Baffinland Iron Mines Corporation
Mary River Project

Milne Inlet Fuel Storage Facility As-Built Documentation

2012-02-10	1	Client Approval	F. Kennedy	D. Stephenson	F. Butts	
2012 01 31	0	Client Approval	F. Kennedy	D. Stephenson	F. Butts	
DATE	**REV.**	**STATUS**	**PREPARED BY**	**CHECKED BY**	**APPROVED BY**	**APPROVED BY**
			HATCH			**CLIENT**

Table of Contents

1. Introduction

Baffinland Iron Mines Corporation currently operates a fuel storage and distribution facility at Milne Inlet, Baffin Island, Nunavut.

The existing facility constructed in 2007 consists of an earth dyke with synthetic liner. The fuel storage, as constructed, consisted of twelve (12) Jet Fuel (Jet A-1) and sixty four (64) Diesel Fuel (Arctic Grade), 113,000 Litre bladder tanks.

Fuel is delivered to the site via a marine pipeline to the tank farm from a shoreline ship manifold.

The distribution facility consists of vehicle fuelling and truck loading of diesel fuel and bulk truck loading of Jet A-1 Fuel.

As the existing facility is reaching its life expectancy, a new fuel facility has been designed and constructed.

1.1 General Description

The new facility is located 350 metres to the north east of the existing bladder tank farm.

The facility consists of a 270 metres of marine offload 150 mm diameter pipeline from the Milne Inlet shoreline running south to a 5 million litre (5,000,000 L) aboveground steel tank located within an earth dyke with synthetic liner.

The truck loading system consists of a diesel supply line from the diesel tank to a truck loading module located within a granular truck loading area constructed with a synthetic liner which drains the loading area into the dyke.

A 200 kW diesel generator with 2,270 L fuel tank is located at the truck loading area and supplies electrical power for the fuel facility and supporting camp.

1.2 Design Criteria

The facility is designed and constructed to the following codes and standards:

1. National Building Code of Canada (NBC) 2010.
2. National Fire Code of Canada (NFCC) 2010.
3. Canadian Electrical Code CSA 22.1-06.
4. Canadian Environmental Protection Act 1998 (2008 Update), Storage tank System for Petroleum Products and Allied Petroleum Products Regulations.
5. CCME Environmental Code of Practice for Aboveground Storage Tank Systems containing Petroleum Products, 2003.
6. ANSI B31.3-2010, Process Piping.

7. ADI 650 11th Edition, 2008, Welded Steel tanks for Oil Storage (including Addendums 1 and 2).

1.3 Secondary Containment

The dyke is approximately 50 metres wide x 127 metres long and 1.5 metres high, having 2 to 1 wall slopes and is designed to the National Fire Code of Canada. An eight (8) metre wide access ramp and truck loading area is constructed on the west end of the dyke.

The dyke is of granular construction with a synthetic liner installed within the dyke floor, walls, and under the truck loading area. The liner is buried 450 mm below the floor of the dyke.

Two (2) layers of 38 mm rigid insulation are installed at a sand layer adjacent to the dyke liner in the tank pad and extends 1.5 metres beyond the limit of the tank shell.

The dyke floor is sloped at 1% away from the tank pad to a drainage swale running along the dyke wall which drains to the low point sumps for dyke maintenance.

The containment is designed to contain 110% of the 5,000,000 litre diesel tank in compliance with the National Fire of Canada. The NFCC required dyke capacity is 5,520 cubic metres. The actual surveyed dyke capacity is 5,681 cubic metres with a 0.15 metre freeboard between the dyke capacity liquid level and the top of the liner at the dyke wall.

The truck loading area is designed as a contained area with synthetic liner sloped to drain into the containment dyke.

The final installation of the synthetic liner joints has been visually inspected and vacuum box tested to 1 to 2 psi maximum as per ASTM D5641. All inspections were witnessed and confirmed by the contractor and construction management personnel.

1.4 Aboveground Vertical Storage Tank

The diesel storage tank is a single wall vertical steel storage tank with a weak seam frangible joint roof design. The tank is designed and constructed to API 650, 11th Edition, Welded Steel Tanks for Oil Storage.

The tank is 25.6 metres in diameter by 9.75 metres high with a 5,000,000 litre nominal capacity. The tank is equipped with double block and bleed valves on the tank fill, suction and tank drawdown nozzles. The tank is equipped with three (3) 50 mm diameter water drain valve assemblies.

The shell of the tank has two (2) 610 mm diameter manways and a 610 mm diameter roof manway for tank access.

The roof nozzles are equipped with a standard open roof vent, emergency roof vent, gauge hatch and tank level radar gauge providing tank level indication and overfill alarm set points.

The tank is constructed with a spiral access stairway and guardrail at the roof of the tank.

The tank assembly has been inspected and tested to API 650 Section 8 which includes visual inspection of all welds, radiograph inspection, vacuum box test of welds, liquid penetration tests, shell to floor joint, mag particle and UT tests on reinforcing pads. In lieu of hydrostatic testing, additional liquid penetration tests and vacuum box tests have been completed in compliance with API 650 Section 7.3.5. All inspection and test reports have been confirmed by the contactor and construction management personnel.

1.5 Marine Pipeline

The Milne Inlet tank farm will be refuelled annually by ocean going tanker. A floating hose is deployed from the ship and connected to the onshore manifold. An aboveground steel marine pipeline transfers the fuel from the shore manifold to the tank farm.

The marine pipeline is a 270 metre long, 150 mm diameter, Sch. 40, pipeline running from the shoreline to the 5,000,000 litre diesel tank and is designed and constructed to ANSI B31.3 – 2010, Process Piping.

The ship floater hose manifold connection is equipped with a gate valve and check valve assembly to enable ship-to-shore connection and to prevent backflow. All connections are contained within a spill containment assembly with a hinged and lockable cover.

The pipeline is installed on pre-cast concrete bases with adjustable structural steel supports, and is also fitted with valved high point vents and low point drains to facilitate fuel line draining after discharge.

The marine pipeline has been tested in compliance with ANSI B31.3 - 2010, Process Piping, including a 5% radiograph of all aboveground welded joints and a pneumatic leak test to Section 345.5.

The final installation has been air tested to a minimum of 758 kPa for 1 hrs. and visually inspected and confirmed by contractor and construction management personnel.

1.6 Truck Loading and Refuelling System

The truck loading and refuelling system is built as a fuel system module. The unit is insulated, heated, and complete with interior and exterior lighting.

The interior fuelling and electrical systems are protected with a manually activated glycol fire suppression system.

The pump suction pipeline from the diesel storage tank to the truck loading/refuelling module is 100 diameter Sch. 40 complete with shut-off valves, vents and drains and is designed and constructed to ANSI B31.3 - 2010, Process Piping.

All pipe testing consisted of a radiograph of 5% of the aboveground welded joints and a pneumatic leak test to Section 345.5 of ANSI B31.3 - 2010, Process Piping.

The final installation has been air tested to a minimum of 758 kPa for 1 hrs. and visually inspected and confirmed by contractor and construction management personnel.

The truck loading equipment consists of a 1500 Lpm truck loading pump, product meters, grounding system, flow control valve and hose reel equipped with 7.62 metres of 75 mm diameter loading hose with drybreak.

The vehicle refuelling equipment consists of a 180 Lpm pump, product meter, flow control valve and hose reel with 10.67 metres of 25 mm diameter dispensing hose and nozzle.

Access to the fuelling equipment is through lockable equipment doors and side rollup door.

1.7 Code Compliance Review

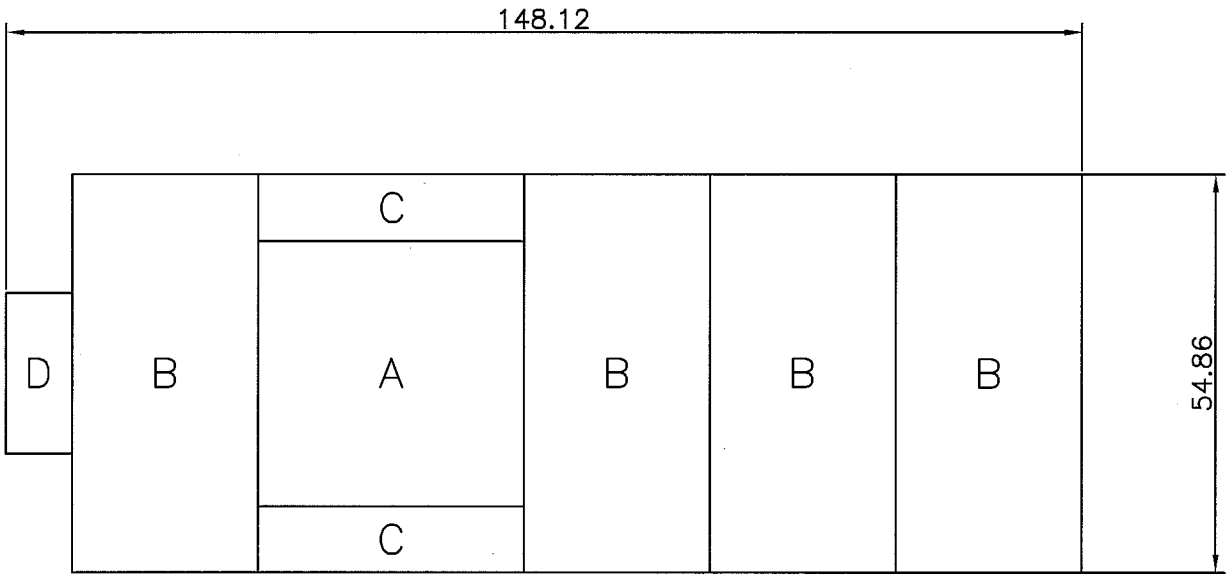
The facility design and construction has been reviewed with the specific requirements of the CCME Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products and Allied Petroleum Products, 2003. The results are tabulated in Appendix A. With regards to the specific sections that apply; this facility conforms with the requirements as laid out in the CCME document.

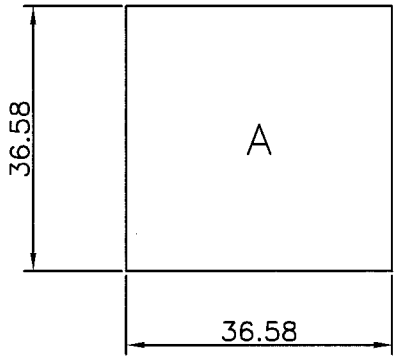
2. List of Contractors

HATCH (HATCH GLOBAL CORPORATE OFFICE) Sheridian Science & Technology Park 2800 Speakman Drive, Mississauga, ON L5K 2R7 Canada Tel: 1-905-855-7600 Fax: 1-905-855-8270	**NUNA LOGISTICS LIMITED** 9839 – 31 Avenue NW Edmonton, AB T6N 1C5 Canada Tel: 1-780-434-9114 Fax: 1-780-434-7758
ADCO IKPIARYUK LIMITED 8750 58th Avenue Edmonton, AB T6E 6G6 Canada Tel: 1-780-465-3265 Fax: 1-780-466-8086	**LAYFIELD GROUP OF COMPANIES** 11603 – 180 Street NW Edmonton, AB T5S 2H6 Canada Tel: 1-780-453-6731 Fax: 1-780-455-5218
GEM-STEEL EDMONTON LIMITED 9060 – 24 Street Edmonton, AB T6P 1X8 Canada Tel: 1-780-449-0000 Fax: 1-780-449-0001	**UNDERHILL GEOMATICS LIMITED** Unit 210A – 3430 Brighton Avenue Burnaby, BC V5A 3H4 Canada Tel: 1-604-732-3384 Fax: 1-604-732-4709

3. Layfield Group Companies – Liner Installation

3.1 Liner Shop Drawings





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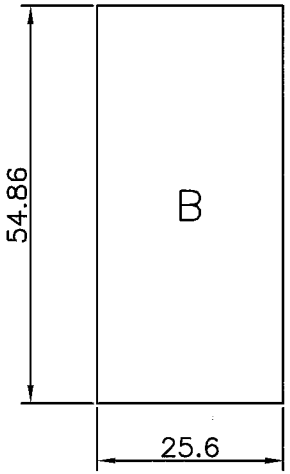
WEIGHT = 1400 kg



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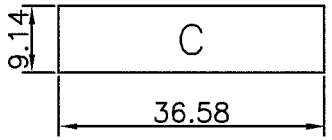
WEIGHT = 1400 kg ea.



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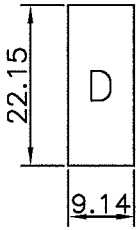


QUANTITY = 1
WEIGHT = 200 kg

LEGEND

NOTES

1) ALL DIMENSIONS IN METERS

2) PANELS FABRICATED TO NEAREST ROLL WIDTH

3) INCLUDES ALLOWANCES FOR SLACK AND SEAMING

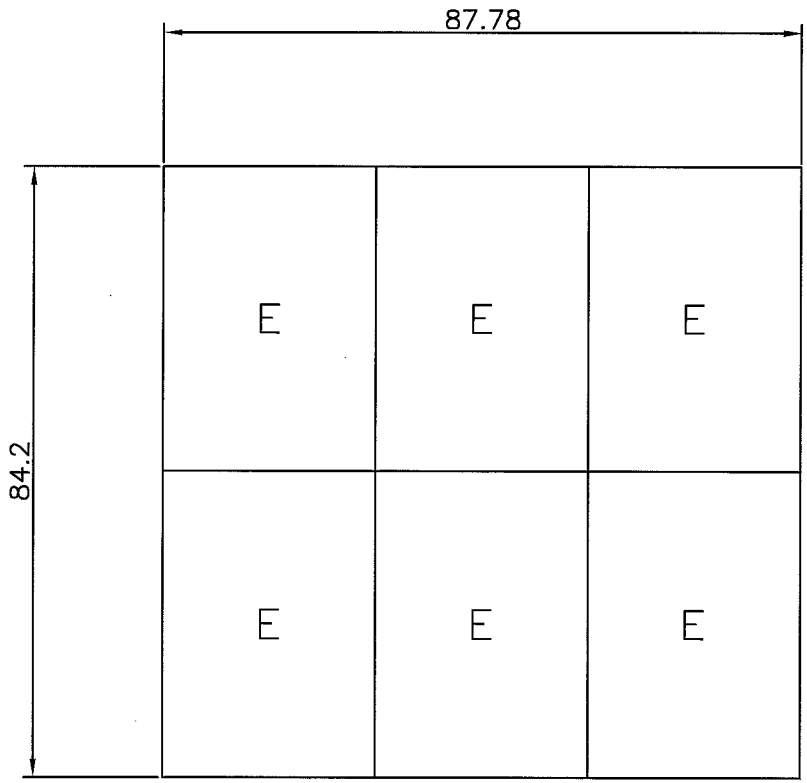
LAYFIELD

BAFFINLAND MILNE INLET
HAZGARD 535

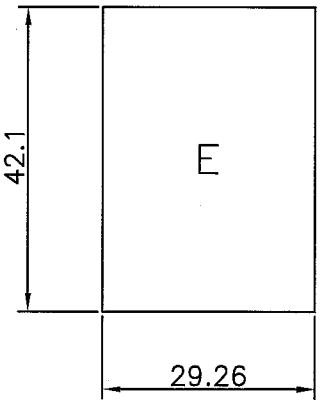
INLET FUEL CONTAINMENT
BAFFIN ISLAND, NUNAVUT

Quote No.	Project No.

DWG: OF	SCALE: N.T.S.	
DWN: JS	CHKD:	APP'D:
DATE: 05/07/2011	REVISION: A	



QUANTITY = 6
WEIGHT = 1300 kg



LEGEND

NOTES

1) ALL DIMENSIONS IN METERS

2) PANELS FABRICATED TO NEAREST ROLL WIDTH

3) INCLUDES ALLOWANCES FOR SLACK AND SEAMING

LAYFIELD

DIESEL STORAGE TANKFARM
HAZGARD 535

5M LITRE TANK FARM
BAFFIN ISLAND, NUNAVUT

Quote No.	Project No.

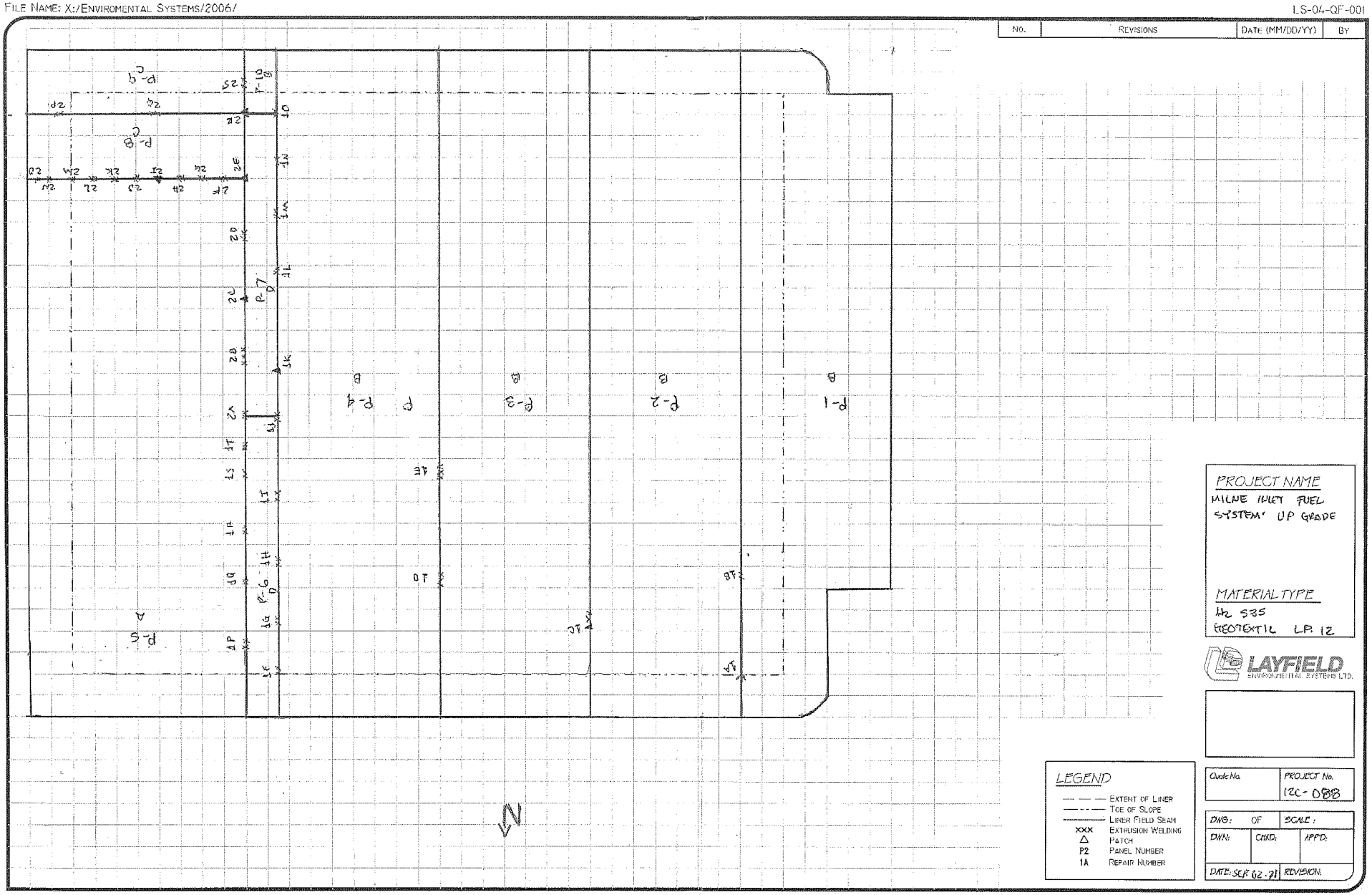
DWG: OF	SCALE: N.T.S.	
DWN: JS	CHKD:	APP'D:
DATE: 05/07/2011	REVISION: A	

3.2 Liner Installation As-Built Drawing

FILE NAME: X:/ENVIROMENTAL SYSTEMS/2006/

LS-04-QF-001

No.	REVISIONS	DATE (MM/DD/YY)	BY



PROJECT NAME
MILNE INLET FUEL SYSTEM UP GRADE

MATERIAL TYPE
HP 535 GEOTEXTILE LP: 12

LAYFIELD
ENVIRONMENTAL SYSTEMS LTD.

LEGEND

———	EXTENT OF LINER
- - - -	TOE OF SLOPE
———	LINER FIELD SEAM
XXX	EXTRUSION WELDING
△	PATCH
P2	PANEL NUMBER
1A	REPAIR NUMBER

Quote No.	PROJECT No. 12C-088
DWG: OF	SCALE:
DWN:	CHKD: APPD:
DATE: SEP 02-21	REVISION:

3.3 Certificate of Acceptance of Soil Subgrade Surface

LAYFIELD

CERTIFICATE OF ACCEPTANCE OF SOIL SUBGRADE SURFACE

PROJECT NAME: Baffinland Milne Inlet Fuel Tank Farm
PROJECT NUMBER: 12C-0098
OWNER: Hatch Mining
LOCATION: Milne Inlet

I, the undersigned, a duly appointed representative of Layfield Environmental Systems Ltd. (LESL), have visually observed the soil subgrade described below, and found it to be an acceptable surface on which to install geomembrane.

This certification is based on observations of the surface of the subgrade only. No subterranean inspections or tests have been performed by Layfield Environmental Systems, and LESL makes no representations or warranties regarding conditions which may exist below the surface of the subgrade. Layfield Environmental Systems accepts no responsibility for conformance of the subgrade to this project's specifications.

The soil subgrade accepted on this date refers to its present condition. Any changes in the subgrade condition that result from the effects of inclement weather and/or other forces beyond the control of Layfield Environmental Systems and remedial work to correct the resulting deficiencies, will be the direct responsibility of the General Contractor.

Area Being Accepted: Fuel Tank Farm. Subgrade is Excellent for Liner Deployment.

LAYFIELD ENVIRONMENTAL SYSTEMS REPRESENTATIVE:

Date: August 29, 2011
Signature:
Name: Christopher D. Mence
Title: Tech.

OWNERS REPRESENTATIVE:

Date: Sept 2, 2011
Signature:
Name: Tyler Bruce
Title: Assistant Project Manager
Company: Nuna Contracting

3.4 Geosynthetics Inventory Log - Sht. 1, 2, and 3

LAYFIELD GEOSYNTHETICS INVENTORY LOG

PROJECT NUMBER: 12C-088
PROJECT TITLE: MILNE INLET FUEL SYSTEM UPGRADE
OWNER: HATCH
CONTRACTOR: NUNA
LOCATION: MARY RIVER
SHEET NUMBER: 1

MATERIAL TYPE: GEOMEMBRANE
GEONET GEOTEXTILE X OTHER:
DATE OF ARRIVAL:
DATE OF INVENTORY: AUG-29-2011
UNLOADING METHOD:
INVENTORY BY: CHRIS NYBACK
PRODUCT TYPE: GEOTEXTIL LP-12
CONDITION IN TRUCK:
MATERIAL MANUFACTURER:

Panel / Roll Number	Material Dimensions			QC Certificate Available	Conf Sample Removed	Other	Remarks
	Thickness or Weight	Length	Width				
20267354	LP-12	300 FT	15 FT				
20267338	LP-12	300 FT	15 FT				
20266215	LP-12	300 FT	15 FT				
20266140	LP-12	300 FT	15 FT				
20263471	LP-12	300 FT	15 FT				
20267333	LP-12	300 FT	15 FT				
20267353	LP-12	300 FT	15 FT				
20267327	LP-12	300 FT	15 FT				
20266154	LP-12	300 FT	15 FT				
20267350	LP-12	300 FT	15 FT				
20266157	LP-12	300 FT	15 FT				
20267344	LP-12	300 FT	15 FT				
20267340	LP-12	300 FT	15 FT				
2026730	LP-12	300 FT	15 FT				
20266218	LP-12	300 FT	15 FT				
20267348	LP-12	300 FT	15 FT				
20267328	LP-12	300 FT	15 FT				
20267329	LP-12	300 FT	15 FT				
20266217	LP-12	300 FT	15 FT				
20267349	LP-12	300 FT	15 FT				
20267454	LP-12	300 FT	15 FT				
20267335	LP-12	300 FT	15 FT				
20266205	LP-12	300 FT	15 FT				
20267468	LP-12	300 FT	15 FT				

SUBMITTED BY: JC
DATE: AUG-29-2011

LAYFIELD GEOSYNTHETICS INVENTORY LOG

PROJECT NUMBER: 12C-088
PROJECT TITLE: MILNE INLET FUEL SYSTEM UPGRADE
OWNER: HATCH
CONTRACTOR: NUNA
LOCATION: MARY RIVER
SHEET NUMBER: a

MATERIAL TYPE: GEOMEMBRANE
GEONET GEOTEXTIL X OTHER:
DATE OF ARRIVAL:
DATE OF INVENTORY: AUG-29-2011
UNLOADING METHOD:
INVENTORY BY: CHRIS NYBACK
PRODUCT TYPE: GEOTEXTIL LP-12
CONDITION IN TRUCK:
MATERIAL MANUFACTURER: LAYFIELD

Panel / Roll Number	Material Dimensions			QC Certificate Available	Conf Sample Removed	Other	Remarks
	Thickness or Weight	Length	Width				
20267459	LP-12	300 FT	15 FT				
20267336	LP-12	300 FT	15 FT				
20267466	LP-12	300 FT	15 FT				
20267469	LP-12	300 FT	15 FT				
20267453	LP-12	300 FT	15 FT				
20267384	LP-12	300 FT	15 FT				
20267455	LP-12	300 FT	15 FT				
20267383	LP-12	300 FT	15 FT				
20267322	LP-12	300 FT	15 FT				
20267312	LP-12	300 FT	15 FT				
20267464	LP-12	300 FT	15 FT				
20267385	LP-12	300 FT	15 FT				
20267323	LP-12	300 FT	15 FT				
20267317	LP-12	300 FT	15 FT				
20267387	LP-12	300 FT	15 FT				
20267311	LP-12	300 FT	15 FT				
20267386	LP-12	300 FT	15 FT				
20267388	LP-12	300 FT	15 FT				
20267351	LP-12	300 FT	15 FT				
20267334	LP-12	300 FT	15 FT				
20267345	LP-12	300 FT	15 FT				
20266216	LP-12	300 FT	15 FT				
20267341	LP-12	300 FT	15 FT				
20266151	LP-12	300 FT	15 FT				

SUBMITTED BY: JC

DATE: AUG-29-2011

LAYFIELD GEOSYNTHETICS INVENTORY LOG

PROJECT NUMBER: 12C-O88

PROJECT TITLE: MILNE INLET FUEL SYSTEM UPGRADE

OWNER: HATCH

CONTRACTOR: NUNA

LOCATION: MARY RIVER

SHEET NUMBER: 3

MATERIAL TYPE: GEOMEMBRANE

GEONET GEOTEXTIL X OTHER:

DATE OF ARRIVAL:

DATE OF INVENTORY: AUG-29-2011

UNLOADING METHOD:

INVENTORY BY: CHRIS NYBACK

PRODUCT TYPE: GEOTEXTIL LP-12

CONDITION IN TRUCK:

MATERIAL MANUFACTURER:

Panel / Roll Number	Material Dimensions: Thickness or Weight	Length	Width	QC Certificate Available	Conf Sample Removed	Other	Remarks
O2O267364	LP-12	300 FT	15 FT				
O2O266138	LP-12	300 FT	15 FT				
O2O266174	LP-12	300 FT	15 FT				
O2O266135	LP-12	300 FT	15 FT				
O2O267337	LP-12	300 FT	15 FT				
O2O266132	LP-12	300 FT	15 FT				
O2O266170	LP-12	300 FT	15 FT				
O2O266152	LP-12	300 FT	15 FT				
O2O266162	LP-12	300 FT	15 FT				
O2O26	LP-12	300 FT	15 FT				
O2O26	LP-12	300 FT	15 FT				
O2O26	LP-12	300 FT	15 FT				
O2O26	LP-12	300 FT	15 FT				
O2O26	LP-12	300 FT	15 FT				
O2O26	LP-12	300 FT	15 FT				
O2O26	LP-12	300 FT	15 FT				
O2O26	LP-12	300 FT	15 FT				
O2O26	LP-12	300 FT	15 FT				
O2O26	LP-12	300 FT	15 FT				
O2O26	LP-12	300 FT	15 FT				
O2O26	LP-12	300 FT	15 FT				
O2O26	LP-12	300 FT	15 FT				
O2O26	LP-12	300 FT	15 FT				
O2O26	LP-12	300 FT	15 FT				

SUBMITTED BY: JC

DATE: AUG-29-2011

3.5 Geomembrane Deployment Log - Sht. 1, 2, and 3

LAYFIELD GEOMEMBRANE DEPLOYMENT LOG

PROJECT NUMBER: 12C-088 **PROJECT TITLE:** MILNE INLET FUEL SYSTEM UP GRADE

OWNER: HATCH **CONTRACTOR:** NUNA

LOCATION: MARY RIVER

GEOMEMBRANE HZ 535 **SECONDARY** **PRIMARY** **CLOSURE** **OTHER**

SUBGRADE CONDITION (SURFACE COMPACTION, PROTRUSIONS, DESICCATION, EXCESSIVE MOISTURE):

REMARKS: GEOTEXTIL UNDER LAY LP-12 **DATE:** MONDAY / AUG -29-2011

HAZGARD 535 **SHEET NUMBER:** 1

DEPLOYMENT EQUIPMENT: ESCAVATOR

DESCRIPTION	PANEL LOCATION REFERENCE NUMBER P-1	PANEL LOCATION REFERENCE NUMBER P-2	PANEL LOCATION REFERENCE NUMBER
PANEL/ROLL NUMBER	B	B	
DEPLOYMENT LENGTH	55 M	55 M	
AMBIENT AIR TEMP.	3 C	3 C	
VISUAL OBSERVATION	NO DAMAGE	NO DAMAGE	
OBSERVED OVERLAP	5"	5"	
CHECKED BY	JC	JC	
ADJACENT PANEL	N= S= E= W=	N= S= E= W=	N= S= E= W=

DESCRIPTION	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER 6
PANEL/ROLL NUMBER			
DEPLOYMENT LENGTH			
AMBIENT AIR TEMP.			
VISUAL OBSERVATION			
OBSERVED OVERLAP			
CHECKED BY			
ADJACENT PANEL	N= S= E= W=	N= S= E= W=	N= S= E= W=

DESCRIPTION	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER
PANEL/ROLL NUMBER			
DEPLOYMENT LENGTH			
AMBIENT AIR TEMP.			
VISUAL OBSERVATION			
OBSERVED OVERLAP			
CHECKED BY			
ADJACENT PANEL	N= S= E= W=	N= S= E= W=	N= S= E= W=

DESCRIPTION	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER
PANEL/ROLL NUMBER			
DEPLOYMENT LENGTH			
AMBIENT AIR TEMP.			
VISUAL OBSERVATION			
OBSERVED OVERLAP			
CHECKED BY			
ADJACENT PANEL	N= S= E= W=	N= S= E= W=	N= S= E= W=

SUBMITTED BY: _____

DATE: _____

LAYFIELD GEOMEMBRANE DEPLOYMENT LOG

PROJECT NUMBER: 12C-088 PROJECT TITLE: MILNE INLET FUEL SYSTEM UP GRADE
OWNER: HATCH CONTRACTOR: NUNA
LOCATION: MARY RIVER
GEOMEMBRANE HZ 535 SECONDARY PRIMARY CLOSURE OTHER
SUBGRADE CONDITION (SURFACE COMPACTION, PROTRUSIONS, DESICCATION, EXCESSIVE MOISTURE):
REMARKS: GEOTEXTIL UNDER LAY LP-12 DATE: TUESDAY/ AUG -30-2011
HAZGARD 535 SHEET NUMBER: 2
DEPLOYMENT EQUIPMENT: ESCAVATOR

DESCRIPTION	PANEL LOCATION REFERENCE NUMBER P-3	PANEL LOCATION REFERENCE NUMBER P-4	PANEL LOCATION REFERENCE NUMBER
PANEL/ROLL NUMBER	B	B	
DEPLOYMENT LENGTH	55 M	55 M	
AMBIENT AIR TEMP.	3 C	3 C	
VISUAL OBSERVATION	NO DAMAGE	NO DAMAGE	
OBSERVED OVERLAP	5"	5"	
CHECKED BY	JC	JC	
ADJACENT PANEL	N= S= E= W=	N= S= E= W=	N= S= E= W=

DESCRIPTION	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER
PANEL/ROLL NUMBER			
DEPLOYMENT LENGTH			
AMBIENT AIR TEMP.			
VISUAL OBSERVATION			
OBSERVED OVERLAP			
CHECKED BY			
ADJACENT PANEL	N= S= E= W=	N= S= E= W=	N= S= E= W=

DESCRIPTION	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER
PANEL/ROLL NUMBER			
DEPLOYMENT LENGTH			
AMBIENT AIR TEMP.			
VISUAL OBSERVATION			
OBSERVED OVERLAP			
CHECKED BY			
ADJACENT PANEL	N= S= E= W=	N= S= E= W=	N= S= E= W=

DESCRIPTION	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER
PANEL/ROLL NUMBER			
DEPLOYMENT LENGTH			
AMBIENT AIR TEMP.			
VISUAL OBSERVATION			
OBSERVED OVERLAP			
CHECKED BY			
ADJACENT PANEL	N= S= E= W=	N= S= E= W=	N= S= E= W=

SUBMITTED BY:

DATE:

LAYFIELD

GEOMEMBRANE DEPLOYMENT LOG

PROJECT NUMBER: 12C-088 **PROJECT TITLE:** MILNE INLET FUEL SYSTEM UP GRADE

OWNER: HATCH **CONTRACTOR:** NUNA

LOCATION: MARY RIVER

GEOMEMBRANE HZ 535 **SECONDARY** **PRIMARY** **CLOSURE** **OTHER**

SUBGRADE CONDITION (SURFACE COMPACTION, PROTRUSIONS, DESICCATION, EXCESSIVE MOISTURE):

REMARKS: GEOTEXTIL UNDER LAY LP-12 **DATE:** SEPT-01-2011

HAZGARD 535 **SHEET NUMBER:** 3

DEPLOYMENT EQUIPMENT: ESCAVATOR

DESCRIPTION	PANEL LOCATION REFERENCE NUMBER P-5	PANEL LOCATION REFERENCE NUMBER P-6	PANEL LOCATION REFERENCE NUMBER P-7
PANEL/ROLL NUMBER	A	D	D
DEPLOYMENT LENGTH	121X 121 FT	14X72	14X72
AMBIENT AIR TEMP.	3C	3C	3C
VISUAL OBSERVATION	NOT DAMAGE	NOT DAMAGE	NOT DAMAGE
OBSERVED OVERLAP	5"	5"	5"
CHECKED BY	JC	JC	JC
ADJACENT PANEL	N= S= P-8 E= W= P-6/7	N= S= P-7 E= P-5 W= P-4	N= P-6 S= P-10 E= P-5/P-8 W= P-4

DESCRIPTION	PANEL LOCATION REFERENCE NUMBER P-8	PANEL LOCATION REFERENCE NUMBER P-9	PANEL LOCATION REFERENCE NUMBER P-10
PANEL/ROLL NUMBER	C	C	B
DEPLOYMENT LENGTH	117X30	117X30	34X 34
AMBIENT AIR TEMP.	4C	4C	4C
VISUAL OBSERVATION	NOT DAMAGE	NOT DAMAGE	NOT DAMAGE
OBSERVED OVERLAP	5"	5"	5"
CHECKED BY	JC	JC	JC
ADJACENT PANEL	N= P-5 S= P-9 E= W= P-7	N= P-8 S= E= W= P-10	N= P-7 S= E= P-9 W= P-4

DESCRIPTION	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER
PANEL/ROLL NUMBER			
DEPLOYMENT LENGTH			
AMBIENT AIR TEMP.			
VISUAL OBSERVATION			
OBSERVED OVERLAP			
CHECKED BY			
ADJACENT PANEL	N= S= E= W=	N= S= E= W=	N= S= E= W=

DESCRIPTION	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER	PANEL LOCATION REFERENCE NUMBER
PANEL/ROLL NUMBER			
DEPLOYMENT LENGTH			
AMBIENT AIR TEMP.			
VISUAL OBSERVATION			
OBSERVED OVERLAP			
CHECKED BY			
ADJACENT PANEL	N= S= E= W=	N= S= E= W=	N= S= E= W=

SUBMITTED BY: _____

DATE: _____

3.6 Geomembrane Trail Seam Log

LAYFIELD

GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER: 12C-088 **PROJECT TITLE:** MILNE INLET FUEL SYSTEM UP GRADE

OWNER: HATCH **CONTRACTOR:** NUNA

LOCATION: MARY RIVER **SHEET NUMBER:** 1

X **TF - # FUSION** X **TX - # = EXTRUSION** **TS - # = SOLVENT**

SAMPLE NUMBER	APPROX. TIME & DATE	WELDING MACHINE NUMBER	WELD TECH.	TEMPERATURES				TEST RESULTS												PASS OR RE-TEST	CHKD BY	REMARKS
				AMBIENT AIR TEMP.	PREHEAT OR MACHINE SPEED	EXTRUDER	WEDGE TEMP. Deg F	INSIDE PEEL MODE ---------- STRENGTH					OUTSIDE PEEL MODE ---------- STRENGTH					SHEAR MODE ---------- STRENGTH				
TF 1	AUG--30-2011 8:00	#23	CN	3 C	520		860	62	62	68	67	67	49	76	68	59	61	68	69	PASSS	JC	
TX 1	AUG--30-2011 11:00	#07	CN	3 C	475	460 F		64		69		67		56		65		81	68	PASS	JC	
TX 2	AUG-31-2011 15:00	#07	CN	5 C	475	460 F		58		52		53		52		56		55	55	PASS	JC	
TF 2	SEPT-01-2011 13:00	#23	CN	4C	650		860	69	56	63	64	66	68	70	66	61	65	70	65	PASS	JC	
TX 3	SEPT -03-2011 7:35	#07	CN	4C	475	460		70		65		74		67		75		72	67	PASS	JC	

LS FORM 3

LAYFIELD ENVIRONMENTAL SYSTEMS

SUBMITTED BY: JC
DATE: AUG-30-2011

LAYFIELD

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 12C-088 **PROJECT TITLE:** MILNE INLET FUEL SYSTEM UP GRADE

OWNER: HATCH **CONTRACTOR:** NUNA

LOCATION: MARY RIVER

PASSING TRIAL SEAMS

	NO.	TIME	TECH ID
X FUSION	TF-1	8:00	CN
EXTRUSION			
SOLVENT			

SHEET NUMBER: 1

DATE: AUG-30-2011

SEAM NUMBER	SEAM SECTION * START POINT	SEAM SECTION * FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES DIGITAL SET WEDGE OR BARREL	MACHINE TEMPERATURES INDICATOR WEDGE OR BARREL	APPROX. LENGTH WELDED (M)	DESTR. NUMBER	CHK'D BY	REMARKS	NON-DESTRUCTIVE TEST DATE	NON-DESTRUCTIVE CHECKED BY
P-1 / P-2	NEOS-SEOS		8:46	3C	CN	520%		860	181.0		JC			
P-1 / P-2	SEOS-NEOS		9:35	3C	CN	520%		860	14.0		JC	cap		
P-1 / P-2	NEOS-SEOS		9:50	3C	CN	520%		860	14.0		JC	cap		
P-2 / P-3	NEOS-SEOS		14:55	3C	CN	520%		860	181.0		JC			
P-3 / P-4	SEOS-NEOS		18:20	3C	CN	520%		860	181.0		JC			
/														
/														
/														
/														
/														
/														
								DAILY TOTAL	571.0					

* *REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR, OR A POINT LOCATION ON THE SEAM.*

SUBMITTED BY: JC

DATE: AUG-30-2011

LAYFIELD

GEOMEMBRANE SEAM LOG

PROJECT NUMBER: 12C-088 **PROJECT TITLE:** MILNE INLET FUEL SYSTEM UP GRADE

OWNER: HATCH **CONTRACTOR:** NUNA

LOCATION: MARY RIVER

PASSING TRIAL SEAMS

	NO.	TIME	TECH ID
X FUSION	TF- 2	13:00	CN
EXTRUSION			
SOLVENT			

SHEET NUMBER: 2

DATE: AUG-30-2011

SEAM NUMBER	SEAM SECTION * START POINT	SEAM SECTION * FINISH POINT	APPROX. START TIME	AMB. AIR TEMP.	WELD TECH.	PREHEAT OR MACH. SPEED	MACHINE TEMPERATURES: DIGITAL SET WEDGE OR BARREL	MACHINE TEMPERATURES: INDICATOR WEDGE OR BARREL	APPROX. LENGTH WELDED (M)	DESTR. NUMBER	CHK'D BY	REMARKS	NON-DESTRUCTIVE: TEST DATE	NON-DESTRUCTIVE: CHECKED BY
P-6 / P-4	NEOS-SEOS		14:30	9 C	CN	650%		860	80.0					
P-4 / P-7	NEOS-SEOS			9 C	CN	650%		860	80.0					
P-10 / P-7	NEOS-SEOS		18:01	9 C	CN	650%		860	21.0					
P-7 /10 / P-9	WEOS-EEOS		18:09	9 C	CN	650%		860	48.0					
P-6/7 / P-5	WEOS-EEOS		14:10	9 C	CN	650%		860	43.0					
P-5 / P-6	NEOS-SEOS		13:25	9 C	CN	650%		860	80.0					
P-9 / P-8	WEOS-EEOS		15:51	9 C	CN	650%		860	117.0					
P-8 / P-5	EEOS-WEOS		16:40	9 C	CN	650%		860	117.0					
P-10 / P-4	NEOS-SEOS		17:45	9 C	CN	650%		860	34.0					
P-8 / P-7	NEOS -SEOS		17:00	9 C	CN	650%		860	29.0					
/														
								DAILY TOTAL	649.0					

* *REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR, OR A POINT LOCATION ON THE SEAM.*

SUBMITTED BY: JC

DATE: SEPT-06-2011

3.7 Geomembrane Seam Pressure Test Log - Sht. 1, 2, 3, and 4

LAYFIELD GEOMEMBRANE SEAM PRESSURE TEST LOG

PROJECT NUMBER: 12C-088 **PROJECT TITLE:** MILNE INLET FUEL SYSTEM UP GRADE

OWNER: HATCH **CONTRACTOR:** NUNA

LOCATION: MARY RIVER

DATE: AUG -30-2011

SHEET NUMBER 1

SEAM NUMBER	SEAM SECTION * FROM	TO	TECH. ID	PRESSURE PSI Start	Finish	TIME START	FINISH	RESULTS PASS	FAIL	SEAM COMPLETE NO	YES	CH'KD BY	REMARKS **
P-1 / P-2	1B	1A	JC	35	35	15 : 2	15 : 7	PASS		NO		JC	
P-1 / P-2	1B	SEOS	JC	35	35	15 : 5	15 : 10	PASS			YES	JC	
P-2 / P-3	1C	NEOS	JC	34	34	16 : 40	16 : 45	PASS		NO		JC	
P-2 / P-3	1C	SEOS	JC	32	32	16 : 42	16 : 47	PASS			YES	JC	
P-3 / P-4	1D	NEOS	JC	35	35	17 : 37	17 : 42	PASS		NO		JC	
P-3 / P-4	1D	1E	JC	34	34	17 : 23	17 : 28	PASS		NO		JC	
P-3 / P-4	1E	SEOS	JC	35	35	17 : 45	17 : 50	PASS			YES	JC	
/	-			:		:	:						
/	-			:		:	:						
/	-			:		:	:						
/	-			:		:	:						
/	-			:		:	:						
/	-			:		:	:						
/	-			:		:	:						
/	-			:		:	:						
/	-			:		:	:						
/	-			:		:	:						

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT ON THE SEAM.

** RECORD ANY QUANTITY OF LEAKS DETECTED AND REFERENCE NEW DEFECT CODE IN REMARKS.

DATE: _____

SUBMITTED BY: _____

LAYFIELD GEOMEMBRANE SEAM PRESSURE TEST LOG

PROJECT NUMBER: 12C-088 **PROJECT TITLE:** MILNE INLET FUEL SYSTEM UP GRADE

OWNER: HATCH **CONTRACTOR:** NUNA

LOCATION: MARY RIVER

DATE: SEPT-02-2011

SHEET NUMBER 2

SEAM NUMBER	SEAM SECTION * FROM	TO	TECH. ID	PRESSURE PSI Start	Finish	TIME START	FINISH	RESULTS PASS	FAIL	SEAM COMPLETE NO	YES	CH'KD BY	REMARKS **
P-4 / P-6	1F	NEOS	JC	32	32	10 : 15	10 : 20	PASS		NO		JC	
P-4 / P-6	1F	1G	JC	33	33	10 : 15	10 : 20	PASS		NO		JC	
P-4 / P-6	1G	1H	JC	35	35	10 : 16	10 : 21	PASS		NO		JC	
P-4 / P-6	1H	1I	JC	36	36	10 : 16	10 : 21	PASS		NO		JC	
P-4 / P-6	1I	1J	JC	39	39	10 : 16	10 : 21	PASS			YES	JC	
P-6 / P-7	1J	2A	JC	35	34	10 : 21	10 : 26	PASS			YES	JC	
P-4 / P-7	1J	1K	JC	35	35	10 : 21	10 : 26	PASS		NO		JC	
P-4 / P-7	1K	1L	JC	35	34	10 : 21	10 : 26	PASS		NO		JC	
P-4 / P-7	1L	1M	JC	35	33	10 : 21	10 : 26	PASS		NO		JC	
P-4 / P-7	1M	1N	JC	35	35	10 : 23	10 : 28	PASS		NO		JC	
P-4 / P-7	1N	1O	JC	35	35	10 : 23	10 : 28	PASS			YES	JC	
P-7 / P-10	1O	2R	JC	35	35	11 : 15	11 : 20	PASS			YES	JC	
P-9 / P-8	2R	2Q	JC	35	35	11 : 15	11 : 20	PASS		NO		JC	
P-9 / P-8	2Q	2P	JC	35	35	11 : 15	11 : 20	PASS		NO		JC	
P-9 / P-8	2P	EEOS	JC	30	30	11 : 15	11 : 20	PASS			YES	JC	
P-7 / P-8	2R	2E	JC	32	32	11 : 23	11 : 28	PASS			YES	JC	
P-5 / P-8	2E	2F	JC	30	30	11 : 23	11 : 28	PASS			YES	JC	

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT ON THE SEAM.

** RECORD ANY QUANTITY OF LEAKS DETECTED AND REFERENCE NEW DEFECT CODE IN REMARKS.

DATE: _____

SUBMITTED BY: _____

LAYFIELD

GEOMEMBRANE SEAM PRESSURE TEST LOG

PROJECT NUMBER: 12C-088

PROJECT TITLE: MILNE INLET FUEL SYSTEM UP GRADE

OWNER: HATCH

CONTRACTOR: NUNA

LOCATION: MARY RIVER

DATE: SEPT-02-2011

SHEET NUMBER 3

SEAM NUMBER	SEAM SECTION * FROM	TO	TECH. ID	PRESSURE PSI Start	Finish	TIME START	FINISH	RESULTS PASS	FAIL	SEAM COMPLETE NO	YES	CH'KD BY	REMARKS **
P-8 / P-5	2F	2G	JC	30	30	12 : 32	12 : 37	PASS		NO			
P-8 / P-5	2G	2H	JC	32	32	12 : 32	12 : 37	PASS		NO			
P-8 / P-5	2H	2I	JC	35	35	12 : 32	12 : 37	PASS		NO			
P-8 / P-5	2I	2J	JC	32	32	12 : 36	12 : 41	PASS		NO			
P-8 / P-5	2J	2K	JC	32	32	12 : 36	12 : 41	PASS		NO			
P-8 / P-5	2K	2L	JC	32	32	12 : 36	12 : 41	PASS		NO			
P-8 / P-5	2L	2M	JC	30	30	12 : 36	12 : 41	PASS		NO			
P-8 / P-5	2M	2N	JC	30	30	12 : 36	12 : 41	PASS		NO			
P-8 / P-5	2N	2O	JC	30	30	12 : 37	12 : 42	PASS			YES		
P-7 / P-5	2F	2D	JC	31	31	13 : 1	13 : 6	PASS		NO			
P-7 / P-5	2D	2C	JC	31	31	13 : 1	13 : 6	PASS		NO			
P-7 / P-5	2C	2B	JC	31	30	13 : 1	13 : 6	PASS		NO			
P-7 / P-5	2B	2A	JC	31	31	13 : 1	13 : 6	PASS			YES		
P-5 / P-6	1P	NEOS	JC	30	30	13 : 15	13 : 20	PASS		NO			
P-5 / P-6	1P	1Q	JC	30	30	13 : 15	13 : 20	PASS		NO			
P-5 / P-6	1Q	1R	JC	31	31	13 : 15	13 : 20	PASS		NO			
P-5 / P-6	1R	1S	JC	30	30	13 : 15	13 : 20	PASS		NO			

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT ON THE SEAM.

** RECORD ANY QUANTITY OF LEAKS DETECTED AND REFERENCE NEW DEFECT CODE IN REMARKS.

DATE: SEPT -02-2011

SUBMITTED BY: JC

LAYFIELD GEOMEMBRANE SEAM PRESSURE TEST LOG

PROJECT NUMBER: 12C-088 **PROJECT TITLE:** MILNE INLET FUEL SYSTEM UP GRADE

OWNER: HATCH **CONTRACTOR:** NUNA

LOCATION: MARY RIVER

DATE: SEPT-02-2011

SHEET NUMBER 4

SEAM NUMBER	SEAM SECTION * FROM	TO	TECH. ID	PRESSURE PSI Start	Finish	TIME START	FINISH	RESULTS PASS	FAIL	SEAM COMPLETE NO	YES	CH'KD BY	REMARKS **
P-5 / P-6	1S	- 1T		32 :	32	11 : 20	11 : 25	PASS		NO			
P-5 / P-6	1T	- 2A		32 :	32	11 : 20	11 : 25	PASS			YES		
/		-		:		:	:						
/		-		:		:	:						
/		-		:		:	:						
/		-		:		:	:						
/		-		:		:	:						
/		-		:		:	:						
/		-		:		:	:						
/		-		:		:	:						
/		-		:		:	:						
/		-		:		:	:						
/		-		:		:	:						
/		-		:		:	:						
/		-		:		:	:						
/		-		:		:	:						
/		-		:		:	:						

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT ON THE SEAM.
** RECORD ANY QUANTITY OF LEAKS DETECTED AND REFERENCE NEW DEFECT CODE IN REMARKS.

DATE: SEPT-02-2011

SUBMITTED BY: JC

3.8 Geomembrane Defect/Repair Logs

LAYFIELD GEOMEMBRANE DEFECT / REPAIR LOG

PROJECT NUMBER: 12C-088 PROJECT TITLE: MILNE INLET FUEL SYSTEM UP GRADE

OWNER: HATCH CONTRACTOR: NUNA

LOCATION: MARY RIVER SHEET NUMBER: 1

DEFECT CODE	LOG DATE	DEFECT LOCATION		DEFECT TYPE	REPAIR TYPE	WELD TECH.	REPAIR DATE	REMARKS **	TEST DATE	CHECKED BY
		SEAM OR PANEL NO.	DEFECT LOCATION DESCRIPTION							
1 A	AUG-30-2011	1 / 2	15FT FR NEOS	B	G&W	CN	AUG 30-2011			
1 B	AUG-30-2011	1 / 2	20FT SEOS 1A	B	G&W	CN	AUG 30-2011			
1 C	AUG-30-2011	2 / 3	17FT FR NEOS	BO	PATCH	CN	AUG 30-2011			
1 D	AUG-30-2011	3 / 4	21FT FR NEOS	BO	G&W	CN	AUG 30-2011			
1 E	AUG-30-2011	3 / 4	11FT FR 1D SEOS	BO	G&W	CN	AUG 30-2011			
1 F	SEPT-02-2011	4 / 6	8FT FR NEOS	BO	G&W	CN	SEPT-02-2011			
1 G	SEPT-02-2011	4 / 6	15FT FR 1F SEOS	BO	G&W	CN	SEPT-02-2012			
1 H	SEPT-02-2011	4 / 6	17FT FR 1G SEOS	BO	G&W	CN	SEPT-02-2013			
1 I	SEPT-02-2011	4 / 6	32FT FR 1H SEOS	BO	G&W	CN	SEPT-02-2014			
1 J	SEPT-02-2011	4 / 6	7FT FR 1I SEOS	T	G&W	CN	SEPT-02-2015			
1 K	SEPT-02-2011	4 / 7	15FT FR 1J SEOS	DT	PATCH	CN	SEPT-02-2016			
1 L	SEPT-02-2011	4 / 7	32 FT FR 1K SEOS	BO	G&W	CN	SEPT-02-2017			
1 M	SEPT-02-2011	4 / 7	15FT FR 1L SEOS	BO	G&W	CN	SEPT-02-2018			
1 N	SEPT-02-2011	4 / 7	10 FT FR 1M SEOS	BO	G&W	CN	SEPT-02-2019			
1 O	SEPT-02-2011	4 / 7	7FT FR 1N SEOS	T	G&W	CN	SEPT-02-2020			
1 P	SEPT-02-2011	5 / 6	17FT FR NEOS	BO	G&W	CN	SEPT-02-2021			
1 Q	SEPT-02-2011	5 / 6	25FT FR 1P SEOS	BO	G&W	CN	SEPT-02-2022			
1 R	SEPT-02-2011	5 / 6	20FT FR 1Q SEOS	BO	G&W	CN	SEPT-02-2023			
1 S	SEPT-02-2011	5 / 6	15 FT FR 1R SEOS	BO	G&W	CN	SEPT-02-2024			
1 T	SEPT-02-2011	5 / 6	4TF FR 1S SEOS	BO	G&W	CN	SEPT-02-2025			

DEFECT TYPE: AD - ANIMAL RELATED DAMAGE; B - UNDISPERSED RESIN BEAD; BO - FUSION WELDER BURN; BS - BOOT-SKIRT FROM FML PENETRATION; CO - CHANGE OF OVERLAP; CR - CREASE; D - INSTALLATION DAMAGE; DS-# - DESTRUCTIVE TEST NUMBER; EE - EARTHWORK EQUIPMENT DAMAGE; EXT - EXTENSION; FM - FISHMOUTH; FS - FAILED SEAM LENGTH; FTS - FIELD TEST STRIP; HT - HEAT TACK BURN; IO - INSUFFICIENT OVERLAP (UNDER SPEC.); MD - MANUFACTURER/DELIVERY DAMAGE; PT - PRESSURE TEST CUT; SI - SOIL SURFACE IRREGULARITY; SL - SLAG ON TEXTURED SHEET; T - THREE PANEL INTERSECTION; VL - VACUUM TEST LEAK; WR - WRINKLE; WS - WELDER RESTART; OTHER:

REPAIR TYPE: P - PATCH, C - CAP, RS - RECONSTRUCTED SEAM, G&W - GRIND/WELD

PASSING TRIAL SEAMS		
NO.	TIME	TECH ID.

** COLUMNS TO BE USED BY THE PROJECT SUPERVISOR OR LEAD TECHNICIAN ONLY.

SUBMITTED BY: _____

DATE: _____

LAYFIELD GEOMEMBRANE DEFECT / REPAIR LOG

PROJECT NUMBER: 12C-088 PROJECT TITLE: MILNE INLET FUEL SYSTEM UP GRADE

OWNER: HATCH CONTRACTOR: NUNA

LOCATION: MARY RIVER SHEET NUMBER 1

DEFECT CODE	LOG DATE	DEFECT LOCATION		DEFECT TYPE	REPAIR TYPE	WELD TECH.	REPAIR DATE	REMARKS **	TEST DATE	CHECKED BY
		SEAM OR PANEL NO.	DEFECT LOCATION DESCRIPTION							
2 A	SEPT- 02-2011	6 / 7	P-5	T	G&W	CN	SEPT 02-2011			
2 B	SEPT- 02-2011	7 / 5	14FT FR 2A SEOS	BO	G&W	CN	SEPT 02-2011			
2 C	SEPT- 02-2011	7 / 5	10 FT FR 2B SEOS	BO	G&W	CN	SEPT 02-2011			
2 D	SEPT- 02-2011	7 / 5	11FT FR 2C SEOS	BO	G&W	CN	SEPT 02-2011			
2 E	SEPT- 02-2011	8 / 5	P-7	T	G&W	CN	SEPT 02-2011			
2 F	SEPT- 02-2011	5 / 8	9FT FR 2E EEOS	T	G&W	CN	SEPT 02-2011			
2 G	SEPT- 02-2011	5 / 8	9FT FR 2F EEOS	T	G&W	CN	SEPT 02-2011			
2 H	SEPT- 02-2011	5 / 8	9FT FR 2G EEOS	T	G&W	CN	SEPT 02-2011			
2 I	SEPT- 02-2011	5 / 8	9FT FR 2H EEOS	T	G&W	CN	SEPT 02-2011			
2 J	SEPT- 02-2011	5 / 8	9FT FR 2I EEOS	T	PATCH	CN	SEPT 02-2011	DT # 2		
2 K	SEPT- 02-2011	5 / 8	9FT FR 2J EEOS	T	G&W	CN	SEPT 02-2011			
2 L	SEPT- 02-2011	5 / 8	9FT FR 2K EEOS	T	G&W	CN	SEPT 02-2011			
2 M	SEPT- 02-2011	5 / 8	9FT FR 2L EEOS	T	G&W	CN	SEPT 02-2011			
2 N	SEPT- 02-2011	5 / 8	9FT FR 2M EEOS	T	G&W	CN	SEPT 02-2011			
2 O	SEPT- 02-2011	5 / 8	4FT FR 2N EEOS	BO	G&W	CN	SEPT 02-2011			
2 P	SEPT- 02-2011	8 / 9	16FT FR EEOS	BO	G&W	CN	SEPT 02-2011			
2 Q	SEPT- 02-2011	8 / 9	57 FT FR 2P WEOS	BO	G&W	CN	SEPT 02-2011			
2 R	SEPT- 02-2011	8 / 9	38 FT FR 2Q WEOS	BO	G&W	CN	SEPT 02-2011			
2 S	SEPT- 02-2011	8 / 9	8 FT FR 2R SEOS	BO	G&W	CN	SEPT 02-2011			
2 T		/								

DEFECT TYPE: AD - ANIMAL RELATED DAMAGE; B - UNDISPERSED RESIN BEAD; BO - FUSION WELDER BURN; BS - BOOTSKIRT FROM FML PENETRATION; CO - CHANGE OF OVERLAP; CR - CREASE; D - INSTALLATION DAMAGE; DS# - DESTRUCTIVE TEST NUMBER; EE - EARTHWORK EQUIPMENT DAMAGE; EXT - EXTENSION; FM - FISHMOUTH; FS - FAILED SEAM LENGTH; FTS - FIELD TEST STRIP; HT - HEAT TACK BURN; IO - INSUFFICIENT OVERLAP (UNDER SPEC.); MD - MANUFACTURER DELIVERY DAMAGE; PT - PRESSURE TEST CUT; SI - SOIL SURFACE IRREGULARITY; SL - SLAG ON TEXTURED SHEET; T - THREE PANEL INTERSECTION; VL - VACUUM TEST LEAK; WR - WRINKLE; WS - WELDER RESTART; OTHER: _____

REPAIR TYPE: P - PATCH, C - CAP, RS - RECONSTRUCTED SEAM, G&W - GRIND/WELD

PASSING TRIAL SEAMS		
NO.	TIME	TECH ID.

** COLUMNS TO BE USED BY THE PROJECT SUPERVISOR OR LEAD TECHNICIAN ONLY.

SUBMITTED BY: _____

DATE: _____

3.9 Geomembrane Vacuum/Air Lance Test Log – Sht. 1 and 2

LAYFIELD GEOMEMBRANE VACUUM / AIR LANCE TEST LOG

PROJECT NUMBER: 12C 088 **PROJECT TITLE:** MILNE INLET FUEL SYSTEM UP GRADE

OWNER: HATCH **CONTRACTOR:** NUNA

LOCATION: MARY RIVER

VACUUM BOX X **AIR LANCE** _____ **SHEET NUMBER:** 1

SEAMS								REPAIRS						
SEAM NUMBER	SEAM SECTION * FROM TO	TEST DATE	TECH ID	DEFECTS **	COMPLETE NO	CHK'D BY	REMARKS **	DEFECT CODE	TEST DATE	TECH ID	DEFECTS **	CHK'D BY	REMARKS **
/	-							1 A	AUG-30-201	JC	B	JC	
/	-							1 B	AUG-30-201	JC	B	JC	
/	-							1 C	AUG-30-201	JC	BO	JC	
/	-							1 D	AUG-30-201	JC	BO	JC	
/	-							1 E	AUG-30-201	JC	BO	JC	
/	-							1 F	SEPT-02-201	JC	BO	JC	
/	-							1 G	SEPT-02-201	JC	BO	JC	
/	-							1 H	SEPT-02-201	JC	BO	JC	
/	-							1 I	SEPT-02-201	JC	BO	JC	
/	-							1 J	SEPT-02-201	JC	T	JC	
/	-							1 K	SEPT-02-201	JC	DT	JC	
/	-							1 L	SEPT-02-201	JC	BO	JC	
/	-							1 M	SEPT-02-201	JC	BO	JC	
/	-							1 N	SEPT-02-201	JC	BO	JC	
/	-							1 O	SEPT-02-201	JC	T	JC	
/	-							1 P	SEPT-02-201	JC	BO	JC	
/	-							1 Q	SEPT-02-201	JC	BO	JC	
/	-							1 R	SEPT-02-201	JC	BO	JC	
/	-							1 S	SEPT-02-201	JC	BO	JC	
/	-							1 T	SEPT-02-201	JC	BO	JC	

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER. OR A POINT LOCATION ON THE SEAM

** RECORD QUANTITY OF LEAKS DETECTED AND REFERENCE NEW DEFECT CODE IN REMARKS

SUBMITTED BY: JC

DATE: SEPT 02 -2011

LAYFIELD GEOMEMBRANE VACUUM / AIR LANCE TEST LOG

PROJECT NUMBER: 12C 088 **PROJECT TITLE:** MILNE INLET FUEL SYSTEM UP GRADE

OWNER: HATCH **CONTRACTOR:** NUNA

LOCATION: MARY RIVER

VACUUM BOX X **AIR LANCE** _____ **SHEET NUMBER:** 2

SEAMS								REPAIRS						
SEAM NUMBER	SEAM SECTION * FROM	TO	TEST DATE	TECH ID	DEFECTS **	COMPLETE NO	CHK'D BY	REMARKS **	DEFECT CODE		TEST DATE	TECH ID	DEFECTS **	CHK'D BY	REMARKS **
/	-								2	A	EPT- 02-201	JC	T	JC	
/	-								2	B	EPT- 02-201	JC	BO	JC	
/	-								2	C	EPT- 02-201	JC	BO	JC	
/	-								2	D	EPT- 02-201	JC	BO	JC	
/	-								2	E	EPT- 02-201	JC	T	JC	
/	-								2	F	EPT- 02-201	JC	T	JC	
/	-								2	G	EPT- 02-201	JC	T	JC	
/	-								2	H	EPT- 02-201	JC	T	JC	
/	-								2	I	EPT- 02-201	JC	T	JC	
/	-								2	J	EPT- 02-201	JC	T	JC	
/	-								2	K	EPT- 02-201	JC	T	JC	
/	-								2	L	EPT- 02-201	JC	T	JC	
/	-								2	M	EPT- 02-201	JC	T	JC	
/	-								2	N	EPT- 02-201	JC	T	JC	
/	-								2	O	EPT- 02-201	JC	BO	JC	
/	-								2	P	EPT- 02-201	JC	BO	JC	
/	-								2	Q	EPT- 02-201	JC	BO	JC	
/	-								2	R	EPT- 02-201	JC	BO	JC	
/	-								2	S	EPT- 02-201	JC	BO	JC	
/	-								2	T					

* REFERENCE SEAM ENDPOINTS FROM AN END OF SEAM (EOS), A REPAIR NUMBER, OR A POINT LOCATION ON THE SEAM

** RECORD QUANTITY OF LEAKS DETECTED AND REFERENCE NEW DEFECT CODE IN REMARKS

SUBMITTED BY: JC

DATE: SEPT -02-2011

3.10 Geomembrane Destructive Test Reports

LAYFIELD GEOMEMBRANE DESTRUCTIVE TEST REPORT

PROJECT NUMBER: 12C-088 **PROJECT TITLE:** MILNE INLET FUEL SYSTEM UP GRADE
OWNER: HATCH **CONTRACTOR:** NUNA
LOCATION: MARY RIVER **SHEET NUMBER:** 1

DESTRUCTIVE TEST NUMBER*: DT# 1 **TEST DATE:** SEPT 02-2011
SEAM NUMBER: P-4 /P-7 **ARCHIVE** ____ **LAYFIELD** ____ **OWNER** ____ **ENGINEER**
SAMPLE LOCATION: 15 FT FR 1J SEOS **3RD PARTY** ____ **YES** ____ **NO** ____ **WHO?**
DATE SEAMED / SAMPLED: SEPT 02 -2011 - **DATE FORWARDED TO LAB** ____
TYPE OF SEAM: WEDGE **DATE LAB TEST RESULTS REC'D** ____

FIELD TEST RESULTS (units = lbf. / in. width = ppi)

SHEAR STRENGTH			PEEL ADHESION				
				INSIDE SEAM		OUTSIDE SEAM	
SPECIMEN NUMBER	SEAM STRENGTH	** LOCUS OF BREAK CODE	SPECIMEN NUMBER	ADHESION STRENGTH	LOCUS OF BREAK CODE	ADHESION STRENGTH	** LOCUS OF BREAK CODE
1	80	SEI	2	62	SEI	72	SEI
3	72	SEI	4	64	SEI	62	SEI
5	73	SEI	6	64	SEI	75	SEI
7	75	SEI	8	67	SEI	77	SEI
9	77	SEI	10	77	SEI	65	SEI
11			12				

* DESTRUCTIVE TEST NUMBERS SHOULD BE SEQUENTIAL AND ARE TO BE PREFIXED BY EITHER DT (FUSION), DX (EXTRUSION) OR DS (SOLVENT).

LPL: PASS PASS

** REFER TO LOCUS OF BREAK CODE DIRECTORIES PROVIDED FOR UNSUPPORTED AND SUPPORTED MATERIALS.

3RD PARTY / LAB: PASS ____ FAIL ____

NOTES: ____

CHECKED BY: JC
DATE: SEPT 02 -2011

LS FORM 8 (OPTIONAL)

LAYFIELD ENVIRONMENTAL SYSTEMS

LAYFIELD

GEOMEMBRANE DESTRUCTIVE TEST REPORT

PROJECT NUMBER: 12C-088 **PROJECT TITLE:** MILNE INLET FUEL SYSTEM UP GRADE
OWNER: HATCH **CONTRACTOR:** NUNA
LOCATION: MARY RIVER **SHEET NUMBER:** 1

DESTRUCTIVE TEST NUMBER*: DT# 1 **TEST DATE:** SEPT 02-2011
SEAM NUMBER: P-5 /P-8 **ARCHIVE** _____ **LAYFIELD** _____ **OWNER** _____ **ENGINEER**
SAMPLE LOCATION: 15 FT FR 1J SEOS **3RD PARTY** _____ **YES** _____ **NO** _____ **WHO?**
DATE SEAMED / SAMPLED: SEPT 02 -2011 - **DATE FORWARDED TO LAB** _____
TYPE OF SEAM: WEDGE **DATE LAB TEST RESULTS REC'D** _____

FIELD TEST RESULTS (units = lbf. / in. width = ppi)

SHEAR STRENGTH			PEEL ADHESION				
				INSIDE SEAM		OUTSIDE SEAM	
SPECIMEN NUMBER	SEAM STRENGTH	** LOCUS OF BREAK CODE	SPECIMEN NUMBER	ADHESION STRENGTH	LOCUS OF BREAK CODE	ADHESION STRENGTH	** LOCUS OF BREAK CODE
1	77	SEI	2	72	SEI	66	SEI
3	59	SEI	4	70	SEI	55	SEI
5	69	SEI	6	67	SEI	61	SEI
7	65	SEI	8	73	SEI	65	SEI
9	64	SEI	10	68	SEI	52	SEI
11			12				

* DESTRUCTIVE TEST NUMBERS SHOULD BE SEQUENTIAL AND ARE TO BE PREFIXED BY EITHER DT (FUSION), DX (EXTRUSION) OR DS (SOLVENT).

LPL: PASS PASS

** REFER TO LOCUS OF BREAK CODE DIRECTORIES PROVIDED FOR UNSUPPORTED AND SUPPORTED MATERIALS.

3RD PARTY / LAB: PASS _____ FAIL _____

NOTES: _____

CHECKED BY: JC

DATE: SEPT -02-2011

3.11 Certificate of Final Inspection and Acceptance

LAYFIELD

CERTIFICATE OF FINAL INSPECTION AND ACCEPTANCE

PROJECT NAME: MILNE INLET FUEL TANK FARM.
PROJECT NUMBER: 12C-088 DATE: SEPT. 02. 2011
OWNER: HATCH MINING
LOCATION: MILNE INLET.

SCOPE OF INSTALLATION(S): THE WORK
UNDERLAY / OVERLAY LP12 GEOTEXTILE. & PANELS ARCGARD 535. WELDED, TESTED, REPAIRED AS PER LAYFIELD QC.

Part 1 – LAYFIELD ENVIRONMENTAL SYSTEMS LTD.

I, CHRISTOPHER NYBAEK, a duly appointed representative of Layfield Environmental Systems Ltd. (LESL), have visually observed the installations (as outlined above), and have found the Work to be complete and free of defects and declare that the Work was completed in accordance with the project specifications, Layfield Environmental Systems' QC program and the terms and conditions of the contract.

Layfield Environmental Systems Representative:
Name: CHRISTOPHER NYBAEK
Title: TECHNICIAN
Date: SEPT. 02. 2011 Signature: [signature]

Part 2 – OWNER (or Representative)

I, TYLER BRUCE, a duly appointed representative of NUNA CONTRACTING, do hereby take over and accept the installation(s) described above, and confirm that the work has been completed in accordance with the project specifications and the terms of the conditions of the contract.

I have evaluated and measured the work together with the Layfield Environmental Systems representative, and agree that the measurements shown are both true and correct, and that the installation has met our approval.

Owners Representative:
Name: TYLER BRUCE
Title: ASSISTANT PROJECT MANAGER
Company: NUNA CONTRACTING
Date: SEPT 2, 2011 Signature: [signature]

Comments:

3.12 Shop QC Fabrication

LAYFIELD

SHOP QC

LG-03-QF-004 24-May-11

Special Fabrication Instructions	In-Process Inspection			
Description of Operations/Procedures	#1	#2	#3	Completed

Job Desc.	Baffinland - Inlet Fuel Containment (Panel A)		
Customer:	Nuna Logistics Ltd.		
Sales Person:	JF	Date:	6-Jul-11
Material Type:	HAZGARD 535 Red/Black 148" Wide		
Prod Code:	12C-~~535~~ 0 57121		
Fab Code:	03LMHZ535		
Length	120	Width	120.0

Docket / Lot #	#	Roll #	Liner# / Panels	Quantity
44905	E26965	H2535-022	1/3+ 771	
44629	E27200	H2535-005	1/43"	
46129	E27260	H253-005	1/6	

Repairs: LINER #1 PANEL #4 771 FROM START

12. 300 860

Mach: FS-UI | Speed: 500 | Temp: 860 | Splice: 1

ASTM D6392

Liner #		Shear (Seam #) 1	6	9			Peel (Seam #) 1L	R	6L	R	9L	R	L	R	L	R	Tech/Date (Seam #) 1	6	9		
0	1	68	70	66			64	62	65	59	51	56					TH	TH	TH		
0																					
0																					
0																					
0																					
0																					
0																					
0																					
0																					
0																					

Inspections	#1 TIM	#2	#3	Final

ZK

July 12 2011

LAYFIELD

SHOP QC

LG-03-QF-004 24-May-11

Special Fabrication Instructions	In-Process Inspection				
Description of Operations/Procedures	#1	#2	#3	Completed	

Job Desc.	Baffinland - Inlet Fuel Containment (Panel B)		
Customer:	Nuna Logistics Ltd.		
Sales Person:	JF	Date:	6-Jul-11
Material Type:	HAZGARD 535 Red/Black 148" Wide		
Prod Code:	12C-055 0 57122		
Fab Code:	03LMHZ535		
Length	180	Width	84.0

Docket / Lot #	#	Roll #	Liner# / Panels	Quantity
44905	EXAG5 H535-011		7 / 6 + 60'	
46129	H2535	006	1 / 80'	
46129	H2535	006	2 / 3' - 5' + 10' + 170'	
46129	H2535	006	2 / 3' - 5' + 10' + 170'	
46129	E27260	H2535-008	2 / 6-7	
46129	E27260	H2535-008	3 / 3 + 130' + 30'	
46129	E27260	H2535-001	3 / 3.	
46129	H2535	002	4 / 5	
46129	H2535	001	4 / 2	

Repairs

L#1 P#7 cross splice 80' from start

L#2 P#7 cross splice 41' from start

#12 500 860

Machine: CFS-UI | Speed: 500 | Temp: 860 | Splice:

ASTM D6392 Shear (Seam #) 65 Peel (Seam #) 45 Tech/Date (Seam #)

Liner #		Shear 1	Shear 5	Shear 6	Peel 1 L	Peel 1 R	Peel 5 L	Peel 5 R	Peel 6 L	Peel 6 R	Peel L	Peel R	Peel L	Peel R	Tech/Date 1	Tech/Date 5	Tech/Date 6
0	1	76	69	71	71	70	56	65	64	63					7/5	3H	3H
0	2	68	70	69	63	60	59	55	62	61					3H	TH	TH
0	3	72	74	73	59	68	63	66	63	60					7/5	7/5	3H
0	4	69	63	69	57	58	54	59	60	66					3H	3H	3H
0																	
0																	
0																	
0																	
0																	
0																	

Inspections	#1	#2	#3	Final
	TIM/ZAC. July 12/2011 July 13/2011 CHRISTINA ZAC/TIM.	Zachar July 13-11		

LAYFIELD

SHOP QC

LG-03-QF-004 24-May-11

Job Desc.	Baffinland - Inlet Fuel Containment (Panel C)		
Customer:	Nuna Logistics Ltd.		
Sales Person:	JF	Date:	6-Jul-11
Material Type:	HAZGARD 535 Red/Black 148" Wide		
Prod Code:	12C-C58 0 . 57123		
Fab Code:	03LMHZ535		
Length	**120**	Width	**30.0**

Special Fabrication Instructions

Description of Operations/Procedures

In-Process Inspection			
#1	#2	#3	Completed

Docket / Lot #	#	Roll #	Liner# / Panels	Quantity
46124		H7583-10	1-2 / 4-2.5	

Repairs

Mach: PFS-UI Speed: Temp: Splice:

ASTM D6392

Liner #		Shear (Seam #) 1	2				Peel (Seam #) 1 L	R	2 L	R	L	R	L	R	L	R	Tech/Date (Seam #) 1	2			
0	1	70	71				54	55	60	61							LS	LS			
0	2	72	73				55	57	62	61							LS	LS			
0																					
0																					
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Inspections	#1 JEFF LEE	#2	#3	Final

July - 16/2011

LAYFIELD

SHOP QC

LG-03-QF-004 24-May-11

Job Desc.	Baffinland - Inlet Fuel Containment (Panel D)		
Customer:	Nuna Logistics Ltd.		
Sales Person:	JF	Date:	6-Jul-11
Material Type:	HAZGARD 535 Red/Black 148" Wide		
Prod Code:	12C-0888	0	57124
Fab Code:	03LMHZ535		
Length	**72.67**	Width	**30.0**

Special Fabrication Instructions
Description of Operations/Procedures

In-Process Inspection			
#1	#2	#3	Completed

Docket / Lot #	#	Roll #	Liner# / Panels	Quantity
U6129		10	1 / 1-25	

Repairs

Mach: PFS-UI Speed: Temp: Splice:

ASTM D6392

Liner #		Shear (Seam #) 1	2				Peel (Seam #) 1 L	R	2 L	R	L	R	L	R	L	R	Tech/Date (Seam #) 1	2			
0	1	73	72				59	58	60	61							15	15			
0																					
0																					
0																					
0																					
0																					
0																					
0																					
0																					
0																					

Inspections	#1	[illegible]	#2		#3		Final	

July-16/2011

LAYFIELD

SHOP QC

LG-03-QF-004 24-May-11

Job Desc.	Baffinland - 5M Diesel Storage (Panel E)		
Customer:	Nuna Logistics Ltd.		
Sales Person:	JF	Date:	6-Jul-11
Material Type:	HAZGARD 535 Red/Black 148" Wide		
Prod Code:	12C-088 0 57425		
Fab Code:	03LMHZ535		
Length	**138.1**	Width	**96.0**

Special Fabrication Instructions

Description of Operations/Procedures

In-Process Inspection #1	#2	#3	Completed

Docket / Lot #	#	Roll #	Liner# / Panels	Quantity
46129	E27260	HZ535-007	1/8	
46129	E27260	HZ535-010	2/PNL1+46'	
46129	E27260	HZ535-011	2/PNL2(93')	
46129	E27260	HZ535-013	3/PNL 1→7	
46129	E27260	HZ535-015	3/PNL8	
46129	E27260	HZ535-015	4/P 1-5	
46129	E27260	HZ535-003	4/P 6-8	
46129	[illegible]	HZ535-011	L5/82' PNL#1	
46905		HZ535-036	L5/57 PNL#1+PNL2→7+PNL8	

Repairs: Splice liner#5 panel 1 and 8

Mach:	Speed:	Temp:	Splice:
12# PHS-UI	500	860	

ASTM D6392

Liner #		Shear 1	Shear 6	Shear 7			Peel 1 L	R	6 L	R	7 L	R	L	R	L	R	Tech/Date 1	6	7		
0	1	72	70	69			60	59	62	60	61	58					PS	PS	[illegible]		
0	2	62	65	68			49	53	50	48	51	50					BS	EL	EL		
0	3	68	69	66			48	50	52	49	50	49					BS	BS	BS		
0	4	64	62	65			51	50	54	53	49	52					HB	HB	HB		
0	5	63	61	66			50	51	51	52	50	49					CA	CA	CA		
0	6	64	65	66			53	54	52	54	53	53					PS	PS	PS		
0																					
0																					
0																					
0																					

Inspections	#1	#2	#3	Final
		Hunter		

James July-17/2011

3.13 Geomembrane Certificate of Analysis – Hazguard 535

LAYFIELD

Geomembrane Certificate of Analysis

LAYFIELD POLY FILMS LTD.
11120 Silversmith Place, Richmond, BC, V7A 5E4
Phone: (604) 275-5588
Fax: (604) 275-7867
Web: www.geomembranes.com
E-Mail: millcerts@LayfieldGroup.com

Customer Layfield Geosynthetics and Industrial Fabrics Ltd.

Address 11603-180 Street NW
Edmonton
Alberta
T5S 2H6
Canada

Customer PO# E26965

Layfield Job # 44905
Values (US/Metric) US

HAZGARD 535

Manufacturing Test Results

Property	Method* ASTM	Units US	Spec		Roll 1	Roll 10	Roll 19	Roll 28	Roll 37
Thickness(min)	D5199	mil	35	✓	38.7	38.5	37.4	38.4	38.9
Thickness(Ave)	D5199	mil	38	✓	40.3	40.6	39.3	40.6	39.8
Tensile Strength MD	D638	lb/in	130	✓	186	196	210	201	198
Elongation MD	D638	%	800	✓	1506.9	1506.4	1840.1	1647.5	1592.0
Tensile Strength TD	D638	lb/in	130	✓	187	209	204	205	203
Elongation TD	D638	%	800	✓	1582.4	1617.1	1600.3	1614.5	1755.5
Tear Strength MD	D1004	lbs	19	✓	24.1		24.1		25.7
Tear Strength TD	D1004	lbs	19	✓	24.0		24.9		25.2
Puncture Strength	D4833	lbs	49	✓	74.5		71.1		71.3
Dim. Stab. MD (max)	D1204	%	1.5	✓	0.0				
Dim. Stab. TD (max)	D1204	%	1.5	✓	0.0				
Carbon Black Content	D1603	%	3	✓					
Carbon Black Dispersion	D5596	1 or 2	2	✓					
Specific Gravity (min)	D1505	g/cc	0.939	✓	0.941 **				

We hereby certify that the geomembrane produced meets or exceeds Layfield's specifications outlined above.

*Please refer to testing notes on reverse.
**Formulation Tested Previously Successfully

October 4, 2011
Date

Authorized Signature

LAYFIELD

Geomembrane Certificate of Analysis

LAYFIELD POLY FILMS LTD.
11120 Silversmith Place, Richmond, BC, V7A 5E4
Phone: (604) 275-5588
Fax: (604) 275-7867
Web: www.geomembranes.com
E-Mail: millcerts@LayfieldGroup.com

Customer Layfield Geosynthetics and Industrial Fabrics Ltd.
Address 11603-180 Street NW
Edmonton
Alberta
T5S 2H6
Canada

Customer PO# E27260

Layfield Job # 46129
Values (US/Metric) US

HAZGARD 535

Manufacturing Test Results

Property	Method* ASTM	Units US	Spec		Roll 1	Roll 10	Roll 19	Roll 28	Roll 37
Thickness(min)	D5199	mil	35	✓	38.2	39.1	39.6	38.0	40.5
Thickness(Ave)	D5199	mil	38	✓	40.0	40.8	41.8	41.4	41.9
Tensile Strength MD	D638	lb/in	130	✓	202	186	192	197	202
Elongation MD	D638	%	800	✓	1373.1	1260.4	1304.9	1323.0	1306.8
Tensile Strength TD	D638	lb/in	130	✓	201	193	194	191	197
Elongation TD	D638	%	800	✓	1418.1	1338.8	1324.3	1290.7	1321.0
Tear Strength MD	D1004	lbs	19	✓	24.0		26.3	24.5	
Tear Strength TD	D1004	lbs	19	✓	25.0		26.1	24.9	
Puncture Strength	D4833	lbs	49	✓	58.8		72.0	74.0	
Dim. Stab. MD (max)	D1204	%	1.5	✓	0.8			0.0	
Dim. Stab. TD (max)	D1204	%	1.5	✓	0.0			0.00	
Carbon Black Content	D1603	%	3	✓	3.4			3	
Carbon Black Dispersion	D5596	1 or 2	2	✓					
Specific Gravity (min)	D1505	g/cc	0.939	✓	0.941 **			0.9	

We hereby certify that the geomembrane produced meets or exceeds Layfield's specifications outlined above.

*Please refer to testing notes on reverse.
**Formulation Tested Previously Successfully

October 4, 2011
Date

Authorized Signature

3.14 Installation Warranty

LAYFIELD ENVIRONMENTAL SYSTEMS LTD.
11603 – 180 Street Edmonton, Alberta T5S 2H6 Canada
Phone: (780) 453-6731
Fax: (780) 452-9495
Toll Free: 1 800 840-2884
Web: www.layfieldgroup.com
E-Mail: edm@layfieldgroup.com

INSTALLATION WARRANTY

Layfield Reference No. : (Job #) 12C-122

LAYFIELD ENVIRONMENTAL SYSTEMS LTD. (LAYFIELD) hereby warrants to Baffinland Iron Mines Corporation; (the Customer) that the work performed by LAYFIELD on the Installation described as Baffinland Milne Inlet Tank Farm / Hazgard 535 will:

1. Meet the field seam specifications set out in the contract between LAYFIELD and the Customer (as amended by LAYFIELD's quotation), all workmanship to meet the requirements of LAYFIELD's Field Installation Quality Assurance program, and be free of defects at the time of completion of the Installation; and

2. Be free of installation defects from the date of the completion of the Installation (September 2, 2011), for a period of one year so long as the completed Installation is used for the purposes and in the manner for which the Installation was designed.

Should damage or defects within the scope of the aforesaid warranties occur, LAYFIELD shall repair the damage or defects, PROVIDED THAT the area to be repaired must first be made ready by the Customer and be in a clean, dry, unencumbered condition, free from all water, soil, sludge, residuals, and liquids of any kind.

To enable LAYFIELD to investigate and determine the cause of any alleged damage or defect, notice and details of any claim hereunder must be presented in writing to LAYFIELD within thirty (30) days after the alleged damage or defect was first noticed or observed. Failure to provide such notice and details shall invalidate all warranties provided hereunder.

The liability of LAYFIELD under the aforesaid warranties are subject to the following conditions:

a. LAYFIELD's only obligation shall be to repair or replace any defective workmanship and in no event shall LAYFIELD be liable for any amount in excess of the cost of the Installation;

b. No allowance will be made for repairs, replacements or alterations made by the Customer unless with the prior written consent of LAYFIELD;

c. The warranties hereunder extend only to the Customer and are not transferable;

d. The warranties hereunder shall not apply to any damage or defects resulting from misuse, mechanical abuse by machinery, equipment or persons, excessive pressures or stresses, exposure of the completed Installation of harmful chemicals, unusual weather conditions, casualty catastrophe such as (but not limited to) earthquake, flood, hail, tornado, or any other act of God;

e. Under no circumstances shall LAYFIELD be liable for any special, direct, indirect, or consequential damages including the loss of use of the Installation howsoever caused;

f. The warranties hereunder are given in lieu of all other warranties, express, implied, statutory, or otherwise, and the Customer expressly waives all other warranties and claims whatsoever except those specifically given herein, and the Customer acknowledges that the warranties hereunder are accepted in preference to and to the exclusion of any or all other warranties; and

g. An Installation Warranty will not be provided for lining projects unless the installation is completed by LAYFIELD personnel or designated LAYFIELD subcontractors.

LAYFIELD ENVIRONMENTAL SYSTEMS LTD.

Greg Van Petten, Director of Construction Operations

4. ADCO Ikpiaryuk Limited – Piping/Electrical/Mechanical

4.1 Fuel Storage Tank Installation Check List

HATCH

Baffinland

FUEL STORAGE TANK INSTALLATION CHECKLIST

BAFFINLAND IRON MINES CORPORATION
· MARY RIVER IRON ORE PROJECT/MILNE INLET FUEL SYSTEM UPGRADE
CONTRACT # H337697

EQUIPMENT:	API 650 Storage Tank	MANUFACTURER:	Gem - Steel
LOCATION:	Baffin Island, Nunavut	MODEL:	N/A
I.D. NO.:	T-001	PRODUCT:	DIESEL

ITEM #	DESCRIPTION	CHECK	DATE	INITIALS	CONTRACTOR	CONSULTANT	COMMENTS
		✓					M.C
1	Name plate details as per API 650 data sheet & specifications.	✓	Sept 27/11		Gem Steel		M.C
2	Tank internals are clean, free of debris and water.	✓					M.C
3	All access stairs and platforms are complete.	✓					M.C
4	All required external and internal welding to tank shell, floor plates, roof plates have been completed and tested as per API 650 requirements.	✓					M.C
5	All internal bolting and torque completed to specification.	✓					M.C
6	All external bolting and torque completed to specification.	✓					M.C
7	All internal piping installed as per engineering drawings and specifications.	✓					M.C
8	Water draw off piping / unobstructed.	✓					M.C
9	All internal flanged connections have the correct nuts, bolts and gaskets as per the engineering drawings and specifications.	✓					M.C.
10	Roof vent, level transmitters and roof gauge hatches installed.	✓					M.C.
11	All required NDE has been complete and back up documentation has been received/approved.	✓	Sept 8		Adco		
12	Pipe connections aligned and supported as per engineering drawings.	N/A	N/A	N/A	N/A	N/A	N/A
13	All tank trim installed as per engineering drawings and manufacturer's instructions.	✓					[illegible]
14	Valve inspection / lockout on all connections.	✓					[illegible]
15	All internal and external tank instrumentation installed as per engineering drawings & specifications.	✓	Sept 5/11		Adco Bauer.		[illegible]
16	All external flanged connections have the correct nuts, bolts and gaskets as per the engineering drawings and specifications.	✓					[illegible]
17	Clearance lights installed on Tank as per engineering drawing and specifications.	✓					[illegible]
18	Confirm grounding connections						

ITEM	DATE	INITIAL
Checks Complete	Steve Davis 27/9/11	[illegible]
HATCH Verification	Marlon Coaley	
Gem-Steel Verification		
Client Verification		

Equipment Checklist #

T-001

4.2 Inspection Test Plan (ITP)

Inspection Test Plan

Client: Nuna Logistics Limited/ Baffin Land Milne site

Job Number: | **Job Number: 3266** | **PO Number:** | **Sept 2/11**

Description: Fuel Supply System | **Drawing:** H337697-4020-60-012-0001 RV B | **P&ID:**

Legend:

H: A mandatory hold on manufacturer until release by inspector or official waiver from client.
M: Inspection stage by inspector on a spot basis but not a mandatory hold point.
HR: A mandatory review and acceptance/approval of specified document.
W: To be informed and invited to inspect. Fabrication to continue if inspector does not attend.
R: Review of test report/certifications.
A: Audit (Review at random)

Activity Number	Quality Related Activity	Reference Documents	Acceptance Criteria	Document Certification Required	Adco			Nuna			Hatch		
					Hold	Sign	Date	Hold	Sign	Date	Hold	Sign	Date
10	Pre-Inspection Kick off meeting/			Meeting Minutes ITP Hold Point Identified	H		Aug 31 2011	H	CF	Aug 31 2011	H		31-08-11
20	Weld procedure specifications, including repairs, weld procedure qualifications. Approved for use by Client prior to start of welding production/fabrication.	ASME IX / ASME B31.3	ASME IX / ASME B31.3	WPS/PQR	HR		Aug 31 2011	H	CF	Aug 31 2011	H		31-08-11
30	Welder qualified to WPS.	ASME IX	"B" Pressure Certification	Welder certification	H		Aug 31 2011	H	CF	Aug 31 2011	H		31-08-11
40	Check that certification is available to weld consumables.	ADCO Quality Manual (QSM)		Manufacturers Certification for welding consumables	HR		Aug 31 2011	H	CF	Aug 31 2011	H		31-08-11
50	Ensure material description and heat numbers match that of the MTRs prior to fabrication.	PO / drawings / MTRs and Heat Number Index Log	Correct material and free from contamination and damage.	Receiving Report and Heat Number Index Log.	W		Aug 31 2011	R	CF	Aug 31 2011	R		31-08-11
60	Tracability of materials / Production Record started for all components.	ADCO Quality Manual (QSM)	Drawing BOM Item traceable to MTR and/or Production Record	Asbuilt Dwg, MTRs	R		Aug 31 2011	R	CF	Aug 31 2011			

Inspection Test Plan

Client: Nuna Logistics Limited/ Baffin land milne site			**Date: Sept 2/11**
Job Number: 3266	**Job Number:** 3266	**PO Number:**	
Description: Fuel Supply System	**H337697-4020-60-012-0001 RV B**	**P&ID:**	

Legend:
H: A mandatory hold on manufacturer until release by inspector or official waiver from client.
M: Inspection stage by inspector on a spot basis but not a mandatory hold point.
HR: A mandatory review and acceptance/approval of specified document.
W: To be informed and invited to inspect. Fabrication to continue if inspector does not attend.
R: Review of test report/certifications.
A: Audit (Review at random)

Activity Number	Quality Related Activity	Reference Documents	Acceptance Criteria	Document Certification Required	Adco			Nuna			Hatch		
70	Check internal and external finish of components.	ASME B31.3	Free of debris, damage and contamination.	Inspection report.	H	[illegible]	Sept 4 2011	A	CF	Sept 5 2011	A	[illegible]	[illegible]
80	Review / ensure that a weld map / record is being operated so that all operations carried out on a specific joint are fully detailed.	Weld Map / Record	List all joint numbers. List all operations welder identities.	Control Sheet / Asbuilt fabrication drawing.	HR	[illegible]	Sept 14 2011	R	CF	Sept 15 2011	R	[illegible]	[illegible]
90	Review welders performance qualification.	ASME IX / Welders Log	Current certificate to approved procedure.	Qualification certificates.	HR	[illegible]	Sept 14/11	H	CF	Sept 15/11			
100	Review NDT technician qualifications.	ASME V	Current and correct category certification CGSB Level 2 or 3 (or international equivalent)	Qualification certificates.	HR	[illegible]	Sept 24/11	R	CF	Sept 24 2011			
110	Check fit-up, alignment and tacking of weld joints.	Weld procedure / approved drawing	PFI ES-3 & PFI ES-24	Inspection report.	M	[illegible]	Sept 24/11	A	CF	Sept 25/11	A	[illegible]	[illegible]
120	Visually examine all completed welds.	ASME B31.3 Welding Inspection requirements	ASME B31.3 Welding Inspection requirements	Inspection report.	HR	[illegible]	Oct 3 2011	A	CF	Oct 3 2011			

Inspection Test Plan

Client: Nuna Logistics Limited			
Job Number:3266	**Job Number:** 3266	**PO Number:**	**Date: Sept 2/11**
Description: Fuel Supply System	**Drawing:** H337697-4020-60-012-0001 RV B	**P&ID:**	

Legend:
H: A mandatory hold on manufacturer until release by inspector or official waiver from client.
M: Inspection stage by inspector on a spot basis but not a mandatory hold point.
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W: To be informed and invited to inspect. Fabrication to continue if inspector does not attend.
R: Review of test report/certifications.
A: Audit (Review at random)

130	NDE performed as per applicable line classes identified on IFC drawings 100% VT press. Welds, 100% RT, 100% MT SWs.	Approved NDT procedures ASME B 31.3	ASME B31.3 normal service conditions	NDE Report	H	DH	Oct/4 2011	R	CF	Oct4 2011		N/A	
140	Ensure all welding repairs have welding repair sign off sheets signed by welder.	ADCO Quality System Manual	ASME B31.3 normal service conditions	Weld Repair Form	H	DH	Oct/5 2011	R	CF	Oct5 2011		N/A	
150	Marking / Tagging of spools.	ADCO Quality System Manual		N/A	M	DH	Oct/5 2011	M	CF	Oct5 2011	A	DH	Oct5 11
160	Pressure Testing as per IFC Drawings.	ADCO Quality System Manual	Minimum 10 minute hold at or above minimum test pressure with no drop. Visual inspection of all joints	Pressure Test Record & Gauge Calibration Certificate	H	DH	Oct/2 2011	W	CF	Oct 2 2011	H	DH	Oct2 11
170	Review all documents.	ASME B31.1	Asbuilts reviewed and accepted, NCRs signed off and completed and NDT requirements met	Asbuilt Drawings, NCRs and AB-83	R	DH	Oct/5 2011	N/A	CF	Oct 5 2011	R	DH	Oct5
180	Issue of Letter of Mechanical Completion to client.	ADCO Quality System Manual	Review of documents	QA acceptance / release	H	DH	Oct/5 2011	N/A	CF	Oct5 2011			

Customer Acceptance:

(Print) (Sign) (Date)

Inspection Test Plan

Client: Nuna Logistics Limited

Job Number: 3266	**Job Number:** 3266	**PO Number:**	**Date: Aug 31,2011**
Description: Milne Inlet Fuel System Upgrade	**Project:** H337697	**P&ID:**	

Legend:

H: A mandatory hold on manufacturer until release by inspector or official waiver from client.
M: Inspection stage by inspector on a spot basis but not a mandatory hold point.
HR: A mandatory review and acceptance/approval of specified document.
W: To be informed and invited to inspect. Fabrication to continue if inspector does not attend.
R: Review of test report/certifications.
A: Audit (Review at random)

Activity Number	Quality Related Activity	Reference Documents	Acceptance Criteria	Document Certification Required	Adco			Nuna			Hatch		
					Hold	Sign	Date	Hold	Sign	Date	Hold	Sign	Date
10	Pre-Inspection Kick off meeting/ with client	Drawings issued for construction from Hatch	Manufacture equipment manuals and documentation	Meeting Minutes ITP Hold Point Identified	H	DH	Aug/31 2011	H	CF	Aug31 2011	H		
20	Low voltage equipment procedure installation approved for installation by client	ADCO Quality Manual with pre-inspection checklist	Electrical equipment Checklist, Electrical cable Checklist	Manufacturers Certification and manuals	HR	DH	Oct/4 2011	H	CF	Oct4 2011	H		
30	Electrician qualified	ADCO Quality Manual	Electrical 309A certification	Electrician certification	H	DH	Aug/31 2011	M	CF	Aug31 2011	H		
40	Inspection for transformers and non combustible material	Electrical CEC regulations	Electrical CEC regulations	Manufacturers Supplied Certification for by Nuna Client Equipment	W			H					
50	Ensure material description matches site standards and electrical prints	PO / drawings / and CSA standards	Correct material and free from any damage.	Receiving Report and shop drawings	HR	DH Oct 4 2011		w	CF	Oct 4 2011	W		
60	Inspection of low voltage installation and components	AdcoQA/QC inspection documentation and shop drawings	Inspection test forms and manufacture shop drawings	Electrician certification Manufacture certification	R	DH Oct 4 2011		R	CF	Oct4 2011	R		

Inspection Test Plan

Client: Nuna Logistics Limited

Job Number: 3266	Job Number: 3266	PO Number:	Date: Aug 31,2011
Description: Milne Inlet Fuel System Upgrade	Project: H337697	P&ID:	

Legend:
H: A mandatory hold on manufacturer until release by inspector or official waiver from client.
M: Inspection stage by inspector on a spot basis but not a mandatory hold point.
HR: A mandatory review and acceptance/approval of specified document.
W: To be informed and invited to inspect. Fabrication to continue if inspector does not attend.
R: Review of test report/certifications.
A: Audit (Review at random)

Activity Number	Quality Related Activity	Reference Documents	Acceptance Criteria	Document Certification Required	Adco			Nuna			Newmont		
70	Documentation of grounding installation	CEC grounding Icodes of installation requirements	Grounding inspection reports of installation	Inspection report.	HR	DT	~~Sept 15~~ Sept 15 2011	H	CF	Sept 15 2011	M	Sept 15 2011	
80	Review / ensure that proper cable installation are implemented	Electrical layout and cec regulations	Cable installation and Megger report sheets	Cable installation and Megger report sheets N/A	HR			M					
90	Inspection of all termination before power is applied to equipment	Cable installation and Megger report sheets, For all cables	Cable installation and Megger report sheets, for all cables	QA/QC and turnover packages from contractor	HR	DT	Oct 5 2011	HR	CF	Oct 5 2011	HK	Oct 5 2011	
100	Inspection of all cable tags and lamicoids needed for installation for identification	Need to implement cable identification numbers	implementation of identification termination codes	Cable inspection report N/A No Cable Tags Given	HR			R					
110					M			A					
120					HR			A					

Inspection Test Plan

Client: Nuna Logistics Limited

Job Number: 3266	Job Number: 3266	PO Number:	Date: Aug 31,2011
Description: Milne Inlet Fuel System Upgrade	Project: H337697	P&ID:	

Legend:
H: A mandatory hold on manufacturer until release by inspector or official waiver from client.
M: Inspection stage by inspector on a spot basis but not a mandatory hold point.
HR: A mandatory review and acceptance/approval of specified document.

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R: Review of test report/certifications.
A: Audit (Review at random)

Customer Acceptance:

(Print)	(Sign)	(Date)

4.3 Welder Performance Qualification Card

GRB Enterprises Ltd
Edmonton Alberta

AOQP 7107(C)

WELDER PERFORMANCE QUALIFICATION CARD

DOUG

Name SUNDBY

W- 15609
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 IX of the ASME BPV Code and subject to the limitations on the reverse side.

APRIL 16, 2010
Date of Test

Welder Signature

BRUCE CORMIER
Welding Examiner (Print/Type)

15176
GRB Card No.

Performance Qualification GRB Card No. 15176

Process(es) SMAW

Materials (P.No.) P1

Filler Metal (F.No) F3 F4

Min. Outside Pipe Diameter 1" OD

Max Deposited Weld Metal 0.104" MAX. TO WELD

Position(s) Qualified ALL

Backing WITHOUT WITH WITH

Backing Gas NONE

Progression UPHILL

#E00 252
Examiner File No.

APRIL 16, 2012
P.Q. Expiry Date

Welding Examiner Signature

Welder Qualification

This card is valid only while employed by a CWB certified company

Transferable Welder

Name: DOUG W. SUNDBY

Employer: Adco Power Ltd., Edmonton, AB

Thickness Range: 3mm & above

Mode: MANUAL

Exp. Date: Aug 30, 2013

Material: Carbon Steel

Process: SMAW

Standard: CSA W47.1

Classification: S

Electrode: F4

Class: FLAT/HORIZONTAL/VERTICAL UP/OVERHEAD

See Reverse for Conditions

Welder's Last Name: GIFFORD	Initial: N	First Name: STEVE	Signature: Steve Gifford
Res. Address:		Postal Code:	Stamp No.: 6
Employer Name: Alliance Weldrow Technologies Inc.			Provincial Registration No.: WP.R3989.5
Street Address: 1016 Upper Wentworth St.			Company PQR No.: 97-01H
Hamilton		Postal Code: L9A 3S3	Company WPS No.used: 97-01
Welding Process(es) Used: SMAW			Type(s): ☑ manual ☐ machine ☐ semi-automatic ☐ automatic
Base Material(s): SA106B / SA106B			Thickness(es): .218"

Variables for All Processes	Actual Values	Range Qualified
Backing material (with/without)	F3 with FA with	F3 with or without FA with
ASME P or S No. to ASME P or S No.	P1 to P1	P1 to P1 or P3x
( ) Plate (✓) Pipe (enter diameter if pipe)	2" dia	1" dia & up
Filler Metal Specification (SFA) Class (QW-404) (Informational Only)	5.1/E7018	
Consumable Insert for GTAW or PAW (QW-404)		
Welding Position (1G, 5G, etc.) (QW-405)	6G	ALL Groove (+Fillets)

Manual or Semi-automatic Variables (QW-350)	Actual Values	Range Qualified
Filler Metal F- No. (QW-404)	F3 F4	F4 or 3 (F3 with or without backing)
Filler Metal Product Form for GTAW, PAW (QW-404)		
Weld deposit thickness for each welding process (QW-404)	F3 .100" F4 MAX	F3 .200" F4 .230"
Process 1: _____ 3 layers minimum ☐ Yes ☐ No		
Process 2: _____ 3 layers minimum ☐ Yes ☐ No		
Vertical progression (uphill/downhill) (QW-405)	Uphill	Uphill only
GTAW, PAW or GMAW backing gas; or OFW fuel gas (QW-408)		
GMAW transfer mode (spray/globular or pulse to short circuit) (QW-409)		
GTAW welding current type & polarity (AC, DCEP, DCEN)(QW-409)		

Machine Welding Variables (QW-361.2)	Actual Values	Range Qualified
Direct or remote visual control		
Automatic arc voltage control (GTAW)		
Automatic joint tracking		
Multiple or single pass per side		

Automatic Welding Variables (QW-361.1)	Actual Values	Range Qualified
Filler metal (EBW or LBW)		

Welder's Copy

Ontario

CERTIFICATE OF QUALIFICATION
CERTIFICAT DE QUALIFICATION

Name / Nom

Trade Certificate/
Certificat :

Issue Date
Date d'effet :

INTER. PROV. NO.
N° INTERPROV.

IDENTIFICATION NO. N° D'IDENTITÉ	TRADE CERTIFICATE CERTIFICAT	EXP. DATE D'EXPIRATION

Welder Qualification

This card is valid only while employed by a CWB certified company

Transferable Welder

Name: **STEVE NJ GIFFORD** Exp. Date: **Nov 13, 2011**
Employer: **Allied Marine & Industrial, Port Colborne**
Testing Standard: **CSA W47.1-03** Material: **Carbon Steel**
Process: **SMAW** Mode: **Manual**
Mode of Transfer: **N/A**
Class: **Flat/Horizontal/Vertical Up/Overhead**
Classification: **S** Electrode: **F4**
Thickness Range: **3mm & above**

See Reverse for Conditions

Technical Standards and Safety Authority
14th Floor - Centre Tower
3300 Bloor Street West
Toronto, Ontario M8X 2X4
Web site: www.tssa.org

Welder/Welding Operator Certificate

Technical Standards and Safety Act
Boilers and Pressure Vessels Regulation

No. 265095

Welder's Last Name: GIFFORD	Initial: N	First Name: STEVE	Signature: [signature]
Stamp No.: 56			
Res. Address:		Postal Code:	Provincial Registration No.: WR 23989.5
Employer Name: [illegible] Welding Techniques Inc.			Company PQR No.: 97-01A
Street Address: 1065 Upper Wellington			Company WPS No. used: 97-01
Hamilton, Ont.		Postal Code: [illegible]	

Welding Process(es) Used: SMAW — Type(s): ☑ manual ☐ machine ☐ semi-automatic ☐ automatic

Base Material(s): SA106B / SA106B — Thickness(es): .218"

Variables for All Processes	Actual Values	Range Qualified
Backing material (with/without)	Without / With	Both with/without F4 with
ASME P or S No. to ASME P or S No.	P1 to P1	P1 thru P11 or P5
( ) Plate (✓) Pipe (enter diameter if pipe)	2" [illegible]	1"OD + UP
Filler Metal Specification (SFA) Class (QW-404) (Informational Only)	E6010 / E7018	
Consumable Insert for GTAW or PAW (QW-404)		
Welding Position (1G, 5G, etc.) (QW-405)	6G	All Groove & Fillet

Manual or Semi-automatic Variables (QW-350)	Actual Values	Range Qualified
Filler Metal F-No. (QW-404)	F3 F4	F4 3 & 1 (F3 only on without backing)
Filler Metal Product Form for GTAW, PAW (QW-404)		
Weld deposit thickness for each welding process (QW-404)	F3 .[illegible]" F4 [illegible]"	F3 .200" F4 .236"
Process 1: ______ 3 layers minimum ☐ Yes ☐ No		
Process 2: ______ 3 layers minimum ☐ Yes ☐ No		
Vertical progression (uphill/downhill) (QW-405)	Uphill	Uphill only
GTAW, PAW or GMAW backing gas; or OFW fuel gas (QW-408)		
GMAW transfer mode (spray/globular or pulse to short circuit) (QW-409)		
GTAW welding current type & polarity (AC, DCEP, DCEN) (QW-409)		

Machine Welding Variables (QW-361.2)	Actual Values	Range Qualified
Direct or remote visual control		
Automatic arc voltage control (GTAW)		
Automatic joint tracking		
Multiple or single pass per side		

Automatic Welding Variables (QW-361.1)	Actual Values	Range Qualified
Filler metal (EBW or LBW)		
Laser type for LBW (CO_2 to YAG etc.)		
Continuous drive or inertia welding (FW)		
Vacuum or out of vacuum (EBW)		

Note: Values in "Range Qualified" are valid only when used with a Qualified Welding Procedure.

Welder's Copy

Note: Values in "Range Qualified" are valid only when used with a Qualified Welding Procedure.

RESULTS

Visual Examination of Completed Weld (QW-302.4) OK

☑ Transverse root and face [QW-462.3(a)]; ☐ Longitudinal root and face [QW-462.3(b)]; ☐ Side (QW-462.2);

☐ Pipe bend specimen, corrosion-resistant overlay [QW-462.5(c)]; ☐ Plate bend specimen, corrosion-resistant overlay [QW-462.5(d)];

☐ Pipe specimen, macro test for fusion [QW-462.5(b)]; ☐ Plate specimen, macro test for fusion [QW-462.5(e)]

Type	Result	Type	Result	Type	Result	Type	Result
1 ROOT	OK	3 ROOT	OK				
2 FACE		4 FACE					

Alternative radiographic examination results (QW-191) _____

Fillet weld — fracture test (QW-181.2) _____ Length and percent of defects _____

☐ Fillet welds in plate [QW-462.4(b)] ☐ Fillet welds in pipe [QW-462.4(c)]

Macro examination (QW-184) _____ Fillet size (in.) _____ x _____ Concavity/convexity (in.) _____

Other tests _____

Film or specimens evaluated by _____ Company _____

Mechanical tests conducted by AWT Laboratory test no. _____

Welding supervised by Stevenson

Test requested by (Print name) Stewart Knudsen Tested at (Print address) ABOVE

We certify that the statements in this record are correct and that the test coupons were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Boiler and Pressure Vessel Code.

Organization Advanced Welding Technologies Signature _____ Date 08/19/16 (mm-dd-yyyy)

FOR TSSA INSPECTOR USE ONLY

The Welder named above has passed the welding test required under Ontario's ***Technical Standards and Safety Act,*** Boilers and Pressure Vessels Regulation and is hereby authorized, subject to the limitations of this certificate.

Check (✔) applicable box below:

☐ To weld for the Employer named above only.

☑ For seeking employment only.

This Certificate expires: 08/19/17. (mm-dd-yyyy)

Gord Osmond 70 _____

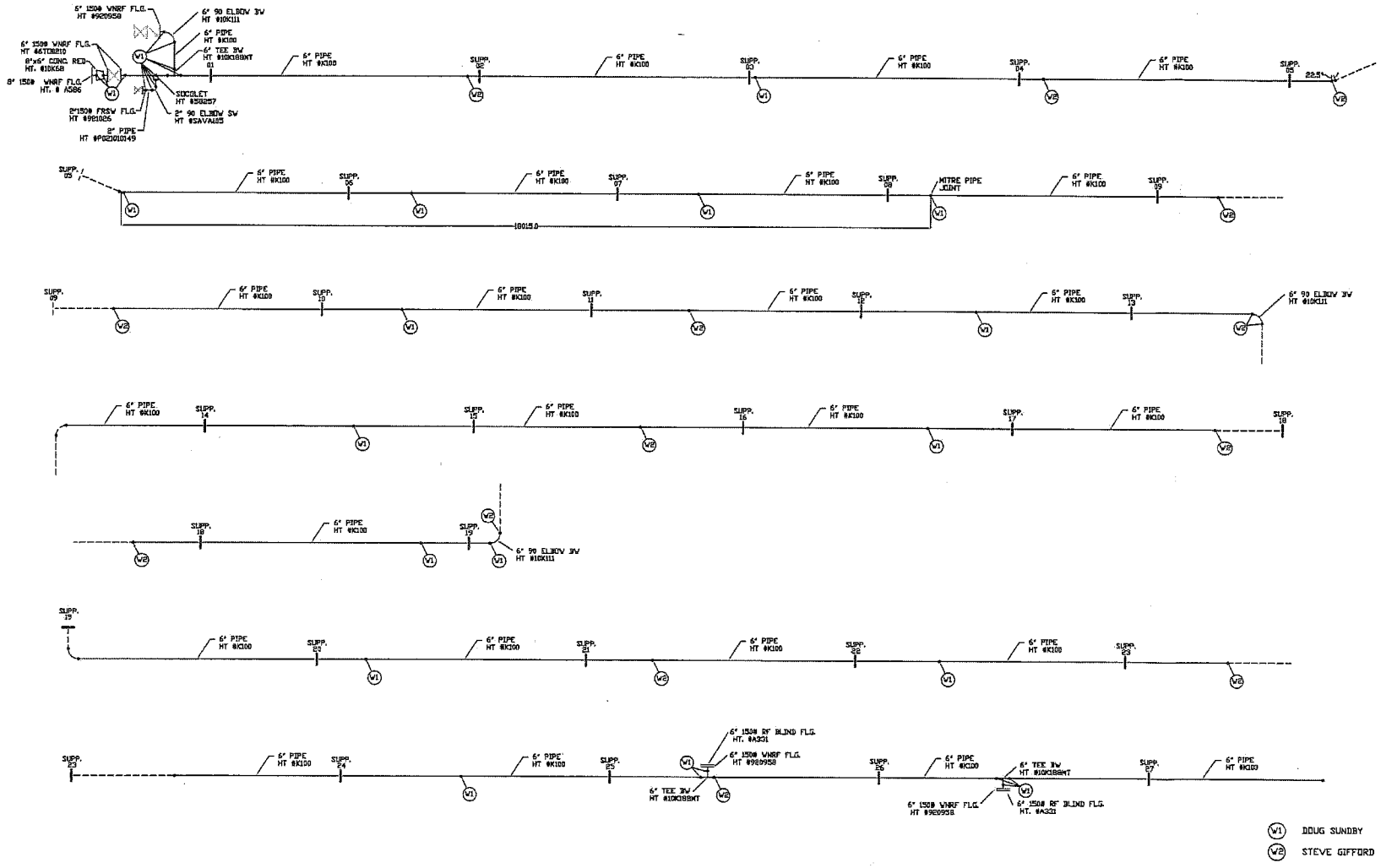
Inspector Name and Number (Print)

_____

Inspector Signature

PV 09397 (11/09)

4.4 Welding Pipe Map



NO.	DESCRIPTION	BY	DATE	BY	DATE	BY	DATE

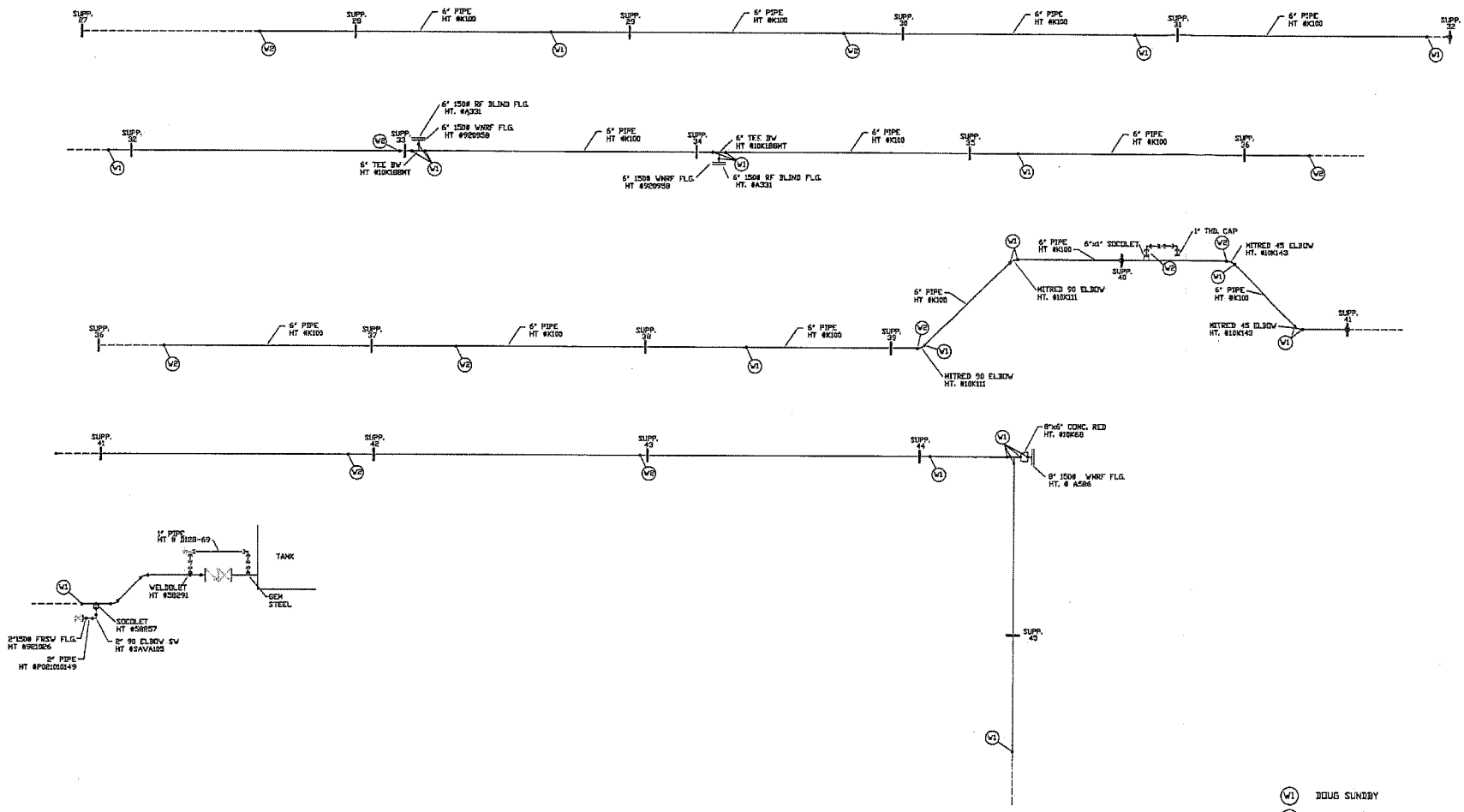
DWG NO.	REFERENCE DRAWINGS	REVISIONS	DRAWN BY	CHECKED BY	DESIGNED BY	APPROVED FOR CONSTRUCTION

DATE	DESCRIPTION

STATUS

ADCO

CUSTOMER		
MARY RIVER PROJECT	MILNE INLET	
DESCRIPTION		
FUEL TANK INLET		
SCALE	DRAWING NUMBER	REV.
NTS	3266-M1	0



NO.	DESCRIPTION	BY	DATE	BY	DATE	BY	DATE	APPROVED FOR CONSTRUCTION	DATE	DESCRIPTION

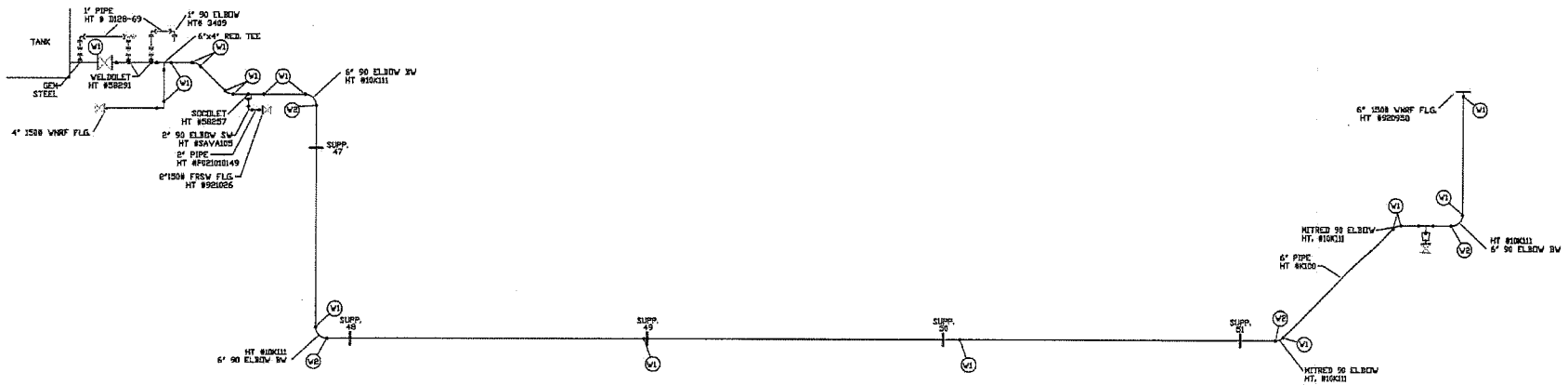
DWG NO. | REFERENCE DRAWINGS | REVISIONS | DRAWN BY | CHECKED BY | DESIGNED BY | APPROVED FOR CONSTRUCTION | STATUS

ADCO

CUSTOMER: MARY RIVER PROJECT | MILNE INLET

DESCRIPTION: FUEL TANK INLET

SCALE: NTS | DRAWING NUMBER: 3266-M2 | REV.: 0



W1 DOUG SUNDBY

W2 STEVE GIFFORD

NO.	DESCRIPTION	BY	DATE	BY	DATE	BY	DATE

DWG NO.	REFERENCE DRAWINGS	REVISIONS	DRAWN BY	CHECKED BY	DESIGNED BY	APPROVED FOR CONSTRUCTION	STATUS

DATE	DESCRIPTION

ADCO

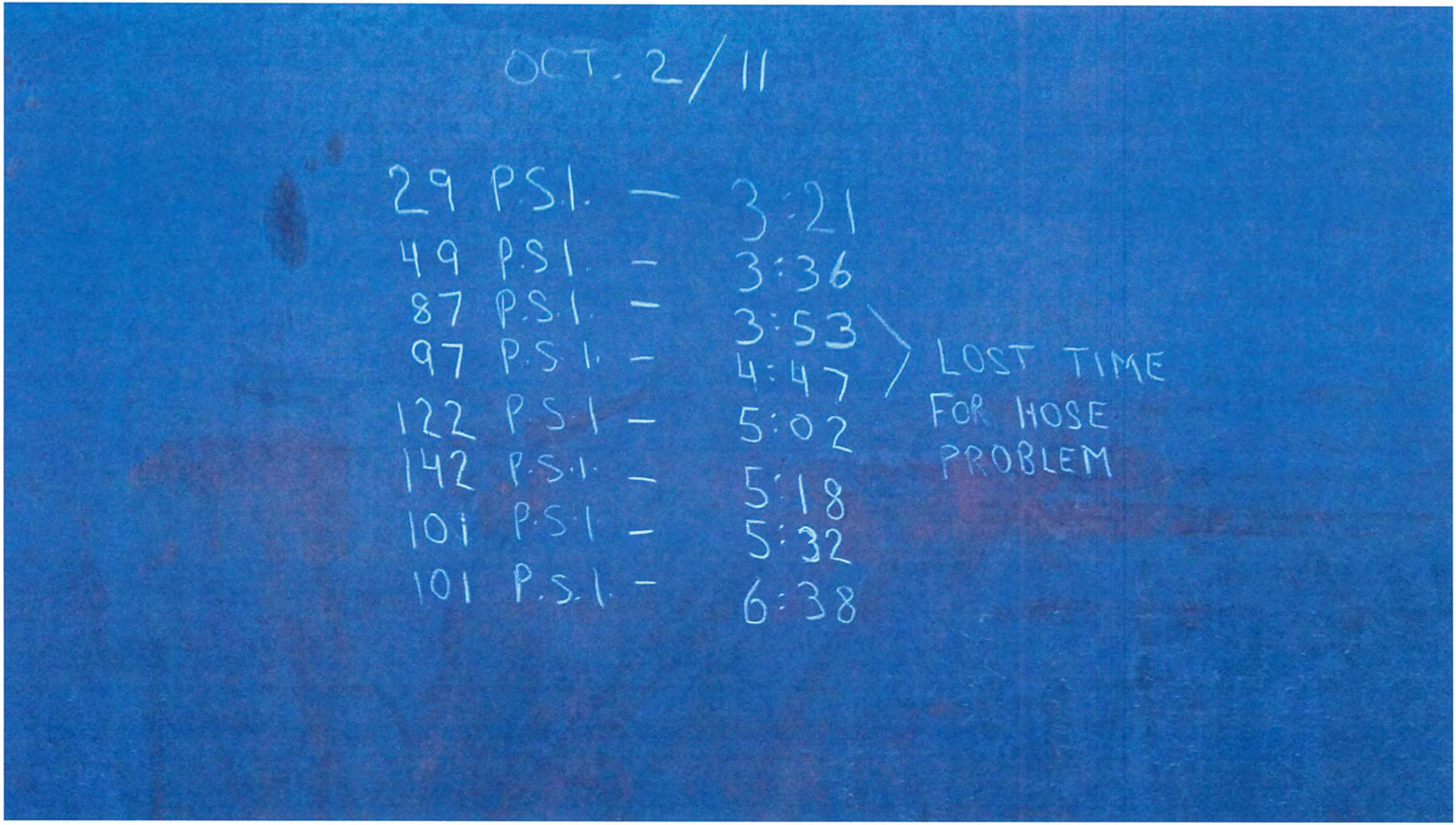
CUSTOMER		
MARY RIVER PROJECT	MILNE INLET	
DESCRIPTION		
FUEL TANK OUTLET		
SCALE	DRAWING NUMBER	REV.
NTS	3266-M3	0

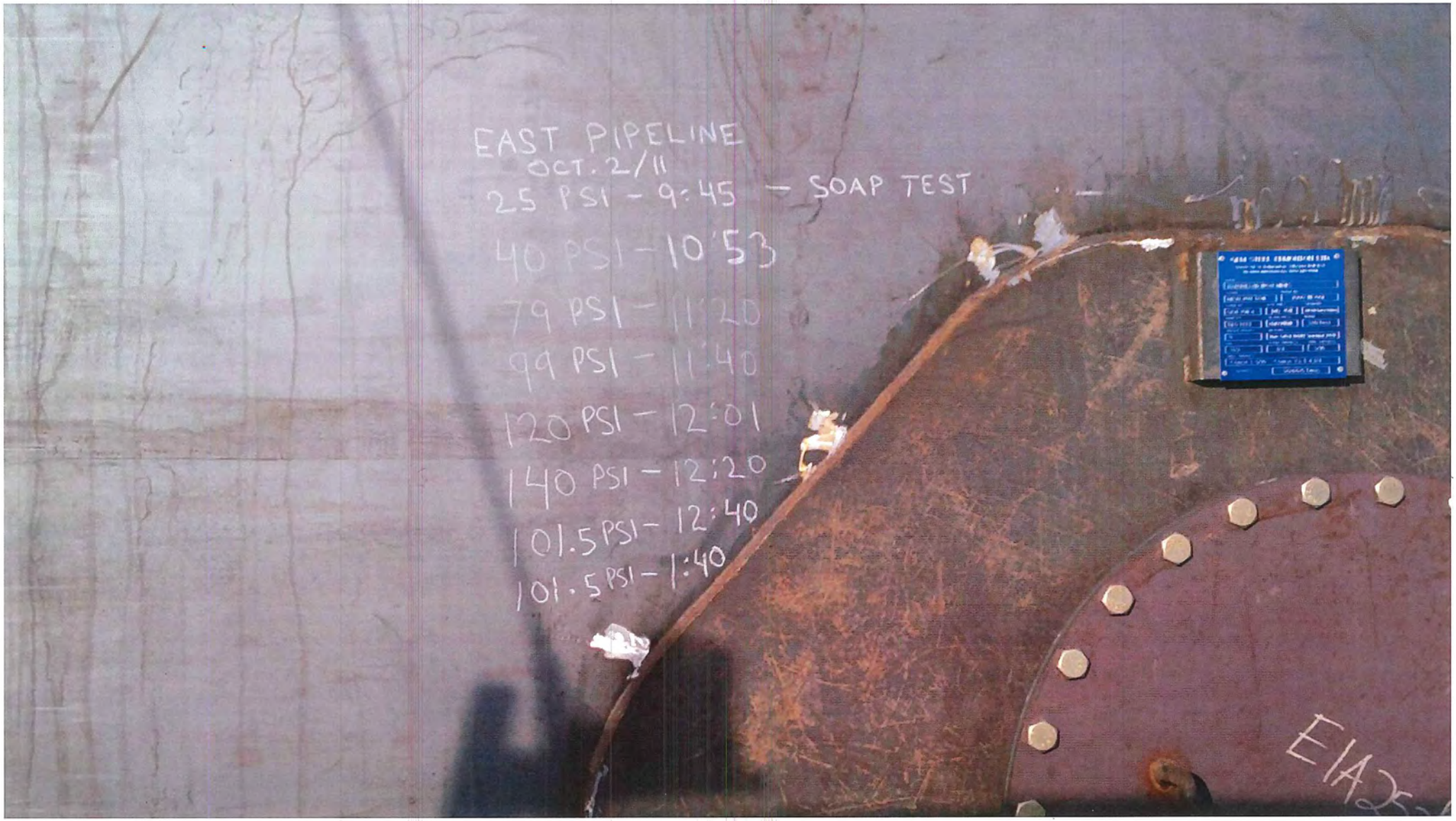
4.5 ASME B-31.3 Pressure Piping Test

WEST

OCT. 2/11

29 PSI	—	3:21	~ SOAP TEST
49 PSI	–	3:36	
87 PSI	–	3:53	LOST TIME FOR HOSE PROBLEM
97 PSI	–	4:47	
122 PSI	–	5:02	
142 PSI	–	5:18	
101 PSI	–	5:32	
101 PSI	–	6:38	


OCT. 2/11
29 P.S.I. — 3:21
49 P.S.I. — 3:36
87 P.S.I. — 3:53
97 P.S.I. — 4:47
122 P.S.I — 5:02
142 P.S.I. — 5:18
101 P.S.I — 5:32
101 P.S.I. — 6:38
LOST TIME FOR HOSE PROBLEM


EAST PIPELINE
OCT. 2/11
25 PSI - 9:45 - SOAP TEST
40 PSI - 10'53
79 PSI - 11:20
99 PSI - 11:40
120 PSI - 12:01
140 PSI - 12:20
101.5 PSI - 12:40
101.5 PSI - 1:40
E1A2-

2011-10-02_11-45-58_828.jpg

2011-10-02_11-58-20_66.jpg

2011-10-02_12-08-06_673.jpg

2011-10-02_12-17-28_804.jpg

2011-10-02_12-26-03_515.jpg

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2011-10-02_16-43-52_202.jpg

2011-10-02_16-54-57_292.jpg

2011-10-02_17-00-13_142.jpg

2011-10-02_17-11-08_260.jpg

2011-10-02_17-14-49_965.jpg

2011-10-02_17-24-36_796.jpg

2011-10-02_17-29-43_646.jpg

2011-10-02_18-34-24_678.jpg

2011-10-02_10-12-47_225.jpg

2011-10-02_10-50-26_279.jpg

2011-10-02_11-17-18_612.jpg

2011-10-02_11-30-02_829.jpg

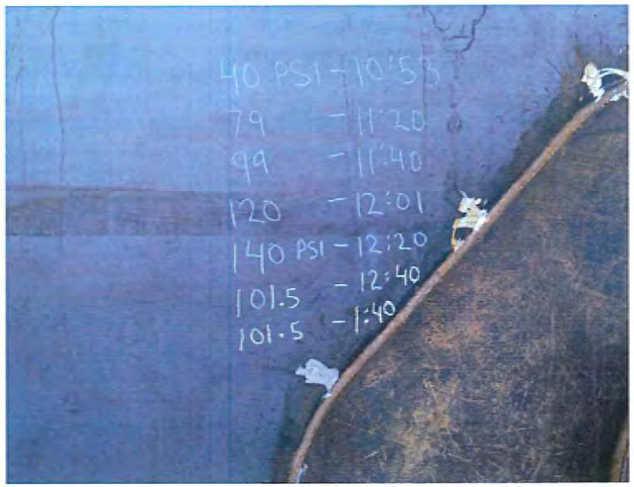
2011-10-02_11-37-20_373.jpg


CERTIFICATE OF CALIBRATION
CERT.#
DATE:
DUE DATE:
psi
kPa
GAUGETECH


CERTIFICATE OF CALIBRATION
psi
kPa
GAUGETECH


psi
kPa
GAUGETECH


CERTIFICATE OF CALIBRATION
GAUGETECH


40 PSI - 10:55
79 - 11:20
99 - 11:40
120 - 12:01
140 PSI - 12:20
101.5 - 12:40
101.5 - 1:40


CERTIFICATE OF CALIBRATION
GAUGETECH
psi
kPa


CERTIFICATE OF CALIBRATION
GAUGETECH
psi
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CERTIFICATE OF CALIBRATION
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CERTIFICATE OF CALIBRATION
GAUGETECH
psi
kPa


CERTIFICATE OF CALIBRATION
GAUGETECH
psi
kPa

4.6 Material Test Reports (MTRs)

Wednesday, 27-Jul-2011

From:

Gary Kitt
5815 - 75 St
Edmonton, AB, Canada
T6E 0T3
Phone : 780-465-0381
Fax : 780-466-0371
Email : mtr@cwcarry.com
Web Site : www.cwcarry.com

To:

ADCO POWER
JEFF
8750-58 AVE.
EDMONTON, AB
Phone : 465-3265
Fax : 466-8086

PO # or Ref #: PO# 3266-00034 WO# 166080

Document Summary Page

The MTR's are printed in the following order:

#	Description	Heat	ID #
1	L 4 X 4 X 5/16	PL1120291501	
2	C 8 X 13.75	W907874	

RECEIVED 27/7/11 #46

SOLD TO: C.W CARRY(1967) LTD
EDMONTON ALBERTA
CANADA

SHIP TO: C.W. CARRY LTD.
5815 - 75TH ST.
EDMONTON AB T6E 0T3
CANADA

NUCOR
YAMATO STEEL COMPANY

CERTIFIED MILL TEST REPORT

MANUFACTURED IN U.S.A. TO AN A.S.S. CERTIFIED MILL

Ship from:
Nucor Steel - Utah
W Cemetery Road
PLYMOUTH, UT 84330
435-458-2300

Date: 20-Jun-2011
B.L. Number: 378195
Load Number: 196280

Material Safety Data Sheets are available at www.nucorbar.com or by contacting your inside sales representative.

NBMG-08 March 9, 2011

HEAT NUM. *	DESCRIPTION	PHYSICAL TESTS					CHEMICAL TESTS						
		YIELD P.S.I.	TENSILE P.S.I.	ELONG % IN 8"	BEND	WT% / DEF	C / Ni	Mn / Cr	P / Mo	S / V	Si / Cb	Cu / Sn	C.E.
PO# =>	27275												
PL1120206001	Nucor Steel - Utah	51,576	76,540	31.0%			.15	.74	.027	.010	.24	.29	.33
	1/2x10" Flat	356MPa	528MPa				.09	.12	.005	.008	.001		
	20' A36/44W	50,044	72,158	33.0%									
	CSA G40.21-04 44W/ASTM A36/A36M-08	345MPa	498MPa										
	ASTM A709/A709M-10 GR 36 [250]												
	ASME SA36-2007 EDITION-2009 ADDENDA												
	ASTM A36/A36M-08, A709/A709M-09a GR36, ASME SA36-07 Ed 09 Ad												
PO# =>	27275												
PL1120291501	Nucor Steel - Utah	51,669	73,311	34.0%			.15	.76	.015	.040	.23	.26	.33
	4x4x5/16 Angle	356MPa	505MPa				.08	.12	.005	.008	.001		
	40' A36/44W	50,833	72,529	35.0%									
	CSA G40.21-04 44W/ASTM A36/A36M-08	350MPa	500MPa										
	ASTM A709/A709M-10 GR 36 [250]												
	ASME SA36-2007 EDITION-2009 ADDENDA												
	ASTM A36/A36M-08, A709/A709M-09a GR36, ASME SA36-07 Ed 09 Ad												

I hereby certify that the material described herein has been manufactured in accordance with the specifications and standards listed above and that it satisfies those requirements.
1.) Weld repair was not performed on this material.
2.) Melted and Manufactured in the United States.
3.) Mercury, Radium, or Alpha source materials in any form have not been used in the production of this material.

QUALITY ASSURANCE: Scott Laurenti

Scott Laurenti

GERDAU AMERISTEEL

WHITBY STEEL MILL
HOPKINS STREET SOUTH
WHITBY ON L1N 5T1 CAN
(905) 668-8811

Chemical and Physical Test Report
MADE IN CANADA

W-116678

SHIP TO	INVOICE TO	SHIP DATE
C.W. CARRY 1976 LTD 5815 75TH ST. - SIDING CN Z062 780-465-0381 EDMONTON, AB T6E 0T3	C.W. CARRY 1976 LTD ACCTS PAYABLE 5815 75 ST NW EDMONTON, AB T6E 0T3	05/31/11 CUST. ACCOUNT NO 60122230

PRODUCED IN: WHITBY

SHAPE + SIZE	GRADE	SPECIFICATION	SALES ORDER	CUST P.O. NUMBER
C8 X 13.75#	44W	A36/44W/50W/A572GR50; ASTM:A36-08;A572GR50 M-08;CSAG40.21-04 (R2009) 4	1040156-04	27267-04

HEAT I.D.	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Nb	B	N	Sn	Al	Ti	Zr	Ca	C Eqv
W907874	.14	.91	.013	.034	.19	.30	.10	.09	.027	.000	.009	.0004	.0135	.011	.000	.00000	.000	.00000	.357

Mechanical Test: Yield 54810 PSI, 377.9 MPA Tensile: 73950 PSI, 509.94 MPA %El: 23.6/8in, 23.6/200MM Def HT: 0, 0MM %l/h 0
Mechanical Test: Yield 54065 PSI, 372.9 MPA Tensile: 74478 PSI, 513.51 MPA %El: 26.2/8in, 26.2/200MM Def HT: 0, 0MM %l/h 0

PRODUCED IN: WHITBY

SHAPE + SIZE	GRADE	SPECIFICATION	SALES ORDER	CUST P.O. NUMBER
C8 X 13.75#	44W	A36/44W/50W/A572GR50; ASTM:A36-08;A572GR50 M-08;CSAG40.21-04 (R2009) 4	1040156-04	27267-04

HEAT I.D.	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Nb	B	N	Sn	Al	Ti	Zr	Ca	C Eqv
W907875	.15	.77	.014	.032	.18	.28	.10	.08	.024	.000	.011	.0004	.0172	.010	.000	.00000	.000	.00000	.352

Mechanical Test: Yield 54684 PSI, 377.03 MPA Tensile: 73286 PSI, 505.29 MPA %El: 23.1/8in, 23.1/200MM Def HT: 0, 0MM %l/h 0
Mechanical Test: Yield 51979 PSI, 358.38 MPA Tensile: 72092 PSI, 497.06 MPA %El: 22.5/8in, 22.5/200MM Def HT: 0, 0MM %l/h 0

PRODUCED IN: WHITBY

SHAPE + SIZE	GRADE	SPECIFICATION	SALES ORDER	CUST P.O. NUMBER
C10 X 15.3#	44W	A36/44W/50W/A572GR50; ASTM:A36-08;A572GR50 M-08;CSAG40.21-04 (R2009) 4	1040156-07	27267-07

HEAT I.D.	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Nb	B	N	Sn	Al	Ti	Zr	Ca	C Eqv
W908753	.14	.79	.011	.029	.21	.34	.08	.09	.024	.000	.012	.0008	.0000	.010	.000	.00000	.000	.00000	.358

Mechanical Test: Yield 58229 PSI, 401.47 MPA Tensile: 75491 PSI, 520.22 MPA %El: 22.5/8in, 22.5/200MM Def HT: 0, 0MM %l/h 0
Mechanical Test: Yield 57599 PSI, 397.13 MPA Tensile: 75875 PSI, 523.14 MPA %El: 23.6/8in, 23.6/200MM Def HT: 0, 0MM %l/h 0

Customer Notes

NO WELD REPAIRMENT PERFORMED. STEEL NOT EXPOSED TO MERCURY.

This material, including the billets, was melted and manufactured in Canada

Bhaskar Yalamanchili
Quality Director
Gerdau Ameristeel

THE ABOVE FIGURES ARE CERTIFIED CHEMICAL AND PHYSICAL TEST RECORDS AS CONTAINED IN THE PERMANENT RECORDS OF COMPANY.

Metallurgical Services Manager
WHITBY STEEL MILL

Thursday, 21-Jul-2011

From:

Gary Kitt
5815 - 75 St
Edmonton, AB, Canada
T6E 0T3
Phone : 780-465-0381
Fax : 780-466-0371
Email : mtr@cwcarry.com
Web Site : www.cwcarry.com

To:

ADCO POWER
JEFF
8750-58 AVE.
EDMONTON, AB
Phone : 465-3265
Fax : 466-8086

PO # or Ref #: PO# 3266-00026 WO# SO-0165890

Document Summary Page

The MTR's are printed in the following order:

#	Description	Heat	ID #
1	3/4 MS ROUND	SE1110228701	

RECEIVED 21/7/11

SOLD TO: C W CARRY(1967) LTD
5815 75TH ST
EDMONTON AB T6E 0T3
CANADA

SHIP TO: C W CARRY
5815 75TH ST
EDMONTON AB T6E 0T3
CANADA

NUCOR
NUCOR STEEL SEATTLE, INC.

CERTIFIED MILL TEST REPORT

Ship from:
Nucor Steel Seattle, Inc.
2424 SW Andover
SEATTLE, WA 98106-1100
206-933-2222

Date: 1-Jun-2011
B.L. Number: 413610
Load Number: 251117

Material Safety Data Sheets are available at www.nucorbar.com or by contacting your inside sales representative.

NBMG-08 March 9, 2011

HEAT NUM. *	DESCRIPTION	PHYSICAL TESTS					CHEMICAL TESTS							
		YIELD P.S.I.	TENSILE P.S.I.	ELONG % IN 8"	BEND	WT% DEF	C / Ni	Mn / Cr	P / Mo	S / V	Si / Cb	Cu / Sn	C.E.
PO# =>	27266												
SE1110181801	Nucor Steel Seattle, Inc.	65,014	102,280	11.7%	OK	-3.8%	.38	1.15	.016	.050	.21	.31	.60
	15mm Rebar 19'8"	448MPa	705MPa			.044	.11	.12	.030	.008	.004		
	Gr400R												
	CSA G30.18-09 GR 400R												
	TEN/YD = 1.57												
PO# =>	27282												
SE1110228701	Nucor Steel Seattle, Inc.	52,906	78,579	25.0%			.17	.74	.013	.037	.20	.27	.35
	3/4" Rd	365MPa	542MPa				.10	.11	.030	.006	.002		
	20' A36/44W	52,556	77,671	25.8%									
	CSA G40.21-04 44W/ASTM A36/A36M-08	362MPa	536MPa										
	ASTM A709/A709M-10 GR 36 [250]												
	ASME SA36-2007 EDITION-2009 ADDENDA												
	ASTM A36/A36M-08, A709/A709M-09a GR36, ASME SA36-07 Ed 09 Ad												

I hereby certify that the material described herein has been manufactured in accordance with the specifications and standards listed above and that it satisfies these requirements.
1.) Weld repair was not performed on this material.
2.) Melted and Manufactured in the United States.
3.) Mercury, Radium, or Alpha source materials in any form have not been used in the production of this material.

QUALITY ASSURANCE: Winky Lai

Friday, 08-Jul-2011

From:

Gary Kitt
5815 - 75 St
Edmonton, AB, Canada
T6E 0T3
Phone : 780-465-0381
Fax : 780-466-0371
Email : mtr@cwcarry.com
Web Site : www.cwcarry.com

To:

ADCO POWER
JEFF
8750-58 AVE.
EDMONTON, AB
Phone : 465-3265
Fax : 466-8086

PO # or Ref #: PO# 3266-00002 WO# 165139

Document Summary Page

The MTR's are printed in the following order:

#	Description	Heat	ID #
1	3/4 MS ROUND	SE1110228801	
2	W 6 X 15	G111822	

RECEIVED 8/7/11

SOLD TO: C W CARRY(1967) LTD
5815 75TH ST
EDMONTON AB T6E 0T3
CANADA

SHIP TO: C W CARRY
5815 75TH ST
EDMONTON AB T6E 0T3
CANADA

NUCOR
NUCOR STEEL SEATTLE, INC.

CERTIFIED MILL TEST REPORT

Ship from:
Nucor Steel Seattle, Inc.
2424 SW Andover
SEATTLE, WA 98106-1100
206-933-2222

Date: 15-Jun-2011
B.L. Number: 414553
Load Number: 251909

Material Safety Data Sheets are available at www.nucorbar.com or by contacting your inside sales representative.

NBMG-08 March 9, 2011

HEAT NUM. *	DESCRIPTION	PHYSICAL TESTS					CHEMICAL TESTS						
		YIELD P.S.I.	TENSILE P.S.I.	ELONG % IN 8"	BEND	WT% / DEF	C / Ni	Mn / Cr	P / Mo	S / V	Si / Cb	Cu / Sn	C.E.
PO# =>	27396												
SE1110162401	Nucor Steel - Seattle Inc	50,526	74,748	31.3%			.17	.71	.016	.039	.18	.27	.34
	1/4x6" Flat	348MPa	515MPa				.10	.12	.020	.008	.003		
	20' A36/44W	52,053	75,253	34.4%									
	CSA G40.21-04 44W/ASTM A36/A36M-08	359MPa	519MPa										
	ASTM A709/A709M-10 GR 36 [250]												
	ASME SA36-2007 EDITION-2009 ADDE NDA												
	ASTM A36/A36M-08, A709/A709M-09a GR36, ASME SA36-07 Ed 09 Ad												
PO# =>	27396												
SE1110228801	Nucor Steel Seattle, Inc.	52,264	77,201	27.3%		***	.16	.74	.012	.034	.19	.32	.34
	3/4" Rd	360MPa	532MPa				.09	.10	.020	.005	.002		
	20' A36/44W	53,501	77,345	28.1%									
	CSA G40.21-04 44W/ASTM A36/A36M-08	369MPa	533MPa										
	ASTM A709/A709M-10 GR 36 [250]												
	ASME SA36-2007 EDITION-2009 ADDE NDA												
	ASTM A36/A36M-08, A709/A709M-09a GR36, ASME SA36-07 Ed 09 Ad												

I hereby certify that the material described herein has been manufactured in accordance with the specifications and standards listed above and that it satisfies these requirements.
1.) Weld repair was not performed on this material.
2.) Melted and Manufactured in the United States.
3.) Mercury, Radium, or Alpha source materials in any form have not been used in the production of this material.

QUALITY ASSURANCE: Winky Lai

GERDAU AMERISTEEL
CARTERSVILLE STEEL MILL
384 OLD GRASSDALE RD NE
CARTERSVILLE GA 30121 USA
(770) 387-3300

Chemical and Physical Test Report
Made and Melted In USA

G-172727

SHIP TO	INVOICE TO	SHIP DATE
C.W. CARRY 1976 LTD 5815 75TH ST. - SIDING CN Z062 EDMONTON, AB T6E 0T3	C.W. CARRY 1976 LTD ACCTS PAYABLE 5815 75 ST NW EDMONTON, AB T6E 0T3	04/01/11 **CUST. ACCOUNT NO** 60122230

PRODUCED IN: CARTERSVILLE

SHAPE + SIZE	GRADE	SPECIFICATION	SALES ORDER	CUST P.O. NUMBER
W6 X 15#	A57250/992	ASTM A572 GR50-07, ASTM A992 -06A, ASTM A709 GR50-10	1020436-01	26505-01

HEAT I.D.	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Nb	B	N	Sn	Al	Ti	Ca	Zn	C Eqv
G111789	.17	1.01	.015	.014	.26	.30	.08	.05	.021	.016	.002	.0005	.0091	.011	.001	.00100	.00140	.00560	.41

Mechanical Test: Yield 54900 PSI, 378.52 MPA Tensile: 75200 PSI, 518.49 MPA %El: 26.6/8in, 26.6/200MM
Customer Requirements: CASTING: STRAND CAST
Comment: NO WELD REPAIRMENT PERFORMED. STEEL NOT EXPOSED TO MERCURY.
Mechanical Test: Yield 54900 PSI, 377.83 MPA Tensile: 75100 PSI, 517.8 MPA %El: 25.8/8in, 25.8/200MM
Customer Requirements: CASTING: STRAND CAST
Comment: NO WELD REPAIRMENT PERFORMED. STEEL NOT EXPOSED TO MERCURY.

PRODUCED IN: CARTERSVILLE

SHAPE + SIZE	GRADE	SPECIFICATION	SALES ORDER	CUST P.O. NUMBER
W6 X 15#	A57250/992	ASTM A572 GR50-07, ASTM A992 -06A, ASTM A709 GR50-10	1020436-02	26505-02

HEAT I.D.	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V	Nb	B	N	Sn	Al	Ti	Ca	Zn	C Eqv
G111822	.16	1.02	.011	.028	.20	.29	.09	.05	.023	.016	.001	.0007	.0094	.012	.001	.00100	.00270	.00490	.4

Mechanical Test: Yield 57800 PSI, 398.52 MPA Tensile: 78700 PSI, 542.62 MPA %El: 22.9/8in, 22.9/200MM
Customer Requirements: CASTING: STRAND CAST
Comment: NO WELD REPAIRMENT PERFORMED. STEEL NOT EXPOSED TO MERCURY.
Mechanical Test: Yield 57800 PSI, 398.52 MPA Tensile: 79200 PSI, 546.08 MPA %El: 23.5/8in, 23.5/200MM
Customer Requirements: CASTING: STRAND CAST
Comment: NO WELD REPAIRMENT PERFORMED. STEEL NOT EXPOSED TO MERCURY.

Customer Notes

NO WELD REPAIRMENT PERFORMED. STEEL NOT EXPOSED TO MERCURY.
All manufacturing processes including melt and cast, occured in USA. MTR complies with EN10204 3.1B

Bhaskar Yalamanchili
Quality Director
Gerdau Ameristeel

THE ABOVE FIGURES ARE CERTIFIED CHEMICAL AND PHYSICAL TEST RECORDS AS CONTAINED IN THE PERMANENT RECORDS OF COMPANY.

Metallurgical Services Manager
CARTERSVILLE STEEL MILL

RECEIVED 3/8/11 MC

PO# 3266-00048
SO# 028.3438
"AMITY"

#49

Shanxi Guanjiaying Flange Forging Co.,Ltd. DingXiang, ShanXi, China

Approved according to ISO9001 and AD(2000)-W0/TRD100 by TÜV Rheinland

Inspection Certificate EN10204/DIN50049-3.1B

Abnahmepruefzeugnis

Zertifiziert nach Druckgeraete-Richthnie 97/23/EG,Anhang I, Abschnitt 4.3 durch TÜV Anlagentechetechnik GmbH (Benannte Stelle Kenn-Nr.0035)

Certificate No. G110035010 Page: 1 of 2

Pruef-Nr. Seite

SHANXI GUANJIAYING FLANGE FORGING CO., LTD. QUALITY INSPECTION 3

Customer:
Besteller

Order No./Bestell Nr.	dated / vom	Works No / Werks Nr.
P.O.7003726		2011-035

Article / Gegenstand: Forging temperature 1050℃-1200℃

Specification/Anforderung: AD(2000)-W0/TRD100, AD(2000)-W9/TRD107 ASME B16.5-2009

Material / Werkstoff: A/SA105N

according to / entsprechend: ASTM A105-2010 ASME SA105 Section II Part A Ed.2007 and Addenda-2008

State of delivery / Lieferzustand: Normalized 910°C/ 0.60hrs

Melting process/Erschmelzungsart: LD+LF

Marking/Kennzeichnung:
Material, Size, PN, DN, Heat-No. / Werkstoff, Groesse, PN, DN, Schmelze-Nr.
Stamp of Manufacturer: Herstellerzeichen
Inspector's stamp: Pruefstempel

Content of the Delivery / Lieferumfang:

Pieces/Stueckzahl	Description/Bezeichnung:	Heat No / Schmelze-Nr.	Test No/ProbeNr.
30	150# SW RF STD 2"	10710334	
275	150# THR RF 2"	10710334	1
70	300# THR RF 2"	10710334	

Mechanical tests / Mechanische Pruefungen: Position of specimen/Probenlage: Tangential

Testing have been performed in accordance with Test Methods and Definitions A 370

Test Value	Tensile test / Zugversuch				Charpy-impact Test, ISO-V Specimen Kerbschlagversuch, ISO-V-Probe 20℃				Hardness Haerte
	Tensile strength	Yield strength(0.2%)	Elongation	Reduction of area	J			Σ/N	HB
	Mpa	Mpa	GL=4d=50MM %	%					
Spec	≥485	≥250	≥22	≥30					137-187
1	498	295	32	68					154

Chemical analysis / chemische Analyse:

Heat No./ Schmelze-Nr.		% C	% Si	% Mn	% P	% S	% Cr	% Mo	% Ni
10710334	Spec	≤0.23	0.10-0.35	0.60-1.05	≤0.035	≤0.040	≤0.30	≤0.12	≤0.40
	cast analysis	0.190	0.300	1.040	0.015	0.007	0.023	0.005	0.010
		%V	% Cu	% Nb	% Al	Cu+ Ni+ Cr+ Mo		Cr+ Mo	CE
	Spec	≤0.08	≤0.40	≤0.02		≤1.00		≤0.32	≤0.43
	cast analysis	0.000	0.010	0.000		0.048		0.028	0.370

Visual and dimensional inspection / Besichtigung und Ausmessung: 100% OK
RF/FF Machined finish:125-250min RMS
dimensional inspection: 2% recorded
Dimension according to customer's drawing
Smooth finish according to MSS-SP6
Hardness to Nace MR01-75 -2003/ISO15156: NACE MR 0103-2005.
mechanical test have been taken from the forged product
Quality assurance requirement according to Annex 1, Section 4.3 : PED97/23/EC
We hereby certify that the material described above has been tested And complies with the terms of the order.

Place / Ort: Dingxiang
Date / Datum: 2011-5-10
Works Inspector / Werkssachverstaendiger

Phoenix * Capitol * Camco

Cap Products

Certified Mill Test Report

Heat Code: CVI
Heat Number: 319089
Item: 15112008: 2 X 4" XHSML BK STL NIPL
Material: ASTM A106-2008 / ASME SA106-2007 Edition, No Addenda

Chemistry Properties

C	Mn	P	S	Si	Cu	Cr
0.2100	0.5200	0.0070	0.0170	0.2200	0.2100	0.0800
Ni	**Mo**	**V**	**Co**	**Al**	**Cb**	**N**
0.1600	0.0220	0.0010				
Pb	**Sn**	**Ta**	**Ti**	**C Eq. Long**		
				0.3420		

Additional Chemical Properties

Mechanical Properties

Tensile(PSI)	Yield(PSI)	Elong. % in 2 in.	Reduction	HBW	HBW 2
71000	46000	34%		140	

Charpy Minimum Impact - ft/lbs

Test 1	Test 2	Test 3	Avg.	Test Temp.

Bend Test Passed
Hydro Test Passed at 2500 psi

This material meets the requirements of the governing specifications. We certify that the above material has been inspected and tested in accordance with the methods prescribed in the governing specification and the results of such inspections and tests conform with applicable requirements.

We further certify this material was inspected with independent inspectors conforming to the requirements of EN 10204 Section 3.1B.

Specification comments:
Meets Hardness Requirments of NACE MR0175 latest edition. Meets ASME SA 106 Grade B Requirements. No weld repair was performed on these products. This material was not exposed to Mercury or any other metal alloy that is liquid at ambient temperatures during processing or while in our posession.
Heat Code Remarks:

Phoenix * Capitol * Camco

Cap Products

Certified Mill Test Report

Heat Code: CVI
Heat Number: 319089
Item: 15112012: 2 X 6" XHSML BK STL NIPL
Material: ASTM A106-2008 / ASME SA106-2007 Edition, No Addenda

Chemistry Properties

C	Mn	P	S	Si	Cu	Cr
0.2100	0.5200	0.0070	0.0170	0.2200	0.2100	0.0800
Ni	**Mo**	**V**	**Co**	**Al**	**Cb**	**N**
0.1600	0.0220	0.0010				
Pb	**Sn**	**Ta**	**Ti**	**C Eq. Long**		
				0.3420		

Additional Chemical Properties

Mechanical Properties

Tensile(PSI)	Yield(PSI)	Elong. % in 2 in.	Reduction	HBW	HBW 2
71000	46000	34%		140	

Charpy Minimum Impact - ft/lbs

Test 1	Test 2	Test 3	Avg.	Test Temp.

Bend Test Passed
Hydro Test Passed at 2500 psi

This material meets the requirements of the governing specifications. We certify that the above material has been inspected and tested in accordance with the methods prescribed in the governing specification and the results of such inspections and tests conform with applicable requirements.

We further certify this material was inspected with independent inspectors conforming to the requirements of EN 10204 Section 3.1B.

Specification comments:
Meets Hardness Requirments of NACE MR0175 latest edition. Meets ASME SA 106 Grade B Requirements. No weld repair was performed on these products. This material was not exposed to Mercury or any other metal alloy that is liquid at ambient temperatures during processing or while in our posession.
Heat Code Remarks:

Phoenix * Capitol * Camco

Cap Products

Certified Mill Test Report

Heat Code: ZJ9
Heat Number: 4002182
Item: 15112012txb: 2 X 6" XHSML BK STL NIPL TOE X BEVEL
Material: ASTM A106-2008 / ASME SA106-2007 Edition, No Addenda

Chemistry Properties

C	Mn	P	S	Si	Cu	Cr
0.1800	1.2000	0.0140	0.0060	0.2100	0.0060	0.0100
Ni	**Mo**	**V**	**Co**	**Al**	**Cb**	**N**
0.0080	0.0030	0.0010				
Pb	**Sn**	**Ta**	**Ti**	**C Eq. Long**		
				0.3840		

Additional Chemical Properties

Mechanical Properties

Tensile(PSI)	Yield(PSI)	Elong. % in 2 in.	Reduction	HBW	HBW 2
81527	55172	32.4%		140	

Charpy Minimum Impact - ft/lbs

Test 1	Test 2	Test 3	Avg.	Test Temp.

Bend Test Passed
Hydro Test Passed at 2500 psi

This material meets the requirements of the governing specifications. We certify that the above material has been inspected and tested in accordance with the methods prescribed in the governing specification and the results of such inspections and tests conform with applicable requirements.

We further certify this material was inspected with independent inspectors conforming to the requirements of EN 10204 Section 3.1B.

Specification comments:
Meets Hardness Requirments of NACE MR0175 latest edition, Meets ASME SA 106 Grade B Requirements. No weld repair was performed on these products. This material was not exposed to Mercury or any other metal alloy that is liquid at ambient temperatures during processing or while in our posession.
Heat Code Remarks:

INSPECTION CERTIFICATE

DATE: 2010-1-18

SHANGHAI GATEWAY FITTINGS CO.,LTD

951,Kesheng Road Beiguan, Malu town, Jia-ding District, Shanghai, China

TEL: 86-21-69155661 FAX: 86-21-69155662

STANDARD: ASTM A234/ASME SA234-07 WPB
MATERIALS: ASTM A106 Gr.B
INSP.SPEC.: ASME B16.9-07

ORDER NO: 7003359
P.I.NO:
CERTIFI.NO: 11A1-7/8

ITEM NO.	PRODUCT & SIZE	QUANTITY PCS	MFG NO.	VISUAL&DIMENTIONAL INSPECTION	HARDNESS MAX.197 HB	HEAT TREATMENT(NOTE)	MAGNETIC PARTICLE EXAMINATION	
61	Tee-2" STD	150	10K176	GOOD	93-85	N	OK	
62	Tee-2 1/2" STD	25	10K181	GOOD	76-69	N	OK	
63	Tee-3" STD	50	10K182	GOOD	76-95	N	OK	
64	Tee-4" STD	50	10K185	GOOD	92~94	N	OK	
65	Tee-6" STD	100	10K188	GOOD	97-76	N	OK	
66	Tee-8" STD	35	10K194	GOOD	90-78	N	OK	
67	Elbow 45 LR-2" XH	150	10J29	GOOD	90-101	A		
68	Elbow 45 LR-6" XH	30	10K38	GOOD	98~108	A		
69	Elbow 45 LR-8" XH	12	10K41	GOOD	86-66	A		
70	Elbow 90 LR-1 1/2" XH	75	10D57	GOOD	83~92	A		

ITEM NO.	MATERIAL CHARGE NO.		C *100	Si *100	Mn *100	P *1000	S *1000	Cu *100	Ni *100	Cr *100	Mo *100	V *100		PHYSICAL TEST YS KSI	TS KSI	E %	C.E x100
	STANDARD	MIN.		10	29									35.5	60		
		MAX.	30		106	50	58	40	40	40	15	8			85.0		50
61	202456		21	20	42	13	15	1	0.8	1.2	0.1	0		37.29	66.46	32.0	29.31
62	9107858		17	25	46	21	11	1.3	4.3	5.8	0.3	0		42.81	68.92	30.0	27.47
63	9106351		18	27	48	15	11	1.5	3.2	4.9	1.0	0		44.98	68.92	30.0	28.89
64	9105872		17	21	58	12	10	1.2	1.7	4.5	1.0	0		43.53	68.92	30.0	29.08
65	093029738		20	26	49	17	12	1.2	1.1	2	0.1	0		38.45	65.30	31.0	29.86
66	08008463		20	24	50	19	9	1.3	1.1	3.3	0.1	0		40.63	61.67	30.0	30.39
67	A-216		21	19	44	17	8	3	4	5	0.7	0		46.43	78.36	35.0	32.74
68	WB92-6422		21	23	47	18	11	1	1	3	1	0		42.08	67.47	37.5	30.70
69	0833231		19	25	50	19	17	1	19	16	2.1	0		37.73	71.10	31.5	33.22
70	1039243		17	25	42	20	10	10	3	4	1	0		39.18	64.57	30.0	35.20

(NOTE):A: HOT FORMED WITH FINAL TEMPERATURE BETWEEN 620℃ - 980℃, AIR COOLING.
N: NORMALIZING AT TEMPERATURE 880℃*0.5 HR, AIR COOLING.
NACE MR-01-75 : SATISFACTORY

MILL TEST CERTIFICATE ACCORDING TO EN10204/3.1

WE HEREBY CERTIFY THAT THE PRODUCT DESCRIBED HEREIN HAS BEEN MANUFACTURED IN ACCORDA WITH THE SPECIFICATIONS CONCERNED AND ALSO WITH THE PURCHASER'S REQUIREMENTS AND THAT THE TEST RESULTS SHOWN HEREIN ARE CORRECT.

K C GUAN
MANAGER OF Q. A. DEPT

RECEIVED 28/7/11

#41

PO # 3266-00033
SO # 0251669

"AMITY"

RECEIVED 25/7/08

PO# 3266-0003 "AMITY"
SO# 0251468

PURCHASER: SEYBOLD INTERNATIONAL CORP.

INSPECTION CERTIFICATE

STANDARD: ASTM A234 WPB-96 / ASME SA234 WPB-03
MATERIALS: ASTM A106 Gr.B
INSP.SPEC.: ASME B16.9-03

SHANGHAI GATEWAY FITTINGS CO.,LTD
951,Kesheng Road Beiguan, Malu town, Jia-ding District, Shanghai, China
TEL: 86-21-69155661 FAX: 86-21-69155662

DATE: 2008-9-18
ORDER NO: 7695
P.I.NO:
CERTIFI.NO: 8I01-4/7

ITEM NO.	PRODUCT & SIZE	QUANTITY PCS	MFG NO.	VISUAL&DIMENSIONAL INSPECTION	HARDNESS MAX.197 HB	HEAT TREATMENT (NOTE)	MAGNETIC PARTICLE EXAMINATION	
31	EL-1-1/4"90°STD	700	8A05	GOOD	83~98	A		
32	EL-1-1/2"90°STD	1200	8A03	GOOD	92~98	A		
33	EL-2"90°STD	1000	8E13	GOOD	91~101	A		
34	EL-3"90°STD	400	3B09	GOOD	87~96	A		
35	EL-4"90°STD	300	8A07	GOOD	91~105	A		
36	EL-6"90°STD	70	8A01	GOOD	88~99	A		
37	EL-8"90°STD	40	8G162	GOOD	91~98	A		
38	EL-10"90°STD	20	7K13	GOOD	82~98	A		
39	TEE-3"*2"STD	30	8E192	GOOD	87~102	N	OK	
40	TEE-4"*2"STD	25	8E104	GOOD	91~101	N	OK	

ITEM NO.	MATERIAL CHARGE NO.		C *100	Si *100	Mn *100	P *1000	S *1000	Cu *100	Ni *100	Cr *100	Mo *100	V *100		PHYSICAL TEST YS KSI	TS KSI	E %	C.E x100
	STANDARD	MIN.		10	29												
		MAX.	30		106	50	58	40	40	40	15	8		35.5	68		
															85.0		50
31	B1246		20	21	49	12	27	2	2	3	0	0		46.43	67.47	35.0	30.96
32	Y20708043		20	21	49	12	27	2	2	12	0	0		46.43	68.92	34.0	32.70
33	YD601094		19	19	52	9	7	8	2	3	0	0		46.43	68.92	33.0	36.40
34	Y607-1371		19	20	53	13	0.7	9	2	4	0	0		47.16	68.92	34.0	37.77
35	318856		14	19	74	5	2	7	8	2	0	0		44.69	65.88	36.5	34.27
36	B2853		20	20	53	11	7	8	4	4	0	0		46.43	67.47	35.0	37.90
37	Y604-423		20	21	58	14	9	5	3	1	1.2	1.1		47.88	67.47	36.0	35.53
38	07-1E-561		20	21	45	10	19	9	2	5	0	0		54.41	65.30	30.0	37.63
39	5E10682		20	23	52	9	16	1	1	1	0	0		39.90	68.20	30.0	29.93
40	1-866		20	23	47	15	4	3	2	3	0	0		44.26	72.55	30.0	31.57

(NOTE)A: HOT FORMED WITH FINAL TEMPERATURE BETWEEN 920℃ ~ 980℃ , AIR COOLING.
N: NORMALIZING AT TEMPERATURE 880℃*0.5 HR., AIR COOLING.
NACE MR-01-75 : SATISFACTORY

WE HEREBY CERTIFY THAT THE PRODUCT DESCRIBED HEREIN HAS BEEN MANUFACTURED IN ACCORDANCE WITH THE SPECIFICATIONS CONCERNED AND ALSO WITH THE PURCHASER'S REQUIREMENTS AND THAT THE TEST RESULTS SHOWN HEREIN ARE CORRECT.

MANAGER OF Q.A. DEPT

39243

MATERIALS TEST CERTIFICATE

BUTT-WELDED FITTINGS

EN 10204

ORIGINAL

APCO PIPE FITTINGS CO., LTD.

CUSTOMER TFF CANADA INC
P.O. NO S-10006

MATERIAL STANDARDS ASTM A234 WPB/ASME SA234-WPB 2007
DIMENSION STANDARD ANSI B16.9/B36.10-2000
SPECIAL CONDITIONS Made of seamless pipes

$CE = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Ni + Cu}{15}$

APCO PED CERTIFICATE No VQ3260/301
APCO ISO CERTIFICATE NO 00108Q31797IR2S/Z200

MINIMUM STANDARD AS PER ABOVE SPECIFICATIONS											MECHANICAL PROPERTIES						CHEMICAL COMPOSITION									
											415 Mpa MIN	240 Mpa MIN	Elongation (longitudinal)	197 HB max	COLD FORM	HOT FORMED	0.3 max	0.29 1+4C max	0.05 max	0.058 max	0.1 min	0.4 max	0.15 max	0.4 max	0.4 max	0.05 max	0.02 max	0.5 max
ITEM	NPS	DESCRIPTION	QTY	HEAT #	TENSILE	YIELD	22%	HARDNS	Y / N	TEMP. C	C	Mn	P	S	Si	Cr	Mo	Ni	Cu	V	Nb	C.E.		
3	1"	90 LR ELBOW STD	250	C1	460	275	32	121	NO	870	0.19	0.53	0.013	0.008	0.23	0.06	0.02	0.07	0.07	0.008	0.007	0.30		
5	1-1/2"	90 LR ELBOW STD	500	E1	485	270	32	127	NO	870	0.19	0.52	0.012	0.007	0.23	0.02	0.03	0.04	0.05	0.007	0.008	0.29		
22	1-1/2"	45 LR ELBOW STD	300	E1	465	270	32	127	NO	870	0.19	0.52	0.012	0.007	0.23	0.02	0.03	0.04	0.05	0.007	0.008	0.29		
28	16"	90 LR ELBOW XS	8	12076	475	265	33	125	NO	870	0.18	0.52	0.012	0.005	0.24	0.02	0.03	0.02	0.05	0.007	0.009	0.28		
34	16"	90 LR ELBOW SCH40	4	12076	475	265	33	125	NO	870	0.18	0.52	0.012	0.005	0.24	0.02	0.03	0.02	0.05	0.007	0.009	0.28		
36	20"	90 LR ELBOW SCH40	5	72108	465	270	35	122	NO	870	0.19	0.56	0.017	0.009	0.25	0.05	0.07	0.05	0.05	0.005	0.008	0.32		
38	10"	90 LR ELBOW SCH80	12	35468	472	265	36	124	NO	870	0.19	0.56	0.016	0.008	0.24	0.05	0.06	0.04	0.05	0.008	0.007	0.30		
40	16"	90 LR ELBOW SCH80	9	61244	469	285	33	120	NO	870	0.18	0.55	0.012	0.008	0.24	0.03	0.01	0.02	0.05	0.008	0.007	0.29		
41	20"	90 LR ELBOW SCH80	4	72117	465	265	32	122	NO	870	0.18	0.52	0.013	0.008	0.25	0.03	0.02	0.05	0.01	0.009	0.007	0.28		
47	3"	180 LR RETURN BEND STD	200	50856	475	280	33	125	NO	870	0.20	0.53	0.015	0.006	0.25	0.06	0.02	0.04	0.05	0.007	0.008	0.31		
48	4"	180 LR RETURN BEND STD	150	25814	473	265	33	124	NO	870	0.20	0.56	0.013	0.009	0.24	0.04	0.02	0.05	0.03	0.008	0.009	0.31		
49	6"	180 LR RETURN BEND STD	100	52692	482	275	32	126	NO	870	0.20	0.52	0.015	0.005	0.22	0.03	0.05	0.04	0.02	0.007	0.008	0.31		
51	2"	180 SR RETURN BEND STD	100	42976	469	285	32	123	NO	870	0.19	0.52	0.012	0.007	0.25	0.03	0.04	0.05	0.03	0.007	0.008	0.30		
52	3"	180 SR RETURN BEND STD	100	50856	475	280	33	125	NO	870	0.20	0.53	0.015	0.006	0.26	0.06	0.02	0.04	0.05	0.007	0.008	0.31		
53	4"	180 SR RETURN BEND STD	50	25814	473	265	33	124	NO	870	0.20	0.56	0.013	0.009	0.24	0.04	0.02	0.05	0.03	0.008	0.009	0.31		
55	3/4"	TEE STD	200	G1	468	265	32	123	YES		0.18	0.56	0.013	0.009	0.24	0.04	0.04	0.05	0.03	0.008	0.009	0.30		
57	1-1/4"	TEE STD	100	J1	465	265	33	122	YES		0.20	0.55	0.009	0.005	0.24	0.04	0.01	0.03	0.05	0.008	0.008	0.31		
59	2"	TEE STD	500	18546	490	270	34	128	YES		0.19	0.52	0.013	0.008	0.24	0.03	0.02	0.06	0.06	0.007	0.008	0.30		
60	1/2"	TEE XS	200	F2	472	260	33	124	NO	870	0.20	0.53	0.012	0.005	0.25	0.03	0.05	0.04	0.05	0.006	0.008	0.31		
61	3/4"	TEE XS	200	G2	476	265	32	125	NO	870	0.19	0.52	0.008	0.006	0.25	0.03	0.02	0.04	0.06	0.007	0.009	0.29		
63	1-1/4"	TEE XS	100	J2	466	285	32	122	NO	870	0.20	0.52	0.015	0.006	0.23	0.06	0.02	0.04	0.05	0.008	0.007	0.31		
65	12"	TEE SCH40	15	51420	490	285	33	126	NO	870	0.19	0.53	0.015	0.007	0.26	0.02	0.03	0.04	0.05	0.007	0.008	0.30		
66	14"	TEE SCH40	9	65729	472	265	33	124	NO	870	0.18	0.52	0.012	0.008	0.25	0.03	0.04	0.05	0.04	0.008	0.009	0.29		
67	16"	TEE SCH40	10	17360	465	270	32	122	NO	870	0.19	0.55	0.013	0.006	0.24	0.05	0.02	0.03	0.02	0.007	0.008	0.30		
72	4"X2"	TEE STD	50	34179	473	265	34	124	YES		0.19	0.56	0.011	0.004	0.22	0.05	0.04	0.03	0.05	0.007	0.009	0.31		
73	6"X4"	TEE STD	50	34003	485	275	31	127	YES		0.19	0.53	0.015	0.006	0.20	0.04	0.01	0.04	0.09	0.007	0.008	0.30		

We hereby certify that the material described herein has been inspected/tested satisfactorily in accordance with the standards specified above and purchase order requirements.

REMARKS: 1. VISUAL EXAMINATION GOOD
2. DIMENSIONAL EXAMINATION GOOD
3. MELTING PROCEDURE E
4. MATERIAL IN ACCORDANCE WITH NACE MR0175-2002
5. HEAT TREATMENT HOT FORMED FITTINGS HAVE BEEN FORMED AT TEMP 870 C AND COOLED IN STILL AIR

HEAT DETAIL

C1	33945	G2	91862	F2	58062
E1	35038	J1	25768		
G1	40502	J2	65209		

APCO PIPE FITTINGS CO. LTD.

QUALITY ENGINEER

702

RECEIVED 26/7/10

Po# 3266-0.33 "AMITY"
SO# 0281546

INSPECTION CERTIFICATE

DATE: 2010-1-18

SHANGHAI GATEWAY FITTINGS CO.,LTD
951,Kesheng Road Beiguan, Malu town, Jia-ding District,
Shanghai, China
TEL: 86-21-69155661 FAX: 86-21-69155662

STANDARD: ASTM A234/ASME SA234-07 WPB
MATERIALS: ASTM A106 Gr.B
INSP.SPEC.: ASME B16.9-07

ORDER NO: 7003359
P.I.NO:
CERTIFI.NO: 11A1-5/8

ITEM NO.	PRODUCT & SIZE	QUANTITY PCS	MFG NO.	VISUAL&DIMENTIONAL INSPECTION	HARDNESS MAX.197 HB	HEAT TREATMENT(NOTE)	MAGNETIC PARTICLE EXAMINATION	
41	Elbow 90 LR-3" STD	800	10K106	GOOD	87~95	A		
42	Elbow 90 LR-4" STD	200	10K108	GOOD	92~94	A		
43	Elbow 90 LR-5" STD	50	10K110	GOOD	85~94	A		
44	Elbow 90 LR-6" STD	200	10K111	GOOD	75~93	A		
45	Elbow 90 LR-8" STD	60	10K114	GOOD	89-76	A		
46	Tee-3 x 2" STD	50	10K184	GOOD	85~98	N	OK	
47	Tee-4 x 2" STD	150	10K186	GOOD	69~85	N	OK	
48	Tee-4 x 3" STD	50	10K187	GOOD	99-85	N	OK	
49	Tee-6 x 3" STD	5	10K190	GOOD	85~99	N	OK	
50	Tee-6 x 4" STD	50	10J155	GOOD	69~85	N	OK	

ITEM NO.	MATERIAL CHARGE NO.	C *100	Si *100	Mn *100	P *1000	S *1000	Cu *100	Ni *100	Cr *100	Mo *100	V *100		PHYSICAL TEST YS KSI	TS KSI	E %	C.E x100
	STAND MIN.		10	29									35.5	60		
	ARD MAX.	30		106	50	58	40	40	40	15	8			85.0		50
41	Z-10814	19	24	52	14	7	0.9	0.5	6	2.1	0		41.35	76.90	35.0	30.22
42	593948	21	28	56	11	14	10	3	4	2	0		48.61	74.00	30.5	41.73
43	A-225	20	23	46	16	15	2	2	2	1	0		43.53	69.65	30.5	30.40
44	593695	20	23	47	9	10	8	3	5	1	0		44.98	71.10	32.0	37.23
45	892717	19	23	56	20	9	0.1	1	2	0.1	0		42.08	66.75	36.5	28.92
46	9106068	19	26	48	23	23	1.2	1.8	4.6	1.0	0		41.35	66.75	31.0	29.44
47	9105872	17	21	58	12	10	1.2	1.7	4.5	1.0	0		43.53	68.92	30.0	29.08
48	9105872	17	21	58	12	10	1.2	1.7	4.5	1.0	0		43.53	68.92	30.0	29.08
49	093029738	20	26	49	17	12	1.2	1.1	2	0.1	0		38.45	65.30	31.0	29.86
50	499448	20	23	53	13	7	10	5	6	1	0		37.00	68.20	31.5	40.57

(NOTE):A: HOT FORMED WITH FINAL TEMPERATURE BETWEEN 620℃ - 980℃ , AIR COOLING.
N: NORMALIZING AT TEMPERATURE 880℃*0.5 HR , AIR COOLING.
NACE MR-01-75 : SATISFACTORY

MILL TEST CERTIFICATE ACCORDING TO EN10204/3.1

WE HEREBY CERTIFY THAT THE PRODUCT DESCRIBED HEREIN HAS BEEN MANUFACTURED IN ACCORDA WITH THE SPECIFICATIONS CONCERNED AND ALSO WITH THE PURCHASER'S REQUIREMENTS AND THAT THE TEST RESULTS SHOWN HEREIN ARE CORRECT.

K C GUAN
MANAGER OF Q. A. DEPT

Order#: 53947 Seq: 7 PO#: 0017173 Heat#: 660 Mill: ULMA
Part#: FL 6 1 R W STD 5 Part Desc: Flanges 6 (168.3mm O.D.) 150# RAISED FACE WELD NECK STD A/SA105N

CLIENTE / Customer / Client

[redacted]

CERTIFICADO DE INSPECCION

Inspection Certificate - Certificat de Réception

DIN EN 10204 / 3.1
ISO 10474 / 3.1

FECHA / Date: 06/03/2010

N.º / No.: 130325

HOJA / Page: 1

SGI 1022184 SGI 0300236

ULMA FORJA, S.COOP.
B° Zubillaga, 3 - Apdo. 14
20560 OÑATI (Gipuzkoa) SPAIN
Tel.: 34 - 943 780552
Fax: 34 - 943 781800
E-mail: ulma@ulmaforging.com

PRODUCTO / Article - Produit: FLANGES

SU PEDIDO N.º / Your Order No. / Votre Cde. N.º: E1-325

DE / of. - de: 04/01/2010

Certified acc. PED 97/23/EC by TÜV Rheinland N.º 01 202 E/Q 02 7445

NORMAS APLICABLES / Requirements - Normes Applicables: ASME B16.5-09

MARCA DEL FABRICANTE / Mark of factory / Marque du fabricant: 75002

MATERIAL CORRESPONDIENTE / Material Correspondent - Qualité: ASTMA105N-05 / ASME SA105N-05

MODO DE FUSION (*) / Steel Making - Elaboration de l'acie: E = Elec. Y = Oxigeno básico

NACE MR0103/03 & MR0175/03
CAN/CSA-Z245.12
Gr.248 CAT 1

DEPARTAMENTO / Section / Département: QUALITY ASSURANCE

PARTIDA / Item / Poste	CANTIDAD / Quantity / Quantité	DESCRIPCION / Description / Description	OBSERVACIONES / Remarks / Observations (*)	COLADA N.º / Heat No / N.º Coulée	RESISTENCIA / T.Strength / Resist Rupt N/mm2	LIMITE ELAST. / Y.Strength / Limite Elast. N/mm2	ALARGAM. / Elongation / Allongement Lo: 4 d %	ESTRICCION / Red. Area / Striction %	RESILIENCIA / Impact test / Résilience Joules	MEDIA / Average / Moyenne	°C	DUREZA / Hardness / Dureté HB
3 F 12 1 R S 5	120	SO 12 150LB RF A105N	NE	379A9	505	312	29,70	56,00				147 155
5 F 14 1 R S 5	30	SO 14 150LB RF A105N	NE	33A0	515	314	30,30	55,00				149 156
13 FL 8 1 R W STD 5	105	WN 8 150LB STD/40 RF A105N	NE	341A9	534	309	32,70	61,40				148 154
13 FL 6 1 R W STD 5	210	WN 6 150LB STD/40 RF A105N	NE	6T0	501	296	28,80	52,30				148 156

COMPOSICION QUIMICA - STEEL MARKER'S LADLE ANALYSIS - ANALYSE CHIMIQUE

COLADA N.º / Heat No / N.º Coulée	C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	Nb %	V %	Cu %	Al %	Ti %	N %	CEq %
33A0	0,210	0,230	0,830	0,013	0,005	0,080	0,120	0,030	0,007	0,001	0,230	0,028	0,000	0,009	0,394
341A9	0,190	0,170	0,910	0,013	0,015	0,050	0,110	0,020	0,005	0,001	0,310	0,002	0,000	0,009	0,384
379A9	0,180	0,190	0,820	0,014	0,005	0,040	0,090	0,050	0,002	0,008	0,160	0,023	0,000	0,000	0,363
6T0	0,160	0,180	0,820	0,011	0,016	0,050	0,080	0,010	0,004	0,001	0,330	0,000	0,000	0,000	0,357

- Las dimensiones y la condición superficial se hallaron satisfactorio.
- Dimension and surface condition were found acceptable
- Les dimensions et l'état de surface sont satisfaisants

- Los materiales citados cumplen las normas aplicables
- Manufacturing requirements are satisfied
- Les normes applicables sont respectées

EL INSPECTOR
Works Inspector - L'Inspecteur

ULMA FORJA S. COOP.
Dpto. de Garantía de calidad
Quality Assurance Dept.

(*) OBSERVACIONES: Remarks / Observations: N_NORMALIZED AT 900 C AND ALLOWED TO COOL IN STILL AIR

FL6150 WN 6

6T0

信盛（姜堰）五金锻造有限公司

SHINSEI (JIANGYAN) STEEL FLANGES CO., LTD.

江苏省姜堰市经济开发区天目路688号(邮编: 225500)
NO.688, TIANMU ROAD , JIANGYAN ECONOMIC DEVELOPMENT ZONE,
JIANGYAN CITY, JIANGSU ,CHINA (225500)
TEL:0523-88206028 FAX:0523-88206058
E-mail:sales@shinsei.ssflanges.com.cn;shipment@shinsei.ssflanges.com.cn
WBE:http://www.ssflanges.com.cn

SSWJ/QD8.2.4A-04

ACCORDING TO EN10204-3. 1/2004

MILL TEST & INSPECTION CERTIFICATE

CUSTOMER:SEYBOLD(AMITY)
CERT NO:11010076 ORDER NO:7003357(17660)

DATE: 2011-01-27
PAGE: 2

ITEM	RAW MATERIAL HEAT NO.	SHINSEI HT.CD.	DESCRIPTION	QUANTITY	SPECIFICATION: ASTM/ASME SA105N-2005
005	2302-13403	A508	BLRF 4" 150	22 PCS	DIMENSION:
005	BS0009003	A142	BLRF 4" 150	20 PCS	ASME/ANSI B16.5-2009
005	10701343	A464	BLRF 4" 150	8 PCS	
006	10701343	A464	BLRF 5" 150	10 PCS	SURFACE: BY VISUAL...GOOD
007	09703777	A331	BLRF 6" 150	77 PCS	
007	10706683	A565	BLRF 6" 150	3 PCS	
008	1305-04979	A500	BLRF 8" 150	30 PCS	

CHEMICAL COMPOSITION (%)

ITEM	C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	CE
Min	-	0.100	0.600	-		-	-	-	-	-	-
Max	0.350	0.350	1.050	0.035	0.040	0.400	0.300	0.400	0.120	0.080	0.430
005	0.190	0.260	0.960	0.025	0.002	0.020	0.040	0.010	0.001	0.006	0.361
005	0.190	0.230	1.030	0.001	0.006	0.120	0.004	0.004	0.0012	0.008	0.373
005	0.210	0.250	1.000	0.014	0.007	0.040	0.040	0.030	0.050	0.004	0.4
006	0.210	0.250	1.000	0.014	0.007	0.040	0.040	0.030	0.050	0.004	0.4
007	0.200	0.250	0.970	0.009	0.006	0.090	0.070	0.040	0.008	0.004	0.387
007	0.180	0.250	0.980	0.012	0.008	0.100	0.080	0.040	0.007	0.003	0.371
008	0.200	0.250	0.950	0.014	0.003	0.020	0.030	0.010	0.002	0.005	0.368

MECHANICAL TEST

ITEM	Tensile Strength (KSI)	Yield Strength (KSI)	Elon-Gation (%)	R of A (%)	Hardness (HB)
Min	70.0	36.0	22.0	30.0	-
Max	-	-	-	-	187.0
005	74.8	49.1	33.1	63.7	144.0
005	75.3	53.3	33.0	59.0	137.0
005	76.6	48.6	28.7	63.1	140.0
006	76.6	48.6	28.7	63.1	140.0
007	73.4	49.1	35.2	69.0	143.0
007	74.1	49.5	33.6	66.2	144.0
008	71.7	51.6	31.8	64.1	141.0

Remark:
HEAT TREATMENT:NORMALIZE AT 860℃
MATERIAL IN ACC.WITH NACE MR0175-2003(ONLY HARDNESS)
ISO9001:2008 & PED97/23/EC CERTIFIED
AD2000-MERKBLATT WO CERTIFIED

WE CERTIFY THE ABOVE MENTIONED FLANGES HAVE BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN

Q.C. MANAGER

INSPECTOR

RECEIVED 2011/1/28

Po # 3266-000.33
So # 026147.2
"AMITY"

接下页

INSPECTION CERTIFICATE

DATE: 2010-1-18

SHANGHAI GATEWAY FITTINGS CO.,LTD
951,Kesheng Road Beiguan, Malu town, Jia-ding District,
Shanghai, China
TEL.: 86-21-69155661 FAX: 86-21-69155662

STANDARD: ASTM A234/ASME SA234-07 WPB
MATERIALS: ASTM A106 Gr.B
INSP.SPEC.: ASME B16.9-07

ORDER NO: 7003359
P.I.NO:
CERTIFI.NO: 11AI-3/8

ITEM NO.	PRODUCT & SIZE	QUANTITY PCS	MFG NO.	VISUAL&DIMENTIONAL INSPECTION	HARDNESS MAX.197 HB	HEAT TREATMENT (NOTE)	MAGNETIC PARTICLE EXAMINATION	
21	Conc Reducer-6 x 5" STD	10	10K86	GOOD	87~93	N	OK	
22	Conc Reducer-8 x 6" STD	30	10K88	GOOD	87~90	N	OK	
23	Conc Reducer-10x 8" STD	15	10K91	GOOD	91-76	N	OK	
24	Ecc Reducer-3 x 2" STD	25	10K146	GOOD	85~98	N	OK	
25	Ecc Reducer-3 x 2 1/2" STD	10	10K147	GOOD	69~85	N	OK	
26	Ecc Reducer-4 x 3" STD	25	10K150	GOOD	99-85	N	OK	
27	Ecc Reducer-6 x4" STD	25	10K152	GOOD	85~99	N	OK	
28	Ecc Reducer-8 x3" STD	5	10K153	GOOD	85~99	N	OK	
29	Ret Bend 180 LR-2" STD	120	10K170	GOOD	85~99	A		
30	Ret Bend 180 LR-3" STD	25	10K171	GOOD	91~101	A		

ITEM NO.	MATERIAL CHARGE NO.	C *100	Si *100	Mn *100	P *1000	S *1000	Cu *100	Ni *100	Cr *100	Mo *100	V *100		PHYSICAL TEST YS KSI	TS KSI	E %	C.E x100
	STAND MIN.		10	29									35.5	60		
	ARD MAX.	30		106	50	58	40	40	40	15	8			85.0		50
21	093029738	20	26	49	17	12	1.2	1.1	2	0.1	0		38.45	65.30	31.0	29.86
22	08008463	20	24	50	19	9	1.3	1.1	3.3	0.1	0		40.63	61.67	30.0	30.39
23	1092074	21	23	53	11	8	3	1	1	0.2	0.1		39.18	65.30	32.5	33.16
24	00605	19	23	50	25	14	1.6	3.6	10.4	1.3	0		38.45	67.47	30.0	31.51
25	00605	19	23	50	25	14	1.6	3.6	10.4	1.3	0		38.45	67.47	30.0	31.51
26	WB02-812	20	24	48	19	12	1	1	2	1.0	0		43.53	69.65	27.0	29.67
27	10004165	19	24	49	18	13	0.8	1.7	1.6	1.9	0		38.45	68.92	28.5	28.78
28	976362	19	24	48	19	18	3	2	1	1	0		42.81	66.75	31.0	30.53
29	WB10-3713	20	20	49	18	10	1.8	3.5	7	2	0		36.28	65.30	30.0	32.00
30	WB10-2308	21	19	50	17	10	1.5	2.3	5.1	0.3	0		36.28	68.20	30.0	32.07

(NOTE):A: HOT FORMED WITH FINAL TEMPERATURE BETWEEN 620℃ - 980℃ , AIR COOLING.
N: NORMALIZING AT TEMPERATURE 880℃*0.5 HR , AIR COOLING.
NACE MR-01-75 : SATISFACTORY

MILL TEST CERTIFICATE ACCORDING TO EN10204/3.1

WE HEREBY CERTIFY THAT THE PRODUCT DESCRIBED HEREIN HAS BEEN MANUFACTURED IN ACCORDA WITH THE SPECIFICATIONS CONCERNED AND ALSO WITH THE PURCHASER'S REQUIREMENTS AND THAT THE TEST RESULTS SHOWN HEREIN ARE CORRECT.

K C GUAN
MANAGER OF Q. A. DEPT

MILL TEST & INSPECTION CERTIFICATE

ACCORDING TO EN 10204 :2004 3.1

柏韋鐵工股份有限公司
高雄縣仁武鄉烏林村仁心路 303 號
BOTH-WELL STEEL FITTINGS CO., LTD.
NO.303, JEN-HSIN ROAD JEN-WU HSIANG
KAOHSIUNG HSIEN, TAIWAN R.O.C.(81460)
TEL: 886-7-371-0497, 371-1536, 372-0260 FAX: 886-7-371-3864 , 371-3882
web site:http://www.bothwell.com.tw e-mail:bothwell@www.bothwell.com.tw or box@bothwell.com.tw

An ISO 9001:2008 Registered Manufacturer

CUSTOMER : SEYBOLD INTERNATIONAL CORP
CERT. NO : 110221 L/C NO :
ORDER NO : 7003371 (17661) DATE : 01/28/2011
INVOICE NO : BW109911048 PAGE : 34 ORIGIN : TAIWAN

ITEM	BW HT.CD.	RAW MATERIAL HEAT NO.	DESCRIPTION	QUANTITY	SPECIFICATION FOR MATERIAL	SPECIFICATION FOR FITTING	INSPECTION SURFACE	INSPECTION DIM.
142	3382	317342	45D ELBOW 1" 3000# S/W	40 PC	ASTM A105N -09	ASME B16.11 - 2009	GOOD	GOOD
143	3365	316685	45D ELBOW 1-1/2" 3000# S/W	20 PC	ASME SA105N			
144	3125	306553	90D ELBOW 3/4" 3000# S/W	100 PC				
145	3409	318229	90D ELBOW 1" 3000# S/W	575 PC				
146	3358	316682	90D ELBOW 1-1/4" 3000# S/W	100 PC				

ITEM	BW HT.CD.	CHEMICAL COMPOSITION (%) C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Cb(Nb)	N	Al	Ti	Zr		CE	MATERIAL SUPPLIER
Min		-	0.100	0.600	-	-	-	-	-	-	-	-	-					-	
Max		0.350	0.350	1.050	0.035	0.040	0.400	0.300	0.400	0.120	0.080	-	-					0.430	
142	3382	0.210	0.200	0.860	0.017	0.011	0.120	0.090	0.040	0.010	0.002	0.001	-					0.384	
143	3365	0.190	0.180	0.810	0.017	0.014	0.130	0.150	0.080	0.020	0.002	0.001	-					0.373	
144	3125	0.200	0.200	0.850	0.014	0.016	0.150	0.080	0.060	0.020	0.002	0.001	-					0.376	
145	3409	0.210	0.200	0.830	0.023	0.016	0.020	0.100	0.060	0.010	0.002	0.001	-					0.376	
146	3358	0.190	0.190	0.820	0.021	0.013	0.120	0.100	0.040	0.010	0.002	0.001	-					0.360	

ITEM	BW HT.CD.	MECHANICAL PROPERTIES T. S. (KSI)	Y. S. (KSI)	EL. (%)	R of A (%)	Hardness (HB)(AVG)		Charpy Impact °F / 0 °C MIN./AVG. / (Joule) 1	2	3	AVG.	HEAT TREATMENT
Min		70.0	36.0	22.0	30.0	-						NORMALIZED
Max		-	-	-	-	187						
142	3382	73.3	50.9	35.8	62.6	141	141					
143	3365	73.4	51.4	34.6	74.6	142	143					
144	3125	75.8	51.8	32.6	66.1	145	142					860℃ A.C.
145	3409	75.6	54.4	36.0	64.5	143	141					
146	3358	73.1	48.3	37.0	64.5	141	141					

ADDITIONAL TEST／REMARKS
CONFORMS TO NACE MR0175/MR0103-2003
STEEL MAKING PROCESS : ELECTRIC FURNACE

WE HEREBY CERTIFY, THAT THE MATERIAL DESCRIBED ABOVE HAS BEEN TESTED AND COMPLIES WITH THE TERMS OF THE ORDER CONTRACT.

C.C. Huang
Q.C.MANAGER
CHEN CHI HUANG

Y.Y. Chang
INSPECTOR
YUAN YAO CHANG

MILL TEST & INSPECTION CERTIFICATE

ACCORDING TO EN 10204 :2004 3.1

柏霖鐵工股份有限公司
高雄縣仁武鄉烏林村仁心路 303 號
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An ISO 9001:2008 Registered Manufacturer

CUSTOMER : SEYBOLD INTERNATIONAL CORP
CERT. NO : 110666 L/C NO :
ORDER NO : 7003507 DATE : 03/19/2011
INVOICE NO : BW109911179 PAGE : 13 ORIGIN : TAIWAN

ITEM	BW HT.CD.	RAW MATERIAL HEAT NO.	DESCRIPTION	QUANTITY	SPECIFICATION FOR MATERIAL	SPECIFICATION FOR FITTING	INSPECTION SURFACE	INSPECTION DIM.
035	2714	393712	CAP 1/4" 3000# NPT	25 PC	ASTM A105N -09	ASME B16.11 - 2009	GOOD	GOOD
036	3374	316851	CAP 1/2" 3000# NPT	25 PC	ASME SA105N			
037	3234	310575	CAP 1" 3000# NPT	75 PC				
038	3327	315758	FULL CPLG 1/8" 3000# NPT	400 PC				
039	3334	315764	FULL CPLG 1/4" 3000# NPT	500 PC				

ITEM	BW HT.CD.	CHEMICAL COMPOSITION (%) C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Cb(Nb)	N	Al	Ti	Zr		CE	MATERIAL SUPPLIER
Min		-	0.100	0.600	-	-	-	-	-	-	-	-	-					-	
Max		0.350	0.350	1.050	0.035	0.040	0.400	0.300	0.400	0.120	0.080	-	-					0.430	
035	2714	0.200	0.190	0.850	0.013	0.013	0.140	0.080	0.050	0.010	0.002	0.001	-					0.373	
036	3374	0.200	0.200	0.840	0.016	0.011	0.160	0.120	0.120	0.020	0.002	0.001	-					0.387	
037	3234	0.210	0.190	0.820	0.017	0.015	0.210	0.100	0.080	0.020	0.002	0.001	-					0.390	
038	3327	0.200	0.190	0.840	0.015	0.015	0.160	0.070	0.050	0.010	0.002	0.001	-					0.370	
039	3334	0.190	0.180	0.850	0.015	0.012	0.180	0.090	0.060	0.020	0.002	0.001	-					0.370	

ITEM	BW HT.CD.	MECHANICAL PROPERTIES T. S. (KSI)	Y. S. (KSI)	EL. (%)	R of A (%)	Hardness (HB) (AVG)	Charpy Impact °F / 0 °C MIN./AVG. / (Joule) 1	2	3	AVG.	HEAT TREATMENT
Min		70.0	36.0	22.0	30.0	-					NORMALIZED
Max		-	-	-	-	187					
035	2714	76.9	59.8	28.8	65.1	141 143					
036	3374	72.6	49.2	36.8	64.5	141 141					
037	3234	77.7	55.2	31.6	66.4	146 143					860℃ A.C.
038	3327	73.4	46.9	35.3	64.5	141 140					
039	3334	73.4	46.0	36.0	61.6	141 140					

ADDITIONAL TEST／REMARKS
CONFORMS TO NACE MR0175/MR0103-2003
STEEL MAKING PROCESS : ELECTRIC FURNACE

WE HEREBY CERTIFY, THAT THE MATERIAL DESCRIBED ABOVE HAS BEEN TESTED AND COMPLIES WITH THE TERMS OF THE ORDER CONTRACT.

C.C. Huang
Q.C.MANAGER
CHEN CHI HUANG

Y.Y. Chang
INSPECTOR
YUAN YAO CHANG

INTERNATIONAL
NUCLEAR PRODUCTS
Manufacturer of Piping and Pressure Vessel Components
4407 Haygood St - Houston, TX 77022
Phone: 713-695-3633 Fax: 713-695-3528
A Bonney Forge Company

Sold To:

MTR #: 198,951
PO #: CI-10-527
Sales Order #: C001013323 Date: 11/23/2010

This product has not come in direct contact with mercury or any of its compounds, nor with any mercury-containing device employing a single boundary of containment. No welding performed.
We certify that the contents of this report are correct and accurate, and that all test results and operations performed by WFI or its subcontractors are in compliance with the material specification and requirements of the referenced code or standard, and that the material conforms to the dimensional requirements of the order. This document is in accordance with EN10204 3.1.

Certified Material Test Report

Heat Code: 58189

Material: A/SA105N 08

Item	Description
11	36 - 3 X 1 3M THP A/SA105N
28	36 - 3 X 1 3M SWP A/SA105N

Chemical Composition

Ladle	C	CR	CU	MN	MO	NB	NI	P
	0.200	0.03	0.120	1.09	0.010	0.01	0.03	0.007
	S	SI	V					
	0.023	0.18	0.00					

Carbon Equivalency: Ladle 0.40

	Tensile PSI	Yield PSI	Elong %	RA %	Hardness	
Product	72,500	50,000	35.95	66.10	130 BHN	130 BHN

Normalized

1. IN ACCORDANCE WITH NACE SPEC MR0175-2002

Marie Debner
Quality Assurance Representative