Source Emissions Testing – Fall 2014 Report



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EXECUTIVE SUMMARY

Northern Pulp Nova Scotia Corporation, referred to herein as Northern Pulp, retained Stantec Consulting Ltd. to conduct source emissions testing at the Kraft pulp mill in New Glasgow, Nova Scotia. Source emissions testing was conducted on the Recovery Boiler, the Lime Kiln, the Smelt Dissolving Tank, the Power Boiler, and the High Level Roof Vent to fulfill the conditions specified in the current Certificate of Approval to Operate (CoA) 2011-076657-R02. The source emissions testing campaign was performed according to the pre-test plan submitted to the Nova Scotia Department of Environment. The testing was conducted during the periods of October 14 - 17, 2014 and October 20 - 25, 2014.

In this report, source emissions testing data are presented for measurements which include combustion gases, total particulate matter (PM), total reduced sulphur (TRS) as well as exhaust gas temperature, exhaust flow rate, moisture content, velocity, and volumetric flow rate. The scope of work for the testing campaign is summarized in Table E.1.

Table E.1 Summary of Scope

Source	Approval Condition	Parameter	Sampling Method
Lime Kiln	6. a)	Total Particulate Matter (PM)	EPS 1/RM/8
	6. b)	Total Reduced Sulphur (TRS)	US EPA Method 16B/C
	-	Combustion Gases	EPS 1/RM/15
Recovery Boiler	6. a)	Total Particulate Matter (PM)	EPS 1/RM/8
	-	Combustion Gases	EPS 1/RM/15
Smelt Dissolving Tank	6. a)	Total Particulate Matter (PM)	EPS 1/RM/8
	-	Combustion Gases	EPS 1/RM/15
Power Boiler	6. a)	Total Particulate Matter (PM)	EPS 1/RM/8
	-	Combustion Gases	EPS 1/RM/15
High Level Roof Vent	6. b)	Total Reduced Sulphur (TRS)	US EPA Method 16B/C
	-	NO_X	EPS 1/RM/15
	-	SO_2	US EPA Method 3A
	-	CO	US EPA Method 10
	-	CO_2 and O_2	US EPA Method 6C

Currently there are specified regulatory limits in the facility's CoA for emissions of PM and/or TRS from four of the five exhaust stacks listed. The measured concentration of PM from the Lime Kiln, Smelt Dissolving Tank and Power Boiler were below their respective regulatory stack limits. The measured concentration of PM from the Recovery Boiler was slightly above the regulatory limit. The maximum 4-hour rolling average concentration of TRS from the Lime Kiln was below the regulatory limit. No limit for TRS is specified for the High Level Roof Vent in the facility's approval.

1.0 INTRODUCTION

Northern Pulp Nova Scotia Corporation, referred to herein as Northern Pulp, retained Stantec Consulting Ltd. (Stantec) to conduct source emissions testing at the Kraft pulp mill in New Glasgow, Nova Scotia. Source emissions testing was conducted on the Recovery Boiler, the Lime Kiln, the Smelt Dissolving Tank, the Power Boiler, and the High Level Roof Vent to fulfill the conditions specified in the current Certificate of Approval to Operate (CoA) 2011-076657-R02. The source emissions testing campaign was performed according the pre-test plan submitted to the Nova Scotia Department of Environment, following methods published by the United States Environmental Protection Agency and Environment Canada. The testing was conducted during the period of October 14 - 17, 2014 and October 20 - 25, 2014.

In this report, source emissions testing data are presented for combustion gases (oxygen, carbon dioxide, nitrogen oxides, sulphur dioxide, and carbon monoxide), total particulate matter (PM), total reduced sulphur (TRS), exhaust gas temperature, exhaust flow rate, moisture content, velocity, and volumetric flow rate. Source emissions testing were conducted on the following sources:

- Lime Kiln;
- Recovery Boiler;
- Smelt Dissolving Tank;
- Power Boiler; and
- High Level Roof Vent.

This report is in five sections. Section 1 contains the introduction and the scope of work for the project. The study approach and a brief description of the various parts of the project are in Section 2. Section 3 contains a brief description of the testing methodologies, equipment, and calibration techniques used during the source emissions testing program. In Section 4, the results of the source emissions testing are presented and discussed, and concluding remarks are presented in Section 5. Appendices A through E contain supporting information for the report, and Appendix F contains operational data from Northern Pulp during the testing periods.

2.0 OVERALL APPROACH

The project consisted of five parts:

1. Submission of the Pre-test Plan;
2. Site Preparation and Preliminary Survey;
3. On-site Source Emissions Testing;
4. Laboratory Analysis; and
5. Information Review and Reporting.

Each of these parts is described below.

2.1 SUBMISSION OF PRE-TEST PLAN

The on-site testing was conducted in accordance with the Pre-Test Plan submitted on September 25, 2014 to Nova Scotia Environment (NSE). The Pre-Test Plan outlined the contaminants to be tested, as well as the methodologies proposed for conducting the source testing on the exhaust stacks.

2.2 ON-SITE SOURCE EMISSIONS TESTING

Stantec set up the source emissions testing equipment and conducted a preliminary survey to measure the exhaust gas temperature, velocity, and flue gas composition for those sources requiring particulate testing. The data from this survey was used to determine the appropriate nozzle size to conduct isokinetic sampling (where the velocity of the gas entering the nozzle is equal to the gas velocity in the stack) for particulate matter sampling.

Three (3) tests for total particulate matter were conducted at defined sampling locations on the exhaust stacks of the Recovery Boiler, the Lime Kiln, the Smelt Dissolving Tank, and the Power Boiler. Three tests for combustion gases were also conducted, near the centre of the exhaust stacks of the Recovery Boiler, the Lime Kiln, the Smelt Dissolving Tank, the Power Boiler and the High Level Roof Vent. All testing was completed in compliance with the sampling methods presented in Table 2.1, in accordance with the *Air Quality Regulation*, under the *Environment Act*, Section 112 issued by Nova Scotia Environment (NSE) and the requirements of the facility's approval (2011-076657-R02) issued by the NSE.

The source emissions testing of the Lime Kiln and the High Level Roof Vent for total reduced sulphur (TRS) was conducted in accordance with US EPA Method 16B/C and the requirements of the facility's approval (2011-076657-R02) issued by NSE.

The methodologies used for testing the emissions from each exhaust stack are summarized in Table 2.1.

Table 2.1 Source Emissions Testing Matrix

Source	Number of Samples per Source	Approval Condition	Parameter	Sampling Method
Lime Kiln	3	6. a)	Total Particulate Matter (PM)	EPS 1/RM/8
	1	6. b)	Total Reduced Sulphur (TRS)	US EPA Method 16B/C
	3	-	Combustion Gases	EPS 1/RM/15
Recovery Boiler	3	6. a)	Total Particulate Matter (PM)	EPS 1/RM/8
	3	-	Combustion Gases	EPS 1/RM/15
Smelt Dissolving Tank	3	6. a)	Total Particulate Matter (PM)	EPS 1/RM/8
	3	-	Combustion Gases	EPS 1/RM/15
Power Boiler	3	6. a)	Total Particulate Matter (PM)	EPS 1/RM/8
	3	-	Combustion Gases	EPS 1/RM/15
High Level Roof Vent	1	6. b)	Total Reduced Sulphur (TRS)	US EPA Method 16B/C
	3	-	NO_X	EPS 1/RM/15
	3	-	SO_2	US EPA Method 3A
	3	-	CO	US EPA Method 10
	3	-	CO_2 and O_2	US EPA Method 6C

In addition to the above testing (as required to meet the Approval conditions), the exhaust flow rate was determined for the High Level Roof Vent to allow for mass emission rate calculations from that source.

2.3 INFORMATION REVIEW AND REPORTING

The data collected in the field, along with data from the laboratory analyses, were entered into the Stantec's source emissions testing spreadsheets for analysis. Emissions calculations were then performed to produce the detailed source emissions testing information. Spreadsheet calculations were verified by hand, and numerous spot checks of spreadsheet formulas were conducted to ensure the accuracy of data. Summary tables were prepared and incorporated into this report for submission to Northern Pulp.

3.0 TEST METHODS, EQUIPMENT, AND CALIBRATIONS

This section contains a description of the methods and equipment used to conduct the source emissions testing campaign. The calibration procedures used to ensure the quality of the source emissions testing data are also summarized in this section.

3.1 SAMPLING PROCEDURES AND EQUIPMENT

The following sub-sections contain brief descriptions of the sampling equipment and methodologies used during the source emissions testing campaign.

3.1.1 Total Particulate Matter

Particulate matter emissions from the four exhaust stacks (Recovery Boiler, Lime Kiln, Smelt Dissolving Tank, and Power Boiler) were measured in accordance with the Environment Canada Reference Method EPS 1/RM/8, entitled *Reference Methods for Source Testing: Measurement of Releases of Particulate from Stationary Sources*.

The sampling train, used specifically for isokinetic sampling of particulate matter, is described in detail in EPS 1/RM/8, and is generally referred to as the 'Method 5' sampling train for particulate matter, named after the United States Environmental Protection Agency (US EPA) protocol. The sampling train consists of several different components which include: a heated sampling probe (a nozzle, stainless steel liner, thermocouple, and pitot tube assembly), a heated sample case containing a filter, an ice box containing impinger glassware, and an umbilical cord leading to the pump and control console. A schematic of the sampling system is shown in Figure 3.1. The operation of the Method 5 sampling train can be generally described as follows.

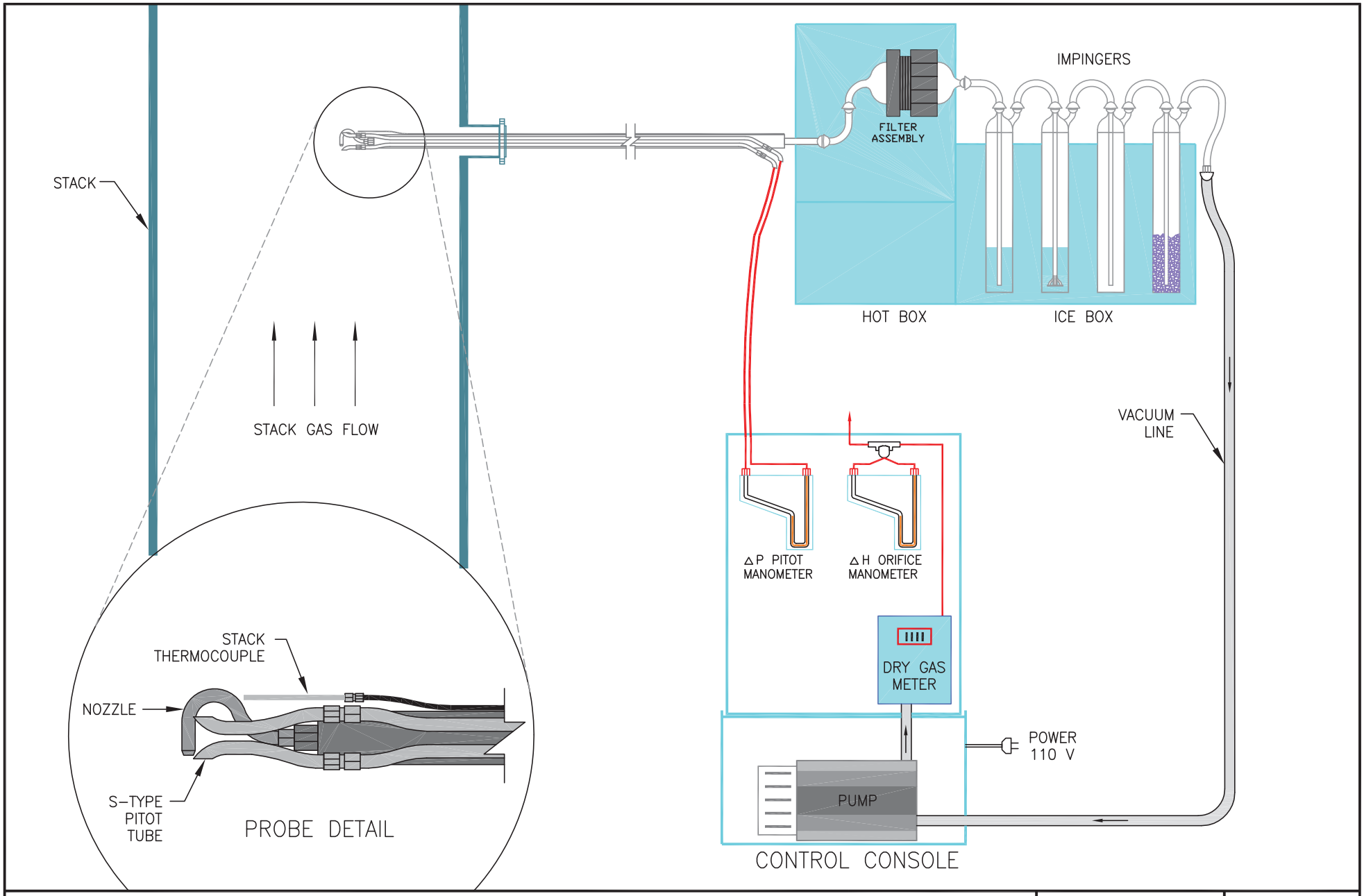
Exhaust gases are drawn through the probe nozzle at or near isokinetic conditions (*i.e.*, where the gas velocity in the nozzle is at the same velocity as the gas in the stack). The gases are then drawn through the inner stainless steel liner of the electrically heated sampling probe to the other components of the sampling train.

A pitot tube assembly is attached to the probe next to the nozzle to measure the exhaust gas velocity in the area of the probe nozzle. Using the differential pressure reading on the control console, the desired nozzle flow rate is determined from the differential pressure across a calibrated orifice.

The exhaust gases are drawn from the probe liner through a pre-weighed glass fiber filter, in the hot side of the sampling unit, and then through pre-weighed impingers in an ice bath to cool the gases and condense the moisture in the gas, before the gas enters the umbilical cord.

The umbilical cord carries the filtered, cooled exhaust gases from the sampling site to the control console. The control console contains a fiber vane vacuum pump, which is used to draw the exhaust gases through the sampling train. A calibrated dry gas meter records the volume of gas sampled.

FILE: STANDARD1



Stantec

SOURCE EMISSIONS TESTING

METHOD 5 SAMPLING TRAIN

Scale: N.T.S.

Fig. No.: 3.1

After completion of testing, the impingers are re-weighed, with the difference in mass corresponding to the mass of water collected. This measurement is used to calculate the moisture content of the exhaust gas.

Prior to the particulate matter testing, filters were conditioned and pre-weighed. Following the testing, particulate matter was recovered from the nozzle, the sampling probe and the in-line filter. Following testing, the filter containing the particulate sample, was conditioned and weighed, and the net weight of the collected particulate matter was determined. After each test, the probe and nozzle were rinsed with acetone and this acetone was collected, placed into a pre-weighed container and evaporated until dry. The amount of particulate for each part of the sample was determined gravimetrically, and the mass of particulate matter collected for each test was calculated as the sum of the particulate matter collected in the filter, probe, and nozzle rinse. The contents of the water filled impingers were also recovered gravimetrically for particulate matter and reported separately as requested by the NSE. These recoveries were performed at Stantec's laboratory in Fredericton, New Brunswick.Appendix C contains the equipment calibration data.

3.1.2 Combustion Gases

The combustion gases (O_2, CO_2, CO, NO_X, and SO_2) from the boilers and the Dissolving Tank were sampled according to the Environment Canada reference method EPS 1/RM/15, entitled *Reference Method for the Monitoring of Gaseous Emissions from Fossil Fuel-fired Burners*. In this method, samples of flue gas are drawn through a probe, non-isokinetically, from a single point near the centre of the stack. An ENERAC Model 500 Micro-Emission Analyzer, manufactured by ENERAC Inc., was used to conduct the sampling. The Model 500 is equipped with a flue gas probe that has an integrated filter trap and condensate trap, and a housing unit that contains the pump and the electrochemical cells which are used to measure concentrations of sulphur dioxide, nitrogen oxides, carbon monoxide, carbon dioxide, and oxygen. The ENERAC Model 500 Micro-Emission Analyzer is manufactured and calibrated to confirm accuracy. Calibration data is included in Appendix C.This unit was also used to measure NO_X from the Lime Kiln. The concentrations and emission rates of oxygen, carbon dioxide, carbon monoxide, and sulphur dioxide were measured continuously from the High Level Roof Vent and the Lime Kiln during total reduced sulphur measurements in accordance with the following US EPA protocols for source emissions testing.

Carbon Dioxide (CO_2) and Oxygen (O_2): Carbon dioxide and oxygen are analyzed according to the US EPA Method 3A, entitled *Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)*. In this method, a sample of stack gas is continuously extracted from the effluent stream at a single point near the centre of the stack through a heated filter and sample line. A portion of the sample is distributed to a paramagnetic analyzer for the determination of oxygen concentration, and to a Luft-type non-dispersive infrared (NDIR) analyzer or equivalent for the determination of carbon dioxide concentration.

Carbon Monoxide (CO): Carbon monoxide emissions were determined according to the US EPA Method 10, *Determination of Carbon Monoxide Emissions from Stationary Sources*. In this method, a sample of stack gas is continuously extracted from the exhaust stream at a single point near the centre of the stack through a heated filter and sample line. The sample is then analyzed for carbon monoxide content using a Luft-type non-dispersive infrared (NDIR) analyzer or equivalent.

Sulphur Dioxide (SO_2): Sulphur dioxide is analyzed according to the US EPA Method 6C, entitled *Determination of Sulphur Dioxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)*. In this method, a sample of stack gas is continuously extracted from the effluent stream at a single point near the centre of the stack through a heated filter and sample line. A portion of the sample is distributed to an instrumental ultraviolet (UV) analyzer for the determination of SO_2 concentration.

3.1.3 Total Reduced Sulphur

The source emissions testing of the Lime Kiln and the High Level Roof Vent for total reduced sulphur was conducted in accordance with US EPA Method 16B, entitled *Determination of Total Reduced Sulfur Emissions from Stationary Sources* and *US EPA Method 16C (real-time data)*.

Method 16C uses the sampling procedures of Method 16A/B and the analytical procedures of Method 6C (for SO_2 analysis) to measure TRS. Total reduced sulfur is defined as hydrogen sulfide, methyl mercaptan, dimethyl sulfide, and dimethyl disulfide (reported as H_2S). As in Method 16A and B, the sample is collected from the source through a heated probe. Stantec modified Method 16 by omitting the citrate buffer scrubber and employing dual analyzers. The citrate buffer scrubber is used to remove SO_2 from the gas stream prior to the oxidizing oven. This modification was done to facilitate more reliable 24-hour sampling as removal of SO_2 using the scrubber requires frequent stops and starts and checks on the buffer to ensure the buffer does not become saturated. This modification thus improves the accuracy of sampling over using the buffer.

The sample is extracted from the exhaust gas of the stack through a heated Teflon line and directed through a first SO_2 analyzer (non-dispersive ultra-violet (NDUV) continuous analyzer) to confirm SO_2 present prior to the oven. The sample is then directed through an oven to thermally oxidize any reduced sulphur compounds to SO_2. Following oxidation of the sample, the exhaust gas from the oven is drawn through a second SO_2 non-dispersive ultra-violet (NDUV) continuous analyzer to analyze the gas for SO_2. The concentration of Total Reduced Sulphur (TRS) is then calculated by subtracting any SO_2 measured in the gas prior to oxidation (measured via the first SO_2 analyzer prior to the oven) from the total SO_2 present after the oxidation oven. Monitoring was conducted continuously over a 24-hour period on each source.

3.2 QUALITY ASSURANCE AND QUALITY CONTROL

Throughout the source emissions testing program, quality assurance and quality control procedures were applied to ensure the collection of reliable and accurate emissions data.

Quality control checks were performed at several stages during the testing program to ensure the collection of representative samples and the generation of valid results.

The Quality Control (QC) checks included the following:

- use of standardized checklists and field notebooks to ensure completeness, traceability, and comparability of the process information and samples;
- field checking of standardized forms by a second person to ensure accuracy and completeness;
- strict adherence to sample chain-of-custody procedures;
- testing for cyclonic or reverse flow, as well as stratified flow conditions; and
- leak checks of sampling train.

Equipment was calibrated according to the protocols and schedule as prescribed by NSE, Environment Canada, and the US EPA. These calibrations include the following:

Pitots: Calibrated in a wind tunnel with probe and nozzles attached.

Gas meters: Calibrated using a critical orifice calibration set.

Nozzle: Four diameter measurements made using a micrometer across the sharpened edges.

Thermocouples: Calibrated using a potentiometric technique.

Gas Analyzers: Calibrated against reference gases using standard calibration gases within the expected range of concentrations from the source.

Calibration data are in Appendix C of this report.

4.0 RESULTS AND DISCUSSION

The results of the source emissions testing campaigns are provided and discussed in this section.

Appendices C through E contain supporting information including calibration information, field data sheets, and calculations.

4.1 EXHAUST STACK SAMPLE LOCATION DETAILS

Table 4.1 provides a summary of the sample location details for each exhaust stack sampled.

Table 4.1 Sample Location Details

Parameter	Recovery Boiler	Lime Kiln	Smelt Dissolving Tank	Power Boiler	High Level Roof Vent
Stack Height – Above Grade (m)	69	37	51	51	65
Exit Diameter / Equivalent Diameter (m)	3.51	1.07	1.22	1.93	1.83
Stack/Duct Description	Circular	Circular	Circular	Circular	Circular
Stack Orientation	Vertical	Vertical	Vertical	Vertical	Vertical
Number of Sample Ports	4	2	2	2	1
Sample Port Diameter (m)	0.1	0.15	0.1	0.1	0.1
Location Upstream from any Disturbance,	>2	2	>2	>2	-
Location Downstream from any Disturbance,	1.45	8	6	>4	-
Ideal or Non Ideal Flow Characteristics at The Sample Location[1]	Not Ideal	Not Ideal[2]	Not Ideal	Not Ideal	-
Total Number of Sample Points for PM	24	24	20	24	NA
Number of Sample Points per Traverse for PM	12	12	10	12	NA
Sample Time per Point for PM (min)	5	5	5	5	NA
Sample time per Test for PM (min)	120	120	100	120	NA
Sample time per Test for TRS (min)	NA	1,440	NA	NA	1,440
Sample time per Test for gases (min)	30	30	30	30	30

Notes:

1 The exhaust gas flow characteristics at the sampling location are referred to as being "Ideal" if the sample ports are located in a straight section of stack at least eight stack diameters downstream and two stack diameters upstream of any flow disturbance.

2 The Lime Kiln sampling location is not ideal due to the cyclonic flow.

4.2 LIME KILN

The results of the source emissions testing for total particulate matter from the Lime Kiln exhaust stack are in Table 4.2. The results of the source emissions testing for combustion gases and total reduced sulphur are in Tables 4.3 and 4.4, respectively.

Table 4.2 Source Testing Results - Lime Kiln - Particulate Matter

Parameter	Test #1	Test #2	Test #3	Average	Stack Emission Limit (Table 1 of Approval)
Test Date	October 23, 2014	October 24, 2014	October 24, 2014	-	-
Test Start time	2:23	8:40	12:30	-	-
Test Duration (min)	120	120	120	120	-
Volume of Gas Sampled (Rm^3)	0.89	0.77	0.85	0.84	-
Average Isokineticity (%)	108	89	97	98	-
Total Volume of Moisture Collected in Impingers (mL)	425	335	361	373	-
Particulate Matter From Filter and Probe Wash (mg)	215	205	218	212	-
Particulate Matter From Impingers (mg)	13.7	8.09	6.53	9.45	-
Plant Production (adubmt/day)	1,033	1,033	1,033	1,033	-
Exhaust Gas Parameters					
Exhaust Gas Temperature (°C)	72	72	71	72	-
Exhaust Gas Moisture Content (%)	39.3	37.1	36.7	37.7	-
Exhaust Gas Velocity (m/s)	13.3	13.0	13.7	13.3	-
Exhaust Gas Volumetric Flow Rate (Rm^3/s)	8.16	8.28	8.83	8.42	-
Oxygen - O_2 (%)	4.05	4.09	4.04	4.06	-
Carbon Dioxide - CO_2 (%)	23.2	23.1	23.3	23.2	-
Total Particulate Matter - PM					
Concentration (mg/Rm^3)	241	265	258	254	-
Emission Rate (kg/hr)	7.08	7.90	8.19	7.72	-
Emission metric (kg/adubmt)	0.16	0.18	0.19	0.18	0.50

Legend:
°C Degrees Celsius.
m/s Metres per second.
Rm^3/s Dry cubic metres per second at reference conditions (25°C and 101.3 kPa).
mg/Rm^3 Milligrams per dry cubic metre at reference conditions (25°C and 101.3 kPa).
kg/hr Kilograms per hour.
adubmt Reference production rate in air dried unbleached metric tonnes.

Isokineticity in the second test was slightly lower than the method criteria (criteria of 90 to 110%). This is not considered to have notably affected the outcome of that test. The average measured emission rate of particulate matter was 0.18 kg/adubmt, which is below the stack emission limit of 0.50 kg/adubmt presented in Table 1 of the facility's Approval (No. 2011-076657-R02).

It should be noted that, as with previous testing, cyclonic flow is present at the sampling location for this source. Sampling was conducted following the angle adjustment approach with the cosine correction applied, as per the US EPA Guidance Document – GD-008.

Table 4.3 Source Testing Results - Lime Kiln - Combustion Gases

Parameter	Test #1	Test #2	Test #3	Average
Test Date	October 23, 2014	October 24, 2014	October 24, 2014	-
Test Duration (min)	30	30	30	30
Exhaust Gas Volumetric Flow Rate (Rm^3/s)	8.16	8.28	8.83	8.42
Sulphur Dioxide - SO_2				
Concentration (ppm)	1.16	6.06	1.68	2.97
Concentration (mg/Rm^3)	3.04	15.9	4.41	7.78
Emissions Rate (kg/hr)	0.09	0.47	0.14	0.23
Nitrogen Oxides - NO_x*				
Concentration (ppm)	130	140	136	135
Concentration (mg/Rm^3)	245	263	255	255
Emissions Rate (kg/hr)	7.19	7.86	8.11	7.72
Carbon Monoxide - CO				
Concentration (ppm)	2.97	3.01	1.98	2.65
Concentration (mg/Rm^3)	3.40	3.45	2.26	3.04
Emissions Rate (kg/hr)	0.10	0.01	0.07	0.09

Legend:

Rm^3/s	Dry cubic metres per second at reference conditions (25°C and 101.3 kPa) based on average of PM test measurements.
mg/Rm^3	Milligrams per dry cubic metre at reference conditions (25°C and 101.3 kPa).
kg/hr	Kilograms per hour.
ND	Not detected.
*	NO_x concentration was measured during the first 30 minutes of particulate matter testing while other gases were measured during the TRS sampling period.

The emission rates for SO_2, NO_x and CO for the Lime Kiln were 0.23, 7.72 and 0.09 kg/hr, respectfully.

Table 4.4 Source Testing Results – Lime Kiln – Total Reduced Sulphur

Parameter	24-hour TRS Monitoring	Stack Emission Limit (Table 1 of Approval)
Test Start	October 23, 2014 20:50	-
Test Finish	October 24, 2014 21:15	-
Average exhaust gas concentration (ppm dv)	2.46	-
Maximum 4-hour rolling average exhaust gas concentration (ppm dv)	6.31	20

Legend:
ppm dv Parts per million, dry volume.

The maximum 4-hour rolling average observed during the testing was 6.31 ppm (dry basis), which is below the stack emission limit of 20 ppm presented in Table 1 of the facility's Approval (No. 2011-076657-R02).

4.3 RECOVERY BOILER

The results of the source emissions testing for total particulate matter and combustion gases from the Recovery Boiler exhaust stack are in Tables 4.5 and 4.6, respectively.

Table 4.5 Source Testing Results - Recovery Boiler - Particulate Matter

Parameter	Test #1	Test #2	Test #3	Average	Stack Emission Limit (Table 1 of Approval)
Test Date	October 17, 2014	October 23, 2014	October 23, 2014	-	-
Test Start	9:10	12:24	4:33	-	-
Test Duration (min)	120	120	120	120	-
Volume of Gas Sampled (Rm^3)	1.76	1.84	1.76	1.79	-
Average Isokineticity (%)	97.4	94.3	102.7	98.1	-
Total Volume of Moisture Collected in Impingers (mL)	575	503	649	576	-
Particulate Matter From Filter and Probe Wash (mg)	1,179	1,016	1,089	1,095	-
Particulate Matter From Impingers (mg)	4.91	3.27	7.19	5.12	-
Exhaust Gas Parameters					
Exhaust Gas Temperature (°C)	66	68	68	67	-
Exhaust Gas Moisture Content (%)	30.7	27.1	33.4	30.4	-
Exhaust Gas Velocity (m/s)	15.1	15.4	14.9	15.1	-
Exhaust Gas Volumetric Flow Rate (Rm^3/s)	88.2	95.2	83.6	89.0	-
Oxygen - O_2 (%)	5.53	6.16	4.24	5.31	-
Carbon Dioxide - CO_2 (%)	11.4	10.9	12.4	11.6	-
Total Particulate Matter - PM Concentration at 11% O_2 (mg/Rm^3)	431	370	368	390	375
Emission Rate (kg/hr)	212	189	186	196	-

Legend:
°C Degrees Celsius.
m/s Metres per second.
Rm^3/s Dry cubic metres per second at reference conditions (25°C and 101.3 kPa).
mg/Rm^3 Milligrams per dry cubic metre at reference conditions (25°C and 101.3 kPa).
kg/hr Kilograms per hour.

The average measured concentration of particulate matter was 390 mg/Rm^3 (corrected to 11% O_2), which is slightly above the stack emission limit of 375 mg/Rm^3 presented in Table 1 of the facility's Approval.

Table 4.6 Source Testing Results - Recovery Boiler - Combustion Gases

Parameter	Test #1	Test #2	Test #3	Average
Test Date	October 17, 2014	October 23, 2014	October 23, 2014	-
Test Duration (min)	30	30	30	30
Exhaust Gas Volumetric Flow Rate (Rm^3/s)	88.2	95.2	83.6	89.0
Sulphur Dioxide - SO_2				
Concentration (ppm)	ND	ND	6.29	<6.29
Concentration (mg/Rm^3)	ND	ND	16.5	<16.5
Emissions Rate (kg/hr)	ND	ND	4.95	<4.95
Nitrogen Oxides - NO_x				
Concentration (ppm)	61.3	59.3	50.3	57.0
Concentration (mg/Rm^3)	115	112	94.6	107
Emissions Rate (kg/hr)	36.6	38.3	28.5	34.4
Carbon Monoxide - CO				
Concentration (ppm)	>2,000	>2,000	>2,000	>2,000
Concentration (mg/Rm^3)	>2,290	>2,290	>2,290	>2,290
Emissions Rate (kg/hr)	>727	>785	>689	>734

Legend:
Rm^3/s Dry cubic metres per second at reference conditions (25°C and 101.3 kPa).
mg/Rm^3 Milligrams per dry cubic metre at reference conditions (25°C and 101.3 kPa).
kg/hr Kilograms per hour.
NA Not Applicable

The emission rates for SO_2, NO_x and CO for the Recovery Boiler were <4.95 kg/hr, 34.4 kg/hr and >734 kg/hr, respectively. The majority of the CO readings taken were above the meters detection limit.

4.4 SMELT DISSOLVING TANK

The results of the source emissions testing for total particulate matter and combustion gases from the Smelt Dissolving Tank exhaust stack are in Tables 4.7 and 4.8, respectively.

Table 4.7 Source Testing Results - Smelt Dissolving Tank - Particulate Matter

Parameter	Test #1	Test #2	Test #3	Average	Stack Emission Limit (Table 1 of Approval)
Test Date	October 17, 2014	October 20, 2014	October 20, 2014	-	-
Test Start	9:00	1:55	4:43	-	-
Test Duration (min)	100	100	100		-
Volume of Gas Sampled (Rm^3)	0.95	0.95	0.96	0.95	-

Table 4.7 Source Testing Results - Smelt Dissolving Tank - Particulate Matter

Parameter	Test #1	Test #2	Test #3	Average	Stack Emission Limit (Table 1 of Approval)
Average Isokineticity (%)	124	101	110	112	-
Total Volume of Moisture Collected in Impingers (mL)	1,149	817	1,000	988	-
Particulate Matter From Filter and Probe Wash (mg)	895	674	636	735	-
Particulate Matter From Impingers (mg)	58.8	35.8	45.2	46.6	-
Pulp Production (adubmt/day)	984	712	712	803	-
Exhaust Gas Parameters					
Exhaust Gas Temperature (°C)	89	82	88	86	-
Exhaust Gas Moisture Content (%)	62.2	53.9	58.5	58.2	-
Exhaust Gas Velocity (m/s)	8.81	8.68	9.09	8.86	-
Exhaust Gas Volumetric Flow Rate (Rm^3/s)	3.18	3.90	3.62	33.56	-
Oxygen - O_2 (%)	20.9	20.9	20.9	20.9	-
Carbon Dioxide - CO_2 (%)	0	0	0	0	-
Total Particulate Matter - PM					
Concentration (mg/Rm^3)	945	708	659	765	-
Emission Rate (kg/hr)	10.8	9.93	9.78	10.67	-
Emission metric (kg/adubmt)	0.26	0.33	0.30	0.30	0.50

Legend:

°C	Degrees Celsius.
m/s	Metres per second.
Rm^3/s	Dry cubic metres per second at reference conditions (25°C and 101.3 kPa).
mg/Rm^3	Milligrams per dry cubic metre at reference conditions (25°C and 101.3 kPa).
kg/hr	Kilograms per hour.
adubmt	Reference production rate in air dried unbleached metric tonnes.

The average measured emission rate of particulate matter was 0.30 kg/adubmt, which is below the stack emission limit of 0.50 kg/adubmt presented in Table 1 of the facility's Approval (No. 2011076657-R02). As presented above the average isokineticity for test 1 was above the method criteria (100 % +/- 10 %). This results because the moisture on this source is highly variable from test to test and moisture directly influences the isokineticity. As the results of this test were

notably higher than the second and third tests and have been included in the average emission metric (kg/adubmt) calculation, the emissions are therefore conservatively reported.

Table 4.8 Source Testing Results - Smelt Dissolving Tank - Combustion Gases

Parameter	Test #1	Test #2	Test #3	Average
Test Date	October 17, 2014	October 20, 2014	October 20, 2014	-
Test Duration (min)	30	30	30	30
Exhaust Gas Volumetric Flow Rate (Rm^3/s)	3.18	3.90	3.62	3.56
Sulphur Dioxide - SO_2				
Concentration (ppm)	ND	ND	ND	ND
Concentration (mg/Rm^3)	ND	ND	ND	ND
Emissions Rate (kg/hr)	ND	ND	ND	ND
Nitrogen Oxides - NO_x				
Concentration (ppm)	ND	ND	ND	ND
Concentration (mg/Rm^3)	ND	ND	ND	ND
Emissions Rate (kg/hr)	ND	ND	ND	ND
Carbon Monoxide - CO				
Concentration (ppm)	ND	ND	ND	ND
Concentration (mg/Rm^3)	ND	ND	ND	ND
Emissions Rate (kg/hr)	ND	ND	ND	ND

Legend:
Rm^3/s Dry cubic metres per second at reference conditions (25°C and 101.3 kPa).
mg/Rm^3 Milligrams per dry cubic metre at reference conditions (25°C and 101.3 kPa).
kg/hr Kilograms per hour.
ND Not detected.

Sulphur dioxide, nitrogen oxides, and carbon monoxide were not detected from the smelt dissolving tank.

4.5 POWER BOILER

The results of the source emissions testing for total particulate matter and combustion gases from the Power Boiler exhaust stack are in Tables 4.9 and 4.10, respectively.

Table 4.9 Source Testing Results - Power Boiler - Particulate Matter

Parameter	Test #1	Test #2	Test #3	Average	Stack Emission Limit (Table 1 of Approval)
Test Date	October 15, 2014	October 15, 2014	October 16, 2014	-	-
Test Start	11:15	2:15	8:55	-	-
Test Duration (min)	120	120	120	120	-
Volume of Gas Sampled (Rm^3)	1.49	1.55	1.83	1.62	-
Average Isokineticity (%)	99.2	98.5	97.9	98.5	-
Total Volume of Moisture Collected in Impingers (mL)	213	229	280	241	-

Table 4.9 Source Testing Results - Power Boiler - Particulate Matter

Parameter	Test #1	Test #2	Test #3	Average	Stack Emission Limit (Table 1 of Approval)
Particulate Matter From Filter and Probe Wash (mg)	118	128	173	140	-
Particulate Matter From Impingers (mg)	2.40	4.80	3.70	3.63	
Exhaust Gas Parameters					
Exhaust Gas Temperature (°C)	61	59	56	59	-
Exhaust Gas Moisture Content (%)	16.2	16.7	17.2	16.7	-
Exhaust Gas Velocity (m/s)	18.4	19.3	22.8	20.1	-
Exhaust Gas Volumetric Flow Rate (Rm^3/s)	36.2	37.9	45.0	39.7	-
Oxygen - O_2 (%)	12.8	11.9	11.8	12.2	-
Carbon Dioxide - CO_2 (%)	5.81	6.60	6.67	6.36	-
Total Particulate Matter - PM					
Concentration at 11% O_2 (mg/Rm^3)	97.0	91.3	103	97.1	150
Emission Rate (kg/hr)	10.3	11.3	15.3	12.3	-

Legend:
°C Degrees Celsius.
m/s Metres per second.
Rm^3/s Dry cubic metres per second at reference conditions (25°C and 101.3 kPa).
mg/Rm^3 Milligrams per dry cubic metre at reference conditions (25°C and 101.3 kPa).
kg/hr Kilograms per hour.

The average measured concentration of particulate matter (corrected to 11% O_2) was 97.1 mg/Rm^3, which is below the stack emission limit of 150 mg/Rm^3 presented in Table 1 of the facility's Approval (No. 2011-076657-R02).

Table 4.10 Source Testing Results - Power Boiler - Combustion Gases

Parameter	Test #1	Test #2	Test #3	Average
Test Date	October 15, 2014	October 15, 2014	October 16, 2014	-
Test Duration (min)	30	30	30	30
Exhaust Gas Volumetric Flow Rate (Rm^3/s)	36.2	37.9	45.0	39.7
Sulphur Dioxide - SO_2				
Concentration (ppm)	ND	ND	ND	ND
Concentration (mg/Rm^3)	ND	ND	ND	ND
Emissions Rate (kg/hr)	ND	ND	ND	ND
Nitrogen Oxides - NO_x				
Concentration (ppm)	48.4	59.7	53.3	53.8
Concentration (mg/Rm^3)	91.1	112.4	100.3	101.3
Emissions Rate (kg/hr)	11.9	15.4	16.3	14.5

Table 4.10 Source Testing Results - Power Boiler - Combustion Gases

Parameter	Test #1	Test #2	Test #3	Average
Carbon Monoxide - CO				
Concentration (ppm)	72	189	60	107
Concentration (mg/Rm³)	82	216	69	123
Emissions Rate (kg/hr)	10.7	30	11	17

Legend:
Rm³/s Dry cubic metres per second at reference conditions (25°C and 101.3 kPa).
mg/Rm³ Milligrams per dry cubic metre at reference conditions (25°C and 101.3 kPa).
kg/hr Kilograms per hour.

The emission rates of NO_X and CO from the Power Boiler were estimated to be 14.5 kg/hr and 17 kg/hr, respectively. No SO_2 was detected.

4.6 HIGH LEVEL ROOF VENT

The results of the source emissions testing for combustion gases and total reduced sulphur from the High Level Roof Vent exhaust stack are in Tables 4.11 and 4.12, respectively. The twenty-four hour testing for total reduced sulphur was conducted over a period of two tests. Testing was initiated on Monday, October 20, 2014 and approximately 18 hours of data were collected prior to the mill shutting down for maintenance. The remainder of the testing was conducted on Thursday, October 23, 2014.

Table 4.11 Source Testing Results - HLRV - Combustion Gases

Parameter	Test #1	Test #2	Test #3	Average
Test Date	October 23, 2014	October 23, 2014	October 23, 2014	-
Test start	15:30	16:00	16:30	-
Test Duration (min)	30	30	30	30
Exhaust Gas Volumetric Flow Rate (Rm³/s)	30.9	31.0	31.0	30.9
Sulphur Dioxide SO_2				
Concentration (ppm)	4.99	5.56	6.33	5.62
Concentration (mg/Rm³)	13.1	14.6	16.6	14.7
Emissions Rate (kg/hr)	1.45	1.62	1.85	1.64
Nitrogen Oxides - NO_X*				
Concentration (ppm)	12.8	12.8	11.9	12.5
Concentration (mg/Rm³)	24.1	24.0	22.4	23.5
Emissions Rate (kg/hr)	2.68	2.68	2.50	2.62
Carbon Monoxide – CO				
Concentration (ppm)	122	122	119	121
Concentration (mg/Rm³)	140	140	136	138
Emissions Rate (kg/hr)	5.5	15.6	15.2	15.4

Legend:
Rm³/s Dry cubic metres per second at reference conditions (25°C and 101.3 kPa).
ppm Parts per million by volume at reference conditions.
mg/Rm³ Milligrams per dry cubic metre at reference conditions (25°C and 101.3 kPa).
kg/hr Kilograms per hour.
* NO_X concentration was measured via EPS 1/RM/15 while other gases were measured during the TRS sampling period using US EPA methods.

The emission rates for SO_2, NO_x and CO from the High Level Roof Vent were estimated to be 1.64 kg/hr, 2.62 kg/hr and 15.4 kg/hr, respectively.

Table 4.12 Source Testing Results - High Level Roof Vent - Total Reduced Sulphur

Parameter	24-hour TRS Monitoring	Stack Emission Limit (Table 1 of Approval)
Test 1 Start	October 20, 2014 14:40	-
Test 1 Finish	October 21, 2014 10:05	-
Test 2 Start	October 23, 2014 9:00	-
Test 2 Finish	October 23, 2014 17:00	-
Average exhaust gas concentration for Test 1 (ppm dv)	56	nl
Average exhaust gas concentration for Test 2 (ppm dv)	17	nl
Maximum 4-hour rolling average exhaust gas concentration for Test 1 (ppm dv)	71	nl
Maximum 4-hour rolling average exhaust gas concentration for Test 2 (ppm dv)	21	nl
Legend: ppm dv Parts per million, dry volume. nl No limit established.		

The maximum 4-hour rolling average observed during test 1 was 71 ppm (dry basis). There is no stack emission limit specified in the facility's Approval (No. 2011-076657-R02).

4.7 SUMMARY OF RESULTS

Currently there are specified regulatory limits in the facility's approval (2011-076657-R02) for emissions of PM and/or TRS from four of the five exhaust stacks listed. The measured concentration of PM from the Lime Kiln, Smelt Dissolving Tank and Power Boiler were below their respective regulatory stack limits. The measured concentration of PM from the Recovery Boiler was slightly above the regulatory limit. The maximum 4-hour rolling average concentration of TRS from the Lime Kiln was below the regulatory limit. No limit for TRS is specified for the High Level Roof Vent in the facility's approval.

5.0 CLOSURE

This report has been prepared for the sole benefit of Northern Pulp Nova Scotia Corporation. This report may not be relied upon by any other person or entity without the express written consent of Stantec and Northern Pulp Nova Scotia Corporation. Any use of this report by a third party, or any reliance on decisions made based upon this report, are the responsibility of the third party. Stantec accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Stantec makes no representation or warranty with respect to this report, other than the work was undertaken by trained professional and technical staff in accordance with generally accepted engineering and scientific practices current at the time the work was performed. Any information or facts provided by others and referred to or utilized in the preparation of this report was assumed by Stantec to be accurate.

This study was undertaken exclusively for the purpose outlined herein and was limited to those contaminants and sources specifically referenced in this report. It should be noted that the measurements were taken over a relatively short time period on-site, and the emissions results may be considered representative only for the conditions present at the time of testing. This report cannot be used or applied under any circumstances to another location or situation or for any other purpose without further evaluation of the data and related limitations.

This report was developed by Gillian Hatcher, M.A.Sc. and reviewed by Vicki Corning, P.Eng. and Mark Scaplen, P.Eng.

If you have any questions regarding the contents of this report, or require any additional information, please do not hesitate to contact the undersigned.

Gillian Hatcher, M.A.Sc.
Project Manager
Tel: (902) 468-7777

Vicki Corning, P.Eng.
Associate, Environmental Services
Tel: (506) 452-7000

Appendix A

Certificate of Approval to Operate

NOVA SCOTIA
Environment

20 Pumphouse Road
R.R.#3 New Glasgow, Nova Scotia
B2H 5C6

Tel: 396-4194
Fax: 396-4765

April 17, 2014

Terri Fraser, P.Eng.
Northern Pulp Nova Scotia Corporation
PO Box 549, Station Main
New Glasgow, NS B2H 5E8

Dear Ms. Fraser:

RE: Approval No. 2011-076657-R02 - Approval to Operate Bleached Kraft Mill and Effluent Treatment System

Attached is Approval No. 2011-076657-R02 to operate a Bleached Kraft Mill and associated works, at or near 260 Granton Abercrombie Road, Abercrombie Point, Abercrombie, and operate an Effluent Treatment System and associated works at or near 340 and 580 Simpson Lane, Pictou Landing, Pictou County, NS.

Please note that Nova Scotia Environment requires a consultative process before the next approval renewal is issued. The consultative process is pursuant to Section 8 (3) of the Approval Notification and Procedures Regulations which states: "Before approving an application, the Minister may require that the applicant provide a consultative process in the area where the activity or the proposed activity is or may be located".

At a minimum, the consultation process shall include a notification to Pictou County residents requesting comments regarding the Bleached Kraft Mill and Effluent Treatment System. A reasonable amount of time must be given for the public to respond with their concerns. You may wish to consider public meetings or a public workshop to explain the operation of the facility.

A report detailing the type of consultation that has been completed, a summary of the concerns from respondents and proposed solutions to the concerns shall be submitted to the Department on or before October 30, 2014.

Should you have any questions regarding this information, please do not hesitate to contact myself or Marc Theriault at (902) 396-4194.

Yours truly,

Penny McLeod
District Manager

cc: Jay Brenton, Regional Director
Kathleen Johnson, Engineering Specialist
Marc Theriault, Inspector

NOVA SCOTIA
NOUVELLE-ÉCOSSE

Environment
Environnement

APPROVAL

Province of Nova Scotia
***Environment Act*, S.N.S. 1994-95, c.1**

APPROVAL HOLDER:	**Northern Pulp Nova Scotia Corporation**
APPROVAL NO:	**2011-076657-R02**
EFFECTIVE DATE:	May 10, 2011
EXPIRY DATE:	January 30, 2015

Pursuant to Part V of the *Environment Act*, S.N.S. 1994-95, c.1 as amended from time to time, approval is granted to the Approval Holder subject to the Terms and Conditions attached to and forming part of this Approval, for the following activity:

Operation of a Bleached Kraft Pulp Mill and associated works, at or near 260 Granton Abercrombie Road, Abercrombie Point, Abercrombie, and operation of an Effluent Treatment System and associated works at or near 340 and 580 Simpson Lane, Pictou Landing, Pictou County, PID(s) 00864538 and 00801191, respectively, in the Province of Nova Scotia.

Administrator Penny McLeod Date Signed April 17, 2014

The Minister has delegated his powers and responsibilities under the *Act* with respect to this Approval to the Administrator named above. Therefore any information or notifications required to be provided to the Minister under this Approval can be provided to the Administrator unless otherwise advised in writing.

TERMS AND CONDITIONS OF APPROVAL
Nova Scotia Environment

Project:	**Northern Pulp Nova Scotia Corporation** **Bleached Kraft Pulp Mill** **260 Granton Abercrombie Road** **Abercrombie Point, Abercrombie, and** **Effluent Treatment System** **340 and 580 Simpson Lane** **Pictou Landing** **Pictou County**
Approval No:	**2011-076657-R02**
File No:	**92100-30/PIC-06**
PIDs:	**00864538, 00801191**

Reference Documents:

- Applications dated September 30, 2006, August 8, 2012 and January 8, 2014, and supporting documentation as outlined in Appendix B.

1. Definitions

a) "Act" means the *Environment Act* S.N.S. 1994-1995, c.1, as amended from time to time and includes all regulations made pursuant to the *Act.*

b) "Administrator" means a person appointed by the Minister for the purpose of this Act, and includes an acting administrator.

c) "Adverse Effect" means an effect that impairs or damages the environment or changes the environment in a manner that negatively affects aspects of human health.

d) "Approval" means an Approval issued pursuant to subsection 56(2) of the *Act.*

e) "Associated works" means any building, structure, processing facility, pollution abatement system or stockpiles associated with the Facility.

f) "Biomass" means a renewable energy source comprised of biological material derived from living or recently living organisms, and for the purpose of this Approval, is limited to natural, untreated and uncoated wood and wood waste in the form of whole chips, chip fines, sawdust and bark. It also includes wood debris from the multiclones of the power boiler and the radiclone rejects and knots from pulping and does not include solid wastes from the effluent treatment system.

g) "Brown Stock Washer" means an installation that removes spent cooking liquor from raw pulp to maximize chemical recovery and minimize carry over of cooking liquor into the bleaching plant.

h) "Black Liquor" means a combination of spent "cooking liquor" (water solution of sodium sulfate and sodium hydroxide) and pulp wash water containing dissolved wood compounds which is the byproduct of cooking the wood chips at an elevated temperature and pressure.

i) "Concentrated non condensable gases" (CNCG) means for the purpose of this Approval, a group of concentrated non condensable process gases that are high in concentrations of TRS and are collected from the digester and evaporator areas of the process, and incinerated in the recovery boiler. Generally, concentrated non condensable gases are high in concentration but low in volume.

j) "Condensate Steam Stripper" means a multi-stage distillation unit that uses steam to remove organics and TRS compounds from process condensate streams.

k) " Controlled Shutdown" means a systematic continuous shutdown of equipment over a scheduled period of up to six (6) hours, which eventually results in no production of pulp.

l) "Dangerous Goods" has the meaning assigned thereto in the *Dangerous Goods Management Regulations (Nova Scotia)*, current edition.

m) "Department" means the Northern Region, Pictou Office, of Nova Scotia Environment located at the following address:

Nova Scotia Environment
Environmental Monitoring and Compliance Division
Northern Region, Pictou Office,
RR#3,
New Glasgow, Nova Scotia, B2H 5C6
Phone: (902) 396-4194
Fax: (902) 396-4765

n) "Dilute Non Condensable Gas" (DNCG) means for the purpose of this Approval, a group of dilute non condensable process gases that are lower in concentrations of TRS, methanol and terpenes than CNCG and originate from the digester area, brownstock washers, filtrate tanks, knotters, liquor storage tanks and black liquor oxidation systems within the Facility. Generally, dilute non condensable gases are low in concentration but high in volume.

o) "Domestic Solid Waste" means municipal type solid waste that originates in the Facility through office and cafeteria operations and includes waste types that are commonly accepted at municipal solid waste management facilities. Domestic solid waste does not include waste originating from industrial processes.

p) "Effluent Treatment System" means a facility designed to remove impurities which have a detrimental effect on water quality by a combination of physical, chemical and biological processes.

q) "Exceedence" means a breach of a regulatory requirement outlined in the *Act*, the Regulations made pursuant to the *Act* and/ or this Approval.

r) "Facility" means the property, any building, structure, processing facility, pollution abatement system or stockpiles necessary in the operation and manufacture of 800 air dried tonnes per day (plus maximum ten percent) of Kraft Pulp, as produced by the digester, located at 260 Granton Abercrombie Branch Road, Abercrombie Point, Abercrombie, as well as the Effluent Treatment System (known as Boat Harbour effluent treatment system) located at 340 and 580 Simpson Lane, Pictou Landing, Pictou County.

s) "Industrial Landfill" means the currently-used facility designed to receive the industrial solid wastes from the Facility associated with wood processing, pulping, pulp drying, recausticizing, utilities and the effluent treatment system. These wastes include bark, gravel, dirt, sawdust, wood slivers, tramp metal, boiler bottom and fly ash, clarifier dregs, settled lime and slaker rejects, lime grit and line mud impurities and effluent treatment System sludge.

t) "Inspector" means any person who is appointed as an inspector by the Minister and includes any municipal or town police officer and any member of the Royal Canadian Mounted Police..

u) "Minister" means the Minister of Environment.

v) "Non Condensable Gas" means gases that cannot be liquefied, and for the purposes of this Approval, are comprised mainly of total reduced sulphur (TRS) compounds along with entrained levels of turpentine, methanol and other organic compounds. Non condensable gases are divided in to two categories: concentrated non condensable gases (CNCG) and dilute non condensable gases (DNCG).

w) "NSE" means Nova Scotia Environment.

x) Opacity Charts" means a series of illustrations ranging from light gray to black used to visually determine the plume opacity of emissions emitted from stationary sources. The shades of gray simulate various emission densities and are assigned numbers ranging from one to five. No. 1 is equivalent to 20 percent density; No. 5 is 100 percent density. Opacity charts are used in the establishment and enforcement of emission standards.

y) "Point 'A'" means the point identified as 'A' on diagram located in Appendix C.

z) "Point 'C'" means the point identified as 'C' on diagram located in Appendix C.

aa) "Point 'D'" means the point identified as 'D' on diagram located in Appendix C.

ab) "Pre-test plan" means a summary of the sampling protocols and testing to be employed by the Approval Holder during emission source testing.

ac) "Reference Production Rate" means the daily production of finished product of a mill as defined by the Federal Pulp and Paper Effluent Regulations (SOR/92-269), as amended from time to time.

ad) "Recovery Boiler" means an enclosed combustion device in which concentrated spent liquor is burned to recover sodium and sulfides, dispose of unwanted dissolved wood components and generate steam.

ae) "Scheduled Total Mill Shutdown" means the period of time in which the Facility is not operating due to regularly scheduled maintenance.

af) "Site" means the lands owned and/or occupied by Northern Pulp Nova Scotia Corporation where the kraft pulp mill and effluent treatment system and associated works are located.

ag) "Stripper off gases" (SOG) means for the purpose of this Approval, the gases that are produced by the condensate steam stripper which are incinerated in the lime kiln.

ah) "Source Testing Event for Particulate Matter" means a phase of performance testing activities that involves the site set-up and the actual testing. For each source the test consists of a preliminary survey, and at least three repetitions of appropriate source testing methodologies.

ai) "Total Reduced Sulfur" (TRS) means any compound of sulfur in a reduced state discharged from a Kraft Pulp Mill consisting primarily of hydrogen sulfide, methyl mercaptan, dimethyl sulfide and dimethyl disulfide.

aj) "Waste Dangerous Goods" means dangerous goods that are no longer in use for their original purpose or materials which have become waste dangerous goods through handling including dangerous goods intended for treatment, disposal or recycling, but does not include dangerous goods returned directly to the manufacturer or supplier of the dangerous goods for reprocessing, repacking or resale and does not include consumer paint products as defined in the *Solid Waste Resource Management Regulations*.

2. Scope of Approval

a) This Approval (the "Approval") relates to the Approval Holder and their applications and supporting documentation, as listed in the reference documents above, to operate the Facility, situated at or near PID(s) # 00864538 and 00801191 situated at 260 Granton Abercrombie Road, Abercrombie Point, Abercrombie, and 340 and 580 Simpson Road, Pictou Landing, Pictou County (the "Site").

b) The Facility and Site shall not exceed the area as outlined in the application and supporting documentation.

c) The Approval Holder shall operate the Facility in accordance with the terms and conditions of this Approval.

3. General Terms and Conditions

a) The Approval Holder shall operate and reclaim the Facility in accordance with provisions of the most recent version of:

i) *Environment Act* S.N.S. 1994-1995, c.1, as amended from time to time; and
ii) Regulations pursuant to the above *Act*.

b) No authority is granted by this Approval to enable the Approval Holder to construct or operate the Facility on lands which are not in the control or ownership of the Approval Holder. It is the responsibility of the Approval Holder to ensure that such a contravention does not occur. The Approval Holder shall provide, to the Department, proof of such control or ownership upon expiry of any relevant lease or agreement. Failure to retain said authorization will result in this Approval being null and void.

c) If there is a discrepancy between the reference documents and the terms and conditions of this Approval, the terms and conditions of this Approval shall apply.

d) The Minister may modify, amend or add conditions to this Approval at anytime pursuant to Section 58 (2) of the Act.

e) This Approval is not transferable without the written consent of the Minister.

f) (i) If the Minister or Administrator determines that there has been non-compliance with any or all of the terms and conditions contained in this Approval, the Minister or Administrator may cancel or suspend the Approval pursuant to subsections 58A (1) and 58A (2) of the *Act,* until such time as the Minister is satisfied that all terms and conditions have been met.

(ii) Despite a cancellation or suspension of this Approval, the Approval Holder remains subject to the penalty provisions of the *Act* and regulations.

g) The Approval Holder shall notify the Department prior to any proposed extensions or modifications of the Facility, including the active area, process changes or waste disposal practices which are not granted under this Approval. An amendment to this Approval may be required before implementing any change. Extensions or modifications to the Facility may be subject to the Environmental Assessment Regulations.

h) Pursuant to Section 60 of the *Act*, the Approval Holder shall submit to the Minister any new and relevant information respecting any adverse effect that actually results, or may result, from any activity to which the Approval relates and that comes to the attention of the Approval Holder after the issuance of the Approval.

i) The Approval Holder shall immediately notify the Department of any incidents of non-compliance with this Approval.

j) The Approval Holder shall bear all expenses incurred in carrying out the environmental monitoring required under the terms and conditions of this Approval.

k) Unless specified otherwise in this Approval, all samples required to be collected by this Approval shall be collected, preserved and analyzed, by qualified personnel, in accordance with recognized industry standards and procedures.

l) Unless written approval is received otherwise from the Minister, all samples required by this Approval shall be analysed by a laboratory that meets the requirements of the Department's "Policy on Acceptable Certification of Laboratories" as amended from time to time.

m) The Approval Holder shall submit any monitoring results or reports required by this Approval to the Department. Unless specified otherwise in this Approval, all monitoring results shall be submitted within 30 days following the month of monitoring.

n) The Approval Holder shall ensure that this Approval, or a copy, is kept on Site at all times and that personnel directly involved in the Facility operation are made fully aware of the terms and conditions which pertain to this Approval.

o) All equipment shall be installed, operated, maintained and calibrated as specified by the manufacturer's instructions.

4. Effluent Generation/Collection/Transmission

I. Effluent Generation

a) The Approval Holder shall undertake a wastewater characterization study to assess the physical and chemical characteristics of the wastewater currently being discharged to the effluent treatment system. The wastewater shall be analyzed for the parameters listed in Table 2 and Table 2A of Appendix A.

b) The Approval Holder shall undertake a water and wastewater optimization study that extends to the whole Facility to assess the reduction of process effluent to sewer arising from water uncontaminated by process effluents and water use resulting in surplus process effluent. The study will include but not be limited to:

i) An updated diagram showing water flow in and all effluent discharged from the Facility by department;
ii) Assessment of water use, both intake and resulting effluent per department within the Facility and whether the optimum use of water is being undertaken for cooling, cleaning, and mixing within each department;
iii) A summary of potential options to prevent uncontaminated water from departments within the Facility being discharged to sewer, including any benefits through resultant reduction and cost effective savings;
iv) The predicted wastewater quality at Point 'A', as identified in Appendix C, based on options outlined in Condition 4 (b) (iii). The Approval Holder shall submit the predicted wastewater quality to the Department for review prior to modeling.
vii) Timetable to implement any options identified in Conditions 4 (b) (iii) above.

The water and wastewater optimization study shall be submitted by no later than June 1st, 2012.

II. Effluent Collection and Pumping Station

c) The Approval Holder shall retain the services of a qualified engineer licensed to Practice in the Province of Nova Scotia to assess the industrial effluent collection and pumping systems at the Mill site. This shall include, but not be limited to, leachate, process effluents, sanitary and storm water effluent collection systems. This study shall include, but not be limited to, an assessment of the current infrastructure integrity and expected life span. The results of this assessment shall be provided to the Department by no later than June 1st, 2012.

d) Based on the results of the assessment required in Condition 4 (c), if necessary, the Approval Holder shall develop a plan to upgrade any deficiencies in the collection and storage system. This plan shall include timelines for implementation. The plan shall be submitted to the Department with the report by no later than June 1st, 2012.

e) The Approval Holder shall develop a black liquor spill collection and recovery management program to minimize losses to the effluent treatment system. This program shall be submitted to the Department by no later than June 1st, 2012.

f) The Approval Holder shall install and implement the emergency black liquor storage tank as outlined in the report entitled Improvements to the Recovery Cycle, Northern Pulp, Nova Scotia, dated August 17, 2010, prepared by KSH. This shall be completed by September 30, 2011.

III. Effluent Transmission Pipeline

g) The Approval Holder shall provide the Department with a plan for integrity inspection/testing of the pipeline between the mill site and Effluent Treatment System. This plan shall propose a schedule for testing every three years, beginning in 2014. The plan shall also include provision for the results of the inspection/testing to be submitted to the Department within 90 days of each inspection/test. The Approval Holder shall submit the plan by no later than March 1, 2013.

5. Effluent Treatment System

I. Effluent Treatment

a) The effluent treatment System has been classified as a **Class III wastewater treatment System**. The day-to-day operations of the effluent treatment System shall be supervised directly by a certified operator who holds an equivalent certification under the *Water and Wastewater Facilities and Public Drinking Water Supplies Regulations*.

b) The Approval Holder shall model the wastewater quality predicted in Condition 4 (b) (iv) to determine the final effluent discharge quality at Point C. Modeling shall include, but not be limited to:

(i) modeling of a number of treatment technology options

(ii) wastewater quality at a number of strategic locations where the quality varies including but not limited to where the force main connects with the gravity sewer (standpipe) and Point A as identified in AppendixC.

(iii) consideration for wastewater from the landfill located at effluent treatment system

(iv) consideration for opportunities to reduce odour from the effluent treatment system.

(v) options for modifications to the Effluent Treatment System, if necessary, to ensure the discharge criteria identified in Table 2 and Table 2A are met.

The model shall be submitted by no later than June 1st, 2012.

c) The Approval Holder shall undertake an evaluation of the Effluent Treatment System. Based on current operations as well as wastewater quality predicted in Condition 4 (b) (iv). This shall include but not be limited to:

(i) an assessment of the efficiency of the system to effectively treat the effluent from the Mill to meet the criteria set out in Table 2 and Table 2A of Appendix A,

(ii) an assessment of the quantity and quality of the effluent being treated, an assessment of any in-efficiencies in the System which may be affecting the treatment efficiency of the Effluent Treatment System,

(iii) assessment of percentage of solids and black liquor being wasted to the Effluent Treatment System,

(iv) recommendations for how any in-efficiencies can be corrected.

(v) a plan for timelines for implementation of recommendations in 5(b)

and 5(c) and a timetable to implement.

This evaluation shall be submitted to the Department for approval by no later than December 31, 2012.

II. Effluent Monitoring & Reporting

d) Effluent discharged from the final aeration basin, identified as Point C, shall be monitored continuously for flow, pH and conductivity.

e) The Approval Holder shall ensure all monitoring equipment is calibrated and maintained in accordance with manufactures specifications. Records of calibration and maintenance performed shall be maintained for not less than three (3) years and shall be made available upon request to the Department.

f) The Approval Holder shall analyze samples of the effluent discharged from the System at Point C, to the environment for the parameters outlined in Table 2 and Table 2A of Appendix A. The Approval Holder shall comply with the monitoring frequency and discharge limits as outlined in Table 2 and Table 2A of Appendix A. Should the effluent discharged from the System not comply with the criteria outlined in Table 2 and Table 2A , the Approval Holder shall follow the approved plan under Condition 5 (c). Results of the effluent monitoring at Point C shall be submitted to the Department on a monthly basis.

g) The Approval Holder shall develop and implement a schedule for regular dredging of the aerated settling basin and the settling ponds to minimize odour generation at the effluent treatment System. This plan shall be submitted to the Department for approval by July 1, 2011.

h) The Approval Holder shall submit monthly reports which contain the following information:

i) Total quantity of BOD, in kilograms, discharged for the days testing was conducted.

ii) Total quantity of BOD discharged for each month, as tested, this information shall be compared to applicable discharge limits.

iii) Total quantity of Suspended Solids, in kilograms, discharged from the System.

iv) Total quantity of Suspended Solids discharged each month, this information shall be compared to applicable discharge limits.

v) Results of acute toxicity testing.

vi) Daily flow, reported in cubic meters.
vii) Daily production of finished product, reported in tonnes.
viii) Results of dioxins and furans testing.

III. Stabilization Basin

i) The Approval Holder shall develop a plan for long term environmental management or rehabilitation of the area formerly utilized as a stabilization basin for the Effluent Treatment System known as Boat Harbour. This plan shall be submitted to the Department for approval by no later than December 31, 2011.

j) The Approval Holder shall continue to monitor Point D for the parameters outlined in Table 2 , Appendix A, unless otherwise authorized in writing by the Minister. The results of this monitoring shall be submitted to the Department on a monthly basis.

6. Ambient Air Emissions

I. Compliance with Air Quality Regulations

a) The Approval Holder shall ensure that emissions from the facility do not contribute to an exceedence of the maximum permissible ground level concentrations specified in Schedule "A" of the Air Quality Regulations.

b) For the purpose of determining compliance with Schedule AA" of the Air Quality Regulations, the measurement of Total Reduced Sulphur (TRS) at the ambient monitoring station(s) shall be considered to be a measurement of hydrogen sulphide.

c) The Approval Holder must be able to demonstrate compliance with condition 6 (a) through the development, implementation and maintenance of an ambient air monitoring and reporting program. The air monitoring and reporting program may include, but is not limited to:

(i) Ambient air monitoring;
(ii) Continuous Emissions monitoring;
(iii) Source testing; and
(iv) Dispersion modelling.

II. Air Dispersion Modeling

d) The Approval Holder shall conduct an air quality dispersion modeling study to estimate the maximum ground level concentrations with frequency analysis at discrete receptor locations outside the boundaries of the facility for each of the air contaminants emitted from the Facility during routine operations. The emission sources to be evaluated in the study include any stationary vent, stack, and area at the facility that release or have the potential to release air contaminants to the environment. The air contaminants that are to be considered in the study and could be released to the air are fine particulate (including PM_{10} and $PM_{2.5}$) and the air contaminants listed in Table 5 of this Approval. This study shall utilize a multi-source model that is sensitive to the terrain and building downwash effects and is acceptable to the Department. As a minimum, the model shall include inputs of the local topography, five years of hourly meteorological data from the nearest meteorological station, emission source characterization including mass emission rates, and discrete receptor locations within a ten kilometer radius of the Facility. Measured emission rates shall be used where available. Where measured emission rates are not available, the emission rates are to be estimated using recognized emission factor equations. The model shall utilize a scenario that uses actual operating data from the facility for the occasion when the highest concentration of the air contaminant at ground level would occur. The operating condition that corresponds to the maximum ground level concentration may occur when the facility is at the maximum production level or running at a lower level or when the process is in transition. The study shall include a description of the operating conditions of the significant sources that result in the maximum ground level concentration of a contaminant. The model shall provide an estimate of the maximum ground level concentrations for the averaging periods associated with the air contaminants listed in Table 5 and fine particulate (including PM_{10} and $PM_{2.5}$)with an averaging period of 24 hours. The results of the study shall be compared to the maximum ground level concentrations of contaminants provided in Table 5. The study shall include mapping identifying receptors and the location and magnitude of ground level concentrations. If the modelling results predict concentrations of air contaminants that exceed the maximum ground level concentrations of air contaminants in Table 5, then the study shall specify the frequency and duration over the modelling period in which these exceedences are predicted. The Air Quality Dispersion Modeling Study shall be submitted to the Department by September 1st, 2012.

III. Ambient Air Monitoring Network

e) The Approval Holder shall use results from the air dispersion modeling conducted under Condition 6 (d) of this Approval and from modeling conducted under Approval Number 2006-054333 to evaluate the effectiveness of the ambient air quality network to measure the impact of air emissions from the Facility. This assessment shall be submitted to the Department by September 1st, 2012 and include but not be limited to

interpretation of the modeling data, relative to the existing stations and provide recommendations on the location and quantity of ambient air quality monitors necessary to provide effective representative ambient air quality data that measures the impact associated with facility activities. The study shall recommend an ambient network consisting of ambient air quality monitors capable of providing:

(i) 1-hour and 24-hour rolling average concentration of Total Reduced Sulphur (TRS) in parts per billion by volume

(ii) 24 hour average concentration in micrograms per cubic metre ($\mu g/m^3$) of total suspended particulates;

(iii) Continuous fine particulate ($PM_{2.5}$) data in micrograms per cubic metre ($\mu g/m^3$); and

(iv) Meteorological data: wind speed, wind direction, ambient temperature, barometric pressure and humidity.

f) The final study report shall include a map identifying the recommended sites and the specified data to be collected at each location. An implementation schedule for the installation of additional ambient air monitors shall be included in the report. All recommended ambient air monitor installations shall be completed by November 30th, 2012.

g) The monitor(s) shall be located, maintained, and operated in a manner and schedule acceptable to the Department. A monitoring equipment protocol shall be submitted to the Department by November 30th, 2012.

IV. Emissions

h) The Approval Holder shall submit the reference production rates and daily production rates based on pulp production by the digester for each calendar year by no later than January 31st of the following year.

i) The Approval Holder shall update the Source Emissions Inventory Report, prepared by Jacques Whitford Environmental, dated December 31st, 2008. This updated Report shall be submitted by September 30, 2011.

j) The Approval Holder shall ensure that major point sources are operated such that stack emissions from the Recovery Boiler, Lime Kiln, Smelt Dissolving Tank and Power Boiler shall comply with the limiting criteria set out in Table 1.

k) The Approval Holder shall submit the engineering design documentation to rebuild or upgrade the air pollution control equipment on the power boiler by July 31st, 2011. The engineering predesign shall include but not be limited to: details of any proposed modifications to the combustion system, equipment included in the rebuild or upgrade, anticipated equipment performance criteria for air contaminants, proposed stack data, proposed combustion residue management and a schedule of implementation.

l) Construction or installation of the power boiler air pollution control equipment shall be complete by January 30, 2012. The commissioning period of the power boiler air pollution control equipment shall not exceed six months unless written authorization is given from the Minister. The Approval Holder shall notify the Department upon commencement of commissioning and the six month commissioning period shall commence on the notification date.

m) Until the power boiler air pollution control equipment is rebuilt or upgraded, the Approval Holder shall ensure that the multiclones are functioning at all times, while the power boiler is operational.

n) The Approval Holder shall submit the engineering design documents for the dilute non-condensable gas (DNCG) collection and incineration system to the Department by June 30, 2011.

o) The Approval Holder shall conduct a study of the Facility to determine the necessary equipment upgrades to comply with the following proposed Facility Emissions Objectives:

PM - 2.0 kg/tonne production
SO_2 - 4.0 kg/tonne production

This study shall at a minimum include proposed equipment performance criteria and estimated emission reductions for each process unit as well as a proposed plan for implementation. This study shall be submitted to the Department by no later than July 1, 2012.

V. Continuous Emission Monitors

p) The Approval Holder shall operate a continuous emission monitor (CEM), that will monitor, on an hourly basis, the Total Reduced Sulphur (TRS) concentration in parts per million by volume being released from the Recovery Boiler exhaust gas stack to the atmosphere.

q) The Approval Holder shall provide the Department with a plan to install a continuous emission monitor (CEM), that will monitor, on an hourly basis, the Total Reduced Sulphur (TRS) concentration in parts per million by volume being released from the Lime Kiln exhaust gas stack to the atmosphere. The plan shall be submitted for approval by the end of the Approval term.

r) The Approval Holder shall ensure that the continuous emission monitor(s) for Total Reduced Sulphur (TRS) are calibrated, maintained and operated in accordance to manufacturers specifications.

Table 1
Stack Emission Limits

POINT SOURCE	**AIR CONTAMINANT**	
	PARTICULATE	**TOTAL REDUCED SULPHUR (TRS)**
Recovery Boiler	375 mg/Rm^3	15 ppm dv (any 4 hour rolling average)*
Lime Kiln	0.50 kg/adubmt	20 ppm dv (any 4 hour rolling average)**
Smelt Dissolving Tank	0.50 kg/adubmt	
Power Boiler	150 mg/Rm^3***	
REFERENCE SAMPLING METHOD	Environment Canada's EPS 1/RM/8	US EPA Method 16/16A/16B

mg - milligrams
Rm^3 - reference cubic meter (ie. The volume of gas at 25 degrees celsius (˚C) and 101.3 kilopascals (kpa) corrected to 11% Oxygen)
ppm dv - parts per million dry volume
kg - kilograms
adubmt - reference production rate in air dried unbleached metric tonnes

* The Approval Holder shall achieve this established stack limit for TRS by January 29, 2013. In the interim, the Approval Holder shall operate the recovery boiler in conjunction with the direct contact evaporators to minimize emissions of TRS to the extent possible.

** TRS limit to be confirmed through source testing, conducted twice per annum, on a continuous basis over a 24-hour period on a day acceptable to the Department. Testing shall be done during normal lime kiln operation and data confirming this shall be submitted along with the TRS test results.

*** The Approval Holder shall comply with the established stack limit by July 30, 2012. If

the Power Boiler air pollution control equipment requires any upgrades under Condition k, the design shall be based on a particulate matter, in stack objective of less than 90 mg/Rm^3.

s) The Approval Holder shall ensure that the continuous emission monitor(s) used to monitor the concentration of the Total Reduced Sulphur (TRS) released from the Recovery Boiler exhaust stack and the Lime Kiln exhaust stack(when installed), are equipped with sufficient data logging capabilities to provide a 4-hour rolling average.

t) The monitoring results from the CEMs shall be recorded and maintained on file for a period of not less than 2 years and made available to an inspector upon request.

VI. Source Testing

u) Each year the Approval Holder shall undertake two source testing events to determine the Particulate Matter (PM) emission rate in grams per second and the concentration released to the atmosphere from the following point source exhaust gas stacks in the following units of concentration:

Exhaust Gas Stack	Concentration Unit
Recovery Boiler	mg/Rm^3
Lime Kiln	kg/adubmt
Smelt Dissolving Tank	kg/adubmt
Power Boiler	mg/Rm^3

mg - milligrams
Rm^3 - reference cubic meter (ie. the volume of gas at 25°C and 101.3 kpa corrected to 11% Oxygen)
kg - kilograms
adubmt - reference production rate in air dried unbleached metric tons

v) Each year one test shall be conducted during January 1st to June 30th and the second test shall be conducted during July 1st to December 31st with at least 120 days between the first and second source testing event. If the results of the first source testing event each year for the Recovery Boiler are accepted by the Department, and are less than 50% of the limiting criteria as described in Condition 6 (j), the Approval Holder may request in writing to be considered exempt from conducting the second test for the Recovery Boiler. Actual operating data for the Recovery Boiler scrubber for the previous year shall accompany any request for exemption. The relationship between the actual operating data and the predicted emission concentrations shall be provided. Upon review of this information, the Minister may amend this condition for the second test period, July 1st to December 31st, through Letter of Authorization.

y) During the first round of source testing for 2013, the Approval Holder shall undertake a Particle Size Distribution Study as an additional requirement to testing conducted under Condition 6 (u) for each of the point sources tested. This study shall determine the concentration in milligrams per cubic meter and emission rate in grams per second of the particulate matter less than or equal to 10 microns in diameter and particulate matter less than or equal to 2.5 microns in diameter that is being released to the environment from each source. The Particulate Size Distribution Study shall be submitted to the Department within 90 days from completion of source testing.

z) Each year the Approval Holder shall undertake two source testing events to determine Total Reduced Sulphur (TRS) concentrations in parts per million by volume, at stack conditions, released to the atmosphere from the following point source exhaust gas stacks:

(i) Lime Kiln (continuous over 24 hour period); and

(ii) High Level Roof Vent (continuous over 24 hour period).

aa) Each year one test shall be conducted during January 1st to June 30th and the second test shall be conducted during July 1st to December 31st with at least 120 days between the first and second source testing event.

ab) Within 90 days of completion of testing, the Approval Holder shall ensure that a Final Report on Source testing is conducted and submitted in accordance with conditions 6 (u) and 6 (v) of this Approval.

VII. Opacity Chart

ac) The Opacity Chart for visual determination of emissions shall be prepared by the recording, in five consecutive areas of the chart, fine black dots evenly spaced on a white background such that:

(i) approximately 20 percent of the space in the first area is black and shall be known as density Number 1;

(ii) approximately 40 percent of the space in the second area is black and shall be known as density Number 2;

(iii) approximately 60 percent of the space in the third area is black and shall be known as density Number 3;

(iv) approximately 80 percent of the space in the fourth area is black and shall be known as density Number 4; and

(v) approximately 100 percent of the space in the fifth area is black and shall be known as density Number 5.

ad) At no time shall the Approval Holder, without prior authorization of the Department, permit the release of emissions that, in the opinion of the Inspector, has a density number greater than 1 but not greater than density number 2, for a period totaling not more than 4 minutes during any one half hour.

ae) At no time shall the Approval Holder, without prior authorization of the Department, permit the release of emissions that, in the opinion of the Inspector, has a density number greater than 2 but not greater than density number 3 for a period totaling not more than 3 minutes during each quarter hour period.

af) The Approval Holder shall use the Opacity chart as defined in accordance with Condition 6 (ac) to monitor emissions from the Facility in response to public complaints. Complaints shall be recorded and maintained on file for a period of not less than 2 years. All complaints of an opacity nature received by the Facility directly from the public shall be reported to the Department immediately between 08:30 and 16:30 Monday to Friday, excluding Holidays, after stipulated hours 1.800.565.1633, otherwise reporting shall be in accordance with Condition 3 (i) of this Approval.

VIII Reporting

ag) The Approval Holder shall submit semi-annual summary reports containing the following information:

(i) a summary of any air quality related emergency and non-emergency incidents pursuant to the Environment Act, the Air Quality Regulations or this Approval, including the date and time of the incident(s).

(ii) a summary of any operational problems related to the continuous air emission monitoring devices, environmental control equipment and/or the ambient air monitor(s), including the date and time of the incident(s).

(iii) a summary of the ambient air quality data from the ambient air monitor(s) identifying the one hour average and 24 hour rolling average of total reduced sulphur in parts per billion, the 24 hour average of total suspended particulate in micrograms per cubic meter, the 24 hour average of continuous fine particulate (PM2.5) data in micrograms per cubic meter and a table showing hourly average wind speed and direction, including the dates used to calculate the averages. In addition, the Approval Holder shall submit the average annual geometric mean ground level concentration of total suspended

particulate for the previous year, in the first semi-annual report of each year.

(iv) a table showing the 4-hour rolling average of total reduced sulphur emissions from the recovery boiler stack, including the date and time covered by the average.

(v) a summary of any complaints received from the public and how they were responded to by the Approval Holder, including the date and time of the complaint.

Each mid-year report shall be submitted with 90 days of July 1st and each year-end report shall be submitted within 90 days of the end of the applicable calendar year.

7. Fuels

I. Primary Fuels

a) Fuel for the power boiler is limited to biomass, No. 2 fuel oil, No. 6 fuel oil and propane only.

II. Alternate Fuels

b) Test burns of alternate fuels may be approved by Letter of Authorization on a case-by-case basis provided the following information has been submitted to the Department and deemed acceptable:

i) written notification of the intent to test the use of an alternate fuel identifying the type, volume, source and rate of consumption;
ii) analytical data identifying trace metals and/or contaminants in the proposed fuel;
iii) identification of potential air contaminants resulting from combustion of the fuel and the anticipated change to emissions for the proposed fuel combustion scenario;
iv) proposed feed rate and feed method;
v) identification of test methods proposed to confirm that air emissions are acceptable;
vi) identification of air quality standards proposed for comparison during testing; and
vii) proposed testing scenarios to demonstrate that testing will be conducted for the cases when the highest concentration of air contaminants would occur.

c) Should a Letter of Authorization be issued by the Department for a test burn of an alternate fuel, the Approval Holder shall be required to submit:

i) A schedule to conduct the test burn. The maximum duration of the test burn shall be 120 hours (unless otherwise approved in writing by the Department); and

ii) Submission of a Final Report outlining the results of the test burn. This report shall include, but not be limited to, the test methods and analytical results, air quality standards used, the feed rates, quantity and quality of fuel used, monitoring data from the CEMs and any other operational data deemed pertinent during the test burn, summary of any equipment problems or failures, and the overall effectiveness of the material as an alternate fuel.

8. Process Control

a) The Approval Holder shall ensure that all Concentrated Non Condensable Gases (CNCG) are collected and directed to the Recovery Boiler for incineration.

b) When the Recovery Boiler becomes inoperable, the Approval Holder shall undertake a controlled shutdown of the evaporator(s) and digester(s) to ensure the release of Concentrated Non Condensable Gases (CNCG) is minimized.

c) The Approval Holder shall prepare and submit an annual report identifying the number of incidents of direct venting to atmosphere of Dilute Non Condensable Gases (DNCG), Concentrated Non Condensable Gases (CNCG), and condensate steam stripper off-gases (SOG). This report shall include the duration of each incident and annual total.

d) The black liquor oxygen-based polishing stage shall be installed to enhance the existing black liquor oxidation system by October 31, 2011.

e) Dilute Non Condensable Gases resulting from emissions of the chip bin and the 1st and 2nd filtrate tanks shall be collected and directed to the Recovery Boiler for incineration. This work shall be completed by October 31, 2011.

f) The Approval Holder shall submit to the Department for approval, a plan to collect and direct to the Recovery Boiler for incineration the Dilute Non Condensable Gases from the brown stock washers, the black liquor oxidizer, the combined seal tank and the

washed stock tank which currently exit through the high level roof vent. This plan shall be submitted by the end of the Approval term.

g) The condensate steam stripper off gases shall be collected and directed to the lime kiln for incineration. The Approval Holder shall develop and implement an operation and maintenance program within 12 months of the date of this approval to improve operational reliability of the condensate steam stripper and thereby reduce the transmission of untreated condensates to the industrial effluent. This program shall be made available to the Department upon request.

9. Groundwater and Surface Water

I. Hydrogeological and Hydrological Evaluation (Mill Site)

a) i) The Approval Holder shall undertake an evaluation of the current groundwater monitoring program at the Mill Site, including, but not limited to: the placement of monitoring wells (horizontal and vertical), frequency of sampling, and parameters. This evaluation shall consider all potential sources of contamination on the Mill Site, including, but not limited to, waste disposal areas, fuel and chemical storage areas, and the ash lagoon.

ii) The evaluation of the existing groundwater monitoring program referenced in 9 (a) (i) shall make recommendations for upgrades to the program, as required.

iii) The evaluation of the existing groundwater monitoring program referenced in 9 (a) (i) shall be conducted by a qualified Hydrogeologist licensed to practice in Nova Scotia by the Association of Professional Geoscientists of Nova Scotia (APGNS) or the Association of Professional Engineers of Nova Scotia (APENS).

iv) The evaluation of the existing groundwater monitoring program referenced in 9 (a) (i) shall be submitted to the Department by September 30, 2011.

b) i) The Approval Holder shall undertake an evaluation of the current surface water monitoring program at the Mill Site, including, but not limited to: the placement of surface water monitoring stations, frequency of sampling, and parameters. This evaluation shall consider all potential sources of contamination on the Mill Site, including, but not limited to, waste disposal areas, fuel and chemical storage areas,

and the ash lagoon.

ii) The evaluation of the existing surface water monitoring program referenced in 9 (b) (i) shall make recommendations for upgrades to the program, as required.

iii) The evaluation of the existing surface water monitoring program referenced in 9 (b) (i) shall be conducted by a qualified Hydrologist.

iv) The evaluation of the existing surface water monitoring program referenced in 9 (b) (i) shall be submitted to the Department by September 30, 2011.

c) The Approval Holder shall identify the presence and susceptibility of surface water and groundwater receptors at the Mill Site. This assessment shall be completed by a qualified professional licensed to practice in Nova Scotia by the Association of Professional Geoscientists of Nova Scotia (APGNS) or the Association of Professional Engineers of Nova Scotia (APENS) and shall include recommendations for upgrades to the existing surface water and groundwater monitoring and management programs, with recommended timelines for the upgrades to be completed, as required. This evaluation shall be submitted to the Department on or before September 30, 2011.

II. Hydrogeological and Hydrological Evaluation (Boat Harbour Treatment System)

d) The Approval Holder shall identify the presence and susceptibility of surface water and groundwater receptors associated with the Effluent Treatment Facility. This assessment shall be completed by a qualified professional licensed to practice in Nova Scotia by the Association of Professional Geoscientists of Nova Scotia (APGNS) or the Association of Professional Engineers of Nova Scotia (APENS) and shall include recommendations for a surface water and groundwater monitoring and/or management program, as required. This evaluation shall be submitted to the Department on or before September 30, 2011.

III. Groundwater Monitoring

e) i) The Approval Holder shall maintain the existing twenty-seven (27) groundwater monitoring wells on the Site: 1A, 1B, 1C, 2A, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 6A, 6B, 7A, 7B, 7C, 8B, 9A, 9C, 09-1A, 96-1B, 96-2B, 09-2C, 09-3B and 96-3C. The location of the twenty-seven (27) groundwater monitoring stations are as identified on the diagram: *Surface Water and Monitoring Well Locations and GroundwaterFlow Direction*, dated April

2010 included in Dillon Consulting's 2009 Annual Monitoring Report, dated March 2010.

ii) All monitoring stations shall be visually inspected during each monitoring event and maintained as required.

iii) Any new or existing well at the Facility that has been damaged or "abandoned" (i.e. is not being used or maintained for present or future use) shall be sealed in a manner acceptable to the Department.

iv) Additional monitoring wells recommended in the evaluations mentioned in Conditions 9 (c) / 9 (d) and approved by the Department shall be installed in accordance with the approved plan for implementation.

v) The Approval Holder shall maintain the following production wells: Construction Gate and Scalehouse.

vi) The Approval Holder shall maintain records for all groundwater monitoring wells and production wells at the Facility.

f) The Approval Holder shall measure static water levels at all groundwater monitoring wells prior to sample collection.

g) i) The Approval Holder shall collect groundwater samples from the following monitoring wells and production wells on a semi-annual basis, during spring and fall: 1B, 2A, 2B, 4A, 4B, 09-1A, 96-1B, 96-2B, 09-2C, 09-3B, 96-3C, the Construction Gate Well, and the Scale house Well.

ii) The Approval Holder shall collect groundwater samples from the following monitoring wells on an annual basis, during the low flow period: 1A, 1C, 3A, 3B, 3C, 4C, 5A, 5B, 6A, 6B, 7A, 7B, 7C, 8B, 9A and 9C.

iii) The Approval Holder shall collect groundwater samples from additional monitoring wells at frequency and time period recommended in the evaluations mentioned in Conditions 9(c) / 9(d) and approved by the Department.

iv) All groundwater samples shall be collected in a consistent manner in accordance with established best practices.

h) I) Groundwater samples from all existing monitoring wells shall be analyzed for general inorganic chemistry and metals as listed in Table 4, Appendix 'A'.

ii) Groundwater samples collected from four existing monitoring wells (09-1A, 96-1B, 96-2B and 09-2C) and one production well (Scale House Well) shall

be analyzed for volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs) on an annual basis, during the low flow period.

iii) Groundwater samples collected from nine existing monitoring wells (4A, 4B, 5A, 5B, 6A, 6B, 7A, 7B and 7C) shall be analyzed for total petroleum hydrocarbons (TPH) and Benzene, Toluene, Ethyl benzene, and Xylene (BTEX) on an annual basis, during the low flow period.

iv) Groundwater samples collected from nine existing monitoring wells (09-3B, 96-3C, 09-2C, 96-2B, 09-1A, 96-1B, 7A, 7B and 7C) shall be analyzed for mercury on a bi-annual basis during the low flow period, starting in 2011.

v) Groundwater samples collected from additional monitoring wells shall be analyzed for parameters recommended in the evaluations mentioned in Sections 9 (c)/ 9 (d) and approved by the Department.

i) The groundwater monitoring program as described in 9 (e), 9 (f), 9 (g), and 9 (h) shall be evaluated annually to determine whether modifications to the program are required. Requests to modify the groundwater monitoring program must be submitted to the Department in writing complete with adequate justification prepared by a qualified Hydrogeologist licensed to practice in Nova Scotia by the Association of Professional Geoscientists of Nova Scotia (APGNS) or the Association of Professional Engineers of Nova Scotia (APENS). Any changes to the program must be approved in writing by the Department prior to implementation.

j) The Approval Holder shall maintain records of the groundwater monitoring program as described in 9 (e), 9 (f), 9 (g), and 9 (h), to be submitted to the Department annually.

k) The Approval Holder shall review the groundwater quality monitoring data as it is collected in order to identify potential adverse impacts associated with mill activities. Any change in groundwater quality or quantity shall be reported immediately to the Department.

l) i) The Approval Holder shall submit an annual report to the Department by April 1st of each calendar year.

ii) The annual report shall include, but is not limited to, the following information: a review of field methodologies, including sampling techniques; a description of the groundwater monitoring network; a review of the current groundwater monitoring program and recommendations for modifications, as applicable; current and historical static water level data in tabular format; current and historical groundwater quality data in tabular format; laboratory

certificates of analysis; a detailed interpretation of the groundwater quality data including an analysis of spatial and temporal trends; and the identification of any adverse impacts to groundwater as a result of mill activities and associated recommendations, as applicable.

iii) The annual report shall be prepared by or under the direction of a Professional Hydrogeologist licensed to practice in Nova Scotia by the Association of Professional Geoscientists of Nova Scotia (APGNS) or the Association of Professional Engineers of Nova Scotia (APENS).

IV. Surface Water Monitoring

m) The Approval Holder shall ensure that the following discharge limits for suspended solids are met for any water which is discharged from the Site to a watercourse or wetland at the Site:

Clear Flows (Normal Background Conditions):*

i) Maximum increase of 25 milligrams/litre from background levels for any short term exposure (24 hours or less)

ii) Maximum average increase of 5 milligrams/litre from background levels for longer term exposure (inputs lasting between 24 and 30 days)

High Flow (Spring Freshets and Storm Events):*

i) Maximum increase of 25 milligrams/litre from background levels at any time when background levels are between 25 milligrams/litre and 250 milligrams/litre

ii) Shall not increase more than 10% over background levels when background is > 250 milligrams/litre

*CCME Environmental Quality Guideline for Aquatic Life, 2002.

n) The Approval Holder shall ensure surface water discharge from the Site meets the limits outlined in Table 3 of Appendix A.

o) i) The Approval Holder shall maintain the existing nine (9) surface water monitoring stations at the Site: SW2, SW4. SW5, SW6, SW9, SW10, SW11, SW12, and SW13.

ii) The location of the nine (9) surface water monitoring stations are identified

on the diagram: *Surface Water and Monitoring Well Locations and Groundwater Flow Direction*, dated April 2010 and included in Dillon Consulting's 2009 Annual Monitoring Report, dated March 2010.

iii) Additional surface water monitoring locations recommended in the evaluations mentioned in Conditions 9 (c)/ 9 (d) and approved by the Department shall be added to the surface water monitoring program and sampled during the next sampling event for the Facility.

iv) The Approval Holder shall maintain records for all surface water monitoring stations.

p) i) The Approval Holder shall collect surface water samples from SW5, SW6, SW9 and SW12 on a quarterly basis.

ii) The Approval Holder shall collect surface water samples from SW2, SW4, SW10, SW11, and SW13 on a semi-annual basis, during spring and fall.

iii) The Approval Holder shall collect surface water samples from additional surface water monitoring locations at frequency and time period recommended in the evaluations mentioned in Conditions 9 (c)/9 (d) and approved by the Department.

iv) The Approval Holder shall collect a leachate sample from the leachate collection manhole on a quarterly basis.

v) All surface water and leachate samples shall be collected in a manner consistent with established industry standards and best practices.

q) i) All surface water and leachate samples shall be analyzed for parameters listed in Table 2 and 3, in Appendix A as well as total suspended solids (TSS), biological oxygen demand (BOD), and chemical oxygen demand (COD).

ii) Once per year, during the low flow period, the surface water samples shall be analyzed for mercury (Hg).

iii) Surface water samples collected from additional surface water monitoring locations shall be analyzed for parameters recommended in the evaluations mentioned in Conditions 9 (c)/9 (d) and approved by the Department.

r) The surface water monitoring program as described in 9 (o), 9 (p) and 9 (q) shall be evaluated annually to determine whether modifications to the program are required. Requests to modify the surface water monitoring program must be submitted to the Department in writing complete with adequate justification prepared by a qualified

Hydrologist. Any changes to the program must be approved in writing by the Department prior to implementation.

s) The Approval Holder shall maintain records of the surface water monitoring program as described in 9 (o), 9 (p) and 9 (q) to be submitted to the Department on an annual basis.

t) The Approval Holder shall review the surface water quality data as it is collected in order to identify potential adverse impacts associated with mill activities. Any adverse impacts to surface water quality or quantity shall be reported immediately to the Department.

u) i) The Approval Holder shall submit an annual report to the Department by April 1st of each calendar year.

ii) The Annual Report shall include, but is not limited to, the following: a review of field methodologies, including sampling techniques; a description of the surface water monitoring network; a review of the current surface water monitoring program and recommendations for modifications, as applicable; current and historical surface water and leachate quality data in tabular format; laboratory certificates of analysis; a detailed interpretation of the surface water quality and leachate data including an analysis of spatial and temporal trends; the identification of any adverse impacts to surface water as a result of mill activities and associated recommendations, as applicable.

iii) The Annual Report shall be prepared by or under the direction of a qualified Hydrologist.

10. Registered Public Drinking Water Supply

a) The Approval Holder shall maintain registration as a Public Drinking Water Supply, in accordance with the Guidelines for Monitoring Public Drinking Water Supplies, as required.

11. Dangerous Goods

I. General

a) In the event of a conflict between the terms and conditions of Condition 11 of this Approval and the Dangerous Goods Management Regulations, the Dangerous Goods Management Regulations will apply.

b) This Approval allows the Facility to store and handle Dangerous Goods.

c) The Approval Holder shall compile a complete inventory or all Dangerous Goods handled and stored at the Facility. This inventory shall be provided to the Department by June 30th, 2011 and following review by NSE, will be considered the list of authorized Dangerous Goods for the Facility under this Approval.

d) The Approval Holder shall not accept or handle Dangerous Goods which are not authorized by this Approval. Should the Facility wish to store or handle any dangerous goods not listed on the inventory provided in condition 11 (c), the Approval Holder shall submit the Material Safety Data Sheets (MSDS) to the Department 10 business days in advance for review.

e) The Approval Holder shall designate Dangerous Goods storage and receiving areas within the Facility and restrict the handling and storage of Dangerous Goods to designated areas.

f) The Approval Holder shall not knowingly accept Waste Dangerous Goods at the Facility.

II. Storage and Handling Facility

g) All loading and unloading of Dangerous Goods shall be completed within the receiving areas of the Facility.

h) All Dangerous Goods shall be handled in a manner which safely minimizes generation of vapour to the atmosphere at the Facility and at the Site.

i) Incompatible Dangerous Goods shall not be loaded or unloaded in the receiving area at the same time.

j) All floors in the loading/unloading and storage areas shall be constructed of smooth impervious material with secondary containment or sloped to an impermeable enclosed drainage collection sump capable of holding a spill.

k) Individual Dangerous Goods or groups of compatible Dangerous Goods shall have secondary containment to meet the specifications of condition 11 (p). Secondary containment shall be constructed such that potential spills of Dangerous Goods do not come in contact with or pass under incompatible materials.

l) A trained employee of the Facility shall be present during all Dangerous Goods handling operations.

m) The Dangerous Goods storage and handling areas of the Facility shall have no open floor drains.

n) All storage racks, vehicles, railcars, ventilation ducts, containers and mix/storage tanks associated with flammable Dangerous Goods shall be electrically grounded to prevent build up of static electric charges.

o) All Dangerous Goods that are accepted by the Facility shall be stored in drums, containers, totes, tanks or pails composed of materials which are compatible with the goods stored therein.

p) All containers or tanks shall be completely surrounded by secondary containment sized to contain 110% of the volume of the largest tank or container in the specifically contained area or 100% of the volume of the largest tank or container plus 10% of the aggregate capacity of all other containers or tanks in the contained area, whichever is greater.

q) All containers shall be stored upright and kept off the floor. All products and Dangerous Goods shall be stored in accordance with manufacturers specifications.

r) The Approval Holder shall not transfer or repackage flammable liquids inside any building at the Facility without receiving prior approval of the Department.

s) Door openings shall be provided with sills or ramps of a minimum 3" inches to contain spillage of Dangerous Goods inside the Dangerous Goods storage buildings.

t) The Dangerous Goods storage building shall be constructed of impervious or liquid tight materials where the outside walls meet the floor.

u) Sufficient aisle space shall be provided between containers/drums to allow the unobstructed movement of persons, transfer equipment, fire protection equipment, spill control equipment, and decontamination equipment to any part of the Dangerous Goods Storage facility.

v) The Approval Holder shall ensure that all storage areas, containers, tanks, totes, drums and pails, including railcars and trucks containing products and Dangerous Goods are labelled to clearly identify their contents.

w) All bulk tank storage vessels shall operate with visual and audible high level alarms.

x) All transfers of bulk Dangerous Goods shall be conducted using containment pads or drip pans to capture spills or drips during transfer operations to/from railcars and other approved containers.

y) The bulk storage tanks shall be equipped with emergency shut-off valves or emergency shut-off on transfer pumps to permit the immediate shutdown of transfer operations in the event of an uncontrolled release.

z) All bulk underground storage tanks at the Dangerous Goods storage facility shall have cathodic protection or sacrificial anode protection systems.

aa) The Approval Holder shall ensure that all sludges and solid wastes associated with the Facility, including tank bottoms, shall be handled and disposed in a manner authorized by the Department. Discharge or disposal of sludges or solid wastes to the Effluent Treatment Facility is strictly prohibited.

ab) The Approval Holder shall not transfer Dangerous Goods to/from more than one railcar or tanker truck at a time.

ac) The Approval Holder shall not store Dangerous Goods in railcar tankers or tanker trucks for a period which exceeds 21 days from arriving on the Site. The Approval Holder shall document exact times of arrival and departure of bulk shipments and make those available to the Department upon request.

ad) The Approval Holder shall maintain written acceptable standard operating procedures for the handling of Dangerous Goods, including valving and venting procedures. Such procedures shall be readily available to all employees.

ae) Should the Facility not meet the requirements of conditions 11(j),(k), (m), (n), (o), (p), (q), (s), (t), (u), (v), (w), (x), (y), and/or (z), the Approval Holder shall undertake an assessment of the Dangerous Goods handling and storage areas. This assessment shall contain a gap analysis outlining the deficiencies and how the Facility will attain compliance by the end of the Approval term. This assessment shall be submitted to the Department by no later than October 31, 2011.

III. Waste Dangerous Goods

af) The disposal of Waste Dangerous Goods, including radioactive sources, shall be at a facility licensed or approved for the disposal of such Waste Dangerous Goods by the applicable regulatory agency having jurisdiction.

IV. Dangerous Goods Bulk Storage Tank Maintenance

ag) The Approval Holder shall conduct Tank Assessment Study to determine the integrity of the dangerous goods bulk storage tanks to store the type and quantity of dangerous goods identified in Condition 11 (c) by no later than December 31, 2011, this study shall include but not be limited to the Standard(s) to which the tanks are being assessed. Subsequently by June 30th on a five (5) year cycle the tank(s) shall be assessed against a Standard(s) acceptable to the Department. The Approval Holder shall submit the proposed Standard(s) to the Department for approval by September 15th, 2011.

ah) If results of the tests required in Condition 11 (ag) indicate that the Dangerous Goods Bulk Storage Tanks require maintenance or upgrades, then the Approval Holder will:

i) Submit to the Department a copy of the report as well as the planned maintenance or upgrades within 30 days of the testing event if maintenance or upgrades are required.

ii) Undertake the necessary maintenance or upgrades within one (1) year of being identified. If these deficiencies cannot be corrected within one (1) year of being identified, then the reasons shall be submitted in writing 60 days prior to the deadline with a proposal for a revised schedule, and a request for an extension.

iii) Following completion of the maintenance or upgrades, the tank(s) shall be retested in accordance with Condition 11 (ag) to ensure the maintenance or upgrades were effective.

V. Inventory Control

ai) The Approval Holder shall maintain an up-to-date inventory of Dangerous Goods which are stored at the Facility. The inventory shall consist of informational requirements of Section 11 (2) of the *Dangerous Goods Management Regulations*.

aj) The inventory shall be made available to the Department for inspection upon request.

12. Petroleum Management

a) The Approval Holder shall conduct a Petroleum Storage Tank System Assessment. The petroleum storage tanks and associated works shall be assessed against the "Nova Scotia Standards for Construction and Installation for Petroleum Storage Tank Systems" (Standard), current edition and the Nova Scotia *Petroleum Management Regulations,* (the Regulations). Any deficiencies shall be outlined and a plan developed for upgrading the System to meet the requirements of the Standard and the Regulations. This Assessment Report shall be submitted to the Department for review and approval by no later than December 31, 2011.

b) The Approval Holder shall reassess in accordance with Condition 12 (a) on a five (5) year cycle for each tank. The results of this testing shall be submitted within 90 days immediately following the testing.

c) If results of the assessment required in Condition 12 (a) or (b) indicate that the Petroleum Storage Tanks require maintenance or upgrades, then the Approval Holder will:

   i) Submit to the Department a copy of the report as well as the planned maintenance or upgrades within 30 days of the testing event if maintenance or upgrades are required.

   ii) Undertake the necessary maintenance or upgrades within one (1) year of being identified. If these deficiencies can not be corrected within one (1) year of being identified, then the reasons shall be submitted in writing 60 days prior to the deadline with a proposal for a revised schedule, and a request for an extension.

   iii) Following completion of the maintenance or upgrades, the tank(s) shall be retested in accordance with Condition 12 (a) to ensure the maintenance or upgrades were effective.

d) The Approval Holder shall operate and maintain the petroleum storage tanks in accordance with the *Nova Scotia Standards for Construction and Installation for Petroleum Storage Tank Systems*, dated June 5, 1997, as amended from time to time.

e) Testing and monitoring of the petroleum storage tanks shall be conducted in accordance with the *Nova Scotia Standards for Construction and Installation for Petroleum Storage Tank Systems*, dated June 5, 1997, as amended from time to time.

13. Industrial Landfill

a) The disposal of domestic solid waste shall be conducted at a facility licensed or approved for the recycling, composting or disposal of such solid waste. The Approval Holder shall not dispose of domestic solid waste at the industrial landfill.

b) The Approval Holder shall dispose of all Effluent Treatment System sludges at the industrial landfill, unless authorization has been obtained from the Department for alternative disposal.

c) The Approval Holder shall dispose of all combustion residues and solid waste originating from pollution control equipment such as, electrostatic precipitators, scrubbers and demisters at the industrial landfill, unless authorization has been obtained from the Department for alternative disposal. Unless otherwise approved, solid waste from the multiclone must be disposed at the industrial landfill.

d) The Approval Holder shall dispose of petroleum impacted soil at a facility licensed or approved for the treatment or disposal for such waste. Disposal of petroleum impacted soils at the Facility's industrial landfill is strictly prohibited.

e) Only industrial waste types for which the industrial landfill was designed and as identified in the Landfill Operations Manual, dated December, 1989 and Solid Waste Management Strategy Background Report, dated November 1989, shall be disposed at the industrial landfill.

f) The Approval Holder shall conduct a detailed technical review of operations at the industrial landfill and submit a report to the Department by April 30, 2012. This review shall include an evaluation of the surface water and groundwater monitoring network, leachate generation and treatment, soil liner and cover requirements, development of the facility in relation to the original design. The current landfill life span shall be reevaluated. Updated engineering drawings and a landfill operations manual shall be submitted to the Department by April 30, 2012. If the existing facility is intended for closure, a closure plan shall be provided by April 30, 2012.

g) The Approval Holder shall undertake an assessment of the closed industrial landfills at the Facility (Landfills 1and 2 as identified in the Annual Ground and Surface Water Reports prepared by Dillon Consulting Ltd.) to be completed by a qualified professional licensed to practice in Nova Scotia by the Association of Professional Geologists of Nova Scotia (APGNS) or the Association of Professional Engineers of Nova Scotia (APENS), to determine whether upgrades to the closed landfills are warranted.This assessment shall be submitted to the Department on or before April 30, 2012.

h) Solid waste closure plans shall be submitted to the Department for any remaining

inactive disposal sites at the facility, by June 30, 2012.

i) The Approval Holder shall develop and submit an Ash Pond Operations and Maintenance Manual to the Department by September 30, 2011.

14. Asbestos

I. Designated Asbestos Disposal Area

a) Asbestos waste generated from the Facility shall disposed of in the area designated for asbestos disposal on Engineering Plan entitled *Industrial Solid Waste Landfill Engineering Drawing Rev. 1 dated August 1990, Sheet 5 and Sheet 6,* prepared by Porter Dillon Consulting Ltd.

b) A copy of the site plan indicating the location of the asbestos waste disposal area shall be recorded by the Approval Holder in the Registry of Deeds. A copy of the registration is to be submitted to the Department within 90 days of the issuance of this Approval.

c) The designated asbestos disposal area shall be clearly marked by signage.

d) The area designated for asbestos waste disposal must be secured from unauthorized access.

e) The Facility shall not accept asbestos waste from third party generators of the waste.

f) The Approval Holder shall provide confirmation to the Department that the asbestos disposal area meets the requirements set out in Condition 14 by September 1, 2011.

II. Designated Area Cover Limits

g) Upon abandonment or discontinuance of use of the designated asbestos waste disposal area, the Approval Holder shall apply a final capping material having a depth of not less than one hundred twenty five (125) centimetres with a permeability of not greater than 10^{-6}.

III. Facility Inspection

h) Upon abandonment or discontinuance of use of the designated asbestos waste disposal area, the Approval Holder shall inspect the area on a monthly basis to ensure that the final capping is intact.

i) The Approval Holder shall undertake any repairs that may be required to maintain the cover limits specified in this Approval.

15. Spills or Releases

a) All spills or releases shall be reported in accordance with the *Act (Part IV)* and the *Emergency Spill Regulations*.

b) Spills or releases shall be cleaned up in accordance with the *Act, Policies, Standards and/or Procedures,* as directed by the Minister.

16. Records Maintenance

a) The Approval Holder shall keep all chemical and physical analyses reports for 10 years.

b) The Approval Holder shall keep all calibration and maintenance records for three years.

c) The Approval Holder shall maintain all other data not mentioned in Conditions 16 a) or 16 b) for a minimum of two (2) years.

17. Reporting

I. General

a) All reporting requirements required by this Approval shall be submitted in writing and/or electronically, in a format acceptable to the Administrator.

b) The Approval Holder shall submit required annual reports within ninety (90) days of the end of the applicable calendar year.

18. Community Liaison Committee

a) The Approval Holder shall establish a Community Liaison Committee in accordance with the Department's Guide for the Formation and Operation of a Community Liaison Committees. The membership of said committee shall consist of at least two representatives of the Pictou Landing First Nation Community, one representative of the Pictou Landing Community, one representative of the Moodie Cove Community, and one representative of the Abercrombie Community, along with participation of one employee of Northern Pulp Nova Scotia Limited.

b) The Approval Holder shall submit the list of proposed Community Liaison Committee members as well as the terms of reference of the Committee to the Department by

September 30th, 2011.

19. Communication Plan

a) The Approval Holder shall develop a Mi'kmaq Communication Plan for the purposes of sharing information between the Approval Holder and the Pictou Landing First Nation on environmental issues. This plan shall be submitted for approval to the Department by no later than September 1st, 2011 and shall include but not be limited to the following information:

i) a mechanism for sharing of any information respecting environmental testing and reporting;

ii) a mechanism for PLFN to identify any questions or concerns they may have about the information supplied to them;

iii) a methodology for tracking the information exchange.

20. Contingency Plans/Operation and Maintenance Manuals

I. Contingency Planning

a) The Approval Holder shall submit to the Department a contingency plan to address any potential emergency situation at the Facility. The contingency plan shall be developed and routinely updated in accordance with the Department's *Contingency Planning Guidelines* dated September 29, 2004, as amended from time to time, and made available to the Department upon request.

b) The Approval Holder shall ensure that all personnel are trained to address environmental emergencies in a manner consistent with the Facility's approved contingency plan and that the necessary materials and equipment are available at all times for such purpose.

c) A copy of the contingency plan is to be maintained on site at all times.

d) A copy of the contingency plan is to be sent to the local fire department.

21. Rehabilitation Plans

a) One (1) year prior to decommissioning/closure of the Facility, or any part thereof, the Approval Holder shall submit a detailed closure plan to the Department for review and approval. The plan shall include but not be limited to, the estimated total cost for labour, equipment, supplies and services of a 3rd party contractor to undertake all the

work necessary to decommission the Facility, or any part thereof, as well as a plan for dealing with all of the wastes and residual materials / contamination in accordance with the *Act*, the Regulations, Policies, Procedures and Guidelines prescribed or adopted by the Department.

b) The closure plan shall include the method and practices for the handling and disposal of all products and waste materials on Site.

c) The closure plan shall be implemented in accordance with the approved plan.

22. Insurance

a) The Approval Holder shall obtain environmental impairment liability insurance in the amount of $5,000,000. Insurance shall indicate Nova Scotia Environment as insured. Proof of coverage shall be provided to the Department within sixty (60) days of issuance of the Approval.

APPENDIX A

TABLE 2: Effluent Monitoring Parameters and Discharge Limits

Parameter	Sample Type	Monitoring Frequency	Location	Discharge Limit
Biochemical Oxygen Demand (BOD_5)	Continuous	3 days per week	Effluent Monitoring Station Point C	3960 kg max per day 2380 kg max monthly average ****
Suspended Solids	Continuous	Daily	Effluent Monitoring Station Point C	4100 kg max per day+ 2460 kg max monthly average ****
Dissolved Oxygen	Field	Daily	Point B and Effluent Monitoring Station Point C	>6.5 mg O_2/L at Point D ****+
pH	Continuous	Daily	Point B and Effluent Monitoring Station Point C	6-9
Flow rate	Continuous	Daily	Effluent Monitoring Station Point C	71,000 cubic meters ****+
Acute Toxicity-rainbow trout	Grab	once per month*, 21 days between tests	Effluent Monitoring Station Point C	Pass LC50, as per the PPER
Acute Toxicity-Daphnia magna	Grab	once per week**, 21 days between tests	Effluent Monitoring Station Point C	Pass LC50, as per the PPER
Dioxins and Furans	24 hour composite sample	Annually, 350 days between samples	Effluent Monitoring Station Point C	as required by the Pulp and Paper Effluent Chlorinated Dioxins and Furans Regulations***

* if LC50 test fails, testing will be increased to weekly until a minimum of three (3) consecutive tests are passed.

** if LC50 test fails, acute toxicity on rainbow trout shall be conducted immediately, testing on Daphnia magna shall be increased to three (3) times per week until a minimum of three (3) consecutive tests are passed.

*** if measurable quantities of 2,3,7,8 TCDD (15 ppq) or 2,3,7,8 TCDF (50 ppq) are detected, testing shall be increased to monthly until three (3) consecutive non-detect quarters are achieved.

**** final treatment objectives will be determined based on the information submitted under condition 4 I (b)(v).

\+ in the event the Approval Holder can not meet the limits outlined, a plan shall be developed to meet compliance by the end of the Approval term. For Suspended Solids, at no time shall any one result exceed the discharge limit by more than 50%.

TABLE 2A: Effluent Parameters and Discharge Limits

PARAMETER	COMPLIANCE	MONITORING LOCATION	LIMIT
Adsorbable organic halides (AOX)****	1 Day Maximum	Effluent Monitoring Station Point C	0.9 kg/adubmt
	Monthly Average		0.6 kg/adubmt
2,3,7,8 TCDD**	1 Day Maximum	Bleach Plant	<ML*
2,3,7,8 TCDF**	1 Day Maximum	Bleach Plant	31.9 pg/adubmt
Chloroform**	1 Day Maximum	Bleach Plant	6.92 pg/adubmt
	Monthly Average		4.14 pg/adubmt
Trichlorosyringol**	1 Day Maximum	Bleach Plant	<ML*
3,4,5 Trichlorocatechol**	1 Day Maximum	Bleach Plant	<ML*
3,4,6 Trichlorocatechol**	1 Day Maximum	Bleach Plant	<ML*
Tetrachlorocatechol**	1 Day Maximum	Bleach Plant	<ML*
2,4,5 Trichlorophenol**	1 Day Maximum	Bleach Plant	<ML*
2,4,6 Trichlorophenol**	1 Day Maximum	Bleach Plant	<ML*
2,3,4,6-tetrachlorophenol**	1 Day Maximum	Bleach Plant	<ML*
Pentachlorophenol**	1 Day Maximum	Bleach Plant	<ML*
3,4,5 Tetrachloroguaiacol**	1 Day Maximum	Bleach Plant	<ML*
3,4,6 Tetrachloroguaiacol**	1 Day Maximum	Bleach Plant	<ML*
4,5,6 Tetrachloroguaiacol**	1 Day Maximum	Bleach Plant	<ML*
Tetrachloroguaiacol**	1 Day Maximum	Bleach Plant	<ML*
Nitrites***	Daily	Effluent Monitoring Station Point C	
Nitrate-Nitrogen***	Daily	Effluent Monitoring Station Point C	2935 µg/L
TKN	Daily	Effluent Monitoring Station Point C	
Total Phosphorous***	Daily	Effluent Monitoring Station Point C	20 µg/L
Colour***	Daily	Effluent Monitoring Station Point C	20 kg/adubmt
Ammonia***	Daily	Effluent Monitoring Station Point C	19 µg/L
Sulfates***		Effluent Monitoring Station Point C	
COD		Effluent Monitoring Station Point C	

PARAMETER	COMPLIANCE	MONITORING LOCATION	LIMIT
Hydrogen Sulphide (H_2S)		Effluent Monitoring Station Point C	
Sodium		Effluent Monitoring Station Point C	

*<ML means less than the minimum level at which the analytical system gives recognizable signals and an acceptable calibration point. The MLs for each pollutant are specified in USEPA 40 CFR 430

**US EPA Guidance Manual for Pulp, Paper and Paperboard and Builders' Paper and Board Mills Pretreatment Standards, US EPA, Effluent Guidelines Division, WH-562, September 1984

***CCME Canadian Environmental Quality Guidelines Water Quality Guidelines for the Protection of Fresh Water Aquatic Life, current edition

****Environmental Management Act, Pulp Mill and Pulp and Paper Mill Liquid Effluent Control Regulations, British Columbia Ministry of Environment, B.C. Reg. 470/90, amendments up to B.C. Reg. 321/2004

TABLE 3: Surface Water Discharge Limits

PARAMETER	DISCHARGE LIMIT
pH	6.5 - 9.0
Total Petroleum Hydrocarbons	3.5 milligrams per litre or Atlantic RBCA*
Chromium (trivalent)	8.9 micrograms per litre
Chromium (Hexavalent)	1.0 micrograms per litre
Copper	2-4 micrograms per litre
Iron	300 micrograms per litre
Nickel	25-150 micrograms per litre
Vanadium	2 milligrams per litre
Zinc	30 micrograms per litre

* lowest value after finalization of Atlantic RBCA standard for surface water

TABLE 4: General Inorganic Chemistry and Metals Parameters

Sodium (Na)	Nitrate + Nitrite (N)	Conductivity	Antimony (Sb)
Potassium (K)	Nitrite (N)	pH	Selenium (Se)
Calcium (Ca)	Nitrate (N)	Total Organic Carbon	Tin (Sn)
Magnesium (Mg)	Phosphorus	Total Dissolved Solids	Silver (Ag)
Hardness ($CaCO_3$)	Ammonia (N)	Aluminum (Al)	Strontium (Sr)
Alkalinity ($CaCO_3$)	Arsenic (As)	Boron (B)	Thallium (Ti)
Carbonate (as $CaCO_3$)	Iron (Fe)	Bismuth (Bi)	Titanium (Ti)
Bicarbonate (as $CaCO_3$)	Manganese (Mn)	Barium (Ba)	Uranium (U)
Sulfate (SO_4)	Lead (Pb)	Beryllium (Be)	Vanadium (V)
Chloride (Cl)	Copper (Cu)	Chromium (Cr)	Cadmium (Cd)
Fluoride (F)	Zinc (Zn)	Cobalt (Co)	Total petroleum Hydrocarbons (TPH)
Silica (SiO_2)	Colour	Molybdenum (Mo)	BTEX
Ortho-Phosphorus (P)	Turbidity	Nickel (Ni)	

Table 5: Air Contaminants, Maximum Ground Level Concentration

Air Contaminant	CAS Number	Half Hour Standard Concentration (ug/m^3)*	24 Hour Standard Concentration (ug/m^3)*
Acetaldehyde	75-07-0	500	500
Acetone	67-64-1	35640	11880
Acrolien	107-02-8	1.2	0.4
Ammonia	7664-41-7	300	100
Antimony	7440-36-0	75	25
Arsenic	7440-38-2	1	0.3
Barium	7440-39-3	30	10
Benzene	71-43-2	**	**
Beryllium	7440-41-7	0.03	0.01
Cadmium	7440-43-9	0.075	0.025
Carbon tetrachloride	56-23-5	7.2	2.4
Chlorine	7782-50-5	30	10
Chlorine Dioxide	10049-04-4	6	2
Chloroform	67-66-3	3	1
Chromium (di- & tri- forms)	7440-47-3	5	1.5
Cobalt	7440-48-4	0.3	0.1
Copper	7440-50-8	100	50
Cresols	1319-77-3	230	75
Dimethyl Disulphide	624-92-0	40	
Dimethyl Sulphide	75-18-3	30	
Ethylbenzene	100-41-4	1400	1000
Fluorides	7664-39-3	4.3	0.86
Formaldehyde	50-00-0	65	65
Lead	7439-92-1	1.5	0.5
Mercaptan		10	
Mercury	7439-97-6	5	2
Methanol	67-56-1	12000	4000
Methylene Chloride	75-09-02	660	220
Methyl Ethyl Ketone	78-93-3	3000	1000
Methyl Isobutyl Ketone	108-10-1	1200	
Molybdenum	7439-98-7	100	120
Naphthalene	91-20-3	36	22.5
Nickel	7440-02-0	5	2
Phenol	108-95-2	100	30
Propionaldehyde	123-38-06	7	
Selenium	7782-49-2	20	10
Sulphuric acid	7664-93-9	15	5
Toluene	108-88-3	2000	
Tri-Chloroethylene	79-01-6	36	12
Vanadium	7440-62-2	5	2
Xylene	1330-20-7	2200	730
Zinc	7440-66-6	100	120

*Summary of Standards and Guidelines to support Ontario Regulation 419:Air Pollution – Local Air Quality, Standards Development Branch, Ontario Ministry of the Environment, February, 2008 (including December 22, 2009 amendment to O.Reg. 419/05)
**Carcinogen. There is no assigned standard for this contaminant and emissions to the environment are to be limited to the greatest extent possible.

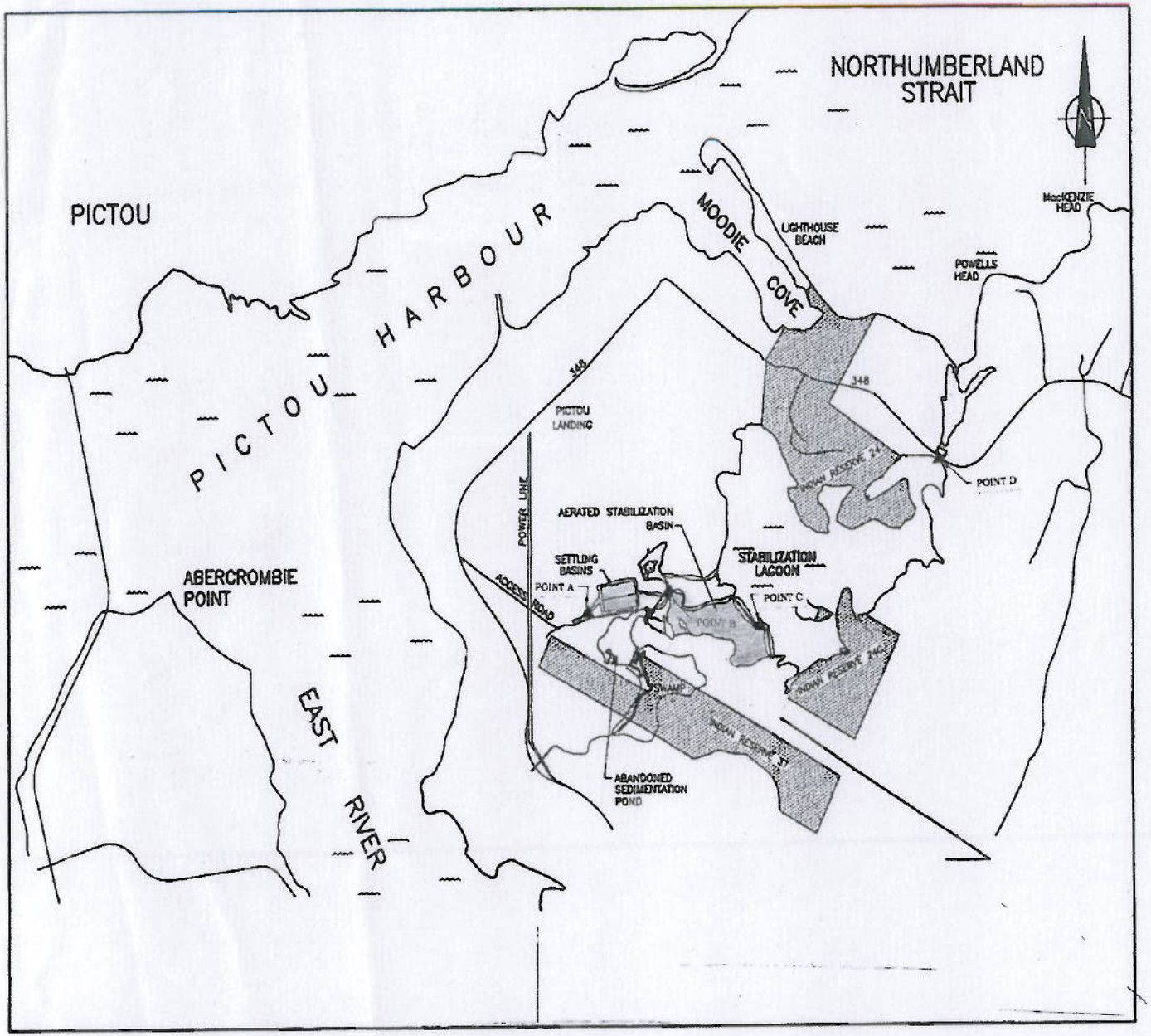
APPENDIX B

Reference Documents

Item	Date	Descriptor	Prepared By
1	Aug. 30, 1976	Engineering Drawing - Recovery Boiler SF Scrubber General Arrangement Drawing No. C07969	Flakt SF Prod. Canada Ltd.
2	Aug. 31, 1976	Engineering Drawing – SF Scrubber Flow And Instrumentation Diagram Drawing No. C07970	Flakt SF Prod. Canada Ltd.
3	Jan. 1977	Engineering Drawing - SF MODO Scrubber Inlet Breeching Arrangement Ducts General Arrangement Drawing No. C08070	Flakt SF Prod. Canada Ltd.
4	Feb. 21, 1977	Engineering Drawing - SF Scrubber MODO System Internal Systems and Piping General Arrangement Drawing No. C08175	Flakt SF Prod. Canada Ltd.
5	Rev. April 3, 1985	Engineering Drawing - Assembly of Ducon Oriclone Venturi Scrubber Size 45/96- Type VVO Drawing No. E25751	Ducon-Mikropul Ltd.
6	Jan. 9, 1985	Engineering Drawing - General Layout of Ducon A-33 Ventri-Rod Scrubber System Size 160 Drawing No. E25776	Ducon-Mikropul Ltd.
7	Rev. May 14, 1985	Engineering Drawing - Flow Diagram For Size 45/96, Type VVO Scrubber Recycled Water Drawing No. C-25896	Ducon-Mikropul Ltd.
8	Rev. July 24, 1988(?)	Engineering Drawing - Water Supply & Distribution Mill Water Balance – Treated Water Flow Schematic Drawing No. 0-4561	Scott Maritimes Limited
9	Rev. July 10, 1989(?)	Engineering Drawing - Water Supply & Distribution Mill Water Balance – Raw Water Flow Schematic Drawing No. 2502-1-0-4560	Scott Maritimes Limited
10	Nov. 1989	Report – Solid Waste Management Strategy Background Report	Porter Dillon Limited
11	Dec. 8, 1989	Report - Industrial Solid Waste Landfill Operations Manual	Porter Dillon Limited
12	Rev. Aug., 1990	Engineering Drawings - Industrial Solid Waste Landfill Engineering Drawings, 1-11	Porter Dillon Limited
13	Record Drawing Sept., 10, 1991	Engineering Drawings - Landfill Leachate Collection System Engineering Drawings, 1-13	Porter Dillon Limited
14	April 26,	Engineering Drawing – Landfill Cap Installation	Porter Dillon Limited

	1994	Engineering Drawing 1	
15	April 26, 1994	Engineering Drawings - Landfill Leachate Collection System Extension Engineering Drawings 1-2	Porter Dillon Limited
16	Aug. 15, 1996	Engineering Drawings - Kimberly-Clark Landfill Closures DWG #1160-JW-1-0530, Sheets 1-11	Kimberly-Clark Jacques Whitford Ltd.
17	Dec. 19, 1997	Engineering Drawing - Ash Pond Statistics DWG. No. 959-KC-9-1007	Kimberly-Clark
18	Dec. 30, 1998	Engineering Drawing - Stack Locations Mill Wide DWG No. 1181-KC-1-1004	Kimberly-Clark Engineering
19	May 7, 1999	Engineering Drawing - Erection Diagram Precipitator KCNS DWG. No. 5631-EEC-5-V53126 SH. 05	Environmental Elements Corporation
20	May 19, 1999	Engineering Drawing - General Arrangement KCNS DWG. No. 5631-EEC-5-53126 SH. 3	Environmental Elements Corporation
21	May 21, 1999	Engineering Drawing - General Arrangement KCNS DWG. No. 5631-EEC-5-V53126 SH. 1	Environmental Elements Corporation
22	May 21, 1999	Engineering Drawing - General Arrangement KCNS DWG. No. 5631-EEC-5-53126 SH. 2	Environmental Elements Corporation
23	Rev. June, 1999	Engineering Drawing - Mill Yard Sewer Layout Dwg. No. 1-E-4499 Rev. 13	Kimberly-Clark
24	Feb 2000	Report entitled *Evaluation of Effluent Treatment Alternatives* Project J632A	Arga Simons
25	Rev. Jan. 4, 2002	Engineering Drawing - Pulp Mill General Arrangement Dwg. No. 0-D-4993	Scott Maritimes Ltd.
26	Sept. 2, 2008	Report - Air Dispersion Modelling Report	Jacques Whitford
27	Sept. 26, 2008	Report - Air Monitoring and Reporting Program Evaluation Report	Jacques Whitford
28	Dec. 19, 2008	Correspondence – Letter from Dave Davis, P.Eng., Northern Pulp to Marc Theriault, Nova Scotia Environment with attached letter report from Jacques Whitford dated December 10, 2008	Northern Pulp/ Jacques Whitford
29	Dec. 31, 2008	Report - Source Emissions Inventory Report	Jacques Whitford
30	June 30, 2009	Correspondence - letter from Dave Davis, P.Eng., Northern Pulp to Marc Theriault, Nova Scotia Environment	Northern Pulp
31	Sept. 25, 2009	Report - Northern Pulp Nova Scotia Corporation, New Glasgow, Nova Scotia Air Emission Management Plan	Pöyry
32	Nov. 24, 2009	Correspondence – letter from Sharon Vervaet, P.Eng., Nova Scotia Environment to Dave Davis, P.Eng., Northern Pulp	Nova Scotia Environment
33	Jan. 14,	Correspondence – Letter from Dave Davis, P.Eng., Northern Pulp to Marc Theriault, Nova Scotia	Northern Pulp/Stantec

	2010	Environment with attached letter report from Stantec dated Jan. 14, 2010	
34	Feb. 11, 2010	Correspondence – Letter from Dave Davis, P. Eng., Northern Pulp to Sharon Vervaet, P.Eng., Nova Scotia Environment with attachments	Northern Pulp
35	Feb., 2010	Document Package submitted to Nova Scotia Environment to satisfy request for information	Northern Pulp
36	Mar. 25, 2010	Correspondence - E-mail from Dave Davis, P.Eng., Northern Pulp to Marc Theriault, Nova Scotia Environment	Northern Pulp
37	May 29, 2010	Correspondence – E-mail from Dave Davis, P.Eng., Northern Pulp to Marc Theriault, Nova Scotia with attached letter report prepared by Callan & Brooks Inc., dated May 27, 2010	Northern Pulp/Callan & Brooks Incorporated
38	July 19, 2010	Report – Northern Pulp Nova Scotia Corporation – Odour Reduction Study Report	KSH Solutions Inc.
39	July 20, 2010	Report – Northern Pulp Abercrombie, NS Green Energy Report	cookengineering
40	July 27, 2010	Correspondence – Letter from Sharon Vervaet, P.Eng., Nova Scotia Environment to Dave Davis, P.Eng., Northern Pulp	Nova Scotia Environment
41	Aug. 17, 2010	Report – Northern Pulp Nova Scotia Corporation Improvements to the Recovery Cycle Study Report	KSH Solutions Inc.
42	Undated, received April 2011	Process Flow Diagrams titled: 1)Water Treatment, 2)Power Boiler, 3) Recovery Boiler, 4) Services-Condensate, Feed Water, Demineralizers, and Steam and 5) Services – Fuel Oil, Propane, Raw Water and Air	Northern Pulp


NORTHUMBERLAND STRAIT
PICTOU
PICTOU HARBOUR
MOODIE COVE
LIGHTHOUSE BEACH
MacKENZIE HEAD
POWELLS HEAD
349
348
PICTOU LANDING
INDIAN RESERVE 24
POINT D
POWER LINE
AERATED STABILIZATION BASIN
SETTLING BASINS
STABILIZATION LAGOON
POINT A
ACCESS ROAD
POINT C
POINT B
ABERCROMBIE POINT
SWAMP
INDIAN RESERVE 24A
INDIAN RESERVE 24
EAST RIVER
ABANDONED SEDIMENTATION POND

Appendix B

Pre-test Plan

Stantec Consulting Ltd.
102 - 40 Highfield Park Drive
Dartmouth NS B3A 0A3
Tel: (902) 468-7777
Fax: (902) 468-9009

September 25, 2014
File: 121511269

Attention: Mr. Marc Theriault
Nova Scotia Environment
20 Pumphouse Road
Pictou, NS B2H 5C6

Dear Mr. Theriault,

Reference: Pre-Test Plan for Source Emissions Testing Northern Pulp, Pictou Mill – Fall 2014

Please accept this Pre-test Plan for the completion of source emissions testing of the Recovery Boiler, the Lime Kiln, the Smelt Dissolving Tank, the Power Boiler and the High Level Roof Vent at the Pictou Mill in New Glasgow, Nova Scotia.

Introduction

Northern Pulp is required to perform source emissions testing on the Recovery Boiler, Lime Kiln, Smelt Dissolving Tank, Power Boiler and the High Level Roof Vent to fulfil the conditions specified in the current Certificate of Approval (CoA) to Operate 2011-076657-R02.

Test Program Organization

The source emissions testing will be performed for:

Company Name:	Northern Pulp
Company Address:	P.O. Box 549, Station Main, New Glasgow, NS, B2H 5E8
Contact Name:	Dave Davis
Position:	Environmental/Technical Leader
Telephone Number:	(902) 752-8461
Email:	ddavis@northernpulp.com

Sampling Company:	Stantec Consulting Ltd.
Project Manager:	Matt Steeves
Telephone Number:	(902) 468-7777
Fax Number:	(902) 468-9009
Email:	Matthew.Steeves@Stantec.com
Sampling Team:	Nick MacDonald, Tristan Blair-Hicks, Andrew Lynch, Michael McLean, Mike Malone

Reference: Pre-Test Plan for Source Emissions Testing Northern Pulp, Pictou Mill – Fall 2014

Source Emissions Testing Program

The exhaust gas from the sources will be analyzed for air contaminants as outlined in Table 1 below.

Table 1 Source Emissions Testing Matrix

Source	Number of Samples per Source	Approval Condition	Parameter	Sampling Method
Recovery Boiler	3	-	Velocity Traverse	EPS 1/RM/8
	3	-	Moisture Content	EPS 1/RM/8
	3	6. a)	Total Particulate Matter (PM)	EPS 1/RM/8
	3	-	Oxygen (O_2), Carbon Dioxide (CO_2)	EPS 1/RM/15
	3	-	Sulphur Dioxide (SO_2)	EPS 1/RM/15
	3	-	Nitrogen Oxides (NO_x)	EPS 1/RM/15
	3	-	Carbon Monoxide (CO)	EPS 1/RM/15
Lime Kiln	3	6. a)	Total Particulate Matter (PM)	EPS 1/RM/8 (EMC GD-008)
	1	6. b)	Total Reduced Sulphur (TRS)	US EPA Method 16B
	3	-	Velocity Traverse	EPS 1/RM/8
	3	-	Moisture Content	EPS 1/RM/8
	3	-	Oxygen (O_2), Carbon Dioxide (CO_2)	EPS 1/RM/15
	3	-	Sulphur Dioxide (SO_2)	EPS 1/RM/15
	3	-	Nitrogen Oxides (NO_x)	EPS 1/RM/15
	3	-	Carbon Monoxide (CO)	EPS 1/RM/15
Smelt Dissolving Tank	3	6. a)	Total Particulate Matter (PM)	EPS 1/RM/8
	3	-	Velocity Traverse	EPS 1/RM/8
	3	-	Moisture Content	EPS 1/RM/8
	3	-	Oxygen (O_2), Carbon Dioxide (CO_2)	EPS 1/RM/15
	3	-	Sulphur Dioxide (SO_2)	EPS 1/RM/15
	3	-	Nitrogen Oxides (NO_x)	EPS 1/RM/15
	3	-	Carbon Monoxide (CO)	EPS 1/RM/15
Power Boiler	3	6. a)	Total Particulate Matter (PM)	EPS 1/RM/8
	3	-	Velocity Traverse	EPS 1/RM/8
	3	-	Moisture Content	EPS 1/RM/8
	3	-	Oxygen (O_2), Carbon Dioxide (CO_2)	EPS 1/RM/15
	3	-	Sulphur Dioxide (SO_2)	EPS 1/RM/15

Reference: Pre-Test Plan for Source Emissions Testing Northern Pulp, Pictou Mill – Fall 2014

Table 1 Source Emissions Testing Matrix

Source	Number of Samples per Source	Approval Condition	Parameter	Sampling Method
	3	-	Nitrogen Oxides (NO_x)	EPS 1/RM/15
	3	-	Carbon Monoxide (CO)	EPS 1/RM/15
High Level Roof Vent	3	6. b)	Velocity Traverse	EPS 1/RM/8
	1	-	Total Reduced Sulphur (TRS)	US EPA Method 16B
	3	-	Oxygen (O_2), Carbon Dioxide (CO_2)	EPS 1/RM/15
	3	-	Sulphur Dioxide (SO_2)	EPS 1/RM/15
	3	-	Nitrogen Oxides (NO_x)	EPS 1/RM/15
	3	-	Carbon Monoxide (CO)	EPS 1/RM/15

Details of each of the methods identified in Table 1 are provided in the sections that follow.

Preliminary Testing: Upon arrival at each sampling location, Stantec will set up the source emissions testing equipment and conduct a preliminary survey to measure the average velocity, flue gas composition, and moisture content in the stack gases using EPS 1/RM/8 Methods B, C, and D, respectively. The data from this survey will be used to determine the appropriate nozzle size to conduct isokinetic sampling (where the velocity of the gas entering the nozzle is equal to the gas velocity in the stack) for particulate matter during the official testing part of the work. Verification for cyclonic or reverse flow will also be conducted during the preliminary survey, according to procedures outlined in the Environment Canada reference method EPS 1/RM/8.

Should fluctuations in the velocity pressure at a selected traverse point exceed 20% of the average pressure for that point; the diameter of the testing cross section will be reduced to include only those areas along the traverse which meet this requirement (less than 20% of the average). Although the diameter may be reduced, the number of sampling points along each traverse will remain the same as determined from EPS 1/RM/8, Method A, using the equivalent diameter.

Volumetric flow and exhaust gas emissions will be calculated using the full cross sectional area.

Particulate Matter: The source emissions testing of the Recovery Boiler, Lime Kiln, Smelt Dissolving Tank, and the Power Boiler for total particulate matter will be conducted in accordance with the Environment Canada reference method EPS 1/RM/8, entitled "Measurement of Releases of Particulate from Stationary Sources". In addition the alignment approach, as specified in the US EPA Guidance Document – GD-008, will be applied when source testing the Lime Kiln due to the cyclonic flow this source exhibits.

The particulate sampling train, used specifically for isokinetic sampling, is described in detail in EPS 1/RM/8, and is generally referred to as the "Method 5" sampling train for particulate matter (after the US EPA protocol). The sampling train has several different components which include: a

heated sampling probe (a nozzle, stainless steel liner, thermocouple, and pitot tube assembly), a heated sample case containing a filter, an ice box containing impinger glassware, and an umbilical cord leading to the pump, and control console. A schematic of the sampling system is shown in Figure 1.

For all source tests, leak checks of the sampling train will be performed as per accepted US EPA and Environment Canada methods. For each official test, two (2) traverses with up to twelve (12) sampling points per traverse will be used. Sampling will be conducted for five (5) minutes per sampling point, up to a maximum sampling time of 120 minutes per test.

The amount of material caught in the impingers will be determined gravimetrically and reported separately from the calculated total particulate matter emissions. All particulate matter samples will be recovered and analyzed at the Stantec laboratory in Fredericton, NB.

Total Reduced Sulphur: The source emissions testing of the Lime Kiln and the High Level Roof Vent for total reduced sulphur will be conducted in accordance with US EPA Method 16B. In this method, the sample is extracted from the exhaust gas of the stack through a heated Teflon line. The sample is chilled and then passes through an SO_2 analyzer to measure SO_2 from the source. The sample exits the analyzer and is then passed through a furnace where all sulphur compounds in the gas stream are thermally oxidized to SO_2, this SO_2 is measured in a second inline analyzer. The difference in the initial SO_2 and the final SO_2 measurement is the total reduced sulphur concentration (reported as H_2S). The analyzers are both Western Research SO_2 non-dispersive ultra-violet (NDUV) continuous analyzer. Monitoring will be conducted continuously over a 24 hour period as required by the approval condition.

Combustion Gases: The combustion gases (O_2, CO_2, CO, NO_X, and SO_2) will be sampled according to the Environment Canada reference method EPS 1/RM/15, entitled "Reference Method for the Monitoring of Gaseous Emissions from Fossil Fuel-fired Burners". In this method, samples of flue gas are drawn through a probe, non-isokinetically, from a single point near the centre of the stack. A Testo 350 XL Flue Gas Analyzer, manufactured by Testo GmbH and Co., will be used to conduct the sampling. The Testo 350 XL is equipped with a flue gas probe that has an integrated filter trap and condensate trap, and a housing unit that contains the pump and the electrochemical cells which are used to measure concentrations of sulphur dioxide, nitrogen oxides, carbon monoxide, carbon dioxide, and oxygen.

The Testo 350 XL Flue Gas Analyzer is manufactured and calibrated to ensure high accuracy.

In accordance with the regulatory requirements for compliance testing, three replicate tests for each contaminant will be conducted on each stack.

Reporting

As per Approval No. 2011-076657-R02, actual particulate matter emission rates will be reported in units of g/s. The concentration released to the atmosphere will be reported in units of mg/m^3 at reference conditions of 25 °C and 101.3 kPa corrected for 11 % oxygen for the Recovery Boiler and

Reference: Pre-Test Plan for Source Emissions Testing Northern Pulp, Pictou Mill – Fall 2014

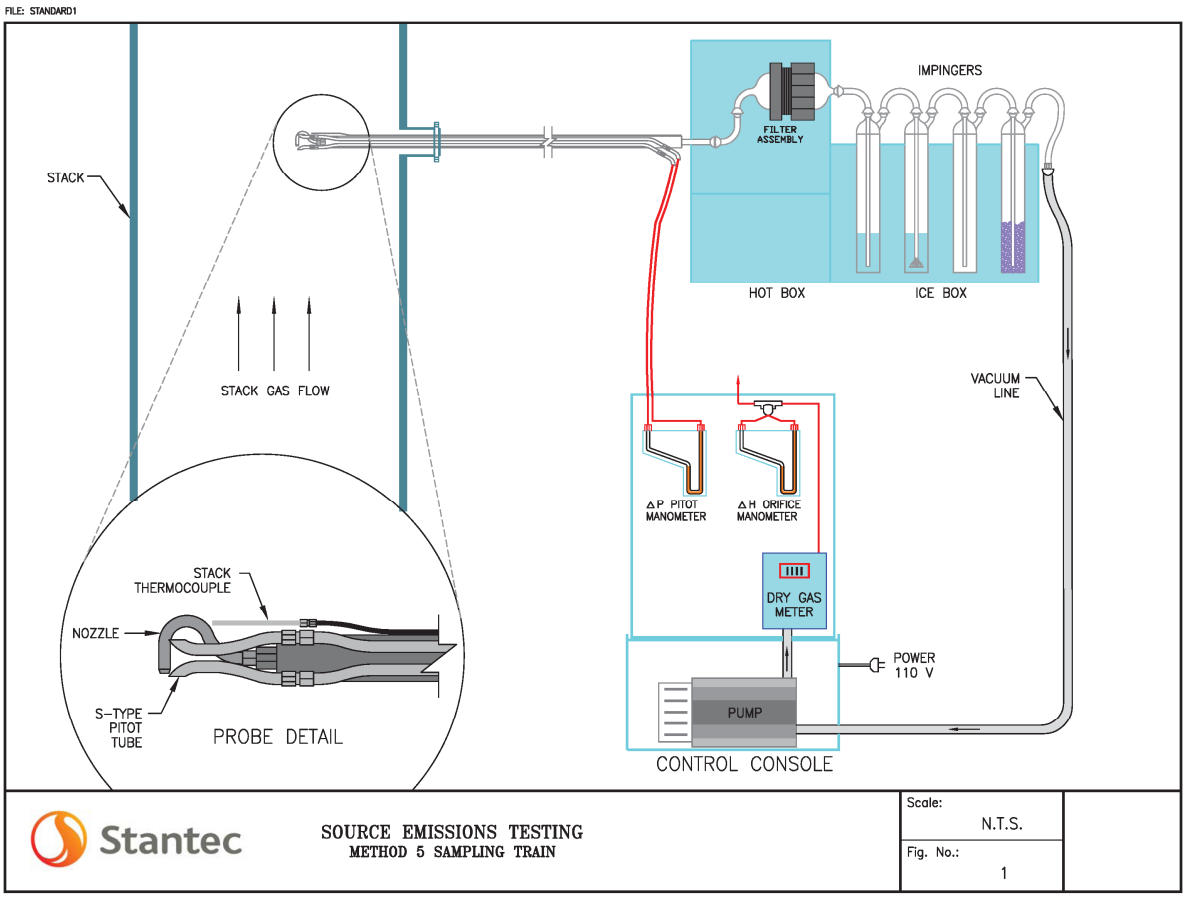
Power Boiler and in units of kg/adubmt for the Lime Kiln and the Dissolving Tank. Total reduced sulphur will be reported in units of parts per million by dry volume (ppmdv).

Results of the source emissions testing will be documented in a final report for submission to Nova Scotia Environment (NSE) for review and approval.

Sampling Locations

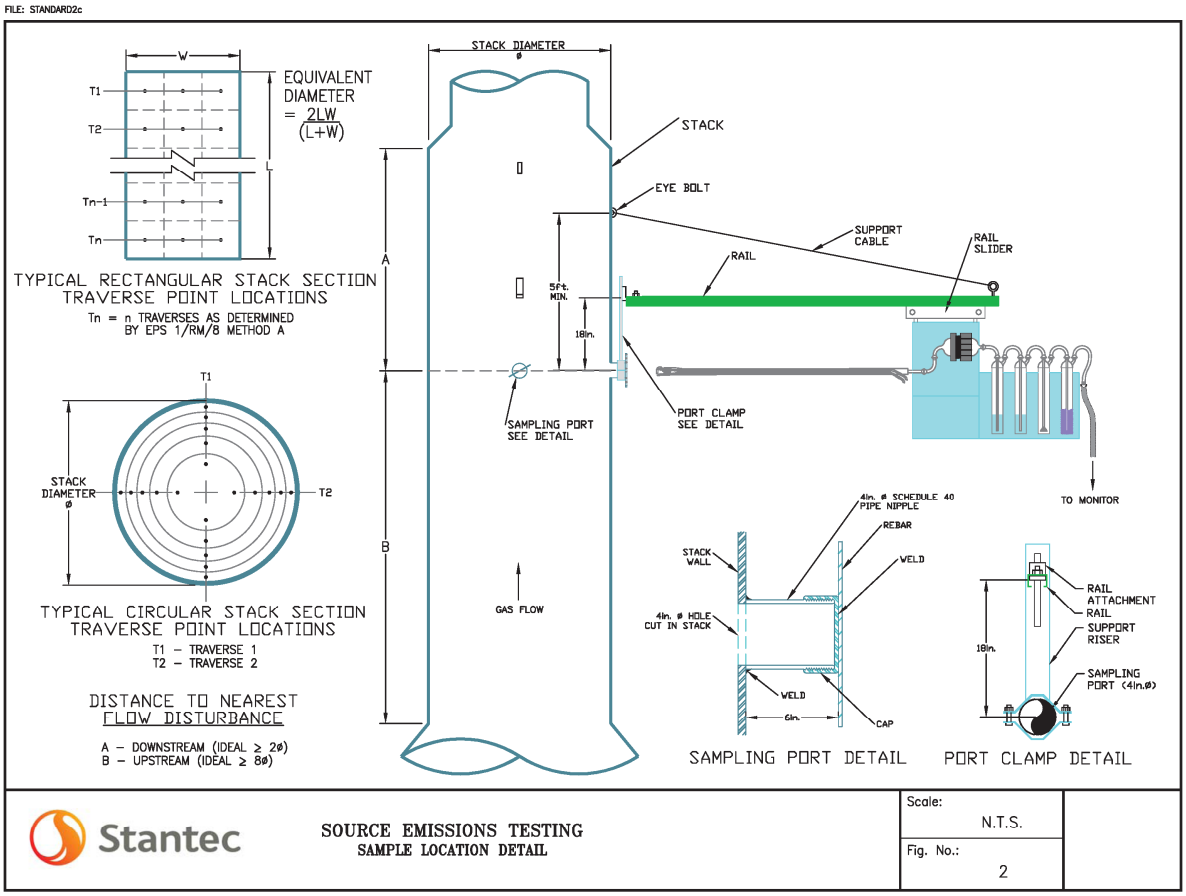
The number and location of sample points along each traverse were determined according to EPS 1/RM/8, Method A, using the exhaust stack diameter. A diagram of a typical sample location is provided in Figure 2.

Figure 1 Source Emission Testing, Method 5 Sampling Train



Reference: Pre-Test Plan for Source Emissions Testing Northern Pulp, Pictou Mill – Fall 2014

Figure 2 Source Emissions Testing, Sample Location Details



Reference: Pre-Test Plan for Source Emissions Testing Northern Pulp, Pictou Mill – Fall 2014

A summary of the sample location details is provided in Table 2.

Table 2 Sample Location Details

Parameter	Recovery Boiler	Lime Kiln	Smelt Dissolving Tank	Power Boiler Scrubber Stack	High Level Roof Vent
Stack Height – Above Grade (m)	69	37	51	51	65
Diameter / Equivalent Diameter (m)	3.51	1.22	1.22	1.93	1.83
Stack/Duct Description	Circular	Circular	Circular	Circular	Circular
Stack Orientation	Vertical	Vertical	Vertical	Vertical	Vertical
Location of Source Testing	In Stack	In Stack	In Stack	In Stack	In Stack
Number of Sample Ports	4	2	2	2	1
Sample Port Diameter (m)	0.1	0.15	0.1	0.1	0.1
Location Upstream from any Disturbance,	>2	2	>2	>2	-
Location Downstream from any Disturbance,	1.45	8	6	> 4	-
Ideal or Non Ideal Flow Characteristics at The Sample Location[1]	Not Ideal	Not Ideal[2]	Not Ideal	Not Ideal	-
Total Number of Sample Points	24	24 (for PM) 1 (for TRS)	20	24	1 (for TRS)
Number of Sample Points per Traverse (PM sampling)	12	12	10	12	NA
Sample Time per Point for PM samples (min)	5	5	5	5	NA
Sample time per Test for PM (min)	120	120	100	120	NA
Sample time per Test for combustion gas (min)	30	30	30	30	30
Sample time per Test for TRS (min)	NA	1,440	NA	NA	1,440

[1] The exhaust gas flow characteristics at the sampling location are referred to as being "Ideal" if the sample ports are located in a straight section of stack at least eight stack diameters downstream and two stack diameters upstream of any flow disturbance.
[2] The lime kiln sampling location has been changed from ideal to not ideal due to the cyclonic flow.

Quality Assurance / Quality Control

Throughout the stack testing program, rigorous quality assurance and quality control procedures will be applied to ensure the collection of reliable, representative, and reproducible emissions data. All equipment will be calibrated according to the protocols as prescribed by Environment Canada, and the US EPA. These calibrations include the following:

Pitots: calibrated in a wind tunnel with probe and nozzles attached;
Gas meters: calibrated against a critical orifice set;
Thermocouples: calibrated using a potentiometric technique;

Nozzle:	four diameter measurements made using a micrometer across the sharpened edges; and
Combustion Gas Analyser:	2 point calibrations before and after the testing using span gases of known concentrations.

Calibration data will be provided in the final report.

Quality control checks will be performed at several stages during the testing program to ensure the collection of representative samples and the generation of valid results. These checks are performed by test personnel throughout the program under the guidance of the source testing crew chief. The Quality Control (QC) checks include the following:

- Use of standardized checklists and field notebooks to ensure completeness, traceability, and comparability of the process information and samples collected;
- Field checking of standardized forms by a second person to ensure accuracy and completeness;
- Strict adherence to sample chain-of-custody procedures;
- Use of appropriate field blanks (*e.g.,* filter and solution samples); and
- Leak checks of sample trains.

All internal quality assurance and quality control procedures will be strictly adhered to during all test programs to ensure the production of useful and high quality data throughout the course of the program.

Qualifications of Source Testing Team

The successful completion of this project requires the skills of competent and experienced professionals who have a strong commitment to complete the project quickly and efficiently and to produce high quality results. The source testing team we have assembled to meet the challenges of this assignment consists of highly trained professionals who bring a broad range of expertise and experience to the project. The following paragraphs provide brief descriptions of the qualifications of the source emissions testing team:

Senior Reviewer:

Ms. Vicki Corning, P.Eng., Ms. Corning has a degree in chemical engineering and has since gained technical and management expertise in many environmental services including: regulatory activities (environmental impact assessments, responses to technical review committees, environmental protection plans, environmental monitoring plans, Greenhouse Gas Verifications, Alberta NOX and SO2 Credit Application Verifications); source emissions testing; ambient air quality monitoring; emissions inventories; pollutant dispersion modelling (AERMOD, ISC); ambient sound quality assessments; noise attenuation modelling; landfill gas testing and utilization; and National Pollutant Reporting Inventory preparation). Ms. Corning has experience in public and stakeholder relations, having participated in several open houses as an air and sound quality specialist on projects undergoing environmental assessment. Ms. Corning is also a team

leader and regional discipline leader for climate and GHG services, managing personnel, business development, quality assurance and training.

Ms. Corning has worked with clients in a variety of different industries in Canada and the US including: gas processing plants, oil refineries, pipeline operations, chemical processes, electrical generating stations (coal, gas, biomass, co-generation, wind), manufacturing plants, construction projects, and pulp mills. Ms. Corning has managed the preparation of several policy reports on renewable energy for the New Brunswick Department of Energy and has presented key messages of this work to several groups. Ms. Corning has also delivered course material on GHG inventory and data management techniques through a contract with the CSA.

Project Manager and Report Writer:

Matt Steeves, B.Sc. joined the Stantec team in 2007 as an Environmental Scientist in Stantec's Dartmouth office and is currently providing technical expertise in the Environmental Services Practice Area. Matt has supported emissions testing at the Northern Pulp mill on several previous campaigns. Matt's consulting experience predominantly relates to the assessment of environmental conditions for inclusion in federal and provincial Environmental Assessments. This work has involved the planning, implementation and reporting of multiple large and small scale field surveys for numerous projects such as pipelines, transmission lines, wind farms, wharfs, highway/bridge construction, rail lines, residential developments and quarries.

In addition to the collection and interpretation of baseline aquatic data for Environmental Assessments, Matt has worked on multiple field-based projects related to air quality and acoustic monitoring.

Christina Flogeras, EIT, is an Air Pollutant and Greenhouse Gas (GHG) Emissions Analyst. She has been involved in air quality studies including dispersion modelling, noise monitoring, source emissions testing, and ambient monitoring. These projects have been across several industrial sectors, including pulp and paper, petroleum refinement, and asphalt production. Ms. Flogeras has created inventories to address National Pollutant Release Inventory (NPRI) and GHG Reporting. She has performed third party desktop reviews for compliance reports and baseline submissions under the Alberta Specified Gas Emitters Regulation and the Alberta Emissions Trading Regulation. Other GHG verification work includes third party verifications under the British Columbia Reporting Regulation, the Ontario 452/09 Regulation, the Massachussetts Greenhouse Gas Reporting Program, and The Climate Registry. Ms. Flogeras has completed GHG offset protocol assessments under the British Columbia Offset Emissions Regulation and the VCS program.

Reference: Pre-Test Plan for Source Emissions Testing Northern Pulp, Pictou Mill – Fall 2014

Source Testing Team:

Mr. Nick MacDonald, P.Tech. Mr. Nick MacDonald graduated from NBCC Moncton in 2007. Since graduation Mr. MacDonald has worked in environmental engineering in a variety of capacities, primarily as an air quality field technician. Mr. MacDonald joined Stantec in 2007, and has completed over 60 source testing projects including testing for total particulate matter and particle size distribution, metals and combustion gas monitoring. Nick is Stantec's primary continuous emissions monitoring specialist and will operate the TRS sampling systems for this project. Nick has conducted testing at Northern Pulp for the last three years. Nick is also responsible for the Stantec source testing team's equipment calibrations and maintenance.

Mr. Andrew Lynch, CFT, is a technician who joined the Air Quality group in Stantec's Fredericton, New Brunswick office in 2011 and has completed over 20 testing campaigns including several at Northern Pulp. Mr. Lynch received a diploma from the Maritime College of Forest Technology in 2007 and since has worked for industrial companies across Canada and the United States. Mr. Lynch has developed analytical and data collection skills through his field experience in environmental services such as forestry and silviculture across North America and is currently developing air quality sampling expertise through Stantec's internal training programs. Mr. Lynch will assist with on-site testing and assist with data analysis and reporting as required.

Mr. Tristan Blair-Hicks, B.Sc., Mr. Tristan Blair-Hicks, EIT, is an Air Quality Engineer-in-Training in Stantec's Fredericton, New Brunswick office specializing in emissions quantification and testing. Tristan completed a work term with Environment Canada where he worked as part of the Climate Change team and assisted in the preparation of the National Greenhouse Gas Inventory. Mr. Blair-Hicks has a degree in mechanical engineering and has been involved in source emissions testing (particulate matter, combustion gases, volatile organic compounds, metals), and ambient monitoring for several industrial sectors, including pulp and paper, petroleum refinement, and asphalt production. Tristan has conducted on-site testing, data entry, quality assurance and control, and reporting for emissions testing campaigns. Tristan has also supported greenhouse gas verification procedures for power plants and oil and gas clients.

Mr. Blair-Hicks has worked with clients in a variety of different industries in the Maritimes, including: gas processing plants, oil refineries, electrical generating stations (coal, gas, co-generation), manufacturing plants, construction projects, and pulp mills.

Mr. Michael Malone, B.Sc., Michael Malone, B.Sc., is an environmental technician/scientist in the Environmental Remediation group at Stantec Consulting Ltd.'s Dartmouth, Nova Scotia location. Mr. Malone has five (5) years of experience in environmental consulting with Stantec and has significant experience in hazardous material assessments and abatement, indoor air quality, mould assessments, asbestos management plans and report preparation. Mr. Malone has been certified in Phase Contrast Microscopy (PCM) from the Institut de recherche Robert-Sauve en Sante et en security du travail (IRSST) since 2012. Mr. Malone also has 2 years of experience in conducting Industrial Source Emissions Testing with Stantec at kraft pulp mills and power generation facilities.

Reference: Pre-Test Plan for Source Emissions Testing Northern Pulp, Pictou Mill – Fall 2014

Mr. Michael McLean, Michael is an Environmental Technologist in Stantec's Dartmouth Nova Scotia Office. He is a recent graduate of Fleming College's Environmental Technology program where he specialized in field sampling techniques and site remediation. He is currently completing his fourth year at Trent University from distance, majoring in Environmental Resource Management. He has worked previously in Nova Scotia at the provincial government level in environmental compliance and inspection. Currently, he is providing technical assistance for Stantec's Environmental Management Department. Michael has worked on a number of field-based projects dealing with industrial emissions. He is experienced conducting baseline noise assessments of sound pressure levels on a variety of construction and industrial sites.

Schedule

The field work portion of the project is scheduled to commence during the week of October 20, 2014. Stantec estimates that the field work can be conducted over a period of one week, assuming consistent operation of the facility. From the completion of the field work it will take approximately 60 working days to complete the laboratory analysis and reporting.

Your timely written approval of this pre-test plan is greatly appreciated. If you have any questions, please do not hesitate to contact me directly at (902) 468-7777.

Regards,

STANTEC CONSULTING LTD.



Matt Steeves
Project Manager – Environmental Services
Phone: (902) 468-7777
Fax: (902) 468-9009
matt.steeves@stantec.com

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Appendix C

Calibration Data

Stantec Consulting Ltd.

Steel Nozzle Calibration Data Sheet

NozzleID	Nozzle Diameter (inches)					
Set - 1	<1>	<2>	<3>	<4>	Hi-Lo	**Avg.**
1-4	0.125	0.124	0.127	0.125	0.003	**0.125**
1-6	0.171	0.175	0.171	0.173	0.004	**0.173**
1-8	0.234	0.231	0.233	0.233	0.003	**0.233**
1-10	0.305	0.306	0.305	0.304	0.002	**0.305**
1-12	0.371	0.373	0.372	0.371	0.002	**0.372**
1-14	0.434	0.436	0.437	0.437	0.003	**0.436**
1-16	0.500	0.502	0.500	0.499	0.003	**0.500**
QA/QC	Check					
	Each Diameter Measured To Within = 0.001 Inches					
	High - Low </= 0.004					
Prepared By: AL					Date: Feb 10, 2014	

VALLEY ENVIRONMENTAL CALIBRATION SERVICES

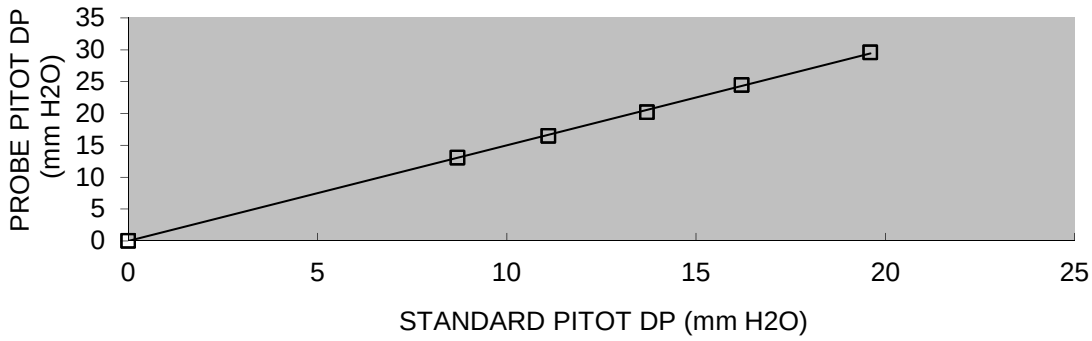
PITOT TUBE CALIBRATION REPORT

CLIENT - **Stantec**
PROBE ID - **8-1 FT M5**
NOZZLE - **#6- 0.1875"**
DATE - **February 18, 2014**

FAN SPEED m/s	STANDARD PITOT (mm H2O)	PROBE PITOT (mm H2O)
0.00	0.00	0.00
12.2	8.70	13.10
13.7	11.10	16.50
15.3	13.70	20.20
16.6	16.20	24.50
18.2	19.60	29.60

PITOT FACTOR Cp = **0.816**

PITOT - 8-1 FT M5 NOZZLE - #6- 0.1875"
February 18, 2014



Technician: T. Ryan

Signature

VALLEY ENVIRONMENTAL SERVICES
160 Pony Drive #1
Newmarket, Ontario L3Y 7B6
PH: (905) 830 0136
FAX: (905) 830 0137

Tunnel	VES
Std. Pitot Cp	0.999
Static	-0.25
Barometric	28.7
Temperature	66
Abs Static	28.68

VALLEY ENVIRONMENTAL CALIBRATION SERVICES

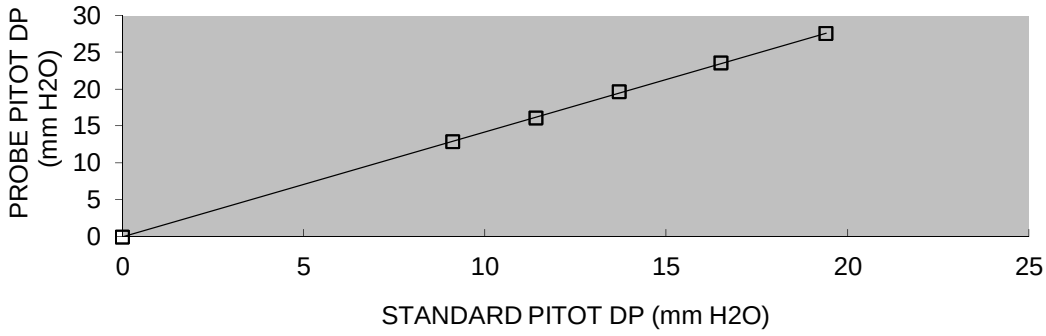
PITOT TUBE CALIBRATION REPORT

CLIENT - **Stantec**
PROBE ID - **2FT M5**
NOZZLE - **#8- 0.250"**
DATE - **March 01, 2014**

FAN SPEED m/s	STANDARD PITOT (mm H2O)	PROBE PITOT (mm H2O)
0.00	0.00	0.00
12.4	9.10	12.90
13.8	11.40	16.10
15.2	13.70	19.70
16.6	16.50	23.60
18.0	19.40	27.60

PITOT FACTOR Cp = **0.838**

PITOT - **2FT M5** **NOZZLE -** **#8- 0.250"**
March 01, 2014



Technician: T. Ryan

Signature

VALLEY ENVIRONMENTAL SERVICES
160 Pony Drive #1
Newmarket, Ontario L3Y 7B6
PH: (905) 830 0136
FAX: (905) 830 0137

Tunnel	VES
Std. Pitot Cp	0.999
Static	-0.25
Barometric	29
Temperature	65
Abs Static	28.98

VALLEY ENVIRONMENTAL CALIBRATION SERVICES

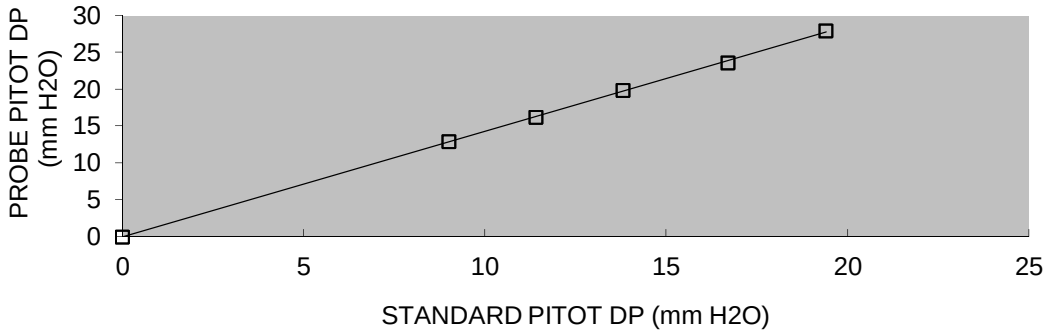
PITOT TUBE CALIBRATION REPORT

CLIENT - **Stantec**
PROBE ID - **5FT M5**
NOZZLE - **#10- 0.3125"**
DATE - **March 01, 2014**

FAN SPEED m/s	STANDARD PITOT (mm H2O)	PROBE PITOT (mm H2O)
0.00	0.00	0.00
12.3	9.00	12.90
13.8	11.40	16.20
15.2	13.80	19.90
16.7	16.70	23.60
18.0	19.40	28.00

PITOT FACTOR Cp = **0.836**

PITOT - **5FT M5** **NOZZLE -** **#10- 0.3125"**
March 01, 2014



Technician: T. Ryan

Signature

VALLEY ENVIRONMENTAL SERVICES
160 Pony Drive #1
Newmarket, Ontario L3Y 7B6
PH: (905) 830 0136
FAX: (905) 830 0137

Tunnel	VES
Std. Pitot Cp	0.999
Static	-0.25
Barometric	29
Temperature	65
Abs Static	28.98

VALLEY ENVIRONMENTAL CALIBRATION SERVICES

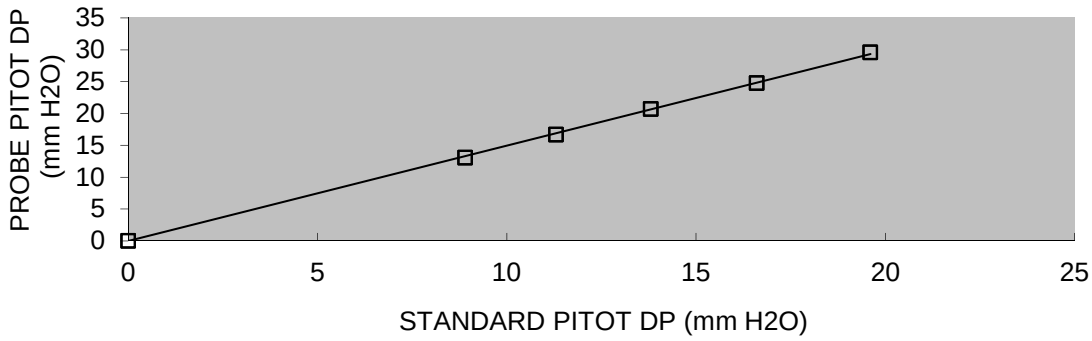
PITOT TUBE CALIBRATION REPORT

CLIENT - **Stantec**
PROBE ID - **8-2 FT M5**
NOZZLE - **#6- 0.1875"**
DATE - **February 24, 2014**

FAN SPEED m/s	STANDARD PITOT (mm H2O)	PROBE PITOT (mm H2O)
0.00	0.00	0.00
12.3	8.90	13.10
13.8	11.30	16.70
15.3	13.80	20.70
16.7	16.60	24.80
18.2	19.60	29.60

PITOT FACTOR Cp = **0.817**

PITOT - 8-2 FT M5 NOZZLE - #6- 0.1875"
February 24, 2014



Technician: T. Ryan

Signature

VALLEY ENVIRONMENTAL SERVICES
160 Pony Drive #1
Newmarket, Ontario L3Y 7B6
PH: (905) 830 0136
FAX: (905) 830 0137

Tunnel	VES
Std. Pitot Cp	0.999
Static	-0.25
Barometric	28.85
Temperature	65
Abs Static	28.83

Pre-Test Dry Gas Meter - Control Unit Calibration

Date : 5/12/2014
Barometric Pressure, Pb : 30.2
Model Number : 1646
Calibrated By : NGM
Job #:

Orifice Manometer Setting, deltaH (in. H2O)	Dry Gas Meter Volume, Vm (cu.ft)						Temperatures (F)				Time, theta (min)
						Total		Dry Gas Meter			
									Outlet, to	Average, tm	
1.0						5.340			43	45	10
1.4						5.247			45	46	8
2.2						5.817			47	49	7

Calculations

Orifice Manometer Setting, deltaH (in. H2O)	Dry Gas Correction Factor, gamma (Tolerance = 0.95 - 1.05, +/-1.5% of avg)	Orifice Pressure Differential (delta H@) yielding 0.75 cfm of air at 68F and 29.92 in.Hg as in. H2O (Tolerance = +/- 0.15 in.)	Orifice Coefficient Ko
1.0	0.990	1.806	0.707
1.4	0.984	1.788	0.715
2.2	0.967	1.821	0.721
Average	**0.980**	**1.805**	**0.714**

METHOD 5 DRY GAS METER CALIBRATION USING CRITICAL ORIFICES

Quality - Service - Reliability

1) Select three critical orifices to calibrate the dry gas meter which bracket the expected operating range.
2) Record barometric pressure before and after calibration procedure.
3) Run at tested vacuum (from Orifice Calibration Report), for a period of time necessary to achieve a minimum total volume of 5 cubic feet.
4) Record data and information in the **GREEN** cells, YELLOW cells are calculated.

DATE:	5/12/2014	METER SERIAL #:	17485069	BAROMETRIC PRESSURE (in Hg):	INITIAL 30.2	FINAL 30.2	AVG (P_{bar}) 30.2
METER PART #:	1646	CRITICAL ORIFICE SET SERIAL #:	1463s				

IF Y VARIATION EXCEEDS 2.00%, ORIFICE SHOULD BE RECALIBRATED

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	DGM READINGS (FT^3) FINAL	DGM READINGS (FT^3) NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y VARIATION (%)	$\Delta H_@$
15	1	0.4164	18	379.81	385.13	5.320	45	47	47	42	43	44.75	10.00	0.95	5.6313	5.5976	0.994		1.81
	2	0.4164	18	385.13	390.50	5.370	45	47	46	43	43	44.75	10.00	0.95	5.6843	5.5976	0.985		1.81
	3	0.4164	18	390.50	395.83	5.330	45	46	46	43	43	44.5	10.00	0.95	5.6447	5.5976	0.992		1.81
														AVG =			0.990	0.99	
18	1	0.5085	17	395.83	401.03	5.20	47	46	47	43	45	45.25	8.00	1.40	5.5049	5.4578	0.991		1.79
	2	0.5085	17	401.03	406.25	5.220	47	47	47	45	45	46	8.00	1.40	5.5178	5.4578	0.989		1.79
	3	0.5085	17	406.25	411.57	5.320	47	47	50	45	47	47.25	8.00	1.40	5.6097	5.4578	0.973		1.78
														AVG =			0.984	0.42	
23	1	0.6307	17	411.57	417.24	5.670	47	50	50	47	47	48.5	7.00	2.20	5.9756	5.9232	0.991		1.82
	2	0.6307	17	417.24	423.08	5.840	47	50	50	47	47	48.5	7.00	2.20	6.1548	5.9232	0.962		1.82
	3	0.6307	17	423.08	429.02	5.940	47	50	50	47	47	48.5	7.00	2.20	6.2602	5.9232	0.946		1.82
														AVG =			0.967	-1.41	

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:

The following equations are used to calculate the standard volumes of air passed through the DGM, V_m (std), and the critical orifice, V_{cr} (std), and the DGM calibration factor, Y. These equations are automatically calculated in the spreadsheet above.

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = 0.980

AVERAGE $\Delta H_@$ = 1.80

(1) $$Vm_{(std)} = K_1 * Vm * \frac{Pbar + (\Delta H / 13.6)}{Tm}$$

= Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

(2) $$Vcr_{(std)} = K' * \frac{Pbar * \Theta}{\sqrt{Tamb}}$$

= Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $$Y = \frac{Vcr_{(std)}}{Vm_{(std)}}$$

= DGM calibration factor

$$\Delta H_@ = \left(\frac{0.75\,\theta}{V_{cr(std)}}\right)^2 \Delta H \left(\frac{V_{m(std)}}{V_m}\right)$$

Pre-Test Dry Gas Meter - Control Unit Calibration

Date : 6/14/2014
Barometric Pressure, Pb : 30.2
Model Number : 1848
Calibrated By : NGM
Job #:

Orifice Manometer Setting, deltaH (in. H2O)				Dry Gas Meter Volume, Vm (cu.ft)			Temperatures (F)				Time, theta (min)
								Dry Gas Meter			
						Total			Outlet, to	Average, tm	
0.9						5.150			65	65	10
1.4						5.120			66	66	8
2.2						5.517			67	67	7

Calculations

Orifice Manometer Setting, deltaH (in. H2O)	Dry Gas Correction Factor, gamma (Tolerance = 0.95 - 1.05, +/-1.5% of avg)	Orifice Pressure Differential (delta H@) yielding 0.75 cfm of air at 68F and 29.92 in.Hg as in. H2O (Tolerance = +/- 0.15 in.)	Orifice Coefficient Ko
0.9	1.049	1.705	0.729
1.4	1.032	1.778	0.726
2.2	1.039	1.816	0.713
Average	**1.040**	**1.766**	**0.723**

METHOD 5 DRY GAS METER CALIBRATION USING CRITICAL ORIFICES

Quality - Service - Reliability

1) Select three critical orifices to calibrate the dry gas meter which bracket the expected operating range.
2) Record barometric pressure before and after calibration procedure.
3) Run at tested vacuum (from Orifice Calibration Report), for a period of time necessary to achieve a minimum total volume of 5 cubic feet.
4) Record data and information in the **GREEN** cells, YELLOW cells are calculated.

DATE:	6/14/2014	METER SERIAL #:	16605036	BAROMETRIC PRESSURE (in Hg):	INITIAL 30.2	FINAL 30.2	AVG (P_{bar}) 30.2
METER PART #:	1848	CRITICAL ORIFICE SET SERIAL #:	1463s				

IF Y VARIATION E)

ORIFICE SHOULD BE R

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	DGM READINGS (FT^3) FINAL	DGM READINGS (FT^3) NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y
15	1	0.4164	18	124.50	129.68	5.180	64	64	66	64	64	64.5	10.00	0.90	5.2759	5.4952	1.042
	2	0.4164	18	129.68	134.84	5.160	64	66	66	64	65	65.25	10.00	0.90	5.2480	5.4952	1.047
	3	0.4164	18	134.84	139.95	5.110	64	66	66	65	66	65.75	10.00	0.90	5.1922	5.4952	1.058
																AVG =	1.049
18	1	0.5085	18	139.95	145.15	5.20	64	66	66	66	66	66	8.00	1.40	5.2876	5.3685	1.015
	2	0.5085	18	145.15	150.22	5.070	64	66	66	66	66	66	8.00	1.40	5.1554	5.3685	1.041
	3	0.5085	18	150.22	155.31	5.090	64	66	67	66	67	66.5	8.00	1.40	5.1708	5.3685	1.038
																AVG =	1.032
23	1	0.6307	18	155.31	160.84	5.530	64	67	67	67	67	67	7.00	2.20	5.6234	5.8263	1.036
	2	0.6307	18	160.84	166.37	5.530	64	67	68	67	67	67.25	7.00	2.20	5.6207	5.8263	1.037
	3	0.6307	18	166.37	171.86	5.490	64	68	68	67	67	67.5	7.00	2.20	5.5774	5.8263	1.045
																AVG =	1.039

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:

The following equations are used to calculate the standard volumes of air passed through the DGM, V_m (std), and the critical orifice, V_{cr} (std), and the DGM calibration factor, Y. These equations are automatically calculated in the spreadsheet above.

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = 1.040

AVERAGE $\Delta H_@$ = 1.77

(1) $$Vm_{(std)} = K_1 * Vm * \frac{Pbar + (\Delta H / 13.6)}{Tm}$$

= Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

(2) $$Vcr_{(std)} = K' * \frac{Pbar * \Theta}{\sqrt{Tamb}}$$

= Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $$Y = \frac{Vcr_{(std)}}{Vm_{(std)}}$$

= DGM calibration factor

$$\Delta H_@ = \left(\frac{0.75\ \theta}{V_{cr}(std)}\right)^2 \Delta H \left(\frac{V_m(std)}{V_m}\right)$$



KCEEDS 2.00%,

ECALIBRATED

Y VARIATION (%)	$\Delta H_{@}$
	1.71
	1.71
	1.70
0.87	
	1.78
	1.78
	1.78
-0.80	
	1.82
	1.82
	1.81
-0.08	

CONTINUOUS EMISSION MONITORS
SYSTEM CALIBRATION AND DRIFT

Client:	Northern Pulp		
Plant:	Pictou		
Location:	Lime Kiln	**Test No.:**	TRS
		Date:	Oct. 23, 2014 - Oct. 24, 2014
Project No.:	121511269	**Time Start:**	8:50 PM
Personnel:	NGM	**Time Finish:**	9:15 PM

INSTRUMENT SPAN VALUES			
Oxygen (%):	25	**Carbon Dioxide (%):**	25
Sulphur Dioxide (ppm):	500	**Carbon Monoxide (ppm):**	300
		TRS (ppm):	500

Analyzer Setting	Cal. Gas Value	Initial Values			Final Values		Drift (<3% Span)
		Analyzer Calibration	System Calibration	System Cal. Bias (<5% Span)	System Calibration	System Cal. Bias (<5% Span)	
O2 Zero	0.00	0.00	0.00	0.00%	0.06	0.24%	0.24%
O2 Span	21.53	21.53	21.54	0.04%	21.54	0.04%	0.00%
CO2 Zero	0.00	0.00	0.00	0.00%	0.77	3.08%	3.08%
CO2 Span	20.84	20.84	20.86	0.08%	20.84	0.00%	-0.08%
CO Zero	0.00	0.00	0.00	0.00%	-4.0	-1.32%	-1.32%
CO Span	290.0	290.0	289.8	-0.08%	287.9	-0.70%	-0.62%
SO2 Zero	0.00	0.00	0.00	0.00%	-3.3	-0.66%	-0.66%
SO2 Span	490.0	490.0	489.9	-0.02%	467.9	-4.42%	-4.40%
TRS Zero	0.00	0.00	0.00	0.00%	-5.45	-1.09%	-1.09%
TRS Span	490.0	490.0	490	0.00%	456.73	-6.65%	-6.65%

	7:55-8:15	
	ZERO	SPAN
TRS	-5.74	476.83
SO2	-7.76	473.19

Note: Data from this period was removed.

CONTINUOUS EMISSION MONITORS
SYSTEM CALIBRATION AND DRIFT

Client:	Northern Pulp
Plant:	Pictou
Location:	HLRV
Project No.:	121511269
Personnel:	NGM

Test No.:	TRS 1
Date:	October 20 - 21, 2014
Time Start:	2:40 PM
Time Finish:	10:05 AM

Test 1 ran 19 hours and 25 minutes.

INSTRUMENT SPAN VALUES			
Oxygen (%):	25	**Carbon Dioxide (%):**	25
Sulphur Dioxide (ppm):	500	**Carbon Monoxide (ppm):**	300
		TRS (ppm):	500

Analyzer Setting	Cal. Gas Value	Initial Values			Final Values		Drift (<3% Span)
		Analyzer Calibration	System Calibration	System Cal. Bias (<5% Span)	System Calibration	System Cal. Bias (<5% Span)	
O2 Zero	0.00	0.00	0.00	0.00%	0.06	0.24%	0.24%
O2 Span	21.53	21.54	21.53	-0.04%	22.04	2.00%	2.04%
CO2 Zero	0.00	0.00	0.00	0.00%	0.02	0.08%	0.08%
CO2 Span	20.84	20.88	20.84	-0.16%	21.09	0.84%	1.00%
CO Zero	0.00	0.00	0.00	0.00%	-5.9	-1.98%	-1.98%
CO Span	290.0	290.0	289.9	-0.04%	283.7	-2.09%	-2.06%
SO2 Zero	0.00	0.00	0.00	0.00%	-9.9	-1.98%	-1.98%
SO2 Span	490.0	490.3	490.0	-0.07%	473.2	-3.42%	-3.35%
TRS Zero	0.00	0.00	0.00	0.00%	22.09	4.42%	4.42%
TRS Span	490.0	490.0	490.56	0.11%	488.26	-0.35%	-0.46%

CONTINUOUS EMISSION MONITORS
SYSTEM CALIBRATION AND DRIFT

Client:	Northern Pulp
Plant:	Pictou
Location:	HLRV
Project No.:	121511269
Personnel:	NGM

Test No.:	TRS 2
Date:	October 23, 2014
Time Start:	9:00 AM
Time Finish:	5:00 PM

Test 2 ran 8 hours. Total test period was 27 hours and 25 minutes.

INSTRUMENT SPAN VALUES			
Oxygen (%):	25	**Carbon Dioxide (%):**	25
Sulphur Dioxide (ppm):	500	**Carbon Monoxide (ppm):**	300
		TRS (ppm):	500

Analyzer Setting	Cal. Gas Value	Initial Values			Final Values		Drift (<3% Span)
		Analyzer Calibration	System Calibration	System Cal. Bias (<5% Span)	System Calibration	System Cal. Bias (<5% Span)	
O2 Zero	0.00	0.00	0.00	0.00%	0.04	0.16%	0.16%
O2 Span	21.53	21.53	21.50	-0.12%	21.48	-0.20%	-0.08%
CO2 Zero	0.00	0.02	0.00	-0.08%	0.03	0.04%	0.12%
CO2 Span	20.84	20.86	20.84	-0.08%	20.86	0.00%	0.08%
CO Zero	0.00	0.00	0.00	0.00%	2.0	0.66%	0.66%
CO Span	290.0	290.0	289.7	-0.10%	290.2	0.06%	0.16%
SO2 Zero	0.00	0.00	0.00	0.00%	3.3	0.66%	0.66%
SO2 Span	490.0	490.2	490.0	-0.04%	486.9	-0.65%	-0.62%
TRS Zero	0.00	0.00	0.00	0.00%	-13.04	-2.61%	-2.61%
TRS Span	490.0	493.2	492.18	-0.21%	477.84	-3.08%	-2.87%

Appendix D

Field Data Sheets

MOISTURE FIELD DATA SHEET

Project No.: 121511269
Client: NORTHERN PULP
Plant: PICTON M/S
Location: LIME KILN
Test: PM-1
Date: OCT 23/2014
Analyst: NGM

Stantec

FILTER ID #
0930-7

Moisture Data

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	1014.3	608.5	405.8
2	100 mL H2O	717.0	707.0	10
3	Blank	668.4	666.9	1.5
4	200g Silica Gel	976.7	969.4	7.3
		Total Weight Gain (g)		424.6
		Moisture Volume (mL)		

Volume H_2O Collected: 424.6 ml

X 0.048 = 20.38 ft^3 H_2O **(Vwc)**

DGM Final 540.41 ft^3

DGM Initial 509.43 ft^3

Final - Initial = 30.98 ft^3 **(Vmc)**

$$\text{Moisture} = \frac{\textbf{Vwc}}{\textbf{(Vwc + Vmc)}}$$

$$\text{Moisture} = \frac{20.38}{20.38 + 30.98}$$

Moisture = 0.40 = 40%

COMBUSTION GAS ANALYSIS
CONCENTRATION FIELD SHEET

Sampling Methodology: Environment Canada EPS 1/RM/15

Stantec

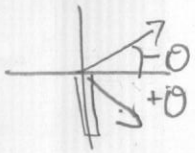
Project No.: 121511269
Client: Northern Pulp
Plant: Pictou, NS
Location: Lime kiln

Fuel Type: Nat gas
Time Start:
Time Finish:

Test No.: Gas # 1-3
Date: Oct 24, 2014

Personnel:

Time	1	2	3	Concentrations				
	~~O_2~~ 1 (%)	~~CO_2~~ (%)	~~CO~~ (ppm)	SO_2 (ppm)	NO_X (ppm)	NO (ppm)	NO_2 (ppm)	THC (%)
0	128	146	125					
5	133	147	151					
10	131	135	143					
15	131	139	129					
20	132	129	131					
25	129	139	130					
30	127	145	140					



SOURCE TESTING FIELD DATA SHEET

Job No.: 121511269
Client: Northern Pulp
Plant: Pictou, NS
Location: Lime Kiln
Test: PM-1
Date: Oct 23, 2014
Operators: TBH
Gamma: 0.980
Delta H@: 1.805
Pitot Coeff.: 0.816
Start: 12:23
Finish: 14:45

Static Pressure (in.H2O): 0.51
Port Length (in): 6"
Stack Dia. (in.): 48"
Probe Length (ft): 8'-1
Nozzle ID (in.): 1-6 (0.173)
Console S/N: 1646

Pre-Test Leak Check: ✓
Vacuum Pressure: -18
Post-Test Leak Check:
Vacuum Pressure:

K': 0.46

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (in.Hg)
									In	Out	
	0				509.48						
1	2.5	161	0.84	0.33	510.23	264	225	45	69	68	-1
	5	161	0.84	0.33	510.99	279	238	44	70	66	-1
2	7.5	161	0.79	0.30	511.68	281	249	42	70	67	-1
	10	161	0.76	0.30	512.44	280	250	42	70	69	-1
3	12.5	161	0.72	0.28	513.19	281	251	42	70	68	-1
	15	162	0.71	0.28	513.90	280	254	43	70	69	-1
4	17.5	162	0.63	0.25	514.57	281	260	43	70	70	-1
	20	163	0.62	0.24	515.21	281	262	43	71	70	-1
5	22.5	162	0.50	0.20	515.84	280	262	43	70	69	-1
	25	162	0.48	0.19	516.40	279	260	44	70	70	-1
6	27.5	162	0.43	0.17	516.96	280	261	44	70	70	-1
	30	162	0.41	0.16	517.48	280	259	44	70	70	-1
7	32.5	163	0.55	0.22	518.11	281	262	45	69	69	-1
	35	163	0.57	0.22	518.73	280	260	44	69	69	-1
8	37.5	162	0.59	0.23	519.37	280	260	44	69	69	-1
	40	162	0.59	0.23	520.01	280	260	45	69	69	-1
9	42.5	163	0.55	0.21	520.62	281	256	45	69	69	-1
	45	162	0.55	0.22	521.25	281	261	45	69	68	-1
10	47.5	160	0.35	0.14	521.72	281	260	46	69	68	-1
	50	160	0.35	0.14	522.24	280	259	48	69	68	-1
11	52.5	158	0.25	0.10	522.65	280	261	48	70	68	-1
	55	159	0.25	0.10	523.09	280	260	48	70	69	-1
12	57.5	159	0.23	0.09	523.50	280	260	48	70	69	-1
	60	158	0.21	0.09	523.90	279	260	50	71	69	-1

-19°
-25°
-20°
-10°
-5°
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0
5
10°
15°
20°
25°

SOURCE TESTING FIELD DATA SHEET

Job No.: 12511269
Client: Nemura Pulp
Plant: Picton, NS
Location: Lime kiln
Test: PM-1
Date: Oct 23, 2014
Operators: TBH
Gamma: 0.930
Delta H@: 1.805
Pitot Coeff.: 0.816
Start: 14:23
Finish: 16:45

Static Pressure (in.H2O): 0.51
Port Length (in): 6"
Stack Dia. (in.): 48"
Probe Length (ft): 8-1
Nozzle ID (in.): 1-10 (0.173)
Console S/N: 16416

Pre-Test Leak Check: ✓
Vacuum Pressure: -18
Post-Test Leak Check: ✓
Vacuum Pressure: -18

K': 0.46

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (in.Hg)
									In	Out	
	0				527.90						
1	2.5	160	0.84	0.33	524.65	280	261	53	71	71	-1
	5	160	0.83	0.32	525.41	279	259	50	71	70	-1
2	7.5	161	0.84	0.33	526.17	279	260	47	71	70	-1
	10	161	0.83	0.33	526.96	280	261	46	71	70	-1
3	12.5	162	0.75	0.30	527.69	281	260	44	71	70	-1
	15	162	0.75	0.30	528.43	279	261	44	71	70	-1
4	17.5	162	0.75	0.30	529.15	280	260	44	72	71	-1
	20	161	0.74	0.29	529.88	280	261	44	72	71	-1.5
5	22.5	161	0.70	0.28	530.59	279	260	44	72	71	-1.5
	25	161	0.70	0.28	531.30	281	260	46	73	71	-1.5
6	27.5	163	0.75	0.29	532.03	280	261	44	73	71	-1.5
	30	161	0.78	0.31	532.78	280	261	44	73	71	-1.5
7	32.5	162	0.46	0.18	533.37	279	260	44	73	71	-1.5
	35	162	0.45	0.18	533.96	280	260	44	72	71	-1.5
8	37.5	162	0.53	0.21	534.54 *	281	260	44	72	71	-1.5
	40	162	0.54	0.21	535.17	279	260	45	73	71	-1.5
9	42.5	161	0.59	0.23	535.84	280	260	45	73	72	-1.5
	45	163	0.58	0.23	536.50	280	260	45	73	72	-1.5
10	47.5	163	0.61	0.24	537.16	280	260	45	74	72	-1.5
	50	162	0.63	0.25	537.84	281	261	45	74	72	-1.5
11	52.5	162	0.65	0.26	538.51	280	260	45	75	73	-1.5
	55	162	0.58	0.23	539.16	280	261	44	74	73	-1.5
12	57.5	161	0.55	0.22	539.79	280	261	44	74	72	-1.5
	60	161	0.52	0.21	540.41	280	261	44	74	72	-2

-60°
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-25°
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-10
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15°
20°
25°
30°

MOISTURE FIELD DATA SHEET

Project No.: 121511269
Client: Northern Pulp
Plant: Pictou, NS
Location: Lime kiln
Test: PM-2
Date: Oct 24, 2014
Analyst: TBH

Stantec

09/9-03

Moisture Data

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	1020.0	691.2	328.8
2	100 mL H2O	698.4	698.1	0.3
3	Blank	666.3	665.1	1.2
4	200g Silica Gel	980.9	976.4	4.5
		Total Weight Gain (g)		334.8
		Moisture Volume (mL)		

Volume H_2O Collected: _____ ml

X 0.048 = 16.0704 ft^3 H_2O **(Vwc)**

DGM Final 568.37 ft^3

DGM Initial 540.79 ft^3

Final - Initial = 27.58 ft^3 **(Vmc)**

$$\text{Moisture} = \frac{\text{Vwc}}{\text{(Vwc + Vmc)}}$$

$$\text{Moisture} = \frac{16.0704}{(16.0704 + 27.58)}$$

Moisture = 37%

SOURCE TESTING FIELD DATA SHEET

Job No.: 121511269.
Client: Northern Pulp
Plant: Pictou, NS
Location: Lime Kiln
Test: PM-2
Date: Oct 23, 2014
Operators: TBH
Gamma: 0.980
Delta H@: 1.805
Pitot Coeff.: 0.816
Start: 8:40
Finish:

Static Pressure (in.H2O): 0.51
Port Length (in): 6"
Stack Dia. (in.): 48"
Probe Length (ft): 8-1
Nozzle ID (in.): 1-6 (0.173)
Console S/N: 16446

Pre-Test Leak Check: ✓
Vacuum Pressure: -13
Post-Test Leak Check: ✓
Vacuum Pressure: -13

K': 0.34

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (in.Hg)
									In	Out	
	0				540.79						
1	2.5	161	0.84	0.24	541.36	281	245	51	70	71	-1
2	5	161	0.85	0.25	542.07	280	250	47	71	70	-1
2	7.5	161	0.90	0.23	542.73	280	253	41	71	70	-1
	10	161	0.80	0.23	543.38	281	256	41	71	70	-1
3	12.5	161	0.76	0.22	544.01	280	260	40	71	70	-1
	15	161	0.73	0.21	544.64	281	262	41	71	70	-1
4	17.5	161	0.81	0.24	545.26	280	261	41	71	70	-1
	20	161	0.82	0.24	545.95	280	262	42	72	71	-1
5	22.5	160	0.73	0.21	546.31	279	261	40	72	71	-1
	25	161	0.77	0.22	546.58	280	260	40	72	71	-1
6	27.5	160	0.75	0.21	547.23	280	260	42	72	71	-1
	30	161	0.80	0.23	547.88	280	260	40	72	71	-1
7	32.5	161	0.42	0.12	548.84	280	261	40	72	71	-1
	35	161	0.39	0.11	549.28	280	260	41	73	71	-1
8	37.5	163	0.54	0.16	549.84	281	260	43	73	72	-1
	40	162	0.52	0.15	550.38	280	260	44	73	72	-1
9	42.5	161	0.61	0.18	550.98	280	260	43	73	72	-1
	45	161	0.60	0.17	551.53	280	260	43	73	72	-1
10	47.5	162	0.63	0.18	552.11	280	260	43	73	72	-1
	50	161	0.61	0.13	552.69	280	259	44	74	72	-1
11	52.5	161	0.62	0.10	553.27	280	260	44	74	72	-1
	55	161	0.61	0.18	553.86	280	260	43	74	72	-1
12	57.5	162	0.57	0.17	554.42	280	260	43	74	72	-1
	60	160	0.58	0.17	554.99	280	260	44	75	73	-1

-65° -50° -35° -15° -5° 0 0 5° 15° 20° 30° 45°

SOURCE TESTING FIELD DATA SHEET

Job No.: 121511269
Client: Northern Pulp
Plant: Pictou, NS
Location: Lime Kiln
Test: PM-2
Date: Oct 23, 2014
Operators: TBH
Gamma: 0.980
Delta H@: 1.805
Pitot Coeff.: 0.816
Start: 8:40
Finish:

Static Pressure (in.H2O): 0.51
Port Length (in): 6"
Stack Dia. (in.): 48"
Probe Length (ft): 8-1
Nozzle ID (in.): 1-6 (0.173)
Console S/N: 1646

Pre-Test Leak Check:
Vacuum Pressure:
Post-Test Leak Check:
Vacuum Pressure:

K': 0.34

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (in.Hg)
									In	Out	
	0				554.99						
1	2.5	160	0.86	0.25	555.52	280	260	53	73	73	-1
	5	161	0.85	0.25	556.21	280	252	53	74	73	-1
2	7.5	160	0.76	0.22	556.86	279	254	43	75	74	-1
	10	161	0.76	0.22	557.49	280	259	42	75	74	-1
3	12.5	161	0.76	0.22	558.11	280	260	42	75	74	-1
	15	160	0.79	0.23	558.78	280	261	42	75	74	-1
4	17.5	161	0.67	0.20	559.38	280	261	42	75	74	-1
	20	161	0.65	0.19	559.97	280	260	42	75	74	-1
5	22.5	161	0.58	0.17	560.54	280	261	42	76	74	-1
	25	163	0.52	0.15	561.08	280	261	43	76	74	-1
6	27.5	161	0.40	0.18	561.54	280	258	43	76	74	-1
	30	161	0.40	0.12	562.02	280	259	43	76	74	-1
7	32.5	161	0.61	0.18	562.52	280	260	44	76	74	-1
	35	161	0.60	0.18	563.11	280	258	45	76	75	-1
8	37.5	161	0.63	0.18	563.70	280	258	45	77	75	-1
	40	161	0.62	0.18	564.26	280	260	44	77	75	-1
9	42.5	161	0.56	0.17	564.85	280	261	45	77	75	-1
	45	161	0.56	0.17	565.42	280	260	45	77	75	-1
10	47.5	161	0.52	0.15	565.95	280	260	45	77	75	-1
	50	161	0.53	0.16	566.50	280	260	45	78	76	-1
11	52.5	160	0.40	0.12	566.99	280	260	45	78	76	-1
	55	160	0.38	0.11	567.46	280	259	45	78	76	-1
12	57.5	160	0.36	0.10	567.91	280	260	45	78	76	-1
	60	160	0.37	0.110	568.37	280	257	45	78	76	-1

-40°
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35°
45°

MOISTURE FIELD DATA SHEET

Project No.: 121511269
Client: NORTHERN PULP
Plant: PICTOU NS
Location: LIME KILN
Test: PM-3
Date: OCT 24/2014
Analyst: NGTA

Stantec

FILTER ID #
0919-06

Moisture Data

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	1015.0	681.6	333.4
2	100 mL H2O	741.7	724.3	17.4
3	Blank	627.1	625.5	1.6
4	200g Silica Gel	830.8	822.3	8.5
		Total Weight Gain (g)		360.9
		Moisture Volume (mL)		

Volume H_2O Collected: 360.9 ml

X 0.048 = 17.32 ft^3 H_2O **(Vwc)**

DGM Final 599.47 ft^3

DGM Initial 569.08 ft^3

Final - Initial = 30.39 ft^3 **(Vmc)**

$$\text{Moisture} = \frac{\text{Vwc}}{\text{(Vwc + Vmc)}}$$

$$\text{Moisture} = \frac{17.32}{17.32 + 30.39}$$

Moisture = 0.36 36%

SOURCE TESTING FIELD DATA SHEET

Job No.: 121511269
Client: NORTHERN PULP
Plant: PICTOU, NS
Location: LIME KILN
Test: PM-3
Date: OCT 23/2014
Operators: TBM / DH
Gamma: 0.980
Delta H@: 1.4605
Pitot Coeff.: 0.816
Start: 12:30
Finish: 14:30

Static Pressure (in.H2O):
Port Length (in): 6
Stack Dia. (in.): 48
Probe Length (ft): 8-1
Nozzle ID (in.): 1-6 (0.173)
Console S/N: 1446

Pre-Test Leak Check:
Vacuum Pressure:
Post-Test Leak Check: 0
Vacuum Pressure: -18

K': 0.4

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (in.Hg)
									In	Out	
	0				583.54						
1	2.5	160	.80	0.28	584.28	281	262	55	76	77	-1
	5	160	.80	0.28	585.01	280	260	51	77	76	-1
2	7.5	160	.82	0.28	585.76	280	259	44	76	76	-1
	10	160	.83	0.28	586.50	280	260	43	77	76	-1
3	12.5	160	.86	0.30	587.26	280	260	43	77	76	-1
	15	160	.83	0.29	588.01	280	260	42	77	78	-1
4	17.5	160	.79	0.27	588.74	280	260	42	77	76	-1
	20	160	.73	0.25	589.42	280	260	42	77	76	-1
5	22.5	161	.63	0.22	590.09	280	260	43	77	76	-2
	25	161	.60	0.21	590.74	280	260	43	77	76	-2
6	27.5	161	.54	0.18	591.34	280	260	43	77	76	-2
	30	161	.54	0.18	591.92	280	260	45	77	77	-2
7	32.5	161	0.57	0.20	592.54	280	259	45	77	76	-2
	35	161	0.55	0.19	593.10 *	280	261	47	77	76	-2
8	37.5	161	0.56	0.19	593.78	279	259	46	77	76	-2
	40	161	0.55	0.19	594.38	280	259	47	78	77	-2
9	42.5	161	0.63	0.22	595.02	280	260	48	77	77	-2
	45	161	0.64	0.22	595.67	280	260	47	77	77	-2
10	47.5	161	0.63	0.22	596.33	280	261	47	77	77	-2
	50	161	0.63	0.22	596.98	281	260	47	77	77	-2
11	52.5	161	0.62	0.21	597.61	280	260	47	77	77	-2
	55	161	0.60	0.21	598.24	280	258	47	77	77	-2
12	57.5	161	0.58	0.20	598.85 *	280	261	48	77	77	-2
	60	161	0.55	0.19	599.47	280	260	48	77	77	-2

-25 -20 -15 -10 -5 0 0 10° 15° 20° 30° 35°

SOURCE TESTING FIELD DATA SHEET

Job No.: 1215111269
Client: NORTHERN PULP
Plant: PICTOU NS
Location: LIME KILN
Test: Run-3
Date: OCT 24/2014
Operators: TBM/DH
Gamma: 0.980
Delta H@: 1.405
Pitot Coeff.: 0.816
Start: 12:30
Finish: 14:30

Static Pressure (in.H2O):
Port Length (in): 6"
Stack Dia. (in.): 48
Probe Length (ft): 8-1
Nozzle ID (in.): 1-6 0.173
Console S/N: 1646

Pre-Test Leak Check: 0
Vacuum Pressure: -14
Post-Test Leak Check:
Vacuum Pressure:

K': 0.4

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (in.Hg)
									In	Out	
	0				569.08						
1	2.5	163	0.86	0.30	569.87	280	236	53	76	76	-1
	5	160	0.83	0.29	570.62	280	256	50	76	76	-1
2	7.5	160	0.84	0.29	571.35	281	257	46	76	76	-1
	10	161	0.84	0.29	572.10	281	254	45	76	76	-1
3	12.5	160	0.77	0.27	572.80	280	256	44	76	76	-1
	15	161	0.77	0.27	573.51	280	263	45	76	76	-1
4	17.5	161	0.63	0.22	574.16	280	261	45	77	76	-1
	20	160	0.62	0.21	574.78	279	259	45	77	76	-1
5	22.5	161	0.55	0.18	575.37	280	260	45	77	76	-1
	25	159	0.46	0.16	575.93	281	251	45	77	76	-1
6	27.5	159	0.40	0.14	576.45	279	258	45	77	76	-1
	30	160	0.38	0.13	576.95	280	253	46	77	76	-1
7	32.5	168	0.57	0.19	577.55	281	254	46	77	77	-1
	35	159	0.60	0.21	578.20	280	256	46	77	77	-1
8	37.5	159	0.59	0.20	578.81	280	254	45	77	76	-1
	40	157	0.60	0.21	579.45	279	257	45	77	77	-1
9	42.5	159	0.56	0.19	580.03	279	256	45	77	77	-1
	45	160	0.57	0.19	580.65	280	255	45	77	77	-1
10	47.5	160	0.39	0.13	581.10 *	281	258	46	77	77	-1
	50	160	0.41	0.14	581.67	280	256	47	77	77	-1
11	52.5	160	0.35	0.12	582.16	280	259	47	77	77	-1
	55	160	0.35	0.12	582.66	280	260	47	77	77	-1
12	57.5	160	0.30	0.10	583.15	280	259	47	78	77	-1
	60	160	0.30	0.10	583.54	280	256	48	78	77	-1

MOISTURE FIELD DATA SHEET

Project No.: 1215 11269
Client: Northern Pulp
Plant: Pictou, NS
Location: Recovery Boiler
Test: PM-1
Date: Oct 22, 2014
Analyst: TBH

Stantec

0930-2

Moisture Data

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	961.3	633.0	328.3
2	100 mL H2O	890.9	701.2	189.7
3	Blank	742.3	716.9	25.4
4	200g Silica Gel	969.6	938.4	31.2
		Total Weight Gain (g)		574.6
		Moisture Volume (mL)		574.6

Volume H_2O Collected: 574.6 ml

X 0.048 = 27.5808 ft^3 H_2O **(Vwc)**

DGM Final 102.22 ft^3

DGM Initial 44.05 ft^3

Final - Initial = 58.17 ft^3 **(Vmc)**

$$\text{Moisture} = \frac{\text{Vwc}}{\text{(Vwc + Vmc)}}$$

$$\text{Moisture} = \frac{27.5808}{(27.5808+58.17)} =$$

$$\textbf{Moisture} = \frac{27.5808}{85.7508} = 32.16\%$$

COMBUSTION GAS ANALYSIS
CONCENTRATION FIELD SHEET

Sampling Methodology: Environment Canada EPS 1/RM/15

Stantec

Project No.: 121511269
Client: Northern Pulp
Plant: Recovery Boiler
Location: Pictou, NS

Fuel Type: nat gas / liquor

Time Start: 10:30
Time Finish: 11:00

Test No.: Case # 1
Date: Oct 23, 2014

Personnel: TBH

Time	Concentrations							
	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	NO_X (ppm)	NO (ppm)	NO_2 (ppm)	THC (%)
0	6.2	11.0	OFF SCALE	0	60			
5	6.0	11.1		0	62			
10	5.2	11.7		0	62			
15	5.3	11.6		0	62			
20	5.2	11.7		0	61			
25	5.5	11.4		0	61			
30	5.3	11.5	↓	0	61			

SOURCE TESTING FIELD DATA SHEET

1/2

Job No.: 121811269
Client: Northern Pulp
Plant: Recovery Boiler
Location: Pictou, NS
Test: PM-1
Date: Oct 17, 2014
Operators: TBT / TP
Gamma: 1.040
Delta H@: 1.766
Pitot Coeff.: 0.838
Start : 9:10
Finish : 11:20

Static Pressure (in.H2O): 1.10
Port Length (in): 6"
Stack Dia. (in.): 138
Probe Length (ft): 2'
Nozzle ID (in.): 1-8 (0.233)
Console S/N: 1848

Pre-Test Leak Check: ✓
Vacuum Pressure: -18
Post-Test Leak Check:
Vacuum Pressure:

K' : 1.64

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (in.Hg)
									In	Out	
	0				44.05						
1	2.5	153	0.62	0.86	45.30	249	255	59	58	58	-1
	5	153	0.61	0.85	46.49	262	256	57	58	58	-1
2	7.5	153	0.59	0.82	47.66	287	260	53	59	60	-1
	10	150	0.59	0.82	48.81	300	264	52	58	58	-2
3	12.5	153	0.61	0.85	50.01	300	266	52	59	56	-2
	15	152	0.60	0.83	51.17	301	268	52	59	58	-2
4	17.5	150	0.59	0.82	52.34	299	269	52	60	58	-2
	20	151	0.58	0.81	53.52	301	272	56	60	58	-2
5	22.5	152	0.60	0.83	54.70	299	273	58	60	58	-2
	25	151	0.61	0.85	55.89	301	273	62	60	58	-2
6	27.5	151	0.60	0.83	57.05	300	276	65	61	58	-2
	30	152	0.60	0.83	58.21	302	277	68	61	58	-2.5
7	32.5	152	0.60	0.83	59.39	300	278	68	62	59	-2.5
	35	152	0.60	0.83	60.59	300	279	69	62	58	-3
8	37.5	154	0.61	0.85	61.75	301	279	69	62	59	-3
	40	153	0.62	0.86	62.97	300	280	70	62	59	-3
9	42.5	153	0.62	0.86	64.17	300	281	67	63	59	-3
	45	151	0.61	0.85	65.37	300	281	64	63	59	-3
10	47.5	150	0.62	0.87	66.58	300	283	59	62	59	-4
	50	152	0.58	0.81	67.75	300	283	59	62	59	-4
11	52.5	152	0.61	0.85	68.94	300	282	59	62	59	-4
	55	153	0.60	0.83	70.14	299	282	55	63	60	-4
12	57.5	152	0.61	0.85	71.31	301	283	52	63	60	-4
	60	154	0.61	0.85	72.53	299	284	52	62	60	-5

2/2

SOURCE TESTING FIELD DATA SHEET

Job No.: 12151269
Client: Northern Pulp
Plant: Recovery Boiler
Location: Pictou, NS
Test: PM-1
Date: Oct 17, 2014
Operators: TBH / TF
Gamma: 1.040
Delta H@: 1.7616
Pitot Coeff.: 0.838
Start: 9:10
Finish: 11:20

Static Pressure (in.H2O): 1.10
Port Length (in): 6"
Stack Dia. (in.): 128
Probe Length (ft): 21
Nozzle ID (in.): T-8 (0.233)
Console S/N: 1348

Pre-Test Leak Check:
Vacuum Pressure:
Post-Test Leak Check:
Vacuum Pressure:

K': 1.64

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (in.Hg)
									In	Out	
	0				72.53						
1	2.5	151	0.61	0.85	73.71	304	283	52	61	61	-5
	5	152	0.61	0.85	74.92	296	285	52	61	59	-6
2	7.5	154	0.64	0.89	76.15	300	285	47	61	60	-6
	10	151	0.64	0.89	77.37	300	285	46	61	59	-6
3	12.5	152	0.63	0.88	78.59	300	285	45	61	60	-6
	15	151	0.62	0.87	79.80	300	285	45	62	61	-7
4	17.5	151	0.62	0.87	81.03	300	285	45	62	60	-7
	20	151	0.63	0.88	82.25	300	285	46	62	60	-7.5
5	22.5	150	0.63	0.88	83.46	300	285	46	62	60	-7.5
	25	152	0.61	0.85	84.67	300	285	46	62	60	-8
6	27.5	151	0.62	0.87	85.89	300	286	46	63	60	-8
	30	149	0.64	0.90	87.16	300	286	47	62	60	-8
7	32.5	148	0.61	0.86	88.39	300	286	48	62	60	-9
	35	151	0.60	0.84	89.62	300	286	48	62	60	-9
8	37.5	153	0.62	0.86	90.87	300	287	49	62	60	-9
	40	151	0.63	0.88	92.13	300	287	50	62	60	-9.5
9	42.5	151	0.63	0.88	93.39	300	287	50	62	60	-10
	45	152	0.61	0.85	94.64	300	288	50	63	60	-10
10	47.5	150	0.63	0.88	95.91	300	287	50	63	60	-10
	50	152	0.64	0.90	97.17	300	288	50	64	61	-10.5
11	52.5	152	0.63	0.88	98.45	300	288	51	63	61	-11
	55	153	0.61	0.85	99.68	300	287	52	64	61	-11
12	57.5	153	0.63	0.88	100.94	300	288	54	64	61	-11
	60	151	0.63	0.88	102.22	300	288	53	64	62	-11

MOISTURE FIELD DATA SHEET

Project No.: 121511269
Client: NORTHERN PULP
Plant: PICTOU NS
Location: RECOVERY BOILER
Test: PM-2
Date: OCT. 23/2014
Analyst: NGM

FILTER 1 OFF
0919-04

Moisture Data

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	918.9	677.8	241.1
2	100 mL H2O	921.4	684.4	237
3	Blank	674.8	666.2	8.6
4	200g Silica Gel	873.7	857.2	16.5
		Total Weight Gain (g)		503.2
		Moisture Volume (mL)		

Volume H_2O Collected: _____ ml

X 0.048 = 24.115 ft^3 H_2O **(Vwc)**

DGM Final 163.68 ft^3

DGM Initial 102.64 ft^3

Final - Initial = 61.04 ft^3 **(Vmc)**

$$\text{Moisture} = \frac{\text{Vwc}}{\text{(Vwc + Vmc)}}$$

$$\text{Moisture} = \frac{24.115}{(24.115 + 61.04)}$$

Moisture = 28 %

COMBUSTION GAS ANALYSIS
CONCENTRATION FIELD SHEET

Sampling Methodology: Environment Canada EPS 1/RM/15

Project No.: 121511269
Client: NORTHERN PULP
Plant: PICTOU PULP MILL
Location: ABERCROMBIE, NS

Fuel Type: _____

Time Start: 1235
Time Finish: 1305

Test No.: 2 OF 3
Date: 23 OCT 2014

Personnel: MIKE MCLEAN/DON HART

Time	Concentrations							
	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	NO_X (ppm)	NO_2 (ppm)	NO (ppm)	THC (%)
1235	5.8	11.3	1178	0	62	0	62	—
1240	6.2	10.9	"OVER"	0	54	0	56	—
1245	6.0	11.0	2962	0	62	0	62	—
1250	6.3	10.9	"OVER"	0	63	0	63	—
1255	6.1	10.9	"OVER"	0	58	0	58	—
1300	6.3	10.7	"OVER"	0	58	0	58	—
1305	6.4	10.7	"OVER"	0	58	0	58	—

1/2

SOURCE TESTING FIELD DATA SHEET

Job No.: 12511269
Client: Northern Pulp
Plant: Pictou, NS
Location: Recovery Boiler
Test: PM-2
Date: Oct 23, 2014
Operators: MM/DH
Gamma: 1.040
Delta H@: 1.7666
Pitot Coeff.: 0.838
Start: 12:24
Finish: 2:24

Static Pressure (in.H2O): 1.10
Port Length (in): 6"
Stack Dia. (in.): 128
Probe Length (ft): 2'
Nozzle ID (in.): 1-9 (0.233)
Console S/N: 1848

Pre-Test Leak Check: ✓
Vacuum Pressure: -15
Post-Test Leak Check:
Vacuum Pressure:

K': 1.57

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (in.Hg)
									In	Out	
	0				102.64						
1	2.5	154	0.81	1.08	104.03	240	293	62	62	61	-1
	5	153	0.72	0.96	105.35	266	295	54	63	61	-1.5
2	7.5	154	0.77	1.03	106.72	279	298	48	62	62	-2
	10	154	0.78	1.04	108.08	294	300	45	63	62	-2
3	12.5	153	0.78	1.04	109.45	297	302	45	64	62	-2
	15	153	0.77	1.03	110.83	300	300	44	64	62	-2
4	17.5	152	0.77	1.03	112.20	300	300	43	65	62	-2
	20	153	0.78	1.04	113.58	300	300	45	65	62	-3
5	22.5	152	0.77	1.04	114.96	300	300	46	66	63	-3
	25	152	0.80	1.08	116.34	300	300	47	67	63	-3
6	27.5	151	0.77	1.04	117.72	300	300	48	67	64	-3
	30	153	0.80	1.08	119.10	300	300	48	67	63	-3
7	32.5	153	0.81	1.09	120.50	300	300	48	67	64	-3
	35	152	0.69	0.93	121.80	300	300	49	68	64	-3.5
8	37.5	154	0.69	0.93	123.12	300	300	49	68	64	-3.5
	40	153	0.67	0.90	124.42	300	300	49	68	65	-3.5
9	42.5	153	0.67	0.90	125.74	300	300	49	68	64	-3.5
	45	154	0.66	0.89	127.00	300	300	49	68	65	-3.5
10	47.5	154	0.64	0.86	128.28	300	300	49	68	64	-4
	50	152	0.65	0.88	129.54	300	300	49	69	64	-4
11	52.5	154	0.64	0.86	130.79	300	300	49	68	65	-4
	55	152	0.61	0.82	132.04	300	300	50	68	64	-4
12	57.5	154	0.64	0.86	133.29	300	300	51	68	65	-4
	60	154	0.62	0.83	134.52	300	300	52	67	65	-4.5

SOURCE TESTING FIELD DATA SHEET

Job No.: 121511269
Client: Northern Pulp
Plant: Pictou, NS
Location: Recovery Boiler
Test: PM-2
Date: Oct 23, 2014
Operators: MM/DH
Gamma: 1.040
Delta H@: 1.7666
Pitot Coeff.: 0.833
Start: 12:24
Finish: 2:24

Static Pressure (in.H2O): 1.10
Port Length (in): 6"
Stack Dia. (in.): 128
Probe Length (ft): 2'
Nozzle ID (in.): 1-6 (0.253)
Console S/N: 1848

Pre-Test Leak Check:
Vacuum Pressure:
Post-Test Leak Check:
Vacuum Pressure:

K': 1.57

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (in.Hg)
									In	Out	
	0				134.52						
1	2.5	154	0.57	0.77	135.71	300	300	51	68	65	-4.5
	5	154	0.60	0.81	136.93	300	300	50	68	65	-4.5
2	7.5	155	0.58	0.78	138.16	300	300	47	67	65	-5
	10	154	0.55	0.74	139.30	300	300	46	67	64	-5
3	12.5	154	0.54	0.73	140.49	300	300	46	67	65	-5
	15	154	0.62	0.83	141.73	300	300	46	67	65	-5
4	17.5	154	0.61	0.82	142.96	300	300	45	63	63	-5
	20	153	0.60	0.80	144.17	300	300	47	63	63	-5.5
5	22.5	154	0.61	0.82	145.40	300	300	47	63	63	-5.5
	25	154	0.61	0.82	146.62	300	300	43	64	63	-6
6	27.5	154	0.61	0.82	147.85	300	300	43	64	63	-6
	30	155	0.59	0.79	149.06	300	300	45	64	63	-6
7	32.5	154	0.60	0.80	150.28	300	300	45	65	63	-6.5
	35	154	0.61	0.82	151.52	300	300	46	65	65	-7
8	37.5	153	0.59	0.79	152.72	300	300	47	65	64	-7
	40	154	0.58	0.78	153.93	300	300	49	65	63	-7
9	42.5	154	0.60	0.80	155.14	300	300	49	65	64	-7.5
	45	154	0.60	0.80	156.35	300	300	48	66	63	-7.5
10	47.5	155	0.59	0.79	157.57	300	300	48	66	63	-7.5
	50	154	0.58	0.78	158.78	300	300	49	67	64	-7.5
11	52.5	155	0.60	0.80	160.00	300	300	49	67	63	-8
	55	153	0.61	0.82	161.23	300	300	50	67	63	-8
12	57.5	154	0.60	0.81	162.46	300	300	50	67	63	-8.5
	60	153	0.59	0.79	163.68	300	300	50	68	64	-8.5

MOISTURE FIELD DATA SHEET

Project No.: 121511269
Client: NORTHERN PULP
Plant: PICTOU NS
Location: RECOVERY BOILER
Test: PM-3
Date: OCT. 23/2014
Analyst: NGM

Stantec

FILTER ID# 09301

Moisture Data

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	975.6	676.9	298.7
2	100 mL H2O	979.6	728.9	250.9
3	Blank	699.3	621.8	77.5
4	200g Silica Gel	858.0	836.4	21.6

Total Weight Gain (g)	648.7
Moisture Volume (mL)	648.7

Volume H_2O Collected: 648.7 ml

X 0.048 = 31.1376 ft^3 H_2O **(Vwc)**

DGM Final 222.38 ft^3

DGM Initial 163.99 ft^3

Final - Initial = 58.39 ft^3 **(Vmc)**

$$\text{Moisture} = \frac{\text{Vwc}}{\text{(Vwc + Vmc)}}$$

$$\text{Moisture} = \frac{31.1376}{(31.1376 + 58.39)}$$

$$\textbf{Moisture} = \frac{31.1376}{89.5276} = 34.78\%$$

COMBUSTION GAS ANALYSIS
CONCENTRATION FIELD SHEET

Sampling Methodology: Environment Canada EPS 1/RM/15

Stantec

Project No.: 121511269
Client: NORTHERN PULP
Plant: PICTOU NS
Location: RECOVERY STACK

Fuel Type: _____

Time Start: 17:00
Time Finish: 17:30

Test No.: 3
Date: OCT 23/2014

Personnel: MM / DH

Time	Concentrations							
	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	NO_X (ppm)	NO (ppm)	NO_2 (ppm)	THC (%)
17:00	4.7	12.0	"OVER"	13	36	35	0	—
17:05	4.3	12.3	"OVER"	7	45	45	0	—
17:10	4.3	12.3	"OVER"	11	44	44	0	—
17:15	3.6	12.7	"OVER"	13	40	40	0	—
17:20	4.0	12.6	"OVER"	0	57	57	0	—
17:25	4.3	12.4	"OVER"	0	64	64	0	—
17:30	4.3	12.3	"OVER"	6	66	66	0	—

SOURCE TESTING FIELD DATA SHEET

Job No.: 121511269
Client: NORTHERN PULP
Plant: PICTOU NS
Location: RECOVERY BOILER
Test: Pm-3
Date: OCT. 23/2014
Operators: MM / DH
Gamma: 1.040
Delta H@: 1.766
Pitot Coeff.: 0.835
Start: 4:33
Finish: 6:33

Static Pressure (in.H2O):
Port Length (in): 6"
Stack Dia. (in.): 128
Probe Length (ft): 2'
Nozzle ID (in.): 1-8 (0.233)
Console S/N: 1845

Pre-Test Leak Check: 0
Vacuum Pressure: -15
Post-Test Leak Check:
Vacuum Pressure:

K': 1.64

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (in.Hg)
									In	Out	
	0				163.99						
1	2.5	154	0.58	0.81	165.24	307	229	56	62	60	-1
	5	154	0.58	0.81	166.44	307	229	52	60	59	-2
2	7.5	153	0.56	0.78	167.65	304	239	46	60	60	-2
	10	153	0.58	0.81	168.88	301	249	45	61	60	-2
3	12.5	152	0.58	0.81	170.12	299	256	45	62	60	-5
	15	155	0.56	0.78	171.31	298	263	45	63	60	-2.5
4	17.5	154	0.58	0.81	172.54	297	269	45	63	62	-2
	20	156	0.58	0.81	173.76	296	271	46	63	63	-2
5	22.5	155	0.58	0.81	174.96	298	280	47	64	61	-2
	25	155	0.56	0.78	176.17	297	280	49	65	61	-2
6	27.5	156	0.58	0.81	177.38	300	287	50	66	61	-2
	30	155	0.62	0.87	178.64	300	290	50	67	62	-2.5
7	32.5	156	0.62	0.86	179.89	300	292	51	66	62	-3
	35	156	0.61	0.85	181.14	300	294	51	66	62	-3
8	37.5	154	0.59	0.83	182.48	300	297	52	67	62	-3
	40	155	0.61	0.85	183.64	300	297	52	68	63	-3
9	42.5	154	0.59	0.83	184.88	300	299	52	68	63	-3
	45	155	0.59	0.83	186.10	300	300	52	68	63	-3.5
10	47.5	156	0.57	0.80	187.30	300	300	52	68	63	-3.5
	50	154	0.59	0.83	188.54	300	300	52	68	64	-3.5
11	52.5	156	0.60	0.84	189.78	300	300	52	69	64	-4
	55	156	0.59	0.83	190.99	300	300	54	68	64	-4
12	57.5	158	0.59	0.82	192.18	300	300	52	68	64	-4
	60	156	0.59	0.83	193.37	300	300	53	67	64	-4
								52	67	64	-4

SOURCE TESTING FIELD DATA SHEET

Job No.: 121511269
Client: NORTHERN PULP
Plant: PICTON NS
Location: RECOVERY BOILER
Test: PM-3
Date: OCT 23/2014
Operators: MM / DH
Gamma: 1.040
Delta H@: 1.766
Pitot Coeff.: 0.834
Start :
Finish :

Static Pressure (in.H2O):
Port Length (in): 6
Stack Dia. (in.): 128
Probe Length (ft): 2
Nozzle ID (in.): 1-8 (0.233)
Console S/N: 1848

Pre-Test Leak Check:
Vacuum Pressure:
Post-Test Leak Check: 0
Vacuum Pressure: -15

K' : 1.64

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (in.Hg)
									In	Out	
	0				193.37						
1	2.5	156	0.59	0.82	194.55	300	300	52	67	62	-4
	5	155	0.61	0.85	195.77	328	300	56	64	64	-4.5
2	7.5	156	0.59	0.82	196.96	317	300	53	66	64	-4.5
	10	156	0.61	0.85	198.18	315	300	52	66	64	-5
3	12.5	156	0.59	0.82	199.38	313	300	52	66	64	-5
	15	156	0.59	0.82	200.56	309	300	52	66	64	-5
4	17.5	156	0.59	0.87	201.78	306	300	53	67	64	-5
	20	156	0.61	0.85	202.99	305	300	54	66	64	-5.5
5	22.5	155	0.59	0.83	203.95	305	300	55	66	64	-5.5
	25	155	0.58	0.81	205.39	303	300	55	66	63	-5.5
6	27.5	155	0.59	0.83	206.58	302	300	56	66	63	-5.5
	30	156	0.60	0.84	207.80	301	300	57	66	63	-6
7	32.5	157	0.59	0.82	209.00	301	300	58	66	64	-6
	35	158	0.59	0.87	210.18	302	300	59	66	63	-6
8	37.5	154	0.61	0.85	211.42	304	300	60	65	63	-6
	40	156	0.61	0.85	212.64	304	301	61	65	63	-7
9	42.5	156	0.61	0.85	213.85	304	300	62	66	63	-7
	45	156	0.58	0.81	215.04	307	300	63	65	63	-7
10	47.5	156	0.62	0.86	216.27	307	300	64	65	63	-7
	50	156	0.61	0.85	217.49	308	300	65	65	62	-7.5
11	52.5	155	0.60	0.84	218.70	307	300	66	65	63	-7.5
	55	153	0.59	0.83	219.92	306	300	67	66	62	-8
12	57.5	155	0.60	0.84	221.14	306	300	67	65	62	-8
	60	155	0.62	0.87	222.38	306	300	68	65	62	-8

MOISTURE FIELD DATA SHEET

Project No.: 121511269
Client: Northern Pulp
Plant: Dissolving Tank
Location: Acton, NS
Test: PM-1
Date: Oct 17, 2014
Analyst: JBH

Stantec

Moisture Data

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	1001.2 1049.7	568.5 724.3	432.7 325.4
2	100 mL H2O	1015.1	704.3	310.8
3	Blank	621.7	569.5	52.2
4	200g Silica Gel	949.1	921.7	27.4
		Total Weight Gain (g)		1148.5
		Moisture Volume (mL)		1148.5

Volume H_2O Collected: 1148.5 ml
X 0.048 = 55.128 ft^3 H_2O **(Vwc)**

DGM Final 435.84 ft^3
DGM Initial 400.65 ft^3
Final - Initial = 35.19 ft^3 **(Vmc)**

$$\text{Moisture} = \frac{\text{Vwc}}{\text{(Vwc + Vmc)}}$$

$$\text{Moisture} = \frac{55.128}{55.128 + 35.19} = \frac{55.128}{90.318}$$

Moisture = 61.04 %

SOURCE TESTING FIELD DATA SHEET

Job No.: 121511269
Client: Northern Pulp
Plant: Dissolving tank
Location: Pictou, NS
Test: PM-1
Date: Oct 17, 2014
Operators: NG/MY/MM
Gamma: 0.980
Delta H@: 1.805
Pitot Coeff.: 0.836
Start :
Finish :

Static Pressure (in.H2O): -0.20
Port Length (in): 6"
Stack Dia. (in.): 48"
Probe Length (ft): 51
Nozzle ID (in.): 0.305 (1+10)
Console S/N: 1646

Pre-Test Leak Check: ✓
Vacuum Pressure:
Post-Test Leak Check:
Vacuum Pressure:

K': 2.55

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (in.Hg)
									In	Out	
	0				400.65						
1	2.5	194	0.18	0.38	401.55	301	266	70	88	87	-1
	5	197	0.17	0.36	402.41	299	270	70	90	87	-1
2	7.5	195	0.18	0.38	403.32	298	274	70	90	87	-1
	10	195	0.21	0.45	404.28	297	276	70	90	87	-1
3	12.5	193	0.21	0.45	405.36	298	279	70	90	87	-2
	15	182	0.15	0.33	406.12	299	281	70	91	88	-2
4	17.5	190	0.20	0.43	407.05	300	284	69	92	88	-2
	20	195	0.18	0.39	407.97	300	285	67	92	88	-2
5	22.5	190	0.17	0.37	408.86	300	287	66	93	89	-2
	25	192	0.17	0.37	409.75	300	288	66	93	89	-2
6	27.5	191	0.17	0.37	410.63	300	290	66	93	89	-2
	30	193	0.16	0.34	411.49	300	292	66	93	89	-3
7	32.5	193	0.17	0.37	412.37	300	293	66	93	89	-3
	35	191	0.15	0.32	413.21	300	295	67	93	90	-3
8	37.5	193	0.16	0.34	414.06	300	296	67	93	90	-3
	40	193	0.16	0.34	414.92	300	297	69	94	90	-3
9	42.5	194	0.17	0.37	415.80	300	297	70	94	90	-4
	45	196	0.04	0.09	416.34	300	298	67	94	90	-4
10	47.5	188	0.15	0.33	417.17	300	298	66	94	90	-4
	50	193	0.16	0.34	418.04	300	300	68	94	90	-4

SOURCE TESTING FIELD DATA SHEET

Job No.: 121511265
Client: Northern Pulp
Plant: Dissolving Tank
Location: Pictou, NS
Test: PM-1
Date: Oct 17, 2014
Operators: NGM / MM
Gamma: 0.900
Delta H@: 1.805
Pitot Coeff.: 0.836
Start :
Finish :

Static Pressure (in.H2O): -0.20
Port Length (in): 6
Stack Dia. (in.): 48
Probe Length (ft): 5'
Nozzle ID (in.): 0.305 (1-10)
Console S/N: 1646

Pre-Test Leak Check: ✓
Vacuum Pressure: -17
Post-Test Leak Check:
Vacuum Pressure: -17

K' : 2.55

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (in.Hg)
									In	Out	
	0				418.04						
1	2.5	197	0.14	0.30	418.83	299	299	70	92	92	-4
	5	195	0.15	0.32	419.66	299	299	70	93	92	-4
2	7.5	199	0.13	0.28	420.46	299	299	70	93	92	-4
	10	198	0.21	0.45	421.42	300	301	62	93	92	-4
3	12.5	199	0.21	0.45	422.39	300	300	58	93	92	-5
	15	177	0.05	0.11	422.95	300	300	55	93	92	-5
4	17.5	192	0.21	0.45	423.90	300	300	55	93	92	-5
	20	195	0.20	0.43	424.87	300	300	58	93	92	-5
5	22.5	185	0.16	0.35	425.75	300	300	55	93	92	-5
	25	193	0.20	0.43	426.71	300	300	53	93	92	-6
6	27.5	199	0.20	0.43	427.67	300	300	55	93	92	-6
	30	196	0.20	0.43	428.63	300	300	56	93	91	-6
7	32.5	196	0.20	0.43	429.63	300	300	53	93	91	-7
	35	200	0.20	0.43	430.58	297	299	48	93	92	-7
8	37.5	194	0.19	0.41	431.53	300	298	47	93	92	-7
	40	201	0.17	0.36	432.43	300	300	47	93	91	-7
9	42.5	189	0.13	0.28	433.23	272	281	47	93	92	-7
	45	188	0.13	0.28	434.02	258	262	48	93	92	-7
10	47.5	191	0.17	0.37	434.91	258	256	48	93	92	-7
	50	193	0.17	0.37	435.84	260	256	48	93	92	-7

MOISTURE FIELD DATA SHEET

Project No.: 121511269
Client: Northern Pulp
Plant: Pictou, NS
Location: Dissolving tank
Test: PM-2
Date: Oct 20th, 2014
Analyst: TBH

0930-4

Moisture Data

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	1016.2	615.7	400.5
2	100 mL H2O	1065.4	723.9	341.5
3	Blank	776.7	710.5	66.2
4	200g Silica Gel	572.5 954.9	570.8 947.6	1.7 7.3
		Total Weight Gain (g)		817.2
		Moisture Volume (mL)		

Volume H_2O Collected: _____ ml

X 0.048 = 39.225 ft^3 H_2O **(Vwc)**

DGM Final 471.01 ft^3

DGM Initial 436.33 ft^3

Final - Initial = 34.68 ft^3 **(Vmc)**

$$\text{Moisture} = \frac{\text{Vwc}}{\text{(Vwc + Vmc)}}$$

$$\text{Moisture} = \frac{39.225}{(39.225 + 34.68)}$$

Moisture = 0.53

SOURCE TESTING FIELD DATA SHEET

1/2

Job No.: 121511269
Client: Northern Pulp
Plant: Dissolving tank
Location: Pictou, NS
Test: PM-1
Date: Oct 28, 2014
Operators: TBH / MM
Gamma: 0.980
Delta H@: 1.805
Pitot Coeff.: 0.836
Start: 13:35
Finish: 16:30

Static Pressure (In.H2O): -0.20
Port Length (In): 6"
Stack Dia. (In.): 48"
Probe Length (ft): 5'
Nozzle ID (In.): 0.305 (1-10)
Console S/N: 1646

Pre-Test Leak Check: ✓
Vacuum Pressure: -18
Post-Test Leak Check:
Vacuum Pressure:

K': 2.55

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (In.H2O)	Orifice dH (In.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (In.Hg)
									In	Out	
	0				436.38						
1	2.5	183	0.20	0.42	437.30	225	225	70	78	78	-1
	5	189	0.22	0.47	438.27	225	225	70	78	78	-1
2	7.5	189	0.21	0.44	439.23	240	225	61	78	78	-1
	10	177	0.19	0.41	440.13	251	231	58	78	78	-1
3	12.5	184	0.21	0.45	441.10	260	238	57	78	78	-1
	15	185	0.22	0.47	442.07	261	244	57	78	77	-1
4	17.5	185	0.22	0.47	443.01	260	248	57	78	78	-1
	20	184	0.05	0.11	443.52	260	255	58	79	78	-1
5	22.5	185	0.18	0.38	444.39	260	256	60	79	78	-1
	25	184	0.16	0.34	445.24	260	260	63	79	78	-1
6	27.5	186	0.17	0.36	446.10	260	261	62	79	78	-1
	30	185	0.13	0.28	446.87	260	260	62	80	78	-1
7	32.5	172	0.11	0.24	447.56	261	260	63	80	78	-1
	35	180	0.14	0.30	448.38	268	261	64	80	78	-1.5
8	37.5	187	0.15	0.32	449.19	278	260	64	80	78	-1.5
	40	181	0.15	0.32	450.00	281	260	64	80	78	-1.5
9	42.5	177	0.14	0.30	450.79	281	259	61	80	78	-1.5
	45	135	0.14	0.33	451.60	280	261	60	80	78	-1.5
10	47.5	156	0.14	0.31	452.40	280	259	59	80	78	-2
	50	182	0.13	0.28	453.16	257	259	58	80	78	-2

2/2

SOURCE TESTING FIELD DATA SHEET

Job No.: 121511269
Client: Northern Pulp
Plant: Pictou, NS
Location: Dissolving Tank
Test: PM-2
Date: Oct 29, 2014
Operators: TBH / MM
Gamma: 0.980
Delta H@: 1.805
Pitot Coeff.: 0.838
Start: 13:35
Finish: 16:30

Static Pressure (in.H2O): -0.20
Port Length (in): 6"
Stack Dia. (in.): 48"
Probe Length (ft): 5'
Nozzle ID (in.): 0.305 (1-10)
Console S/N: 1646

Pre-Test Leak Check:
Vacuum Pressure:
Post-Test Leak Check: ✓
Vacuum Pressure: -18

K': 2.55

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (in.Hg)
									In	Out	
	0				453.16						
1	2.5	183	0.23	0.49	454.21	282	260	64	80	79	-2
	5	182	0.22	0.47	455.29	280	249	63	80	79	-2.5
2	7.5	182	0.23	0.49	456.18	278	257	63	80	78	-2.5
	10	182	0.23	0.49	457.17	279	260	51	80	79	-3
3	12.5	183	0.23	0.49	458.16	281	261	51	80	79	-3
	15	180	0.20	0.43	459.11	280	261	51	80	78	-3
4	17.5	180	0.21	0.45	460.03 *	280	260	51	80	78	-3
	20	167	0.15	0.33	460.90	280	260	53	80	78	-3
5	22.5	163	0.15	0.33	461.73	281	260	53	81	79	-3
	25	176	0.17	0.37	462.60	280	260	55	81	79	-3
6	27.5	178	0.15	0.32	463.41	280	259	056	81	78	-3
	30	181	0.16	0.34	464.25	280	260	52	81	79	-3
7	32.5	183	0.16	0.34	465.08	280	260	58	80	79	-3
	35	185	0.18	0.38	465.97	280	260	53	81	79	-3.5
8	37.5	183	0.17	0.36	466.82	280	260	51	81	79	-4
	40	170	0.13	0.28	467.59	280	260	51	81	79	-4
9	42.5	182	0.17	0.36	468.45	280	260	52	81	79	-4
	45	185	0.17	0.36	469.30	280	260	53	81	79	-4
10	47.5	185	0.17	0.36	470.16	280	260	53	81	79	-4
	50	188	0.16	0.34	471.01	280	260	54	81	79	-4

MOISTURE FIELD DATA SHEET

Project No.: 121511269
Client: NORTHERN PULP
Plant: PICTOU NS
Location: DISSOLVING TANK
Test: PM-3
Date: OCT 20/2014
Analyst: NGM

0930-6

Moisture Data

BLANK 1037.0 665.5 371.5

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	1029.7	687.5	342.2
2	100 mL H2O	979.3	704.2	275.1
3	Blank	665.6	662.8	2.8
4	200g Silica Gel	1038.9	1030.9	8

Total Weight Gain (g)	999.6
Moisture Volume (mL)	999.6

Volume H_2O Collected: 999.6 ml
X 0.048 = 47.9808 ft^3 H_2O **(Vwc)**

DGM Final 508.78 ft^3
DGM Initial 473.64 ft^3
Final - Initial = 35.14 ft^3 **(Vmc)**

$$\text{Moisture} = \frac{\text{Vwc}}{\text{(Vwc + Vmc)}}$$

$$\text{Moisture} = \frac{47.9808}{(47.9808 + 35.14)}$$

$$\textbf{Moisture} = \frac{47.9808}{83.1208} = 0.5772 = 57.7\%$$

1/2

SOURCE TESTING FIELD DATA SHEET

Job No.: 12151269
Client: Northern Pulp
Plant: Pictou, NS
Location: Dissolv. Tank
Test: PM-3
Date: Oct 20, 2014
Operators: TBH / MM
Gamma: 0.980
Delta H@: 1.805
Pitot Coeff.: 0.876
Start: 10:43
Finish: 13:20

Static Pressure (in.H2O): -0.20
Port Length (in): 6"
Stack Dia. (in.): 48"
Probe Length (ft): 5'
Nozzle ID (in.): 0.305 (1-10)
Console S/N: 16726

Pre-Test Leak Check: ✓
Vacuum Pressure: -18
Post-Test Leak Check:
Vacuum Pressure:

K': 2.55

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (in.Hg)
									In	Out	
	0				473.64						
1	2.5	196	0.24	0.50	474.65	280	235	67	79	79	-1
	5	196	0.24	0.50	475.65	279	245	66	79	79	-1
2	7.5	200	0.27	0.56	476.72	279	251	56	80	79	-1
	10	196	0.26	0.54	477.76	279	255	54	80	79	-1
3	12.5	182	0.20	0.42	478.66	280	260	52	80	79	-1
	15	190	0.25	0.53	479.68	280	261	52	80	79	-1
4	17.5	191	0.23	0.49	480.68	280	261	53	81	79	-1
	20	189	0.20	0.42	481.60	279	261	53	81	79	-1
5	22.5	191	0.18	0.38	482.49	280	260	54	81	79	-1
	25	194	0.19	0.40	483.39	280	260	56	81	79	-1
6	27.5	189	0.16	0.34	484.23	280	260	56	82	80	-1
	30	192	0.17	0.36	484.92	280	260	58	82	80	-1
7	32.5	191	0.10	0.21	485.70	280	260	58	82	80	-1
	35	178	0.15	0.32	486.50	280	260	58	82	80	-1
8	37.5	190	0.16	0.34	487.35	280	260	57	82	80	-2
	40	187	0.16	0.34	488.18	280	260	56	82	80	-2
9	42.5	193	0.16	0.34	489.02	281	260	55	82	80	-2.5
	45	194	0.17	0.36	489.87	280	260	54	82	80	-2.5
10	47.5	198	0.18	0.38	490.75	280	260	54	82	80	-2.5
	50	198	0.17	0.36	491.62	280	259	54	82	80	-2.5

2/2

SOURCE TESTING FIELD DATA SHEET

Job No.: 121511269
Client: N. Nerin Pulp
Plant: Pictou, NS
Location: P.ss. Tank
Test: PM-B
Date: Oct 20, 2014
Operators: TBH/MM
Gamma: 0.980
Delta H@: 1.905
Pitot Coeff.: 0.836
Start: 16:43
Finish: 18:20

Static Pressure (in.H2O): -0.20
Port Length (in): 4"
Stack Dia. (in.): 48"
Probe Length (ft): 5'
Nozzle ID (in.): 0.305 (1-10)
Console S/N: 1646

Pre-Test Leak Check:
Vacuum Pressure:
Post-Test Leak Check:
Vacuum Pressure:

K': 2.55

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (in.Hg)
									In	Out	
	0				491.60						
1	2.5	192	0.16	0.34	492.46	280	259	63	81	80	-2.5
	5	193	0.17	0.36	493.31	280	259	63	82	81	-1.5
2	7.5	190	0.06	0.13	493.85	280	259	55	82	80	-3
	10	193	0.23	0.49	494.81	280	260	55	82	80	-2.5
3	12.5	196	0.23	0.48	494.80	279	260	57	82	80	-3.5
	15	197	0.22	0.46	496.76	278	260	52	82	80	-3.5
4	17.5	196	0.22	0.46	497.74	276	261	50	83	80	-3.5
	20	180	0.15	0.32	498.54	282	260	49	83	80	-3.5
5	22.5	181	0.17	0.37	499.41	281	260	49	83	81	-3
	25	193	0.17	0.36	500.26	280	260	51	84	81	-4
6	27.5	194	0.18	0.38	501.15	280	260	50	84	81	-4
	30	193	0.16	0.34	501.99	280	260	52	84	81	-4
7	32.5	195	0.17	0.36	502.85	275	260	53	85	81	-4
	35	196	0.18	0.38	503.72	279	259	54	85	81	-4.5
8	37.5	199	0.19	0.40	504.63	279	260	55	85	81	-4.5
	40	194	0.18	0.38	505.51	279	261	57	85	82	-5
9	42.5	178	0.14	0.30	506.30	279	260	57	85	82	-4.5
	45	185	0.16	0.34	507.13	282	260	58	85	82	-4
10	47.5	186	0.16	0.34	507.98	278	260	59	86	82	-4.5
	50	185	0.15	0.32	508.78	281	260	60	85	82	-5

MOISTURE FIELD DATA SHEET

Project No.: 121511269
Client: Northern Pulp
Plant: Power Boiler
Location: Pictou, NS
Test: PM-1
Date: Oct 15, 2014
Analyst: TBH

Stantec

FILTER ID #
0902-03

Moisture Data

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	879.7	722.1	157.6
2	100 mL H2O	749.1	711.2	37.9
3	Blank	575.1	569.7	5.4
4	200g Silica Gel	974.2	962.6	11.4
		Total Weight Gain (g)		212.3
		Moisture Volume (mL)		

Volume H_2O Collected: 212.3 ml
X 0.048 = 10.19 ft^3 H_2O **(Vwc)**

DGM Final 927.09 ft^3
DGM Initial 877.37 ft^3
Final - Initial = 49.72 ft^3 **(Vmc)**

$$\text{Moisture} = \frac{\text{Vwc}}{\text{(Vwc + Vmc)}}$$

$$\text{Moisture} = \frac{10.19}{10.19 + 49.72}$$

Moisture = 17%

SOURCE TESTING FIELD DATA SHEET

Job No.: 1215112609
Client: Northern Pulp
Plant: Power + Baler
Location: Pictou, NS
Test: PM-1
Date: Oct 15, 2014
Operators: MM / DH
Gamma: 1.040
Delta H@: 1.706
Pitot Coeff.: 0.817
Start: 11:15
Finish: 13:00

Static Pressure (in.H2O): 0.20
Port Length (in): 6"
Stack Dia. (in.): 76"
Probe Length (ft): 8'
Nozzle ID (in.): 1-6 (0.173)
Console S/N: 1848

Pre-Test Leak Check:
Vacuum Pressure:
Post-Test Leak Check:
Vacuum Pressure:

K': 0.64

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (in.Hg)
									In	Out	
	0				877.37						
1	2.5	143	1.1	0.62	878.54	300	210	67	67	67	-1
	5	137	1.3	0.73	879.64	270	202	68	66	68	-1
2	7.5	139	1.1	0.62	880.66	293	209	68	67	66	-1
	10	142	1.1	0.62	881.77	297	215	66	67	67	-2
3	12.5	141	1.1	0.62	882.86	298	216	63	66	67	-2
	15	140	0.66	0.36	883.59	295	219	61	66	66	-2
4	17.5	147	0.66	0.37	884.43	296	224	59	66	67	-2
	20	143	0.61	0.34	885.19	301	221	59	67	66	-2
5	22.5	143	0.60	0.34	885.96	300	226	59	69	67	-2
	25	142	0.52	0.29	886.68	300	230	60	68	68	-2
6	27.5	139	0.53	0.30	887.49	300	230	60	68	67	-2
	30	142	0.58	0.33	888.32	301	230	60	68	67	-2
7	32.5	142	0.57	0.32	889.05	299	230	60	69	68	-2
	35	142	0.90	0.51	890.04	300	225	60	68	68	-2
8	37.5	141	0.89	0.50	891.12	300	226	61	67	70	-2
	40	142	1.40	0.79	892.17	299	222	61	70	68	-2
9	42.5	141	1.40	0.79	893.38	300	218	62	69	69	-2
	45	139	1.50	0.85	894.62	301	221	61	69	68	-2
10	47.5	139	1.50	0.85	895.88	300	218	61	70	68	-2
	50	142	1.65	0.92	897.17	300	221	61	70	69	-2
11	52.5	141	1.60	0.90	898.44	298	212	63	70	68	-2
	55	143	1.70	0.95	899.75	299	209	61	70	69	-2
12	57.5	145	1.75	0.98	901.08	299	206	61	70	69	-2
	60	144	1.80	1.01	902.43	299	200	61	71	69	-2

SOURCE TESTING FIELD DATA SHEET

Job No.: 171511269
Client: Northern Pulp
Plant: Power Boiler
Location: Pictou, NS
Test: PM-1
Date: Oct 15, 2014
Operators: MM/DH
Gamma: 1.040
Delta H@: 1.7606
Pitot Coeff.: 0.812
Start :
Finish : 13:00

Static Pressure (In.H2O): 0.20
Port Length (In): 6"
Stack Dia. (In.): 76"
Probe Length (ft): 8-2
Nozzle ID (In.): 6 (0.173)
Console S/N: 1848

Pre-Test Leak Check:
Vacuum Pressure:
Post-Test Leak Check:
Vacuum Pressure:

K' : 0.64

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (In.Hg)
									In	Out	
	0				902.43						
1	2.5	143	1.35	0.76	903.64	299	229	68	69	69	-2
	5	145	1.40	0.78	904.84	300	228	67	69	69	-2
2	7.5	144	1.40	0.78	906.04	298	219	63	69	68	-2
	10	147	1.40	0.78	907.24	296	231	60	71	71	-2
3	12.5	144	1.35	0.76	908.40	299	233	59	70	69	-2
	15	141	1.10	0.62	909.47	298	236	58	69	69	-2
4	17.5	143	1.10	0.62	910.55	298	240	58	69	68	-2
	20	144	1.05	0.59	911.59	301	241	59	69	70	-2
5	22.5	141	1.05	0.59	912.64	300	243	59	69	71	-2
	25	142	1.00	0.56	913.66	301	243	59	70	69	-2
6	27.5	140	1.00	0.57	914.68	300	243	60	70	69	-2
	30	141	1.05	0.59	915.74	299	245	60	70	69	-2
7	32.5	139	1.00	0.57	916.78	300	245	60	71	69	-2
	35	136	0.99	0.56	917.80	301	244	60	70	69	-2
8	37.5	136	0.99	0.56	918.83	298	244	60	71	70	-2
	40	140	0.89	0.50	919.80	300	242	60	69	71	-2
9	42.5	138	0.90	0.51	920.78	299	232	61	71	69	-2
	45	139	0.82	0.46	921.75	300	231	62	71	69	-2
10	47.5	138	0.83	0.47	922.66	299	231	63	71	70	-2
	50	138	0.73	0.41	923.54	301	231	64	71	69	-2
11	52.5	139	0.78	0.44	924.46	300	229	64	71	69	-2
	55	137	0.68	0.39	925.32	300	231	64	71	70	-2
12	57.5	138	0.72	0.41	926.21	300	229	64	71	69	-2
	60	136	0.70	0.40	927.09	300	225	63	72	70	-2

COMBUSTION GAS ANALYSIS
CONCENTRATION FIELD SHEET

Sampling Methodology: Environment Canada EPS 1/RM/15

Stantec

Project No.: 121511269
Client: Northern Pulp
Plant: Power Boiler
Location: Pictou, NS

Fuel Type: Nat gas
Time Start: 11:30
Time Finish: 12:00

Test No.: Gas #1
Date: Oct 15, 2014

Personnel: TBH

Time	Concentrations							
	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	NO_x (ppm)	NO (ppm)	NO_2 (ppm)	THC (%)
0	13.2	5.5	75	0	48			
5	13.1	5.6	83	0	48			
10	13.2	5.7	68	0	49			
15	13.0	5.8	64	0	44			
20	12.9	6.1	68	0	47			
25	12.7	6.0	73	0	51			
30	12.8	6.0	72	0	52			

MOISTURE FIELD DATA SHEET

Project No.: 121511269
Client: NORTHERN PULP
Plant: PICTOU NS
Location: POWER BOILER
Test: PM 2
Date: OCT 15/2011
Analyst: NGM

Stantec

0930-3

Moisture Data

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	881.4	696.9	184.5
2	100 mL H2O	746.6	719.8	26.8
3	Blank	617.2	612.7	4.5
4	200g Silica Gel	1031.8	1018.5	13.3
		Total Weight Gain (g)		229.1
		Moisture Volume (mL)		

Volume H_2O Collected: 229.1 ml
X 0.048 = 11.0 ft^3 H_2O **(Vwc)**

DGM Final 979.31 ft^3
DGM Initial 927.35 ft^3
Final - Initial = 51.96 ft^3 **(Vmc)**

$$\text{Moisture} = \frac{\text{Vwc}}{\text{(Vwc + Vmc)}}$$

$$\text{Moisture} = \frac{11.0}{11.0 + 51.96}$$

Moisture = 17.5 %

SOURCE TESTING FIELD DATA SHEET

Job No.: 12151269
Client: Northern Pulp
Plant: Pictou NS
Location: Power Boiler
Test: PM-2
Date: Oct 15, 2014
Operators: TBH / TM
Gamma: 1.040
Delta H@: 1.7606
Pitot Coeff.: 0.817
Start: 10:15
Finish:

Static Pressure (in.H2O): 0.20
Port Length (in): 6"
Stack Dia. (in.): 72"
Probe Length (ft): 8-2
Nozzle ID (in.): 1-6 (0.173)
Console S/N: 1848

Pre-Test Leak Check: -18
Vacuum Pressure: ✓
Post-Test Leak Check: ✓
Vacuum Pressure: -18

K': 0.64

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (In.H2O)	Orifice dH (In.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (In.Hg)
									In	Out	
	0				927.35						
1	2.5	131	1.35	0.77	928.55	256	225	75	70	69	-1
	5	139	1.40	0.79	929.76	277	222	76	71	70	-1
2	7.5	144	1.30	0.73	930.91	295	234	68	70	70	-1
	10	140	1.30	0.73	932.05	299	236	65	71	70	-1
3	12.5	140	1.15	0.65	933.15	301	242	64	71	70	-2
	15	145	1.10	0.62	934.20	300	246	59	72	71	-2
4	17.5	139	1.05	0.59	935.27	299	249	58	72	70	-2
	20	138	1.05	0.60	936.32	300	254	56	72	70	-2
5	22.5	135	0.96	0.55	937.34	300	255	56	73	70	-2
	25	137	0.95	0.54	938.36	296	243	56	73	71	-2
6	27.5	141	0.97	0.55	939.37	300	246	56	73	71	-2
	30	140	0.96	0.54	940.38	301	254	56	73	71	-2
7	32.5	140	0.95	0.54	941.39	300	254	56	74	71	-2
	35	140	0.93	0.53	942.38	298	256	58	74	71	-2
8	37.5	141	0.87	0.49	943.33	300	255	58	74	71	-2
	40	138	0.89	0.51	944.30	301	256	57	74	71	-2
9	42.5	135	0.94	0.59	945.30	301	257	58	74	71	-2
	45	138	0.95	0.54	946.30	301	261	58	74	72	-2
10	47.5	139	0.94	0.53	947.30	300	259	58	74	72	-2
	50	140	0.84	0.48	948.27	300	259	58	74	72	-2
11	52.5	140	0.82	0.47	949.19	300	260	59	74	72	-2
	55	139	0.86	0.49	950.10	300	259	59	75	73	-2
12	57.5	138	0.73	0.42	951.07	300	259	58	74	72	-2
	60	139	0.74	0.42	951.97	300	256	58	74	72	-2

SOURCE TESTING FIELD DATA SHEET

Job No.: K18I1269
Client: Northern Pulp
Plant: Pictou, NS
Location: Power Boiler
Test: PM-2
Date: Oct 11, 2014
Operators: TOH/TB
Gamma: 1.040
Delta H@: 1.7766
Pitot Coeff.: 0.817
Start: 12:15
Finish: 16:30

Static Pressure (In.H2O): 0.20
Port Length (in): 6"
Stack Dia. (in.): 72"
Probe Length (ft): 8-2
Nozzle ID (in.): 1-6 (0.173)
Console S/N: 18-10

Pre-Test Leak Check: ✓
Vacuum Pressure: -8

K': 0.64

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (In.H2O)	Orifice dH (In.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (In.Hg)
									In	Out	
	0				951.97						
1	2.5	138	1.20	0.68	953.07	300	265	69	72	71	-1
	5	138	1.30	0.741	954.22	298	266	66	72	72	-1
2	7.5	138	0.87	0.50	955.18	299	267	66	72	72	-3
	10	138	0.84	0.48	956.14	301	265	58	73	72	-2
3	12.5	138	0.61	0.35	956.93	301	268	60	73	72	-2
	15	136	0.60	0.34	957.72	300	270	58	72	71	-2
4	17.5	138	0.61	0.35	958.51	300	271	59	72	71	-2
	20	138	0.58	0.33	959.29	299	265	59	73	71	-2
5	22.5	141	0.82	0.46	960.16	300	263	60	73	71	-2
	25	138	0.84	0.48	961.11	300	259	61	73	71	-2
6	27.5	139	1.35	0.77	962.80 *	301	257	61	73	72	-2
	30	136	1.30	0.74	963.39	299	252	61	74	71	-2
7	32.5	136	1.60	0.91	964.66	300	252	60	74	72	-2
	35	135	1.50	0.86	965.90	299	253	60	74	72	-3
8	37.5	137	1.70	0.97	967.19	297	254	60	74	72	-4
	40	137	1.75	1.00	968.52	298	256	60	74	72	-4
9	42.5	139	1.80	1.02	969.86	298	255	60	74	72	-4
	45	136	1.85	1.06	971.21	297	251	61	74	72	-5
10	47.5	132	1.90	1.08	972.57	297	250	61	74	72	-5
	50	133	1.85	1.06	973.93	296	239	60	74	71	-5
11	52.5	132	1.75	1.01	975.25 *	294	243	60	74	71	-5
	55	135	1.85	1.06	976.60	293	241	61	74	71	-5
12	57.5	137	1.90	1.09	977.96	295	246	61	74	71	-6
	60	139	1.95	1.11	979.31	295	248	61	74	71	-6

COMBUSTION GAS ANALYSIS
CONCENTRATION FIELD SHEET

Sampling Methodology: Environment Canada EPS 1/RM/15

Stantec

Project No.: 121511269
Client: Northern Pulp
Plant: Power Boiler
Location: Pictou, NS

Fuel Type: Nat. gas

Time Start: 3:30
Time Finish: 4:00

Test No.: Gas # 2
Date: Oct 15, 2014

Personnel: TBT

Time	Concentrations							
	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	NO_x (ppm)	NO (ppm)	NO_2 (ppm)	THC (%)
0	12.6	6.2	178	0	53			
5	12.5	6.3	165	0	54			
10	12.0	6.5	160	0	58			
15	12.0	6.6	245	0	60			
20	11.9	6.6	236	0	61			
25	10.9	7.2	210	0	67			
30	11.5	6.8	127	0	65			

MOISTURE FIELD DATA SHEET

Project No.: 121511269
Client: Northern Pulp
Plant: Pictou, NS
Location: Power Boiler
Test: PM-3
Date: Oct 16, 2014
Analyst: TBH

Stantec

Moisture Data

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	954.5	729.9	224.6
2	100 mL H2O	743.3	708.7	34.6
3	Blank	574.4	568.5	5.9
4	200g Silica Gel	989.1	974.1	15.0
		Total Weight Gain (g)		280.1
		Moisture Volume (mL)		280.1

Volume H_2O Collected: 280.1 ml
X 0.048 = 13.4448 ft^3 H_2O **(Vwc)**

DGM Final 1039.43 ft^3
DGM Initial 979.55 ft^3
Final - Initial = 59.88 ft^3 **(Vmc)**

$$\text{Moisture} = \frac{\textbf{Vwc}}{\textbf{(Vwc + Vmc)}}$$

$$\text{Moisture} = \frac{13.4448}{(13.4448 + 59.88)} = \frac{13.4448}{73.3248}$$

Moisture = 0.183 = 18.3%

SOURCE TESTING FIELD DATA SHEET

Job No.: 121511 2609
Client: Northern Pulp
Plant: Pictou, NS
Location: Power Boiler
Test: PM-3
Date: Oct 16, 2014
Operators: TBH / TF
Gamma: 1.040
Delta H@: 1.7666
Pitot Coeff.: 0.817
Start: 8:55
Finish:

Static Pressure (in.H2O): 0.20
Port Length (in): 6"
Stack Dia. (in.): 72"
Probe Length (ft): 8-2
Nozzle ID (in.): 1-6 (0.173)
Console S/N: 1848

Pre-Test Leak Check: ✓
Vacuum Pressure: -18
Post-Test Leak Check:
Vacuum Pressure:

K': 0.64

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (In.H2O)	Orifice dH (In.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (In.Hg)
									In	Out	
	0				979.55						
1	2.5	132	1.50	0.84	980.79	294	274	58	60	60	-1
	5	131	1.50	0.85	982.01	299	272	57	61	61	-2
2	7.5	132	1.30	0.73	983.16	300	272	53	60	61	-2
	10	136	1.20	0.67	984.22	300	272	52	61	60	-2
3	12.5	135	1.00	0.56	985.19 *	301	276	52	61	61	-2
	15	136	0.98	0.55	986.20	299	278	53	61	61	-2
4	17.5	136	0.78	0.44	987.08	300	279	52	60	62	-2
	20	136	0.73	0.41	987.93	283	285	53	62	60	-2
5	22.5	135	1.10	0.62	988.97	298	287	53	61	61	-2
	25	133	1.10	0.62	990.01	300	282	54	61	60	-2
6	27.5	132	1.60	0.90	991.26	299	284	54	61	60	-2
	30	133	1.55	0.87	992.47	304	285	55	62	60	-2
7	32.5	136	1.70	0.95	993.75	298	282	55	61	60	-2
	35	135	1.85	1.03	995.09	300	273	55	62	60	-2
8	37.5	136	2.15	1.20	996.53	300	272	55	62	60	-2.5
	40	133	2.00	1.12	997.92	300	269	56	63	60	-2.5
9	42.5	134	2.30	1.29	999.40	300	265	56	62	61	-2.5
	45	131	2.25	1.27	1000.86	301	267	55	63	60	-2.5
10	47.5	130	2.40	1.35	1002.45 *	299	265	56	63	61	-3
	50	131	2.35	1.32	1003.89	301	262	56	62	60	-3
11	52.5	133	2.60	1.46	1005.42	299	257	56	62	60	-3
	55	133	2.60	1.46	1006.95	300	259	55	63	60	-4
12	57.5	134	2.65	1.48	1008.55	300	256	54	62	60	-4
	60	132	2.75	1.55	1010.17	300	254	55	61	60	-4.5

SOURCE TESTING FIELD DATA SHEET

Job No.: 121511269
Client: Northern Pulp
Plant: Pictou, NS
Location: Power Boiler
Test: PM-3
Date: Oct 16, 2014
Operators: TBH / TF
Gamma: 1.040
Delta H@: 1.7606
Pitot Coeff.: 0.819
Start :
Finish : 11:10

Static Pressure (in.H2O): 0.20
Port Length (in): 6"
Stack Dia. (in.): 72"
Probe Length (ft): 8-2
Nozzle ID (in.): 1-6 (0.173)
Console S/N: 1848

Pre-Test Leak Check:
Vacuum Pressure:
Post-Test Leak Check:
Vacuum Pressure:

K' : 0.64

Traverse Point	Time (min)	Stack Gas Temp., Ts (F)	Velocity Head, dP (in.H2O)	Orifice dH (in.H2O)	Gas Meter Volume (cu.ft)	Probe Temp. (F)	Oven Temp. (F)	Impinger Outlet Temp. (F)	Gas Meter Temp. (F)		Pump Vacuum (in.Hg)
									In	Out	
	0				1010.17						
1	2.5	133	1.75	0.98	1011.49	298	265	57	60	60	-2
	5	133	1.80	1.01	1012.85	298	264	56	61	60	-2
2	7.5	134	2.00	1.12	1014.25	298	264	52	62	60	-4
	10	134	2.10	1.18	1015.65	297	265	50	63	60	-4.5
3	12.5	133	2.00	1.12	1017.05	296	265	48	62	61	-4.5
	15	135	2.10	1.17	1018.47	297	266	47	65	60	-4.5
4	17.5	133	1.80	1.01	1019.81	292	265	48	63	60	-4.5
	20	132	1.90	1.07	1021.17	287	268	47	63	61	-5
5	22.5	133	1.70	0.95	1022.46	287	270	47	64	60	-5
	25	134	1.60	0.90	1023.72	291	272	48	64	61	-5
6	27.5	134	1.55	0.87	1024.95	292	273	48	63	61	-5
	30	134	1.40	0.79	1026.11	277	278	50	63	60	-5
7	32.5	133	1.45	0.82	1027.30	287	279	48	64	61	-5
	35	134	1.40	0.79	1028.46	293	278	49	63	61	-5
8	37.5	133	1.50	0.84	1029.60 *	297	278	49	63	61	-5
	40	130	1.50	0.85	1030.88	300	275	48	63	61	-5
9	42.5	132	1.35	0.76	1032.03	300	274	49	64	61	-5
	45	132	1.30	0.73	1033.15	300	272	49	63	61	-5
10	47.5	132	1.20	0.68	1034.25	300	270	49	64	61	-5
	50	131	1.25	0.71	1035.34	300	270	49	63	61	-5
11	52.5	132	1.10	0.62	1036.39	300	269	49	63	61	-5
	55	132	1.15	0.65	1037.46	300	271	50	64	61	-5
12	57.5	130	0.97	0.55	1038.44	299	271	50	64	61	-5
	60	129	0.98	0.55	1039.43	300	270	50	63	61	-4

COMBUSTION GAS ANALYSIS
CONCENTRATION FIELD SHEET

Sampling Methodology: Environment Canada EPS 1/RM/15

Stantec

Project No.: 121511269
Client: Northern Pulp
Plant: Pictou, NS
Location: Power Boiler

Fuel Type:

Time Start: 10:00
Time Finish: 10:30

Test No.: Gas # 3
Date: Oct 16, 2014

Personnel:

Time	Concentrations							
	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	NO_x (ppm)	NO (ppm)	NO_2 (ppm)	THC (%)
0	11.9	6.6	56	0	51			
5	11.5	6.9	55	0	52			
10	11.8	6.7	57	0	52			
15	12.0	6.6	64	0	52			
20	11.5	6.9	57	0	55			
25	12.1	6.5	71	0	54			
30	12.0	6.5	63	0	57			

VOLUMETRIC FLOWRATE DETERMINATION
FIELD SHEET

Project No.: 12012769
Client: Northern Pulp
Location: HARRIS
Personnel: TB/HMA

Barometric Press. (in. Hg): _____
Static Press. (in. H_2O): _____
Gas Moisture (%): _____
CO2 (%) _____
O2 (%) _____

Stack Diameter (in.) 72
Pitot Coefficient, Cp: 0.840

Date: Oct 23, 2014
Time : 6:00

Point	Test: 1-1	
	ΔP (in. H_2O)	Temp Ts (°F)
1	0.78	130
2	0.79	128
3	0.80	133
4	0.85	132
5	0.96	131
6	0.99	135
7	1.05	133
8	1.10	132
9	1.05	130
10	0.99	128
11	0.98	130
12	0.90	130

Date: Oct 23, 2014
Time : 6:15

Point	Test: 1-2	
	ΔP (in. H_2O)	Temp Ts (°F)
1	0.75	130
2	0.80	130
3	0.80	128
4	0.90	130
5	0.95	128
6	1.00	125
7	1.10	130
8	1.05	130
9	1.00	128
10	0.99	128
11	0.90	127
12	0.85	130

Date: Oct 23, 2014
Time : 6:30

Point	Test: 2-1	
	ΔP (in. H_2O)	Temp Ts (°F)
1	0.78	132
2	0.85	131
3	0.90	133
4	0.95	132
5	1.00	133
6	1.00	131
7	1.05	130
8	1.00	129
9	0.95	131
10	0.90	131
11	0.90	130
12	0.88	

Date: Oct 23, 2014
Time : 6:40

Point	Test: 2-2	
	ΔP (in. H_2O)	Temp Ts (°F)
1	0.75	131
2	0.80	131
3	0.89	133
4	0.95	132
5	1.00	131
6	1.05	130
7	1.12	131
8	1.00	130
9	0.98	129
10	0.90	133
11	0.88	132
12	0.87	133

VOLUMETRIC FLOWRATE DETERMINATION
FIELD SHEET

Project No.: 12.1311269
Client: Northern Pulp
Location: HLRV
Personnel: TBT/MM

Barometric Press. (in. Hg): _____
Static Press. (in. H_2O): _____
Gas Moisture (%): _____
CO2 (%) _____
O2 (%) _____

Stack Diameter (in.) 72
Pitot Coefficient, Cp: 0.840

Date: Oct 23, 2014
Time : 6:50

Point	Test: 3-1	
	ΔP (in. H_2O)	Temp Ts (°F)
1	0.76	131
2	0.85	132
3	0.89	137
4	0.95	130
5	1.00	129
6	1.05	131
7	1.10	130
8	1.05	130
9	0.99	129
10	0.95	128
11	0.88	130
12	0.83	129

Date: Oct 23, 2014
Time : 7:00

Point	Test: 3-2	
	ΔP (in. H_2O)	Temp Ts (°F)
1	0.76	131
2	0.85	130
3	0.90	130
4	0.98	131
5	1.00	130
6	1.05	132
7	1.06	131
8	1.10	132
9	0.95	131
10	0.90	132
11	0.88	131
12	0.85	130

Date: _____
Time :

Point	Test:	
	ΔP (in. H_2O)	Temp Ts (°F)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

Date: _____
Time :

Point	Test:	
	ΔP (in. H_2O)	Temp Ts (°F)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

COMBUSTION GAS ANALYSIS
CONCENTRATION FIELD SHEET

Sampling Methodology: Environment Canada EPS 1/RM/15

Stantec

Project No.: 121511268
Client: Northern Pulp
Plant: NLRV
Location: Pictou, NS

Fuel Type: NH

Time Start: 6:00 pm
Time Finish: 7:30 pm

Test No.: 1, 2, 3
Date: Oct 23rd, 2014

Personnel: TBH/NM

Time	Concentrations							
	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	NO_X (ppm)	NO (ppm)	NO_2 (ppm)	THC (%)
0					12.1			
5					13.3			
10					12.5			
15					12.1			
20					12.4			
25					13.0			
30					13.5			
0					14.2			
5					13.3			
10					12.1			
15					12.3			
20					12.7			
25					12.5			
30					12.2			
0					11.1			
5					11.5			
10					11.8			
15					12.5			
20					11.9			
25					11.8			

Appendix E

Calculations

Raw Data for: Northern Pulp Fall Source Testing

Test #1

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Lime Kiln
Test: PM-1
Date: 23-Oct-14
Personnel: TBH/NGM

Test Start: 2:23 PM
Test Finish: 4:45 PM

Particulate Collected from Filter (mg):	208.1
Particulate Collected from Probe Wash (mg):	6.7
Particulate Collected from Impinger Wash (mg):	13.7
Total Particulate Collected (mg):	228.5

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	1014.3	608.5	405.8
2	100 mL H2O	717.0	707.0	10.0
3	Blank	668.4	666.9	1.5
4	200g Silica Gel	976.7	969.4	7.3
			Total Weight Gain (g)	424.6
			Moisture Volume (mL)	424.6

Parameters

Barometric Pressure, Pbar (in. Hg)	30.00
Stack Static Pressure, Pstatic (in. H2O)	0.51
Ambient Temp, (°F)	70
H2O Volume Collected, Vw (mL)	424.6
Total # Sampling Points,	24
Sampling Time per Point, (min)	5
Readings Taken Every __ mins	2.5
Regulatory Agency	NSENV

O2, (%)	4.05
CO2, (%)	23.24
N2, (%)	72.7

Stack Diameter, (in.)	48	
Stack Area, (sq. ft.)	12.57	
Probe Length, (in.)	96	
Nozzle Diameter, (in.)	0.173	Nozzle ID = 1-6 (0.173)
Pitot Coefficient, (Cp)	0.816	
Gamma, meter constant	0.980	

	Traverse Point	Time (min)	Stack Gas Temp, Ts (°F)	S-type Pitot delta P (in. H2O)	Orifice delta H (in. H2O)	Gas Meter Volume (cu. ft.)	Gas Meter Temp Inlet (°F)	Gas Meter Temp Outlet (°F)	Nozzle Angle (Cyclonic Flow) (deg. from vert.) (+ clockwise)
		0.00				509.430			
Traverse 1	**1**	2.5	161	0.84	0.33	510.230	69	68	-19
		5	161	0.84	0.33	510.990	70	68	-19
	2	7.5	161	0.79	0.30	511.680	70	69	-25
		10	161	0.76	0.30	512.440	70	69	-25
	3	12.5	161	0.72	0.28	513.190	70	68	-20
		15	162	0.71	0.28	513.900	70	69	-20
	4	17.5	162	0.63	0.25	514.570	71	70	-10
		20	163	0.62	0.24	515.210	71	70	-10
	5	22.5	162	0.50	0.20	515.840	70	69	-5
		25	162	0.48	0.19	516.400	70	70	-5
	6	27.5	162	0.43	0.17	516.960	70	70	0
		30	162	0.41	0.16	517.480	70	70	0
	7	32.5	163	0.55	0.22	518.110	69	69	0
		35	163	0.57	0.22	518.730	69	69	0
	8	37.5	162	0.59	0.23	519.370	69	69	5
		40	162	0.59	0.23	520.010	69	69	5
	9	42.5	163	0.55	0.21	520.620	69	69	10
		45	162	0.55	0.22	521.250	69	68	10
	10	47.5	160	0.35	0.14	521.720	69	68	15
		50	160	0.35	0.14	522.240	69	68	15
	11	52.5	158	0.25	0.10	522.650	70	68	20
		55	159	0.25	0.10	523.090	70	69	20
	12	57.5	159	0.23	0.09	523.500	70	69	25
		60	158	0.24	0.09	523.900	71	69	25
						523.900			
Traverse 2	**1**	62.5	160	0.84	0.33	524.650	71	71	-60
		65	160	0.83	0.32	525.410	71	70	-60
	2	67.5	161	0.84	0.33	526.170	71	70	-55
		70	161	0.83	0.33	526.960	71	70	-55
	3	72.5	162	0.75	0.30	527.690	71	70	-25
		75	162	0.75	0.30	528.430	71	70	-25
	4	77.5	162	0.75	0.30	529.150	72	71	-15
		80	161	0.74	0.29	529.880	72	71	-15
	5	82.5	161	0.70	0.28	530.590	72	71	-10
		85	161	0.70	0.28	531.300	73	71	-10
	6	87.5	163	0.75	0.29	532.030	73	71	0
		90	161	0.78	0.31	532.780	73	71	0
	7	92.5	162	0.46	0.18	533.370	73	71	0
		95	162	0.45	0.18	533.960	72	71	0
	8	97.5	162	0.53	0.21	534.540	72	71	10
		100	162	0.54	0.21	535.170	73	71	10
	9	102.5	161	0.59	0.23	535.840	73	72	15
		105	163	0.58	0.23	536.500	73	72	15
	10	107.5	163	0.61	0.24	537.160	74	72	20
		110	162	0.63	0.25	537.840	74	72	20
	11	112.5	162	0.65	0.26	538.510	75	73	25
		115	162	0.58	0.23	539.160	74	73	25
	12	117.5	161	0.55	0.22	539.790	74	72	30
		120	161	0.52	0.21	540.410	74	72	30

Calculations for: Northern Pulp Summer Source Testing

Test #1

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Lime Kiln
Test: PM-1
Date: 23-Oct-14
Personnel: TBH/NGM

Calculated Parameters

Stack Gas Pressure, Ps (in.Hg)	30.04
Stack Gas Molecular Weight, Dry Basis, Md (lb/lb-mole)	31.88
Volume of Water Vapour Collected, Vwc (cu.ft)	20.381
Stack Gas Moisture Content (% as decimal)	0.393
Stack Gas Molecular Weight, Wet Basis, Ms (lb/lb-mole)	26.42

Isokineticity Checks

Check average **Within Criteria**

	Traverse Point	Time (min)	Stack Gas Temp, Ts (R)	S-type Pitot, delta P (in. H2O)	Orifice delta H (in. H2O)	Measured Stack Gas Velocity, Us (ft/s)	Vertical Stack Gas Velocity, Us (ft/s)	Gas Meter: Meter Press., Pm (in. Hg)	Gas Meter: Avg. Temp, Tm (R)	Gas Meter: Volume, Vm (cu. ft.)	Gas Meter: Vol. @ Ref., Vmc (cu. ft.)	Isokinetics I (%)
Traverse 1	**1**	2.5	621	0.84	0.33	56.45	53.37	30.02	529	0.800	0.799	109.79
		5	621	0.84	0.33	56.45	53.37	30.02	529	0.760	0.759	104.20
	2	7.5	621	0.79	0.30	54.74	49.61	30.02	530	0.690	0.688	97.45
		10	621	0.76	0.28	53.69	48.66	30.02	530	0.760	0.758	109.43
	3	12.5	621	0.72	0.28	52.26	49.11	30.02	529	0.750	0.749	111.05
		15	622	0.71	0.25	51.94	48.81	30.02	530	0.710	0.708	105.85
	4	17.5	622	0.63	0.24	48.92	48.18	30.02	531	0.670	0.667	105.83
		20	623	0.62	0.20	48.57	47.84	30.01	531	0.640	0.637	101.98
	5	22.5	622	0.50	0.19	43.59	43.42	30.01	530	0.630	0.628	111.90
		25	622	0.48	0.17	42.70	42.54	30.01	530	0.560	0.558	101.42
	6	27.5	622	0.43	0.16	40.42	40.42	30.01	530	0.560	0.558	107.15
		30	622	0.41	0.22	39.47	39.47	30.02	530	0.520	0.518	101.91
	7	32.5	623	0.55	0.22	45.75	45.75	30.02	529	0.630	0.629	106.89
		35	623	0.57	0.23	46.57	46.57	30.02	529	0.620	0.619	103.33
	8	37.5	622	0.59	0.23	47.35	47.17	30.02	529	0.640	0.639	104.76
		40	622	0.59	0.23	47.35	47.17	30.02	529	0.640	0.639	104.76
	9	42.5	622	0.59	0.21	47.35	46.63	30.02	529	0.640	0.639	104.75
		45	623	0.55	0.22	45.75	45.05	30.02	529	0.610	0.609	103.50
	10	47.5	622	0.55	0.14	45.71	44.16	30.01	529	0.630	0.629	106.88
		50	620	0.35	0.14	36.41	35.17	30.01	529	0.990	0.989	210.21
	11	52.5	620	0.35	0.10	36.41	34.21	30.01	529	0.410	0.410	87.05
		55	618	0.25	0.10	30.72	28.87	30.01	529	0.440	0.439	110.25
	12	57.5	619	0.25	0.09	30.75	27.86	30.01	530	0.410	0.409	102.72
		60	619	0.23	0.09	29.49	26.73	30.01	530	0.400	0.399	104.48
Traverse 2	**1**	62.5	620	0.84	0.33	56.40	28.20	30.02	531	0.750	0.746	102.36
		65	620	0.83	0.32	56.07	28.03	30.02	531	0.760	0.757	104.44
	2	67.5	621	0.84	0.33	56.45	32.38	30.02	531	0.760	0.757	103.91
		70	621	0.83	0.33	56.11	32.18	30.02	531	0.790	0.787	108.66
	3	72.5	622	0.75	0.30	53.38	48.38	30.02	531	0.730	0.727	105.70
		75	622	0.75	0.30	53.38	48.38	30.02	531	0.740	0.737	107.15
	4	77.5	622	0.75	0.30	53.38	51.56	30.02	532	0.720	0.715	104.06
		80	621	0.74	0.29	52.98	51.18	30.02	532	0.730	0.725	106.12
	5	82.5	621	0.70	0.28	51.53	50.75	30.02	532	0.710	0.705	106.12
		85	621	0.70	0.28	51.53	50.75	30.02	532	0.710	0.705	106.02
	6	87.5	623	0.75	0.29	53.42	53.42	30.02	532	0.730	0.725	105.48
		90	621	0.78	0.31	54.39	54.39	30.02	532	0.750	0.745	106.10
	7	92.5	622	0.46	0.18	41.81	41.81	30.01	532	0.590	0.586	108.74
		95	622	0.45	0.18	41.35	41.35	30.01	532	0.590	0.586	110.05
	8	97.5	622	0.53	0.21	44.87	44.19	30.02	532	0.580	0.576	99.69
		100	622	0.54	0.21	45.30	44.61	30.02	532	0.630	0.625	107.18
	9	102.5	621	0.59	0.23	47.31	45.70	30.02	533	0.670	0.664	108.86
		105	623	0.58	0.23	46.98	45.38	30.02	533	0.660	0.654	108.33
	10	107.5	623	0.61	0.24	48.18	45.27	30.02	533	0.660	0.654	105.54
		110	622	0.63	0.25	48.92	45.97	30.02	533	0.680	0.674	106.91
	11	112.5	622	0.65	0.26	49.70	45.04	30.02	534	0.670	0.663	103.51
		115	622	0.58	0.23	46.94	42.54	30.02	534	0.650	0.643	106.40
	12	117.5	621	0.55	0.22	45.68	39.56	30.02	533	0.630	0.624	105.92
		120	621	0.52	0.21	44.41	38.46	30.02	533	0.620	0.614	107.20
		Total	**Average**	**Average**	**Average**	**Average**	**Average**	**Average**	**Average**	**Total**	**Total**	**Average**
		120	621	0.61	0.23	47.48	43.53	30.02	530.59	31.620	31.467	107.54

Combustion Gas Data for: Northern Pulp

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Lime Kiln
Test: PM-1
Date: 23-Oct-14
Personnel: TBH/NGM

Test Start: 14:23
Test Finish: 16:45

Time (min)	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
0	4.05	23.24	2.97	1.16	128
5					133
10					131
15					131
20					132
25					129
30					127
Average:	**4.05**	**23.24**	**2.97**	**1.16**	**130**

O2, CO2, CO, and SO2 concentrations are average from TRS testing conducted from October 23 to October 24

Raw Data for: Northern Pulp Fall Source Testing

Test #2

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Lime Kiln
Test: PM-2
Date: 24-Oct-14
Personnel: TBH/NGM

Test Start: 8:40 AM
Test Finish: 10:40 AM

Particulate Collected from Filter (mg):	202.2
Particulate Collected from Probe Wash (mg):	2.5
Particulate Collected from Impinger Wash (mg):	8.1
Total Particulate Collected (mg):	212.7

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	1020.0	691.2	328.8
2	100 mL H2O	698.4	698.1	0.3
3	Blank	666.3	665.1	1.2
4	200g Silica Gel	980.9	976.4	4.5
			Total Weight Gain (g)	334.8
			Moisture Volume (mL)	334.8

Parameters

Barometric Pressure, Pbar (in. Hg)	30.00
Stack Static Pressure, Pstatic (in. H2O)	0.51
Ambient Temp, (°F)	70
H2O Volume Collected, Vw (mL)	334.8
Total # Sampling Points,	24
Sampling Time per Point, (min)	5
Readings Taken Every __ mins	2.5
Regulatory Agency	NSENV

O2, (%)	4.1
CO2, (%)	23.1
N2, (%)	72.8

Stack Diameter, (in.)	48
Stack Area, (sq. ft.)	12.57
Probe Length, (in.)	96
Nozzle Diameter, (in.)	0.173
Pitot Coefficient, (Cp)	0.816
Gamma, meter constant	0.98

	Traverse Point	Time (min)	Stack Gas Temp, Ts (°F)	S-type Pitot delta P (in. H2O)	Orifice delta H (in. H2O)	Gas Meter Volume (cu. ft.)	Gas Meter Temp Inlet (°F)	Gas Meter Temp Outlet (°F)	Nozzle Angle (Cyclonic Flow) (deg. from vert.)
		0.00				540.790			
Traverse 1	**1**	2.5	161	0.84	0.24	541.360	70	71	-65
		5	161	0.85	0.25	542.070	71	70	-65
	2	7.5	161	0.80	0.23	542.730	71	70	-50
		10	161	0.80	0.23	543.380	71	70	-50
	3	12.5	161	0.76	0.22	544.010	71	70	-35
		15	161	0.73	0.21	544.640	71	70	-35
	4	17.5	161	0.81	0.24	545.260	71	70	-15
		20	161	0.82	0.24	545.950	72	71	-15
	5	22.5	160	0.73	0.21	546.310	72	71	-5
		25	161	0.77	0.22	546.580	72	71	-5
	6	27.5	160	0.75	0.21	547.230	72	71	0
		30	161	0.80	0.23	547.880	72	71	0
	7	32.5	161	0.42	0.12	548.840	72	71	0
		35	161	0.39	0.11	549.280	73	71	0
	8	37.5	163	0.54	0.16	549.840	73	72	5
		40	162	0.52	0.15	550.380	73	72	5
	9	42.5	161	0.61	0.18	550.980	73	72	15
		45	161	0.60	0.17	551.530	73	72	15
	10	47.5	162	0.63	0.18	552.110	73	72	20
		50	161	0.61	0.18	552.690	74	72	20
	11	52.5	161	0.62	0.18	553.270	74	72	30
		55	161	0.61	0.18	553.860	74	72	30
	12	57.5	162	0.57	0.17	554.420	74	72	45
		60	160	0.58	0.17	554.990	75	73	45
						554.990			
Traverse 2	**1**	62.5	160	0.86	0.25	555.520	73	73	-40
		65	161	0.85	0.25	556.210	74	73	-40
	2	67.5	160	0.76	0.22	556.860	75	74	-30
		70	161	0.76	0.22	557.490	75	74	-30
	3	72.5	161	0.76	0.22	558.110	75	74	-15
		75	160	0.79	0.23	558.780	75	74	-15
	4	77.5	161	0.67	0.20	559.380	75	74	-10
		80	161	0.65	0.19	559.970	75	74	-10
	5	82.5	161	0.58	0.17	560.540	76	74	-5
		85	163	0.52	0.15	561.080	76	74	-5
	6	87.5	161	0.40	0.12	561.540	76	74	0
		90	161	0.40	0.12	562.020	76	74	0
	7	92.5	161	0.61	0.18	562.520	76	74	0
		95	161	0.60	0.18	563.110	76	75	0
	8	97.5	161	0.63	0.18	563.700	77	75	10
		100	161	0.62	0.18	564.260	77	75	10
	9	102.5	161	0.56	0.17	564.850	77	75	20
		105	161	0.56	0.17	565.420	77	75	20
	10	107.5	161	0.52	0.15	565.950	77	75	25
		110	161	0.53	0.16	566.500	78	76	25
	11	112.5	160	0.40	0.12	566.990	78	76	35
		115	160	0.38	0.11	567.460	78	76	35
	12	117.5	160	0.36	0.11	567.910	78	76	45
		120	160	0.37	0.11	568.370	78	76	45

Calculations for: Northern Pulp Summer Source Testing
Test #2

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Lime Kiln
Test: PM-2
Date: 24-Oct-14
Personnel: TBH/NGM

Calculated Parameters

Stack Gas Pressure, Ps (in.Hg)	30.04
Stack Gas Molecular Weight, Dry Basis, Md (lb/lb-mole)	31.85
Volume of Water Vapour Collected, Vwc (cu.ft)	16.070
Stack Gas Moisture Content (% as decimal)	0.371
Stack Gas Molecular Weight, Wet Basis, Ms (lb/lb-mole)	26.72

Isokineticity Checks

Check average **Outside of Criteria**

	Traverse Point	Time (min)	Stack Gas Temp, Ts (R)	S-type Pitot, delta P (in. H2O)	Orifice delta H (in. H2O)	Measured Stack Gas Velocity, Us (ft/s)	Vertical Stack Gas Velocity, Us (ft/s)	Gas Meter: Meter Press., Pm (in. Hg)	Gas Meter: Avg. Temp, Tm (R)	Gas Meter: Volume, Vm (cu. ft.)	Vol. @ Ref., Vmc (cu. ft.)	Isokinetics I (%)
Traverse 1	**1**	2.5	621	0.84	0.24	56.13	23.72	30.02	531	0.570	0.567	75.54
		5	621	0.85	0.25	56.47	23.86	30.02	531	0.710	0.707	93.55
	2	7.5	621	0.80	0.23	54.78	35.21	30.02	531	0.660	0.657	89.63
		10	621	0.80	0.23	54.78	35.21	30.02	531	0.650	0.647	88.27
	3	12.5	621	0.76	0.22	53.39	43.74	30.02	531	0.630	0.627	87.78
		15	621	0.73	0.21	52.33	42.87	30.02	531	0.630	0.627	89.56
	4	17.5	621	0.81	0.24	55.12	53.24	30.02	531	0.620	0.617	83.68
		20	621	0.82	0.24	55.46	53.57	30.02	532	0.690	0.686	92.38
	5	22.5	620	0.73	0.21	52.29	52.09	30.02	532	0.360	0.358	51.04
		25	621	0.77	0.22	53.74	53.54	30.02	532	0.270	0.268	37.30
	6	27.5	620	0.75	0.21	53.00	53.00	30.02	532	0.650	0.646	90.92
		30	621	0.80	0.23	54.78	54.78	30.02	532	0.650	0.646	88.11
	7	32.5	621	0.42	0.12	39.69	39.69	30.01	532	0.960	0.953	179.54
		35	621	0.39	0.11	38.25	38.25	30.01	532	0.440	0.437	85.31
	8	37.5	623	0.54	0.16	45.08	44.91	30.01	533	0.560	0.555	92.35
		40	622	0.52	0.15	44.20	44.03	30.01	533	0.540	0.535	90.67
	9	42.5	621	0.61	0.18	47.84	46.21	30.01	533	0.600	0.595	92.95
		45	621	0.60	0.17	47.44	45.83	30.01	533	0.550	0.545	85.91
	10	47.5	622	0.63	0.18	48.65	45.72	30.01	533	0.580	0.575	88.49
		50	621	0.61	0.18	47.84	44.95	30.01	533	0.580	0.575	89.77
	11	52.5	621	0.62	0.18	48.23	41.77	30.01	533	0.580	0.575	89.04
		55	621	0.61	0.18	47.84	41.43	30.01	533	0.590	0.584	91.32
	12	57.5	622	0.57	0.17	46.28	32.72	30.01	533	0.560	0.555	89.73
		60	620	0.58	0.17	46.61	32.96	30.01	534	0.570	0.564	90.23
Traverse 2	**1**	62.5	620	0.86	0.25	56.75	43.48	30.02	533	0.530	0.525	69.04
		65	621	0.85	0.25	56.47	43.26	30.02	534	0.690	0.683	90.40
	2	67.5	620	0.76	0.22	53.35	46.20	30.02	535	0.650	0.642	89.81
		70	621	0.76	0.22	53.39	46.24	30.02	535	0.630	0.622	87.12
	3	72.5	621	0.76	0.22	53.39	51.57	30.02	535	0.620	0.612	85.74
		75	620	0.79	0.23	54.39	52.54	30.02	535	0.670	0.662	90.80
	4	77.5	621	0.67	0.20	50.13	49.37	30.01	535	0.600	0.593	88.36
		80	621	0.65	0.19	49.38	48.63	30.01	535	0.590	0.583	88.22
	5	82.5	621	0.58	0.17	46.64	46.47	30.01	535	0.570	0.562	90.13
		85	623	0.52	0.15	44.24	44.07	30.01	535	0.540	0.533	90.32
	6	87.5	621	0.40	0.12	38.74	38.74	30.01	535	0.460	0.454	87.58
		90	621	0.40	0.12	38.74	38.74	30.01	535	0.480	0.474	91.39
	7	92.5	621	0.61	0.18	47.84	47.84	30.01	535	0.500	0.493	77.10
		95	621	0.60	0.18	47.44	47.44	30.01	536	0.590	0.582	91.64
	8	97.5	621	0.63	0.18	48.61	47.88	30.01	536	0.590	0.581	89.35
		100	621	0.62	0.18	48.23	47.49	30.01	536	0.560	0.552	85.49
	9	102.5	621	0.56	0.17	45.83	43.07	30.01	536	0.590	0.581	94.77
		105	621	0.56	0.17	45.83	43.07	30.01	536	0.570	0.561	91.56
	10	107.5	621	0.52	0.15	44.17	40.03	30.01	536	0.530	0.522	88.34
		110	621	0.53	0.16	44.59	40.41	30.01	537	0.550	0.541	90.64
	11	112.5	620	0.40	0.12	38.71	31.71	30.01	537	0.490	0.482	92.87
		115	620	0.38	0.11	37.73	30.90	30.01	537	0.470	0.462	91.39
	12	117.5	620	0.36	0.11	36.72	25.96	30.01	537	0.450	0.442	89.90
		120	620	0.37	0.11	37.23	26.32	30.01	537	0.460	0.452	90.65
		Total	**Average**	**Average**	**Average**	**Average**	**Average**	**Average**	**Average**	**Total**	**Total**	**Average**
		120	621	0.63	0.18	48.31	42.60	30.01	533.58	27.580	27.296	88.66

Combustion Gas Data for: Northern Pulp

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Lime Kiln
Test: PM-2
Date: 24-Oct-14
Personnel: TBH/NGM

Test Start: 8:40
Test Finish: 10:40

Time (min)	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
0	4.09	23.06	3.0	6.1	146
5					147
10					135
15					139
20					129
25					139
30					145
Average:	**4.1**	**23.1**	**3.0**	**6.1**	**140**

O2, CO2, CO, and SO2 concentrations are from TRS testing conducted concurrently.

Raw Data for: Northern Pulp Fall Source Testing

Test #3

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Lime Kiln
Test: PM-3
Date: 24-Oct-14
Personnel: NGM & TBH

Test Start: 12:30 PM
Test Finish: 2:30 PM

Particulate Collected from Filter (mg):	199.3
Particulate Collected from Probe Wash (mg):	18.8
Particulate Collected from Impinger Wash (mg):	6.5
Total Particulate Collected (mg):	224.6

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	1015.0	681.6	333.4
2	100 mL H2O	741.7	724.3	17.4
3	Blank	627.1	625.5	1.6
4	200g Silica Gel	830.8	822.3	8.5
			Total Weight Gain (g)	360.9
			Moisture Volume (mL)	360.9

Parameters

Barometric Pressure, Pbar (in. Hg)	30.00
Stack Static Pressure, Pstatic (in. H2O)	0.51
Ambient Temp, (°F)	70
H2O Volume Collected, Vw (mL)	360.90
Total # Sampling Points,	24
Sampling Time per Point, (min)	5
Readings Taken Every __ mins	2.5
Regulatory Agency	NSENV

O2, (%)	4.04
CO2, (%)	23.28
N2, (%)	72.7

Stack Diameter, (in.)	48
Stack Area, (sq. ft.)	12.57
Probe Length, (in.)	96
Nozzle Diameter, (in.)	0.173
Pitot Coefficient, (Cp)	0.816
Gamma, meter constant	0.98

	Traverse Point	Time (min)	Stack Gas Temp, Ts (°F)	S-type Pitot delta P (in. H2O)	Orifice delta H (in. H2O)	Gas Meter Volume (cu. ft.)	Gas Meter Temp Inlet (°F)	Gas Meter Temp Outlet (°F)	Nozzle Angle (Cyclonic Flow) (deg. from vert.)
						569.080			
Traverse 1	**1**	2.5	163	0.86	0.30	569.870	76	76	-30
		5	160	0.83	0.29	570.620	76	76	-30
	2	7.5	160	0.84	0.29	571.350	76	76	-20
		10	161	0.84	0.29	572.100	76	76	-20
	3	12.5	160	0.77	0.27	572.800	76	76	-15
		15	161	0.77	0.27	573.510	76	76	-15
	4	17.5	161	0.63	0.22	574.160	77	76	-10
		20	160	0.62	0.21	574.780	77	76	-10
	5	22.5	161	0.55	0.18	575.370	77	76	-5
		25	159	0.46	0.16	575.930	77	76	-5
	6	27.5	159	0.40	0.14	576.450	77	76	0
		30	160	0.38	0.13	576.950	77	76	0
	7	32.5	158	0.57	0.19	577.550	77	77	0
		35	159	0.60	0.21	578.200	77	77	0
	8	37.5	159	0.59	0.20	578.810	77	76	5
		40	157	0.60	0.21	579.450	77	77	5
	9	42.5	159	0.56	0.19	580.030	77	77	10
		45	160	0.57	0.19	580.650	77	77	10
	10	47.5	160	0.39	0.13	581.100	77	77	15
		50	160	0.41	0.14	581.670	77	77	15
	11	52.5	160	0.35	0.12	582.160	77	77	25
		55	160	0.35	0.12	582.660	77	77	25
	12	57.5	160	0.30	0.10	583.150	78	77	35
		60	160	0.30	0.10	583.540	78	77	35
						583.540			
Traverse 2	**1**	62.5	160	0.80	0.28	584.280	76	77	-25
		65	160	0.80	0.28	585.010	77	76	-25
	2	67.5	160	0.82	0.28	585.760	76	76	-20
		70	160	0.83	0.28	586.500	77	76	-20
	3	72.5	160	0.86	0.30	587.260	77	76	-15
		75	160	0.83	0.29	588.010	77	78	-15
	4	77.5	160	0.79	0.27	588.740	77	76	-10
		80	160	0.73	0.25	589.420	77	76	-10
	5	82.5	161	0.63	0.22	590.090	77	76	-5
		85	161	0.60	0.21	590.740	77	76	-5
	6	87.5	161	0.54	0.18	591.340	77	76	0
		90	161	0.54	0.18	591.920	77	77	0
	7	92.5	161	0.57	0.20	592.540	77	76	0
		95	161	0.55	0.19	593.100	77	76	0
	8	97.5	161	0.56	0.19	593.780	77	76	10
		100	161	0.55	0.19	594.380	78	77	10
	9	102.5	161	0.63	0.22	595.020	77	77	15
		105	161	0.64	0.22	595.670	77	77	15
	10	107.5	161	0.63	0.22	596.330	77	77	20
		110	161	0.63	0.22	596.980	77	77	20
	11	112.5	161	0.62	0.21	597.610	77	77	30
		115	161	0.60	0.21	598.240	77	77	30
	12	117.5	161	0.58	0.20	598.850	77	77	35
		120	161	0.55	0.19	599.470	77	77	35

Calculations for: Northern Pulp Summer Source Testing
Test #3

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Lime Kiln
Test: PM-3
Date: 24-Oct-14
Personnel: NGM & TBH

Calculated Parameters

Stack Gas Pressure, Ps (in.Hg)	30.04
Stack Gas Molecular Weight, Dry Basis, Md (lb/lb-mole)	31.89
Volume of Water Vapour Collected, Vwc (cu.ft)	17.323
Stack Gas Moisture Content (% as decimal)	0.367
Stack Gas Molecular Weight, Wet Basis, Ms (lb/lb-mole)	26.79

Isokineticity Checks

Check average **Within Criteria**

	Traverse Point	Time (min)	Stack Gas Temp, Ts (R)	S-type Pitot, delta P (in. H2O)	Orifice delta H (in. H2O)	Measured Stack Gas Velocity, Us (ft/s)	Vertical Stack Gas Velocity, Us (ft/s)	Meter Press., Pm (in. Hg)	Gas Meter Avg. Temp, Tm (R)	Gas Meter Volume, Vm (cu. ft.)	Vol. @ Ref., Vmc (cu. ft.)	Isokinetics I (%)
Traverse 1	**1**	2.5	623	0.86	0.30	56.81	49.20	30.02	536	0.790	0.778	102.13
		5	620	0.83	0.29	55.68	48.22	30.02	536	0.750	0.739	98.45
	2	7.5	620	0.84	0.29	56.01	52.64	30.02	536	0.730	0.719	95.26
		10	621	0.84	0.29	56.06	52.68	30.02	536	0.750	0.739	97.94
	3	12.5	620	0.77	0.27	53.63	51.80	30.02	536	0.700	0.690	95.40
		15	621	0.77	0.27	53.67	51.84	30.02	536	0.710	0.700	96.84
	4	17.5	621	0.63	0.22	48.55	47.81	30.02	537	0.650	0.640	97.91
		20	620	0.62	0.21	48.12	47.39	30.02	537	0.620	0.610	94.06
	5	22.5	621	0.55	0.18	45.36	45.19	30.01	537	0.590	0.581	95.11
		25	619	0.46	0.16	41.42	41.26	30.01	537	0.560	0.551	98.54
	6	27.5	619	0.40	0.14	38.62	38.62	30.01	537	0.520	0.512	98.12
		30	620	0.38	0.13	37.67	37.67	30.01	537	0.500	0.492	96.87
	7	32.5	618	0.57	0.19	46.07	46.07	30.01	537	0.600	0.590	94.69
		35	619	0.60	0.21	47.30	47.30	30.02	537	0.650	0.639	100.07
	8	37.5	619	0.59	0.20	46.91	46.73	30.01	537	0.610	0.600	94.79
		40	617	0.60	0.21	47.23	47.05	30.02	537	0.640	0.629	98.37
	9	42.5	619	0.56	0.19	45.70	45.00	30.01	537	0.580	0.570	92.42
		45	620	0.57	0.19	46.14	45.44	30.01	537	0.620	0.610	98.00
	10	47.5	620	0.39	0.13	38.17	36.87	30.01	537	0.450	0.442	85.98
		50	620	0.41	0.14	39.13	37.80	30.01	537	0.570	0.560	106.22
	11	52.5	620	0.35	0.12	36.16	32.77	30.01	537	0.490	0.482	98.83
		55	620	0.35	0.12	36.16	32.77	30.01	537	0.500	0.492	100.84
	12	57.5	620	0.30	0.10	33.47	27.42	30.01	538	0.490	0.481	106.64
		60	620	0.30	0.10	33.47	27.42	30.01	538	0.390	0.383	84.88
Traverse 2	**1**	62.5	620	0.80	0.28	54.66	49.54	30.02	537	0.740	0.728	98.85
		65	620	0.80	0.28	54.66	49.54	30.02	537	0.730	0.719	97.51
	2	67.5	620	0.82	0.28	55.34	52.00	30.02	536	0.750	0.739	99.05
		70	620	0.83	0.28	55.68	52.32	30.02	537	0.740	0.728	97.05
	3	72.5	620	0.86	0.30	56.68	54.74	30.02	537	0.760	0.748	97.92
		75	620	0.83	0.29	55.68	53.78	30.02	538	0.750	0.737	98.18
	4	77.5	620	0.79	0.27	54.32	53.50	30.02	537	0.730	0.719	98.13
		80	620	0.73	0.25	52.22	51.42	30.02	537	0.680	0.669	95.08
	5	82.5	621	0.63	0.22	48.55	48.36	30.02	537	0.670	0.659	100.92
		85	621	0.60	0.21	47.38	47.20	30.02	537	0.650	0.640	100.32
	6	87.5	621	0.54	0.18	44.95	44.95	30.01	537	0.600	0.590	97.61
		90	621	0.54	0.18	44.95	44.95	30.01	537	0.580	0.570	94.27
	7	92.5	621	0.57	0.20	46.18	46.18	30.01	537	0.620	0.610	98.18
		95	621	0.55	0.19	45.36	45.36	30.01	537	0.560	0.551	90.27
	8	97.5	621	0.56	0.19	45.77	45.08	30.01	537	0.680	0.669	108.63
		100	621	0.55	0.19	45.36	44.67	30.01	538	0.600	0.589	96.54
	9	102.5	621	0.63	0.22	48.55	46.89	30.02	537	0.640	0.629	96.31
		105	621	0.64	0.22	48.93	47.26	30.02	537	0.650	0.639	97.05
	10	107.5	621	0.63	0.22	48.55	45.62	30.02	537	0.660	0.649	99.32
		110	621	0.63	0.22	48.55	45.62	30.02	537	0.650	0.639	97.82
	11	112.5	621	0.62	0.21	48.16	41.71	30.02	537	0.630	0.619	95.57
		115	621	0.60	0.21	47.38	41.03	30.02	537	0.630	0.619	97.15
	12	117.5	621	0.58	0.20	46.58	38.16	30.01	537	0.610	0.600	95.67
		120	621	0.55	0.19	45.36	37.16	30.01	537	0.620	0.610	99.85
		Total	**Average**	**Average**	**Average**	**Average**	**Average**	**Average**	**Average**	**Total**	**Total**	**Average**
		120	620	0.61	0.21	47.44	45.08	30.02	536.70	30.390	29.900	97.41

Combustion Gas Data for: Northern Pulp

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Lime Kiln
Test: PM-3
Date: 24-Oct-14
Personnel: TBH/NGM

Test Start: 12:30
Test Finish: 14:30

All gases except Nox are obtained from the 24 hr TRS testing

Time (min)	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
0	4.04	23.28	2.0	1.7	125
5					151
10					143
15					129
20					131
25					130
30					140
Average:	**4.0**	**23.3**	**2.0**	**1.7**	**136**

O2, CO2, CO, and SO2 concentrations are from TRS testing conducted concurrently.

DATA ENTRY

Northern Pulp

Lime Kiln

Stack Height from Grade: 37 m

Stack Diameter: 1.22 m

Standard Temperature, Tstd (F):	77
(K):	298
Standard Pressure, Pstd (in.Hg):	29.92
(Bar):	1.0

Parameter	Symbol	Units	Test 1	Test 2	Test 3	Average
Test ID	-	-	PM-1	PM-2	PM-3	-
Date	-	-	23-Oct-14	24-Oct-14	24-Oct-14	n/a
Start Time	-	-	2:23 PM	8:40 AM	12:30 PM	n/a
End Time	-	-	4:45 PM	10:40 AM	2:30 PM	n/a
Total Sampling Time	-	min	120	120	120	120
Stack Diameter	D	in.	48	48	48	48
Average Stack Gas Temperature	Ts	F	161	161	160	161
Average Dry Gas Meter Temperature	Tm	F	71	74	77	74
Barometric Pressure	Pbar	in.Hg	30.00	30.00	30.00	30.00
Stack Static Pressure	Pstatic	in.H2O	0.51	0.51	0.51	0.51
Average Pressure Drop (Head)	dP	in.H2O	0.61	0.63	0.61	0.62
Average deltaH Orifice	dH	in.H2O	0.23	0.18	0.21	0.21
Average Meter Temperature	Tm	F	71	74	77	74
Gas Sample Volume	Vm	cu.ft	31.6	27.6	30.4	29.9
Average Isokinetics	I	%	107.5	88.7	97.4	97.9
Nozzle Diameter	Dn	in.	0.173	0.173	0.173	0.173
Pitot Coefficient	Cp	-	0.816	0.816	0.816	0.816
Gamma, meter constant	y	-	0.980	0.980	0.980	0.980
Reference Temperature	Tref	R	537	537	537	537
Reference Pressure	Pref	in.Hg	29.92	29.92	29.92	29.92
Stack Gas Oxygen Content	Co2	%	4.05	4.09	4.04	4.06
Stack Gas Carbon Dioxide Content	Cco2	%	23.2	23.1	23.3	23.2
Stack Gas Nitrogen Content	Cn2	%	72.7	72.8	72.7	72.7
Stack Gas Sulphur Dioxide Content	Cso2	ppm	1.2	6.1	1.7	3.0
Stack Gas Nitrogen Oxides Content	Cnox	ppm	130.1	140.0	135.6	135.2
Stack Gas Carbon Monoxide Content	Cco	ppm	3.0	3.0	2.0	2.7
Volume of Water Collected	Vw	mL	425	335	361	373
Particulate Collected from Filter	-	mg	208	202	199	203
Particulate Collected from Probe Wash	-	mg	6.65	2.46	18.79	9.3
Particulate Collected from Impinger Wash	-	mg	13.72	8.09	6.53	9.45
Total Particulate Collected (excl. impingers)	Mp	mg	215	205	218	212

Legend:

F - degrees Fahrenheit
K - degrees Kelvin
Bar - bars
in.Hg - inches of mercury
in. - inches
in.H2O - inches of water
cu.ft - cubic feet
R - degrees Rankin
NOx - as NO2

CALCULATIONS

Northern Pulp

Lime Kiln

Stack Height from Grade: 37 m

Stack Diameter: 1.22 m

Variable	Symbol	Units	Calculation	Test 1	Test 2	Test 3	Average
Stack Area	As	sq.ft	As = Pi x ((D/12)^2)/ 4	12.57	12.57	12.57	12.57
		sq.m	As (sq.m) = As (sq.ft) x 0.0929	1.17	1.17	1.17	1.17
Barometric Pressure	Pbar	kPa	Pbar (kPa) = Pbar (in.Hg) x 3.386	102	102	102	102
Stack Static Pressure	Pstatic	kPa	Pstatic (kPa) = Pstatic (in.H2O) x 0.249	0.13	0.13	0.13	0.13
Avg. Stack Temperature	Ts	R	Ts (R) = Ts (F) + 460	621	621	620	621
Avg. Meter Temperature	Tm	R	Tm (R) = Tm (F) + 460	531	534	537	534
Nozzle Diameter	Dn	mm	Dn (mm) = Dn (in.) x 25.4	4	4	4	4
Gas Meter Pressure	Pm	in.Hg	Pm = Pbar + (dH / 13.6)	30.0	30.0	30.0	30.0
Sample Volume at STP	Vmc	cu.ft	Vmc = Tref/Pref x (Vm x Pm x y) / Tm	31.5	27.3	29.9	29.5
		cu.m	Vmc (cu.m) = 0.02832 x Vmc (cu.ft)	0.89	0.77	0.85	0.84
Volume of Water Vapour	Vwc	cu.ft	Vwc = 0.0480 x Vw	20.4	16.1	17.3	17.9
Water Fraction	Bwo	-	Bwo = Vwc / (Vwc + Vmc)	0.39	0.37	0.37	0.38
Molecular Weight, Dry	Md	lb/lb-mol	Md = 0.44 (Cco2) + 0.32 (Co2) + 0.28 (Cn2)	31.9	31.9	31.9	31.9
Molecular Weight, Wet	Ms	lb/lb-mol	Ms = Md (1 - Bwo) + (18 x Bwo)	26.4	26.7	26.8	26.6
Stack Pressure	Ps	in.Hg	Ps = Pbar + (Pstatic / 13.6)	30.0	30.0	30.0	30.0
Stack Gas Velocity	Us	ft/s	Us = 85.33 x Cp x ((dP x Ts)/(Ps x Ms))^0.5	43.5	42.6	45.1	43.7
		m/s	Us (m/s) = 0.3048 x Us (ft/s)	13.3	13.0	13.7	13.3
Actual Stack Gas Flow Rate	Q	acfm	Q = 60 x Us x As	32,824	32,118	33,992	32,978
Dry Stack Gas Flow Rate	Qs	dscfm	Qs = Q x (1-Bwo) x (Tref/Ts) x (Ps/Pref)	17,280	17,550	18,705	17,845
		dscms	Qs (dscms) = 0.000472 x Qs (dscfm)	8.16	8.28	8.83	8.42
Sulphur Dioxide - SO2							
SO2 Measured Concentration	Cso2	ppm	Measurement from Flue Gas Analyzer	1.16	6.06	1.68	2.97
Uncorrected @ Ref Cond	Cso2	mg/Rcm	Cso2 (mg/Rcm) = Cso2 (ppm) x 2.62	3.04	15.9	4.41	7.78
SO2 Emission Rate	ERso2	g/s	ERso2 = Cso2/1000 x Qs	0.02	0.13	0.04	0.1
		kg/hr	ERso2 (kg/hr) = 3.6 x ERso2 (g/s)	0.09	0.47	0.14	0.2
SO2 Concentration							
Corrected to 11% O2	Cso2	mg/Rcm	Cso2 (11% O2) = Cso2 (mg/Rcm) x (20.9-11) / (20.9-Co2)	1.79	9.35	2.59	4.58
Corrected to 3% O2	Cso2	mg/Rcm	Cso2 (3% O2) = Cso2 (mg/Rcm) x (20.9-3) / (20.9-Co2)	3.23	16.9	4.68	8.27
Corrected to 12% CO2	Cso2	mg/Rcm	Cso2 (12% CO2) = Cso2 (mg/Rcm) x (12/Cco2)	1.57	8.26	2.27	4.04
Nitrogen Oxides - NOx							
NOx Measured Concentration	Cnox	ppm	Measurement from Flue Gas Analyzer	130	140	136	135
Uncorrected @ Ref Cond	Cnox	mg/Rcm	Cnox (mg/Rcm) = Cnox (ppm) x 1.882	245	263	255	255
NOx Emission Rate	ERnox	g/s	ERnox = Cnox/1000 x Qs	2.00	2.18	2.25	2.14
		kg/hr	ERnox (kg/hr) = 3.6 x ERnox (g/s)	7.19	7.86	8.11	7.72
NOx Concentration							
Corrected to 11% O2	Cnox	mg/Rcm	Cnox (11% O2) = Cnox (mg/Rcm) x (20.9-11) / (20.9-Co2)	144	155	150	150
Corrected to 3% O2	Cnox	mg/Rcm	Cnox (3% O2) = Cnox (mg/Rcm) x (20.9-3) / (20.9-Co2)	260	281	271	271
Corrected to 12% CO2	Cnox	mg/Rcm	Cnox (12% CO2) = Cnox (mg/Rcm) x (12/Cco2)	126	137	132	132
Carbon Monoxide - CO							
CO Measured Concentration	Cco	ppm	Measurement from Flue Gas Analyzer	2.97	3.01	1.98	2.65
Uncorrected @ Ref Cond	Cco	mg/Rcm	Cco (mg/Rcm) = Cco (ppm) x 1.145	3.40	3.45	2.26	3.04
CO Emission Rate	ERco	g/s	ERco = Cco/1000 x Qs	0.03	0.03	0.02	0.03
		kg/hr	ERco (kg/hr) = 3.6 x ERco (g/s)	0.10	0.10	0.07	0.09
CO Concentration							
Corrected to 11% O2	Cco	mg/Rcm	Cco (11% O2) = Cco (mg/Rcm) x (20.9-11) / (20.9-Co2)	2.00	2.03	1.33	1.79
Corrected to 3% O2	Cco	mg/Rcm	Cco (3% O2) = Cco (mg/Rcm) x (20.9-3) / (20.9-Co2)	3.61	3.68	2.40	3.23
Corrected to 12% CO2	Cco	mg/Rcm	Cco (12% CO2) = Cco (mg/Rcm) x (12/Cco2)	1.76	1.80	1.17	1.57
Particulate Concentration	Cs	mg/dscm	Cs = Mp / Vmc	241	265	258	254
Particulate Emission Rate	ERp	g/s	ERp = Cs/1000 x Qs	1.97	2.19	2.27	2.14
		kg/hr	ERp (kg/hr) = 3.6 x ERp (g/s)	7.08	7.90	8.19	7.72
Plant Production		adubmt/day		939	939	939	939
Particulate Concentration							
Corrected to 11% O2	Cs	mg/dscm	Cs (11% O2) = Cs x (20.9-11) / (20.9-Co2)	142	156	151	150
Corrected to 3% O2	Cs	mg/dscm	Cs (3% O2) = Cs x (20.9-3) / (20.9-Co2)	256	282	273	271
Corrected to 12% CO2	Cs	mg/dscm	Cs (12% CO2) = Cs x (12/Cco2)	124	138	133	132
Emission Metric		kg/adubmt		0.18	0.20	0.21	0.20

Legend:

sq.ft - square feet
sq.m - square metres
Pi - 3.142
R - degrees Rankin
ppm - parts per million
in.Hg - inches of m
cu.ft - cubic feet
cu.m - cubic metres
STP - standard ten
dscfm - dry standa
mg/dscm - miligrams per dry standard cubic metre
g/s - grams per second
NOx - as NO2
acfm - actual cubic feet per minute
dscms - dry standard cubic metres per second

OFFICIAL STACK TESTING RESULTS
Northern Pulp
Lime Kiln

Stack Height from Grade: 37 m
Stack Diameter: 1.22 m

Parameter	Test 1	Test 2	Test 3	Average	NSENV Limits
Test ID	PM-1	PM-2	PM-3	-	-
Test Date	23-Oct-14	24-Oct-14	24-Oct-14	-	-
Stack Gas Temperature (C)	72	72	71	72	-
Moisture Content (%)	39.3	37.1	36.7	37.7	-
Velocity (m/s)	13.3	13.0	13.7	13.3	-
Volumetric Flow (dscms)	8.16	8.28	8.83	8.42	-
Oxygen - O2 (%)	4.05	4.09	4.04	4.06	-
Carbon Dioxide - CO2 (%)	23.2	23.1	23.3	23.2	-
Sulphur Dioxide - SO2					
SO2 Measured Concentration (ppm)	1.16	6.06	1.68	2.97	-
Uncorrected at Ref Cond (mg/Rcm)	3.04	15.9	4.41	7.78	-
Emission Rate (kg/hr)	0.09	0.47	0.14	0.23	-
Nitrogen Oxides - NOx					
NOx Measured Concentration (ppm)	130	140	136	135	-
Uncorrected at Ref Cond (mg/Rcm)	245	263	255	255	-
Emission Rate (kg/hr)	7.19	7.86	8.11	7.72	-
Carbon Monoxide - CO					
CO Measured Concentration (ppm)	2.97	3.01	1.98	2.65	-
Uncorrected at Ref Cond (mg/Rcm)	3.40	3.45	2.26	3.04	-
Emission Rate (kg/hr)	0.10	0.10	0.07	0.09	-
Particulate Matter - PM					
Particulate Concentration (mg/dscm)	241	265	258	254	-
Particulate Emission Rate (kg/hr)	7.08	7.90	8.19	7.72	-
Particulate Emission Rate (kg/adubmt)	0.18	0.20	0.21	0.20	0.50

Legend:
C - degrees Celsius
m/s - metres per second
dscms - dry standard cubic metres per second
ppm - parts per million
adubmt - air dried unbleached metric tonne (1,069 adubmt/d)
STP - standard temperature and pressure (25 C and 101.3 kPa)
mg/dscm - miligrams per dry standard cubic metre
NOx - as NO2
ND - non-detectable

Particulate Recoveri Northern Pulp Summer Source Testing

Client: Northern Pulp
Facility: Abercrombie
Location: Lime Kiln
Job Number: 121511269

IMPINGER CATCH

Container ID	Beaker Pre Weights (g) Date Analysed by Trial 1	Trial 2	Trial 3	Average	Sample ID	Recoveries Jar + Sample + Rinse (g)	Jar Tare (g)	Sample Collected (g)	Rinse Water (g)	Total Rinse Water (g)	Beaker Post Weights (g) Date Analysed by Trial 1	Trial 2	Trial 3	Average	Uncorrected Particulate Weight (g)	Corrected Particulate Weight (g)
V2	109.1725	109.1725		109.1725	PM-1	908.0	456.6	451.4	18.7	470.1	109.1896	109.1894		109.1895	0.0170	0.0137
B5	110.3819	110.3824		110.3822	PM-2	981.3	455.8	525.5	26.9	552.4	110.3939	110.3943		110.3941	0.0120	0.0081
L1	109.1927	109.1929		109.1928	PM-3	908.4	455.9	452.5	15.5	468.0	109.2028	109.2024		109.2026	0.0098	0.0065
																Conc. (g/mL)
F5	107.3464	107.3450		107.3457	WB	471.7	392.9	78.8		78.8	107.3465	107.3460		107.3463	0.0006	0.000007

PROBE WASH

Container ID	Beaker Pre Weights (g) Date Analysed by Trial 1	Trial 2	Trial 3	Average	Sample ID	Recoveries Jar + Acetone (g)	Jar Tare (g)	Recovered Acetone (g)	Rinse Acetone	Total Acetone (g)	Beaker Post Weights (g) Date Analysed by Trial 1	Trial 2	Trial 3	Average	Uncorrected Particulate Weight (g)	Corrected Particulate Weight (g)
Y3	109.0874	109.0869		109.0872	PM-1	441.9	324.3	117.6	22.3	139.9	109.0975	109.0970		109.0973	0.0101	0.0067
L4	109.1998	109.1999		109.1999	PM-2	451.2	324.6	126.6	10.8	137.4	109.2044	109.2070		109.2057	0.0059	0.0025
M3	111.5217	111.5218		111.5218	PM-3	502.7	324.8	177.9	19.3	197.2	111.5454	111.5454		111.5454	0.0237	0.0188
																Conc. (g/mL)
V5	113.7144	113.7143		113.7144	AB	399.0	326.0	73.0		73.0	113.7159	113.7164		113.7162	0.0018	0.000019

Density of Acetone: 0.7850 g/ml

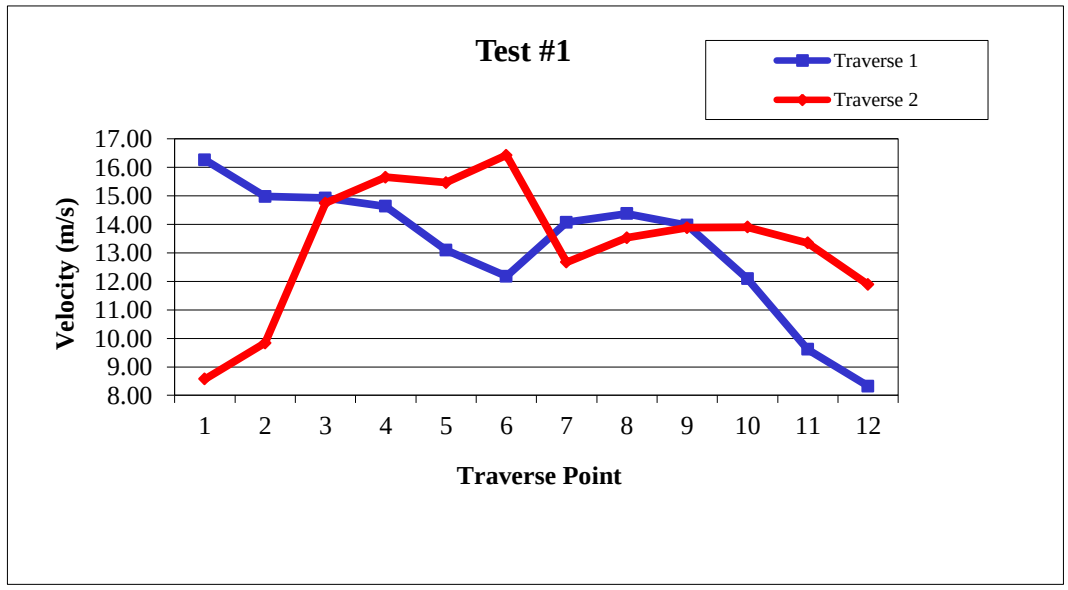
FILTER CATCH

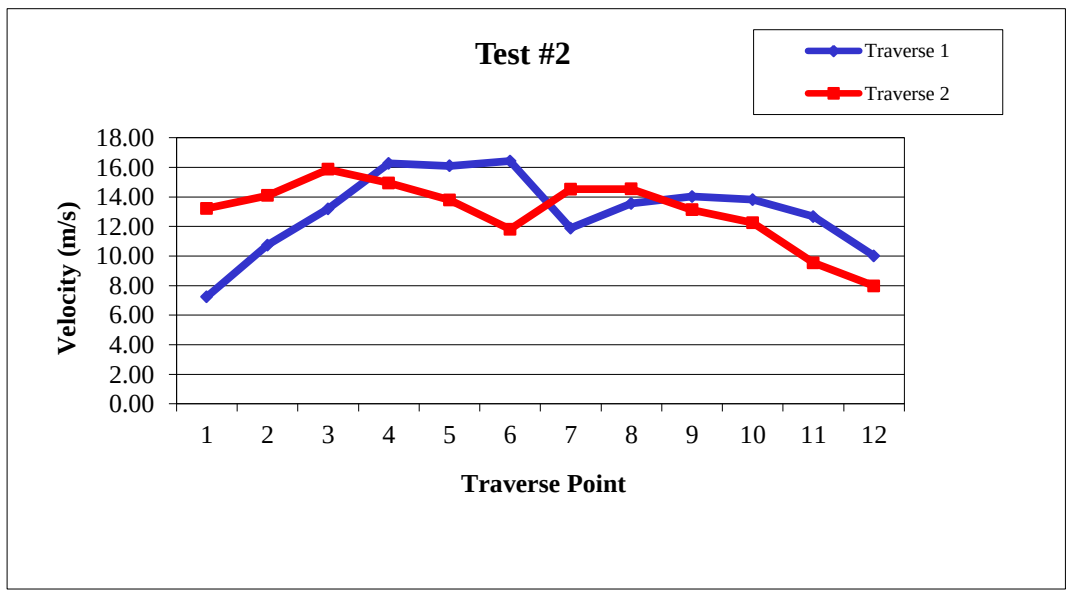
Filter ID	Pre Weights (g) Date: Analysed by Trial 1	Trial 2	Trial 3	Average	Sample ID	Post Weights (g) Date: Analysed by Trial 1	Trial 2	Trial 3	Average	Particulate Weight from Filter (g)
0930-7	0.4124	0.4119		0.4122	PM-1	0.6202	0.6203		0.6203	0.2081
0919-03	0.4154	0.4158		0.4156	PM-2	0.6176	0.6179		0.6178	0.2022
0919-06	0.4165	0.4169		0.4167	PM-3	0.6157	0.6162		0.6160	0.1993

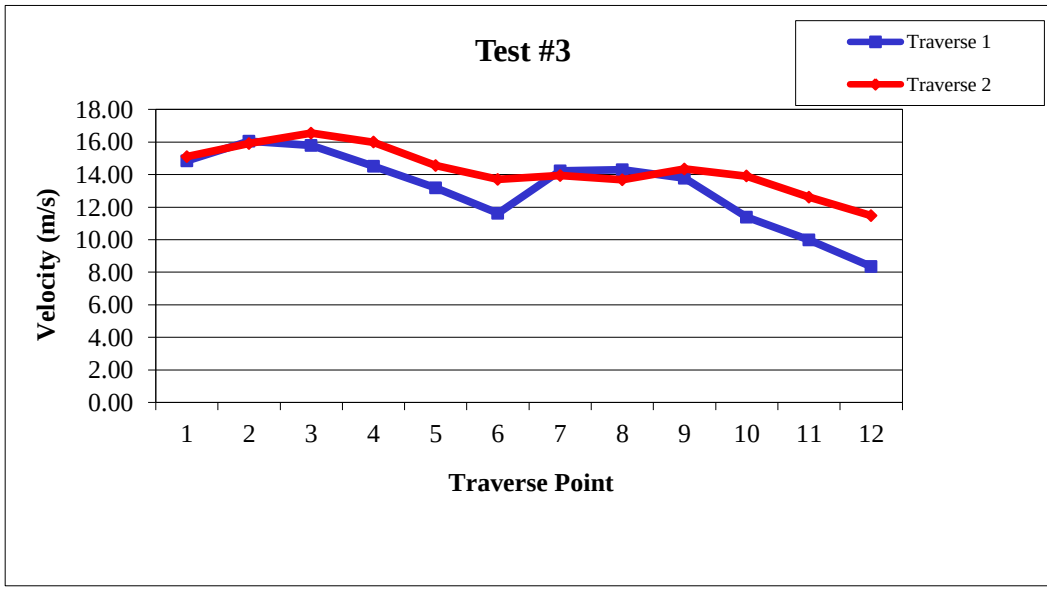
Northern Pulp
Pictou

121511269

Stack Gas Velocity Profiles
Lime Kiln







Summary of RAW DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	296	2050	3.392	24.01	2.798	3.096	6.469	2014	297	904	4.085	22.9	1.981	4.939	9.4
2014	296	2051	3.394	24.14	2.848	0.605	6.758	2014	297	905	4.079	22.93	1.981	5.31	9.44
2014	296	2052	3.37	24.28	2.749	0	6.597	2014	297	906	4.145	22.85	1.989	6.493	9.59
2014	296	2053	3.406	24.32	2.683	0	5.313	2014	297	907	4.191	22.79	1.981	6.424	9.4
2014	296	2054	3.466	24.3	2.642	0	4.356	2014	297	908	4.236	22.71	1.981	5.888	9.34
2014	296	2055	3.432	24.3	2.6	-0.482	3.526	2014	297	909	4.18	22.77	1.981	5.131	9.36
2014	296	2056	3.437	24.31	2.642	-1.61	3.191	2014	297	910	4.216	22.74	1.981	5.049	9.34
2014	296	2057	3.443	24.29	2.65	-1.954	2.853	2014	297	911	4.129	22.85	1.981	5.255	9.4
2014	296	2058	3.513	24.27	2.633	-2.889	2.273	2014	297	912	4.157	22.89	1.964	5.668	9.34
2014	296	2059	3.492	24.29	2.625	-3.288	2.185	2014	297	913	4.084	22.96	1.973	6.41	9.78
2014	296	2100	3.439	24.37	2.386	-3.302	2.087	2014	297	914	4.101	22.99	1.94	6.603	10.06
2014	296	2101	3.405	24.44	2.097	-3.302	1.948	2014	297	915	4.04	23.02	1.94	6.603	10.33
2014	296	2102	3.404	24.48	2.121	-3.302	1.853	2014	297	916	4.079	23.06	1.964	6.603	10.48
2014	296	2103	3.527	24.31	2.055	-3.302	1.187	2014	297	917	4.17	23.02	1.923	6.603	10.43
2014	296	2104	3.489	24.38	2.336	-3.302	1.004	2014	297	918	4.166	23	1.981	6.603	10.17
2014	296	2105	3.604	24.3	2.055	-3.302	0.696	2014	297	919	4.115	23.04	1.94	6.603	10.07
2014	296	2106	3.657	24.17	2.022	-3.302	0.42	2014	297	920	4.135	22.97	1.948	6.603	9.92
2014	296	2107	3.717	24.11	2.072	-3.302	0.089	2014	297	921	4.093	23.03	1.931	6.094	9.85
2014	296	2108	3.764	24.04	2.047	-3.302	-0.146	2014	297	922	4.043	23.12	1.931	5.103	9.54
2014	296	2109	3.766	23.98	2.097	-3.302	-0.136	2014	297	923	4.026	23.17	1.849	5.089	9.41
2014	296	2110	3.721	24.01	2.006	-3.302	-0.231	2014	297	924	4.059	23.18	1.634	4.952	9.34
2014	296	2111	3.726	24.01	1.981	-3.302	-0.484	2014	297	925	4.119	23.11	1.651	4.952	8.87
2014	296	2112	3.723	24.02	1.998	-3.302	-0.849	2014	297	926	4.077	23.15	1.634	4.924	8.93
2014	296	2113	3.73	23.92	1.998	-3.302	-0.805	2014	297	927	4.09	23.13	1.659	4.897	8.8
2014	296	2114	3.7	23.9	1.981	-3.302	-0.784	2014	297	928	4.077	23.12	1.733	4.883	8.82
2014	296	2115	3.739	23.82	2.014	-3.302	-1.015	2014	297	929	4.066	23.13	1.593	4.869	8.72
2014	296	2116	3.816	23.75	1.981	-3.329	-1.285	2014	297	930	4.084	23.09	1.618	4.457	8.72
2014	296	2117	3.713	23.8	2.022	-3.659	-1.296	2014	297	931	4.133	23.02	1.502	4.278	8.63
2014	296	2118	3.725	23.83	2.039	-3.714	-1.296	2014	297	932	4.167	22.93	1.04	4.195	8.41
2014	296	2119	3.764	23.79	2.006	-3.948	-1.544	2014	297	933	4.108	22.96	1.131	3.755	8.4
2014	296	2120	3.811	23.78	1.981	-4.416	-1.619	2014	297	934	4.072	22.94	0.999	3.384	8.47
2014	296	2121	3.794	23.81	1.981	-4.608	-1.706	2014	297	935	4.015	23	1.164	4.071	8.84
2014	296	2122	3.759	23.85	1.981	-4.787	-1.923	2014	297	936	4.059	22.98	1.147	4.814	8.91
2014	296	2123	3.752	23.86	1.989	-4.842	-1.821	2014	297	937	4.152	22.9	1.04	4.952	8.94
2014	296	2124	3.744	23.83	1.989	-4.925	-1.663	2014	297	938	4.21	22.86	1.147	4.952	8.57
2014	296	2125	3.777	23.74	1.981	-4.952	-1.996	2014	297	939	4.155	22.89	1.032	4.745	8.59
2014	296	2126	3.818	23.71	1.997	-4.952	-2.465	2014	297	940	4.164	22.93	1.197	4.016	8.45
2014	296	2127	3.849	23.66	1.989	-4.966	-2.458	2014	297	941	4.115	22.95	1.015	3.741	8.41
2014	296	2128	3.822	23.65	1.981	-4.966	-2.326	2014	297	942	4.113	22.97	0.924	3.397	8.37
2014	296	2129	3.791	23.63	1.981	-4.952	-2.428	2014	297	943	4.112	23.01	0.446	3.301	8.24
2014	296	2130	3.793	23.67	1.981	-4.98	-2.468	2014	297	944	4.056	23.1	0.553	3.301	8.32
2014	296	2131	3.742	23.65	1.981	-4.966	-2.446	2014	297	945	4.104	23.06	0.528	3.507	8.37
2014	296	2132	3.845	23.48	1.981	-5.062	-2.722	2014	297	946	4.082	23.08	0.487	4.58	8.67
2014	296	2133	3.857	23.46	1.981	-5.255	-2.875	2014	297	947	4.049	23.12	0.569	4.814	9.01
2014	296	2134	3.803	23.49	1.981	-5.612	-2.801	2014	297	948	4.115	23.1	0.223	4.938	8.98
2014	296	2135	3.909	23.43	1.981	-5.475	-3.103	2014	297	949	4.1	23.1	0.074	4.951	9.01
2014	296	2136	3.865	23.45	1.981	-5.818	-3.103	2014	297	950	4.147	23.11	0.132	4.951	9.1
2014	296	2137	3.796	23.49	1.981	-6.038	-3.007	2014	297	951	4.027	23.22	0.107	4.951	9.1
2014	296	2138	3.801	23.5	1.981	-6.204	-3.055	2014	297	952	4.044	23.23	0.124	4.979	9.33
2014	296	2139	3.846	23.5	1.981	-6.355	-3.369	2014	297	953	4.124	23.13	0.149	5.034	9.14
2014	296	2140	3.821	23.5	1.981	-6.286	-3.369	2014	297	954	4.146	23.12	0.091	5.048	9.14
2014	296	2141	3.875	23.41	1.981	-6.341	-3.543	2014	297	955	4.103	23.14	0.437	4.951	9.18
2014	296	2142	3.84	23.4	1.989	-6.479	-3.552	2014	297	956	4.108	23.08	0.528	4.951	9.11
2014	296	2143	3.92	23.36	1.981	-6.561	-3.875	2014	297	957	4.141	23.05	0.553	4.951	9.01
2014	296	2144	3.904	23.35	1.981	-6.588	-3.811	2014	297	958	4.105	23.09	0.528	4.855	8.79
2014	296	2145	3.863	23.44	1.981	-6.602	-3.586	2014	297	959	4.03	23.14	0.47	4.814	8.95
2014	296	2146	3.835	23.45	1.981	-6.602	-3.498	2014	297	1000	4.158	23.04	0.413	4.896	8.96
2014	296	2147	3.825	23.45	1.981	-6.602	-3.535	2014	297	1001	4.162	22.99	0.545	4.896	8.76
2014	296	2148	3.869	23.45	1.981	-6.602	-3.974	2014	297	1002	4.096	23.09	0.124	4.14	8.81
2014	296	2149	3.801	23.5	1.981	-6.602	-3.876	2014	297	1003	4.072	23.17	0.132	3.961	8.86
2014	296	2150	3.834	23.49	1.981	-6.602	-4.001	2014	297	1004	4.056	23.14	0.124	4.47	9.02
2014	296	2151	3.756	23.58	1.981	-6.602	-3.74	2014	297	1005	4.015	23.17	0.289	4.332	8.95
2014	296	2152	3.762	23.55	1.981	-6.602	-3.577	2014	297	1006	4.024	23.17	0.512	3.796	8.75
2014	296	2153	3.881	23.44	1.981	-6.602	-4.249	2014	297	1007	4.076	23.1	0.553	3.535	8.49
2014	296	2154	3.857	23.53	1.981	-6.602	-4.339	2014	297	1008	4.077	23.14	0.446	3.301	8.37
2014	296	2155	3.751	23.66	1.972	-6.602	-3.989	2014	297	1009	3.988	23.24	0.512	3.301	8.57
2014	296	2156	3.783	23.67	1.981	-6.602	-4.298	2014	297	1010	4.101	23.13	0.52	3.301	8.52
2014	296	2157	3.858	23.6	1.981	-6.602	-4.482	2014	297	1011	4.126	23.14	0.091	3.301	8.21
2014	296	2158	3.809	23.68	1.981	-6.602	-4.399	2014	297	1012	4.023	23.3	0.066	3.301	8.32
2014	296	2159	3.774	23.75	1.981	-6.602	-4.488	2014	297	1013	3.973	23.34	0.083	3.301	8.48
2014	296	2200	3.772	23.72	1.981	-6.602	-4.627	2014	297	1014	4.008	23.33	0.157	3.315	8.38
2014	296	2201	3.816	23.62	1.981	-6.602	-4.62	2014	297	1015	4.037	23.31	0.116	3.425	8.6
2014	296	2202	3.808	23.58	1.981	-6.602	-4.612	2014	297	1016	4.146	23.27	0.091	3.383	8.25
2014	296	2203	3.814	23.57	1.981	-6.602	-4.821	2014	297	1017	4.2	23.27	0.083	3.37	8.26
2014	296	2204	3.901	23.47	1.981	-6.602	-4.845	2014	297	1018	4.08	23.36	0.058	3.301	8.45
2014	296	2205	3.918	23.42	1.981	-6.602	-4.829	2014	297	1019	4.127	23.24	0.091	3.301	8.09
2014	296	2206	3.931	23.37	1.981	-6.602	-5.012	2014	297	1020	4.068	23.27	0.033	3.301	8.04
2014	296	2207	3.872	23.4	1.981	-6.602	-5.009	2014	297	1021	4.043	23.3	0.017	3.301	7.85
2014	296	2208	3.917	23.4	1.972	-6.602	-5.162	2014	297	1022	4.007	23.37	0.033	3.301	7.94
2014	296	2209	3.946	23.36	1.981	-6.602	-5.2	2014	297	1023	4.04	23.31	0.058	3.301	7.76
2014	296	2210	3.938	23.41	1.981	-6.602	-5.114	2014	297	1024	4.116	23.23	0.099	3.301	7.34
2014	296	2211	3.887	23.46	1.972	-6.602	-5.1	2014	297	1025	4.195	23.21	0.173	3.301	7.45
2014	296	2212	3.877	23.44	1.981	-6.602	-5.044	2014	297	1026	4.086	23.33	0.107	3.301	7.77
2014	296	2213	3.893	23.49	1.981	-6.602	-5.313	2014	297	1027	4.057	23.33	0.116	3.301	7.76
2014	296	2214	3.913	23.52	1.981	-6.602	-5.532	2014	297	1028	4.052	23.36	0.091	3.301	7.51
2014	296	2215	3.871	23.55	1.981	-6.602	-5.129	2014	297	1029	4.097	23.29	0.132	3.301	7.43
2014	296	2216	3.843	23.59	1.981	-6.602	-5.1	2014	297	1030	4.079	23.26	0.066	3.301	7.32
2014	296	2217	3.829	23.54	1.981	-6.602	-5.122	2014	297	1031	4.121	23.2	0.091	3.301	7.32
2014	296	2218	3.846	23.52	1.981	-6.602	-5.365	2014	297	1032	4.135	23.14	0.099	3.301	7.31

Summary of RAW DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	296	2219	3.964	23.41	1.981	-6.602	-5.764	2014	297	1033	4.07	23.18	0.107	3.301	7.33
2014	296	2220	3.898	23.48	1.981	-6.602	-5.601	2014	297	1034	4.159	23.13	0.116	3.301	7.23
2014	296	2221	3.883	23.44	1.981	-6.602	-5.576	2014	297	1035	4.135	23.19	0.14	3.301	7.09
2014	296	2222	3.98	23.32	1.981	-6.602	-5.827	2014	297	1036	4.158	23.13	0.107	3.301	7.11
2014	296	2223	3.992	23.28	1.981	-6.602	-6.072	2014	297	1037	4.146	23.16	0.107	3.301	6.974
2014	296	2224	3.963	23.28	1.981	-6.602	-5.964	2014	297	1038	4.168	23.18	0.091	3.287	6.798
2014	296	2225	3.893	23.3	1.981	-6.602	-5.745	2014	297	1039	4.096	23.26	0.091	3.287	6.903
2014	296	2226	3.913	23.27	1.981	-6.602	-5.83	2014	297	1040	4.08	23.27	0.124	3.301	7.01
2014	296	2227	3.948	23.24	1.981	-6.602	-5.731	2014	297	1041	4.069	23.31	0.066	3.301	7.23
2014	296	2228	3.951	23.26	1.981	-6.602	-5.917	2014	297	1042	3.964	23.41	0.14	3.301	7.48
2014	296	2229	3.935	23.32	1.981	-6.602	-5.946	2014	297	1043	4.061	23.27	0.14	3.301	7.22
2014	296	2230	4.001	23.29	1.981	-6.602	-6.064	2014	297	1044	4.163	23.17	0.132	3.301	6.743
2014	296	2231	3.898	23.41	1.981	-6.602	-6.028	2014	297	1045	4.181	23.15	0.074	3.301	6.862
2014	296	2232	3.838	23.5	1.981	-6.602	-5.87	2014	297	1046	4.103	23.24	0.083	3.301	6.841
2014	296	2233	3.818	23.53	1.981	-6.602	-5.759	2014	297	1047	4.097	23.27	0.017	3.273	6.852
2014	296	2234	3.816	23.52	1.981	-6.602	-5.705	2014	297	1048	4.035	23.28	0.017	3.301	7.08
2014	296	2235	3.928	23.39	1.981	-6.602	-6.053	2014	297	1049	4.103	23.18	0.025	3.301	7.05
2014	296	2236	3.894	23.43	1.981	-6.602	-6.156	2014	297	1050	4.179	23.14	0.025	3.287	6.973
2014	296	2237	3.863	23.42	1.981	-6.602	-6.06	2014	297	1051	4.129	23.14	0.025	3.273	6.874
2014	296	2238	3.911	23.33	1.981	-6.602	-6.042	2014	297	1052	4.123	23.13	0.025	3.053	6.833
2014	296	2239	3.953	23.31	1.981	-6.602	-6.316	2014	297	1053	4.135	23.12	0.017	3.04	6.592
2014	296	2240	3.998	23.18	1.981	-6.602	-6.532	2014	297	1054	4.127	23.17	0.033	3.067	6.79
2014	296	2241	3.982	23.19	1.981	-6.602	-6.38	2014	297	1055	4.128	23.17	0.008	3.191	6.814
2014	296	2242	3.861	23.27	1.923	-6.602	-6.126	2014	297	1056	4.144	23.12	0.033	2.902	6.074
2014	296	2243	3.891	23.22	1.972	-6.602	-6.255	2014	297	1057	4.118	23.19	0.008	2.709	5.661
2014	296	2244	3.988	23.15	1.931	-6.602	-6.548	2014	297	1058	4.063	23.3	0.017	2.269	6.148
2014	296	2245	4.025	23.08	1.964	-6.602	-6.477	2014	297	1059	4.13	23.21	0.033	2.778	6.191
2014	296	2246	3.954	23.16	1.931	-6.602	-6.629	2014	297	1100	4.145	23.18	0.017	2.888	6.173
2014	296	2247	3.928	23.24	1.948	-6.602	-6.402	2014	297	1101	4.234	23.07	0.008	2.861	6.162
2014	296	2248	3.85	23.3	1.972	-6.602	-6.291	2014	297	1102	4.207	23.09	0.025	2.022	6.192
2014	296	2249	3.829	23.38	1.915	-6.602	-5.913	2014	297	1103	4.166	23.16	0.041	1.705	6.516
2014	296	2250	3.884	23.31	1.972	-6.602	-6.5	2014	297	1104	4.127	23.19	0.033	1.719	6.538
2014	296	2251	3.897	23.3	1.956	-6.602	-6.496	2014	297	1105	4.094	23.2	0.033	1.76	6.455
2014	296	2252	3.925	23.29	1.948	-6.602	-6.584	2014	297	1106	4.122	23.19	0.05	1.678	6.592
2014	296	2253	3.961	23.3	1.981	-6.602	-6.732	2014	297	1107	4.128	23.14	0.017	2.118	6.448
2014	296	2254	3.833	23.41	1.923	-6.602	-6.433	2014	297	1108	4.117	23.11	0.058	2.132	6.514
2014	296	2255	3.833	23.38	1.972	-6.602	-6.325	2014	297	1109	4.179	23.02	0.066	2.049	6.481
2014	296	2256	3.845	23.37	1.956	-6.602	-6.481	2014	297	1110	4.15	23.03	0.033	2.324	6.507
2014	296	2257	3.997	23.23	1.981	-6.602	-6.804	2014	297	1111	4.127	23.05	0.074	2.723	6.613
2014	296	2258	4.022	23.19	1.981	-6.602	-6.932	2014	297	1112	4.121	23.12	0.05	2.517	6.439
2014	296	2259	3.878	23.4	1.964	-6.602	-6.809	2014	297	1113	4.095	23.23	0.066	2.379	6.349
2014	296	2300	3.831	23.4	1.981	-6.602	-6.715	2014	297	1114	4.039	23.32	0.008	2.379	6.621
2014	296	2301	3.828	23.45	1.981	-6.602	-6.434	2014	297	1115	4.066	23.32	0.041	2.654	6.739
2014	296	2302	3.904	23.43	1.981	-6.602	-6.621	2014	297	1116	3.999	23.38	0.05	2.338	6.76
2014	296	2303	3.903	23.44	1.981	-6.602	-6.657	2014	297	1117	4.078	23.31	0.025	2.916	6.36
2014	296	2304	3.867	23.45	1.981	-6.602	-6.737	2014	297	1118	4.071	23.39	0.091	2.998	6.485
2014	296	2305	3.719	23.64	1.981	-6.602	-6.445	2014	297	1119	4.085	23.34	0.074	2.792	6.582
2014	296	2306	3.775	23.55	1.981	-6.602	-6.063	2014	297	1120	4.101	23.33	0.033	2.764	6.361
2014	296	2307	3.877	23.46	1.981	-6.602	-6.713	2014	297	1121	4.119	23.3	0.05	2.847	6.318
2014	296	2308	3.918	23.44	1.981	-6.602	-7.05	2014	297	1122	4.103	23.4	0.041	2.118	6.372
2014	296	2309	3.865	23.45	1.981	-6.602	-6.889	2014	297	1123	4.07	23.44	0.008	2.104	6.345
2014	296	2310	3.962	23.35	1.981	-6.602	-7.22	2014	297	1124	4.044	23.41	0	2.022	6.13
2014	296	2311	3.927	23.29	1.981	-6.602	-7.04	2014	297	1125	4.061	23.45	0.017	2.297	6.085
2014	296	2312	3.963	23.26	1.981	-6.602	-7.02	2014	297	1126	4.406	23.09	0	1.994	6.518
2014	296	2313	3.845	23.32	1.981	-6.602	-6.961	2014	297	1127	3.919	23.73	0.017	1.884	7.74
2014	296	2314	3.782	23.31	1.981	-6.602	-6.552	2014	297	1128	3.942	23.48	0.033	2.008	13.38
2014	296	2315	3.872	23.19	1.981	-6.602	-6.842	2014	297	1129	4.053	23.34	0.008	1.967	15.31
2014	296	2316	3.921	23.15	1.972	-6.602	-6.992	2014	297	1130	4.062	23.35	0	1.678	14.3
2014	296	2317	3.94	23.13	1.981	-6.602	-7.18	2014	297	1131	4.091	23.38	0.008	1.65	14.88
2014	296	2318	3.983	23.09	1.964	-6.602	-7.12	2014	297	1132	4.137	23.33	0.05	1.65	17.28
2014	296	2319	3.933	23.11	1.956	-6.602	-7.33	2014	297	1133	4.119	23.32	0.066	1.65	21.51
2014	296	2320	3.831	23.26	1.981	-6.602	-7.07	2014	297	1134	4.031	23.43	0.017	1.664	25.63
2014	296	2321	3.821	23.3	1.972	-6.602	-7.07	2014	297	1135	4.035	23.44	0.025	1.582	26.38
2014	296	2322	3.779	23.31	1.981	-6.602	-6.892	2014	297	1136	4.036	23.45	0.017	1.32	23.36
2014	296	2323	3.828	23.32	1.956	-6.602	-7.05	2014	297	1137	4.014	23.44	0.041	1.32	19.06
2014	296	2324	3.845	23.3	1.981	-6.602	-6.977	2014	297	1138	4.016	23.44	0.008	1.32	15.01
2014	296	2325	3.91	23.21	1.981	-6.602	-7.13	2014	297	1139	4.004	23.47	0.017	1.155	12.34
2014	296	2326	3.887	23.25	1.981	-6.602	-7.24	2014	297	1140	3.895	23.56	0.025	1.265	11.84
2014	296	2327	3.854	23.24	1.981	-6.602	-7.39	2014	297	1141	3.825	23.6	0.008	1.059	11.83
2014	296	2328	3.859	23.21	1.981	-6.602	-7.21	2014	297	1142	4.013	23.45	0.041	1.279	10.64
2014	296	2329	3.894	23.15	1.981	-6.602	-7.21	2014	297	1143	4.139	23.29	0.008	1.238	9.64
2014	296	2330	3.917	23.13	1.972	-6.602	-7.32	2014	297	1144	4.177	23.27	0	0.619	8.95
2014	296	2331	3.868	23.1	1.981	-6.602	-7.07	2014	297	1145	4.196	23.24	0.008	0.041	8.73
2014	296	2332	3.852	23.1	1.981	-6.602	-7.18	2014	297	1146	4.236	23.2	0	0	8.27
2014	296	2333	3.942	23.02	1.981	-6.602	-7.3	2014	297	1147	4.312	23.13	0.008	0	7.76
2014	296	2334	3.936	23.03	1.981	-6.602	-7.43	2014	297	1148	4.419	23	0.008	0	7.08
2014	296	2335	3.859	23.1	1.981	-6.602	-7.4	2014	297	1149	4.539	22.82	0.008	0	6.767
2014	296	2336	3.926	23.07	1.972	-6.602	-7.39	2014	297	1150	4.573	22.77	0	0	6.111
2014	296	2337	3.962	22.99	1.981	-6.602	-7.54	2014	297	1151	4.62	22.7	0	0	5.844
2014	296	2338	3.904	23.08	1.981	-6.602	-7.4	2014	297	1152	4.668	22.61	0.008	0	5.741
2014	296	2339	3.983	22.97	1.981	-6.602	-7.31	2014	297	1153	4.722	22.58	0.008	0	5.385
2014	296	2340	4.209	22.88	1.981	-6.602	-7.68	2014	297	1154	4.696	22.56	0.017	0	5.448
2014	296	2341	4.187	22.83	1.981	-6.602	-7.69	2014	297	1155	4.744	22.5	0	0	4.955
2014	296	2342	4.327	22.69	1.981	-6.602	-7.93	2014	297	1156	4.784	22.46	0.017	0	4.646
2014	296	2343	4.381	22.64	1.981	-6.602	-8.22	2014	297	1157	4.757	22.45	0	0	4.334
2014	296	2344	4.322	22.67	1.981	-6.602	-8.2	2014	297	1158	4.73	22.48	0.008	0	4.215
2014	296	2345	4.336	22.64	1.981	-6.602	-8.14	2014	297	1159	4.747	22.5	0	0	4.027
2014	296	2346	4.379	22.56	1.981	-6.602	-8.22	2014	297	1200	4.725	22.54	0	0	4.141
2014	296	2347	4.389	22.53	1.972	-6.602	-8.32	2014	297	1201	4.708	22.57	0	0	3.888

Summary of RAW DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	296	2348	4.317	22.6	1.799	-6.602	-8.18	2014	297	1202	4.719	22.59	0	0	3.96
2014	296	2349	4.348	22.54	1.832	-6.602	-8.28	2014	297	1203	4.652	22.61	0	0	3.797
2014	296	2350	4.409	22.43	1.898	-6.602	-8.22	2014	297	1204	4.671	22.54	0	0	3.814
2014	296	2351	4.437	22.41	1.824	-6.602	-8.57	2014	297	1205	4.714	22.47	0	0	3.65
2014	296	2352	4.408	22.41	1.89	-6.602	-8.29	2014	297	1206	4.703	22.47	0	0	3.72
2014	296	2353	4.332	22.48	1.824	-6.602	-8.15	2014	297	1207	4.699	22.46	0	0	3.543
2014	296	2354	4.36	22.5	1.881	-6.602	-8.32	2014	297	1208	4.674	22.49	0	0	3.499
2014	296	2355	4.315	22.53	1.89	-6.602	-8.43	2014	297	1209	4.6	22.6	0	0	3.411
2014	296	2356	4.283	22.58	1.824	-6.602	-8.4	2014	297	1210	4.583	22.66	0	0	3.518
2014	296	2357	4.283	22.52	1.923	-6.602	-8.3	2014	297	1211	4.533	22.76	0	0	3.548
2014	296	2358	4.357	22.51	1.815	-6.602	-8.36	2014	297	1212	4.51	22.79	-0.008	0	3.513
2014	296	2359	4.314	22.53	1.815	-6.602	-8.42	2014	297	1213	4.509	22.82	0	0	3.588
2014	296	2400	4.357	22.49	1.915	-6.602	-8.54	2014	297	1214	4.431	22.93	0	0	3.635
2014	297	1	4.164	22.77	1.799	-6.602	-8.04	2014	297	1215	4.484	22.92	0	0	3.564
2014	297	2	4.151	22.74	1.906	-6.602	-7.76	2014	297	1216	4.448	23.01	0	0	3.57
2014	297	3	4.212	22.72	1.865	-6.602	-8.22	2014	297	1217	4.43	22.97	0	0	3.672
2014	297	4	4.189	22.74	1.799	-6.602	-8.06	2014	297	1218	4.447	22.97	0	0	3.612
2014	297	5	4.211	22.81	1.848	-6.602	-8.16	2014	297	1219	4.356	22.97	0	0	3.841
2014	297	6	4.177	22.79	1.848	-6.602	-8.12	2014	297	1220	4.284	22.97	0	0	3.777
2014	297	7	4.232	22.77	1.923	-6.602	-8.18	2014	297	1221	4.354	22.81	0	0	3.923
2014	297	8	4.174	22.84	1.89	-6.602	-8.18	2014	297	1222	4.503	22.58	0	0	3.851
2014	297	9	4.202	22.83	1.865	-6.602	-8.35	2014	297	1223	4.565	22.49	0	0	3.612
2014	297	10	4.243	22.81	1.857	-6.602	-8.23	2014	297	1224	4.636	22.39	0.008	0	3.422
2014	297	11	4.171	22.9	1.815	-6.602	-8.1	2014	297	1225	4.648	22.3	0	0	3.198
2014	297	12	4.242	22.82	1.915	-6.602	-8.43	2014	297	1226	4.598	22.31	0	0	3.308
2014	297	13	4.25	22.79	1.815	-6.602	-8.49	2014	297	1227	4.554	22.34	0	0	3.462
2014	297	14	4.234	22.79	1.898	-6.602	-8.62	2014	297	1228	4.571	22.4	0	0	3.425
2014	297	15	4.234	22.8	1.898	-6.602	-8.67	2014	297	1229	4.567	22.4	0	0	3.229
2014	297	16	4.194	22.89	1.799	-6.602	-8.35	2014	297	1230	4.479	22.52	0	0	3.295
2014	297	17	4.288	22.78	1.948	-6.602	-8.55	2014	297	1231	4.458	22.56	0	0	3.535
2014	297	18	4.284	22.79	1.815	-6.602	-8.69	2014	297	1232	4.481	22.56	0	0	3.441
2014	297	19	4.249	22.82	1.898	-6.602	-8.51	2014	297	1233	4.433	22.67	0	0	3.513
2014	297	20	4.149	23	1.857	-6.602	-8.57	2014	297	1234	4.416	22.71	0	0	3.568
2014	297	21	4.112	23	1.84	-6.602	-8.55	2014	297	1235	4.394	22.75	0	0	3.672
2014	297	22	4.193	22.91	1.931	-6.602	-8.6	2014	297	1236	4.409	22.79	0	0	3.753
2014	297	23	4.371	22.77	1.815	-6.602	-8.98	2014	297	1237	4.3	22.93	0	0	3.912
2014	297	24	4.314	22.83	1.923	-6.602	-8.97	2014	297	1238	4.219	23.06	0	0	4.188
2014	297	25	4.185	22.89	1.873	-6.602	-8.87	2014	297	1239	4.295	22.97	0	0	4.236
2014	297	26	4.276	22.78	1.848	-6.602	-8.96	2014	297	1240	4.379	22.92	0	0	4.133
2014	297	27	4.285	22.8	1.948	-6.602	-8.83	2014	297	1241	4.452	22.85	0	0	3.895
2014	297	28	4.235	22.83	1.807	-6.602	-8.93	2014	297	1242	4.347	22.94	0	0	3.923
2014	297	29	4.215	22.81	1.923	-6.602	-8.82	2014	297	1243	4.239	23.05	0	0	3.954
2014	297	30	4.268	22.82	1.84	-6.602	-9.11	2014	297	1244	4.227	23.06	0	0	4.045
2014	297	31	4.193	22.86	1.873	-6.602	-8.96	2014	297	1245	4.141	23.11	0	0	4.119
2014	297	32	4.182	22.91	1.881	-6.602	-8.8	2014	297	1246	4.12	23.14	0	0	4.237
2014	297	33	4.215	22.9	1.807	-6.602	-8.79	2014	297	1247	4.006	23.27	0	0	4.587
2014	297	34	4.227	22.89	1.881	-6.602	-8.81	2014	297	1248	4.043	23.23	0	0	4.687
2014	297	35	4.287	22.87	1.593	-6.602	-9.06	2014	297	1249	4.099	23.1	0	0	4.646
2014	297	36	4.16	23	1.733	-6.602	-9.09	2014	297	1250	4.187	23.04	0.008	0	4.513
2014	297	37	4.108	23.05	1.584	-6.602	-8.74	2014	297	1251	4.163	23.06	0.025	0.014	4.502
2014	297	38	4.112	23.06	1.609	-6.602	-8.97	2014	297	1252	4.107	23.12	0.008	0	4.257
2014	297	39	4.149	23.07	1.593	-6.602	-8.83	2014	297	1253	4.122	23.15	0.033	0	4.243
2014	297	40	4.127	23.03	1.601	-6.602	-8.79	2014	297	1254	4.056	23.23	0.008	0	4.61
2014	297	41	4.097	23	1.634	-6.602	-8.79	2014	297	1255	4.011	23.3	0.017	0	4.729
2014	297	42	4.167	22.92	1.584	-6.602	-9.1	2014	297	1256	4.066	23.25	0	0	4.654
2014	297	43	4.14	22.94	1.601	-6.602	-9.14	2014	297	1257	4.009	23.4	0	0	4.796
2014	297	44	4.15	22.95	1.659	-6.602	-8.91	2014	297	1258	3.989	23.43	0	0	4.913
2014	297	45	4.069	23.09	1.502	-6.602	-8.89	2014	297	1259	4.126	23.33	0	0	4.588
2014	297	46	4.025	23.15	1.716	-6.602	-8.71	2014	297	1300	4.119	23.25	0	0	4.54
2014	297	47	3.905	23.28	1.65	-6.602	-8.26	2014	297	1301	4.087	23.23	0	0.014	4.591
2014	297	48	4.062	23.12	1.7	-6.602	-8.52	2014	297	1302	4.075	23.23	0	0	4.627
2014	297	49	4.16	23.02	1.626	-6.602	-8.96	2014	297	1303	4.055	23.2	0	0	4.607
2014	297	50	4.069	23.11	1.609	-6.602	-8.9	2014	297	1304	4.045	23.22	0	0	4.741
2014	297	51	4.134	23.05	1.7	-6.602	-8.96	2014	297	1305	4.068	23.18	0	0	4.661
2014	297	52	4.167	23.01	1.584	-6.602	-9.16	2014	297	1306	4.074	23.18	0	0	4.519
2014	297	53	4.249	22.96	1.634	-6.602	-9.22	2014	297	1307	4.063	23.18	0	0	4.4
2014	297	54	4.091	23.14	1.551	-6.602	-9.04	2014	297	1308	4.044	23.24	0.008	0	4.136
2014	297	55	4.002	23.22	1.708	-6.602	-8.63	2014	297	1309	4.058	23.27	0	0	4.178
2014	297	56	4.085	23.15	1.659	-6.602	-8.71	2014	297	1310	4.033	23.31	0	0	4.265
2014	297	57	4.146	23.13	1.683	-6.602	-8.91	2014	297	1311	3.957	23.34	0	0	4.536
2014	297	58	4.165	23.08	1.609	-6.602	-9.14	2014	297	1312	3.925	23.45	0.008	0	4.532
2014	297	59	4.113	23.14	1.576	-6.602	-9.06	2014	297	1313	4.056	23.31	0	0	4.182
2014	297	100	4.105	23.13	1.675	-6.615	-9.01	2014	297	1314	4.083	23.3	0	0	4.027
2014	297	101	4.128	23.08	1.634	-6.602	-9.04	2014	297	1315	4.085	23.36	0	0	4.233
2014	297	102	4.16	23.05	1.659	-6.602	-8.99	2014	297	1316	4.069	23.33	0	0	4.125
2014	297	103	4.181	23.03	1.7	-6.602	-9.25	2014	297	1317	4.089	23.29	0	0	4.235
2014	297	104	4.236	23.01	1.626	-6.602	-9.42	2014	297	1318	4.124	23.19	0	0	4.213
2014	297	105	4.131	23.06	1.675	-6.602	-9.12	2014	297	1319	4.153	23.2	0	0	4.154
2014	297	106	4.175	23.02	1.675	-6.602	-9.22	2014	297	1320	4.065	23.29	0	0	4.398
2014	297	107	4.19	23	1.659	-6.602	-9.28	2014	297	1321	4.087	23.27	0	0	4.233
2014	297	108	4.092	23.14	1.857	-6.602	-9.1	2014	297	1322	4.081	23.33	0	0	4.264
2014	297	109	4.216	22.95	1.741	-6.602	-9.24	2014	297	1323	4.158	23.27	0	0	3.872
2014	297	110	4.099	23.09	1.791	-6.602	-8.86	2014	297	1324	4.155	23.25	0	0	3.669
2014	297	111	4.107	23.1	1.824	-6.602	-8.94	2014	297	1325	4.102	23.3	0	0	3.862
2014	297	112	4.177	23.03	1.733	-6.602	-9.24	2014	297	1326	4.061	23.35	0	0	3.746
2014	297	113	4.164	23.03	1.848	-6.602	-9.23	2014	297	1327	4.022	23.43	0	0	3.87
2014	297	114	4.104	23.09	1.749	-6.602	-9.15	2014	297	1328	4.013	23.5	0	0	3.967
2014	297	115	4.065	23.2	1.799	-6.602	-9.1	2014	297	1329	4.108	23.44	0	0	3.702
2014	297	116	4.103	23.18	1.824	-6.615	-9.07	2014	297	1330	4.164	23.34	0	0	3.564

Summary of RAW DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	297	117	3.993	23.29	1.799	-6.602	-8.82	2014	297	1331	4.166	23.38	0	0	3.44
2014	297	118	4.011	23.3	1.898	-6.602	-8.9	2014	297	1332	4.143	23.29	0	0	3.366
2014	297	119	4.144	23.18	1.84	-6.602	-9.02	2014	297	1333	4.173	23.19	0	0	3.15
2014	297	120	4.164	23.12	1.915	-6.602	-9.16	2014	297	1334	4.16	23.22	0	0	3.261
2014	297	121	4.133	23.1	1.89	-6.602	-9.43	2014	297	1335	4.158	23.18	0	0	3.009
2014	297	122	4.103	23.11	1.799	-6.602	-9.22	2014	297	1336	4.159	23.12	0	0	3.198
2014	297	123	4.164	23.05	1.848	-6.602	-9.47	2014	297	1337	4.132	23.12	0	0	3.107
2014	297	124	4.198	23	1.791	-6.602	-9.7	2014	297	1338	4.133	23.13	0	0	3.011
2014	297	125	4.164	22.99	1.923	-6.602	-9.45	2014	297	1339	4.132	23.16	0	0	3.118
2014	297	126	4.102	23.08	1.881	-6.602	-9.32	2014	297	1340	4.176	23.13	0	0	2.836
2014	297	127	4.065	23.15	1.865	-6.602	-9.28	2014	297	1341	4.11	23.19	0	0	2.883
2014	297	128	4.101	23.11	1.881	-6.602	-9.25	2014	297	1342	4.09	23.19	0	0	2.851
2014	297	129	4.069	23.15	1.857	-6.602	-9.29	2014	297	1343	4.075	23.19	0	0	3.073
2014	297	130	4.045	23.18	1.964	-6.602	-9.07	2014	297	1344	4.114	23.09	-0.008	0	3.084
2014	297	131	4.026	23.19	1.865	-6.602	-8.98	2014	297	1345	4.12	23.06	0	0	2.864
2014	297	132	4.008	23.18	1.881	-6.602	-9.06	2014	297	1346	4.024	23.14	0	0	3.156
2014	297	133	4.001	23.25	1.873	-6.602	-9.07	2014	297	1347	4.009	23.22	0	0	2.971
2014	297	134	4.015	23.22	1.848	-6.615	-9.16	2014	297	1348	3.997	23.24	0	0	3.121
2014	297	135	4.012	23.27	1.964	-6.602	-8.82	2014	297	1349	4.062	23.23	0	0	2.707
2014	297	136	4.001	23.3	1.865	-6.602	-9.01	2014	297	1350	3.99	23.34	0	0	2.853
2014	297	137	3.979	23.31	1.923	-6.602	-8.88	2014	297	1351	3.975	23.35	0	0	2.712
2014	297	138	4.052	23.29	1.865	-6.602	-9.03	2014	297	1352	3.943	23.43	0	0	2.716
2014	297	139	4.034	23.31	1.848	-6.602	-8.93	2014	297	1353	3.95	23.48	0	0	3.123
2014	297	140	4.028	23.31	1.956	-6.602	-9.04	2014	297	1354	3.95	23.43	0	0	3.243
2014	297	141	4.054	23.26	1.84	-6.602	-9.27	2014	297	1355	3.972	23.38	0	0	3.228
2014	297	142	4.032	23.28	1.923	-6.602	-9.07	2014	297	1356	3.955	23.4	0	0	3.198
2014	297	143	4.024	23.31	1.848	-6.602	-8.85	2014	297	1357	3.86	23.49	0	0	3.016
2014	297	144	4.005	23.32	1.898	-6.602	-8.78	2014	297	1358	3.879	23.49	0	0	3.161
2014	297	145	3.965	23.4	1.939	-6.602	-8.61	2014	297	1359	3.952	23.41	0	0	3.216
2014	297	146	4.001	23.39	1.832	-6.602	-8.56	2014	297	1400	3.924	23.45	0	0	3.06
2014	297	147	4.037	23.37	1.948	-6.602	-8.64	2014	297	1401	3.911	23.43	0	0	3.133
2014	297	148	4.05	23.36	1.824	-6.602	-8.54	2014	297	1402	3.801	23.55	0	0	3.421
2014	297	149	3.977	23.45	1.906	-6.602	-8.29	2014	297	1403	3.813	23.54	0	0	3.5
2014	297	150	3.852	23.54	1.931	-6.602	-7.55	2014	297	1404	3.895	23.49	0	0	3.315
2014	297	151	3.954	23.46	1.84	-6.602	-7.51	2014	297	1405	3.833	23.46	0	0	3.399
2014	297	152	3.988	23.44	1.939	-6.519	-7.47	2014	297	1406	3.997	23.3	0	0	3.002
2014	297	153	4.007	23.43	1.848	-5.694	-7.08	2014	297	1407	3.98	23.31	0	0	2.942
2014	297	154	3.931	23.55	1.948	-4.828	-6.47	2014	297	1408	3.973	23.27	0	0	2.87
2014	297	155	3.974	23.48	1.89	-3.48	-5.931	2014	297	1409	3.934	23.33	0	0	2.654
2014	297	156	3.901	23.59	1.857	-3.301	-5.16	2014	297	1410	3.957	23.36	0	0	2.615
2014	297	157	3.89	23.65	1.923	-3.301	-4.609	2014	297	1411	3.931	23.36	0	0	2.7
2014	297	158	3.933	23.66	1.84	-3.301	-4.279	2014	297	1412	3.94	23.4	0	0	2.758
2014	297	159	3.909	23.65	1.906	-3.301	-4.024	2014	297	1413	3.896	23.43	0	0	3.07
2014	297	200	3.873	23.74	1.873	-3.205	-3.624	2014	297	1414	3.863	23.44	0	0	3.242
2014	297	201	3.821	23.8	1.881	-1.829	-3.067	2014	297	1415	3.866	23.41	0	0	3.328
2014	297	202	3.865	23.77	1.89	-0.261	-2.557	2014	297	1416	3.92	23.38	0	0	3.155
2014	297	203	3.808	23.82	1.824	0	-2.075	2014	297	1417	3.864	23.44	0	0	3.134
2014	297	204	3.892	23.83	1.956	0	-1.946	2014	297	1418	3.848	23.46	0.008	0	3.592
2014	297	205	3.866	23.79	1.832	0	-1.883	2014	297	1419	3.98	23.33	0	0	3.227
2014	297	206	3.808	23.87	1.65	0	-1.848	2014	297	1420	3.964	23.36	0	0	3.071
2014	297	207	3.851	23.85	1.518	0	-1.942	2014	297	1421	3.861	23.48	0	0	3.067
2014	297	208	3.924	23.73	1.634	0	-2.289	2014	297	1422	3.918	23.45	0	0	2.755
2014	297	209	3.93	23.72	1.733	0	-2.868	2014	297	1423	3.961	23.37	0	0	2.505
2014	297	210	3.866	23.79	1.642	-0.124	-2.631	2014	297	1424	3.844	23.46	0	0	2.829
2014	297	211	3.863	23.75	1.716	-0.454	-2.466	2014	297	1425	3.873	23.46	0	0	2.657
2014	297	212	3.827	23.83	1.56	-0.083	-2.434	2014	297	1426	3.797	23.51	0	0	2.909
2014	297	213	3.83	23.88	1.774	0	-2.271	2014	297	1427	3.848	23.44	0	0	2.866
2014	297	214	3.893	23.81	1.815	0	-2.357	2014	297	1428	3.9	23.38	0	0	2.577
2014	297	215	3.859	23.89	1.749	0	-2.007	2014	297	1429	3.978	23.31	0	0	2.324
2014	297	216	3.785	24	1.898	0	-1.719	2014	297	1430	3.888	23.39	0.008	0	2.609
2014	297	217	3.865	23.96	1.749	0	-1.785	2014	297	1431	3.871	23.41	0	0	2.608
2014	297	218	3.85	23.99	1.774	0	-2.07	2014	297	1432	3.88	23.43	0.008	0	2.671
2014	297	219	3.875	23.99	1.848	0	-1.997	2014	297	1433	3.91	23.41	0	0	2.928
2014	297	220	3.827	24.05	1.733	0	-2.085	2014	297	1434	3.98	23.33	0	0	2.56
2014	297	221	3.761	24.14	1.865	0	-1.718	2014	297	1435	4.038	23.23	0	0	2.207
2014	297	222	3.813	24.1	1.774	0	-1.718	2014	297	1436	3.911	23.39	0	0	2.234
2014	297	223	3.828	24.08	1.848	0	-2.053	2014	297	1437	3.947	23.39	0.025	0	2.456
2014	297	224	3.882	24.08	1.815	0	-2.337	2014	297	1438	3.984	23.37	0	0	2.279
2014	297	225	3.872	24.12	1.758	-0.316	-2.7	2014	297	1439	3.992	23.34	0.017	0	2.286
2014	297	226	3.853	24.07	1.857	-1.595	-3.046	2014	297	1440	3.993	23.35	0.008	0	2.042
2014	297	227	3.892	24.08	1.733	-2.077	-3.43	2014	297	1441	3.996	23.35	0	0	1.917
2014	297	228	3.763	24.2	1.832	-2.324	-3.268	2014	297	1442	3.951	23.38	0	0	1.96
2014	297	229	3.786	24.14	1.766	-2.682	-2.931	2014	297	1443	3.933	23.4	0	0	2.275
2014	297	230	3.832	24.09	1.799	-2.544	-3.217	2014	297	1444	3.962	23.34	0.025	0	2.317
2014	297	231	3.81	24.1	1.84	-3.053	-3.294	2014	297	1445	3.94	23.39	0	0	2.118
2014	297	232	3.86	24.06	1.741	-3.273	-3.526	2014	297	1446	3.948	23.39	0.017	0	1.84
2014	297	233	3.868	24.09	1.832	-3.287	-3.678	2014	297	1447	3.954	23.44	0.008	0	1.468
2014	297	234	3.833	24.04	1.791	-3.301	-3.734	2014	297	1448	3.963	23.47	0	0	1.477
2014	297	235	3.896	24	1.716	-3.301	-3.686	2014	297	1449	3.899	23.49	0	0	1.524
2014	297	236	3.883	23.98	1.766	-3.301	-4.019	2014	297	1450	3.992	23.44	0	0	1.364
2014	297	237	3.917	23.94	1.758	-3.301	-4.275	2014	297	1451	3.93	23.51	0.033	0	1.338
2014	297	238	3.882	23.99	1.898	-3.301	-4.5	2014	297	1452	3.979	23.47	0	0	1.319
2014	297	239	3.883	23.97	1.807	-3.301	-4.647	2014	297	1453	3.97	23.47	0.008	0	1.425
2014	297	240	3.918	23.97	1.89	-3.301	-4.705	2014	297	1454	3.907	23.54	0	0	1.506
2014	297	241	3.899	23.97	1.898	-3.301	-4.541	2014	297	1455	3.939	23.5	0.083	0	1.514
2014	297	242	3.859	23.94	1.807	-3.301	-4.485	2014	297	1456	3.957	23.43	0.099	0	1.396
2014	297	243	3.945	23.86	1.948	-3.301	-5.008	2014	297	1457	4.004	23.37	0.05	0	1.373
2014	297	244	3.948	23.84	1.84	-3.301	-5.155	2014	297	1458	4.024	23.31	0.404	0	1.3
2014	297	245	3.938	23.8	1.89	-3.301	-5.134	2014	297	1459	4.029	23.28	0.454	0	1.341

Summary of RAW DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	297	246	4.03	23.69	1.881	-3.301	-5.367	2014	297	1500	4.005	23.27	1.122	0	1.458
2014	297	247	4.007	23.72	1.881	-3.301	-5.4	2014	297	1501	3.96	23.31	1.081	0	1.479
2014	297	248	4.003	23.73	1.939	-3.301	-5.5	2014	297	1502	3.98	23.31	1.114	0	1.451
2014	297	249	3.995	23.71	1.807	-3.301	-5.466	2014	297	1503	3.917	23.31	1.815	0	1.516
2014	297	250	3.988	23.74	1.948	-3.301	-5.33	2014	297	1504	3.961	23.26	1.799	0	1.767
2014	297	251	4.062	23.65	1.873	-3.301	-5.554	2014	297	1505	3.959	23.26	1.923	0	1.843
2014	297	252	4.075	23.59	1.873	-3.301	-5.803	2014	297	1506	4.002	23.19	1.956	0	1.762
2014	297	253	4.009	23.66	1.939	-3.301	-5.611	2014	297	1507	4.054	23.13	1.981	0	1.546
2014	297	254	4.076	23.59	1.799	-3.301	-5.72	2014	297	1508	4.029	23.15	1.906	0	1.606
2014	297	255	4.009	23.69	1.939	-3.301	-5.446	2014	297	1509	4.03	23.18	1.972	0	1.791
2014	297	256	3.968	23.71	1.873	-3.301	-5.156	2014	297	1510	4.038	23.18	1.981	0	1.759
2014	297	257	3.906	23.83	1.873	-3.301	-4.932	2014	297	1511	4.043	23.15	1.981	0	1.682
2014	297	258	3.983	23.78	1.915	-3.301	-5.002	2014	297	1512	4.028	23.19	1.972	0	1.694
2014	297	259	4.047	23.64	1.848	-3.301	-5.529	2014	297	1513	4.041	23.19	1.931	0	1.847
2014	297	300	3.934	23.77	1.972	-3.301	-5.4	2014	297	1514	4.063	23.18	1.972	0	1.813
2014	297	301	3.881	23.8	1.782	-3.301	-5.109	2014	297	1515	4.051	23.24	1.923	0	1.705
2014	297	302	3.906	23.8	1.898	-3.301	-5.075	2014	297	1516	4.088	23.21	1.964	0	1.576
2014	297	303	3.971	23.73	1.898	-3.301	-4.983	2014	297	1517	4.044	23.23	1.972	0	1.634
2014	297	304	3.935	23.81	1.824	-3.301	-5.122	2014	297	1518	4.03	23.25	1.799	0	1.553
2014	297	305	3.9	23.81	1.931	-3.301	-4.836	2014	297	1519	4.046	23.23	1.956	0	1.678
2014	297	306	3.9	23.82	1.824	-3.301	-4.867	2014	297	1520	4.065	23.17	1.774	0	1.545
2014	297	307	3.916	23.83	1.923	-3.301	-4.774	2014	297	1521	3.994	23.31	1.807	0	1.55
2014	297	308	3.859	23.9	1.857	-3.301	-4.573	2014	297	1522	3.972	23.32	1.337	0	1.635
2014	297	309	3.803	23.98	1.84	-3.301	-4.392	2014	297	1523	4.055	23.24	1.436	0	1.51
2014	297	310	3.787	24.01	1.939	-3.301	-3.943	2014	297	1524	4.076	23.21	1.386	0	1.392
2014	297	311	3.855	23.97	1.782	-3.301	-3.839	2014	297	1525	4.098	23.16	1.395	0	1.368
2014	297	312	3.831	24.04	1.931	-3.301	-3.896	2014	297	1526	4.018	23.31	1.477	0	1.534
2014	297	313	3.755	24.16	1.824	-3.301	-3.349	2014	297	1527	3.989	23.33	1.411	0	1.693
2014	297	314	3.813	24.08	1.881	-3.301	-3.555	2014	297	1528	3.979	23.34	1.263	0	1.699
2014	297	315	3.833	24.04	1.923	-3.301	-3.718	2014	297	1529	3.988	23.32	0.891	0	1.47
2014	297	316	3.883	23.98	1.782	-3.301	-4.207	2014	297	1530	3.94	23.34	0.999	0	1.466
2014	297	317	3.933	23.92	1.939	-3.301	-4.445	2014	297	1531	4.029	23.29	0.899	0	1.166
2014	297	318	3.909	23.96	1.873	-3.301	-4.95	2014	297	1532	4.07	23.21	0.866	0	0.785
2014	297	319	3.802	24.05	1.906	-3.301	-4.755	2014	297	1533	4.112	23.2	0.866	0	0.795
2014	297	320	3.878	23.94	1.898	-3.301	-4.557	2014	297	1534	4.118	23.21	0.916	0	0.715
2014	297	321	3.909	23.97	1.84	-3.301	-4.119	2014	297	1535	4.097	23.23	0.99	0	0.817
2014	297	322	3.868	23.97	1.964	-3.301	-4.294	2014	297	1536	4.013	23.41	0.842	0	1.018
2014	297	323	3.909	23.95	1.857	-3.301	-4.044	2014	297	1537	4.052	23.35	0.924	0	1.048
2014	297	324	3.905	23.93	1.89	-3.301	-4.192	2014	297	1538	4.111	23.31	0.899	0	1.073
2014	297	325	3.933	23.82	1.898	-3.301	-4.22	2014	297	1539	4.082	23.32	0.833	0	1.258
2014	297	326	4.038	23.64	1.848	-3.301	-4.804	2014	297	1540	4.026	23.39	0.957	0	1.366
2014	297	327	4.021	23.62	1.931	-3.301	-5.034	2014	297	1541	3.943	23.49	0.899	0	1.491
2014	297	328	4.073	23.57	1.873	-3.301	-5.18	2014	297	1542	4.008	23.45	0.974	0	1.407
2014	297	329	3.91	23.75	1.939	-3.301	-4.852	2014	297	1543	3.987	23.47	0.891	0	1.256
2014	297	330	3.986	23.69	1.865	-3.301	-4.885	2014	297	1544	3.963	23.53	0.924	-0.014	1.265
2014	297	331	4.084	23.65	1.881	-3.301	-5.408	2014	297	1545	3.924	23.61	0.941	0	1.491
2014	297	332	4.011	23.7	1.948	-3.301	-5.334	2014	297	1546	3.916	23.62	0.932	0	1.509
2014	297	333	4.012	23.67	1.84	-3.301	-5.276	2014	297	1547	3.971	23.66	0.949	-0.028	1.472
2014	297	334	3.973	23.72	1.939	-3.301	-5.028	2014	297	1548	3.977	23.62	0.578	0	1.212
2014	297	335	3.993	23.71	1.824	-3.301	-5.118	2014	297	1549	3.858	23.71	0.074	0	1.4
2014	297	336	3.95	23.78	1.89	-3.301	-4.784	2014	297	1550	3.896	23.72	0.083	0	1.37
2014	297	337	3.977	23.72	1.915	-3.301	-5.085	2014	297	1551	3.915	23.67	0.05	0	1.397
2014	297	338	4.102	23.58	1.824	-3.301	-5.592	2014	297	1552	3.904	23.71	0.107	-0.014	1.348
2014	297	339	4.055	23.62	1.972	-3.301	-5.488	2014	297	1553	3.908	23.68	0.107	0	1.202
2014	297	340	4.043	23.62	1.832	-3.301	-5.341	2014	297	1554	3.75	23.83	0.066	0	1.721
2014	297	341	4.018	23.66	1.915	-3.301	-5.272	2014	297	1555	3.906	23.62	0.083	-0.014	1.495
2014	297	342	4.039	23.7	1.906	-3.301	-5.277	2014	297	1556	4.009	23.52	0.074	0	1.334
2014	297	343	4.039	23.66	1.84	-3.301	-5.455	2014	297	1557	3.99	23.47	0.14	0	1.176
2014	297	344	3.958	23.8	1.964	-3.301	-5.186	2014	297	1558	4.037	23.37	0.099	0	1.111
2014	297	345	4.009	23.76	1.807	-3.301	-5.468	2014	297	1559	4.024	23.35	0.033	-0.014	1.147
2014	297	346	4.015	23.79	1.906	-3.301	-5.325	2014	297	1600	3.994	23.42	0.058	-0.124	1.142
2014	297	347	3.974	23.83	1.906	-3.301	-5.275	2014	297	1601	4.018	23.32	0.025	-0.11	1.221
2014	297	348	3.987	23.74	1.873	-3.301	-5.343	2014	297	1602	4.038	23.23	0.074	-0.11	1.168
2014	297	349	3.977	23.76	1.915	-3.315	-5.261	2014	297	1603	4.026	23.27	0.066	-0.179	1.206
2014	297	350	3.993	23.62	1.832	-3.411	-5.609	2014	297	1604	4.035	23.25	0.074	-0.165	1.234
2014	297	351	4.093	23.54	1.956	-4.346	-6.014	2014	297	1605	3.942	23.35	0.017	-0.44	1.397
2014	297	352	4.11	23.51	1.881	-4.731	-6.199	2014	297	1606	4.026	23.27	0.008	-0.605	1.271
2014	297	353	4.115	23.51	1.857	-4.869	-6.301	2014	297	1607	4.111	23.21	0	-0.66	0.887
2014	297	354	4.127	23.52	1.915	-4.951	-6.478	2014	297	1608	4.076	23.24	0	-0.798	1.282
2014	297	355	4.041	23.6	1.848	-4.951	-6.343	2014	297	1609	4.063	23.28	0.008	-0.688	1.213
2014	297	356	4.057	23.62	1.939	-4.951	-6.357	2014	297	1610	4.007	23.35	0	-0.77	1.351
2014	297	357	4.089	23.6	1.857	-4.951	-6.475	2014	297	1611	4.032	23.35	0.008	-0.66	1.268
2014	297	358	4.049	23.62	1.906	-4.951	-6.446	2014	297	1612	4.056	23.28	0	-0.811	1.242
2014	297	359	4.067	23.61	1.89	-4.951	-6.331	2014	297	1613	4.047	23.28	0	-1.444	1.022
2014	297	400	4.18	23.42	1.881	-4.951	-6.611	2014	297	1614	4.007	23.36	0	-1.045	1.04
2014	297	401	4.273	23.29	1.939	-4.951	-6.768	2014	297	1615	4.042	23.37	0	-0.825	1.066
2014	297	402	4.243	23.27	1.848	-5.103	-6.897	2014	297	1616	4.061	23.37	0.025	-1.307	0.972
2014	297	403	4.335	23.13	1.873	-5.666	-7.04	2014	297	1617	4.027	23.43	0	-1.417	0.822
2014	297	404	4.359	23.07	1.881	-6.368	-7.42	2014	297	1618	3.994	23.49	0	-1.582	1.164
2014	297	405	4.298	23.07	1.865	-6.368	-7.51	2014	297	1619	4.048	23.42	0	-1.554	1
2014	297	406	4.27	23.11	1.948	-6.574	-7.28	2014	297	1620	4.029	23.48	0	-1.609	1.131
2014	297	407	4.251	23.13	1.824	-6.574	-7.53	2014	297	1621	3.988	23.49	0	-1.582	1.191
2014	297	408	4.223	23.16	1.906	-6.602	-7.45	2014	297	1622	3.975	23.5	0	-1.527	1.033
2014	297	409	4.13	23.27	1.865	-6.602	-7.15	2014	297	1623	3.926	23.6	0	-1.485	1.242
2014	297	410	4.128	23.34	1.824	-6.602	-7.05	2014	297	1624	4.011	23.52	0	-1.499	1.005
2014	297	411	4.196	23.27	1.923	-6.56	-7.25	2014	297	1625	4.023	23.5	0	-1.554	1.186
2014	297	412	4.17	23.3	1.807	-6.56	-7.23	2014	297	1626	3.971	23.58	0	-1.623	1.122
2014	297	413	4.199	23.32	1.948	-6.395	-7.28	2014	297	1627	4.03	23.49	0	-1.527	1.096
2014	297	414	4.149	23.36	1.865	-6.065	-7.18	2014	297	1628	4.098	23.45	0	-1.595	0.69

Summary of RAW DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	297	415	4.142	23.4	1.873	-6.327	-7	2014	297	1629	4.099	23.42	0	-1.623	0.777
2014	297	416	4.098	23.42	1.915	-6.285	-6.937	2014	297	1630	4.052	23.42	-0.008	-1.65	0.656
2014	297	417	4.103	23.38	1.865	-6.107	-6.877	2014	297	1631	3.983	23.45	0	-1.692	1.022
2014	297	418	4.093	23.44	1.948	-5.653	-6.874	2014	297	1632	3.936	23.43	0	-1.719	1.239
2014	297	419	4.016	23.51	1.848	-6.079	-6.523	2014	297	1633	4.031	23.34	0	-1.76	1.092
2014	297	420	4.066	23.44	1.898	-5.584	-6.511	2014	297	1634	4.128	23.19	0	-1.65	0.756
2014	297	421	4.059	23.44	1.915	-5.336	-6.573	2014	297	1635	4.105	23.17	0	-1.664	0.675
2014	297	422	4.08	23.44	1.832	-5.474	-6.628	2014	297	1636	4.142	23.13	0	-1.76	0.607
2014	297	423	4.135	23.28	1.948	-5.446	-6.475	2014	297	1637	4.084	23.19	0	-1.733	0.594
2014	297	424	4.233	23.15	1.807	-6.189	-6.867	2014	297	1638	3.954	23.32	0	-1.87	1.023
2014	297	425	4.106	23.26	1.923	-6.272	-6.94	2014	297	1639	3.985	23.31	0	-1.788	0.959
2014	297	426	4.199	23.18	1.881	-6.272	-7.03	2014	297	1640	4.006	23.25	0	-1.87	1.136
2014	297	427	4.278	23.09	1.881	-6.478	-7.31	2014	297	1641	3.999	23.3	0	-2.159	1.007
2014	297	428	4.28	23.08	1.931	-6.505	-7.37	2014	297	1642	3.936	23.39	0	-1.843	1.224
2014	297	429	4.215	23.15	1.807	-6.602	-7.21	2014	297	1643	3.988	23.33	0	-2.049	1.104
2014	297	430	4.168	23.23	1.948	-6.602	-7.38	2014	297	1644	4.088	23.23	0	-1.994	0.784
2014	297	431	4.228	23.21	1.906	-6.602	-7.21	2014	297	1645	4.042	23.27	0	-2.036	0.99
2014	297	432	4.24	23.13	1.873	-6.547	-6.958	2014	297	1646	4.012	23.39	0	-2.132	0.966
2014	297	433	4.29	23.1	1.898	-6.327	-7.25	2014	297	1647	4.066	23.3	0	-1.926	0.953
2014	297	434	4.294	23.08	1.807	-6.285	-7.07	2014	297	1648	4.069	23.3	0	-2.352	0.894
2014	297	435	4.273	23.08	1.939	-6.478	-7.33	2014	297	1649	4.104	23.23	0	-2.159	0.701
2014	297	436	4.279	23.01	1.84	-6.588	-7.14	2014	297	1650	4	23.33	0	-2.558	0.927
2014	297	437	4.224	23.08	1.865	-6.588	-6.97	2014	297	1651	3.971	23.37	0	-2.751	1.165
2014	297	438	4.221	23.07	1.906	-6.602	-7.21	2014	297	1652	4.011	23.32	0	-2.696	0.992
2014	297	439	4.256	23.06	1.815	-6.602	-7.1	2014	297	1653	4.015	23.31	0	-2.531	0.937
2014	297	440	4.308	22.98	1.906	-6.505	-7.24	2014	297	1654	4.082	23.27	0	-2.448	0.788
2014	297	441	4.273	22.96	1.857	-6.34	-7.06	2014	297	1655	4.08	23.26	0	-1.953	0.758
2014	297	442	4.256	22.95	1.865	-6.285	-7.08	2014	297	1656	4.021	23.25	0	-2.269	0.932
2014	297	443	4.341	22.83	1.873	-6.175	-7.25	2014	297	1657	4.003	23.31	0	-2.489	1.111
2014	297	444	4.344	22.86	1.824	-6.34	-7.23	2014	297	1658	4.004	23.33	-0.008	-2.696	1.078
2014	297	445	4.358	22.81	1.923	-6.519	-7.25	2014	297	1659	3.946	23.39	0	-2.682	1.012
2014	297	446	4.315	22.8	1.832	-6.45	-7.13	2014	297	1700	3.992	23.38	0	-2.751	1.191
2014	297	447	4.399	22.74	1.857	-6.602	-7.5	2014	297	1701	3.953	23.4	0	-2.737	1.235
2014	297	448	4.341	22.8	1.873	-6.602	-7.54	2014	297	1702	4.038	23.37	0	-2.723	0.851
2014	297	449	4.371	22.81	1.84	-6.602	-7.62	2014	297	1703	4.043	23.36	0	-2.778	0.993
2014	297	450	4.282	22.89	1.915	-6.602	-7.26	2014	297	1704	4.035	23.36	0	-2.599	0.912
2014	297	451	4.222	22.97	1.848	-6.602	-7.33	2014	297	1705	4.084	23.39	0	-2.682	0.993
2014	297	452	4.258	23.03	1.939	-6.492	-7.19	2014	297	1706	4.06	23.38	-0.017	-2.627	0.802
2014	297	453	4.38	22.91	1.824	-6.492	-7.49	2014	297	1707	4.021	23.46	0	-2.819	0.781
2014	297	454	4.369	22.89	1.848	-6.34	-7.6	2014	297	1708	3.953	23.56	-0.008	-2.586	0.849
2014	297	455	4.373	22.82	1.906	-6.203	-7.44	2014	297	1709	3.916	23.62	0	-2.462	1.148
2014	297	456	4.308	22.86	1.807	-6.175	-7.22	2014	297	1710	3.904	23.64	-0.008	-2.517	1.406
2014	297	457	4.304	22.79	1.915	-6.299	-7.25	2014	297	1711	3.934	23.65	0	-2.723	1.392
2014	297	458	4.31	22.81	1.848	-6.272	-7.2	2014	297	1712	3.878	23.72	0	-2.888	1.364
2014	297	459	4.365	22.77	1.898	-6.327	-7.23	2014	297	1713	3.948	23.69	0	-2.696	1.293
2014	297	500	4.371	22.78	1.923	-6.382	-7.29	2014	297	1714	4.05	23.57	0	-2.888	0.728
2014	297	501	4.369	22.81	1.824	-6.368	-7.4	2014	297	1715	4.002	23.63	0	-2.709	0.787
2014	297	502	4.37	22.82	1.881	-6.395	-7.39	2014	297	1716	3.984	23.71	0	-2.847	0.948
2014	297	503	4.369	22.87	1.815	-6.34	-7.43	2014	297	1717	3.998	23.75	0	-2.696	0.883
2014	297	504	4.404	22.84	1.906	-5.501	-7.49	2014	297	1718	3.952	23.77	0	-2.627	0.993
2014	297	505	4.309	22.92	1.865	-6.175	-7.23	2014	297	1719	3.97	23.74	0	-2.599	1.225
2014	297	506	4.178	23.02	1.84	-6.203	-6.952	2014	297	1720	3.926	23.8	-0.008	-2.572	1.195
2014	297	507	4.242	22.97	1.89	-5.887	-7.05	2014	297	1721	3.912	23.82	0	-2.489	1.234
2014	297	508	4.275	22.91	1.824	-5.68	-7.06	2014	297	1722	3.994	23.73	-0.033	-2.682	1.051
2014	297	509	4.411	22.74	1.931	-5.983	-7.43	2014	297	1723	3.968	23.76	0	-2.599	1.095
2014	297	510	4.403	22.78	1.865	-6.162	-7.6	2014	297	1724	4.021	23.69	-0.008	-2.806	0.722
2014	297	511	4.34	22.83	1.848	-6.478	-7.51	2014	297	1725	4.003	23.69	0	-3.04	0.803
2014	297	512	4.36	22.83	1.865	-6.588	-7.54	2014	297	1726	3.987	23.67	-0.008	-2.847	0.921
2014	297	513	4.355	22.85	1.84	-6.588	-7.71	2014	297	1727	3.974	23.71	-0.025	-3.095	0.952
2014	297	514	4.329	22.83	1.915	-6.533	-7.47	2014	297	1728	3.944	23.72	0	-3.232	1.074
2014	297	515	4.385	22.74	1.857	-6.505	-7.46	2014	297	1729	3.941	23.63	-0.058	-3.095	1.228
2014	297	516	4.307	22.85	1.89	-6.588	-7.4	2014	297	1730	4.066	23.56	0	-3.095	0.91
2014	297	517	4.284	22.9	1.848	-6.602	-7.3	2014	297	1731	3.986	23.58	-0.025	-3.15	1.08
2014	297	518	4.258	22.87	1.815	-6.478	-7.19	2014	297	1732	4.039	23.53	0	-3.273	0.873
2014	297	519	4.371	22.72	1.939	-6.382	-7.32	2014	297	1733	4.059	23.54	0	-3.177	0.781
2014	297	520	4.46	22.55	1.799	-6.217	-7.62	2014	297	1734	3.991	23.6	-0.008	-3.301	0.871
2014	297	521	4.456	22.46	1.865	-6.272	-7.74	2014	297	1735	3.973	23.63	0	-3.287	0.916
2014	297	522	4.332	22.57	1.848	-6.602	-7.66	2014	297	1736	4.028	23.58	-0.025	-3.301	0.733
2014	297	523	4.359	22.56	1.832	-6.602	-7.69	2014	297	1737	3.893	23.75	0	-3.301	1.065
2014	297	524	4.321	22.62	1.906	-6.602	-7.62	2014	297	1738	3.744	23.77	-0.017	-3.301	1.439
2014	297	525	4.322	22.67	1.815	-6.602	-7.68	2014	297	1739	3.836	23.74	0	-3.301	1.008
2014	297	526	4.266	22.75	1.906	-6.602	-7.57	2014	297	1740	3.809	23.71	-0.017	-3.301	1.054
2014	297	527	4.296	22.79	1.815	-6.602	-7.71	2014	297	1741	3.791	23.74	-0.025	-3.301	1.087
2014	297	528	4.313	22.7	1.848	-6.602	-7.56	2014	297	1742	3.709	23.74	-0.008	-3.301	1.466
2014	297	529	4.389	22.69	1.948	-6.602	-7.69	2014	297	1743	3.776	23.62	-0.041	-3.301	1.426
2014	297	530	4.352	22.73	1.815	-6.602	-7.64	2014	297	1744	3.931	23.52	0	-3.287	0.712
2014	297	531	4.29	22.84	1.906	-6.547	-7.46	2014	297	1745	3.887	23.51	-0.017	-3.301	0.811
2014	297	532	4.361	22.78	1.857	-6.148	-7.39	2014	297	1746	3.798	23.58	0	-3.301	1.186
2014	297	533	4.401	22.75	1.848	-6.313	-7.43	2014	297	1747	3.788	23.67	-0.008	-3.301	1.159
2014	297	534	4.297	22.86	1.865	-6.409	-7.38	2014	297	1748	3.825	23.63	0	-3.301	1.161
2014	297	535	4.191	23.01	1.857	-6.437	-7.08	2014	297	1749	3.783	23.71	0	-3.301	1.048
2014	297	536	4.25	23.01	1.948	-6.327	-7.05	2014	297	1750	3.807	23.73	-0.066	-3.301	0.781
2014	297	537	4.272	22.88	1.824	-6.313	-7.17	2014	297	1751	3.786	23.74	-0.033	-3.287	0.941
2014	297	538	4.321	22.81	1.881	-6.052	-7.25	2014	297	1752	3.831	23.71	-0.058	-3.301	0.778
2014	297	539	4.241	22.89	1.848	-6.052	-7.03	2014	297	1753	3.853	23.76	-0.083	-3.301	0.495
2014	297	540	4.239	22.79	1.832	-6.024	-6.837	2014	297	1754	3.82	23.79	-0.041	-3.301	0.715
2014	297	541	4.31	22.66	1.915	-5.666	-7.11	2014	297	1755	3.941	23.68	-0.099	-3.301	0.556
2014	297	542	4.457	22.53	1.815	-5.391	-7.29	2014	297	1756	3.763	23.83	-0.017	-3.301	0.981
2014	297	543	4.434	22.55	1.898	-5.859	-7.5	2014	297	1757	3.807	23.79	-0.099	-3.301	0.895

Summary of RAW DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	297	544	4.386	22.57	1.89	-5.556	-7.48	2014	297	1758	3.816	23.82	-0.083	-3.301	0.755
2014	297	545	4.441	22.59	1.824	-5.9	-7.61	2014	297	1759	3.852	23.77	-0.025	-3.301	0.613
2014	297	546	4.393	22.61	1.898	-6.217	-7.57	2014	297	1800	3.897	23.73	0	-3.301	0.32
2014	297	547	4.31	22.74	1.824	-5.969	-7.31	2014	297	1801	3.905	23.68	0	-3.301	0.441
2014	297	548	4.276	22.78	1.948	-5.722	-7.28	2014	297	1802	3.902	23.66	0	-3.301	0.337
2014	297	549	4.314	22.78	1.873	-5.694	-7.21	2014	297	1803	3.924	23.62	0	-3.301	0.283
2014	297	550	4.367	22.69	1.815	-5.983	-7.35	2014	297	1804	3.957	23.59	-0.008	-3.301	0.206
2014	297	551	4.345	22.68	1.865	-5.529	-7.2	2014	297	1805	3.883	23.62	0	-3.301	0.436
2014	297	552	4.351	22.55	1.807	-5.667	-7.21	2014	297	1806	3.959	23.49	0	-3.301	0.305
2014	297	553	4.34	22.57	1.923	-5.501	-7.1	2014	297	1807	4.015	23.38	0	-3.301	0.089
2014	297	554	4.437	22.49	1.84	-5.378	-7.43	2014	297	1808	3.983	23.4	0	-3.301	0.138
2014	297	555	4.369	22.5	1.84	-5.24	-7.38	2014	297	1809	3.965	23.4	0	-3.301	0.246
2014	297	556	4.328	22.54	1.873	-5.103	-7.32	2014	297	1810	3.894	23.41	0	-3.301	0.241
2014	297	557	4.346	22.56	1.84	-4.951	-7.07	2014	297	1811	3.894	23.45	-0.017	-3.301	0.508
2014	297	558	4.33	22.59	1.923	-4.951	-6.897	2014	297	1812	3.933	23.41	0	-3.301	0.144
2014	297	559	4.337	22.63	1.815	-4.896	-6.969	2014	297	1813	3.886	23.48	0	-3.301	0.124
2014	297	600	4.277	22.72	1.873	-4.387	-6.551	2014	297	1814	3.847	23.55	0	-3.301	0.462
2014	297	601	4.368	22.66	1.84	-3.562	-6.639	2014	297	1815	3.866	23.53	-0.008	-3.301	0.3
2014	297	602	4.367	22.59	1.815	-3.37	-6.481	2014	297	1816	3.849	23.55	0	-3.301	0.461
2014	297	603	4.493	22.53	1.89	-3.328	-6.797	2014	297	1817	3.89	23.56	0	-3.301	0.433
2014	297	604	4.443	22.49	1.807	-3.328	-6.83	2014	297	1818	3.864	23.61	0	-3.301	0.286
2014	297	605	4.286	22.6	1.931	-3.301	-6.49	2014	297	1819	3.801	23.69	0	-3.301	0.664
2014	297	606	4.31	22.56	1.832	-3.92	-6.577	2014	297	1820	3.827	23.62	0	-3.301	0.697
2014	297	607	4.332	22.46	1.848	-4.704	-7.02	2014	297	1821	3.853	23.57	0	-3.301	0.465
2014	297	608	4.442	22.27	1.865	-4.951	-7.11	2014	297	1822	3.885	23.48	0	-3.301	0.429
2014	297	609	4.367	22.31	1.799	-4.965	-7.1	2014	297	1823	3.977	23.41	0	-3.301	0.07
2014	297	610	4.433	22.25	1.915	-5.144	-7.37	2014	297	1824	3.909	23.44	0	-3.301	0.168
2014	297	611	4.453	22.25	1.807	-5.034	-7.6	2014	297	1825	3.858	23.54	0	-3.301	0.091
2014	297	612	4.371	22.34	1.873	-5.474	-7.33	2014	297	1826	3.922	23.51	0	-3.301	0.144
2014	297	613	4.394	22.3	1.898	-5.515	-7.48	2014	297	1827	3.891	23.52	-0.017	-3.301	0.006
2014	297	614	4.442	22.26	1.815	-5.048	-7.39	2014	297	1828	3.808	23.6	-0.008	-3.301	0.633
2014	297	615	4.478	22.24	1.898	-4.951	-7.51	2014	297	1829	3.773	23.68	-0.008	-3.301	0.818
2014	297	616	4.458	22.23	1.824	-4.951	-7.21	2014	297	1830	3.834	23.69	-0.025	-3.301	0.455
2014	297	617	4.412	22.3	1.898	-4.91	-7.04	2014	297	1831	3.853	23.72	0	-3.301	0.358
2014	297	618	4.424	22.28	1.865	-4.91	-7.13	2014	297	1832	3.796	23.74	-0.033	-3.301	0.43
2014	297	619	4.405	22.31	1.807	-4.951	-7.23	2014	297	1833	3.796	23.78	-0.017	-3.301	0.351
2014	297	620	4.33	22.39	1.89	-4.951	-7.2	2014	297	1834	3.714	23.88	0	-3.301	1.078
2014	297	621	4.353	22.37	1.824	-4.951	-7.08	2014	297	1835	3.76	23.85	0	-3.301	0.932
2014	297	622	4.331	22.43	1.939	-4.965	-7.09	2014	297	1836	3.795	23.81	0	-3.301	0.41
2014	297	623	4.349	22.39	1.832	-4.951	-6.946	2014	297	1837	3.875	23.67	-0.017	-3.301	0.525
2014	297	624	4.387	22.4	1.84	-4.883	-7.1	2014	297	1838	3.805	23.73	0	-3.301	0.501
2014	297	625	4.432	22.35	1.881	-4.552	-7.09	2014	297	1839	3.837	23.68	-0.041	-3.301	0.311
2014	297	626	4.448	22.34	1.857	-4.002	-6.915	2014	297	1840	3.818	23.66	0	-3.301	0.7
2014	297	627	4.416	22.35	1.923	-3.989	-6.973	2014	297	1841	3.86	23.64	0	-3.301	0.43
2014	297	628	4.412	22.4	1.873	-3.741	-6.976	2014	297	1842	3.844	23.62	-0.025	-3.301	0.631
2014	297	629	4.416	22.41	1.84	-3.452	-6.786	2014	297	1843	3.844	23.63	0	-3.301	0.476
2014	297	630	4.341	22.47	1.873	-3.397	-6.53	2014	297	1844	3.893	23.56	-0.025	-3.301	0.257
2014	297	631	4.355	22.52	1.807	-3.301	-6.525	2014	297	1845	3.938	23.52	0	-3.301	0.028
2014	297	632	4.361	22.47	1.939	-3.301	-6.518	2014	297	1846	3.844	23.66	-0.05	-3.301	0.228
2014	297	633	4.417	22.45	1.848	-3.301	-6.522	2014	297	1847	3.777	23.72	-0.017	-3.301	0.495
2014	297	634	4.374	22.46	1.873	-3.301	-6.489	2014	297	1848	3.76	23.77	0	-3.301	1.018
2014	297	635	4.386	22.48	1.824	-3.301	-6.357	2014	297	1849	3.754	23.84	-0.017	-3.301	0.688
2014	297	636	4.482	22.35	1.84	-3.301	-6.316	2014	297	1850	3.748	23.87	0	-3.301	0.963
2014	297	637	4.491	22.33	1.898	-3.301	-6.522	2014	297	1851	3.865	23.81	0	-3.301	0.605
2014	297	638	4.404	22.42	1.84	-3.301	-6.716	2014	297	1852	3.933	23.7	0	-3.301	0.382
2014	297	639	4.357	22.5	1.915	-3.301	-6.554	2014	297	1853	3.903	23.69	0	-3.301	0.081
2014	297	640	4.333	22.52	1.799	-3.342	-6.651	2014	297	1854	3.857	23.7	0	-3.301	0.116
2014	297	641	4.354	22.49	1.857	-3.301	-6.514	2014	297	1855	3.901	23.63	0	-3.301	0.253
2014	297	642	4.293	22.53	1.898	-3.301	-6.538	2014	297	1856	3.869	23.66	0	-3.301	0.275
2014	297	643	4.323	22.49	1.84	-3.301	-6.477	2014	297	1857	3.851	23.61	0	-3.301	0.44
2014	297	644	4.375	22.36	1.923	-3.301	-6.408	2014	297	1858	3.912	23.51	0	-3.301	0.322
2014	297	645	4.396	22.39	1.815	-3.301	-6.643	2014	297	1859	3.94	23.46	0	-3.301	0.293
2014	297	646	4.385	22.39	1.857	-3.315	-6.679	2014	297	1900	4.029	23.31	0	-3.301	-0.08
2014	297	647	4.422	22.37	1.881	-3.328	-6.792	2014	297	1901	4.042	23.27	0	-3.301	0.01
2014	297	648	4.419	22.39	1.84	-3.301	-6.849	2014	297	1902	4.019	23.26	0	-3.301	-0.022
2014	297	649	4.477	22.4	1.89	-3.301	-6.959	2014	297	1903	3.983	23.23	0	-3.301	0.01
2014	297	650	4.427	22.4	1.741	-3.301	-6.732	2014	297	1904	3.978	23.22	0	-3.301	0.094
2014	297	651	4.374	22.44	1.799	-3.301	-6.781	2014	297	1905	3.968	23.2	0	-3.301	0.043
2014	297	652	4.349	22.48	1.791	-3.301	-6.589	2014	297	1906	4.015	23.21	0	-3.301	-0.076
2014	297	653	4.301	22.54	1.725	-3.301	-6.448	2014	297	1907	4.063	23.15	0	-3.301	-0.077
2014	297	654	4.289	22.59	1.749	-3.301	-6.51	2014	297	1908	4.003	23.24	0	-3.301	-0.252
2014	297	655	4.414	22.48	1.749	-3.301	-6.734	2014	297	1909	3.966	23.3	0	-3.301	-0.21
2014	297	656	4.431	22.42	1.758	-3.301	-6.838	2014	297	1910	3.921	23.39	0	-3.301	0.198
2014	297	657	4.407	22.44	1.774	-3.301	-6.792	2014	297	1911	3.969	23.37	0	-3.301	-0.103
2014	297	658	4.386	22.43	1.782	-3.301	-6.69	2014	297	1912	4.002	23.35	0	-3.301	-0.483
2014	297	659	4.364	22.43	1.749	-3.301	-6.549	2014	297	1913	3.964	23.41	0	-3.301	-0.397
2014	297	700	4.388	22.4	1.716	-3.301	-6.606	2014	297	1914	3.86	23.6	0	-3.301	-0.155
2014	297	701	4.39	22.42	1.832	-3.301	-6.748	2014	297	1915	3.848	23.59	0	-3.301	0.067
2014	297	702	4.319	22.42	1.683	-3.328	-6.918	2014	297	1916	3.799	23.65	0	-3.301	0.325
2014	297	703	4.327	22.43	1.791	-3.466	-6.818	2014	297	1917	3.809	23.63	0	-3.301	0.474
2014	297	704	4.288	22.49	1.741	-4.195	-7.01	2014	297	1918	3.873	23.6	0	-3.301	0.274
2014	297	705	4.3	22.47	1.337	-4.319	-6.947	2014	297	1919	3.869	23.61	0	-3.301	0.136
2014	297	706	4.324	22.48	1.098	-4.03	-7.08	2014	297	1920	3.909	23.61	0	-3.301	0.111
2014	297	707	4.391	22.44	0.99	-3.7	-7.13	2014	297	1921	3.874	23.63	0	-3.301	0.083
2014	297	708	4.409	22.4	1.122	-3.672	-7.11	2014	297	1922	3.826	23.65	0	-3.301	0.166
2014	297	709	4.346	22.51	1.023	-3.48	-7.07	2014	297	1923	3.774	23.7	0	-3.301	0.506
2014	297	710	4.333	22.51	1.122	-3.301	-6.983	2014	297	1924	3.866	23.63	0	-3.301	0.334
2014	297	711	4.342	22.53	1.056	-3.315	-6.779	2014	297	1925	3.867	23.66	0	-3.301	0.164
2014	297	712	4.305	22.59	1.048	-3.301	-6.743	2014	297	1926	3.848	23.68	0	-3.301	-0.022

Summary of RAW DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	297	713	4.316	22.55	1.081	-3.301	-6.76	2014	297	1927	3.815	23.64	0	-3.301	0.193
2014	297	714	4.372	22.46	0.99	-3.315	-6.994	2014	297	1928	3.908	23.48	0	-3.301	0.29
2014	297	715	4.378	22.45	1.131	-3.301	-6.812	2014	297	1929	3.915	23.46	0	-3.301	0.118
2014	297	716	4.39	22.42	1.007	-3.301	-6.798	2014	297	1930	3.873	23.47	0	-3.301	0.349
2014	297	717	4.306	22.45	1.015	-3.356	-6.798	2014	297	1931	3.911	23.45	0	-3.301	0.23
2014	297	718	4.262	22.51	1.065	-3.493	-6.844	2014	297	1932	3.944	23.43	0	-3.301	0.048
2014	297	719	4.271	22.49	1.056	-3.315	-6.65	2014	297	1933	3.867	23.48	0	-3.301	0.052
2014	297	720	4.359	22.46	1.081	-3.301	-6.797	2014	297	1934	3.804	23.53	-0.008	-3.301	0.513
2014	297	721	4.312	22.51	1.048	-3.301	-6.697	2014	297	1935	3.861	23.49	0	-3.301	0.373
2014	297	722	4.296	22.55	1.04	-3.301	-6.633	2014	297	1936	3.902	23.48	0	-3.301	0.184
2014	297	723	4.325	22.58	1.048	-3.301	-6.386	2014	297	1937	3.855	23.52	0	-3.301	0.392
2014	297	724	4.319	22.57	0.982	-3.301	-6.456	2014	297	1938	3.911	23.48	0	-3.301	0.129
2014	297	725	4.316	22.58	1.073	-3.301	-6.606	2014	297	1939	4.043	23.33	0	-3.301	-0.336
2014	297	726	4.308	22.58	0.999	-3.301	-6.409	2014	297	1940	3.984	23.38	0	-3.301	-0.154
2014	297	727	4.25	22.64	1.147	-3.301	-6.519	2014	297	1941	3.968	23.39	0	-3.301	-0.087
2014	297	728	4.292	22.56	1.073	-3.301	-6.602	2014	297	1942	3.954	23.39	0	-3.301	0.044
2014	297	729	4.227	22.64	1.032	-3.301	-6.229	2014	297	1943	3.952	23.38	0	-3.301	-0.143
2014	297	730	4.276	22.62	1.139	-3.301	-6.479	2014	297	1944	3.904	23.45	0	-3.301	0.297
2014	297	731	4.315	22.59	1.065	-3.301	-6.801	2014	297	1945	4.045	23.32	0	-3.301	-0.202
2014	297	732	4.316	22.6	1.155	-3.301	-7.03	2014	297	1946	4.215	23.04	0	-3.301	-0.07
2014	297	733	4.312	22.59	0.949	-3.37	-6.908	2014	297	1947	4.288	23.02	0	-3.301	0.74
2014	297	734	4.267	22.59	1.106	-3.727	-6.936	2014	297	1948	4.138	23.14	0	-3.301	1.477
2014	297	735	4.294	22.55	1.089	-3.521	-7.02	2014	297	1949	3.85	23.57	0	-3.301	1.308
2014	297	736	4.323	22.47	1.065	-3.631	-6.825	2014	297	1950	3.942	23.36	0	-3.301	-0.323
2014	297	737	4.35	22.42	1.065	-3.81	-7.04	2014	297	1951	4.234	23.09	0	-3.301	-0.976
2014	297	738	4.393	22.38	1.015	-4.044	-7.33	2014	297	1952	4.273	23.03	0	-3.301	-1.008
2014	297	739	4.33	22.43	1.089	-4.58	-7.19	2014	297	1953	4.269	23.05	0	-3.301	-1.181
2014	297	740	4.226	22.49	1.032	-4.387	-6.985	2014	297	1954	4.14	23.16	0	-3.301	-0.879
2014	297	741	4.34	22.39	1.032	-4.016	-7.14	2014	297	1955	4.085	23.21	0	-3.301	-0.871
2014	297	742	4.379	22.34	1.04	-3.7	-7.13	2014	297	1956	4.03	23.28	0	-3.301	-0.536
2014	297	743	4.424	22.31	1.056	-3.672	-7.24	2014	297	1957	3.866	23.49	0	-3.301	-0.037
2014	297	744	4.471	22.26	1.048	-3.686	-7.35	2014	297	1958	3.741	23.65	0	-3.301	0.904
2014	297	745	4.449	22.29	1.032	-4.002	-7.35	2014	297	1959	3.667	23.73	0	-3.301	1.483
2014	297	746	4.402	22.3	1.007	-4.47	-7.34	2014	297	2000	3.768	23.59	0	-3.301	1.35
2014	297	747	4.441	22.26	1.032	-4.58	-7.43	2014	297	2001	3.68	23.64	0	-3.301	1.639
2014	297	748	4.409	22.3	1.048	-4.731	-7.25	2014	297	2002	3.785	23.55	0	-3.301	1.61
2014	297	749	4.386	22.31	1.147	-4.951	-7.54	2014	297	2003	3.795	23.57	0	-3.301	1.521
2014	297	750	4.429	22.29	1.007	-4.814	-7.53	2014	297	2004	3.974	23.4	0	-3.301	1.037
2014	297	751	4.407	22.31	1.015	-4.828	-7.38	2014	297	2005	4.107	23.28	0	-3.301	0.538
2014	297	752	4.359	22.35	1.098	-4.621	-7.32	2014	297	2006	4.061	23.31	0	-3.301	0.627
2014	297	753	4.382	22.31	1.073	-4.649	-7.2	2014	297	2007	3.996	23.32	0	-3.301	0.836
2014	297	754	4.431	22.27	1.197	-4.649	-7.34	2014	297	2008	4.106	23.24	0	-3.301	0.74
2014	297	755	4.394	22.33	0.99	-4.731	-7.45	2014	297	2009	4.164	23.17	0	-3.301	0.239
2014	297	756	4.371	21.1	11.82	-4.91	-7.39	2014	297	2010	4.16	23.12	0	-3.301	0.305
2014	297	757	3.11	3.443	71.7	-5.268	-10.67	2014	297	2011	4.195	23.05	0	-3.301	0.131
2014	297	758	0.066	2.122	-0.437	-6.588	-12.75	2014	297	2012	4.209	22.94	0	-3.301	0.136
2014	297	759	0.047	1.478	-1.551	-2.531	-2.972	2014	297	2013	4.237	22.92	0	-3.301	0.117
2014	297	800	0.239	1.965	-1.981	0	-0.756	2014	297	2014	4.358	22.78	0	-3.301	-0.111
2014	297	801	0.113	0.856	-1.981	275.9	170.6	2014	297	2015	4.296	22.86	0	-3.301	-0.347
2014	297	802	0.034	0.651	-2.063	426.6	416.3	2014	297	2016	4.273	22.88	0	-3.301	-0.337
2014	297	803	0.033	0.505	-2.179	454	455.4	2014	297	2017	4.272	22.87	0	-3.301	0.124
2014	297	804	0.032	0.401	-2.245	483.2	484	2014	297	2018	4.277	22.92	0	-3.301	-0.168
2014	297	805	0.032	0.491	-2.261	496.8	502.9	2014	297	2019	4.275	22.87	0	-3.301	-0.228
2014	297	806	3.42	19.6	-1.906	322.3	435.4	2014	297	2020	4.261	22.87	0	-3.301	-0.041
2014	297	807	4.245	21.08	-0.668	80.4	114.5	2014	297	2021	4.334	22.78	0	-3.301	-0.355
2014	297	808	4.302	21.55	-0.297	38.5	49	2014	297	2022	4.342	22.75	0	-3.301	-0.364
2014	297	809	4.325	21.9	-0.116	24.32	31.32	2014	297	2023	4.337	22.76	0	-3.301	-0.195
2014	297	810	4.203	22.28	-0.099	17.19	23.87	2014	297	2024	4.248	22.81	0	-3.301	-0.206
2014	297	811	4.227	22.42	-0.017	14.65	20.42	2014	297	2025	4.278	22.77	0	-3.301	-0.018
2014	297	812	4.168	22.61	0	13.2	17.52	2014	297	2026	4.261	22.78	0	-3.301	-0.125
2014	297	813	4.136	22.74	0	11.48	15.84	2014	297	2027	4.307	22.76	0	-3.301	-0.282
2014	297	814	4.281	22.69	0	9.9	14.59	2014	297	2028	4.297	22.81	0	-3.301	-0.228
2014	297	815	4.205	22.75	0	9.9	13.5	2014	297	2029	4.215	22.84	0	-3.301	-0.154
2014	297	816	4.229	22.78	0	9.88	13.02	2014	297	2030	4.246	22.8	0.008	-3.301	-0.032
2014	297	817	4.242	22.72	0.008	8.31	12.21	2014	297	2031	4.307	22.75	0	-3.301	-0.249
2014	297	818	4.277	22.74	0	7.32	11.5	2014	297	2032	4.296	22.74	0	-3.301	-0.226
2014	297	819	4.33	22.64	0.091	6.602	10.89	2014	297	2033	4.176	22.85	0	-3.301	0.037
2014	297	820	4.247	22.69	0.033	6.602	10.19	2014	297	2034	4.239	22.78	0	-3.301	0.164
2014	297	821	4.248	22.66	0.074	6.602	9.86	2014	297	2035	4.197	22.84	0	-3.301	-0.032
2014	297	822	4.208	22.68	0.124	6.065	9.45	2014	297	2036	4.183	22.81	0	-3.301	-0.034
2014	297	823	4.36	22.53	0.446	5.075	9.14	2014	297	2037	4.272	22.74	0	-3.301	-0.175
2014	297	824	4.258	22.61	0.8	4.786	8.77	2014	297	2038	4.278	22.71	0	-3.301	-0.091
2014	297	825	4.198	22.63	1.131	4.621	8.86	2014	297	2039	4.33	22.67	0	-3.301	-0.331
2014	297	826	4.186	22.6	1.337	4.828	8.87	2014	297	2040	4.236	22.78	0	-3.301	-0.184
2014	297	827	4.271	22.57	1.353	4.539	8.54	2014	297	2041	4.182	22.85	0	-3.301	0.113
2014	297	828	4.25	22.66	1.758	3.727	8.42	2014	297	2042	4.159	22.9	0.008	-3.301	0.226
2014	297	829	4.297	22.57	1.84	3.397	8.08	2014	297	2043	4.182	22.93	0	-3.301	0.043
2014	297	830	4.244	22.63	1.931	3.301	7.99	2014	297	2044	4.162	22.99	0	-3.301	0.132
2014	297	831	4.214	22.68	1.956	3.301	8.01	2014	297	2045	4.152	23	0	-3.301	0.058
2014	297	832	4.231	22.66	1.948	3.301	7.75	2014	297	2046	4.187	22.9	0	-3.04	0.128
2014	297	833	4.272	22.62	1.972	3.301	7.89	2014	297	2047	4.177	22.91	0	-2.654	0.193
2014	297	834	4.215	22.75	1.981	3.301	7.75	2014	297	2048	4.203	22.84	0	-2.654	-0.019
2014	297	835	4.226	22.69	1.981	3.301	7.9	2014	297	2049	4.14	22.9	0	-2.379	0.37
2014	297	836	4.235	22.68	1.981	3.301	8.1	2014	297	2050	4.141	22.92	0	-2.132	0.429
2014	297	837	4.224	22.7	1.981	3.301	7.63	2014	297	2051	4.137	22.91	0	-1.788	0.355
2014	297	838	4.225	22.66	1.981	3.301	7.41	2014	297	2052	4.165	22.83	0	-1.733	0.598
2014	297	839	4.169	22.76	1.997	3.301	7.36	2014	297	2053	4.183	22.87	0	-1.664	0.48
2014	297	840	4.232	22.72	2.03	3.301	7.39	2014	297	2054	4.144	22.88	0	-1.65	0.655
2014	297	841	4.174	22.79	2.121	3.301	7.68	2014	297	2055	4.139	22.88	0	-1.637	0.674

Summary of RAW DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	297	842	4.212	22.76	2.071	3.301	7.94	2014	297	2056	4.208	22.78	0	-1.609	0.479
2014	297	843	4.281	22.67	1.989	3.301	8.17	2014	297	2057	4.147	22.77	0	-1.54	0.535
2014	297	844	4.277	22.68	2.022	3.301	8.17	2014	297	2058	4.116	22.81	0.017	-1.458	0.71
2014	297	845	4.284	22.64	2.038	3.301	8.3	2014	297	2059	4.187	22.74	0	-0.908	0.663
2014	297	846	4.28	22.64	2.022	3.301	8.1	2014	297	2100	4.154	22.75	0.008	-0.77	0.666
2014	297	847	4.203	22.69	1.989	3.301	8.08	2014	297	2101	4.1	22.84	0.017	-0.646	0.699
2014	297	848	4.247	22.67	1.989	3.301	8.09	2014	297	2102	4.073	22.92	0.017	-0.33	0.957
2014	297	849	4.198	22.69	1.989	3.301	8.2	2014	297	2103	4.086	22.91	0	-0.028	0.979
2014	297	850	4.144	22.78	1.989	3.301	8.43	2014	297	2104	4.092	22.93	0.017	-0.055	1.073
2014	297	851	4.174	22.75	2.022	3.301	8.46	2014	297	2105	4.068	22.97	0.033	-0.055	1.023
2014	297	852	4.203	22.72	1.997	3.301	8.57	2014	297	2106	3.987	23.1	0.008	-0.014	1.246
2014	297	853	4.127	22.83	1.981	3.301	8.55	2014	297	2107	4.01	23.08	0.008	0	1.397
2014	297	854	4.221	22.75	2.014	3.81	8.56	2014	297	2108	3.987	23.14	0.008	0	1.455
2014	297	855	4.199	22.78	1.989	4.099	8.68	2014	297	2109	4.019	23.04	0.025	0	1.331
2014	297	856	4.131	22.83	1.981	4.594	8.89	2014	297	2110	3.999	23.04	0.025	0	1.56
2014	297	857	4.128	22.88	1.997	4.842	8.94	2014	297	2111	3.999	23.02	0.008	0	1.397
2014	297	858	4.133	22.87	2.006	4.938	9.15	2014	297	2112	4.033	22.92	0.025	0	1.549
2014	297	859	4.189	22.8	1.997	4.952	9.03	2014	297	2113	4.416	22.67	0	0	1.283
2014	297	900	4.179	22.8	1.981	4.952	9	2014	297	2114	4.314	22.71	0.008	0	0.765
2014	297	901	4.25	22.72	1.981	4.952	8.78	2014	297	2115	4.258	22.73	0.008	0	1.076
2014	297	902	4.221	22.77	1.981	4.939	8.74								

Summary of CORRECTED DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **Lime Kiln**
Test No.: **TRS**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	296	2050	3.37	24.06	4.76	4.84	9.46	4.62	
2014	296	2051	3.37	24.19	4.81	2.30	9.76	7.46	
2014	296	2052	3.34	24.33	4.72	1.68	9.59	7.91	
2014	296	2053	3.38	24.37	4.65	1.68	8.27	6.59	
2014	296	2054	3.44	24.35	4.61	1.68	7.29	5.61	
2014	296	2055	3.41	24.35	4.57	1.19	6.43	5.24	
2014	296	2056	3.41	24.36	4.61	0.04	6.09	6.05	
2014	296	2057	3.42	24.34	4.62	0.00	5.74	5.74	
2014	296	2058	3.49	24.32	4.60	0.00	5.14	5.14	
2014	296	2059	3.47	24.34	4.59	0.00	5.05	5.05	
2014	296	2100	3.41	24.42	4.35	0.00	4.95	4.95	
2014	296	2101	3.38	24.50	4.07	0.00	4.81	4.81	
2014	296	2102	3.38	24.54	4.09	0.00	4.71	4.71	
2014	296	2103	3.50	24.36	4.02	0.00	4.03	4.03	
2014	296	2104	3.46	24.43	4.30	0.00	3.84	3.84	
2014	296	2105	3.58	24.35	4.02	0.00	3.52	3.52	
2014	296	2106	3.63	24.22	3.99	0.00	3.24	3.24	
2014	296	2107	3.69	24.16	4.04	0.00	2.90	2.90	
2014	296	2108	3.74	24.09	4.02	0.00	2.65	2.65	
2014	296	2109	3.74	24.03	4.07	0.00	2.66	2.66	
2014	296	2110	3.69	24.06	3.98	0.00	2.57	2.57	
2014	296	2111	3.70	24.06	3.95	0.00	2.31	2.31	
2014	296	2112	3.70	24.07	3.97	0.00	1.93	1.93	
2014	296	2113	3.70	23.97	3.97	0.00	1.98	1.98	
2014	296	2114	3.67	23.95	3.95	0.00	2.00	2.00	
2014	296	2115	3.71	23.86	3.98	0.00	1.76	1.76	
2014	296	2116	3.79	23.79	3.95	0.00	1.48	1.48	
2014	296	2117	3.69	23.84	3.99	0.00	1.47	1.47	
2014	296	2118	3.70	23.87	4.01	0.00	1.47	1.47	
2014	296	2119	3.74	23.83	3.98	0.00	1.22	1.22	
2014	296	2120	3.78	23.82	3.95	0.00	1.14	1.14	
2014	296	2121	3.77	23.85	3.95	0.00	1.05	1.05	
2014	296	2122	3.73	23.89	3.95	0.00	0.83	0.83	
2014	296	2123	3.73	23.91	3.96	0.00	0.93	0.93	
2014	296	2124	3.72	23.87	3.96	0.00	1.09	1.09	
2014	296	2125	3.75	23.78	3.95	0.00	0.75	0.75	
2014	296	2126	3.79	23.75	3.97	0.00	0.27	0.27	
2014	296	2127	3.82	23.70	3.96	0.00	0.27	0.27	
2014	296	2128	3.80	23.69	3.95	0.00	0.41	0.41	
2014	296	2129	3.76	23.67	3.95	0.00	0.31	0.31	
2014	296	2130	3.77	23.71	3.95	0.00	0.26	0.26	
2014	296	2131	3.72	23.69	3.95	0.00	0.29	0.29	
2014	296	2132	3.82	23.52	3.95	0.00	0.00	0.00	
2014	296	2133	3.83	23.50	3.95	0.00	0.00	0.00	
2014	296	2134	3.78	23.53	3.95	0.00	0.00	0.00	
2014	296	2135	3.88	23.47	3.95	0.00	0.00	0.00	
2014	296	2136	3.84	23.49	3.95	0.00	0.00	0.00	
2014	296	2137	3.77	23.53	3.95	0.00	0.00	0.00	
2014	296	2138	3.77	23.54	3.95	0.00	0.00	0.00	
2014	296	2139	3.82	23.54	3.95	0.00	0.00	0.00	
2014	296	2140	3.79	23.54	3.95	0.00	0.00	0.00	
2014	296	2141	3.85	23.45	3.95	0.00	0.00	0.00	
2014	296	2142	3.81	23.44	3.96	0.00	0.00	0.00	
2014	296	2143	3.89	23.40	3.95	0.00	0.00	0.00	
2014	296	2144	3.88	23.39	3.95	0.00	0.00	0.00	
2014	296	2145	3.84	23.48	3.95	0.00	0.00	0.00	
2014	296	2146	3.81	23.49	3.95	0.00	0.00	0.00	
2014	296	2147	3.80	23.49	3.95	0.00	0.00	0.00	
2014	296	2148	3.84	23.49	3.95	0.00	0.00	0.00	

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	296	2149	3.77	23.54	3.95	0.00	0.00	0.00	
2014	296	2150	3.81	23.53	3.95	0.00	0.00	0.00	
2014	296	2151	3.73	23.62	3.95	0.00	0.00	0.00	
2014	296	2152	3.74	23.59	3.95	0.00	0.00	0.00	
2014	296	2153	3.85	23.48	3.95	0.00	0.00	0.00	
2014	296	2154	3.83	23.57	3.95	0.00	0.00	0.00	
2014	296	2155	3.72	23.70	3.94	0.00	0.00	0.00	
2014	296	2156	3.76	23.71	3.95	0.00	0.00	0.00	
2014	296	2157	3.83	23.64	3.95	0.00	0.00	0.00	
2014	296	2158	3.78	23.72	3.95	0.00	0.00	0.00	
2014	296	2159	3.75	23.79	3.95	0.00	0.00	0.00	
2014	296	2200	3.75	23.76	3.95	0.00	0.00	0.00	
2014	296	2201	3.79	23.66	3.95	0.00	0.00	0.00	
2014	296	2202	3.78	23.62	3.95	0.00	0.00	0.00	
2014	296	2203	3.79	23.61	3.95	0.00	0.00	0.00	
2014	296	2204	3.87	23.51	3.95	0.00	0.00	0.00	
2014	296	2205	3.89	23.46	3.95	0.00	0.00	0.00	
2014	296	2206	3.90	23.41	3.95	0.00	0.00	0.00	
2014	296	2207	3.85	23.44	3.95	0.00	0.00	0.00	
2014	296	2208	3.89	23.44	3.94	0.00	0.00	0.00	
2014	296	2209	3.92	23.40	3.95	0.00	0.00	0.00	
2014	296	2210	3.91	23.45	3.95	0.00	0.00	0.00	
2014	296	2211	3.86	23.50	3.94	0.00	0.00	0.00	
2014	296	2212	3.85	23.48	3.95	0.00	0.00	0.00	
2014	296	2213	3.87	23.53	3.95	0.00	0.00	0.00	
2014	296	2214	3.89	23.56	3.95	0.00	0.00	0.00	
2014	296	2215	3.84	23.59	3.95	0.00	0.00	0.00	
2014	296	2216	3.82	23.63	3.95	0.00	0.00	0.00	
2014	296	2217	3.80	23.58	3.95	0.00	0.00	0.00	
2014	296	2218	3.82	23.56	3.95	0.00	0.00	0.00	
2014	296	2219	3.94	23.45	3.95	0.00	0.00	0.00	
2014	296	2220	3.87	23.52	3.95	0.00	0.00	0.00	
2014	296	2221	3.86	23.48	3.95	0.00	0.00	0.00	
2014	296	2222	3.95	23.36	3.95	0.00	0.00	0.00	
2014	296	2223	3.97	23.31	3.95	0.00	0.00	0.00	
2014	296	2224	3.94	23.31	3.95	0.00	0.00	0.00	
2014	296	2225	3.87	23.33	3.95	0.00	0.00	0.00	
2014	296	2226	3.89	23.30	3.95	0.00	0.00	0.00	
2014	296	2227	3.92	23.27	3.95	0.00	0.00	0.00	
2014	296	2228	3.92	23.29	3.95	0.00	0.00	0.00	
2014	296	2229	3.91	23.36	3.95	0.00	0.00	0.00	
2014	296	2230	3.97	23.32	3.95	0.00	0.00	0.00	
2014	296	2231	3.87	23.45	3.95	0.00	0.00	0.00	
2014	296	2232	3.81	23.54	3.95	0.00	0.00	0.00	
2014	296	2233	3.79	23.57	3.95	0.00	0.00	0.00	
2014	296	2234	3.79	23.56	3.95	0.00	0.00	0.00	
2014	296	2235	3.90	23.43	3.95	0.00	0.00	0.00	
2014	296	2236	3.87	23.47	3.95	0.00	0.00	0.00	
2014	296	2237	3.84	23.46	3.95	0.00	0.00	0.00	
2014	296	2238	3.88	23.37	3.95	0.00	0.00	0.00	
2014	296	2239	3.93	23.35	3.95	0.00	0.00	0.00	
2014	296	2240	3.97	23.21	3.95	0.00	0.00	0.00	
2014	296	2241	3.96	23.22	3.95	0.00	0.00	0.00	
2014	296	2242	3.83	23.30	3.89	0.00	0.00	0.00	
2014	296	2243	3.86	23.25	3.94	0.00	0.00	0.00	
2014	296	2244	3.96	23.18	3.90	0.00	0.00	0.00	
2014	296	2245	4.00	23.11	3.93	0.00	0.00	0.00	
2014	296	2246	3.93	23.19	3.90	0.00	0.00	0.00	
2014	296	2247	3.90	23.27	3.92	0.00	0.00	0.00	

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	296	2248	3.82	23.33	3.94	0.00	0.00	0.00	
2014	296	2249	3.80	23.42	3.88	0.00	0.00	0.00	
2014	296	2250	3.86	23.35	3.94	0.00	0.00	0.00	
2014	296	2251	3.87	23.33	3.93	0.00	0.00	0.00	
2014	296	2252	3.90	23.32	3.92	0.00	0.00	0.00	
2014	296	2253	3.93	23.33	3.95	0.00	0.00	0.00	
2014	296	2254	3.81	23.45	3.89	0.00	0.00	0.00	
2014	296	2255	3.81	23.42	3.94	0.00	0.00	0.00	
2014	296	2256	3.82	23.41	3.93	0.00	0.00	0.00	
2014	296	2257	3.97	23.26	3.95	0.00	0.00	0.00	
2014	296	2258	4.00	23.22	3.95	0.00	0.00	0.00	
2014	296	2259	3.85	23.44	3.93	0.00	0.00	0.00	
2014	296	2300	3.80	23.44	3.95	0.00	0.00	0.00	
2014	296	2301	3.80	23.49	3.95	0.00	0.00	0.00	
2014	296	2302	3.88	23.47	3.95	0.00	0.00	0.00	
2014	296	2303	3.88	23.48	3.95	0.00	0.00	0.00	
2014	296	2304	3.84	23.49	3.95	0.00	0.00	0.00	
2014	296	2305	3.69	23.68	3.95	0.00	0.00	0.00	
2014	296	2306	3.75	23.59	3.95	0.00	0.00	0.00	
2014	296	2307	3.85	23.50	3.95	0.00	0.00	0.00	
2014	296	2308	3.89	23.48	3.95	0.00	0.00	0.00	
2014	296	2309	3.84	23.49	3.95	0.00	0.00	0.00	
2014	296	2310	3.94	23.39	3.95	0.00	0.00	0.00	
2014	296	2311	3.90	23.32	3.95	0.00	0.00	0.00	
2014	296	2312	3.94	23.29	3.95	0.00	0.00	0.00	
2014	296	2313	3.82	23.36	3.95	0.00	0.00	0.00	
2014	296	2314	3.76	23.35	3.95	0.00	0.00	0.00	
2014	296	2315	3.85	23.22	3.95	0.00	0.00	0.00	
2014	296	2316	3.89	23.18	3.94	0.00	0.00	0.00	
2014	296	2317	3.91	23.16	3.95	0.00	0.00	0.00	
2014	296	2318	3.96	23.12	3.93	0.00	0.00	0.00	
2014	296	2319	3.91	23.14	3.93	0.00	0.00	0.00	
2014	296	2320	3.80	23.29	3.95	0.00	0.00	0.00	
2014	296	2321	3.79	23.33	3.94	0.00	0.00	0.00	
2014	296	2322	3.75	23.35	3.95	0.00	0.00	0.00	
2014	296	2323	3.80	23.36	3.93	0.00	0.00	0.00	
2014	296	2324	3.82	23.33	3.95	0.00	0.00	0.00	
2014	296	2325	3.88	23.24	3.95	0.00	0.00	0.00	
2014	296	2326	3.86	23.28	3.95	0.00	0.00	0.00	
2014	296	2327	3.83	23.27	3.95	0.00	0.00	0.00	
2014	296	2328	3.83	23.24	3.95	0.00	0.00	0.00	
2014	296	2329	3.87	23.18	3.95	0.00	0.00	0.00	
2014	296	2330	3.89	23.16	3.94	0.00	0.00	0.00	
2014	296	2331	3.84	23.13	3.95	0.00	0.00	0.00	
2014	296	2332	3.83	23.13	3.95	0.00	0.00	0.00	
2014	296	2333	3.92	23.05	3.95	0.00	0.00	0.00	
2014	296	2334	3.91	23.06	3.95	0.00	0.00	0.00	
2014	296	2335	3.83	23.13	3.95	0.00	0.00	0.00	
2014	296	2336	3.90	23.10	3.94	0.00	0.00	0.00	
2014	296	2337	3.94	23.02	3.95	0.00	0.00	0.00	
2014	296	2338	3.88	23.11	3.95	0.00	0.00	0.00	
2014	296	2339	3.96	23.00	3.95	0.00	0.00	0.00	
2014	296	2340	4.18	22.91	3.95	0.00	0.00	0.00	
2014	296	2341	4.16	22.86	3.95	0.00	0.00	0.00	
2014	296	2342	4.30	22.71	3.95	0.00	0.00	0.00	
2014	296	2343	4.36	22.66	3.95	0.00	0.00	0.00	
2014	296	2344	4.30	22.69	3.95	0.00	0.00	0.00	
2014	296	2345	4.31	22.66	3.95	0.00	0.00	0.00	
2014	296	2346	4.35	22.58	3.95	0.00	0.00	0.00	

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	296	2347	4.36	22.55	3.94	0.00	0.00	0.00	
2014	296	2348	4.29	22.62	3.77	0.00	0.00	0.00	
2014	296	2349	4.32	22.56	3.80	0.00	0.00	0.00	
2014	296	2350	4.38	22.45	3.87	0.00	0.00	0.00	
2014	296	2351	4.41	22.43	3.79	0.00	0.00	0.00	
2014	296	2352	4.38	22.43	3.86	0.00	0.00	0.00	
2014	296	2353	4.31	22.50	3.79	0.00	0.00	0.00	
2014	296	2354	4.33	22.52	3.85	0.00	0.00	0.00	
2014	296	2355	4.29	22.55	3.86	0.00	0.00	0.00	
2014	296	2356	4.26	22.60	3.79	0.00	0.00	0.00	
2014	296	2357	4.26	22.54	3.89	0.00	0.00	0.00	
2014	296	2358	4.33	22.53	3.78	0.00	0.00	0.00	
2014	296	2359	4.29	22.55	3.78	0.00	0.00	0.00	
2014	296	2400	4.33	22.51	3.88	0.00	0.00	0.00	
2014	297	1	4.14	22.80	3.77	0.00	0.00	0.00	
2014	297	2	4.12	22.76	3.88	0.00	0.00	0.00	
2014	297	3	4.19	22.74	3.83	0.00	0.00	0.00	
2014	297	4	4.16	22.76	3.77	0.00	0.00	0.00	
2014	297	5	4.18	22.84	3.82	0.00	0.00	0.00	
2014	297	6	4.15	22.82	3.82	0.00	0.00	0.00	
2014	297	7	4.21	22.80	3.89	0.00	0.00	0.00	
2014	297	8	4.15	22.87	3.86	0.00	0.00	0.00	
2014	297	9	4.18	22.86	3.83	0.00	0.00	0.00	
2014	297	10	4.22	22.84	3.83	0.00	0.00	0.00	
2014	297	11	4.14	22.93	3.78	0.00	0.00	0.00	
2014	297	12	4.22	22.85	3.88	0.00	0.00	0.00	
2014	297	13	4.22	22.82	3.78	0.00	0.00	0.00	
2014	297	14	4.21	22.82	3.87	0.00	0.00	0.00	
2014	297	15	4.21	22.83	3.87	0.00	0.00	0.00	
2014	297	16	4.17	22.92	3.77	0.00	0.00	0.00	
2014	297	17	4.26	22.81	3.92	0.00	0.00	0.00	
2014	297	18	4.26	22.82	3.78	0.00	0.00	0.00	
2014	297	19	4.22	22.85	3.87	0.00	0.00	0.00	
2014	297	20	4.12	23.03	3.83	0.00	0.00	0.00	
2014	297	21	4.09	23.03	3.81	0.00	0.00	0.00	
2014	297	22	4.17	22.94	3.90	0.00	0.00	0.00	
2014	297	23	4.35	22.80	3.78	0.00	0.00	0.00	
2014	297	24	4.29	22.86	3.89	0.00	0.00	0.00	
2014	297	25	4.16	22.92	3.84	0.00	0.00	0.00	
2014	297	26	4.25	22.81	3.82	0.00	0.00	0.00	
2014	297	27	4.26	22.83	3.92	0.00	0.00	0.00	
2014	297	28	4.21	22.86	3.78	0.00	0.00	0.00	
2014	297	29	4.19	22.84	3.89	0.00	0.00	0.00	
2014	297	30	4.24	22.85	3.81	0.00	0.00	0.00	
2014	297	31	4.17	22.89	3.84	0.00	0.00	0.00	
2014	297	32	4.16	22.94	3.85	0.00	0.00	0.00	
2014	297	33	4.19	22.93	3.78	0.00	0.00	0.00	
2014	297	34	4.20	22.92	3.85	0.00	0.00	0.00	
2014	297	35	4.26	22.90	3.56	0.00	0.00	0.00	
2014	297	36	4.13	23.03	3.70	0.00	0.00	0.00	
2014	297	37	4.08	23.08	3.55	0.00	0.00	0.00	
2014	297	38	4.09	23.09	3.58	0.00	0.00	0.00	
2014	297	39	4.12	23.10	3.56	0.00	0.00	0.00	
2014	297	40	4.10	23.06	3.57	0.00	0.00	0.00	
2014	297	41	4.07	23.03	3.60	0.00	0.00	0.00	
2014	297	42	4.14	22.95	3.55	0.00	0.00	0.00	
2014	297	43	4.11	22.97	3.57	0.00	0.00	0.00	
2014	297	44	4.12	22.98	3.63	0.00	0.00	0.00	
2014	297	45	4.04	23.12	3.47	0.00	0.00	0.00	

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	46	4.00	23.18	3.69	0.00	0.00	0.00	
2014	297	47	3.88	23.31	3.62	0.00	0.00	0.00	
2014	297	48	4.04	23.15	3.67	0.00	0.00	0.00	
2014	297	49	4.13	23.05	3.60	0.00	0.00	0.00	
2014	297	50	4.04	23.14	3.58	0.00	0.00	0.00	0.51
2014	297	51	4.11	23.08	3.67	0.00	0.00	0.00	0.49
2014	297	52	4.14	23.04	3.55	0.00	0.00	0.00	0.46
2014	297	53	4.22	22.99	3.60	0.00	0.00	0.00	0.43
2014	297	54	4.06	23.17	3.52	0.00	0.00	0.00	0.40
2014	297	55	3.98	23.25	3.68	0.00	0.00	0.00	0.37
2014	297	56	4.06	23.18	3.63	0.00	0.00	0.00	0.35
2014	297	57	4.12	23.16	3.65	0.00	0.00	0.00	0.33
2014	297	58	4.14	23.11	3.58	0.00	0.00	0.00	0.30
2014	297	59	4.09	23.17	3.55	0.00	0.00	0.00	0.28
2014	297	100	4.08	23.16	3.64	0.00	0.00	0.00	0.26
2014	297	101	4.10	23.11	3.60	0.00	0.00	0.00	0.24
2014	297	102	4.13	23.08	3.63	0.00	0.00	0.00	0.22
2014	297	103	4.15	23.06	3.67	0.00	0.00	0.00	0.20
2014	297	104	4.21	23.04	3.60	0.00	0.00	0.00	0.19
2014	297	105	4.10	23.09	3.64	0.00	0.00	0.00	0.17
2014	297	106	4.15	23.05	3.64	0.00	0.00	0.00	0.15
2014	297	107	4.16	23.03	3.63	0.00	0.00	0.00	0.14
2014	297	108	4.07	23.17	3.83	0.00	0.00	0.00	0.13
2014	297	109	4.19	22.98	3.71	0.00	0.00	0.00	0.12
2014	297	110	4.07	23.12	3.76	0.00	0.00	0.00	0.11
2014	297	111	4.08	23.13	3.79	0.00	0.00	0.00	0.10
2014	297	112	4.15	23.06	3.70	0.00	0.00	0.00	0.09
2014	297	113	4.14	23.06	3.82	0.00	0.00	0.00	0.08
2014	297	114	4.08	23.12	3.72	0.00	0.00	0.00	0.07
2014	297	115	4.04	23.23	3.77	0.00	0.00	0.00	0.06
2014	297	116	4.08	23.21	3.79	0.00	0.00	0.00	0.05
2014	297	117	3.97	23.32	3.77	0.00	0.00	0.00	0.05
2014	297	118	3.98	23.33	3.87	0.00	0.00	0.00	0.04
2014	297	119	4.12	23.21	3.81	0.00	0.00	0.00	0.04
2014	297	120	4.14	23.15	3.88	0.00	0.00	0.00	0.03
2014	297	121	4.11	23.13	3.86	0.00	0.00	0.00	0.03
2014	297	122	4.08	23.14	3.77	0.00	0.00	0.00	0.02
2014	297	123	4.14	23.08	3.82	0.00	0.00	0.00	0.02
2014	297	124	4.17	23.03	3.76	0.00	0.00	0.00	0.02
2014	297	125	4.14	23.02	3.89	0.00	0.00	0.00	0.01
2014	297	126	4.08	23.11	3.85	0.00	0.00	0.00	0.01
2014	297	127	4.04	23.18	3.83	0.00	0.00	0.00	0.01
2014	297	128	4.07	23.14	3.85	0.00	0.00	0.00	0.01
2014	297	129	4.04	23.18	3.83	0.00	0.00	0.00	0.00
2014	297	130	4.02	23.21	3.93	0.00	0.00	0.00	0.00
2014	297	131	4.00	23.22	3.83	0.00	0.00	0.00	0.00
2014	297	132	3.98	23.21	3.85	0.00	0.00	0.00	0.00
2014	297	133	3.97	23.28	3.84	0.00	0.00	0.00	0.00
2014	297	134	3.99	23.25	3.82	0.00	0.00	0.00	0.00
2014	297	135	3.99	23.30	3.93	0.00	0.00	0.00	0.00
2014	297	136	3.97	23.33	3.83	0.00	0.00	0.00	0.00
2014	297	137	3.95	23.35	3.89	0.00	0.00	0.00	0.00
2014	297	138	4.03	23.32	3.83	0.00	0.00	0.00	0.00
2014	297	139	4.01	23.35	3.82	0.00	0.00	0.00	0.00
2014	297	140	4.00	23.35	3.93	0.00	0.00	0.00	0.00
2014	297	141	4.03	23.29	3.81	0.00	0.00	0.00	0.00
2014	297	142	4.01	23.31	3.89	0.00	0.00	0.00	0.00
2014	297	143	4.00	23.35	3.82	0.00	0.00	0.00	0.00
2014	297	144	3.98	23.36	3.87	0.00	0.00	0.00	0.00

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	145	3.94	23.44	3.91	0.00	0.00	0.00	0.00
2014	297	146	3.97	23.43	3.80	0.00	0.00	0.00	0.00
2014	297	147	4.01	23.41	3.92	0.00	0.00	0.00	0.00
2014	297	148	4.02	23.40	3.79	0.00	0.00	0.00	0.00
2014	297	149	3.95	23.49	3.88	0.00	0.00	0.00	0.00
2014	297	150	3.83	23.58	3.90	0.00	0.00	0.00	0.00
2014	297	151	3.93	23.50	3.81	0.00	0.00	0.00	0.00
2014	297	152	3.96	23.48	3.91	0.00	0.00	0.00	0.00
2014	297	153	3.98	23.47	3.82	0.00	0.00	0.00	0.00
2014	297	154	3.90	23.59	3.92	0.00	0.00	0.00	0.00
2014	297	155	3.95	23.52	3.86	0.00	0.00	0.00	0.00
2014	297	156	3.87	23.63	3.83	0.00	0.00	0.00	0.00
2014	297	157	3.86	23.69	3.89	0.00	0.00	0.00	0.00
2014	297	158	3.91	23.70	3.81	0.00	0.00	0.00	0.00
2014	297	159	3.88	23.69	3.88	0.00	0.00	0.00	0.00
2014	297	200	3.85	23.78	3.84	0.00	0.00	0.00	0.00
2014	297	201	3.79	23.84	3.85	0.00	0.00	0.00	0.00
2014	297	202	3.84	23.81	3.86	1.42	0.17	0.00	0.00
2014	297	203	3.78	23.86	3.79	1.68	0.67	0.00	0.00
2014	297	204	3.87	23.87	3.93	1.68	0.80	0.00	0.00
2014	297	205	3.84	23.83	3.80	1.68	0.87	0.00	0.00
2014	297	206	3.78	23.92	3.62	1.68	0.90	0.00	0.00
2014	297	207	3.82	23.89	3.49	1.68	0.81	0.00	0.00
2014	297	208	3.90	23.77	3.60	1.68	0.45	0.00	0.00
2014	297	209	3.90	23.76	3.70	1.68	0.00	0.00	0.00
2014	297	210	3.84	23.83	3.61	1.56	0.10	0.00	0.00
2014	297	211	3.84	23.79	3.69	1.22	0.27	0.00	0.00
2014	297	212	3.80	23.87	3.53	1.60	0.30	0.00	0.00
2014	297	213	3.80	23.93	3.74	1.68	0.47	0.00	0.00
2014	297	214	3.87	23.85	3.78	1.68	0.38	0.00	0.00
2014	297	215	3.83	23.94	3.72	1.68	0.74	0.00	0.00
2014	297	216	3.76	24.05	3.87	1.68	1.04	0.00	0.00
2014	297	217	3.84	24.01	3.72	1.68	0.97	0.00	0.00
2014	297	218	3.82	24.04	3.74	1.68	0.67	0.00	0.00
2014	297	219	3.85	24.04	3.82	1.68	0.75	0.00	0.00
2014	297	220	3.80	24.10	3.70	1.68	0.66	0.00	0.00
2014	297	221	3.73	24.19	3.83	1.68	1.04	0.00	0.00
2014	297	222	3.79	24.15	3.74	1.68	1.04	0.00	0.00
2014	297	223	3.80	24.13	3.82	1.68	0.69	0.00	0.00
2014	297	224	3.86	24.13	3.78	1.68	0.40	0.00	0.00
2014	297	225	3.85	24.17	3.73	1.36	0.03	0.00	0.00
2014	297	226	3.83	24.12	3.83	0.06	0.00	0.00	0.00
2014	297	227	3.87	24.13	3.70	0.00	0.00	0.00	0.00
2014	297	228	3.74	24.25	3.80	0.00	0.00	0.00	0.00
2014	297	229	3.76	24.19	3.74	0.00	0.00	0.00	0.00
2014	297	230	3.81	24.14	3.77	0.00	0.00	0.00	0.00
2014	297	231	3.78	24.15	3.81	0.00	0.00	0.00	0.00
2014	297	232	3.83	24.11	3.71	0.00	0.00	0.00	0.00
2014	297	233	3.84	24.14	3.80	0.00	0.00	0.00	0.00
2014	297	234	3.81	24.09	3.76	0.00	0.00	0.00	0.00
2014	297	235	3.87	24.05	3.69	0.00	0.00	0.00	0.00
2014	297	236	3.86	24.03	3.74	0.00	0.00	0.00	0.00
2014	297	237	3.89	23.99	3.73	0.00	0.00	0.00	0.00
2014	297	238	3.86	24.04	3.87	0.00	0.00	0.00	0.00
2014	297	239	3.86	24.02	3.78	0.00	0.00	0.00	0.00
2014	297	240	3.89	24.02	3.86	0.00	0.00	0.00	0.00
2014	297	241	3.87	24.02	3.87	0.00	0.00	0.00	0.00
2014	297	242	3.83	23.99	3.78	0.00	0.00	0.00	0.00
2014	297	243	3.92	23.91	3.92	0.00	0.00	0.00	0.00

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	244	3.92	23.88	3.81	0.00	0.00	0.00	0.00
2014	297	245	3.91	23.84	3.86	0.00	0.00	0.00	0.00
2014	297	246	4.00	23.73	3.85	0.00	0.00	0.00	0.00
2014	297	247	3.98	23.76	3.85	0.00	0.00	0.00	0.00
2014	297	248	3.98	23.77	3.91	0.00	0.00	0.00	0.00
2014	297	249	3.97	23.75	3.78	0.00	0.00	0.00	0.00
2014	297	250	3.96	23.78	3.92	0.00	0.00	0.00	0.00
2014	297	251	4.04	23.69	3.84	0.00	0.00	0.00	0.00
2014	297	252	4.05	23.63	3.84	0.00	0.00	0.00	0.00
2014	297	253	3.98	23.70	3.91	0.00	0.00	0.00	0.00
2014	297	254	4.05	23.63	3.77	0.00	0.00	0.00	0.00
2014	297	255	3.98	23.73	3.91	0.00	0.00	0.00	0.00
2014	297	256	3.94	23.75	3.84	0.00	0.00	0.00	0.00
2014	297	257	3.88	23.87	3.84	0.00	0.00	0.00	0.00
2014	297	258	3.96	23.82	3.88	0.00	0.00	0.00	0.00
2014	297	259	4.02	23.68	3.82	0.00	0.00	0.00	0.00
2014	297	300	3.91	23.81	3.94	0.00	0.00	0.00	0.00
2014	297	301	3.85	23.84	3.75	0.00	0.00	0.00	0.00
2014	297	302	3.88	23.84	3.87	0.00	0.00	0.00	0.00
2014	297	303	3.94	23.77	3.87	0.00	0.00	0.00	0.00
2014	297	304	3.91	23.85	3.79	0.00	0.00	0.00	0.00
2014	297	305	3.87	23.85	3.90	0.00	0.00	0.00	0.00
2014	297	306	3.87	23.86	3.79	0.00	0.00	0.00	0.00
2014	297	307	3.89	23.87	3.89	0.00	0.00	0.00	0.00
2014	297	308	3.83	23.95	3.83	0.00	0.00	0.00	0.00
2014	297	309	3.78	24.03	3.81	0.00	0.00	0.00	0.00
2014	297	310	3.76	24.06	3.91	0.00	0.00	0.00	0.00
2014	297	311	3.83	24.02	3.75	0.00	0.00	0.00	0.00
2014	297	312	3.80	24.09	3.90	0.00	0.00	0.00	0.00
2014	297	313	3.73	24.21	3.79	0.00	0.00	0.00	0.00
2014	297	314	3.79	24.13	3.85	0.00	0.00	0.00	0.00
2014	297	315	3.81	24.09	3.89	0.00	0.00	0.00	0.00
2014	297	316	3.86	24.03	3.75	0.00	0.00	0.00	0.00
2014	297	317	3.91	23.97	3.91	0.00	0.00	0.00	0.00
2014	297	318	3.88	24.01	3.84	0.00	0.00	0.00	0.00
2014	297	319	3.78	24.10	3.88	0.00	0.00	0.00	0.00
2014	297	320	3.85	23.99	3.87	0.00	0.00	0.00	0.00
2014	297	321	3.88	24.02	3.81	0.00	0.00	0.00	0.00
2014	297	322	3.84	24.02	3.93	0.00	0.00	0.00	0.00
2014	297	323	3.88	24.00	3.83	0.00	0.00	0.00	0.00
2014	297	324	3.88	23.98	3.86	0.00	0.00	0.00	0.00
2014	297	325	3.91	23.86	3.87	0.00	0.00	0.00	0.00
2014	297	326	4.01	23.68	3.82	0.00	0.00	0.00	0.00
2014	297	327	3.99	23.66	3.90	0.00	0.00	0.00	0.00
2014	297	328	4.05	23.61	3.84	0.00	0.00	0.00	0.00
2014	297	329	3.88	23.79	3.91	0.00	0.00	0.00	0.00
2014	297	330	3.96	23.73	3.83	0.00	0.00	0.00	0.00
2014	297	331	4.06	23.69	3.85	0.00	0.00	0.00	0.00
2014	297	332	3.98	23.74	3.92	0.00	0.00	0.00	0.00
2014	297	333	3.99	23.71	3.81	0.00	0.00	0.00	0.00
2014	297	334	3.95	23.76	3.91	0.00	0.00	0.00	0.00
2014	297	335	3.97	23.75	3.79	0.00	0.00	0.00	0.00
2014	297	336	3.92	23.82	3.86	0.00	0.00	0.00	0.00
2014	297	337	3.95	23.76	3.88	0.00	0.00	0.00	0.00
2014	297	338	4.08	23.62	3.79	0.00	0.00	0.00	0.00
2014	297	339	4.03	23.66	3.94	0.00	0.00	0.00	0.00
2014	297	340	4.02	23.66	3.80	0.00	0.00	0.00	0.00
2014	297	341	3.99	23.70	3.88	0.00	0.00	0.00	0.00
2014	297	342	4.01	23.74	3.88	0.00	0.00	0.00	0.00

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	343	4.01	23.70	3.81	0.00	0.00	0.00	0.00
2014	297	344	3.93	23.84	3.93	0.00	0.00	0.00	0.00
2014	297	345	3.98	23.80	3.78	0.00	0.00	0.00	0.00
2014	297	346	3.99	23.83	3.88	0.00	0.00	0.00	0.00
2014	297	347	3.95	23.87	3.88	0.00	0.00	0.00	0.00
2014	297	348	3.96	23.78	3.84	0.00	0.00	0.00	0.00
2014	297	349	3.95	23.80	3.88	0.00	0.00	0.00	0.00
2014	297	350	3.97	23.66	3.80	0.00	0.00	0.00	0.00
2014	297	351	4.07	23.58	3.93	0.00	0.00	0.00	0.00
2014	297	352	4.08	23.55	3.85	0.00	0.00	0.00	0.00
2014	297	353	4.09	23.55	3.83	0.00	0.00	0.00	0.00
2014	297	354	4.10	23.56	3.88	0.00	0.00	0.00	0.00
2014	297	355	4.01	23.64	3.82	0.00	0.00	0.00	0.00
2014	297	356	4.03	23.66	3.91	0.00	0.00	0.00	0.00
2014	297	357	4.06	23.64	3.83	0.00	0.00	0.00	0.00
2014	297	358	4.02	23.66	3.88	0.00	0.00	0.00	0.00
2014	297	359	4.04	23.65	3.86	0.00	0.00	0.00	0.00
2014	297	400	4.15	23.46	3.85	0.00	0.00	0.00	0.00
2014	297	401	4.25	23.32	3.91	0.00	0.00	0.00	0.00
2014	297	402	4.22	23.30	3.82	0.00	0.00	0.00	0.00
2014	297	403	4.31	23.16	3.84	0.00	0.00	0.00	0.00
2014	297	404	4.33	23.10	3.85	0.00	0.00	0.00	0.00
2014	297	405	4.27	23.10	3.83	0.00	0.00	0.00	0.00
2014	297	406	4.24	23.14	3.92	0.00	0.00	0.00	0.00
2014	297	407	4.22	23.16	3.79	0.00	0.00	0.00	0.00
2014	297	408	4.20	23.19	3.88	0.00	0.00	0.00	0.00
2014	297	409	4.10	23.30	3.83	0.00	0.00	0.00	0.00
2014	297	410	4.10	23.38	3.79	0.00	0.00	0.00	0.00
2014	297	411	4.17	23.30	3.89	0.00	0.00	0.00	0.00
2014	297	412	4.14	23.33	3.78	0.00	0.00	0.00	0.00
2014	297	413	4.17	23.36	3.92	0.00	0.00	0.00	0.00
2014	297	414	4.12	23.40	3.83	0.00	0.00	0.00	0.00
2014	297	415	4.12	23.44	3.84	0.00	0.00	0.00	0.00
2014	297	416	4.07	23.46	3.88	0.00	0.00	0.00	0.00
2014	297	417	4.08	23.42	3.83	0.00	0.00	0.00	0.00
2014	297	418	4.07	23.48	3.92	0.00	0.00	0.00	0.00
2014	297	419	3.99	23.55	3.82	0.00	0.00	0.00	0.00
2014	297	420	4.04	23.48	3.87	0.00	0.00	0.00	0.00
2014	297	421	4.03	23.48	3.88	0.00	0.00	0.00	0.00
2014	297	422	4.05	23.48	3.80	0.00	0.00	0.00	0.00
2014	297	423	4.11	23.31	3.92	0.00	0.00	0.00	0.00
2014	297	424	4.21	23.18	3.78	0.00	0.00	0.00	0.00
2014	297	425	4.08	23.29	3.89	0.00	0.00	0.00	0.00
2014	297	426	4.17	23.21	3.85	0.00	0.00	0.00	0.00
2014	297	427	4.25	23.12	3.85	0.00	0.00	0.00	0.00
2014	297	428	4.25	23.11	3.90	0.00	0.00	0.00	0.00
2014	297	429	4.19	23.18	3.78	0.00	0.00	0.00	0.00
2014	297	430	4.14	23.26	3.92	0.00	0.00	0.00	0.00
2014	297	431	4.20	23.24	3.88	0.00	0.00	0.00	0.00
2014	297	432	4.21	23.16	3.84	0.00	0.00	0.00	0.00
2014	297	433	4.26	23.13	3.87	0.00	0.00	0.00	0.00
2014	297	434	4.27	23.11	3.78	0.00	0.00	0.00	0.00
2014	297	435	4.25	23.11	3.91	0.00	0.00	0.00	0.00
2014	297	436	4.25	23.04	3.81	0.00	0.00	0.00	0.00
2014	297	437	4.20	23.11	3.83	0.00	0.00	0.00	0.00
2014	297	438	4.19	23.10	3.88	0.00	0.00	0.00	0.00
2014	297	439	4.23	23.09	3.78	0.00	0.00	0.00	0.00
2014	297	440	4.28	23.01	3.88	0.00	0.00	0.00	0.00
2014	297	441	4.25	22.99	3.83	0.00	0.00	0.00	0.00

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	442	4.23	22.98	3.83	0.00	0.00	0.00	0.00
2014	297	443	4.32	22.86	3.84	0.00	0.00	0.00	0.00
2014	297	444	4.32	22.89	3.79	0.00	0.00	0.00	0.00
2014	297	445	4.33	22.84	3.89	0.00	0.00	0.00	0.00
2014	297	446	4.29	22.83	3.80	0.00	0.00	0.00	0.00
2014	297	447	4.37	22.76	3.83	0.00	0.00	0.00	0.00
2014	297	448	4.32	22.83	3.84	0.00	0.00	0.00	0.00
2014	297	449	4.35	22.84	3.81	0.00	0.00	0.00	0.00
2014	297	450	4.26	22.92	3.88	0.00	0.00	0.00	0.00
2014	297	451	4.20	23.00	3.82	0.00	0.00	0.00	0.00
2014	297	452	4.23	23.06	3.91	0.00	0.00	0.00	0.00
2014	297	453	4.35	22.94	3.79	0.00	0.00	0.00	0.00
2014	297	454	4.34	22.92	3.82	0.00	0.00	0.00	0.00
2014	297	455	4.35	22.85	3.88	0.00	0.00	0.00	0.00
2014	297	456	4.28	22.89	3.78	0.00	0.00	0.00	0.00
2014	297	457	4.28	22.82	3.88	0.00	0.00	0.00	0.00
2014	297	458	4.28	22.84	3.82	0.00	0.00	0.00	0.00
2014	297	459	4.34	22.80	3.87	0.00	0.00	0.00	0.00
2014	297	500	4.35	22.81	3.89	0.00	0.00	0.00	0.00
2014	297	501	4.34	22.84	3.79	0.00	0.00	0.00	0.00
2014	297	502	4.34	22.85	3.85	0.00	0.00	0.00	0.00
2014	297	503	4.34	22.90	3.78	0.00	0.00	0.00	0.00
2014	297	504	4.38	22.87	3.88	0.00	0.00	0.00	0.00
2014	297	505	4.28	22.95	3.83	0.00	0.00	0.00	0.00
2014	297	506	4.15	23.05	3.81	0.00	0.00	0.00	0.00
2014	297	507	4.22	23.00	3.86	0.00	0.00	0.00	0.00
2014	297	508	4.25	22.94	3.79	0.00	0.00	0.00	0.00
2014	297	509	4.39	22.76	3.90	0.00	0.00	0.00	0.00
2014	297	510	4.38	22.81	3.83	0.00	0.00	0.00	0.00
2014	297	511	4.31	22.86	3.82	0.00	0.00	0.00	0.00
2014	297	512	4.33	22.86	3.83	0.00	0.00	0.00	0.00
2014	297	513	4.33	22.88	3.81	0.00	0.00	0.00	0.00
2014	297	514	4.30	22.86	3.88	0.00	0.00	0.00	0.00
2014	297	515	4.36	22.76	3.83	0.00	0.00	0.00	0.00
2014	297	516	4.28	22.88	3.86	0.00	0.00	0.00	0.00
2014	297	517	4.26	22.93	3.82	0.00	0.00	0.00	0.00
2014	297	518	4.23	22.90	3.78	0.00	0.00	0.00	0.00
2014	297	519	4.35	22.74	3.91	0.00	0.00	0.00	0.00
2014	297	520	4.43	22.57	3.77	0.00	0.00	0.00	0.00
2014	297	521	4.43	22.48	3.83	0.00	0.00	0.00	0.00
2014	297	522	4.31	22.59	3.82	0.00	0.00	0.00	0.00
2014	297	523	4.33	22.58	3.80	0.00	0.00	0.00	0.00
2014	297	524	4.29	22.64	3.88	0.00	0.00	0.00	0.00
2014	297	525	4.30	22.69	3.78	0.00	0.00	0.00	0.00
2014	297	526	4.24	22.77	3.88	0.00	0.00	0.00	0.00
2014	297	527	4.27	22.82	3.78	0.00	0.00	0.00	0.00
2014	297	528	4.29	22.72	3.82	0.00	0.00	0.00	0.00
2014	297	529	4.36	22.71	3.92	0.00	0.00	0.00	0.00
2014	297	530	4.33	22.75	3.78	0.00	0.00	0.00	0.00
2014	297	531	4.26	22.87	3.88	0.00	0.00	0.00	0.00
2014	297	532	4.34	22.81	3.83	0.00	0.00	0.00	0.00
2014	297	533	4.38	22.77	3.82	0.00	0.00	0.00	0.00
2014	297	534	4.27	22.89	3.83	0.00	0.00	0.00	0.00
2014	297	535	4.16	23.04	3.83	0.00	0.00	0.00	0.00
2014	297	536	4.22	23.04	3.92	0.00	0.00	0.00	0.00
2014	297	537	4.25	22.91	3.79	0.00	0.00	0.00	0.00
2014	297	538	4.29	22.84	3.85	0.00	0.00	0.00	0.00
2014	297	539	4.21	22.92	3.82	0.00	0.00	0.00	0.00
2014	297	540	4.21	22.82	3.80	0.00	0.00	0.00	0.00

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	541	4.28	22.68	3.88	0.00	0.00	0.00	0.00
2014	297	542	4.43	22.55	3.78	0.00	0.00	0.00	0.00
2014	297	543	4.41	22.57	3.87	0.00	0.00	0.00	0.00
2014	297	544	4.36	22.59	3.86	0.00	0.00	0.00	0.00
2014	297	545	4.42	22.61	3.79	0.00	0.00	0.00	0.00
2014	297	546	4.37	22.63	3.87	0.00	0.00	0.00	0.00
2014	297	547	4.28	22.76	3.79	0.00	0.00	0.00	0.00
2014	297	548	4.25	22.81	3.92	0.00	0.00	0.00	0.00
2014	297	549	4.29	22.81	3.84	0.00	0.00	0.00	0.00
2014	297	550	4.34	22.71	3.78	0.00	0.00	0.00	0.00
2014	297	551	4.32	22.70	3.83	0.00	0.00	0.00	0.00
2014	297	552	4.33	22.57	3.78	0.00	0.00	0.00	0.00
2014	297	553	4.31	22.59	3.89	0.00	0.00	0.00	0.00
2014	297	554	4.41	22.51	3.81	0.00	0.00	0.00	0.00
2014	297	555	4.34	22.52	3.81	0.00	0.00	0.00	0.00
2014	297	556	4.30	22.56	3.84	0.00	0.00	0.00	0.00
2014	297	557	4.32	22.58	3.81	0.00	0.00	0.00	0.00
2014	297	558	4.30	22.61	3.89	0.00	0.00	0.00	0.00
2014	297	559	4.31	22.65	3.78	0.00	0.00	0.00	0.00
2014	297	600	4.25	22.74	3.84	0.00	0.00	0.00	0.00
2014	297	601	4.34	22.68	3.81	0.00	0.00	0.00	0.00
2014	297	602	4.34	22.61	3.78	0.00	0.00	0.00	0.00
2014	297	603	4.47	22.55	3.86	0.00	0.00	0.00	0.00
2014	297	604	4.42	22.51	3.78	0.00	0.00	0.00	0.00
2014	297	605	4.26	22.62	3.90	0.00	0.00	0.00	0.00
2014	297	606	4.28	22.58	3.80	0.00	0.00	0.00	0.00
2014	297	607	4.31	22.48	3.82	0.00	0.00	0.00	0.00
2014	297	608	4.42	22.29	3.83	0.00	0.00	0.00	0.00
2014	297	609	4.34	22.33	3.77	0.00	0.00	0.00	0.00
2014	297	610	4.41	22.27	3.88	0.00	0.00	0.00	0.00
2014	297	611	4.43	22.27	3.78	0.00	0.00	0.00	0.00
2014	297	612	4.35	22.36	3.84	0.00	0.00	0.00	0.00
2014	297	613	4.37	22.32	3.87	0.00	0.00	0.00	0.00
2014	297	614	4.42	22.28	3.78	0.00	0.00	0.00	0.00
2014	297	615	4.45	22.26	3.87	0.00	0.00	0.00	0.00
2014	297	616	4.43	22.25	3.79	0.00	0.00	0.00	0.00
2014	297	617	4.39	22.32	3.87	0.00	0.00	0.00	0.00
2014	297	618	4.40	22.30	3.83	0.00	0.00	0.00	0.00
2014	297	619	4.38	22.33	3.78	0.00	0.00	0.00	0.00
2014	297	620	4.30	22.41	3.86	0.00	0.00	0.00	0.00
2014	297	621	4.33	22.39	3.79	0.00	0.00	0.00	0.00
2014	297	622	4.30	22.45	3.91	0.00	0.00	0.00	0.00
2014	297	623	4.32	22.41	3.80	0.00	0.00	0.00	0.00
2014	297	624	4.36	22.42	3.81	0.00	0.00	0.00	0.00
2014	297	625	4.41	22.37	3.85	0.00	0.00	0.00	0.00
2014	297	626	4.42	22.36	3.83	0.00	0.00	0.00	0.00
2014	297	627	4.39	22.37	3.89	0.00	0.00	0.00	0.00
2014	297	628	4.39	22.42	3.84	0.00	0.00	0.00	0.00
2014	297	629	4.39	22.43	3.81	0.00	0.00	0.00	0.00
2014	297	630	4.32	22.49	3.84	0.00	0.00	0.00	0.00
2014	297	631	4.33	22.54	3.78	0.00	0.00	0.00	0.00
2014	297	632	4.34	22.49	3.91	0.00	0.00	0.00	0.00
2014	297	633	4.39	22.47	3.82	0.00	0.00	0.00	0.00
2014	297	634	4.35	22.48	3.84	0.00	0.00	0.00	0.00
2014	297	635	4.36	22.50	3.79	0.00	0.00	0.00	0.00
2014	297	636	4.46	22.37	3.81	0.00	0.00	0.00	0.00
2014	297	637	4.47	22.35	3.87	0.00	0.00	0.00	0.00
2014	297	638	4.38	22.44	3.81	0.00	0.00	0.00	0.00
2014	297	639	4.33	22.52	3.88	0.00	0.00	0.00	0.00

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	640	4.31	22.54	3.77	0.00	0.00	0.00	0.00
2014	297	641	4.33	22.51	3.83	0.00	0.00	0.00	0.00
2014	297	642	4.27	22.55	3.87	0.00	0.00	0.00	0.00
2014	297	643	4.30	22.51	3.81	0.00	0.00	0.00	0.00
2014	297	644	4.35	22.38	3.89	0.00	0.00	0.00	0.00
2014	297	645	4.37	22.41	3.78	0.00	0.00	0.00	0.00
2014	297	646	4.36	22.41	3.83	0.00	0.00	0.00	0.00
2014	297	647	4.40	22.39	3.85	0.00	0.00	0.00	0.00
2014	297	648	4.39	22.41	3.81	0.00	0.00	0.00	0.00
2014	297	649	4.45	22.42	3.86	0.00	0.00	0.00	0.00
2014	297	650	4.40	22.42	3.71	0.00	0.00	0.00	0.00
2014	297	651	4.35	22.46	3.77	0.00	0.00	0.00	0.00
2014	297	652	4.32	22.50	3.76	0.00	0.00	0.00	0.00
2014	297	653	4.27	22.56	3.69	0.00	0.00	0.00	0.00
2014	297	654	4.26	22.61	3.72	0.00	0.00	0.00	0.00
2014	297	655	4.39	22.50	3.72	0.00	0.00	0.00	0.00
2014	297	656	4.41	22.44	3.73	0.00	0.00	0.00	0.00
2014	297	657	4.38	22.46	3.74	0.00	0.00	0.00	0.00
2014	297	658	4.36	22.45	3.75	0.00	0.00	0.00	0.00
2014	297	659	4.34	22.45	3.72	0.00	0.00	0.00	0.00
2014	297	700	4.36	22.42	3.69	0.00	0.00	0.00	0.00
2014	297	701	4.36	22.44	3.80	0.00	0.00	0.00	0.00
2014	297	702	4.29	22.44	3.65	0.00	0.00	0.00	0.00
2014	297	703	4.30	22.45	3.76	0.00	0.00	0.00	0.00
2014	297	704	4.26	22.51	3.71	0.00	0.00	0.00	0.00
2014	297	705	4.27	22.49	3.31	0.00	0.00	0.00	0.00
2014	297	706	4.30	22.50	3.07	0.00	0.00	0.00	0.00
2014	297	707	4.37	22.46	2.96	0.00	0.00	0.00	0.00
2014	297	708	4.38	22.42	3.09	0.00	0.00	0.00	0.00
2014	297	709	4.32	22.53	2.99	0.00	0.00	0.00	0.00
2014	297	710	4.31	22.53	3.09	0.00	0.00	0.00	0.00
2014	297	711	4.32	22.55	3.03	0.00	0.00	0.00	0.00
2014	297	712	4.28	22.61	3.02	0.00	0.00	0.00	0.00
2014	297	713	4.29	22.57	3.05	0.00	0.00	0.00	0.00
2014	297	714	4.35	22.48	2.96	0.00	0.00	0.00	0.00
2014	297	715	4.35	22.47	3.10	0.00	0.00	0.00	0.00
2014	297	716	4.36	22.44	2.98	0.00	0.00	0.00	0.00
2014	297	717	4.28	22.47	2.99	0.00	0.00	0.00	0.00
2014	297	718	4.24	22.53	3.04	0.00	0.00	0.00	0.00
2014	297	719	4.24	22.51	3.03	0.00	0.00	0.00	0.00
2014	297	720	4.33	22.48	3.05	0.00	0.00	0.00	0.00
2014	297	721	4.29	22.53	3.02	0.00	0.00	0.00	0.00
2014	297	722	4.27	22.57	3.01	0.00	0.00	0.00	0.00
2014	297	723	4.30	22.60	3.02	0.00	0.00	0.00	0.00
2014	297	724	4.29	22.59	2.95	0.00	0.00	0.00	0.00
2014	297	725	4.29	22.60	3.04	0.00	0.00	0.00	0.00
2014	297	726	4.28	22.60	2.97	0.00	0.00	0.00	0.00
2014	297	727	4.22	22.66	3.12	0.00	0.00	0.00	0.00
2014	297	728	4.27	22.58	3.04	0.00	0.00	0.00	0.00
2014	297	729	4.20	22.66	3.00	0.00	0.00	0.00	0.00
2014	297	730	4.25	22.64	3.11	0.00	0.00	0.00	0.00
2014	297	731	4.29	22.61	3.04	0.00	0.00	0.00	0.00
2014	297	732	4.29	22.62	3.13	0.00	0.00	0.00	0.00
2014	297	733	4.29	22.61	2.92	0.00	0.00	0.00	0.00
2014	297	734	4.24	22.61	3.08	0.00	0.00	0.00	0.00
2014	297	735	4.27	22.57	3.06	0.00	0.00	0.00	0.00
2014	297	736	4.30	22.49	3.04	0.00	0.00	0.00	0.00
2014	297	737	4.32	22.44	3.04	0.00	0.00	0.00	0.00
2014	297	738	4.37	22.40	2.99	0.00	0.00	0.00	0.00

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	739	4.30	22.45	3.06	0.00	0.00	0.00	0.00
2014	297	740	4.20	22.51	3.00	0.00	0.00	0.00	0.00
2014	297	741	4.31	22.41	3.00	0.00	0.00	0.00	0.00
2014	297	742	4.35	22.36	3.01	0.00	0.00	0.00	0.00
2014	297	743	4.40	22.33	3.03	0.00	0.00	0.00	0.00
2014	297	744	4.45	22.28	3.02	0.00	0.00	0.00	0.00
2014	297	745	4.42	22.31	3.00	0.00	0.00	0.00	0.00
2014	297	746	4.38	22.32	2.98	0.00	0.00	0.00	0.00
2014	297	747	4.42	22.28	3.00	0.00	0.00	0.00	0.00
2014	297	748	4.38	22.32	3.02	0.00	0.00	0.00	0.00
2014	297	749	4.36	22.33	3.12	0.00	0.00	0.00	0.00
2014	297	750	4.40	22.31	2.98	0.00	0.00	0.00	0.00
2014	297	751	4.38	22.33	2.99	0.00	0.00	0.00	0.00
2014	297	752	4.33	22.37	3.07	0.00	0.00	0.00	0.00
2014	297	753	4.36	22.33	3.04	0.00	0.00	0.00	0.00
2014	297	754	4.41	22.29	3.17	0.00	0.00	0.00	0.00
2014	297	816	4.20	22.81	1.97	11.76	16.21	4.45	0.02
2014	297	817	4.22	22.74	1.98	10.16	15.37	5.22	0.04
2014	297	818	4.25	22.76	1.97	9.15	14.64	5.49	0.06
2014	297	819	4.30	22.66	2.07	8.41	14.01	5.60	0.09
2014	297	820	4.22	22.71	2.01	8.41	13.29	4.88	0.11
2014	297	821	4.22	22.68	2.05	8.41	12.95	4.54	0.13
2014	297	822	4.18	22.70	2.10	7.87	12.53	4.66	0.14
2014	297	823	4.33	22.55	2.42	6.86	12.21	5.35	0.17
2014	297	824	4.23	22.63	2.77	6.56	11.83	5.27	0.19
2014	297	825	4.17	22.65	3.10	6.39	11.92	5.53	0.21
2014	297	826	4.16	22.62	3.31	6.61	11.93	5.33	0.23
2014	297	827	4.24	22.59	3.32	6.31	11.59	5.28	0.26
2014	297	828	4.22	22.68	3.73	5.48	11.47	5.99	0.28
2014	297	829	4.27	22.59	3.81	5.15	11.12	5.97	0.31
2014	297	830	4.22	22.65	3.90	5.05	11.03	5.98	0.33
2014	297	831	4.19	22.70	3.93	5.05	11.05	6.00	0.35
2014	297	832	4.20	22.68	3.92	5.05	10.78	5.73	0.38
2014	297	833	4.25	22.64	3.94	5.05	10.93	5.88	0.40
2014	297	834	4.19	22.77	3.95	5.05	10.78	5.73	0.43
2014	297	835	4.20	22.71	3.95	5.05	10.94	5.89	0.45
2014	297	836	4.21	22.70	3.95	5.05	11.14	6.09	0.48
2014	297	837	4.20	22.72	3.95	5.05	10.66	5.61	0.50
2014	297	838	4.20	22.68	3.95	5.05	10.43	5.38	0.52
2014	297	839	4.14	22.78	3.97	5.05	10.38	5.33	0.54
2014	297	840	4.21	22.74	4.00	5.05	10.41	5.36	0.57
2014	297	841	4.15	22.82	4.09	5.05	10.71	5.66	0.59
2014	297	842	4.19	22.78	4.04	5.05	10.98	5.93	0.61
2014	297	843	4.25	22.69	3.96	5.05	11.21	6.16	0.64
2014	297	844	4.25	22.70	3.99	5.05	11.21	6.16	0.67
2014	297	845	4.26	22.66	4.01	5.05	11.35	6.30	0.69
2014	297	846	4.25	22.66	3.99	5.05	11.14	6.09	0.72
2014	297	847	4.18	22.71	3.96	5.05	11.12	6.07	0.74
2014	297	848	4.22	22.69	3.96	5.05	11.13	6.08	0.77
2014	297	849	4.17	22.71	3.96	5.05	11.24	6.20	0.79
2014	297	850	4.12	22.81	3.96	5.05	11.48	6.43	0.82
2014	297	851	4.15	22.77	3.99	5.05	11.51	6.46	0.85
2014	297	852	4.18	22.74	3.97	5.05	11.63	6.58	0.87
2014	297	853	4.10	22.86	3.95	5.05	11.60	6.56	0.90
2014	297	854	4.19	22.77	3.98	5.57	11.61	6.05	0.93
2014	297	855	4.17	22.81	3.96	5.86	11.74	5.88	0.95
2014	297	856	4.10	22.86	3.95	6.37	11.95	5.59	0.97
2014	297	857	4.10	22.91	3.97	6.62	12.01	5.39	1.00
2014	297	858	4.11	22.90	3.98	6.72	12.22	5.50	1.02

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	859	4.16	22.83	3.97	6.73	12.10	5.37	1.04
2014	297	900	4.15	22.83	3.95	6.73	12.07	5.34	1.06
2014	297	901	4.22	22.74	3.95	6.73	11.84	5.11	1.08
2014	297	902	4.19	22.80	3.95	6.72	11.80	5.08	1.11
2014	297	904	4.06	22.93	3.95	6.72	12.48	5.76	1.13
2014	297	905	4.05	22.96	3.95	7.10	12.52	5.42	1.16
2014	297	906	4.12	22.88	3.96	8.30	12.67	4.37	1.18
2014	297	907	4.16	22.82	3.95	8.23	12.48	4.25	1.19
2014	297	908	4.21	22.73	3.95	7.69	12.42	4.73	1.21
2014	297	909	4.15	22.80	3.95	6.91	12.44	5.52	1.24
2014	297	910	4.19	22.76	3.95	6.83	12.42	5.59	1.26
2014	297	911	4.10	22.88	3.95	7.04	12.48	5.44	1.28
2014	297	912	4.13	22.92	3.93	7.46	12.42	4.96	1.30
2014	297	913	4.06	22.99	3.94	8.22	12.87	4.65	1.32
2014	297	914	4.07	23.02	3.91	8.42	13.16	4.74	1.34
2014	297	915	4.01	23.05	3.91	8.42	13.44	5.02	1.36
2014	297	916	4.05	23.09	3.93	8.42	13.59	5.18	1.38
2014	297	917	4.14	23.05	3.89	8.42	13.54	5.12	1.41
2014	297	918	4.14	23.03	3.95	8.42	13.27	4.86	1.43
2014	297	919	4.09	23.07	3.91	8.42	13.17	4.75	1.45
2014	297	920	4.11	23.00	3.92	8.42	13.01	4.60	1.46
2014	297	921	4.07	23.06	3.90	7.90	12.94	5.05	1.49
2014	297	922	4.02	23.15	3.90	6.89	12.62	5.74	1.51
2014	297	923	4.00	23.20	3.82	6.87	12.49	5.62	1.53
2014	297	924	4.03	23.21	3.60	6.73	12.42	5.69	1.56
2014	297	925	4.09	23.14	3.62	6.73	11.93	5.20	1.58
2014	297	926	4.05	23.18	3.60	6.70	12.00	5.29	1.60
2014	297	927	4.06	23.16	3.63	6.68	11.86	5.19	1.62
2014	297	928	4.05	23.15	3.70	6.66	11.88	5.22	1.64
2014	297	929	4.04	23.16	3.56	6.65	11.78	5.13	1.67
2014	297	930	4.06	23.12	3.59	6.23	11.78	5.55	1.69
2014	297	931	4.11	23.05	3.47	6.04	11.69	5.64	1.71
2014	297	932	4.14	22.96	3.01	5.96	11.46	5.50	1.73
2014	297	933	4.08	22.99	3.10	5.51	11.45	5.94	1.76
2014	297	934	4.05	22.97	2.97	5.13	11.52	6.39	1.79
2014	297	935	3.99	23.03	3.14	5.83	11.90	6.07	1.81
2014	297	936	4.03	23.01	3.12	6.59	11.97	5.38	1.83
2014	297	937	4.13	22.93	3.01	6.73	12.01	5.27	1.86
2014	297	938	4.18	22.89	3.12	6.73	11.63	4.89	1.88
2014	297	939	4.13	22.92	3.00	6.52	11.65	5.12	1.90
2014	297	940	4.14	22.96	3.17	5.78	11.50	5.72	1.92
2014	297	941	4.09	22.98	2.99	5.50	11.46	5.96	1.95
2014	297	942	4.09	23.00	2.90	5.15	11.42	6.27	1.97
2014	297	943	4.09	23.04	2.42	5.05	11.29	6.24	2.00
2014	297	944	4.03	23.13	2.53	5.05	11.37	6.32	2.02
2014	297	945	4.08	23.09	2.50	5.26	11.42	6.16	2.05
2014	297	946	4.06	23.11	2.46	6.35	11.73	5.38	2.07
2014	297	947	4.02	23.15	2.54	6.59	12.08	5.49	2.10
2014	297	948	4.09	23.13	2.20	6.72	12.05	5.33	2.12
2014	297	949	4.07	23.13	2.05	6.73	12.08	5.35	2.14
2014	297	950	4.12	23.14	2.11	6.73	12.17	5.44	2.16
2014	297	951	4.00	23.25	2.08	6.73	12.17	5.44	2.19
2014	297	952	4.02	23.26	2.10	6.76	12.41	5.65	2.21
2014	297	953	4.10	23.16	2.12	6.82	12.21	5.40	2.23
2014	297	954	4.12	23.15	2.07	6.83	12.21	5.38	2.25
2014	297	955	4.08	23.17	2.41	6.73	12.25	5.52	2.28
2014	297	956	4.08	23.11	2.50	6.73	12.18	5.45	2.30
2014	297	957	4.11	23.08	2.53	6.73	12.08	5.35	2.32
2014	297	958	4.08	23.12	2.50	6.63	11.85	5.22	2.34

Summary of CORRECTED DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **Lime Kiln**
Test No.: **TRS**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	959	4.00	23.17	2.44	6.59	12.02	5.42	2.37
2014	297	1000	4.13	23.07	2.39	6.67	12.03	5.35	2.39
2014	297	1001	4.14	23.02	2.52	6.67	11.82	5.15	2.41
2014	297	1002	4.07	23.12	2.10	5.90	11.87	5.97	2.43
2014	297	1003	4.05	23.20	2.11	5.72	11.92	6.20	2.46
2014	297	1004	4.03	23.17	2.10	6.24	12.09	5.85	2.48
2014	297	1005	3.99	23.20	2.26	6.10	12.02	5.92	2.51
2014	297	1006	4.00	23.20	2.49	5.55	11.81	6.26	2.54
2014	297	1007	4.05	23.13	2.53	5.29	11.54	6.26	2.56
2014	297	1008	4.05	23.17	2.42	5.05	11.42	6.37	2.59
2014	297	1009	3.96	23.27	2.49	5.05	11.63	6.58	2.62
2014	297	1010	4.07	23.16	2.49	5.05	11.57	6.53	2.64
2014	297	1011	4.10	23.17	2.07	5.05	11.25	6.21	2.67
2014	297	1012	4.00	23.33	2.04	5.05	11.37	6.32	2.69
2014	297	1013	3.95	23.38	2.06	5.05	11.53	6.48	2.72
2014	297	1014	3.98	23.37	2.13	5.06	11.43	6.37	2.75
2014	297	1015	4.01	23.35	2.09	5.17	11.66	6.48	2.78
2014	297	1016	4.12	23.30	2.07	5.13	11.30	6.16	2.80
2014	297	1017	4.17	23.30	2.06	5.12	11.31	6.19	2.83
2014	297	1018	4.05	23.40	2.03	5.05	11.50	6.45	2.85
2014	297	1019	4.10	23.27	2.07	5.05	11.13	6.08	2.88
2014	297	1020	4.04	23.30	2.01	5.05	11.08	6.03	2.90
2014	297	1021	4.02	23.33	1.99	5.05	10.88	5.84	2.93
2014	297	1022	3.98	23.41	2.01	5.05	10.98	5.93	2.95
2014	297	1023	4.01	23.35	2.03	5.05	10.79	5.74	2.98
2014	297	1024	4.09	23.26	2.07	5.05	10.36	5.31	3.00
2014	297	1025	4.17	23.24	2.15	5.05	10.47	5.42	3.02
2014	297	1026	4.06	23.37	2.08	5.05	10.80	5.75	3.05
2014	297	1027	4.03	23.37	2.09	5.05	10.79	5.74	3.07
2014	297	1028	4.03	23.40	2.07	5.05	10.53	5.49	3.09
2014	297	1029	4.07	23.32	2.11	5.05	10.45	5.40	3.12
2014	297	1030	4.05	23.29	2.04	5.05	10.34	5.29	3.14
2014	297	1031	4.09	23.23	2.07	5.05	10.34	5.29	3.16
2014	297	1032	4.11	23.17	2.07	5.05	10.33	5.28	3.18
2014	297	1033	4.04	23.21	2.08	5.05	10.35	5.30	3.20
2014	297	1034	4.13	23.16	2.09	5.05	10.25	5.20	3.23
2014	297	1035	4.11	23.22	2.11	5.05	10.10	5.05	3.25
2014	297	1036	4.13	23.16	2.08	5.05	10.12	5.07	3.27
2014	297	1037	4.12	23.19	2.08	5.05	9.98	4.93	3.29
2014	297	1038	4.14	23.21	2.07	5.03	9.80	4.77	3.31
2014	297	1039	4.07	23.29	2.07	5.03	9.91	4.88	3.33
2014	297	1040	4.05	23.30	2.10	5.05	10.02	4.97	3.35
2014	297	1041	4.04	23.35	2.04	5.05	10.25	5.20	3.37
2014	297	1042	3.94	23.45	2.11	5.05	10.50	5.45	3.39
2014	297	1043	4.03	23.30	2.11	5.05	10.24	5.19	3.41
2014	297	1044	4.14	23.20	2.11	5.05	9.74	4.70	3.43
2014	297	1045	4.15	23.18	2.05	5.05	9.87	4.82	3.45
2014	297	1046	4.08	23.27	2.06	5.05	9.85	4.80	3.47
2014	297	1047	4.07	23.30	1.99	5.02	9.86	4.84	3.49
2014	297	1048	4.01	23.31	1.99	5.05	10.09	5.04	3.52
2014	297	1049	4.08	23.21	2.00	5.05	10.06	5.01	3.54
2014	297	1050	4.15	23.17	2.00	5.03	9.98	4.95	3.56
2014	297	1051	4.10	23.17	2.00	5.02	9.88	4.86	3.58
2014	297	1052	4.10	23.16	2.00	4.80	9.84	5.04	3.60
2014	297	1053	4.11	23.15	1.99	4.78	9.59	4.81	3.62
2014	297	1054	4.10	23.20	2.01	4.81	9.79	4.98	3.64
2014	297	1055	4.10	23.20	1.98	4.94	9.82	4.88	3.66
2014	297	1056	4.12	23.15	2.01	4.64	9.06	4.41	3.68
2014	297	1057	4.09	23.22	1.98	4.44	8.63	4.19	3.70

Summary of CORRECTED DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **Lime Kiln**
Test No.: **TRS**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	1058	4.04	23.33	1.99	4.00	9.13	5.14	3.72
2014	297	1059	4.10	23.24	2.01	4.52	9.18	4.66	3.74
2014	297	1100	4.12	23.21	1.99	4.63	9.16	4.53	3.75
2014	297	1101	4.21	23.10	1.98	4.60	9.15	4.55	3.77
2014	297	1102	4.18	23.12	2.00	3.74	9.18	5.43	3.80
2014	297	1103	4.14	23.19	2.02	3.42	9.51	6.09	3.82
2014	297	1104	4.10	23.22	2.01	3.44	9.53	6.10	3.85
2014	297	1105	4.07	23.23	2.01	3.48	9.45	5.97	3.87
2014	297	1106	4.10	23.22	2.02	3.39	9.59	6.20	3.90
2014	297	1107	4.10	23.17	1.99	3.84	9.44	5.60	3.92
2014	297	1108	4.09	23.14	2.03	3.86	9.51	5.65	3.94
2014	297	1109	4.15	23.05	2.04	3.77	9.47	5.70	3.97
2014	297	1110	4.12	23.06	2.01	4.05	9.50	5.45	3.99
2014	297	1111	4.10	23.08	2.05	4.46	9.61	5.15	4.01
2014	297	1112	4.09	23.15	2.02	4.25	9.43	5.18	4.03
2014	297	1113	4.07	23.26	2.04	4.11	9.34	5.23	4.06
2014	297	1114	4.01	23.36	1.98	4.11	9.62	5.51	4.08
2014	297	1115	4.04	23.36	2.02	4.39	9.74	5.35	4.10
2014	297	1116	3.97	23.42	2.02	4.07	9.76	5.70	4.13
2014	297	1117	4.05	23.35	2.00	4.66	9.35	4.69	4.14
2014	297	1118	4.04	23.43	2.07	4.74	9.48	4.74	4.16
2014	297	1119	4.06	23.38	2.05	4.53	9.58	5.05	4.19
2014	297	1120	4.07	23.37	2.01	4.50	9.35	4.85	4.21
2014	297	1121	4.09	23.33	2.02	4.59	9.31	4.72	4.23
2014	297	1122	4.08	23.44	2.02	3.84	9.36	5.52	4.25
2014	297	1123	4.04	23.48	1.98	3.83	9.33	5.51	4.27
2014	297	1124	4.02	23.45	1.97	3.74	9.11	5.37	4.29
2014	297	1125	4.03	23.49	1.99	4.02	9.07	5.04	4.31
2014	297	1126	4.38	23.12	1.97	3.72	9.51	5.80	4.34
2014	297	1127	3.89	23.77	1.99	3.60	10.77	7.17	4.37
2014	297	1128	3.92	23.52	2.01	3.73	16.58	12.85	4.42
2014	297	1129	4.03	23.38	1.98	3.69	18.56	14.87	4.48
2014	297	1130	4.04	23.39	1.97	3.39	17.52	14.13	4.54
2014	297	1131	4.06	23.42	1.98	3.36	18.12	14.75	4.60
2014	297	1132	4.11	23.37	2.02	3.36	20.59	17.22	4.68
2014	297	1133	4.09	23.36	2.04	3.36	24.94	21.58	4.77
2014	297	1134	4.00	23.47	1.99	3.38	29.18	25.80	4.87
2014	297	1135	4.01	23.48	2.00	3.30	29.96	26.66	4.98
2014	297	1136	4.01	23.49	1.99	3.03	26.85	23.82	5.08
2014	297	1137	3.99	23.48	2.02	3.03	22.42	19.39	5.17
2014	297	1138	3.99	23.48	1.98	3.03	18.25	15.22	5.23
2014	297	1139	3.98	23.51	1.99	2.86	15.51	12.64	5.28
2014	297	1140	3.87	23.60	2.00	2.97	14.99	12.02	5.33
2014	297	1141	3.80	23.64	1.98	2.76	14.98	12.22	5.38
2014	297	1142	3.99	23.49	2.02	2.99	13.76	10.77	5.43
2014	297	1143	4.11	23.32	1.98	2.94	12.73	9.78	5.47
2014	297	1144	4.15	23.30	1.97	2.31	12.02	9.70	5.51
2014	297	1145	4.17	23.27	1.98	1.72	11.79	10.07	5.55
2014	297	1146	4.21	23.23	1.97	1.68	11.32	9.63	5.59
2014	297	1147	4.29	23.16	1.98	1.68	10.79	9.11	5.63
2014	297	1148	4.39	23.03	1.98	1.68	10.09	8.41	5.66
2014	297	1149	4.51	22.85	1.98	1.68	9.77	8.09	5.70
2014	297	1150	4.55	22.80	1.97	1.68	9.09	7.41	5.73
2014	297	1151	4.59	22.72	1.97	1.68	8.82	7.14	5.76
2014	297	1152	4.64	22.63	1.98	1.68	8.71	7.03	5.79
2014	297	1153	4.70	22.60	1.98	1.68	8.35	6.66	5.81
2014	297	1154	4.67	22.58	1.99	1.68	8.41	6.73	5.84
2014	297	1155	4.72	22.52	1.97	1.68	7.90	6.22	5.87
2014	297	1156	4.76	22.48	1.99	1.68	7.59	5.90	5.89

Summary of CORRECTED DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **Lime Kiln**
Test No.: **TRS**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	1157	4.73	22.47	1.97	1.68	7.27	5.58	5.92
2014	297	1158	4.70	22.50	1.98	1.68	7.14	5.46	5.94
2014	297	1159	4.72	22.52	1.97	1.68	6.95	5.27	5.96
2014	297	1200	4.70	22.56	1.97	1.68	7.07	5.38	5.98
2014	297	1201	4.68	22.59	1.97	1.68	6.81	5.12	6.00
2014	297	1202	4.69	22.61	1.97	1.68	6.88	5.20	6.03
2014	297	1203	4.63	22.63	1.97	1.68	6.71	5.03	6.05
2014	297	1204	4.65	22.56	1.97	1.68	6.73	5.05	6.07
2014	297	1205	4.69	22.49	1.97	1.68	6.56	4.88	6.09
2014	297	1206	4.68	22.49	1.97	1.68	6.63	4.95	6.11
2014	297	1207	4.67	22.48	1.97	1.68	6.45	4.77	6.13
2014	297	1208	4.65	22.51	1.97	1.68	6.41	4.72	6.15
2014	297	1209	4.57	22.62	1.97	1.68	6.32	4.63	6.17
2014	297	1210	4.56	22.68	1.97	1.68	6.43	4.74	6.19
2014	297	1211	4.51	22.78	1.97	1.68	6.46	4.77	6.21
2014	297	1212	4.48	22.82	1.97	1.68	6.42	4.74	6.23
2014	297	1213	4.48	22.85	1.97	1.68	6.50	4.81	6.25
2014	297	1214	4.41	22.96	1.97	1.68	6.55	4.86	6.27
2014	297	1215	4.46	22.95	1.97	1.68	6.47	4.79	6.29
2014	297	1216	4.42	23.04	1.97	1.68	6.48	4.80	6.31
2014	297	1217	4.40	23.00	1.97	1.68	6.58	4.90	6.31
2014	297	1218	4.42	23.00	1.97	1.68	6.52	4.84	6.31
2014	297	1219	4.33	23.00	1.97	1.68	6.76	5.08	6.31
2014	297	1220	4.26	23.00	1.97	1.68	6.69	5.01	6.30
2014	297	1221	4.33	22.84	1.97	1.68	6.84	5.16	6.31
2014	297	1222	4.48	22.60	1.97	1.68	6.77	5.09	6.31
2014	297	1223	4.54	22.51	1.97	1.68	6.52	4.84	6.31
2014	297	1224	4.61	22.41	1.98	1.68	6.33	4.64	6.31
2014	297	1225	4.62	22.32	1.97	1.68	6.10	4.41	6.30
2014	297	1226	4.57	22.33	1.97	1.68	6.21	4.53	6.30
2014	297	1227	4.53	22.36	1.97	1.68	6.37	4.69	6.29
2014	297	1228	4.55	22.42	1.97	1.68	6.33	4.65	6.29
2014	297	1229	4.54	22.42	1.97	1.68	6.13	4.45	6.29
2014	297	1230	4.45	22.54	1.97	1.68	6.20	4.51	6.28
2014	297	1231	4.43	22.58	1.97	1.68	6.44	4.76	6.27
2014	297	1232	4.46	22.58	1.97	1.68	6.35	4.66	6.27
2014	297	1233	4.41	22.69	1.97	1.68	6.42	4.74	6.27
2014	297	1234	4.39	22.73	1.97	1.68	6.48	4.79	6.26
2014	297	1235	4.37	22.77	1.97	1.68	6.58	4.90	6.26
2014	297	1236	4.38	22.82	1.97	1.68	6.67	4.98	6.25
2014	297	1237	4.27	22.96	1.97	1.68	6.83	5.15	6.25
2014	297	1238	4.19	23.09	1.97	1.68	7.11	5.43	6.25
2014	297	1239	4.27	23.00	1.97	1.68	7.16	5.48	6.25
2014	297	1240	4.35	22.95	1.97	1.68	7.06	5.38	6.25
2014	297	1241	4.43	22.88	1.97	1.68	6.81	5.13	6.25
2014	297	1242	4.32	22.97	1.97	1.68	6.84	5.16	6.25
2014	297	1243	4.21	23.08	1.97	1.68	6.87	5.19	6.24
2014	297	1244	4.20	23.09	1.97	1.68	6.97	5.29	6.24
2014	297	1245	4.11	23.14	1.97	1.68	7.04	5.36	6.24
2014	297	1246	4.09	23.17	1.97	1.68	7.17	5.48	6.23
2014	297	1247	3.98	23.30	1.97	1.68	7.53	5.84	6.23
2014	297	1248	4.02	23.26	1.97	1.68	7.63	5.95	6.23
2014	297	1249	4.07	23.13	1.97	1.68	7.59	5.90	6.23
2014	297	1250	4.16	23.07	1.98	1.68	7.45	5.77	6.23
2014	297	1251	4.14	23.09	2.00	1.70	7.44	5.74	6.23
2014	297	1252	4.08	23.15	1.98	1.68	7.19	5.50	6.22
2014	297	1253	4.10	23.18	2.01	1.68	7.17	5.49	6.22
2014	297	1254	4.03	23.26	1.98	1.68	7.55	5.87	6.21
2014	297	1255	3.98	23.33	1.99	1.68	7.67	5.99	6.21

Summary of CORRECTED DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **Lime Kiln**
Test No.: **TRS**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	1256	4.04	23.28	1.97	1.68	7.59	5.91	6.21
2014	297	1257	3.98	23.44	1.97	1.68	7.74	6.06	6.22
2014	297	1258	3.96	23.47	1.97	1.68	7.86	6.18	6.22
2014	297	1259	4.10	23.37	1.97	1.68	7.53	5.84	6.22
2014	297	1300	4.09	23.28	1.97	1.68	7.48	5.79	6.22
2014	297	1301	4.06	23.26	1.97	1.70	7.53	5.83	6.22
2014	297	1302	4.05	23.26	1.97	1.68	7.57	5.88	6.23
2014	297	1303	4.03	23.23	1.97	1.68	7.55	5.86	6.23
2014	297	1304	4.02	23.25	1.97	1.68	7.68	6.00	6.23
2014	297	1305	4.04	23.21	1.97	1.68	7.60	5.92	6.23
2014	297	1306	4.05	23.21	1.97	1.68	7.46	5.77	6.23
2014	297	1307	4.04	23.21	1.97	1.68	7.33	5.65	6.24
2014	297	1308	4.02	23.27	1.98	1.68	7.06	5.38	6.24
2014	297	1309	4.03	23.30	1.97	1.68	7.10	5.42	6.25
2014	297	1310	4.01	23.35	1.97	1.68	7.19	5.51	6.25
2014	297	1311	3.93	23.38	1.97	1.68	7.47	5.79	6.25
2014	297	1312	3.90	23.49	1.98	1.68	7.47	5.79	6.25
2014	297	1313	4.03	23.35	1.97	1.68	7.11	5.43	6.25
2014	297	1314	4.06	23.33	1.97	1.68	6.95	5.27	6.25
2014	297	1315	4.06	23.40	1.97	1.68	7.16	5.48	6.26
2014	297	1316	4.04	23.37	1.97	1.68	7.05	5.37	6.26
2014	297	1317	4.06	23.32	1.97	1.68	7.16	5.48	6.26
2014	297	1318	4.10	23.22	1.97	1.68	7.14	5.46	6.26
2014	297	1319	4.13	23.23	1.97	1.68	7.08	5.40	6.26
2014	297	1320	4.04	23.32	1.97	1.68	7.33	5.65	6.27
2014	297	1321	4.06	23.30	1.97	1.68	7.16	5.48	6.27
2014	297	1322	4.05	23.37	1.97	1.68	7.19	5.51	6.27
2014	297	1323	4.13	23.30	1.97	1.68	6.79	5.11	6.27
2014	297	1324	4.13	23.28	1.97	1.68	6.58	4.90	6.27
2014	297	1325	4.08	23.33	1.97	1.68	6.78	5.10	6.26
2014	297	1326	4.03	23.39	1.97	1.68	6.66	4.98	6.26
2014	297	1327	4.00	23.47	1.97	1.68	6.79	5.11	6.26
2014	297	1328	3.99	23.54	1.97	1.68	6.89	5.21	6.26
2014	297	1329	4.08	23.48	1.97	1.68	6.61	4.93	6.26
2014	297	1330	4.14	23.38	1.97	1.68	6.47	4.79	6.26
2014	297	1331	4.14	23.42	1.97	1.68	6.35	4.66	6.25
2014	297	1332	4.12	23.32	1.97	1.68	6.27	4.59	6.25
2014	297	1333	4.15	23.22	1.97	1.68	6.05	4.36	6.25
2014	297	1334	4.13	23.25	1.97	1.68	6.16	4.48	6.24
2014	297	1335	4.13	23.21	1.97	1.68	5.90	4.22	6.23
2014	297	1336	4.13	23.15	1.97	1.68	6.10	4.41	6.22
2014	297	1337	4.11	23.15	1.97	1.68	6.00	4.32	6.22
2014	297	1338	4.11	23.16	1.97	1.68	5.90	4.22	6.21
2014	297	1339	4.11	23.19	1.97	1.68	6.01	4.33	6.21
2014	297	1340	4.15	23.16	1.97	1.68	5.72	4.04	6.21
2014	297	1341	4.08	23.22	1.97	1.68	5.77	4.09	6.20
2014	297	1342	4.06	23.22	1.97	1.68	5.74	4.06	6.19
2014	297	1343	4.05	23.22	1.97	1.68	5.97	4.28	6.19
2014	297	1344	4.09	23.12	1.97	1.68	5.98	4.30	6.18
2014	297	1345	4.09	23.09	1.97	1.68	5.75	4.07	6.17
2014	297	1346	4.00	23.17	1.97	1.68	6.05	4.37	6.16
2014	297	1347	3.98	23.25	1.97	1.68	5.86	4.18	6.16
2014	297	1348	3.97	23.27	1.97	1.68	6.02	4.33	6.15
2014	297	1349	4.04	23.26	1.97	1.68	5.59	3.91	6.14
2014	297	1350	3.96	23.38	1.97	1.68	5.74	4.06	6.14
2014	297	1351	3.95	23.39	1.97	1.68	5.60	3.91	6.13
2014	297	1352	3.92	23.47	1.97	1.68	5.60	3.92	6.13
2014	297	1353	3.92	23.52	1.97	1.68	6.02	4.34	6.12
2014	297	1354	3.92	23.47	1.97	1.68	6.14	4.46	6.12

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: Lime Kiln
Test No.: TRS

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	1355	3.95	23.42	1.97	1.68	6.13	4.44	6.11
2014	297	1356	3.93	23.44	1.97	1.68	6.10	4.41	6.11
2014	297	1357	3.83	23.53	1.97	1.68	5.91	4.23	6.10
2014	297	1358	3.85	23.53	1.97	1.68	6.06	4.38	6.10
2014	297	1359	3.93	23.45	1.97	1.68	6.11	4.43	6.10
2014	297	1400	3.90	23.49	1.97	1.68	5.95	4.27	6.09
2014	297	1401	3.88	23.47	1.97	1.68	6.03	4.35	6.09
2014	297	1402	3.77	23.59	1.97	1.68	6.33	4.64	6.09
2014	297	1403	3.79	23.58	1.97	1.68	6.41	4.72	6.08
2014	297	1404	3.87	23.53	1.97	1.68	6.22	4.53	6.07
2014	297	1405	3.81	23.50	1.97	1.68	6.30	4.62	6.07
2014	297	1406	3.97	23.33	1.97	1.68	5.89	4.21	6.06
2014	297	1407	3.95	23.35	1.97	1.68	5.83	4.15	6.05
2014	297	1408	3.95	23.30	1.97	1.68	5.76	4.08	6.04
2014	297	1409	3.91	23.37	1.97	1.68	5.54	3.85	6.03
2014	297	1410	3.93	23.40	1.97	1.68	5.50	3.81	6.02
2014	297	1411	3.90	23.40	1.97	1.68	5.58	3.90	6.01
2014	297	1412	3.91	23.44	1.97	1.68	5.64	3.96	6.00
2014	297	1413	3.87	23.47	1.97	1.68	5.96	4.28	5.99
2014	297	1414	3.84	23.48	1.97	1.68	6.14	4.46	5.98
2014	297	1415	3.84	23.45	1.97	1.68	6.23	4.55	5.98
2014	297	1416	3.89	23.42	1.97	1.68	6.05	4.37	5.97
2014	297	1417	3.84	23.48	1.97	1.68	6.03	4.35	5.96
2014	297	1418	3.82	23.50	1.98	1.68	6.50	4.82	5.95
2014	297	1419	3.95	23.37	1.97	1.68	6.13	4.44	5.95
2014	297	1420	3.94	23.40	1.97	1.68	5.97	4.28	5.94
2014	297	1421	3.83	23.52	1.97	1.68	5.96	4.28	5.93
2014	297	1422	3.89	23.49	1.97	1.68	5.64	3.96	5.92
2014	297	1423	3.93	23.41	1.97	1.68	5.38	3.70	5.91
2014	297	1424	3.82	23.50	1.97	1.68	5.72	4.03	5.91
2014	297	1425	3.85	23.50	1.97	1.68	5.54	3.86	5.90
2014	297	1426	3.77	23.55	1.97	1.68	5.80	4.12	5.90
2014	297	1427	3.82	23.48	1.97	1.68	5.75	4.07	5.89
2014	297	1428	3.87	23.42	1.97	1.68	5.46	3.77	5.88
2014	297	1429	3.95	23.35	1.97	1.68	5.20	3.51	5.87
2014	297	1430	3.86	23.43	1.98	1.68	5.49	3.81	5.87
2014	297	1431	3.84	23.45	1.97	1.68	5.49	3.81	5.86
2014	297	1432	3.85	23.47	1.98	1.68	5.55	3.87	5.85
2014	297	1433	3.88	23.45	1.97	1.68	5.82	4.14	5.85
2014	297	1434	3.95	23.37	1.97	1.68	5.44	3.76	5.84
2014	297	1435	4.01	23.26	1.97	1.68	5.08	3.39	5.84
2014	297	1436	3.88	23.43	1.97	1.68	5.10	3.42	5.83
2014	297	1437	3.92	23.43	2.00	1.68	5.33	3.65	5.82
2014	297	1438	3.96	23.41	1.97	1.68	5.15	3.47	5.82
2014	297	1439	3.97	23.38	1.99	1.68	5.16	3.47	5.81
2014	297	1440	3.97	23.39	1.98	1.68	4.91	3.22	5.80
2014	297	1441	3.97	23.39	1.97	1.68	4.78	3.10	5.80
2014	297	1442	3.92	23.42	1.97	1.68	4.82	3.14	5.79
2014	297	1443	3.91	23.44	1.97	1.68	5.15	3.46	5.78
2014	297	1444	3.94	23.38	2.00	1.68	5.19	3.51	5.77
2014	297	1445	3.91	23.43	1.97	1.68	4.98	3.30	5.77
2014	297	1446	3.92	23.43	1.99	1.68	4.70	3.02	5.76
2014	297	1447	3.93	23.48	1.98	1.68	4.32	2.63	5.75
2014	297	1448	3.94	23.51	1.97	1.68	4.32	2.64	5.74
2014	297	1449	3.87	23.53	1.97	1.68	4.37	2.69	5.73
2014	297	1450	3.97	23.48	1.97	1.68	4.21	2.53	5.72
2014	297	1451	3.90	23.55	2.01	1.68	4.18	2.50	5.71
2014	297	1452	3.95	23.51	1.97	1.68	4.16	2.48	5.70
2014	297	1453	3.94	23.51	1.98	1.68	4.27	2.59	5.69

Summary of CORRECTED DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **Lime Kiln**
Test No.: **TRS**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	1454	3.88	23.58	1.97	1.68	4.35	2.67	5.68
2014	297	1455	3.91	23.54	2.06	1.68	4.36	2.68	5.67
2014	297	1456	3.93	23.47	2.07	1.68	4.24	2.56	5.66
2014	297	1457	3.98	23.41	2.02	1.68	4.22	2.54	5.66
2014	297	1458	4.00	23.35	2.38	1.68	4.14	2.46	5.65
2014	297	1459	4.00	23.31	2.43	1.68	4.18	2.50	5.64
2014	297	1500	3.98	23.30	3.09	1.68	4.31	2.62	5.63
2014	297	1501	3.93	23.35	3.05	1.68	4.33	2.64	5.62
2014	297	1502	3.95	23.35	3.09	1.68	4.30	2.62	5.61
2014	297	1503	3.89	23.35	3.78	1.68	4.36	2.68	5.60
2014	297	1504	3.93	23.29	3.77	1.68	4.62	2.94	5.59
2014	297	1505	3.93	23.29	3.89	1.68	4.70	3.02	5.58
2014	297	1506	3.98	23.22	3.93	1.68	4.62	2.94	5.56
2014	297	1507	4.03	23.16	3.95	1.68	4.40	2.71	5.55
2014	297	1508	4.00	23.18	3.88	1.68	4.46	2.78	5.54
2014	297	1509	4.00	23.21	3.94	1.68	4.65	2.97	5.53
2014	297	1510	4.01	23.21	3.95	1.68	4.62	2.93	5.51
2014	297	1511	4.02	23.18	3.95	1.68	4.54	2.85	5.50
2014	297	1512	4.00	23.22	3.94	1.68	4.55	2.87	5.49
2014	297	1513	4.01	23.22	3.90	1.68	4.71	3.02	5.49
2014	297	1514	4.04	23.21	3.94	1.68	4.67	2.99	5.48
2014	297	1515	4.02	23.27	3.89	1.68	4.56	2.88	5.47
2014	297	1516	4.06	23.24	3.93	1.68	4.43	2.74	5.45
2014	297	1517	4.02	23.26	3.94	1.68	4.49	2.80	5.44
2014	297	1518	4.00	23.28	3.77	1.68	4.40	2.72	5.43
2014	297	1519	4.02	23.26	3.93	1.68	4.53	2.85	5.43
2014	297	1520	4.04	23.20	3.74	1.68	4.39	2.71	5.42
2014	297	1521	3.97	23.35	3.78	1.68	4.40	2.72	5.41
2014	297	1522	3.95	23.36	3.31	1.68	4.49	2.80	5.40
2014	297	1523	4.03	23.27	3.41	1.68	4.36	2.68	5.39
2014	297	1524	4.05	23.24	3.36	1.68	4.24	2.55	5.38
2014	297	1525	4.07	23.19	3.37	1.68	4.21	2.53	5.36
2014	297	1526	3.99	23.35	3.45	1.68	4.38	2.70	5.35
2014	297	1527	3.96	23.37	3.38	1.68	4.55	2.86	5.34
2014	297	1528	3.95	23.38	3.23	1.68	4.55	2.87	5.32
2014	297	1529	3.96	23.36	2.86	1.68	4.32	2.64	5.28
2014	297	1530	3.91	23.38	2.97	1.68	4.31	2.63	5.23
2014	297	1531	4.00	23.32	2.87	1.68	4.00	2.32	5.18
2014	297	1532	4.04	23.24	2.84	1.68	3.61	1.93	5.13
2014	297	1533	4.09	23.23	2.84	1.68	3.62	1.94	5.07
2014	297	1534	4.09	23.24	2.89	1.68	3.54	1.86	4.98
2014	297	1535	4.07	23.26	2.96	1.68	3.65	1.96	4.88
2014	297	1536	3.99	23.45	2.81	1.68	3.85	2.17	4.78
2014	297	1537	4.03	23.39	2.90	1.68	3.88	2.20	4.69
2014	297	1538	4.08	23.35	2.87	1.68	3.91	2.23	4.62
2014	297	1539	4.06	23.36	2.81	1.68	4.10	2.42	4.57
2014	297	1540	4.00	23.43	2.93	1.68	4.21	2.53	4.53
2014	297	1541	3.92	23.53	2.87	1.68	4.34	2.66	4.49
2014	297	1542	3.98	23.49	2.95	1.68	4.25	2.57	4.45
2014	297	1543	3.96	23.51	2.86	1.68	4.10	2.41	4.41
2014	297	1544	3.94	23.57	2.90	1.67	4.11	2.44	4.38
2014	297	1545	3.90	23.65	2.91	1.68	4.34	2.66	4.35
2014	297	1546	3.89	23.66	2.90	1.68	4.36	2.68	4.32
2014	297	1547	3.94	23.70	2.92	1.65	4.32	2.67	4.29
2014	297	1548	3.95	23.66	2.55	1.68	4.05	2.37	4.27
2014	297	1549	3.83	23.75	2.05	1.68	4.25	2.56	4.24
2014	297	1550	3.87	23.76	2.06	1.68	4.21	2.53	4.22
2014	297	1551	3.89	23.71	2.02	1.68	4.24	2.56	4.20
2014	297	1552	3.88	23.75	2.08	1.67	4.19	2.52	4.18

Summary of CORRECTED DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **Lime Kiln**
Test No.: **TRS**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	1553	3.88	23.72	2.08	1.68	4.04	2.36	4.16
2014	297	1554	3.72	23.87	2.04	1.68	4.58	2.89	4.14
2014	297	1555	3.88	23.66	2.06	1.67	4.34	2.68	4.13
2014	297	1556	3.98	23.56	2.05	1.68	4.18	2.50	4.11
2014	297	1557	3.96	23.51	2.11	1.68	4.01	2.33	4.10
2014	297	1558	4.01	23.41	2.07	1.68	3.95	2.27	4.08
2014	297	1559	4.00	23.39	2.01	1.67	3.99	2.32	4.07
2014	297	1600	3.97	23.46	2.03	1.56	3.98	2.42	4.06
2014	297	1601	3.99	23.36	2.00	1.57	4.06	2.49	4.05
2014	297	1602	4.01	23.26	2.05	1.57	4.01	2.44	4.04
2014	297	1603	4.00	23.30	2.04	1.50	4.05	2.55	4.02
2014	297	1604	4.01	23.28	2.05	1.51	4.07	2.56	4.01
2014	297	1605	3.92	23.39	1.99	1.23	4.24	3.01	4.01
2014	297	1606	4.00	23.30	1.98	1.07	4.11	3.05	4.00
2014	297	1607	4.08	23.24	1.97	1.01	3.72	2.71	3.99
2014	297	1608	4.05	23.27	1.97	0.87	4.12	3.26	3.98
2014	297	1609	4.04	23.31	1.98	0.98	4.05	3.07	3.98
2014	297	1610	3.98	23.39	1.97	0.90	4.20	3.30	3.97
2014	297	1611	4.01	23.39	1.98	1.01	4.11	3.10	3.96
2014	297	1612	4.03	23.31	1.97	0.86	4.08	3.23	3.96
2014	297	1613	4.02	23.31	1.97	0.21	3.86	3.65	3.95
2014	297	1614	3.98	23.40	1.97	0.62	3.88	3.26	3.95
2014	297	1615	4.02	23.41	1.97	0.84	3.90	3.06	3.94
2014	297	1616	4.03	23.41	2.00	0.35	3.81	3.46	3.93
2014	297	1617	4.00	23.47	1.97	0.24	3.65	3.41	3.93
2014	297	1618	3.97	23.53	1.97	0.07	4.00	3.93	3.92
2014	297	1619	4.02	23.46	1.97	0.10	3.83	3.74	3.92
2014	297	1620	4.00	23.52	1.97	0.04	3.97	3.93	3.91
2014	297	1621	3.96	23.53	1.97	0.07	4.03	3.96	3.91
2014	297	1622	3.95	23.54	1.97	0.13	3.87	3.74	3.90
2014	297	1623	3.90	23.64	1.97	0.17	4.08	3.91	3.90
2014	297	1624	3.98	23.56	1.97	0.15	3.84	3.69	3.89
2014	297	1625	4.00	23.54	1.97	0.10	4.03	3.93	3.89
2014	297	1626	3.94	23.62	1.97	0.03	3.96	3.93	3.89
2014	297	1627	4.00	23.53	1.97	0.13	3.93	3.81	3.89
2014	297	1628	4.07	23.49	1.97	0.06	3.51	3.46	3.88
2014	297	1629	4.07	23.46	1.97	0.03	3.60	3.58	3.88
2014	297	1630	4.03	23.46	1.97	0.00	3.48	3.48	3.87
2014	297	1631	3.96	23.49	1.97	0.00	3.86	3.86	3.87
2014	297	1632	3.91	23.47	1.97	0.00	4.08	4.08	3.87
2014	297	1633	4.00	23.38	1.97	0.00	3.93	3.93	3.86
2014	297	1634	4.10	23.22	1.97	0.00	3.58	3.58	3.86
2014	297	1635	4.08	23.20	1.97	0.00	3.50	3.50	3.85
2014	297	1636	4.12	23.16	1.97	0.00	3.43	3.43	3.85
2014	297	1637	4.06	23.22	1.97	0.00	3.42	3.42	3.84
2014	297	1638	3.93	23.36	1.97	0.00	3.86	3.86	3.84
2014	297	1639	3.96	23.35	1.97	0.00	3.79	3.79	3.83
2014	297	1640	3.98	23.28	1.97	0.00	3.97	3.97	3.82
2014	297	1641	3.97	23.33	1.97	0.00	3.84	3.84	3.82
2014	297	1642	3.91	23.43	1.97	0.00	4.06	4.06	3.81
2014	297	1643	3.96	23.37	1.97	0.00	3.94	3.94	3.81
2014	297	1644	4.06	23.26	1.97	0.00	3.61	3.61	3.80
2014	297	1645	4.02	23.30	1.97	0.00	3.82	3.82	3.79
2014	297	1646	3.99	23.43	1.97	0.00	3.80	3.80	3.79
2014	297	1647	4.04	23.33	1.97	0.00	3.79	3.79	3.78
2014	297	1648	4.04	23.33	1.97	0.00	3.72	3.72	3.77
2014	297	1649	4.08	23.26	1.97	0.00	3.53	3.53	3.76
2014	297	1650	3.97	23.37	1.97	0.00	3.76	3.76	3.75
2014	297	1651	3.94	23.41	1.97	0.00	4.00	4.00	3.75

Summary of CORRECTED DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **Lime Kiln**
Test No.: **TRS**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	1652	3.98	23.36	1.97	0.00	3.83	3.83	3.74
2014	297	1653	3.99	23.35	1.97	0.00	3.77	3.77	3.73
2014	297	1654	4.06	23.30	1.97	0.00	3.62	3.62	3.72
2014	297	1655	4.05	23.29	1.97	0.00	3.58	3.58	3.71
2014	297	1656	3.99	23.28	1.97	0.00	3.76	3.76	3.70
2014	297	1657	3.98	23.35	1.97	0.00	3.95	3.95	3.70
2014	297	1658	3.98	23.37	1.97	0.00	3.91	3.91	3.69
2014	297	1659	3.92	23.43	1.97	0.00	3.85	3.85	3.68
2014	297	1700	3.97	23.42	1.97	0.00	4.03	4.03	3.67
2014	297	1701	3.93	23.44	1.97	0.00	4.08	4.08	3.66
2014	297	1702	4.01	23.41	1.97	0.00	3.68	3.68	3.65
2014	297	1703	4.02	23.40	1.97	0.00	3.83	3.83	3.65
2014	297	1704	4.01	23.40	1.97	0.00	3.74	3.74	3.64
2014	297	1705	4.06	23.43	1.97	0.00	3.83	3.83	3.63
2014	297	1706	4.03	23.42	1.96	0.00	3.63	3.63	3.62
2014	297	1707	3.99	23.50	1.97	0.00	3.61	3.61	3.61
2014	297	1708	3.93	23.60	1.97	0.00	3.68	3.68	3.60
2014	297	1709	3.89	23.66	1.97	0.00	3.99	3.99	3.60
2014	297	1710	3.88	23.68	1.97	0.00	4.25	4.25	3.59
2014	297	1711	3.91	23.69	1.97	0.00	4.24	4.24	3.59
2014	297	1712	3.85	23.76	1.97	0.00	4.21	4.21	3.58
2014	297	1713	3.92	23.73	1.97	0.00	4.14	4.14	3.57
2014	297	1714	4.02	23.61	1.97	0.00	3.55	3.55	3.56
2014	297	1715	3.98	23.67	1.97	0.00	3.61	3.61	3.56
2014	297	1716	3.96	23.75	1.97	0.00	3.78	3.78	3.55
2014	297	1717	3.97	23.79	1.97	0.00	3.71	3.71	3.54
2014	297	1718	3.93	23.81	1.97	0.00	3.83	3.83	3.54
2014	297	1719	3.94	23.78	1.97	0.00	4.07	4.07	3.53
2014	297	1720	3.90	23.84	1.97	0.00	4.03	4.03	3.52
2014	297	1721	3.89	23.86	1.97	0.00	4.07	4.07	3.52
2014	297	1722	3.97	23.77	1.94	0.00	3.89	3.89	3.51
2014	297	1723	3.94	23.80	1.97	0.00	3.93	3.93	3.51
2014	297	1724	3.99	23.73	1.97	0.00	3.55	3.55	3.50
2014	297	1725	3.98	23.73	1.97	0.00	3.63	3.63	3.49
2014	297	1726	3.96	23.71	1.97	0.00	3.75	3.75	3.49
2014	297	1727	3.95	23.75	1.95	0.00	3.78	3.78	3.48
2014	297	1728	3.92	23.76	1.97	0.00	3.91	3.91	3.48
2014	297	1729	3.91	23.67	1.92	0.00	4.07	4.07	3.47
2014	297	1730	4.04	23.60	1.97	0.00	3.74	3.74	3.47
2014	297	1731	3.96	23.62	1.95	0.00	3.92	3.92	3.46
2014	297	1732	4.01	23.57	1.97	0.00	3.70	3.70	3.46
2014	297	1733	4.03	23.58	1.97	0.00	3.61	3.61	3.46
2014	297	1734	3.96	23.64	1.97	0.00	3.70	3.70	3.45
2014	297	1735	3.95	23.67	1.97	0.00	3.75	3.75	3.45
2014	297	1736	4.00	23.62	1.95	0.00	3.56	3.56	3.45
2014	297	1737	3.87	23.79	1.97	0.00	3.90	3.90	3.45
2014	297	1738	3.72	23.81	1.96	0.00	4.29	4.29	3.45
2014	297	1739	3.81	23.78	1.97	0.00	3.84	3.84	3.44
2014	297	1740	3.78	23.75	1.96	0.00	3.89	3.89	3.44
2014	297	1741	3.76	23.78	1.95	0.00	3.92	3.92	3.44
2014	297	1742	3.68	23.78	1.97	0.00	4.31	4.31	3.44
2014	297	1743	3.75	23.66	1.93	0.00	4.27	4.27	3.44
2014	297	1744	3.90	23.56	1.97	0.00	3.54	3.54	3.44
2014	297	1745	3.86	23.55	1.96	0.00	3.64	3.64	3.44
2014	297	1746	3.77	23.62	1.97	0.00	4.03	4.03	3.44
2014	297	1747	3.76	23.71	1.97	0.00	4.00	4.00	3.44
2014	297	1748	3.80	23.67	1.97	0.00	4.00	4.00	3.44
2014	297	1749	3.76	23.75	1.97	0.00	3.88	3.88	3.43
2014	297	1750	3.78	23.77	1.91	0.00	3.61	3.61	3.43

Summary of CORRECTED DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **Lime Kiln**
Test No.: **TRS**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	1751	3.76	23.78	1.94	0.00	3.77	3.77	3.43
2014	297	1752	3.80	23.75	1.92	0.00	3.61	3.61	3.43
2014	297	1753	3.83	23.80	1.89	0.00	3.31	3.31	3.43
2014	297	1754	3.79	23.83	1.93	0.00	3.54	3.54	3.42
2014	297	1755	3.91	23.72	1.88	0.00	3.38	3.38	3.42
2014	297	1756	3.74	23.87	1.96	0.00	3.81	3.81	3.42
2014	297	1757	3.78	23.83	1.88	0.00	3.73	3.73	3.41
2014	297	1758	3.79	23.86	1.89	0.00	3.58	3.58	3.41
2014	297	1759	3.83	23.81	1.95	0.00	3.44	3.44	3.41
2014	297	1800	3.87	23.77	1.97	0.00	3.13	3.13	3.40
2014	297	1801	3.88	23.72	1.97	0.00	3.26	3.26	3.40
2014	297	1802	3.88	23.70	1.97	0.00	3.15	3.15	3.39
2014	297	1803	3.90	23.66	1.97	0.00	3.10	3.10	3.39
2014	297	1804	3.93	23.63	1.97	0.00	3.02	3.02	3.38
2014	297	1805	3.86	23.66	1.97	0.00	3.25	3.25	3.37
2014	297	1806	3.93	23.53	1.97	0.00	3.12	3.12	3.37
2014	297	1807	3.99	23.42	1.97	0.00	2.90	2.90	3.36
2014	297	1808	3.96	23.44	1.97	0.00	2.95	2.95	3.36
2014	297	1809	3.94	23.44	1.97	0.00	3.06	3.06	3.35
2014	297	1810	3.87	23.45	1.97	0.00	3.05	3.05	3.35
2014	297	1811	3.87	23.49	1.96	0.00	3.33	3.33	3.35
2014	297	1812	3.91	23.45	1.97	0.00	2.95	2.95	3.34
2014	297	1813	3.86	23.52	1.97	0.00	2.93	2.93	3.34
2014	297	1814	3.82	23.59	1.97	0.00	3.28	3.28	3.34
2014	297	1815	3.84	23.57	1.97	0.00	3.11	3.11	3.33
2014	297	1816	3.82	23.59	1.97	0.00	3.28	3.28	3.32
2014	297	1817	3.86	23.60	1.97	0.00	3.25	3.25	3.32
2014	297	1818	3.84	23.65	1.97	0.00	3.10	3.10	3.31
2014	297	1819	3.77	23.73	1.97	0.00	3.49	3.49	3.31
2014	297	1820	3.80	23.66	1.97	0.00	3.52	3.52	3.31
2014	297	1821	3.83	23.61	1.97	0.00	3.28	3.28	3.30
2014	297	1822	3.86	23.52	1.97	0.00	3.25	3.25	3.30
2014	297	1823	3.95	23.45	1.97	0.00	2.88	2.88	3.29
2014	297	1824	3.88	23.48	1.97	0.00	2.98	2.98	3.29
2014	297	1825	3.83	23.58	1.97	0.00	2.90	2.90	3.28
2014	297	1826	3.90	23.55	1.97	0.00	2.95	2.95	3.28
2014	297	1827	3.86	23.56	1.96	0.00	2.81	2.81	3.28
2014	297	1828	3.78	23.64	1.97	0.00	3.46	3.46	3.27
2014	297	1829	3.75	23.72	1.97	0.00	3.65	3.65	3.27
2014	297	1830	3.81	23.73	1.95	0.00	3.27	3.27	3.27
2014	297	1831	3.83	23.76	1.97	0.00	3.17	3.17	3.27
2014	297	1832	3.77	23.78	1.94	0.00	3.25	3.25	3.27
2014	297	1833	3.77	23.82	1.96	0.00	3.17	3.17	3.26
2014	297	1834	3.69	23.93	1.97	0.00	3.91	3.91	3.26
2014	297	1835	3.73	23.89	1.97	0.00	3.76	3.76	3.26
2014	297	1836	3.77	23.85	1.97	0.00	3.23	3.23	3.26
2014	297	1837	3.85	23.71	1.96	0.00	3.34	3.34	3.26
2014	297	1838	3.78	23.77	1.97	0.00	3.32	3.32	3.26
2014	297	1839	3.81	23.72	1.93	0.00	3.12	3.12	3.26
2014	297	1840	3.79	23.70	1.97	0.00	3.53	3.53	3.26
2014	297	1841	3.83	23.68	1.97	0.00	3.25	3.25	3.26
2014	297	1842	3.82	23.66	1.95	0.00	3.45	3.45	3.26
2014	297	1843	3.82	23.67	1.97	0.00	3.29	3.29	3.26
2014	297	1844	3.87	23.60	1.95	0.00	3.07	3.07	3.26
2014	297	1845	3.91	23.56	1.97	0.00	2.83	2.83	3.26
2014	297	1846	3.82	23.70	1.92	0.00	3.04	3.04	3.26
2014	297	1847	3.75	23.76	1.96	0.00	3.31	3.31	3.26
2014	297	1848	3.73	23.81	1.97	0.00	3.85	3.85	3.26
2014	297	1849	3.73	23.88	1.96	0.00	3.51	3.51	3.27

Summary of CORRECTED DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **Lime Kiln**
Test No.: **TRS**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	1850	3.72	23.92	1.97	0.00	3.80	3.80	3.27
2014	297	1851	3.84	23.85	1.97	0.00	3.43	3.43	3.27
2014	297	1852	3.91	23.74	1.97	0.00	3.20	3.20	3.28
2014	297	1853	3.88	23.73	1.97	0.00	2.89	2.89	3.28
2014	297	1854	3.83	23.74	1.97	0.00	2.92	2.92	3.28
2014	297	1855	3.87	23.67	1.97	0.00	3.07	3.07	3.28
2014	297	1856	3.84	23.70	1.97	0.00	3.09	3.09	3.28
2014	297	1857	3.82	23.65	1.97	0.00	3.26	3.26	3.29
2014	297	1858	3.89	23.55	1.97	0.00	3.14	3.14	3.29
2014	297	1859	3.91	23.50	1.97	0.00	3.11	3.11	3.29
2014	297	1900	4.00	23.35	1.97	0.00	2.72	2.72	3.29
2014	297	1901	4.02	23.30	1.97	0.00	2.81	2.81	3.29
2014	297	1902	3.99	23.29	1.97	0.00	2.78	2.78	3.29
2014	297	1903	3.96	23.26	1.97	0.00	2.81	2.81	3.29
2014	297	1904	3.95	23.25	1.97	0.00	2.90	2.90	3.30
2014	297	1905	3.94	23.23	1.97	0.00	2.85	2.85	3.30
2014	297	1906	3.99	23.24	1.97	0.00	2.73	2.73	3.29
2014	297	1907	4.04	23.18	1.97	0.00	2.73	2.73	3.29
2014	297	1908	3.98	23.27	1.97	0.00	2.55	2.55	3.29
2014	297	1909	3.94	23.33	1.97	0.00	2.59	2.59	3.29
2014	297	1910	3.89	23.43	1.97	0.00	3.01	3.01	3.29
2014	297	1911	3.94	23.41	1.97	0.00	2.70	2.70	3.29
2014	297	1912	3.98	23.39	1.97	0.00	2.31	2.31	3.29
2014	297	1913	3.94	23.45	1.97	0.00	2.40	2.40	3.29
2014	297	1914	3.83	23.64	1.97	0.00	2.65	2.65	3.29
2014	297	1915	3.82	23.63	1.97	0.00	2.87	2.87	3.28
2014	297	1916	3.77	23.69	1.97	0.00	3.14	3.14	3.29
2014	297	1917	3.78	23.67	1.97	0.00	3.29	3.29	3.29
2014	297	1918	3.85	23.64	1.97	0.00	3.09	3.09	3.29
2014	297	1919	3.84	23.65	1.97	0.00	2.94	2.94	3.29
2014	297	1920	3.88	23.65	1.97	0.00	2.92	2.92	3.29
2014	297	1921	3.85	23.67	1.97	0.00	2.89	2.89	3.29
2014	297	1922	3.80	23.69	1.97	0.00	2.98	2.98	3.29
2014	297	1923	3.75	23.74	1.97	0.00	3.33	3.33	3.29
2014	297	1924	3.84	23.67	1.97	0.00	3.15	3.15	3.30
2014	297	1925	3.84	23.70	1.97	0.00	2.97	2.97	3.30
2014	297	1926	3.82	23.72	1.97	0.00	2.78	2.78	3.30
2014	297	1927	3.79	23.68	1.97	0.00	3.00	3.00	3.30
2014	297	1928	3.88	23.52	1.97	0.00	3.10	3.10	3.30
2014	297	1929	3.89	23.50	1.97	0.00	2.93	2.93	3.30
2014	297	1930	3.85	23.51	1.97	0.00	3.16	3.16	3.30
2014	297	1931	3.88	23.49	1.97	0.00	3.04	3.04	3.31
2014	297	1932	3.92	23.47	1.97	0.00	2.85	2.85	3.31
2014	297	1933	3.84	23.52	1.97	0.00	2.86	2.86	3.31
2014	297	1934	3.78	23.57	1.97	0.00	3.33	3.33	3.32
2014	297	1935	3.83	23.53	1.97	0.00	3.19	3.19	3.32
2014	297	1936	3.88	23.52	1.97	0.00	2.99	2.99	3.33
2014	297	1937	3.83	23.56	1.97	0.00	3.21	3.21	3.33
2014	297	1938	3.88	23.52	1.97	0.00	2.94	2.94	3.33
2014	297	1939	4.02	23.37	1.97	0.00	2.46	2.46	3.34
2014	297	1940	3.96	23.42	1.97	0.00	2.65	2.65	3.34
2014	297	1941	3.94	23.43	1.97	0.00	2.72	2.72	3.34
2014	297	1942	3.93	23.43	1.97	0.00	2.85	2.85	3.34
2014	297	1943	3.93	23.42	1.97	0.00	2.66	2.66	3.34
2014	297	1944	3.88	23.49	1.97	0.00	3.11	3.11	3.34
2014	297	1945	4.02	23.36	1.97	0.00	2.60	2.60	3.34
2014	297	1946	4.19	23.07	1.97	0.00	2.73	2.73	3.34
2014	297	1947	4.26	23.05	1.97	0.00	3.57	3.57	3.35
2014	297	1948	4.11	23.17	1.97	0.00	4.32	4.32	3.35

Summary of CORRECTED DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **Lime Kiln**
Test No.: **TRS**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)
2014	297	1949	3.82	23.61	1.97	0.00	4.15	4.15	3.36
2014	297	1950	3.92	23.40	1.97	0.00	2.47	2.47	3.36
2014	297	1951	4.21	23.12	1.97	0.00	1.80	1.80	3.36
2014	297	1952	4.25	23.06	1.97	0.00	1.77	1.77	3.35
2014	297	1953	4.24	23.08	1.97	0.00	1.59	1.59	3.35
2014	297	1954	4.11	23.19	1.97	0.00	1.90	1.90	3.35
2014	297	1955	4.06	23.24	1.97	0.00	1.91	1.91	3.34
2014	297	1956	4.00	23.31	1.97	0.00	2.25	2.25	3.34
2014	297	1957	3.84	23.53	1.97	0.00	2.77	2.77	3.34
2014	297	1958	3.71	23.69	1.97	0.00	3.74	3.74	3.35
2014	297	1959	3.64	23.77	1.97	0.00	4.33	4.33	3.36
2014	297	2000	3.74	23.63	1.97	0.00	4.19	4.19	3.37
2014	297	2001	3.65	23.68	1.97	0.00	4.49	4.49	3.37
2014	297	2002	3.76	23.59	1.97	0.00	4.46	4.46	3.38
2014	297	2003	3.77	23.61	1.97	0.00	4.37	4.37	3.39
2014	297	2004	3.95	23.44	1.97	0.00	3.87	3.87	3.40
2014	297	2005	4.08	23.31	1.97	0.00	3.36	3.36	3.40
2014	297	2006	4.03	23.35	1.97	0.00	3.45	3.45	3.40
2014	297	2007	3.97	23.36	1.97	0.00	3.67	3.67	3.40
2014	297	2008	4.08	23.27	1.97	0.00	3.57	3.57	3.41
2014	297	2009	4.14	23.20	1.97	0.00	3.05	3.05	3.41
2014	297	2010	4.13	23.15	1.97	0.00	3.12	3.12	3.41
2014	297	2011	4.17	23.08	1.97	0.00	2.94	2.94	3.40
2014	297	2012	4.18	22.97	1.97	0.00	2.94	2.94	3.40
2014	297	2013	4.21	22.95	1.97	0.00	2.93	2.93	3.40
2014	297	2014	4.33	22.81	1.97	0.00	2.69	2.69	3.40
2014	297	2015	4.27	22.89	1.97	0.00	2.45	2.45	3.40
2014	297	2016	4.25	22.91	1.97	0.00	2.46	2.46	3.39
2014	297	2017	4.25	22.90	1.97	0.00	2.93	2.93	3.39
2014	297	2018	4.25	22.95	1.97	0.00	2.63	2.63	3.39
2014	297	2019	4.25	22.90	1.97	0.00	2.57	2.57	3.38
2014	297	2020	4.23	22.90	1.97	0.00	2.76	2.76	3.38
2014	297	2021	4.31	22.81	1.97	0.00	2.44	2.44	3.37
2014	297	2022	4.32	22.77	1.97	0.00	2.43	2.43	3.37
2014	297	2023	4.31	22.78	1.97	0.00	2.60	2.60	3.36
2014	297	2024	4.22	22.84	1.97	0.00	2.59	2.59	3.35
2014	297	2025	4.25	22.80	1.97	0.00	2.79	2.79	3.35
2014	297	2026	4.23	22.81	1.97	0.00	2.68	2.68	3.35
2014	297	2027	4.28	22.78	1.97	0.00	2.51	2.51	3.34
2014	297	2028	4.27	22.84	1.97	0.00	2.57	2.57	3.33
2014	297	2029	4.19	22.87	1.97	0.00	2.65	2.65	3.33
2014	297	2030	4.22	22.83	1.98	0.00	2.77	2.77	3.33
2014	297	2031	4.28	22.77	1.97	0.00	2.55	2.55	3.32
2014	297	2032	4.27	22.76	1.97	0.00	2.57	2.57	3.32
2014	297	2033	4.15	22.88	1.97	0.00	2.84	2.84	3.31
2014	297	2034	4.21	22.81	1.97	0.00	2.97	2.97	3.31
2014	297	2035	4.17	22.87	1.97	0.00	2.77	2.77	3.31
2014	297	2036	4.16	22.84	1.97	0.00	2.77	2.77	3.30
2014	297	2037	4.25	22.76	1.97	0.00	2.62	2.62	3.30
2014	297	2038	4.25	22.73	1.97	0.00	2.71	2.71	3.30
2014	297	2039	4.30	22.69	1.97	0.00	2.46	2.46	3.29
2014	297	2040	4.21	22.81	1.97	0.00	2.62	2.62	3.29
2014	297	2041	4.16	22.88	1.97	0.00	2.92	2.92	3.28
2014	297	2042	4.13	22.93	1.98	0.00	3.04	3.04	3.28
2014	297	2043	4.16	22.96	1.97	0.00	2.85	2.85	3.27
2014	297	2044	4.14	23.02	1.97	0.00	2.94	2.94	3.27
2014	297	2045	4.13	23.03	1.97	0.00	2.86	2.86	3.27
2014	297	2046	4.16	22.93	1.97	0.00	2.94	2.94	3.26
2014	297	2047	4.15	22.94	1.97	0.00	3.00	3.00	3.26

Summary of CORRECTED DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **Lime Kiln**
Test No.: **TRS**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS average (ppm)	
2014	297	2048	4.18	22.87	1.97	0.00	2.79	2.79	3.26	
2014	297	2049	4.11	22.93	1.97	0.00	3.19	3.19	3.25	
2014	297	2050	4.11	22.95	1.97	0.00	3.25	3.25	3.25	
2014	297	2051	4.11	22.94	1.97	0.00	3.17	3.17	3.25	
2014	297	2052	4.14	22.86	1.97	0.00	3.42	3.42	3.25	
2014	297	2053	4.16	22.90	1.97	0.00	3.30	3.30	3.25	
2014	297	2054	4.12	22.91	1.97	0.00	3.48	3.48	3.24	
2014	297	2055	4.11	22.91	1.97	0.01	3.50	3.49	3.24	
2014	297	2056	4.18	22.81	1.97	0.04	3.30	3.26	3.24	
2014	297	2057	4.12	22.80	1.97	0.11	3.36	3.24	3.24	
2014	297	2058	4.09	22.84	1.99	0.20	3.54	3.34	3.24	
2014	297	2059	4.16	22.76	1.97	0.76	3.49	2.73	3.23	
2014	297	2100	4.13	22.77	1.98	0.90	3.49	2.59	3.23	
2014	297	2101	4.07	22.87	1.99	1.02	3.52	2.50	3.22	
2014	297	2102	4.05	22.95	1.99	1.35	3.79	2.44	3.21	
2014	297	2103	4.06	22.94	1.97	1.65	3.81	2.16	3.21	
2014	297	2104	4.07	22.96	1.99	1.63	3.91	2.28	3.20	
2014	297	2105	4.04	23.00	2.01	1.63	3.86	2.23	3.19	
2014	297	2106	3.96	23.13	1.98	1.67	4.09	2.42	3.19	
2014	297	2107	3.98	23.11	1.98	1.68	4.24	2.56	3.18	
2014	297	2108	3.96	23.17	1.98	1.68	4.30	2.62	3.18	
2014	297	2109	3.99	23.07	2.00	1.68	4.17	2.49	3.18	
2014	297	2110	3.97	23.07	2.00	1.68	4.41	2.73	3.17	
2014	297	2111	3.97	23.05	1.98	1.68	4.24	2.56	3.16	
2014	297	2112	4.01	22.95	2.00	1.68	4.40	2.72	3.16	
2014	297	2113	4.39	22.69	1.97	1.68	4.13	2.44	3.15	
2014	297	2114	4.29	22.73	1.98	1.68	3.59	1.91	3.14	
2014	297	2115	4.23	22.75	1.98	1.68	3.91	2.23	3.14	
AVERAGE:			4.05	23.24	2.97	1.16	3.60	2.46	6.31	Maximum

Note: Negative SO2, TRS + SO2, and TRS entries are set to zero.

Average for PM-2	4.09	23.06	3.01	6.06
Average for PM-3	4.04	23.28	1.98	1.68

Raw Data for: Northern Pulp Fall Source Testing

Test #1

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Recovery Boiler
Test: PM-1
Date: 17-Oct-14
Personnel: TBH/TF

Test Start: 9:10 AM
Test Finish: 11:20 AM

Particulate Collected from Filter (mg):	1093.1
Particulate Collected from Probe Wash (mg):	86.0
Particulate Collected from Impinger Wash (mg):	4.9
Total Particulate Collected (mg):	1184.0

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	961.3	633.0	328.3
2	100 mL H2O	890.9	701.2	189.7
3	Blank	742.3	716.9	25.4
4	200g Silica Gel	969.6	938.4	31.2
			Total Weight Gain (g)	574.6
			Moisture Volume (mL)	574.6

Parameters

Barometric Pressure, Pbar (in. Hg)	29.77	**O2, (%)**	5.5	**Stack Diameter, (in.)**	138	
Stack Static Pressure, Pstatic (in. H2O)	1.10	**CO2, (%)**	11.4	**Stack Area, (sq. ft.)**	103.87	
Ambient Temp, (°F)	69	**N2, (%)**	83.0	**Probe Length, (ft.)**	2	
H2O Volume Collected, Vw (mL)	574.6	**CO (ppm)**	#DIV/0!	**Nozzle Diameter, (in.)**	0.233	1-8 (0-233)
Total # Sampling Points,	24	**NOx (ppm)**	61.3	**Pitot Coefficient, (Cp)**	0.838	
Sampling Time per Point, (min)	5	**SO2 (ppm)**	0.0	**Gamma, meter constant**	1.040	
Readings Taken Every __ mins	2.5			**Port length (in.)**	6	
Regulatory Agency	NSENV					

	Traverse Point	Time (min)	Stack Gas Temp, Ts (°F)	S-type Pitot delta P (in. H2O)	Orifice delta H (in. H2O)	Gas Meter Volume (cu. ft.)	Gas Meter Temp Inlet (°F)	Gas Meter Temp Outlet (°F)
						44.050		
Traverse 1	**1-1**	2.5	153	0.62	0.86	45.300	58	58
		5	153	0.61	0.85	46.490	58	58
	1-2	7.5	153	0.59	0.82	47.660	59	60
		10	150	0.59	0.82	48.810	58	58
	1-3	12.5	153	0.61	0.85	50.010	59	58
		15	152	0.60	0.83	51.170	59	58
	1-4	17.5	150	0.59	0.82	52.340	60	58
		20	151	0.58	0.81	53.520	60	58
	1-5	22.5	152	0.60	0.83	54.700	60	58
		25	151	0.61	0.85	55.890	60	58
	1-6	27.5	151	0.60	0.83	57.050	61	58
		30	152	0.60	0.83	58.210	61	58
Traverse 2	**2-1**	32.5	152	0.60	0.83	59.390	62	58
		35	152	0.60	0.83	60.590	62	58
	2-2	37.5	154	0.61	0.85	61.750	62	59
		40	153	0.62	0.86	62.970	62	59
	2-3	42.5	153	0.62	0.86	64.170	63	59
		45	151	0.61	0.85	65.370	63	59
	3-4	47.5	150	0.62	0.87	66.580	62	59
		50	152	0.58	0.81	67.750	62	59
	3-5	52.5	152	0.61	0.85	68.940	62	59
		55	153	0.60	0.83	70.140	63	60
	3-6	57.5	152	0.61	0.85	71.310	63	60
		60	154	0.61	0.85	72.530	62	60
Traverse 3	**3-1**	62.5	151	0.61	0.85	73.710	61	61
		65	152	0.61	0.85	74.920	61	59
	3-2	67.5	154	0.64	0.89	76.150	61	60
		70	151	0.64	0.89	77.370	61	59
	3-3	72.5	152	0.63	0.88	78.590	61	60
		75	151	0.62	0.87	79.800	62	61
	3-4	77.5	151	0.62	0.87	81.030	62	60
		80	151	0.63	0.88	82.250	62	60
	3-5	82.5	150	0.63	0.88	83.460	62	60
		85	152	0.61	0.85	84.670	62	60
	3-6	87.5	151	0.62	0.87	85.890	63	60
		90	149	0.64	0.90	87.160	62	60
Traverse 4	**4-1**	92.5	148	0.61	0.86	88.390	62	60
		95	151	0.60	0.84	89.620	62	60
	4-2	97.5	153	0.62	0.86	90.870	62	60
		100	151	0.63	0.88	92.130	62	60
	4-3	102.5	151	0.63	0.88	93.390	62	60
		105	152	0.61	0.85	94.640	63	60
	4-4	107.5	150	0.63	0.88	95.910	63	60
		110	152	0.64	0.90	97.170	64	61
	4-5	112.5	152	0.63	0.88	98.450	63	61
		115	153	0.61	0.85	99.680	64	61
	4-6	117.5	153	0.63	0.88	100.940	64	61
		120	151	0.63	0.88	102.220	64	62

Calculations for Northern Pulp Fall Source Testing
Test #1

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Recovery Boiler
Test: PM-1
Date: 17-Oct-14
Personnel: TBH/TF

Calculated Parameters

Stack Gas Pressure, Ps (in.Hg)	29.85
Stack Gas Molecular Weight, Dry Basis, Md (lb/lb-mole)	30.05
Volume of Water Vapour Collected, Vwc (cu.ft)	27.581
Stack Gas Moisture Content (% as decimal)	0.307
Stack Gas Molecular Weight, Wet Basis, Ms (lb/lb-mole)	26.35

Isokineticity Checks

Check average **Within Criteria**

	Traverse Point	Time (min)	Stack Gas Temp, Ts (R)	S-type Pitot, delta P (in. H2O)	Orifice delta H (in. H2O)	Stack Gas Velocity, Us (ft/s)	Gas Meter: Meter Press., Pm (in. Hg)	Gas Meter: Avg. Temp, Tm (R)	Gas Meter: Volume, Vm (cu. ft.)	Vol. @ Ref., Vmc (cu. ft.)	Isokinetics I (%)
Traverse 1	**1-1**	2.5	613	0.62	0.86	49.71	29.83	518	1.250	1.344	100.52
		5	613	0.61	0.85	49.30	29.83	518	1.190	1.279	96.48
	1-2	7.5	613	0.59	0.82	48.49	29.83	520	1.170	1.254	96.16
		10	610	0.59	0.82	48.37	29.83	518	1.150	1.236	94.56
	1-3	12.5	613	0.61	0.85	49.30	29.83	519	1.200	1.289	97.19
		15	612	0.60	0.83	48.86	29.83	519	1.160	1.246	94.65
	1-4	17.5	610	0.59	0.82	48.37	29.83	519	1.170	1.255	96.02
		20	611	0.58	0.81	48.00	29.83	519	1.180	1.266	97.75
	1-5	22.5	612	0.60	0.83	48.86	29.83	519	1.180	1.266	96.19
		25	611	0.61	0.85	49.22	29.83	519	1.190	1.277	96.13
	1-6	27.5	611	0.60	0.83	48.82	29.83	520	1.160	1.243	94.39
		30	612	0.60	0.83	48.86	29.83	520	1.160	1.243	94.47
Traverse 2	**2-1**	32.5	612	0.60	0.83	48.86	29.83	520	1.180	1.264	96.01
		35	612	0.60	0.83	48.86	29.83	520	1.200	1.285	97.63
	2-2	37.5	614	0.61	0.85	49.34	29.83	521	1.160	1.241	93.67
		40	613	0.62	0.86	49.71	29.83	521	1.220	1.305	97.64
	2-3	42.5	613	0.62	0.86	49.71	29.83	521	1.200	1.283	95.95
		45	611	0.61	0.85	49.22	29.83	521	1.200	1.283	96.57
	3-4	47.5	610	0.62	0.87	49.59	29.83	521	1.210	1.295	96.61
		50	612	0.58	0.81	48.04	29.83	521	1.170	1.252	96.72
	3-5	52.5	612	0.61	0.85	49.26	29.83	521	1.190	1.273	95.94
		55	613	0.60	0.83	48.90	29.83	522	1.200	1.281	97.43
	3-6	57.5	612	0.61	0.85	49.26	29.83	522	1.170	1.249	94.14
		60	614	0.61	0.85	49.34	29.83	521	1.220	1.304	98.42
Traverse 3	**3-1**	62.5	611	0.61	0.85	49.22	29.83	521	1.180	1.261	94.96
		65	612	0.61	0.85	49.26	29.83	520	1.210	1.296	97.64
	3-2	67.5	614	0.64	0.89	50.54	29.83	521	1.230	1.316	96.98
		70	611	0.64	0.89	50.42	29.83	520	1.220	1.307	96.04
	3-3	72.5	612	0.63	0.88	50.07	29.83	521	1.220	1.305	96.79
		75	611	0.62	0.87	49.63	29.83	522	1.210	1.292	96.50
	3-4	77.5	611	0.62	0.87	49.63	29.83	521	1.230	1.315	98.19
		80	611	0.63	0.88	50.02	29.83	521	1.220	1.304	96.62
	3-5	82.5	610	0.63	0.88	49.98	29.83	521	1.210	1.293	95.75
		85	612	0.61	0.85	49.26	29.83	521	1.210	1.293	97.45
	3-6	87.5	611	0.62	0.87	49.63	29.83	522	1.220	1.303	97.30
		90	609	0.64	0.90	50.34	29.84	521	1.270	1.358	99.63
Traverse 4	**4-1**	92.5	608	0.61	0.86	49.10	29.83	521	1.230	1.315	98.74
		95	611	0.60	0.84	48.82	29.83	521	1.230	1.315	99.80
	4-2	97.5	613	0.62	0.86	49.71	29.83	521	1.250	1.336	99.95
		100	611	0.63	0.88	50.02	29.83	521	1.260	1.347	99.78
	4-3	102.5	611	0.63	0.88	50.02	29.83	521	1.260	1.347	99.78
		105	612	0.61	0.85	49.26	29.83	522	1.250	1.335	100.58
	4-4	107.5	610	0.63	0.88	49.98	29.83	522	1.270	1.356	100.40
		110	612	0.64	0.90	50.46	29.84	523	1.260	1.343	98.80
	4-5	112.5	612	0.63	0.88	50.07	29.83	522	1.280	1.366	101.26
		115	613	0.61	0.85	49.30	29.83	523	1.230	1.311	98.86
	4-6	117.5	613	0.63	0.88	50.11	29.83	523	1.260	1.343	99.66
		120	611	0.63	0.88	50.02	29.83	523	1.280	1.363	100.98
		Total	**Average**	**Average**	**Average**	**Average**	**Average**	**Average**	**Total**	**Total**	**Average**
		120	612	0.61	0.86	49.40	29.83	521	58.170	62.228	97.37

Combustion Gas Data for: Northern Pulp

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Recovery Boiler
Test: PM-1
Date: 17-Oct-14
Personnel: TBH/TF

Test Start: 10:30 AM
Test Finish: 11:00 AM

Time (min)	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
0	6.20	11.00	off scale	0	60
5	6.00	11.10	off scale	0	62
10	5.20	11.70	off scale	0	62
15	5.30	11.60	off scale	0	62
20	5.20	11.70	off scale	0	61
25	5.50	11.40	off scale	0	61
30	5.30	11.50	off scale	0	61
Average:	**5.5**	**11.4**	**#DIV/0!**	**0**	**61**

Raw Data For: Northern Pulp Fall Source Testing

Test #2

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Recovery Boiler
Test: PM-2
Date: 23-Oct-14
Personnel: NGM, MM, DH

Test Start: 12:24 PM
Test Finish: 2:24 AM

Particulate Collected from Filter (mg):	852.3
Particulate Collected from Probe Wash (mg):	164.1
Particulate Collected from Impinger Wash (mg):	3.3
Total Particulate Collected (mg):	1019.7

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	918.9	677.8	241.1
2	100 mL H2O	921.4	684.4	237.0
3	Blank	674.8	666.2	8.6
4	200g Silica Gel	873.7	857.2	16.5
			Total Weight Gain (g)	503.2
			Moisture Volume (mL)	503.2

Parameters

Barometric Pressure, Pbar (in. Hg)	29.91
Stack Static Pressure, Pstatic (in. H2O)	1.10
Ambient Temp, (°F)	55
H2O Volume Collected, Vw (mL)	503.2
Total # Sampling Points,	24
Sampling Time per Point, (min)	5
Readings Taken Every __ mins	2.5
Regulatory Agency	NSENV

O2, (%)	6.2
CO2, (%)	10.9
N2, (%)	82.9
CO(ppm)	2070.0
NOx (ppm)	59.3
SO2 (ppm)	0.0

Stack Diameter, (in.)	138
Stack Area, (sq. ft.)	103.87
Probe Length, (ft.)	2
Nozzle Diameter, (in.)	0.233
Pitot Coefficient, (Cp)	0.838
Gamma, meter constant	1.04
Port length (in.)	6

	Traverse Point	Time (min)	Stack Gas Temp, Ts (°F)	S-type Pitot delta P (in. H2O)	Orifice delta H (in. H2O)	Gas Meter Volume (cu. ft.)	Gas Meter Temp Inlet (°F)	Gas Meter Temp Outlet (°F)
						102.640		
Traverse 1	**1-1**	2.5	154	0.81	1.08	104.030	62	61
		5	153	0.72	0.96	105.350	63	61
	1-2	7.5	154	0.77	1.03	106.720	62	62
		10	154	0.78	1.04	108.080	63	62
	1-3	12.5	153	0.78	1.04	109.450	64	62
		15	153	0.77	1.03	110.830	64	62
	1-4	17.5	152	0.77	1.03	112.200	65	62
		20	153	0.78	1.04	113.580	65	62
	1-5	22.5	152	0.77	1.04	114.960	66	63
		25	152	0.80	1.08	116.340	67	63
	1-6	27.5	151	0.77	1.04	117.720	67	64
		30	153	0.80	1.08	119.100	67	63
Traverse 2	**2-1**	32.5	153	0.81	1.09	120.500	67	64
		35	152	0.69	0.93	121.800	68	64
	2-2	37.5	154	0.69	0.93	123.120	68	64
		40	153	0.67	0.90	124.420	68	65
	2-3	42.5	153	0.67	0.90	125.740	68	64
		45	154	0.66	0.89	127.000	68	65
	2-4	47.5	154	0.64	0.86	128.280	68	64
		50	152	0.65	0.88	129.540	69	64
	2-5	52.5	154	0.64	0.86	130.790	68	65
		55	152	0.61	0.82	132.040	68	64
	2-6	57.5	154	0.64	0.86	133.290	68	65
		60	154	0.62	0.83	134.520	67	65
Traverse 3	**3-1**	62.5	154	0.57	0.77	135.710	68	65
		65	154	0.60	0.81	136.930	68	65
	3-2	67.5	155	0.58	0.78	138.160	67	65
		70	154	0.55	0.74	139.300	67	64
	3-3	72.5	154	0.54	0.73	140.490	67	65
		75	154	0.62	0.83	141.730	67	65
	3-4	77.5	154	0.61	0.82	142.960	63	63
		80	153	0.60	0.80	144.170	63	63
	3-5	82.5	154	0.61	0.82	145.400	63	63
		85	154	0.61	0.82	146.620	64	63
	3-6	87.5	154	0.61	0.82	147.850	64	63
		90	155	0.59	0.79	149.060	64	63
Traverse 4	**4-1**	92.5	154	0.60	0.80	150.280	65	63
		95	154	0.61	0.82	151.520	65	65
	4-2	97.5	153	0.59	0.79	152.720	65	64
		100	154	0.58	0.78	153.930	65	63
	4-3	102.5	154	0.60	0.80	155.140	65	64
		105	154	0.60	0.80	156.350	66	63
	4-4	107.5	155	0.59	0.79	157.570	66	63
		110	154	0.58	0.78	158.780	67	64
	4-5	112.5	155	0.60	0.80	160.000	67	63
		115	153	0.61	0.82	161.230	67	63
	4-6	117.5	154	0.60	0.81	162.460	67	63
		120	153	0.59	0.79	163.680	68	64

Calculations for Northern Pulp Fall Source Testing
Test #2

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Recovery Boiler
Test: PM-2
Date: 23-Oct-14
Personnel: NGM, MM, DH

Calculated Parameters

Stack Gas Pressure, Ps (in.Hg)	29.99
Stack Gas Molecular Weight, Dry Basis, Md (lb/lb-mole)	29.99
Volume of Water Vapour Collected, Vwc (cu.ft)	24.154
Stack Gas Moisture Content (% as decimal)	0.271
Stack Gas Molecular Weight, Wet Basis, Ms (lb/lb-mole)	26.75

Isokineticity Checks

Check average **Within Criteria**

	Traverse Point	Time (min)	Stack Gas Temp, Ts (R)	S-type Pitot, delta P (in. H2O)	Orifice delta H (in. H2O)	Stack Gas Velocity, Us (ft/s)	Gas Meter: Meter Press., Pm (in. Hg)	Gas Meter: Avg. Temp, Tm (R)	Gas Meter: Volume, Vm (cu. ft.)	Vol. @ Ref., Vmc (cu. ft.)	Isokinetics I (%)
Traverse 1	**1-1**	2.5	614	0.81	1.08	56.31	29.99	522	1.390	1.492	93.32
		5	613	0.72	0.96	53.04	29.98	522	1.320	1.415	93.81
	1-2	7.5	614	0.77	1.03	54.90	29.98	522	1.370	1.469	94.24
		10	614	0.78	1.04	55.25	29.98	523	1.360	1.457	92.86
	1-3	12.5	613	0.78	1.04	55.21	29.98	523	1.370	1.466	93.38
		15	613	0.77	1.03	54.85	29.98	523	1.380	1.477	94.67
	1-4	17.5	612	0.77	1.03	54.81	29.98	524	1.370	1.465	93.82
		20	613	0.78	1.04	55.21	29.98	524	1.380	1.475	93.97
	1-5	22.5	612	0.77	1.04	54.81	29.98	525	1.380	1.473	94.32
		25	612	0.80	1.08	55.87	29.99	525	1.380	1.471	92.46
	1-6	27.5	611	0.77	1.04	54.76	29.98	526	1.380	1.470	94.07
		30	613	0.80	1.08	55.91	29.99	525	1.380	1.471	92.53
Traverse 2	**2-1**	32.5	613	0.81	1.09	56.26	29.99	526	1.400	1.491	93.21
		35	612	0.69	0.93	51.88	29.98	526	1.300	1.383	93.57
	2-2	37.5	614	0.69	0.93	51.97	29.98	526	1.320	1.404	95.17
		40	613	0.67	0.90	51.17	29.97	527	1.300	1.381	94.94
	2-3	42.5	613	0.67	0.90	51.17	29.97	526	1.320	1.404	96.49
		45	614	0.66	0.89	50.83	29.97	527	1.260	1.339	92.78
	2-4	47.5	614	0.64	0.86	50.05	29.97	526	1.280	1.361	95.80
		50	612	0.65	0.88	50.36	29.97	527	1.260	1.339	93.34
	2-5	52.5	614	0.64	0.86	50.05	29.97	527	1.250	1.328	93.47
		55	612	0.61	0.82	48.78	29.97	526	1.250	1.329	95.66
	2-6	57.5	614	0.64	0.86	50.05	29.97	527	1.250	1.328	93.47
		60	614	0.62	0.83	49.26	29.97	526	1.230	1.308	93.53
Traverse 3	**3-1**	62.5	614	0.57	0.77	47.23	29.96	527	1.190	1.264	94.27
		65	614	0.60	0.81	48.46	29.97	527	1.220	1.296	94.21
	3-2	67.5	615	0.58	0.78	47.69	29.97	526	1.230	1.308	96.76
		70	614	0.55	0.74	46.40	29.96	526	1.140	1.213	92.10
	3-3	72.5	614	0.54	0.73	45.97	29.96	526	1.190	1.265	96.93
		75	614	0.62	0.83	49.26	29.97	526	1.240	1.319	94.29
	3-4	77.5	614	0.61	0.82	48.86	29.97	523	1.230	1.316	94.83
		80	613	0.60	0.80	48.42	29.97	523	1.210	1.294	93.98
	3-5	82.5	614	0.61	0.82	48.86	29.97	523	1.230	1.316	94.83
		85	614	0.61	0.82	48.86	29.97	524	1.220	1.304	93.97
	3-6	87.5	614	0.61	0.82	48.86	29.97	524	1.230	1.314	94.74
		90	615	0.59	0.79	48.09	29.97	524	1.210	1.293	94.83
Traverse 4	**4-1**	92.5	614	0.60	0.80	48.46	29.97	524	1.220	1.302	94.65
		95	614	0.61	0.82	48.86	29.97	525	1.240	1.321	95.24
	4-2	97.5	613	0.59	0.79	48.02	29.97	525	1.200	1.280	93.72
		100	614	0.58	0.78	47.65	29.97	524	1.210	1.292	95.48
	4-3	102.5	614	0.60	0.80	48.46	29.97	525	1.210	1.290	93.79
		105	614	0.60	0.80	48.46	29.97	525	1.210	1.290	93.79
	4-4	107.5	615	0.59	0.79	48.09	29.97	525	1.220	1.301	95.44
		110	614	0.58	0.78	47.65	29.97	526	1.210	1.288	95.20
	4-5	112.5	615	0.60	0.80	48.50	29.97	525	1.220	1.300	94.55
		115	613	0.61	0.82	48.82	29.97	525	1.230	1.311	94.39
	4-6	117.5	614	0.60	0.81	48.46	29.97	525	1.230	1.311	95.25
		120	613	0.59	0.79	48.02	29.97	526	1.220	1.297	95.01
		Total	**Average**	**Average**	**Average**	**Average**	**Average**	**Average**	**Total**	**Total**	**Average**
		120	614	0.66	0.88	50.61	29.97	525	61.040	65.081	94.31

Combustion Gas Data for: Northern Pulp

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Recovery Boiler
Test: PM-2
Date: 23-Oct-14
Personnel: NGM, MM, DH

Test Start: 12:35 PM
Test Finish: 1:05 PM

Time (min)	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
0	5.80	11.30	1178	0	62
5	6.20	10.90	over	0	54
10	6.00	11.00	2962	0	62
15	6.30	10.90	over	0	63
20	6.10	10.90	over	0	58
25	6.30	10.70	over	0	58
30	6.40	10.70	over	0	58
Average:	**6.16**	**10.91**	**2070**	**0**	**59**

Raw Data For: Northern Pulp Fall Source Testing

Test #3

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Recovery Boiler
Test: PM-3
Date: 23-Oct-14
Personnel: NGM/MM/DH

Test Start: 4:33 PM
Test Finish: 6:33 PM

Particulate Collected from Filter (mg):	746.1
Particulate Collected from Probe Wash (mg):	343.0
Particulate Collected from Impinger Wash (mg):	7.2
Total Particulate Collected (mg):	1096.2

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	975.6	676.9	298.7
2	100 mL H2O	979.8	728.9	250.9
3	Blank	699.3	621.8	77.5
4	200g Silica Gel	858.0	836.4	21.6
			Total Weight Gain (g)	648.7
			Moisture Volume (mL)	648.7

Parameters

Barometric Pressure, Pbar (in. Hg)	29.83
Stack Static Pressure, Pstatic (in. H2O)	1.10
Ambient Temp, (°F)	53
H2O Volume Collected, Vw (mL)	648.7
Total # Sampling Points,	24
Sampling Time per Point, (min)	5
Readings Taken Every __ mins	2.5
Regulatory Agency	NSENV

O2, (%)	4.2
CO2, (%)	12.4
N2, (%)	83.4
CO(ppm)	#DIV/0!
NOx (ppm)	50.3
SO2 (ppm)	6.3

Stack Diameter, (in.)	138
Stack Area, (sq. ft.)	103.87
Probe Length, (ft.)	2
Nozzle Diameter, (in.)	0.233
Pitot Coefficient, (Cp)	0.838
Gamma, meter constant	1.04
Port length (in.)	6

	Traverse Point	Time (min)	Stack Gas Temp, Ts (°F)	S-type Pitot delta P (in. H2O)	Orifice delta H (in. H2O)	Gas Meter Volume (cu. ft.)	Gas Meter Temp Inlet (°F)	Gas Meter Temp Outlet (°F)
						163.990		
Traverse 1	**1-1**	2.5	154	0.58	0.81	165.240	62	60
		5	154	0.58	0.81	166.440	60	59
	1-2	7.5	153	0.56	0.78	167.650	60	60
		10	153	0.58	0.81	168.880	61	60
	1-3	12.5	152	0.58	0.81	170.120	62	60
		15	155	0.56	0.78	171.310	63	60
	1-4	17.5	154	0.58	0.81	172.540	63	62
		20	156	0.58	0.81	173.760	63	63
	1-5	22.5	155	0.58	0.81	174.960	64	61
		25	155	0.56	0.78	176.170	65	61
	1-6	27.5	156	0.58	0.81	177.380	66	61
		30	155	0.62	0.87	178.640	67	62
Traverse 2	**2-1**	32.5	156	0.62	0.86	179.890	66	62
		35	156	0.61	0.85	181.140	66	62
	2-2	37.5	154	0.59	0.83	182.480	67	62
		40	155	0.61	0.85	183.640	68	63
	2-3	42.5	154	0.59	0.83	184.880	68	63
		45	155	0.59	0.83	186.100	68	63
	2-4	47.5	156	0.57	0.80	187.300	68	63
		50	154	0.59	0.83	188.540	68	64
	2-5	52.5	156	0.60	0.84	189.780	69	64
		55	156	0.59	0.83	190.990	68	64
	2-6	57.5	158	0.59	0.82	192.180	68	64
		60	156	0.59	0.83	193.370	67	64
Traverse 3	**3-1**	62.5	156	0.59	0.82	194.550	67	62
		65	155	0.61	0.85	195.770	64	64
	3-2	67.5	156	0.59	0.82	196.960	66	64
		70	156	0.61	0.85	198.180	66	64
	3-3	72.5	156	0.59	0.82	199.380	66	64
		75	156	0.59	0.82	200.560	66	64
	3-4	77.5	156	0.59	0.82	201.780	67	64
		80	156	0.61	0.85	202.990	66	64
	3-5	82.5	155	0.59	0.83	203.950	66	64
		85	155	0.58	0.81	205.390	66	63
	3-6	87.5	155	0.59	0.83	206.580	66	63
		90	156	0.60	0.84	207.800	66	63
Traverse 4	**4-1**	92.5	157	0.59	0.82	209.000	66	64
		95	158	0.59	0.82	210.180	66	63
	4-2	97.5	154	0.61	0.85	211.420	65	63
		100	156	0.61	0.85	212.640	65	63
	4-3	102.5	156	0.61	0.85	213.850	66	63
		105	156	0.58	0.81	215.040	65	63
	4-4	107.5	156	0.62	0.86	216.270	65	63
		110	156	0.61	0.85	217.490	65	62
	4-5	112.5	155	0.60	0.84	218.700	65	63
		115	153	0.59	0.83	219.920	66	62
	4-6	117.5	155	0.60	0.84	221.140	65	62
		120	155	0.62	0.87	222.380	65	62

Calculations for Northern Pulp Fall Source Testing
Test #3

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Recovery Boiler
Test: PM-3
Date: 23-Oct-14
Personnel: NGM/MM/DH

Calculated Parameters

Stack Gas Pressure, Ps (in.Hg)	29.91
Stack Gas Molecular Weight, Dry Basis, Md (lb/lb-mole)	30.15
Volume of Water Vapour Collected, Vwc (cu.ft)	31.138
Stack Gas Moisture Content (% as decimal)	0.334
Stack Gas Molecular Weight, Wet Basis, Ms (lb/lb-mole)	26.09

Isokineticity Checks

Check average **Within Criteria**

	Traverse Point	Time (min)	Stack Gas Temp, Ts (R)	S-type Pitot, delta P (in. H2O)	Orifice delta H (in. H2O)	Stack Gas Velocity, Us (ft/s)	Meter Press., Pm (in. Hg)	Gas Meter Avg. Temp, Tm (R)	Gas Meter Volume, Vm (cu. ft.)	Vol. @ Ref., Vmc (cu. ft.)	Isokinetics I (%)
Traverse 1	**1-1**	2.5	614	0.58	0.81	48.30	29.89	521	1.250	1.338	107.12
		5	614	0.58	0.81	48.30	29.89	520	1.200	1.289	103.13
	1-2	7.5	613	0.56	0.78	47.42	29.89	520	1.210	1.298	105.64
		10	613	0.58	0.81	48.26	29.89	521	1.230	1.318	105.42
	1-3	12.5	612	0.58	0.81	48.22	29.89	521	1.240	1.328	106.09
		15	615	0.56	0.78	47.50	29.89	522	1.190	1.273	103.76
	1-4	17.5	614	0.58	0.81	48.30	29.89	523	1.230	1.313	105.11
		20	616	0.58	0.81	48.38	29.89	523	1.220	1.301	104.32
	1-5	22.5	615	0.58	0.81	48.34	29.89	523	1.200	1.281	102.63
		25	615	0.56	0.78	47.50	29.89	523	1.210	1.291	105.20
	1-6	27.5	616	0.58	0.81	48.38	29.89	524	1.210	1.289	103.37
		30	615	0.62	0.87	49.98	29.89	525	1.260	1.340	103.84
Traverse 2	**2-1**	32.5	616	0.62	0.86	50.02	29.89	524	1.250	1.331	103.20
		35	616	0.61	0.85	49.62	29.89	524	1.250	1.331	104.04
	2-2	37.5	614	0.59	0.83	48.72	29.89	525	1.340	1.425	113.10
		40	615	0.61	0.85	49.58	29.89	526	1.160	1.232	96.19
	2-3	42.5	614	0.59	0.83	48.72	29.89	526	1.240	1.316	104.46
		45	615	0.59	0.83	48.76	29.89	526	1.220	1.295	102.86
	2-4	47.5	616	0.57	0.80	47.96	29.89	526	1.200	1.274	103.01
		50	614	0.59	0.83	48.72	29.89	526	1.240	1.315	104.36
	2-5	52.5	616	0.60	0.84	49.21	29.89	527	1.240	1.314	103.56
		55	616	0.59	0.83	48.80	29.89	526	1.210	1.283	102.00
	2-6	57.5	618	0.59	0.82	48.88	29.89	526	1.190	1.262	100.48
		60	616	0.59	0.83	48.80	29.89	526	1.190	1.263	100.41
Traverse 3	**3-1**	62.5	616	0.59	0.82	48.80	29.89	525	1.180	1.255	99.76
		65	615	0.61	0.85	49.58	29.89	524	1.220	1.299	101.46
	3-2	67.5	616	0.59	0.82	48.80	29.89	525	1.190	1.265	100.51
		70	616	0.61	0.85	49.62	29.89	525	1.220	1.297	101.35
	3-3	72.5	616	0.59	0.82	48.80	29.89	525	1.200	1.275	101.35
		75	616	0.59	0.82	48.80	29.89	525	1.180	1.254	99.66
	3-4	77.5	616	0.59	0.82	48.80	29.89	526	1.220	1.295	102.94
		80	616	0.61	0.85	49.62	29.89	525	1.210	1.286	100.51
	3-5	82.5	615	0.59	0.83	48.76	29.89	525	0.960	1.020	81.02
		85	615	0.58	0.81	48.34	29.89	525	1.440	1.532	122.68
	3-6	87.5	615	0.59	0.83	48.76	29.89	525	1.190	1.266	100.52
		90	616	0.60	0.84	49.21	29.89	525	1.220	1.298	102.28
Traverse 4	**4-1**	92.5	617	0.59	0.82	48.84	29.89	525	1.200	1.275	101.43
		95	618	0.59	0.82	48.88	29.89	525	1.180	1.255	99.92
	4-2	97.5	614	0.61	0.85	49.54	29.89	524	1.240	1.320	103.04
		100	616	0.61	0.85	49.62	29.89	524	1.220	1.299	101.54
	4-3	102.5	616	0.61	0.85	49.62	29.89	525	1.210	1.287	100.61
		105	616	0.58	0.81	48.38	29.89	524	1.190	1.267	101.56
	4-4	107.5	616	0.62	0.86	50.02	29.89	524	1.230	1.310	101.54
		110	616	0.61	0.85	49.62	29.89	524	1.220	1.300	101.64
	4-5	112.5	615	0.60	0.84	49.17	29.89	524	1.210	1.288	101.46
		115	613	0.59	0.83	48.68	29.89	524	1.220	1.299	102.99
	4-6	117.5	615	0.60	0.84	49.17	29.89	524	1.220	1.300	102.39
		120	615	0.62	0.87	49.98	29.89	524	1.240	1.322	102.39
		Total	**Average**	**Average**	**Average**	**Average**	**Average**	**Average**	**Total**	**Total**	**Average**
		120	615	0.59	0.83	48.87	29.89	524	58.390	62.167	102.66

Combustion Gas Data for: Northern Pulp Fall Source Testing

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Recovery Boiler
Test: PM-3
Date: 23-Oct-14
Personnel: NGM/MM/DH

Test Start: 5:00 PM
Test Finish: 5:30 PM

Time (min)	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
0	4.70	12.00	over	13	36
5	4.30	12.30	over	7	45
10	4.30	12.30	over	11	44
15	3.80	12.70	over	13	40
20	4.00	12.60	over	0	57
25	4.30	12.40	over	0	64
30	4.30	12.30	over	0	66
Average:	**4.24**	**12.37**	**#DIV/0!**	**6**	**50**

DATA ENTRY

Northern Pulp

Recovery Boiler

Operating Conditions: Normal

Emission Control Equipment: Multicyclones

Stack Diameter: 3.5 m

Reference Temperature, Tref (F):	77
(K):	298
Reference Pressure, Pref (in.Hg):	29.92
(Bar):	1.0

Parameter	Symbol	Units	Test 1	Test 2	Test 3	Average
Test ID	**-**	**-**	PM-1	PM-2	PM-3	-
Date	**-**	**-**	17-Oct-14	23-Oct-14	23-Oct-14	n/a
Start Time	**-**	**-**	9:10 AM	12:24 PM	4:33 PM	n/a
End Time	**-**	**-**	11:20 AM	2:24 AM	6:33 PM	n/a
Total Sampling Time	**-**	**min**	120	120	120	120
Stack Diameter	**D**	**in.**	138	138	138	138
Average Stack Gas Temperature	**Ts**	**F**	152	154	155	153
Average Dry Gas Meter Temperature	**Tm**	**F**	61	65	64	63
Barometric Pressure	**Pbar**	**in.Hg**	29.8	29.9	29.8	29.8
Stack Static Pressure	**Pstatic**	**in.H2O**	1.10	1.10	1.10	1.10
Average Pressure Drop (Head)	**dP**	**in.H2O**	0.61	0.66	0.59	0.62
Average deltaH Orifice	**dH**	**in.H2O**	0.86	0.88	0.83	0.86
Average Meter Temperature	**Tm**	**F**	61	65	64	63
Gas Sample Volume	**Vm**	**cu.ft**	58.2	61.0	58.4	59.2
Average Isokinetics	**I**	**%**	97.4	94.3	102.7	98.1
Nozzle Diameter	**Dn**	**in.**	0.233	0.233	0.233	0.233
Pitot Coefficient	**Cp**	**-**	0.838	0.838	0.838	0.838
Gamma, meter constant	**y**	**-**	1.040	1.040	1.040	1.040
Reference Temperature	**Tref**	**R**	537	537	537	537
Reference Pressure	**Pref**	**in.Hg**	29.92	29.92	29.92	29.92
Stack Gas Oxygen Content	**Co2**	**%**	5.53	6.16	4.24	5.31
Stack Gas Carbon Dioxide Content	**Cco2**	**%**	11.4	10.9	12.4	11.6
Stack Gas Nitrogen Content	**Cn2**	**%**	83.0	82.9	83.4	83.1
Stack Gas Sulphur Dioxide Content	**Cso2**	**ppm**	0	0	6	2
Stack Gas Nitrogen Oxides Content	**Cnox**	**ppm**	61	59	50	57
Stack Gas Carbon Monoxide Content	**Cco**	**ppm**	Over	2070	Over	2070
Volume of Water Collected	**Vw**	**mL**	575	503	649	576
Particulate Collected from Filter	**-**	**mg**	1,093	852	746	897
Particulate Collected from Probe Wash	**-**	**mg**	86.0	164	343	198
Particulate Collected from Impinger Wash	**-**	**mg**	4.91	3.27	7.19	5.12
Total Particulate Collected (excluding impingers)	**Mp**	**mg**	1,179	1,016	1,089	1,095

Legend:

F - degrees Fahrenheit
K - degrees Kelvin
Bar - bars
in.Hg - inches of mercury
in. - inches
in.H2O - inches of water
cu.ft - cubic feet
R - degrees Rankin
NOx - as NO2

CALCULATIONS

Northern Pulp

Recovery Boiler

Operating Conditions: Normal

Emission Control Equipment: Multicyclones

Stack Diameter: 3.5 m

Variable	Symbol	Units	Calculation	Test 1	Test 2	Test 3	Average
Stack Area	As	sq.ft	As = Pi x ((D/12)^2)/ 4	103.87	103.87	103.87	103.87
		sq.m	As (sq.m) = As (sq.ft) x 0.0929	9.65	9.65	9.65	9.65
Barometric Pressure	Pbar	kPa	Pbar (kPa) = Pbar (in.Hg) x 3.386	100.8	101.3	101.0	101.0
Stack Static Pressure	Pstatic	kPa	Pstatic (kPa) = Pstatic (in.H2O) x 0.249	0.27	0.27	0.27	0.27
Avg. Stack Temperature	Ts	R	Ts (R) = Ts (F) + 460	612	614	615	613
Avg. Meter Temperature	Tm	R	Tm (R) = Tm (F) + 460	521	525	524	523
Nozzle Diameter	Dn	mm	Dn (mm) = Dn (in.) x 25.4	6	6	6	6
Gas Meter Pressure	Pm	in.Hg	Pm = Pbar + (dH / 13.6)	29.8	30.0	29.9	29.9
Sample Volume at Ref Cond	Vmc	cu.ft	Vmc = Tref/Pref x (Vm x Pm x y) / Tm	62.2	65.1	62.2	63.2
		cu.m	Vmc (cu.m) = 0.02832 x Vmc (cu.ft)	1.76	1.84	1.76	1.79
Volume of Water Vapour	Vwc	cu.ft	Vwc = 0.0480 x Vw	27.6	24.2	31.1	27.6
Water Fraction	Bwo	-	Bwo = Vwc / (Vwc + Vmc)	0.307	0.271	0.334	0.304
Molecular Weight, Dry	Md	lb/lb-mol	Md = 0.44 (Cco2) + 0.32 (Co2) + 0.28 (Cn2)	30.0	30.0	30.1	30.1
Molecular Weight, Wet	Ms	lb/lb-mol	Ms = Md (1 - Bwo) + (18 x Bwo)	26.3	26.7	26.1	26.4
Stack Pressure	Ps	in.Hg	Ps = Pbar + (Pstatic / 13.6)	29.9	30.0	29.9	29.9
Stack Gas Velocity	Us	ft/s	Us = 85.33 x Cp x ((dP x Ts)/(Ps x Ms))^0.5	49.4	50.6	48.9	49.6
		m/s	Us (m/s) = 0.3048 x Us (ft/s)	15.1	15.4	14.9	15.1
Actual Stack Gas Flow Rate	Q	acfm	Q = 60 x Us x As	307,860	315,398	304,595	309,284
Dry Stack Gas Flow Rate	Qs	Rcfm	Qs = Q x (1-Bwo) x (Tref/Ts) x (Ps/Pref)	186,833	201,798	177,062	188,564
		Rcms	Qs (Rcms) = 0.000472 x Qs (Rcfm)	88.2	95.2	83.6	89.0
Sulphur Dioxide - SO2							
SO2 Measured Concentration	Cso2	ppm	Measurement from Flue Gas Analyzer	ND	ND	6.29	6.29
Uncorrected @ Ref Cond	Cso2	mg/Rcm	Cso2 (mg/Rcm) = Cso2 (ppm) x 2.62	ND	ND	16.5	16.5
SO2 Emission Rate	ERso2	g/s	ERso2 = Cso2/1000 x Qs	ND	ND	1.38	1.38
		kg/hr	ERso2 (kg/hr) = 3.6 x ERso2 (g/s)	ND	ND	4.95	4.95
SO2 Concentration							
Corrected to 11% O2	Cso2	mg/Rcm	Cso2 (11% O2) = Cso2 (mg/Rcm) x (20.9-11) / (20.9-Co2)	ND	ND	9.79	9.79
Corrected to 3% O2	Cso2	mg/Rcm	Cso2 (3% O2) = Cso2 (mg/Rcm) x (20.9-3) / (20.9-Co2)	ND	ND	17.7	17.7
Corrected to 12% CO2	Cso2	mg/Rcm	Cso2 (12% CO2) = Cso2 (mg/Rcm) x (12/Cco2)	ND	ND	16.0	16.0
Nitrogen Oxides - NOx							
NOx Measured Concentration	Cnox	ppm	Measurement from Flue Gas Analyzer	61.3	59.3	50.3	57.0
Uncorrected @ Ref Cond	Cnox	mg/Rcm	Cnox (mg/Rcm) = Cnox (ppm) x 1.882	115	112	95	107
NOx Emission Rate	ERnox	g/s	ERnox = Cnox/1000 x Qs	10.2	10.6	7.91	9.57
		kg/hr	ERnox (kg/hr) = 3.6 x ERnox (g/s)	36.6	38.3	28.5	34.4
NOx Concentration							
Corrected to 11% O2	Cnox	mg/Rcm	Cnox (11% O2) = Cnox (mg/Rcm) x (20.9-11) / (20.9-Co2)	74.3	74.9	56.2	68.5
Corrected to 3% O2	Cnox	mg/Rcm	Cnox (3% O2) = Cnox (mg/Rcm) x (20.9-3) / (20.9-Co2)	134	135	102	124
Corrected to 12% CO2	Cnox	mg/Rcm	Cnox (12% CO2) = Cnox (mg/Rcm) x (12/Cco2)	121	123	91.8	112
Carbon Monoxide - CO							
CO Measured Concentration	Cco	ppm	Measurement from Flue Gas Analyzer	Over range	2,070	Over range	NA
Uncorrected @ Ref Cond	Cco	mg/Rcm	Cco (mg/Rcm) = Cco (ppm) x 1.145	NA	2,370	NA	2,370
CO Emission Rate	ERco	g/s	ERco = Cco/1000 x Qs	NA	226	NA	226
		kg/hr	ERco (kg/hr) = 3.6 x ERco (g/s)	NA	813	NA	813
CO Concentration							
Corrected to 11% O2	Cco	mg/Rcm	Cco (11% O2) = Cco (mg/Rcm) x (20.9-11) / (20.9-Co2)	NA	1,592	NA	>1,592
Corrected to 3% O2	Cco	mg/Rcm	Cco (3% O2) = Cco (mg/Rcm) x (20.9-3) / (20.9-Co2)	NA	6,890	NA	>6,890
Corrected to 12% CO2	Cco	mg/Rcm	Cco (12% CO2) = Cco (mg/Rcm) x (12/Cco2)	NA	2,606	NA	>2,606
Particulate Concentration	Cs	mg/Rcm	Cs = Mp / Vmc	669	552	619	613
Particulate Emission Rate	ERp	g/s	ERp = Cs/1000 x Qs	59.0	52.5	51.7	54.4
		kg/hr	ERp (kg/hr) = 3.6 x ERp (g/s)	212	189	186	196
Particulate Concentration							
Corrected to 11% O2	Cs	mg/Rcm	Cs (11% O2) = Cs x (20.9-11) / (20.9-Co2)	431	370	368	390
Corrected to 3% O2	Cs	mg/Rcm	Cs (3% O2) = Cs x (20.9-3) / (20.9-Co2)	779	670	665	704
Corrected to 12% CO2	Cs	mg/Rcm	Cs (12% CO2) = Cs x (12/Cco2)	703	606	600	636

Legend:

sq.ft - square feet
sq.m - square metres
Pi - 3.142
R - degrees Rankin
acfm - actual cubic feet per minute
Rcfm - dry reference cubic feet per minute
Rcms - dry reference cubic metres per second
ppm - parts per million
cu.m - cubic metres
Ref Cond - reference temperature and pressure (25 C and 101.3 kPa)
in.Hg - inches of mercury
cu.ft - cubic feet
mg/Rcm - miligrams per dry reference cubic metre
g/s - grams per second
NOx - as NO2

OFFICIAL STACK TESTING RESULTS
Northern Pulp
Recovery Boiler
Operating Conditions: Normal
Emission Control Equipment: Multicyclones
Stack Diameter: 3.5 m

Parameter	Test 1	Test 2	Test 3	Average	NSENV Limits
Test ID	PM-1	PM-2	PM-3	-	-
Test Date	17-Oct-14	23-Oct-14	23-Oct-14	-	-
Stack Gas Temperature (C)	66	68	68	67	-
Moisture Content (%)	30.7	27.1	33.4	30.4	-
Velocity (m/s)	15.1	15.4	14.9	15.1	-
Volumetric Flow (Rcms)	88.2	95.2	83.6	89.0	-
Oxygen - O2 (%)	5.53	6.16	4.24	5.31	-
Carbon Dioxide - CO2 (%)	11.4	10.9	12.4	11.6	-
Sulphur Dioxide - SO2					
SO2 Measured Concentration (ppm)	ND	ND	6.29	<6.29	-
Uncorrected at Ref Cond (mg/Rcm)	ND	ND	16.5	<16.5	-
Emission Rate (kg/hr)	ND	ND	4.95	<4.95	-
Nitrogen Oxides - NOx					
NOx Measured Concentration (ppm)	61.3	59.3	50.3	57.0	-
Uncorrected at Ref Cond (mg/Rcm)	115	112	94.6	107	-
Emission Rate (kg/hr)	36.6	38.3	28.5	34.4	-
Carbon Monoxide - CO					
CO Measured Concentration (ppm)	Over range	2,070	Over range	2,070	-
Uncorrected at Ref Cond (mg/Rcm)	NA	2,370	NA	2,370	-
Emission Rate (kg/hr)	NA	813	NA	813	-
Particulate Matter - PM					
Uncorrected at Ref Cond (mg/Rcm)	669	552	619	613	-
PM - Corrected to 11% O2 (mg/Rcm)	431	370	368	390	375
Particulate Emission Rate (kg/hr)	212	189	186	196	-

Legend: C - degrees Celsius
m/s - metres per second
Rcms - dry reference cubic metres per second
ppm - parts per million
Ref Cond - reference temperature and pressure (25 C and 1
mg/Rcm - miligrams per dry reference cubic metre
NOx - as NO2

Particulate Recoveries: Impinger Catch, Probe Wash, Filter Catch

Client: Northern Pulp
Facility: Pictou
Location: Recovery Boiler
Job Number: 121511269

IMPINGER CATCH

Container ID	Beaker Pre Weights (g) Date Analysed by Trial 1	Trial 2	Trial 3	Average	Sample ID	Recoveries Jar + Sample + Rinse (g)	Jar Tare (g)	Sample Collected (g)	Rinse Water (g)	Total Water (g)	Beaker Post Weights (g) Date Analysed by Trial 1	Trial 2	Trial 3	Average	Uncorrected Particulate Weight (g)	Corrected Particulate Weight (g)
I6	107.9290	107.9294		107.9292	PM-1	1100.0	455.8	644.2	13.5	13.5	107.9342	107.9342		107.9342	0.0050	0.0049
Q3	111.5963	111.5964		111.5964	PM-2	1075.5	456.5	619.0	10.8	10.8	111.5995	111.5999		111.5997	0.0034	0.0033
A3	110.3080	110.3083		110.3082	PM-3	1225.5	456.9	768.6	15.5	15.5	110.3154	110.3155		110.3155	0.0073	0.0072
																Conc. (g/mL)
F5	107.3464	107.3450		107.3457	WB	471.7	392.9	78.8		78.8	107.3465	107.3460		107.3463	0.0006	0.000007

Container ID	Beaker Pre Weights (g) Date Analysed by Trial 1	Trial 2	Trial 3	Average	Sample ID	Recoveries Jar + Acetone (g)	Jar Tare (g)	Recovered Acetone (g)	Rinse Acetone	Total Acetone (g)	Beaker Post Weights (g) Date Analysed by Trial 1	Trial 2	Trial 3	Average	Uncorrected Particulate Weight (g)	Corrected Particulate Weight (g)
A6	110.6389	110.6393		110.6391	PM-1	415.3	303.3	112.0	25.0	137.0	110.7285	110.7285		110.7285	0.0894	0.0860
S1	109.1762	109.1758		109.1760	PM-2	453.0	325.0	128.0	36.5	164.5	109.3444	109.3440		109.3442	0.1682	0.1641
K4	111.0096	111.0094		111.0095	PM-3	436.8	322.1	114.7	44.2	158.9	111.3566	111.3562		111.3564	0.3469	0.3430
																Conc. (g/mL)
V5	113.7144	113.7143		113.7144	AB	399.0	326.0	73.0		73.0	113.7159	113.7164		113.7162	0.0018	0.000019

Density of Acetone: 0.7850 g/ml

FILTER CATCH

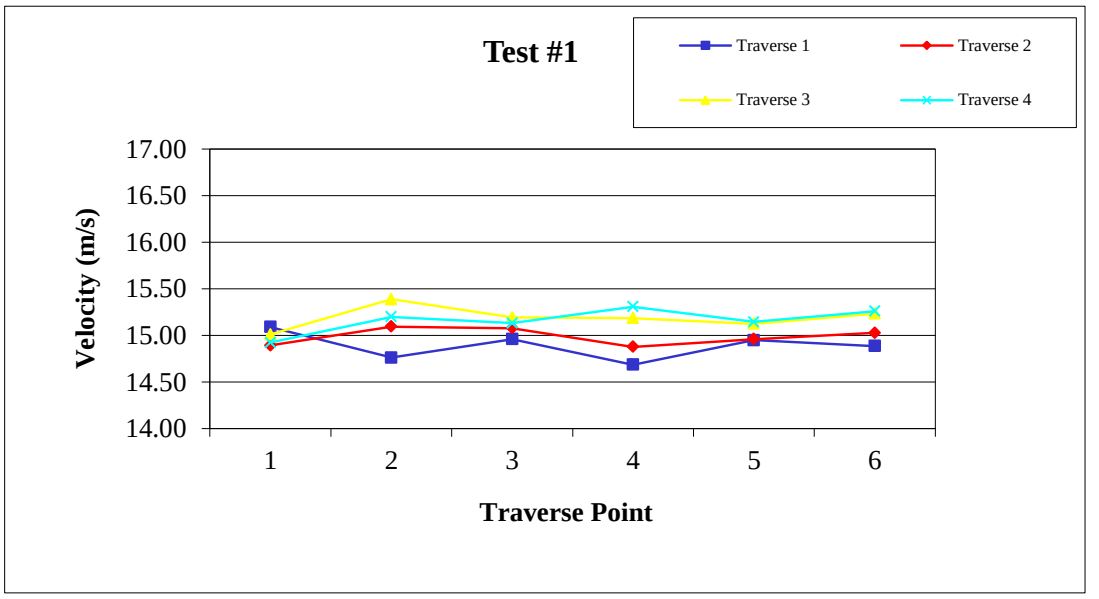
Filter ID	Pre Weights (g) Analysed by Trial 1	Trial 2	Trial 3	Average	Sample ID	Post Weights (g) Date: Analysed by Trial 1	Trial 2	Trial 3	Average	Particulate Weight from Filter (g)
0930-2	0.4125	0.4126		0.4126	PM-1	1.5057	1.5056		1.5057	1.0931
0919-08	0.4180	0.4175		0.4178	PM-2	1.2702	1.2699		1.2701	0.8523
0930-1	0.4160	0.4156		0.4158	PM-3	1.1616	1.1621		1.1619	0.7461

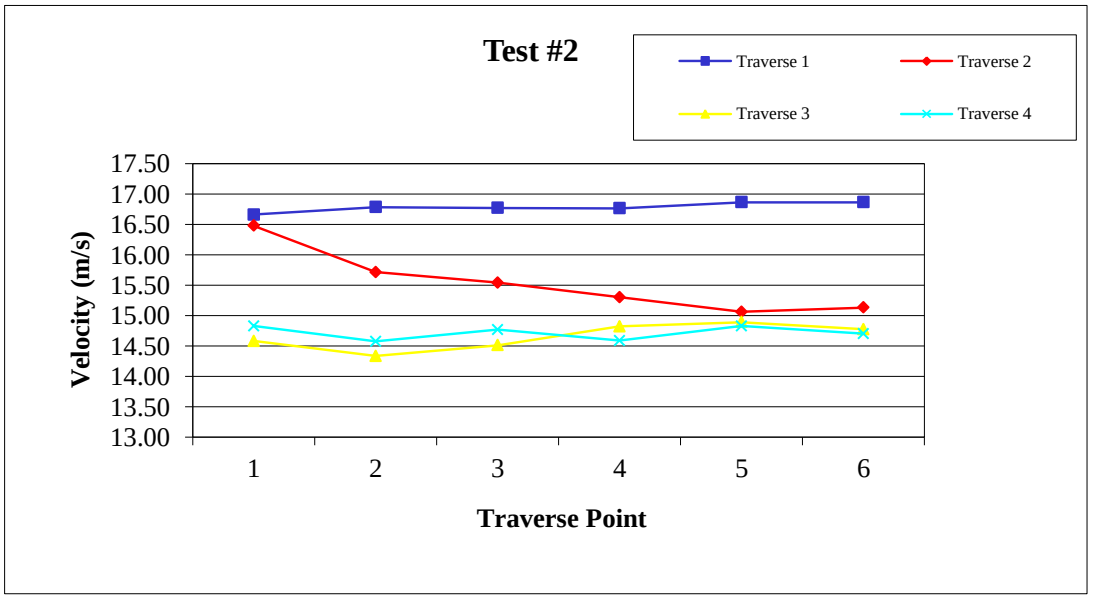
Northern Pulp
Pictou

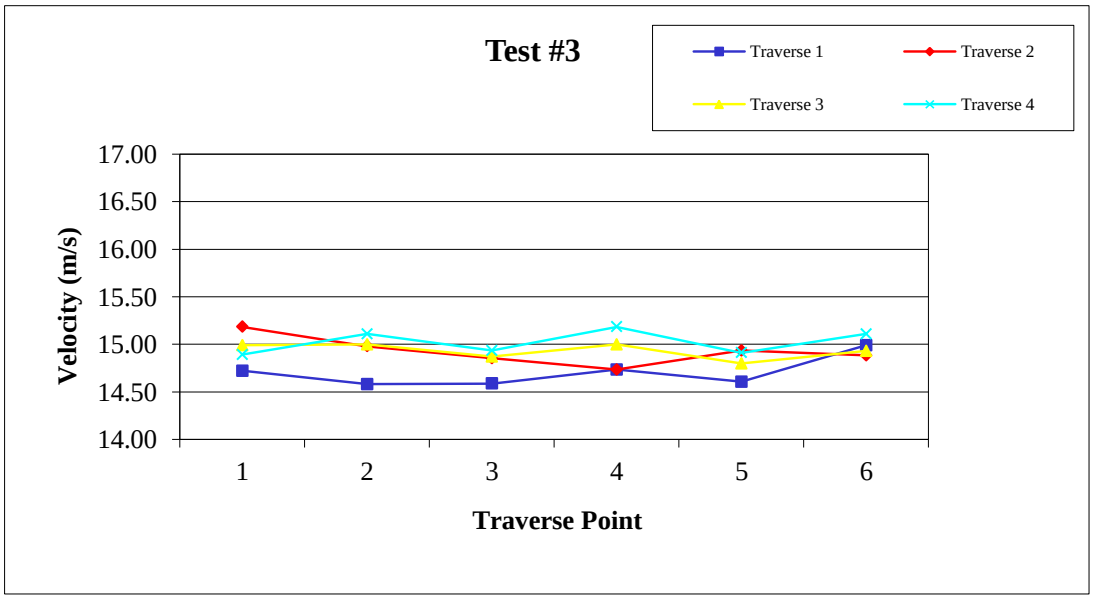
Job No. 121511269

Stack Gas Velocity Profiles

Recovery Boiler







Raw Data for: Northern Pulp Fall Source Testing

Test #1

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Dissolving Tank
Test: PM-1
Date: 17-Oct-14
Personnel: TBH/MM

Test Start: 9:00 AM
Test Finish: 11:30 AM

Particulate Collected from Filter (mg):	656.1
Particulate Collected from Probe Wash (mg):	239.1
Particulate Collected from Impinger Wash (mg):	58.8
Total Particulate Collected (mg):	954.0

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
0	blank	1001.2	568.5	432.7
1	100 mL H2O	1049.7	724.3	325.4
2	100 mL H2O	1015.1	704.3	310.8
3	Blank	621.7	569.5	52.2
4	200g Silica Gel	949.1	921.7	27.4
			Total Weight Gain (g)	1148.5
			Moisture Volume (mL)	1148.5

Parameters

Barometric Pressure, Pbar (in. Hg)	29.77	**O2, (%)**	20.9	**Stack Diameter, (in.)**	48		
Stack Static Pressure, Pstatic (in. H2O)	-0.20	**CO2, (%)**	0.0	**Stack Area, (sq. ft.)**	12.57		
Ambient Temp, (°F)	69	**N2, (%)**	79.1	**Probe Length, (ft.)**	5		
H2O Volume Collected, Vw (mL)	1148.5	**CO(ppm)**	0.0	**Nozzle Diameter, (in.)**	0.305	(1-10)	
Total # Sampling Points,	20	**NOx (ppm)**	0.0	**Pitot Coefficient, (Cp)**	0.836		
Sampling Time per Point, (min)	5	**SO2 (ppm)**	0.0	**Gamma, meter constant**	0.980		
Readings Taken Every __ mins	2.5			**Port length (in.)**	6		
Regulatory Agency	NSENV						

	Traverse Point	Time (min)	Stack Gas Temp, Ts (°F)	S-type Pitot delta P (in. H2O)	Orifice delta H (in. H2O)	Gas Meter Volume (cu. ft.)	Gas Meter Temp Inlet (°F)	Gas Meter Temp Outlet (°F)
						400.650		
Traverse 1	**1**	2.5	184	0.18	0.38	401.550	88	87
		5	197	0.17	0.36	402.410	90	87
	2	7.5	195	0.18	0.38	403.320	90	87
		10	195	0.21	0.45	404.280	90	87
	3	12.5	193	0.21	0.45	405.360	90	87
		15	182	0.15	0.33	406.120	91	88
	4	17.5	190	0.20	0.43	407.050	92	88
		20	191	0.18	0.39	407.950	92	88
	5	22.5	190	0.17	0.37	408.860	93	89
		25	192	0.17	0.37	409.750	93	89
	6	27.5	191	0.17	0.37	410.630	93	89
		30	193	0.16	0.34	411.490	93	89
	7	32.5	193	0.17	0.37	412.370	93	89
		35	181	0.15	0.32	413.210	93	90
	8	37.5	193	0.16	0.34	414.060	93	90
		40	193	0.16	0.34	414.920	94	90
	9	42.5	184	0.17	0.37	415.800	94	90
		45	196	0.04	0.09	416.340	94	90
	10	47.5	188	0.15	0.33	417.170	94	90
		50	193	0.16	0.34	418.080	94	90
Traverse 2	**1**	52.5	197	0.14	0.30	418.830	92	92
		55	195	0.15	0.32	419.660	93	92
	2	57.5	199	0.13	0.28	420.660	93	92
		60	198	0.21	0.45	421.420	93	92
	3	62.5	199	0.21	0.45	422.390	93	92
		65	177	0.05	0.11	422.950	93	92
	4	67.5	192	0.21	0.45	423.900	93	92
		70	195	0.20	0.43	424.870	93	92
	5	72.5	185	0.16	0.35	425.750	93	92
		75	193	0.20	0.43	426.710	93	92
	6	77.5	199	0.20	0.43	427.670	93	92
		80	196	0.20	0.43	428.630	93	91
	7	82.5	196	0.20	0.43	429.630	93	91
		85	200	0.20	0.43	430.580	93	92
	8	87.5	194	0.18	0.41	431.530	93	92
		90	201	0.17	0.36	432.430	93	91
	9	92.5	189	0.13	0.28	433.230	93	92
		95	188	0.13	0.28	434.020	93	92
	10	97.5	191	0.17	0.37	434.910	93	92
		100	193	0.17	0.37	435.840	93	92

Calculations for: Northern Pulp Fall Source Testing
Test #1

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Dissolving Tank
Test: PM-1
Date: 17-Oct-14
Personnel: TBH/MM

Calculated Parameters

Stack Gas Pressure, Ps (in.Hg)	29.75
Stack Gas Molecular Weight, Dry Basis, Md (lb/lb-mole)	28.84
Volume of Water Vapour Collected, Vwc (cu.ft)	55.128
Stack Gas Moisture Content (% as decimal)	0.622
Stack Gas Molecular Weight, Wet Basis, Ms (lb/lb-mole)	22.09

Isokineticity Checks

Check average **Outside of Criteria**

	Traverse Point	Time (min)	Stack Gas Temp, Ts (R)	S-type Pitot, delta P (in. H2O)	Orifice delta H (in. H2O)	Stack Gas Velocity, Us (ft/s)	Gas Meter: Meter Press., Pm (in. Hg)	Gas Meter: Avg. Temp, Tm (R)	Gas Meter: Volume, Vm (cu. ft.)	Gas Meter: Vol. @ Ref., Vmc (cu. ft.)	Isokinetics I (%)
Traverse 1	**1**	2.5	644	0.18	0.38	29.96	29.80	548	0.900	0.862	120.70
		5	657	0.17	0.36	29.41	29.80	549	0.860	0.822	119.64
	2	7.5	655	0.18	0.38	30.21	29.80	549	0.910	0.870	122.85
		10	655	0.21	0.45	32.63	29.80	549	0.960	0.917	120.01
	3	12.5	653	0.21	0.45	32.58	29.80	549	1.080	1.032	134.80
		15	642	0.15	0.33	27.30	29.79	550	0.760	0.725	111.06
	4	17.5	650	0.20	0.43	31.72	29.80	550	0.930	0.886	118.34
		20	651	0.18	0.39	30.12	29.80	550	0.900	0.858	120.80
	5	22.5	650	0.17	0.37	29.25	29.80	551	0.910	0.866	125.36
		25	652	0.17	0.37	29.29	29.80	551	0.890	0.847	122.79
	6	27.5	651	0.17	0.37	29.27	29.80	551	0.880	0.837	121.32
		30	653	0.16	0.34	28.44	29.79	551	0.860	0.818	122.39
	7	32.5	653	0.17	0.37	29.32	29.80	551	0.880	0.837	121.50
		35	641	0.15	0.32	27.28	29.79	552	0.840	0.798	122.20
	8	37.5	653	0.16	0.34	28.44	29.79	552	0.850	0.808	120.85
		40	653	0.16	0.34	28.44	29.79	552	0.860	0.816	122.16
	9	42.5	644	0.17	0.37	29.11	29.80	552	0.880	0.835	120.44
		45	656	0.04	0.09	14.25	29.78	552	0.540	0.512	153.67
	10	47.5	648	0.15	0.33	27.43	29.79	552	0.830	0.788	121.30
		50	653	0.16	0.34	28.44	29.79	552	0.910	0.864	129.27
Traverse 2	**1**	52.5	657	0.14	0.30	26.68	29.79	552	0.750	0.712	114.23
		55	655	0.15	0.32	27.58	29.79	553	0.830	0.787	121.84
	2	57.5	659	0.13	0.28	25.75	29.79	553	1.000	0.948	158.15
		60	658	0.21	0.45	32.71	29.80	553	0.760	0.721	94.53
	3	62.5	659	0.21	0.45	32.73	29.80	553	0.970	0.920	120.75
		65	637	0.05	0.11	15.70	29.78	553	0.560	0.531	140.34
	4	67.5	652	0.21	0.45	32.56	29.80	553	0.950	0.901	117.63
		70	655	0.20	0.43	31.85	29.80	553	0.970	0.920	123.35
	5	72.5	645	0.16	0.35	28.27	29.79	553	0.880	0.835	124.13
		75	653	0.20	0.43	31.80	29.80	553	0.960	0.911	121.89
	6	77.5	659	0.20	0.43	31.94	29.80	553	0.960	0.911	122.45
		80	656	0.20	0.43	31.87	29.80	552	0.960	0.912	122.28
	7	82.5	656	0.20	0.43	31.87	29.80	552	1.000	0.950	127.37
		85	660	0.20	0.43	31.97	29.80	553	0.950	0.901	121.26
	8	87.5	654	0.18	0.41	30.19	29.80	553	0.950	0.901	127.24
		90	661	0.17	0.36	29.49	29.80	552	0.900	0.854	124.79
	9	92.5	649	0.13	0.28	25.56	29.79	553	0.800	0.759	125.55
		95	648	0.13	0.28	25.54	29.79	553	0.790	0.749	123.89
	10	97.5	651	0.17	0.37	29.27	29.80	553	0.890	0.844	122.36
		100	653	0.17	0.37	29.32	29.80	553	0.930	0.882	128.06
		Total	**Average**	**Average**	**Average**	**Average**	**Average**	**Average**	**Total**	**Total**	**Average**
		100	652	0.17	0.36	28.89	29.80	551	35.190	33.447	123.84

Combustion Gas Data for: Northern Pulp

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Dissolving Tank
Test: PM-1
Date: 17-Oct-14
Personnel: TBH/MM

Test Start: 11:00 AM
Test Finish: 11:30 AM

Time (min)	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
0	20.90	0.00	0.0	0	0
5	20.90	0.00	0.0	0	0
10	20.90	0.00	0.0	0	0
15	20.90	0.00	0.0	0	0
20	20.90	0.00	0.0	0	0
25	20.90	0.00	0.0	0	0
30	20.90	0.00	0.0	0	0
Average:	**20.90**	**0.00**	**0.0**	**0**	**0**

Raw Data for: Northern Pulp Fall Source Testing

Test #2

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Dissolving Tank
Test: PM-2
Date: 20-Oct-14
Personnel: TBH/MM

Test Start: 1:55 PM
Test Finish: 4:30 PM

Particulate Collected from Filter (mg):	501.1
Particulate Collected from Probe Wash (mg):	173.1
Particulate Collected from Impinger Wash (mg):	35.8
Total Particulate Collected (mg):	709.9

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
0	blank	1016.2	615.7	400.5
1	100 mL H2O	1065.4	723.9	341.5
2	100 mL H2O	776.7	710.5	66.2
3	Blank	572.5	570.8	1.7
4	200g Silica Gel	954.9	947.6	7.3
			Total Weight Gain (g)	817.2
			Moisture Volume (mL)	817.2

Parameters

Barometric Pressure, Pbar (in. Hg)	29.71	**O2, (%)**	20.9	**Stack Diameter, (in.)**	48
Stack Static Pressure, Pstatic (in. H2O)	-0.20	**CO2, (%)**	0.0	**Stack Area, (sq. ft.)**	12.57
Ambient Temp, (°F)	45	**N2, (%)**	79.1	**Probe Length, (ft.)**	5
H2O Volume Collected, Vw (mL)	817.2	**CO(ppm)**	0.0	**Nozzle Diameter, (in.)**	0.305
Total # Sampling Points,	20	**NOx (ppm)**	0.0	**Pitot Coefficient, (Cp)**	0.836
Sampling Time per Point, (min)	5	**SO2 (ppm)**	0.0	**Gamma, meter constant**	0.98
Readings Taken Every __ mins	2.5			**Port length (in.)**	6
Regulatory Agency	NSENV				

	Traverse Point	Time (min)	Stack Gas Temp, Ts (°F)	S-type Pitot delta P (in. H2O)	Orifice delta H (in. H2O)	Gas Meter Volume (cu. ft.)	Gas Meter Temp Inlet (°F)	Gas Meter Temp Outlet (°F)
						436.380		
Traverse 1	**1**	2.5	183	0.20	0.42	437.300	78	78
		5	189	0.22	0.47	438.270	78	78
	2	7.5	189	0.21	0.44	439.230	78	78
		10	177	0.19	0.41	440.130	78	78
	3	12.5	184	0.21	0.45	441.100	78	78
		15	185	0.22	0.47	442.070	78	77
	4	17.5	185	0.22	0.47	443.010	78	78
		20	184	0.05	0.11	443.520	79	78
	5	22.5	185	0.18	0.38	444.390	79	78
		25	184	0.16	0.34	445.240	79	78
	6	27.5	186	0.17	0.36	446.100	79	78
		30	185	0.13	0.28	446.870	80	78
	7	32.5	172	0.11	0.24	447.560	80	78
		35	180	0.14	0.30	448.380	80	78
	8	37.5	187	0.15	0.32	449.190	80	78
		40	181	0.15	0.32	450.000	80	78
	9	42.5	177	0.14	0.30	450.790	80	78
		45	135	0.14	0.33	451.600	80	78
	10	47.5	156	0.14	0.31	452.400	80	78
		50	182	0.13	0.28	453.160	80	78
Traverse 2	**1**	52.5	183	0.23	0.49	454.210	80	79
		55	182	0.22	0.47	455.290	80	79
	2	57.5	182	0.23	0.49	456.180	80	78
		60	182	0.23	0.49	457.170	80	79
	3	62.5	183	0.23	0.49	458.160	80	79
		65	180	0.20	0.43	459.110	80	78
	4	67.5	180	0.21	0.45	460.030	80	78
		70	167	0.15	0.33	460.900	80	78
	5	72.5	163	0.15	0.33	461.730	81	79
		75	176	0.17	0.37	462.600	81	79
	6	77.5	178	0.15	0.32	463.410	81	78
		80	181	0.16	0.34	464.250	81	79
	7	82.5	183	0.16	0.34	465.080	80	79
		85	185	0.18	0.38	465.970	81	79
	8	87.5	183	0.17	0.36	466.820	81	79
		90	170	0.13	0.28	467.590	81	79
	9	92.5	182	0.17	0.36	468.450	81	79
		95	185	0.17	0.36	469.300	81	79
	10	97.5	185	0.17	0.36	470.160	81	79
		100	188	0.16	0.34	471.010	81	79

Calculations for: Northern Pulp Fall Source Testing
Test #2

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Dissolving Tank
Test: PM-2
Date: 20-Oct-14
Personnel: TBH/MM

Calculated Parameters

Stack Gas Pressure, Ps (in.Hg)	29.70
Stack Gas Molecular Weight, Dry Basis, Md (lb/lb-mole)	28.84
Volume of Water Vapour Collected, Vwc (cu.ft)	39.226
Stack Gas Moisture Content (% as decimal)	0.539
Stack Gas Molecular Weight, Wet Basis, Ms (lb/lb-mole)	23.00

Isokineticity Checks

Check average **Within Criteria**

	Traverse Point	Time (min)	Stack Gas Temp, Ts (R)	S-type Pitot, delta P (in. H2O)	Orifice delta H (in. H2O)	Stack Gas Velocity, Us (ft/s)	Meter Press., Pm (in. Hg)	Gas Meter Avg. Temp, Tm (R)	Gas Meter Volume, Vm (cu. ft.)	Gas Meter Vol. @ Ref., Vmc (cu. ft.)	Isokinetics I (%)
Traverse 1	**1**	2.5	643	0.20	0.42	30.95	29.74	538	0.920	0.895	99.31
		5	649	0.22	0.47	32.62	29.74	538	0.970	0.943	100.31
	2	7.5	649	0.21	0.44	31.87	29.74	538	0.960	0.933	101.60
		10	637	0.19	0.41	30.03	29.74	538	0.900	0.875	99.20
	3	12.5	644	0.21	0.45	31.74	29.74	538	0.970	0.943	102.27
		15	645	0.22	0.47	32.52	29.74	538	0.970	0.944	100.09
	4	17.5	645	0.22	0.47	32.52	29.74	538	0.940	0.914	96.90
		20	644	0.05	0.11	15.49	29.72	539	0.510	0.495	110.00
	5	22.5	645	0.18	0.38	29.41	29.74	539	0.870	0.845	99.04
		25	644	0.16	0.34	27.71	29.74	539	0.850	0.826	102.54
	6	27.5	646	0.17	0.36	28.61	29.74	539	0.860	0.835	100.81
		30	645	0.13	0.28	25.00	29.73	539	0.770	0.747	103.02
	7	32.5	632	0.11	0.24	22.76	29.73	539	0.690	0.669	99.34
		35	640	0.14	0.30	25.84	29.73	539	0.820	0.796	105.32
	8	37.5	647	0.15	0.32	26.89	29.73	539	0.810	0.786	101.06
		40	641	0.15	0.32	26.77	29.73	539	0.810	0.786	100.59
	9	42.5	637	0.14	0.30	25.78	29.73	539	0.790	0.766	101.23
		45	595	0.14	0.33	24.91	29.73	539	0.810	0.786	100.32
	10	47.5	616	0.14	0.31	25.35	29.73	539	0.800	0.776	100.81
		50	642	0.13	0.28	24.94	29.73	539	0.760	0.737	101.45
Traverse 2	**1**	52.5	643	0.23	0.49	33.20	29.74	540	1.050	1.018	105.41
		55	642	0.22	0.47	32.44	29.75	540	1.080	1.047	110.77
	2	57.5	642	0.23	0.49	33.17	29.75	539	0.890	0.864	89.36
		60	642	0.23	0.49	33.17	29.75	540	0.990	0.960	99.31
	3	62.5	643	0.23	0.49	33.20	29.74	540	0.990	0.960	99.37
		65	640	0.20	0.43	30.88	29.74	539	0.950	0.922	102.12
	4	67.5	640	0.21	0.45	31.64	29.73	539	0.920	0.893	96.49
		70	627	0.15	0.33	26.47	29.73	539	0.870	0.844	106.86
	5	72.5	623	0.15	0.33	26.39	29.74	540	0.830	0.804	101.44
		75	636	0.17	0.37	28.38	29.73	540	0.870	0.843	100.90
	6	77.5	638	0.15	0.32	26.70	29.74	540	0.810	0.785	100.27
		80	641	0.16	0.34	27.64	29.74	540	0.840	0.814	100.82
	7	82.5	643	0.16	0.34	27.69	29.75	540	0.830	0.805	99.90
		85	645	0.18	0.49	29.41	29.74	540	0.890	0.862	101.03
	8	87.5	643	0.17	0.36	28.54	29.74	540	0.850	0.823	99.15
		90	630	0.13	0.41	24.70	29.74	540	0.770	0.746	101.65
	9	92.5	642	0.17	0.36	28.52	29.74	540	0.860	0.833	100.22
		95	645	0.17	0.36	28.58	29.74	540	0.850	0.823	99.29
	10	97.5	645	0.17	0.36	28.58	29.74	540	0.860	0.833	100.45
		100	648	0.16	0.34	27.79	29.71	540	0.850	0.823	102.49
		Total	**Average**	**Average**	**Average**	**Average**	**Average**	**Average**	**Total**	**Total**	**Average**
		100	640	0.17	0.38	28.47	29.74	539	34.630	33.600	101.06

Combustion Gas Data for: Northern Pulp

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Dissolving Tank
Test: PM-2
Date: 20-Oct-14
Personnel: TBH/MM

Test Start: 2:30 PM
Test Finish: 3:00 PM

Time (min)	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
0	20.90	0.00	0.0	0	0
5	20.90	0.00	0.0	0	0
10	20.90	0.00	0.0	0	0
15	20.90	0.00	0.0	0	0
20	20.90	0.00	0.0	0	0
25	20.90	0.00	0.0	0	0
30	20.90	0.00	0.0	0	0
Average:	**20.90**	**0.00**	**0.0**	**0**	**0**

Raw Data for: Northern Pulp Fall Source Testing

Test #3

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Dissolving Tank
Test: PM-3
Date: 20-Oct-14
Personnel: TBH/MM

Test Start: 4:43 PM
Test Finish: 6:20 PM

Particulate Collected from Filter (mg):	584.7
Particulate Collected from Probe Wash (mg):	51.2
Particulate Collected from Impinger Wash (mg):	45.2
Total Particulate Collected (mg):	681.0

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
0	Blank	1037.0	665.5	371.5
1	100 mL H2O	1029.7	687.5	342.2
2	100 mL H2O	979.3	704.2	275.1
3	Blank	665.6	662.8	2.8
4	200g Silica Gel	1038.9	1030.9	8.0
			Total Weight Gain (g)	999.6
			Moisture Volume (mL)	999.6

Parameters

Barometric Pressure, Pbar (in. Hg)	29.79	**O2, (%)**	20.9	**Stack Diameter, (in.)**	48
Stack Static Pressure, Pstatic (in. H2O)	-0.20	**CO2, (%)**	0.0	**Stack Area, (sq. ft.)**	12.57
Ambient Temp, (°F)	42.00	**N2, (%)**	79.1	**Probe Length, (ft.)**	5
H2O Volume Collected, Vw (mL)	999.60	**CO(ppm)**	0.0	**Nozzle Diameter, (in.)**	0.305
Total # Sampling Points,	20	**NOx (ppm)**	0.0	**Pitot Coefficient, (Cp)**	0.836
Sampling Time per Point, (min)	5	**SO2 (ppm)**	0.0	**Gamma, meter constant**	0.98
Readings Taken Every __ mins	2.5			**Port length (in.)**	6
Regulatory Agency	NSENV				

	Traverse Point	Time (min)	Stack Gas Temp, Ts (°F)	S-type Pitot delta P (in. H2O)	Orifice delta H (in. H2O)	Gas Meter Volume (cu. ft.)	Gas Meter Temp Inlet (°F)	Gas Meter Temp Outlet (°F)
						473.640		
Traverse 1	**1**	2.5	196	0.24	0.50	474.650	79	79
		5	196	0.24	0.50	475.650	79	79
	2	7.5	200	0.27	0.56	476.720	80	79
		10	196	0.26	0.54	477.760	80	79
	3	12.5	182	0.20	0.42	478.660	80	79
		15	190	0.25	0.53	479.680	80	79
	4	17.5	191	0.23	0.49	480.680	81	79
		20	189	0.20	0.42	481.600	81	79
	5	22.5	191	0.18	0.38	482.490	81	79
		25	194	0.19	0.40	483.390	81	79
	6	27.5	189	0.16	0.34	484.230	82	80
		30	192	0.17	0.36	484.920	82	80
	7	32.5	191	0.10	0.21	485.700	82	80
		35	178	0.15	0.32	486.500	82	80
	8	37.5	190	0.16	0.34	487.350	82	80
		40	187	0.16	0.34	488.180	82	80
	9	42.5	193	0.16	0.34	489.020	82	80
		45	194	0.17	0.36	489.870	82	80
	10	47.5	198	0.18	0.38	490.750	82	80
		50	198	0.17	0.36	491.620	82	80
						491.620		
Traverse 2	**1**	52.5	192	0.16	0.34	492.460	81	80
		55	193	0.17	0.64	493.310	82	81
	2	57.5	190	0.06	0.13	493.850	82	80
		60	193	0.23	0.49	494.810	82	80
	3	62.5	196	0.23	0.48	495.800	82	80
		65	197	0.22	0.46	496.760	82	80
	4	67.5	196	0.22	0.46	497.740	83	80
		70	180	0.15	0.32	498.540	83	80
	5	72.5	181	0.17	0.37	499.410	83	81
		75	193	0.17	0.36	500.260	84	81
	6	77.5	194	0.18	0.38	501.150	84	81
		80	183	0.16	0.34	501.990	84	81
	7	82.5	195	0.17	0.36	502.850	85	81
		85	196	0.18	0.38	503.720	85	81
	8	87.5	199	0.19	0.40	504.630	85	81
		90	194	0.18	0.38	505.510	85	82
	9	92.5	178	0.14	0.30	506.300	85	82
		95	185	0.16	0.34	507.130	85	82
	10	97.5	186	0.16	0.34	507.980	86	82
		100	185	0.15	0.32	508.780	85	82

Calculations for: Northern Pulp Fall Source Testing
Test #3

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Dissolving Tank
Test: PM-3
Date: 20-Oct-14
Personnel: TBH/MM

Calculated Parameters

Stack Gas Pressure, Ps (in.Hg)	29.77
Stack Gas Molecular Weight, Dry Basis, Md (lb/lb-mole)	28.84
Volume of Water Vapour Collected, Vwc (cu.ft)	47.981
Stack Gas Moisture Content (% as decimal)	0.585
Stack Gas Molecular Weight, Wet Basis, Ms (lb/lb-mole)	22.50

Isokineticity Checks

Check average **Outside of Criteria**

	Traverse Point	Time (min)	Stack Gas Temp, Ts (R)	S-type Pitot, delta P (in. H2O)	Orifice delta H (in. H2O)	Stack Gas Velocity, Us (ft/s)	Meter Press., Pm (in. Hg)	Gas Meter Avg. Temp, Tm (R)	Gas Meter Volume, Vm (cu. ft.)	Vol. @ Ref., Vmc (cu. ft.)	Isokinetics I (%)
Traverse 1	**1**	2.5	656	0.24	0.50	34.59	29.82	539	1.010	0.983	110.47
		5	656	0.24	0.50	34.59	29.82	539	1.000	0.973	109.37
	2	7.5	660	0.27	0.56	36.79	29.83	540	1.070	1.041	110.59
		10	656	0.26	0.54	36.00	29.83	540	1.040	1.011	109.19
	3	12.5	642	0.20	0.42	31.23	29.82	540	0.900	0.875	106.55
		15	650	0.25	0.53	35.14	29.83	540	1.020	0.992	108.71
	4	17.5	651	0.23	0.49	33.73	29.82	540	1.000	0.971	111.09
		20	649	0.20	0.42	31.40	29.82	540	0.920	0.894	109.41
	5	22.5	651	0.18	0.38	29.84	29.81	540	0.890	0.864	111.73
		25	654	0.19	0.40	30.73	29.82	540	0.900	0.874	110.23
	6	27.5	649	0.16	0.34	28.09	29.81	541	0.840	0.814	111.46
		30	652	0.17	0.36	29.02	29.81	541	0.690	0.669	89.03
	7	32.5	651	0.10	0.21	22.24	29.80	541	0.780	0.756	131.08
		35	638	0.15	0.32	26.96	29.81	541	0.800	0.775	108.70
	8	37.5	650	0.16	0.34	28.11	29.81	541	0.850	0.824	112.87
		40	647	0.16	0.34	28.04	29.81	541	0.830	0.804	109.96
	9	42.5	653	0.16	0.34	28.17	29.81	541	0.840	0.814	111.80
		45	654	0.17	0.36	29.06	29.81	541	0.850	0.824	109.85
	10	47.5	658	0.18	0.38	30.00	29.81	541	0.880	0.853	110.86
		50	658	0.17	0.36	29.15	29.81	541	0.870	0.843	112.77
Traverse 2	**1**	52.5	652	0.16	0.34	28.15	29.81	541	0.840	0.815	111.82
		55	653	0.17	0.64	29.04	29.83	542	0.850	0.824	109.74
	2	57.5	650	0.06	0.13	17.21	29.80	541	0.540	0.523	117.04
		60	653	0.23	0.49	33.78	29.82	541	0.960	0.931	106.61
	3	62.5	656	0.23	0.48	33.86	29.82	541	0.990	0.960	110.19
		65	657	0.22	0.46	33.14	29.82	541	0.960	0.931	109.33
	4	67.5	656	0.22	0.46	33.11	29.82	542	0.980	0.949	111.42
		70	640	0.15	0.32	27.01	29.81	542	0.800	0.775	108.77
	5	72.5	641	0.17	0.37	28.77	29.81	542	0.870	0.842	111.11
		75	653	0.17	0.36	29.04	29.81	543	0.850	0.822	109.46
	6	77.5	654	0.18	0.38	29.91	29.81	543	0.890	0.860	111.47
		80	643	0.16	0.34	27.96	29.81	543	0.840	0.812	110.64
	7	82.5	655	0.17	0.36	29.09	29.81	543	0.860	0.831	110.81
		85	656	0.18	0.38	29.95	29.81	543	0.870	0.840	109.03
	8	87.5	659	0.19	0.40	30.84	29.82	543	0.910	0.879	111.26
		90	654	0.18	0.38	29.91	29.81	544	0.880	0.849	110.02
	9	92.5	638	0.14	0.30	26.05	29.81	544	0.790	0.762	110.59
		95	645	0.16	0.34	28.00	29.81	544	0.830	0.801	109.29
	10	97.5	646	0.16	0.34	28.02	29.81	544	0.850	0.819	111.91
		100	645	0.15	0.32	27.11	29.81	544	0.800	0.772	108.79
		Total	**Average**	**Average**	**Average**	**Average**	**Average**	**Average**	**Total**	**Total**	**Average**
		100	651	0.18	0.39	29.82	29.82	541	35.140	34.050	110.38

Combustion Gas Data for: Northern Pulp

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Dissolving Tank
Test: PM-3
Date: 20-Oct-14
Personnel: TBH/MM

Test Start: 8:30 AM
Test Finish: 9:00 AM

Time (min)	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
0	20.90	0.00	0.0	0	0
5	20.90	0.00	0.0	0	0
10	20.90	0.00	0.0	0	0
15	20.90	0.00	0.0	0	0
20	20.90	0.00	0.0	0	0
25	20.90	0.00	0.0	0	0
30	20.90	0.00	0.0	0	0
Average:	**20.90**	**0.00**	**0.0**	**0**	**0**

DATA ENTRY

Northern Pulp

Dissolving Tank

Operating Conditions: Normal

Stack Height from Grade: 51 m

Stack Diameter: 1.22 m

Reference Temperature, Tref (F):	77
(K):	298
Reference Pressure, Pref (in.Hg):	29.92
(Bar):	1.0

Parameter	Symbol	Units	Test 1	Test 2	Test 3	Average
Test ID	-	-	PM-1	PM-2	PM-3	-
Date	-	-	17-Oct-14	20-Oct-14	20-Oct-14	n/a
Start Time	-	-	9:00 AM	1:55 PM	4:43 PM	n/a
End Time	-	-	11:30 AM	4:30 PM	6:20 PM	n/a
Total Sampling Time	-	min	100	100	100	100
Stack Diameter	D	in.	48	48	48	48
Average Stack Gas Temperature	Ts	F	192	180	191	188
Average Dry Gas Meter Temperature	Tm	F	91	79	81	84
Barometric Pressure	Pbar	in.Hg	29.77	29.71	29.79	29.76
Stack Static Pressure	Pstatic	in.H2O	-0.20	-0.20	-0.20	-0.20
Average Pressure Drop (Head)	dP	in.H2O	0.17	0.17	0.18	0.17
Average deltaH Orifice	dH	in.H2O	0.36	0.38	0.39	0.38
Average Meter Temperature	Tm	F	91	79	81	84
Gas Sample Volume	Vm	cu.ft	35.19	34.63	35.14	34.99
Average Isokinetics	I	%	123.8	101.1	110	112
Nozzle Diameter	Dn	in.	0.305	0.305	0.305	0.305
Pitot Coefficient	Cp	-	0.836	0.836	0.836	0.836
Gamma, meter constant	y	-	0.980	0.980	0.980	0.980
Reference Temperature	Tref	R	537	537	537	537
Reference Pressure	Pref	in.Hg	29.92	29.92	29.92	29.92
Stack Gas Oxygen Content	Co2	%	20.9	20.9	20.9	20.9
Stack Gas Carbon Dioxide Content	Cco2	%	0.0	0.0	0.0	0.0
Stack Gas Nitrogen Content	Cn2	%	79.1	79.1	79.1	79.1
Stack Gas Sulphur Dioxide Content	Cso2	ppm	0.0	0.0	0.0	0.0
Stack Gas Nitrogen Oxides Content	Cnox	ppm	0.0	0.0	0.0	0.0
Stack Gas Carbon Monoxide Content	Cco	ppm	0.0	0.0	0.0	0.0
Volume of Water Collected	Vw	mL	1,149	817	1,000	988
Particulate Collected from Filter	-	mg	656	501	584.7	581
Particulate Collected from Probe Wash	-	mg	239	173	51.2	154
Particulate Collected from Impinger Wash	-	mg	58.8	35.8	45.2	46.6
Total Particulate Collected (excluding impingers)	Mp	mg	895	674	636	735

Legend:

F - degrees Fahrenheit
K - degrees Kelvin
Bar - bars
in.Hg - inches of mercury
in. - inches
in.H2O - inches of water
cu.ft - cubic feet
R - degrees Rankin
NOx - as NO2

CALCULATIONS

Northern Pulp

Dissolving Tank

Operating Conditions: Normal

Stack Height from Grade: 51 m

Stack Diameter: 1.22 m

Variable	Symbol	Units	Calculation	Test 1	Test 2	Test 3	Average
Stack Area	As	sq.ft sq.m	As = Pi x ((D/12)^2)/ 4 As (sq.m) = As (sq.ft) x 0.0929	12.57 1.17	12.57 1.17	12.57 1.17	12.57 1.17
Barometric Pressure	Pbar	kPa	Pbar (kPa) = Pbar (in.Hg) x 3.386	100.8	100.6	100.9	100.8
Stack Static Pressure	Pstatic	kPa	Pstatic (kPa) = Pstatic (in.H2O) x 0.249	-0.05	-0.05	-0.05	-0.05
Avg. Stack Temperature	Ts	R	Ts (R) = Ts (F) + 460	652	640	651	648
Avg. Meter Temperature	Tm	R	Tm (R) = Tm (F) + 460	551	539	541	543.9
Nozzle Diameter	Dn	mm	Dn (mm) = Dn (in.) x 25.4	8	8	8	8
Gas Meter Pressure	Pm	in.Hg	Pm = Pbar + (dH / 13.6)	29.80	29.74	29.82	29.78
Sample Volume at Ref Cond	Vmc	cu.ft	Vmc = Tref/Pref x (Vm x Pm x y) / Tm	33.44	33.60	34.05	33.7
		cu.m	Vmc (cu.m) = 0.02832 x Vmc (cu.ft)	0.95	0.95	0.96	0.95
Volume of Water Vapour	Vwc	cu.ft	Vwc = 0.0480 x Vw	55.1	39.2	48.0	47.4
Water Fraction	Bwo	-	Bwo = Vwc / (Vwc + Vmc)	0.62	0.54	0.58	0.58
Molecular Weight, Dry	Md	lb/lb-mol	Md = 0.44 (Cco2) + 0.32 (Co2) + 0.28 (Cn2)	28.8	28.8	28.8	28.8
Molecular Weight, Wet	Ms	lb/lb-mol	Ms = Md (1 - Bwo) + (18 x Bwo)	22.1	23.0	22.5	22.5
Stack Pressure	Ps	in.Hg	Ps = Pbar + (Pstatic / 13.6)	29.8	29.7	29.8	29.7
Stack Gas Velocity	Us	ft/s	Us = 85.33 x Cp x ((dP x Ts)/(Ps x Ms))^0.5	28.9	28.5	29.8	29.1
		m/s	Us (m/s) = 0.3048 x Us (ft/s)	8.81	8.68	9.09	8.86
Actual Stack Gas Flow Rate	Q	acfm	Q = 60 x Us x As	21,781	21,466	22,484	21,910
Dry Stack Gas Flow Rate	Qs	Rcfm	Qs = Q x (1-Bwo) x (Tref/Ts) x (Ps/Pref)	6,734	8,253	7,660	7,549
		Rcms	Qs (Rcms) = 0.000472 x Qs (Rcfm)	3.18	3.90	3.62	3.56
Sulphur Dioxide - SO2							
SO2 Measured Concentration	Cso2	ppm	Measurement from Flue Gas Analyzer	ND	ND	ND	ND
Uncorrected @ Ref Cond	Cso2	mg/Rcm	Cso2 (mg/Rcm) = Cso2 (ppm) x 2.62	ND	ND	ND	ND
SO2 Emission Rate	ERso2	g/s	ERso2 = Cso2/1000 x Qs	ND	ND	ND	ND
		kg/hr	ERso2 (kg/hr) = 3.6 x ERso2 (g/s)	ND	ND	ND	ND
Nitrogen Oxides - NOx							
NOx Measured Concentration	Cnox	ppm	Measurement from Flue Gas Analyzer	ND	ND	ND	ND
Uncorrected @ Ref Cond	Cnox	mg/Rcm	Cnox (mg/Rcm) = Cnox (ppm) x 1.882	ND	ND	ND	ND
NOx Emission Rate	ERnox	g/s	ERnox = Cnox/1000 x Qs	ND	ND	ND	ND
		kg/hr	ERnox (kg/hr) = 3.6 x ERnox (g/s)	ND	ND	ND	ND
Carbon Monoxide - CO							
CO Measured Concentration	Cco	ppm	Measurement from Flue Gas Analyzer	ND	ND	ND	ND
Uncorrected @ Ref Cond	Cco	mg/Rcm	Cco (mg/Rcm) = Cco (ppm) x 1.145	ND	ND	ND	ND
CO Emission Rate	ERco	g/s	ERco = Cco/1000 x Qs	ND	ND	ND	ND
		kg/hr	ERco (kg/hr) = 3.6 x ERco (g/s)	ND	ND	ND	ND
Particulate Concentration	Cs	mg/Rcm	Cs = Mp / Vmc	945	708	659	771
Particulate Emission Rate	ERp	g/s	ERp = Cs/1000 x Qs	3.00	2.76	2.38	2.72
		kg/hr	ERp (kg/hr) = 3.6 x ERp (g/s)	10.81	9.93	8.58	9.78
Emission Metric		adubmt/day		984	712	712	803
Emission Metric		kg/adubmt		0.26	0.33	0.29	0.30

Legend:

sq.ft - square feet
sq.m - square metres
Pi - 3.142
R - degrees Rankin
ppm - parts per million
in.Hg - inches of mercury
cu.ft - cubic feet
cu.m - cubic metres
Ref Cond - reference temperature and pressure (25 C and 101.3 kPa)
Rcms - dry reference cubic metres per second
Rcfm - dry reference cubic feet per minute
mg/Rcm - miligrams per dry reference cubic metre
g/s - grams per second
NOx - as NO2
acfm - actual cubic feet per minute
adubmt - air dried unbleached metric tonnes

OFFICIAL STACK TESTING RESULTS
Northern Pulp
Dissolving Tank

Operating Conditions: Normal
Stack Height from Grade: 51 m
Stack Diameter: 1.22 m

Parameter	Test 1	Test 2	Test 3	Average	NSENV Limits
Test ID	PM-1	PM-2	PM-3	-	-
Test Date	17-Oct-14	20-Oct-14	20-Oct-14	-	-
Stack Gas Temperature (C)	89	82	88	86	-
Moisture Content (%)	62.2	53.9	58.5	58.2	-
Velocity (m/s)	8.81	8.68	9.09	8.86	-
Volumetric Flow (Rcms)	3.18	3.90	3.62	3.56	-
Oxygen - O2 (%)	20.9	20.9	20.9	20.9	-
Carbon Dioxide - CO2 (%)	0.0	0.0	0.0	0.0	-
Sulphur Dioxide - SO2					
SO2 Measured Concentration (ppm)	ND	ND	ND	ND	-
Uncorrected at Ref Cond (mg/Rcm)	ND	ND	ND	ND	-
Emission Rate (kg/hr)	ND	ND	ND	ND	-
Nitrogen Oxides - NOx					
NOx Measured Concentration (ppm)	ND	ND	ND	ND	-
Uncorrected at Ref Cond (mg/Rcm)	ND	ND	ND	ND	-
Emission Rate (kg/hr)	ND	ND	ND	ND	-
Carbon Monoxide - CO					
CO Measured Concentration (ppm)	ND	ND	ND	ND	-
Uncorrected at Ref Cond (mg/Rcm)	ND	ND	ND	ND	-
Emission Rate (kg/hr)	ND	ND	ND	ND	-
Particulate Matter - PM					
Particulate Concentration (mg/Rcm)	945	708	659	771	-
Particulate Emission Rate (kg/hr)	10.8	9.93	8.58	9.78	-
Particulate Emission Rate (kg/ADUBMT)	0.26	0.33	0.29	0.30	0.50

Legend:
C - degrees Celsius
m/s - metres per second
Rcms - dry reference cubic metres per second
ppm - parts per million
ADUBMT - air dried unbleached metric tonnes
Ref Cond - reference temperature and pressure (25 C and 101.3 kPa)
mg/Rcm - miligrams per dry reference cubic metre
NOx - as NO2
ND - non-detectable

Particulate Recoveries: Impinger Catch, Probe Wash, Filter Catch

Client: Northern Pulp
Facility: Pictou
Location: Dissolving Tank
Job Number: 121511269

IMPINGER CATCH

Container ID	Beaker Pre Weights (g) Analysed by Trial 1	Trial 2	Trial 3	Average	Sample ID	Recoveries Jar + Sample + Rinse (g)	Jar Tare (g)	Sample Collected (g)	Rinse Water (g)	Total Rinse Water (g)	Beaker Post Weights (g) Date Analysed by Trial 1	Trial 2	Trial 3	Average	Uncorrected Particulate Weight (g)	Corrected Particulate Weight (g)
R2	112.1435	112.1430		112.1433	PM-1	1981.2	785.0	1196.2	16.8	16.8	112.2023	112.2020		112.2022	0.0589	0.0588
O4	113.2926	113.2912		113.2919	PM-2	1308.8	392.7	916.1	10.1	10.1	113.3280	113.3276		113.3278	0.0359	0.0358
R3	113.6040	113.6040		113.6040	PM-3	1934.9	848.5	1086.4	14.6	29.2	113.6495	113.6493		113.6494	0.0454	0.0452
																Conc. (g/mL)
F5	107.3464	107.3450		107.3457	WB	471.7	392.9	78.8		78.8	107.3465	107.3460		107.3463	0.0006	0.000007

PROBE WASH

Container ID	Beaker Pre Weights (g) Analysed by Trial 1	Trial 2	Trial 3	Average	Sample ID	Recoveries Jar + Acetone (g)	Jar Tare (g)	Recovered Acetone (g)	Rinse Acetone	Total Acetone (g)	Beaker Post Weights (g) Date Analysed by Trial 1	Trial 2	Trial 3	Average	Uncorrected Particulate Weight (g)	Corrected Particulate Weight (g)
O5	111.9725	111.9713		111.9719	PM-1	452.0	325.9	126.1	33.1	159.2	112.2151	112.2148		112.2150	0.2430	0.2391
H3	109.1998	109.1999		109.1999	PM-2	455.4	325.2	130.2	19.4	149.6	109.3766	109.3766		109.3766	0.1767	0.1731
P5	112.4401	112.4405		112.4403	PM-3	407.6	302.8	104.8	22.2	127.0	112.4947	112.4945		112.4946	0.0543	0.0512
																Conc. (g/mL)
V5	113.7144	113.7143		113.7144	AB	399.0	326.0	73.0		73.0	113.7159	113.7164		113.7162	0.0018	0.000019

Density of Acetone: 0.7850 g/ml

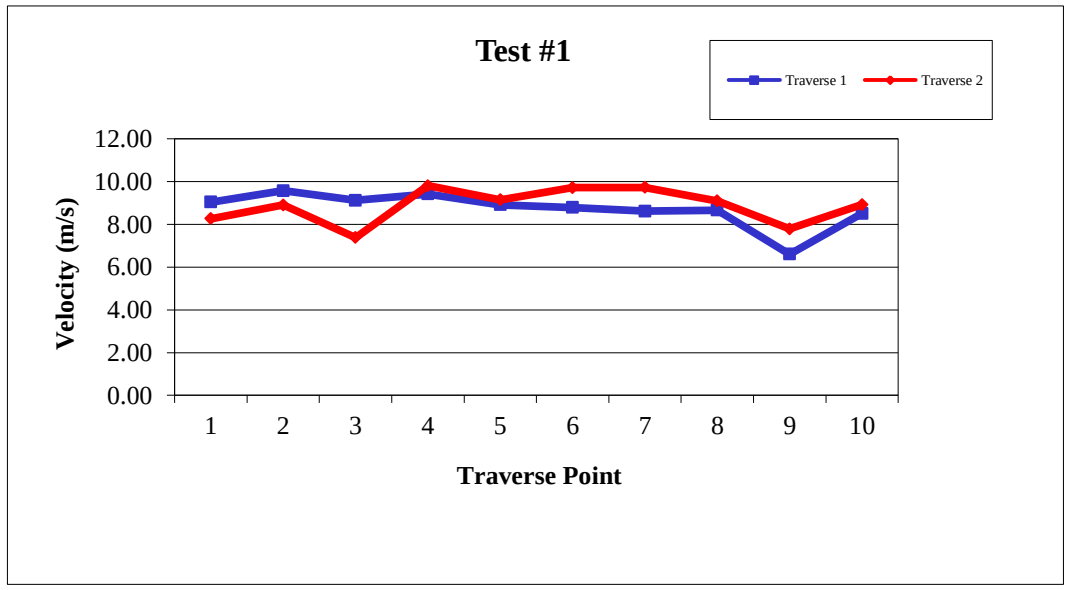
FILTER CATCH

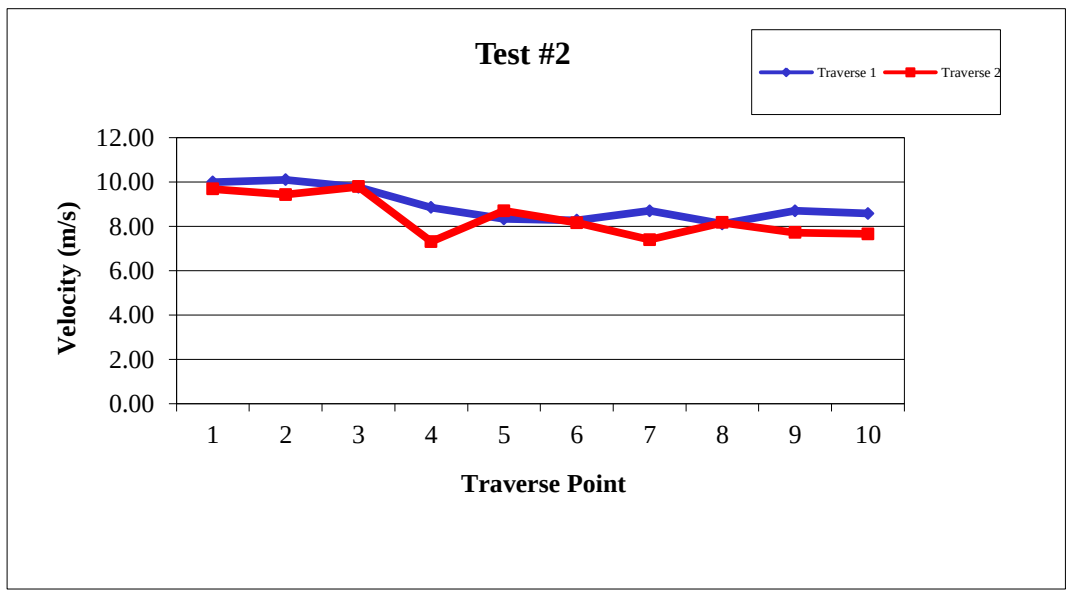
Filter ID	Pre Weights (g) Analysed by Trial 1	Trial 2	Trial 3	Average	Sample ID	Post Weights (g) Analysed by Trial 1	Trial 2	Trial 3	Average	Particulate Weight from Filter (g)
0930-5	0.4211	0.4209		0.4210	PM-1	1.0768	1.0773		1.0771	0.6561
0930-8	0.4094	0.4090		0.4092	PM-2	0.9100	0.9105		0.9103	0.5011
0930-6	0.4106	0.4106		0.4106	PM-3 1	0.4516	0.4521		0.4519	0.0413
0919-05	0.4148	0.4148		0.4148	PM-3 2	0.9582	0.9582		0.9582	0.5434

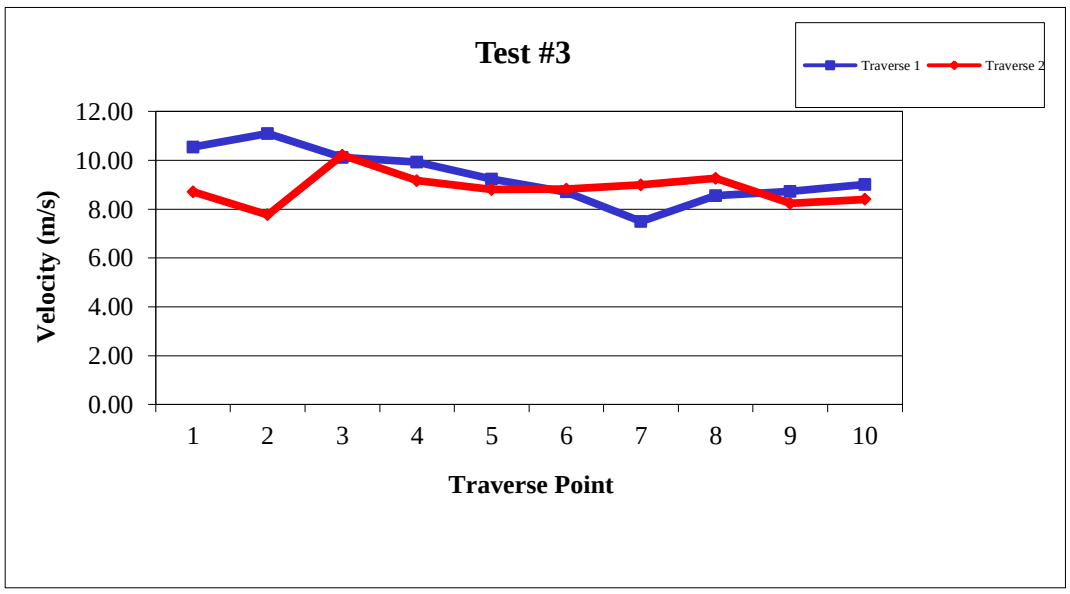
Northern Pulp
Pictou

121511269

Stack Gas Velocity Profiles
Dissolving Tank







Raw Data for: **Northern Pulp Fall Source Testing**

Test #1

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Power Boiler
Test: PM-1
Date: 15/10/2014
Personnel: MM DH

Test Start: 11:15 AM
Test Finish: 1:00 PM

Particulate Collected from Filter (mg):	103.9
Particulate Collected from Probe Wash (mg):	13.8
Particulate Collected from Impinger Wash (mg):	2.4
Total Particulate Collected (mg):	117.7

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	879.7	722.1	157.6
2	100 mL H2O	749.1	711.2	37.9
3	Blank	575.1	569.7	5.4
4	200g Silica Gel	974.2	962.6	11.6
			Total Weight Gain (g)	212.5
			Moisture Volume (mL)	212.5

Parameters

Barometric Pressure, Pbar (in. Hg)	29.96
Stack Static Pressure, Pstatic (in. H2O)	0.20
Ambient Temp, (°F)	73
H2O Volume Collected, Vw (mL)	212.5
Total # Sampling Points,	24
Sampling Time per Point, (min)	5
Readings Taken Every __ mins	2.5
Regulatory Agency	NSENV

O2, (%)	12.8
CO2, (%)	5.8
N2, (%)	81.3
CO(ppm)	71.9
NOx (ppm)	48.4
SO2 (ppm)	0.0

Stack Diameter, (in.)	72
Stack Area, (sq. ft.)	28.27
Probe Length, (ft.)	8
Nozzle Diameter, (in.)	0.173
Pitot Coefficient, (Cp)	0.817
Gamma, meter constant	1.040
Port length (in.)	6

	Traverse Point	Time (min)	Stack Gas Temp, Ts (°F)	S-type Pitot delta P (in. H2O)	Orifice delta H (in. H2O)	Gas Meter Volume (cu. ft.)	Gas Meter Temp Inlet (°F)	Gas Meter Temp Outlet (°F)
						877.370		
Traverse 1	**1**	2.5	143	1.10	0.62	878.540	67	67
		5	137	1.30	0.73	879.640	66	68
	2	7.5	139	1.10	0.62	880.660	67	66
		10	142	1.10	0.62	881.720	67	67
	3	12.5	141	1.10	0.62	882.860	66	67
		15	140	0.66	0.36	883.540	66	66
	4	17.5	142	0.66	0.37	884.430	66	67
		20	143	0.61	0.34	885.190	67	66
	5	22.5	143	0.60	0.34	885.960	69	67
		25	142	0.52	0.29	886.680	68	68
	6	27.5	139	0.53	0.30	887.490	68	67
		30	142	0.58	0.33	888.320	68	67
	7	32.5	142	0.57	0.32	889.050	69	68
		35	142	0.90	0.51	890.040	68	68
	8	37.5	141	0.89	0.50	891.120	67	70
		40	142	1.40	0.79	892.170	70	68
	9	42.5	141	1.40	0.79	893.380	69	69
		45	139	1.50	0.85	894.620	69	68
	10	47.5	139	1.50	0.85	895.880	70	68
		50	142	1.65	0.92	897.170	70	69
	11	52.5	141	1.60	0.90	898.440	70	68
		55	143	1.70	0.95	899.750	70	69
	12	57.5	145	1.75	0.98	901.080	70	69
		60	144	1.80	1.01	902.430	71	69
Traverse 2	**1**	62.5	143	1.35	0.76	903.640	69	69
		65	145	1.40	0.78	904.840	69	69
	2	67.5	144	1.40	0.78	906.040	69	68
		70	147	1.40	0.78	907.210	71	71
	3	72.5	144	1.35	0.76	908.400	70	69
		75	141	1.10	0.62	909.420	69	69
	4	77.5	143	1.10	0.62	910.550	69	68
		80	144	1.05	0.59	911.590	69	70
	5	82.5	141	1.05	0.59	912.640	69	71
		85	142	1.00	0.56	913.660	70	69
	6	87.5	140	1.00	0.57	914.680	70	69
		90	141	1.05	0.59	915.740	70	69
	7	92.5	139	1.00	0.57	916.780	71	69
		95	136	0.99	0.56	917.800	70	69
	8	97.5	136	0.99	0.56	918.830	71	69
		100	140	0.89	0.50	919.800	69	70
	9	102.5	138	0.90	0.51	920.780	71	71
		105	139	0.82	0.46	921.750	71	69
	10	107.5	138	0.83	0.47	922.660	71	69
		110	138	0.73	0.41	923.540	71	70
	11	112.5	139	0.78	0.44	924.460	71	69
		115	137	0.68	0.39	925.320	71	69
	12	117.5	138	0.72	0.41	926.210	71	70
		120	138	0.70	0.40	927.090	72	69

Calculations for: Northern Pulp Fall Source Testing
Test #1

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Power Boiler
Test: PM-1
Date: 15/10/2014
Personnel: MM DH

Calculated Parameters

Stack Gas Pressure, Ps (in.Hg)	29.97
Stack Gas Molecular Weight, Dry Basis, Md (lb/lb-mole)	29.44
Volume of Water Vapour Collected, Vwc (cu.ft)	10.200
Stack Gas Moisture Content (% as decimal)	0.162
Stack Gas Molecular Weight, Wet Basis, Ms (lb/lb-mole)	27.59

Isokineticity Checks

Check average **Within Criteria**

	Traverse Point	Time (min)	Stack Gas Temp, Ts (R)	S-type Pitot, delta P (in. H2O)	Orifice delta H (in. H2O)	Stack Gas Velocity, Us (ft/s)	Meter Press., Pm (in. Hg)	Gas Meter Avg. Temp, Tm (R)	Gas Meter Volume, Vm (cu. ft.)	Vol. @ Ref., Vmc (cu. ft.)	Isokinetics I (%)
Traverse 1	**1**	2.5	603	1.10	0.62	62.44	30.00	527	1.170	1.243	108.84
		5	597	1.30	0.73	67.54	30.01	527	1.100	1.169	93.68
	2	7.5	599	1.10	0.62	62.23	30.00	527	1.020	1.085	94.66
		10	602	1.10	0.62	62.39	30.00	527	1.060	1.126	98.52
	3	12.5	601	1.10	0.62	62.34	30.00	527	1.140	1.213	105.97
		15	600	0.66	0.36	48.25	29.98	526	0.680	0.724	81.56
	4	17.5	602	0.66	0.37	48.33	29.99	527	0.890	0.946	106.83
		20	603	0.61	0.34	46.50	29.98	527	0.760	0.808	94.96
	5	22.5	603	0.60	0.34	46.12	29.98	528	0.770	0.816	96.73
		25	602	0.52	0.29	42.90	29.98	528	0.720	0.763	97.07
	6	27.5	599	0.53	0.30	43.20	29.98	528	0.810	0.859	108.00
		30	602	0.58	0.33	45.30	29.98	528	0.830	0.881	106.06
	7	32.5	602	0.57	0.32	44.91	29.98	529	0.730	0.773	93.92
		35	602	0.90	0.51	56.43	30.00	528	0.990	1.050	101.51
	8	37.5	601	0.89	0.50	56.07	29.99	529	1.080	1.144	111.16
		40	602	1.40	0.79	70.38	30.02	529	1.050	1.112	86.22
	9	42.5	601	1.40	0.79	70.33	30.02	529	1.210	1.282	99.27
		45	599	1.50	0.85	72.67	30.02	529	1.240	1.315	98.23
	10	47.5	599	1.50	0.85	72.67	30.02	529	1.260	1.335	99.72
		50	602	1.65	0.92	76.41	30.03	530	1.290	1.365	97.51
	11	52.5	601	1.60	0.90	75.18	30.02	529	1.270	1.345	97.49
		55	603	1.70	0.95	77.62	30.03	530	1.310	1.387	97.64
	12	57.5	605	1.75	0.98	78.89	30.03	530	1.330	1.408	97.87
		60	604	1.80	1.01	79.94	30.03	530	1.350	1.428	97.79
Traverse 2	**1**	62.5	603	1.35	0.76	69.17	30.01	529	1.210	1.281	101.25
		65	605	1.40	0.78	70.56	30.02	529	1.200	1.271	98.77
	2	67.5	604	1.40	0.78	70.50	30.02	529	1.200	1.272	98.79
		70	607	1.40	0.78	70.68	30.02	531	1.170	1.234	96.10
	3	72.5	604	1.35	0.76	69.23	30.01	530	1.190	1.259	99.57
		75	601	1.10	0.62	62.34	30.00	529	1.020	1.080	94.37
	4	77.5	603	1.10	0.62	62.44	30.00	529	1.130	1.197	104.82
		80	604	1.05	0.59	61.06	30.00	530	1.040	1.100	98.63
	5	82.5	601	1.05	0.59	60.90	30.00	530	1.050	1.109	99.23
		85	602	1.00	0.56	59.49	30.00	530	1.020	1.079	98.95
	6	87.5	600	1.00	0.57	59.39	30.00	530	1.020	1.079	98.79
		90	601	1.05	0.59	60.90	30.00	530	1.060	1.121	100.27
	7	92.5	599	1.00	0.57	59.34	30.00	530	1.040	1.099	100.54
		95	596	0.99	0.56	58.89	30.00	530	1.020	1.079	98.95
	8	97.5	596	0.99	0.56	58.89	30.00	530	1.030	1.088	99.83
		100	600	0.89	0.50	56.02	29.99	530	0.970	1.026	99.56
	9	102.5	598	0.90	0.51	56.24	30.00	531	0.980	1.033	99.58
		105	599	0.82	0.46	53.73	29.99	530	0.970	1.025	103.53
	10	107.5	598	0.83	0.47	54.01	29.99	530	0.910	0.961	96.46
		110	598	0.73	0.41	50.65	29.99	531	0.880	0.929	99.36
	11	112.5	599	0.78	0.44	52.40	29.99	530	0.920	0.972	100.68
		115	597	0.68	0.39	48.85	29.99	530	0.860	0.908	100.61
	12	117.5	598	0.72	0.41	50.31	29.99	531	0.890	0.939	101.18
		120	598	0.70	0.40	49.60	29.99	531	0.880	0.929	101.46
		Total	**Average**	**Average**	**Average**	**Average**	**Average**	**Average**	**Total**	**Total**	**Average**
		120	601	1.06	0.60	60.30	30.00	529	49.720	52.647	99.22

Combustion Gas Data for: Northern Pulp

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Power Boiler
Test: PM-1
Date: 15/10/2014
Personnel: MM DH

Test Start: 11:30 AM
Test Finish: 12:00 PM

Time (min)	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
0	12.20	5.50	75	0	48
5	13.10	5.60	83	0	48
10	13.20	5.70	68	0	49
15	13.00	5.80	64	0	44
20	12.90	6.10	68	0	47
25	12.70	6.00	73	0	51
30	12.80	6.00	72	0	52
Average:	**12.84**	**5.81**	**72**	**0**	**48**

Raw Data for: **Northern Pulp Fall Source Testing**

Test #2

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Power Boiler
Test: PM-2
Date: 15/10/2014
Personnel: MM DH

Test Start: 2:15 PM
Test Finish: 4:30 PM

Particulate Collected from Filter (mg):	114.7
Particulate Collected from Probe Wash (mg):	13.6
Particulate Collected from Impinger Wash (mg):	4.8
Total Particulate Collected (mg):	128.3

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	881.4	696.9	184.5
2	100 mL H2O	746.6	719.8	26.8
3	Blank	617.2	612.7	4.5
4	200g Silica Gel	1031.8	1018.5	13.3
			Total Weight Gain (g)	229.1
			Moisture Volume (mL)	229.1

Parameters

Barometric Pressure, Pbar (in. Hg)	29.96	**O2, (%)**	11.9	**Stack Diameter, (in.)**	72
Stack Static Pressure, Pstatic (in. H2O)	0.20	**CO2, (%)**	6.6	**Stack Area, (sq. ft.)**	28.27
Ambient Temp, (°F)	70	**N2, (%)**	81.5	**Probe Length, (ft.)**	8
H2O Volume Collected, Vw (mL)	229.1	**CO(ppm)**	188.7	**Nozzle Diameter, (in.)**	0.173
Total # Sampling Points,	24	**NOx (ppm)**	59.7	**Pitot Coefficient, (Cp)**	0.817
Sampling Time per Point, (min)	5	**SO2 (ppm)**	0.0	**Gamma, meter constant**	1.04
Readings Taken Every __ mins	2.5			**Port length (in.)**	6
Regulatory Agency	NSENV				

	Traverse Point	Time (min)	Stack Gas Temp, Ts (°F)	S-type Pitot delta P (in. H2O)	Orifice delta H (in. H2O)	Gas Meter Volume (cu. ft.)	Gas Meter Temp Inlet (°F)	Gas Meter Temp Outlet (°F)
						927.350		
Traverse 1	**1**	2.5	131	1.35	0.77	928.550	70	69
		5	139	1.40	0.79	929.760	71	70
	2	7.5	144	1.30	0.73	930.910	70	70
		10	140	1.30	0.73	932.050	71	70
	3	12.5	140	1.15	0.65	933.150	71	70
		15	145	1.10	0.62	934.200	72	71
	4	17.5	139	1.05	0.59	935.270	72	70
		20	138	1.05	0.60	936.320	72	70
	5	22.5	135	0.96	0.55	937.340	73	70
		25	137	0.95	0.54	938.360	73	71
	6	27.5	141	0.97	0.55	939.370	73	71
		30	140	0.96	0.54	940.380	73	71
	7	32.5	140	0.95	0.54	941.390	73	71
		35	140	0.93	0.53	942.380	74	71
	8	37.5	141	0.87	0.49	943.330	74	71
		40	138	0.89	0.51	944.300	74	71
	9	42.5	135	0.94	0.54	945.300	74	71
		45	138	0.95	0.54	946.300	74	71
	10	47.5	139	0.94	0.53	947.300	74	72
		50	140	0.84	0.48	948.270	74	72
	11	52.5	140	0.82	0.47	949.190	74	72
		55	139	0.86	0.49	950.100	75	73
	12	57.5	138	0.73	0.42	951.070	74	72
		60	139	0.74	0.42	951.970	74	72
Traverse 2	**1**	62.5	138	1.20	0.68	953.070	72	71
		65	138	1.30	0.74	954.220	72	72
	2	67.5	138	0.87	0.50	955.180	72	72
		70	138	0.84	0.48	956.140	73	72
	3	72.5	138	0.61	0.35	956.930	73	72
		75	136	0.60	0.34	957.720	72	71
	4	77.5	138	0.61	0.35	958.510	72	71
		80	138	0.58	0.33	959.290	72	71
	5	82.5	141	0.82	0.46	960.180	73	71
		85	138	0.84	0.48	961.110	73	71
	6	87.5	139	1.35	0.77	962.300	73	71
		90	136	1.30	0.74	963.390	73	71
	7	92.5	136	1.60	0.91	964.660	73	72
		95	135	1.50	0.86	965.900	74	72
	8	97.5	137	1.70	0.97	967.190	74	72
		100	137	1.75	1.00	968.520	74	72
	9	102.5	139	1.80	1.02	969.860	74	72
		105	136	1.85	1.06	971.210	74	72
	10	107.5	132	1.90	1.08	972.570	74	72
		110	133	1.85	1.06	973.930	74	71
	11	112.5	132	1.75	1.01	975.250	74	71
		115	135	1.85	1.06	976.600	74	71
	12	117.5	137	1.90	1.09	977.960	74	71
		120	139	1.95	1.11	979.310	74	71

Calculations for: Northern Pulp Fall Source Testing
Test #2

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Power Boiler
Test: PM-2
Date: 15/10/2014
Personnel: MM DH

Calculated Parameters

Stack Gas Pressure, Ps (in.Hg)	29.97
Stack Gas Molecular Weight, Dry Basis, Md (lb/lb-mole)	29.53
Volume of Water Vapour Collected, Vwc (cu.ft)	10.997
Stack Gas Moisture Content (% as decimal)	0.167
Stack Gas Molecular Weight, Wet Basis, Ms (lb/lb-mole)	27.60

Isokineticity Checks

Check average **Within Criteria**

	Traverse Point	Time (min)	Stack Gas Temp, Ts (R)	S-type Pitot, delta P (in. H2O)	Orifice delta H (in. H2O)	Stack Gas Velocity, Us (ft/s)	Meter Press., Pm (in. Hg)	Gas Meter Avg. Temp, Tm (R)	Gas Meter Volume, Vm (cu. ft.)	Vol. @ Ref., Vmc (cu. ft.)	Isokinetics I (%)
Traverse 1	**1**	2.5	591	1.35	0.77	68.47	30.01	530	1.200	1.270	99.95
		5	599	1.40	0.79	70.19	30.01	531	1.210	1.278	99.45
	2	7.5	604	1.30	0.73	67.92	30.01	530	1.150	1.215	98.58
		10	600	1.30	0.73	67.70	30.01	531	1.140	1.204	97.30
	3	12.5	600	1.15	0.65	63.67	30.00	531	1.100	1.161	99.81
		15	605	1.10	0.62	62.53	30.00	532	1.050	1.106	97.62
	4	17.5	599	1.05	0.59	60.79	30.00	531	1.070	1.128	101.41
		20	598	1.05	0.60	60.74	30.00	531	1.050	1.107	99.43
	5	22.5	595	0.96	0.55	57.93	30.00	532	1.020	1.074	100.66
		25	597	0.95	0.54	57.72	29.99	532	1.020	1.073	101.26
	6	27.5	601	0.97	0.55	58.52	30.00	532	1.010	1.063	99.56
		30	600	0.96	0.54	58.17	29.99	532	1.010	1.063	99.99
	7	32.5	600	0.95	0.54	57.87	29.99	532	1.010	1.063	100.51
		35	600	0.93	0.53	57.26	29.99	533	0.990	1.041	99.48
	8	37.5	601	0.87	0.49	55.43	29.99	533	0.950	0.999	98.77
		40	598	0.89	0.51	55.92	29.99	533	0.970	1.020	99.47
	9	42.5	595	0.94	0.54	57.32	29.99	533	1.000	1.051	99.54
		45	598	0.95	0.54	57.77	29.99	533	1.000	1.051	99.26
	10	47.5	599	0.94	0.53	57.52	29.99	533	1.000	1.050	99.77
		50	600	0.84	0.48	54.42	29.99	533	0.970	1.019	102.45
	11	52.5	600	0.82	0.47	53.76	29.99	533	0.920	0.966	98.35
		55	599	0.86	0.49	55.01	29.99	534	0.910	0.954	94.74
	12	57.5	598	0.73	0.42	50.64	29.99	533	0.970	1.019	109.70
		60	599	0.74	0.42	51.03	29.99	533	0.900	0.945	101.18
Traverse 2	**1**	62.5	598	1.20	0.68	64.93	30.01	532	1.100	1.159	97.37
		65	598	1.30	0.74	67.58	30.01	532	1.150	1.211	97.72
	2	67.5	598	0.87	0.50	55.29	29.99	532	0.960	1.010	99.66
		70	598	0.84	0.48	54.33	29.99	533	0.960	1.009	101.32
	3	72.5	598	0.61	0.35	46.29	29.98	533	0.790	0.830	97.81
		75	596	0.60	0.34	45.84	29.98	532	0.790	0.832	98.64
	4	77.5	598	0.61	0.35	46.29	29.98	532	0.790	0.832	98.00
		80	598	0.58	0.33	45.14	29.98	532	0.780	0.821	99.22
	5	82.5	601	0.82	0.46	53.81	29.99	532	0.890	0.936	95.40
		85	598	0.84	0.48	54.33	29.99	532	0.930	0.979	98.25
	6	87.5	599	1.35	0.77	68.93	30.01	532	1.190	1.253	99.32
		90	596	1.30	0.74	67.47	30.01	532	1.090	1.148	92.47
	7	92.5	596	1.60	0.91	74.85	30.02	533	1.270	1.337	97.06
		95	595	1.50	0.86	72.41	30.02	533	1.240	1.304	97.69
	8	97.5	597	1.70	0.97	77.22	30.03	533	1.290	1.356	95.65
		100	597	1.75	1.00	78.35	30.03	533	1.330	1.399	97.20
	9	102.5	599	1.80	1.02	79.59	30.03	533	1.340	1.409	96.73
		105	596	1.85	1.06	80.49	30.03	533	1.350	1.420	95.90
	10	107.5	592	1.90	1.08	81.29	30.03	533	1.360	1.430	95.01
		110	593	1.85	1.06	80.28	30.03	533	1.360	1.432	96.45
	11	112.5	592	1.75	1.01	78.02	30.03	533	1.320	1.389	96.16
		115	595	1.85	1.06	80.42	30.03	533	1.350	1.421	95.91
	12	117.5	597	1.90	1.09	81.63	30.04	533	1.360	1.432	95.50
		120	599	1.95	1.11	82.84	30.04	533	1.350	1.421	93.74
		Total	**Average**	**Average**	**Average**	**Average**	**Average**	**Average**	**Total**	**Total**	**Average**
		120	598	1.17	0.67	63.25	30.00	532	51.960	54.692	98.47

Combustion Gas Data for: Northern Pulp

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Power Boiler
Test: PM-2
Date: 15/10/2014
Personnel: MM DH

Test Start: 3:30 PM
Test Finish: 4:00 PM

Time (min)	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
0	12.60	6.20	178	0	53
5	12.50	6.30	165	0	54
10	12.00	6.50	160	0	58
15	12.00	6.60	245	0	60
20	11.90	6.60	236	0	61
25	10.90	7.20	210	0	67
30	11.50	6.80	127	0	65
Average:	**11.91**	**6.60**	**189**	**0**	**60**

Raw Data for: **Northern Pulp Fall Source Testing**

Test #3

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Power Boiler
Test: PM-3
Date: 16/10/2014
Personnel: MM DH

Test Start: 8:55 AM
Test Finish: 11:10 AM

Particulate Collected from Filter (mg):	152.5
Particulate Collected from Probe Wash (mg):	20.4
Particulate Collected from Impinger Wash (mg):	3.7
Total Particulate Collected (mg):	172.9

Impinger No.	Impinger Contents	Final Weight (g)	Tare Weight (g)	Weight of Moisture (g)
1	100 mL H2O	954.5	729.9	224.6
2	100 mL H2O	743.3	708.7	34.6
3	Blank	574.4	568.5	5.9
4	200g Silica Gel	989.1	974.1	15.0
			Total Weight Gain (g)	280.1
			Moisture Volume (mL)	280.1

Parameters

Barometric Pressure, Pbar (in. Hg)	30.03
Stack Static Pressure, Pstatic (in. H2O)	0.20
Ambient Temp, (°F)	62
H2O Volume Collected, Vw (mL)	280.10
Total # Sampling Points,	3
Sampling Time per Point, (min)	5
Readings Taken Every __ mins	2.5
Regulatory Agency	NSENV

O2, (%)	11.8
CO2, (%)	6.7
N2, (%)	81.5
CO(ppm)	60.4
NOx (ppm)	53.3
SO2 (ppm)	0.0

Stack Diameter, (in.)	72
Stack Area, (sq. ft.)	28.27
Probe Length, (ft.)	8
Nozzle Diameter, (in.)	0.173
Pitot Coefficient, (Cp)	0.817
Gamma, meter constant	1.04
Port length (in.)	6

	Traverse Point	Time (min)	Stack Gas Temp, Ts (°F)	S-type Pitot delta P (in. H2O)	Orifice delta H (in. H2O)	Gas Meter Volume (cu. ft.)	Gas Meter Temp Inlet (°F)	Gas Meter Temp Outlet (°F)
						979.550		
Traverse 1	**1**	2.5	132	1.50	0.84	980.790	60	60
		5	131	1.50	0.85	982.010	61	61
	2	7.5	133	1.30	0.73	983.160	60	61
		10	136	1.20	0.67	984.220	61	60
	3	12.5	135	1.00	0.56	985.190	61	61
		15	136	0.98	0.55	986.200	61	61
	4	17.5	136	0.79	0.44	987.080	60	62
		20	136	0.73	0.41	987.930	62	60
	5	22.5	135	1.10	0.62	988.970	61	61
		25	133	1.10	0.62	990.010	61	6
	6	27.5	132	1.60	0.90	991.260	61	60
		30	133	1.55	0.87	992.470	62	60
	7	32.5	136	1.70	0.95	993.750	61	60
		35	135	1.85	1.03	995.090	62	60
	8	37.5	136	2.15	1.20	996.530	62	60
		40	133	2.00	1.12	997.920	63	60
	9	42.5	134	2.30	1.29	999.400	63	61
		45	131	2.25	1.27	1000.860	63	60
	10	47.5	130	2.40	1.35	1002.450	63	60
		50	131	2.35	1.32	1003.890	62	60
	11	52.5	133	2.60	1.46	1005.420	62	60
		55	133	2.60	1.46	1006.950	63	60
	12	57.5	134	2.65	1.48	1008.550	62	60
		60	132	2.75	1.55	1010.170	61	60
Traverse 2	**1**	62.5	133	1.75	0.98	1011.490	60	60
		65	133	1.80	1.01	1012.850	61	60
	2	67.5	134	2.00	1.12	1014.250	62	60
		70	134	2.10	1.18	1015.650	63	60
	3	72.5	133	2.00	1.12	1017.050	65	61
		75	135	2.10	1.17	1018.470	63	60
	4	77.5	133	1.80	1.01	1019.810	63	60
		80	132	1.90	1.07	1021.170	64	60
	5	82.5	133	1.70	0.95	1022.460	64	61
		85	134	1.60	0.90	1023.720	63	60
	6	87.5	134	1.55	0.87	1024.950	63	60
		90	134	1.40	0.79	1026.110	64	60
	7	92.5	133	1.45	0.82	1027.300	63	61
		95	134	1.40	0.79	1028.460	63	61
	8	97.5	133	1.50	0.84	1029.600	63	61
		100	130	1.50	0.85	1030.880	64	61
	9	102.5	132	1.35	0.76	1032.030	63	61
		105	132	1.30	0.73	1033.150	64	61
	10	107.5	132	1.20	0.68	1034.250	63	61
		110	131	1.25	0.71	1035.340	63	61
	11	112.5	132	1.10	0.62	1036.390	64	61
		115	132	1.15	0.65	1037.460	63	61
	12	117.5	130	0.97	0.55	1038.440	63	61
		120	129	0.98	0.55	1039.430	64	61

Calculations for: Northern Pulp Fall Source Testing
Test #3

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Power Boiler
Test: PM-3
Date: 16/10/2014
Personnel: MM DH

Calculated Parameters

Stack Gas Pressure, Ps (in.Hg)	30.05
Stack Gas Molecular Weight, Dry Basis, Md (lb/lb-mole)	29.54
Volume of Water Vapour Collected, Vwc (cu.ft)	13.445
Stack Gas Moisture Content (% as decimal)	0.172
Stack Gas Molecular Weight, Wet Basis, Ms (lb/lb-mole)	27.55

Isokineticity Checks

Check average **Within Criteria**

	Traverse Point	Time (min)	Stack Gas Temp, Ts (R)	S-type Pitot, delta P (in. H2O)	Orifice delta H (in. H2O)	Stack Gas Velocity, Us (ft/s)	Meter Press., Pm (in. Hg)	Gas Meter Avg. Temp, Tm (R)	Gas Meter Volume, Vm (cu. ft.)	Vol. @ Ref., Vmc (cu. ft.)	Isokinetics I (%)
Traverse 1	**1**	2.5	592	1.50	0.84	72.20	30.10	520	1.240	1.340	100.51
		5	591	1.50	0.85	72.14	30.10	521	1.220	1.316	98.61
	2	7.5	593	1.30	0.73	67.27	30.09	521	1.150	1.241	100.09
		10	596	1.20	0.67	64.79	30.08	521	1.060	1.144	96.25
	3	12.5	595	1.00	0.56	59.10	30.08	521	0.970	1.045	96.28
		15	596	0.98	0.55	58.55	30.08	521	1.010	1.088	101.35
	4	17.5	596	0.79	0.44	52.57	30.07	521	0.880	0.948	98.33
		20	596	0.73	0.41	50.54	30.07	521	0.850	0.916	98.80
	5	22.5	595	1.10	0.62	61.98	30.08	521	1.040	1.121	98.44
		25	593	1.10	0.62	61.88	30.08	494	1.040	1.183	103.75
	6	27.5	592	1.60	0.90	74.57	30.10	521	1.250	1.349	98.02
		30	593	1.55	0.87	73.45	30.10	521	1.210	1.305	96.38
	7	32.5	596	1.70	0.95	77.12	30.10	521	1.280	1.382	97.71
		35	595	1.85	1.03	80.38	30.11	521	1.340	1.446	97.90
	8	37.5	596	2.15	1.20	86.73	30.12	521	1.440	1.554	97.72
		40	593	2.00	1.12	83.44	30.12	522	1.390	1.498	97.44
	9	42.5	594	2.30	1.29	89.55	30.13	522	1.480	1.595	96.77
		45	591	2.25	1.27	88.35	30.13	522	1.460	1.574	96.36
	10	47.5	590	2.40	1.35	91.17	30.13	522	1.590	1.715	101.55
		50	591	2.35	1.32	90.29	30.13	521	1.440	1.555	93.10
	11	52.5	593	2.60	1.46	95.13	30.14	521	1.530	1.652	94.23
		55	593	2.60	1.46	95.13	30.14	522	1.530	1.651	94.14
	12	57.5	594	2.65	1.48	96.13	30.14	521	1.600	1.728	97.70
		60	592	2.75	1.55	97.76	30.15	521	1.620	1.752	97.05
Traverse 2	**1**	62.5	593	1.75	0.98	78.05	30.11	520	1.320	1.427	99.17
		65	593	1.80	1.01	79.16	30.11	521	1.360	1.468	100.66
	2	67.5	594	2.00	1.12	83.51	30.12	521	1.400	1.511	98.32
		70	594	2.10	1.18	85.57	30.12	522	1.400	1.509	95.87
	3	72.5	593	2.00	1.12	83.44	30.12	523	1.400	1.505	97.86
		75	595	2.10	1.17	85.64	30.12	522	1.420	1.531	97.32
	4	77.5	593	1.80	1.01	79.16	30.11	522	1.340	1.444	98.99
		80	592	1.90	1.07	81.26	30.11	522	1.360	1.464	97.62
	5	82.5	593	1.70	0.95	76.93	30.10	523	1.290	1.387	97.85
		85	594	1.60	0.90	74.69	30.10	522	1.260	1.358	98.78
	6	87.5	594	1.55	0.87	73.52	30.10	522	1.230	1.325	97.96
		90	594	1.40	0.79	69.87	30.09	522	1.160	1.248	97.10
	7	92.5	593	1.45	0.82	71.05	30.10	522	1.190	1.281	97.80
		95	594	1.40	0.79	69.87	30.09	522	1.160	1.248	97.10
	8	97.5	593	1.50	0.84	72.26	30.10	522	1.140	1.227	92.12
		100	590	1.50	0.85	72.08	30.10	523	1.280	1.376	103.08
	9	102.5	592	1.35	0.76	68.49	30.09	522	1.150	1.237	97.86
		105	592	1.30	0.73	67.21	30.09	523	1.120	1.204	97.02
	10	107.5	592	1.20	0.68	64.58	30.08	522	1.100	1.183	99.26
		110	591	1.25	0.71	65.85	30.09	522	1.090	1.173	96.30
	11	112.5	592	1.10	0.62	61.83	30.08	523	1.050	1.128	98.85
		115	592	1.15	0.65	63.22	30.08	522	1.070	1.151	98.62
	12	117.5	590	0.97	0.55	57.96	30.08	522	0.980	1.054	98.16
		120	589	0.98	0.55	58.21	30.08	523	0.990	1.064	98.48
		Total	**Average**	**Average**	**Average**	**Average**	**Average**	**Average**	**Total**	**Total**	**Average**
		120	593	1.64	0.92	74.66	30.10	521	59.880	64.599	97.93

Combustion Gas Data for: Northern Pulp

Client: Northern Pulp
Job Number: 121511269

Plant: Pictou
Location: Power Boiler
Test: PM-3
Date: 16/10/2014
Personnel: MM DH

Test Start: 10:00 AM
Test Finish: 10:30 AM

Time (min)	O2 (%)	CO2 (%)	CO (ppm)	SO2 (ppm)	NOx (ppm)
0	11.90	6.60	56	0	51
5	11.50	6.90	55	0	52
10	11.80	6.70	57	0	52
15	12.00	6.60	64	0	52
20	11.50	6.90	57	0	55
25	12.10	6.50	71	0	54
30	12.00	6.50	63	0	57
Average:	**11.83**	**6.67**	**60**	**0**	**53**

DATA ENTRY

Northern Pulp

Power Boiler

Fuel: Biomass

Operating Conditions: Normal

Emission Control Equipment: Scrubber

Stack Diameter: 1.83 m

Reference Temperature, Tref (F):	77
(K):	298
Reference Pressure, Pref (in.Hg):	29.92
(Bar):	1.0

Parameter	Symbol	Units	Test 1	Test 2	Test 3	Average
Test ID	-	-	PM-1	PM-2	PM-3	-
Date	-	-	15/10/2014	15/10/2014	16/10/2014	n/a
Start Time	-	-	11:15 AM	2:15 PM	8:55 AM	n/a
End Time	-	-	1:00 PM	4:30 PM	11:10 AM	n/a
Total Sampling Time	-	min	120	120	120	120
Stack Diameter	D	in.	72	72	72	72
Average Stack Gas Temperature	Ts	F	141	138	133	137
Average Dry Gas Meter Temperature	Tm	F	69	72	61	67
Barometric Pressure	Pbar	in.Hg	29.96	29.96	30.03	29.98
Stack Static Pressure	Pstatic	in.H2O	0.20	0.20	0.20	0.20
Average Pressure Drop (Head)	dP	in.H2O	1.06	1.17	1.64	1.29
Average deltaH Orifice	dH	in.H2O	0.60	0.67	0.92	0.73
Average Meter Temperature	Tm	F	69	72	61	67
Gas Sample Volume	Vm	cu.ft	49.7	52.0	59.9	53.9
Average Isokinetics	I	%	99.2	98.5	97.9	98.5
Nozzle Diameter	Dn	in.	0.173	0.173	0.173	0.173
Pitot Coefficient	Cp	-	0.817	0.817	0.817	0.817
Gamma, meter constant	y	-	1.040	1.040	1.040	1.040
Reference Temperature	Tref	R	537	537	537	537
Reference Pressure	Pref	in.Hg	29.92	29.92	29.92	29.92
Stack Gas Oxygen Content	Co2	%	12.8	11.9	11.8	12.2
Stack Gas Carbon Dioxide Content	Cco2	%	5.8	6.6	6.7	6.4
Stack Gas Nitrogen Content	Cn2	%	81.3	81.5	81.5	81.4
Stack Gas Sulphur Dioxide Content	Cso2	ppm	0.0	0.0	0.0	0.0
Stack Gas Nitrogen Oxides Content	Cnox	ppm	48.4	59.7	53.3	53.8
Stack Gas Carbon Monoxide Content	Cco	ppm	72	189	60	107
Volume of Water Collected	Vw	mL	213	229	280	241
Particulate Collected from Filter	-	mg	104	115	153	124
Particulate Collected from Probe Wash	-	mg	13.8	13.6	20.4	15.9
Particulate Collected from Impinger Wash	-	mg	2.40	4.80	3.70	3.63
Total Particulate Collected (excluding impingers)	Mp	mg	118	128	173	140

Legend:

F - degrees Fahrenheit
K - degrees Kelvin
Bar - bars
in.Hg - inches of mercury
in. - inches
in.H2O - inches of water
cu.ft - cubic feet
R - degrees Rankin
NOx - as NO2

CALCULATIONS

Northern Pulp

Power Boiler

Fuel: Biomass

Operating Conditions: Normal

Emission Control Equipment: Scrubber

Stack Diameter: 1.83 m

Variable	Symbol	Units	Calculation	Test 1	Test 2	Test 3	Average
Stack Area	As	sq.ft	As = Pi x ((D/12)^2)/ 4	28.27	28.27	28.27	28.27
		sq.m	As (sq.m) = As (sq.ft) x 0.0929	2.63	2.63	2.63	2.63
Barometric Pressure	Pbar	kPa	Pbar (kPa) = Pbar (in.Hg) x 3.386	101.4	101.4	101.7	101.5
Stack Static Pressure	Pstatic	kPa	Pstatic (kPa) = Pstatic (in.H2O) x 0.249	0.05	0.05	0.05	0.05
Avg. Stack Temperature	Ts	R	Ts (R) = Ts (F) + 460	601	598	593	597
Avg. Meter Temperature	Tm	R	Tm (R) = Tm (F) + 460	529	532	521	527
Nozzle Diameter	Dn	mm	Dn (mm) = Dn (in.) x 25.4	4	4	4	4
Gas Meter Pressure	Pm	in.Hg	Pm = Pbar + (dH / 13.6)	30.00	30.00	30.10	30.04
Sample Volume at Ref Cond	Vmc	cu.ft	Vmc = Tref/Pref x (Vm x Pm x y) / Tm	52.65	54.69	64.60	57.3
		cu.m	Vmc (cu.m) = 0.02832 x Vmc (cu.ft)	1.49	1.55	1.83	1.62
Volume of Water Vapour	Vwc	cu.ft	Vwc = 0.0480 x Vw	10.2	11.0	13.44	11.55
Water Fraction	Bwo	-	Bwo = Vwc / (Vwc + Vmc)	0.162	0.167	0.172	0.17
Molecular Weight, Dry	Md	lb/lb-mol	Md = 0.44 (Cco2) + 0.32 (Co2) + 0.28 (Cn2)	29.44	29.53	29.54	29.5
Molecular Weight, Wet	Ms	lb/lb-mol	Ms = Md (1 - Bwo) + (18 x Bwo)	27.59	27.60	27.55	27.6
Stack Pressure	Ps	in.Hg	Ps = Pbar + (Pstatic / 13.6)	29.97	29.97	30.05	30.00
Stack Gas Velocity	Us	ft/s	Us = 85.33 x Cp x ((dP x Ts)/(Ps x Ms))^0.5	60.3	63.2	74.7	66.1
		m/s	Us (m/s) = 0.3048 x Us (ft/s)	18.4	19.3	22.8	20.1
Actual Stack Gas Flow Rate	Q	acfm	Q = 60 x Us x As	102,305	107,298	126,656	112,086
Dry Stack Gas Flow Rate	Qs	Rcfm	Qs = Q x (1-Bwo) x (Tref/Ts) x (Ps/Pref)	76,718	80,367	95,334	84,140
		Rcms	Qs (Rcms) = 0.000472 x Qs (Rcfm)	36.2	37.9	45.0	39.7
Sulphur Dioxide - SO2							
SO2 Measured Concentration	Cso2	ppm	Measurement from Flue Gas Analyzer	ND	ND	ND	ND
Uncorrected @ Ref Cond	Cso2	mg/Rcm	Cso2 (mg/Rcm) = Cso2 (ppm) x 2.62	ND	ND	ND	ND
SO2 Emission Rate	ERso2	g/s	ERso2 = Cso2/1000 x Qs	ND	ND	ND	ND
		kg/hr	ERso2 (kg/hr) = 3.6 x ERso2 (g/s)	ND	ND	ND	ND
SO2 Concentration							
Corrected to 11% O2	Cso2	mg/Rcm	Cso2 (11% O2) = Cso2 (mg/Rcm) x (20.9-11) / (20.9-Co2)	ND	ND	ND	ND
Corrected to 3% O2	Cso2	mg/Rcm	Cso2 (3% O2) = Cso2 (mg/Rcm) x (20.9-3) / (20.9-Co2)	ND	ND	ND	ND
Corrected to 12% CO2	Cso2	mg/Rcm	Cso2 (12% CO2) = Cso2 (mg/Rcm) x (12/Cco2)	ND	ND	ND	ND
Nitrogen Oxides - NOx							
NOx Measured Concentration	Cnox	ppm	Measurement from Flue Gas Analyzer	48.4	59.7	53.3	53.8
Uncorrected @ Ref Cond	Cnox	mg/Rcm	Cnox (mg/Rcm) = Cnox (ppm) x 1.882	91	112	100	101
NOx Emission Rate	ERnox	g/s	ERnox = Cnox/1000 x Qs	3.30	4.26	4.51	4.03
		kg/hr	ERnox (kg/hr) = 3.6 x ERnox (g/s)	11.9	15.3	16.2	14.5
NOx Concentration							
Corrected to 11% O2	Cnox	mg/Rcm	Cnox (11% O2) = Cnox (mg/Rcm) x (20.9-11) / (20.9-Co2)	112	124	109	115
Corrected to 3% O2	Cnox	mg/Rcm	Cnox (3% O2) = Cnox (mg/Rcm) x (20.9-3) / (20.9-Co2)	202	224	198	208
Corrected to 12% CO2	Cnox	mg/Rcm	Cnox (12% CO2) = Cnox (mg/Rcm) x (12/Cco2)	188	204	180	191
Carbon Monoxide - CO							
CO Measured Concentration	Cco	ppm	Measurement from Flue Gas Analyzer	72	189	60	107
Uncorrected @ Ref Cond	Cco	mg/Rcm	Cco (mg/Rcm) = Cco (ppm) x 1.145	82	216	69	123
CO Emission Rate	ERco	g/s	ERco = Cco/1000 x Qs	3.0	8.20	3.11	4.8
		kg/hr	ERco (kg/hr) = 3.6 x ERco (g/s)	10.7	29.5	11.2	17.1
CO Concentration							
Corrected to 11% O2	Cco	mg/Rcm	Cco (11% O2) = Cco (mg/Rcm) x (20.9-11) / (20.9-Co2)	101	238	76	138
Corrected to 3% O2	Cco	mg/Rcm	Cco (3% O2) = Cco (mg/Rcm) x (20.9-3) / (20.9-Co2)	183	430	137	250
Corrected to 12% CO2	Cco	mg/Rcm	Cco (12% CO2) = Cco (mg/Rcm) x (12/Cco2)	170	393	124	229
Particulate Concentration	Cs	mg/Rcm	Cs = Mp / Vmc	78.9	82.8	94.5	85.4
Particulate Emission Rate	ERp	g/s	ERp = Cs/1000 x Qs	2.86	3.14	4.25	3.42
		kg/hr	ERp (kg/hr) = 3.6 x ERp (g/s)	10.3	11.3	15.3	12.3
Particulate Concentration							
Corrected to 11% O2	Cs	mg/Rcm	Cs (11% O2) = Cs x (20.9-11) / (20.9-Co2)	97.0	91.3	103	97.1
Corrected to 3% O2	Cs	mg/Rcm	Cs (3% O2) = Cs x (20.9-3) / (20.9-Co2)	175	165	187	176
Corrected to 12% CO2	Cs	mg/Rcm	Cs (12% CO2) = Cs x (12/Cco2)	163	151	170	161.2

Legend:

sq.ft - square feet
sq.m - square metres
Pi - 3.142
R - degrees Rankin
ppm - parts per million
in.Hg - inches of mercury
cu.ft - cubic feet
cu.m - cubic metres
Ref Cond - reference temperature and pressure (25 C and 101.3 kPa)
Rcms - dry reference cubic metres per second
Rcfm - dry reference cubic feet per minute
mg/Rcm - miligrams per dry reference cubic metre
g/s - grams per second
NOx - as NO2
acfm - actual cubic feet per minute

OFFICIAL STACK TESTING RESULTS
Northern Pulp
Power Boiler

Fuel: Biomass
Operating Conditions: Normal
Emission Control Equipment: Scrubber
Stack Diameter: 1.83 m

Parameter	Test 1	Test 2	Test 3	Average	NSENV Limits
Test ID	PM-1	PM-2	PM-3	-	-
Test Date	15/10/2014	15/10/2014	16/10/2014	-	-
Stack Gas Temperature (C)	61	59	56	59	-
Moisture Content (%)	16.2	16.7	17.2	16.7	-
Velocity (m/s)	18.4	19.3	22.8	20.1	-
Volumetric Flow (Rcms)	36.2	37.9	45.0	39.7	-
Oxygen - O2 (%)	12.8	11.9	11.8	12.2	-
Carbon Dioxide - CO2 (%)	5.81	6.60	6.67	6.36	-
Sulphur Dioxide - SO2					
SO2 Measured Concentration (ppm)	ND	ND	ND	ND	-
Uncorrected at Ref Cond (mg/Rcm)	ND	ND	ND	ND	-
Emission Rate (kg/hr)	ND	ND	ND	ND	-
Nitrogen Oxides - NOx					
NOx Measured Concentration (ppm)	48.4	59.7	53.3	53.8	-
Uncorrected at Ref Cond (mg/Rcm)	91.1	112.4	100.3	101.3	-
Emission Rate (kg/hr)	11.88	15.35	16.25	14.49	-
Carbon Monoxide - CO					
CO Measured Concentration (ppm)	72	189	60	107	-
Uncorrected at Ref Cond (mg/Rcm)	82	216	69	123	-
Emission Rate (kg/hr)	10.7	30	11	17	-
Particulate Matter - PM					
Uncorrected at Ref Cond (mg/Rcm)	78.9	82.8	94.5	85.4	-
PM - Corrected to 11% O2 (mg/Rcm)	97.0	91.3	103	97.1	150
Particulate Emission Rate (kg/hr)	10.3	11.3	15.3	12.3	-

Legend:
C - degrees Celsius
m/s - metres per second
Rcms - dry reference cubic metres per second
ppm - parts per million
Ref Cond - reference temperature and pressure (25 C and 101.3 kPa)
mg/Rcm - miligrams per dry reference cubic metre
NOx - as NO2
ND - non-detectable

Particulate Recoveries: Impinger Catch, Probe Wash, Filter Catch

Client: Northern Pulp
Facility: Pictou
Location: Power Boiler
Job Number: 121511269

IMPINGER CATCH

Container ID	Beaker Pre Weights (g) Date Analysed by Trial 1	Trial 2	Trial 3	Average	Sample ID	Recoveries Jar + Sample + Rinse (g)	Jar Tare (g)	Sample Collected (g)	Rinse Water (g)	Total Rinse Water (g)	Beaker Post Weights (g) Date Analysed by Trial 1	Trial 2	Trial 3	Average	Uncorrected Particulate Weight (g)	Corrected Particulate Weight (g)
I1	111.6603	111.6605		111.6604	PM-1	730.2	392.3	337.9	13.8	13.8	111.6629	111.6629		111.6629	0.0025	0.0024
I5	107.6477	107.6476		107.6477	PM-2	740.8	392.3	348.5	15.0	15.0	107.6526	107.6525		107.6526	0.0049	0.0048
E6	108.0465	108.0470		108.0468	PM-3	767.8	392.6	375.2	14.2	14.2	108.0505	108.0506		108.0506	0.0038	0.0037
																Conc. (g/mL)
F5	107.3464	107.3450		107.3457	WB	471.7	392.9	78.8		78.8	107.3465	107.3460		107.3463	0.0006	0.000007

PROBE WASH

Container ID	Beaker Pre Weights (g) Date Analysed by Trial 1	Trial 2	Trial 3	Average	Sample ID	Recoveries Jar + Acetone (g)	Jar Tare (g)	Recovered Acetone (g)	Rinse Acetone	Total Acetone (g)	Beaker Post Weights (g) Date Analysed by Trial 1	Trial 2	Trial 3	Average	Uncorrected Particulate Weight (g)	Corrected Particulate Weight (g)
B4	107.8616	107.8620		107.8618	PM-1	393.9	325.0	68.9	26.4	95.3	107.8780	107.8778		107.8779	0.0161	0.0138
J5	112.9456	112.9445		112.9451	PM-2	422.9	325.1	97.8	7.7	105.5	112.9610	112.9615		112.9613	0.0162	0.0136
Z2	113.2748	113.2744		113.2746	PM-3	456.8	326.1	130.7	11.7	142.4	113.2983	113.2988		113.2986	0.0240	0.0204
																Conc. (g/mL)
V5	113.7144	113.7143		113.7144	AB	399.0	326.0	73.0		73.0	113.7159	113.7164		113.7162	0.0018	0.000019

Density of Acetone: 0.7850 g/ml

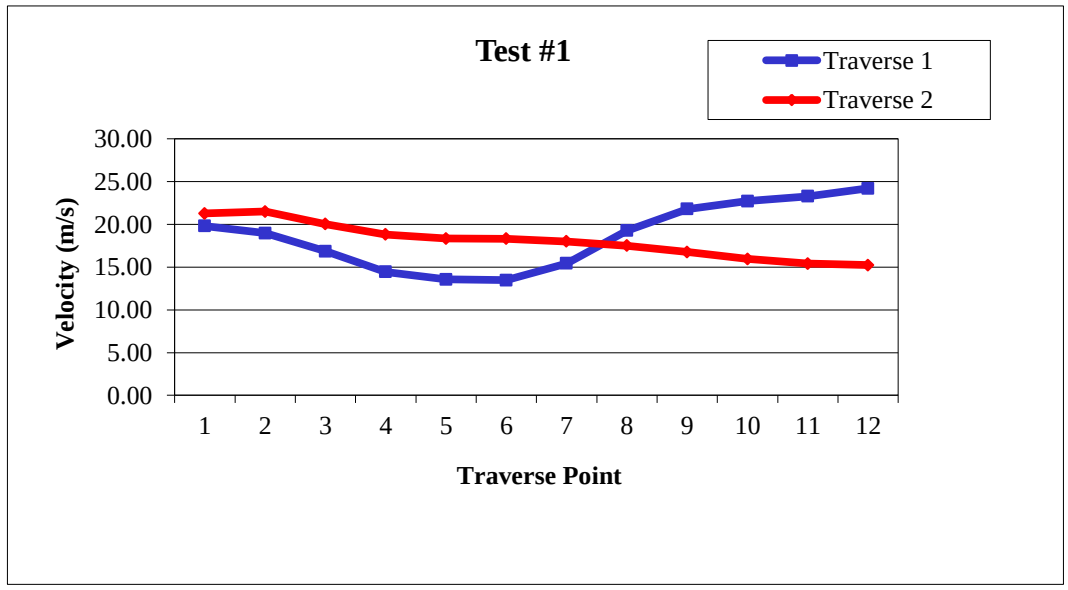
FILTER CATCH

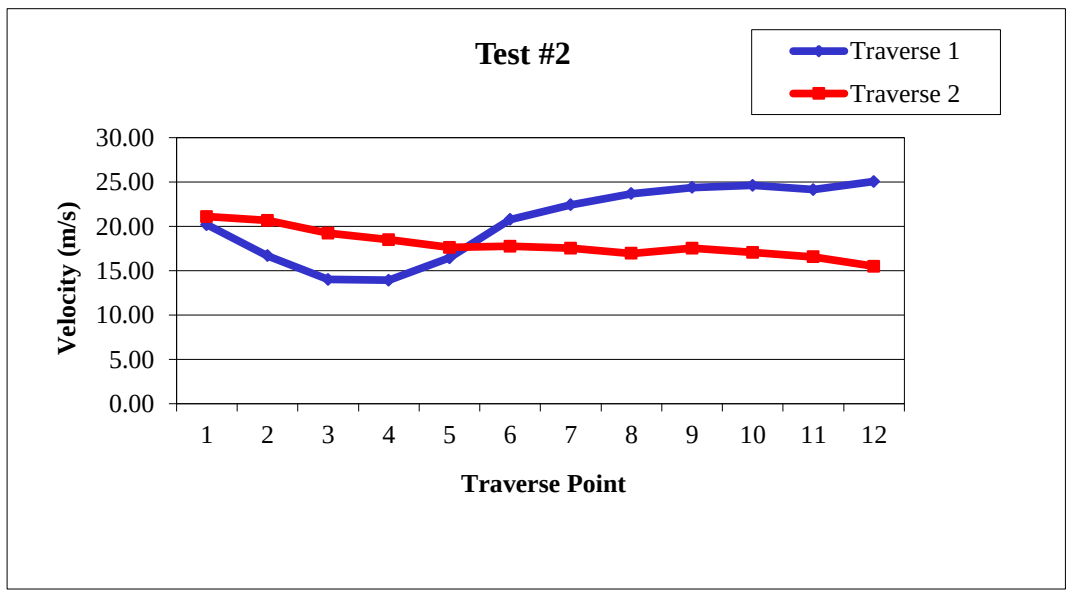
Filter ID	Pre Weights (g) Analysed by Trial 1	Trial 2	Trial 3	Average	Sample ID	Post Weights (g) Date: Analysed by Trial 1	Trial 2	Trial 3	Average	Particulate Weight from Filter (g)
0902-03	0.4119	0.4116		0.4118	PM-1	0.5154	0.5159		0.5157	0.1039
0930-3	0.4043	0.4048		0.4046	PM-2	0.5191	0.5194		0.5193	0.1147
0930-4	0.4087	0.4090		0.4089	PM-3	0.5612	0.5615		0.5614	0.1525

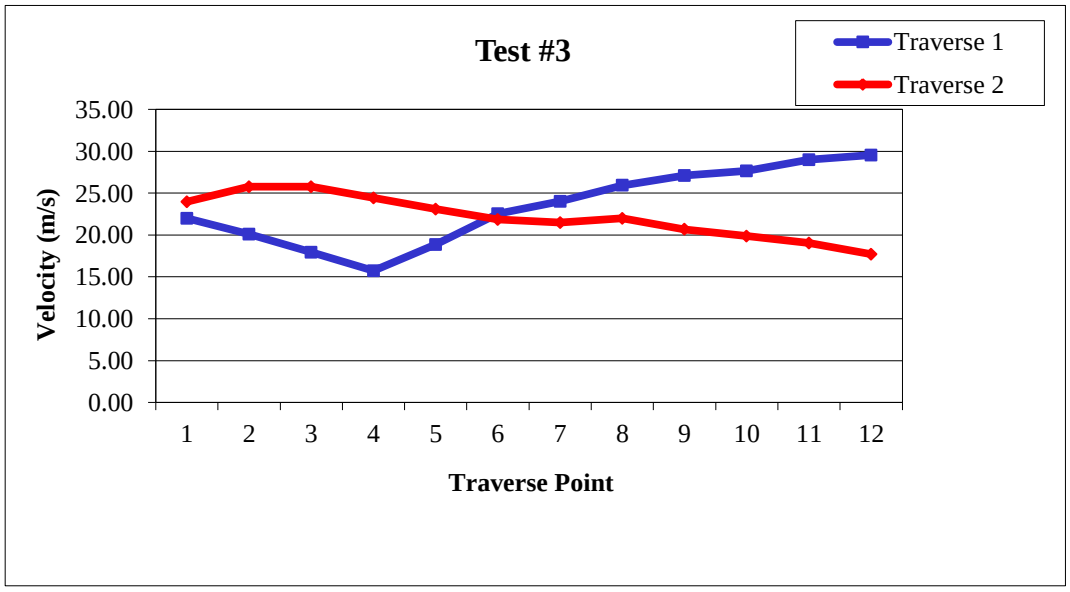
Northern Pulp
Pictou

121511269

Stack Gas Velocity Profiles
Power Boiler







GAS CALCULATIONS

Client:	Northern Pulp
Plant:	New Glasgow, NS
Location:	High Level Roof Vent

	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	NO_X (ppm)
Ave. Gas 1	20.9	0.2	122.0	5.0	12.8
Ave. Gas 2	20.9	0.2	122.1	5.6	12.8
Ave. Gas 3	20.8	0.2	118.7	6.3	11.9

Test 1 Time	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	NO_X (ppm)
O2, CO2, CO, and SO2 are averages from TRS Testing, Oct. 23 15:30 - 16:00. NOX are from concurrent flow tests.	20.87	0.19	122.01	4.99	12.1 13.3 12.9 12.1 12.4 13 13.9

Test 2 Time	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	NO_X (ppm)
O2, CO2, CO, and SO2 are averages from TRS Testing, Oct. 23 16:00 - 16:30. NOX are from concurrent flow tests.	20.85	0.19	122.10	5.56	14.2 13.3 12.1 12.3 12.7 12.5 12.2

Test 3 Time	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	NO_X (ppm)
O2, CO2, CO, and SO2 are averages from TRS Testing, Oct. 23 16:30 - 17:00. NOX are from concurrent flow tests.	20.85	0.19	118.75	6.33	11.1 11.5 11.8 12.5 11.9 11.8 12.8

Raw Data for: **Northern Pulp Fall Source Testing**

Test #1

Client: Northern Pulp
Job Number: 121511269

Plant: New Glasgow, NS
Location: High Level Roof Vent
Test: Flow 1
Date: 23-Oct-14
Personnel: TBH/NM

Test Start: 6:00 PM
Test Finish: 6:15 PM

Parameters

Barometric Pressure, Pbar (in. Hg)	29.82	**O2, (%)**	20.9	**Stack Diameter, (in.)**	72
Stack Static Pressure, Pstatic (in. H2O)	0.00	**CO2, (%)**	0.2	**Stack Area, (sq. ft.)**	28.27
Ambient Temp, (°F)	53	**N2, (%)**	78.9	**Pitot Coefficient, (Cp)**	0.840
Assumed Moisture Content (as decimal)	0.3				

Traverse Point		Time (min)	Stack Gas Temp, Ts (°F)	S-type Pitot delta P (in. H2O)
1	**1**	15	130	0.78
	2		128	0.79
	3		133	0.80
	4		132	0.85
	5		131	0.96
	6		135	0.99
	7		133	1.05
	8		132	1.10
	9		130	1.05
	10		128	0.99
	11		130	0.98
	12		130	0.90
2	**1**		130	0.75
	2		130	0.80
	3		128	0.80
	4		130	0.90
	5		128	0.95
	6		125	1.00
	7		130	1.10
	8		130	1.05
	9		128	1.00
	10		128	0.99
	11		127	0.90
	12		130	0.85

Calculations for: Northern Pulp Fall Source Testing

Test #1

Client:	Northern Pulp
Job Number:	121511269
Plant:	New Glasgow, NS
Location:	High Level Roof Vent
Test:	Flow 1
Date:	23-Oct-14
Personnel:	TBH/NM

Calculated Parameters

Stack Gas Pressure, Ps (in.Hg)	29.82
Stack Gas Molecular Weight, Dry Basis, Md (lb/lb-mole)	28.87
Volume of Water Vapour Collected, Vwc (cu.ft)	0.014
Stack Gas Moisture Content (% as decimal)	0.300
Stack Gas Molecular Weight, Wet Basis, Ms (lb/lb-mole)	25.61

Traverse Point		Time (min)	Stack Gas Temp, Ts (R)	S-type Pitot, delta P (in. H2O)	Stack Gas Velocity, Us (ft/s)
1	**1**	15	590	0.78	55.64
	2		588	0.79	55.90
	3		593	0.80	56.50
	4		592	0.85	58.19
	5		591	0.96	61.78
	6		595	0.99	62.95
	7		593	1.05	64.72
	8		592	1.10	66.19
	9		590	1.05	64.56
	10		588	0.99	62.58
	11		590	0.98	62.37
	12		590	0.90	59.77
2	**1**		590	0.75	54.56
	2		590	0.80	56.35
	3		588	0.80	56.26
	4		590	0.90	59.77
	5		588	0.95	61.30
	6		585	1.00	62.74
	7		590	1.10	66.08
	8		590	1.05	64.56
	9		588	1.00	62.90
	10		588	0.99	62.58
	11		587	0.90	59.62
	12		590	0.85	58.09
		Total	**Average**	**Average**	**Average**
		15	590	0.93	60.7

Raw Data for: **Northern Pulp Fall Source Testing**

Test #2

Client: Northern Pulp
Job Number: 121511269

Plant: New Glasgow, NS
Location: High Level Roof Vent
Test: Flow 2
Date: 23-Oct-14
Personnel: TBH/NM

Test Start: 6:30 PM
Test Finish: 6:40 PM

Parameters

Barometric Pressure, Pbar (in. Hg)	29.80	**O2, (%)**	20.9	**Stack Diameter, (in.)**	72
Stack Static Pressure, Pstatic (in. H2O)	0.00	**CO2, (%)**	0.2	**Stack Area, (sq. ft.)**	28.27
Ambient Temp, (°F)	53	**N2, (%)**	79.0	**Pitot Coefficient, (Cp)**	0.840
Assumed Moisture Content (as decimal)	0.3				

Traverse Point		Time (min)	Stack Gas Temp, Ts (°F)	S-type Pitot delta P (in. H2O)
1	**1**	10	132	0.78
	2		131	0.85
	3		133	0.90
	4		132	0.95
	5		133	1.00
	6		131	1.00
	7		130	1.05
	8		129	1.00
	9		131	0.95
	10		131	0.90
	11		130	0.90
	12			0.88
2	**1**		131	0.75
	2		132	0.80
	3		133	0.89
	4		132	0.95
	5		131	1.00
	6		130	1.05
	7		131	1.10
	8		130	1.00
	9		129	0.98
	10		133	0.90
	11		132	0.88
	12		133	0.87

Calculations for: Northern Pulp Fall Source Testing

Test #1

Client:	Northern Pulp
Job Number:	121511269
Plant:	New Glasgow, NS
Location:	High Level Roof Vent
Test:	Flow 2
Date:	23-Oct-14
Personnel:	TBH/NM

Calculated Parameters

Stack Gas Pressure, Ps (in.Hg)	29.80
Stack Gas Molecular Weight, Dry Basis, Md (lb/lb-mole)	28.87
Volume of Water Vapour Collected, Vwc (cu.ft)	0.014
Stack Gas Moisture Content (% as decimal)	0.300
Stack Gas Molecular Weight, Wet Basis, Ms (lb/lb-mole)	25.61

Traverse Point		Time (min)	Stack Gas Temp, Ts (R)	S-type Pitot, delta P (in. H2O)	Stack Gas Velocity, Us (ft/s)
1	**1**	10	592	0.78	55.76
	2		591	0.85	58.16
	3		593	0.90	59.95
	4		592	0.95	61.54
	5		593	1.00	63.19
	6		591	1.00	63.09
	7		590	1.05	64.59
	8		589	1.00	62.98
	9		591	0.95	61.49
	10		591	0.90	59.85
	11		590	0.90	59.80
	12		460	0.88	52.21
2	**1**		591	0.75	54.63
	2		592	0.80	56.47
	3		593	0.89	59.62
	4		592	0.95	61.54
	5		591	1.00	63.09
	6		590	1.05	64.59
	7		591	1.10	66.16
	8		590	1.00	63.03
	9		589	0.98	62.35
	10		593	0.90	59.95
	11		592	0.88	59.23
	12		593	0.87	58.94
		Total	**Average**	**Average**	**Average**
		10	586	0.93	60.5

Raw Data for: **Northern Pulp Fall Source Testing**

Test #3

Client: Northern Pulp
Job Number: 121511269

Plant: New Glasgow, NS
Location: High Level Roof Vent
Test: Flow 3
Date: 23-Oct-14
Personnel: TBH/NM

Test Start: 6:50 PM
Test Finish: 7:00 PM

Parameters

Barometric Pressure, Pbar (in. Hg)	29.80	**O2, (%)**	20.8	**Stack Diameter, (in.)**	72
Stack Static Pressure, Pstatic (in. H2O)	0.00	**CO2, (%)**	0.2	**Stack Area, (sq. ft.)**	28.27
Ambient Temp, (°F)	53	**N2, (%)**	79.0	**Pitot Coefficient, (Cp)**	0.840
Assumed Moisture Content (as decimal)	0.3				

Traverse Point		Time (min)	Stack Gas Temp, Ts (°F)	S-type Pitot delta P (in. H2O)
1	**1**	10	131	0.76
	2		132	0.85
	3		132	0.89
	4		130	0.95
	5		129	1.00
	6		131	1.05
	7		130	1.10
	8		130	1.05
	9		129	0.99
	10		128	0.95
	11		130	0.88
	12		129	0.83
2	**1**		131	0.76
	2		130	0.85
	3		130	0.90
	4		131	0.98
	5		130	1.00
	6		132	1.05
	7		131	1.05
	8		132	1.10
	9		131	0.95
	10		132	0.90
	11		131	0.88
	12		130	0.85

Calculations for: Northern Pulp Fall Source Testing

Test #1

Client:	Northern Pulp
Job Number:	121511269
Plant:	New Glasgow, NS
Location:	High Level Roof Vent
Test:	Flow 3
Date:	23-Oct-14
Personnel:	TBH/NM

Calculated Parameters

Stack Gas Pressure, Ps (in.Hg)	29.80
Stack Gas Molecular Weight, Dry Basis, Md (lb/lb-mole)	28.86
Volume of Water Vapour Collected, Vwc (cu.ft)	0.014
Stack Gas Moisture Content (% as decimal)	0.300
Stack Gas Molecular Weight, Wet Basis, Ms (lb/lb-mole)	25.61

Traverse Point		Time (min)	Stack Gas Temp, Ts (R)	S-type Pitot, delta P (in. H2O)	Stack Gas Velocity, Us (ft/s)
1	**1**	10	591	0.76	55.00
	2		592	0.85	58.21
	3		592	0.89	59.57
	4		590	0.95	61.44
	5		589	1.00	62.98
	6		591	1.05	64.64
	7		590	1.10	66.11
	8		590	1.05	64.59
	9		589	0.99	62.66
	10		588	0.95	61.33
	11		590	0.88	59.13
	12		589	0.83	57.38
2	**1**		591	0.76	55.00
	2		590	0.85	58.11
	3		590	0.90	59.80
	4		591	0.98	62.45
	5		590	1.00	63.03
	6		592	1.05	64.70
	7		591	1.05	64.64
	8		592	1.10	66.22
	9		591	0.95	61.49
	10		592	0.90	59.90
	11		591	0.88	59.18
	12		590	0.85	58.11
		Total	**Average**	**Average**	**Average**
		10	591	0.94	61.1

CALCULATIONS

Northern Pulp
New Glasgow, NS
High Level Roof Vent
Operating Conditions: Normal

77	
298	
29.92	
1.0	

Symbol	Units	Test 1	Test 2	Test 3	Average
-	-	Flow 1	Flow 2	Flow 3	n/a
-	-	23-Oct-14	23-Oct-14	23-Oct-14	n/a
-	-	6:00 PM	6:30 PM	6:50 PM	n/a
-	-	6:15 PM	6:40 PM	7:00 PM	n/a
-	min	15	10	10	12
D	in.	72	72	72	72
Ts	F	130	126	131	129
Pbar	in.Hg	29.82	29.80	29.80	29.80
Pstatic	in.H_2O	0.00	0.00	0.00	0
dP	in.H_2O	0.93	0.93	0.94	0.93
Cp	-	0.840	0.840	0.840	0.840
Tref	R	537	537	537	537
Pref	in.Hg	29.92	29.92	29.92	29.92
Bwo		0.30	0.30	0.30	0.30
Us	ft/s	60.7	60.5	61.1	60.7
Acfm	cu.ft/m	102,917	102,650	103,602	103,056
Dscfm	cu.ft/m	65,375	65,592	65,677	65,548
MMSCFH		3.92	3.94	3.94	3.93

GAS CALCULATIONS
Northern Pulp
New Glasgow, NS
High Level Roof Vent

Variable	Symbol	Units	Calculation	Test 1	Test 2	Test 3	Average
Dry Stack Gas Flow Rate	**Qs**	**dscfm**		65,375	65,592	65,677	65,548
		dscms	**Qs (dscms) = 0.000472 x Qs (dscfm)**	30.9	31.0	31.0	30.9
Stack Gas Oxygen Content	**Co2**	**%**	**Measurement from Flue Gas Analyzer**	20.9	20.9	20.8	20.9
Stack Gas Carbon Dioxide Content	**Cco2**	**%**	**Measurement from Flue Gas Analyzer**	0.2	0.2	0.2	0.2
Sulphur Dioxide - SO2							
SO2 Measured Concentration	**Cso2**	**ppm**	**Measurement from Flue Gas Analyzer**	4.99	5.56	6.33	5.62
Uncorrected @ STP	**Cso2**	**mg/dscm**	**Cso2 (mg/dscm) = Cso2 (ppm) x 2.62**	13.1	14.6	16.6	14.7
SO2 Emission Rate	**ERso2**	**g/s**	**ERso2 = Cso2/1000 x Qs**	0.40	0.45	0.51	0.46
		kg/hr	**ERso2 (kg/hr) = 3.6 x ERso2 (g/s)**	1.45	1.62	1.85	1.64
SO2 Concentration							
Corrected to 11% O2	**Cso2**	**mg/dscm**	**Cso2 (11% O2) = Cso2 (mg/dscm) x (20.9-11) / (20.9-Co2)**	3,938	3,097	3,245	3,427
Corrected to 3% O2	**Cso2**	**mg/dscm**	**Cso2 (3% O2) = Cso2 (mg/dscm) x (20.9-3) / (20.9-Co2)**	7,120	5,599	5,868	6,195
Corrected to 12% CO2	**Cso2**	**mg/dscm**	**Cso2 (12% CO2) = Cso2 (mg/dscm) x (12/Cco2)**	826	898	1,035	920
Nitrogen Oxides - NOx							
NOx Measured Concentration	**Cnox**	**ppm**	**Measurement from Flue Gas Analyzer**	12.8	12.8	11.9	12.5
Uncorrected @ STP	**Cnox**	**mg/dscm**	**Cnox (mg/dscm) = Cnox (ppm) x 1.882**	24.1	24.0	22.4	23.5
NOx Emission Rate	**ERnox**	**g/s**	**ERnox = Cnox/1000 x Qs**	0.74	0.74	0.70	0.73
		kg/hr	**ERnox (kg/hr) = 3.6 x ERnox (g/s)**	2.68	2.68	2.50	2.62
NOx Concentration							
Corrected to 11% O2	**Cnox**	**mg/dscm**	**Cnox (11% O2) = Cnox (mg/dscm) x (20.9-11) / (20.9-Co2)**	7,269	5,106	4,390	5,588
Corrected to 3% O2	**Cnox**	**mg/dscm**	**Cnox (3% O2) = Cnox (mg/dscm) x (20.9-3) / (20.9-Co2)**	13,142	9,232	7,938	10,104
Corrected to 12% CO2	**Cnox**	**mg/dscm**	**Cnox (12% CO2) = Cnox (mg/dscm) x (12/Cco2)**	1,525	1,481	1,400	1,469
Carbon Monoxide - CO							
CO Measured Concentration	**Cco**	**ppm**	**Measurement from Flue Gas Analyzer**	122	122	119	121
Uncorrected @ STP	**Cco**	**mg/dscm**	**Cco (mg/dscm) = Cco (ppm) x 1.145**	140	140	136	138
CO Emission Rate	**ERco**	**g/s**	**ERco = Cco/1000 x Qs**	4.31	4.33	4.21	4.28
		kg/hr	**ERco (kg/hr) = 3.6 x ERco (g/s)**	15.5	15.6	15.2	15.4
CO Concentration							
Corrected to 11% O2	**Cco**	**mg/dscm**	**Cco (11% O2) = Cco (mg/dscm) x (20.9-11) / (20.9-Co2)**	42,104	29,732	26,621	32,819
Corrected to 3% O2	**Cco**	**mg/dscm**	**Cco (3% O2) = Cco (mg/dscm) x (20.9-3) / (20.9-Co2)**	76,128	53,757	48,133	59,339
Corrected to 12% CO2	**Cco**	**mg/dscm**	**Cco (12% CO2) = Cco (mg/dscm) x (12/Cco2)**	8,835	8,623	8,491	8,650

Legend:

sq.ft - square feet
sq.m - square metres
Pi - 3.142
R - degrees Rankin
ppm - parts per million
in.Hg - inches of mercury
cu.ft - cubic feet
cu.m - cubic metres
STP - standard temperature and pressure (25 C and 101.3 kPa)
dscms - dry standard cubic metres per second
dscfm - dry standard cubic feet per minute
mg/dscm - miligrams per dry standard cubic metre
g/s - grams per second
NOx - as NO2
acfm - actual cubic feet per minute

STACK TESTING RESULTS
GAS CALCULATIONS
Northern Pulp
New Glasgow, NS
High Level Roof Vent

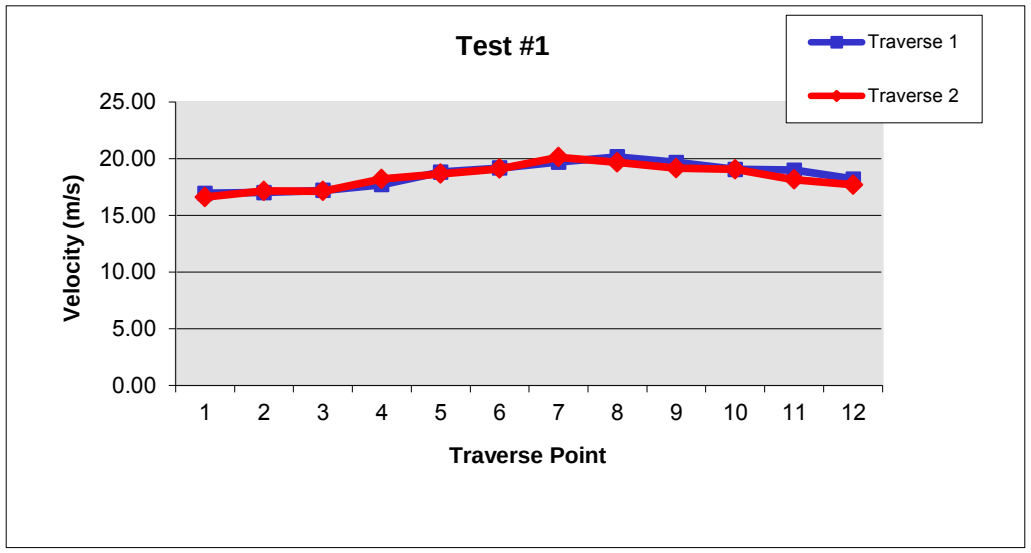
Parameter	Test 1	Test 2	Test 3	Average	Limits
Oxygen - O2 (%)	20.9	20.9	20.8	20.9	-
Carbon Dioxide - CO2 (%)	0.2	0.2	0.2	0.2	-
Sulphur Dioxide - SO2					
SO2 Measured Concentration (ppm)	4.99	5.56	6.33	5.62	-
Uncorrected at STP (mg/dscm)	13.1	14.6	16.6	14.7	-
Emission Rate (kg/hr)	1.45	1.62	1.85	1.64	-
Nitrogen Oxides - NOx					
NOx Measured Concentration (ppm)	12.8	12.8	11.9	12.5	-
Uncorrected at STP (mg/dscm)	24.1	24.0	22.4	23.5	-
Emission Rate (kg/hr)	2.68	2.68	2.50	2.62	-
Carbon Monoxide - CO					
CO Measured Concentration (ppm)	122	122	119	121	-
Uncorrected at STP (mg/dscm)	140	140	136	138	-
Emission Rate (kg/hr)	15.5	15.6	15.2	15.4	-

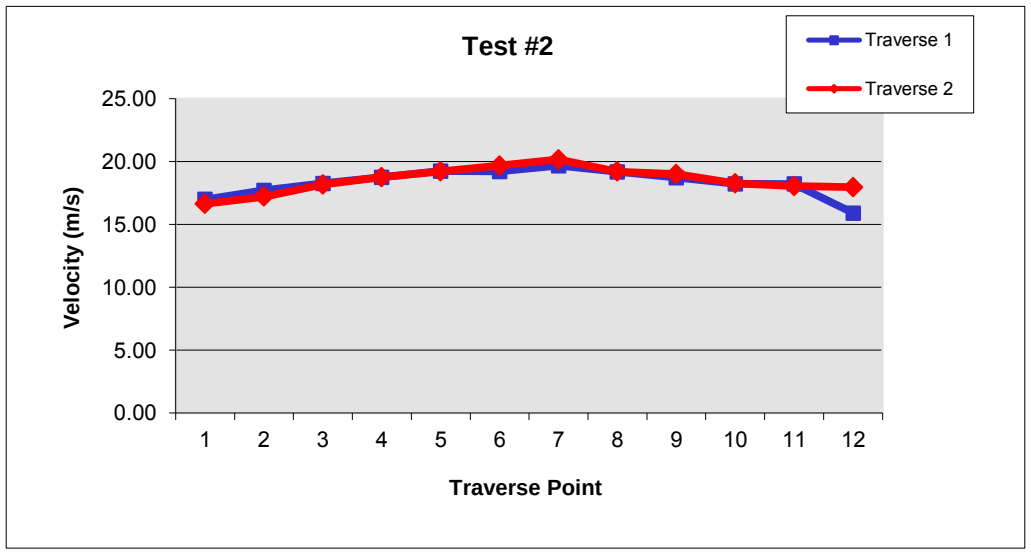
Legend:

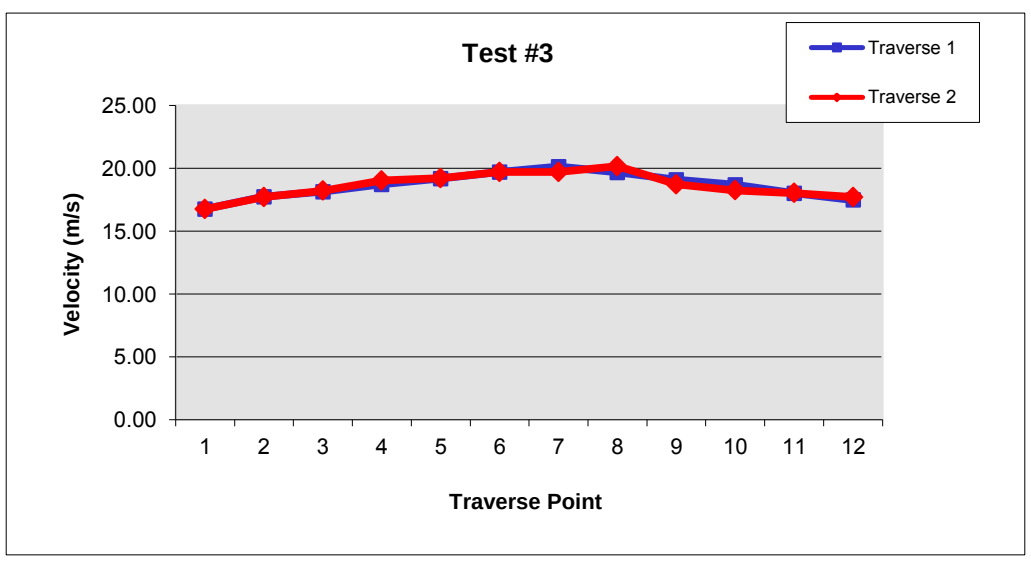
C - degrees Celsius
m/s - metres per second
dscms - dry standard cubic metres per second
ppm - parts per million
STP - standard temperature and pressure (25 C and 101.3 kPa)
mg/dscm - miligrams per dry standard cubic metre
NOx - as NO2
ND - non-detectable

Raw Data for: **Job No. 121511269**
New Glasgow, NS

Northern Pulp Fall Source Testing
Velocity Profile







Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 1**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	293	1440	20.61	0.203	70.3	9.48	66.89
2014	293	1441	20.6	0.198	69.1	9.9	69.17
2014	293	1442	20.6	0.198	70.9	9.9	70.4
2014	293	1443	20.62	0.195	70.2	9.93	69.61
2014	293	1444	20.63	0.193	71.3	10.44	70.1
2014	293	1445	20.63	0.196	72	10.36	69.88
2014	293	1446	20.64	0.196	75.4	9.94	68.27
2014	293	1447	20.63	0.193	74.7	9.9	69.2
2014	293	1448	20.64	0.196	75.8	9.9	68.06
2014	293	1449	20.63	0.195	71.6	9.92	68.14
2014	293	1450	20.64	0.195	72.6	9.92	67.36
2014	293	1451	20.61	0.195	69.59	10.47	69.02
2014	293	1452	20.63	0.193	73.2	10.23	66.83
2014	293	1453	20.61	0.194	70.6	10.1	68.62
2014	293	1454	20.61	0.189	71.2	10.36	69.03
2014	293	1455	20.62	0.191	71.5	10.25	68.74
2014	293	1456	20.63	0.185	72	10.03	69.8
2014	293	1457	20.63	0.186	72.6	9.93	70.3
2014	293	1458	20.62	0.183	68.75	9.9	69.99
2014	293	1459	20.64	0.189	69.94	9.9	69.14
2014	293	1500	20.64	0.192	72.3	9.9	69.19
2014	293	1501	20.64	0.189	70.2	9.9	68.24
2014	293	1502	20.65	0.188	70.8	9.9	67.54
2014	293	1503	20.64	0.184	69.46	9.9	66.74
2014	293	1504	20.64	0.185	68.82	9.9	68.56
2014	293	1505	20.64	0.184	70.3	9.9	68.68
2014	293	1506	20.64	0.182	69.81	9.9	68.84
2014	293	1507	20.64	0.183	70.2	9.9	68.56
2014	293	1508	20.64	0.182	68.6	9.9	68.76
2014	293	1509	20.65	0.183	69.32	9.9	68.01
2014	293	1510	20.65	0.182	70.5	9.9	67.24
2014	293	1511	20.66	0.181	67.12	9.9	66.87
2014	293	1512	20.65	0.178	65.93	9.9	68.39
2014	293	1513	20.64	0.175	67.48	9.9	68.76
2014	293	1514	20.65	0.178	67.36	9.74	69.55
2014	293	1515	20.66	0.179	68.54	9.59	68.15
2014	293	1516	20.65	0.176	69.13	9.33	67.98
2014	293	1517	20.66	0.178	70.1	9.49	68.39
2014	293	1518	20.65	0.179	70.1	8.87	68.61
2014	293	1519	20.67	0.181	70.3	8.98	67.86
2014	293	1520	20.66	0.183	70.3	8.83	67.6
2014	293	1521	20.67	0.187	71.5	8.39	67.04
2014	293	1522	20.65	0.191	67.82	8.27	68.39

Summary of RAW DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	293	1523	20.66	0.194	73	8.27	67.57
2014	293	1524	20.66	0.198	71.4	8.25	67.36
2014	293	1525	20.67	0.194	72.1	8.11	67.73
2014	293	1526	20.66	0.193	71	7.89	67.45
2014	293	1527	20.67	0.195	69.83	7.88	68.56
2014	293	1528	20.66	0.198	72	7.67	68.65
2014	293	1529	20.68	0.2	73.3	7.12	66.6
2014	293	1530	20.66	0.196	69.09	7.33	67.28
2014	293	1531	20.66	0.197	67.92	7.61	68.25
2014	293	1532	20.66	0.198	68.2	7.22	66.87
2014	293	1533	20.65	0.197	66.74	7.72	67.33
2014	293	1534	20.66	0.196	66.53	7.04	67
2014	293	1535	20.65	0.192	65.19	7.78	69
2014	293	1536	20.65	0.192	64.33	7.72	67.81
2014	293	1537	20.65	0.194	64.72	7.36	67.88
2014	293	1538	20.66	0.193	66.45	6.822	67.97
2014	293	1539	20.66	0.195	66.71	7.04	67.98
2014	293	1540	20.67	0.195	66.73	6.602	68.2
2014	293	1541	20.67	0.188	63.4	6.891	69.15
2014	293	1542	20.65	0.186	63.12	6.946	70.7
2014	293	1543	20.66	0.185	64.99	6.726	70.5
2014	293	1544	20.66	0.184	64.27	6.602	70.8
2014	293	1545	20.66	0.186	65.08	6.629	69.71
2014	293	1546	20.65	0.184	64.29	6.671	70.5
2014	293	1547	20.68	0.185	66.83	6.602	69.68
2014	293	1548	20.67	0.185	67.11	6.602	69.75
2014	293	1549	20.64	0.185	63.2	6.602	72.2
2014	293	1550	20.65	0.184	64.52	6.629	72.1
2014	293	1551	20.67	0.185	65.95	6.602	71.3
2014	293	1552	20.65	0.19	67.07	6.602	70.8
2014	293	1553	20.67	0.189	66.75	6.602	71.2
2014	293	1554	20.67	0.191	66.61	6.602	70.6
2014	293	1555	20.66	0.19	67.06	6.602	70.1
2014	293	1556	20.66	0.193	66.76	6.602	72.6
2014	293	1557	20.68	0.194	67.51	6.602	93.2
2014	293	1558	20.67	0.195	67.07	6.615	82.8
2014	293	1559	20.65	0.197	64.51	6.602	82.5
2014	293	1600	20.66	0.194	65.23	6.629	82.8
2014	293	1601	20.65	0.195	62.81	6.615	83
2014	293	1602	20.68	0.195	66.3	6.602	82.4
2014	293	1603	20.65	0.193	65	6.602	84.4
2014	293	1604	20.66	0.192	64.13	6.602	84.9
2014	293	1605	20.67	0.192	64.99	6.602	85.2

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 1**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	293	1606	20.66	0.191	64.26	6.602	84.6
2014	293	1607	20.66	0.189	64.14	6.602	86
2014	293	1608	20.68	0.193	64.5	6.602	83.2
2014	293	1609	20.67	0.19	64.28	6.602	84.6
2014	293	1610	20.67	0.191	64.19	6.602	84.4
2014	293	1611	20.65	0.193	63.65	6.602	86.1
2014	293	1612	20.65	0.191	62.82	6.602	86.6
2014	293	1613	20.66	0.192	63.85	6.602	85.6
2014	293	1614	20.67	0.191	63.69	6.602	84.8
2014	293	1615	20.68	0.19	64.92	6.602	82.8
2014	293	1616	20.67	0.191	62.82	6.602	84.3
2014	293	1617	20.67	0.192	63.43	6.602	84.6
2014	293	1618	20.68	0.192	63.23	6.602	85.2
2014	293	1619	20.67	0.192	62.67	6.602	83.7
2014	293	1620	20.67	0.191	62.39	6.602	86.1
2014	293	1621	20.67	0.192	62.39	6.602	84.9
2014	293	1622	20.66	0.189	61.35	6.602	85.5
2014	293	1623	20.67	0.189	62.97	6.602	85.4
2014	293	1624	20.66	0.187	63.19	6.602	86.2
2014	293	1625	20.66	0.187	62.51	6.602	86.1
2014	293	1626	20.67	0.188	64.84	6.602	85.3
2014	293	1627	20.67	0.186	63.2	6.602	85.5
2014	293	1628	20.67	0.188	61.12	6.602	85.6
2014	293	1629	20.67	0.188	60.38	6.602	84.7
2014	293	1630	20.68	0.186	62.22	6.602	85.5
2014	293	1631	20.69	0.187	62.41	6.602	85.9
2014	293	1632	20.69	0.186	60.93	6.602	86.3
2014	293	1633	20.67	0.189	61.77	6.602	86.4
2014	293	1634	20.69	0.187	62.7	6.602	85.8
2014	293	1635	20.69	0.185	65.2	6.602	85.8
2014	293	1636	20.68	0.189	66.14	6.602	85
2014	293	1637	20.67	0.187	66.07	6.602	86.9
2014	293	1638	20.69	0.189	65.53	6.602	86.7
2014	293	1639	20.7	0.188	65.22	6.602	86.5
2014	293	1640	20.67	0.19	62.95	6.602	87.8
2014	293	1641	20.69	0.195	63.2	6.602	86.5
2014	293	1642	20.69	0.196	65.01	6.602	87.5
2014	293	1643	20.69	0.198	62.87	6.602	88.3
2014	293	1644	20.68	0.198	63.35	6.602	89.7
2014	293	1645	20.67	0.196	61.24	6.602	90.7
2014	293	1646	20.69	0.199	62.16	6.602	89
2014	293	1647	20.67	0.198	61.71	6.602	90.1
2014	293	1648	20.68	0.196	60.94	6.602	90.9

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 1**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	293	1649	20.69	0.196	62.42	6.602	89.7
2014	293	1650	20.69	0.19	60.93	6.602	90.2
2014	293	1651	20.67	0.189	58.66	6.602	91.1
2014	293	1652	20.68	0.188	60.89	6.602	91.8
2014	293	1653	20.68	0.188	59.8	6.602	91.6
2014	293	1654	20.68	0.188	60.51	6.602	91.9
2014	293	1655	20.7	0.191	61.68	6.602	91.2
2014	293	1656	20.69	0.194	62.56	6.602	91.5
2014	293	1657	20.68	0.196	60.88	6.602	91.1
2014	293	1658	20.68	0.194	61.16	6.602	91.6
2014	293	1659	20.67	0.193	60.43	6.602	92
2014	293	1700	20.69	0.194	61.41	6.602	91.8
2014	293	1701	20.69	0.195	60.13	6.602	91.8
2014	293	1702	20.69	0.194	59.96	6.602	92.3
2014	293	1703	20.69	0.194	58.77	6.602	92.9
2014	293	1704	20.72	0.193	60.77	6.602	91.2
2014	293	1705	20.69	0.189	60.66	6.602	91.6
2014	293	1706	20.69	0.188	59.36	6.602	92.4
2014	293	1707	20.69	0.186	60.02	6.836	93.6
2014	293	1708	20.7	0.189	61.16	6.726	92.4
2014	293	1709	20.69	0.187	60.35	6.602	93.2
2014	293	1710	20.7	0.19	60.51	6.629	92.9
2014	293	1711	20.68	0.187	60.6	6.973	94
2014	293	1712	20.68	0.189	60.28	7.59	95.1
2014	293	1713	20.67	0.188	59.23	7.88	95.6
2014	293	1714	20.68	0.185	58.99	8.05	96
2014	293	1715	20.7	0.188	60.45	7.92	93.6
2014	293	1716	20.69	0.188	58.69	7.99	94.9
2014	293	1717	20.69	0.186	59.56	8.17	95.2
2014	293	1718	20.68	0.185	58.79	8.25	95.7
2014	293	1719	20.71	0.184	62.06	8.13	93.8
2014	293	1720	20.7	0.182	59.42	8.16	94.2
2014	293	1721	20.7	0.183	59.32	7.85	94.1
2014	293	1722	20.71	0.186	60.8	7.61	93.1
2014	293	1723	20.69	0.184	59.31	7.88	93.7
2014	293	1724	20.69	0.184	56.61	8.2	95.2
2014	293	1725	20.71	0.181	57.72	7.91	95.1
2014	293	1726	20.71	0.178	57.69	8.07	96.7
2014	293	1727	20.69	0.181	57.01	8.25	93.2
2014	293	1728	20.7	0.174	58.38	8.25	91.7
2014	293	1729	20.7	0.174	59.8	8.25	91.1
2014	293	1730	20.72	0.175	59.05	8.25	91.8
2014	293	1731	20.71	0.176	59.38	8.18	91.7

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 1**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	293	1732	20.71	0.175	59.36	8.25	91.8
2014	293	1733	20.72	0.174	59.44	8.17	91.9
2014	293	1734	20.71	0.172	58.24	8.03	93.8
2014	293	1735	20.69	0.167	56.87	8.25	95.7
2014	293	1736	20.7	0.17	56.6	8.25	95.4
2014	293	1737	20.7	0.168	56.44	8.22	96.1
2014	293	1738	20.73	0.168	57.48	7.8	93.2
2014	293	1739	20.72	0.168	57.58	7.15	93.9
2014	293	1740	20.73	0.166	56.98	7.59	93.2
2014	293	1741	20.72	0.166	57.02	7.45	93.9
2014	293	1742	20.74	0.166	58.02	7.12	92.8
2014	293	1743	20.73	0.167	56.41	7.37	93.2
2014	293	1744	20.71	0.168	56.45	7.67	93.5
2014	293	1745	20.73	0.163	57.64	7.26	88.4
2014	293	1746	20.72	0.168	57.76	7.06	89.7
2014	293	1747	20.73	0.172	58.45	6.904	90.1
2014	293	1748	20.73	0.17	58.31	7.22	91.4
2014	293	1749	20.74	0.172	58.43	7.12	91
2014	293	1750	20.74	0.17	58.3	6.904	90.4
2014	293	1751	20.72	0.17	59.32	7.72	90.8
2014	293	1752	20.73	0.169	58	7.22	90
2014	293	1753	20.72	0.17	58.18	7.37	91.9
2014	293	1754	20.73	0.168	60.37	7.08	91.1
2014	293	1755	20.74	0.17	59.89	7.18	90.9
2014	293	1756	20.73	0.169	59.06	6.849	89.9
2014	293	1757	20.74	0.167	58.14	6.725	90
2014	293	1758	20.74	0.173	56.97	6.78	89.7
2014	293	1759	20.74	0.173	56.77	6.602	89.6
2014	293	1800	20.74	0.174	56.4	6.643	89.8
2014	293	1801	20.74	0.172	56.44	6.601	89.7
2014	293	1802	20.74	0.168	56.67	6.656	89.4
2014	293	1803	20.75	0.169	57.54	6.601	90
2014	293	1804	20.74	0.167	56.5	6.615	90.1
2014	293	1805	20.76	0.166	57.09	6.601	90.1
2014	293	1806	20.74	0.164	54.67	6.615	91.1
2014	293	1807	20.74	0.165	55.34	6.601	90.2
2014	293	1808	20.73	0.164	54.58	6.601	91.3
2014	293	1809	20.74	0.163	54.87	6.601	91
2014	293	1810	20.74	0.16	54.36	6.601	90.9
2014	293	1811	20.73	0.161	53.36	6.601	91.2
2014	293	1812	20.75	0.164	55.33	6.6	90.1
2014	293	1813	20.75	0.165	53.83	6.6	91.5
2014	293	1814	20.75	0.163	52.8	6.6	90.7

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 1**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	293	1815	20.76	0.164	52.7	6.6	90.4
2014	293	1816	20.77	0.165	54.35	6.6	89.8
2014	293	1817	20.76	0.167	52.17	6.6	90.2
2014	293	1818	20.76	0.169	53.08	6.6	89
2014	293	1819	20.77	0.167	52.08	6.6	89.7
2014	293	1820	20.75	0.167	51.84	6.6	89
2014	293	1821	20.76	0.169	50.55	6.6	88.9
2014	293	1822	20.76	0.165	50.53	6.6	88.8
2014	293	1823	20.76	0.162	50.2	6.6	88.9
2014	293	1824	20.76	0.162	48.64	6.6	88.7
2014	293	1825	20.76	0.161	49.06	6.6	89.1
2014	293	1826	20.76	0.161	48.92	6.6	89.3
2014	293	1827	20.77	0.158	48.73	6.6	88.3
2014	293	1828	20.76	0.159	50.04	6.6	88.7
2014	293	1829	20.77	0.159	50.03	6.6	88.1
2014	293	1830	20.77	0.159	50.13	6.6	88.6
2014	293	1831	20.75	0.16	48.51	6.6	89.9
2014	293	1832	20.76	0.158	49.33	6.6	90
2014	293	1833	20.76	0.16	50.08	6.6	89.5
2014	293	1834	20.75	0.158	50.25	6.6	90.3
2014	293	1835	20.77	0.159	50.55	6.6	89.4
2014	293	1836	20.78	0.159	50.89	6.6	88.6
2014	293	1837	20.76	0.164	50.12	6.6	88.8
2014	293	1838	20.76	0.162	48.61	6.6	89.5
2014	293	1839	20.76	0.16	47.9	6.6	90.5
2014	293	1840	20.79	0.161	49.44	6.6	88.9
2014	293	1841	20.78	0.161	49.46	6.6	88.9
2014	293	1842	20.79	0.161	50.26	6.6	88.1
2014	293	1843	20.78	0.162	49.98	6.6	88.8
2014	293	1844	20.79	0.162	49.79	6.6	88.2
2014	293	1845	20.76	0.161	48.57	6.6	89.4
2014	293	1846	20.76	0.16	49.65	6.6	90.1
2014	293	1847	20.78	0.16	50.69	6.6	88.8
2014	293	1848	20.79	0.161	49.86	6.6	88
2014	293	1849	20.79	0.163	49.48	6.6	88.5
2014	293	1850	20.79	0.17	48.71	6.6	87.6
2014	293	1851	20.78	0.173	48.73	6.6	88.5
2014	293	1852	20.76	0.173	48.56	6.6	89.7
2014	293	1853	20.77	0.176	48.75	6.6	89.3
2014	293	1854	20.77	0.177	48.62	6.6	89.1
2014	293	1855	20.78	0.18	48.76	6.6	87.7
2014	293	1856	20.78	0.179	49.05	6.6	87.5
2014	293	1857	20.78	0.183	49.88	6.559	87.5

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 1**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	293	1858	20.8	0.186	50.37	6.229	86.5
2014	293	1859	20.78	0.186	48.22	6.367	87.4
2014	293	1900	20.78	0.186	47.94	6.353	87.7
2014	293	1901	20.79	0.189	49.7	6.353	87
2014	293	1902	20.78	0.188	47.29	6.587	87
2014	293	1903	20.76	0.191	47.87	6.587	88.2
2014	293	1904	20.76	0.189	47.61	6.601	88.5
2014	293	1905	20.77	0.195	47.51	6.601	88.3
2014	293	1906	20.78	0.192	48.69	6.601	87.6
2014	293	1907	20.77	0.191	48.36	6.601	87.1
2014	293	1908	20.76	0.184	46.74	6.601	89.5
2014	293	1909	20.77	0.183	46.65	6.601	87.8
2014	293	1910	20.77	0.185	47.03	6.601	88.7
2014	293	1911	20.78	0.184	48.4	6.601	87.3
2014	293	1912	20.77	0.184	48.9	6.587	87.6
2014	293	1913	20.78	0.186	48.51	6.601	87.2
2014	293	1914	20.78	0.185	48.56	6.601	87.8
2014	293	1915	20.75	0.184	47.5	6.601	88.4
2014	293	1916	20.77	0.186	48.4	6.601	87.8
2014	293	1917	20.77	0.184	49.3	6.601	87.7
2014	293	1918	20.76	0.185	49.02	6.601	87.8
2014	293	1919	20.77	0.185	47.94	6.601	88.1
2014	293	1920	20.78	0.184	48.06	6.601	86.5
2014	293	1921	20.78	0.183	48.24	6.601	86.9
2014	293	1922	20.77	0.184	47.17	6.602	87.1
2014	293	1923	20.78	0.181	46.77	6.602	88.5
2014	293	1924	20.78	0.183	47.32	6.602	88.8
2014	293	1925	20.79	0.182	47.94	6.588	87.8
2014	293	1926	20.78	0.181	47.61	6.505	86.7
2014	293	1927	20.78	0.181	48.59	6.602	88.5
2014	293	1928	20.76	0.182	47.85	6.602	89.9
2014	293	1929	20.76	0.183	47.9	6.602	88.5
2014	293	1930	20.78	0.181	47.74	6.574	87.7
2014	293	1931	20.78	0.177	47.24	6.588	87.8
2014	293	1932	20.78	0.178	48.53	6.588	88.4
2014	293	1933	20.78	0.177	48.47	6.56	87.7
2014	293	1934	20.78	0.177	48.68	6.574	88
2014	293	1935	20.79	0.179	48.89	6.519	88.3
2014	293	1936	20.77	0.178	47.58	6.574	87.4
2014	293	1937	20.78	0.179	47.38	6.574	87.7
2014	293	1938	20.79	0.179	47.98	6.217	87.4
2014	293	1939	20.79	0.179	47.94	6.354	87.6
2014	293	1940	20.78	0.18	47.36	6.547	87.3

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 1**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	293	1941	20.78	0.182	47.51	6.574	88.1
2014	293	1942	20.79	0.177	48.08	6.505	87.9
2014	293	1943	20.77	0.178	47.23	6.601	89.8
2014	293	1944	20.78	0.177	48.4	6.505	88.3
2014	293	1945	20.79	0.176	48.19	6.258	87.6
2014	293	1946	20.77	0.174	46.66	6.574	89.5
2014	293	1947	20.8	0.171	48.1	6.299	88.3
2014	293	1948	20.78	0.172	48.42	6.354	88
2014	293	1949	20.79	0.171	49.21	6.203	87.5
2014	293	1950	20.77	0.17	48.11	6.601	87.9
2014	293	1951	20.77	0.168	48.32	6.56	90.3
2014	293	1952	20.8	0.172	50.12	6.244	88.5
2014	293	1953	20.78	0.179	49.07	6.051	87.8
2014	293	1954	20.78	0.176	48.81	6.079	88.7
2014	293	1955	20.79	0.177	49.15	5.955	88
2014	293	1956	20.77	0.177	47.4	6.01	88.2
2014	293	1957	20.79	0.177	48.06	5.844	88.4
2014	293	1958	20.79	0.175	46.21	6.064	88.8
2014	293	1959	20.78	0.175	46.92	6.078	88.5
2014	293	2000	20.78	0.173	47.32	5.844	88.8
2014	293	2001	20.79	0.174	47.14	5.83	87.9
2014	293	2002	20.8	0.174	46.15	5.335	87.5
2014	293	2003	20.79	0.172	45.42	5.39	89.1
2014	293	2004	20.8	0.171	47.55	5.101	87.8
2014	293	2005	20.8	0.171	47.03	4.978	88.2
2014	293	2006	20.78	0.171	45.94	4.991	88.8
2014	293	2007	20.81	0.176	47.94	4.95	87.1
2014	293	2008	20.79	0.178	48.34	4.95	88.9
2014	293	2009	20.8	0.175	48.52	4.95	88.4
2014	293	2010	20.8	0.172	48.98	5.019	88.4
2014	293	2011	20.8	0.176	48.75	5.115	88.3
2014	293	2012	20.79	0.174	49.14	5.101	88.2
2014	293	2013	20.78	0.174	48.52	5.472	90
2014	293	2014	20.8	0.178	49.41	5.335	89.3
2014	293	2015	20.79	0.18	48.08	4.977	88.8
2014	293	2016	20.79	0.177	48.7	4.977	89.1
2014	293	2017	20.79	0.177	48.58	5.211	88.9
2014	293	2018	20.79	0.177	49.55	5.005	88.5
2014	293	2019	20.79	0.177	49.04	5.074	89
2014	293	2020	20.79	0.178	50.45	4.964	88
2014	293	2021	20.81	0.178	48.67	4.977	87.7
2014	293	2022	20.78	0.177	48.52	4.977	89.5
2014	293	2023	20.77	0.175	48.66	5.362	90.2

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 1**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	293	2024	20.78	0.174	47.91	5.074	90.3
2014	293	2025	20.8	0.176	48.94	4.977	89.3
2014	293	2026	20.79	0.179	49.35	4.964	88.6
2014	293	2027	20.79	0.178	47.77	4.95	88.8
2014	293	2028	20.79	0.176	47.4	4.95	89.1
2014	293	2029	20.79	0.18	48	4.964	89.2
2014	293	2030	20.79	0.176	49.09	4.95	88.5
2014	293	2031	20.8	0.175	48.49	4.95	88.6
2014	293	2032	20.8	0.174	48.51	4.798	88.7
2014	293	2033	20.8	0.175	48.69	4.95	89
2014	293	2034	20.8	0.177	47.93	4.95	90
2014	293	2035	20.79	0.176	48.38	4.95	90.4
2014	293	2036	20.79	0.177	48.35	4.881	89.6
2014	293	2037	20.79	0.178	47.79	4.908	90.1
2014	293	2038	20.8	0.177	49.42	4.771	90.3
2014	293	2039	20.8	0.179	48.1	4.523	89.6
2014	293	2040	20.8	0.177	47.2	4.537	90.2
2014	293	2041	20.81	0.178	48.66	4.166	89.1
2014	293	2042	20.79	0.176	47.94	4.042	89.3
2014	293	2043	20.8	0.174	46.65	3.919	89.9
2014	293	2044	20.8	0.174	47.06	3.946	89.6
2014	293	2045	20.81	0.175	47.67	3.644	88.2
2014	293	2046	20.8	0.176	47.45	3.74	88.5
2014	293	2047	20.8	0.177	47.41	4.015	89
2014	293	2048	20.81	0.175	46.87	3.506	89.8
2014	293	2049	20.8	0.176	46.49	3.52	88.3
2014	293	2050	20.81	0.174	47.09	3.369	87.8
2014	293	2051	20.8	0.176	48.14	3.314	87.8
2014	293	2052	20.81	0.177	48.33	3.314	88
2014	293	2053	20.8	0.177	47.15	3.3	88.2
2014	293	2054	20.8	0.172	46.82	3.341	88.7
2014	293	2055	20.81	0.174	46.53	3.314	87.9
2014	293	2056	20.8	0.172	46.19	3.3	88.9
2014	293	2057	20.8	0.174	46.53	3.314	88.4
2014	293	2058	20.8	0.175	46.38	3.341	88.6
2014	293	2059	20.81	0.176	45.59	3.3	89.2
2014	293	2100	20.81	0.174	47.81	3.3	88.8
2014	293	2101	20.81	0.17	48.83	3.3	88.1
2014	293	2102	20.79	0.171	48.02	3.3	89.4
2014	293	2103	20.82	0.17	49.41	3.3	88.6
2014	293	2104	20.81	0.171	48.92	3.3	89.1
2014	293	2105	20.82	0.172	51.21	3.3	87.9
2014	293	2106	20.81	0.173	49.75	3.3	88.8

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 1**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	293	2107	20.81	0.174	50.59	3.3	88.5
2014	293	2108	20.8	0.174	49.12	3.3	89.3
2014	293	2109	20.81	0.174	48.09	3.3	88.8
2014	293	2110	20.82	0.175	49.32	3.3	88.7
2014	293	2111	20.81	0.176	48.08	3.3	89.1
2014	293	2112	20.82	0.175	50.29	3.3	88.5
2014	293	2113	20.81	0.176	51.2	3.3	88.6
2014	293	2114	20.82	0.181	51.42	3.3	88.5
2014	293	2115	20.81	0.185	51.72	3.3	88.7
2014	293	2116	20.82	0.185	50.87	3.3	88
2014	293	2117	20.81	0.184	48.26	3.3	88.8
2014	293	2118	20.82	0.184	50.32	3.3	88.6
2014	293	2119	20.82	0.188	50.49	3.3	88.1
2014	293	2120	20.81	0.18	49.18	3.3	88.5
2014	293	2121	20.83	0.182	49.2	3.3	88.2
2014	293	2122	20.83	0.18	49.15	3.3	87.4
2014	293	2123	20.84	0.18	49.88	3.3	88.1
2014	293	2124	20.84	0.181	49.41	3.3	87.9
2014	293	2125	20.82	0.181	49.13	3.3	88.4
2014	293	2126	20.82	0.182	50.23	3.3	89
2014	293	2127	20.83	0.181	51.2	3.3	88.4
2014	293	2128	20.82	0.182	51.67	3.3	87.8
2014	293	2129	20.81	0.182	49.25	3.3	89.3
2014	293	2130	20.8	0.184	49.76	3.3	89.7
2014	293	2131	20.81	0.183	50.19	3.3	89.6
2014	293	2132	20.81	0.183	50.12	3.3	90.2
2014	293	2133	20.8	0.183	50.36	3.3	90.1
2014	293	2134	20.82	0.183	51.32	3.3	89
2014	293	2135	20.8	0.185	50.85	3.3	90.1
2014	293	2136	20.82	0.181	52.44	3.3	89.9
2014	293	2137	20.82	0.177	50.54	3.3	89.8
2014	293	2138	20.82	0.179	49.84	3.3	89.8
2014	293	2139	20.82	0.177	49.31	3.3	89.4
2014	293	2140	20.83	0.177	50.13	3.3	89.8
2014	293	2141	20.84	0.179	50.71	3.3	89
2014	293	2142	20.82	0.179	50.87	3.3	89.6
2014	293	2143	20.83	0.181	50.43	3.3	89.2
2014	293	2144	20.83	0.181	48.76	3.3	89.1
2014	293	2145	20.81	0.178	47.37	3.3	89.6
2014	293	2146	20.82	0.179	48.33	3.3	90.1
2014	293	2147	20.82	0.18	48.5	3.3	89.9
2014	293	2148	20.81	0.181	47.71	3.3	90.8
2014	293	2149	20.83	0.181	47.29	3.3	90.1

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 1**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	293	2150	20.83	0.18	47.08	3.3	90.2
2014	293	2151	20.83	0.18	47.87	3.3	90.1
2014	293	2152	20.84	0.179	48.91	3.3	89
2014	293	2153	20.82	0.182	50.54	3.3	89.4
2014	293	2154	20.82	0.181	50.85	3.3	89.4
2014	293	2155	20.83	0.183	51.26	3.3	88.9
2014	293	2156	20.84	0.186	50.92	3.3	88.8
2014	293	2157	20.83	0.185	50.39	3.3	90
2014	293	2158	20.82	0.184	50.15	3.3	90.2
2014	293	2159	20.85	0.185	50.52	3.3	89
2014	293	2200	20.84	0.184	49.06	3.3	88.8
2014	293	2201	20.84	0.183	49.56	3.3	89.6
2014	293	2202	20.82	0.184	48.37	3.3	90
2014	293	2203	20.82	0.184	47.98	3.3	89.7
2014	293	2204	20.83	0.186	48.15	3.3	90.1
2014	293	2205	20.84	0.185	48.62	3.3	89.5
2014	293	2206	20.83	0.183	48.94	3.3	89.5
2014	293	2207	20.83	0.184	48.01	3.3	90
2014	293	2208	20.83	0.183	49.32	3.3	89.7
2014	293	2209	20.83	0.185	48.97	3.3	89.7
2014	293	2210	20.84	0.184	48.78	3.3	89.8
2014	293	2211	20.83	0.184	48.39	3.3	89.9
2014	293	2212	20.83	0.183	48.9	3.3	90.2
2014	293	2213	20.85	0.183	50.92	3.3	89.4
2014	293	2214	20.84	0.184	51.41	3.3	89.8
2014	293	2215	20.83	0.183	52.26	3.3	90.2
2014	293	2216	20.83	0.185	52.39	3.3	89.9
2014	293	2217	20.82	0.184	51.86	3.3	91
2014	293	2218	20.84	0.185	52.57	3.3	90.2
2014	293	2219	20.83	0.189	54.03	3.3	90.4
2014	293	2220	20.85	0.193	54.97	3.3	89.9
2014	293	2221	20.85	0.193	53.47	3.3	89.1
2014	293	2222	20.84	0.194	52.63	3.3	89.7
2014	293	2223	20.83	0.194	52.57	3.3	90.7
2014	293	2224	20.85	0.195	54.07	3.3	89.6
2014	293	2225	20.84	0.193	51.67	3.3	90.5
2014	293	2226	20.85	0.19	53.24	3.3	90.7
2014	293	2227	20.85	0.189	54.08	3.3	89.8
2014	293	2228	20.85	0.188	52.88	3.3	89.5
2014	293	2229	20.84	0.187	53.91	3.3	89.9
2014	293	2230	20.85	0.187	55.46	3.3	90.4
2014	293	2231	20.84	0.186	55.47	3.3	90.8
2014	293	2232	20.84	0.188	56.8	3.3	90.1

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 1**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	293	2233	20.86	0.19	57.5	3.3	89.2
2014	293	2234	20.85	0.194	55.61	3.3	89.1
2014	293	2235	20.85	0.194	54.22	3.3	89.7
2014	293	2236	20.85	0.195	56.7	3.3	89.3
2014	293	2237	20.83	0.194	54.35	3.3	90.6
2014	293	2238	20.85	0.195	54.51	3.3	90
2014	293	2239	20.85	0.194	55.58	3.3	89.5
2014	293	2240	20.86	0.195	53.5	3.3	88.9
2014	293	2241	20.86	0.197	53.75	3.3	89.4
2014	293	2242	20.84	0.195	53.22	3.3	90.1
2014	293	2243	20.85	0.194	52.54	3.3	90.1
2014	293	2244	20.86	0.193	52.66	3.3	88.7
2014	293	2245	20.85	0.197	51.34	3.3	89.2
2014	293	2246	20.86	0.191	51.53	3.3	89.2
2014	293	2247	20.86	0.19	53.52	3.3	89.6
2014	293	2248	20.84	0.193	52.09	3.3	90.8
2014	293	2249	20.84	0.193	50.52	3.3	90.5
2014	293	2250	20.85	0.194	50.9	3.3	90.7
2014	293	2251	20.86	0.191	50.49	3.3	90
2014	293	2252	20.86	0.192	51.63	3.3	89.1
2014	293	2253	20.86	0.192	51.07	3.3	89.8
2014	293	2254	20.85	0.193	50.64	3.3	90.8
2014	293	2255	20.84	0.193	51.38	3.3	91.2
2014	293	2256	20.85	0.193	51.91	3.3	90.7
2014	293	2257	20.84	0.192	51.72	3.3	90.7
2014	293	2258	20.86	0.192	53.11	3.3	89.9
2014	293	2259	20.85	0.193	52.41	3.3	89.6
2014	293	2300	20.84	0.192	50.23	3.3	91.3
2014	293	2301	20.85	0.194	51.46	3.3	90.1
2014	293	2302	20.84	0.188	49.33	3.3	91.1
2014	293	2303	20.86	0.19	50.37	3.3	89.5
2014	293	2304	20.86	0.185	51.69	3.3	89.1
2014	293	2305	20.87	0.184	52.69	3.3	88.5
2014	293	2306	20.86	0.185	55.04	3.3	89.3
2014	293	2307	20.85	0.184	51.01	3.3	89.6
2014	293	2308	20.86	0.185	53.51	3.3	89.5
2014	293	2309	20.84	0.185	53.19	3.3	89.4
2014	293	2310	20.86	0.185	52.55	3.3	88.5
2014	293	2311	20.84	0.184	51.73	3.3	89.4
2014	293	2312	20.86	0.187	52.46	3.3	89
2014	293	2313	20.86	0.184	53.08	3.3	89.5
2014	293	2314	20.85	0.183	52.96	3.3	90.1
2014	293	2315	20.86	0.186	53.02	3.3	89.8

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 1**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	293	2316	20.87	0.186	53.32	3.3	88.9
2014	293	2317	20.87	0.186	52.48	3.3	88.2
2014	293	2318	20.85	0.183	52.93	3.3	89.9
2014	293	2319	20.87	0.185	53.12	3.3	89.3
2014	293	2320	20.85	0.185	52.57	3.3	89.1
2014	293	2321	20.84	0.186	52.24	3.3	89.5
2014	293	2322	20.84	0.185	53.14	3.3	90.2
2014	293	2323	20.86	0.186	54.34	3.3	88.5
2014	293	2324	20.86	0.185	53.56	3.3	89.6
2014	293	2325	20.86	0.187	54.49	3.3	88.9
2014	293	2326	20.86	0.186	53.56	3.3	88.8
2014	293	2327	20.87	0.184	54	3.272	88.1
2014	293	2328	20.85	0.185	56.33	3.3	88.2
2014	293	2329	20.85	0.185	55.53	3.3	89
2014	293	2330	20.87	0.188	56.84	3.272	88.8
2014	293	2331	20.86	0.188	56.58	3.231	89
2014	293	2332	20.86	0.19	56.53	3.3	88.8
2014	293	2333	20.87	0.19	57.07	3.19	88.7
2014	293	2334	20.87	0.189	58.04	3.135	87.8
2014	293	2335	20.87	0.191	57.48	3.204	87.7
2014	293	2336	20.87	0.19	58.06	3.245	89.2
2014	293	2337	20.86	0.19	56.24	3.245	88.6
2014	293	2338	20.87	0.189	56.07	3.176	88.1
2014	293	2339	20.87	0.191	56.31	2.571	87.4
2014	293	2340	20.86	0.19	54.71	3.149	88
2014	293	2341	20.87	0.189	54.48	3.066	88.7
2014	293	2342	20.88	0.191	55.75	2.599	88.3
2014	293	2343	20.89	0.189	56.09	2.516	87.4
2014	293	2344	20.88	0.19	58.18	2.832	88.1
2014	293	2345	20.88	0.184	59.8	2.915	87.2
2014	293	2346	20.86	0.185	58.94	3.217	88.6
2014	293	2347	20.89	0.191	62.7	2.791	86.4
2014	293	2348	20.89	0.19	62.23	3.052	85.9
2014	293	2349	20.87	0.192	60.45	3.245	85.5
2014	293	2350	20.88	0.192	60.61	3.204	84.5
2014	293	2351	20.87	0.193	60.39	3.204	84.7
2014	293	2352	20.89	0.194	61.57	3.176	83.6
2014	293	2353	20.88	0.194	62.85	2.915	83.1
2014	293	2354	20.88	0.195	63.22	2.654	82.4
2014	293	2355	20.87	0.202	60.55	2.612	82.2
2014	293	2356	20.88	0.202	60.89	1.98	81.9
2014	293	2357	20.87	0.202	60.48	1.939	81.7
2014	293	2358	20.87	0.2	61.34	1.705	81

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 1**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	293	2359	20.88	0.2	60.98	1.677	80.9
2014	293	2400	20.87	0.201	60.39	1.636	80.3
2014	294	1	20.86	0.197	60.73	1.677	80.2
2014	294	2	20.87	0.195	61.18	1.65	79.8
2014	294	3	20.87	0.194	62.23	1.554	79.7
2014	294	4	20.88	0.199	62.64	1.251	78.7
2014	294	5	20.88	0.204	62.86	1.155	78.4
2014	294	6	20.88	0.203	63.81	0.701	77.7
2014	294	7	20.89	0.205	63.35	0.302	77.8
2014	294	8	20.88	0.202	65.86	0.137	77.5
2014	294	9	20.88	0.203	65	0.027	76.5
2014	294	10	20.87	0.204	64.26	0	76.8
2014	294	11	20.87	0.204	63.27	0	76.9
2014	294	12	20.87	0.204	66.05	0	76.8
2014	294	13	20.87	0.208	65.15	0	75.8
2014	294	14	20.86	0.207	63.78	0	75.9
2014	294	15	20.86	0.205	64.35	0	75.6
2014	294	16	20.87	0.207	65.36	0	75.3
2014	294	17	20.87	0.207	63.97	0	75.7
2014	294	18	20.88	0.209	67.9	0	74
2014	294	19	20.87	0.206	65.82	0	73.5
2014	294	20	20.86	0.201	62.39	0	74.6
2014	294	21	20.89	0.197	66.19	0	72.7
2014	294	22	20.88	0.199	68.76	0	71.3

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	294	23	20.88	0.196	68.51	0	71.7
2014	294	24	20.89	0.201	69.01	0	70.8
2014	294	25	20.89	0.202	68.99	0	70.9
2014	294	26	20.88	0.204	69.68	0	69.38
2014	294	27	20.87	0.204	68.29	0	69.67
2014	294	28	20.89	0.207	70.9	0	68.16
2014	294	29	20.89	0.21	73.4	0	67.12
2014	294	30	20.89	0.21	71.8	0	67.07
2014	294	31	20.88	0.211	70.8	0	66.57
2014	294	32	20.87	0.209	69.44	0	67.77
2014	294	33	20.89	0.212	69.63	0	67.42
2014	294	34	20.88	0.209	70.1	0	67.87
2014	294	35	20.89	0.21	70.5	0	64.82
2014	294	36	20.88	0.209	69.26	0	66.25
2014	294	37	20.88	0.21	70.9	0	66.21
2014	294	38	20.89	0.211	71.1	0	66.21
2014	294	39	20.89	0.209	71.5	0	64.98
2014	294	40	20.88	0.208	70.5	0	65.91
2014	294	41	20.89	0.208	72	0	64.87
2014	294	42	20.89	0.211	71.7	0	64.38
2014	294	43	20.87	0.207	71.8	0	64.76
2014	294	44	20.88	0.21	72.3	0	64.92
2014	294	45	20.86	0.208	70.4	0	66.51
2014	294	46	20.87	0.211	69.98	0	66.82
2014	294	47	20.9	0.208	75.1	0	64.76
2014	294	48	20.88	0.209	74.3	0	63.35
2014	294	49	20.88	0.21	74	0	63.58
2014	294	50	20.89	0.211	73.9	0	62.45
2014	294	51	20.89	0.209	71.8	0	64.28
2014	294	52	20.88	0.203	69.06	0	65.04
2014	294	53	20.88	0.204	70.5	0	64.68
2014	294	54	20.88	0.204	70.9	0	65.49
2014	294	55	20.89	0.204	73.5	0	64.69
2014	294	56	20.9	0.202	75.3	0	63.96
2014	294	57	20.89	0.203	73.6	0	64.69
2014	294	58	20.89	0.201	74.7	0	64.89
2014	294	59	20.9	0.209	76.2	0	63.34
2014	294	100	20.89	0.215	75.7	0	64.13
2014	294	101	20.9	0.215	74.2	0	64.53
2014	294	102	20.9	0.218	76.2	0	63.36
2014	294	103	20.9	0.216	75.7	0	63.06
2014	294	104	20.89	0.217	73.5	0	63.9
2014	294	105	20.9	0.214	73.8	0	63.43

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	294	106	20.9	0.211	71.5	0	63.49
2014	294	107	20.88	0.208	72.3	0	63.43
2014	294	108	20.89	0.209	76.7	0	62.5
2014	294	109	20.89	0.213	74.3	0	61.6
2014	294	110	20.9	0.213	73.7	0	62.21
2014	294	111	20.88	0.213	70.7	0	62.49
2014	294	112	20.87	0.212	71.3	0	63.11
2014	294	113	20.89	0.213	71.7	0	63.89
2014	294	114	20.89	0.21	74.8	0	62.96
2014	294	115	20.89	0.21	73.8	0	62.71
2014	294	116	20.9	0.209	73.8	0	61.37
2014	294	117	20.87	0.211	71.5	0	63.41
2014	294	118	20.9	0.211	74.7	0	62.11
2014	294	119	20.9	0.21	75.1	0	62
2014	294	120	20.92	0.214	79.7	0	60.58
2014	294	121	20.9	0.216	75.3	0	62.17
2014	294	122	20.87	0.219	74.3	0	63.72
2014	294	123	20.91	0.215	76.5	0	62.2
2014	294	124	20.92	0.218	77	0	61.04
2014	294	125	20.9	0.213	72.8	0	62.49
2014	294	126	20.91	0.211	73.6	0	62.67
2014	294	127	20.9	0.216	71	0	62.52
2014	294	128	20.91	0.212	72.3	0	63.07
2014	294	129	20.9	0.212	72.3	0	63.31
2014	294	130	20.9	0.211	74.6	0	62.65
2014	294	131	20.89	0.212	75.1	0	62.89
2014	294	132	20.89	0.209	74.2	0	63.52
2014	294	133	20.9	0.211	76.3	0	61.85
2014	294	134	20.9	0.212	74.6	0	62.41
2014	294	135	20.89	0.212	74.3	0	62.73
2014	294	136	20.89	0.212	73.9	0	63.94
2014	294	137	20.9	0.212	76.3	0	61.6
2014	294	138	20.91	0.218	76.7	0	60.77
2014	294	139	20.89	0.217	73.8	0	61.97
2014	294	140	20.9	0.221	74.8	0	61.41
2014	294	141	20.89	0.214	71.8	0	62.78
2014	294	142	20.88	0.214	71.5	0	64.02
2014	294	143	20.89	0.214	74.4	0	62.68
2014	294	144	20.91	0.213	76.5	0	61.74
2014	294	145	20.9	0.21	75.4	0	60.92
2014	294	146	20.9	0.211	74.6	0	60.36
2014	294	147	20.92	0.212	74.2	0	59.72
2014	294	148	20.91	0.213	75.2	0	58.76

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	294	149	20.9	0.214	72.2	0	60.4
2014	294	150	20.88	0.213	69.77	0	61.15
2014	294	151	20.91	0.215	74.6	0	58.63
2014	294	152	20.9	0.212	72.9	0	58.19
2014	294	153	20.9	0.212	72.3	0	58.48
2014	294	154	20.9	0.216	73.1	0	58.24
2014	294	155	20.89	0.215	70.5	0	59.83
2014	294	156	20.91	0.212	74.1	0	58.06
2014	294	157	20.9	0.214	73.7	0	57.43
2014	294	158	20.9	0.214	74.3	0	57.57
2014	294	159	20.91	0.213	74.3	0	56.43
2014	294	200	20.91	0.213	75.3	0	57.49
2014	294	201	20.91	0.212	74.8	0	57.25
2014	294	202	20.91	0.212	73.1	0	58.26
2014	294	203	20.91	0.214	72.6	0.22	58.41
2014	294	204	20.92	0.211	72.6	1.457	59.27
2014	294	205	20.91	0.208	72.1	2.076	59.13
2014	294	206	20.91	0.207	70.6	3.094	60.52
2014	294	207	20.91	0.208	72	3.231	59.57
2014	294	208	20.9	0.205	71.9	3.3	60.92
2014	294	209	20.89	0.208	71.1	3.3	61.8
2014	294	210	20.91	0.206	74.4	3.3	61.59
2014	294	211	20.9	0.209	73.5	3.3	61.26
2014	294	212	20.92	0.208	76.2	3.3	60.38
2014	294	213	20.91	0.21	75.4	3.3	61.43
2014	294	214	20.9	0.209	73.8	3.3	61.5
2014	294	215	20.91	0.211	76.2	3.3	59.68
2014	294	216	20.9	0.211	75.2	3.3	60.97
2014	294	217	20.9	0.21	74	3.3	60.87
2014	294	218	20.91	0.213	74.8	3.3	60.53
2014	294	219	20.9	0.21	72.8	3.341	60.73
2014	294	220	20.89	0.209	71.5	3.891	60.96
2014	294	221	20.9	0.203	71.2	4.647	61.54
2014	294	222	20.9	0.209	72.3	4.743	61.22
2014	294	223	20.9	0.209	72.7	5.046	61.25
2014	294	224	20.9	0.209	72.2	5.967	62.03
2014	294	225	20.91	0.21	72.9	5.403	60.66
2014	294	226	20.9	0.209	72.5	6.187	61.53
2014	294	227	20.92	0.209	73.5	6.311	60.58
2014	294	228	20.91	0.211	72.5	6.572	60.65
2014	294	229	20.91	0.212	73.3	6.6	61.22
2014	294	230	20.91	0.209	72.1	6.6	61.73
2014	294	231	20.9	0.211	69.71	6.6	62.62

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	294	232	20.92	0.209	70.9	6.6	61.58
2014	294	233	20.9	0.209	67.91	6.6	62.74
2014	294	234	20.9	0.209	67.2	6.6	63.21
2014	294	235	20.91	0.209	68.53	6.6	62.37
2014	294	236	20.92	0.211	69.08	6.6	62.63
2014	294	237	20.93	0.209	69.78	6.6	61.61
2014	294	238	20.91	0.209	66.23	6.6	64.19
2014	294	239	20.92	0.207	67.81	6.6	63.46
2014	294	240	20.91	0.207	65.26	6.6	63.81
2014	294	241	20.91	0.205	63.9	6.6	64.78
2014	294	242	20.92	0.205	64.4	6.6	64.55
2014	294	243	20.9	0.201	64.25	6.6	65.88
2014	294	244	20.92	0.203	65.37	6.6	65.48
2014	294	245	20.91	0.2	62.79	6.6	66.9
2014	294	246	20.92	0.198	64.43	6.6	66.22
2014	294	247	20.92	0.2	66.74	6.6	65.32
2014	294	248	20.91	0.197	65.6	6.6	66.11
2014	294	249	20.93	0.2	68.57	6.6	64.7
2014	294	250	20.92	0.201	66.54	6.6	65.3
2014	294	251	20.92	0.202	65.47	6.6	65.94
2014	294	252	20.91	0.199	63.01	6.6	66.6
2014	294	253	20.92	0.201	63.69	6.6	66.83
2014	294	254	20.91	0.202	65.17	6.6	66.55
2014	294	255	20.91	0.203	65.62	6.6	66.22
2014	294	256	20.9	0.2	60.34	6.6	68.72
2014	294	257	20.9	0.199	60.01	6.6	68.74
2014	294	258	20.92	0.199	62.13	6.6	67.1
2014	294	259	20.9	0.197	59.12	6.6	69.18
2014	294	300	20.91	0.196	60.92	6.6	68.59
2014	294	301	20.92	0.193	60.51	6.421	68.89
2014	294	302	20.91	0.193	62.87	5.871	67.96
2014	294	303	20.91	0.192	59.87	5.582	68.83
2014	294	304	20.92	0.194	60.53	4.991	68.43
2014	294	305	20.9	0.196	58.81	5.046	69.53
2014	294	306	20.93	0.194	60.96	4.881	67.81
2014	294	307	20.92	0.197	60.89	4.95	67.25
2014	294	308	20.92	0.194	60.72	4.867	67.33
2014	294	309	20.9	0.196	58.22	4.716	68.8
2014	294	310	20.91	0.194	58.31	4.015	68.22
2014	294	311	20.93	0.196	59.74	3.589	67.4
2014	294	312	20.92	0.196	60.06	3.589	67.3
2014	294	313	20.92	0.198	58.14	3.754	68.22
2014	294	314	20.92	0.197	59.54	3.3	68.01

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	294	315	20.92	0.196	57.64	3.3	68.53
2014	294	316	20.93	0.195	59.5	3.3	67.69
2014	294	317	20.94	0.193	61.08	3.3	66.84
2014	294	318	20.91	0.196	57.12	3.3	69.23
2014	294	319	20.91	0.195	58.13	3.3	68.7
2014	294	320	20.91	0.195	56.59	3.3	69.57
2014	294	321	20.92	0.194	55.61	3.3	70.2
2014	294	322	20.92	0.198	54.57	3.3	70.8
2014	294	323	20.91	0.197	55.75	3.3	70.2
2014	294	324	20.93	0.197	56.43	3.3	71.1
2014	294	325	20.91	0.196	53.96	3.3	72.4
2014	294	326	20.91	0.195	55.26	3.3	73.2
2014	294	327	20.91	0.196	54.45	3.272	73.4
2014	294	328	20.92	0.195	56.96	2.502	73.9
2014	294	329	20.92	0.196	55.38	1.705	74.8
2014	294	330	20.9	0.195	53.78	1.636	77.3
2014	294	331	20.92	0.196	54.08	1.141	77
2014	294	332	20.91	0.194	53.76	0.894	78.1
2014	294	333	20.91	0.194	53.41	0.454	78.6
2014	294	334	20.91	0.196	52.79	0.756	79.2
2014	294	335	20.92	0.197	52.98	0.426	79.3
2014	294	336	20.91	0.194	52.4	0.522	80.7
2014	294	337	20.91	0.192	50.13	0.687	81.4
2014	294	338	20.91	0.193	50.49	0.454	81.2
2014	294	339	20.93	0.194	51.72	0.247	80.6
2014	294	340	20.93	0.194	51.91	0	80.6
2014	294	341	20.93	0.192	52.72	0	81.5
2014	294	342	20.93	0.191	52.58	0	81.5
2014	294	343	20.93	0.196	50.49	0.027	82.3
2014	294	344	20.94	0.194	49.26	0	81.8
2014	294	345	20.92	0.196	49.6	0	82.6
2014	294	346	20.94	0.192	50.4	0	83.1
2014	294	347	20.93	0.193	48.5	0	84
2014	294	348	20.93	0.191	47.71	0	84.2
2014	294	349	20.93	0.192	48.47	0	83.6
2014	294	350	20.93	0.187	46.86	0	83.7
2014	294	351	20.94	0.188	49.51	0	83.3
2014	294	352	20.92	0.189	48.55	0	83.3
2014	294	353	20.92	0.189	47.69	0	83
2014	294	354	20.94	0.189	49.46	0	82.5
2014	294	355	20.93	0.187	48.75	0	83.1
2014	294	356	20.94	0.187	48.45	0	82.7
2014	294	357	20.93	0.188	47.28	0	83.4

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	294	358	20.95	0.188	48.49	0	82
2014	294	359	20.94	0.187	48.48	0	83
2014	294	400	20.93	0.187	49.15	0	83.3
2014	294	401	20.93	0.186	46.81	0	82.9
2014	294	402	20.94	0.187	46.54	0	83.2
2014	294	403	20.94	0.186	48.21	0	82.6
2014	294	404	20.94	0.188	48.83	0	82.4
2014	294	405	20.95	0.188	48.89	0	82.1
2014	294	406	20.95	0.189	48.61	0	81.6
2014	294	407	20.96	0.186	48.33	0	80.8
2014	294	408	20.94	0.187	47.66	0	80.7
2014	294	409	20.96	0.186	48.28	0	80.3
2014	294	410	20.96	0.187	48.53	0	80.2
2014	294	411	20.96	0.188	47.35	0	80.6
2014	294	412	20.94	0.184	46.09	0	80.7
2014	294	413	20.96	0.181	45.74	0	80
2014	294	414	20.95	0.18	46.77	0	80.3
2014	294	415	20.95	0.178	46.97	0	80.1
2014	294	416	20.96	0.178	46.3	0	80
2014	294	417	20.94	0.177	42.67	0	80.2
2014	294	418	20.97	0.177	45.34	0	79.3
2014	294	419	20.96	0.175	43.27	0	79.8
2014	294	420	20.97	0.174	43.38	0	79.6
2014	294	421	20.96	0.173	42.61	0	78.9
2014	294	422	20.95	0.172	41.77	0	79.6
2014	294	423	20.97	0.17	42.61	0	79.6
2014	294	424	20.95	0.171	42.16	0	80.6
2014	294	425	20.93	0.171	40.37	0	80.6
2014	294	426	20.94	0.17	40.79	0	80.7
2014	294	427	20.96	0.17	42.13	0	79.3
2014	294	428	20.96	0.173	41.73	0	78.6
2014	294	429	20.97	0.173	40.99	0	79
2014	294	430	20.97	0.172	40.96	0	79.4
2014	294	431	20.98	0.169	41.44	0	79
2014	294	432	20.97	0.168	41.26	0	78.9
2014	294	433	20.96	0.169	40.53	0	79.4
2014	294	434	20.95	0.168	40.08	0	79.7
2014	294	435	20.97	0.17	40.17	0	78.5
2014	294	436	20.96	0.171	39.81	0	79
2014	294	437	20.97	0.168	38.76	0	79
2014	294	438	20.97	0.166	38.89	0	79.3
2014	294	439	20.97	0.162	39.23	0	78.8
2014	294	440	20.99	0.165	40.63	0	77.8

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	294	441	20.97	0.162	38.6	0	78.5
2014	294	442	20.97	0.16	40.56	0	78.6
2014	294	443	20.97	0.157	40.24	0	78.6
2014	294	444	20.96	0.16	40.59	0	78.3
2014	294	445	20.98	0.159	41.41	0	78.3
2014	294	446	20.99	0.158	39.79	0	77.6
2014	294	447	20.99	0.158	39.14	0	77.6
2014	294	448	21.02	0.159	38.59	0	77.3
2014	294	449	21.03	0.158	40.06	0	77
2014	294	450	21.04	0.161	40.67	0	76.7
2014	294	451	21.07	0.163	40.07	0	76.3
2014	294	452	21.15	0.159	36.94	-0.151	75
2014	294	453	21.29	0.158	38.31	-1.554	71.7
2014	294	454	21.42	0.159	37.78	-3.217	68.35
2014	294	455	21.71	0.168	39.43	-3.3	63.96
2014	294	456	21.78	0.169	39.59	-3.3	60.55
2014	294	457	21.79	0.169	38.79	-3.3	59.25
2014	294	458	21.79	0.169	39.39	-3.341	58.41
2014	294	459	21.79	0.168	40.76	-3.465	57.74
2014	294	500	21.79	0.167	40.62	-3.685	57.93
2014	294	501	21.79	0.171	39.9	-3.932	58.51
2014	294	502	21.79	0.172	40.99	-4.015	60.66
2014	294	503	21.79	0.17	41.82	-4.716	60.49
2014	294	504	21.79	0.171	41.44	-4.193	65.88
2014	294	505	21.79	0.173	39.76	-4.757	63.59
2014	294	506	21.8	0.173	40.6	-4.895	62.1
2014	294	507	21.8	0.172	41.21	-4.991	59.1
2014	294	508	21.8	0.17	40.58	-5.032	58.44
2014	294	509	21.8	0.171	40.6	-4.991	60.63
2014	294	510	21.8	0.174	38.94	-4.95	65.53
2014	294	511	21.8	0.175	39.28	-4.977	64
2014	294	512	21.8	0.173	39.6	-5.005	61.45
2014	294	513	21.81	0.175	38.33	-5.005	58.55
2014	294	514	21.81	0.174	38.97	-5.527	57.63
2014	294	515	21.81	0.174	40.22	-5.912	55.38
2014	294	516	21.81	0.173	39.86	-6.297	55.14
2014	294	517	21.81	0.176	39.57	-6.091	55.95
2014	294	518	21.81	0.173	39.26	-5.898	57.37
2014	294	519	21.81	0.175	40.61	-6.242	56.39
2014	294	520	21.81	0.175	39.04	-6.393	57.82
2014	294	521	21.81	0.174	40.61	-6.242	60.26
2014	294	522	21.81	0.173	38.9	-6.435	56.78
2014	294	523	21.81	0.176	37.44	-6.49	56.17

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	294	524	21.81	0.177	37.5	-6.517	56.5
2014	294	525	21.81	0.175	38.1	-6.325	59.87
2014	294	526	21.81	0.175	39.42	-6.421	59.83
2014	294	527	21.81	0.172	38.07	-6.38	58.92
2014	294	528	21.81	0.176	38.78	-6.503	56.18
2014	294	529	21.81	0.174	39.62	-6.586	57.08
2014	294	530	21.81	0.175	37.81	-6.558	55.98
2014	294	531	21.81	0.174	37.7	-6.558	55.83
2014	294	532	21.81	0.174	38.04	-6.586	55.28
2014	294	533	21.81	0.174	37.83	-6.6	56.47
2014	294	534	21.81	0.175	38.19	-6.6	54.95
2014	294	535	21.81	0.174	36.77	-6.6	55.62
2014	294	536	21.81	0.173	37.13	-6.586	55.71
2014	294	537	21.81	0.174	37.26	-6.476	55.46
2014	294	538	21.81	0.176	36.22	-6.448	56
2014	294	539	21.81	0.173	36.1	-6.421	55.83
2014	294	540	21.81	0.172	36.54	-6.38	55.76
2014	294	541	21.81	0.173	36.97	-6.421	56.05
2014	294	542	21.81	0.172	38.38	-6.531	54.95
2014	294	543	21.81	0.171	37.58	-6.517	55.44
2014	294	544	21.82	0.17	35.65	-6.517	55.52
2014	294	545	21.81	0.17	36.78	-6.586	55.36
2014	294	546	21.81	0.173	40.38	-6.6	55.75
2014	294	547	21.81	0.172	39.69	-6.517	56.57
2014	294	548	21.81	0.171	39.09	-6.572	55.95
2014	294	549	21.81	0.172	40.57	-6.586	55.06
2014	294	550	21.81	0.17	39.73	-6.6	54.85
2014	294	551	21.82	0.172	37.1	-6.6	54.82
2014	294	552	21.82	0.171	37.32	-6.545	55.3
2014	294	553	21.82	0.17	38.47	-6.517	55.23
2014	294	554	21.82	0.171	38.83	-6.6	55.46
2014	294	555	21.82	0.173	38.75	-6.586	55.08
2014	294	556	21.82	0.171	38.7	-6.6	54.74
2014	294	557	21.82	0.17	38.53	-6.6	55
2014	294	558	21.82	0.17	38.52	-6.352	68.5
2014	294	559	21.82	0.17	36.41	-5.156	69.91
2014	294	600	21.82	0.17	37.27	-4.936	64.03
2014	294	601	21.82	0.172	38.27	-4.936	63.44
2014	294	602	21.82	0.17	40.22	-4.95	62.28
2014	294	603	21.82	0.17	38.15	-4.936	62.62
2014	294	604	21.82	0.171	39.12	-4.936	62.98
2014	294	605	21.82	0.166	39.56	-4.95	63.41
2014	294	606	21.82	0.166	38.86	-4.936	64.14

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	294	607	21.82	0.164	40.31	-4.895	64.72
2014	294	608	21.82	0.166	40.76	-4.922	64.09
2014	294	609	21.82	0.165	40.73	-4.936	64.94
2014	294	610	21.82	0.167	39.51	-4.922	64.98
2014	294	611	21.82	0.164	40.71	-4.95	63.59
2014	294	612	21.82	0.172	40.76	-4.936	63.84
2014	294	613	21.82	0.171	40.4	-4.922	64.74
2014	294	614	21.82	0.171	42.42	-4.895	64.17
2014	294	615	21.82	0.171	42.21	-4.908	64.92
2014	294	616	21.82	0.171	41.45	-4.881	64.91
2014	294	617	21.82	0.17	42.57	-4.908	65.54
2014	294	618	21.82	0.171	43.19	-4.95	63.88
2014	294	619	21.82	0.169	42.11	-4.95	63.75
2014	294	620	21.82	0.17	44.37	-4.95	62.69
2014	294	621	21.82	0.169	45.49	-4.963	62.79
2014	294	622	21.82	0.172	44.97	-4.977	63.7
2014	294	623	21.82	0.172	44.65	-4.936	63.28
2014	294	624	21.82	0.169	43.18	-4.922	64.87
2014	294	625	21.82	0.171	42.13	-4.963	64.26
2014	294	626	21.82	0.172	43.05	-4.991	63.73
2014	294	627	21.82	0.172	40.49	-4.95	64.06
2014	294	628	21.82	0.168	40.09	-4.95	64.09
2014	294	629	21.82	0.168	40.63	-4.936	64.36
2014	294	630	21.82	0.169	41.8	-4.95	63.68
2014	294	631	21.82	0.169	41.3	-4.95	63.94
2014	294	632	21.82	0.169	41.42	-4.95	64.97
2014	294	633	21.82	0.167	40.45	-4.95	65.58
2014	294	634	21.82	0.165	38.69	-4.922	64.78
2014	294	635	21.82	0.167	39.92	-4.895	65.47
2014	294	636	21.82	0.165	40.28	-4.908	65.03
2014	294	637	21.82	0.165	42.56	-4.936	64.44
2014	294	638	21.82	0.163	43.06	-4.95	64.52
2014	294	639	21.82	0.165	44.35	-4.936	63.56
2014	294	640	21.82	0.166	45.35	-4.95	63.56
2014	294	641	21.82	0.168	44.66	-4.977	64.95
2014	294	642	21.82	0.166	43.07	-4.95	66.54
2014	294	643	21.82	0.168	43.47	-4.895	66.01
2014	294	644	21.82	0.17	42.19	-4.785	66.34
2014	294	645	21.82	0.17	43.63	-4.895	64.94
2014	294	646	21.82	0.17	44.24	-4.922	63.63
2014	294	647	21.82	0.169	45.56	-5.005	62.15
2014	294	648	21.82	0.172	44.31	-5.101	62.59
2014	294	649	21.82	0.173	41.03	-5.101	64.01

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	294	650	21.83	0.171	40.46	-5.073	64.66
2014	294	651	21.83	0.169	41.01	-4.963	64.88
2014	294	652	21.83	0.158	37.57	-4.95	64.92
2014	294	653	21.83	0.154	31.9	-4.963	61.44
2014	294	654	21.83	0.149	28.69	-5.005	63.84
2014	294	655	21.84	0.149	16.19	-4.991	63.22
2014	294	656	21.84	0.137	11.57	-5.018	64.51
2014	294	657	21.84	0.13	10.74	-4.991	63.91
2014	294	658	21.84	0.13	13.97	-5.073	62.47
2014	294	659	21.84	0.128	12.75	-4.991	63.3
2014	294	700	21.84	0.126	11.55	-4.95	64.2
2014	294	701	21.84	0.12	11.72	-4.991	63.26
2014	294	702	21.84	0.121	11.64	-5.046	63.37
2014	294	703	21.84	0.118	12.83	-4.95	64.77
2014	294	704	21.84	0.116	12.14	-4.84	65.09
2014	294	705	21.84	0.103	8.81	-4.551	66.17
2014	294	706	21.84	0.103	7.64	-4.235	66.51
2014	294	707	21.84	0.099	6.847	-4.207	66.48
2014	294	708	21.84	0.096	8.21	-3.891	66.14
2014	294	709	21.85	0.092	5.552	-3.699	66.85
2014	294	710	21.85	0.089	5.948	-3.506	68.03
2014	294	711	21.85	0.09	5.923	-3.479	68.51
2014	294	712	21.85	0.088	6.575	-3.451	66.97
2014	294	713	21.85	0.086	6.022	-3.465	67.17
2014	294	714	21.85	0.085	5.296	-3.465	67.14
2014	294	715	21.85	0.083	4.595	-3.41	68.04
2014	294	716	21.85	0.083	2.12	-3.314	67.16
2014	294	717	21.85	0.078	-1.237	-3.424	65.78
2014	294	718	21.85	0.078	-1.419	-3.382	67.24
2014	294	719	21.85	0.078	-0.817	-3.3	66.09
2014	294	720	21.85	0.08	-0.652	-3.3	65.43
2014	294	721	21.85	0.079	-0.643	-3.314	66.47
2014	294	722	21.85	0.076	-0.478	-3.41	66.17
2014	294	723	21.85	0.078	-0.437	-3.479	66.44
2014	294	724	21.85	0.074	-0.454	-3.492	65.96
2014	294	725	21.85	0.077	2.533	-3.575	64.85
2014	294	726	21.85	0.082	2.97	-3.314	71.2
2014	294	727	21.85	0.081	1.46	-3.314	66.33
2014	294	728	21.85	0.083	1.287	-3.3	63.69
2014	294	729	21.85	0.079	0.404	-3.506	61.11
2014	294	730	21.85	0.081	0.437	-3.492	52.91
2014	294	731	21.85	0.08	0.198	-4.743	49.2
2014	294	732	21.85	0.082	0.058	-4.95	47.42

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	294	733	21.85	0.081	0.107	-4.977	48.38
2014	294	734	21.85	0.083	0.066	-5.183	48.6
2014	294	735	21.85	0.08	0.074	-4.922	54.82
2014	294	736	21.85	0.08	0.049	-4.895	56.16
2014	294	737	21.86	0.083	0.074	-4.29	55.44
2014	294	738	21.86	0.081	0.025	-4.661	50.14
2014	294	739	21.86	0.082	0.082	-5.225	47.3
2014	294	740	21.86	0.081	0.041	-6.435	45.14
2014	294	741	21.86	0.081	0.025	-6.6	45.14
2014	294	742	21.86	0.082	-0.107	-6.6	46.14
2014	294	743	21.86	0.08	-0.033	-6.6	49.1
2014	294	744	21.86	0.084	-0.008	-6.6	47.45
2014	294	745	21.86	0.081	-0.041	-6.6	46.44
2014	294	746	21.86	0.082	0	-6.6	46.4
2014	294	747	21.86	0.08	-0.041	-6.6	45.24
2014	294	748	21.87	0.08	-0.008	-6.6	42.25
2014	294	749	21.86	0.081	4.826	-6.6	41.36
2014	294	750	21.86	0.08	7.47	-6.6	40.3
2014	294	751	21.86	0.082	7.96	-6.6	40.34
2014	294	752	21.86	0.082	6.847	-6.6	42
2014	294	753	21.85	0.082	5.94	-6.6	43.06
2014	294	754	21.86	0.081	5.659	-6.6	43.12
2014	294	755	21.86	0.082	5.073	-6.6	42.55
2014	294	756	21.86	0.082	4.471	-6.6	42.06
2014	294	757	21.86	0.081	3.943	-6.6	42.34
2014	294	758	21.86	0.083	3.696	-6.6	40.8
2014	294	759	21.86	0.08	3.762	-6.6	40.25
2014	294	800	21.86	0.085	3.811	-6.6	39.39
2014	294	801	21.87	0.081	3.226	-6.6	38.2
2014	294	802	21.87	0.083	2.788	-6.6	37.62
2014	294	803	21.87	0.082	2.087	-6.6	37.24
2014	294	804	21.87	0.081	1.98	-6.6	36.07
2014	294	805	21.87	0.081	1.98	-6.6	37.23
2014	294	806	21.87	0.081	1.98	-6.6	38.98
2014	294	807	21.87	0.084	1.98	-6.6	37.66
2014	294	808	21.87	0.079	1.93	-6.6	36.12
2014	294	809	21.87	0.082	1.93	-6.6	37.58
2014	294	810	21.87	0.082	1.856	-6.6	37.29
2014	294	811	21.87	0.081	0.957	-6.6	35.17
2014	294	812	21.87	0.081	0.206	-6.6	34.65
2014	294	813	21.87	0.081	0.404	-6.6	33.61
2014	294	814	21.87	0.083	1.642	-6.6	33.29
2014	294	815	21.87	0.079	1.609	-6.6	33.9

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	294	816	21.87	0.082	1.708	-6.6	33.11
2014	294	817	21.87	0.082	1.188	-6.6	33.33
2014	294	818	21.88	0.081	1.328	-6.6	32.63
2014	294	819	21.87	0.081	1.93	-6.6	32.52
2014	294	820	21.88	0.081	1.988	-6.6	32.37
2014	294	821	21.88	0.083	2.013	-6.6	32.25
2014	294	822	21.88	0.079	1.955	-6.6	32.29
2014	294	823	21.88	0.085	1.914	-6.6	32.41
2014	294	824	21.88	0.082	1.873	-6.6	32.01
2014	294	825	21.88	0.084	1.93	-6.6	31.94
2014	294	826	21.88	0.08	1.84	-6.6	31.93
2014	294	827	21.88	0.081	1.906	-6.6	32.25
2014	294	828	21.88	0.08	1.906	-6.6	31.9
2014	294	829	21.88	0.081	1.815	-6.6	32.45
2014	294	830	21.88	0.084	1.336	-6.6	34.03
2014	294	831	21.88	0.081	1.246	-6.6	37.93
2014	294	832	21.88	0.084	1.048	-6.6	41.47
2014	294	833	21.88	0.081	0.8	-6.6	46.96
2014	294	834	21.89	0.081	0.346	-6.6	49.65
2014	294	835	21.89	0.08	0.322	-6.6	45.59
2014	294	836	21.89	0.081	0.305	-6.6	47.17
2014	294	837	21.89	0.083	0.049	-6.6	46.38
2014	294	838	21.89	0.081	0.025	-6.545	48.48
2014	294	839	21.89	0.082	0.825	-5.596	49.81
2014	294	840	21.89	0.082	1.369	-4.991	50.24
2014	294	841	21.89	0.082	1.988	-4.95	50.89
2014	294	842	21.89	0.076	1.204	-4.908	51.81
2014	294	843	21.89	0.077	0	-4.908	49.94
2014	294	844	21.89	0.078	0.008	-4.702	48.64
2014	294	845	21.89	0.077	0	-4.4	48.72
2014	294	846	21.89	0.079	0	-4.276	48.19
2014	294	847	21.89	0.076	0	-4.647	46.8
2014	294	848	21.9	0.08	0.016	-4.95	47.26
2014	294	849	21.9	0.075	0	-4.95	46.52
2014	294	850	21.9	0.078	0	-4.936	46.07
2014	294	851	21.9	0.078	0.016	-4.963	46.78
2014	294	852	21.9	0.078	0	-4.95	48.34
2014	294	853	21.9	0.078	-0.041	-4.95	49.12
2014	294	854	21.9	0.077	-0.008	-4.922	49.61
2014	294	855	21.9	0.077	-0.033	-4.908	50.35
2014	294	856	21.9	0.073	-0.016	-4.95	49.96
2014	294	857	21.9	0.075	-0.016	-4.908	50.54
2014	294	858	21.9	0.073	-0.049	-4.853	50.64

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	294	859	21.9	0.076	-0.008	-4.895	50.19
2014	294	900	21.9	0.075	-0.082	-4.895	51.12
2014	294	901	21.9	0.075	-0.058	-4.936	48.2
2014	294	902	21.9	0.074	-0.058	-4.936	46.84
2014	294	903	21.9	0.071	-0.008	-4.977	44.83
2014	294	904	21.9	0.071	0.066	-5.802	40.01
2014	294	905	21.91	0.07	0.008	-6.6	33.62
2014	294	906	21.91	0.073	0.082	-6.6	31.66
2014	294	907	21.91	0.071	0.041	-6.6	31.2
2014	294	908	21.91	0.073	0.008	-6.6	30.63
2014	294	909	21.91	0.071	0	-6.6	29.99
2014	294	910	21.91	0.072	0	-6.6	30.89
2014	294	911	21.91	0.072	-0.008	-6.6	32.64
2014	294	912	21.91	0.068	0	-6.6	31.02
2014	294	913	21.91	0.07	0	-6.6	30.09
2014	294	914	21.91	0.068	0	-6.6	32.04
2014	294	915	21.91	0.071	0.008	-6.6	30.02
2014	294	916	21.92	0.067	0	-6.916	28.76
2014	294	917	21.92	0.068	0	-7.77	28.57
2014	294	918	21.92	0.063	-1.873	-8.02	28.47
2014	294	919	21.92	0.066	-2.137	-7.04	29.39
2014	294	920	21.92	0.064	-2.879	-6.806	29.49
2014	294	921	21.92	0.066	-3.366	-6.696	29.39
2014	294	922	21.92	0.065	-2.59	-6.613	30.42
2014	294	923	21.92	0.063	-2.442	-6.6	30.66
2014	294	924	21.92	0.066	-2.516	-6.6	31.59
2014	294	925	21.92	0.061	-2.442	-6.6	30.81
2014	294	926	21.92	0.065	-2.566	-6.6	33.4
2014	294	927	21.92	0.06	-3.316	-6.6	34.02
2014	294	928	21.92	0.063	-3.754	-6.613	31.58
2014	294	929	21.93	0.062	-3.869	-6.6	31.11
2014	294	930	21.93	0.059	-3.885	-6.6	30.11
2014	294	931	21.93	0.059	-3.902	-6.696	29.92
2014	294	932	21.93	0.058	-3.951	-6.971	31.54
2014	294	933	21.93	0.058	-3.968	-6.998	30.95
2014	294	934	21.93	0.058	-3.984	-7.01	30.2
2014	294	935	21.93	0.058	-3.968	-7.27	30.52
2014	294	936	21.93	0.056	-4.009	-7.26	30.97
2014	294	937	21.93	0.058	-3.96	-7.09	30.2
2014	294	938	21.93	0.055	-4.009	-6.985	29.8
2014	294	939	21.93	0.057	-3.968	-7.38	29.45
2014	294	940	21.93	0.055	-4.017	-7.77	29.71
2014	294	941	21.93	0.052	-4.026	-7.74	29.63

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	294	942	21.93	0.053	-4.083	-8.11	29.84
2014	294	943	21.93	0.052	-4.059	-8.25	29.79
2014	294	944	21.93	0.053	-4.001	-8.26	29.82
2014	294	945	21.92	0.051	-4.059	-8.25	29.79
2014	294	946	21.92	0.054	-4.009	-8.24	30.4
2014	294	947	21.92	0.052	-4.075	-8.25	30.17
2014	294	948	21.92	0.053	-4.001	-8.24	29.9
2014	294	949	21.92	0.051	-4.059	-8.24	30.09
2014	294	950	21.93	0.051	-4.273	-8.25	30.39
2014	294	951	21.93	0.053	-4.611	-8.35	30.05
2014	294	952	21.93	0.052	-4.653	-8.57	30.29
2014	294	953	21.93	0.054	-4.62	-8.85	29.71
2014	294	954	21.93	0.05	-4.71	-9.18	29.46
2014	294	955	21.93	0.055	-4.661	-9.34	29.47
2014	294	956	21.93	0.051	-4.397	-9.68	29.47
2014	294	957	21.93	0.056	-4.298	-9.82	29.23
2014	294	958	21.93	0.06	-4.455	-9.9	29.19
2014	294	959	21.93	0.064	-4.257	-9.9	29.37
2014	294	1000	21.93	0.067	-4.009	-9.9	29.11
2014	294	1001	21.92	0.071	-3.976	-9.9	28.73
2014	294	1002	21.94	0.075	-5.61	-9.9	25.49
2014	294	1003	21.94	0.075	-5.791	-9.9	24.62
2014	294	1004	21.94	0.083	-5.857	-9.9	24.5
2014	294	1005	21.94	0.084	-5.832	-9.9	24.25

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	293	1440	20.37	0.19	73.33	14.53	57.20	42.67	
2014	293	1441	20.36	0.19	72.13	14.95	59.54	44.58	
2014	293	1442	20.36	0.19	73.93	14.95	60.80	45.84	
2014	293	1443	20.38	0.18	73.23	14.99	59.99	45.00	
2014	293	1444	20.39	0.18	74.33	15.50	60.49	44.99	
2014	293	1445	20.39	0.18	75.03	15.42	60.27	44.85	
2014	293	1446	20.40	0.18	78.43	15.00	58.62	43.62	
2014	293	1447	20.39	0.18	77.73	14.95	59.57	44.61	
2014	293	1448	20.40	0.18	78.83	14.95	58.40	43.45	
2014	293	1449	20.39	0.18	74.63	14.97	58.48	43.51	
2014	293	1450	20.40	0.18	75.63	14.97	57.68	42.71	
2014	293	1451	20.37	0.18	72.62	15.53	59.39	43.86	
2014	293	1452	20.39	0.18	76.23	15.29	57.14	41.85	
2014	293	1453	20.37	0.18	73.63	15.16	58.98	43.82	
2014	293	1454	20.37	0.18	74.23	15.42	59.40	43.98	
2014	293	1455	20.38	0.18	74.53	15.31	59.10	43.79	
2014	293	1456	20.39	0.17	75.03	15.09	60.18	45.10	
2014	293	1457	20.39	0.18	75.63	14.99	60.70	45.71	
2014	293	1458	20.38	0.17	71.78	14.95	60.38	45.42	
2014	293	1459	20.40	0.18	72.97	14.95	59.51	44.55	
2014	293	1500	20.40	0.18	75.33	14.95	59.56	44.60	
2014	293	1501	20.40	0.18	73.23	14.95	58.59	43.63	
2014	293	1502	20.41	0.18	73.83	14.95	57.87	42.91	
2014	293	1503	20.40	0.17	72.49	14.95	57.05	42.09	
2014	293	1504	20.40	0.17	71.85	14.95	58.91	43.96	
2014	293	1505	20.40	0.17	73.33	14.95	59.04	44.08	
2014	293	1506	20.40	0.17	72.84	14.95	59.20	44.25	
2014	293	1507	20.40	0.17	73.23	14.95	58.91	43.96	
2014	293	1508	20.40	0.17	71.63	14.95	59.12	44.16	
2014	293	1509	20.41	0.17	72.35	14.95	58.35	43.40	
2014	293	1510	20.41	0.17	73.53	14.95	57.56	42.61	
2014	293	1511	20.42	0.17	70.14	14.95	57.18	42.23	
2014	293	1512	20.41	0.17	68.95	14.95	58.74	43.78	
2014	293	1513	20.40	0.16	70.50	14.95	59.12	44.16	
2014	293	1514	20.41	0.17	70.38	14.79	59.93	45.13	
2014	293	1515	20.42	0.17	71.57	14.64	58.49	43.85	
2014	293	1516	20.41	0.17	72.16	14.38	58.32	43.94	
2014	293	1517	20.42	0.17	73.13	14.54	58.74	44.20	
2014	293	1518	20.41	0.17	73.13	13.92	58.97	45.05	
2014	293	1519	20.43	0.17	73.33	14.03	58.20	44.17	
2014	293	1520	20.42	0.17	73.33	13.88	57.93	44.05	
2014	293	1521	20.43	0.18	74.53	13.43	57.36	43.92	
2014	293	1522	20.41	0.18	70.84	13.31	58.74	45.43	
2014	293	1523	20.42	0.18	76.03	13.31	57.90	44.59	
2014	293	1524	20.42	0.19	74.43	13.29	57.68	44.39	
2014	293	1525	20.43	0.18	75.13	13.15	58.06	44.91	
2014	293	1526	20.42	0.18	74.03	12.93	57.78	44.85	
2014	293	1527	20.43	0.18	72.86	12.92	58.91	45.99	
2014	293	1528	20.42	0.19	75.03	12.71	59.01	46.30	
2014	293	1529	20.44	0.19	76.33	12.16	56.91	44.75	
2014	293	1530	20.42	0.18	72.12	12.37	57.60	45.24	
2014	293	1531	20.42	0.19	70.95	12.65	58.60	45.95	
2014	293	1532	20.42	0.19	71.23	12.26	57.18	44.93	
2014	293	1533	20.41	0.19	69.76	12.76	57.65	44.89	
2014	293	1534	20.42	0.18	69.55	12.07	57.32	45.24	
2014	293	1535	20.41	0.18	68.21	12.82	59.36	46.54	
2014	293	1536	20.41	0.18	67.35	12.76	58.15	45.39	
2014	293	1537	20.41	0.18	67.74	12.40	58.22	45.82	

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	293	1538	20.42	0.18	69.47	11.86	58.31	46.45	
2014	293	1539	20.42	0.18	69.73	12.07	58.32	46.25	
2014	293	1540	20.43	0.18	69.75	11.63	58.55	46.91	
2014	293	1541	20.43	0.18	66.42	11.92	59.52	47.59	
2014	293	1542	20.41	0.18	66.14	11.98	61.11	49.13	
2014	293	1543	20.42	0.17	68.01	11.76	60.90	49.14	
2014	293	1544	20.42	0.17	67.29	11.63	61.21	49.57	
2014	293	1545	20.42	0.18	68.10	11.66	60.09	48.43	
2014	293	1546	20.41	0.17	67.31	11.70	60.90	49.20	
2014	293	1547	20.44	0.17	69.85	11.63	60.06	48.43	
2014	293	1548	20.43	0.17	70.13	11.63	60.13	48.50	
2014	293	1549	20.40	0.17	66.22	11.63	62.64	51.01	
2014	293	1550	20.41	0.17	67.54	11.66	62.54	50.88	
2014	293	1551	20.43	0.17	68.97	11.63	61.72	50.09	
2014	293	1552	20.41	0.18	70.09	11.63	61.21	49.57	
2014	293	1553	20.43	0.18	69.77	11.63	61.62	49.98	
2014	293	1554	20.43	0.18	69.63	11.63	61.00	49.37	
2014	293	1555	20.42	0.18	70.08	11.63	60.49	48.86	
2014	293	1556	20.42	0.18	69.78	11.63	63.05	51.42	
2014	293	1557	20.44	0.18	70.53	11.63	84.15	72.52	
2014	293	1558	20.43	0.18	70.09	11.65	73.50	61.85	
2014	293	1559	20.41	0.19	67.53	11.63	73.19	61.56	
2014	293	1600	20.42	0.18	68.25	11.66	73.50	61.84	
2014	293	1601	20.41	0.18	65.83	11.65	73.71	62.06	
2014	293	1602	20.44	0.18	69.32	11.63	73.09	61.46	
2014	293	1603	20.41	0.18	68.02	11.63	75.14	63.51	
2014	293	1604	20.42	0.18	67.15	11.63	75.65	64.02	
2014	293	1605	20.43	0.18	68.01	11.63	75.96	64.33	
2014	293	1606	20.42	0.18	67.28	11.63	75.34	63.71	
2014	293	1607	20.42	0.18	67.16	11.63	76.78	65.14	
2014	293	1608	20.44	0.18	67.52	11.63	73.91	62.28	
2014	293	1609	20.43	0.18	67.30	11.63	75.34	63.71	
2014	293	1610	20.43	0.18	67.21	11.63	75.14	63.51	
2014	293	1611	20.41	0.18	66.67	11.63	76.88	65.25	
2014	293	1612	20.41	0.18	65.84	11.63	77.39	65.76	
2014	293	1613	20.42	0.18	66.87	11.63	76.37	64.73	
2014	293	1614	20.43	0.18	66.71	11.63	75.55	63.92	
2014	293	1615	20.44	0.18	67.94	11.63	73.50	61.87	
2014	293	1616	20.43	0.18	65.84	11.63	75.04	63.40	
2014	293	1617	20.43	0.18	66.45	11.63	75.34	63.71	
2014	293	1618	20.44	0.18	66.25	11.63	75.96	64.33	
2014	293	1619	20.43	0.18	65.69	11.63	74.42	62.79	
2014	293	1620	20.43	0.18	65.41	11.63	76.88	65.25	
2014	293	1621	20.43	0.18	65.41	11.63	75.65	64.02	
2014	293	1622	20.42	0.18	64.37	11.63	76.27	64.63	
2014	293	1623	20.43	0.18	65.99	11.63	76.16	64.53	
2014	293	1624	20.42	0.18	66.21	11.63	76.98	65.35	
2014	293	1625	20.42	0.18	65.53	11.63	76.88	65.25	
2014	293	1626	20.43	0.18	67.86	11.63	76.06	64.43	
2014	293	1627	20.43	0.18	66.22	11.63	76.27	64.63	
2014	293	1628	20.43	0.18	64.14	11.63	76.37	64.73	
2014	293	1629	20.43	0.18	63.40	11.63	75.45	63.81	
2014	293	1630	20.44	0.18	65.24	11.63	76.27	64.63	
2014	293	1631	20.45	0.18	65.43	11.63	76.68	65.04	
2014	293	1632	20.45	0.18	63.95	11.63	77.09	65.45	
2014	293	1633	20.43	0.18	64.79	11.63	77.19	65.55	
2014	293	1634	20.45	0.18	65.72	11.63	76.57	64.94	
2014	293	1635	20.45	0.17	68.22	11.63	76.57	64.94	

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	293	1636	20.44	0.18	69.16	11.63	75.75	64.12	
2014	293	1637	20.43	0.18	69.09	11.63	77.70	66.07	
2014	293	1638	20.45	0.18	68.55	11.63	77.50	65.86	
2014	293	1639	20.46	0.18	68.24	11.63	77.29	65.66	
2014	293	1640	20.43	0.18	65.97	11.63	78.62	66.99	
2014	293	1641	20.45	0.18	66.22	11.63	77.29	65.66	
2014	293	1642	20.45	0.18	68.03	11.63	78.31	66.68	
2014	293	1643	20.45	0.19	65.89	11.63	79.13	67.50	
2014	293	1644	20.44	0.19	66.37	11.63	80.57	68.93	
2014	293	1645	20.43	0.18	64.26	11.63	81.59	69.96	
2014	293	1646	20.45	0.19	65.18	11.63	79.85	68.22	
2014	293	1647	20.43	0.19	64.73	11.63	80.98	69.34	
2014	293	1648	20.44	0.18	63.96	11.63	81.80	70.16	
2014	293	1649	20.45	0.18	65.44	11.63	80.57	68.93	
2014	293	1650	20.45	0.18	63.95	11.63	81.08	69.45	
2014	293	1651	20.43	0.18	61.68	11.63	82.00	70.37	
2014	293	1652	20.44	0.18	63.91	11.63	82.72	71.09	
2014	293	1653	20.44	0.18	62.82	11.63	82.51	70.88	
2014	293	1654	20.44	0.18	63.53	11.63	82.82	71.19	
2014	293	1655	20.46	0.18	64.70	11.63	82.10	70.47	
2014	293	1656	20.45	0.18	65.58	11.63	82.41	70.78	
2014	293	1657	20.44	0.18	63.90	11.63	82.00	70.37	
2014	293	1658	20.44	0.18	64.18	11.63	82.51	70.88	
2014	293	1659	20.43	0.18	63.45	11.63	82.92	71.29	
2014	293	1700	20.45	0.18	64.43	11.63	82.72	71.09	
2014	293	1701	20.45	0.18	63.15	11.63	82.72	71.09	
2014	293	1702	20.45	0.18	62.98	11.63	83.23	71.60	
2014	293	1703	20.45	0.18	61.79	11.63	83.85	72.21	
2014	293	1704	20.48	0.18	63.79	11.63	82.10	70.47	
2014	293	1705	20.45	0.18	63.68	11.63	82.51	70.88	
2014	293	1706	20.45	0.18	62.38	11.63	83.33	71.70	
2014	293	1707	20.45	0.18	63.04	11.87	84.56	72.69	
2014	293	1708	20.46	0.18	64.18	11.76	83.33	71.58	
2014	293	1709	20.45	0.18	63.37	11.63	84.15	72.52	
2014	293	1710	20.46	0.18	63.53	11.66	83.85	72.19	
2014	293	1711	20.44	0.18	63.62	12.01	84.97	72.97	
2014	293	1712	20.44	0.18	63.30	12.63	86.10	73.47	
2014	293	1713	20.43	0.18	62.25	12.92	86.61	73.69	
2014	293	1714	20.44	0.17	62.01	13.09	87.02	73.93	
2014	293	1715	20.46	0.18	63.47	12.96	84.56	71.60	
2014	293	1716	20.45	0.18	61.71	13.03	85.89	72.86	
2014	293	1717	20.45	0.18	62.58	13.21	86.20	72.99	
2014	293	1718	20.44	0.17	61.81	13.29	86.71	73.42	
2014	293	1719	20.47	0.17	65.08	13.17	84.77	71.60	
2014	293	1720	20.46	0.17	62.44	13.20	85.18	71.97	
2014	293	1721	20.46	0.17	62.34	12.89	85.08	72.18	
2014	293	1722	20.47	0.18	63.82	12.65	84.05	71.40	
2014	293	1723	20.45	0.17	62.33	12.92	84.67	71.74	
2014	293	1724	20.45	0.17	59.63	13.24	86.20	72.96	
2014	293	1725	20.47	0.17	60.74	12.95	86.10	73.15	
2014	293	1726	20.47	0.17	60.71	13.11	87.74	74.63	
2014	293	1727	20.45	0.17	60.03	13.29	84.15	70.86	
2014	293	1728	20.46	0.16	61.40	13.29	82.62	69.32	
2014	293	1729	20.46	0.16	62.82	13.29	82.00	68.71	
2014	293	1730	20.48	0.16	62.07	13.29	82.72	69.43	
2014	293	1731	20.47	0.17	62.40	13.22	82.62	69.39	
2014	293	1732	20.47	0.16	62.38	13.29	82.72	69.43	
2014	293	1733	20.48	0.16	62.46	13.21	82.82	69.61	

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	293	1734	20.47	0.16	61.26	13.07	84.77	71.70	
2014	293	1735	20.45	0.16	59.89	13.29	86.71	73.42	
2014	293	1736	20.46	0.16	59.62	13.29	86.41	73.11	
2014	293	1737	20.46	0.16	59.46	13.26	87.12	73.86	
2014	293	1738	20.49	0.16	60.50	12.84	84.15	71.31	
2014	293	1739	20.48	0.16	60.60	12.19	84.87	72.68	
2014	293	1740	20.49	0.16	60.00	12.63	84.15	71.52	
2014	293	1741	20.48	0.16	60.04	12.49	84.87	72.38	
2014	293	1742	20.50	0.16	61.04	12.16	83.74	71.59	
2014	293	1743	20.49	0.16	59.43	12.41	84.15	71.75	
2014	293	1744	20.47	0.16	59.47	12.71	84.46	71.75	
2014	293	1745	20.49	0.15	60.66	12.30	79.24	66.94	
2014	293	1746	20.48	0.16	60.78	12.09	80.57	68.47	
2014	293	1747	20.49	0.16	61.47	11.94	80.98	69.04	
2014	293	1748	20.49	0.16	61.33	12.26	82.31	70.05	
2014	293	1749	20.50	0.16	61.45	12.16	81.90	69.74	
2014	293	1750	20.50	0.16	61.32	11.94	81.29	69.35	
2014	293	1751	20.48	0.16	62.34	12.76	81.69	68.94	
2014	293	1752	20.49	0.16	61.02	12.26	80.88	68.62	
2014	293	1753	20.48	0.16	61.20	12.41	82.82	70.41	
2014	293	1754	20.49	0.16	63.39	12.11	82.00	69.89	
2014	293	1755	20.50	0.16	62.91	12.22	81.80	69.58	
2014	293	1756	20.49	0.16	62.08	11.88	80.77	68.89	
2014	293	1757	20.50	0.16	61.16	11.76	80.88	69.12	
2014	293	1758	20.50	0.16	59.99	11.81	80.57	68.76	
2014	293	1759	20.50	0.16	59.79	11.63	80.47	68.83	
2014	293	1800	20.50	0.16	59.42	11.67	80.67	69.00	
2014	293	1801	20.50	0.16	59.46	11.63	80.57	68.94	
2014	293	1802	20.50	0.16	59.69	11.69	80.26	68.57	
2014	293	1803	20.51	0.16	60.56	11.63	80.88	69.24	
2014	293	1804	20.50	0.16	59.52	11.65	80.98	69.33	
2014	293	1805	20.52	0.16	60.11	11.63	80.98	69.35	
2014	293	1806	20.50	0.15	57.68	11.65	82.00	70.36	
2014	293	1807	20.50	0.15	58.36	11.63	81.08	69.45	
2014	293	1808	20.49	0.15	57.59	11.63	82.21	70.57	
2014	293	1809	20.50	0.15	57.88	11.63	81.90	70.27	
2014	293	1810	20.50	0.15	57.37	11.63	81.80	70.16	
2014	293	1811	20.49	0.15	56.37	11.63	82.10	70.47	
2014	293	1812	20.51	0.15	58.35	11.63	80.98	69.35	
2014	293	1813	20.51	0.15	56.84	11.63	82.41	70.78	
2014	293	1814	20.51	0.15	55.81	11.63	81.59	69.96	
2014	293	1815	20.52	0.15	55.71	11.63	81.29	69.65	
2014	293	1816	20.53	0.15	57.36	11.63	80.67	69.04	
2014	293	1817	20.52	0.16	55.18	11.63	81.08	69.45	
2014	293	1818	20.52	0.16	56.09	11.63	79.85	68.22	
2014	293	1819	20.53	0.16	55.09	11.63	80.57	68.94	
2014	293	1820	20.51	0.16	54.85	11.63	79.85	68.22	
2014	293	1821	20.52	0.16	53.56	11.63	79.75	68.12	
2014	293	1822	20.52	0.15	53.54	11.63	79.65	68.01	
2014	293	1823	20.52	0.15	53.21	11.63	79.75	68.12	
2014	293	1824	20.52	0.15	51.65	11.63	79.54	67.91	
2014	293	1825	20.52	0.15	52.07	11.63	79.95	68.32	
2014	293	1826	20.52	0.15	51.93	11.63	80.16	68.53	
2014	293	1827	20.53	0.15	51.74	11.63	79.13	67.50	
2014	293	1828	20.52	0.15	53.05	11.63	79.54	67.91	
2014	293	1829	20.53	0.15	53.04	11.63	78.93	67.30	
2014	293	1830	20.53	0.15	53.14	11.63	79.44	67.81	
2014	293	1831	20.51	0.15	51.52	11.63	80.77	69.14	

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	293	1832	20.52	0.15	52.34	11.63	80.88	69.24	
2014	293	1833	20.52	0.15	53.09	11.63	80.36	68.73	
2014	293	1834	20.51	0.15	53.26	11.63	81.18	69.55	
2014	293	1835	20.53	0.15	53.56	11.63	80.26	68.63	
2014	293	1836	20.54	0.15	53.90	11.63	79.44	67.81	
2014	293	1837	20.52	0.15	53.13	11.63	79.65	68.01	
2014	293	1838	20.52	0.15	51.62	11.63	80.36	68.73	
2014	293	1839	20.52	0.15	50.91	11.63	81.39	69.76	
2014	293	1840	20.55	0.15	52.45	11.63	79.75	68.12	61.23
2014	293	1841	20.54	0.15	52.47	11.63	79.75	68.12	61.34
2014	293	1842	20.55	0.15	53.27	11.63	78.93	67.30	61.43
2014	293	1843	20.54	0.15	52.99	11.63	79.65	68.01	61.52
2014	293	1844	20.55	0.15	52.80	11.63	79.03	67.40	61.62
2014	293	1845	20.52	0.15	51.58	11.63	80.26	68.63	61.71
2014	293	1846	20.52	0.15	52.66	11.63	80.98	69.35	61.82
2014	293	1847	20.54	0.15	53.70	11.63	79.65	68.01	61.92
2014	293	1848	20.55	0.15	52.87	11.63	78.83	67.20	62.01
2014	293	1849	20.55	0.15	52.49	11.63	79.34	67.71	62.11
2014	293	1850	20.55	0.16	51.72	11.63	78.42	66.79	62.21
2014	293	1851	20.54	0.16	51.74	11.63	79.34	67.71	62.31
2014	293	1852	20.52	0.16	51.57	11.63	80.57	68.94	62.42
2014	293	1853	20.53	0.17	51.76	11.63	80.16	68.53	62.53
2014	293	1854	20.53	0.17	51.63	11.63	79.95	68.32	62.63
2014	293	1855	20.54	0.17	51.77	11.63	78.52	66.89	62.72
2014	293	1856	20.54	0.17	52.06	11.63	78.31	66.68	62.82
2014	293	1857	20.54	0.17	52.89	11.59	78.31	66.72	62.91
2014	293	1858	20.56	0.18	53.38	11.26	77.29	66.03	62.99
2014	293	1859	20.54	0.18	51.23	11.40	78.21	66.82	63.08
2014	293	1900	20.54	0.18	50.95	11.38	78.52	67.14	63.18
2014	293	1901	20.55	0.18	52.71	11.38	77.80	66.42	63.27
2014	293	1902	20.54	0.18	50.30	11.62	77.80	66.18	63.36
2014	293	1903	20.52	0.18	50.88	11.62	79.03	67.41	63.46
2014	293	1904	20.52	0.18	50.62	11.63	79.34	67.71	63.57
2014	293	1905	20.53	0.18	50.52	11.63	79.13	67.50	63.67
2014	293	1906	20.54	0.18	51.70	11.63	78.42	66.78	63.76
2014	293	1907	20.53	0.18	51.37	11.63	77.90	66.27	63.85
2014	293	1908	20.52	0.17	49.75	11.63	80.36	68.73	63.95
2014	293	1909	20.53	0.17	49.66	11.63	78.62	66.99	64.05
2014	293	1910	20.53	0.17	50.04	11.63	79.54	67.91	64.15
2014	293	1911	20.54	0.17	51.41	11.63	78.11	66.48	64.25
2014	293	1912	20.53	0.17	51.91	11.62	78.42	66.80	64.35
2014	293	1913	20.54	0.18	51.52	11.63	78.01	66.37	64.44
2014	293	1914	20.54	0.17	51.57	11.63	78.62	66.99	64.54
2014	293	1915	20.51	0.17	50.51	11.63	79.24	67.60	64.63
2014	293	1916	20.53	0.18	51.41	11.63	78.62	66.99	64.73
2014	293	1917	20.53	0.17	52.31	11.63	78.52	66.89	64.82
2014	293	1918	20.52	0.17	52.03	11.63	78.62	66.99	64.92
2014	293	1919	20.53	0.17	50.95	11.63	78.93	67.30	65.01
2014	293	1920	20.54	0.17	51.07	11.63	77.29	65.66	65.10
2014	293	1921	20.54	0.17	51.25	11.63	77.70	66.07	65.19
2014	293	1922	20.53	0.17	50.18	11.63	77.90	66.27	65.28
2014	293	1923	20.54	0.17	49.78	11.63	79.34	67.71	65.38
2014	293	1924	20.54	0.17	50.33	11.63	79.65	68.01	65.47
2014	293	1925	20.55	0.17	50.95	11.62	78.62	67.00	65.57
2014	293	1926	20.54	0.17	50.62	11.54	77.50	65.96	65.65
2014	293	1927	20.54	0.17	51.60	11.63	79.34	67.71	65.75
2014	293	1928	20.52	0.17	50.86	11.63	80.77	69.14	65.85
2014	293	1929	20.52	0.17	50.91	11.63	79.34	67.71	65.93

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	293	1930	20.54	0.17	50.75	11.61	78.52	66.91	66.03
2014	293	1931	20.54	0.17	50.25	11.62	78.62	67.00	66.12
2014	293	1932	20.54	0.17	51.54	11.62	79.24	67.62	66.21
2014	293	1933	20.54	0.17	51.48	11.59	78.52	66.93	66.30
2014	293	1934	20.54	0.17	51.69	11.61	78.83	67.22	66.39
2014	293	1935	20.55	0.17	51.90	11.55	79.13	67.58	66.48
2014	293	1936	20.53	0.17	50.59	11.61	78.21	66.61	66.57
2014	293	1937	20.54	0.17	50.39	11.61	78.52	66.91	66.66
2014	293	1938	20.55	0.17	50.99	11.25	78.21	66.97	66.74
2014	293	1939	20.55	0.17	50.95	11.38	78.42	67.03	66.83
2014	293	1940	20.54	0.17	50.37	11.58	78.11	66.53	66.91
2014	293	1941	20.54	0.17	50.52	11.61	78.93	67.32	67.00
2014	293	1942	20.55	0.17	51.09	11.54	78.72	67.19	67.08
2014	293	1943	20.53	0.17	50.24	11.63	80.67	69.04	67.16
2014	293	1944	20.54	0.17	51.41	11.54	79.13	67.60	67.24
2014	293	1945	20.55	0.17	51.20	11.29	78.42	67.13	67.31
2014	293	1946	20.53	0.16	49.67	11.61	80.36	68.76	67.40
2014	293	1947	20.56	0.16	51.11	11.33	79.13	67.81	67.47
2014	293	1948	20.54	0.16	51.43	11.38	78.83	67.44	67.55
2014	293	1949	20.55	0.16	52.22	11.23	78.31	67.08	67.63
2014	293	1950	20.53	0.16	51.12	11.63	78.72	67.09	67.70
2014	293	1951	20.53	0.16	51.33	11.59	81.18	69.59	67.77
2014	293	1952	20.56	0.16	53.13	11.27	79.34	68.07	67.85
2014	293	1953	20.54	0.17	52.08	11.08	78.62	67.54	67.92
2014	293	1954	20.54	0.17	51.82	11.11	79.54	68.44	68.00
2014	293	1955	20.55	0.17	52.16	10.98	78.83	67.84	68.08
2014	293	1956	20.53	0.17	50.41	11.04	79.03	67.99	68.16
2014	293	1957	20.55	0.17	51.07	10.87	79.24	68.37	68.23
2014	293	1958	20.55	0.16	49.22	11.09	79.65	68.55	68.21
2014	293	1959	20.54	0.16	49.93	11.11	79.34	68.23	68.24
2014	293	2000	20.54	0.16	50.33	10.87	79.65	68.78	68.27
2014	293	2001	20.55	0.16	50.15	10.86	78.72	67.87	68.29
2014	293	2002	20.56	0.16	49.16	10.36	78.31	67.96	68.31
2014	293	2003	20.55	0.16	48.43	10.41	79.95	69.54	68.35
2014	293	2004	20.56	0.16	50.56	10.12	78.62	68.50	68.37
2014	293	2005	20.56	0.16	50.04	10.00	79.03	69.03	68.39
2014	293	2006	20.54	0.16	48.95	10.01	79.65	69.64	68.41
2014	293	2007	20.57	0.17	50.95	9.97	77.90	67.93	68.43
2014	293	2008	20.55	0.17	51.35	9.97	79.75	69.78	68.45
2014	293	2009	20.56	0.16	51.53	9.97	79.24	69.27	68.48
2014	293	2010	20.56	0.16	51.99	10.04	79.24	69.20	68.50
2014	293	2011	20.56	0.17	51.76	10.14	79.13	69.00	68.52
2014	293	2012	20.55	0.16	52.15	10.12	79.03	68.91	68.54
2014	293	2013	20.54	0.16	51.53	10.50	80.88	70.38	68.56
2014	293	2014	20.56	0.17	52.42	10.36	80.16	69.80	68.58
2014	293	2015	20.55	0.17	51.09	10.00	79.65	69.65	68.60
2014	293	2016	20.55	0.17	51.71	10.00	79.95	69.96	68.64
2014	293	2017	20.55	0.17	51.59	10.23	79.75	69.52	68.66
2014	293	2018	20.55	0.17	52.56	10.03	79.34	69.31	68.68
2014	293	2019	20.55	0.17	52.05	10.09	79.85	69.76	68.71
2014	293	2020	20.55	0.17	53.46	9.98	78.83	68.84	68.73
2014	293	2021	20.57	0.17	51.68	10.00	78.52	68.52	68.75
2014	293	2022	20.54	0.17	51.53	10.00	80.36	70.37	68.77
2014	293	2023	20.53	0.16	51.67	10.38	81.08	70.70	68.80
2014	293	2024	20.54	0.16	50.92	10.09	81.18	71.09	68.82
2014	293	2025	20.56	0.17	51.95	10.00	80.16	70.16	68.84
2014	293	2026	20.55	0.17	52.36	9.98	79.44	69.46	68.86
2014	293	2027	20.55	0.17	50.78	9.97	79.65	69.68	68.88

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	293	2028	20.55	0.17	50.41	9.97	79.95	69.98	68.91
2014	293	2029	20.55	0.17	51.01	9.98	80.06	70.07	68.93
2014	293	2030	20.55	0.17	52.10	9.97	79.34	69.37	68.95
2014	293	2031	20.56	0.16	51.50	9.97	79.44	69.47	68.97
2014	293	2032	20.56	0.16	51.52	9.82	79.54	69.73	68.99
2014	293	2033	20.56	0.16	51.70	9.97	79.85	69.88	69.01
2014	293	2034	20.56	0.17	50.94	9.97	80.88	70.91	69.03
2014	293	2035	20.55	0.17	51.39	9.97	81.29	71.32	69.06
2014	293	2036	20.55	0.17	51.36	9.90	80.47	70.57	69.08
2014	293	2037	20.55	0.17	50.80	9.93	80.98	71.05	69.11
2014	293	2038	20.56	0.17	52.43	9.79	81.18	71.39	69.13
2014	293	2039	20.56	0.17	51.11	9.54	80.47	70.93	69.15
2014	293	2040	20.56	0.17	50.21	9.55	81.08	71.53	69.18
2014	293	2041	20.57	0.17	51.67	9.18	79.95	70.77	69.19
2014	293	2042	20.55	0.17	50.95	9.06	80.16	71.10	69.22
2014	293	2043	20.56	0.16	49.66	8.93	80.77	71.84	69.24
2014	293	2044	20.56	0.16	50.07	8.96	80.47	71.51	69.25
2014	293	2045	20.57	0.16	50.68	8.65	79.03	70.38	69.26
2014	293	2046	20.56	0.17	50.46	8.75	79.34	70.59	69.26
2014	293	2047	20.56	0.17	50.42	9.03	79.85	70.82	69.27
2014	293	2048	20.57	0.16	49.88	8.52	80.67	72.15	69.28
2014	293	2049	20.56	0.17	49.50	8.53	79.13	70.60	69.29
2014	293	2050	20.57	0.16	50.10	8.38	78.62	70.24	69.29
2014	293	2051	20.56	0.17	51.15	8.32	78.62	70.30	69.30
2014	293	2052	20.57	0.17	51.34	8.32	78.83	70.50	69.30
2014	293	2053	20.56	0.17	50.16	8.31	79.03	70.72	69.29
2014	293	2054	20.56	0.16	49.83	8.35	79.54	71.19	69.30
2014	293	2055	20.57	0.16	49.54	8.32	78.72	70.40	69.29
2014	293	2056	20.56	0.16	49.20	8.31	79.75	71.44	69.30
2014	293	2057	20.56	0.16	49.54	8.32	79.24	70.91	69.30
2014	293	2058	20.56	0.16	49.39	8.35	79.44	71.09	69.30
2014	293	2059	20.57	0.17	48.60	8.31	80.06	71.75	69.30
2014	293	2100	20.57	0.16	50.82	8.31	79.65	71.34	69.30
2014	293	2101	20.57	0.16	51.84	8.31	78.93	70.62	69.30
2014	293	2102	20.55	0.16	51.03	8.31	80.26	71.95	69.31
2014	293	2103	20.57	0.16	52.42	8.31	79.44	71.13	69.30
2014	293	2104	20.57	0.16	51.93	8.31	79.95	71.65	69.30
2014	293	2105	20.57	0.16	54.22	8.31	78.72	70.42	69.30
2014	293	2106	20.57	0.16	52.76	8.31	79.65	71.34	69.30
2014	293	2107	20.57	0.16	53.60	8.31	79.34	71.03	69.30
2014	293	2108	20.56	0.16	52.13	8.31	80.16	71.85	69.30
2014	293	2109	20.57	0.16	51.10	8.31	79.65	71.34	69.30
2014	293	2110	20.57	0.16	52.33	8.31	79.54	71.24	69.29
2014	293	2111	20.57	0.17	51.09	8.31	79.95	71.65	69.29
2014	293	2112	20.57	0.16	53.30	8.31	79.34	71.03	69.28
2014	293	2113	20.57	0.17	54.21	8.31	79.44	71.13	69.27
2014	293	2114	20.57	0.17	54.43	8.31	79.34	71.03	69.26
2014	293	2115	20.57	0.17	54.73	8.31	79.54	71.24	69.25
2014	293	2116	20.57	0.17	53.88	8.31	78.83	70.52	69.24
2014	293	2117	20.57	0.17	51.27	8.31	79.65	71.34	69.24
2014	293	2118	20.57	0.17	53.33	8.31	79.44	71.13	69.23
2014	293	2119	20.57	0.18	53.50	8.31	78.93	70.62	69.22
2014	293	2120	20.57	0.17	52.19	8.31	79.34	71.03	69.22
2014	293	2121	20.58	0.17	52.21	8.31	79.03	70.72	69.21
2014	293	2122	20.58	0.17	52.16	8.31	78.21	69.90	69.20
2014	293	2123	20.59	0.17	52.89	8.31	78.93	70.62	69.20
2014	293	2124	20.59	0.17	52.42	8.31	78.72	70.42	69.19
2014	293	2125	20.57	0.17	52.14	8.31	79.24	70.93	69.18

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	293	2126	20.57	0.17	53.24	8.31	79.85	71.54	69.18
2014	293	2127	20.58	0.17	54.21	8.31	79.24	70.93	69.16
2014	293	2128	20.57	0.17	54.68	8.31	78.62	70.31	69.16
2014	293	2129	20.57	0.17	52.26	8.31	80.16	71.85	69.17
2014	293	2130	20.56	0.17	52.77	8.31	80.57	72.26	69.18
2014	293	2131	20.57	0.17	53.20	8.31	80.47	72.16	69.20
2014	293	2132	20.57	0.17	53.13	8.31	81.08	72.77	69.21
2014	293	2133	20.56	0.17	53.37	8.31	80.98	72.67	69.22
2014	293	2134	20.57	0.17	54.33	8.31	79.85	71.54	69.23
2014	293	2135	20.56	0.17	53.86	8.31	80.98	72.67	69.24
2014	293	2136	20.57	0.17	55.45	8.31	80.77	72.46	69.23
2014	293	2137	20.57	0.17	53.55	8.31	80.67	72.36	69.23
2014	293	2138	20.57	0.17	52.85	8.31	80.67	72.36	69.22
2014	293	2139	20.57	0.17	52.32	8.31	80.26	71.95	69.23
2014	293	2140	20.58	0.17	53.14	8.31	80.67	72.36	69.22
2014	293	2141	20.59	0.17	53.72	8.31	79.85	71.54	69.22
2014	293	2142	20.57	0.17	53.88	8.31	80.47	72.16	69.22
2014	293	2143	20.58	0.17	53.44	8.31	80.06	71.75	69.22
2014	293	2144	20.58	0.17	51.77	8.31	79.95	71.65	69.22
2014	293	2145	20.57	0.17	50.38	8.31	80.47	72.16	69.22
2014	293	2146	20.57	0.17	51.34	8.31	80.98	72.67	69.25
2014	293	2147	20.57	0.17	51.51	8.31	80.77	72.46	69.27
2014	293	2148	20.57	0.17	50.72	8.31	81.69	73.39	69.28
2014	293	2149	20.58	0.17	50.30	8.31	80.98	72.67	69.29
2014	293	2150	20.58	0.17	50.09	8.31	81.08	72.77	69.31
2014	293	2151	20.58	0.17	50.88	8.31	80.98	72.67	69.32
2014	293	2152	20.59	0.17	51.92	8.31	79.85	71.54	69.33
2014	293	2153	20.57	0.17	53.55	8.31	80.26	71.95	69.35
2014	293	2154	20.57	0.17	53.86	8.31	80.26	71.95	69.35
2014	293	2155	20.58	0.17	54.27	8.31	79.75	71.44	69.36
2014	293	2156	20.59	0.18	53.93	8.31	79.65	71.34	69.37
2014	293	2157	20.58	0.17	53.40	8.31	80.88	72.57	69.38
2014	293	2158	20.57	0.17	53.16	8.31	81.08	72.77	69.40
2014	293	2159	20.60	0.17	53.53	8.31	79.85	71.54	69.41
2014	293	2200	20.59	0.17	52.07	8.31	79.65	71.34	69.42
2014	293	2201	20.59	0.17	52.57	8.31	80.47	72.16	69.43
2014	293	2202	20.57	0.17	51.38	8.31	80.88	72.57	69.45
2014	293	2203	20.57	0.17	50.99	8.31	80.57	72.26	69.46
2014	293	2204	20.58	0.18	51.16	8.31	80.98	72.67	69.48
2014	293	2205	20.59	0.17	51.63	8.31	80.36	72.05	69.49
2014	293	2206	20.58	0.17	51.95	8.31	80.36	72.05	69.50
2014	293	2207	20.58	0.17	51.02	8.31	80.88	72.57	69.51
2014	293	2208	20.58	0.17	52.33	8.31	80.57	72.26	69.52
2014	293	2209	20.58	0.17	51.98	8.31	80.57	72.26	69.53
2014	293	2210	20.59	0.17	51.79	8.31	80.67	72.36	69.53
2014	293	2211	20.58	0.17	51.40	8.31	80.77	72.46	69.54
2014	293	2212	20.58	0.17	51.91	8.31	81.08	72.77	69.55
2014	293	2213	20.60	0.17	53.93	8.31	80.26	71.95	69.56
2014	293	2214	20.59	0.17	54.42	8.31	80.67	72.36	69.57
2014	293	2215	20.58	0.17	55.27	8.31	81.08	72.77	69.58
2014	293	2216	20.58	0.17	55.40	8.31	80.77	72.46	69.59
2014	293	2217	20.57	0.17	54.87	8.31	81.90	73.59	69.61
2014	293	2218	20.59	0.17	55.58	8.31	81.08	72.77	69.63
2014	293	2219	20.58	0.18	57.04	8.31	81.29	72.98	69.65
2014	293	2220	20.60	0.18	57.98	8.31	80.77	72.46	69.66
2014	293	2221	20.60	0.18	56.48	8.31	79.95	71.65	69.68
2014	293	2222	20.59	0.18	55.64	8.31	80.57	72.26	69.69
2014	293	2223	20.58	0.18	55.58	8.31	81.59	73.28	69.71

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	293	2224	20.60	0.18	57.08	8.31	80.47	72.16	69.73
2014	293	2225	20.59	0.18	54.68	8.31	81.39	73.08	69.75
2014	293	2226	20.60	0.18	56.25	8.31	81.59	73.28	69.77
2014	293	2227	20.60	0.18	57.09	8.31	80.67	72.36	69.79
2014	293	2228	20.60	0.18	55.89	8.31	80.36	72.05	69.81
2014	293	2229	20.59	0.18	56.92	8.31	80.77	72.46	69.83
2014	293	2230	20.60	0.18	58.48	8.31	81.29	72.98	69.85
2014	293	2231	20.59	0.18	58.49	8.31	81.69	73.39	69.87
2014	293	2232	20.59	0.18	59.82	8.31	80.98	72.67	69.89
2014	293	2233	20.61	0.18	60.52	8.31	80.06	71.75	69.90
2014	293	2234	20.60	0.18	58.63	8.31	79.95	71.65	69.91
2014	293	2235	20.60	0.18	57.23	8.31	80.57	72.26	69.92
2014	293	2236	20.60	0.18	59.72	8.31	80.16	71.85	69.94
2014	293	2237	20.58	0.18	57.36	8.31	81.49	73.18	69.96
2014	293	2238	20.60	0.18	57.52	8.31	80.88	72.57	69.98
2014	293	2239	20.60	0.18	58.60	8.31	80.36	72.05	69.99
2014	293	2240	20.61	0.18	56.51	8.31	79.75	71.44	70.00
2014	293	2241	20.61	0.19	56.76	8.31	80.26	71.95	70.01
2014	293	2242	20.59	0.18	56.23	8.31	80.98	72.67	70.03
2014	293	2243	20.60	0.18	55.55	8.31	80.98	72.67	70.05
2014	293	2244	20.61	0.18	55.67	8.31	79.54	71.24	70.07
2014	293	2245	20.60	0.19	54.35	8.31	80.06	71.75	70.09
2014	293	2246	20.61	0.18	54.54	8.31	80.06	71.75	70.10
2014	293	2247	20.61	0.18	56.53	8.31	80.47	72.16	70.11
2014	293	2248	20.59	0.18	55.10	8.31	81.69	73.39	70.13
2014	293	2249	20.59	0.18	53.53	8.31	81.39	73.08	70.16
2014	293	2250	20.60	0.18	53.91	8.31	81.59	73.28	70.18
2014	293	2251	20.61	0.18	53.50	8.31	80.88	72.57	70.20
2014	293	2252	20.61	0.18	54.64	8.31	79.95	71.65	70.22
2014	293	2253	20.61	0.18	54.08	8.31	80.67	72.36	70.23
2014	293	2254	20.60	0.18	53.65	8.31	81.69	73.39	70.26
2014	293	2255	20.59	0.18	54.39	8.31	82.10	73.80	70.28
2014	293	2256	20.60	0.18	54.92	8.31	81.59	73.28	70.30
2014	293	2257	20.59	0.18	54.73	8.31	81.59	73.28	70.33
2014	293	2258	20.61	0.18	56.12	8.31	80.77	72.46	70.36
2014	293	2259	20.60	0.18	55.42	8.31	80.47	72.16	70.38
2014	293	2300	20.59	0.18	53.24	8.31	82.21	73.90	70.41
2014	293	2301	20.60	0.18	54.47	8.31	80.98	72.67	70.43
2014	293	2302	20.59	0.18	52.34	8.31	82.00	73.69	70.46
2014	293	2303	20.61	0.18	53.38	8.31	80.36	72.05	70.49
2014	293	2304	20.61	0.17	54.70	8.31	79.95	71.65	70.51
2014	293	2305	20.62	0.17	55.70	8.31	79.34	71.03	70.52
2014	293	2306	20.61	0.17	58.06	8.31	80.16	71.85	70.54
2014	293	2307	20.60	0.17	54.02	8.31	80.47	72.16	70.56
2014	293	2308	20.61	0.17	56.52	8.31	80.36	72.05	70.58
2014	293	2309	20.59	0.17	56.20	8.31	80.26	71.95	70.60
2014	293	2310	20.61	0.17	55.56	8.31	79.34	71.03	70.61
2014	293	2311	20.59	0.17	54.74	8.31	80.26	71.95	70.63
2014	293	2312	20.61	0.18	55.47	8.31	79.85	71.54	70.65
2014	293	2313	20.61	0.17	56.09	8.31	80.36	72.05	70.67
2014	293	2314	20.60	0.17	55.97	8.31	80.98	72.67	70.70
2014	293	2315	20.61	0.18	56.03	8.31	80.67	72.36	70.72
2014	293	2316	20.62	0.18	56.33	8.31	79.75	71.44	70.74
2014	293	2317	20.62	0.18	55.49	8.31	79.03	70.72	70.75
2014	293	2318	20.60	0.17	55.94	8.31	80.77	72.46	70.78
2014	293	2319	20.62	0.17	56.13	8.31	80.16	71.85	70.80
2014	293	2320	20.60	0.17	55.58	8.31	79.95	71.65	70.81
2014	293	2321	20.59	0.18	55.25	8.31	80.36	72.05	70.84

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	293	2322	20.59	0.17	56.15	8.31	81.08	72.77	70.87
2014	293	2323	20.61	0.18	57.35	8.31	79.34	71.03	70.89
2014	293	2324	20.61	0.17	56.57	8.31	80.47	72.16	70.91
2014	293	2325	20.61	0.18	57.50	8.31	79.75	71.44	70.92
2014	293	2326	20.61	0.18	56.57	8.31	79.65	71.34	70.94
2014	293	2327	20.62	0.17	57.01	8.28	78.93	70.65	70.96
2014	293	2328	20.60	0.17	59.35	8.31	79.03	70.72	70.97
2014	293	2329	20.60	0.17	58.55	8.31	79.85	71.54	70.98
2014	293	2330	20.62	0.18	59.86	8.28	79.65	71.37	71.00
2014	293	2331	20.61	0.18	59.60	8.24	79.85	71.61	71.02
2014	293	2332	20.61	0.18	59.55	8.31	79.65	71.34	71.03
2014	293	2333	20.62	0.18	60.09	8.20	79.54	71.35	71.05
2014	293	2334	20.62	0.18	61.06	8.14	78.62	70.48	71.06
2014	293	2335	20.62	0.18	60.50	8.21	78.52	70.31	71.08
2014	293	2336	20.62	0.18	61.08	8.25	80.06	71.80	71.09
2014	293	2337	20.61	0.18	59.26	8.25	79.44	71.19	71.11
2014	293	2338	20.62	0.18	59.09	8.18	78.93	70.75	71.13
2014	293	2339	20.62	0.18	59.33	7.57	78.21	70.64	71.14
2014	293	2340	20.61	0.18	57.72	8.16	78.83	70.67	71.16
2014	293	2341	20.62	0.18	57.49	8.07	79.54	71.47	71.18
2014	293	2342	20.63	0.18	58.77	7.60	79.13	71.53	71.20
2014	293	2343	20.64	0.18	59.11	7.52	78.21	70.69	71.21
2014	293	2344	20.63	0.18	61.20	7.84	78.93	71.09	71.22
2014	293	2345	20.63	0.17	62.82	7.92	78.01	70.09	71.23
2014	293	2346	20.61	0.17	61.96	8.22	79.44	71.22	71.25
2014	293	2347	20.64	0.18	65.72	7.80	77.19	69.39	71.25
2014	293	2348	20.64	0.18	65.25	8.06	76.68	68.62	71.25
2014	293	2349	20.62	0.18	63.47	8.25	76.27	68.01	71.26
2014	293	2350	20.63	0.18	63.63	8.21	75.24	67.03	71.26
2014	293	2351	20.62	0.18	63.41	8.21	75.45	67.23	71.26
2014	293	2352	20.64	0.18	64.59	8.18	74.32	66.14	71.24
2014	293	2353	20.63	0.18	65.87	7.92	73.81	65.89	71.23
2014	293	2354	20.63	0.18	66.24	7.66	73.09	65.43	71.22
2014	293	2355	20.62	0.19	63.57	7.62	72.89	65.27	71.21
2014	293	2356	20.63	0.19	63.91	6.98	72.58	65.60	71.20
2014	293	2357	20.62	0.19	63.50	6.94	72.37	65.44	71.19
2014	293	2358	20.62	0.19	64.36	6.70	71.66	64.95	71.18
2014	293	2359	20.63	0.19	64.00	6.67	71.55	64.88	71.16
2014	293	2400	20.62	0.19	63.41	6.63	70.94	64.31	71.15
2014	294	1	20.61	0.19	63.75	6.67	70.84	64.16	71.13
2014	294	2	20.62	0.18	64.20	6.65	70.43	63.78	71.11
2014	294	3	20.62	0.18	65.25	6.55	70.32	63.77	71.09
2014	294	4	20.63	0.19	65.66	6.24	69.30	63.06	71.07
2014	294	5	20.63	0.19	65.88	6.15	68.99	62.85	71.04
2014	294	6	20.63	0.19	66.83	5.69	68.28	62.59	71.02
2014	294	7	20.64	0.19	66.37	5.29	68.38	63.09	70.99
2014	294	8	20.63	0.19	68.88	5.12	68.07	62.95	70.97
2014	294	9	20.63	0.19	68.02	5.01	67.05	62.03	70.94
2014	294	10	20.62	0.19	67.28	4.98	67.35	62.37	70.91
2014	294	11	20.62	0.19	66.29	4.98	67.46	62.47	70.88
2014	294	12	20.62	0.19	69.07	4.98	67.35	62.37	70.85
2014	294	13	20.62	0.20	68.17	4.98	66.33	61.35	70.82
2014	294	14	20.61	0.20	66.80	4.98	66.43	61.45	70.78
2014	294	15	20.61	0.19	67.37	4.98	66.13	61.14	70.75
2014	294	16	20.62	0.20	68.38	4.98	65.82	60.83	70.71
2014	294	17	20.62	0.20	66.99	4.98	66.23	61.24	70.67
2014	294	18	20.63	0.20	70.93	4.98	64.49	59.50	70.63
2014	294	19	20.62	0.19	68.84	4.98	63.97	58.99	70.59

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	294	20	20.61	0.19	65.41	4.98	65.10	60.12	70.55
2014	294	21	20.64	0.19	69.21	4.98	63.15	58.17	70.51
2014	294	22	20.63	0.19	71.79	4.98	61.72	56.74	70.46
2014	294	23	20.63	0.18	71.54	4.98	62.13	57.15	70.40
2014	294	24	20.64	0.19	72.04	4.98	61.21	56.22	70.34
2014	294	25	20.64	0.19	72.02	4.98	61.31	56.33	70.28
2014	294	26	20.63	0.19	72.71	4.98	59.75	54.77	70.22
2014	294	27	20.62	0.19	71.32	4.98	60.05	55.07	70.16
2014	294	28	20.64	0.20	73.93	4.98	58.50	53.52	70.09
2014	294	29	20.64	0.20	76.43	4.98	57.44	52.45	70.02
2014	294	30	20.64	0.20	74.83	4.98	57.39	52.40	69.94
2014	294	31	20.63	0.20	73.83	4.98	56.88	51.89	69.87
2014	294	32	20.62	0.20	72.47	4.98	58.10	53.12	69.80
2014	294	33	20.64	0.20	72.66	4.98	57.75	52.76	69.73
2014	294	34	20.63	0.20	73.13	4.98	58.21	53.22	69.66
2014	294	35	20.64	0.20	73.53	4.98	55.08	50.10	69.58
2014	294	36	20.63	0.20	72.29	4.98	56.55	51.56	69.50
2014	294	37	20.63	0.20	73.93	4.98	56.51	51.52	69.42
2014	294	38	20.64	0.20	74.13	4.98	56.51	51.52	69.34
2014	294	39	20.64	0.20	74.53	4.98	55.25	50.26	69.25
2014	294	40	20.63	0.20	73.53	4.98	56.20	51.21	69.17
2014	294	41	20.64	0.20	75.03	4.98	55.13	50.15	69.08
2014	294	42	20.64	0.20	74.73	4.98	54.63	49.65	68.99
2014	294	43	20.62	0.20	74.83	4.98	55.02	50.04	68.90
2014	294	44	20.63	0.20	75.33	4.98	55.19	50.20	68.81
2014	294	45	20.61	0.20	73.43	4.98	56.81	51.83	68.73
2014	294	46	20.62	0.20	73.01	4.98	57.13	52.15	68.66
2014	294	47	20.65	0.20	78.13	4.98	55.02	50.04	68.57
2014	294	48	20.63	0.20	77.33	4.98	53.58	48.59	68.48
2014	294	49	20.63	0.20	77.03	4.98	53.81	48.83	68.38
2014	294	50	20.64	0.20	76.93	4.98	52.66	47.67	68.29
2014	294	51	20.64	0.20	74.83	4.98	54.53	49.54	68.20
2014	294	52	20.63	0.19	72.09	4.98	55.31	50.32	68.12
2014	294	53	20.63	0.19	73.53	4.98	54.94	49.95	68.03
2014	294	54	20.63	0.19	73.93	4.98	55.77	50.78	67.95
2014	294	55	20.64	0.19	76.53	4.98	54.95	49.96	67.86
2014	294	56	20.65	0.19	78.33	4.98	54.20	49.22	67.77
2014	294	57	20.64	0.19	76.63	4.98	54.95	49.96	67.68
2014	294	58	20.64	0.19	77.73	4.98	55.15	50.17	67.60
2014	294	59	20.65	0.20	79.23	4.98	53.57	48.58	67.50
2014	294	100	20.64	0.20	78.73	4.98	54.38	49.39	67.41
2014	294	101	20.65	0.20	77.23	4.98	54.79	49.80	67.32
2014	294	102	20.65	0.21	79.23	4.98	53.59	48.60	67.23
2014	294	103	20.65	0.20	78.73	4.98	53.28	48.30	67.13
2014	294	104	20.64	0.21	76.53	4.98	54.14	49.16	67.04
2014	294	105	20.65	0.20	76.83	4.98	53.66	48.67	66.95
2014	294	106	20.65	0.20	74.53	4.98	53.72	48.74	66.86
2014	294	107	20.63	0.20	75.33	4.98	53.66	48.67	66.76
2014	294	108	20.64	0.20	79.73	4.98	52.71	47.72	66.67
2014	294	109	20.64	0.20	77.33	4.98	51.78	46.80	66.56
2014	294	110	20.65	0.20	76.73	4.98	52.41	47.42	66.46
2014	294	111	20.63	0.20	73.73	4.98	52.70	47.71	66.36
2014	294	112	20.62	0.20	74.33	4.98	53.33	48.35	66.27
2014	294	113	20.64	0.20	74.73	4.98	54.13	49.15	66.18
2014	294	114	20.64	0.20	77.83	4.98	53.18	48.19	66.08
2014	294	115	20.64	0.20	76.83	4.98	52.92	47.94	65.99
2014	294	116	20.65	0.20	76.83	4.98	51.55	46.56	65.88
2014	294	117	20.62	0.20	74.53	4.98	53.64	48.65	65.79

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	294	118	20.65	0.20	77.73	4.98	52.31	47.32	65.69
2014	294	119	20.65	0.20	78.13	4.98	52.19	47.21	65.59
2014	294	120	20.67	0.20	82.73	4.98	50.74	45.75	65.49
2014	294	121	20.65	0.20	78.33	4.98	52.37	47.38	65.39
2014	294	122	20.62	0.21	77.33	4.98	53.96	48.97	65.30
2014	294	123	20.66	0.20	79.53	4.98	52.40	47.41	65.21
2014	294	124	20.67	0.21	80.03	4.98	51.21	46.23	65.11
2014	294	125	20.65	0.20	75.83	4.98	52.70	47.71	65.01
2014	294	126	20.66	0.20	76.63	4.98	52.88	47.90	64.92
2014	294	127	20.65	0.20	74.03	4.98	52.73	47.74	64.82
2014	294	128	20.66	0.20	75.33	4.98	53.29	48.31	64.73
2014	294	129	20.65	0.20	75.33	4.98	53.54	48.55	64.64
2014	294	130	20.65	0.20	77.63	4.98	52.86	47.88	64.54
2014	294	131	20.64	0.20	78.13	4.98	53.11	48.12	64.44
2014	294	132	20.64	0.20	77.23	4.98	53.75	48.77	64.34
2014	294	133	20.65	0.20	79.33	4.98	52.04	47.06	64.23
2014	294	134	20.65	0.20	77.63	4.98	52.61	47.63	64.13
2014	294	135	20.64	0.20	77.33	4.98	52.94	47.96	64.03
2014	294	136	20.64	0.20	76.93	4.98	54.18	49.20	63.93
2014	294	137	20.65	0.20	79.33	4.98	51.78	46.80	63.83
2014	294	138	20.66	0.21	79.73	4.98	50.93	45.95	63.72
2014	294	139	20.64	0.21	76.83	4.98	52.16	47.18	63.61
2014	294	140	20.65	0.21	77.83	4.98	51.59	46.61	63.51
2014	294	141	20.64	0.20	74.83	4.98	52.99	48.01	63.41
2014	294	142	20.63	0.20	74.53	4.98	54.26	49.28	63.31
2014	294	143	20.64	0.20	77.43	4.98	52.89	47.91	63.21
2014	294	144	20.66	0.20	79.53	4.98	51.93	46.94	63.11
2014	294	145	20.65	0.20	78.43	4.98	51.09	46.10	63.00
2014	294	146	20.65	0.20	77.63	4.98	50.51	45.53	62.89
2014	294	147	20.67	0.20	77.23	4.98	49.86	44.87	62.78
2014	294	148	20.66	0.20	78.23	4.98	48.88	43.89	62.66
2014	294	149	20.65	0.20	75.23	4.98	50.56	45.57	62.54
2014	294	150	20.63	0.20	72.80	4.98	51.32	46.34	62.43
2014	294	151	20.66	0.20	77.63	4.98	48.74	43.76	62.31
2014	294	152	20.65	0.20	75.93	4.98	48.29	43.31	62.19
2014	294	153	20.65	0.20	75.33	4.98	48.59	43.60	62.08
2014	294	154	20.65	0.20	76.13	4.98	48.34	43.36	61.96
2014	294	155	20.64	0.20	73.53	4.98	49.97	44.99	61.85
2014	294	156	20.66	0.20	77.13	4.98	48.16	43.17	61.73
2014	294	157	20.65	0.20	76.73	4.98	47.51	42.53	61.61
2014	294	158	20.65	0.20	77.33	4.98	47.66	42.67	61.49
2014	294	159	20.66	0.20	77.33	4.98	46.49	41.50	61.36
2014	294	200	20.66	0.20	78.33	4.98	47.57	42.59	61.24
2014	294	201	20.66	0.20	77.83	4.98	47.33	42.34	61.12
2014	294	202	20.66	0.20	76.13	4.98	48.36	43.38	61.00
2014	294	203	20.66	0.20	75.63	5.21	48.52	43.31	60.87
2014	294	204	20.67	0.20	75.63	6.45	49.40	42.95	60.75
2014	294	205	20.66	0.20	75.13	7.08	49.25	42.18	60.63
2014	294	206	20.66	0.20	73.63	8.10	50.68	42.58	60.50
2014	294	207	20.66	0.20	75.03	8.24	49.71	41.47	60.38
2014	294	208	20.65	0.19	74.93	8.31	51.09	42.78	60.25
2014	294	209	20.64	0.20	74.13	8.31	51.99	43.68	60.13
2014	294	210	20.66	0.19	77.43	8.31	51.77	43.47	60.02
2014	294	211	20.65	0.20	76.53	8.31	51.44	43.13	59.89
2014	294	212	20.67	0.20	79.23	8.31	50.53	42.23	59.77
2014	294	213	20.66	0.20	78.43	8.31	51.61	43.30	59.65
2014	294	214	20.65	0.20	76.83	8.31	51.68	43.37	59.53
2014	294	215	20.66	0.20	79.23	8.31	49.82	41.51	59.40

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	294	216	20.65	0.20	78.23	8.31	51.14	42.83	59.28
2014	294	217	20.65	0.20	77.03	8.31	51.04	42.73	59.15
2014	294	218	20.66	0.20	77.83	8.31	50.69	42.38	59.02
2014	294	219	20.65	0.20	75.83	8.35	50.89	42.54	58.90
2014	294	220	20.64	0.20	74.53	8.90	51.13	42.23	58.77
2014	294	221	20.65	0.19	74.23	9.66	51.72	42.06	58.64
2014	294	222	20.65	0.20	75.33	9.76	51.40	41.63	58.52
2014	294	223	20.65	0.20	75.73	10.07	51.43	41.36	58.39
2014	294	224	20.65	0.20	75.23	10.99	52.23	41.23	58.26
2014	294	225	20.66	0.20	75.93	10.43	50.82	40.40	58.13
2014	294	226	20.65	0.20	75.53	11.22	51.71	40.50	57.99
2014	294	227	20.67	0.20	76.53	11.34	50.74	39.40	57.85
2014	294	228	20.66	0.20	75.53	11.60	50.81	39.21	57.71
2014	294	229	20.66	0.20	76.33	11.63	51.40	39.76	57.58
2014	294	230	20.66	0.20	75.13	11.63	51.92	40.29	57.44
2014	294	231	20.65	0.20	72.74	11.63	52.83	41.20	57.31
2014	294	232	20.67	0.20	73.93	11.63	51.76	40.13	57.17
2014	294	233	20.65	0.20	70.94	11.63	52.95	41.32	57.04
2014	294	234	20.65	0.20	70.22	11.63	53.43	41.80	56.92
2014	294	235	20.66	0.20	71.56	11.63	52.57	40.94	56.79
2014	294	236	20.67	0.20	72.11	11.63	52.84	41.21	56.66
2014	294	237	20.68	0.20	72.81	11.63	51.79	40.16	56.53
2014	294	238	20.66	0.20	69.25	11.63	54.44	42.81	56.41
2014	294	239	20.67	0.20	70.83	11.63	53.69	42.06	56.28
2014	294	240	20.66	0.20	68.28	11.63	54.05	42.42	56.16
2014	294	241	20.66	0.19	66.92	11.63	55.04	43.41	56.04
2014	294	242	20.67	0.19	67.42	11.63	54.81	43.17	55.92
2014	294	243	20.65	0.19	67.27	11.63	56.17	44.54	55.80
2014	294	244	20.67	0.19	68.39	11.63	55.76	44.13	55.69
2014	294	245	20.66	0.19	65.81	11.63	57.21	45.58	55.58
2014	294	246	20.67	0.19	67.45	11.63	56.52	44.89	55.47
2014	294	247	20.67	0.19	69.76	11.63	55.60	43.96	55.35
2014	294	248	20.66	0.19	68.62	11.63	56.40	44.77	55.24
2014	294	249	20.68	0.19	71.60	11.63	54.96	43.33	55.11
2014	294	250	20.67	0.19	69.56	11.63	55.57	43.94	54.99
2014	294	251	20.67	0.19	68.49	11.63	56.23	44.60	54.87
2014	294	252	20.66	0.19	66.03	11.63	56.91	45.27	54.76
2014	294	253	20.67	0.19	66.71	11.63	57.14	45.51	54.65
2014	294	254	20.66	0.19	68.19	11.63	56.86	45.22	54.54
2014	294	255	20.66	0.19	68.64	11.63	56.52	44.89	54.42
2014	294	256	20.65	0.19	63.36	11.63	59.08	47.45	54.31
2014	294	257	20.65	0.19	63.03	11.63	59.10	47.47	54.21
2014	294	258	20.67	0.19	65.15	11.63	57.42	45.79	54.09
2014	294	259	20.65	0.19	62.14	11.63	59.55	47.92	53.99
2014	294	300	20.66	0.18	63.94	11.63	58.94	47.31	53.89
2014	294	301	20.67	0.18	63.53	11.45	59.25	47.80	53.78
2014	294	302	20.66	0.18	65.89	10.90	58.30	47.40	53.67
2014	294	303	20.66	0.18	62.89	10.61	59.19	48.58	53.57
2014	294	304	20.67	0.18	63.55	10.01	58.78	48.77	53.47
2014	294	305	20.65	0.18	61.83	10.07	59.91	49.84	53.38
2014	294	306	20.68	0.18	63.98	9.90	58.15	48.25	53.29
2014	294	307	20.67	0.19	63.91	9.97	57.57	47.60	53.19
2014	294	308	20.67	0.18	63.74	9.89	57.65	47.77	53.09
2014	294	309	20.65	0.18	61.24	9.73	59.16	49.43	52.99
2014	294	310	20.66	0.18	61.33	9.03	58.57	49.54	52.90
2014	294	311	20.68	0.18	62.76	8.60	57.73	49.13	52.81
2014	294	312	20.67	0.18	63.08	8.60	57.62	49.02	52.71
2014	294	313	20.67	0.19	61.16	8.77	58.57	49.80	52.62

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	294	314	20.67	0.19	62.56	8.31	58.35	50.04	52.53
2014	294	315	20.67	0.18	60.66	8.31	58.88	50.57	52.44
2014	294	316	20.68	0.18	62.52	8.31	58.02	49.71	52.35
2014	294	317	20.69	0.18	64.10	8.31	57.15	48.84	52.25
2014	294	318	20.66	0.18	60.14	8.31	59.60	51.29	52.17
2014	294	319	20.66	0.18	61.15	8.31	59.06	50.75	52.08
2014	294	320	20.66	0.18	59.61	8.31	59.95	51.64	52.00
2014	294	321	20.67	0.18	58.63	8.31	60.59	52.29	51.92
2014	294	322	20.67	0.19	57.58	8.31	61.21	52.90	51.84
2014	294	323	20.66	0.19	58.77	8.31	60.59	52.29	51.75
2014	294	324	20.68	0.19	59.45	8.31	61.52	53.21	51.68
2014	294	325	20.66	0.18	56.97	8.31	62.85	54.54	51.61
2014	294	326	20.66	0.18	58.28	8.31	63.67	55.36	51.54
2014	294	327	20.66	0.18	57.46	8.28	63.87	55.59	51.47
2014	294	328	20.67	0.18	59.98	7.50	64.38	56.88	51.42
2014	294	329	20.67	0.18	58.40	6.70	65.31	58.60	51.37
2014	294	330	20.65	0.18	56.79	6.63	67.87	61.23	51.32
2014	294	331	20.67	0.18	57.09	6.13	67.56	61.43	51.28
2014	294	332	20.66	0.18	56.77	5.89	68.69	62.80	51.25
2014	294	333	20.66	0.18	56.42	5.44	69.20	63.76	51.21
2014	294	334	20.66	0.18	55.80	5.75	69.81	64.07	51.18
2014	294	335	20.67	0.19	55.99	5.41	69.92	64.50	51.16
2014	294	336	20.66	0.18	55.41	5.51	71.35	65.84	51.14
2014	294	337	20.66	0.18	53.14	5.68	72.07	66.39	51.12
2014	294	338	20.66	0.18	53.50	5.44	71.86	66.42	51.10
2014	294	339	20.68	0.18	54.73	5.23	71.25	66.01	51.08
2014	294	340	20.68	0.18	54.92	4.98	71.25	66.26	51.06
2014	294	341	20.68	0.18	55.73	4.98	72.17	67.18	51.05
2014	294	342	20.68	0.18	55.59	4.98	72.17	67.18	51.03
2014	294	343	20.68	0.18	53.50	5.01	72.99	67.98	51.01
2014	294	344	20.69	0.18	52.27	4.98	72.48	67.49	51.00
2014	294	345	20.67	0.18	52.61	4.98	73.30	68.31	50.99
2014	294	346	20.69	0.18	53.41	4.98	73.81	68.82	50.98
2014	294	347	20.68	0.18	51.51	4.98	74.73	69.74	50.98
2014	294	348	20.68	0.18	50.72	4.98	74.93	69.95	50.98
2014	294	349	20.68	0.18	51.48	4.98	74.32	69.33	50.98
2014	294	350	20.68	0.18	49.87	4.98	74.42	69.44	50.99
2014	294	351	20.69	0.18	52.52	4.98	74.01	69.03	51.00
2014	294	352	20.67	0.18	51.56	4.98	74.01	69.03	51.00
2014	294	353	20.67	0.18	50.70	4.98	73.71	68.72	51.02
2014	294	354	20.69	0.18	52.47	4.98	73.19	68.21	51.02
2014	294	355	20.68	0.18	51.76	4.98	73.81	68.82	51.04
2014	294	356	20.69	0.18	51.46	4.98	73.40	68.41	51.05
2014	294	357	20.68	0.18	50.29	4.98	74.11	69.13	51.07
2014	294	358	20.70	0.18	51.50	4.98	72.68	67.70	51.08
2014	294	359	20.69	0.18	51.49	4.98	73.71	68.72	51.09
2014	294	400	20.68	0.18	52.16	4.98	74.01	69.03	51.11
2014	294	401	20.68	0.18	49.82	4.98	73.60	68.62	51.13
2014	294	402	20.69	0.18	49.55	4.98	73.91	68.93	51.15
2014	294	403	20.69	0.18	51.22	4.98	73.30	68.31	51.17
2014	294	404	20.69	0.18	51.84	4.98	73.09	68.11	51.18
2014	294	405	20.70	0.18	51.90	4.98	72.78	67.80	51.20
2014	294	406	20.70	0.18	51.62	4.98	72.27	67.29	51.22
2014	294	407	20.71	0.18	51.34	4.98	71.45	66.47	51.24
2014	294	408	20.69	0.18	50.67	4.98	71.35	66.36	51.25
2014	294	409	20.71	0.18	51.29	4.98	70.94	65.95	51.26
2014	294	410	20.71	0.18	51.54	4.98	70.84	65.85	51.28
2014	294	411	20.71	0.18	50.36	4.98	71.25	66.26	51.30

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	294	412	20.69	0.17	49.10	4.98	71.35	66.36	51.31
2014	294	413	20.71	0.17	48.75	4.98	70.63	65.65	51.33
2014	294	414	20.70	0.17	49.78	4.98	70.94	65.95	51.34
2014	294	415	20.70	0.17	49.98	4.98	70.73	65.75	51.36
2014	294	416	20.71	0.17	49.31	4.98	70.63	65.65	51.38
2014	294	417	20.69	0.17	45.68	4.98	70.84	65.85	51.40
2014	294	418	20.72	0.17	48.35	4.98	69.92	64.93	51.42
2014	294	419	20.71	0.16	46.28	4.98	70.43	65.44	51.44
2014	294	420	20.72	0.16	46.39	4.98	70.22	65.24	51.47
2014	294	421	20.71	0.16	45.62	4.98	69.51	64.52	51.49
2014	294	422	20.70	0.16	44.77	4.98	70.22	65.24	51.52
2014	294	423	20.72	0.16	45.62	4.98	70.22	65.24	51.55
2014	294	424	20.70	0.16	45.17	4.98	71.25	66.26	51.59
2014	294	425	20.68	0.16	43.37	4.98	71.25	66.26	51.63
2014	294	426	20.69	0.16	43.79	4.98	71.35	66.36	51.67
2014	294	427	20.71	0.16	45.14	4.98	69.92	64.93	51.71
2014	294	428	20.71	0.16	44.73	4.98	69.20	64.21	51.75
2014	294	429	20.72	0.16	43.99	4.98	69.61	64.62	51.80
2014	294	430	20.72	0.16	43.96	4.98	70.02	65.03	51.85
2014	294	431	20.73	0.16	44.44	4.98	69.61	64.62	51.90
2014	294	432	20.72	0.16	44.26	4.98	69.51	64.52	51.95
2014	294	433	20.71	0.16	43.53	4.98	70.02	65.03	52.00
2014	294	434	20.70	0.16	43.08	4.98	70.32	65.34	52.05
2014	294	435	20.72	0.16	43.17	4.98	69.10	64.11	52.10
2014	294	436	20.71	0.16	42.81	4.98	69.61	64.62	52.16
2014	294	437	20.72	0.16	41.76	4.98	69.61	64.62	52.21
2014	294	438	20.72	0.16	41.89	4.98	69.92	64.93	52.27
2014	294	439	20.72	0.15	42.23	4.98	69.40	64.42	52.32
2014	294	440	20.74	0.15	43.63	4.98	68.38	63.39	52.38
2014	294	441	20.72	0.15	41.60	4.98	69.10	64.11	52.43
2014	294	442	20.72	0.15	43.56	4.98	69.20	64.21	52.49
2014	294	443	20.72	0.15	43.24	4.98	69.20	64.21	52.55
2014	294	444	20.71	0.15	43.59	4.98	68.89	63.91	52.61
2014	294	445	20.73	0.15	44.41	4.98	68.89	63.91	52.66
2014	294	446	20.74	0.15	42.79	4.98	68.17	63.19	52.71
2014	294	447	20.74	0.15	42.14	4.98	68.17	63.19	52.76
2014	294	448	20.77	0.15	41.59	4.98	67.87	62.88	52.81
2014	294	449	20.78	0.15	43.06	4.98	67.56	62.57	52.87
2014	294	450	20.79	0.15	43.67	4.98	67.25	62.27	52.92
2014	294	451	20.82	0.15	43.07	4.98	66.84	61.86	52.98
2014	294	452	20.90	0.15	39.94	4.83	65.51	60.68	53.03
2014	294	453	21.04	0.15	41.31	3.42	62.13	58.71	53.06
2014	294	454	21.17	0.15	40.78	1.75	58.70	56.95	53.09
2014	294	455	21.46	0.16	42.43	1.66	54.20	52.54	53.10
2014	294	456	21.53	0.16	42.59	1.66	50.71	49.05	53.10
2014	294	457	21.53	0.16	41.79	1.66	49.38	47.72	53.09
2014	294	458	21.53	0.16	42.39	1.62	48.52	46.90	53.08
2014	294	459	21.53	0.16	43.76	1.50	47.83	46.34	53.06
2014	294	500	21.53	0.16	43.62	1.27	48.03	46.75	53.05
2014	294	501	21.53	0.16	42.90	1.03	48.62	47.59	53.05
2014	294	502	21.53	0.16	43.99	0.94	50.82	49.88	53.05
2014	294	503	21.53	0.16	44.82	0.24	50.65	50.41	53.05
2014	294	504	21.53	0.16	44.44	0.76	56.17	55.41	53.08
2014	294	505	21.53	0.16	42.76	0.19	53.82	53.63	53.10
2014	294	506	21.54	0.16	43.60	0.06	52.30	52.24	53.12
2014	294	507	21.54	0.16	44.21	0.00	49.22	49.22	53.12
2014	294	508	21.54	0.16	43.58	0.00	48.55	48.55	53.12
2014	294	509	21.54	0.16	43.60	0.00	50.79	50.79	53.13

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	294	510	21.54	0.16	41.94	0.00	55.81	55.81	53.17
2014	294	511	21.54	0.16	42.28	0.00	54.24	54.24	53.20
2014	294	512	21.54	0.16	42.60	0.00	51.63	51.63	53.21
2014	294	513	21.55	0.16	41.33	0.00	48.66	48.66	53.22
2014	294	514	21.55	0.16	41.97	0.00	47.72	47.72	53.21
2014	294	515	21.55	0.16	43.22	0.00	45.41	45.41	53.20
2014	294	516	21.55	0.16	42.86	0.00	45.17	45.17	53.19
2014	294	517	21.55	0.17	42.57	0.00	46.00	46.00	53.18
2014	294	518	21.55	0.16	42.26	0.00	47.45	47.45	53.18
2014	294	519	21.55	0.16	43.61	0.00	46.45	46.45	53.18
2014	294	520	21.55	0.16	42.04	0.00	47.91	47.91	53.18
2014	294	521	21.55	0.16	43.61	0.00	50.41	50.41	53.20
2014	294	522	21.55	0.16	41.90	0.00	46.85	46.85	53.20
2014	294	523	21.55	0.17	40.44	0.00	46.22	46.22	53.18
2014	294	524	21.55	0.17	40.50	0.00	46.56	46.56	53.18
2014	294	525	21.55	0.16	41.10	0.00	50.01	50.01	53.20
2014	294	526	21.55	0.16	42.42	0.00	49.97	49.97	53.21
2014	294	527	21.55	0.16	41.07	0.00	49.04	49.04	53.21
2014	294	528	21.55	0.17	41.78	0.00	46.23	46.23	53.20
2014	294	529	21.55	0.16	42.62	0.00	47.15	47.15	53.20
2014	294	530	21.55	0.16	40.81	0.00	46.03	46.03	53.19
2014	294	531	21.55	0.16	40.70	0.00	45.87	45.87	53.18
2014	294	532	21.55	0.16	41.04	0.00	45.31	45.31	53.17
2014	294	533	21.55	0.16	40.83	0.00	46.53	46.53	53.16
2014	294	534	21.55	0.16	41.19	0.00	44.97	44.97	53.15
2014	294	535	21.55	0.16	39.77	0.00	45.66	45.66	53.14
2014	294	536	21.55	0.16	40.13	0.00	45.75	45.75	53.13
2014	294	537	21.55	0.16	40.26	0.00	45.50	45.50	53.12
2014	294	538	21.55	0.17	39.22	0.00	46.05	46.05	53.12
2014	294	539	21.55	0.16	39.10	0.00	45.87	45.87	53.11
2014	294	540	21.55	0.16	39.54	0.00	45.80	45.80	53.11
2014	294	541	21.55	0.16	39.97	0.00	46.10	46.10	53.11
2014	294	542	21.55	0.16	41.38	0.00	44.97	44.97	53.09
2014	294	543	21.55	0.16	40.58	0.00	45.47	45.47	53.08
2014	294	544	21.56	0.16	38.65	0.00	45.56	45.56	53.07
2014	294	545	21.55	0.16	39.78	0.00	45.39	45.39	53.06
2014	294	546	21.55	0.16	43.38	0.00	45.79	45.79	53.06
2014	294	547	21.55	0.16	42.69	0.00	46.63	46.63	53.07
2014	294	548	21.55	0.16	42.09	0.00	46.00	46.00	53.07
2014	294	549	21.55	0.16	43.57	0.00	45.09	45.09	53.08
2014	294	550	21.55	0.16	42.73	0.00	44.87	44.87	53.07
2014	294	551	21.56	0.16	40.10	0.00	44.84	44.84	53.07
2014	294	552	21.56	0.16	40.32	0.00	45.33	45.33	53.07
2014	294	553	21.56	0.16	41.47	0.00	45.26	45.26	53.08
2014	294	554	21.56	0.16	41.83	0.00	45.50	45.50	53.09
2014	294	555	21.56	0.16	41.75	0.00	45.11	45.11	53.10
2014	294	556	21.56	0.16	41.70	0.00	44.76	44.76	53.09
2014	294	557	21.56	0.16	41.53	0.00	45.02	45.02	53.10
2014	294	558	21.56	0.16	41.52	0.00	58.85	58.85	53.17
2014	294	559	21.56	0.16	39.41	0.00	60.30	60.30	53.24
2014	294	600	21.56	0.16	40.27	0.01	54.27	54.26	53.30
2014	294	601	21.56	0.16	41.27	0.01	53.67	53.66	53.34
2014	294	602	21.56	0.16	43.22	0.00	52.48	52.48	53.38
2014	294	603	21.56	0.16	41.15	0.01	52.83	52.82	53.42
2014	294	604	21.56	0.16	42.12	0.01	53.20	53.18	53.46
2014	294	605	21.56	0.16	42.56	0.00	53.64	53.64	53.51
2014	294	606	21.56	0.16	41.86	0.01	54.39	54.37	53.56
2014	294	607	21.56	0.15	43.31	0.06	54.98	54.93	53.61

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	294	608	21.56	0.16	43.76	0.03	54.34	54.31	53.66
2014	294	609	21.56	0.15	43.73	0.01	55.21	55.19	53.72
2014	294	610	21.56	0.16	42.51	0.03	55.25	55.22	53.76
2014	294	611	21.56	0.15	43.71	0.00	53.82	53.82	53.81
2014	294	612	21.56	0.16	43.76	0.01	54.08	54.07	53.85
2014	294	613	21.56	0.16	43.40	0.03	55.00	54.97	53.90
2014	294	614	21.56	0.16	45.43	0.06	54.42	54.36	53.95
2014	294	615	21.56	0.16	45.22	0.04	55.19	55.14	54.00
2014	294	616	21.56	0.16	44.45	0.07	55.18	55.11	54.06
2014	294	617	21.56	0.16	45.58	0.04	55.82	55.78	54.11
2014	294	618	21.56	0.16	46.20	0.00	54.12	54.12	54.16
2014	294	619	21.56	0.16	45.12	0.00	53.99	53.99	54.20
2014	294	620	21.56	0.16	47.38	0.00	52.90	52.90	54.25
2014	294	621	21.56	0.16	48.50	0.00	53.00	53.00	54.29
2014	294	622	21.56	0.16	47.98	0.00	53.94	53.94	54.34
2014	294	623	21.56	0.16	47.66	0.01	53.51	53.49	54.39
2014	294	624	21.56	0.16	46.19	0.03	55.13	55.11	54.45
2014	294	625	21.56	0.16	45.14	0.00	54.51	54.51	54.50
2014	294	626	21.56	0.16	46.06	0.00	53.97	53.97	54.56
2014	294	627	21.56	0.16	43.49	0.00	54.30	54.30	54.62
2014	294	628	21.56	0.16	43.09	0.00	54.34	54.34	54.68
2014	294	629	21.56	0.16	43.63	0.01	54.61	54.60	54.74
2014	294	630	21.56	0.16	44.80	0.00	53.92	53.92	54.80
2014	294	631	21.56	0.16	44.30	0.00	54.18	54.18	54.86
2014	294	632	21.56	0.16	44.42	0.00	55.24	55.24	54.92
2014	294	633	21.56	0.16	43.45	0.00	55.86	55.86	54.98
2014	294	634	21.56	0.15	41.69	0.03	55.04	55.01	55.04
2014	294	635	21.56	0.16	42.92	0.06	55.75	55.69	55.10
2014	294	636	21.56	0.15	43.28	0.04	55.30	55.26	55.16
2014	294	637	21.56	0.15	45.57	0.01	54.69	54.68	55.21
2014	294	638	21.56	0.15	46.07	0.00	54.78	54.78	55.27
2014	294	639	21.56	0.15	47.36	0.01	53.79	53.78	55.32
2014	294	640	21.56	0.16	48.36	0.00	53.79	53.79	55.37
2014	294	641	21.56	0.16	47.67	0.00	55.22	55.22	55.42
2014	294	642	21.56	0.16	46.08	0.00	56.84	56.84	55.48
2014	294	643	21.56	0.16	46.48	0.06	56.30	56.25	55.53
2014	294	644	21.56	0.16	45.20	0.17	56.64	56.47	55.58
2014	294	645	21.56	0.16	46.64	0.06	55.21	55.15	55.63
2014	294	646	21.56	0.16	47.25	0.03	53.86	53.84	55.66
2014	294	647	21.56	0.16	48.57	0.00	52.35	52.35	55.69
2014	294	648	21.56	0.16	47.32	0.00	52.80	52.80	55.73
2014	294	649	21.56	0.16	44.03	0.00	54.25	54.25	55.77
2014	294	650	21.57	0.16	43.46	0.00	54.92	54.92	55.81
2014	294	651	21.57	0.16	44.01	0.00	55.14	55.14	55.86
2014	294	652	21.57	0.15	40.57	0.00	55.19	55.19	55.91
2014	294	653	21.57	0.14	34.90	0.00	51.62	51.62	55.93
2014	294	654	21.57	0.14	31.68	0.00	54.08	54.08	55.97
2014	294	655	21.58	0.14	19.17	0.00	53.44	53.44	56.00
2014	294	656	21.58	0.13	14.55	0.00	54.77	54.77	56.04
2014	294	657	21.58	0.12	13.72	0.00	54.15	54.15	56.07
2014	294	658	21.58	0.12	16.95	0.00	52.68	52.68	56.09
2014	294	659	21.58	0.12	15.73	0.00	53.53	53.53	56.12
2014	294	700	21.58	0.12	14.53	0.00	54.45	54.45	56.15
2014	294	701	21.58	0.11	14.70	0.00	53.48	53.48	56.18
2014	294	702	21.58	0.11	14.62	0.00	53.60	53.60	56.20
2014	294	703	21.58	0.11	15.81	0.00	55.03	55.03	56.23
2014	294	704	21.58	0.11	15.12	0.11	55.36	55.25	56.26
2014	294	705	21.58	0.09	11.79	0.40	56.47	56.06	56.29

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	294	706	21.58	0.09	10.62	0.72	56.81	56.09	56.32
2014	294	707	21.58	0.09	9.82	0.75	56.78	56.04	56.35
2014	294	708	21.58	0.09	11.19	1.07	56.44	55.37	56.38
2014	294	709	21.59	0.08	8.53	1.26	57.16	55.90	56.41
2014	294	710	21.59	0.08	8.92	1.45	58.37	56.92	56.45
2014	294	711	21.59	0.08	8.90	1.48	58.86	57.38	56.48
2014	294	712	21.59	0.08	9.55	1.51	57.29	55.78	56.51
2014	294	713	21.59	0.08	9.00	1.50	57.49	55.99	56.53
2014	294	714	21.59	0.07	8.27	1.50	57.46	55.96	56.56
2014	294	715	21.59	0.07	7.57	1.55	58.38	56.83	56.59
2014	294	716	21.59	0.07	5.09	1.65	57.48	55.83	56.61
2014	294	717	21.59	0.07	1.73	1.54	56.07	54.53	56.63
2014	294	718	21.59	0.07	1.55	1.58	57.56	55.98	56.66
2014	294	719	21.59	0.07	2.15	1.66	56.38	54.72	56.67
2014	294	720	21.59	0.07	2.32	1.66	55.71	54.05	56.69
2014	294	721	21.59	0.07	2.33	1.65	56.77	55.13	56.70
2014	294	722	21.59	0.07	2.49	1.55	56.47	54.91	56.71
2014	294	723	21.59	0.07	2.53	1.48	56.74	55.26	56.72
2014	294	724	21.59	0.06	2.52	1.47	56.25	54.78	56.73
2014	294	725	21.59	0.07	5.51	1.38	55.11	53.73	56.74
2014	294	726	21.59	0.07	5.94	1.65	61.62	59.97	56.76
2014	294	727	21.59	0.07	4.43	1.65	56.63	54.98	56.76
2014	294	728	21.59	0.07	4.26	1.66	53.93	52.26	56.74
2014	294	729	21.59	0.07	3.38	1.45	51.28	49.83	56.71
2014	294	730	21.59	0.07	3.41	1.47	42.88	41.41	56.64
2014	294	731	21.59	0.07	3.17	0.21	39.08	38.87	56.55
2014	294	732	21.59	0.07	3.03	0.00	37.26	37.26	56.45
2014	294	733	21.59	0.07	3.08	0.00	38.24	38.24	56.35
2014	294	734	21.59	0.07	3.04	0.00	38.47	38.47	56.24
2014	294	735	21.59	0.07	3.05	0.03	44.84	44.81	56.16
2014	294	736	21.59	0.07	3.02	0.06	46.21	46.16	56.09
2014	294	737	21.60	0.07	3.05	0.66	45.47	44.81	56.00
2014	294	738	21.60	0.07	3.00	0.29	40.05	39.75	55.89
2014	294	739	21.60	0.07	3.05	0.00	37.14	37.14	55.77
2014	294	740	21.60	0.07	3.01	0.00	34.92	34.92	55.64
2014	294	741	21.60	0.07	3.00	0.00	34.92	34.92	55.51
2014	294	742	21.60	0.07	2.87	0.00	35.95	35.95	55.38
2014	294	743	21.60	0.07	2.94	0.00	38.98	38.98	55.26
2014	294	744	21.60	0.07	2.96	0.00	37.29	37.29	55.13
2014	294	745	21.60	0.07	2.93	0.00	36.26	36.26	55.00
2014	294	746	21.60	0.07	2.97	0.00	36.21	36.21	54.87
2014	294	747	21.60	0.07	2.93	0.00	35.03	35.03	54.73
2014	294	748	21.61	0.07	2.96	0.00	31.96	31.96	54.57
2014	294	749	21.60	0.07	7.80	0.00	31.05	31.05	54.41
2014	294	750	21.60	0.07	10.45	0.00	29.97	29.97	54.25
2014	294	751	21.60	0.07	10.94	0.00	30.01	30.01	54.09
2014	294	752	21.60	0.07	9.82	0.00	31.71	31.71	53.93
2014	294	753	21.59	0.07	8.92	0.00	32.79	32.79	53.78
2014	294	754	21.60	0.07	8.64	0.00	32.86	32.86	53.63
2014	294	755	21.60	0.07	8.05	0.00	32.27	32.27	53.48
2014	294	756	21.60	0.07	7.45	0.00	31.77	31.77	53.33
2014	294	757	21.60	0.07	6.92	0.00	32.06	32.06	53.18
2014	294	758	21.60	0.07	6.67	0.00	30.48	30.48	53.02
2014	294	759	21.60	0.07	6.74	0.00	29.92	29.92	52.86
2014	294	800	21.60	0.07	6.79	0.00	29.03	29.03	52.70
2014	294	801	21.61	0.07	6.20	0.00	27.82	27.82	52.53
2014	294	802	21.61	0.07	5.76	0.00	27.22	27.22	52.35
2014	294	803	21.61	0.07	5.06	0.00	26.83	26.83	52.18

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	294	804	21.61	0.07	4.95	0.00	25.63	25.63	52.00
2014	294	805	21.61	0.07	4.95	0.00	26.82	26.82	51.83
2014	294	806	21.61	0.07	4.95	0.00	28.61	28.61	51.67
2014	294	807	21.61	0.07	4.95	0.00	27.26	27.26	51.50
2014	294	808	21.61	0.07	4.90	0.00	25.68	25.68	51.33
2014	294	809	21.61	0.07	4.90	0.00	27.18	27.18	51.17
2014	294	810	21.61	0.07	4.83	0.00	26.88	26.88	51.01
2014	294	811	21.61	0.07	3.93	0.00	24.71	24.71	50.84
2014	294	812	21.61	0.07	3.18	0.00	24.18	24.18	50.66
2014	294	813	21.61	0.07	3.38	0.00	23.11	23.11	50.48
2014	294	814	21.61	0.07	4.62	0.00	22.79	22.79	50.30
2014	294	815	21.61	0.07	4.58	0.00	23.41	23.41	50.13
2014	294	816	21.61	0.07	4.68	0.00	22.60	22.60	49.95
2014	294	817	21.61	0.07	4.16	0.00	22.83	22.83	49.77
2014	294	818	21.62	0.07	4.30	0.00	22.11	22.11	49.59
2014	294	819	21.61	0.07	4.90	0.00	22.00	22.00	49.41
2014	294	820	21.62	0.07	4.96	0.00	21.84	21.84	49.23
2014	294	821	21.62	0.07	4.99	0.00	21.72	21.72	49.05
2014	294	822	21.62	0.07	4.93	0.00	21.76	21.76	48.87
2014	294	823	21.62	0.07	4.89	0.00	21.88	21.88	48.69
2014	294	824	21.62	0.07	4.85	0.00	21.47	21.47	48.51
2014	294	825	21.62	0.07	4.90	0.00	21.40	21.40	48.33
2014	294	826	21.62	0.07	4.81	0.00	21.39	21.39	48.14
2014	294	827	21.62	0.07	4.88	0.00	21.72	21.72	47.95
2014	294	828	21.62	0.07	4.88	0.00	21.36	21.36	47.77
2014	294	829	21.62	0.07	4.79	0.00	21.93	21.93	47.60
2014	294	830	21.62	0.07	4.31	0.00	23.54	23.54	47.43
2014	294	831	21.62	0.07	4.22	0.00	27.54	27.54	47.27
2014	294	832	21.62	0.07	4.02	0.00	31.17	31.17	47.13
2014	294	833	21.62	0.07	3.77	0.00	36.79	36.79	47.02
2014	294	834	21.63	0.07	3.32	0.00	39.54	39.54	46.91
2014	294	835	21.63	0.07	3.29	0.00	35.39	35.39	46.79
2014	294	836	21.63	0.07	3.28	0.00	37.00	37.00	46.68
2014	294	837	21.63	0.07	3.02	0.00	36.19	36.19	46.56
2014	294	838	21.63	0.07	3.00	0.00	38.35	38.35	46.45
2014	294	839	21.63	0.07	3.80	0.00	39.71	39.71	46.34
2014	294	840	21.63	0.07	4.34	0.00	40.15	40.15	46.24
2014	294	841	21.63	0.07	4.96	0.00	40.81	40.81	46.15
2014	294	842	21.63	0.07	4.18	0.04	41.76	41.71	46.06
2014	294	843	21.63	0.07	2.97	0.04	39.84	39.80	45.96
2014	294	844	21.63	0.07	2.98	0.25	38.51	38.26	45.85
2014	294	845	21.63	0.07	2.97	0.55	38.59	38.04	45.74
2014	294	846	21.63	0.07	2.97	0.68	38.05	37.37	45.63
2014	294	847	21.63	0.07	2.97	0.31	36.62	36.32	45.52
2014	294	848	21.64	0.07	2.99	0.00	37.10	37.10	45.41
2014	294	849	21.64	0.06	2.97	0.00	36.34	36.34	45.30
2014	294	850	21.64	0.07	2.97	0.01	35.88	35.86	45.19
2014	294	851	21.64	0.07	2.99	0.00	36.60	36.60	45.08
2014	294	852	21.64	0.07	2.97	0.00	38.20	38.20	44.98
2014	294	853	21.64	0.07	2.93	0.00	39.00	39.00	44.89
2014	294	854	21.64	0.07	2.96	0.03	39.50	39.47	44.81
2014	294	855	21.64	0.07	2.94	0.04	40.26	40.22	44.75
2014	294	856	21.64	0.06	2.96	0.00	39.86	39.86	44.69
2014	294	857	21.64	0.06	2.96	0.04	40.46	40.41	44.66
2014	294	858	21.64	0.06	2.92	0.10	40.56	40.46	44.63
2014	294	859	21.64	0.07	2.96	0.06	40.10	40.04	44.60
2014	294	900	21.64	0.06	2.89	0.06	41.05	40.99	44.58
2014	294	901	21.64	0.06	2.91	0.01	38.06	38.04	44.54

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 1

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	294	902	21.64	0.06	2.91	0.01	36.67	36.65	44.49
2014	294	903	21.64	0.06	2.96	0.00	34.61	34.61	44.43
2014	294	904	21.64	0.06	3.04	0.00	29.67	29.67	44.35
2014	294	905	21.65	0.06	2.98	0.00	23.12	23.12	44.21
2014	294	906	21.65	0.06	3.05	0.00	21.12	21.12	44.08
2014	294	907	21.65	0.06	3.01	0.00	20.65	20.65	43.95
2014	294	908	21.65	0.06	2.98	0.00	20.06	20.06	43.82
2014	294	909	21.65	0.06	2.97	0.00	19.41	19.41	43.70
2014	294	910	21.65	0.06	2.97	0.00	20.33	20.33	43.58
2014	294	911	21.65	0.06	2.96	0.00	22.12	22.12	43.44
2014	294	912	21.65	0.06	2.97	0.00	20.46	20.46	43.30
2014	294	913	21.65	0.06	2.97	0.00	19.51	19.51	43.16
2014	294	914	21.65	0.06	2.97	0.00	21.51	21.51	43.05
2014	294	915	21.65	0.06	2.98	0.00	19.44	19.44	42.93
2014	294	916	21.66	0.06	2.97	0.00	18.15	18.15	42.82
2014	294	917	21.66	0.06	2.97	0.00	17.95	17.95	42.71
2014	294	918	21.66	0.05	1.10	0.00	17.85	17.85	42.59
2014	294	919	21.66	0.06	0.83	0.00	18.79	18.79	42.47
2014	294	920	21.66	0.05	0.09	0.00	18.89	18.89	42.36
2014	294	921	21.66	0.06	0.00	0.00	18.79	18.79	42.24
2014	294	922	21.66	0.05	0.38	0.00	19.85	19.85	42.11
2014	294	923	21.66	0.05	0.53	0.00	20.09	20.09	42.00
2014	294	924	21.66	0.06	0.45	0.00	21.04	21.04	41.89
2014	294	925	21.66	0.05	0.53	0.00	20.25	20.25	41.79
2014	294	926	21.66	0.05	0.40	0.00	22.90	22.90	41.67
2014	294	927	21.66	0.05	0.00	0.00	23.53	23.53	41.56
2014	294	928	21.66	0.05	0.00	0.00	21.03	21.03	41.45
2014	294	929	21.67	0.05	0.00	0.00	20.55	20.55	41.34
2014	294	930	21.67	0.05	0.00	0.00	19.53	19.53	41.23
2014	294	931	21.67	0.05	0.00	0.00	19.33	19.33	41.11
2014	294	932	21.67	0.05	0.00	0.00	20.99	20.99	41.01
2014	294	933	21.67	0.05	0.00	0.00	20.39	20.39	40.91
2014	294	934	21.67	0.05	0.00	0.00	19.62	19.62	40.80
2014	294	935	21.67	0.05	0.00	0.00	19.95	19.95	40.69
2014	294	936	21.67	0.05	0.00	0.00	20.41	20.41	40.59
2014	294	937	21.67	0.05	0.00	0.00	19.62	19.62	40.48
2014	294	938	21.67	0.04	0.00	0.00	19.21	19.21	40.37
2014	294	939	21.67	0.05	0.00	0.00	18.85	18.85	40.26
2014	294	940	21.67	0.04	0.00	0.00	19.12	19.12	40.15
2014	294	941	21.67	0.04	0.00	0.00	19.04	19.04	40.04
2014	294	942	21.67	0.04	0.00	0.00	19.25	19.25	39.92
2014	294	943	21.67	0.04	0.00	0.00	19.20	19.20	39.82
2014	294	944	21.67	0.04	0.00	0.00	19.23	19.23	39.71
2014	294	945	21.66	0.04	0.00	0.00	19.20	19.20	39.60
2014	294	946	21.66	0.04	0.00	0.00	19.83	19.83	39.49
2014	294	947	21.66	0.04	0.00	0.00	19.59	19.59	39.38
2014	294	948	21.66	0.04	0.00	0.00	19.31	19.31	39.27
2014	294	949	21.66	0.04	0.00	0.00	19.51	19.51	39.16
2014	294	950	21.67	0.04	0.00	0.00	19.82	19.82	39.06
2014	294	951	21.67	0.04	0.00	0.00	19.47	19.47	38.95
2014	294	952	21.67	0.04	0.00	0.00	19.71	19.71	38.85
2014	294	953	21.67	0.04	0.00	0.00	19.12	19.12	38.74
2014	294	954	21.67	0.04	0.00	0.00	18.86	18.86	38.63
2014	294	955	21.67	0.04	0.00	0.00	18.87	18.87	38.52
2014	294	956	21.67	0.04	0.00	0.00	18.87	18.87	38.41
2014	294	957	21.67	0.05	0.00	0.00	18.63	18.63	38.30
2014	294	958	21.67	0.05	0.00	0.00	18.59	18.59	38.19
2014	294	959	21.67	0.05	0.00	0.00	18.77	18.77	38.02

Summary of CORRECTED DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 1**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)	
2014	294	1000	21.67	0.06	0.00	0.00	18.50	18.50	37.85	
2014	294	1001	21.66	0.06	0.00	0.00	18.12	18.12	37.70	
2014	294	1002	21.68	0.06	0.00	0.00	14.80	14.80	37.54	
2014	294	1003	21.68	0.06	0.00	0.00	13.91	13.91	37.38	
2014	294	1004	21.68	0.07	0.00	0.00	13.78	13.78	37.22	
2014	294	1005	21.68	0.07	0.00	0.00	13.53	13.53	37.05	
AVERAGE:			20.85	0.16	49.69	6.81	62.81	56.00	71.26	Maximum

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 2**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	296	900	20.86	0.239	108.3	6.604	13.74
2014	296	901	20.86	0.234	108.7	6.604	14.13
2014	296	902	20.9	0.23	114.5	6.604	12.97
2014	296	903	20.88	0.228	110.3	6.604	13.08
2014	296	904	20.89	0.221	111.2	6.604	12.94
2014	296	905	20.91	0.228	115.4	6.604	12.79
2014	296	906	20.88	0.227	110.7	6.604	12.81
2014	296	907	20.88	0.225	109.6	6.604	13.38
2014	296	908	20.88	0.22	109.4	6.604	12.99
2014	296	909	20.89	0.219	115.5	6.604	13.41
2014	296	910	20.89	0.221	111.9	6.604	13.07
2014	296	911	20.91	0.219	114.6	6.604	11.62
2014	296	912	20.89	0.218	109.7	6.604	11.83
2014	296	913	20.89	0.216	112.9	6.604	12.79
2014	296	914	20.89	0.214	113.7	6.604	11.68
2014	296	915	20.89	0.217	112.3	6.604	12.31
2014	296	916	20.92	0.215	118.5	6.604	12.32
2014	296	917	20.89	0.216	115.2	6.604	13.07
2014	296	918	20.89	0.219	112.6	6.604	12.65
2014	296	919	20.9	0.224	114.1	6.603	12.19
2014	296	920	20.89	0.223	113.6	6.603	11.86
2014	296	921	20.9	0.223	115.1	6.603	11.88
2014	296	922	20.91	0.225	114.8	6.603	12.61
2014	296	923	20.9	0.224	113.8	6.603	11.93
2014	296	924	20.91	0.22	115.5	6.603	10.68
2014	296	925	20.9	0.223	116.2	6.603	10.77
2014	296	926	20.89	0.222	114.4	6.603	11.41
2014	296	927	20.9	0.22	115.6	6.603	11.46
2014	296	928	20.9	0.221	118.1	6.603	10.97
2014	296	929	20.89	0.219	114.8	6.603	10.67
2014	296	930	20.89	0.217	114.5	6.603	11.31
2014	296	931	20.88	0.213	114.3	6.602	11.83
2014	296	932	20.89	0.216	118.9	6.602	11.55
2014	296	933	20.91	0.226	123.3	6.602	10.84
2014	296	934	20.9	0.225	117.4	6.602	10.97
2014	296	935	20.89	0.224	114.7	6.602	11.58
2014	296	936	20.9	0.22	114.8	6.602	11.32
2014	296	937	20.9	0.225	115.4	6.602	11.19
2014	296	938	20.91	0.223	116.6	6.602	10.9
2014	296	939	20.9	0.219	116.1	6.602	10.97
2014	296	940	20.9	0.219	115.2	6.602	11.52
2014	296	941	20.9	0.214	113.3	6.602	11.12
2014	296	942	20.89	0.216	113.5	6.602	11.26

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 2**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	296	943	20.9	0.214	114.1	6.602	11.2
2014	296	944	20.9	0.214	114.4	6.602	11.17
2014	296	945	20.91	0.213	115.6	6.602	10.81
2014	296	946	20.89	0.212	115.1	6.602	10.43
2014	296	947	20.9	0.217	112.5	6.602	10.52
2014	296	948	20.9	0.21	115.9	6.602	10.78
2014	296	949	20.92	0.21	115.4	6.602	11.4
2014	296	950	20.9	0.213	111.9	6.602	10.93
2014	296	951	20.91	0.212	113.9	6.602	11.56
2014	296	952	20.92	0.214	117.9	6.602	11.31
2014	296	953	20.91	0.216	113.3	6.602	10.97
2014	296	954	20.91	0.214	113.1	6.602	10.41
2014	296	955	20.91	0.216	116	6.602	10.97
2014	296	956	20.92	0.213	116.7	6.602	10.42
2014	296	957	20.91	0.216	115.4	6.602	10.96
2014	296	958	20.91	0.211	115.9	6.602	10.99
2014	296	959	20.9	0.213	111	6.602	10.63
2014	296	1000	20.9	0.212	114.3	6.602	10.72
2014	296	1001	20.9	0.211	110.1	6.602	10.72
2014	296	1002	20.9	0.209	111.1	6.602	10.49
2014	296	1003	20.91	0.206	116.4	6.602	10.02
2014	296	1004	20.91	0.215	114.2	6.602	10.32
2014	296	1005	20.9	0.211	112.3	6.602	10.14
2014	296	1006	20.9	0.21	111.1	6.602	11.25
2014	296	1007	20.9	0.209	110.8	6.602	10.87
2014	296	1008	20.92	0.215	115.9	6.602	10.4
2014	296	1009	20.92	0.217	113.3	6.602	9.85
2014	296	1010	20.92	0.214	115	6.602	9.86
2014	296	1011	20.92	0.213	112.9	6.602	9.66
2014	296	1012	20.93	0.211	112.3	6.602	9.21
2014	296	1013	20.91	0.211	110.6	6.602	9.57
2014	296	1014	20.91	0.212	112.3	6.602	10.56
2014	296	1015	20.9	0.212	111.8	6.602	10.2
2014	296	1016	20.9	0.216	110.9	6.602	10.26
2014	296	1017	20.91	0.212	112.1	6.602	10.8
2014	296	1018	20.92	0.21	110.9	6.602	10.35
2014	296	1019	20.92	0.211	112.6	6.602	10.28
2014	296	1020	20.91	0.208	112	6.602	10.24
2014	296	1021	20.91	0.212	112.5	6.602	10.14
2014	296	1022	20.9	0.21	109.8	6.602	10.71
2014	296	1023	20.9	0.213	111.6	6.602	10.21
2014	296	1024	20.92	0.21	112.9	6.602	9.69
2014	296	1025	20.93	0.209	114	6.602	9.7

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 2**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	296	1026	20.93	0.217	120.5	6.602	9.32
2014	296	1027	20.92	0.218	125.4	6.602	9.36
2014	296	1028	20.92	0.218	120.6	6.602	9.78
2014	296	1029	20.93	0.215	112.6	6.602	9.15
2014	296	1030	20.91	0.212	111.4	6.602	9.52
2014	296	1031	20.92	0.211	110.7	6.588	9.36
2014	296	1032	20.91	0.211	112	6.56	9.99
2014	296	1033	20.91	0.214	111.2	6.533	9.62
2014	296	1034	20.92	0.21	111.2	6.602	10.15
2014	296	1035	20.92	0.209	113	6.602	10.18
2014	296	1036	20.93	0.208	115.4	6.574	8.98
2014	296	1037	20.92	0.208	114.5	6.56	9.24
2014	296	1038	20.92	0.211	112.2	6.56	10.11
2014	296	1039	20.93	0.212	111.9	6.574	9.9
2014	296	1040	20.92	0.213	113.5	6.588	10.09
2014	296	1041	20.93	0.215	114.7	6.588	9.45
2014	296	1042	20.94	0.218	114.1	6.588	9.12
2014	296	1043	20.94	0.218	115.1	6.602	9.8
2014	296	1044	20.92	0.214	111.2	6.588	10.07
2014	296	1045	20.93	0.214	114.1	6.602	9.87
2014	296	1046	20.93	0.212	112.9	6.56	9.4
2014	296	1047	20.92	0.214	112.6	6.602	9.74
2014	296	1048	20.92	0.213	113.9	6.574	9.99
2014	296	1049	20.92	0.213	112.6	6.547	9.79
2014	296	1050	20.92	0.214	114.7	6.588	11.26
2014	296	1051	20.93	0.215	113.6	6.588	10.05
2014	296	1052	20.94	0.216	113.3	6.602	9.67
2014	296	1053	20.93	0.209	111	6.588	9.13
2014	296	1054	20.92	0.212	110.9	6.574	10.42
2014	296	1055	20.92	0.21	111.9	6.547	10.59
2014	296	1056	20.92	0.21	111.6	6.588	10.58
2014	296	1057	20.91	0.209	113.9	6.478	9.84
2014	296	1058	20.92	0.207	115.4	6.533	10.53
2014	296	1059	20.92	0.214	113.7	6.588	10.57
2014	296	1100	20.93	0.212	113	6.382	10.51
2014	296	1101	20.92	0.214	111	6.505	10.49
2014	296	1102	20.94	0.217	114.6	6.588	10.36
2014	296	1103	20.93	0.216	112.2	6.395	10.28
2014	296	1104	20.94	0.214	114.9	6.079	10.16
2014	296	1105	20.94	0.217	115.8	6.079	10.3
2014	296	1106	20.94	0.219	115.7	6.107	9.84
2014	296	1107	20.93	0.225	125.2	6.175	10.1
2014	296	1108	20.93	0.232	127.3	6.285	10.79

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 2**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	296	1109	20.94	0.226	123.7	5.969	10.52
2014	296	1110	20.94	0.225	117.7	5.942	10.77
2014	296	1111	20.92	0.221	111.2	6.519	11.21
2014	296	1112	20.94	0.222	115.7	6.368	10.91
2014	296	1113	20.94	0.221	112.2	6.134	11.25
2014	296	1114	20.94	0.217	115.3	6.423	11.38
2014	296	1115	20.93	0.218	110.6	6.588	11.62
2014	296	1116	20.92	0.218	108.9	6.574	11.34
2014	296	1117	20.94	0.218	110.3	6.533	11.3
2014	296	1118	20.92	0.222	108.9	6.533	11.08
2014	296	1119	20.92	0.217	106.8	6.258	11.21
2014	296	1120	20.94	0.219	110.4	6.162	11.04
2014	296	1121	20.94	0.218	112.4	6.065	10.87
2014	296	1122	20.95	0.22	112.5	5.914	10.32
2014	296	1123	20.95	0.215	112.1	5.309	9.52
2014	296	1124	20.94	0.214	108.3	5.584	10.2
2014	296	1125	20.95	0.216	110.5	5.24	10.36
2014	296	1126	20.93	0.215	108.1	5.611	9.81
2014	296	1127	20.93	0.219	110.3	5.859	10.34
2014	296	1128	20.93	0.217	108.8	5.57	10.52
2014	296	1129	20.94	0.217	111.7	5.433	10.26
2014	296	1130	20.94	0.223	112.2	5.419	10.9
2014	296	1131	20.94	0.224	111.5	5.721	10.95
2014	296	1132	20.96	0.227	114.1	5.212	10.65
2014	296	1133	20.95	0.224	115.4	5.13	10.55
2014	296	1134	20.93	0.227	108.4	5.24	10.53
2014	296	1135	20.92	0.224	107.5	5.35	11.13
2014	296	1136	20.92	0.225	107.6	5.171	11.48
2014	296	1137	20.94	0.226	112.8	5.213	10.88
2014	296	1138	20.93	0.223	108.8	5.254	10.8
2014	296	1139	20.93	0.226	110.1	5.35	11.16
2014	296	1140	20.94	0.221	111	5.254	11.4
2014	296	1141	20.94	0.222	113.6	5.254	11.1
2014	296	1142	20.96	0.222	114.9	4.979	10.92
2014	296	1143	20.94	0.222	108.8	5.006	11.05
2014	296	1144	20.95	0.223	110.5	4.951	10.78
2014	296	1145	20.95	0.222	111.6	4.965	10.7
2014	296	1146	20.95	0.227	114.5	4.965	10.53
2014	296	1147	20.93	0.225	111.1	5.006	11.18
2014	296	1148	20.94	0.224	111	4.951	10.42
2014	296	1149	20.93	0.224	111.8	4.951	10.8
2014	296	1150	20.95	0.227	114.5	4.951	10.67
2014	296	1151	20.94	0.232	113.8	4.965	10.9

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 2**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	296	1152	20.95	0.234	113.3	4.951	10.41
2014	296	1153	20.96	0.233	114.7	4.951	10.78
2014	296	1154	20.96	0.24	115.2	4.937	10.38
2014	296	1155	20.96	0.239	112.3	4.951	10.38
2014	296	1156	20.94	0.236	110.8	4.951	10.26
2014	296	1157	20.93	0.236	110.5	4.951	10.79
2014	296	1158	20.95	0.234	116.4	4.964	10.8
2014	296	1159	20.94	0.232	111.9	4.951	9.97
2014	296	1200	20.94	0.235	110.8	4.951	10.82
2014	296	1201	20.94	0.231	111	4.923	10.68
2014	296	1202	20.94	0.233	110.4	4.895	11.06
2014	296	1203	20.94	0.234	110.1	4.758	10.83
2014	296	1204	20.94	0.233	111.2	4.758	10.97
2014	296	1205	20.95	0.233	113.2	4.387	10.64
2014	296	1206	20.95	0.232	113.5	3.74	10.39
2014	296	1207	20.96	0.238	113.2	3.562	10.16
2014	296	1208	20.95	0.233	112.9	3.768	10.24
2014	296	1209	20.95	0.236	113.5	3.672	10.32
2014	296	1210	20.94	0.231	109	3.452	10.62
2014	296	1211	20.93	0.226	108.3	3.369	10.77
2014	296	1212	20.94	0.229	111.4	3.369	10.8
2014	296	1213	20.93	0.228	107.4	3.424	10.86
2014	296	1214	20.93	0.233	108.2	3.397	10.91
2014	296	1215	20.93	0.231	109.9	3.369	10.85
2014	296	1216	20.94	0.227	111.2	3.314	10.68
2014	296	1217	20.94	0.229	109.9	3.356	10.6
2014	296	1218	20.95	0.232	113.6	3.301	10.8
2014	296	1219	20.93	0.232	110.1	3.328	11.14
2014	296	1220	20.94	0.226	111.7	3.383	11.15
2014	296	1221	20.93	0.23	109.3	3.562	11.44
2014	296	1222	20.93	0.227	107.3	3.342	11.03
2014	296	1223	20.93	0.227	108.1	3.397	11.74
2014	296	1224	20.92	0.225	107.2	4.03	12.05
2014	296	1225	20.94	0.225	110.2	4.071	11.49
2014	296	1226	20.92	0.229	108.3	3.988	11.37
2014	296	1227	20.92	0.221	107	4.098	11.98
2014	296	1228	20.92	0.226	109.8	3.975	11.28
2014	296	1229	20.92	0.234	109	4.126	11.3
2014	296	1230	20.92	0.223	107.3	4.47	11.57
2014	296	1231	20.93	0.223	106.6	4.098	11.46
2014	296	1232	20.93	0.218	106.7	4.112	11.37
2014	296	1233	20.93	0.221	106.7	4.484	11.45
2014	296	1234	20.94	0.22	109.6	4.071	11.22

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 2**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	296	1235	20.91	0.221	107.4	4.47	10.95
2014	296	1236	20.91	0.22	112.9	4.869	11.59
2014	296	1237	20.9	0.223	118	4.786	11.89
2014	296	1238	20.91	0.227	112.2	4.855	12.01
2014	296	1239	20.91	0.218	106.8	4.827	11.61
2014	296	1240	20.91	0.22	103.7	4.676	11.61
2014	296	1241	20.92	0.217	106.2	4.841	11.79
2014	296	1242	20.92	0.217	107.3	4.594	11.56
2014	296	1243	20.93	0.219	108	4.525	11.31
2014	296	1244	20.91	0.214	106.2	4.786	11.3
2014	296	1245	20.91	0.216	106.6	4.855	12.01
2014	296	1246	20.93	0.216	110.2	4.786	11.26
2014	296	1247	20.93	0.222	111.9	4.594	11.18
2014	296	1248	20.94	0.224	111.7	4.456	11.23
2014	296	1249	20.93	0.226	107.9	4.429	11.29
2014	296	1250	20.91	0.22	103.2	4.814	11.66
2014	296	1251	20.92	0.218	104.4	4.814	11.72
2014	296	1252	20.92	0.22	105.7	4.841	11.71
2014	296	1253	20.93	0.217	108.3	4.731	11.17
2014	296	1254	20.92	0.217	106.7	4.635	11.56
2014	296	1255	20.92	0.218	105.1	4.841	11.54
2014	296	1256	20.93	0.217	108.4	4.828	11.37
2014	296	1257	20.92	0.219	104.9	4.828	11.5
2014	296	1258	20.92	0.217	105.2	4.828	12.04
2014	296	1259	20.92	0.217	109.1	4.869	11.35
2014	296	1300	20.91	0.218	107.8	4.8	11.19
2014	296	1301	20.91	0.218	107.4	4.841	11.17
2014	296	1302	20.91	0.219	105.5	4.841	12.15
2014	296	1303	20.93	0.217	109.9	4.456	11.67
2014	296	1304	20.93	0.219	110.5	4.442	12.08
2014	296	1305	20.92	0.22	107.7	4.277	12.07
2014	296	1306	20.94	0.217	111.4	4.085	11.97
2014	296	1307	20.93	0.217	108	4.236	11.89
2014	296	1308	20.92	0.213	108.3	4.291	11.78
2014	296	1309	20.91	0.216	105.6	4.099	11.82
2014	296	1310	20.92	0.211	107.9	3.892	11.84
2014	296	1311	20.92	0.215	106.6	3.507	11.59
2014	296	1312	20.9	0.213	106.5	3.356	11.71
2014	296	1313	20.91	0.211	106.1	3.328	11.9
2014	296	1314	20.92	0.21	107.3	3.315	12.05
2014	296	1315	20.92	0.21	106.1	3.356	12.07
2014	296	1316	20.91	0.21	106	3.37	11.99
2014	296	1317	20.91	0.209	105.1	3.315	12.33

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 2**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	296	1318	20.93	0.211	108.6	3.301	12.26
2014	296	1319	20.92	0.21	105.6	3.301	12.24
2014	296	1320	20.9	0.209	105	3.301	12.47
2014	296	1321	20.93	0.208	107.5	3.301	12.02
2014	296	1322	20.92	0.206	105.6	3.301	12.13
2014	296	1323	20.93	0.215	110.3	3.301	12.06
2014	296	1324	20.92	0.214	107.6	3.301	11.91
2014	296	1325	20.92	0.215	108.2	3.301	11.42
2014	296	1326	20.92	0.216	107.6	3.301	12
2014	296	1327	20.91	0.214	106.4	3.301	12.39
2014	296	1328	20.9	0.218	104.7	3.301	12.47
2014	296	1329	20.91	0.212	107.2	3.301	12.39
2014	296	1330	20.89	0.209	101.8	3.315	12.7
2014	296	1331	20.91	0.21	104.1	3.37	12.81
2014	296	1332	20.91	0.212	107.1	3.342	12.17
2014	296	1333	20.91	0.216	105.1	3.301	11.82
2014	296	1334	20.9	0.208	103.8	3.301	11.91
2014	296	1335	20.9	0.205	106.4	3.315	12.07
2014	296	1336	20.92	0.206	109	3.301	11.56
2014	296	1337	20.88	0.212	105.4	3.328	12.01
2014	296	1338	20.9	0.205	108.3	3.356	12.36
2014	296	1339	20.88	0.209	103.3	3.493	12.69
2014	296	1340	20.89	0.211	105.9	3.48	12.67
2014	296	1341	20.88	0.209	105.5	4.057	12.88
2014	296	1342	20.87	0.211	104.6	3.851	12.92
2014	296	1343	20.88	0.212	107	3.782	12.4
2014	296	1344	20.89	0.209	108.1	4.057	12.36
2014	296	1345	20.87	0.213	106.3	4.057	12.2
2014	296	1346	20.87	0.213	107.6	4.14	12.37
2014	296	1347	20.87	0.213	106.6	4.291	12.24
2014	296	1348	20.87	0.214	106.1	4.319	12.59
2014	296	1349	20.86	0.21	104.5	4.662	12.51
2014	296	1350	20.87	0.211	107.6	4.759	12.22
2014	296	1351	20.87	0.21	107.1	4.883	12.37
2014	296	1352	20.88	0.212	109.1	4.924	12.5
2014	296	1353	20.88	0.208	107.6	4.869	12.3
2014	296	1354	20.87	0.211	107.9	4.951	12.37
2014	296	1355	20.86	0.21	107.3	4.952	12.57
2014	296	1356	20.87	0.209	110.8	4.952	12.35
2014	296	1357	20.87	0.211	108.3	4.952	12.35
2014	296	1358	20.86	0.211	108.8	4.952	12.3
2014	296	1359	20.86	0.211	107.9	4.952	12.25
2014	296	1400	20.85	0.212	108.6	4.952	12.7

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 2**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	296	1401	20.87	0.211	120.7	4.952	12.41
2014	296	1402	20.86	0.213	120.4	4.952	12.42
2014	296	1403	20.85	0.21	113	4.952	12.74
2014	296	1404	20.87	0.216	110.4	4.952	12.45
2014	296	1405	20.85	0.211	108	4.98	12.68
2014	296	1406	20.84	0.211	106.2	5.076	13.27
2014	296	1407	20.85	0.213	107.5	5.035	13.22
2014	296	1408	20.85	0.212	109.3	5.007	13.13
2014	296	1409	20.86	0.213	109.3	5.626	12.93
2014	296	1410	20.85	0.211	109.4	5.269	13.34
2014	296	1411	20.85	0.205	109.4	5.544	13.39
2014	296	1412	20.85	0.211	109	5.847	13.71
2014	296	1413	20.84	0.211	108.3	5.929	13.85
2014	296	1414	20.86	0.212	110.5	5.654	13.13
2014	296	1415	20.87	0.211	112.9	5.682	13.33
2014	296	1416	20.87	0.212	112.1	5.888	12.87
2014	296	1417	20.87	0.218	113.8	5.764	12.62
2014	296	1418	20.85	0.213	109.3	5.778	13.36
2014	296	1419	20.85	0.211	110.7	5.764	13.1
2014	296	1420	20.85	0.211	113.1	6.15	13.71
2014	296	1421	20.85	0.211	112.7	6.549	13.98
2014	296	1422	20.83	0.216	108.1	6.549	14.49
2014	296	1423	20.85	0.213	112.2	6.576	14.21
2014	296	1424	20.86	0.215	111.9	6.521	14.24
2014	296	1425	20.83	0.215	109.6	6.535	14.61
2014	296	1426	20.85	0.215	112	6.604	14.02
2014	296	1427	20.84	0.216	111	6.604	14.66
2014	296	1428	20.85	0.215	114.3	6.604	14.57
2014	296	1429	20.85	0.212	112.2	6.604	14.23
2014	296	1430	20.85	0.21	113.1	6.604	14.34
2014	296	1431	20.86	0.209	113.8	6.604	14.6
2014	296	1432	20.85	0.213	114	6.604	14.56
2014	296	1433	20.84	0.21	111.5	6.604	14.92
2014	296	1434	20.85	0.212	114.4	6.604	14.59
2014	296	1435	20.84	0.212	113.9	6.604	14.44
2014	296	1436	20.85	0.21	113.9	6.604	14.79
2014	296	1437	20.85	0.214	113.9	6.604	14.68
2014	296	1438	20.83	0.215	111.3	6.604	15.06
2014	296	1439	20.84	0.214	116.1	6.604	14.82
2014	296	1440	20.83	0.215	112.1	6.604	15.15
2014	296	1441	20.83	0.215	116	6.604	14.77
2014	296	1442	20.84	0.216	115.5	6.604	14.92
2014	296	1443	20.85	0.214	118.3	6.604	14.59

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 2**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	296	1444	20.85	0.215	121.7	6.604	14.71
2014	296	1445	20.83	0.217	118.1	6.604	14.89
2014	296	1446	20.83	0.214	116.2	6.604	15.27
2014	296	1447	20.84	0.214	115.1	6.604	15.12
2014	296	1448	20.84	0.215	114.3	6.604	15.44
2014	296	1449	20.84	0.218	112.9	6.604	15.16
2014	296	1450	20.85	0.22	116.9	6.604	14.9
2014	296	1451	20.86	0.217	117.7	6.604	15.15
2014	296	1452	20.83	0.22	117.5	6.604	15.17
2014	296	1453	20.85	0.22	118.9	6.604	15.22
2014	296	1454	20.83	0.218	112.7	6.604	15.37
2014	296	1455	20.84	0.217	114.1	6.604	15.42
2014	296	1456	20.85	0.214	115.7	6.603	15.37
2014	296	1457	20.84	0.216	116.2	6.603	14.98
2014	296	1458	20.86	0.219	117.6	6.603	14.61
2014	296	1459	20.85	0.219	118.5	6.603	14.91
2014	296	1500	20.84	0.22	112.7	6.603	14.54
2014	296	1501	20.85	0.213	114.9	6.603	14.72
2014	296	1502	20.84	0.214	112.9	6.603	14.71
2014	296	1503	20.87	0.22	121.3	6.603	14.35
2014	296	1504	20.84	0.22	113.8	6.603	14.97
2014	296	1505	20.86	0.216	116.3	6.603	14.48
2014	296	1506	20.85	0.212	115.6	6.603	14.36
2014	296	1507	20.86	0.215	116.7	6.603	14.75
2014	296	1508	20.86	0.214	117.9	6.603	14.55
2014	296	1509	20.85	0.215	114.2	6.603	15
2014	296	1510	20.85	0.214	114.9	6.603	14.54
2014	296	1511	20.85	0.21	118.3	6.603	14.23
2014	296	1512	20.85	0.214	114.9	6.603	14.17
2014	296	1513	20.85	0.209	117.6	6.603	13.86
2014	296	1514	20.85	0.212	118.2	6.603	13.9
2014	296	1515	20.85	0.211	116.3	6.603	14.62
2014	296	1516	20.84	0.209	117.1	6.603	14.34
2014	296	1517	20.84	0.212	117.5	6.603	14.54
2014	296	1518	20.82	0.208	113.6	6.603	15.1
2014	296	1519	20.84	0.21	117.4	6.603	14.53
2014	296	1520	20.85	0.21	120	6.603	14.02
2014	296	1521	20.84	0.21	120	6.603	14.65
2014	296	1522	20.83	0.21	116.5	6.603	14.95
2014	296	1523	20.83	0.204	118.4	6.604	15.48
2014	296	1524	20.84	0.208	117.1	6.604	15.15
2014	296	1525	20.85	0.21	120	6.604	14.93
2014	296	1526	20.84	0.204	114.5	6.604	14.89

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 2**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	296	1527	20.84	0.201	119.6	6.604	15.52
2014	296	1528	20.83	0.197	117.5	6.604	16.13
2014	296	1529	20.83	0.196	114.2	6.604	15.99
2014	296	1530	20.86	0.198	122.9	6.604	15.2
2014	296	1531	20.84	0.201	119.6	6.604	15.69
2014	296	1532	20.84	0.207	132.2	6.604	15.14
2014	296	1533	20.84	0.208	134.2	6.604	15.11
2014	296	1534	20.82	0.203	125	6.604	15.45
2014	296	1535	20.82	0.203	120.3	6.604	15.33
2014	296	1536	20.84	0.199	121.7	6.604	14.87
2014	296	1537	20.83	0.2	120.4	6.604	15.03
2014	296	1538	20.84	0.205	122.8	6.604	14.76
2014	296	1539	20.83	0.205	120.4	6.604	15.17
2014	296	1540	20.82	0.201	117.1	6.604	15.79
2014	296	1541	20.85	0.202	122.3	6.604	19.82
2014	296	1542	20.83	0.204	120	6.604	27
2014	296	1543	20.83	0.202	119.2	6.604	29.55
2014	296	1544	20.84	0.201	123.8	6.604	28.85
2014	296	1545	20.84	0.208	124.6	6.604	28.75
2014	296	1546	20.82	0.205	120.6	6.604	29.83
2014	296	1547	20.82	0.201	120.8	6.604	29.7
2014	296	1548	20.83	0.205	118.9	6.604	28.78
2014	296	1549	20.82	0.203	121.8	6.604	29.57
2014	296	1550	20.81	0.203	122.5	6.604	30.87
2014	296	1551	20.81	0.2	119.2	6.604	30.79
2014	296	1552	20.82	0.206	124.1	6.604	30.3
2014	296	1553	20.82	0.207	123	6.604	30.19
2014	296	1554	20.82	0.206	120.3	6.604	30.68
2014	296	1555	20.82	0.209	123.2	6.604	30.65
2014	296	1556	20.83	0.212	126.1	6.604	29.23
2014	296	1557	20.83	0.215	123.8	6.604	29.19
2014	296	1558	20.84	0.214	126.2	6.604	28.9
2014	296	1559	20.81	0.208	119.6	6.604	29.71
2014	296	1600	20.82	0.211	123.3	6.659	29.41
2014	296	1601	20.81	0.208	119.5	6.673	29.48
2014	296	1602	20.81	0.208	120.6	6.604	29.16
2014	296	1603	20.83	0.208	125.3	6.604	29
2014	296	1604	20.83	0.206	123.6	6.604	29.28
2014	296	1605	20.83	0.209	126.4	6.618	30.15
2014	296	1606	20.82	0.204	121.7	6.81	29.66
2014	296	1607	20.83	0.208	126.1	6.783	29.56
2014	296	1608	20.82	0.208	124.1	6.838	28.34
2014	296	1609	20.82	0.207	122.9	6.824	28.92

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 2**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	296	1610	20.81	0.209	119.8	7.03	29.18
2014	296	1611	20.83	0.209	126.8	6.824	28.46
2014	296	1612	20.82	0.213	125.2	6.631	29.18
2014	296	1613	20.8	0.211	124.1	7.07	28.45
2014	296	1614	20.8	0.21	121	7.42	30.19
2014	296	1615	20.8	0.215	121.5	7.13	29.38
2014	296	1616	20.81	0.211	123.7	7.84	30.19
2014	296	1617	20.79	0.21	118.9	8.02	30.08
2014	296	1618	20.8	0.209	122.7	7.84	29.25
2014	296	1619	20.81	0.214	124.5	7.87	29.71
2014	296	1620	20.81	0.216	121.7	7.53	29.32
2014	296	1621	20.81	0.21	120.9	7.43	29.98
2014	296	1622	20.81	0.21	120.8	7.26	28.94
2014	296	1623	20.82	0.209	121.7	7.88	29.67
2014	296	1624	20.8	0.201	120	7.73	29.39
2014	296	1625	20.82	0.204	123.5	7.39	29.84
2014	296	1626	20.82	0.21	123.7	7.17	30.12
2014	296	1627	20.84	0.211	124.7	7.2	30.03
2014	296	1628	20.82	0.215	120.5	7.28	29.44
2014	296	1629	20.82	0.211	120.2	7.58	29.95
2014	296	1630	20.82	0.211	122	7.54	29.71
2014	296	1631	20.82	0.204	120.2	7.62	28.75
2014	296	1632	20.81	0.205	120	7.94	29.77
2014	296	1633	20.82	0.21	123.1	7.9	29.31
2014	296	1634	20.82	0.206	121.2	7.79	28.88
2014	296	1635	20.82	0.211	124.6	7.97	28.74
2014	296	1636	20.8	0.207	120.6	8.17	29.39
2014	296	1637	20.82	0.209	123.7	8.03	29.39
2014	296	1638	20.83	0.213	124.5	7.83	29.47
2014	296	1639	20.83	0.211	123.7	7.87	29.12
2014	296	1640	20.81	0.21	119.4	8.05	30.03
2014	296	1641	20.81	0.206	120.3	8.23	31.07
2014	296	1642	20.81	0.206	120	8.08	31.09
2014	296	1643	20.83	0.211	124.2	7.87	29.89
2014	296	1644	20.81	0.211	119.7	7.86	28.87
2014	296	1645	20.81	0.21	117.5	8.12	29.59
2014	296	1646	20.81	0.207	116.6	7.91	29.68
2014	296	1647	20.81	0.209	116.7	7.83	29.14
2014	296	1648	20.79	0.21	113.8	8.02	29.75
2014	296	1649	20.81	0.207	116.3	7.97	30.94
2014	296	1650	20.82	0.207	120.9	7.5	30.07
2014	296	1651	20.8	0.208	116.4	7.75	29.86
2014	296	1652	20.81	0.207	117.5	7.65	30.11

Summary of RAW DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 2**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)
2014	296	1653	20.8	0.208	114.8	7.84	31.2
2014	296	1654	20.81	0.202	116.5	7.94	31.05
2014	296	1655	20.8	0.203	115.7	8.16	31.23
2014	296	1656	20.81	0.203	117.1	8.09	31.97
2014	296	1657	20.8	0.201	117.3	8.2	32.26
2014	296	1658	20.8	0.201	117.2	8.19	32.5
2014	296	1659	20.8	0.199	117.6	8.14	31.45
2014	296	1700	20.79	0.203	114.5	8.14	33.14

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 2

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	296	900	20.90	0.22	107.70	4.99	20.20	15.21	
2014	296	901	20.90	0.22	108.10	4.99	20.59	15.60	
2014	296	902	20.94	0.22	113.92	4.99	19.43	14.44	
2014	296	903	20.92	0.21	109.71	4.99	19.54	14.55	
2014	296	904	20.93	0.21	110.61	4.99	19.40	14.41	
2014	296	905	20.95	0.21	114.83	4.99	19.25	14.26	
2014	296	906	20.92	0.21	110.11	4.99	19.27	14.28	
2014	296	907	20.92	0.21	109.01	4.99	19.84	14.85	
2014	296	908	20.92	0.21	108.81	4.99	19.45	14.46	
2014	296	909	20.93	0.20	114.93	4.99	19.87	14.88	
2014	296	910	20.93	0.21	111.31	4.99	19.53	14.54	
2014	296	911	20.95	0.20	114.02	4.99	18.08	13.10	
2014	296	912	20.93	0.20	109.11	4.99	18.29	13.31	
2014	296	913	20.93	0.20	112.32	4.99	19.25	14.26	
2014	296	914	20.93	0.20	113.12	4.99	18.14	13.16	
2014	296	915	20.93	0.20	111.72	4.99	18.77	13.78	
2014	296	916	20.96	0.20	117.94	4.99	18.78	13.79	
2014	296	917	20.93	0.20	114.63	4.99	19.53	14.54	
2014	296	918	20.93	0.20	112.02	4.99	19.11	14.12	
2014	296	919	20.94	0.21	113.52	4.99	18.65	13.67	
2014	296	920	20.93	0.21	113.02	4.99	18.32	13.34	
2014	296	921	20.94	0.21	114.53	4.99	18.34	13.36	
2014	296	922	20.95	0.21	114.23	4.99	19.07	14.08	
2014	296	923	20.94	0.21	113.22	4.99	18.39	13.41	
2014	296	924	20.95	0.21	114.93	4.99	17.15	12.16	
2014	296	925	20.94	0.21	115.63	4.99	17.24	12.25	
2014	296	926	20.93	0.21	113.82	4.99	17.87	12.89	
2014	296	927	20.94	0.21	115.03	4.99	17.92	12.94	
2014	296	928	20.94	0.21	117.54	4.99	17.44	12.45	
2014	296	929	20.93	0.20	114.23	4.99	17.14	12.15	
2014	296	930	20.93	0.20	113.92	4.99	17.77	12.79	
2014	296	931	20.92	0.20	113.72	4.98	18.29	13.31	
2014	296	932	20.93	0.20	118.34	4.98	18.01	13.03	
2014	296	933	20.95	0.21	122.76	4.98	17.31	12.32	
2014	296	934	20.94	0.21	116.84	4.98	17.44	12.45	
2014	296	935	20.93	0.21	114.13	4.98	18.04	13.06	
2014	296	936	20.94	0.21	114.23	4.98	17.78	12.80	
2014	296	937	20.94	0.21	114.83	4.98	17.65	12.67	
2014	296	938	20.95	0.21	116.03	4.98	17.37	12.38	
2014	296	939	20.94	0.20	115.53	4.98	17.44	12.45	
2014	296	940	20.94	0.20	114.63	4.98	17.98	13.00	
2014	296	941	20.94	0.20	112.72	4.98	17.59	12.60	
2014	296	942	20.93	0.20	112.92	4.98	17.72	12.74	
2014	296	943	20.94	0.20	113.52	4.98	17.66	12.68	
2014	296	944	20.94	0.20	113.82	4.98	17.63	12.65	
2014	296	945	20.95	0.20	115.03	4.98	17.28	12.29	
2014	296	946	20.93	0.20	114.53	4.98	16.90	11.91	
2014	296	947	20.94	0.20	111.92	4.98	16.99	12.00	
2014	296	948	20.94	0.20	115.33	4.98	17.25	12.26	
2014	296	949	20.96	0.20	114.83	4.98	17.86	12.88	
2014	296	950	20.94	0.20	111.31	4.98	17.40	12.41	
2014	296	951	20.95	0.20	113.32	4.98	18.02	13.04	
2014	296	952	20.96	0.20	117.34	4.98	17.77	12.79	
2014	296	953	20.95	0.20	112.72	4.98	17.44	12.45	
2014	296	954	20.95	0.20	112.52	4.98	16.88	11.89	
2014	296	955	20.95	0.20	115.43	4.98	17.44	12.45	
2014	296	956	20.96	0.20	116.13	4.98	16.89	11.90	
2014	296	957	20.95	0.20	114.83	4.98	17.43	12.44	
2014	296	958	20.95	0.20	115.33	4.98	17.46	12.47	
2014	296	959	20.94	0.20	110.41	4.98	17.10	12.11	
2014	296	1000	20.94	0.20	113.72	4.98	17.19	12.20	
2014	296	1001	20.94	0.20	109.51	4.98	17.19	12.20	

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 2

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	296	1002	20.94	0.19	110.51	4.98	16.96	11.97	
2014	296	1003	20.95	0.19	115.83	4.98	16.49	11.50	
2014	296	1004	20.95	0.20	113.62	4.98	16.79	11.80	
2014	296	1005	20.94	0.20	111.72	4.98	16.61	11.62	
2014	296	1006	20.94	0.20	110.51	4.98	17.71	12.73	
2014	296	1007	20.94	0.19	110.21	4.98	17.34	12.35	
2014	296	1008	20.96	0.20	115.33	4.98	16.87	11.88	
2014	296	1009	20.96	0.20	112.72	4.98	16.32	11.33	
2014	296	1010	20.96	0.20	114.43	4.98	16.33	11.34	
2014	296	1011	20.96	0.20	112.32	4.98	16.13	11.15	
2014	296	1012	20.97	0.20	111.72	4.98	15.68	10.70	
2014	296	1013	20.95	0.20	110.01	4.98	16.04	11.06	
2014	296	1014	20.95	0.20	111.72	4.98	17.03	12.04	
2014	296	1015	20.94	0.20	111.21	4.98	16.67	11.68	
2014	296	1016	20.94	0.20	110.31	4.98	16.73	11.74	
2014	296	1017	20.95	0.20	111.52	4.98	17.27	12.28	
2014	296	1018	20.96	0.20	110.31	4.98	16.82	11.83	
2014	296	1019	20.96	0.20	112.02	4.98	16.75	11.76	
2014	296	1020	20.95	0.19	111.42	4.98	16.71	11.72	
2014	296	1021	20.95	0.20	111.92	4.98	16.61	11.62	
2014	296	1022	20.94	0.20	109.21	4.98	17.18	12.19	
2014	296	1023	20.94	0.20	111.01	4.98	16.68	11.69	
2014	296	1024	20.96	0.20	112.32	4.98	16.16	11.18	
2014	296	1025	20.97	0.19	113.42	4.98	16.17	11.19	
2014	296	1026	20.97	0.20	119.95	4.98	15.79	10.81	
2014	296	1027	20.96	0.20	124.86	4.98	15.83	10.85	
2014	296	1028	20.96	0.20	120.05	4.98	16.25	11.26	
2014	296	1029	20.97	0.20	112.02	4.98	15.62	10.64	
2014	296	1030	20.95	0.20	110.81	4.98	15.99	11.01	
2014	296	1031	20.96	0.20	110.11	4.97	15.83	10.86	
2014	296	1032	20.95	0.20	111.42	4.94	16.46	11.52	
2014	296	1033	20.95	0.20	110.61	4.92	16.09	11.17	
2014	296	1034	20.96	0.20	110.61	4.98	16.62	11.63	
2014	296	1035	20.96	0.19	112.42	4.98	16.65	11.66	
2014	296	1036	20.97	0.19	114.83	4.96	15.45	10.50	
2014	296	1037	20.96	0.19	113.92	4.94	15.71	10.77	
2014	296	1038	20.96	0.20	111.62	4.94	16.58	11.64	
2014	296	1039	20.97	0.20	111.31	4.96	16.37	11.41	
2014	296	1040	20.96	0.20	112.92	4.97	16.56	11.59	
2014	296	1041	20.97	0.20	114.13	4.97	15.92	10.95	
2014	296	1042	20.98	0.20	113.52	4.97	15.59	10.62	
2014	296	1043	20.98	0.20	114.53	4.98	16.27	11.28	
2014	296	1044	20.96	0.20	110.61	4.97	16.54	11.57	
2014	296	1045	20.97	0.20	113.52	4.98	16.34	11.35	
2014	296	1046	20.97	0.20	112.32	4.94	15.87	10.93	
2014	296	1047	20.96	0.20	112.02	4.98	16.21	11.22	
2014	296	1048	20.96	0.20	113.32	4.96	16.46	11.50	
2014	296	1049	20.96	0.20	112.02	4.93	16.26	11.33	
2014	296	1050	20.96	0.20	114.13	4.97	17.72	12.75	
2014	296	1051	20.97	0.20	113.02	4.97	16.52	11.55	
2014	296	1052	20.98	0.20	112.72	4.98	16.14	11.16	
2014	296	1053	20.97	0.19	110.41	4.97	15.60	10.63	
2014	296	1054	20.96	0.20	110.31	4.96	16.89	11.93	
2014	296	1055	20.96	0.20	111.31	4.93	17.06	12.13	
2014	296	1056	20.96	0.20	111.01	4.97	17.05	12.08	
2014	296	1057	20.95	0.19	113.32	4.86	16.31	11.45	
2014	296	1058	20.96	0.19	114.83	4.92	17.00	12.08	
2014	296	1059	20.96	0.20	113.12	4.97	17.04	12.07	
2014	296	1100	20.97	0.20	112.42	4.76	16.98	12.21	
2014	296	1101	20.96	0.20	110.41	4.89	16.96	12.07	
2014	296	1102	20.98	0.20	114.02	4.97	16.83	11.86	
2014	296	1103	20.97	0.20	111.62	4.78	16.75	11.97	

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 2

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	296	1104	20.98	0.20	114.33	4.46	16.63	12.17	
2014	296	1105	20.98	0.20	115.23	4.46	16.77	12.31	
2014	296	1106	20.98	0.20	115.13	4.49	16.31	11.82	
2014	296	1107	20.97	0.21	124.66	4.55	16.57	12.01	
2014	296	1108	20.97	0.22	126.77	4.67	17.26	12.59	
2014	296	1109	20.98	0.21	123.16	4.35	16.99	12.64	
2014	296	1110	20.98	0.21	117.14	4.32	17.24	12.92	
2014	296	1111	20.96	0.21	110.61	4.90	17.67	12.77	
2014	296	1112	20.98	0.21	115.13	4.75	17.38	12.63	
2014	296	1113	20.98	0.21	111.62	4.51	17.71	13.20	
2014	296	1114	20.98	0.20	114.73	4.80	17.84	13.04	
2014	296	1115	20.97	0.20	110.01	4.97	18.08	13.11	
2014	296	1116	20.96	0.20	108.30	4.96	17.80	12.85	
2014	296	1117	20.98	0.20	109.71	4.92	17.76	12.85	
2014	296	1118	20.96	0.21	108.30	4.92	17.55	12.63	
2014	296	1119	20.96	0.20	106.20	4.64	17.67	13.04	
2014	296	1120	20.98	0.20	109.81	4.54	17.51	12.96	
2014	296	1121	20.98	0.20	111.82	4.44	17.34	12.89	
2014	296	1122	20.99	0.21	111.92	4.29	16.79	12.50	
2014	296	1123	20.99	0.20	111.52	3.68	15.99	12.31	
2014	296	1124	20.98	0.20	107.70	3.96	16.67	12.71	
2014	296	1125	20.99	0.20	109.91	3.61	16.83	13.21	
2014	296	1126	20.97	0.20	107.50	3.99	16.28	12.29	
2014	296	1127	20.97	0.20	109.71	4.24	16.81	12.57	
2014	296	1128	20.97	0.20	108.20	3.95	16.99	13.04	
2014	296	1129	20.98	0.20	111.11	3.81	16.73	12.92	
2014	296	1130	20.98	0.21	111.62	3.79	17.37	13.57	
2014	296	1131	20.98	0.21	110.91	4.10	17.42	13.32	
2014	296	1132	21.00	0.21	113.52	3.59	17.12	13.53	
2014	296	1133	20.99	0.21	114.83	3.50	17.02	13.51	
2014	296	1134	20.97	0.21	107.80	3.61	17.00	13.38	
2014	296	1135	20.96	0.21	106.90	3.72	17.60	13.87	
2014	296	1136	20.96	0.21	107.00	3.54	17.94	14.40	
2014	296	1137	20.98	0.21	112.22	3.59	17.35	13.76	
2014	296	1138	20.97	0.21	108.20	3.63	17.27	13.64	
2014	296	1139	20.97	0.21	109.51	3.72	17.62	13.90	
2014	296	1140	20.98	0.21	110.41	3.63	17.86	14.24	
2014	296	1141	20.98	0.21	113.02	3.63	17.57	13.94	
2014	296	1142	21.00	0.21	114.33	3.35	17.39	14.03	
2014	296	1143	20.98	0.21	108.20	3.38	17.52	14.14	
2014	296	1144	20.99	0.21	109.91	3.32	17.25	13.92	
2014	296	1145	20.99	0.21	111.01	3.34	17.17	13.83	
2014	296	1146	20.99	0.21	113.92	3.34	17.00	13.66	
2014	296	1147	20.97	0.21	110.51	3.38	17.64	14.27	
2014	296	1148	20.98	0.21	110.41	3.32	16.89	13.56	
2014	296	1149	20.97	0.21	111.21	3.32	17.27	13.94	
2014	296	1150	20.99	0.21	113.92	3.32	17.14	13.81	
2014	296	1151	20.98	0.22	113.22	3.34	17.37	14.03	
2014	296	1152	20.99	0.22	112.72	3.32	16.88	13.55	
2014	296	1153	21.00	0.22	114.13	3.32	17.25	13.92	
2014	296	1154	21.00	0.23	114.63	3.31	16.85	13.54	
2014	296	1155	21.00	0.22	111.72	3.32	16.85	13.52	
2014	296	1156	20.98	0.22	110.21	3.32	16.73	13.41	
2014	296	1157	20.97	0.22	109.91	3.32	17.26	13.93	
2014	296	1158	20.99	0.22	115.83	3.34	17.27	13.93	
2014	296	1159	20.98	0.22	111.31	3.32	16.44	13.12	
2014	296	1200	20.98	0.22	110.21	3.32	17.29	13.96	
2014	296	1201	20.98	0.22	110.41	3.29	17.15	13.85	
2014	296	1202	20.98	0.22	109.81	3.27	17.53	14.26	
2014	296	1203	20.98	0.22	109.51	3.13	17.30	14.17	
2014	296	1204	20.98	0.22	110.61	3.13	17.44	14.31	
2014	296	1205	20.99	0.22	112.62	2.75	17.11	14.35	

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 2

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	296	1206	20.99	0.22	112.92	2.10	16.86	14.75	
2014	296	1207	21.00	0.22	112.62	1.92	16.63	14.70	
2014	296	1208	20.99	0.22	112.32	2.13	16.71	14.58	
2014	296	1209	20.99	0.22	112.92	2.04	16.79	14.75	
2014	296	1210	20.98	0.22	108.40	1.81	17.09	15.27	
2014	296	1211	20.97	0.21	107.70	1.73	17.24	15.51	
2014	296	1212	20.98	0.21	110.81	1.73	17.27	15.54	
2014	296	1213	20.97	0.21	106.80	1.79	17.33	15.54	
2014	296	1214	20.97	0.22	107.60	1.76	17.38	15.62	
2014	296	1215	20.97	0.22	109.31	1.73	17.32	15.59	
2014	296	1216	20.98	0.21	110.61	1.67	17.15	15.47	
2014	296	1217	20.98	0.21	109.31	1.72	17.07	15.35	
2014	296	1218	20.99	0.22	113.02	1.66	17.27	15.60	
2014	296	1219	20.97	0.22	109.51	1.69	17.61	15.92	
2014	296	1220	20.98	0.21	111.11	1.74	17.61	15.87	
2014	296	1221	20.97	0.22	108.71	1.92	17.90	15.98	
2014	296	1222	20.97	0.21	106.70	1.70	17.50	15.79	
2014	296	1223	20.97	0.21	107.50	1.76	18.20	16.44	
2014	296	1224	20.96	0.21	106.60	2.40	18.51	16.12	
2014	296	1225	20.98	0.21	109.61	2.44	17.95	15.52	
2014	296	1226	20.96	0.21	107.70	2.35	17.83	15.48	
2014	296	1227	20.96	0.21	106.40	2.46	18.44	15.98	
2014	296	1228	20.96	0.21	109.21	2.34	17.74	15.40	
2014	296	1229	20.96	0.22	108.40	2.49	17.76	15.27	
2014	296	1230	20.96	0.21	106.70	2.84	18.03	15.20	
2014	296	1231	20.97	0.21	106.00	2.46	17.92	15.46	
2014	296	1232	20.97	0.20	106.10	2.48	17.83	15.36	
2014	296	1233	20.97	0.21	106.10	2.85	17.91	15.06	
2014	296	1234	20.98	0.21	109.01	2.44	17.68	15.25	
2014	296	1235	20.95	0.21	106.80	2.84	17.42	14.58	
2014	296	1236	20.95	0.21	112.32	3.24	18.05	14.81	
2014	296	1237	20.94	0.21	117.44	3.16	18.35	15.20	
2014	296	1238	20.95	0.21	111.62	3.23	18.47	15.25	
2014	296	1239	20.95	0.20	106.20	3.20	18.07	14.88	
2014	296	1240	20.95	0.21	103.09	3.05	18.07	15.03	
2014	296	1241	20.96	0.20	105.59	3.21	18.25	15.04	
2014	296	1242	20.96	0.20	106.70	2.96	18.02	15.06	
2014	296	1243	20.97	0.20	107.40	2.89	17.77	14.88	
2014	296	1244	20.95	0.20	105.59	3.16	17.76	14.61	
2014	296	1245	20.95	0.20	106.00	3.23	18.47	15.25	
2014	296	1246	20.97	0.20	109.61	3.16	17.72	14.57	
2014	296	1247	20.97	0.21	111.31	2.96	17.64	14.68	
2014	296	1248	20.98	0.21	111.11	2.82	17.69	14.87	
2014	296	1249	20.97	0.21	107.30	2.80	17.75	14.96	
2014	296	1250	20.95	0.21	102.58	3.18	18.12	14.94	
2014	296	1251	20.96	0.20	103.79	3.18	18.18	15.00	
2014	296	1252	20.96	0.21	105.09	3.21	18.17	14.96	
2014	296	1253	20.97	0.20	107.70	3.10	17.63	14.53	
2014	296	1254	20.96	0.20	106.10	3.00	18.02	15.02	
2014	296	1255	20.96	0.20	104.49	3.21	18.00	14.79	
2014	296	1256	20.97	0.20	107.80	3.20	17.83	14.64	
2014	296	1257	20.96	0.20	104.29	3.20	17.96	14.77	
2014	296	1258	20.96	0.20	104.59	3.20	18.50	15.30	
2014	296	1259	20.96	0.20	108.50	3.24	17.81	14.57	
2014	296	1300	20.95	0.20	107.20	3.17	17.65	14.48	13.25
2014	296	1301	20.95	0.20	106.80	3.21	17.63	14.42	13.24
2014	296	1302	20.95	0.20	104.89	3.21	18.61	15.40	13.24
2014	296	1303	20.97	0.20	109.31	2.82	18.13	15.31	13.25
2014	296	1304	20.97	0.20	109.91	2.81	18.54	15.73	13.25
2014	296	1305	20.96	0.21	107.10	2.64	18.53	15.89	13.26
2014	296	1306	20.98	0.20	110.81	2.45	18.43	15.98	13.26
2014	296	1307	20.97	0.20	107.40	2.60	18.35	15.75	13.27

Summary of CORRECTED DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 2**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	296	1308	20.96	0.20	107.70	2.66	18.24	15.58	13.27
2014	296	1309	20.95	0.20	104.99	2.47	18.28	15.82	13.28
2014	296	1310	20.96	0.20	107.30	2.26	18.30	16.05	13.28
2014	296	1311	20.96	0.20	106.00	1.87	18.05	16.18	13.29
2014	296	1312	20.94	0.20	105.90	1.72	18.17	16.46	13.30
2014	296	1313	20.95	0.20	105.49	1.69	18.36	16.67	13.32
2014	296	1314	20.96	0.20	106.70	1.68	18.51	16.84	13.33
2014	296	1315	20.96	0.20	105.49	1.72	18.53	16.81	13.34
2014	296	1316	20.95	0.20	105.39	1.73	18.45	16.72	13.36
2014	296	1317	20.95	0.19	104.49	1.68	18.79	17.12	13.37
2014	296	1318	20.97	0.20	108.00	1.66	18.72	17.06	13.38
2014	296	1319	20.96	0.20	104.99	1.66	18.70	17.04	13.39
2014	296	1320	20.94	0.19	104.39	1.66	18.93	17.27	13.41
2014	296	1321	20.97	0.19	106.90	1.66	18.48	16.82	13.42
2014	296	1322	20.96	0.19	104.99	1.66	18.59	16.93	13.44
2014	296	1323	20.97	0.20	109.71	1.66	18.52	16.86	13.45
2014	296	1324	20.96	0.20	107.00	1.66	18.37	16.71	13.46
2014	296	1325	20.96	0.20	107.60	1.66	17.88	16.22	13.48
2014	296	1326	20.96	0.20	107.00	1.66	18.46	16.80	13.50
2014	296	1327	20.95	0.20	105.79	1.66	18.85	17.19	13.52
2014	296	1328	20.94	0.20	104.09	1.66	18.93	17.27	13.53
2014	296	1329	20.95	0.20	106.60	1.66	18.85	17.19	13.55
2014	296	1330	20.93	0.19	101.18	1.68	19.16	17.48	13.58
2014	296	1331	20.95	0.20	103.49	1.73	19.27	17.54	13.60
2014	296	1332	20.95	0.20	106.50	1.70	18.63	16.93	13.61
2014	296	1333	20.95	0.20	104.49	1.66	18.28	16.62	13.63
2014	296	1334	20.94	0.19	103.19	1.66	18.37	16.71	13.64
2014	296	1335	20.94	0.19	105.79	1.68	18.53	16.86	13.66
2014	296	1336	20.96	0.19	108.40	1.66	18.02	16.36	13.68
2014	296	1337	20.92	0.20	104.79	1.69	18.47	16.78	13.69
2014	296	1338	20.94	0.19	107.70	1.72	18.82	17.10	13.71
2014	296	1339	20.92	0.19	102.68	1.86	19.15	17.30	13.73
2014	296	1340	20.93	0.20	105.29	1.84	19.13	17.29	13.75
2014	296	1341	20.92	0.19	104.89	2.42	19.34	16.92	13.77
2014	296	1342	20.91	0.20	103.99	2.22	19.38	17.16	13.79
2014	296	1343	20.92	0.20	106.40	2.15	18.86	16.72	13.80
2014	296	1344	20.93	0.19	107.50	2.42	18.82	16.40	13.82
2014	296	1345	20.91	0.20	105.69	2.42	18.66	16.24	13.83
2014	296	1346	20.91	0.20	107.00	2.51	18.83	16.32	13.85
2014	296	1347	20.91	0.20	106.00	2.66	18.70	16.04	13.87
2014	296	1348	20.91	0.20	105.49	2.69	19.05	16.36	13.88
2014	296	1349	20.90	0.20	103.89	3.03	18.97	15.94	13.90
2014	296	1350	20.91	0.20	107.00	3.13	18.68	15.55	13.91
2014	296	1351	20.91	0.20	106.50	3.25	18.83	15.58	13.92
2014	296	1352	20.92	0.20	108.50	3.30	18.96	15.67	13.94
2014	296	1353	20.92	0.19	107.00	3.24	18.76	15.52	13.95
2014	296	1354	20.91	0.20	107.30	3.32	18.83	15.51	13.96
2014	296	1355	20.90	0.20	106.70	3.32	19.03	15.71	13.97
2014	296	1356	20.91	0.19	110.21	3.32	18.81	15.49	13.99
2014	296	1357	20.91	0.20	107.70	3.32	18.81	15.49	14.00
2014	296	1358	20.90	0.20	108.20	3.32	18.76	15.44	14.01
2014	296	1359	20.90	0.20	107.30	3.32	18.71	15.39	14.03
2014	296	1400	20.89	0.20	108.00	3.32	19.16	15.84	14.04
2014	296	1401	20.91	0.20	120.15	3.32	18.87	15.55	14.06
2014	296	1402	20.90	0.20	119.85	3.32	18.88	15.56	14.07
2014	296	1403	20.89	0.20	112.42	3.32	19.20	15.88	14.09
2014	296	1404	20.91	0.20	109.81	3.32	18.91	15.59	14.10
2014	296	1405	20.89	0.20	107.40	3.35	19.14	15.79	14.12
2014	296	1406	20.88	0.20	105.59	3.45	19.73	16.28	14.14
2014	296	1407	20.89	0.20	106.90	3.41	19.68	16.27	14.15
2014	296	1408	20.89	0.20	108.71	3.38	19.59	16.21	14.17
2014	296	1409	20.90	0.20	108.71	4.00	19.39	15.39	14.18

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 2

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	296	1410	20.89	0.20	108.81	3.64	19.80	16.16	14.20
2014	296	1411	20.89	0.19	108.81	3.92	19.85	15.93	14.22
2014	296	1412	20.89	0.20	108.40	4.22	20.17	15.94	14.24
2014	296	1413	20.88	0.20	107.70	4.31	20.31	16.00	14.27
2014	296	1414	20.90	0.20	109.91	4.03	19.59	15.56	14.28
2014	296	1415	20.91	0.20	112.32	4.06	19.79	15.73	14.30
2014	296	1416	20.91	0.20	111.52	4.27	19.33	15.06	14.31
2014	296	1417	20.91	0.20	113.22	4.14	19.08	14.94	14.33
2014	296	1418	20.89	0.20	108.71	4.16	19.82	15.66	14.34
2014	296	1419	20.89	0.20	110.11	4.14	19.56	15.42	14.36
2014	296	1420	20.89	0.20	112.52	4.53	20.17	15.64	14.37
2014	296	1421	20.89	0.20	112.12	4.93	20.44	15.51	14.39
2014	296	1422	20.87	0.20	107.50	4.93	20.94	16.01	14.41
2014	296	1423	20.89	0.20	111.62	4.96	20.67	15.71	14.42
2014	296	1424	20.90	0.20	111.31	4.90	20.70	15.79	14.44
2014	296	1425	20.87	0.20	109.01	4.92	21.06	16.15	14.46
2014	296	1426	20.89	0.20	111.42	4.99	20.48	15.49	14.48
2014	296	1427	20.88	0.20	110.41	4.99	21.11	16.13	14.50
2014	296	1428	20.89	0.20	113.72	4.99	21.02	16.04	14.52
2014	296	1429	20.89	0.20	111.62	4.99	20.69	15.70	14.54
2014	296	1430	20.89	0.20	112.52	4.99	20.80	15.81	14.56
2014	296	1431	20.90	0.19	113.22	4.99	21.05	16.07	14.58
2014	296	1432	20.89	0.20	113.42	4.99	21.01	16.03	14.60
2014	296	1433	20.88	0.20	110.91	4.99	21.37	16.39	14.62
2014	296	1434	20.89	0.20	113.82	4.99	21.04	16.06	14.64
2014	296	1435	20.88	0.20	113.32	4.99	20.89	15.91	14.66
2014	296	1436	20.89	0.20	113.32	4.99	21.24	16.26	14.68
2014	296	1437	20.89	0.20	113.32	4.99	21.13	16.15	14.70
2014	296	1438	20.87	0.20	110.71	4.99	21.51	16.53	14.73
2014	296	1439	20.88	0.20	115.53	4.99	21.27	16.29	14.75
2014	296	1440	20.87	0.20	111.52	4.99	21.60	16.62	14.77
2014	296	1441	20.87	0.20	115.43	4.99	21.22	16.24	14.79
2014	296	1442	20.88	0.20	114.93	4.99	21.37	16.39	14.81
2014	296	1443	20.89	0.20	117.74	4.99	21.04	16.06	14.83
2014	296	1444	20.89	0.20	121.15	4.99	21.16	16.18	14.85
2014	296	1445	20.87	0.20	117.54	4.99	21.34	16.36	14.87
2014	296	1446	20.87	0.20	115.63	4.99	21.72	16.74	14.89
2014	296	1447	20.88	0.20	114.53	4.99	21.57	16.59	14.92
2014	296	1448	20.88	0.20	113.72	4.99	21.89	16.91	14.94
2014	296	1449	20.88	0.20	112.32	4.99	21.61	16.63	14.96
2014	296	1450	20.89	0.21	116.33	4.99	21.35	16.37	14.98
2014	296	1451	20.90	0.20	117.14	4.99	21.60	16.62	15.00
2014	296	1452	20.87	0.21	116.94	4.99	21.62	16.64	15.02
2014	296	1453	20.89	0.21	118.34	4.99	21.67	16.69	15.04
2014	296	1454	20.87	0.20	112.12	4.99	21.82	16.84	15.07
2014	296	1455	20.88	0.20	113.52	4.99	21.87	16.89	15.09
2014	296	1456	20.89	0.20	115.13	4.99	21.82	16.84	15.11
2014	296	1457	20.88	0.20	115.63	4.99	21.43	16.45	15.13
2014	296	1458	20.90	0.20	117.04	4.99	21.06	16.08	15.15
2014	296	1459	20.89	0.20	117.94	4.99	21.36	16.38	15.16
2014	296	1500	20.88	0.21	112.12	4.99	20.99	16.01	15.18
2014	296	1501	20.89	0.20	114.33	4.99	21.17	16.19	15.20
2014	296	1502	20.88	0.20	112.32	4.99	21.16	16.18	15.21
2014	296	1503	20.91	0.21	120.75	4.99	20.81	15.82	15.23
2014	296	1504	20.88	0.21	113.22	4.99	21.42	16.44	15.25
2014	296	1505	20.90	0.20	115.73	4.99	20.93	15.95	15.26
2014	296	1506	20.89	0.20	115.03	4.99	20.82	15.83	15.28
2014	296	1507	20.90	0.20	116.13	4.99	21.20	16.22	15.30
2014	296	1508	20.90	0.20	117.34	4.99	21.00	16.02	15.31
2014	296	1509	20.89	0.20	113.62	4.99	21.45	16.47	15.33
2014	296	1510	20.89	0.20	114.33	4.99	20.99	16.01	15.34
2014	296	1511	20.89	0.20	117.74	4.99	20.69	15.70	15.36

Summary of CORRECTED DATA

Client: Northern Pulp
Project No.: 121511269
Stack: HLRV
Test No.: TRS 2

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)
2014	296	1512	20.89	0.20	114.33	4.99	20.63	15.64	15.37
2014	296	1513	20.89	0.19	117.04	4.99	20.32	15.33	15.38
2014	296	1514	20.89	0.20	117.64	4.99	20.36	15.37	15.39
2014	296	1515	20.89	0.20	115.73	4.99	21.07	16.09	15.40
2014	296	1516	20.88	0.19	116.53	4.99	20.80	15.81	15.41
2014	296	1517	20.88	0.20	116.94	4.99	20.99	16.01	15.43
2014	296	1518	20.86	0.19	113.02	4.99	21.55	16.57	15.44
2014	296	1519	20.88	0.20	116.84	4.99	20.98	16.00	15.45
2014	296	1520	20.89	0.20	119.44	4.99	20.48	15.49	15.46
2014	296	1521	20.88	0.20	119.44	4.99	21.10	16.12	15.48
2014	296	1522	20.87	0.20	115.93	4.99	21.40	16.42	15.49
2014	296	1523	20.87	0.19	117.84	4.99	21.93	16.95	15.51
2014	296	1524	20.88	0.19	116.53	4.99	21.60	16.62	15.53
2014	296	1525	20.89	0.20	119.44	4.99	21.38	16.40	15.54
2014	296	1526	20.88	0.19	113.92	4.99	21.34	16.36	15.56
2014	296	1527	20.88	0.19	119.04	4.99	21.97	16.98	15.58
2014	296	1528	20.87	0.18	116.94	4.99	22.58	17.59	15.60
2014	296	1529	20.87	0.18	113.62	4.99	22.44	17.45	15.62
2014	296	1530	20.90	0.18	122.36	4.99	21.65	16.67	15.63
2014	296	1531	20.88	0.19	119.04	4.99	22.14	17.15	15.65
2014	296	1532	20.88	0.19	131.69	4.99	21.59	16.61	15.66
2014	296	1533	20.88	0.19	133.70	4.99	21.56	16.58	15.67
2014	296	1534	20.86	0.19	124.46	4.99	21.90	16.92	15.69
2014	296	1535	20.86	0.19	119.75	4.99	21.78	16.80	15.70
2014	296	1536	20.88	0.18	121.15	4.99	21.32	16.34	15.71
2014	296	1537	20.87	0.19	119.85	4.99	21.48	16.50	15.72
2014	296	1538	20.88	0.19	122.25	4.99	21.21	16.23	15.73
2014	296	1539	20.87	0.19	119.85	4.99	21.62	16.64	15.74
2014	296	1540	20.86	0.19	116.53	4.99	22.24	17.25	15.76
2014	296	1541	20.89	0.19	121.75	4.99	26.26	21.27	15.79
2014	296	1542	20.87	0.19	119.44	4.99	33.42	28.43	15.85
2014	296	1543	20.87	0.19	118.64	4.99	35.96	30.97	15.92
2014	296	1544	20.88	0.19	123.26	4.99	35.26	30.27	15.98
2014	296	1545	20.88	0.19	124.06	4.99	35.16	30.17	16.05
2014	296	1546	20.86	0.19	120.05	4.99	36.24	31.25	16.12
2014	296	1547	20.86	0.19	120.25	4.99	36.11	31.12	16.19
2014	296	1548	20.87	0.19	118.34	4.99	35.19	30.20	16.26
2014	296	1549	20.86	0.19	121.25	4.99	35.98	30.99	16.33
2014	296	1550	20.85	0.19	121.95	4.99	37.27	32.29	16.41
2014	296	1551	20.85	0.19	118.64	4.99	37.19	32.21	16.49
2014	296	1552	20.86	0.19	123.56	4.99	36.71	31.72	16.56
2014	296	1553	20.86	0.19	122.46	4.99	36.60	31.61	16.63
2014	296	1554	20.86	0.19	119.75	4.99	37.08	32.10	16.71
2014	296	1555	20.86	0.19	122.66	4.99	37.05	32.07	16.79
2014	296	1556	20.87	0.20	125.57	4.99	35.64	30.65	16.86
2014	296	1557	20.87	0.20	123.26	4.99	35.60	30.61	16.93
2014	296	1558	20.88	0.20	125.67	4.99	35.31	30.32	17.00
2014	296	1559	20.85	0.19	119.04	4.99	36.12	31.13	17.07
2014	296	1600	20.86	0.20	122.76	5.04	35.82	30.78	17.14
2014	296	1601	20.85	0.19	118.94	5.06	35.89	30.83	17.21
2014	296	1602	20.85	0.19	120.05	4.99	35.57	30.58	17.28
2014	296	1603	20.87	0.19	124.76	4.99	35.41	30.42	17.35
2014	296	1604	20.87	0.19	123.06	4.99	35.69	30.70	17.42
2014	296	1605	20.87	0.19	125.87	5.00	36.56	31.56	17.49
2014	296	1606	20.86	0.19	121.15	5.19	36.07	30.87	17.56
2014	296	1607	20.87	0.19	125.57	5.17	35.97	30.80	17.62
2014	296	1608	20.86	0.19	123.56	5.22	34.75	29.53	17.68
2014	296	1609	20.86	0.19	122.36	5.21	35.33	30.12	17.75
2014	296	1610	20.85	0.19	119.24	5.42	35.59	30.17	17.81
2014	296	1611	20.87	0.19	126.27	5.21	34.87	29.66	17.87
2014	296	1612	20.86	0.20	124.66	5.01	35.59	30.58	17.94
2014	296	1613	20.84	0.20	123.56	5.46	34.86	29.41	17.99

Summary of CORRECTED DATA

Client: **Northern Pulp**
Project No.: **121511269**
Stack: **HLRV**
Test No.: **TRS 2**

Year	Day (Julian)	Hour	O_2 (%)	CO_2 (%)	CO (ppm)	SO_2 (ppm)	TRS + SO2 (ppm)	TRS (ppm)	4-hour rolling TRS Average (ppm)	
2014	296	1614	20.84	0.20	120.45	5.81	36.60	30.79	18.06	
2014	296	1615	20.84	0.20	120.95	5.52	35.79	30.27	18.12	
2014	296	1616	20.85	0.20	123.16	6.23	36.60	30.37	18.18	
2014	296	1617	20.83	0.20	118.34	6.41	36.49	30.07	18.24	
2014	296	1618	20.84	0.19	122.15	6.23	35.66	29.43	18.30	
2014	296	1619	20.85	0.20	123.96	6.26	36.12	29.86	18.36	
2014	296	1620	20.85	0.20	121.15	5.92	35.73	29.81	18.41	
2014	296	1621	20.85	0.20	120.35	5.82	36.39	30.57	18.48	
2014	296	1622	20.85	0.20	120.25	5.65	35.35	29.70	18.53	
2014	296	1623	20.86	0.19	121.15	6.27	36.08	29.81	18.59	
2014	296	1624	20.84	0.19	119.44	6.12	35.80	29.68	18.65	
2014	296	1625	20.86	0.19	122.96	5.78	36.25	30.47	18.70	
2014	296	1626	20.86	0.20	123.16	5.56	36.53	30.97	18.77	
2014	296	1627	20.88	0.20	124.16	5.59	36.44	30.85	18.83	
2014	296	1628	20.86	0.20	119.95	5.67	35.85	30.18	18.89	
2014	296	1629	20.86	0.20	119.65	5.97	36.36	30.39	18.95	
2014	296	1630	20.86	0.20	121.45	5.93	36.12	30.19	19.02	
2014	296	1631	20.86	0.19	119.65	6.01	35.16	29.15	19.07	
2014	296	1632	20.85	0.19	119.44	6.33	36.18	29.85	19.13	
2014	296	1633	20.86	0.20	122.56	6.29	35.72	29.43	19.19	
2014	296	1634	20.86	0.19	120.65	6.18	35.29	29.11	19.25	
2014	296	1635	20.86	0.20	124.06	6.36	35.15	28.79	19.31	
2014	296	1636	20.84	0.19	120.05	6.56	35.80	29.24	19.37	
2014	296	1637	20.86	0.19	123.16	6.42	35.80	29.38	19.43	
2014	296	1638	20.87	0.20	123.96	6.22	35.88	29.66	19.49	
2014	296	1639	20.87	0.20	123.16	6.26	35.53	29.27	19.55	
2014	296	1640	20.85	0.20	118.84	6.44	36.44	29.99	19.61	
2014	296	1641	20.85	0.19	119.75	6.62	37.47	30.85	19.67	
2014	296	1642	20.85	0.19	119.44	6.47	37.49	31.02	19.74	
2014	296	1643	20.87	0.20	123.66	6.26	36.30	30.04	19.80	
2014	296	1644	20.85	0.20	119.14	6.25	35.28	29.03	19.86	
2014	296	1645	20.85	0.20	116.94	6.51	36.00	29.49	19.92	
2014	296	1646	20.85	0.19	116.03	6.30	36.09	29.79	19.98	
2014	296	1647	20.85	0.19	116.13	6.22	35.55	29.33	20.04	
2014	296	1648	20.83	0.20	113.22	6.41	36.16	29.75	20.11	
2014	296	1649	20.85	0.19	115.73	6.36	37.34	30.98	20.17	
2014	296	1650	20.86	0.19	120.35	5.89	36.48	30.59	20.24	
2014	296	1651	20.84	0.19	115.83	6.14	36.27	30.13	20.30	
2014	296	1652	20.85	0.19	116.94	6.04	36.52	30.48	20.37	
2014	296	1653	20.84	0.19	114.23	6.23	37.60	31.37	20.43	
2014	296	1654	20.85	0.19	115.93	6.33	37.45	31.12	20.50	
2014	296	1655	20.84	0.19	115.13	6.55	37.63	31.08	20.57	
2014	296	1656	20.85	0.19	116.53	6.48	38.37	31.89	20.64	
2014	296	1657	20.84	0.19	116.73	6.59	38.66	32.07	20.71	
2014	296	1658	20.84	0.19	116.63	6.58	38.90	32.32	20.79	
2014	296	1659	20.84	0.18	117.04	6.53	37.85	31.32	20.85	
2014	296	1700	20.83	0.19	113.92	6.53	39.54	33.00	20.93	
AVERAGE:			20.92	0.20	113.17	4.29	21.39	17.09	20.93	Maximum
Average concentrations from Test 1			20.85	0.16	49.69	6.81	62.81	56.00	71.26	Test 1 Maximum
Average concentrations for Flow 1			20.87	0.19	122.01	4.99				
Average concentrations for Flow 2			20.85	0.19	122.10	5.56				
Average concentrations for Flow 3			20.85	0.19	118.75	6.33				

Project: 12511269 Northern Pulp
Test: PM-2
Date: November 21 2014
Analyst: Christina Vasseur

Absolute stack gas pressure (Ps) in in.Hg is:

$$Ps = P_{bar} + \frac{P_{static}\ in.H_2O}{13.6\ in.H_2O/in.Hg}$$

$$Ps = \frac{29.91\ in\ Hg}{} + \frac{1.10\ in\ H_2O}{13.6\ in\ H_2O/in\ Hg}$$

Ps = 29.99 in.Hg

A

The molecular weight of the stack gas on a dry basis (Md) in lb/lb-mole is:

$$Md = 0.44\ (\%CO_2) + 0.32\ (\%O_2) + 0.28\ [\ (\%N_2)]$$

$$Md = 0.44 \times 10.91 + 0.32 \times 6.16 + 0.28\ (82.93 + \ /\ ) + 0.40\ (\ /\ + \ /\ )$$

$$Md = 4.80 + 1.97 + 23.22 + \ /$$

Md = 29.99 lb/lb-mole

B

The volume of water vapour collected at reference conditions (Vwc) in ft^3 is:

Vwc = 0.0480 ft^3/mL × volume of moisture collected mL.

Vwc = 0.0480 × 503.2 mL

Vwc = 24.1536 ft^3

The average _H orifice in in.H_2O is:

$$\text{_H orifice}_{avg.} = \frac{\Sigma \text{ _H orifice}}{\text{\# points}}$$

$$\text{_H orifice}_{avg.} = \frac{23.24 + 19.11}{24 \times 2}$$

$$\text{_H orifice}_{avg.} = 0.88 \text{ in.}H_2O$$

The pressure at the gas meter (Pm) in in.Hg is:

$$Pm = P_{bar} + \frac{\text{_H orifice}_{avg.} \text{ in.}H_2O}{13.6 \text{ in.}H_2O/\text{in.Hg}}$$

$$Pm = 29.91 \text{ in Hg} + \frac{0.88 \text{ in}H_2O}{13.6 \text{ in}H_2O/\text{in Hg}}$$

$$Pm = 29.91 \text{ in Hg} + 0.06 \text{ in Hg}$$

$$Pm = 29.97 \text{ in.Hg}$$

C

The temperature of the gas meter (Tm) in °R is:

$$Tm = \frac{\Sigma \text{ meter temp. °F}}{\text{\# points}} + 460$$

Traverse 1 = 1590 + 1520 = 3110
Traverse 2 = 1578 + 1529 = 3107

$$Tm = \frac{3110 + 3107}{24 \times 4} + 460$$

$$Tm = \frac{6217}{96} + 460$$

$$Tm = 525 \text{ °R}$$

D

The total volume of gas metered (Vm) in ft^3 is:

Vm = Vf ft^3 - Vi ft^3

Vm = 163.68 ft^3 - 102.64 ft^3

Vm = 61.04 ft^3

The dry gas volume at reference conditions (Vmc) in ft^3 is:

$$Vmc = \frac{T_{ref}\ °R}{P_{ref}\ in.Hg} \times \frac{Pm\ in.Hg \times Vm\ ft^3 \times \gamma}{Tm\ °R}$$

$$Vmc = \frac{77+460R}{29.92\ in\ Hg} \times \frac{29.97\ in\ Hg \times 61.04\ ft^3 \times 1.040}{525\ °R}$$

Vmc = 65.08 ft^3 x 1 m^3 / 35.31 ft^3 = 1.84 m^3

E

The stack gas moisture content, i.e. the proportion by volume of water vapour in the gas stream (Bwo) is:

$$Bwo = \frac{Vwc\ ft^3}{Vwc\ ft^3 + Vmc\ ft^3}$$

$$Bwo = \frac{24.1536\ ft^3}{24.1536\ ft^3 + 65.08\ ft^3}$$

$$Bwo = \frac{24.1536\ ft^3}{89.23}$$

Bwo = 0.27

E

The Molecular weight of the stack gas on a wet basis (Ms) in lb/lb-mole is:

Ms = Md lb/lb-mole (1-Bwo) + 18 lb/lb-mole x Bwo

Ms = 29.99 lb/lbmol x (1 - 0.27) + 18 x 0.27

Ms = 29.99 lb/lbmol x 0.729 + 4.87

Ms = 26.75 lb/lb-mole

G

The average temperature of the stack ($Ts_{avg.}$) in °R is:

$Ts_{avg.} = \frac{\Sigma Ts\ °F}{\#\ points} + 460$

$Ts_{avg.} = \frac{3673 + 3696}{24 \times 2} + 460$

$Ts_{avg.} = \frac{7369}{48} + 460$

$Ts_{avg.} = 614$ °R

H

The average velocity ($Us_{avg.}$) of the stack in ft/s is:

Point 2-2, reading 2
Ts = 154 °F
ΔP = 0.55 in H_2O

$Us_{avg.} = \frac{\Sigma V}{\#\ points}$

$U_{S1} = 85.33 C_P \sqrt{\frac{\Delta P_1 \cdot T_{S1}}{P_S \cdot M_S}} = 85.33(0.838) \times \sqrt{\frac{(0.55)(154+460)}{(29.99)(26.75)}}$

$U_{S1} = 46.4$ ft/s

$Us_{avg.} = \frac{2429.20\ ft/s}{24 \times 2}$

$Us_{avg.} = 50.61$ ft/s x 1 m / 3.281 ft = 15.4 m/s

I

The cross-sectional area of the stack (As) in ft^2 is:

As = $\frac{\Pi (D\ ft)^2}{4}$

As = $\frac{\Pi}{4}$ x (138 in / (12 in/ft))^2

As = 0.7854 x 132 ft^2

As = 103.9 ft^2

The volumetric stack gas flowrate on a dry basis at reference conditions (Qs) in ft^3/hr is:

Qs = 3600 s/hr x Us ft/s x As ft^2 x (1-Bwo) x $\frac{T_{ref}\ °R}{Ts_{avg.}\ °R}$ x $\frac{Ps\ in.Hg}{P_{ref}\ in.Hg}$

Qs = 3600 x 50.61 ft/s x 103.9 ft^2 x (1 - 0.27) x $\frac{77+460\ R}{614\ R}$ x $\frac{29.99\ in\ Hg}{29.92\ in\ Hg}$

Qs = 3600 x 50.61 ft/s x 103.9 ft^2 x 0.729 x 0.88 x 1.00

Qs = 121078888 ft^3/hr x 1 hr / 60 min = 201815 ft^3/min

Qs = 201815 ft^3/min x 1 m^3 / 35.31 ft^3 x 1 min / 60 s = 95.3 m^3/s

rounding: 95.2 m^3/s

The total amount of particulate matter collected (Mp) in mg is:

Mp = 1016 mg (excluding impingers)

The concentration of the particulate matter in the stack gas on a dry basis at reference conditions (Cp) in lb/ft^3 is:

$$Cp = 2.205 \times 10^{-6} \text{ lb/mg} \times \frac{Mp \text{ mg}}{Vmc \text{ ft}^3}$$

$$Cp = 2.205 \times 10^{-6} \text{ lb/mg} \times \frac{1016 \text{ mg}}{65.08 \text{ ft}^3}$$

Cp = 3.44×10^{-5} lb/ft^3 x 453,590 mg / lb x 35.31 ft^3 / m^3 = 551 mg/m^3

rounding: 552 mg/m^3

The emission rate of the particulate matter from the stack on a dry basis at reference conditions (ERp) in lb/hr is:

Erp = Cp lb/ft^3 x Qs ft^3/hr

ERp = $\frac{3.44 \times 10^{-5} \text{ lb}}{\text{ft}^3}$ x $\frac{12108888 \text{ ft}^3}{\text{hr}}$

ERp = 417 lb/hr x 1 kg / 2.20 lb = 189 kg/hr