------|------|
| Test No. | Full | Split | Volts | Amps |
| Tensiles & Impacts | 2 | 5 | 25 | 220 |

| | | |
|---------------|-----------|----------------------|
| Test Results: | As Welded | Stress Relieved |
| | | 8 hrs. @1150-1200°F. |
| Yield | 73,100 | 65,500 |
| Tensile | 78,800 | 75,300 |
| Elongation | 27.0% | 30.0% |
| Red. of Area | 65.9% | 77.0% |

Charpy V-Notch Impacts Tested @-20°F.

| | | |
|-----------|---------------------|-----------------|
| Impacts | 109-112-120-122-130 | 132-137-147-200 |
| Lat. Exp. | 82-81-83-84-88 | 93-88-92-69-67 |
| % Shear | 30-30-30-30-30 | 60-60-70-70-70 |



Fillets: OK Horizontal

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.
The undersigned certifies that this report is correct and that no significant change has been made in any of the elements described in the qualification approval.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 16th day of August 1977

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

SEAL _____
Notary Public

My commission expires: 8-21-78

BY _____
R. W. Boyer

DUKE POWER COMPANY
 QUALITY ASSURANCE DEPARTMENT
 SUPPLIER QUALITY ASSURANCE CERTIFICATION

Name of Supplier ITT Grinnell Ind. Piping, Inc. Date 8-17-78
 Address of Supplier Plant Kernersville, NC Mill Power Order No. C-12517
 _____ Duke Item or Req. No. 1206.00-1.0
 _____ Spec. No. CNS-1206.00-1.0 Rev. 2

Supplier ID Nos. CT-01-16x
 Description of Component(s) or Material(s) Fabricated Piping Assembly
CT-SM-5B

Attached Documentation covers all Components/Materials on Mill Power Order.
 Attached Documentation covers partial shipment of Components/Materials on Mill Power Order.

The following listed tests, inspections and reports have been completed as required by the specification:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Physical & Chemical Analysis | <input type="checkbox"/> Major Repair Records & Charts |
| <input type="checkbox"/> Hydro (Test Pressure - PSIG _____) | <input checked="" type="checkbox"/> Personnel Qualifications on Record |
| <input type="checkbox"/> Design Report | <input type="checkbox"/> Stress Report |
| <input checked="" type="checkbox"/> Radiographic Test | <input type="checkbox"/> Ultrasonic Test |
| <input checked="" type="checkbox"/> Penetrant Test | <input type="checkbox"/> Repair NDE |
| <input type="checkbox"/> Operating Test | <input type="checkbox"/> Performance Curve |
| <input checked="" type="checkbox"/> Dimensional Check | <input type="checkbox"/> Deviation Record # _____ |
| | <input checked="" type="checkbox"/> Heat Treatment |
| | <input checked="" type="checkbox"/> Magnetic Particle |
| | <input checked="" type="checkbox"/> Cleanliness |
| | <input checked="" type="checkbox"/> ASME Data Report |

- 1) _____
- 2) _____
- 3) _____

This certifies that the listed Component(s) or Material(s) conform to the requirements of the above referenced Duke Power documents including all codes, standards, test requirements and Quality Assurance requirements invoked therein.

DUKE POWER COMPANY

QA RECORDS APPROVED

S. V. Caldwell
 QA REPRESENTATIVE

DATE 11-27-78

Thomas A. Smith
 Supplier Representative Authorized Signature

Title Mgr. of Proc Date 8-17-78

(See Instructions)

ITT Grinnell Industrial Piping Inc.

KERNERSVILLE, N. C.

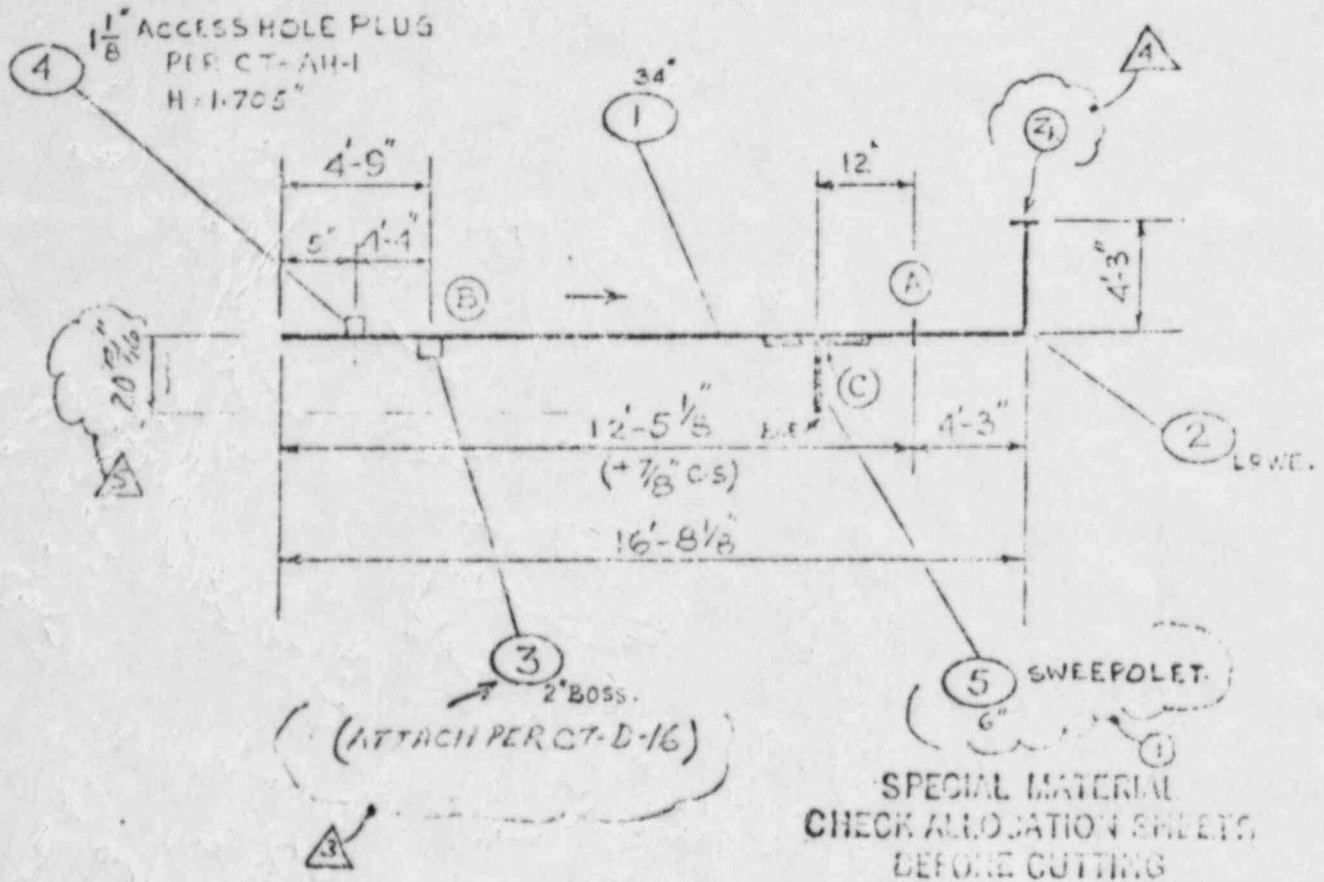
Sheet 2 of 4
FORM EN-101 REV. 1-70
G.A. FORM NO. 10

CONT. NO. 7127
NAME DUKE POWER COMPANY
LOCATION CATAWBA UNIT #1
CHICKLOTTE, N.C.
C-12517

→ RE DRAWN 12-28-77
REV ① 12-11-77
REV ② 12-14-77
REV ③ 12-24-77
REV ④ 12-29-77
REV ⑤ 1-2-78

CHK'D [Signature]
CHK'D [Signature]
CHK'D [Signature]
CHK'D [Signature]
CHK'D [Signature]
CHK'D [Signature]

LENGTH OF ACCESS HOLE PLUG SHALL
BE ± 1/16" OF ACTUAL WALL THICK.
SHOP SHALL GRIND TO FIT—IF REQUIRED.



QUALITY CONTROL

PAINT FLOW ARROWS

{ USE BAR# 15 LOT# 4121
{ HT.# L 3123 (13'-0 3/8")

MACHINE ENDS
PER SWITCH CT-D-2
EXCEPT AS NOTED

Nuclear Safety Related

CLASS DUKE B LINE SPEC PS 1500-5 (01) APP CODE 712-500-UL-12 NO. REQ'D 1

| | | | | | | |
|--------------------|---|------------------|---|------------|---|---------------------|
| Radiography (RT) | ✓ | Special Marking | | Preheat | ✓ | Cert. of Compliance |
| Mag. Particle (MT) | ✓ | Special Cleaning | ✓ | Heat Treat | | Mill Test Reports |
| Penetrant (PT) | | Paint | ✓ | Code Stamp | ✓ | Data Reports |

SYSTEM MAIN STEAM (DM) FAB. SPEC. 1 S H B
REF. DRWG NO. EN-1401-SM-C-2 (01) PRESS. 1185 PSI TEMP. 600 °F WT. 1947.2 LBS.
WELD MARK CT-SM-5B REGISTER CT-CL-16X

KERNERSVILLE, N. C.

Register No. CT-01-16X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 3 Of 4

Piece Mark CT-EM-5B

DUKE POWER COMPANY
CATAWBA UNIT #1
CHARLOTTE, N.C.
P.O. - C-12517

Revision No. AS M

Revision Date 5-2-77

Contract No. 7125

Location _____

| PART NUMBER | DESCRIPTION | QUAN OR LENG | QUALITY CONTROL | | | | ACCOUNTING/MATERIAL | | |
|-------------------|--|--------------|----------------------------|----------|------------|--------|---------------------|-----------------|-------------|
| | | | HEAT NUMBER | DOCUMENT | IN PROCESS | STATUS | U/M | UNIT PRICE P.O. | DIS. VENDOR |
| <u>CT-01-11-1</u> | <u>31.4" ID X 1/2" MW. SMLS CS, PIPE TO ASME SA-106 GR. C</u> | <u>1255'</u> | | | | | <u>F</u> | | |
| | <u>USE BAR #15, LOT #4121 HT #L3125 (13'-0 1/2")</u> | | | | | | | | |
| <u>CT-01-17-1</u> | <u>31.4" ID X 1/2" MW. 90° LWR TO SA-234 WPE-W MADE FROM SA-515 GR. 70 PLATE (70,000 PSI TENSILE), OR SA-234 VPC SEAMLESS, ENDS PFR DETAIL CT-D-2.</u> | <u>1</u> | | | | | <u>F</u> | | |
| <u>CT-3002-3</u> | <u>3000# CS. SP. WELD BOSS TO SA-105, PER DET. SK# CT-WB-1 (ATTACH PER CT-D-16)</u> | <u>1</u> | | | | | <u>E</u> | | |
| | | | <u>SEE ATTACHED SHEETS</u> | | | | | | |
| <u>CT-4012-2</u> | <u>1 1/2" ACCESS HOLE PLUG PER CT-AH-1, H=1.705" MAT TO SA-105</u> | <u>1</u> | | | | | <u>E</u> | | |

Code Ann. Sec. III, Cl. 2

Class DUKE 'B'

Nuclear Safety Related

Job Supplement JS 118

MFG. Code _____

KERNERSVILLE, N. C.

Register No. CT-01-16X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 2/ of 2/

Revision No. ASM Revision Date 5-23-77

Part No. CT-5M-5B

DUKE POWER COMPANY
STATION UNIT # 1
Charlotte, N.C.
P.O. - C-1251

Contract No. 7127

Location _____

| PART NUMBER | DESCRIPTION | QUAN OR LENG | QUALITY CONTROL | | | | ACCOUNTING MATERIAL | | | |
|----------------------------|--|--------------|-----------------|----------|------------|--------|---------------------|-----------------|-------------|-----|
| | | | HEAT NUMBER | DOCUMENT | IN PROCESS | STATUS | U/M | UNIT PRICE P.O. | DIS. VENDOR | NET |
| 3.4 | SP. END PROT. PERCT-LPH | 2 | | | | | E | | | |
| 3.4 | SPIDER BRACING PER CT-ES-1 | 2 | | | | | E | | | |
| 2 ALCA X 3.4" 6" CT-2103-1 | 3.4" (1.375" MW) X 6" (S-80) SWEEPolet TO SA-105, 3 1/2" BE. | 1 | | | | | E | | | |
| 6" | B.E. PROT. | 1 | | | | | E | | | |
| SEE ATTACHED SHEETS | | | | | | | | | | |
| 2" | END PROT. | 1 | | | | | E | | | |

Code Kern. Sec. III, CI 2

Class DUKE B

Nuclear Safety Related

Job Supplement JS 118

MFG. Code _____

Register No. C.T-01-16X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 1 Of 2

Revision No. ① SM Revision Date 11-11-77

Piece Mark CT-SM-5B

Job Name CATAWBA UNIT #1

Contract No. 7127

Location _____

DUKE POWER COMPANY
CATAWBA UNIT #1

| ITEM | PART NUMBER | DESCRIPTION | QTY OR LENG | QUALITY CONTROL | | | ACCOUNTING/MATERIAL | | |
|------|---------------------|---|-------------|------------------------|---------------------|--------|---------------------|-----------------|-------------------------|
| | | | | HEAT NUMBER | DOCUMENT IN PROCESS | STATUS | U/M | UNIT PRICE P.O. | DIS. VENDOR |
| 1 | PAD*
CT-01-11-1 | 3.4
31.438" I.D X 1.375" MW. SMLS
CS, PIPE TO ASME SA-106
GR.C
USE BAR#15, LOT#4121 HT#13123
(13-0%) | 12.58 | L3123
(SN-26622) | 101
150 | 101 | F | 5-18-75 | |
| 2 | LAA*
CT-01-17-1 | 3.4
31.438" I.D X 1.375" MW, 90° LRWE
TO SA-234WPB-W, MADE
FROM SA-515GR.70 PLATE,
(70,000 PSI TENSILE), OR
SA-234WPC SEAMLESS,
ENDS PER DETAIL CT-D-2. | 1 | ARBT
Buf-10
3/17 | Q.C.
101
150 | | E | | FY-B
E-2
11/22/78 |
| 2 | Y*AA
CT-3002-3 | 2
3000# CS, SP. WELD BOSS
TO SA-105, PER DET. SK 11
CT-WB-1 | 1 | AA1
Buf-4
3/17 | Q.C.
101
150 | | E | | 5-22-73 |
| 1 | XIXIX*
CT-4012-2 | 1.12
1 1/8" ACCESS HOLE PLUG
PER CT-AH-1, H=1.705"
MAT. TO SA-105 | 1 | ABF
RP 4
3/17 | Q.C.
101
150 | | E | Rec. 9/10 2/10 | 5-14 |

SUPERCEDED

Code Amc. Sec. III, Cl. 2

Class DUKE B

Nuclear Safety Related

Job Supplement JS118

MFG. Code _____

PROJECT DUKE POWER (cat) CONTRACT 7127 PC. MK# CT-SM-5B REG. # C.T. 01
 SYSTEM MAIN STEAM CLASS DUKE B 012 SPECIFICATION JS-118-F (SUPPLEMENT)

WELD DATA

| WELD | FIT-UP/PREHEAT | | | BACKING | ROOT | | INTERMEDIATE | | FINAL | | | RT DATE | | | MAG | LP |
|------------------|----------------|------------|--------------|----------------|---|------------|----------------|-------------------|----------------|------------------------|--------------------|-----------------------|---------|-------|--------|--------|
| | WELDER I.D. | WELD MAT'L | Q.C. INSP. | | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | Q.C. INSP. | Q.C. | AI | CUST. | | |
| A | PROC | 1-4-2-2 | | C321 | PROC | 1-4-2-2 | PROC | 1-1-1-7 | PROC | 1-2-2-7 | Q.C. INSP. | | | | | |
| | 5-190 | 065220 | Q.C. IPI 150 | | C321 | 065220 | C321 | 1ACG* | C321 | 0575 | 5-22-78 | 6/29/78 | 6/29/78 | | | |
| DATE | 5-22-78 | WW207 | 5-22-78 | 5-22-78 | WW207 | 5-22-78 | WW201 | 5-22-78 | WW209 | | | | | | | |
| B | PROC | 1-4-2-2 | | C321 | PROC | 1-4-2-2 | PROC | 1-1-1-7 | PROC | 1-1-1-7 | Q.C. INSP. | | | | | |
| | 5190 | 065220 | Q.C. IPI 150 | | C321 | 065220 | C321 | 1ACG* | C321 | 1ACH** | Q.C. IPI 150 | | | | | |
| DATE | 5-22-78 | WW207 | 5-22-78 | 5-22-78 | WW207 | 5-22-78 | WW201 | 5-22-78 | WW202 | 5-24-78 | | | | | | 6/5/78 |
| C | PROC | 1-4-2-2 | | C-296
C-121 | PROC | 1-4-2-2 | PROC | 1-1-1-7 | PROC | 1-1-1-7 | Q.C. INSP. | | | | | |
| | C329 | 065220 | Q.C. IPI 150 | | C-296
C-121 | 065220 | C-296
C-121 | 1-ACG*
1-ACH** | C-296
C-121 | 1-ACZ*
C383
C438 | Q.C. IPI 150 | | | | | |
| DATE | 5-24-78 | WW207 | 5-24-78 | 5-26-78 | WW207 | 5-26-78 | WW201
WW202 | 5-26-78 | WW203 | 5-29-78 | | | | | | |
| Code | PROC | 1-4-2-2 | | PROC | | PROC | | PROC | | | | | | | | |
| Plate | 5-190 | 065220 | Q.C. IPI 150 | | | | | | | | | | | | | |
| DATE | 5-22-78 | WW207 | 5-22-78 | | | | | | | | | | | | | 6/8/78 |
| Build up
Z.P. | PROC | 1-4-2-2 | | C439 | PROC | | PROC | | PROC | | | | | | | |
| | C439 | 065214 | Q.C. IPI 150 | | | | | | | | | | | | | |
| DATE | 5-22-78 | WW206 | 5-24-78 | | | | | | | | | | | | | 6/4/78 |
| STRESS DATE | N/A | | | | FINAL INSP. | 50 | | | | SPECIAL OPERATIONS: | Q.C. DOC. APPROVAL | | | | | |
| SQUARE UP | 6-8-78 | | | | * 41186841/02-1-J733P
* 42185451/02-1-L719R
* 48285101/03-3-B821K | | | | C DIM. N/A | | | DOIT 8/31/78 | | | | |
| CLEAN UP | | | | | CUST INSP | | | | OTHER | | | A/I STAMP/DATA REPORT | | | 9/1/78 | |
| | | | | | | | | | | | CUST DOC APPROVAL | | | | | |

Req. No. FF-763
 ITT GRIP NELL INDUSTRIAL
 PIPING, INC.
50 B-3

Form N6.3A

Standard Hours

Date

6-27-78

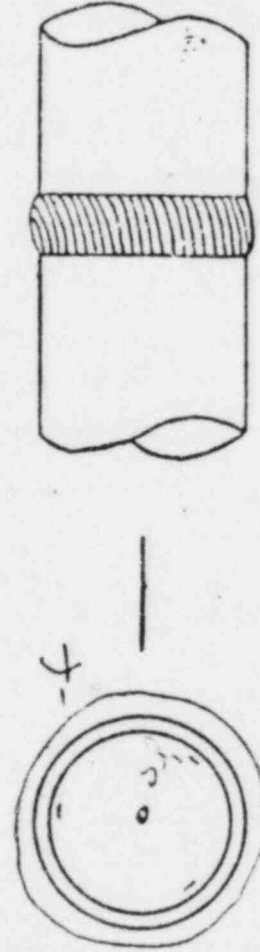
In-Process
 Repair

AUTOMATIC INSPECTION REPORT

| | | | | | | | |
|--|--|-----------------------------|----|---------------------|----|---|----|
| Source of
Defect No. <u>CT-01-16X</u> | | Picture No. <u>CT-5M-5B</u> | | Roll No. <u>Aug</u> | | Film Size
and Exposure
No. <u>6-205 6-32121</u>
<u>11-372 6-36530</u>
<u>6-264 6-3733</u> | |
| View | <u>1</u> | Defect Type | | Comments | | REPRODUCTION | |
| Energy | <u>IR02</u> | LP | LT | SC | CR | T | RT |
| Source Circle
or STD & SL | <u>40</u> | | | | | | |
| Source Size
or Focal Spot | <u>1/2</u> | | | | | | |
| Source Film Diameter | <u>17</u> | | | | | | |
| Time | <u>2.45</u> | | | | | | |
| Actual Weld
Thickness | <u>1.437</u> | | | | | | |
| Penetration | <u>30</u> | | | | | | |
| Penetration | <u>2T</u> | | | | | | |
| Shield Thickness | <u>0.2</u> | | | | | | |
| Film Size | <u>7x17</u> | | | | | | |
| Film Type | <u>70</u> | | | | | | |
| Welding Technique | Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | | | | | | |
| Seam | Front | | | | | | |
| | Back | <u>.010</u> | | | | | |
| Depth | at ends & dia. | <u>.010</u> | | | | | |
| | Automatic | | | | | | |
| Welding Procedure | <u>142-23-4</u> | | | | | | |
| | <u>11-1-9 F</u> | | | | | | |
| | <u>1-2-2-0</u> | | | | | | |
| | <u>6-10-78 B Wicks</u> | | | | | | |
| | <u>6-10-78 B Wicks</u> | | | | | | |

(PA) FA Light Leak Scanner CLD

(PA) XX
(PA) AI



Customer DuPont Power Co.

Contract 71277128

Inspection Standard I-SF-181-10

Location Catawba Unit 1 & 2

Job No.

Customer Approval - Date

I-SF-1711-2

Inspection Standard

I-SF-181-10

Approval

Signature [Signature]

6-29-78

Handwritten signature

SEE REVERSE SIDE FOR WELD REPAIR

Req No FF-144
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.
5B B-3

In Process
 Repair

Form N5.3A

Standard Hours

Date 6-18-71

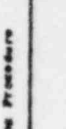
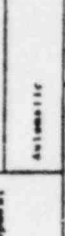
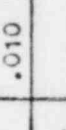
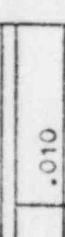
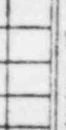
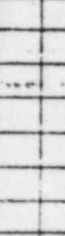
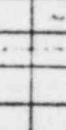
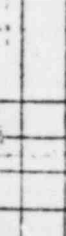
RP#665

| | | | | | | | |
|--|--|---|--|---------------------|--|---|--|
| Specs or
Revision No. <u>CT-01-16 X</u> | | Pipe Size
and Schedule
<u>3" 40</u> | | Weld No. <u>Ac1</u> | | Pipe Size
and Schedule
<u>3" 40</u> | |
| Views | | Defect Type | | Defect Type | | Defect Type | |
| Source | | Defect Type | | Defect Type | | Defect Type | |
| Source Curve
of EWP & WA | | Defect Type | | Defect Type | | Defect Type | |
| Source Size
of Focal Spot | | Defect Type | | Defect Type | | Defect Type | |
| Source Fila Distance | | Defect Type | | Defect Type | | Defect Type | |
| Time | | Defect Type | | Defect Type | | Defect Type | |
| Actual Weld
Thickness | | Defect Type | | Defect Type | | Defect Type | |
| Penetration | | Defect Type | | Defect Type | | Defect Type | |
| Sensitivity | | Defect Type | | Defect Type | | Defect Type | |
| Beta Thickness | | Defect Type | | Defect Type | | Defect Type | |
| Fila Size | | Defect Type | | Defect Type | | Defect Type | |
| Fila Type | | Defect Type | | Defect Type | | Defect Type | |
| Viewing Technique | | Defect Type | | Defect Type | | Defect Type | |
| Screen | | Defect Type | | Defect Type | | Defect Type | |
| Development | | Defect Type | | Defect Type | | Defect Type | |
| Welding Procedure | | Defect Type | | Defect Type | | Defect Type | |

File Interval
 AP
 DF
 6.5
 JM
 MP
 PS
 SV
 VY
 YA

Severity
 UC - Un-Set Out
 C - Crater
 CB - Crack
 V - Tongue
 BU - Blow
 S - Spatter
 P - Porosity
 L - Lack of Fusion
 T - Tungsten
 Y - Yell. Tip

Comments
 SPAL F-A Light Leak sample to ch
 OKIF Rej: MAC WA still visible
 Hs (V-Y)



Inspector - Date 6-20-71 by W. J. ...

Interpretation - Date 6-11-71 by Algon

Approval - Date _____ by _____

Customer Duke Power Co.

Contract 712717128

Inspection Standard ISE-181-10

Customer Approval - Date _____

Location Catawba Unit 1 & 2

Job No. _____

Acceptance Standard ISE-1711-2

SEE REVERSE SIDE FOR WELD REPAIR

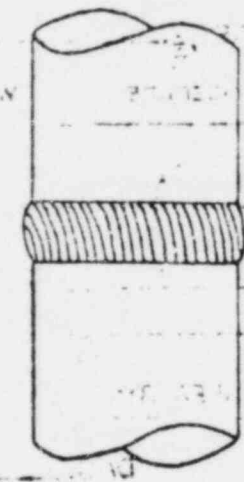
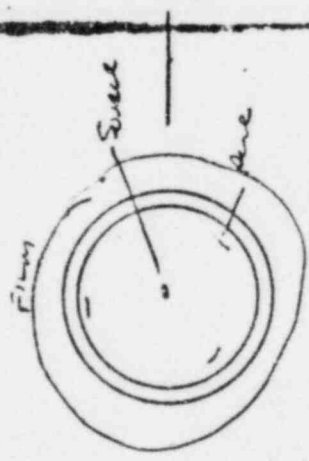
Req. No. E-865
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.
52 B.3

In-Process
 Repair

Form N6.3A Standard Hours
6-8.78

Date 6-8-78
RPA 6LY

| | | | |
|---|---------------------------|-------------------|--|
| System or
Regulator No. <u>CT-01-16X</u> | Plate No. <u>CT-52-50</u> | Weld No. <u>A</u> | Welder No. <u>C-32151</u>
<u>C-30353</u>
<u>C-4713</u> |
| Weld | Defect Type | Defect | Orientation |
| Source | AD | R | X |
| Source Code
or SPD No. | DF | | X |
| Source Size
or Total Spot | GT | | X |
| Source Film Distance | JM | | X |
| Time | FP | | X |
| Actual Weld
Thickness | PS | | X |
| Penetration | SV | | X |
| Bevel Slip | VY | | X |
| Bevel Thickness | YA | | X |
| File Size | | | |
| File Type | | | |
| Viewing Technique | | | |
| Screen | Front | | |
| Development | Back | | |
| Exposure | 60" Index 8 min. | | |
| Processing | Automatic | | |
| Exposure | 1723K | | |
| Processing | 1713E | | |



Customer Radio Power Co. Location Clinton Unit 1 & 2
 Control 7/27/78
 Inspection Standard ISE-18.10
 Customer Approval - Date 7/13/78 By [Signature]
 Inspector [Signature] Date 6-13-78
 Approval - Date 6-13-78 By [Signature]

Req. No. F 866
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.

In-Process
 Repair

Form N6.3A

Standard Hours _____

Date 6-8-78

| | | | | | |
|---|--|----------------------------|--------------------------|--|---|
| System or Register No. <u>CT-01-164</u> | | Plate No. <u>CT-577-50</u> | Roll No. <u>C-30-0-2</u> | Flap Size and Schedule <u>34" (1.315")</u> | Roller No. <u>C-121513</u>
<u>C-43500323</u> |
| Blank | 9 | | | | |
| Number | <u>4192</u> | | | | |
| Source Curve or SIP & SA | <u>190</u> | | | | |
| Source Size at Focal Spot | <u>.142</u> | | | | |
| Source Film Distance | <u>32 7/8"</u> | | | | |
| Film | <u>5-30</u> | | | | |
| Actual Weld Thickness | <u>1.500</u> | | | | |
| Penetration | <u>30</u> | | | | |
| Sensitivity | <u>2T</u> | | | | |
| Blind Thickness | <u>125 ± 0-</u> | | | | |
| Film Size | <u>8x10</u> | | | | |
| Film Type | <u>70</u> | | | | |
| Viewing Technique | Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | | | | |
| Screen | Front <u>.010</u>
Back <u>.010</u> | | | | |
| Development | <u>45" Endless S roll</u>
Solvent <u>X</u> | | | | |
| Exposure | <u>1-4-2-2-5</u> | | | | |

| Defect Type | Defect Type | | | | | | | Comments | Rejection |
|-------------|-------------|---|---|---|---|---|---|----------|-----------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| AC | | | | | | | | | X |
| CE | | | | | | | | | X |
| EE | | | | | | | | | X |
| FF | | | | | | | | | X |
| KK | | | | | | | | | X |
| MM | | | | | | | | | X |
| OO | | | | | | | | | X |
| QA | | | | | | | | | X |

| | | |
|--------------------------|-----------------|----------------|
| SP - Lack of Penetration | UC - Under Cut | Severity |
| SA - Lack of Fusion | C - Crater | A - Acceptable |
| SB - Slag | CB - Crack | B - Rejection |
| SC - Blow Hole | T - Tongue | C - Borderline |
| SD - Burn | UL - Under Line | |

Process Alc Cla
 Process Alc
 Note: BASE FOR USE IN AREAS TO MEET DENSITY

Customer: Duke Power Co. Location: Catawba Unit 1 & 2
 Contract: 7127/7128
 Inspection Standard: ISF-181-10
 Customer Approval - Date: _____ By: _____
 Inspector: [Signature]
 Date: 6-13-78
 Approved: [Signature]
 Date: 6-13-78
 Job No.: ISF-17112

Req No F-867
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.
5383

In Process
 Repair

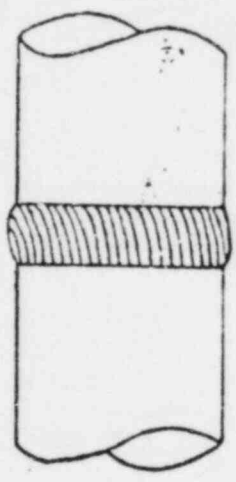
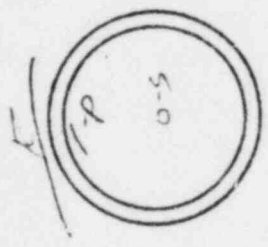
Form N6.3A

Standard Hours _____

Date 6-8-78

| | | | | | | | |
|---|--|---|--|---|--|---------------------------------|--|
| Radiator or Register No. <u>CT-01-16X</u> | | Film No. <u>AT-SP-70</u> | | Weld No. <u>Q-2R</u> | | Radiator No. <u>C-03102</u> | |
| View | <u>1</u> | Defect Type
LE 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 | | Comments
<u>PA A-B + A-P SEALS (O) CLR</u> | | Interpretation
ACC. <u>X</u> | |
| Exposure | <u>1K-192</u> | | | | | | |
| Exposure Center
or SIP & SA | <u>50</u> | | | | | | |
| Exposure Size
or Focal Spot | <u>.142</u> | | | | | | |
| Source Film Distance | <u>17</u> | | | | | | |
| Time | <u>1:15</u> | | | | | | |
| Actual Weld
Thickness | <u>.250</u> | | | | | | |
| Penetration | <u>5</u> | | | | | | |
| Sensitivity | <u>9T</u> | | | | | | |
| Base Thickness | <u>.250</u> | | | | | | |
| Film Size | <u>4 1/2 X 11</u> | | | | | | |
| Film Type | <u>35</u> | | | | | | |
| Viewing Technique | Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | | | | | | |
| Screen | Front | | | | | | |
| | Back | | | | | | |
| Development | 40' Sides & etc. | | | | | | |
| | Automatic | | | | | | |
| Welding Procedure | <u>1K-2-3-K13</u> | | | | | | |

PP - Lack of Penetration
 UC - Under Cut
 A - Crater
 CB - Crack
 T - Tongue
 RL - High Low
 B - Burrs
 S - Slag
 P - Porosity
 M - Bad Film



Radiographer - Bill-2R By Bill-2R
 Interpretation - Bill-2R By Bill-2R
 Approval - Bill-2R By Bill-2R

Customer Delta Power Co. Location Columbia Unit 1 & 2
 Contract 712717123 Job No. _____
 Inspection Standard SF-181-10 Acceptance Standard SF-1711-2
 Customer's Approval - None

Cameron

IRON WORKS, INC.

ITT GRIGGELL INDUSTRIAL PIPING, INC.
KERNERSVILLE, NC 27284

P. O. BOX 1217
HOUSTON, TEXAS 77001

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

Date 22 July 1976

| | | |
|---|---|---|
| Customer Order No.
KER-2053-P | C.I.W. Sales Order No.
F-5693 | Specification
ASME-SA106 Gr. C and ASME-Section III, Class 2
Thru Summer 1974 Addenda |
|---|---|---|

Description of Material O.D. _____ x I.D. **31.433"** x WALL **1.375" M.W.**

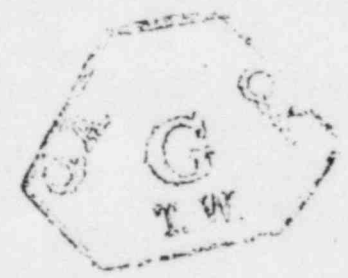
C.I.W. Part No. **86-5693-345-314**

| Heat No. | Location or Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|-----|------|------|-----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |
| L 3117 | | .24 | .89 | .012 | .021 | .23 | | | |
| L 3119 | | .24 | .91 | .011 | .012 | .22 | | | |
| L 3122 | | .26 | .90 | .014 | .010 | .26 | | | |
| L 3123 | | .25 | .93 | .015 | .016 | .25 | | | |
| L 3130 | | .24 | .96 | .011 | .015 | .23 | | | |

| Quantity or Serial No. | Heat No. | Test Loc. | Tensile PSI | Yield Point
% Offset Yield PSI | MECHANICAL PROPERTIES | | | | Specimen Size | Test Lot# |
|------------------------|----------|-----------|-------------|-----------------------------------|-----------------------|-------------|------------|-----------|---------------|-----------|
| | | | | | % Elong. 2 In. | % Red. Area | Macro Etch | Bend Test | | |
| 1 | L 3117 | Trans. | 79,900 | 44,700 | 25.0 | 45.8 | | OK | .505 | 17 |
| 3 | L 3119 | Trans. | 79,900 | 46,400 | 23.2 | 55.7 | | OK | .505 | 19 |
| 2 | L 3122 | Trans. | 80,900 | 46,900 | 26.0 | 51.9 | | OK | .505 | 22 |
| 3 | L 3123 | Trans. | 78,400 | 41,200 | 28.2 | 50.8 | | OK | .505 | 23 |
| 1 | L 3130 | Trans. | 77,900 | 40,200 | 27.9 | 50.8 | | OK | .505 | 30 |

| Forg. Ser. # | Heat # | Test Lot # |
|--------------|--------|------------|
| 26608 | L 3122 | 22 |
| 26609 | L 3122 | 22 |
| 26611Z | L 3119 | 19 |
| 26613Y | L 3119 | 19 |
| 26613Z | L 3119 | 19 |
| 26618 | L 3130 | 30 |
| 26622X | L 3123 | 23 |
| 26622Y | L 3123 | 23 |
| 26622Z | L 3123 | 23 |
| 26624Y | L 3117 | 17 |

CATAWBA
P#8



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

Heat Treatment:

Subscribed and Sworn to before me this
22nd day of July 1976
Notary Public

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

[Signature]
Metallurgical Representative **H. O. WRIGHT, /qt**

MILL TEST CERTIFICATE

SOLD TO ITT Grinnell Corporation
Kernersville, N.C.
SHIP TO Same for Duke Power

ITT GRINNELL CORPORATION
 WELDING PRODUCTS DIVISION
 PRINCETON, KY.

Kernersville

OUR
ORDER NO. 62935
BRANCH
ORDER NO. List 2833
CUSTOMER'S
ORDER NO. _____

DATE November 15, 1976

| 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-234 WPC | | | | | | | | | | | | | A-106C |
| 31.625 x 1.375 Min. wall | F | 44900 | 82400 | 25.0 | .25 | .98 | .013 | .011 | .22 | | | CT-01-17-1 | ARAP |
| IR 90° Ell | | | | | | | | | | | | CW-01-17-1 | |
| -Ditto- | F | 40900 | 79900 | 27.7 | .26 | 1.02 | .010 | .011 | .25 | " | " | | ARAR |
| -Ditto- | F | 45900 | 85100 | 27.9 | .25 | 1.01 | .009 | .021 | .23 | " | " | | ARBT |
| <div style="border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block; margin-bottom: 10px;"> <i>Catamba
BWF-16</i> </div> <p>*Standard round test specimen used for tensile properties.</p> <p>The above fittings were manufactured and tested in strict compliance with ASME Section III, 1974 Edition, Class 2 through the 1974 Summer Addenda.</p> <p>All fittings represented by this Mill Test Certificate will meet the following requirements: ASME Section III, Part 1, Subsection 1, Paragraph 1-10.1, Ex. 1974.</p> <p>We certify that the fittings listed herein comply with the requirements of ASME Section III, Part 1, Subsection 1, Paragraph 1-10.1, Ex. 1974. This certificate is issued by the American Society of Mechanical Engineers as evidenced by the issuance of Quality Systems Certificate (Certificate Number: 1-10-1974).</p> | | | | | | | | | | | | | |

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
 THIS _____ DAY OF _____ 1976

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

NOTARY PUBLIC

R. D. BERLIN

The Colonial Machine Company, Inc.

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

Phone (814) 539-7033

May 31, 1977

ITT Grinnell Industrial Piping Inc.
P. O. Box 566
Kernersville, NC 27284

CERTIFIED MILL TEST REPORT

Puke CT
SWF-4

| | | |
|------------------------------------|-------------------------------|-------------------------------|
| OUR ORDER NO.
KER 6156-P | OUR ORDER NO.
10038 | DATE SHIPPED
6/1/77 |
|------------------------------------|-------------------------------|-------------------------------|

| ITEM | TYPE | MATERIAL-SPEC. | SHIPPED | HEAT NO. | CMC CODE |
|------|------|--|---------|----------|----------|
| | | <u>ASME SA105 NORMALIZED</u> | | | |
| 1 | | 3/4" S/W Spec. Weld Bosses per SK CT-WB-1
Pt. No. Y*A*SE* CT-3002-1 (Rev. 0 10/14/76) | 40 | N94153 | AUA |
| 2 | 1" | Ditto Pt. No. Y*A*SE* CT-3002-2 | 20 | E87257 | ARA |
| 3 | 2" | Ditto Pt. No. Y*A*SE* CT-3002-3 | 12 | A00070 | AA1 |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CB | TI | CO | OTHER ELEMENTS |
|------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| 1 | .32 | .80 | .006 | .021 | .22 | | | | | | | | |
| 2 | .26 | .78 | .011 | .027 | .24 | | | | | | | | |
| 3 | .32 | .74 | .017 | .026 | .19 | | | | | | | | |



| ITEM | TENSILE | 2% YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1. 2. 3. 4. 5. 6. ETC. |
|------|---------|----------|----------|--------|----------|--------------------|---------------------------------|
| 1 | 76700 | 36800 | 34.0 | 58.2 | | | Mill Source - U.S. Steel |
| 2 | 75000 | 47000 | 32.0 | 61.3 | | | Mill Source - " " |
| 3 | 75360 | 42770 | 31.0 | 52.4 | | | Mill Source " " |

INSPECTION WAIVED PER MR. TOM WILSON ON 5/31/77.

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.

dg

By *Rosemary R. Woycik*

The Colonial Machine Company, Inc.

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

Phone (314) 539-7033

SEPT. 20, 1977

ITT GRINNELL INDUSTRIAL PIPING, INC.
P. O. BOX 565
KERNERSVILLE, NC 27284

CERTIFIED MILL TEST REPORT

CT
AP-4

| | | |
|------------------------------|------------------------|-------------------------|
| YOUR ORDER NO.
KER 8630-B | OUR ORDER NO.
10457 | DATE SHIPPED
9/20/77 |
|------------------------------|------------------------|-------------------------|

| ITEM | TYPE | MATERIAL-SPEC. | SHIPPED | HEAT NO. | CMC CO. |
|-----------|------|---|---------|----------|---------|
| | | ASME SECTION III CLASS 2 (1974 ADDENDA THRU WINTER 1974)
ASME SA105 | | | |
| 1 (89590) | | 1.13" ACCESS HOLE PLUGS PER CT-AH-1, H = 2.188"
PART NO. CT-4012-1 | 12 | 78849 | ABF |
| 2 (89591) | | 1.13" DITTO H = 1.705" PART CT-4012-2 | 25 | 78849 | ABF |
| 3 (89592) | | 1.13" DITTO H = 2.609" PART CT-4012-3 | 16 | 78849 | ABF |
| 4 (89593) | | 1.13" ACCESS HOLE PLUGS PER CT-AH-2, H = 1.705",
PART CT-4012-4 (SQUEEZE HEAD) | 30 | 78849 | ABF |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CB | TI | CO | OTHER ELEMENTS |
|-------------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| 1
THRU 4 | .26 | .71 | .013 | .025 | .23 | | | | | | | | |

ITT GRINNELL
CHECK
TOL
DATE 9-28-77

| ITEM | TENSILE | % YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1. 2. 3. 4. 5. 6. ETC. |
|-------------|---------|---------|----------|--------|----------|--------------------|---------------------------------|
| 1
THRU 4 | 75000 | 48500 | 32.0 | 58.6 | | | MILL SOURCE - COPPERWELD |

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.

By *Ramsey S. W.*



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

AREA OFFICE
 TELEPHONE 475-1100
 TWX 510-651-3722
 TELEX 847451

CUSTOMER: ITT GRINNELL CORP.
CUSTOMER'S Order No.: KER 9442-B
SHIPPED TO: ITT GRINNELL CORP.
 PO BOX 566
 HIGHWAY 421
 KERNERSVILLE NC 27284

CT
 Swf-17

Date May 2, 1978
Bonney Order No. 61651
Mark
 KER 9442-B

CT-2168-1

| Item No. | Quantity No. | Bonney Lot No. | Grade or Specification No.
Chemical Analysis, Physical Properties, Remarks: |
|----------|--------------|----------------|--|
| | 4 | P232 | SA105N
34 (1.375MW) x 6 (.432) Sweepolet
C.27 Mn.95 P.012 S.014 Si.26
T/S 85,700 Y/S 54,700 El 32 Ra 59 |

ITTG - IPI
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE MAY 9 1978
 SHEET 1 OF 1

This is to certify that:

The fittings supplied are in complete accordance with the ASME Boiler and Pressure Vessel Code, Section III, Class 2, 1974 Edition including Winter 1974 Addenda; SA105N And the Purchase Order.

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.



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 certified by additional laboratory checks.

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

by *[Signature]*
 QUALITY ASSURANCE MANAGER



UNION CARBIDE CORPORATION
 LINDE DIVISION
 WELDING MATERIALS
 P.O. BOX 710, ASHTABULA, OHIO 44004

Feb. 10, 1978

CUSTOMER: ITT Grinnell
 7 Greensboro Reg. Airport
 Greensboro, N.C. - 27400

YOUR ORDER NO. 11-258 KER 9419

LINDE S.O. NO. 711250A1

1/8" Dia.
 S/L Rod

WW-207

MATERIAL: Linde 65

This is to certify that this material will conform to AWS A5.18-69
 ASME SPA5.18. It has the following chemical analysis meeting the
 requirements of Classification E70S-2:

| | | |
|--------------------|---|---------------|
| <u>HEAT NUMBER</u> | - | <u>065220</u> |
| Carbon | - | .05 |
| Manganese | - | 1.11 |
| Phosphorous | - | .009 |
| Sulphur | - | .022 |
| Silicon | - | .50 |
| Aluminum | - | .071 |
| Titanium | - | .06 |
| Zirconium | - | .053 |

**INSPECTED
820**

ITTG - IPI
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE MAY 22 1978
 SHEET 1 OF 9

Ladle Analysis

HJT/klr

Howard Fisher
 Quality Assurance - Welding Materials
 Plant - Union Carbide Corporation
 Linde Division

ITT Grinnell

Industrial Piping Inc.

SUBJECT: Welding Filler Materials
WIRE: Linde 65, Heat No. 065220

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 5-2, that the test results shown in Taussig Associates, Inc. Report 24131 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat-treated condition (total time not to exceed 20 hours). This may also be used on impact-tested material with a minimum service temperature of +30 degrees F.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 Edition.

WW-2071

J. F. Elder 3/29/78
J. F. Elder Date
Materials Engineer

DECEMBER
130

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 22 1978
SHEET 2 OF 9

MATERIAL TEST REPORT #24131

R & D TEST #460

Linde 65, Heat No. 065220

WW-207

The following tests were performed in accordance with SFA 5.18, E70S-2:

1. All-Weld Metal Tension Test:

As-Welded:

Heat Treated*

Tensile Strength: 81,850 psi
Yield Point: 68,700
Elongation(%) in 2": 30

Tensile Strength: 78,750 psi
Yield Point: 70,825
Elongation(%) in 2": 31

2. Charpy V-Notch Impact Tests:

As-Welded:

| Temp. | Ft. lbs. | Lat. Exp. (mils) | %Shear |
|-------|----------|------------------|--------|
| -20°F | 49 | 39 | 40 |
| -20 | 17 | 19 | 20 |
| -20 | 44 | 35 | 40 |
| -20 | 63 | 46 | 50 |
| -20 | 76 | 56 | 60 |

Heat-Treated*

| Temp. | Ft. lbs. | Lat. Exp. (mils) | %Shear |
|-------|----------|------------------|--------|
| +30°F | 103 | 66 | 70 |
| +30 | 70 | 59 | 60 |
| +30 | 70 | 51 | 50 |

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 24 1973
SHEET 3 OF 9

BECHTEL
130

3. Chemical Analysis: (Additional elements required by ASME Section III, Cl. 1 for information only)

Ni : < 0.05 V : < 0.01
Cr : < 0.05 Cu : 0.10
Mo : < 0.03

4. Radiography: Acceptable

WW-2071

*Heat-treated for 16 hours at 1150 degrees F, cooling to 600 degrees F shall be 300 degrees F/hr. (\pm 100 degrees F/hr.).

This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by ITT Grinnell IPI and our subcontractor are in compliance with the requirements of SFA 5.18 and the applicable material requirements of NB-2400 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by ITT Grinnell IPI. This report, in conjunction with the Linde Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.

J. F. Elder 3/29/78
J. F. Elder Date
Materials Engineer

ESCHTEL
130

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 22 1978
SHEET 4 OF 9

Lausig Associates Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



Report No. 24131 - March 28, 1978

ITT Grinnell Industrial Piping, Inc.
P.O. Box 566 - Hwy 421
Kernersville, North Carolina 27284

Attn: Mr. J. F. Elder

WW-207

DECNTEL
130

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 26 1978
SHEET 5 OF 9

S B J E C T

Mechanical and Chemical Testing of the Weld
Metal of Two (2) Plates Marked Test No. 460.
Per Requisition No. 34622.

BACKGROUND:

Two (2) welded plate assemblies were submitted to our laboratory for chemical analysis, charpy impact and tension testing of the weld metal. The assemblies had been identified as plate no. 460, 1/8" Linde 65, Heat no. 065220. One plate was to be tested as-welded and the other tested after a stress relieving heat treatment.

TEST RESULTS:

WW-207

Chemical Analysis:

The weld metal of plate no. 460 was drilled in a manner which prevented removal of material from the base metal. These drillings were cleaned and subjected to a quantitative chemical analysis with the following results:

| | |
|------------|-------|
| Nickel | <.05% |
| Chromium | <.05 |
| Molybdenum | <.03 |
| Vanadium | <.01 |
| Copper | .10 |

ITG - IPI
QUALITY CONTROL
APPROVED:
T. C. WILSON
DATE MAY 2 1950
SHEET 6 OF 9

Heat Treatment:

The plate no. 460 was cut to permit it to fit into heat treating furnace. The pieces were heated to 1150°F and held for 16 hours at temperature. Cooling was done at a rate of less than 300°F/Hr. to below 600°F.

RECEIVED
139

Tension Testing:

Two, round, all weld metal tension test specimens were machined from plate no. 460, as-welded and heat treated. Both specimens were subjected to standard tension testing giving the results as follows:

| | <u>Heat Treated</u>
<u>No. 460</u> | <u>As-Received</u>
<u>No. 460</u> |
|----------------------------------|---------------------------------------|--------------------------------------|
| Tensile Strength, psi. | 78,750 | 81,850 |
| Yield Strength, psi.(.2% Offset) | 70,825 | 68,700 |
| % Elongation in 2 inches | 31 | 30 |
| % Reduction of Area | 68 | 70 |

Impact Testing:

A total of eight, full size (10mm x 10mm), Charpy V-notch impact test specimens were machined from the two submitted plate assemblies. Five of the specimens were from the as-welded plate and three were from the heat treated plate. All were notch in the weld metal and removed and oriented per NB 2322 of the ASME Boiler & Pressure Vessel Code.

No. 460 - As-Received:

| <u>Test Temperature</u> | <u>Absorbed Energy (ft-lbs)</u> | <u>Mils Lateral Expansion</u> | <u>Percent Shear</u> |
|-------------------------|---------------------------------|-------------------------------|----------------------|
| - 20°F | 49 | 39 | 40 |
| - 20°F | 17 | 19 | 20 |
| - 20°F | 44 | 35 | 40 |
| - 20°F | 63 | 46 | 50 |
| - 20°F | 76 | 56 | 60 |

No. 460 - Heat Treated:

| | | | |
|--------|-----|----|----|
| + 30°F | 103 | 66 | 70 |
| + 30°F | 70 | 59 | 60 |
| + 30°F | 70 | 51 | 50 |

WW-2071

DEC 130

MAH:i

Respectfully submitted,

Mark A. Hineman

Mark A. Hineman
Staff Engineer
TAUSSIG ASSOCIATES, INC.

ITG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 22 1978
SHEET 7 OF 9

Taussig Associates Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (312) 676 2100



PRODUCT TESTING FAILURE INVESTIG. MATERIAL EVALUATION QUALITY ASSURANCE

TO: ITT Grinnell Indust Piping
P. O. Box 566 - Hwy 4
Kernersville, N. C. 2

Report No.: 24131-1a
Date: 5-26-78
Your Order No.:

Attention: Mr. John Elde.

SUBJECT: Charpy Impact Testing at the Weld Metal of Test Plate #460A; 1/8" Linde 65, Heat #065220 - As-Welded.

TEST RESULTS:
Impact Testing:

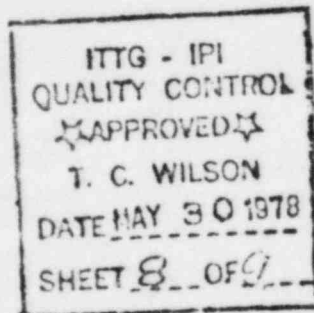
WW-207

Specimen Size: 10mm x 10mm
Notch Type: V
Test Temperature: + 30°F

DEBITED
\$30

| <u>Specimen Number</u> | <u>Absorbed Energy (ft-lbs)</u> | <u>Mils Lateral Expansion</u> | <u>Percent Shear</u> |
|------------------------|---------------------------------|-------------------------------|----------------------|
| G1 | 105 | 67 | 60 |
| G2 | 137 | 70 | 70 |
| G3 | 101 | 66 | 60 |

All specimens were removed and oriented in accordance with NB-2332.



Corwyn M. Berger
General Manager

TAUSSIG ASSOCIATES, INC.
By
Mark A. Hineman
Staff Engineer

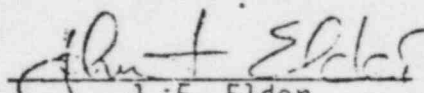
WW-207

SUBJECT: Welding Filler Materials
WIRE: Linde 65, Heat No. 065220

This is to certify that the subject material was welded into a test plate in accordance with NB-2340 using WFS 5-2. These test results are shown in Taussig Associates, Inc. Report No. 24131-1a and supplement the results shown in Taussig Associates, Inc. Report No. 24131.

Charpy Impacts

| <u>Temp.</u> | <u>Ft.-lbs.</u> | <u>Lat. exp. (mils)</u> | <u>%Shear</u> |
|--------------|-----------------|-------------------------|---------------|
| +30°F | 105 | 67 | 60 |
| +30°F | 137 | 70 | 70 |
| +30°F | 101 | 66 | 60 |


J. F. Elder
Materials Engineer

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE JUN. 1 1978
SHEET 2 OF 2

CERTIFICATE OF ANALYSIS



UNION CARBIDE CORPORATION
LINDE DIVISION
WELDING MATERIALS
P.O. BOX 710, ASHTABULA, OHIO 44004

1/16/78

CUSTOMER: ITT GRINNELL
OLD HIGHWAY 421
KERNERSVILLE NC 27284

YOUR ORDER NO.: 11-137-KER 9113
LINDE S.O. NO.: _____

WW-206

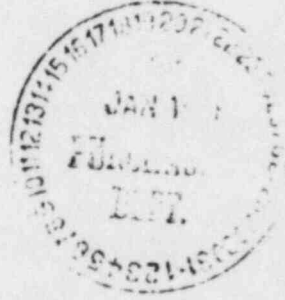
MATERIAL: Linde 65

This is to certify that this material will conform to AWS A5.18-69
ASME SFA5.18. It has the following chemical analysis meeting the
requirements of classification E70S-2:

HEAT NUMBER - 065214

| | | |
|-------------|---|------|
| Carbon | - | .04 |
| Manganese | - | 1.17 |
| Phosphorous | - | .008 |
| Sulphur | - | .015 |
| Silicon | - | .54 |
| Aluminum | - | .12 |
| Titanium | - | .07 |
| Zirconium | - | .041 |

**CREDIT
130**



Ladle Analysis:

Howard Tucker - RLL
Quality Assurance - Welding Materials Plant
Union Carbide Corporation - Linde Division

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB. 21 1978
SHEET 1 OF 4

Industrial Union Inc.

SUBJECT: Welding Filler Materials

WIRE: Linde G5, Heat No. 065214

This is to certify that the subject material was welded into test plates as shown in SPA 5.1 using WPS 5-2, that the test results shown in Tausig Associates, Inc. Report 23490 were produced from these test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat treated condition (total time not to exceed 26 hours). This may also be used on impact-tested material with a minimum service temperature of +30 degrees F.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 Edition.

WW-2016

John F. Elder 2/21/78
J. F. Elder

REGTEL
130

ITIG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB 21 1978
SHEET 2 OF 4

MATERIAL TEST REPORT #23490

R & D TEST #135

Linde 65, Heat No. 065214

WW-206

The following tests were performed in accordance with SFA 5.18, E70S-2:

1. All-Weld Metal Tension Test:

As-Welded:

Tensile Strength: 79,200 psi
Yield Point: 74,700
Elongation (%) in 2": 28

Heat-Treated*

Tensile Strength: 76,600
Yield Point: 66,400
Elongation (%) in 2": 30

2. Charpy V-Notch Impact Tests:

As-Welded:

| Temp. | Ft.lbs. | Lat. Exp. (mils) | %Shear |
|-------|---------|------------------|--------|
| -20 | 143 | 91 | 90 |
| -20 | 123 | 79 | 80 |
| -20 | 100 | 69 | 70 |
| -20 | 111 | 75 | 80 |
| -20 | 111 | 80 | 80 |

Heat-Treated*

| Temp. | Ft.lbs. | Lat. Exp. (mils) | %Shear |
|-------|---------|------------------|--------|
| +30 | 80 | 63 | 60 |
| +30 | 97 | 73 | 70 |
| +30 | 107 | 73 | 70 |

REGISTERED
150

3. Chemical Analysis: (additional elements required by ASME Section III, Cl. 1 for information only)

Ni: < 0.05 V: < 0.01
Cr: < 0.05 Cu: 0.12
Mo: < 0.03

4. Radiography Test: Acceptable

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB 21 1978
SHEET 3 OF 4

*Heat-treated for 16 hours at 1150 degrees F, cooling to 600 degrees F shall be 300 degrees F/hr. (+ 100 degrees F/hr.)

This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by ITT Grinnell IPI and our subcontractor are in compliance with the requirements of SFA 5.18 and the applicable material requirements of U-2600 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by ITT Grinnell IPI. This report, in conjunction with the Linde Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.

WW-2061

J. F. Elder
J. F. Elder Date

REVISED
100

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB. 21 1976
SHEET 4 OF 4

CHEMETRON CORPORATION

WELDING PRODUCTS DIVISION

CERTIFIED MATERIALS TEST REPORT

CERTIFICATE OF ANALYSIS

WW-201

Customer Order No. 4365 Rel.14-424

Order No. 711093-2

National Welders Supply
P.O. Box N-93
3011 N. Liberty Street
Winston Salem, N.C. 27105

Shipped

This material conforms to Specification
ITT Spec. ES 1073-1
SFA 5.1 Sec. III

E 7018

Type

Test No. 650
X-Rays Satisfactory
Control No. MMM074

Trade Name or Trademark: Atom Arc 7018

Diameter Size: 3/32"
19,650 lbs.

Lot Number: 02-1-J728P

Heat Number: 411B6841

Moisture @1800°F. 0.29%
Concentricity 4%
Type Steel A-285

Table with 5 columns: Test No., Full, Split, Volts, Amps. Row 1: Tensiles & Impacts, 1, 6, 22, 110

Table of chemical composition: Carbon .04, Manganese 1.06, Chromium .03, Nickel .02, Silicon .48, Columbium + Tantalum, Molybdenum .01, Tungsten, Copper .02, Titanium, Phosphorus .012, Sulphur .016, Vanadium .03

Table of mechanical properties: Test Results, As Welded 8 hrs. @1150°F, Stress Relieved. Yield 73,100, Tensile 80,000, Elongation 28.0%, Red. of Area 76.0%, Stress Relieved 65,400, 75,900, 30.0%, 77.9%

RECITEL 100
ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB. 22 1978
SHEET 1 OF 1

Charpy V-Notch Impacts Tested @-20°F.
Impacts 42-58-63-72-82 68-72-80-92-98
Lat.Exp. 38-48-52-59-68 58-61-67-78-83
%Shear 20-20-20-20-30 20-30-30-30-30

Filletts: OK Vertical Overhead

State of Penna.)
County of York) SS

ASME QUALITY SYSTEM CERTIFICATE (MATERIAL)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978

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

Subscribed and sworn to before me
this 21st day of November 1977

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

SEA: [Signature] Notary Public

My commission expires: 8/21/78

BY [Signature]
D. C. Fisher

CERTIFIED MATERIALS TEST REPORT

WW-2021

Customer Order No. 4372

Order No. 150310-1

National Welders Supply Co.
Ref. 14-5406
3011 N. Liberty Street
Winston Salem, N.C. 27105

Shipped _____

This material conforms to Specification
ES 1073-3 (SFA 5.1 Sec. II)

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAR. 10 1978
SHEET 1 OF 1

Type E 7018
Test No. 1145
X-Rays Satisfactory
Control No. NNN009

Trade Name
or Trademark:

Atom Arc 7018

Diameter Size:

1/8"
50# sample returned

Lot Number:

02-1-L719R

Heat Number:

421B5451

Moisture @1800°F. 0.15%
Concentricity 4%
Type Steel A-285

| | |
|----------------------|------|
| Carbon | .04 |
| Manganese | 1.01 |
| Chromium | .03 |
| Nickel | .03 |
| Silicon | .43 |
| Columbium + Tantalum | |
| Molybdenum | .01 |
| Tungsten | |
| Copper | .02 |
| Titanium | |
| Phosphorus | .010 |
| Sulphur | .015 |
| Vanadium | .02 |

| | | | | |
|--------------------|------|-------|-------|------|
| Test No. | Full | Split | Volts | Amps |
| Tensiles & Impacts | 1 | 5 | 22 | 135 |

| | | |
|---------------|-----------------------|-----------------|
| Test Results: | As Welded | Stress Relieved |
| | 16 hrs. @1100-1200°F. | |
| Yield | 67,000 | 65,700 |
| Tensile | 77,400 | 76,900 |
| Elongation | 28.0% | 31.0% |
| Red. of Area | 67.3% | 78.1% |

Charpy V-Notch Impacts Tested @-20°F.
Impacts 96-106-107-107-121 88-92-94-109-110
Lat. Exp. 72-71-71-75-77 72-71-78-79-81
& Shear 40-50-50-50-50 20-30-20-40-40

Filletts: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

State of Penna.)
County of York) SS

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

Subscribed and sworn to before me
this 7th day of March 1978

SEAL Anneta G. Conway
Notary Public

My commission expires: 8/21/78

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

BY [Signature]
T. C. Wilson

The Reid - Avery Company

Pandolph, Baltimore, Md. 21222

TEST REPORT

DATE: 4/11/78

OLD TO ITT Grinnel
Old Highway 421
Kernersville, NC 27284

SHIPPED TO:

DATE SHIPPED: 11/30/78

P.O. NO.:

P.O. NO.: Kee 6999

SPECIFICATION:

| ITEM | POUNDS | SIZE | TYPE | LOT NO. | HEAT NO. |
|------|--------|------|---------|---------|----------|
| 1. | | 1/8 | 128 RHM | | 519316 |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |

WMM-2041

CHEMICAL ANALYSIS OF WIRE CONVEYOR METAL

| ITEM | C | Mn | P | S | Si | Cr | Ni | Mo | Al | Cu |
|------|-----|------|------|------|-----|------|------|-----|-----|------|
| 1. | .13 | 1.71 | .019 | .013 | .05 | .029 | .040 | .53 | .00 | .041 |
| 2. | | | | | | | | | | |
| 3. | | | | | | | | | | |
| 4. | | | | | | | | | | |
| 5. | | | | | | | | | | |
| 6. | | | | | | | | | | |

DEBITEL
130

ITTG - IPI
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE JUN 13 1978
 SHEET 1 OF 5

ADDITIONAL TEST RESULTS

State of _____

City of _____

Subscribed and sworn to before me this _____ day

of _____ 19 _____

Notary Public _____

My commission expires _____

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

[Signature]

QUALITY ASSURANCE DEPARTMENT

ITT Grinnell

Industrial Piping Inc.

WW-2091

SUBJECT: Welding Filler Materials
WIRE: RACo 128 HMM: Ht. No. 519346
FLUX: Linde 80; Lot 0575, Con. 8290

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 3-1, that the test results shown in Taussig Associates, Inc. Report 22867-1 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This material shall not be used on impact-tested fabrication.

This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by ITT Grinnell IPI and our Subcontractor are in compliance with the requirements of SFA 5.23 for an F70-EA3-A3 type classification, and the applicable material requirements of NB-2400 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by ITT Grinnell IPI. This report, in conjunction with the RACo Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.

DEBNTL
120

| |
|---|
| ITTG - IPI
QUALITY CONTROL
★APPROVED★
T. C. WILSON
DATE JUN 13 1978
SHEET 2 OF 5 |
|---|

John F. Elder 3/21/78
J. F. Elder lpte

Taussig Associates Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



Report No. 22867-1 - December 14, 1977

ITT Grinnell Industrial Piping
P. O. Box 566 - Hwy 421
Kernersville, NC 27284

Attn: Mr. J. F. Elder

WW-209

SUBJECT

Mechanical & Chemical Testing of the Weld
Metal of Test Plate #428.

ENCLOSURE
130

| |
|--|
| ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE JUN. 13 1978
SHEET 3 OF 5 |
|--|

Corrections:

3-22-78 - Heat #519346 on page 1.

PRODUCT TESTING FAILURE INVESTIGATION MATERIAL EVALUATION QUALITY ASSURANCE

BACKGROUND:

Two (2) welded plate assemblies were submitted to our laboratory for chemical analysis, charpy impact and tension testing of the weld metal. The assemblies had been identified as plate number 428, RACO 128HMM, Ht. #519346, Linde 80, Lot 0575, Con. 8290. One plate was to be tested as-welded and the other tested after a stress relieving heat treatment.

TEST RESULTS:

Chemical Analysis:

The weld metal of plate number 428 was drilled in a manner which prevented removal of material from the base metal. These drillings were cleaned and subjected to a quantitative chemical analysis with the following results:

| | |
|------------|------|
| Carbon | .05 |
| Manganese | 1.23 |
| Phosphorus | .014 |
| Sulfur | .013 |
| Silicon | .40 |
| Nickel | <.05 |
| Chromium | <.05 |
| Molybdenum | .53 |
| Copper | .15 |
| Vanadium | <.01 |

WW-20911

Heat Treatment:

Plate number 428 was cut to permit it to fit into a heat treating furnace. The pieces were heated to 1100°F and held for 16 hours at temperature. Cooling was done at a rate of less than 200°F/Hr. to below 800°F. The pieces were then marked 428H.

Tension Testing:

Two, round, all weld metal tension test specimens were machined from plate number 428, as-welded and heat treated. Both specimens were subjected to standard tension testing giving the results as follows:

REBATES
MCC

| |
|-------------------|
| ITTG - IPI |
| QUALITY CONTROL |
| ★APPROVED★ |
| T. C. WILSON |
| DATE JUN. 13 1978 |
| SHEET 4 OF 5 |

| | <u>No. 428H</u>
<u>Heat Treated</u> | <u>No. 428</u>
<u>As-Welded</u> |
|------------------------|--|------------------------------------|
| Tensile Strength, Psi. | 83,875 | 83,325 |
| Yield Strength, Psi. | 68,725 | 70,325 |
| % Elongation in 2" | 27 | 27 |
| % Reduction of Area | 61 | 61 |

Impact Testing:

Five (5), full size (10mm x 10mm), Charpy V-Notch impact test specimens were machined from the heat treated plate assembly. All were notched in the weld metal.

No. 428H - Heat Treated:

| <u>Test</u>
<u>Temperature</u> | <u>Absorbed Energy</u>
<u>(ft-lbs)</u> | <u>Mils Lateral</u>
<u>Expansion</u> | <u>Percent</u>
<u>Shear</u> |
|-----------------------------------|---|---|--------------------------------|
| 0°F | 45 | 39 | 40 |
| 0°F | 40 | 36 | 40 |
| 0°F | 42 | 35 | 40 |
| 0°F | 48 | 41 | 40 |
| 0°F | 50 | 41 | 50 |

Respectfully submitted,

Mark A. Hineman

Mark A. Hineman
Staff Engineer

TAUSSIG ASSOCIATES, INC.

WW-204

MAH:ln

ITTG - IPI
QUALITY CONTROL
★APPROVED★
T. C. WILSON
DATE JUN. 1 8 1976
SHEET 5 OF 5

RECEIVED
130

CERTIFIED MATERIALS TEST REPORT

W988-2031

Customer Order No. 4374 (14-4631)

Order No. 153016-1

National Welders Supply Co.

Shipped _____

P.O. Box N-93

3011 N. Liberty Street

Winston Salem, N.C. 27105

ITTG - IPI
QUALITY CONTROL
APPROVED
DATE 4-10-78
SHEET 1 OF 1

This material conforms to Specification
ES 1073-3 & ES 1084-4,
ASME SFA 5.1 Sec. III NA370

Type E 7018

Trade Name
or Trademark:

Atom Arc 7018

Test No. 1149
X-Rays Satisfactory
Control No. NNN050

Diameter Size:

5/32"
20,000 lbs.

Moisture @1800°F. 0.11%
Concentricity 3%
Type Steel A-285

Lot Number:

03-3-B821K

Heat Number:

482B5101

Carbon .03
Manganese .92
Chromium .03
Nickel .03
Silicon .28
Columbium +
Tantalum
Molybdenum .01
Tungsten
Copper .02
Titanium
Phosphorus .009
Sulphur .016
Vanadium .01

Test No. Full Split Volts Amps
Tensiles &
Impacts 1 7 24 170

Test Results: As Welded Stress Relieved
16 hrs. @1100-1200°F.
Yield 68,000 62,000
Tensile 77,500 72,700
Elongation 28.0% 32.0%
Red.of Area 71.2% 78.1%

Charpy V-Notch Impacts Tested @ -20°F.
Impacts 123-138-150-185-214 120-172-180-204-208
Lat.Exp. 85-86-84-82-91 81-80-86-91-85
% Shear 60-60-70-80-80 50-80-80-90-90

Filletts: OK Vertical Overhead
ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

State of Penna.)
County of York) SS

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

Subscribed and sworn to before me
this 6TH day of April 1978

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

SEA: [Signature]
Notary Public

My commission expires: 8/21/78

BY [Signature]
D. G. Flohr

DUKE POWER COMPANY
 QUALITY ASSURANCE DEPARTMENT
 SUPPLIER QUALITY ASSURANCE CERTIFICATION

Name of Supplier JIT Crinnell Ind. Piping, Inc.

Date 9-15-77

Address of Supplier Plant Kornersville, NC

Mill Power Order No. C-12517

Duke Item or Req. No. 1206.00-1.0

Spec. No. CNS-1206.00-1.0 Rev.

Supplier ID Nos. CT-SM-50

Description of Component(s) or Material(s) Fabricated Piping Assembly

Attached Documentation covers all Components/Materials on Mill Power Order.
 Attached Documentation covers partial shipment of Components/Materials on Mill Power Order.

The following listed tests, inspections and reports have been completed as required by the specification:

- | | |
|--|--|
| <input type="checkbox"/> Physical & Chemical Analysis | <input type="checkbox"/> Major Repair Records & Charts |
| <input type="checkbox"/> Hydro (Test Pressure - PSIG <u> </u>) | <input checked="" type="checkbox"/> Personnel Qualifications on Record |
| <input type="checkbox"/> Design Report | <input checked="" type="checkbox"/> Stress Report |
| <input type="checkbox"/> Radiographic Test | <input type="checkbox"/> Ultrasonic Test |
| <input type="checkbox"/> Penetrant Test | <input type="checkbox"/> Repair NDE |
| <input type="checkbox"/> Operating Test | <input type="checkbox"/> Performance Curve |
| <input checked="" type="checkbox"/> Dimensional Check | <input type="checkbox"/> Deviation Record <u> </u> |
| | <input type="checkbox"/> Heat Treatment |
| | <input checked="" type="checkbox"/> Magnetic Particle |
| | <input checked="" type="checkbox"/> Cleanliness |
| | <input checked="" type="checkbox"/> ASME Data Report |

- 1) _____
- 2) _____
- 3) _____

This certifies that the listed Component(s) or Material(s) conform to the requirements of the above referenced Duke Power documents including all codes, standards, test requirements and Quality Assurance requirements invoked therein.

DUKE POWER COMPANY
 QA RECORDS APPROVED
Doug L. Keener
 QA REPRESENTATIVE
 DATE 3/7/78

Thomas A. Smith
 Supplier Representative Authorized Signature
 Title Mgr. of Proc Date 9-15-77

(See Instructions)

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

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

SHEET 1 OF 3

1. Fabricated by ITT Grinnell Industrial Piping, Inc. Order No. 7127
(Name and Address of Fabricator) Kernersville, N. C.
2. Fabricated for Duke Power Company Charlotte, N. C. Order No. C-12517
(Name and Address)
3. Owner Duke Power Company 4. Location of Plant Newport, S. C.

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

(a) Drawing No. CT-01-26X Prepared by ITT Grinnell Industrial Piping, Inc.
 (b) National Board No. N/A

6. The material, design, construction, and workmanship complies with ASME Code Section III, Class Nuc. 2
 Edition 1974, Addenda Date Winter 1974, 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)

Supplemental Sheets #2 --- Drawings
#3 --- Bill(s) of Material

7. Shop Hydrostatic Test Field psi.

8. Description of piping inspected Piece Mark Number CT-SM-5C
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length)
See Attached Sheets
- fittings - flanges, etc.)

We certify that the statements made in this report are correct and that the fabrication of the described piping conform with the requirements of SECTION III of the ASME BOILER AND PRESSURE VESSEL CODE.
 Date 9-13-77 Signed ITT Grinnell Industrial Piping, Inc. By Thomas A. Smith
(Fabricator)
 Certificate of Authorization Expires 7-16-77 Certificate of Authorization No. N-1456

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 Maryland and employed by * of Hartford, CT. have inspected the piping described in this Data Report on 9-15-77, 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. *The Hartford Steam Boiler Inspection and Insurance Company. 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 9-15-77, 1977
(Inspector) Thomas A. Smith Commissioned 9-1-77
(Inspector) Thomas A. Smith National Board, State, Province and/or Country

* 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 3

ITT Grinnell Industrial Piping Inc.

KERNERSVILLE, N. C.

FORM EN-101 REV 1/76
Q.A. FORM N2.1C

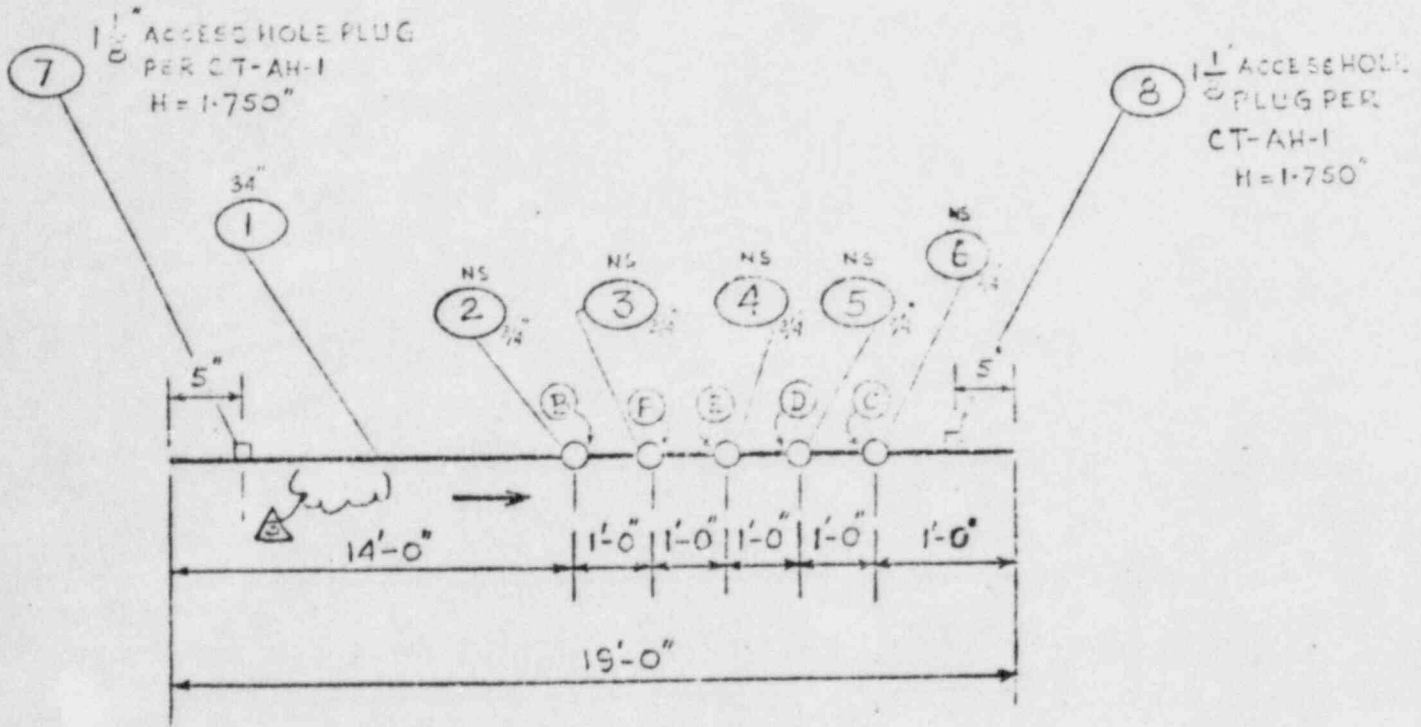
Sheet 2 of 3

CONT. NO. 7127
NAME DUKE POWER COMPANY
LOCATION CATAWBA UNIT #1

DRW'N SM 4-21-77 CHK'D PG 11-1-77
REV. 2 SM 4-21-77 CHK'D PG
REV. 2 SM 4-21-77 CHK'D PG
REV. 2 SM 4-21-77 CHK'D PG

NOTE: - LENGTH OF A-H PLUG SHALL BE $\pm \frac{1}{16}$ " OF ACTUAL WALL THK. SHOP SHALL GRIND TO FIT, IF REQD.

DUKE POWER COMPANY
CHARLOTTE, N.C.
C-12517



MACHINE ENDS
PER SKETCH CT-D-2

Nuclear Safety Related

CLASS Duke B LINE SPEC PS 1500.5 (01) APP. CODE EN-101 III CL 2 NO. REQ'D 1

| | | | | | | | |
|-----------------------|-------------------------------------|------------------|-------------------------------------|------------|-------------------------------------|---------------------|-------------------------------------|
| Radiography (RT) | <input checked="" type="checkbox"/> | Special Marking | <input type="checkbox"/> | Preheat | <input checked="" type="checkbox"/> | Cert. of Compliance | <input type="checkbox"/> |
| Mag. Particle (MT) | <input checked="" type="checkbox"/> | Solvent Cleaning | <input checked="" type="checkbox"/> | Heat Treat | <input checked="" type="checkbox"/> | Mill Test Report | <input checked="" type="checkbox"/> |
| Lin. Penetration (PT) | <input type="checkbox"/> | Painting | <input checked="" type="checkbox"/> | Cap Stamp | <input checked="" type="checkbox"/> | Data Reports | <input checked="" type="checkbox"/> |

SYSTEM MAIN STEAM (M) FAB. SPEC. ASME
REF. DRWG NO. CT-01-26X PRESS. 1250 PSI TEMP. 630 °F WT. 12.4 LBS.
PIECE MARK SM-5C REGISTER CT-01-26X

Duke Power Company / CHARLOTTE, N.C. / C-12517
 Job Name: CATAWBA UNIT #1
 Job No.: CAT-5M-5C
 Materials Record
 Production Planner:

Sheet 3 of 3
 Revision No. A-5M
 Contract No. 7127
 Location:

| PART NUMBER | DESCRIPTION | QTY OR LENO | HEAT NUMBER | QUALITY CONTROL | PROCESS | TATURI UM | UNIT PRICE | ACCOUNTING MATERIAL |
|-------------|---|-------------|-------------|-----------------|---------|-----------|------------|---------------------|
| | | | | | | | | |
| 100 | 26.438" J. DXI-750NW. SMLS | 1 | J-600 | | | F | | |
| | CS, PIPE TO ASMF, SA-106C | | | | | | | |
| | 3/4" 3000# CS, SPECIAL WELD | 1 | AUA | OP-1 | | E | | |
| | BOSS TO SA-105, PER DET. | | | | | | | |
| | SKATE CT-WB-1 | | | | | | | |
| | DITTO | 1 | AUA | OP-1 | | E | | |
| | DITTO | 1 | AUA | OP-1 | | E | | |
| | DITTO | 1 | AUA | OP-1 | | E | | |
| | DITTO | 1 | AUA | OP-1 | | E | | |
| | 1/2" ACCESS HOLE PLUG, PER CT-411, SA-105, H-1710 | 1 | ABF | OP-1 | | E | | |
| | DITTO | 1 | ABF | OP-1 | | E | | |

Code: 5000 Class: DUKE B
 Job Supplement: A-5M
 Nuclear Safety Rating: D
 MFG. Code: 21-1-711

CONTRACT 1127

NO. SKS 07-54 CC

REV. 01 08-68

CLASS B

SPECIFICATION JS-118-2

SUPPLEMENT

WELD DATA

| PREPARE | | WELDER
I.D. | WELD MAT'L | INTERMEDIATE | | FINAL | | FT. DATE | Q.C. | INSP. | POST & INSP. |
|------------|------------|----------------|------------|----------------|------------|----------------|------------|----------|------|-------|--------------|
| WELD MAT'L | Q.C. INSP. | | | WELDER
I.D. | WELD MAT'L | WELDER
I.D. | WELD MAT'L | | | | |
| | | PROC | | PROC | | PROC | | | | | |
| 1-4-3-3 | | 337 | 065118 | 337 | 1A65 | 337 | | | | | |
| 1-4-3-3 | 8377 | 0013 | 065118 | 0011 | 065118 | 0015 | 8377 | | | | 8-11 |
| 1-4-3-3 | | PROC | 1-4-3-3 | PROC | 1-1-3-5 | PROC | 1-1-3-5 | | | | |
| 065118 | | 0174 | 065118 | C154 | 1A65 | C154 | 1A65 | | | | |
| 065118 | 8377 | 8-3 | 065118 | 8-3 | 1A65 | 8-3 | 1A65 | 8377 | | | 8-11 |
| 1-4-3-3 | | PROC | 1-4-3-3 | PROC | 1-1-3-5 | PROC | 1-1-3-5 | | | | |
| 065118 | | 337 | 065118 | 337 | 1A65 | 337 | | | | | |
| 065118 | 8377 | 0013 | 065118 | 0011 | 065118 | 0015 | 8377 | | | | 8-11 |
| 1-4-3-3 | | PROC | 1-4-3-3 | PROC | 1-1-3-5 | PROC | 1-1-3-5 | | | | |
| 065118 | | 337 | 065118 | 337 | 1A65 | 337 | | | | | |
| 065118 | 8377 | 0013 | 065118 | 0011 | 065118 | 0015 | 8377 | | | | 8-11 |

STRESS LINE

FINAL INSP. 9-27-77



SPECIAL OPERATIONS: C DIM.

Q.C. DOC. APPROVAL

9-15-77

WALL THK.

WALL THK. 1/4" MIN. TO 1/2" MAX.

WALL THK.

A/I STAMP/DATE/PROJECT

9-15-77

CURT INSP.

CURT INSP.

CURT INSP.

CURT DOC APPROVAL

MAGNETIC PARTICLE EXAMINATION REPORT

CUSTOMER Duke Power CONTRACT/PO NO: 2127
 SPECIFICATION IEEE-MTP-1-1 QUALITY REQUIRED: ~~IEEE~~ MTA-1
 EXAMINATION METHOD DC Prods
 EQUIPMENT TYPE: M-3000
 ITEM OR PART NAME: CT-01-26x PC-W-K-CT-5M-5C
 SYSTEM/WHEN REQUIRED: MN. STM

| ITEM IDENTIFICATION
WELD/SERIAL/H.T. NO. | SIZE AND THICKNESS | AREA EXAMINED
(INDICATE, ROOT, INTERMEDIATE,
FINAL WELD OR MATERIAL AS
APPLICABLE) | INTERPRETATION |
|---|--------------------|---|----------------|
| B | 3/4" 2000# 2025 | FINAL | Accept |
| C | " " " | " | " |
| D | " " " | " | " |
| E | " " " | " | " |
| F | " " " | " | " |
| FILLET WELDS ON CODE PLATE | | " | " |
| | | | |
| | | | |
| | | | |
| | | | |

 EXAMINATION PERFORMED BY: J. Grubman

 DATE: 8-11-77

 ASNT LEVEL: II

 INTERPRETATION PERFORMED BY: J. Grubman

 DATE: 8-11-77

 ASNT LEVEL: II

 APPROVAL: J. Grubman

 DATE: 8-11-77

 ASNT LEVEL: II

J. I. Grinnell Industrial Piping Inc.

KERRILLSVILLE, N. C.

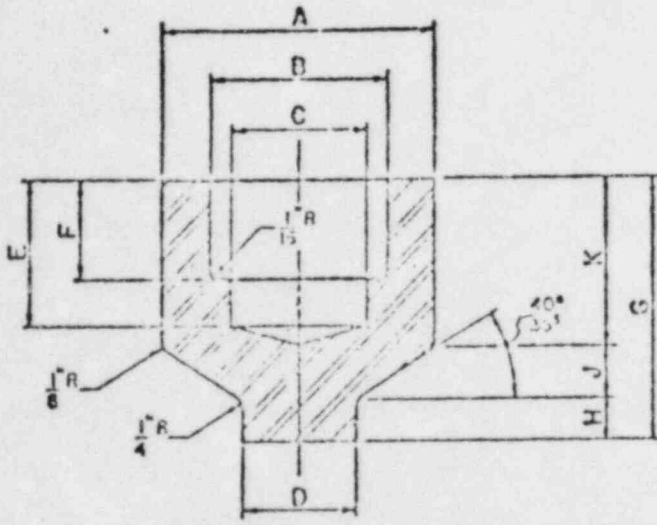
7127 & 7128

DUKE POWER COMPANY
GREENSBORO UNIT # 1 & 2

DRWN *SM* 10-14-76

CHK'D *PG* 10-14-76

REV. _____ CHK'D _____
REV. _____ CHK'D _____
REV. _____ CHK'D _____



| N.P.S. | A
±0.031" | B
±0.001" | C
±0.031" | D
±0.031" | E
±0.031" | F
±0.031" | G
±0.031" | H
±0.031" | J
±0.031" | K
±0.031" |
|--------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1/2" | 1.000 | 0.650 | 0.470 | 0.313 | 0.750 | 0.500 | 1.375 | 0.100 | 0.400 | 0.750 |
| 3/4" | 1.700 | 1.070 | 0.534 | 0.400 | 0.613 | 0.503 | 1.500 | 0.100 | 0.494 | 0.920 |
| 1" | 2.250 | 1.335 | 0.701 | 0.556 | 0.675 | 0.625 | 1.700 | 0.250 | 0.600 | 0.901 |
| 1 1/2" | 2.500 | 1.670 | 1.150 | 1.031 | 1.000 | 0.688 | 1.875 | 0.250 | 0.503 | 1.063 |
| 1 1/2" | 3.000 | 1.920 | 1.300 | 1.203 | 1.000 | 0.750 | 2.000 | 0.250 | 0.703 | 1.047 |
| 2" | 3.025 | 2.401 | 1.603 | 1.563 | 1.250 | 0.675 | 2.500 | 0.250 | 0.703 | 1.469 |

SOCKET WELD

LINE SPEC _____

APP. CORR. _____

NO. REVD _____

| | | | |
|--------------|-----------------------|--------------------|-----------------------------|
| BY: _____ | Special Marking _____ | Project _____ | Cont. of Construction _____ |
| CHK'D: _____ | Special Order _____ | Rev. _____ | Mat'l. & Equip. _____ |
| DATE: _____ | Parting _____ | Contract No. _____ | Plant Report _____ |

FAB. PART NO. _____

QTY. _____

PREP. _____

EST. _____

TE. _____

ISS. _____

REV. _____

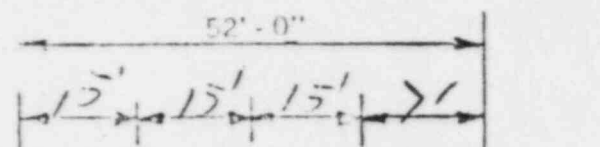
REV. _____

FURNACE LOAD SHEET

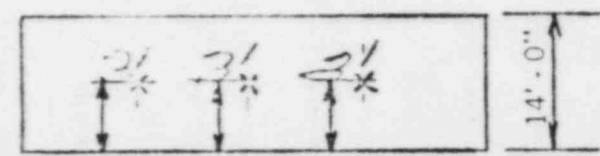
Load Number _____

Date 8-10-77

| REGISTER NO. | SKETCH NO. | TYPE MATERIAL | WEIGHT | TEMP. REQD.* | RATE OF HT PER HR | HOLD TIME | RATE OF COOLING PER HOUR | SPEC. NO. | TIME IN | TIME OUT |
|--------------|------------|---------------|--------|--------------------|-------------------|-----------|--------------------------|-----------|---------|----------|
| RF | 61-20 | F106C | 1461 | 1150 ^{±5} | 1150 ⁰ | 2 hrs | 100 ⁰ S | II | 6" | 1.25.00 |
| CT | 01-35X | II | 14,934 | II | II | | II | III | 24" | 1.25.00 |
| CT | 01-7X | II | 14,934 | II | 1150 ⁰ | | 100 ⁰ S | II | 24" | 1.25.00 |
| CT | 01-26X | II | 14,934 | II | | | II | III | 24" | 1.25.00 |
| ZT | 03-10 | MISS K&S | 11,700 | II | | | | II | 24" | 1.25.00 |
| ZI | 04-4 | F106C | 4,558 | II | | | | II | 11.2" | 1.25.00 |
| ZJ | 13-50 | II | 1,820 | II | | | | II | 24" | 1.02.30 |



PLAN



ELEVATION

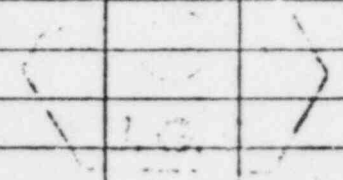
THERMOCOUPLE LOCATIONS

1/2 INCH EQUALS 30MM
S/N RECORDER AND PING
C70-53483-1-1 SQ 33976001

2 1/2

2

3 1/2



* Temperature variation within any 15 foot interval of weld length shall not exceed 250 degrees F

Load Inspection to insure against local flame impingement
O. C. Stamp _____

DEG. FAHR.

800

1000

1200

1400

1600

1800

2000

2200

PF 61-20.

CT 01-35X

CT 01-7X

CT 01-26X

ZI 03-10

ZI 04-4

ZI 13-50.

3/4 INCH EQUALS 30MIN
S/N RECORDER AND PROGRAM
C70-53468-1-1 SO333975 01

TIME TO REACH TEMP 2 1/2 HRS
TIME AT TEMP 2 HRS
TIME TO COOL 3 1/4 HRS



DEG. FAHR

800

1000

1200

1400

1600

1800

2000

2200

Load Sheet # 536

7:00 PM 8-10-77

Catawba

IRON WORKS, CO.
P. O. BOX 1217
HOUSTON, TEXAS 77001

111 MITCHELL INDUSTRIAL PIPING, INC.
KEMERSVILLE, NC 27214

ASME QUALITY SYSTEM CERTIFICATE (REV. 1-6-60)
NO. N-1261 EXPIRES 10-27-76.

Date 22 July 1976

| | | |
|----------------------------------|----------------------------------|---|
| Customer Order No.
KER-2353-F | C.I.W. Sales Order No.
F-5696 | Specification
ASME-SA106 Gr. C and ASME-Section III, Class 2
Thru Summer 1975 Addenda |
| Description of Material | O.D. 31.433" | WALL 1.750" M.W. |
| C.I.W. Part No. 06-5696-332-314 | | |

| Heat No. | Location or Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|-----|------|------|-----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |
| 6000 | | .24 | .86 | .010 | .013 | .20 | | | |

| Quantity or Lot No. | Heat No. | Test Loc. | Tensile PSI | Yield Point % Offset Yield PSI | MECHANICAL PROPERTIES | | | | | Specimen Size | Test Lot# |
|---------------------|----------|-----------|-------------|--------------------------------|-----------------------|-------------|------------|-----------|------------------|---------------|-----------|
| | | | | | % Elong. 2 In. | % Red. Area | Macro Etch | Bend Test | Flat-tening Test | | |
| 4 | J 6000 | Trans. | 76,400 | 40,200 | 28.2 | 56.0 | | | OK | .505 | 546 |

| Forg. Ser. # | Test Lot# |
|--------------|-----------|
| #26547N | 546 |
| 26547Y | 546 |
| 26548W | 546 |
| 26548Y | 545 |

CATAWBA
PH9



Hydrostatic Test Each length of pipe hydrostatically tested at 2400 psi for 5 sec. and found acceptable.

Heat Treatments:

Subscribed and Sworn to before me this 22nd Day of July 1976

[Signature]
Notary Public
R. A. HIGHTON
Notary Public in and for the State of Texas
My Commission Expires June 1, 1977

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

[Signature]
Metallurgical Representative
O. WRIGHT

The Colonial Machine Company, Inc.

P. O. Box 290 Pleasantville, Pa. 16341

Phone (412) 599-1011

May 31, 1977

ITT Grinnell Industrial Piping Inc.
P. O. Box 566
Kernersville, NC 27284

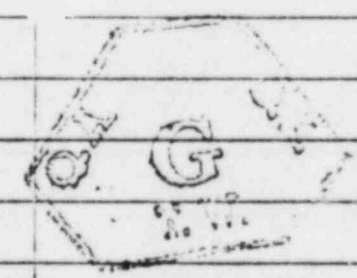
CERTIFIED MILL TEST REPORT

pick CT
SUS-4

| | | |
|--------------|--------------|--------------|
| OUR ORDER NO | OUR ORDER NO | DATE SHIPPED |
| KBR 6156-P | 10632 | 6/1/77 |

| ITEM | TYPE | MATERIAL SPEC | QUANTITY | SHIPPED | HEAT NO. | CLASS. |
|-----------------------|------|--|----------|---------|----------|--------|
| ASME SA195 NORMALIZED | | | | | | |
| 1 | | 3/4" S/W Spec. Weld Bosses per SK CT-WB-1
Pt. No. Y*A*SE* CT-3002-1 (Rev. 0 10/14/76) | 40 | | N94153 | AAA |
| 2 | | 1" Ditto Pt. No. Y*A*SE* CT-3002-2 | 20 | | E87257 | AAA |
| 3 | | 2" Ditto Pt. No. Y*A*SE* CT-3002-3 | 12 | | A00070 | AAA |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CB | TI | CO | OTHER ELEMENTS |
|------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| 1 | .32 | .80 | .006 | .021 | .22 | | | | | | | | |
| 2 | .26 | .78 | .011 | .027 | .24 | | | | | | | | |
| 3 | .32 | .74 | .017 | .026 | .19 | | | | | | | | |



| ITEM | TENSILE | 2% YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1. 2. 3. 4. 5. 6. ETC. |
|------|---------|----------|----------|--------|----------|--------------------|---------------------------------|
| 1 | 76700 | 36800 | 34.0 | 58.2 | | | Mill Source - U.S. Steel |
| 2 | 75000 | 47000 | 32.0 | 61.3 | | | Mill Source - " " |
| 3 | 75360 | 42770 | 31.0 | 52.4 | | | Mill Source " " |

INSPECTION WAIVED PER MR. TOM WILSON ON 5/31/77.

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.

dg

By *Rosemary P. Wagoner*

The Colonial Machine Company, Inc.

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

Phone (814) 539-7033

ITT Grinnell Industrial Piping Inc.
P. O. Box 566
Kernersville, NC 27284

May 20, 1977

CERTIFIED MILL TEST REPORT

CT
N.P. 1

| | | |
|------------------------------------|-------------------------------|--------------------------------|
| OUR ORDER NO.
KER 6117-B | OUR ORDER NO.
10013 | DATE SHIPPED
5/25/77 |
| ITEM TYPE | MATERIAL SPEC. | SHIPPED HEAT NO. CWT. |

ASME SA105

| | | | | |
|---|--|----|-------|-----|
| 1 | 1.13" Access Plugs per CT-AH-1, H = 1.75"
Pt. No. ****SF* CT-4005-1 | 12 | 78849 | ABF |
| 2 | 1.13" Access Plugs per CT-AH-1, H = 1.375"
Pt. No. ****SF* CT-4005-2 | 25 | 78849 | ABF |
| 3 | 1.13" Access Plugs per CT-AH-2, H = 1.375"
Pt. No. ****SF* CT-4005-3 (Sq. Head) | 30 | 78849 | ABF |
| 4 | 1.13" Access Plugs per CT-AH-1, H = 2.626"
Pt. No. ****SF* CT-4005-4 | 16 | 78849 | ABF |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | OR | TI | CO | OTHER ELEMENTS |
|------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| -4 | .26 | .71 | .013 | .025 | .23 | | | | | | | | |



| ITEM | TENSILE | 2% YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-ABILITY | REMARKS: 1. 2. 3. 4. 5. 6. ETC. |
|------|---------|----------|----------|--------|----------|----------------|---------------------------------|
| 1-4 | 75000 | 48500 | 32.0 | 58.6 | | | Mill Source - Copperweld |

INSPECTION WAIVED PER MR. TOM WILSON ON 5/23/77.

We hereby certify that the information contained hereon has been taken from the original dg 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.

By *Roman R. Wojcik*



UNION CARBIDE CORPORATION

LINDE DIVISION

WELDING MATERIALS

P.O. BOX 710, ASHTABULA, OHIO 44004

CT
WV13

July 15, 1977

CUSTOMER: Industrial Welding Supply
2501 Champagne
Ashboro, N.C. 27203
(For: IIT Grinnell)

YOUR ORDER NO.: 11-476
LINDE S.O. NO.: 011476 U
QUANTITY: 420 lbs.

MATERIAL: Linde 65 - Heat No. 065118 - 1/8" Diameter x 36" Straight Lengths

This is to certify that Linde 65, Class E70S-2, as supplied under the above order number, shipped from one heat number, has been tested using the test assembly specified in Fig. 5 of AWS A5.18-69, and ASME SPAS.18 specifications. The wire met all the mechanical and impact property requirements of these specifications using the gas-tungsten arc welding process with Argon shielding gas. During the manufacturing processes, tests, and inspections, the materials furnished under this contract have not come in direct contact with mercury or any of its compounds nor with any mercury-containing device employing a single boundary of containment.

| MECHANICAL PROPERTIES OF WELD(S) PER TABLE 3 - | AS-WELDED | * STRESS RELIEVED | REQUIRED |
|--|-----------|-------------------|-------------|
| Weld Test Number | G0524-1 | G0526-1 | |
| All-Weld Metal Tensile | | | |
| Yield Strength, psi | 69,400 | 70,900 | 60,000 min. |
| Ultimate Strength, psi | 79,700 | 83,900 | 72,000 min. |
| Elongation in 2", % | 32.5 | 30.0 | 22 min. |
| Reduction of Area, % | 79.0 | 74.1 | ----- |

CHARPY V-NOTCH IMPACT STRENGTH @ -20°F (ft./lbs.)

| As-Welded | * S.R. |
|----------------|----------------|
| 126.5 | 130.0 |
| 101.5 | 95.0 |
| 120.5 | 97.5 |
| 100.0 | 66.0 |
| 79.5 | 132.5 |
| 107.3 (Ave. 3) | 107.5 (Ave. 3) |

LATERAL EXPANSION (INCHES)

| As-Welded | * S.R. |
|-----------|--------|
| .076 | .085 |
| .074 | .067 |
| .080 | .072 |
| .073 | .055 |
| .063 | .085 |

DUCTILE FRACTURE AREA (PERCENT)

| As-Welded | * S.R. |
|-----------|--------|
| 60 | 50 |
| 50 | 50 |
| 60 | 50 |
| 50 | 40 |
| 35 | |

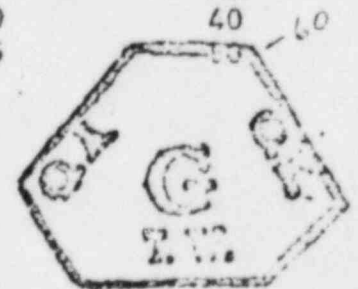
Required 20 ft./lbs.

RADIOGRAPHIC TESTS: X-ray(s) met the requirements of Fig. 1

APPLICATION CONDITIONS: 230 Amps, 15 Volts, 5/6 Inches Per Minute

CHEMICAL ANALYSIS:

| C | Mn | P | S | Si | Al | Ti | Zr | Ni | Cr | Mo | V | Cu | |
|------|------|------|------|-----|-----|-----|-----|-----|-----|------|------|-----|---------------|
| .04 | 1.11 | <.01 | .017 | .55 | .11 | .06 | .03 | .03 | .01 | <.01 | <.01 | .01 | - Actual |
| .06 | .90 | .025 | .035 | .40 | .05 | .05 | .02 | --- | --- | --- | --- | --- | - Required |
| max. | 1.40 | max. | max. | .70 | .15 | .15 | .12 | | | | | | < = less than |



Weldment Stress Relieved at 1125°F, plus or minus 25°F, for 8 hours. Cooling rate 100°F/hr. to 500°F, then air cooled.

Sworn to before me this _____ day of _____

R. J. Edonato
Materials Standards Specialist

PIZZI E. TAVARO
Entry File # 011476 U

CT.
W611

5-2-78

KER 5365-P

Customer Order No. 4352 Rel #14-3753
Order No. 518321-1

NATIONAL WELDERS
551 NINTH STREET NE
WINSTON SALEM, N. C.
PO #14-3963

Shipped _____

This material conforms to Specification
SFA 5.1 &
Code II Spec.

E 7018

Trade Name or Trademark: Atom Arc 7018
Diameter Size: 3/32"
Lot Number: 17,500 lb.
Heat Number: B713NIAC
402A2291

Type: E 7018
Test No. 626
X-Ray Satisfactory
Control No. KKK075

Moisture @1800°F. 0.11%
Concentricity 4%
Type Steel A-285

Carbon .05
Manganese 1.09
Chromium .06
Nickel .01
Silicon .59
Columbium + Tantalum
Molybdenum .02
Tungsten
Copper .01
Titanium
Phosphorus .012
Sulphur .014
Vanadium .03

| Test No. | Full | Split | Volts | Amps |
|--------------------|-----------|-------|--------------------------|------|
| Tensiles & Impacts | 1 | 6 | 21 | 95 |
| Test Results: | As Welded | | Stress Relieved | |
| | | | 8 hrs. @1225°F. -1250°F. | |
| Yield | 72,400 | | 71,100 | |
| Tensile | 86,300 | | 82,800 | |
| Elongation | 24.0% | | 27.0% | |
| Red. of Area | 75.8% | | 76.0% | |

Charpy V-Notch Impacts Tested @-20°F.
Impacts 70-70-82-91-96 87-89-92-94-125
Lat. Exp. 55-56-63-72-74 73-75-75-80-74
% Shear 20-20-30-30-60 30-30-30-30-60

Fillets: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 29th day of April 1977

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

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

SEAL _____
Notary Public

My commission expires: 8-21-78

BY R. W. Boyer
R. W. Boyer

CERTIFIED MATERIALS TEST REPORT

NATIONAL WELDERS
GA DEPT.
Approved By: *Jim Male*
Date: *6-28-77*

CT
WW15

Customer Order No. 4365
Order No. 120315
Shipped

NATIONAL WELDERS
551 NORTH WALLET
WINSTON SALEM, N.C. 27105

This material conforms to Specification

ASME SFA5.1

E 7018

Trade Name or Trademark: *Atom Arc 7018*
Diameter Size: *1/8"*
Lot Numbers: *20,000 lb.*
02-1-E710R
Heat Numbers: *42TA1061*

Moisture @1800°F. 0.17%
Concentricity 4%
Type Steel A-285

Type
Test No. 976
X-Ray Satisfactory
Control No. LLL061

| | |
|----------------------|------|
| Carbon | .05 |
| Manganese | 1.11 |
| Chromium | .03 |
| Nickel | .02 |
| Silicon | .35 |
| Columbium + Tantalum | |
| Molybdenum | .01 |
| Tungsten | |
| Copper | .02 |
| Titanium | |
| Phosphorus | .012 |
| Sulphur | .021 |
| Vanadium | .02 |

| Test No. | Full | Split | Volts | A |
|--------------------|------|-------|-------|----|
| Tensiles & Impacts | 1 | 6 | 24 | 14 |

| Test Results: | As Welded | Stress Relieved |
|---------------|-----------|-----------------|
| Yield | 70,540 | 62,920 |
| Tensile | 78,150 | 75,750 |
| Elongation | 30.0% | 30.0% |
| Red. of Area | 73.2% | 78.1% |

8 hrs. @1150°F. / 1200°F.

Charpy V-Notch Impacts Tested @-20°F.

| | | |
|-----------|---------------------|---------------------|
| Impacts | 108-116-128-143-179 | 101-105-107-107-111 |
| Lat. Exp. | 79-80-88-86-72 | 81-80-82-78-83 |
| % Shear | 40-50-60-60-50 | 40-40-40-40-40 |

Filets: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

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

CHROMETRON CORPORATION
MEDICAL PRODUCTS DIVISION

BY *[Signature]*
R. W. Boyer



State of Penna. 1 SS
County of York 1

Subscribed and sworn to before me
this 16th day of June 19 77

SEAL
Notary Public
2-21-78



UNION CARBIDE CORPORATION
 LINDE DIVISION
 WELDING MATERIALS PLANT
 P.O. BOX 710, ASHTABULA, OHIO 44004

CT
 ww 19

November 9, 1976

Report of Ladle
 Chemical Analysis
 Welding Wire

ITT Grinnell
 Old Highway #421
 Kernersville, N.C. 27284

Your Order No. 06-901 Linde LOB
 LINDE Shipper's Order 005328 R02 Wire Size 1/8
 Quantity Shipped 25,899 LBS Stock No. 1184F32
 Date Shipped 11-3-76 Package 65# Coil
 Control _____

This is to certify that our records show that the material in the
 aforementioned shipment conforms to our standard specifications for this grade
 of LINDE welding wire and has the following analysis:

HEAT NUMBER - 402013

Carbon - .12
 Manganese - 1.14
 Phosphorous - .003
 Sulphur - .019
 Silicon - .02
 Copper - .055
 Molybdenum - .49



Ladle Analysis

Howard S. L. Tucker
 Quality Assurance - Welding Materials Plant
 Union Carbide Corporation - Linde Division

HJT/KLR

Grinnell Associates Inc.

655 N. HAMILTON AVE., CHICAGO, ILL. 60645 (AC 312) 670 2100

METAL



TESTING



Report No. 19926C - March 14, 1977

ITT Grinnell Industrial Piping, Inc.
P. O. Box 566
Highway 421
Kernersville, North Carolina 27284

Attn: Mr. Walter J. Sperko

S U B J E C T

Mechanical Testing of a Welded Plate Assembly
Marked No. 254. Per Requisition No. 28418.

BACKGROUND:

A welded plate assembly was submitted to our laboratory for mechanical testing. The assembly was identified as Test Plate No. 254 and had reportedly been welded with Linde 40B, heat 402013 with Linde 30 flux, lot 1164, con. #8264. The approximately 3/4 inch thick plate was to be impact and tension tested in the weld metal.

CT
ww19

TEST RESULTS:

Impact Testing:

Three full size Charpy V-notch impact test specimen were machined from the submitted plate assembly. The specimens were all notched in the weld metal and tested at plus 30° F with the following results:

| | <u>No. 1</u> | <u>No. 2</u> | <u>No. 3</u> |
|--------------------------|--------------|--------------|--------------|
| Absorbed Energy (ft-lbs) | 25 | 30 | 34 |
| Lateral Expansion (mils) | 30 | 31 | 33 |
| Percent Shear | 40 | 40 | 50 |

Tension Testing:

One round, reduced section, all weld metal, tension test specimen was machined from the submitted plate assembly. This specimen was subjected to a standard tension test with the following results:

| | |
|--------------------------|--------|
| Diameter (in.) | .504 |
| Area (sq.in.) | .1995 |
| Tensile Load (lbs.) | 15,625 |
| Tensile Strength, (psi.) | 78,320 |
| Yield Point (psi.) | 69,270 |
| % Elongation (2 in.) | 29 |
| % Reduction of Area | 58 |

Respectfully submitted,

Mark A. Hineman

Mark A. Hineman
Staff Engineer
TAUSSIG ASSOCIATES, INC.

DUKE POWER COMPANY
 QUALITY ASSURANCE DEPARTMENT
 SUPPLIER QUALITY ASSURANCE CERTIFICATION

Name of Supplier ITT Grinnell Ind. Piping, Inc.

Date 9-7-77

Address of Supplier Plant Fernersville, NC

Mill Power Order No. C-12517

Duke Item or Req. No. 1206.00-1.0

Spec. No. CNS-1206.00-1.0 Rev.

Supplier ID Nos. CT-5M-5D

Description of Component(s) or Material(s) Fabricated Piping Assembly

Attached Documentation covers all Components/Materials on Mill Power Order.
 Attached Documentation covers partial shipment of Components/Materials on Mill Power Order.

The following listed tests, inspections and reports have been completed as required by the specification:

- | | |
|--|--|
| <input type="checkbox"/> Physical & Chemical Analysis | <input type="checkbox"/> Major Repair Records & Charts |
| <input type="checkbox"/> Hydro (Test Pressure - PSIG <u> </u>) | <input checked="" type="checkbox"/> Personnel Qualifications on Record |
| <input type="checkbox"/> Design Report | <input checked="" type="checkbox"/> Stress Report |
| <input type="checkbox"/> Radiographic Test | <input type="checkbox"/> Ultrasonic Test |
| <input type="checkbox"/> Penetrant Test | <input type="checkbox"/> Repair NDE |
| <input type="checkbox"/> Operating Test | <input type="checkbox"/> Performance Curve |
| <input checked="" type="checkbox"/> Dimensional Check | <input type="checkbox"/> Deviation Record # <u> </u> |
| | <input type="checkbox"/> Heat Treatment |
| | <input checked="" type="checkbox"/> Magnetic Particle |
| | <input checked="" type="checkbox"/> Cleanliness |
| | <input checked="" type="checkbox"/> ASME Date Report |

1)

2)

3)

This certifies that the listed Component(s) or Material(s) conform to the requirements of the above referenced Duke Power documents including all codes, standards, test requirements and Quality Assurance requirements invoked therein.

DUKE POWER COMPANY
 QA RECORDS APPROVED
Gary L. Keener
 QA REPRESENTATIVE
 DATE 3/8/78

Thomas A. Smith
 Supplier Representative Authorized Signature

Title Min. of Proc Date 9-7-77

(See Instructions)

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

Sheet 1 of 3

1. Fabricated by ITT Grinnell Industrial Piping, Inc. Order No. 7127
(Name and Address of Fabricator) Kernersville, N. C.

2. Fabricated for Duke Power Company Charlotte, N. C. Order No. C-12517
(Name and Address)

3. Owner Duke Power Company 4. Location of Plant Newport, S. C.

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

(a) Drawing No. CT-01-35X Prepared by ITT Grinnell Industrial Piping, Inc.
(b) National Board No. N/A

6. The material, design, construction, and workmanship comply with ASME Code Section III, Class N-2
Edition 1974, Addenda Date Winter 1974, 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)

Supplemental Sheets 3 --- Drawings
3 --- Bill(s) of Material

7. Shop Hydrostatic Test Field psi.

8. Description of piping inspected Piece Mark Number CT-5M-5D
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length

See Attached Sheets
- fittings - flanges, etc.)

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 8-31-77 Signed ITT Grinnell Industrial Piping, Inc. By Thomas A. Smith
(Fabricator)

Certificate of Authorization Expires 7-16-79 Certificate of Authorization No. N 1456

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 N.C. and employed by * of Hartford, CT. have inspected the piping described in this Data Report on 9-7-77, 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. *The Hartford Steam Boiler Inspection and Insurance Company 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.

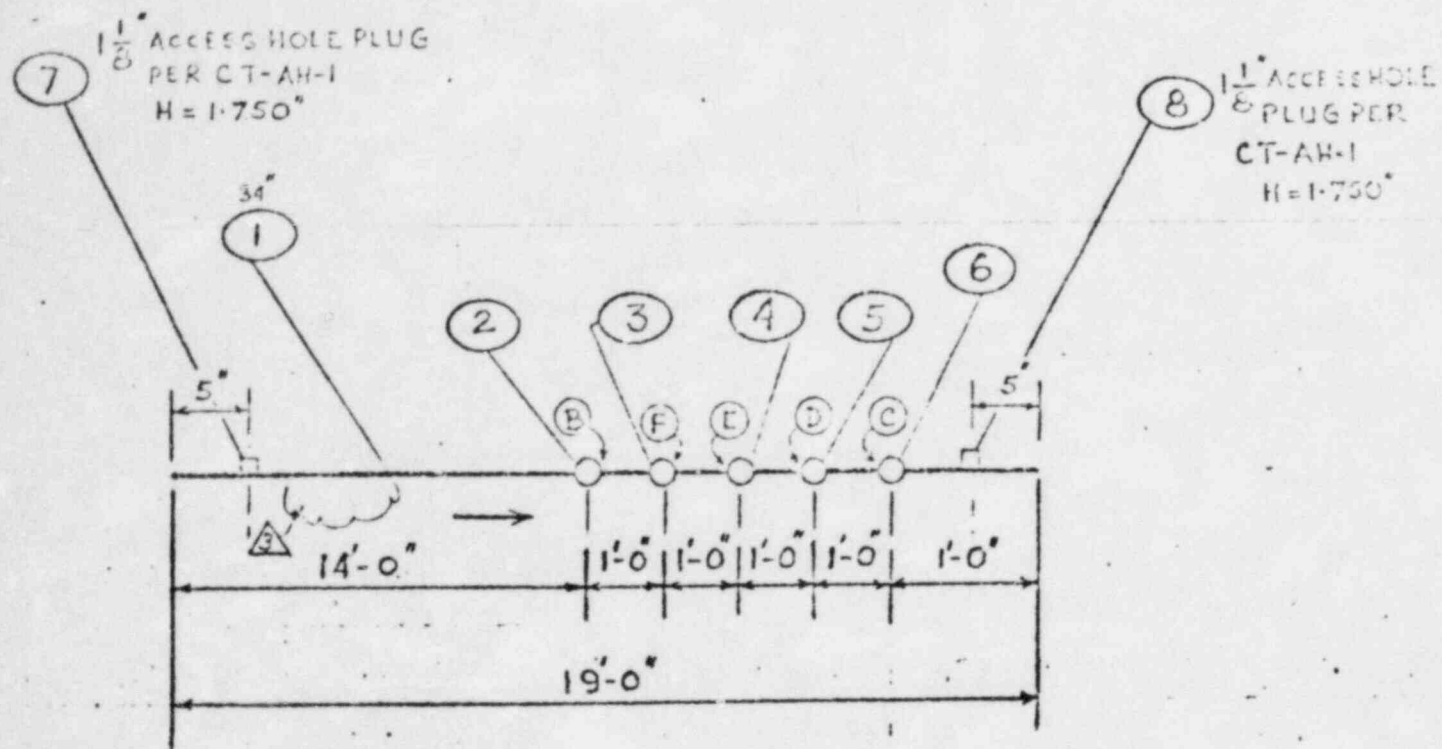
Dated 9-7-77 by Barry K. Bolte (Inspector) Commission No. N.C. - No. 878
National Board, State, Province and No.

* Supplemental sheets in form of...

UNIT NO. 7127
 NAME DUKE POWER COMPANY, CHARLOTTE, N.C.
 LOCATION CATAWBA UNIT #1 P.O. C-12517

DRW'N SM 4-21-77 CHK'D. PC 11-1-76
 REV. SM 4-21-77 CHK'D. EG
 REV. SM 6-19-77 CHK'D. EG
 REV. SM 7-20-77 CHK'D. EG

NOTE: - LENGTH OF AH-PLUG SHALL BE $\pm 1/16$ " OF ACTUAL WALL THK. SHOP SHALL GRIND TO FIT, IF REQD.



QUALITY CONTROL

MACHINE ENDS
 PER SKETCH CT-D-2

Nuclear Safety Related

CLASS DUKE B LINE SPEC PS 1500:5(01) APP. CODE ASME Sec. III, CL 2 NO. REQ'D 1

| | | | | | | | |
|----------------------|-------------------------------------|------------------|-------------------------------------|------------|-------------------------------------|---------------------|-------------------------------------|
| Radiography (RT) | <u>N/A</u> | Special Marking | | Preheat | <input checked="" type="checkbox"/> | Cert. of Compliance | |
| Mag. Particle (MT) | <input checked="" type="checkbox"/> | Special Cleaning | <input checked="" type="checkbox"/> | Heat Treat | <input checked="" type="checkbox"/> | Mill Test Reports | <input checked="" type="checkbox"/> |
| Eq. Examination (ED) | | Painting | <input checked="" type="checkbox"/> | Code Stamp | <input checked="" type="checkbox"/> | Data Reports | <input checked="" type="checkbox"/> |

SYSTEM MAIN STEAM (SM) FAB. SPECS. J.S. 113
 P. DRWG NO. CH-1191-5M 004 PRESS. 1230 PSI TEMP. 600°F. WT. 14936 LBS.
 DATE MARK CT-SM-5D REGISTER CT-01-35X

GRINNELL INDUSTRIAL PIPING, INC., KERNERSVILLE, N.C.

FORM GR-100-1-77
QA FORM 2.12

MIL 2 1977

Duke Power Co., Charlotte, N.C.

Order No. CT-01-35X P.O. C12517 MATERIALS RECORD Sheet 3 Of 3
 System: Main Steam PRODUCTION PLANNER Revision No. 1-01 Revision Date 1-21-77
 Part Mark CT-SM-5D Job Name DUKE POWER COMPANY Contract No. 7127 Location _____
CATAWBA UNIT #1

| PART NUMBER | DESCRIPTION | QUAN
OR
LENG | QUALITY CONTROL | | | ACCOUNTING/MATERIAL | | |
|-----------------------|---|--------------------|-----------------|------------------|------------|---------------------|--------------|-----|
| | | | HEAT
NUMBER | DOCUMENT IN PROG | STATUS U/M | UNIT PRICE
P.O. | DIG
LXCOR | NET |
| RECT CD
21-01-15-1 | 3.4
31.438" I.D X 1.750" MW. SML'S
CS PIPE TO ASME SA-106C | 12-0 | J-6000 | 265480 | (Circled) | F | P-9 | |
| Y-A
CT-3-2-1 | 0.75
3/4" 3000# CS, SPECIAL WELD
BOSS TO SA-105, PER DET.
SK-# CT-WB-1 | 1 | AUA | SWT-4
SJM | (Circled) | E | | |
| Y-A
CT-3-2-1 | 0.75
DITTO | 1 | AUA | SWT-4
SJM | (Circled) | E | | |
| Y-A
CT-3-2-1 | 0.75
DITTO | 1 | AUA | SWT-4
SJM | (Circled) | E | | |
| Y-A
CT-3-2-1 | 0.75
DITTO | 1 | AUA | SWT-4
SJM | (Circled) | E | | |
| Y-A
CT-3-2-1 | 1.2
1" ACCESS HOLE PLUG PER
CT-AH-1, SA-105, H=1.750" | 1 | ABF | RP-1
SJM | (Circled) | E | | |
| Y-A
CT-3-2-1 | 1.2
DITTO | 1 | ABF | RP-1
SJM | (Circled) | E | | |

SHOP COPY LAYOUT
 DELETED
 JUL 27 77

PROJECT USS POWDER
 SYSTEM Weld Shop

CONTRACT -1127
 CLASS B

DC. MKK CT-54-5D
 SPECIFICATION JS-118-2

REG. # CT-01-384
 SUPPLEMENT

WELD DATA

| WELD | FIT-UP/PREPAR | | | WELDER I.D. | ROOT | WELDER I.D. | INTERMEDIATE | WELDER I.D. | FINAL | Q.C. | CUST. | SOFT FINAL | |
|----------|---------------------|-------------|---------------|-------------|---------------------|---------------------|---------------------|-------------|--------------|--------------|-------------|--------------|--------------|
| | WELDER I.D. | WELD MAT'L | Q.C. INSP. | | WELD MAT'L | | WELD MAT'L | | WELD MAT'L | | | | Q.C. INSP. |
| <u>A</u> | <u>PROC 1-4-3-2</u> | <u>C210</u> | <u>065150</u> | <u>PROC</u> | <u>PROC</u> | <u>PROC</u> | | | | | | | |
| <u>B</u> | <u>PROC 1-4-3-2</u> | <u>C210</u> | <u>065150</u> | <u>PROC</u> | <u>PROC 1-4-3-3</u> | <u>PROC 1-1-3-5</u> | <u>PROC 1-1-3-5</u> | <u>C-49</u> | <u>C-145</u> | <u>1-ABS</u> | <u>C-49</u> | <u>C-145</u> | <u>1-ABL</u> |
| <u>C</u> | <u>PROC 1-4-3-2</u> | <u>C210</u> | <u>065150</u> | <u>PROC</u> | <u>PROC 1-4-3-3</u> | <u>PROC 1-1-3-5</u> | <u>PROC 1-1-3-5</u> | <u>C-49</u> | <u>C-145</u> | <u>1-ABS</u> | <u>C-49</u> | <u>C-145</u> | <u>1-ABL</u> |
| <u>D</u> | <u>PROC 1-4-3-2</u> | <u>C210</u> | <u>065150</u> | <u>PROC</u> | <u>PROC 1-4-3-3</u> | <u>PROC 1-1-3-5</u> | <u>PROC 1-1-3-5</u> | <u>C-49</u> | <u>C-145</u> | <u>1-ABS</u> | <u>C-49</u> | <u>C-145</u> | <u>1-ABL</u> |
| <u>E</u> | <u>PROC 1-4-3-2</u> | <u>C210</u> | <u>065150</u> | <u>PROC</u> | <u>PROC 1-4-3-3</u> | <u>PROC 1-1-3-3</u> | <u>PROC 1-1-3-3</u> | <u>C-49</u> | <u>C-145</u> | <u>1-ABS</u> | <u>C-49</u> | <u>C-145</u> | <u>1-ABL</u> |

STRESS DATE

FINAL INSP.

SPECIAL OPERATIONS:
C DIM.

Q.C. DOC. APPROVAL

SQUARE UP

*42242291/B713NIAC
*421A101/02-1-E7100

WALL THK.

A/I STATE DATA REPORT
ANZ (63)
9-7-77

CLEAN UP

CUST INSP

OTHER

CUST DOC APPROVAL

PROJECT LAKE LOWER
SYSTEM MAIN ST

CONTRACT 1127
CLASS B

DC. MK# CT-5M-50
SPECIFICATION J3-118

REG.# CT-01-304
SUPPLEMENT

WELD DATA

| WELD | FIT-UP/TREATMENT | | | ROOT | INTERMEDIATE | | | FINAL | | | QC DATE | | FOOT | FINAL |
|------|------------------|------------|------------|--------|--------------|------------|-------------|------------|-------------|------------|------------|------|------|-------|
| | WELDER I.D. | WELD MAT'L | Q.C. INSP. | | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | Q.C. INSP. | Q.C. | | |
| F | PROC | 1-4-3-2 | | PROC | 1-4-3-3 | PROC | 1-1-3-5 | PROC | 1-1-3-5 | | | | | |
| | 210 | 065150 | (136) | C-145 | 065119 | C-145 | 1-ABS* | C-49 | 1-ABW* | (136) | - | - | - | |
| DATE | 7/17/77 | ww12 | 7/27/77 | 8-3-77 | ww13 | 8-3-77 | ww11 | 8-3-77 | ww10 | 8-4-77 | | | | 8-11 |
| F | PROC | 1-4-3-3 | | PROC | | PROC | | PROC | | | | | | |
| | 210 | 065150 | (136) | | | | | | | | | | | |
| DATE | 7/19/77 | ww12 | 7/29/77 | | | | | | | | | | | 8-11 |
| | PROC | | | PROC | | PROC | | PROC | | | | | | |
| DATE | | | | | | | | | | | | | | |
| | PROC | | | PROC | | PROC | | PROC | | | | | | |
| DATE | | | | | | | | | | | | | | |
| | PROC | | | PROC | | PROC | | PROC | | | | | | |
| DATE | | | | | | | | | | | | | | |

| | | | |
|---------------|----------------------|---------------------|-----------------------|
| STRESS DATE | FINAL INSP. | SPECIAL OPERATIONS: | Q.C. DOC. APPROVAL |
| | 8-29-77 (136) | C DIM. | FT. 8/30/77 |
| SQUARE UP | *402A0091/B713N1AC | WALL THK. | A/I STATE/DATA REPORT |
| 8-11-77 (136) | *421A1061/02-1-E710K | | ANI (136) |
| CLEAN UP | CUST INSP | OTHER | 9-7-77 |
| | | | CUST DOC APPROVAL |

MAGNETIC PARTICLE EXAMINATION REPORT

CUSTOMER Duke PWR CONTRACT/PO NO: 7129
 SPECIFICATION ASNT-MTP-1-1 QUALITY REQUIRED: ASNT-MTA-1
 EXAMINATION METHOD D.C. Prods
 EQUIPMENT TYPE: M-3000
 ITEM OR PART NAME: CT-01-35A PC-A.K.-CT-SM-5D
 SYSTEM/WHEN REQUIRED: MN. STM

| ITEM IDENTIFICATION
WELD/SERIAL/H.T. NO. | SIZE AND THICKNESS | AREA EXAMINED
(INDICATE, ROOT, INTERMEDIATE,
FINAL WELD OR MATERIAL AS
APPLICABLE) | INTERPRETATION |
|---|--------------------|---|----------------|
| B | 3/4" 3000# BOSS | FINAL | Acc'd |
| C | " " " | " | " |
| D | " " " | " | " |
| E | " " " | " | " |
| F | " " " | " | " |
| FILLET WELDS ON POPE PLATE | | " | " |
| | | | |
| | | | |
| | | | |
| | | | |

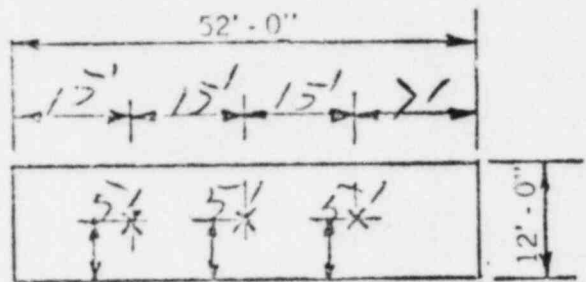
EXAMINATION PERFORMED BY: J. Archana DATE: 8-11-77
 ASNT LEVEL: II
 INTERPRETATION PERFORMED BY: J. Archana DATE: 8-11-77
 ASNT LEVEL: II
 APPROVAL: J. Archana DATE: 8-11-77
 ASNT LEVEL: II

FURNACE LOAD SHEET

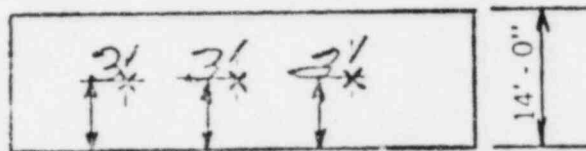
Load Number _____

Date 8-10-77

| REGISTER NO. | SKETCH NO. | TYPE MATERIAL | WEIGHT | TEMP. REQD.* | RATE OF HT PER HR | HOLD TIME | RATE OF COOLING PER HOUR | SPEC. NO. | TIME IN | TIME OUT |
|--------------|------------|---------------|--------|---------------------|-------------------|-----------|--------------------------|-----------|---------|----------|
| DF | 61-20 | A106C | 1461 | 1150 ^{±25} | 400 ⁰ | 2 hr | 100° S. I | | 6" | 1.25 hr |
| CT | 01-35X | " | 14,934 | " | 1150 ⁰ | | 100° S. I | | 34" | 1.25 hr |
| CT | 01-7X | " | 14,934 | " | 1150 ⁰ | | 100° S. I | | 34" | 1.25 hr |
| CT | 01-26X | " | 14,934 | " | | | S. I | | 34" | 1.25 hr |
| ZI | 03-10 | A106C | 11,700 | " | | | | | 5 1/4" | .77 hr |
| ZI | 04-4 | A106C | 4558 | " | | | | | 11.6" | 1.26 hr |
| ZJ | 13-50 | " | 1820 | " | | | | | 6" | 1.02 hr |



PLAN

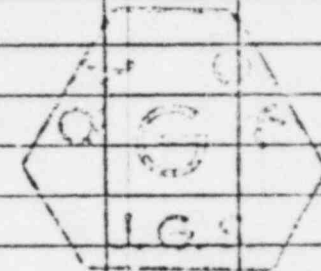


ELEVATION

THERMOCOUPLE LOCATIONS

1/2 INCH EQUALS 30MM
S/N RECORDER AND PROGRAM
C70-53468-1-1 SO333975001

TIME TO ... 2 1/2
TIME TO ... 2
TIME TO ... 3 1/2



- Copy 1 - Shop File
2 - O. C.
3 - Billing
4 - Meter Log Clerk

* Temperature variation within any 15 foot interval of weld length shall not exceed 250 degrees F

Load Inspection to insure against local flame impingement
O. C. Stamp



DEG. FAHR.

800

1000

1200

1400

1600

1800

2000

PF 61-20.

CT 01-35X

CT 01-7X

CT 01-2.6X

ZI 03-10

ZI 04-4

ZI 13-50.

3/4 INCH EQUALS 30MIN
S/N RECORDER AND PROGRAM
C70-53468-1-1 S033975 01

TIME TO REACH TEMP 2 1/2 HR
TIME AT TEMP 2 HR
TIME TO COOL 3 1/2 HR



DEG. FAHR.

800

1000

1200

1400

1600

1800

2000

Load Sheet # 536

7:00 PM 8-10-77

Camero

IRON WORKS, INC.

P. O. BOX 1212
HOUSTON, TEXAS 77001

ITT GRINNELL INDUSTRIAL PIPING, INC.
KERNERSVILLE, NC 27234

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

Date 22 July 1976

| | | |
|----------------------------------|----------------------------------|---|
| Customer Order No.
KER-2353-P | C.I.W. Sales Order No.
F-5696 | Specification
ASME-SA106 Gr. C and ASME-Section III, Class 2
Thru Summer 1974 Addenda |
|----------------------------------|----------------------------------|---|

| | | | |
|-------------------------|------|---------|-------------|
| Description of Material | O.D. | x I.D. | x WALL |
| | | 31.438" | 1.750" M.W. |

C.I.W. Part No. 86-5696-352-314

| Heat No. | Location or Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|----|---|---|----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |

| | | | | | | | | | |
|------|--|-----|-----|------|------|-----|--|--|--|
| 6000 | | .24 | .86 | .010 | .013 | .20 | | | |
|------|--|-----|-----|------|------|-----|--|--|--|

| Quantity or 1/1 No. | Heat No. | Test Loc. | Tensile PSI | Yield Point % Offset Yield PSI | MECHANICAL PROPERTIES | | | Macro Etch | Bend Test | Flattening Test | Specimen Size | Test Lot# |
|---------------------|----------|-----------|-------------|--------------------------------|-----------------------|-------------|--|------------|-----------|-----------------|---------------|-----------|
| | | | | | % Elong. In. | % Red. Area | | | | | | |

| | | | | | | | | | | | |
|---|--------|--------|--------|--------|------|------|--|--|----|------|-----|
| 4 | J 6000 | Trans. | 76,400 | 40,200 | 28.2 | 56.0 | | | OK | .505 | 546 |
|---|--------|--------|--------|--------|------|------|--|--|----|------|-----|

| Forg. Ser. # | Test Lot# |
|--------------|--------------------|
| #26547W | XXX 546 |
| 26547Y | 546 |
| 26548W | 546 |
| 26548Y | 546 |

CATAWBA
P#9



Hydrostatic Test Each length of pipe hydrostatically tested at 2400 psi for 5 sec. and found acceptable.

Heat Treatment:

Subscribed and Sworn to before me this 22nd Day of July 1976

[Signature]
Notary Public
G. A. TOUCHTON
Notary Public in and for Harris County, Texas

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

[Signature]
Metallurgical Representative J. WRIGHT, / 68

CERTIFICATE OF TEST ON PIPE MATERIAL

Cameron

IRON WORKS, L.P.

P. O. BOX 1212
HOUSTON, TEXAS 77002

S
O
L
O

ITT GRINNELL INDUSTRIAL PIPING, INC.
KERNERSVILLE, NC 27284

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

Date 22 July 1976

| | | |
|----------------------------------|----------------------------------|---|
| Customer Order No.
KER-2853-P | C.I.W. Sales Order No.
F-5697 | ASME-SAI06-GR. C and ^{Specification} ASME-Section III, Class I
Thru Summer 1974 Addenda |
|----------------------------------|----------------------------------|---|

| | | | | | |
|-------------------------|------|--------|---------|--------|-------------|
| Description of Material | O.D. | x I.D. | 31.438" | x WALL | 1.750" M.W. |
|-------------------------|------|--------|---------|--------|-------------|

C.I.W. Part No. 86-5697-352-314

| Heat No. | Location or Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|-----|------|------|-----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |
| J 6000 | | .24 | .86 | .010 | .013 | .20 | | | |
| J 6003 | | .25 | .92 | .016 | .016 | .25 | | | |

| Quantity of I No. | Heat No. | Test Loc. | Tensile PSI | Yield Point
% Offset Yield PSI | MECHANICAL PROPERTIES | | | | | Specimen Size | Test Lot |
|-------------------|----------|-----------|-------------|-----------------------------------|-----------------------|-------------|------------|-----------|------------------|---------------|----------|
| | | | | | % Elong. In. | % Red. Area | Macro Etch | Bend Test | Flat-tening Test | | |
| 2 | J 6000 | Trans. | 76,400 | 40,200 | 28.2 | 56.0 | | | OK | .505 | 54 |
| 6 | J 6003 | Trans. | 85,600 | 47,400 | 26.9 | 51.4 | | | OK | .505 | 54 |

| Forg. Ser. # | Heat # | Test Lot # |
|--------------|--------|------------|
| 26543X | J 6003 | 543 |
| 26543Y | J 6003 | 543 |
| 26544W | J 6003 | 543 |
| 26544Y | J 6003 | 543 |
| 26545W | J 6003 | 543 |
| 26545Y | J 6003 | 543 |
| 26546W | J 6000 | 546 |
| 26546Y | J 6000 | 546 |

CATAWBA
PH 9



Hydrostatic Test Each length of pipe hydrostatically tested at 2400 psi for 5 sec. and found acceptable.

Heat Treatment:

I, G. T. Touchton
Notary Public
G. T. TOUCHTON

I certify these tests to be correct as contained in the record of the company.
H. H. Hight
Metallurgical Representative

MINNELL INDUSTRIAL PIPING, INC.

CUSTOMER ORDER NUMBER
KER-2853-P

DATE
7-14-76

7-352-314

SALES ORDER NUMBER
F-5697

SIZE
31.438" ID. X 1.750" MW. X C/L.

| ORDER NUMBER | HEAT NUMBER | SERIAL NUMBER | ACTUAL LENGTH | WEIGHT | ORDERED LENGTH | REMARKS |
|--------------|-------------|---------------|---------------|---------|----------------|---------|
| 06 | J-6003 | 26513W | 19' 3 1/8" | 13,570# | 19' 3" | |
| | " | 26514Y | 19' 3 3/16" | 13,570# | " | |
| | " | 26515W | 19' 3 1/4" | 13,570# | " | |
| | J-6000 | 26516Y | 19' 3 1/4" | 13,570# | " | |
| | J-6003 | 26513Y | 10' 6 1/4" | 7,360# | 10' 6" | |
| | " | 26514W | 10' 6 1/4" | 7,360# | " | |
| | " | 26515Y | 10' 6 3/16" | 7,360# | " | |
| | J-6000 | 26516W | 10' 6 1/4" | 7,360# | " | |

CATAWBA
PFG

| | | |
|-----------------------|--------------|----------------------|
| TOTAL LENGTH - ACTUAL | TOTAL WEIGHT | TOTAL LENGTH ORDERED |
| 119' 1 3/4" | 83,720# | 119' 0" |

I CERTIFY THAT THESE LENGTHS AND WEIGHTS ARE CORRECT AS RETAINED IN THE RECORDS OF THE COMPANY.

SIGNED: *[Signature]*

The Colonial Machine Company, Inc.

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

Phone (814) 539-7033

May 31, 1977

ITT Grinnell Industrial Piping Inc.
P. O. Box 566
Kernersville, NC 27284

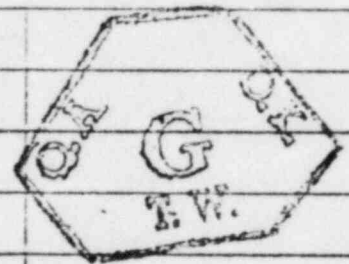
CERTIFIED MILL TEST REPORT

Sub CT
SWF-4

| | | |
|---------------|---------------|--------------|
| OUR ORDER NO. | OUR ORDER NO. | DATE SHIPPED |
| KER 6156-P | 10038 | 6/1/77 |

| ITEM | TYPE | MATERIAL SPEC. | SHIPPED | HEAT NO. | CMC CODE |
|------|------|--|---------|----------|----------|
| | | ASME SA105 NORMALIZED | | | |
| 1 | | 3/4" S/W Spec. Weld Bosses per SK CT-WB-1
Pt. No. Y*A*SE* CT-3002-1 (Rev. 0 10/14/76) | 40 | N94153 | AUA |
| 2 | 1" | Ditto Pt. No. Y*A*SE* CT-3002-2 | 20 | E87257 | ARA |
| 3 | 2" | Ditto Pt. No. Y*A*SE* CT-3002-3 | 12 | A00070 | AA1 |

| ITEM | C | MH | P | S | SI | CR | NI | MO | CU | CB | TI | CO | OTHER ELEMENTS |
|------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| 1 | .32 | .80 | .006 | .021 | .22 | | | | | | | | |
| 2 | .26 | .78 | .011 | .027 | .24 | | | | | | | | |
| 3 | .32 | .74 | .017 | .026 | .19 | | | | | | | | |



| ITEM | TENSILE | 2% YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1. 2. 3. 4. 5. 6. ETC. |
|------|---------|----------|----------|--------|----------|--------------------|---------------------------------|
| 1 | 76700 | 36800 | 34.0 | 58.2 | | | Mill Source - U.S. Steel |
| 2 | 75000 | 47000 | 32.0 | 61.3 | | | Mill Source - " " |
| 3 | 75360 | 42770 | 31.0 | 52.4 | | | Mill Source " " |

INSPECTION WAIVED PER MR. TOM WILSON ON 5/31/77.

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.

dg

By *Renee P. Wyches*

The Colonial Machine Company, Inc.

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

Phone (314) 539-7033

ITT Grinnell Industrial Piping Inc.
P. O. Box 566
Kernersville, NC 27284

May 20, 1977
**CERTIFIED
MILL TEST REPORT**

CT
A.P. 1

| | | |
|------------------------------------|-------------------------------|--------------------------------|
| OUR ORDER NO.
KER 6117-B | OUR ORDER NO.
10013 | DATE SHIPPED
5/25/77 |
|------------------------------------|-------------------------------|--------------------------------|

| ITEM | TYPE | MATERIAL SPEC. | SHIPPED | HEAT NO. | CMC CODE |
|------|------|--|---------|----------|----------|
| | | ASME SA105 | | | |
| 1 | | 1.13" Access Plugs per CT-AH-1, H = 1.75"
Pt. No. ****SF* CT-4005-1 | 12 | 78849 | ABF |
| 2 | | 1.13" Access Plugs per CT-AH-1, H = 1.375"
Pt. No. ****SF* CT-4005-2 | 25 | 78849 | ABF |
| 3 | | 1.13" Access Plugs per CT-AH-2, H = 1.375"
Pt. No. ****SF* CT-4005-3 (Sq. Head) | 30 | 78849 | ABF |
| 4 | | 1.13" Access Plugs per CT-AH-1, H = 2.026"
Pt. No. ****SF* CT-4005-4 | 16 | 78849 | ABF |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CB | TI | CO | OTHER ELEMENTS |
|------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| -4 | .26 | .71 | .013 | .025 | .23 | | | | | | | | |



| ITEM | TENSILE | 2% YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1. 2. 3. 4. 5. 6. ETC. |
|------|---------|----------|----------|--------|----------|--------------------|---------------------------------|
| 1-4 | 75000 | 48500 | 32.0 | 58.6 | | | Mill Source - Copperweld |

INSPECTION WAIVED PER MR. TOM WILSON ON 5/23/77.

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.

By *Rosemary R. Weyerhoff*

NATIONAL WELDERS
QA DEPT.
Approved By *Jim Make*
Date *6-28-77*

CERTIFIED MATERIALS TEST REPORT

CT
WW10

Customer Order No. 4365
Order No. 120315
Shipped _____

NATIONAL WELDERS
551 NINTH STREET
WINSTON SALEM, N.C. 27105

This material conforms to Specification

ASME SFAS.1

E 7018

Trade Name or Trademark: Atom Arc 7018
Diameter Size: 1/8"
Lot Number: 20,000 lb.
Heat Number: 02-1-E710R
421A1061

Type _____
Test No. 976
X-Ray Satisfactory
Control No. LL061

Moisture @1800°F. 0.17%
Concentricity 4%
Type Steel A-285

| | |
|----------------------|------|
| Carbon | .05 |
| Manganese | 1.11 |
| Chromium | .03 |
| Nickel | .02 |
| Silicon | .35 |
| Columbium + Tantalum | |
| Molybdenum | .01 |
| Tungsten | |
| Copper | .02 |
| Titanium | |
| Phosphorus | .012 |
| Sulphur | .021 |
| Vanadium | .02 |

| | | | | |
|--------------------|------|-------|-------|--|
| Test No. | Full | Split | Volts | |
| Tensiles & Impacts | 1 | 6 | 24 | |

| | | |
|---------------|-----------|------------------------|
| Test Results: | As Welded | Stress Relieved |
| | | 8 hrs. @1150°F-1200°F. |
| Yield | 70,540 | 62,920 |
| Tensile | 78,150 | 75,750 |
| Elongation | 30.0% | 30.0% |
| Red. of Area | 79.2% | 78.1% |

Charpy V-Notch Impacts Tested @-20°F.

| | | |
|-----------|---------------------|------------------|
| Impacts | 108-116-128-143-179 | 101-105-107-107- |
| Lat. Exp. | 79-80-83-86-72 | 81-80-82-78-83 |
| % Shear | 40-50-60-60-50 | 40-40-40-40-40 |

Fillets: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

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



State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 16th day of June 19 77

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

SEAL _____
Notary Public

My commission expires: 8-21-78

BY *Roll Royce*
D. W. BOYER

CT
WW 11

NATIONAL WELDERS
CORP.
Approved by *Jim Miller*
Date: *5-2-77*

KER 5365-P

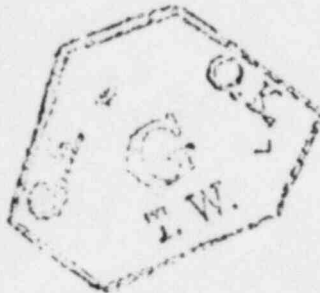
Customer Order No. 4352 Rel #14-3963
Order No. 518321-1

NATIONAL WELDERS
551 NINTH STREET NE
WINSTON SALEM, N. C.
PO #14-3963

Shipped _____

This material conforms to Specification
SFA 5.1 &
Code 11 Spec.

*Carbon
Welding*



E 7018

Trade Name or Trademark: Atom Arc 7018
Diameter Size: 3/32"
Lot Numbers: 17,500 lb.
Heat Number: B713N1AC
402A2291

Type _____
Test No. 626
X-Ray Satisfactory
Control No. KKK075

Moisture @1800°F. 0.11%
Concentricity 4%
Type Steel A-285

| Test No. | Full | Split | Volts | Amps |
|--------------------|------|-------|-------|------|
| Tensiles & Impacts | 1 | 6 | 21 | 95 |

| Test Results: | As Welded | Stress Relieved
8 hrs. @1225°F. -1250°F. |
|---------------|-----------|---|
| Yield | 72,400 | 71,100 |
| Tensile | 86,300 | 82,800 |
| Elongation | 24.0% | 27.0% |
| Red. of Area | 75.8% | 76.0% |

Charpy V-Notch Impacts Tested @-20°F.

| | | |
|-----------|----------------|-----------------|
| Impacts | 70-70-82-91-96 | 87-89-92-94-125 |
| Lot. Exp. | 55-56-63-72-74 | 73-75-75-80-74 |
| % Shear | 20-20-30-30-60 | 30-30-30-30-60 |

Fillets: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 29th day of April 1977

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

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

SEAL _____
Notary Public

My commission expires: 8-21-78

BY *R.V.P.*
R. V. BOYER

CT
6612



UNION CARBIDE CORPORATION
LINDE DIVISION
WELDING MATERIALS
P.O. BOX 710, ASHTABULA, OHIO 44004

June 1, 1977

ITT Grinnell
PURCHASE ORDER NO.: KER 5570-P
YOUR ORDER NO.: 11-224
LINDE S.O. NO.: 911224 P 01
QUANTITY: 840 lbs.

CUSTOMER: Industrial Welding Supply
2501 Champagne Drive
Asheboro, N.C. 27203

E-105-2

MATERIAL: Linde 65 - Heat No. 065150 - 3/32" Diameter x 36" Straight Lengths

This is to certify that Linde 65, Class E70S-2, as supplied under the above order number, shipped from one heat number, has been tested using the test assembly specified in Fig. 5 of AWS A5.18-69, and ASME SFA5.18 specifications. The wire met all the mechanical and impact property requirements of these specifications using the gas-tungsten arc welding process with Argon shielding gas. During the manufacturing processes, tests, and inspections, the materials furnished under this contract have not come in direct contact with mercury or any of its compounds nor with any mercury-containing device employing a single boundary of containment. Material conforms to the requirements of ITT Grinnell Materials Engineering Standard, Code 134.

| MECHANICAL PROPERTIES OF WELD(S) PER TABLE 3 - | AS-WELDED
G0830AW | * STRESS RELIEVED
H0502-1SR | REQUIRED |
|--|----------------------|--------------------------------|-------------|
| Weld Test Number | | | |
| All-Weld Metal Tensile Yield Strength, psi | 67,000 | 68,400 | 60,000 min. |
| Ultimate Strength, psi | 77,000 | 78,900 | 72,000 min. |
| Elongation in 2", % | 34.0 | 32.5 | 22 min. |
| Reduction of Area, % | 79.6 | 71.2 | ----- |

SHARPLY V-NOTCH IMPACT STRENGTH @ -20 F (ft./lbs.)

| As-Welded | * S.R. |
|---------------|---------------|
| 192.5 | 102.0 |
| 199.5 | 119.0 |
| 193.0 | 126.0 |
| 197.0 | 91.0 |
| 193.0 | 98.0 |
| 194.3 (Ave.3) | 106.3 (Ave.3) |

Required 20 ft./lbs.

LATERAL EXPANSION (INCHES)

| As-Welded | * S.R. |
|-----------|--------|
| .082 | .072 |
| .086 | .081 |
| .089 | .082 |
| .083 | .069 |
| .086 | .070 |

Required (25 mils) (40 mils)

DUCTILE FRACTURE AREA (PERCENT)

| As-Welded | * S.R. |
|-----------|--------|
| 100 | 70 |
| 100 | 80 |
| 100 | 80 |
| 100 | 70 |
| 100 | 70 |

RADIOGRAPHIC TESTS: X-ray(s) met the requirements of Fig. 1
APPLICATION CONDITIONS: 320-350 Amps, 13-14 Volts, 5 IPM
CHEMICAL ANALYSIS:

| C | Mn | P | S | Si | Al | Ti | Zr | Ni | Cr | Mo | V | Cu | Actual | Required |
|------|------|------|------|-----|-----|-----|-----|-----|-----|------|------|-----|--------|----------|
| .05 | 1.12 | .010 | .014 | .53 | .12 | .06 | .08 | .02 | .01 | <.01 | <.01 | .05 | | |
| .06 | .90 | .025 | .035 | .40 | .05 | .05 | .02 | -- | -- | -- | -- | -- | | |
| max. | 1.40 | max. | max. | .70 | .15 | .15 | .12 | | | | | | | |

< = less than

* Weldment stress relieved at 1225°F, (+25°F, -0°F) for 8 hours. Cooling rate 200°F/hr. to 800°F, then air cooled.

Sworn to before me this
1st day of June 1977



R. J. Wilkowitz
Materials Standards Specialist

HAZEL E. TAYLOR

CERTIFIED MATERIALS TEST REPORT



UNION CARBIDE CORPORATION
 LINDE DIVISION
 WELDING MATERIALS
 P.O. BOX 710, AVONDALE, OHIO 44004

CT
 WW13

July 15, 1977

CUSTOMER: Industrial Welding Supply
 2501 Champagne
 Ashboro, N.C. 27203
 (For: ITT Grinnell)

YOUR ORDER NO.: 11-476
LINDE S.O. NO.: 011476 U
QUANTITY: 420 lbs.

MATERIAL: Linde 65 - Heat No. 065118 - 1/8" Diameter x 36" Straight Lengths

This is to certify that Linde 65, Class E70S-2, as supplied under the above order number, shipped from one heat number, has been tested using the test assembly specified in Fig. 5 of AWS A5.18-69, and ASME SPA5.18 specifications. The wire met all the mechanical and impact property requirements of these specifications using the gas-tungsten arc welding process with Argon shielding gas. During the manufacturing processes, tests, and inspection the materials furnished under this contract have not come in direct contact with mercury or any of its compounds nor with any mercury-containing device employing a single boundary of containment.

| <u>MECHANICAL PROPERTIES OF WELD(S) PER TABLE 3 -</u> | | <u>AS-WELDED</u> | <u>* STRESS RELIEVED</u> | <u>REQUIRED</u> |
|---|--|------------------|--------------------------|-----------------|
| Weld Test Number | | G0524-1 | G0526-1 | |
| All-Weld Metal Tensile | | | | |
| Yield Strength, psi | | 69,400 | 70,900 | 60,000 min |
| Ultimate Strength, psi | | 79,700 | 83,900 | 72,000 min |
| Elongation in 2", % | | 32.5 | 30.0 | 22 min |
| Reduction of Area, % | | 79.0 | 74.1 | ----- |

CHARPY V-NOTCH IMPACT
STRENGTH @ -20°F (ft./lbs.)

| As-Welded | * S.R. |
|----------------|----------------|
| 126.5 | 130.0 |
| 101.5 | 95.0 |
| 120.5 | 97.5 |
| 100.0 | 66.0 |
| 79.5 | 132.5 |
| 107.3 (Ave. 3) | 107.5 (Ave. 3) |

LATERAL EXPANSION
(INCHES)

| As-Welded | * S.R. |
|-----------|--------|
| .076 | .085 |
| .074 | .067 |
| .080 | .072 |
| .073 | .055 |
| .063 | .085 |

DUCTILE FRACTURE AREA
(PERCENT)

| As-Welded | * S.R. |
|-----------|--------|
| 60 | 50 |
| 50 | 50 |
| 60 | 50 |
| 50 | 40 |
| 35 | |

Required 20 ft./lbs.

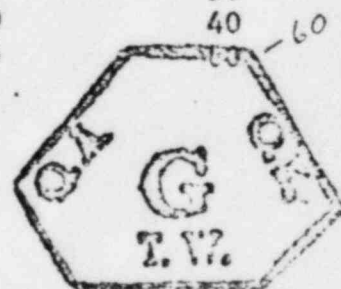
RADIOGRAPHIC TESTS: X-ray(s) met the requirements of Fig. 1

APPLICATION CONDITIONS: 230 Amps, 15 Volts, 5/6 Inches Per Minute

CHEMICAL ANALYSIS:

| C | Mn | P | S | Si | Al | Ti | Zr | Ni | Cr | Mo | V | Cu | |
|------|------|------|------|-----|-----|-----|-----|-----|-----|------|------|-----|------------|
| .04 | 1.11 | <.01 | .017 | .55 | .11 | .06 | .03 | .03 | .01 | <.01 | <.01 | .01 | - Actual |
| .06 | .90 | .025 | .035 | .40 | .05 | .05 | .02 | --- | --- | --- | --- | --- | - Required |
| max. | 1.40 | max. | max. | .70 | .15 | .15 | .12 | | | | | | |

< = less than



* Weldment Stress Relieved at 1125°F, plus or minus 25°F, for 8 hours. Cooling rate 100°F/hr to 500°F, then air cooled.

Sworn to before me this

day of _____

R. J. DiDonato
 R. J. DiDonato

DUKE POWER COMPANY
 QUALITY ASSURANCE DEPARTMENT
 SUPPLIER QUALITY ASSURANCE CERTIFICATION

Name of Supplier JIT Grinnell Ind. Piping, Inc.

Date 8-24-77

Address of Supplier Plant Fernersville, NC

Mill Power Order No. C-12517

Duke Item or Req. No. 1206.00-1.0

Spec. No. CNS-1206.00-1.0 Rev. 2

Supplier ID Nos. CT-Sm-1A

Description of Component(s) or Material(s) fabricated Piping Assembly

Attached Documentation covers all Components/Materials on Mill Power Order.
 Attached Documentation covers partial shipment of Components/Materials on Mill Power Order.

The following listed tests, inspections and reports have been completed as required by the specification:

- | | |
|--|--|
| <input type="checkbox"/> Physical & Chemical Analysis | <input type="checkbox"/> Major Repair Records & Charts |
| <input type="checkbox"/> Hydro (Test Pressure - PSIG <u> </u>) | <input checked="" type="checkbox"/> Personnel Qualifications on Record |
| <input type="checkbox"/> Design Report | <input checked="" type="checkbox"/> Stress Report |
| <input type="checkbox"/> Radiographic Test | <input type="checkbox"/> Ultrasonic Test |
| <input type="checkbox"/> Penetrant Test | <input type="checkbox"/> Repair NDE |
| <input type="checkbox"/> Operating Test | <input type="checkbox"/> Performance Curve |
| <input checked="" type="checkbox"/> Dimensional Check | <input type="checkbox"/> Deviation Record # <u> </u> |
| | <input type="checkbox"/> Heat Treatment |
| | <input checked="" type="checkbox"/> Magnetic Particle |
| | <input checked="" type="checkbox"/> Cleanliness |
| | <input checked="" type="checkbox"/> ASME Data Report |

- 1) _____
- 2) _____
- 3) _____

This certifies that the listed Component(s) or Material(s) conform to the requirements of the above referenced Duke Power documents including all codes, standards, test requirements and Quality Assurance requirements invoked therein.

DUKE POWER COMPANY
 QA RECORDS APPROVED
Gary L. Keener
 QA REPRESENTATIVE
 DATE 3/8/78

Thomas A. Smith
 Supplier Representative Authorized Signature

Title Mgr. of Proc Date 9/24/77

(See Instructions)

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

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

SHEET 1 OF 3

1. Fabricated by ITT Grinnell Industrial Piping, Inc. Order No. 712
(Name and Address of Fabricator) Kernersville, N. C.
2. Fabricated for Duke Power Company Charlotte, N. C. Order No. C-12517
(Name and Address)
3. Owner Duke Power Company 4. Location of Plant Newport, S. C.

5. Piping System Identification MAIN STEAM
(Brief description of intended use, main coolant etc.)
TEW E-18-77
 (a) Drawing No. CT-01-7X Prepared by ITT Grinnell Industrial Piping, Inc.
 (b) National Board No. N/A

6. The date of design, construction, and workmanship complies with ASME Code Section III, Class NUC.2
 Edition 1974, Addenda Date Winter 1974, 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)

Supplemental Sheets #3 --- Drawing
#3 --- Bill(s) of Material

7. Shop Hydrostatic Test Field psi.

8. Description of piping inspected Piece Mark Number CT-SM-6A
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length
See Attached Sheets
- fittings - flanges, etc.)

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 8-18-77 Signed ITT Grinnell Ind. Piping, Inc. By Thomas A. Smith
(Fabricator)
 Certificate of Authorization Expires 7-16-79 Certificate of Authorization No. 11-1456

CERTIFICATE OF PIPE INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and in the State or Province of Maryland and employed by * of Hartford, CT.
 have inspected the piping described in this Data Report on 8/23/77, 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. *The Hartford Steam Boiler Inspection and Insurance Company
 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 8/23/77 Richard W. Storkley Commissions Maryland-94
(Inspector) National Board, State, Province and Loc.

* 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

LINE NO. 7127
 NAME DUKE POWER COMPANY
 LOCATION CATANBA UNIT # 1

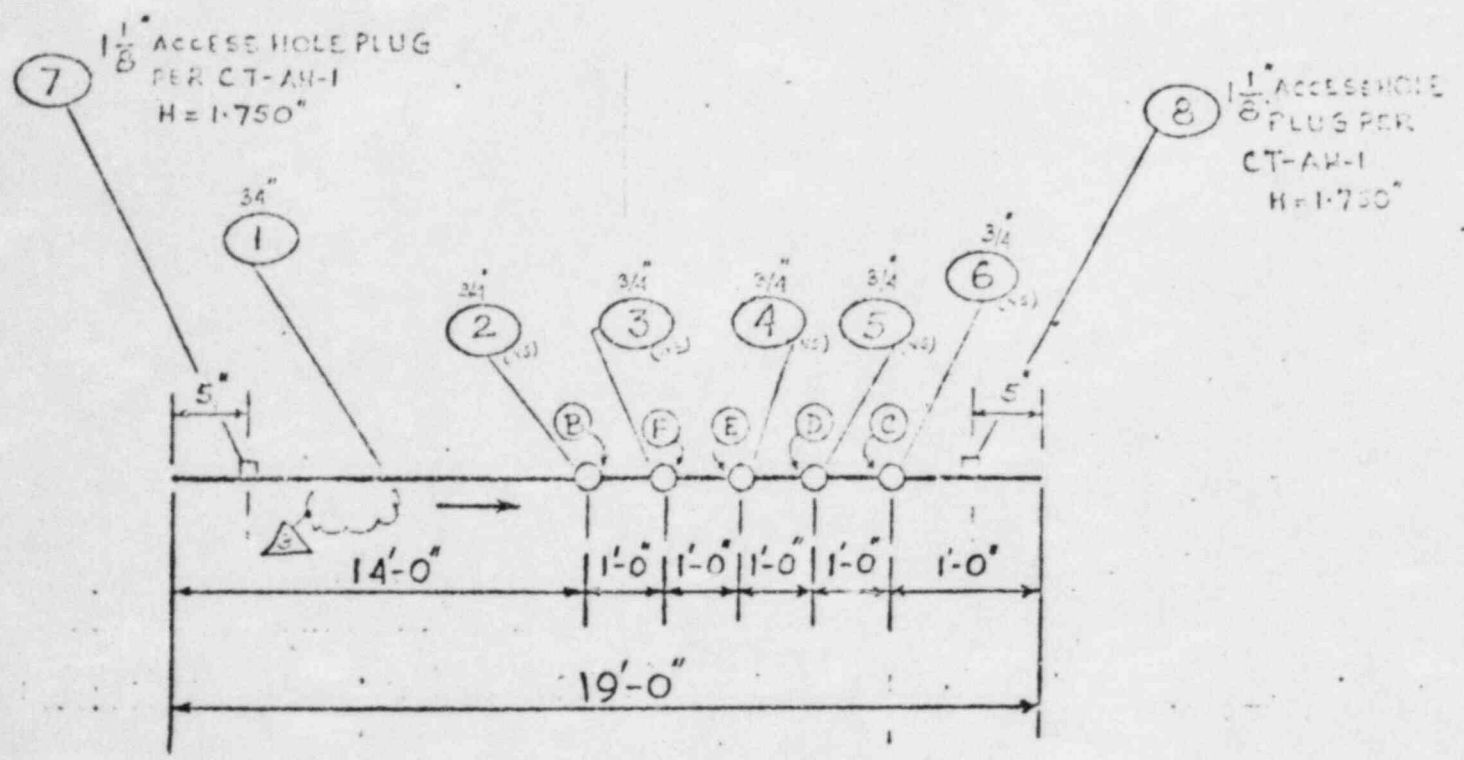
REVISION

DRAWN TO 21-76
 REV. Δ SM 4-21-77
 REV. Δ SM 2-20-77
 REV. Δ SM 7-27-77
 CHK'D W. 1-76
 CHK'D 9
 CHK'D
 CHK'D

NOTE: - LENGTH OF ACCESS HOLE PLUG SHALL BE $\pm 1/16$ " OF ACTUAL WALL THK. SHOP SHALL GRIND TO FIT, IF REQ'D.

QUALITY CONTROL

DUKE POWER COMPANY
 CHARLOTTE, N.C.
 C-12517



MACHINE ENDS
 PER SKETCH CT-D-2

Nuclear Safety Related

CLASS. DUKE B LINE SPEC. PS 1500.5 (91) APP. CODE ATN 5-III, CL 2 NO. REQ'D 1

| | | | | | | | |
|-----------------|----|------------------|---|------------|---|---------------------|---|
| Autography (ET) | NA | Special Marking | | Preheat | ✓ | Cert. of Compliance | |
| Particle (MT) | ✓ | Special Cleaning | ✓ | Heat Treat | ✓ | Mill Test Reports | ✓ |
| Penetration | | Polishing | ✓ | Code Stamp | ✓ | Data Reports | |

ITEM MAIN STEAM (SM) FAB SPEC. JS 118
 DRAWG NO. CH-1491-SM-003 PRESS. 1230 PSI. TEMP. 600 F. WT. 1234 LBS
 REMARK CT-SM-CA REGISTER CT-CH-7X

GRINNELL INDUSTRIAL PIPING, INC.

DUKE POWER COMPANY
CHARLOTTE, N.C.
C-12517

FORM 10-1-1970
QA FORM 127F

Register No. CT-01-7X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet B Of 3

Piece Mark CT-SM-GA

DUKE POWER COMPANY
CATAWBA UNIT #1

Revision No. 1 Revision Date 1-17

Job Name CATAWBA UNIT #1 Contract No. 7127

Location _____

| ITEM | PART NUMBER | DESCRIPTION | QUAN-
OR
LEN | QUALITY CONTROL | | | | ACCOUNTING/MATERIAL | | | |
|------|------------------------------|---|--------------------|-----------------|----------------|------------|--------|---------------------|--------------------|-----------------|-----|
| | | | | HEAT
NUMBER | DOCUMENT
NO | IN PROCESS | STATUS | U/M | UNIT PRICE
P.O. | DIS-
VEN COR | NET |
| 1 | DUCT CDY 3/4
CT-01-10-1 | 31.428" I.D. X 1.750" MW. SMLS
CS; PIPE TO ASME SA-106 C | 10-4 | | | | | F | | | |
| 2 | Y * A - 10 SE *
CT-3302-1 | 3/4" 3000# CS, SPECIAL WELD
BOSS TO SA-105, PER DET.
SK.# CT-WB-1 | 1 | | | | | E | | | |
| 3 | Y * A - 10 SE *
CT-3302-1 | ———— DITTO ———— | 1 | | | | | E | | | |
| 4 | Y * A - 10 SE *
CT-3302-1 | ———— DITTO ———— | 1 | | | | | E | | | |
| 5 | Y * A - 10 SE *
CT-3302-1 | ———— DITTO ———— | 1 | | | | | E | | | |
| 6 | Y * A - 10 SE *
CT-3302-1 | ———— DITTO ———— | 1 | | | | | E | | | |
| 7 | X * X * X * X *
CT-4005-1 | 1 1/8" ACCESS HOLE PLUG PER
CT-AH-1, SA-105, "H"=1.750" | 1 | | | | | E | | | |
| 8 | X * X * X * X *
CT-4005-1 | ———— DITTO ———— | 1 | | | | | E | | | |

Code Name, Sec. III, Cl. 2

Class DUKE 'B'

Nuclear Safety Related

Job Subelement JS118

MFG. Code _____

MAIN STEAM

Register No. CT-01-7X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 1 of 2

Price Mark CT-SM-GA

Job Name CAWABA UNIT #1

DUKE POWER COMPANY

Revision No. SM

Revision Date 1-11-73

Contract No. 7127

Location _____

| PART NUMBER | DESCRIPTION | QUAN
OR
LEN | QUALITY CONTROL | | | ACCOUNTING/MATERIAL | | | |
|-------------|---|-------------------|-----------------|----------|------------|---------------------|------------|-----------|-----------|
| | | | HEAT
NUMBER | DOCUMENT | IN PROCESS | TAT/USE U/M | UNIT PRICE | D.S.
| D.S.
|
| 3.4 | 31.438" J.D.XI-750 MW, SML'S
CS PIPE TO ASME SA-106 C | 10 | 2737 | | | | | | |
| 0.75 | 3/4" 3000# CS, SPECIAL WELD
BOSS TO SA-105, PER DET.
SK.# CT-WB-1 | 1 | AUA | 510 | | | | | |
| 0.75 | DITTO | 1 | AUA | 510 | | | | | |
| 0.75 | DITTO | 1 | AUA | 510 | | | | | |
| 0.75 | DITTO | 1 | AUA | 510 | | | | | |
| 1.12 | 1 1/8" ACCESS HOLE PLUG PER
CT-AH-1, SA-105, "H"=1.750" | 1 | ABF | 510 | | | | | |
| 1.12 | DITTO | 1 | ABF | 510 | | | | | |

STOP WORK LAYOUT

REWORK
1/21/73

Code Item No. III, Cl. 2

Class DUKE 'B'

Nuclear Safety Related

Job Supplement JS118

MFG. Code _____

E-1-4

WELD DATA
 CONTRACT 1127 DC. MK# CT-511-6-A REG.# CT-01
 CLASS B SPECIFICATION JS-118-2 SUPPLEMENT

| WELD | FIT-UP/BEAT | | ROOF | INTERMEDIATE | | FINAL | | RT DATE | WELD | RT |
|------|-------------|------------|---------------|--------------|---------------|-------------|---------------|---------|------|------|
| | WELDER I.D. | WELD MAT'L | | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | | | |
| A | PROC | | PROC | | PROC | | | | | |
| B | 1-4-3-3 | | PROC 1-4-3-3 | | PROC 1-1-3-5 | | PROC 1-1-3-5 | | | |
| | 2379 | 065150 | C299 | 065118 | C299 | 1-ABS | C299 | 1-ABS | | |
| | 7-29 | 77 wws12 | 7/29/77 | wws13 | 7/29/77 | wws11 | 7/29/77 | wws10 | | 8-11 |
| C | 1-4-3-3 | | PROC 1-4-3-3 | | PROC 1-1-3-5 | | PROC 1-1-3-5 | | | |
| | 2379 | 065150 | C-49
C-145 | 065114 | C-49
C-145 | 1-ABS | C-49
C-145 | 1-ABS | | |
| | 7-29 | 77 wws12 | 7-29 | 77 wws13 | 7-29 | wws11 | 7-29 | wws10 | | 7-29 |
| D | 1-4-3-3 | | PROC 1-4-3-3 | | PROC 1-1-3-5 | | PROC 1-1-3-5 | | | |
| | 2379 | 065150 | C-49
C-145 | 065118 | C-49
C-145 | 1-ABS | C-49
C-145 | 1-ABS | | |
| | 7-29 | 77 wws12 | 7-29 | 77 wws13 | 7-29 | wws11 | 7-29 | wws10 | | 7-29 |
| E | 1-4-3-3 | | PROC 1-4-3-3 | | PROC 1-1-3-5 | | PROC 1-1-3-5 | | | |
| | 2379 | 065150 | C299 | 065118 | C299 | 1-ABS | C299 | 1-ABS | | |
| | 7-29 | 77 wws12 | 7/29/77 | wws13 | 7/29/77 | wws11 | 7/29/77 | wws10 | | 7-29 |

| | | | |
|-----------------------------|---|-------------------------------|---|
| STRESS DATE | FINAL INSP. | SPECIAL OPERATIONS:
C DIM. | Q.C. DOC. APPROVAL
<u>7858-18-77</u> |
| EDWARD UP
<u>9-11-77</u> | *ABS-45642271/87131VAC
**ABW-42111061/00-1-E710K | WALL THK. | A/I STAMP/DATA REPORT
<u>8/23/77</u> |
| CERT NO. | CUST INSP. | OTHER | CUST DOC APPROVAL |

CONTRACT 7127 U. MK# 01-57624 REG. # C-101
 CLASS B SPECIFICATION 35-13-2 SUPPLEMENT

WELD DATA

| WELD | PIPE/TUB | | | FOOT | INTERMEDIATE | | | FINAL | | | RT DATE | MSG |
|------|--------------|------------|------------|--------------|--------------|------------|--------------|-------------|------------|------------|---------|-----|
| | WELDER I.D. | WELD MAT'L | Q.C. INSP. | | WELDER I.D. | WELD MAT'L | Q.C. INSP. | WELDER I.D. | WELD MAT'L | Q.C. INSP. | | |
| F | PROC 1-4-3-3 | | | PROC 1-4-3-3 | PROC 1-1-3-5 | | PROC 1-1-3-5 | | | | | |
| | 0329 065150 | | | 0329 065118 | 0329 1065 | | 0329 1065 | | | | | |
| | 7-28-97 | | | 7/29/97 | 7/29/97 | | 7/29/97 | | | | | |
| F | PROC 1-4-3-3 | | | PROC | PROC | | PROC | | | | | |
| | 0329 065150 | | | | | | | | | | | |
| | 7-28 | | | | | | | | | | | |
| | PROC | | | PROC | PROC | | PROC | | | | | |
| | | | | | | | | | | | | |
| | PROC | | | PROC | PROC | | PROC | | | | | |
| | | | | | | | | | | | | |
| | PROC | | | PROC | PROC | | PROC | | | | | |
| | | | | | | | | | | | | |

| | | | |
|-----------------------------|--|-------------------------------|--|
| STRESS DATE | FINAL INSP. | SPECIAL OPERATIONS:
C DIM. | Q.C. DOC. APPROVAL
<u>TAB B-18-77</u> |
| SEARCH UP
<u>8-11-97</u> | *ABS-402A2271/B713NIAC
**ABD-A21A106/02-1-ETIOR | WALL THK. | A/I STAMP/DATA REPORT
<u>5/23/11</u> |
| CLEAN UP | CUST INSP | OTHER | CUST DOC APPROVAL |

MAGNETIC PARTICLE EXAMINATION REPORT

CUSTOMER Duke Power CONTRACT/PO NO: 7127
 SPECIFICATION MTP-1-1 QUALITY REQUIRED: MTA-1
 EXAMINATION METHOD DC Prods
 EQUIPMENT TYPE: M-3000
 ITEM OR PART NAME: CT-01-7x PC-N.K. CT-SM-6A
 SYSTEM/WHEN REQUIRED: MN STM

| ITEM IDENTIFICATION
WELD/SERIAL/H.T. NO. | SIZE AND THICKNESS | AREA EXAMINED
(INDICATE, ROOT, INTERMEDIATE,
FINAL WELD OR MATERIAL AS
APPLICABLE) | INTERPRETATION |
|---|--------------------|---|----------------|
| B | 3/4" 3000# Boss | Final | Acc'd |
| C | " " " | " | " |
| D | " " " | " | " |
| E | " " " | " | " |
| F | " " " | " | " |
| FILLET WELDS ON CODE PLATE | | " | " |
| | | | |
| | | | |
| | | | |
| | | | |

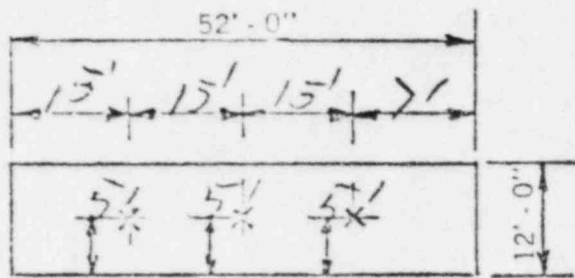
EXAMINATION PERFORMED BY: James J. Grubbs DATE: 8-11-77
 ASNT LEVEL: II
 INTERPRETATION PERFORMED BY: James J. Grubbs DATE: 8-11-77
 ASNT LEVEL: II
 APPROVAL: James J. Grubbs DATE: 8-11-77
 ASNT LEVEL: II

Load Number _____

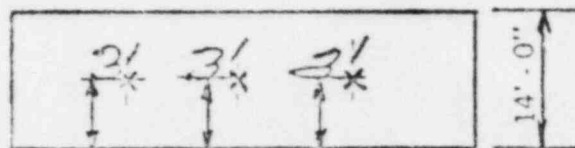
FURNACE LOAD SHEET

Date 8-10-77

| REGISTER NO. | SKETCH NO. | TYPE MATERIAL | WEIGHT | TEMP. REQ.* | RATE OF HT PER HR | HOLD TIME | RATE OF COOLING PER HOUR | SPEC. NO. | TIME IN | TIME OUT |
|--------------|------------|---------------|--------|---------------------|-------------------|-----------|--------------------------|-----------|---------|----------|
| PF | 61-20 | A106C | 1461 | 1150 ²⁵⁰ | 1400 ⁰ | 2 hrs | 100° S. J. | | 6" | 1.250 |
| CT | 01-35X | " | 14,934 | " | " | | " S. III | | 34" | 1.250 |
| CT | 01-7X | " | 14,934 | " | 1150 ⁰ | | 100° S. III | | 34" | 1.250 |
| CT | 01-26X | " | 14,934 | " | " | | S. III | | 34" | 1.250 |
| ZI | 03-10 | A155 Ke20 | 11,700 | " | " | | | 1331-1 | 34" | 1.772 |
| ZI | 04-4 | A106C | 4558 | " | " | | | " | 11.6 | 1.250 |
| ZJ | 13-50 | " | 1820 | " | " | | | " | 64" | 1.022 |



PLAN



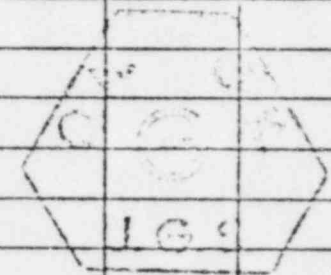
ELEVATION

THERMOCOUPLE LOCATIONS

1/2 INCH EQUALS 30MLN
S/N RECORDER AND PROGRAM
C70-53468-1-1 SO 338976001

Unit: 10
Line: 10
Line: 10

1/2
2
3 1/2



1600 1800 2000 2200 2400

$\frac{1}{2}$ INCH EQUALS 30MIN
S/N RECORDER AND PROGRAM
C70-53463-1-1 S0333975 01

TIME TO REACH Temp 2 1/2 HRS
TIME AT TEMP 0 HRS
TIME TO COOL 3 1/4 HRS

1600 1800 2000 2200 2400

Sheet # 5-36

Cameron

IRON WORKS, INC.

P. O. BOX 1462
HOUSTON, TEXAS 77001

Date 18 Oct. 1976

S
O
L
D
T
O

ITT ORINWELL INDUSTRIAL PIPING, INC.
KERRVILLE, NC 27284

Customer Order No. **KER-2853-P** C.I.W. Sales Order No. **F-5696** Specification **ASME SA106 Gr. C and ASME Section III, Class 2 thru Supplement 1974 Addenda**

Description of Material O.D. _____ x I.D. **31.438"** x WALL **1.750" M.W.**

C.I.W. Part No. **CG-5696-352-314** ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NO. N-1261 EXPIRES 10-27-78.

Heat No. _____ Location or Serial No. _____ CHEMICAL ANALYSIS

L 2463 .25 1.00 .011 .018 .21

*Cameron
P-12*

| Quantity or Serial No. | Heat No. | Test Loc. | Tensile PSI | Yield Point | | MECHANICAL PROPERTIES | | | | | Specimen Size | Test Lot# |
|------------------------|----------|-----------|-------------|--------------------|--------------|-----------------------|------------|-----------|-----------------|----|---------------|-----------|
| | | | | % Offset Yield PSI | % Elong. In. | % Red. Area | Macro Etch | Bend Test | Flattening Test | | | |
| 1 | L 2463 | Trans. | 83,600 | 45,900 | 22.5 | 42.5 | | | | OK | .505 | 463 |

Forg. Sor. # **127137** Test Lot# **463**



Hydrostatic Test Each length of pipe hydrostatically tested at 2400 psi for 5 sec. and found acceptable.
Heat Treatment:

Subscribed and sworn to before me this
18th Day of Oct. 1976
R. E. Vercher
Notary Public

I certify these tests to be correct as contained in the records of the company.
[Signature]
Metallurgical Representative H. O. WILSON

The Colonial Machine Company, Inc.

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

Phone (814) 529-7033

May 31, 1977

ITT Grinnell Industrial Piping Inc.
P. O. Box 566
Kernersville, NC 27284

CERTIFIED MILL TEST REPORT

Auth CT
SWF-4

| | | |
|-------------------------------------|-------------------------------|-------------------------------|
| YOUR ORDER NO.
KER 6156-P | OUR ORDER NO.
10038 | DATE SHIPPED
6/1/77 |
|-------------------------------------|-------------------------------|-------------------------------|

| ITEM | TYPE | MATERIAL SPEC | SHIPPED | HEAT NO. | CIAC |
|------|------|--|---------|----------|------|
| | | ASME SA105 NORMALIZED | | | |
| 1 | | 3/4" S/W Spec. Weld Bosses per SK CT-WB-1
Pt. No. Y*A*SE* CT-3002-1 (Rev. 0 10/14/76) | 40 | N94153 | AU |
| 2 | | 1" Ditto Pt. No. Y*A*SE* CT-3002-2 | 20 | E87257 | AR |
| 3 | | 2" Ditto Pt. No. Y*A*SE* CT-3002-3 | 12 | A00070 | AA |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CB | TI | CO | OTHER ELEMENTS |
|------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| 1 | .32 | .80 | .006 | .021 | .22 | | | | | | | | |
| 2 | .26 | .78 | .011 | .027 | .24 | | | | | | | | |
| 3 | .32 | .74 | .017 | .026 | .19 | | | | | | | | |



| ITEM | TENSILE | 2% YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1. 2. 3. 4. 5. 6. ETC. |
|------|---------|----------|----------|--------|----------|--------------------|---------------------------------|
| 1 | 76700 | 36800 | 34.0 | 58.2 | | | Mill Source - U.S. Steel |
| 2 | 75000 | 47000 | 32.0 | 61.3 | | | Mill Source - " " |
| 3 | 75360 | 42770 | 31.0 | 52.4 | | | Mill Source " " |

INSPECTION WAIVED PER MR. TOM WILSON ON 5/31/77.

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.

dg

By *Rosemary R. Weyer*

The Colonial Machine Company, Inc.

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

Phone (814) 539-7033

ITT Grinnell Industrial Piping Inc.
P. O. Box 566
Kernersville, NC 27284

May 20, 1977

CERTIFIED MILL TEST REPORT

CT
A.P.I.

| | | |
|------------------------------------|------------------------------|--------------------------------|
| YOUR ORDER NO.
KER 117-B | OUR ORDER NO.
1001 | DATE SHIPPED
5/25/77 |
|------------------------------------|------------------------------|--------------------------------|

| ITEM | TYPE | MATERIAL SPEC. | SHIPPED | HEAT NO. | CMC CO. |
|------|------|--|---------|----------|---------|
| | | ASME SA105 | | | |
| 1 | | 1.13" Access Plugs per CT-AH-1, H = 1.75"
Pt. No. ****SF* CT-4005-1 | 12 | 78849 | ABF |
| 2 | | 1.13" Access Plugs per CT-AH-1, H = 1.375"
Pt. No. ****SF* CT-4005-2 | 25 | 78849 | ABF |
| 3 | | 1.13" Access Plugs per CT-AH-2, H = 1.375"
Pt. No. ****SF* CT-4005-3 (Sq. Head) | 30 | 78849 | ABF |
| 4 | | 1.13" Access Plugs per CT-AH-1, H = 2.026"
Pt. No. ****SF* CT-4005-4 | 16 | 78849 | ABF |

| ITEM | C | Mn | P | S | Si | CR | Ni | MO | CU | CB | Ti | CO | OTHER ELEMENTS |
|------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| -4 | .26 | .21 | .013 | .025 | .23 | | | | | | | | |



| ITEM | TENSILE | 2% YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1. 2. 3. 4. 5. 6. ETC. |
|------|---------|----------|----------|--------|----------|--------------------|---------------------------------|
| 1-4 | 75000 | 48500 | 32.0 | 58.6 | | | Mill Source - Copperweld |

INSPECTION WAIVED PER MR. TOM WILSON ON 5/23/77.

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.

By *Ronald H. Wilson*

UNION CARBIDE CORPORATION

LINDE DIVISION

WELDING MATERIALS

P.O. BOX 719, ASHTABULA, OHIO 44004

CT
W012

June 1, 1977

CUSTOMER: Industrial Welding Supply
2501 Champagne Drive
Asheboro, N.C. 27203

ITT Grinnell
PURCHASE ORDER NO.: KER 5570-P
YOUR ORDER NO.: 11-224
LINDE S.O. NO.: 911224 P 01
QUANTITY: 840 lbs.

E-705-2

MATERIAL: Linde 65 - Heat No. 065150 - 3/32" Diameter x 36" Straight Lengths

This is to certify that Linde 65, Class E705-2, as supplied under the above order number, shipped from one heat number, has been tested using the test assembly specified in Fig. 5 of AWS A5.18-69, and ASME SPAS.18 specifications. The wire met all the mechanical and impact property requirements of these specifications using the gas-tungsten arc welding process with Argon shielding gas. During the manufacturing processes, tests, and inspections, the materials furnished under this contract have not come in direct contact with mercury or any of its compounds nor with any mercury-containing device employing a single boundary of containment. Material conforms to the requirements of ITT Grinnell Materials Engineering Standard, Code 134.

| MECHANICAL PROPERTIES OF WELD(S) PER TABLE 3 - | AS-WELDED
G0830AW | * STRESS RELIEVED
H0502-1SR | REQUIRED |
|--|----------------------|--------------------------------|-------------|
| Weld Test Number | | | |
| All-Weld Metal Tensile Yield Strength, psi | 67,000 | 68,400 | 60,000 min. |
| Ultimate Strength, psi | 77,000 | 78,900 | 72,000 min. |
| Elongation in 2", % | 34.0 | 32.5 | 22 min. |
| Reduction of Area, % | 79.6 | 71.2 | ----- |

CHARPY V-NOTCH IMPACT STRENGTH @ -20 F (ft./lbs.)

LATERAL EXPANSION (INCHES)

DUCTILE FRACTURE AREA (PERCENT)

| As-Welded | * S.R. | As-Welded | * S.R. | As-Welded | * S.R. |
|----------------------|---------------|------------------------------|--------|-----------|--------|
| 192.5 | 102.0 | .082 | .072 | 100 | 70 |
| 199.5 | 119.0 | .086 | .081 | 100 | 80 |
| 193.0 | 126.0 | .089 | .082 | 100 | 80 |
| 197.0 | 91.0 | .083 | .069 | 100 | 70 |
| 193.0 | 98.0 | .086 | .070 | 100 | 70 |
| 194.3 (Ave.3) | 106.3 (Ave.3) | Required (25 mils) (40 mils) | | Q. A. | |
| Required 20 ft./lbs. | | | | I. W. S. | |

RADIOGRAPHIC TESTS: X-ray(s) met the requirements of Fig. 1

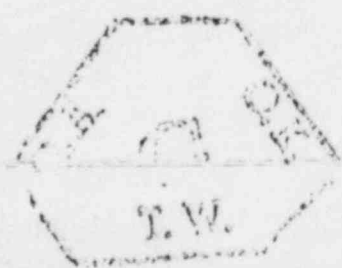
APPLICATION CONDITIONS: 320-330 Amps, 13-14 Volts, 5 IPM

CHEMICAL ANALYSIS:

| C | Mn | P | S | Si | Al | Ti | Zr | Ni | Cr | Mo | V | Cu | Actual | Required |
|-----------|------|------|------|-----|-----|-----|-----|-----|-----|------|------|-----|--------|----------|
| .05 | 1.12 | .010 | .014 | .53 | .12 | .06 | .08 | .02 | .01 | <.01 | <.01 | .05 | | |
| .06 | .99 | .025 | .035 | .40 | .05 | .05 | .02 | -- | -- | -- | -- | -- | | |
| max. 1.40 | | max. | max. | .70 | .15 | .15 | .12 | | | | | | | |

* Weldment stress relieved at 1225°F, (+25°F, -0°F) for 8 hours. Cooling rate 200°F/hr. to 800°F, then air cooled.

Sworn to before me this
17 day of June 1977



R. J. Bilanate
Materials Standards Specialist



UNION CARBIDE CORPORATION
LINDE DIVISION
WELDING MATERIALS
P.O. BOX 710, CLEVELAND, OHIO 44104

CT
WW13

July 15, 1977

CUSTOMER: Industrial Welding Supply
2501 Champagne
Ashboro, N.C. 27203
(For: ITT Grinnell)

YOUR ORDER NO.: 11-476
LINDE S.O. NO.: 011476 U
QUANTITY: 420 lbs.

MATERIAL: Linde 65 - Heat No. 065118 - 1/8" Diameter x 36" Straight Lengths

This is to certify that Linde 65, Class E70S-2, as supplied under the above order number, shipped from one heat number, has been tested using the test assembly specified in Fig. 5 of AWS A5.18-69, and ASME SPA5.18 specifications. The wire met all the mechanical and impact property requirements of these specifications using the gas-tungsten arc welding process with Argon shielding gas. During the manufacturing processes, tests, and inspection the materials furnished under this contract have not come in direct contact with mercury or any of its compounds nor with any mercury-containing device employing a single boundary of containment.

| MECHANICAL PROPERTIES OF WELD(S) PER TABLE 3 - | AS-WELDED | * STRESS RELIEVED | REQUIRED |
|--|-----------|-------------------|-------------|
| Weld Test Number | G0524-1 | G0526-1 | |
| All-Weld Metal Tensile Yield Strength, psi | 69,400 | 70,900 | 60,000 min. |
| Ultimate Strength, psi | 79,700 | 83,900 | 72,000 min. |
| Elongation in 2", % | 32.5 | 30.0 | 22 min. |
| Reduction of Area, % | 79.0 | 74.1 | ----- |

CHARPY V-NOTCH IMPACT STRENGTH @ -20°F (ft./lbs.)

| As-Welded | * S.R. |
|----------------|----------------|
| 126.5 | 130.0 |
| 101.5 | 95.0 |
| 120.5 | 97.5 |
| 100.0 | 66.0 |
| 79.5 | 132.5 |
| 107.3 (Ave. 3) | 107.5 (Ave. 3) |

LATERAL EXPANSION (INCHES)

| As-Welded | * S.R. |
|-----------|--------|
| .076 | .085 |
| .074 | .067 |
| .080 | .072 |
| .073 | .055 |
| .063 | .085 |

DUCTILE FRACTURE AREA (PERCENT)

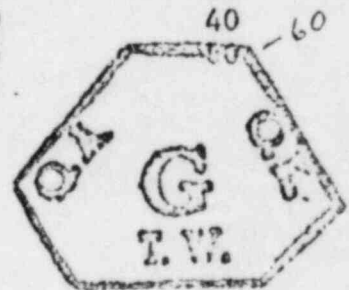
| As-Welded | * S.R. |
|-----------|--------|
| 60 | 50 |
| 50 | 50 |
| 60 | 50 |
| 50 | 40 |
| 35 | |

* Required 20 ft./lbs.

RADIOGRAPHIC TESTS: X-ray(s) met the requirements of Fig. 1
APPLICATION CONDITIONS: 230 Amps, 15 Volts, 5/6 Inches Per Minute

CHEMICAL ANALYSIS:

| C | Mn | P | S | Si | Al | Ti | Zr | Ni | Cr | Mo | V | Cu | |
|------|------|------|------|-----|-----|-----|-----|-----|-----|------|------|-----|---------------|
| .04 | 1.11 | <.01 | .017 | .55 | .11 | .06 | .03 | .03 | .01 | <.01 | <.01 | .01 | - Actual |
| .06 | .90 | .025 | .035 | .40 | .05 | .05 | .02 | --- | --- | --- | --- | --- | - Required |
| max. | 1.40 | max. | max. | .70 | .15 | .15 | .12 | | | | | | < = less than |



* Weldment Stress Relieved at 1125°F, plus or minus 25°F, for 8 hours. Cooling rate 100°F/hr. to 500°F, then air cooled.

Sworn to before me this
day of July 1977

R. J. DiPietro
R. J. DiPietro
Materials Standards Specialist

CT
W011

NATIONAL WELDERS
CO. DIST.
Name: *Jim White*
Date: *5-2-77*

KER 5365-P

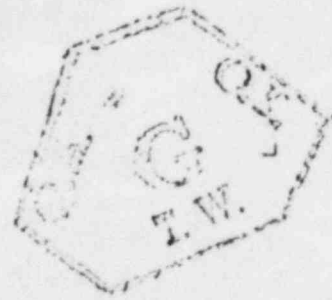
Customer Order No. 4352 Rel #14-3953

Order No. 518321-1

NATIONAL WELDERS
551 NINTH STREET NE
WINSTON SALEM, N. C.
PO #14-3953

Shipped _____

This material conforms to Specification
SFA 5.1 &
Code II Spec.



Type E 7018
Test No. 626
X-Ray Satisfactory
Control No. KKK075

Trade Name
or Trademarks:

Welding Products
Atom Arc 7018

Diameter Size:

3/32"
17,500 lb.

Moisture @1800°F. 0.11%
Concentricity 4%
Type Steel A-285

Lot Numbers:

B713N1AC

Heat Numbers:

402A2291

| | |
|----------------------|------|
| Carbon | .05 |
| Manganese | 1.09 |
| Chromium | .06 |
| Nickel | .01 |
| Silicon | .59 |
| Columbium + Tantalum | |
| Molybdenum | .02 |
| Tungsten | |
| Copper | .01 |
| Titanium | |
| Phosphorus | .012 |
| Sulphur | .014 |
| Vanadium | .03 |

| Test No. | Full | Split | Volts | Amps |
|--------------------|------|-------|-------|------|
| Tensiles & Impacts | 1 | 6 | 21 | 95 |

| Test Results: | As Welded | Stress Relieved |
|---------------|-----------|-------------------------|
| | | 8 hrs. @1225°F. -1250°F |
| Yield | 72,400 | 71,100 |
| Tensile | 86,300 | 82,800 |
| Elongation | 24.0% | 27.0% |
| Red. of Area | 75.8% | 76.0% |

Charpy V-Notch Impacts Tested @-20°F.

| | | |
|----------|----------------|-----------------|
| Impacts | 70-70-82-91-95 | 87-89-92-94-125 |
| Lat.Exp. | 55-56-63-72-74 | 73-75-75-80-74 |
| % Shear | 20-20-30-30-60 | 30-30-30-30-60 |

Fillets: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 29th day of April 1977

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

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

SEAL _____
Notary Public

My commission expires: 8-21-78

BY *[Signature]*
D. M. [unclear]

KEA-5365

NATIONAL WELDERS
QA DEPT.
Approved By: *Jim Mabe*
Date: *6-28-77*
NATIONAL WELDERS
551 NINTH STREET
WINSTON SALEM, N.C. 27105

(CT
WW10)

Customer Order No. 4365
Order No. 120315
Shipped _____

This material conforms to Specification

ASME SFA5.1

E 7018

Trade Name or Trademark: Atom Arc 7018
Diameter Size: 1/8"
Lot Number: 20,000 1b.
Heat Number: 02-1-E710R
421A1061

Type _____
Test No. 976
X-Ray Satisfactory
Control No. LLL061

Moisture @1800°F. 0.17%
Concentricity 4%
Type Steel A-285

| | |
|----------------------|------|
| Carbon | .05 |
| Manganese | 1.11 |
| Chromium | .03 |
| Nickel | .02 |
| Silicon | .35 |
| Columbium + Tantalum | |
| Molybdenum | .01 |
| Tungsten | |
| Copper | .02 |
| Titanium | |
| Phosphorus | .012 |
| Sulphur | .021 |
| Vanadium | .02 |

| | | | |
|--------------------|------|-------|-------|
| Test No. | Full | Split | Volts |
| Tensiles & Impacts | 1 | 6 | 24 |

| | | |
|---------------|-----------|-----------------|
| Test Results: | As Welded | Stress Relieved |
| Yield | 70,540 | 62,920 |
| Tensile | 78,150 | 75,750 |
| Elongation | 30.0% | 30.0% |
| Red. of Area | 79.2% | 78.1% |

Charpy V-Notch Impacts Tested @-20°F.

| | | |
|-----------|---------------------|-----------------|
| Impacts | 108-116-128-143-179 | 101-105-107-107 |
| Lat. Exp. | 79-80-83-86-72 | 81-80-82-78-83 |
| % Shear | 40-50-60-60-50 | 40-40-40-40-40 |

Fillets: **OK** **Vertical** **Overhead**

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

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

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 16th day of June 19 77

SEAL _____
Notary Public

My commission expires: 8-21-78

BY *[Signature]*

DUKE POWER COMPANY
 QUALITY ASSURANCE DEPARTMENT
 SUPPLIER QUALITY ASSURANCE CERTIFICATION

Name of Supplier JIT Grinnell Ind. Piping, Inc.

Date 9-15-77

Address of Supplier Plant Fernersville, NC

Mill Power Order No. C-12517

Duke Item or Req. No. 1206.00-1.0

Spec. No. CNS-1206.00-1.0 Rev.

Supplier ID Nos. CT-SM-1013

Description of Component(s) or Material(s) Lubricated Piping Assembly

Attached Documentation covers all Components/Materials on Mill Power Order.
 Attached Documentation covers partial shipment of Components/Materials on Mill Power Order.

The following listed tests, inspections and reports have been completed as required by the specification:

- | | |
|--|--|
| <input type="checkbox"/> Physical & Chemical Analysis | <input type="checkbox"/> Major Repair Records & Charts |
| <input type="checkbox"/> Hydro (Test Pressure - PSIG <u> </u>) | <input checked="" type="checkbox"/> Personnel Qualifications on Record |
| <input type="checkbox"/> Design Report | <input checked="" type="checkbox"/> Stress Report |
| <input checked="" type="checkbox"/> Radiographic Test | <input type="checkbox"/> Ultrasonic Test |
| <input checked="" type="checkbox"/> Penetrant Test | <input type="checkbox"/> Repair NDE |
| <input type="checkbox"/> Operating Test | <input type="checkbox"/> Performance Curve |
| <input checked="" type="checkbox"/> Dimensional Check | <input type="checkbox"/> Deviation Record # <u> </u> |
| | <input type="checkbox"/> Heat Treatment |
| | <input checked="" type="checkbox"/> Magnetic Particle |
| | <input checked="" type="checkbox"/> Cleanliness |
| | <input checked="" type="checkbox"/> ASME Data Report |

1) _____

2) _____

3) _____

This certifies that the listed Component(s) or Material(s) conform to the requirements of the above referenced Duke Power documents including all codes, standards, test requirements and Quality Assurance requirements invoked therein.

DUKE POWER COMPANY
 QA RECORDS APPROVED
Barry L Keener
 QA REPRESENTATIVE
 DATE: 3/3/78

Thomas A. Smith
 Supplier Representative Authorized Signature

Title Mgr. of Proc. Date 9-15-77

(See Instructions)

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

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

SHEET 1 OF 3

1. Fabricated by ITT Grinnell Industrial Piping, Inc. Order No. 7127
(Name and Address of Fabricator) Kernersville, N. C.
2. Fabricated for Duke Power Company Charlotte, N. C. Order No. C-12517
(Name and Address)
3. Owner Duke Power Company 4. Location of Plant Newport, S. C.

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

(a) Drawing No. CT-01-17X Prepared by ITT Grinnell Industrial Piping, Inc.

(b) National Board No. N/A

6. The material, design, construction, and workmanship complies with ASME Code Section III, Class NUC 2
 Edition 1974, Addenda Date Winter 1974, 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)

Supplemental Sheets #2 --- Drawings
#3 --- Bill(s) of Material

7. Shop Hydrostatic Test Field psi.

8. Description of piping inspected Piece Mark Number CT-01-63
(Include - mark no. - material spec. - nom. pipe size - schedule or thickness - length
See Attached Sheets
- fittings - flanges, etc.)

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 9-13-77 signed ITT Grinnell Industrial Piping, Inc. by Thomas A. Smith
(Fabricator)

Certificate of Authorization Expires 7-16-79 Certificate of Authorization No. 3-1256

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 Maryland and employed by * of Hartford, CT. have inspected the piping described in this Data Report on 9-15-77, 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. *The Hartford Steam Boiler Inspection and Insurance Company

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 or answer for any personal injury or property damage, or a loss of any kind arising from or connected with this inspection.

Date 9-15-77 [Signature] Commission No. 09177

* Supplemental sheets in form of lists, sketches or drawings may be used provided they appear on 8 1/2" x 11" (216 x 279 mm) information in Items 1, 2 and 8 on this Data Report is included on each sheet and the sheets are properly identified and signed by the Inspector.

ITT Grinnell Industrial Piping Inc.

KENNESVILLE, N. C.

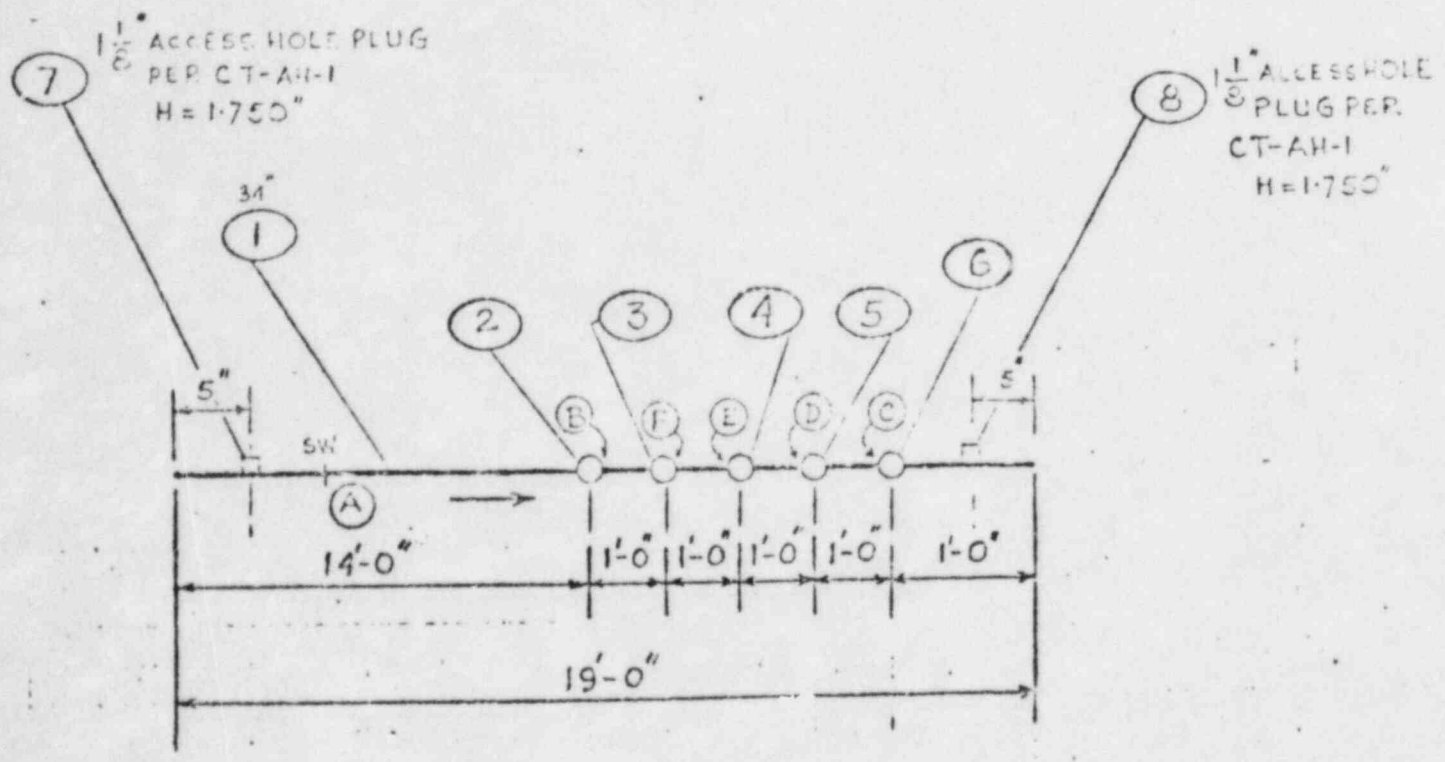
FORM 10-10-76
 Q.A. 10-10-76
 Sheet 2 of 3

INT. NO. 7127
 NAME DUKE POWER COMPANY
 LOCATION CATAWBA UNIT # 1

DRWING NO. 102-76 _____ CHK'D P.G. 11-1-76
 REV. Δ 10-4-77 _____ CHK'D P.G.
 REV. Δ 5-21-77 _____ CHK'D P.G.
 REV. _____ CHK'D _____

NOTE: - LENGTH OF A.H. PLUG SHALL BE $\pm 1/16$ " OF ACTUAL WALL THK. SHOP SHALL GRIND TO FIT, IF RECD.

DUKE POWER COMPANY
 CHARLOTTE, N.C.
 C-12517



MACHINE ENDS
 PER SKETCH CT-D-2

Nuclear Safety Related

CLASS DUKE B LINE SPEC. PS 1500-5 (50) APP. CODE 2-5-5, III, CI 2 NO. REQ'D _____

| | | | | | | | |
|--------------------|-------------------------------------|------------------|-------------------------------------|------------|-------------------------------------|---------------------|-------------------------------------|
| radiography (RT) | <input checked="" type="checkbox"/> | Special Marking | <input type="checkbox"/> | Preheat | <input checked="" type="checkbox"/> | Cert. of Compliance | <input type="checkbox"/> |
| Mag. Particle (MT) | <input checked="" type="checkbox"/> | Special Cleaning | <input checked="" type="checkbox"/> | Heat Treat | <input checked="" type="checkbox"/> | Mil Test Reports | <input checked="" type="checkbox"/> |
| Penetrant (PT) | <input type="checkbox"/> | Painting | <input checked="" type="checkbox"/> | Over Stamp | <input checked="" type="checkbox"/> | Data Reports | <input type="checkbox"/> |

STEM MARK 5-TEAM (5M) FAB. SPECS. 5-118
 E. DRAWING NO. CH-1491-5-1002 PRESS. 1230 PSI TEMP. 600 °F. WT. 1314 LBS.
 CT MARK CT-8M-02 REG. FILE CT-01-17X

U.S.D.

Duke Power Company/Charlotte, N.C. / C-12517

Sheet 3 of 3

MATERIALS RECORD

DUKE POWER COMPANY

Revision No. A

Revision Date 12-1-77

Job Name CATAWBA UNIT #1

Contract No. 7127

Location

| PART NUMBER | DESCRIPTION | QTY | OR
REF | UNIT | MFG. CODE | MATERIAL | STATUS | UNIT PRICE | TOTAL | ACCOUNTING DATE | NET |
|-------------|-----------------------------|-----|-----------|-------|-----------|----------|--------|------------|-------|-----------------|-----|
| | | | | | | | | | | | |
| 21-438 | 31.438" J.DX1750NW, SMLS | 19 | 6 | 3-600 | | | | | | | |
| | C.S. PIPE TO ASME, SA-106 C | | | | | | | | | | |
| 0.75 | 1/4" 3000 HCS, SPECIAL WELD | | | | | | | | | | |
| | LOSS TO SA-105, PER DET. | | | | | | | | | | |
| | SKETCH C.T-WB-1 | | | | | | | | | | |
| 0.75 | DITTO | | | | | | | | | | |
| 0.75 | DITTO | | | | | | | | | | |
| 0.75 | DITTO | | | | | | | | | | |
| 0.75 | DITTO | | | | | | | | | | |
| 1.12 | 1" ACCESS HOLE PLUG, PFR | | | | | | | | | | |
| | C.T-ALL-1, SA-105, PER DET. | | | | | | | | | | |
| 1.12 | DITTO | | | | | | | | | | |

Nuclear Safety Policy

MFG. Code

Class DUKE 'B'

Code

Supplement

U.S.I.B.

711

CONTRACT **7127** REG. # **CT-57-68** REG. # **CT-01-77**
 CLASS **B** SPECIFICATION **JS-118-2** SUPPLEMENT

WELD DATA

| NO. | PREPARE | | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | INSP. | RE DATE | | P.C. FINAL |
|-----|------------|------|-------------|------------|-------------|------------|-------------|------------|-------|---------|-------|------------|
| | WELD MAT'L | Q.C. | | | | | | | | Q.C. | CUST. | |
| 1 | 1-4-3-3 | | PROC | 1-4-3-3 | PROC | 1-4-3-3 | PROC | 1-4-3-3 | | | | |
| 2 | 065718 | | C284 | 065718 | C284 | 1-4-3-3 | C284 | 1-4-3-3 | | | | |
| 3 | 00013 | | 7/4/77 | 00013 | 7/4/77 | 00013 | 7/4/77 | 00013 | 9477 | | | |
| 4 | 1-4-3-3 | | PROC | | PROC | | PROC | | | | | |
| 5 | 065718 | | | | | | | | | | | |
| 6 | 00013 | | | | | | | | | | | |
| 7 | | | PROC | | PROC | | PROC | | | | | |
| 8 | | | PROC | | PROC | | PROC | | | | | |
| 9 | | | PROC | | PROC | | PROC | | | | | |

| | | | |
|-------------|----------------------------|---------------------|-----------------------|
| STRESS DATE | FINAL INSP. | SPECIAL OPERATIONS: | Q.C. DOC. APPROVAL |
| | | C DIM. | TEW 9-13-77 |
| SQUARE UP | *ABS-402A2271/BENHAC | WALL THK. | A/I STAMP/DATA REPORT |
| | *KAPIS-421A1061/02-1-E710K | | |
| DATE | CUST INSP | OTHER | CUST DOC APPROVAL |

MAGNETIC PARTICLE EXAMINATION REPORT

CUSTOMER: Duke Pipe CONTRACT/PO NO: 2127
 SPECIFICATION: MTA-1-1 QUALITY REQUIRED: MTA-1
 EXAMINATION METHOD: E.C. 1000
 EQUIPMENT TYPE: M-2000-Magn. Magic
 ITEM OR WPT. NAME: CT-01-12x TRUCK CT-5m-6B
 SYSTEM/WHEN REQUIRED: Main Stem (5m)

| ITEM IDENTIFICATION
WELD/SERIAL/H.T. NO. | SIZE AND THICKNESS | AREA EXAMINED
(INDICATE FOOT IN' EXTENTS,
FINAL FIELD OR MATERIAL AS
APPLICABLE) | INTERPRETATION |
|---|--------------------|---|----------------|
| B | 3/4" 3000# Brass | Final | accept |
| C | ↓ | ↓ | ↓ |
| D | ↓ | ↓ | ↓ |
| E | ↓ | ↓ | ↓ |
| F | ↓ | ↓ | ↓ |
| | Code plate | Fillets | ↓ |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

EXAMINATION PERFORMED BY: J. Smith DATE: 8/23/77
 ASST LEVEL: II
 INTERPRETATION PERFORMED BY: J. Smith DATE: 8/23/77
 ASST LEVEL: II
 APPROVAL: J. Smith DATE: 8/30/77

ITT Grinnell Industrial Supply Inc.

KELLSVILLE, N. C.

NO. 7127 & 7128

DUSE POWER COMPANY
 GEORGETOWN, N. C. 28526

Drawn SM 10-11-76

CHK'D. [Signature] 10-11-76

REV. _____

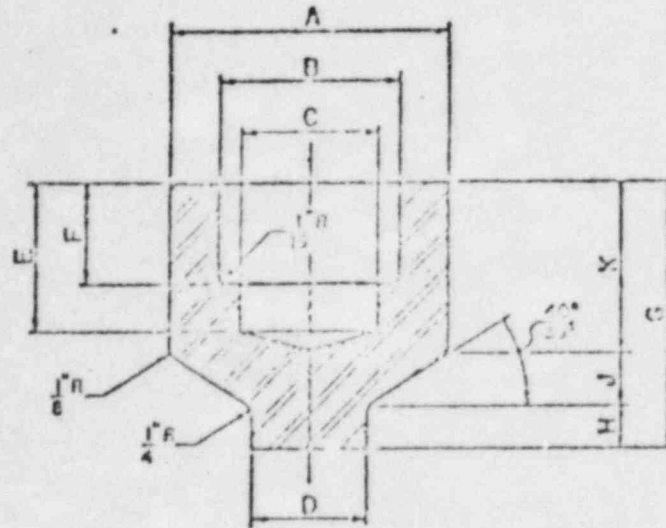
CHK'D. _____

REV. _____

CHK'D. _____

REV. _____

CHK'D. _____



| N.P.S. | A
±0.032" | B
±0.005" | C
±0.012" | D
±0.012" | E
±0.012" | F
±0.012" | G
±0.012" | H
±0.012" | J
±0.012" | K
±0.012" |
|--------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1/2" | 1.500 | 0.660 | 0.475 | 0.313 | 0.757 | 0.500 | 1.375 | 0.163 | 0.433 | 0.750 |
| 3/4" | 1.750 | 1.070 | 0.534 | 0.400 | 0.812 | 0.563 | 1.500 | 0.163 | 0.464 | 0.820 |
| 1" | 2.250 | 1.335 | 0.701 | 0.555 | 0.975 | 0.625 | 1.750 | 0.250 | 0.603 | 0.901 |
| 1 1/2" | 2.500 | 1.670 | 1.150 | 1.021 | 1.000 | 0.683 | 1.875 | 0.250 | 0.663 | 1.053 |
| 1 1/2" | 3.000 | 1.920 | 1.200 | 1.063 | 1.000 | 0.750 | 2.000 | 0.250 | 0.700 | 1.047 |
| 2" | 3.075 | 2.411 | 1.603 | 1.563 | 1.250 | 0.875 | 2.500 | 0.250 | 0.705 | 1.400 |

SOCKET WELD

LINE SPEC.

ALL DIMENSIONS

UNLESS NOTED

| | | | |
|--------------------------|-----------------|----------|------------------|
| Drawn by: [Signature] | Special Marking | Project | Dept. of Control |
| Checked by: [Signature] | Size of Drawing | Rev. | Spec. Dept. |
| Approved by: [Signature] | Feature | Quantity | Production |

FABRICATION

PREPARED BY: [Signature] DATE: [Date]

DRAWN BY: [Signature] DATE: [Date]

Form No. CC-865
 IET GERRHILL INDUSTRIAL
 PIPING, INC.

In-Process
 Repair

Form N6.3A

Standard Hours

5200-3

RADIOGRAPHIC INSPECTION REPORT

Date 8-8-77

AP 7713

Order No. CT-11-17X Piece No. CT-SM-6B Weld No. A Rollout No. C100
5200-3 743108172 238

| Views | Magnification | Defect Type | Defect Type | | | | | | | Remarks |
|-------------------------|--|-------------|-------------|----|----|----|----|---|----|---------|
| | | | LC | LT | SC | PC | CR | Y | DL | |
| Source to Film Distance | 17" | A | | | | | | | | |
| Film Size | 7x17 | | | | | | | | | |
| Film Type | 7C | | | | | | | | | |
| Viewing Technique | Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | | | | | | | | | |
| Screen | Front .010
Back .010 | | | | | | | | | |
| Development | 80° Dark 8 min
Automatic | | | | | | | | | |
| Exposure | 1.4333 | | | | | | | | | |

P - Lack of Penetration
 C - Cracks
 X - Porosity
 DL - Main Thru
 LC - Lack of Fusion
 LT - Lack of Fusion
 SC - Cracks
 PC - Cracks
 CR - Cracks
 Y - Cracks
 DL - Main Thru
 A - Acridifiable
 B - Repeatability
 D - Burdettline



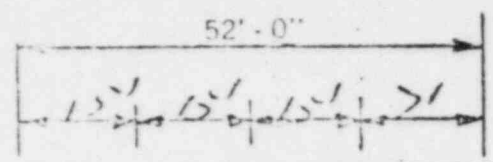
Radiographer - Date 8-12-77 by Bob O'Neil
 Inspector - Date 8-11-77 by Allyson
 Approval Date _____ by _____
 Customer PHOTOGRAPHY CO. Location _____
 Contract _____ Job No. _____
 Inspection Standard _____ Acceptance Standard _____
 Customer Approval Date _____ by _____

Load Number _____

FURNACE LOAD SHEET

Date 8-29-77

| REGISTER NO. | SKETCH NO. | TYPE MATERIAL | WEIGHT | TEMP. REQD.* | RATE OF HT PER HR | HOLD TIME | RATE OF COOLING PER HOUR | SPEC. NO. | TIME IN | TIME OUT |
|--------------|------------|---------------|--------|---------------------|-------------------|-----------|--------------------------|-----------|---------|----------|
| M.E | 01-117 | 7106 B | 968 | 1150 ^{±25} | 400° | 2 1/2 | 400° | 131-1 | 16" | 580 |
| M.E | 01-111 | 11 | 1095 | 11 | 2 | | 2 | 11 | 16" | 580 |
| M.E | 01-140 | 11 | 760 | 11 | 1150° | | 600 | 11 | 16" | 580 |
| M.E | 01-137 | 11 | 1220 | 11 | | | | 11 | 16" | 580 |
| M.E | 04-127B | 11 | 2090 | 11 | | | | 5-11 | 18" | 580 |
| T-T | 04-63 | 11-C | 525 | 11 | | | | 131-1 | 6" | XXS |
| T-T | 04-21 | 11 | 3485 | 11 | | | | 11 | 14" | 516.0 |
| CT | 01-17X | 11 | 14,934 | 11 | | | | 5-11 | 31 1/2" | 1,250 |
| CT | 07-45 | 11 B | 5,824 | 11 | | | | 131-1 | 20" | 560 |
| CT | 04-18 | 11 | 1090 | 11 | | | | 5-11 | 18" | 580 |



PLAN



ELEVATION

THERMOCOUPLE LOCATIONS

1/2 INCH EQUIL. 30.1.1
S/N RECORDER AND PROG. 1
C70-55-55-1-1 SU 1355/5001

TIME TO ... 2 1/4
TIME AT TEMP. 2
TIME TO COOL ... 2 1/4

1 - Shop File
2 - ...
3 - ...
4 - ...

* Temperature variation within any 15 foot interval of weld length shall not exceed 250 degrees F

Load Inspection to insure against local flame impingement
D. C. Stamp

Catawba

IRON WORKS, INC.

P. O. BOX 121

HOUSTON, TEXAS 77001

ITT. GRINNELL INDUSTRIAL PIPING, INC.
KEMPERSVILLE, MO. 27234

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

Date: 22 July 1975

| | | |
|----------------------------------|----------------------------------|---|
| Customer Order No.
KER-2353-P | C.I.W. Sales Order No.
F-5696 | Specification
ASME-SA106 Gr. C and ASME-Section III, Class 2
Thru Summer 1974 Addenda |
| Description of Material | O.D. _____ x I.D. 31.433" | WALL 1.750" M.W. |
| C.I.W. Part No. 86-5696-352-314 | | |

| Heat No. | Location or Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|-----|------|------|-----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |
| J 6000 | | .24 | .86 | .010 | .013 | .20 | | | |

| Quantity or II No. | Heat No. | Test Loc. | Tensile PSI | Yield Point % Offset Yield PSI | MECHANICAL PROPERTIES | | | | Flattening Test | Specimen Size | Test Lot# |
|--------------------|----------|-----------|-------------|--------------------------------|-----------------------|-------------|------------|-----------|-----------------|---------------|-----------|
| | | | | | % Elong. 2 In. | % Red. Area | Macro Etch | Bend Test | | | |
| 4 | J 6000 | Trans. | 76,400 | 40,200 | 28.2 | 56.0 | | OK | .505 | 546 | |

| Forg. Ser. # | Test Lot# |
|--------------|-----------|
| #26547A | 255 546 |
| 26547Y | 546 |
| 26548W | 546 |
| 26548Y | 546 |

CATAWBA
PH9



Hydrostatic Test Each length of pipe hydrostatically tested at 2400 psi for 5 sec. and found acceptable.

Heat Treatment:

Subscribed and sworn to before me this
2nd Day of July 1975

[Signature]
Notary Public
G. A. FORTSON
Notary Public in and for the State of Texas
COMMISSION EXPIRES JANUARY 1, 1977

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

[Signature]
Metallurgical Engineer
G. O. [unclear]

The Colonial Machine Company, Inc.

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

Phone (412) 539-7033

May 31, 1977

ITT Grinnell Industrial Piping Inc.
P. O. Box 566
Kernersville, NC 27284

CERTIFIED MILL TEST REPORT

Order CT
5017-4

| | | | | | |
|----------------|---------------|----------------|---------|----------|------|
| YOUR ORDER NO. | OUR ORDER NO. | DATE SHIPPED | | | |
| KER 6155-P | 10033 | 6/1/77 | | | |
| ITEM | TYPE | MATERIAL SPEC. | SHIPPED | HEAT NO. | QTY. |

ASME SA105 NORMALIZED

| | | | | |
|---|--|----|--------|-----|
| 1 | 3/4" S/W Spec. Weld Bosses per SA CT-WB-1
Pt. No. Y*A*SE* CT-3002-1 (Rev. 9 10/14/76) | 40 | N94153 | AA1 |
| 2 | 1" Ditto Pt. No. Y*A*SE* CT-3002-2 | 20 | E97257 | AA1 |
| 3 | 2" Ditto Pt. No. Y*A*SE* CT-3002-3 | 12 | A00070 | AA1 |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CB | TI | CO | OTHER ELEMENTS |
|------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| 1 | .32 | .80 | .006 | .021 | .22 | | | | | | | | |
| 2 | .26 | .78 | .011 | .027 | .24 | | | | | | | | |
| 3 | .32 | .74 | .017 | .026 | .19 | | | | | | | | |

| ITEM | TENSILE | 2% YIELD | % ELONG | % RA. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1. 2. 3. 4. 5. 6. ETC. |
|------|---------|----------|---------|-------|----------|--------------------|---------------------------------|
| 1 | 76700 | 36800 | 34.0 | 58.2 | | | Mill Source - U.S. Steel |
| 2 | 75000 | 47000 | 32.0 | 61.3 | | | Mill Source - " " |
| 3 | 75360 | 42770 | 31.0 | 52.4 | | | Mill Source " " |

INSPECTION WAIVED PER MR. TOM WILSON ON 5/31/77.

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.

dg

By *Ramona R. Wilson*

The Colonial Machine Company, Inc.

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

Phone (814) 539-7033

ITT Grinnell Industrial Piping Inc.
P. O. Box 566
Kernersville, NC 27284

May 20, 1977

CERTIFIED MILL TEST REPORT

CT
R.P. I

L

| YOUR ORDER NO. | | OUR ORDER NO. | DATE SHIPPED | | | | | | | | | | |
|----------------|------|--|--------------|----------|--------|----|----|----|----|----|----|----|----------------|
| KER 6117-B | | 10013 | 5/25/77 | | | | | | | | | | |
| ITEM | TYPE | MATERIAL SPEC. | SHIPPED | HEAT NO. | QMC C. | | | | | | | | |
| ASME SA105 | | | | | | | | | | | | | |
| 1 | | 1.13" Access Plugs per CT-AH-1, H = 1.75"
Pt. No. ****SF* CT-4005-1 | 12 | 78849 | ABF | | | | | | | | |
| 2 | | 1.13" Access Plugs per CT-AH-1, H = 1.375"
Pt. No. ****SF* CT-4005-2 | 25 | 78849 | ABF | | | | | | | | |
| 3 | | 1.13" Access Plugs per CT-AH-2, H = 1.375"
Pt. No. ****SF* CT-4005-3 (Sq. Head) | 30 | 78849 | ABF | | | | | | | | |
| 4 | | 1.13" Access Plugs per CT-AH-1, H = 2.026"
Pt. No. ****SF* CT-4005-4 | 16 | 78849 | ABF | | | | | | | | |
| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CB | BI | CO | OTHER ELEMENTS |
| -4 | .26 | .71 | .013 | .025 | .23 | | | | | | | | |



| ITEM | TENSILE | 2% YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1 2 3 4 5 6 ETC. |
|--|---------|----------|----------|--------|----------|--------------------|---------------------------|
| 1-4 | 75000 | 48500 | 32.0 | 58.6 | | | Mill Source - Copperweld |
| INSPECTION WAIVED PER MR. TOM WILSON ON 5/23/77. | | | | | | | |

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.

By *Ronald R. Wilson*



UNION CARBIDE CORPORATION
 LINDE DIVISION
 WELDING MATERIALS
 P.O. BOX 710, ASHTABULA, OHIO 44004

CT
 W/13

July 15, 1977

CUSTOMER: Industrial Welding Supply
 2501 Champagne
 Ashboro, N.C. 27205
 (For: ITT Grinnell)

YOUR ORDER NO.: 11-476
 LINDE S.O. NO.: 011476 U
 QUANTITY: 420 lbs.

MATERIAL: Linde 65 - Heat No. 045118 - 1/8" Diameter x 36" Straight Lengths

This is to certify that Linde 65, Class E70S-2, as supplied under the above order number, shipped from one heat number, has been tested using the test assembly specified in Fig. 5 of AWS A5.18-69, and ASME SPAS.18 specifications. The wire met all the mechanical and impact property requirements of these specifications using the gas-tungsten arc welding process with Argon shielding gas. During the manufacturing processes, tests, and inspections the materials furnished under this contract have not come in direct contact with mercury or any of its compounds nor with any mercury-containing device employing a single boundary of containment.

| MECHANICAL PROPERTIES OF WELD(S) PER TABLE 3 - | AS-WELDED | * STRESS RELIEVED | REQUIRED |
|--|-----------|-------------------|-------------|
| Weld Test Number | G0524-1 | G0526-1 | |
| All-Weld Metal Tensile | | | |
| Yield Strength, psi | 69,400 | 70,900 | 60,000 min. |
| Ultimate Strength, psi | 79,700 | 83,900 | 72,000 min. |
| Elongation in 2", % | 32.5 | 30.0 | 22 min. |
| Reduction of Area, % | 79.0 | 74.1 | ----- |

| CHARPY V-NOTCH IMPACT STRENGTH @ -20°F (ft./lbs.) | |
|---|----------------|
| As-Welded | * S.R. |
| 26.5 | 130.0 |
| 01.5 | 95.0 |
| 20.5 | 97.5 |
| 00.0 | 66.0 |
| 79.5 | 132.5 |
| 07.3 (Ave. 3) | 107.5 (Ave. 3) |

| LATERAL EXPANSION (INCHES) | |
|----------------------------|--------|
| As-Welded | * S.R. |
| .076 | .085 |
| .074 | .067 |
| .080 | .072 |
| .073 | .055 |
| .063 | .085 |

| DUCTILE FRACTURE AREA (PERCENT) | |
|---------------------------------|--------|
| As-Welded | * S.R. |
| 60 | 50 |
| 56 | 50 |
| 60 | 50 |
| 50 | 40 |
| 35 | |

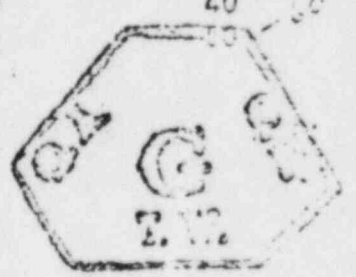
Required 20 ft./lbs.

RADIOGRAPHIC TESTS: X-ray(s) met the requirements of Fig. 1
 APPLICATION CONDITIONS: 230 Amps, 15 Volts, 5/6 Inches Per Minute

CHEMICAL ANALYSIS:

| C | Mn | P | S | Si | Al | Ti | Zr | Ni | Cr | Mo | V | Cu | |
|------|------|------|------|-----|-----|-----|-----|-----|-----|------|------|-----|------------|
| .04 | 1.11 | <.01 | .017 | .55 | .11 | .06 | .03 | .03 | .01 | <.01 | <.01 | .01 | - Actual |
| .06 | .90 | .025 | .035 | .40 | .05 | .05 | .02 | --- | --- | --- | --- | --- | - Required |
| max. | 1.40 | max. | max. | .70 | .15 | .15 | .12 | | | | | | |

< = less than



Weldment Stress Relieved at 1125°F, plus or minus 25°F, for 8 hours. Cooling rate 100°F/hr. to 500°F, then air cooled.

Worn to before me this
 day of _____ 1977

R. J. ...
 R. J. ...
 Materials Standards Specialist

11771 E. ...
 ...

CT
W011

NATIONAL METAL
5-2-77

KER 5365-1

Customer Order No. 4352 Ref #14-3522

Order No. 518321-1

NATIONAL METAL
551 NINTH STREET NE
WINSTON SALEM, N. C.
PO #14-3563

Shipped _____

This material conforms to Specification
SFA 5.1 &
Code II Spec.

E 7018

Trade Name or Trademark: Atom Arc 7018
Diameter Size: 3/32"
17,500 lb.
Lot Numbers: B713N1AC
Heat Numbers: 402A2291

Type: E 7018
Test No. 626
X-Ray Satisfactory
Control No. KKK075

Moisture @1800°F. 0.11%
Concentricity 4%
Type Steel A-285

| | |
|----------------------|------|
| Carbon | .05 |
| Manganese | 1.09 |
| Chromium | .06 |
| Nickel | .01 |
| Silicon | .59 |
| Columbium + Tantalum | |
| Molybdenum | .02 |
| Tungsten | |
| Copper | .01 |
| Titanium | |
| Phosphorus | .012 |
| Sulphur | .014 |
| Vanadium | .03 |

| Test No. | Full | Split | Volts | Amps |
|--------------------|------|-------|-------|------|
| Tensiles & Impacts | 1 | 6 | 21 | 95 |

| Test Results: | As Welded | Stress Relieved |
|---------------|-----------|-----------------|
| Yield | 72,400 | 71,100 |
| Tensile | 86,300 | 82,800 |
| Elongation | 24.0% | 27.0% |
| Red. of Area | 75.8% | 76.0% |

Charpy V-Notch Impacts Tested @-20°F.
Impacts 70-70-82-91-95 87-89-92-94-125
Lat.Exp. 55-56-63-72-74 73-75-75-80-74
% Shear 20-20-30-30-60 30-30-30-30-60

Fillets: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 29th day of April, 1977

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

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

SEAL _____
Notary Public
My commission expires: 8-21-78

BY R. W. Boyer
R. W. Boyer

KEA-5365-

NATIONAL WELDERS
QA DEPT.
Approved By: *Jim. made*
Date: *6-28-77*

CERTIFIED MATERIALS TEST REPORT

CT
WW15

Customer Order No. 4365
Order No. 120315
Shipped _____

NATIONAL WELDERS
551 NINTH STREET
WINSTON SALEM, N.C. 27105

This material conforms to Specification

ASME SFAS.1

E 7018

Trade Name or Trademark: Atom Arc 7018
Diameter Size: 1/8"
Lot Numbers: 20,000 lb.
02-1-E710R
Heat Numbers: 421A1061

Type _____
Test No. 976
X-Ray Satisfactory
Control No. LLL051

Moisture @1800°F. 0.17%
Concentricity 4%
Type Steel A-285

| | |
|----------------------|------|
| Carbon | .05 |
| Manganese | 1.11 |
| Chromium | .03 |
| Nickel | .02 |
| Silicon | .35 |
| Columbium + Tantalum | |
| Molybdenum | .01 |
| Tungsten | |
| Copper | .02 |
| Titanium | |
| Phosphorus | .012 |
| Sulphur | .021 |
| Vanadium | .02 |

| | | | | |
|--------------------|------|-------|-------|----|
| Test No. | Full | Split | Volts | A |
| Tensiles & Impacts | 1 | 6 | 24 | 14 |

| | | |
|---------------|-----------|-------------------------|
| Test Results: | As Welded | Stress Relieved |
| | | 8 hrs. @1150°F. 1200°F. |
| Yield | 70,540 | 62,920 |
| Tensile | 78,150 | 75,750 |
| Elongation | 30.0% | 30.0% |
| Red. fof Area | 79.2% | 78.1% |

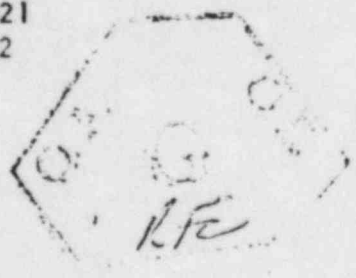
Charpy V-Notch Impacts Tested @-20°F.

| | | |
|-----------|---------------------|-------------------|
| Impacts | 103-116-128-143-179 | 101-105-107-107-1 |
| Lat. Exp. | 79-80-83-86-72 | 81-80-82-78-83 |
| % Shear | 40-50-60-60-50 | 40-40-40-40-40 |

Fillets: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

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



State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 16th day of June, 19 77

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

SEAL _____
Notary Public

My commission expires 8-21-78

BY *R. W. Boyer*
R. W. Boyer

CERTIFIED MATERIALS TEST REPORT

CT
ww 18

Customer Order No. 4365 Rel. 1/4-1977

Order No. 711090-1

Shipped KGTZ 6174

ITT GRINNELL INDUSTRIAL
PIPING, INC.
HIGHWAY 421
KERNERSVILLE, N.C. 27204

This material conforms to Specification
SFA 5.1 &
Itt Grinnell ES-1072-1

Trade Name or Trademark: Atom Arc 7018
Diameter Size: 1/8"
Lot Numbers: 16,750 lb.
Heat Numbers: 02-2-6711R
431A1631

Type E 7018
Test No. 213
X-Ray Satisfactory
Control No. HMM006

Moisture @1800°F. 0.18%
Concentricity 4%
Type Steel A-285

| | |
|----------------------|------|
| Carbon | .04 |
| Manganese | 1.04 |
| Chromium | .03 |
| Nickel | .01 |
| Silicon | .52 |
| Columbium + Tantalum | |
| Molybdenum | .01 |
| Tungsten | |
| Copper | .01 |
| Titanium | |
| Phosphorus | .009 |
| Sulphur | .016 |
| Vanadium | .02 |

| Test No. | Full | Split | Volts | Amps |
|--------------------|------|-------|-------|------|
| Tensiles & Impacts | 1 | 5 | 22 | 130 |

| Test Results: | As Welded | Stress Relieved |
|---------------|-----------|----------------------|
| | | 8 hrs. @1150-1200°F. |
| Yield | 68,400 | 60,600 |
| Tensile | 76,400 | 75,100 |
| Elongation | 29.0% | 30.0% |
| Red. of Area | 78.7% | 77.5% |

Charpy V-Notch Impacts Tested @-20°F.
Impacts 50-100-120-123-130 131-134-143-151-202
Lat. Exp. 41-72-79-78-31 93-95-89-35-97
% Shear 15-20-30-30-30 60-60-60-70-80

Filllets: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

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

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 3rd day of August 19 77

SEAL *[Signature]*
Notary Public

My commission expires 8-21-78

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

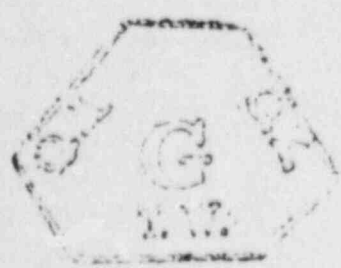
BY *[Signature]*

SUBJECT: Welding Filler Materials
WIRE: Linde 40B, Heat No. 402013
FLUX: Linde 80, Lot No. 1164, Control No. 8264
R & D TEST NOS. 254 & 294

This is to certify that the subject materials were welded into test plates as shown in SFA 5-1, using WPS 3-1, that the test results shown in Taussig Associates, Inc. Test Report No. 19926C and 20826 were produced from those test plates and that the radiograph of the plates were acceptable.

In reference to ASME Section III fabrication, the subject material is acceptable for use on material in the as-welded or post weld heat-treated condition (total time not to exceed 5 hours) and on impact test material with a minimum service temperature of +30 degrees F. This material is not acceptable for use on base materials in excess of 70,000 psi minimum tensile strength.

*Carlauba
MW-19*



W. J. Sperko, P.E.

Date: 7/29/77

100115

Lucas Industries Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 678 2100



Report No. 19926C - March 14, 1977

ITT Grinnell Industrial Piping, Inc.
P. O. Box 566
Highway 421
Kernersville, North Carolina 27284

Attn: Mr. Walter J. Sperko

*Catamba
nw-19*

S B J E C T

Mechanical Testing of a Welded Plate Assembly
Marked No. 254. Per Requisition No. 28418.

UNION CARBIDE CORPORATION
 LINDE DIVISION
 WELDING MATERIALS PLANT
 P.O. BOX 719, ASHTABULA, OHIO 44004

November 9, 1976

Report of Linde
 Chemical Analysis
 Welding Wire

ITT Grinnell
 Old Highway 421
 Kernersville, N.C. 27284

Your Order No. 06-901 Linde 402
 LINDE Shipper's Order 000320 892 Wire Size 1/8
 Quantity Shipped 25,890 LBS. Stock No. 114832
 Date Shipped 11-3-76 Package 62-6011
 Control _____

This is to certify that our records show that the material in the
 aforementioned shipment conforms to our standard specifications for this grade
 of LINDE welding wire and has the following analysis:

HEAT NUMBER - 402013

| | | |
|-------------|---|------|
| Carbon | - | .12 |
| Manganese | - | 1.14 |
| Phosphorous | - | .003 |
| Sulphur | - | .019 |
| Silicon | - | .02 |
| Copper | - | .055 |
| Molybdenum | - | .49 |

*Castamba
 LW-19*

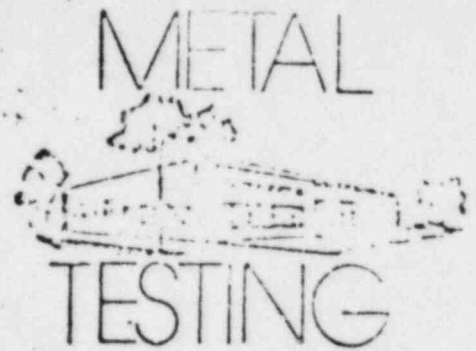
Ladle Analysis

[Signature]

 Union Carbide Corporation - Linde Division

Instrig Associates Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100

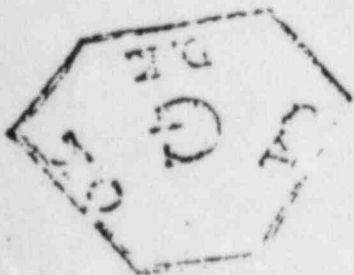


Report No. 20826 - May 27, 1977

ITT Grinnell Industrial Piping, Inc.
P.O. Box 566
Highway 421
Kernersville, North Carolina 27284

Attn: Mr. John F. Elder

CT
ww-19



SUBJECT

Mechanical Testing of a Welded Plate Assembly
Marked Test No. 294 after Post Weld Heat
Treatment. Requisition No. 28471.

BACKGROUND:

A 3/4" thick welded plate assembly was submitted to our laboratory for weld metal tension and impact tests. The plate assembly, identified as test No. 294 had reportedly been submerged arc welded using Linde 40-B, heat 402013 filler and Linde 80, lot 1164 flux.

TEST RESULTS:

Chemical Analysis:

A chemical analysis had previously been done on the weld metal of a similar plate using filler from the same heat number and flux from the same lot. The results of this chemical analysis, from test No. 251, Taussig Associates report No. 19910, were as follows:

| | |
|------------|------|
| Carbon | .07% |
| Manganese | .94 |
| Phosphorus | .010 |
| Sulfur | .018 |
| Silicon | .45 |
| Nickel | <.05 |
| Chromium | <.05 |
| Molybdenum | .36 |
| Copper | .12 |
| Vanadium | <.01 |

CT
uw-19

Heat Treatment:

The submitted plate assembly was cut to a size which would permit fitting into a heat treating furnace and from which all the required test specimens could be obtained. These pieces were then subjected to a stress relief anneal at 1150°F. for four (4) hours in a calibrated furnace. Cooling was done at a rate not exceeding 300°F. per hour.

Impact Testing:

Three (3) full size Charpy-V-Notch impact test specimens were machined from the submitted plate assembly after heat treatment. These specimens were notched in the weld metal and tested at plus 30°F. The results of this testing are as follows:



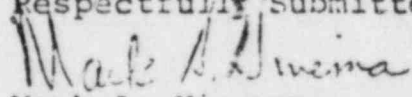
| | <u>Sample
No. 1</u> | <u>Sample
No. 2</u> | <u>Sample
No. 3</u> |
|----------------------------|-------------------------|-------------------------|-------------------------|
| Absorbed Energy,
ft-lbs | 73 | 72 | 67 |
| Mils Lateral Expansion | 67 | 61 | 66 |
| Percent Shear Fracture | 90 | 90 | 90 |

Tension Testing:

One round, reduced section, all weld metal, tension test specimen was machined from the submitted plate assembly. This specimen was subjected to a standard tension test with the following results:

| | |
|--------------------------------|--------|
| Diameter (in.) | .502 |
| Area (sq. in.) | .1979 |
| Tensile Load (lbs.) | 13,850 |
| Tensile Strength, (psi.) | 70,000 |
| Yield Point psi. (0.2% Offset) | 54,070 |
| % Elongation in 2" | 31 |
| % Reduction of Area | 64 |

CT
uw-19

Respectfully Submitted,

 Mark A. Himsman
 Staff Engineer
 TAUSSIG ASSOCIATES, INC.

MAH:i



Lausig Associates Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



Report No. 19926C - March 14, 1977

ITT Grinnell Industrial Piping, Inc.
P. O. Box 566
Highway 421
Kernersville, North Carolina 27284

Attn: Mr Walter J. Sperko

CT
ww-19

S U B J E C T

Mechanical Testing of a Welded Plate Assembly
Marked No. 254. Per Requisition No. 28413.

A welded plate assembly was submitted to our laboratory for mechanical testing. The assembly was identified as Test Plate No. 254 and had reportedly been welded with Linde 408, heat 402013 with Linde 30 flux, lot 1164, con. #8264. The approximately 3/4 inch thick plate was to be impact and tension tested in the weld metal.

TEST RESULTS:

Impact Testing:

Three full size Charpy V-notch impact test specimen were machined from the submitted plate assembly. The specimens were all notched in the weld metal and tested at plus 30° F with the following results:

| | <u>No. 1</u> | <u>No. 2</u> | <u>No. 3</u> |
|--------------------------|--------------|--------------|--------------|
| Absorbed Energy (ft-lbs) | 25 | 30 | 34 |
| Lateral Expansion (mils) | 30 | 31 | 33 |
| Percent Shear | 40 | 40 | 50 |

Tension Testing:

One round, reduced section, all weld metal, tension test specimen was machined from the submitted plate assembly. This specimen was subjected to a standard tension test with the following results:

| | |
|--------------------------|--------|
| Diameter (in.) | .504 |
| Area (sq.in.) | .1995 |
| Tensile Load (lbs.) | 15,625 |
| Tensile Strength, (psi.) | 78,320 |
| Yield Point (psi.) | 69,270 |
| % Elongation (2 in.) | 29 |
| % Reduction of Area | 58 |

CF
uw-19

Respectfully submitted,

Mark A. Hineman
Staff Engineer
TAUSSIG ASSOCIATES, INC.

DUKE POWER COMPANY
 QUALITY ASSURANCE DEPARTMENT
 SUPPLIER QUALITY ASSURANCE CERTIFICATION

Name of Supplier ITT Grinnell Ind. Piping, Inc. Date 3-23-78
 Address of Supplier Plant Kernersville, NC Mill Power Order No. C-12517
 _____ Duke Item or Req. No. 1206.00-1.0
 _____ Spec. No. CNS-1206.00-1.0 Rev. _____

Supplier ID Nos. _____

Description of Component(s) or Material(s) Fabricated Piping Assembly

CT-SM-6C

Attached Documentation covers all Components/Materials on Mill Power Order.
 Attached Documentation covers partial shipment of Components/Materials on Mill Power Order.

The following listed tests, inspections and reports have been completed as required by the specification:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Physical & Chemical Analysis | <input type="checkbox"/> Major Repair Records & Charts |
| <input type="checkbox"/> Hydro (Test Pressure - PSIG _____) | <input checked="" type="checkbox"/> Personnel Qualifications on Record |
| <input type="checkbox"/> Design Report | <input type="checkbox"/> Stress Report |
| <input checked="" type="checkbox"/> Radiographic Test | <input type="checkbox"/> Ultrasonic Test |
| <input type="checkbox"/> Penetrant Test | <input type="checkbox"/> Repair NDE |
| <input type="checkbox"/> Operating Test | <input type="checkbox"/> Performance Curve |
| <input checked="" type="checkbox"/> Dimensional Check | <input type="checkbox"/> Deviation Record # _____ |
| | <input checked="" type="checkbox"/> Heat Treatment |
| | <input checked="" type="checkbox"/> Magnetic Particle |
| | <input checked="" type="checkbox"/> Cleanliness |
| | <input checked="" type="checkbox"/> ASME Data Report |

- 1) _____
- 2) _____
- 3) _____

This certifies that the listed Component(s) or Material(s) conform to the requirements of the above referenced Duke Power documents including all codes, standards, test requirements and Quality Assurance requirements invoked therein.

DUKE POWER COMPANY
 QA RECORDS APPROVED
Bery L. Keene
 QA REPRESENTATIVE
 DATE 4/27/78 (See Instructions)

Thomas A. Smith
 Supplier Representative Authorized Signature
 Title Vice. of Proc Date 3-23-78

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

1. Fabricated by ITT Grinnell Ind. Piping, Inc., Kernersville Order No. 7127
(Name and Address of Fabricator) NC

2. Fabricated for Duke Power Company, Charlotte, NC Order No. C12517
(Name and Address)

3. Owner Duke Power Company 4. Location of Plant Newport, SC

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

(a) Drawing No. CT-01-27X Prepared by ITT GRINNELL INDUSTRIAL PIPING CO. INC.
(b) National Board No. N/A

6. The material, design, construction, and workmanship complies with ASME Code Section III, Class N-2
Edition 1974, Addenda Date Winter 1974, 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)

Supplemental Sheets 2 ---Drawings
3 ---Bill (s) of Material

7. Shop Hydrostatic Test: Field psi.

8. Description of piping inspected Piece Mark Number CT-5M-6C
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length - fittings - flanges, etc.)
See Attached Sheets

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 3-23-78 Signed ITT Grinnell Ind. Piping, Inc. by Thomas A. Smith
(Fabricator)

Certificate of Authorization Expires 7-16-79 Certificate of Authorization No. N 1456

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 MP and employed by Hartford, CT. have inspected the piping described in this Data Report on 3/24/78, 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. *The Hartford Steam Boiler Inspection and Insurance Co.
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 3/24/78
Tom Donald Commission MP128
(Inspector) National Board, State, Province and No.

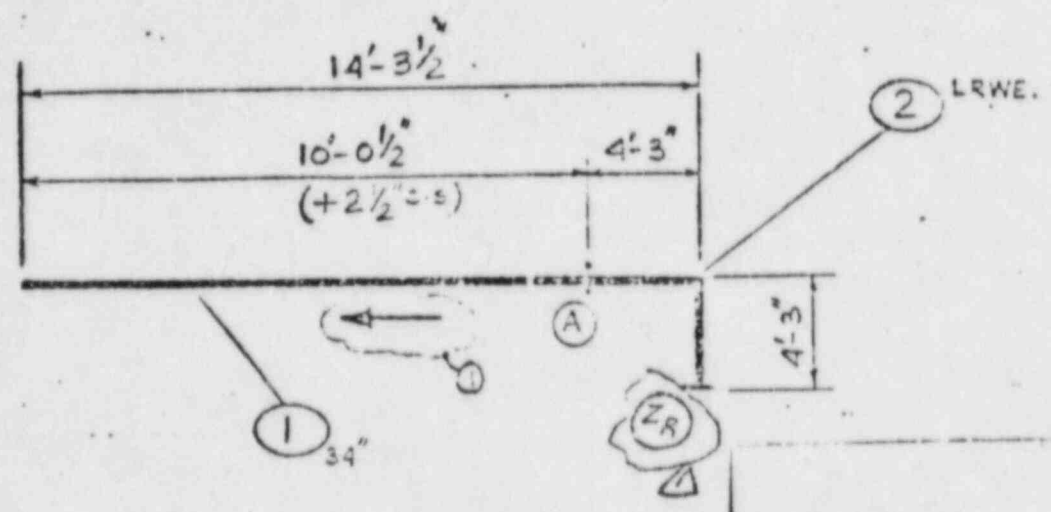
* Supplemental sheets in form of lists, sketches or drawings may be used provided (1) size is 8 1/2" x 11", (2) information in items 1, 2 and 5 on this data report is included on each sheet, and (3) each sheet is numbered and number of sheets is recorded in item 7, "Remarks".
Printed in U.S.A. (2/73) This form (E62) is obtainable from the ASME, 345 E. 47th St., New York, N.Y. 10017

ITT Grinnell Industrial Piping Inc.
KERNERSVILLE, N. C.

FORM 210
20F3

CGNT. NO: 7127
NAME DUKE POWER COMPANY
LOCATION CATAWBA UNIT #1
Charlotte, NC.
PO C 12517

→ RE DRW'N 11 PG 2-24-78
REV. _____
REV. _____
CHK'D PG
CHK'D 28-3-78
CHK'D _____
CHK'D _____



REVISION

PIPE: 31-438 I D XI-750 MW.
SA-106C
FLG:
D. W. FITG: SA-234 WFB-W
F. S. FITG: CR SA-234 WFC

PAINT FLOW ARROWS

MACHINE ENDS
PER SKETCH CT-D-2

Nuclear Safety Related

CLASS DUKE B LINE SPEC. PS 1500-5(0) APP. CODE PS 1500-5(0) NO. REQ'D 1

| | | | | | | | |
|---------------------|-------------------------------------|------------------|-------------------------------------|------------|-------------------------------------|---------------------|-------------------------------------|
| Radiography (RT) | <input checked="" type="checkbox"/> | Special Marking | <input type="checkbox"/> | Preheat | <input checked="" type="checkbox"/> | Cert. of Compliance | <input type="checkbox"/> |
| Mag. Particle (MT) | <input checked="" type="checkbox"/> | Special Cleaning | <input checked="" type="checkbox"/> | Heat Treat | <input checked="" type="checkbox"/> | Mill Test Reports | <input checked="" type="checkbox"/> |
| Liq. Penetrant (PT) | <input type="checkbox"/> | Painting | <input checked="" type="checkbox"/> | Code Stamp | <input checked="" type="checkbox"/> | Data Reports | <input checked="" type="checkbox"/> |

SYSTEM MAN STEAM (SM) FAB. SPEC. JS 118
REF. DRWG NO. SN-1401-SM201-REV 2 PRESS. 118.5 PSI. TEMP. 600 °F. WT 1200 LBS.
PIECE MARK CT-SM-6C REGISTER CT-01-27

GRINNELL INDUSTRIAL PIPING, INC.

KERNERSVILLE NC.

FORM EN-102 REV 7/78
Q.A. FORM N2.1F

H.P

Register No. CT-01-27X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 3 Of 3

Picture Mark CT-SM-6C Job Name DUKE POWER COMPANY CATAWBA UNIT # 1 Contract No. 7127 Location _____
Charlottesville NC
PROC 12517

Revision No. _____ Revision Date _____

| ITEM | PART NUMBER | DESCRIPTION | QUAN
OR
LENG | QUALITY CONTROL | | | ACCOUNTING/MATERIAL | | | | |
|------|-----------------------|---|--------------------|------------------|------------------------|-----------------------------|-----------------------------|---------------------|----------------|-----|------|
| | | | | TEST
NUMBER | DOCUMENT IN
PROCESS | STATUS | U/M | UNIT PRICE
P. Q. | DIS.
VENDOR | NET | |
| 1 | PBCT CD
CT-01-15-1 | 31-438" I.D X 1-750" MW. SMLS
CS PIPE TO ASME SA-106C | 10 | L3274120 | | QC
121
150
2-10-78 | QC
121
161
2-14-78 | F | | | |
| 2 | LA/T
CT-01-18-1 | 31-438" I.D X 1-750" MW. 90°
L.P.W.E. TO SA-234WPC-W
MADE FROM SA-515 GR. 70
PLATE (70,000 PSI TENSILE), OP
TO SA-234WPC SMLS ENDS.
PER DET. CT-D-2. | 1 | ARAR | Buy-19
2-11-78 | QC
121
150
2-10-78 | E | | | | HEAD |
| | | 3/4" SP. END PROT. PER CT-EP-1 | 2 | | | | | E | | | |
| | | 3/4" SPIDER BRACING PER
CT-ES-1 | 2 | | | | | E | | | |
| | | | | SHOP COPY LAYOUT | | | | | | | |

GENERATOR
TUB 2011

12/19
BOM

Code Am 5-111-012 Class DUKE B

Nuclear Safety Related

Req. No. C-109
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.

SA B-3

In-Process
 Repair

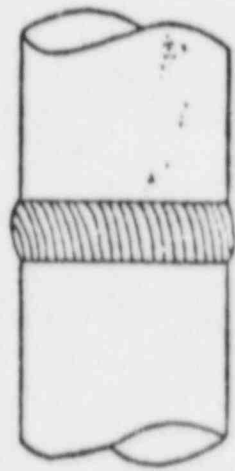
LABORATORY IDENTIFICATION REPORT

Form N6.3A

Standard Hours

Date 3-1-78

| | | | | |
|-------------------------------|--|--------------------|-------------------------------------|--|
| Specimen No. <u>CT-01-27X</u> | Specimen No. <u>CT-JM-6C</u> | Batch No. <u>A</u> | Part Name <u>31.051, 1.0.11.750</u> | Part Size <u>C-3162, C-3040, C-401K1, C-3040, C-1X5K1, C-3040, C-1X5K1</u> |
| View | Source | Defect Type | Comments | Micrograph |
| | <u>1.42</u> | | | <input checked="" type="checkbox"/> |
| Source Corrosion at 875 & 95 | <u>5.0</u> | | | <input checked="" type="checkbox"/> |
| Source Erosion at Front Spot | <u>1.42</u> | | | <input checked="" type="checkbox"/> |
| Source File Distance | <u>1.75</u> | | | <input checked="" type="checkbox"/> |
| Form | <u>40</u> | | <u>scratch cla</u> | <input checked="" type="checkbox"/> |
| Actual Hard Thickness | <u>1.215</u> | | | <input checked="" type="checkbox"/> |
| Densitometer | <u>95</u> | | <u>process must make cla</u> | <input checked="" type="checkbox"/> |
| Refractometer | <u>50</u> | | <u>6nit w/x</u> | <input checked="" type="checkbox"/> |
| Thin Thickness | <u>0.100</u> | | | <input checked="" type="checkbox"/> |
| File Size | <u>7x.7</u> | | | <input checked="" type="checkbox"/> |
| File Type | <u>7</u> | | | <input checked="" type="checkbox"/> |
| Flawing Technique | Single <input checked="" type="checkbox"/> Multiple <input type="checkbox"/> | | | |
| Screen | Front <u>.010</u> | | | |
| | Back <u>.010</u> | | | |
| Development | 60" Sides & end. | | | |
| Etching Procedure | Estimate | | | |
| | <u>1433-5</u> | | | |
| | <u>1433-5</u> | | | |



Manufacturer - 316, 304, 401K1
 Identification - 3-1-78
 Approved - 3-1-78
 Date 3-8-78 (EXB)
 Signature Stanford
 Location Catamba Unit I & 2
 Job No. 15E17112
 Inspector 1-1-1-10
 Date 1-1-1-10
 Signature 15E17112

Req. No. 2-810
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.

5A-D-3

In-Process
 Repair

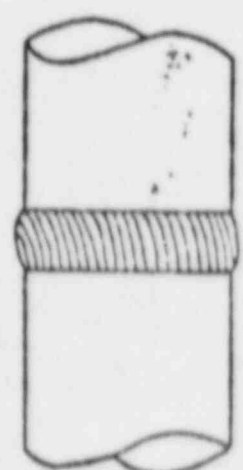
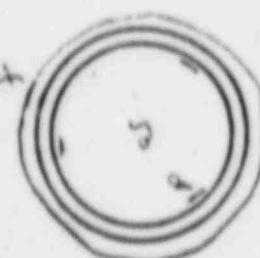
Form N6.3A

Standard Hours

Date 3-1-78

| | | | | | |
|---|--|---------------------------|------------------------------|---|---------------------------------|
| Specimen or Register No. <u>CT-01-27X</u> | | Drawn No. <u>CT-DM-6C</u> | Scale No. <u>DRZR</u> | Plate Size and Serial No. <u>11.75"</u> | Number of Plates <u>6428A10</u> |
| Form | | File Location | Material Type | Comments | Inspection |
| Source | <u>Ship</u> | A-P | SP, LP, R, P, RT, C, S, T, W | | X |
| Source Control or ETP & SN | <u>50</u> | P-F | | | X |
| Source Size or Forklift Spd | <u>11.5</u> | G-5 | | <u>SURFACE SCANNED PERIT M/G CLK</u> | X |
| Source File Storage | <u>17"</u> | J-M | | | X |
| Time | <u>1</u> | M-P | | | X |
| Actual Size or Length | <u>6.5</u> | P-S | | | X |
| Orientation | <u>5</u> | S-V | | | X |
| Directionality | <u>PT</u> | V-Y | | | X |
| File Thickness | <u>6.5</u> | Y-T | | | X |
| File Size | <u>7.17</u> | | | | |
| File Type | <u>55</u> | | | | |
| Flanging Technique | Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | | | | |
| Dimension | Height <u>.010</u> | | | | |
| | Width <u>.010</u> | | | | |
| Development | W/ Sodium Sulf. <u>I</u> | | | | |
| Welding Procedure | <u>1-4-33-113</u> | | | | |

SP - Lack of Reinforcement
 LP - Lack of Fusion
 R - Ring
 P - Porosity
 RT - Both Thin
 C - Cracks
 S - Surface
 T - Thickness
 W - Surface

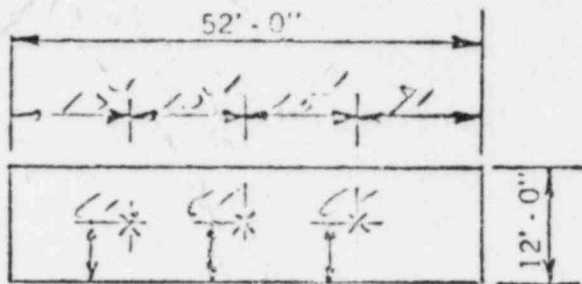
Manufacturer - ITT Grinnell Industrial Piping, Inc. Customer - Essex Power Co. Location - Catamba Unit 1 & 2
 Date of Manufacture - 5/77 Order No. - 710777100 Job No. -
 Inspector - 3777 Inspection Standard - ASME B31.1 Inspection Procedure - ISF-1741-2
 Signature - [Signature] Date - 3-1-78 Inspector - [Signature]

Load Number _____

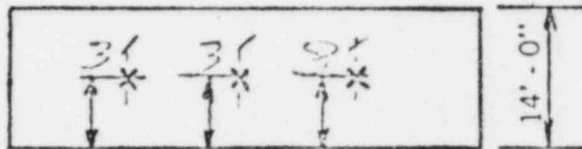
FURNACE LOAD SHEET

Date 3-14-78

| REGISTER NO. | SKETCH NO. | TYPE MATERIAL | WEIGHT | TEMP. REQD.* | RATE OF HT PER HR | HOLD TIME | RATE OF COOLING PER HOUR | SPEC. NO. | TIME IN | TIME OUT |
|--------------|------------|---------------|--------|---------------------|-------------------|-----------|--------------------------|-----------|---------|----------|
| CT | 01-5X | HK6 C | 8546 | 1150 ^{±.5} | 400' | 2 hrs | 20° | S-III | 34" | 1:37.5 |
| CT | 01-18X | " | 12081 | " | 400' | | down | S-III | 34" | 1:45 |
| CT | 01-27X | " | 12081 | " | 1150° | | 20° | S-III | 34" | 1:50 |
| CW | 01-19X | " | 12081 | " | | | 60° | S-III | 34" | 1:55 |
| CW | 01-7X | " | 12081 | " | | | | S-III | 34" | 1:55 |
| CW | 01-41X | " | 12081 | " | | | | S-III | 34" | 1:55 |
| AH | 04-17 | HK6 B | 6755 | " | | | | 831.1 | 104 | 526 |
| WJ | 03-8 | HK6 C | 15092 | " | | | | 11 | 34" | 6:55 |
| | | | 90798 | | | | | | | |



PLAN



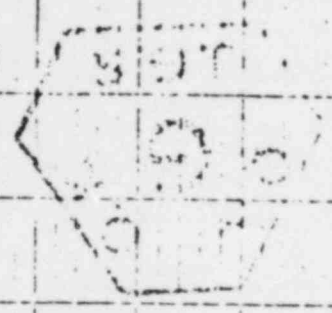
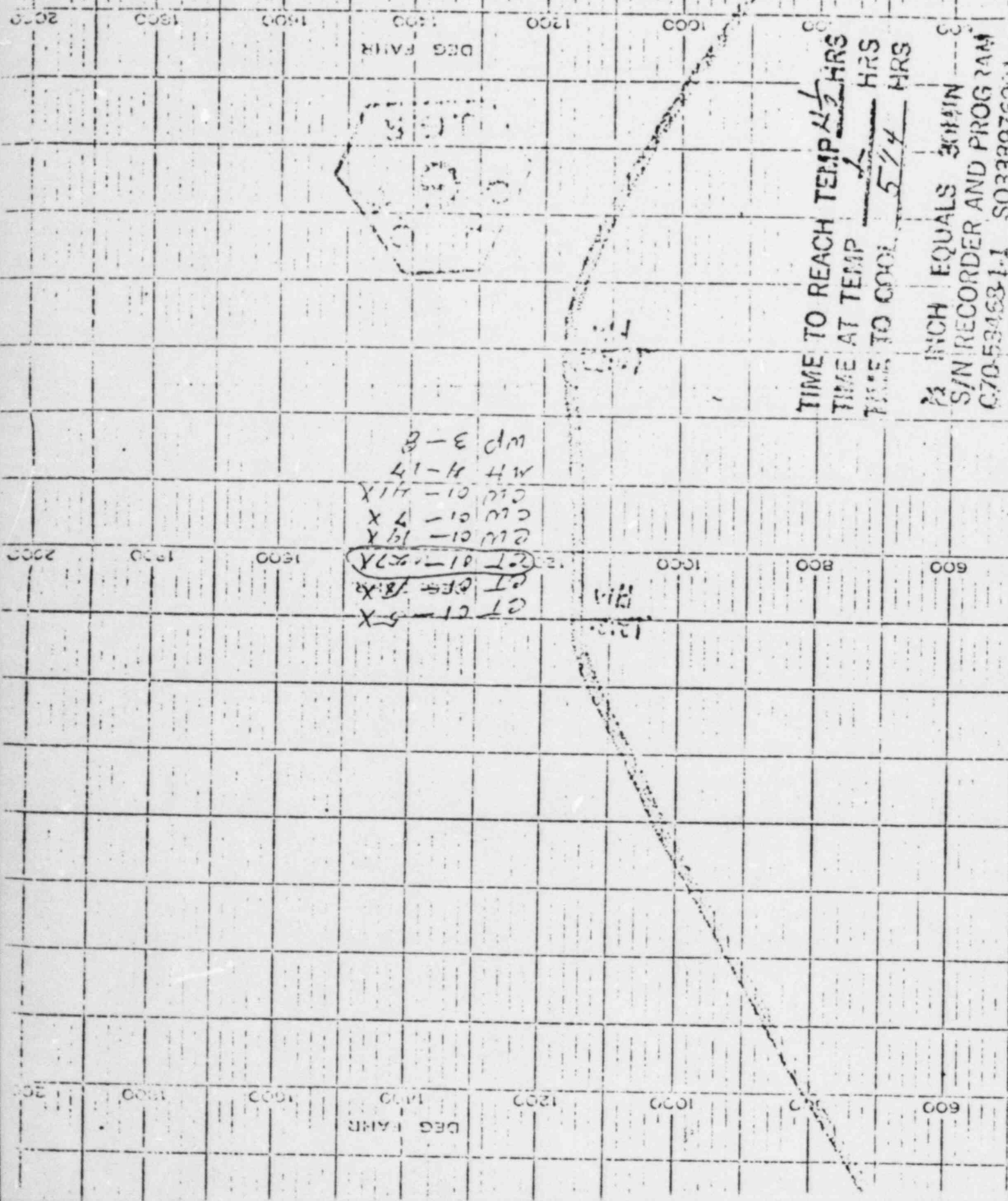
ELEVATION

* THERMOCOUPLE LOCATIONS

1 INCH EQUAL SECTION
S/N RECORDER AND PROGRAM
C70-5316 4-1 1013 975

TIME TO REACH TEMP 4 HRS
TIME AT TEMP 2 HRS
TIME TO COOL 5 1/4 HRS

4:00 PM 3-14-78



CT 1-5X
 CT 1-8X
 CT 1-10X
 CT 1-12X
 CT 1-14X
 CT 1-16X
 CT 1-18X
 CT 1-20X
 CT 1-22X
 CT 1-24X
 CT 1-26X
 CT 1-28X
 CT 1-30X
 CT 1-32X
 CT 1-34X
 CT 1-36X
 CT 1-38X
 CT 1-40X
 CT 1-42X
 CT 1-44X
 CT 1-46X
 CT 1-48X
 CT 1-50X
 CT 1-52X
 CT 1-54X
 CT 1-56X
 CT 1-58X
 CT 1-60X
 CT 1-62X
 CT 1-64X
 CT 1-66X
 CT 1-68X
 CT 1-70X
 CT 1-72X
 CT 1-74X
 CT 1-76X
 CT 1-78X
 CT 1-80X
 CT 1-82X
 CT 1-84X
 CT 1-86X
 CT 1-88X
 CT 1-90X
 CT 1-92X
 CT 1-94X
 CT 1-96X
 CT 1-98X
 CT 1-100X

TIME TO REACH TEMP 1 1/2 HRS
 TIME AT TEMP 1 1/2 HRS
 TIME TO COOL 5 1/4 HRS

1/2 INCH EQUALS 30MIN
 S/N RECORDER AND PROGRAM
 C70-53463-1-1 S0333976071

CERTIFICATE OF TEST ON PIPE MATERIAL

Cameron

IRON WORKS, INC.

P. O. BOX 1212
HOUSTON, TEXAS 77001

S
O
L
D
T
O

ITT GRINNELL INDUSTRIAL PIPING, INC.
KERRYSVILLE, NC 27284

CT
P. 76

Date 24 September 1976

Customer Order No. *Duck* KER-2553-P C.I.W. Sales Order No. F-5696 ASME-SA106 Gr. C and ^{Specification} ASME-Section III, Class 2 Thru Summer 1974 Addenda

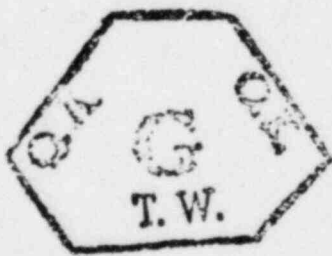
Description of Material O.D. x I.D. 31.438" x WALL 1.750" M.W.

C.I.W. Part No. 86-5696-352-314 ASME QUALITY SYSTEM CERTIFICATE (MATERIALS) NO. N-1261 EXPIRES 10-27-79.

| Heat No. | Location or Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|-----|------|------|-----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |
| L 3274 | | .26 | .93 | .017 | .010 | .26 | | | |

| Quantity or Serial No. | Heat No. | Test Loc. | Tensile PSI | Yield Point % Offset Yield PSI | MECHANICAL PROPERTIES | | | | Specimen Size | Test Lot # | |
|------------------------|----------|-----------|-------------|--------------------------------|-----------------------|-------------|------------|-----------|---------------|------------|------------------|
| | | | | | % Elong. 2 In. | % Red. Area | Macro Etch | Bend Test | | | Flat-tening Test |
| 3 | L 3274 | Trans. | 81,100 | 42,700 | 28.1 | 58.6 | | | OK | .505 | 74 |

| Forg. Ser. # | Test Lot # |
|--------------|------------|
| 26914Y | 74 |
| 26914Z | 74 |
| 26915Z | 74 |



Hydrostatic Test Each length of pipe hydrostatically tested at 2400 psi for 5 sec. and found acceptable

Heat Treatment:

Subscribed and Sworn to before me this 24th Day of September 1976

G. R. Touchton
Notary Public
G. R. TOUCHTON
Notary Public in and for Dallas County, Texas

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

W. C. Wright
Metallurgical Representative

MILL TEST CERTIFICATE

ITT GRINNELL CORPORATION
WELDING PRODUCTS DIVISION
PRINCETON, KY.

OUR
ORDER NO. 62933

SOLD TO ITT Grinnell Corporation
Kernersville, N.C.

Kernersville

BRANCH
ORDER NO. List 2832

SHIP TO Same for Duke Power

DATE November 18, 1976

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 1"
% | C | MN | P | S | SI | | | | | |
| ASME SA-234 WPC | | | | | | | | | | | | | | A-106C |
| 31.625 x 1.750 Min. wall | F | 47900 | 81100 | *27.8 | .26 | .95 | .016 | .008 | .28 | | CV-01-18-1 | KCCH | | |
| LR 90° Ell | | | | | | | | | | | | | | |
| -Ditto- | F | 42200 | 79900 | *27.5 | .25 | .86 | .009 | .011 | .23 | " | " | KCCL | | |
| -Ditto- | F | 44900 | 82400 | *25.0 | .25 | .98 | .013 | .011 | .22 | " | " | ARAR | | |
| <p>*Standard round test specimen used for tensile properties.</p> <p>The above fitting was manufactured and tested in strict compliance with ASME Section III, 1974 Edition, Class 2 through the 1974 Summer Addenda.</p> | | | | | | | | | | | | | | |
| <p>We certify that the fittings listed herein comply with the requirements of ASME Specification A-234. They were produced in accordance with the Materials Manufacturers Quality Systems Program, accredited by the American Society of Mechanical Engineers as evidenced by the issuance of Quality Systems Certificate (Materials) Number M-834.</p> | | | | | | | | | | | | | | |

Catalina
Box-19

10/20/76
F.W.

The fittings represented by this Metallurgical Report will meet the following requirements as to hardness: Brinell Hardness Number, Max. 177.

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
THIS _____ DAY OF _____ 19____

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

R. B. Bulin



UNION CARBIDE CORPORATION
 LINDE DIVISION
 WELDING MATERIALS
 P.O. BOX 710, ASHTABULA, OHIO 44004

CT
 WW13

July 15, 1977

CUSTOMER: Industrial Welding Supply
 2501 Champagne
 Ashboro, N.C. 27203
 (For: ITT Grinnell)

YOUR ORDER NO.: 11-476
 LINDE S.O. NO.: 011476 U
 QUANTITY: 420 lbs.

MATERIAL: Linde 65 - Heat No. 065118 - 1/8" Diameter x 36" Straight Lengths

This is to certify that Linde 65, Class E70S-2, as supplied under the above order number, shipped from one heat number, has been tested using the test assembly specified in Fig. 5 of AWS A5.18-69, and ASME SFAS.18 specifications. The wire met all the mechanical and impact property requirements of these specifications using the gas-tungsten arc welding process with Argon shielding gas. During the manufacturing processes, tests, and inspection the materials furnished under this contract have not come in direct contact with mercury or any of its compounds nor with any mercury-containing device employing a single boundary of containment.

| MECHANICAL PROPERTIES OF WELD(S) PER TABLE 3 - | AS-WELDED | * STRESS RELIEVED | REQUIRED |
|--|-----------|-------------------|------------|
| Weld Test Number | G0524-1 | G0526-1 | |
| All-Weld Metal Tensile | | | |
| Yield Strength, psi | 69,400 | 70,900 | 60,000 min |
| Ultimate Strength, psi | 79,700 | 83,900 | 72,000 min |
| Elongation in 2", % | 32.5 | 30.0 | 22 min |
| Reduction of Area, % | 79.0 | 74.1 | ----- |

CHARPY V-NOTCH IMPACT
 STRENGTH @ -20°F (ft./lbs.)

| As-Welded | * S.R. |
|----------------|----------------|
| 126.5 | 130.0 |
| 101.5 | 95.0 |
| 120.5 | 97.5 |
| 100.0 | 66.0 |
| 79.5 | 132.5 |
| 107.3 (Ave. 3) | 107.5 (Ave. 3) |

LATERAL EXPANSION
 (INCHES)

| As-Welded | * S.R. |
|-----------|--------|
| .076 | .085 |
| .074 | .067 |
| .080 | .072 |
| .073 | .055 |
| .063 | .085 |

DUCTILE FRACTURE AREA
 (PERCENT)

| As-Welded | * S.R. |
|-----------|--------|
| 60 | 50 |
| 50 | 50 |
| 60 | 50 |
| 50 | 40 |
| 35 | |

Required 20 ft./lbs.

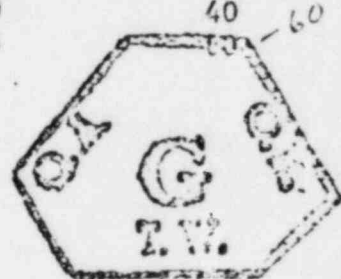
RADIOGRAPHIC TESTS: X-ray(s) met the requirements of Fig. 1

APPLICATION CONDITIONS: 230 Amps, 15 Volts, 5/6 Inches Per Minute

CHEMICAL ANALYSIS:

| C | Mn | P | S | Si | Al | Ti | Zr | Ni | Cr | Mo | V | Cu | |
|------|------|------|------|-----|-----|-----|-----|-----|-----|------|------|-----|-----------|
| .04 | 1.11 | <.01 | .017 | .55 | .11 | .06 | .03 | .03 | .01 | <.01 | <.01 | .01 | - Actual |
| .06 | .90 | .025 | .035 | .40 | .05 | .05 | .02 | --- | --- | --- | --- | --- | - Require |
| max. | 1.40 | max. | max. | .70 | .15 | .15 | .12 | --- | --- | --- | --- | --- | |

< = less than



* Weldment Stress Relieved at 1125°F, plus or minus 25°F, for 8 hours. Cooling rate 100°F/hr to 500°F, then air cooled.

Sworn to before me this

15th day of July 1977

[Signature]

PAUL E. TARRACCO
 Henry Huber, Ashland Company

[Signature]

R. J. DiDonato
 Materials Standards Specialist

CERTIFIED MATERIALS TEST REPORT

CATAWBA
WW-29

National Welders Supply
P.O. Box N-93
3011 N. Liberty Street
Winston Salem, N.C. 27105

Customer Order No. 4365 Rel.14-424

Order No. 711093-2

Shipped _____

This material conforms to Specification
ITT Spec. ES 1073-1
SFA 5.1 Sec.III

Trade Name or Trademark: Atom Arc 7018

Diameter Size: 3/32"
19,650 lbs.

Lot Number: 02-1-J728P
Heat Number: 411B6841

Carbon .04
Manganese 1.06
Chromium .03
Nickel .02
Silicon .48
Columbium + Tantalum
Molybdenum .01
Tungsten
Copper .02
Titanium
Phosphorus .012
Sulphur .016
Vanadium .03

Moisture @1800°F. 0.29%
Concentricity 4%
Type Steel A-285

Test No. Full Split Volts Amps
Tensiles & Impacts 1 6 22 110

Test Results: As Welded Stress Relieved
8 hrs. @1150°F.
Yield 73,100 65,400
Tensile 80,000 75,900
Elongation 28.0% 30.0%
Red. of Area 76.0% 77.9%

Charpy V-Notch Impacts Tested @-20°F.

Impacts 42-58-63-72-82 68-72-80-92-98
Lat.Exp. 38-48-52-59-68 58-61-67-78-83
%Shear 20-20-20-20-30 20-30-30-30-30

Fillets: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIAL)
NUMBER N-122; EXPIRES ON SEPTEMBER 8, 1977

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

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 21st day of November 1977

SEAL *Annetta E. Conway*
Notary Public

My commission expires: 8/21/78

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

BY *D. G. Eddy*
D. G. Eddy

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE DEC. 22 1977
SHEET 1 OF 1

REC. REPORT #647

CERTIFIED MATERIALS TEST REPORT

*Catalpa
ww 27*

Customer Order No. 4365 Rel. 14-4

Order No. 711093-2

Shipped _____

National Welders Supply
P.O. Box N-93
3011 N. Liberty Street
Winston Salem, N.C. 27105

This material conforms to Specification
ITT Spec. ES 1073-1
SFA 5.1 Sec. III

Trade Name or Trademark: Atom Arc 7018

Type E 7018

Diameter Size: 1/8"
15,000 lbs.

Test No. 485
X-Rays Satisfactory
Control #MM045

Lot Number: 02-3-S719R
Heat Number: 402B1441

Moisture @1800°F. 0.24%
Concentricity 4%
Type Steel A-285

Carbon .03
Manganese .89
Chromium .03
Nickel .02
Silicon .36
Columbium + Tantalum
Molybdenum .01
Tungsten
Copper .02
Titanium
Phosphorus .011
Sulphur .020
Vanadium .02

| Test No. | Full | Split | Volts | Amp |
|--------------------|------|-------|-------|-----|
| Tensiles & Impacts | 1 | 5 | 25 | 14 |

| Test Results: | As Welded | Stress Relieved |
|---------------|-----------|-----------------|
| Yield | 64,508 | 62,048 |
| Tensile | 77,000 | 74,698 |
| Elongation | 31.0% | 29.0% |
| Red. of Area | 79.9% | 78.4% |

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE DEC 22 1977
SHEET 1 OF 1

Charpy V-Notch Impacts Tested @-20°F.

Impacts 67-83-84-104-106/84-84-97-111-1
Lat. Exp. 55-67-70-77-79 70-72-77-90-83
% Shear 30-20-30-40-50 30-20-20-40-70

Filletts: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIAL)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978
The undersigned certifies that this report is correct and that no significant change has been made in any of the elements described in the qualification approval.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 21st day of November 1977

SEAL *[Signature]*
Notary Public

My commission expires: 8/21/78

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

BY *[Signature]*

ITT Grinnell

Industrial Piping Inc.

CT
ww-23

SUBJECT: Welding Filler Materials
WIRE: RACO 128, Heat No. 517715
FLUX: Linde 80; Lot 0575, Con. No. C8290

This is to certify that the subject materials were welded into test plates as shown in SFA 5-1, that the test results shown in Taussig Associates, Inc. Report 21547 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III, Cl. 1 material in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This material may not be used on impact-tested fabrication.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the Winter of 1975 Addendum.

ITT & IPI
QA OK
TCE
DATE OCT. 26 1977

John F. Elder
John F. Elder
Materials Engineer

Date: 10/26/77

Harvig Associates Inc.

6955 N. HAMILTON AVE., CHICAGO, ILL. 60645 (AC 312) 876 2100



Report No. 21547 - August 3, 1977

ITT Grinnell Industrial Piping, Inc.
P. O. Box 566 - Hwy 421
Kernersville, North Carolina 27284

Attention: Mr. J. F. Edler

CT
WW 23

S U B J E C T

Weld Metal Testing of Two Plates Marked Number 320.

1.1 & 1.1
CA 64
TBN
DATE OCT 26 1977

BACKGROUND:

Two welded plate assemblies were submitted to our laboratory for chemical analysis, impact testing and tension testing of the weld metal. The assemblies were identified as Test Plate #320; RACO 128, heat number 517715; Linde 80 flux; lot 0575. One of the plates was to be tested in the as-welded condition and the second was to be stress relieved before testing.

CT
WW 23

TEST RESULTS:

Chemical Analysis:

The weld metal of one of the submitted plates was drilled in a manner which prevented removal of material from the base metal. These drillings were then cleaned and subjected to a quantitative chemical analysis with the following results:

| | <u>#320</u> |
|------------|-------------|
| Carbon | .04 |
| Manganese | 1.38 |
| Phosphorus | .014 |
| Sulfur | .023 |
| Silicon | .51 |
| Nickel | <.05 |
| Chromium | <.05 |
| Molybdenum | .52 |
| Copper | .11 |
| Vanadium | <.01 |

ITT 6 1961
DA CK
TGW
DATE OCT 26 1961

Heat Treatment:

The plate which was not drilled for chemical analysis was cut to fit into a heat treating furnace. The pieces were heated to 1100°F and held for 16 hours. Cooling was done at 200°F/hr to below 800°F.

Tension Testing:

One, round, all weld metal, tensions test specimen was machined from each plate assembly; as-welded and after heat treatment. Each specimen was subjected to a standard tension test with results as follows:

| | <u>As-Welded</u> | <u>Heat Treated</u> |
|------------------------|------------------|---------------------|
| Tensile Strength, psi. | 79,700 | 78,760 |
| Yield Point, psi. | 67,570 | 63,750 |
| % Elongation, in 2" | 28 | 28 |

Impact Testing:

A total of eleven, full size (10 mm x 10 mm), Charpy V-notch impact test specimens were machined from the two submitted plate assemblies. Three of the specimens were from the as-welded plate and eight were from the heat treated plate. All were notched in the weld metal.

CT
WV 23
2

As-Welded:

| <u>Test Temperature °F</u> | <u>Absorbed Energy ft-lbs</u> | <u>Mils of Lateral Expansion</u> | <u>Percent Shear</u> |
|----------------------------|-------------------------------|----------------------------------|----------------------|
| +30 | 32 | 31 | 20 |
| +30 | 13 | 17 | 10 |
| +30 | 32 | 32 | 20 |

Heat Treated:

| | | | |
|-----|----|----|----|
| +30 | 42 | 38 | 30 |
| +30 | 46 | 42 | 30 |
| +30 | 40 | 37 | 30 |
| -20 | 19 | 16 | 10 |
| -20 | 30 | 28 | 10 |
| -20 | 30 | 28 | 10 |
| -20 | 25 | 22 | 10 |
| -20 | 28 | 26 | 10 |

Respectfully submitted,

Mark A. Hineman

Mark A. Hineman
Staff Engineer
TAUSSIG ASSOCIATES, INC.

MAH:ln

ITT G IPI
CA OK
TWS
DATE OCT 26 1977

DUKE POWER COMPANY
 QUALITY ASSURANCE DEPARTMENT
 SUPPLIER QUALITY ASSURANCE CERTIFICATION

Name of Supplier ITT Grinnell Ind. Piping, Inc. Date 5-23-78
 Address of Supplier Plant Fernersville, NC Mill Power Order No. C-12517
 _____ Duke Item or Req. No. 1206.00-1.0
 _____ Spec. No. CNS-1206.00-1.0 Rev. 2
 Supplier ID Nos. CT-01-36X

Description of Component(s) or Material(s) Fabricated Piping Assembly
CT-SM-6D

Attached Documentation covers all Components/Materials on Mill Power Order.
 Attached Documentation covers partial shipment of Components/Materials on Mill Power Order.

The following listed tests, inspections and reports have been completed as required by the specification:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Physical & Chemical Analysis | <input checked="" type="checkbox"/> Major Repair Records & Charts |
| <input type="checkbox"/> Hydro (Test Pressure - PSIG _____) | <input checked="" type="checkbox"/> Personnel Qualifications on Record |
| <input type="checkbox"/> Design Report | <input type="checkbox"/> Stress Report |
| <input checked="" type="checkbox"/> Radiographic Test | <input type="checkbox"/> Ultrasonic Test |
| <input checked="" type="checkbox"/> Penetrant Test | <input type="checkbox"/> Repair NDE |
| <input type="checkbox"/> Operating Test | <input type="checkbox"/> Performance Curve |
| <input checked="" type="checkbox"/> Dimensional Check | <input type="checkbox"/> Deviation Record # _____ |
| | <input checked="" type="checkbox"/> Heat Treatment |
| | <input checked="" type="checkbox"/> Magnetic Particle |
| | <input checked="" type="checkbox"/> Cleanliness |
| | <input checked="" type="checkbox"/> ASME Data Report |

- 1) _____
- 2) _____
- 3) _____

This certifies that the listed Component(s) or Material(s) conform to the requirements of the above referenced Duke Power documents including all codes, standards, test requirements and Quality Assurance requirements invoked therein.

DUKE POWER COMPANY
QA RECORDS APPROVED
S. U. Caldwell
 QA REPRESENTATIVE
 DATE 5-11-78

Thomas A. Smith
 Supplier Representative Authorized Signature
 Title Mgr. of Proc Date 5/23/78

(See Instructions)

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

10F3

1. Fabricated by ITT Crinnell Ind. Piping, Inc., Kernersville Order No. 7127
(Name and Address of Fabricator)

2. Fabricated for Duke Power Company, Charlotte, NC Order No. C-12517
(Name and Address)

3. Owner Duke Power Company 4. Location of Plant Newport, SC

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

(a) Drawing No. CT-01-36X Prepared by ITT Grinnell Industrial Piping, Inc.
 (b) National Board No. N/A

6. The material, design, construction, and workmanship complies with ASME Code Section III, Class N-2
 Edition 1974, Addenda Date Winter 1974, 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)

Supplemental Sheets 3 ----- Drawings
 ----- Bill (s) of Material

7. Shop Hydrostatic Test Field 3 psi.

8. Description of piping inspected Piece Mark Number CT-5M-6D
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length - fittings - flanges, etc.)
See Attached Sheets

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 5-23-78 Signed ITT GRINNELL Ind. Piping, Inc. By Thomas A. Smith
(Fabricator)
 Certificate of Authorization Expires 7-16-79 Certificate of Authorization No. N1456

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 Maryland and employed by * Hartford, CT. have inspected the piping described in this Data Report on 5/31/78, 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. *The Hartford Steam Boiler Inspection and Insurance Co.
 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 5/31/78 Richard L. Shirkley Commissions Md - 94
(Inspector) National Board, State, Province and No.

* 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 in item 7, "Remarks".
 Printed in U.S.A. (2/73) This form (E62) is obtainable from the ASME, 345 E. 47th St., New York, N.Y. 10017

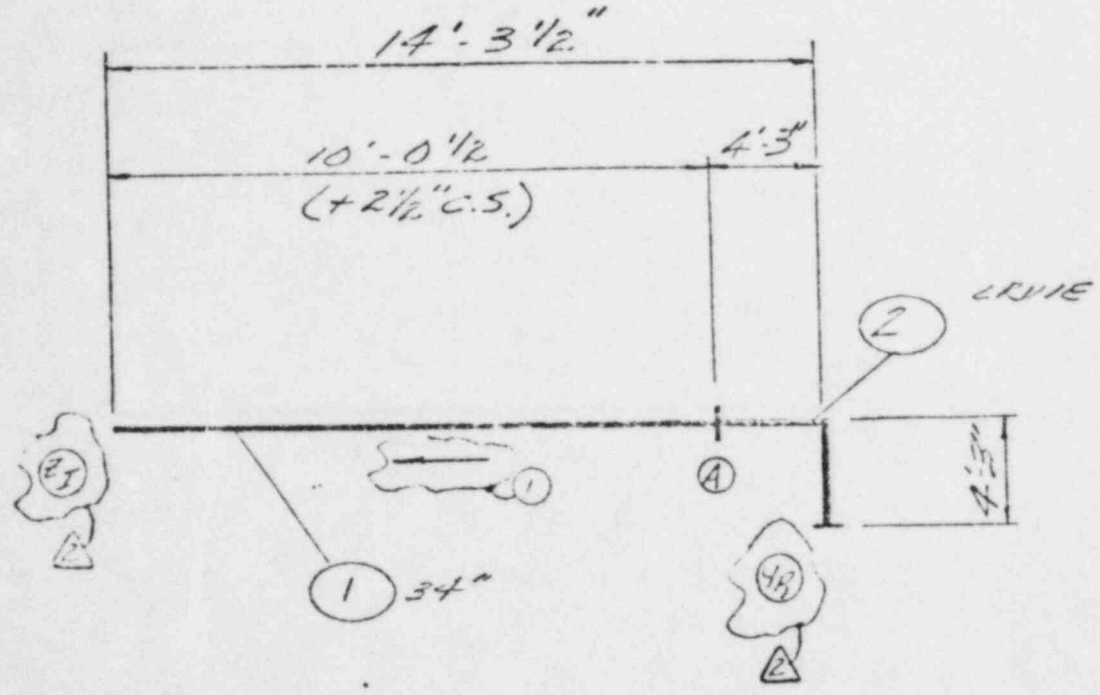
ITT Grinnell Industrial Piping Inc.

KERNERSVILLE, N. C.

FORM 710
218.3

CONT. NO. 1127
 NAME DUKE POWER COMPANY
 LOCATION CHARLOTTE AREA #1
Charlotte N.C.
P.O. C12517

REV. 153-17-78 CHK'D 12-5-78
 REV. _____ CHK'D _____
 REV. _____ CHK'D _____
 REV. _____ CHK'D _____



PIPE: 51.438" ID X 1.750" MW
SA-106
 FLG: _____
 B. W. FITG: SA-254 WPC-W
 F. S. FITG: CK SA-254 WPC

PAINT FLOW ARROWS

QUALITY CONTROL

MACHINE SPTS
 PER SKETCH CT-D-2

Nuclear Safety Related

CLASS DUKE "B" LINE SPEC. PS 1500.5(01) APP. CODE III, CL 2 NO. REQ'D 1

| | | | | | | | |
|---------------------|-------------------------------------|------------------|-------------------------------------|------------|-------------------------------------|---------------------|-------------------------------------|
| Radiography (RT) | <input checked="" type="checkbox"/> | Special Marking | <input type="checkbox"/> | Preheat | <input checked="" type="checkbox"/> | Cert. of Compliance | <input type="checkbox"/> |
| Mag. Particle (MT) | <input checked="" type="checkbox"/> | Special Cleaning | <input checked="" type="checkbox"/> | Heat Treat | <input checked="" type="checkbox"/> | Mill Test Reports | <input checked="" type="checkbox"/> |
| Liq. Penetrant (PT) | <input type="checkbox"/> | Painting | <input checked="" type="checkbox"/> | Code Stamp | <input checked="" type="checkbox"/> | Data Reports | <input checked="" type="checkbox"/> |

SYSTEM SA-106 FAB. SPECS JD-113
 REF. DRW'G NO. SA-111-2000-184 PRESS. 1100 PSI. TEM. 600 °F. WT. 1200 LBS.
 PIECE MARK CT-SW-6D REGISTER

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|----|

GRINNELL INDUSTRIAL PIPING, INC.

KERNERSVILLE N.C.

FORM EN-102 REV 7/75
Q.A. FORM N2.1F

H.P.

Register No. CT-01-36X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 3 Of 3

Revision No. _____ Revision Date _____

Piece Mark CT-SM-6D Job Name DUKE POWER COMPANY CATAWBA UNIT #1 Contract No. 7127 Location _____

| ITEM | PART NUMBER | DESCRIPTION | QUAN OR LENG | QUALITY CONTROL | | | ACCOUNTING/MATERIAL | | | |
|------|----------------------------------|--|--------------|-----------------|----------|------------|---------------------|-----|-----------------|-------------|
| | | | | HEAT NUMBER | DOCUMENT | IN PROCESS | STATUS | U/M | UNIT PRICE P.O. | D.S. VENDOR |
| 1 | P.B.C.T.C.D.* 3.4"
CT-01-15-1 | 31.438" I.D X 1.750" MW. SML'S
CS PIPE TO ASME SA-106C | 10'-02" | | | | | F | | |
| 2 | L.A.A.T.C.* 3.4"
CT-01-18-1 | 31.438" I.D X 1.750" M.W. 90°
LRWE TO SA-234WPB-W
MADE FROM SA-515 GR.70
PLATE (70,000 PSI TENSILE), OR
TO SA-234WPC SML'S, ENDS
PER DET. CT-D-2. | 1 | | | | | E | | |
| | 3.4 | SP. END PROT. PER CT-EP-1 | 2 | | | | | E | | |
| | 3.4 | SPIDER BRACING PER
CT-ES-1 | 2 | | | | | E | | |

SHOP COPY LAYOUT

PROVISION

See 5/1/77
Att: [Signature]

Code Time Sec. III, Cl. 2 Class DUKE 'B'

Nuclear Safety Related

Job Supplement JS 118

MFG. Code _____

GRINNELL INDUSTRIAL PIPING, INC.

FORM EN 102 REV 7/75
O.A. FORM N2.1F

11-P

Register No. CT-01-26X Sheet 1 of 1 Revision No. 1 Revision Date
 Piece Mark CT-SM-6D Job Name DUKE POWER COMPANY Contract No. 7127 Location
CATAWBA UNIT #1

MATERIALS RECORD
PRODUCTION PLANNER

| PART NUMBER | DESCRIPTION | QUANTITY | HEAT NUMBER | QUALITY CONTROL DOCUMENT IN PROCESS | STATUS | U/M | UNIT PRICE | DIS. | NET | ACCOUNTING MATERIAL |
|-------------|---|----------|-------------|-------------------------------------|--------|-----|------------|------|-----|---------------------|
| | | | | | | | | | | |
| 1 | 31-438" I.D X 1-750" M.W. SMLS | 1 | 117 | 117 | F | | 1.14 | | | |
| CT-01-1 | CS PIPE TO ASME SA-106C | | 117 | 117 | | | 2-14-78 | | | |
| 1 | 31-438" I.D X 1-750" M.W. 90° | 1 | KCC | KCC | E | | | | | |
| CT-01-1 | LRWL TO SA-234WPB-W
MADE FROM SA-515 GR.70
PLATE (70,000 PSI TENSILE), OR
TO SA-234WPG SMLS, ENDS
PER DET. CT-D-2 | | | | | | | | | |
| 1 | SP. END PROT. PERCT-FP-1 | 2 | | | E | | | | | |
| CT-01-1 | SPIDER BRACING PER
CT-ES-1 | 2 | | | E | | | | | |

SUPERSEDED

SHOP COPY LAYOUT

CONTRACT 7127 CLASS 2 SPECIFICATION 55118-6 SUPPLEMENT REG. C.C. PC. MK# C1-5A1-6-D

WELD DATA

| ITEM NO. | INTERMEDIATE | | ROOT | | FINAL | | RT DATE |
|----------|-------------------|------------|----------------|--------------------------------|--------------|-----------------|-------------------|
| | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | |
| 1 | PROC | 1-4-3-3 | PROC | 1-4-3-3 | PROC | 1-2-2-1 | |
| 2 | C204
C314 | 065118 | C201
C314 | 1AEC*
1AEC*
Ww27
Ww27 | C124
C314 | 517715
05250 | 3-17-78
3-8-78 |
| 3 | 3/4/78
PROC | Ww24 | 3/4/78
PROC | | | | |
| 4 | 5/29/78
3/7/78 | 065118 | | | | | 4-19-78 |
| 5 | 3/4/78
PROC | Ww13 | | | | | |
| 6 | 3/4/78
PROC | 1-4-3-3 | | | | | |
| 7 | C321
3/4/78 | 065033 | | | | | |
| 8 | | Ww27 | | | | | |
| 9 | | 4-6-78 | | | | | |
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O.C. DOC. APPEAL
E.T. 5/23/78
A/I STAMP/DATA REPORT
5/31/78
CUST DEC APPEAL

SPECIAL OPERATIONS:
C DIM.
WALL THK.
OTHER

FINAL INST
CUST INST
*421A1061/02-1-E705
*402B141/02-3-5719R

4-6-78
CUST INST

Req. No. D-253
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.
5A B-3

In-Process
 Repair

Form N6.3A

Standard Hours _____

Date 3-14-78

| | | | | | | | | | |
|--|--|---------------------------------|--|-------------------|--|---|--|--|--|
| Machine or Register No. <u>CT-01-36X</u> | | Plate No. <u>CT-JM-6D</u> | | Void No. <u>A</u> | | Pipe Size and Schedule
<u>21.431-1.0-X-1.750</u> | | Volume No.
<u>C-204R
C-314X
C-401B
C-1340</u> | |
| EXAMINATION | | | | | | | | | |
| View | <u>1</u> | | | | | | | | |
| Source | <u>Ir 192</u> | | | | | | | | |
| Source Curves
or SFD's | <u>65</u> | | | | | | | | |
| Source Size
at Focal Spot | <u>.142</u> | | | | | | | | |
| Source Film Distance | <u>17"</u> | | | | | | | | |
| Time | <u>3:00</u> | | | | | | | | |
| Actual Weld
Thickness | <u>1.812</u> | | | | | | | | |
| Penetration | <u>35</u> | | | | | | | | |
| Sensitivity | <u>2T</u> | | | | | | | | |
| Shim Thickness | <u>.062</u> | | | | | | | | |
| Film Size | <u>7X17</u> | | | | | | | | |
| Film Type | <u>7D</u> | | | | | | | | |
| Viewing Technique | Single <input checked="" type="checkbox"/> | Double <input type="checkbox"/> | | | | | | | |
| Screen | Front | <u>.010</u> | | | | | | | |
| | Back | <u>.010</u> | | | | | | | |
| Development | 30' Endo & dia. | | | | | | | | |
| | Automatic | <u>X</u> | | | | | | | |
| Welding Procedure | <u>144.33-0</u> | | | | | | | | |
| | <u>144.33-33</u> | | | | | | | | |

| Defect Type | SP | LZ | B | P | BT | UC | C | CV | T | HL |
|-------------|----|----|---|---|----|----|---|----|---|----|
| A-D | | | | | | | | | | |
| B-F | | | | | | | | | | |
| C-I | | | | | | | | | | |
| J-N | | | | | | | | | | |
| M-P | | | | | | | | | | |
| Q-S | | | | | | | | | | |
| T-V | | | | | | | | | | |
| W-Y | | | | | | | | | | |
| Z-A | | | | | | | | | | |

| Defect | Severely | Acceptable | Rejection | Borderline |
|----------------|----------|------------|-----------|------------|
| UC - Under Cut | | | | |
| C - Crater | | | | |
| CV - Crack | | | | |
| T - Trap | | | | |
| BT - Blowhole | | | | |
| HL - Hot Tear | | | | |

Customer Duke Power Co. Location Catawba Unit 1 & 2

Contract 1447773 Job No. _____

Inspection Standard _____ Acceptance Standard ISF-1711-2

Customer Approval 1518110 By _____

Inspector 3178 by D. Lelbette Level 3

Approval 3178 by Allegans Level 4

Approval 3-17-78 by Allegans Level 4

Whitford

Req. No. D-255
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.
SB B-3

In-Process
 Repair

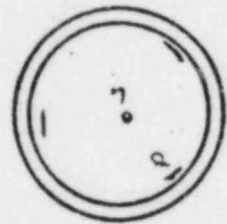
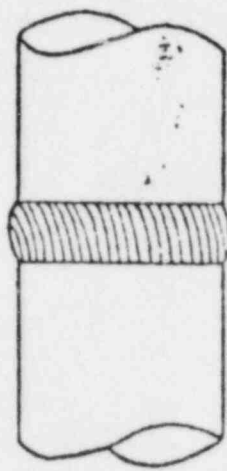
Form N6.3A

Standard Hours

Date 3-14-78

| | | | | | | | | | |
|---|--|--|--|---------------------|--|---|--|--------------------------|--|
| System or Register No. <u>CT-01-36X</u> | | Pipe No. <u>CT-5M-6D</u> | | Weld No. <u>A-2</u> | | Pipe Size and Schedule <u>10.8 10.8 X 1.250</u> | | Order No. <u>2204110</u> | |
| View | | Film Interval | | Defect Type | | Comments | | Representation | |
| Source | | AD | | LP LP | | | | X | |
| Source Curves or STD 8 88 | | PF | | B P | | | | X | |
| Source Size at Focal Spot | | GS | | C | | | | X | |
| Source Film Distance | | JM | | T | | | | X | |
| Time | | NP | | Y | | | | X | |
| Actual Weld Thickness | | P-S | | S | | SP/ACK | | X | |
| Penetration | | S-V | | V | | (PA) XX | | X | |
| Sensitivity | | V-Y | | A | | | | X | |
| Weld Thickness | | YA | | | | | | X | |
| Film Size | | | | | | | | | |
| Film Type | | | | | | | | | |
| Viewing Technique | | Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | | | | | | | |
| Screen | | Front .010 | | | | | | | |
| Development | | Back .010 | | | | | | | |
| Exposure | | 60" Kodak 8 min. | | | | | | | |
| Processing | | Automatic | | | | | | | |
| Welding Procedure | | I | | | | | | | |
| Welding Procedure | | 1-1-3-5 RB | | | | | | | |

SP - Lack of Penetration
 LP - Lack of Fusion
 B - Size of Fusion
 C - Normality
 T - Burn Thru
 Y - Under Cut
 V - Crater
 S - Porosity
 A - Receptable
 S - Receptable
 V - Burdette
 Y - Burdette



Inspector - Date 4-17-78 by Richard J. [Signature]
 Interpretation - Date 4-19-78 by Al [Signature]
 Approval - Date 4-19-78 by [Signature]

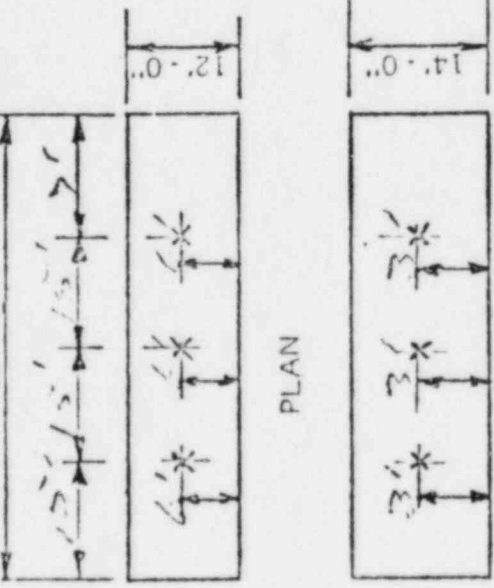
Customer Duko Power Co. Location Catawba Unit 1 & 2
 Control 7127712 Job No. _____
 Inspection Standard ASME B31.1 Acceptance Standard ASME B31.1
 Customer Approval - Date _____

APR 19 1978

Load Number _____ Date 4-6-78

FURNACE LOAD SHEET

| REGISTER NO. | SKETCH NO. | TYPE MATERIAL | WEIGHT | TEMP. RECD.* | RATE OF HT PER HR | HOLD TIME | RATE OF COOLING PER HOUR | SPEC. NO. | TIME IN | TIME OUT |
|--------------|------------|---------------|--------|--------------|-------------------|-----------|--------------------------|-----------|---------|----------|
| CT 01-568 | | 106 C | 13,681 | 1150±25 | 240° | 2 hrs | 240° | 11 | 3:44 | 1:23 |
| CT 07-80 | | Cs | 2,780 | 11 | up to | | down | 1336.1 | 3:44 | 1:00 |
| CT 07-97 | | KC 70 | 1,965 | 11 | 1150° | | 600° | 11 | 2:11 | 1:00 |
| CT 07-99 | | 106-13 | 13,78 | 11 | | | | 11 | 2:44 | 5:56 |
| WP 3-2 | | KC 60 | 5,271 | 11 | | | | 11 | 3:44 | 0:55 |
| WP 4-6 | | 106 C | 5,570 | 11 | | | | 11 | 1:16 | 5:16 |
| WP 4-39 | | 11 | 1,46 | 11 | | | | 11 | 2:44 | 1:25 |
| CU 4-24 | | KC 70 | 18,030 | 11 | | | | 11 | 2:44 | 1:52 |
| MS 23-102 | | Cs | 2,880 | 11 | | | | 11 | 2:44 | 5:16 |
| MS 1-24 | | 106-13 | 7,514 | 11 | | | | 11 | 2:44 | 9:03 |
| SB 4-19 | | " | 2,314 | 11 | | | | 11 | 1:16 | 5:12 |



PLAN
ELEVATION
THERMOCOUPLE LOCATIONS

Copy 1 - Shop File
2 - O. C.
3 - Billing

* Temperature variation within any 15 foot interval of weld length shall not exceed 250 degrees F

Load Inspection to ensure against local flame impingement
O. C. A. Corp. 4-15-78

RECORD EQUALS 30MIN
S/T RECORDER AND PROGRAM
C705546111 S033397601

TIME TO REACH TEMP 3 1/2 HRS
TIME AT TEMP 2 HRS
TIME TO COOL 1 HRS

- CT 01-36X
- CT 07-80
- CT 07-87
- CT 07-99
- WP 3-2
- WP 4-6
- WP 4-39
- CW 01-24
- NM 23-162
- MS 1-24
- SB 4-195

REG FAN

600 800 1000 1200 1400 1600 1800 2000

CERTIFICATE OF TEST ON PIPE MATERIAL

Cameron

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

S
O
L
D
T
O

ITT CORNWELL INDUSTRIAL PIPING, INC.
KERNERSVILLE, NC 27294

CT
P. 76

Date 24 September 1976

Customer Order No. *Duty* KER-2553-P C.I.W. Sales Order No. F-5696 ASME-SA106 Gr. C and ASME-Section III, Class 2 Thru Summer 1974 Addenda Specification

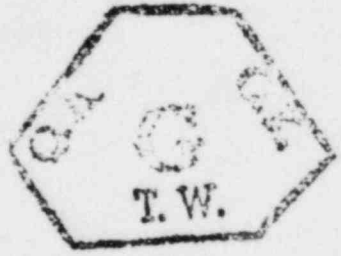
Description of Material O.D. x I.D. 31.439" x WALL 1.750" M.W.

C.I.W. Part No. 86-5696-352-314 ASME QUALITY SYSTEM CERTIFICATE (MATERIALS) NO. N-1061 EXPIRES 10-27-79.

| Heat No. | Location or Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|-----|------|------|-----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |
| L 3274 | | .26 | .93 | .017 | .010 | .26 | | | |

| Quantity or Serial No. | Heat No. | Test Loc. | Tensile PSI | Yield Point % Offset Yield PSI | MECHANICAL PROPERTIES | | | | | Specimen Size | Test Lot# |
|------------------------|----------|-----------|-------------|--------------------------------|-----------------------|-------------|------------|-----------|------------------|---------------|-----------|
| | | | | | % Elong. 2 In. | % Red. Area | Macro Etch | Bend Test | Flat-tening Test | | |
| 3 | L 3274 | Trans. | 61,100 | 42,700 | 28.1 | 50.6 | | | OK | .505 | 74 |

| Forg. Ser. # | Test Lot # |
|--------------|------------|
| 26914Y | 74 |
| 26914Z | 74 |
| 26915Z | 74 |



Hydrostatic Test Each length of pipe hydrostatically tested at 2400 psi for 5 sec. and found acceptable
Heat Treatment:

Subscribed and Sworn to before me this 24th Day of September 1976
[Signature]
Notary Public
G. A. JOHNSON

I certify these tests to be correct as contained in the records of the company.
[Signature]
Metallurgical Representative G. O. WRIGHT, Inc



UNION CARBIDE CORPORATION
LINDE DIVISION
WELDING MATERIALS
P.O. BOX 710, ASHTABULA, OHIO 41004

CT
WW13

July 15, 1977

CUSTOMER: Industrial Welding Supply
2501 Champagne
Ashboro, N.C. 27203
(For: ITT Grinnell)

YOUR ORDER NO.: 11-476
LINDE S.O. NO.: 011476 U
QUANTITY: 420 lbs.

MATERIAL: Linde 65 - Heat No. 065118 - 1/8" Diameter x 36" Straight Lengths

This is to certify that Linde 65, Class E70S-2, as supplied under the above order number, shipped from one heat number, has been tested using the test assembly specified in Fig. 5 of AWS A5.18-69, and ASME SFA5.18 specifications. The wire met all the mechanical and impact property requirements of these specifications using the gas-tungsten arc welding process with Argon shielding gas. During the manufacturing processes, tests, and inspection the materials furnished under this contract have not come in direct contact with mercury or any of its compounds nor with any mercury-containing device employing a single boundary of containment.

| MECHANICAL PROPERTIES OF WELD(S) PER TABLE 3 - | AS-WELDED | * STRESS RELIEVED | REQUIRED |
|--|-----------|-------------------|------------|
| Weld Test Number | G0524-1 | G0526-1 | |
| All-Weld Metal Tensile | | | |
| Yield Strength, psi | 69,400 | 70,900 | 60,000 min |
| Ultimate Strength, psi | 79,700 | 83,900 | 72,000 min |
| Elongation in 2", % | 32.5 | 30.0 | 22 min |
| Reduction of Area, % | 79.0 | 74.1 | ----- |

CHARPY V-NOTCH IMPACT STRENGTH @ -20°F (ft./lbs.)

| As-Welded | * S.R. |
|----------------|----------------|
| 126.5 | 130.0 |
| 101.5 | 95.0 |
| 120.5 | 97.5 |
| 100.0 | 66.0 |
| 79.5 | 132.5 |
| 107.3 (Ave. 3) | 107.5 (Ave. 3) |

LATERAL EXPANSION (INCHES)

| As-Welded | * S.R. |
|-----------|--------|
| .076 | .085 |
| .074 | .067 |
| .080 | .072 |
| .073 | .055 |
| .063 | .085 |

DUCTILE FRACTURE AREA (PERCENT)

| As-Welded | * S.R. |
|-----------|--------|
| 60 | 50 |
| 50 | 50 |
| 60 | 50 |
| 50 | 40 |
| 35 | |

Required 20 ft./lbs.

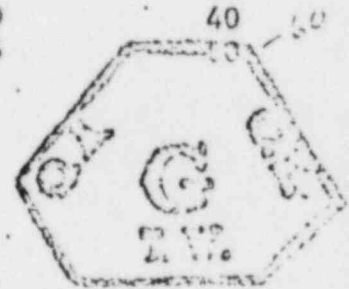
RADIOGRAPHIC TESTS: X-ray(s) met the requirements of Fig. 1

APPLICATION CONDITIONS: 230 Amps, 15 Volts, 5/6 Inches Per Minute

CHEMICAL ANALYSIS:

| C | Mn | P | S | Si | Al | Ti | Zr | Ni | Cr | Mo | V | Cu | |
|------|------|------|------|-----|-----|-----|-----|-----|-----|------|------|-----|-----------|
| .04 | 1.11 | <.01 | .017 | .55 | .11 | .06 | .03 | .03 | .01 | <.01 | <.01 | .01 | - Actual |
| .06 | .90 | .025 | .035 | .40 | .05 | .05 | .02 | --- | --- | --- | --- | --- | - Require |
| max. | 1.40 | max. | max. | .70 | .15 | .15 | .12 | | | | | | |

< = less than



* Weldment Stress Relieved at 1125°F, plus or minus 25°F, for 8 hours. Cooling rate 100°F/hr to 500°F, then air cooled.

Sworn to before me this
15th day of July 1977

R. J. DiFonzo
Materials Standards Specialist

CT
WW 24

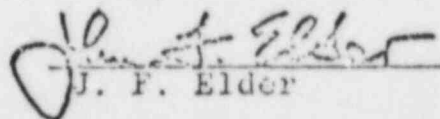
SUBJECT: Welding Filler Materials

WIRE: Linde 65, Heat No. 065155

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 5-2 that the test results shown in Taussig Associates, Inc. Report 22557 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This may also be used on impact tested material with a minimum service temperature of +30 degrees F.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 Edition.


J. F. Elder

ITT & IPI
QA BK
TCW
DATE NOV 17 1977
PAGE 145



UNION CARBIDE CORPORATION
 LINDE DIVISION
 WELDING MATERIALS
 P.O. BOX 710, ASHTABULA, OHIO 44004

Nov. 11, 1977

CUSTOMER: ITT Grinnell
 Old Highway 421
 Kernersville, N.C. - 27284

YOUR ORDER NO. 11-023

LINDE S.O. NO. 1023-U

1/8" Dia.
 S/L Rod

*CT
 WW-24*

MATERIAL: Linde 65

THIS IS TO CERTIFY THAT THIS MATERIAL WILL CONFORM TO AWS A5.18-69
 ASME SPAS. 18. IT HAS THE FOLLOWING CHEMICAL ANALYSIS MEETING THE
 REQUIREMENTS OF CLASSIFICATION B708-2:

| | | |
|--------------------|---|--------|
| <u>HEAT NUMBER</u> | - | 065155 |
| CARBON | - | .03 |
| MANGANESE | - | 1.05 |
| PHOSPHOROUS | - | .006 |
| SULFUR | - | .018 |
| SILICON | - | .41 |
| Aluminum | - | .07 |
| Titanium | - | .10 |
| Zirconium | - | .04 |

Ladle Analysis:

Howard Jackson

 QUALITY ASSURANCE - WELDING MATERIALS PLANT
 UNION CARBIDE CORPORATION - LINDE DIVISION

KLR

ITV 8 191
 05 07
 TMS
 DATE NOV 17
 1977

Tausig Associates Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) C76 2100



Report No. 22557 - November 11, 1977

ITT Grinnell Industrial Piping, Inc.
P. O. Box 566
Highway 421
Kernersville, North Carolina 27284

Attn: Mr. J. F. Elder

CT
WW 24

S U B J E C T

Mechanical and Chemical Testing of the Weld
Metal of Two (2) Plates Marked Nos. 411 and
412.

ITT & IPI
CA OK
TOM
DATE NOV 17 1977
PAGE 31

BACKGROUND:

Two (2) welded plate assemblies were submitted to our laboratory for chemical analysis, charpy impact and tension testing of the weld metal. The assemblies had been identified as test plate nos. 411 and 412 Linde 65, heat no. 065155; tested as-welded and the other tested after a stress relieving heat treatment.

TEST RESULTS:

Chemical Analysis:

The weld metal of plate no. 411 was drilled in a maner which prevented removal of material from the base metal. These drillings were cleaned and subjected to a quantitative chemical analysis with the following results:

| | |
|------------|-------|
| Nickel | <.05% |
| Chromium | <.05 |
| Molybdenum | <.03 |
| Copper | .08 |
| Vanadium | <.01 |

CT
ww 24

Heat Treatment:

The plate no. 412 was cut to permit it to fit into a heat treating furnace. These pieces were heated to 1125°F and held for 16 hours at temperature. Cooling was done at a rate of less than 200°F/hr. to below 800°F.

Tension Testing:

Two, round, all weld metal tension test specimens were machined from plates nos. 411 and 412, as-welded and heat treated. Both specimens were subjected to standard tension testing giving the results as follows:

| | <u>No. 411</u> | <u>No. 412</u> |
|--------------------------------------|----------------|----------------|
| Tensile Strength, psi. | 81,600 | 77,950 |
| Yield Strength, psi.
(.2% Offset) | 75,900 | 66,300 |
| % Elongation in 2 inches | 26 | 30 |
| % Reduction of Area | 73 | 81 |

ITT 3 191
CA BX
TCW
DATE NOV 17 1955
PAGE 4 of 5

Impact Testing:

A total of eleven, full size (10mm x 10mm), Charpy V-notch impact test specimens were machined from the two submitted plate assemblies. Three of the specimens were from the as-welded plate and eight were from the heat treated plate. All were notched in the weld metal.

No. 412 - Heat Treated:

| <u>Test Temperature</u> | <u>Absorbed Energy (ft-lbs)</u> | <u>Mils Lateral Expansion</u> | <u>Percent Shear</u> |
|-------------------------|---------------------------------|-------------------------------|----------------------|
| +30 | 261 | 84 | 100 |
| +30 | 261 | 95 | 100 |
| +30 | 231 | 76 | 100 |

No. 411 - as-Welded

| | | | |
|-----|-----|----|-----|
| +30 | 106 | 75 | 100 |
| +30 | 116 | 84 | 100 |
| +30 | 127 | 83 | 100 |
| -20 | 112 | 78 | 80 |
| -20 | 29 | 25 | 30 |
| -20 | 80 | 58 | 60 |
| -20 | 79 | 61 | 60 |
| -20 | 65 | 46 | 50 |

CT
WW 24

Respectfully submitted,

Mark A. Hineman

Mark A. Hineman
Staff Engineer
TAUSSIG ASSOCIATES, INC.

MAH:i

ITT G 121
QA CK
TCW
DATE NOV. 17 1977
Page 5 of 5

CERTIFIED MATERIALS TEST REPORT

Ref: 6174-1

Customer Order No. 4365

Order No. 120315-1

Shipped

This material conforms to Specification

ASME SFA5.1

Type E 7018
Test No. 959
X-Ray Satisfactory
Control NO. LLL050

NATIONAL WELDERS
551 NINTH STREET
WINSTON SALEM, N.C. 27105

CT
WU30

Trade Name or Trademark: Atom Arc 7018
Diameter Size: 3/32"
19,950 lb.
Lot Number: 02-1-E705P
Heat Number: 421A1061

Moisture @1800°F. 0.20%
Concentricity 4%
Type Steel A-285

| | |
|----------------------|------|
| Carbon | .05 |
| Manganese | 1.12 |
| Chromium | .04 |
| Nickel | .02 |
| Silicon | .65 |
| Columbium + Tantalum | |
| Molybdenum | .01 |
| Tungsten | |
| Copper | .02 |
| Titanium | |
| Phosphorus | .011 |
| Sulphur | .023 |
| Vanadium | .02 |

| Test No. | Full | Split | Volts | Am |
|--------------------|------|-------|-------|----|
| Tensiles & Impacts | 1 | 7 | 22 | |

| Test Results: | As Welded | Stress Relieved |
|---------------|-----------|-----------------|
| Yield | 66,500 | 58,500 |
| Tensile | 76,900 | 72,300 |
| Elongation | 25.0% | 30.0% |
| Red. of Area | 75.0% | 79.0% |

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE DEC. 22 '77
SHEET 1 OF 1

Rec. Report # 649

Charpy V-Notch Impacts Tested @-20°F.

| | | |
|-----------|----------------|--------------------|
| Impacts | 52-88-93-93-99 | 45-100-115-116-123 |
| Lat. Exp. | 53-70-72-77-77 | 48-78-83-88-90 |
| % Shear | 20-20-30-30-40 | 20-30-30-50-50 |

Filllets: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

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

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

State of Penna.)
County of) SS

Subscribed and sworn to before me
this 24th day of June 19 77

SEAL Robert F. Walcott
Notary Public

My commission expires: 9/1/80

BY R. W. Ryan

CERTIFIED MATERIALS TEST REPORT

*Catalina
WW 27*

Customer Order No. 4365 Re1.14-4

Order No. 711093-2

National Welders Supply
P.O. Box N-93
3011 N. Liberty Street
Winston Salem, N.C. 27105

Shipped _____

This material conforms to Specification
ITT Spec. ES 1075-1
SEA 5.1 Sec. III

Trade Name or Trademark: Atom Arc 7018

Type E 7018

Diameter Size: 1/8"
15,000 lbs.

Test No. 485
X-Rays Satisfactory
Control #MMM045

Lot Number: 02-3-S719R
Heat Number: 402B1441

Moisture @1800°F. 0.24%
Concentricity 4%
Type Steel A-285

Carbon .03
Manganese .89
Chromium .03
Nickel .02
Silicon .36
Columbium + Tantalum
Molybdenum .01
Tungsten
Copper .02
Titanium
Phosphorus .011
Sulphur .020
Vanadium .02

Test No. Full Split Volts Amp
Tensiles & Impacts 1 5 25 14

Test Results: As Welded Stress Relieved
8 hrs. @1150°F
Yield 64,508 62,048
Tensile 77,000 74,698
Elongation 31.0% 29.0%
Red. of Area 79.9% 78.4%

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE DEC 22 1977
SHEET 1 OF 1

Charpy V-Notch Impacts Tested @-20°F.
Impacts 67-83-84-104-106/84-84-97-111-1
Lat. Exp. 53-67-70-77-79 70-72-77-90-83
% Shear 30-20-30-40-50 30-20-20-40-70

Filletts: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE MATERIAL NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978
The undersigned certifies that this report is correct and that no significant change has been made in any of the elements described in the qualification approval.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 21st day of November 1977

SEAL *[Signature]*
Notary Public
My commission expires: 8/21/78

CHEMETRON CORPORATION
WELDING ELECTRODES DIVISION
BY *[Signature]*

Industrial Piping Inc.

CT
WW-23

SUBJECT: Welding Filler Materials
WIRE: RACO 128, Heat No. 517715
FLUX: Linde 80; Lot 0575, Con. No. C8290

This is to certify that the subject materials were welded into test plates as shown in SFA 5-1, that the test results shown in Taussig Associates, Inc. Report 21547 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III, Cl. 1 material in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This material may not be used on impact-tested fabrication.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the Winter of 1975 Addendum.

INT & EN
QA & EN
TCW
DATE OCT. 26 1977

John F. Elder
John F. Elder
Materials Engineer

Date: 10/26/77

Harvey *Associates* *Inc.*

6955 N. HAMLEN AVE., CHICAGO, ILL. 60645 (AC 312) 376 2100



Report No. 21547 - August 3, 1977

ITT Grinnell Industrial Piping, Inc.
P. O. Box 566 - Hwy 421
Kernersville, North Carolina 27284

Attention: Mr. J. F. Edler

CT
ww 23

S U B J E C T

Weld Metal Testing of Two Plates Marked Number 320.

11 8 1977
CA 64
TON
DATE OCT 26 1977

BACKGROUND:

Two welded plate assemblies were submitted to our laboratory for chemical analysis, impact testing and tension testing of the weld metal. The assemblies were identified as Test Plate #320; WACO 128, heat number 517715; Linde 80 flux; lot 0575. One of the plates was to be tested in the as-welded condition and the second was to be stress relieved before testing.

CT
WW 23

TEST RESULTS:

Chemical Analysis:

The weld metal of one of the submitted plates was drilled in a manner which prevented removal of material from the base metal. These drillings were then cleaned and subjected to a quantitative chemical analysis with the following results:

| | <u>#320</u> |
|------------|-------------|
| Carbon | .04 |
| Manganese | 1.38 |
| Phosphorus | .014 |
| Sulfur | .023 |
| Silicon | .51 |
| Nickel | <.05 |
| Chromium | <.05 |
| Molybdenum | .52 |
| Copper | .11 |
| Vanadium | <.01 |

ITT & IPI
QA CK
TGW
DATE OCT. 26 1977

Heat Treatment:

The plate which was not drilled for chemical analysis was cut to fit into a heat treating furnace. The pieces were heated to 1100°F and held for 16 hours. Cooling was done at 200°F/hr to below 800°F.

Tension Testing:

One, round, all weld metal, tensions test specimen was machined from each plate assembly; as-welded and after heat treatment. Each specimen was subjected to a standard tension test with results as follows:

| | <u>As-Welded</u> | <u>Heat Treated</u> |
|------------------------|------------------|---------------------|
| Tensile Strength, psi. | 79,700 | 78,760 |
| Yield Point, psi. | 67,570 | 63,750 |
| % Elongation, in 2" | 28 | 28 |

Impact Testing:

A total of eleven, full size (10 mm x 10 mm), Charpy V-notch impact test specimens were machined from the two submitted plate assemblies. Three of the specimens were from the as-welded plate and eight were from the heat treated plate. All were notched in the weld metal.

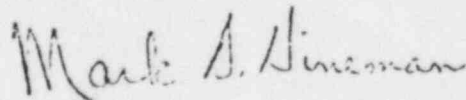
As-Welded:

| <u>Test Temperature °F</u> | <u>Absorbed Energy ft-lbs</u> | <u>Mils of Lateral Expansion</u> | <u>Percent Shear</u> |
|----------------------------|-------------------------------|----------------------------------|----------------------|
| +30 | 32 | 31 | 20 |
| +30 | 13 | 17 | 10 |
| +30 | 32 | 32 | 20 |

Heat Treated:

| | | | |
|-----|----|----|----|
| +30 | 42 | 38 | 30 |
| +30 | 46 | 42 | 30 |
| +30 | 40 | 37 | 30 |
| -20 | 19 | 16 | 10 |
| -20 | 30 | 28 | 10 |
| -20 | 30 | 28 | 10 |
| -20 | 25 | 22 | 10 |
| -20 | 28 | 26 | 10 |

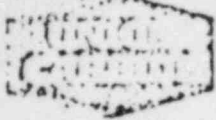
Respectfully submitted,



Mark A. Hineman
Staff Engineer
TAUSSIG ASSOCIATES, INC.

MAH:ln

ITT G IPI
CA OK
TGS
DATE OCT 26 1977



UNION CARBIDE CORPORATION
LINDE DIVISION

Customer's copy
January 16, 1975

WELDING MATERIALS PLANT
P.O. BOX 710, ASHTABULA, OHIO 44004

CUSTOMER: Industrial Welding Supply
P.O. Box 1506
2501 Champagne
Ashboro, N. C. 27203

YOUR ORDER NO.: 06-052
LINDE S.O. NO.: 004033 Q 02
QUANTITY: 4,020 lbs.
GRINNELL P.O. NO.: KER-11412-3

MATERIAL: Linde 65 - Heat No. 065033 - 1/8" Diameter x 36" Straight Lengths

This is to certify that Linde 65, Class E70S-2, as supplied under the above order number, shipped from one heat number, has been tested using the test assembly specified in Fig. 5 of AWS A5.18-69, and ASME SFAS.13 specifications. The wire met all the mechanical and impact property requirements of these specifications using the gas-tungsten arc welding process with Argon shielding gas. During the manufacturing processes, tests, and inspection the materials furnished under this contract have not come in direct contact with mercury or any of its compounds nor with any mercury-containing device employing a single boundary of containment.

| MECHANICAL PROPERTIES OF WELD(S) PER TABLE 3 - | AS-WELDED | * STRESS RELIEVED | REQUIRED |
|--|-----------|-------------------|-----------|
| Weld Test Number | E0520-1 | E0528-1 | |
| All-Weld Metal Tensile Yield Strength, psi | 65,600 | 58,100 | ** 58,000 |
| Ultimate Strength, psi | 74,000 | 72,200 | 72,000 |
| Elongation in 2", % | 32.5 | 37.5 | 22 |
| Reduction of Area, % | 82.4 | 80.5 | ----- |

| CHARPY V-NOTCH IMPACT STRENGTH @ -20 F (ft./lbs.) | |
|---|---------------|
| As-Welded | * S.R. |
| 238.5 | 239.0 |
| 196.0 | 239.0 |
| 95.0 | 238.5 |
| 239.5 | 239.5 |
| 239.5 | 239.0 |
| 224.6 (Ave 3) | 239.0 (Ave 3) |

| LATERAL EXPANSION (INCHES) | |
|----------------------------|--------|
| As-Welded | * S.R. |
| *** | *** |
| .090 | *** |
| .069 | *** |
| *** | *** |
| *** | *** |

| DUCTILE FRACTURE AREA (PERCENT) | |
|---------------------------------|--------|
| As-Welded | * S.R. |
| *** | *** |
| 100 | *** |
| 45 | *** |
| *** | *** |
| *** | *** |

Required 20 ft./lbs.

RADIOGRAPHIC TESTS: X-ray(s) met the requirements of Fig. 1

APPLICATION CONDITIONS: 280 Amps, 16.5 - 18 Volts, 5 - 6 1/2 Inches Per Minute

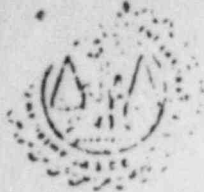
CHEMICAL ANALYSIS:

| C | Mn | P | S | Si | Al | Ti | Zr | |
|-----|------|------|------|-----|------|------|------|---------------------------------|
| .05 | 1.27 | .012 | .016 | .55 | .032 | .052 | .018 | - Heat Number 065033 (Actual) |
| .06 | .90 | .025 | .035 | .40 | .05 | .05 | .02 | - Required - Single values max. |
| | 1.40 | | | .70 | .15 | .15 | .12 | |

- * Weldment Stress Relieved at 1125 F for 8 hours.
- ** Per footnote (f) of Table 3., of AWS A5.18-69 and ASME SFAS.13.
- *** Charpy V-Notch Impact Specimens did not fracture.

Sworn to before me this
14 day of January, 1975
[Signature]
Notary Public

[Signature]
R. J. McDonato
Materials Standards Specialist



CHICAGO SPECTRO SERVICE LABORATORY, INC.

Spectrographic and Chemical Analysis Metallurgists

4848 S. KEDZIE AVE. • CHICAGO, ILL. 606

ANALYSIS REPORT FOR:

AREA CODE 312 - 523-70

- ITT Grinnell Industrial Piping, Inc.
- Post Office Box 566 Hwy. 421
- Kernersville, North Carolina 27284
- Attention: Walter Sperko

*October
www 7*

PURCHASE ORDER NO. KER-17913-W

DATE September 25, 1975

Report Number: 2299 & 2298-1,

Sample Number: HEAT #065033

| | |
|----------|-------|
| Nickel | 0.10% |
| Chromium | 0.03 |
| Copper | 0.27 |
| Vanadium | <0.01 |

Sample Number:

1-1/4 CR

2-1/4 CR

Chromium

1.17%

0.06 (0.05)
Recheck

CHICAGO SPECTRO SERVICE LABORATORY, INC.

BY *[Signature]*

Name of Supplier ITT Grinnell Ind. Piping, Inc.

Date 10-23-78

Address of Supplier Plant Roxboro, NC

Mill Power Order No. C-12517

Duke Item or Req. No. 1206.00-1.0

Spec. No. CNS-1206.00-1.0 Rev.

Supplier ID Nos. CT-01-BX

Description of Component(s) or Material(s) Fabricated Piping Assembly

CT-5M-7A

Attached Documentation covers all Components/Materials on Mill Power Order.
 Attached Documentation covers partial shipment of Components/Materials on Mill Power Order.

The following listed tests, inspections and reports have been completed as required by the specification:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Physical & Chemical Analysis | <input type="checkbox"/> Major Repair Records & Charts |
| <input type="checkbox"/> Hydro (Test Pressure - PSIG _____) | <input checked="" type="checkbox"/> Personnel Qualifications on Record |
| <input type="checkbox"/> Design Report | <input type="checkbox"/> Stress Report |
| <input checked="" type="checkbox"/> Radiographic Test | <input type="checkbox"/> Ultrasonic Test |
| <input type="checkbox"/> Penetrant Test | <input type="checkbox"/> Repair NDE |
| <input type="checkbox"/> Operating Test | <input type="checkbox"/> Performance Curve |
| <input checked="" type="checkbox"/> Dimensional Check | <input type="checkbox"/> Deviation Record # _____ |
| | <input checked="" type="checkbox"/> Heat Treatment |
| | <input checked="" type="checkbox"/> Magnetic Particle |
| | <input checked="" type="checkbox"/> Cleanliness |
| | <input checked="" type="checkbox"/> ASME Data Report |

- 1) _____
- 2) _____
- 3) _____

This certifies that the listed Component(s) or Material(s) conform to the requirements of the above referenced Duke Power documents including all codes, standards, test requirements and Quality Assurance requirements invoked therein.

DUKE POWER COMPANY
QA RECORDS APPROVED
W. J. Caldwell
 QA REPRESENTATIVE
 DATE 3-7-79

Thomas A. Smith
 Supplier Representative Authorized Signature
 Title Mgr. of Proc. Date 10-23

(See Instructions)

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

1. Fabricated by ITT Grinnell Piping, Inc. Kernersville Order No. 7128 Sheet 1 of 3
(Name and Address of Fabricator)

2. Fabricated for Duke Power Company, Charlotte, NC Order No. C-12517
(Name and Address)

3. Owner Duke Power Company 4. Location of Plant Newport, SC

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

(a) Drawing No. CT-01-EX Prepared by ITT Grinnell Industrial Piping, Inc.
 (b) National Board No. N/A

6. The material, design, construction, and workmanship complies with ASME Code Section III, Class 1-2
 Edition 1974, Addenda Date Winter 1974, 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)

Supplemental Sheets 2 --- Drawings
3 --- Bill (s) of Material

7. Shop Hydrostatic Test Field psi.

8. Description of piping inspected Piece Mark Number CT-5M-7A
(Include - mark no. - material spec. - nom. pipe size - schedule or thickness - length - fittings - flanges, etc.)
See Attached Sheets

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 10-27-78 Signed ITT GRINNELL Ind. Piping, Inc. by [Signature]
(Fabricator)

Certificate of Authorization Expires 7-16-79 Certificate of Authorization No. N-1451

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 N.C. and employed by * Hartford, CT.

have inspected the piping described in this Data Report on 10-30-1978, 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. *The Hartford Steam Boiler Inspection and Insurance Co.

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 10-30-1978 [Signature]
(Inspector)

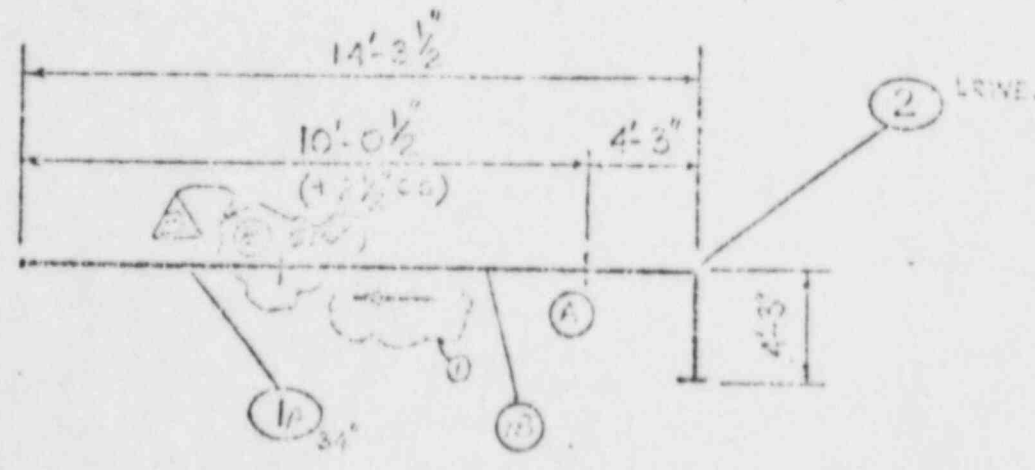
Commission N.C. - No. 878
National Board, State, Province and No.

* 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 in 6.

Printed in U.S.A. (2-73)

LINE NO. 7127
 NAME DUKE POWER COMPANY
 LOCATION CATWASA UNIT #1
 Charlotte, N.C.
 P.C. 6-12517

→ DRAWN BY J. J. 12-15-77 CHK'D BY
 REV. 1 12-15-77 CHK'D BY
 REV. 2 1-14-78 CHK'D BY
 REV. 3 7-12-78 CHK'D BY



PIPE: 31-436 XI-750MW
 SA-106C
 FLG:
 D. W. F (13): SA-22410FB-W, CR
 SA-234WIC
 F. S. FTG:

PAINT FLOW ARROWS

MACHINE ENDS
 PER SKETCH CT-D-2

QUALITY CONTROL

Nuclear Safety Related

LINE DUKE B LINE SPEC PS 1500-5(01) APP. CODE 375.5a III, ch. 2 NO. 11

| | | | | | | | |
|-----------------|-------------------------------------|---------------|-------------------------------------|------------|-------------------------------------|---------------------|--------------------------|
| Autography (BT) | <input checked="" type="checkbox"/> | Engr. Marking | <input type="checkbox"/> | Polish | <input checked="" type="checkbox"/> | Cert. of Compliance | <input type="checkbox"/> |
| Particle (MP) | <input checked="" type="checkbox"/> | Used Cleaning | <input checked="" type="checkbox"/> | Heat Treat | <input checked="" type="checkbox"/> | MU To Reports | <input type="checkbox"/> |
| Machine End | <input type="checkbox"/> | Ready | <input checked="" type="checkbox"/> | File Stamp | <input checked="" type="checkbox"/> | Detail parts | <input type="checkbox"/> |

DATE 10-25-78 FAB. NO. 35113
 DRAWING NO. CH-149-SMOC3(222) PRESS. 110.5 AT. TEMP. 500 °F W. 11291 LBS
 REMARK CT-SM-7A REGISTER CT-01-BX

Req. No. H-651

In-Process

RADIOGRAPHIC INSPECTION REPORT

Standard Hours _____

ITT GRINNELL INDUSTRIAL PIPING, INC. 51000

Repair

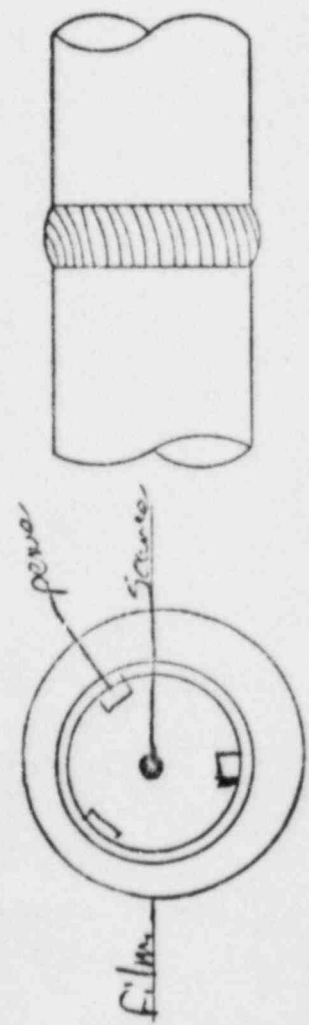
Date 10-2-78

Form N5.3A

| | | | | | | | | | | | | | | | |
|--|---------------------------|-------------------|---|---|---|---|----|----|---|----|---|----|----------|----------------|---|
| Register No. <u>CT-01-88</u> | Piece No. <u>CT-5M-2A</u> | Weld No. <u>A</u> | Pipe Size and Schedule <u>3/4" 48710. Y1250</u> | Welder No. <u>C-08301 C-044901 C-1460</u> | | | | | | | | | | | |
| Views <u>1</u> | INTERPRETATION | | | | | | | | | | | | | | |
| Source <u>IC 192</u> | Film Interval <u>AP</u> | Defect Type | LP | LF | S | P | BT | UC | C | GT | T | HL | Comments | Interpretation | |
| Source Current or KVP & MA <u>70</u> | <u>DL</u> | | | | | | | | | | | | | | X |
| Source Size or Focal Spot <u>.1X.1</u> | <u>GT</u> | | | | | | | | | | | | | | X |
| Source Film Distance <u>18.0"</u> | <u>JM</u> | | | | | | | | | | | | | | X |
| Time <u>3:0</u> | <u>MP</u> | | | | | | | | | | | | | | X |
| Actual Field Thickness <u>1.812</u> | <u>PS</u> | | | | | | | | | | | | | | X |
| Penetrant <u>35</u> | <u>SU</u> | | | | | | | | | | | | | | X |
| Sensitivity <u>2T</u> | <u>VY</u> | | | | | | | | | | | | | | X |
| Shim Thickness <u>.002</u> | <u>YH</u> | | | | | | | | | | | | | | X |
| Film Size <u>9"X17"</u> | <u>LA</u> | | | | | | | | | | | | | | X |
| Film Type <u>70</u> | | | | | | | | | | | | | | | X |
| Viewing Technique <input type="checkbox"/> Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> Double | | | | | | | | | | | | | | | |
| Screen | Front | Back | | | | | | | | | | | | | |
| Development | 35" Modex 8 min | Automatic | X | | | | | | | | | | | | |
| Welding Procedure | | | | | | | | | | | | | | | |
| Root | <u>1-K-2-R</u> | | | | | | | | | | | | | | |
| Intermediate | <u>1-1-2-10</u> | | | | | | | | | | | | | | |
| Balance | <u>1-2-2-4</u> | | | | | | | | | | | | | | |

process snapshots ch

RIB



Customer Life Transfer Co. Location Catowba Unit I & 2

Contract 71217128 Job No. _____

Inspection Standard ASNT 191-10 Acceptance Standard ASME 1711-2

Authorized Insp. [Signature] By _____

Customers Approval [Signature] Date _____ By _____

Inspector [Signature] Date 10-3-78 By O. Sedberry

Interpretation [Signature] Date 10-4-78 By [Signature]

Approval [Signature] Date 10-4-78 By [Signature]

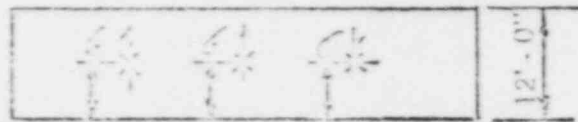
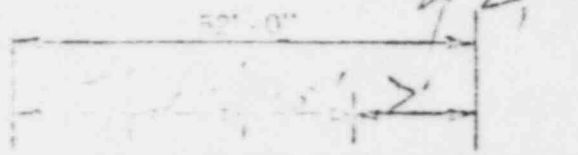
Load Number _____

FURNACE LOAD SHEET

Date 10-9-78

| REGISTER NO. | SKETCH NO. | TYPE MATERIAL | WEIGHT | TEMP. REQD.* | RATE OF HT PER HR | HOLD TIME | RATE OF COOLING PER HOUR | SPEC. NO. | TIME IN | TIME OUT |
|--------------|------------|---------------|--------|--------------|-------------------|-----------|--------------------------|-----------|---------|----------|
| CT | 01-7X | R106 C | 12081 | 1150 ± 25° | 200° | 2 1/2 hrs | 20° F/HR | 11 | 34" | 6:55 AM |
| CT | 01-47A | 11 | 1086 | 11 | 100° | | down | 11 | 15" | 5:10 PM |
| CT | 04-119 | 11-B | 2810 | 11 | 1150° | | 5° | 11 | 12" | 5:50 PM |
| CT | 04-134 | 11 | 1565 | 11 | | | 100° | 11 | 11" | 5:50 PM |
| W.L. | 02-001 | 11 C | 1255 | 11 | | | | 11 | 6" | 8:15 PM |
| M.H. | 04-87 | 11-B | 12791 | 11 | | | | 11 | 24" | 5:12 PM |
| M.H. | 04-93 | 11 | 5361 | 11 | | | | 11 | 24" | 5:12 PM |
| M.D. | 03-6 | KC70 | 13048 | 11 | | | | 11 | 24" | 5:57 PM |

2047



PLAN



ELEVATION

THERMOCOUPLE LOCATIONS



Copy 1 - Shop File

2 - O. C.

* Temperature variation within any 15 foot interval of weld length shall not exceed 250 degrees F

Inspection to insure against

distortion

10-9-78

CT 04-134
WL 62-808
MH 04-87
MH 04-93
KD 03-6



007 10 000

3:30
PM

1:00
PM

8:00 PM 10-9-75 Load sent 10980

TELETYPE
3
11-5

FOR DAVIS
COLLECTOR AND

Cannell

IRON WORKS, INC.

P. O. BOX 141
HOUSTON, TEXAS 77001

ITT GINNELL INDUSTRIAL PIPING, INC.
KERRVILLE, NC 27234

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

Date 22 July 1976

| | | |
|----------------------------------|----------------------------------|--|
| Customer Order No.
KER-2353-P | C.I.W. Sales Order No.
F-5696 | Specification
ASME-SA106 Gr. C and ASME-Section III, Class
I thru Summary 1974 Addenda |
|----------------------------------|----------------------------------|--|

| | | | | | |
|-------------------------|------|--------|---------|--------|-------------|
| Description of Material | O.D. | x I.D. | 31.438" | x WALL | 1.750" M.W. |
|-------------------------|------|--------|---------|--------|-------------|

C.I.W. Part No. 86-5696-352-314

| Heat No. | Location or Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|-----|------|------|-----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |
| J 6000 | | .24 | .86 | .010 | .013 | .20 | | | |

| Quantity or Lot No. | Heat No. | Test Loc. | Tensile PSI | Yield Point | | MECHANICAL PROPERTIES | | | | | Specimen Size |
|---------------------|----------|-----------|-------------|--------------------|----------------|-----------------------|------------|-----------|-----------------|----|---------------|
| | | | | % Offset Yield PSI | % Elong. 2 In. | % Red. Area | Macro Etch | Bend Test | Flattening Test | | |
| 4 | J 6000 | Trans. | 76,400 | 40,200 | 28.2 | 56.0 | | | | OK | .505 |

| Forg. Ser. # | Test Lot # |
|--------------|------------|
| #26547W | 546 |
| 26547Y | 546 |
| 26548W | 546 |
| 26548Y | 546 |

CATAWBA
P#9



Hydrostatic Test Each length of pipe hydrostatically tested at 2400 psi for 5 sec. and found acceptable.

Heat Treatment:

Subscribed and Sworn to before me this
2nd Day of July 1976

[Signature]
Notary Public
G. A. TOUCHTON
Notary Public for All Ector County, Texas

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

[Signature]
Metallurgist represented by J. WRIGHT

Handwritten: 269141

S
6
1
D
Y
O

ITT CRAWFELL INDUSTRIAL PIPES, INC.
KERRVILLE, TEXAS 77284

CT
P-76

11002
P. O. BOX 100
HOUSTON, TEXAS 77001

Date 24 September 1976

Customer Order No. KER-2353-P *DW* C.I.W. Sales Order No. F-5696
Application: ASME Section III, Class 1
Third Summer 1974 / Honda

Description of Material: O.D. _____ x I.D. 31.175" x WALL 1.750" M.W.

C.I.W. Part No. 86-5696-352-314
ASME QUALITY FACTOR CERTIFICATE (MATERIALS)
NO. 1-1001-1000-1-507-70

| Heat No. | Location or Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|-----|------|------|-----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |
| L 3274 | | .26 | .93 | .017 | .010 | .20 | | | |

| Quantity or Serial No. | Heat No. | TEST LOC. | Tensile PSI | Yield Point
% Offset
Yield PSI | MECHANICAL PROPERTIES | | | | | Specimen Size | Test Lot |
|------------------------|----------|-----------|-------------|--------------------------------------|-----------------------|-------------|------------|-----------|------------------|---------------|----------|
| | | | | | % Elong. 2 In. | % Red. Area | Macro Etch | Bend Test | Flat-tening Test | | |
| 3 | L 3274 | Trans. | 61,100 | 42,700 | 28.1 | 50.6 | | | OK | .505 | 74 |

| Forg. Ser. # | Test Lot # |
|--------------|------------|
| 269141 | 74 |
| 269142 | 74 |
| 269152 | 74 |



Hydrostatic Test Each length of pipe hydrostatically tested at 2400 psi for 7 sec. and found acceptable.
Heat Treatment:

Subscribed and Sworn to before me this 24th Day of September 1976
G. A. [Signature]
Notary Public
G. A. [Signature]

Examine the above to be correct as contained in the records of the company.
[Signature]
Manufacturing Representative

MILL TEST CERTIFICATE

SOLD TO ITT Grinnell Corporation
Kernersville, N.C.
 SHIP TO Same for Duke Power

ITT GRINNELL CORPORATION
 WELDING PRODUCTS DIVISION
 PRINCETON, KY. Kernersville

DATE November 17, 1976

OUR ORDER NO. 62933
 BRANCH ORDER NO. List 2932
 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-234 WPC
31.625 x 1.750 Min. wall
IR 90° B11 | P | 47900 | 81100 | *27.8 | .26 | .95 | .016 | .008 | .28 | | | CT-01-18-1 | K003 | A-106C |
| <p>*Standard round test specimen used for tensile properties</p> <p>The above fitting was manufactured and tested in strict compliance with ASME Section III, 1974 Edition, Class 2 through the 1974 Summer Addendum.</p> <p>The fittings represented by this Mill Test Report shall meet the following requirements as to material: <u>ASME Section III, Part 2, Division 1, Subpart 1, Paragraph 117.1.1</u></p> <p style="text-align: right; font-size: small;">We certify that the fittings listed herein comply with the requirements of ASME Section III, Part 2, Division 1, Subpart 1, Paragraph 117.1.1 and are produced in accordance with the ASME Manufacturing Quality System Program, accepted by the American Society of Mechanical Engineers (ASME) under the auspices of the Board of Certified Manufacturers (ASME Number B-324).</p> | | | | | | | | | | | | | | |

Columbo
11-19-76

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 FORGED BETWEEN 1110 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____

REBwin



UNION CARBIDE CORPORATION
LINDE DIVISION
WELDING MATERIALS
P.O. BOX 710, ASHTABULA, OHIO 44004

1/16/78

CUSTOMER: ITT GRINNELL
OLD HIGHWAY 421
KERNERSVILLE NC 27284

YOUR ORDER NO.: 11-137-KER 9113
LINDE S.O. NO.:

WV-206

MATERIAL: Linde 65

This is to certify that this material will conform to AWS A5.18-69 ASME SPA5.18. It has the following chemical analysis meeting the requirements of classification E7CS-2:

HEAT NUMBER - 065214

| | | |
|-------------|---|------|
| Carbon | - | .04 |
| Manganese | - | 1.17 |
| Phosphorous | - | .008 |
| Sulphur | - | .015 |
| Silicon | - | .54 |
| Aluminum | - | .12 |
| Titanium | - | .07 |
| Zirconium | - | .041 |

COUNTER 130



Ladle Analysis:

Howard Tucker - ITC

Quality Assurance - Welding Materials Plant
Union Carbide Corporation - Linde Division

ITC - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB 21 1978
SHEET 1 OF 4

Industrial Pipe, Inc.

SUBJECT: Welding Filler Materials

WIRE: Linde C5, Heat No. 065214

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 5-2, that the test results shown in Tausig Associates, Inc. Report 23-190 were produced from these test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This may also be used on impact-tested material with a minimum service temperature of +30 degrees F.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 Edition.

WW-206

John F. Elder 2/21/78
J. F. Elder

DRETEL
130

ITIG - IPI
QUALITY CONTROL
APPROVED
T. G. WILSON
DATE FEB 21 1978
SHEET 2 OF 4

MATERIAL TEST REPORT #23490

R & D TEST 1455

Linde 65, Heat No. 005214

WV-206

The following tests were performed in accordance with SFA 5.18, E705-2:

1. All-Weld Metal Tension Test:

As-Welded:

Tensile Strength: 79,200 psi

Yield Point: 74,700

Elongation (%) in 2": 28

Heat-Treated*

Tensile Strength: 76,000

Yield Point: 66,400

Elongation (%) in 2": 30

2. Charpy V-Notch Impact Tests:

As-Welded:

| <u>Temp.</u> | <u>Ft.lbs.</u> | <u>Lat. Exp. (mils)</u> | <u>%Shear</u> |
|--------------|----------------|-------------------------|---------------|
| -20 | 143 | 91 | 90 |
| -20 | 123 | 79 | 80 |
| -20 | 100 | 69 | 70 |
| -20 | 111 | 75 | 90 |
| -20 | 111 | 80 | 80 |

Heat-Treated*

| <u>Temp.</u> | <u>Ft.lbs.</u> | <u>Lat. Exp. (mils)</u> | <u>%Shear</u> |
|--------------|----------------|-------------------------|---------------|
| +30 | 80 | 63 | 60 |
| +30 | 97 | 73 | 70 |
| +30 | 107 | 73 | 70 |

DEC 11 1978

3. Chemical Analysis: (additional elements required by ASME Section III, Cl. 1 for information only)

Ni: < 0.05 V : < 0.01
 Cr: < 0.05 Cu : 0.12
 Mo: < 0.03

4. Radiography Test: Acceptable

ITTG - IPI
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE FEB 21 1978
 SHEET 3 OF 4

*Heat-treated for 16 hours at 1150 degrees F, cooling to 600 degrees F shall be 300 degrees F/hr. (± 100 degrees F/hr.)

This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by ITT Grinnell IP1 and our subcontractor are in compliance with the requirements of SA 5.18 and the applicable material requirements of MS-2100 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by ITT Grinnell IP1. This report, in conjunction with the Link Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.

W-206

J. F. Elder
J. F. Elder Date

CHANGES
E30

ITTG - IP1
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB. 21 1978
SHEET 4 OF 4

CERTIFIED MATERIALS TEST REPORT

WW-202

Customer Order No. 4372

Order No. 150310-1

National Welders Supply Co.
Ref. 14-5406
3011 N. Liberty Street
Winston Salem, N.C. 27105

CHECKED
820

Shipped _____

This material conforms to Specification

ES 1073-3 (SFA 5.1 Sec. I

Type E 7018

Test No. 1145
X-Rays Satisfactory
Control No. NNN009

ITIG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAR 10 1978
SHEET 1 OF 1

Trade Name
or Trademark:

Atom Arc 7018

Diameter Size:

1/8"
50# sample returned

Lot Number:

02-1-L719R

Moisture @1800°F. 0.15%

Heat Number:

421B5451

Concentricity 4%

Type Steel A-285

| | |
|----------------------|------|
| Carbon | .04 |
| Manganese | 1.01 |
| Chromium | .03 |
| Nickel | .03 |
| Silicon | .43 |
| Columbium + Tantalum | |
| Molybdenum | .01 |
| Tungsten | |
| Copper | .02 |
| Titanium | |
| Phosphorus | .010 |
| Sulphur | .015 |
| Vanadium | .02 |

| | | | | |
|----------|------|-------|-------|------|
| Test No. | Full | Split | Volts | Amps |
|----------|------|-------|-------|------|

| | | | | |
|--------------------|---|---|----|-----|
| Tensiles & Impacts | 1 | 5 | 22 | 135 |
|--------------------|---|---|----|-----|

| | | |
|---------------|-----------------------|-----------------|
| Test Results: | As Welded | Stress Relieved |
| | 16 hrs. @1100-1200°F. | |

| | | |
|--------------|--------|--------|
| Yield | 67,000 | 65,700 |
| Tensile | 77,400 | 76,900 |
| Elongation | 28.0% | 31.0% |
| Red. of Area | 67.3% | 78.1% |

Charpy V-Notch Impacts Tested @ -20°F.

| | | |
|-----------|--------------------|------------------|
| Impacts | 96-106-107-107-121 | 88-92-94-109-110 |
| Lat. Exp. | 72-71-71-75-77 | 72-71-78-79-81 |
| % Shear | 40-50-50-50-50 | 20-30-20-40-40 |

Filletts: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 7th day of March 1978

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

SEAL

Amelia G. Conway
Notary Public

My commission expires: 8/21/78

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

BY

D. J. Jacoby
D. J. Jacoby

CERTIFIED MATERIALS TEST REPORT

W-20-1

Customer Order No. 5677 Rel.14-47

Order No. 155206-1

Shipped _____

National Welders Supply Co.
P.O. Box N-95
3011 N. Liberty Street
Winston Salem, N.C. 27105

This material conforms to Specification
ITT Grinnel ES 1073-3 & RS 1
ASME SFA 5.1 Sec.III

Type E 7018

Trade Name or Trademark: Atom Arc 7018

Test No. 1485
X-Rays Satisfactory
Control No. NNN060

Diameter Size: 3/32"
27,800 lbs.

Lot Number: 02-S-C805P
Heat Number: 401C6261

Moisture @1800°F. 0.13%
Concentricity 4%
Type Steel A-285

Carbon .04
Manganese .97
Chromium .03
Nickel .03
Silicon .45
Columbium +
Tantalum
Molybdenum .01
Tungsten
Copper .02
Titanium
Phosphorus .009
Sulphur .016
Vanadium .02
Ferrite,
Magna Gage

Test No. Full Split Volts Amps
Tensiles & Impacts 1 6 22 100

Test Results: As Welded Stress Relieved
16 hrs.@1100-1200°F.
Yield 64,600 63,100
Tensile 75,900 76,100
Elongation 29.0% 32.0%
Red.of Area 71.8% 79.9%

Charpy V-Notch Impacts Tested @-20°F.

Impacts 92-120-123-128-144 86-96-96-100-111
Lat.Exp. 77-83-90-88-98 63-73-74-72-76
% Shear 40-50-70-70-70 40-40-40-40-50
Fillets: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

State of Penna.)
County of York) SS

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

19 78

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 1 / 1978
SHEET 1 OF 1

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

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

SEAL Notary Public

My commission expires: 8/21/78

RECEIVED
520

BY [Signature]

UNION CARBIDE CORPORATION
 LINDE DIVISION
 WELDING MATERIALS
 P.O. BOX 710, ASHTABULA, OHIO 44004

12/27-250

CUSTOMER: ITT Grinnell
 P.O. Box 543
 Kernersville, N.C. 27224

YOUR ORDER NO.:
 LINDE S.O. NO.:
 QUANTITY:

MATERIAL: RACO 123 - Heat No. 519346 - 1/8" Dia. - 65 lb. Coils
 Linde 80 Flux - Lot No. 0304 - 12 x 65

This is to certify that Linde 80 Submerged Arc Welding Flux, was tested with RACO 123 Electrode, Class E43. All tests required by Specifications AWS A5.23-76, Add. 1-76 and ASME BFA5.23 Winter 1977 Addenda, were performed and the above flux-electrode combination met the applicable requirements for an E43-E43-A3 classification. The mechanical properties of the deposited metal are as follows:

MECHANICAL PROPERTIES OF WELD

| Weld Test Number | AS-WELDED
JUL 12 - 1978 | * STRESS RELIEVED
JUL 25 - 1978 |
|------------------------|----------------------------|------------------------------------|
| All-Weld Metal Tensile | | |
| Yield Strength, psi | 77,000 | 65,000 |
| Ultimate Strength, psi | 89,000 | 80,000 |
| Elongation in 2", % | 20.0 | 27.5 |
| Reduction of Area, % | 36.6 | 65.7 |

CHARPY V-NOTCH IMPACT

STRENGTH @ 0°F (ft./lbs.)

| * S.R. |
|---------------|
| 34.0 |
| 26.0 |
| 34.0 |
| 26.0 |
| 42.0 |
| 32.0 (Ave. 5) |

ITTG - IPI
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE AUG 11 1978
 SHEET / OF /

LATERAL EXPANSION
(INCHES)

| * S.R. |
|--------|
| .032 |
| .025 |
| .027 |
| .024 |
| .036 |

DUCTILE FRACTURE AREA
(PERCENT)

| * S.R. |
|--------|
| 35 |
| 25 |
| 35 |
| 25 |
| 40 |

Required 20 ft./lbs. *

RADIOGRAPHIC TEST(S): X-ray(s) met the requirements of Fig. 3 of AWS/ASME BFA5.23-76.

CHEMICAL ANALYSIS OF WELD DEPOSIT

| C | Fe | Mn | S | Si | Cu | Mg | Ni | Cr | V |
|------|------|------|------|-----|-----|-----|------|-----|------|
| .075 | 1.23 | .021 | .019 | .03 | .22 | .50 | <.02 | .03 | <.02 |

CHEMICAL ANALYSIS OF ELECTRODE

| C | Fe | Mn | S | Si | Cu | Mg | Ni | Cr | V |
|------|------|------|------|-----|------|-----|-----|-----|------|
| .115 | 1.70 | .012 | .015 | .05 | .276 | .48 | .05 | .02 | <.01 |

APPLICATION CONDITIONS: 405 amps, 32 volts, 16 IPH

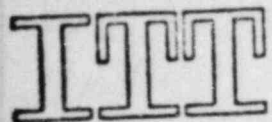
*Weldment stress relieved at 1150°F, 25°C, for 16 hours. Cooling rate was 250°F/hr. to 650°F, then air cooled.

Sworn to before me this

9th day of August 1978
 Janet M. [Signature]

R. J. [Signature]

R. J. [Signature]
 Special Order Administrator



ITT Grinnell
Industrial Piping, Inc.

P. O. Box 566
Kernersville, N. C. 27284
(919) - 993-4831
Telex No.: 806439

11-27-78

Duke Power Company
P. O. Box 2178
Charlotte, North Carolina 28201

Attention: Q. A. Manager, Engineering & Services
Quality Assurance Department

Subject: Quality Assurance
Catawba #1 & 2
Duke Power Order No. C-12517
Our Contract 7127 & 7128

Gentlemen:

Attached are requested Quality Assurance Papers on the following:

Duke Spec. No. and Title:

Duke Classification Identification:

GRINNELL Purchase Order Number:

Purchased From: Kernersville

Material Description:

Test Reports attached: FORM 930.1 WITH ATTACHMENTS AS INDICATED THERE ON

SEE ATTACHED
SHEET

We have examined these reports and find that the material furnished meets the requirements of the applicable specifications.

Very truly yours,

ITT GRINNELL INDUSTRIAL PIPING, INC.

G. P. Greeson / 22

G. P. Greeson
Project Engineer, IPD

GPG/rc

Enclosures

| | | | |
|-----------|---|-----------|---|
| CT-01-8X | / | CT-SM-7A | B |
| CT-10-78 | / | CT-HW-78 | G |
| CT-10-251 | / | CT-HW-251 | G |
| CT-95-4 | / | CT-HR-4 | G |
| CT-95-35 | / | CT-HR-35 | G |
| CT-96-18 | / | CT-SB-18 | G |

Doc. # 99



ITT Grinnell
Industrial Piping, Inc.

P. O. Box 566
Kernersville, N. C. 27284
(919) - 993-4831
Telex No.: 806439

11-27-78

Duke Power Company
P. O. Box 2178
Charlotte, North Carolina 28201

Attention: Q. A. Manager, Engineering & Services
Quality Assurance Department

Subject: Quality Assurance
Catawba #1
Duke Power Order No. C-12517
Our Contract 7127

Gentlemen:

Attached are requested Quality Assurance Papers on the following:

Duke Spec. No. and Title: (SM) MAIN STEAM

Duke Classification Identification: "B"

GRINNELL Purchase Order Number:

Purchased From: Kernersville

Material Description:

CT-01-8X / CT-SM-8X

Test Reports attached: X-RAY FILM AND READER SHEETS

We have examined these reports and find that the material furnished meets the requirements of the applicable specifications.

Very truly yours,

ITT GRINNELL INDUSTRIAL PIPING, INC.

G. P. Greeson / 82

G. P. Greeson
Project Engineer, IPD

GPG/rc

Enclosures

**DUKE POWER COMPANY
QUALITY ASSURANCE DEPARTMENT
SUPPLIER QUALITY ASSURANCE CERTIFICATION**

Name of Supplier ITT Grinnell Ind. Piping, Inc. Date 5-16-78
 Address of Supplier Plant Kernersville, NC Mill Power Order No. C-12517
 _____ Duke Item or Req. No. 1206.00-1.0
 _____ Spec. No. CNS-1206.00-1.0 Rev. 2
 Supplier ID Nos. _____

Description of Component(s) or Material(s) Fabricated Piping Assembly
CT-5A1-7B

Attached documentation covers all Components/Materials on Mill Power Order.
 Attached documentation covers partial shipment of Components/Materials on Mill Power Order.

The following listed tests, inspections and reports have been completed as required by the specification:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Physical & Chemical Analysis | <input type="checkbox"/> Major Repair Records & Charts |
| <input type="checkbox"/> Hydro (Test Pressure - PSIG _____) | <input checked="" type="checkbox"/> Personnel Qualifications on Record |
| <input type="checkbox"/> Design Report | <input type="checkbox"/> Stress Report |
| <input checked="" type="checkbox"/> Radiographic Test | <input type="checkbox"/> Ultrasonic Test |
| <input type="checkbox"/> Penetrant Test | <input type="checkbox"/> Repair NDE |
| <input type="checkbox"/> Operating Test | <input type="checkbox"/> Performance Curve |
| <input checked="" type="checkbox"/> Dimensional Check | <input checked="" type="checkbox"/> Deviation Record # <u>IP-1446</u> |
| | <input checked="" type="checkbox"/> Heat Treatment |
| | <input checked="" type="checkbox"/> Magnetic Particle |
| | <input checked="" type="checkbox"/> Cleanliness |
| | <input checked="" type="checkbox"/> ASME Data Report |

- 1) _____
- 2) _____
- 3) _____

This certifies that the listed Component(s) or Material(s) conform to the requirements of the above referenced Duke Power documents including all codes, standards, test requirements and Quality Assurance requirements.

DUKE POWER COMPANY
 QA RECORDS APPROVED
Sam J. Caldwell
 QA REPRESENTATIVE
 DATE 9-5-78

Thomas A. Smith
 Supplier Representative Authorized Signature
 Title Mgr. of Proc Date 5-16-78

(See Instructions)

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

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

SHEET 1 OF 3

1. Fabricated by ITT Grinnell Ind. Piping, Inc., Kernersville Order No. 7127
(Name and Address of Fabricator)

2. Fabricated for Duke Power Company, Charlotte, NC Order No. C-12517
(Name and Address)

3. Owner Duke Power Company 4. Location of Plant Newport, SC

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

(a) Drawing No. CT-01-18X Prepared by ITT Grinnell Industrial Piping, Inc.
 (b) National Board No. N/A

6. The material, design, construction, and workmanship complies with ASME Code Section III, Class N-2
 Edition 1974, Addenda Date Winter 1974, 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)

Supplemental Sheets 2 ---- Drawings
3 ---- Bill (s) of Material

7. Shop Hydrostatic Test Field psi.

8. Description of piping inspected Piece Mark Number CT-SM-7B
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length - fittings - flanges, etc.)
See Attached Sheets

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 5-17-78 Signed ITT GRINNELL Ind. Piping, Inc. by Thomas A. Smith
(Fabricator)

Certificate of Authorization Expires 7-16-79 Certificate of Authorization No. N-1456

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 Maryland and employed by * Hartford, CT. have inspected the piping described in this Data Report on 5/18 1978, 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. *The Hartford Steam Boiler Inspection and Insurance Co. 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 5/18 1978 Richard L. Shorkey Commissions Maryland-44
(Inspector) National Board, State, Province and No.

* 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 in item 7, "Remarks".
 Printed in U.S.A. (2/73) This form (E62) is obtainable from the ASME, 345 E. 47th St., New York, N.Y. 10017

ITT Grinnell Industrial Piping Inc.

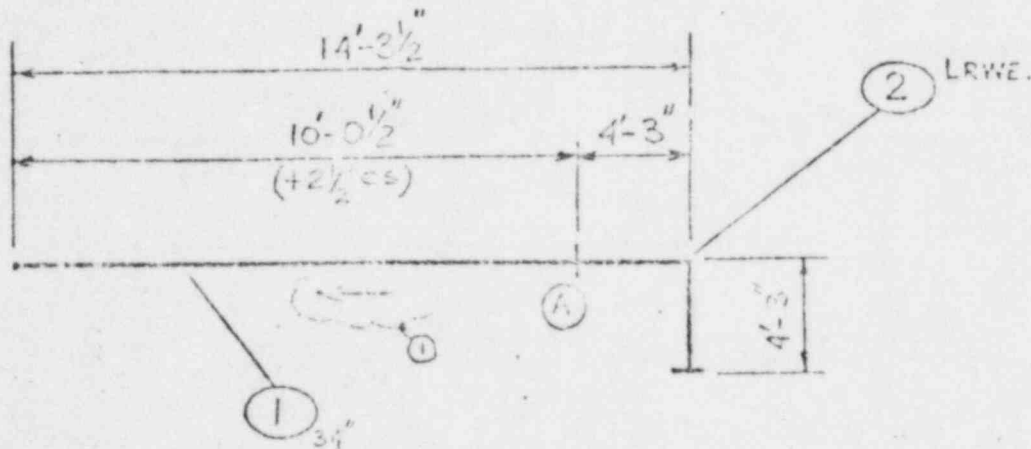
KERNERSVILLE, N. C.

D.A. FORM 12.1

sheet 2 of 3

CONT. NO. 7127
 NAME DUKE POWER COMPANY
 LOCATION CATAWBA UNIT #1
 Charlotte, N.C.
 C-12517

→ REDRWN SM 10-25-77 CHK'D EG
 REV. ① SM 12-14-77 CHK'D EG
 REV. ② PG 2-27-79 CHK'D JL 5-2-79
 REV. _____ CHK'D _____



PIPE: 31-436 I-DYI-750MW
 SA-106C
 FLG:
 B. W. FTIG: SA-224WPC-W
 CF CA-234WPC
 F. S. FTIG:

QUALITY CONTROL

PAINT FLOW ARROWS

REVISION

MACHINE ENDS
 PER SKETCH CT-D-2

Nuclear Safety Related

CLASS DUKE B LINE SPEC. PS 1500.5 (21) APP. CODE SA-106C NO. REQ'D 1

| | | | | | | |
|---------------------|---|------------------|---|------------|---|--------------------|
| Radiography (RT) | ✓ | Special Marking | | Preheat | ✓ | Cost of Compliance |
| Magn. Particle (MT) | ✓ | Special Coatings | ✓ | Heat Treat | ✓ | MT Test Reports |
| Liq. Penetrant (PT) | | Painting | ✓ | Code Stamp | ✓ | Data Reports |

SYSTEM MAIN STEAM (SM) FAB. SPEC. J.S.H.S.
 REF. DRWG NO. CN-1491-SMOO2(2002) PRESS. 135 PSI TEMP. 600 °F. WT. 681 LBS.
 PLACE MARK. CT-SM-7B RECEIPTER CT-01-18X

JOHN GRINNELL INDUSTRIAL PIPING, INC.

Kennesawville, N.C.

FORM EN-102 REV 7/78
O.A. FORM P.2.1F

Register No. CT-01-157 Sheet 3 Of 3 Revision No. _____ Revision Date _____
 Materials Record
 PRODUCTION PLANNER
 'DUKE POWER COMPANY
 Job Name: CATAWBA UNIT #1 Contract No. 7127 Location _____
 Piece Mark: CT-SM-7P

| PART NUMBER | DESCRIPTION | QTY | UNIT PRICE | STATUS | LOCATION | ACCOUNTING MATERIAL | |
|-------------|---|-----|------------|--------|----------|---------------------|------|
| | | | | | | UNIT PRICE | EXT |
| CT-01-157 | 31-438" I.D. X 1.750" MW. SMLS
CS PIPE TO ASME SA-106C | 34 | | F | | | 712 |
| CT-01-157 | 31-438" I.D. X 1.750" MW. 90°
LRVLE TO SA-234WPB-W
MADE FROM SA-515 GR 70
PLATE (10,000 PSI TENSILE), OR
TO SA-234WPC SMLS ENDS
PER DET. CT-D-2. | 34 | | F | | | 714Z |
| CT-01-157 | SP. END FLOT. PER CT-E-1 | 2 | | F | | | |
| CT-01-157 | SP. END BRACING BEER
CT-E-1 | 2 | | F | | | |

Code: _____ Date: _____ Class: DUKE 'E' Nuclear Safety Related

ITI Grinnell Industrial Piping, Inc.

QUALITY CONTROL

FORM N1

FABRICATION NONCONFORMANCE REPORT

REPORT NO. IP1446

| | | | |
|---------------------------------------|-----------------------------|-------------------------------------|----------------------------------|
| PROJECT
<u>Well Pad - Columbia</u> | CONTRACT NO.
<u>7157</u> | CODE SPEC.
<u>ASME Section 2</u> | REGISTER NO.
<u>C7-01-18X</u> |
|---------------------------------------|-----------------------------|-------------------------------------|----------------------------------|

1. DESCRIPTION OF NONCONFORMANCE:

Weld metal was added to repair the damaged end of item #2 after the substitution had been stress relieved.

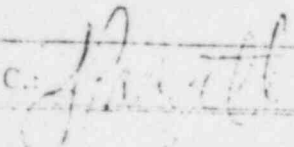
| | | | | |
|-----|-------|-------|-------|--|
| HOP | DATE: | INSP. | DATE: | Q.C.  DATE: <u>3-1-77</u> |
|-----|-------|-------|-------|--|

RECOMMENDED ACTION:

FORWARD to customer for approval to have field end of item #2 stress relieved at job site in the field

CP

Take I.E. route necessary operations for stress relieving item #2. Document all work.

| | |
|---|----------------------|
| Q.C.  | DATE: <u>3-16-77</u> |
|---|----------------------|

DISPOSITION:

Return to Q.C. after completion of above recommended action for closing of the nonconformance report.

NONCONFORMANCE REPORT
CLOSED

Q.C. APPROVAL:

DATE:

ITT Grinnell Industrial Piping, Inc.

QUALITY CONTROL

FORM 111

FABRICATION NONCONFORMANCE REPORT

REPORT NO. TR 1011

| | | | |
|---|-----------------------------|-------------------------------------|---------------------------------|
| PROJECT
<u>7-1-100 - Cabana 11.9</u> | CONTRACT NO.
<u>7117</u> | CODE SPEC.
<u>ASME B31.1 (1)</u> | REGISTER NO.
<u>CT-01-11</u> |
|---|-----------------------------|-------------------------------------|---------------------------------|

DESCRIPTION OF NONCONFORMANCE:
Weld metal was added to repair the damaged end of pipe after the substitution had been stress relieved.

| | | | | | |
|-----|-------|-------|-------|------------------|-------|
| WOP | DATE: | INSP. | DATE: | Q.C. <u>2/11</u> | DATE: |
|-----|-------|-------|-------|------------------|-------|

COMMENDED ACTION:
Forward to customer for approval to the field end of pipe stress relieved at jobsite in the field.

02

Under I.E. code necessary operations for stress relieving to be documented all around.

| | |
|--|---|
| 3. DISPOSITION:
<u>Ref. to D.C. after complete P&ID check and approval of the customer.</u> | APPROVED
DUKE POWER CO.
DATE: <u>2/11/10</u>
BY: <u>G. N. BLACKLEY</u> |
|--|---|

Req. No. C-965
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.
50 B-3

In-Process
 Repair

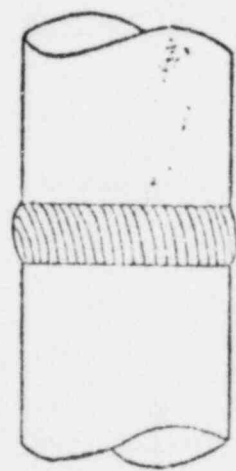
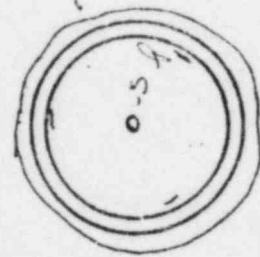
Form N6.3A

Standard Hours

Date 3-6-78

RADIOGRAPHIC DEFLECTION REPORT

| | | | | | | | | | | |
|---|---|---------------------------|-------------------|--|--|----|---|----|----------------------|----------------|
| Specimen or
Inspector No. <u>CT-01-18X</u> | | Plate No. <u>CT-SM-70</u> | Roll No. <u>A</u> | Pipe Size
and Schedule
<u>3.5" 10.0 Y1.750</u> | Roller No. <u>614741
6151041
61260</u> | | | | | |
| View | <u>1</u> | Defect Type | | | | | | | | |
| Source | <u>TR192</u> | IR | LP | RF | SC | TC | T | PL | Comments | Interpretation |
| Source Center
of FFP & RA | <u>50</u> | | | | | | | | | |
| Source Size
or Focal Spot | <u>142</u> | | | | | | | | <u>process CR</u> | <u>X</u> |
| Source Film Distance | <u>17"</u> | | | | | | | | <u>check leak CR</u> | <u>X</u> |
| Time | <u>6:00</u> | | | | | | | | <u>post MK CR</u> | <u>X</u> |
| Actual Weld
Thickness | <u>1.812</u> | | | | | | | | <u>(SA) 2-X</u> | <u>X</u> |
| Penetration | <u>35</u> | | | | | | | | <u>(SA) 1-X</u> | <u>X</u> |
| Sensitivity | <u>27</u> | | | | | | | | | <u>X</u> |
| Exposure | <u>0.62</u> | | | | | | | | | <u>X</u> |
| Film Size | <u>7 X 17</u> | | | | | | | | | <u>X</u> |
| Film Type | <u>7D</u> | | | | | | | | | <u>X</u> |
| Viewing Technique | Single <input type="checkbox"/> Double <input type="checkbox"/> | | | | | | | | | <u>X</u> |
| Screen | Front | <u>.010</u> | | | | | | | | |
| | Back | <u>.010</u> | | | | | | | | |
| Development | <u>90" Kodak 6 min.</u> | | | | | | | | | |
| Fixing Procedure | <u>Automatic</u> | | | | | | | | | |



Inspector - Date 3-6-78 of Clayton S. Beckwith
 Interpretation - Date 3-9-78 by Clayton S. Beckwith
 Approval - Date 3-17-78 by Clayton S. Beckwith
 Customer Duke Power Co. Location Catawba Unit 1 2:2
 Contract 71277100 Job No. _____
 Inspection Standard ASME B1.10 Description Standard ASME B1.1-2
 Customer Approval - Date _____ By _____

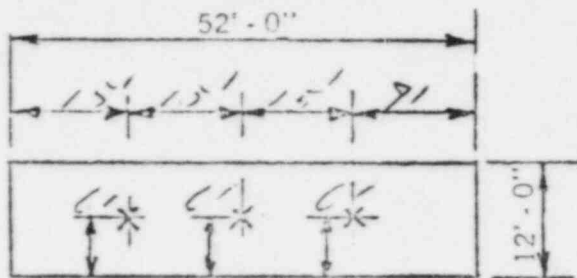
Handwritten: Hartford 3/10/78

Load Number _____

FURNACE LOAD SHEET

Date 3-14-78

| REGISTER NO. | SKETCH NO. | TYPE MATERIAL | WEIGHT | TEMP. REQ.* | RATE OF HT PER HR | HOLD TIME | RATE OF COOLING PER HOUR | SPEC. NO. | TIME IN | TIME OUT |
|--------------|------------|---------------|--------|---------------------|-------------------|-----------|--------------------------|-----------|---------|----------|
| CT | 01-5X | 7106 C | 8546 | 1150 ^{±25} | 200° | 2 hrs | 20° | S-111 | 34" | 1:37.5 |
| CT | 01-16X | " | 12081 | " | 1150° | | 20° | S-111 | 34" | 1:37.5 |
| CT | 01-27X | " | 12081 | " | 1150° | | 20° | S-111 | 34" | 1:37.5 |
| CW | 01-19X | " | 12081 | " | | | 60° | S-111 | 34" | 1:37.5 |
| CW | 01-7X | " | 12081 | " | | | | S-111 | 34" | 1:37.5 |
| CW | 01-41X | " | 12081 | " | | | | S-111 | 34" | 1:37.5 |
| AM | 04-17 | 7106 B | 6745 | " | | | | 1531.1 | 16" | 5:20 |
| WP | 3-8 | 7106 C | 15092 | " | | | | 11 | 34" | 6:55 |
| | | | 90798 | | | | | | | |



PLAN



ELEVATION

THERMOCOUPLE LOCATIONS

1 INCH SQUARE
S/N RECORDER AND PROGRAM
C70-5316-1-1 1013 97

TIME TO REACH TEMP 2 HRS
TIME AT TEMP 2 HRS
TIME TO COOL 5/4 HRS

- Copy 1 - Shop File
- 2 - Q. C.
- 3 - Billing
- 4 - Master Log Clerk

* Temperature variation within any 15 foot interval of weld length shall not exceed 250 degrees F

Load Inspection to insure against local flame impingement
Q. C. Stamp 3-14-78

CT CI - 5X
 CT CI - 7X
 CT CI - 27X
 CW CI - 14X
 CW CI - 7X
 CW CI - 41X
 MH 4-17
 WP 3-8

1000
 1000
 1000

TIME TO REACH TEMP 1 1/2 HRS
 TIME AT TEMP 2 HRS
 TIME TO COOL 5 1/4 HRS

2 INCH EQUALS 30 MIN
 S/W RECORDER AND PROGRAM
 C7053468.1.1 50338975001

DEG FAHR

1000 1200 1400 1600 1800 2000

S
O
L
D
T
O

Connell

IRON WORKS, INC.
P. O. BOX 1214
HOUSTON, TEXAS 77001

LITTLE CORNELL INDUSTRIAL PIPES, INC.
KEENEYSVILLE, MO 67294

CT
P. 76

Date 24 September 1976

Customer Order No. KER-2353-P
C.I.W. Sales Order No. F-5696
ASME-5A106 Gr. C and ASME-Section III, Class 2
Thru Summer 1974 Addenda

Description of Material
O.D. _____ x I.D. 31.430" x WALL 1.750" M.W.

C.I.W. Part No. 05-5696-352-314
ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NO. M-1291 EXPIRES 10-27-79.

| Heat No. | Location or Serial No. | CHEMICAL ANALYSIS | | | | | | | |
|----------|------------------------|-------------------|-----|------|------|-----|----|----|----|
| | | C | MN | P | S | SI | CR | NI | MO |
| L 3274 | | .26 | .93 | .017 | .010 | .26 | | | |

| Quantity or Serial No. | Heat No. | Test Loc. | Tensile PSI | Yield Point % Offset Yield PSI | MECHANICAL PROPERTIES | | | | Specimen Size | Test Lot# |
|------------------------|----------|-----------|-------------|--------------------------------|-----------------------|-------------|------------|-----------|---------------|-----------|
| | | | | | % Elong. 2 in. | % Red. Area | Macro Etch | Bend Test | | |
| 3 | L 3274 | Trans. | 61,100 | 42,700 | 28.1 | 59.6 | | OK | .505 | 74 |

| For. Ser. # | Test Lot # |
|-------------|------------|
| 26914Y | 74 |
| 26914Z | 74 |
| 26915Z | 74 |



Hydrostatic test Each length of pipe hydrostatically tested at 2400 psi for 5 sec. and found acceptable.
Heat Treatment:

Subscribed and sworn to before me this 24th Day of September 1976

G. A. Touchton
Notary Public

G. A. TOUCHTON

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

W. L. ...
Metallurgical Representative

MILL TEST CERTIFICATE

SOLD TO ITT Grinnell Corporation
Kernersville, N.C.
 SHIP TO Same for Duke Power

ITT GRINNELL CORPORATION
 WELDING PRODUCTS DIVISION
 PRINCETON, KY. Kernersville

OUR
 ORDER NO. 62933
 BRANCH
 ORDER NO. List 2832
 CUSTOMER'S
 ORDER NO. _____

DATE November 18, 1976

| 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-234 WPC | | | | | | | | | | | | | | A-106C |
| 31.625 x 1.750 Min. wall | F | 47900 | 81100 | *27.8 | .26 | .95 | .016 | .008 | .28 | | C7-01-18-1 | KCCH | | |
| IR 90° Ell | | | | | | | | | | | | | | |
| -Ditto- | F | 42200 | 79900 | *27.5 | .25 | .86 | .009 | .011 | .23 | " | " | KCCL | | |
| -Ditto- | F | 44900 | 82400 | *25.0 | .25 | .98 | .013 | .011 | .22 | " | " | AFAR | | |
| <p>*Standard round test specimen used for tensile properties.</p> <p>The above fitting was manufactured and tested in strict compliance with ASME
 Section III, 1974 Edition, Class 2 through the 1974 Summer Addenda.</p> | | | | | | | | | | | | | | |
| <p>We certify that the fittings listed herein comply with the requirements of ASME Section III, 1974 Edition, Class 2 through the 1974 Summer Addenda. They were produced in accordance with the Mill Test Report Program, approved by the American Society of Mechanical Engineers, and are covered by the ASME Quality System Certificate (Materials) Number N-832.</p> | | | | | | | | | | | | | | |

Columbo
 11-19

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
 THIS _____ DAY OF _____ 19____

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

R. B. Biles



UNION CARBIDE CORPORATION
 LINDE DIVISION
 WELDING MATERIALS
 P.O. BOX 719, ASHTABULA, OHIO 44004

CT
 WW13

July 15, 1977

CUSTOMER: Industrial Welding Supply
 2501 Champagne
 Ashboro, N.C. 27203
 (For: ITT Grinnell)

YOUR ORDER NO.: 11-476
 LINDE S.O. NO.: 011476 U
 QUANTITY: 420 lbs.

MATERIAL: Linde 65 - Heat No. 065118 - 1/8" Diameter x 36" Straight Lengths

This is to certify that Linde 65, Class E70S-2, as supplied under the above order number, shipped from one heat number, has been tested using the test assembly specified in Fig. 5 of AWS A5.18-69, and ASME SFAS.18 specifications. The wire met all the mechanical and impact property requirements of these specifications using the gas-tungsten arc welding process with Argon shielding gas. During the manufacturing processes, tests, and inspection the materials furnished under this contract have not come in direct contact with mercury or any of its compounds nor with any mercury-containing device employing a single boundary of containment.

| MECHANICAL PROPERTIES OF WELD(S) PER TABLE 3 - | AS-WELDED | * STRESS RELIEVED | REQUIRED |
|--|-----------|-------------------|------------|
| Weld Test Number | G0524-1 | G0526-1 | |
| All-Weld Metal Tensile Yield Strength, psi | 69,400 | 70,900 | 60,000 min |
| Ultimate Strength, psi | 79,700 | 83,900 | 72,000 min |
| Elongation in 2", % | 32.5 | 30.0 | 22 min |
| Reduction of Area, % | 79.0 | 74.1 | ----- |

| CHARPY V-NOTCH IMPACT STRENGTH @ -20°F (ft./lbs.) | |
|---|----------------|
| As-Welded | * S.R. |
| 126.5 | 130.0 |
| 101.5 | 95.0 |
| 120.5 | 97.5 |
| 100.0 | 66.0 |
| 79.5 | 132.5 |
| 107.3 (Ave. 3) | 107.5 (Ave. 3) |

| LATERAL EXPANSION (INCHES) | |
|----------------------------|--------|
| As-Welded | * S.R. |
| .076 | .085 |
| .074 | .067 |
| .080 | .072 |
| .073 | .055 |
| .063 | .085 |

| DUCTILE FRACTURE AREA (PERCENT) | |
|---------------------------------|--------|
| As-Welded | * S.R. |
| 60 | 50 |
| 50 | 50 |
| 60 | 50 |
| 50 | 40 |
| 35 | |



RADIOGRAPHIC TESTS: X-ray(s) met the requirements of Fig. 1
 APPLICATION CONDITIONS: 230 Amps, 15 Volts, 5/6 Inches Per Minute

CHEMICAL ANALYSIS:

| C | Mn | P | S | Si | Al | Ti | Zr | Ni | Cr | Mo | V | Cu | |
|------|------|------|------|-----|-----|-----|-----|------|------|------|------|------|------------|
| .04 | 1.11 | <.01 | .017 | .55 | .11 | .06 | .03 | .03 | .01 | <.01 | <.01 | .01 | - Actual |
| .05 | .90 | .025 | .035 | .40 | .05 | .05 | .02 | ---- | ---- | ---- | ---- | ---- | - Required |
| max. | 1.40 | max. | max. | .70 | .15 | .15 | .12 | | | | | | |

< = less than

* Weldment Stress Relieved at 1125°F, plus or minus 25°F, for 8 hours. Cooling rate 100°F/hr. to 500°F, then air cooled.

Sworn to before me this
 day of July 1977

R. J. DiLento
 R. J. DiLento
 Materials Standards Specialist

UNION CARBIDE CORPORATION
LINDE DIVISION
WELDING MATERIALS
P.O. BOX 510, AMHERST, OHIO 44004

1/16/78

CUSTOMER: ITT GRINNELL
OLD HIGHWAY 421
KERNERSVILLE NC 27284

YOUR ORDER NO.: 11-137-KER 9113

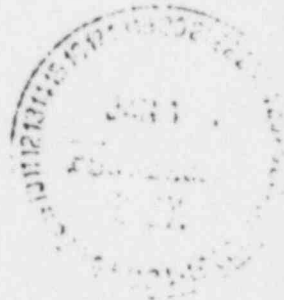
LINDE S.O. NO.:

*Catawba
ww-34*

MATERIAL: Linde 65

This is to certify that this material will conform to AWS A5.18-69
ASME SA5.18. It has the following chemical analysis meeting the
requirements of classification E70S-2:

| | | |
|--------------------|---|--------|
| <u>HEAT NUMBER</u> | - | 065214 |
| Carbon | - | .04 |
| Manganese | - | 1.17 |
| Phosphorous | - | .008 |
| Sulphur | - | .015 |
| Silicon | - | .54 |
| Aluminum | - | .12 |
| Titanium | - | .07 |
| Zirconium | - | .041 |



Ladle Analysis:

Howard Taylor - All

Quality Assurance - Welding Materials Plant
Union Carbide Corporation - Linde Division

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB. 21 1978
SHEET 1 OF 4

Catawba
WW-34

SUBJECT: Welding Filler Materials

WIRE: Linde 65, Heat No. 065214

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 5-2, that the test results shown in Tausig Associates, Inc. Report 23490 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This may also be used on impact-tested material with a minimum service temperature of +30 degrees F.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 Edition.

John F. Elder 2/21/78
J. F. Elder

ITIG - IPI
QUALITY CONTROL
APPROVED:
T. G. WILSON
DATE FEB 21 1978
SHEET 2 OF 4

MATERIAL TEST REPORT #23450
R & D TEST #435

*Catawba
WW 34*

Linde 65, Heat No. 065214

The following tests were performed in accordance with SFA 5.18, E70S-2:

1. All-Weld Metal Tension Test:

As-Welded:

Tensile Strength: 79,200 psi
Yield Point: 74,700
Elongation (%) in 2": 28

Heat-Treated*

Tensile Strength: 76,600
Yield Point: 66,400
Elongation (%) in 2": 30

2. Charpy V-Notch Impact Tests:

As-Welded:

| <u>Temp.</u> | <u>Ft. lbs.</u> | <u>Lat. Exp. (mils)</u> | <u>%Shear</u> |
|--------------|-----------------|-------------------------|---------------|
| -20 | 143 | 91 | 90 |
| -20 | 123 | 79 | 80 |
| -20 | 100 | 69 | 70 |
| -20 | 111 | 75 | 80 |
| -20 | 111 | 80 | 80 |

Heat-Treated*

| <u>Temp.</u> | <u>Ft. lbs.</u> | <u>Lat. Exp. (mils)</u> | <u>%Shear</u> |
|--------------|-----------------|-------------------------|---------------|
| +30 | 80 | 63 | 60 |
| +30 | 97 | 73 | 70 |
| +30 | 107 | 73 | 70 |

3. Chemical Analysis: (additional elements required by ASME Section III, Cl. 1 for information only)

Ni: < 0.05 V : < 0.01
Cr: < 0.05 Cu : 0.12
Mo: < 0.03

4. Radiographic Tests: Acceptable

ITG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE: Feb 21 1976
SHEET 3 OF 4

*Heat-treated for 16 hours at 1150 degrees F, cooling to 600 degrees F shall be 300 degrees F/hr. (\pm 100 degrees F/hr.)

This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by IIT Grinnell IPI and our subcontractor are in compliance with the requirements of SFA 5.18 and the applicable material requirements of AB-2400 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by IIT Grinnell IPI. This report, in conjunction with the Linde Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.

Catawba
WW-34

J. F. Elger

J. F. Elger Date

IITG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB. 21 1976
SHEET 4 OF 4

CERTIFIED MATERIALS TEST REPORT

CAT#WBA
WW-29

Customer Order No. 4365 Rel.14-4

Order No. 711093-2

Shipped

National Welders Supply
P.O. Box N-93
3011 N. Liberty Street
Winston Salem, N.C. 27105

This material conforms to Specification
ITT Spec. ES 1073-
SFA 5.1 Sec. III

Type E 7018

Test No. 650
X-Rays Satisfactory
Control No. MMM074

Moisture @1800°F. 0.29%
Concentricity 4%
Type Steel A-285

| Test No. | Full | Split | Volts | Amps |
|--------------------|------|-------|-------|------|
| Tensiles & Impacts | 1 | 6 | 22 | 110 |

| Test Results: | As Welded | Stress Relieved |
|---------------|-----------------|-----------------|
| | 8 hrs. @1150°F. | |
| Yield | 73,100 | 65,400 |
| Tensile | 80,000 | 75,900 |
| Elongation | 28.0% | 30.0% |
| Red. of Area | 76.0% | 77.9% |

Charpy V-Notch Impacts Tested @-20°F.

| | | |
|-----------|----------------|----------------|
| Impacts | 42-58-63-72-82 | 68-72-80-92-98 |
| Lat. Exp. | 38-48-52-59-68 | 58-61-67-78-83 |
| %Shear | 20-20-20-20-30 | 20-30-30-30-30 |

Fillets: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIAL)
NUMBER N-1223 EXPIRES ON SEPTEMBER 8, 1978

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

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

BY *D. G. Flohr*
D. G. Flohr

Trade Name of Trademark: Atom Arc 7018

Diameter Size: 3/32"
19,650 lbs.

Lot Number: 02-1-J728P
Heat Number: 411B6841

| | |
|----------------------|------|
| Carbon | .04 |
| Manganese | 1.06 |
| Chromium | .03 |
| Nickel | .02 |
| Silicon | .48 |
| Columbium + Tantalum | |
| Molybdenum | .01 |
| Tungsten | |
| Copper | .02 |
| Titanium | |
| Phosphorus | .012 |
| Sulphur | .016 |
| Vanadium | .03 |

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE DEC. 22 1977
SHEET 1 OF 1

Rec. Report #647

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 21st day of November 1977

SEAL *Annitta S. Conway*
Notary Public

My commission expires: 8/21/78

CERTIFIED MATERIALS TEST REPORT

*Catalina
WW 27*

Customer Order No. 4365 Rel. 14-4

Order No. 711093-2

National Welders Supply
P.O. Box N-93
3011 N. Liberty Street
Winston Salem, N.C. 27105

Shipped _____

This material conforms to Specification
ITT Spec. ES 1073-1
SFA 5.1 Sec. III

Trade Name or Trademark: Atom Arc 7018

Type E 7018

Diameter Size: 1/8"
15,000 lbs.

Test No. 485
X-Rays Satisfactory
Control #MM045

Lot Numbers: 02-3-S719R
Heat Numbers: 402B1441

Moisture @1800°F. 0.24%
Concentricity 4%
Type Steel A-285

Carbon .03
Manganese .89
Chromium .03
Nickel .02
Silicon .36
Columbium + Tantalum
Molybdenum .01
Tungsten
Copper .02
Titanium
Phosphorus .011
Sulphur .020
Vanadium .02

| Test No. | Full | Split | Volts | Amperes |
|--------------------|------|-------|-------|---------|
| Tensiles & Impacts | 1 | 5 | 25 | 14 |

| Test Results: | As Welded | Stress Relieved |
|---------------|-----------|-----------------|
| Yield | 64,508 | 62,048 |
| Tensile | 77,000 | 74,698 |
| Elongation | 31.0% | 29.0% |
| Red. of Area | 79.9% | 78.4% |

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE DEC 22 1977
SHEET 1 OF 1

Charpy V-Notch Impacts Tested @-20°F.

Impacts 67-83-84-104-106/S4-84-97-111-7
Lat. Exp. 53-67-70-77-79 70-72-77-90-83
% Shear 30-20-30-40-50 30-20-20-40-70

Filletts: OK Vertical Overhead

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 21st day of November 1977

ASME QUALITY SYSTEM CERTIFICATE (MATERIAL)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978
The undersigned certifies that this report is correct and that no significant change has been made in any of the elements described in the qualification approval.

SEAL *[Signature]*
Notary Public

My commission expires: 8/21/78

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

BY *[Signature]*

ITT Ginnell

Industrial Piping Inc.

CT
WW-23

SUBJECT: Welding Filler Materials
WIRE: RACO 128, Heat No. 517715
FLUX: Linde 80; Lot 0575, Con. No. C8290

This is to certify that the subject materials were welded into test plates as shown in SFA 5-1, that the test results shown in Taussig Associates, Inc. Report 21547 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III, Cl. 1 material in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This material may not be used on impact-tested fabrication.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the Winter of 1975 Addendum.

ITT G INI
QA OK
TGM
DATE OCT. 26 1977

John F. Elder
John F. Elder
Materials Engineer

Date: 10/26/77

Harvey Associates Inc.

695511 HAMILIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



Report No. 21547 - August 3, 1977

ITT Grinnell Industrial Piping, Inc.
P. O. Box 566 - Hwy 421
Kernersville, North Carolina 27284

Attention: Mr. J. F. Edler

CT
ww 23

SUBJECT

Weld Metal Testing of Two Plates Marked Number 320.

1.1 & 1.1
LA CK
TCW
DATE 08/15/77

BACKGROUND:

Two welded plate assemblies were submitted to our laboratory for chemical analysis, impact testing and tension testing of the weld metal. The assemblies were identified as Test Plate #320; EACO 128, heat number 517715; Linde 80 flux; lot 0575. One of the plates was to be tested in the as-welded condition and the second was to be stress relieved before testing.

CT
WW 23

TEST RESULTS:

Chemical Analysis:

The weld metal of one of the submitted plates was drilled in a manner which prevented removal of material from the base metal. These drillings were then cleaned and subjected to a quantitative chemical analysis with the following results:

| | <u>#320</u> |
|------------|-------------|
| Carbon | .04 |
| Manganese | 1.38 |
| Phosphorus | .014 |
| Sulfur | .023 |
| Silicon | .51 |
| Nickel | <.65 |
| Chromium | <.95 |
| Molybdenum | .52 |
| Copper | .11 |
| Vanadium | <.01 |

ITT & IRI
QA ON
TGW
DATE OCT 26 '77

Heat Treatment:

The plate which was not drilled for chemical analysis was cut to fit into a heat treating furnace. The pieces were heated to 1100°F and held for 16 hours. Cooling was done at 200°F/hr to below 800°F.

Tension Testing:

One, round, all weld metal, tensions test specimen was machined from each plate assembly; as-welded and after heat treatment. Each specimen was subjected to a standard tension test with results as follows:

| | <u>As-Welded</u> | <u>Heat Treated</u> |
|------------------------|------------------|---------------------|
| Tensile Strength, psi. | 79,700 | 78,760 |
| Yield Point, psi. | 67,570 | 63,750 |
| % Elongation, in 2" | 28 | 28 |

Impact Testing:

A total of eleven, full size (10 mm x 10 mm), Charpy V-notch impact test specimens were machined from the two submitted plate assemblies. Three of the specimens were from the as-welded plate and eight were from the heat treated plate. All were notched in the weld metal.

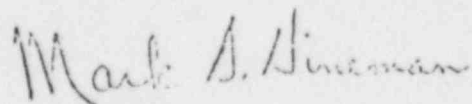
As-Welded:

| <u>Test Temperature, °F</u> | <u>Absorbed Energy ft-lbs</u> | <u>Mils of Lateral Expansion</u> | <u>Percent Shear</u> |
|-----------------------------|-------------------------------|----------------------------------|----------------------|
| +30 | 32 | 31 | 20 |
| +30 | 13 | 17 | 10 |
| +30 | 32 | 32 | 20 |

Heat Treated:

| | | | |
|-----|----|----|----|
| +30 | 42 | 38 | 30 |
| +30 | 46 | 42 | 30 |
| +30 | 40 | 37 | 30 |
| -20 | 19 | 16 | 10 |
| -20 | 30 | 28 | 10 |
| -20 | 30 | 28 | 10 |
| -20 | 25 | 22 | 10 |
| -20 | 28 | 26 | 10 |

Respectfully submitted,



Mark A. Hineman
Staff Engineer
TAUSSIG ASSOCIATES, INC.

MAH:ln

ITT G IPI
CA. OX
TOW
DATE: OCT 26 1977

Name of Supplier ITT Grinnell Ind. Piping, Inc.

Date 11-28-78

Address of Supplier Plant Kernersville, NC

Mill Power Order No. C-12517

Duke Item or Req. No. 1205-00-1,0

Spec. No. CNS-1205-00-1,0 Rev.

Supplier ID Nos. CT-11-258

Description of Component(s) or Material(s) Fabricated Piping Assembly

CT-5M-7C

Attached Documentation covers all Components/Materials on Mill Power Order.
 Attached Documentation covers partial shipment of Components/Materials on Mill Power Order.

The following listed tests, inspections and reports have been completed as required by the specification:

- | | | |
|--|--|---|
| <input checked="" type="checkbox"/> Physical & Chemical Analysis | <input type="checkbox"/> Major Repair Records & Charts | |
| <input type="checkbox"/> Hydro (Test Pressure - PSIG _____) | <input checked="" type="checkbox"/> Personnel Qualifications on Record | |
| <input type="checkbox"/> Design Report | <input type="checkbox"/> Stress Report | <input checked="" type="checkbox"/> Heat Treatment |
| <input checked="" type="checkbox"/> Radiographic Test | <input type="checkbox"/> Ultrasonic Test | <input checked="" type="checkbox"/> Magnetic Particle |
| <input type="checkbox"/> Penetrant Test | <input type="checkbox"/> Repair NDE | <input checked="" type="checkbox"/> Cleanliness |
| <input type="checkbox"/> Operating Test | <input type="checkbox"/> Performance Curve | <input checked="" type="checkbox"/> ASME Data Report |
| <input checked="" type="checkbox"/> Dimensional Check | <input checked="" type="checkbox"/> Deviation Record # <u>1792</u> | |

- 1) _____
- 2) _____
- 3) _____

This certifies that the listed Component(s) or Material(s) conform to the requirements of the above referenced Duke Power documents including all codes, standards, test requirements and Quality Assurance requirements invoked therein.

DUKE POWER COMPANY

QA RECORDS APPROVED

S. V. Caldwell

QA REPRESENTATIVE

DATE 3-16-79

Thomas R. Smith

Supplier Representative Authorized Signature

Title Mgr. of Proc Date 11/28/78

(See Instructions)

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

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

1065

1. Fabricated by ITT Grinnell Ind. Piping, Inc. Kernersville Order No. 7128
(Name and Address of Fabricator)

2. Fabricated for Duke Power Company, Charlotte, NC Order No. C-12517
(Name and Address)

3. Owner Duke Power Company 4. Location of Plant Newport, SC

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

(a) Drawing No. CT-1-288 Prepared by ITT Grinnell Industrial Piping, Inc.
 (b) National Board No. N/A

6. The material, design, construction, and workmanship complies with ASME Code Section III, Class N-2
 Edition 1974, Addenda Date Winter 1974, 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)

Supplemental Sheets 2 ---- Drawings
3, 4, 5 ---- Bill (s) of Material

7. Shop Hydrostatic Test Field psi.

8. Description of piping inspected Piece Mark Number CT-5M-7C
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length - fittings - flanges, etc.)
See Attached Sheets

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 ITT GRINNELL AND PRESSURE VESSEL CODE.
 Date 10-30-78 Signed Ind. Piping, Inc. by James G. Hendon
(Fabricator)
 Certificate of Authorization Expires 7-16-79 Certificate of Authorization No. A-1456

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 _____ and employed by _____ of Hartford, CT. have inspected the piping described in this Data Report on 10-30-78, 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. *The Hartford Steam Boiler Inspection and Insurance Co.

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 10-30-78, 1978
(Inspector) Commission James G. Hendon
National Board, State, Province and No.

* 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 in Item 7. "Remarks".
 Printed in U.S.A. (2/73) This form (K-2) is obtainable from the ASME, 115 E. 47th St., New York

ITT Grinnell Industrial Piping Inc.

KERNERSVILLE, N. C.

FORM NO. 101 REV 1
Q.A. FD. 44-210

CONT. NO. 7127

NAME DUKE POWER COMPANY

LOCATION CATAWBA UNIT #1

Charlotte, N.C. CH OF ACCESS HOLE PLUG SMALL

612517

STOP SMALL END TO CT-2 REQUIRED

REDW'N. 12-14-77

CHK'D

REV. 12-14-77

CHK'D

REV. 1-22-78

CHK'D

REV. 12-23-78

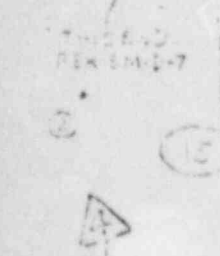
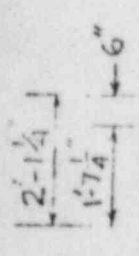
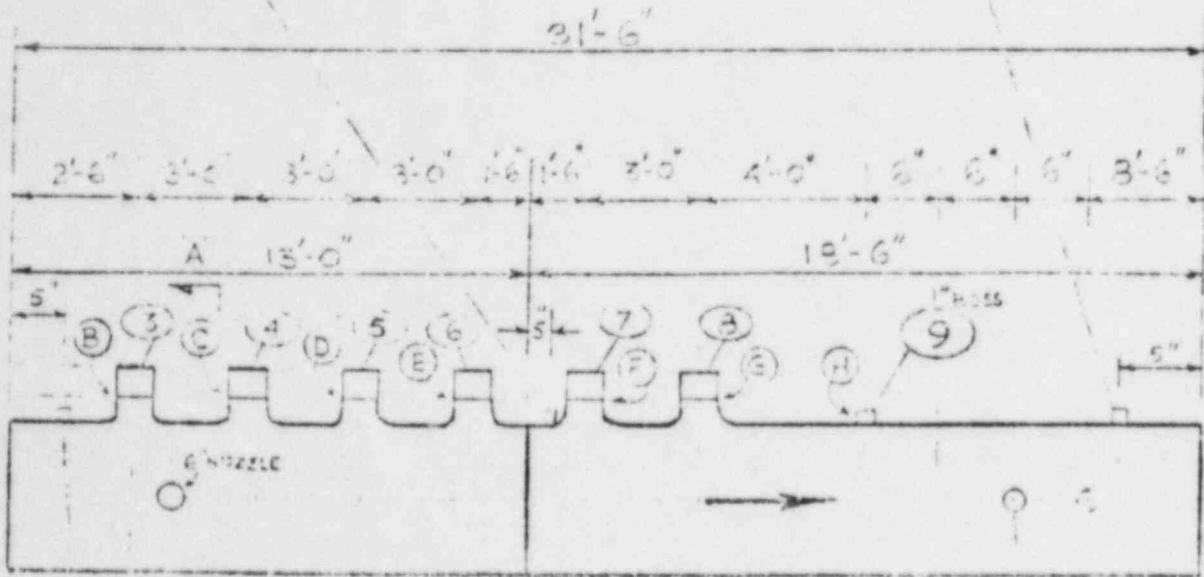
CHK'D

12-23-78

CHK'D

1/8" ACCESS HOLE PLUG
TO CT-AH-I
H = 2.500"

1/8" ACCESS HOLE PLUG
TO CT-AH-I
H = 2.500"

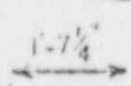


NOTE: STOP SMALL END TO CT-2 REQUIRED

PER WELD ENDS ARE
MADE PER CT-2 PER
PROC. 42.13.2.10

PER WELD ENDS ARE
MADE PER CT-2 PER
PROC. 42.13.2.10

MACHINE MARK
PER SKETCH 8M-D-7
ENCL. 42.13.2.10



SECTION A-A

Nuclear Safety Related

| CLASS | LINE SPEC. | APP. CODE | NO. REQ'D |
|---|--|---|---|
| <input type="checkbox"/> Radiography (RT)
<input type="checkbox"/> Mag. Particle (MT)
<input type="checkbox"/> Pen. Test (PT) | <input type="checkbox"/> Special Marking
<input type="checkbox"/> Special Cleaning
<input type="checkbox"/> Pickling | <input type="checkbox"/> Preheat
<input checked="" type="checkbox"/> Heat Treat
<input type="checkbox"/> Case Stamp | <input type="checkbox"/> Cert. of Compliance
<input checked="" type="checkbox"/> M.I.T. Reports
<input type="checkbox"/> Data Reports |
| SYSTEM | FAB. SECS. | PRESS. | PSI. TEMP. |
| REF. DRWG. NO. | | | |
| PIECE MARK | 70 | | |
| | | | REGISTER |

Part No. T-91-28X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 3 of 5

BUYER FORBES COMPANY

Revision 5

Job Name Charlotte, N.C.

Contract No. 1111

Location

Part No. C-12517

Part Name Sys- Main Steam

| PART NUMBER | QUAN OR LENG | QUALITY CONTROL | HEAT NUMBER | DOCUMENT REFERENCE | DATE | ITEM P.O. | DMS NUMBER | NET |
|-------------------------------|--------------|-----------------|-------------|--------------------|------|-----------|------------|-----|
| | | | | | | | | |
| 151-227 | 1 | | | | | | | |
| 150 LB. SAFETY VALVE | | | | | | | | |
| HEAD RIMMED W/4" O | | | | | | | | |
| 2 DIA 1/2" HW OUTLETS AND | | | | | | | | |
| 1 - 2" SW 90 OUTLET (NS) | | | | | | | | |
| (PER DSQ # 42145) | | | | | | | | |
| 151-227 | 1 | | | | | | | |
| 1 - 2" SW 90 - EX. PT | | | | | | | | |
| RIMMED W/1/2" DIA 1/2" O | | | | | | | | |
| 2 - 1/2" O DIA 1/2" NW OUTLET | | | | | | | | |
| PER DSQ # 42145 | | | | | | | | |
| 151-227 | 1 | | | | | | | |
| 1 - 2" SW 90 - EX. PT | | | | | | | | |
| RIMMED W/1/2" DIA 1/2" O | | | | | | | | |
| 2 - 1/2" O DIA 1/2" NW OUTLET | | | | | | | | |
| PER DSQ # 42145 | | | | | | | | |
| 151-227 | 1 | | | | | | | |
| 1 - 2" SW 90 - EX. PT | | | | | | | | |
| RIMMED W/1/2" DIA 1/2" O | | | | | | | | |
| 2 - 1/2" O DIA 1/2" NW OUTLET | | | | | | | | |
| PER DSQ # 42145 | | | | | | | | |
| 151-227 | 1 | | | | | | | |
| 1 - 2" SW 90 - EX. PT | | | | | | | | |
| RIMMED W/1/2" DIA 1/2" O | | | | | | | | |
| 2 - 1/2" O DIA 1/2" NW OUTLET | | | | | | | | |
| PER DSQ # 42145 | | | | | | | | |

GRINNELL INDUSTRIAL PIPING, INC.

FORM EN 102 REV 7/76
U.S. FORM 112 IF

H-P

Register No. CT-01-28X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 1 of 3

DUKE POWER COMPANY

Revision No. _____ Revision Date _____

Piece Mark CT-SM-7C Job Name CATAWBA UNIT # 1

Contract No. 7127 Location _____

| PART NUMBER | DESCRIPTION | QTY OR LENG | HEAT NUMBER | QUALITY CONTROL | STATUS | UNIT | DIS VENDOR | MATERIAL |
|---------------------------------|---|-------------|-------------|-----------------|--------|------|------------|----------|
| | | | | | | | | |
| 1
CT-01-12
(1000 # 02275) | 31.5" NOM I.D. X 2.575 RW X
12'-0" L.G. SAFETY VALVE
HEADER MANIFOLD W/4-10"
O.D. X 1 1/2" NW OUTLETS AND
1, - 6" SCH 50 OUTLET (S) | 2.27 | | | | E | | |
| 2
CT-01-13
(1000 # 02275) | --- DITTO --- EXCEPT
MANIFOLD WILL BE 10'-6" L.G.
W/2 - 10" O.D. X 1 1/2" NW OUTLETS | 2.27 | | | | E | | |
| 3
CT-2095-1 | 10" A.R.O.D. FORGED CS
TRANSITION PC. MATERIAL
TO ASME SA-10.2 (2.0")
(L = LENGTH = 6")
(PER DET. CT-SM-2) | | | | | E | | |

DUPLICATE

BE 100
150
2.275

PRODUCTION COPY LAYOUT

Handwritten signature

Nuclear Safety Related

Code ASME Sec. III, Cl. 2 Class DUFE 'B'

Job Supplement JS 11B

MFG. Code _____

GRINNELL INDUSTRIAL PIPING, INC.

FORM EN 102 REV 7-76
Q.A. FORM N2.1.

Regis. of No. CT-01-2BX

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 2 Of 3

DUKE POWER COMPANY

Revision No. _____ Revision Date _____

Job Name CATAWBA UNIT # 1

Place Mark CT-SM-7C

Contract No. 7127 Location _____

| LINE | PART NUMBER | DESCRIPTION | QUAN OR LENG | HEAT NUMBER | QUALITY CONTROL DOCUMENT IN PROCESS STATUS | U/M | ACCOUNTING MATERIAL | |
|------|-------------|--|--------------|-------------|--|-----|---------------------|-------------|
| | | | | | | | UNIT PRICE | DIS. VENDOR |
| 4 | CT-2095-2 | 10" AB750-D FORGED C-S
TRANSITION PC, MATERIAL
TO ASME SA-106 GR.C
(L - LENGTH = 6")
(PER DET. CT-SM-3) | 1 | 32722 | Buf. On 157
6-22-75 | E | | |
| 5 | CT-2095-2 | DITTO | 1 | 12241 | Buf. On 157
6-22-75 | E | | |
| 6 | CT-2095-2 | DITTO | 1 | 8241 | Buf. On 157
6-22-75 | E | | |
| 7 | CT-2095-2 | DITTO | 1 | 3041 | Buf. On 157
6-22-75 | E | | |
| 8 | CT-2095-2 | DITTO | 1 | 32722 | Buf. On 157
6-22-75 | E | | |
| 9 | CT-3002-2 | 1" 2000 H.S., SEWELD BOSS
TO SA-105, PER DET. SK-CT-WB-1 | 1 | 3041 | Buf. On 157
6-22-75 | E | | |
| 10 | CT-3002-2 | DITTO | 1 | 3041 | Buf. On 157
6-22-75 | E | | |
| 11 | CT-3002-2 | DITTO | 1 | 3041 | Buf. On 157
6-22-75 | E | | |
| 12 | CT-3002-2 | DITTO | 1 | 3041 | Buf. On 157
6-22-75 | E | | |

UNRECORDED
 8-14-75

Code XXXX Sec III, Cl. 2 DUKE B Class DUKE B MFG. Code _____
 Job Supplement JS 118 **Nuclear Safety Related**

GRINNELL INDUSTRIAL PIPING, INC.

FORM EN-102 REV 7/76
Q.A. FORM N-11F
H.P.

Register No. CT-01-28X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 3 Of 3

DUKE POWER COMPANY

Revision No. _____ Revision Date _____

Piece Mark CT-SM-7C

Job Name CATAWBA UNIT #1

Contract No. 7127 Location _____

| PART NUMBER | DESCRIPTION | QTY OR LENG | HEAT NUMBER | QUALITY CONTROL DOCUMENT IN PROCESS | STATUS | U/M | ACCOUNTING-MATERIAL | |
|-------------|---|-------------|-------------|-------------------------------------|--------|-----|---------------------|-----------------|
| | | | | | | | UNIT PRICE P.O. | DIS. VENDOR No. |
| CT-4012-3 | 1 1/2" ACCESS HOLE PLUG PER 50 CT-AH-1, TO ASME, SA-195, H=2.609" | 1 | ABF | AP 4 3/20 | | E | | Res. 7/9/76 |
| CT-4012-3 | DITTO | 1 | ABF | AP 4 3/20 | | E | | Res. 7/9/76 |
| CT-4012-3 | DITTO | 1 | ABF | AP 4 3/20 | | E | | Res. 7/9/76 |
| | AS O.D. SP. END PROT. PER 50 CT-EP-1 | 2 | | | | E | | |
| | 5" O.D. BEVEL END PROT. 50 CT-EP-1 | 5 | | | | E | | |
| | 6" PIPE SIZE B.F. PROT. 50 CT-EP-1 | 1 | | | | E | | |
| | 35" SPIDER BRACING PER 50 CT-ES-1 | 2 | | | | E | | |

COPY SENT

Nuclear Safety Related

Code _____

Class DUKE B

Job Supplement JS 11A

MFG. Code _____

PROJECT Duke Power (Cat) CONTRACT 7127 PC. MK# CT-SM-7C REG. CIT 0.1 28A
 SYSTEM M/W STRAIN SM CLASS "B" SPECIFICATION J5-118-1 SUPPLEMENT _____

WELD DATA

| WELD | FIT-UP/PREHEAT | | | ROOF | INTERMEDIATE | | FINAL | | | RT DATE | | MAG | LP | |
|------------|----------------|------------|----------------|---------|--------------|------------|-------------|------------|-------------|----------------|------------|-----|----|-------|
| | WELDER I.D. | WELD MAT'L | Q.C. INSP. | | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | Q.C. INSP. | | | Q.C. |
| L | PROC | 1-4-2-2 | | PROC | 1-4-2-2 | PROC | 1-1-3-10 | PROC | 1-1-3-10 | | | | | |
| | 522 | 065214 | (Q.C. IPI 150) | 3510 | 065220 | 2510 | 1AC QAA | 2510 | 1AC HAA | (Q.C. IPI 150) | | | | 10/23 |
| DATE | 6/23/78 | 10/23/78 | 6/23/78 | 6/23/78 | 10/23/78 | 6/23/78 | 10/23/78 | 6/23/78 | 10/23/78 | 6/23/78 | | | | 10/23 |
| Code Plate | PROC | 1-4-2-2 | | PROC | | PROC | | PROC | | | | | | 10/23 |
| | 522 | 065214 | (Q.C. IPI 150) | | | | | | | | | | | 10/23 |
| DATE | 1-14-78 | 10/23/78 | 1-14/78 | | | | | | | | | | | 10/23 |
| Code Plate | PROC | 1-4-2-2 | | PROC | | PROC | | PROC | | | | | | 10/23 |
| | 522 | 065214 | (Q.C. IPI 150) | | | | | | | | | | | 10/23 |
| DATE | 6/23/78 | 10/23/78 | 6/23/78 | | | | | | | | | | | 10/23 |
| | PROC | | | PROC | | PROC | | PROC | | | | | | |
| DATE | | | | | | | | | | | | | | |
| | PROC | | | PROC | | PROC | | PROC | | | | | | |
| DATE | | | | | | | | | | | | | | |

| | | | |
|---|-------------------------------|-----------------------------------|------------------------------------|
| STRESS DATE
8-7-78 | FINAL INSP.
(Q.C. IPI 150) | SPECIAL OPERATIONS:
C DIM. N/A | Q.C. DOC. APPROVAL
BIT 10/30/78 |
| SQUARE UP
10-23-78
(Q.C. IPI 150) | CUST INSP | WALL THK.
I | A/I STAMP/DATA REPORT |
| CLEAN UP
HS 10-25-78 | | OTHER | CUST DOC APPROVAL |

Req. No. IF 620
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.

In Process
 Repair

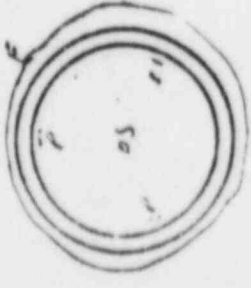
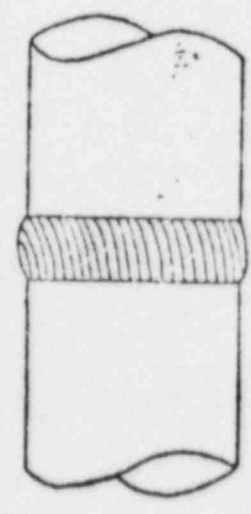
RADIOGRAPHIC DEFLECTION REPORT

Form N6.3A

Standard Hours

Date 2-6-73

| | | | | | | | | | | | |
|--|--|----------------------------|--|-------------------|--|--|--|------------------------------|--|-------------------------|--|
| System or Register No. <u>CT-61-221</u> | | Plate No. <u>CT-209-26</u> | | Weld No. <u>A</u> | | Pipe Size and Schedule <u>X 2.375" 10W</u> | | Material <u>C333R1 S4578</u> | | Welder No. <u>W2765</u> | |
| Technician <u>AB B-3</u> | | Film Interval <u>AB</u> | | Defect Type | | Comments | | Orientation | | X | |
| Source <u>Ce60</u> | | Film Interval <u>DC</u> | | Defect Type | | Comments | | Orientation | | X | |
| Source Current or kV <u>55"</u> | | Film Interval <u>ES</u> | | Defect Type | | Comments | | Orientation | | X | |
| Source Size at Focal Spot <u>1.15"</u> | | Film Interval <u>EM</u> | | Defect Type | | Comments | | Orientation | | X | |
| Source Film Distance <u>17"</u> | | Film Interval <u>MP</u> | | Defect Type | | Comments | | Orientation | | X | |
| Film <u>330</u> | | Film Interval <u>PS</u> | | Defect Type | | Comments | | Orientation | | X | |
| Screen <u>2431"</u> | | Film Interval <u>SU</u> | | Defect Type | | Comments | | Orientation | | X | |
| Penetration <u>40</u> | | Film Interval <u>VY</u> | | Defect Type | | Comments | | Orientation | | X | |
| Sensitivity <u>25</u> | | Film Interval <u>YA</u> | | Defect Type | | Comments | | Orientation | | X | |
| Beam Thickness <u>611</u> | | Film Interval <u>YB</u> | | Defect Type | | Comments | | Orientation | | X | |
| Film Size <u>257</u> | | Film Interval <u>YH</u> | | Defect Type | | Comments | | Orientation | | X | |
| Film Type <u>MT35</u> | | Film Interval <u>YI</u> | | Defect Type | | Comments | | Orientation | | X | |
| Viewing Technique <input checked="" type="checkbox"/> Single <input type="checkbox"/> Double | | Film Interval | | Defect Type | | Comments | | Orientation | | X | |
| Screen | | Film Interval | | Defect Type | | Comments | | Orientation | | X | |
| Development | | Film Interval | | Defect Type | | Comments | | Orientation | | X | |
| Fixing Procedure | | Film Interval | | Defect Type | | Comments | | Orientation | | X | |



Inspector - AB B-3 Date 2/6/73 By AB B-3
 Interpretation - AB B-3 Date 2/6/73 By AB B-3
 Approval - AB B-3 Date 2/6/73 By AB B-3

Customer Duke Power Co. Location Catawba Unit 1 & 2
 Contract 71577123 Job No. _____
 Purpose Standard 15F-181-10 Acceptance Standard 15F-1711-2
 Customer Approval - AB B-3 By _____

Reg. No. FF-1
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.

In Process
 Repair

Form N6.3A

Standard Hours

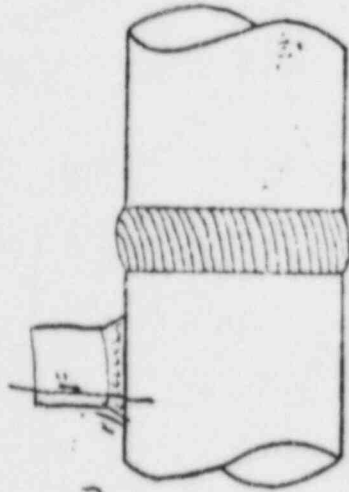
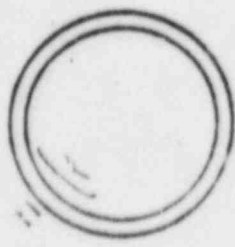
BB B-3

Date 2-6-73

| | | | | | |
|---|--|---------------------------|---------------------|--|---|
| Service or
Registry No. <u>11-01-238</u> | | Part No. <u>11-511-16</u> | Roller No. <u>B</u> | Roller Size and Location
<u>Z-DX 2.3 20" W</u>
<u>31-SX 2.3 20" W 17</u> | Roller No. <u>CS 1110</u>
<u>C14 5 B</u> |
| Form | <u>16</u> | Defect Type | Comments | | |
| Form | <u>1060</u> | | | | |
| Form | <u>55</u> | | | | |
| Form | <u>.125</u> | | | | |
| Form | <u>26"</u> | | | | |
| Form | <u>3.45</u> | | <u>scabbed c/a</u> | | |
| Form | <u>1.480</u> | | <u>scabbed c/a</u> | | |
| Form | <u>30</u> | | | | |
| Form | <u>2 T</u> | | | | |
| Form | <u>550</u> | | | | |
| Form | <u>4/2 X 2</u> | | | | |
| Form | <u>201 55</u> | | | | |
| Form | <u>Double</u> <input type="checkbox"/> | | | | |
| Form | <u>.010</u> | | | | |
| Form | <u>.010</u> | | | | |
| Form | <u>40" Scales 6 mil.</u> | | | | |
| Form | <u>Automatic</u> | | | | |
| Form | <u>1-4-73</u> | | | | |
| Form | <u>1-4-73</u> | | | | |

SP - Lack of Penetration UC - Under Cut
 EP - Lack of Fusion C - Crater
 B - Singe CB - Crack
 P - Porosity T - Traps
 BT - Burn Thru BL - Blow Low

Severity
 A - Acceptable
 B - Suspect
 C - Rejection



Indisputable - Date 7/18/75 By Bill Dornick
 Interpretation - Date 7/15/78 By William Best
 Approval - Date 7/10/78 By William B

Customer Duke Power Co. Location Catawba Unit 1 & 2
 Contract 71277128 Job No. _____
 Inspection Standard ISF-151-10 Acceptable Standard ISF-17112
 Customer Approval - Date _____ By _____

Reg. No. FE 623
 IFT GRINNELL INDUSTRIAL
 PIPING, INC.

In-Process
 Repair

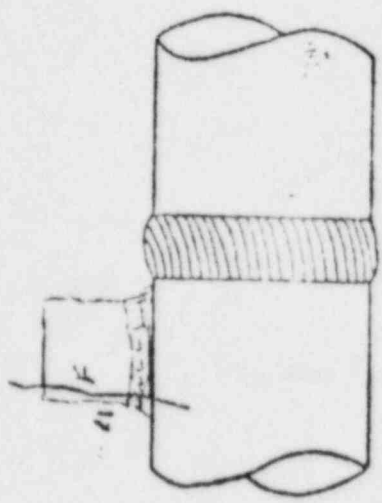
Form N6.3A

Standard Hours _____

Date 7-6-77

| | | | | | |
|--|--|---|---|--|---|
| Division or
Register No. <u>CT-CL-281</u> | | Price No. <u>SL-301-76</u> | Sold No. <u>Q</u> | Film Size
and Schedule
<u>100X 8.25 510</u> | Welder No. <u>649210</u>
<u>55105</u> |
| Views
<u>16</u>
<u>CAGE</u>
<u>55</u>
<u>125</u>
<u>26</u>
<u>245</u>
<u>1837</u>
<u>30</u>
<u>27</u>
<u>147</u>
<u>4200</u>
<u>55</u> | Source Catalog
or SPI & SA
<u>55</u>
<u>125</u>
<u>26</u>
<u>245</u>
<u>1837</u>
<u>30</u>
<u>27</u>
<u>147</u>
<u>4200</u>
<u>55</u> | Defect Type
(L M S R UT SC C CR T RL)
[Grid with handwritten marks] | Comments
<u>SCRATCH EN</u>

<u>scratches etc</u> | Description
(A-D) [Grid with handwritten marks] | Interpretation
(A-D) [Grid with handwritten marks] |
| Film Interval
<u>30</u>
<u>60</u>
<u>90</u>
<u>120</u>
<u>150</u>
<u>180</u>
<u>210</u>
<u>240</u>
<u>270</u>
<u>300</u>
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<u>450</u>
<u>540</u>
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<u>810</u>
<u>900</u>
<u>990</u>
<u>1080</u>
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<u>8100</u>
<u>8190</u>
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<u>9270</u>
<u>9360</u>
<u>9450</u>
<u>9540</u>
<u>9630</u>
<u>9720</u>
<u>9810</u>
<u>9900</u>
<u>9990</u> | Priority
A - Acceptable
B - Rejection
C - Borderline | | | | |
| Film Type
<u>55</u> | Viewing Technique
Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | Etching
Front <u>.010</u>
Back <u>.010</u>
40" Back & 40" automatic
Soling Procedure <u>1-4-4-2-2</u>
<u>1-1-2-2-2-2</u> | Etching
Front <u>.010</u>
Back <u>.010</u>
40" Back & 40" automatic
Soling Procedure <u>1-4-4-2-2</u>
<u>1-1-2-2-2-2</u> | | |



Customer MIKE POW Location CLARK
 Contract 717-11P Job No. _____
 Inspection Standard I-5E 11-10 Acceptance Standard I-5E 11-10
 Customer Approval - Date _____ By _____

Part No. FF 624
 FIT GRINNELL INDUSTRIAL
 PIPING, INC.

In Process
 Repair

Form No. 3A

Standard Form

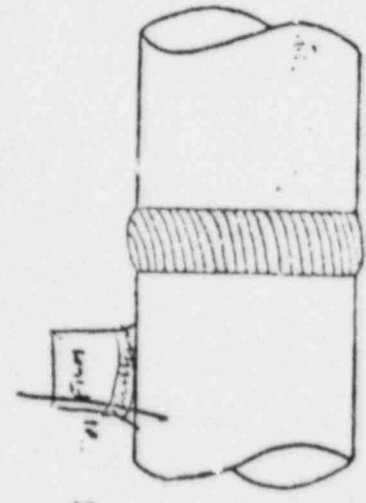
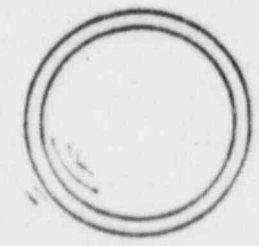
BB B3

Date 2-6-77

| | | | | | | | | | |
|------------------------------|--|-----------------------------|----|----------|---|------------------------|---|-------------------------------|---|
| Specimen or Register No. | | Pipe No. | | Weld No. | | Pipe Size and Schedule | | Welder No. | |
| <u>C7-01234</u> | | <u>C7-01-76</u> | | <u>E</u> | | <u>10" X 3.25" SD</u> | | <u>C143X18</u>
<u>5348</u> | |
| Item | Value | LP | LC | 2 | 3 | 4 | 5 | 6 | 7 |
| Source | <u>16</u> | | | | | | | | |
| Source Catalogue or S.P. No. | <u>1660</u> | | | | | | | | |
| Source Size or Focal Spot | <u>55"</u> | | | | | | | | |
| Source Film Distance | <u>125"</u> | | | | | | | | |
| Time | <u>20.9</u> | | | | | | | | |
| Actual Radiolucent Thickness | <u>3.44"</u> | | | | | | | | |
| Penetration | <u>1.4370"</u> | | | | | | | | |
| Sensitivity | <u>30</u> | | | | | | | | |
| Beam Thickness | <u>21"</u> | | | | | | | | |
| Beam Thickness | <u>.187</u> | | | | | | | | |
| Film Size | <u>4/2x10</u> | | | | | | | | |
| Film Type | <u>201T-55</u> | | | | | | | | |
| Firing Technique | Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | | | | | | | | |
| | Screen | Front <u>.010</u> | | | | | | | |
| Development | Back <u>.010</u> | | | | | | | | |
| | Development | M ² Soda S. Sol. | | | | | | | |
| Exposure Procedure | Automatic | | | | | | | | |
| | Exposure Procedure | <u>194-1-1</u> | | | | | | | |

| Film Interval | Defect Type | | | | | | | Remarks |
|----------------|-------------|----|---|---|---|---|---|---------|
| | LP | LC | 2 | 3 | 4 | 5 | 6 | |
| <u>16</u> | | | | | | | | |
| <u>1660</u> | | | | | | | | |
| <u>55"</u> | | | | | | | | |
| <u>125"</u> | | | | | | | | |
| <u>20.9</u> | | | | | | | | |
| <u>3.44"</u> | | | | | | | | |
| <u>1.4370"</u> | | | | | | | | |
| <u>30</u> | | | | | | | | |
| <u>21"</u> | | | | | | | | |
| <u>.187</u> | | | | | | | | |
| <u>4/2x10</u> | | | | | | | | |
| <u>201T-55</u> | | | | | | | | |

LP - Lack of Penetration
 LC - Lack of Fusion
 2 - Crack
 3 - Porosity
 4 - Burn Thru
 5 - Under Cut
 6 - Crater
 7 - Tungsten
 8 - Burden Line
 9 - Spatter
 10 - Incomplete
 11 - Unacceptable
 12 - Rejection
 13 - Burden Line



Radiographer - John J. [unclear]
 Interpretation - John J. [unclear]
 Approval - John J. [unclear]
 Date 2-20-76
 Location Catawba Unit 1 & 2
 Job No. NS-1111-2
 Contract 7277123
 Inspection Firm SE-181-10
 Customer Approval - [Signature] By [Signature]

Westford

MAGNETIC PARTICLE EXAMINATION REPORT

Customer: Duke PWR #1 Register No.: CT-01-28X

Contract/P.O. NO.: 7127 Piece Mark: CT-SM-70

System: MAIN STM

Examination Method: DC Prods AC Yoke Other

Equipment Type: Ecow Sput Model No.: M-2000

Procedure: MTP-1-1 Acceptance: MIA-1-0/MIA-2-0

| ITEM IDENTIFICATION
WELD/SERIAL/HT. NO. | SIZE AND THICKNESS | AREA EXAMINED INDICATE,
ROOT, INTERMEDIATE, FINAL
WELD OR MATERIAL AS
APPLICABLE | RESULTS |
|--|--------------------|---|---------|
| J | 1" SPC/BOSS | FINAL | ACC |
| K | | | |
| H | | | |
| L | | | |
| CODE PL | | | |
| 2 FIELD ENDS | 31.5" ID x 2.375" | ENDS | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

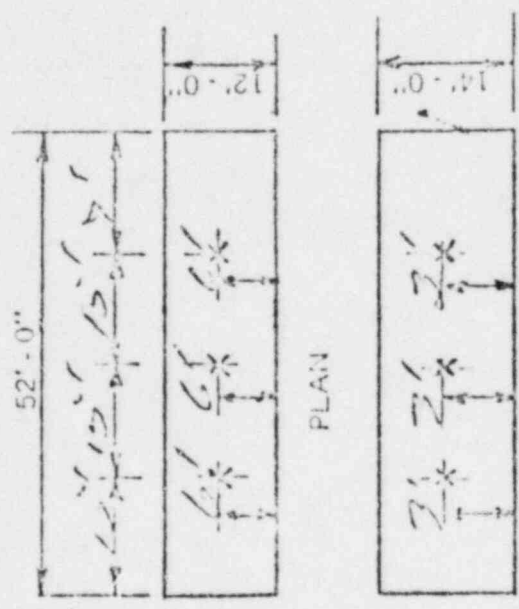
EXAMINATION PERFORMED BY: D. E. STUBER DATE: 10-23-78
 NDT Level: II

INTERPRETATION PERFORMED BY: RF Strada DATE: ↓
 NDT Level: I

Date 8-7-78

FURNACE LOAD SHEET

| REGISTER NO. | SWETCH NO. | TYPE MATERIAL | WEIGHT | TEMP. REQ'D* | RATE OF HT PER HR | HOLD TIME | RATE OF COOLING PER HOUR | SPEC. NO. | TIME IN | TIME OUT |
|--------------|------------|---------------|--------|--------------|-------------------|-----------|--------------------------|-----------|---------|----------|
| 11R | 1-33X | KC20 | 32,014 | 1150° | 160° | 2 1/2 hrs | 110° S. FT | | 33:07 | 2:32 |
| 21T | 01-28X | EM6C | 14,301 | 11 | 144° | | 110° S. FT | | 31:10 | 2:22 |
| 31T | 01-67 | 11 | 9,417 | 11 | 1150° | | 110° S. FT | | 24:11 | 5:50 |
| 41T | 04-77 | 11-ER | 11,711 | 11 | | | 110° S. FT | | 24:11 | |
| 51T | 04-116 | 11 | 6,799 | 11 | | | 110° S. FT | | 18' | 5:51 |
| 61T | 43-58 | 11 | 15,413 | 11 | | | 110° S. FT | | 24:11 | 5:140 |
| 71T | 43-40 | 11 | 11,610 | 11 | | | 110° S. FT | | 24:11 | 5:140 |



WARRANTY
THERMOCOUPLES AND PROTECTIVE
SILICON SEALANT SO 33597501

TIME TO REACH TEMP. _____ HRS
TIME AT TEMP. _____ HRS
TIME TO COOL _____ HRS

* Temperature variation within any 15 foot interval of weld length shall not exceed 250 degrees F



DEG FAHR

TIME TO HEAT 11.5 HRS
TIME AT TEMP 8.5 HRS
TIME TO COOL 5.5 HRS

MR 1-33X
→ CT 01-22X
CT 01-67
CT 04-77
CT 04-116
PH-FWT 43-38
PH-FWT 43-40



75308 1973



ITT Grinnell Corporation

P.O. Box 647
Princeton, Kentucky 40345
Telephone (502) 365 5551

Statement of Compliance

Customer Purchase Order:
List 3306

Prof. 300
CT

The items supplied by ITT Grinnell, Welding Products Division have been supplied in accordance with the Verification and Identification Program accepted by ASME.

RBB
R. B. Berlica
Division Quality Assurance Manager

Quality System
Certificate (Materials)
No.

September 16, 1977
Date

N-834

Expiration Date:
September 30, 1977

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB 18 1978
SHEET 2 OF 2

WELDING PRODUCTS DIV.

PRINCETON PLANT

REPAIR REQUEST

Rev. 0

Page 2 of 2

Customer KERNERSVILLE

Job

P.O. and Item No. 3306

Purchaser Approval

Date

Specification SA-106-C-C

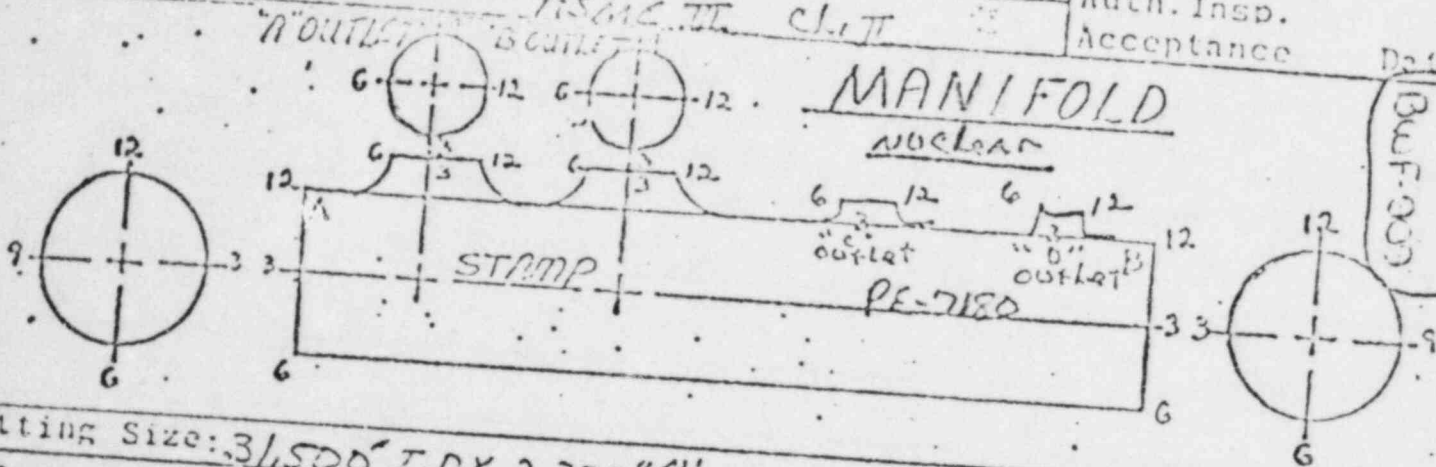
S.O. No. 63216-5

Applicable Code & Addenda ASME III

Heat No. BB6

Auth. Insp. Acceptance

Date



Fitting Size: 3/16" I.D. X 2.375" O.D. X 13'-0" MANIFOLD

Defect Type: Thin Area

Defect Size: 1 1/4" long 1.3" around .100" thin.

Defect Location: "D" outlet, starts at fitting edge and continues for 1 1/4", and from 10:00 to 2:30 o'clock.

Recommended Repair Method:

Repair shall be made in accordance with approved Repair Procedure # 1129 and the following:

1. Stamp "PE-ND" on fitting

2. Build up with weld using E7018 has per. 1-01-5-17 / 8-18-77

3. Grind on machine smooth.

| | |
|------|--------|
| Oper | Accept |
| | A. J. |

4. EXAMINE thickness

5. Penetrant EXAMINE

Per. I-SF-1733-1

I-SF-1734-1

6.

7.

| |
|-----------------|
| ITIG - BPA |
| QUALITY CONTROL |
| X-A PROVED |
| T. E. WILSON |
| DATE |
| SHEET |

Weld Issue # 1129

J. Buschman
Princeton O.S. Manager

9-12-77

Date

Providence O.A. Manager

Date

GENERAL

WELDING PRODUCTS DIV.
PRINCETON PLANT
REPAIR REQUEST

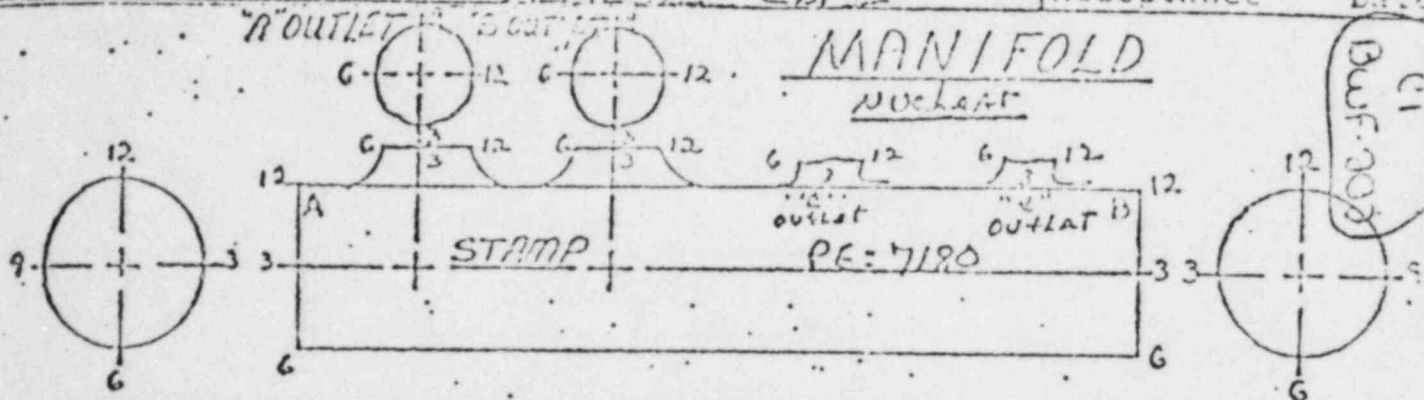
R. R. No.

Rev. 0

Page 1 of 2

Customer: KEENEYSVILLE Job: _____
 P.O. and Item No. 3306 S.O. No. 63216-5
 Specification SA-106-C-C Heat No. B B C A
 Applicable Code & Addenda ASME III CB, II

Purchaser Approval _____ Date _____
 Auth. Insp. Acceptance _____ Date _____



Fitting Size: 31.500" ID. X 2.375" THK X 13'-0" MANIFOLD

Defect Type: Thin Area

Defect Size: 1 1/4" Long, 15" around, .020" thin

Defect Location: "B" outlet, starts at fitting edge and continues for 1 1/4" and from 3:00 to 9:00 o'clock. Also: 1 1/4" long .100" thin. "C" outlet, starts at fitting edge and continues 1 1/4" and continues completely around.

Recommended Repair Method:

Repair shall be made in accordance with approved Repair Procedure 439 and the following:

1. Stamp "PE NO" on fitting 5/8"
2. Build up with weld using 5701 Red patch 5-6 9-12-77
3. Grind or machine smooth. 9-14-77

4. EXAMINE THICKNESS

5. Penetrant EXAMINE
 Per. I-SF-1733-4
 I-SF-1736-1

- 6.
- 7.

Oper. _____
 A. 1.
 T. C. WILSON
 DATE _____
 SHEET _____ OF _____

A. G. ... 9-12-77
 Princeton, D.C. Manager Date

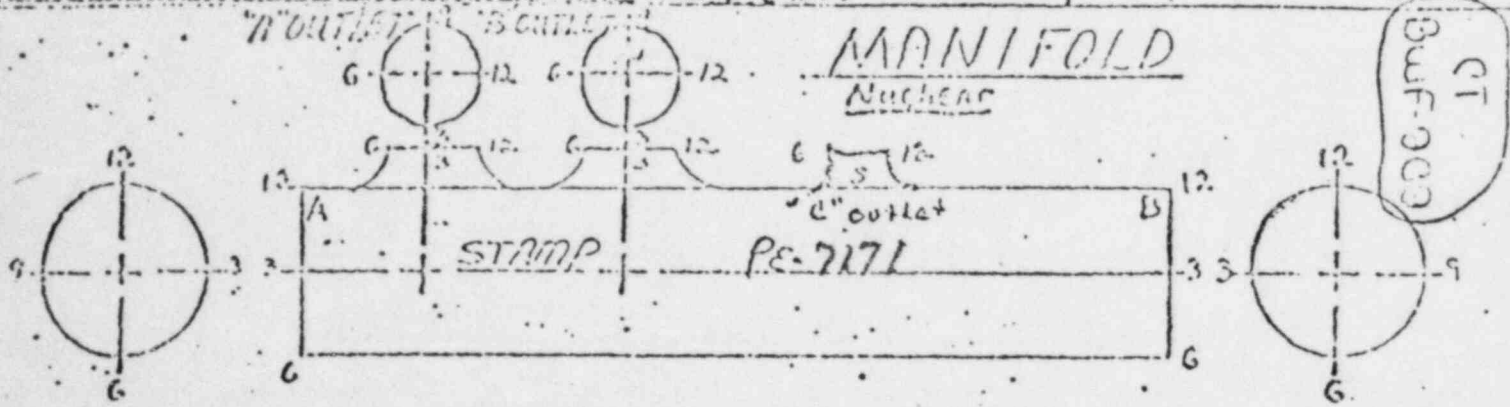
Providence, D.A. Manager Date

J. I. Grinnell

WELDING PRODUCTS DIV.
PRINCETON PLANT
REPAIR REQUEST

R. R. No. _____
Rev. 0
Page 1 of 2 *1/16*

| | | | |
|--|-------------------------|-------------------|------------|
| Customer: <u>KENNEDY LINE</u> | Job _____ | Purchaser _____ | Date _____ |
| P.O. and Item No. <u>3306</u> | S.O. No. <u>63216-2</u> | Approval _____ | |
| Specification <u>SA-106-CCL</u> | Heat No. <u>JCCA</u> | Auth. Insp. _____ | Date _____ |
| Applicable Code & Addenda <u>ASME III, CLD</u> | | Acceptance _____ | |



Fitting Size: 3/8" SCS 2.0 x 2.75" 7/8" x 1.5" 0" Manifold

Defect Type: Thin Area

Defect Size: 1/8" long completely around O.D. and thin

Defect Location: C. Outlet starts at outlet edge and continues for 1/8", and completely around O.D.

Recommended Repair Method:

Repair shall be made in accordance with approved Repair Procedure SP-1230-4 and the following:

- Stamp "C-100" on fitting *Eds*
- Build up with weld metal *See not for 1-01-a-b*
- Grind smooth for marking *9-8-77 K*

Operator _____ *Accept* _____

9-8-77

A. B. Bingham 9-8-77

Princeton O.C. Manager Date

Operator A. T.

- EXAMINE thickness of *W*
- Re-entrant Examine per ASME III SP-1230-4 SP-1230-1
-
-
-
-
-

Weld Issues

INSPECTOR
QUALITY CONTROL
MANAGER
T. C. WILSON

SHEET 30 of 2

Providence O.C. Manager

WELDING PROJECTS DIV.
 PRINCETON PLANT
 REPAIR REQUEST

Rev. 0

Page 2 of 2

Customer KEENEYSVILLE

Job

Purchaser Approval

Date

P.C. and Item No. 3306

S.O. No. 63216-2

Specification SA-106-C.C.

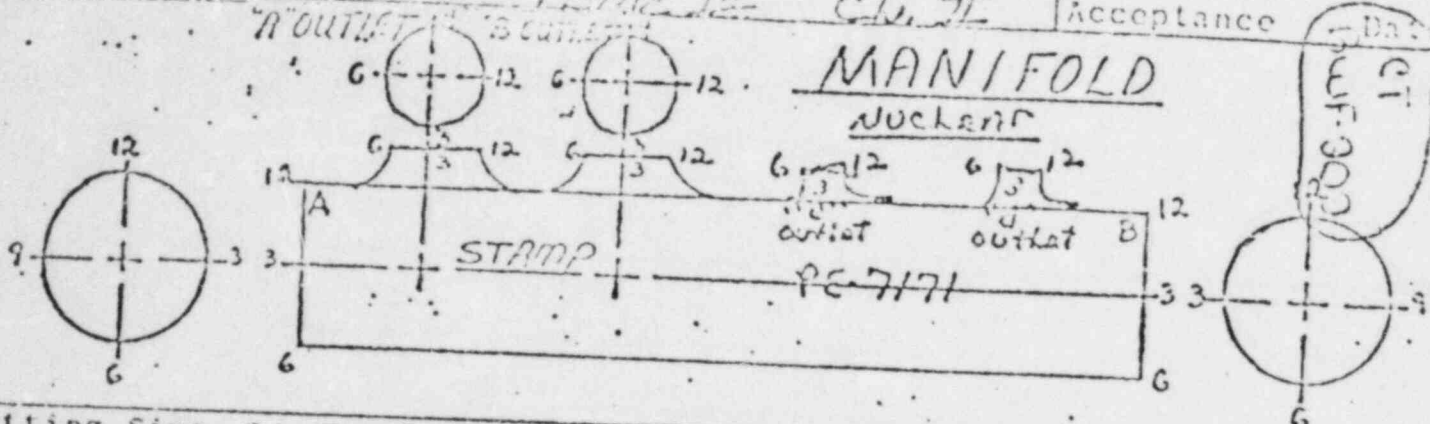
Heat No. JCCA

Auth. Insp. Acceptance

Applicable Code & Addenda ASME III

CL II

Date
9-11-77
100-100



Fitting Size: 31.500" I.D. x 2.375" W x 13'-0" MANIFOLD

Defect Type: Thin Area

Defect Size: 1 1/8" long 6" around 0.020" thin

Defect Location: A outlet. Starts at outlet edge and continues for 1 1/8" and from 3:00 to 6:00 o'clock. Also: 1 1/8" long 1 1/4" around 0.020" thin. D outlet. Starts at outlet edge and continues for 1 1/8" and from 12:00 to 6:00 o'clock.

Recommended Repair Method:

Repair shall be made in accordance with approved Repair Procedure # 439 and the following:

1. Stamp "PE-ND." on fitting sdg
2. Build up with weld using E7013 Rod par. 1-01-5-6 9-12-77
3. Ground on machine smooth. 9-13-77 DR

Oper. DR
 Accept. A. I.

4. EXAMINE thickness
5. Penetrant EXAMINE par. I-SF-1733-4
2-SF-1736-1
- 6.
- 7.

Oper. DR
 Accept. A. I.

ITG - 101
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 SHEET 6 OF 12

weld issue

J. P. ... 9-12-77
 Princeton O.C. Manager Date

Providence O.A. Manager Date

WELDING PRODUCTS DIVISION
QUALITY ASSURANCE MANUAL

PAGE 1 of 1

REV. 2

APR. 1975

DATE 6/2/76

WELD MATERIAL REQUISITION

Weld Issued 11/10/76

CT
Buif-303

Form W5.1A

Material Type E 7018 5/8" Ø Weld Rod

Mat./Lot No. N/A (Wire) Machine No. N/A

Mat./Batch No. N/A (Flux) Machine No. N/A

402117691

Mat./Lot No. 02232123 (Electrodes) Mat. Box No. _____

Quantity: _____

Distributed By _____ Appr. by Q.C. [Signature]

- 5949 PE-5974
- 5950 PE-7155
- 5951 PE-7150
- 5952 PE-7159
- 5953 PE-7154
- 5954 PE-7153
- 5955 PE-5953
- 5956 PE-7152 5/8
- 5957 PE-7170 5/8
- 5958 PE-7167
- 5959 PE-7171
- 5960 PE-7173
- 5961 PE-7174
- 5962 PE-7159

PE-7180

ITG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB. 16 1976
SHEET 7 OF 10

CERTIFIED MATERIALS TEST REPORT

Customer Order No. PKY 7N 020

Order No. 120001-1

Shipped

This material conforms to Specification ASME SFA 5.1 Sec. II Part C

ITT GRINNELL CORP.
ROUTE 3
PRINCETON, KY. 42445

Type E 7018

Trade Name or Trademark:

Atom Arc 7018

Test No. 767
X-Ray Satisfactory
Control No. LLL010

Diameter Size:

5/32"
1,000 lb.

Moisture @1800°F. 0.16%
Concentricity 3%
Type Steel A-285

Lot Number:

03-2-C718J

Heat Number:

402A7681

| Test No. | Full | Split | Volts |
|--------------------|------|-------|-------|
| Tensiles & Impacts | 1 | 7 | 23 |

| Test Results: | As Welded | Stress Relieved
8 hr. @1150°F. |
|---------------|-----------|-----------------------------------|
| Yield | 69,800 | 63,000 |
| Tensile | 76,800 | 74,000 |
| Elongation | 31.0% | 31.0% |
| Red. of Area | 77.5% | 78.5% |

Charpy V-Notch Impacts Tested @-20°F.

| | | |
|-----------|---------------------|----------------|
| Impacts | 103-129-137-214-236 | 54-64-85-100- |
| Lat. Exp. | 83-87-88-88-84 | 47-45-49-57-73 |
| % Shear | 30-50-50-100-100 | 15-15-15-15-15 |

Fillets: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 3, 1975.

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

CHIMETRON CORPORATION
WELDING PLANT & DIVISION

| | |
|----------------------|------|
| Carbon | .04 |
| Manganese | 1.04 |
| Chromium | .03 |
| Nickel | .01 |
| Silicon | .39 |
| Columbium + Tantalum | |
| Molybdenum | .01 |
| Tungsten | |
| Copper | .02 |
| Titanium | |
| Phosphorus | .011 |
| Sulphur | .012 |
| Vanadium | .02 |

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB 16 1978
SHEET 3 OF 10

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 12th day of August 19 77

SEAL *[Signature]*
Notary Public

My commission expires: 8-21-78

[Signature]

ITT Grinnell
PRINCETON, PENNSYLVANIA
BWF-300

PENETRANT

EXAMINATION REPORT

| PE# | HEAT CODE | ITEM DESCRIPTION | SO. NO. | PE SPEC. | EXAMINER
(SNT-TC-IA LEVEL II) | DATE | AREA EXAMINED
mechanical / other | RESULTS | MATERIAL CODES |
|-----|-----------|---------------------------|------------|----------|----------------------------------|--------|-------------------------------------|---------|----------------|
| 172 | BHDD | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0574 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 173 | BHDC | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0575 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 174 | BHDE | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0576 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 175 | BHDF | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0577 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 176 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0578 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 177 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0579 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 178 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0580 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 179 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0581 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 180 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0582 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 181 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0583 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 182 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0584 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 183 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0585 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 184 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0586 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 185 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0587 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 186 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0588 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 187 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0589 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 188 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0590 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 189 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0591 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 190 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0592 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 191 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0593 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 192 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0594 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 193 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0595 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 194 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0596 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 195 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0597 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 196 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0598 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 197 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0599 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 198 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0600 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 199 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0601 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |
| 200 | BHDI | 1/2" x 1/2" x 1/2" 304 SS | 14M-3-0602 | 3-00 | K.M. MALLI | 9-8-77 | mechanical | A1 | F-F-A |

METHOD: VISIBLE DYE (SOLVENT REMOVABLE)
 PRE-CLEANER: MICHAFUX SPOT CHECK SKC-5
 PENETRANT: MICHAFUX SPOT CHECK (SPRAY) SKL-HF/SKL-S
 CLEANER: MICHAFUX SPOT CHECK SKC-5
 POST-CLEANER: MICHAFUX SPOT CHECK SKC-5
 DEVELOPER: MICHAFUX SPOT CHECK (SPRAY) SKD-5

QUALITY CONTROL
 DATE: 9-15-77
 SHEET 10 OF 10

ABBREVIATIONS (RESULTS)
 A1: Acceptable - No apparent discontinuities.
 A2: Acceptable - Discontinuities not in excess of specification standards.
 R: Reject - Discontinuities in excess of specification standards.

WELDING PRODUCTS DIV.
PRINCETON PLANT
REPAIR REQUEST

Rev. 0

Page 1 of 1

CA
Burl

Customer: *W. W. ...* Job: *...*

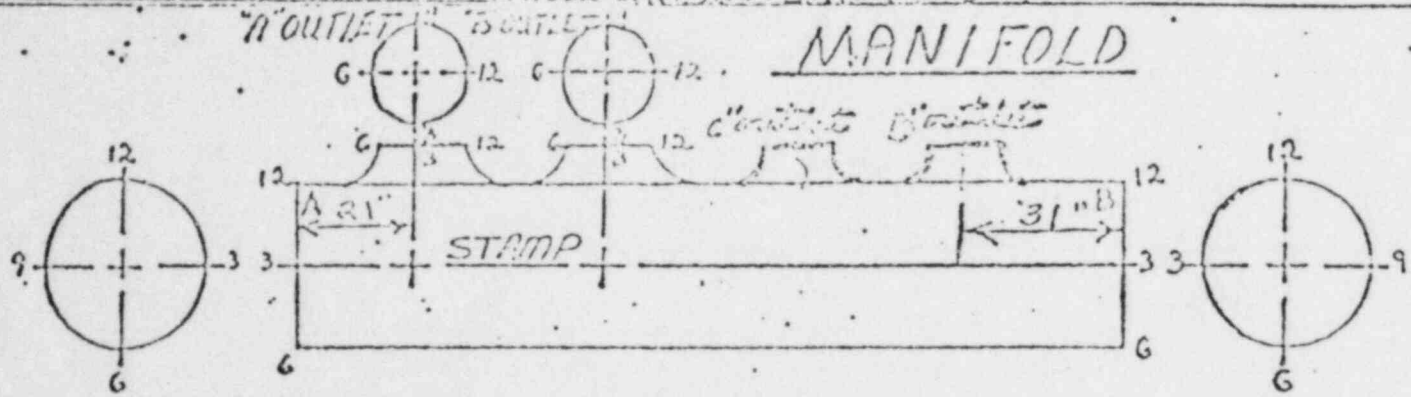
Purchaser Approval Date

P.O. and Item No. S.O. No. *6326-3*

Specification: *SA-106-CB-C* Heat No. *JCCN*

Auth. Insp. Acceptance Date

Applicable Code & Addenda: *ASME Section VIII Div. 2*



Fitting Size: *31.500 Id x 2.375 w x 15-6 LG manifold*

Defect Type: *Thin area*

Defect Size: *1/4" diam 23" circumferential*

Defect Location: *B within flange of fitting and continue for 1" and for 100° relative to 9:00 o'clock.*

Recommended Repair Method:

Repair shall be made in accordance with approved Repair Procedure *4-59* and the following:

- Stamp *WES 850* on fitting *B*.
IR Procedure 2-23-77
- Build up with weld using *E 7018* rod per *W-01-1-9*.

| | |
|----------------|-----------|
| Oper. | Accept |
| <i>W-2</i> | <i>AI</i> |
| <i>2-23-77</i> | |
- Grind smooth.

| | |
|----------------|-----------|
| Oper. | Accept |
| <i>W-2</i> | <i>AI</i> |
| <i>2-23-77</i> | |

4. Check thickness. Oper. *W-2* Accept *AI*

5. Penetrent Examine per *I-SF-1733-1* MF-MS-
I-SF-1736-1 2-23-77

6. Oper. *W-2* Accept *AI*

7. Weld cover *W-2*

J. Beaudron 2-23-77
Princeton O.C. Manager Date

Providence O.C. Manager Date

QUALITY ASSURANCE MANUAL
WELDING PRODUCTS DIVISION

PAGE 2 OF 2
REV. APP. (C)
DATE 5/3/74

TITLE:

WELD MATERIAL REQUISITION

CA
Rough

Date: 2-22-77

Heat Code NA

Requisition No. 4401

Material: weld Rod

Weld Material Specification: E7018 5/32 Ø

Heat No. 20381X000

Lot No. NA (Electrode)

Lot No.: NA (Flux)

Quantity.: _____

Weld Sta. Box No. 1

Distributed By _____

Appr. By Q.C. _____

PE 5849

PE 5850 WTS 2-23-77

Ginnell

WELDING PRODUCTS DIV.
PRINCETON PLANT
REPAIR REQUEST

R.R. PE5843

Rev. 0

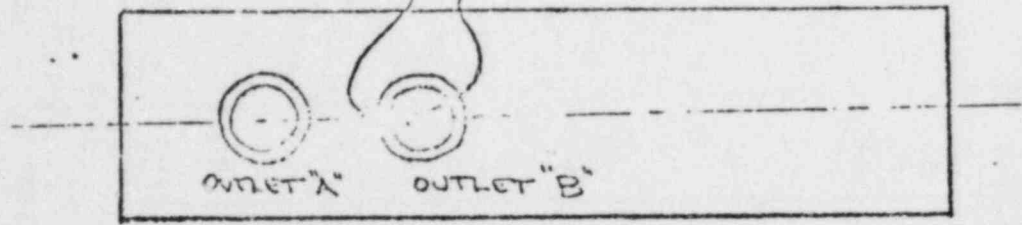
Page 1 of 2

CR
REVIEW

Customer KERRYSVILLE Job Super Power
P.O. and Item No. 3306 S.O. No. 632163
Specification SA-106-GR-(C) Heat No. DRFX
Applicable Code & Addenda ASME Section VIII Div. 1

Customer Approval _____
Date _____

MANIFOLD: *1- BUILD UP OUTLET O.D. $\frac{1}{8}$ " (THIN) *2- BUILD UP OUTLET I.D. $\frac{3}{16}$ " (DUE TO FORMING DAMAGE)



Fitting Size: 3.500 ID x 2.375" O.D. x 19'-6" L.F. Manifold

DEFECT TYPE AND LOCATION:

- *1: FORMED THIN, (.125"), ON O.D. OF OUTLET "B", THIN AREA EXTENDS 1" EITHER SIDE OF CENTERLINE OF HEADSET. THIN AREA STARTS AT OUTER EDGE AND IS $\frac{1}{2}$ " LENGTH FROM O.D. (AS PER DRAWING ABOVE)
- *2: TOOLING DAMAGE, ON OUTLET I.D. $\frac{3}{16}$ BEVEL, 2" LONG, 1" WIDE, IN BORE OF OUTLET AS PER DRAWING ABOVE.

Recommended Repair Method:

Repair shall be made in accordance with approved Repair Procedure PP-1439 and the following:

1. Stamp "PE5843" on fitting
- 1A Preheat to 400°F. min.
2. Build up with weld using E7018 REX-PH-1-01-1-9-15-77-41
3. Machine to correct outlet shape

4. Penitentiary Examine I-SF-1733-4 HT + J-B LH I-SF-1736-1 2-24-77
5. Stress Release 1100 to 1200°F
6. For $1\frac{1}{2}$ " local 1-26-77

weld issue 399

Jim Bunnen 11-77
Princeton O.C. Manager Date

Providence O.A. Manager Date

202

J. I. Grimmell

WELDING PRODUCTS DIV.
PRINCETON PLANT
REPAIR REQUEST

R.R. RF 5843

Rev. 0

Page 2 of 2

CA
Bent
L

Customer Kearnsville Job Welding

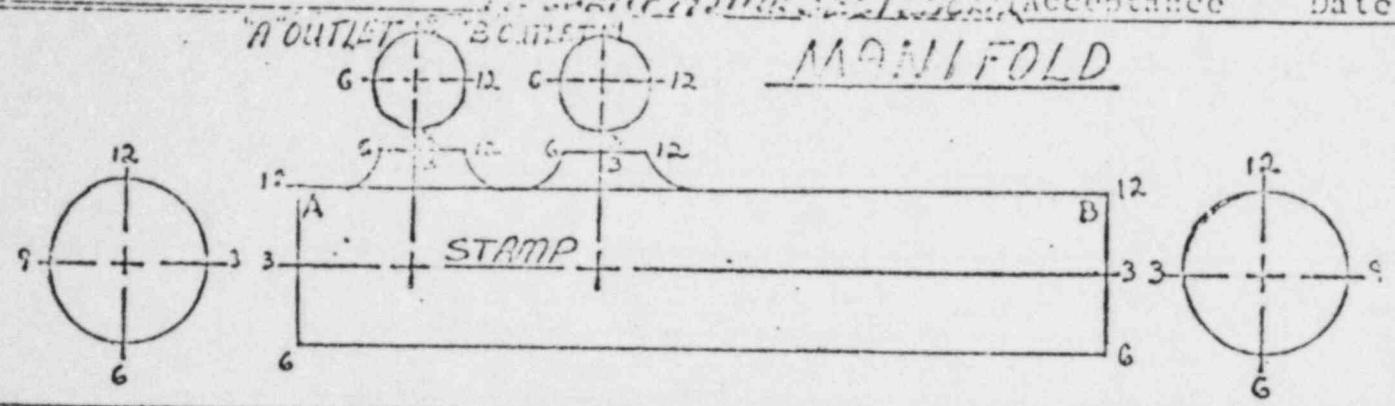
Purchaser Approval _____ Date _____

P.O. and Item No. _____ S.O. No. 13215-2

Specification 57-105-GB-C Heat No. BBFX

Auth. Insp. Acceptance _____ Date _____

Applicable Code & Addenda ASME SECTION VIII



Fitting Size: 3/4" ID x 2.375 x 18"-6 LG manifold

Defect Type: Crack

Defect Size: 1/2" long, 25" circum, 1/25" thick

Defect Location: Bottom center of manifold

Recommended Repair Method:

Repair shall be made in accordance with approved Repair Procedure TF-489 and the following:

1. Stamp RF 5843 on fitting
- 1A Preheat to 250°F MIN
2. Build up with weld
3. Grind smooth

4. Check thickness

5. Post Weld Exam
PR I-SF-1733-4

6. I-SF-1736-1

7. _____

Weld David 399

Princeton O.C. Manager _____ Date 2-24-77

Providence O.A. Manager _____ Date _____

QUALITY ASSURANCE MANUAL
WELDING PRODUCTS DIVISION

WELD MATERIAL REQUISITION

CA
Revised

Date: 1-15-76

Heat Code NA

Requisition No. 399

Material: weld Rod

Weld Material Specification: E7018 1/8 D

Heat No. W2T4401

Lot No. Electrode (Electrode)

Lot No.: NA (Flux)

Quantity.: _____

Weld Sta. Box No. 1

Distributed By _____

Appr. By Q.C. _____

- PE 5771
- PE 5772
- PE 6221
- PE 5836
- PE 5837
- PE 5838
- PE 5839
- PE 5840
- PE 5636
- PE 5843
- PE 5844
- PE 5854
- PE 5811 P2
- PE 5877

CA
Bout 61

W T Grinnell
PRINCETON, KENTUCKY

PENETRANT

EXAMINATION REPORT

| PE# | HEAT CODE | ITEM DESCRIPTION | SO. NO. | PE SPEC. | EXAMINER (SNT-TC-A LEVEL II) | DATE | AREA EXAMINED | RESULTS | MATERIAL CODES |
|-----|-----------|----------------------|---------|----------|------------------------------|---------|---------------|---------|----------------|
| 337 | FDY | 36" DIA. 1.890 YD EN | 1347-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 338 | FDY | 36" DIA. 1.890 YD EN | 1348-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 339 | FDY | 4" DIA. 1.890 YD EN | 1349-4 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 340 | FDY | " " " " | " | " | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 341 | FDY | " " " " | " | " | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 342 | FDY | " " " " | " | " | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 343 | FDY | " " " " | " | " | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 344 | FDY | 36" DIA. 1.890 YD EN | 1350-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 345 | FDY | 36" DIA. 1.890 YD EN | 1351-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 346 | FDY | 36" DIA. 1.890 YD EN | 1352-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 347 | FDY | 36" DIA. 1.890 YD EN | 1353-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 348 | FDY | 36" DIA. 1.890 YD EN | 1354-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 349 | FDY | 36" DIA. 1.890 YD EN | 1355-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 350 | FDY | 36" DIA. 1.890 YD EN | 1356-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 351 | FDY | 36" DIA. 1.890 YD EN | 1357-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 352 | FDY | 36" DIA. 1.890 YD EN | 1358-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 353 | FDY | 36" DIA. 1.890 YD EN | 1359-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 354 | FDY | 36" DIA. 1.890 YD EN | 1360-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 355 | FDY | 36" DIA. 1.890 YD EN | 1361-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 356 | FDY | 36" DIA. 1.890 YD EN | 1362-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 357 | FDY | 36" DIA. 1.890 YD EN | 1363-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 358 | FDY | 36" DIA. 1.890 YD EN | 1364-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 359 | FDY | 36" DIA. 1.890 YD EN | 1365-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 360 | FDY | 36" DIA. 1.890 YD EN | 1366-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 361 | FDY | 36" DIA. 1.890 YD EN | 1367-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 362 | FDY | 36" DIA. 1.890 YD EN | 1368-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 363 | FDY | 36" DIA. 1.890 YD EN | 1369-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 364 | FDY | 36" DIA. 1.890 YD EN | 1370-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 365 | FDY | 36" DIA. 1.890 YD EN | 1371-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 366 | FDY | 36" DIA. 1.890 YD EN | 1372-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 367 | FDY | 36" DIA. 1.890 YD EN | 1373-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 368 | FDY | 36" DIA. 1.890 YD EN | 1374-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 369 | FDY | 36" DIA. 1.890 YD EN | 1375-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 370 | FDY | 36" DIA. 1.890 YD EN | 1376-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 371 | FDY | 36" DIA. 1.890 YD EN | 1377-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 372 | FDY | 36" DIA. 1.890 YD EN | 1378-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 373 | FDY | 36" DIA. 1.890 YD EN | 1379-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 374 | FDY | 36" DIA. 1.890 YD EN | 1380-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 375 | FDY | 36" DIA. 1.890 YD EN | 1381-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 376 | FDY | 36" DIA. 1.890 YD EN | 1382-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 377 | FDY | 36" DIA. 1.890 YD EN | 1383-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 378 | FDY | 36" DIA. 1.890 YD EN | 1384-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 379 | FDY | 36" DIA. 1.890 YD EN | 1385-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 380 | FDY | 36" DIA. 1.890 YD EN | 1386-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 381 | FDY | 36" DIA. 1.890 YD EN | 1387-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 382 | FDY | 36" DIA. 1.890 YD EN | 1388-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 383 | FDY | 36" DIA. 1.890 YD EN | 1389-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 384 | FDY | 36" DIA. 1.890 YD EN | 1390-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 385 | FDY | 36" DIA. 1.890 YD EN | 1391-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 386 | FDY | 36" DIA. 1.890 YD EN | 1392-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 387 | FDY | 36" DIA. 1.890 YD EN | 1393-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 388 | FDY | 36" DIA. 1.890 YD EN | 1394-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 389 | FDY | 36" DIA. 1.890 YD EN | 1395-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 390 | FDY | 36" DIA. 1.890 YD EN | 1396-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 391 | FDY | 36" DIA. 1.890 YD EN | 1397-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 392 | FDY | 36" DIA. 1.890 YD EN | 1398-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 393 | FDY | 36" DIA. 1.890 YD EN | 1399-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 394 | FDY | 36" DIA. 1.890 YD EN | 1400-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 395 | FDY | 36" DIA. 1.890 YD EN | 1401-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 396 | FDY | 36" DIA. 1.890 YD EN | 1402-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 397 | FDY | 36" DIA. 1.890 YD EN | 1403-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 398 | FDY | 36" DIA. 1.890 YD EN | 1404-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 399 | FDY | 36" DIA. 1.890 YD EN | 1405-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |
| 400 | FDY | 36" DIA. 1.890 YD EN | 1406-3 | 1198 | WASH. II | 8-11-77 | ✓ | A1 | .. |

METHOD: VISIBLE DYE (SOLVENT REMOVABLE)
 PRE-CLEANER: MAGNAFLUX SPOT CHECK SKC-5
 PENETRANT: MAGNAFLUX SPOT CHECK (SPRAY) SKL-11F/SKL-5
 CLEANER: MAGNAFLUX SPOT CHECK SKC-5
 POST CLEANER: MAGNAFLUX SPOT CHECK SKC-5
 DEVELOPER: MAGNAFLUX SPOT CHECK (SPRAY) SKD-5

ABBREVIATIONS (RESULTS)
 A1: Acceptable - No apparent discontinuities.
 A2: Acceptable - Discontinuities not in excess of specification standards.
 R: Reject - Discontinuities in excess of specification standards.

The Colonial Machine Company, Inc.

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

Phone (814) 589-7033

December 15, 1977

ITT Grinnell Industrial Liping, Inc.
P. O. Box 516
Keeneraville, PA 27224

CERTIFIED MILL TEST REPORT

CT
BLUF-014

ORDER NO. **KLR 6215-B** OUR ORDER NO. **10102** DATE SHIPPED **12/10/77**

| ITEM | TYPE | MATERIAL-SPEC. | SHIPPED | HEAT NO. | CMC |
|-----------|--|---|---------|----------|-----|
| | | NOTE: Section III Class 2 Table 10 was Date July 1974 with Annex 1974 Section 4 | | | |
| 1 (15/83) | 10.00" x 6.625" Transition Piece per Det. CT-2095-2,
Part No. CT-2095-1 | | 4 | 603030 | |
| 2 (15/89) | 10.00" x 3.75" Transition Piece per Det. CT-2095-3,
Part No. CT-2095-2 | | 20 | 82199 | |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CB | TI | CO | OTHER ELEMENTS |
|------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| 1 | .32 | .24 | .015 | .023 | .24 | | | | | | | | |
| 2 | .27 | .25 | .010 | .026 | .23 | | | | | | | | |

INSPECTION WAIVED PER MR. RICHARD GATIS ON 12/10/77.

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB. 28 1978
SHEET 1 OF 3

| ITEM | TENSILE | 2% YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-ABILITY | REMARKS: 1. 2. 3. 4. 5. & ETC. |
|------|---------|----------|----------|--------|----------|----------------|--------------------------------|
| 1 | 85,200 | 55,100 | 22 | 32.5 | | | Mill Source - Republic |
| 2 | 77,000 | 40,000 | 24.0 | 47.9 | | | Mill Source - Atlas |

It. 1 - Normalized at 1700 Deg. F. - 6-1/2 hrs. - Air cooled. (Heat Treat charts attached)

It. 2 - Normalized at 1650 Deg. F. - 2-1/2 hrs. - Air cooled. (Heat Treat charts attached)

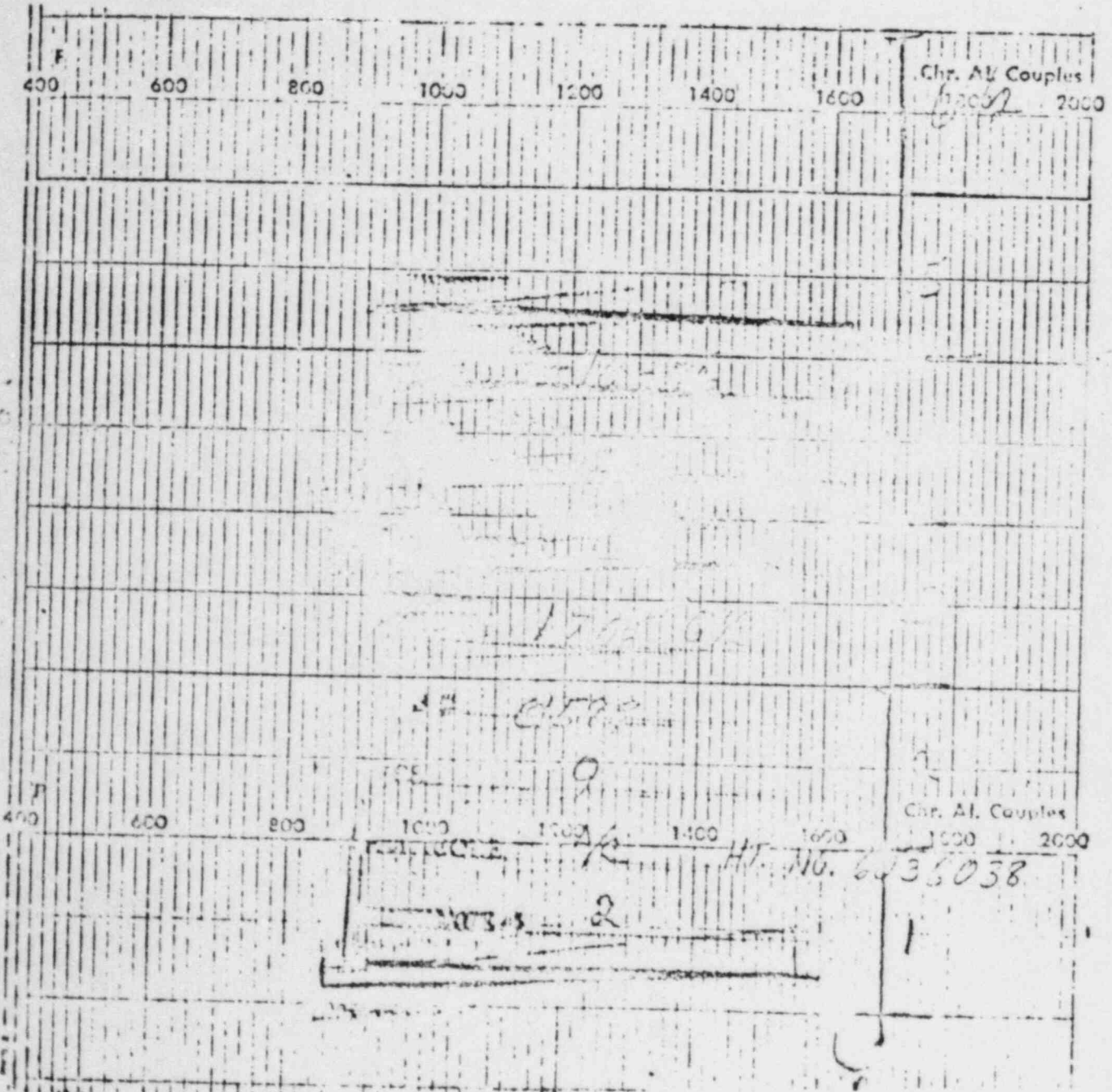
We hereby certify that the information contained hereon has been taken from the original mill test report from the producing mill, which is now on file in our office. We also certify that the material and the items as listed above meet the specification and all requirements as covered by the specification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

By *Rosemary C. Williams*

CT
Bwf-314

ITIG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB 28 1978
SHEET 2 OF 3

ITT GRINNELL ORDER KER 6215-B IT. 1



ITT GRINNELL ORDER KER 5215-B IT. 2

CT
BWF 014

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
APR 23 1979
SHEET 3 OF 3

| | | |
|-------------------|-----------|-----|
| DATE | 3/11-1979 | 1/2 |
| TIME
BY MAN # | 213 | |
| TIME
CUT MAN # | 125 | 3 |
| QUENCH
MEDIUM | 11-1/3 | |
| JOB # | 22070 | 2 |
| FCS | 10 | |
| LT. CODE | 2557 | 1 |
| PL. SPACE # | 0 | |

No. 62008 LEVER & PUNCHING CO. INDIANAPOLIS, IN.

84318 111 1003

The Colonial Machine Company, Inc.

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

Phone (412) 539-7031

May 31, 1977

ITT Grinnell Industrial Piping Inc.
P. O. Box 566
Kornersville, NC 27284

CERTIFIED MILL TEST REPORT

Sub CT
SWF-4

| | | |
|----------------|---------------|--------------|
| YOUR ORDER NO. | OUR ORDER NO. | DATE SHIPPED |
| KER 6156-P | 10038 | 6/1/77 |

| ITEM | TYPE | MATERIAL SPEC. | QTY | HEAT NO. | END |
|------|------|--|-----|----------|-----|
| | | ASME SA105 NORMALIZED | | | |
| 1 | | 3/4" S/W Spec. Weld Bosses per SK CT-WB-1
Pt. No. Y*A*SE* CT-3002-1 (Rev. 0 10/14/76) | 40 | N94153 | ALL |
| 2 | | 1" Ditto Pt. No. Y*A*SE* CT-3002-2 | 20 | ES7257 | ALL |
| 3 | | 2" Ditto Pt. No. Y*A*SE* CT-3002-3 | 12 | A00070 | ALL |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CB | TI | CO | OTHER ELEMENTS |
|------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| 1 | .32 | .80 | .006 | .021 | .22 | | | | | | | | |
| 2 | .26 | .78 | .011 | .027 | .24 | | | | | | | | |
| 3 | .32 | .74 | .010 | .026 | .19 | | | | | | | | |

| ITEM | TENSILE | 2% YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1, 2, 3, 4, 5, 6 ETC. |
|------|---------|----------|----------|--------|----------|--------------------|--------------------------------|
| 1 | 76700 | 36900 | 34.0 | 58.2 | | | Mill Source - U.S. Steel |
| 2 | 75000 | 47000 | 32.0 | 61.3 | | | Mill Source - " " |
| 3 | 75360 | 42770 | 31.0 | 52.4 | | | Mill Source - " " |

INSPECTION WAIVED PER MR. TOM WILSON ON 5/31/77.

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.

By *Rosemary R. W...*

The Colonial Machine Company, Inc.

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

Phone (814) 539-7033

ITT GRIZZELL INDUSTRIAL PIPING, INC.
P. O. BOX 565
KERNERSVILLE, NC 27284

SEPT. 20, 1977

CERTIFIED MILL TEST REPORT

CT
AP-4

| | | |
|----------------|---------------|--------------|
| YOUR ORDER NO. | OUR ORDER NO. | DATE SHIPPED |
| KER 8630-B | 10457 | 9/20/77 |

| ITEM | TYPE | MATERIAL SPEC. | SHIPPED | HEAT NO. | |
|-----------|------|--|---------|----------|-----|
| | | ASME SECTION III CLASS 2 (1974 ADDENDA THRU WINTER 1974)
ASME SA105 | | | |
| 1 (89590) | | 1.13" ACCESS HOLE PLUGS PER CT-AH-1, H = 2.188"
PART NO. CT-4012-1 | 12 | 78849 | AEF |
| 2 (89591) | | 1.13" DITTO H = 1.705" PART CT-4012-2 | 25 | 78849 | AEF |
| 3 (89592) | | 1.13" DITTO H = 2.609" PART CT-4012-3 | 16 | 78849 | AEF |
| 4 (89593) | | 1.13" ACCESS HOLE PLUGS PER CT-AH-2, H = 1.705",
PART CT-4012-4 (SQUARE HEAD) | 30 | 78849 | AEF |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CB | TI | CO | OTHER ELEMENTS |
|-------------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| 1
THRU 4 | .26 | .71 | .013 | .025 | .25 | | | | | | | | |

ITT GRIZZELL
CHECK
DATE 9-22-77

| ITEM | TENSILE | 2% YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1, 2, 3, 4, 5, 6, ETC. |
|-------------|---------|----------|----------|--------|----------|--------------------|---------------------------------|
| 1
THRU 4 | 75000 | 48500 | 32.0 | 58.6 | | | MILL SOURCE - COPPERWELD |

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 heats as listed above meet the specification and all requirements as covered by the specification and your purchase order.

By: *[Signature]*



UNION CARBIDE CORPORATION
 LINDE DIVISION
 WELDING MATERIALS
 P.O. BOX 710, MONTICELLO, OHIO 44004

Feb. 10, 1978

CUSTOMER: ITT Grinnell
 7 Greensboro Pk. Airport
 Greensboro, N.C. - 27400

YOUR ORDER NO. 11-258 KFR 9419

LINDE S.O. NO. 711250A1

1/8" Dia.
 S/L Rod

WW-207

MATERIAL: Linde 65

This is to certify that this material will conform to AWS A5. 18-69
 ASME SA5.18. It has the following chemical analysis meeting the
 requirements of Classification E70S-2:

| | | |
|--------------------|---|---------------|
| <u>HEAT NUMBER</u> | - | <u>065220</u> |
| Carbon | - | .05 |
| Manganese | - | 1.11 |
| Phosphorous | - | .009 |
| Sulphur | - | .022 |
| Silicon | - | .50 |
| Aluminum | - | .071 |
| Titanium | - | .06 |
| Zirconium | - | .053 |

RECEIVED
230

ITIG - IP1
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE MAY 22 1978
 SHEET 1 OF 1

Ladle Analysis

L. T/klr

Howard Tucker / det

Quality Assurance - Welding Materials
 Plant - Union Carbide Corporation
 Linde Division

ITTTT Grinnell

Industrial Piping Inc.

SUBJECT: Welding Filler Materials
WIRE: Linde 65, Heat No. 065220

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 5-2, that the test results shown in Taussig Associates, Inc. Report 24131 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat-treated condition (total time not to exceed 20 hours). This may also be used on impact-tested material with a minimum service temperature of +30 degrees F.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 Edition.

WV-2071

J. F. Elder / 5/22/78
J. F. Elder Date
Materials Engineer

DESIGN
130

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 22 1978
SHEET 2 OF 9

MATERIAL TEST REPORT #24131

R & D TEST #460

Linde 65, Heat No. 065220

WV-227

The following tests were performed in accordance with SFA 5.18, E70S-2:

1. All-Weld Metal Tension Test:

As-Welded:

Heat Treated*

Tensile Strength: 81,850 psi
Yield Point: 68,700
Elongation(%) in 2": 30

Tensile Strength: 78,750 psi
Yield Point: 70,825
Elongation(%) in 2": 31

2. Charpy V-Notch Impact Tests:

As-Welded:

| Temp. | Ft. lbs. | Lat. Exp. (mils) | %Shear |
|-------|----------|------------------|--------|
| -20°F | 49 | 39 | 40 |
| -20 | 17 | 19 | 20 |
| -20 | 44 | 35 | 40 |
| -20 | 63 | 46 | 50 |
| -20 | 76 | 56 | 60 |

Heat-Treated*

| Temp. | Ft. lbs. | Lat. Exp. (mils) | %Shear |
|-------|----------|------------------|--------|
| +30°F | 103 | 66 | 70 |
| +30 | 70 | 59 | 60 |
| +30 | 70 | 51 | 50 |

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE: 11/24/78
SHEET 3 OF 9

EXCISE
120

3. Chemical Analysis: (Additional elements required by ASME Section III, Cl. 1 for information only)

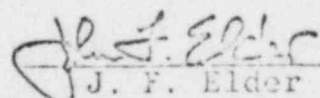
Ni : < 0.05 V : < 0.01
Cr : < 0.05 Cu : 0.10
Mo : < 0.03

4. Radiography: Acceptable

W-207

*Heat-treated for 16 hours at 1150 degrees F, cooling to 600 degrees F shall be 300 degrees F/hr. (± 100 degrees F/hr.).

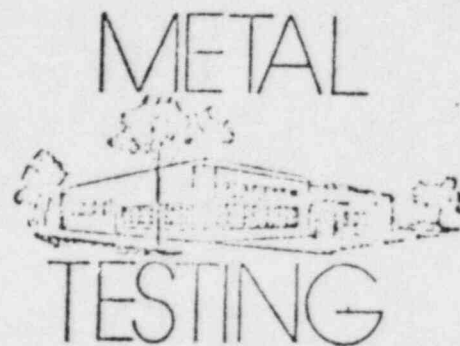
This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by ITT Grinnell IPI and our subcontractor are in compliance with the requirements of SFA 5.18 and the applicable material requirements of NB-2400 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by ITT Grinnell IPI. This report, in conjunction with the Linde Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.

 3/29/73
J. F. Elder Date
Materials Engineer

DEBITEL
130

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 22 1970
SHEET 4 OF 9

Tennig Associates Inc.
6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



Report No. 24131 - March 28, 1978

ITT Grinnell Industrial Piping, Inc.
P.O. Box 566 - Hwy 421
Kernersville, North Carolina 27284

Attn: Mr. J. F. Elder

WW-207

RECEIVED
5 30

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 24 1978
SHEET 5 OF 9

S U B J E C T

Mechanical and Chemical Testing of the Weld
Metal of Two (2) Plates Marked Test No. 460.
Per Requisition No. 34622.

BACKGROUND:

Two (2) welded plate assemblies were submitted to our laboratory for chemical analysis, charpy impact and tension testing of the weld metal. The assemblies had been identified as plate no. 460, 1/8" Linde 65, Heat no. 065220. One plate was to be tested as-welded and the other tested after a stress relieving heat treatment.

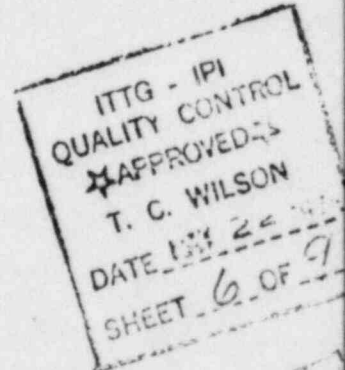
TEST RESULTS:

WW-207

Chemical Analysis:

The weld metal of plate no. 460 was drilled in a manner which prevented removal of material from the base metal. These drillings were cleaned and subjected to a quantitative chemical analysis with the following results:

| | |
|------------|-------|
| Nickel | <.05% |
| Chromium | <.05 |
| Molybdenum | <.03 |
| Vanadium | <.01 |
| Copper | .10 |



Heat Treatment:

The plate no. 460 was cut to permit it to fit into heat treating furnace. The pieces were heated to 1150°F and held for 16 hours at temperature. Cooling was done at a rate of less than 300°F/Hr. to below 600°F.

Tension Testing:

Two, round, all weld metal tension test specimens were machined from plate no. 460, as-welded and heat treated. Both specimens were subjected to standard tension testing giving the results as follows:

| | <u>Heat Treated</u>
<u>No. 460</u> | <u>As-Received</u>
<u>No. 460</u> |
|---------------------------------|---------------------------------------|--------------------------------------|
| Tensile Strength, psi. | 78,750 | 81,850 |
| Yield Strength, psi.(.20Offset) | 70,825 | 68,700 |
| % Elongation in 2 inches | 31 | 30 |
| % Reduction of Area | 68 | 70 |

Impact Testing:

A total of eight, full size (10mm x 10mm), Charpy V-notch impact test specimens were machined from the two submitted plate assemblies. Five of the specimens were from the as-welded plate and three were from the heat treated plate. All were notch in the weld metal and removed and oriented per NB 2322 of the ASME Boiler & Pressure Vessel Code.

No. 460 - As-Received:

| <u>Test Temperature</u> | <u>Absorbed Energy (ft-lbs)</u> | <u>Mils Lateral Expansion</u> | <u>Percent Shear</u> |
|-------------------------|---------------------------------|-------------------------------|----------------------|
| - 20°F | 49 | 39 | 40 |
| - 20°F | 17 | 19 | 20 |
| - 20°F | 44 | 35 | 40 |
| - 20°F | 63 | 46 | 50 |
| - 20°F | 76 | 56 | 60 |

No. 460 - Heat Treated:

| | | | |
|--------|-----|----|----|
| + 30°F | 103 | 66 | 70 |
| + 30°F | 70 | 59 | 60 |
| + 30°F | 70 | 51 | 50 |

WIN-207

DEC 130

Respectfully submitted,

Mark A. Hineman

Mark A. Hineman
Staff Engineer
TAUSSIG ASSOCIATES, INC.

MAH:i

ITIG - IPI
QUALITY CONTROL
APPROVED
T. G. WILSON
DATE MAY 2 1971
SHEET 7 OF 7

Taussig Associates Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



PRODUCT TESTING FAILURE INVESTIGATION MATERIAL EVALUATION QUALITY ASSURANCE

TO: ITT Grinnell Industrial Piping
P. O. Box 566 - Hwy 421
Kernersville, N. C. 27284

Report No.: 24131-1a
Date: 5-26-78
Your Order No.:

Attention: Mr. John Elder

SUBJECT: Charpy Impact Testing at the Weld Metal of Test Plate #460A; 1/8" Linde 65, Heat #065220 - As-Welded.

TEST RESULTS:
Impact Testing:

WW-207

Specimen Size: 10mm x 10mm
Notch Type: V
Test Temperature: + 30°F

DESHTEL
130

| <u>Specimen Number</u> | <u>Absorbed Energy (ft-lbs)</u> | <u>Mils Lateral Expansion</u> | <u>Percent Shear</u> |
|------------------------|---------------------------------|-------------------------------|----------------------|
| G1 | 105 | 67 | 60 |
| G2 | 137 | 70 | 70 |
| G3 | 101 | 66 | 60 |

All specimens were removed and oriented in accordance with NB-2332.

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 30 1978
SHEET 3 OF 9

CMR
Corwyn M. Berger
General Manager

TAUSSIG ASSOCIATES, INC.
By *Mark A. Hineman*
Mark A. Hineman
Staff Engineer

ITTG Grinnell

Industrial Piping Inc.

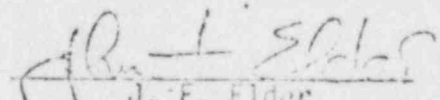
WW-207

SUBJECT: Welding Filler Materials
WIRE: Linde 65, Heat No. 065220

This is to certify that the subject material was welded into a test plate in accordance with NB-2340 using WPS 5-2. These test results are shown in Taussig Associates, Inc. Report No. 24131-1a and supplement the results shown in Taussig Associates, Inc. Report No. 24131.

Charpy Impacts

| <u>Temp.</u> | <u>Ft.-lbs.</u> | <u>Lat. exp. (mils)</u> | <u>%Shear</u> |
|--------------|-----------------|-------------------------|---------------|
| +30°F | 105 | 67 | 60 |
| +30°F | 137 | 70 | 70 |
| +30°F | 101 | 66 | 60 |


J. F. Elder
Materials Engineer

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE JUN 1 1978
SHEET 2 OF 2



UNION CARBIDE CORPORATION
LINDE DIVISION
WELDING MATERIALS
P.O. BOX 710, ASHTABULA, OHIO 44004

1/16/78

CUSTOMER: ITT GRINNELL
OLD HIGHWAY 421
KEMERSVILLE NC 27284

YOUR ORDER NO.: 11-137-KER 9113
LINDE S.O. NO.: _____

WW-206

MATERIAL: Linde 65

This is to certify that this material will conform to AWS A5.18-69
ASME SFA5.18. It has the following chemical analysis meeting the
requirements of classification E70S-2:

| | | |
|--------------------|---|---------------|
| <u>HEAT NUMBER</u> | - | <u>065214</u> |
| Carbon | - | .04 |
| Manganese | - | 1.17 |
| Phosphorous | - | .008 |
| Sulphur | - | .015 |
| Silicon | - | .54 |
| Aluminum | - | .12 |
| Titanium | - | .07 |
| Zirconium | - | .041 |

**RECEIVED
198**



Ladle Analysis:

Howard Taylor - M/C
Quality Assurance - Welding Materials Plant
Union Carbide Corporation - Linde Division

ITTG - 121
QUALITY CONTROL
APPROVED:
T. C. WILSON
DATE FEB. 21 1978
SHEET 1 OF 4

Industrial Engineering

SUBJECT: Welding Filler Materials

WIRE: Linde G5, Heat No. 065214

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 5-2, that the test results shown in Taussig Associates, Inc. Report 23490 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This may also be used on impact-tested material with a minimum service temperature of +30 degrees F.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 Edition.

WW-206

John F. Elder 2/21/77
J. F. Elder

CONTROL
100

ITIG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB 21 1977
SHEET 2 OF 4

MATERIAL TEST REPORT #23199

R & D TEST #335

Linde 65, Heat No. 065214

WVI-206

The following tests were performed in accordance with SFA 5.18, E70S-2:

1. All-Weld Metal Tension Test:

As-Welded:

Tensile Strength: 79,200 psi
 Yield Point: 74,700
 Elongation (%) in 2": 28

Heat-Treated*

Tensile Strength: 76,600
 Yield Point: 66,400
 Elongation (%) in 2": 30

2. Charpy V-Notch Impact Tests:

As-Welded:

| <u>Temp.</u> | <u>Ft.lbs.</u> | <u>Lat. Exp. (mils)</u> | <u>%Shear</u> |
|--------------|----------------|-------------------------|---------------|
| -20 | 143 | 91 | 90 |
| -20 | 123 | 79 | 80 |
| -20 | 100 | 69 | 70 |
| -20 | 111 | 75 | 80 |
| -20 | 111 | 80 | 80 |

Heat-Treated*

| <u>Temp.</u> | <u>Ft.lbs.</u> | <u>Lat. Exp. (mils)</u> | <u>%Shear</u> |
|--------------|----------------|-------------------------|---------------|
| +30 | 80 | 63 | 60 |
| +30 | 97 | 73 | 70 |
| +30 | 107 | 73 | 70 |

RECEIVED
130

3. Chemical Analysis: (additional elements required by ASME Section III, Cl. 1 for information only)

Ni: < 0.05 V : < 0.01
 Cr: < 0.05 Cu : 0.12
 Mo: < 0.03

4. Macrography Test: Acceptable

ITTG - IPI
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE: 08 21 1978
 SHEET 3 OF 4

*Heat-treated for 16 hours at 1150 degrees F, cooling to 600 degrees F shall be 300 degrees F/hr. (± 100 degrees F/hr.)

This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by ITT Grinnell IPI and our subcontractor are in compliance with the requirements of SFA 5.1B and the applicable material requirements of 1B-2000 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by ITT Grinnell IPI. This report, in conjunction with the Linde Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.

WV-206

J. F. Elmer

J. F. Elmer Date

100

ITTG - IPI
QUALITY CONTROL
APPROVED:
T. G. WILSON
DATE FEB. 21 1976
SHEET 4 OF 4

CERTIFIED MATERIALS TEST REPORT

WVY-203

Customer Order No. 4374 (14-4631)

Order No. 153016-1

National Welders Supply Co.

Shipped _____

P.O. Box N-93

3011 N. Liberty Street

Winston Salem, N.C. 27105

ITTG - IPI
QUALITY CONTROL
APPROVED
DATE 4-10-78
SHEET 1 OF 1

This material conforms to Specification
ES 1073-3 & ES 1084-4,
ASME SFA 5.1 Sec. III NA370

Trade Name or Trademark: Atom Arc 7018

Type E 7018

Diameter Size: 5/32"
20,000 lbs.
Lot Number: 03-3-B821K
Heat Number: 482B5101

Test No. 1149
X-Rays Satisfactory
Control No. NNN050

Moisture @1800°F. 0.11%
Concentricity 3%
Type Steel A-285

Carbon .03
Manganese .92
Chromium .03
Nickel .03
Silicon .28
Columbium + Tantalum
Molybdenum .01
Tungsten
Copper .02
Titanium
Phosphorus .009
Sulphur .016
Vanadium .01

| Test No. | Full | Split | Volts | Amps |
|--------------------|------|-------|-------|------|
| Tensiles & Impacts | 1 | 7 | 24 | 170 |

| Test Results: | As Welded | Stress Relieved |
|---------------|-----------|-----------------|
| Yield | 68,000 | 62,000 |
| Tensile | 77,500 | 72,700 |
| Elongation | 28.0% | 32.0% |
| Red. of Area | 71.2% | 78.1% |

16 hrs. @1100-1200°F.

Charpy V-Notch Impacts Tested @ -20°F.
Impacts 123-138-150-185-214 120-172-180-204-208
Lat. Exp. 85-86-84-82-91 81-80-86-91-85
½ Shear 60-60-70-80-80 50-80-80-90-90

Fillets: OK Vertical Overhead
ASME QUALITY SYSTEM CERTIFICATE (MATERIAL
NUMBER N-1224 EXPIRES ON SEPTEMBER 3, 197

RECEIVED
9 30

State of Penna.)
County of York) SS

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

Subscribed and sworn to before me
this 6TH day of April 1978

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

SEAL [Signature]
Notary Public

My commission expires: 8/21/78

BY [Signature]
D. G. Fluhr

CERTIFIED MATERIALS TEST REPORT

WW-2021

Customer Order No. 4372

Order No. 150310-1

National Welders Supply Co.
Ref. 14-5406
3011 N. Liberty Street
Winston Salem, N.C. 27105

ENTER 830

Shipped _____

This material conforms to Specification

ES 1073-3 (SFA 5.1 Sec. I)

Type E 7018

Test No. 1145
X-Rays Satisfactory
Control No. NNN009

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAR 10 1978
SHEET 1 OF 1

Trade Name
or Trademark:

Atom Arc 7018

Diameter Size:

1/8"
50# sample returned

Lot Number:

02-1-L719R

Heat Number:

421B5451

Moisture @1800°F. 0.15%
Concentricity 4%
Type Steel A-285

| | |
|----------------------|------|
| Carbon | .04 |
| Manganese | 1.01 |
| Chromium | .03 |
| Nickel | .03 |
| Silicon | .43 |
| Columbium + Tantalum | |
| Molybdenum | .01 |
| Tungsten | |
| Copper | .02 |
| Titanium | |
| Phosphorus | .010 |
| Sulphur | .015 |
| Vanadium | .02 |

Test No. Full Split Volts Amps

Tensiles & Impacts 1 5 22 135

Test Results: As Welded Stress Relieved
16 hrs. @1100-1200°F.

| | | |
|--------------|--------|--------|
| Yield | 67,000 | 65,700 |
| Tensile | 77,400 | 76,900 |
| Elongation | 28.0% | 31.0% |
| Red. of Area | 67.3% | 78.1% |

Charpy V-Notch Impacts Tested @-20°F.
Impacts 96-106-107-107-121 88-92-94-109-110
Lat. Exp. 72-71-71-75-77 72-71-78-79-81
% Shear 40-50-50-50-50 20-30-20-40-40

Filletts: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 7th day of March 1978

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

SEAL Anneta S. Ramsey
Notary Public

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

My commission expires: 8/21/78

BY D. J. Jacoby
D. J. Jacoby

WW-2011

Customer Order No. 4365 Rel.14-4243

711093-2

Order No.

Shipped

National Welders Supply
P.O. Box N-93
3011 N. Liberty Street
Winston Salem, N.C. 27105

This material conforms to Specification
ITT Spec. ES 1073-1,
SFA 5.1 Sec.III

Trade Name or Trademark: Atom Arc 7018

Type E 7018

Diameter Size: 3/32"
19,650 lbs.

Test No. 650
X-Rays Satisfactory
Control No. MMM074

Lot Number: 02-1-J728P
Heat Number: 411B6841

Moisture @1800°F. 0.29%
Concentricity 4%
Type Steel A-285

Carbon .04
Manganese 1.06
Chromium .03
Nickel .02
Silicon .48
Columbium + Tantalum
Molybdenum .01
Tungsten
Copper .02
Titanium
Phosphorus .012
Sulphur .016
Vanadium .03

| Test No. | Full | Split | Volts | Amps |
|--------------------|------|-------|-------|------|
| Tensiles & Impacts | 1 | 6 | 22 | 110 |

| Test Results: | As Welded | Stress Relieved |
|---------------|-----------------|-----------------|
| | 8 hrs. @1150°F. | |
| Yield | 73,100 | 65,400 |
| Tensile | 80,000 | 75,900 |
| Elongation | 28.0% | 30.0% |
| Red. of Area | 76.0% | 77.9% |

RECEIVED
239

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB. 22 1978
SHEET 1 OF 1

Charpy V-Notch Impacts Tested @ -20°F.

| | | |
|-----------|----------------|----------------|
| Impacts | 42-58-63-72-82 | 68-72-80-92-98 |
| Lat. Exp. | 38-48-52-59-68 | 58-61-67-78-83 |
| %Shear | 20-20-20-20-30 | 20-30-30-30-30 |

Fillets: OK Vertical Overhead

State of Penna.)
County of York) SS

ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978

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

Subscribed and sworn to before me
this 21st day of November 1977

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

SEAL *[Signature]*
Notary Public

My commission expires: 8/21/78

BY *[Signature]*
D. G. Flohr

The Reid - Avery Company

TEST REPORT

Fundalk, Baltimore, Md. 21222

DATE: 4/11/78

SOLD TO: ITT Granel
Old Highway 421
Kernersville, NC 27284

SHIPPED TO:

DATE SHIPPED: 11/30/78

P.O. NO.:

P.O. NO.: Rec 6999

SPECIFICATION:

| ITEM | POUNDS | SIZE | TYPE | LOT NO. | HEAT NO. |
|------|--------|------|---------|---------|----------|
| 1. | | 1/8 | 128 UHM | | 519346 |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |

WMA-2091

CHEMICAL ANALYSIS OF WIRE

| ITEM | C | Mn | P | S | Si | Cr | Ni | Mo | Al | Cu |
|------|-----|------|------|------|-----|------|------|-----|-----|------|
| 1. | .13 | 1.71 | .019 | .013 | .05 | .022 | .040 | .53 | .00 | .041 |
| 2. | | | | | | | | | | |
| 3. | | | | | | | | | | |
| 4. | | | | | | | | | | |
| 5. | | | | | | | | | | |
| 6. | | | | | | | | | | |

RECEIVED
139

ADDITIONAL TEST RESULTS

ITTG - IPI
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE: JAN 13 1978
 SHEET 1 OF 5

State of _____

City of _____

Subscribed and sworn to before me this _____ day

of _____ 19 _____

Notary Public _____

My commission expires _____

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

[Signature]
 QUALITY ASSURANCE DEPARTMENT

ITT Grinnell

Industrial Piping Inc.

WW-2001

SUBJECT: Welding Filler Materials
WIRE: RACo 128 IMM: Ht. No. 519346
FLUX: Linde 80; Lot 0575, Con. 8290

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 3-1, that the test results shown in Taussig Associates, Inc. Report 22367-1 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This material shall not be used on impact-tested fabrication.

This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by ITT Grinnell IPI and our Subcontractor are in compliance with the requirements of SFA 3.23 for an F70-EA3-A3 type classification, and the applicable material requirements of NB-2400 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by ITT Grinnell IPI. This report, in conjunction with the RACo Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.

DEC 1978
#30

| |
|------------------|
| ITTG - IPI |
| QUALITY CONTROL |
| APPROVED |
| T. C. WILSON |
| DATE JUN 13 1978 |
| SHEET 2 OF 5 |

J. F. Elder 2/2/78
J. F. Elder ipis

Fausig Associates Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



Report No. 22867-1 - December 14, 1977

ITT Grinnell Industrial Piping
P. O. Box 566 - Hwy 421
Kernersville, NC 27284

Attn: Mr. J. F. Elder

WW-2091

S U B J E C T

Mechanical & Chemical Testing of the Weld
Metal of Test Plate #428.

190

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE JUN. 13 1978
SHEET 3 OF 5

Corrections:

3-22-78 - Heat 1519346 on page 1.

PRODUCT TESTING FAILURE INVESTIGATION MATERIAL EVALUATION QUALITY ASSURANCE

BACKGROUND:

Two (2) welded plate assemblies were submitted to our laboratory for chemical analysis, charpy impact and tension testing of the weld metal. The assemblies had been identified as plate number 428, RACO 128HMM, Ht. #519346, Linde 80, Lot 0575, Con. 8290. One plate was to be tested as-welded and the other tested after a stress relieving heat treatment.

TEST RESULTS:

Chemical Analysis:

The weld metal of plate number 428 was drilled in a manner which prevented removal of material from the base metal. These drillings were cleaned and subjected to a quantitative chemical analysis with the following results:

| | |
|------------|------|
| Carbon | .05 |
| Manganese | 1.23 |
| Phosphorus | .014 |
| Sulfur | .013 |
| Silicon | .40 |
| Nickel | <.05 |
| Chromium | <.05 |
| Molybdenum | .53 |
| Copper | .15 |
| Vanadium | <.01 |

WW-2091

Heat Treatment:

Plate number 428 was cut to permit it to fit into a heat treating furnace. The pieces were heated to 1100°F and held for 16 hours at temperature. Cooling was done at a rate of less than 200°F/Hr. to below 800°F. The pieces were then marked 428H.

Tension Testing:

Two, round, all weld metal tension test specimens were machined from plate number 428, as-welded and heat treated. Both specimens were subjected to standard tension testing giving the results as follows:

RECEIVED
JUN 18 1978

| |
|-------------------|
| ITTG - IPI |
| QUALITY CONTROL |
| APPROVED |
| T. C. WILSON |
| DATE JUN. 18 1978 |
| SHEET 4 OF 5 |

| | No. 428H
Heat Treated | No. 428
As-Welded |
|------------------------|--------------------------|----------------------|
| Tensile Strength, Psi. | 83,875 | 83,325 |
| Yield Strength, Psi. | 68,725 | 70,325 |
| % Elongation in 2" | 27 | 27 |
| % Reduction of Area | 61 | 61 |

Impact Testing:

Five (5), full size (10mm x 10mm), Charpy V-Notch impact test specimens were machined from the heat treated plate assembly. All were notched in the weld metal.

No. 428H - Heat Treated:

| Test Temperature | Absorbed Energy (ft-lbs) | Mils Lateral Expansion | Percent Shear |
|------------------|--------------------------|------------------------|---------------|
| 0°F | 45 | 39 | 40 |
| 0°F | 40 | 36 | 40 |
| 0°F | 42 | 35 | 40 |
| 0°F | 48 | 41 | 40 |
| 0°F | 50 | 41 | 50 |

Respectfully submitted,

Mark A. Hineman

Mark A. Hineman
Staff Engineer

TAUSSIG ASSOCIATES, INC.

WW-2041

MAH:ln

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE JUL 13 1976
SHEET 5 OF 5

RECEIVED
130

FABRICATION NONCONFORMANCE REPORT

REPORT NO. *IP 179*

| | | | |
|--|-----------------------------|---------------------------|--------------------------------|
| SUBJECT
<i>W/S Power 2 (cylinder)</i> | CONTRACT NO.
<i>7127</i> | CODE SPEC.
<i>ASME</i> | REGISTERED
<i>CT-01-288</i> |
|--|-----------------------------|---------------------------|--------------------------------|

DESCRIPTION OF NONCONFORMANCE:

| | | | | | | | | | | | |
|---|---------------|-----------|-----------------|-----------|---------------|-----------|-----------------|----------------|----------|----------|-----------------|
| ① | <i>Center</i> | <i>of</i> | <i>item # 3</i> | <i>to</i> | <i>center</i> | <i>of</i> | <i>item # 4</i> | <i>is 1/2"</i> | | | |
| ② | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>is 1/2"</i> |
| ③ | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>is 3/4"</i> |
| ④ | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>is 7/8"</i> |
| ⑤ | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>"</i> | <i>is 5/16"</i> |

| | | | | | |
|------|-------|------------------------|----------------------|-------------------------|----------------------|
| SHOP | DATE: | INSP. <i>J. Poyner</i> | DATE: <i>1/27/78</i> | Q.C. <i>[Signature]</i> | DATE: <i>1/27/78</i> |
|------|-------|------------------------|----------------------|-------------------------|----------------------|

2. RECOMMENDED ACTION: *Engines to obtain customer acceptance of above dimensional problems and issue an as built sketch.*

APPROVED
 DUKE POWER CO.
 DATE: *01 18 1978*
 BY: *S. K. BLACKLEY*
 CHIEF ENGINEER
 MECHANICAL &
 NUCLEAR DIVISION

| | |
|-----------------|--|
| 3. DISPOSITION: | Q.C. <i>[Signature]</i> DATE: <i>1/27/78</i> |
|-----------------|--|

Upon completion of above recommended action found sketch to O.C. to close fabrication nonconformance report.



ITT Grinnell
Industrial Piping, Inc.

P. O. Box 566
Kernersville, N. C. 27284
(919) - 993-4831
Telex No.: 806439

11-27-78

Duke Power Company
P. O. Box 2178
Charlotte, North Carolina 28201

Attention: Q. A. Manager, Engineering & Services
Quality Assurance Department

Subject: Quality Assurance
Catawba #1
Duke Power Order No. C-12517
Our Contract 7127

Doc. # 98

Gentlemen:

Attached are requested Quality Assurance Papers on the following:

Duke Spec. No. and Title: (SM) MAIN STEAM

Duke Classification Identification: "B"

GRINNELL Purchase Order Number:

Purchased From: Kernersville

Material Description: CT-01-28X / CT-SM-7C

Test Reports attached: FORM 930.1 WITH ATTACHMENTS AS INDICATED THERE ON

We have examined these reports and find that the material furnished meets the requirements of the applicable specifications.

Very truly yours,

ITT GRINNELL INDUSTRIAL PIPING, INC.

G. P. Greeson / 12

G. P. Greeson
Project Engineer, IPD

GPG/rc

Enclosures



ITT Grinnell
Industrial Piping, Inc.

P. O. Box 566
Kernersville, N. C. 27284
(919) - 993-4831
Telex No.: 806439

11-27-78

Duke Power Company
P. O. Box 2178
Charlotte, North Carolina 28201

Attention: Q. A. Manager, Engineering & Services
Quality Assurance Department

Subject: Quality Assurance
Catawba #1
Duke Power Order No. C-12517
Our Contract 7127

Gentlemen:

Attached are requested Quality Assurance Papers on the following:

Duke Spec. No. and Title: (SM) MAIN STEAM

Duke Classification Identification: "B"

GRINNELL Purchase Order Number:

Purchased From: Kernersville

Material Description: CT-01-28X / CT-SM-7C

Test Reports attached: X-RAY FILM AND READER SHEETS

We have examined these reports and find that the material furnished meets the requirements of the applicable specifications.

Very truly yours,

ITT GRINNELL INDUSTRIAL PIPING, INC.

G. P. Greason / 82

G. P. Greason
Project Engineer, IPD

GPG/rc

Enclosures



ITT Grinnell
Industrial Piping, Inc.

P. O. Box 566
Kernersville, N. C. 27284
(919) - 993-4831
Telex No.: 806439

11-27-78

Duke Power Company
P. O. Box 2178
Charlotte, North Carolina 28201

Attention: Q. A. Manager, Engineering & Services
Quality Assurance Department

Subject: Quality Assurance
Catawba #1 & 2
Duke Power Order No. C-12517
Our Contract 7127

Gentlemen:

Attached are requested Quality Assurance Papers on the following:

Duke Spec. No. and Title:

(SM) MAIN STEAM

Duke Classification Identification: "B"

GRINNELL Purchase Order Number:

Purchased From: Kernersville

Material Description:

CW-01-42X / CW-SM-7D

Test Reports attached: X-RAY FILM AND READER SHEETS

We have examined these reports and find that the material furnished meets the requirements of the applicable specifications.

Very truly yours,

ITT GRINNELL INDUSTRIAL PIPING, INC.

G. P. Greason/sz

G. P. Greason
Project Engineer, IPD

GPG/rc

Enclosures



ITT Grinnell
Industrial Piping, Inc.

P. O. Box 566
Kernersville, N. C. 27284
(919) - 993-4831
Telex No.: 606439

11-27-78

Duke Power Company
P. O. Box 2178
Charlotte, North Carolina 28201

Attention: Q. A. Manager, Engineering & Services
Quality Assurance Department

Subject: Quality Assurance
Catawba #1 & 2
Duke Power Order No. C-12517
Our Contract 7127

Doc. # 98

Gentlemen:

Attached are requested Quality Assurance Papers on the following:

Duke Spec. No. and Title: (SM) MAIN STEAM

Duke Classification Identification: "B"

GRINNELL Purchase Order Number:

Purchased From: Kernersville

Material Description: CW-01-42X / CW-SM-7D

Test Reports attached: FORM 930.1 WITH ATTACHMENTS AS INDICATED THERE ON

We have examined these reports and find that the material furnished meets the requirements of the applicable specifications.

Very truly yours,

ITT GRINNELL INDUSTRIAL PIPING, INC.

G. P. Greeson/12

G. P. Greeson
Project Engineer, IPD

GPG/rc

Enclosures

TO

117 6/11/71

DATE REPLY NECESSARY

REPLY NOT NECESSARY

DATE 7-6-71

FROM

J. W. WENDER
CHIEF SEN

SUBJECT
RT Film Review
Film # 117, 118, 119
sent to W. H. N. A.

MESSAGE

PLEASE REVIEW THE ATTACHED RT FILM.

SIGNED

REPLY

Reviewed above listed items. No significant discrepancies.

[Signature]

SIGNED

DATE

RETURN THIS COPY TO SENDER

FOLD TO RETURN

FOLD TO SEND

DUKE POWER COMPANY
 QUALITY ASSURANCE DEPARTMENT
 SUPPLIER QUALITY ASSURANCE CERTIFICATION

Name of Supplier ITT Grinnell Ind. Piping, Inc. Date 1-25-79
 Address of Supplier Plant Reno, NV Mill Power Order No. C-12517
 _____ Duke Item or Req. No. 1206.00-1.0
 _____ Spec. No. CNS-1206.00-1.0 Rev. _____
 Supplier ID Nos. Req # CT-01-37X P.C.M.# CT-SM-7D

Description of Component(s) or Material(s) Lubricated Piping Assembly

Attached Documentation covers all Components/Materials on Mill Power Order.
 Attached Documentation covers partial shipment of Components/Materials on Mill Power Order.

The following listed tests, inspections and reports have been completed as required by the specification:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Physical & Chemical Analysis | <input type="checkbox"/> Major Repair Records & Charts |
| <input type="checkbox"/> Hydro (Test Pressure - PSIG _____) | <input type="checkbox"/> Personnel Qualifications on Record |
| <input type="checkbox"/> Design Report | <input type="checkbox"/> Stress Report |
| <input checked="" type="checkbox"/> Radiographic Test | <input type="checkbox"/> Ultrasonic Test |
| <input type="checkbox"/> Penetrant Test | <input type="checkbox"/> Repair NDE |
| <input type="checkbox"/> Operating Test | <input type="checkbox"/> Performance Curve |
| <input type="checkbox"/> Dimensional Check | <input checked="" type="checkbox"/> Deviation Record # <u>MR-IP-1720</u> |
| | <input checked="" type="checkbox"/> Heat Treatment |
| | <input checked="" type="checkbox"/> Magnetic Particle |
| | <input type="checkbox"/> Cleanliness |
| | <input checked="" type="checkbox"/> ASME Data Report |

- 1) _____
- 2) _____
- 3) _____

This certifies that the listed Component(s) or Material(s) conform to the requirements of the above referenced Duke Power documents including all codes, standards, test requirements and Quality Assurance requirements invoked therein.

DUKE POWER COMPANY

QA RECORDS APPROVED

B. W. Caldwell
 QA REPRESENTATIVE

DATE 3-7-79

Randall H. [Signature]
 Supplier Representative Authorized Signature
 Title Quality Control Mgr. Date _____

(See Instructions)

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

SHEET 1 OF 5

1. Fabricated by ITT Grinnell Ind. Piping, Inc., Kernersville Order No. 7127
(Name and Address of Fabricator)

2. Fabricated for Duke Power Company, Charlotte, NC Order No. C-12517
(Name and Address)

3. Owner Duke Power Company 4. Location of Plant Newport, SC

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

(a) Drawing No. CT-01-37X Prepared by ITT Grinnell Industrial Piping, Inc.

(b) National Board No. N/A

6. The material, design, construction, and workmanship complies with ASME Code Section III, Class N-2
Edition 1974, Addenda Date Winter 1974, 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 NA
(* size of Part - Item number, Manufacturer's name, and identifying stamp)

Supplemental Sheets 2 --- Drawings
3,4,5 --- Bill (s) of Material

7. Shop Hydrostatic Test Field psi.

8. Description of piping inspected Piece Mark Number CT-SM-7D
(include - mark no. - material spec. - nom. pipe size - schedule or thickness - length
See Attached Sheets
- fittings - flanges, etc.)

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 1-26-79 Signed ITT GRINNELL Ind. Piping, Inc. By [Signature]
(Fabricator)

Certificate of Authorization Expires 7-16-79 Certificate of Authorization No. N-1456

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 N.C. and employed by * of Hartford, CT. have inspected the piping described in this Data Report on 1-26-79, 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. *The Hartford Steam Boiler Inspection and Insurance Co.
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 1-26-79 [Signature] Commission N.C. - No. 878
(Inspector) National Board, State, Province and No.

ITT Grinnell Industrial Piping Inc.

KERNERSVILLE, N. C.

FORM EN-101 REV. 8/77
Q. A. FORM 42.10

SHEET 2 OF 5

CONT. NO. 7127

NAME DUKE POWER Co. CHARLOTTE, NC.

LOCATION CATAWBA #1
ORDR #C-12517

NOTE: SEE NCR #IP-1720

REDRWN Δ SL 12-28-78

CHK'D FB 12/29/78

REV. Δ PG-22-79

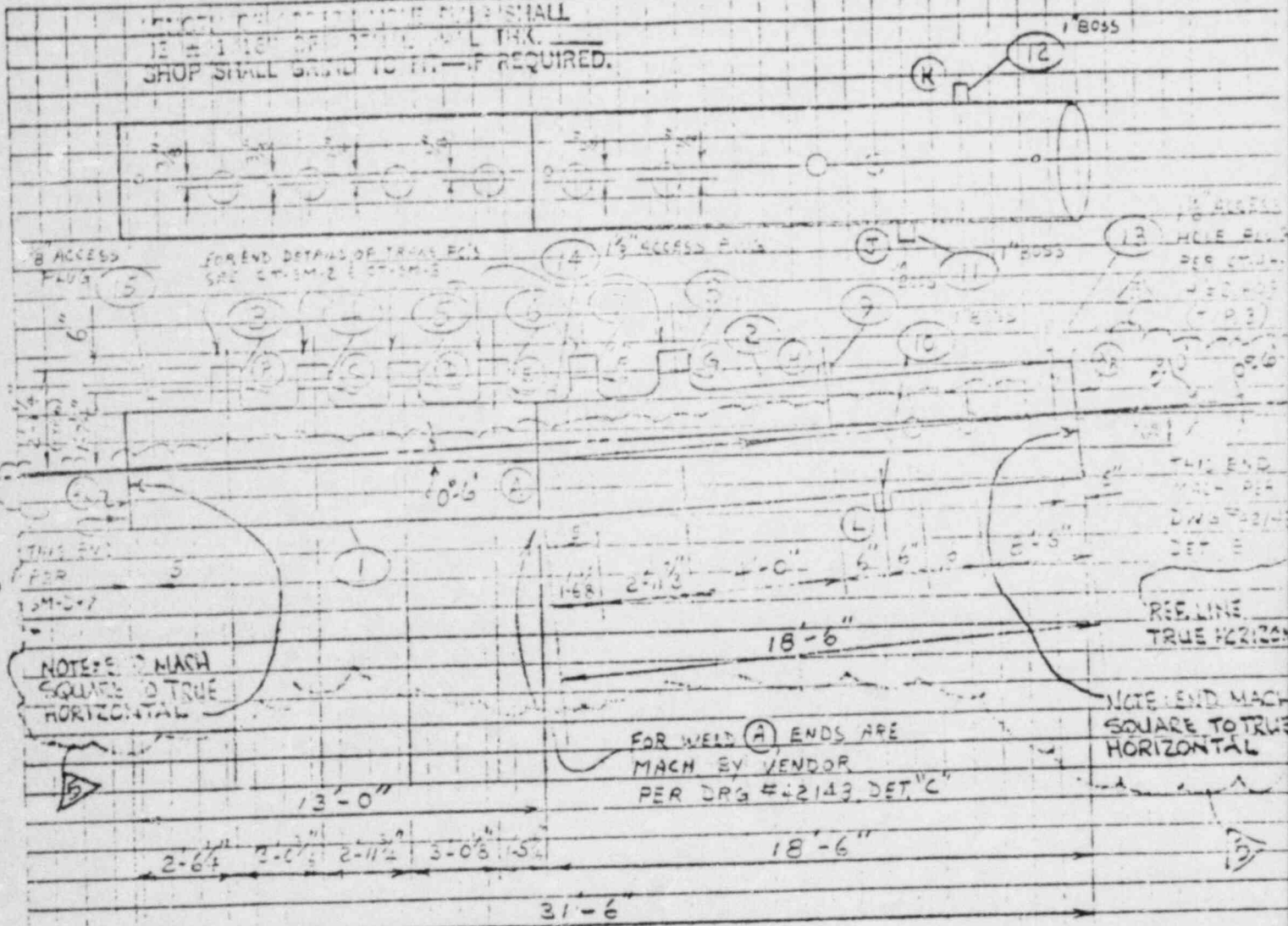
CHK'D FB 1-22-79

REV. _____

CHK'D _____

REV. _____

CHK'D _____



PAINT FLOW ARROWS

PIPE: 31.5 ID X 2.375 V.W SA-106-2
ES. ATT. TRANS FC 10" OD X 1.5" H. L. 20" H.
A-F PLUGS: BODY SA-106

MACH ENDS
PER SHEET 4 SM-D-7
(EXCEPT AS NOTED)

NUCLEAR SAFETY RELATED

CLASS DUKE B LINE SPEC. PS 1500.5 (01) APP. CODE ASME SEC III CL2 NO. REQ'D

| | | | | | | | |
|---------------------|-------------------------------------|------------------|-------------------------------------|------------|-------------------------------------|---------------------|-------------------------------------|
| Radiography (RT) | <input checked="" type="checkbox"/> | Special Marking | <input type="checkbox"/> | Preheat | <input checked="" type="checkbox"/> | Cert. of Compliance | <input type="checkbox"/> |
| Mag. Particle (MT) | <input checked="" type="checkbox"/> | Special Cleaning | <input checked="" type="checkbox"/> | Heat Treat | <input checked="" type="checkbox"/> | Mill Test Reports | <input checked="" type="checkbox"/> |
| Lic. Penetrant (PT) | <input type="checkbox"/> | Painting | <input checked="" type="checkbox"/> | Code Stamp | <input checked="" type="checkbox"/> | Data Reports | <input checked="" type="checkbox"/> |

SYSTEM MAIN STEAM (SM) FAB. SPECS. JS 113
REF. DRW'G NO. CN-1491-SM004 RESS. 1135 PSI. TEMP. 600 °F. WT. 14301 LBS.

PIECE MARK CT-SM-7D REGISTER CIT 1011 11 137X

GRINNELL INDUSTRIAL PIPING, INC.

Kennesaw, P.C.

| Register No. <u>CI-01-37X</u> | | MATERIALS RECORD | | Sheet <u>3</u> | Date <u>8/5</u> | | | | | |
|---------------------------------|---|---|-----|--------------------------|------------------------------|----------------|-----|------------|-------------|-----|
| System: <u>North-South</u> | | PRODUCTION PLANNER | | Revision No. <u>DSM</u> | Revision Date <u>5-10-78</u> | | | | | |
| Job Name <u>CATAWBA UNIT #1</u> | | DUKE POWER COMPANY <u>4012072, 2X</u> | | Contract No. <u>7127</u> | Location | | | | | |
| Piece Mark <u>CT-SM-7D</u> | | Job No. <u>1257</u> | | HEAT NUMBER | QUALITY CONTROL | PROCESS STATUS | U/M | UNIT PRICE | DIS. VENDOR | NET |
| ITEM | PART NUMBER | DESCRIPTION | QTY | OH | DATE | STATUS | U/M | P.O. | | |
| 1 | X X X X X X X X X X
CT-01-1
SP # 2005
HT # 2005
PL # 5005 | 31.5" NOM. I.D. X 2.375" NW. X
13'-0" LONG SAFETY VALVE.
HEADER MANIFOLD W/4 -
10" O.D. X 1 1/2" NOM. W. OUTLETS
ALL OUTLETS AND HEADER
ENDS I.D. MACHINED PER
(DRG. # 42148) | 3 | 1.5 | 12.317 | | E | | | |
| 2 | X X X X X X X X X X
CT-01-1
SP # 2005
HT # 2005
PL # 5005 | --- DITTO --- EXCEPT
MANIFOLD WILL BE 19'-6" LONG
W/2-10" O.D. X 1 1/2" NW. OUTLETS. | 3 | 1.5 | 12.317 | | E | | | |
| 3 | X X X X X X X X X X
CT-20-1
SP # 2005
HT # 2005
PL # 5005 | 10" X 6" O.P. FORGED C.S.
TRANSITION PC. MATERIAL
TO ASME SA-105 HT. (1" LENGTH = 6")
(PER DET. CT-SM-2) | 1 | | | | F | | | |



Nuclear Safety Related

Code DUKE B

Class DUKE B

MFG. Code

Job Supplement 15113

GRINNELL INDUSTRIAL PIPING, INC.

Kernersville, N.C.

FORM I.P. 102 REV. 2/68
G.A. FORM 102.11

11-F

Register No. CT-01-37X

System: Main Steam

Piece Mark CT-SM-7D

MATERIALS RECORD
PRODUCTION PLANNER

DUKE POWER COMPANY CHARLOTTE, N.C.


CATAWBA UNIT # 1

Order # C-12517

Sheet 24 of 35

Revision No. 1 Revision Date 6-6-78

Contract No. 7127 Location _____

| ITEM | PART NUMBER | DESCRIPTION | QTY
OR
LENG | QUALITY CONTROL | | | ACCOUNTING/MATERIAL | | | | |
|------|------------------------------|--|-------------------|-----------------|----------|------------|---------------------|-----|--------------------|---------------|-----|
| | | | | HEAT
NUMBER | DOCUMENT | IN PROCESS | STATUS | U/M | UNIT PRICE
P.O. | DIS
VENDOR | NET |
| 4 | X X X X X X X X
CT-2095-2 | 10" XB 750 D. FORGED C.S
TRANSITION PC. MATERIAL
TO ASME (SA-105 HT.)
(L = LENGTH = 6")
(PER DET. CT-SM-3) | 1 | | | | | E | | | |
| | | | | | | | | | | | |
| 5 | X X X X X X X X
CT-2095-2 | ———— DITTO ———— | 1 | | | | | E | | | |
| 6 | X X X X X X X X
CT-2095-2 | ———— DITTO ———— | 1 | | | | | E | | | |
| 7 | X X X X X X X X
CT-2095-2 | ———— DITTO ———— | 1 | | | | | E | | | |
| 8 | X X X X X X X X
CT-2095-2 | ———— DITTO ———— | 1 | | | | | E | | | |
| 9 | Y X A A C E X
CT-3002-2 | 1"  C.S. SP. WELD BOSS
TO SA-105, PER DET. SK. CT-WB-1 | 1 | | | | | E | | | |
| 10 | Y X A A C E X
CT-3002-2 | ———— DITTO ———— | 1 | | | | | E | | | |
| 11 | Y X A A C E X
CT-3002-2 | ———— DITTO ———— | 1 | | | | | E | | | |
| 12 | Y X A A C E X
CT-3002-2 | ———— DITTO ———— | 1 | | | | | E | | | |

Code Ann. Sec. III, Cl. 2 Class DUKE B

Nuclear Safety Related

Job Supplement JS 118

MFG. Code _____

GRINNELL INDUSTRIAL PIPING, INC.

Kanawha, W.C.

MATERIALS RECORD
PRODUCTION PLANNERS

Sheet 35 of 85

Register No. CT-01-37X

System: Main Steam

DUKE POWER COMPANY *Charlotte, N.C.*

Revision No. A-01

Revision Date 5-10-78

Piece Mark CT-SM-7D

Job Name CATAWBA UNIT #1
CATAWBA # C-12517

Contract No. 7127

Location _____

| ITEM | PART NUMBER | DESCRIPTION | QTY | QUALITY CONTROL | | | ACCOUNTING/MATERIAL | | | |
|------|----------------------------|---|-----|-----------------|----------|------------|---------------------|-----|-----------------|-------------|
| | | | | HEAT NUMBER | DOCUMENT | IN PROCESS | STATUS | U/M | UNIT PRICE P.O. | DIS. VENDOR |
| 12 | <i>XXXXXX</i>
CT-4012-3 | <i>1 1/8" ACCESS HOLE PLUG PER SK. CT-AH-1, TO ASME, SA-105, H=2.609"</i> | 1 | | | | | E | | |
| 13 | <i>XXXXXX</i>
CT-4012-3 | <i>DITTO</i> | 1 | | | | | E | | |
| 14 | <i>XXXXXX</i>
CT-4012-3 | <i>DITTO</i> | 1 | | | | | E | | |
| 15 | <i>XXXXXX</i>
CT-4012-3 | <i>35" O.D. SP. END PROT. PER SK.# CT-EP-1</i> | 2 | | | | | E | | |
| | | <i>8.75" O.D. BEVEL END PROT.</i> | 5 | | | | | E | | |
| | | <i>6" PIPE SIZE B.E. PROT.</i> | 1 | | | | | E | | |
| | | <i>35" SPIDER BRACING PER CT-ES-1</i> | 2 | | | | | E | | |

Nuclear Safety Related

Code Time Sec. III, Cl. 2

Class DUKE 'B'

Job Sup. JS 118

MEG. Code _____

GRINNELL INDUSTRIAL PIPING, INC.

Kelowna, N.C.

Contract # 7127

FORM EN 3.2 REV 1176
O.A. FORM 12.17

Register No. CT-01-37X

MATERIALS RECORD
PRODUCTION PLANNER

Sheet 04 of 05

System Main Steam

DUKE POWER COMPANY, Charlotte, N.C.

Revision No. 1 Revision Date 5-11-77

Piece Mark CT-SM-7D

Job Name CATAWBA UNIT # 1

Contract No. 7127

Location _____

| QTY | PART NUMBER | DESCRIPTION | SIZE OR LENG | QUALITY CONTROL | | | ACCOUNTING/MATERIAL | | |
|-----|----------------------|--|--------------|-----------------|------------|------------|---------------------|-----|-----------------|
| | | | | HEAT NUMBER | DOCUMENT | IN PROCESS | STATUS | U/M | UNIT PRICE P.O. |
| 4 | YXAA3E2
CT-2005-2 | 10" X 87" O.D. FORGED C.S.
TRANSITION PC. MATERIAL
TO ASME SA-105 HT.
(L = LENGTH = 6")
(PER DET. CT-SM-3) | 1 | 82199 | Surf. 3.00 | 100% | E | | E-4-2 |
| | | ———— DITTO ——— | 1 | 82199 | Surf. 3.00 | 100% | E | | |
| | | ———— DITTO ——— | 1 | 82199 | Surf. 3.00 | 100% | E | | |
| | | ———— DITTO ——— | 1 | 82199 | Surf. 3.00 | 100% | E | | |
| | | ———— DITTO ——— | 1 | 82199 | Surf. 3.00 | 100% | E | | |
| | | ———— DITTO ——— | 1 | 82199 | Surf. 3.00 | 100% | E | | |
| 2 | YXAA3E2
CT-2005-2 | 1" X 87" O.D. C.S. SP. WELD BOSS
TO SA-105, PER DET. SK-CT-WB-1 | 1 | 82199 | Surf. 4.00 | 100% | E | | |
| | | ———— DITTO ——— | 1 | 82199 | Surf. 4.00 | 100% | E | | |
| | | ———— DITTO ——— | 1 | 82199 | Surf. 4.00 | 100% | E | | |
| | | ———— DITTO ——— | 1 | 82199 | Surf. 4.00 | 100% | E | | |

Code Weld. Sec. III, Cl. 2 Class DUKE 'B' Nuclear Safety Related

Job Supplement JS 118 MFG. Code OVER

GRINNELL INDUSTRIAL PIPING, INC.

FORM EN-102 REV 7/76
O.A. FORM 12.12

CONTRACT 7127

Register No. CT-01-37X Sheet 85 of 05
 System: Marble Run Revision No. 1 Revision Date _____
 Piece Mark CT-54-7D Job Name CATAWBA UNIT #1 Contract No. 7127 Location _____
600-2517

MATERIALS RECORD
PRODUCTION PLANNER

DUKE POWER COMPANY
CATAWBA UNIT #1

| PART NUMBER | DESCRIPTION | DIM OR LENG | QTY | MATERIAL | UNIT PRICE P.O. | DIS. VENDOR | NET | ACCOUNTING/MATERIAL | QUALITY CONTROL | | STATUS | U/M | |
|-------------|--|-------------|-----|----------|-----------------|-------------|-----|---------------------|-----------------|---------------------|--------|-----|---------|
| | | | | | | | | | HEAT NUMBER | DOCUMENT IN PROCESS | | | |
| 112 | 1" ACCESS HOLE PLUG PER SK: CT-AH-1, TO ASME, SA-105, H = 2.603" | 1 | 1 | ABE | | | | | AP 4 | AP 4 | E | | SKB DEL |
| 112 | DITTO | 1 | 1 | ABE | | | | | AP 4 | AP 4 | E | | SKB DEL |
| 112 | DITTO | 1 | 1 | ABE | | | | | AP 4 | AP 4 | E | | SKB DEL |
| 112 | 35" O.D. SP. END PROT. PER SK: # CT-EP-1 | 2 | 2 | | | | | | | | E | | |
| 112 | 35" O.D. BEVEL END PROT. | 5 | 5 | | | | | | | | E | | |
| 112 | 6" PIPE SIZE B.F. PROT. | 1 | 1 | | | | | | | | E | | |
| 112 | 35" SPIDER BRACING PER CT-ES-1 | 2 | 2 | | | | | | | | E | | |

Ceds. Name: See III, Cl. 2 Class: DUKE 'B' Nuclear Safety Related

Job Supplement: JS 11A

MFG. Code

PROJECT Duke Power (Cat) CONTRACT 7127 PC. MK# CT-SM-7D REG. # C.T. 01 372
 SYSTEM MAWSTEAM(SM) CLASS "B" SPECIFICATION J3-11B-67 SUPPLEMENT _____

WELD DATA

| WELD | FIT-UP/PREHEAT | | | BACKING | ROOT | | INTERMEDIATE | | FINAL | | | RT DATE | | | MAG | |
|------|----------------|------------|------------|---------|--------------|------------------|--------------|---------------------------|-------------|------------------|------------|---------|---------|-------|------|-------|
| | WELDER I.D. | WELD MAT'L | Q.C. INSP. | | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | Q.C. INSP. | Q.C. | ANSI | CUST. | ROOT | FINAL |
| A | PROC | 1-4-2-2 | | | PROC | 1-4-2-2 | PROC | 1-1-3-10 | PROC | 1-2-2-4 | C/124 | 6/17/78 | 6/17/78 | - | - | |
| | S262 | 065220 | | | 0510
C143 | 065214
065220 | 0510
C143 | 1AC6*
1ACH** | C124 | 519346
0595 | | | | | | |
| DATE | 6/2/78 | 11/11/207 | 6-5-78 | | 7/5/78 | 11/11/207 | 7/5/78 | 11/11/207 | | 6-10-78 | | | | | | |
| B | PROC | 1-4-2-2 | | | PROC | 1-4-2-2 | PROC | 1-1-3-10 | PROC | 1-1-3-10 | C/124 | 6/15/78 | - | AP | - | |
| | S262 | 065220 | | | 0510
C143 | 065220 | 0510
C143 | 1AC6*
1ACH** | C124 | 1ACH**
1ACI** | | | | | | |
| DATE | 6/2/78 | 11/11/207 | 6-5-78 | | 7/5/78 | 11/11/207 | 7/5/78 | 11/11/207 | 7/16/78 | 1-5-78 | | | | | | |
| C | PROC | 1-4-2-2 | | | PROC | 1-4-2-2 | PROC | 1-1-3-10 | PROC | 1-1-3-10 | C/124 | 6/14/78 | - | AP | - | |
| | S262 | 065220 | | | 0442 | 065220 | 0442 | 1AC6*
1ACH**
1ACI** | C124 | 1-ACI** | | | | | | |
| DATE | 6/2/78 | 11/11/207 | 6-5-78 | | 6-7-78 | 11/11/207 | 6-7-78 | 11/11/207 | 7/5/78 | 1-5-78 | | | | | | |
| D | PROC | 1-4-2-2 | | | PROC | 1-4-2-2 | PROC | 1-1-3-10 | PROC | 1-1-3-10 | C/124 | 6/14/78 | - | RT | - | |
| | S262 | 065220 | | | 0342 | 065220 | 0342 | 1AC6*
1ACH** | C124 | 1ACH**
1ACI** | | | | | | |
| DATE | 6/2/78 | 11/11/207 | 6-5-78 | | 6/6/78 | 11/11/207 | 6/6/78 | 11/11/207 | 7/5/78 | 1-5-78 | | | | | | |
| E | PROC | 1-4-2-2 | | | PROC | 1-4-2-2 | PROC | 1-1-3-10 | PROC | 1-1-3-10 | C/124 | 6/14/78 | - | - | - | |
| | S262 | 065220 | | | 0510
C143 | 065220 | 0510
C143 | 1AC6*
1ACH** | C124 | 1ACI** | | | | | | |
| DATE | 6/2/78 | 11/11/207 | 6-5-78 | | 7/5/78 | 11/11/207 | 7/5/78 | 11/11/207 | 6/4/78 | 1-5-78 | | | | | | |

| | | | |
|-------------------------------|---|--|---|
| STRESS DATE
<u>6-20-78</u> | FINAL INSP.
<u>11/1/78</u> | SPECIAL OPERATIONS:
C DIM. <u>N/A</u> | Q.C. DOC. APPROVAL
<u>1-24-79</u> |
| SQUARE UP
<u>11/1/78</u> | * 1AC6 4106841/03-7-78
** 1ACH 4318545/02-1-78
*** 1ACI 4428641/03-3-78 | WALL THK. <u>/</u> | A/I STAMP/DATA REPORT
ANSI <u>(35)</u>
<u>1-26-79</u> |
| CLEAN UP
<u>11-25-78</u> | CUST INSP | OTHER <u>/</u> | CUST DOC APPROVAL |

PROJECT Duke Power (Cat) CONTRACT 7127 PC. MK# CT-3M-7D REG. # CIT 01 322
 SYSTEM MAINSTREAM(SM) CLASS B SPECIFICATION J5-118-67 SUPPLEMENT _____

WELD DATA

| WELD | FIT-UP/PREHEAT | | | BACKING | ROOT | | INTERMEDIATE | | FINAL | | RT DATE | | MAG | LP |
|------|----------------|------------|------------|---------|-------------|------------|--------------|-------------|-------------|------------|------------|------|-----|-------|
| | WELDER I.D. | WELD MAT'L | Q.C. INSP. | | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | Q.C. INSP. | Q.C. | | |
| F | PROC | 1-4-2-2 | | | PROC | 1-4-2-2 | PROC | 1-1-3-10 | PROC | 1-1-3-10 | C/ | - | - | - |
| | 9262 | 065220 | 1058 | | 2428 | 065220 | C428 | *1ACH *1ACE | 2428 | 1-ACI | | | | |
| DATE | 4/7/78 | 11/10/77 | 6-5-78 | | 6-7-78 | 11/10/77 | 6-7-78 | 11/10/77 | 6-7-78 | 11/10/77 | | | | |
| G | PROC | 1-4-2-2 | | | PROC | 1-4-2-2 | PROC | 1-1-3-10 | PROC | 1-1-3-10 | C/ | - | - | - |
| | 5262 | 065220 | 1058 | | 2384 | 065220 | C392 | 1ACG *1ACH | 2384 | 1ACF | | | | |
| DATE | 4/7/78 | 11/10/77 | 10-5-78 | | 6/7/78 | 11/10/77 | 6/7/78 | 11/10/77 | 6/7/78 | 11/10/77 | | | | |
| H | PROC | 1-4-2-2 | | | PROC | 1-4-2-2 | PROC | 1-1-3-10 | PROC | 1-1-3-10 | | | | |
| | 5262 | 065214 | 1058 | | 5262 | 065214 | 2442 | 1ACG *1ACH | 2442 | 1ACG *1ACH | | | | |
| DATE | 4/7/78 | 11/10/77 | 10-13 | | 4/7/78 | 11/10/77 | 4/7/78 | 11/10/77 | 4/7/78 | 11/10/77 | | | | 12/13 |
| J | PROC | 1-4-2-2 | | | PROC | 1-4-2-2 | PROC | 1-1-3-10 | PROC | 1-1-3-10 | | | | |
| | 5262 | 065214 | 1058 | | 5262 | 065214 | 2362 | 1ACG *1ACH | 2362 | 1ACG | | | | |
| DATE | 4/7/78 | 11/10/77 | 10-8 | | 4/7/78 | 11/10/77 | 4/7/78 | 11/10/77 | 4/7/78 | 11/10/77 | | | | 12/13 |
| K | PROC | 1-4-2-2 | | | PROC | 1-4-2-2 | PROC | 1-1-3-10 | PROC | 1-1-3-10 | | | | |
| | 5262 | 065214 | 1058 | | 5262 | 065214 | 2384 | 1ACG *1ACH | 2384 | 1ACG | | | | |
| DATE | 4/7/78 | 11/10/77 | 10-7 | | 4/7/78 | 11/10/77 | 4/7/78 | 11/10/77 | 4/7/78 | 11/10/77 | | | | 12/13 |

| | | | | | | | |
|-------------|-------------|-------------|---------|---------------------|------------|-----------------------|-----------------|
| STRESS DATE | 6-20-78 | FINAL INSP. | 1/23/79 | SPECIAL OPERATIONS: | C DIM. N/A | Q.C. DOC. APPROVAL | RK 1-24-79 |
| SQUARE UP | (I) (20) | | | WALL THK. | | A/I STAMP/DATA REPORT | ANI (S) 1-26-79 |
| CLEAN UP | (V) 1-23-79 | | | OTHER | | CUST DOC APPROVAL | |

PROJECT Duke Power (Cat) CONTRACT 7127 PC. MK# CT-SM-7D REG. # CTI 011 37A
 SYSTEM MAINSTREAM SM CLASS B SPECIFICATION J3-118-67 SUPPLEMENT

WELD DATA

| WELD | FIT-UP/PREHEAT | | ROOT | | INTERMEDIATE | | FINAL | | RT DATE | | LP |
|------|----------------|------------|------------|-------------|-------------------------|-------------|-------------------------|-------------------------|---------|-------|-------|
| | WELDER I.D. | WELD MAT'L | Q.C. INSP. | WELDER I.D. | WELD MAT'L | WELDER I.D. | WELD MAT'L | Q.C. INSP. | Q.C. | CUST. | |
| L | PROC | 1-4-2-2 | | PROC | 1-4-2-2 | PROC | 1-1-3-10 | 1-1-3-10 | | | |
| DATE | SQA2 | 065214 | | 0442 | 11C G + 11C G + 11C G + | 0442 | 11C G + 11C G + 11C G + | 11C G + 11C G + 11C G + | | | |
| DATE | 6/9/78 | 11110206 | | 6/9/78 | 11110206 | 6/9/78 | 11110206 | 11110206 | | | 4/3 |
| DATE | PROC | 1-4-2-2 | | PROC | | PROC | | | | | |
| DATE | 6-7 | 065214 | | | | | | | | | 03/13 |
| DATE | PROC | 1-4-2-2 | | PROC | | PROC | | | | | |
| DATE | C442 | 065214 | | | | | | | | | |
| DATE | 6-9-78 | 11110206 | | | | | | | | | 12/17 |
| DATE | PROC | 1-4-2-2 | | PROC | | PROC | | | | | |
| DATE | C-442 | 065214 | | | | | | | | | |
| DATE | 6-9-78 | 11110206 | | | | | | | | | 12/12 |
| DATE | PROC | | | PROC | | PROC | | | | | |

| | | | | |
|-------------|-------------|---|--------------------------------------|---------------------------------------|
| STRESS DATE | 6-20-78 | FINAL INSP. | SPECIAL OPERATIONS: | Q.C. DOC. APPROVAL |
| SQUARE UP | (Signature) | * ACG 4/10654/02-1-1987
44 GCH 421 B545/12-11-79 B | C DIM. N/A
WALL THK. 6
OTHER I | 1-24-79
ANI (Signature)
1-26-79 |
| CLEAN UP | BL/12379 | CUST INSP | | CUST DOC APPROVAL |

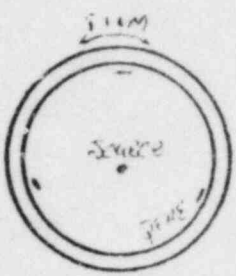
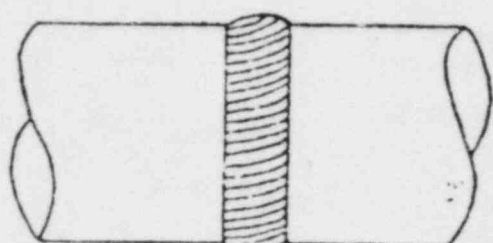
Req. No. FF-4
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.
BB BS

In-Process
 Repair RADIOGRAPHIC INSPECTION REPORT

Form N6.3A

Standard Hours _____

Date 6-13-78

| | | | | | | | | | | | | | | | | | | | |
|---|---------------------------|-------------------------------------|-----------|---|--|---|---|----------------------------------|----|----|---|----|---|----|----|----------|--------------|--|----------|
| System or Register No. <u>C7-01-37X</u> | | Piece No. <u>C7-5M-7D</u> | | Weld No. <u>A</u> | | Pipe Size and Schedule <u>2.375" MW 31.5" nom. ID X</u> | | Reader No. <u>C510 C149 C134</u> | | | | | | | | | | | |
| TECHNIQUE | View | <u>1</u> | | INTERPRETATION | Film Interval | Defect Type | | | | | | | | | | Comments | REPRODUCTION | | |
| | Source | <u>TR 92</u> | | | LP | LP | 2 | P | UT | DC | C | CR | T | PL | LP | | LP | | |
| | Source Current or kV | <u>100</u> | | | <u>AD</u> | | | | | | | | | | | | | | <u>X</u> |
| | Source Size or Focal Spot | <u>142</u> | | | <u>DE</u> | | | | | | | | | | | | | | <u>X</u> |
| | Source Film Distance | <u>18"</u> | | | <u>GJ</u> | | | | | | | | | | | | | | <u>X</u> |
| | Time | <u>5:00</u> | | | <u>JM</u> | | | | | | | | | | | | | | <u>X</u> |
| | Actual Weld Thickness | <u>2.137</u> | | | <u>PP</u> | | | | | | | | | | | | | | <u>X</u> |
| | Penetrator | <u>40</u> | | | <u>PS</u> | | | | | | | | | | | | | | <u>X</u> |
| | Sensitivity | <u>2T</u> | | | <u>SV</u> | | | | | | | | | | | | | | <u>X</u> |
| | Exposure | <u>662</u> | | | <u>VY</u> | | | | | | | | | | | | | | <u>X</u> |
| Exposure | <u>7X17</u> | | <u>YL</u> | | | | | | | | | | | | | | <u>X</u> | | |
| Exposure | <u>70</u> | | <u>LA</u> | | | | | | | | | | | | | | <u>X</u> | | |
| Viewing Technique | Single | <input checked="" type="checkbox"/> | Double | <input type="checkbox"/> | LP - Lack of Penetration DC - Under Cut Severity
LJ - Lack of Fusion C - Crater A - Acceptable
S - Slag CR - Crack B - Rejection
P - Porosity T - Tungsten B - Burdelline
BT - Burn Thru RT - High Low | | | | | | | | | | | | | | |
| Screen | Front | <u>.010</u> | |   | | | | | | | | | | | | | | | |
| Development | Back | <u>.010</u> | | | | | | | | | | | | | | | | | |
| Welding Procedure | 48" Ends & min. | | | | | | | | | | | | | | | | | | |
| Welding Procedure | Automatic | <u>X</u> | | | | | | | | | | | | | | | | | |

Radiographer - Date 6-14-78 By C. Latta Leone
 Interpretation - Date 6-15-78 By Alger Level
 Approval - Date 6-15-78 By Alger I

Customer Duke Power Co. 27/7128 Location Catawba Unit 1 & 2
 Contract 15F-151-10 Job No. 15F-17112
 Inspection Standard _____ Acceptance Standard _____
 Customers Approval - Date _____ By _____

Hartford 6/15/78 (MS)

Req. No. FF 5
 ITT GRINNELL INDUSTRIAL
 PIPING, INC

In-Process
 Repair RADIOGRAPHIC INSPECTION REPORT

Form NG-3A

Standard Hours _____

Date 6-13-78

BBB-3

| | | | | | | | | | | | | | | | | |
|--|--|------------------------------|----------------------|--|---|---|---|----|----|---|----|---|----|----------|----------------|------------|
| System or Register No.
<u>CT-01-37X</u> | | Piece No.
<u>CT-5M-2D</u> | Weld No.
<u>B</u> | Weld Size and Schedule
<u>10" X 6" 00</u> | Roller No.
<u>C510</u>
<u>1-143</u>
<u>1-428</u> | | | | | | | | | | | |
| View | <u>16</u> | EXPOSURE | File Interval | Defect Type | | | | | | | | | | Comments | NO. OF DEFECTS | |
| Source | <u>TR 192</u> | | A B C | LP | LPZ | S | P | UT | UC | C | CR | T | HL | | ACCEPTABLE | REJECTABLE |
| Source Curve
at FFD & WD | <u>100</u> | | D E | | | | | | | | | | | | | |
| Source Size
or Focal Spot | <u>.142</u> | | F G | | | | | | | | | | | | | |
| Source Film Distance | <u>20"</u> | | H I | | | | | | | | | | | | | |
| | <u>2:00</u> | | J K | | | | | | | | | | | | | |
| Actual Weld
Thickness | <u>1.2</u> | | L M | | | | | | | | | | | | | |
| Penetrometer | <u>25</u> | | N O | | | | | | | | | | | | | |
| Sensitivity | <u>2T</u> | | P Q | | | | | | | | | | | | | |
| Weld Thickness | <u>-</u> | | | | | | | | | | | | | | | |
| Weld Size | <u>4 1/2 x 10</u> | | | | | | | | | | | | | | | |
| Weld Type | <u>55</u> | | | | | | | | | | | | | | | |
| Viewing Technique | Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | | | | | | | | | | | | | | | |
| Screen | Front | <u>.010</u> | | | | | | | | | | | | | | |
| | Back | <u>.010</u> | | | | | | | | | | | | | | |
| Development | 65° Kodak D 19 | | | | | | | | | | | | | | | |
| | Automatic | <u>X</u> | | | | | | | | | | | | | | |
| Welding Procedure | <u>1-4-2-2</u>
<u>1-1-3-10</u> | | | | | | | | | | | | | | | |

LP - Lack of Penetration UC - Under Cut Sensitivity
 LPZ - Lack of Fusion C - Crater A - Acceptable
 S - Slag CR - Cracks R - Rejection
 P - Porosity T - Tungsten B - Burdeline
 UT - Burn Thru HL - High Low

SCALE

Radiographer - Date 6-14-78 By D. Lathier LEVEL II
 Interpretation - Date 6-15-78 By [Signature] Level Lead
 Approval - Date 6-15-78 By [Signature] Level II

Customer Duke Power Co. Location Catawba Unit 1 & 2
 Contract 07/7123 Job No. _____
 Inspection Standard ISF-181-10 Acceptance Standard ISF-1711-2
 Customer Approval - Date _____ By _____

Reg. No. FF 7
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.

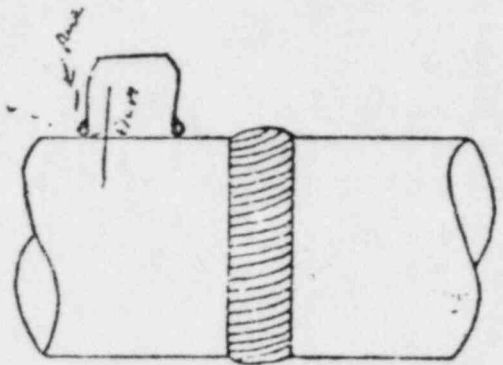
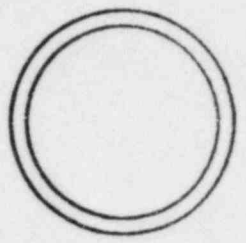
In-Process
 Repair RADIOGRAPHIC INSPECTION REPORT

Form N6.3A Standard Hours _____
 Date 6-13-78

BB B3

| | | | | | | | | | | | | | | | | | | | |
|---|--|--|----------------------|--|------------------------------------|---|---|----|----|---|----|---|----|----------|--------------------|--|--|--|--|
| System or
Replacer No.
<u>CT-01-37X</u> | | Disc No.
<u>CT-5M-7D</u> | Weld No.
<u>D</u> | Pipe Size
and Schedule
<u>10" x 8.75" O.D.</u> | Welder No.
<u>C284
C342</u> | | | | | | | | | | | | | | |
| Views | <u>16</u> | I
N
T
E
R
P
R
E
T
A
T
I
O
N | File Interval | Defect Type | | | | | | | | | | Comments | S.E. - S.E. - S.E. | | | | |
| Source | <u>La #172</u> | | AB | LP | LF | S | P | PT | UC | C | CR | T | HL | | | | | | |
| Source Curve
or E.V.P. & M. | <u>100</u> | | BC | | | | | | | | | | | | | | | | |
| Source Size
or Focal Spot | <u>142</u> | | CD | | | | | | | | | | | | | | | | |
| Source Film Distance | <u>20"</u> | | DE | | | | | | | | | | | | | | | | |
| T
E
C
H
N
I
Q
U
E | Time | | <u>2:00</u> | EF | | | | | | | | | | | | | | | |
| | Actual Weld
Thickness | | <u>1.375</u> | FG | | | | | | | | | | | | | | | |
| | Penetrant | | <u>30</u> | GH | | | | | | | | | | | | | | | |
| | Sensitivity | | <u>2T</u> | HI | | | | | | | | | | | | | | | |
| Weld Thickness | <u>.125</u> | | IJ | | | | | | | | | | | | | | | | |
| File Size | <u>4 1/2 x 10</u> | KL | | | | | | | | | | | | | | | | | |
| File Type | <u>70</u> | LM | | | | | | | | | | | | | | | | | |
| Viewing Technique | Single <input type="checkbox"/> Double <input checked="" type="checkbox"/> | NO | | | | | | | | | | | | | | | | | |
| Screen | Front | <u>.010</u> | OP | | | | | | | | | | | | | | | | |
| | Back | <u>.010</u> | PA | | | | | | | | | | | | | | | | |
| Development | 40" Endok & etc. | | | | | | | | | | | | | | | | | | |
| | Automatic | <u>X</u> | | | | | | | | | | | | | | | | | |
| Welding Procedure | <u>1-1-2-2
1-1-3-10</u> | | | | | | | | | | | | | | | | | | |

LP - Lack of Penetration UC - Under Cut Severity
 LF - Lack of Fusion C - Crater A - Acceptable
 S - Slag CR - Crack R - Rejectable
 P - Porosity T - Tungsten B - Borderline
 PT - Burn Thru HL - High Low



Radiographer - Date 6-13-78 By Bob Paul II
 Interpretation - Date 6-14-78 By W. Johnson (Cue)
 Approval - Date 6-14-78 By W. Johnson II

Customer Duke Power Co. Location Catawba Unit 1 & 2
 Contract 7107/7128 Job No. _____
 Inspection Standard ASME 181.10 Acceptable Standard 1-SE-1711.2
 Customer Approval - Date _____ By _____

Req. No. 448
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.

In-Process
 Repair

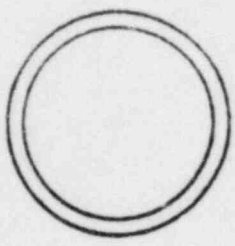
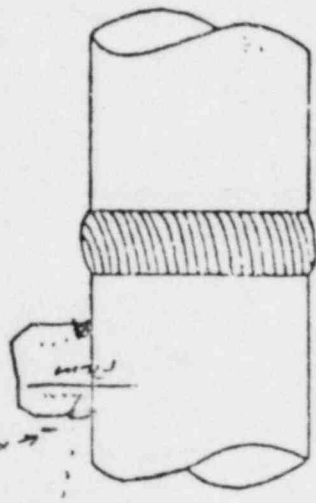
Form N6.3A
 RADIOGRAPHIC INSPECTION REPORT

Standard Hours _____
 Date 6-13-78

BB 53

| | | | | | | | | | |
|--|--|--|--|------------------------------|--|---|--|--|--|
| Specimen or
Receptor No. <u>C7-C1-378</u> | | Piece No. <u>C7-517-7D</u> | | Yield No. <u>E</u> | | Film Size
and Style <u>10" X 8.25" 010</u> | | Order No. <u>C510</u>
<u>C143</u>
<u>C342</u>
<u>C284</u> | |
| View <u>16</u> | | Film Interval <u>ABC</u> | | Defect Type | | Chemistry <u>SPIRES</u> | | Orientation | |
| Source <u>4092</u> | | Source Curves
or RVP & RA <u>100</u> | | IP LE 3 4 5 6 7 8 9 10 11 12 | | Process <u>SAI</u> | | Development | |
| Source Size
or Focal Spot <u>.142</u> | | Source Film Distance <u>21"</u> | | A A | | SAI | | X X X X X X X X X X | |
| Time <u>2:00</u> | | Actual Weld
Thickness <u>1.375"</u> | | K K | | SAI | | X X X X X X X X X X | |
| Penetration <u>30</u> | | Sensitivity <u>2T</u> | | L L | | SAI | | X X X X X X X X X X | |
| Beam Thickness <u>.125</u> | | Film Size <u>4xNO</u> | | M M | | SAI | | X X X X X X X X X X | |
| Film Type <u>7c</u> | | Viewing Technique <input checked="" type="checkbox"/> Single <input type="checkbox"/> Double | | N N | | SAI | | X X X X X X X X X X | |
| Screen | | Front <u>.010</u> | | O O | | SAI | | X X X X X X X X X X | |
| Development | | Back <u>.010</u> | | P P | | SAI | | X X X X X X X X X X | |
| Welding Procedure | | 40° Enick 8 wire
Automatic | | Q Q | | SAI | | X X X X X X X X X X | |
| | | 1-4-2-2
1-1-2-1-0 | | R R | | SAI | | X X X X X X X X X X | |

SEVERITY
 UC - Lack of Penetration
 UB - Under Cut
 C - Crater
 CB - Crack
 P - Porosity
 PT - Burn Thru
 BL - Burn Line
 S - Slag
 A - Acceptable
 B - Rejection
 T - Turbidity
 B - Burdeline



Location Catawba Unit I & 2

Customer Pratt & Whitney Co.

Radiographer - Date 6-13-78 By BB 53

Interpretation - Date 6-14-78 By BB 53

Approval - Date 6-14-78 By BB 53

Contract No. 2717123

Job No. _____

Acceptance Standard 1-SF-1711-2

Inspection Sheet SF-181-10

Customer Approval - Date _____ By _____

(BK3)

Req. No. CF-10
 ITT GRINNELL INDUSTRIAL
 PIPING, INC.

In-Process
 Repair

Form N6.3A

Standard Hours

Date 6-13-78

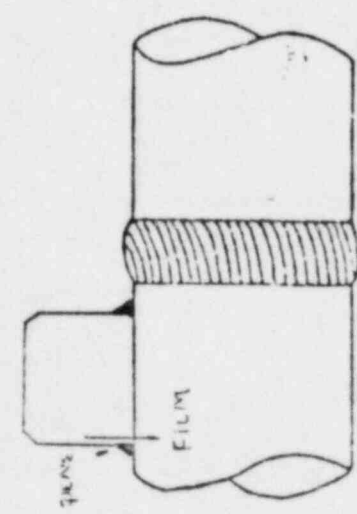
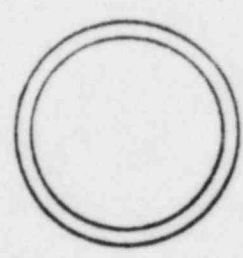
RADIOGRAPHIC INSPECTION REPORT

| | | | | | | | | | | | | | | | | | | | |
|--|--|---------------|--|------------|----|---------------------------|---------------|------------|----------------------|----|----|----|----|----|----|----|----|----|----|
| Specimen or
Register No. | CT-01-37X | Part No. | CT-501-70 | Serial No. | C | Film Size
and Schedule | 10-X8-1501100 | Roller No. | C254
C343
C423 | | | | | | | | | | |
| Views | 16 | Defect Type | None | | | | | | | | | | | | | | | | |
| Source | IR ¹⁹² | Film Interval | A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P | LP | LT | LC | PC | PT | ST | CT | MT | NT | OT | PT | ST | CT | MT | NT | OT |
| Source Curve
of R ₉₀ & R ₄₅ | 100 | Defect Type | None | | | | | | | | | | | | | | | | |
| Source Size
of Focal Spot | .142 | Defect Type | None | | | | | | | | | | | | | | | | |
| Source Film Distance | 20" | Defect Type | None | | | | | | | | | | | | | | | | |
| Time | 2.00 | Defect Type | None | | | | | | | | | | | | | | | | |
| Actual Film
Thickness | 1. | Defect Type | None | | | | | | | | | | | | | | | | |
| Pressurizer | 30 | Defect Type | None | | | | | | | | | | | | | | | | |
| Sensitivity | 2T | Defect Type | None | | | | | | | | | | | | | | | | |
| Film Thickness | 125 | Defect Type | None | | | | | | | | | | | | | | | | |
| Film Size | 4 1/2 x 10 | Defect Type | None | | | | | | | | | | | | | | | | |
| Film Type | 70 | Defect Type | None | | | | | | | | | | | | | | | | |
| Viewing Technique | Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> | Defect Type | None | | | | | | | | | | | | | | | | |
| Screen | Front .010
Back .010 | Defect Type | None | | | | | | | | | | | | | | | | |
| Development | 40' Fresh & dry.
Automatic | Defect Type | None | | | | | | | | | | | | | | | | |
| Winding Procedure | 1-4-2-2
1-1-3-10 | Defect Type | None | | | | | | | | | | | | | | | | |

SP - Lack of Penetration
 LP - Lack of Fusion
 CP - Crater
 CB - Crack
 P - Porosity
 BT - Burn Thru

UC - Under Cut
 C - Crater
 CC - Crack
 N - Negation
 PL - High Line

SW - Swirl
 A - Acceptable
 R - Rejection
 B - Borderline



Customer: Duke Power Co. Location: Catawba Unit 1 & 2
 Contract: 11277123 Job No.: ISF-1711-2
 Inspecting Standard: ASME-1981 Acceptance Standard:
 Customer Approval - Date: _____ By: _____

Radiographer - Date: 6-14-78 By: C. E. Miller IR
 Interpretation - Date: 6-15-78 By: Algeron Level
 Approval - Date: 6-15-78 By: Algeron Level

MAGNETIC PARTICLE EXAMINATION REPORT

Customer: DUKE PWR. Register No.: CT-01-374

Contract/P.O. NO.: 7127 Piece Mark: CT-SM-70

System: MN. STM (SM)

Examination Method: DC Prods _____ AC Yoke Other _____

Equipment Type: MAGNA FLUX Model No.: 4-6

Procedure: MTP-1-1 Acceptance: MTA-1-0

| ITEM IDENTIFICATION
WELD/SERIAL/HT. NO. | SIZE AND THICKNESS | AREA EXAMINED INDICATE,
ROOT, INTERMEDIATE, FINAL
WELD OR MATERIAL AS
APPLICABLE | RESULTS |
|--|-----------------------|---|---------|
| ZR | 31.5" I.D X 2.375" MW | FINAL | Acc'd |
| XR | " " | " | " |
| 2 FIELD ENDS | " " | MATERIAL | " |
| FILLET WELDS ON CODE PLATE | | FINAL | " |
| H | 1" SPEC. BOSS | FINAL | " |
| J | " " " | " | " |
| K | " " " | " | " |
| L | " " " | " | " |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

EXAMINATION PERFORMED BY: J. Andrews DATE: 12/13/78

NDT Level: II

INTERPRETATION PERFORMED BY: J. Andrews DATE: 12/13/78

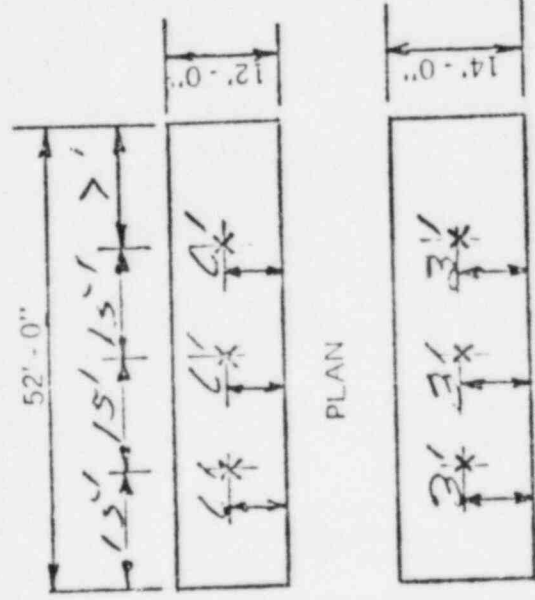
NDT Level: II

Date 6-20-78

FURNACE LOAD SHEET

Load Number

| REGISTER NO. | SKETCH NO. | TYPE MATERIAL | WEIGHT | TEMP. REQD.* | RATE OF HT PER HR | HOLD TIME | RATE OF COOLING PER HOUR | SPEC. NO. | TIME IN | TIME OUT |
|--------------|------------|---------------|--------------|--------------|-------------------|-----------|--------------------------|-----------|---------|----------|
| WE 03-6 | | KC60 | 25,950 | 1150 ± 25 | 170 | 2 1/2 hr | 170 | A31-1 | 4 1/2" | 2.1.28 |
| WE 03-11 | | 11 | 15,175 | 11 | 24.75 | | 24.75 | 11 | 4 1/2" | 16.525 |
| CT 01-32X | | A106C | 14,301 | 11 | | | 600 | A31-1 | 3 1/2" | 2.325 |
| CT 04-117 | | A106B | 3,586 | 11 | 1150 | | | 11 | 18" | 5.80 |
| CT 04-148 | | 11-C | 2472 | 11 | | | | 11 | 20" | 5.80 |
| A1Q 01-17 | | 11-B | 6168 | 11 | | | | 11 | 31" | 1.267 |
| | | | <u>67652</u> | | | | | | | |



PLAN
ELEVATION
THERMOCOUPLE LOCATIONS

TIME TO REACH TEMP. 1 1/2 HRS
 TIME AT TEMP. 2 1/2 HRS
 TIME TO COOL 5 1/2 HRS

24 INCH EQUALS 30 MM
 SWP REQUIRED PER AWWA PROGRAM
 070-5314-14 50338970001

Load Inspection to insure against local flame impingement
 Q. C. S. amp 46
150
 6-20-78

* Temperature variation within any 15 foot interval of weld length shall not exceed 250 degrees F
 Copy 1 - Shop File
 2 - Q. C.
 3 - Ballot

DEG. FAHR. 1400 1500 1600 1800 2000 2200 2400

DEG. FAHR. 1400 1500 1600 1800 2000 2200 2400



WE03-6
WE 03-11
CT 01-37X ←
CT 04-117
CT 04-148
MQ 01-17

2003

CT-01-17
MQ01-17

CT-01-37X



DEG FAIR

2400
2200
2000
1800
1600
1400
1200
1000
800
600
0

1/2 INCH - EQUALS 30 MIN
THERM RECORDER AND PROGRAM
S0399570001

TIME TO REACH TEMP 4 MINS
TIME AT TEMP 2 1/2 MINS
TIME TO COOL 5 1/2 MINS

9:00 AM 6-20-75

Load Sheet # 0918

DEG FAIR

2400
2200
2000
1800
1600
1400
1200
1000
800
600
0

9:16 AM 6-20-75

MILL TEST CERTIFICATE

OLD TO ITT Grinnell Corporation

Kernersville, N.C.

ITT GRINNELL CORPORATION
WELDING PRODUCER DIVISION
PRINCETON, KY.

Kernersville

OUR ORDER NO. 63216

BRANCH ORDER NO. List 3304

SHIP TO Same for Duke Power

CT
MAN-3

DATE August 26, 1977

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-234 WPC | | | | | | | | | | | | A-105C |
| 1.500" ID x 2.375" N/W x
3'-0" long manifold with
-10.000" OD x 1.500" N/W
outlets | F | 41400 | 77400 | *28.0 | .24 | .89 | .010 | .019 | .22 | | 26955
KMA3 | |
| | | PF# 5910 | | RE# 3317 | | | | | | | | |
| 1.500" ID x 2.375" N/W x
3'-0" long manifold with
-10.000" OD x 1.500" N/W
outlet and 1-4.625" OD x
4.62" wall outlet | F | | | | | | | | | | 26954
KMA3 | |
| | | (Same as above) | | | | | | | | | | |
| | | PF# 7130 | | | | | | | | | | |
| | The above fittings were manufactured and tested in strict compliance with ASME Section III, 1974 Edition, Class 2 through the 1974 Summer Addenda. | | | | | | | | | | | |
| | The above fitting was radiographically examined in accordance with ASME Section VIII, UW-51 and found acceptable. | | | | | | | | | | | |
| | *Standard round test specimen used for tensile properties. | | | | | | | | | | | |

This certificate is reproduced by this Member without charge from the original report. It is not to be used as a substitute for the original report. Grinnell Barrows Number, WPA, 1977

REC 5 1977
 Rec Report 31
 Page 142

HEAT TREATMENT - LEGEND - A - NORMALIZED

B - NORMALIZED AND TEMPERED

C - NORMALIZED, QUENCHED & TEMPERED

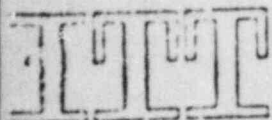
D - STRESS RELIEVED

E - HEAT TREATED PER SPECIFICATION OR ORDER. F - HOT FORGED BETWEEN 1100 AND 1600°F AND STRENGTHENED BY AIR

SUBMITTED 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__



ITT Grinnell Corporation

P.O. Box 647
Princeton, Kentucky 42445
Telephone (502) 365-5551

Statement of Compliance

Customer Purchase Order:

List 3306

CW-01-1-2

10/11/77
5

The items supplied by ITT Grinnell, Welding Products Division have been supplied in accordance with the Verification and Identification Program accepted by ASME.

R. B. Perlman

Division Quality Assurance Manager

Quality System
Certificate (Materials)
No.

August 26, 1977
Date

N-834

Expiration Date:
September 30, 1977

ITT G-IP1
QA-OK
DATE DEC 5 1977

PAGE 2 of 8

JIMMIE GRINNELL

WELDING PRODUCTS DIV.

PRINCETON PLANT

REPAIR REQUEST

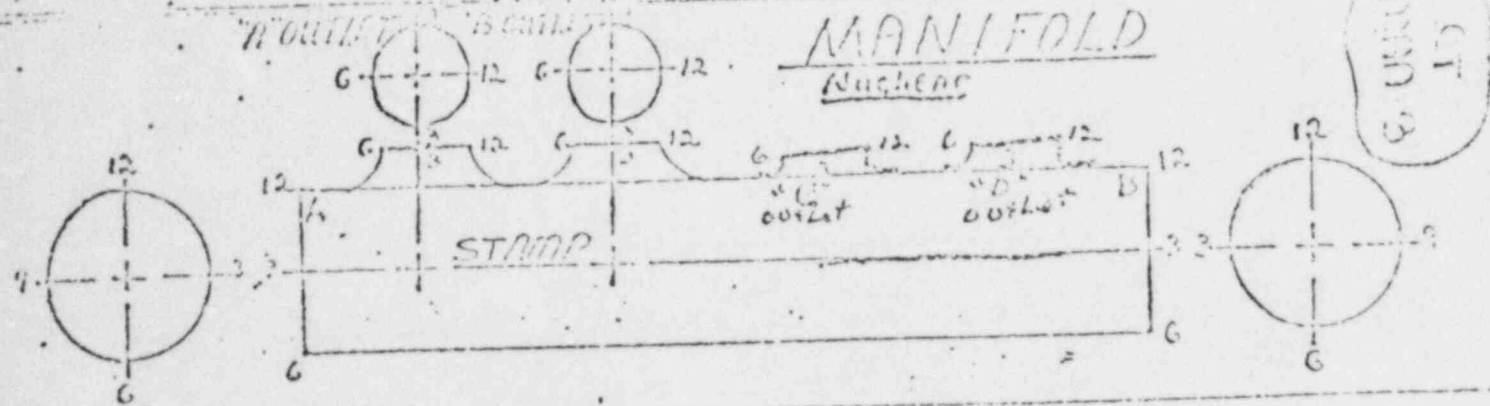
R.R. No.

Rev. D

Page 1 of 1

Customer Kamecoville Job _____
 P.O. and Item No. _____ S.O. No. 63216-2
 Specification SA-106-B-C Heat No. KAD
 App'd Code & Addenda ASME B31.1

Purchaser Approval _____ Date _____
 Auth. Insp. Acceptance _____ Date _____



Fitting Size: 3.50" x 2.25" per wall x 12-0" Manifold

Defect Type: Thin Area

Defect Size: 1 1/4" long 15% around .075" thin.

Defect Location: At Outlet, starts at outlet edge and continues for 1 1/4" and from 4:00 to 9:00 o'clock.

Recommended Repair Method:
 Repair shall be made in accordance with approved Repair Procedure #459 and the following:
 1. Stamp "CND." on fitting
 2. Build up with weld using 6018 per 1-01-5-6
 3. Grind smooth
 Oper _____
 Accept _____
T. Bingham 8-29-77
 Section O.C. Manager Date

1. EXAMINE THICKNESS
 5. PENETRAANT EXAMINE
 P.C. I-SF-1733-4
 I-SF-1736-1
 6.
 7.
 would issue you
 Oper _____
 Accept _____
 Date _____
 Providence O.A. Manager Date

Grinnell

WELDING PRODUCTS DIVISION

QUALITY ASSURANCE MANUAL

WELD MATERIAL REQUISITION

NO. Form W5.14

PAGE 1 of 1

REV. 2

APR 1977

DATE 6/1/76

Weld ISSUE
405

Form W5.14

8-27-77

Material Type: E 7018 5/32 Weld Rod

Lot No. M/A (Weld) Machine No. M/A

Lot No. M/A (Flux) Machine No. M/A

Lot No. 411X5941 5627M/AE (Electrodes) Hot Box No. 4 P-2

Qty: 2 lbs

Requested by: [Signature] Appr. by O.C. [Signature]

3
10

- | | | | |
|------|---------|----------|-------------------|
| 5910 | PE-5937 | PE 5953 | PE-5951 |
| 5923 | PE-5920 | PE 5968 | PE-7128 |
| 5925 | PE-5939 | PE-5969 | PE-7130 - 8-27-77 |
| 5926 | PE-5938 | PE-5996 | |
| 5927 | PE-5942 | PE-5997 | |
| 5928 | PE-5920 | PE-59106 | |
| 5929 | PE-5945 | PE-7107 | |
| 5933 | PE-5947 | PE-7108 | |
| 5937 | PE-5948 | PE-5998 | |
| 5938 | PE-5949 | PE-7120 | |
| 5939 | PE-5950 | PE-7123 | |
| 5940 | PE-5951 | PE-7124 | |
| 5941 | PE-5952 | PE-7125 | |
| 5942 | PE-5904 | PE-5917 | |

DATE REC'D
page 4 of 2

ITT GRINNELL CORPORATION
 WELDING PRODUCTS DIVISION
 P.O. BOX 647
 PRINCETON, KENTUCKY 42445

WELDING FILLER MATERIAL AND FLUX CERTIFICATION

FILLER METAL

AWS Specification: SFA 5.1
 Filler Metal Trade Name: Atom Arc 7018
 Heat Number: 411X0941
 Lot Number: 5627M1AE

FLUX

AWS Specification
 Flux Trade Name: MA
 Lot Number:

JOINT DESIGN

Joint Design in Accordance With: SFA 5.1

BASE METAL

Material Spec., Gr.: A-516 Gr. 70

POST WELD HEAT TREATMENT

1500°F 1 hour air cooled

ALL WELD METAL TENSILE TEST

| Dia (in) | Area (in ²) | Ultimate Total Load (LBS) | Ultimate Unit Stress (PST) | Character of Failure |
|----------|-------------------------|---------------------------|----------------------------|----------------------|
| .505 | .200 | | 72000 | all weld |

WELD METAL IMPACT TOUGHNESS TESTS

| Specimen Number | Temp (°F) | Impact Values (ft-lbs) | % Shear Area | Lateral Expansion (in) | Drop Weight Break | Drop Weight Recast |
|-----------------|-----------|------------------------|--------------|------------------------|-------------------|--------------------|
| 1 | +30 | 90 | 90 | .061 | | |
| 2 | +30 | 97 | 100 | .071 | | |
| 3 | +30 | 120 | 100 | .096 | | |

OTHER TESTS

| C | Mn | P | Si | Ni | CR | Mo | S | V | Cu |
|------|------|-------|------|------|------|------|-------|------|------|
| 0.04 | 1.15 | 0.013 | 0.40 | 0.03 | 0.04 | 0.05 | 0.014 | 0.02 | 0.02 |

THIS IS TO CERTIFY THAT THE STATEMENTS MADE IN THIS RECORD ARE CORRECT AND THAT THE TEST WELD WAS PREPARED, WELDED, AND TESTED IN FULL ACCORDANCE WITH THE CURRENT REQUIREMENTS OF SECTION OF THE ASME BOILER AND PRESSURE VESSEL CODE.

CERTIFIED BY:

J. Bunder

DATE:

7-20-77

ITT GRINNELL
 CA OK
 DATE DEC 5 1977
 Page 5 of 8

MPN 3

ITT GRUBBS & COMPANY
 WELDING PRODUCTS DIVISION
 P.O. BOX 647
 PRINCETON, KENTUCKY 42445

WELDING FILLER MATERIAL AND FILLER CERTIFICATION

FILLER METAL

AWS Specification: SFA 5.1
 Filler Metal Trade Name: Atom Arc 7018
 Heat Number: 411X0941
 Lot Number: S627M1AE
 Sample 247

FILLER

AWS Specification
 Filler Trade Name: NA
 Lot Number:

JOINT DESIGN

Joint Design in Accordance With: SFA 5.1

BASE METAL

Material Spec., Gr.: A-516-70

POST WELD HEAT TREATMENT

1500°F. 1 hour air cool 1100°F. 1 hour air cool

ALL WELD METAL TENSILE TESTS

| Dia
(in) | Area
(in ²) | Ultimate
Total Load (lbs) | Ultimate
Unit Stress (PSI) | Character of
Failure |
|-------------|----------------------------|------------------------------|-------------------------------|-------------------------|
| .505 | .200 | | 71834 | All weld |

WELD METAL IMPACT TONGUESS TESTS

| Specimen
Number | Test Temp
(°F) | Impact
Values (ft-lbs) | % Shear
Area | Lateral
Expansion (in) | Drop Weight
Break No. 1000 |
|--------------------|-------------------|---------------------------|-----------------|---------------------------|-------------------------------|
| 1 | +30 | 120 | 100 | .096 | |
| 2 | +30 | 120 | 100 | .093 | |
| 3 | +30 | 120 | 100 | .098 | |

OTHER TESTS

| C | MN | P | Si | Ni | CR | Mo | S | V | Cu |
|------|------|-------|------|------|------|------|-------|------|-----|
| 0.04 | 1.15 | 0.013 | 0.40 | 0.03 | 0.04 | 0.05 | 0.014 | 0.02 | 0.0 |

THIS IS TO CERTIFY THAT THE STATEMENTS MADE IN THIS RECORD ARE CORRECT AND THAT THE TEST WELD WAS PREPARED, WELDED, AND TESTED IN FULL ACCORDANCE WITH THE CURRENT REQUIREMENTS OF SECTION III NB-2400 OF THE ASME BOILER AND PRESSURE VESSEL CODE.

CERTIFIED BY: *J. Bunker*

DATE: 7-20-77

ITT & IPI
 CA OK
 TCM
 DATE REC. 5-1977
 PAGE 6 of 8

MAN. 3

CERTIFICATE OF ANALYSIS

7-N013

4352

Customer Order No. _____

7-N013

Order No. 517402-1

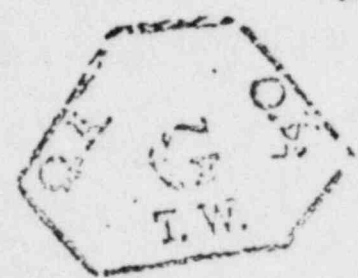
Shipped _____

This material conforms to Specification
SFA 5.1
Code 11 Spcc.

E 7018

Type _____
Test No. 232
X-Ray Satisfactory
Control No. JJJ075

3
D
P
W



CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION
National Welders
11 North St. NE
Boston Salem, N. C. 28208
14-3836

Name Atom Arc 7018
Trade _____
Size 5/32"
Weight 20,050 lb.
Numbers 5627MIAE
411X0941

Moisture @1800°F. 0.11%
Concentricity 2%
Type Steel A-285

| | |
|------------|------|
| Carbon | .04 |
| Manganese | 1.15 |
| Phosphorus | .04 |
| Nickel | .03 |
| Silicon | .40 |
| Aluminum | |
| Tantalum | |
| Vanadium | .05 |
| Tungsten | |
| Copper | .02 |
| Titanium | |
| Sulphur | .014 |
| Vanadium | .02 |

| Test No. | Full | Split | Volts | Amps |
|--------------------|------|-----------|--------|--------------------------|
| Tensiles & Impacts | 1 | 7 | 23 | 170 |
| Test Results: | | As Welded | 8 hrs. | Stress Relieved @1150°F. |
| Yield | | 70,800 | | 63,600 |
| Tensile | | 78,300 | | 76,100 |
| Elongation | | 28.0% | | 32.0% |
| Red. of Area | | 69.0% | | 76.7% |

QUALITY SYSTEM CERTIFICATE
NUMBER N-1224 EXPIRES
NUMBER 8, 1978.

Charpy V-Notch Impacts Tested @ 20°F.
Impacts 89-85-89-110-140 116-110-116-142-180
Lat. Exp. 71-70-72-53 6 70-74-30-90-95
% Shear 40-40-40-50 70 80-80-20-100-100
Filletts: OK Vertical Overhead

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

Witnessed and sworn to before me:
on the _____ day of January 19 77.

ITTE G IN
ON ON
TON

DATE DEC 5 1977

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

[Signature]
Notary Public

Page 2 of 2

[Signature]

CT
MAN 3

Rev. 3306
Dev. 1761-A

(FORM 1-11-1977)

TT Grinnell

PENETRANT

EXAMINATION REPORT

PRINCETON, KENTUCKY

| REP# | HEAT CODE | ITEM DESCRIPTION | SO. NO. | PE SPEC. | EXAMINER
(SNT-ATC-A LEVEL III) | DATE | AREA EXAMINED | RESULTS | MATERIAL CODE |
|------|-----------|-------------------------------|--------------|------------------------|-----------------------------------|---------|---------------|---------|---------------|
| 24 | KEHV | 12" X 8" 5/8" Conc Rod
w/B | 70379-6 | 35F-172-5
35F-172-5 | BOB SLICE | 9-1-77 | cdw | AI | F F K |
| 25 | KEHV | 2" X 6" 5/8" Ecc. Rod
w/B | KE-8-6903-20 | 35F-172-5
35F-172-5 | BOB SLICE | 9-1-77 | cdw | AI | F F K |
| 26 | HBBB | 6" 5/16" I.D. 90° wp/B | KE-3-6903-07 | 35F-172-5
35F-172-5 | | | cdw | | |
| 27 | ARDZ | 40" DIA. 1/2" DIA. 5/8" DIA. | 69450-1 | 35F-172-5
35F-172-5 | P. O. M. S. L. I. C. | 8-31-77 | ✓ | AI | F F K |
| 28 | BBFB | 4" DIA. 3/8" DIA. 1/2" DIA. | 63216-5 | 35F-172-5
35F-172-5 | P. O. M. S. L. I. C. | 8-31-77 | cdw | AI | F F K |
| 29 | HFHV | 12" X 8" 5/8" Conc Rod
w/B | 70377-6 | 35F-172-5
35F-172-5 | P. O. M. S. L. I. C. | 9-1-77 | cdw | AI | F F K |
| 30 | Kand - | 31.50" DIA. 3/8" DIA. | 62316-2 | 35F-172-5
35F-172-5 | P. O. M. S. L. I. C. | 8-31-77 | cdw | AI | F F K |
| 31 | HFHV | 12" X 8" 5/8" Conc Rod w/B | 70372-6 | 35F-172-5
35F-172-5 | | | cdw | | |
| 32 | GLXC | 30" DIA. 3/8" DIA. | 63220-0200 | 35F-172-5
35F-172-5 | B. G. L. I. C. | 9-2-77 | cdw | AI | F F K |
| 33 | ADXY | 4" DIA. 3/8" DIA. 1/2" DIA. | 70419-510 | 35F-172-5
35F-172-5 | P. O. M. S. L. I. C. | 8-31-77 | ✓ | AI | F F K |
| 34 | ADXY | 4" DIA. 3/8" DIA. 1/2" DIA. | 70419-510 | 35F-172-5
35F-172-5 | P. O. M. S. L. I. C. | 8-31-77 | ✓ | AI | F F K |
| 35 | HEKS | 4" DIA. 3/8" DIA. 1/2" DIA. | 70422-36 | 35F-172-5
35F-172-5 | P. O. M. S. L. I. C. | 7-6-77 | cdw | AI | F F K |

METHOD: VISIBLE DYE (SOLVENT REMOVABLE)
 PRE-CLEANER: MAGNAFLUX SPOT CHECK SKC-5
 PENETRANT: MAGNAFLUX SPOT CHECK (SPRAY) SKL-HF/SKL-S
 CLEANER: MAGNAFLUX SPOT CHECK SKC-5
 POST-CLEANER: MAGNAFLUX SPOT CHECK SKC-5

ABBREVIATIONS (RESULTS)
 AI: Acceptable - No apparent discontinuities.
 A2: Acceptable - Discontinuities not in excess of specification standards.
 R: Reject - Discontinuities in excess of specification standards.

MILL TEST CERTIFICATE

ITT GRINNELL CORPORATION
WELDING PRODUCTS DIVISION
PRINCETON, KY.

OUR ORDER NO. 63216

SOLD TO ITT Grinnell Corporation
Kernersville, N.C.

Kernersville

BRANCH ORDER NO. List 3306

SHIP TO Same for Duke Power

DATE February 24, 1977

CA
P. 1/1

CUSTOMER'S ORDER NO. _____

| 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-234 WPC
31.500" I.D. x 2.375" N/W
x 18'-6" long manifold
with 2-10.00" O.D. x
1.500" N/W outlets | F | 45900 | 80400 | *26.2 | .26 | .93 | .012 | .015 | .21 | | | | 26907
BBFX | A-106C
PF# 5843 |
| -Ditto- | F | 42400 | 79900 | *26.8 | .25 | .95 | .010 | .014 | .22 | | | | 26911
JCCN | PF# 5850 |
| The above fitting was manufactured and tested in strict compliance with ASME
Section III, 1974 Edition, Class 2 through the 1974 Summer Addenda. | | | | | | | | | | | | | | |
| *Standard round test specimen used for tensile properties. | | | | | | | | | | | | | | |
| This fitting represented by this report is a true and correct report according to the requirements as to hardness, Brinell Hardness Number, Max. 127". | | | | | | | | | | | | | | |

HEAT TREATMENT - LEGEND A = NORMALIZED B = NORMALIZED AND TEMPERED C = NORMALIZED, BLEACHED, & TEMPERED D = STRESS RELIEVED
 E = HEAT TREATED PER SPECIFICATION ON ORDER F = HOT FORGED AT 1450 AND 1500 °F AND COOLED IN STILL AIR

SUBSCRIBED AND SWORN TO BEFORE ME
 THIS _____ DAY OF _____ 19__

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

Grinnell

WELDING PRODUCTS DIV.
PRINCETON PLANT
REPAIR REQUEST

Rev. 0

Page 1 of 1

CA
Part 61

Customer Krownsville Job De. McGuire

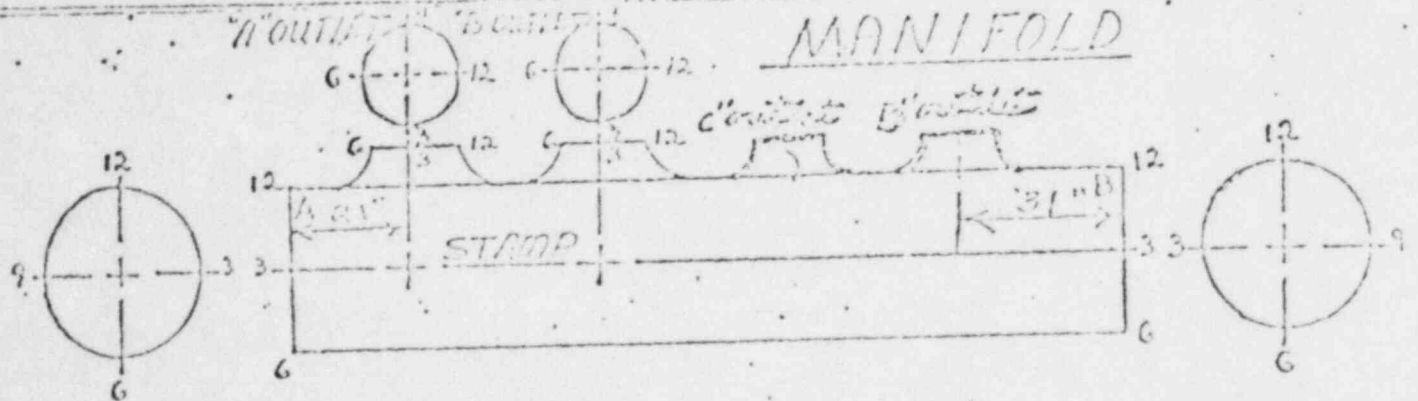
Purchaser Approval _____ Date _____

P.O. and Item No. _____ S.O. No. 63216-3

Specification SA-106-GR-C Heat No. JCCN

Auth. Insp. Acceptance _____ Date _____

Applicable Code & Addenda Nuclear Side with Ch-2



Fitting Size: 3.500 Id x 2.375 w x 18-6 LG manifold

Defect Type: Thin area

Defect Size: 1" long, .23" around, .075 thin.

Defect location B thin starts at fitting edge & continues for 1" and from 11:00 o'clock to 9:00 o'clock.

| Recommended Repair Method: | | Oper. | Accpt. |
|--|--|-------------------------|------------------|
| Repair shall be made in accordance with approved Repair Procedure # <u>4-39</u> and the following: | | | |
| 1. Stamp <u>PS 550</u> on fitting <u>B</u> .
<u>I.R. Procedure 2-23-77</u> | | | |
| 2. Build up with weld using <u>E 7018</u> rod per <u>W-001-1-9</u> . | Oper. <u>AK</u>
Date <u>2-23-77</u> | Accpt. <u>AI</u> | |
| 3. Grind smooth. | Oper. <u>AK</u> | | |
| 4. Check thickness. | | Oper. <u>AK</u> | Accpt. <u>AI</u> |
| 5. Permittent Examine per <u>I-SF-1733-1</u> & <u>I-SF-1736-1</u> .
<u>HT-mst 2-23-77</u> | | | |
| 6. _____ | | | |
| 7. _____ | | | |
| Weld. Assoc. <u>101</u> | | | |
| J. Beaudin <u>2-23-77</u> | | | |
| Princeton O.C. Manager | Date | Providence O.A. Manager | Date |

QUALITY ASSURANCE MANUAL
WELDING PRODUCTS DIVISION

REV. (10611)
PAGE 2 OF 2
REV. APR. 65
DATE 5/3/74

TITLE:

WELD MATERIAL REQUISITION

CA
P. 11

Date: 2-22-77

Heat Code NA

Requisition No. IT 401

Material: weld Rod

Weld Material Specification: E7018 5/32

Heat No. 20381X000

Lot No. NA (Electrode)

Lot No.: NA (Flux)

Quantity: _____

Weld Sta. Box No. 1

Distributed By _____

Appr. By Q.C. _____

PE 5849
PE 5850 W/ 2-23-77

ITT Grinnell

PENETRANT

EXAMINATION REPORT

PRINCETON, KENTUCKY

| PE= | HEAT CODE | ITEM DESCRIPTION | SO. NO. | PE SPEC. | EXAMINER
(SNT-TC-1A LEVEL III) | DATE | AREA EXAMINED | | RESULTS | MATERIAL CODES | |
|------|-----------|-----------------------------|---------|----------|-----------------------------------|---------|---------------|-------|---------|----------------|-----|
| | | | | | | | Development | Other | | . | ... |
| 5849 | JCC A | 3150014242758846 GR-C | 63206-3 | F-50 | MT, MS IIF | 2-22-77 | cdw | | A1 | ✓ | ... |
| 5850 | JCC IN | " " " " " " | " | " | " | 2-23-77 | cdw | | A1 | ✓ | ... |
| 5851 | MHC | 20" x 70" W. Penetrant | 12971-1 | " | " | 2-23-77 | ✓ | | A1 | ✓ | ... |
| 5852 | MHC | " " " " " " | " | " | " | " | ✓ | | A1 | ✓ | ... |
| 5853 | MHC | 20" x 70" W. Penetrant | 12212-3 | F-50 | " | " | cdw | | | | |
| 5854 | MCSV | 20" x 70" W. Penetrant | 64350-1 | F-50 | " | " | cdw | | | | |
| 5855 | APFC | 42" x 24" x 51" TEF | 64192-3 | F-50 | ST, MS IIF | 2-24-77 | ✓ | | A1 | ✓ | ... |
| 5856 | APFC | 42" x 24" x 51" TEF | 64190-5 | F-50 | ST, MS IIF | 2-25-77 | ✓ | | A1 | ✓ | ... |
| 5857 | APFC | 42" x 24" x 51" TEF | 64191-3 | F-50 | ST, MS IIF | 2-25-77 | ✓ | | A1 | ✓ | ... |
| 5858 | ANSI | 20" x 24" x 51" TEF | 64192-3 | F-50 | " | " | ✓ | | A1 | ✓ | ... |
| 5859 | APFC | 20" x 24" x 51" TEF | 64192-3 | F-50 | " | " | cdw | | | | |
| 5860 | APFC | 20" x 24" x 51" TEF | 64192-3 | F-50 | " | " | cdw | | | | |
| 5861 | APFC | 42" x 24" x 51" TEF | 64192-3 | F-50 | ST, MS IIF | 2-28-77 | ✓ | | | | |
| 5862 | APFC | 12" x 36" x 67" GR-V-10 TEF | 64192-3 | F-50 | " | " | cdw | | | | |
| 5863 | " | " " " " " " | " | " | " | " | " | | | | |

(Handwritten signature/initials)

ABBREVIATIONS (RESULTS)

- A1: Acceptable - No apparent discontinuities.
- A2: Acceptable - Discontinuities not in excess of specification standards.
- R: Reject - Discontinuities in excess of specification standards.

METHOD: VISIBLE DYE (SOLVENT REMOVABLE)

PRE-CLEANER: MAGNAFLUX SPOT CHECK SKC-S

PENETRANT: MAGNAFLUX SPOT CHECK (SPRAY) SKL-HF/SKL-S

CLEANER: MAGNAFLUX SPOT CHECK SKC-S

POST CLEANER: MAGNAFLUX SPOT CHECK SKC-S

DEVELOPER: MAGNAFLUX SPOT CHECK (SPRAY) SKD-S

Grinnell

WELDING PRODUCTS DIV.
PRINCETON PLANT
REPAIR REQUEST

R.R. PE5843

Rev. 0

Page 1 of 2

CA
PWF 61

Customer VERMERSVILLE

Job Super Power

Customer Approval _____

P.O. and Item No. 3301

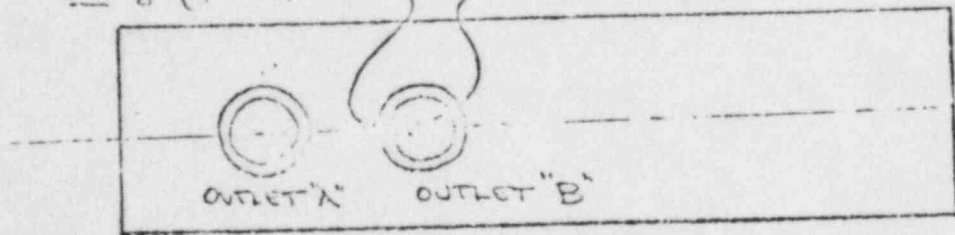
S.O. No. 632163

Date _____

Specification SA-106-GR-1 Heat No. 525X

Applicable Code & Addenda _____

MANIFOLD: #1 - BUILD UP OUTLET OD. $\frac{1}{8}$ " (THIN) #2 - BUILD UP OUTLET ID. $\frac{5}{16}$ " (DUE TO FLAMING DAMAGE)



Fitting Size: 2.500 ID x 0.375 W x 19" L Manifold

DEFECT TYPE, SIZE, & LOCATION:

- #1: FORMED THIN, (.125"), ON OD. OF OUTLET "B"; THIN AREA EXTENDS 1" EITHER SIDE OF CENTERLINE OF HEADSET. THIN AREA STARTS AT OUTLET EDGE AND IS 1/2" LENGTH FROM OUTER OD. (AS PER DRAWING ABOVE)
- #2: TOOLING DAMAGE, ON OUTLET ID. 5/16" DEEP, 2" LONG, 1" WIDE, IN BORE OF OUTLET AS PER DRAWING ABOVE.

Recommended Repair Method:

Repair shall be made in accordance with approved Repair Procedure PE1439 and the following:

1. Stamp "PE5843" on fitting
- 1A Preheat to 400°F min
2. Build up with weld using E7018 Rod PW-1-01-1-9-25.77.77
3. Machine to correct outlet shape 1-26.77 U.S.

4. Penetrant Examine E-SF-1733-4 HT+8B LD I-SF-1736-1 2-24-77
- 5.

Stress Relieve 1100 to 1200°F For 1 1/2 hours 1-36.77.77

weld level 399

Jim Burman 1-17-77
Princeton O.C. Manager Date

Providence O.A. Manager Date

252

Grinnell

WELDING PRODUCTS DIV.
PRINCETON PLANT
REPAIR REQUEST

R.R. *RF 5843*

Rev. 0

Page 2 of 2



Customer *Kearnsville* Job *Dupont Machine*

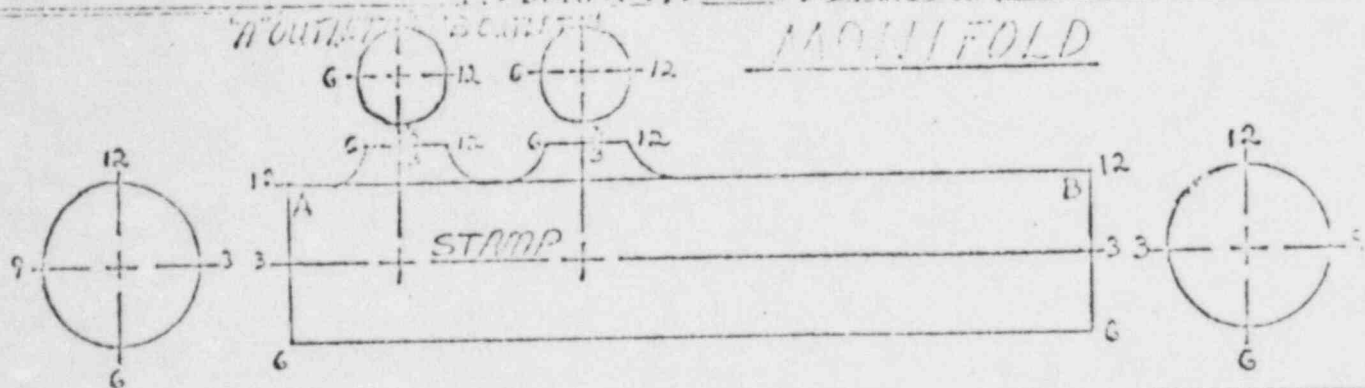
Purchaser Approval _____ Date _____

P.O. and Item No. _____ S.O. No. *13216-3*

Specification *57-106-CR-C* Heat No. *BBFX*

Auth. Insp. Acceptance _____ Date _____

Applicable Code & Addenda *ASME SECTION 8*



Fitting Size: *3.500 ID x 2.375 x 18'-6" L-G manifold*

Defect Type: *Thin Area*

Defect Size: *1/2" diam, 25" circum, 1.25" thin*

Defect Location: *R. side of manifold 1/2" from bottom edge of continuation from 1/2" over from 230 center to 330 center*

Recommended Repair Method:

Repair shall be made in accordance with approved Repair Procedure *I-439* and the following:

- Stamp *RF 5843* on fitting
- Build up with weld
- Grind smooth

1. Check thickness

5. PWIT or Exam

6. I-SF-1733-4

7. I-SF-1736-1

weld done 399

Jim Bunch 2-24-77
Princeton O.C. Manager Date

Providence O.A. Manager Date

ITT GRINNELL

QUALITY ASSURANCE MANUAL
WELDING PRODUCTS DIVISION

NO. Form W5.1A

PAGE (WE-1061)
3 OF 3

REV. APR. 68

DATE 5/3/76

WELD MATERIAL REQUISITION

CA
Bent

Date: 1-20-76

Heat Code NA

Requisition No. 309

Material: weld rod

Weld Material Specification: E7018 1/8 Ø

Heat No. 148T1401

Lot No. 148T1401 (Electrode)

Lot No.: NA (Flux)

Quantity.: _____

Weld Sta. Box No. 1

Distributed By _____

Appr. By Q.C. _____

- PE 5771
- PE 5772
- PE 6221
- PE 5836
- PE 5837
- PE 5838
- PE 5839
- PE 5840
- PE 5636
- PE 5843
- PE 5844
- PE 5854
- PE 5811 P2
- PE 5877

TT Grinnell

PENETRANT

EXAMINATION REPORT

PRINCETON, KENTUCKY

BCA
BWF6

| PE= | HEAT CODE | ITEM DESCRIPTION | SO. NO. | PE SPEC. | EXAMINER
(ENT-TC-A) LEVEL III | DATE | AREA EXAMINED | RESULTS | MATERIAL CODES |
|-----|-----------|-----------------------------|---------|----------|----------------------------------|---------|---------------|---------|----------------|
| 824 | ADY | 36" 7/8" x 1/8" 900 Y-60 | Y349-3 | W-99 | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 825 | ADY | 36" 7/8" x 1/8" 900 Y-60 | Y349-3 | W-99 | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 826 | HSCR | 4" 5/8" x 1/8" 900 W-99 | 64363-4 | W-99 | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 827 | " | " | " | " | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 828 | " | " | " | " | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 829 | " | " | " | " | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 830 | " | " | " | " | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 831 | " | " | " | " | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 832 | ADY | 36" 7/8" x 1/8" 900 Y-60 | Y349-3 | W-99 | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 833 | " | " | " | " | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 834 | ADY | 25" 15/16" x 1/8" 900 Y-60 | Y3700-3 | W-99 | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 835 | ADY | 24" x 1/8" x 1/8" W-99 | 64367-5 | W-99 | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 836 | ADY | 23" 1/2" x 1/8" x 1/8" W-99 | 64369-2 | W-99 | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 837 | HCCR | 4" 5/8" x 1/8" 900 W-99 | 64363-4 | W-99 | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 838 | " | " | " | " | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 839 | " | " | " | " | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 840 | " | " | " | " | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 841 | ADY | 36" 7/8" x 1/8" 900 Y-60 | Y349-3 | W-99 | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 842 | ADY | 20" 5/8" x 1/8" 900 W-99 | 64363-2 | W-99 | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 843 | ADY | 20" 5/8" x 1/8" 900 W-99 | 64363-3 | W-99 | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 844 | ADY | 11" x 1/8" x 1/8" W-99 | 64364-2 | W-99 | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 845 | ADY | 11" x 1/8" x 1/8" W-99 | 64364-2 | W-99 | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 846 | ADY | 11" x 1/8" x 1/8" W-99 | 64364-2 | W-99 | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 847 | ADY | 8" x 1/8" x 1/8" W-99 | 64364-1 | W-99 | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |
| 848 | ADY | 6" x 1/8" x 1/8" W-99 | 64364-1 | W-99 | W. H. J. L. | 8-11-77 | ✓ | AI | ✓ |

METHOD: VISIBLE DYE (SOLVENT REMOVABLE)
 PRE-CLEANER: MAGNIFLUX SPOT CHECK SKL-5
 PENETRANT: MAGNIFLUX SPOT CHECK (SPRAY) SKL-HF/SKL-5
 CLEANER: MAGNIFLUX SPOT CHECK SKL-5
 POST CLEANER: MAGNIFLUX SPOT CHECK SKL-5
 DEVELOPER: MAGNIFLUX SPOT CHECK (SPRAY) SKL-5

ABBREVIATIONS (RESULTS)
 A1: Acceptable - No apparent discontinuities.
 A2: Acceptable - Discontinuities not in excess of specification standards.
 R: Reject - Discontinuities in excess of specification standards.

The Colonial Machine Company, Inc.

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

Phone (814) 539-7033

December 15, 1977

ITT Grinnell Industrial Piping, Inc.
P. O. Box 566
Kernersville, NC 27284

CERTIFIED MILL TEST REPORT

CT
BWF-314

| | | |
|-------------------------------------|-------------------------------|---|
| YOUR ORDER NO.
KER 6215-B | OUR ORDER NO.
10162 | DATE SHIPPED
12/15/77 12/15/77 |
|-------------------------------------|-------------------------------|---|

| ITEM | TYPE | MATERIAL-SPEC. | SHIPPED | HEAT NO. | QNC NO. |
|---|------|--|---------|----------|---------|
| ASME Section III Class 2 Basic Issue Date July 1974 with Addendum 1974
ASME SA105 NORMALIZED | | | | | |
| 1 (8508) | | 10.00" x 6.625" Transition Piece per Det. CT-SM-2,
Part No. CT-2095-1 | 4 | 603038 | |
| 2 (8509) | | 10.00" x 8.75" Transition Piece per Det. CT-SM-3,
Part No. CT-2095-2 | 20 | 82199 | |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CB | TI | CO | OTHER ELEMENTS |
|------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| 1 | .32 | .24 | .015 | .023 | .24 | | | | | | | | |
| 2 | .27 | .75 | .010 | .026 | .23 | | | | | | | | |

INSPECTION WAIVED PER MR. RICHARD CURTIS ON 12/16/77.

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB 28 1978
SHEET 1 OF 3

| ITEM | TENSILE | 2% YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1. 2. 3. 4. 5. 6. ETC. |
|--|---------|----------|----------|--------|----------|--------------------|---------------------------------|
| 1 | 85,200 | 55,100 | 22 | 32.5 | | | Mill Source - Republic |
| 2 | 78,000 | 40,000 | 24.0 | 47.9 | | | Mill Source - Arco |
| It. 1 - Normalized at 1700 Deg. F. - 6-1/2 Hrs. - Air cooled. (Heat Treat Charts attached) | | | | | | | |
| It. 2 - Normalized at 1650 Deg. F. - 3-1/2 Hrs. - Air cooled. (Heat Treat Charts attached) | | | | | | | |

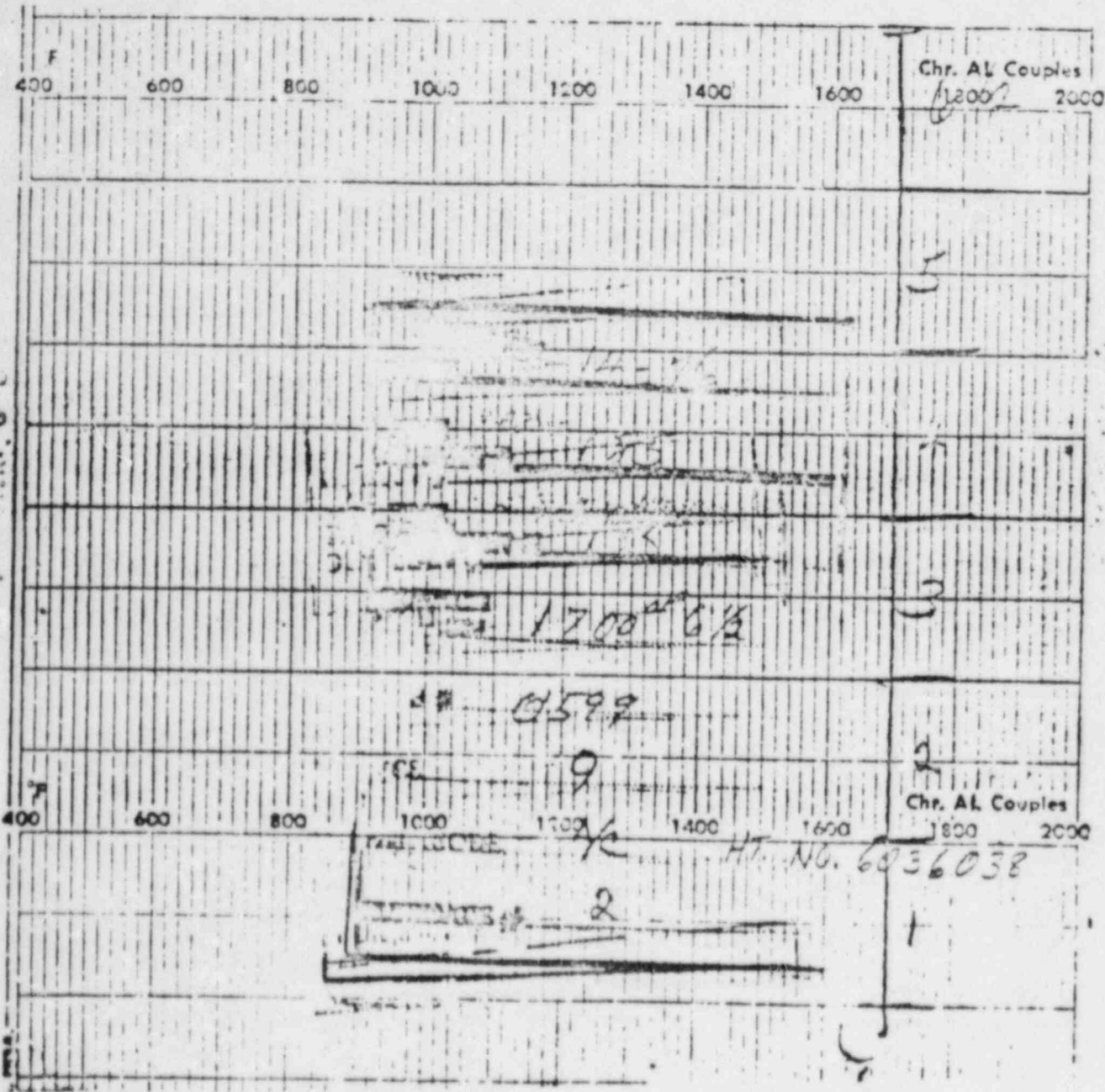
db We hereby certify that the information contained hereon has been taken from the original mill test report from the producing mill, which is now on file in our office. We also certify that the material and the items as listed above meet the specification and all requirements as covered by the specification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

By *Rosemary C. Wilson*

CT
Bwf-314

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB 28 1978
SHEET 2 OF 3

ITT GRINNELL ORDER KER 6215-B IT. 1



ITT GRINNELL ORDER KER 6215-B IT. 2

CT
Bwf: 014

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB 28 1978
SHEET 3 OF 3

DATE 3/15/77

TIME IN MAN # 213

TIME OUT MAN # 125

QUENCH MEDIUM 1650°F 3. hrs 1/2

JOB # 02070

PCS 10

INT. CODE # 0369 HT. 110. 82199

FURNACE # 2

1/2

3

2

1

Ms 630078 LETS & ENGINEERING CO. P. 113

DATE FEB 28 1978

800 1000 1200 1400 1600 1800

The Colonial Machine Company, Inc.

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

Phone (814) 589-7033

May 31, 1977

ITT Grinnell Industrial Piping Inc.
P. O. Box 566
Kernersville, NC 27284

CERTIFIED MILL TEST REPORT

Sub CT
SWF-4

| | | |
|-------------------------------------|-------------------------------|-------------------------------|
| YOUR ORDER NO.
KER 6156-P | OUR ORDER NO.
10038 | DATE SHIPPED
6/1/77 |
|-------------------------------------|-------------------------------|-------------------------------|

| ITEM | TYPE | MATERIAL SPEC. | SHIPPED | HEAT NO. | CMC CODE |
|------|------|--|---------|----------|----------|
| | | <u>ASME SA105 NORMALIZED</u> | | | |
| 1 | | 3/4" S/W Spec. Weld Bosses per SK CT-WB-1
Pt. No. Y*A*SE* CT-3002-1 (Rev. 0 10/14/76) | 40 | N94153 | AUA |
| 2 | | 1" Ditto Pt. No. Y*A*SE* CT-3002-2 | 20 | E87257 | ARA |
| 3 | | 2" Ditto Pt. No. Y*A*SE* CT-3002-3 | 12 | A00070 | AA1 |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CB | TI | CO | OTHER ELEMENTS |
|------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| 1 | .32 | .80 | .006 | .021 | .22 | | | | | | | | |
| 2 | .26 | .78 | .011 | .027 | .24 | | | | | | | | |
| 3 | .32 | .74 | .017 | .026 | .19 | | | | | | | | |



| ITEM | TENSILE | 2% YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1. 2. 3. 4. 5. 6. ETC. |
|------|---------|----------|----------|--------|----------|--------------------|---------------------------------|
| 1 | 76700 | 36800 | 34.0 | 58.2 | | | Mill Source - U.S. Steel |
| 2 | 75000 | 47000 | 32.0 | 61.3 | | | Mill Source - " " |
| 3 | 75360 | 42770 | 31.0 | 52.4 | | | Mill Source " " |

INSPECTION WAIVED PER MR. TOM WILSON ON 5/31/77.

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.

dg

By *Rosemary S. Waycross*

The Colonial Machine Company, Inc.

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

Phone (314) 589-7033

SEPT. 20, 1977

ITT GRINNELL INDUSTRIAL PIPING, INC.
P. O. BOX 566
KERNERSVILLE, NC 27284

CERTIFIED MILL TEST REPORT

CT
AP-4

| | | |
|----------------|---------------|--------------|
| YOUR ORDER NO. | OUR ORDER NO. | DATE SHIPPED |
| KER 8630-B | 10457 | 9/20/77 |

| ITEM | TYPE | MATERIAL SPEC. | SHIPPED | HEAT NO. | CMC COO. |
|-----------|------|--|---------|----------|----------|
| | | ASME SECTION III CLASS 2 (1974 ADDENDA THRU WINTER 1974)
ASME SA105 | | | |
| 1 (89590) | | 1.13" ACCESS HOLE PLUGS PER CT-AH-1, H = 2.188"
PART NO. CT-4012-1 | 12 | 78849 | ABF |
| 2 (89591) | | 1.13" DITTO H = 1.705" PART CT-4012-2 | 25 | 78849 | ABF |
| 3 (89592) | | 1.13" DITTO H = 2.609" PART CT-4012-3 | 16 | 78849 | ABF |
| 4 (89593) | | 1.13" ACCESS HOLE PLUGS PER CT-AH-2, H = 1.705",
PART CT-4012-4 (SQUARE HEAD) | 30 | 78849 | ABF |

| ITEM | C | MN | P | S | SI | CR | NI | MO | CU | CB | TI | CO | OTHER ELEMENTS |
|-------------|-----|-----|------|------|-----|----|----|----|----|----|----|----|----------------|
| 1
THRU 4 | .26 | .71 | .013 | .025 | .23 | | | | | | | | |

ITT & IPI
CA CK
TCY
DATE 9-29-77

| ITEM | TENSILE | 2% YIELD | % ELONG. | % R.A. | HARDNESS | HARDEN-
ABILITY | REMARKS: 1. 2. 3. 4. 5. 6. ETC. |
|-------------|---------|----------|----------|--------|----------|--------------------|---------------------------------|
| 1
THRU 4 | 75000 | 48500 | 32.0 | 58.6 | | | MILL SOURCE - COPPERWELD |

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.

By *Rosemary P. W...*

CERTIFIED MATERIALS TEST REPORT

WV-2011

Customer Order No. 4365 Rel.14-42

Order No. 711093-2

Shipped

National Welders Supply
P.O. Box N-93
3011 N. Liberty Street
Winston Salem, N.C. 27105

This material conforms to Specification
ITT Spec. ES 1073-1
SFA 5.1 Sec.III

E 7018

Trade Name or Trademark: Atom Arc 7018

Diameter Size: 3/32"
19,650 lbs.

Lot Number: 02-1-J728P
Heat Number: 411B6841

Carbon .04
Manganese 1.06
Chromium .03
Nickel .02
Silicon .48
Columbium + Tantalum
Molybdenum .01
Tungsten
Copper .02
Titanium
Phosphorus .012
Sulphur .016
Vanadium .03

Moisture @1800°F. 0.29%
Concentricity 4%
Type Steel A-285

| Test No. | Full | Split | Volts | Amps |
|--------------------|------|-------|-------|------|
| Tensiles & Impacts | 1 | 6 | 22 | 110 |

| Test Results: | As Welded
8 hrs. @1150°F. | Stress Relieved |
|---------------|------------------------------|-----------------|
| Yield | 73,100 | 65,400 |
| Tensile | 80,000 | 75,900 |
| Elongation | 28.0% | 30.0% |
| Red. of Area | 76.0% | 77.9% |

Charpy V-Notch Impacts Tested @-20°F.

| | | |
|----------|----------------|----------------|
| Impacts | 42-58-63-72-82 | 68-72-80-92-98 |
| Lat.Exp. | 38-48-52-59-68 | 58-61-67-78-83 |
| %Shear | 20-20-20-20-30 | 20-30-30-30-30 |

Filletts: OK Vertical Overhead

ASME QUALITY SYSTEM CERTIFICATE (MATERIAL)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978

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

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 21st day of November 1977

SEAL Arthur J. Donahy
Notary Public

My commission expires: 8/21/78

BY P. J. Miller

RECITEL
200
ITTG - IPI
QUALITY CONTROL
APPROVED:
T. C. WILSON
DATE FEB. 22 1978
SHEET 1 OF 1

CERTIFIED MATERIALS TEST REPORT

WMS-2021

Customer Order No. 4372

Order No. 150310-1

National Welders Supply Co.
Ref. 14-5406
3011 N. Liberty Street
Winston Salem, N.C. 27105

Shipped _____

This material conforms to Specification
ES 1073-3 (SFA 5.1 Sec. 1)

ITIG - IPI
QUALITY CONTROL
2 APPROVALS
T. C. WILSON
DATE MAR 1 1978
SHEET 1 OF 1

Type E 7018

Test No. 1145
X-Rays Satisfactory
Control No. NNN009

Trade Name
or Trademarks:

Atom Arc 7018

Diameter Size:

1/8"
50# sample returned

Lot Numbers:

02-1-L719R

Heat Numbers:

421B5451

Moisture @1800°F. 0.11%
Concentricity 4%
Type Steel A-285

| | |
|----------------------|------|
| Carbon | .04 |
| Manganese | 1.01 |
| Chromium | .03 |
| Nickel | .03 |
| Silicon | .43 |
| Columbium + Tantalum | |
| Molybdenum | .01 |
| Tungsten | |
| Copper | .02 |
| Titanium | |
| Phosphorus | .010 |
| Sulphur | .015 |
| Vanadium | .02 |

| | | | | |
|--------------------|------|-------|-------|------|
| Test No. | Full | Split | Volts | Amps |
| Tensiles & Impacts | 1 | 5 | 22 | 135 |

| | | |
|---------------|-----------------------|-----------------|
| Test Results: | As Welded | Stress Relieved |
| | 16 hrs. @1100-1200°F. | |
| Yield | 67,000 | 65,700 |
| Tensile | 77,400 | 76,900 |
| Elongation | 28.0% | 31.0% |
| Red. of Area | 67.3% | 78.1% |

Charpy V-Notch Impacts Tested @-20°F.
Impacts 96-106-107-107-121 88-92-94-109-110
Lat. Exp. 72-71-71-75-77 72-71-78-79-81
% Shear 40-50-50-50-50 20-30-20-40-40

Filletts: OK Vertical Overhead
ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 7th day of March 1978

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

SEAL

Arnette P. Ramsey
Notary Public

CHEMSTRON CORPORATION
WELDING PRODUCTS DIVISION

My commission expires: 8/21/78

BY

[Signature]

CERTIFIED MATERIALS TEST REPORT

WV-203

Customer Order No. 4374 (14-4651)

Order No. 153016-1

National Welders Supply Co.

P.O. Box N-93
 3011 N. Liberty Street
 Winston Salem, N.C. 27105

Shipped _____

This material conforms to Specification
 ES 1073-3 & ES 1084-4,
 ASME SFA 5.1 Sec. III NA37

Trade Name or Trademark: **Atom Arc 7018**
 Diameter Size: **5/32"**
 20,000 lbs.
 Lot Number: **03-3-B821K**
 Heat Number: **482B5101**

ITTG - IFI
 QUALITY CONTROL
 APPROVED
L.P.
 DATE 4-10-78
 SHEET 1 OF 1

Type E 7018

Test No. 1149
 X-Rays Satisfactory
 Control No. NNN050

Moisture @1800°F. 0.11%
 Concentricity 3%
 Type Steel A-285

| | |
|----------------------|------|
| Carbon | .03 |
| Manganese | .92 |
| Chromium | .03 |
| Nickel | .03 |
| Silicon | .28 |
| Columbium + Tantalum | |
| Molybdenum | .01 |
| Tungsten | |
| Copper | .02 |
| Titanium | |
| Phosphorus | .009 |
| Sulphur | .016 |
| Vanadium | .01 |

| Test No. | Full | Split | Volts | Amps |
|--------------------|------|-------|-------|------|
| Tensiles & Impacts | 1 | 7 | 24 | 170 |

| Test Results: | As Welded | Stress Relieved |
|---------------|-----------|------------------------|
| | | 16 hrs. @ 1100-1200°F. |
| Yield | 68,000 | 62,000 |
| Tensile | 77,500 | 72,700 |
| Elongation | 28.0% | 32.0% |
| Red. of Area | 71.2% | 78.1% |

Charpy V-Notch Impacts Tested @ -20°F.
 Impacts 128-138-150-185-214 120-172-180-204-208
 Lat. Exp. 85-86-84-82-91 81-80-86-91-85
 % Shear 60-60-70-80-80 50-80-80-90-90

Fillets: OK Vertical Overhead
 ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
 NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

State of Penna.)
 County of York) SS

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

Subscribed and sworn to before me
 this 6TH day of April 1978

CHEMETRON CORPORATION
 WELDING PRODUCTS DIVISION

SEAL *[Signature]*
 Notary Public

My commission expires: 8/21/78

BY *[Signature]*

CERTIFIED MATERIALS TEST REPORT

W2
203

Customer Order No. 4374 (14-4631)

Order No. 153016-1

National Welders Supply Co.

P.O. Box N-93

3011 N. Liberty Street

Winston Salem, N.C. 27105

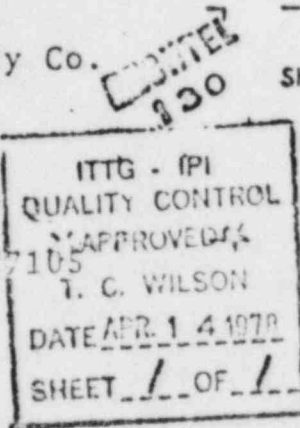
Atom Arc 7018

Shipped _____

This material conforms to Specification
ES 1073-3 & ES 1084-4,
ASME SFA 5.1 Sec. III NA3

Type E 7018

Test No. 1149
X-Rays Satisfactory
Control No. NNN050



Trade Name
or Trademark:

Diameter Size:

Lot Numbers:

Heat Numbers:

5/32"
20,000 lbs.
03-3-B821K
482B5101

Moisture @1800°F. 0.11%
Concentricity 3%
Type Steel A-285

| Test No. | Full | Split | Volts | Amps |
|--------------------|------|-------|-------|------|
| Tensiles & Impacts | 1 | 7 | 24 | 170 |

| Test Results: | As Welded | Stress Relieved |
|---------------|------------------------|-----------------|
| | 16 hrs. @ 1100-1200°F. | |
| Yield | 68,000 | 62,000 |
| Tensile | 77,500 | 72,700 |
| Elongation | 28.0% | 32.0% |
| Red. of Area | 71.2% | 78.1% |

Charpy V-Notch Impacts Tested @ -20°F.
Impacts 128-138-150-185-214 120-172-180-204-214
Lat. Exp. 85-86-84-82-91 81-80-86-91-85
% Shear 60-60-70-80-80 50-80-80-90-90

Filletts: OK Vertical Overhead
ASME QUALITY SYSTEM CERTIFICATE (MATERIALS)
NUMBER N-1224 EXPIRES ON SEPTEMBER 8, 1978.

State of Penna.)
County of York) SS

Subscribed and sworn to before me
this 6TH day of April 1978

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

SEAL [Signature]
Notary Public

My commission expires: 8/21/78

CHEMETRON CORPORATION
WELDING PRODUCTS DIVISION

BY [Signature]

CERTIFICATE OF ANALYSIS

UNION CARBIDE CORPORATION
LINDE DIVISION
WELDING MATERIALS
P.O. BOX 710, ASHTABULA, OHIO 44004

1/16/78

CUSTOMER: IIT GRINNELL
OLD HIGHWAY 421
KEMMERSVILLE NC 27284

YOUR ORDER NO.: 11-137-KER 9113
LINDE S.O. NO.: _____

WVW 206

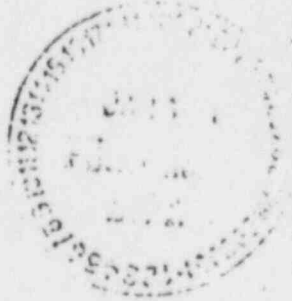
MATERIAL: Linde 65

This is to certify that this material will conform to AWS A5.18-69
ASME SA5.18. It has the following chemical analysis meeting the
requirements of classification E70S-2:

HEAT NUMBER - 065214

| | | |
|-------------|---|------|
| Carbon | - | .04 |
| Manganese | - | 1.17 |
| Phosphorous | - | .008 |
| Sulphur | - | .015 |
| Silicon | - | .54 |
| Aluminum | - | .12 |
| Titanium | - | .07 |
| Zirconium | - | .041 |

**CHECKED
120**



Ladle Analysis:

Howard Tucker - RLC
Quality Assurance - Welding Materials Plant
Union Carbide Corporation - Linde Division

IITG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB. 21 1978
SHEET 1 OF 4

Industrial Engineering Inc.

SUBJECT: Welding Filler Materials

WIRE: Linde G5, Heat No. 065234

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 5-2, that the test results shown in Tausig Associates, Inc. Report 23499 were produced from these test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This may also be used on impact-tested material with a minimum service temperature of +30 degrees F.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 Edition.

WW-206

John F. Elder 2/2/77
J. F. Elder

QCINTEL
130

FIG - 101
QUALITY CONTROL
APPROVED
T. G. WILSON
DATE FEB 21 1977
SHEET 2 OF 4

MATERIAL TEST REPORT 123490

R & D TEST #435

Linde G5, Heat No. 065214

WW-2061

The following tests were performed in accordance with SFA 5.18, E70S-2:

1. All-Weld Metal Tension Test:

| <u>As-Welded:</u> | <u>Heat-Treated*</u> |
|------------------------------|--------------------------|
| Tensile Strength: 79,200 psi | Tensile Strength: 76,000 |
| Yield Point: 74,700 | Yield Point: 66,400 |
| Elongation (%) in 2": 28 | Elongation (%) in 2": 30 |

2. Charpy V-Notch Impact Tests:

As-Welded:

| <u>Temp.</u> | <u>Ft. lbs.</u> | <u>Lat. Exp. (mils)</u> | <u>%Shear</u> |
|--------------|-----------------|-------------------------|---------------|
| -20 | 143 | 91 | 90 |
| -20 | 123 | 79 | 80 |
| -20 | 100 | 69 | 70 |
| -20 | 111 | 75 | 80 |
| -20 | 111 | 80 | 80 |

Heat-Treated*

| <u>Temp.</u> | <u>Ft. lbs.</u> | <u>Lat. Exp. (mils)</u> | <u>%Shear</u> |
|--------------|-----------------|-------------------------|---------------|
| +30 | 80 | 63 | 60 |
| +30 | 97 | 73 | 70 |
| +30 | 107 | 73 | 70 |

**REC'D
13C**

3. Chemical Analysis: (additional elements required by ASME Section III, Cl. 1 for information only)

Ni: < 0.05 V : < 0.01
 Cr: < 0.05 Cu : 0.12
 Mo: < 0.03

4. Radiography Test: Acceptable

ITTG - IPI
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE FEB 21 1978
 SHEET 3 OF 4

*Heat-treated for 16 hours at 1150 degrees F, cooling to 600 degrees F shall be 300 degrees F/hr. (\pm 100 degrees F/hr.)

This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by ITI Grinnell IPI and our subcontractor are in compliance with the requirements of SFA 5.18 and the applicable material requirements of LB-2600 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by ITI Grinnell IPI. This report, in conjunction with the Linde Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.

WW-2061

J. F. Elder
J. F. Elder Date

INSURED
ISO

ITIG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE FEB. 21 1978
SHEET 4 OF 4



UNION CARBIDE CORPORATION
 LINDE DIVISION
 WELDING MATERIALS
 P.O. BOX 710, CANTON, OHIO 44704

Feb. 10, 1978

CUSTOMER: ITT Grinnell
 7 Greensboro Reg. Airport
 Greensboro, N.C. - 27400

YOUR ORDER NO. 11-258 FEB 9419

LINDE S.O. NO. 711256A1

1/8" dia.
 S/L Rod

W-207

MATERIAL: Linde 65

This is to certify that this material will conform to AMS A5.18-69
ASME SA5.18. It has the following chemical analysis meeting the
 requirements of Classification WCS-2:

| | | |
|--------------------|---|---------------|
| <u>HEAT NUMBER</u> | - | <u>065220</u> |
| Carbon | - | .05 |
| Manganese | - | 1.11 |
| Phosphorous | - | .009 |
| Sulphur | - | .022 |
| Silicon | - | .50 |
| Aluminum | - | .071 |
| Titanium | - | .06 |
| Zirconium | - | .053 |

W-207
 220

ITTG - IPI
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE MAY 22 1978
 SHEET 1 OF 1

Ladle Analysis

HJT/rlr

Thomas J. ...
 Quality Assurance - Welding Materials
 Plant - Union Carbide Corporation
 Linde Division

Industrial Piping Inc.

SUBJECT: Welding Filler Materials
WIRE: Linde 65, Heat No. 065220

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 5-2, that the test results shown in Taussig Associates, Inc. Report 24131 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat-treated condition (total time not to exceed 20 hours). This may also be used on impact-tested material with a minimum service temperature of +30 degrees F.

This also certifies that the subject material is in compliance with all applicable addenda of ASME Section III, CL 1 through the 1977 Edition.

WV-207

J. F. Elder 3/29/72
J. F. Elder Date
Materials Engineer

DEPT 130

ITIG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 22 1972
SHEET 2 OF 2

MATERIAL TEST REPORT #24131

R & D TEST #460

WW-207

Linde 65, Heat No. 065220

The following tests were performed in accordance with SPA 5.18, E708-2:

1. All-Weld Metal Tension Test:

As-Welded:

Heat Treated*

Tensile Strength: 81,850 psi
Yield Point: 68,700
Elongation(%) in 2": 30

Tensile Strength: 78,750 psi
Yield Point: 70,825
Elongation(%) in 2": 31

2. Charpy V-Notch Impact Tests:

As-Welded:

| Temp. | Ft. lbs. | Lat. Exp. (mils) | %Shear |
|-------|----------|------------------|--------|
| -20°F | 49 | 39 | 40 |
| -20 | 17 | 19 | 20 |
| -20 | 44 | 35 | 40 |
| -20 | 63 | 46 | 50 |
| -20 | 76 | 53 | 60 |

Heat-Treated*

| Temp. | Ft. lbs. | Lat. Exp. (mils) | %Shear |
|-------|----------|------------------|--------|
| +30°F | 103 | 66 | 70 |
| +30 | 70 | 59 | 60 |
| +30 | 70 | 51 | 50 |

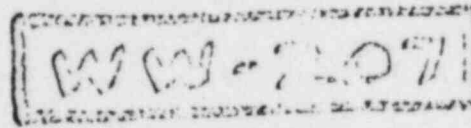
ITIG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 24 1974
SHEET 3 OF 9

COPIES
120

3. Chemical Analysis: (Additional elements required by ASME Section III, Cl. 1 for information only)

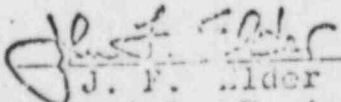
Ni : < 0.05 V : < 0.01
Cr : < 0.05 Cu : 0.10
Mo : < 0.03

4. Radiography: Acceptable



*Heat-treated for 16 hours at 1150 degrees F, cooling to 600 degrees F shall be 300 degrees F/hr. (± 100 degrees F/hr.).

This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by ITT Grinnell IPI and our subcontractor are in compliance with the requirements of SPA 5.18 and the applicable material requirements of NB-2400 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by ITT Grinnell IPI. This report, in conjunction with the Linde Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.


J. F. Elder 3/29/73
Materials Engineer Date

REGISTER
130

ITTG - IPI
QUALITY CONTROL
APPROVED:
T. C. WILSON
DATE MAY 22 1973
SHEET 4 OF 9

ITG Associates Inc.

6955 N. HAMILIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100

METAL

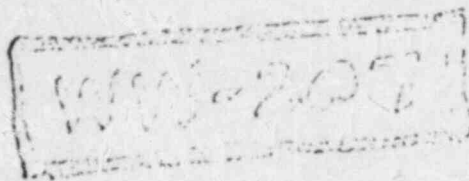


TESTING

Report No. 24151 - March 28, 1978

ITT Grinnell Industrial Piping, Inc.
P.O. Box 566 - Hwy 421
Kernersville, North Carolina 27286

Attn: Mr. J. F. Elder



RECEIVED
ISS

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 22 1978
SHEET 5 OF 7

S U B J E C T

Mechanical and Chemical Testing of the Weld
Metal of Two (2) Plates Marked Test No. 460.
Per Requisition No. 34622.

BACKGROUND:

Two (2) welded plate assemblies were submitted to our laboratory for chemical analysis, Charpy impact and tension testing of the weld metal. The assemblies had been identified as plate no. 460, 1/8" Linde 65, Heat no. 065220. One plate was to be tested as-welded and the other tested after a stress relieving heat treatment.

TEST RESULTS:

061001-2007

Chemical Analysis:

The weld metal of plate no. 460 was drilled in a manner which prevented removal of material from the base metal. These drillings were cleaned and subjected to a quantitative chemical analysis with the following results:

| | |
|------------|-------|
| Nickel | <.05% |
| Chromium | <.05 |
| Molybdenum | <.03 |
| Vanadium | <.01 |
| Copper | .10 |

ITIG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE: 11/11/55
SHEET 6 OF 10

Heat Treatment:

The plate no. 460 was cut to permit it to fit into heat treating furnace. The pieces were heated to 1150°F and held for 16 hours at temperature. Cooling was done at a rate of less than 300°F/hr. to below 600°F.

Tension Testing:

Two, round, all weld metal tension test specimens were machined from plate no. 460, as-welded and heat treated. Both specimens were subjected to standard tension testing giving the results as follows:

| | <u>Heat Treated</u>
<u>No. 460</u> | <u>As-Received</u>
<u>No. 460</u> |
|-----------------------------------|---------------------------------------|--------------------------------------|
| Tensile Strength, psi. | 78,750 | 81,850 |
| Yield Strength, psi. (.2% Offset) | 70,825 | 68,700 |
| % Elongation in 2 inches | 31 | 30 |
| % Reduction of Area | 68 | 70 |

Impact Testing:

A total of eight, full size (10mm x 10mm), Charpy V-notch impact test specimens were machined from the two submitted plate assemblies. Five of the specimens were from the as-welded plate and three were from the heat treated plate. All were notch in the weld metal and removed and oriented per NB 2322 of the ASME Boiler & Pressure Vessel Code.

No. 460 - As-Received:

| <u>Test Temperature</u> | <u>Absorbed Energy (ft-lbs)</u> | <u>Mils Lateral Expansion</u> | <u>Percent Shear</u> |
|-------------------------|---------------------------------|-------------------------------|----------------------|
| - 20°F | 49 | 29 | 40 |
| - 20°F | 17 | 19 | 20 |
| - 20°F | 44 | 35 | 40 |
| - 20°F | 63 | 46 | 50 |
| - 20°F | 76 | 56 | 60 |

No. 460 - Heat Treated:

| | | | |
|--------|-----|----|----|
| + 30°F | 103 | 66 | 70 |
| + 30°F | 70 | 59 | 60 |
| + 30°F | 70 | 51 | 50 |

WWW-207

DEC 11 1960

MAH:i

Respectfully submitted,

Mark A. Hinesman

Mark A. Hinesman
Staff Engineer

TAUSSIG ASSOCIATES, INC.

ITTG - IPI
QUALITY CONTROL
T. C. WILSON
DATE MAY 2
SHEET 7 OF 9

Taussig Associates Inc.

6955 N. HAMMILL AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



PRODUCT TESTING FAILURE INVESTIGATION MATERIAL EVALUATION QUALITY ASSURANCE

TO: ITT Grinnell Industrial Piping
P. O. Box 266 - Box 421
Karnersville, N. C. 27284

Report No.: 24131-1a
Date: 5-26-78
Your Order No.:

Attention: Mr. John Elder

SUBJECT: Charpy Impact Testing at the Weld Metal of Test Plate
#460A; 1/8" Linde 65, Heat #06522 - As-Welded.

TEST RESULTS:

Impact Testing:

WW-207

Specimen Size: 10mm x 10mm
Notch Type: V
Test Temperature: + 30°F

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\$20

| <u>Specimen Number</u> | <u>Absorbed Energy (ft-lbs)</u> | <u>Mils Lateral Expansion</u> | <u>Percent Shear</u> |
|------------------------|---------------------------------|-------------------------------|----------------------|
| G1 | 105 | 67 | 60 |
| G2 | 137 | 70 | 70 |
| G3 | 101 | 66 | 60 |

All specimens were removed and oriented in accordance with NB-2332.

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE MAY 30 1978
SHEET 8 OF 9

Call...

TAUSSIG ASSOCIATES, INC.
VA - 11/11

WW-207

SUBJECT: Welding Filler Materials
WIRE: Linde 65, Heat No. 065220

This is to certify that the subject material was welded in to a test plate in accordance with WB-2340 using WPS 5-2. These test results are shown in Taussig Associates, Inc. Report No. 24131-1a and supplement the results shown in Taussig Associates, Inc. Report No. 24131.

Charpy Impacts

| Temp. | Ft.-lbs. | Lat. exp. (mils) | %Shear |
|-------|----------|------------------|--------|
| +30°F | 105 | 67 | 60 |
| +30°F | 137 | 70 | 70 |
| +30°F | 101 | 66 | 60 |

J. F. Eider
J. F. Eider
Materials Engineer

ITIG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE JUN 1 1970
SHEET 1 OF 1

The Reid - Avery Company
Dundalk, Baltimore, Md. 21222

ASSURANCE
 TEST REPORT

DATE: 4/11/78

SOLD TO: **ITT Grinnel**
 Old Highway 421
 Kernersville, NC 27284

SHIPPED TO:

DATE SHIPPED: 11/30/78

P.O. NO.:

P.O. NO.: *Rec 6999*

SPECIFICATION:

| ITEM | POUNDS | SIZE | TYPE | LOT NO. | HEAT NO. |
|------|--------|------|---------|---------|----------|
| 1. | | 1/8 | 128 HMM | | 510346 |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |

W1001-2001

CHEMICAL ANALYSIS OF WIRE

| ITEM | C | Mn | P | S | Si | Cr | Ni | Mo | Ti | Cu |
|------|-----|------|------|------|-----|------|------|-----|-----|------|
| 1. | .13 | 1.71 | .019 | .013 | .05 | .020 | .040 | .53 | .00 | .041 |
| 2. | | | | | | | | | | |
| 3. | | | | | | | | | | |
| 4. | | | | | | | | | | |
| 5. | | | | | | | | | | |
| 6. | | | | | | | | | | |

DEBITEL
 130

ITTG - IFI
 QUALITY CONTROL
 APPROVED
 T. C. WILSON
 DATE JUN 13 1978
 SHEET 1 OF 5

ADDITIONAL TEST RESULTS

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

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

Notary Public
 My commission expires _____

[Signature]
 QUALITY ASSURANCE DEPARTMENT

WV-209

SUBJECT: Welding Filler Materials
WIRE: RACo 128 HMM: Ht. No. 519346
FLUX: Linde 80; Lot 0575, Con. 8290.

This is to certify that the subject material was welded into test plates as shown in SFA 5.1 using WPS 3-1, that the test results shown in Taussig Associates, Inc. Report 22367-1 were produced from those test plates and that the radiographs of the test plates were acceptable.

The subject material is acceptable for use on ASME Section III fabrication in the as-welded condition or post-weld heat treated condition (total time not to exceed 20 hours). This material shall not be used on impact-tested fabrication.

This certification affirms that the contents of this report are correct and accurate and that all test results and operations performed by ITT Grinnell IPI and our Subcontractor are in compliance with the requirements of SFA 5.23 for an F70-EA3-A3 type classification, and the applicable material requirements of NB-2400 of Section III, Cl. 1 of the ASME Boiler and Pressure Vessel Code, as designated by ITT Grinnell IPI. This report, in conjunction with the RACo Certificate of Analysis, is in compliance with all applicable addenda of ASME Section III, Cl. 1 through the 1977 edition.

DESITE
120

ITTG - IPI
QUALITY CONTROL
★APPROVED★
T. C. WILSON
DATE JUN 13 1978
SHEET 2 OF 5

J. F. Elder 3/3/78
J. F. Elder Date

Taussig Associates Inc.

6955 N. HAMLIN AVE., CHICAGO, ILL. 60645 (AC 312) 676 2100



Report No. 22867-1 - December 14, 1977

ITT Grinnell Industrial Piping
P. O. Box 566 - Hwy 421
Kernersville, NC 27284

Attn: Mr. J. F. Elder

WW-2091

S U B J E C T

Mechanical & Chemical Testing of the Weld
Metal of Test Plate #428.

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190

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APPROVED
T. C. WILSON
DATE JUN. 13 1978
SHEET 3 OF 5

Corrections:

3-22-78 - Heat #519346 on page 1.

BACKGROUND:

Two (2) welded plate assemblies were submitted to our laboratory for chemical analysis, charpy impact and tension testing of the weld metal. The assemblies had been identified as plate number 428, RACO 128HMM, Ht. #519346, Linde 80, Lot 0575, Con. 8290. One plate was to be tested as-welded and the other tested after a stress relieving heat treatment.

TEST RESULTS:

Chemical Analysis:

The weld metal of plate number 428 was drilled in a manner which prevented removal of material from the base metal. These drillings were cleaned and subjected to a quantitative chemical analysis with the following results:

| | |
|------------|------|
| Carbon | .05 |
| Manganese | 1.23 |
| Phosphorus | .014 |
| Sulfur | .013 |
| Silicon | .40 |
| Nickel | <.05 |
| Chromium | <.05 |
| Molybdenum | .53 |
| Copper | .15 |
| Vanadium | <.01 |

428-209

Heat Treatment:

Plate number 428 was cut to permit it to fit into a heat treating furnace. The pieces were heated to 1100°F and held for 16 hours at temperature. Cooling was done at a rate of less than 200°F/Hr. to below 800°F. The pieces were then marked 428H.

Tension Testing:

Two, round, all weld metal tension test specimens were machined from plate number 428, as-welded and heat treated. Both specimens were subjected to standard tension testing giving the results as follows:

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JUN 13 1978

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APPROVED
T. C. WILSON
DATE JUN 13 1978
SHEET 4 OF 5

| | No. 428H
Heat Treated | No. 428
As-Welded |
|------------------------|--------------------------|----------------------|
| Tensile Strength, Psi. | 83,875 | 83,325 |
| Yield Strength, Psi. | 68,725 | 70,325 |
| % Elongation in 2" | 27 | 27 |
| % Reduction of Area | 61 | 61 |

Impact Testing:

Five (5), full size (10mm x 10mm), Charpy V-Notch impact test specimens were machined from the heat treated plate assembly. All were notched in the weld metal.

No. 428H - Heat Treated:

| <u>Test Temperature</u> | <u>Absorbed Energy (ft-lbs)</u> | <u>Mils Lateral Expansion</u> | <u>Percent Shear</u> |
|-------------------------|---------------------------------|-------------------------------|----------------------|
| 0°F | 45 | 39 | 40 |
| 0°F | 40 | 36 | 40 |
| 0°F | 42 | 35 | 40 |
| 0°F | 48 | 41 | 40 |
| 0°F | 50 | 41 | 50 |

Respectfully submitted,

Mark A. Hineman

Mark A. Hineman
Staff Engineer

TAUSSIG ASSOCIATES, INC.

WW-2091

MAH:ln

ITTG - IPI
QUALITY CONTROL
APPROVED
T. C. WILSON
DATE JUN 1 8 1978
SHEET 5 OF 5

130

IIT Grinnell Industrial Piping, Inc.

QUALITY CONTROL

FORM 1

FABRICATION NONCONFORMANCE REPORT

REPORT NO. IP-1720

| | | | |
|--|-----------------------------|---|----------------------------------|
| PROJECT
<u>Duke Power Co. Cottleville</u> | CONTRACT NO.
<u>5137</u> | CODE SPEC.
<u>ASME SEC. I, CL. 2</u> | REGISTER NO.
<u>CT-01-371</u> |
|--|-----------------------------|---|----------------------------------|

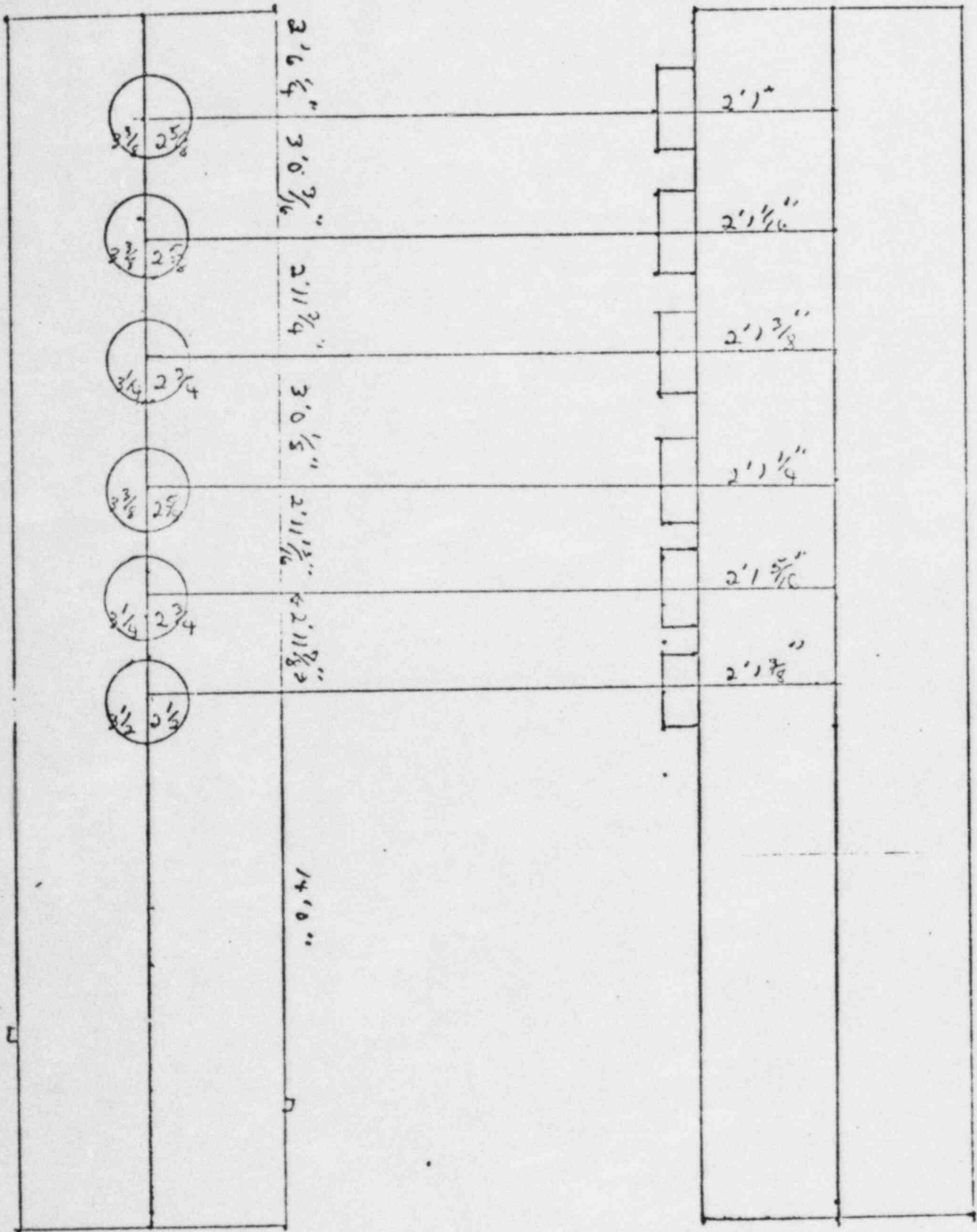
1. DESCRIPTION OF NONCONFORMANCE: ① Pipe is bowed at weld ②
this makes the field end of item #2 out of level and
5/8" higher from weld ② to the field end
② item # 8 is 1/2" off center
items # 5 & 7 are 1/4" off center and items # 3, 4
and 6, are 3/8" off center
NOTE: F.F.S.R. has been completed

| | | | | | |
|------|-------|-------|-------|------------------------------|-------|
| SHOP | DATE: | INSP. | DATE: | Q.C.: <u>Ron [Signature]</u> | DATE: |
|------|-------|-------|-------|------------------------------|-------|

2. RECOMMENDED ACTION: Engineer to obtain customer
approval of above dev. and issue as revised
as built drawing

3. DISPOSITION: 1+
1.1.1 To be done by 1.1.1.1
report.

4. NONCONFORMANCE REPORT CLOSED: _____ Q.C. APPROVAL: _____ DATE: _____



3'6"

QUALITY CONTROL
FABRICATION NONCONFORMANCE REPORT

REPORT NO. IP-1732

| | | | |
|--|-----------------------------|--|----------------------------------|
| OBJECT
<u>Duke Power Co. Contract</u> | CONTRACT NO.
<u>7127</u> | CODE SPEC.
<u>PS&E SECT 10.12</u> | REGISTER NO.
<u>CT-01-32A</u> |
|--|-----------------------------|--|----------------------------------|

DESCRIPTION OF NONCONFORMANCE: (1) Pipe is bowed at weld (2) this makes the field condition #2 out of level and 5/8" higher from weld (2) to the field End (3) item # 8 is 1/2" off center items # 5 & 7 are 1/4" off center and items # 3, 4 and 6 are 3/8" off center
 Note: F.F.S.R. has been completed

| | | | | | |
|----|-------|-------|-------|-----------------------------|----------------------|
| CP | DATE: | INSP. | DATE: | Q.C. <u>Ron [Signature]</u> | DATE: <u>6-28-70</u> |
|----|-------|-------|-------|-----------------------------|----------------------|

RECOMMENDED ACTION: Engineer to advise customer approval of above dem. and issue a revised as built drawing

APPROVED
 DUKE POWER CO.
 DATE: 21 DEC 1970
MECHANICAL & NUCLEAR DIVISION

| | | |
|--------------|-------------------------|----------------------|
| DISPOSITION: | Q.C. <u>[Signature]</u> | DATE: <u>6-28-70</u> |
|--------------|-------------------------|----------------------|

after completion of revision forward field to Q.C. to close fabrication nonconformance report.



ITT Grinnell
Industrial Piping, Inc.

P. O. Box 566
Kernersville, N. C. 27284
(919) - 993-4831
Telex No.: 806-439

2-15-79
Duke Power Company
P. O. Box 2178
Charlotte, North Carolina 28201

Attention: Q. A. Manager, Engineering & Services
Quality Assurance Department

Subject: Quality Assurance
Catawba #1 & 2
Duke Power Order No. C-12517
Our Contract 7127-7128

Doc # 112

Gentlemen:

Attached are requested Quality Assurance Papers on the following:

Duke Spec. No. and Title: S M E C F

Duke Classification Identification: B E G

GRINNELL Purchase Order Number:

Purchased From: Kernersville

Material Description: CT-1-37X / CT-5A-7D
CT-4-135 / CT-CF-135

Test Reports attached: FORM 930.1 WITH ATTACHMENTS AS INDICATED THERE

We have examined these reports and find that the material furnished meets the requirements of the applicable specifications.

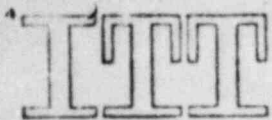
Very truly yours,

ITT GRINNELL INDUSTRIAL PIPING, INC.

G. P. Gresson / *HR.*
G. P. Gresson
Project Engineer, IPD

GPG/rc

Enclosures



ITT Grinnell
Industrial Piping, Inc.

P. O. Box 566
Kernersville, N. C. 27204
(919) - 993-4831
Telex No.: 806439

2-15-79
Duke Power Company
P. O. Box 2178
Charlotte, North Carolina 28201

Attention: Q. A. Manager, Engineering & Services
Quality Assurance Department

Subject: Quality Assurance
Catawba #1
Duke Power Order No. C-12517
Our Contract 7127

Doc # 112

Gentlemen:

Attached are requested Quality Assurance Papers on the following:

Duke Spec. No. and Title: SM

Duke Classification Identification: B

GRINNELL Purchase Order Number:

Purchased From: Kernersville

Material Description: CT-1-37X/CT-SM-7D

Test Reports attached: X-RAY FILM AND READER SHEETS

We have examined these reports and find that the material furnished meets the requirements of the applicable specifications.

Very truly yours,

ITT GRINNELL INDUSTRIAL PIPING, INC.

G. P. Greeson
G. P. Greeson
Project Engineer, IPD

GPG/rc

Enclosures

MA-6
1-78

ITT GINNELL INDUSTRIAL PIPING, INC.
FINAL LOADING SHEET

Preston Mason

Bill of Lading No. _____

Loading Sheet No. 0203 Date Loaded 1/25/79

Customer Order No. CONTRACT # 7127 Date Shipped _____ Routing _____
 Sold to DUKE POWER COMPANY Address P. O. BOX 32307
C/O MILL POWER SUPPLY Address CHARLOTTE, N.C. 28232
 Ship to DUKE POWER COMPANY Address CATAWBA NUCLEAR STATION
C/O D. G. BEAN Address SC HWY. 274, SOUTH CAROLINA

| Destination | | Car Number | | Weight | No. Pcs. | Rate |
|-----------------------------|---------|-----------------|--------|---------|----------|------|
| SC HWY. 274, SOUTH CAROLINA | | YARBROUGH #X-10 | | 17,282 | 2 | |
| Kernersville Plant No. | | Piece Mark | Weight | Remarks | | |
| C T | 1 3 7 X | CT-SM-7D | 14301 | | | 1 |
| C T | 4 1 3 5 | CT-CF-135 | 2981 | | | 2 |
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RECEIVED

Project Engineering Dept.

Doc #112