



#### Baffinland Iron Mines Corporation Mary River Project

Construction Summary Report: Construction Summary Report: Milne Port Off-Spec Sewage Effluent Pond (PWSP)



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			Botton	Alex P	337	the		
2013-12-19	0	Approved For Use	S. Potter	S. Hassan	S. Perry	O. Curran		
DATE			PREPARED BY	CHECKED BY	APPROVED BY	APPROVED BY		
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Baffinland Iron Mines Corporation - Mary River Project

Construction Summary Report: Construction Summary Report: Milne Port Off-Spec Sewage Effluent Pond (PWSP) December 19, 2013

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#### 1. Facility Description

#### 1.1 Purpose and Design Basis

The off-spec effluent pond has been constructed to store the off-spec effluent from the Milne Port Sewage Treatment Plant (STP). During normal operation, the treated effluent from the STP will be directed to the permitted discharge point(s) at Milne Inlet. In the event that the treated effluent does not meet discharge requirements, the off-spec effluent will be pumped to the pond. Once the problem in the STP is corrected, the off-spec effluent from the pond will be transported via vacuum truck and re-processed through the STP before dierctly discharing to Milne Inlet.

The design basis for the pond's storage capacity is as following:

- Total bed/population during operation = 120 nos
- Sewage generation rate = 300 lpd
- Required 30 days off-spec effluent storage volume during operation = 1,080 m<sup>3</sup> with 0.3m free board
- Designed pond volume = 2,230 m<sup>3</sup> with 0.3m free board (the designed volume represents working capacity for early construction and startup based on 120 people's 62 days storage or 248 people's 30 days storage).

#### 1.2 Location and Base Elevations

The pond is located at south side of the fuel tank farm and west side of power generators with northing between N7,976,020 and N7,976,060 and easting between E503,590 and E503,670. Pond bottom elevation is EL. 12.80 m and berm top elevation is EL. 14.28 m.

#### 1.3 Geometry and Access

The pond has been constructed as rectangular shape to optimize the earthworks materials (granular fills and liner). The pond berms have side slope not steeper than 3H:1V and the berm top width is 3.0 m to meet the access and liner anchoring requirements. The pond also has a 6 m wide 6% grade access ramp with a 6 m x 10 m landing pad at the end of the access ramp for provideing vacuum truck access to pump off-spec water out the pond and it has sloped surface toward to the pond.

There is a 14 m x 6 m anex area at east side of the landing pad to accommodate a sattelite shed pad.

#### 1.4 Earthworks Materials Details

The pond has been constructed with raised earthworks on top of the laydown pad B1-B2-B3. It has been sealed with exposed liner material for storing the off-spec effluent without any leakage. The pond materials are listed below:

Type 8 (150 mm minus) as main/core material of berm







- Type 5 (32 mm minus) for covering the core material on top and inside surface of the berm
- Type 6 / Type 9 (9.5 mm minus) for liner bedding and anchoring
- Type 4 Geomembrane (Enviro liner 6060 HD)
- Non-woven geotextile (Layfield LP7) for protection of the liner material
- Jersey barrier for truck safety.

#### 1.5 Issue for Construction (IFC) Drawings

Two IFC drawings have been issued that include plan, sections and details which are as follows:

- H349000-2735-10-035-0001: Minle Port Off-Spec Effluent Pond Plan
- H349000-2735-10-035-0002: Minle Port Off-Spec Effluent Pond Sections & Details.

As part of the engineering design process, a 3D earthworks model of the pond including the berm, access ramp, landing and satellite shed pad were prepared, the drawings went through internal and client reviews and finally issued with the P.Eng.

#### 2. Construction Activity Summary

Based on the design drawings:

- The area was cleared and graded to prepare the subbase for the effluent pond.
- 100mm of Type 8 (150 mm minus) was placed for the construction of the berm, but RFI-008 was issued to address the size of aggregate being produced from Run of Quarry (ROQ). Material with a range of 100-300mm was approved by the field engineer. Refer to Section 5 for details of the field instruction.
- Another layer of 100mm Type 9 (9.5 minus) or Type 6 (4.75 minus) was placed on top.
- A non-woven geotextile was added with the liner as the final phase of the components of the effluent pond. Refer to Appendix A for details of QA/QC of liner installation.

The quality assurance and quality control (QA/QC) conducted by Layfield, documents the preparation of the subgrade, installation and testing of the geomembrane with a final inspection of the completed liner.

- A certificate of acceptance of the soil subgrade for installation of the liner was verified and signed by the NUNA project coordinator and Layfield Environmental supervisor.
- A geomembrane deployment log describes the location, size, temperature when placed, visually observed and initialled that the panel had been checked.







- A geomembrane trial seam log tested the welding before the entire installation proceeded. Connection of the trial panels checked and signed off.
- An air lance test log had been completed for each seam and signed off.
- A layout drawings shows all of the panel numbers, as described in the log documents.
- A certificate of final inspection and acceptance was signed by Layfield and Nuna representatives.

See Appendix A – Liner Data

#### 2.1 Photographic Records



Figure 1: Before - Sub-grade Prepared







Figure 2: Before - Levelling



Figure 3: During - Liner Installed







Figure 4: During – Grading of Final Layer



Figure 5: Completed – Earthworks







Figure 6: Completed – Operational

#### 3. As-Built Drawings

The as-built drawings were signed on December 17, 2013 by Bradford Watkin representing NUNA. The drawing states that "this drawing accurately reflects the as-built field condition in conjunction with the survey as-built data". Please refer to Appendix B – As built Drawings.





Table 3-1: 'As-Built' Drawing List

Drawing Number	Title	Revision
H349000-2735-10-035-0001 1 S ABMU01-YX001	OFF-SPEC EFFLUENT POND (PSWP) - PLAN	1
H349000-2735-10-035-0001 2 S ABMU01-YX001	OFF-SPEC EFFLUENT POND (PSWP) – SECTIONS AND DETAILS	2
H349000-2735-10-015- 0001-0-S-ABMU01-YX001	MILNE PORT LAYDOWN AREA, CAMP & SERVICES BUILDINGS RUN OF QUARRY FILL AREAS	0

#### 4. Unanticipated Observations

Not applicable.

#### 5. Field Decisions

- The as-built design of the effluent pond had a size variation from the material specified in the issued for construction design drawings. The design indicated 150mm minus material for base material and berms.
- Request for information (NE-RFI-008) was submitted on June 2<sup>nd</sup>, 2013 for the use of ROQ material produced from blasting in the range of 100-300mm.
- The corrective action was to allow the base material and berms to be built with the ROQ material produced. The material would be selected specifically and approved by the client representative before being placed.
- Refer to appendix for field instruction NE-RFI-008 (See Appendix C).

#### 6. Vibration Monitoring

No vibration monitoring was conducted during the construction of the Milne Port Off-Spec Effluent Pond (PWSP) as it was not deemed necessary based on scope of activities required for construction.

A geotechnical inspection was conducted in 2013 by a 3<sup>rd</sup> party, independent, Nunavut certified engineer that was inclusive of all containment structures at the Mary River Mine Site and Milne Port site including the Milne Port Off-Spec Effluent Pond (PWSP). As noted in Section 4.09 of Appendix D, the inspection found "no sign of weakness in any of the construction" of the Milne Port Off-Spec Effluent Pond (PWSP).





Control for quarrying activity was conducted as per the quarry specific management plans. For the Milne Port Off-Spec Effluent Pond (PWSP), the quarry in closest proximity and used for aggregate material supply was Quarry Q1. Please see Quarry Management Plan, Milne Inlet Quarry (Q1) (H349000-1000-07-126-0013) for detailed information of quarrying activity controls. It should be noted however this quarry is not in close proximity to fish bearing water.

#### 7. Environmental Monitoring

Environmental monitoring at Milne Port during the construction Milne Port Off-Spec Effluent Pond (PWSP) was conducted as per the 2013 Comprehensive Environmental Monitoring Plan (March 2013).

The risks to the water quality at Milne Port as a result of construction of the Milne Port Off-Spec Effluent Pond (PWSP) would originate from following sources based on construction methodology:

- · Spills from equipment
- Increase in sediment load in the water.

There were no recorded spills from equipment used in the construction of the PWSP and the water monitoring results show that the Total Suspended Solids (TSS) levels were below the required thresholds. As such, the environmental mitigation strategies were effective in maintaining runoff water quality. See internal and external surface water monitoring results for Milne Port in Appendix E.

#### 8. Fuel Storage System

Not applicable.

#### 9. Earthworks Data

#### 9.1 Survey Data

Based on the design drawings provided, a survey was conducted on each material required to build the effluent pond. NUNA East Ltd, provided a completion of construction document, Hatch document E349000-YX00100-124-0005 Sub01 contains the survey data in Section 4 which has been extracted as reference and can be seen in Appendix F.

#### 9.2 Geotechnical Data

Not applicable.

#### 10. Performance Evaluation

Not applicable.







#### 11. Surface Monitoring

None conducted.

#### 12. Required Maintenance

None conducted.

#### 13. Adaptive Management

Based on monitoring results indicating no adverse significant environmental impacts, no specific adaptive management practices were implemented as a result of construction of the Milne Port Off-Spec Effluent Pond (PWSP).

For discussion of adaptive management principles and practices applied during the Construction Phase of the Project and their overall effectiveness please refer to the 2013 Annual Report to the Nunavut Impact Review Board (to be submitted in March 2014).





# Appendix A Liner Data



Section 8
Liner Data



# CERTIFICATE OF ACCEPTANCE OF SOIL SUBGRADE SURFACE

ROJECT NAME	
ROJECT NUME	ER: Botfinland MRP Milne Port Fool Opprove Phan 2- Efflort
OWNER: None	a logistics
OCATION: _B	iffurland NO
LESL), have visu	, a duly appointed representative of Layfield Environmental Systems Ltd. ally observed the soil subgrade described below, and found it to be an on which to install geomembrane.
spections or tests o representations ubgrade. Layfield	based on observations of the surface of the subgrade only. No subterranean have been performed by Layfield Environmental Systems, and LESL makes or warranties regarding conditions which may exist below the surface of the Environmental Systems accepts no responsibility for conformance of the eject's specifications.
ibgrade condition eyond the contro	accepted on this date refers to its present condition. Any changes in the n that result from the effects of inclement weather and/or other forces l of Layfield Environmental Systems and remedial work to correct the es, will be the direct responsibility of the General Contractor.
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Date:	19-50/3 2013
Signature:	
Name: Title:	Sometime Copyright
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WNERS REPRE	SENTATIVE:
Date:	19/auly /2013
Signature:	MA
Name:	mike Price
Title:	Project Coardinator
Company:	Duna East ·

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PROJECT NUMBER:	14c-091	PROJECT TITLE:	Effluent Pond				
OWNER:	Nuna Logistics	CONTRACTOR:	Nuna Logistics				
LOCATION:	Baffinland NU						
GEOMEMBRANE	SECONDARY	PRIMARY CLOSURE	OTHER				
	SURFACE COMPACTION, PROTRUSIONS,		Y THE WASHINGTON				
		and the state of t	DAME. 00 1.132				
REMARKS: Installation of	f LP12 Geotextile under lay and EL 60-60		DATE: 20-Jul-13				
			SHEET NUMBER: 1				
DEPLOYMENT EQUIPME	NT: Spreader Bar and Crane						
	PANEL LOCATION REFERENCE	PANEL LOCATION REFERENCE	PANEL LOCATION REFERENCE				
	NUMBER 1						
		NUMBEI 2	NUMBEF 3				
PANEL/ROLL NUMBER	005759995	005759995	005759995				
DEPLOYMENT LENGTH AMBIENT AIR TEMP.	48.76 mts	9.11 X 4.8 mts 2C	4.8 X 4.26 mts 2C				
VISUAL OBSERVATION	Good	Good	Good				
DBSERVED OVERLAP	6"	6"	6"				
CHECKED BY	PH	PH	PH				
ADJACENT PANEL	N= TRENCH S= TRENCH	N= TRENCH \$= P4	N= TRENCH S= P5				
	6= TIE-IN w= P14	E= P3 W= P1	E= P5 W= P2				
DESCRIPTION	PANEL LOCATION REFERENCE	PANEL LOCATION REFERENCE	PANEL LOCATION REFERENCE				
DESCRIPTION	NUMBEF 4	NUMBEF 5	NUMBEF 6				
ANEL/ROLL NUMBER	005759995	005759995	005759995				
EPLOYMENT LENGTH MBIENT AIR TEMP.	9.69 X 4.8 mts 2 C	4.57 X 3.5 mts 2 C	9.6 mts 2 C				
ISUAL OBSERVATION	Good	Good	Damage				
BSERVED OVERLAP	6"	6"	6"				
HECKED BY	PH	PH	PH				
DJACENT PANEL	N= P2, P3, P2 S= P6	N= P3 S= P4	N= P4 S= P7				
	E- TRENCH W- P1	E= TRENCH W= P2, P3	E= TRENCH W= PI				
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AND PONT NUMBER	005759995	005759995					
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BSERVED OVERLAP	6"	6"	6"				
HECKED BY	PH	PH	PH				
DJACENT PANEL	N= P6 S= P8	N= P7 S= P9	N= P8 S= P10				
	E= TRENCH W= P1	E= TRENCH W= P1	E= TRENCH W= PI				
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ANEL/ROLL NUMBER	005759995	005759995	005759995				
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SUBMITTED BY: PH

DATE: 20-Jul-13

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OWNER:	Nuna Logistics	c	ONTRACTOR: _	Nuna Logistics			
LOCATION:	Baffinland NU						
	SECONDARY SURFACE COMPACTION, PROTRUSIONS, LP12 Geotextile under lay and EL 60-60		LOSURE /E MOISTURE):	OTHER	3		
				SHEET NUMBER:	2		
DEPLOYMENT EQUIPME	NT: Spreader Bar and Crane			*****			
	PANEL LOCATION REFERENCE NUMBEF 13	PANEL LOCATION R NUMBER 14	EFERENCE	PANEL LOCATION NUMBER 1	REFERENCE 5		
PANEL/ROLL NUMBER DEPLOYMENT LENGTH AMBIENT AIR TEMP. VISUAL OBSERVATION OBSERVED OVERLAP CHECKED BY ADJACENT PANEL	005759995 9.6 mts 2 C Good 6" PH N= P12	005759995 48.76 mts 2 C Good 6" PH N= TRENCH E= PI	s= TRENCH w= P15, P16	005759995 23.31 mts 2 C Damage 6" PH N= P16 E= P14	s- TRENCH w- P17		
DESCRIPTION	PANEL LOCATION REFERENCE NUMBEF 16	PANEL LOCATION R NUMBER	EFERENCE	PANEL LOCATION I	REFERENCE		
PANEL/ROLL NUMBER DEPLOYMENT LENGTH AMBIENT AIR TEMP, VISUAL OBSERVATION OBSRRVED OVERLAP CHECKED BY ADJACENT PANEL	005760583 34.44 mts 2 C Damage 6" PH N= \$5" E5" W=	N+ En	S= W=	N <sup>ac</sup> E=	S= W=		
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005760583	005760583	**	005760583				
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		******					
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E= P19 W= TRENCH	E= P19	w= TRENCH	E= P19	w- TRENCH			
PANEL LOCATION REFERENCE	PANEL LOCAT	ON REFERENCE	PANEL LOCATION REFI	ERENCE			
NUMBEI 26	NUMBEI	27	NUMBEI 28				
005901040	005901040						
10.57 mts							
2 C	2 C		2 C				
Good	Good		Good				
6"							
N= P25 S= P27	N= P26	S= P28	N= P27	S= P29			
15 125 34 127	120	3-120	1.27	3. 12.2			
	Nuna Logistics	Nuna Logistics	Nuna Logistics   Secondary   Primary   CLOSURE	Numa Logistics			

DATE: 20-Jul-13



PROJECT NUMBER:	14c-091			PROJECT TITLE:	Effluent Pond				
OWNER:	Nuna Logistics			CONTRACTOR: _	Nuna Logistics				
LOCATION:	Baffinland NU								
GEOMEMBRANE SUBGRADE CONDITION (S REMARKS: Installation of		PROTRUSIONS, DE	IMARY SICCATION, EXC	CLOSURE ESSIVE MOISTURE):	OTHER				
					SHEET NUMBE				
DEPLOYMENT EQUIPME	NT: Spreader Bar ar	nd Crane	1000						
	PANEL LOCATION REF	ERENCE	PANEL LOCATION	ON REFERENCE	PANEL LOCATION	ON REFERENCE			
ANEL/ROLL NUMBER DEPLOYMENT LENGTH AMBIENT AIR TEMP, VISUAL OBSERVATION DBSERVED OVERLAP CHECKED BY	005901040 10.21 mts 2 C Good 6"								
ADJACENT PANEL	N= P28 E= P19	S= TRENCH	N= E≃	S= W=	N= E=	S= W=			
DESCRIPTION	PANEL LOCATION REF	ERENCE	PANEL LOCATION	ON REFERENCE	PANEL LOCATIONUMBER	N REFERENCE			
ANEL/ROLL NUMBER DEPLOYMENT LENGTH IMBIENT AIR TEMP, VISUAL OBSERVATION DBSERVED OVERLAP HECKED BY									
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	E=	W=	E=	Wa	E=	w=			
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LS FORM 2

LAYFIELD ENVIRONMENTAL SYSTEMS

DATE:



### GEOMEMBRANE TRIAL SEAM LOG

PROJECT NUMBER:		14C - 091PRO					ROJECT TITLE:					Baffinland MRP Milne Port Fuel Upgrade										
OWNER	OWNER:		Nuna Logistics CONTR			RACTOR:				Nuna Logistics												
LOCATI			***	Baffinlan	NU		SHEE	ET NUMBER:			1											
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TF-2	21-Jul-13	27 PW	PH	3C	45%		830	113	109	107	109	108	104	102	105	103	104	125	119	PASS	PH	
	1000																					
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LS FORM 3



LS FORM 3

### GEOMEMBRANE TRIAL SEAM LOG

	ROJECT NUMBER:	14C - 091				PROJE	ECT	PROJECT TITLE:					Baffinland MRP Milne Port Fuel Upgrade							
OWNER				Nuna Log	istics		CONT	RAC	TOI	R:		Nuna Logistics								
LOCATI	ON:		-	Baffinlan	NU		SHEET NUMBER:				1									
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		t aran			TEMPER	ATURES				7.4.		TES	TRES	ULTS	*	mus ou	740		I I	
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PROJECT NUMBER:

### GEOMEMBRANE SEAM LOG

14C - 091

PROJECT NU	PROJECT NUMBER:		14C - 091					TITLE:	Baffinland MRP Milne Port Fuel Upgrade					
OWNER:		Nuna Logi	stics		AMILE		CONTRAC	TOR:	Nuna logi	stics				
LOCATION:		Baffinlan l	UV										- Sym	
					PASSING	TRIAL SEA	AMS							
				NO.		TIME	TECH II	)						
X_	FUSION			TF-1		13:55 HF		PH	]					
										SHEE	T NUMBER:	1		
0	EXTRUSION								1	OTILL				
						-			-		DATE:	20-Jul-13		
SOLVENT					ann									
								10	1					
		MACHINE TEMPERATURES  PREHEAT  MACHINE TEMPERATURES			1		- w	NON						
SEAM NUMBER	SEAM SECTION * START FINISH	APPROX. START	AMB.	WELD	OR	DIGITAL SET	INDICATOR			CHK'D	REMARKS	NON- DESTRUCTIVE		
HOMBER	POINT POINT	T TIME	TEMP.		MACH. SPEED	WEDGE OR BARREL	WEDGE OR BARREL	(M)	NUMBER	BY		TEST DATE	CHECKE	
2 / 3	SEOS TO NEOS	14:09	3C	PH	50%	830	830	4.8		PH		20-Jul-13		
4 / 5	EEOS TO WEOS	14:14	3C	PH	50%	830	830	4.6		PH		20-Jul-13		
4 / 6	EEOS TO WEOS	14:18	3C	PH	50%	830	830	9.7		PH		20-Jul-13		
6 / 7	EEOS TO WEOS	14:27	3C	PH	50%	830	830	9.6		PH		20-Jul-13		
2,3 / 4,5	EEOS TO WEOS	14:36	3C	PH	50%	830	830	11.8		PH		20-Jul-13		
7 / 8	EEOS TO WEOS	14:46	3C	PH	50%	830	830	9.6		PH		20-Jul-13		
8 / 9	EEOS TO WEOS	14:51	3C	PH	50%	830	830	9.6		PH		20-Jul-13		
9 / 10	EEOS TO WEOS	15:48	3C	PH	50%	830	830	9.6		PH		20-Jul-13		
10 / 11	EEOS TO WEOS	15:55	3C	PH	50%	830	830	9.6		PH		20-Jul-13		
11 / 12	EEOS TO WEOS	16:09	3C	PH	50%	830	830	9.6		PH		20-Jul-13	-	
12 / 13	EEOS TO WEOS	16:06	3C	PH	50%	830	830	9.6		PH		20-Jul-13		
							LY TOTAL	98.0					300	
REFERENCE SEA	IM ENDPOINTS FROM AI	V END OF SEA	M (EOS),	A REPAI	R, OR A POINT	LOCATION ON T	HE SEAM.			SUBM	ITTED BY:			
S FORM 4						LAYFIELD EN					DATE:			

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Alliannings.	

### GEOMEMBRANE SEAM LOG

PROJECT NU	MBER:			4C - 091		-	PROJECT	Baffinland MRP Milne Port Fuel Upgrade							
OWNER:		Nuna Logi	***************************************	-14/	1992		CONTRAC	TOR:	Nuna logistics						
LOCATION:		Baffinlan I	NU		armid.										
					PASSING	TRIAL SEA	AMS								
111				NO.		TIME	TECH II								
_X_	FUSION			TF-1		13:55 HF	RS	PH	1						
								- Marian		SHEET	NUMBER:	2			
	EXTRUSION									~~~~					
						*			4		DATE:	20-Jul-13			
-	SOLVENT					*		-	1						
			<u></u>					· ·	1						
			a luviania			MACHINE TE	MPERATURES								
SEAM	SEAM SECTION * START FINISH	APPROX. START	AMB.	WELD	PREHEAT OR	DIGITAL SET	INDICATOR	APPROX. LENGTH	DESTR.	CHK'D		NON- DESTRUCTIVE			
NUMBER	POINT POINT	TIME	TEMP.	TECH.	MACH. SPEED	WEDGE OR	WEDGE OR	WELDED (M)	NUMBER	BY	REMARKS	TEST	CHECKE		
4 1 20			-			BARREL	BARREL					DATE	BY		
1 / 14	SEOS TO NEOS	16:41	3C	PH	50%	830	830	48.8		PH		20-Jul-13			
1 / TIE-IN	SEOS TO NEOS	17:17	3C	PH	50%	830	830	48.8	DT-1	PH	TIE-IN	20-Jul-13			
15 / 16	EEOS TO WEOS	18:04	3C	PH	50%	830	830	4.8		PH	100	20-Jul-13			
14 / 15,16	SEOS TO NEOS	18:09	3C	PH	50%	830	830	48.8		PH		20-Jul-13			
1	ANII ANII		-				- 0-1-0								
1									-						
,															
1													-0-		
1	distance.						ave.						-		
	-				-	DATE	LY TOTAL	249.1							
REFERENCE SEA	M ENDPOINTS FROM A	N END OF SEA	AM (EOS)	A REPAI	R, OR A POINT	LOCATION ON T	HE SEAM.	243.1	3	STIRM	ITTED BY:	DII			
S FORM 4										JODIVI	the second secon	20-Jul-13	· ·		

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Carlinananna Carlinananna	LAYFIELD

### GEOMEMBRANE SEAM LOG

PROJECT NUMBER:		14C - 091		_PROJECT TITLE:	Baffinland MRP Milne Port Fuel Upgrade				
OWNER:	Nuna Logistics			CONTRACTOR:	Nuna logistics				
OCATION:	Baffinlan NU	Marketine Bridger (1		2 12 m Cal 2 M					
		PAS	SING TRIAL SE	CAMS					
		NO.	TIME	TECH ID					
X_FUSION		TF-2		RS PH					
EXTRUSION					SHEET NUMBER:	3			
					DATE:	21-Jul-13			
SOLVENT	-				_				

					PREHEAT	MACHINE TE	MPERATURES	inneati	-			276	ON-
SEAM NUMBER	SEAM SECTION * START FINISH	APPROX. START	AMB. AIR	WELD TECH.	OR MACH.	DIGITAL SET	INDICATOR	APPROX. LENGTH WELDED	DESTR.	CHK'D	REMARKS		UCTIVE
	POINT POINT	TIME	TEMP.	ē.	SPEED	WEDGE OR BARREL	WEDGE OR BARREL	(M)	NUMBER	BY		TEST DATE	CHECKED BY
15,16 / 17	SEOS TO NEOS	9:03	3C	PH	45%	830	830	57.3	DT-2	PH		21-Jul-13	- 000
17 / 18	SEOS TO NEOS	9:30	3C	PH	45%	830	830	48.8		PH		21-Jul-13	
18 / 19	SEOS TO NEOS	10:56	3C	PH	45%	830	830	48.8		РН		21-Jul-13	
20 / 21	EEOS TO WEOS	12:09	3C	PH	45%	830	830	10.8		PH		21-Jul-13	
21 / 22	EEOS TO WEOS	12:15	3C	PH	45%	830	830	10.8		PH		21-Jul-13	
22 / 23	EEOS TO WEOS	12:25	3C	PH	45%	830	830	10.8		PH		21-Jul-13	
23 / 24	EEOS TO WEOS	12:32	3C	PH	45%	830	830	10.7		PH		21-Jul-13	
24 / 25	EEOS TO WEOS	12:53	3C	PH	45%	830	830	10.6	DT-3	PH		21-Jul-13	
25 / 26	EEOS TO WEOS	12:58	3C	PH	45%	830	830	10.6		PH		21-Jul-13	
26 / 27	EEOS TO WEOS	13:03	3C	PH	45%	830	830	10.6		PH		21-Jul-13 21-Jul-13	
27 / 28	EEOS TO WEOS	13:09	3C	PH	45%	830	830	10.6		PH		21-Jul-13 21-Jul-13	

DAILY TOTAL 240.2

SUBMITTED BY: PH

DATE: <u>21-Jul-13</u>

LS FORM 4

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

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LS FORM 4

### GEOMEMBRANE SEAM LOG

PROJECT NU	MBER:		14	4C - 091			PROJECT T	Baffinland MRP Milne Port Fuel Upgrade							
OWNER:		Nuna Logi	stics				CONTRAC	TOR:	Nuna logistics						
OCATION:		Baffinlan l	NU									- Approximately and the second			
					PASSING	TRIAL SEA	AMS								
164				NO.		TIME	TECH ID								
X	FUSION			TF-2		08:18 HF	RS	PH	]						
	202.00								1	SHEET	T NUMBER:	4			
-	EXTRUSION				1 (Section 1)	-14			1						
	w 22 0 22 0 22 0				700				1		DATE:	21-Jul-13			
0	SOLVENT														
	- No.	·			1800			100	j)						
	SEAM SECTION *				PREHEAT	MACHINE TE	MPERATURES	APPROX.			CHK'D BY REMARKS	NO	ON-		
SEAM NUMBER	START FINISH	APPROX. START	AMB. AIR	WELD TECH.	OR MACH.	DIGITAL SET	INDICATOR	LENGTH	DESTR. NUMBER			DESTRUCTIVE			
	POINT POINT		TEMP.	ILCIL	SPEED	WEDGE OR BARREL	WEDGE OR BARREL	(M)				TEST DATE	CHECKEI		
28 / 29	WEOS TO EEOS	13:15	3C	PH	45%	830	830	57.3		PH		21-Jul-13			
19 / TIE-IN	NEOS TO SEOS	13:28	3C	PH	45%	830	830	48.8		PH		21-Jul-13			
/	M														
/		-													
1	***			<u> </u>											
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### GEOMEMBRANE DEFECT / REPAIR LOG

PROJEC	T NUMBI	ER:	14C - 091		PROJEC	T TITLE:	Baffinland I	Baffinland MRP Milne Port Fuel Upgrade					
OWNER	la .	Nuna Lo	ogistics		CONTRA	ACTOR:	Nuna Logist						
LOCATI	ION:	Baffinla	and NU			NUMBER:	1	-040					
			DEFECT LOCATION							7			
CODE	LOG DATE	SEAM OR PANEL NO.	DEFECT LOCATION DESCRIPTION	DEFECT TYPE	REPAIR TYPE	WELD TECH.	REPAIR DATE	REM.	ARKS	TEST DATE	CHECKED BY		
1 A	20-Jul-13	2,3 / 4,5	4.8 mts Seam 2-3 NEOS TO SEOS	T	G&W	RR	21-Jul-13			01.7.140			
1 B	20-Jul-13	1 / 2,4	9.11 mts Seam 1-Tie-In NEOS TO SEOS	T	G&W	RR	21-Jul-13			21-Jul-13	YE		
1 C	20-Jul-13	6 /	2.13 mts Seam 4-6 WEOS TO EEOS 0.3 m S		G&W	RR	21-Jul-13						
1 D	20-Jul-13	1 / 6,7	4.7 mts S from 1B	T	G&W	RR	21-Jul-13						
1 E	20-Jul-13	7 /	1.37 mts S from 1D	MD	G&W	RR	21-Jul-13	-					
1 F	20-Jul-13	7 /	2.44mts S, 1.22 mts E from 1D	MD	G&W	RR	21-Jul-13						
1 G	20-Jul-13	1 / 7,8	4.7 mts S from 1D	T	G&W	RR							
1 H	20-Jul-13		4.7 mts S from 1G	T	G&W	RR	21-Jul-13 21-Jul-13		0.00				
1 I	20-Jul-13		4.7 mts S from 1H	Ť	G&W	RR		0.00					
1 J	20-Jul-13		14.7 mts S from 1I	Ť	G&W	RR	21-Jul-13 21-Jul-13	ne.		-			
1 K	20-Jul-13		4.7 mts S from 1J	T	G&W	RR							
1 L	20-Jul-13		4.7 mts S from 1K	T	P, G & W	RR	21-Jul-13						
1 M	20-Jul-13		34.44 mts Seam 14-15,16 NEOS TO SEOS	T	G&W	RR	21-Jul-13 21-Jul-13						
1 N	20-Jul-13	15 /	2.41 mts E from 1Q	MD	G&W	RR	21-Jul-13				-		
10	20-Jul-13	16 /	2.13 mts E, 0.45 mts N from 1Q	MD	G&W	RR	21-Jul-13						
1 P	20-Jul-13	16 /	1.85 mts E, 0.18 mts N from 1Q	MD	G&W	RR	21-Jul-13						
1 Q	21-Jul-13	17 / 15,16	34.44 mts Seam 17-15,16 NEOS TO SEOS	T	G&W	RR	21-Jul-13	W 31	- inim				
1 R	20-Jul-13	16 /	7.49 mts N, 0.15 mts W from 1M	MD	G&W	RR	21-Jul-13			-			
1 S	20-Jul-13	16 /	9.65 mts N, 0.15 mts W from 1M	MD	G&W	RR	21-Jul-13						
1 T	20-Jul-13	16 /	18.49 mts N, 0.55 mts W from 1M	MD	G&W	RR	21-Jul-13						
DEPECT TYPE:	AD - ANIMAL RELATI	ED DAMAGE	EE - EARTHWORK EQUIPMENT DAMAGE	PT - PRESSURE TES	-	ICK	21-301-13						
	B - UNDISPERSED RE		EXT-EXTENSION	SI-SOIL SURFACE	RREGULARITY		T.	PA	SSING TRIAL SEAMS		lo .		
	BS - BOOT/SKIRT FRO		FM - FISHMOUTH FS - FAILED SHAM LENGTH	SL-SLAG ON TEXT			J.E.	NO.	TIME	TECH ID.			
	DS - BOOT/SKIRT FROM FAIL PENETRATION CO - CRANGE OF OVERLAP CR - CREASE D - INSTALLATION DAMAGE		FIS - FIELD TEST STEIP  BT - HEAT TACK RUEN  IO - INSUFFICIENT OVERLAP (UNDER SPEC.)	T - THREE PANEL O VI VACUUM TES: WR - WRINKLE WS - WELDER RES:	TLEAK			TX-I	12:18	RR			
	DS-# - DESTRUCTIVE P - PATCH, C - CAP, R	TEST NUMBER 5 - RECONSTRUCTED SPAM, G	MD - MANUFACTURER/DELIVERY DAMAGE 3&W - GRIND/WELD	OTHER:		100							
** C	OLUMNS TO	BE USED BY TH	IE PROJECT SUPERVISOR OR LEAD TECHNIC	CIAN ONLY		SI	UBMITTED BY: P	Н			L		
LPL	FORM 7		LAYFIELD ENVIRONMENTAL SYSTEMS				the second of the second second second second second	21 14 12			KI .		

21-Jul-13



### GEOMEMBRANE DEFECT / REPAIR LOG

PROJEC	T NUMB	ER:	14C - 091		PROJEC	T TITLE:	Baffinland	MRP Milne	Port Fuel U	Dograde	
OWNER	t:	Nuna Lo	gistics		CONTR	ACTOR:	Nuna Logis			18	
LOCAT	ION:	Baffinla	nd NU		SHEET	NUMBER:	2				
15,17			DEFECT LOCATION								
DEFECT CODE	LOG DATE	SEAM OR PANEL NO.	DEFECT LOCATION DESCRIPTION	DEFECT TYPE	REPAIR TYPE	WELD TECH.	REPAIR DATE		IARKS	TEST DATE	CHECKED BY
2 A	20-Jul-13	16 /	20.30 mts N 0.28 mts E from 1Q	MD	G&W	RR	21-Jul-13			-	
2 B	20-Jul-13	16 /	9.60 mts N 0.40 mts E from 10	MD	G&W	RR	21-Jul-13			21-Jul-13	YE
2 C	21-Jul-13	19 / 20, 21	4.8 mts NEOS TO SEOS Seam 19-Tie In	T	G&W	RR	21-Jul-13				
2 D	21-Jul-13	19 / 21,22	4.7 mts S from 2C	T	G&W	RR	21-Jul-13				
2 E	21-Jul-13		4.7 mts S from 2D	T	G&W	RR	21-Jul-13				
2 F	21-Jul-13	23 /	1.11 mts S, 1.06 mts W from 2E	MD	G&W	RR	21-Jul-13				
2 G	21-Jul-13	23 /	1.29 mts S from 2F	MD	G&W	RR	21-Jul-13				
2 H	21-Jul-13		4.7 mts S from 2E	T	G&W	RR	21-Jul-13				
2 J	21-Jul-13		4.7 mts S from 2H	T	G&W	RR	21-Jul-13			_	
2 J	21-Jul-13		4.7 mts S from 2I	T	G&W	RR	21-Jul-13				
2 K	21-Jul-13		4.7 mts S from 2J	T	G&W	RR	21-Jul-13				
2L	21-Jul-13		4.7 mts S from 2K	T	G&W	RR	21-Jul-13	,			
2 M	21-Jul-13		4.7 mts S from 2L	T	G&W	RR	21-Jul-13			-	-
2 N	21-Jul-13	23 /	2.21 mts W from 2F	MD	G&W	RR	21-Jul-13				
20		/									
2 P		1							_		
2 Q		1									
2 R		1									
2 \$		1						- design		1	
2 T	AD - ANIMAL RELATI	/									
DEFECT TIPE;	B - UNDISPERSED RE		ER - EARTHWORK EQUIPMENT DAMAGE EXT - EXTENSION	PT - PRESSURE TES							
	BO - FUSION WELDER		FM - FISHMOUTR	SI - SOIL SURFACE I					ASSING TRIAL SEAM		
		M FML PENETRATION	FS-FAILED SEAM LENOTH	T - THREE PANEL O			1	NO.	TIME	TECH ID.	
	CO - CHANGE OF OVE CR - CREASE		FTS - FIELD TEST STRIP HT - HEAT TACK BURN	VL - VACUUM TEST	LEAK		L	TX-1	12:18	RR	
	D-INSTALLATION DA		IO - INSUFFICIENT OVERLAP (UNDER SPEC.)	WR - WRINKLE WS - WELDER REST	APT		1				
DEDAID TUAN.	DS-# - DESTRICTIVE		MD - MANUFACTURER/DELIVERY DAMAGE	OTHER:			-				
CALFAIR 1 TPE:	r - PATICH, C - CAP, R	S - RECONSTRUCTED SEAM, GA	W-GRIND/WELD		300000000000000000000000000000000000000		144				
** C	OLUMNS TO	RE LISED BY THE	PROJECT SUPERVISOR OR LEAD TECHNIC			1.73%			-		
LPL	FORM 7	JOED DI THE	LAYFIELD ENVIRONMENTAL SYSTEMS	IAN ONLY.		SU	BMITTED BY: F				
	200 (200)		EN VINONMENTAL STREMS				DATE: _	21-Jul-13	a manual and a man		

# LAYFIELD GEOMEMBRANE VACUUM / AIR LANCE TEST LOG

PROJECT NUMBER:	14C - 091		PROJECT TITLE:	Baffinland MRP Milne Port	Fuel Upgrade
OWNER:	Nuna Logistics		CONTRACTOR:	Nuna Logistics	
LOCATION:	Baffinland NU		-		
VACUUM BOX		AIR LANCE	X	SHEET NUMBER:	1

SEAMS									REPAIRS						
SEAM NUMBER	SEAM SECT	TION *	TEST DATE	TECH ID	DEFECTS **	COMPLETE NO YES	CHK'D BY	REMARKS	DEFECT CODE	TEST DATE	TECH ID	DEFECTS **	CHK'D BY	REMARKS	
2 / 3	SEOS -	NEOS	21-Jul-12	PH					1 A	DAIL	1D	-	BY	**	
4 / 5	EEOS -	WEOS	21-Jul-13	PH	-				1 B				-	, City	
4 / 6	EEOS -	WEOS	21-Jul-13	3 PH				GIATAN	1 C				+ +		
6 / 7	EEOS -	WEOS	21-Jul-13	PH					1 D						
,3 / 4,5	NEEOS -	SWEOS	21-Jul-13	PH					1 E				-		
7 / 8	EEOS -	WEOS	21-Jul-13	PH					1 F		1 1			*	
8 / 9	EEOS -	WEOS	21-Jul-13	PH			127		1 G				-		
9 / 10	EEOS -	WEOS	21-Jul-13	PH					1 H	***************************************	1				
10 / 11	EEOS -	WEOS	21-Jul-13	PH					111						
11 / 12	EEOS -	WEOS	21-Jul-13	PH					1 1 1			77111-100			
12 / 13	EEOS -	WEOS	21-Jul-12	PH					1 K						
1 / TIE	SEOS -	NEOS	21-Jul-13	PH					1 L			-	$\vdash$	-	
1 / 14	SEOS -	NEOS	21-Jul-13	PH					1 M	***				***	
15 / 16	EEOS -	WEOS	21-Jul-13	PH				, , , , , , , , , , , , , , , , , , ,	1 N	-					
14 / 15,1	SEOS -	NEOS	21-Jul-13	PH				To the second se	10						
5,16 / 17	SEOS -	NEOS	21-Jul-13	PH				100	1 P		1	- in t		-	
17 / 18	SEOS -	NEOS	21-Jul-13	PH	11-00				1 Q				+		
18 / 19	SEOS -	NEOS	21-Jul-13	PH				7979	1 R						
20 / 21	EEOS -	WEOS	21-Jul-13	PH					18	in a	1				
21 / 22	EEOS -	WEOS	21-Jul-13	PH			1111	- 10 year	1 T	6					

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

T	C	E	1	D'	A	6
		-		R	v	0

SUBMITTED BY:	
DATE:	

<sup>\*\*</sup> RECORD QUANTITY OF LEAKS DETECTED AND REFERENCE NEW DEFECT CODE IN REMARKS

## LAYFIELDSRANE VACUUM / AIR LANCE TEST LOG

PRO.	JECT	NUMBE	R:		14C - 091					PROJECT TIT	LE: I	Baffinland M	IRP Mil	ne Port Fu	el Unora	ide.
OWN	ER:				Nuna Logi	istics				CONTRACTOR		Nuna Logisti	100			
LOC	ATIO	N:			Baffinland	NU					•					
*	VACU	UM BO	X _			1918-1		AIR LAN	CE	X		SHEET!	NUMBI	ER:	2	
		- 444			SE	AMS			_			-	B	REPAIRS		
SE/NUM		SEAM FROM	SECT		TEST	TECH	DEFECTS		CHK'D	APPLICATION OF PRICE	DEFEC		TECH	DEFECTS	CHK'D	REMARKS
22	/ 23	EEOS	-	TO WEOS	DATE 21-Jul-13	ID	**	YES	BY	**	CODE		ID	**	BY	**
23	/ 24	EEOS	-	WEOS	21-Jul-13						2 /					
24		EEOS	-	WEOS	21-Jul-13						2 H					v
25	/ 26	EEOS	4	WEOS	21-Jul-13						2 (					
26	/ 27	EEOS	-	WEOS	21-Jul-13						2 I		-			
27	/ 28	EEOS	-	WEOS	21-Jul-13						2 F					
28	/ 29	WEOS	-	EEOS	21-Jul-13						2 0					
19	/ TIE-	NEOS	-	SEOS	21-Jul-13						2 1					
			4								2 1		-		$\vdash$	
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SUBMITTED BY:	
DATE:	

<sup>\*\*</sup> RECORD QUANTITY OF LEAKS DETECTED AND REFERENCE NEW DEFECT CODE IN REMARKS

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City City	
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Tall California	LAYPIELLI
C. montage	LAYFIELD

### GEOMEMBRANE DESTRUCTIVE TEST REPORT

PROJECT NUM		14C - 09	1	PROJECT TITLE: Baffinland MRP Miln Port Fuel Upgrade							
OWNER:	Nuna Logist			CONTRACTOR:	Nuna Logistics	13					
LOCATION:	Baffinland N	NU		SHEET NUMBER							
DESTRUCTIVE SEAM NUMBE	E TEST NUMBER*: R: 1-2	DT-I		TEST DATE:							
SAMPLE LOCATION: 48.76 mts NEOS TIE-IN			ARCHIVE	LAYFIELD	_OWNER	ENGINEER					
DATE SEAMED / SAMPLED: 20-Jul-13 - TYPE OF SEAM: Fusion		de la	3RD PARTY	YES	_ NO	WHO?					
		20 341 13	-	DATE FORWARD DATE LAB TEST	DECIT TO DECID						
	nye fav.	The same of the sa		_ DATE DAD TEST	RESULTS REC D	-	- Marian Paris - Company -				
		FIELI	TEST RESU	LTS (units = lbf. / i	n. width = ppi)						
	SHEAR STRENGT	Н		,,uu	PEEL ADHESI	ION					
SPECIMEN		** LOCUS OF	SPECIMEN		E SEAM	OU	TSIDE SEAM				
NUMBER	SEAM STRENGTH	BREAK CODE	NUMBER	ADHESION STRENGTH	LOCUS OF BREAK CODE	ADHESION	** LOCUS OF				
1	126	SE1	2	110	SE1	112	SE1				
3	123	SE1	4	119	SE1	107	SE1				
5	124	SE1	6	108	SEI	105	SE1				
7	126	SE1	8	110	SE1	102	SEI				
9	129	SEI	10	110	SE1	105	SE1				
			10		1 361	103	SEI				
11			12	1							
DESTRUCTIVE	TEST NUMBERS SHOU	LD BE SEQUENTIAL	AND ARE TO BE	PREFIXED	I PI · P	224					
DESTRUCTIVE	TEST NUMBERS SHOU (FUSION), DX (EXTRUS	LD BE SEQUENTIAL (ION) OR DS (SOLVEN	AND ARE TO BE	PREFIXED	LPL: PA	ASS	FAIL				
* DESTRUCTIVE BY EITHER DT  ** REFER TO LO SUPPORTED I	` (FUSION), DX (EXTRUS CUS OF BREAK CODE I MATERIALS.	SION) OR DS (SOLVE) DIRECTORIES PROVIL	AND ARE TO BE NT). DED FOR UNSUP:				FAIL FAIL				
* DESTRUCTIVE BY EITHER DT  ** REFER TO LO SUPPORTED I	(FUSION), DX (EXTRUS CUS OF BREAK CODE I	SION) OR DS (SOLVE) DIRECTORIES PROVIL	AND ARE TO BE NT). DED FOR UNSUP:								

LS FORM 8 (OPTIONAL)