



the pressure equipment safety authority

9410 - 20 Ave N.W.
Edmonton, Alberta, Canada T6N 0A4
Tel: (780) 437-9100 / Fax: (780) 437-7787

December 13, 2006

Ron Sobie
PAINTEARTH ENERGY SERVICES INC
BOX 24
HALKIRK, AB

Dear Ron Sobie,

The welding procedures received on December 06, 2006 are accepted for registration as follows:

Reg. No. : WP-1684.2

Accepted on: December 13, 2006

Tracking No. : 2006-09148

Reg Type : New Design

Spec. No. : PESI-1SR REV 0

Registered under owner / manufacturer name PAINTEARTH ENERGY SERVICES INC

Please note the acceptance of the registration does not allow the use of this welding procedure in the construction, modification, or repair of any boiler, pressure vessel, pressure piping system or fitting in Alberta unless the contractor/manufacturer has registered a Quality Control system for such work with ABSA.

Welding procedures, which specify impact testing, have been accepted in accordance with A.S.M.E. Section IX only. Other A.S.M.E. Code Sections may have additional requirements respecting impact testing.

An invoice covering survey and registration fees will be forwarded from our Revenue Accounts.

Enclosed is a stamped welding procedure for your reference.

Sincerely,

ROSEBERG, BOB, P. Eng.
Design Survey Engineer

WELDING PROCEDURE SPECIFICATION NO: PESI-1sr (Rev.0)

WELDING PROCEDURE QUALIFICATION RECORD NO(S): CCL-1sr-2, CCL-1sr-1,
COS-2-2

QUALIFIED FOR

Base Metal (Typical): P1 to P1 (SA 36, SA 106 Gr. B, SA 105, SA 516 Gr. 70, etc.)
Process(es): SMAW Weld Types: GROOVE & FILLET
Position: ALL POSITIONS Diameter: ALL DIAMETERS
Filler Metal: E6010, E6011, E7018, E7018-1

BASE METAL CONDITIONS & GROOVE THICKNESS RANGE QUALIFIED:
STANDARD APPLICATIONS WITH P.W.H.T.

BASE METAL THICKNESS RANGE 1.6 to 203 mm (0.062 to 8.00 in.) inclusive

COMBINED DEPOSITED WELD METAL THICKNESS

ASME B31.1	<u>203 mm (8.00 in.) maximum</u>
ASME B31.3	<u>203 mm (8.00 in.) maximum</u>
ASME SECT. VIII, DIV.1	<u>203 mm (8.00 in.) maximum</u>

ALBERTA BOILERS SAFETY ASSOCIATION	
PROVINCE OF ALBERTA	
SAFETY CODES ACT	
WELDING PROCEDURE	
Reg. No. WP	<u>1684.2</u>
Spec No.	<u>PESI-1sr</u>
Weld Process	<u>SMAW</u>
Matl. Gr. P No.	<u>1</u> to P No. <u>1</u>
Elec. Gr. F No.	<u>3+4</u> A No. <u>1</u>
Th. Qual. For	<u>203mm</u> PWHT <u>YES</u>
Yr. <u>06</u> Mo. <u>12</u> Day <u>12</u> Signed <u>R. ROSEBERG, P.ENG.</u>	
WELDING SPECIALIST	

PROVINCIAL REGISTRATION

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QW-482 WELDING PROCEDURE SPECIFICATION (WPS)

Paintearth Energy Services Inc.

Welding Procedure Specification No. PESI-1sr (Rev.0) Date November 22, 2006
Revision(s) Rev.0 - (Non-Essential) Format update, company name change, (formerly IPS Manufacturing Limited) & WPS No. change, formerly IPS-1sr (Rev.1)
September 25, 2005.
Supporting PQR No.(s) CCL-1sr-1, CCL-1sr-2, COS-2-2
Welding Process(es) SMAW Type(s) Manual

JOINTS (QW-402)

Joint Design All ASME groove & fillet, reference construction drawing for joint details.
Where joint details are not specified, see figures 1 to 15 attached
Root Opening As per attached typical groove designs, see figures 1 to 15 attached
Backing With or without Retainers Not required

BASE METALS (QW-403)

P-Number P1 To P-Number P1
Thickness Range: Groove See cover page for thickness qualified by governing code
Fillet All base metal thicknesses
Base Metal 1.6 to 203 mm (0.062 to 8.00 in.) inclusive
Pipe Diameter Ranges: Groove All diameters
Fillet All diameters
Deposited Weld Metal (Per Pass) F3: 6.35 mm (0.250 in.) maximum
F4: 12.7 mm (0.500 in.) maximum

FILLER METALS (QW-404)

Specification No. (SFA) SFA 5.1 SFA 5.1
AWS No. (Class) E6010, E6011 E7018, E7018-1
F-No. F3 F4
A-No. A1 A1
Size 3/32 to 3/16 in. inclusive 3/32 to 1/4 in. inclusive
Deposited Weld Metal Thickness Range:
Groove 6.35 mm (0.250 in.) max.* 203 mm (8.00 in.) max.*
Fillet All fillet sizes All fillet sizes
Other *Combined deposited weld metal thickness shall not exceed 203 mm (8.00 in.)

POSITION (QW-405)

Position of Groove All positions Position of Fillet All positions
Weld Progression F3: Vertical up or vertical down F4: Vertical up

PREHEAT (QW-406)

Preheat Temperature (Min.) < 1.00 in.: 10°C (50°F)
≥1.00 in.: 24°C (75°F) or per attached preheat sheet,
whichever is greater
Interpass Temperature (Max.) 371°C (700°F)
Preheat Maintenance As per minimum preheat temperature above prior to welding. Preheat maintenance is not required if welding is interrupted or after the completion of welding unless required by the code of construction.

WPS NO. PESI-1sr (Rev.0)

POST WELD HEAT TREATMENT (QW-407)

Temperature Range See P.W.H.T. Sheet Time Range See P.W.H.T. Sheet

ELECTRICAL CHARACTERISTICS (QW-409)

Current Direct Polarity Reverse, electrode positive
Amps See Table #1 Volts See Table #1
Maximum Heat Input N/A

TECHNIQUE (QW-410)

String or Weave Either Travel Speed See Table #1
Initial & Interpass Cleaning Brushing, chipping or grinding as required
Method of Back Gouging Air carbon arc, back-grind as required
Multiple or Single Pass Per Side Either
Multiple or Single Electrodes Single
Peening Not permitted

TABLE 1 - WELDING PARAMETERS

Process	Filler Metal	Diameter mm (in.)	Current Type & Polarity	Amperage Range	Voltage Range	Travel Speed mm/min. (i.p.m.)
SMAW	E6010/E6011	2.4 (3/32)	DCRP	50 - 100	18 - 26	38 - 300 (1.5 - 12)
SMAW	E6010/E6011	3.2 (1/8)	DCRP	60 - 140	19 - 28	38 - 350 (1.5 - 14)
SMAW	E6010/E6011	4.0 (5/32)	DCRP	115 - 200	20 - 30	50 - 400 (2.0 - 16)
SMAW	E7018/E7018-1	2.4 (3/32)	DCRP	60 - 110	18 - 26	38 - 300 (1.5 - 12)
SMAW	E7018/E7018-1	3.2 (1/8)	DCRP	90 - 150	19 - 28	38 - 350 (1.5 - 14)
SMAW	E7018/E7018-1	4.0 (5/32)	DCRP	110 - 220	20 - 28	50 - 400 (2.0 - 16)
SMAW	E7018/E7018-1	5.0 (3/16)	DCRP	160 - 320	21 - 30	75 - 500 (3.0 - 20)
SMAW	E7018/E7018-1	5.5 (7/32)	DCRP	240 - 350	22 - 32	125 - 550 (5.0 - 22)
SMAW	E7018/E7018-1	6.4 (1/4)	DCRP	300 - 400	22 - 32	125 - 550 (5.0 - 22)

Note: Size of electrode, filler metal, number of passes, voltage, amperage, and travel speed will vary with position, joint thickness, joint type etc.

TYPICAL JOINT DESIGNS

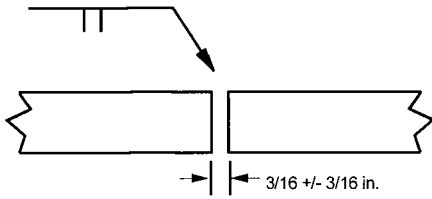


Figure 1
Single Square Butt

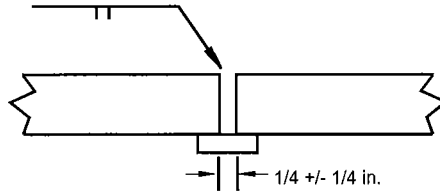


Figure 2
Single Square Butt with Backing Strip

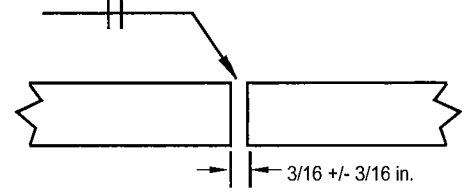


Figure 3
Double Square Butt

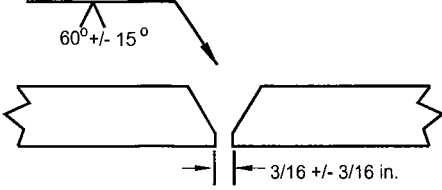


Figure 4
Single Vee Butt

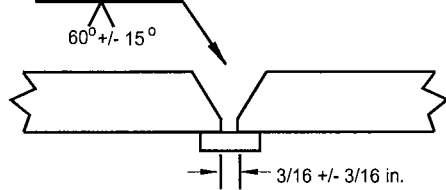


Figure 5
Single Vee Butt with Backing Strip

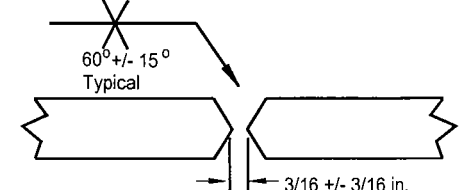


Figure 6
Double Vee Butt

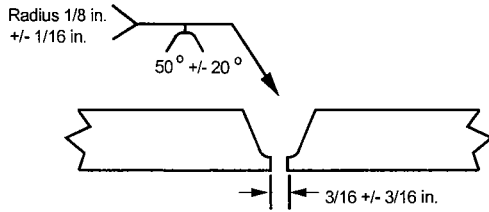


Figure 7
Single U Butt

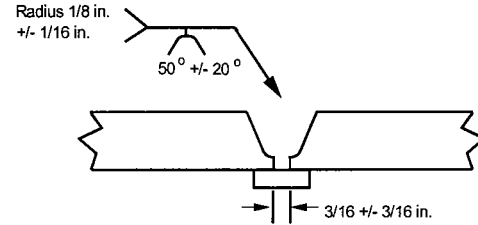


Figure 8
Single U Butt with Backing Strip

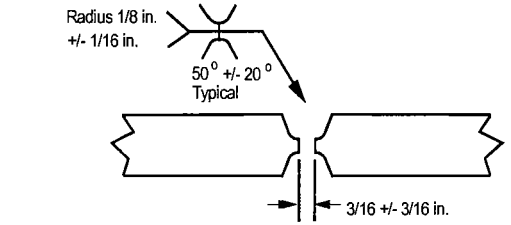


Figure 9
Double U Butt

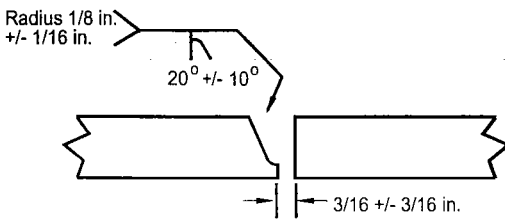


Figure 10
Single J Butt

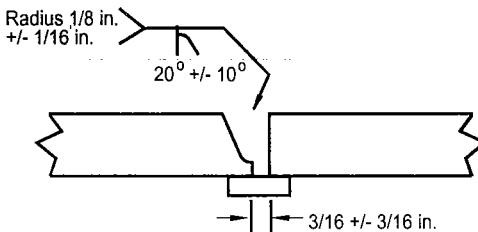


Figure 11
Single J Butt with Backing Strip

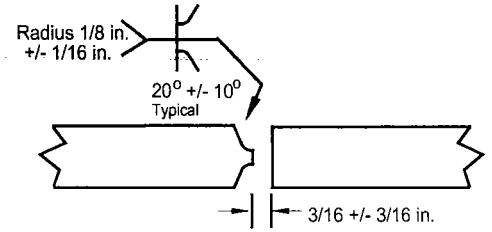


Figure 12
Double J Butt

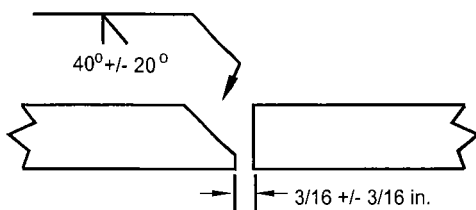


Figure 13
Single Bevel Butt

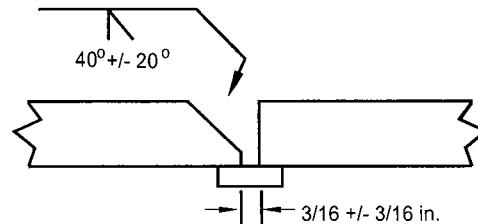


Figure 14
Single Bevel Butt with Backing Strip

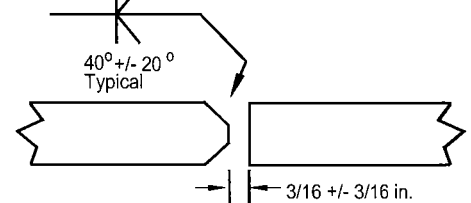


Figure 15
Double Bevel Butt

Or as per the joint design on the approved construction drawing.

PREHEAT**P-No. 1**

1. Welds joining pressure parts or attachments shall be preheated to not less than the minimum preheat temperatures stated in paragraph 5.
2. The preheat temperature shall be maintained during welding.
3. If welding is interrupted, the weld joint and adjacent areas shall be reheated to the minimum preheat temperature stated in paragraph 5, prior to the start of welding.
4. Preheat temperatures shall be checked by the welder or inspector, using temperature indicating crayons or other reputable methods.
5. Minimum preheating temperatures shall be as follows:

PRESSURE VESSELS IN ACCORDANCE WITH ASME SECTION VIII, DIV. 1

NOMINAL WALL THICKNESS	MINIMUM PREHEAT TEMPERATURE
0 to 31.8 mm (0 to 1.25 in.)	10°C (50°F)
Over 31.8 mm (Over 1.25 in.)	93°C (200°F)
Over 25.4 mm (1.0 in.) & specified maximum carbon content in excess of 0.30%.	80°C (175°F)

- The conditions of UW-30 shall apply for base metal temperatures below 0°C (32°F).
- The preheat zone shall extend at least 50.8 mm (2.0 in.) beyond each edge of the weld.

PROCESS PIPING IN ACCORDANCE WITH ASME B31.3

NOMINAL WALL THICKNESS	MINIMUM SPECIFIED BASE METAL TENSILE STRENGTH	MINIMUM PREHEAT TEMPERATURE
< 25.4 mm (1.0 in.)	≤ 490 MPa (71 ksi)	10°C (50°F)
≥ 25.4 mm (1.0 in.)	All	80°C (175°F)
All	> 490 MPa (71 ksi)	80°C (175°F)

- The preheat zone shall extend at least 25.4 mm (1.0 in.) beyond each edge of the weld.
- The interruption of welding shall be subject to the requirements of paragraph 320.2.4.

POWER PIPING IN ACCORDANCE WITH ASME B31.1

NOMINAL WALL THICKNESS	MINIMUM PREHEAT TEMPERATURE
Over 25.4 mm (1.0 in.) & specified maximum carbon content in excess of 0.30%.	80°C (175°F)
All others	10°C (50°F)

- The preheat zone shall extend at least 76.2 mm (3.0 in.) beyond each edge of the weld.

POSTWELD HEAT TREATMENT
P-No. 1

PRESSURE VESSELS IN ACCORDANCE WITH ASME SECTION VIII, DIV. 1

1. All postweld heat treatment shall be in accordance with ASME Section VIII, Division I, UW-40 & UCS-56 latest edition and addenda.
2. Post weld heat treatment temperatures and minimum holding times are as follows:

NOMINAL WALL THICKNESS	HEAT TREAT TEMPERATURE	HOLDING TIME
Up to 50.8 mm (2.0 in.)	595°C (1100°F) minimum	1 Hour / 25.4 mm (inch), 15 minutes minimum
Over 50.8 mm (2.0 in.)	595°C (1100°F) minimum	2 Hours plus 15 minutes for each additional 25.4 mm (inch) over 50.8 mm (2.0 in.)

PROCESS PIPING IN ACCORDANCE WITH ASME B31.3

1. All postweld heat treatment shall be in accordance with Table 331.1.1 of ASME B31.3 latest edition and addenda.
2. Post weld heat treatment temperatures and minimum holding times are as follows:

NOMINAL WALL THICKNESS	MINIMUM SPECIFIED TENSILE STRENGTH	HEAT TREAT TEMPERATURE	HOLDING TIME
All	All	595 - 650°C (1100 - 1200°F)	1 Hour / 25.4 mm (inch), 1 Hour minimum

POWER PIPING IN ACCORDANCE WITH ASME B31.1

1. All postweld heat treatment shall be in accordance with Table 132 of ASME B31.1 latest edition and addenda.
2. Post weld heat treatment temperatures and minimum holding times are as follows:

NOMINAL WALL THICKNESS	HEAT TREAT TEMPERATURE	HOLDING TIME
Up to 50.8 mm (2.0 in.)	595 - 650°C (1100 - 1200°F)	1 Hour / 25.4 mm (inch), 15 minutes minimum
Over 50.8 mm (2.0 in.)	595 - 650°C (1100 - 1200°F)	2 Hours plus 15 minutes for each additional 25.4 mm (inch) over 50.8 mm (2.0 in.)

QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Paintearth Energy Services Inc.

Procedure Qualification Record No. CCL-1sr-2 Date January 24, 1996
PQR Revision(s) Format update, company name change,
(formerly Chadco Canada Ltd.) November 22, 2006
Welding Procedure Specification No. PESI-1sr (Rev.0)
Welding Process(es) SMAW Type(s) Manual

JOINTS (QW-402)

Type Butt joint, single vee groove, see next page

BASE METALS (QW-403)

Material Spec. SA 516 Type or Grade Grade 70
P-No. P1 To P-No. P1 Thickness 12.7 mm (0.500 in.)
Diameter N/A Other Plate

FILLER METALS (QW-404)

Specification No. (SFA) SFA 5.1 SFA 5.1
AWS No. (Class) E6010 E7018-1
Filler Metal F-No. F3 F4
Filler Metal A-No. A1 A1
Size of Electrode 3/32 in. 1/8, 5/32 in.
Other _____
Deposited Weld Metal Thickness 1.6 mm (0.063 in.) 11.1 mm (0.4375 in.)

POSITION (QW-405)

Position of Groove 1G
Weld Progression N/A

PREHEAT (QW-406)

Preheat Temperature 10°C (50°F) Interpass Temp. (Max.) 282°C (540°F)

POSTWELD HEAT TREATMENT (QW-407)

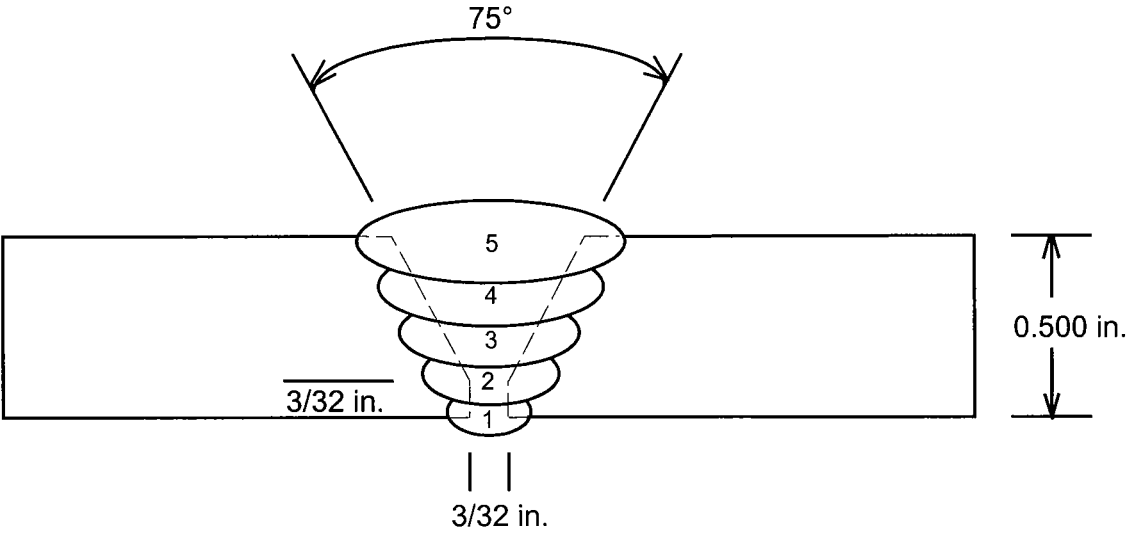
Temperature 621°C (1150°F) Time 1 Hour

ELECTRICAL CHARACTERISTICS (QW-409)

Current Direct Polarity Reverse, electrode positive
Amps See next page Volts See next page
Heat Input N/A

TECHNIQUE (QW-410)

String or Weave Both Travel Speed See next page
Multiple or Single Pass Per Side Multipass from groove side
Multiple or Single Electrodes Single



Pass	Process	Filler Metal	Diameter mm (in.)	Current & Polarity	Amperage Range	Voltage Range	Travel Speed mm/min. (i.p.m.)
1	SMAW	E6010	3/32	DCRP	75 - 95	20 - 26	102 - 178 (4.0 - 7.0)
Remainder	SMAW	E7018-1	1/8 & 5/32	DCRP	75 - 95	20 - 26	102 - 178 (4.0 - 7.0)

PQR NO. CCL-1sr-2

TENSILE TEST (QW-150)

Specimen No.	Width in.	Thickness in.	Area Sq. in.	Ultimate Load lbs.	Ultimate Stress Psi	Character & Fracture Location
GBT1	0.748	0.492	0.368	28,880	78,450	Ductile
						Base Metal
GBT2	0.745	0.495	0.369	29,100	78,860	Ductile
						Base Metal

GUIDED BEND TEST (QW-160)

Type & Figure No.	Result	Type & Figure No.	Result
QW-462.2, TSB - GBB1	Pass	QW-462.2, TSB - GBB3	Pass
QW-462.2, TSB - GBB2	Pass	QW-462.2, TSB - GBB4	Pass

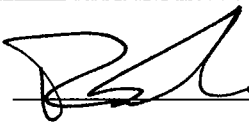
OTHER TESTS

See attached Rockwell hardness test report 83-6002B(GB)

Welders Name Brock Hutt Certificate File No. W-5406
Tests Conducted By QC Inspection Services Ltd.
Laboratory Test No. 83-6002B(GB)

We hereby recertify that the statements in this record have been revised in accordance with paragraph QW-200.2 and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer PAINTEARTH ENERGY SERVICES INC., formerly
Chadco Canada Ltd.

Date DEC 1/06. Signed 

QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Paintearth Energy Services Inc.
Procedure Qualification Record No. CCL-1sr-1 Date November 3, 1994
PQR Revision(s) Format update, company name change,
(formerly Chadco Canada Ltd.) November 22, 2006
Welding Procedure Specification No. PESI-1sr (Rev.0)
Welding Process(es) SMAW Type(s) Manual

JOINTS (QW-402)

Type Butt joint, single vee groove, see next page

BASE METALS (QW-403)

Material Spec. SA 333 Type or Grade Grade 6
P-No. P1 To P-No. P1 Thickness 9.52 mm (0.375 in.)
Diameter 168.3 mm (6.625 in.) O.D. Other 6 in. Sch. 80 m/c to 0.375 in. w.t.

FILLER METALS (QW-404)

Specification No. (SFA)	<u>SFA 5.1</u>	<u>SFA 5.1</u>
AWS No. (Class)	<u>E6010</u>	<u>E7018</u>
Filler Metal F-No.	<u>F3</u>	<u>F4</u>
Filler Metal A-No.	<u>A1</u>	<u>A1</u>
Size of Electrode	<u>3/32 in.</u>	<u>3/32, 1/8 in.</u>
Other		
Deposited Weld Metal Thickness	<u>3.2 mm (0.125 in.)</u>	<u>6.35 mm (0.250 in.)</u>

POSITION (QW-405)

Position of Groove 5G
Weld Progression Vertical up

PREHEAT (QW-406)

Preheat Temperature 10°C (50°F) Interpass Temp. (Max.) 343°C (650°F)

POSTWELD HEAT TREATMENT (QW-407)

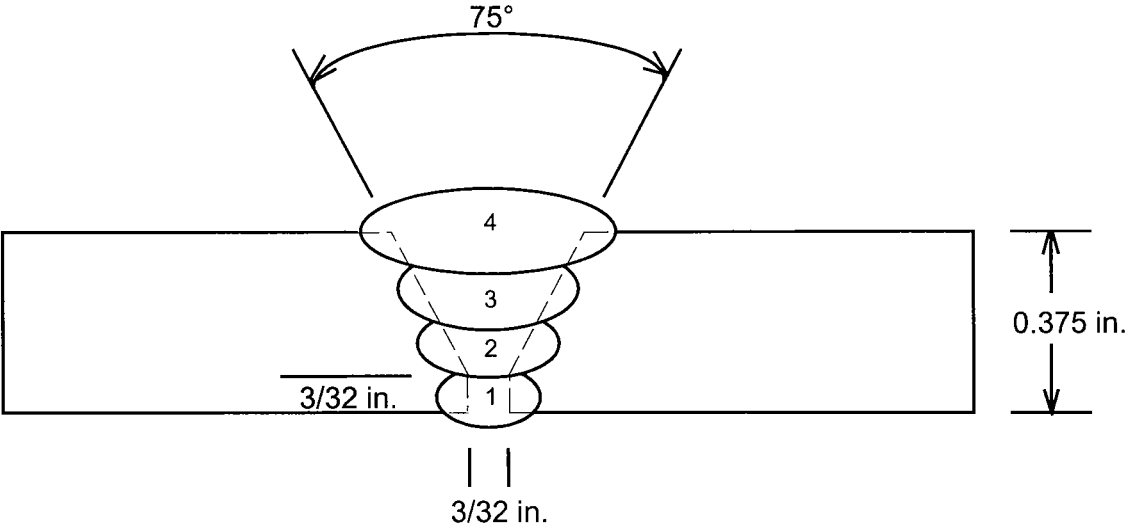
Temperature 621°C (1150°F) Time 1 Hour

ELECTRICAL CHARACTERISTICS (QW-409)

Current	<u>Direct</u>	Polarity	<u>Reverse, electrode positive</u>
Amps	<u>See next page</u>	Volts	<u>See next page</u>
Heat Input	<u>N/A</u>		

TECHNIQUE (QW-410)

String or Weave	<u>Weave</u>	Travel Speed	<u>See next page</u>
Multiple or Single Pass Per Side		Multipass from groove side	
Multiple or Single Electrodes		Single	



Pass	Process	Filler Metal	Diameter mm (in.)	Current & Polarity	Amperage Range	Voltage Range	Travel Speed mm/min (ipm.)
1	SMAW	E6010	3/32	DCRP	90 - 140	20 - 28	76 - 102 (3.0 - 4.0)
Remainder	SMAW	E7018-1	1/8 & 5/32	DCRP	90 - 140	20 - 28	76 - 102 (3.0 - 4.0)

PQR NO. CCL-1sr-1

TENSILE TEST (QW-150)

Specimen No.	Width in.	Thickness in.	Area Sq. in.	Ultimate Load lbs.	Ultimate Stress Psi	Character & Fracture Location
NIT1	0.754	0.323	0.244	16,930	69,500	Ductile
						Parent Metal
NIT2	0.750	0.320	0.240	16,760	69,800	Ductile
						Parent Metal

GUIDED BEND TEST (QW-160)

Type & Figure No.	Result	Type & Figure No.	Result
QW-462.3a, TFB - NTB1	Pass	QW-462.3a, TRB - NTB2	Pass
QW-462.3a, TFB - NTB3	Pass	QW-462.3a, TRB - NTB4	Pass

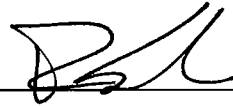
OTHER TESTS

See attached Rockwell hardness test report 83-4005(NT)

Welders Name Brock Hutt Certificate File No. W-5406
Tests Conducted By QC Inspection Services Ltd.
Laboratory Test No. 83-4005(NT)

We hereby recertify that the statements in this record have been revised in accordance with paragraph QW-200.2 and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer PAINTEARTH ENERGY SERVICES INC., formerly
Chadco Canada Ltd.

Date DEC 1 / 06. Signed 

QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Paintearth Energy Services Inc.

Procedure Qualification Record No. COS-2-2 Date January 9, 1996
PQR Revision(s) Format update, company name change,
(formerly Chadco Oilfield Services Ltd.) November 22, 2006
Welding Procedure Specification No. PESI-1sr (Rev.0)
Welding Process(es) GMAW / SMAW Type(s) Semi Auto / Manual

JOINTS (QW-402)

Type Butt joint, single vee groove, see next page

BASE METALS (QW-403)

Material Spec. SA 516 Type or Grade Grade 70
P-No. P1 To P-No. P1 Thickness 38.1 mm (1.50 in.)
Diameter N/A Other Plate

FILLER METALS (QW-404)

	GMAW	SMAW
Specification No. (SFA)	<u>SFA 5.18</u>	<u>SFA 5.1</u>
AWS No. (Class)	<u>ER70S-2</u>	<u>E7018-1</u>
Filler Metal F-No.	<u>F6</u>	<u>F4</u>
Filler Metal A-No.	<u>A1</u>	<u>A1</u>
Size of Electrode	<u>0.035 in.</u>	<u>1/4 in.</u>
Other		
Deposited Weld Metal Thickness	<u>19.1 mm (0.750 in.)</u>	<u>19.1 mm (0.750 in.)</u>

POSITION (QW-405)

Position of Groove 1G
Weld Progression N/A

PREHEAT (QW-406)

Preheat Temperature 79°C (175°F) Interpass Temp. (Max.) 316°C (600°F)

POSTWELD HEAT TREATMENT (QW-407)

Temperature 621°C (1150°F) Time 2.8 Hours

GAS (QW-408)

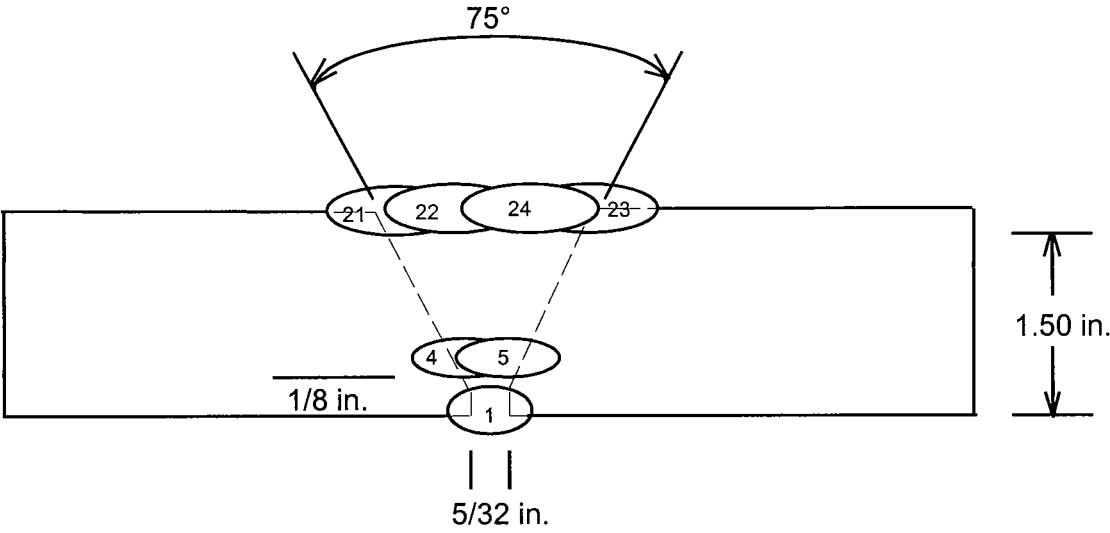
Shielding 75% Argon, 25% CO2 (Welding Grade) @ 12.5 liters per minute (25 cfph)
Backing None Trailing Without

ELECTRICAL CHARACTERISTICS (QW-409)

Current Direct Polarity Reverse, electrode positive
Amps GMAW: 105 - 205 SMAW: 310 - 360 Volts GMAW: 19 - 34 SMAW: 22 - 29
Mode of Metal Transfer GMAW: Short circuiting arc for root, globular & spray for fill
Heat Input N/A

TECHNIQUE (QW-410)

String or Weave Both Travel Speed 4.1 - 12.5 ipm
Multiple or Single Pass Per Side Multipass from groove side
Multiple or Single Electrodes Single



Pass	Process	Filler Metal	Diameter mm (in.)	Current & Polarity	Amperage Range	Voltage Range	Travel Speed mm/min. (i.p.m.)
Up to 3/4" Deposit	GMAW	ER70S-2	0.9 (0.035)	DCRP	105 - 205	19 - 34	104 - 318 (4.1 - 12.5)
Remainder	SMAW	E7018-1	6.4 (1/4)	DCRP	310 - 360	22 - 29	104 - 318 (4.1 - 12.5)

PQR NO. COS-2-2

TENSILE TEST (QW-150)

Specimen No.	Width in.	Thickness in.	Area Sq. in.	Ultimate Load lbs.	Ultimate Stress Psi	Character & Fracture Location
FCT1	1.511	0.747	1.129	85,000	75,300	Ductile
						Parent Metal
FCT2	1.506	0.752	1.132	86,600	76,500	Ductile
						Parent Metal

GUIDED BEND TEST (QW-160)

Type & Figure No.	Result	Type & Figure No.	Result
QW-462.2, TSB - FCB1	Pass	QW-462.2, TSB - FCB3	Pass
QW-462.2, TSB - FCB2	Pass	QW-462.2, TSB - FCB4	Pass

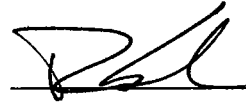
OTHER TESTS

See attached Vickers hardness survey report 83-6001(FC)

Welders Name Fred Wigley Certificate File No. W-4525
 Tests Conducted By QC Inspection Services Ltd.
 Laboratory Test No. 83-6001(FC)

We hereby recertify that the statements in this record have been revised in accordance with paragraph QW-200.2 and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer PAINTEARTH ENERGY SERVICES INC., formerly
Chadco Oilfield Services Ltd.

Date Dec 1/06 Signed 

MECHANICAL TEST REPORT

for Procedure Qualification Record #CCL-1sr-2

Client Name: Chadco Canada Ltd.
 Address: Box 24, Halkirk, AB
 Attention: Tom Chadwick

Client P.O.:
 Date: January 24, 1996
 Job Number: 83 - 6002B(GB)

Materials: SA-516-70 Size: plate, 0.500" thick Condition: PWHT
 Test Specification: ASME Section IX

Tensile Tests

QW-462.1(a) (Plate)

Sample Identification:	GBT1	GBT2
Sample Size - inch:(W x T)	0.748 x 0.492	0.745 x 0.495
Least X-Sect. Area - in ² :	0.368	0.369
Ultimate Load - lbs:	28,880	29,100
Ult. Ten. Strength - psi:	78,450	78,860
Character of Failure:	Ductile	Ductile
Location of Failure:	Base Metal	Base metal
Required Tensile Strength:	70,000 psi	70,000 psi
Pass or Fail:	Pass	Pass
Remarks:		

Bend Test QW-462.2 (Side Bend)

Sample Identification:	GBB1	GBB2	GBB3	GBB4
Type of Bend Test:	TSB	TSB	TSB	TSB
Pass or Fail:	Pass	Pass	Pass	Pass
Remarks:				

Nick Break Tests

Sample Identification: Not Required.
 Standard or Optional:
 Method of Breaking Specimen
 Pass or Fail:
 Remarks:

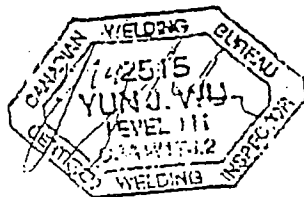
* TSB, TFB, TRB = transverse side, face or root bend

LSB, LFB, LRB = longitudinal side, face or root bend

We certify that the statements in this record are acceptable, in accordance with the requirements of ASME Section IX.

TEST RESULTS CERTIFIED BY:

QC INSPECTION SERVICES LTD.



HARDNESS TEST REPORT

for Procedure Qualification Record #CCL-1sr-2

Date: January 24, 1996 **Job No.:** 83 - 6002B(GB)

Client: Chadco Canada Ltd.

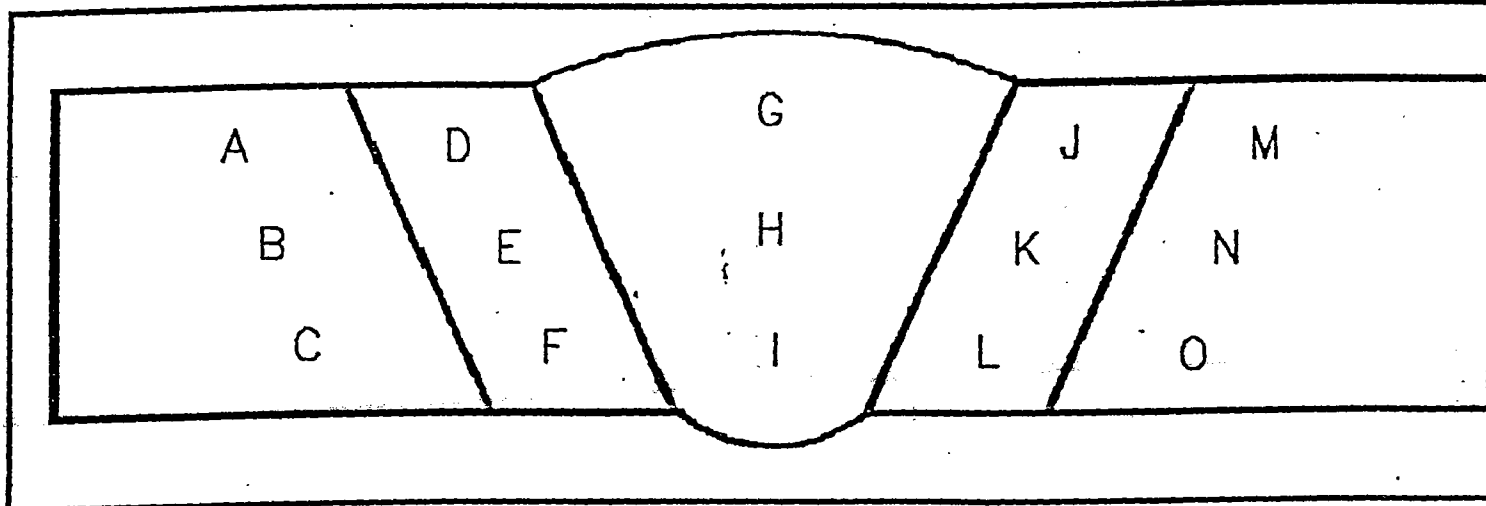
Address: Box 24, Halkirk, AB

Material: SA-516-70 **Condition:** PWHT

Size: Plate, 0.500" thick

Test Method: Hardness testing performed using the Rockwell "B" scale (HRB)

Calibration: Equip. #: Wilson Test Block #: Kentrall Std.: 84.9±1HRB Act. Reading: 85.5HR



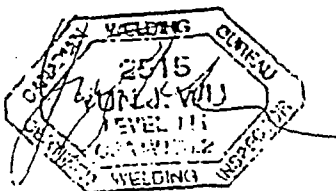
Hardness values

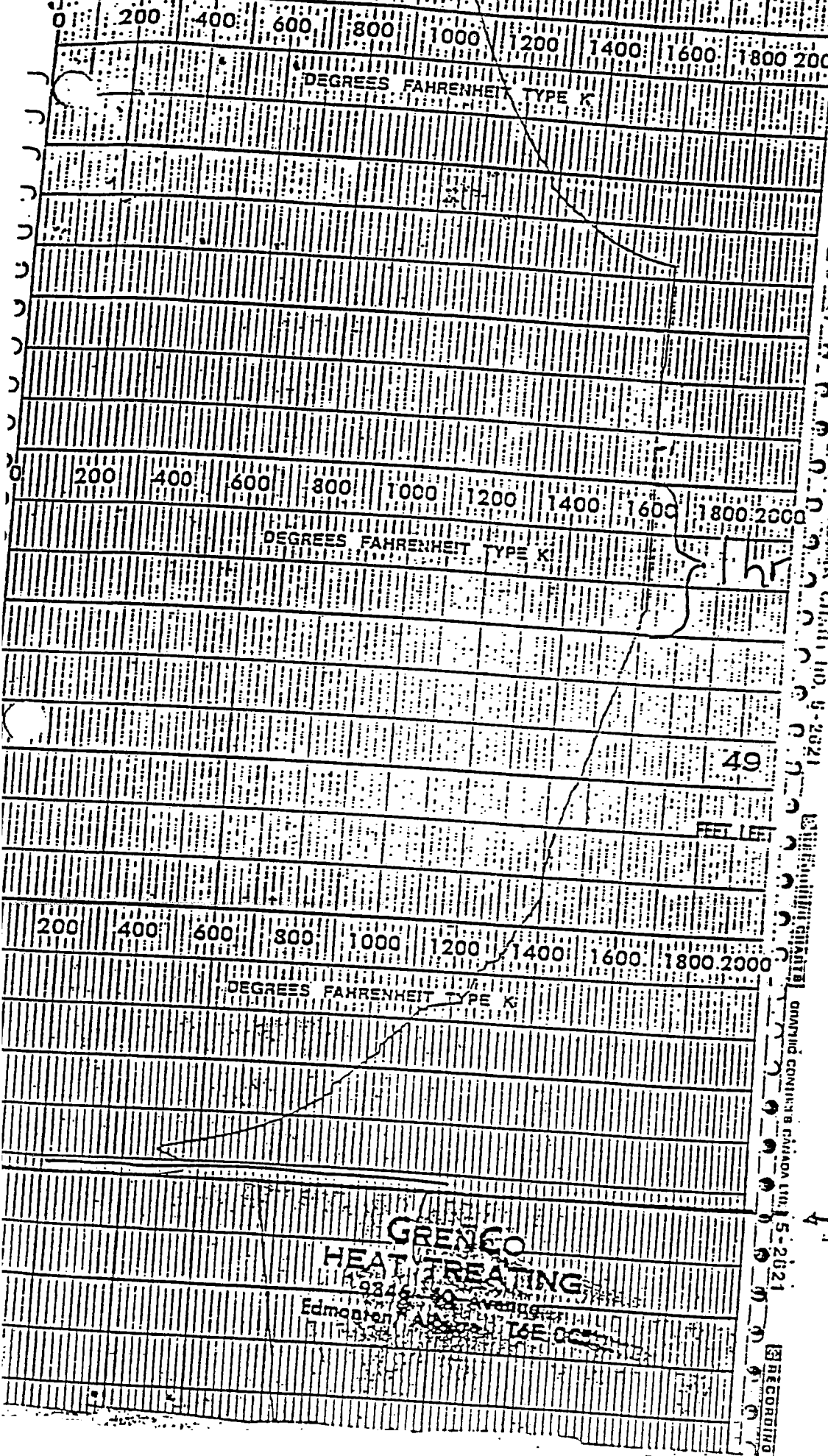
A= 83.0	D= 92.5	G= 90.0	J= 90.0	M= 83.5
B= 82.0	E= 90.0	H= 91.0	K= 89.5	N= 84.0
C= 82.5	F= 88.5	I= 92.0	L= 90.5	O= 84.0

These hardness values do not exceed 99.5 HRB (99.5 HRB = 22 HRC)

Test Results Certified by:

QC INSPECTION SERVICES LTD.





GRESCO
HEAT TREATING
19346-10 Avenue
Edmonton, Alberta

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MECHANICAL TEST REPORT

for Procedure Qualification Record #CCL-1sr-1

Client Name: Chadco Canada Ltd.
 Address: Box 24, Halkirk, AB T0C 1M0
 Attention: Thomas Chadwick

Client P.O.: Thomas Chadwick
 Date: November 3, 1994
 Job Number: 83 - 4005 (NT)

Materials: SA-333-G NPS 6 machined to 0.375" WT

Tensile Tests

Test Specification:

Sample Identification:

Sample Size - inch:(W x T)

Least X-Sect. Area - in²:

Ultimate Load - lbs:

Ult. Ten. Strength - psi:

Character of Failure:

Location of Failure:

Required Tensile Strength:

Pass or Fail:

Remarks:

NIT1

.754 x .323

.244

16,930

69,500

Ductile

Parent metal

60,000 psi

Pass

ASME Section IX

NIT2

.750 x .320

.240

16,760

69,800

Ductile

Parent metal

60,000 psi

Pass

Bend Test

Test Specification:

Sample Identification:

Type of Bend Test:

Pass or Fail:

Remarks:

NTB1

TFB

Pass

NTB2

TRB

Pass

ASME Section IX

NTB3

TFB

Pass

NTB4

TRB

Pass

Nick Break Tests

Test Specification:

Sample Identification:

Standard or Optional:

Method of Breaking Specimen

Pass or Fail:

Remarks:

Not required

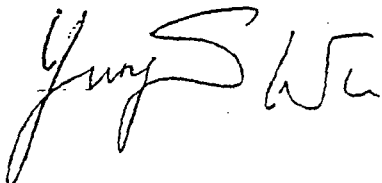
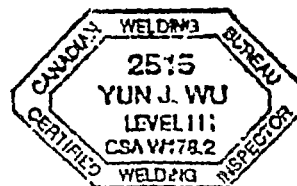
*Types of Bend Tests

TSB, TFB, TRB = transverse side, face or root bend

LSB, LFB, LRB = longitudinal side, face or root bend

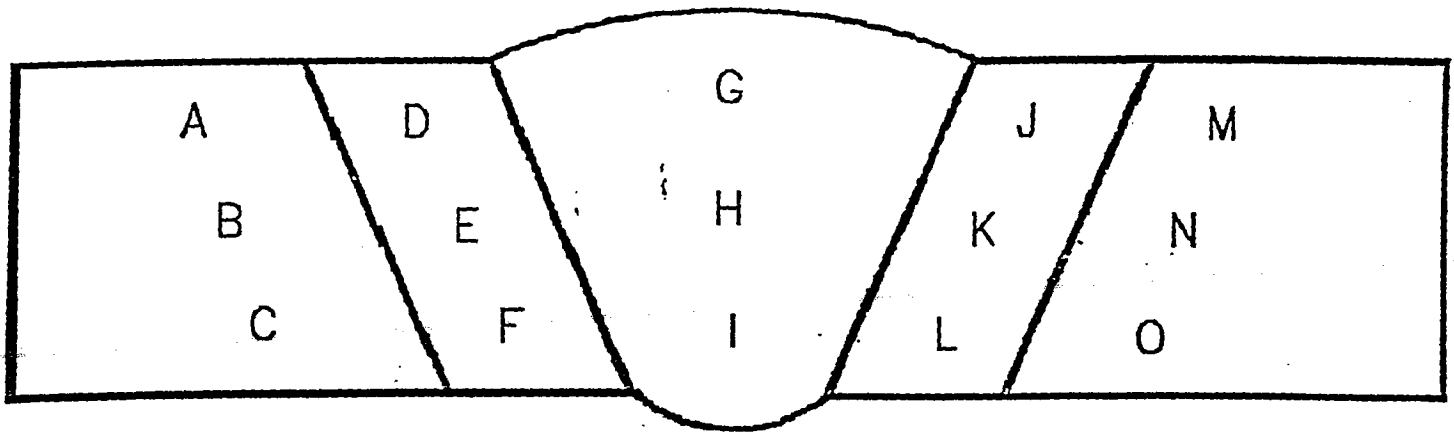
TEST RESULTS CERTIFIED BY:

QC INSPECTION SERVICES LTD.

HARDNESS TEST REPORT
for Procedure Qualification Record # CCL-1sr-1

Date: November 3, 1994 **Job No.:** 83 - 4005 (NT)
Client: Chadco Canada Ltd.
Address: P.O. Box 24, Halkirk, AB T0C 1M0
Material: ASME SA-333 Grade 6 (PWHT)
Size: 6" dia. x .375" WT
Test Method: Hardness testing performed using the Rockwell "B" scale (HRB).



Hardness values

A= 68.5	D= 77.0	G= 88.5	J= 77.0	M= 70.5
B= 69.0	E= 77.5	H= 87.0	K= 76.0	N= 70.0
C= 68.5	F= 76.5	I= 85.0	L= 75.0	O= 70.5

These hardness values do not exceed 22 HRC (22 HRC = 99.5 HRB)

Test Results Certified by: QC INSPECTION SERVICES LTD.



MECHANICAL TEST REPORT

for Procedure Qualification Record # COS-2-2

Client:	Chadco Oilfield Services Ltd	Job Number:	83-6001 (FC)
Address:	P.O. Box 24, Halkirk AB	Date:	January 09, 1996
Attention:	Thomas Chadwick		
Materials:	ASME SA516 Gr.70	Size:	1.5" w.t. Plate
Condition:	Post Weld Heat Treat		
Test Specification:	ASME Section IX		

Tensile Tests QW 462.1(a)

Sample Identification:	FCT1	FCT2
Sample Size - inch:(W x T)	1.511" x 0.747"	1.506" x 0.752"
Least X-Sept. Area - in ² :	1.129 in ²	1.132 in ²
Ultimate Load - lbs:	85 000 lbs	86 600 lbs
Ult. Ten. Strength - psi:	75 300 psi	76 500 psi
Character of Failure:	Ductile	Ductile
Location of Failure:	Parent	Parent
Required Tensile Strength:	70,000 psi	70,000 psi
Pass or Fail:	Pass	Pass
Remarks:		

* Bend Test QW 462.2

Sample Identification:	FCB1	FCB2	FCB3	FCB4
Type of Bend Test:	TSB	TSB	TSB	TSB
Pass or Fail:	Pass	Pass	Pass	Pass
Remarks:				

Nick Break Tests

Sample Identification:	
Standard or Optional:	NOT REQUIRED
Method of Breaking Specimen	
Pass or Fail:	
Remarks:	

* Types of Bend Tests

TSB, TFB, TRB = transverse side, face or root bend

LSB, LFB, LRB = longitudinal side, face or root bend

We certify that the statements in this record are acceptable, in accordance with the requirements of ASME Section IX.

TEST RESULTS CERTIFIED BY:

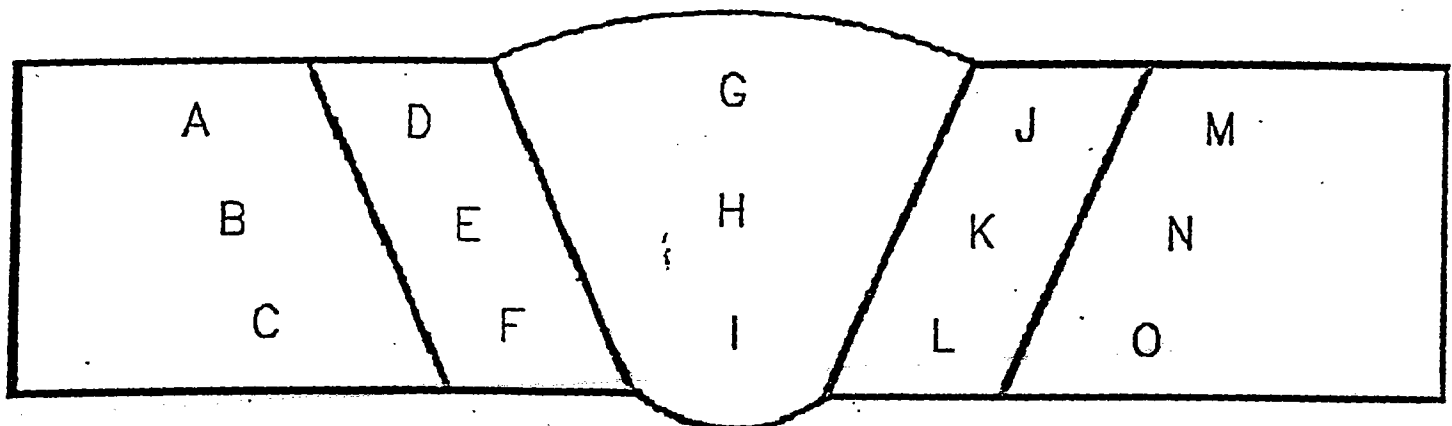
QC INSPECTION SERVICES LTD.

2227
M. KERELIUK
CANADIAN WELDING BUREAU

HARDNESS TEST REPORT

for Procedure Qualification Record # COS-2-2

Date:	January 09, 1996		Job No.:	83-6001 (FC
Client:	Chadco Oilfield Services Ltd.			
Address:	P.O. Box 24 Halkirk AB			
Material:	ASME SA516 Grade 70	Condition:	Post Weld Heat Trea	
Size:	1.5" thick plate			
Test Method:	Hardness testing performed in accordance with ASTM E-92 (Microhardness testing) u. a Vickers Microhardness Tester with a 500g load (HV ₅₀₀)			
Calibration:	Equip.: Leitz	Test Block :	266 ± 6 HV ₅₀₀	Act. Reading: 271 HV ₅₀₀



Hardness Values

A:	200	D:	195	G:	179	J:	174	M:	198
B:	223	E:	187	H:	181	K:	174	N:	195
C:	203	F:	184	I:	213	L:	195	O:	203

These hardness values do not exceed 248 HV₅₀₀ (248 HV₅₀₀ = 22 HRC)

We certify that the statements in this record are acceptable, in accordance with the requirements of ASME Section IX.

Test Results Certified by:

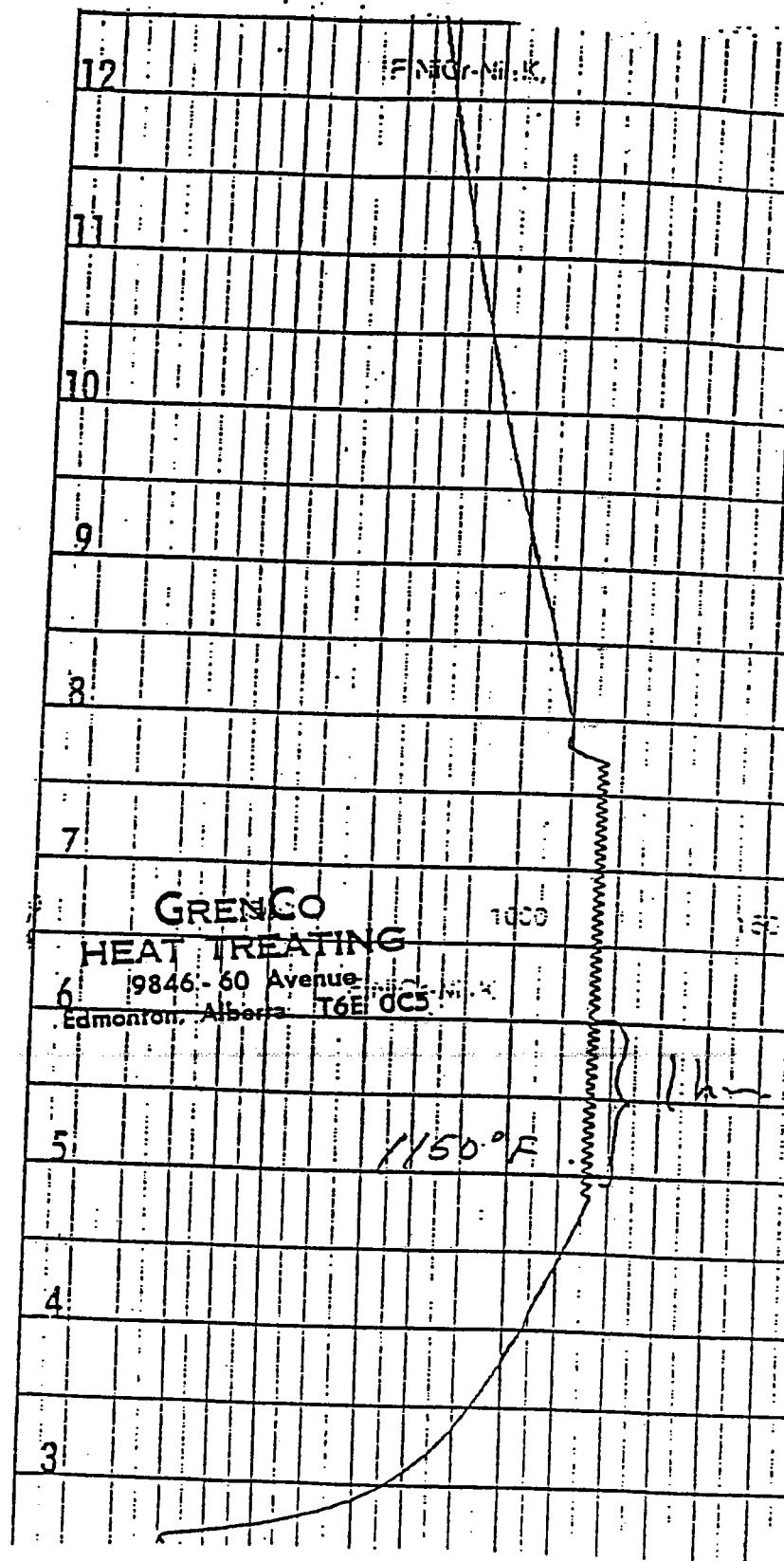
[Signature] CET

QC INSPECTION SERVICES LTD.



IC Inspection Services
P.O. 46220
O. 303711
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GRENCO
HEAT TREATING
19846 - 60 Avenue
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