

**BOILERS AND PRESSURE VESSELS
REPAIR OR ALTERATION REPORT**

AB-40 (Side A) 2015-11

(A) #: 607657

OWNER EQUIP. NO: 62066035

REPAIR ORG. JOB NO:

REPAIR ☒ and/or ALTERATION ☐ Partial ☐ Final ☒

Name of Organization doing Repair/Alteration KRM WELDING SERVICES LTD

Address 16232 83B STREET EDMONTON, ALBERTA

AQP No. & Expiry Date AQP-21784 2017/06/04

Name of Owner HUSKY OIL OPERATIONS LIMITED

Address 4429 44 STREET LLOYDMINSTER, SK S9V 0Z8

Location of Installation HUSKY OIL OPERATIONS LIMITED, MORGAN BATTERY (LS 10-34-51-04-W4)

Boiler/Pressure Vessel Description 150 HP GLYCOL HEATING BOILER

CRN U1463.23

Manufacturer's Name SASKATOON BOILER MFG. CO. LTD.

Serial No. 7119

Original Design Conditions:

a) Vessel/Shellside/Boiler: Max Allowable Working Press. 160 PSI Min/Max Design Temp /250 F
b) Jacket/Tubeside: Max Allowable Working Press. Min/Max Design Temp /

New Design Conditions:

a) Vessel/Shellside/Boiler: Max Allowable Working Press. Min/Max Design Temp /
b) Jacket/Tubeside: Max Allowable Working Press. Min/Max Design Temp /

Description of defects (location and types of deterioration that resulted in the repair/alteration).

LINEAR INDICATION ON RIGHT FRONT SADDLE CONNECTION

Original Code Edition and Addenda ASME Sect. IV Year 07 Addenda A09

Code Edition and Addenda used for performing the work ASME Sect. IV Year 15 Addenda

Description of Work performed. (Step by step description of repair/alteration method used. Attach additional pages as required, and reference any additional documents used to provide the required information; such as repair or alteration procedures, drawings, and specifications)

MPI SHELL REMOVE INDICATIONS
PREHEAT TO 50 F
E6010 ROOT
MPI
E7018 FILL AND CAP
MPI AND VISUAL
HYDRO

Heat Treatment: Preheat Temp 50 F Post Weld HT (Temp./Time) Other

Non Destructive Examination (Specify type and extent).

MPI
VISUAL
HYDRO

Pressure Test

Vessel/Shellside/Boiler

Tubeside/Jacket

a) Hydrostatic 240 PSI

Other Test

(A) #: 607657

OWNER EQUIP. NO. 62066035

3. **Material** - List any material used in repair/alteration and any base material welded on:

Item	Material Specifications	Thickness / Schedule	Diameter	Item	Material Specifications	Thickness / Schedule	Diameter
Shell/Drums	SA-516	0.3125	60"	Heads/ Ends			
Tubesheet				Tubes			
Nozzles				Flanges/Fittings		Class	

1. **Welding Procedures** - Alberta Registration Number WP- 2917.2

WPS Numbers used: KRM-2 REV1

5. **Welded Replacement Parts:** Attached are Manufacturer's Partial Data Reports or Repair/Alteration Reports properly identified and signed by Authorized Inspector for the following items of this report: (Welded parts supplied by others).3. **Responsibility Owner/Client.** Identify below items that the owner/client has assumed responsibility for. **Note (2)**

- a) Alteration Design Submission _____ b) Repair/Alteration Procedure: _____ c) Material Control _____
- d) Welding Control _____ e) NDE _____ f) Heat Treatment _____ g) Pressure Test _____

Note 2: Owner/client must have a valid Alberta Quality Program (AQP), for the scope of work, to assume responsibility for function c, d, e, f, or g.

REMARKS:**CERTIFICATE OF COMPLIANCE**

We certify that the statements made in this Report are correct and that all design, material, construction and workmanship on this repair/alteration conform to the requirements of the Alberta Safety Codes Act and Regulations and the AB-513.

a) For all items except for items identified in 16:

KRM WELDING SERVICES LTD

(Repair/Alteration Organization Name)

21784 2017/06/04

(AQP Number & Expiry Date)

JUNE 16, 2016

(Signature & Date)

KEVIN MARTIN

(Print Name)

b) For items identified in 16 only:

(Owner/Client Organization Name)

(AQP Number & Expiry Date)

(Signature & Date)

(Print Name)

1. **DATE WORK WAS COMPLETED:** JUNE 16, 2016**CERTIFICATE OF INSPECTION**

I have inspected the repairs and/or alterations described in this report. To the best of my knowledge, this work has been done in accordance with the Safety Codes Act and Regulations and the requirements established in AB-513.

i) **In-service Inspector (ISI) Certification**

(When the repair is inspected by an ISI per the requirements established in AB-513)

b) **ABSA Safety Codes Officer Certification**

(When work is inspected by ABSA).

Owner-User/Inspection Company Name

AQP#

In-Service Inspector Signature & Date

In-Service Inspector Name (Please Print)

In-Service Inspector Alberta Cert #

ABSA SCO Signature & Date

Print Name

Report Received by ABSA SCO

25 JUNE 2014

REPAIR/ALTERATION TRAVEL SHEET

PAGE 1 OF 1

Vessel Title	Manufacturer/Serial Number	Identification Number
Cylindrical Head	Saskatoon 7119	607657
CODE INSPECTOR REVIEW:		REVIEW DATE:

Indicate Sequence Numbers And Hold Points Which Are Applicable By *

Seq.	Operations	Hold Points	Comments	Rep. Org.	Code Insp.	Owner Insp.
1	Repair/Alteration Procedure Accepted by ABSA Safety Codes Officer/and OUP Inspector when applicable	H	June 14	KM	June 16/16 MK	
2	Welding Procedures Registered for Welding to be done	X	June 14	KM	June 16/16 MK	
3	Welders have valid Alberta P.Q. Card for work to be done	X	June 14	KM	June 16/16 MK	
4	Cracks MT/PT check after removal	X	June 14	KM	June 16/16 MK	
5a	Materials to be used - checked against PO/Drawing			N/A.		
5b	- material identified with correct SA/SS specifications		June 14 Welding	KM		
5c	- material test reports checked against specifications			N/A		
6a	Fit up - shell courses-flush patches-heads			N/A		
6b	- tubesheet/shell - firetube			N/A		
6c	- nozzles and fittings			N/A		
7	Radiographic Examination			N/A		
8	Ultrasonic Examination (MT/PT)	X	June 14	KM	June 16/16 MK	
9	Internal Visual after welding			N/A		
10	External Visual after welding	X	June 14	KM	June 16/16 MK	
11	Heat Treatment			N/A		
12	Hardness Tests			N/A		
13	Hydrostatic Pressure Test	H	Gauge No.'s 400-3 400-4	KM	June 16/16 MK	
14	Alternative Test (Specify)			N/A		
15	Nonconformance Report # _____ Cleared			N/A		
16	Pressure Vessel Repair or Alteration Report (AB 40) completed	X	June 16	KM	June 16/16 MK	
17	Repair/Alteration Nameplate attached			N/A		

OUTLINE SKETCH

MATERIAL USED IN REPAIR/ALTERATION

(Record Welder's Symbols and Heat No.'s, Radiograph ID No.'s) Attach separate sketch if required.	Item	Mat.'l Spec	Plate & Heads Heat & Plate#	Thk/	Sch.	Rating
	Shell/Patches					
	Heads' End					
	Tubesheet					
	Firetube					
	Nozzles					
	Fittings					

IRISNDT

MAGNETIC PARTICLE INSPECTION REPORT

CA0132-MT-571
Page 1 of 2

Procedure: 5.0 Rev

Technique: MT-2V

Code: ASME Sect I - A-260.4

Other:

Client: Husky Operations

IRISNDT #: LYD1600663

Location: Morgan Battery 10-34-51-4w4

Item Inspected: Glycol Boiler Crack repair areas as listed

Date: 14-Jun-16

WO #: 60278548

PO #: 8401063456

Surface Condition: Painted ☐ Sandblasted ☐ Machined ☒ As Cast ☐ As Forged ☐ Weldment ☒ Other ☐

Material: P-1

Thickness: Various

Heat Treatment: As welded

Magnetizing Equipment: Yoke ☒ Coil ☐ Permanent ☐ IRISNDT #: 40040

Mfg: Contour

Calibration Date: 14-Jun-16

Method of Magnetization: AC ☒ DC ☐ Continuous ☒

Blacklight: Y ☐ N/A ☒ IRISNDT #: Verification per ASME V Art 7 T.777.2

Blacklight Meter: IRISNDT #: Calibration Date: - -

Whitelight: Y ☒ N/A ☐ Verification per ASME V Art 7 T.777.1

Lighting Equipment: Flashlight Standard Bulb (4xAA)

Magnetic Particles: Dry ☐ Wet ☒ Red ☐ Grey ☐ Black ☒ Fluorescent ☐
Batch #: 1397-64 Mfg: Magnaflux Type: 7C

Background: ☒ Batch #: 1807 Mfg: Ardrex Type: 8901W

A magnetic particle inspection was carried out on the following areas of
H-120 GLYCOL BOILER SN# 7119 For crack repairs
@ Husky Morgan Battery 10-34-51-4w4

- 100% of EXCAVATED crack areas inspected to prove removal of found cracking
- 100% of ROOT PASS inspected
- 100% of FINAL WELD inspected

RESULTS: All items listed above inspected ACCEPTABLE TO CODE.

Approver: Marc Case 2Z-02018989

REQ: Ray Trachuk @ Husky Energy

Inspection Limitation(s):

Unit#: 667 Kilometers: 50
In: 1400 Out: 1800 Hrs: 4.0
In: Out: Hrs:

Personnel:
Sheldon Trachuk
Jordan Ross

Consumables:
--MIN--

Interpretation by:

Sheldon Trachuk
(Print)

SNT-TC-1A: 2

C.G.S.B.: 2
(Level)

C.G.S.B. #: 11405

(Signature)
Client Representative:
(Print)

I am in full
agreement with
report contents

(Sign)

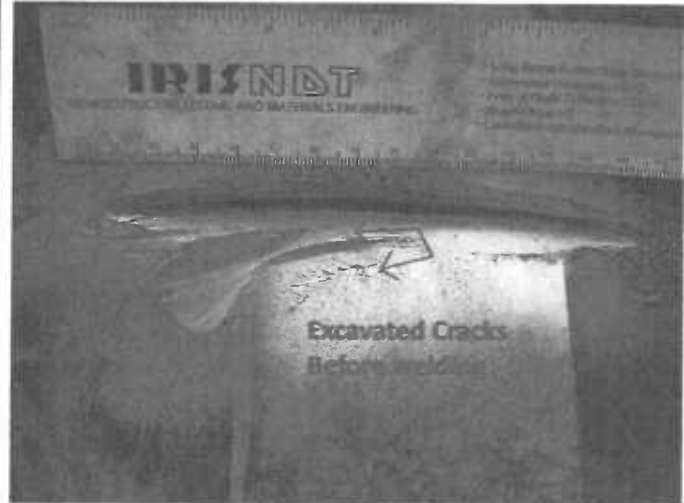
5311- 86 Steet, Edmonton, Alberta T6E 5T8 Phone: (780) 437-2022 fax: (780) 436-4873
Calgary (403) 279-6121
Edmonton (780) 875-6455
Sherwood (780) 674-3018
Nisku (780) 955-7616

Cold Lake (780) 826-6105
Fort McMurray (780) 743-1536
Red Deer (403) 347-1742

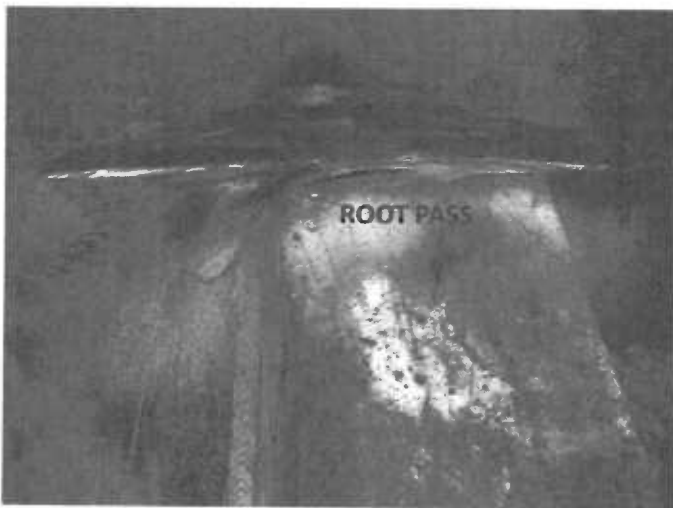
www.irisndt.com

Engineering, Calgary (403) 217-9684
Engineering, Edmonton (780) 437-2022
Rope Access Services (780) 437-2022
Offices also located in USA and UK

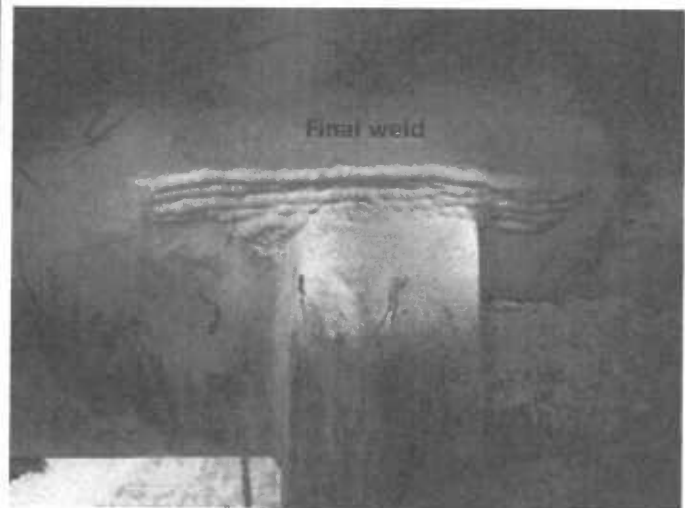
IRISNDT-E-2003H



EXCAVATED Cracks BEFORE WELDING



ROOT PASS



FINAL WELD

NAME:

Art Street

NEAR VISION:

uncorrected

RE _____

LE _____

corrected

RE J1

LE J1

COLOUR VISION:

14/14 Pass

SHADES OF GREY: 17/17 Pass

DATE OF EXAM:

Jan. 5. 16

DATE OF EXPIRY:

Jan. 5. 17

EXAMINER:

Print

Sheldon Trachuk

Signature



REQUIREMENTS:

- 1) NEAR-VISION - The examination shall assure natural or corrected near-distance acuity in at least one eye such that the applicant is capable of reading a minimum of Jaeger Number 2 or equivalent type and size letter at a distance of not less than 30 cm (12 inches) on a standard Jaeger test chart. The ability to perceive an Ortho-Rater minimum of 10 or similar test patterns is also acceptable. This test shall be administered annually.
- 2) COLOUR-VISION - The examination, by use of Ishihara plates, or other similar method, shall demonstrate the capability of distinguishing contrast among colours used in non-destructive examination. All 14 Ishihara plates shall be used in the assessment and the individual must correctly identify 13 out of 14 plates. Successful completion of a practical test in the applicable method shall be accepted as demonstrating acceptable colour contrast differentiation. This test shall be administered annually.
- 3) SHADES OF GREY - An examination, by use of a calibrated step tablet or other similar method, shall demonstrate the capability of distinguishing contrast among shades of grey used in non-destructive examination. The individual must correctly identify all the steps presented. Successful completion of a practical test in the applicable method shall be accepted as demonstrating acceptable differentiation in shades of grey. This test shall be administered annually..



SNT-TC-1A CERTIFICATION

EMPLOYEE: Arthur (Art) Street

SNT / ASNT CERTIFICATIONS		QUALIFICATION GRADES		CERTIFICATION DATES		
Method & Level	Certified By	Initial	Recert	Initial	Current	Due
RT Level II	IRISNDT	86%	95%	Dec 2010	Nov 2015	Dec 2020
MT Level II	IRISNDT	87%	94%	Jul 2009	Nov 2015	Dec 2020
PT Level II	IRISNDT	86%	89%	Jul 2009	Nov 2015	Dec 2020

OTHER CERTIFICATIONS		QUALIFICATION GRADES		CERTIFICATION DATES		
RT Level II	CGSB	Pass	NA	Dec 2010	Feb 2014	Dec 2016
MT Level II	CGSB	Pass	NA	Jul 2009	Feb 2014	Dec 2016
PT Level II	CGSB	Pass	NA	Jul 2009	Feb 2014	Dec 2016

EMPLOYMENT EXPERIENCE:

From	To	Employer	Methods	Months
2006	Present	IRISNDT	RT, MT, PT	108

EDUCATION: ☒ High School ☐ Successful Completion Minimum 2 years-Engineering/Science at University, College or Technical School

Date	Institution	Length	Subject/Courses
2006	College of the North Atlantic	9 months	Non-destructive Testing Technician Program

EYE EXAMINATIONS:

This certifies that the employee has met the training and examination requirements of IRISNDT Qualification and Certification Manual (Work Practice) in accordance with SNT-TC-1A (2006 and 2011 Editions).

CERTIFICATION:

Initial Certification and Re-certification carried out in accordance with IRISNDT Personnel Qualification and Certification Manual (Work Practice).

This certifies that the employee has met the training and examination requirements of IRISNDT Qualification and Certification Manual (Work Practice) in accordance with SNT-TC-1A (2006 and 2011 Editions).

Name: Wesley Weber

Title: NDE Certifying Level 3

Signed: 

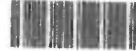
Date: November, 2015

RESTRICTIONS, NOTES and COMMENTS:



Natural Resources
Canada

Ressources naturelles
Canada



Name/
Nom **Arthur Gordon Street**
Reg. No. /
No. matricule **12882**
Issue Date/
Date d'émission **2014/02/10**

This card does not identify the stated individual as an employee or representative of Natural Resources Canada, Government of Canada.
Cette carte n'identifie pas l'individu d'être un employé ou un représentant de Ressources naturelles Canada, Gouvernement du Canada

Corrective lenses for (X) near () far vision.
Verres correctifs pour la vision de (X) près () distance.

Signature : 



Natural Resources
Canada

Ressources naturelles
Canada

Certified to/Certifié selon : CAN/CGSB-48.9712

12882

Method Méthode	Level Niveau	Sector Secteur	Cert. Date Date cert.	Date recent. Date recent.	Expires Expiration
MT	2	EMC	2009/07/14		2016/12/31
PT	2	EMC	2009/07/13		2016/12/31
RT	2	EMC	2010/12/24		2016/12/31

For verification of certification status, policies and definitions, visit website:
<http://nrcan.gc.ca/> Pour la vérification de la certification, les politiques, et les définitions,
visitez le site web: <http://nrcan.gc.ca/>

Manager, Certifying Agency
Gestionnaire, Organisme de certification



Natural Resources
Canada

Ressources naturelles
Canada



Name/
Nom **Sheldon Trachuk**
Reg. No. /
No. matricule **11405**
Issue Date/
Date d'émission **2014/02/10**

This card does not identify the stated individual to be an employee or representative of Natural Resources Canada, Government of Canada.
Cette carte n'identifie pas l'individu d'être un employé ou un représentant de Ressources naturelles Canada, Gouvernement du Canada.

Corrective lenses for () near (X) far vision.
Verres correctifs pour la vision de () près (X) distance.

Signature [Signature] **11405**



Natural Resources
Canada

Ressources naturelles
Canada

Certified to / Certifié selon : CAN/CGSB 46.97.12

11405

Method Méthode	Level Niveau	Sector Secteur	Cert. Date Date cert.	Date recert. Date recert.	Expires Expiration
MT	2	EMC	2004/07/13		2016/12/31
PT	2	EMC	2004/07/16		2016/12/31
RT	2	EMC	2005/07/28		2016/12/31
UT	1	EMC	2013/09/30		2016/12/31

For verification of certification status, policies and definitions, visit website:
<http://ndt.nrcan.gc.ca/> Pour la vérification de la certification, les politiques, et les définitions,
visitez le site web: <http://ndt.nrcan.gc.ca/>

Manager, Certifying Agency
Gestionnaire, Organisme de certification



SNT-TC-1A CERTIFICATION

EMPLOYEE: Sheldon Trachuk

SNT / ASNT CERTIFICATIONS		QUALIFICATION GRADES		CERTIFICATION DATES		
Method & Level	Certified By	Initial	Recert	Initial	Current	Due
RT Level II	IRISNDT	90%	96%	Jan 2007	Aug 2015	Dec 2020
MT Level II	IRISNDT	80%	95%	Jan 2007	Mar 2015	Dec 2020
PT Level II	IRISNDT	80%	90%	Jan 2007	Mar 2015	Dec 2020
UT Level I	IRISNDT	98%	93%	Jun 2014	Mar 2015	Dec 2020

OTHER CERTIFICATIONS		QUALIFICATION GRADES		CERTIFICATION DATES		
RT Level II	CGSB	Pass	NA	Jul 2005	Feb 2014	Dec 2016
MT Level II	CGSB	Pass	NA	Jul 2004	Feb 2014	Dec 2016
PT Level II	CGSB	Pass	NA	Jul 2004	Feb 2014	Dec 2016
UT Level I	CGSB	Pass	NA	Sep 2013	Sep 2013	Dec 2016

EMPLOYMENT EXPERIENCE:

From	To	Employer	Methods	Months
2001	Present	IRISNDT	RT, MT, PT, UT, Visual	168

EDUCATION: ☒ High School ☐ Successful Completion Minimum 2 years-Engineering/Science at University, College or Technical School

Date	Institution	Length	Subject/Courses
2011	CINDE	40 hours	Ultrasonic Inspection Level I
2004	SAIT	40 hours	Magnetic Particle Inspection
2004	SAIT	40 hours	Liquid Penetrant Inspection
2004	INTEG	120 hours	Radiography Level I and II

EYE EXAMINATIONS:

This certifies that the employee has met the training and examination requirements of IRISNDT Qualification and Certification Manual (Work Practice) in accordance with SNT-TC-1A (2006 and 2011 Editions).

CERTIFICATION:

Initial Certification and Re-certification carried out in accordance with IRISNDT Personnel Qualification and Certification Manual (Work Practice).

This certifies that the employee has met the training and examination requirements of IRISNDT Qualification and Certification Manual (Work Practice) in accordance with SNT-TC-1A (2006 and 2011 Editions).

Name: Wesley H. Weber

Title: NDE Certifying Level 3

Signed: 

Date: March, 2015

RESTRICTIONS, NOTES and COMMENTS:

NAME:

Sheldon Trachuk

NEAR VISION:

uncorrected

RE

LE

corrected

RE

LE

51

51

COLOUR VISION:

14/14 Pass

SHADES OF GREY:

17/17 Pass

DATE OF EXAM:

Jan 5. 16

DATE OF EXPIRY:

Jan 5. 17

EXAMINER:

ART STREET

Print

[Signature]

Signature

REQUIREMENTS:

- 1) NEAR-VISION - The examination shall assure natural or corrected near-distance acuity in at least one eye such that the applicant is capable of reading a minimum of Jaeger Number 2 or equivalent type and size letter at a distance of not less than 30 cm (12 inches) on a standard Jaeger test chart. The ability to perceive an Ortho-Rater minimum of 10 or similar test patterns is also acceptable. This test shall be administered annually.
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- 3) SHADES OF GREY - An examination, by use of a calibrated step tablet or other similar method, shall demonstrate the capability of distinguishing contrast among shades of grey used in non-destructive examination. The individual must correctly identify all the steps presented. Successful completion of a practical test in the applicable method shall be accepted as demonstrating acceptable differentiation in shades of grey. This test shall be administered annually..

25 JUNE 2014

CONTRACT REVIEW

PAGE 3 OF 3

TURNOVER PACKAGE REQUIREMENTS

Number of Copies: Digital: _____

Number of Copies: Paper: _____

Turnover package to be sent to: _____

TURNOVER PACKAGE CONTENTS

ITEM	REQUIRED BY CUSTOMER	Stored for 5 years by KRM Welding Services Ltd.
Contract Review Form	✓	✓
Design Specifications	✗	✓
Drawings and Calculations	✗	✓
Physical test reports: charpy, hardness	✗	✓
Nonconformity Reports	✗	✓
Materials Lists, Spool Lists, Purchase Orders generated by KRM Welding Services Ltd.	✗	✓
Material Test Reports	✗	✓
Materials Heat Number Identification Drawings	✗	✓
NDE Location Map	✓	✓
Radiography Reports	✗	✓
Radiographic Film	✗	ASME B31.1 and B31.1 BEP only
Other NDE Reports (MT, UT)	✓	✓
Welding Procedures	✓	✓
Welder Log and Tickets	✓	✓
Welder Identification Map	✗	✓
Heat treatment records	✗	✓
Heat Treatment Identification Drawings	✗	✓
Examination Report(s) for Pressure Piping	✗	✓
Pressure/ Temperature Gauge Calibration Records	✓	✓
Pressure test records	✗	✓
AB-83, AB-83F, AB-83 Partial Data Report	✗	✓
AB-81 Completion of Construction	✗	✓
As Built Drawings	✗	✓

✓ Designates documents to be stored by KRM Welding Services Ltd. for a minimum of 5 years.

Contract Review Notes acknowledged by the following parties:

Owner's Representative

Date

June 16, 2016

KRM Welding Services Ltd. Representative

Date

June 16, 2016

CERTIFYING STATEMENTDate June 14, 2016.

I have reviewed the written practice, procedures, personnel records and certification of

IRIS WDT.

(Name of Subcontracted NDE Company)

In my opinion, they comply, in all respects, with requirements of ASME Section V Non-destructive Examination and the CGSB (Canadian General Standards Board) or ASNT (American Society for Non-Destructive Testing).

IRIS WDT.

(Name of Subcontracted NDE Company)

Are appointed to perform

MT

Radiography (RT), Ultrasonics (UT), Liquid Penetrant (PT), Magnetic Particle (MT)


Non-destructive examinations for KRM Welding Services Ltd.

(Name of Subcontracted NDE companies Level III person)

Is by this statement, certified to act as the Level III person for KRM Welding Services Ltd. to be responsible for the following non-destructive examination.

MT

Radiography (RT), Ultrasonics (UT), Liquid Penetrant (PT), Magnetic Particle (MT)

June 14, 2016
Date
Signature of Quality Control Manager

25 JUNE 2014

NDE INSTRUCTION SHEET

PAGE 1 OF 1

Date: June 14, 2016.KRM Welding Services Ltd. Contact: Keun Martin Job Number: June 16, 2016.

Deliver Reports and Film To: _____

Inspection Method

Radiography: _____ Ultrasonic _____ Magnetic Particle ☒

Liquid Penetrant _____ Hardness Testing _____

Minimum Technician Qualification

CGSB Level II _____ SNT Level II _____

Acceptance Criteria:

ASME B31.3 _____ (Year) ASME B31.1 _____ (Year)

ASME B31.3 Service Category _____ (Normal, Cat. D, Cat. M, High Pressure, Sever Cyclic)

Customer Specification: IV no linear indications.

Maximum Allowable Hardness: _____

Joints to be tested (Attach NDE location drawing showing joints to be tested, welder names and any other information required to be on the test reports)

Quantity	Identification	Size and Schedule	Test Method
<u>1 each</u>	<u>right front saddle connection.</u>		<u>MT.</u>

Additional Instructions:

Note: Radiographic examination to comply with ASME Section V Article 2.

Ultrasonic examination to comply with ASME Section V Article 4

Liquid Penetrant examination to comply with ASME Section V Article 6

Magnetic Particle examination to comply with ASME Section V Article 7

Hardness testing to comply with written procedure _____

CONTRACT REVIEW

Job Number: June 16, 2016 Date: June 16, 2016
Owner Company: Husky Oil Morgan Battery
Scope of Work: Boiler Repair.

	OWNER	KRM WELDING SERVICES LTD.
Materials Receiving Inspection, Identification and Traceability	<u>N/A</u>	<u>Km</u>
Welding	<u>N/A</u>	<u>Km</u>
Site Control of Heat Treatment	<u>N/A</u>	<u>N/A</u>
Site Control of NDE	<u>X NO</u>	<u>X Km</u>
Measuring and Test Equipment	<u>N/A</u>	<u>Km</u>
Witness of Pressure Tests	<u>X NO</u>	<u>Km</u>
Document & Data Control	<u>X NO</u>	<u>Km</u>
Preparing and Retention of Quality Control Records	<u>X NO</u>	<u>Km</u>

The Alberta Pressure Equipment Safety Regulation requires the Owner to have an ABSA authorized Quality Management System, if they assume any of the Quality Management System functions listed above.

A piping system over 500 litres in capacity must be registered with ABSA.

RESPONSIBLE FOR SUPPLY	OWNER	KRM WELDING SERVICES LTD.
Materials		
Design Registration with ABSA		
Design & Specifications		
Construction Drawings		
NDE		
Heat Treatment		
Pressure Testing		

Code of Construction:

ASME B31.3 Process Piping, Year _____ Fluid Service Category _____
ASME B31.1 Power Piping, Year _____ B31.1 Boiler External Piping, _____
ASME B31.5 Refrigeration Piping, Year _____
ASME B31.9 Building Services Piping, Year _____
Additional Customer Specifications: _____

KRM Welding Services Ltd. Representative's Initials:
Owner's Representative's Initials:

<u>Km</u>
<u>X/NO</u>

WELDING PROCEDURE SPECIFICATION

WPS No.: KRM-2 (Rev1)

SUPPORTING PQR No.(s): KRM-2A - KRM-2B
in accordance with

ASME Section I, IV, VIII, IX, B31.1 and B31.3
qualified for

Process(s): SMAW
Filler Metal F-No.: F3 / F4
AWS Classification: E6010 / E7018-1

Position(s): All
A-No.: A1
Weld Type(s): Groove / Fillet

Base Metal: P- 1

Thickness Ranges

As Welded Thermal Condition

	Without Impacts	Without Impacts
ASME BPV Section.VIII	0.0625"	0.375" to 0.750"
ASME BPV Section.I	0.0625" to 0.750"	0.375" to 0.750"
ASME BPV Section.IV	0.0625" to 0.750"	0.375" to 0.750"
ASME B31.1	0.0625" to 0.750"	0.375" to 0.750"
ASME B31.3	0.0625" to 0.750"	0.375" to 0.750"

Revision Content: Rev 1 Addition of Charpy and Vickers

Provincial Registrations:

ADSA	
SAFETY CODES ACT - PROVINCE OF ALBERTA	
WELDING PROCEDURE	
Reg. No. WP	2917.2
Spec. No.	KRM-2 (REV1)
Weld Process	SMAW
Matl. Gr. P No.	1 Gr 1+2 to P No. 1 Gr 1+2
Elec. Gr. F No.	3+4 A No. 1
Th. Qual. For	19.1mm P.W.H.T. NO
MIN TH. QUAL	9.5mm, CVA -46°C
Yr 19 Mo. 3 Day 16	Signed R. ROSEBERG, P.ENG.
	WELDING SPECIALIST

19339

Grade "B" Pressure Welder's
Certificate of Competency

This is to certify that Kevin Martin
having complied with provisions of the Safety Codes Act, is authorized to engage
in pressure welding in accordance with the prescribed Regulations.

Dated at Edmonton
December 15, 2005



W-23560

File no.

Chief Inspector and Administrator

GRB Enterprises Ltd
Edmonton Alberta

AOQP 7107

WELDER PERFORMANCE QUALIFICATION CARD

Name

KEVIN R.
MARTIN

W-23560
ABSA File Number

Name

This card is issued pursuant to the Safety Codes Act and the Pressure Welders
Regulation. The performance qualification is in accordance with Section 14 of the
ASME BPV Code and subject to the limitations on the reverse side.

FEB-09-2016

Date of Test

Welder Signature

G.R. Bellehumeur 23116

Welding Examiner (Print/Type)

GRB Card No.

Performance Qualification GRB Card No. 23116

Process(es)

SMW

Materials (P.No.)

P-1-Th-PBF

Filler Metal (F.No)

E3 E4

Min. Outside
Pipe Diameter

1" OD

Max Deposited
Weld Metal

0.25" MAX

Position(s)
Qualified

ALL

Backing

without with with

Backing Gas

N/A

Progression

uphill uphill

#E00022

P.Q. Expiry Date

FEB-09-2018

Examiner File No.

Welding Examiner Signature

WELDER'S NAME AND ABSA FILE NUMBER	SYMBOL	PROCESS/ GMAW TRANSFER MODE	WELDING PROCEDURE (WPS #)	"P" NUMBER	"F" NUMBER	POSITION/ WELD PROGRESSION	MAX DEP. WELD METAL THK.	MIN. PIPE DIA.	EXPIRY DATE P.Q. CD.
Kevin Martin W23460		SMaw	2917.2		F3, F4	All	max	1"	Feb 9 2018

HYDROSTATIC TEST ☒PNEUMATIC TEST ☐Date: June 16, 2016Job Number: June 16, 2016.LSD: 10-34-51-04-W4Description of Product: Saskatoon BoilerTests Conducted By: Kevin Martin.Test Pressure: 240 psi Test Temperature: 17°C.Test Medium: 240 psiHolding Time at Test Pressure: 10 minsResults: passedOwner's Inspector Witnessing Test: x Ray TrachukGauge Number(s): 400-3
400-4 Dead Weight Number: W/AChart Recorder Number: W/A.

Signature of Owner's Inspector

Date

Signature of QC Inspector

Date

June 16, 2016.



Western Gauge and Instruments Ltd.

Certificate of Calibration

Number# C8610

Customer:	KRM WELDING	Manufacturer:	WGI
Customer P/O:	KRM	Serial Number:	PG-400-3
Order:	OE0014859	Pressure Range:	0/400 PSI/KPA
Accuracy +/- :	1% OF FULL SCALE	Part Number:	
CALIBRATION DATE : October 6, 2015			

Test Equipment Used

Gauge: 3-D DIGITAL
Serial Number: AC 8780169

Date Calibrated: May 21/ 15
Range: 30" HG/500 PSI

Test Gauge	Upscale Pressure	Error +/-
0 PSI	0 PSI	0 PSI
50	49	-1
100	98	-2
200	197	-3
300	296	-4
400	396	-4

Technician: Bs
BRENTT STARRATT

Q.C. Manager: R-G
RANDY GABRUCK

Western Gauge and Instruments Ltd. Certifies that the above information is traceable to N.I.S.T.

6624 50 ST S.E. Edmonton, Alberta T6B 2N7 :780-463-3800, F: 780-463-3990.
E-Mail : brentt@wgiltld.ca



Western Gauge and Instruments Ltd.

Certificate of Calibration

Number# C8611

Customer:	KRM WELDING	Manufacturer:	WGI
Customer P/O:	KRM	Serial Number:	PG-400-4
Order:	OE0014859	Pressure Range:	0/400 PSI/KPA
Accuracy +/- :	1% OF FULL SCALE	Part Number:	
CALIBRATION DATE : October 6, 2015			

Test Equipment Used

Gauge: 3-D DIGITAL
Serial Number: AC 8780169

Date Calibrated: May 21/ 15
Range: 30"HG/500 PSI

Test Gauge	Upscale Pressure	Error + / -
0 PSI	0 PSI	0 PSI
50	48	-2
100	98	-2
200	198	-2
300	298	-2
400	398	-2

Technician: 
BRENTT STARRATT

Q.C. Manager: 
RANDY GABRUCK

Western Gauge and Instruments Ltd. Certifies that the above information is traceable to N.I.S.T.

6624 50 ST S.E. Edmonton, Alberta T6B 2N7 :780-463-3800, F: 780-463-3990.
E-Mail : brentt@wgiltld.ca



8505 Argyll Road
Edmonton AB T6B 4B2
Phone: (780) 434-7850 Fax: (780) 988-5177
cal.lab@bhd.ca www.bhd.ca

Certificate of Calibration

Asset Number: ANC5362
Manufacturer: FLUKE
Model Number: 62 Max
Serial Number: 34070908WS

Customer:
KRM Welding
16232 83B Street
Edmonton, AB T5Z 3L9

Customer Asset

Calibration Date: 24-May-2016

Temperature: 24.3 °C

Calibration Due: 24-May-2017

Relative Humidity: 21 %

Condition as Received In Tolerance As Found / As Left (Pass)
/Returned:

Procedure Name: Fluke 62-Max+: Cal VER (1 Year)

BHD Calibration Laboratories Ltd. certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes.

- The quality system is registered to ISO 9001:2008.

- This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

- The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma ($k=2$) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

- This calibration certificate shall not be reproduced except in full without the written approval of BHD Calibration Laboratories Ltd. .

Standards Used

Cal Standard	Model	Serial Number	Description	Cal Due
CL216	4181	B5C256	Infrared Calibrator	05/05/2017
CL223	4180	B59773	Infrared Calibrator	09/16/2016

Measurement Test Data

Test Description	Lower Acceptance Limit	Measured Value	Upper Acceptance Limit	Status
TEMPERATURE TESTS				
-15.0 °C	-18.00 °C	-14.70 °C	-12.00 °C	Pass

Measurement Test Data

Test Description	Lower Acceptance Limit	Measured Value	Upper Acceptance Limit	Status	TUR
0.0 °C	-2.00 °C	-0.40 °C	2.00 °C	Pass	
50.0 °C	49.00 °C	49.90 °C	51.00 °C	Pass	
200.0 °C	198.00 °C	199.30 °C	202.00 °C	Pass	
500.0 °C	495.00 °C	498.10 °C	505.00 °C	Pass	

***** End of Measurement Report *****

D. Brkovic
Daniel Brkovic

SCANNED



5511 - 82 Avenue
Edmonton AB T6B 2J6

Phone# 780-426-3890
Fax # 780-462-5899

WELDING MACHINE CALIBRATION (ALTERNATOR)

CUSTOMER :	KROL WELDING LTD
UNIT #	
CONTACT PERSON :	

MANUFACTURER :	LINCOLN ELECTRIC
MODEL #	VANTAGE 400
SERIAL #	U1141008516 - 12270

FACEPLATE RATING: 400 AMP 36 VOLTS 100 % DUTY CYCLE

MACHINE SETTINGS	TESTED OUTPUT	LOAD BANK SETTINGS
100	101 AMPS @ 49 VOLTS	100
150	153 AMPS @ 50 VOLTS	150
200	206 AMPS @ 51 VOLTS	200
250	258 AMPS @ 50 VOLTS	250
300	310 AMPS @ 51 VOLTS	300
400	360 AMPS @ 45 VOLTS	400
MAXIMUM OUTPUT	495 AMPS @ 34 VOLTS	750
Calibrated Output	400 AMPS @ 36 VOLTS	500

RPM's OR HERTZ	63.2 Hz.
OPEN CIRCUIT VOLTAGE	59.5 V.

NOTES :

WELDING CABLE TESTED	YES	NO <input checked="" type="checkbox"/>
----------------------	-----	--

DATE REPORT WAS COMPLETED*:	APRIL 20/14
CALIBRATION EQUIPMENT USED :	LINCOLN ELECTRIC MASTERLOAD 750
COMMENTS:	PASS

TECHNICIAN WHO COMPLETED THIS REPORT:

JOE HACHEZ

NAME (PRINTED)

SIGNATURE

*CALIBRATIONS ARE VALID FOR 1 YEAR FROM COMPLETION DATE.



5511 - 82 Avenue
Edmonton AB T6B 2J6

Phone# 780-426-3890
Fax # 780-462-5899

CONTINENTAL LOAD BANK CALIBRATION

CUSTOMER: CONTINENTAL ENGINES LTD.

UNIT# 01

CONTACT PERSON: RICK

MANUFACTURER: LINCOLNELECTRIC

MODEL #: MASTERLOAD 750

SERIAL #: 216 CODE: 10401 K587D26244

DATE REPORT WAS COMPLETED*: JANUARY 2 2016

CALIBRATION EQUIPMENT USED: FLUKE 111, TRUE RMS DMM

CALIBRATION EQUIPMENT USED: DE-311 2, DC AMP CLAMP SER#G0002784

COMMENTS:

FACEPLATE RATING

MAXIMUM OUTPUT (NO CABLES) UNIT PASSES LINCOLN SPECS

OPEN CIRCUIT VOLTAGE:

WELDING CABLES CONDITION:

TECHNICIAN WHO COMPLETED THIS REPORT:

BOYD BOSER

NAME (PRINTED)

SIGNATURES

*CALIBRATIONS ARE VALID FOR 1 YEAR FROM COMPLETION DATE.

Job 10-32
OTS-150W

FORM H-2 MANUFACTURER'S DATA REPORT FOR ALL TYPES OF BOILERS
EXCEPT WATERTUBE AND THOSE MADE OF CAST IRON
As Required by the Provisions of the ASME Code Rules, Section IV

62046035

1. Manufactured and certified by Saskatoon Boiler Mfg. Co. Ltd., 2011 Quebec Avenue, Saskatoon, SK, S7K 1W5
(name and address of manufacturer)
2. Manufactured for Northern Blizzard Resources Inc., 5301 - 62nd Street, Lloydminster, AB, T9V 2E5
(name and address of purchaser)
3. Location of installation Northern Blizzard Resources Inc., Morgan 10-34-51-04 W4M Battery, AB
(name and address)
4. Unit identification Marine Boiler 7119 U1463.23 B1659C(r0) 477 2011
(complete boiler, superheater, waterwall, economizer, etc.) (manufacturer's serial no.) (CRN) (drawing no.) (National Bd. no.) (year built)
5. The chemical and physical properties of all parts meet the requirements of material specifications of the ASME BOILER AND PRESSURE VESSEL CODE. The design, construction, and workmanship conform to ASME Code, Section IV, 2007 - A09
(year) (addenda (as applicable)(date)) (Code Case no.)
- Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of this report None

- (name of part, item number, manufacturer's name, and identifying stamp)
6. Shells or drums 1 SA-516-70 0.3125" 60" 105" TS/TS --- ---
(no.) (material spec., gr.) (thickness) (inside diameter) (length (overall)) (inside diameter) (length (overall))
7. Joints Double Butt Welded 85% Double Butt Welded Two
(long. (seamless, welded)) (eff. (compared to seamless)) (length (seamless, welded)) (no. of shell courses)
8. Tubesheet SA-516-70 0.75" Tube holes 148 x 2.025"
(material spec., grade) (thickness) (number and diameter)
9. Tubes: No. SA-178-A Straight Diameter 2" Length 105.5" Gauge 0.095" mw
(material spec., grade) (straight or bent) (if various, give max. and min.) (for thickness)
10. Heads None
(material spec. no.) (thickness) (flat, dished, ellipsoidal) (radius of dish)
11. Furnace SA-53-B 0.50" Nom. 1 24" OD 105" Pressure Zone 105.75" Plain Seams ERW
(material spec., gr.) (thickness) (no.) (size (O.D. or W x H)) (length (each section)) (total) (type (plain, corrugated, etc.)) (type (seamless, welded))
12. Staybolts None
(no.) (size (diameter)) (material spec., gr.) (size) (pitch (horizontal and vertical)) (MANWP)
13. Stays or braces:

Location	Material Spec.	Type	Number and Size	Pitch	Total Net Area	Fig. HG-343 L/1	Dist. Tubes to Shell	MANWP
(a) F.H. above tubes	SA-36	Through	2 of 1.75"	11"	4.81 sq in	1.0	14"	160 psig
(b) R.H. above tubes	SA-36	Through	2 of 1.75"	11"	4.81 sq in	1.0	14"	160 psig
(c) F.H. below tubes	---	---	---	---	---	---	---	---
(d) R.H. below tubes	---	---	---	---	---	---	---	---
(e) Through stays	SA-36	Through	10 of 1.0"	7.188"	7.85 sq in	1.0	---	160 psig

14. Other parts: 1. Water Baffle Top & Btm Plates 2. Water Baffle Cap 3. ---
(brief description, i.e., doors, boiler piping)
1. SA-516-70, 11.625" x 74.688" Lg, 0.50" T, 15 psig Steam, 160 psig Water
2. SA-516-70, 3.313" x 74.688" Lg, 0.375" T, 15 psig Steam, 160 psig Water
3. ---
(material spec., grade, size, material thickness, MANWP)

15. Nozzles, inspection, and safety valve openings:

Purpose (inlet, outlet, drain, etc.)	No.	Diameter or Size	Type	How Attached	Material	Nominal Thickness	Reinforcement Material	Location
Handhole	8	2.75" x 3.5"	Obround	Bolted	NA	0.75" Cover	NA	Shell & TS
Manhole	None	---	---	---	---	---	---	---
Outlet	1	6" 150#	RFSO	Welded	SA-106-B	0.280"	SA-516-70	Shell
Inlet	1	6" 150#	RFSO	Welded	SA-106-B	0.280"	SA-516-70	Shell
Safety Valve	1	2"	NPT Cplg	Welded	SA-105	3000#	NA	Shell
Drain	1	1-1/2"	NPT Cplg	Welded	SA-105	3000#	NA	Shell
Various	11	2" to 3/4"	NPT Cplg	Welded	SA-105	3000#	NA	Shell

FORM H-2 (Back)

16. Boiler supports 2 Saddies Welded
(no.) (type (saddies, legs, lugs))

17. MAWP 160 psig water Based on HW-701.3b Heating surface 707 sq. ft. (attachment (bolted or welded))
(Code par. and/or formula) (total) Shop hydro. test (complete boiler)

18. Maximum water temperature 250 deg F

19. Remarks Handhole Covers: Saskatoon Boiler Mfg. Co. Ltd. 300 psig at 422 deg F, CRN OH0555.324T157.

CERTIFICATE OF SHOP COMPLIANCE

We certify that the statements made in this data report are correct and that all details of design, material, construction, and workmanship of this boiler conform to Section IV of the ASME BOILER AND PRESSURE VESSEL CODE.

"H" Certificate of Authorization no. 7804 expires 28 February, 2012
 Date 9 Feb 2011 Signed [Signature] Name Saskatoon Boiler Mfg. Co. Ltd.
(by representative) (manufacturer that constructed and certified boiler)

CERTIFICATE OF SHOP INSPECTION

Boiler constructed by Saskatoon Boiler Mfg. Co. Ltd. at Saskatoon, Saskatchewan, Canada
 I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the state or province of Saskatchewan and employed by Technical Safety Authority of Saskatchewan

have inspected parts of this boiler referred to as data items 4, 6-11, 13-19 and have examined Manufacturers' Partial Data Reports for items _____ and state that, to the best of my knowledge and belief, the manufacturer has constructed this boiler in accordance with the applicable sections of the ASME BOILER AND PRESSURE VESSEL CODE.

By signing this certificate neither the inspector nor his employer makes any warranty, expressed or implied, concerning the boiler described in this Manufacturer's Data Report. Furthermore, neither the inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date 9 Feb 2011 Signed [Signature] Commissions SK/057 12287 ANB
(Authorized Inspector) (National Bd. (incl. endorsements), state, prov., and no.)

CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE

We certify that the field assembly construction of all parts of this boiler conforms with the requirements of Section IV of the ASME BOILER AND PRESSURE VESSEL CODE.

"H" Certificate of Authorization no. _____ expires _____
 Date _____ Signed _____ Name _____
(by representative) (assembler that certified and constructed field assembly)

CERTIFICATE OF FIELD ASSEMBLY INSPECTION

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the state or province of _____ and employed by _____

have compared the statements in this Manufacturer's Data Report with the described boiler and state that the parts referred to as data items _____, not included in the certificate of shop inspection, have been inspected by me and that to the best of my knowledge and belief the manufacturer and/or the assembler has constructed and assembled this boiler in accordance with the applicable sections of the ASME BOILER AND PRESSURE VESSEL CODE. The described boiler was inspected and subjected to a hydrostatic test of _____.

By signing this certificate neither the inspector nor his employer makes any warranty, expressed or implied, concerning the boiler described in this Manufacturer's Data Report. Furthermore, neither the inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date _____ Signed _____ Commissions _____
(Authorized Inspector) (National Bd. (incl. endorsements), state, prov., and no.)

SASKATOON BOILER MFG. CO. LTD.

FACTORY INSPECTION AND FIRE TEST REPORT - GAS FIRED JOB NUMBER 10-32

ORDER: NORTHERN BLIZZARD RESOURCES INC.

DEL: QTS-G 150 W SERIAL NO. 7119 ULC NO: AR530050

PROGRAMMER: MODEL NO. E110, EP160, ED510, EDV1 SERIAL NO: 1046-04

BLOWER MOTOR: MODEL NO. BROOKS S/N ILL2285 TYPE: _____ FRAME: W-DA184T-S

VOLTS: 480 PH: 3 HP: 7.5 RPM: 3460 AMPS: 8.6 SF: 1.15

MAGNETIC STARTER: CT16 HEATERS: TI16C 8-12 AMPS

FIRE TESTS	LOW	HIGH
Comb Eff%	<u>86.5</u>	<u>82.3</u>
Stack Temp	<u>213</u>	<u>366</u>
O ₂ %	<u>5.7</u>	<u>5.2</u>
CO PPM	<u>3</u>	<u>53</u>
CO ₂ %	<u>8.6</u>	<u>8.9</u>
Nox PPM	<u>61</u>	<u>49</u>
Input- CFH	<u>1200</u>	<u>6276</u>

BURNER MODEL CRG-165-Z
 S/N 1110-405
 WATER PUMP MODEL ULC # 95
 S/N _____
 VOLTS _____
 AMPS _____
 STARTER _____
 HEATER _____

CONTROL TESTS	
Hi Limit MR.	<u>OK</u>
Opr Cont	<u>OK</u>
Mod Cont	<u>OK</u>
Lwco # 1	<u>OK</u>
Lwco # 2	<u>—</u>
Flame Monitor	<u>OK</u>
Air Sw	<u>OK</u>
Low Fire Sw	<u>OK</u>
Hi Gas SW	<u>OK 28"</u>
Low Gas SW	<u>OK 12"</u>
Flow SW	<u>✓</u>
Hi Water	<u>—</u>
Ind Lites	<u>OK</u>
Alarms	<u>✓</u>
Dielectric Test	<u>OK</u>
Remote S.D.	<u>✓</u>
Gas Leaks	<u>NIL</u>

PRESSURES

	LOW	HIGH
Inlet "w/psl	<u>5</u>	<u>5</u>
Reg "w/psl	<u>1.0</u>	<u>0.9</u>
Gas Train "w/psl	<u>24.5</u>	<u>17.4</u>
Manifold "wc	<u>2</u>	<u>7.3</u>
Wind Box "wc	<u>3</u>	<u>8.6</u>
Comb "wc	_____	_____
Pilot "wc	<u>4.2</u>	_____
Amps Blower	<u>4.7</u>	<u>7.8</u>
Amps Water Pump	<u>—</u>	<u>—</u>
Boiler Temp	<u>240</u>	Pressure <u>13</u> Purge Time <u>60</u>

Air Band 3/4" DIFF PL. Gas 1/2" IN Orifice Size 57 X 13/64 Ign Funnel _____ Baffle Plate 3" Choke Ring —
AIR BAFFLE 10 3/8 ODX B 5/8 ID, GAS SPREADING SOLID B 3/8 ODX 7 1/2 ID
DIFF. PLATE SCOTCH 6 3/8 ODX 3 1/4 ID G/W 4.6 MM HOLES
15 BOILER HAS HONEYWELL MODULATING GAS VALVE

COMPLETED BY: Tygonna Williams DATE: FEB 18/11

SASKATOON BOILER MFG. CO. LTD.

Job #10-32

Date: March 14, 2011

SPARE PARTS LIST FOR: Northern Blizzard Resources, Lloydminster, AB

BOILER MODEL: OTS-G150W

SERIAL NO: 7119

The spare parts have been divided into three categories as follows:

RM - Routine Maintenance - Items which should be on site

CO - Items which should be stocked for Critical Operation

RL - Remote Locations - items to be stocked, where locations are more than a few hours delivery from Saskatoon

Burner: **CRG-165-2 S/N 1110-405**

RM	CO	RL	ITEM	PRICE
X				
X			Electrodes (set)	WP478C
X			Fuses	10 amp
X			Lubricant for plug valves	(3) 3/8" lube sticks
X			Inspection opening gaskets	(8) 2½" x 3½" OB
X			Rear Baffle Gasket	13 ft. Tadpole Tape
X			Burner Gasket	7' - 1½" Rope
	X		Refractory Cement	6# Kel Seal
	X		Programming control	E110-ED510-EP160-EUV1
	X		Hi Limit Control	L4008E1040 Man.
	X		Operating Control	T775M 2048
	X		Modulating Control	T77M 2048
	X		Modulating Motor	M9484F001
	X		Low Level Control	3E2C
	X		Pump Control	N/A
	X		Linkage Arms	(2) 3½" Lg.
	X		Rod Ends	(2) 1/4"
	X		Air Switch	AFS-A
	X		Safety Valve	9.9 x 5 x 1 1 Kunkle 927 set at 160 psi
		X	Blower Fan Wheel (1) set	10.6 x 4.5 x 1-1/8" Bore
		X	Door Gaskets	34 ft.
		X	Ignition Transformer	1092F
		X	Scanner Assembly	UV1A-6
		X	Pilot Solenoid Valve	(2) V4046C 1054 - 3/8"
		X	Main Gas Valve Actuator	(2) V4055D 1019
		X	Main Gas Valve Body	(2) V5055C 1000 & V5055A 1038
		X	Blower Motor	7½ HP 480V-3-60
X			Burner Refractory	SBM
			Rear Sight Glass	#B-1740-5
			Valve	Honeywell 1½" V51E 1000
FOR GAS/OIL OR OIL FIRED BOILERS				
X				N/A
X			Oil Nozzles	N/A
X			Cartridge for Oil Filter	N/A
X			Filter for air compressor	N/A
	X		Belts (set)	N/A
		X	Air compressor	N/A
		X	Oil Solenoid Valve	N/A
		X	Oil Pump	N/A
		X	Compressor &/or Pump motor	N/A
			Changeover switch	

Prices listed are effective for 30 days only, from date issued, FOB factory, Saskatoon
All applicable taxes extra

SK-1068

PREVENTATIVE MAINTENANCE

RECOMMENDED FOR

SASKATOON BOILERS - ALL TYPES - ALL SIZES - ALL FUELS
DISPLAY ONE OF THESE CARDS IN A VISIBLE LOCATION AS NEAR AS POSSIBLE TO THE BURNER. AN ADDITIONAL CARD SHOULD BE DISPLAYED IN THE BOILER ROOM WHERE IT WILL BE EASILY ACCESSIBLE IN AN EMERGENCY.

MAINTENANCE INSTRUCTIONS: A regular maintenance program is critical to ensure that your boiler will operate reliably and efficiently. Your maintenance program will consist of daily, weekly, monthly, semi-annual, and annual tests that will confirm that all parts of the boiler are operating as intended. The frequencies and tests recommended by **Saskatoon Boiler** are listed below. An experienced operator may have to increase the frequency or add additional checks depending on the actual operating conditions or jurisdictional requirements. The owner's safety program, maintenance lockout procedures and hazard assessment requirements must be followed.

DAILY

1. Blowdown the boiler through each blowdown connection for a minimum of five seconds.
2. While the boiler is operating, blowdown the water column(s) to the low water cut off point. If the unit does not shut down, correct the fault.
3. Check the stack temperature.
4. Verify that combustion gasses are not leaking from the boiler into the boiler room.
5. Verify that the boiler pressure or water temperature is not excessive.
6. Verify the fuel and water levels. The boiler must not run out of either during operation.
7. Add lubricating oil to the air compressor oil reservoir if low.

WEEKLY

1. Observe the operation of the electronic combustion control to ensure that it functions as described in the manufacturer's documentation.
2. Clean the boiler exterior so that oil and dust do not accumulate. Pay extra attention to the operating components.
3. Inspect the feedwater or circulation system and maintain it per the manufacturer's recommendations.
4. Steam Boilers - Test the feedwater and compare it against the water standards supplied by the water treatment company.
5. Turn the oil strainer(s).

MONTHLY

1. Perform a Try Lever Test; refer to the "SAFETY AND OPERATION CHECK PROCEDURES" section of the manual for the try lever test procedure.
2. Test the high limit control to be sure that it operates satisfactorily.
3. Inspect the burner air damper linkages and damper connections. Tighten if required.
4. Lubricate the blowdown valve(s).
5. Clean the air compressor intake filter.
6. Clear the electrode porcelain of any carbon deposits.

SEMI-ANNUALLY

1. Thoroughly clean the furnace and tubes.
2. Check for any tube or boiler leaks.
3. Replace the gasket around the rear turn chamber with a new one.
4. Clean the sight glass in the rear door. Replace if necessary.
5. If the unit is equipped with a non-freeze siphon drain for the pressure controls, it must be disassembled and cleaned.
6. Inspect the fuel tank, water tank, lines and connections for leaks. Repair or tighten as necessary.
7. Flush the air compressor.
8. Drain and flush the oil strainer(s).

ANNUALLY

1. Remove all handhole and manway covers and inspect the waterside of the boiler for corrosion or scale build-up.
2. Flush the inside of the boiler with a hose, making sure to remove all sludge and deposits.
3. Return the handhole and manway covers with new gaskets.
4. Disconnect the piping on the discharge side of the feedwater pipe and inspect for scale buildup.
5. Inspect the check valve(s) in the feedwater system to determine that they are seating properly.
6. Lubricate the electric motors if they are equipped with grease fittings.
7. Replace the fusible plug if so equipped.
8. Inspect the fuel filter and replace if necessary.
9. Check the fuel pump pressure to ensure that the pressure conforms to the manufacturer's requirements, adjust or replace the fuel pump as required.
10. If the unit is equipped with probe type level controls, they should be removed and cleaned.
11. Verify that the safety valve(s) are in proper working condition.
12. Remove, inspect and clean all components of the burner oil nozzle assembly. See the "BURNER AND BURNER OIL ASSEMBLY SERVICING AND MAINTENANCE" section of the manual.
13. Lubricate the manual shut-off valve(s).

VERY IMPORTANT WARNINGS