

BOILERS AND PRESSURE VESSELS REPAIR AND ALTERATION REPORT

(A) #: **3150678**

OWNER EQUIP NO.: _____

REPAIR ☒

and/or

ALTERATION ☐

Partial ☐ Final ☒

1. **Name and Address of Organization** doing Repair/Alteration Exact Oilfield Developing Ltd.
1412 Tamerack Road N.E. Slave Lake AB AQP No. & Expiry Date 2172 November 26 / 2014
Location of Installation 2-33-83-25 W4 Muskwa
2. **Name of Owner** Husky Energy
Address 707 8 Ave. SW Calgary AB T2P 3G7
3. **Boiler/Pressure Vessel Description** Inlet Separator CRN N0306.2
Manufacturer's Name Bimac Industries Ltd. Built 1995 Serial No. 4523
4. **Design Conditions:**
a) Vessel/Shellside/Boiler: Max Allowable Working Press. 285 psi Min/Max Design Temp -20 F/100 F
b) Jacket/Tubeside: Max Allowable Working Press. _____ Min/Max Design Temp /
5. **Description of defects** (location and types of deterioration that resulted in the repair/alteration).
Flange faces were corroded on 4 - 1" & 15 - 1.5"
6. **ASME Code Edition and Addenda** used for work: ASME Sect. VIII-I Year 2010 Addenda _____
7. **Repair/Alter. Description of Work.** Step by step description of repair/alteration method, attach additional sheets as needed.
Note 1: Repair/Alteration Procedure to be accepted by ABSA SCO prior to start of work.
Replace 4 - 1" , 15 - 1.5" Flanges & 2 - 1.5" 45's
Repair Procedure Supplied By Husky
8. **Material** - List any material used in repair/alteration and any base material welded on:

Item	Mat'l Spec.	Thick/Sch	Diam	Item	Mat'l Spec.	Thick/Sch	Diam
Shell/Drum	SA 516 70	.875"	84"	Heads/ Ends	SA 516 70	843"	84"
Tubeshe				Tubes			
Nozzles	SA 106B 1" / 1.5"	XXH		Flanges/Fitting	SA 105 / 350 LF2	Class 150	
9. **Welding Procedure** – Alberta Registration Number WP- 1093.2 WPS Numbers used: EOD-2-2
10. **Heat Treatment:** Bake Out (Temp./Time) 500F / 1hr Preheat Temp 260 F Post Weld HT (Temp./Time) 1150F/1 hr
11. **Non Destructive Examination** (Specify type and extent).
MPI Prep ends, 100% RT after welding & before PWHT. 100% RT & MT after PWHT


(A) #: 3150678

OWNER EQUIP. NO. _____

Pressure Test

Vessel/Boiler/Shellside

Tubeside/Jacket

a) Hydrostatic 428 psi 1 Hr. 

b) Other Test _____

13. **Welded Replacement Parts:** Attached are Manufacturer's Partial Data Reports or Repair/Alteration Reports properly identified and signed by Authorized Inspectors for the following items of this report: (Welded parts supplied by others).

14. **Responsibility Owner/Client.** Identify below items that the owner/client has assumed responsibility for. **Note (2)**

a) Design Submission _____ b) Repair/Alteration Procedure: Yes 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.

- 15 **REMARKS:** Under 8. Material The Flanges are 1" & 1.5"

16. **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.

- a) For all items except for items identified in 14:
Exact Oilfield Developing Ltd.

(Repair/Alteration Organization Name)

2172 Nov. 26/08

(AQP Number & Expiry Date)



June 18, 2012

(Signature & Date)

Len Hayne

(Print Name)

- b) For items identified in 14 only:
Husky Energy

(Owner/Client Organization Name)

8125 Oct. 6, 2012

(AQP Number & Expiry Date)



(Signature & Date)

Roman Wynnyk

(Print Name)

17. DATE WORK WAS COMPLETED: June 18, 2012

18. **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.

- a) **Owner-User Inspection Certification (Field Only)**

(Required when Owner-User Inspects the work under their ABSA Authorized Owner-User Quality Program).

8125 Oct. 6, 2012

Owner-User AQP# & Expiry Date



In-Service Inspector Signature & Date

Roman Wynnyk

In-Service Inspector Name (Please Print)

API-37754 / 000585

In-Service Inspector Alberta Cert #

- b) **ABSA Safety Codes Officer Certification**

(when work is inspected by ABSA).

ABSA SCO Signature & Date

Print Name

Report Received by ABSA SCO

Date

FORM U-1A MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS
(Alternative Form for Single Chamber, Completely Shop Fabricated - Vessel Only)
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

1438
(A) 2150678

1. Manufactured and certified by **BIMAC INDUSTRIES LTD. 9515 - 48 STREET S.E. CALGARY, ALBERTA T2P 2G8**
(Name and address of manufacturer)
2. Manufactured for **Morrison Petroleum Ltd. #3000 400-3 Ave. S.W. Calgary, AB. T2P 4H2**
(Name and address of purchaser)
3. Location of installation **MUSKWA GAS PLANT - LSD - 02-33-83-25W4M**
(Name and address)
4. Type **Inlet Separator** **4523** **N0306.2** **95089** **N/A** **1995**
(Type of Vessel/Boiler Vess. Tank) (Mfr's serial No.) (CVR) (Drawing No.) (Plant Bld. No.) (Year)
5. The chemical and physical properties of all parts meet the requirements of material specification of the ASME BOILER AND PRESSURE VESSELS CODE.
The design, construction, and workmanship conform to ASME Rules, Section VIII, Division 1

6. Shell: **SA-516-70N** **0.875** **0.125** **84" ID** **10'-0" s/s**
(Mat'l (Spec. No., Grade)) (Nom. Thick. (in)) (Corr. All. (in)) (Diam. ID (ft. & in)) (Length (overall) (ft. & in))
7. Seams: **Single Butt Full** **100** **1150** **1** **Single Butt Full** **1**
(Long. Weld (No. ft. (Spot or Full)) (Elev. (ft.)) (HT. Temp. (°F)) (Time (hr)) (Weld. Dbl. (Sngl. Lap, Butt)) (ft. (Spot, Partial or Full)) (No. of Courses)
8. Heads: (a) Mat'l **SA-516-70N** (b) Mat'l **1**
(Spec. No. Grade)

	Location (Top Bottom, Ends)	Minimum Thickness	Corrosion Allowance	Crown Radius	Knurled Radius	Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Prev (Cont./Crn.)
(a)	ENDS	0.843	0.125			2:1				Cont.

If removable, bolts used (describe other fasteners)

MAWP: **285** **psi** of max. temp **100** **°F**
Min Des. Met Temp **-20** **°F** at **285** **psi** hydro, press, or comb. test pressure **428** **psi**

10. Flanges, inspection and safety valve openings:

Purpose (Inlet, Outlet, Drain)	No.	Diameter or Size	Type	Material	Nominal Thickness	Reinforcement Material	How Attached	Location
Manway / IO	1	20"	Pipe	SA-106-B	0.500	SA-516-70N	Welded	Head
In/Outlet	2	12"	Pipe	SA-106-B	0.688	SA-516-70N	Welded	Shell/Head
W.Out/PHO	2	3"	Pipe	SA-106-B	0.600	SA-516-70N	Welded	Shell
RVC	1	4"	Pipe	SA-106-B	0.674	SA-516-70N	Welded	Shell
Drain	1	2"	Pipe	SA-106-B	0.436	-	Welded	Shell
TI/GG/LC/HLS1	1	1 1/2"	Pipe	SA-106-B	0.400	-	Welded	Shell
Spare	4	1 1/2"	Pipe	SA-106-B	0.400	-	Welded	Shell
PT/PT/PS/Spare	4	1"	Pipe	SA-106-B	0.358	-	Welded	Shell

11. Supports: **BM** **No** **logs** **None** **logs** **None** **Other** **Saddles** **Attached** **welded to shell**
(Yes/no) (No) (No) (No) (Describe) (Where and how)

12. Remarks: Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of this report:

SERVICE: Sour Natural Gas **SAFETY VALVES: UC125** **RADIOGRAPHY: UW11a**
CUBIC CAPACITY: 474 B.F. (13.45 m³) **IMPACT TESTING: Nil Per UG 20F (1-5)**

CERTIFICATE OF SHOP COMPLIANCE

We certify that the statements made in this report are correct and that all details of design, material, construction and workmanship of this vessel conform to the ASME Code for Pressure Vessels, Section VIII, Division 1, "U" Certificate of Authorization No. **23824**, expires **July 8, 1997**
Date **FEB 14, 1996** Co. Name **BIMAC INDUSTRIES LTD.** Signed **[Signature]** (Representative)

CERTIFICATE OF SHOP INSPECTION

Vessel constructed by **BIMAC INDUSTRIES LTD.** at **CALGARY, ALBERTA, 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 **ALBERTA** and employed by **Alberta Boilers Safety Association**
have inspected the component described in the Manufacturer's Data Report on **Feb. 2, 1996** and state that to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME code, Section VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed, or implied, concerning the pressure vessel described in the 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 **Feb 2** Signed **[Signature]** Commission **4003**
(Authorized Inspector) (Not. Bld. Incl. endorsements, State, Prov. and Co.)

PRESSURE EQUIPMENT REPAIR / ALTERATION PROCEDURE

Repair Request by Roman Wynnyk

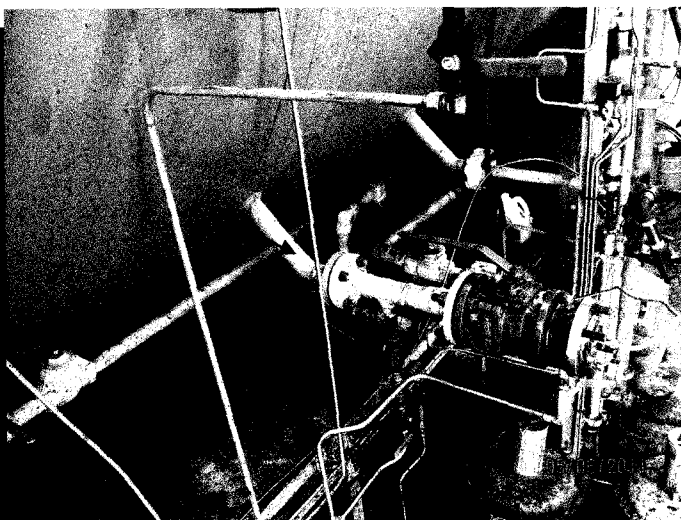
Accepted by Operations Superintendent

☒ Yes ☐ No

Plant Name	Muskwa	Location (LSD)	2-33-83-25-W4	Job #	
Equipment Description	Plant Inlet Separator	Tag #		Prov. Reg #	3150678
Manufacturer	Bimac Industries Ltd.	Serial #	4523	CRN	N0306.2
Work to be Performed is a	<input type="checkbox"/> Routine Repair	<input checked="" type="checkbox"/> Non Routine Repair	<input type="checkbox"/> Alteration		
Authorized Inspector Acceptance	Mike Prefumo				
A. I. Location	Edmonton, Alberta	Phone	780-721-6059	A. I. Inspection waived	<input type="checkbox"/>
Contractor Name & Address	Exact Oilfield Developing				
Contractor Quality Program Reg. #	AQP-2172	Expiry Date	Nov 26, 2014		
Work Start Date	June 11, 2012	Contact	Len Hayne	Phone	780-849-2211
Code of Design	<input type="checkbox"/> ASME I <input type="checkbox"/> ASME IV <input checked="" type="checkbox"/> ASME VIII				
Shell Side Process Fluid	Water / Oil / Gas	<input type="checkbox"/> Sweet <input checked="" type="checkbox"/> Sour	<input type="checkbox"/> Low Temp		
Tube Side Process Fluid		<input type="checkbox"/> Sweet <input type="checkbox"/> Sour	<input type="checkbox"/> Low Temp		
Shell Side Design	MAWP 1965	KPag @ 37.8 °C	MDMT -29 °C		
	<input checked="" type="checkbox"/> RT-1 <input type="checkbox"/> RT-2 <input type="checkbox"/> RT-3 <input type="checkbox"/> RT-4	PWHT <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Test Press		
Tube Side Design	MAWP	KPag @ °C	MDMT °C		
	<input type="checkbox"/> RT-1 <input type="checkbox"/> RT-2 <input type="checkbox"/> RT-3 <input type="checkbox"/> RT-4	PWHT <input type="checkbox"/> Yes <input type="checkbox"/> No	Test Press		
Sketch (use space provided or attach an additional sketch to show details of repair/alteration) Separate Sketch attached					<input type="checkbox"/> Yes <input type="checkbox"/> No



1 1/2" RFWN Flange with Corroded Flange



1 1/2" Nozzle with 45 degree elbow

NOTE: Due to material availability from increased job scope 2-1" and 5-11/2" flanges were substituted using material and grade listed below.

Nozzles with substitute materials are identified in Exact Oilfield Development Quality Control Pkg.

MATERIAL LIST

Item	Description	Size	Material & Grade	Sch / Rating	Qty
1	1 1/2" 45° L.R. ELBOW	1 1/2"	SA234WPB	SCH. (XXH)	2
2	1 1/2" RFWN Flange	1 1/2"	SA-105N	150 # ANSI XXH bore	10
3	1" RFWN Flange	1"	SA-105N	150 # ANSI XXH bore	2
4	1" RFWN Flange	1"	A350 -LF2	150 # ANSI XXH bore	2
5	1 1/2" RFWN Flange	1 1/2"	A350-LF2	150 # ANSI XXH bore	5

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PRESSURE EQUIPMENT REPAIR / ALTERATION PROCEDURE

REPAIR PROCEDURE

The following Husky Specifications form part of the requirements of this Procedure

Spec Number	Name	Spec Number	Name
PS-MW-01	WELDING		
JSP-10	Degassification Procedure		

Repair Procedure (Additional Detailed Procedure Attached)

☐ Yes

☒ No

Maintenance requirements revealed 19 Nozzles on Inlet separator to have a severely corroded flange faces which require replacement.

Repair as follows : (note: no repair work is to commence until approval has been provided by the ABSA Authorized Inspector)

1. Nozzle, 45 degree elbow and corroded flanges are to be de-gassed as per Husky procedure JSP-10 bake out procedure (attached) for a period of 1 hr at a minimum temperature of 400 degrees F.
2. The flanges and 45 degree elbows are to be removed using either the zip cut or torch method.
3. (HOLD POINT) In Service Inspector to inspect the interior of the nozzle to determine if there is any additional corrosion and to ensure nozzle is above minimum thickness requirements. The nozzle piping should be UT examined prior to identify potential concern areas.
4. Nozzle end is to be dressed in accordance with 'Weld Detail 2' of the attached design drawing for butt welds. MT check dressed face to ensure no discontinuities exist prior to fitting/welding.
5. Repair contractor's welder to be qualified to ASME IX – P1- P1 – F3/F4 - 6G (all position)
6. Weld the nozzles to the 45 degree elbow using Exact Oilfield Developments registered P1-P1; F3/F4 c/w PWHT, weld procedure.
7. Nozzles without elbows to be welded directly to prept. nozzle using Exact Oilfield Developments registered P1-P1; F3/F4 c/w PWHT, weld procedure.
8. Prior to Post weld Heat treat, perform 100% RT(radiography) to confirm weld quality.
9. Post weld Heat treat (PWHT) to be performed at a temperature of 1150F for a period of 1 hr. in accordance with the criteria set out in ASME SECT. VIII Div. 1 UCS 56.
10. Once complete, perform 100% RT (radiography), and MT (Mag. Particle) testing. NDE to be completed in accordance with a written procedure as per ASME SECTION V Articles 2 and Article 7.
11. Perform hydrotest to a pressure of 2951KPA for a period of 1 hr. The test is to be witnessed by the Authorized Inspector and the Husky representative.
12. Exact Oilfield Development is to compile all quality documents including the Repair & Alteration AB-40 and forward two copies to Husky Energy Asset Integrity, Slave Lake office within 2 weeks of the completion of job.

Activity Responsibilities

The following tasks are the Responsibility of

	HUSKY	CONTRACTOR	Comments
Design Submission to AIA	<input type="checkbox"/>	<input type="checkbox"/>	The repair procedure is to be reviewed by Authorized inspector and clearance for repair given.
Repair Alteration Procedure - AB40	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Material Control	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Welding Control	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
NDE	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Heat Treatment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Leak Test	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

WELDING REQUIREMENTS

Welding Procedure Specification Number **EOD-2 REV.2**

Min Preheat Temp 60 F PWHT Required ☒ Yes (see PWHT Instruction Sheet) ☐ No

LEAK TEST REQUIREMENTS
☒ Hydro ☐ Pneumatic ☐ Service ☐ Alternate (see Alternative Test Report)

Required Test Pressure 2951 KPA

PROCEDURE PREPARED BY

Roman Wynnyk

May 3/2012

Print Name

Signature

Date

Husky Field Contact Jody Singer

Phone # 780 975 8625

ATTACHMENTS

The following Husky attached documents form part of the requirements of this Procedure

1. Bimac Industries Drawing # 95089
2. Manufacturers Data Report A3150678
3. Husky Oil Operations JSP-10 Carbon Steel Base and Weld Material Degassification (Bake-Out).

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PRESSURE EQUIPMENT REPAIR / ALTERATION PROCEDURE
CRITICAL JOB ACTIVITIES
AIA: ABSA/Sask. Boilers Branch (The AIA may identify hold points by initialing the task(s) they would like to witness)
All activities are considered to be the responsibility of the Contractor and should be reflected / transferred to the required documentation referenced in their registered QA / QC Program Manual.

No.	Activity	Husky Energy	Contractor	AIA
1	Material checked against drawing / bill of material	V	*	
2	Mill tests checked on weld fittings and pipe	V	*	
3	Threaded fittings checked for traceability / identification			
4	Flange and fitting ratings check	V	*	
5	Degas heat treatment	V	*	
6	Fit up checked		*	
7	Welder's ID / Qualifications checked	V	*	
8	In Process VT Completed			
9	External VT inspection complete	*	*	
10	Radiographs reviewed	V	*	
11	Post Weld Heat Treatment checked and chart verified / signed	V	*	
NDE Required				
12	Radiography	V	*	
13	UT (only if requested by QA Coordinator)			
14	Other (MPI, LPI, Hardness Testing)	V	*	
15	Hardness Testing Completed			
16	Hydrostatic test complete	H	*	
17	External painting complete	V	*	
18	Affidavits / Data reports complete	V	*	
19	Alternative Testing Completed and Form signed off.			
20	In-Service Leak Test Completed			
	Document package provided to facility office.			
	Document package sent to Calgary Tech Services	V	*	

H = Hold

V = Verify

* = Required Inspection / Test / Activity (Can be indicated by % required)

QUALITY DOCUMENTS

The following documents along with this Pressure Equipment Repair/Alteration Procedure shall be completed by the approved contractor and the completed "Quality Job File" submitted to the Facility Lead Inspector.
For "Replacement In Kind", documentation is maintained at the facility office.

Document Name	Review for Acceptance prior to start of Repair / Alteration	Developed By
Jurisdictional Repair / Alteration Report	Yes	Contractor/Husky
Copy of QA Program Certificate (AQP)	Yes	Contractor
Copy of Weld Procedure(s) used	Yes	Contractor
Copy of Welder Certificates	Yes	Contractor
NDE Interpretation Reports		Contractor
Radiographic Film		Contractor
Leak Test Reports		Contractor
Repair/Alteration Nameplate Facsimile		Contractor
Bake-Out Procedure (sour service only)		Contractor / Husky
Post Weld Heat Treatment Chart		Contractor / Husky
Alternative Testing & In Process Examination Report		
Bolting Procedure		



the pressure equipment safety authority

CORRECTIVE ACTION REPORT

Form No: AB-21

Rev. No: 4

2009-02

Report # 2012-07-03.1

Part 1 (To be completed by the ABSA SCO)

Company Name Exact Oilfield Developing Ltd. AQP / AOQP / ASVS# NA AQP-2172

Location where Nonconformance was identified: Husky, Muskwa Plant

Activity: QS Certification Audit ☐ Other Repair

Report issued to:

Date issued: 2012-07-03

Name Len Hayne

Title QC Representative

Tel# 780-849-2211

E-Mail len@exactoilfield.com

Non-conformance description and instructions (Provide a brief description. Identify any applicable quality system documentation references and any sections of the SCA, PESR, and ABSA policy documents that have been contravened)

Contrary to document AB-513 (Alberta Repair & Alteration Requirements), a material change was made, to the procedure, during the repair of pressure vessel (A) 3150678, without notifying the In-Service Husky Inspector responsible for the inspection and certification of the AB-40.

You are required to complete Part 2 below and submit it by: 2012-07-30

ABSA Safety Codes Officer Mike Prefumo

Telephone # 780-721-6059

E-Mail prefumo@absa.ca

Part 2 (To be completed by the company and submitted to the ABSA Safety Codes Officer)

Note: Quality System Certificate Holders must ensure that they use the nonconformance and corrective action reports and processes defined in their quality system manual and provide an outline below of the action taken.

a) Action to correct the non-conformance (Indicate action and timing)

Exact will issue an NCR to their QA program to be accepted by Husky's In-Service Inspector Under Proposed Disposition or Repairs of the NCR it will state that Husky's In-Service Inspector will determine a course of action in accordance with Husky's Chief Inspector.

Date Completed: July 17, 2012

b) Action to prevent recurrence: (Determining the root cause, and taking suitable measures to prevent the nonconformance from recurring and for verifying that the preventative action is effective)

In the future Exact will ensure that any change to the repair procedure provided by the customer in regards to in-kind material will be modified and approved by trained and designated In-Service Inspector.

c) Certification (by company authorized person)

Name Len Hayne

Title QCI

Signature 

Date July 17, 2012

Part 3 Acceptance by ABSA Safety Codes Officer

Name M. Prefumo

Signature 

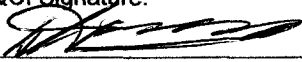
Date 2012-07-20


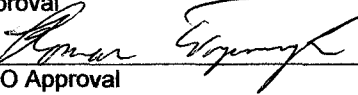
Exact Oilfield Developing Limited

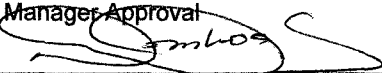
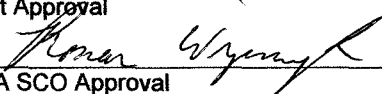
Quality System Manual
Exhibit 16

Non-Conformance Report

Work Order No:	Non-Conformance Report No: EOD-1001
Client: Husky Energy	
Project & Location: Vessel Repair A# 3150678, 2012 Turnaround	2-33-83-25 W4 Muskwa
Drawing Number:	Line No:

Description of Non-Conformance	
A material change was made, to the procedure, during the repair of pressure vessel A# 3150678, without notifying the Husky's In-Service Inspector responsible for the inspection and certification of the AB-40	
QCM/QCI Signature: 	Date: July 17/2012

Proposed Disposition or Repairs	
Husky's In-Service Inspector will determine a course of action in accordance with Husky's Chief Inspector.	
QC Manager Approval 	Date: July 17/2012
Client Approval 	Date: July 17/2012
ABSA SCO Approval	Date:

Non Conformance Rectified	
In the future Exact will ensure that any change to the repair procedure provided by the customer in regards to in-kind material will be modified and approved by a qualified and designated In-Service Inspector	
QC Manager Approval 	Date: July 17/2012
Client Approval 	Date: July 17/2012
ABSA SCO Approval	Date:

Repair Data

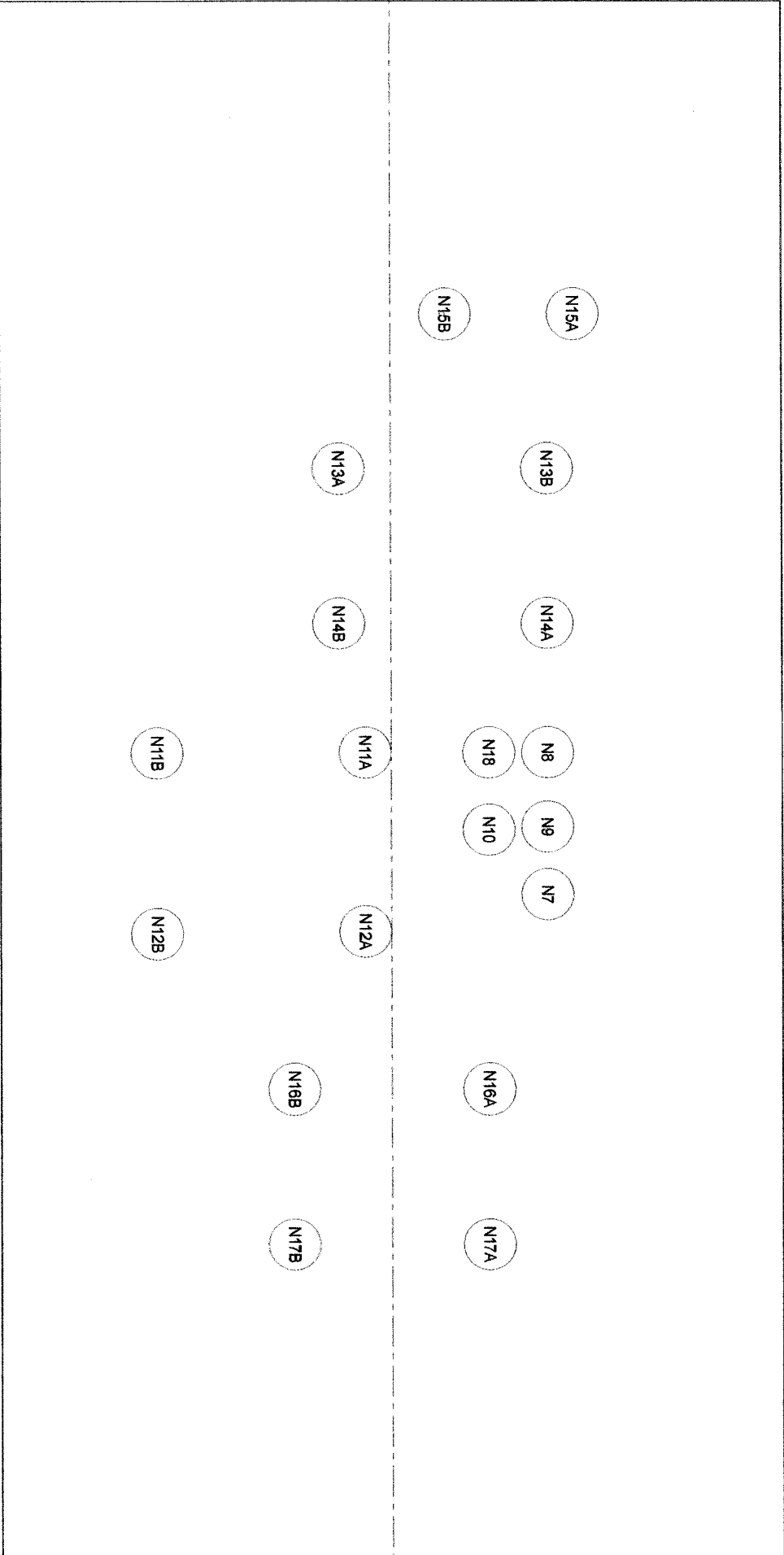
Nozzle	Size (Inch)	Rating & Material	Heat Number	Welder	RT	MT
N10	1.5	CL 150 RFWN XXH A350 LF2/Gr 359 II	6336/44	XX	X20	OK
N9	1	CL 150 RFWN XXH A105N	4390809	XX	X13	OK
N11A	1.5	CL 150 RFWN XXH A105N	75888	K	X12	OK
N11B	1.5	CL 150 RFWN XXH A105N 45° Ell XXH A234 WPB	75888 A707	XX	X1 X21	OK
N7	1	CL 150 RFWN XXH A350 LF2/Gr 359 II	73948/33	XX	X21	OK
N13A	1.5	CL 150 RFWN XXH A105N	75888	K	X15	OK
N13B	1.5	CL 150 RFWN XXH A105N	75888	K	X3	OK
N14A	1.5	CL 150 RFWN XXH A350 LF2/Gr 359 II	6336/44	XX	X14	OK
N14B	1.5	CL 150 RFWN XXH A105N	75888	K	X4	OK
N15A	1.5	CL 150 RFWN XXH A350 LF2/Gr 359 II	6336/44	XX	X16	OK
N15B	1.5	CL 150 RFWN XXH A105N	75888	K	X17	OK
N16A	1.5	CL 150 RFWN XXH A350 LF2/Gr 359 II	6336/44	XX	X8	OK
N16B	1.5	CL 150 RFWN XXH A105N	75888	XX	X6	OK
N17A	1.5	CL 150 RFWN XXH A350 LF2/Gr 359 II	6336/44	XX	X7	OK
N17B	1.5	CL 150 RFWN XXH A105N	75888	XX	X5	OK
N12A	1.5	CL 150 RFWN XXH A105N	75888	XX	X9	OK
N12B	1.5	CL 150 RFWN XXH A105N 45° Ell XXH A234 WPB	75888 A707	XX	X2 X10	OK
N8	1	CL 150 RFWN XXH A105N	4390809	XX	X19	OK
N18	1	CL 150 RFWN XXH A350 LF2/Gr 359 II	73948/33	XX	X18	OK

Exact Oilfield Developing Limited

Husky Energy Ltd

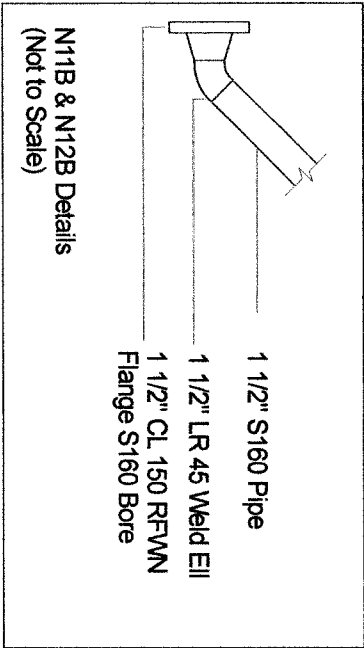
Muskwa 2-33-83-25W4
Inlet Separator (A3150678)
Nozzle Replacement

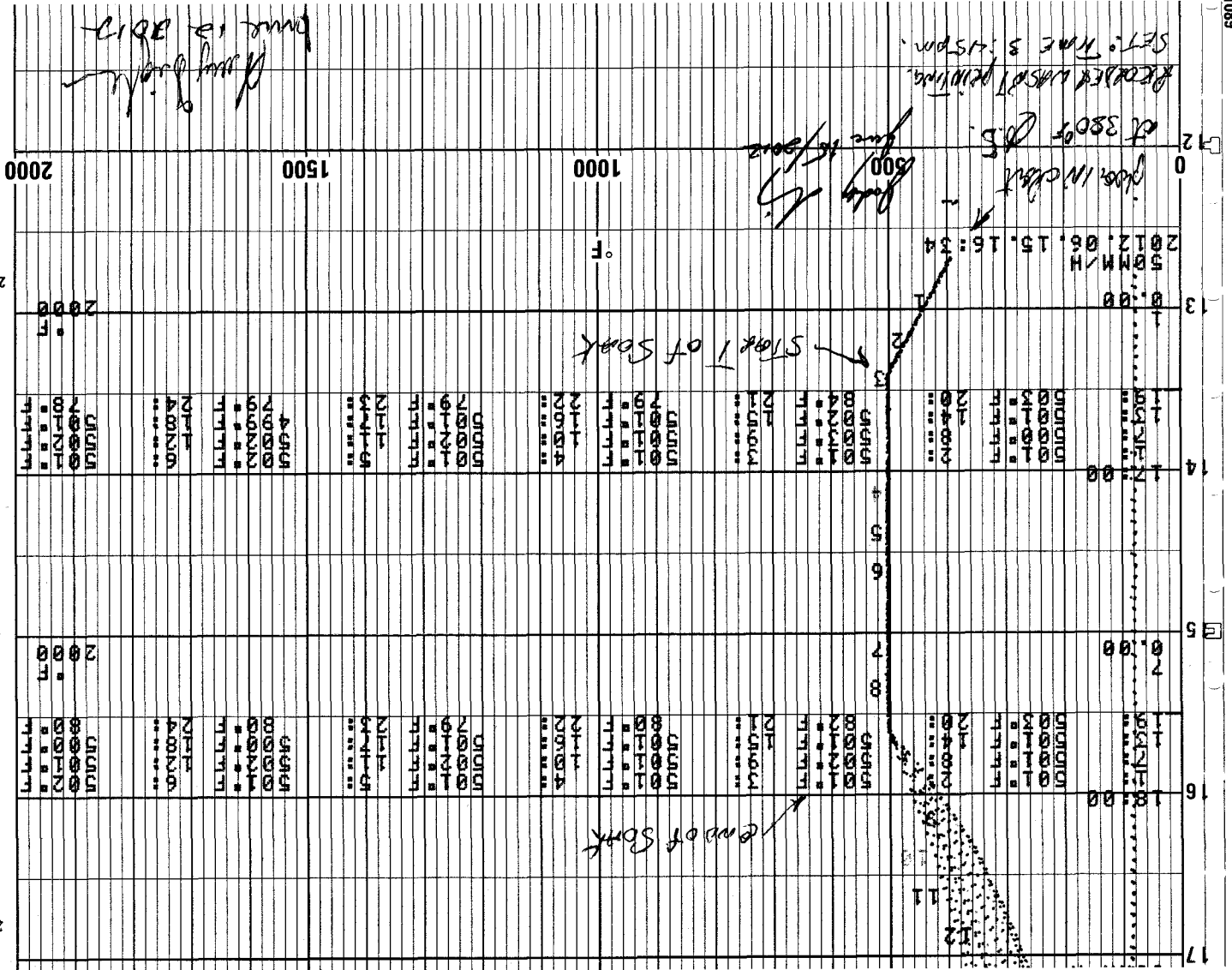
Drawn By: CGMc	Date: 2012-07-06	



Notes:

1. MT Inspection was carried out on all prepped ends prior to welding, on all first weld beads, on all completed welds and after completion of PWHT.
2. All welds were also RT Inspected upon the completion of welding and also after the completion of PWHT.
3. The vessel was hydrotested to 2950 kPa for 1 hour upon completion of the repairs.
4. N11B - X1 is the flange to elbow weld & X11 elbow to pipe weld.
5. N12B - X2 is the flange to elbow weld & X10 elbow to pipe weld.





Recorder No. 18-188 Date: June 15/2017 Signature: [Signature] Technician: Gary B. [Signature] Customer: EXACT Offroad Development Site: 2-33-83-25 W-4 Chart # 2 Set # 2		Chart Speed: 50 mm/hr Job No. 033	
Weld #	Weld Dia.	TC #	Weld Description
15	1 1/2"	1-15	BAKE OUT
4	1"	16-19	BAKE OUT
MUST KNOW RIVER GAS PLANT 102ET SEPARATOR TEMP 500°F HEAD 1 HE.			



R & R Stress Relieving Service Ltd.

2103 - 6 Street, Nisku, AB T9E 7X8 Ph: (780) 955-7559 Fx: (780) 955-2903 1-800-499-4328
#13 Burbank Industrial Park, Blackfalds, AB Ph: (403) 885-2280 Fx: (403) 885-0177

CERTIFICATE OF CONFORMANCE OF RECORDING INSTRUMENTS


CERTIFIED BY:	<u>R & R Stress Relieving Service Ltd.</u>
TEST NUMBER:	<u>RR0605B</u>
DATE:	<u>June 5, 2012</u>
DATE DUE:	<u>September 5, 2012</u>
INSTRUMENT MFG:	<u>Chino</u>
MODEL NUMBER:	<u>AH-3745 N00</u>
SERIAL NUMBER:	<u>AH-082Q163</u>
RECORDER NUMBER:	<u>IR-188</u>

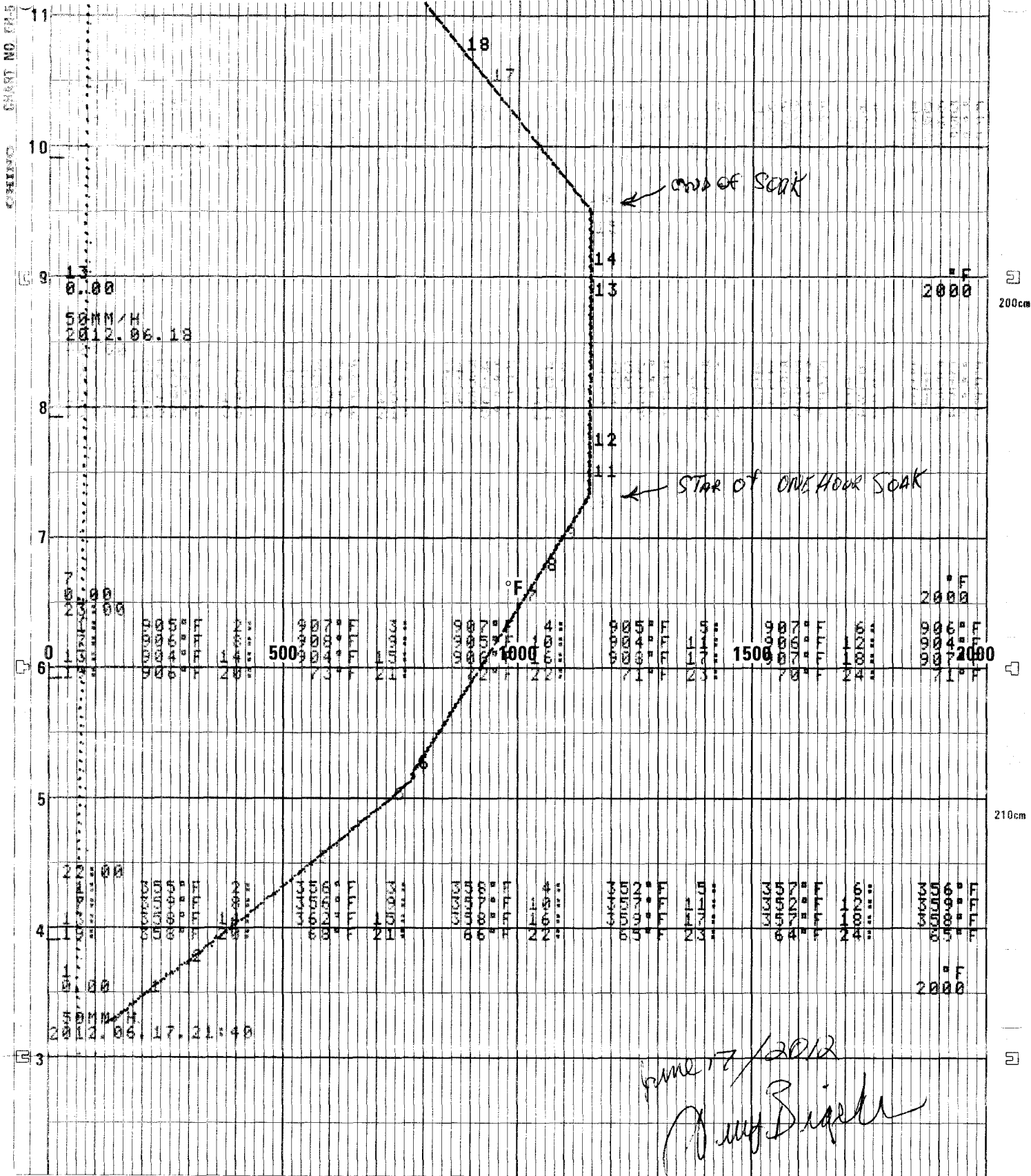
This instrument has been calibrated and it is within the manufacturers specifications.


REFERENCE STANDARDS

<u>DIGIMITE 311600 S/N 48430-5522</u>	<u>CERT DATE NOV 25/11</u>
<u>GORDON 5060 CALIBRATOR S/N 028-84257113</u>	<u>CERT DATE OCT 25/11</u>

R&R Stress Relieving Service Ltd. certifies that the above listed instrument meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the National Institute of Standards and Technology (NIST), or to the NIST accepted intrinsic standards of measurement, or derived by the ratio type of self-calibration techniques. This calibration complies with NIL-STD-45662A and ANSI/NCSL Z540.3-2006.


Steve Pierson



 R&R Strees Relieving Service Ltd		Technician: <i>GERRY BIGLER</i> Signature: <i>Gerry Bigler</i>		Customer: <i>OXART OILFIELD DEVELOPMENT</i>			
Date: <i>June 17/2012</i>		Job No. <i>233</i>		Site: <i>2-33-83-25 W-4 Heston</i>			
Recorder No. <i>1R-185</i>		Chart Speed: 50 mm/hr		Chart # <i>4</i>		Set# <i>1</i>	
Weld#	Weld Dia.	TC#	Weld Description	Weld#	Weld Dia.	TC#	Weld Description
X1, X11	1 1/2"	1	45° BW	X15	1 1/2"	13	BW
X2, X10	1 1/2"	2	45° BW	X16	1 1/2"	14	BW
X3	1 1/2"	3	BW	X17	1 1/2"	15	BW
X4	1 1/2"	4	BW	X18	1"	16	BW
X5	1 1/2"	5	BW	X19	1"	17	BW
X6	1 1/2"	6	BW	X20	1"	18	BW
X7	1 1/2"	7	BW	X21	1"	19	BW
X8	1 1/2"	8	BW	INLET SEPARATOR.			
X9	1 1/2"	9	BW				
X12	1 1/2"	10	BW				
X13	1 1/2"	11	BW				
X14	1 1/2"	12	BW				



R & R Stress Relieving Service Ltd.

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#13 Burbank Industrial Park, Blackfalds, AB Ph: (403) 885-2280 Fx: (403) 885-0177

CERTIFICATE OF CONFORMANCE OF RECORDING INSTRUMENTS

CERTIFIED BY: R & R Stress Relieving Service Ltd.
TEST NUMBER: RR0605B
DATE: June 5, 2012
DATE DUE: September 5, 2012
INSTRUMENT MFG: Chino
MODEL NUMBER: AH-3745 N00
SERIAL NUMBER: AH-082Q163
RECORDER NUMBER: IR-188

This instrument has been calibrated and it is within the manufacturers specifications.

REFERENCE STANDARDS

DIGIMITE 311600 S/N 48430-5522 CERT DATE NOV 25/11
GORDON 5060 CALIBRATOR S/N 028-84257113 CERT DATE OCT 25/11

R&R Stress Relieving Service Ltd. certifies that the above listed instrument meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the National Institute of Standards and Technology (NIST), or to the NIST accepted intrinsic standards of measurement, or derived by the ratio type of self-calibration techniques. This calibration complies with NIL-STD-45662A and ANSI/NCSL Z540.3-2006.


Steve Pierson

EXACT OILFIELD DEVELOPING LIMITED

Page 78

Quality System Manual

Exhibit 18

Heat Treatment Instructions

Owner Company HUSKY MUSKWA Job # _____
 Reference 2-33-83-25 WH Date: _____
 Materials SA-105N & SA334 WPB
 Code ASME SECTION VIII DIV 1

Component Description

Drawing	Diameter	Thickness	Material	Length	Weight
<u>2</u>	<u>6" FLANGES</u>	<u>SCH80</u>	<u>SA105N</u>		
<u>15</u>	<u>1 1/2" FLANGE</u>	<u>XXH</u>	<u>SA105N</u>		
<u>2</u>	<u>1 1/2" 45°</u>	<u>XXH</u>	<u>SA334 WPB</u>		
<u>4</u>	<u>1" FLANGES</u>	<u>"</u>	<u>SA105N</u>		

Type Of Treatment

Instructions: Stress Relieving

1. Temperature to be raised from 800 F ~~&~~ {426 C} to 1150 F ~~&~~ {621 C} at a maximum rate 400 F ~~&~~ per hour. Not to exceed 222 C per hour. (Calculated rate of 222 C per hour divided by governing thickness.
2. Temperature to be held at 1150 F ~~&~~ {621 C} plus or minus 14 C for 60 minutes
3. Temperature to be lowered from 1150 F ~~&~~ {621 C} to 800 F ~~&~~ {426 C} at a rate of 500 F ~~&~~ per hour. Must not exceed 278 C per hour.

{ } -Suggested Temperature Guidelines

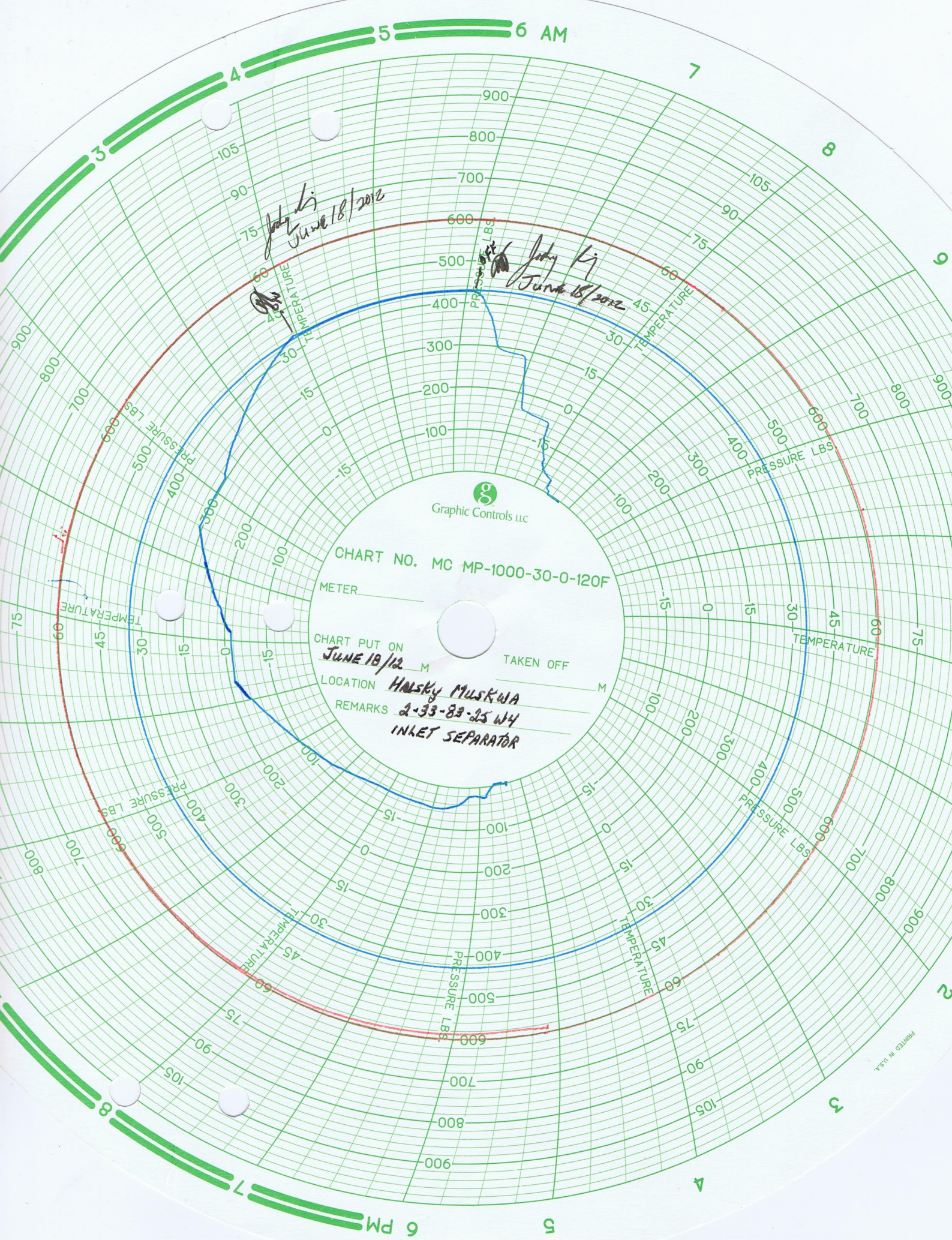
Additional Requirements

1. Job # and description to be marked on chart.
2. Furnace thermocoupling calibration to be provided
3. Sufficient thermocouplings located to control and maintain a uniform temperature
4. No welding to be performed after the final stress relieving

Operator Signature [Signature] Date: JUNE 12/2012
 Machine Number 114
 QCI/QCM Approval [Signature] Date: JUNE 17/12

Edition No: 5
 Revision 2

Date: August 1, 2008



Graphic Controls LLC

CHART NO. MC MP-1000-30-0-120F

METER

CHART PUT ON

JUNE 18/12

TAKEN OFF

LOCATION

Halsky Muskwa

REMARKS

2-33-83-25 W4

INLET SEPARATOR

EXACT OILFIELD DEVELOPING LTD.
HYDROTEST INFORMATION

Company HUSKY MUSKWA
Location - LSD 2-33-83-25 W4
Recorder METERCHECK
Range 0-1000[#] Serial # M-0014
Gauge METERCHECK
Range 0-1000[#] Serial # M-0678
Date on JUNE 18/12 Time _____
Date off JUNE 18/12 Time _____
Test Press 428 PSI 1 HR.
Signature [Signature]

SERIAL NO. M — 0679

3721

Make: CPW Size: 4.5" Pressure: 0-1,000^{PSI}

DW Piston 1/100

0 %	0
20 %	200
40 %	400
50 %	500
60 %	600
70 %	700
80 %	800
100 %	1,000

GAUGE:

0
200
400
500
600
700
800
1,000

Company: ExactDate Calibrated: June 12/2012Location: ThurskyJob #: ThurskyOperator: K. Taylor

Deadweight: Amtek DM-R-50 S/N 10232

BHD Calibrations Laboratory Deadweight Tester

Certified by N.I.S.T.

Pressure readings calibrated to gravity 9.8115310 meters per second squared and ambient temperature of 20 Degrees Celsius

The Business Factory (780) 849-6680

5335

SERIAL NO. M — 0014Customer: Exact Date: June 12/12
Job Number: Husky Location: Muskoka

- ☒ Calibrate Static
☒ Spare Pens Supplied
☒ Hose Supplied
☒ Charts Supplied
☒ Check Temperature
☒ Spare Battery Supplied
☒ Fittings Supplied

Technician: K. TaylorRemarks: Installed New Clock BatteryStatic 0-1000 PSI G Temperature: -30/120°F

TEST%	FOUND%	LEFT%
0		0
20		20
40		40
50		50
60		60
80		80
100		100
0		0

TEST	FOUND	LEFT
27		27
67		67
104		104

Traceable Calibration Sequence:

Gauge: Make Crystal S/N M0303 Date May 12

Deadweight: Amtek DM-R-50 S/N 10232

BHD Calibrations Lab. DH Instruments RPM-4 Pressure Calibrator SN 489

Certified by N.I.S.T.

Pressure readings calibrated to gravity 9.8115310 meters per second squared and ambient temperature of 20 Degrees Celsius

EXACT OILFIELD DEVELOPING LIMITED

Page 71

Quality System Manual

Standard Hydrostatic Test Procedure Record

Section VIII Div 1 Pressure Vessels

Category "H" Fittings

Owner HUSKY MUSKWA
 Address _____
 Location 2-33-83-25 W4
 CRN NO30612 Serial 4523
 Pressure Design 285 PSI ~~kpa~~ Test 428 PSI ~~kpa~~
 Temp Min Design _____ deg C Test _____ deg C
 Test Medium Water ✓ Other _____

Preparation

Initial

- Step 1 Pipe, Flanges, Fittings, Studs, Nuts, Gaskets are of proper size, material and classification. AK
 Step 2 Welds satisfactory and traceable to welders AK
 Step 3 All NDE and heat treatment complete. Records filed. AK
 Step 4 Test equipment and manifolds are rated to test pressure AK
 Step 5 Area to be cleared of employees not associated with the test. Signs to be posted restricting access. AK

Pressure Test

- Step 1 Minimum of two pressure devices to be installed for monitoring. Range of devices ≥ 1.5 and ≤ 4 times the final test pressure. AK
 Step 2 Gradually pressurize the system in 3 stages. At each stage the vessel should be inspected. If a leak is found the system should be depressurized before tightening or repairing. AK
 Step 3 After completion of the test the system should be depressured slowly until no pressure is recorded. AK
 Step 4 If the chart recorder is used, the start and finish of the test should be initial where the pen is recording "0".
 Test pressure 428 PSI ~~kpa~~ was held for 60 minutes
 Prior 2001 1.5x MAWP
 2001 and newer 1.3x MAWP

Inspector/Test conductor

Owners Representative

Date JUNE 18/12

Judy Li
June 18/2012

CLIENT: **HUSKY ENERGY**

PAGE **1** OF **1**

LOCATION: **MUSKWA 2-33-78-25W4M**

DATE: **JUNE 15/12**

RT PROCEDURE: **RT.ASME.1 R13**

JOB #: **53115626**

ACCEPTANCE STANDARD: **ASME VIII DIV 1 UW 51**

AFE:

ITEMS EXAMINED: **INLET SEPARATOR PIPING A#3150678 CRN NO 306.2**

DEFECT LEGEND			CODE LEGEND		TECHNIQUES
IF - INCOMPLETE FUSION IP - INCOMPLETE PENETRATION UC - UNDERCUTTING S - SLAG BT - BURN THROUGH	P - POROSITY HL - HIGH / LOW IC - INTERNAL CONCAVITY LC - LOW COVER	HB - HOLLOW BEAD C - CRACK AC - ARC BURNS EP-EXCESSIVE PENETRATION SH - SHRINKAGE 1 - SLIGHT, 2 - MEDIUM, 3 - SEVERE	1. ASME B31.3 NORMAL 2. ASME B31.3 SEVERE 3. ASME VIII DIV 1 UW 51 4. ASME VIII DIV UW 52	5. ASME B31.1 6. CSA Z 662 7. API 650 8. OTHER	1. SINGLE WALL EXPOSURE 3. SINGLE WALL VIEWING 2. DOUBLE WALL EXPOSURE 4. DOUBLE WALL VIEWING

	WELD #		THK	DIA.	WLDR SYM	IF	IP	UC	S	BT	P	IC	LC		TECH #	CODE #	ACC.EPT	LINE NUMBER	REJECT
XF	1	N11B	XXH	1.5	XX										1/3	3	<input checked="" type="checkbox"/>	1 100% VISUAL	
XF	2	N12B	XXH	1.5	XX										1/3	3	<input checked="" type="checkbox"/>	2	
																	<input type="checkbox"/>	3	
																	<input type="checkbox"/>	4	
																	<input type="checkbox"/>	5	
																	<input type="checkbox"/>	6	
																	<input type="checkbox"/>	7	
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																	<input type="checkbox"/>	22	
																	<input type="checkbox"/>	23	
																	<input type="checkbox"/>	24	

Exposures per Weld.	Film Make and Type	Screens	Films per Cassette	Type of Energy	Physical Size	Activity or K.V.	Maximum Source Side Object To Film Distance	Maximum Source to Object Distance	Material	Thickness			IQI		Exp. Time Ci/min
										Base	Weld	R.F.	Type	Size	
3	GE D4	.010 PB	1	IR 192	3.8MM	40 Ci			CS				DIN	10-16	

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 contract terms or reference. All certificates and / or reports are the result of work performed in conformance with applicable specifications and standards to the best of our ability and intent. However, the company will not be responsible for deviation within the normal limits of accuracy in accordance with standard practices. Final Code Acceptance shall require Client and Manufacturer

A.M.		P.M.		TOTAL HOURS		KILOMETERS		SUBSISTENCE		FILM	
TIME IN	TIME OUT	TIME	TIME	S.T.	0	hrs.	0	MAN DAY	OT / MEALS		
				O.T.		hrs.					

Film interpretation is done in accordance with the specified code, to the best of my professional ability.

Radiographer: **BLAINE GULLION** *Blaine Gullion* VT/CSB Level: **2** Reg. No.: **7233** Assistant: **MARTIN CLARK**

I am in full agreement with the contents of this report and accept receipt of the associated film. Client Representative

RADIOGRAPHY REPORT

REPORT# **PLRT- 2950 BG**

CLIENT: **HUSKY ENERGY**

PAGE **1** OF **2**

LOCATION: **MUSKWA 2-33-78-25W4M**

DATE: **JUNE 16/12**

RT PROCEDURE: **RT.ASME.1 R13**

JOB #: **53115626**

ACCEPTANCE STANDARD: **ASME VIII DIV 1 UW 51**

AFE:

ITEMS EXAMINED: **INLET SEPARATOR PIPING-VESSEL A#3150678 CRN NO306.2**

DEFECT LEGEND		HB - HOLLOW BEAD	CODE LEGEND	TECHNIQUES
IF - INCOMPLETE FUSION IP - INCOMPLETE PENETRATION UC - UNDERCUTTING S - SLAG BT - BURN THROUGH	P - POROSITY HL - HIGH / LOW IC - INTERNAL CONCAVITY LC - LOW COVER	C - CRACK AC - ARC BURNS EP-EXCESSIVE PENETRATION SH - SHRINKAGE 1 - SLIGHT, 2 - MEDIUM, 3 - SEVERE	1. ASME B31.3 NORMAL 2. ASME B31.3 SEVERE 3. ASME VIII DIV 1 UW 51 4. ASME VIII DIV UW 52	5. ASME B31.1 6. CSA Z 662 7. API 650 8. OTHER
				1. SINGLE WALL EXPOSURE 3. SINGLE WALL VIEWING 2. DOUBLE WALL EXPOSURE 4. DOUBLE WALL VIEWING

	WELD #	THK	DIA.	WLD R SYM	IF	IP	UC	S	BT	P	IC	LC	TECH #	CODE #	ACC.EPT	LINE NUMBER	REJECT
XF	3	N13B	XXH	1.5	K								1/3	3	<input checked="" type="checkbox"/>	1 100% VISUAL	
XF	4	N14B	XXH	1.5	K								1/3	3	<input checked="" type="checkbox"/>	2	
XF	5	N17B	XXH	1.5	XX								1/3	3	<input checked="" type="checkbox"/>	3	
XF	6	N16B	XXH	1.5	XX								1/3	3	<input checked="" type="checkbox"/>	4	
															<input type="checkbox"/>	5	
															<input type="checkbox"/>	6	
															<input type="checkbox"/>	7	
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															<input type="checkbox"/>	19	
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															<input type="checkbox"/>	21	
															<input type="checkbox"/>	22	
															<input type="checkbox"/>	23	
															<input type="checkbox"/>	24	
																\$3,451.50	COST
																\$172.83	GST
																\$3,629.33	Total

Exposures per Weld.	Film Make and Type	Screens	Films per Cassette	Type of Energy	Physical Size	Activity or K.V.	Maximum Source Side Object To Film Distance	Maximum Source To Object Distance	Material	Thickness			IQI		Exp. Time C/min
										Base	Weld	R.F.	Type	Size	
3	GE D4	.010 PB	1	IR 192	3.8MM	40 Ci			CS				DIN	10-16	

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 contract terms or reference. All certificates and / or reports are the result of work performed in conformance with applicable specifications and standards to the best of our ability and intent. However, the company will not be responsible for deviation within the normal limits of accuracy in accordance with standard practices. Final Code Acceptance shall require Client and Manufacturer

A.M.	P.M.	TOTAL HOURS	KILOMETERS	SUBSISTENCE	FILM
TIME IN	TIME OUT	TIME	TIME	MAN DAY	OT / MEALS
		ST.	hrs.		
		O.T.	13	hrs.	360
				2	

Film Interpretation is done in accordance with the specified code, to the best of my professional ability.

TIME Radiographer: **BLAINE GULLION** *Blaine L. Gullion* VT/CGSB Level: **2** Reg. No.: **7233** Assistant: **MARTIN CLARK**

I am in full agreement with the contents of this report and accept receipt of the associated film. Client Representative

MAGNETIC PARTICLE EXAMINATION REPORT

2507 - 84 Avenue,
Alberta T6P 1K1

Edmonton,

CLIENT: HUSKY ENERGY

DATE: JUNE16/12

PAGE: 2 OF 2

INVOICE ADDRESS:

WORK LOCATION: MUSKWA 2-33-78-25W4M

EXAMINATION STANDARD: ASME V Article 7

ACCEPTANCE STANDARD: ASME VIII Div 1 App 6

TEAM PROCEDURE: MT.ASME.1 R9

EXAMINATION OF: 6 -1.5"xth welds-Prepped ends,root and final passes

MATERIAL AND THICKNESS: CARBON STEEL

SURFACE CONDITION:

☒ AS GROUND

☐ MACHINED

☐ PAINTED

☐ SHOT BLAST

☒ BASE METAL

☒ AS WELDED

TEMPERATURE: 80 °C

MT - 0025 - BG

TEAM JOB NO.: 5626

BRANCH NO.: 5311

PO NO.: ---

WO NO.: ---

TEST EQUIPMENT AND MATERIALS:

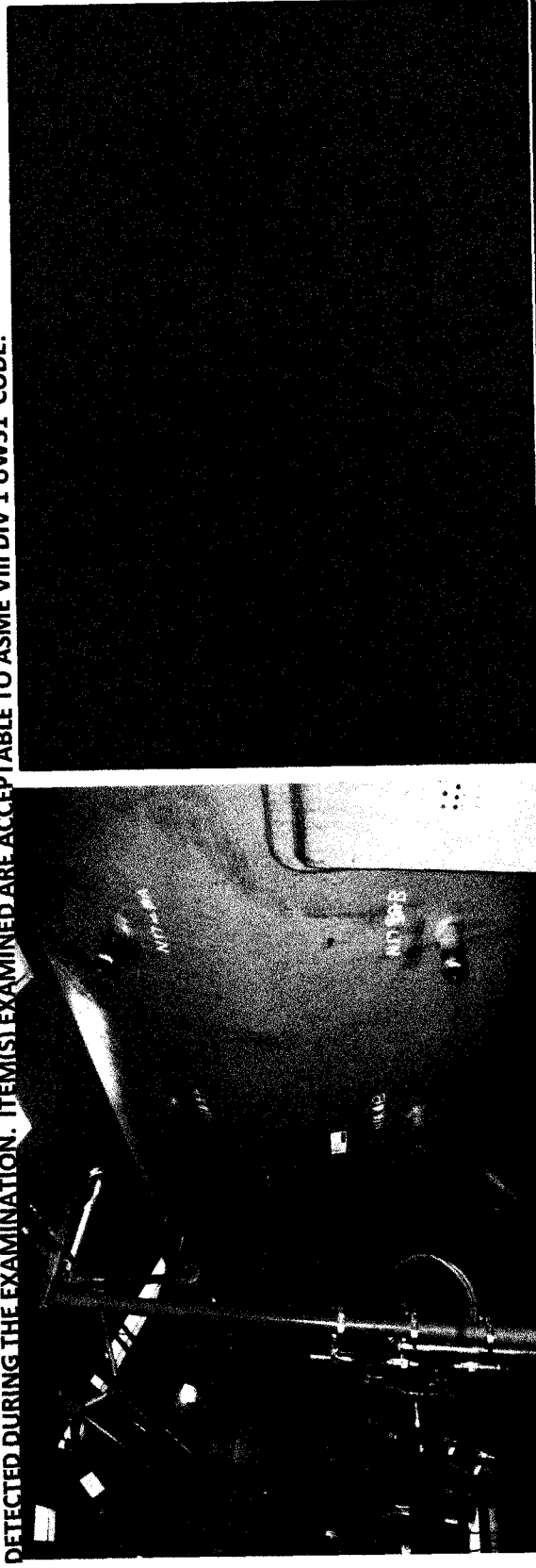
EQUIPMENT	MODEL AND SERIAL NO.	CURRENT	TEST MEDIUM	MANUFACTURER /BATCH NO./CONCENTRATION
<input checked="" type="checkbox"/> EM YOKE	Contour Probe B300	<input checked="" type="checkbox"/> AC	<input checked="" type="checkbox"/> WET VISIBLE	ARDOX/8031-32120909
<input type="checkbox"/> PERM. MAGNET	CAL DUE AUG 20/12	<input type="checkbox"/> DC	<input type="checkbox"/> DRY POWDER	CIRCLE 63 RED/16451
<input type="checkbox"/> BENCH		<input checked="" type="checkbox"/> CONTINUOUS	<input checked="" type="checkbox"/> CONTRAST PAINT	ARDOX 8901W/65111109
<input checked="" type="checkbox"/> WHITE LIGHT		<input type="checkbox"/> RESIDUAL	<input type="checkbox"/> WET FLUORESCENT	
<input type="checkbox"/> BLACKLIGHT				

BLACK LIGHT INTENSITY BEFORE EXAMINATION: $\mu W/CM^2$

BLACK LIGHT INTENSITY AFTER EXAMINATION: $\mu W/CM^2$

WHITE LIGHT/BACKGROUND: $\mu W/CM^2$

A VISIBLE WET CONTRAST MT EXAMINATION WAS CARRIED OUT ON THE ITEM(S) DETAILED IN THE PHOTOGRAPH. NO RELEVANT INDICATIONS WERE DETECTED DURING THE EXAMINATION. ITEM(S) EXAMINED ARE ACCEPTABLE TO ASME VIII DIV 1 UW51 CODE.



A026 MPE RO

TECHNICIANS

INTERPRETATION IS IN ACCORDANCE WITH THE ABOVE MENTIONED STANDARDS, TO THE BEST OF MY PROFESSIONAL ABILITY

(PRINT): BLAINE GULLION

REG. NO.: 7233

(SIGN):

CGSB/SNT LEVEL: 2

(PRINT): MARTIN CLARK

REG. NO.:

(SIGN):

CGSB/SNT LEVEL:

I HAVE READ AND AM IN FULL AGREEMENT WITH THE CONTENTS OF THIS REPORT.

CLIENT REPRESENTATIVE: (PRINT):

JODY SINGER

(SIGN):

Blaine Lick

MAGNETIC PARTICLE EXAMINATION REPORT

2507 - 84 Avenue,
Alberta T6P 1K1

Edmonton,

CLIENT: HUSKY ENERGY DATE: JUNE17/12 PAGE: 2 OF 2
INVOICE ADDRESS: WORK LOCATION: MUSKWA 2-33-78-25W4M
EXAMINATION STANDARD: ASME V Article 7 ACCEPTANCE STANDARD: ASME VIII Div 1 App 6

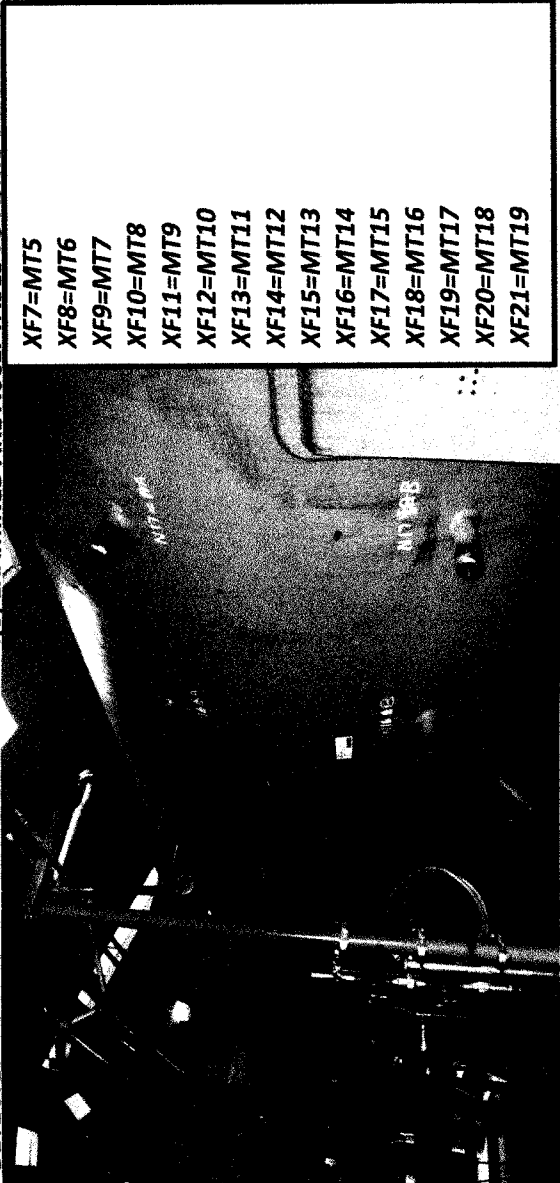
TEAM PROCEDURE: MT-ASME.1 R9 EXAMINATION OF: 15-1" & 1.5" xhx welds-Prepped ends,root/final pass
MATERIAL AND THICKNESS: CARBON STEEL
SURFACE CONDITION: ☒ AS GROUND ☐ MACHINED ☐ PAINTED ☐ SHOT BLAST ☒ BASE METAL ☒ AS WELDED
TEMPERATURE: 80 °C

TEST EQUIPMENT AND MATERIALS:

EQUIPMENT	MODEL AND SERIAL NO.	CURRENT	TEST MEDIUM	MANUFACTURER /BATCH NO./CONCENTRATION
<input checked="" type="checkbox"/> EM YOKE	Contour Probe B300	<input checked="" type="checkbox"/> AC	<input checked="" type="checkbox"/> WET VISIBLE	ARDOX/8031-32120909
<input type="checkbox"/> PERM. MAGNET	CAL DUE AUG 20/12	<input type="checkbox"/> DC	<input type="checkbox"/> DRY POWDER	CIRCLE 63 RED/16451
<input type="checkbox"/> BENCH		<input checked="" type="checkbox"/> CONTINUOUS	<input checked="" type="checkbox"/> CONTRAST PAINT	ARDOX 8901W/65111109
<input checked="" type="checkbox"/> WHITE LIGHT		<input type="checkbox"/> RESIDUAL	<input type="checkbox"/> WET FLUORESCENT	
<input type="checkbox"/> BLACKLIGHT				

BLACK LIGHT INTENSITY BEFORE EXAMINATION: $\mu\text{W}/\text{CM}^2$ BLACK LIGHT INTENSITY AFTER EXAMINATION: $\mu\text{W}/\text{CM}^2$ WHITE LIGHT/BACKGROUND: $\mu\text{W}/\text{CM}^2$

A VISIBLE WET CONTRAST MT EXAMINATION WAS CARRIED OUT ON THE ITEM(S) DETAILED IN THE PHOTOGRAPH. NO RELEVANT INDICATIONS WERE DETECTED DURING THE EXAMINATION. ITEM(S) EXAMINED ARE ACCEPTABLE TO ASME VIII DIV 1 UW51 CODE.



A#3150678 CRN NO306.2

TECHNICIANS
INTERPRETATION IS IN ACCORDANCE WITH THE ABOVE MENTIONED STANDARDS, TO THE BEST OF MY PROFESSIONAL ABILITY
(PRINT): BLAINE GULLION CGSB/SNT LEVEL: 2 REG. NO.: 7233 (SIGN):
(PRINT): MARTIN CLARK CGSB/SNT LEVEL: REG. NO.: (SIGN):
CLIENT REPRESENTATIVE: (PRINT): JODY SINGER (SIGN):

A026 MPE R0

MAGNETIC PARTICLE EXAMINATION REPORT

2507 - 84 Avenue,
Alberta T6P 1K1

Edmonton,

CLIENT: **HUSKY ENERGY** DATE: **JUNE18/12** PAGE: **2** OF **2**
INVOICE ADDRESS: **WORK LOCATION: MUSKWA 2-33-78-25W4M**
EXAMINATION STANDARD: **ASME V Article 7** ACCEPTANCE STANDARD: **ASME VIII Div 1 App 6**
TEAM PROCEDURE: **MT-ASME.1 R9**

MT - 0028 - BG

TEAM JOB NO.: **5626**
BRANCH NO.: **5311**
PO NO.: **---**
WO NO.: **---**

SURFACE CONDITION: ☒ AS GROUND ☐ MACHINED ☐ PAINTED ☐ SHOT BLAST ☒ BASE METAL ☒ AS WELDED
TEMPERATURE: **15** °C

TEST EQUIPMENT AND MATERIALS:

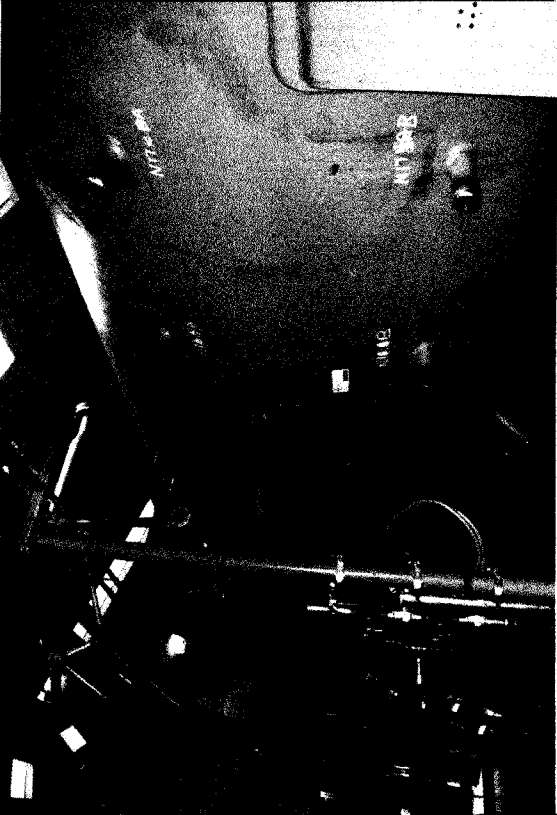
EQUIPMENT	MODEL AND SERIAL NO.	CURRENT	TEST MEDIUM	MANUFACTURER / BATCH NO./CONCENTRATION
<input checked="" type="checkbox"/> EM YOKE	Contour Probe B300	<input checked="" type="checkbox"/> AC	<input checked="" type="checkbox"/> WET VISIBLE	ARDOX/8031-32120909
<input type="checkbox"/> PERM. MAGNET	CAL DUE AUG 20/12	<input type="checkbox"/> DC	<input type="checkbox"/> DRY POWDER	CIRCLE 63 RED/16451
<input type="checkbox"/> BENCH		<input checked="" type="checkbox"/> CONTINUOUS	<input checked="" type="checkbox"/> CONTRAST PAINT	ARDOX 8901W/65111109
<input checked="" type="checkbox"/> WHITE LIGHT		<input type="checkbox"/> RESIDUAL	<input type="checkbox"/> WET FLUORESCENT	
<input type="checkbox"/> BLACKLIGHT				

BLACK LIGHT INTENSITY BEFORE EXAMINATION: **μW/CM²**

BLACK LIGHT INTENSITY AFTER EXAMINATION: **μW/CM²**

WHITE LIGHT/BACKGROUND: **μW/CM²**

A VISIBLE WET CONTRAST MT EXAMINATION WAS CARRIED OUT ON THE ITEM(S) DETAILED IN THE PHOTOGRAPH. NO RELEVANT INDICATIONS WERE DETECTED DURING THE EXAMINATION. ITEM(S) EXAMINED ARE ACCEPTABLE TO ASME VIII DIV 1 UW51 CODE.



12 hour pwht
black/white mpi
inspection done on 21
welds MT#1-21

A#3150678 CRN NO306.2

TECHNICIANS

INTERPRETATION IS IN ACCORDANCE WITH THE ABOVE MENTIONED STANDARDS, TO THE BEST OF MY PROFESSIONAL ABILITY

(PRINT): **BLAINE GULLION**

CGSB/SNT LEVEL: **2** REG. NO.: **7233** (SIGN):

(PRINT): **MARTIN CLARK**

CGSB/SNT LEVEL: REG. NO.: (SIGN):

A026 MPE R0

Blaine L. Gullion

I HAVE READ AND AM IN FULL AGREEMENT WITH THE CONTENTS OF THIS REPORT.

CLIENT REPRESENTATIVE: (PRINT): **JODY SINGER** (SIGN):

REPORT# **PLRT- 2953 BG**

NT: **HUSKY ENERGY**
 LOCATION: **MUSKWA 2-33-83-25W4M**
 RT PROCEDURE: **RT.ASME.1 R13**
 ACCEPTANCE STANDARD: **ASME VIII DIV 1 UW 51**
 ITEMS EXAMINED: **INLET SEPARATOR PIPING-VESSEL A#3150678 CRN NO306.2**

PAGE **1** OF **2**
 DATE: **JUNE 18/12**
 JOB #: **53115626**
 AFE: _____

DEFECT LEGEND	HB - HOLLOW BEAD	CODE LEGEND	TECHNIQUES
IF - INCOMPLETE FUSION IP - INCOMPLETE PENETRATION UC - UNDERCUTTING S - SLAG BT - BURN THROUGH	P - POROSITY HL - HIGH / LOW IC - INTERNAL CONCAVITY LC - LOW COVER	C - CRACK AC - ARC BURNS EP - EXCESSIVE PENETRATION SH - SHRINKAGE 1 - SLIGHT, 2 - MEDIUM, 3 - SEVERE	1. SINGLE WALL EXPOSURE 3. SINGLE WALL VIEWING 2. DOUBLE WALL EXPOSURE 4. DOUBLE WALL VIEWING
		1. ASME B31.3 NORMAL 2. ASME B31.3 SEVERE 3. ASME VIII DIV 1 UW 51 4. ASME VIII DIV UW 52	5. ASME B31.1 6. CSA Z 662 7. API 650 8. OTHER

WELD #	THK	DIA.	WLD	SYM	IF	IP	UC	S	BT	P	IC	LC	TECH #	CODE #	ACC.EPT	LINE NUMBER	REJECT
XF 7	N17A	XXH	1.5	XX									1/3	3	<input checked="" type="checkbox"/>	100% VISUAL	
XF 8	N16A	XXH	1.5	XX									1/3	3	<input checked="" type="checkbox"/>	12 hour PWHT inspection	
XF 9	N12A	XXH	1.5	XX									1/3	3	<input checked="" type="checkbox"/>		
XF 10	N12B	XXH	1.5	XX									1/3	3	<input checked="" type="checkbox"/>	4	
XF 11	N11B	XXH	1.5	XX									1/3	3	<input checked="" type="checkbox"/>	5	
XF 12	N11A	XXH	1.5	K									1/3	3	<input checked="" type="checkbox"/>	6	
XF 13	N10	XXH	1.5	XX									1/3	3	<input checked="" type="checkbox"/>	7	
XF 14	N14A	XXH	1.5	XX									1/3	3	<input checked="" type="checkbox"/>	8	
XF 15	N13A	XXH	1.5	K									1/3	3	<input checked="" type="checkbox"/>	9	
XF 16	N15A	XXH	1.5	XX						2			1/3	3	<input checked="" type="checkbox"/>	10	
XF 17	N15B	XXH	1.5	K									1/3	3	<input checked="" type="checkbox"/>	11	
XF 18	N18	XXH	1"	XX						2			1/3	3	<input checked="" type="checkbox"/>	12	
XF 19	N8	XXH	1"	XX									1/3	3	<input checked="" type="checkbox"/>	13	
XF 20	N9	XXH	1"	XX									1/3	3	<input checked="" type="checkbox"/>	14	
XF 21	N7	XXH	1"	XX									1/3	3	<input checked="" type="checkbox"/>	15	
															<input type="checkbox"/>	16	
															<input type="checkbox"/>	17	
															<input type="checkbox"/>	18	
															<input type="checkbox"/>	19	
															<input type="checkbox"/>	20	
															<input type="checkbox"/>	21	
															<input type="checkbox"/>	22	\$1,461.00 COST
															<input type="checkbox"/>	23	\$172.83 GST
															<input type="checkbox"/>	24	\$3,629.33 Total

Exposures per Weld	Film Make and Type	Screens	Films per Cassette	Type of Energy	Physical Size	Activity or K.V.	Maximum Source Side Object To Film Distance	Maximum Source To Object Distance	Material	Thickness	Base	Weld	R.F.	IQI	Type	Size	Exp. Time C/min (mAs)
3	GE D4	.010 PB	1	IR 192	3.8MM	40 CI			CS						DIN	10-16	

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 contract terms or reference. All certificates and / or reports are the result of work performed in conformance with applicable specifications and standards to the best of our ability and intent. However, the company will not be responsible for deviation within the normal limits of accuracy in accordance with standard practices. Final Code Acceptance shall require Client and Manufacturer

A.M.	P.M.	TOTAL HOURS	KILOMETERS	SUBSISTENCE	FILM
TIME IN	TIME OUT	TIME	TIME	ST. 7 hrs.	200
				O.T. hrs.	
				MAN DAY	OT / MEALS

Final interpretation is done in accordance with the specified code, to the best of my professional ability.

Radiographer: **BLAINE GULLION** *Blaine Gullion* VT/CGSB Level: **2** Reg. No.: **7233** Assistant: **MARTIN CLARK**

I am in full agreement with the contents of this report and accept receipt of the associated film. Client Representative **JODY SINGER**



Natural Resources
Canada

Ressources naturelles
Canada



Name: **Blaine S. Gullion**
Nom:
Reg. No.: **7233**
No. matricule:
Issue Date: **2011/06/19**
Date d'émission:

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 || far vision.
Verres correctifs pour la vision de || près || éloignée.

Signature: **Corrective**



Natural Resources
Canada

Ressources naturelles
Canada

Certified to Certifié selon CAN CGSB 48.973

7233

Method Méthode	Level Niveau	Sector Secteur	Cert. Date Date cert.	Date recert. Date recert.	Expires Expiration
MT	2	EMC	2004/06/01		2012/12/31
PT	2	EMC	2011/08/12		2012/12/31
RT	2	EMC	1998/08/20		2012/12/31

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

Manager, Certifying Agency
Gestionnaire, Organisme de certification



Atomic Energy
Control Board

Commission de contrôle
de l'énergie atomique

This certifies that **Gullion, Blaine S.**
La présente atteste que
has qualified pursuant to Section 18 of the Atomic Energy Control Regulations as a:
s'est qualifié en vertu de l'article 18 du Règlement sur le contrôle de l'énergie
atomique comme étant un:

**Qualified Opérateur
Operator qualifié**

QUALIFICATION DATE
DATE DE QUALIFICATION **1995/06/30**

REG. NO.
NO. MATRICULE **7233**

ISSUE DATE
DATE D'ÉMISSION **1998/02/03**

ISSUING OFFICER
AGENT RESPONSABLE

NRCAN EYE EXAMINATION REPORT - NDT PERSONNEL

Three vision assessments may be required: Near Vision, Distance Vision (visual testing method only) and Colour Vision (initial certification only). This form must be completed and returned to the NDT Certifying Agency when applying for examination in any NDT method, renewal of certification or recertification.

CANDIDATE'S NAME: Blaine Gullion REGISTRATION NUMBER: 7233

Near Vision and Distance Vision – to be completed by medically recognized personnel (ophthalmologist, optometrist, physician, nurse, etc.)

Near vision acuity: shall permit reading Times Roman N4.5 (Jaeger number 2) or equivalent letters at not less than 30 cm with one or both eyes, either corrected or uncorrected.

I CONFIRM THAT THE CANDIDATE:
(Please check ☒ one)

- ☒ Meets the requirement without correction
☐ Meets the requirement with correction
☐ Does not meet the requirement

Distance vision acuity: (required only for the visual testing method) shall equal Snellen Fraction 20/30 or better in at least one eye, either corrected or uncorrected.

I CONFIRM THAT THE CANDIDATE:
(Please check ☒ one)

- ☒ Meets the requirement without correction
☐ Meets the requirement with correction
☐ Does not meet the requirement

McArthur Murray
Examiner's Name (Please Print/Type)

[Signature]
Examiner's Signature

C.O.
Appointment/Title

2011-12-13
Date of Eye Examination yyyy/mm/dd

Colour Vision (required only for initial certification, not for renewal or recertification)

- to be completed by medically recognized personnel or the employer or certified level 3 NDT personnel.

NOTE: A candidate who passes an Ishihara test (short or long) is acceptable. As an alternative or in case of a failure of an Ishihara test, the employer or Level 3 NDT personnel may administer a performance test to confirm if the candidate can see flaw indications that are typical of the method. Example: In liquid penetrant, confirm that the candidate can see red indications on a white background and fluorescent-green indications on a variety of backgrounds.

I CONFIRM THAT THE CANDIDATE CAN DISTINGUISH CONTRAST BETWEEN THE COLOURS USED IN THE NDT METHOD(S) CONCERNED AS SPECIFIED BY THE EMPLOYER (OR PASSED AN ISHIHARA TEST).

Examiner's Name (Please Print/Type)

Examiner's Signature

Appointment/Title

Date of Eye Examination yyyy/mm/dd

NOTE: PROVINCIAL HEALTH CARE PROGRAMS MAY NOT COVER THE COST FOR AN EYE EXAMINATION

Welder's Log and Continuity Log

Exact Oilfield Developing Ltd.

"B" Pressure welder's Log Control

[illegible]

Alberta
Government

OPERATOR'S LICENCE

No: 152184-453
Class: 5
Cond/End:
Expires: 22 APR 2015

MONTGOMERY-HEWETT, Chris N
PO Box 12
Widewater AB T0G 2M0

Sex: F DOB: 22 APR 1981
Eyes: green Hair: blond
Ht: 168 cm Wt: 57 kg

Issued: 06 MAY 2010

0546-71300

Alberta
Municipal Affairs
and Housing
22009

ABSA

the pressure equipment safety authority

Grade "B" Pressure Welder's
Certificate of Competency

This is to certify that Chris Montgomery
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
June 05, 2008



W-26675
File no.

Chief Inspector and Administrator

Performance Qualification GRB Card No. 15388

Process(es) SMAW Materials (P.No.) P1
Filler Metal (F.No) E3 E4 Min. Outside Pipe Diameter 1"00
Max Deposited Weld Metal 9.104" 9.0" MAX Position(s) Qualified ALL
Backing without with with Backing Gas N/A
Progression uphill uphill #E00 022
P.Q. Expiry Date JUNE-4-12 Welding Examiner Signature G.R. Bellehumeur

GRB Enterprises Ltd
Edmonton Alberta

AOQP 7107(C)

WELDER PERFORMANCE QUALIFICATION CARD

Name CHRIS
Name MONTGOMERY-HEWETT W- 26675
ABSA 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 on the reverse side.

Date of Test JUNE-4-10 Welder Signature Chris Hewett
Welding Examiner (Print/Type) G.R. Bellehumeur GRB Card No. 15388

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	F Number	Process	WPS Qualified To	Positions Qualified To	Thickness Range Qualified To	Minimum Pipe Diameter Qualified To	Expiry Date Of Ticket
Uphill "K"	# 18427	W-10793	P-1	F-6 F-4	GTAW/SAW	EOD-8	All	250" - 438"	1" OD	Nov. 15/2014
	# 16813	W-10793	P-1	F-3 F-4	SMAW	EOD-1-3	All	188" - 684"	1" NPS	Aug. 23/2013
	# 16814	W-10793	P-1	F-3	SMAW	EOD-CSA-2	All	0.436"	1" NPS	Aug. 23/2013
"3"	# 17087	W-10234	P1	F-3 F-4	SMAW	EOD-CSA-2	All	250" - 186"	1" OD	Nov. 3/2013
	# 17086	W-10234	P-1	F-3 F-4	SMAW	EOD-1-3	All	104" - Max	1" OD	Nov. 3/2013
Uphill "J"	# 17043	W-19732	P-1	F-3 F-4	SMAW	EOD-1-3	All	104 - Max	1" OD	Oct. 24/2013
	# 17044	W-19732	P-1	F-3 F-4	SMAW	EOD-CSA-2	All	250" - 186"	1" OD	Oct. 24/2013
Uphill "R"	# 17181	W-21515	P-1	F-6 F-4	GTAW/SAW	EOD-8	All	250 - 438	1" OD	Dec. 7/2013
	# 15800	W-21515	P-1 - P-8	F-6 F-5	GTAW/SAW	EOD-3	All	250" - 438"	1" OD	Nov. 4/2012
	# 16034	W-21515	P-1	F-3 F-4	SMAW	EOD-1-3	All	188" - 500"	1" OD	Feb. 17/2013
	# 16380	W-21515	P-1	F-3 F-4	SMAW	EOD-1-3	All	104" - Max	1" OD	Apr. 28/2013
Uphill "2"	# 17168	W-21857	P-1 - P-8	F-6 F-5	GTAW/SAW	EOD-3-1	All	250" - 438"	1" OD	Nov. 30/2013
	# 18456	W-21857	P-1	F-6 F-4	GTAW/SAW	EOD-8	All	250" - 438"	1" OD	Nov. 26/2014
	# 18198	W-21857	P-1	F-3 F-4	SMAW	EOD-1-3	All	104" - Max	1" OD	Sept. 20/2014
	# 118199	W-21857	P-1	F-3	SMAW	EOD-CSA-2	FV/O	560"	2.875"	Sept. 20/2014
Uphill "G"	# 17288	W-17894	P-1 - P-8	F-6 F-5	GTAW/SAW	EOD-9	All	250" - 438"	1" OD	Jan. 2/2014
	# 17104	W-17894	P-1	F-6 F-4	GTAW/SAW	EOD-8	All	250" - 438"	1" OD	Nov. 7/2013
	# 17103	W-17894	P-1	F-3 F-4	SMAW	EOD-1-3	All	104" - Max	1" OD	Nov. 7/2013

GRB Enterprises Ltd
Edmonton Alberta
WELDER PERFORMANCE QUALIFICATION CARD

AOQP 7107(C)

Name KIM LUMMERDING W-10793
ASBA 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 on the reverse side.
Date of Test AUG 23, 2011
Welder Signature [Signature]
Welding Examiner (Print Name) BRUCE CORMIER 16813
GRB Card No.

Performance Qualification GRB Card No. 16813

Process(es) SMAW Materials (P.No.) P1
Filler Metal (F.No) F3 F4 Min. Outside Pipe Diameter 1"00
Max Deposited Weld Metal 0.188" 0.684" Position(s) Qualified ALL
Backing WITHOUT WITH WITH Backing Gas NONE
Progression UPHILL #E00 252
AUG 23, Welding Examiner Signature [Signature]
P.Q. Expiry Date 2013 Examiner File No.

GRB Enterprises Ltd
Edmonton Alberta
WELDER PERFORMANCE QUALIFICATION CARD

AOQP 7107(C)

Name KIM LUMMERDING W-10793
ASBA 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 on the reverse side.
Date of Test AUG 23, 2011
Welder Signature [Signature]
Welding Examiner (Print Name) BRUCE CORMIER 16814
GRB Card No.

Performance Qualification GRB Card No. 16814

Process(es) SMAW Materials (P.No.) P1
Filler Metal (F.No) F3 Min. Outside Pipe Diameter 1"00
Max Deposited Weld Metal 0.436" Position(s) Qualified ALL
Backing WITHOUT WITH Backing Gas NONE
Progression DOWNHILL #E00 252
AUG 23, Welding Examiner Signature [Signature]
P.Q. Expiry Date 2013 Examiner File No.

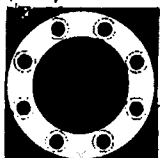
GRB Enterprises Ltd
Edmonton Alberta
WELDER PERFORMANCE QUALIFICATION CARD

AOQP 7107(C)

Name KIM LUMMERDING W-10793
ASBA 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 on the reverse side.
Date of Test NOV 15, 2012
Welder Signature [Signature]
Welding Examiner (Print Name) BRUCE CORMIER 18427
GRB Card No.

Performance Qualification GRB Card No. 18427

Process(es) GMAW SMAW Materials (P.No.) P1
Filler Metal (F.No) F6 F4 Min. Outside Pipe Diameter 1"00
Max Deposited Weld Metal 0.250" 0.436" Position(s) Qualified ALL
Backing WITHOUT WITH Backing Gas NONE
Progression UPHILL #E00 252
NOV 15, 2014 Welding Examiner Signature [Signature]
P.Q. Expiry Date Examiner File No.

**OFFICINE NICOLA GALPERTI & FIGLIO S.p.A.**

Sede Legale e Amministrativa: 23824 DERVIO (LC) - Via Enrico Fermi, 48
C.C.I.A.A. Lecce n. 00306890138 - R.E.A. n. 79816 C.F. e P.I.V.A. 000205890138
Stabilimento - Ufficio Amministrativo / Workshop - Warehouse - Offices Mailing address:
22010 GERA LARIO (CO) - Località S. Agata - Tel. (0344) 97200
Telefax (0344) 97210 - E-MAIL ADDRESS: galperti@galperti.com

CERTIFICATO DI COLLAUDO
TEST/CERTIFICATE

EN 10204
EN 10204

NS ORDINE/INTERNAL JOB

SPETT. LEMESSRS:

GALPERTI CANADA(1999) INC.

3931 - 76 AVENUE
EDMONTON, ALBERTA, T6B 2S8 (CDN)

051176

CERTIFICATO DI COLLAUDO
TEST/CERTIFICATE N.

3.1

DATA/DATE

VS. ORDINE/OUR P.O.

DATA/DATE

004944/1

15/05/2006

STOCK E345

28/10/2005

POS/ITEM	DESCRIZIONE/DESCRIPTION	QUANTITA' QUANTITY	S/A	MATERIALE/MATERIAL	N° COLATA/PROVA HEAT N°/TEST N°	ACCIAIERIA STEEL MILL	
002/002	0,75" 300 SW RF 160 NACE MR-01-75	50 S		Z245.12-M01 GR.359	70429/33	RIVA ACC. SPA	A
005/005	1,50" 1500 WN RJ 160 NACE MR-01-75	100 S		Z245.12-M01 GR.359	9184/20	OLIFER/ACP SPA	B
008/008	1,50" 150 WN RF XXS NACE MR-01-75	50 S		Z245.12-M01 GR.359	6336/44	OLIFER/ACP SPA	C
013/013	14" 300 WN RF XS NACE MR-01-75	5 S		Z245.12-M01 GR.359	152585.V/37	VENETE SPA	D
032/032	36" 150 WN RF STD NACE MR-01-75	10 S		Z245.12-M01 GR.359	79531.S/23	SAFAU SPA	E

ANALISI CHIMICA/CHEMICAL ANALYSIS

	C %	MN %	SI %	P %	S %	CR %	NI %	MO %	CU %	V %	SN %	AL %	NB %	TI %	N %	03%	FC%	FL%
A	0,170	1,180	0,200	0,011	0,012	0,080	0,050	0,010	0,180	0,012	0,007	0,020	0,001	0,012		0,090	0,366	0,402
A C	0,165	1,175	0,190	0,010	0,010	0,075	0,045	0,015	0,185	0,010	0,007	0,040	0,001	0,012		0,090	0,360	0,396
B	0,150	1,150	0,190	0,001	0,004	0,110	0,160	0,040	0,170	0,0005	0,013	0,027			0,009	0,150	0,341	0,393
B C	0,144	1,142	0,212	0,001	0,004	0,095	0,163	0,043	0,156	0,0005	0,013	0,038	0,001		0,009	0,138	0,334	0,383
C	0,150	1,200	0,200	0,010	0,008	0,130	0,160	0,040	0,200	0,0166	0,013	0,027			0,007	0,170	0,350	0,411
C C	0,150	1,195	0,200	0,005	0,003	0,120	0,175	0,045	0,190	0,0150	0,013	0,028	0,001	0,001	0,007	0,165	0,349	0,409
D	0,151	1,181	0,227	0,012	0,001	0,103	0,155	0,030	0,300	0,0250	0,017	0,032	0,003	0,016		0,133	0,347	0,409
D C	0,150	1,180	0,220	0,010	0,001	0,100	0,150	0,030	0,290	0,0240	0,017	0,035	0,003	0,016		0,130	0,346	0,406
E	0,168	1,180	0,270	0,007	0,005	0,110	0,110	0,030	0,210	0,0300	0,009	0,029	0,001	0,002	0,009	0,140	0,364	0,419
E C	0,165	1,185	0,270	0,005	0,001	0,105	0,100	0,040	0,200	0,0250	0,009	0,048	0,001	0,002	0,009	0,145	0,362	0,416

NOTE/NOTES

03=Chromium + Molybdenum
FC=Carbon Equivalent Short Formula
FL=Carbon Equivalent Long Formula

C = ANALISI DI PRODOTTO/CHECK ANALYSIS

CARATTERISTICHE MECCANICHE/MECHANICAL PROPERTIES

TIPO/TYPE	Ø PROVETTA DIAMETER	SEZIONE AREA	LUNGHEZZA LENGTH	TRAZIONE/TENSILE		ROTTURA TENSILE	SNERVAMENTO YIELD	ALL. BLOCCO %	CONTR. REDUCT. %	RESILLENZA/CHARPY TESTES		DUREZZA HB (AVERAGE)
				TEMP. TEMPERATURE	Mpa					TEMP. TEMPERATURE	VALORI/VALUES	
A S	12,50	122,70	50,00	20	455	359	20,0			-50	Min. 27 Med. 27	197
A O	12,50	122,70	50,00	20	578	370	30,3	71,3		-50	92 - 96 - 101	165
B S	12,50	122,70	50,00	20	455	359	20,0			-50	Min. 27 Med. 27	197
B O	12,50	122,70	50,00	20	558	389	29,3	68,7		-50	96 - 101 - 102	170
C S	12,50	122,70	50,00	20	455	359	20,0			-50	Min. 27 Med. 27	197
C O	12,50	122,70	50,00	20	550	390	31,7	70,8		-50	114 - 115 - 117	172
D S	12,50	122,70	50,00	20	455	359	20,0			-50	Min. 27 Med. 27	197
D O	12,50	122,70	50,00	20	579	397	28,0	72,0		-50	97 - 98 - 99	174
E S	12,50	122,70	50,00	20	455	359	20,0			-50	Min. 27 Med. 27	197
E O	12,50	122,70	50,00	20	554	382	27,0	66,0		-50	97 - 102 - 104	178

NOTE/NOTES

Lateral Exp/Shear Area (Average)

A = mm.1.35/ 90% B = mm.1.55/ 75% C = mm.1.25/ 80% D = mm.1.25/ 75% E = mm.1.55/ 80%

O = OTTENUTE/OBTAINED
S = STANDARD

TRATTAMENTI TERMICI/HEAT TREATMENTS

A	Normalized at 900 dgr.C for 1 h.-Cooling from 900 dgr.C in still air
B	Normalized at 900 dgr.C for 1.1/2 h.-Cooling from 900 dgr.C in still air
C	Normalized at 900 dgr.C for 1 h.-Cooling from 900 dgr.C in still air
D	Normalized at 900 dgr.C for 2.1/2 h.-Cooling from 900 dgr.C in still air
E	Normalized at 900 dgr.C for 4 h.-Cooling from 900 dgr.C in still air

NOTE GENERALI/GENERAL NOTES

FINITURA/ROUGHNESS

FSF4=Ra 3,2 - Ra 6,3

F = FINISH 63 MICROINCH MAX

STANDARD/STANDARD

B1 = ANSI B16.5

MS = ANSI B16.47 Series A

NOTE/NOTES

Material according to Sour Service.

MARCHIO DI FABBRICA
TRADE MARK



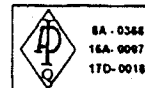
DATA COLLAUDO INT.
INT. INSPECT DATE

15/05/2006

COLLAUDATORE INT.
INT. INSPECTOR

A. RUSCONI

ENTE UFFICIALE DI COLLAUDO
INSPECTION AUTHORITY



SAN ENG STEEL FORGING CO. LTD
311, Jen Hsin Road, Jen Wu District
Keelung, Taiwan, R.O.C.
TEL: 07-3724249; FAX: 07-3712923
URL: www.saneng.com.tw
e-mail: saneng@kds.seed.net.tw



MILL TEST CERTIFICATE

EN10204-3.1.B(DIN60049/3.1.B)

Customer:

Order No.:

Certificate No.: SE-46808

Date: 01/16/2012

Page: 1 OF 1

PRODUCT			MATERIAL SPECIFICATIONS			DIMENSIONAL SPECIFICATIONS											
FORGED CARBON STEEL FLANGES			ASTM A105-10/ASME SA105-10a			ASME B16.5-09 CSA Z245.12											
Item No.	CODE NO	DESCRIPTION	QUANTITY	CHEMICAL COMPOSITION (%)												CE(%)	
				C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Nb	N		
			Min Max														
1	7534124	150 WNR STD 18" A105N	10 PCE	0.200	0.220	1.050	0.035	0.040	0.400	0.300	0.400	0.120	0.030	0.020	0.001	0.007	0.419
2	7534485	150 WNR XXS 1" A105N	10 PCE	0.200	0.210	1.170	0.020	0.004	0.120	0.150	0.030	0.020	0.003	0.001	0.006	0.401	
3	7555271	150 SCRF 12" A105N	20 PCE	0.220	0.220	1.140	0.015	0.004	0.005	0.020	0.010	0.004	0.005	0.001	0.006	0.418	
4	7555783	150 BLRF 10" A105N	50 PCE	0.210	0.210	1.130	0.021	0.003	0.005	0.010	0.010	0.001	0.004	0.002	0.006	0.402	
5	7535791	150 BLRF 12" A105N	6 PCE	0.210	0.230	1.160	0.013	0.002	0.011	0.020	0.010	0.004	0.004	0.001	0.007	0.410	
6	7530625	800 WNR XXS 2" A105N	48 PCE	0.212	0.250	1.030	0.016	0.009	0.007	0.021	0.054	0.002	0.010	0.005	0.003	0.392	
7	7530625	800 WNR XXS 2" A105N	2 PCE	0.212	0.250	1.050	0.011	0.013	0.018	0.045	0.046	0.005	0.037	0.005	0.005	0.401	
8	7538605	800 THRTJ 2" A105N	5 PCE	0.212	0.250	1.050	0.011	0.013	0.018	0.045	0.046	0.005	0.037	0.005	0.005	0.401	
9	7531815	900/1500 WNR TJ XXS 2" A105N	50 PCE	0.220	0.210	1.100	0.014	0.004	0.120	0.080	0.050	0.012	0.010	0.008	0.006	0.429	
Item No.	Heat No.	T.S.(¹) (MPa)	Y.S.(¹) (MPa)	E.L.(¹) (%)	Hardness (HRC)	R.A.(¹) (%)	Impact Test		Material Supplier	REMARKS							
							Temp: Minimum	Joule									
1	Y101676	537.4	379.5	36.2	155/152	71.3		2	KOTOBUKI	880 °C/3HRS							
2	4390809	513.9	352.1	36.0	151/150	69.5		3	ACOMINAS	CONFORMS WITH NACE MR0103-10 AND NACE							
3	4498563	533.5	381.5	34.8	154/152	71.3			ACOMINAS	MR0175/ISO15156.2-09							
4	4443545	517.8	366.8	36.0	152/150	71.3			ACOMINAS	CONFORMS WITH Z245.12 CAT 1 GR 248 SOUR							
5	4390846	533.5	381.5	34.8	154/152	68.8			ACOMINAS	SERVICE-09							
6	931275	508.9	323.6	34.2	155/152	66.0			NTMK	TEST SPECIMEN ORIENTATION: TRANSVERSE							
7	21379	513.9	354.0	34.2	152/150	68.6			NTMK								
8	21379	513.9	354.0	34.2	152/150	68.6			NTMK								
9	53813	543.3	395.2	34.8	157/155	69.5			WEI CHIH STEEL								
*1: T.S. = Tensile Strength, Y.S.=Yield Strength, E.L.=Elongation, R.A.=Reduction of Area.																	
*2: N=Normalized, A=Annealed, Q=Quenched, T=Tempered, S.T.=Solution Treated, S.R.=Stress Relieved, A.C.=Air Cooled, F.C.=Furnace Cooled, W.C.=Water Cooled, O.C.=Oil Cooled.																	
*3: C.E. Value = C + (Mn/8) + (Cr + Mo + V)/5 + (Ni + Cu)/15																	
We hereby certify that the material has been tested in accordance with the above specification and also with the requirements called for by the above order.																	
Manager of Quality Assurance Dept																	



Manager of Quality Assurance Dept.



METALFAR
PRODOTTI INDUSTRIALI S.P.A.

SEDE AMMINISTRATIVA E STABILIMENTO:
23851 CESANA BRIANZA (LC) - Italy
Via G. Parini, 28
Tel. +39 031.655441
Fax +39 031.655149
quality.mife@farmas.com

CERTIFICATO DI COLLAUDO SECONDO EN 10204 - 3.1 INSPECTION CERTIFICATE

	Certif. N. 5289	Del/Dated 02.11.2011
	Factura / Invoice N. 3558	Del/Dated 28.10.2011
	DDT / Del Note N. 4082	Del/Dated 28.10.2011
	Ns-Ord. / Our ref. N.	Del/Dated

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**COMPANY WITH QUALITY MANAGEMENT
SYSTEM CERTIFIED BY DNV
= ISO 9001:2008 =**

COD. COL.	COLATA	POS.	VS. ORDINE	Q.T.A'	DESCRIZIONE	DIM. IN ACC. A DIM. ACCORDANCE TO ASMEFANSI B16.5-2009										VISO E DIMENS. VIS. & DIMENS. SATISFACTORY	
HEAT CODE	HEAT	ITEM	YOUR REFERENCE	Q.T.Y	DESCRIPTION												
75888		024	37547TRANS AM	15,00	WIN 150 RF 1/2" XXS A105												
MATERIALE / MATERIAL																	
ASTM A105																	
			C%	SR%	Mn%	S%	P%	C%	Ni%	Mo%	Ti%	Cu%	V%	Nb%	N%	Al%	C.E.%
			0,200	0,210	1,000	0,013	0,015	0,080	0,050	0,010	0,005	0,160	0,001	0,002	0,000	0,029	0,399
			SNERVAMENTO			ALLUNGAMENTO	CONTRAZIONE	DUREZZA			RESILUENZA / IMPACT TEST			SNERVAMENTO			
			YIELD POINT	TENSILE STRENGTH	ELONGATION	REDUCTION OF AREA	MINIMUM	MINIMUM	MINIMUM	MINIMUM	TEMP / TYPE	1	2	YIELD POINT	MINIUM	YIELD POINT	MINIUM
			338,0	547,0	33,0	58,0	164,0 - 166,0	164,0 - 166,0	164,0 - 166,0	164,0 - 166,0	KV	20	89	90	83	0,0	0,0
			126,60	50,80	1												
			FORMA			PROVETTA / TEST SPECIMEN	SHAPE			No RIL			OUR REF.				
						126,60 x 50,80											

NOTE MANUFACTURING IN ACCORDANCE WITH ORDER AND SPECIFICATION
NOTES MATERIAL IN ACCORDANCE WITH NACE MR-0175/2003 ISO 15156-2009
MATERIAL IN ACCORDANCE WITH NACE MR-0103/2010

UFFICIO CONTROLLO QUALITA'
QUALITY CONTROL DEPARTMENT

ENTE UFFICIALE DI COLLAUDO
INSPECTION AUTHORITY

**MARCHIO PRODUZIONE
MANUFACTURER'S SYMBOL**





INSPECTION CERTIFICATE

(EN10204:2004 3.1 / ISO 10474:1991 3.1B)

 1499-1, SONG JUNG-DONG,
 GANGSEO-GU, BUSAN, KOREA
 Tel : 82-51-831-6550
 Fax : 82-51-831-6886

Customer	SEYBOLD	Certificate No.	20070302945	Date	2007/03/14
P.O No.	6097	Project Name			
Job No.		POR/Req'n No			
Specification for Material	ASTM A420 WPL6 / ASME SA420 WPL6 - 01	Starting Material	FORGED STEEL		
Specification for Inspection	ASME B16.9-2001	Dimension and Visual Inspection	GOOD		
Heat Code No [HCN]	Descriptions		Q'ty (Pcs)	Heat Treatment	
A707	45° ELBOW LONG	XX-S B.W 1-1/2"	10	N: 910°C	

CHEMICAL COMPOSITION (%)

Heat Code No [HCN]	Spec.	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Cb	Raw Heat No/Maker
	Max.	0.30	0.40	1.35	0.035	0.040	0.40	0.30	0.12	0.40	0.080	0.020	
	Min.	-	0.15	0.60	-	-	-	-	-	-	-	-	
A707	L	0.19	0.29	1.04	0.022	0.004	0.06	0.15	0.07	0.10	0.001	0.001	B82886 / SAMMI

MECHANICAL PROPERTIES

Heat Code No [HCN]	Spec	Y.S	T.S	E.L (%)		* Impact Test(J)					
		Ksi				Temp.(°C)		Size(2mm-v)			
		Max.	85			-					
		Min.	35			60	30	-46			
						Act.	Ave.				
A707	P	50.5	76.3	32.0		117.6	92.1	121.5	110.4		

We hereby certify that the material herein has been made and tested in accordance with the above specification and also with the requirements called for by the above order.

Remark :

* Impact Specimen Size & Spec. Value.
 Size Min. Ave.
 A707 10X10X55mm 13.6 17.6

Legend:

HB: Brinell
 ST: Solution Treatment
 SR: Stress Relieving
 N: Normalized
 T: Tempered
 A: Annealed
 Q: Quenched
 (G): Hot-Dip Galvanized Coating

AC: Air Cool
 OC: Oil Cool
 WQ: Water Quenched
 WC: Water Cool
 L: Ladle
 P: Product

☐ Reviewed by :

☐ Witnessed by :

Approved by :



Director of Quality Assurance Dep't



OFFICINE NICOLA GALPERTI & FIGLIO S.p.A.

Sede Legale e Amministrativa: 23824 DERVIO (LC) - Via Enrico Fermi, 48
C.C.I.A.A. Lecce n. 00205990138 - R.E.A. n. 79815 C.F. e P.IVA IT00205990138
Stabilimento - Uffici Amministrativi / Workshop - Warehouse - Offices Mailing address:
22010 GERA LARIO (CO) - Località S. Agata - Tel. (0344) 97200
Telefax (0344) 97210 - E-MAIL ADDRESS: galperu@galperti.com
CERTIFICATO DI COLLAUDO EN 10204 NS ORIONE/INTERNAL.08
TEST/CERTIFICATE EN 10204

SPETT. LE/MESSRS.

GALPERTI CANADA(1999) INC.

3931 - 76 AVENUE
EDMONTON, ALBERTA, T6B 2S8 (CDN)

069611/1 3.1 060400
DATA/DATE 26/07/2007 VS. ORDINE/YOUR P.O. STOCK E412 DATA/DATE 26/04/2006

POS/ITEM	DESCRIZIONE/DESCRIPTION	QUANTITA' QUANTITY	S/A	MATERIALE/MATERIAL	N° COLATA/PROVA HEAT N°/TEST N°	ACCIAIERIA STEEL MILL	
002/002	1" 150 WN RF XXS LF/52 B1 FSS NACE MR-01-75	50 S		Z245.12-M01 GR.359	73948/33	RIVA ACC. SPA	A
018/018	24" 300 WN RF STD LF/52 B1 FSF4 NACE MR-01-75	5 S		Z245.12-M01 GR.359	160572.V/22	VENETE SPA	B

ANALISI CHIMICA/CHEMICAL ANALYSIS																		
#	C %	MN %	SI %	P %	S %	CR %	NI %	MO %	CU %	V %	SN %	AL %	NB %	TI %	N %	03%	FC%	FL%
A	0.160	1.230	0.200	0.012	0.010	0.070	0.060	0.010	0.180	0.014	0.008	0.023	0.001	0.019		0.080	0.365	0.399
A C	0.155	1.220	0.195	0.010	0.008	0.075	0.055	0.015	0.185	0.010	0.008	0.043	0.001	0.019		0.090	0.358	0.394
B	0.163	1.192	0.260	0.009	0.001	0.101	0.099	0.015	0.179	0.016	0.012	0.038	0.003	0.006		0.116	0.361	0.406
B C	0.160	1.190	0.250	0.006	0.001	0.105	0.095	0.020	0.170	0.015	0.012	0.053	0.003	0.006		0.125	0.358	0.404

NOTE/NOTES

03=Chromium + Molybdenum
FC=Carbon Equivalent Short Formula
FL=Carbon Equivalent Long Formula

C = ANALISI DI PRODOTTO/CHECK ANALYSIS

CARATTERISTICHE MECCANICHE/MECHANICAL PROPERTIES																	
TRAZIONE/TENSILE										RESILIENZA/CHARPY TESTES							
TIPO/TYPE	Ø PROVETTA DIAMETER	SEZIONE AREA	LUNGHEZZA LENGTH	TEMP. TEMPERATURE	ROTTURA TENSILE	SNERVAMENTO YIELD	ALL BLONG %	CONTR REDUCT. %		TIPO/TYPE	TEMP. TEMPERATURE	VALORI/VALUES			DUREZZA HB HARDNESS (AVERAGE)		
	mm.	mm ²	mm.	C	Mpa	Mpa				KV	C	Joule					
A S	12,50	122,70	50,00	20	455	359	20,0			-50	Min.	27	Med.	27	197		
A O	12,50	122,70	50,00	20	564	372	29,8	69,4		-50		93	96	101	165		
B S	12,50	122,70	50,00	20	455	359	20,0			-50	Min.	27	Med.	27	197		
B O	12,50	122,70	50,00	20	551	375	29,1	70,4		-50		100	104	109	175		

NOTE/NOTES

Lateral Exp/Shear Area (Average)
A = mm.1.60/ 90% B = mm.1.30/ 85%

O = OTTENUTE/OBTAINED
S = STANDARD

TRATTAMENTI TERMICI/HEAT TREATMENTS										NOTE GENERALI/GENERAL NOTES							
A	Normalized at 900 dgr.C for 1 h.-Cooling from 900 dgr.C in still air									FINITURE/ROUGHNESS							
A										FSS = Ra 3,2 - Ra 6,3							
B	Normalized at 900 dgr.C for 3 h.-Cooling from 900 dgr.C in still air									FSF4 = Ra 3,2 - Ra 6,3							
B																	

STANDARD/STANDARD
B1 = ASME B16.5 Ed.2003

NOTE/NOTES

Material according to Sour Service.

MARCHIO DI FABBRICA
TRADE MARK



DATA COLLAUDO INT.
INT. INSPECT DATE

26/07/2007

COLLAUDATORE INT.
INT. INSPECTOR

F. BARILANI

Barilani

