



ARD report  
Dust management Plan and  
Abandonment and Restoration Plan  
For  
2015, 2016 and 2017

Iqaluit  
June 6<sup>th</sup>, 2018

### **2015 Operational Season:**

ARD report: No operation for this season, the authorization was given in 2016

Dust Management Plan: No operation for this season, the authorization was given in 2016

Abandonment and restauration plan: No operation for this season, the authorization was given in 2016

### **2016 operational season**

The new asphalt plant was mobilized on the 2<sup>nd</sup> sealift of that year. Prior to that, the site preparation including regrading of the site and ditches construction in preparation of the installation of the new asphalt plant took place between July 27<sup>th</sup> and August 4<sup>th</sup>. The concrete foundations for the different components of the plant were built from August 17<sup>th</sup> and the assembly of the plant started on September 4<sup>th</sup> until November.

ARD report:

- Mitigation or monitoring activities undertaken relative to dust and noise. As detailed in the project proposal the dust management was done for the road inside the North 40 Quarry area. The decision to use water to mitigate the dust was taken by the site superintendent and the decision was taken to provide safety vision for the workers. The rest of the road are under the City of Iqaluit zoning.
- No mitigation for the noise as the location of the Asphalt batch plant was already being use for aggregate stockpiling and the level of operational work would be equivalent.
- Air quality testing: no air quality testing was done in 2016 as the Asphalt batch plant was not in operation for production.
- No complaints or reporting of impacts by community members were reported during the 2016 operational season.
- No community consultation was undertaken during the 2016 operational season.
- No heritage site was encountered during the 2016 operational season as the site was previously use as an aggregate stockpiling area.

**Dust Management Plan:** the plan was determine during the screening process and consisted of proposing that the dust management was to be done for the road inside the

North 40 Quarry area only. The decision to use water to mitigate the dust was taken by the site superintendent and the decision was taken to provide safety vision for the workers. The rest of the road are under the City of Iqaluit zoning.

**Abandonment and restauration plan:** The end of the land lease is not final, for now it is until 2026. At the end of the lease, as describe in the screening process, the intention is to return the Area to its original aggregate stockpiling Area.

### **2017 operational season**

The assembly of the plant was resumed in May and lasted until June 30<sup>th</sup> where the emission testing took place. The batch plant was a back-up to the other asphalt plant dedicated to Iqaluit airport improvement project and therefore was only in use a few shifts. The asphalt was produced on June 30<sup>th</sup>, July 1<sup>st</sup>, 3<sup>rd</sup> and 17<sup>th</sup> for a total of 1,422 metric tons representing ≈4% of the 2017 total quantities.

ARD report:

- Mitigation or monitoring activities undertaken relative to dust and noise. As detailed in the project proposal the dust management was done for the road inside the North 40 Quarry area. The decision to use water to mitigate the dust was taken by the site superintendent and the decision was taken to provide safety vision for the workers. The rest of the road are under the City of Iqaluit zoning.
- No mitigation for the noise as the location of the Asphalt batch plant was already being use for aggregate stockpiling and the level of operational work would be equivalent.
- Air quality testing: as described in the screening process we did an air quality testing at the start up according to the Asphalt Paving Industry Emission Regulations of Nunavut (APIERN). The tests results were conform to standard and the operation of producing Asphalt Mix could proceed. The test results are attached to this document. As describe in the APIERN the emission testing shall be carried out at the time of every change of operating location and when plant modifications are made which may affect emissions from that plant. No complaints or reporting of impacts by community members were reported during the 2016 operational season.
- No community consultation was undertaken during the 2017 operational season.

- No heritage site was encountered during the 2017 operational season as the site was previously use as an aggregate stockpiling area.

**Dust Management Plan:** the plan was determine during the screening process and consisted of proposing that the dust management was to be done for the road inside the North 40 Quarry area only. The decision to use water to mitigate the dust was taken by the site superintendent and the decision was taken to provide safety vision for the workers. The rest of the road are under the City of Iqaluit zoning.

**Abandonment and restauration plan:** The end of the land lease is not final, for now it is until 2026. At the end of the lease, as describe in the screening process, the intention is to return the Area to its original aggregate stockpiling Area.

**Issue 1:** potential negative impact to water quality, vegetation and soil from potential spills resulting from the storage and transfer of fuel and asphalt end product.

Mitigations follow-up

- 7 - There is no water body around the asphalt plant in an area of 31 meters,
- 8 - There is no water body around the asphalt plant in an area of 31 meters,
- 9 – the storage of chemical and fuel is made in a way not accessible to wildlife,
- 10 – there is no barrels of fuel and other chemical expect for bitumen which is a non-hazard for spill
- 11 – We have followed our spill contingency plan and installed spill kits close to the double wall reservoir.
- 12 – The inspection of the large double wall fuel tank is made during the operational season as it is not accessible during winter, see document for weekly inspection from June to October 2017.
- 13 – removal of any hydrocarbon contaminated soil will be made according to the spill contingency plan, none occurred in 2017
- 14 – All personnel is aware of the Spill contingency plan and informed of the procedure in case of a spill.

**Issue 2:** Potential negative impact to air quality from increase sound level as well as dust from transportation activities

Mitigations follow-up

- 21 to 23 have been followed.
- The air testing was done at startup as required by the ASPHALT PAVING INDUSTRY EMISSION REGULATIONS, art 3.2. The test results are excellent and as specified in the regulations we will plan an emission test at every change of operation location and when plant modifications are made which may affect emissions from that plant. No modification to the plant is scheduled in 2018.

**Issue 3:** Potential impact on surface water drainage, terrain and wildlife and bird habitat from the proposed installation of the asphalt plant, on site stockpiling, vehicle movements and general operations

Mitigations follow-up

- 5 - no water is used
- 6 - all waste are inaccessible to wildlife
- 15 - The site was an aggregate stockpiling area, no nest were found.
- 16 - all personnel were made aware of mitigation #16
- 17 - the site was an aggregate stockpiling area
- 18 – water flow is directed around the stockpiling area
- 19 – the site is in operation until at least 2026
- 20 - the site is in operation until at least 2026

**Issue 4:** Socio-economic effects on Northerners

Mitigations follow-up

- 24 – All staff were made aware of our responsibilities and requirements regarding archeological or paleontological sites encountered during operations, but the site was an aggregate stockpiling area before an asphalt batch plant site.

**Issue 5:** Potential positive impact to residents of Iqaluit

Mitigations follow-up

- 25 – Local resident of Iqaluit have worked on the batch plant site in 2017 for the work done at the IIAIP project. There was a report done to the owner by bias of the General contractor to the GN.

**Issue 6:** Potential positive impact to residents of Iqaluit

Mitigations follow-up

- 25 – In 2017 the responsibility to inform the public was the responsibility of the General contractor of the IIAIP project as we were merely just a supplier of asphalt.
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# **CONSULAIR**

AIR & ENVIRONMENT GLOBAL MANAGEMENT

**PROFESSIONNAL SERVICES**

**STACK TESTING EMISSION REPORT**

**ASPHALT PAVING PLANT**



**Kudlik Construction Ltd.**

**KUDLIK CONSTRUCTION**

MAXIME GAUDREAU  
PROJECT MANAGER

OUR REFERENCE : #17-4865

[consul-air.com](http://consul-air.com)

## **Quebec**

2022, Lavoisier Street, Suite 125, Quebec  
QC G1N 4L5  
PHONE - 418 650.5960  
FAX - 418 704.2221  
TOLL-FREE - 1 866 6969.AIR (247)

## **Montreal**

600 Leclerc Street, Suite 101, Repentigny  
QC J6A 2E5  
PHONE - 450 654.8000  
FAX - 450 654.6730



## Timetable

Version ID	Version date	Detail	Revised by

**Final version**

WRITTEN BY

A handwritten signature in cursive script, appearing to read "Patrick Bordeleau".

Patrick Bordeleau, Ing.

VERIFIED BY

A handwritten signature in cursive script, appearing to read "Pascal Waltzing".

Pascal Waltzing, Biochemist

Quebec city, september 12th 2017



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## **ABBREVIATIONS**

QA/QC : Quality assurance & control

ACFM : Actual cubic feet per minute

CO<sub>2</sub> : Carbon dioxyde

ECCC : Environnement et Changement climatique Canada

O<sub>2</sub> : Oxygen

N : Normal conditions as defined in the environmental protection act

P : Particulate matter

SCFM : Standard cubic feet per minute

%dv : Volume percentage on dry basis

## **SOMMARY**

Consulair was mandated by Kudlik Construction to perform a stack sampling emission testing program of its hot mix asphalt plant located in Iqaluit, Nunavut.

The goals of the stack sampling emission test were:

- To obtain an actual situation of the atmospheric emission ;
- To evaluate the physical characteristics of the gas flow in the stack;
- To evaluate the concentration and the emission rate of major Hazardous Air Pollutants (HAPs) ;
- To compare the emission results with applicable laws in Nunavut ;
- To ensure that Consulair's QA/QC is respected throughout stack sampling program.

The sampled parameters were particulate matter (PM), oxygen (O<sub>2</sub>), carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO) and opacity of the emission flux.

The results from the stack sampling program are representative of the operating conditions of the hot mix asphalt plant and the sampling procedures used. QA/QC program was respected.

The mean particulate matter concentration of the hot mix asphalt plant has been 0.082 g/Nm<sup>3</sup> during the tests. The value is inferior to the standard of 0.23 g/Nm<sup>3</sup> of the asphalt paving industry emission regulations of Nunavut, Environmental Protection Act.

Mean opacity value of emission is inferior to 20 %, which is the standard in the Environmental Protection Act.

The following table shows the results obtained at the boiler exhaust pipe during the project that took place on the 30<sup>th</sup> of June and July 1<sup>st</sup> 2017.

## STACK EMISSION REPORT

COMPANY : Kudlik construction Ltd.				
ADDRESS : P.O. box 727, 1519 Federal Road, Iqaluit, Nunavut X0A 0H0				
TELEPHONE : (867)-979-1166				
MANUFACTURER OF PLANT : H&B (Gencor Industries inc.)				
TYPE OF PLANT : ASPHALT BATCH MIXING PLANT			CHIMNEY DIMENSION : 0.838 x 1.219 m	
LOCATION OF PLANT : Iqaluit, Nunavut				
DATE OF TEST : 30 of June and July 1 <sup>st</sup>				
SAMPLE ID	1	2	3	MEAN
DATE OF TEST	30/06/17	01/07/17	01/07/17	N.A.
OPERATION DATA				
BITUMINOUS MIX PRODUCTION (kg/h)	75,000	100,000	100,000	92,000
GAS CHARACTERISTICS				
TEMPERATURE (°C)	87	80	74	80
HUMIDITY (% v/v)	7.6	6.9	8.4	7.7
VELOCITY (m/s)	8.3	8.2	7.5	8.0
ACTUAL FLOW RATE (m <sup>3</sup> /h)	39 001	38 370	34 869	37 413
ACTUAL FLOW RATE (ft <sup>3</sup> /min) (ACFM)	22 955	22 584	20 523	22 021
STANDARD FLOW RATE (Nm <sup>3</sup> /h)	29 825	30 109	27 435	29 123
STANDARD FLOW RATE (Nm <sup>3</sup> /min)	497	502	457	485
STANDARD FLOW RATE (Nft <sup>3</sup> /min) (SCFM)	17 554	17 721	16 147	17 141
COMBUSTION GAS CONCENTRATION				
CO <sub>2</sub> (% v/v dry)	2.5	2.5	2.6	2.5
O <sub>2</sub> (% v/v dry)	17.3	17.3	17.1	17.2
SAMPLING INFORMATION				
TEST MEAN ISOKINETIC RATE (%)	93	99	101	N.A.
POINTS PERCENTAGE <90% & >110% (%)	100	100	100	N.A.
SAMPLED VOLUME (Nm <sup>3</sup> )	2.25	2.42	2.03	N.A.
PUMPING RATE (ft <sup>3</sup> /min)	0.96	1.03	0.86	N.A.
PARTICULATE MATTER				
WEIGHT (mg)	25.9	23.1	16.3	N. A.
CONCENTRATION (g/Nm <sup>3</sup> )	0.111	0.091	0.075	0.092
STANDARD (g/Nm <sup>3</sup> )*	0.23			
RATE (kg/h)	0.33	0.27	0.21	0.27
OPACITY				
OPACITY (%)	< 20	< 20	< 20	< 20
STANDARD (%)*	20			

**N: normal conditions at 101.3 kPa and 25 °C, on dry basis.**

\* Asphalt paving industry emission regulations of Nunavut, Environmental Protection Act.

## 1 INTRODUCTION

Consulair Inc. was mandated by Kudlik construction Ltd. to perform a stack sampling emission testing program of its hot mix asphalt plant located in Iqaluit, Nunavut. The sampling program was done on the 30<sup>th</sup> of June and July 1<sup>st</sup> 2017.

### 1.1 **SAMPLING GOALS**

The goals of the stack sampling emission test were:

- To evaluate the physical characteristics of the gas flow in the stack;
- To evaluate the concentration and the emission rate of major Hazardous Air Pollutants (HAPs) ;
- To compare the emission results with applicable laws in Nunavut ;
- To ensure that Consulair's QA/QC is respected throughout stack sampling program.

The sampled parameters were particulate matter (PM), oxygen (O<sub>2</sub>), carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO) and opacity of the emission flux. Table 1-1 shows the information.

**TABLE 1-1 – POLLUTANTS AND SOURCE**

SOURCE	PARTICULATE MATTER	OXYGEN	CARBON DIOXIDE	CARBON MONOXIDE	OPACITY
Hot mix asphalt plant	√	√	√	√	√

Gas characteristics such as temperature, humidity and velocity were measured during the sampling process. The pollutants have been sampled in triplicate.

## 2 SAMPLING SITE INFORMATION

The project was realised at the following place:

- ❖ **Iqaluit Airport**  
1126 Mivvik Street,  
Iqaluit, NU  
X0A 0H0

## 3 HUMAN RESSOURCES

Information on the client is available in table 3-1. Information on the consulair's team for the project is available in table 3-2. Table 3-3 shows the laboratory used for the analysis.

**TABLE 3-1 – KUDLIK'S TEAM**

CLIENT	CONTACT	DUTY
Kudlik Construction Ltd. P.O. Box 727 1519 Federal Road Iqaluit (Nunavut) X0A 0H0	Maxime Gaudreault,  Phone : 418-802-8224 email : mgaudreau@kudlik.biz	Project manager

**TABLE 3-2 – CONSULAIR'S TEAM**

RESSOURCE	TITLE	EXPERIENCE	DUTY
Patrick Bordeleau	Ing	6 years	Project manager Data compilation Report writing.
Pascal Waltzing	Biochemist	12 years	Report validation Sampling console operation and train handling. Preparation and recovery of sampling trains. Logistic of the samples to the laboratory
Jean-François Guay	Technician	2 years	Train handling.

**TABLE 3-3 – ANALYTICAL LABORATORY**

LABORATORY	ANALYSIS	ACCREDITATION DOMAIN DR-12-LLA (QUEBEC)
Consulair	P	400

## 4 **PROCESS AND INDUSTRY DESCRIPTION**

Kudlik construction is operating a hot mix asphalt plant in Iqaluit, Nunavut. The type of the plant is an H&B (Gencor industries inc.) asphalt batch mixing plant and it works on light oil (diesel). During a stable production, the capacity of the plant is 160 tons per hour.

## 5 **ENVIRONMENTAL PROTECTION ACT OF NUNAVUT**

### 5.1 **C. E-23 ASPHALT PAVING INDUSTRY EMISSION REGULATIONS**

The regulation on asphalt paving industry emissions cite on the 1<sup>st</sup> paragraph of article 2 that:

*The emission of pollutants into the ambient air as a consequence of the normal operation of an asphalt paving plant shall not exceed:*

a) 0.23 g of particulate matter for each normal cubic metre of dry and undiluted exhaust gases, measured by the methods described in the Department of Fisheries and the Environment, publication EPS-1-AP-74-1 entitled *Standard Reference Methods for Source Testing: Measurement of Emission of Particulates from Stationary Sources* ;

b) an opacity of 20%, measured by the methods described in the Department of Fisheries and the Environment publication EPS-1-AP-75-2 entitled *Standard Reference Methods for Source Testing: Measurement of Opacity of Emissions from Stationary Sources*.

## 6 SAMPLING

### 6.1 OPERATING CONDITIONS

Communication was maintained with the assigned manager from Kudlik during the whole sampling process. This was done to insure good operating conditions of the equipment.

Table 6-1 shows the production data for bituminous mix.

**TABLE 6-1 – BITUMINOUS MIX PRODUCTION**

Tests	PM-1	PM-E2	PM-E3	MEAN
Date	30/06/2017	01/07/2017	01/07/2017	N. A.
Test start time	21:18	20:23	22:24	N. A.
Test end time	22:48	21:55	23:52	N. A.
Bituminous mix production (kg/h)	75,000	100,000	100,000	92,000

### 6.2 SOURCE DIMENSIONS

Source's characteristics are described in Table 6-2.

**TABLE 6-2 – SAMPLED SITE CHARACTERISTICS**

SOURCE	DUCT DIMENSIONS (m)	DIAMETER NUMBER		NUMBER OF PORTS USED	NUMBER OF SAMPLING POINTS	
		A <sub>D</sub>	B <sub>D</sub>		BY TRAVERSE	TOTAL
Hot mix asphalt plant	0.686 x 1.892	0.6	8.5	4	4	16

A<sub>D</sub> – duct diameter downstream from flow disturbance ;

B<sub>D</sub> – duct diameter upstream from flow disturbance.



### 6.3 SAMPLING METHODOLOGY

Sampling methods used in this project are methods approved and recommended by known organisms such as United States Environmental Protection Agency (USEPA) and Environment Canada (EC). The sampling methods are described in Table 6-3.

**TABLE 6-3 – SAMPLING METHODS**

PARAMETER	METHODS	LENGHT / SAMPLED VOLUME DURING THE TEST
Sampling site	Method A, EPS 1/RM/8 from EC*	Before isokinetic sampling
Gas temperature	Thermocouple	With isokinetic sampling
Gas velocity	Method B, EPS 1/RM/8 from EC*	With isokinetic sampling
Gas humidity	Method D, EPS 1/RM/8 from EC*	With isokinetic sampling
Particulate matter	Method E, EPS 1/RM/8 from EC*	60 minutes minimum / 1.5 m <sup>3</sup> minimum
Emission opacity	EPS 1-AP-75-2	6 minutes
O <sub>2</sub> / CO <sub>2</sub>	Method C, EPS 1/RM/8 from EC*	With isokinetic sampling on 5 minutes interval
CO	Method C, EPS 1/RM/8 from EC*	With isokinetic sampling on 5 minutes interval

\* Report EPS 1-AP-74-1, Reference Method for Source Testing: Measurement of Releases of Particulate from Stationary Sources, from february 1974 has been revised and is actually presented under the name of EPS 1/RM/8 reference method.

#### 6.3.1 Sampling site

The number of traverse points is determined by method A of EPS 1/RM/8 and is named « Determination of Sampling Site and Traverse Points ». This method describes the number of sampling points needed in relation with downstream and upstream distance of the site from disturbances.

#### 6.3.2 Humidity, temperature and velocity

In the duct, humidity, temperature and gas velocity are measured with reference method for source testing from EC which holds the reference number EPS 1/RM/8 and was published in 1993. This method is divided in six test methods, from A to F, which can be used individually or combined together to measure characteristics of a gas flow. These tests methods are :

- Method A – Determination of Sampling Site and Traverse Points ;
- Method B – Determination of Stack Gas Velocity and Volumetric Flow Rate ;
- Method C – Determination of Molecular Weight by Gas Analysis ;

- Method D – Determination of Moisture Content ;
- Method E – Determination of Particulate Releases ;
- Method F – Calibration Procedure for S-Type Pitot Tube, Dry Gas Meter and Orifice Meter.

### 6.3.3 Particulate matter

Particulate matter was sampled in isokinetic condition on a certain number of points which are positioned on a perpendicular section of the duct gas flow. Table 6-4 shows the instruments needed for the sampling method of particulate matter.

**TABLE 6-4 – PARTICULATE MATTER SYSTEM COMPOSITION**

SAMPLING PROBE	SAMPLING TRAIN	CONTROL EQUIPMENT OF A MANUAL SAMPLING SYSTEM
<ul style="list-style-type: none"> <li>• Stainless steel nozzle.</li> <li>• Stainless steel probe with a heating system up to 120°C.</li> <li>• S-Type Pitot tube fixed to the sampling probe.</li> <li>• Thermocouple fixed to the sampling probe.</li> </ul>	<ul style="list-style-type: none"> <li>• Pyrex filter holder located inside a heated box (120°C).</li> <li>• Glass fiber filter on a teflon base placed inside the pyrex filter holder.</li> <li>• Impinger #1 – 100 ml of deionized water.</li> <li>• Impinger #2 – 100 ml of deionized water.</li> <li>• Impinger #3 – empty.</li> <li>• Impinger #4 – silica gel.</li> </ul>	<ul style="list-style-type: none"> <li>• Sampling cord which links the sampling console to the sampling train.</li> <li>• Sampling console with an oil manometer, a dry gas meter, an orifice flowmeter, a temperature controller and reader.</li> <li>• Vacuum pump.</li> </ul>

For each test, the minimal sampling length time is 60 minutes and the minimal sampled gas volume is 1.5 m<sup>3</sup>. Isokinetic mean value must be in between 90 and 110 % and at least 90% of the isokinetic values calculated at each point must be in between 90 and 110 %.

### 6.3.4 Emission opacity

For emission opacity measurement, the regulation states that EPS 1-AP-75-2 with micro-Ringelmann must be used. The observer must note the correct number of the opacity scale (0 to 4) according to the observed opacity and must choose a distance which enable a perfect visibility of the fume. The sun must be positioned in a 140° angle behind the observer. The observation has to be done such as the vision line is, as much as possible, perpendicular to the plume direction. For rectangular ducts, the observation has to be made such as the line of vision is perpendicular to the length of the duct. The observation must be done at a point where maximal opacity can be observed and there is no water vapor. The plume must be observed in a discontinuous pattern every 15 seconds. Opacity is calculated as a mean of 24 successive observations on 15 seconds intervals. Three sets of 24 observations are necessary.

### 6.3.5 Gaseous parameters

Gaseous parameters ( $O_2$ , CO and  $CO_2$ ) have been measured in respect to the method C of EPS 1/RM/8 of EC with a NOVA combustion analyzer. Table 6-5 shows the information on the instrument and the calibration gas used. Verification of the instrument was made according to the user manual.

**TABLE 6-5 – GAS ANALYTICAL INSTRUMENT PARAMETERS**

INSTRUMENT	GAS	$O_2$	$CO_2$	CO
Manufacturer	NOVA			
Model	375WP			
Cell	electrochemical		IR	electrochemical
Zero	Nitrogen			
Physical Range	0-25%dv		0-20%dv	0-2000 ppmv

## 6.4 TESTING PROGRAM

### 6.4.1 Testing schedule

Table 6-6 presents the complete tests schedule for the sampling program.

**TABLE 6-6 – TESTS SCHEDULE**

SOURCE ID	PARAMETER	TEST ID	DATE	TEST START TIME	TEST END TIME
Exhaust duct of hot mix asphalt plant	Particulate matter	PM-1	30/06/17	21 :18	22 :48
		PM-2	01/07/17	20 :23	21 :55
		PM-3	01/07/17	22 :24	23 :52
	Opacity	OP-1	30/06/17	21 :18	22 :17
		OP-2	01/07/17	20 :23	21 :22
		OP-3	01/07/17	22 :24	23 :23

## **8 QA/QC PROGRAM**

The quality assurance and quality control program within Consulair verify the sampling process with numerous steps. Consulair makes sure that every step of the sampling program is followed and validates the applicability of the QAQC within the sampling method which was used. The major points are described in this section.

### **8.1 AQ/CQ DURING PREPARATION**

#### **8.1.1 Sampling team**

The sampling team was made of 2 workers. The description is in table 3-2.

#### **8.1.2 Sampling methods**

The sampling methods used during this project were determined with the law that is used to verify the emission source. The methods are presented in table 6-2.

#### **8.1.3 Field reports**

The field data sheets are presented in appendix 5.

### **8.2 METHODS CRITERIAS**

**Consulair** made sure that every step of the QAQC program enabled to obtain the goal fixed in the project.

This section presents the results of the QAQC program of every method used during the sampling project. The limit value used as criterias are shown in the tables.

## 8.2.1 Particulate – Method E EPS 1/RM/8

Table 7-1 presents the validation criterias of the method used during the sampling program. Table 7-2 presents the equipment used during the sampling program.

**TABLE 8-1 – QA/QC - EPS 1/RM/8**

SAMPLING SITE EPS 1/RM/8 METHOD A				CRITERIA
CYCLONIC FLOW (°)		0		≤ 15°
REVERSE FLOW		NO		NO
TEST ID	1	2	3	
STACK LENGHT (m)	0.686	0.686	0.686	---
STACK WIDTH (m)	1.892	1.892	1.892	---
A <sub>0</sub>	0.6	0.6	0.6	≥ 0.5
B <sub>0</sub>	8.5	8.5	8.5	≥ 2.0
NUMBER OF SAMPLING POINTS	16	16	16	---
GAS VELOCITY (m/s)	8.3	8.2	7.5	3.0 ≤ V ≤ 30
PARTICULATE SAMPLING EPS 1/RM/8 METHOD E				
SAMPLING TIME (min)	80	80	80	≥ 60
SAMPLED VOLUME (m <sup>3</sup> R)	2.25	2.42	2.03	≥ 1.5
MEAN ISOKINETIC (%)	93	99	101	90 ≤ ISO ≤ 110
ISO CRITERIA (% points)	100%	100%	100%	≥ 90
PROBE TEMPERATURE (°F)	OK	OK	OK	223 ≤ T ≤ 273
FILTER TEMPERATURE (°F)	OK	OK	OK	223 ≤ T ≤ 273
EXIT TEMPERATURE (°F)	OK	OK	OK	32 ≤ T ≤ 68
4% D <sub>MOY</sub> (ft <sup>3</sup> /min)	0.038	0.041	0.035	
PRE-TEST LEAK CHECK -15poHg (ft <sup>3</sup> /min)	0.020	0.020	0.020	≤ 0.02 ou 4% Dmoy
POST TEST LEAK CHECK (ft <sup>3</sup> /min)	0.020	0.020	0.020	≤ 0.02 ou 4% Dmoy
ACETONE RESIDUAL (%m)	OK	OK	OK	≤ 0.001
EQUIPMENT INFORMATION				
SAMPLING MODULE ID	20	20	20	
DRY GAS METER COEFFICIENT K <sub>C</sub>	1.006	1.006	1.006	0.95 < K <sub>C</sub> < 1.05
CONSOLE ORIFICE COEFICIENT K <sub>O</sub>	0.973	0.973	0.973	
Δh@	1.052	1.052	1.052	
ID PITOT	05-02 Moy. SS	05-02 Moy. SS	05-19 Moy. SS	
COEFFICIENT PITOT	0.767	0.767	0.832	
ID NOZZLE	7-371	7-371	7-372	
NOZZLE DIAMETER (in)	0.3945	0.3945	0.3745	
<b>N: Reference conditions at 101.3 kPa and 25 °C, on dry basis.</b>				

Only 16 points were sampled in the stack due to the sampling port being too small to fit all 25 points. The length to width ratio would not have been in a 1 to 2 ratio if 24 points had been sampled.

**TABLE 8-2 – EQUIPMENT INFORMATION - EPS 1/RM/8**

MATERIAL INFORMATION EPS 1/RM/8	
BUSE	STAINLESS STEEL 316L
SONDE	STAINLESS STEEL 316L
FILTRE	FIBER GLASS 125 mm
PORTE-FILTRE	GLASS
SUPPORT FILTRE	PTFE
1 <sup>er</sup> BARBOTTEUR	Greenburg-Smith modified; H <sub>2</sub> O 100 ml
2 <sup>e</sup> BARBOTTEUR	Greenburg-Smith; H <sub>2</sub> O 100 ml
3 <sup>e</sup> BARBOTTEUR	Greenburg-Smith modified; empty
GEL DE SILICE	Silica gel container

### 8.2.2 Molecular mass – Method C EPS 1/RM/8

The following tables show the result for the analyser check during the sampling.

**TABLE 8-3 – ANALYSER CHECK 30-06-2017**

ANALYSER CHECK – 30-06-2017				
Gas	Échelle	Analyzer verification (span error)	Final verification (span error)	Drift
		TOLERANCE +/- 2%	TOLERANCE +/- 5%	TOLERANCE +/- 3%
O <sub>2</sub>	Low (zero)	0.00	2.21	2.21
	Mid	0.97	1.32	1.32
	High	0.22	0.44	0.44
CO <sub>2</sub>	Low (zero)	0.00	0.00	0.00
	Mid	0.66	0.00	0.00
	High	0.38	2.74	2.74
CO	Low (zero)	0.00	0.54	0.54
	Mid	0.87	0.33	0.33
	High	0.01	2.28	2.28

**TABLE 8-4 – ANALYSER CHECK 01-07-2017**

<b>ANALYSER CHECK – 01-07-2017</b>				
<b>Gas</b>	<b>Échelle</b>	<b>Analyzer verification (span error)</b>	<b>Final verification (span error)</b>	<b>Drift</b>
		<b>TOLERANCE +/- 2%</b>	<b>TOLERANCE +/- 5%</b>	<b>TOLERANCE +/- 3%</b>
<b>O<sub>2</sub></b>	Low (zero)	<b>1.32</b>	<b>0.44</b>	<b>2.21</b>
	Mid	<b>0.97</b>	<b>0.00</b>	<b>1.32</b>
	High	<b>0.66</b>		<b>0.44</b>
<b>CO<sub>2</sub></b>	Low (zero)	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
	Mid	<b>0.11</b>	<b>0.00</b>	<b>0.00</b>
	High	<b>0.16</b>		<b>2.74</b>
<b>CO</b>	Low (zero)	<b>0.00</b>	<b>0.54</b>	<b>0.54</b>
	Mid	<b>0.33</b>	<b>0.22</b>	<b>0.33</b>
	High	<b>0.12</b>		<b>2.28</b>

## 8.3 QA/QC POSTSAMPLING

### 8.3.1 Laboratory

The laboratory used to analyse the samples is accredited in Quebec by the « Centre d'expertise en analyse environnementale du Québec (CEAEQ) » for different chemical compounds. The analytical report is available in appendix 3.

## 9 RESULTS

Normalized values are reported at a temperature of 25°C and at atmospheric pressure of 101.3 kPa, on a dry basis.

In the results, a "<" sign preceding a value indicates that the laboratory result is lower than the Reported Detection Limit (RDL) and represents a maximal result. When this case happens, this detection limit is directly used in the equation.

If not mentioned, the displayed mean values are the mean of every test made for a same operating condition of the process.

Compiled data are available at appendix 1. Field sheets are available at appendix 5.

Results are shown in **Erreur ! Source du renvoi introuvable.** and 6-2.

**TABLE 9-1 – PARTICULATE MEASUREMENT**

SCHEDULE				
TEST ID	1	2	3	MEAN
DATE	30/06/17	01/07/17	01/07/17	
START TIME	21h18	20h23	22h24	
END TIME	22h48	21h55	23h52	
SAMPLING DATA				
STATIC PRESSURE (kPa)	0.00	0.00	0.00	0.00
HUMIDITY (%v)	7.6	6.9	8.4	7.7
TEMPERATURE (°C)	87	80	74	80
VELOCITY (m/s)	8.3	8.2	7.5	8.0
ACTUAL FLOW RATE (m <sup>3</sup> /h)	39 001	38 370	34 869	37 413
NORMAL FLOW RATE (m <sup>3</sup> N/h)	29 825	30 109	27 435	29 123
NORMAL FLOW RATE (m <sup>3</sup> N/min)	497	502	457	485
ACTUAL FLOW RATE (ACFM)	22 955	22 584	20 523	22 021
NORMAL FLOW RATE (SCFM)	17 554	17 721	16 147	17 141
CO <sub>2</sub> (%vd)	2.5	2.5	2.6	2.5
O <sub>2</sub> (%vd)	17.3	17.3	17.1	17.2
PARTICULATE MATTER				
PARTICULATE MATTER MASS FILTER (mg)	17.6	14.8	11.6	N.A.
PARTICULATE MATTER MASS PROBE (mg)	8.3	8.3	4.7	N.A.
<b>CONCENTRATION (mg/Nm<sup>3</sup>)</b>	<b>11.1</b>	<b>9.1</b>	<b>7.5</b>	<b>9.2</b>
<b>NORM (mg/Nm<sup>3</sup>)</b>		<b>23</b>		
EMISSION RATE (kg/h)	0.33	0.27	0.21	0.27
PROCESS DATA				
PRODUCTION RATE (ton/h)	70	70	70	70
<b>N: Normal conditions at 101.3 kPa and 25 °C, on a dry basis.</b>				
<b>N.A. : Not Applicable</b>				

**TABLE 9-2 – OPACITY**

TEST SCHEDULE				
TESTS ID	OP-1	OP-2	OP-3	MEAN
DATE	30/06/17	01/07/17	01/07/17	(1 to 3)
TEST START TIME	05:45	02:55	04:25	
TEST END TIME	05:51	03:01	04:31	
LENGTH OF TEST (MINUTES)	60	60	60	
OPACITY				
<b>OPACITY (%)</b>	<b>&lt; 20</b>	<b>&lt; 20</b>	<b>&lt; 20</b>	<b>&lt; 20</b>
<b>STANDARD* (%)</b>	<b>20</b>			

\* Regulation on asphalt paving industry emission in Nunavut.



## 10 RESULTS ANALYSIS

Table 10-1 shows a comparison of the results with the applicable standards.

**TABLE 10-1 – STANDARD COMPARISON**

PARAMETERS	TEST 1	TEST 2	TEST 3	MEAN	STANDARD*
<b>OPERATING CONDITION</b>					
BITUMINOUS MIX PRODUCTION (kg/h)	75,000	100,000	100,000	92,000	N. A.
<b>OBTAINED RESULTS</b>					
STANDARD GAS FLOW (Nm <sup>3</sup> /min)	497	502	457	485	N. A.
PATRICULATE MATTER CONCENTRATION (g/Nm <sup>3</sup> )	0.111	0.091	0.075	0.092	0.23
EMISSION OPACITY (%)	< 20	< 20	< 20	< 20	20

**N: normal conditions at 101.3 kPa and 25 °C, on dry basis.**

\* Regulation on asphalt paving industry emission in Nunavut.

Mean concentration of particulate matter has been of 0.082 g/Nm<sup>3</sup> and is lower than the value of the Nunavut regulation on asphalt paving industry emission, which is 0.23 g/Nm<sup>3</sup>.

The mean emission opacity of the hot mix asphalt plant has been of 20 % and is not higher than the value of the regulation.

## 11 CONCLUSION

Consulair was hired by Kudlik construction Ltd. to complete a stack sampling program of his hot mix asphalt plant located in Iqaluit, Nunavut.

The tests have been made in normal operating conditions to ensure representative data.

The results show that the plant respects the regulation on asphalt paving industry emission of Nunavut.

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## 12 REFERENCES

**ENVIRONMENT CANADA CLIMATE CHANGE, ECCC (1993).** EPS 1/RM/8, Reference method for source testing. Measurement of releases of particulate from stationary sources, current edition.

**ENVIRONMENTAL PROTECTION ACT (1998),** Asphalt paving industry emission regulations.

# APPENDIX 1

Compiled data



**Kudlik Construction Ltd.**

Kudlik Iqaluit  
17-4865  
Asphalte  
P

HORAIRE DES ESSAIS				
ESSAI NUMÉRO	1	2	3	MOYENNE
DATE DE L'ESSAI	30/06/17	01/07/17	01/07/17	(1 à 3)
DÉBUT DE L'ESSAI	21h18	20h23	22h24	
FIN DE L'ESSAI	22h48	21h55	23h52	
DURÉE DE L'ESSAI (minutes)	80	80	80	80
NOMBRE DE POINTS	16	16	16	16
DONNÉES DES ÉQUIPEMENTS D'ÉCHANTILLONNAGE				
PRESSIION BAROMÉTRIQUE ("Hg)	29.90	29.90	29.90	29.90
PRESSIION STATIQUE ("H2O)	0.01	0.01	0.01	0.01
PRESSIION STATIQUE (kPa)	0.002	0.002	0.002	0.00
COEFFICIENT DU COMPTEUR (20,20,20,20,20)	1.006	1.006	1.006	1.006
COEFFICIENT DU PITOT (05-02 Moy. SS,05-02 Moy. SS,05-19 Moy. SS	0.767	0.767	0.832	0.789
DIAMÈTRE DE LA BUSE (po) (7-371,7-371,7-372,7-372,7-372)	0.3945	0.3945	0.3745	0.3878
TEMPÉRATURE COMPTEUR (°F)	60	60	60	60
TEMPÉRATURE COMPTEUR (°C)	16	16	16	16
HUMIDITÉ DES GAZ & VOLUME ÉCHANTILLONNÉ				
MASSE D'EAU (g)	136.0	133.0	137.0	135.3
VOLUME D'EAU (pi")	6.53	6.38	6.58	6.50
HUMIDITÉ GAZ (BWO)	0.076	0.069	0.084	0.077
HUMIDITÉ GAZ (% v/v)	7.6	6.9	8.4	7.7
VOLUME GAZ RÉFÉRENCE (pi³R)	79.37	85.61	71.57	78.85
VOLUME GAZ RÉFÉRENCE (m³R)	2.248	2.424	2.027	2.233
CARACTÉRISTIQUES DU CONDUIT				
DIAMÈTRES AVANT LES TROUS D'ÉCHANTILLONNAGE	8.5	8.5	8.48	
DIAMÈTRES APRÈS LES TROUS D'ÉCHANTILLONNAGE	0.6	0.6	0.61	
DIAMÈTRE DU CONDUIT (pi)	0.00	0.00	0.00	
DIAMÈTRE DU CONDUIT (m)	0.000	0.000	0.000	
ÉPAISSEUR DU PORT D'ÉCHANTILLONNAGE (po)	2.5	2.5	2.5	
LONGUEUR DU CONDUIT (pi)	2.3	2.3	2.3	
LARGEUR DU CONDUIT (pi)	6.2	6.2	6.2	
DIAMÈTRE ÉQUIVALENT (pi)	3.303	3.303	3.303	
DIAMÈTRE ÉQUIVALENT (m)	1.007	1.007	1.007	
PRESSIION CONDUIT ("Hg)	29.90	29.90	29.90	29.90
PRESSIION COMPTEUR ("Hg)	30.02	30.05	30.01	30.03
SURFACE DU CONDUIT (pi²)	14.0	14.0	14.0	14.0
SURFACE DU CONDUIT (m²)	1.30	1.30	1.30	1.30
CARACTÉRISTIQUES DES GAZ				
TEMPÉRATURE CHEMINÉE (°F)	188	176	165	177
TEMPÉRATURE CHEMINÉE (°C)	86.9	80.2	73.7	80.3
CO₂ (%vs)	2.5	2.5	2.6	2.5
O₂ (%vs)	17.3	17.3	17.1	17.2
O₂ (%vh)	16.0	16.1	15.6	15.9
CO (ppmv)	116	156	121	131
SO₂ (%vs)	0	0	0	0
N₂ (%vs)	80.2	80.2	80.4	80.3
Ar (%vs)	0.00	0.00	0.00	0.00
POIDS MOLÉCULAIRE SEC	29.09	29.09	29.09	29.09
POIDS MOLÉCULAIRE HUMIDE	28.24	28.32	28.16	28.24
VITESSE DES GAZ (pi/s)	27.4	26.9	24.5	26.3
VITESSE DES GAZ (m/s)	8.3	8.2	7.5	8.0
DÉBIT GAZ ACTUELS (pi³/h)	1 377 299	1 355 022	1 231 402	1 321 241
DEBIT GAZ ACTUELS (m³/h)	39 001	38 370	34 869	37 413
DÉBIT GAZ ACTUELS (pi³/min)(APCM)	22 955	22 584	20 523	22 021
DÉBIT GAZ NORMALISÉS (pi³R/h)	1 053 244	1 063 285	968 847	1 028 459
DÉBIT GAZ NORMALISÉS (m³R/h)	29 825	30 109	27 435	29 123
DÉBIT GAZ NORMALISÉS (pi³R/min) (RPCM)	17 554	17 721	16 147	17 141
INFORMATIONS D'ÉCHANTILLONNAGE				
COEFFICIENT DE L'ORIFICE DU COMPTEUR (20,20,20,20,20)	0.973	0.973	0.973	
VITESSE MAXIMALE (m/s)	10.33	11.25	10.99	
VITESSE MINIMALE (m/s)	6.55	4.89	4.19	
10%Vmax (m/s)	1.03	1.12	1.10	
Pourcentage >10%Vmax	100%	100%	100%	
NOMBRE POINTS ΔP 20% et + de ΔPmoy	9	16	14	
ISOCINÉTISME MOYEN (%)	93.0	99.5	101.1	
% PTS RESPECT CRITERE ISO	100%	100%	100%	
DÉBIT DE POMPAGE MAX (pi³/min)	≤ 1.19	≤ 1.39	≤ 1.30	
PRESSIION DE VIDE MAX DURANT ESSAI (-"Hg)	4	3	1	
TEMPÉRATURE SONDE MAX (°F)	252	251	252	
TEMPÉRATURE SONDE MIN (°F)	245	244	244	
TEMPÉRATURE FILTRE MAX (°F)	257	254	256	
TEMPÉRATURE FILTRE MIN (°F)	245	246	245	
TEMPÉRATURE SORTIE MAX (°F)	60	53	60	
TEMPÉRATURE SORTIE MIN (°F)	50	49	52	
DÉBIT DE POMPAGE MOYEN (pi³/min)	0.96	1.03	0.86	
4% DÉBIT DE POMPAGE MOYEN (pi³/min)	0.038	0.041	0.035	
TEST DE FUITE AVANT LES ESSAIS À 15 "Hg (pi³/min)	< 0.020	< 0.020	< 0.020	
TEST DE FUITE APRÈS LES ESSAIS (pi³/min)	< 0.020	< 0.020	< 0.020	

Kudlik Iqaluit  
17-4865  
Asphalte  
P

HORAIRE DES ESSAIS				
ESSAI NUMÉRO	1	2	3	MOYENNE
DATE DE L'ESSAI	<u>30/06/17</u>	<u>01/07/17</u>	<u>01/07/17</u>	(1 à 3)
DÉBUT DE L'ESSAI	<u>21h18</u>	<u>20h23</u>	<u>22h24</u>	
FIN DE L'ESSAI	<u>22h48</u>	<u>21h55</u>	<u>23h52</u>	
PARTICULATE MATTER SPE 1/RM/8				
MASS FILTER (mg)	<u>17.60</u>	<u>14.8</u>	<u>11.6</u>	
MASS PROBE (mg)	<u>8.3</u>	<u>8.3</u>	<u>4.7</u>	
MASS BLANK ACETONE (mg)	<u>1</u>	<u>1</u>	<u>1</u>	
VOLUME BLANK ACETONE (mL)	<u>128</u>	<u>128</u>	<u>128</u>	
RESIDU ACETONE (%)	0.001	0.001	0.001	
DL PROBE (mg)	<u>1.0</u>	<u>1.0</u>	<u>1.0</u>	
DL FILTER (mg)	<u>0.1</u>	<u>0.1</u>	<u>0.1</u>	
MASS PROBE (mg)	7	7	4	6
MASS TOTAL (mg)	25	22	15	21
CONCENTRATION (mg/Nm³)	11.1	9.1	7.5	9
DL METHOD (mg/Nm³)	0.5	0.5	0.5	
EMISSION RATE (kg/h)	0.33	0.27	0.21	0.27
NORM (mg/Nm³)	23.0			
DONNÉES D'OPÉRATION PROCÉDÉ				
TAUX D'ALIMENTATION PROCÉDÉ (ton/hr)	70	100	100	90
N: Normal conditions de référence à 101.3 kPa et 25 °C, sur base sèche.				

	RELEVÉ D'ÉCHANTILLONNAGE: Asphalte - P - ESSAI# 1																								
Heure	Trav. #	Poin t #	Durée de pompage (minutes)	Différence de pression "H <sub>2</sub> O		Températures °F			Orifice	Volume de gaz (pi <sup>3</sup> )			Vitesse m/s	Iso. %	>10%Vmax	O <sub>2</sub> %v	CO <sub>2</sub> %v	CO ppmv	Vacuum po Hg	Températures °F					
				ΔP	ΔH	Cheminée	Compteur Entrée	Compteur Sortie		Début	Fin	Total								Sonde	Filtre	Sortie F Cond	Trappe	Aux3	Module
21h18	1	1	5	0.21	1.55	167	60	60	70	125.95	130.62	4.67	7.88	93.5	1.0	17.8	1.5	178	4.0	250	247	50	-	-	-
		2	5	0.21	1.52	179	60	60	70	130.62	135.22	4.60	7.95	93.0	1.0	17.3	2.5	203	4.0	252	247	50	-	-	-
		3	5	0.22	1.59	183	60	60	70	135.22	139.95	4.73	8.16	93.7	1.0	17.4	2.5	169	4.0	250	256	50	-	-	-
21h38	2	4	5	0.21	1.50	191	60	60	71	139.95	144.45	4.50	8.03	91.8	1.0	17.4	2.0	163	4.0	246	253	50	-	-	-
21h41		1	5	0.18	1.29	190	60	60	71	144.45	148.71	4.26	7.43	93.7	1.0	17.2	2.5	141	4.0	247	254	52	-	-	-
		2	5	0.18	1.27	196	60	60	71	148.71	152.95	4.24	7.46	93.7	1.0	17.2	2.5	157	4.0	246	254	52	-	-	-
	3	3	5	0.18	1.27	197	60	60	71	152.95	157.16	4.21	7.47	93.1	1.0	17.3	2.5	90	4.0	250	254	51	-	-	-
22h01		4	5	0.18	1.28	191	60	60	71	157.16	161.36	4.20	7.43	92.5	1.0	17.3	2.5	90	4.0	250	254	51	-	-	-
22h05		1	5	0.14	1.00	191	60	60	70	161.36	165.17	3.81	6.55	95.1	1.0	17.4	2.5	70	4.0	250	245	52	-	-	-
	4	2	5	0.22	1.56	193	60	60	70	165.17	169.75	4.58	8.23	91.4	1.0	16.8	2.5	70	4.0	246	256	52	-	-	-
		3	5	0.24	1.70	193	60	60	70	169.75	174.62	4.87	8.59	93.1	1.0	16.8	3.0	73	4.0	245	253	52	-	-	-
22h25		4	5	0.24	1.70	193	60	60	70	174.62	179.47	4.85	8.59	92.7	1.0	16.8	3.0	73	4.0	249	253	54	-	-	-
22h28	4	1	5	0.28	2.00	189	60	60	70	179.47	184.71	5.24	9.25	92.5	1.0	17.4	2.5	80	4.0	249	252	56	-	-	-
		2	5	0.32	2.29	188	60	60	70	184.71	190.34	5.63	9.89	93.0	1.0	17.4	2.5	92	5.0	250	245	59	-	-	-
		3	5	0.35	2.51	187	60	60	70	190.34	196.21	5.87	10.33	92.7	1.0	17.4	2.5	98	5.0	245	257	60	-	-	-
22h48		4	5	0.35	2.51	187	60	60	70	196.21	202.11	5.90	10.33	93.2	1.0	17.5	2.5	111	6.0	249	248	60	-	-	-

	RELEVÉ D'ÉCHANTILLONNAGE: Asphalte - P - ESSAI# 2																								
Heure	Trav. #	Poin t #	Durée de pompage (minutes)	Différence de pression "H <sub>2</sub> O		Températures °F			Orifice	Volume de gaz (pi <sup>3</sup> )			Vitesse m/s	Iso. %	>10%Vmax	O <sub>2</sub> %v	CO <sub>2</sub> %v	CO ppmv	Vacuum po Hg	Températures °F					
				ΔP	ΔH	Cheminée	Compteur Entrée	Compteur Sortie		Début	Fin	Total								Sonde	Filtre	Sortie F Cond	Trappe	Aux3	Module
20h23	1	1	5	0.31	2.67	161	60	60	67	2.75	8.84	6.09	9.51	99.6	1.0	18.1	2.1	0	6.0	245	253	49	-	-	-
		2	5	0.31	2.56	188	60	60	67	8.84	14.81	5.97	9.72	99.7	1.0	18.1	2.1	105	6.0	249	252	49	-	-	-
		3	5	0.08	0.67	182	60	60	67	14.81	17.89	3.08	4.91	100.3	1.0	18.1	2.1	105	3.0	249	252	49	-	-	-
20h43		4	5	0.08	0.67	175	60	60	67	17.89	20.95	3.06	4.89	99.1	1.0	18.1	2.1	105	3.0	244	253	50	-	-	-
20h47	2	1	5	0.11	0.93	173	60	60	68	20.95	24.55	3.60	5.72	99.3	1.0	17.1	2.6	98	3.0	251	254	50	-	-	-
		2	5	0.13	1.10	173	60	60	69	24.55	28.49	3.94	6.22	100.0	1.0	17.1	2.6	100	4.0	246	254	50	-	-	-
		3	5	0.15	1.28	172	60	60	70	28.49	32.72	4.23	6.67	100.0	1.0	17.1	2.6	122	5.0	251	253	50	-	-	-
21h12		4	5	0.16	1.36	172	60	60	70	32.72	37.05	4.33	6.89	99.1	1.0	17.1	2.6	90	5.0	250	246	50	-	-	-
	3	1	5	0.18	1.53	174	60	60	71	37.05	41.61	4.56	7.32	98.6	1.0	17.1	2.6	90	5.0	246	253	52	-	-	-
		2	5	0.17	1.44	176	60	60	71	41.61	46.09	4.48	7.13	99.8	1.0	16.6	3.1	385	5.0	248	251	52	-	-	-
		3	5	0.30	2.52	181	60	60	71	46.09	51.92	5.83	9.51	98.4	1.0	16.5	3.1	400	5.0	249	247	53	-	-	-
21h32		4	5	0.30	2.52	180	60	60	71	51.92	57.77	5.85	9.50	98.7	1.0	16.8	2.6	219	9.0	250	252	53	-	-	-
21h35	4	1	5	0.40	3.37	178	60	60	71	57.77	64.56	6.79	10.95	99.2	1.0	17.0	2.6	200	11.0	250	246	53	-	-	-
		2	5	0.42	3.53	181	60	60	71	64.56	71.46	6.90	11.25	98.7	1.0	17.2	2.6	113	11.0	250	247	53	-	-	-
		3	5	0.38	3.20	180	60	60	71	71.46	78.09	6.63	10.69	99.5	1.0	17.6	2.1	179	11.0	251	251	53	-	-	-
21h55		4	5	0.37	3.13	177	60	60	71	78.09	84.82	6.73	10.52	102.1	1.0	17.6	2.1	185	11.0	246	247	53	-	-	-

	RELEVÉ D'ÉCHANTILLONNAGE: Asphalte - P - ESSAI# 3																								
Heure	Trav. #	Poin t #	Durée de pompage (minutes)	Différence de pression "H <sub>2</sub> O		Températures °F			Orifice	Volume de gaz (pi <sup>3</sup> )			Vitesse m/s	Iso. %	>10%Vmax	O <sub>2</sub> %v	CO <sub>2</sub> %v	CO ppmv	Vacuum po Hg	Températures °F					
				ΔP	ΔH	Cheminée	Compteur Entrée	Compteur Sortie		Début	Fin	Total								Sonde	Filtre	Sortie F Cond	Trappe	Aux3	Module
22h24	1	1	5	0.05	0.41	172	60	60	69	85.30	87.70	2.40	4.19	101.6	1.0	17.2	2.1	109	1.0	245	251	52	-	-	-
		2	5	0.05	0.40	175	60	60	68	87.70	90.11	2.41	4.20	102.3	1.0	16.9	2.6	123	1.0	247	254	52	-	-	-
		3	5	0.07	0.56	174	60	60	68	90.11	92.96	2.85	4.97	102.2	1.0	16.9	2.6	103	2.0	252	246	52	-	-	-
22h44	2	4	5	0.07	0.57	173	60	60	68	92.96	95.75	2.79	4.96	99.9	1.0	17.0	2.6	105	2.0	245	251	52	-	-	-
22h47		1	5	0.10	0.81	169	60	60	68	95.75	99.15	3.40	5.91	101.6	1.0	17.4	2.6	103	2.0	246	250	52	-	-	-
		2	5	0.11	0.90	166	60	60	68	99.15	102.72	3.57	6.19	101.5	1.0	17.4	2.6	110	2.0	251	249	54	-	-	-
		3	5	0.12	0.98	164	60	60	68	102.72	106.44	3.72	6.45	101.1	1.0	17.3	2.6	114	2.0	244	248	54	-	-	-
23h07	3	4	5	0.15	1.23	162	60	60	68	106.44	110.59	4.15	7.20	100.8	1.0	17.3	2.6	119	3.0	244	255	54	-	-	-
23h09		1	5	0.20	1.66	158	60	60	68	110.59	115.37	4.78	8.29	100.4	1.0				4.0	251	246	57	-	-	-
		2	5	0.22	1.81	160	60	60	68	115.37	120.35	4.98	8.71	99.9	1.0	16.9	2.6	133	4.0	250	251	57	-	-	-
		3	5	0.25	2.06	160	60	60	68	120.35	125.65	5.30	9.28	99.8	1.0	17.0	2.6	133	5.0	250	256	57	-	-	-
23h29	4	4	5	0.26	2.14	160	60	60	68	125.65	131.11	5.46	9.47	100.8	1.0	17.0	2.6	137	5.0	244	250	57	-	-	-
23h32		1	5	0.25	2.07	160	60	60	69	131.11	136.48	5.37	9.28	101.1	1.0	16.8	2.6	128	5.0	249	245	57	-	-	-
		2	5	0.26	2.15	160	60	60	69	136.48	141.90	5.42	9.47	100.1	1.0	16.9	2.6	129	5.0	250	251	60	-	-	-
		3	5	0.28	2.31	161	60	60	69	141.90	147.57	5.67	9.83	101.0	1.0	17.0	2.6	133	5.0	245	254	60	-	-	-
23h52		4	5	0.35	2.89	161	60	60	69	147.57	154.01	6.44	10.99	102.8	1.0	17.0	2.6	135	5.0	249	255	60	-	-	-



## APPENDIX 2

Process data



**Kudlik Construction Ltd.**

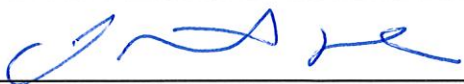
**FORM 2**  
**MALFUNCTION / BREAKDOWN RECORD**

(Section 5)

DURING THE PERIOD OF 2017-06-30 TO 2017-07-01

COMPANY NAME	Kudlik Construction Ltd.
ADDRESS	P.O. Box 727, 1519 Federal Road Iqaluit, Nunavut X0A 0H0
TELEPHONE	867.979.1166
LOCATION OF PLANT	Iqaluit, Nunavut
MANUFACTURER OF PLANT	H&B (Gencor Industries inc.)
TYPE OF PLANT	Asphalt Batch Mixing Plant
DATE OF OCCURRENCE	No occurrence
TIME OF OCCURRENCE (MINUTES)	N/A
DURATION OF OCCURRENCE	N/A
PRODUCTION RATE (kg/hr)	N/A
NATURE OF MALFUNCTION OR BREAKDOWN	N/A

I CERTIFY THAT THE STATEMENTS LISTED ABOVE ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

SIGNATURE OF RESPONSIBLE COMPANY OFFICER	
TITLE	Jean-David Laberge (Project Manager)
DATE	2017-08-02

## APPENDIX 3

Calibration certificates



## RÉSUMÉ D'ÉTALONNAGE DES BUSES 2017

Classe Buse	COFFRE 1		COFFRE 2		COFFRE 3		COFFRE 4		COFFRE 5		COFFRE 6		COFFRE 7	
	#	Ø (po)	#	Ø (po)	#	Ø (po)	#	Ø (po)	#	Ø (po)	#	Ø (po)	#	Ø (po)
0.125	1-121	0.1281	2-121	0.1368	3-121	0.1250	4-121	0.1214	5-121	0.1311	6-121	0.1241	7-121	
	1-122	0.1285	2-122	0.1201	3-123	0.1290	4-122	0.1291	5-122	0.1235	6-122	0.1265	7-122	
0.187	1-181	0.1840	2-181	0.1908	3-181	0.1796	4-181	0.1971	5-181	0.1909	6-181	0.1878	7-181	0.1914
	1-182	0.1918	2-182	0.1925	3-182	0.1793	4-182	0.1935	5-182	0.2015	6-182	0.1861	7-182	0.1894
	1-183	0.1868	2-183	0.1846	3-183	0.1826	4-183	0.1858	5-183	0.2013	6-183	0.1888		
0.218	1-211	0.2340	2-211	0.2110			4-211	0.2225	5-211	0.2270	6-211	0.2205	7-211	0.2155
	1-212	0.2189	2-212	0.2218			4-212	0.2221	5-212	0.2323	6-212	0.2181	7-212	0.2208
	1-213	0.2198	2-213	0.2278			4-213	0.2330	5-213	0.2326	6-213	0.2221		
0.250	1-251	0.2465	2-251	0.2479	3-251	0.2544	4-251	0.2628	5-251	0.2573	6-251	0.2546	7-251	0.2513
	1-252	0.2484	2-252	0.2584	3-252	0.2575	4-252	0.2596	5-252	0.2509	6-252	0.2536	7-252	0.2578
	1-253	0.2505	2-253	0.2548	3-253	0.2531	4-255 0.2596 4-256 0.2616	5-253	0.2609	6-253	0.2509			
	1-254	0.2461	2-254	0.2534	3-254	0.2435		5-254	0.2619	6-254	0.2556			
	1-255	0.2498												
0.281	1-281	0.2919	2-281	0.2884	3-281	0.2918	4-281	0.2850	5-281	0.2906	6-281	0.2878	7-281	0.2910
	1-282	0.2910	2-282	0.2843	3-282	0.2965	4-282	0.2863	5-282	0.2865	6-282	0.2865	7-282	0.2889
	1-283	0.3055	2-283	0.3011	3-283	0.3039	4-283	0.3006	5-283	0.2795	6-283	0.2811		
					3-284	0.3166								
0.312	1-311	0.3199	2-311	0.3111	3-311	0.3211	4-311	0.3176	5-311	0.3186	6-311	0.3139	7-311	0.3119
	1-312	0.3188	2-312	0.3118	3-312	0.3705	4-312	0.3125	5-312	0.3209	6-312	0.3116	7-312	0.3158
	1-313	0.3133	2-313	0.3081	3-313	0.3213	4-313	0.3254	5-313	0.3226	6-313	0.3129		
			2-314	0.3133										
0.375	1-371	0.3746	2-371	0.3799	3-371	0.3796	4-371	0.3751	5-371	0.3881	6-371	0.3816	7-371	0.3945
	1-372	0.3846	2-372	0.3864	3-372	0.4000	4-372	0.3771	5-372	0.3869	6-372	0.3744	7-372	0.3745
	1-373	0.3771	2-373	0.3861	3-373	0.3771	4-373	0.3731	5-373	0.3924	6-373	0.3798		
	1-374	0.3750							6-374	0.3820				
0.437	1-431	0.4390	2-431	0.4469	3-431	0.4474	4-431	0.4414	5-431	0.4326	6-431	0.4363	7-431	0.4496
	1-432	0.4360	2-432	0.4446	3-432	0.4486	4-432	0.4428	5-432	0.4398	6-432	0.4413	7-432	0.4374
	1-433	0.4394	2-433	0.4498	3-433	0.4384	4-433	0.4359	5-433	0.4431	6-433	0.4396		
	1-434	0.4371			3-434	0.4455								
0.500	1-501	0.5011	2-501	0.5031	3-501	0.5090	4-501	0.5011	5-501	0.5126	6-501	0.4988	7-501	0.5003
	1-502	0.5059	2-502	0.4989	3-502	0.5064	4-502	0.5005	5-502	0.5246	6-502	0.4981	7-502	0.5014
	1-503	0.5006	2-503	0.5054	3-504	0.5239	4-503	0.4990	5-503	0.5113	6-503	0.5053		
	1-504	0.5029	2-504	0.4994			4-504	0.5033	6-504	0.5080				
			2-505	0.5005										
0.625	1-621	0.6323	2-621	0.6303	3-621	0.6259	4-621	0.6266	5-621	0.6334	6-621	0.6101	7-621	
	1-622	0.6094	2-622	0.6114	3-622	0.6278	4-622	0.6239	5-622	0.6345	6-622	0.6198	7-622	
0.687	1-681	0.6993	2-681	0.7061			4-681	0.6809	5-681	0.6951	6-681	0.6679	7-681	0.6799
	1-682	0.7054	2-682	0.7110			4-682	0.6786	5-682	0.6986	6-682	0.6796	7-682	0.6803
0.937	1-931	0.9484	2-931	0.9793			4-931	0.9196	5-931	0.9523	6-931	0.9226	7-931	0.9258
Validation	09-févr-17		08-févr-17		22-mars-17		10-févr-17		10-févr-17		09-févr-17		26-oct-16	
Version 5														

## RÉSUMÉ D'ÉTALONNAGE DES BUSES DE VERRE 2017

Classe Buse	COFFRE A		COFFRE B		COFFRE C			
	#	Ø (po)	#	Ø (po)	#	Ø (po)	#	Ø (po)
0.180	A-180-1	0.1920	B-180-1					
	A-180-2	0.1895	B-180-2	0.1981	C-180-2	0.1831		
	A-180-3	0.1886	B-180-3	0.1829	C-180-3	0.1846		
			B-180-4	0.1834	C-180-4	0.1858		
0.218	A-218-1	0.2150	B-218-1	0.2179				
	A-218-2	0.2180	B-218-2	0.2181				
			B-218-3	0.2215				
	A-218-4	0.2196						
	A-218-5	0.2209	B-218-5	0.2194				
	A-218-6	0.2176						
			B-218-7	0.2180	C-218-6	0.2166		
					C-218-7	0.2160		
0.250	A-250-1	0.2523	B-250-1	0.2508	C-250-1	0.2513		
	A-250-2	0.2529	B-250-2	0.2561	C-250-2	0.2561		
					C-250-3	0.2520		
	A-250-4	0.2519	B-250-4	0.2531	C-250-4	0.2503		
	A-250-5	0.2509	B-250-5	0.2524				
			B-250-6	0.2504				
					C-250-7	0.2494		
	A-250-8	0.2545						
0.280			B-280-1	0.2878				
			B-280-2	0.2805				
	A-280-3	0.2910			C-280-3	0.2863		
	A-280-4	0.2851			C-280-4	0.2826		
	A-280-5	0.2910	B-280-5	0.2774	C-280-5	0.2808		
	A-280-6	0.2819	B-280-6	0.2860	C-280-6	0.2781		
0.312	A-312-2	0.3130	B-312-2	0.3121	C-312-2	0.3063		
			B-312-3	0.3141	C-312-3	0.3095		
			B-312-4	0.3108				
	A-312-5	0.3138	B-312-5	0.3125				
	A-312-6	0.3115			C-312-6	0.3074		
	A-312-7	0.3110			C-312-7	0.3105		
	A-312-8	0.3129	B-312-8	0.3150				
0.343	A-343-1	0.3504						
	A-343-2	0.3355	B-343-2	0.3425				
	A-343-3	0.3460	B-343-3	0.3425	C-343-3	0.3426		
	A-343-4	0.3480	B-343-4	0.3429	C-343-4	0.3509		
			B-343-5	0.3461	C-343-5	0.3449		
					C-343-6	0.3471		
0.375			B-375-1	0.3861	C-375-1	0.3749		
	A-375-2	0.3763	B-375-2	0.3710	C-375-2	0.3750		
			B-375-3	0.3749	C-375-3	0.3799		
	A-375-4	0.3738	B-375-4		C-375-4	0.3754		
	A-375-5	0.3790	B-375-5	0.3731				
	A-375-6	0.3720	B-375-6					
0.406	A-406-1	0.4079	B-406-1	0.4078	C-406-1	0.4133		
	A-406-2	0.4144	B-406-2	0.4110	C-406-2	0.4116		
	A-406-3	0.4091	B-406-3	0.4095	C-406-3	0.4075		
0.437	A-437-1	0.4406			C-437-1	0.4339		
	A-437-2	0.4394	B-437-2	0.4258	C-437-2	0.4395		
	A-437-3	0.4351	B-437-3	0.4385	C-437-3	0.4384		
	A-437-4	0.4415	B-437-4	0.4399				
0.500	A-500-1	0.5064	B-500-1	0.5043	C-500-1	0.5006		
	A-500-2	0.5040	B-500-2	0.5066	C-500-2	0.4986		
0.562	A-562-1	0.5606	B-562-1	0.5690	C-562-1	0.5564		
	A-562-2	0.5700	B-562-2	0.5590	C-562-2	0.5644		
Validation:	23-mars-17		27-févr-17		27-févr-17			

## RÉSUMÉ D'ÉTALONNAGE DES BUSES DE QUARTZ/INCONEL 2017

Liner de 3 pi		Liner de 5 pi		Liner de 9 pi		INCONEL	
#	Ø (po)	#	Ø (po)	#	Ø (po)	#	Ø (po)
3Q-371	0.3759	5Q-374	0.3730	9Q-681	#DIV/0!	I-501	0.4975
3Q-372	0.3719	5Q-376	0.3718	9Q-682	0.6938	I-502	0.5036
3Q-373	0.3741	5Q-432	#DIV/0!	9Q-683	#DIV/0!	I-561	0.5634
3Q-431	0.4370	5Q-433	#DIV/0!			I-562	0.5749
3Q-432	0.4354						
3Q-433	0.4351						
3Q-501	0.4978						
3Q-502	0.5040						
3Q-503	0.4955						
Validation:	2017-03-22					2017-03-07	
Version 5							

#	Année	MDF	LV	#	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Moy. S <sub>t</sub>	Thermocouple	P-T-B	Endroit
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	(Validation)	---	---
05-01	2017	N	N	Buse	5-311															0.774	OK	OK	LE-14-B
				Ct	0.774															1.2			
				E. Rel	1.2															---			
05-02	2017	O	N	Buse	4-313															0.767	OK	OK	LE-11-V
				Ct	0.767															1.3			
				E. Rel	1.3															---			
05-03	2017	N	O	Buse	4-313															0.777	OK	OK	LE-11-V
				Ct	0.777															0.4			
				E. Rel	0.4															---			
05-05	2017	O	O	Buse	4-313															0.819	OK	OK	LE-14-B
				Ct	0.819															0.0			
				E. Rel	0.0															---			
05-08	2017	O	O	Buse	5-311															0.793	OK	OK	LE-05-O
				Ct	0.793															1.0			
				E. Rel	1.0															---			
05-09	2017	O	O	Buse	4-313															0.811	OK	OK	LE-14-B
				Ct	0.811															0.7			
				E. Rel	0.7															---			
05-10	2017	O	O	Buse	5-311															0.782	OK	OK	LE-05-O
				Ct	0.782															0.4			
				E. Rel	0.4															---			
05-11	2017	O	O	Buse	5-511															0.792	OK	OK	LE-02-W
				Ct	0.792															0.6			
				E. Rel	0.6															---			
05-12	2017	O	O	Buse	4-313															0.818	OK	OK	LE-15-B
				Ct	0.818															1.4			
				E. Rel	1.4															---			
05-13	2017	O	O	Buse	4-313															0.789	OK	OK	LE-11-V
				Ct	0.789															1.3			
				E. Rel	1.3															---			
05-14	2017	O	O	Buse	5-121	5-183	5-213	5-251	5-291	5-311	5-371	5-431	5-502	5-621	5-682					0.762	OK	OK	LE-02-W
				Ct	0.770	0.762	0.766	0.775	0.765	0.761	0.758	0.756	0.758	0.754	0.761					1.1			
				E. Rel	0.9	1.4	1.0	1.1	1.2	1.0	0.9	1.1	1.0	1.0	1.0					---			
05-15	2017	O	O	Buse	5-121	5-183	5-213	5-251	5-291	5-311	5-371	5-431	5-502	5-621	5-682					0.768	OK	OK	LE-02-W
				Ct	0.767	0.767	0.766	0.775	0.769	0.768	0.771	0.765	0.763	0.771	0.766					0.7			
				E. Rel	0.6	0.9	0.8	0.4	0.6	0.0	0.8	0.9	1.0	1.0	1.0					---			
05-16	2017	O	O	Buse	5-121	5-183	5-213	5-251	5-291	5-311	5-371	5-431	5-502	5-621	5-682					0.823	OK	OK	LE-02-W
				Ct	0.826	0.823	0.818	0.834	0.822	0.820	0.827	0.822	0.818	0.821	0.821					1.0			
				E. Rel	0.7	0.7	0.9	0.9	1.0	0.9	1.1	1.3	1.3	1.2	1.1					---			
05-17	2017	N	N	Buse	4-313															0.784	OK	OK	LE-02-W
				Ct	0.784															0.7			
				E. Rel	0.7															---			
05-18	2017	O	O	Buse	4-313															0.778	OK	OK	LE-08-Br
				Ct	0.778															0.4			
				E. Rel	0.4															---			
05-19	2017	O	N	Buse	4-313															0.832	OK	OK	LE-08-Br
				Ct	0.832															0.9			
				E. Rel	0.9															---			
05-20	2017	O	O	Buse	5-311															0.800	OK	OK	LE-08-Br
				Ct	0.800															1.0			
				E. Rel	1.0															---			
05-21	2017	O	V	Buse	5-121															0.797	OK	OK	Atelier Qc
				Ct	0.797															1.3			
				E. Rel	1.3															---			
05-22	2017	O	O	Buse	4-313															0.803	OK	OK	LE-09-G
				Ct	0.803															1.0			
				E. Rel	1.0															---			
05-23	2017	O	O	Buse	4-313															0.804	OK	OK	LE-09-G
				Ct	0.804															1.0			
				E. Rel	1.0															---			
05-24	2017	O	sc	Buse	5-311															0.795	OK	OK	Atelier Qc
				Ct	0.795															1.4			
				E. Rel	1.4															---			
05-25	2017	O	sc	Buse	4-313															0.810	OK	OK	Atelier Qc
				Ct	0.810															1.2			
				E. Rel	1.2															---			
05-26	2017	O	sc	Buse	4-313															0.808	OK	OK	Atelier Qc
				Ct	0.808															0.7			
				E. Rel	0.7															---			
05-27	2017	O	sc	Buse	4-313															0.765	OK	OK	Atelier Qc
				Ct	0.765															0.4			
				E. Rel	0.4															---			

Effectué par: TDD/JM/JFG/MC/MR/DP

Date: Février 2017

Vérifié par: Eric Trépanier

Signature:

Date: 9 mars 2017

**FEUILLE D'ÉTALONNAGE DES MODULES 2017**

MODULE	GAMMA (K <sub>c</sub> )	ORIFICE (K <sub>o</sub> )	$\Delta H@$ moy	DATE ÉTALONNAGE	COMPENSÉ 60 °F
		K <sub>o</sub>			
1	1.003	1.002	0.968	17-janv-17	OUI
2	0.993	0.984	1.009	18-janv-17	OUI
3	1.000	0.978	1.023	24-oct-16	OUI
4	0.984	0.957	1.068	16-janv-17	OUI
5	1.001	0.994	0.936	21-mars-17	NON
6	1.004	0.994	1.000	25-juil-16	OUI
7	0.990	1.006	0.912	21-oct-16	NON
8	0.993	1.030	0.929	01-août-16	OUI
9	0.996	1.010	0.907	03-août-16	NON
10	1.010	0.987	1.020	11-avr-17	OUI
11	1.015	0.977	1.026	30-mai-16	OUI
12	0.997	0.910	1.115	11-mai-16	NON
13	1.012	0.986	0.950	22-mars-17	non
14	1.007	1.001	0.982	13-avr-17	OUI
15	1.005	0.983	0.956	20-oct-16	NON
16	1.007	1.010	0.904	28-juil-16	NON
17	1.001	1.040	0.853	01-août-16	NON
18	1.007	1.020	0.887	28-juil-16	NON
19	1.014	1.004	0.974	07-juil-16	OUI
20	1.006	0.973	1.052	26-juil-16	OUI
21	1.001	0.999	0.983	20-oct-16	OUI
22	0.995	1.008	0.974	05-juil-16	OUI
23	1.017	1.016	0.897	27-juil-16	NON
24	1.011	1.025	0.883	24-oct-16	NON
25	0.985	0.756	1.632	04-mai-16	NON

MODULE	GAMMA (K <sub>c</sub> )	DATE ÉTALONNAGE
F-1	1.012	20-janv-17
F-2	0.987	10-mai-16
F-3	0.984	21-oct-16
F-4	0.986	05-juil-16
F-5	0.993	22-févr-17
F-6	0.999	14-avr-17

Version: 5  
Date: 19-05-2017





# HiQ® Certificate / Certificat HiQ®

MEDS1 CO 50PPM CO2 5% O2 11% N2 BAL 152  
1% NIST

Certificate Date : 02/20/2015 Use by : 02/20/2018  
Cylinder Size : 152  
Nominal Pressure : 2,000 PSG  
Lot Number : 1329861 Cylinder No. : CC95382  
Product Code : 24099207

Component	Nominal	Certified
Carbon Monoxide	50PPM	51.0PPM
Carbon Dioxide	5%	5.12%
Oxygen	11%	11.08%
Nitrogen		Balance

CYL17-032

MEDS1 CO 50PPM CO2 5% O2 11% N2 BAL  
152  
1% NIST

Date du certificat : 02/20/2015 Utilisé par : 02/20/2018  
Taille de la bouteille : 152  
Pression nominale : 2,000 PSG  
Numéro de lot : 1329861 Numéro de bouteille : CC95382  
Code du produit : 24099207

Composant	Nominale	Certifiée
MONOXYDE CARBONE	50PPM	51.0PPM
DIOXYDE CARBONE	5%	5.12 %
OXYGÈNE	11%	11.08%
AZOTE		Balance



## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE

Purchase order #4501709184

Lot #1404757

Cylinder Number: SX 20280

PGVP ID #L12016

Procedure: G1

Gas Type Code: OCC

Cylinder pressure: 2000 psig

Certification date

February 3, 2017

Expiration Date

February 4, 2025

## ANALYTICAL RESULTS

Component	Requested Concentration ± blending tolerance	Date of Assay	Mean Concentration	Certified Concentration Uncertainty expressed at 95% confidence
Oxygen	22.5 % ± 5%	February 3, 2017	22.69 %	22.69 ± 0.01 %
Carbon Monoxide	900 ppm ± 5%	February 3, 2017	920.1 ppm	920.1 ± 3.31 ppm
Carbon Dioxide	18 % ± 5%	February 3, 2017	18.23 %	18.23 ± 0.02 %

BALANCE GAS: Nitrogen

## REFERENCE STANDARDS

Component	Type	Serial Number	Reference Number	Concentration	Expiration Date
Oxygen	NTRM	CC 237234	071001	24.52 ± 0.12 %	March 27, 2017
Carbon Monoxide	GMIS NTRM	CC 180486 CC 133724	GMIS CC 180486 021003	1011.1 ± 2.9 ppm 988 ± 90 ppm	January 13, 2018 November 5, 2017
Carbon Dioxide	GMIS NTRM	SG 9164344 SG 9916842	1187941 101001	20.05 ± 0.02 % 19.98 ± 0.14 %	March 17, 2017 April 15, 2016

## CERTIFICATION INSTRUMENTS

Component	Make/Model	Measurement Principle	Serial Number	Last calibration
Oxygen	Servomex 04100 C1	Paramagnetic Sensor	392350	January 9, 2017
Carbon Monoxide	SICK MCS 100E	Infrared Photometer	04310670	January 12, 2017
Carbon Dioxide	SICK MCS 100E	Infrared Photometer	04310670	January 12, 2017

THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE 2012 EPA PROTOCOL PROCEDURE

DO NOT USE THIS CYLINDER WHEN THE PRESSURE FALLS BELOW 100 PSIG

Analyst: Keith Cybulski Signature

Date: February 3, 2017

Notes:

## APPENDIX 4

Laboratory reports



**Kudlik Construction Ltd.**



## RAPPORT D'ESSAI

**Date :** 19 juillet 2017

**Réf :** P1926-1

### Client

**# Client :** C17

**Nom :** Waltzing Pascal

**Téléphone :** (418) 650-5960 # 2213

**Courriel :** pascal.waltzing@consul-air.com

**Adresse :**

CONSULAIR Québec  
125-2022, rue Lavoisier  
Québec QC  
G1N 4L5 Canada

### Résumé du projet

**Nb. d'objets :** 7

**# Projet lab. :** P1926

**Votre # projet :** 17-4865

**Chantier :** Kudlik Construction inc. Iqaluit

### Résumé des essais

#### Paramètre(s) accrédités

ST	Paramètre	Q.	Principe (Méthode)	Matrice
	Matières particulaires (MP-A)	4	Gravimétrie (LPT1)	Acétone
	Matières particulaires (MP-F)	3	Gravimétrie (LPT2)	Filtre

ST : paramètre Sous-Traité



## Résultats d'essai(s)

ST	Param.	Échantillon (s)		Dates			Résultat(s)		LDR
		# Lab	# Client	Échantillon.	Récep.	Essai	Valeur	Unité	
	MP-A	110717-79	2 - Asph - BS - 1	30-06-17	11-07-17	12-07-17	8.3	mg	1.0
		110717-80	4 - Asph - BS - 2	01-07-17	11-07-17	12-07-17	8.3	mg	1.0
		110717-81	6 - Asph - BS - 3	01-07-17	11-07-17	12-07-17	4.7	mg	1.0
		110717-82	7 - Asph - BS - BI	01-07-17	11-07-17	12-07-17	< LDR	mg	1.0
	MP-F	110717-83	1 - Asph - Filtre - 1	30-06-17	11-07-17	13-07-17	17.6	mg	0.1
		110717-84	3 - Asph - Filtre - 2	01-07-17	11-07-17	13-07-17	14.8	mg	0.1
		110717-85	5 - Asph - Filtre - 3	01-07-17	11-07-17	13-07-17	11.6	mg	0.1

ST : Essai Sous-Traité  
LDR : Limite de Détection Rapportée

## Commentaire(s)

1. LPT1 & LPT2: Méthode MA.100-Part 1.0 (Domaine 400 de Chimie de l'air)
2. Le volume de l'échantillon 110717-82 ; V= 128 mL.

## Contrôle de qualité

ST	Param.	Date	# Réf	Type	Résultat(s)		LDR
					Valeur	Unité	
	MP-A	12-07-17	BL matrice	BL	< LDR	mg	1.0
			BL1207	BL	< LDR	mg	-
			MR1207	MR	100.4	% Récup.	-
	MP-F	13-07-17	AP-02 Conforme	-	-	mg	0.1

ST : Contrôle qualité Sous-Traité  
# Réf : Référence du contrôle qualité dans le système de suivi du laboratoire  
BL : Blanc  
MR : Matériau de Référence  
DP : Duplicata  
RP : Réplicata  
AD : Ajout Dosé  
EA : Étalon Analogue  
TM: Témoin de l'extraction  
LDR : Limite de Détection Rapportée

## Signature

Les résultats ne se rapportent qu'aux objets soumis à l'essai  
Tout ou partie de ce document ne peut être reproduit sans l'autorisation du laboratoire de CONSULAIR.  
Ce rapport d'essai est certifié par la (les) personne(s) mentionnée(s) ci-après.  
Pour toute question concernant ce certificat d'analyse, veuillez vous adresser directement à :



Malha Kirèche



# APPENDIX 5

Field documents



**Kudlik Construction Ltd.**

**PRISE DE DONNÉES OPACITÉ**

HEURE	N° MESURE	OPACITÉ (0 à 4)	HEURE	N° MESURE	OPACITÉ (0 à 4)	HEURE	N° MESURE	OPACITÉ (0 à 4)	HEURE	N° MESURE	OPACITÉ (0 à 4)	HEURE	N° MESURE	OPACITÉ (0 à 4)
21:18:00	1	1	21:30:00	49	1	21:42:00	97	1	21:54:00	145	1	22:06:00	193	1
21:18:15	2	1	21:30:15	50	1	21:42:15	98	1	21:54:15	146	1	22:06:15	194	1
21:18:30	3	1	21:30:30	51	1	21:42:30	99	1	21:54:30	147	1	22:06:30	195	1
21:18:45	4	1	21:30:45	52	1	21:42:45	100	1	21:54:45	148	1	22:06:45	196	1
21:19:00	5	1	21:31:00	53	1	21:43:00	101	1	21:55:00	149	1	22:07:00	197	1
21:19:15	6	1	21:31:15	54	1	21:43:15	102	1	21:55:15	150	1	22:07:15	198	1
21:19:30	7	1	21:31:30	55	1	21:43:30	103	1	21:55:30	151	1	22:07:30	199	1
21:19:45	8	1	21:31:45	56	1	21:43:45	104	1	21:55:45	152	1	22:07:45	200	1
21:20:00	9	1	21:32:00	57	1	21:44:00	105	1	21:56:00	153	1	22:08:00	201	1
21:20:15	10	1	21:32:15	58	1	21:44:15	106	1	21:56:15	154	1	22:08:15	202	1
21:20:30	11	1	21:32:30	59	1	21:44:30	107	1	21:56:30	155	1	22:08:30	203	1
21:20:45	12	1	21:32:45	60	1	21:44:45	108	1	21:56:45	156	1	22:08:45	204	1
21:21:00	13	1	21:33:00	61	1	21:45:00	109	1	21:57:00	157	1	22:09:00	205	1
21:21:15	14	1	21:33:15	62	1	21:45:15	110	1	21:57:15	158	1	22:09:15	206	1
21:21:30	15	1	21:33:30	63	1	21:45:30	111	1	21:57:30	159	1	22:09:30	207	1
21:21:45	16	1	21:33:45	64	1	21:45:45	112	1	21:57:45	160	1	22:09:45	208	1
21:22:00	17	1	21:34:00	65	1	21:46:00	113	1	21:58:00	161	1	22:10:00	209	1
21:22:15	18	1	21:34:15	66	1	21:46:15	114	1	21:58:15	162	1	22:10:15	210	1
21:22:30	19	1	21:34:30	67	1	21:46:30	115	1	21:58:30	163	1	22:10:30	211	1
21:22:45	20	1	21:34:45	68	1	21:46:45	116	1	21:58:45	164	1	22:10:45	212	1
21:23:00	21	1	21:35:00	69	1	21:47:00	117	1	21:59:00	165	1	22:11:00	213	1
21:23:15	22	1	21:35:15	70	1	21:47:15	118	1	21:59:15	166	1	22:11:15	214	1
21:23:30	23	1	21:35:30	71	1	21:47:30	119	1	21:59:30	167	1	22:11:30	215	1
21:23:45	24	1	21:35:45	72	1	21:47:45	120	1	21:59:45	168	1	22:11:45	216	1
21:24:00	25	1	21:36:00	73	1	21:48:00	121	1	22:00:00	169	1	22:12:00	217	1
21:24:15	26	1	21:36:15	74	1	21:48:15	122	1	22:00:15	170	1	22:12:15	218	1
21:24:30	27	1	21:36:30	75	1	21:48:30	123	1	22:00:30	171	1	22:12:30	219	1
21:24:45	28	1	21:36:45	76	1	21:48:45	124	1	22:00:45	172	1	22:12:45	220	1
21:25:00	29	1	21:37:00	77	1	21:49:00	125	1	22:01:00	173	1	22:13:00	221	1
21:25:15	30	1	21:37:15	78	1	21:49:15	126	1	22:01:15	174	1	22:13:15	222	1
21:25:30	31	1	21:37:30	79	1	21:49:30	127	1	22:01:30	175	1	22:13:30	223	1
21:25:45	32	1	21:37:45	80	1	21:49:45	128	1	22:01:45	176	1	22:13:45	224	1
21:26:00	33	1	21:38:00	81	1	21:50:00	129	1	22:02:00	177	1	22:14:00	225	1
21:26:15	34	1	21:38:15	82	1	21:50:15	130	1	22:02:15	178	1	22:14:15	226	1
21:26:30	35	1	21:38:30	83	1	21:50:30	131	1	22:02:30	179	1	22:14:30	227	1
21:26:45	36	1	21:38:45	84	1	21:50:45	132	1	22:02:45	180	1	22:14:45	228	1
21:27:00	37	1	21:39:00	85	1	21:51:00	133	1	22:03:00	181	1	22:15:00	229	1
21:27:15	38	1	21:39:15	86	1	21:51:15	134	1	22:03:15	182	1	22:15:15	230	1
21:27:30	39	1	21:39:30	87	1	21:51:30	135	1	22:03:30	183	1	22:15:30	231	1
21:27:45	40	1	21:39:45	88	1	21:51:45	136	1	22:03:45	184	1	22:15:45	232	1
21:28:00	41	1	21:40:00	89	1	21:52:00	137	1	22:04:00	185	1	22:16:00	233	1
21:28:15	42	1	21:40:15	90	1	21:52:15	138	1	22:04:15	186	1	22:16:15	234	1
21:28:30	43	1	21:40:30	91	1	21:52:30	139	1	22:04:30	187	1	22:16:30	235	1
21:28:45	44	1	21:40:45	92	1	21:52:45	140	1	22:04:45	188	1	22:16:45	236	1
21:29:00	45	1	21:41:00	93	1	21:53:00	141	1	22:05:00	189	1	22:17:00	237	1
21:29:15	46	1	21:41:15	94	1	21:53:15	142	1	22:05:15	190	1	22:17:15	238	1
21:29:30	47	1	21:41:30	95	1	21:53:30	143	1	22:05:30	191	1	22:17:30	239	1
21:29:45	48	1	21:41:45	96	1	21:53:45	144	1	22:05:45	192	1	22:17:45	240	1

 Technicien: PW



**PRISE DE DONNÉES OPACITÉ**

HEURE	N° MESURE	OPACITÉ (0 à 4)	HEURE	N° MESURE	OPACITÉ (0 à 4)	HEURE	N° MESURE	OPACITÉ (0 à 4)	HEURE	N° MESURE	OPACITÉ (0 à 4)	HEURE	N° MESURE	OPACITÉ (0 à 4)
20:23:00	1	1	20:35:00	49	1	20:47:00	97	1	20:59:00	145	1	21:11:00	193	1
20:23:15	2	1	20:35:15	50	1	20:47:15	98	1	20:59:15	146	1	21:11:15	194	1
20:23:30	3	1	20:35:30	51	1	20:47:30	99	1	20:59:30	147	1	21:11:30	195	1
20:23:45	4	1	20:35:45	52	1	20:47:45	100	1	20:59:45	148	1	21:11:45	196	1
20:24:00	5	1	20:36:00	53	1	20:48:00	101	1	21:00:00	149	1	21:12:00	197	1
20:24:15	6	1	20:36:15	54	1	20:48:15	102	1	21:00:15	150	1	21:12:15	198	1
20:24:30	7	1	20:36:30	55	1	20:48:30	103	1	21:00:30	151	1	21:12:30	199	1
20:24:45	8	1	20:36:45	56	1	20:48:45	104	1	21:00:45	152	1	21:12:45	200	1
20:25:00	9	1	20:37:00	57	1	20:49:00	105	1	21:01:00	153	1	21:13:00	201	1
20:25:15	10	1	20:37:15	58	1	20:49:15	106	1	21:01:15	154	1	21:13:15	202	1
20:25:30	11	1	20:37:30	59	1	20:49:30	107	1	21:01:30	155	1	21:13:30	203	1
20:25:45	12	1	20:37:45	60	1	20:49:45	108	1	21:01:45	156	1	21:13:45	204	1
20:26:00	13	1	20:38:00	61	1	20:50:00	109	1	21:02:00	157	1	21:14:00	205	1
20:26:15	14	1	20:38:15	62	1	20:50:15	110	1	21:02:15	158	1	21:14:15	206	1
20:26:30	15	1	20:38:30	63	1	20:50:30	111	1	21:02:30	159	1	21:14:30	207	1
20:26:45	16	1	20:38:45	64	1	20:50:45	112	1	21:02:45	160	1	21:14:45	208	1
20:27:00	17	1	20:39:00	65	1	20:51:00	113	1	21:03:00	161	1	21:15:00	209	1
20:27:15	18	1	20:39:15	66	1	20:51:15	114	1	21:03:15	162	1	21:15:15	210	1
20:27:30	19	1	20:39:30	67	1	20:51:30	115	1	21:03:30	163	1	21:15:30	211	1
20:27:45	20	1	20:39:45	68	1	20:51:45	116	1	21:03:45	164	1	21:15:45	212	1
20:28:00	21	1	20:40:00	69	1	20:52:00	117	1	21:04:00	165	1	21:16:00	213	1
20:28:15	22	1	20:40:15	70	1	20:52:15	118	1	21:04:15	166	1	21:16:15	214	1
20:28:30	23	1	20:40:30	71	1	20:52:30	119	1	21:04:30	167	1	21:16:30	215	1
20:28:45	24	1	20:40:45	72	1	20:52:45	120	1	21:04:45	168	1	21:16:45	216	1
20:29:00	25	1	20:41:00	73	1	20:53:00	121	1	21:05:00	169	1	21:17:00	217	1
20:29:15	26	1	20:41:15	74	1	20:53:15	122	1	21:05:15	170	1	21:17:15	218	1
20:29:30	27	1	20:41:30	75	1	20:53:30	123	1	21:05:30	171	1	21:17:30	219	1
20:29:45	28	1	20:41:45	76	1	20:53:45	124	1	21:05:45	172	1	21:17:45	220	1
20:30:00	29	1	20:42:00	77	1	20:54:00	125	1	21:06:00	173	1	21:18:00	221	1
20:30:15	30	1	20:42:15	78	1	20:54:15	126	1	21:06:15	174	1	21:18:15	222	1
20:30:30	31	1	20:42:30	79	1	20:54:30	127	1	21:06:30	175	1	21:18:30	223	1
20:30:45	32	1	20:42:45	80	1	20:54:45	128	1	21:06:45	176	1	21:18:45	224	1
20:31:00	33	1	20:43:00	81	1	20:55:00	129	1	21:07:00	177	1	21:19:00	225	1
20:31:15	34	1	20:43:15	82	1	20:55:15	130	1	21:07:15	178	1	21:19:15	226	1
20:31:30	35	1	20:43:30	83	1	20:55:30	131	1	21:07:30	179	1	21:19:30	227	1
20:31:45	36	1	20:43:45	84	1	20:55:45	132	1	21:07:45	180	1	21:19:45	228	1
20:32:00	37	1	20:44:00	85	1	20:56:00	133	1	21:08:00	181	1	21:20:00	229	1
20:32:15	38	1	20:44:15	86	1	20:56:15	134	1	21:08:15	182	1	21:20:15	230	1
20:32:30	39	1	20:44:30	87	1	20:56:30	135	1	21:08:30	183	1	21:20:30	231	1
20:32:45	40	1	20:44:45	88	1	20:56:45	136	1	21:08:45	184	1	21:20:45	232	1
20:33:00	41	1	20:45:00	89	1	20:57:00	137	1	21:09:00	185	1	21:21:00	233	1
20:33:15	42	1	20:45:15	90	1	20:57:15	138	1	21:09:15	186	1	21:21:15	234	1
20:33:30	43	1	20:45:30	91	1	20:57:30	139	1	21:09:30	187	1	21:21:30	235	1
20:33:45	44	1	20:45:45	92	1	20:57:45	140	1	21:09:45	188	1	21:21:45	236	1
20:34:00	45	1	20:46:00	93	1	20:58:00	141	1	21:10:00	189	1	21:22:00	237	1
20:34:15	46	1	20:46:15	94	1	20:58:15	142	1	21:10:15	190	1	21:22:15	238	1
20:34:30	47	1	20:46:30	95	1	20:58:30	143	1	21:10:30	191	1	21:22:30	239	1
20:34:45	48	1	20:46:45	96	1	20:58:45	144	1	21:10:45	192	1	21:22:45	240	1

 Technicien: *PW*



**PRISE DE DONNÉES OPACITÉ**

HEURE	N° MESURE	OPACITÉ (0 à 4)	HEURE	N° MESURE	OPACITÉ (0 à 4)	HEURE	N° MESURE	OPACITÉ (0 à 4)	HEURE	N° MESURE	OPACITÉ (0 à 4)	HEURE	N° MESURE	OPACITÉ (0 à 4)
22:24:00	1	1	22:36:00	49	1	22:48:00	97	1	23:00:00	145	1	23:12:00	193	1
22:24:15	2	1	22:36:15	50	1	22:48:15	98	1	23:00:15	146	1	23:12:15	194	1
22:24:30	3	1	22:36:30	51	1	22:48:30	99	1	23:00:30	147	1	23:12:30	195	1
22:24:45	4	1	22:36:45	52	1	22:48:45	100	1	23:00:45	148	1	23:12:45	196	1
22:25:00	5	1	22:37:00	53	1	22:49:00	101	1	23:01:00	149	1	23:13:00	197	1
22:25:15	6	1	22:37:15	54	1	22:49:15	102	1	23:01:15	150	1	23:13:15	198	1
22:25:30	7	1	22:37:30	55	1	22:49:30	103	1	23:01:30	151	1	23:13:30	199	1
22:25:45	8	1	22:37:45	56	1	22:49:45	104	1	23:01:45	152	1	23:13:45	200	1
22:26:00	9	1	22:38:00	57	1	22:50:00	105	1	23:02:00	153	1	23:14:00	201	1
22:26:15	10	1	22:38:15	58	1	22:50:15	106	1	23:02:15	154	1	23:14:15	202	1
22:26:30	11	1	22:38:30	59	1	22:50:30	107	1	23:02:30	155	1	23:14:30	203	1
22:26:45	12	1	22:38:45	60	1	22:50:45	108	1	23:02:45	156	1	23:14:45	204	1
22:27:00	13	1	22:39:00	61	1	22:51:00	109	1	23:03:00	157	1	23:15:00	205	1
22:27:15	14	1	22:39:15	62	1	22:51:15	110	1	23:03:15	158	1	23:15:15	206	1
22:27:30	15	1	22:39:30	63	1	22:51:30	111	1	23:03:30	159	1	23:15:30	207	1
22:27:45	16	1	22:39:45	64	1	22:51:45	112	1	23:03:45	160	1	23:15:45	208	1
22:28:00	17	1	22:40:00	65	1	22:52:00	113	1	23:04:00	161	1	23:16:00	209	1
22:28:15	18	1	22:40:15	66	1	22:52:15	114	1	23:04:15	162	1	23:16:15	210	1
22:28:30	19	1	22:40:30	67	1	22:52:30	115	1	23:04:30	163	1	23:16:30	211	1
22:28:45	20	1	22:40:45	68	1	22:52:45	116	1	23:04:45	164	1	23:16:45	212	1
22:29:00	21	1	22:41:00	69	1	22:53:00	117	1	23:05:00	165	1	23:17:00	213	1
22:29:15	22	1	22:41:15	70	1	22:53:15	118	1	23:05:15	166	1	23:17:15	214	1
22:29:30	23	1	22:41:30	71	1	22:53:30	119	1	23:05:30	167	1	23:17:30	215	1
22:29:45	24	1	22:41:45	72	1	22:53:45	120	1	23:05:45	168	1	23:17:45	216	1
22:30:00	25	1	22:42:00	73	1	22:54:00	121	1	23:06:00	169	1	23:18:00	217	1
22:30:15	26	1	22:42:15	74	1	22:54:15	122	1	23:06:15	170	1	23:18:15	218	1
22:30:30	27	1	22:42:30	75	1	22:54:30	123	1	23:06:30	171	1	23:18:30	219	1
22:30:45	28	1	22:42:45	76	1	22:54:45	124	1	23:06:45	172	1	23:18:45	220	1
22:31:00	29	1	22:43:00	77	1	22:55:00	125	1	23:07:00	173	1	23:19:00	221	1
22:31:15	30	1	22:43:15	78	1	22:55:15	126	1	23:07:15	174	1	23:19:15	222	1
22:31:30	31	1	22:43:30	79	1	22:55:30	127	1	23:07:30	175	1	23:19:30	223	1
22:31:45	32	1	22:43:45	80	1	22:55:45	128	1	23:07:45	176	1	23:19:45	224	1
22:32:00	33	1	22:44:00	81	1	22:56:00	129	1	23:08:00	177	1	23:20:00	225	1
22:32:15	34	1	22:44:15	82	1	22:56:15	130	1	23:08:15	178	1	23:20:15	226	1
22:32:30	35	1	22:44:30	83	1	22:56:30	131	1	23:08:30	179	1	23:20:30	227	1
22:32:45	36	1	22:44:45	84	1	22:56:45	132	1	23:08:45	180	1	23:20:45	228	1
22:33:00	37	1	22:45:00	85	1	22:57:00	133	1	23:09:00	181	1	23:21:00	229	1
22:33:15	38	1	22:45:15	86	1	22:57:15	134	1	23:09:15	182	1	23:21:15	230	1
22:33:30	39	1	22:45:30	87	1	22:57:30	135	1	23:09:30	183	1	23:21:30	231	1
22:33:45	40	1	22:45:45	88	1	22:57:45	136	1	23:09:45	184	1	23:21:45	232	1
22:34:00	41	1	22:46:00	89	1	22:58:00	137	1	23:10:00	185	1	23:22:00	233	1
22:34:15	42	1	22:46:15	90	1	22:58:15	138	1	23:10:15	186	1	23:22:15	234	1
22:34:30	43	1	22:46:30	91	1	22:58:30	139	1	23:10:30	187	1	23:22:30	235	1
22:34:45	44	1	22:46:45	92	1	22:58:45	140	1	23:10:45	188	1	23:22:45	236	1
22:35:00	45	1	22:47:00	93	1	22:59:00	141	1	23:11:00	189	1	23:23:00	237	1
22:35:15	46	1	22:47:15	94	1	22:59:15	142	1	23:11:15	190	1	23:23:15	238	1
22:35:30	47	1	22:47:30	95	1	22:59:30	143	1	23:11:30	191	1	23:23:30	239	1
22:35:45	48	1	22:47:45	96	1	22:59:45	144	1	23:11:45	192	1	23:23:45	240	1

 Technicien: *PW*



Usine : <b>KUDLIK</b>	Date : <b>2017-06-30</b>	P. Bar (po Hg) :	# Cold box : <b>B1-1</b>
Ville : <b>IQALUIT</b>	MP -1	P. Stat. (po H <sub>2</sub> O) : <b>0.01</b>	
ID point d'émission : <b>ASPHALTE</b>	Sonde N° : <b>05-02</b>	Module N° : <b>20</b>	K' : <b>8.75</b>
Diamètre : <b>27 x 74.5</b>	Cp : <b>0.767</b>	Kc : <b>1.006</b>	
Distance avant : <b>336</b>	Buse N° : <b>22 7-371</b>	Ko : <b>0.973</b>	Niveau du manomètre : <b>h</b>
Distance après : <b>21</b>	Coef : <b>0.3945</b>	Distance P-T°-B : <b>h</b>	Zéro du manomètre : <b>L</b>

Heure	Trav.	Point	Temps prélèv. (min)	ΔP (po H <sub>2</sub> O)	ΔH (po H <sub>2</sub> O)	Températures (°F)				Volume Prélevé (pi³)	Masse molaire			Vaccum po. Hg	Température			
						Cheminée	Compteur		Orifice		O <sub>2</sub> (%v)	CO <sub>2</sub> (%v)	CO (ppmv)		Sonde (°F)	Filtre (°F)	Sortie (°F)	Trappe/Filtre (°F)
							Entrée	Sortie										
21h18	1	1	5	0.21	1.55	167	60	60	70	125.95								
		2		0.21	1.52	179			70	130.62	17.8	1.5	178	4	250	247	50	
		3		0.22	1.59	183			70	135.22	17.3	2.5	203		252	247	50	
21h38		4		0.21	1.50	191			71	139.95	17.4	2.5	169		250	256	50	
										144.45	17.4	2.0	163		246	253	50	
21h41	2	1		0.18	1.29	190			71	148.71	17.2	2.5	141		247	254	52	
		2		0.18	1.29	196			71	152.95	17.2	2.5	157		246	254	52	
		3		0.18	1.27	197			71	157.16	17.3	2.5	90		250	254	51	
22h01		4		0.18	1.28	191			71	161.36	17.3	2.5	90		250	254	51	
22h05	3	1		0.14	1.00	191			70	165.17	17.4	2.5	70		250	245	52	
		2		0.22	1.56	193			70	169.75	16.8	2.5	70		246	256	52	
		3		0.24	1.70	193			70	174.62	16.8	3.0	73		245	253	52	
22h25		4		0.24	1.70	193			70	179.47	16.8	3.0	73		249	253	54	
22h28	4	1		0.28	2.00	189			70	184.71	17.4	2.5	80		249	252	56	
		2		0.32	2.29	188			70	190.34	17.4	2.5	92	5	250	245	59	
		3		0.35	2.51	187			70	196.21	17.4	2.5	98		245	257	60	
22h48		4		0.35	2.51	187			70	202.11	17.8	2.5	111	6	249	248	60	
														</				

TDF Initial Débit (pi³/min): <b>0</b>	Pression (inhg) : <b>-15</b>	Volume ini (pi³): <b>125.63</b>	Volume fin (pi³): <b>125.95</b>	Volume (pi³):	Fuite Pitot (ΔP) :
TDF Final Débit (pi³/min): <b>0</b>	Pression (inhg) : <b>-8</b>	Volume ini (pi³): <b>202.11</b>	Volume fin (pi³): <b>202.20</b>	Volume (pi³):	
REMARQUES : O <sub>2</sub> /CO <sub>2</sub> - Utiliser le formulaire de gaz en continu pour calibration des appareils.					

75 t/h

 TECHNICIEN : **PW**

## DÉTERMINATION DES MATIÈRES PARTICULAIRES TOTALES - SPE 1/RM/8

Client: KUDLIK CONSTRUCTION	# Projet: 4965
Source: USINE ASPHALTE	# Essai: 1 # Caisson: BR-1
Date d'échantillonnage: 2017-06-30	Date d'assemblage: 2017-06-30

## Préparation - Volume d'eau recueilli

ITEM #	PIÈCE	CONTENU	POIDS		
			APRÈS	AVANT	TOTAL
1	Support à filtre	Filtre Fibre de verre (47, 86 ou 125 mm)	PVA-91-11	0.7195	
2	Barboteur 1	100 mL - H <sub>2</sub> O déminéralisée	708.5	624.0	
3	Barboteur 2 Greenberg-Smith	100 mL - H <sub>2</sub> O déminéralisée	565.5	524.5	
4	Barboteur 3	VIDE	561.0	558.5	
5	Absorbeur d'humidité résiduelle	GEL DE SILICE	1083.5	1870.0	
TOTAL					

## Récupération finale

Date de récupération : 2017-06-30	Heure de récupération: 23h50
Nettoyage de l'extérieur des différentes pièces :	✓
Conditionnement des contenants de récupération :	✓

## Contenant 1 - Récupération du filtre (Séparateur principal)

Filtre	Mettre dans un pètri propre et scellé avec ruban adhésif ou téflon	✓
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## Contenant 2 - Récupération de la buse à la partie avant du porte-filtre

Items	Remarques	Lavage et brossage	Niveau de liquide
		Acétone ACS	
de la buse à la partie avant du porte-filtre	✓	✓	✓

## Contenant 3 et 4 - Récupération des barboteurs (si nécessaire)

Items	Remarques	1 <sup>er</sup> Rinçage (contenant 3)	2 <sup>e</sup> Rinçage (contenant 4)	Niveau de liquide
		Produit:	Produit:	
du bas de cloche au dernier barboteur	✓	✓	✓	✓

Remarques :

\_\_\_\_\_ PW

Blanc: 100 mL Acétone

## 3 - LOTS DES PRODUITS UTILISÉS (si applicable)

Produit	# Lot du produit
Acétone ACS	

Technicien: PW

Date : 2017-06-30



Usine : KUDLIK	Date : 2017-07-01	P. Bar (po Hg) :	# Cold box : Bx-4
Ville : IQALUIT	MP-2	P. Stat. (po H <sub>2</sub> O) : -0,10	
ID point d'émission : ASPPALTE	Sonde N° : 05-02	Module N° : 20	K' : 10,14
Diamètre : 27 x 74,5 125	Cp : 0,767	Kc : 11006	
Distance avant :	Buse N° : 7-371	Ko : 0,923	Niveau du manomètre : sk
Distance après :	Coef : 0,3945	Distance P-T°-B : sk	Zéro du manomètre : sk

[illegible]

TDF Initial Débit (pi³/min):	0	Pression (inhg):	-15	Volume ini (pi³):	2.59	Volume fin (pi³):	<del>28.50</del>	Volume (pi³):		Fuite Pitot (ΔP):	
TDF Final Débit (pi³/min):	0	Pression (inhg):	-15	Volume ini (pi³):	84.82	Volume fin (pi³):	85.00	Volume (pi³):			dk
REMARQUES	O₂/CO₂ - Utiliser le formulaire de gaz en continu pour calibration des appareils.										

75 à 100 t/h

### TECHNICIEN :

**DÉTERMINATION DES MATIÈRES PARTICULAIRES TOTALES - SPE 1/RM/8**

Client: <b>KUDLIK CONSTRUCTION</b>	# Projet: <b>4865</b>
Source: <b>USINE ASPHALTE</b>	# Essai: <b>2</b> # Caisson: <b>Dr-4</b>
Date d'échantillonnage: <b>2017-0</b>	Date d'assemblage: <b>2017-06-30</b> Heure:

**Préparation - Volume d'eau recueilli**

ITEM #	PIÈCE	CONTENU	POIDS		
			APRÈS	AVANT	TOTAL
1	Support à filtre	Filtre Fibre de verre (47, 86 ou 125 mm)			
2	Barboteur 1	100 mL - H <sub>2</sub> O déminéralisée	744.5	660.5	
3	Barboteur 2 Greenberg-Smith	100 mL - H <sub>2</sub> O déminéralisée	657.0	628.5	
4	Barboteur 3	VIDE	618.5	612.0	
5	Absorbeur d'humidité résiduelle	GEL DE SILICE	1805.0	1793.0	
TOTAL					

133.0g  
6.9%  
Hum

**Récupération finale**

Date de récupération: <b>2017-07-02</b>	Heure de récupération: <b>1400</b>
Nettoyage de l'extérieur des différentes pièces:	✓
Conditionnement des contenants de récupération:	✓

**Contenant 1 - Récupération du filtre (Séparateur principal)**

Filtre	Mettre dans un pètri propre et scellé avec ruban adhésif ou téflon	✓
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**Contenant 2 - Récupération de la buse à la partie avant du porte-filtre**

Items	Remarques	Lavage et brossage	Niveau de liquide
		Acétone ACS	
de la buse à la partie avant du porte-filtre	<i>Re</i>	✓	✓

**Contenant 3 et 4 - Récupération des barboteurs (si nécessaire)**

Items	Remarques	1 <sup>er</sup> Rinçage (contenant 3)	2 <sup>e</sup> Rinçage (contenant 4)	Niveau de liquide
		Produit:	Produit:	
du bas de cloche au dernier barboteur	<i>Re</i>	✓	✓	<i>Re</i>

Remarques:	<i>Re</i>
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Blanc: 100 mL Acétone	✓
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**3 - LOTS DES PRODUITS UTILISÉS (si applicable)**

Produit	# Lot du produit
Acétone ACS	

Technicien: <i>Re</i>	Date: <b>2017-07-02</b>
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Usine : KUDLIK	Date : 2017-07-01	P. Bar (po Hg) :	# Cold box : Br-1
Ville : 16 ALUIT	MP-2	P. Stat. (po H <sub>2</sub> O) : -0.04	
ID point d'émission : ASPHALTE	Sonde N° : 05-19	Module N° : 20	K' : 9.69
Diamètre : 27 x 74.5 +2.5	Cp : 0.832	Kc : 1.006	
Distance avant : 336"	Buse N° : 7-372	Ko : 0.973	Niveau du manomètre : 2h
Distance après : 29"	Coef : 0.3745	Distance P-T°-B : A	Zéro du manomètre : 1h

[illegible]

TDF Initial Débit (pi <sup>3</sup> /min):	0	Pression (inhg):	-15	Volume ini (pi <sup>3</sup> ):	85.00	Volume fin (pi <sup>3</sup> ):	85.30	Volume (pi <sup>3</sup> ):		Fuite Pitot (ΔP):	
TDF Final Débit (pi <sup>3</sup> /min):	0	Pression (inhg):	-7	Volume ini (pi <sup>3</sup> ):	154.01	Volume fin (pi <sup>3</sup> ):	154.12	Volume (pi <sup>3</sup> ):			ok
REMARQUES	O <sub>2</sub> /CO <sub>2</sub> - Utiliser le formulaire de gaz en continu pour calibration des appareils.										

100 t/L

## TECHNICIEN :

**DÉTERMINATION DES MATIÈRES PARTICULAIRES TOTALES - SPE 1/RM/8**

Client: <b>KUDLIK</b>	# Projet: <b>4865</b>
Source: <b>ASPHALTE</b>	# Essai: <b>3</b> # Caisson: <b>B1-1</b>
Date d'échantillonnage: <b>2017-</b>	Date d'assemblage: <b>2017-06-30</b> Heure:

**Préparation - Volume d'eau recueilli**

ITEM #	PIÈCE	CONTENU	POIDS		
			APRÈS	AVANT	TOTAL
1	Support à filtre	Filtre Fibre de verre (47, 86 ou 125 mm)			
2	Barboteur 1	100 mL - H <sub>2</sub> O déminéralisée	691.0	589.5	
3	Barboteur 2 Greenberg-Smith	100 mL - H <sub>2</sub> O déminéralisée	490.5	471.0	
4	Barboteur 3	VIDE	565.5	562.0	
					137.0
					8.4% hum
5	Absorbeur d'humidité résiduelle	GEL DE SILICE	1895.5	1883.0	
TOTAL					

**Récupération finale**

Date de récupération: <b>2017-07-02</b>	Heure de récupération: <b>2 1400</b>
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Nettoyage de l'extérieur des différentes pièces: ☒

Conditionnement des contenants de récupération: ☒

**Contenant 1 - Récupération du filtre (Séparateur principal)**

Filtre	Mettre dans un pétri propre et scellé avec ruban adhésif ou téflon	<input checked="" type="checkbox"/>
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**Contenant 2 - Récupération de la buse à la partie avant du porte-filtre**

Items	Remarques	Lavage et brossage	Niveau de liquide
		Acétone ACS	
de la buse à la partie avant du porte-filtre	<b>pu</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

**Contenant 3 et 4 - Récupération des barboteurs (si nécessaire)**

Items	Remarques	1 <sup>er</sup> Rinçage (contenant 3)	2 <sup>e</sup> Rinçage (contenant 4)	Niveau de liquide
		Produit:	Produit:	
du bas de cloche au dernier barboteur	<b>pu</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<b>pu</b>

Remarques:

**pu**


Blanc: 100 mL Acétone

**3 - LOTS DES PRODUITS UTILISÉS (si applicable)**

Produit	# Lot du produit
Acétone ACS	

Technicien: **pu** Date: **pu 2017-07-01**



	FORMULAIRE: F_18_V7		Compagnie: <b>RUDLIK</b>
	MÉTHODE 7E / 10 / 6C / 3A		# de projet: <b>4865</b>
			Source: <b>ASPHANTE</b>
			Date: <b>2017-06-30</b>

### Identification des analyseurs (# Consulair)

O <sub>2</sub> :	CO <sub>2</sub> :	CO:	SO <sub>2</sub> :	NO:	AUTRE:
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### Identification des bombonnes (# Bombonne)

Azote: <b>RUDLIK</b>	O <sub>2</sub> /CO <sub>2</sub> /CO: <b>29217-032-001</b>	SO <sub>2</sub> :	NO:	AUTRE:
Pression finale:	Pression finale:	Pression finale:	Pression finale:	Pression finale:
Air zéro:	O <sub>2</sub> /CO <sub>2</sub> /CO:	SO <sub>2</sub> :	NO:	AUTRE:
Pression finale:	Pression finale:	Pression finale:	Pression finale:	Pression finale:

### Vérification du système de prélèvement/conditionnement

Test de fuite (O/N): <b>0</b>	Temp. Refroidisseur: <b>-</b>	Temp. cordon: <b>-</b>	Temp. pompe: <b>-</b>
Pression analyseurs: <b>-</b>	Débit principal (#2): <b>-</b>	Débit excès (#7): <b>-</b>	Temps de réponse syst.: <b>-</b>

### AGENDA DE L'ÉTALONNAGE

### ANALYSEURS / ÉCHELLES PHYSIQUES

GAZ	Conc. de vérification	Dilution (O/N)	Vérif. Analyseur	Vérif. Sonde	Heure	O2	CO2	CO	SO2	NO	Prendre en notes les valeurs d'écart	
						ANALYSEURS / CONCENTRATIONS					% err.	OK?
N <sub>2</sub>		N	✓		16431	0.3	0	0				
O <sub>2</sub> /CO <sub>2</sub> /CO	2287/16.2/1	N	✓		16438	22.8	16.2	920				
O <sub>2</sub> /CO <sub>2</sub> /CO	1106/5.1/5		✓		16444	11.2	5.0	59				
N <sub>2</sub>			✓		23437	0.5	0	5				
O <sub>2</sub> /CO <sub>2</sub> /CO	1108/5.1/5		✓		23441	11	5.0	62				
O <sub>2</sub> /CO <sub>2</sub> /CO	2267/16.2/90.1		✓		23448	22.8	16.2	899				
<b>2017-07-01</b>												
N <sub>2</sub>			✓		19407	0.3	0	0				
O <sub>2</sub> /CO <sub>2</sub> /CO	2267/16.2/90.1		✓		19412	22.8	16.2	919				
O <sub>2</sub> /CO <sub>2</sub> /CO	1108/5.1/5		✓		19420	11.3	5.1	54				
N <sub>2</sub>			✓		23459	0.2	0.1	1				
O <sub>2</sub> /CO <sub>2</sub> /CO	1108/5.1/5		✓		23405	11.3	5.1	56				

Technicien:

*PA*



Compagnie: **KUDLIK**

Source: **ASPHALTE**

# Projet: **4865**

Ville: **IQUALUIT**

Date: **2017-06-30**

**1 - VÉRIFICATION DES MODULES AVEC ORIFICES CRITIQUES**

PRESSION BAROMÉTRIQUE (in Hg)

INITIAL

FINAL

**29.90**

**29.90**

# POMPE: **04272**

# MODULE: **20**

# KIT CALIB: **7**

Gamma (K<sub>c</sub>): **1.006**

#ORIFICE	#ESSAI	K' FACTEUR (AVG)	TEST VACUUM (in Hg)	COMPTEUR VOLUME (FT <sup>3</sup> )			TEMPÉRATURES °F						DURÉE TEMPS (min)	DGM ΔH (in H <sub>2</sub> O)
				INITIAL	FINAL	NET (V <sub>m</sub> )	AMBIANT INITIAL	COMPTEUR IN		COMPTEUR OUT		AMBIANT FINAL		
<b>7-5</b>	1	<b>0.5280</b>	<b>-19</b>	<b>108.0</b>	<b>124.08</b>	<b>9.88</b>	<b>69</b>	<b>60</b>	<b>60</b>	<b>60</b>	<b>60</b>	<b>69</b>	<b>7</b>	<b>0.86</b>
	2													
	3													

Commentaires:

Respect de l'écart de 5 % du K<sub>c</sub> :

**-3.3**

**oui**

Technicien :

**PW**

# 21-047-12 40,000L FUEL TANK WEEKLY INSPECTION

DATE	NAME	SIGNATURE	COMMENT
23-06-2017	Patrick Pelletier	Pat Pelletier	ok
30-06-2017	Patrick Pelletier	Pat Pelletier	ok
07-07-2017	Patrick Pelletier	Pat Pelletier	ok
14-07-2017	Patrick Pelletier	Pat Pelletier	ok
21-07-2017	Patrick Pelletier	Pat Pelletier	ok
28-07-2017	Patrick Pelletier	Pat Pelletier	ok
04-08-2017	Patrick Pelletier	Pat Pelletier	ok
11-08-2017	Patrick Pelletier	Pat Pelletier	ok
18-08-2017	Patrick Pelletier	Pat Pelletier	ok
25-08-2017	Patrick Pelletier	Pat Pelletier	ok
01-09-2017	Patrick Pelletier	Pat Pelletier	ok
08-09-2017	Patrick Pelletier	Pat Pelletier	ok
15-09-2017	Patrick Pelletier	Pat Pelletier	ok
22-09-2017	Patrick Pelletier	Pat Pelletier	ok
29-09-2017	Patrick Pelletier	Pat Pelletier	ok
06-10-2017	Patrick Pelletier	Pat Pelletier	ok
13-10-2017	Patrick Pelletier	Pat Pelletier	ok
20-10-2017	Patrick Pelletier	Pat Pelletier	ok
27-10-2017	Patrick Pelletier	Pat Pelletier	ok
03-11-2017	Patrick Pelletier	Pat Pelletier	ok



# 21-047-11 75,000L BITUMEN TANK WEEKLY INSPECTION

DATE	NAME	SIGNATURE	COMMENT
23-06-2017	Patrick Pelletier	Pat Pelletier	OK
30-06-2017	Patrick Pelletier	Pat Pelletier	OK
07-07-2017	Patrick Pelletier	Pat Pelletier	OK
14-07-2017	Patrick Pelletier	Pat Pelletier	OK
21-07-2017	Patrick Pelletier	Pat Pelletier	OK
28-07-2017	Patrick Pelletier	Pat Pelletier	OK
04-08-2017	Patrick Pelletier	Pat Pelletier	OK
11-08-2017	Patrick Pelletier	Pat Pelletier	OK
18-08-2017	Patrick Pelletier	Pat Pelletier	OK
25-08-2017	Patrick Pelletier	Pat Pelletier	OK
01-09-2017	Patrick Pelletier	Pat Pelletier	OK
08-09-2017	Patrick Pelletier	Pat Pelletier	OK
15-09-2017	Patrick Pelletier	Pat Pelletier	OK
22-09-2017	Patrick Pelletier	Pat Pelletier	OK
29-09-2017	Patrick Pelletier	Pat Pelletier	OK
06-10-2017	Patrick Pelletier	Pat Pelletier	OK
13-10-2017	Patrick Pelletier	Pat Pelletier	OK
20-10-2017	Patrick Pelletier	Pat Pelletier	OK
27-10-2017	Patrick Pelletier	Pat Pelletier	OK
03-11-2017	Patrick Pelletier	Pat Pelletier	OK



# 21-047-10 75,000L BITUMEN TANK WEEKLY INSPECTION

DATE	NAME	SIGNATURE	COMMENT
23-06-2017	Patrick Pelletier	Pat Pelletier	OK
30-06-2017	Patrick Pelletier	Pat Pelletier	OK
07-07-2017	Patrick Pelletier	Pat Pelletier	OK
14-07-2017	Patrick Pelletier	Pat Pelletier	OK
21-07-2017	Patrick Pelletier	Pat Pelletier	OK
28-07-2017	Patrick Pelletier	Pat Pelletier	OK
04-08-2017	Patrick Pelletier	Pat Pelletier	OK
11-08-2017	Patrick Pelletier	Pat Pelletier	OK
18-08-2017	Patrick Pelletier	Pat Pelletier	OK
25-08-2017	Patrick Pelletier	Pat Pelletier	OK
01-09-2017	Patrick Pelletier	Pat Pelletier	OK
08-09-2017	Patrick Pelletier	Pat Pelletier	OK
15-09-2017	Patrick Pelletier	Pat Pelletier	OK
22-09-2017	Patrick Pelletier	Pat Pelletier	OK
29-09-2017	Patrick Pelletier	Pat Pelletier	OK
06-10-2017	Patrick Pelletier	Pat Pelletier	OK
13-10-2017	Patrick Pelletier	Pat Pelletier	OK
20-10-2017	Patrick Pelletier	Pat Pelletier	OK
27-10-2017	Patrick Pelletier	Pat Pelletier	OK
03-11-2017	Patrick Pelletier	Pat Pelletier	OK