

BOILERS AND PRESSURE VESSELS REPAIR OR ALTERATION REPORT

(A) #: 403457

OWNER EQUIP. NO: $\sqrt{V-620}$

REPAIR ORG. JOB NO:

REPAIR 🖾	and/or	ALTERATION [Partial 🗌	Final 🛚
I. Name of Orga	nization doing Re	pair/Alteration Exact Oilfield Developing	<u>-</u>	
-	12 Tamarack Road		No. & Expiry Date 2172 Nover	nber 26 / 2014
. Name of Owne	r Canadian I	Natural Resources Ltd.		
Address	2500-855 2 St.	SW Calgary AB T2P 4J8	_	
Location of Ins	tallation 1	2-9-81-22 W4 Brintnell Battery		
Boiler/Pressure	e Vessel Descript	tion Treater	CR	N L0015.2
Manufacturer's	Name RCI Reso	ource Constructors Inc. Year 1998	Serial No. 97015-2-	30
1. Original Desigi	n Conditions:			
a) Vessel/Sho	ellside/Boiler:	 	Min/Max Design Temp	-20 F/300 F
b) Jacket/Tub	peside:	Max Allowable Working Press.	Min/Max Design Temp	
5. New Design Co	onditions:			
a) Vessel/Sho	ellside/Boiler:	Max Allowable Working Press.	Min/Max Design Temp	
b) Jacket/Tub	oeside:	Max Allowable Working Press.	Min/Max Design Temp	
Description of any additional d	Work performed. ocuments used to	d for performing the work ASME Sect . VIII- (Step by step description of repair/alteration me provide the required information; such as repair tube # C80054 & 16'3" for tube 509893A.	ethod used. Attach additional pages a	s required, and referen
		All work to follow CNRL repair / alteration proce	dure	
0. Heat Treatment	t: Preheat Temp	o 176 F Post Weld HT (Temp	./Time) С	Other
1. Non Destructiv	e Examination (S	Specify type and extent).		
/IPI prep ends. N	/IPI root weld.			
100% RT on butt	weld			
MPI 12 hr. after o	completion of w	vork.		
2. Pressure Test		Vessel/Shellside/Boiler	Tubeside/Jacket	
a) Hydrostat	-			

13. Material -	List any material used in	repair/alteration and	any base m	aterial welded on:	
	Material	Thickness /	. .		

Item	Material Specifications	Thickness / Schedule	Diameter	Item	Material Specifications	Thickness / Schedule	Diameter
Shell/Drums	SA516-70	.500"	120"	Heads/ Ends	SA516-70	.691"/.439"	
Tubesheet				Tubes	A106B	.375* / .500	20"
Nozzles				Flanges/Fittings	_	Class	

14.	Welding Procedures - Alberta Registration Number W	/P- <u>1093.2</u>	WPS Numbers used: EOD-1-3
15.	Welded Replacement Parts: Attached are Manufacture by Authorized Inspector for the following items of this re		ata Reports or Repair/Alteration Reports properly identified and signed of parts supplied by others).
16.	Responsibility Owner/Client. Identify below items the	t the owner/c	lient has assumed responsibility for. Note (2)
	a) Alteration Design Submission b) Re	pair/Alteration	Procedure: yes c) Material Control
	d) Welding Control e) NDE	f) H	eat Treatment g) Pressure Test
	Note 2: Owner/client must have a valid Alberta Quality function c, d, e, f, or g.	Program (AQ	P), for the scope of work, to assume responsibility for
17.	REMARKS:		
18.		prect and the	
	 a) For all items except for items identified in 16: Exact Oiffield Developing Ltd. 		 b) For items identified in 16 only: Canadian Natural Resources Ltd.
	(Repair/Alteration Organization Name) 2172 Nov. 25 / 2014	•	(Owner/Client Organization Name) Sune 30 / 2013
	(AOP Number & Expiry Date) Mar. 15, 2013	•	(AGP Number & Expiry Date)
	(Signature & Date) Len Hayne	-	(Signature & Date)
	(Print Name)	-	(Print Name)
19.	DATE WORK WAS COMPLETED: Mar. 15, 2013		
2 0.			E OF INSPECTION
	I have inspected the repairs and/or alterations described Safety Codes Act and Regulations and the requirements	l in this report s established	t. To the best of my knowledge, this work has been done in accordance with the in AB-513.
	In-service Inspector (ISI) Certification (When the repair is inspected by an ISI per the require established in AB-513)		b) ABSA Safety Codes Officer Centification (when work is inspected by ABSA).
Ci	anadian Natural Resources	8039	
0	wner-User/Inspection Company Name (MAD 19/1) 3	AQP#	ABSA SCO Signature & Date
_	In-Service Inspector Signature & Date	-	Print Name
_	Chris Hill		
	In-Service Inspector Name (Please Print)		
	In-Service Inspector Alberta Cert #		
	eport Received by ABSA SCO		



Canadian Natural

Procedure Number: IN-QP-010

Owner User Program – Pressure Vessel Repair Procedure
Vessel Firetube Repair - Replacement of Damaged Sections
12-9 Treater 620

Contents

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Scope	
Procedure	
Vendor Qualification	
Cut-Out	
Weld Preparation	
Hydrogen Bake Out and Sulfur Removal	
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Travel Sheet	

Revision History

Date	Revision	Ву	Chk	Approver
Nov 24, 2011	1.3	AM	KM	AM

Static Data

Date:	March 11, 2013	CNRL Facility:	Central Brintnell		
Facility LSD:	12-09-81-22W4	Vessel Description:	Treater 620		
A#:	A0403457	CRN:	L0015.2		
Vessel Serial #:	97015-2-30	Fire tube Serial #:	509893A		
Vessel MAWP:	75 PSI	Fire tube Thickness:	0.500"		
Owners Inspector:	IRIS Inspection Services	Repair Organization:	Exact Oilfield Developing Ltd.		
Scope of Work:	Inspect and repair the deformation on the firetube by replacing 16ft 3" of the damaged section of the tube. Ensure firetube checklist is complete and correct before job completion. Ensure QC package is complete and sent to Anthony Merle. *Bake-out not required because of sweet service* **PWHT not required***				

Scope

Installation of replacement section of severely pitted or collapsed firetube from ASME Section VIII Division I pressure vessel constructed of P-I Group 1 or 2 materials. Note that due to the high March 13,20 (likelihood of repeat failure, all repairs on vessel firetubes must be post weld heat treated (PWHT) regardless of whether the firetube was PWHT at time of manufacture.

Materials shall be of the same specification, grade, and dimensions as defined in the manufacturer's original registered design.

Procedure

Vendor Qualification

 CNRL Owner's Inspector must review Contractor's Quality Control Program, welding procedures, and welder qualifications prior to the start of the repair. Any concerns must be brought the attention of the CNRL Integrity group.

Cut-Out

- 2. Define the area to be removed.
- 3. Perform UT of the cut area to determine if any laminations or discontinuities exist.
- If laminations or discontinuities are identified, move the cut out area to attempt to avoid these defects.
- Owner's Inspector shall approve the layout of the area to be removed prior to the initial cut being made.
- 6. Make sure the firetube has been sanitized and there are no explosive environments present.
- 7. Perform the cut.

Weld Preparation

- The joint preparation shall be in accordance with the contractor's registered WPS.
- The surface shall be cleaned to white metal for a distance of 10 mm beyond the expected weld area.
- 10. The weld area shall be MPI (where practical Wet Fluorescent MPI) examined for laminations and surface discontinuities. If laminations or surface discontinuities are identified they shall be brought to the attention of the Chief inspector.

Hydrogen Bake Out and Sulfur Removal

Note: Remove this section if firetube has not been in sour service

- 11. Vessels that have been exposed to sour or sulfur bearing process streams shall required the weld attachment area to undergo a "Bake Out" procedure. This procedure shall consist of heating the weld attachment area and 10 cm on each side to 315°C (600°F) for and holding that temperature for a minimum of 60 minutes. Bake out should be done prior to cutting out, if cutout is done thermally. Stipulate controls methods.
- 12. Bake Out is performed by either induction soil (use thermocouples as control instrumentation) or propane torch (use temperature sensitive crayons upper and lower temperature to be controlled). Oxyacatylene terches are not acceptable.
- 13. If induction colls are used, a 250°C (482°F) four hour heat treatment may be substituted for the normal 450°C (842°F) one-hour heat treatment.

Welding

- 14. Minimum pre-heat shall be 80°C (176°F) for a 100 mm band on both sides of the weld attachment area.
- 15. The CNRL Owner's Inspector shall witness seal on the box being broken and ensure that once the box has been opened the electrodes are stored in an oven.
- 16. The CNRL Owner's Inspector shall approve the alignment and fit-up of the replacement section with only the tack welds in place.
- Welding shall be in accordance with the contractor's registered PWHT WPS utilizing new E 7018-1 electrodes.
- Inspect root weld using dry powder MT.
- 19. Complete the butt welds. No down hand welding shall be used.
- 20. Perform post weld heat treatment (PWHT). If firetube was PWHT at time of manufacture, perform PWHT as per U1A. If firetube was not PWHT at time of manufacture, perform PWHT by heating to 620°C (1150°F) and holding for 1 hour. PWHT may be performed by either oven or stross relief truck. Heating rates shall be as per ASME-Section VIII Division 1.
- 21. After PWHT, the weld area shall be wrapped with an insulating blanket and allowed to slow cool to 100°C (212°F). The seeling rate shall not exceed 260°C (500°F) / hour.

Post Weld Non-Destructive Examination (NDE)

- 22. Complete 100% RT of butt weld joints.
- 23. MT 12 hours after completion of the work
- 24. No hydro-test is required.

Documentation

 The CNRL Owner's Inspector must make sure that Contractor has completed required QC documentation and jurisdictional documents.

- 26. The CNRL Owner's Inspector must sign off the jurisdictional documents and make sure one copy is submitted to the jurisdictional authority and one is included in the QC package.
- 27. Mail a hard copy of QC Documentation to:

Anthony Merle c/o CNRL Suite 2500, 855 – 2nd Street SW Calgary AB, T2P 4J8

Travel Sheet

A#:	A403457	Date: MAR. 13/13	509893A
Vessel LSD:	12-09-81-22W4	Facility:	Central Brintnell Battery

Cton #	December of Ston	Insp.	Cor	Contractor		Owners	nspector
Step #	Description of Step	Point Initial Date		Point	Initial	Date	
	Scope Sign-Off					CP Mar	32013
Vendor Q	ualification						,
Step 1	Ensure Vendor is Qualified		47	13/03/13		A	MP213/17
Cut-Out							
Step 2	Mark Area		de	11	_	A	
Step 3	Perform UT					Į. A	
Step 4	Move Area if Defects Found					A	
Step 5	Owners Inspector Approval		482	p		(A	
Step 6	Ensure Removal of LEL			\			
Step 7	Perform Cut		M	11	_	A_{\perp}	
Weld Pre	paration						
Step 8	Joint Prep as per WPS		A	7		A	
Step 9	Surface Prep		O Salar	1/		\mathcal{A}^{-}	
Step 10	Weld Area MPI for Discontinuities		Casc .	11		A	
Hydrogor	Bake Out						
Step 11	Perform Bake Out (If Required)					_	-
Step 12	Heating Method Used for Bake Out						
Step 13	Substitution of Industions Coils						
Welding						_	
Step 14	Pre-Heat		Á	83		1	
Step 15	New Electrodes		as	- 11		A	
Step 16	Owners Acceptance of Fit-Up		#	#		M	
Step 17	Approved WPS		ON.	11		A.	<₹
Step 18	Inspect Root Weld		W	11		A	MAR15/15
Step 19	Completion of Weld		TOP	13/03/14		6	MAR 15/
Step 20	PWHT						
Step 21	Slew Cool						
Post-Wel	d Non-Destructive Examination (NDI	E)			: .		
Step 22	Completion of Radiography		to	13/03/15		\mathcal{A}	MAR 15/1
Step 23	12 Hour MPI		442	" "		IA	MARISI 13
Step 24	No Hydrotest					A	(/
Documen	tation						
Step 25	Completion of Contractor Documentation		SE	13/03/15			
Step 26	Owners Inspector Signs Jurisdictional Docs		Off.	· / _{//}			
Step 27	Mail QC Docs to Anthony Merie		199				

H = Hold Point, W = Witness Point, R = Review Point

F	inal Sign-Off		
Contractor:	Owners inspector:		
	<u> </u>	 	



Canadian Natural

Procedure Number: IN-QP-010

Owner User Program – Pressure Vessel Repair Procedure
Vessel Firetube Repair - Replacement of Damaged Sections
12-9 Treater 620

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Revision History

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Nov 24, 2011	1.3	AM	KM	AM

Static Data

		T					
Date:	March 11, 2013	CNRL Facility:	Central Brintnell				
Facility LSD:	12-09-81-22W4	Vessel Description:	Treater 620				
A#:	A0403457	CRN:	L0015.2				
Vessel Serial #:	97015-2-30	Fire tube Serial #:	C80054				
Vessel MAWP:	75 PSI	Fire tube Thickness:	0.593° 1375 MP				
Owners inspector:	IRIS Inspection Services	Repair Organization:	Exact Oilfield Developing Ltd.				
Scope of Work:	section of the tube. Ensure completion. Ensure QC page	Inspect and repair the deformation on the firetube by replacing #8ft of the damaged section of the tube. Ensure firetube checklist is complete and correct before job completion. Ensure QC package is complete and sent to Anthony Merle. *Bake-out not required because of sweet service* **30'0FPIPE MY					

Scope

Installation of replacement section of severely pitted or collapsed firetube from ASME Section VIII Division I pressure vessel constructed of P-I Group 1 or 2 materials. Note that due to the high Mar 13, 2013 likelihood of repeat failure, all repairs on vessel firetubes must be post weld heat treated (PWHT) regardless of whether the firetube was PWHT at time of manufacture.

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Procedure

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- 6. Make sure the firetube has been sanitized and there are no explosive environments present.
- 7. Perform the cut.

Weld Preparation

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- 13. If induction coils are used, a 250°C (482°F) four hour heat treatment may be substituted for the normal 450°C (842°F) one hour heat treatment.

Welding

- 14. Minimum pre-heat shall be 80°C (176°F) for a 100 mm band on both sides of the weld attachment area.
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- 16. The CNRL Owner's Inspector shall approve the alignment and fit-up of the replacement section with only the tack welds in place.
- Welding shall be in accordance with the contractor's registered PWHT WPS utilizing new E 7018-1 electrodes.
- 18. Inspect root weld using dry powder MT.
- 19. Complete the butt welds. No down hand welding shall be used.
- 20. Perform post wold heat treatment (PWHT). If firetube was PWHT at time of manufacture, perform PWHT as per U1A. If firetube was not PWHT at time of manufacture, perform PWHT by heating to 620°C (1150°F) and holding for 1 hour. PWHT may be performed by either oven or stress relief truck. Heating rates shall be as per ASME Section VIII Division 1.
- 21. After PWHT, the weld area shall be wrapped with an insulating blanket and allowed to slow cool to 100°C (212°F). The cooling rate shall not exceed 260°C (500°F) / hour.

Post Weld Non-Destructive Examination (NDE)

- 22. Complete 100% RT of butt weld joints.
- 23. MT 12 hours after completion of the work
- 24. No hydro-test is required.

Documentation

 The CNRL Owner's Inspector must make sure that Contractor has completed required QC documentation and jurisdictional documents.

- 26. The CNRL Owner's Inspector must sign off the jurisdictional documents and make sure one copy is submitted to the jurisdictional authority and one is included in the QC package.
- 27. Mail a hard copy of QC Documentation to:

Anthony Merie c/o CNRL Suite 2500, 855 – 2nd Street SW Calgary AB, T2P 4J8

Travel Sheet

A #:	A403457	Date: MAR. 12/13	C80054
Vessel LSD:	12-09-81-22W4	Facility:	Central Brintnell Battery

O4e #	December of Stan	insp.	Co	Contractor		Owners Inspector		
Step#	Description of Step	Point	Initial	Date	insp. Point	Initial	Date	
Scope Sign-Off						CP Mar	32013	
Vendor (aualification .							
Step 1	Ensure Vendor is Qualified		S	13/03/12		(A	MAC 13/13	
Cut-Out				7				
Step 2	Mark Area		CAF	11		A	MPR 12/13	
Step 3	Perform UT		/					
Step 4	Move Area if Defects Found		/			_	/	
Step 5	Owners Inspector Approval		91	11		A	MAR 12/13	
Step 6	Ensure Removal of LEL		/					
Step 7	Perform Cut		M	"		íΑ	MAR 12/13	
Weld Pre	paration							
Step 8	Joint Prep as per WPS		M	11		(A	MA212/1	
Step 9	Surface Prep		H	13/03/13		CA	1	
Step 10	Weld Area MPI for Discontinuities		AGV.	"		iA	-\$/	
Hydroge	n Bake Out						•	
Step 11	Perform Bake-Out (If Required)]	
Step 12	Heating Method Used for Bake Out							
Step 13	Substitution of Inductions Coils				1		1	
Welding			***************************************	41. 4	 	·		
Step 14	Pre-Heat	T	₽	13/03/13		LA.	MAR15/13	
Step 15	New Electrodes		B	11		A	1	
Step 16	Owners Acceptance of Fit-Up		94	- 11		(A		
Step 17	Approved WPS		pr	11		CA	4	
Step 18	Inspect Root Weld		M	1)		iA	MR15/1	
Step 19	Completion of Weld		to	13/03/14		A	MAR13/1	
Step 20	PWHT			,,.		ļ		
Step 21	Slow-Cool)		
	d Non-Destructive Examination (ND)E)	i	1.00	- + <u>1</u> 4'		, , , , , , , , , , , , , , , , , , ,	
Step 22	Completion of Radiography		#	13/03/15		(A	MAR_151 (
Step 23	12 Hour MPi		(A)	, i		iA	u	
Step 24	No Hydrotest		,			iA	l,	
Documer	ntation		•		1, 1	1		
Step 25	Completion of Contractor Documentation		A	13/03/15				
Step 26	Owners Inspector Signs Jurisdictional Docs		M	11				
Step 27	Mail QC Docs to Anthony Merie		SA					

H = Hold Point, W = Witness Point, R = Review Point

		Final Sign-Off		
Contractor:	Allenson	Owners inspector:		

AB-2; (tide 1) 97/11

A-3103457 AB-3: (Life 1) 971
THE ME 13 AB
MANUFACTURER'S DATA REPORT FOR PRESSURE VESSEL

DECLARATION DE CONFCEIGNE DU CONSTRUCTEUR D'APPAREILS SOL'S PRESSION

ALBERTA LABOUR Alberta Bollers Safety Association 200, 4208 - 97 Street Edmonton AB T62 329 Partial Partiel [:

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Upon shipment of a pressure vessel, this form fully and correctly filled an anual be mailted to the office of the Chief Inspector in the province of installation in accompance with the regulations under the Act, governing the construction and installation of pressure vessels.																		
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Pressure Vessel impredur		thatlus Aub a ,baq b di birane sering:			b stow see				olofi adu ind Aline all
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HFAU OTFICE PO 80x 312u 53251-RR 232 Sherwood Pc k, Alberts, T&A 2A6 Pt une: (403) 417-7222, Fax: (403) 417-7220

Manufactured and cortried by

:tCl Resource Constructors Inc., 53251 RR 232 Sherwood Park, Alberta, TSA 2A6 (Name and Address of Manufacturer)

2. Manufactured for:

C.S. RESOURCES LTD. 6/6 MILLENIA RESOUR _ E COUSUITIJES
(Name and Address of Purchasser) 150, 1300 - 8+h STREET CALGARY, AB.

3. Location of installation. PELICAN LAKE COMPLEX, WABASCA AB., LSD# 12-9-081-22W4M

(Migr's Secial No)

. Type: Horizontal E

(Horz. Vert. or Sphere)

EMULSION TREATER 97015-2-36

(Taril Sep., Heat

Such., Etc.)

L-0015.2 (CRN) 97015.1/5 # (+2, (Drawing No.)

N/A Real Bd. 40.) (

/948 (Yeer Build)

Diameter Purpose lien Nominal Reinforcement How * (Inlet, Cutlet, Drain) or Size Material Location Thk Material Type Attached PIPE 150 # RTUN WERDES 34-103 EMULSION WLLT SCH 40 SA 100 B S(1:80 w illogo SHELL WELARD SA-105 GAS OUTLET N2 LSO BREWN PPE 34 106 8 SOME SOME PIPE **≤**4**8**0 WELDKO 150 ERFUN 56480 56480 DIL OUTLET SA 105 WELSEA PIPE HEAD SA 1065 WEUND 7" SCH 160 1500 REUN WATER OUTLET 31416 NY SA 105 WILDER ISO RESO SAIRS ... 150 PREUN N5 48 SCHBO PIPE DRAIN WELL O 5A10 PIPE BOOKEND SA 106 B 41660 SHELL ANOPE SCHIO NONIE Saus WELDED PIPK 3A106 B PIPE 2450 SHELL wileya 3700 SO '9YZHH O A K FUB 7/4" SC4 80 RELIEF SAIRS 1.00 JK WELER? MELL -- (1 e 6 0 Li C. a 60 PIPE 9 001 AZ SCHSO P.76 NBALE BOY REUN 364 80 364 80 264 80 ASH WATER INLET SA 108 ISO RESO SA 103 R PIPE 37616 MELICO SA 106 B LINSH WATER I ULET NYME 11 ISO F REUP SCH 160 MELAKA A/05 SCH 160 150 FRF50 SA /U' USLO CO SHELL 54/007 esand water ourse nionie SO" REWN SCH TO PIK te 5A 105 WELLI GI PIDE PIDE Lille 54KIL SA 106 0 sen fo 71 DESCUDER OFFET NII A/R X4 80 LICLAR PUPE 3CH 40 5CH 40 TIPL . 5A 106 G MELEKO 150 RESO 4 ELOKO M 1/2 SA 105 MANWAY SHELL SA MIG SCH 40 <u> 24 "</u> WELDED 37635 GUND FLAN 14 1/5" GASKAT SA 4 3974 1.25 STYD SA MUZHM NVT 1.25 C5 SA \$1670 DAVIT HANGE SCH YO WELDER PIPE DOME Di HEAD PIPE 14 / SA106 B SCHYO WELDER SHALL HLAD **UNIOCO** PIPE 5CH 40 3CH 40 SA 101 B 1500 4550 772 340 WELSK! 3 14 SS 417 GASKET ALIBATH .25 AUTE NUT JA MYZ HM SA 31670N SA 31670N .375 FILL TUBE PLATE 71-78 PLATE 0,5 SA 51670 GASKET PEOPRENL

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Name

RCI Resource Constructors Inc.

Signed (Manufacturer) (Representative) -

Date Maciales

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HEAD OFFILE PO Box 3120, 53251-RR 232 Sherwood Park, Alberta, TBA 2A6 Phone: (403) 417-7212, Fax: (403) 417-7220

flanufactured and certified by:

RCI Resource Constructors Inc., 53251 RR 232 Sherwood Park, Alberta. T84 2A6 (Name and Address of Manufacturer)

Manufactured for:

S RESOURCES LTD. 46 MILLENIA RESOURCE CONSULTING Hame and Address of Purchaser) ISO, 1300-8th STREET, CALGARY, ALBERTA

Location of installation:

PELICAN LAKE COMPLEX, WABASCA, AB, LSD # 12-9-081-22W4M (Name and Address)

Horizontal Type: (Horz, Vert, or Sphere) (Tank, Sep., Hest

ENAL ENL

(Mg/s Serial No.)

(CRN)

EMULSIUN TREATER 970152-30 1-00152 97015.1/3 REV 2 (Doseino No.)

NIA Diari Bd. No.)

1998 (Year Built)

Reinforcement Purpose Nominal How " (Inlet, Outlet, Drain) No. or Size Type Material This. Material Location Attached 3A 14367M FIRE TUBE FT 1/2 5700 NUT 3A 1442 414 SA 10 \$ DESLUDAR (SPAA;) NII A/R LING FLANCE 4735" 31655 A19387 ASKET STUD SAITYL HAT NUT SA 105 DESCUBLE OUTLET IN 12 AIB SO4 REWA SCH 80 WELDE D PIPE SA 105 SA -106 IS SA 105 211 SOF RESO SCHBO WILDED PIPE SC HBO ISOURTHUM ISOURTEF GASKET SCH 60 NIZA WELDED WATER LT SCH ILO SA 145 37655 A-H387H STUD SA IOLB SCH 160 PIPE WELDED SHELL PIPE A 1066 WELLED CI A/B 6000 A COUPLING SHALL 105 WELACO 105 6000 W LE LORD HELL COURING 1.00 SHELL 105 60000 PRIOED COUPLING 60000 10 ^ 105 CONFLINA 24 A 16 AMPLE Courling 6000 P 165 were co SHELL SHELL SHELL SHELL SHELL SHELL 3A 10 WELDED COURING WELLEN) SAMPLE CS AIG 6000 105 COUPLINE 103 L000 F 6000 1.0 SA 705 WELDLD 6000 # 6000 # 6000 # COUPLING CI AR PETORO PETORO SA 105 . 6 3A 103 COSPLING 0 17 C9 AB COUPLING MELOKA HEAD 6000 4 PLVA SPARE SA 105 SMEL: WELDED 000 E " میا A/05 SP/ LE COJELING 6000 6 WEGE SYLLL 401 SA 10 بم ۲۰ 6000 0 PLVS 10: 6000 W " ميا COUPLING 103 M' Will SHELL 10" 6000 A PLUG 105 CLISAIB COUPLING 105 6000 0 weed to SIELL LZ A 103 000 WELCED SHILL SAMPLE CIH CONPLING

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Name

RCI Resource Constructors Inc.

Signed (Manufacturer)). allies

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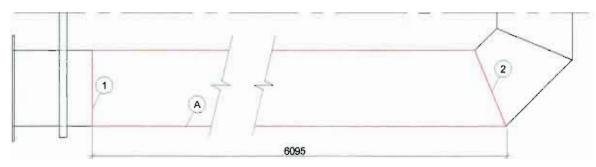
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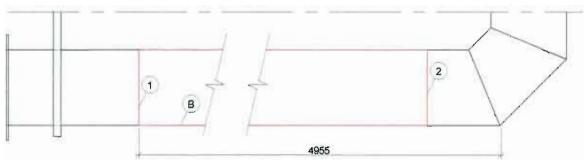
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Tube C80054 (Hot Side Only)



Tube 509893A (Hot Side Only)

Notes:

- 1. All dimensions in mm
- 2. New material shown thus:
- Tube C80054 RT Report PLRT-6003-HW
 Tube 509893A RT Report PLRT-6004-HW

			Materials	3			
Item	Oty.		Heat No				
Α	6.1 m	508 mm OD x 9	VVA4084				
В	5.0 m	508 mm OD x	MA1427				
С							
			Welding				
WP	S No	EOD-1-3					
M	<i>l</i> eld	Welder	RT	MT	UT		
Tube C	80054						
1 (Bu	tt Weld)	3	X2	MP1			
2 (Bu	tt Weld)	3	X1	MP1			

Ŋ	IDE S	ervices	

MP1

MP1

X2

хз

Tube 509893A 1 (Butt Weld) 2

2 (Butt Weld) 2

Contractor	Technician
Team Industrial Services	H Wahlstrom
IRIS NOT	C Auld
	Team Industrial Services

	Ve	essel Data	
Equipment Number:	V-620	Serial Number:	97015-2-30
'A' Number:	A403457	CRN Number:	L0015.2

Exact Oilfield Developing Ltd Box 755, Slave Lake, AB, TOG 2A0

Canadian Natural Resources Ltd

CNRL C Brintnell 12-9-81-22W4M V620 Firetube Repairs - 2013-03-18 C80054 & 509893A

Owe CGMc	· 2013-03-30	∞ NTS
· 001	0	EOD-CN-1300207-7022



NONDESTRUCTIVE INSPECTION REPORT

166110-CA-001

Page 1 of 5

<u>`</u>					
Type of Inspection: MT VT	Job/P.O.#:	IRISNDT#:	166110	Date:	15-Mar-13
Test Technique: Visual, MT-1V, MT-2V	Client: CNRL				
Equipment:	Location: Exact Oilfield,	Slave Lake			
	Item Inspected: 20" Fire	tube, C80054-Treater 62	20		
	Code: ASME VIII, Client n	epair procedure			
Scope:					
Provide visual oversight and NDT support for repairs or plant. Repairs are to be performed as detailed in CNRL meet ASME VIII standard and the standards defined in t management system. Repairs will be performed off-site	procedure IN-QP-010, "Ves: he CNRL pressure equipme	sel Firetube Repair-Rep ent integrity manageme	placement of D ent system and	amaged the con	Sections", to
Results/Observations:					
Prior to commencement of the repair, the equipment ow	vner (CNRL) developed and	approved an ABSA ac	cepted repair :	scope fo	r the firetube.
The repair consisted of the removal and replacement of repair. One of the 2 circ welds was a mitered joint. All so original design.					
Areas for repair were marked and confirmed. As the ves	ssel is considered a "sweet	service" vessel, no hy	drogen bake o	ut was p	erformed
Joint preparation was completed as required in the WPS particle inspection. No indications were found (See IRIS			kamined using	dry visl	ble magnetic
All welding was performed by qualified welders, using a Oilfield quality management system (AQP-2172).	approved weld procedures (WP 1093.2, procedure	EOD-2 Rev 2)	un d er th	e Exact
All new E7018-1 rods were used for the repairs, and rod	s were stored as required b	y the procedure.			
Fit up on all joints were visually inspected and approve	d (proper gap, no unaccapt	able intarnal m i salignn	nent) prior to c	ommeno	ing welding.
Dry visible magnetic particle inspection was performed	on the root pass of each w	eld. No indications wer	e noted (1661°	10-CA-00	1MT)
Radiography was performed on all butt welds by TEAM.	. No rejectable defects were	found (See TEAM rep	ort)		
Visual inspection of welds was performed during welding	ng and upon completion of	each weld, with no issu	ues or indication	ons.	
Wet visible magnetic particle inspection was performed stress relief. No indications were found (166110-CA-001		hour post) and all exis	sting welds on	the firet	ube prior to
Post weld heat treatment was walved by CNRL for this r	•				
As per the procedure, no hydro test is to be performed.	-				
Unit#- Kilometers: Consumables		Interpretation by: Chris Auld-API 510,IBPV		SNT-T	C-1A 2
In Out: Hrs:		(Print) A		– c.g.s.	(Level)
In. Out Firs:			wie Aufd nin the author of this document I I 303/18 10:57 23-07107	C.G.S.	B.# <u>12725</u>
Personnel:		(Signeture)		-	
CA		Client Representative: (Print) Fam in full			
		agreement with			
		(Sign)			
1		1			

5311 – 186 Street Edmonton, Alberta, Toff, 518. Phone, (780) 437-2922 Fax* (780) 418-1436 Calgary (403) 279-6121 Lloydomaster (780) 875-6455 Barthead (780) 674-3018 Nisku (786) 955-7616 Culpary Lloydanuster Bentsesd Nisku

Cold Lake Fort McMurray Rod Dust

(780) 826-6105 (780) 743-1536 (403) 347-1742

Deer Park, TX Matrix, Houston, TX Tukin, OK

(281) 476-1444 (713) 722-7177 (918) 445-8773

Equipment Photographs:





C80054 FIRETUBE REPAIR-MARCH 2013 (01)

C80054 FIRETUBE REPAIR-MARCH 2013 (02)





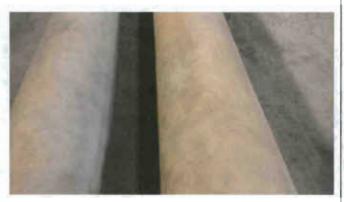
C80054 FIRETUBE REPAIR-MARCH 2013 (03)

C80054 FIRETUBE REPAIR-MARCH 2013 (04)

5311 - Se Succe Gilmogram, Albert Tel: FISt Private. (780) 487-2022 Face (780) 438-4436

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Cold Lake Fort McMarray Rod Deer (780) 826-6108 (780) 743-153 (403) 887-1/74 Door Park, TX Materix, Floration, TX: Tytise, CW. (281) 476-4444 (713) 722-5177 (918) 446-877





C80054 FIRETUBE REPAIR-MARCH 2013 (05)

C80054 FIRETUBE REPAIR-MARCH 2013 (06)





C80054 FIRETUBE REPAIR-MARCH 2013 (07)

C80054 FIRETUBE REPAIR-MARCH 2013 (08)

riu, 76E 518 Phone (780) 437-3022 Fax (780) 438-1436 (463) 279-6121 (780) 875-6455 (780) 935-7616

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C80054 FIRETUBE REPAIR-MARCH 2013 (11)

C80054 FIRETUBE REPAIR-MARCH 2013 (12)

n, Alberta, 168.518. Phone: (786) 437-2022 Fire: (780) 438-1436 (403) 279-6121 (780) 875-6455 (780) 675-43018 (780) 955-7616

Cold Lake Fort Mobilianay Red Dear

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Deer Paris, TX Matrix, Hauston, TX Tubus, OK

(7281) 476-4444 (713) 722-7177 (718) 446-8173



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Cetgary (403) 278-8121
Lloydminster (780) 875-6455
Earthead (780) 874-3018
Red Ceer
Nisku (780) 955-7818

MAGNETIC PARTICLE INSPECTION REPORT

166110-CA-001MT

Page 1 of 1

Procedures: MT 1V-2V Code: ASME VIII, client procedure, information only report for all existing welds		tfield Developing-Slaw retube C80054,Treate		Date: :15-Mar-13
Surface Condition: Painted Sandblasted	Machined As	Cast As Forged	☐ Weldment ☑ Other	· 🗆
Material: CS		Thickness:	: N/A Heat To	reatment: N/A
Magnetizing Equipment: Yoke ☑ Coil ☐ IRISNDT #: 40193		nch: Headshot 🗌 📑	Central Conductor	_
Blacklight: IRISNDT #: Verification per ASME V	Mfg Art 7 T.777.2	g:	Calibration Dat	e: Jan-11
Whitelight: Battery Powered Min. 3V 110V Power Min. 60W Bu			i0 cm (12in) of the inspection imum 1000 Ex (100fc)	surface
Method of Magnetization: AC ⊠ DC □ 0	Continuous 🛛 Resid	lual 🗌		
Magnetic Particles: Dry ☑ Wet ☑ Batch #: 957/1182		d ⊠ Grey □ Bla g: Magnaflux	ck 🖾 Fluorescent 🗌 Type: 8A/7C	
Background: 🛛 Batch #: 1197	Mfg	g: Chemetall	Type: Ardrox 8	3901W
Inspection Results: Dry visible magnetic particle inspection was pe addition, Wet visible magnetic particle inspectio welds on the fire tube. New welds completed: 2-20" pipe to pipe butt wat in newly completed welds Welder ID-3 RT Designation-X-1, X-2 No indications were found at the time of inspection in the complete welds. NOTE: ALL REPAIR WELDS WERE PERFORMED QP-010, "Vessel Firetube Repair-Replacement of TO FIND IN-SERVICE DEFECTS AND WAS NOT	en was performed on a reld (Includes 1 miters lion. D AND ASSESSED BA f Damaged Sections"	all newly completed on the state of the stat	welds (12 hour post) and a	ccessible existing PAIR PROCEDURE IN-
Inspection Limitation(s): Access to some existing	welds was limited by fi		adia ku	
I Ulius. Kirimeters: 1	nsunables: T-MIN	Interpreta Chris Auf (Prin (Signatur Client Re I am in fu agreeme report co	Come Auto I am the nation of the Occurrence 201 202115 02:57 42-07007 re) spresentative: (Print) dil not with	SNT-TC-1A 2 - C.G.S.8. 2 (Level) C.G.S.6.# 12725

(281) 478-4444 (713) 722-7177 (918) 448-8773

Deer Park, TX Matrix, Houston, TX Tubsa, OK

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NONDESTRUCTIVE

166110-CA-002

	INSPEC	TION REPORT		Page	1 of 4
Type of Inspection: MT VT	Job/P.O.#:	IRISNDT#:	166110	Date:	15-Mar-13
Test Technique: Visual, MT-1V, MT-2V	Client: CNRL				
Equipment:	Location: Exact Oilfield,	Slave Lake			
	Item Inspected: 20" Fire	tube, 509893A-Treater 62	0		
	Code: ASME VIII, Client n	epair procedure			
Scope:					
Provide visual oversight and NDT support for repairs or plant. Repairs are to be performed as detailed in CNRL meet ASME Vill standard and the standards defined in management system. Repairs will be performed off-situ	procedure IN-QP-010, "Vest the CNRL pressure equipme	sel Firetube Repair-Repl ent integrity managemen	scement of t	Damaged d the con	Sections", to
Results/Observations:					
Prior to commencement of the repair, the equipment of	wner (CNRL) developed and	approved an ABSA acce	epted repair	scope fo	r the firetube.
The repair consisted of the removal and replacement o repair. All sourced materials were of the same specific	f the damagad section of the ation, grade and dimensions	e 20" fire tube. 2 circ wel detailed in the original	ds were req design.	uired to c	omplete the
Areas for repair were marked and confirmed. As the ve	ssel is considered a "sweet	service" vessel, no hydi	ogen bake d	out wes p	erformed
Joint preparetion was completed as required in the WP particle inspection. No indications were found (See IRI:			mined using	g dry visi	ble magnetic
All welding was performed by qualified welders, using Oilfield quality management system (AQP-2172).	approved weld procedures (WP 1093.2, procedure E	OD-2 Rev 2)	under th	e Exact
All new E7018-1 rods were used for the repairs, and roo	ds were stored as required b	y the procedure.			
Fit up on all joints were visually inspected and approve	ed (proper gap, no unaccept	able internal misalignme	nt) prior to	commenc	ing welding.
Dry visible magnetic particle inspection was performed	on the root pass of each w	eld. No indications were	noted (1661	10-CA-00	2MT)
Radiography wes performed on all butt welds by TEAM	l. No rejectable defects were	found (See TEAM repor	t)		
Visual inspection of welds was performed during weldi	ng and upon completion of	each weld, with no issue	s or Indicati	lons.	
Wet visible magnetic particle inspection was performed stress relief. No indications were found (166110-CA-00)		hour post) and all exist	ng welds or	the firet	ube prior to
Post weld heat trestment was waived try CNRL for this	repair				
As per the procedure, no hydro test is to be performed	_				
Un#: Kilometers Consumable	S	Interpretation by: Chris Auld-API 510,IBPV		SNT-T	
In: Out. Hrs:		(Pr // /) Cres Au	d	— c.g.s.	(Level)
In: Out Hrs:		// //// I um the	Who of the document 18 00.57.54 -0700*	C.G.S.	B. # <u>12725</u>
Personnel		(Signature) Client Representative:		_	
CA		(Print)			
		agreement with report contents			
		(Sign)			

Cold Leke Fort McMurray Red Deer

(780) 826-6105 (780) 743-1536 (403) 347-1742

Does Park, TX Matrix, Hunston, TX Tulsa, OK

(281) 476-4444 (713) 722-7177 (918) 446-8773

Equipment Photographs:





509893A- FIRETUBE REPAIR MARCH 2013 (1)

509893A- FIRETUBE REPAIR MARCH 2013 (2)





509893A- FIRETUBE REPAIR MARCH 2013 (3)

509893A- FIRETUBE REPAIR MARCH 2013 (4)





509893A- FIRETUBE REPAIR MARCH 2013 (5)

509893A- FIRETUBE REPAIR MARCH 2013 (6)



509893A- FIRETUBE REPAIR MARCH 2013 (7)



5311 – 86 Street Edmonton, Alberta, T6E 5T8 Phone: (780) 437-2022 Fex: (760) 438-1438
Celgary (403) 279-8121
Lloydrainster (780) 675-6455
Barrhead (780) 674-3018
Red Deer
Nisku (780) 955-7616

MAGNETIC PARTICLE INSPECTION REPORT

166110-CA-002MT

Page 1 of 1

Procedures: MT 1V-2V	Job / P.O. #:		IRISNDT #: 166110	Date: 15-Mar-13
Code: ASME VIII, client procedure, information	Client: CNRL			
only report for all existing welds	Location: Exact	Oilfield Developing-Si	ave Lake	
	Item Inspected:	Firetube 509893A,Tra	eater 620	
Surface Condition: Painted Sandblasted	Machined 🗍 /	As Cast 🗌 As Forç	ged Weldment M Other	· a
Material: CS		Thickne	ess: N/A Heat Tr	reatment: N/A
Magnetizing Equipment: Yoke ☒ Coil ☐ (RISNDT #: 40193		Bench: Headshot 🗌 Mfg: Parker	Central Conductor Coil Calibration Da	
Blacklight: IRISNDT #: Verification per ASME V		Mfg:	Calibration Dat	e: -Jan-11
Whitelight: Battery Powered Min. 3V 110V Power Min. 60W Bu			n 30 cm (12in) of the inspection ninimum 1000 Lx (100fc)	surface
Method of Magnetization: AC ☒ DC ☐ C	Continuous 🖾 Res	sidual 🗆		
Magnetic Particles: Dry ☑ Wet ☑		,_	Black A Fluorescent	
Batch #: 957/1182		Mfg: Magnaflux	Type: 8A/7C	_
Background: Batch #: 1197	N	Mfg: Chemetall	Type: Ardrox i	8901W
Dry visible magnetic perticle inspection was peraddition, Wet visible magnetic particle inspection welds on the fire tube. New welds completed: 2-20" pipe to pipe butt with welds and provided welds. Welder ID-J. RT Designation-X-1, X-2. No indications were found at the time of inspection in the provided welds. NOTE: ALL REPAIR WELDS WERE PERFORMED QP-010, "Vessel Firetube Repair-Replacement of TO FIND IN-SERVICE DEFECTS AND WAS NOT.	on was performed or reld . don. D AND ASSESSED of f Damaged Section	BASED ON ASME VIST. ALL EXISTING V	ed welds (12 hour post) and a lii STANDARD AND CNRL RE VELDS WERE EXAMINED FOR	ccessible existing
Inspection Limitation(s): Access to some existing	welds was limited by			
Units. Richters	onsumables: IT-MIN	Chris (Prin (Sign Clier	Christ Add I see the allies of the address of t	SNT-TC-1A 2 - C.G.S.B 2 (Leval) C.G.S.B.# 12725
		agra	in tull ——————————————————————————————————	

IRISNDT E-2003F

(780) 628-6105 (780) 743-1536 (403) 347-1742

EAM ®Industrial Services RADIOGRAPHY REPORT **REPORT#** PLRT-6003 HW CLIENT: CNRL PAGE 1 OF LOCATION: CENTRAL BRINTNELL 12-9-81-22 W4M 15-Mar-13 DATE: RT.ASME.1 R15 53112429 RT PROCEDURE: JOB #: ACCEPTANCE STANDARD: ASME VIII DIV 1 UW 51 O/AFE #: TREATER A403457 FIRETUBE C80054 REPAIR ITEMS EXAMINED: HB - HOLLOW BEAD C - CRACK AC - ARC BURNS EP-EXCESSIVE PENETRATION SH - SHRINKAGE CODE LEGEND DEFECT LEGEND TECHNIQUES DEFECT LEGEND

IF -INCOMPLETE FUSION

IP - INCOMPLETE PENETRATION

UC - UNDERCUTTING

8 - SLAG

BT - BURN THROUGH P - POROSITY HL -HIGH/LOW IC - INTERNAL CONCAVITY LC - LOW COVER 1. ASME 831.3 NORMAL 2. ASME 831.3 SEVERE 3. ASME VIII DIV 1 UW 51 4. ASME VIII DIV UW 52 5. AGME B31,1 6. CSA Z 662 7. API 650 6. OTHER 1. SINGLE WALL EXPOSURE 3. SINGLE WALL VIEWING 2. DOUBLE WALL EXPOSURE 4. DOUBLE WALL VIEWING 1 - SLIGHT, 2 - MEDIUM, 3 - SEVERE WLDR WELD# LOCATION THK DIA. 1F ΙÞ UC S BT P IC ιC TECH# CODE# ACC.EPT REMARKS REJECT SYM 20 3 7 1 508 STD 2/3 3 1 X 2 2 508 STD 20 3 2 1/3 3 7 3 4 5 6 7 8 9 10 11 12 13 14 15 16

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This Certificate or Report is valid only for that work which was specifically requested. The Company is not responsible for any views or opinions expressed by employees performing this work which fall outside the confrect terms or reference. All certificates and / or reports are the result of work porformed in conformance with applicable specifications and standards to the best of our ability and intant. However, the company will not be responsible for deviation within the normal familts of accuracy in accordance with standard practices. First Code Acceptance shall require Client and Manufacturer

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TEAM Industrial Services

RADIOGRAPHY REPORT

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TEAM Industrial Services Inspection Services Canada

Slave Lake, Alberta Phone: 780-805-6384 Fax: 780-849-5321 ndtaltec@hotmail.com

Harold Wahlstrom Senior Technician Area Supervisor



Natural Resources

Ressources naturelles

Canada

Canada



Harold Wahlstrom

1913

2011/01/12

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Natural Resources

Ressources naturelles

Canada

Canada 1913

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Cert. Date Date cert. EMC 1997/09/05 1897/12/02

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This certifies that <u>Harold Whalstrom</u> has qualified to S.N.T. No.SNT-TC-1A Radiographic Inspection Level Level Magnetic Particle Level Levell Liquid Penetrant Level Leveli Ultrasonic Testing Level Level III Examiner: S. Banner Date of Issuer 01 January 2011

31 December 2013

TEAM

Quality System Supplement Corporate

FORM 103.10 Rev: 6 Page 1 of 1

VISION ACUITY RECORD

Name: Harold Wahlstrom	Employee #: 664923
Vision A	cuity Results
Near Vision Requirements Required for All Personnel	<u>Distance Vision Requirements</u> Branch is Required to Determine Applicability
<u>Left Eye</u> <u>Right Eye</u>	<u>Left Eye</u> <u>Right Eye</u>
Uncorrected J-1 @ 12" J-1 @ 12"	Uncorrected 20/ Snellen 20/ Snellen
Corrected J- @ "J- @ "	Corrected 20/ Snellen 20/ Snellen
Satisfactory Near Vision (J-1 minimum required in at least one eye)	Satisfactory Distance Vision (20/30 Snellen minimum required in at least one eye.
Unsatisfactory Near Vision	☐ Unsatisfactory Distance Vision
Corrective Lenses Required (J-1 requirement in at least one eye met with use of corrective lenses	
Reading card has been verified IAW 8.1.2.1 of 33.G.103-S8 for personnel certifying to 33.G.103-S4 (CP-189/ASME XI)	N/A (Branch determined non-applicable by Code or contractual agreements)
Color Vision	on Requirements
Required f	or All Personnel
(Use Form 103,10a "Colo	r Vision Examination Charts")
Can differentiate between col	ors or shades of gray used in method(s)
	olors or shades of gray used in method(s)
	sfactory Corrective Lenses Required
Deficiencies: None	
Brightness Discri	nination Requirements
Branch is Required (o Determine Applicability
⊠ N/A □ Satisfactory □ U	nsatisfactory Corrective Lenses Required
Remarks/Restrictions;	
Administered By:	Reviewed & Approved By:
Signature:	IDT Level III Signature: Lesp. Level 3 Signature
	IDT Level III Name: Lesp. Level 3 Name: Stan Banner
Location: Edmonton	Date: 1 November 2012
Date: 1 November 2012 Nex	t Examination Date: 1 November 2013

Welder's Log and Continuity Log

Exact Oilfield Developing Ltd.

"B" Pressure Welder's Log Control

Welder's Name Welder's Symbol	Ticket #	File #	P Number	FΝι	ımber	Process	WPS Qualified To	Positions Qualified To	Thickness Range Qualified To	Minimum Pipe Diameter Qualified To	Expiry Date Of Ticket
	# 18427	W-10793	P-1	F-6	F-4	GTAW/SMAW	EOD-8	All	.250"438"	1" OD	Nov. 15/2014
Uphill	# 16813	W-10793	P-1	F-3	F-4	SMAW	EOD-1-3	All	.188"684"	1" NPS	Aug. 23/2013
Kim Lummerding "K"	# 16814	W-10793	P-1	F-3		SMAW	EOD-CSA-2	Ali	0.436"	1" NPS	Aug. 23/2013
								_			
"3"	# 17087	W-10234	P1	F-3	F-4_	SMAW	EOD-CSA-2	All	.25 <mark>0"186"</mark>	1" OD	Nov. 3/2013
David Edwards Uphill	# 17086	W-10234	P-1	F-3	F-4	SMAW	EOD-1-3	All	.104" - Max	1" OD	Nov. 3/2013
Uphill	# 17043	W-19732	P-1	F-3	F-4	SMAW	EOD-1-3	Ail	.104 - Max	1" OD	Oct. 24/2013
Carmen Conrad "J"	# 17044	W-19732	P-1	F-3	F-4	SMAW	EOD-CSA-2	All	.250"186"	1" OD	Oct. 24/2013
	# 17181	W-21515	P-1	F-6	F-4	GTAW/SMAW	EOD-8	All	.250438	1" OD	Dec. 7/2013
	#18676	W-21515	P-1 - P-8	F-6	F-5	GTAW/SMAW	EOD-3	All	.250"438"	1" OD	Feb. 12/2015
Uphill	# 18674	W-21515	P-1	F-3	F-4	SMAW	EOD-1-3	Αii	.104" - Max	1" OD	Feb. 12/2015
Robin Edwards "R"	# 18675	W-21515	P-1	F-3	F-4	SMAW	EOD-1-3	All	.250"438"	• 1" OD	Feb. 12/2015
	# 17168	W-21857	P-1 - P-8	F-6	F-5	GTAW/SMAW	EOD-3-1	All	.250"438"	1" OD	Nov. 30/2013
	# 18456	W-21857	P-1	F-6	F-4	GTAW/SMAW	EOD-8	All	.250"438"	1' OD	Nov. 26/2014
Uphill	# 18198	W-21857	P-1	F-3	F-4	SMAW	EOD-1-3	All	.104" - Max	1" OD	Sept. 20/2014
Jeff White "2"	# 118199	W-21857	P-1	F-3		SMAW	EOD-CSA-2	F/V/O	.560"	2.875"	Sept. 20/2014
	# 17288	W-17894	P-1 - P-8	F-6	F-5	GTAW/SMAW	EOD-9	All	.250"438"	1" OD	Jan. 2/2014
	# 17104	W-17894	P-1	F-6	F-4	GTAW/SMAW	EOD-8	All	.250"438"	1" OD	Nov. 7/2013
Brent Ghostkeeper "G"	# 17103	W-17894	P-1	F-3	F-4	SMAW	EOD-1-3	All	.104" - Max	1" OD	Nov. 7/2013

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	Performance Qualification GRB Card No. 18198
GRB Enterprises Ltd. Edmonton Alberta	
WELDER PERFORMANCE QUALIFICATION CARD	Process(es) Materials (P.No.): PI
JEFF HIM	Filler Metal (F.No) F 3 F4 Min Outside Co
Name W 2185	May Deposited
Name : This card is issued pursuant to the Safety Codes Act and the Pressure Welders	Weld Metal "Qualified "Qualified
Name and is issued pursuant to the Safety Codes Act and the Pressure Walders This card is issued pursuant to the Safety Codes Act and the Pressure Walders Regulation. The performance qualification is in accordance with Section IX of the ASME BPV Code and subject to the Imitations on the reverse side.	Backing Gas NONE
SEPT 20, 2012	Progression #E00 2 5 2
BRUCE CORNIER 18198	SEPT 20, 2014 Belle
Welding Examiner (Print/Type) GRB Card No.	P.O. Exphy Date Welding Examiner Signature
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GRB Enterprises Ltd	Performance Qualification GRB Card No. 18199
Edmonton Alberta AOQP / 10/10)	
WELDER PERFORMANCE QUALIFICATION CARD	Process(es) Materials (P.No.)
Neme W-21857	Filler Metal (F.No) Pipe Diameter, 2-8-75
ABSA File Number	Max Deposited Position(s)
Name	Weld Model
ASMEIBPV Code and subject to the illimitations on the reverse side.	Backing Gas
Date of Test	Examiner File No.
BRUCE CORNIER 18199	SEPT20 2014 Be Co
	.) "PO Froity Date."
Welding Examiner (Frint/Type) GRB Card No.	P.O. Explry Date Welding Examiner Signature
GRB Enterprises Ltd Edmonton Alberta AOOP 7107(C)	Performance Qualification GRB Card No.
GRB Enterprises Ltd Edmonton Alberta AOOP 7107(C) WELDER PERFORMANCE QUALIFICATION CARD	Performance Qualification GRB Card No.
GRB Enterprises Ltd Edmonton Alberta WELDER PERFORMANCE QUALIFICATION CARD JEFF W. 21857	Performance Qualification GRB Card No. GTAW SMAW PI THROUGH Process(es) Materials (P.No.) P8 Filler Metal (F.No.) F & F & Min. Outside "
GRB Enterprises Ltd Edmonton Alberta WELDER PERFORMANCE QUALIFICATION CARD JEFF Hame W- 21857 ABGA File Number	Performance Qualification GRB Card No. GTAM SMAM PI THROUGH Process(es) Filler Metal (F.No.) FG F5 Min. Outside Pipe Diameter
GRB Enterprises Ltd Edmonton Alberta WELDER PERFORMANCE QUALIFICATION CARD JEFF Name W. 21857 AB6A File Number This card is issued pursuant to the Safety Codes Act and the Pressure Welders Regulation: The performance qualification is in accordance with Section IX of the	Performance Qualification GRB Card No. GTAM SMAM PI THROUGH Process(es) Filler Metal (F.No.) FG F5 Min. Outside Pipe Diameter Max Deposited O. 250 O. 438 Position(s) Qualified
GRB Enterprises Ltd Edmonton Alberta WELDER PERFORMANCE QUALIFICATION CARD JEFF Name W- 21857 ABBA File Number This card is issued pursuant to the Safety Codes Act and the Pressure Welders Regulation. The performance qualification is in accordance with Section IX of the ASME BPV Code and subject to the limitations of the reverse side.	Performance Qualification GRB Card No. GTAM SMAM PI THROUGH Process(es) Filler Metal (F.No) F F F Min. Outside Pipe Diameter Max Deposited 0. 250 0.438 Position(s) Qualified Metal Backing MIN Backing Gas MITH
GRB Enterprises Ltd Edmonton Alberta WELDER PERFORMANCE QUALIFICATION CARD JEFF Hame W. 21857 ABGA File Number This card is issued pursuant to the Safety Codes Act and the Prossure Welcers Regulation The performance qualification is in accordance with Section IX of the ASME BPV Code and subject to the limitations of the reverse side Date of Test Welder Signature	Performance Qualification GRB Card No. GTAN SMAN PI THROUGH Process(es) Materials (P.No.) PB Filler Metal (F.No) F F F Min. Outside Pipe Diameter Pipe Diameter Pipe Diameter Position(s) Weld Metal Backing MITH Backing Gas MITH Progression PHILL #E00 25:
GRB Enterprises Ltd Edmonton Alberta WELDER PERFORMANCE QUALIFICATION CARD JEFF Name W- 21857 ABBA File Number This carrd is issued pursuant to the Safety Codes Act and the Pressure Welcars Regulation. The performance qualification is in accordance with Section IX of the ASME BPV Code and subject to the limitations of the reverse side	Performance Qualification GRB Card No. GTAM SMAM PI THROUGH Process(es) Filler Metal (F.No) FG F5 Min. Outside Pipe Diameter Max Deposited Weld Metal Weld Metal Backing Max Deposition(s) Weld Metal Backing Max Deposition Metal Backing Max Deposited O. 250 O. 4 3B Position(s) Progression Max Deposited Max Deposited Deposited Metal Backing Max Deposited Deposition Metal Backing Max Deposited Deposition Metal Backing Max Deposited Deposition Metal Backing Max Deposited D
GRB Enterprises Ltd Edmonton Alberta WELDER PERFORMANCE QUALIFICATION CARD JEFF Name W- 21857 ABGA File Number This carrd is issued pursuant to the Safety Codes Act and the Pressure Welcars Regulation. The performance qualification is in accordance with Section IX of the ASME BPV Code and subject to the limitations of the reverse side NO. 30, 201 Date of Test Welder Signature 17168	Performance Qualification GRB Card No. GTAM SMAW PI THROUGH Process(es) Filler Metal (F.No) FG F5 Min. Outside Pipe Diameter Max Deposited O. 250 O. 438 Position(s) Qualified ALL Backing Metal Backing Gas MITH Progression PHILL Backing Gas MITH Progression PHILL Backing Gas MITH Progression PHILL Backing Gas MITH
GRB Enterprises Ltd Edmonton Alberta AOOP 7107(C) WELDER PERFORMANCE QUALIFICATION CARD JEFF Tiame WHITE WAR 21857 AB6A File Number This card is issued pursuant to the Safety Codes Act and the Prossure Welders Figulation: The performance qualification is in accordance with Section IX of the ASME BPV Code and subject to the limitations of the reverse side NO. 130, 201 Date of Test Welder Signature 17168 Welding Evarince: (FrintType) GRB Card No.	Performance Qualification GRB Card No. GTAM SMAM PI THROUGH Process(es) Filler Metal (F.No) F F F Min. Outside Pipe Diameter Max Deposited Weld Metal Weld Metal Backing Min. Outside Pipe Diameter Progression Philip Backing Gas Mith Progression Philip Backing Gas Min. Progression Philip Backing Gas
GRB Enterprises Ltd Edmonton Alberta WELDER PERFORMANCE QUALIFICATION CARD JEFF Tame W. 21857 AB6A File Number This card is issued pursuant to the Safety Codes Act and the Pressure Welders Figulation. The performance qualification is in accordance with Section IX of the ASME BPV Code and subject to the limitations of the reverse side Date of Test Welder Signature 17168 Welding Evarinner (FinntType) GRB Enterprises Ltd Edmonton Alberta: ACOP 7107(C)	Performance Qualification GRB Card No. GTAN SMAN PI THROUGH Process(es) Materials (P.No.) PB Min. Outside Pipe Diameter Pipe Diameter Position(s) Weld Metal Backing Gas Progression P
GRB Enterprises Ltd Edmonton Alberta AOOP 7107(C) WELDER PERFORMANCE QUALIFICATION CARD JEFF Tiame W. 21857 AB6A File Number This card is issued pursuant to the Safety Codes Act and the Pressure Welders Figulation. The performance qualification is in accordance with Section IX of the ASME BPV Code and subject to the limitations of the reverse side. Date of Test Welder Signature 17168 Welding Evaringer (FrintType) GRB Enterprises Ltd. WELDER PERFORMANCE QUALIFICATION CARD.	Performance Qualification GRB Card No. GTAM SMAN PI THROUGH Process(es) Materials (P.No.) PS Min. Outside Pipe Diameter Pipe Diameter Position(s) Weld Metal Backing Sas MITH Progression Progress
GRB Enterprises Ltd Edmonton Alberta WELDER PERFORMANCE QUALIFICATION CARD JEFF Name W. 21857 ABGA File Number This carrd is issued pursuant to the Safety Codes Act and the Pressure Welders Regulation. The performance qualification is in accordance with Section 18 of the ASME BPV Code and subject to the limitations of the reverse side. Date of Test Welder Signature 17168 Welding Evaringer (Frant Type) GRB Enterprises Ltd Edmonton Alberta AOQP 7107(C) WELDER PERFORMANCE QUALIFICATION CARD	Performance Qualification GRB Card No. GTA SNAN PI THROUGH Process(es) Materials (P.No.) PS Min. Outside Pipe Diameter Position(s) Qualified A-Qualified A-Qual
GRB Enterprises Ltd Edmonton Alberta WELDER PERFORMANCE QUALIFICATION CARD JEFF Tame WHITE WARD ABGA File Number This card is issued pursuant to the Safety Codes Act and the Prossure Welcars Tagulation. The performance qualification is in accordance with Section IX of the ASME BPV Code and subject to the limitations or the reverse side Nelder Signature Welder Signature TA 168 Welding Evaringer (Finititype) GRB Enterprises Ltd Edmonton Alberta Name Name Name	Performance Qualification GRB Card No. Process(es) Filler Metal (FNo) Max Deposited O. 250 O. + 38 Position(s) Weld Metal Backing Progression Progression Progression Progression Progression Progression Progression Progression Progression Process(es) Process(es) Process(es) Process(es) Materials (PNo.) Process(es)
GRB Enterprises Ltd Edmonton Alberta WELDER PERFORMANCE QUALIFICATION CARD JEFF Tame WHITE WARD ABGA File Number This card is issued pursuant to the Safety Codes Act and the Prossure Welcars Tagulation. The performance qualification is in accordance with Section IX of the ASME BPV Code and subject to the limitations or the reverse side Nelder Signature Welder Signature TA 168 Welding Evaringer (Finititype) GRB Enterprises Ltd Edmonton Alberta Name Name Name	Performance Qualification GRB Card No. Process(es) Filler Metal (FNo) Max Deposited O. 250 O. 438 Position(s) Progression Progression Progression Progression Progression Process(es) Process(es) Process(es) Max Deposited No. 18456
GRB Enterprises Ltd Edmonton Alberta WELDER PERFORMANCE QUALIFICATION CARD JEFF Vame Welder Squalus of the Safety Codes Act and the Pressure Welders Squalus of Test Welder Squaluse Welder Squaluse Welder Squaluse GRB Enterprises Ltd Edmonton Alberta Welder Squaluse AQQP 7107(C) WELDER PERFORMANCE QUALIFICATION CARD WELDER PERFORMANCE QUALIFICATION CARD Name Name Welder Squaluse AQQP 7107(C) WELDER PERFORMANCE QUALIFICATION CARD Name Regulation. The performance qualification is in accordance with Section IX of the Regulation. The performance dualification is in accordance with Section IX of the Regulation. The performance dualification is in accordance with Section IX of the Regulation. The performance dualification is in accordance with Section IX of the Regulation. The performance dualification is in accordance with Section IX of the Regulation. The performance dualification is in accordance with Section IX of the Regulation. The performance dualification is in accordance with Section IX of the Regulation. The performance dualification is in accordance with Section IX of the Regulation. The performance dualification is in accordance with Section IX of the Regulation. The performance dualification is in accordance with Section IX of the Regulation.	Performance Qualification GRB Card No. Process(es) Filler Metal (FNo) Backing Progression P
GRB Enterprises Ltd Edmonton Alberta WELDER PERFORMANCE QUALIFICATION CARD JEFF Tame W. 21857 ABEA File Number This card is issued pursuant to the Safety Codes Act and the Pressure Welder's Tagulation. The performance qualification is in accordance with Section IX of the ASME BPV Code and subject to the limitations of the reverse side. Date of Test Welder Signature 17168 Welding Evarince (Final Type) GRB Enterprises Ltd. Edmonton Alberta AGOP 7107(C) WELDER PERFORMANCE QUALIFICATION CARD The card is issued pursuant to the Safety Codes Act and the Pressure Welders Regulation. The performance qualification is in accordance with Section IX of the Regulation. The performance qualification is in accordance with Section IX of the Regulation. The performance qualification is in accordance with Section IX of the Regulation. The performance qualification is in accordance with Section IX of the Regulation. The performance qualification is in accordance with Section IX of the Regulation. The performance qualification is in accordance with Section IX of the Regulation. The performance qualification is in accordance with Section IX of the Regulation. The performance qualification is in accordance with Section IX of the Regulation. The performance qualification is in accordance with Section IX of the Regulation. The performance of the Implication of the reverse relies.	Performance Qualification GRB Card No. GTAN SMAN PI THROUGH Process(es) Materials (P.No.) PB Max Deposited Weld Metal Position(s) Augustified Backing Gas Jones Backing Gas Jones Augustified Backing Gas Jones August
GRB Enterprises Ltd Edmonton Alberta WELDER PERFORMANCE QUALIFICATION CARD JEFF Tame W. 21857 ABEA File Number This card is issued pursuant to the Safety Codes Act and the Pressure Welders Figuilation. The performance qualification is in accordance with Section IX of the ASME BPV Code and subject to the limitations of the reverse side. Date of Test Welder Signature Welder Signature 17168 GRB Enterprises Ltd Edmonton Alberta WELDER PERFORMANCE QUALIFICATION CARD JEFF Name Name ABSA File Number This card is issued pursuant to the Safety Codes Act and the Pressure Welders Requisition. The performance qualification is in accordance with Section IX of the Requisition. The performance qualification is in accordance with Section IX of the ASME BPV Code and subject to the limitation of the reverse raide. Whether Persecutions Welcher Persecutions ASME Services (Sides) ASME Services (Side	Performance Qualification GRB Card No. GTAN SMAN PI THROUGH Process(es) Materials (P.No.) P.8 Filler Metal (F.No.) F.5 Min. Outside Pipe Diameter 1 C.0 Max Deposited Weld Metal Position(s) A Backing Backing Gas Min. Outside Pipe Diameter Description Position(s) A Progression Progression Backing Gas Min. Outside Pipe Diameter Search No. Position(s) A Performance Qualification GRB Card No. 18456 Process(es) Materials (P.No.) P.1 Filler Metal (F.No.) F.6 Min. Outside Pipe Diameter Pile No. Max Deposited Pipe Diameter Pipe Diam
GRB Enterprises Ltd Edmonton Alberta WELDER PERFORMANCE QUALIFICATION CARD JEFF Tame W. 21857 ABEA Fee Number This card is issued pursuant to the Safety Codes Act and the Pressure Welder's Flequiation. The performance qualification is in accordance with Section it of the ASME BPV Code and subject to the limitations of the reverse side. Date of Test Welder Signature 17168 GRB Enterprises Ltd Edmonton Alberta WELDER PERFORMANCE QUALIFICATION CARD This card is issued pursuant to the Safety Codes Act and the Pressure Welders Name Name Name ABSA Fise Number This card is issued pursuant to the Safety Codes Act and the Pressure Welders ASME BPV Code and subject to the limitation is in accordance with Section ix of the Regulation. The performance qualification is in accordance with Section ix of the Regulation. The performance qualification is in accordance with Section ix of the Implication of the reverse raide.	Performance Qualification GRB Card No. Process(es) Materials (P.No.) P. Min. Outside Pipe Diameter Pipe Diameter Position(s) Qualified Progression Progression Position(s) P. Backing Gas VITA Position(s) A. Qualified Progression Position(s) A. Backing Gas VITA Progression Position(s) A. Backing Gas VITA Progression Position(s) A. Process(es) Materials (P.No.) P. Min. Outside Pipe Diameter Weld Metal (P.No.) P. Min. Outside Pipe Diameter Weld Metal (P.No.) P. Backing Gas VITA Process(es) Max Deposited Pipe Diameter Weld Metal (P.No.) P. Backing Gas VITA Progression Progression Particle Pipe Diameter Backing Gas VITA Progression Progression Particle Pipe Diameter Backing Gas VITA Backing Gas
GRB Enterprises Ltd Edmonton Alberta WELDER PERFORMANCE QUALIFICATION CARD JEFF Tame W. 21857 ABEA File Number This card is issued pursuant to the Safety Codes Act and the Pressure Welders Figuilation. The performance qualification is in accordance with Section IX of the ASME BPV Code and subject to the limitations of the reverse side. Date of Test Welder Signature Welder Signature 17168 GRB Enterprises Ltd Edmonton Alberta WELDER PERFORMANCE QUALIFICATION CARD JEFF Name Name ABSA File Number This card is issued pursuant to the Safety Codes Act and the Pressure Welders Requisition. The performance qualification is in accordance with Section IX of the Requisition. The performance qualification is in accordance with Section IX of the ASME BPV Code and subject to the limitation of the reverse raide. Whether Persecutions Welcher Persecutions ASME Services (Sides) ASME Services (Side	Performance Qualification GRB Card No. Process(es) Filler Metal (FNo) F F S Min. Outside Pipe Diameter Position(s) A Qualified A Progression Progression Performance Qualification GRB Card No. 18456 Process(es) Performance Qualification GRB Card No. 18456 Process(es) Min. Outside Pipe Diameter Pile No. 18456 Process(es) Min. Outside Pipe Diameter Pipe No. 18456 Process(es) Min. Outside Pipe Diameter Pipe Dia

RATE BPV Code and subject to the limitations on the reverse side. Date of Test Welding Examiner (Print/Type) AOOP 7107(C) AO	Performance Qualification GRB Card No. 17031 Process(es) 5MAW Materials (P.No.) P1 Filler Metal (F.No) F3 F4 Min. Outside Pipe Diarmeter Pipe Diarmeter Pipe Diarmeter Position(s) ALL Weld Metal Progression Backing Gas MONE Progression PHILL Backing Gas MONE Progression PHILL Backing Gas MONE Progression PHILL Examiner Signature
GRB Enterprises Ltd Edmonton Alberta AOQP 7107(C) WELDER PERFORMANCE QUALIFICATION CARD DAVID Name EDWARDS Name This card is issued pursuant to the Safety Codes Act and the Pressure Welders Regulation. The performance qualification is in accordance with Section IX of the	Performance Qualification GRB Card No. 17()87 Process(es) SNAW Materials (P.No.) P1 Filler Metal (F.No.) F3 F4 Min. Outside 1"00 Max Deposited 0.250" 0.186" Position(s) ACM Weld Metal Qualified ACM

Performance Qualification GRB Card No. 17036



UNITED STATES STEEL

TUBULAR PRODUCTS CERTIFIED TEST REPORT

DATE: 08/25/12 TIME: 04:19:49 SERIAL NO: L0042723

(IN ACCORDANCE WITH ISO 10474/EN10204/DIN50049 "type 3.1")

DA00386 02	R90436	E1-3292	LT8171	
SOLO TO. U S STEEL TUBULAR P C/O COMCO PIPE & SU 333 7TH AVE SW STE	RODUCTS CANADA	MALTO U S STEEL TUBULAR C/O COMCO PIPE & 333 7TH AVE SW ST	SUPPLY CO	VENDOR USS TUBULAR PRODUCTS 2199 EAST 28TH ST. LORAIN, OH 44055
CALGARY AB T2P 2Z1		CALGARY AB T2P 22	Z1	

SPECIFICATION AND GRADE

PIPE CARBON SMLS STD PIPE ASTM A53-*10 ASTM A106-*10 GRADE B ASME SA53-*2010 EDITION ASME SA106-*2010 EDITION GRADE B CSA Z245.1-*07 CAT I GRADE 290 EXCEPT MARKING BLK REG MILL COAT PE BEV 30 DEG MEETING ALL THE APPLICABLE REQUIREMENTS OF NACE STANDARD MR-01-75 *: ISO 15156-2 2009 ED AND MR-0103-2009_ED

MATERIAL COND: AS ROLL	ED					O.D.: 2.0	.000	(508	. 000))			in (mm) V	VALL:	375	(9.5	25)			In (min)
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U-UPSE PRODUCT IDENTIFICATION MA3883 MA3883 W963AA	TYPE HEAT PROD	15 1:	03 009 03 010	004	8 - STR SI - 23 - 24	14 14	(0 5 0 5	04	0 2 0 1	026 022	MECH	03 02	0003 0004	Π 002 004	001	co			.33 .31	.35
PRODUCT IDENTIFICATION MA3883 MA3883 W963AA MA3883 W963AA	TYPE HEAT PROD PROD	15 1 13 1 14 1	03 009 03 010 06 010	004	23 24 24	14 14 15	05 05	04 04 03	02 01 01	026 022 026	MECH	03 02 02	0003 0004	n 002 004	001 003 003	co			.33 .31 .33	.3! .3!
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UNITED STATES STEEL

TUBULAR PRODUCTS

DATE: 10/09/10

TIME: 04:48:45

CERTIFIED TEST REPORT SERIAL NO: 10033572 (IN ACCORDANCE WITH ISO 10474/EN10204/DBN50048 "type 3.1")

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FULL LENGTH DRUFT							MANDREL											
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MELTED AND MANUFACTURED IN THE USA. NO REPAIRS BY WELDING. NO MERCURY OR MERCURY COMPOUNDS ARE ADDED TO THE STEEL AND ALL MERCURY BEARING EQUIPMENT IS PROTECTED BY A DOUBLE BOUNDARY OF CONTAINMENT.

*C.E. IS BASED ON THE FOLLOWING EQUATION(S):

FOR CARBON MIN: .13 TO MAX: .30, CE=C+ (MN/6)+(CR+MO+V)/5+(NI+CU)/15 WITH .43 MAX C.E.

FOR CARBON MIN: .01 TO MAX: .21, CE=C+F (MN/6+81/24+CU/15+N1/20+CR/5+M0/5+V/5+NB/5+5B) WITH .40 MAX C.E.

*NOTE A SEE ATTACHED REPORT FOR HARDNESS RESULTS.

PRODUCT WAS HOT ROLLED AND HOT FINISHED

THIS IS TO CERTIFY THAT THE PRODUCT DESCRIBED HEREIN WAS MAINLIFACTURED, SAMPLED, TESTED AUGUOR DISPECTED IN ACCORDANCE WITH THE SPECIFICATION AND PULFILLS THE REQUEREMENTS IN SUCH RESPECTS.

PREPARED BY THE OFFICE OF: R. HARRIS - MANAGER, Q.A.

10/09/10

UNITED STATES STEEL

TUBULAR PRODUCTS CERTIFIED TEST REPORT DATE: 10/09/10 TIME: 04:48:45

SERIAL NO: L0033572

(IN ACCORDANCE WITH ISO 19474/EN10204/DIN50049 "type 3.1")

TT03331 04	SHIPPERS NO. R82662	P.O. NUMBER 4887730-00	VEHICLE LD LT8214	
CCTF CORP 5407 53 AVENUE NW EDMONTON AB T6B 3G	O ADDRESS	20 XH /		VENDOR USS TUBULAR PRODUCTS 2199 EAST 28TH ST. LORAIN, OH 44055
		SPECIFICATION AND	GRADE	

PIPE CARBON SMLS STD PIPE ASTM A53-*07 ASTM A106-*08 GRADE B ASME SA53-*2007 EDITION ASME SA106-*2007 EDITION GRADE B CSA Z245.1-*07 CAT I GRADE 290 EXCEPT MARKING BLK REG MILL COAT PE BEV 30 DEG MEETING ALL THE APPLICABLE REQUIREMENTS OF NACE STANDARD MR-01-75 *: 2003/COR.1:2005 AND MR0103-2007

> 2523566 2520061

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PRODUCT	TYPE			+		ESMI	CU	ME	СК	MO /	-	N V	B	T1	CB	- ∞			
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UNITED STATES STEEL

TUBULAR PRODUCTS

CERTIFIED TEST REPORT
(IN ACCORDANCE WITH ISO 10474/EN10204/DIN50049 "type 3.1")

DATE: 08/25/12 TIME: 04:19:49 SERIAL NO: L0042723

MILL ORDER/ITEM NO		SHIPPE	R5 NO.		P.O. NUMBER												
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IDENTIFICATION			842.6	COLLAPSE	·				COND.	! `	<u> </u>		. Ave	<u>'</u>	, 2	! -	
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					TESTING / IN:	PECTION IN	FORMATION							_			
TESTIN	SPECTION			YES					RESULTS / CO	MMENT	5						
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MELTED AND MANUFACTURED IN THE USA. NO REPAIRS BY WELDING. NO MERCURY OR MERCURY COMPOUNDS ARE ADDED TO THE STEEL AND ALL MERCURY BEARING EQUIPMENT IS PROTECTED BY A DOUBLE BOUNDARY OF CONTAINMENT.

*C.E. IS BASED ON THE FOLLOWING EQUATION (8):

FOR CARBON MIN: .13 TO MAX: .30, CE=C+(MN/6)+(CR+MO+V)/5+(NI+CU)/15 WITH .43 MAX C.E.

FOR CARBON MIN: .01 TO MAX: .21, CE=C+F(MN/6+SI/24+CU/15+NI/20+CR/5+MO/5+V/5+NB/5+5B) WITH .40 MAX C.E.

PRODUCT WAS HOT ROLLED AND HOT FINISHED

THIS IS TO CERTIFY THAT THE PRODUCT DESCRIBED HEREIN WAS MANUFACTURED, SAMPLED, TESTED AND/OR INSPECTED IN ACCORDANCE WITH THE SPECIFICATION AND FULFILLS THE REQUIREMENTS IN SUCH RESPECTS

PREPARED BY THE OFFICE OF: BRAD KOURY - MANAGER, Q.A.

DATE 08/25/12_

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