



## Report:

# Mercury Emission Testing at the Clean Harbors Sarnia Facility (February 2016)

Date: March 23, 2016



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## Mercury Emission Testing at the Clean Harbors Sarnia Facility (February 2016)

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Report No.: 21655  
10 pages, 5 Appendices

### Revision History

Version	Date	Summary Changes/Purpose of Revision
1	March 23, 2016	None

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## EXECUTIVE SUMMARY

ORTECH Consulting Inc. (ORTECH) was requested by Clean Harbors Canada Inc., (Clean Harbors) to conduct a mercury emission testing program at the incineration facility located in Corunna, Ontario.

Mercury emission tests were performed at the Incinerator Exhaust Stack following the procedures outlined in US EPA Method 30B, “*Determination of Total Vapour Phase Mercury Emissions from Coal-Fired Combustion Sources Using Carbon Sorbent Traps*” to determine the amount of total vapour phase mercury present in the gas stream.

The test method states that the recovery spike must be within 50 to 150 percent of the expected mass collected in the traps during sampling. Six pairs of tube samples were collected during one day of testing on February 23, 2016. To ensure that at least one of the spike concentrations would fall within the concentration range requirements of the test method one tube from each of the six pairs of adsorbent tubes were spiked with increasing amounts of mercury, ranging from 100 ng to 3600 ng, by the analytical laboratory prior to commencing the test program.

The results of three of the pairs of tubes, including the spike that best represented the mercury concentration in the stack gas at the time of testing, are reported.

The average combustion gas values for each test period were obtained from the plant continuous emission monitoring (CEM) system. The average oxygen concentration for each test was used to determine the dry reference concentration adjusted to 11% oxygen.

The average mercury emission data from the triplicate total vapour phase mercury tests is provided below:

Mercury Parameter	Average
Dry Reference Concentration ( $\mu\text{g}/\text{Rm}^3$ )*	20.4
Dry Adjusted Concentration ( $\mu\text{g}/\text{Rm}^3$ )**	25.3

\* reference conditions are 25°C and 1 atmosphere

\*\* at 25°C and 1 atmosphere, adjusted to 11% oxygen

During the emission testing program, the powdered activated carbon (PAC) injection rate was 22.2 lb/hr.

## 1. INTRODUCTION

ORTECH Consulting Inc. (ORTECH) was requested by Clean Harbors Canada Inc., (Clean Harbors) to conduct a mercury emission testing program at the incineration facility located in Corunna, Ontario.

Mercury emission tests were performed at the Incinerator Exhaust Stack following the procedures outlined in US EPA Method 30B, *“Determination of Total Vapour Phase Mercury Emissions from Coal-Fired Combustion Sources Using Carbon Sorbent Traps”* to determine the amount of total vapour phase mercury present in the gas stream.

The average combustion gas values for each test period were obtained from the plant continuous emission monitoring (CEM) system. The average oxygen concentration for each test was used to determine the dry reference concentration adjusted to 11% oxygen.

Six pairs of adsorbent tubes were collected during one day of sampling on February 23, 2016. The spike tubes from each test pair were spiked with increasing amounts of mercury, ranging from 100 ng to 3600 ng, prior to commencing the test program to ensure that at least one of the spike concentrations would fall within the concentration range requirements of the test method. The test method states that the recovery spike must be within 50 to 150 percent of the expected mass collected in the traps during sampling. The results of three of the pairs of tubes, including the spike that best represented the mercury concentration in the stack gas at the time of testing, are reported.

All tables referenced herein are included in Appendix 1.

## 2. SAMPLING LOCATION

The Incinerator Exhaust Stack has an inside diameter of 1.52 meters at the sampling platform and 1.22 meters at the stack exit. The stack height above grade is 68.6 meters.

Mercury sampling was conducted at the breeching connecting the induced draft fan to the stack. Sampling was conducted at a single point in the center of the duct.

Previous testing programs conducted by ORTECH at the Clean Harbors Incinerator Exhaust Stack have shown that there is no stack gas stratification between the breeching connecting the induced draft fan to the stack and the stack sampling platform location.

### 3. SAMPLING METHODOLOGY

Mercury emission tests were performed following the procedures outlined in US EPA Method 30B, “Determination of Total Vapour Phase Mercury Emissions from Coal-Fired Combustion Sources Using Carbon Sorbent Traps”.

ORTECH used two probes in parallel so that the mercury traps were only 1 to 2 inches apart. Each probe was heated to approximately 135°C to prevent condensation of the stack gas on the sampling media. Each mercury trap was also specially designed for sampling at wet sources. Each tube had an extended section of glass to allow for the heating of the stack gas before it came into contact with the sampling media.

The sampling methodology is briefly described as follows. Each sorbent trap was removed from the clean sorbent trap storage container, the end caps were removed from the traps and the traps were attached to the end of the sampling probe and leak checked. The probe was inserted into the stack and the sample pumps were started. The stack gas was drawn through the traps and into the sampling probe. The sampled gas stream then passed through a series of empty impingers followed by a silica gel trap to remove any remaining traces of moisture prior to the pump and dry gas meter.

A run consisted of paired mercury traps, identified as either A or B, sampled simultaneously. In each tube pair one of either the A or B tube was spiked with a known quantity of mercury. Due to the variability in the mercury concentration in the stack gas and the necessity to have the spiked tubes prepared at least two weeks in advance of the testing program, six pairs of tubes were used for the sampling program to ensure that at least one of the spike concentrations would fall within the concentration range requirements of the test method.

Each test run was sixty minutes in duration at an approximate sampling rate of one liter per minute.

At approximately five minute time increments throughout each test, the following information was measured and recorded for each sampling train:

- Elapsed sampling time
- Dry gas meter volume
- Dry gas meter temperatures
- Control module orifice pressure
- Sampling pump vacuum

At the start and finish of each sampling run the sampling trains were leak-checked. The leakage rate for each train must not exceed 4% of the average sampling rate for the collection period. If a trap pair did not have an acceptable initial leak check, the leak was found and repaired and/or the traps were replaced with a new pair until no leak was discernible. All the leak checks performed for the traps used showed no discernible leak through the test train.

Field testing data sheets for the mercury tests are provided in Appendix 2.

All of the sampling equipment used during the emission testing program was calibrated following the applicable reference method. Equipment calibration data is provided in Appendix 3.

#### **4. ANALYSIS METHODOLOGY**

At the end of each successful sampling run, the mercury traps were removed from the test train, capped and placed in their appropriate sample container. Each trap was labeled prior to being shipped to Ohio Lumex for analysis.

The traps were analyzed by thermal decomposition with atomic absorption following the procedures detailed in US EPA Method 7473 (direct thermal desorption with atomic absorption and no gold amalgamation). The method is applicable for total mercury “direct” testing of 40 CFR Part 75 Appendix K and EPA Method 30B sorbent traps.

The analysis is briefly described as follows. The sorbent trap tube end cap is removed; the glass wool plug closest to the appropriate carbon bed is carefully removed and separated from the carbon fraction. The sorbent is transferred into a quartz ladle and then covered with anhydrous sodium carbonate. The ladle is inserted into the heated analyzer thermo catalytic conversion chamber. Mercury is converted from a bound state to the atomic state by thermal decomposition in the furnace and is then detected by atomic absorption. The mercury concentration is measured and recorded using an automated data acquisition system. Both the glass wool plug and the sorbent of each bed are analyzed for the trap and the final mercury mass is the sum of the measurements.

The Ohio Lumex analytical report for total vapour phase mercury is provided in Appendix 4.

## 5. QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

The analysis of samples for mercury was performed by thermal decomposition with atomic absorption. Specific analytical QC procedures for the mercury analysis are summarized below:

- Calibrations are performed on the day of the analysis.
- Three or more calibration points are used for the calibration curve.
- The field samples analyzed must fall within a calibrated range.
- For each calibration curve,  $R^2 \geq 0.99$ , and the analyzer response must be within  $\pm 10\%$  for each standard used in the calibration.
- Following calibration, a second source standard is analyzed. The measured value of the independently prepared standard must be within  $\pm 10\%$  of the expected value.
- A blank analysis is conducted prior to analyzing the samples and must be less than the method detection limit.
- At the end of each set of analysis, a calibration standard is tested which must be within  $\pm 10\%$  of the expected value.

Approximately two weeks before the field testing, sample media was ordered from Ohio Lumex. Six unspiked mercury traps and six pre-spiked mercury traps were ordered. The pre-spiked mercury traps were spiked with known quantities of mercury ranging from 100 ng to 3600 ng in order to ensure that at least one of the traps fell within the spiking criterion stated in the test method. The recovery spike must be within 50 to 150 percent of the expected mass collected in the traps during sampling according to the test method. The spiking levels for the field recovery traps was estimated using mercury emission data from previous testing programs conducted between 2014 and 2015. The pre-spiked mercury traps for Test No. 4 (800 ng) and Test No. 5 (1400 ng) were used for spike recovery determination as the concentrations best fit the requirements of the QA/QC criteria (within  $\pm 50\%$  of the expected concentration). The concentration in the Test No. 4 spiked tube (800 ng) was 65% of the average mercury collected for Test No. 3 to Test No. 5 (1240 ng), and the concentration in the Test No. 5 spiked tube (1400 ng) was 113% of the average mercury collected for Test No. 3 to Test No. 5.

The field spike recovery provides specific verification of the performance of the combined sampling and analytical approach for the test program. Six sets of paired samples, one of each pair which is spiked with a known quantity of mercury, were collected. The samples were analyzed and the spike concentrations for Test No. 4 and Test No. 5 fell within the spike range criterion stated in the test method. The spike recovery for Test No. 4 and Test No. 5 were 115% and 113%, respectively. US EPA Method 30B requires the average of the spike recoveries to be between 85 % and 115%.



US EPA Method 30B requires the paired sorbent trap agreement to be  $\leq 10\%$  relative deviation for mercury concentrations greater than  $1 \mu\text{g}/\text{Rm}^3$  or  $\leq 20\%$  relative deviation for mercury concentrations less than  $1 \mu\text{g}/\text{Rm}^3$ . If the paired trap agreement is greater than the above stated limits the run is not valid. All of the traps collected during the test program had concentrations greater than  $1 \mu\text{g}/\text{Rm}^3$ . The paired trap agreement was 5.9% for Test No. 3, 5.1% for Test No. 4, and 7.0% for Test No. 5. The dry adjusted mercury concentration ranged from  $23.5 \mu\text{g}/\text{Rm}^3$  for Test No. 3 to  $28.3 \mu\text{g}/\text{Rm}^3$  for Test No. 5.

## 6. RESULTS

Six mercury runs were collected during one day of sampling on February 23, 2016. A run consisted of paired mercury traps, identified as either A or B, sampled simultaneously. The spike tubes from each test pair were spiked with increasing amounts of mercury, ranging from 100 ng to 3600 ng, prior to commencing the test program to ensure that at least one of the spike concentrations would fall within the concentration range requirements of the test method. The results for Test No. 3 to Test No. 5 are reported.

The sampling schedule is summarized in Table 1. This information includes test dates and times for each of the mercury runs performed. All test times match plant time (i.e. daylight savings time).

Mercury emission sample analyses for Test No. 3 to Test No. 5 are provided in Table 3. Mercury was detected in Section 1 of each trap in quantities greater than the method detection limit (1.17 ng) in all of the traps. Mercury was also collected in Section 2 in five of the six traps in quantities greater than the method detection limit. However, the amount detected in Section 2 was less than 1% of the mercury collected in Section 1, indicating that there was no breakthrough or potential loss of mercury. US EPA Method 30B states that  $\leq 10\%$  of the total mercury collected should be collected in Section 2 for mercury concentrations greater than  $1 \mu\text{g}/\text{Rm}^3$  or  $\leq 20\%$  of the total mercury collected should be collected in Section 2 for mercury concentrations less than  $1 \mu\text{g}/\text{Rm}^3$ .

Included in Table 2 are the mercury concentration calculations for Test No. 3 to Test No. 5. The average oxygen concentration measured by the Clean Harbors CEM system for each test was used to determine the dry reference concentration adjusted to 11% oxygen.

Approximately two weeks before the field testing, sample media was ordered from Ohio Lumex. Six unspiked mercury traps and six pre-spiked mercury traps were ordered. The pre-spiked mercury traps were spiked with known quantities of mercury ranging from 100 ng to 3600 ng in order to ensure that at least one of the traps fell within the spiking criterion stated in the test method. The pre-spiked mercury traps for Test No. 4 (800 ng) and Test No. 5 (1400 ng) were used for spike recovery determination as the concentrations best fit the requirements of the QA/QC criteria (within  $\pm 50\%$  of the expected concentration).

US EPA Method 30B states that it is acceptable to use the field recovery runs as test runs for emission testing as long as they meet the paired trap agreement criteria. The mass of the mercury spike initially present in each of the spiked traps was subtracted from the total mercury collected in Section 1 of the trap. The difference represents the amount of mercury in the stack gas.

The paired trap agreement was 5.9% for Test No. 3, 5.1% for Test No. 4, and 7.0% for Test No. 5. The dry adjusted mercury concentration ranged from 23.5  $\mu\text{g}/\text{Rm}^3$  for Test No. 3 to 28.3  $\mu\text{g}/\text{Rm}^3$  for Test No. 5. The mercury emission data from the total vapour phase mercury tests is provided below:

Mercury Parameter	Test 3	Test 4	Test 5	Average
Dry Reference Conc. ( $\mu\text{g}/\text{Rm}^3$ )*	18.8	19.5	23.0	20.4
Dry Adjusted Conc. ( $\mu\text{g}/\text{Rm}^3$ **	23.5	24.2	28.3	25.3

\* Reference conditions are 25°C and 1 atmosphere.

\*\* At 25°C and 1 atmosphere, adjusted to 11% oxygen

The incinerator exhaust stack mercury concentration limit as stated in Environmental Compliance Approval No. 8-1030-94-006 (formerly Certificate of Approval (Air) No. 8-1030-94-006) is 50  $\mu\text{g}/\text{Rm}^3$  adjusted to 11% oxygen. The mercury concentrations were below this limit during the test program.

The spiked mercury trap recovery calculations for Test No. 4 and Test No. 5 are shown in Table 3. The spike recovery for Test No. 4 and Test No. 5 were 115% and 113%, respectively. US EPA Method 30B requires the average of the spike recoveries to be between 85 % and 115%.

## 7. FACILITY PROCESS DATA

Incinerator process data was supplied by Clean Harbors personnel for the emission test periods. The process data is provided in Appendix 5 as average values for each test for the following process parameters:

- incinerator feed rates (rich, lean, emulsion and alkaline streams)
- volumetric flowrates (secondary air and stack gases)
- temperatures (primary zone, secondary zone, spray dryer inlet and outlet, stack gases)
- pressures (burner, spray dryer outlet, baghouse differential)
- combustion gas stack concentrations (CO, HCl, CO<sub>2</sub>, H<sub>2</sub>O, THC, O<sub>2</sub>, SO<sub>2</sub>)
- stack gas opacity
- carbon injection rate

During the emission testing program, the powdered activated carbon (PAC) injection rate was 22.2 lb/hr.

**APPENDIX 1**

**Data Tables  
(2 pages)**

**Table 1: Mercury Test Schedule**

Test Number	Test Date	Sampling Period		Sampling Time
		Start	Finish	min
1	February 23, 2016	9:50	10:50	60
2	February 23, 2016	11:53	12:53	60
3	February 23, 2016	13:12	14:12	60
4	February 23, 2016	14:28	15:28	60
5	February 23, 2016	15:46	16:46	60
6	February 23, 2016	17:02	18:02	60

Note: All test times match plant time (i.e. daylight savings time).

**Table 2: Mercury Emission Data**

Test/Run No.	Tube ID	Mercury Collected			Dry Gas Volume Sampled Rm <sup>3*</sup>	Mercury Concentration		Paired Trap Agreement %
		Section 1 ng	Section 2 ng	Total ng		Dry Reference µg/Rm <sup>3*</sup>	Dry Adjusted µg/Rm <sup>3**</sup>	
3	A***	1093.0	<1.17	1093	0.0617	17.7	22.2	-
	B	1285.0	1.6	1287	0.0646	19.9	24.9	-
	Average					18.8	23.5	5.9
4	A	1072.0	2.6	1075	0.0580	18.5	22.9	-
	B ***	1250.0	0.7	1251	0.0610	20.5	25.4	-
	Average					19.5	24.2	5.1
5	A***	1384.0	6.1	1390	0.0565	24.6	30.3	-
	B	1342.0	1.2	1343	0.0628	21.4	26.3	-
	Average					23.0	28.3	7.0
Average				1240		20.4	25.3	

Note: Concentration data is only report for three tests as required by US EPA Method 30B

\* At 25°C and 1 atmosphere

\*\* At 25°C and 1 atmosphere, adjusted to 11% oxygen

\*\*\* Spiked tube, mercury collected corrected for the original spike (500 ng for Test No. 3, 800 ng for Test No. 4, 1400 ng for Test No. 5).

**Table 3: Mercury Spike Tube Recovery**

Test No.	Spike Tube			Unspike Tube			Spike Concentration ng/Rm <sup>3*</sup>	Spike Recovery %
	Total Collected ng	Volume Sampled Rm <sup>3*</sup>	Mercury Concentration ng/Rm <sup>3*</sup>	Total Collected ng	Volume Sampled Rm <sup>3*</sup>	Mercury Concentration ng/Rm <sup>3*</sup>		
3	1593.0	0.0617	25804	1286.6	0.0646	19908	5896	NA
4	2050.7	0.0610	33598	1074.6	0.0580	18519	15079	115
5	2790.1	0.0565	49401	1343.2	0.0628	21373	28028	113
Average								114

Note: The spike tubes were spiked with mercury by the analytical laboratory prior to sampling. The original spike concentrations were 500 ng for Test No. 3, 800 ng for Test No. 4 and 1400 ng for Test No. 5.

"NA" Not Applicable. Spike recovery was not calculated as spike concentration was outside the range specified in US EPA Method 30B.

## **APPENDIX 2**

### **Mercury Field Data Sheets (7 pages)**

**Clean Harbors, Sarnia**  
**Mercury Tube Sampling Train**  
**Sample Volume Corrections**

**Incinerator Exhaust Stack**

Test # - Tube (tube pair field ID)	DGMCF	Initial DGM Reading (L)	Final DGM Reading (L)	Actual Vol. Sampled (L)	Barometric Pressure (in Hg)	Average DGM Pressure del H (in H <sub>2</sub> O)	Average DGM Temperature (°C)	Corrected Volume (L)*	Corrected Volume (Rm <sup>3</sup> )*
T1A (307462) Spiked	1.019	14.88	78.12	63.24	29.6	1.2	14.3	66.26	0.0663
T1B (299883)	1.030	8.55	68.26	59.71	29.6	2.5	16.2	63.02	0.0630
T2A (299885)	1.019	83.20	150.10	66.90	29.5	1.2	21.0	68.42	0.0684
T2B (307498) Spiked	1.030	72.65	133.60	60.95	29.5	2.5	19.1	63.63	0.0636
T3A (291929) Spiked	1.019	52.08	113.80	61.72	29.5	0.9	27.0	61.73	0.0617
T3B (299779)	1.030	40.98	103.61	62.63	29.5	2.5	22.1	64.63	0.0646
T4A (299860)	1.019	35.51	94.60	59.09	29.5	0.8	32.4	58.03	0.0580
T4B (307449) Spiked	1.030	17.90	77.85	59.95	29.5	2.5	26.0	61.04	0.0610
T5A (309700) Spiked	1.019	96.30	153.10	56.80	29.5	0.8	28.5	56.48	0.0565
T5B (299950)	1.030	79.70	140.50	60.80	29.5	2.5	21.4	62.85	0.0628
T6A (299784)	1.019	56.39	116.25	59.86	29.5	0.8	25.0	60.18	0.0602
T6B (309715) Spiked	1.030	41.80	99.40	57.60	29.5	2.5	16.8	60.44	0.0604

\* dry at 25°C and 1 atmosphere

**ORTECH Environmental  
Mercury Tube Data Sheet**

Plant: CLEAN HARBORS SAINT  
 Plant Location: CORUNNA, OH  
 Test No.: 1

Test location: STARK BREECHING  
 Date: FEB 23/16  
 Project No.: 21655

**Train A**

Tube Identification: 307462 Spiked  Yes  No  
 Spike Concentration 100 ng

Measuring Device: MII  
 Control Module 4 A11542  
 Barometer 2 ENVICAN

Barometric Pressure 29.57

Clock Time	Dry Gas Meter L	Meter Temperature		Meter Pressure Δ H "H <sub>2</sub> O	Pump Vacuum "Hg Gauge
		Outlet AVG °C	Inlet °C		
0	14.88	3		1.2	4
5	19.46	8		1.2	10
10	23.3	12		1.2	12
15	28.5	13		1.2	12
20	34.4	14		1.2	11
25	39.9	14		1.2	12
30	45.0	15		1.2	12
35	50.2	16		1.2	12.5
40	55.8	16		1.2	12.5
45	61.5	18		1.2	12.5
50	66.4	19		1.2	12.5
55	77.5	18		1.2	12.5
60	78.12	18		1.2	12.5

Start Time: 9:50 Initial Leak Check <.01 Lpm@ 22"Hg DGMCF: 1.019  
 Finish Time: 10:50 Final Leak Check <.01 Lpm@ 18"Hg Sample Volume: 63.24  
 Average DGM Temp: 14.3  
 Average DGM Δ H: 1.2

**Train B**

Tube Identification: 299883 Spiked  Yes  No  
 Spike Concentration - ng

Measuring Device: MII  
 Control Module 2 1017

Clock Time	Dry Gas Meter L	Meter Temperature		Meter Pressure Δ H "H <sub>2</sub> O	Pump Vacuum "Hg Gauge
		Outlet AVG °C	Inlet °C		
0	8.55	8		2.5	5
5	13.0	13		2.5	8
10	18.0	15		2.5	9.5
15	22.7	16		2.5	10
20	27.7	17		2.5	11
25	32.6	17		2.5	11
30	37.5	17		2.5	11
35	42.5	17		2.5	11
40	47.6	17		2.5	11
45	53.0	18		2.5	11
50	58.0	19		2.5	11
55	63.1	19		2.5	11
60	68.26	18		2.5	11

Start Time: 9:50 Initial Leak Check <.01 Lpm@ 20"Hg DGMCF: 1.030  
 Finish Time: 10:50 Final Leak Check <.01 Lpm@ 17"Hg Sample Volume: 59.71  
 Average DGM Temp: 16.2  
 Average DGM Δ H: 2.5

Operator: A. J. U. J.



# ORTECH Environmental Mercury Tube Data Sheet

Plant: CLEAN HARBORS  
 Plant Location: COLUMBIA, ON  
 Test No.: 2

Test location: STACK BREATHING  
 Date: FEB 23 116  
 Project No.:

**Train A**

Tube Identification: 299885 Spiked Yes  No  
 Spike Concentration \_\_\_\_\_ ng

Measuring Device: MII  
 Control Module 4  
 Barometer: ENVCAN

Barometric Pressure: 29.54

Clock Time	Dry Gas Meter L	Meter Temperature		Meter Pressure Δ H "H <sub>2</sub> O	Pump Vacuum "Hg Gauge
		Outlet AUG °C	Inlet °C		
0	83.20	17		1.2	6
5	88.2	17		1.2	7
10	93.9	17		1.2	10
15	98.7	18		1.2	12
20	104.6	19		1.2	12
25	108.3	20		1.2	12
30	116.4	21		1.2	12
35	119.2	22		1.2	12
40	125.2	23		1.2	12
45	133.2	24		1.2	12
50	139.2	25		1.2	12
55	145.8	25		1.2	12
60	150.1	25		1.2	12

Start Time: 1109 1153 Initial Leak Check 2.01 Lpm@ 13"Hg DGMCF: 1.019  
 Finish Time: 1209 1253 Final Leak Check \_\_\_\_\_ Lpm@ \_\_\_\_\_ "Hg Sample Volume: 46.9  
 TEST PAUSED @ 1115 BACK ON @ 1159 AVE DUE TO RUMP(CH) Average DGM Temp: 21.0  
 Average DGM Δ H: 1.2

**Train B**

Tube Identification: 307498 Spiked  Yes  No  
 Spike Concentration 250 ng

Measuring Device: MII  
 Control Module 2 1017

Clock Time	Dry Gas Meter L	Meter Temperature		Meter Pressure Δ H "H <sub>2</sub> O	Pump Vacuum "Hg Gauge
		Outlet AUG °C	Inlet °C		
0	72.65	16		2.5	6
5	77.6	16		2.5	8
10	82.5	16		2.5	12
15	87.6	17		2.5	12
20	92.5	17		2.5	12
25	97.6	18		2.5	12
30	102.5	19		2.5	12
35	107.6	20		2.5	12
40	112.5	21		2.5	12
45	118.5	22		2.5	12
50	123.6	22		2.5	12
55	128.6	22		2.5	12
60	133.6	22		2.5	12

Start Time: 1109 1153 Initial Leak Check 2.01 Lpm@ 12"Hg DGMCF: 1.030  
 Finish Time: 1209 1253 Final Leak Check \_\_\_\_\_ Lpm@ \_\_\_\_\_ "Hg Sample Volume: 60.95  
 Average DGM Temp: 19.1  
 Average DGM Δ H: 2.5  
 Operator: D. J. UG

## ORTECH Environmental Mercury Tube Data Sheet

Plant: <u>CLEAN HARBOR</u>
Plant Location: <u>Colonna, ON</u>
Test No.: <u>3</u>

Test location: <u>STACK BASECHINA</u>
Date: <u>FEB 23/16</u>
Project No.:

**Train A**

Tube Identification: <u>291929</u>	Spiked <input checked="" type="radio"/> Yes <input type="radio"/> No
Spike Concentration <u>500</u> ng	

Measuring Device	MII
Control Module <u>4</u>	<u>11542</u>
Barometer	<u>ENV-CAN</u>

Barometric Pressure	<u>99.50</u>
---------------------	--------------

Clock Time	Dry Gas Meter L	Meter Temperature		Meter Pressure Δ H "H <sub>2</sub> O	Pump Vacuum "Hg Gauge
		Outlet AVG- °C	Inlet °C		
0	52.09	21		9.9	5
5	57.3	25		9.9	5
10	61.7	25		9.9	5
15	66.6	25		9.9	5
20	71.5	26		9.9	5
25	76.7	27		9.9	5
30	81.4	27		9.9	5
35	86.9	28		9.9	5
40	91.9	28		9.9	5
45	98.6	29		9.9	5
50	103.9	30		9.9	5
55	109.0	30		9.9	5
60	113.80	30		9.9	5

Start Time: <u>13 12</u>	Initial Leak Check <u>2.01</u> Lpm@ <u>13</u> "Hg	DGMCF: <u>1.019</u>
Finish Time: <u>14 12</u>	Final Leak Check <u>2.01</u> Lpm@ <u>21.5</u> "Hg	Sample Volume: <u>61.72</u>
		Average DGM Temp: <u>27.0</u>
		Average DGM Δ H: <u>9</u>

**Train B**

Tube Identification: <u>209779</u>	Spiked <input type="radio"/> Yes <input checked="" type="radio"/> No
Spike Concentration <u>-</u> ng	

Measuring Device	MII
Control Module <u>2</u>	<u>10117</u>

Clock Time	Dry Gas Meter L	Meter Temperature		Meter Pressure Δ H "H <sub>2</sub> O	Pump Vacuum "Hg Gauge
		Outlet AVG- °C	Inlet °C		
0	40.95	19		2.5	5
5	46.1	21		2.5	8
10	50.8	21		2.5	10
15	55.8	21		2.5	10
20	60.9	21		2.5	10
25	66.3	22		2.5	10
30	71.9	22		2.5	10
35	77.2	22		2.5	10
40	83.0	23		2.5	10
45	88.3	23		2.5	10
50	93.5	24		2.5	10
55	99.0	24		2.5	10
60	103.61	24		2.5	10

Start Time: <u>13 12</u>	Initial Leak Check <u>2.01</u> Lpm@ <u>15</u> "Hg	DGMCF: <u>1.030</u>
Finish Time: <u>14 12</u>	Final Leak Check <u>2.01</u> Lpm@ <u>20</u> "Hg	Sample Volume: <u>62.63</u>
		Average DGM Temp: <u>22.1</u>
		Average DGM Δ H: <u>2.5</u>

Operator: <u>D J U</u>
------------------------

**ORTECH Environmental  
Mercury Tube Data Sheet**

Plant: CLEAN HARBORS  
 Plant Location: CORWINVA, ON  
 Test No.: 4

Test location: STACK BRIDGEHEAD  
 Date: FEB 23 / 16  
 Project No.:

**Train A**

Tube Identification: 299860 Spiked Yes  No  
 Spike Concentration — ng

Measuring Device: MII  
 Control Module 4 11542  
 Barometer: ENV. CAN

Barometric Pressure: 29.49

Clock Time	Dry Gas Meter L	Meter Temperature		Meter Pressure Δ H "H <sub>2</sub> O	Pump Vacuum "Hg Gauge
		Outlet AVG °C	Inlet °C		
0	35.51	27		8	5
5	40.8	31		8	5
10	45.5	31		8	5
15	50.3	31		8	5
20	55.4	32		8	5
25	60.4	32		8	5
30	65.3	33		8	5
35	70.3	34		8	5
40	75.1	35		8	5
45	80.0	35		8	5
50	84.9	34		8	5
55	89.8	33		8	5
60	94.60	33		8	5

Start Time: 1428 Initial Leak Check 2.01 Lpm@ 15"Hg DGMCF: 1.019  
 Finish Time: 1528 Final Leak Check 2.01 Lpm@ 16"Hg Sample Volume: 59.09  
 Average DGM Temp: 32.4  
 Average DGM Δ H: 0.8

**Train B**

Tube Identification: 307449 Spiked  Yes No  
 Spike Concentration 800 ng

Measuring Device: MII  
 Control Module 2 10117

Clock Time	Dry Gas Meter L	Meter Temperature		Meter Pressure Δ H "H <sub>2</sub> O	Pump Vacuum "Hg Gauge
		Outlet AVG °C	Inlet °C		
0	17.9	24		2.5	5
5	23.1	25		2.5	8
10	29.	26		2.5	10.5
15	33.0	26		2.5	11
20	39.	26		2.5	11
25	43.1	26		2.5	11
30	46.1	27		2.5	11
35	53.2	27		2.5	11
40	58.2	27		2.5	11
45	63.1	27		2.5	11
50	66.2	26		2.5	11
55	73.2	26		2.5	11
60	77.85	25		2.5	11

Start Time: 1428 Initial Leak Check 2.01 Lpm@ 15"Hg DGMCF: 1.030  
 Finish Time: 1528 Final Leak Check 2.01 Lpm@ 14"Hg Sample Volume: 59.95  
 Average DGM Temp: 26.0  
 Average DGM Δ H: 2.5

Operator: D. J. O.

**ORTECH Environmental  
Mercury Tube Data Sheet**

Plant: CLEAN HARBORS  
 Plant Location: CORUMNA, ON  
 Test No.: 5

Test location: STACK BREAKING  
 Date: FEB 23/16  
 Project No.:

**Train A**

Tube Identification: 309700 Spiked  Yes  No  
 Spike Concentration 14W ng

Measuring Device: MII  
 Control Module 4 11542  
 Barometer ENV. CAN

Barometric Pressure 29.48

Clock Time	Dry Gas Meter L	Meter Temperature		Meter Pressure Δ H "H <sub>2</sub> O	Pump Vacuum "Hg Gauge
		Outlet AVG °C	Inlet °C		
0	96.30	26		0.8	5
5	101.8	28		0.8	7
10	106.7	29		0.8	8
15	111.0	29		0.8	8.5
20	115.5	29		0.8	9
25	119.9	29		0.8	9
30	124.0	29		0.8	9
35	128.5	29		0.8	9
40	132.4	29		0.8	9
45	136.6	29		0.8	9
50	141.6	28		0.8	9
55	148.1	28		0.8	9
60	153.10	28		0.8	9

Start Time: 1546 Initial Leak Check 2.0 Lpm@ 16"Hg DGMCF: 1.019  
 Finish Time: 1646 Final Leak Check 2.0 Lpm@ 17"Hg Sample Volume: 56.8  
 Average DGM Temp: 28.9  
 Average DGM Δ H: 0.8

**Train B**

Tube Identification: 209950 Spiked  Yes  No  
 Spike Concentration - ng

Measuring Device: MII  
 Control Module 2 10177

Clock Time	Dry Gas Meter L	Meter Temperature		Meter Pressure Δ H "H <sub>2</sub> O	Pump Vacuum "Hg Gauge
		Outlet AVG °C	Inlet °C		
0	79.70	20		2.5	5
5	85.1	22		2.5	7
10	90.1	23		2.5	8
15	95.1	23		2.5	8.5
20	100.0	22		2.5	9
25	105.2	21		2.5	9
30	110.1	21		2.5	9
35	115.4	21		2.5	9
40	120.0	21		2.5	9
45	125.1	21		2.5	9
50	130.1	21		2.5	9
55	135.5	21		2.5	9
60	140.50	21		2.5	9

Start Time: 1546 Initial Leak Check 2.0 Lpm@ 17"Hg DGMCF: 1.030  
 Finish Time: 1646 Final Leak Check 2.0 Lpm@ 19"Hg Sample Volume: 60.8  
 Average DGM Temp: 21.4  
 Average DGM Δ H: 2.5

Operator: D. D. U.

**ORTECH Environmental  
Mercury Tube Data Sheet**

Plant: CLEAN HARBORS  
 Plant Location: CORUNNA, ON  
 Test No.: 6

Test location: STARK BREACHING  
 Date: FEB 23 / 16  
 Project No.:

**Train A**

Tube Identification: 299784 Spiked Yes  No   
 Spike Concentration \_\_\_\_\_ ng

Measuring Device: MII  
 Control Module: 11542  
 Barometer: ENV. CAN

Barometric Pressure: 29.46

Clock Time	Dry Gas Meter L	Meter Temperature		Meter Pressure Δ H "H <sub>2</sub> O	Pump Vacuum "Hg Gauge
		Outlet Avg °C	Inlet °C		
0	56.39	23		0.8	5
5	61.30	26		0.8	6
10	66.2	26		0.8	6
15	71.1	25		0.8	6
20	76.0	25		0.8	6
25	81.1	25		0.8	6
30	86.0	25		0.8	6
35	91.1	25		0.8	6
40	96.2	25		0.8	6
45	101.2	25		0.8	6
50	106.0	25		0.8	6
55	110.8	25		0.8	6
60	116.25	25		0.8	6

Start Time: 1702 Initial Leak Check 2.01 Lpm @ 17" Hg DGMCF: 1.019  
 Finish Time: 1802 Final Leak Check 2.01 Lpm @ 15" Hg Sample Volume: 59.86  
 Average DGM Temp: 25.0  
 Average DGM Δ H: 0.8

**Train B**

Tube Identification: 309715 Spiked Yes  No   
 Spike Concentration 2600 ng

Measuring Device: MII  
 Control Module: 10117

Clock Time	Dry Gas Meter L	Meter Temperature		Meter Pressure Δ H "H <sub>2</sub> O	Pump Vacuum "Hg Gauge
		Outlet Avg °C	Inlet °C		
0	41.80	19		2.5	6
5	46.70	19		2.5	7.5
10	52.1	19		2.5	9
15	57.0	19		2.5	10
20	61.5	17		2.5	10
25	66.0	16		2.5	10
30	70.5	16		2.5	10
35	74.5	16		2.5	10
40	79.5	16		2.5	10
45	84.5	16		2.5	10
50	89.3	16		2.5	10
55	94.3	16		2.5	10
60	99.40	16		2.5	10

Start Time: 1702 Initial Leak Check 2.01 Lpm @ 15" Hg DGMCF: 1.030  
 Finish Time: 1802 Final Leak Check 2.01 Lpm @ 16" Hg Sample Volume: 57.6  
 Average DGM Temp: 16.8  
 Average DGM Δ H: 2.5

Operator: D J W

### **APPENDIX 3**

#### **ORTECH Equipment Calibration (4 pages)**

# ORTECH Environmental

## Dry Gas Meter Calibration Data

Calibration Procedure	03-J004
Meter Number	Vost 4
Date	February 17, 2016
Barometric Pressure	29.53
System Leak Check	NDL @ 22 "Hg

MII NUMBERS	
DGM	A11542
Gasometer	A01463
Barometer	COE 20028

Calibrated By	Mike Traynor
Signature	
Reviewed and Accepted By	

$ft^3 = cm^3 \times 1.332$  litres per cm<sup>3</sup>/28.3168 litres per ft<sup>3</sup>

$$DGMCF = \frac{V_{std} \text{ ft}^3}{V_{dgm} \text{ ft}^3} \times \frac{T_{dgm} \text{ } ^\circ\text{F} + 460}{T_{std} \text{ } ^\circ\text{F} + 460} \times \frac{P_{bar} \text{ (in. Hg)}}{(P_{bar} \text{ in. Hg} + DGM \text{ Pressure}) / 13.6}$$



Initial	Gasometer Reading cm		Gasometer Volume ft <sup>3</sup>	Gasometer Temperature °C	DGM Reading L		DGM Volume ft <sup>3</sup>	DGM Average Temperature °C	DGM Pressure in. H <sub>2</sub> O	DGM Outlet °C	DGM Calibration Factor	Time min.	Flow Rate lpm
	Final	cm			Initial	Final							
87.70	71.70	16.00	0.753	21.0	183.44	204.84	0.756	29.0	1.2	29.0	1.020	17	1.3
74.50	57.50	17.00	0.800	21.0	138.54	161.15	0.798	27.0	1.2	27.0	1.019	18	1.3
57.50	40.80	16.70	0.786	21.0	161.15	183.44	0.787	28.0	1.2	28.0	1.019	18	1.2

DGMCF AVERAGE

1 Lpm 1.019

**Acceptance Criteria:**  
 Individual values of DGM calibration factor must be within ± 1.5% of the average value.  
 If not the calibration must be repeated. Also, the DGMCF average value must be 1.00 ± 0.05,  
 otherwise the meter must be repaired and/or adjusted as necessary and recalibrated prior to use.  
 (Environment Canada Reference Method EPS 1/RM/8, Section 6)

## ORTECH Environmental Trendicator Calibration

Calibration Procedure	03-J005
Trendicator Type	Nutech
MII	A11542
Date	February 17, 2016
Calibrated By	Mike Traynor
Signature	
Reviewed and Accepted By	

Fluke Calibrator Output (COE 20024) (°C)	Trendicator Display Value		Percent Difference (%)
	Before Adjustment (°C)	After Adjustment (°C)	
0	0	NA	0.0
10	10		0.0
20	20		0.0
50	50		0.0
75	75		0.0
100	100		0.0
125	126		-0.8
150	151		-0.7
200	200		0.0
300	301		-0.3
400	401		-0.3
500	501		-0.2
600	601		-0.2

$$\% \text{ Difference} = \frac{(\text{micromite} - \text{after adjustment reading}) \times 100}{\text{micromite}}$$

**Acceptance Criteria:**

Trendicator display must read within  $\pm 1.5\%$  of the micromite value at each output. Otherwise, the Trendicator must be repaired and/or adjusted as necessary, and recalibrated prior to use. (MOE Source Testing Code, Version #2, Method 5)



**ORTECH Environmental**  
Dry Gas Meter Calibration Data

Calibration Procedure	03-J004
Meter Number	Vost 2
Date	January 18, 2016
Barometric Pressure	29.47
System Leak Check	<.005lpm @ 21" Hg

MII NUMBERS	
DGM	A10117
Gasometer	A01463
Barometer	COE20028
Calibrated By	David Utley
Signature	<i>[Signature]</i>
Reviewed and Accepted By	<i>[Signature]</i>

ft<sup>3</sup> = cm \* 1.332 litres per cm/28.3168 litres per ft<sup>3</sup>

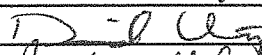

$$DGMCF = \frac{V_{std} \text{ ft}^3}{V_{dgm} \text{ ft}^3} \times \frac{T_{dgm} \text{ } ^\circ\text{F} + 460}{T_{std} \text{ } ^\circ\text{F} + 460} \times \frac{P_{bar} \text{ (in. Hg)}}{(P_{bar} \text{ in. Hg} + DGM \text{ Pressure}) / 13.6}$$

Gasometer Reading		Gasometer Volume	Gasometer Temperature	DGM Reading		DGM Volume	DGM Average Temperature	DGM Pressure	DGM Outlet	DGM Calibration	Time	Flow Rate
Initial	Final	cm	°C	Initial	Final	ft <sup>3</sup>	°C	in. H <sub>2</sub> O	°C	Factor	min.	lpm
84.20	59.90	24.30	21.0	115.700	147.550	1.125	26.0	2.5	26.0	1.027	32	1.0
87.00	61.90	25.10	21.0	147.550	180.470	1.163	26.0	2.5	26.0	1.026	33	1.0
83.50	50.70	32.80	21.0	73.130	115.700	1.503	26.0	2.5	26.0	1.037	43	1.0

DGMCF AVERAGE  
1 Lpm 1.030

**Acceptance Criteria:**  
Individual values of DGM calibration factor must be within ± 1.5% of the average value.  
If not the calibration must be repeated. Also, the DGMCF average value must be 1.00 ± 0.05, otherwise the meter must be repaired and/or adjusted as necessary and recalibrated prior to use.  
(Environment Canada Reference Method EPS 1/RM/8, Section 6)

## ORTECH Environmental Trendicator Calibration

Calibration Procedure	03-J005
Trendicator Type	Nutech
MII	A10117
Date	January 18, 2016
Calibrated By	David Utley
Signature	
Reviewed and Accepted By	

Fluke Calibrator Output (COE 20024) (°C)	Trendicator Display Value		Percent Difference (%)
	Before Adjustment (°C)	After Adjustment (°C)	
0	0	NA	0.0
10	10	↓	0.0
20	20		0.0
50	50		0.0
75	75		0.0
100	100		0.0
125	125		0.0
150	150		0.0
200	200		0.0
300	300		0.0
400	400		0.0
500	500		0.0
600	601		0.0

NA= No Adjustment

$$\% \text{ Difference} = \frac{(\text{micromite} - \text{after adjustment reading}) \times 100}{\text{micromite}}$$

**Acceptance Criteria:**

Trendicator display must read within  $\pm 1.5\%$  of the micromite value at each output. Otherwise, the Trendicator must be repaired and/or adjusted as necessary, and recalibrated prior to use. (MOE Source Testing Code, Version #2, Method 5)

**APPENDIX 4**

**Mercury Analytical Report  
(5 pages)**

## Sorbent Trap Analysis Report

Project Number: 2006129

Turn-around: Standard

Plant: ORTECH Environmental Date: 3/4/2016  
 Contact: David Utley Analyst(s): Patrick Cook  
 Phone: (905)-822-4120\*235  
 Email: dutley@ortech.ca Method: EPA 7473

Trap ID	AGS Mass (ng)	Section 1 Mass (ng)	Section 2 Mass (ng)	Total Mass (ng)	Section 3 Mass (ng)	Spike Level (ng)	Breakthrough (%)	(%) Spike Recovery	Source	Notes
OL307462		1836	2.7	1839		100	0.15%		T1	
OL299883		1830	0.0	1830			0.00%		T1	
OL299885		1324	0.1	1324			0.01%		T2	
OL307498		1604	0.1	1604		250	0.01%		T2	
OL291929		1593	0.0	1593		500	0.00%		T3	
OL299779		1285	1.6	1287			0.12%		T3	
OL299860		1072	2.6	1075			0.24%		T4	
OL307449		2050	0.7	2051		800	0.03%		T4	
OL309700		2784	6.1	2790		1400	0.22%		T5	
OL299950		1342	1.2	1343			0.09%		T5	
OL299784		1298	0.0	1298			0.00%		T6	
OL309715		4585	1.0	4586		3600*	0.02%		T6	*See revised chain of custody

MDL = 1.17 ng  
 Method Uncertainty = +/- 10%



# ORTECH

Analyst: Patrick Cook  
 File Name: 160303\_PMC\_ORTECH  
 Analyzer #: 1642 Cell type: Short  
 MDL: 1.17 ng

Date: 3/3/2016  
 Temperature (°C): 680  
 Flow Rate (L/min): 1.50  
 SD: 1.2

ID #	PF Mass (ng)	AGS Mass (ng)	Section 1 Mass (ng)	Section 2 Mass (ng)	Section 3 Mass (ng)	Section 4 Mass (ng)	Spike Level (ng)	Source:	Notes:
1	OL307462		1836	2.7			100	T1	
2	OL299883		1830	0.0			unspiked		
3	OL299885		1324	0.1			unspiked	T2	
4	OL307498		1604	0.1			250		
5	OL291929		1593	0.0			500	T3	
6	OL299779		1285	1.6			unspiked		
7	OL299860		1072	2.6			unspiked	T4	
8	OL307449		2050	0.7			800		
9	OL309700		2784	6.1			1400	T5	
10	OL299950		1342	1.2			unspiked		
11	OL299784		1298	0.0			unspiked	T6	
12	OL309715		4585	1.0			3600		
13									
14									
15									
16									
17									
18									
19									
20									

Lot # Std.	Std. (ng)	Calculated (ng)
J2-MEB569125 B	10	see cal. report
J2-MEB570097 B	100	see cal. report
J2-MEB569148 B	500	see cal. report
J2-MEB569143 B	1000	see cal. report
J2-MEB579071 B	5000	see cal. report
J2-MEB579071 B	10000	see cal. report
		see cal. report
		see cal. report
		see cal. report
		see cal. report

Lot # Std.	Std. (ng)	Calculated (ng)
182610	100	94.5
182661	100	98.6
J2-MEB579071 B	5000	5319
182615	100	95.5

Concentration (µg/mL)	Lot #/Bottle ID	Exp. Date
0.1	J2-MEB569125 B	11/1/2016
1	J2-MEB570097 B	11/1/2016
10	J2-MEB569148 B	11/1/2016
100	J2-MEB579071 B	11/1/2016
1000	F2-HG02105 B	5/1/2016
0.1	J2-MEB569125 A	11/1/2016
1	J2-MEB570097 A	11/1/2016
10	J2-MEB569148 A	11/1/2016
100	J2-MEB579071 A	11/1/2016
1000	F2-HG02105 A	11/1/2016
1 (Independent)	H2-HG02130 C	5/1/2016
10 (Independent)	J2-MEB569022 A	11/1/2016
100 (Independent)	G2-MEB484061 A	7/1/2016

Lot # Std.	Std. (ng)	Calculated (ng)
J2-MEB569022 A	500	499.4

Lot # Std.	Std. (ng)	(area count/mass)
J2-MEB569125 B	5	59

\*Performed daily prior to analysis of sorbent traps, QA/QC found in the SOP for trap analysis. If a new calibration curve is used a new bench sheet must be filled out

\*\*Performed directly after calibration curve is verified, must come within 10% of expected value

\*\*\*The chosen response factor value must fall in between the lowest point on the calibration curve and the MDL

\*\*\*\*Must be performed between every 10 samples and between every analytical batch

\*\*\*\*\*Subject to change, for analyst convenience only

AB
----

Immediately report any QA/QC failures or anything suspicious to the QA/QC Manager



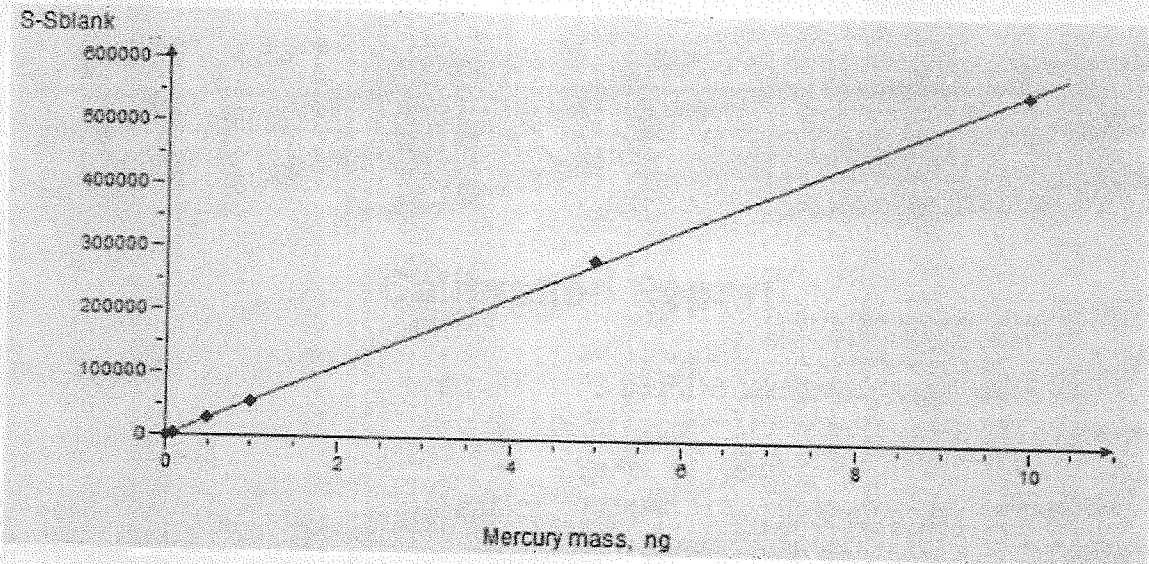
Analyst Signature: Patrick Cook

Date: 3 3 2016

By signing this report I confirm that the above data are true to the best of my knowledge.

# Calibration Report

Report created 03.03.2016 18:31:14  
 Instrument RA915M Serial number 1642  
 Calibration created 03.03.2016 10:00:06  
 Calibration name 160303\_PMC\_10-10000\_2



## Results

N	Mercury mass, ng	S-Sblank	Ref.data, ng/g	Calculated, ng/g	d, %
1	5.00	286800	5000.0	5100.4	2.0
2	0.50	29210	500.0	519.5	3.9
3	10.00	559300	10000.0	9947.9	-0.5
4	1.00	56720	1000.0	1008.8	0.9
5	0.10	5553	100.0	98.8	-1.2
6	0.01	554	10.0	9.8	-1.5

Calibration S - Sblank = a·m  
 Algorithm LSM  
 Correlation coefficient 0.999938  
 Residual standard deviation 36.408102



# ANALYSIS SAMPLE RETURN FORM

<b>FROM:</b>	
Name:	DAVID WITLEY
Company:	ORTECH
Date:	FEB 25 / 16
Email:	dutley@ortech.ca
Phone Number:	617-212-9184

<b>SHIP TO:</b>	
Name:	Ohio Lumex Analytical Laboratory
Company:	Ohio Lumex Co., Inc.
Address:	9263 Ravenna Rd., Unit A-3 Twinsburg, OH 44087
Phone:	330-405-0837
Fax:	330-405-0847

Number of Samples:	Sample I.D. Numbers / Special Client I.D.:	Sampling Method / Important Information / Comments:
12	SEE ATTACHED SAMPLE LOG	30B

<b>Analysis Turnaround Time:</b>		<b>Payment/Billing Information:</b>
<b>Check One:</b> <input type="checkbox"/> Same Day <input type="checkbox"/> Next Day Rush <input type="checkbox"/> 2nd Day Rush <input checked="" type="checkbox"/> Standard	<b>Report Type:</b> (Check One) <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Extended	<b>Payment Method: (Check One)</b> <input checked="" type="checkbox"/> Purchase Order PO #: 21655-52221 * Please provide a hard copy of PO when available <input type="checkbox"/> Credit Card *If paying by credit card, please provide a phone number so that we may contact for the cc#  Phone Number: _____
<b>Contacts to Receive Report: (email)</b> dutley@ortech.ca		<b>Packaging Instructions:</b> Please return traps packaged in their individual plastic tubes accompanied by their unique chain of custody. Place into a cardboard box or tube with enough packaging material that the traps cannot bounce or bend – similarly to how they were delivered.
<b>Comments:</b>		

**ORTECH Environmental Sample Log  
Mercury Tube Samples  
Incinerator Exhaust Stack**

Job/Report Number: 21655  
 Received By: David Utley  
 Job Assigned To: Ohio Lumex  
 PO #: 21655-J2221

Tube ID	Sample Date	Sample Description	Approx. Sample Volume m <sup>3</sup>	Sample Analysis
(307462) Spiked	February 23, 2016	Test 1 Tube A	0.06	Hg
(299883)	February 23, 2016	Test 1 Tube B	0.06	Hg
(299885)	February 23, 2016	Test 2 Tube A	0.06	Hg
(307498) Spiked	February 23, 2016	Test 2 Tube B	0.06	Hg
(291929) Spiked	February 23, 2016	Test 3 Tube A	0.06	Hg
(299779)	February 23, 2016	Test 3 Tube B	0.06	Hg
(299860)	February 23, 2016	Test 4 Tube A	0.06	Hg
(307449) Spiked	February 23, 2016	Test 4 Tube B	0.06	Hg
(309700) Spiked	February 23, 2016	Test 5 Tube A	0.06	Hg
(299950)	February 23, 2016	Test 5 Tube B	0.06	Hg
(299784)	February 23, 2016	Test 6 Tube A	0.06	Hg
(309715) Spiked	February 23, 2016	Test 6 Tube B	0.06	Hg

All tubes sampled at approximately 1 litre/minute for 60 minutes.  
 Expected concentrations are approximately 200 - 800ng

Relinquished To: \_\_\_\_\_ Date: \_\_\_\_\_  
 Relinquished By: David Utley Date: FEB 25/16



## **APPENDIX 5**

### **Clean Harbors Process Data (18 pages)**

		Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PAC
		LPM	LPM	LPM	LPM	LPM	SCFM	LPM	Lbs/h
\$Date	\$Time	FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT
23/02/2016	9:50:00	32.27	5.83	178.95	187.83	4.07	244.35	14.44	22.51
23/02/2016	9:51:00	32.18	5.85	180.65	187.65	4.20	251.93	14.44	22.36
23/02/2016	9:52:00	31.95	5.55	178.20	187.52	4.17	250.35	14.44	21.86
23/02/2016	9:53:00	31.94	5.46	181.32	187.07	4.23	253.80	14.44	22.52
23/02/2016	9:54:00	32.10	5.15	179.75	187.02	4.19	251.63	14.44	21.76
23/02/2016	9:55:00	32.09	5.57	180.47	187.02	3.96	237.53	14.44	21.92
23/02/2016	9:56:00	31.98	5.34	180.00	187.61	3.93	235.80	14.44	21.99
23/02/2016	9:57:00	32.42	5.68	181.89	187.70	3.99	239.48	14.44	21.94
23/02/2016	9:58:00	32.25	5.61	180.18	187.70	4.13	247.58	14.44	21.87
23/02/2016	9:59:00	32.27	5.14	179.52	188.46	3.89	233.18	14.44	22.00
23/02/2016	10:00:00	32.42	5.21	180.84	187.83	4.19	251.48	14.44	22.33
23/02/2016	10:01:00	31.97	5.55	180.37	188.37	4.10	245.78	14.44	21.97
23/02/2016	10:02:00	32.28	5.68	179.81	187.88	4.20	252.23	14.44	22.28
23/02/2016	10:03:00	31.85	5.64	181.18	187.88	4.24	254.25	14.44	22.10
23/02/2016	10:04:00	32.09	5.35	179.85	187.20	3.82	229.43	14.44	21.95
23/02/2016	10:05:00	32.12	5.68	179.94	187.47	4.04	242.33	14.44	21.78
23/02/2016	10:06:00	32.31	5.95	180.14	188.19	4.17	250.05	14.44	22.12
23/02/2016	10:07:00	32.30	5.43	180.80	188.24	4.11	246.30	14.44	21.79
23/02/2016	10:08:00	32.22	5.59	179.94	188.24	4.13	247.95	14.44	21.81
23/02/2016	10:09:00	32.45	5.73	181.61	188.06	4.08	244.95	14.44	21.79
23/02/2016	10:10:00	31.98	5.65	177.91	187.52	4.22	253.13	14.44	22.60
23/02/2016	10:11:00	32.21	5.33	181.08	187.52	3.97	238.43	14.44	22.59
23/02/2016	10:12:00	31.85	4.92	179.85	186.93	4.07	244.20	14.44	21.78
23/02/2016	10:13:00	32.00	5.06	179.19	187.56	3.98	239.03	14.44	22.34
23/02/2016	10:14:00	32.09	4.78	180.05	187.56	4.11	246.60	14.44	22.46
23/02/2016	10:15:00	32.19	5.30	179.94	188.51	4.15	249.08	14.44	22.36
23/02/2016	10:16:00	32.22	5.32	180.95	187.97	4.16	249.60	14.44	22.62
23/02/2016	10:17:00	32.22	5.50	180.52	188.01	4.25	254.85	14.44	21.78
23/02/2016	10:18:00	32.18	5.33	180.37	188.87	4.20	252.23	14.44	21.73
23/02/2016	10:19:00	32.64	5.58	181.08	188.15	4.24	254.63	14.44	22.18
23/02/2016	10:20:00	32.51	5.38	179.90	188.19	4.12	247.35	14.44	22.49
23/02/2016	10:21:00	32.46	5.48	181.85	188.19	4.17	249.90	14.44	22.31
23/02/2016	10:22:00	32.42	5.10	179.04	187.11	4.02	241.13	14.44	21.84
23/02/2016	10:23:00	32.63	5.51	180.18	187.83	3.95	236.85	14.44	22.47
23/02/2016	10:24:00	32.19	5.23	180.28	187.92	3.88	232.80	14.44	21.87
23/02/2016	10:25:00	32.16	5.17	178.62	187.70	4.19	251.33	14.44	22.57
23/02/2016	10:26:00	32.42	5.04	180.37	187.07	4.20	252.15	14.44	22.33
23/02/2016	10:27:00	32.48	5.29	180.18	187.16	4.20	252.23	14.44	22.13
23/02/2016	10:28:00	32.30	5.14	180.75	187.34	4.03	241.65	14.44	21.86
23/02/2016	10:29:00	32.22	4.93	180.42	187.88	4.11	246.83	14.44	22.54
23/02/2016	10:30:00	32.54	4.86	180.33	187.34	4.22	253.43	14.44	22.46
23/02/2016	10:31:00	32.76	4.99	180.37	187.38	4.08	244.95	14.44	22.33
23/02/2016	10:32:00	32.67	5.09	180.80	187.43	4.07	244.20	14.44	21.86
23/02/2016	10:33:00	32.27	5.33	181.14	188.01	4.12	247.20	14.44	22.44
23/02/2016	10:34:00	32.21	5.18	180.09	187.47	4.17	249.98	14.44	21.84
23/02/2016	10:35:00	32.72	5.21	180.24	188.10	3.67	220.05	14.44	22.20
23/02/2016	10:36:00	32.61	4.93	180.52	188.10	4.20	251.70	14.44	22.00
23/02/2016	10:37:00	32.63	5.09	180.99	188.19	4.24	254.63	14.44	22.05
23/02/2016	10:38:00	32.81	5.24	181.14	188.19	4.24	254.63	14.44	21.73
23/02/2016	10:39:00	32.58	5.14	179.66	188.28	4.28	256.88	14.44	21.81
23/02/2016	10:40:00	32.99	5.13	180.80	188.15	4.27	255.90	14.44	21.78
23/02/2016	10:41:00	32.72	5.16	180.37	188.06	4.20	252.15	14.44	22.52
23/02/2016	10:42:00	32.46	5.08	179.66	187.92	4.11	246.45	14.44	22.47
23/02/2016	10:43:00	32.40	4.93	179.62	187.43	4.08	244.50	14.44	22.46
23/02/2016	10:44:00	32.49	4.81	180.37	187.47	3.89	233.48	14.44	21.74
23/02/2016	10:45:00	32.99	4.98	179.85	187.70	3.93	235.88	14.44	21.99
23/02/2016	10:46:00	32.93	5.01	180.90	187.74	4.21	252.30	14.44	22.56
23/02/2016	10:47:00	32.82	5.16	179.81	188.33	3.96	237.38	14.44	21.92
23/02/2016	10:48:00	32.87	5.26	180.71	187.70	3.72	222.90	14.44	22.34
23/02/2016	10:49:00	32.87	5.24	180.37	189.00	3.86	231.30	14.44	21.92
23/02/2016	10:50:00	32.63	5.21	179.94	187.56	3.91	234.83	14.44	22.49

February 23/2016	Waste Flows							Flows	
	Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PACFlow	
Test#1	FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT	
Max	32.99	5.95	181.89	189.00	4.28	256.88	14.44	22.62	
Min	31.85	4.78	177.91	186.93	3.67	220.05	14.44	21.73	
Average	32.37	5.29	180.26	187.79	4.09	245.39	14.44	22.14	
Variance	0.09	0.08	0.60	0.20	0.02	69.87	0.00	0.09	



\$Date	\$Time	CO	HCl	CO2	H2O	THC	O2	Opacity	SO2
		PPM	PPM	%	%	PPM	%	%	PPM
		AT-205CORR	AT-213A	AT-213B	AT-213C	AT-259CORR	AT-261	AT-263	AT-264
23/02/2016	9:50:00	55.6	32.08	9.58	40.06	25.7	12.23	1.46	633.3
23/02/2016	9:51:00	49.3	32.86	9.47	40.06	21.7	12.11	1.41	622.1
23/02/2016	9:52:00	49.6	31.78	9.38	40.06	23.2	12.06	1.47	614.0
23/02/2016	9:53:00	48.8	31.47	9.41	40.06	21.2	12.19	1.43	617.4
23/02/2016	9:54:00	50.2	31.34	9.46	40.06	24.8	12.24	1.66	622.7
23/02/2016	9:55:00	55.4	30.64	9.47	40.06	21.8	12.23	1.36	627.0
23/02/2016	9:56:00	52.7	30.88	9.44	40.06	26.8	12.18	1.56	623.4
23/02/2016	9:57:00	58.3	32.16	9.55	40.06	21.9	12.26	1.42	633.1
23/02/2016	9:58:00	57.6	31.32	9.52	40.06	24.5	12.22	1.46	628.1
23/02/2016	9:59:00	53.7	31.47	9.46	40.06	21.7	12.13	1.42	622.2
23/02/2016	10:00:00	49.3	30.76	9.32	40.06	23.2	12.01	1.55	607.0
23/02/2016	10:01:00	50.6	30.42	9.48	40.06	24.0	12.20	1.47	622.9
23/02/2016	10:02:00	50.6	30.16	9.53	40.06	25.5	12.23	1.67	627.9
23/02/2016	10:03:00	56.5	30.97	9.59	40.06	22.3	12.21	1.38	634.8
23/02/2016	10:04:00	51.4	31.14	9.47	40.06	25.1	12.13	1.65	629.4
23/02/2016	10:05:00	53.3	31.51	9.54	40.06	22.6	12.15	1.42	632.9
23/02/2016	10:06:00	53.8	31.32	9.54	40.06	24.8	12.13	1.50	630.0
23/02/2016	10:07:00	58.1	31.04	9.43	40.06	22.7	12.02	1.42	618.3
23/02/2016	10:08:00	49.2	30.27	9.33	40.06	24.8	11.98	1.55	611.9
23/02/2016	10:09:00	53.7	30.82	9.45	40.06	24.0	12.10	1.47	619.3
23/02/2016	10:10:00	59.6	31.24	9.55	40.06	25.4	12.17	1.60	626.5
23/02/2016	10:11:00	58.1	30.21	9.53	40.06	23.2	12.10	1.42	626.9
23/02/2016	10:12:00	55.8	30.08	9.50	40.06	23.5	12.09	1.63	625.5
23/02/2016	10:13:00	53.8	31.41	9.56	40.06	23.3	12.13	1.42	630.7
23/02/2016	10:14:00	51.5	31.81	9.56	40.06	22.1	12.10	1.52	631.5
23/02/2016	10:15:00	50.0	31.64	9.45	40.06	23.7	12.01	1.46	619.2
23/02/2016	10:16:00	49.9	29.85	9.28	40.06	23.2	11.93	1.50	602.6
23/02/2016	10:17:00	58.9	29.89	9.45	40.06	26.6	12.13	1.57	616.1
23/02/2016	10:18:00	70.3	32.18	9.57	40.06	27.1	12.20	1.73	628.6
23/02/2016	10:19:00	74.2	32.37	9.56	40.06	27.3	12.14	1.38	624.6
23/02/2016	10:20:00	75.2	31.78	9.58	40.06	26.1	12.15	1.65	629.6
23/02/2016	10:21:00	72.3	30.94	9.59	40.06	23.7	12.11	1.42	630.2
23/02/2016	10:22:00	62.6	31.33	9.59	40.06	23.6	12.07	1.47	630.2
23/02/2016	10:23:00	56.3	31.25	9.46	40.06	24.4	11.92	1.42	620.8
23/02/2016	10:24:00	60.7	29.74	9.47	40.06	22.4	11.97	1.52	619.1
23/02/2016	10:25:00	62.4	29.75	9.58	40.06	27.4	12.05	1.57	625.7
23/02/2016	10:26:00	66.4	30.16	9.61	40.06	22.7	12.08	1.45	631.6
23/02/2016	10:27:00	64.9	29.61	9.51	40.06	25.3	11.99	1.36	625.5
23/02/2016	10:28:00	58.5	30.02	9.48	40.06	24.3	11.97	1.48	625.5
23/02/2016	10:29:00	67.6	30.39	9.57	40.06	24.8	12.02	1.42	630.0
23/02/2016	10:30:00	58.0	31.03	9.53	40.06	21.2	11.97	1.41	627.0
23/02/2016	10:31:00	57.9	30.47	9.33	40.06	23.1	11.82	1.42	605.4
23/02/2016	10:32:00	56.2	30.05	9.32	40.06	21.0	11.86	1.45	607.7
23/02/2016	10:33:00	60.9	30.03	9.49	40.06	26.7	12.05	1.51	620.0
23/02/2016	10:34:00	74.9	30.69	9.58	40.06	22.1	12.10	1.40	625.6
23/02/2016	10:35:00	72.4	30.78	9.54	40.06	29.1	12.05	1.37	623.9
23/02/2016	10:36:00	70.3	30.63	9.58	40.06	21.4	12.07	1.42	632.9
23/02/2016	10:37:00	66.1	31.21	9.62	40.06	28.2	12.05	1.43	634.3
23/02/2016	10:38:00	66.4	31.33	9.51	40.06	21.4	11.95	1.37	626.0
23/02/2016	10:39:00	66.0	30.82	9.44	40.06	27.1	11.88	1.42	616.7
23/02/2016	10:40:00	67.4	30.91	9.50	40.06	23.1	11.94	1.42	617.6
23/02/2016	10:41:00	71.4	31.33	9.58	40.06	25.3	12.00	1.45	627.5
23/02/2016	10:42:00	71.6	31.80	9.63	40.06	21.2	12.04	1.36	635.8
23/02/2016	10:43:00	62.3	30.80	9.56	40.06	28.0	11.96	1.36	632.9
23/02/2016	10:44:00	65.3	31.18	9.63	40.06	20.9	11.98	1.42	637.0
23/02/2016	10:45:00	64.2	31.44	9.59	40.06	24.9	11.93	1.42	633.5
23/02/2016	10:46:00	53.9	31.38	9.51	40.06	20.0	11.86	1.40	628.4
23/02/2016	10:47:00	50.4	31.47	9.32	40.06	23.7	11.77	1.38	613.8
23/02/2016	10:48:00	49.3	31.57	9.41	40.06	22.7	11.89	1.45	619.1
23/02/2016	10:49:00	61.1	32.01	9.58	40.06	27.6	12.03	1.46	627.2
23/02/2016	10:50:00	70.6	33.19	9.59	40.06	21.9	12.01	1.33	634.3

February 23/2016

Test#	Analyzers								
	CO	HCl	CO2	H2O	THC	O2	Opacity	SO2	
	AT-205	AT-213A	AT-213B	AT-213C	AT-259	AT-261	AT-263	AT-264	
<b>Max</b>	75.2	33.19	9.63	40.06	29.1	12.26	1.73	637.0	
<b>Min</b>	48.8	29.61	9.28	40.06	20.0	11.77	1.33	602.6	
<b>Average</b>	59.4	31.05	9.50	40.06	24.0	12.06	1.47	624.7	
<b>Variance</b>	61.8	0.60	0.01	0.00	4.6	0.01	0.01	61.5	

		Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PAC
		LPM	LPM	LPM	LPM	LPM	SCFM	LPM	Lbs/h
\$Date	\$Time	FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT
23/02/2016	11:53:00	31.37	5.14	180.37	187.38	4.11	246.83	14.66	21.69
23/02/2016	11:54:00	31.26	4.93	181.70	186.80	3.88	232.65	14.66	22.49
23/02/2016	11:55:00	31.28	4.94	180.61	187.34	4.21	252.60	14.66	21.79
23/02/2016	11:56:00	31.19	5.42	179.94	187.34	3.88	232.65	14.66	22.02
23/02/2016	11:57:00	31.29	5.05	181.08	187.07	4.05	243.00	14.66	22.62
23/02/2016	11:58:00	31.31	5.22	178.85	187.02	4.21	252.60	14.66	22.10
23/02/2016	11:59:00	31.70	5.39	181.98	187.16	4.14	248.18	14.66	21.76
23/02/2016	12:00:00	31.46	5.41	180.05	187.83	4.15	249.08	14.66	22.52
23/02/2016	12:01:00	31.43	5.45	180.71	187.70	4.25	254.70	14.66	22.30
23/02/2016	12:02:00	31.46	5.58	179.85	187.92	4.02	241.35	14.66	22.13
23/02/2016	12:03:00	31.49	5.47	181.08	188.19	4.18	250.95	14.66	22.08
23/02/2016	12:04:00	31.49	5.52	179.62	187.83	4.12	247.20	14.66	22.44
23/02/2016	12:05:00	31.44	5.30	180.47	187.79	4.03	241.65	14.66	22.57
23/02/2016	12:06:00	31.50	5.00	179.10	187.16	3.94	236.18	14.66	22.02
23/02/2016	12:07:00	31.32	5.23	179.94	187.16	4.03	242.03	14.66	22.57
23/02/2016	12:08:00	31.23	5.23	178.72	187.43	4.28	256.50	14.66	22.05
23/02/2016	12:09:00	31.38	5.26	180.99	187.38	4.26	255.38	14.66	22.30
23/02/2016	12:10:00	31.34	4.76	179.52	186.75	4.09	245.63	14.66	21.86
23/02/2016	12:11:00	31.58	4.77	180.90	187.92	4.24	254.10	14.66	21.73
23/02/2016	12:12:00	31.46	4.74	179.62	188.24	4.27	255.90	14.66	22.60
23/02/2016	12:13:00	31.65	4.82	179.15	187.61	4.21	252.75	14.66	22.49
23/02/2016	12:14:00	31.22	4.79	179.24	187.25	4.29	257.25	13.65	21.86
23/02/2016	12:15:00	31.62	5.06	181.42	187.88	4.17	250.13	14.93	21.73
23/02/2016	12:16:00	31.65	4.88	179.52	188.55	3.81	228.75	14.93	21.74
23/02/2016	12:17:00	31.80	5.32	181.42	188.69	3.84	230.33	14.93	21.79
23/02/2016	12:18:00	31.49	4.82	180.24	188.51	3.95	237.23	14.93	22.57
23/02/2016	12:19:00	31.77	4.94	180.00	187.92	3.91	234.68	14.93	22.44
23/02/2016	12:20:00	31.43	4.86	178.62	187.92	3.99	239.33	14.93	22.44
23/02/2016	12:21:00	31.47	4.84	181.18	188.51	4.00	239.78	14.93	21.79
23/02/2016	12:22:00	31.50	4.69	180.00	187.70	4.18	250.88	14.93	21.78
23/02/2016	12:23:00	31.20	4.50	180.00	187.07	4.20	252.15	14.93	21.82
23/02/2016	12:24:00	31.07	4.79	180.80	187.02	4.24	254.18	14.93	21.76
23/02/2016	12:25:00	31.40	4.52	179.38	186.98	4.21	252.83	14.78	22.54
23/02/2016	12:26:00	31.46	4.68	179.24	187.52	4.26	255.68	14.78	22.46
23/02/2016	12:27:00	31.26	4.78	181.18	187.65	3.90	233.93	14.78	22.59
23/02/2016	12:28:00	31.32	4.70	180.33	187.65	3.95	237.15	14.78	21.78
23/02/2016	12:29:00	31.68	5.04	180.24	188.24	4.17	250.05	14.78	21.81
23/02/2016	12:30:00	31.44	4.87	181.08	188.46	3.99	239.25	14.78	22.39
23/02/2016	12:31:00	31.43	5.11	179.57	188.55	4.25	255.23	14.78	22.46
23/02/2016	12:32:00	31.47	4.88	180.14	188.01	4.12	247.28	14.78	21.81
23/02/2016	12:33:00	31.62	4.99	180.61	188.15	4.19	251.48	14.78	22.08
23/02/2016	12:34:00	31.38	5.11	180.28	188.28	4.22	253.13	14.78	21.76
23/02/2016	12:35:00	31.22	5.19	179.81	187.74	4.08	244.95	13.73	21.78
23/02/2016	12:36:00	31.22	5.06	180.28	187.79	4.20	252.23	14.74	22.51
23/02/2016	12:37:00	31.31	5.19	180.24	187.79	3.91	234.38	14.74	22.44
23/02/2016	12:38:00	31.53	5.13	180.18	187.74	3.88	232.88	14.74	22.44
23/02/2016	12:39:00	31.20	5.13	180.28	187.74	4.11	246.30	14.66	22.44
23/02/2016	12:40:00	31.40	5.33	181.04	187.74	3.95	236.78	14.66	22.07
23/02/2016	12:41:00	31.65	5.28	179.94	188.24	4.28	256.95	14.66	22.57
23/02/2016	12:42:00	31.58	5.29	181.27	188.24	4.13	247.80	14.66	21.76
23/02/2016	12:43:00	31.38	5.48	180.99	188.24	4.25	255.15	14.66	22.62
23/02/2016	12:44:00	31.52	5.35	184.74	188.15	4.23	253.80	14.66	22.47
23/02/2016	12:45:00	31.50	5.56	180.75	188.15	4.10	246.23	14.66	22.07
23/02/2016	12:46:00	31.32	5.48	182.55	188.10	4.16	249.75	14.66	22.31
23/02/2016	12:47:00	31.46	5.35	181.65	188.78	4.15	249.08	14.66	21.87
23/02/2016	12:48:00	31.53	5.27	182.45	188.24	4.26	255.53	14.66	21.91
23/02/2016	12:49:00	31.47	5.41	181.85	188.24	4.26	255.75	14.66	22.46
23/02/2016	12:50:00	31.13	5.22	182.13	188.24	4.12	247.13	14.66	22.52
23/02/2016	12:51:00	31.25	5.26	181.80	188.87	3.79	227.55	14.66	22.49
23/02/2016	12:52:00	31.34	5.22	182.51	188.15	4.28	256.50	14.66	22.59
23/02/2016	12:53:00	31.19	5.23	179.94	187.56	4.30	258.23	14.66	21.81

February 23/2016		Waste Flows							Flows
Test#		Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PACFlow
		FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT
Max		31.80	5.58	184.74	188.87	4.30	258.23	14.93	22.62
Min		31.07	4.50	178.62	186.75	3.79	227.55	13.65	21.69
Average		31.42	5.10	180.54	187.82	4.11	246.71	14.70	22.17
Variance		0.03	0.07	1.20	0.26	0.02	71.78	0.04	0.11



		CO	HCl	CO2	H2O	THC	O2	Opacity	SO2	
		PPM	PPM	%	%	PPM	%	%	PPM	
\$Date	\$Time	AT-205CORR	AT-213A	AT-213B	AT-213C	AT-259CORR	AT-261	AT-263	AT-264	
23/02/2016	11:53:00	<b>Analyzer Purge Check</b>						1.33		
23/02/2016	11:54:00	<b>Analyzer Purge Check</b>						1.45		
23/02/2016	11:55:00	46.2	17.35	9.23	40.06	18.9	20.01	1.38	589.3	
23/02/2016	11:56:00	42.8	18.91	9.20	40.06	21.1	19.18	1.43	587.2	
23/02/2016	11:57:00	42.5	20.51	9.14	40.06	18.5	17.76	1.36	577.5	
23/02/2016	11:58:00	38.9	21.16	8.95	40.06	20.4	16.74	1.45	563.4	
23/02/2016	11:59:00	40.9	21.06	9.08	40.06	20.4	16.56	1.40	572.9	
23/02/2016	12:00:00	47.5	22.46	9.20	40.06	23.6	16.05	1.60	582.0	
23/02/2016	12:01:00	54.9	23.17	9.22	40.06	20.8	15.49	1.33	587.7	
23/02/2016	12:02:00	55.9	23.47	9.20	40.06	22.5	15.21	1.47	585.1	
23/02/2016	12:03:00	85.0	25.05	9.32	40.06	32.5	14.82	1.36	591.3	
23/02/2016	12:04:00	76.7	24.62	9.37	40.06	33.7	14.45	1.43	598.8	
23/02/2016	12:05:00	76.9	25.32	9.28	40.06	29.2	14.22	1.33	585.4	
23/02/2016	12:06:00	68.6	24.92	9.07	40.06	29.4	13.77	1.46	577.1	
23/02/2016	12:07:00	65.3	25.85	9.16	40.06	31.7	13.72	1.42	585.0	
23/02/2016	12:08:00	74.5	26.44	9.20	40.06	29.4	13.60	1.57	587.7	
23/02/2016	12:09:00	73.9	26.20	9.20	40.06	29.2	13.48	1.32	583.6	
23/02/2016	12:10:00	65.7	27.34	9.20	40.06	28.2	13.38	1.52	586.6	
23/02/2016	12:11:00	63.9	26.78	9.23	40.06	27.0	13.31	1.38	589.6	
23/02/2016	12:12:00	59.9	26.25	9.20	40.06	26.4	13.23	1.42	585.0	
23/02/2016	12:13:00	56.5	25.50	9.05	40.06	26.6	13.05	1.36	573.3	
23/02/2016	12:14:00	52.1	24.86	9.02	40.06	25.1	13.04	1.45	574.8	
23/02/2016	12:15:00	53.4	26.05	9.11	40.06	25.4	13.11	1.36	579.9	
23/02/2016	12:16:00	50.5	27.65	9.19	40.06	25.4	13.15	1.45	590.3	
23/02/2016	12:17:00	52.8	26.98	9.17	40.06	27.9	13.07	1.30	589.3	
23/02/2016	12:18:00	55.7	26.96	9.19	40.06	28.3	13.06	1.45	589.3	
23/02/2016	12:19:00	64.1	28.90	9.31	40.06	26.5	13.05	1.36	596.2	
23/02/2016	12:20:00	55.5	28.34	9.28	40.06	23.6	12.95	1.40	596.2	
23/02/2016	12:21:00	51.5	27.12	9.13	40.06	24.2	12.80	1.33	582.4	
23/02/2016	12:22:00	48.2	27.12	8.98	40.06	24.6	12.74	1.36	568.9	
23/02/2016	12:23:00	54.5	28.57	9.17	40.06	26.0	12.93	1.42	580.0	
23/02/2016	12:24:00	54.8	28.93	9.20	40.06	23.5	12.96	1.42	584.4	
23/02/2016	12:25:00	54.1	28.03	9.11	40.06	27.2	12.89	1.31	578.8	
23/02/2016	12:26:00	60.3	26.99	9.11	40.06	24.6	12.95	1.48	582.7	
23/02/2016	12:27:00	54.8	27.23	9.15	40.06	25.3	12.94	1.33	583.9	
23/02/2016	12:28:00	51.2	28.02	9.17	40.06	22.8	12.95	1.33	586.8	
23/02/2016	12:29:00	52.4	27.71	8.97	40.06	26.7	12.82	1.33	570.6	
23/02/2016	12:30:00	60.2	28.05	9.07	40.06	23.0	12.99	1.36	579.0	
23/02/2016	12:31:00	61.7	28.77	9.15	40.06	28.0	13.05	1.50	583.4	
23/02/2016	12:32:00	62.3	29.35	9.26	40.06	23.1	13.12	1.33	595.5	
23/02/2016	12:33:00	51.7	28.23	9.16	40.06	26.0	12.99	1.33	587.5	
23/02/2016	12:34:00	52.0	27.86	9.20	40.06	23.3	13.01	1.40	592.5	
23/02/2016	12:35:00	56.3	28.67	9.22	40.06	24.3	13.00	1.36	593.0	
23/02/2016	12:36:00	47.4	27.87	9.14	40.06	21.5	12.89	1.33	585.2	
23/02/2016	12:37:00	45.5	26.98	9.03	40.06	24.0	12.81	1.40	575.4	
23/02/2016	12:38:00	46.7	27.18	9.03	40.06	22.4	12.91	1.40	579.4	
23/02/2016	12:39:00	50.7	27.70	9.13	40.06	27.4	13.03	1.51	588.2	
23/02/2016	12:40:00	55.3	28.59	9.16	40.06	22.9	13.03	1.33	590.5	
23/02/2016	12:41:00	53.8	28.36	9.11	40.06	26.3	12.99	1.37	586.1	
23/02/2016	12:42:00	55.5	28.37	9.17	40.06	21.9	13.06	1.38	596.8	
23/02/2016	12:43:00	50.5	28.51	9.19	40.06	25.3	13.01	1.38	594.9	
23/02/2016	12:44:00	46.6	28.30	9.19	40.06	22.8	13.01	1.36	596.0	
23/02/2016	12:45:00	46.3	28.16	8.99	40.06	26.4	12.87	1.42	578.3	
23/02/2016	12:46:00	54.7	28.58	9.14	40.06	24.3	13.02	1.37	589.5	
23/02/2016	12:47:00	55.8	28.94	9.20	40.06	27.5	13.06	1.42	595.4	
23/02/2016	12:48:00	55.6	29.50	9.26	40.06	24.1	13.06	1.30	606.0	
23/02/2016	12:49:00	51.3	28.06	9.19	40.06	28.0	12.95	1.30	601.2	
23/02/2016	12:50:00	56.8	29.20	9.30	40.06	23.3	13.02	1.37	611.8	
23/02/2016	12:51:00	55.0	29.14	9.26	40.06	27.9	12.97	1.36	610.0	
23/02/2016	12:52:00	55.4	26.96	9.12	40.06	23.3	12.81	1.33	597.2	
23/02/2016	12:53:00	50.1	27.86	9.03	40.06	24.0	12.78	1.35	589.8	

February 23/2016

	Analyzers								
	CO	HCl	CO2	H2O	THC	O2	Opacity	SO2	
Test1	AT-205	AT-213A	AT-213B	AT-213C	AT-259	AT-261	AT-263	AT-264	
Max	85.0	29.50	9.37	40.06	33.7	20.01	1.60	611.8	
Min	38.9	17.35	8.95	40.06	18.5	12.74	1.30	563.4	
Average	55.6	26.63	9.16	40.06	25.2	13.68	1.39	586.9	
Variance	82.7	6.95	0.01	0.00	9.9	2.40	0.00	88.8	

\$Date	\$Time	Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PAC
		LPM	LPM	LPM	LPM	LPM	SCFM	LPM	Lbs/h
		FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT
23/02/2016	13:12:00	31.38	5.16	182.22	188.55	3.93	236.03	14.66	21.82
23/02/2016	13:13:00	31.22	4.97	182.27	188.01	4.28	256.65	14.66	22.46
23/02/2016	13:14:00	31.44	5.12	183.69	188.55	4.24	254.55	14.66	21.73
23/02/2016	13:15:00	31.44	5.09	182.32	188.10	4.23	253.65	14.66	22.08
23/02/2016	13:16:00	31.59	5.22	183.45	188.19	4.26	255.45	14.66	21.94
23/02/2016	13:17:00	31.26	5.25	182.70	188.19	4.23	253.80	14.66	21.82
23/02/2016	13:18:00	31.62	5.52	182.36	188.73	4.27	256.05	14.66	21.79
23/02/2016	13:19:00	31.08	5.33	182.13	188.19	4.12	247.43	14.66	21.84
23/02/2016	13:20:00	31.56	5.20	181.65	188.19	4.08	244.95	14.66	22.41
23/02/2016	13:21:00	31.32	5.18	182.45	188.19	4.02	241.43	14.66	22.56
23/02/2016	13:22:00	31.53	5.18	183.03	188.33	4.16	249.53	14.66	22.26
23/02/2016	13:23:00	31.04	4.79	179.38	187.11	4.21	252.83	14.66	22.05
23/02/2016	13:24:00	31.20	4.86	180.99	187.70	4.24	254.10	14.66	22.08
23/02/2016	13:25:00	31.13	5.08	181.80	187.07	4.27	256.20	14.66	22.23
23/02/2016	13:26:00	31.52	5.11	180.71	187.88	3.99	239.40	14.66	22.25
23/02/2016	13:27:00	31.28	4.90	182.88	186.80	3.90	234.15	14.66	22.31
23/02/2016	13:28:00	31.56	5.05	181.61	187.34	4.26	255.83	14.66	21.84
23/02/2016	13:29:00	31.59	5.15	183.26	187.88	4.26	255.38	14.66	22.31
23/02/2016	13:30:00	31.76	5.20	182.36	187.88	4.31	258.83	14.66	21.79
23/02/2016	13:31:00	31.76	5.24	182.75	187.97	4.30	257.78	14.66	21.95
23/02/2016	13:32:00	31.55	5.31	183.07	187.65	3.96	237.38	14.66	22.57
23/02/2016	13:33:00	31.68	5.26	182.75	188.19	4.22	253.28	14.66	22.60
23/02/2016	13:34:00	31.88	5.43	183.45	188.24	4.26	255.53	14.66	22.28
23/02/2016	13:35:00	31.32	5.30	182.45	188.24	4.25	255.00	14.66	22.54
23/02/2016	13:36:00	31.65	5.40	182.27	188.24	4.25	255.00	14.66	21.94
23/02/2016	13:37:00	31.52	5.04	181.94	187.70	4.10	245.78	14.66	22.33
23/02/2016	13:38:00	31.71	5.12	183.45	187.70	4.09	245.63	14.66	21.97
23/02/2016	13:39:00	31.19	5.20	180.09	187.70	3.90	234.23	14.66	21.82
23/02/2016	13:40:00	31.44	5.08	180.75	188.24	3.79	227.18	14.66	22.12
23/02/2016	13:41:00	31.73	5.29	183.88	187.65	4.26	255.53	14.66	21.91
23/02/2016	13:42:00	31.65	4.94	182.51	187.65	4.09	245.63	14.66	21.79
23/02/2016	13:43:00	31.68	4.90	184.31	188.19	4.24	254.25	14.66	22.62
23/02/2016	13:44:00	31.95	5.08	182.13	188.19	4.14	248.40	14.66	21.79
23/02/2016	13:45:00	31.59	4.94	184.31	188.33	4.24	254.18	14.66	22.21
23/02/2016	13:46:00	31.85	4.76	183.03	188.46	4.19	251.48	14.66	21.95
23/02/2016	13:47:00	31.56	4.48	182.64	188.19	4.15	249.08	14.66	22.04
23/02/2016	13:48:00	31.40	4.75	182.79	188.19	4.23	254.03	14.66	21.81
23/02/2016	13:49:00	31.47	4.38	183.41	188.06	4.11	246.75	14.66	22.62
23/02/2016	13:50:00	31.86	4.43	180.84	187.52	4.13	247.50	14.66	21.81
23/02/2016	13:51:00	31.82	4.37	184.59	187.52	4.14	248.48	14.66	22.39
23/02/2016	13:52:00	31.76	4.25	182.84	187.47	3.88	232.80	14.66	22.46
23/02/2016	13:53:00	31.88	4.28	183.17	188.10	4.19	251.40	14.66	22.57
23/02/2016	13:54:00	31.85	8.85	183.41	188.64	4.13	247.65	14.66	22.51
23/02/2016	13:55:00	31.91	8.86	183.84	188.64	3.86	231.60	14.66	22.46
23/02/2016	13:56:00	32.48	8.78	183.12	188.64	4.16	249.38	14.66	22.34
23/02/2016	13:57:00	32.36	9.22	143.38	188.64	4.22	253.13	14.66	21.79
23/02/2016	13:58:00	32.54	9.07	157.64	188.10	4.28	256.58	14.66	22.39
23/02/2016	13:59:00	32.37	8.95	154.18	188.01	4.26	255.83	15.75	22.43
23/02/2016	14:00:00	32.31	7.01	160.29	187.97	4.00	239.93	15.75	22.26
23/02/2016	14:01:00	32.07	6.72	177.86	187.97	4.31	258.53	15.34	22.08
23/02/2016	14:02:00	31.85	6.58	175.25	187.83	3.91	234.75	15.34	22.57
23/02/2016	14:03:00	31.82	6.74	177.48	187.83	4.28	256.73	15.34	22.44
23/02/2016	14:04:00	31.71	6.13	177.11	187.83	3.90	234.00	15.34	21.79
23/02/2016	14:05:00	31.67	6.26	176.54	187.25	4.24	254.48	15.34	22.52
23/02/2016	14:06:00	31.65	6.09	174.07	187.79	3.89	233.48	15.34	21.81
23/02/2016	14:07:00	31.95	6.28	172.46	186.66	3.93	235.58	14.33	22.44
23/02/2016	14:08:00	31.82	6.21	173.17	186.98	3.84	230.18	15.38	22.44
23/02/2016	14:09:00	31.73	5.95	171.90	186.98	4.26	255.68	15.38	22.28
23/02/2016	14:10:00	31.43	6.03	171.61	186.44	4.12	246.98	15.38	22.60
23/02/2016	14:11:00	31.86	6.16	173.88	186.48	4.19	251.33	15.38	21.76
23/02/2016	14:12:00	31.49	6.27	174.45	186.62	4.19	251.33	15.38	21.84

February 23/2016	Waste Flows								Flows
	Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PACFlow	
Test1	FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT	
Max	32.54	9.22	184.59	188.73	4.31	258.83	15.75	22.62	
Min	31.04	4.25	143.38	186.44	3.79	227.18	14.33	21.73	
Average	31.66	5.68	179.12	187.86	4.14	248.19	14.82	22.17	
Variance	0.11	1.57	59.88	0.32	0.02	74.13	0.10	0.09	





		CO	HCl	CO2	H2O	THC	O2	Opacity	SO2
		PPM	PPM	%	%	PPM	%	%	PPM
\$Date	\$Time	AT-205CORR	AT-213A	AT-213B	AT-213C	AT-259CORR	AT-261	AT-263	AT-264
23/02/2016	13:12:00	69.0	28.42	9.16	40.06	28.4	13.05	1.31	611.9
23/02/2016	13:13:00	70.0	28.21	9.10	40.06	29.0	13.00	1.50	608.9
23/02/2016	13:14:00	70.3	28.15	9.21	40.06	25.5	13.04	1.32	615.8
23/02/2016	13:15:00	62.1	28.48	9.18	40.06	25.8	13.02	1.40	614.4
23/02/2016	13:16:00	56.4	28.54	9.03	40.06	25.3	12.88	1.33	601.9
23/02/2016	13:17:00	53.0	28.15	8.97	40.06	26.0	12.91	1.41	599.0
23/02/2016	13:18:00	55.5	28.76	9.14	40.06	27.6	13.05	1.38	612.6
23/02/2016	13:19:00	57.2	28.63	9.20	40.06	27.6	13.07	1.36	615.9
23/02/2016	13:20:00	63.5	28.95	9.18	40.06	28.4	13.02	1.31	612.0
23/02/2016	13:21:00	65.7	28.48	9.24	40.06	28.3	13.06	1.40	617.8
23/02/2016	13:22:00	69.9	28.33	9.25	40.06	28.9	13.04	1.33	617.8
23/02/2016	13:23:00	71.1	28.86	9.23	40.06	25.0	12.97	1.36	617.8
23/02/2016	13:24:00	62.6	28.48	8.97	40.06	24.5	12.78	1.33	596.1
23/02/2016	13:25:00	56.5	27.66	8.92	40.06	22.4	12.79	1.36	593.1
23/02/2016	13:26:00	51.6	27.85	9.05	40.06	26.5	12.98	1.42	604.8
23/02/2016	13:27:00	55.1	28.75	9.15	40.06	24.1	13.07	1.36	618.0
23/02/2016	13:28:00	57.2	28.87	9.10	40.06	28.1	13.02	1.30	615.5
23/02/2016	13:29:00	58.7	29.25	9.13	40.06	24.3	13.02	1.40	621.3
23/02/2016	13:30:00	53.7	29.05	9.19	40.06	26.9	13.04	1.33	623.4
23/02/2016	13:31:00	49.8	29.06	9.22	40.06	23.4	13.05	1.36	626.9
23/02/2016	13:32:00	47.5	28.75	9.06	40.06	25.9	12.90	1.36	609.4
23/02/2016	13:33:00	52.2	28.19	9.10	40.06	23.9	12.96	1.35	615.6
23/02/2016	13:34:00	52.2	28.66	9.12	40.06	28.5	12.98	1.46	619.6
23/02/2016	13:35:00	57.2	29.61	9.22	40.06	23.8	13.04	1.31	632.5
23/02/2016	13:36:00	56.4	28.66	9.21	40.06	27.1	12.98	1.35	628.9
23/02/2016	13:37:00	54.6	29.37	9.22	40.06	23.1	12.98	1.35	634.3
23/02/2016	13:38:00	52.8	29.71	9.23	40.06	27.0	12.94	1.36	634.3
23/02/2016	13:39:00	52.4	29.95	9.19	40.06	22.1	12.86	1.31	628.8
23/02/2016	13:40:00	47.4	28.64	8.91	40.06	27.3	12.76	1.36	607.0
23/02/2016	13:41:00	49.5	28.77	8.97	40.06	23.6	12.87	1.37	610.9
23/02/2016	13:42:00	53.3	29.67	9.10	40.06	26.6	12.98	1.42	620.1
23/02/2016	13:43:00	56.5	29.89	9.15	40.06	24.2	13.02	1.28	630.2
23/02/2016	13:44:00	53.9	29.56	9.13	40.06	29.9	12.98	1.30	626.5
23/02/2016	13:45:00	64.2	30.35	9.22	40.06	24.6	13.05	1.33	636.9
23/02/2016	13:46:00	57.0	30.89	9.20	40.06	28.5	12.97	1.37	635.0
23/02/2016	13:47:00	56.3	30.84	9.21	40.06	23.8	12.96	1.31	637.2
23/02/2016	13:48:00	53.1	29.40	9.01	40.06	24.8	12.78	1.40	617.3
23/02/2016	13:49:00	45.6	28.29	9.07	40.06	24.3	12.91	1.33	623.4
23/02/2016	13:50:00	43.8	29.92	9.10	40.06	25.4	12.97	1.38	629.3
23/02/2016	13:51:00	46.4	30.22	9.17	40.06	25.3	13.02	1.27	636.6
23/02/2016	13:52:00	48.5	29.09	9.11	40.06	27.1	12.96	1.40	632.2
23/02/2016	13:53:00	52.3	29.66	9.20	40.06	23.9	13.00	1.33	639.4
23/02/2016	13:54:00	49.5	29.70	9.18	40.06	27.0	12.98	1.36	636.4
23/02/2016	13:55:00	48.8	29.99	9.12	40.06	35.7	12.92	1.31	629.8
23/02/2016	13:56:00	100.5	29.87	9.14	40.06	52.9	12.83	1.40	632.2
23/02/2016	13:57:00	201.9	31.10	9.53	40.06	46.8	12.98	1.42	669.9
23/02/2016	13:58:00	189.3	31.28	9.45	40.06	23.3	12.85	1.52	649.8
23/02/2016	13:59:00	69.4	30.31	8.91	40.06	18.8	12.54	1.25	556.0
23/02/2016	14:00:00	32.5	30.15	8.42	40.06	20.4	12.68	1.42	530.5
23/02/2016	14:01:00	29.3	29.51	8.06	40.06	23.8	12.81	1.33	522.4
23/02/2016	14:02:00	38.4	29.04	8.57	40.06	25.8	13.12	1.40	561.0
23/02/2016	14:03:00	46.3	30.09	9.03	40.06	25.4	13.17	1.36	601.8
23/02/2016	14:04:00	46.8	30.15	8.96	40.06	25.4	13.12	1.46	601.8
23/02/2016	14:05:00	49.6	31.01	9.11	40.06	25.6	13.26	1.40	614.5
23/02/2016	14:06:00	46.4	31.26	9.17	40.06	25.1	13.26	1.55	618.0
23/02/2016	14:07:00	45.1	30.42	9.14	40.06	24.4	13.24	1.27	618.0
23/02/2016	14:08:00	39.4	30.01	8.97	40.06	24.8	13.11	1.56	602.5
23/02/2016	14:09:00	37.8	30.35	9.04	40.06	23.5	13.19	1.32	604.0
23/02/2016	14:10:00	36.0	31.20	9.02	40.06	22.5	13.20	1.36	601.7
23/02/2016	14:11:00	34.3	31.15	8.54	40.06	22.5	13.10	1.35	586.2
23/02/2016	14:12:00	31.9	30.40	8.05	40.06	23.4	13.06	1.42	570.3

February 23/2016

Test#	Analyzers								
	CO	HCl	CO2	H2O	THC	O2	Opacity	SO2	
	AT-205	AT-213A	AT-213B	AT-213C	AT-259	AT-261	AT-263	AT-264	
<b>Max</b>	201.9	31.28	9.53	40.06	52.9	13.26	1.56	669.9	
<b>Min</b>	29.3	27.66	8.05	40.06	18.8	12.54	1.25	522.4	
<b>Average</b>	58.0	29.44	9.06	40.06	26.3	12.99	1.37	613.7	
<b>Variance</b>	786.6	0.92	0.07	0.00	25.9	0.02	0.00	625.7	

		Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PAC
		LPM	LPM	LPM	LPM	LPM	SCFM	LPM	Lbs/h
\$Date	\$Time	FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT
23/02/2016	14:28:00	31.56	6.91	181.23	185.94	4.03	241.80	15.34	22.59
23/02/2016	14:29:00	31.50	6.69	179.62	186.48	3.99	239.55	15.34	22.46
23/02/2016	14:30:00	31.50	6.45	180.18	185.94	4.11	246.83	15.34	21.86
23/02/2016	14:31:00	31.80	6.49	180.56	185.36	4.13	247.88	15.34	21.82
23/02/2016	14:32:00	31.56	6.44	179.19	184.82	4.20	252.23	15.34	22.39
23/02/2016	14:33:00	31.71	6.39	180.24	185.36	4.16	249.75	15.34	22.07
23/02/2016	14:34:00	31.46	6.34	182.17	184.68	4.22	253.28	15.34	21.91
23/02/2016	14:35:00	31.68	6.54	181.27	185.94	4.07	243.90	15.34	22.39
23/02/2016	14:36:00	31.65	6.67	179.62	185.90	4.27	256.35	15.34	22.08
23/02/2016	14:37:00	31.86	6.91	179.52	185.99	4.33	259.65	15.34	21.91
23/02/2016	14:38:00	31.62	6.90	182.04	185.45	4.20	252.00	15.34	22.54
23/02/2016	14:39:00	31.77	6.74	178.85	186.89	4.27	255.98	15.34	21.81
23/02/2016	14:40:00	31.77	6.90	181.32	186.35	4.26	255.68	15.34	21.82
23/02/2016	14:41:00	31.85	6.83	178.72	186.62	4.13	247.73	15.34	22.59
23/02/2016	14:42:00	31.91	6.84	180.33	186.62	3.99	239.33	15.34	22.62
23/02/2016	14:43:00	31.82	6.69	179.04	186.62	4.09	245.25	15.34	22.62
23/02/2016	14:44:00	31.97	6.52	179.19	186.62	4.26	255.53	15.34	21.87
23/02/2016	14:45:00	31.77	6.59	181.14	186.62	4.22	253.28	15.34	21.82
23/02/2016	14:46:00	31.79	6.85	182.51	186.62	3.98	239.03	15.34	21.79
23/02/2016	14:47:00	31.55	6.25	178.53	186.80	4.25	254.85	15.34	22.44
23/02/2016	14:48:00	31.23	6.25	180.84	186.30	4.16	249.60	15.34	21.81
23/02/2016	14:49:00	31.29	6.09	178.72	186.30	4.00	240.08	15.34	22.52
23/02/2016	14:50:00	31.55	6.22	179.38	185.72	4.08	244.73	15.34	22.54
23/02/2016	14:51:00	31.32	5.96	179.47	185.72	4.27	255.98	15.34	21.89
23/02/2016	14:52:00	31.82	6.08	180.14	185.18	4.07	244.13	15.34	22.12
23/02/2016	14:53:00	31.53	6.24	180.05	185.85	4.14	248.25	15.34	21.95
23/02/2016	14:54:00	31.79	6.23	179.90	186.39	4.10	246.15	15.34	21.81
23/02/2016	14:55:00	31.82	6.45	179.10	186.39	4.28	256.80	15.34	21.82
23/02/2016	14:56:00	32.16	6.22	181.61	186.44	4.27	255.90	15.34	22.54
23/02/2016	14:57:00	31.70	6.34	181.18	186.84	4.11	246.83	15.34	21.79
23/02/2016	14:58:00	31.88	6.36	181.23	186.84	4.02	240.98	15.34	22.62
23/02/2016	14:59:00	31.91	6.36	178.95	186.21	4.10	246.00	15.34	21.97
23/02/2016	15:00:00	32.06	6.37	180.09	186.21	4.11	246.83	15.34	22.43
23/02/2016	15:01:00	31.91	6.31	181.32	186.80	4.15	248.70	15.34	22.60
23/02/2016	15:02:00	31.65	6.30	180.56	185.67	4.22	253.13	15.34	22.56
23/02/2016	15:03:00	31.37	6.05	179.62	186.30	3.79	227.10	15.34	22.41
23/02/2016	15:04:00	31.74	6.15	180.90	186.30	3.86	231.45	15.34	21.92
23/02/2016	15:05:00	31.20	6.00	179.47	185.81	4.16	249.45	15.34	21.81
23/02/2016	15:06:00	31.80	5.90	179.34	186.08	4.25	255.08	15.34	22.23
23/02/2016	15:07:00	31.52	6.00	179.81	186.08	4.21	252.38	15.34	21.87
23/02/2016	15:08:00	31.85	6.25	181.08	186.08	4.11	246.30	15.34	22.10
23/02/2016	15:09:00	31.79	5.85	179.90	185.72	3.73	223.73	15.34	22.08
23/02/2016	15:10:00	31.74	5.21	180.90	186.26	3.97	238.35	15.34	22.26
23/02/2016	15:11:00	31.82	5.09	179.15	185.81	4.01	240.30	15.34	21.95
23/02/2016	15:12:00	32.19	5.39	179.38	186.62	3.73	223.80	15.34	21.78
23/02/2016	15:13:00	31.97	5.44	180.80	186.08	4.15	248.93	15.34	22.25
23/02/2016	15:14:00	32.34	5.35	181.32	186.03	4.18	250.95	15.34	22.05
23/02/2016	15:15:00	32.31	5.26	180.33	186.03	4.14	248.40	15.34	22.47
23/02/2016	15:16:00	32.49	5.50	141.39	186.62	3.88	232.80	16.58	22.57
23/02/2016	15:17:00	32.37	5.18	140.21	186.03	3.85	231.15	15.41	22.49
23/02/2016	15:18:00	32.24	5.22	160.57	186.03	4.15	248.78	15.41	22.60
23/02/2016	15:19:00	32.24	5.05	165.88	186.08	4.03	241.88	15.41	21.87
23/02/2016	15:20:00	31.91	5.04	166.87	185.49	4.22	253.35	15.41	21.84
23/02/2016	15:21:00	32.07	40.00	143.10	185.45	4.22	253.43	15.41	22.60
23/02/2016	15:22:00	31.88	5.75	169.57	185.45	4.12	247.05	15.49	21.79
23/02/2016	15:23:00	31.86	5.36	170.24	185.45	3.63	217.58	15.49	21.81
23/02/2016	15:24:00	31.82	5.91	170.81	186.17	3.63	217.50	15.49	22.21
23/02/2016	15:25:00	31.82	6.33	170.43	186.17	3.92	235.20	15.49	21.82
23/02/2016	15:26:00	32.34	6.14	171.42	186.21	3.51	210.68	15.49	22.21
23/02/2016	15:27:00	32.13	6.16	171.37	186.21	4.14	248.48	15.49	22.46
23/02/2016	15:28:00	32.30	5.91	172.61	186.21	4.10	245.93	15.49	22.26

February 23/2016	Waste Flows								Flows
	Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PACFlow	
Test1	FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT	
Max	32.49	40.00	182.51	186.89	4.33	259.65	16.58	22.62	
Min	31.20	5.04	140.21	184.68	3.51	210.68	15.34	21.78	
Average	31.83	6.62	176.21	186.06	4.07	244.47	15.39	22.15	
Variance	0.08	17.67	79.05	0.23	0.03	116.37	0.03	0.10	



		CO	HCl	CO2	H2O	THC	O2	Opacity	SO2
		PPM	PPM	%	%	PPM	%	%	PPM
\$Date	\$Time	AT-205CORR	AT-213A	AT-213B	AT-213C	AT-259CORR	AT-261	AT-263	AT-264
23/02/2016	14:28:00	77.9	32.84	9.16	40.06	27.6	13.07	1.40	634.1
23/02/2016	14:29:00	85.5	34.51	9.32	40.06	37.2	13.16	1.46	647.0
23/02/2016	14:30:00	94.2	34.58	9.34	40.06	26.5	13.06	1.36	649.6
23/02/2016	14:31:00	86.8	34.52	9.26	40.06	30.8	12.96	1.36	643.8
23/02/2016	14:32:00	70.0	35.16	9.27	40.06	25.4	12.93	1.42	646.0
23/02/2016	14:33:00	72.2	34.51	9.28	40.06	29.5	12.91	1.36	645.8
23/02/2016	14:34:00	67.4	34.24	9.28	40.06	24.8	12.88	1.40	645.8
23/02/2016	14:35:00	65.2	33.72	9.06	40.06	29.8	12.68	1.40	622.6
23/02/2016	14:36:00	71.2	33.24	9.19	40.06	27.2	12.84	1.36	635.0
23/02/2016	14:37:00	76.7	33.27	9.26	40.06	33.9	12.91	1.50	642.4
23/02/2016	14:38:00	91.5	36.04	9.39	40.06	27.8	12.96	1.33	656.4
23/02/2016	14:39:00	81.0	34.50	9.35	40.06	35.6	12.84	1.36	655.8
23/02/2016	14:40:00	79.8	34.77	9.42	40.06	27.6	12.80	1.40	664.2
23/02/2016	14:41:00	82.8	34.89	9.43	40.06	30.3	12.74	1.40	662.4
23/02/2016	14:42:00	79.3	34.70	9.38	40.06	25.8	12.62	1.36	656.0
23/02/2016	14:43:00	70.8	33.90	9.17	40.06	28.5	12.42	1.42	632.5
23/02/2016	14:44:00	68.0	34.67	9.26	40.06	25.2	12.53	1.42	642.4
23/02/2016	14:45:00	57.9	34.30	9.37	40.06	29.3	12.61	1.52	652.2
23/02/2016	14:46:00	57.6	34.99	9.38	40.06	25.4	12.57	1.33	659.1
23/02/2016	14:47:00	55.3	34.31	9.33	40.06	31.9	12.52	1.40	653.9
23/02/2016	14:48:00	62.4	34.56	9.40	40.06	23.8	12.56	1.36	656.9
23/02/2016	14:49:00	52.6	34.27	9.37	40.06	25.4	12.51	1.40	654.4
23/02/2016	14:50:00	39.8	33.66	9.15	40.06	22.7	12.39	1.35	638.5
23/02/2016	14:51:00	37.2	33.22	9.04	40.06	24.3	12.35	1.42	628.0
23/02/2016	14:52:00	39.0	34.24	9.18	40.06	25.0	12.51	1.40	635.3
23/02/2016	14:53:00	47.4	35.26	9.24	40.06	28.1	12.65	1.48	644.8
23/02/2016	14:54:00	53.1	35.54	9.28	40.06	24.7	12.67	1.31	650.6
23/02/2016	14:55:00	51.0	35.68	9.23	40.06	29.1	12.60	1.40	644.3
23/02/2016	14:56:00	55.4	35.28	9.35	40.06	25.3	12.67	1.33	653.2
23/02/2016	14:57:00	53.5	35.36	9.38	40.06	27.6	12.65	1.37	651.7
23/02/2016	14:58:00	48.6	36.06	9.31	40.06	26.1	12.57	1.31	647.6
23/02/2016	14:59:00	52.0	34.73	9.18	40.06	27.9	12.50	1.38	631.8
23/02/2016	15:00:00	55.2	35.96	9.34	40.06	27.6	12.67	1.46	645.7
23/02/2016	15:01:00	54.0	36.24	9.36	40.06	29.8	12.69	1.56	649.9
23/02/2016	15:02:00	58.5	35.48	9.35	40.06	27.0	12.63	1.31	654.7
23/02/2016	15:03:00	59.9	34.67	9.33	40.06	31.3	12.57	1.46	653.0
23/02/2016	15:04:00	65.6	34.76	9.40	40.06	26.7	12.59	1.33	657.4
23/02/2016	15:05:00	61.2	34.41	9.40	40.06	27.5	12.54	1.40	654.8
23/02/2016	15:06:00	56.0	35.07	9.25	40.06	25.4	12.44	1.33	636.5
23/02/2016	15:07:00	46.7	34.04	9.14	40.06	25.5	12.41	1.46	625.8
23/02/2016	15:08:00	47.6	34.64	9.23	40.06	28.1	12.52	1.46	632.8
23/02/2016	15:09:00	58.3	35.09	9.35	40.06	27.5	12.61	1.56	643.3
23/02/2016	15:10:00	55.6	33.41	9.29	40.06	26.4	12.55	1.27	640.8
23/02/2016	15:11:00	51.5	33.20	9.25	40.06	27.9	12.54	1.52	637.8
23/02/2016	15:12:00	49.9	34.48	9.32	40.06	26.1	12.58	1.33	644.0
23/02/2016	15:13:00	45.0	33.93	9.28	40.06	25.7	12.54	1.36	638.0
23/02/2016	15:14:00	43.6	33.48	9.20	40.06	26.2	12.47	1.32	627.6
23/02/2016	15:15:00	44.9	33.17	9.15	40.06	25.8	12.45	1.38	618.7
23/02/2016	15:16:00	44.4	34.11	9.24	40.06	21.7	12.58	1.37	625.7
23/02/2016	15:17:00	38.2	32.95	8.66	40.06	17.9	12.48	1.37	583.5
23/02/2016	15:18:00	26.5	28.28	7.17	40.06	17.0	12.26	1.20	453.2
23/02/2016	15:19:00	24.8	26.42	6.85	40.06	21.4	12.66	1.46	403.7
23/02/2016	15:20:00	27.6	26.72	7.09	40.06	21.7	13.06	1.31	427.0
23/02/2016	15:21:00	31.4	28.26	8.33	40.06	21.3	13.72	1.27	514.8
23/02/2016	15:22:00	27.8	27.25	7.32	40.06	21.6	13.45	1.31	458.9
23/02/2016	15:23:00	29.8	25.31	6.96	40.06	23.4	13.76	1.33	445.4
23/02/2016	15:24:00	33.4	26.65	7.47	40.06	28.2	14.18	1.33	505.1
23/02/2016	15:25:00	39.1	28.45	8.57	40.06	27.0	14.44	1.27	562.2
23/02/2016	15:26:00	38.1	28.50	8.54	40.06	29.7	14.27	1.25	569.6
23/02/2016	15:27:00	39.7	28.86	8.60	40.06	27.7	14.25	1.30	575.7
23/02/2016	15:28:00	41.4	30.54	9.08	40.06	29.2	14.17	1.31	582.5

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	Analyzers								
	CO	HCl	CO2	H2O	THC	O2	Opacity	SO2	
Test#1	AT-205	AT-213A	AT-213B	AT-213C	AT-259	AT-261	AT-263	AT-264	
Max	94.2	36.24	9.43	40.06	37.2	14.44	1.56	664.2	
Min	24.8	25.31	6.85	40.06	17.0	12.26	1.20	403.7	
Average	54.0	33.09	8.99	40.06	26.7	12.91	1.37	614.1	
Variance	300.1	7.64	0.41	0.00	12.0	0.32	0.01	3777.9	

\$Date	\$Time	Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PAC
		LPM	LPM	LPM	LPM	LPM	SCFM	LPM	Lbs/h
		FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT
23/02/2016	15:46:00	32.30	5.94	175.64	186.08	3.96	237.38	15.79	22.47
23/02/2016	15:47:00	32.67	5.46	176.82	185.36	4.02	241.28	15.68	22.08
23/02/2016	15:48:00	32.70	5.58	176.15	185.99	3.90	233.93	15.68	22.51
23/02/2016	15:49:00	32.57	5.88	175.83	187.25	4.02	240.90	15.68	21.94
23/02/2016	15:50:00	32.39	5.89	175.21	187.52	4.09	245.10	15.68	22.21
23/02/2016	15:51:00	32.45	6.20	176.34	187.34	3.76	225.53	15.68	22.18
23/02/2016	15:52:00	32.34	5.49	175.44	187.88	3.52	211.20	15.68	22.26
23/02/2016	15:53:00	32.16	5.63	175.21	186.62	4.02	240.90	15.68	21.87
23/02/2016	15:54:00	31.97	5.61	179.00	187.25	3.82	229.43	14.59	22.30
23/02/2016	15:55:00	31.83	5.46	180.61	186.57	3.80	228.00	15.64	22.25
23/02/2016	15:56:00	31.76	5.85	178.29	186.66	3.43	205.58	15.64	22.25
23/02/2016	15:57:00	31.80	5.82	179.90	186.21	4.13	247.58	15.56	22.60
23/02/2016	15:58:00	31.88	5.66	179.62	186.48	4.18	250.65	15.56	21.87
23/02/2016	15:59:00	32.06	5.69	180.99	187.20	4.26	255.45	15.56	22.41
23/02/2016	16:00:00	32.28	5.63	178.85	187.11	3.87	232.35	15.56	21.92
23/02/2016	16:01:00	32.37	6.12	180.28	187.56	4.05	243.08	15.56	22.57
23/02/2016	16:02:00	32.46	5.64	178.05	186.93	3.63	217.88	15.56	22.44
23/02/2016	16:03:00	32.48	6.30	180.00	187.29	3.97	238.43	15.56	22.08
23/02/2016	16:04:00	32.31	5.58	179.04	186.84	4.18	250.88	15.56	22.05
23/02/2016	16:05:00	32.39	6.02	179.85	187.11	4.26	255.68	15.56	21.87
23/02/2016	16:06:00	32.22	5.86	179.19	186.98	3.86	231.53	15.56	21.76
23/02/2016	16:07:00	32.52	5.28	180.00	187.38	4.24	254.33	15.56	22.39
23/02/2016	16:08:00	31.97	5.65	179.28	187.11	3.87	231.90	15.56	22.07
23/02/2016	16:09:00	32.40	5.79	179.24	186.84	4.05	242.70	15.56	22.18
23/02/2016	16:10:00	32.15	5.49	178.95	186.66	4.23	253.65	15.56	22.52
23/02/2016	16:11:00	31.94	5.58	180.90	187.29	3.88	232.65	15.56	21.78
23/02/2016	16:12:00	31.94	5.31	179.94	187.29	3.78	226.73	15.56	21.78
23/02/2016	16:13:00	31.91	5.42	180.33	188.01	4.17	250.28	15.56	22.28
23/02/2016	16:14:00	31.73	4.98	178.53	186.80	4.25	255.15	15.56	21.82
23/02/2016	16:15:00	31.80	5.18	180.75	187.20	3.72	223.35	15.56	22.12
23/02/2016	16:16:00	31.89	5.46	179.57	187.29	3.97	237.90	15.56	21.86
23/02/2016	16:17:00	31.83	5.13	178.72	187.97	4.26	255.45	15.56	21.94
23/02/2016	16:18:00	31.47	4.67	179.43	187.29	4.26	255.68	15.56	22.26
23/02/2016	16:19:00	32.00	5.07	179.00	187.34	4.22	253.20	15.56	22.56
23/02/2016	16:20:00	31.47	4.65	178.91	187.34	4.17	250.05	15.56	22.36
23/02/2016	16:21:00	31.86	4.77	180.56	187.92	3.64	218.48	15.56	22.41
23/02/2016	16:22:00	31.89	4.99	179.85	187.38	4.21	252.45	15.56	22.43
23/02/2016	16:23:00	31.98	4.43	179.75	187.02	4.05	243.15	15.56	21.89
23/02/2016	16:24:00	31.97	4.45	179.62	187.74	4.23	253.95	15.56	22.49
23/02/2016	16:25:00	32.07	4.42	180.24	188.06	4.07	244.13	15.56	21.82
23/02/2016	16:26:00	32.34	4.74	179.66	187.34	3.87	232.43	15.56	21.86
23/02/2016	16:27:00	31.95	3.90	180.24	188.15	3.87	232.43	15.56	22.38
23/02/2016	16:28:00	32.00	4.57	180.37	186.84	4.04	242.10	15.56	22.21
23/02/2016	16:29:00	32.03	4.94	179.62	187.47	4.20	252.15	15.56	22.31
23/02/2016	16:30:00	31.41	4.46	180.95	187.20	4.12	247.35	15.56	22.57
23/02/2016	16:31:00	32.13	4.53	180.00	187.83	4.15	248.78	15.56	21.94
23/02/2016	16:32:00	31.40	4.50	180.95	187.38	3.87	231.98	15.56	21.79
23/02/2016	16:33:00	31.74	4.91	179.38	187.97	4.15	249.08	15.56	21.74
23/02/2016	16:34:00	31.26	4.90	180.05	187.02	4.00	240.15	15.56	22.33
23/02/2016	16:35:00	31.77	4.45	179.90	187.74	3.82	229.35	15.56	21.81
23/02/2016	16:36:00	31.68	4.85	181.23	187.47	4.14	248.18	15.56	22.02
23/02/2016	16:37:00	31.98	4.87	179.34	187.07	3.91	234.75	15.56	22.05
23/02/2016	16:38:00	31.85	4.90	179.75	187.43	4.00	239.70	15.56	22.38
23/02/2016	16:39:00	31.68	4.54	184.50	187.20	3.89	233.55	15.56	21.76
23/02/2016	16:40:00	31.44	4.52	180.65	186.80	4.09	245.55	15.56	22.57
23/02/2016	16:41:00	31.61	4.41	181.70	186.80	3.84	230.63	15.56	21.86
23/02/2016	16:42:00	31.70	4.87	183.07	186.89	4.03	241.50	14.51	21.91
23/02/2016	16:43:00	31.37	4.53	182.51	186.62	3.98	238.88	15.53	22.44
23/02/2016	16:44:00	32.34	4.50	185.02	186.48	3.96	237.75	15.53	22.60
23/02/2016	16:45:00	32.18	4.71	183.12	187.70	3.90	233.93	15.53	21.91
23/02/2016	16:46:00	32.52	4.92	184.16	187.70	3.96	237.60	15.53	22.59

February 23/2016	Waste Flows							Flows
	Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PACFlow
Test1	FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT
Max	32.70	6.30	185.02	188.15	4.26	255.68	15.79	22.60
Min	31.26	3.90	175.21	185.36	3.43	205.58	14.51	21.74
Average	32.01	5.17	179.67	187.17	4.00	239.76	15.55	22.16
Variance	0.12	0.32	4.23	0.29	0.04	130.50	0.04	0.08



\$Date	\$Time	CO	HCl	CO2	H2O	THC	O2	Opacity	SO2
		PPM	PPM	%	%	PPM	%	%	PPM
		AT-205CORR	AT-213A	AT-213B	AT-213C	AT-259CORR	AT-261	AT-263	AT-264
23/02/2016	15:46:00	31.1	31.14	8.51	40.06	24.6	12.98	1.30	596.0
23/02/2016	15:47:00	33.0	31.09	8.99	40.06	24.4	13.15	1.33	608.9
23/02/2016	15:48:00	35.1	32.41	9.12	40.06	28.1	13.26	1.48	619.6
23/02/2016	15:49:00	38.4	33.03	9.14	40.06	26.4	13.24	1.23	627.5
23/02/2016	15:50:00	39.0	32.58	9.10	40.06	28.5	13.19	1.33	624.1
23/02/2016	15:51:00	41.2	32.95	9.26	40.06	25.1	13.25	1.28	637.7
23/02/2016	15:52:00	36.9	33.20	9.22	40.06	27.2	13.14	1.30	633.3
23/02/2016	15:53:00	36.2	33.64	9.18	40.06	24.7	13.08	1.23	629.5
23/02/2016	15:54:00	34.2	31.79	8.96	40.06	25.1	12.92	1.37	608.8
23/02/2016	15:55:00	35.5	32.83	9.17	40.06	25.5	13.10	1.31	627.5
23/02/2016	15:56:00	37.8	34.05	9.24	40.06	28.0	13.14	1.43	646.0
23/02/2016	15:57:00	40.3	34.58	9.25	40.06	26.2	13.12	1.25	649.4
23/02/2016	15:58:00	39.6	34.48	9.21	40.06	28.3	13.03	1.33	646.9
23/02/2016	15:59:00	41.9	34.45	9.30	40.06	25.6	13.06	1.27	661.8
23/02/2016	16:00:00	41.2	34.12	9.28	40.06	27.3	13.00	1.33	659.1
23/02/2016	16:01:00	40.3	34.24	9.20	40.06	26.4	12.81	1.27	649.7
23/02/2016	16:02:00	42.4	34.51	9.11	40.06	27.3	12.75	1.33	641.5
23/02/2016	16:03:00	45.7	34.55	9.30	40.06	27.0	12.91	1.40	659.7
23/02/2016	16:04:00	44.0	34.12	9.31	40.06	27.9	12.88	1.50	659.7
23/02/2016	16:05:00	43.4	34.16	9.32	40.06	27.1	12.79	1.21	661.6
23/02/2016	16:06:00	42.2	35.23	9.30	40.06	27.0	12.73	1.42	665.1
23/02/2016	16:07:00	42.9	35.16	9.38	40.06	26.5	12.77	1.25	673.8
23/02/2016	16:08:00	40.9	34.36	9.39	40.06	25.4	12.70	1.31	672.5
23/02/2016	16:09:00	37.8	34.50	9.17	40.06	25.0	12.51	1.26	651.8
23/02/2016	16:10:00	35.8	33.62	9.08	40.06	24.8	12.48	1.38	644.5
23/02/2016	16:11:00	36.8	34.23	9.23	40.06	25.5	12.63	1.43	658.5
23/02/2016	16:12:00	38.0	35.40	9.36	40.06	26.5	12.71	1.48	673.5
23/02/2016	16:13:00	38.2	35.28	9.35	40.06	26.6	12.69	1.23	675.7
23/02/2016	16:14:00	37.2	34.03	9.31	40.06	26.8	12.64	1.50	675.0
23/02/2016	16:15:00	36.7	35.12	9.38	40.06	25.8	12.64	1.27	675.6
23/02/2016	16:16:00	33.4	33.90	9.27	40.06	24.6	12.55	1.32	665.3
23/02/2016	16:17:00	33.4	33.64	9.20	40.06	25.9	12.49	1.28	655.7
23/02/2016	16:18:00	37.3	34.19	9.17	40.06	23.9	12.54	1.35	653.3
23/02/2016	16:19:00	35.5	34.12	9.20	40.06	26.0	12.63	1.36	658.2
23/02/2016	16:20:00	33.3	33.62	9.21	40.06	24.0	12.66	1.36	661.0
23/02/2016	16:21:00	35.0	32.74	9.15	40.06	26.3	12.63	1.25	656.6
23/02/2016	16:22:00	36.3	33.14	9.15	40.06	25.2	12.64	1.33	657.6
23/02/2016	16:23:00	36.2	33.29	9.30	40.06	25.9	12.72	1.30	669.2
23/02/2016	16:24:00	32.9	32.77	9.23	40.06	22.6	12.68	1.30	663.0
23/02/2016	16:25:00	31.0	31.53	9.02	40.06	24.0	12.60	1.31	644.6
23/02/2016	16:26:00	29.9	31.53	9.00	40.06	23.5	12.66	1.32	643.0
23/02/2016	16:27:00	31.0	32.86	9.16	40.06	25.7	12.81	1.37	655.8
23/02/2016	16:28:00	31.2	32.66	9.20	40.06	23.1	12.83	1.27	660.9
23/02/2016	16:29:00	30.1	32.24	9.16	40.06	26.4	12.78	1.25	652.6
23/02/2016	16:30:00	32.0	31.54	9.18	40.06	23.5	12.83	1.31	657.2
23/02/2016	16:31:00	33.2	32.06	9.17	40.06	25.2	12.83	1.27	659.0
23/02/2016	16:32:00	33.1	32.49	9.20	40.06	22.5	12.86	1.25	662.0
23/02/2016	16:33:00	30.1	31.75	8.98	40.06	25.0	12.74	1.31	641.2
23/02/2016	16:34:00	32.0	32.26	9.05	40.06	24.0	12.90	1.27	645.1
23/02/2016	16:35:00	32.5	32.79	9.09	40.06	27.4	12.97	1.40	649.3
23/02/2016	16:36:00	33.2	33.70	9.17	40.06	24.7	13.04	1.20	662.2
23/02/2016	16:37:00	31.6	32.51	9.13	40.06	28.4	12.99	1.25	660.8
23/02/2016	16:38:00	35.0	32.95	9.23	40.06	25.0	13.05	1.30	671.3
23/02/2016	16:39:00	34.7	32.56	9.22	40.06	26.9	13.03	1.30	668.3
23/02/2016	16:40:00	33.0	32.00	9.14	40.06	24.8	12.91	1.30	660.6
23/02/2016	16:41:00	32.2	31.71	9.06	40.06	27.3	12.84	1.30	656.9
23/02/2016	16:42:00	36.2	32.22	9.15	40.06	25.6	12.93	1.31	669.9
23/02/2016	16:43:00	40.3	33.47	9.26	40.06	30.2	13.00	1.38	685.9
23/02/2016	16:44:00	46.0	33.90	9.34	40.06	26.1	12.98	1.27	701.8
23/02/2016	16:45:00	45.2	33.37	9.28	40.06	31.1	12.89	1.33	698.9
23/02/2016	16:46:00	51.8	34.95	9.41	40.06	26.4	12.90	1.30	714.3

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Test#	Analyzers								
	CO	HCl	CO2	H2O	THC	O2	Opacity	SO2	
	AT-205	AT-213A	AT-213B	AT-213C	AT-259	AT-261	AT-263	AT-264	
Max	51.8	35.40	9.41	40.06	31.1	13.26	1.50	714.3	
Min	29.9	31.09	8.51	40.06	22.5	12.48	1.20	596.0	
Average	36.8	33.33	9.19	40.06	25.9	12.86	1.32	655.3	
Variance	22.0	1.28	0.02	0.00	2.8	0.04	0.00	439.9	



\$Date	\$Time	Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PAC
		LPM	LPM	LPM	LPM	LPM	SCFM	LPM	Lbs/h
		FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT
23/02/2016	17:02:00	32.22	5.30	182.13	187.38	4.17	250.35	15.53	22.56
23/02/2016	17:03:00	32.19	5.04	183.22	187.29	4.08	244.50	15.53	22.49
23/02/2016	17:04:00	32.00	5.58	183.22	186.30	3.87	232.13	15.53	21.84
23/02/2016	17:05:00	31.67	5.54	182.70	187.07	4.12	247.35	15.53	22.10
23/02/2016	17:06:00	32.21	5.47	183.84	187.29	4.11	246.45	15.53	22.41
23/02/2016	17:07:00	32.12	5.28	182.70	187.47	4.10	245.70	15.53	22.59
23/02/2016	17:08:00	32.31	5.70	184.12	187.65	4.17	250.35	15.53	21.78
23/02/2016	17:09:00	32.27	5.19	182.79	186.89	4.06	243.68	15.53	22.44
23/02/2016	17:10:00	32.34	5.92	183.35	187.43	4.17	249.90	15.53	22.43
23/02/2016	17:11:00	32.39	5.27	182.51	187.02	4.11	246.30	15.53	22.56
23/02/2016	17:12:00	32.54	5.64	183.65	187.56	4.00	239.78	15.53	22.12
23/02/2016	17:13:00	32.13	5.34	181.80	187.16	4.10	245.70	15.53	21.89
23/02/2016	17:14:00	32.45	5.42	182.41	187.83	3.94	236.48	15.53	22.49
23/02/2016	17:15:00	32.25	4.75	182.94	186.89	4.08	244.58	15.53	22.20
23/02/2016	17:16:00	32.25	5.37	183.31	187.43	4.05	243.15	15.53	21.97
23/02/2016	17:17:00	31.76	5.37	182.27	186.89	4.08	244.65	15.53	21.79
23/02/2016	17:18:00	32.40	5.03	183.41	187.61	3.99	239.33	15.53	22.64
23/02/2016	17:19:00	31.83	5.68	183.54	186.80	4.06	243.38	15.53	21.97
23/02/2016	17:20:00	32.15	5.25	181.89	186.80	4.03	241.50	15.60	21.92
23/02/2016	17:21:00	31.79	5.34	182.84	187.34	4.07	243.90	15.60	21.78
23/02/2016	17:22:00	31.86	5.24	183.26	187.56	4.02	241.43	15.60	22.54
23/02/2016	17:23:00	31.80	5.08	182.45	186.84	4.11	246.53	15.60	22.18
23/02/2016	17:24:00	31.68	5.14	182.75	187.83	4.00	240.08	15.60	22.57
23/02/2016	17:25:00	31.56	5.08	182.88	187.79	4.05	242.70	15.60	22.38
23/02/2016	17:26:00	31.74	5.11	182.94	187.79	4.03	241.58	15.60	22.43
23/02/2016	17:27:00	31.13	4.74	182.41	187.02	3.99	239.33	15.60	22.26
23/02/2016	17:28:00	31.38	4.87	181.32	187.02	4.00	239.85	15.60	22.47
23/02/2016	17:29:00	31.52	4.88	183.07	187.02	4.08	244.65	15.60	21.76
23/02/2016	17:30:00	31.65	5.21	182.88	187.56	3.97	238.28	15.60	21.89
23/02/2016	17:31:00	31.76	5.24	184.40	187.02	4.04	242.48	15.60	22.02
23/02/2016	17:32:00	31.80	4.69	182.41	187.02	4.03	241.80	15.60	22.31
23/02/2016	17:33:00	31.85	5.24	184.64	187.02	4.00	240.15	15.60	22.12
23/02/2016	17:34:00	32.52	4.95	182.75	187.61	4.13	247.73	15.60	22.59
23/02/2016	17:35:00	32.37	5.18	183.60	187.16	4.09	245.63	15.60	22.57
23/02/2016	17:36:00	32.64	5.13	183.17	188.33	4.08	244.73	15.60	21.81
23/02/2016	17:37:00	32.37	5.24	183.65	187.79	3.94	236.55	15.60	21.78
23/02/2016	17:38:00	32.69	5.29	181.80	188.33	3.99	239.10	15.60	22.51
23/02/2016	17:39:00	32.93	5.10	182.17	187.38	4.16	249.45	15.60	22.38
23/02/2016	17:40:00	32.46	4.94	181.80	186.71	4.22	253.28	15.60	22.13
23/02/2016	17:41:00	32.31	4.73	183.60	186.62	3.98	238.58	15.60	22.31
23/02/2016	17:42:00	32.30	4.71	182.27	186.62	4.05	243.00	15.60	22.60
23/02/2016	17:43:00	32.09	5.06	182.79	186.62	4.07	243.90	14.51	22.57
23/02/2016	17:44:00	32.40	5.06	182.04	187.16	3.85	230.93	15.64	22.17
23/02/2016	17:45:00	32.58	5.26	183.65	186.62	3.23	193.58	15.64	22.38
23/02/2016	17:46:00	32.60	4.92	182.55	187.29	3.98	238.80	15.64	21.79
23/02/2016	17:47:00	32.13	5.22	183.41	187.25	4.21	252.38	15.64	21.73
23/02/2016	17:48:00	32.43	5.30	183.45	187.38	4.16	249.60	15.64	22.07
23/02/2016	17:49:00	32.73	5.34	182.75	186.80	3.98	238.65	15.64	21.74
23/02/2016	17:50:00	32.57	4.91	181.89	187.56	3.92	234.98	15.64	22.20
23/02/2016	17:51:00	32.99	4.71	183.22	185.85	4.12	247.05	15.64	21.87
23/02/2016	17:52:00	32.30	4.58	180.95	186.53	4.24	254.40	15.64	22.52
23/02/2016	17:53:00	32.57	4.88	182.36	186.53	4.15	248.70	15.64	22.51
23/02/2016	17:54:00	32.31	4.58	180.99	186.53	4.18	250.95	15.64	22.25
23/02/2016	17:55:00	32.22	4.92	182.88	186.98	3.75	224.70	15.64	22.30
23/02/2016	17:56:00	32.93	4.57	181.18	186.89	4.12	247.05	15.64	22.57
23/02/2016	17:57:00	33.21	5.01	183.69	186.89	4.09	245.25	15.64	21.84
23/02/2016	17:58:00	33.12	4.79	183.03	187.43	3.92	235.43	15.64	21.89
23/02/2016	17:59:00	32.78	4.81	182.70	187.52	3.86	231.38	15.64	22.34
23/02/2016	18:00:00	32.97	4.70	181.89	186.98	3.94	236.55	15.64	22.47
23/02/2016	18:01:00	32.06	4.98	182.79	187.02	4.15	249.15	15.64	21.84
23/02/2016	18:02:00	32.43	5.04	181.46	186.84	4.23	254.03	15.64	22.60

February 23/2016	Waste Flows								Flows
	Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PACFlow	
Test1	FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT	
Max	33.21	5.92	184.64	188.33	4.24	254.40	15.64	22.64	
Min	31.13	4.57	180.95	185.85	3.23	193.58	14.51	21.73	
Average	32.24	5.11	182.76	187.16	4.04	242.35	15.57	22.22	
Variance	0.19	0.09	0.63	0.22	0.02	75.59	0.02	0.09	



\$Date	\$Time	CO	HCl	CO2	H2O	THC	O2	Opacity	SO2
		PPM	PPM	%	%	PPM	%	%	PPM
		AT-205CORR	AT-213A	AT-213B	AT-213C	AT-259CORR	AT-261	AT-263	AT-264
23/02/2016	17:02:00	95.0	38.96	9.70	40.06	29.7	12.12	1.27	779.1
23/02/2016	17:03:00	77.0	38.88	9.68	40.06	27.5	12.00	1.36	770.9
23/02/2016	17:04:00	65.7	39.39	9.53	40.06	26.6	11.87	1.26	756.4
23/02/2016	17:05:00	54.4	40.15	9.31	40.06	27.4	11.77	1.36	735.8
23/02/2016	17:06:00	58.3	40.30	9.46	40.06	27.5	11.97	1.42	747.7
23/02/2016	17:07:00	60.6	40.09	9.52	40.06	28.6	12.00	1.58	749.1
23/02/2016	17:08:00	60.9	39.69	9.55	40.06	28.9	11.98	1.27	752.7
23/02/2016	17:09:00	61.6	39.40	9.51	40.06	30.7	11.94	1.50	746.0
23/02/2016	17:10:00	67.3	38.91	9.62	40.06	29.5	11.99	1.33	751.8
23/02/2016	17:11:00	65.3	37.85	9.61	40.06	27.5	11.97	1.40	748.9
23/02/2016	17:12:00	58.9	36.98	9.46	40.06	26.8	11.82	1.36	728.4
23/02/2016	17:13:00	50.5	36.25	9.33	40.06	26.6	11.82	1.42	712.9
23/02/2016	17:14:00	54.2	36.23	9.45	40.06	28.6	12.00	1.45	717.9
23/02/2016	17:15:00	53.5	35.51	9.49	40.06	25.8	12.03	1.52	720.2
23/02/2016	17:16:00	49.1	33.74	9.41	40.06	27.0	11.98	1.31	713.6
23/02/2016	17:17:00	46.8	33.01	9.40	40.06	25.8	12.05	1.43	711.1
23/02/2016	17:18:00	44.8	31.92	9.38	40.06	26.1	12.04	1.33	706.3
23/02/2016	17:19:00	39.7	32.77	9.37	40.06	23.9	12.08	1.36	697.0
23/02/2016	17:20:00	37.9	31.67	9.13	40.06	25.4	12.00	1.36	669.7
23/02/2016	17:21:00	37.9	30.62	9.06	40.06	23.4	12.03	1.37	663.1
23/02/2016	17:22:00	37.7	30.50	9.24	40.06	26.3	12.27	1.42	673.8
23/02/2016	17:23:00	39.2	30.84	9.31	40.06	24.4	12.40	1.33	679.9
23/02/2016	17:24:00	38.4	28.53	9.22	40.06	26.9	12.35	1.31	668.9
23/02/2016	17:25:00	37.6	28.82	9.26	40.06	24.5	12.39	1.45	673.4
23/02/2016	17:26:00	37.7	28.50	9.29	40.06	26.9	12.48	1.33	674.8
23/02/2016	17:27:00	35.7	28.33	9.20	40.06	23.2	12.41	1.27	661.8
23/02/2016	17:28:00	34.6	28.05	9.08	40.06	25.1	12.37	1.33	650.7
23/02/2016	17:29:00	31.7	26.72	9.03	40.06	23.4	12.47	1.31	645.9
23/02/2016	17:30:00	33.6	27.43	9.15	40.06	27.0	12.63	1.36	655.2
23/02/2016	17:31:00	35.9	27.33	9.22	40.06	23.8	12.71	1.27	665.6
23/02/2016	17:32:00	34.5	26.98	9.19	40.06	27.6	12.69	1.27	661.6
23/02/2016	17:33:00	36.2	27.75	9.24	40.06	24.3	12.74	1.33	668.4
23/02/2016	17:34:00	35.2	27.52	9.24	40.06	28.1	12.72	1.33	667.2
23/02/2016	17:35:00	36.8	27.64	9.29	40.06	24.4	12.75	1.31	670.9
23/02/2016	17:36:00	34.4	26.73	9.07	40.06	26.2	12.59	1.33	651.5
23/02/2016	17:37:00	35.7	26.86	9.14	40.06	25.4	12.73	1.36	657.7
23/02/2016	17:38:00	37.4	27.43	9.20	40.06	28.9	12.79	1.38	663.2
23/02/2016	17:39:00	44.4	28.51	9.27	40.06	25.7	12.82	1.27	674.5
23/02/2016	17:40:00	42.9	27.02	9.21	40.06	28.4	12.73	1.27	671.7
23/02/2016	17:41:00	41.5	26.69	9.26	40.06	23.8	12.75	1.30	679.4
23/02/2016	17:42:00	40.2	26.87	9.28	40.06	26.8	12.74	1.35	679.0
23/02/2016	17:43:00	36.4	27.55	9.21	40.06	23.9	12.64	1.30	673.2
23/02/2016	17:44:00	34.1	26.90	9.02	40.06	26.0	12.55	1.36	655.3
23/02/2016	17:45:00	37.9	27.22	9.14	40.06	25.8	12.68	1.33	666.3
23/02/2016	17:46:00	45.9	28.31	9.31	40.06	29.8	12.83	1.48	687.4
23/02/2016	17:47:00	48.0	27.90	9.39	40.06	27.7	12.80	1.23	700.0
23/02/2016	17:48:00	48.6	27.18	9.39	40.06	29.7	12.75	1.40	700.0
23/02/2016	17:49:00	51.9	28.61	9.45	40.06	26.7	12.72	1.31	708.7
23/02/2016	17:50:00	43.5	28.02	9.43	40.06	28.6	12.62	1.30	703.3
23/02/2016	17:51:00	44.3	28.14	9.38	40.06	24.2	12.54	1.26	698.0
23/02/2016	17:52:00	40.4	27.03	9.16	40.06	25.7	12.36	1.35	672.1
23/02/2016	17:53:00	38.1	28.37	9.23	40.06	25.4	12.51	1.30	679.2
23/02/2016	17:54:00	37.2	29.20	9.26	40.06	26.3	12.55	1.52	683.8
23/02/2016	17:55:00	36.8	29.45	9.30	40.06	25.1	12.54	1.20	689.6
23/02/2016	17:56:00	37.0	28.89	9.25	40.06	26.7	12.52	1.36	687.4
23/02/2016	17:57:00	37.7	28.66	9.32	40.06	25.0	12.58	1.27	695.6
23/02/2016	17:58:00	35.7	28.02	9.29	40.06	26.1	12.54	1.33	687.9
23/02/2016	17:59:00	38.7	28.44	9.19	40.06	25.6	12.44	1.27	676.0
23/02/2016	18:00:00	39.8	27.82	9.13	40.06	25.6	12.42	1.36	669.4
23/02/2016	18:01:00	39.4	28.70	9.27	40.06	26.4	12.61	1.33	683.1
23/02/2016	18:02:00	37.8	29.46	9.33	40.06	27.6	12.64	1.38	691.9

February 23/2016

Test#	Analyzers								
	CO	HCl	CO2	H2O	THC	O2	Opacity	SO2	
	AT-205	AT-213A	AT-213B	AT-213C	AT-259	AT-261	AT-263	AT-264	
Max	95.0	40.30	9.70	40.06	30.7	12.83	1.58	779.1	
Min	31.7	26.69	9.02	40.06	23.2	11.77	1.20	645.9	
Average	44.8	30.84	9.31	40.06	26.4	12.39	1.35	693.1	
Variance	146.0	20.54	0.02	0.00	3.2	0.10	0.01	1089.3	