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ORTECH
a Kontrol Technologies Company

Report:

Clean Harbors Canada Inc.
Mercury Emission Testing Program at the Clean Harbors Sarnia Incineration Facility

Date: September 16, 2022



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Table of Contents

List of Appendices

EXECUTIVE SUMMARY

ORTECH Consulting Inc. (ORTECH) was requested by Clean Harbors to conduct a mercury emission testing program at the incineration facility located at 4090 Telfer Road in Corunna, Ontario. The testing program was conducted on August 17, 2022.

To satisfy a requirement of a Provincial Officers Order (Order Number 5857-9ZWQ44) that was issued in 2015, Clean Harbors conducts mercury emission testing three times per year, with one mercury testing program being part of the annual compliance emission testing program. Three mercury test programs were completed at the Clean Harbor's facility in February, April and May of 2022, however they failed to meet the required quality control criteria of the sampling method. Clean Harbors sent a notification to the Ministry of the Environment, Conservation and Parks (MECP) on June 20, 2022 stating that there was a potential exceedance of mercury from the Incinerator Exhaust Stack. Clean Harbors committed to repeat the mercury testing as soon as practical after the July 2022 maintenance shutdown. During the shutdown the facility replaced the Incinerator Exhaust Stack and performed maintenance on the powdered activated carbon (PAC) injection system and the baghouse. During this shutdown new PAC was also acquired. This report details the results of the comprehensive mercury testing program completed after the maintenance shutdown to demonstrate compliance with the Provincial Officers Order and Environmental Compliance Approval (ECA) No. 8-1030-94-006.

Mercury testing was conducted at the Incinerator Exhaust Stack (Post PAC-Injection) following both US EPA Method 29 (modified) and US EPA Method 30B. Sampling for particulate matter, acid gases and combustion gases was also conducted at the Incinerator Exhaust Stack.

Sampling for mercury using US EPA Method 29 (modified) was conducted after the Spray Dryer and just before the PAC injection point (Pre PAC-Injection) concurrently with the sampling at the Incinerator Exhaust Stack in order to calculate the mercury removal efficiency of the control system.

The following table summarizes the average test results and the corresponding emission criteria:

Mercury Emission Data	ECA Limit	Pre-PAC Injection	Post PAC-Injection	
		Method 29	Method 29	Method 30B
Dry Reference Conc. (µg/Rm^3)*	-	191	2.16	2.34
Dry Adjusted Conc. (µg/Rm^3)**	50	163	1.85	1.98

* At 25°C and 1 atm

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

The results for both test methods show that the mercury measured on August 17, 2022 at the Incinerator Exhaust Stack (Post PAC-Injection) was well below the limit stated in the ECA.

All tables referenced in this report are provided in Appendix 1.

1. INTRODUCTION

ORTECH Consulting Inc. (ORTECH) was requested by Clean Harbors to conduct a mercury emission testing program at the incineration facility located at 4090 Telfer Road in Corunna, Ontario. The testing program was conducted on August 17, 2022.

To satisfy a requirement of a Provincial Officers Order (Order Number 5857-9ZWQ44) that was issued in 2015, Clean Harbors conducts mercury emission testing three times per year, with one mercury testing program being part of the annual compliance emission testing program. Three mercury test programs were completed at the Clean Harbor's facility in February, April, and May of 2022, however they failed to meet the required quality control criteria of the sampling method. Clean Harbors sent a notification to the Ministry of the Environment, Conservation and Parks (MECP) on June 20, 2022 stating that there was a potential exceedance of mercury from the Incinerator Exhaust Stack. Clean Harbors committed to repeat the mercury testing as soon as practical after the July 2022 maintenance shutdown. During the shutdown the facility replaced the Incinerator Exhaust Stack and performed maintenance on the powdered activated carbon (PAC) injection system and the baghouse. During this shutdown new PAC was also acquired. This report details the results of the comprehensive mercury testing program completed after the maintenance shutdown to demonstrate compliance with the Provincial Officers Order and Environmental Compliance Approval (ECA) No. 8-1030-94-006. A copy of the ECA is provided in Appendix 2.

Mercury testing was conducted at the Incinerator Exhaust Stack (Post PAC-Injection) following both US EPA Method 29 (modified) and US EPA Method 30B. Sampling for particulate matter, acid gases and combustion gases was also conducted at the Incinerator Exhaust Stack.

Sampling for mercury using US EPA Method 29 (modified) was conducted after the Spray Dryer and just before the PAC injection point (Pre PAC-Injection) concurrently with the sampling at the Incinerator Exhaust Stack in order to calculate mercury removal efficiency of the control system.

2. SOURCE DESCRIPTION

2.1 Process Description

The incineration system, shown in Figure 1, consists of a refractory-lined, fixed-chamber combustion reactor and a three-stage gas conditioning and cleaning system. In the combustion chamber there are two reaction zones referred to as the primary zone and secondary zone. In the primary zone, high heating value ("rich") wastes are intimately mixed with combustion air and ignited to produce a turbulent, luminous flame. Intermediate heating value ("emulsion") wastes are also injected into the primary zone. Reaction temperatures are continuously monitored and controlled to maintain temperatures normally in excess of 1300°C.

Downstream of the luminous primary reaction zone, aqueous ("lean") wastes with a much lower heating value are sprayed into the combustion chamber. This portion of the chamber is known as the secondary zone and temperatures within this zone are maintained in excess of 800°C.

Upon exiting the secondary zone of the combustion chamber, the combustion gases are cooled in a quench chamber to about 550°C by the injection of process water. The combustion gases are further cooled and acid gases are removed in a spray dryer where alkaline waste liquid ("alkaline") and/or reagent grade lime slurry is injected. The exit temperature of the gases leaving the spray dryer is typically between 160°C and 195°C, and should not exceed 220°C. Powdered activated carbon (PAC) is injected into the air pollution control system to adsorb contaminants.

Finally, the gases are directed to a four-compartment baghouse where the fine suspended particulate matter and PAC in the gas phase is filtered out. The hot, humid gases exiting the baghouse are then discharged to the atmosphere through a 68.8 meter high, 1.47 meter inside diameter, insulated steel main stack. The stack gases are monitored by continuous emission monitors (CEMs) located in the induced draft fan discharge ducting with opacity being measured in-situ eight stack diameters downstream of the breaching inlet to the stack (approximately fifteen meters above grade, accessible by a ladder). The CEMs record the oxygen, carbon monoxide, total hydrocarbon, sulphur dioxide and hydrochloric acid concentrations. As well, stack gas flowrate and temperature are recorded.

During the testing program the incinerator was operated normally, as specified in Part 15, "Limitation on Wastes", and Part 16, "Detailed Operating Conditions", of the ECA, while maintaining high feed rates in order to demonstrate compliance with emission guidelines, with the following exception.

Clean Harbors was granted Amended ECA No. 4650-8N6L9N, dated May 29, 2012, to treat up to 36 tonnes per hour of hazardous waste at the Thermal Desorber Unit (TDU). The thermal desorption system uses standard rotary kiln technology to remove organic contaminants from solid wastes. The kiln off-gas is directed through a multi-stage treatment sequence before being released to the atmosphere. Kiln off-gas is drawn through a cyclone to remove coarse particulate matter. The gas then enters a set of scrubbers to reduce acid levels and any other condensable material. The gas is then directed to the hazardous waste liquid incinerator to combust organic constituents at temperatures up to 1300°C. The Thermal Desorber Unit (TDU) was exhausting to the incinerator during each test.

2.2 Process Operations

During the emission testing program, the incinerator was operated with an average primary zone temperature of 1359°C. Normal operating temperature must be in excess of 1300°C while achieving the maximum thermal and feed loading practical within the incineration system. The average spray dryer outlet temperature was 193.9°C (must not exceed 220°C).

Average feed rates for the rich, lean and emulsion streams during the testing program were as follows:

Feed Stream	Flow (L/min)
Rich	33.6
Lean	152
Emulsion	6.40
Total	192

The powdered activated carbon (PAC) injection rate during the test program was 15.6 kg/h (34.4 lb/h).

3. SAMPLING LOCATIONS

The Incinerator Exhaust Stack has an inside diameter of 1.47 meters at the sampling platform and 1.22 meters at the stack exit. The stack height above grade is 68.6 meters.

Sampling for particulate and mercury, using US EPA Method 29 (Modified), was conducted at the sampling platform permanently installed on the stack, through two ports at 90° to each other and at the same vertical height. Mercury, using US EPA Method 30B, and acid gases were sampled through a third port located on the same sampling platform.

The sampling ports are located at an "ideal" location as defined by the Ontario Source Testing Code. An "ideal" location is defined as being at least eight stack diameters downstream and at least two stack diameters upstream of flow disturbances.

The combustion gases sampling probe was inserted into the breaching connecting the induced draft fan to the stack. Previous testing programs conducted by ORTECH at the Clean Harbors Incinerator Exhaust Stack have shown that there is no stack gas stratification between the breaching connecting the induced draft fan to the stack and the stack sampling platform location.

Mercury sampling, using US EPA Method 29 (Modified), was also conducted prior to the PAC injection to determine the mercury removal efficiency. A single sample port, at a non-ideal location, between the spray dryer and the PAC injection was used to determine the inlet mercury concentration.

4. SAMPLING AND ANALYTICAL PROCEDURES

Equipment calibrations, analyzer linearizations and other pre-test and QA/QC activities were performed prior to the commencement of the emission testing program. These results are presented and discussed in Section 8 of this report.

4.1 US EPA Method 29 Sampling at the Incinerator Exhaust Stack

Particulate matter and mercury were sampled together using a modified version of the sampling train and sampling procedures outlined in United States Environmental Protection Agency (US EPA) Method 29. The multi-metals sampling method was modified to collect and analyze mercury only. Two US EPA Method 29 (Modified) tests were conducted at the Incinerator Exhaust Stack. Each test was conducted concurrently with three US EPA Method 30B tests performed at the same sampling location.

Major components of the sampling train are as follows:

- A glass nozzle and glass probe liner assembly
- A glass fiber filter
- The first impinger initially contained 50 mL of 4% potassium permanganate/10% sulphuric acid solution
- The second knockout impinger initially contained 100 mL of 4% potassium permanganate/10% sulphuric acid solution
- The third impinger initially contained 50 mL of 4% potassium permanganate/10% sulphuric acid solution
- The fourth and fifth impingers initially contained 100 mL of 4% potassium permanganate/10% sulphuric acid solution
- The sixth impinger was initially empty
- The seventh impinger contained silica gel

All test train and auxiliary glassware was cleaned according to the appropriate methods as outlined in the Pre-Test Plan.

A single test for particulate matter and mercury involved the collection of stack gas sampled at ten points centered on equal areas along each of the two stack traverses. Each point was sampled for nine minutes for a total actual sampling time of one hundred and eighty minutes per test.

At three-minute time increments the following information was measured and recorded:

- Elapsed sampling time
- Dry gas meter volume
- Pitot tube pressure
- Stack gas temperature
- Probe, oven, and impinger outlet temperatures
- Dry gas meter temperatures
- Control module orifice pressure
- Sampling pump vacuum

At the start and finish of sampling each traverse, the sampling trains were leak-checked. A valid leak-check as specified by each of the sampling methods is a leakage rate of less than 0.00057 cubic meters per minute (m^3/min) or 4% of the sampling rate, whichever is less. The leak checks performed for all tests were less than this maximum permitted leakage rate.

Field data sheets for the two particulate and mercury tests performed at the Incinerator Exhaust Stack using US EPA Method 29 (Modified) are provided in Appendix 3.

The blank train was prepared in an identical manner to the test trains, transported to site as a spare test train, and then recovered at the end of the test day in a manner identical to the test trains.

Following the conclusion of each test performed with the US EPA Method 29 sampling train, the probe was disconnected and all openings sealed with Teflon tape. The probe was recovered at the sampling location and the test trains were taken to the on-site ORTECH laboratory for sample recovery. The train recovery procedure is briefly described as follows. The recovery data sheets are provided in Appendix 4.

The test trains were visually inspected to ensure that no damage had occurred during movement. The condition of the test train was noted. Filter and impinger content colors were recorded. The filter housing was disassembled and the filter carefully transferred to its pre-test petri dish with the use of Teflon coated tweezers.

All the impingers were wiped dry on the outside then weighed and the results used to determine the exhaust gas moisture content.

The front half of the sampling train was brushed and rinsed thoroughly with acetone. A nylon bristle probe brush was used to assist in dislodging any particulate matter that may have adhered to the inside surfaces of the nozzle and probe assembly. This front half rinse was then repeated using 0.1N nitric acid, however no brushing was performed.

The contents of the first to sixth impingers are transferred to an amber glass sample bottle and the impingers with connecting glassware are rinsed in triplicate with approximately 100 mL of fresh acidified potassium permanganate solution followed by a triplicate rinse with 100 mL of distilled, de-ionized water. All the rinsing of this glassware was added to the impinger solution sample.

Any brown residue present in the impingers was removed by rinsing with 8N hydrochloric acid (HCl). These acid rinses are added to a separate amber glass sample bottle that initially contains 150 mL of distilled, de-ionized water. The impingers are then rinsed with distilled, de-ionized water to remove remaining traces of 8N HCl and this rinse is also added to the sample bottle.

Each sample container was sealed and labeled once that portion of the recovery was completed. The samples were then checked against the master sample log/chain of custody form and refrigerated until they were transported to the ALS Environmental laboratory for analysis.

Particulate samples (front half acetone rinse and filter) collected from the trains underwent gravimetric determination before mercury analysis.

The particulate matter and mercury analytical report is provided in Appendix 5.

4.2 US EPA Method 30B Sampling at the Incinerator Exhaust Stack

Six pairs of tube samples were collected at the Incinerator Exhaust Stack following the procedures outlined in US EPA Method 30B.

A dual probe assembly was used so that the paired mercury traps are positioned 1 to 2 inches apart. Each probe is heated to approximately 135°C to prevent condensation of the stack gas on the sampling media. The mercury traps used for sampling are specially designed for use at wet sources; each tube has an extended section of glass to allow for the heating of the stack gas before it comes into contact with the sampling media.

The sampling methodology is briefly described as follows. Each sorbent trap is removed from the clean sorbent trap storage container, the end caps are removed from the traps and the traps are attached to the end of the sampling probe and leak checked. The probe is inserted into the stack and the sample pumps are started. Stack gas is drawn through the traps and into the sampling probe and 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 consists 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 falls 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. To ensure that at least one of the spike concentrations fall within the concentration range requirements of the test method one tube from each of the six pairs of adsorbent tubes was spiked with increasing amounts of mercury, ranging from 150 ng to 2200 ng, by the analytical laboratory (Ohio Lumex) prior to commencing the test program.

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

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 are 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 does not have an acceptable initial leak check, the leak is found and repaired and/or the traps are replaced with a new pair until an acceptable leak check is obtained.

Field data sheets for the six mercury tests performed at the Incinerator Exhaust Stack using US EPA Method 30B are provided in Appendix 6.

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 appropriately 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 mercury analytical report from Ohio Lumex is provided in Appendix 7.

4.3 Mercury Sampling Prior to the PAC Injection

Particulate matter and mercury were sampled together using a modified version of the sampling train and sampling procedures outlined in United States Environmental Protection Agency (US EPA) Method 29. The sampling was conducted concurrently with the sampling at the Incinerator Exhaust Stack so that the mercury removal efficiency could be determined.

The sampling loosely followed the methodology detail in Section 4.1, with the following exceptions:

- The sampling was conducted at a constant sampling rate at a single point in the duct (non-isokinetic); and
- The sampling was stopped when the vacuum on the test train increased significantly enough that the operator could not maintain the sampling rate.

Field data sheets for the two particulate and mercury tests performed prior to the PAC Injection using US EPA Method 29 (Modified) are provided in Appendix 8.

The recovery data sheets are provided in Appendix 4. The particulate matter and mercury analytical report is provided in Appendix 5.

4.4 Acid Gases

Hydrogen chloride, hydrogen fluoride, hydrogen bromide and hydrogen iodide were sampled at the Incinerator Exhaust Stack using the sampling train and sampling procedures outlined in US EPA Method 26.

A single test for these components involved the collection of stack gas sampled at a single point in the stack using a sampling flowrate of approximately two liters per minute for sixty minutes.

At five-minute time increments throughout each test, the following information was measured and recorded for the Method 26 sampling train:

- Elapsed sampling time
- Dry gas meter volume
- Stack gas temperature
- Probe, oven and impinger outlet temperatures
- Dry gas meter temperatures
- Control module orifice pressure
- Sampling pump vacuum

At the start and finish of each test the sampling train was leak-checked. A valid leak check as specified by US EPA Method 26 is a leakage rate of less than 0.04 L/min. The leak checks performed for each of the acid gases tests met this criterion. All leak checks were performed through the entire sampling system by sealing the probe end. The leak check data for the acid gases tests is summarized in Section 8 of this report.

All test train components were cleaned according to the procedures outlined in US EPA Method 26. Field data sheets for the four Method 26 tests performed are provided in Appendix 9.

One Method 26 reagent blank was prepared during the test program.

Prior to loading of the field test trains, a recovery data sheet was prepared to record initial volumes of the test train components. This sheet was also used during sample recovery to record final volumes. The train recovery data sheet is provided in Appendix 10.

On site, the train was disassembled, and the volumes of the first impinger to the fifth impinger were measured. The impingers with connecting glassware back to but not including the three-way valve were rinsed in triplicate with distilled, deionized water and made up to a known volume which was recorded on the sample recovery sheet.

The samples were then sealed, labeled and the fluid levels marked. The samples were then refrigerated until they were delivered to the ALS laboratory for analysis.

The analytical reports for the acid gas analysis are provided in Appendix 11.

4.5 Combustion Gases

Sampling by ORTECH for the combustion gases involved the insertion of a 9 millimeter inside diameter stainless steel probe into the breaching leading to the Incinerator Exhaust Stack. The combustion gases were drawn through the probe and heated filter oven and transferred to the Mobile Source Monitoring Laboratory (MSML) by way of a heated Teflon sampling line that was maintained at a temperature of approximately 160°C throughout the test program to prevent possible condensation.

The combustion gas sample was then conditioned through another heated filter and dried using a two-pass refrigeration unit. The gas was then split into several portions that were metered with rotameters and delivered to each continuous combustion gas analyzer except for the total hydrocarbon analyzer; a portion of the hot, wet gas stream was delivered directly to the total hydrocarbon analyzer.

A Siemens Ultramat 23 analyzer was used to measure oxygen and carbon dioxide concentrations. The method used for sampling was US EPA (40 CFR 60) Method 3A.

A CAI CLD 700 analyzer was used to measure the nitrogen oxides concentrations. The method used for sampling was US EPA (40 CFR 60) Method 7E.

An Ametek 922 analyzer was used to measure sulphur dioxide concentrations. The method used was EPA (40 CFR 60) Method 6C.

A Siemens Ultramat 23 analyzer was used to measure carbon monoxide concentrations. The method used for sampling was US EPA (40 CFR 60) Method 10.

A VIG 20 flame ionization analyzer was used to measure total hydrocarbons (THC) concentrations. The method used was US EPA (40 CFR 60) Method 25A.

The following data acquisition devices were used in conjunction with the continuous analyzers:

Data Logger: Modicon TSX Momentum data acquisition system, 16 channels
Data Software: CEMView
Data Processing: Lap Top Computer

These data acquisition devices were used to transfer the electrical signals from each analyzer into a data file for later processing in a spreadsheet format.

Calibrations were completed before and after each test run according to the sampling protocols.

Linearization checks were performed on the CEMs prior to and at the conclusion of testing. Zero and span drifts, and bias checks were performed prior to and at the completion of each test.

Leak checks of the CEM system were conducted sporadically throughout the program. ORTECH generally relied on other indicators of leakage problems, such as oxygen interference. However, it should be noted that all leak checks performed were acceptable.

4.6 Process Sample Collection

Liquid waste (rich, lean, alkaline, emulsion, TDU and leachate) samples were collected and composited by Clean Harbors personnel. Clean Harbors submitted the samples to Lambton Scientific for mercury analysis. The mercury analytical report for the process samples is provided in Appendix 12.

5. INTERNAL AND EXTERNAL QA/QC PROGRAM

5.1 General

As with other emission testing programs conducted by ORTECH, a comprehensive internal quality assurance/quality control (QA/QC) program was included. Testing was conducted in accordance with ECA No. 8-1030-94-006 and the Notice of Amendment, and the Pre-Test Plan detailing the sampling and analytical methodologies submitted to and approved by the MECP.

Blank sampling trains were recovered and analyzed or reagent blanks were analyzed using the same procedures as the test trains to provide background concentrations of the emission test components.

5.2 Pre-Test Activities

Prior to the commencement of the emission testing program, the following activities were performed:

- Preparation and pre-cleaning of the manual stack sampling trains and sample containers;
- Preparation and quality checks of chemicals, reagents, filters and mercury tubes;
- Calibration of all sampling and monitoring equipment, as well as CEM system linearity and bias checks;
- Development (and review) of data acquisition, data reduction and summary procedures;
- Development of internal QA/QC field data sheets;
- Review of equipment calibration logs; and
- Review of proposed field and laboratory procedures.

All equipment used in the field testing program was calibrated and checked prior to the field testing program. Pertinent equipment calibration data is supplied in Appendix 13.

As part of ORTECH's internal QA/QC, data acquisition, data reduction and summary procedures were already in place and periodic spot checks of the computer programs was performed using known data sets.

A Pre-Test Plan detailing the proposed sampling and analytical methodology was sent to the MECP for review and approval. Provided in Appendix 14 is a copy of the letter, dated August 2, 2022, from the MECP accepting the testing methodology. Testing was conducted following the sampling and analytical methodologies detailed in the Pre-Test Plan under normal operating conditions.

5.3 Emission Testing QA/QC Results

On the day of set up for the field testing program, the following activities were performed. Preliminary testing involved collecting data necessary to perform the required calculations for choosing a nozzle size to permit isokinetic sampling. Much of the preliminary data used in the initial calculations was collected during previous testing programs conducted by ORTECH at this location, and also by reference to the on-site CEM system.

The internal diameter of the stack was verified and the appropriate number of sampling points was marked on the sampling probes. The number of sampling points to be used was stated in the Pre-Test Plan as well as the required sampling time per point.

The following general QA/QC criteria were satisfied for each of the test trains where applicable:

- All sampling equipment was cleaned prior to the commencement of the field testing program.
- All sampling equipment passed a visual and operational check prior to use.
- Oil filled manometer gauges which had been properly leveled and zeroed were used to measure the velocity pressure.
- A test was only considered acceptable if the proper number and location of traverse points had been sampled.
- All sampling data was recorded in ink on preformatted data sheets at least once every three minutes and at least twice during sampling each point.
- Any unusual occurrences were noted on the appropriate data form.
- The team leader reviewed all calibration and sampling data forms daily.
- Only tapered edge sampling nozzles and S-type pitot tubes that had been visually inspected and caliper measured, and deemed acceptable, were used.
- Each leg of the S-type pitot was leak-checked before the start of testing. The leak-checks were all acceptable (no change in pressure occurred).
- Each entire sampling train, met acceptable leak-check criteria before and after each test, and during any move from one traverse to another.
- The S-type pitot tube and sampling nozzle were maintained parallel to the flow during testing and care was taken to ensure that they did not scrape the ports when being inserted and removed from the stack.
- The probe and filter components were maintained at 120°C ± 14°C during testing.

The average percent isokineticity fell within the QA/QC criteria limits of 90 to 110% for each test.

Prior to and at the end of each test, ORTECH's CEMs were calibrated. Also, prior to commencing testing linearity and response/reproducibility checks were conducted on the CEMS. The calibration data for ORTECH's CEM systems is supplied in Appendix 15.

Note sulphur dioxide data was not recorded during Test No. 1 due to scrubbing issues in the sampling system prior to the analyzer. The issue was corrected prior to the start of Test No. 2.

5.4 Sample Recovery, Handling and Custody

ORTECH's sample identification scheme and system for handling and processing samples was initiated as part of ORTECH's sample tracking system for stack emission samples. All samples were identified by a unique sample number comprised of a series of numbers and letters. A master sample log/chain of custody form was maintained by the QA/QC designate and was made available to the ORTECH personnel designated to perform the sample recovery for a specific sampling train. Once a sample was collected it was labeled and checked against the sample log by the QA/QC designate.

The information contained within the sample number and the sample log enabled the sampling, recovery, data reduction and report writing personnel to easily determine the test date, test number, test type and train sample identification for a given sample. To ensure continuity, the analytical laboratories were requested to use the ORTECH number for sample identification.

The ORTECH personnel responsible for shipping samples used the master sample log/chain of custody form to document the transfer of the samples to the appropriate analytical laboratory. Care was taken when shipping the samples in order to maintain sample integrity. Once the samples and master sample log/chain of custody forms were received by the analytical laboratory, the laboratory personnel verified that all samples had been received and their integrity maintained. The laboratory personnel then signed the master log and made a photocopy which ORTECH personnel received as a record of the chain of custody for the samples.

5.5 Analytical Results

All analyses for the present emission testing program were performed using acceptable laboratory procedures in accordance with the specified analytical protocols. Adherence to the prescribed QA/QC procedures ensured data of consistent and measurable quality. Analytical quality control focused on the use of control standards to provide a measure of analytical accuracy. Replicate analyses (usually duplicate analysis) of the same sample were used as a means of determining precision of the various analytical procedures. Also specific acceptance criteria were defined for various analytical operations including calibrations, control standard analysis, drift checks, blanks, etc.

The following general QA/QC procedures were incorporated into the analytical effort:

- the on-site Field Supervisor reviewed all data and QA/QC data on a daily basis for completeness and acceptability
- master sample logs were maintained for all samples collected
- analytical QA/QC data was tabulated by the analytical laboratories using appropriate charts or forms
- all hard copy raw data was maintained in organized files

Specific analytical QA/QC procedures are discussed in the analytical reports and are briefly summarized below.

5.5.1 US EPA Method 29 Mercury Analysis QA/QC

The analyses for mercury on the Method 29 stack samples employed cold vapour atomic absorption (CVAA). The analytical QA/QC is described as follows and the results are provided in the analytical report.

- A 5 point calibration bracketing the expected range.
- An instrument check calibration standard was analyzed immediately after the calibration and must be within 90%-110% of the actual concentration.
- One mid-range calibration standard was analyzed after 10 samples and at the end of the run and must be within 85%-115% of the actual concentration.
- Instrument calibration blank check sample is analyzed with every 10 samples and must be within three times the minimum detection limit.
- One duplicate sample analysis was performed for this program on Test No. 1. The relative percent difference was less than 1.2% well within the acceptable limit of less than ±20%, for fractions that are greater than 5 times the minimum detection limit.
- One blank spike (performed as a pre-digestion spike) was analyzed for this program. All of the results were between 94-97% within the acceptable limit of 80-120% of the true value.
- One matrix spike (performed as a post digestion spike) was analyzed for this program. All of the results were between 96-99% within the acceptable limit of 80-120% of the true value.

5.5.2 US EPA Method 30B Mercury Analysis QA/QC

The analysis of the Method 30B 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 ± 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 ± 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 ±10% of the expected value.

US EPA Method 30B requires the paired sorbent trap agreement to be ≤10% relative deviation for mercury concentrations greater than 1 µg/Rm^3 or ≤20% relative deviation for mercury concentrations less than 1 µg/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 µg/Rm^3. The average dry adjusted mercury concentration ranged from a low of 1.95 µg/Rm^3 (Tube Pair No. 3) to a high of 2.55 µg/Rm^3 (Tube Pair No. 1) for the first four tests. The first four tests met the paired trap agreement in the test method. Test No. 5 and Test No. 6 did not meet the paired trap agreement criterion stated in the method; however this is typical when the spike concentration is significantly higher than the in-stack mercury concentration. The data for Test No. 5 and Test No. 6 is reported but is excluded from the average calculations.

Six unspiked mercury traps and six pre-spiked mercury traps were ordered approximately two weeks before the field testing program from Ohio Lumex. The pre-spiked mercury traps were spiked with known quantities of mercury ranging from 150 ng to 2200 ng in order to ensure that at least one of the traps met 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 2022. The pre-spiked mercury trap for Test No. 1 (150 ng) and Test No. 2 (250 ng) were used for spike recovery determination as the concentrations best fit the requirements of the QA/QC criteria.

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 concentration for Test No. 1 and Test No. 2 fell within the spike range criterion stated in the test method. The spike recovery for Test No. 1 and Test No. 2 was 95.2% and 103.7%, respectively. US EPA Method 30B requires the spike recovery to be between 85% and 115%. The field spike recovery calculations are provided in Appendix 7 with the analytical report.

5.5.3 Acid Gas Sample Analysis QA/QC

Analyses of the acid gas samples from the Method 26 sampling train involved suppressed ion chromatography-conductivity detection. The analytical QA/QC included the following:

- A 6 point calibration bracketing the expected range.
- An instrument check calibration standard was analyzed immediately after the calibration and must be within 90%-110% of the actual concentration.
- A complete set of calibration standards were analyzed at the end of the analysis and must be within 10% of the true value.
- One mid-range calibration standard was analyzed after 10 samples and at the end of the run and actual concentration and must be within 90%-110% of the actual concentration.

- Instrument calibration blank check samples are analyzed with every 10 samples and must be within three times the minimum detection limit for each ion.
- All samples were analyzed in duplicate for each compound and the results had a relative percent difference of less than 2.8%, for analyses that are greater than 5 times the minimum detection limit.
- One blank spike was analyzed for this program. All the results were between 93-96% within the acceptable limit of 80-120% of the true value.
- A matrix spike (spike confirmation) sample was analyzed with every 20 samples to confirm the identity of each peak. The results of the matrix spike sample must be within 80%-120% of the true value. The matrix spikes for this test program were between 80-106%.

6. RESULTS AND DISCUSSION

The mercury emission testing program was conducted on August 17, 2022. A detailed sampling schedule for the testing program is provided in Table 1.

6.1 Stack Gas Sampling Parameters

Emission test calculations for the particulate and mercury tests at the Incinerator Exhaust Stack are provided in Appendix 16.

Stack gas sampling parameters for the particulate and mercury tests are summarized in Table 2. These parameters include calibration data, nozzle diameter, dry gas volume sampled and average percentage of isokineticity for each test, where applicable.

6.2 Stack Gas Physical Parameters

Stack gas physical parameters for the particulate and mercury tests at the Incinerator Exhaust Stack are presented in Table 3 and are summarized below:

Stack Gas Parameter	Incinerator Exhaust Stack
Gas Temperature (°C)	193
Moisture by Volume (%)	48.7
Velocity (m/s)	29.7
Absolute Pressure (kPa)	99.7
Carbon Dioxide by Volume (%)*	7.68
Oxygen by Volume (%)*	9.29

* dry at 25°C and 1 atmosphere

6.3 Volumetric Flowrate Data

Stack gas volumetric flowrates for the particulate and mercury tests at the Incinerator Exhaust Stack are also given in Table 3 and are summarized below:

Stack Gas Parameter	Incinerator Exhaust Stack
Actual Flowrate (m^3/s)	50.7
Dry Reference Flowrate (Rm^3/s)*	16.4
Dry Adjusted Flowrate (Rm^3/s)**	19.2
Wet Reference Flowrate (Rm^3/s)*	31.9

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

The volumetric flowrates measured at the Incinerator Exhaust Stack were used to calculate emission data for the contaminants measured at the Pre-PAC Injection sampling location since this location was highly non-ideal for flow measurements.

6.4 Particulate Emission Data

Particulate emission data is given in Table 4 and the average particulate emission results are presented below:

Particulate Emission Parameter	Pre-PAC Injection	Incinerator Exhaust Stack
Actual Concentration (mg/m^3)	3438	1.48
Dry Reference Concentration (mg/Rm^3)*	10636	4.59
Dry Adjusted Concentration (mg/Rm^3)**	9069	3.91
Wet Reference Concentration (mg/Rm^3)*	5463	2.36
Particulate Emission Rate (g/s)	174	0.075

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

6.5 Acid Gases Emission Data

Hydrogen chloride, hydrogen fluoride, hydrogen bromide and hydrogen iodide data obtained from each of the four acid gas tests are given in Table 5.

Hydrogen chloride, hydrogen fluoride and hydrogen bromide were detected in quantities greater than the detect limit in all four tests. Hydrogen iodide was not detected in quantities greater than the detection limit in any of the tests and the emission calculations are based on the value of the detection limit. The average acid gas emission results are presented below:

Parameter	Incinerator Exhaust Stack			
	HCl	HF	HBr	HI
Actual Conc. (mg/m^3)	24.8	14.4	3.50	<0.18
Dry Reference Conc. (mg/Rm^3)*	76.8	44.6	10.8	<0.57
Dry Adjusted Conc. (mg/Rm^3)**	65.5	38.1	9.24	<0.48
Wet Reference Conc. (mg/Rm^3)*	39.4	22.9	5.56	<0.29
Emission Rate (g/s)	1.26	0.73	0.18	<0.0093

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

6.6 Combustion Gas Emission Data

Average combustion gas analysis data for each of the tests are summarized in Table 6 as dry concentrations except for total hydrocarbons, which was measured on a wet basis. The average combustion gas analysis data is also shown on a dry basis adjusted to 11% oxygen in Table 6.

Combustion gas emission data for the five tests performed at the Incinerator Exhaust Stack are given in Table 7.

The average combustion gas emission results were as follows:

Combustion Gas Parameter	Incinerator Exhaust Stack						
	CO_2	CO	NO_X	NO	O_2	SO_2	THC
Actual Conc. (mg/m^3)	44531	23.7	67.8	43.6	39274	125	7.85
Dry Reference Conc. (mg/Rm^3)**	137830	73.3	210	135	121560	387	24.3
Dry Adjusted Conc. (mg/Rm^3)***	117537	62.5	179	115	143873	330	20.7
Dry Conc. (ppm)	76640	64.0	112	110	92940	148	19.1*
Emission Rate (g/s)	2256	1.20	3.43	2.21	1990	6.33	0.40

* wet basis as methane
** at 25°C and 1 atmosphere
*** at 25°C and 1 atmosphere, adjusted to 11% oxygen

Combustion gas concentrations measured by the ORTECH continuous emission monitoring system, expressed as 1-minute average concentrations, for the five tests performed at the Incinerator Exhaust Stack are provided in Appendix 17.

6.7 Mercury Emission Data

Mercury testing was conducted at the Incinerator Exhaust Stack (Post PAC-Injection) following both US EPA Method 29 (modified) and US EPA Method 30B. Sampling for mercury using US EPA Method 29 (modified) was also conducted after the Spray Dryer, just before the PAC injection point (Pre PAC-Injection), concurrently with the sampling at the Incinerator Exhaust Stack in order to calculate mercury removal efficiency.

The US EPA Method 30B mercury emission data for the Incinerator Exhaust Stack is detailed in Table 8. Four of the six tests met the paired trap agreement in the test method. Test No. 5 and Test No. 6 did not meet the paired trap agreement criterion stated in the method; however this is typical when the spike concentration is significantly higher than the in-stack mercury concentration. The data for Test No. 5 and Test No. 6 is reported but is excluded from the average calculations.

The US EPA Method 29 mercury emission data for the Incinerator Exhaust Stack and the PAC injection point is detailed in Table 9. The volumetric flowrates measured at the Incinerator Exhaust Stack were used to calculate emission data for the contaminants measured at the Pre-PAC Injection sampling location since this location was highly non-ideal for flow measurements.

The following table summarizes the average test results and the corresponding emission criteria:

Mercury Emission Data	ECA Limit	Pre-PAC Injection	Post PAC-Injection	
		Method 29	Method 29	Method 30B
Dry Reference Conc. (µg/Rm^3)*	-	191	2.16	2.34
Dry Adjusted Conc. (µg/Rm^3)**	50	163	1.85	1.98

* At 25°C and 1 atm

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

The mercury removal efficiency was calculated using the dry reference concentration data calculated from the US EPA Method 29 tests conducted Pre and Post PAC Injection. The mercury removal efficiency calculations are detailed in Table 10.

The average mercury removal efficiency for the two Method 29 tests conducted was 98.9%.

7. FACILITY PROCESS DATA

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

- daily incineration report of analysis
- incinerator feed rates (rich, lean, emulsion, alkaline and leachate streams)
- volumetric flowrates (TDU, secondary air and stack gases)
- PAC feed rate
- temperatures (primary zone, secondary zone, spray dryer inlet and outlet)
- pressures (spray dryer outlet, baghouse differential)
- combustion gas stack concentrations (CO, THC, O_2, SO_2)
- stack gas opacity

The one-minute average CEM combustion gas results are provided in Appendix 18, and the one-minute average process data including waste flows, PAC feed and incinerator temperatures and pressures are provided in Appendix 19.

APPENDIX 1

Data Tables
(10 pages)

TABLE 1
Clean Harbors
Test Schedule

Mercury Tests (US EPA Method 30B)

Sampling Location	Test Number	Test Date	Sampling Period		Sampling Time
			Start	Finish	min
Incinerator Exhaust	1	August 17, 2022	9:27	10:27	60
Incinerator Exhaust	2	August 17, 2022	10:47	11:47	60
Incinerator Exhaust	3	August 17, 2022	12:11	13:11	60
Incinerator Exhaust	4	August 17, 2022	14:01	15:01	60
Incinerator Exhaust	5	August 17, 2022	15:24	16:29	60
Incinerator Exhaust	6	August 17, 2022	16:46	17:46	60

Particulate Matter and Mercury Tests (US EPA Method 29 Modified)

Sampling Location	Test Number	Test Date	Sampling Period		Sampling Time
			Start	Finish	min
Incinerator Exhaust	1	August 17, 2022	9:25	13:02	180
Incinerator Exhaust	2	August 17, 2022	13:53	17:28	180
Pre-PAC Injection	1	August 17, 2022	9:40	10:00	20
Pre-PAC Injection	2	August 17, 2022	14:21	14:46	25

Acid Gases Tests

Sampling Location	Test Number	Test Date	Sampling Period		Sampling Time
			Start	Finish	min
Incinerator Exhaust	1	August 17, 2022	10:10	11:10	60
Incinerator Exhaust	2	August 17, 2022	11:39	12:39	60
Incinerator Exhaust	3	August 17, 2022	14:18	15:18	60
Incinerator Exhaust	4	August 17, 2022	15:56	16:56	60

Combustion Gas Tests

Sampling Location	Test Number	Test Date	Sampling Period		Sampling Time
			Start	Finish	min
Incinerator Exhaust	1	August 17, 2022	10:30	11:00	30
Incinerator Exhaust	2	August 17, 2022	11:55	12:55	60
Incinerator Exhaust	3	August 17, 2022	13:25	14:25	60
Incinerator Exhaust	4	August 17, 2022	14:37	15:37	60
Incinerator Exhaust	5	August 17, 2022	16:00	17:30	90

TABLE 2
Clean Harbors
Stack Gas Sampling Parameters

US EPA Method 29 (modified) - Particulate Matter and Mercury Test

Sampling Location	Test No.	Pitot Tube Coefficient	Dry Gas Meter Factor	Nozzle Diameter mm	Gas Volume Sampled Rm^3 *	Percentage of Isokineticity %
Incinerator Exhaust	1	0.845	0.973	6.36	3.385	102.4
Incinerator Exhaust	2	0.845	0.973	6.36	3.349	101.7
Pre-PAC Injection	1	-	1.003	5.85	0.187	-
Pre-PAC Injection	2	-	1.003	5.85	0.252	-

* Dry at 25°C and 1 atmosphere

TABLE 3
Clean Harbors
Stack Gas Physical Parameters and Volumetric Flowrates

US EPA Method 29 (modified) - Particulate Matter and Mercury Test

Sampling Location	Test No.	Gas Temp.	Moisture by Volume	Gas Velocity	Static Pressure	Absolute Pressure	Carbon Dioxide by Volume	Oxygen by Volume	Actual Flowrate	Dry Reference Flowrate	Dry Adjusted Flowrate	Wet Reference Flowrate
		°C	%	m/s	kPa	kPa	% *	% *	m^3/s	Rm^3/s **	Rm^3/s ***	Rm^3/s**
Incinerator Exhaust	1	193	48.6	29.7	-0.030	99.8	7.72	9.28	50.7	16.4	19.3	31.9
Incinerator Exhaust	2	193	48.7	29.7	-0.030	99.7	7.63	9.30	50.7	16.3	19.2	31.9
Incinerator Exhaust	Average	193	48.7	29.7	-0.030	99.7	7.68	9.29	50.7	16.4	19.2	31.9

* Dry basis, measured by the ORTECH CEMS

** At 25 °C and 1 atmosphere

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

TABLE 4
Clean Harbors
Particulate Emission Data

Sampling Location	Test No.	Particulate Collected			Dry Gas Volume Sampled	Particulate Concentration				Particulate Emission Rate
		Probe Rinse	Main Filter	Total		Actual	Dry Reference	Dry Adjusted	Wet Reference	
		mg	mg	mg	Rm^3*	mg/m^3	mg/Rm^3*	mg/Rm^3**	mg/Rm^3*	g/s
Incinerator Exhaust	1	14.0	1.5	15.5	3.385	1.48	4.58	3.90	2.36	0.075
Incinerator Exhaust	2	10.3	5.1	15.4	3.349	1.48	4.60	3.93	2.36	0.075
Incinerator Exhaust	Average					1.48	4.59	3.91	2.36	0.075
Pre-PAC Injection	1	896	1220	2116	0.187	3661	11306	9633	5814	186
Pre-PAC Injection	2	1110	1400	2510	0.252	3215	9967	8504	5112	163
Pre-PAC Injection	Average					3438	10636	9069	5463	174

* At 25 °C and 1 atmosphere

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

TABLE 5
Clean Harbors
Incinerator Exhaust Stack
Acid Gas Emission Data

Hydrogen Chloride

Test No.	HCl Collected mg	Dry Volume Sampled Rm^3*	Hydrogen Chloride Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	HCl Emission Rate g/s
1	7.74	0.1178	21.3	65.7	56.0	33.8	1.08
2	8.68	0.1184	23.7	73.3	62.4	37.7	1.20
3	10.7	0.1185	29.1	90.3	77.0	46.3	1.48
4	9.13	0.1173	25.1	77.9	66.4	39.9	1.27
Blank	0.0723	Average	24.8	76.8	65.5	39.4	1.26

Hydrogen Fluoride

Test No.	HF Collected mg	Dry Volume Sampled Rm^3*	Hydrogen Fluoride Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	HF Emission Rate g/s
1	5.39	0.1178	14.8	45.8	39.0	23.5	0.75
2	5.13	0.1184	14.0	43.3	36.9	22.3	0.71
3	5.37	0.1185	14.6	45.3	38.7	23.2	0.74
4	5.18	0.1173	14.2	44.2	37.7	22.7	0.72
Blank	0.0527	Average	14.4	44.6	38.1	22.9	0.73

Hydrogen Bromide

Test No.	HBr Collected mg	Dry Volume Sampled Rm^3*	Hydrogen Bromide Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	HBr Emission Rate g/s
1	0.615	0.1178	1.69	5.22	4.45	2.68	0.086
2	0.884	0.1184	2.42	7.46	6.36	3.84	0.12
3	1.26	0.1185	3.43	10.6	9.07	5.45	0.17
4	2.35	0.1173	6.46	20.0	17.1	10.3	0.33
Blank	<0.225	Average	3.50	10.8	9.24	5.56	0.18

Hydrogen Iodide

Test No.	HI Collected mg	Dry Volume Sampled Rm^3*	Hydrogen Iodide Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	HI Emission Rate g/s
1	<0.0643	0.1178	<0.18	<0.55	<0.47	<0.28	<0.0090
2	<0.0680	0.1184	<0.19	<0.57	<0.49	<0.30	<0.0094
3	<0.0671	0.1185	<0.18	<0.57	<0.48	<0.29	<0.0093
4	<0.0680	0.1173	<0.19	<0.58	<0.49	<0.30	<0.0095
Blank	<0.0671	Average	<0.18	<0.57	<0.48	<0.29	<0.0093

* At 25 °C and 1 atmosphere

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

Note: All analytical results are reported as the average of duplicate analyses.
"<" indicates that the analyte was not detected (was less than the analytical detection limit), and the value of the detection limit was used to calculate the emission data.

TABLE 6
Clean Harbors
Incinerator Exhaust Stack
Combustion Gas Analyses

Average Combustion Gases - As Measured

Test No.	Carbon Dioxide %	Carbon Monoxide ppm	Nitrogen Oxides * ppm	Nitric Oxide ppm	Oxygen %	Sulfur Dioxide ppm	Total Hydrocarbons ** ppm
1	7.71	65.8	108	107	9.37	-	19.4
2	7.74	70.7	107	105	9.19	132	22.1
3	7.93	60.9	117	115	8.93	166	19.7
4	7.12	49.8	114	112	9.84	138	15.3
5	7.82	73.0	112	111	9.14	156	18.9
Average	7.66	64.0	112	110	9.29	118	19.3

Average Combustion Gases - Dry Basis Adjusted to 11% Oxygen

Test No.	Carbon Dioxide %	Carbon Monoxide ppm	Nitrogen Oxides * ppm	Nitric Oxide ppm	Oxygen %	Sulfur Dioxide ppm	Total Hydrocarbons ppm
1	6.62	56.5	92.7	91.9	-	-	32.4
2	6.54	59.8	90.5	88.8	-	112	36.4
3	6.56	50.4	96.8	95.1	-	137	31.8
4	6.37	44.6	102	100	-	124	26.7
5	6.58	61.5	94.3	93.4	-	131	31.0
Average	6.54	54.5	95.3	93.9	-	101	31.7

* Nitric oxide and nitrogen dioxide

** Wet basis as methane, one-minute average data

TABLE 7
Clean Harbors
Incinerator Exhaust Stack
Combustion Gas Emission Data

Test No.	Combustion Gas	Dry Actual Concentration	Dry Adjusted Concentration	Dry Concentration by Weight Reference**	Dry Concentration by Weight Adjusted ***	Wet Concentration by Weight Actual	Wet Concentration by Weight Reference**	Emission Rate
		ppm	ppm	mg/Rm^3	mg/Rm^3	mg/m^3	mg/Rm^3	g/s
1	Carbon Dioxide	77100	65691	138658	118140	44897	71306	2275
	Carbon Monoxide	65.8	56.1	75.3	64.2	24.4	38.7	1.24
	Nitrogen Oxides ****	108	92.0	203	173	65.7	104	3.33
	Nitric Oxide	107	91.2	131	111.8	42.5	67.5	2.15
	Oxygen	93700	110000	122554	143873	39682	63024	2011
	Sulphur Dioxide	-	-	-	-	-	-	-
	Total Hydrocarbons	19.4 *	32.1	24.7	21.0	7.99	12.7	0.40
2	Carbon Dioxide	77400	65947	139197	118600	45072	71583	2284
	Carbon Monoxide	70.7	60.2	80.9	68.9	26.2	41.6	1.33
	Nitrogen Oxides ****	107	91.2	201	171	65.1	103	3.30
	Nitric Oxide	105	89.5	129	110	41.7	66.2	2.11
	Oxygen	91900	110000	120199	143873	38920	61814	1972
	Sulphur Dioxide	132	112	345	294	112	178	5.67
	Total Hydrocarbons	22.1 *	36.6	28.1	23.9	9.10	14.5	0.46
3	Carbon Dioxide	79300	67664	142614	121688	46008	73142	2330
	Carbon Monoxide	60.9	52.0	69.7	59.5	22.5	35.7	1.14
	Nitrogen Oxides ****	117	99.8	220	188	71.0	113	3.59
	Nitric Oxide	115	98.1	141	120	45.5	72.3	2.30
	Oxygen	89300	110000	116799	143873	37680	59902	1908
	Sulphur Dioxide	166	142	434	371	140	223	7.10
	Total Hydrocarbons	19.7 *	32.8	25.1	21.4	8.10	12.9	0.41
4	Carbon Dioxide	71200	60752	128047	109258	41309	65671	2092
	Carbon Monoxide	49.8	42.5	57.0	48.6	18.4	29.2	0.93
	Nitrogen Oxides ****	114.0	97.3	214	183	69.1	110	3.50
	Nitric Oxide	112.0	95.6	137	117	44.3	70.4	2.24
	Oxygen	98400	110000	128701	143873	41520	66007	2103
	Sulphur Dioxide	138	118	361	308	116	185	5.90
	Total Hydrocarbons	15.3 *	25.5	19.5	16.6	6.29	10.0	0.32
5	Carbon Dioxide	78200	66725	140636	120000	45370	72128	2298
	Carbon Monoxide	73.0	62.3	83.5	71.3	27.0	42.8	1.37
	Nitrogen Oxides ****	112	95.6	211	180	67.9	108	3.44
	Nitric Oxide	111	94.7	136	116	43.9	69.8	2.22
	Oxygen	91400	110000	119545	143873	38566	61311	1953
	Sulphur Dioxide	156	133	408	348	132	209	6.67
	Total Hydrocarbons	18.9 *	31.4	24.1	20.6	7.77	12.4	0.39
Average	Carbon Dioxide	76640	65356	137830	117537	44531	70766	2256
	Carbon Monoxide	64.0	54.6	73.3	62.5	23.7	37.6	1.20
	Nitrogen Oxides ****	112	95.2	210	179	67.8	108	3.43
	Nitric Oxide	110	93.8	135	115	43.6	69.2	2.21
	Oxygen	92940	110000	121560	143873	39274	62412	1990
	Sulphur Dioxide	148	126	387	330	125	199	6.33
	Total Hydrocarbons	19.1 *	31.7	24.3	20.7	7.85	12.5	0.40

* THC concentrations by volume (ppm) are provided on a wet basis
** At 25°C and 1 atmosphere
*** At 25°C and 1 atmosphere, adjusted to 11% oxygen by volume
**** Nitric oxide and nitrogen dioxide as the equivalent amount of nitrogen dioxide

TABLE 8
Clean Harbors
Incinerator Exhaust Stack
US EPA Method 30B Mercury Emission Data

Test/Run No.	Tube ID	Mercury Collected Section 1	Mercury Collected Section 2	Mercury Collected Total	Dry Gas Volume Sampled	Mercury Concentration Dry Reference	Mercury Concentration Dry Adjusted	Paired Trap Agreement
		ng	ng	ng	Rm^3*	µg/Rm^3*	µg/Rm^3**	%
1	A	148.8	<0.39	149	0.0570	2.61	2.24	-
	B ***	156.1	1.0	157	0.0630	2.50	2.14	-
	Average					2.55	2.19	2.2
2	A ***	141.9	2.0	144	0.0578	2.49	2.14	-
	B	151.6	0.9	153	0.0654	2.33	2.01	-
	Average					2.41	2.08	3.3
3	A	115.8	1.5	117	0.0567	2.07	1.75	-
	B ***	99.6	1.3	101	0.0553	1.82	1.54	-
	Average					1.95	1.65	6.3
4	A ***	134.4	<0.39	134	0.0561	2.40	1.98	-
	B	150.8	0.3	151	0.0611	2.47	2.04	-
	Average					2.43	2.01	1.6
5	A	84.0	0.1	84.1	0.0591	1.42	1.32	-
	B ***	60.0	<0.39	60.0	0.0623	0.96	0.90	-
	Average					1.19	1.11	19.2
6	A ***	26.0	1.1	27.1	0.0569	0.48	0.40	-
	B	127.7	0.8	129	0.0619	2.08	1.74	-
	Average					1.28	1.07	62.7
Average				138		2.34	1.98	

Note: The results for Test No. 5 and Test No. 6 were excluded from the average as the paired trap agreement didn't meet the method QA/QC.
This is typical for spike concentrations that are significantly higher than the stack mercury concentration.

* 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.

TABLE 9
Clean Harbors
US EPA Method 29 (Modified) Mercury Emission Data

Sampling Location	Test No.	Mercury Collected			Dry Gas Volume Sampled	Mercury Concentration		Emission Rate
		Particulate Bound	Impingers & Rinses	Total		Dry Reference	Dry Adjusted	
		µg	µg	µg	Rm^3*	µg/Rm^3*	µg/Rm^3**	mg/s
Incinerator Exhaust	1	0.15	7.84	7.99	3.385	2.36	2.01	0.039
Incinerator Exhaust	2	0.20	6.39	6.59	3.349	1.97	1.68	0.032
Incinerator Exhaust	Average					2.16	1.85	0.035
Pre-PAC Injection	1	7.92	26.6	34.5	0.187	184	157	3.03
Pre-PAC Injection	2	7.80	42.0	49.8	0.252	198	169	3.23
Pre-PAC Injection	Average					191	163	3.13
Blank		<0.015	<0.3					

* At 25°C and 1 atmosphere

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

Note: The Pre-PAC Injection emission data was calculated using the volumetric flowrates measured at the Incinerator Exhaust Stack

TABLE 10
Clean Harbors
Mercury Removal Efficiency

US EPA Method 29 (modified)

Test No.	Mercury Dry Reference Concentration		Removal Efficiency
	Pre-PAC Injection	Incinerator Exhaust	
	$\mu g/Rm^3$*	$\mu g/Rm^3$*	%
1	184	2.36	98.7
2	198	1.97	99.0
Average	191	2.16	98.9

* At 25°C and 1 atmosphere

APPENDIX 2

Environmental Compliance Approval No. 8-1030-94-006
(29 pages)

Ministry of Environment and Energy
Ontario

Ministère de l'Environnement et de l'Énergie

CERTIFICATE OF APPROVAL (AIR)
NUMBER 8-1030-94-006

LAIDLAW ENVIRONMENTAL SERVICES LTD.
265 N. Front Street,
Sarnia, Ontario
N7T 7X1

Located at: Part of Lot 9, Concession 10, Township of Moore, County of Lambton

You have applied in accordance with Section 9 of the Environmental Protection Act for approval of:

to operate the facility to incinerate hauled liquid industrial waste class no(s). 111-114 inclusive, 121, 122, 123, 131-135 inclusive, 141-150 inclusive, 211-213 inclusive, 221, 222, 231-233 inclusive, 241, 242, 251-254 inclusive, 261-270 inclusive, 281, 282, 311 and 321 which may bring about the emissions of air pollutants from an exhaust stack with the height of approximately 68 metres above ground, with the diameter of approximately 1.5 metres and equipped with an exhaust cone 1.22 metres in diameter in accordance with the application from Laidlaw Environmental Services Ltd. dated December 23, 1994 and supporting documentation listed in Appendix A, subject to conditions as described in Schedule I.

This certificate replaces the Certificate of Approval (Air) Number 8-1039-91-006 dated May 23, 1991.

You are hereby notified that this approval is issued subject to the following terms and conditions outlined below:

TERMS AND CONDITIONS

DEFINITIONS

1. For the purpose of this Certificate of Approval:

   a. "air pollution control system" means the entire air pollution control train consisting of a spray dryer and a baghouse as described in the Application for Certificate of Approval for Plant Modifications at Tricil (Sarnia) Limited, Corunna, Ontario by Tricil Limited dated July 15, 1981.

   b. "ash" means solid residues from the incineration process;

   c. "baghouse ash" means solids recovered from the baghouse;

   d. "°C" means degrees Celsius;

   e. "CEM" means continuous emission monitor;

e. "CEM-CSA" means Continuous Emission Monitoring Methods, Canadian Standards Method: CAN/CSA-Z223.2-M86, ISSN 0317-5669, September 1986, Canadian Standards Association;

g. "certificate" means this entire certificate of approval including its schedules issued in accordance with Section 8 of the Environmental Protection Act;

h. "company" means Laidlaw Environmental Services (Sarnia) Ltd. formerly called Tricil (Sarnia) Limited;

i. "Director" means any Ministry employee appointed by the Minister pursuant to Section 5 of the Act;

j. "District Manager" means the District Manager, Sarnia District Office of the Southwestern Region of the Ministry;

k. "facility" consists of an incinerator, storage tanks for waste and the associated piping and pumps, and air pollution control system as described in the Application for Certificate of Approval for Plant Modifications at Tricil (Sarnia) Limited, Corunna, Ontario by Tricil Limited dated July 15, 1981; and in the document titled "Proposal to Provide Secondary Combustion Air for the L.E.S.L. Lambton Incinerator" and shown in drawings numbered D-32-2-043 and DX-03-0-192 by Four Nines, Inc.; and in the document titled Modifications to Existing Sarnia Tank Farm, Conceptual Scope of Work, February 1991, and modified to allow the introduction of vent gases from the existing storage tanks and purge gases from the centrifuge and the steam still into the combustion air plenum at the incinerator as described in the application for a certificate of approval (air) dated August 7, 1991 and supporting documentation listed in Appendix; and further modified as described in the application letter to Mr. H.O. Wigle dated November 16, 1992 and signed by Mr. Dean C. Edwardson along with a document titled: Proposal; Incineration of Intermediate Heat Value Waste and drawings by the MIG Engineering Ltd. of Sarnia, Ontario numbered 8881/8745/8562 and No. 8562;

l. "GCM-THC" means Guideline for Continuous Monitoring of Total Hydrocarbons (Draft), Ontario Ministry of the Environment;

m. "incinerator" means equipment for thermal destruction of waste as described in the Application for Certificate of Approval for Plant Modifications at Tricil (Sarnia) Limited, Corunna, Ontario by Tricil Limited dated July 15, 1981;

n. "intermediate heat value waste" means an emulsion containing rich and lean waste with a total heating value of more than 4 MJ/kg and less than 25 MJ/kg;

o. "kPa" means kiloPascals;

p. "lean waste" means waste water contaminated with small quantity of liquid organic waste with a heating value of not more than 4 MJ/Kg;

q. "lpm" means liters per minute averaged over a one minute period;

r. "Manager" means the Manager, Environmental Engineering Services Section, Science and Technology Branch, or any other person who represents and carries out the duties of the Manager, Environmental Engineering Services Section, Science and Technology Branch, as those duties relate to the conditions of this certificate;

s. "Ministry" means the Ontario Ministry of Environment and Energy;

t. "MJ/kg" means megajoules per kilogram;

u. "ppm" means parts per million by volume;

v. "Regional Director" means the Director of the Southwestern Region of the Ministry of the Environment and Energy;

w. "rich waste" means liquid organic waste with a heat value of at least 25 MJ/kg;

x. "Source Testing Code" means the Ministry's publication ISBN 0-7748-6419-X "Source Testing Code", Version #2, Report # ARB-66-80, November 1980;

y. "U.S. opacity guideline" means Performance Specification 1 - Specifications and Test Procedures for Opacity Continuous Emission Monitoring Systems in Stationary Sources, Title 40, Part 60 under Code of Federal Regulations Ch. I, July 1, 1987 Edition.

Applicability of the Certificate

2. The company shall operate the facility and shall fulfil the requirements of this certificate in full compliance with each and every condition contained in Provisional Certificate of Approval No. A 031813 issued for a Waste Disposal Site.

Requirements

3. The conditions of this certificate are imposed pursuant to Section 8 of the *Environmental Protection Act*. The issuance of this certificate in no way abrogates the company's legal obligation to comply with all of the requirements of Ontario Regulation 346, and all other applicable legislation and regulations.

Interpretation (Severability and Conflicts)

4. a. The requirements of this certificate are severable. If any requirement of this certificate, or the application of any requirement of this certificate to any circumstance, is held invalid, the application of such requirement to other circumstances and the remainder of this certificate shall not be affected thereby.

b. In all matters requiring the interpretation and implementation of this certificate, the conditions of the certificate shall take precedence, followed in descending order by the company's application and the documentation, referred to in this certificate, which is submitted in support of this application.

Compliance

5. The company shall ensure compliance with all the terms and conditions of this certificate. Non-compliance constitutes a violation of the *Environmental Protection Act* and is grounds for enforcement.

Changes to be Reported

6. The company shall notify the District Manager in writing of any of the following changes within 30 days of the change occurring:

a. change of address of the company;

b. change of the name of the corporation where the company or operator is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" (Form 1, 2, or 3 of O. Reg. 189, R.R.O. 1989, as amended from time to time), filed under The *Corporations Information Act* shall be included in the notification to the District Manager;

c. change in directors or officers of the corporation where the company or operator is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" as referred to in clause (b);

Information

7. In the event the company provides to the Ministry information, records, documentation or notification in accordance with this certificate (for the purposes of this condition, "information"),

a. the receipt of said information by the Ministry;

b. the acceptance by the Ministry of the information's completeness accuracy; or,

c. the failure of the Ministry to prosecute the Company, or to requi the company to take any action, under this certificate or a statute or regulation in relation to said information;

shall not be construed as the approving, excusing or justifying by t Ministry of any act or omission of the company relating to sa information, amounting to non-compliance with this certificate or a statute or regulation.

Adverse Impact

8. The company shall take all reasonable steps to minimize any adver effect resulting from non-compliance with the requirements specified this certificate including, but not limited to, such accelerated additional monitoring as may be necessary to determine the nature a impact of the discharge in respect of which there is non-compliance.

Conditions for Ministry Order of Immediate Shutdown

9. The Regional Director may order an immediate shutdown of the facilit and the company shall comply with such an order where, in the opinion o the Regional Director upon probable grounds, a violation of an condition has resulted or may result in an adverse effect as that i described in the *Environmental Protection Act*.

SECTION 2: OPERATION AND MAINTENANCE

Operation and Maintenance

10. a. The company shall ensure that at all times, the site and facilit and related fixtures, appurtenances, equipment and services which are installed or used to achieve compliance with this certificate are properly operated and maintained.

b. In furtherance of, but without limiting the generality of, the obligation imposed by subcondition a the company shall ensure that:

i. funding, staffing, training of staff, laboratory and proces controls, quality assurance and quality control procedures o or in relation to the site and facility is adequate to achiev compliance with this certificate; and,

ii. equipment and material are kept on hand and in good repair fo immediate use in the event of:

(1) any change in process parameters which results o potentially could result in an excursion from the operational ranges set out in condition 16 of this certificate;

(2) any fire or explosion;

(3) any discharge of a contaminant into the natural environment or interior of any building; or,

(4) any spill within the meaning of Part IX of the *Environmental Protection Act*,

and staff are trained in the use of said equipment and material and in the methods and procedures to be employed upon the occurrence of such an event.

Operating Manual

11. In furtherance of, but without limiting the generality of the obligation imposed by condition 10, the company shall operate the facility in accordance with the Operating Manual which should be made avilable to the District Manager for inspection upon request. The company shall keep the operating manual up to date through revisions undertaken from time to time so as to reflect any changes in the described operation and maintenance procedures made necessary by good engineering practice, this certificate or the requirements of the Ministry.

Due Diligence

12. The obligations imposed by the terms and conditions of this certificate of approval are obligations of due diligence.

Stack Emission Criteria

13. The Company shall operate the incinerator such that it meets all point of impingement standards in Regulation 346 and guidelines listed in Schedule A and the following emission constraints;

a. Maximum opacity of the stack gas as measured by a properly maintained opacity monitor shall not exceed 10% for more than four minutes in the aggregate in any thirty minute period.

b. Maximum concentration of residual organic matter as measured by a total hydrocarbon monitor shall not exceed 100 ppm by volume on undiluted basis, expressed as equivalent methane, being an average of ten measurements taken at approximately one minute intervals.

c. The maximum concentration of carbon monoxide (CO) in the stack gas shall not exceed 250 ppm by volume on undiluted basis, being an average of ten measurements taken at approximately one minute intervals.

d. Maximum concentration of particulate matter in the stack shall not exceed 50 mg/m^3 normalized to 11% of oxygen in dry stack gas at 25°C and 101.3 kPa.

14. Within six month following the issue date of this certificate, the company shall submit to the Regional Director a report outlining a timetable and steps it will undertake to decrease the concentrations of carbon monoxide in the stack gas to less than 100 parts per million.

Limitation on Wastes

15. The Company shall comply with limitations regarding the feeding rates of various wastes and the heat contents of these wastes as follows;

a. The maximum feeding rate of rich waste to the incinerator shall not exceed 45 lpm with a minimum heating value of 25 MJ/kg.

b. The maximum feeding rate of lean waste to the incinerator shall not exceed 170 lpm providing the heating value of waste does not exceed 4 MJ/kg.

c. The maximum feeding rate of intermediate heat value waste to the incinerator shall not exceed 20 lpm.

d. Wastes fed into the incinerator shall not contain more than 2% of organic chlorine by weight.

Detailed Operating Conditions

16. In addition to the obligations imposed by condition 13, condition 14 and condition 15, the company shall operate the incinerator at all times while wastes are fed into the incinerator as follows;

a. The company shall install and operate mixers or recirculation pumps in the designated feed tanks for lean and rich wastes, as described in Modifications to Existing Sarnia Tank Farm, Conceptual Scope of Work, January 17, 1991, prior to feeding these wastes into the incinerator.

b. 1300°C flame temperature measured accurately in the primary zone by means of auxiliary fuel control.

c. 800°C as measured by the temperature recorder TR-241 located at the exit from the incinerator by means of control of the feeding rate of lean waste.

d. The incinerator shall provide not less residual oxygen in the stack gas than 8% by volume as measured by the continuous emission monitor for oxygen.

e. Spray dryer outlet temperature shall not exceed 225°C

f. Incinerator pressure, as measured at the exit of the incinerator by a pressure indicator PI-242 shall not exceed 25 millimetres of water column for more than 5 seconds.

g. The company shall operate the incinerator to immediately cut off waste feed when any of the following occurs:

i. the temperature in the primary chamber falls below 1300°C.

ii. the exit temperature as measured in subcondition c. falls below 800°C.

iii. Concentration of oxygen in the stack gas as measured in subcondition "d" falls below 8%.

iv. Level of opacity in the stack gas exceeds 10% for more than four minutes in any half hour as described in subcondition "13a".

v. Concentration of organic matter in the incinerator exhaust gas exceeds 100 ppm on the average in a ten measurements taken at approximately one minute intervals.

vi. Concentration of carbon monoxide (CO) in the stack gas exceeds 250 ppm, being an average of ten measurements taken at approximately one minute intervals.

vii. Spray dryer outlet temperature exceeds 225°C.

h. The company shall shut down the incinerator in the event of;

i. Incinerator pressure, as measured in subcondition "f", exceed 25 millimetres of water.

ii. Loss of flame in the incinerator.

i. During start-up and shut-down of the incinerator, waste must not b introduced into the incinerator unless the incinerator is operatin within the conditions specified in subconditions "a" through "f inclusive;

17. Within six months following the issue date of this certificate, th company shall submit to the Regional Director a report outlining a timetable and steps which it will undertake to decrease the spray dryer outlet temperature to less than 200°C.

SECTION 3: CONTINUOUS MONITORING AND STACK TESTING

Continuous Emission and Process Monitoring

18. All CEMs presently installed on site shall be maintained and operated in accordance with the procedures described in the attached copies of CEM procedures. The monitored parameters include the following:

a. opacity;

b. stack concentrations of: sulphur dioxide, total hydrocarbons (THC), carbon monoxide and oxygen;

c. feed rates to the incinerator, temperature in the incinerator primary zone, incinerator exit temperature, incinerator exit pressure, exit spray dryer temperature, stack gas temperature and stack gas flow;

d. Continuous emission monitoring equipment and process monitoring equipment for parameters listed in subcondition a and subcondition b and subcondition c shall be equipped with continuous recording devices and with appropriate alarms for indication of exceedances of set points where applicable;

e. Audible and/or visible alarms indicating exceedances of set points will be activated at the values specified in subcondition 13 a., subcondition 13b and subcondition 13c of this certificate;

f. Continuous stack monitors shall be properly maintained and calibrated as described in the attached copies of the U.S. opacity guideline, GCM-THC and CEM-CSA and confirmed by the Manager.

Stack Testing

19. The company shall carry out stack testing annually to determine th emissions of the following;

a. Total particulates and trace metals specified in Table 6 c Schedule B to this certificate;

b. Volatile organic contaminants specified in Table 3 of Schedule B t this certificate;

c. Semivolatile trace organic species specified in Tables 1, 2, 4, ar 5 of Schedule B to this certificate;

d. Oxides of nitrogen;

e. Sulphur dioxide;

f. Hydrogen chloride.

20. The company shall use sampling and analytical procedures which are i agreement with the Source Testing Code and approved by the Manager;

a. Each pollutant category listed in condition 19 shall be sampled minimum of three times to obtain three valid test samples as par of one sampling campaign;

b. Each sampling test shall be considered a compliance test as define in the Source Testing Code.

21. In preparation for stack testing, the company shall, within the limitations imposed by the availability of waste, tank farm capacity and time constraints, attempt to accumulate sufficient quantities of waste which are representative of waste causing highest stack emissions i normal operation;

a. Prior to stack testing the company shall analyze the composite samples of all wastes fed to the facility for the following: total PCBs, total dioxins and furans, hexachlorobenzene, pentachlorophenol, hexachloroethane, carbon tetrachloride and solids content in addition to all parameters listed in the company report on analyses of daily process samples titled "Incineration of Intermediate Heat Value Wastes at Tricil (Sarnia) Limited." dated 1987;

b. A record of THC and opacity monitor readings shall be kept while incinerating wastes of known composition as per subcondition a;

c. Company shall make every effort to secure sufficient quantity o representative waste for feeding the facility during stack testing The representative waste shall be similar in composition to th waste which caused the highest THC and opacity readings in pre-tes work described in subcondition a and subcondition b;

d. Upon consulting the District Manager, the company may exceed th maximum feeding rates shown in condition 15 in the period of on month prior to and during stack tests providing the increased fee rates do not violate other terms of this certificate.

Incinerator Operation During Stack Testing

22. For the purpose and duration of stack tests only, or after obtaining the approval from the Director, the company may change the minimum temperatures in the incinerator imposed by subcondition 16b and subcondition 16c providing none of the limits imposed by condition 13 has been exceeded.

23. The Company shall call a meeting between the stack sampling consultant, the Manager and the District Manager, at least two weeks prior to tests, to discuss:

a. sampling protocol, process conditions and individual responsibilities during testing;

b. timing of tests so that witnessing can be arranged at Manager's discretion;

c. procedure for execution of a new tests in place of any compliance test which, in the opinion of the Manager or its designate, deviated significantly from the Source Testing Code.

Sampling of Process Effluents

24. The Company shall prepare three composite samples of rich waste, lean waste and baghouse ash during each stack test. The composite samples shall be analyzed for contaminants to be specified by the company and approved by the Regional Director prior to stack tasting. Sampling procedure and frequency shall be determined at the meeting referred to in condition 23.

Reporting of Stack Testing Results

25. The company shall provide to the District Manager;

a. A report summarizing test results not later than 30 days after the receipt of the results from the laboratory.

b. A stack test report conforming with the requirements of the Source Testing Code and containing stack testing results, continuous monitoring data obtained during each stack sampling test, results of analyses on process samples, process data and feed rates, assessment of operation and interpretation of results not later than 90 days after the receipt of the results from the laboratory.

c. Any test including sampling and laboratory analyses which in the opinion of the Director has not been performed in accordance with the Source Testing Code or sampling methods as agreed to by the Manager, shall be repeated by the company in the shortest time practicable.

Reporting of Continuous Emission Monitoring Data

26. The company shall provide to the District Manager monthly summaries of continuous emission monitoring data; the summaries shall include average monthly values of all parameters listed subcondition 18a and subcondition 18b and the concomitant standard deviations; the number and duration of exceedances of the operational ranges listed in subcondition 13a, subcondition 13b and subcondition 13c; and reasons for exceedances and corrective actions.

The reasons for the imposition of these terms and conditions are as follows:

SECTION 1: GENERAL CONDITIONS

Definitions

1. Condition 1 is included to define special terms used throughout this certificate.

Applicability of the Certificate

2. Condition 2 is imposed to emphasize that in addition to conditions in this certificate the company shall comply with conditions contained in the Provisional Certificate of Approval A 031813 issued for a Waste Disposal Site.

Requirements

3. Condition 3 is included to emphasize that the issuance of th certificate does not diminish any other statutory and regulator obligations to which the company is subject in the construction maintenance and operation of the facility, and in particular th requirements of Regulation 346.

Interpretation (Severability and Conflict)

4. Condition 4 is included to clarify how the certificate is to be judicially interpreted and specifically, to clarify that the requirements of the certificate are severable and that they prevail over supporting documentation.

Compliance

5. Condition 5 is included to emphasize that the company is under a statutory obligation to ensure compliance with the certificate.

Changes to be Reported

6. Condition 6 is included to ensure that the Ministry records are kept accurate and current with respect to approved facility and to ensure that subsequent owners of the facility are made aware of the certificate and continue to operate the facility in compliance with it.

Information

7. Condition 7 is included to ensure that Ministry personnel, when acting in the course of their duties, will be given information and records related to the facility which are the subject of this certificate, to enable the Ministry to be assured of the company's compliance with the terms and conditions of this certificate. Subsection c. is included to make the company aware that the mere provision of information in accordance with this certificate shall not exonerate it from enforcement in relation to any non-compliance disclosed by that information simply because the Ministry fails to note the non-compliance, require corrective action or prosecute.

Adverse Impact

8. Condition 8 is included to emphasize that the company has an ongoing duty to mitigate any adverse impacts resulting from non-compliance with the certificate.

Conditions for Ministry Order of Immediate Shutdown

9. Condition 9 is included to emphasize that the company will not be permitted to operate the facility in case of non-compliance with the conditions in this certificate.

SECTION 2: OPERATION AND MAINTENANCE

Operation and Maintenance

10. Condition 10 is included to ensure that the facility will be operated maintained, funded, staffed and equipped in a manner enabling compliance with the terms and conditions of this certificate, such that th environment is protected and deterioration, loss, injury or damage t any person or property is prevented.

Operating Manual

11. Condition 11 is included to ensure that the company shall follow approved operating procedures as required by this certificate and that the operating manual shall be kept up to date.

Due Diligence

12. Condition 12 is included to clarify that the terms and conditions of this certificate of approval impose a standard of due diligence and not absolute liability.

Stack Emission Criteria

13. Condition 13 is included to ensure that the facility, including air pollution control equipment, will not emit into the ambient air pollutants at rates which are higher than achievable by the facility as demonstrated by stack tests and the company's monthly reports. In the case of carbon monoxide, the two minutes interval was added to recognize that some time will be required to purge the incinerator and the air pollution control equipment after the waste feed has been cut off as required by condition 16 of the certificate.

14. Condition 14 is included to ensure that further improvements to the incineration process are made to ensure a minimum combustion efficiency of 99.9 %.

Limitation on Wastes

15. Condition 15 is included to ensure that feeding rates to the incinerator shall not exceed the values which were recorded during stack testing which in conjuction with continuous emission monitoring indicated compliance with emission limits imposed by this certificate.

Detailed Operating Conditions

16. Condition 16 is included to specify safe limits of operating parameters in normal operation and actions to be taken when these limits are not met. These limits have been achieved in operation and are considered adequate for the destruction of toxic trace organics.

17. Condition 17 is included to ensure that the company decreases th temperature of the scrubber outlet so as to minimize the emissions o dioxins and volatile metals such as mercury.

SECTION 3: CONTINUOUS MONITORING AND STACK TESTING

Continuous Emission and Process Monitoring

18. Condition 18 is included to ensure compliance with the requirements or continuous emission and process monitoring, as applicable, imposed by condition 13, condition 15 and condition 16. This condition emphasizes that the Manager is authorized to determine whether the monitors are operated in an acceptable manner.

Stack Testing

19. Condition 19 is included to specify stack sampling which must be carried out on annual basis in order to assess air emissions from the facility. The selection of pollutants for sampling was based on waste composition, consideration of process and the results of previous stack testing at this facility.

20. Condition 20 is included to emphasize the authority of the Manager to approve sampling and analytical procedures, the required number of stack tests and the fact that every test will be considered as compliance test as described in the Source Testing Code.

21. Condition 21 is included to establish a relationship between the waste composition and stack emissions and to ensure that the emissions measured during stack testing will be representative of those process conditions which may induce highest stack emissions, as is stipulated by the definition of compliance test in the Source Testing Code.

22. Condition 22 allows the company to change the temperatures in the incinerator for testing purposes and in normal operation only after obtaining the Director's approval.

23. Condition 23 is included to enable all parties involved in testing to determine responsibilities and agree on procedures during stack testing in order to ensure a satisfactory sampling program and accurate results.

24. Condition 24 is included to ensure that the collection of waste samples required for interpretation of stack sampling results is carried out.

Reporting

25. Condition 25 is included to ensure that the results of sampling and measurements are communicated to the Ministry so that the operation can be assessed and corrective actions initiated as soon as possible if required.

26. Condition 26 is included to ensure that the results of continuc emission measurements are communicated to the Ministry so that t operation can be assessed and corrective actions initiated as soon possible if required. The reporting shall be more comprehensive aft the installation of a new data logger has been completed.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990 c. E-19, may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 142 of the Environmental Protection Act, as amended provi that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary,
Environmental Appeal Board,
112 St. Clair Avenue West,
Suite 502,
Toronto, Ontario.
M4V 1N3

AND

The Director,
Section 9, Environmental Protection Act,
Ministry of the Environment and Energy,
250 Davisville Avenue, 3rd Floor,
Toronto, Ontario.
M4S 1H2

The above noted works are approved under Section 9 of the Environmental Protection Act.

DATED AT TORONTO this 19th *day of.* April 1994

P. DeAngelis, P. Eng.,
Director,
Section 9,
Environmental Protection Act.

VO/pm
cc MOEE Sarnia District Manager
J. Zend, Science & Technology Branch

SCHEDULE A - POINT OF IMPINGEMENT CONCENTRATIONS

Column 1 NAME OF CONTAMINANT	Column 2 HALF HOUR AVERAGE CONCENTRATION AT POINT OF IMPINGEMENT
Aluminum Oxide	100
Arsenic	1
Barium-total water soluble	30
Chromium (Di,Tri and Hexavalent forms)	5
Manganese	7.5
Molybdenum	100
Nickel	5
Phosphorous Pentachloride	30
Potassium Hydroxide	28
Selenium	20
Sodium Hydroxide	20
Silica-respirable (d≤10 micron)	15
Strontium	100
Vinyl Chloride	3
Trichlorofluoromethane	18000
Trifluorotrichloroethane	2400000
Methylene Chloride	5300
Chloroform	1500
1,1,1-Trichloroethane	350000
1,2-Dichloroethane	1200
Perchloroethylene	10000
Isopropyl Benzene(Cumene)	100
1,2,4-Trimethyl Benzene(Mesitylene)	500
Carbon Tetrachloride	1800
1,2,4-Trichlorobenzene	100
Naphthalene	36
Benzo(a)pyrene	3.3 ng/cubic metre*
Pentachlorophenol	60
Polychlorinated Biphenyls (PCBs)	0.45
Polychlorinated Dibenzodioxins (PCCD's)	in pg/cubic metre - see formula
Polychlorinated Dibenzofurans (PCDF's)	in pg/cubic metre - see formula

formula: (PCDD's/450) + (PCDF's/22500) ≤ 1

* Concentration is in micrograms per cubic metre of air unless noted otherwise.

** ng/cubic metre = nanograms per cubic metre

SCHEDULE B - MONITORING PARAMETERS

TABLE 1: PCBs and Chlorobenzenes in Stack Samples

Octachlorostyrene
Hexachlorobenzene
1,3,5-Trichlorobenzene
1,2,3-Trichlorobenzene
1,2,4-Trichlorobenzene
Hexachlorobutadiene
2,4,5-Trichlorobenzene
2,3,6-Trichlorobenzene
1,2,4,5-Tetrachlorobenzene
Hexachloroethane
1,2,3,5-Tetrachlorobenzene
α,2,6-Trichlorotoluene
1,2,3,4-tetrachlorobenzene
Pentachlorobenzene
Dichlorobiphenyls
Trichlorobiphenyls
Tetrachlorobiphenyls
Pentachlorobiphenyls
Hexachlorobiphenyls
Heptachlorobiphenyls
Octachlorobiphenyls
Nonachlorobiphenyls
Decachlorobiphenyl
Total PCB congeners

TABLE 2: Polychlorinated Dibenzodioxins and Polychlorinated Furans

T_4CDD	T_4CDF
P_5CDD	P_5CDF
H_6CDD	H_6CDF
H_7CDD	H_7CDF
O_8CDD	O_8CDF

2,3,7,8-T_4CDD	2,3,7,8-T_4CDF
1,2,3,7,8-P_5CDD	1,2,3,7,8-P_5CDF
1,2,3,4,7,8-H_6CDD	2,3,4,7,8-P_5CDF
1,2,3,6,7,8-H_6CDD	1,2,3,4,7,8-H_6CDF
1,2,3,7,8,9-H_6CDD	1,2,3,6,7,8-H_6CDF
1,2,3,4,6,7,8-H_7CDD	1,2,3,7,8,9-H_6CDF
	2,3,4,6,7,8-H_6CDF
	1,2,3,4,6,7,8-H_7CDF
	1,2,3,4,7,8,9-H_7CDF

SCHEDULE B - MONITORING PARAMETERS

TABLE 3: Volatile Organics in Stack Samples

Dichlorodifluoromethane
Vinyl Chloride
Bromomethane
Trichlorofluoromethane
1,1-Dichloroethene
Trichlorotrifluoroethane
Methylene chloride
trans-1,2-Dichloroethene
Chloroform
1,1,1-Trichloroethane
1,2-Dichloroethane
Benzene
1,2-Dichloropropane
Trichloroethene
Bromodichloromethane
Toluene
Dibromochloromethane
Ethylene dibromide
Tetrachloroethene
Ethylbenzene
m & p-Xylene
Bromoform
o-Xylene
Cumene
Mesitylene
Acetone
2-Butanone
Carbontetrachloride
Styrene

SCHEDULE 8 - MONITORING PARAMETERS

TABLE 1: PAH's in Stack Samples

Tetralin
Naphthalene
2-Methylnaphthalene
1-Methylnaphthalene
2-Chloronaphthalene
Biphenyl
Acenaphthylene
Acenaphthene
Fluorene
Phenanthrene
Anthracene
2-Methylanthracene
o-Terphenyl
1-Methylphenanthrene
9-Methylphenanthrene
Fluoranthrene
Pyrene
9,10-Dimethylanthracene
m-Terphenyl
p-Terphenyl
Benzo (a) Fluorene
Benzo (b) Fluorene
Benzo (a) Anthracene
Triphenylene + Chrysene
Perylene
Benzo (b) Fluoranthene
Benzo (k) Fluoranthene
Benzo (e) Pyrene
Benzo (a) Pyrene
3-Methylchloranthrene
Indeno (1,2,3,c,d) Pyrene
Dibenzo (a,c) Anthracene and Dibenzo (a,h) Anthracene
Picene
Benzo (g,h,i) Perylene
Coronene
Benzo (b) Anthracene
Quinoline
Dibenzo (a,e) Pyrene

SCHEDULE B - MONITORING PARAMETERS

TABLE 5: Chlorophenols in Stack Samples

2,3-dichlorophenol
2,4-dichlorophenol
2,6-dichlorophenol
2,3,4-trichlorophenol
2,4,5-trichlorophenol
2,4,6-trichlorophenol
3,4,5-trichlorophenol
2,3,4,6-tetrachlorophenol
2,3,5,6-tetrachlorophenol
Pentachlorophenol

TABLE 6: Inorganics in Stack Samples

Boron
Barium
Calcium
Cadmium
Copper
Iron
Potassium
Magnesium
Manganese
Sodium
Nickel
Phosphorus
Lead
Strontium
Zinc
Chromium
Aluminum
Silicon
Tin
Titanium
Molybdenum
Vanadium
Sulphur
Mercury
Arsenic
Selenium
Antimony
Silver
Beryllium
Cobalt
Fluorides
Lithium

APPENDIX A

1. Application for Certificate of Approval for Plant Modifications a Tricil (Sarnia) Limited, Corunna, Ontario, submitted to the Ontari Ministry of the Environment by Tricil Limited on July 15, 1981.

2. Application for Certificate of Approval for Plant Modifications a Tricil Sarnia) Limited, Corunna, Ontario, Supplementar Information, submitted to the Ontario Ministry of the Environmen by Tricil Limited on July 15, 1981.

3. "Incineration of Intermediate Heat Value Wastes at Tricil (Sarnia Ltd.", 1987.

4. Air Emission Testing at the Tricil, Sarnia Incinerator, A Draft Report to: Tricil Limited, 89 The Queensway West, Mississauga, Ontario, P.90-43-E25 CI, January 30, 1990, Ortech International, 2395 Speakman Drive, Mississauga, Ontario.

5. Application for Certificate of Approval (Air) for the modification to the incineration feed system received at the Approvals Branch on September 28 1990.

6. A Proposal to Provide Secondary Combustion Air for the L.E.S.L. Lambton Incinerator.

7. Drawing by the MIG Engineering Ltd. of Sarnia, Ontario No. 8881,3745,1562.

8. L.E.S.L. - Lambton Facility, S.I.P.S. Process Vent Control System (a three page description of a system).

9. Drawing no. 1-21, Site Plan.

10. Drawing no. 20E-PFF-808, Fume Incineration, Piping and Instrumentation Diagram.

11. Drawing by the MIG Engineering Ltd. of Sarnia, Ontario No. 8562.

12. Modifications to Existing Sarnia Tank Farm, Conceptual Scope of Work, January 17, 1991.

13. A proposal to Provide Secondary Combustion Air for the L.E.S.L. Lambton Incinerator.

14. Drawing No. DX-03-0-192 dated January 23, 1991, and Drawing No. D-32-2-043 dated February 20, 1991 by Four Nines, Inc.

15. Application letter to Mr. H.O. Wigle dated November 16, 1992 and signed by Mr. Dean C. Edwardson.

16. Application for Certificate of Approval (Air) for the installation of a vent control system (fume incineration) to control emissions from S.I.P.S. plant storage tanks and processing equipment received at the Approvals Branch on December 2, 1991.

17. "Laidlaw Environmental Services Ltd., Lambton Facility, 1993 Stack Test Plan".

18. Application for a Certificate of Approval No. 8-1039-91, dated December 17, 1993, to increase feed rates to the existing unit and to burn wastes with an intermediate heat value (emulsion).

19. Performance Evaluation, Lambton Facility Incineration System, Volume 1, December 1993.

Ministry of the Environment | Ministère de l'Environnement

Ontario

CERTIFICATE OF APPROVAL
WASTE/AIR
NUMBER 6547-5G5MSP

Under the Environmental Protection Act and the regulations and subject to the limitations thereof, this Notice of Amendment (Notice) amends Provisional Certificate of Approval (Waste Disposal Site) No. A031813, dated January 27, 1986 and Notice, dated April 8, 1987 as well as Certificate of Approval (Air) No. 8-1030-94-006, dated April 19, 1994.

Clean Harbors Canada Inc.
4090 Telfer Road
Corunna, ON
N0N 1G0

Located: Lot 9, Concession 10
Township of Moore, County of Lambton

to permit the modification of the facility to incinerate hauled liquid industrial waste in the following manner:

(a) to add additional auxiliary waste injection ports;
(b) to provide for the addition of powdered activated carbon in the air pollution control system;
(c) to add a fume collection and incineration system to the tank farm;
(d) to increase the amount of secondary air supplied to the furnace; and,
(e) to alter the feed rate limitations for the system.

all in accordance with the applications and supporting information as listed in Schedule "A" which is attached to this Notice of Amendment and forms part of this Notice of Amendment, which includes the use of the Site only for the Transfer/Processing/ Incineration of the following categories of waste:

a facility to incinerate hauled liquid industrial waste class numbers:

111 - 114 inclusive; 121, 122, 123, 131 - 135 inclusive;
141 - 150 inclusive; 211 - 213 inclusive; 221, 222,
231 - 233 inclusive; 241, 242, 251 - 254 inclusive;
261 - 270 inclusive; 281, 282, 311, and 321

This amendment also allows the removal of the baghouse bypass duct work which is no longer required.

You are hereby notified that this amendment is issued subject to the terms and conditions of the original Certificate with the following changes:

1. The company shall ensure that the combined feed of all waste streams does not exceed 245 litres per minute.

2. The Company shall optimize the operation of the Incinerator and the Air Pollution Control System by establishing appropriate waste feed mix scenarios to accommodate the variability of heating values encountered with the types of wastes that may be incinerated. The Company shall also establish an Operating Window for the Incinerator and the Air Pollution Control System, including acceptable ranges for the Baseline Parameters and all set points for the continuously monitored parameters. Such an Operating Window shall based upon operating experience and shall be refined not later than during the first Source Testing following the issuance of this amendment. The Company shall submit details of the Operating Window to the Director, Manager and the District Manager as part of the Source Testing Report.

3. The Company shall, at all times, operate the Incinerator and the Air Pollution Control Equipment within the Operating Window, unless the Director determines, in consultation with the Manager and the District Manager that the Operating Window will not, based on the source testing results, adequately guarantee compliance with the Act, O. Reg. 346 and the Performance Conditions of this Certificate.

Concentration Limits:

4. The Company shall, at all times, operate the Incinerator and the Air Pollution Control System in such a manner as to ensure that the following Performance Conditions are met:

   (a) The concentration of organic matter having a carbon content, expressed as equivalent methane, in the Main Stack expressed as a ten minute block average, shall be not more than 100 parts per million by volume on dry basis normalized to 11 percent oxygen.

   (b) The one hour block average concentration of carbon monoxide in the main stack shall be not more than 100 parts per million by volume on a dry basis normalized to 11 percent oxygen; or 110 milligrams per dry cubic metre normalized to 11 percent oxygen at a reference temperature of 25°C and a reference pressure of 101.3 kilopascals.

(c) The concentration of suspended particulate matter in the Stack shall be not more than 20 milligrams per dry cubic metre normalized to 11 percent oxygen at a reference temperature of 25°C and a reference pressure of 101.3 kilopascals.

(d) The opacity at the exit of the Main Stack shall be not more than:

(i) 5 percent, calculated on a 2 hour average; and

(ii) 10 percent, calculated on a 6 minute average.

(e) (i) The toxicity equivalent concentration of dioxins and furans in the Gases in the Main Stack shall be not more than 80 picograms per dry cubic metre normalized to 11 percent oxygen at a reference temperature of 25°C and a reference pressure of 101.3 kilopascals.

(ii) The toxicity equivalent concentration of dioxins and furans shall be calculated in accordance with the International Scheme set out in Schedule 3 of the Certificate.

(f) The concentration of mercury in the Gases in the Stack shall be not more than 50 micrograms per dry cubic metre normalized to 11 percent oxygen at a reference temperature of 25°C and a reference pressure of 101.3 kilopascals.

Interpretation:

5. (a) The requirements of this Notice are severable. If any requirement of this Notice, or the application of any requirement of this Notice or the application of any requirement of this Notice to any circumstance, is held invalid, the application of such requirement to other circumstances and the remainder of this Notice shall not be affected thereby.

(b) In all matters requiring the interpretation and implementation of this Notice, the conditions of this Notice shall take precedence, followed in descending order by the chronological approval documents that this Notice amends.

The reasons for the imposition of these conditions are as follows:

1. The reason for Condition 1 is to limit the amount of waste that can be fed to the incinerator at any time. This Condition alters the conditions regarding Feed Rate limitations in certificates of approval numbers A031813 and 8-1030-94-006.

2. Conditions 2 and 3 address the need to optimize the operation and develop a plan for continual monitoring of the optimized operation.

3. Conditions 4 set minimum performance requirements considered necessary to prevent an adverse effect resulting from the operation of the Equipment.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, you may by written notice served upon me, the Environmental Appeal Board and the Environmental Commissioner, Environmental Bill of Rights, S.O. 1993, Chapter 28, within 15 days after receipt of this Notice, require a hearing by the Board. Section 142 of the Environmental Protection Act, as amended provides that the Notice requiring a hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

In addition to these legal requirements, the Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the waste disposal site is located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary,
Environmental Appeal Board,
2300 Yonge St., 12th Fl.
P.O. Box 2382
Toronto, Ontario
M4P 1E4.

The Environmental Commissioner,
1075 Bay Street,
Suite 605,
6th Floor
Toronto, Ontario
M5S 2W5.

The Director,
Sections 9 & 39,
Environmental Protection Act
Ministry of the Environment
2St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

This instrument is subject to Section 38 of the Environmental Bill of Rights, that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek to appeal for 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry, you can determine when the leave to appeal period ends.

DATED AT TORONTO this 24th day of January, 2023

Director,
(Section 9 and Section 39,)
Environmental Protection Act

c: District Manager, Sarnia

SCHEDULE "A"

This Schedule "A" forms part of Certificate (Air and Waste Disposal Site):

1. Application for a Certificate of Approval (Air), for Plant Modifications at Safety Kleen Ltd. Corunna, Ontario submitted to the Ontario Ministry of the Environment by Safety Kleen Ltd, on November 27, 2000 and all supporting documentation.

2. Application for a Certificate of Approval (Air), for Plant Modifications at Safety Kleen Ltd Corunna, Ontario submitted to the Ontario Ministry of the Environment by Safety Kleen Ltd. on October 31, 2001 and all supporting documentation.

3. Supplemental information on the above Applications for a Certificates of Approval (Air) submitted to the Ontario Ministry of the Environment by Safety Kleen Ltd. on March 1, 2002.

4. "Operating Manual Lambton Incineration System". Chemical Services Division, Clean Harbors Canada Inc. Latest Revision May, 2002

5. "QA/QC Plan for Safety Kleen Lambton Facility" Prepared by CEM Specialties. Draft Revision 1.

APPENDIX 3

Method 29 Train Field Data Sheets
Incinerator Exhaust Stack
(8 pages)

ORTECH Consulting Inc.

Plant	Clean Harbors
Plant Location	Corunna, Ontario
Test No.:	1- Mercury
Test Date	August 17th / 2022
Test Location	Exhaust Stack
Operator Signature	Adam Petressi

Project No.:	22196
Page	1 of 4
Probe No.:	6 series
Meter Box No.:	Team 1
Impinger Box No.:	9

Pitot Factor	0.845	
DGMCF	0.973	
Barometric Pressure	29.47 ~~29.53~~	"Hg
Static Pressure	-0.12	"H2O
Nozzle Size	0.2505	inches
Stack Diameter	4.833 feet	(58")
Length	0	feet
Width	0	feet
Port length:	12	inches

Reading Interval	3
Number of Ports	2
Number of Points/Port	10

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	2327.7	g
WCBDA	22.7	g

Combustion Gas Concentration

Oxygen	9.28	%
Carbon Dioxide	7.72	%
Carbon Monoxide	68.2	ppm

Measuring Device	MII Numbers
Probe / Pitot SA	B03778
Trendicator	COE 20094
Control Box	COE 20094
Incline Manometer	COE 20094
Comb.Gas.Analyzer	
Micromanometer	
Barometer	Env.Can
Calipers	

Nozzle Measurements	
1	0.2510
2	0.2510
3	0.2500
4	0.2500
Average:	0.2505

Probe Liner (Glass) / Metal / (Teflon) / Other_____

Nozzle (Glass) / Metal / Other_____

Union (None) / Metal / Teflon / Other_____

Pitot Leak Checked? (Yes) No

Site Diagram

Notes:

Field Data Sheet

Date: Aug. 17th/22	Plant: Clean Harbors	Test No.: 1-Mercury	Page 2 of 4
	Plant Location: Corunna, Ontario	Test Location: Exhaust Stack 22196	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	58.32	1.6	0.69	378	233	249	6069	77	71	73	41.7	4
	3	60.64	1.2	0.59	377	253	248	51	251	73	75	41.7	4
	6	62.89	1.5	0.66	377	253	246	50	264	73	75	41.6	4
2	9	64.87	1.5	0.66	378	252	246	51	265	72	76	41.6	4
	12	66.90	1.5	0.66	378	252	251	50	264	73	74	1.5	4
	15	68.95	1.5	0.66	379	252	248	50	262	72	74	1.5	4
3	18	70.99	1.4	0.64	380	252	247	50	263	73	75	1.5	4
	21	73.02	1.6	0.68	380	252	248	47	258	73	76	1.7	4
	24	75.04	1.5	0.66	380	252	248	44	260	73	75	1.6	4
4	27	77.10	1.6	0.68	380	252	249	43	263	73	75	1.7	4
	30	79.15	1.6	0.68	379	253	247	43	266	72	75	1.7	4
	33	81.25	1.5	0.66	381	253	252	43	266	73	77	1.5	4
5	36	83.60	1.5	0.66	381	253	252	43	269	73	76	1.5	4
	39	85.65	1.5	0.66	382	254	252	44	268	73	77	1.3	4
	42	87.64	1.5	0.66	381	253	253	45	265	73	76	1.3	4
6	45	89.44	1.5	0.66	382	253	251	45	264	73	78	1.5	4
	48	91.49	1.5	0.66	382	252	247	44	260	73	75	1.5	4
	51	93.56	1.5	0.66	382	254	247	43	263	73	75	1.4	4
7	54	95.57	1.7	0.7	382	253	249	42	261	73	75	1.5	4
	57	97.62	1.6	0.66	382	253	246	41	260	73	75	1.6	4
	60	99.69	1.5	0.66	381	253	245	41	262	73	76	1.4	4

Traverse: 1				
Start Time: 9:25 am	Initial Leak Check: 0.002	cfm@ 15	"Hg
Finish Time: —	Final Leak Check: —	cfm@ —	"Hg

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22196

Operator: Adam Petrossi

Field Data Sheet

Date: Aug. 17th/22	Plant: Clean Harbors	Test No.: 1 - Mercury	Page 3 of 4
	Plant Location: Corunna, Ontario	Test Location: Exhaust Stack 22196	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
8	63	101.69	1.5	0.66	381	253	248	41	264	73	76	1.4	4
	66	103.69	1.5	0.66	379	253	246	42	265	74	76	1.5	4
	69	105.70	1.6	0.69	379	253	246	42	264	74	76	1.5	4
9	72	107.73	1.5	0.66	379	254	248	41	267	74	76	1.5	4
	75	109.69	1.5	0.66	380	253	249	41	265	74	76	1.5	4
	78	111.82	1.5	0.66	380	253	245	43	266	74	76	1.3	4
10	81	113.79	1.5	0.66	380	254	245	44	266	74	76	1.4	4
	84	115.76	1.5	0.66	381	253	248	44	266	74	76	1.5	4
	87	117.79	1.5	0.66	381	254	245	44	267	74	76	1.4	4
	90	119.87											
1	0	120.~~00~~27	1.4	0.64	381	254	252	61	211	75	77	1.6	5
	3	122.49	1.4	0.64	381	253	250	47	212	75	77	1.5	5
	6	124.53	1.5	0.66	382	253	250	45	211	75	77	1.3	4
2	9	126.47	1.6	0.69	382	253	250	45	265	75	77	1.5	4
	12	128.45	1.4	0.64	380	254	250	43	261	75	76	1.6	4
	15	130.55	1.5	0.67	381	254	251	42	211	76	77	1.4	4
3	18	132.55	1.5	0.66	381	254	247	41	211	75	77	1.4	4
	21	134.55	1.6	0.69	379	253	247	42	262	75	77	1.5	4
	24	136.58	1.5	0.67	381	254	251	43	265	75	78	1.6	4
4	27	138.68	1.4	0.64	379	254	252	43	267	75	78	1.4	4

Traverse: ~~Run~~ 1					
Start Time: ———	Initial Leak Check: ———	cfm@ ———	"Hg		
Finish Time: 10:55	Final Leak Check: 0.003	cfm@ 15	"Hg		

Traverse: 2					
Start Time: 11:32am	Initial Leak Check: 0.003	cfm @ 16	"Hg		
Finish Time: ———	Final Leak Check: ———	cfm @ ———	"Hg		

Project No.: 22196

Operator: Adam Petrossi

Field Data Sheet

Date: Aug 17th /22	Plant: Clean Harbors	Test No.: 1 - Mercury	Page 4 of 4
	Plant Location: Corunna, Ontario	Test Location: Exhaust Stack 22196	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	30	140.70	1.5	0.67	379	254	250	44	266	74	77	1.4	4
	33	142.71	1.5	0.67	379	254	249	44	264	75	78	1.4	4
5	36	144.69	1.5	0.67	379	254	248	43	264	76	79	1.4	4
	39	146.68	1.6	0.69	379	255	251	43	264	75	79	1.45	4
	42	148.71	1.4	0.65	379	254	251	44	264	76	80	1.5	4
6	45	150.78	1.5	0.67	379	254	249	45	264	76	79	1.4	4
	48	152.80	1.8	0.73	379	254	249	46	264	76	80	1.4	4
	51	154.80	1.7	0.71	379	254	250	46	265	76	80	1.7	4
7	54	157.00	1.7	0.71	378	255	251	47	266	76	80	1.6	4
	57	159.18	1.7	0.71	379	254	250	48	266	77	80	1.6	4
	60	161.35	1.7	0.71	379	254	248	51	266	77	81	1.6	4
8	63	163.53	1.7	0.71	377	255	250	49	266	77	81	1.6	4
	66	165.73	1.7	0.71	379	254	250	46	257	77	80	1.6	4
	69	167.80	1.7	0.71	378	254	247	44	259	77	81	1.6	4
9	72	169.97	1.7	0.71	378	254	247	44	261	78	81	1.6	4
	75	172.01	1.7	0.71	379	253	247	43	262	77	81	1.7	4
	78	174.19	1.6	0.69	379	255	248	45	266	77	80	1.6	4
10	81	176.33	1.7	0.71	377	254	247	45	264	78	80	1.5	4
	84	178.43	1.6	0.69	378	255	250	47	260	78	80	1.6	4
	87	180.55	1.6	0.69	377	254	249	43	263	78	81	1.6	4
	90	182.67											

Traverse: 2				
Start Time: —	Initial Leak Check: —	cfm@ —	"Hg
Finish Time: 1:02 pm	Final Leak Check: 0.004	cfm@ 15	"Hg

Traverse:				
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22196

Operator: Adam Petrossi

ORTECH Consulting Inc.

Plant	Clean Harbors
Plant Location	Corunna, Ontario
Test No.:	2 - Mercury
Test Date	August 17th / 2022
Test Location	Exhaust Stack
Operator Signature	Adam Petross

Project No.:	22196
Page	1 of 4
Probe No.:	6 series
Meter Box No.:	Team 1
Impinger Box No.:	9

Pitot Factor	0.845	
DGMCF	0.973	
Barometric Pressure	~~29.53~~	"Hg
Static Pressure	29.44 - 0.12	"H2O
Nozzle Size	0.2505	inches
Stack Diameter	4.833 feet	(58")
Length	0	feet
Width	0	feet
Port length:	12	inches

Reading Interval	3
Number of Ports	2
Number of Points/Port	10

Probe Liner (Glass) / Metal / (Teflon) / Other_____

Nozzle (Glass) / Metal / Other_____

Union (None) / Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	2310.1	g
WCBDA	25.2	g

Combustion Gas Concentration

Oxygen	9.30	%
Carbon Dioxide	7.63	%
Carbon Monoxide	61.2	ppm

Measuring Device	MII Numbers
Probe / Pitot	
Trendicator	
Control Box	
Incline Manometer	
Comb.Gas.Analyzer	
Micromanometer	
Barometer	Env.Can
Calipers	

Nozzle Measurements	
1	0.2510
2	0.2510
3	0.2500
4	0.2500
Average:	0.2505

Site Diagram

Notes:

Field Data Sheet

Date: Aug. 17/22	Plant: Clean Harbors	Test No.: 2 - Mercury	Page 2 of 4
	Plant Location: Corunna, Ontario	Test Location: Exhaust Stack 22196	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	183.20	1.3	0.62	380	254	196	62	78	76	78	1.4	3
	3	185.30	1.4	0.64	385	251	220	54	167	76	77	1.3	3
	6	187.18	1.5	0.66	384	252	244	50	193	75	76	1.4	3
2	9	189.18	1.5	0.66	383	252	245	49	201	75	76	1.4	3
	12	191.18	1.5	0.66	384	253	247	47	207	75	76	1.4	3
	15	193.17	1.5	0.66	383	252	247	46	215	75	76	1.4	3
3	18	195.14	1.5	0.66	383	252	248	44	124	75	76	1.45	3
	21	197.15	1.5	0.66	383	252	245	41	114	75	76	1.4	3
	24	199.13	1.5	0.66	383	252	244	39	132	75	77	1.45	3
4	27	201.15	1.5	0.66	382	252	250	37	46	75	76	1.45	3
	30	203.16	1.5	0.66	383	253	252	37	54	75	77	1.4	3
	33	205.18	1.7	0.71	382	253	248	38	137	75	77	1.4	3
5	36	207.26	1.5	0.66	383	253	252	40	159	75	77	1.5	3
	39	209.19	1.5	0.66	382	253	245	41	128	75	77	1.6	3
	42	211.30	1.5	0.66	380	252	250	39	139	75	77	1.45	3
6	45	213.35	1.5	0.66	383	253	249	38	122	75	78	1.45	3
	48	215.39	1.4	0.64	383	253	246	37	97	75	77	1.4	3
	51	217.41	1.85	0.74	383	252	249	38	135	76	78	1.7	3
7	54	219.55	1.75	0.72	384	253	249	39	98	76	79	1.5	3
	57	221.60	2.0	0.77	383	253	247	39	205	75	78	1.8	3
	60	223.81	1.75	0.72	384	252	248	38	215	75	78	1.85	4

Traverse: 1					Traverse:				
Start Time: 1:53 pm	Initial Leak Check: 0.004	cfm@	17	"Hg	Start Time:	Initial Leak Check:		cfm @	"Hg
Finish Time:	Final Leak Check:	cfm@		"Hg	Finish Time:	Final Leak Check:		cfm @	"Hg

Project No.: 22196

Operator: Adam Petrossi

Field Data Sheet

Date: Aug. 17/22	Plant: Clean Harbors	Test No.: 2- Mercury	Page 3 of 4
	Plant Location: Corunna, Ontario	Test Location: Exhaust Stack 22196	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
8	63	226.06	1.7	0.71	384	252	249	38	215	75	78	1.75	4.0
	66	228.30	1.75	0.72	384	253	248	39	211	75	78	1.6	4.0
	69	230.48	1.85	0.74	382	252	248	38	212	76	78	1.65	4.0
9	72	232.66	1.75	0.72	386	253	254	37	240	76	78	1.7	4.0
	75	234.84	1.8	0.73	384	252	246	37	242	76	78	1.7	4.0
	78	237.05	1.75	0.72	381	252	245	38	240	76	78	1.7	4.0
10	81	239.23	1.75	0.72	381	252	246	40	242	76	78	1.7	4.0
	84	241.42	1.7	0.71	379	252	249	41	243	76	78	1.7	4.0
	87	243.58	1.7	0.71	382	252	250	41	197	76	78	1.65	4.0
	90	245.80											
1	0	246.34	1.65	0.70	365	251	245	66	97	76	78	1.4	3.5
	3	248.44	1.65	0.70	367	250	238	49	213	76	76	1.45	3.5
	6	250.46	1.65	0.70	367	250	253	46	214	76	76	1.55	4.0
2	9	252.54	1.45	0.66	367	250	286	46	214	76	76	1.55	4.0
	12	254.63	1.5	0.67	369	250	246	46	205	76	76	1.4	4.0
	15	256.63	1.4	0.64	371	249	265	47	213	76	76	1.45	4.0
3	18	258.67	1.45	0.65	371	250	261	48	213	76	76	1.4	4.0
	21	260.66	1.45	0.65	375	251	250	47	214	75	76	1.4	4.0
	24	262.64	1.45	0.66	375	251	242	47	214	75	77	1.4	4.0
4	27	264.61	1.45	0.65	377	251	250	50	214	75	77	1.45	4.0

Traverse: #1					Traverse: 2				
Start Time:	Initial Leak Check:		cfm@	"Hg	Start Time: 15:58	Initial Leak Check: 0.002		cfm @ 18	"Hg
Finish Time: 3:23 pm	Final Leak Check: 0.003		cfm@ 17	"Hg	Finish Time:	Final Leak Check:		cfm @	"Hg

Project No.: 22196

Operator: Adam Petrossi

Field Data Sheet

Date: Aug. 17/22	Plant: Clean Harbors	Test No.: 2-Mercury	Page 4 of 4
	Plant Location: Corunna, Ontario	Test Location: Exhaust Stack 22196	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	30	266.63	1.45	0.65	378	250	274	51	214	75	77	1.4	4.0
	33	268.62	1.5	0.67	379	250	242	48	215	75	77	1.4	4.0
5	36	270.61	1.5	0.66	380	238	244	45	211	75	77	1.45	4.0
	39	272.61	1.5	0.66	382	246	241	46	213	75	77	1.45	4.0
	42	274.61	1.5	0.66	380	250	242	45	215	75	77	1.45	4.0
6	45	276.64	1.5	0.66	381	250	244	45	215	75	77	1.45	4.0
	48	278.69	1.5	0.66	380	248	240	48	212	75	77	1.45	4.0
	51	280.70	1.5	0.66	380	249	245	47	211	75	77	1.45	4.0
7	54	282.87	1.5	0.66	384	250	231	58	214	76	77	1.45	4.0
	57	284.90	1.45	0.65	382	250	250	74	213	75	75	1.45	4.0
	60	286.91	1.4	0.64	381	250	261	59	229	75	75	1.45	4.0
8	63	288.92	1.4	0.64	381	250	255	59	230	75	75	1.4	4.0
	66	290.89	1.4	0.64	380	250	243	60	214	75	75	1.4	4.0
	69	292.85	1.4	0.64	379	250	260	55	174	75	75	1.4	4.0
9	72	294.81	1.4	0.64	379	250	256	53	188	75	75	1.4	4.0
	75	296.77	1.45	0.65	380	250	254	53	202	74	75	1.4	4.0
	78	298.71	1.4	0.64	381	250	255	53	214	74	75	1.4	4.0
10	81	300.66	1.45	0.65	379	250	247	55	214	74	75	1.4	4.0
	84	302.59	1.4	0.64	381	250	237	58	214	74	75	1.4	4.0
	87	304.54	1.4	0.64	380	250	260	59	215	74	75	1.4	4.0
	90	306.48											

Traverse: 2			
Start Time:	Initial Leak Check:	cfm@	"Hg
Finish Time: 5:28pm	Final Leak Check: 0.001	cfm@ 17	"Hg

Traverse:			
Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22196

Operator: Adam Petrossi

APPENDIX 4

Method 29 Train Recovery Data Sheets
(5 pages)

Method 29 (modified)
Particulate and Mercury Train Recovery Data Sheet

Client: Clean Harbors
Project No.: 22196
Date: Aug 17/22

Test No.: 1
Test Location: STACK

Nozzle, Probe Liner Cyclone Bypass & F.H. Filter Housing

CONTAINER TS1	
Empty Wt:	280.0
After Act. Rinse:	476.9

MARK FLUID LEVEL

SEAL AND LABEL TS1

CONTAINER TS2	
Empty Wt:	280.0
After 0.1N HNO_3 Rinse:	520.1

MARK FLUID LEVEL

SEAL AND LABEL TS2

Quartz Fibre Filter	
Filter ID:	Q2875
Initial Wt:	
Final Wt:	
Gain:	
Colour:	LIGHT BEIGE

SEAL CONTAINER TS3

Impingers 1 - 6	
Impinger #1 50mL of $KMnO_4/H_2SO_4$	
Empty Wt:	694.2
Initial Wt:	718.1
Final Wt:	898.0
1 Gain:	179.9
Colour:	CLEAR
Impinger #2 Knockout w/ 100mL of $KMnO_4/H_2SO_4$	
Empty Wt:	726.1
Initial Wt:	833.9
Final Wt:	2625.6
2 Gain:	1791.7
Colour:	CLEAR
Impinger #3 50 mL of $KMnO_4/H_2SO_4$	
Empty Wt:	577.5
Initial Wt:	631.5
Final Wt:	917.0
3 Gain:	285.5
Colour:	BLACK
Impinger #4 100ml of $KMnO_4/H_2SO_4$	
Empty Wt:	643.8
Initial Wt:	761.1
Final Wt:	822.3
4 Gain:	61.2
Colour:	PURPLE
Impinger #5 100mL of $KMnO_4/H_2SO_4$	
Empty Wt:	~~572.6~~ 642.8
Initial Wt:	760.9
Final Wt:	768.2
5 Gain:	7.3
Colour:	PURPLE
Impinger #6 Empty	
Empty Wt:	594.7
Final Wt:	596.8
6 Gain:	2.1
Colour:	—

Impingers Recovery and Rinse	
CONTAINER TS4-A	
Empty Wt:	1356.0
With Imp. 1-6 Soln:	4099.9
After $KMnO_4$ Rinse:	4784.8
After D.I. Water Rinse:	4813.0

MARK FLUID LEVEL

SEAL & LABEL TS4-A

CONTAINER TS4-B	
Empty Wt:	485.0
With 150 mL DI Water:	557.0
HCl Rinse of imp. 1-6:	699.8
After D.I. Water Rinse:	831.2

MARK FLUID LEVEL

SEAL & LABEL TS4-B

Impinger 7	
Impinger #7 Silica Gel	
Initial Wt:	993.1
Final Wt:	1015.8
7 Gain:	22.7

Sample Identification:	
TS1 (Probe Rinse-Acetone)	1
TS2 (Probe Rinse-0.1N HNO_3)	2
TS3 (Filter)	3
TS4-A (Impinger 1-6 Sol'n-$KMnO_4$)	4
TS4-B (Impinger 1-6 Rinse-HCl)	5

TS1,TS2- Amber Glass Bottle
TS3- Petri Dish
TS4- Amber Glass Bottle

CWTR = 1+2+3+4+5+6: 2327.7

WCBDA= 7: 22.7

Train Loaded By:
Train Recovered By:
Recovery Witnessed By:

ORTECH

Method 29 (modified)
Particulate and Mercury Train Recovery Data Sheet

Client: Clean Harbors
Project No.: 22196
Date: AUG 17/22

Test No.: #2
Test Location: STACK

Nozzle, Probe Liner Cyclone Bypass & F.H. Filter Housing

CONTAINER TS1	
Empty Wt:	280.0
After Act. Rinse:	495.7

MARK FLUID LEVEL

SEAL AND LABEL TS1

CONTAINER TS2	
Empty Wt:	280.0
After 0.1N HNO_3 Rinse:	503.6

MARK FLUID LEVEL

SEAL AND LABEL TS2

Quartz Fibre Filter	
Filter ID:	Q288803
Initial Wt:	
Final Wt:	
Gain:	
Colour:	BEIGE

SEAL CONTAINER TS3

Impingers 1 - 6

Impinger #1 50mL of $KMnO_4/H_2SO_4$	
Empty Wt:	527.5
Initial Wt:	606.7
Final Wt:	839.5
1 Gain:	232.8
Colour:	CLEAR

Impinger #2 Knockout w/ 100mL of $KMnO_4/H_2SO_4$	
Empty Wt:	772.1
Initial Wt:	863.1
Final Wt:	2743.1
2 Gain:	1880.0
Colour:	

Impinger #3 50 mL of $KMnO_4/H_2SO_4$	
Empty Wt:	445.4
Initial Wt:	696.0
Final Wt:	858.6
3 Gain:	162.6
Colour:	

Impinger #4 100ml of $KMnO_4/H_2SO_4$	
Empty Wt:	674.8
Initial Wt:	786.5
Final Wt:	810.8
4 Gain:	24.3
Colour:	

Impinger #5 100mL of $KMnO_4/H_2SO_4$	
Empty Wt:	650.5
Initial Wt:	766.4
Final Wt:	774.5
5 Gain:	8.1
Colour:	

Impinger #6 Empty	
Empty Wt:	611.9
Final Wt:	614.2
6 Gain:	2.3
Colour:	

Impingers Recovery and Rinse

CONTAINER TS4-A	
Empty Wt:	1360.5
With Imp. 1-6 Soln:	4087.7
After $KMnO_4$ Rinse:	4220.3
After D.I. Water Rinse:	4620.3

MARK FLUID LEVEL

SEAL & LABEL TS4-A

CONTAINER TS4-B	
Empty Wt:	410.9
With 150 mL DI Water:	658.5
HCl Rinse of imp. 1-6:	710.9
After D.I. Water Rinse:	896.2

MARK FLUID LEVEL

SEAL & LABEL TS4-B

Impinger 7

Impinger #7 Silica Gel	
Initial Wt:	930.1
Final Wt:	961.3
7 Gain:	25.2

Sample Identification:	
TS1 (Probe Rinse-Acetone)	6
TS2 (Probe Rinse-0.1N HNO_3)	7
TS3 (Filter)	8
TS4-A (Impinger 1-6 Sol'n-$KMnO_4$)	9
TS4-B (Impinger 1-6 Rinse-HCl)	10

5

TS1,TS2- Amber Glass Bottle
TS3- Petri Dish
TS4- Amber Glass Bottle

CWTR = 1+2+3+4+5+6: 2310.1

WCBDA= 7: 25.2

Train Loaded By: DM
Train Recovered By: DM
Recovery Witnessed By:

ORTECH

Method 29 (modified)
Particulate and Mercury Train Recovery Data Sheet

Client: Clean Harbors
Project No.: 22196
Date: AUG 17/22

Test No.: 1
Test Location: INLET

Nozzle, Probe Liner Cyclone Bypass & F.H. Filter Housing	Quartz Fibre Filter	Impingers 1 - 6	Impingers Recovery and Rinse	Impinger 7
	Filter ID: Q28802			

CONTAINER TS1	
Empty Wt:	775.0
After Act. Rinse:	925.0

MARK FLUID LEVEL

SEAL AND LABEL TS1

CONTAINER TS2	
Empty Wt:	275.0
After 0.1N HNO_3 Rinse:	355.0

MARK FLUID LEVEL

SEAL AND LABEL TS2

Initial Wt:	
Final Wt:	
Gain:	
Colour:	OFF WHITE/TAN

SEAL CONTAINER TS3

Impinger #1 50mL of $KMnO_4/H_2SO_4$	
Empty Wt:	650.6
Initial Wt:	753.4
Final Wt:	766.9
1 Gain:	13.5
Colour:	PURPLE

Impinger #2 Knockout w/ 100mL of $KMnO_4/H_2SO_4$	
Empty Wt:	767.9
Initial Wt:	890.9
Final Wt:	1161.2
2 Gain:	270.3
Colour:	PURPLE

Impinger #3 50 mL of $KMnO_4/H_2SO_4$	
Empty Wt:	
Initial Wt:	
Final Wt:	
3 Gain:	
Colour:	

Impinger #4 100ml of $KMnO_4/H_2SO_4$	
Empty Wt:	650.3
Initial Wt:	757.9
Final Wt:	708.0
4 Gain:	-49.9
Colour:	PURPLE

Impinger #5 100mL of $KMnO_4/H_2SO_4$	
Empty Wt:	669.8
Initial Wt:	794.5
Final Wt:	712.2
5 Gain:	-82.3
Colour:	PURPLE

Impinger #6 Empty	
Empty Wt:	
Final Wt:	
6 Gain:	
Colour:	

CONTAINER TS4-A	
Empty Wt:	404.7
With Imp. 1-6 Soln:	975.6
After $KMnO_4$ Rinse:	1110.8
After D.I. Water Rinse:	1210.8

MARK FLUID LEVEL

SEAL & LABEL TS4-A

CONTAINER TS4-B	
Empty Wt:	479.0
With 150 mL DI Water:	560.0
HCl Rinse of imp. 1-6:	725.0
After D.I. Water Rinse:	825.1

MARK FLUID LEVEL

SEAL & LABEL TS4-B

Impinger #7 Silica Gel	
Initial Wt:	1003.8
Final Wt:	1007.3
7 Gain:	3.5

Sample Identification:	
TS1 (Probe Rinse-Acetone)	11
TS2 (Probe Rinse-0.1N HNO_3)	12
TS3 (Filter)	13
TS4-A (Impinger 1-6 Sol'n-$KMnO_4$)	14
TS4-B (Impinger 1-6 Rinse-HCl)	15

16

TS1,TS2- Amber Glass Bottle
TS3- Petri Dish
TS4- Amber Glass Bottle

CWTR = 1+2+3+4+5+6: 151.6

WCBDA= 7: 3.5

Train Loaded By: RM
Train Recovered By: RM
Recovery Witnessed By:

ORTECH

Method 29 (modified)
Particulate and Mercury Train Recovery Data Sheet

Client: Clean Harbors
Project No.: 22196
Date: AUG 17/22

Test No.: 2
Test Location: INLET

Nozzle, Probe Liner Cyclone Bypass & F.H. Filter Housing	Quartz Fibre Filter	Impingers 1 - 6	Impingers Recovery and Rinse	Impinger 7
	Filter ID: QZ8801			

CONTAINER TS1	
Empty Wt:	285.0
After Act. Rinse:	

MARK FLUID LEVEL

SEAL AND LABEL TS1

CONTAINER TS2	
Empty Wt:	285.0
After 0.1N HNO_3 Rinse:	

MARK FLUID LEVEL

SEAL AND LABEL TS2

Initial Wt:	
Final Wt:	
Gain:	
Colour:	BEIGE

SEAL CONTAINER TS3

Impinger #1 50mL of $KMnO_4/H_2SO_4$	
Empty Wt:	652.9
Initial Wt:	772.7
Final Wt:	848.4
1 Gain:	75.7
Colour:	PURPLE

Impinger #2 Knockout w/ 100mL of $KMnO_4/H_2SO_4$	
Empty Wt:	784.4
Initial Wt:	910.4
Final Wt:	932.8
2 Gain:	22.4
Colour:	PURPLE

Impinger #3 50 mL of $KMnO_4/H_2SO_4$	
Empty Wt:	
Initial Wt:	
Final Wt:	
3 Gain:	
Colour:	

Impinger #4 100ml of $KMnO_4/H_2SO_4$	
Empty Wt:	653.0
Initial Wt:	761.4
Final Wt:	721.9
4 Gain:	-39.5
Colour:	PURPLE

Impinger #5 100mL of $KMnO_4/H_2SO_4$	
Empty Wt:	672.7
Initial Wt:	791.7
Final Wt:	913.5
5 Gain:	121.8
Colour:	PURPLE

Impinger #6 Empty	
Empty Wt:	
Final Wt:	
6 Gain:	
Colour:	

CONTAINER TS4-A	
Empty Wt:	440.0
With Imp. 1-6 Soln:	1064.5
After $KMnO_4$ Rinse:	1197.5
After D.I. Water Rinse:	1430.9

MARK FLUID LEVEL

SEAL & LABEL TS4-A

CONTAINER TS4-B	
Empty Wt:	440.0
With 150 mL DI Water:	560.0
HCl Rinse of imp. 1-6:	652.4
After D.I. Water Rinse:	856.0

MARK FLUID LEVEL

SEAL & LABEL TS4-B

Impinger #7 Silica Gel	
Initial Wt:	1006.5
Final Wt:	1011.0
7 Gain:	4.5

Sample Identification:	
TS1 (Probe Rinse-Acetone)	16
TS2 (Probe Rinse-0.1N HNO_3)	17
TS3 (Filter)	18
TS4-A (Impinger 1-6 Sol'n-$KMnO_4$)	19
TS4-B (Impinger 1-6 Rinse-HCl)	20

16

TS1,TS2- Amber Glass Bottle
TS3- Petri Dish
TS4- Amber Glass Bottle

CWTR = 1+2+3+4+5+6: 180.7

WCBDA= 7: 4.5

Train Loaded By: RM
Train Recovered By: RM
Recovery Witnessed By:

ORTECH

Method 29 (modified)
Particulate and Mercury Train Recovery Data Sheet

Client: Clean Harbors
Project No.: 22196
Date: Aug 17/22

Test No.: BLANK
Test Location: —

Nozzle, Probe Liner Cyclone Bypass & F.H. Filter Housing	Quartz Fibre Filter	Impingers 1 - 6	Impingers Recovery and Rinse	Impinger 7
	Filter ID: Q28799			

CONTAINER TS1	
Empty Wt:	2850
After Act. Rinse:	3194

MARK FLUID LEVEL

SEAL AND LABEL TS1

CONTAINER TS2	
Empty Wt:	285.0
After 0.1N HNO_3 Rinse:	547.6

MARK FLUID LEVEL

SEAL AND LABEL TS2

Initial Wt:	
Final Wt:	
Gain:	
Colour:	

SEAL CONTAINER TS3

Impinger #1 50mL of $KMnO_4/H_2SO_4$	
Empty Wt:	
Initial Wt:	
Final Wt:	
1 Gain:	
Colour:	

Impinger #2 Knockout w/ 100mL of $KMnO_4/H_2SO_4$	
Empty Wt:	
Initial Wt:	
Final Wt:	
2 Gain:	
Colour:	

Impinger #3 50 mL of $KMnO_4/H_2SO_4$	
Empty Wt:	
Initial Wt:	
Final Wt:	
3 Gain:	
Colour:	

Impinger #4 100ml of $KMnO_4/H_2SO_4$	
Empty Wt:	
Initial Wt:	
Final Wt:	
4 Gain:	
Colour:	

Impinger #5 100mL of $KMnO_4/H_2SO_4$	
Empty Wt:	
Initial Wt:	
Final Wt:	
5 Gain:	
Colour:	

Impinger #6 Empty	
Empty Wt:	
Final Wt:	
6 Gain:	
Colour:	

CONTAINER TS4-A	
Empty Wt:	405.0
With Imp. 1-6 Soln:	617.0
After $KMnO_4$ Rinse:	617.0
After D.I. Water Rinse:	989

MARK FLUID LEVEL

SEAL & LABEL TS4-A

CONTAINER TS4-B	
Empty Wt:	405.0
With 150 mL DI Water:	555.0
HCl Rinse of imp. 1-6:	625.0
After D.I. Water Rinse:	828.7

MARK FLUID LEVEL

SEAL & LABEL TS4-B

Impinger #7 Silica Gel	
Initial Wt:	
Final Wt:	
7 Gain:	

Sample Identification:	
TS1 (Probe Rinse-Acetone)	21
TS2 (Probe Rinse-0.1N HNO_3)	22
TS3 (Filter)	23
TS4-A (Impinger 1-6 Sol'n-$KMnO_4$)	24
TS4-B (Impinger 1-6 Rinse-HCl)	25

TS1,TS2- Amber Glass Bottle
TS3- Petri Dish
TS4- Amber Glass Bottle

CWTR = 1+2+3+4+5+6: —

WCBDA= 7: —

Train Loaded By: DM
Train Recovered By: RM
Recovery Witnessed By:

ORTECH

APPENDIX 5

Method 29 Analytical Reports
(7 pages)

1435 Norjohn Court, Unit 1, Burlington ON, L7L 0E6
Phone: 905-331-3111, FAX: 905-331-4567

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2729215		Mississauga, ON L5J 2Y4
Date of Report	31-Aug-22		Canada
Date of Sample Receipt	18-Aug-22	**Client Contact:**	Chris Belore
		Client Project ID:	22196 Clean Harbors

COMMENTS:

Sample Particulate Analysis via Gravimetric USEPA Method 5 (LL5 30-AUG-2022)

REPORT FLAGS:

J - The value is uncertain and below what can be reliably identified as positive with a ≥99% confidence limit (i.e. below the laboratory determined MDL).

LCB = Laboratory Control Blank
CVS = Continuing Verification Standard Sample (limits: ±2 in the last decimal)
LOR = Limit of Reporting

Certified by: L. Wrona

Lynne Wrona
Project Manager

ALS Environmental

Sample Analysis Summary Report

Sample Name		22-22196-PM-(1 THRU 5) TEST#1	22-22196-PM-(6 THRU 10) TEST#2	22-22196-PM-(11 THRU 15) TEST#1	22-22196-PM-(16 THRU 20) TEST#2	22-22196-PM-(21 THRU 25) BLANK	
ALS Sample ID		L2729215-1	L2729215-2	L2729215-3	L2729215-4	L2729215-5	
Matrix		Stack	Stack	Stack	Stack	Stack	
Analysis type		Sample	Sample	Sample	Sample	Sample	
Sampling Date/Time		17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22	
Date of Receipt		18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22	
PM via Gravimetric Analysis	**LOR**						
Method 5	**mg**	**mg**	**mg**	**mg**	**mg**	**mg**	
Filter Particulate Matter	0.8	1.5	5.1	1220	1400	0.8	
Acetone Particulate Matter	0.4	14.0	10.3	896	1110	0.1	J
	g	**g**	**g**	**g**	**g**	**g**	
Acetone Mass	0.02	189	160	241	274	312	

ALS Environmental

Sample Analysis Summary Report

Sample Name		MB	
ALS Sample ID		L2729215-MB	
Matrix		n/a	
Analysis type		Sample	
Sampling Date/Time		n/a	
Date of Receipt		n/a	
PM via Gravimetric Analysis	**LOR**		
Method 5	**mg**	**mg**	
Filter Particulate Matter	0.8	<0.1	
Acetone Particulate Matter	0.4	0.1	J
	g	**g**	
Acetone Mass	0.02	31.4	

ALS Environmental
1435 Norjohn Court, Unit 1, Burlington ON, L7L 0E6
Phone: 905-331-3111, FAX: 905-331-4567

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	Ortech Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2729215		Mississauga, ON L5J 2Y4
Date of Report	6-Sep-22		Canada
Date of Sample Receipt	18-Aug-22	**Client Contact:**	Chris Belore
		Client Project ID:	22196 Clean Harbors

COMMENTS:

Sample Preparation via USEPA Method 29 (LL5 01-Sep-2022)
Mercury Analysis via CVAA using Method USEPA 7470A (KC11 24-Aug-2022, 06-Sep-2022)

LOR = Limit of Reporting
LCB = Laboratory Control Blank (limits: <LOR)
LCS = Laboratory Control Sample (limits: hivol, solids: 85-115%, stack: 90-110%)
MS = Matrix Spike Sample (limits: 75-125%)
RPD = Relative Percent Difference (limits: <20%)
CCV/CVS = Calibration Verification Standard (limits: 85-115%)

Certified by: L. Wrona
Lynne Wrona
Project Manager

ALS Environmental

Sample Analysis Summary Report

Sample Name		22-22196-PM-(1 THRU 5) TEST#1	22-22196-PM-(6 THRU 10) TEST#2	22-22196-PM-(11 THRU 15) TEST#1	22-22196-PM-(16 THRU 20) TEST#2	22-22196-PM-(21 THRU 25) BLANK
ALS Sample ID		L2729215-1	L2729215-2	L2729215-3	L2729215-4	L2729215-5
Matrix		Stack	Stack	Stack	Stack	Stack
Analysis type		Sample	Sample	Sample	Sample	Sample
Sampling Date/Time		17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22
Date of Receipt		18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22
Mercury via CVAA	**LOR**					
Method 29	**ug**	**ug**	**ug**	**ug**	**ug**	**ug**
Analytical Fraction 1B	0.015	0.150	0.200	7.92	7.80	<0.015
Analytical Fraction 3B	0.025	7.84	6.39	0.283	10.7	<0.05
Analytical Fraction 3C	0.25	<0.3	<0.3	26.3	31.3	<0.3

ALS Environmental

Sample QC Summary Report

Sample Name		LCB	LCS	LCS	LCSD	LCSD
ALS Sample ID		LCB	LCS	LCS	LCSD	LCSD
Analysis type		Method Blank	Blank Spike	Blank Spike	Blank Spike Dup	Blank Spike Dup
Sampling Date/Time		N/A	N/A	N/A	N/A	N/A
Date of Receipt		N/A	N/A	N/A	N/A	N/A
Mercury via CVAA	**LOR**					
Method 29	**ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Analytical Fraction 1B	0.015	<0.015	0.290	97%	0.291	97%
Analytical Fraction 3B	0.025	<0.025	0.471	94%	0.475	95%
Analytical Fraction 3C	0.25	<0.25	4.89	97%	4.83	96%

ALS Environmental

Sample QC Summary Report

Sample Name		22-22196-PM-(1 THRU 5) TEST#1	22-22196-PM-(1 THRU 5) TEST#1	22-22196-PM-(1 THRU 5) TEST#1	22-22196-PM-(1 THRU 5) TEST#1	22-22196-PM-(1 THRU 5) TEST#1	22-22196-PM-(1 THRU 5) TEST#1
ALS Sample ID		L2729215-1	L2729215-1DUP	L2729215-1MS	L2729215-1MS	L2729215-1MSD	L2729215-1MSD
Matrix		Stack	Stack	Stack	Stack	Stack	Stack
Analysis type		Sample	Duplicate	Matrix Spike	Matrix Spike	Matrix Spike Dup	Matrix Spike Dup
Sampling Date/Time		17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22
Date of Receipt		18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22
Mercury via CVAA	**LOR**						
Method 29	**ug**	**ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Analytical Fraction 1B	0.015	0.150	0.151	0.447	99%	0.441	97%
Analytical Fraction 3B	0.025	7.84	7.75	10.9	97%	10.8	94%
Analytical Fraction 3C	0.250	<0.3	<0.3	5.86	96%	5.88	96%

APPENDIX 6

Method 30B Train Field Data Sheets
Incinerator Exhaust Stack
(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_2O)	Average DGM Temperature (°C)	Corrected Volume (L)*	Corrected Volume (Rm^3)*
T1A OL663187	0.988	48.30	108.50	60.20	29.48	0.5	33.6	57.03	0.0570
T1B OL618359 (Spiked)	1.018	28.40	91.70	63.30	29.48	2.5	29.4	62.96	0.0630
T2A OL528943 (Spiked)	0.988	12.00	73.90	61.90	29.48	0.5	38.3	57.76	0.0578
T2B OL663163	1.018	92.20	158.30	66.10	29.48	2.5	31.2	65.35	0.0654
T3A OL663165	0.988	74.50	135.50	61.00	29.47	0.5	39.2	56.73	0.0567
T3B OL568842 (Spiked)	1.018	59.00	115.00	56.00	29.47	2.3	31.1	55.34	0.0553
T4A OL610673 (Spiked)	0.988	37.70	98.00	60.30	29.44	0.5	38.8	56.10	0.0561
T4B OL663238	0.992	15.50	80.00	64.50	29.44	1.8	35.3	61.13	0.0611
T5A OL624083	0.988	98.70	162.30	63.60	29.43	0.5	39.1	59.09	0.0591
T5B OL620071 (Spiked)	0.992	81.00	146.60	65.60	29.43	1.8	34.8	62.25	0.0623
T6A OL610641 (Spiked)	0.988	73.20	133.80	60.60	29.42	0.5	35.5	56.94	0.0569
T6B OL624086	0.992	49.00	113.80	64.80	29.42	1.8	32.9	61.85	0.0619

* dry at 25°C and 1 atmosphere

ORTECH
Mercury Tube Data Sheet

Plant:	Clean Harbors
Plant Location:	Corunna
Test No.:	1

Test location:	STACK
Date:	AUG 17/22
Project No.:	22196

Train A

Tube Identification:	OL663187	Spiked ~~Yes~~ (No)	
Spike Concentration	— ng		

Measuring Device	MII
Control Module VOST 3	M12010
Barometer	ENV. CAN.

Barometric Pressure	29.48

Clock Time	Dry Gas Meter L	Average Meter Temperature °C	Meter Pressure Δ H "H_2O"	Pump Vacuum "Hg Gauge
0	48.3	32	.5	8 7
5	53.5	34	.5	7
10	58.4	34	.5	8
15	63.4	33	.5	8
20	68.4	32	.5	8
25	73.4	32	.5	8
30	78.4	33	.5	8
35	83.2	33	.5	8
40	87.8	34	.5	8.5
45	92.8	34	.5	8.5
50	97.9	36	.5	8.5
55	103.1	36	.5	8.5
60	108.5	34	.5	8.5

Start Time:	09:27	Initial Leak Check .00	LPM@ 17 "Hg
Finish Time:	10:27	Final Leak Check	LPM@ "Hg

DGMCF:	.988
Sample Volume:	
Average DGM Temp:	
Average DGM Δ H:	

Train B

Tube Identification:	OL618359	Spiked ~~Yes~~ No	
Spike Concentration	150 ng		

Measuring Device VOST 2	MII
Control Module	M10117

Clock Time	Dry Gas Meter L	Average Meter Temperature °C	Meter Pressure Δ H "H_2O"	Pump Vacuum "Hg Gauge
0	28.4	27	2.5	5
5	33.7	29	2.5	5
10	38.9	29	2.5	6
15	44.1	29	2.5	6
20	49.5	28	2.5	6
25	54.7	29	2.5	6
30	60.0	29	2.5	6
35	65.3	30	2.5	6
40	70.6	30	2.5	6
45	75.8	30	2.5	6
50	81.2	31	2.5	6
55	86.4	30	2.5	6
60	91.7	30	2.5	6

Start Time:	09:27	Initial Leak Check .00	LPM@ 11 "Hg
Finish Time:	10:27	Final Leak Check	LPM@ "Hg

DGMCF:	1.018
Sample Volume:	
Average DGM Temp:	
Average DGM Δ H:	

Operator:	D TURTON

ORTECH
Mercury Tube Data Sheet

Plant:	Clean Harbors
Plant Location:	Corunna
Test No.:	2

Test location:	STACK
Date:	Aug 17/22
Project No.:	22196

Measuring Device	MII
Control Module V3	AF2010
Barometer	ENV. CAN.

Train A

Tube Identification:	OL528943	Spiked (Yes) ~~No~~	
Spike Concentration	290 ng		

Barometric Pressure	99.48

Clock Time	Dry Gas Meter L	Average Meter Temperature °C	Meter Pressure Δ H "H_2O"	Pump Vacuum "Hg Gauge
0	12.0	33	.5	7
5	17.8	37	.5	7
10	23.6	37	.5	7
15	28.6	38	.5	7
20	33.4	37	.5	7.5
25	39.8	38	.5	7.5
30	44.7	40	.5	8
35	48.7	~~40~~ 38	.5	8
40	53.7	38	.5	8
45	58.6	40	.5	8
50	63.8	40	.5	8
55	68.8	41	.5	8
60	73.9	41	.5	8

Start Time:	10:47	Initial Leak Check .005 LPM@ 15 "Hg	DGMCF: .988
Finish Time:	11:47	Final Leak Check .005 LPM@ 15 "Hg	Sample Volume:
			Average DGM Temp:
			Average DGM Δ H: .5

Train B

Tube Identification:	OL663163	Spiked ~~Yes~~ (No)	
Spike Concentration	___ ng		

Measuring Device	MII
Control Module V2	A10117

Clock Time	Dry Gas Meter L	Average Meter Temperature °C	Meter Pressure Δ H "H_2O"	Pump Vacuum "Hg Gauge
0	92.2	29	2.5	5
5	98.0	31	2.5	5
10	103.7	31	2.5	5
15	108.7	31	2.5	5
20	113.6	31	2.5	5
25	118.4	31	2.5	5
30	123.1	32	2.5	9
35	129.4	31	2.5	8
40	135.3	31	2.5	8
45	141.4	31	2.5	8
50	147.1	33	2.5	7
55	152.7	32	2.5	7
60	158.3	31	2.5	7

Start Time:	10:47	Initial Leak Check .005 LPM@ 15 "Hg	DGMCF: 1.018
Finish Time:	11:47	Final Leak Check .005 LPM@ 15 "Hg	Sample Volume:
			Average DGM Temp:
			Average DGM Δ H: 2.5

Operator:	ST

ORTECH
Mercury Tube Data Sheet

Plant:	Clean Harbors
Plant Location:	Corunna
Test No.:	3

Test location:	STACK
Date:	AUG 17/22
Project No.:	22/69

Train A

Tube Identification:	663165	Spiked ~~Yes~~ No	
Spike Concentration	— ng		

Measuring Device	MII
Control Module V3	A12010
Barometer	ENV. CAN.

Barometric Pressure	29.47

Clock Time	Dry Gas Meter L	Average Meter Temperature °C	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
0	74.5	38	.5	6
5	80.4	41	.5	6
10	85.8	41	.5	6
15	90.7	40	.5	6
20	95.5	39	.5	6 7
25	100.6	39	.5	7
30	105.7	39	.5	7
35	110.7	39	.5	7
40	115.6	39	.5	7
45	120.6	39	.5	7
50	125.5	39	.5	7
55	130.5	39	.5	7
60	135.5	37	.5	7

Start Time:	12:11	Initial Leak Check .005 LPM@ 13 "Hg	DGMCF: 0.988
Finish Time:	13:11	Final Leak Check LPM@ "Hg	Sample Volume:
			Average DGM Temp:
			Average DGM Δ H:

Train B

Tube Identification:	568842	Spiked (Yes) No	Measuring Device: MII
Spike Concentration	40 ng		Control Module V2: A10117

Clock Time	Dry Gas Meter L	Average Meter Temperature °C	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge	
0	59.0	31	2.5	2	
5	64.5	34	2.5	6	
10	69.8	32	2.5	6	
15	74.8	32	2.5	6	
20	79.5	33	2.3	6.5	* MAKE UP
25	83.9	31	2.3	6.5	
30	88.4	30	2.3	6.5	
35	92.7	31	2.3	6.5	
40	97.0	30	2.2	6.5	
45	101.0	30	2.1	6.5	
50	105.8	30	2.0	6.5	
55	110.3	30	2.0	6.5	
60	115.0	31	2	6.5	

Start Time:	12:11	Initial Leak Check .005 LPM@ 15 "Hg	DGMCF: 1.018
Finish Time:	13:11	Final Leak Check LPM@ "Hg	Sample Volume:
			Average DGM Temp:
			Average DGM Δ H:

Operator:	DT

ORTECH
Mercury Tube Data Sheet

Plant:	Clean Harbors
Plant Location:	Corunna
Test No.:	4

Test location:	STACK
Date:	AUG 17 '22
Project No.:	22196

Train A

Tube Identification:	010673	Spiked (Yes) No	
Spike Concentration	600 ng		

Measuring Device	MII
Control Module	A12010
Barometer	ENV. CAN.

Barometric Pressure	29.44

Clock Time	Dry Gas Meter L	Average Meter Temperature °C	Meter Pressure Δ H "H_2O"	Pump Vacuum "Hg Gauge
0	37.7	36	.5	4
5	42.4	39	.5	6
10	47.9	39	.5	7
15	53.2	38	.5	7
20	58.3	39	.5	7
25	63.2	39	.5	7
30	68.2	40	.5	7
35	73.2	39	.5	7
40	78.2	39	.5	7
45	83.2	39	.5	7
50	88.1	39	.5	7
55	92.9	40	.5	7
60	98.0	38	.5	7

Start Time:	~~13:59~~ 14:01	Initial Leak Check ~~.05~~ LPM@ 16 "Hg	DGMCF: .988
Finish Time:	15:01	Final Leak Check ~~.07~~ LPM@ 16 "Hg	Sample Volume:
			Average DGM Temp:
			Average DGM Δ H:

Train B

Tube Identification:	663248	Spiked ~~Yes~~ No	
Spike Concentration	ng		

Measuring Device	MII
Control Module	M05498

Clock Time	Dry Gas Meter L	Average Meter Temperature °C	Meter Pressure Δ H "H_2O"	Pump Vacuum "Hg Gauge
0	15.5	33	1.8	6
5	21.0	35	1.8	6
10	26.2	35	1.8	7
15	31.0	35	1.8	7
20	35.5	35	1.8	9
25	41.3	36	1.8	9
30	~~46.2~~ 47.0	~~40~~ 36	1.8	9
35	52.5	36	1.8	9
40	58.0	36	1.8	9
45	63.3	36	1.8	9
50	69.0	36	1.8	9
55	74.6	36	1.8	9
60	80.0	38	1.8	9

Start Time:	14:01	Initial Leak Check ~~.05~~ LPM@ 22 "Hg	DGMCF: .992
Finish Time:	15:01	Final Leak Check ~~.05~~ LPM@ 18 "Hg	Sample Volume:
			Average DGM Temp:
			Average DGM Δ H:

Operator:	DT

ORTECH
Mercury Tube Data Sheet

Plant:	Clean Harbors
Plant Location:	Corunna
Test No.:	5

Test location:	STACK
Date:	AUG 17/22
Project No.:	22198

Train A

Tube Identification:	624083	Spiked ~~Yes~~ (No)	
Spike Concentration	— ng		

Measuring Device	MII
Control Module	A/2010
Barometer	ENV. CAN.

Barometric Pressure	29.43

Clock Time	Dry Gas Meter L	Average Meter Temperature °C	Meter Pressure Δ H "H_2O"	Pump Vacuum "Hg Gauge
0	98.7	37	.5	6
5	104.3	39	.5	6
10	109.8	39	.5	6
* 15	115.3	39	.5	6
* 20 DOWN	121.1	39	.5	6
25	126.1	39	.5	7
30	131.3	39	.5	7
35	136.5	39	.5	7
40	141.6	39	.5	7
45	146.8	41	.5	7
50	152.1	39	.5	7
55	157.1	39	.5	7
60	162.3	40	.5	7

Start Time:	15:24	Initial Leak Check	.005 LPM@ 18 "Hg
Finish Time:	16:29	Final Leak Check	.005 LPM@ 18 "Hg

DGMCF:	.988
Sample Volume:	
Average DGM Temp:	
Average DGM Δ H:	

* PROCESS ISSUE BACK ON 15:49

Train B

Tube Identification:	620071	Spiked (Yes) No	
Spike Concentration	1000 ng		

Measuring Device	MII
Control Module	M05498

Clock Time	Dry Gas Meter L	Average Meter Temperature °C	Meter Pressure Δ H "H_2O"	Pump Vacuum "Hg Gauge
0	~~75.9~~ 81.0	34	~~1.8~~ 1.8	9
5	86.5	34	1.8	9
10	92.0	34	1.8	9
15	97.8	34	1.8	9
* 20 DOWN	103.5	34	1.8	9
25	107.5	36	1.8	13
30	113.2	35	1.8	13
35	118.9	36	1.8	13
40	124.5	35	1.8	13
45	130.0	36	1.8	13
50	135.7	34	1.8	13
55	141.2	35	1.8	13
60	146.6	35	1.8	13

Start Time:	15:24	Initial Leak Check	.005 LPM@ 17 "Hg
Finish Time:	16:29	Final Leak Check	.005 LPM@ 5 "Hg

DGMCF:	.992
Sample Volume:	
Average DGM Temp:	
Average DGM Δ H:	

Operator:	ST

ORTECH
Mercury Tube Data Sheet

Plant:	Clean Harbors
Plant Location:	Corunna
Test No.:	6

Test location:	STACK
Date:	AUG 17/22
Project No.:	22196

Measuring Device	MII
Control Module	A1201
Barometer	ENV. CAN.

Train A

Tube Identification:	610641	Spiked (Yes) No	
Spike Concentration	2250 ng		

Barometric Pressure	29.43

Clock Time	Dry Gas Meter L	Average Meter Temperature °C	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
0	73.2	36	.5	6
5	78.5	37	.5	6
10	83.5	37	.5	6
15	88.5	37	.5	6
20	92.9	36	.5	6
25	97.6	36	.5	8
30	102.5	35	.5	9
35	107.7	35	.5	9
40	112.8	35	.5	9
45	118.0	35	.5	9
50	123.2	34	.5	9
55	128.5	34	.5	9
60	133.8	34	.5	9

Start Time:	16:46	Initial Leak Check .005 LPM@ 15 "Hg	DGMCF: .988
Finish Time:	17:48	Final Leak Check .005 LPM@ 15 "Hg	Sample Volume:
			Average DGM Temp:
			Average DGM Δ H:

Train B

Tube Identification:	624086	Spiked ~~Yes~~ (No)	
Spike Concentration	— ng		

Measuring Device	MII
Control Module	M05498

Clock Time	Dry Gas Meter L	Average Meter Temperature °C	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
0	49.0	32	1.8	6
5	54.1	33	1.8	6
10	59.1	33	1.8	6
15	64.1	33	1.8	6
20	69.0	33	1.8	6
25	72.7	32	1.8	11
30	78.4	33	1.8	11
35	84.5	33	1.8	11
40	90.6	33	1.8	10.5
45	95.7	33	1.8	10.5
50	101.5	33	1.8	10.5
55	108.0	33	1.8	10.5
60	113.8	33	1.8	10.5

Start Time:	16:46	Initial Leak Check .005 LPM@ 15 "Hg	DGMCF: 0.992
Finish Time:	17:46	Final Leak Check .005 LPM@ 15 "Hg	Sample Volume:
			Average DGM Temp:
			Average DGM Δ H:

Operator:	DT

APPENDIX 7

Method 30B Analytical Report
(18 pages)

Clean Harbors, Sarnia
Incinerator Exhaust Stack
Mercury Spike Tube Recovery

Test No.	Pre-Test Spike Concentration	Spike Tube			Unspiked Tube			Spike Concentration	Spike Recovery
		Total Collected	Volume Sampled	Mercury Concentration	Total Collected	Volume Sampled	Mercury Concentration		
	ng	ng	Rm^3*	ng/Rm^3*	ng	Rm^3*	ng/Rm^3*	ng/Rm^3*	%
1	150	307	0.0630	4878	148.8	0.0570	2609	2269	95.2
2	250	394	0.0578	6820	152.5	0.0654	2333	4487	103.7
3	400	501	0.0553	9051	117.3	0.0567	2068	6984	96.6
4	600	734	0.0561	13092	151.1	0.0611	2472	10620	99.3
5	1000	1060	0.0623	17028	84.1	0.0591	1423	15605	97.1
6	2200	2227	0.0569	39113	128.5	0.0619	2078	37035	95.9
Average									98.0

Sorbent Trap Analysis Report

Date	8/29/22	Company	ORTECH	Method	EPA 7473
Analyst[s]	Lindsey Buzaki	Contact	Chris Belore	Method Uncertainty	± 10%
Project	2029794	Phone	905-822-4120 ext. 324	MDL	0.39 ng
Turnaround	Standard	Email	cbelore@ortech.ca	LOQ	5 ng

Trap ID	Pre-Filter Mass [ng]	AGS Mass [ng]	Section 1 Mass [ng]	Section 2 Mass [ng]	Total Mass [ng][1]	Section 3 Mass [ng]	Spike Level [ng]	Breakthrough [%][2]	Spike Recovery [%][3]	Source	Notes	Affected Section
OL663187			148.8	0.0	148.8			0.0%		Test 1 - Stack		
OL618359			306.1	*1.0*	*307.1*		150	0.3%		Test 1 - Stack		
OL528943			391.9	*2.0*	*393.9*		250	0.5%		Test 2 - Stack		
OL663163			151.6	*0.9*	*152.5*			0.6%		Test 2 - Stack		
OL663165			115.8	*1.5*	*117.3*			1.3%		Test 3 - Stack		
OL568842			499.6	*1.3*	500.9		400	0.3%		Test 3 - Stack		
OL610673			734.4	0.0	734.4		600	0.0%		Test 4 - Stack		
OL663238			150.8	0.3	151.1			0.2%		Test 4 - Stack		
OL624083			84.0	0.1	84.1			0.1%		Test 5 - Stack		
OL620071			1060	0.0	1060		1000	0.0%		Test 5 - Stack		
OL610641			2226	*1.1*	*2227*		2200	0.1%		Test 6 - Stack		
OL624086			127.7	*0.8*	*128.5*			0.6%		Test 6 - Stack		

[1] Total Mass = PF+AGS+S1+S2

[2] Breakthrough = S2 / [PF+AGS+S1]

[3] For PS12B only Spike Recovery = S3 / Spike Level

[R] Data invalidation qualifier - refer to notes

ATTENTION: A response factor was used to calculate certain values on this report. Italicized masses appear on the report as rounded to the nearest tenth nanogram.

ORTECH

Analyst	Lindsey Buzaki
File Name	220829_LHB_ORTECH_2029794
Analyzer	444
Cell type	Short

Temperature [°C]	680
Flow Rate [L/min]	1.5
MDL [ng]	0.39
SD	1

	Trap 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	Affected Section
1	OL663187			148.8	0.0				Test 1 - Stack		
2	OL618359			306.1	*1.0*				Test 1 - Stack		
3	OL528943			391.9	*2.0*				Test 2 - Stack		
4	OL663163			151.6	*0.9*				Test 2 - Stack		
5	OL663165			115.8	*1.5*				Test 3 - Stack		
6	OL568842			499.6	1.3				Test 3 - Stack		
7	OL610673			734.4	0.0				Test 4 - Stack		
8	OL663238			150.8	0.3				Test 4 - Stack		
9	OL624083			84.0	0.1				Test 5 - Stack		
10	OL620071			1060	0.0				Test 5 - Stack		
11	OL610641			2226	*1.1*				Test 6 - Stack		
12	OL624086			127.7	*0.8*				Test 6 - Stack		
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											

Additional Notes

Daily Calibration[1]

Lot Std. ID	Std. [ng]	Calculated [ng]
S2-MEB708106 A	5.0	see cal. report
S2-MEB708106 A	10.0	see cal. report
S2-MEB712974 A	100.0	see cal. report
S2-HG709270 A	1000.0	see cal. report
S2-MEB708107 A	5000.0	see cal. report
S2-MEB708107 A	10000.0	see cal. report

Continuing Calibration Verifications[1]

Lot Std. ID	Std. [ng]	Calculated [ng]
OLS019237	1500.0	1445
S2-HG709270 A	1000.0	981.3
S2-HG709270 A	1000.0	1007
S2-HG709270 A	1000.0	1014

Active Hg Standard Bank[5]

Kit Used ☑ A ☐ B

Concentration [µg/mL]	Lot Std. ID	Exp. Date
0.1	T2-MEB716662 B	7/6/2023
1	S2-MEB712974 B	7/6/2023
10	R2-HG700202 B	3/3/2023
100	S2-MEB708107 B	3/31/2023
1000	P2-HG677010	4/22/2023
0.1	S2-MEB708106 A	5/16/2023
1	S2-MEB712974 A	3/3/2023
10	S2-HG709270 A	7/29/2023
100	S2-MEB708107 A	5/16/2023
1 (Independent)	R2-HG691902	6/23/2023
10 (Independent)	R2-MEB691339	1/31/2023
100 (Independent)	P2-MEB681004	2/8/2023

Independent Calibration Verification[2]

Lot Std. ID	Std. [ng]	Calculated [ng]
R2-MEB691339	1000.0	1016

Response Factor (Method 30B Only)[4]

Lot Std. ID	Std. [ng]	Area/Mass
S2-MEB708106 A	2	50

Pipette Identification

A6

RF Pipette ID (if different from cal)

L3

Method Blank measured mass[6]

0 0

Other Reagents

Sodium Carbonate	22110-11
Iodinated Activated Carbon	4C33

[1]Performed daily prior to analysis of sorbent traps, Refer to SOP for Instrument Calibration for acceptance criteria

[2]Performed immediately after calibration curve is verified, must come within 10% of expected value

[3]Performed between every 10 samples for method 30B and after every analytical batch

[4]Response factor value must fall between the LOQ and MDL

[5]Subject to change, for analyst convenience only

[6]Method blank must be measured at a value less than LOQ

[7]Data invalidation qualifier - refer to notes

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

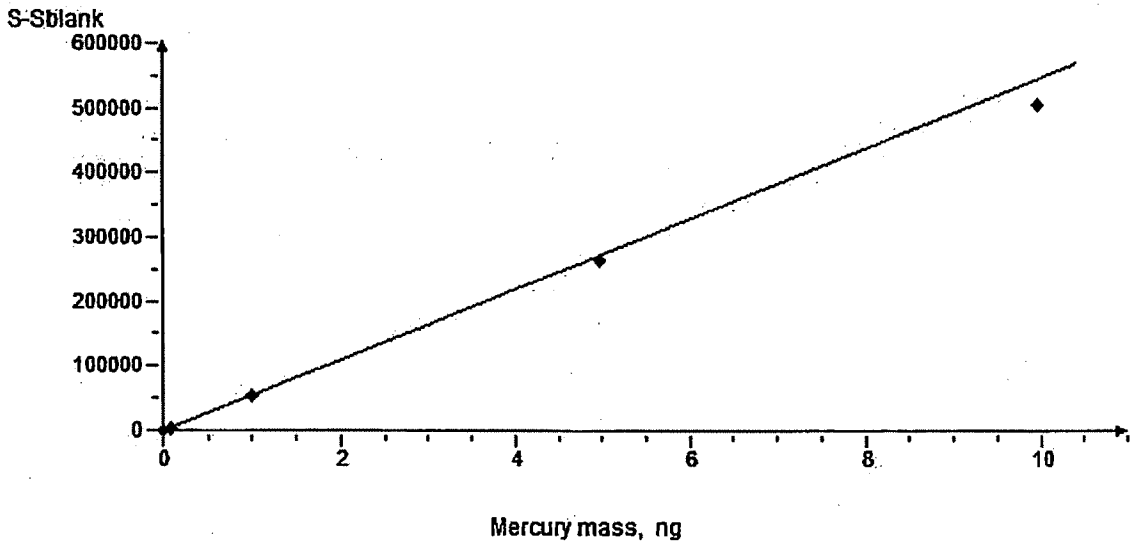
Analyst Signature
By signing this report I confirm that the above data are true to the best of my knowledge.

Date 8/29/22

OHIO LUMEX

REPORT

Report created	29.08.2022 11:45:33
Instrument RA915+	Serial number 444
Calibration created	29.08.2022 11:45:30
Calibration name	220829_LHB_5-10000_p2



Results

N	Mercury mass, ng	S-Sblank	Ref.data, ppb	Calculated, ppb	d, %
1	10.00	510000	10000.0	9261.3	-7.4
2	5.00	266900	5000.0	4846.1	-3.1
3	1.00	56230	1000.0	1021.1	2.1
4	0.10	5860	100.0	106.4	6.4
5	0.01	574	10.0	10.4	4.3
6	0.01	269	5.0	4.9	-2.3

Calibration	S - Sblank = a·m
Algorithm	WLSM
Correlation coefficient	0.999769
Residual standard deviation	238.698046
Coefficient	a = 55070.0000

Report Issued: 08/29/22 Project: 2029794

Trap ID

OL663187

Ohio Lumex Co., Inc.
Hg Sorbent Trap Chain of Custody Form

☒ **UNSPIKED** ☐ **SPIKED AT:**

Production Lot: U-1139 Spike Date:

Carbon Lot: 4C Spike Time:

QA/QC Signature (Spike):

QA/QC Signature (Trap Assembly):

☐ High Flow ☐ Fluffy Pre-filter ☐ 185 mm ☐ 240 mm
☐ Static Pre-filter ☐ AGS ☐ 300 mm ☒ 450 mm

Type of Trap: **30B**

SAMPLING INFORMATION

Facility / Source:

Boiler ID:

Sampling Location:

Run Number (Optional):

Sampling Train: ☐ A ☐ B

PRE-Run Leak Check: ☐ PASS ☐ FAIL

Run Start Date/Time: /

Run End Date/Time: /

POST-Run Leak Check: ☐ PASS ☐ FAIL

SAMPLING CONDITIONS AND PARAMETERS

Avg. Duct Temp (F°):

Avg. Trap Temp (F°):

Avg. Flow Rate (cc/min):

Total Volume (L): or (dscm)

Estimated Avg. Hg Concentration (µg/dscm):

Event Occurred During Sampling: ☐ Startup ☐ Shutdown

CEMENT ONLY:

# of RAW MILL OFF events during sampling:

REQUIRED IF RETURNING TO OHIO LUMEX

Estimated Hg Mass in Section 1 of Sorbent Trap (ng):

Note: Analyzer calibration range will be set based on this value. Leaving this blank may result in out-of-calibration analysis. Please contact us if you require assistance estimating this value.

CHAIN OF CUSTODY

	Signature	Date	Time	Security Seal
Sample(s) taken by				If applicable place chain of custody seal here (see security seal instruction sheet)
Sample(s) prepared for shipment by				
Courier/Other (if applicable)				Seal intact as received: Yes ☐ No ☐
Sample(s) received by lab	[signature]	8.22.22	10:50	Seal intact as received: Yes ☐ No ☐
Sample(s) analyzed by	[signature]	8/29/22	15:00	Seal intact as received: Yes ☐ No ☐

Ensure sampling conditions prevent moisture condensation in the trap media. Moisture condensation is a major cause of measurement failure in sorbent traps and should be prevented.
Spiking Method: Cold Vapor Adsorption Via Impinger Sparging. Certified Accuracy ± 10%, Traceable to NIST.

Best Before: July 2025

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1 888 876 2611 toll free
www.ohiolumex.com
mail@ohiolumex.com
30350 Bruce Industrial Pkwy.
Cleveland, OH 44139 USA

Report Issued: 08/29/22

Project: 2029794

OHIO LUMEX

Ohio Lumex Co., Inc.
Sorbent Trap Chain of Custody Form

OL618359

☐ **Unspiked** ☒ **Spiked At:** 150ng

Spiking Method Cold Vapor Adsorption Via Impinger Sparging
Certified Accuracy ± 10%, Traceable to NIST

QA/QC Signature (Trap Assembly) _____

QA/QC Signature (Spike) _____

Production Lot: S-4CEA Carbon Lot: 4C

☐High Flow ☐Fluffy Pre-filter ☐240 mm
☐Static Pre-filter ☐AGS ☐300 mm
☐185 mm ☒450 mm

Spike Date: 3/17/2022 Spike Time: 1455 Type of Trap: 30B

TO BE FILLED OUT BY SAMPLING TECHNICIAN

Plant/Source: _____

Boiler ID: _____

Sampling Location: _____ *(stack, FGD inlet, etc.)*

Run Number (optional): _____

Sampling Train (circle one): **A** **B**

PRE-Run Leak Check (circle one): **PASS** **FAIL**

Run START: _____ Date _____ Time

Run END: _____ Date _____ Time

POST-Run Leak Check (circle one): **PASS** **FAIL**

Notes: _____

SAMPLING CONDITIONS AND PARAMETERS

Ave Duct Temp (F°): _____

Ave Trap Temp (F°): _____

Ave Flow Rate (cc/min): _____

Total Volume (L) _____ or (dscm): _____

Estimated Ave Hg Concentration (µg/dscm): _____

Circle Event if Occurred During Sampling:

STARTUP **SHUTDOWN**

For CEMENT KILNS Only

No. of RAW MILL OFF Events During Sampling: _____

REQUIRED IF RETURNING TO OHIO LUMEX FOR ANALYSIS

Estimated Hg Mass in Section 1 of Sorbent Trap (ng): _____

Note: Analyzer calibration range will be set based on this value. Leaving this blank may result in out-of-calibration analysis. Please contact us if you require assistance estimating this value.

Chain Of Custody

Signatures along with Date/Time required for insertion, removal, lab receiving and lab analysis of trap.

	Signature	Date	Time	Security Seal
Trap inserted by				**If Applicable** Place Chain of Custody seal here (See Security Seal Instruction Sheet)
Trap removed and sealed by				
Courier/Other (If Applicable)				Seal intact as received Yes ☐ No ☐
Courier/Other (If Applicable)				Seal intact as received Yes ☐ No ☐
Trap received by lab	[signature]	8-22-22	10:50	Seal intact as received Yes ☐ No ☐
Trap analyzed by	[signature]	8/29/22	15:12	Seal intact as received Yes ☐ No ☐

Make sure all of your sampling conditions prevent moisture condensation in the trap media. Moisture condensation is a major cause of breakthrough and spike loss in sorbent traps and should be prevented at all costs. Deactivated glass and glass wool Impregnated Activated Carbon – Refer to SDS

Best Before: March 2025

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Cleveland, OH 44139 USA

Report Issued: 08/29/22

Project: 2029794

Trap ID

OL528943

Ohio Lumex Co., Inc.
Sorbent Trap Chain of Custody Form

☐ **Unspiked** ☒ **Spiked At:** 250ng

Spiking Method Cold Vapor Adsorption Via Impinger Sparging
Certified Accuracy ± 10%, Traceable to NIST

QA/QC Signature (Trap Maker) _____

QA/QC Signature (Spiker) _____

Production Lot: S-39E4 Carbon Lot: 4C

☐ High Flow ☐ Coil Pre-filter ☐ 240 mm
☐ Static Pre-filter ☐ AGS ☐ 300 mm
☐ Fluffy Pre-filter ☐ 185 mm ☒ 450 mm

Spike Date: 1/15/2020 Spike Time: 1055

Type of Trap: 30B

TO BE FILLED OUT BY SAMPLING TECHNICIAN

Plant/Source: _____

Boiler ID: _____

Sampling Location: _____ (stack, FGD inlet, etc.)

Run Number (optional): _____

Sampling Train (circle one): **A** **B**

PRE-Run Leak Check (circle one): **PASS** **FAIL**

Run START: _____ Date _____ Time

Run END: _____ Date _____ Time

POST-Run Leak Check (circle one): **PASS** **FAIL**

Notes: _____

SAMPLING CONDITIONS AND PARAMETERS

Ave Duct Temp (F°): _____

Ave Trap Temp (F°): _____

Ave Flow Rate (cc/min): _____

Total Volume (L) _____ or (dscm): _____

Estimated Ave Hg Concentration (µg/dscm): _____

Circle Event if Occurred During Sampling:

STARTUP **SHUTDOWN**

For CEMENT KILNS Only

No. of RAW MILL OFF Events During Sampling: _____

REQUIRED IF RETURNING TO OHIO LUMEX FOR ANALYSIS

Estimated Hg Mass in Section 1 of Sorbent Trap (ng): _____

Note: Analyzer calibration range will be set based on this value. Leaving this blank may result in out-of-calibration analysis. Please contact us if you require assistance estimating this value.

Chain Of Custody

Signatures along with Date/Time required for insertion, removal, lab receiving and lab analysis of trap.

	Signature	Date	Time	Security Seal
Trap inserted by				**If Applicable** Place Chain of Custody seal here (See Security Seal Instruction Sheet)
Trap removed and sealed by				
Courier/Other (If Applicable)				Seal intact as received Yes ☐ No ☐
Courier/Other (If Applicable)				Seal intact as received Yes ☐ No ☐
Trap received by lab		8-22-22	10:50	Seal intact as received Yes ☐ No ☐
Trap analyzed by		8/29/22	15:18	Seal intact as received Yes ☐ No ☐

Make sure all of your sampling conditions prevent moisture condensation in the trap media. Moisture condensation is a major cause of breakthrough and spike loss in sorbent traps and should be prevented at all costs. Deactivated glass and glass wool Impregnated Activated Carbon – Refer to SDS

Best Before: January 2023

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30350 Bruce Industrial Pkwy.
Cleveland, OH 44139 USA

Report Issued: 08/29/22

Project: 2029794

Trap ID

OL663163

Ohio Lumex Co., Inc.
Hg Sorbent Trap Chain of Custody Form

☒ **UNSPIKED** ☐ **SPIKED AT:**

Production Lot: U-1139 Spike Date:

Carbon Lot: 4C Spike Time:

QA/QC Signature (Spike):

QA/QC Signature (Trap Assembly):

☐ High Flow ☐ Fluffy Pre-filter ☐ 185 mm ☐ 240 mm
☐ Static Pre-filter ☐ AGS ☐ 300 mm ☒ 450 mm

Type of Trap: **30B**

SAMPLING INFORMATION

Facility / Source:

Boiler ID:

Sampling Location:

Run Number (Optional):

Sampling Train: ☐ A ☐ B

PRE-Run Leak Check: ☐ PASS ☐ FAIL

Run Start Date/Time: /

Run End Date/Time: /

POST-Run Leak Check: ☐ PASS ☐ FAIL

SAMPLING CONDITIONS AND PARAMETERS

Avg. Duct Temp (F°):

Avg. Trap Temp (F°):

Avg. Flow Rate (cc/min):

Total Volume (L): or (dscm)

Estimated Avg. Hg Concentration (µg/dscm):

Event Occurred During Sampling: ☐ Startup ☐ Shutdown

CEMENT ONLY:

# of RAW MILL OFF events during sampling:

REQUIRED IF RETURNING TO OHIO LUMEX

Estimated Hg Mass in Section 1 of Sorbent Trap (ng):

Note: Analyzer calibration range will be set based on this value. Leaving this blank may result in out-of-calibration analysis. Please contact us if you require assistance estimating this value.

CHAIN OF CUSTODY

	Signature	Date	Time	Security Seal
Sample(s) taken by				If applicable place chain of custody seal here (see security seal instruction sheet)
Sample(s) prepared for shipment by				
Courier/Other (if applicable)				Seal intact as received. Yes ☐ No ☐
Sample(s) received by lab		8-22-22	10:50	Seal intact as received: Yes ☐ No ☐
Sample(s) analyzed by		8/29/22	15:24	Seal intact as received Yes ☐ No ☐

Ensure sampling conditions prevent moisture condensation in the trap media. Moisture condensation is a major cause of measurement failure in sorbent traps and should be prevented.
Spiking Method Cold Vapor Adsorption Via Impinger Sparging; Certified Accuracy ± 10%, Traceable to NIST

Best Before:July 2025

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Report Issued: 08/29/22

Project: 2029794

Trap ID

OL663165

Ohio Lumex Co., Inc.
Hg Sorbent Trap Chain of Custody Form

☒ **UNSPIKED** ☐ **SPIKED AT:**

Production Lot: U-1139 Spike Date:

Carbon Lot: 4C Spike Time:

QA/QC Signature (Spike):

QA/QC Signature (Trap Assembly):

☐ High Flow ☐ Fluffy Pre-filter ☐ 185 mm ☐ 240 mm
☐ Static Pre-filter ☐ AGS ☐ 300 mm ☒ 450 mm

Type of Trap: **30B**

SAMPLING INFORMATION

Facility / Source:

Boiler ID:

Sampling Location:

Run Number (Optional):

Sampling Train: ☐ A ☐ B

PRE-Run Leak Check: ☐ PASS ☐ FAIL

Run Start Date/Time: /

Run End Date/Time: /

POST-Run Leak Check: ☐ PASS ☐ FAIL

SAMPLING CONDITIONS AND PARAMETERS

Avg. Duct Temp (F°):

Avg. Trap Temp (F°):

Avg. Flow Rate (cc/min):

Total Volume (L): or (dscm)

Estimated Avg. Hg Concentration (µg/dscm):

Event Occurred During Sampling: ☐ Startup ☐ Shutdown

CEMENT ONLY:

# of RAW MILL OFF events during sampling:

REQUIRED IF RETURNING TO OHIO LUMEX

Estimated Hg Mass in Section 1 of Sorbent Trap (ng):

Note: Analyzer calibration range will be set based on this value. Leaving this blank may result in out-of-calibration analysis. Please contact us if you require assistance estimating this value.

CHAIN OF CUSTODY

	Signature	Date	Time	Security Seal
Sample(s) taken by				If applicable place chain of custody seal here. (see security seal instruction sheet)
Sample(s) prepared for shipment by				
Courier/Other (if applicable)				Seal intact as received Yes ☐ No ☐
Sample(s) received by lab	[signature]	8-22-22	10:50	Seal intact as received Yes ☐ No ☐
Sample(s) analyzed by	[signature]	8/29/22	15:32	Seal intact as received Yes ☐ No ☐

Ensure sampling conditions prevent moisture condensation in the trap media. Moisture condensation is a major cause of measurement failure in sorbent traps and should be prevented.
Spiking Method Cold Vapor Adsorption Via Impinger Sparging Certified Accuracy ± 10%, Traceable to NIST

Best Before:July 2025

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Cleveland, OH 44139 USA

Report Issued: 08/29/22 Project: 2029794

OHIO LUMEX

Ohio Lumex Co., Inc.
Sorbent Trap Chain of Custody Form

Trap ID
OL568842

☐ Unspiked ☒ Spiked At: 400ng
Spiking Method Cold Vapor Adsorption Via Impinger Sparging
Certified Accuracy ± 10%, Traceable to NIST

QA/QC Signature (Trap Assembly)_____

QA/QC Signature (Spike)_____

Production Lot: S-4B51 Carbon Lot: 4C

☐ High Flow ☐ Fluffy Pre-filter ☐ 240 mm
☐ Static Pre-filter ☐ AGS ☐ 300 mm
☐ 185 mm ☒ 450 mm

Spike Date: 1/19/2022 Spike Time: 1312 Type of Trap: 30B

TO BE FILLED OUT BY SAMPLING TECHNICIAN

Plant/Source:_____ PRE-Run Leak Check (circle one): PASS FAIL

Boiler ID:_____ Run START: _____ (Date) _____ (Time)

Sampling Location: _____ (stack, FGD inlet, etc.)

Run Number (optional):_____ Run END: _____ (Date) _____ (Time)

Sampling Train (circle one): A B POST-Run Leak Check (circle one): PASS FAIL

Notes:_____

SAMPLING CONDITIONS AND PARAMETERS

Ave Duct Temp (F°):_____ Estimated Ave Hg Concentration (µg/dscm):_____

Ave Trap Temp (F°):_____ Circle Event if Occurred During Sampling:

Ave Flow Rate (cc/min):_____ STARTUP SHUTDOWN

Total Volume (L)_____ or (dscm):_____

For CEMENT KILNS Only
No. of RAW MILL OFF Events During Sampling:_____

REQUIRED IF RETURNING TO OHIO LUMEX FOR ANALYSIS

Estimated Hg Mass in Section 1 of Sorbent Trap (ng):_____

Note: Analyzer calibration range will be set based on this value. Leaving this blank may result in out-of-calibration analysis. Please contact us if you require assistance estimating this value.

Chain Of Custody

Signatures along with Date/Time required for insertion, removal, lab receiving and lab analysis of trap.

	Signature	Date	Time	Security Seal
Trap inserted by				If Applicable Place Chain of Custody seal here (See Security Seal Instruction Sheet)
Trap removed and sealed by				
Courier/Other (If Applicable)				Seal intact as received Yes ☐ No ☐
Courier/Other (If Applicable)				Seal intact as received Yes ☐ No ☐
Trap received by lab	[signature]	8.22.22	10:50	Seal intact as received Yes ☐ No ☐
Trap analyzed by	[signature]	8/29/22	15:39	Seal intact as received Yes ☐ No ☐

Make sure all of your sampling conditions prevent moisture condensation in the trap media. Moisture condensation is a major cause of breakthrough and spike loss in sorbent traps and should be prevented at all costs. Deactivated glass and glass wool Impregnated Activated Carbon – Refer to SDS

Best Before: January 2025

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30350 Bruce Industrial Pkwy.
Cleveland, OH 44139 USA

Report Issued: 08/29/22

Project: 2029794

Trap ID

OL610673

Ohio Lumex Co., Inc.
Sorbent Trap Chain of Custody Form

☐ **Unspiked** ☒ **Spiked At:** 600ng

Spiking Method Cold Vapor Adsorption Via Impinger Sparging
Certified Accuracy ± 10%, Traceable to NIST

QA/QC Signature (Trap Assembly) _____

QA/QC Signature (Spike) _____

Production Lot: S-4DF9 Carbon Lot: 4C

☐ High Flow ☐ Fluffy Pre-filter ☐ 240 mm
☐ Static Pre-filter ☐ AGS ☐ 300 mm
☐ 185 mm ☒ 450 mm

Spike Date: 05/02/2022 Spike Time: 1218 Type of Trap: 30B

TO BE FILLED OUT BY SAMPLING TECHNICIAN

Plant/Source: _____

Boiler ID: _____

Sampling Location: _____ (stack, FGD inlet, etc.)

Run Number (optional): _____

Sampling Train (circle one): A B

PRE-Run Leak Check (circle one): PASS FAIL

Run START: _____ Date _____ Time

Run END: _____ Date _____ Time

POST-Run Leak Check (circle one): PASS FAIL

Notes: _____

SAMPLING CONDITIONS AND PARAMETERS

Ave Duct Temp (F°): _____

Ave Trap Temp (F°): _____

Ave Flow Rate (cc/min): _____

Total Volume (L) _____ or (dscm): _____

Estimated Ave Hg Concentration (µg/dscm): _____

Circle Event if Occurred During Sampling:

STARTUP SHUTDOWN

For CEMENT KILNS Only

No. of RAW MILL OFF Events During Sampling: _____

REQUIRED IF RETURNING TO OHIO LUMEX FOR ANALYSIS

Estimated Hg Mass in Section 1 of Sorbent Trap (ng): _____

Note: Analyzer calibration range will be set based on this value. Leaving this blank may result in out-of-calibration analysis. Please contact us if you require assistance estimating this value.

Chain Of Custody

Signatures along with Date/Time required for insertion, removal, lab receiving and lab analysis of trap.

	Signature	Date	Time	Security Seal
Trap inserted by				**If Applicable** Place Chain of Custody seal here (See Security Seal Instruction Sheet)
Trap removed and sealed by				
Courier/Other (If Applicable)				Seal intact as received Yes ☐ No ☐
Courier/Other (If Applicable)				Seal intact as received Yes ☐ No ☐
Trap received by lab	[signature]	8.22.22	10:50	Seal intact as received Yes ☐ No ☐
Trap analyzed by	[signature]	8/29/22	15:40	Seal intact as received Yes ☐ No ☐

Make sure all of your sampling conditions prevent moisture condensation in the trap media. Moisture condensation is a major cause of breakthrough and spike loss in sorbent traps and should be prevented at all costs. Deactivated glass and glass wool Impregnated Activated Carbon – Refer to SDS

Best Before: May 2025

1 440 264 2500 office
1 888 876 2611 toll free
www.ohiolumex.com
mail@ohiolumex.com
30350 Bruce Industrial Pkwy.
Cleveland, OH 44139 USA

Report Issued: 08/29/22

Project: 2029794

Trap ID

OL663238

Ohio Lumex Co., Inc.
Hg Sorbent Trap Chain of Custody Form

☒ **UNSPIKED** ☐ **SPIKED AT:**

Production Lot: U-1139 Spike Date:

Carbon Lot: 4C Spike Time:

QA/QC Signature (Spike):

QA/QC Signature (Trap Assembly):

☐ High Flow ☐ Fluffy Pre-filter ☐ 185 mm ☐ 240 mm
☐ Static Pre-filter ☐ AGS ☐ 300 mm ☒ 450 mm

Type of Trap: **30B**

SAMPLING INFORMATION

Facility / Source:

Boiler ID:

Sampling Location:

Run Number (Optional):

Sampling Train: ☐ A ☐ B

PRE-Run Leak Check: ☐ PASS ☐ FAIL

Run Start Date/Time: /

Run End Date/Time: /

POST-Run Leak Check: ☐ PASS ☐ FAIL

SAMPLING CONDITIONS AND PARAMETERS

Avg. Duct Temp (F°):

Avg. Trap Temp (F°):

Avg. Flow Rate (cc/min):

Total Volume (L): or (dscm)

Estimated Avg. Hg Concentration (µg/dscm):

Event Occurred During Sampling: ☐ Startup ☐ Shutdown

CEMENT ONLY:

# of RAW MILL OFF events during sampling:

REQUIRED IF RETURNING TO OHIO LUMEX

Estimated Hg Mass in Section 1 of Sorbent Trap (ng):

Note: Analyzer calibration range will be set based on this value. Leaving this blank may result in out-of-calibration analysis. Please contact us if you require assistance estimating this value.

CHAIN OF CUSTODY

	Signature	Date	Time	Security Seal
Sample(s) taken by				If applicable place chain of custody seal here (see security seal instruction sheet)
Sample(s) prepared for shipment by				
Courier/Other (if applicable)				Seal intact as received: Yes ☐ No ☐
Sample(s) received by lab		8.22.22	10:50	Seal intact as received: Yes ☐ No ☐
Sample(s) analyzed by		8/29/22	15:51	Seal intact as received: Yes ☐ No ☐

Ensure sampling conditions prevent moisture condensation in the trap media. Moisture condensation is a major cause of measurement failure in sorbent traps and should be prevented.
Spiking Method Cold Vapor Adsorption Via Impinger Sparging Certified Accuracy ± 10%. Traceable to NIST

Best Before:July 2025

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1 888 876 2611 toll free

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mail@ohiolumex.com

30350 Bruce Industrial Pkwy.
Cleveland, OH 44139 USA

Report Issued: 08/29/22

Project: 2029794

Trap ID

OL624083

Ohio Lumex Co., Inc.
Hg Sorbent Trap Chain of Custody Form

☒ **UNSPIKED** ☐ **SPIKED AT:**

QA/QC Signature (Trap Assembly):

Production Lot: U-1115 Spike Date:

Carbon Lot: 4C Spike Time:

☐ High Flow ☐ Fluffy Pre-filter ☐ 185 mm ☐ 240 mm
☐ Static Pre-filter ☐ AGS ☐ 300 mm ☒ 450 mm

QA/QC Signature (Spike):

Type of Trap: 30B

SAMPLING INFORMATION

Facility / Source:

Boiler ID:

Sampling Location:

Run Number (Optional):

Sampling Train: ☐ A ☐ B

PRE-Run Leak Check: ☐ PASS ☐ FAIL

Run Start Date/Time: /

Run End Date/Time: /

Run Number (Optional):

POST-Run Leak Check: ☐ PASS ☐ FAIL

SAMPLING CONDITIONS AND PARAMETERS

Avg. Duct Temp (F°):

Avg. Trap Temp (F°):

Avg. Flow Rate (cc/min):

Total Volume (L): or (dscm)

Estimated Avg. Hg Concentration (µg/dscm):

Event Occurred During Sampling: ☐ Startup ☐ Shutdown

CEMENT ONLY:

# of RAW MILL OFF events during sampling:

REQUIRED IF RETURNING TO OHIO LUMEX

Estimated Hg Mass in Section 1 of Sorbent Trap (ng):

Note. Analyzer calibration range will be set based on this value. Leaving this blank may result in out-of-calibration analysis. Please contact us if you require assistance estimating this value.

CHAIN OF CUSTODY

	Signature	Date	Time	Security Seal
Sample(s) taken by				If applicable place chain of custody seal here (see security seal instruction sheet)
Sample(s) prepared for shipment by				
Courier/Other (if applicable)				Seal intact as received Yes ☐ No ☐
Sample(s) received by lab		8-22-22	10:50	Seal intact as received Yes ☐ No ☐
Sample(s) analyzed by		8/29/22	~~15:5~~ 16:00	Seal intact as received Yes ☐ No ☐

Ensure sampling conditions prevent moisture condensation in the trap media. Moisture condensation is a major cause of measurement failure in sorbent traps and should be prevented.
Spiking Method Cold Vapor Adsorption Via Impinger Sparging Certified Accuracy ± 10%, Traceable to NIST

Best Before: June 2025

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2611 toll free
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mail@ohiolumex.com
30350 Bruce Industrial Pkwy.
Cleveland, OH 44139 USA

Report Issued: 08/29/22 Project: 2029794

OHIO LUMEX

Ohio Lumex Co., Inc.
Sorbent Trap Chain of Custody Form

Trap ID
OL620071

☐ **Unspiked** ☒ **Spiked At:** 1,000ng
Spiking Method Cold Vapor Adsorption Via Impinger Sparging
Certified Accuracy ± 10%, Traceable to NIST

QA/QC Signature (Trap Assembly) _____

QA/QC Signature (Spike) _____

Production Lot: S-4DF8 Carbon Lot: 4C

☐ High Flow ☐ Fluffy Pre-filter ☐ 240 mm
☐ Static Pre-filter ☐ AGS ☐ 300 mm
☐ 185 mm ☒ 450 mm

Spike Date: 05/02/2022 Spike Time: 1122 Type of Trap: 30B

TO BE FILLED OUT BY SAMPLING TECHNICIAN

Plant/Source: _____ PRE-Run Leak Check (circle one): **PASS** **FAIL**

Boiler ID: _____ Run START: _____ (Date) _____ (Time)

Sampling Location: _____ (stack, FGD inlet, etc.)

Run Number (optional): _____ Run END: _____ (Date) _____ (Time)

Sampling Train (circle one): **A** **B** POST-Run Leak Check (circle one): **PASS** **FAIL**

Notes: _____

SAMPLING CONDITIONS AND PARAMETERS

Ave Duct Temp (F°): _____ Estimated Ave Hg Concentration (µg/dscm): _____

Ave Trap Temp (F°): _____ Circle Event if Occurred During Sampling:

Ave Flow Rate (cc/min): _____ **STARTUP** **SHUTDOWN**

Total Volume (L) _____ or (dscm): _____

For CEMENT KILNS Only
No. of RAW MILL OFF Events During Sampling: _____

REQUIRED IF RETURNING TO OHIO LUMEX FOR ANALYSIS

Estimated Hg Mass in Section 1 of Sorbent Trap (ng): _____

Note: Analyzer calibration range will be set based on this value. Leaving this blank may result in out-of-calibration analysis. Please contact us if you require assistance estimating this value.

Chain Of Custody

Signatures along with Date/Time required for insertion, removal, lab receiving and lab analysis of trap.

	Signature	Date	Time	Security Seal
Trap inserted by				**If Applicable** Place Chain of Custody seal here (See Security Seal Instruction Sheet)
Trap removed and sealed by				
Courier/Other (If Applicable)				Seal intact as received Yes ☐ No ☐
Courier/Other (If Applicable)				Seal intact as received Yes ☐ No ☐
Trap received by lab		8-22-22	10:50	Seal intact as received Yes ☐ No ☐
Trap analyzed by		8/29/22	10:00	Seal intact as received Yes ☐ No ☐

Make sure all of your sampling conditions prevent moisture condensation in the trap media. Moisture condensation is a major cause of breakthrough and spike loss in sorbent traps and should be prevented at all costs. Deactivated glass and glass wool Impregnated Activated Carbon – Refer to SDS

Best Before: May 2025

1 440 264 2500 office
1 888 876 2611 toll free
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mail@ohiolumex.com
30350 Bruce Industrial Pkwy.
Cleveland, OH 44139 USA

Report Issued: 08/29/22

Project: 2029794

Trap ID

OL610641

Ohio Lumex Co., Inc.
Sorbent Trap Chain of Custody Form

☐ **Unspiked** ☒ **Spiked At:** 2,200ng

Spiking Method Cold Vapor Adsorption Via Impinger Sparging
Certified Accuracy ± 10%, Traceable to NIST

QA/QC Signature (Trap Assembly) _____

QA/QC Signature (Spike) _____

Production Lot: S-DF7 Carbon Lot: 4C

☐ High Flow ☐ Fluffy Pre-filter ☐ 240 mm
☐ Static Pre-filter ☐ AGS ☐ 300 mm
☐ 185 mm ☒ 450 mm

Spike Date: 05/02/2022 Spike Time: 1050

Type of Trap: 30B

TO BE FILLED OUT BY SAMPLING TECHNICIAN

Plant/Source: _____

Boiler ID: _____

Sampling Location: _____ *(stock, FGD inlet, etc.)*

Run Number (optional): _____

Sampling Train (circle one): **A** **B**

PRE-Run Leak Check (circle one): **PASS** **FAIL**

Run START: _____ Date _____ Time

Run END: _____ Date _____ Time

POST-Run Leak Check (circle one): **PASS** **FAIL**

Notes: _____

SAMPLING CONDITIONS AND PARAMETERS

Ave Duct Temp (F°): _____

Ave Trap Temp (F°): _____

Ave Flow Rate (cc/min): _____

Total Volume (L) _____ or (dscm): _____

Estimated Ave Hg Concentration (µg/dscm): _____

Circle Event if Occurred During Sampling:

STARTUP **SHUTDOWN**

For CEMENT KILNS Only

No. of RAW MILL OFF Events During Sampling: _____

REQUIRED IF RETURNING TO OHIO LUMEX FOR ANALYSIS

Estimated Hg Mass in Section 1 of Sorbent Trap (ng): _____

Note: Analyzer calibration range will be set based on this value. Leaving this blank may result in out-of-calibration analysis. Please contact us if you require assistance estimating this value.

Chain Of Custody

Signatures along with Date/Time required for insertion, removal, lab receiving and lab analysis of trap.

	Signature	Date	Time	Security Seal
Trap inserted by				**If Applicable** Place Chain of Custody seal here (See Security Seal Instruction Sheet)
Trap removed and sealed by				
Courier/Other (If Applicable)				Seal intact as received Yes ☐ No ☐
Courier/Other (If Applicable)				Seal intact as received Yes ☐ No ☐
Trap received by lab	[signature]	5-22-22	10:50	Seal intact as received Yes ☐ No ☐
Trap analyzed by	[signature]	8/29/22	10:14	Seal intact as received Yes ☐ No ☐

Make sure all of your sampling conditions prevent moisture condensation in the trap media. Moisture condensation is a major cause of breakthrough and spike loss in sorbent traps and should be prevented at all costs. Deactivated glass and glass wool Impregnated Activated Carbon – Refer to SDS

Best Before: May 2025

1 440 264 2500 office
1 888 876 2611 toll free
www.ohiolumex.com
mail@ohiolumex.com
30350 Bruce Industrial Pkwy.
Cleveland, OH 44139 USA

Report Issued: 08/29/22

Project: 2029794

Trap ID

OL624086

Ohio Lumex Co., Inc.
Hg Sorbent Trap Chain of Custody Form

☒ **UNSPIKED** ☐ **SPIKED AT:**

QA/QC Signature (Trap Assembly):

Production Lot: U-1115 Spike Date:

Carbon Lot: 4C Spike Time:

☐ High Flow ☐ Fluffy Pre-filter ☐ 185 mm ☐ 240 mm
☐ Static Pre-filter ☐ AGS ☐ 300 mm ☒ 450 mm

QA/QC Signature (Spike):

Type of Trap: 30B

SAMPLING INFORMATION

Facility / Source:

Boiler ID:

Sampling Location:

Run Number (Optional):

Sampling Train: ☐ A ☐ B

PRE-Run Leak Check: ☐ PASS ☐ FAIL

Run Start Date/Time: /

Run End Date/Time: /

Run Number (Optional):

POST-Run Leak Check: ☐ PASS ☐ FAIL

SAMPLING CONDITIONS AND PARAMETERS

Avg. Duct Temp (F°):

Avg. Trap Temp (F°):

Avg. Flow Rate (cc/min):

Total Volume (L): or (dscm)

Estimated Avg. Hg Concentration (µg/dscm):

Event Occurred During Sampling: ☐ Startup ☐ Shutdown

CEMENT ONLY:

# of RAW MILL OFF events during sampling:

REQUIRED IF RETURNING TO OHIO LUMEX

Estimated Hg Mass in Section 1 of Sorbent Trap (ng):

Note: Analyzer calibration range will be set based on this value. Leaving this blank may result in out-of-calibration analysis. Please contact us if you require assistance estimating this value.

CHAIN OF CUSTODY

	Signature	Date	Time	Security Seal
Sample(s) taken by				If applicable place chain of custody seal here (see security seal instruction sheet)
Sample(s) prepared for shipment by				
Courier/Other (if applicable)				Seal intact as received: Yes ☐ No ☐
Sample(s) received by lab		8-22-22	10:50	Seal intact as received: Yes ☐ No ☐
Sample(s) analyzed by		8/29/22	10:19	Seal intact as received: Yes ☐ No ☐

Ensure sampling conditions prevent moisture condensation in the sampling train. Moisture condensation is a major cause of measurement failure in sorbent traps and should be prevented.
Spiking Method Cold Vapor Adsorption Via Impinger Sparging Certified Accuracy ± 10%, Traceable to NIST

Best Before: June 2025

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Cleveland, OH 44139 USA

Project: 2029794

ORTECH Consulting Inc. Sample Log
Mercury Tube Samples
Incinerator Exhaust Stack

Job/Report Number: 22196
Received By: David Utley
Job Assigned To: Ohio Lumex
PO #: 20000-J2858

Tube ID	Spiked?	Sample Date	Sample Description	Approx. Sample Volume m^3	Sample Analysis
OL663187	No	August 17, 2022	Test 1 - Stack	0.06	Hg
OL618359	Yes	August 17, 2022	Test 1 - Stack	0.06	Hg
OL528943	Yes	August 17, 2022	Test 2 - Stack	0.06	Hg
OL663163	No	August 17, 2022	Test 2 - Stack	0.06	Hg
OL663165	No	August 17, 2022	Test 3 - Stack	0.06	Hg
OL568842	Yes	August 17, 2022	Test 3 - Stack	0.06	Hg
OL610673	Yes	August 17, 2022	Test 4 - Stack	0.06	Hg
OL663238	No	August 17, 2022	Test 4 - Stack	0.06	Hg
OL624083	No	August 17, 2022	Test 5 - Stack	0.06	Hg
OL620071	Yes	August 17, 2022	Test 5 - Stack	0.06	Hg
OL610641	Yes	August 17, 2022	Test 6 - Stack	0.06	Hg
OL624086	No	August 17, 2022	Test 6 - Stack	0.06	Hg

Relinquished To: _____ Date: _____

Relinquished By: DLA Date: Aug 18/22

ORTECH

This report has been reviewed and approved by:

Jonathan Cross
QA/QC Manager and Research Scientist

OHIO LUMEX

APPENDIX 8

Method 29 Train Field Data Sheets
Pre-PAC Injection
(5 pages)

Clean Harbors, Sarnia
Particulate and Mercury Sampling Train
Pre-PAC Injection

Test No.	Dry Gas Meter Correction Factor	Initial Dry Gas Meter Reading ft^3	Final Dry Gas Meter Reading ft^3	Actual Volume Sampled ft^3	Barometric Pressure in. mercury	Average Dry Gas Meter Pressure in. water	Average Dry Gas Meter Temperature °F	Average Dry Gas Meter Temperature °C	Corrected Gas Volume Sampled Rm^3 *	Total Gain (g)	Moisture (%)
1	1.003	40.10	46.85	6.75	29.48	0.4	82.5	28.1	0.1872	155.1	52.99
2	1.003	47.30	56.50	9.20	29.44	0.3	88.7	31.5	0.2518	184.9	49.96

* Dry at 25°C and 1 atmosphere

ORTECH Consulting Inc.

Plant	Clean Harbors
Plant Location	Corunna, Ontario
Test No.:	1 M29
Test Date	AUG 17/22
Test Location	~~Incinerator Exhaust Stack~~ INLET
Operator Signature	

Project No.:	22195
Page	1 of 2
Probe No.:	3/4
Meter Box No.:	1
Impinger Box No.:	1/2

Pitot Factor	—	
DGMCF	1.003	
Barometric Pressure	29.48	"Hg
Static Pressure		"H2O
Nozzle Size	.2304	inches
Stack Diameter	5	
Length	0	feet
Width	0	feet
Port length:	8	inches

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	151.6	g
WCBDA	3.5	g

Combustion Gas Concentration

Oxygen	%
Carbon Dioxide	%
Carbon Monoxide	ppm

Measuring Device	MII Numbers
Probe / Pitot	—
Trendicator	A04015
Control Box	
Incline Manometer	—
Comb.Gas.Analyzer	
Micromanometer	—
Barometer	Env.Can
Calipers	303906

Reading Interval	~~5~~ 5
Number of Ports	1
Number of Points/Port	~~10~~ 1

Nozzle Measurements

1	.2305
2	.2305
3	.2305
4	.2300
Average:	

Probe Liner (Glass) / Metal /Teflon / Other_____

Nozzle (Glass) / Metal / Other_____

Union (None) / Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Site Diagram

Notes:

Field Data Sheet

Date: AUG-17/22	Plant: Clean Harbors	Test No.: 1 of MM5	Page 2 of 2
	Plant Location: Corunna, Ontario	Test Location: ~~Incinerator Exhaust Stack~~ INLET	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	40.10			408	251	250	69		82	82	.5	3
	~~3~~ 5	42.16			406	252	245	57		82	82	.4	9
	~~6~~ 10	43.95			405	252	245	56		82	84	.3	13
	~~9~~ 15	45.50			408	252	245	56		82	84	.2	15
~~2~~	~~12~~ 20	46.65											
	~~15~~ 25												
	~~18~~ 30												
	~~21~~												
~~3~~	~~24~~												
	~~27~~												
	~~30~~												
	~~33~~												
~~4~~	~~36~~												
	~~39~~												
	~~42~~												
	~~45~~												
~~5~~	~~48~~												
	~~51~~												
	~~54~~												
	~~57~~												
~~6~~	~~60~~												

Traverse:					
Start Time:	940	Initial Leak Check:	.003	cfm@	15 "Hg
Finish Time:	1000	Final Leak Check:	.003	cfm@	16 "Hg

Traverse:				
Start Time:		Initial Leak Check:	cfm @	"Hg
Finish Time:		Final Leak Check:	cfm @	"Hg

Project No.: 22195

Operator: DH

ORTECH Consulting Inc.

Plant	Clean Harbors
Plant Location	Corunna, Ontario
Test No.:	2 - M29
Test Date	AUG 17/22
Test Location	Incinerator Exhaust Stack
Operator Signature	D D W

Project No.:	22196
Page	1 of 2
Probe No.:	3
Meter Box No.:	1
Impinger Box No.:	1/6

Pitot Factor	—	
DGMCF	1.003	
Barometric Pressure	29.44	"Hg
Static Pressure		"H2O
Nozzle Size	.2304	inches
Stack Diameter	5	
Length	0	feet
Width	0	feet
Port length:	8	inches

Particulate Gain

Filter	mg
Probe	mg

Moisture Gain

CWTR	180.4	g
WCBDA	4.5	g

Combustion Gas Concentration

Oxygen	%
Carbon Dioxide	%
Carbon Monoxide	ppm

Measuring Device	MII Numbers
Probe / Pitot	SEE
Trendicator	
Control Box	TEST
Incline Manometer	
Comb.Gas.Analyzer	1
Micromanometer	
Barometer	Env.Can
Calipers	

Reading Interval	~~3~~ 5	
Number of Ports	~~2~~ 1	
Number of Points/Port	10	1

Probe Liner (Glass) / Metal /Teflon / Other_____

Nozzle (Glass) / Metal / Other_____

Union (None) / Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Site Diagram

Nozzle Measurements	
1	
2	
3	
4	
Average:	

Notes:

Field Data Sheet

Date: AUG 17/22	Plant: Clean Harbors	Test No.: 2 M29	Page 2 of 2
	Plant Location: Corunna, Ontario	Test Location: ~~Incinerator Exhaust Stack~~ INLET	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	47.30			400	253	260	82		86	86	.3	2
	~~4~~ 5	49.49			416	253	241	62		86	87	.3	5
	~~8~~ 10	51.61			391	268	255	56		87	89	.3	8
	~~12~~ 15	53.52			412	265	258	53		8	91	.3	11
~~2~~	~~16~~ 20	55.10			402	266	260	51		88	93	.2	15
	~~20~~ 25	56.50			400	270	2965	50		89	95	.2	15
	~~24~~ 30												
	28												
~~3~~	32												
	36												
	40												
	44												
~~4~~	48												
	52												
	56												
	60												
~~5~~	64												
	68												
	72												
	76												
~~6~~	80												

Traverse:					
Start Time:	1421	Initial Leak Check:	.003 cfm@	16	"Hg
Finish Time:	1446	Final Leak Check:	.002 cfm@	17	"Hg

Traverse:					
Start Time:		Initial Leak Check:	cfm @		"Hg
Finish Time:		Final Leak Check:	cfm @		"Hg

Project No.: 22196

Operator :

APPENDIX 9

Acid Gas Field Data Sheets
(5 pages)

Clean Harbors, Sarnia
Acid Gas Sampling Train
Sample Volume Corrections

Incinerator Exhaust Stack

Test #	DGMCF	Initial DGM Reading (L)	Final DGM Reading (L)	Actual Vol. Sampled (L)	Barometric Pressure (in Hg)	Average DGM Pressure del H (in H_2O)	Average DGM Temperature (°C)	Corrected Volume (L)*	Corrected Volume (Rm^3)*
1	1.009	58.00	178.40	120.40	29.48	2.0	31.3	117.80	0.1178
2	1.009	79.30	200.90	121.60	29.47	2.0	32.6	118.43	0.1184
3	1.009	5.10	126.80	121.70	29.44	2.0	32.3	118.53	0.1185
4	1.009	32.40	152.40	120.00	29.43	2.0	31.2	117.27	0.1173

* dry at 25°C and 1 atmosphere

ORTECH
Method 26 Data Sheet

Plant:	CLEAN HARBORS
Plant Location:	CORUNNA ON
Test No.:	1
Test location:	STACK
Date:	AUG 17/22
Project No.:	22196

Measuring Device	MII Number
Control Module	A1154L VOTT4
Barometer	

P_{Bar}	29.48

Clock Time	Dry Gas Meter L	Probe Temp °C	Stack Temp °C	Oven Temp °C	Impinger Outlet °C	Meter Temp °C	Meter Pressure Δ H "H_2O"	Pump Vacuum "Hg Gauge
0	58.0	200	194	—	24	28	2	1
5	68.2	200	195	—	28	31	2	1
10	78.2	200	195	—	28	31	2	1
15	87.8	200	195		28	32	2	1.5
20	98.2	200	195		28	32	2	1.5
25	108.6	200	195		28	32	2	1.5
30	118.6	200	195		28	32	2	1.5
35	128.7	200	194		28	32	2	1.5
40	138.8	200	193		28	32	2	1.5
45	148.2	200	193		28	32	2	~~1.5~~ 2
50	158.0	200	192		28	31	2	2
55	168.2	200	193		28	31	2	2
60	178.4	200	193	✓	28	31	2	2

Start Time:	10:10		
Finish Time:	11:10		
Initial Leak Check:	.005	Lpm @ 15	" Hg
Final Leak Check:	.005	Lpm @ 15	" Hg

DGMCF:	
Sample Volume:	1.09
Average DGM Temp:	
Average DGM Δ H:	

Comments:

Probe Purge On: @

Off: @

sample @ ~2 lpm for 60 minutes.

Operator : DT

ORTECH
Method 26 Data Sheet

Plant:	CLEAN HARBORS
Plant Location:	CORUNA/ON
Test No.:	2
Test location:	STACK
Date:	AUG 17/22
Project No.:	22196

Measuring Device	MII Number
Control Module	A11542
Barometer	

P_{Bar}	29.47

Clock Time	Dry Gas Meter L	Probe Temp °C	Stack Temp °C	Oven Temp °C	Impinger Outlet °C	Meter Temp °C	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
0	79.3	200	194	—	18	29	2	1
5	89.4	200	194	|	18	30	2	1
10	99.5	200	194	|	18	32	2	1.5
15	109.5	200	194	|	18	32	2	1.5
20	119.3	200	194	|	18	32	2	1.5
25	129.1	200	194	|	18	33	2	1.5
30	139.0	200	194	|	18	33	2	1.5
35	148.7	200	195	|	18	34	2	2
40	158.9	200	195	|	18	34	2	2
45	168.7	200	192	|	18	33	2	2
50	179.4	200	192	|	18	34	2	2
55	189.9	200	192	|	18	34	2	2
60	200.9	200	192	↓	18	34	2	2

Start Time:	11:39	
Finish Time:	12:39	
Initial Leak Check:	.005	Lpm @ 15 " Hg
Final Leak Check:	.005	Lpm @ 15 " Hg

DGMCF:	1.009
Sample Volume:	
Average DGM Temp:	
Average DGM Δ H:	

Comments:

Probe Purge On: @

Off: @

sample @ ~2 lpm for 60 minutes.

Operator : JT

ORTECH
Method 26 Data Sheet

Plant:	CLEAN HARBORS
Plant Location:	CORRUNA
Test No.:	3
Test location:	STACK
Date:	AUG 17/22
Project No.:	22196

Measuring Device	MII Number
Control Module	A115472
Barometer	ENV CAN

P_{Bar}	29.44

Clock Time	Dry Gas Meter L	Probe Temp °C	Stack Temp °C	Oven Temp °C	Impinger Outlet °C	Meter Temp °C	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
0	5.1	200	195	—	18	31	2	1
5	15.3	200	194	|	18	33	2	1
10	25.3	200	192	|	18	33	2	1
15	35.3	200	193	|	18	33	2	1
20	45.0	200	193	|	18	33	2	1
25	54.3	200	192	|	18	33	2	1.5
30	64.2	200	191	|	18	32	2	1.5
35	74.1	200	191	|	18	32	2	1.5
40	84.9	200	192	|	18	32	2	1.5
45	95.5	200	192	|	18	32	2	1.5
50	106.0	200	192	|	18	32	2	1.5
55	116.6	200	193	|	18	32	2	1.5
60	126.8	200	193	V	18	32	2	1.5

Start Time:	14:18		
Finish Time:	15:18		
Initial Leak Check:	.005	Lpm @ 15	" Hg
Final Leak Check:		Lpm @	" Hg

DGMCF:	1.009
Sample Volume:	
Average DGM Temp:	
Average DGM Δ H:	

Comments:

Probe Purge On: @

Off: @

sample @ ~2 lpm for 60 minutes.

Operator : DT

ORTECH
Method 26 Data Sheet

Plant:	CLEAN HARBORS
Plant Location:	CORRUNA
Test No.:	4
Test location:	STACK
Date:	AUG 17/22
Project No.:	22186

Measuring Device	MII Number
Control Module	A11542
Barometer	ENV CAN

P_{Bar}	29.43

Clock Time	Dry Gas Meter L	Probe Temp °C	Stack Temp °C	Oven Temp °C	Impinger Outlet °C	Meter Temp °C	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
0	32.4	200	186	~~17~~	17	30	2	1
5	42.4	200	188		17	30	2	1
10	52.5	200	188		17	33	2	1
15	62.3	200	189		17	32	2	1
20	72.0	200	191		17	33	2	1.5
25	82.0	200	191		17	33	2	1.5
30	92.3	200	190		17	34	2	1.5
35	102.5	200	190		17	34	2	1.5
40	112.4	200	190		17	30	2	1.5
45	122.2	200	191		17	30	2	1.5
50	132.0	200	192		17	29	2	1.5
55	142.2	200	192		17	29	2	1.5
60	152.4	200	192		17	28	2	1.5

Start Time:	15:56		
Finish Time:	16:56		
Initial Leak Check:	.005	Lpm @ 15	" Hg
Final Leak Check:	.005	Lpm @ 15	" Hg

DGMCF:	1.009
Sample Volume:	
Average DGM Temp:	
Average DGM Δ H:	

Comments:

Probe Purge On: @

Off: @

sample @ ~2 lpm for 60 minutes.

Operator : DT

APPENDIX 10

Acid Gas Recovery Data Sheet
(1 page)

ORTECH Consulting Inc. Recovery & Sample Log
Method 26
Incinerator Stack

L2729208-COFC

Client: Clean Harbors, Corunna
Job/Report Number: 22196
Received By: Dan Turton
How Received: Train Recovery
Job Assigned To: ALS
PO #: 22196-J2864

Test Number	ORTECH Sample ID 22-22196-M26-	Date Sampled	Contents of Impingers	Initial Volume (ml)	Final Volume (ml)	Gain (ml)	H_2O Rinse (ml)	Total Sample Volume (ml)	Analysis
1	1	AUG 17/22	0.1N H2SO4	30.0	110	80	20	130	Halides
					~~110~~	~~8~~			
2	2	AUG 17/22	0.1N H2SO4	30.0	110	80	20	130	Halides
					~~108~~	~~78~~			
3	3	AUG 17/22	0.1N H2SO4	30.0	108	78	22	130	Halides
4	4	AUG 17/22	0.1N H2SO4	30.0	107	77	23	130	Halides
Blank	5	AUG 17/22	0.1N H2SO4	30.0	30	0	100	130	Halides

Impinger 1 empty, Imp 2+3 30ml split 0.1n H2SO4, Imp 4 & Imp 5 empty, Imp 6 Silica Gel

Relinquished by: _____ Date: Aug 18/22

Relinquished to: Amra Barra Date: 18-Aug-2022 15:45

22.0°C

APPENDIX 11

Acid Gas Analytical Report
(4 pages)

ALS Environmental
1435 Norjohn Court, Unit 1, Burlington ON, L7L 0E6
Phone: 905-331-3111, FAX: 905-331-4567

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2729208		Mississauga, ON L5J 2Y4
Date of Report	2-Sep-22		Canada
Date of Sample Receipt	18-Aug-22	**Client Contact:**	Chris Belore
		Client Project ID:	22196 Clean Harbors

COMMENTS:

Cl as HCl Anion Analyzed via Ion Chromatography USEPA Method 26/26A (SA 23, 29-Aug-22)
Br as HBr Anion Analyzed via Ion Chromatography USEPA Method 26/26A (SA 23-Aug-22)
F as HF Anion Analyzed via Ion Chromatography USEPA Method 26/26A (SA 23-Aug-22)
I as HI Anion Analyzed via Ion Chromatography USEPA Method 26/26A (SA 30 Aug-22)

ANALYST COMMENTS:

Fluoride observed in the method blank above its LOR. Sample data is well above this threshold, indicating any impact to data quality is negligible.
PE 2-Sep-22

LOR = Limit of Reporting
MB = Laboratory Control Blank (limits: <LOR)
LCS = Laboratory Control Sample (limits: 90-110%)
MS = Matrix Spike Sample (limits: 90-110%, NH_3: 85-115%)
RPD = Relative Percent Difference (limits: <20% for sample duplicate, <10% for duplicate injection)

Certified by: L. Wrona
Lynne Wrona
Project Manager

ALS Environmental

Sample Analysis Summary Report

Sample Name	22-22196-M26-1 TEST#1	22-22196-M26-2 TEST#2	22-22196-M26-3 TEST#3	22-22196-M26-4 TEST#4	22-22196-M26-5 BLANK
ALS Sample ID	L2729208-1	L2729208-2	L2729208-3	L2729208-4	L2729208-5
Matrix	Stack	Stack	Stack	Stack	Stack
Analysis type	Sample	Sample	Sample	Sample	Sample
Sampling Date/Time	17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22
Date of Receipt	18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22
Ion Chromatography Analysis USEPA Method 26/26A	**mg**	**mg**	**mg**	**mg**	**mg**
Total F^- as HF (ave)	5.39	5.13	5.37	5.18	0.0527
Analysis 1	5.40	5.14	5.39	5.20	0.0516
Analysis 2	5.38	5.11	5.35	5.16	0.0538
Total Cl^- as HCl (ave)	7.74	8.68	10.7	9.13	0.0723
Analysis 1	7.76	8.67	10.8	9.09	0.0735
Analysis 2	7.73	8.68	10.7	9.16	0.0711
Total Br^- as HBr (ave)	0.615	0.884	1.26	2.35	<0.225
Analysis 1	0.616	0.897	1.26	2.38	<0.225
Analysis 2	0.613	0.872	1.26	2.32	<0.225
Total I^- as HI (ave)	<0.0643	<0.0680	<0.0671	<0.0680	<0.0671
Analysis 1	<0.0643	<0.0680	<0.0671	<0.0680	<0.0671
Analysis 2	<0.0643	<0.0680	<0.0671	<0.0680	<0.0671

ALS Environmental

Sample QC Summary Report

Sample Name	MB	LCS	LCS
ALS Sample ID	MB	LCS	LCS
Matrix	Stack	Stack	Stack
Analysis type	Method Blank	Blank Spike	Blank Spike
Sampling Date/Time	n/a	n/a	n/a
Date of Receipt	n/a	n/a	n/a
Ion Chromatography Analysis			
USEPA Method 26/26A	**mg**	**mg**	**% Rec**
Total F^- as HF (ave)	0.00281	0.0536	96%
Analysis 1	0.00280	0.0542	
Analysis 2	0.00281	0.0530	
Total Cl^- as HCl (ave)	<0.00241	0.0746	94%
Analysis 1	<0.00241	0.0748	
Analysis 2	<0.00241	0.0744	
Total Br^- as HBr (ave)	<0.00791	0.241	93%
Analysis 1	<0.00791	0.242	
Analysis 2	<0.00791	0.240	
Total I^- as HI (ave)	<0.00236	0.0723	96%
Analysis 1	<0.00236	0.0723	
Analysis 2	<0.00236	0.0723	

ALS Environmental

Sample QC Summary Report

Sample Name	22-22196-M26-1 TEST#1	22-22196-M26-1 TEST#1	22-22196-M26-1 TEST#1	22-22196-M26-1 TEST#1
ALS Sample ID	L2729208-1	L2729208-1DUP	L2729208-1MS	L2729208-1MS
Matrix	Stack	Stack	Stack	Stack
Analysis type	Sample	Duplicate	Matrix Spike	Matrix Spike
Sampling Date/Time	17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22
Date of Receipt	18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22
Ion Chromatography Analysis				
USEPA Method 26/26A	**mg**	**mg**	**mg**	**% Rec**
Total F^- as HF (ave)	5.39	5.43	6.90	106%
Analysis 1	5.40	5.44	6.93	
Analysis 2	5.38	5.41	6.87	
Total Cl^- as HCl (ave)	7.74	7.52	11.9	98%
Analysis 1	7.76	7.53	11.9	
Analysis 2	7.73	7.51	11.9	
Total Br^- as HBr (ave)	0.615	0.599	6.09	80%
Analysis 1	0.616	0.586	6.14	
Analysis 2	0.613	0.612	6.05	
Total I^- as HI (ave)	<0.0643	<0.0643	1.84	89%
Analysis 1	<0.0643	<0.0643	1.84	
Analysis 2	<0.0643	<0.0643	1.84	

APPENDIX 12

Feed Sample Analytical Report
(2 pages)

LAMBTON SCIENTIFIC

a division of TECHNICAL CHEMICAL SERVICES Inc.

391 Vidal Street South, Sarnia, ON, N7T 2V3

Phone: (519) 344-4747 Fax: (519) 344-2350 E-Mail: info@lambtonscientific.com

Certificate of Analysis

Customer:	**Clean Harbors Ltd.**	L.S. Submission No.:	2208-271
Address:	R. R. #1 4090 Telfer Road Corunna, Ontario N0N 1G0	Invoice Number.:	37523
Attention:	**Rob Girard**	Purchase Order No.:	RG
Authorized By:	Rob Girard	Date Received:	Aug-22-2022
Phone Number:	(519) 864-1021	Time Received:	9:00
Fax Number:	(519) 864-3816	Date Re-Submitted:	---
E-Mail:	girard.rob@cleanharbors.com		
Project Number:		Requested Turn-Around:	Standard (4 - 7 Days)
		Report Due Date:	Aug-30-2022 by 16:30

Project Description:	**Hg**

Notes, Abbrevations, Acronyms and Explanations:

PDF Copy to be E-MAILED to Client (no Hardcopy)

The following work performed and recorded herein has been carried out in accordance with acceptable professional standards employing acceptable/recognized analytical methodologies and quality assurance procedures. Methodologies used by LS are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, ASTM, APHA. Method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Although every care and due diligence is taken in the performance of our services, TCS/LS and its staff shall not be held responsible for any losses or damages resulting directly or indirectly from any errors or omissions. The extent of TCS/LS's liability is limited to a refund of the analytical cost(s) for the parameter(s) in question. No other warranty is expressed or implied. Customer samples will be retained at LS for a minimum of one month from the date of receipt (provided sufficient sample size originally received).

ATG ... Analytical Test Group [MISA]
BTEXS ... Benzene, Toluene, Ethylbenzene, Xylenes (m, o, p-), Styrene
CAS# ... Chemical Abstracts Service Registry Number
CF ... Concentration Factor (numerical value: original volume / reduced volume)
COC ... Chain Of Custody (record of client analytical request) [Sample Submission Form]
COMP ... Composite (sample formed from multiple samples)
CRM ... Certified Reference Material
CVAAS ... Cold Vapour Atomic Absorption Spectroscopy
DF ... Dilution Factor (numerical value: final diluted volume / original volume)
DUP ... Duplicate (customer Field QA/QC or lab chosen entire sample process re-analysis)
EF ... Extraction Factor (numerical value: extract volume / sample quantity)
FF ... Final Factor (numerical value; product of EF and either DF or CF)
FIELD QA/QC ... Quality control samples at time of sampling [TB, TSB, DUP]
GC-FID ... Gas Chromatography - Flame Ionization Detector
GC-MSD ... Gas Chromatography - Mass Spectroscopy Detector
GRAB ... Grab (sample at a single point in time)
IC ... Ion Chromatography
ICP-AES ... Inductively Coupled Plasma - Atomic/Optical Emission Spectroscopy
INTERIM ... Interim report (non-finalized report, ie: partial, draft, incomplete, etc)
ISE ... Ion-Selective Electrode
LCS ... Laboratory Control Sample (lab QA/QC for analyte recovery [MISA = Spiked Blank]
LOQ ... Limit Of Quantification (lowest concentration result with meaningful U)
MB ... Method Blank (lab QA/QC sample for contamination of analytical process)
MDL ... Method Detection Limit (MISA)
MISA ... Municipal and Industrial Strategy for Abatement (Ont Reg)
MRL ... Method Reporting Limit (MRL >= MDL)
MS ... Matrix Spike (lab QA/QC sample for analyte interference [MISA = Spiked Sample]
P&T ... Purge and Trap
PAH ... Polynuclear Aromatic Hydrocarbon
QA/QC ... Quality Assurance and Quality Control
RC ... Remark Code (MISA: <W, <DL, <LMDL, <T, etc)
REP ... Replicate (lab chosen QA/QC sample re-analysis for difference comparison)
RI ... Re-Issued (replacement report due to amendment)
RS ... Re-Submitted (client requested submission change after original submission)
RT ... Report TAT (client requested change to turn-around time)
RPD ... Relative Percent Difference (QA/QC comparative statistic between matched results)
SRI ... Smallest Reporting Increment (MISA)
SRL ... Sample Reporting Limit (product of MRL and any quantification factors)
SURROGATE ... known added compounds that mimic analytes for QA/QC recovery
TB ... Travelling Blank (sample for collection contamination) [MISA FIELD QA/QC]
TCLP ... Toxicity Characteristic Leaching Procedure (EPA 1311)
TSB ... Travelling Spiked Blank (sample for collection analyte recovery) [MISA FIELD QA/QC]
U ... Uncertainty; measure of total variability associated with result
VOCs ... Volatile Organic Compounds
% REC ... Percent Recovery (QA/QC statistic between actual versus predicted result)

--- ... sample not analyzed, not requested or data not available
< ... result less than MRL or less than MRL multiplied by any quantification factors

The results reported relate only to the samples as received by the laboratory.
This report has been reviewed and approved by:

August 24, 2022 — **Dated**

Andy Schmidtmeyer, M.Sc.

Interim Report 1:	*Interim Report 2:*	*Final Report:*
		E-MAILED
		August 24, 2022

LAMBTON SCIENTIFIC
a division of TECHNICAL CHEMICAL SERVICES Inc.
Certificate of Analysis

Clean Harbors Ltd.
Sub. Num: 2208-271
Sub. Date: Aug-22-2022

Hg

							Mercury					
							Reference Method (or modified from) EPA 3050B/6010C					
							Qualifier: ---				Initials: MS/TO	
Lambton Scientific ID	Customer ID	Sample Date	Sample Time	Info	MRL	Units	FF	Results	Qualifier	Comments	Extraction Date	Analysis Date
2208-09933	Alkaline Composite	Aug-17-2022	---	Grab / Other	0.05	mg/kg	10	< 0.05			Aug-22-2022	Aug-24-2022
2208-09934	Rich Composite	Aug-17-2022	---	Grab / Other	0.20	mg/kg	53	0.48				
2208-09935	Lean Composite	Aug-17-2022	---	Grab / Other	0.20	mg/kg	53	0.44				
2208-09936	Emulsion Composite	Aug-17-2022	---	Grab / Other	0.20	mg/kg	44	< 0.22				
2208-09937	Leachate Composite	Aug-17-2022	---	Grab / Other	0.20	mg/kg	46	< 0.23				
2208-09938	TDU Raw Composite	Aug-17-2022	---	Grab / Other	0.50	mg/kg	99	9.2				
2208-09939	TDU Post Composite	Aug-17-2022	---	Grab / Other	0.50	mg/kg	106	< 0.53				

Report Notes/Comments:

	Mercury										
	LABORATORY QA/QC DATA										
			MB	LCS		RM	MS	REP			
				Lab Control Sample			Sample Matrix Spike	Replicate			
				Spiked Blank		Reference Material					
			Method Blank	% Recovery			% Rec	DF		% RPD	Qualifier
	MRL	Units		Actual	Limits	% Rec					
BATCH	0.005	mg/L	< 0.005	100	80-120	84	---		---		

APPENDIX 13

Equipment Calibration Data
(12 pages)

ORTECH Consulting Inc.
Pitot Tube Calibration

Date	February 8, 2022
Probe/Pitot ID	S9
MII Number	B03770
Calibrated Against	B02911
Cp standard	0.99777
Calibration Procedure	93-T62-SP-012

Calibration Facility	ORTECH Consulting Inc.
Calibrated By	Dan Turton
Signature	
Reviewed/Accepted By	

$$Cp = Cpstd * \sqrt{\frac{Pstd}{Ps}}$$

Configuration	Wind Tunnel Velocity m/s	Velocity Head Standard Pitot in. H_2O Pstd	Velocity Head S-Type Pitot in. H_2O Ps	S-Type Pitot Coefficient Cp_s	Deviation From The Mean
With Nozzle	7.32	0.130	0.180	0.848	0.0031
(0.25")	9.30	0.210	0.290	0.849	0.0042
	11.75	0.335	0.470	0.842	0.0025
	13.47	0.440	0.620	0.841	0.0043
	16.11	0.630	0.880	0.844	0.0006
			Mean	0.845	0.0029
Without Nozzle	7.32	0.130	0.185	0.836	0.0065
	9.08	0.200	0.280	0.843	0.0004
	11.66	0.330	0.460	0.845	0.0022
	13.62	0.450	0.630	0.843	0.0004
	15.59	0.590	0.820	0.846	0.0035
			Mean	0.843	0.0026

Note: Pitots must always be used in the orientation that they are calibrated in (marked F for front and B for back).

Acceptance Criteria:
The Cp of Standard Pitots must be in the range of 0.99 ±0.01.
For Stausscheibe (S-Type) Pitots refer to the measurement criteria as specified in Method 2 of the Ontario Source Testing Code. If the pitot meets these measurement requirements it is assigned a Cp of 0.84. Otherwise, calculate the absolute differences between the average pitot tube coefficient and the coefficient obtained for each of the wind tunnel settings. The average of these differences must not exceed 0.01. Otherwise, the calibration must be repeated. (Environment Canada Reference Method EPS 1/RM/8, Section 6).

ORTECH

Dry Gas Meter Calibration Using Calibrated Critical Orifice

Meter Console Information	
Meter Number	1
Meter MII Number	A04015
Orifice Set ID	COE20999
Barometer ID	COE 20028

Calibration Conditions		
Barometric Pressure	29.68	in Hg
Theoretical Critical Vacuum	14.0	in Hg
System Leak Check	NDL @ 23" Hg	
Calibration Date	July 6, 2022	
Calibration Technician	Blair McIntyre	
Reviewed and Accepted By		

Factors/Conversions		
Std Temp	528	°R
Std Press	29.92	in Hg
K_1	17.647	oR/in Hg

Calibration Data

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice DH	Volume Initial	Volume Final	Avg. DGM Temp Initial	Avg. DGM Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Q)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F			°F	°F	in Hg
10.0	0.15	77.320	80.393	75.0	78.0	UR-40	0.2352	75.2	75.2	19.0
10.0	0.30	80.393	84.756	78.0	81.0	UR-48	0.3308	75.2	75.2	18.0
10.0	0.50	84.756	90.784	81.0	85.0	UR-55	0.4520	75.2	75.2	16.0
10.0	0.90	90.784	98.646	85.0	88.0	UR-63	0.5874	75.2	75.2	11.0
10.0	1.60	29.250	39.720	74.0	78.0	UR-73	0.8107	75.2	75.2	11.0

Results

Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	DH @	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(DY)	($Q_{m(std)(corr)}$)	(DH@)	(DDH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
3.001	0.300	3.017	0.302	1.005	0.003	0.302	0.927	0.029
4.239	0.424	4.244	0.424	1.001	-0.001	0.424	0.937	0.039
5.822	0.582	5.799	0.580	0.996	-0.007	0.580	0.836	-0.061
7.552	0.755	7.536	0.754	0.998	-0.005	0.754	0.891	-0.006
10.272	1.027	10.401	1.040	1.013	0.010	1.040	0.832	-0.066
			DGMCF	1.003			0.898	DH@ Average

Individual values of DGM calibration factor (Y) must be within ± 1.5% of the average value.
If not the calibration must be repeated. Also, the DGMCF average value (Y) 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
Trendicator Calibration

Calibration Procedure	03 - J005
Trendicator Type	Omega DP116
MII	A04015
Date	July 5, 2022
Calibrated By	Blair McIntyre
Reviewed and Accepted By	

Fluke Calibrator Output (COE 20024) (°F)	Tredicator Display Value		Percent Difference
	Before Adjustment (°F)	After Adjustment (°F)	(%)
32	32		0.0
70	70		0.0
100	100		0.0
200	201		-0.5
250	252		-0.8
300	302		-0.7
400	400		0.0
500	500		0.0
600	601		-0.2
700	703		-0.4
800	802		-0.3
900	903		-0.3
1000	1003		-0.3
1100	1104		-0.4
1200	1204		-0.3
1250	1254		-0.3

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

Acceptance Criteria:
'Trendicator display must read within ± 1.5%, and ± 3 degrees F of the standard value at each output. Otherwise, the Trendicator must be repaired and/or adjusted as necessary, and recalibrated prior to use.
(Ontario Source Testing Code, June 2010, Part C: Method ON-2, 7.5 Appendix 2E)

ORTECH

Dry Gas Meter Calibration Data

Calibration Procedure	03-J004
Meter Number	Vost 3
Date	July 18, 2022
Barometric Pressure	29.23
System Leak Check	<0.01LPM @ 19.5" Hg

MII NUMBERS	
DGM	A12010
Gasometer	A01463
Barometer	COE 20028

Calibrated By	Adam Petrossi
Signature	
Reviewed and Accepted By	

ft^3= cm* 1.332 litres per cm/28.3168 litres per ft^3

$$DGMCF = \frac{Vstd\ ft^3}{Vdgm\ ft^3} \quad \frac{Tdgm\ ^\circ F+460}{Tstd\ ^\circ F+460} \quad \frac{Pbar\ (in.\ Hg)}{(Pbar\ in.\ Hg+DGMPressure/13.6)}$$

Gasometer Reading cm			Gasometer Volume	Gasometer Temperature	DGM Reading L		DGM Volume	DGM Average Temperature	DGM Pressure	DGM Outlet	DGM Calibration	Time	Flow Rate
Initial	Final	cm	ft^3	°C	Initial	Final	ft^3	°C	in. H_2O	°C	Factor	min.	lpm
55.60	40.00	15.60	0.734	23.5	68.45	89.78	0.753	31.0	1.00	31.0	0.996	15	1.4
48.50	36.40	12.10	0.569	24.0	103.11	120.36	0.609	38.0	1.00	39.0	0.976	15	1.2
49.90	36.10	13.80	0.649	24.0	137.00	156.65	0.694	43.0	1.00	43.0	0.993	15	1.3

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)

DGMCF AVERAGE

1Lpm	0.988

ORTECH
Trendicator Calibration

Calibration Procedure	**03-J005**
Trendicator Type	**Nutech**
MII	**A12010**
Date	**July 18, 2022**
Calibrated By	**Adam Petrossi**
Signature	
Reviewed and Accepted By	

Fluke Calibrator Output (COE 20024) (°C)	Tredicator Display Value		Percent Difference
	Before Adjustment (°C)	After Adjustment (°C)	(%)
0	0		0.0
20	20		0.0
50	50		0.0
100	101		-1.0
150	151		-0.7
200	200		0.0
300	300		0.0
400	399		0.3
500	499		0.2
600	599		0.2

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

Acceptance Criteria:
Trendicator display must read within ± 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

Dry Gas Meter Calibration Data

Calibration Procedure	03-J004
Meter Number	Vost 2
Date	August 11, 2022
Barometric Pressure	29.53
System Leak Check	<0.01 Lpm @ "Hg

MII NUMBERS	
DGM	A10117
Gasometer	A01463
Barometer	COE20028

Calibrated By	Blair McIntyre
Signature	
Reviewed and Accepted By	

ft^3= cm* 1.332 litres per cm/28.3168 litres per ft^3

$$DGMCF = \frac{Vstd\ ft^3}{Vdgm\ ft^3} \quad \frac{Tdgm\ ^\circ F+460}{Tstd\ ^\circ F+460} \quad \frac{Pbar\ (in.\ Hg)}{(Pbar\ in.\ Hg+DGMPressure/13.6)}$$

Gasometer Reading cm			Gasometer Volume	Gasometer Temperature	DGM Reading L		DGM Volume	DGM Average Temperature	DGM Pressure	DGM Outlet	DGM Calibration	Time	Flow Rate
Initial	Final	cm	ft^3	°C	Initial	Final	ft^3	°C	in. H_2O	°C	Factor	min.	lpm
66.80	51.80	15.00	0.706	23.0	14.360	34.440	0.709	32.0	6.0	32.0	1.010	10	2.0
51.80	36.80	15.00	0.706	23.0	34.440	54.240	0.699	33.0	6.0	33.0	1.028	10	2.0
36.80	21.70	15.10	0.710	23.0	54.240	74.100	0.701	33.0	6.0	33.0	1.032	10	2.0
35.90	28.40	7.50	0.353	23.0	117.400	127.340	0.351	32.0	2.5	32.0	1.029	10	1.0
51.20	43.50	7.70	0.362	23.0	96.800	107.150	0.366	32.0	2.5	32.0	1.015	10	1.0
43.50	35.90	7.60	0.357	23.0	107.150	117.400	0.362	32.0	2.5	32.0	1.011	10	1.0

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 I/RM/8, Section 6)

DGMCF AVERAGE	
2 Lpm	1.023
1Lpm	1.018

Revision June 5, 2007

ORTECH

Trendicator Calibration

Calibration Procedure	**03-J005**
Trendicator Type	**Nutech**
MII	**A10117**
Date	**August 11, 2022**
Calibrated By	**Blair McIntyre**
Signature	
Reviewed and Accepted By	

Fluke Calibrator Output (COE 20024) (°C)	**Tredicator Display Value**		**Percent Difference**
	Before Adjustment (°C)	**After Adjustment (°C)**	**(%)**
0	0		0.0
20	20		0.0
50	50		0.0
100	102		-2.0
150	151		-0.7
200	200		0.0
300	300		0.0
400	399		0.3
500	499		0.2
600	599		0.2

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

Acceptance Criteria:
Trendicator display must read within ± 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

Dry Gas Meter Calibration Data

Calibration Procedure	03-J004
Meter Number	Vost 4
Date	August 15, 2022
Barometric Pressure	29.56
System Leak Check	NDL @ 17.5 "Hg

MII NUMBERS	
DGM	A11542
Gasometer	A01463
Barometer	COE 20028

Calibrated By	Blair McIntyre
Signature	
Reviewed and Accepted By	

ft^3= cm* 1.332 litres per cm/28.3168 litres per ft^3

$$DGMCF = \frac{Vstd\ ft^3}{Vdgm\ ft^3} \quad \frac{Tdgm\ ^\circ F+460}{Tstd\ ^\circ F+460} \quad \frac{Pbar\ (in.\ Hg)}{(Pbar\ in.\ Hg+DGMPressure/13.6)}$$

Gasometer Reading cm			Gasometer Volume	Gasometer Temperature	DGM Reading L		DGM Volume	DGM Average Temperature	DGM Pressure	DGM Outlet	DGM Calibration	Time	Flow Rate
Initial	Final	cm	ft^3	°C	Initial	Final	ft^3	°C	in. H_2O	°C	Factor	min.	lpm
48.40	33.60	14.80	0.696	23.0	16.24	36.05	0.700	28.0	2.0	27.0	1.007	10	2.0
33.60	18.60	15.00	0.706	23.0	36.05	56.21	0.712	30.0	2.0	30.0	1.009	10	2.0
64.50	49.60	14.90	0.701	23.0	56.21	76.34	0.711	32.0	2.0	32.0	1.011	10	2.0
56.20	49.00	7.20	0.339	23.0	13.08	23.18	0.357	33.0	0.8	33.0	0.980	10	1.0
34.40	27.10	7.30	0.343	23.0	43.31	53.45	0.358	33.0	0.8	33.0	0.989	10	1.0
41.60	34.40	7.20	0.339	23.0	33.17	43.31	0.358	33.0	0.8	33.0	0.976	10	1.0

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)

DGMCF AVERAGE

2Lpm	1.009
1Lpm	0.982

Revision June 5, 2007

ORTECH

Trendicator Calibration

Calibration Procedure	**03-J005**
Trendicator Type	**Nutech**
MII	**A11542**
Date	**August 15, 2022**
Calibrated By	**Blair McIntyre**
Signature	
Reviewed and Accepted By	

Fluke Calibrator Output (COE 20024) (°C)	Tredicator Display Value		Percent Difference
	Before Adjustment (°C)	After Adjustment (°C)	(%)
0	0		0.0
20	20		0.0
50	50		0.0
100	101		-1.0
150	150		0.0
200	199		0.5
300	299		0.3
400	399		0.3
500	498		0.4
600	599		0.2

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

Acceptance Criteria:
Trendicator display must read within ± 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

Dry Gas Meter Calibration Using Calibrated Critical Orifice

Meter Console Information	
Meter Number	Team 1
Meter MII Number	COE 20094
Orifice Set ID	COE20999
Barometer ID	COE 20028

Calibration Conditions		
Barometric Pressure	29.53	in Hg
Theoretical Critical Vacuum	13.9	in Hg
System Leak Check	NDL @ 16.5"Hg	
Calibration Date	June 7, 2022	
Calibration Technician	Blair McIntyre	
Reviewed and Accepted By		

Factors/Conversions		
Std Temp	528	°R
Std Press	29.92	in Hg
K_1	17.647	oR/in Hg

Calibration Data										
Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice DH	Volume Initial	Volume Final	Avg. DGM Temp Initial	Avg. DGM Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Q)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F			°F	°F	in Hg
10.0	0.29	0.735	3.900	71.5	71.5	UR-40	0.2352	72.5	72.5	22.0
10.0	0.58	3.900	8.320	71.5	72.5	UR-48	0.3308	72.5	72.5	20.5
10.0	1.20	8.320	14.390	72.5	72.5	UR-55	0.4520	72.5	72.5	19.0
10.0	2.00	14.390	22.255	72.5	72.5	UR-63	0.5874	72.5	72.5	17.0
10.0	3.70	22.280	33.040	72.5	73.5	UR-73	0.8107	72.5	72.5	14.0

Results								
Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	DH @	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(DY)	($Q_{m(std)(corr)}$)	(DH@)	(DDH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
3.105	0.311	3.010	0.301	0.969	-0.004	0.301	1.801	-0.107
4.336	0.434	4.233	0.423	0.976	0.003	0.423	1.821	-0.087
5.958	0.596	5.784	0.578	0.971	-0.002	0.578	2.018	0.110
7.735	0.774	7.517	0.752	0.972	-0.001	0.752	1.991	0.084
10.617	1.062	10.374	1.037	0.977	0.004	1.037	1.934	0.026
			DGMCF	0.973			1.907	DH@ Average

Individual values of DGM calibration factor (Y) must be within ± 1.5% of the average value.
If not the calibration must be repeated. Also, the DGMCF average value (Y) 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

Trendicator Calibration

Calibration Procedure	03 - J005
Trendicator Type	Omega DP118
MII	COE 20094
Date	June 7, 2022
Calibrated By	Blair McIntyre
Reviewed and Accepted By	

Fluke Calibrator Output (COE 20024) (°F)	Tredicator Display Value		Percent Difference
	Before Adjustment (°F)	After Adjustment (°F)	(%)
32	32		0.0
70	69		1.4
100	99		1.0
200	201		-0.5
250	252		-0.8
300	302		-0.7
400	401		-0.3
500	500		0.0
600	601		-0.2
700	700		0.0
800	800		0.0
900	900		0.0
1000	1001		-0.1
1100	1102		-0.2
1200	1202		-0.2
1250	1251		-0.1

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

Acceptance Criteria:

'Trendicator display must read within ± 1.5%, and ± 3 degrees F of the standard value at each output. Otherwise, the Trendicator must be repaired and/or adjusted as necessary, and recalibrated prior to use.

(Ontario Source Testing Code, June 2010, Part C: Method ON-2, 7.5 Appendix 2E)

ORTECH

Manometer Calibration Data

Date	June 7, 2022	Calibrated By	Blair McIntyre
Manometer Number	Team 1	Signature	
Manometer MII Number	COE 20094	Reviewed/Accepted By	
Calibrated Against	Dual 3		
MII Number	COE 20008		
Calibration Procedure	03 - J010		

Front Leg

Manometer Scale "H_2O	Manometer Reading "H_2O		Reference Manometer Reading "H_2O	Percent Difference %
	Before Adjustment	After Adjustment		
	0.300		0.310	3.2
0-1.0	0.600		0.600	0.0
	0.900		0.910	1.1
	3.00		3.00	0.0
1.0-10.0	6.00		6.02	0.3
	9.00		9.01	0.1

$$\text{Percent Difference} = \frac{(\text{Ref. Manometer} - \text{Instrument Reading})}{\text{Ref. Manometer}} \times 100$$

Acceptance Criteria:
The manometer being calibrated must be within ± 5.0% of the Standard value at each reading. Otherwise, the manometer must be repaired and/or adjusted as necessary and recalibrated prior to use. Manometers must be capable of measuring velocity pressure to within 0.005 "H_2O on the 0 to 1 inch scale, and 0.05 "H_2O on the 1 to 10 inch scales.
(Environment Canada Reference Method 1/RM/8, Section 2)

APPENDIX 14

Pre-Test Plan Acceptance Letter
(3 pages)

Ministry of the Environment, Conservation and Parks
Technical Assessment and Standards Development Branch
40 St. Clair Avenue West
7th Floor
Toronto ON M4V 1M2
Phone: 416.327.5519
Fax: 416.327.2936

Ministère de l'Environnement, de la Protection de la nature et des Parcs
Direction des évaluations techniques et de l'élaboration des normes
40, avenue St. Clair Ouest
7e étage
Toronto, ON M4V 1M2
Tél: 416 .327.5519
Téléc: 416. 327.2936

Ontario

Via email: cbelore@oretch.ca

TSS File No.: SWR:SA: 110093:22

2022/08/02

Chris Belore
ORTECH

Dear Mr. Belore:

Subject: Pre-test plan review for source testing to be conducted at Clean Harbors

We received your pre-test plan (Project #22196), dated July 22, 2022, prepared on behalf of Clean Harbors and referring to source testing to be conducted at their facility in Corunna, Ontario.

Testing is being repeated due to elevated mercury concentrations at the Incinerator Exhaust Stack.

Sources to be tested:

- Pre PAC-Injection
- Post Pac-Injection (2 locations)

Target contaminants:

- Mercury (Hg)

Reference methods to be used:

Stack gas parameters	Ontario Source Testing Code (OSTC) Methods ON-1-ON-4
Hg	US EPA Method 29
Hg	US EPA Method 30B

Testing strategy

Clean Harbors committed to repeat the mercury testing as soon as practical after the July 2022 maintenance shutdown. During the shutdown the facility is replacing the Incinerator Exhaust Stack and performing maintenance on the powdered activated carbon (PAC) injection system and the baghouse.

Mercury testing will be conducted at the following locations:

- Pre PAC-Injection, after the Spray Dryer, and just before PAC injection point
- Post PAC-Injection after the ID fan on the breaching to the exhaust stack
- Post PAC-Injection at the sample ports located on the stack platform

US EPA Method 29 will be used at the incinerator exhaust stack. Two tests will be conducted concurrently with three of the US EPA Method 30B tests at the breaching location.

US EPA Method 30B will be used at the breaching to the incinerator exhaust stack. Six pairs of sampling tubes will be collected.

Mercury testing will also be conducted prior to the PAC injection to determine the mercury removal efficiency. A single sample port, at a non-ideal location will be tested with either a modified US EPA Method 30B or modified US EPA Method 29 sampling train.

Liquid waste (rich, lean, alkaline and emulsion) samples will be collected and composited by Clean Harbors personnel based on US EPA Method S004 (Tap) in SW-846, 3rd Edition. A sample will be collected every thirty minutes during the stack testing periods and placed in a large, chilled container for compositing. Clean Harbors personnel will also collect a sample of baghouse dust every thirty minutes during the stack testing periods. These samples will be analyzed in-house by the Clean Harbors laboratory for mercury.

***Operating conditions*:**

Recorded data will include, but not be limited to:

- waste feed stream analysis for mercury (rich, lean, emulsion, alkaline and leachate streams)
- incinerator feed rates (rich, lean, emulsion, alkaline and leachate streams)
- volumetric flowrates (TDU, secondary air and stack gases)
- PAC feed rate
- temperatures (primary zone, secondary zone, spray dryer inlet and outlet)
- pressures (spray dryer outlet, baghouse differential)
- combustion gas stack concentrations (CO, HCl, CO2, H2O, THC, O2, SO2)
- stack gas opacity

The pre-test plan is approved as the proposed reference methodologies/sampling strategies are acceptable.

As per our conversation over the phone, the testing program is anticipated to begin the week of August 15, 2022. If any changes occur please notify both the Sarnia Area Office and the Source Testing Group week of the 15th.

Just a reminder that the source testing report is required to be submitted in electronic format to the source testing group at sourcetesting@ontario.ca.

If you have any questions with regards to this assessment, I can be reached by phone at 437-995-2835 or by email at sourcetesting@ontario.ca

Sincerely,

Caitlyn Ruddy
Source Assessment Specialist
Technology Standards Section

cc: F. Wagner- Clean Harbors (frank.wagner@safety-kleen.com)
N. Does- Sarnia District Office (nicole.does@ontario.ca)
S. Mercer- EAPD (steve.mercer@ontario.ca)
J. McKerrall –TSS (jeffrey.mckerrall@ontario.ca)
B. Fullerton- TSS (bill.fullerton@ontario.ca)

File AQ-02 (Clean Harbors- Incinerator)

Doc.Mgmt # 5AF070070

APPENDIX 15

ORTECH CEM Calibration Data
(15 pages)

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22196	Date:	August 17, 2022
Company:	Clean Harbors	Operator:	J. Grollman
Location:	Sarnia	Analyzer ID	VIG 20
Test Location:	Incinerator	Test	1

THC Full Scale Setting	**100**
Zero Gas (ppm)	<0.1 ppm
Low Gas Value (ppm)	20-35 % full scale setting
Mid Gas Value (ppm)	45-55 % full scale setting
High Gas Value (ppm)	80-90 % full scale setting

Perform analyzer calibration as per manufacturers instructions.
Calculate the linearity factor "C" based on the zero and high gas values. Based on the calculated linearity, predict the analyzer response for low and mid values (D3 and D4). Calculate calibration error with the low and mid (B3 and B4) gasses.

	Cal.Gas Value (A)		Initial Analyzer Response (B)		Linearity (B2-B1)/(A2-A1)		Predicted Response (A X C)		Calibration Error % ((B)-(D)/AX100	
Zero	0	A1	0.05	B1	1.006	C				
High	89.4	A2	90.03	B2						
Mid	44.7	A4	44.5	B4			45.0	D4	-1.1	E4
Low	22.35	A3	22.42	B3			22.5	D3	-0.3	E3

Criteria +/-5%

Note: If the calibration Error (E3 and E4) are greater than 5%, repeat the procedure until values are acceptable.

Perform test. At the completion of the test or hourly; Calculate the calibration drift as a percent of full scale value.
Introduce the zero and mid level gases at the probe and record data as the system final response.

	System Initial Response (F)	System Final Response (G)	Calibration Drift (G-F)/span*100
Zero	0.05	0	0.05
Mid	44.5	44.4	0.1

Criteria 3%

Calculate systen response time by introducing zero gas to the probe, record time to reach 95% of calibration gas value.
Repeat with upscale gas. Perform three runs and calculate average of the runs.

	Zero Response Time (seconds)		Upscale Response Time (seconds)
Run 1	40		45
Run 2	40		45
Run 3	40		45
Average	**40**		**45**

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22196	Date:	August 17, 2022
Company:	Clean Harbors	Operator:	J. Grollman
Location:	Sarnia	Analyzer ID	VIG 20
Test Location:	Incinerator	Test	2

THC Full Scale Setting	**100**
Zero Gas (ppm)	<0.1 ppm
Low Gas Value (ppm)	20-35 % full scale setting
Mid Gas Value (ppm)	45-55 % full scale setting
High Gas Value (ppm)	80-90 % full scale setting

Perform analyzer calibration as per manufacturers instructions.
Calculate the linearity factor "C" based on the zero and high gas values. Based on the calculated linearity, predict the analyzer response for low and mid values (D3 and D4). Calculate calibration error with the low and mid (B3 and B4) gasses.

	Cal.Gas Value (A)		Initial Analyzer Response (B)		Linearity (B2-B1)/(A2-A1)	Predicted Response (A X C)		Calibration Error % ((B)-(D)/AX100	
Zero	0	A1	0.05	B1	1.006				
High	89.4	A2	90.03	B2	C				
Mid	44.7	A4	44.5	B4		45.0	D4	-1.1	E4
Low	22.35	A3	22.42	B3		22.5	D3	-0.3	E3

Criteria +/-5%

Note: If the calibration Error (E3 and E4) are greater than 5%, repeat the procedure until values are acceptable.

Perform test. At the completion of the test or hourly; Calculate the calibration drift as a percent of full scale value.
Introduce the zero and mid level gases at the probe and record data as the system final response.

	System Initial Response (F)	System Final Response (G)	Calibration Drift (G-F)/span*100
Zero	0	0	0
Mid	44.38	43.7	0.7

Criteria 3%

Calculate systen response time by introducing zero gas to the probe, record time to reach 95% of calibration gas value.
Repeat with upscale gas. Perform three runs and calculate average of the runs.

	Zero Response Time (seconds)		Upscale Response Time (seconds)
Run 1	40		45
Run 2	40		45
Run 3	40		45
Average	**40**		**45**

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22196	Date:	August 17, 2022
Company:	Clean Harbors	Operator:	J. Grollman
Location:	Sarnia	Analyzer ID	VIG 20
Test Location:	Incinerator	Test	3

THC Full Scale Setting	**100**
Zero Gas (ppm)	<0.1 ppm
Low Gas Value (ppm)	20-35 % full scale setting
Mid Gas Value (ppm)	45-55 % full scale setting
High Gas Value (ppm)	80-90 % full scale setting

Perform analyzer calibration as per manufacturers instructions.
Calculate the linearity factor "C" based on the zero and high gas values. Based on the calculated linearity, predict the analyzer response for low and mid values (D3 and D4). Calculate calibration error with the low and mid (B3 and B4) gasses.

	Cal.Gas Value (A)		Initial Analyzer Response (B)		Linearity (B2-B1)/(A2-A1)		Predicted Response (A X C)		Calibration Error % ((B)-(D)/AX100	
Zero	0	A1	0.05	B1	1.006					
High	89.4	A2	90.03	B2		C				
Mid	44.7	A4	44.5	B4			45.0	D4	-1.1	E4
Low	22.35	A3	22.42	B3			22.5	D3	-0.3	E3

Criteria +/-5%

Note: If the calibration Error (E3 and E4) are greater than 5%, repeat the procedure until values are acceptable.

Perform test. At the completion of the test or hourly; Calculate the calibration drift as a percent of full scale value.
Introduce the zero and mid level gases at the probe and record data as the system final response.

	System Initial Response (F)	System Final Response (G)	Calibration Drift (G-F)/span*100
Zero	0	0	0
Mid	43.7	43.6	0.1

Criteria 3%

Calculate systen response time by introducing zero gas to the probe, record time to reach 95% of calibration gas value.
Repeat with upscale gas. Perform three runs and calculate average of the runs.

	Zero Response Time (seconds)		Upscale Response Time (seconds)
Run 1	40		45
Run 2	40		45
Run 3	40		45
Average	**40**		**45**

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22196	Date:	August 17, 2022
Company:	Clean Harbors	Operator:	J. Grollman
Location:	Sarnia	Analyzer ID	VIG 20
Test Location:	Incinerator	Test	4

THC Full Scale Setting	**100**
Zero Gas (ppm)	<0.1 ppm
Low Gas Value (ppm)	20-35 % full scale setting
Mid Gas Value (ppm)	45-55 % full scale setting
High Gas Value (ppm)	80-90 % full scale setting

Perform analyzer calibration as per manufacturers instructions.
Calculate the linearity factor "C" based on the zero and high gas values. Based on the calculated linearity, predict the analyzer response for low and mid values (D3 and D4). Calculate calibration error with the low and mid (B3 and B4) gasses.

	Cal.Gas Value (A)		Initial Analyzer Response (B)		Linearity (B2-B1)/(A2-A1)		Predicted Response (A X C)		Calibration Error % ((B)-(D)/AX100	
Zero	0	A1	0.05	B1	1.006	C				
High	89.4	A2	90.03	B2						
Mid	44.7	A4	44.5	B4			45.0	D4	-1.1	E4
Low	22.35	A3	22.42	B3			22.5	D3	-0.3	E3

Criteria +/-5%

Note: If the calibration Error (E3 and E4) are greater than 5%, repeat the procedure until values are acceptable.

Perform test. At the completion of the test or hourly; Calculate the calibration drift as a percent of full scale value.
Introduce the zero and mid level gases at the probe and record data as the system final response.

	System Initial Response (F)	System Final Response (G)	Calibration Drift (G-F)/span*100
Zero	0	0	0
Mid	43.6	43.0	0.6

Criteria 3%

Calculate systen response time by introducing zero gas to the probe, record time to reach 95% of calibration gas value.
Repeat with upscale gas. Perform three runs and calculate average of the runs.

	Zero Response Time (seconds)		Upscale Response Time (seconds)
Run 1	40		45
Run 2	40		45
Run 3	40		45
Average	**40**		**45**

Clean Harbors
Mobile Source Monitoring Laboratory # 1
Daily Analyzer Calibration Evaluation
22196
August 17, 2022
Test 1 Final Calculations (Stack)

Analyzer		O2	CO2	SO2	CO	NO	NOx
MII Number/Serial Number		COE 20060	COE 20060	COE 20052	COE 20101		
Model		Siemens Ultramat 23	Siemens Ultramat 23	Ametek 922	Siemens Ultramat 23	CAI CLD 700 NOX	
Range		25	25	250	100	250	250
Actual Cylinder Value	High	23.02	23.29	225.7	91.05	225.6	225.6
	Mid.	11.51	11.65	112.85	45.53	112.8	112.8
	Zero	0.00	0.00	0	0	0	0

Analyzer Initial Calibration	Zero	0.00	0.00	0	0.0	0.0	0.0
	Mid	11.40	11.31	115	45.0	111.6	111.6
	High	22.99	23.30	225.8	91.4	225.6	226.3
System Initial Calibration	Zero	0.00	0.17	0	0.0	0.1	0.1
	Upscale	11.45	11.29	112	44.8	111.3	111.7
System Final Calibration	Zero	0.15	0.20	0.8	0.0	0.4	0.4
	Upscale	11.41	11.33	109.3	46.1	113.4	114.7

Calibration Error Results

Analyzer Calibration Error = (Measured Concentration of Cal Gas in Direct Mode - Manufacturer Certified Cal Gas Concentration)/Analyzer Range)*100

	Analyzer		O2	CO2	SO2	CO	NO	NOx
	Analyzer Span Range		25.00	25.00	250	100	250	250
Calibration Error	Zero	%	0.00	0.00	0.00	0.00	0.00	0.00
	Mid	%	0.44	1.36	0.86	0.53	0.48	0.48
	High	%	0.12	0.04	0.04	0.35	0.00	0.28
Acceptable Limits	of Span		+-2%	+-2%	+-2%	+-2%	+-2%	+-2%
Error Results			PASS	PASS	PASS	PASS	PASS	PASS

System Drift

Drift Calculation = | System Bias $_{final}$ - System Bias $_{initial}$ |

	Analyzer	O2	CO2	SO2	CO	NO	NOx
	Span	25.00	25.00	250	100	250	250
Initial System Bias	Zero	0.00	0.68	0.00	0.00	0.02	0.03
	Upscale	0.20	-0.08	-1.20	-0.2	-0.1	0.0
Final System Bias	Zero	0.60	0.80	0.80	0.0	0.2	0.2
	Upscale	0.04	0.08	-2.28	1.1	0.7	1.2

System Zero Drift	%	0.60	0.12	0.80	0.00	0.14	0.13
System Cal Drift	%	0.16	0.16	1.08	1.27	0.84	1.20
Acceptable Limits	of Span	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %
Drift Result		PASS	PASS	PASS	PASS	PASS	PASS

System Calibration Bias

System Bias Calculation = ((Measured Concentration of Cal Gas in System Calibration Mode - Measured Concentration of Cal Gas in Direct Mode)/Analyzer Range))* 100

Analyzer		O2	CO2	SO2	CO	NO	Nox
Analyzer Full Scale Span		25	25	250	100	250	250
Analyzer Initial	Zero	0.00	0.00	0.00	0.0	0.0	0.0
	Upscale	11.40	11.31	115.00	45.0	111.6	111.6
System Initial	Zero	0.00	0.17	0.00	0.0	0.1	0.1
	Upscale	11.45	11.29	112.00	44.8	111.3	111.7
Analyzer Final	Zero	0.00	0.00	0.00	0.0	0.0	0.0
	Upscale	0.00	0.00	0.00	0.0	0.0	0.0
System Final	Zero	0.1S	0.20	0.80	0.0	0.4	0.4
	Upscale	11.41	11.33	109.30	46.1	113.4	114.7

Initial System Bias	Zero	%	0.00	0.68	0.00	0.00	0.02	0.03
	Upscale	%	0.20	-0.08	-1.20	-0.22	-0.12	0.04
Final System Bias	Zero	%	0.60	0.80	0.80	0.00	0.16	0.16
	Upscale	%	0.04	0.08	-2.28	1.05	0.72	1.24
Acceptable Limits	of Span		+ - 5 %	+ - 5 %	+ - 5 %	+ - 5 %	+ - 5 %	+ - 5 %
Bias Results			PASS	PASS	PASS	PASS	PASS	PASS

Clean Harbors
Mobile Source Monitoring Laboratory # 1
Daily Analyzer Calibration Evaluation
22196
August 17, 2022
Test 2 Final Calculations (Stack)

Analyzer		O2	CO2	SO2	CO	NO	NOx
MII Number/Serial Number		COE 20060	COE 20060	COE 20052	COE 20101		
Model		Siemens Ultramat 23	Siemens Ultramat 23	Ametek 922	Siemens Ultramat 23	CAI CLD 700 NOX	
Range		25	25	250	100	250	250
Actual Cylinder Value	High	23.02	23.29	225.7	91.05	225.6	225.6
	Mid.	11.51	11.65	112.85	45.53	112.8	112.8
	Zero	0.00	0.00	0	0	0	0

Analyzer Initial Calibration	Zero	0.00	0.00	0	0.0	0.0	0.0
	Mid	11.40	11.31	115	45.0	111.6	111.6
	High	22.99	23.30	225.8	91.4	225.6	226.3
System Initial Calibration	Zero	0.15	0.20	0.8	0.0	0.4	0.4
	Upscale	11.41	11.33	109.3	46.1	113.4	114.7
System Final Calibration	Zero	0.18	0.10	0.8	0.7	0.5	0.5
	Upscale	11.39	11.40	113.4	45.0	112.2	113.8

Calibration Error Results

Analyzer Calibration Error = (Measured Concentration of Cal Gas in Direct Mode - Manufacturer Certified Cal Gas Concentration)/Analyzer Range)*100

Analyzer			O2	CO2	SO2	CO	NO	NOx
Analyzer Span Range			25.00	25.00	250	100	250	250
Calibration Error	Zero	%	0.00	0.00	0.00	0.00	0.00	0.00
	Mid	%	0.44	1.36	0.86	0.53	0.48	0.48
	High	%	0.12	0.04	0.04	0.35	0.00	0.28
Acceptable Limits	of Span		+-2%	+-2%	+-2%	+-2%	+-2%	+-2%
Error Results			PASS	PASS	PASS	PASS	PASS	PASS

System Drift

Drift Calculation = | System Bias $_{final}$ - System Bias $_{initial}$ |

	Analyzer	O2	CO2	SO2	CO	NO	NOx
	Span	25.00	25.00	250	100	250	250
Initial System Bias	Zero	0.60	0.80	0.32	0.00	0.16	0.16
	Upscale	0.04	0.08	-2.28	1.1	0.7	1.2
Final System Bias	Zero	0.72	0.40	0.80	0.7	0.2	0.2
	Upscale	-0.04	0.36	-0.64	0.0	0.2	0.9

System Zero Drift	%	0.12	0.40	0.48	0.70	0.04	0.04
System Cal Drift	%	0.08	0.28	1.64	1.05	0.48	0.36
Acceptable Limits	of Span	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %
Drift Result		PASS	PASS	PASS	PASS	PASS	PASS

System Calibration Bias

System Bias Calculation = ((Measured Concentration of Cal Gas in System Calibration Mode - Measured Concentration of Cal Gas in Direct Mode)/Analyzer Range))* 100

Analyzer		O2	CO2	SO2	CO	NO	Nox
Analyzer Full Scale Span		25	25	250	100	250	250
Analyzer Initial	Zero	0.00	0.00	0.00	0.0	0.0	0.0
	Upscale	11.40	11.31	115.00	45.0	111.6	111.6
System Initial	Zero	0.15	0.20	0.80	0.0	0.4	0.4
	Upscale	11.41	11.33	109.30	46.1	113.4	114.7
Analyzer Final	Zero	0.00	0.00	0.00	0.0	0.0	0.0
	Upscale	0.00	0.00	0.00	0.0	0.0	0.0
System Final	Zero	0.18	0.10	0.80	0.7	0.5	0.5
	Upscale	11.39	11.40	113.40	45.0	112.2	113.8

Initial System Bias	Zero	%	0.60	0.80	0.32	0.00	0.16	0.16
	Upscale	%	0.04	0.08	-2.28	1.05	0.72	1.24
Final System Bias	Zero	%	0.72	0.40	0.80	0.70	0.20	0.20
	Upscale	%	-0.04	0.36	-0.64	0.00	0.24	0.88
Acceptable Limits	of Span		+ - 5 %	+ - 5 %	+ - 5 %	+ - 5 %	+ - 5 %	+ - 5 %
Bias Results			PASS	PASS	PASS	PASS	PASS	PASS

Clean Harbors
Mobile Source Monitoring Laboratory # 1
Daily Analyzer Calibration Evaluation
22196
August 17, 2022
Test 3 Final Calculations (Stack)

Analyzer		O2	CO2	SO2	CO	NO	NOx
MII Number/Serial Number		COE 20060	COE 20060	COE 20052	COE 20101		
Model		Siemens Ultramat 23	Siemens Ultramat 23	Ametek 922	Siemens Ultramat 23	CAI CLD 700 NOX	
Range		25	25	250	100	250	250
Actual Cylinder Value	High	23.02	23.29	225.7	91.05	225.6	225.6
	Mid.	11.51	11.65	112.85	45.53	112.8	112.8
	Zero	0.00	0.00	0	0	0	0

Analyzer Initial Calibration	Zero	0.00	0.00	0	0.0	0.0	0.0
	Mid	11.40	11.31	115	45.0	111.6	111.6
	High	22.99	23.30	225.8	91.4	225.6	226.3
System Initial Calibration	Zero	0.18	0.10	0.8	0.7	0.5	0.5
	Upscale	11.39	11.40	113.4	45.0	112.2	113.8
System Final Calibration	Zero	0.09	0.03	0.4	0.3	0.4	0.4
	Upscale	11.41	11.35	113.4	47.0	110.3	111.9

Calibration Error Results

Analyzer Calibration Error = (Measured Concentration of Cal Gas in Direct Mode - Manufacturer Certified Cal Gas Concentration)/Analyzer Range)*100

Analyzer			O2	CO2	SO2	CO	NO	NOx
Analyzer Span Range			25.00	25.00	250	100	250	250
Calibration Error	Zero	%	0.00	0.00	0.00	0.00	0.00	0.00
	Mid	%	0.44	1.36	0.86	0.53	0.48	0.48
	High	%	0.12	0.04	0.04	0.35	0.00	0.28
Acceptable Limits	of Span		+-2%	+-2%	+-2%	+-2%	+-2%	+-2%
Error Results			PASS	PASS	PASS	PASS	PASS	PASS

System Drift

Drift Calculation = | System Bias $_{final}$ - System Bias $_{Initial}$ |

	Analyzer	O2	CO2	SO2	CO	NO	NOx
	Span	25.00	25.00	250	100	250	250
Initial System Bias	Zero	0.72	0.40	0.32	0.70	0.20	0.20
	Upscale	-0.04	0.36	-0.64	0.0	0.2	0.9
Final System Bias	Zero	0.36	0.12	0.40	0.3	0.2	0.2
	Upscale	0.04	0.16	-0.64	2.0	-0.5	0.1

System Zero Drift	%	0.36	0.28	0.08	0.40	0.04	0.04
System Cal Drift	%	0.08	0.20	0.00	2.00	0.78	0.76
Acceptable Limits	of Span	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %
Drift Result		PASS	PASS	PASS	PASS	PASS	PASS

System Calibration Bias

System Bias Calculation = ((Measured Concentration of Cal Gas in System Calibration Mode - Measured Concentration of Cal Gas in Direct Mode)/Analyzer Range))* 100

Analyzer		O2	CO2	SO2	CO	NO	Nox
Analyzer Full Scale Span		25	25	250	100	250	250
Analyzer Initial	Zero	0.00	0.00	0.00	0.0	0.0	0.0
	Upscale	11.40	11.31	115.00	45.0	111.6	111.6
System Initial	Zero	0.18	0.10	0.80	0.7	0.5	0.5
	Upscale	11.39	11.40	113.40	45.0	112.2	113.8
Analyzer Final	Zero	0.00	0.00	0.00	0.0	0.0	0.0
	Upscale	0.00	0.00	0.00	0.0	0.0	0.0
System Final	Zero	0.09	0.03	0.40	0.3	0.4	0.4
	Upscale	11.41	11.35	113.40	47.0	110.3	111.9

Initial System Bias	Zero	%	0.72	0.40	0.32	0.70	0.20	0.20
	Upscale	%	-0.04	0.36	-0.64	0.00	0.24	0.88
Final System Bias	Zero	%	0.36	0.12	0.40	0.30	0.16	0.16
	Upscale	%	0.04	0.16	-0.64	2.00	-0.54	0.12
Acceptable Limits	of Span		+ - 5 %	+ - 5 %	+ - 5 %	+ - 5 %	+ - 5 %	+ - 5 %
Bias Results			PASS	PASS	PASS	PASS	PASS	PASS

Clean Harbors
Mobile Source Monitoring Laboratory # 1
Daily Analyzer Calibration Evaluation
22196
August 17, 2022
Test 4 Final Calculations (Stack)

Analyzer		O2	CO2	SO2	CO	NO	NOx
MII Number/Serial Number		COE 20060	COE 20060	COE 20052	COE 20101		
Model		Siemens Ultramat 23	Siemens Ultramat 23	Ametek 922	Siemens Ultramat 23	CAI CLD 700 NOX	
Range		25	25	250	100	250	250
Actual Cylinder Value	High	23.02	23.29	225.7	91.05	225.6	225.6
	Mid.	11.51	11.65	112.85	45.53	112.8	112.8
	Zero	0.00	0.00	0	0	0	0

Analyzer Initial Calibration	Zero	0.00	0.00	0	0.0	0.0	0.0
	Mid	11.40	11.31	115	45.0	111.6	111.6
	High	22.99	23.30	225.8	91.4	225.6	226.3
System Initial Calibration	Zero	0.09	0.03	0.4	0.3	0.4	0.4
	Upscale	11.41	11.35	113.4	47.0	110.3	111.9
System Final Calibration	Zero	0.13	0.07	0.2	0.2	0.7	0.8
	Upscale	11.64	11.29	115.13	47.0	110.5	112.1

Calibration Error Results

Analyzer Calibration Error = (Measured Concentration of Cal Gas in Direct Mode - Manufacturer Certified Cal Gas Concentration)/Analyzer Range)*100

Analyzer			O2	CO2	SO2	CO	NO	NOx
Analyzer Span Range			25.00	25.00	250	100	250	250
Calibration Error	Zero	%	0.00	0.00	0.00	0.00	0.00	0.00
	Mid	%	0.44	1.36	0.86	0.53	0.48	0.48
	High	%	0.12	0.04	0.04	0.35	0.00	0.28
Acceptable Limits	of Span		+-2%	+-2%	+-2%	+-2%	+-2%	+-2%
Error Results			PASS	PASS	PASS	PASS	PASS	PASS

System Drift

Drift Calculation = | System Bias $_{final}$ - System Bias $_{initial}$ |

	Analyzer	O2	CO2	SO2	CO	NO	NOx
	Span	25.00	25.00	250	100	250	250
Initial System Bias	Zero	0.36	0.12	0.16	0.30	0.16	0.16
	Upscale	0.04	0.16	-0.64	2.0	-0.5	0.1
Final System Bias	Zero	0.52	0.28	0.20	0.2	0.3	0.3
	Upscale	0.96	-0.08	0.05	2.0	-0.4	0.2

System Zero Drift	%	0.16	0.16	0.04	0.10	0.12	0.14
System Cal Drift	%	0.92	0.24	0.69	0.00	0.10	0.06
Acceptable Limits	of Span	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %
Drift Result		PASS	PASS	PASS	PASS	PASS	PASS

System Calibration Bias

System Bias Calculation = ((Measured Concentration of Cal Gas in System Calibration Mode - Measured Concentration of Cal Gas in Direct Mode)/Analyzer Range))* 100

Analyzer		O2	CO2	SO2	CO	NO	Nox
Analyzer Full Scale Span		25	25	250	100	250	250
Analyzer Initial	Zero	0.00	0.00	0.00	0.0	0.0	0.0
	Upscale	11.40	11.31	115.00	45.0	111.6	111.6
System Initial	Zero	0.09	0.03	0.40	0.3	0.4	0.4
	Upscale	11.41	11.35	113.40	47.0	110.3	111.9
Analyzer Final	Zero	0.00	0.00	0.00	0.0	0.0	0.0
	Upscale	0.00	0.00	0.00	0.0	0.0	0.0
System Final	Zero	0.13	0.07	0.20	0.2	0.7	0.8
	Upscale	11.64	11.29	115.13	47.0	110.5	112.1

Initial System Bias	Zero	%	0.36	0.12	0.16	0.30	0.16	0.16
	Upscale	%	0.04	0.16	-0.64	2.00	-0.54	0.12
Final System Bias	Zero	%	0.52	0.28	0.20	0.20	0.28	0.30
	Upscale	%	0.96	-0.08	0.05	2.00	-0.44	0.18
Acceptable Limits	of Span		+ - 5 %	+ - 5 %	+ - 5 %	+ - 5 %	+ - 5 %	+ - 5 %
Bias Results			PAS5	PASS	PASS	PASS	PASS	PASS

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Oxygen
Location	Sarnia, ON	**Analyzer ID.**	Siemens Ultramat 23
Project No.	22196	**Analyzer Span Setting**	25

Span Gas Concentration	11.65

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	45	55
2	45	55
3	45	55

System Response Time* 55 Seconds

Average Time 50 Seconds

* Reported as Greatest Value of all Response Time Checks

Criteria: < 200 seconds for a 95% response to a step change in concentration of gas at the probe exit

REPRODUCIBILITY CHECKS

Run	Analyzer Value
1	11.29
2	11.33
3	11.4
4	11.35
5	11.29
Mean	11.33
Standard Deviation (SD)	0.05
% RSD Criteria <3%	**0.41**

% RSD = SD/Mean X 100

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Carbon Dioxide
Location	Sarnia, ON	**Analyzer ID.**	Siemens Ultramat 23
Project No.	22196	**Analyzer Span Setting**	25

Span Gas Concentration	11.65

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	50	55
2	50	55
3	50	55

System Response Time* 55 Seconds
Average Time 53 Seconds

* Reported as Greatest Value of all Response Time Checks
Criteria: < 200 seconds for a 95% response to a step change in concentration of gas at the probe exit

REPRODUCIBILITY CHECKS

Run	Analyzer Value
1	11.29
2	11.33
3	11.4
4	11.35
5	11.29
Mean	11.33
Standard Deviation (SD)	0.05
% RSD Criteria <3%	**0.41**

% RSD = SD/Mean X 100

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Sulphur Dioxide
Location	Sarnia, ON	**Analyzer ID.**	Ametek 922
Project No.	22196	**Analyzer Span Setting**	250

Span Gas Concentration	112.85

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	80	80
2	80	80
3	80	80

System Response Time* 80 Seconds
Average Time 80 Seconds

* Reported as Greatest Value of all Response Time Checks
Criteria: < 200 seconds for a 95% response to a step change in concentration of gas at the probe exit

REPRODUCIBILITY CHECKS

Run	Analyzer Value
1	112
2	109.3
3	113.4
4	113.4
5	115.13
Mean	113
Standard Deviation (SD)	2.17
% RSD Criteria <3%	**1.93**

% RSD = SD/Mean X 100

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Carbon Monoxide
Location	Sarnia, ON	**Analyzer ID.**	Siemens Ultramat 23
Project No.	22196	**Analyzer Span Setting**	100

Span Gas Concentration	45.53

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	40	45
2	40	45
3	40	45

System Response Time* 45 Seconds
Average Time 43 Seconds

* Reported as Greatest Value of all Response Time Checks
Criteria: < 200 seconds for a 95% response to a step change in concentration of gas at the probe exit

REPRODUCIBILITY CHECKS

Run	Analyzer Value
1	44.78
2	46.05
3	45
4	47
5	47
Mean	46
Standard Deviation (SD)	1.06
% RSD Criteria <3%	**2.30**

% RSD = SD/Mean X 100

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Nitric Oxide
Location	Sarnia, ON	**Analyzer ID.**	CAI CLD 700 NOX
Project No.	22196	**Analyzer Span Setting**	226

Span Gas Concentration	112.8

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	60	60
2	60	60
3	60	60

System Response Time* 60 Seconds
Average Time 60 Seconds

* Reported as Greatest Value of all Response Time Checks
Criteria: < 200 seconds for a 95% response to a step change in concentration of gas at the probe exit

REPRODUCIBILITY CHECKS

Run	Analyzer Value
1	111.3
2	113.4
3	112.2
4	110.25
5	110.5
Mean	112
Standard Deviation (SD)	1.29
% RSD Criteria <3%	**1.16**

% RSD = SD/Mean X 100

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Nitrogen Oxides
Location	Sarnia, ON	**Analyzer ID.**	CAI CLD 700 NOX
Project No.	22196	**Analyzer Span Setting**	250

Span Gas Concentration	112.8

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	60	60
2	60	60
3	60	60

System Response Time* 60 Seconds
Average Time 60 Seconds

* Reported as Greatest Value of all Response Time Checks
Criteria: < 200 seconds for a 95% response to a step change in concentration of gas at the probe exit

REPRODUCIBILITY CHECKS

Run	Analyzer Value
1	111.7
2	114.7
3	113.8
4	111.19
5	112.06
Mean	113
Standard Deviation (SD)	1.49
% RSD Criteria <3%	**1.32**

% RSD = SD/Mean X 100

METHOD 7E - Determination of Nitrogen Oxides Emissions From Stationary Sources

(Instrumental Analyzer Procedure)

NO_2 to NO Conversion Efficiency Test Procedure

Client:	Clean Harbors	22196	
Date:	August 17, 2022	Location:	Sarnia

Certified Concentration of NO_2 Calibration Gas	**48.48**

Analyzer Reading in Direct Mode	**44.76**

Equation 7E-7 (EPA Method 7E Section 12.7)

$$Eff_{NO2} = \frac{\text{Measured Concentration in Direct Mode}}{\text{Manufacturer Certified Concentration of Cal. Gas}} \times 100$$

$$Eff_{NO2} = \frac{44.76}{48.48} \times 100 = \mathbf{92.3\ \%}$$

Method 7E criteria is >/= 90%

Efficiency Test Result	**Pass**

APPENDIX 16

Particulate and Mercury Test Emission Calculations
Incinerator Exhaust
(8 pages)

ORTECH Environmental

Plant:	Clean Harbors
Plant Location:	Corunna, ON
Test Location:	Incinerator Exhaust Stack
Test No.:	1 - Mercury
Date:	August 17, 2022

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.845	
DGM CORRECTION FACTOR	0.973	
NOZZLE DIAMETER	6.36	mm
DRY REF GAS VOLUME SAMPLED	3.385	m^3
AVGERGE ISOKINETICITY	102.4	%
STACK DIAMETER	1.47	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.70	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	193.1	°C
AVERAGE GAS MOISTURE BY VOLUME	48.6	%
AVERAGE GAS VELOCITY	29.73	m/s
BAROMETRIC PRESSURE (Station)	99.797	Kpa
STATIC PRESSURE	-0.030	Kpa
ABSOLUTE GAS PRESSURE	99.767	Kpa
OXYGEN CONCENTRATION	9.28	%
CARBON DIOXIDE CONCENTRATION	7.72	%
CARBON MONOXIDE CONCENTRATION	68.2	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	50.68	m^3/s
DRY REF GAS FLOWRATE	16.41	Rm^3/s
DRY ADJ GAS FLOWRATE	19.26	Rm^3/s
WET REF GAS FLOWRATE	31.91	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	14	mg
	-FILTER	1.5	mg
	-TOTAL	15.5	mg
DRY REF GAS VOLUME SAMPLED		3.385	m^3
PARTICULATE CONC. - ACTUAL		1.482	mg/m^3
PARTICULATE CONC. - DRY REF		4.579	mg/m^3
PARTICULATE CONC. - DRY ADJ		3.901	mg/m^3
PARTICULATE CONC. - WET REF		2.355	mg/m^3
PARTICULATE EMISSION RATE		0.075123	g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Environmental

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	1 - Mercury	**Test Location:**	Incinerator Exhaust Stack
Date:	August 17, 2022	**Operator:**	AP

Pitot Factor	0.845	**Filter (mg)**	1.5		
DGMCF	0.973	**Probe (mg)**	14		
Barometric Pressure	29.47 "Hg	**CWTR (g)**	2327.7		
Static Pressure	-0.120 "H_2O	**WCBDA (g)**	22.7		
Nozzle	0.2505 inches				
Stack Diameter	4.833 ft	**Leak Check Volume**		0.4 ft^3	
Length	0.000 ft	**Reading Interval**		3 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		10	

Combustion Gases	
O2%	9.28
CO2%	7.72
COppm	68.2

Measured H2O
48.6 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
1	0	58.32	1.6	376	69	77	73	1.7	4.0		30.21	
	3	60.64	1.2	377	52	73	75	1.7	4.0		26.18	**112.9**
	6	62.89	1.5	377	50	72	74	1.6	4.0		29.27	**126.7**
2	9	64.87	1.5	378	51	72	76	1.6	4.0		29.29	**99.9**
	12	66.90	1.5	378	50	73	74	1.5	4.0		29.29	**102.3**
	15	68.95	1.5	379	50	72	74	1.5	4.0		29.30	**103.4**
3	18	70.99	1.4	380	50	73	75	1.5	4.0		28.33	**103.0**
	21	73.02	1.6	380	47	73	76	1.7	4.0		30.28	**106.0**
	24	75.04	1.5	380	44	73	75	1.6	4.0		29.32	**98.6**
4	27	77.10	1.6	380	43	73	75	1.7	4.0		30.28	**103.9**
	30	79.15	1.6	379	43	72	75	1.7	4.0		30.26	**100.2**
	33	81.25	1.5	381	43	73	77	1.5	4.0		29.34	**102.6**
5	36	83.60	1.5	381	43	73	76	1.5	4.0		29.34	**118.4**
	39	85.65	1.5	382	44	73	77	1.3	4.0		29.36	**103.4**
	42	87.64	1.5	381	45	73	76	1.3	4.0		29.34	**100.2**
6	45	89.44	1.5	382	45	73	78	1.5	4.0		29.36	**90.7**
	48	91.49	1.5	382	44	73	75	1.5	4.0		29.36	**103.2**
	51	93.56	1.5	382	43	73	75	1.4	4.0		29.36	**104.5**
7	54	95.57	1.7	382	42	73	75	1.5	4.0		31.25	**101.5**
	57	97.62	1.5	382	41	73	75	1.6	4.0		29.36	**97.2**

ORTECH Environmental

Plant: Clean Harbors
Test No.: 1 - Mercury
Date: August 17, 2022

Plant Location: Corunna, ON
Test Location: Incinerator Exhaust Stack
Operator: AP

Pitot Factor	0.845	**Filter (mg)**	1.5		
DGMCF	0.973	**Probe (mg)**	14		
Barometric Pressure	29.47 "Hg	**CWTR (g)**	2327.7		
Static Pressure	-0.120 "H_2O	**WCBDA (g)**	22.7		
Nozzle	0.2505 inches				
Stack Diameter	4.833 ft	**Leak Check Volume**		0.4 ft^3	
Length	0.000 ft	**Reading Interval**		3 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		10	

Combustion Gases	
O2%	9.28
CO2%	7.72
COppm	68.2

Measured H2O
48.6 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	60	99.69	1.5	381	41	73	76	1.4	4.0		29.34	**104.5**
8	63	101.69	1.5	381	41	73	76	1.4	4.0		29.34	**100.8**
	66	103.69	1.5	379	42	74	76	1.5	4.0		29.30	**100.8**
	69	105.70	1.6	379	42	74	76	1.5	4.0		30.26	**101.1**
9	72	107.73	1.5	379	41	74	76	1.5	4.0		29.30	**98.9**
	75	109.69	1.5	380	41	74	76	1.5	4.0		29.32	**98.6**
	78	111.82	1.5	380	43	74	76	1.3	4.0		29.32	**107.2**
10	81	113.79	1.5	380	44	74	76	1.4	4.0		29.32	**99.1**
	84	115.76	1.5	381	44	74	76	1.5	4.0		29.34	**99.1**
	87	117.79	1.5	381	44	74	76	1.4	4.0		29.34	**102.2**
	90	119.87								0.4		**104.7**
1	0	120.27	1.4	381	61	75	77	1.6	5.0		28.34	
	3	122.49	1.4	381	47	75	77	1.5	5.0		28.34	**115.6**
	6	124.53	1.5	382	45	75	77	1.3	4.0		29.36	**106.2**
2	9	126.47	1.6	382	45	75	77	1.5	4.0		30.32	**97.5**
	12	128.45	1.4	380	43	75	76	1.6	4.0		28.33	**96.4**
	15	130.55	1.5	381	42	76	77	1.4	4.0		29.34	**109.3**
3	18	132.55	1.5	381	41	75	77	1.4	4.0		29.34	**100.4**
	21	134.55	1.6	379	42	75	77	1.5	4.0		30.26	**100.5**
	24	136.58	1.5	381	43	75	78	1.6	4.0		29.34	**98.7**
4	27	138.68	1.4	379	43	75	78	1.4	4.0		28.31	**105.5**
	30	140.70	1.5	379	44	74	77	1.4	4.0		29.30	**104.9**
	33	142.71	1.5	379	44	75	78	1.4	4.0		29.30	**101.0**
5	36	144.69	1.5	379	43	76	79	1.4	4.0		29.30	**99.3**
	39	146.68	1.6	379	43	75	79	1.45	4.0		30.26	**99.6**
	42	148.71	1.4	379	44	76	80	1.5	4.0		28.31	**98.5**
6	45	150.78	1.5	379	45	76	79	1.4	4.0		29.30	**107.2**
	48	152.80	1.8	379	46	76	80	1.4	4.0		32.10	**101.1**
	51	154.80	1.7	379	46	76	80	1.7	4.0		31.20	**91.3**
7	54	157.00	1.7	378	47	76	80	1.6	4.0		31.18	**103.4**

ORTECH Environmental

Plant: Clean Harbors
Test No.: 1 - Mercury
Date: August 17, 2022

Plant Location: Corunna, ON
Test Location: Incinerator Exhaust Stack
Operator: AP

Pitot Factor	0.845	**Filter (mg)**	1.5		
DGMCF	0.973	**Probe (mg)**	14		
Barometric Pressure	29.47 "Hg	**CWTR (g)**	2327.7		
Static Pressure	-0.120 "H_2O	**WCBDA (g)**	22.7		
Nozzle	0.2505 inches				
Stack Diameter	4.833 ft	**Leak Check Volume**		0.4 ft^3	
Length	0.000 ft	**Reading Interval**		3 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		10	

Combustion Gases	
O2%	9.28
CO2%	7.72
COppm	68.2

Measured H2O
48.6 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	57	159.18	1.7	379	48	77	80	1.6	4.0		31.20	**102.4**
	60	161.35	1.7	379	51	77	81	1.6	4.0		31.20	**101.9**
8	63	163.53	1.7	377	49	77	81	1.6	4.0		31.16	**102.3**
	66	165.73	1.7	379	46	77	80	1.6	4.0		31.20	**103.1**
	69	167.80	1.7	378	44	77	81	1.6	4.0		31.18	**97.2**
9	72	169.97	1.7	378	44	78	81	1.6	4.0		31.18	**101.8**
	75	172.01	1.7	379	43	77	81	1.7	4.0		31.20	**95.6**
	78	174.19	1.6	379	45	77	80	1.6	4.0		30.26	**102.3**
10	81	176.33	1.7	377	45	78	80	1.5	4.0		31.16	**103.6**
	84	178.43	1.6	378	47	78	80	1.6	4.0		30.25	**98.4**
	87	180.55	1.6	377	43	78	81	1.6	4.0		30.23	**102.5**
	90	182.67										**102.3**

ORTECH Environmental

Plant:	Clean Harbors
Plant Location:	Corunna, ON
Test Location:	Incinerator Exhaust Stack
Test No.:	2 - Mercury
Date:	August 17, 2022

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT		0.845
DGM CORRECTION FACTOR		0.973
NOZZLE DIAMETER		6.36 mm
DRY REF GAS VOLUME SAMPLED		3.349 m^3
AVGERGE ISOKINETICITY		101.7 %
STACK DIAMETER		1.47 m
LENGTH		0.00 m
WIDTH		0.00 m
AREA OF STACK or DUCT		1.70 m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE		193.3 °C
AVERAGE GAS MOISTURE BY VOLUME		48.7 %
AVERAGE GAS VELOCITY		29.72 m/s
BAROMETRIC PRESSURE (Station)		99.695 Kpa
STATIC PRESSURE		-0.030 Kpa
ABSOLUTE GAS PRESSURE		99.665 Kpa
OXYGEN CONCENTRATION		9.3 %
CARBON DIOXIDE CONCENTRATION		7.63 %
CARBON MONOXIDE CONCENTRATION		61.2 ppm

FLOWRATE

ACTUAL GAS FLOWRATE		50.65 m^3/s
DRY REF GAS FLOWRATE		16.34 Rm^3/s
DRY ADJ GAS FLOWRATE		19.15 Rm^3/s
WET REF GAS FLOWRATE		31.86 Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	10.3 mg
	-FILTER	5.1 mg
	-TOTAL	15.4 mg
DRY REF GAS VOLUME SAMPLED		3.349 m^3
PARTICULATE CONC. - ACTUAL		1.484 mg/m^3
PARTICULATE CONC. - DRY REF		4.599 mg/m^3
PARTICULATE CONC. - DRY ADJ		3.925 mg/m^3
PARTICULATE CONC. - WET REF		2.360 mg/m^3
PARTICULATE EMISSION RATE		0.075158 g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Environmental

Plant: Clean Harbors
Test No.: 2 - Mercury
Date: August 17, 2022

Plant Location: Corunna, ON
Test Location: Incinerator Exhaust Stack
Operator: AP

Pitot Factor	0.845	**Filter (mg)**	5.1		
DGMCF	0.973	**Probe (mg)**	10.3		
Barometric Pressure	29.44 "Hg	**CWTR (g)**	2310.1		
Static Pressure	-0.120 "H_2O	**WCBDA (g)**	25.2		
Nozzle	0.2505 inches				
Stack Diameter	4.833 ft	**Leak Check Volume**		0.54 ft^3	
Length	0.000 ft	**Reading Interval**		3 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		10	

Combustion Gases	
O2%	9.3
CO2%	7.63
COppm	61.2

Measured H2O
48.7 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures				ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
				Stack °F	Imp. Out °F	DGM Out °F	DGM In °F					
1	0	183.20	1.3	380	62	76	78	1.4	3.0		27.32	
	3	185.30	1.4	385	54	76	77	1.3	3.0		28.44	**113.2**
	6	187.18	1.5	384	50	75	76	1.4	3.0		29.42	**98.0**
2	9	189.18	1.5	383	49	75	76	1.4	3.0		29.40	**100.9**
	12	191.18	1.5	384	47	75	76	1.4	3.0		29.42	**100.9**
	15	193.17	1.5	383	46	75	76	1.4	3.0		29.40	**100.4**
3	18	195.14	1.5	383	44	75	76	1.45	3.0		29.40	**99.4**
	21	197.15	1.5	383	41	75	76	1.4	3.0		29.40	**101.4**
	24	199.13	1.5	383	39	75	77	1.45	3.0		29.40	**99.9**
4	27	201.15	1.5	382	37	75	76	1.45	3.0		29.38	**101.8**
	30	203.16	1.5	383	37	75	77	1.4	3.0		29.40	**101.3**
	33	205.18	1.7	382	38	75	77	1.4	3.0		31.28	**101.8**
5	36	207.25	1.5	383	40	75	77	1.5	3.0		29.40	**97.9**
	39	209.19	1.5	382	41	75	77	1.6	3.0		29.38	**97.8**
	42	211.30	1.5	380	39	75	77	1.45	3.0		29.35	**106.3**
6	45	213.35	1.5	383	38	75	78	1.45	3.0		29.40	**103.1**
	48	215.39	1.4	383	37	75	77	1.4	3.0		28.40	**102.7**
	51	217.41	1.85	383	38	76	78	1.7	3.0		32.65	**105.4**
7	54	219.55	1.75	384	39	76	79	1.5	3.0		31.78	**97.0**
	57	221.60	2	383	39	75	78	1.8	3.0		33.95	**95.4**

ORTECH Environmental

Plant: Clean Harbors
Test No.: 2 - Mercury
Date: August 17, 2022

Plant Location: Corunna, ON
Test Location: Incinerator Exhaust Stack
Operator: AP

Pitot Factor	0.845	**Filter (mg)**	5.1		
DGMCF	0.973	**Probe (mg)**	10.3		
Barometric Pressure	29.44 "Hg	**CWTR (g)**	2310.1		
Static Pressure	-0.120 "H_2O	**WCBDA (g)**	25.2		
Nozzle	0.2505 inches				
Stack Diameter	4.833 ft	**Leak Check Volume**		0.54 ft^3	
Length	0.000 ft	**Reading Interval**		3 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		10	

Combustion Gases	
O2%	9.3
CO2%	7.63
COppm	61.2

Measured H2O
48.7 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	60	223.81	1.75	384	38	75	78	1.85	4.0		31.78	**96.4**
8	63	226.06	1.7	384	38	75	78	1.75	4.0		31.32	**105.0**
	66	228.30	1.75	384	39	75	78	1.6	4.0		31.78	**106.1**
	69	230.48	1.85	382	38	76	78	1.65	4.0		32.63	**101.7**
9	72	232.66	1.75	386	37	76	78	1.7	4.0		31.81	**98.7**
	75	234.84	1.8	384	37	76	78	1.7	4.0		32.23	**101.8**
	78	237.05	1.75	381	38	76	78	1.7	4.0		31.72	**101.6**
10	81	239.23	1.75	381	40	76	78	1.7	4.0		31.72	**101.5**
	84	241.42	1.7	379	41	76	78	1.7	4.0		31.23	**101.9**
	87	243.58	1.7	382	41	76	78	1.65	4.0		31.28	**101.9**
	90	245.80								0.54		**104.9**
1	0	246.34	1.65	365	66	76	78	1.4	3.5		30.50	
	3	248.44	1.65	367	49	76	76	1.45	3.5		30.54	**99.6**
	6	250.46	1.65	367	46	76	76	1.55	4.0		30.54	**96.1**
2	9	252.54	1.45	367	46	76	76	1.55	4.0		28.63	**99.0**
	12	254.63	1.5	369	46	76	76	1.4	4.0		29.16	**106.1**
	15	256.63	1.4	371	47	76	76	1.45	4.0		28.20	**99.9**
3	18	258.67	1.45	371	48	76	76	1.4	4.0		28.70	**105.6**
	21	260.66	1.45	375	47	75	76	1.4	4.0		28.77	**101.3**
	24	262.64	1.45	375	47	75	77	1.4	4.0		28.77	**101.1**
4	27	264.61	1.45	377	50	75	77	1.45	4.0		28.80	**100.5**
	30	266.63	1.45	378	51	75	77	1.4	4.0		28.82	**103.2**
	33	268.62	1.5	379	48	75	77	1.4	4.0		29.33	**101.7**
5	36	270.61	1.5	380	45	75	77	1.45	4.0		29.35	**100.0**
	39	272.61	1.5	382	46	75	77	1.45	4.0		29.38	**100.6**
	42	274.61	1.5	380	45	75	77	1.45	4.0		29.35	**100.7**
6	45	276.64	1.5	381	45	75	77	1.45	4.0		29.37	**102.1**
	48	278.69	1.5	380	48	75	77	1.45	4.0		29.35	**103.2**
	51	280.70	1.5	380	47	75	77	1.45	4.0		29.35	**101.1**
7	54	282.87	1.5	384	58	76	77	1.45	4.0		29.42	**109.2**

ORTECH Environmental

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	2 - Mercury	**Test Location:**	Incinerator Exhaust Stack
Date:	August 17, 2022	**Operator:**	AP

Pitot Factor	0.845	**Filter (mg)**	5.1		
DGMCF	0.973	**Probe (mg)**	10.3		
Barometric Pressure	29.44 "Hg	**CWTR (g)**	2310.1		
Static Pressure	-0.120 "H_2O	**WCBDA (g)**	25.2		
Nozzle	0.2505 inches				
Stack Diameter	4.833 ft	**Leak Check Volume**		0.54 ft^3	
Length	0.000 ft	**Reading Interval**		3 minutes	
Width	0.000 ft	**Number of Ports**		2	
		Number of points / Port		10	

Combustion Gases	
O2%	9.3
CO2%	7.63
COppm	61.2

Measured H2O
48.7 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	57	284.90	1.45	382	74	75	75	1.45	4.0		28.89	**102.3**
	60	286.91	1.4	381	59	75	75	1.45	4.0		28.37	**103.1**
8	63	288.92	1.4	381	59	75	75	1.4	4.0		28.37	**104.9**
	66	290.89	1.4	380	60	75	75	1.4	4.0		28.35	**102.8**
	69	292.85	1.4	379	55	75	75	1.4	4.0		28.34	**102.2**
9	72	294.81	1.4	379	53	75	75	1.4	4.0		28.34	**102.2**
	75	296.77	1.45	380	53	74	75	1.4	4.0		28.86	**102.2**
	78	298.71	1.4	381	53	74	75	1.4	4.0		28.37	**99.5**
10	81	300.66	1.45	379	55	74	75	1.4	4.0		28.84	**101.9**
	84	302.59	1.4	381	58	74	75	1.4	4.0		28.37	**98.9**
	87	304.54	1.4	380	59	74	75	1.4	4.0		28.35	**101.9**
	90	306.48										**101.3**

APPENDIX 17

ORTECH One-Minute Average
Combustion Gas Results
(6 pages)

Clean Harbors, Sarnia

CEM Sampling at the Incinerator Exhaust Stack

Test 1 - August 17, 2022

Time	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NOx ppm	THC - 1 min ppm *	THC - 10 min ppm *
10:30	9.90	7.41	68.6		103	103	16.5	
10:31	9.51	7.72	68.5		102	103	18.5	
10:32	9.37	7.84	77.3		102	103	19.3	
10:33	9.20	7.95	68.8		105	106	20.7	
10:34	8.70	8.28	74.6		106	107	23.9	
10:35	9.73	7.54	58.8		105	106	16.9	
10:36	9.18	7.96	70.2		107	108	21.7	
10:37	9.60	7.63	69.0		106	108	17.4	
10:38	9.53	7.68	53.6		111	112	17.3	
10:39	9.68	7.58	60.8		108	109	16.7	18.9
10:40	9.37	7.81	64.4		107	108	19.1	19.1
10:41	9.34	7.83	73.5		107	108	20.1	19.3
10:42	8.99	8.07	65.0		108	109	22.3	19.6
10:43	8.87	8.08	87.4		103	104	27.2	20.3
10:44	9.35	7.72	65.9		107	110	18.5	19.7
10:45	9.19	7.86	66.4		110	111	20.3	20.0
10:46	9.56	7.53	59.0		110	111	16.9	19.6
10:47	9.48	7.57	62.5		109	109	17.8	19.6
10:48	9.60	7.49	60.5		107	107	17.1	19.6
10:49	9.11	7.85	64.0		106	107	20.8	20.0
10:50	9.27	7.68	66.7		108	110	18.6	20.0
10:51	8.63	8.20	66.2		106	107	23.7	20.3
10:52	9.19	7.73	62.6		104	107	19.1	20.0
10:53	9.15	7.80	56.5		111	112	19.1	19.2
10:54	9.30	7.67	63.9		107	108	18.8	19.2
10:55	9.55	7.47	61.0		111	111	16.9	18.9
10:56	9.53	7.50	61.5		109	110	17.4	18.9
10:57	9.56	7.47	62.1		105	106	18.3	19.0
10:58	9.14	7.81	69.9		105	106	19.8	19.2
10:59	9.22	7.71	61.3		107	107	19.9	19.2
11:00	10.78	6.48	68.2		103	104	20.8	19.4
Min	8.63	6.48	53.6		102	103	16.5	18.9
Max	10.78	8.28	87.4		111	112	27.2	20.3
Avg	9.37	7.71	65.8		107	108	19.4	19.5
St Dev	0.39	0.31	6.6		2.6	2.6	2.4	0.4

* Wet Basis as equivalent methane

Note: No SO2 data due to scrubbing in the sampling system. Problem was resolved prior to Test No. 2.

Clean Harbors, Sarnia
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - August 17, 2022

Time	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NOx ppm	THC - 1 min ppm *	THC - 10 min ppm *
11:55	8.92	7.91	64.1	135	110	111	21.7	
11:56	9.52	7.44	57.9	115	110	110	19.2	
11:57	9.16	7.75	73.1	111	106	106	22.1	
11:58	9.33	7.58	75.1	113	102	104	20.9	
11:59	8.64	8.14	89.5	133	100	101	31.1	
12:00	9.22	7.62	88.1	129	99	100	23.0	
12:01	9.18	7.68	75.1	115	104	105	21.8	
12:02	9.15	7.76	74.0	138	104	106	22.0	
12:03	9.58	7.42	65.5	118	104	106	18.6	
12:04	9.21	7.69	69.3	130	106	106	21.9	22.2
12:05	9.09	7.76	70.5	136	107	109	21.8	22.2
12:06	9.25	7.63	69.5	119	105	106	20.7	22.4
12:07	9.15	7.73	65.1	130	105	106	21.9	22.4
12:08	8.49	8.28	94.4	175	102	102	33.6	23.6
12:09	9.37	7.55	76.3	147	102	105	21.0	22.6
12:10	8.90	7.93	72.2	142	106	107	23.1	22.6
12:11	9.22	7.68	70.0	151	106	108	21.9	22.6
12:12	9.27	7.65	68.1	129	108	108	21.1	22.5
12:13	9.43	7.54	76.6	120	103	104	20.6	22.7
12:14	8.92	7.93	74.6	151	106	108	23.5	22.9
12:15	9.32	7.64	67.6	134	108	109	20.1	22.7
12:16	8.76	8.04	63.2	133	105	106	25.9	23.2
12:17	9.00	7.85	81.1	155	105	107	23.7	23.4
12:18	9.06	7.84	57.9	147	110	112	20.6	22.1
12:19	9.43	7.52	59.5	110	107	107	20.3	22.1
12:20	9.53	7.50	63.5	107	106	107	18.8	21.6
12:21	9.38	7.61	67.1	113	104	105	21.7	21.6
12:22	9.01	7.89	74.1	153	109	111	22.8	21.8
12:23	8.86	7.98	67.7	144	111	111	23.8	22.1
12:24	9.19	7.74	65.7	139	109	110	22.4	22.0
12:25	8.75	8.05	78.7	124	105	105	26.8	22.7
12:26	9.31	7.67	63.3	135	104	107	20.9	22.2
12:27	8.92	7.93	60.8	138	110	111	23.7	22.2
12:28	9.42	7.61	59.0	132	107	109	20.3	22.2
12:29	9.51	7.52	62.4	122	108	109	19.9	22.1
12:30	9.37	7.62	57.3	126	106	107	19.9	22.2
12:31	9.32	7.65	63.8	123	107	108	21.2	22.2
12:32	9.37	7.64	71.5	119	103	104	21.2	22.0
12:33	9.06	7.85	62.8	120	106	106	22.7	21.9
12:34	8.82	8.06	75.9	150	98	100	30.8	22.7
12:35	9.33	7.64	74.9	137	105	108	20.6	22.1
12:36	9.09	7.82	59.1	124	106	106	22.3	22.2
12:37	9.50	7.54	58.4	122	105	106	19.4	21.8
12:38	9.44	7.58	69.8	127	106	106	19.9	21.8
12:39	9.39	7.64	63.7	119	105	106	20.4	21.8
12:40	9.15	7.78	74.9	134	105	106	22.0	22.1
12:41	9.04	7.87	65.0	132	109	111	20.7	22.0
12:42	8.63	8.20	68.7	147	108	108	25.9	22.5
12:43	9.48	7.52	74.0	131	102	103	20.4	22.2
12:44	8.92	8.00	62.6	146	106	107	22.6	21.4
12:45	9.50	7.56	72.2	136	103	106	19.6	21.3
12:46	9.18	7.78	67.4	132	107	108	22.0	21.3
12:47	9.37	7.65	72.9	136	107	108	19.5	21.3
12:48	8.94	7.97	67.0	147	109	110	22.5	21.6
12:49	9.40	7.63	76.4	136	107	107	19.9	21.5
12:50	9.32	7.68	72.4	115	103	103	21.7	21.5
12:51	9.05	7.86	104	139	98.0	99.3	27.5	22.1
12:52	9.17	7.78	94.9	135	100	103	21.9	21.7
12:53	9.12	7.87	85.6	152	107	108	21.8	21.9
12:54	9.57	7.49	65.8	120	105	106	17.7	21.4
12:55	9.50	7.54	73.6	118	105	105	19.5	21.4
Min	8.49	7.42	57.3	107	98.0	99.3	17.7	21.3
Max	9.58	8.28	104	175	111	112	33.6	23.6
Avg	9.19	7.74	70.7	132	105	107	22.1	22.1
St Dev	0.26	0.19	9.5	13.4	2.8	2.8	2.9	0.5

* Wet Basis as equivalent methane

Clean Harbors, Sarnia

CEM Sampling at the Incinerator Exhaust Stack

Test 3 - August 17, 2022

Time	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NOx ppm	THC - 1 min ppm *	THC - 10 min ppm *
13:25	8.60	8.16	81.9	177	105	105	26.9	
13:26	8.91	7.98	60.5	173	112	115	18.9	
13:27	8.91	7.98	58.9	171	115	116	19.1	
13:28	9.40	7.64	56.0	147	114	116	16.5	
13:29	9.16	7.81	60.0	156	115	116	17.2	
13:30	9.45	7.59	54.8	138	113	114	16.1	
13:31	8.88	8.00	66.1	147	112	112	21.7	
13:32	8.90	7.99	65.0	158	112	114	19.3	
13:33	8.33	8.41	68.0	183	113	114	24.9	
13:34	9.08	7.83	64.3	168	108	111	20.1	20.1
13:35	9.08	7.84	59.8	139	114	115	18.6	19.2
13:36	9.27	7.72	59.9	147	112	113	18.8	19.2
13:37	9.18	7.79	58.7	158	114	116	17.5	19.0
13:38	9.15	7.79	56.9	157	116	117	17.5	19.1
13:39	8.94	7.94	55.5	168	119	121	18.5	19.3
13:40	8.82	8.04	58.6	166	116	117	20.6	19.7
13:41	8.74	8.07	62.9	163	117	118	21.0	19.7
13:42	8.64	8.13	67.9	162	112	112	25.1	20.3
13:43	9.11	7.84	64.1	167	109	113	17.7	19.5
13:44	8.93	7.98	54.5	162	118	119	19.8	19.5
13:45	8.82	8.00	54.7	183	115	119	18.2	19.5
13:46	8.96	7.94	48.2	184	124	125	17.1	19.3
13:47	9.24	7.69	49.9	157	118	119	16.6	19.2
13:48	8.78	8.03	56.9	169	115	116	19.1	19.4
13:49	8.99	7.89	58.1	155	115	117	18.0	19.3
13:50	8.65	8.13	55.3	160	118	119	20.8	19.3
13:51	8.82	7.96	63.4	193	108	111	21.2	19.4
13:52	8.75	8.05	58.3	181	119	121	19.2	18.8
13:53	9.08	7.83	57.8	162	116	117	17.7	18.8
13:54	8.91	7.93	54.5	183	120	122	18.2	18.6
13:55	9.10	7.79	53.5	171	122	123	16.3	18.4
13:56	9.18	7.73	49.1	147	123	124	16.8	18.4
13:57	8.97	7.87	60.8	145	114	114	19.1	18.6
13:58	8.30	8.40	59.7	196	112	114	22.0	18.9
13:59	8.52	8.23	55.5	183	114	116	23.5	19.5
14:00	9.01	7.86	53.7	164	114	118	17.9	19.2
14:01	8.29	8.37	61.7	209	117	118	28.8	19.9
14:02	9.33	7.62	72.6	169	114	117	17.1	19.7
14:03	9.09	7.81	48.0	151	121	121	17.1	19.7
14:04	9.12	7.78	49.9	166	118	119	16.7	19.5
14:05	8.88	7.94	51.7	159	120	121	19.1	19.8
14:06	8.96	7.90	61.6	159	117	118	18.6	20.0
14:07	8.28	8.41	60.6	206	115	116	24.5	20.5
14:08	9.03	7.80	59.2	161	116	119	18.6	20.2
14:09	8.86	7.97	56.8	171	122	124	18.9	19.7
14:10	8.93	7.92	58.4	182	120	121	19.0	19.8
14:11	9.42	7.55	51.4	141	119	120	15.7	18.5
14:12	9.12	7.79	67.3	133	114	115	20.2	18.8
14:13	8.93	7.91	73.2	169	117	120	18.4	19.0
14:14	8.87	7.95	60.4	160	118	119	18.4	19.1
14:15	9.02	7.86	53.7	153	120	121	17.0	18.9
14:16	8.44	8.24	61.4	187	113	113	25.9	19.6
14:17	9.18	7.70	67.6	167	111	115	17.7	19.0
14:18	8.80	8.09	67.1	164	113	113	23.3	19.4
14:19	8.92	7.92	85.2	195	109	112	20.5	19.6
14:20	9.02	7.87	55.1	167	120	121	17.3	19.4
14:21	9.28	7.65	54.5	147	118	118	16.4	19.5
14:22	8.79	8.03	55.4	166	116	117	18.6	19.3
14:23	9.34	7.62	52.5	138	114	115	16.1	19.1
14:24	8.32	8.38	72.3	175	110	111	33.9	20.6
14:25	8.76	8.08	131	202	97.1	100	27.7	21.7
Min	8.28	7.55	48.0	133	97.1	100	15.7	18.4
Max	9.45	8.41	131	209	124	125	33.9	21.7
Avg	8.93	7.93	60.9	166	115	117	19.7	19.4
St Dev	0.28	0.21	11.7	17.0	4.5	4.3	3.5	0.6

* Wet Basis as equivalent methane

Clean Harbors, Sarnia
CEM Sampling at the Incinerator Exhaust Stack
Test 4 - August 17, 2022

Time	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NOx ppm	THC - 1 min ppm *	THC - 10 min ppm *
14:37	8.56	8.12	55.5	191	119	121	18.5	
14:38	9.15	7.75	44.2	169	122	123	15.2	
14:39	8.80	8.02	43.7	176	123	123	17.6	
14:40	8.87	7.95	49.2	177	120	122	17.2	
14:41	8.77	8.03	43.4	153	125	126	17.9	
14:42	8.91	7.92	48.8	160	116	117	19.3	
14:43	8.60	8.17	47.1	186	116	119	19.1	
14:44	8.89	7.96	49.1	168	117	119	18.2	
14:45	9.04	7.85	45.3	159	119	120	16.7	
14:46	8.93	7.93	48.8	181	119	121	16.7	17.6
14:47	9.07	7.81	41.6	160	123	125	15.7	17.4
14:48	9.13	7.79	43.6	137	122	122	16.9	17.5
14:49	8.93	7.95	47.4	155	117	118	17.2	17.5
14:50	8.36	8.44	48.2	193	116	117	22.8	18.1
14:51	9.26	7.64	47.8	161	113	114	16.0	17.9
14:52	8.85	7.99	45.2	165	118	120	17.5	17.7
14:53	9.04	7.85	49.2	163	116	119	17.6	17.5
14:54	9.21	7.72	46.7	155	122	123	15.5	17.2
14:55	9.15	7.78	49.4	155	116	117	16.4	17.2
14:56	8.80	8.04	47.0	180	117	118	18.1	17.4
14:57	9.01	7.88	49.8	149	115	116	17.4	17.5
14:58	8.54	8.23	46.7	178	116	117	19.9	17.8
14:59	8.58	8.19	56.1	202	108	110	21.8	18.3
15:00	9.14	7.78	45.3	145	117	120	15.9	17.6
15:01	8.95	7.90	48.2	157	116	117	17.9	17.8
15:02	9.27	7.69	44.0	158	119	121	14.6	17.5
15:03	9.11	7.84	42.5	157	121	121	15.9	17.3
15:04	9.34	7.62	41.3	143	118	119	15.0	17.3
15:05	8.88	8.00	47.0	171	115	116	17.9	17.4
15:06	9.30	7.65	46.8	136	114	115	16.0	17.2
15:07	8.67	8.15	55.2	148	112	113	20.3	17.5
15:08	9.25	7.70	56.4	156	107	109	17.5	17.3
15:09	9.12	7.78	50.9	135	111	112	17.2	16.8
15:10	9.43	7.58	53.3	136	108	110	15.7	16.8
15:11	9.19	7.74	47.5	143	113	114	15.9	16.6
15:12	9.51	7.50	48.3	132	111	111	15.1	16.6
15:13	8.80	8.04	60.5	164	108	110	20.6	17.1
15:14	9.02	7.89	54.3	171	111	112	17.2	17.3
15:15	9.30	7.69	46.3	139	114	115	15.7	17.1
15:16	9.03	7.88	53.6	152	108	109	19.3	17.4
15:17	9.00	7.89	49.0	172	110	114	16.3	17.0
15:18	9.27	7.71	44.0	146	115	116	15.7	16.9
15:19	9.30	7.68	43.3	141	113	116	15.1	16.6
15:20	9.17	7.77	44.3	148	114	115	15.9	16.7
15:21	9.63	7.45	43.0	125	110	111	14.4	16.5
15:22	9.07	7.88	54.4	137	106	107	18.0	16.8
15:23	9.28	7.69	50.7	147	109	111	15.5	16.3
15:24	8.94	7.94	48.2	124	110	111	18.2	16.4
15:25	9.87	7.20	50.4	129	105	110	14.3	16.3
15:26	9.95	6.92	36.1	196	147	154	9.2	15.2
15:27	10.75	5.95	27.5	218	130	131	7.3	14.3
15:28	12.15	4.62	141.5	113	114	116	9.5	13.7
15:29	13.36	3.84	204.8	57.3	99.0	99.3	7.3	12.9
15:30	13.76	3.64	72.6	31.5	94.8	95.2	7.3	12.1
15:31	13.87	3.58	31.3	24.3	92.2	92.8	7.2	11.4
15:32	13.87	3.58	28.3	21.3	90.5	91.8	7.4	10.3
15:33	13.91	3.56	26.9	19.6	92.4	92.8	7.4	9.5
15:34	13.82	3.60	26.5	18.5	90.0	91.7	7.6	8.4
15:35	13.84	3.59	26.8	17.8	93.2	93.7	7.6	7.8
15:36	14.03	3.49	26.9	17.1	83.3	84.7	7.5	7.6
15:37	13.98	3.51	26.5	16.6	88.3	89.7	7.5	7.6
Min	8.36	3.49	26.5	16.6	83.3	84.7	7.2	7.6
Max	14.03	8.44	204.8	218	147	154	22.8	18.3
Avg	9.84	7.12	49.8	138	112	114	15.3	15.8
St Dev	1.75	1.57	25.2	51.7	10.9	11.2	4.1	3.0

* Wet Basis as equivalent methane

Clean Harbors, Sarnia

CEM Sampling at the Incinerator Exhaust Stack

Test 5 - August 17, 2022

Time	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NOx ppm	THC - 1 min ppm *	THC - 10 min ppm *
16:00	9.40	7.60	105.1	122	99.4	101	19.2	
16:01	9.58	7.47	124.6	123	101	102	20.2	
16:02	9.81	7.30	112.9	113	97.8	98.8	17.7	
16:03	9.77	7.35	135.4	106	94.7	95.6	19.7	
16:04	9.37	7.63	113.3	137	100	102	19.7	
16:05	9.37	7.65	111.0	144	103	104	20.3	
16:06	9.03	7.90	106.1	153	103	104	20.6	
16:07	9.08	7.78	106.0	145	104	105	22.5	
16:08	9.31	7.67	92.6	131	102	104	18.7	
16:09	9.00	7.93	95.3	155	106	108	20.9	20.0
16:10	9.38	7.63	80.7	166	108	110	17.6	19.8
16:11	9.24	7.74	82.0	154	110	111	18.2	19.6
16:12	9.40	7.61	79.8	147	109	111	16.7	19.5
16:13	8.94	7.97	81.6	171	110	111	20.2	19.5
16:14	9.13	7.82	78.0	165	110	111	18.6	19.4
16:15	8.69	8.15	74.8	177	111	112	22.2	19.6
16:16	9.16	7.84	82.8	165	107	109	20.9	19.6
16:17	9.00	7.91	62.8	164	114	117	18.5	19.2
16:18	9.00	7.94	68.6	175	111	113	20.5	19.4
16:19	9.29	7.70	59.2	155	112	115	17.1	19.0
16:20	9.26	7.73	68.1	162	115	115	18.3	19.1
16:21	9.13	7.82	72.2	149	110	111	19.1	19.2
16:22	8.86	8.05	72.5	172	111	111	19.7	19.5
16:23	8.94	7.96	61.3	171	114	116	18.9	19.4
16:24	8.56	8.24	72.2	188	111	112	24.5	20.0
16:25	9.10	7.87	66.1	178	111	115	18.6	19.6
16:26	8.79	8.09	61.8	175	118	119	21.3	19.6
16:27	9.30	7.71	66.5	177	113	114	17.3	19.5
16:28	9.10	7.86	58.4	155	118	119	18.5	19.3
16:29	9.31	7.70	62.8	172	115	116	16.7	19.3
16:30	8.75	8.14	67.2	171	113	114	20.9	19.6
16:31	9.13	7.83	60.5	168	115	118	17.0	19.3
16:32	8.57	8.26	54.4	171	117	117	21.3	19.5
16:33	8.92	7.96	58.3	189	113	114	20.5	19.7
16:34	8.82	8.07	58.6	180	116	118	19.6	19.2
16:35	9.63	7.52	62.9	165	117	119	15.5	18.9
16:36	10.89	6.57	39.0	162	129	132	9.3	17.7
16:37	10.08	7.13	35.1	172	134	134	11.5	17.1
16:38	9.38	7.63	40.5	155	124	124	15.7	16.8
16:39	9.07	7.86	51.1	163	120	122	17.3	16.8
16:40	9.06	7.88	51.9	160	118	119	17.9	16.5
16:41	8.69	8.17	63.9	188	116	117	21.4	17.0
16:42	9.05	7.89	54.8	190	113	116	18.9	16.7
16:43	8.93	7.97	57.9	166	118	118	18.8	16.6

Clean Harbors, Sarnia

CEM Sampling at the Incinerator Exhaust Stack

Test 5 - August 17, 2022

Time	O_2 %	CO_2 %	CO ppm	SO_2 ppm	NO ppm	NOx ppm	THC - 1 min ppm *	THC - 10 min ppm *
16:44	9.46	7.57	61.9	142	114	115	16.6	16.3
16:45	9.31	7.69	64.0	145	116	118	16.6	16.4
16:46	9.55	7.51	65.5	141	111	112	16.0	17.1
16:47	9.20	7.75	68.4	131	111	112	18.1	17.7
16:48	9.33	7.70	72.2	134	109	111	17.6	17.9
16:49	8.88	7.99	76.6	136	109	110	21.2	18.3
16:50	9.11	7.81	81.6	150	106	108	20.7	18.6
16:51	9.28	7.72	67.9	143	109	111	17.6	18.2
16:52	9.19	7.75	80.6	144	107	108	19.7	18.3
16:53	9.52	7.53	75.6	135	106	107	16.0	18.0
16:54	9.56	7.53	85.1	137	107	108	18.0	18.1
16:55	9.45	7.59	89.5	144	105	107	17.2	18.2
16:56	9.02	7.90	77.9	134	107	108	19.7	18.6
16:57	8.95	7.95	70.8	143	108	110	20.4	18.8
16:58	8.83	8.04	87.5	162	109	112	20.9	19.1
16:59	9.07	7.85	61.4	176	110	112	17.6	18.8
17:00	8.89	8.00	70.8	150	114	114	20.1	18.7
17:01	9.24	7.78	73.9	154	109	112	17.6	18.7
17:02	9.28	7.70	59.0	145	115	115	16.2	18.4
17:03	9.39	7.62	65.1	141	111	112	16.2	18.4
17:04	8.95	7.96	67.4	164	112	113	19.8	18.6
17:05	9.07	7.88	74.3	148	111	113	19.4	18.8
17:06	8.59	8.24	75.7	172	112	113	21.5	19.0
17:07	8.87	8.07	71.2	167	110	112	22.0	19.1
17:08	9.00	7.91	65.4	148	111	114	18.6	18.9
17:09	8.92	7.99	72.2	169	113	113	20.9	19.2
17:10	9.22	7.77	70.9	164	112	113	17.7	19.0
17:11	9.29	7.70	73.1	148	112	114	17.8	19.0
17:12	9.19	7.78	70.5	138	111	112	17.8	19.2
17:13	9.02	7.90	65.8	147	111	112	18.8	19.4
17:14	8.92	7.97	59.6	159	112	114	18.6	19.3
17:15	8.45	8.34	63.4	182	113	113	23.4	19.7
17:16	9.10	7.81	77.1	180	103	107	19.8	19.5
17:17	8.83	8.04	62.2	147	114	115	19.6	19.3
17:18	9.21	7.75	60.0	147	111	114	17.4	19.2
17:19	9.11	7.84	63.5	154	114	114	19.4	19.0
17:20	9.34	7.67	75.4	148	112	113	17.1	19.0
17:21	8.90	7.99	77.5	159	109	110	21.3	19.3
17:22	9.04	7.89	77.3	149	109	110	19.0	19.4
17:23	8.67	8.15	66.5	155	112	113	21.1	19.7
17:24	8.72	8.11	68.4	182	107	108	22.6	20.1
17:25	8.98	7.94	65.9	148	111	113	18.6	19.6
17:26	8.91	8.01	69.9	155	113	113	20.9	19.7
17:27	9.32	7.68	62.7	146	112	114	16.7	19.4
17:28	9.17	7.80	78.5	146	111	112	19.5	19.6
17:29	9.23	7.75	85.0	149	108	108	19.4	19.6
17:30	8.88	8.00	100.8	147	106	107	23.5	20.3
Min	8.45	6.57	35.1	106	94.7	95.6	9.3	16.3
Max	10.89	8.34	135.4	190	134	134	24.5	20.3
Avg	9.14	7.82	73.0	156	111	112	18.9	18.8
St Dev	0.34	0.25	17.2	17.0	5.7	5.7	2.3	1.0

* Wet Basis as equivalent methane

APPENDIX 18

Clean Harbors One-Minute Average
Combustion Gas Results
(8 pages)

		Analyzers							
		Backup CO	Main HCl	Main CO2	Main H2O	THC	Backup O2	Opacity	Backup SO2
		PPM	PPM	%	%	PPM	%	%	PPM
$Date	$Time	AT-205-2NEW	AT-213A-1NEW	AT-213B-1NEW	AT-213CB	AT-259-1NEW	AT-261A-2NEW	AT-263	AT-264-2NEW
2022-08-17	9:25:00	50.54	0.00	0.00	0.08	16.80	10.06	0.41	59.20
2022-08-17	9:26:00	55.87	0.00	0.00	0.08	17.40	9.85	0.41	59.80
2022-08-17	9:27:00	60.41	0.00	0.00	0.08	16.50	10.35	0.26	51.90
2022-08-17	9:28:00	55.83	0.00	0.00	0.08	19.20	9.72	0.45	50.90
2022-08-17	9:29:00	64.12	0.00	0.00	0.08	18.30	9.77	0.51	78.60
2022-08-17	9:30:00	47.29	0.00	0.00	0.08	20.10	9.36	0.52	63.50
2022-08-17	9:31:00	91.86	0.00	0.00	0.08	25.00	8.91	0.45	88.60
2022-08-17	9:32:00	51.59	0.00	0.00	0.08	18.90	9.59	0.60	97.40
2022-08-17	9:33:00	66.70	0.00	0.00	0.08	21.50	8.97	0.47	94.10
2022-08-17	9:34:00	45.57	0.00	0.00	0.08	16.60	9.98	0.47	93.30
2022-08-17	9:35:00	54.55	0.00	0.00	0.08	18.40	9.75	0.36	61.50
2022-08-17	9:36:00	47.79	0.00	0.00	0.08	20.00	9.75	0.37	70.40
2022-08-17	9:37:00	57.67	0.00	0.00	0.08	19.80	9.32	0.47	78.90
2022-08-17	9:38:00	48.68	0.00	0.00	0.08	19.70	9.60	0.45	63.30
2022-08-17	9:39:00	57.24	0.00	0.00	0.08	23.00	8.97	0.32	92.00
2022-08-17	9:40:00	49.74	0.00	0.00	0.08	17.70	9.41	0.40	86.20
2022-08-17	9:41:00	56.47	0.00	0.00	0.08	22.00	9.41	0.40	82.00
2022-08-17	9:42:00	52.20	0.00	0.00	0.08	17.20	9.55	0.41	118.40
2022-08-17	9:43:00	58.97	0.00	0.00	0.08	17.90	9.77	0.56	70.40
2022-08-17	9:44:00	46.31	0.00	0.00	0.08	16.80	9.63	0.36	84.10
2022-08-17	9:45:00	62.28	0.00	0.00	0.08	20.30	9.43	0.37	68.30
2022-08-17	9:46:00	55.42	0.00	0.00	0.08	18.70	9.48	0.36	85.10
2022-08-17	9:47:00	49.20	0.00	0.00	0.09	22.10	9.26	0.36	96.60
2022-08-17	9:48:00	51.78	0.00	0.00	0.08	21.30	8.76	0.37	120.40
2022-08-17	9:49:00	56.98	0.00	0.00	0.08	18.40	9.49	0.41	81.60
2022-08-17	9:50:00	48.03	0.00	0.00	0.08	18.30	9.49	0.60	75.40
2022-08-17	9:51:00	43.54	0.00	0.00	0.08	16.30	9.70	0.45	72.00
2022-08-17	9:52:00	58.57	0.00	0.00	0.08	18.20	9.70	0.36	57.10
2022-08-17	9:53:00	45.57	0.00	0.00	0.08	16.90	9.90	0.36	61.30
2022-08-17	9:54:00	60.39	0.00	0.00	0.08	19.70	9.27	0.33	68.50
2022-08-17	9:55:00	52.61	0.00	0.00	0.08	17.80	9.76	0.40	67.70
2022-08-17	9:56:00	85.77	0.00	0.00	0.08	22.40	8.94	0.45	63.80
2022-08-17	9:57:00	52.07	0.00	0.00	0.08	17.00	9.70	0.45	90.10
2022-08-17	9:58:00	68.89	0.00	0.00	0.08	19.50	9.48	0.40	54.20
2022-08-17	9:59:00	64.47	0.00	0.00	0.08	18.30	9.79	0.33	66.60
2022-08-17	10:00:00	54.81	0.00	0.00	0.08	18.10	9.57	0.26	78.80
2022-08-17	10:01:00	58.76	0.00	0.00	0.08	17.20	9.99	0.22	73.10
2022-08-17	10:02:00	47.92	0.00	0.00	0.08	19.00	9.35	0.30	65.30
2022-08-17	10:03:00	44.95	0.00	0.00	0.08	18.40	9.14	0.37	90.20
2022-08-17	10:04:00	48.49	0.00	0.00	0.08	21.40	9.34	0.33	61.40
2022-08-17	10:05:00	61.21	0.00	0.00	0.08	21.90	8.91	0.41	98.10
2022-08-17	10:06:00	53.03	0.00	0.00	0.08	20.10	9.70	0.33	85.40
2022-08-17	10:07:00	49.04	0.00	0.00	0.08	19.20	9.07	0.41	90.30
2022-08-17	10:08:00	46.96	0.00	0.00	0.08	16.60	9.81	0.37	78.90
2022-08-17	10:09:00	51.18	0.00	0.00	0.08	19.80	9.60	0.36	63.20
2022-08-17	10:10:00	48.37	0.00	0.00	0.08	17.50	10.02	0.25	84.00
2022-08-17	10:11:00	45.89	0.00	0.00	0.08	19.10	9.18	0.22	75.80
2022-08-17	10:12:00	59.61	0.00	0.00	0.08	18.10	9.67	0.51	61.90
2022-08-17	10:13:00	64.71	0.00	0.00	0.09	22.30	8.99	0.51	95.40
2022-08-17	10:14:00	48.48	0.00	0.00	0.08	17.50	9.70	1.33	82.60
2022-08-17	10:15:00	66.40	0.00	0.00	0.08	22.40	8.81	0.60	105.00
2022-08-17	10:16:00	45.99	0.00	0.00	0.08	17.90	9.65	0.63	127.90
2022-08-17	10:17:00	56.76	0.00	0.00	0.08	17.00	10.06	0.51	47.50
2022-08-17	10:18:00	50.68	0.00	0.00	0.08	17.30	9.44	0.41	61.20
2022-08-17	10:19:00	58.55	0.00	0.00	0.08	19.70	9.66	0.33	63.10
2022-08-17	10:20:00	52.34	0.00	0.00	0.09	19.00	9.23	0.36	77.60
2022-08-17	10:21:00	58.57	0.00	0.00	0.08	22.70	9.25	0.43	67.50
2022-08-17	10:22:00	88.84	0.00	0.00	0.08	22.90	9.02	0.56	84.90

		Analyzers							
		Backup CO	Main HCl	Main CO2	Main H2O	THC	Backup O2	Opacity	Backup SO2
		PPM	PPM	%	%	PPM	%	%	PPM
$Date	$Time	AT-205-2NEW	AT-213A-1NEW	AT-213B-1NEW	AT-213CB	AT-259-1NEW	AT-261A-2NEW	AT-263	AT-264-2NEW
2022-08-17	10:23:00	54.97	0.00	0.00	0.08	18.10	9.54	0.60	66.70
2022-08-17	10:24:00	67.38	0.00	0.00	0.08	21.80	9.33	0.60	60.30
2022-08-17	10:25:00	57.00	0.00	0.00	0.09	16.60	9.88	0.65	55.90
2022-08-17	10:26:00	63.46	0.00	0.00	0.08	18.60	9.88	0.52	43.20
2022-08-17	10:27:00	60.32	0.00	0.00	0.08	17.40	9.89	0.42	52.60
2022-08-17	10:28:00	54.68	0.00	0.00	0.08	19.30	9.69	0.36	55.80
2022-08-17	10:29:00	57.45	0.00	0.00	0.08	16.90	9.72	0.47	55.00
2022-08-17	10:30:00	72.03	0.00	0.00	0.08	22.10	9.31	0.56	43.60
2022-08-17	10:31:00	63.61	0.00	0.00	0.08	18.10	10.13	0.47	73.70
2022-08-17	10:32:00	83.13	0.00	0.00	0.08	19.40	9.87	0.52	55.40
2022-08-17	10:33:00	91.79	0.00	0.00	0.09	20.90	9.89	0.52	35.70
2022-08-17	10:34:00	61.47	0.00	0.00	0.08	17.80	10.11	0.47	40.90
2022-08-17	10:35:00	70.01	0.00	0.00	0.08	17.30	10.11	0.37	36.90
2022-08-17	10:36:00	80.56	0.00	0.00	0.08	19.80	9.72	0.30	36.00
2022-08-17	10:37:00	64.47	0.00	0.00	0.09	19.30	9.52	0.21	47.90
2022-08-17	10:38:00	71.30	0.00	0.00	0.08	22.10	9.53	0.33	76.20
2022-08-17	10:39:00	59.13	0.00	0.00	0.08	21.90	8.65	0.36	108.10
2022-08-17	10:40:00	48.62	0.00	0.00	0.08	16.90	9.90	0.32	65.20
2022-08-17	10:41:00	95.83	0.00	0.00	0.09	22.60	9.26	0.26	58.90
2022-08-17	10:42:00	47.22	0.00	0.00	0.08	16.60	9.72	0.28	75.10
2022-08-17	10:43:00	62.80	0.00	0.00	0.08	17.80	9.72	0.45	60.00
2022-08-17	10:44:00	53.27	0.00	0.00	0.08	16.40	9.72	0.50	63.60
2022-08-17	10:45:00	68.22	0.00	0.00	0.09	20.20	9.51	0.52	56.90
2022-08-17	10:46:00	59.72	0.00	0.00	0.08	17.60	9.53	0.56	75.70
2022-08-17	10:47:00	71.80	0.00	0.00	0.08	25.00	9.10	0.48	83.70
2022-08-17	10:48:00	76.00	0.00	0.00	0.08	21.30	9.69	0.41	132.90
2022-08-17	10:49:00	62.24	0.00	0.00	0.08	20.90	9.49	0.36	79.40
2022-08-17	10:50:00	58.46	0.00	0.00	0.08	19.60	9.26	0.48	90.30
2022-08-17	10:51:00	70.77	0.00	0.00	0.08	17.50	9.73	0.48	69.80
2022-08-17	10:52:00	64.64	0.00	0.00	0.08	17.90	9.73	0.33	57.80
2022-08-17	10:53:00	64.39	0.00	0.00	0.08	18.70	9.94	0.37	54.30
2022-08-17	10:54:00	75.40	0.00	0.00	0.08	21.00	9.11	0.36	85.80
2022-08-17	10:55:00	53.33	0.00	0.00	0.09	21.20	9.65	0.26	71.60
2022-08-17	10:56:00	55.60	0.00	0.00	0.08	22.70	8.61	0.37	83.50
2022-08-17	10:57:00	44.06	0.00	0.00	0.08	18.10	9.51	0.30	91.50
2022-08-17	10:58:00	51.69	0.00	0.00	0.08	20.40	9.31	0.36	79.40
2022-08-17	10:59:00	48.95	0.00	0.00	0.08	17.00	9.40	0.41	79.20
2022-08-17	11:00:00	59.94	0.00	0.00	0.08	18.30	9.83	0.37	59.60
2022-08-17	11:01:00	63.46	0.00	0.00	0.08	16.70	9.82	0.26	64.40
2022-08-17	11:02:00	71.05	0.00	0.00	0.08	23.30	9.82	0.32	55.20
2022-08-17	11:03:00	48.47	0.00	0.00	0.08	17.00	9.37	0.36	94.20
2022-08-17	11:04:00	62.05	0.00	0.00	0.08	23.60	9.34	0.37	50.50
2022-08-17	11:05:00	54.57	0.00	0.00	0.08	20.40	9.90	0.36	106.20
2022-08-17	11:06:00	64.38	0.00	0.00	0.08	20.10	9.64	0.30	62.60
2022-08-17	11:07:00	50.90	0.00	0.00	0.08	18.60	9.22	0.33	75.40
2022-08-17	11:08:00	63.24	0.00	0.00	0.08	18.30	9.72	0.36	64.40
2022-08-17	11:09:00	58.66	0.00	0.00	0.08	17.50	9.72	0.33	63.30
2022-08-17	11:10:00	60.08	0.00	0.00	0.08	19.60	9.95	0.30	58.50
2022-08-17	11:11:00	64.14	0.00	0.00	0.08	21.20	9.47	0.45	59.70
2022-08-17	11:12:00	63.78	0.00	0.00	0.08	19.80	9.73	0.36	77.00
2022-08-17	11:13:00	99.18	0.00	0.00	0.08	28.30	8.86	0.37	67.30
2022-08-17	11:14:00	48.03	0.00	0.00	0.08	17.50	9.43	0.26	104.10
2022-08-17	11:15:00	76.19	0.00	0.00	0.08	21.80	9.66	0.17	46.60
2022-08-17	11:16:00	61.46	0.00	0.00	0.08	17.10	9.81	0.18	68.80
2022-08-17	11:17:00	63.21	0.00	0.00	0.08	18.10	9.80	0.26	49.90
2022-08-17	11:18:00	68.25	0.00	0.00	0.08	17.50	10.01	0.11	48.80
2022-08-17	11:19:00	67.83	0.00	0.00	0.08	22.70	9.37	0.48	74.20
2022-08-17	11:20:00	52.04	0.00	0.00	0.08	18.10	9.59	0.48	84.40

		Analyzers							
		Backup CO	Main HCl	Main CO2	Main H2O	THC	Backup O2	Opacity	Backup SO2
		PPM	PPM	%	%	PPM	%	%	PPM
$Date	$Time	AT-205-2NEW	AT-213A-1NEW	AT-213B-1NEW	AT-213CB	AT-259-1NEW	AT-261A-2NEW	AT-263	AT-264-2NEW
2022-08-17	11:21:00	69.32	0.00	0.00	0.08	23.40	9.60	0.48	49.50
2022-08-17	11:22:00	77.03	0.00	0.00	0.08	23.20	9.28	0.48	44.90
2022-08-17	11:23:00	66.79	0.00	0.00	0.08	18.90	9.76	0.48	70.10
2022-08-17	11:24:00	77.25	0.00	0.00	0.08	20.40	9.15	0.52	60.60
2022-08-17	11:25:00	55.64	0.00	0.00	0.09	17.70	9.95	0.62	59.50
2022-08-17	11:26:00	74.75	0.00	0.00	0.08	18.90	9.96	0.72	46.90
2022-08-17	11:27:00	77.55	0.00	0.00	0.08	21.50	9.75	0.63	37.30
2022-08-17	11:28:00	97.90	0.00	0.00	0.08	21.60	9.54	0.76	57.50
2022-08-17	11:29:00	71.31	0.00	0.00	0.08	21.80	9.95	0.48	34.60
2022-08-17	11:30:00	73.87	0.00	0.00	0.08	28.30	8.61	0.53	111.10
2022-08-17	11:31:00	76.93	0.00	0.00	0.08	21.80	8.83	0.43	158.10
2022-08-17	11:32:00	45.62	0.00	0.00	0.08	22.30	9.03	0.48	115.10
2022-08-17	11:33:00	45.59	0.00	0.00	0.08	18.90	9.32	0.41	112.40
2022-08-17	11:34:00	48.15	0.00	0.00	0.08	17.70	9.76	0.41	124.00
2022-08-17	11:35:00	46.08	0.00	0.00	0.08	17.20	9.78	0.26	75.50
2022-08-17	11:36:00	47.99	0.00	0.00	0.08	21.50	8.87	0.25	113.50
2022-08-17	11:37:00	55.95	0.00	0.00	0.08	17.60	9.84	0.41	95.60
2022-08-17	11:38:00	88.92	0.00	0.00	0.09	30.70	9.19	0.37	50.40
2022-08-17	11:39:00	49.12	0.00	0.00	0.08	20.70	8.77	0.30	115.00
2022-08-17	11:40:00	52.52	0.00	0.00	0.08	19.20	9.39	0.30	84.90
2022-08-17	11:41:00	65.60	0.00	0.00	0.09	20.40	9.18	0.28	76.90
2022-08-17	11:42:00	45.02	0.00	0.00	0.08	16.90	9.54	0.30	90.70
2022-08-17	11:43:00	54.52	0.00	0.00	0.08	17.90	9.32	0.17	67.60
2022-08-17	11:44:00	51.73	0.00	0.00	0.08	21.00	9.94	0.22	64.70
2022-08-17	11:45:00	53.01	0.00	0.00	0.08	19.10	8.85	0.30	112.50
2022-08-17	11:46:00	41.91	0.00	0.00	0.09	17.90	9.71	0.22	73.40
2022-08-17	11:47:00	73.14	0.00	0.00	0.08	25.30	8.82	0.21	66.40
2022-08-17	11:48:00	59.35	0.00	0.00	0.08	19.10	9.25	0.36	108.60
2022-08-17	11:49:00	68.29	0.00	0.00	0.08	23.20	9.25	0.30	77.80
2022-08-17	11:50:00	59.64	0.00	0.00	0.08	18.40	9.46	0.45	77.60
2022-08-17	11:51:00	52.84	0.00	0.00	0.08	18.30	9.46	0.45	84.20
2022-08-17	11:52:00	43.78	0.00	0.00	0.08	16.70	9.90	0.36	74.80
2022-08-17	11:53:00	61.16	0.00	0.00	0.08	19.10	9.90	0.45	42.00
2022-08-17	11:54:00	60.68	0.00	0.00	0.08	19.80	9.69	0.56	43.80
2022-08-17	11:55:00	72.31	0.00	0.00	0.08	22.20	9.26	0.48	56.60
2022-08-17	11:56:00	82.14	0.00	0.00	0.08	21.50	8.85	0.41	62.10
2022-08-17	11:57:00	60.30	0.00	0.00	0.08	19.50	9.81	0.37	60.50
2022-08-17	11:58:00	56.19	0.00	0.00	0.08	20.00	9.40	0.41	67.00
2022-08-17	11:59:00	53.16	0.00	0.00	0.08	18.90	9.94	0.26	54.50
2022-08-17	12:00:00	46.02	0.00	0.00	0.08	18.70	9.27	0.30	89.30
2022-08-17	12:01:00	55.51	0.00	0.00	0.08	18.30	10.31	0.18	61.80
2022-08-17	12:02:00	72.69	0.00	0.00	0.08	20.10	9.64	0.06	47.50
2022-08-17	12:03:00	57.65	0.00	0.00	0.08	19.40	9.85	0.22	46.80
2022-08-17	12:04:00	109.37	0.00	0.00	0.08	25.00	8.73	0.22	77.40
2022-08-17	12:05:00	68.04	0.00	0.00	0.08	18.00	9.63	0.35	60.10
2022-08-17	12:06:00	76.93	0.00	0.00	0.08	21.20	9.44	0.37	39.80
2022-08-17	12:07:00	60.43	0.00	0.00	0.08	17.80	10.08	0.45	79.70
2022-08-17	12:08:00	54.28	0.00	0.00	0.08	18.00	10.08	0.56	43.30
2022-08-17	12:09:00	74.53	0.00	0.00	0.08	19.40	9.65	0.30	59.60
2022-08-17	12:10:00	81.17	0.00	0.00	0.08	20.20	9.44	0.36	66.80
2022-08-17	12:11:00	58.07	0.00	0.00	0.09	18.80	9.64	0.48	40.30
2022-08-17	12:12:00	71.31	0.00	0.00	0.08	22.90	9.69	0.41	53.80
2022-08-17	12:13:00	89.09	0.00	0.00	0.08	24.10	8.40	0.42	107.50
2022-08-17	12:14:00	59.93	0.00	0.00	0.08	18.80	9.86	0.25	78.50
2022-08-17	12:15:00	64.86	0.00	0.00	0.08	21.40	9.22	0.18	61.50
2022-08-17	12:16:00	59.87	0.00	0.00	0.08	17.90	9.73	0.15	84.80
2022-08-17	12:17:00	76.08	0.00	0.00	0.09	19.60	9.73	0.36	58.20
2022-08-17	12:18:00	62.54	0.00	0.00	0.08	18.60	9.93	0.22	36.40

		Analyzers							
		Backup CO	Main HCl	Main CO2	Main H2O	THC	Backup O2	Opacity	Backup SO2
		PPM	PPM	%	%	PPM	%	%	PPM
$Date	$Time	AT-205-2NEW	AT-213A-1NEW	AT-213B-1NEW	AT-213CB	AT-259-1NEW	AT-261A-2NEW	AT-263	AT-264-2NEW
2022-08-17	12:19:00	72.71	0.00	0.00	0.08	20.80	9.30	0.27	83.40
2022-08-17	12:20:00	49.32	0.00	0.00	0.08	17.20	9.73	0.48	68.60
2022-08-17	12:21:00	85.34	0.00	0.00	0.08	27.30	9.14	0.48	52.60
2022-08-17	12:22:00	54.78	0.00	0.00	0.08	18.40	9.72	0.46	89.20
2022-08-17	12:23:00	54.81	0.00	0.00	0.08	18.90	9.48	0.56	85.10
2022-08-17	12:24:00	57.35	0.00	0.00	0.08	18.80	10.32	0.45	39.50
2022-08-17	12:25:00	63.02	0.00	0.00	0.08	17.20	9.89	0.32	31.20
2022-08-17	12:26:00	64.54	0.00	0.00	0.09	22.10	9.67	0.15	27.10
2022-08-17	12:27:00	61.98	0.00	0.00	0.08	19.70	9.47	0.17	87.20
2022-08-17	12:28:00	68.11	0.00	0.00	0.09	21.30	9.07	0.26	62.80
2022-08-17	12:29:00	74.07	0.00	0.00	0.08	21.90	9.76	0.26	80.20
2022-08-17	12:30:00	76.27	0.00	0.00	0.08	22.10	8.94	0.15	46.90
2022-08-17	12:31:00	49.31	0.00	0.00	0.08	18.10	9.92	0.00	72.10
2022-08-17	12:32:00	54.46	0.00	0.00	0.08	19.40	9.28	0.31	72.30
2022-08-17	12:33:00	50.04	0.00	0.00	0.08	17.20	9.78	0.32	57.70
2022-08-17	12:34:00	57.07	0.00	0.00	0.08	17.50	10.00	0.32	47.80
2022-08-17	12:35:00	47.10	0.00	0.00	0.08	18.10	9.77	0.26	46.90
2022-08-17	12:36:00	63.88	0.00	0.00	0.08	18.70	9.77	0.25	53.70
2022-08-17	12:37:00	63.50	0.00	0.00	0.08	16.90	9.77	0.37	45.20
2022-08-17	12:38:00	64.74	0.00	0.00	0.08	21.70	9.34	0.26	47.90
2022-08-17	12:39:00	101.13	0.00	0.00	0.08	25.80	9.40	0.20	61.40
2022-08-17	12:40:00	55.07	0.00	0.00	0.08	18.50	9.82	0.22	76.80
2022-08-17	12:41:00	56.83	0.00	0.00	0.08	19.10	9.51	0.37	47.20
2022-08-17	12:42:00	73.91	0.00	0.00	0.09	18.60	9.99	0.33	45.90
2022-08-17	12:43:00	64.89	0.00	0.00	0.08	17.20	9.78	0.16	61.10
2022-08-17	12:44:00	72.82	0.00	0.00	0.08	22.40	9.75	0.18	35.50
2022-08-17	12:45:00	73.58	0.00	0.00	0.08	19.50	9.47	0.30	68.00
2022-08-17	12:46:00	48.13	0.00	0.00	0.09	20.10	9.52	0.30	60.50
2022-08-17	12:47:00	72.19	0.00	0.00	0.09	24.30	8.90	0.28	76.70
2022-08-17	12:48:00	49.16	0.00	0.00	0.08	17.70	10.11	0.22	67.70
2022-08-17	12:49:00	60.69	0.00	0.00	0.08	21.00	9.07	0.30	73.60
2022-08-17	12:50:00	46.75	0.00	0.00	0.08	16.30	9.80	0.18	63.90
2022-08-17	12:51:00	87.02	0.00	0.00	0.09	21.50	9.37	0.15	52.00
2022-08-17	12:52:00	64.60	0.00	0.00	0.08	18.20	9.82	0.11	70.30
2022-08-17	12:53:00	61.79	0.00	0.00	0.08	22.20	9.34	0.21	75.10
2022-08-17	12:54:00	53.62	0.00	0.00	0.08	16.30	9.78	0.18	65.80
2022-08-17	12:55:00	99.44	0.00	0.00	0.08	23.20	9.78	0.11	38.30
2022-08-17	12:56:00	99.03	0.00	0.00	0.08	23.80	10.00	0.16	68.20
2022-08-17	12:57:00	74.83	0.00	0.00	0.09	24.70	9.41	0.26	53.50
2022-08-17	12:58:00	66.54	0.00	0.00	0.08	18.40	9.46	0.41	95.70
2022-08-17	12:59:00	62.50	0.00	0.00	0.08	17.80	10.01	0.22	44.60
2022-08-17	13:00:00	81.59	0.00	0.00	0.08	19.10	9.81	0.17	46.40
2022-08-17	13:01:00	92.22	0.00	0.00	0.09	21.00	9.81	0.25	45.60
2022-08-17	13:02:00	83.09	0.00	0.00	0.08	21.70	9.61	0.21	46.50

August 17/2022	**Analyzers**							
	Backup CO	Main HCl	Main CO2	Main H2O	THC	Backup O2	Opacity	Backup SO2
Test	AT-205-2NEW	AT-213A-1NEW	AT-213B-1NEW	AT-213CB	AT-259-1NEW	%	AT-263	AT-264-2NEW
Units	PPM	PPM	%	%	PPM	AT-261A-2NEW	%	PPM
Max	109.37	0.00	0.00	0.09	30.70	10.35	1.33	158.10
Min	41.91	0.00	0.00	0.08	16.30	8.40	0.00	27.10
Average	62.24	0.00	0.00	0.08	19.74	9.55	0.37	69.70
Variance	171.21	0.00	0.00	0.00	6.13	0.13	0.02	449.02

		Analyzers							
		Backup CO	Main HCl	Main CO2	Main H2O	THC	Backup O2	Opacity	Backup SO2
		PPM	PPM	%	%	PPM	%	%	PPM
$Date	$Time	AT-205-2NEW	AT-213A-1NEW	AT-213B-1NEW	AT-213CB	AT-259-1NEW	AT-261A-2NEW	AT-263	AT-264-2NEW
2022-08-17	13:53:00	58.60	0.00	0.00	0.08	20.90	9.20	0.30	101.90
2022-08-17	13:54:00	41.86	0.00	0.00	0.08	17.80	9.42	0.26	85.30
2022-08-17	13:55:00	62.16	0.00	0.00	0.08	23.50	9.02	0.26	86.60
2022-08-17	13:56:00	63.73	0.00	0.00	0.08	18.90	9.12	0.22	126.00
2022-08-17	13:57:00	63.84	0.00	0.00	0.08	20.00	8.91	0.26	117.80
2022-08-17	13:58:00	43.86	0.00	0.00	0.08	17.20	9.50	0.15	86.30
2022-08-17	13:59:00	60.64	0.00	0.00	0.08	19.00	9.25	0.26	115.70
2022-08-17	14:00:00	43.65	0.00	0.00	0.08	16.80	9.47	0.18	104.80
2022-08-17	14:01:00	50.41	0.00	0.00	0.08	19.40	9.68	0.31	80.60
2022-08-17	14:02:00	56.77	0.00	0.00	0.09	22.10	9.27	0.30	66.10
2022-08-17	14:03:00	50.78	0.00	0.00	0.08	24.70	8.62	0.26	124.60
2022-08-17	14:04:00	57.71	0.00	0.00	0.08	23.80	8.41	0.28	120.00
2022-08-17	14:05:00	48.12	0.00	0.00	0.08	18.10	9.40	0.37	93.30
2022-08-17	14:06:00	124.75	0.00	0.00	0.08	29.30	8.33	0.40	126.90
2022-08-17	14:07:00	40.52	0.00	0.00	0.08	16.30	9.82	0.18	112.00
2022-08-17	14:08:00	46.21	0.00	0.00	0.08	18.80	9.39	0.13	82.90
2022-08-17	14:09:00	43.47	0.00	0.00	0.08	18.30	9.39	0.22	91.30
2022-08-17	14:10:00	52.12	0.00	0.00	0.08	21.20	9.19	0.13	90.90
2022-08-17	14:11:00	44.55	0.00	0.00	0.08	19.60	9.45	0.23	76.90
2022-08-17	14:12:00	69.01	0.00	0.00	0.08	23.30	8.58	0.27	150.10
2022-08-17	14:13:00	44.32	0.00	0.00	0.08	17.80	9.46	0.13	93.90
2022-08-17	14:14:00	49.03	0.00	0.00	0.08	19.80	9.26	0.31	105.40
2022-08-17	14:15:00	41.07	0.00	0.00	0.08	17.30	9.72	0.26	111.80
2022-08-17	14:16:00	53.96	0.00	0.00	0.08	17.30	9.71	0.37	71.90
2022-08-17	14:17:00	78.89	0.00	0.00	0.08	22.70	9.51	0.26	50.40
2022-08-17	14:18:00	63.29	0.00	0.00	0.08	20.60	9.31	0.33	101.60
2022-08-17	14:19:00	54.65	0.00	0.00	0.08	19.80	9.10	0.35	92.30
2022-08-17	14:20:00	41.23	0.00	0.00	0.08	20.40	9.53	0.33	83.80
2022-08-17	14:21:00	90.05	0.00	0.00	0.08	26.10	8.44	0.33	116.80
2022-08-17	14:22:00	52.46	0.00	0.00	0.08	17.20	9.52	0.30	106.10
2022-08-17	14:23:00	100.82	0.00	0.00	0.08	28.30	8.62	0.15	80.60
2022-08-17	14:24:00	54.60	0.00	0.00	0.08	17.20	9.08	0.22	139.70
2022-08-17	14:25:00	60.55	0.00	0.00	0.08	18.40	9.32	0.30	99.10
2022-08-17	14:26:00	45.79	0.00	0.00	0.08	18.40	9.74	0.21	69.20
2022-08-17	14:27:00	44.15	0.00	0.00	0.08	19.20	9.10	0.15	97.90
2022-08-17	14:28:00	46.27	0.00	0.00	0.08	17.00	9.77	0.26	59.50
2022-08-17	14:29:00	125.51	0.00	0.00	0.08	50.60	8.46	0.32	95.20
2022-08-17	14:30:00	60.02	0.00	0.00	0.08	18.90	9.40	0.35	132.00
2022-08-17	14:31:00	55.27	0.00	0.00	0.08	20.00	9.56	0.26	108.20
2022-08-17	14:32:00	49.45	0.00	0.00	0.08	20.80	9.57	0.30	81.20
2022-08-17	14:33:00	40.67	0.00	0.00	0.08	16.50	9.29	0.22	105.30
2022-08-17	14:34:00	43.27	0.00	0.00	0.08	16.60	9.69	0.10	53.90
2022-08-17	14:35:00	42.99	0.00	0.00	0.08	20.40	9.67	0.26	75.80
2022-08-17	14:36:00	43.04	0.00	0.00	0.08	17.90	9.02	0.37	122.90
2022-08-17	14:37:00	57.43	0.00	0.00	0.08	23.00	9.67	0.33	60.10
2022-08-17	14:38:00	47.84	0.00	0.00	0.08	22.70	8.35	0.33	112.90
2022-08-17	14:39:00	42.29	0.00	0.00	0.08	18.10	9.29	0.31	139.40
2022-08-17	14:40:00	52.57	0.00	0.00	0.08	23.30	9.27	0.30	69.70
2022-08-17	14:41:00	48.39	0.00	0.00	0.08	18.10	9.27	0.21	143.70
2022-08-17	14:42:00	43.25	0.00	0.00	0.08	19.50	8.86	0.35	145.70
2022-08-17	14:43:00	34.81	0.00	0.00	0.08	15.80	9.75	0.23	122.70
2022-08-17	14:44:00	42.94	0.00	0.00	0.08	21.00	9.12	0.30	112.30
2022-08-17	14:45:00	36.62	0.00	0.00	0.08	16.90	9.11	0.41	118.80
2022-08-17	14:46:00	42.17	0.00	0.00	0.09	20.30	9.11	0.45	87.10
2022-08-17	14:47:00	41.70	0.00	0.00	0.08	18.90	9.82	0.33	92.50
2022-08-17	14:48:00	46.49	0.00	0.00	0.08	20.60	8.73	0.36	118.70
2022-08-17	14:49:00	43.23	0.00	0.00	0.08	17.70	9.44	0.37	108.60
2022-08-17	14:50:00	49.50	0.00	0.00	0.08	19.50	9.22	0.30	79.50

		Analyzers							
		Backup CO	Main HCl	Main CO2	Main H2O	THC	Backup O2	Opacity	Backup SO2
		PPM	PPM	%	%	PPM	%	%	PPM
$Date	$Time	AT-205-2NEW	AT-213A-1NEW	AT-213B-1NEW	AT-213CB	AT-259-1NEW	AT-261A-2NEW	AT-263	AT-264-2NEW
2022-08-17	14:51:00	35.04	0.00	0.00	0.08	17.80	9.22	0.18	121.80
2022-08-17	14:52:00	35.07	0.00	0.00	0.08	16.90	9.44	0.26	95.20
2022-08-17	14:53:00	47.95	0.00	0.00	0.08	18.90	9.44	0.37	61.90
2022-08-17	14:54:00	38.58	0.00	0.00	0.08	21.70	9.44	0.22	77.60
2022-08-17	14:55:00	51.95	0.00	0.00	0.08	23.90	8.52	0.41	131.30
2022-08-17	14:56:00	37.46	0.00	0.00	0.08	17.00	9.61	0.37	94.80
2022-08-17	14:57:00	41.61	0.00	0.00	0.08	18.70	9.19	0.33	103.30
2022-08-17	14:58:00	44.07	0.00	0.00	0.08	16.80	9.15	0.31	89.00
2022-08-17	14:59:00	43.27	0.00	0.00	0.08	16.60	9.59	0.26	85.30
2022-08-17	15:00:00	38.00	0.00	0.00	0.08	17.20	9.39	0.22	76.50
2022-08-17	15:01:00	39.60	0.00	0.00	0.08	18.60	8.96	0.27	123.80
2022-08-17	15:02:00	40.51	0.00	0.00	0.08	17.80	9.44	0.33	71.20
2022-08-17	15:03:00	47.61	0.00	0.00	0.08	23.70	8.80	0.30	106.90
2022-08-17	15:04:00	42.60	0.00	0.00	0.08	19.60	9.66	0.35	147.00
2022-08-17	15:05:00	37.08	0.00	0.00	0.08	18.60	9.64	0.33	78.30
2022-08-17	15:06:00	39.18	0.00	0.00	0.08	17.60	9.26	0.33	85.70
2022-08-17	15:07:00	36.73	0.00	0.00	0.08	16.30	9.61	0.31	87.20
2022-08-17	15:08:00	39.51	0.00	0.00	0.09	16.80	9.19	0.36	87.10
2022-08-17	15:09:00	38.36	0.00	0.00	0.08	18.70	9.82	0.07	60.80
2022-08-17	15:10:00	39.93	0.00	0.00	0.09	18.30	9.11	0.22	106.10
2022-08-17	15:11:00	49.94	0.00	0.00	0.09	18.80	9.76	0.26	62.20
2022-08-17	15:12:00	53.81	0.00	0.00	0.08	21.40	8.91	0.33	73.90
2022-08-17	15:13:00	47.83	0.00	0.00	0.08	17.30	9.37	0.33	88.20
2022-08-17	15:14:00	58.66	0.00	0.00	0.08	19.70	9.34	0.37	56.20
2022-08-17	15:15:00	42.89	0.00	0.00	0.08	16.00	9.74	0.37	58.40
2022-08-17	15:16:00	45.71	0.00	0.00	0.08	17.20	9.52	0.33	70.20
2022-08-17	15:17:00	44.83	0.00	0.00	0.08	16.30	9.94	0.30	51.50
2022-08-17	15:18:00	59.96	0.00	0.00	0.08	19.20	9.11	0.38	87.10
2022-08-17	15:19:00	40.48	0.00	0.00	0.08	16.60	9.22	0.36	108.50
2022-08-17	15:20:00	43.89	0.00	0.00	0.08	17.70	9.65	0.35	64.90
2022-08-17	15:21:00	52.19	0.00	0.00	0.08	21.00	9.90	0.33	70.90
2022-08-17	15:22:00	39.50	0.00	0.00	0.09	18.60	9.22	0.26	102.80
2022-08-17	15:23:00	0.78	0.00	0.00	0.08	3.60	21.17	0.35	0.00
2022-08-17	15:24:00	37.73	0.00	0.00	0.08	17.90	10.07	0.30	0.00
2022-08-17	15:25:00	37.89	0.00	0.00	0.08	17.00	9.40	0.31	46.50
2022-08-17	15:26:00	41.72	0.00	0.00	0.08	17.30	10.06	0.21	35.50
2022-08-17	15:27:00	58.05	0.00	0.00	0.08	19.60	9.20	0.41	46.20
2022-08-17	15:28:00	37.62	0.00	0.00	0.08	18.10	9.68	0.31	70.80
2022-08-17	15:29:00	46.41	0.00	0.00	0.08	21.10	9.27	0.27	41.40
2022-08-17	15:30:00	34.23	0.00	0.00	0.08	12.90	10.45	0.11	45.60
2022-08-17	15:31:00	26.68	0.00	0.00	0.08	9.30	10.02	0.06	102.30
2022-08-17	15:32:00	24.50	0.00	0.00	0.09	9.80	10.82	0.07	155.40
2022-08-17	15:33:00	465.83	0.00	0.00	0.09	11.90	12.27	0.06	37.50
2022-08-17	15:34:00	162.86	0.00	0.00	0.08	10.00	13.94	0.06	0.00
2022-08-17	15:35:00	24.23	0.00	0.00	0.09	10.20	14.35	0.06	0.00
2022-08-17	15:36:00	23.32	0.00	0.00	0.08	10.10	14.57	0.07	0.00
2022-08-17	15:37:00	22.15	0.00	0.00	0.08	10.30	14.57	0.15	0.00
2022-08-17	15:38:00	22.08	0.00	0.00	0.09	10.00	14.57	0.25	0.00
2022-08-17	15:39:00	23.05	0.00	0.00	0.08	10.50	14.57	0.20	0.00
2022-08-17	15:40:00	23.37	0.00	0.00	0.08	10.30	14.57	0.06	0.00
2022-08-17	15:41:00	23.79	0.00	0.00	0.08	10.40	14.78	0.07	0.00
2022-08-17	15:42:00	22.93	0.00	0.00	0.08	10.50	14.78	0.06	0.00
2022-08-17	15:43:00	22.89	0.00	0.00	0.08	10.60	14.78	0.11	0.00
2022-08-17	15:44:00	22.77	0.00	0.00	0.09	10.60	14.78	0.17	0.00
2022-08-17	15:45:00	21.83	0.00	0.00	0.08	8.20	13.10	0.11	0.00
2022-08-17	15:46:00	20.82	0.00	0.00	0.08	7.70	10.91	0.15	0.00
2022-08-17	15:47:00	20.57	0.00	0.00	0.08	6.10	13.02	0.11	167.40
2022-08-17	15:48:00	24.12	0.00	0.00	0.08	6.60	14.57	0.15	203.00

		Analyzers							
		Backup CO	Main HCl	Main CO2	Main H2O	THC	Backup O2	Opacity	Backup SO2
		PPM	PPM	%	%	PPM	%	%	PPM
$Date	$Time	AT-205-2NEW	AT-213A-1NEW	AT-213B-1NEW	AT-213CB	AT-259-1NEW	AT-261A-2NEW	AT-263	AT-264-2NEW
2022-08-17	15:49:00	24.54	0.00	0.00	0.08	10.20	12.58	0.18	160.20
2022-08-17	15:50:00	32.04	0.00	0.00	0.08	12.90	11.04	0.23	55.90
2022-08-17	15:51:00	39.24	0.00	0.00	0.09	13.90	10.87	0.15	19.40
2022-08-17	15:52:00	86.65	0.00	0.00	0.09	17.60	10.22	0.22	1.10
2022-08-17	15:53:00	70.09	0.00	0.00	0.08	18.50	9.64	0.33	23.60
2022-08-17	15:54:00	64.98	0.00	0.00	0.09	21.80	8.93	0.30	83.20
2022-08-17	15:55:00	79.13	0.00	0.00	0.08	18.10	9.35	0.30	77.20
2022-08-17	15:56:00	87.68	0.00	0.00	0.08	18.30	10.24	0.30	32.90
2022-08-17	15:57:00	101.29	0.00	0.00	0.08	19.10	9.60	0.37	33.60
2022-08-17	15:58:00	101.39	0.00	0.00	0.08	17.70	10.40	0.33	23.10
2022-08-17	15:59:00	98.82	0.00	0.00	0.08	19.20	10.40	0.22	0.00
2022-08-17	16:00:00	113.09	0.00	0.00	0.08	21.00	10.61	0.26	1.10
2022-08-17	16:01:00	142.08	0.00	0.00	0.08	22.10	9.94	0.33	28.10
2022-08-17	16:02:00	86.67	0.00	0.00	0.08	19.90	10.18	0.30	37.90
2022-08-17	16:03:00	106.59	0.00	0.00	0.09	22.30	9.56	0.30	28.10
2022-08-17	16:04:00	103.63	0.00	0.00	0.08	18.20	10.05	0.38	57.90
2022-08-17	16:05:00	96.43	0.00	0.00	0.08	21.70	9.65	0.20	42.50
2022-08-17	16:06:00	104.27	0.00	0.00	0.08	18.60	10.11	0.23	43.00
2022-08-17	16:07:00	131.58	0.00	0.00	0.09	20.30	10.12	0.26	37.00
2022-08-17	16:08:00	142.41	0.00	0.00	0.08	19.20	10.18	0.27	24.70
2022-08-17	16:09:00	96.88	0.00	0.00	0.08	23.00	9.56	0.33	53.40
2022-08-17	16:10:00	97.70	0.00	0.00	0.08	22.70	9.79	0.36	67.00
2022-08-17	16:11:00	84.51	0.00	0.00	0.08	23.40	9.12	0.41	76.00
2022-08-17	16:12:00	98.34	0.00	0.00	0.08	21.40	9.12	0.38	70.30
2022-08-17	16:13:00	91.82	0.00	0.00	0.09	20.80	9.76	0.50	54.90
2022-08-17	16:14:00	81.52	0.00	0.00	0.08	22.10	9.15	0.41	75.20
2022-08-17	16:15:00	58.37	0.00	0.00	0.08	18.70	9.80	0.33	97.30
2022-08-17	16:16:00	86.29	0.00	0.00	0.08	20.70	9.59	0.38	83.20
2022-08-17	16:17:00	67.20	0.00	0.00	0.08	19.20	9.80	0.18	68.10
2022-08-17	16:18:00	89.34	0.00	0.00	0.08	21.20	9.14	0.18	101.70
2022-08-17	16:19:00	61.00	0.00	0.00	0.08	19.50	9.33	0.31	86.80
2022-08-17	16:20:00	85.92	0.00	0.00	0.08	23.70	8.89	0.33	107.90
2022-08-17	16:21:00	77.28	0.00	0.00	0.08	18.60	9.34	0.31	90.40
2022-08-17	16:22:00	63.65	0.00	0.00	0.08	21.20	9.34	0.30	95.30
2022-08-17	16:23:00	62.31	0.00	0.00	0.08	19.00	9.42	0.38	103.80
2022-08-17	16:24:00	73.12	0.00	0.00	0.09	20.30	9.66	0.38	76.30
2022-08-17	16:25:00	62.63	0.00	0.00	0.08	19.70	9.64	0.36	97.40
2022-08-17	16:26:00	80.13	0.00	0.00	0.08	21.10	9.42	0.36	68.10
2022-08-17	16:27:00	58.01	0.00	0.00	0.08	20.90	9.01	0.42	96.50
2022-08-17	16:28:00	57.76	0.00	0.00	0.08	22.70	9.23	0.20	102.00
2022-08-17	16:29:00	61.26	0.00	0.00	0.08	23.70	8.40	0.26	120.80
2022-08-17	16:30:00	48.16	0.00	0.00	0.09	19.20	9.45	0.26	111.00
2022-08-17	16:31:00	64.41	0.00	0.00	0.08	25.30	9.02	0.33	89.70
2022-08-17	16:32:00	45.56	0.00	0.00	0.08	17.20	9.61	0.31	115.50
2022-08-17	16:33:00	62.63	0.00	0.00	0.09	22.10	9.39	0.37	70.10
2022-08-17	16:34:00	49.70	0.00	0.00	0.08	18.10	9.81	0.45	105.50
2022-08-17	16:35:00	74.92	0.00	0.00	0.08	22.10	8.97	0.30	88.70
2022-08-17	16:36:00	42.31	0.00	0.00	0.08	17.20	9.31	0.36	99.70
2022-08-17	16:37:00	59.57	0.00	0.00	0.08	23.40	8.73	0.41	99.50
2022-08-17	16:38:00	49.56	0.00	0.00	0.08	19.10	9.67	0.33	131.60
2022-08-17	16:39:00	66.06	0.00	0.00	0.08	21.70	9.01	0.32	113.70
2022-08-17	16:40:00	38.36	0.00	0.00	0.08	13.20	10.53	0.36	98.70
2022-08-17	16:41:00	31.07	0.00	0.00	0.08	11.90	11.38	0.38	92.00
2022-08-17	16:42:00	31.32	0.00	0.00	0.08	14.00	10.48	0.26	109.10
2022-08-17	16:43:00	49.24	0.00	0.00	0.08	20.10	9.63	0.35	74.40
2022-08-17	16:44:00	42.36	0.00	0.00	0.08	18.90	9.19	0.35	92.70
2022-08-17	16:45:00	53.91	0.00	0.00	0.08	22.60	9.44	0.33	76.10
2022-08-17	16:46:00	46.03	0.00	0.00	0.08	21.90	8.78	0.46	117.80

		Analyzers							
		Backup CO	Main HCl	Main CO2	Main H2O	THC	Backup O2	Opacity	Backup SO2
		PPM	PPM	%	%	PPM	%	%	PPM
$Date	$Time	AT-205-2NEW	AT-213A-1NEW	AT-213B-1NEW	AT-213CB	AT-259-1NEW	AT-261A-2NEW	AT-263	AT-264-2NEW
2022-08-17	16:47:00	47.00	0.00	0.00	0.08	18.60	9.31	0.35	123.70
2022-08-17	16:48:00	56.17	0.00	0.00	0.08	20.20	9.31	0.46	94.00
2022-08-17	16:49:00	58.93	0.00	0.00	0.08	18.40	9.65	0.31	64.90
2022-08-17	16:50:00	62.16	0.00	0.00	0.08	16.90	9.85	0.30	66.70
2022-08-17	16:51:00	66.15	0.00	0.00	0.08	19.40	9.42	0.26	50.30
2022-08-17	16:52:00	63.93	0.00	0.00	0.08	17.40	9.63	0.37	55.30
2022-08-17	16:53:00	83.43	0.00	0.00	0.08	22.90	9.02	0.46	54.00
2022-08-17	16:54:00	62.64	0.00	0.00	0.08	18.50	10.11	0.42	77.90
2022-08-17	16:55:00	67.07	0.00	0.00	0.08	21.50	9.60	0.37	63.20
2022-08-17	16:56:00	79.24	0.00	0.00	0.08	19.80	9.77	0.41	71.60
2022-08-17	16:57:00	72.32	0.00	0.00	0.08	18.10	9.78	0.45	54.40
2022-08-17	16:58:00	105.66	0.00	0.00	0.08	19.60	9.78	0.30	56.80
2022-08-17	16:59:00	81.42	0.00	0.00	0.08	19.20	9.78	0.31	67.60
2022-08-17	17:00:00	69.82	0.00	0.00	0.08	21.80	9.36	0.45	52.30
2022-08-17	17:01:00	80.18	0.00	0.00	0.08	25.70	9.33	0.41	64.90
2022-08-17	17:02:00	58.71	0.00	0.00	0.08	21.20	9.10	0.46	88.00
2022-08-17	17:03:00	53.38	0.00	0.00	0.08	17.70	9.36	0.38	110.50
2022-08-17	17:04:00	83.40	0.00	0.00	0.08	22.50	9.15	0.48	71.80
2022-08-17	17:05:00	57.21	0.00	0.00	0.08	17.70	9.57	0.37	76.70
2022-08-17	17:06:00	59.53	0.00	0.00	0.08	18.90	9.57	0.33	70.30
2022-08-17	17:07:00	50.63	0.00	0.00	0.08	17.20	9.78	0.30	59.50
2022-08-17	17:08:00	77.56	0.00	0.00	0.08	20.70	9.09	0.33	95.20
2022-08-17	17:09:00	75.44	0.00	0.00	0.08	18.90	9.33	0.36	66.70
2022-08-17	17:10:00	62.52	0.00	0.00	0.08	22.10	8.65	0.30	102.60
2022-08-17	17:11:00	58.36	0.00	0.00	0.08	20.70	9.82	0.45	95.70
2022-08-17	17:12:00	62.11	0.00	0.00	0.08	21.40	9.31	0.37	69.10
2022-08-17	17:13:00	68.69	0.00	0.00	0.08	20.40	9.10	0.45	105.10
2022-08-17	17:14:00	64.78	0.00	0.00	0.08	20.10	9.43	0.48	84.70
2022-08-17	17:15:00	70.74	0.00	0.00	0.08	18.70	9.43	0.33	73.70
2022-08-17	17:16:00	59.50	0.00	0.00	0.08	20.70	9.26	0.35	50.50
2022-08-17	17:17:00	55.25	0.00	0.00	0.08	20.00	9.26	0.37	67.00
2022-08-17	17:18:00	61.57	0.00	0.00	0.08	20.40	9.26	0.50	84.20
2022-08-17	17:19:00	77.48	0.00	0.00	0.08	30.20	8.65	0.51	95.80
2022-08-17	17:20:00	53.81	0.00	0.00	0.08	18.50	9.36	0.48	114.10
2022-08-17	17:21:00	63.82	0.00	0.00	0.08	21.20	9.15	0.38	72.90
2022-08-17	17:22:00	46.22	0.00	0.00	0.08	17.10	9.57	0.46	68.90
2022-08-17	17:23:00	88.28	0.00	0.00	0.08	21.90	9.36	0.36	68.90
2022-08-17	17:24:00	62.90	0.00	0.00	0.08	18.10	9.80	0.13	69.90
2022-08-17	17:25:00	86.04	0.00	0.00	0.08	22.00	8.98	0.37	84.10
2022-08-17	17:26:00	61.01	0.00	0.00	0.08	18.80	9.41	0.45	70.50
2022-08-17	17:27:00	62.06	0.00	0.00	0.08	24.10	8.99	0.50	80.30
2022-08-17	17:28:00	54.33	0.00	0.00	0.08	21.20	9.73	0.37	125.30

August 17/2022	**Analyzers**							
	Backup CO	Main HCl	Main CO2	Main H2O	THC	Backup O2	Opacity	Backup SO2
Test	AT-205-2NEW	AT-213A-1NEW	AT-213B-1NEW	AT-213CB	AT-259-1NEW	%	AT-263	AT-264-2NEW
Units	PPM	PPM	%	%	PPM	AT-261A-2NEW	%	PPM
Max	465.83	0.00	0.00	0.09	50.60	21.17	0.51	203.00
Min	0.78	0.00	0.00	0.08	3.60	8.33	0.06	0.00
Average	59.60	0.00	0.00	0.08	18.83	9.85	0.30	79.04
Variance	1369.00	0.00	0.00	0.00	20.61	2.37	0.01	1382.61

APPENDIX 19

Clean Harbors One-Minute Average
Process Data
(8 pages)

		Waste Flows								Air Flows				Temperatures						Pressures			
		Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PAC	Primary	Secondary	Stack Velocity	Stack Flow	Primary	Secondary A	Secondary B	Quench	SDA	Stack	Incinerator	SDA Inlet	BH Inlet	BH dP
		LPM	LPM	LPM	LPM	LPM	SCFM	LPM	Lbs/h	m3/h	m3/h	m/s	Rm3/s	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C	mmH2O	mmH2O	mmH2O	mmH2O
$Date	$Time	FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT	PV-236	PV-209	FT-260-VEL	FT-260-REFDRY	TE-240	TE-241		TE-203	TE-204	TE-258	PT-242A	PT-249	PT-615	PDT-622
2022-08-17	9:25:00	37.22	6.28	154.32	185.09	4.73	284.03	14.21	34.05	17700	11579	26.11	110222	1336.1	1110.6	1106.0	450.2	188.0	189.6	-21.0	-66.1	-113.2	294.3
2022-08-17	9:26:00	35.90	6.30	153.24	184.55	4.33	259.58	14.21	34.81	17631	11680	25.61	107968	1335.1	1112.2	1108.1	450.3	189.5	189.6	-20.6	-64.0	-111.6	303.3
2022-08-17	9:27:00	36.77	6.43	155.17	185.36	4.76	285.38	14.21	33.81	17438	11708	26.01	109662	1333.4	1110.6	1107.0	450.4	190.0	189.6	-17.5	-61.5	-105.9	294.3
2022-08-17	9:28:00	36.23	6.21	154.98	185.13	4.31	258.30	14.21	34.83	17288	11500	25.96	109416	1337.4	1113.3	1109.1	450.6	190.5	189.6	-16.5	-59.9	-102.0	304.3
2022-08-17	9:29:00	36.99	6.22	154.37	184.59	4.77	285.98	14.21	33.86	17394	11702	26.08	109859	1338.4	1114.5	1110.1	450.5	190.5	189.6	-12.7	-52.1	-99.8	325.3
2022-08-17	9:30:00	37.74	6.44	158.25	186.08	4.74	284.55	14.21	35.10	17125	11365	25.89	109053	1341.9	1118.2	1113.1	450.7	190.5	189.6	-5.9	-43.8	-90.4	335.1
2022-08-17	9:31:00	36.71	6.50	157.02	185.49	4.71	282.45	14.21	33.65	18006	11562	26.38	111109	1348.1	1122.3	1118.2	451.0	190.5	189.6	-17.5	-62.4	-111.3	304.8
2022-08-17	9:32:00	37.52	6.49	157.55	184.68	4.34	260.18	14.21	34.39	17181	11472	25.90	108995	1348.0	1121.9	1118.2	451.4	191.5	189.6	-9.2	-50.1	-97.6	319.3
2022-08-17	9:33:00	37.04	6.56	157.07	185.49	4.79	287.33	14.21	34.99	18125	11624	26.97	113473	1350.1	1126.4	1121.2	451.7	192.5	190.7	-22.8	-71.0	-124.0	282.3
2022-08-17	9:34:00	36.27	6.66	156.97	185.45	4.78	286.88	14.21	34.81	17581	11618	26.96	113322	1343.8	1123.1	1120.0	452.0	193.5	190.7	-18.6	-64.1	-110.0	298.7
2022-08-17	9:35:00	36.77	6.71	157.92	184.86	4.86	291.68	14.21	33.63	17800	11612	27.75	116478	1343.8	1122.0	1118.8	452.4	194.0	191.7	-27.2	-76.0	-124.9	250.7
2022-08-17	9:36:00	35.91	6.66	157.59	185.94	4.38	262.80	14.21	33.71	17250	11596	26.41	110849	1347.1	1124.7	1119.9	452.8	195.0	191.7	-13.7	-56.9	-100.1	299.0
2022-08-17	9:37:00	36.65	6.66	156.78	184.73	4.76	285.53	14.21	34.52	17388	11607	28.37	118909	1345.5	1123.3	1119.9	452.9	195.0	191.7	-26.2	-72.8	-118.9	254.3
2022-08-17	9:38:00	36.77	6.81	158.49	185.63	4.73	284.03	14.21	34.91	16963	11455	25.91	108947	1349.0	1123.1	1118.9	453.2	195.0	191.7	-7.9	-46.4	-90.6	331.1
2022-08-17	9:39:00	35.55	6.83	156.50	184.37	4.77	286.13	14.21	34.55	17006	11416	25.57	107205	1352.4	1125.0	1121.1	453.5	194.5	191.7	-7.1	-44.4	-86.3	339.6
2022-08-17	9:40:00	35.78	6.96	159.01	185.81	4.73	283.95	14.21	33.97	17600	11506	26.41	110662	1350.8	1124.8	1121.1	453.6	194.5	191.7	-11.8	-51.9	-100.8	313.4
2022-08-17	9:41:00	36.41	6.97	156.31	185.31	4.74	284.10	14.21	34.83	17056	11618	25.61	107346	1352.4	1127.0	1122.2	453.8	194.5	191.7	-10.3	-50.0	-96.0	324.4
2022-08-17	9:42:00	36.95	7.01	158.64	185.36	4.70	282.08	14.21	34.10	17481	11511	27.08	113477	1348.1	1129.0	1125.5	454.1	195.5	192.7	-17.4	-62.5	-112.7	292.6
2022-08-17	9:43:00	37.49	6.72	158.64	185.40	4.75	285.15	14.25	35.25	17356	11528	26.83	112359	1346.0	1128.4	1124.4	454.4	196.0	192.7	-15.0	-58.8	-104.9	304.0
2022-08-17	9:44:00	36.20	6.71	159.24	186.66	4.73	283.65	14.25	34.86	17544	11528	26.63	111367	1342.8	1127.8	1124.4	454.5	196.5	192.7	-14.7	-58.5	-103.4	294.4
2022-08-17	9:45:00	35.85	6.62	154.98	186.57	4.73	283.73	14.25	34.81	17188	11427	26.60	111218	1343.8	1128.4	1123.4	454.9	197.0	192.7	-11.6	-54.8	-97.0	303.4
2022-08-17	9:46:00	35.55	6.79	154.65	185.09	4.74	284.63	14.25	34.55	17444	11466	26.55	111001	1346.5	1127.1	1123.4	455.2	196.5	192.7	-10.1	-51.0	-97.8	322.8
2022-08-17	9:47:00	36.60	6.84	157.64	185.76	4.70	281.70	14.25	34.02	16981	11472	25.79	107846	1350.4	1128.9	1124.5	455.2	196.0	193.7	-6.7	-45.6	-87.2	335.2
2022-08-17	9:48:00	36.62	6.87	158.30	185.63	4.30	257.70	14.25	34.91	17806	11601	26.70	111640	1352.5	1128.9	1124.5	455.7	195.5	193.7	-18.6	-61.6	-114.3	298.9
2022-08-17	9:49:00	34.70	6.91	158.15	185.72	4.71	282.30	14.25	34.05	17238	11528	26.50	110737	1349.5	1127.6	1124.5	455.6	196.0	193.7	-11.9	-54.6	-97.2	319.2
2022-08-17	9:50:00	36.18	7.00	155.04	185.27	4.71	282.38	14.25	34.94	18119	11545	27.61	115452	1348.1	1125.1	1121.4	455.6	195.5	193.7	-23.8	-68.4	-125.1	273.6
2022-08-17	9:51:00	35.27	7.10	160.38	184.73	4.72	283.05	14.25	34.52	17463	11680	26.64	111331	1342.5	1123.3	1120.4	455.7	196.0	193.7	-18.0	-64.0	-109.4	297.3
2022-08-17	9:52:00	34.25	6.79	157.40	184.28	4.76	285.75	14.25	35.12	17600	11680	27.94	116727	1339.9	1122.4	1119.4	455.6	196.5	193.7	-28.6	-77.0	-122.8	250.9
2022-08-17	9:53:00	35.27	7.03	157.35	185.76	4.30	257.85	14.25	33.68	17338	11466	26.60	111148	1338.1	1120.6	1117.4	456.0	196.5	193.7	-13.3	-56.0	-99.0	298.9
2022-08-17	9:54:00	34.04	6.68	158.82	184.50	4.74	284.55	14.25	34.99	17456	11483	28.41	118711	1340.8	1122.8	1118.5	455.8	196.5	193.7	-25.1	-76.4	-110.3	263.9
2022-08-17	9:55:00	35.57	6.95	157.68	185.04	4.69	281.25	14.25	34.68	17206	11399	26.38	109920	1341.5	1119.9	1116.4	456.0	196.5	193.7	-6.6	-45.9	-91.1	330.7
2022-08-17	9:56:00	34.70	6.96	155.51	185.18	4.70	281.93	14.25	34.23	17144	11523	25.20	105322	1345.5	1122.8	1118.7	455.7	195.5	193.7	-5.7	-45.6	-86.7	341.2
2022-08-17	9:57:00	33.72	6.93	160.01	186.26	4.72	283.28	14.25	34.07	17350	11472	26.43	110439	1341.5	1122.3	1119.7	455.9	195.5	193.7	-13.5	-57.0	-101.9	313.6
2022-08-17	9:58:00	35.64	6.90	158.54	185.63	4.71	282.83	14.25	34.78	17206	11680	26.45	110542	1340.5	1120.0	1117.5	455.5	195.0	193.7	-8.8	-49.0	-93.4	323.8
2022-08-17	9:59:00	36.11	6.95	157.83	185.27	4.81	288.53	14.25	34.97	17775	11534	27.13	113364	1339.5	1120.8	1116.4	455.4	195.0	193.7	-17.8	-63.3	-111.0	292.3
2022-08-17	10:00:00	34.76	6.85	157.74	184.46	4.79	287.63	14.25	34.94	17650	11607	26.21	109550	1341.8	1122.6	1118.6	455.3	196.0	193.7	-17.1	-61.1	-105.8	302.3
2022-08-17	10:01:00	37.26	6.95	156.22	185.00	4.78	286.80	14.25	34.60	17563	11607	26.32	109724	1339.4	1121.4	1118.6	455.5	196.0	193.7	-14.7	-59.0	-104.8	294.3
2022-08-17	10:02:00	35.69	7.00	157.68	184.91	4.73	284.03	14.25	33.57	17113	11376	26.14	109260	1344.5	1123.9	1119.6	455.5	196.5	193.7	-12.3	-54.0	-98.9	303.4
2022-08-17	10:03:00	34.89	6.84	156.50	184.59	4.72	283.28	14.25	33.73	17375	11562	26.06	108911	1342.3	1124.6	1121.6	455.3	196.5	193.7	-12.4	-52.4	-98.3	325.8
2022-08-17	10:04:00	35.66	6.95	157.07	185.54	4.77	286.28	14.25	34.52	16906	11371	25.97	108140	1344.4	1125.9	1121.6	455.6	196.5	193.7	-5.4	-46.8	-86.9	334.9
2022-08-17	10:05:00	35.04	6.90	158.64	184.50	4.78	286.73	14.25	34.76	17794	11612	26.92	112522	1346.5	1128.3	1124.7	455.7	195.5	193.7	-20.2	-65.5	-116.6	285.7
2022-08-17	10:06:00	36.18	6.98	157.92	185.76	4.77	285.98	14.25	33.73	17150	11399	25.80	107881	1346.4	1128.1	1124.7	455.8	195.5	193.7	-10.4	-52.5	-95.9	317.3
2022-08-17	10:07:00	34.98	6.82	157.21	184.19	4.80	288.00	14.25	35.12	17669	11612	28.14	117629	1345.9	1129.0	1124.7	455.7	195.5	193.7	-30.0	-80.4	-125.0	242.6
2022-08-17	10:08:00	34.86	6.84	158.87	185.31	4.81	288.30	14.25	33.94	17313	11528	26.93	112509	1344.1	1124.5	1121.3	455.8	196.0	193.7	-16.6	-60.1	-105.8	298.4
2022-08-17	10:09:00	34.98	6.82	156.93	185.45	4.78	286.73	14.25	33.94	17688	11534	27.42	114518	1346.6	1125.8	1121.3	455.9	196.0	193.7	-27.2	-77.3	-118.6	252.1
2022-08-17	10:10:00	35.51	6.98	158.40	185.81	4.76	285.75	14.25	34.55	17356	11506	25.67	107222	1342.5	1126.2	1122.4	455.8	196.5	193.7	-12.3	-55.4	-100.1	298.9
2022-08-17	10:11:00	34.07	6.89	158.73	184.95	4.86	291.60	14.25	34.34	17200	11405	25.54	106581	1340.9	1126.3	1122.4	456.1	196.5	193.7	-9.7	-50.4	-96.4	303.9
2022-08-17	10:12:00	35.22	6.86	155.41	185.27	4.74	284.63	14.25	34.70	17163	11674	25.30	105649	1346.4	1125.4	1121.4	455.8	196.5	193.7	-10.9	-51.0	-93.7	330.1
2022-08-17	10:13:00	34.50	6.85	156.84	185.18	4.83	289.58	14.25	34.13	16956	11545	25.39	106033	1349.3	1125.7	1121.4	455.9	196.0	193.7	-5.2	-44.8	-87.5	338.7
2022-08-17	10:14:00	37.71	6.93	157.64	185.94	4.33	259.65	14.25	34.86	17431	11545	25.95	108409	1351.9	1126.0	1122.5	455.7	196.0	193.7	-10.3	-53.1	-101.9	312.2
2022-08-17	10:15:00	37.41	6.94	156.97	185.54	4.72	282.90	14.25	33.92	17138	11584	25.82	107870	1357.9	1132.4	1127.8	455.6	196.5	193.7	-8.7	-50.0	-95.4	324.3
2022-08-17	10:16:00	34.22	6.73	158.96	185.54	4.76	285.30	14.25	34.28	17825	11545	26.43	110161	1350.6	1131.3	1127.9	455.9	197.0	193.7	-20.4	-65.3	-113.1	292.1
2022-08-17	10:17:00	36.80	6.88	158.87	185.49	4.74	284.18	14.25	34.60	17419	11641	26.35	109906	1344.0	1124.8	1121.4	456.3	198.0	194.7	-15.8	-61.1	-104.9	303.3
2022-08-17	10:18:00	35.03	6.83	158.15	184.41	4.33	260.03	14.25	33.71	17525	11523	26.16	109039	1342.5	1124.8	1121.4	456.6	198.0	194.7	-13.4	-56.4	-105.4	294.3
2022-08-17	10:19:00	34.89	6.86	157.40	184.91	4.80	288.08	14.25	34.78	17288	11376	25.76	107366	1342.1	1125.9	1121.4	456.7	198.5	194.7	-9.8	-52.0	-95.4	303.1
2022-08-17	10:20:00	35.21	6.87	158.87	184.01	4.80	287.78	14.25	33.76	17619	11494	25.41	105765	1343.1	1126.7	1123.6	457.0	198.5	194.7	-12.6	-54.4	-100.6	323.5
2022-08-17	10:21:00	34.23	6.99	158.87	185.36	4.73	283.88	14.25	34.44	17106	11489	25.10	104585	1347.1	1126.9	1122.5	457.0	198.5	194.7	-5.7	-42.9	-88.1	334.6
2022-08-17	10:22:00	34.29	6.81	157.92	184.86	4.78	287.03	14.25	34.97	17663	11624	26.62	110856	1348.0	1127.1	1122.5	457.0	197.5	194.7	-21.8	-68.5	-120.3	275.3
2022-08-17	10:23:00	34.02	6.77	157.97	184.68	4.71	282.38	14.25	34.86	17119	11523	25.28	105356	1342.9	1124.8	1121.4	457.0	197.0	194.7	-9.7	-50.9	-96.8	317.4
2022-08-17	10:24:00	34.59	6.70	157.44	184.64	4.81	288.53	14.25	34.18	17563	11528	28.20	117517	1344.1	1122.7	1119.4	456.9	196.5	194.7	-27.2	-75.3	-124.2	242.1
2022-08-17	10:25:00	35.04	6.80	157.74	185.31	4.36	261.30	14.25	34.94	17613	11641	26.53	110252	1338.9	1120.0	1117.3	456.5	196.5	194.7	-18.7	-63.9	-108.5	297.4
2022-08-17	10:26:00	35.06	6.68	157.44	184.68	4.72	283.20	14.25	33.84	17294	11618	28.03	116862	1338.1	1118.4	1115.2	456.4	197.0	194.7	-24.9	-75.5	-111.5	255.8
2022-08-17	10:27:00	34.26	6.91	158.21	185.18	4.76	285.45	14.25	34.86	17113	11590	26.12	108934	1338.5	1119.2	1115.2	456.6	197.0	194.7	-13.0	-55.0	-100.6	298.2
2022-08-17	10:28:00	34.56	6.76	157.07	185.40	4.77	286.13	14.25	34.81	17144	11624	25.65	106906	1338.3	1119.1	1115.2	456.2	196.5	194.7	-11.7	-52.5	-98.2	304.9
2022-08-17	10:29:00	34.28	6.92	158.11	185.36	4.75	284.70	14.25	34.20	17088	11483	25.82	107672	1336.3	1117.1	1114.1	455.9	196.0	194.7	-10.6	-51.8	-94.8	330.6
2022-08-17	10:30:00	34.26	6.83	157.44	184.95	4.75	285.08	14.25	34.20	16919	11483	25.70	107424	1340.1	1118.7	1115.1	455.5	195.0	194.7	-6.6	-45.4	-87.6	339.6
2022-08-17	10:31:00	34.44	6.83	158.40	185.31	4.76	285.45	14.25	33.86	17563	11523	25.77	107647	1338.8	1118.4	1115.0	455.4	194.5	194.7	-13.9	-57.0	-104.3	310.4
2022-08-17	10:32:00	34.94	6.82	157.68	185.13	4.77	286.05	14.25	34.36	17244	11523	26.07	108876	1336.1	1114.1	1110.8	455.1	194.5	194.7	-11.6	-53.1	-96.0	322.9
2022-08-17	10:33:00	32.84	6.85	158.40	185.72	4.89	293.10	14.25	34.70	17581	11539	26.29	109897	1337.9	1112.0	1109.7	455.1	194.0	193.6	-22.2	-68.5	-114.2	290.5

		Waste Flows								Air Flows				Temperatures						Pressures			
		Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PAC	Primary	Secondary	Stack Velocity	Stack Flow	Primary	Secondary A	Secondary B	Quench	SDA	Stack	Incinerator	5DA Inlet	BH Inlet	BH dP
		LPM	LPM	LPM	LPM	LPM	SCFM	LPM	Lbs/h	m3/h	m3/h	m/s	Rm3/s	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C	mmH2O	mmH2O	mmH2O	mmH2O
$Date	$Time	FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT	PV-236	PV-209	FT-260-VEL	FT-260-REFDRY	TE-240	TE-241		TE-203	TE-204	TE-258	PT-242A	PT-249	PT-615	PDT-622
2022-08-17	10:34:00	32.81	6.76	154.74	185.81	4.73	283.88	14.25	33.86	17413	11556	26.38	110290	1335.1	1110.2	1107.5	454.7	194.0	193.6	-19.9	-64.0	-108.9	302.6
2022-08-17	10:35:00	35.97	6.68	157.78	183.92	4.77	286.05	14.25	34.73	17569	11663	25.69	107374	1332.9	1108.0	1105.4	454.4	194.0	193.6	-17.1	-62.0	-106.7	293.3
2022-08-17	10:36:00	34.61	6.76	155.88	185.18	4.69	281.33	14.25	34.70	17169	11573	26.06	108993	1336.1	1109.9	1106.5	454.0	194.0	193.6	-13.3	-55.1	-99.7	301.3
2022-08-17	10:37:00	35.49	6.75	159.15	185.31	4.76	285.68	14.25	33.94	17681	11343	25.82	108010	1338.9	1113.4	1109.6	453.8	193.5	193.6	-14.2	-58.4	-105.8	321.4
2022-08-17	10:38:00	36.60	7.02	157.35	185.76	4.28	256.58	14.25	33.47	17063	11545	25.19	105198	1345.6	1118.6	1114.8	453.6	194.0	193.6	-6.6	-47.0	-90.1	334.5
2022-08-17	10:39:00	34.22	6.86	156.93	185.63	4.29	257.55	14.25	35.10	17700	11747	27.23	113986	1346.6	1124.1	1120.2	453.8	193.5	193.6	-30.1	-80.5	-128.6	245.2
2022-08-17	10:40:00	35.45	6.70	159.15	185.27	4.74	284.48	14.25	34.94	17188	11641	25.43	106398	1341.0	1119.6	1115.9	453.6	194.0	193.6	-9.7	-50.4	-98.7	316.0
2022-08-17	10:41:00	35.96	6.89	158.06	185.63	4.76	285.45	14.25	34.83	17381	11551	27.45	114686	1343.3	1121.2	1117.0	453.6	194.0	193.6	-28.5	-80.3	-120.1	245.9
2022-08-17	10:42:00	36.21	6.88	157.59	185.36	4.74	284.48	14.25	34.02	17744	11551	26.36	110291	1340.4	1120.2	1117.0	454.2	195.0	193.6	-17.1	-61.6	-108.2	297.8
2022-08-17	10:43:00	36.05	6.82	157.25	185.04	4.30	258.23	13.84	34.65	17406	11652	26.13	109330	1340.3	1120.8	1117.0	454.3	196.0	193.6	-16.1	-60.8	-106.2	304.8
2022-08-17	10:44:00	37.38	6.88	157.74	187.25	4.79	287.33	13.84	35.15	17200	11528	25.70	107398	1339.9	1118.3	1114.8	454.5	196.5	193.6	-12.2	-54.5	-101.6	298.1
2022-08-17	10:45:00	35.76	6.89	156.97	185.45	4.73	283.50	13.84	33.71	17038	11264	25.62	107067	1342.0	1119.7	1115.9	454.5	196.5	193.6	-13.4	-56.4	-98.5	305.7
2022-08-17	10:46:00	35.73	6.93	158.25	186.80	4.35	260.93	13.84	33.86	17075	11399	26.25	109666	1344.3	1121.0	1117.0	454.6	196.0	193.6	-9.2	-50.1	-93.5	327.6
2022-08-17	10:47:00	37.73	6.81	157.40	184.95	4.71	282.38	13.84	34.57	17163	11393	25.62	107008	1352.0	1124.9	1120.1	454.6	195.5	193.6	-5.2	-45.8	-86.6	337.4
2022-08-17	10:48:00	34.31	6.80	157.78	185.72	4.72	283.05	13.84	34.99	17525	11646	25.87	108104	1353.3	1127.1	1124.2	454.8	195.5	193.6	-17.3	-62.5	-104.2	309.4
2022-08-17	10:49:00	36.50	6.92	157.92	185.00	4.78	286.50	13.84	33.65	17113	11438	25.54	106711	1350.6	1126.1	1122.0	454.8	196.0	193.6	-10.5	-53.0	-96.2	321.6
2022-08-17	10:50:00	36.11	6.80	156.74	186.17	4.31	258.53	13.84	34.55	17513	11579	26.64	111261	1347.0	1126.0	1122.0	454.9	195.5	193.6	-20.5	-67.5	-115.8	288.6
2022-08-17	10:51:00	37.26	6.82	156.78	185.31	4.72	282.90	13.84	34.28	17250	11567	25.73	107481	1343.0	1123.0	1119.8	455.0	196.0	193.6	-17.2	-62.6	-108.8	300.4
2022-08-17	10:52:00	34.34	6.73	157.74	184.50	4.31	258.83	13.84	35.04	17431	11562	26.14	109121	1342.5	1121.7	1118.8	454.8	196.5	193.6	-18.2	-62.5	-111.0	291.4
2022-08-17	10:53:00	35.18	6.74	156.74	185.76	4.34	260.10	13.84	34.57	17050	11444	25.92	108234	1347.6	1119.8	1116.8	455.2	196.5	193.6	-12.0	-55.9	-98.0	301.8
2022-08-17	10:54:00	35.18	6.73	157.31	184.73	4.79	287.55	13.84	34.86	17844	11562	25.39	106033	1349.6	1122.9	1119.1	454.9	196.0	193.6	-13.9	-55.6	-113.9	307.9
2022-08-17	10:55:00	37.11	6.89	157.64	186.21	4.30	258.08	13.84	33.86	16913	11455	25.47	106344	1350.3	1123.1	1119.1	455.2	196.0	193.6	-5.7	-44.9	-89.0	335.1
2022-08-17	10:56:00	35.94	6.84	157.97	185.36	4.75	285.15	13.84	33.68	17400	11556	27.41	114451	1355.9	1126.9	1122.2	455.0	195.0	193.6	-27.5	-79.4	-124.7	243.4
2022-08-17	10:57:00	35.94	6.81	159.11	185.58	4.81	288.45	13.84	34.97	17188	11562	25.49	106474	1354.0	1127.2	1123.2	454.9	195.5	193.6	-12.7	-56.4	-100.1	317.1
2022-08-17	10:58:00	36.15	6.74	156.93	185.27	4.80	287.78	13.84	34.02	17075	11466	27.43	114563	1353.0	1126.4	1123.2	454.7	195.0	193.6	-24.6	-77.3	-106.8	262.3
2022-08-17	10:59:00	34.13	6.99	156.17	185.67	4.80	288.23	13.84	34.07	17656	11635	26.29	109781	1349.6	1125.8	1123.2	454.9	195.5	193.6	-18.0	-64.3	-110.8	295.0
2022-08-17	11:00:00	34.95	6.84	158.58	184.23	4.32	259.43	13.84	34.94	17450	11539	26.51	110643	1347.6	1123.5	1119.9	454.5	196.0	193.6	-16.8	-60.3	-107.4	305.8
2022-08-17	11:01:00	35.07	6.92	157.44	184.64	4.72	282.98	13.84	34.05	17288	11539	26.32	110173	1345.9	1121.1	1117.9	454.6	196.5	193.6	-14.1	-57.8	-102.7	295.5
2022-08-17	11:02:00	35.72	6.75	157.35	185.13	4.76	285.53	13.84	34.28	17169	11523	25.60	106937	1348.3	1122.1	1118.0	454.6	196.0	193.6	-11.7	-55.0	-98.6	307.8
2022-08-17	11:03:00	34.58	6.91	156.84	185.45	4.75	285.15	13.84	33.81	17188	11539	25.15	105046	1345.1	1123.2	1120.1	454.2	196.0	193.6	-9.7	-51.4	-94.2	326.9
2022-08-17	11:04:00	35.73	6.93	157.07	185.40	4.33	259.95	13.84	34.83	16969	11534	24.98	104173	1348.5	1124.8	1120.1	454.4	195.5	193.6	-4.7	-44.8	-88.1	339.1
2022-08-17	11:05:00	35.61	6.79	158.87	185.54	4.71	282.68	13.84	34.65	17344	11562	25.44	106534	1347.9	1125.1	1122.1	454.0	195.0	193.6	-14.7	-59.5	-107.1	308.8
2022-08-17	11:06:00	35.48	6.85	157.64	185.31	4.32	258.90	13.84	33.81	17088	11455	25.38	106031	1348.9	1124.8	1121.0	454.1	195.0	193.6	-9.4	-52.6	-96.9	321.9
2022-08-17	11:07:00	36.14	6.79	157.25	185.94	4.74	284.55	13.84	33.71	17844	11697	26.14	109260	1348.9	1124.3	1121.0	453.9	195.0	193.6	-20.9	-70.0	-116.7	290.4
2022-08-17	11:08:00	37.17	6.88	158.40	185.54	4.81	288.53	13.84	34.05	17500	11612	25.99	108538	1344.3	1123.3	1119.9	454.1	196.0	193.6	-15.3	-63.3	-107.4	301.8
2022-08-17	11:09:00	34.31	6.74	158.06	185.04	4.37	262.28	13.84	34.39	17631	11612	25.69	106987	1343.9	1122.7	1119.9	454.4	196.5	193.6	-17.8	-63.0	-113.3	288.5
2022-08-17	11:10:00	34.47	6.95	158.21	185.90	4.67	280.20	13.84	34.41	17150	11455	25.89	108059	1342.8	1121.2	1117.9	454.6	196.5	193.6	-13.3	-57.0	-100.8	301.4
2022-08-17	11:11:00	35.72	6.80	158.45	185.31	4.73	283.95	13.84	33.78	17531	11730	27.05	112876	1347.9	1122.0	1117.9	454.1	196.0	193.6	-26.8	-79.4	-127.2	255.4
2022-08-17	11:12:00	34.70	6.87	158.87	185.45	4.76	285.38	13.84	34.39	16888	11573	24.99	104370	1346.5	1120.3	1117.9	454.4	196.0	193.6	-6.6	-49.0	-89.6	333.6
2022-08-17	11:13:00	36.48	6.85	157.35	185.45	4.77	286.43	13.84	34.81	17194	11360	27.60	115234	1352.9	1123.9	1120.1	454.3	195.0	193.6	-27.6	-78.4	-120.9	247.8
2022-08-17	11:14:00	34.05	6.94	158.77	185.99	4.82	289.35	13.84	34.97	17200	11517	24.81	103624	1347.1	1122.8	1120.0	454.4	195.0	193.6	-11.5	-52.0	-100.8	315.2
2022-08-17	11:15:00	34.37	6.74	160.72	184.77	4.79	287.25	13.84	33.84	17069	11556	25.20	105252	1347.8	1121.6	1117.9	454.4	194.5	193.6	-9.0	-50.3	-95.3	325.0
2022-08-17	11:16:00	35.28	6.89	159.82	185.36	4.79	287.25	13.84	34.81	17556	11528	25.49	106544	1342.1	1118.7	1115.8	454.1	195.0	193.6	-19.9	-65.0	-112.7	295.5
2022-08-17	11:17:00	36.48	6.77	156.45	185.63	4.40	264.23	13.84	34.36	17231	11410	25.68	107257	1340.8	1117.2	1114.8	454.4	195.5	193.6	-14.5	-58.6	-106.5	305.9
2022-08-17	11:18:00	35.58	6.86	160.14	185.90	4.41	264.45	13.84	33.81	17200	11511	25.43	106165	1342.8	1118.2	1113.8	454.0	196.0	193.6	-13.9	-58.4	-103.7	295.1
2022-08-17	11:19:00	36.06	6.76	159.05	185.13	4.83	290.03	13.84	34.99	17175	11500	25.39	105964	1347.1	1122.1	1118.2	454.2	196.0	193.6	-11.0	-55.4	-97.4	305.6
2022-08-17	11:20:00	34.77	6.77	159.82	184.23	4.76	285.53	13.84	35.18	17319	11410	25.23	105338	1342.3	1121.2	1118.1	454.0	196.0	193.6	-9.0	-50.8	-96.3	327.4
2022-08-17	11:21:00	35.51	6.69	158.54	185.85	4.79	287.10	13.84	34.89	16913	11343	24.42	101952	1341.4	1117.7	1114.9	454.2	195.0	193.6	-6.0	-44.3	-88.6	338.3
2022-08-17	11:22:00	33.87	6.84	158.87	185.09	4.79	287.48	13.84	35.02	17619	11573	25.00	104174	1344.9	1120.2	1116.0	453.8	194.0	193.6	-17.5	-61.8	-110.5	307.4
2022-08-17	11:23:00	34.89	6.77	161.28	186.21	4.90	293.93	13.84	34.13	17188	11534	24.81	103683	1343.1	1117.2	1114.8	453.5	194.0	193.6	-10.1	-52.5	-96.1	321.3
2022-08-17	11:24:00	35.48	6.68	158.92	185.49	4.93	295.88	13.84	34.97	17663	11539	25.82	107940	1343.1	1118.6	1114.9	453.2	194.0	193.6	-21.2	-68.3	-118.9	289.0
2022-08-17	11:25:00	33.33	6.68	157.40	184.91	4.80	288.00	13.84	34.49	17406	11635	24.88	103987	1340.9	1117.1	1113.9	453.1	194.5	193.6	-16.3	-61.6	-108.5	295.5
2022-08-17	11:26:00	34.34	6.56	158.92	185.85	4.83	289.95	13.84	33.68	17481	11730	25.11	104971	1339.8	1113.5	1110.9	453.2	194.0	193.6	-21.1	-69.3	-117.5	274.6
2022-08-17	11:27:00	34.13	6.78	159.24	185.99	4.83	289.88	13.84	35.02	17044	11494	24.94	104002	1341.5	1114.9	1110.9	453.0	194.0	193.6	-12.3	-54.8	-98.3	296.9
2022-08-17	11:28:00	34.34	6.68	157.83	186.17	4.90	294.23	13.84	33.81	17494	11629	26.50	110818	1338.6	1114.1	1110.9	452.6	193.5	193.6	-26.2	-76.6	-121.4	249.8
2022-08-17	11:29:00	36.05	6.70	157.31	185.63	4.87	292.43	13.84	34.52	17025	11382	24.76	103662	1345.1	1113.5	1110.0	452.7	192.5	193.6	-7.3	-48.5	-90.0	328.5
2022-08-17	11:30:00	37.86	6.63	161.75	185.72	4.82	289.13	13.84	33.94	16563	11472	26.35	110280	1356.9	1122.3	1118.1	452.2	192.0	193.6	-18.0	-70.4	-99.3	265.6
2022-08-17	11:31:00	36.66	6.79	159.86	185.49	4.84	290.48	13.84	34.10	17031	11371	24.86	104136	1358.3	1130.6	1125.6	452.6	193.0	192.6	-9.1	-51.4	-97.9	311.5
2022-08-17	11:32:00	36.92	6.70	158.58	186.30	4.94	296.55	13.84	33.63	16813	11461	24.26	101854	1357.8	1133.0	1128.7	452.5	194.0	192.6	-8.8	-51.0	-92.4	320.9
2022-08-17	11:33:00	32.55	6.61	157.78	185.72	4.77	286.35	13.84	34.20	17406	11584	25.24	105415	1358.8	1137.7	1132.8	453.1	195.0	192.6	-19.8	-66.9	-112.5	291.3
2022-08-17	11:34:00	34.71	6.67	157.92	185.76	4.82	289.20	13.84	34.73	17288	11534	25.00	104510	1354.5	1130.4	1127.3	453.6	196.0	193.7	-12.9	-56.8	-104.4	301.0
2022-08-17	11:35:00	37.01	6.76	157.87	186.66	4.38	262.88	13.84	34.07	17256	11438	24.94	104162	1355.4	1128.3	1124.3	454.2	196.5	193.7	-11.5	-55.9	-103.1	297.1
2022-08-17	11:36:00	33.59	6.56	159.77	185.94	4.79	287.25	13.84	33.71	17163	11410	25.24	105397	1358.8	1133.3	1128.8	454.5	197.0	193.7	-9.4	-53.0	-98.6	302.2
2022-08-17	11:37:00	34.88	6.70	159.01	185.63	4.82	289.35	13.84	34.13	17106	11433	25.08	104686	1350.5	1127.1	1123.6	454.8	197.0	193.7	-10.1	-52.5	-94.1	323.4
2022-08-17	11:38:00	36.30	6.76	157.83	186.53	4.77	285.98	13.84	34.86	16869	11354	24.14	100811	1359.9	1126.6	1122.4	454.7	196.0	193.7	-4.6	-43.5	-86.8	332.1
2022-08-17	11:39:00	35.19	6.67	158.40	185.22	4.80	287.93	13.84	33.76	17469	11494	25.13	104951	1359.0	1129.2	1125.6	455.0	195.0	193.7	-13.7	-60.8	-106.7	303.3
2022-08-17	11:40:00	34.52	6.72	157.55	185.54	4.87	292.28	13.84	34.13	16963	11371	24.48	102245	1356.5	1129.3	1125.6	454.7	195.5	193.7	-8.1	-48.4	-94.0	318.7
2022-08-17	11:41:00	37.17	6.61	157.55	185.36	4.81	288.45	13.13	34.86	17494	11641	25.57	106784	1357.9	1128.8	1125.6	454.7	194.5	193.7	-20.0	-68.0	-119.6	280.8
2022-08-17	11:42:00	36.50	6.57	161.10	186.98	4.71	282.68	14.18	33.71	17288	11669	25.22	105336	1350.8	1128.5	1125.6	455.0	195.5	193.7	-11.5	-56.6	-104.7	297.0

		Waste Flows								Air Flows				Temperatures						Pressures			
		Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PAC	Primary	Secondary	Stack Velocity	Stack Flow	Primary	Secondary A	Secondary B	Quench	SDA	Stack	Incinerator	SDA Inlet	BH Inlet	BH dP
		LPM	LPM	LPM	LPM	LPM	SCFM	LPM	Lbs/h	m3/h	m3/h	m/s	Rm3/s	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C	mmH2O	mmH2O	mmH2O	mmH2O
$Date	$Time	FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT	PV-236	PV-209	FT-260-VEL	FT-260-REFDRY	TE-240	TE-241		TE-203	TE-204	TE-258	PT-242A	PT-249	PT-615	PDT-622
2022-08-17	11:43:00	34.08	6.68	156.97	185.81	4.53	271.50	14.18	34.83	17688	11674	26.54	110804	1349.8	1126.1	1123.4	454.8	196.0	193.7	-26.2	-75.3	-122.4	250.8
2022-08-17	11:44:00	36.20	6.63	161.81	186.44	4.77	258.30	14.18	34.39	17188	11455	24.93	104019	1356.0	1126.2	1122.5	454.9	196.0	193.7	-10.2	-52.5	-101.1	298.1
2022-08-17	11:45:00	35.54	6.63	157.35	186.35	4.83	289.50	14.18	33.81	17275	11517	26.62	111464	1355.5	1126.9	1123.6	454.8	196.0	193.7	-23.4	-72.6	-115.1	252.9
2022-08-17	11:46:00	34.79	6.68	159.77	187.07	4.73	283.95	14.18	34.68	16781	11489	24.24	101236	1352.9	1123.9	1121.4	454.7	195.5	193.7	-5.2	-44.8	-86.9	331.7
2022-08-17	11:47:00	36.26	6.67	162.52	186.30	4.72	283.28	14.18	34.65	16794	11489	24.28	101701	1361.4	1125.8	1121.5	454.7	194.0	193.7	-1.8	-40.4	-84.1	339.6
2022-08-17	11:48:00	35.39	6.81	162.80	186.08	4.88	293.03	14.18	34.28	17075	11382	24.93	104196	1355.9	1127.9	1123.8	454.5	194.0	193.7	-11.4	-55.0	-96.3	310.9
2022-08-17	11:49:00	35.79	6.77	160.67	185.40	4.76	285.53	14.18	34.28	16831	11393	24.50	102449	1354.8	1127.4	1123.8	454.5	194.0	193.7	-6.8	-48.3	-93.7	323.4
2022-08-17	11:50:00	36.26	6.58	157.31	186.08	4.73	283.80	14.18	34.15	17369	11562	25.50	106591	1355.4	1128.1	1123.8	454.3	194.5	193.7	-17.1	-67.3	-111.8	291.3
2022-08-17	11:51:00	34.28	6.68	158.06	186.80	4.71	282.60	14.18	34.28	17125	11669	25.21	105358	1354.1	1129.0	1124.9	454.2	195.5	193.7	-15.8	-62.1	-105.8	302.1
2022-08-17	11:52:00	32.61	6.54	157.87	185.22	4.86	291.30	14.18	34.18	17206	11534	25.08	104806	1348.5	1126.4	1123.9	454.4	195.5	193.7	-16.1	-61.0	-103.6	292.6
2022-08-17	11:53:00	33.41	6.75	157.92	185.99	4.82	288.90	14.18	34.57	16881	11551	25.06	104695	1347.4	1122.1	1118.9	454.3	195.0	193.7	-11.9	-56.5	-97.5	301.4
2022-08-17	11:54:00	35.00	6.67	157.83	186.12	4.83	289.88	14.18	35.07	16994	11545	24.65	103031	1348.3	1122.0	1118.9	453.8	194.5	193.7	-11.1	-57.5	-96.3	324.6
2022-08-17	11:55:00	34.47	6.70	159.11	185.45	4.76	285.45	14.18	35.07	16738	11449	24.49	102412	1352.4	1123.1	1120.0	453.7	194.0	193.7	-3.8	-43.9	-88.1	333.9
2022-08-17	11:56:00	34.05	6.46	157.55	184.73	4.79	287.25	14.18	34.02	17319	11629	25.31	105884	1351.5	1123.1	1120.0	453.2	192.5	193.7	-17.1	-61.1	-112.8	298.4
2022-08-17	11:57:00	33.39	6.74	160.14	186.12	4.89	293.18	14.18	34.76	16900	11405	24.75	103650	1349.4	1123.1	1118.9	452.9	192.5	193.7	-9.2	-53.1	-95.4	317.2
2022-08-17	11:58:00	33.74	6.75	158.54	185.94	4.77	286.05	14.18	33.86	17450	11506	25.99	108841	1349.0	1122.9	1120.0	452.8	192.0	192.6	-24.4	-71.3	-124.8	269.4
2022-08-17	11:59:00	36.54	6.60	156.45	185.58	4.73	283.88	14.18	34.60	17156	11483	25.55	106968	1350.4	1123.1	1118.9	452.8	193.0	192.6	-15.3	-62.0	-107.3	296.6
2022-08-17	12:00:00	32.72	6.57	159.72	184.64	4.77	286.43	14.18	34.68	17288	11573	26.23	109736	1349.1	1127.5	1124.1	452.7	194.0	192.6	-28.4	-82.8	-122.8	250.2
2022-08-17	12:01:00	33.93	6.76	161.04	185.90	4.81	288.60	14.18	33.71	16913	11337	24.74	103588	1341.4	1123.1	1119.9	452.9	194.5	192.6	-12.3	-58.4	-100.0	296.8
2022-08-17	12:02:00	32.88	6.68	159.39	185.81	4.85	290.70	14.18	34.10	17238	11539	26.67	111369	1342.4	1120.2	1116.9	452.8	194.0	192.6	-23.7	-78.1	-107.4	263.8
2022-08-17	12:03:00	34.92	6.74	163.08	184.77	4.75	285.08	14.18	33.89	16806	11416	24.65	103230	1346.8	1118.9	1114.9	452.7	193.0	192.6	-6.2	-48.0	-92.4	329.8
2022-08-17	12:04:00	32.85	6.73	158.54	185.04	4.78	286.58	14.18	34.23	16856	11399	24.07	100800	1350.1	1120.5	1116.0	452.5	192.5	192.6	-6.2	-47.4	-87.7	337.1
2022-08-17	12:05:00	34.56	6.81	159.91	186.44	4.82	289.35	14.18	33.86	17044	11416	24.95	104560	1344.4	1119.3	1116.0	452.3	192.0	192.6	-12.3	-54.5	-101.1	311.0
2022-08-17	12:06:00	33.92	6.62	156.31	186.08	4.77	286.05	14.18	33.73	16963	11393	24.52	102767	1346.8	1121.9	1118.1	451.8	192.0	192.6	-11.6	-53.9	-99.3	320.8
2022-08-17	12:07:00	33.53	6.63	157.40	185.18	4.80	287.93	14.18	34.02	17350	11657	25.29	106022	1343.4	1120.5	1118.1	451.8	192.0	192.6	-20.7	-68.3	-114.6	289.6
2022-08-17	12:08:00	36.14	6.60	158.06	185.72	4.75	285.15	14.18	33.57	17119	11399	25.18	105553	1341.9	1118.4	1114.9	451.6	192.5	192.6	-14.4	-60.8	-108.1	301.9
2022-08-17	12:09:00	35.96	6.66	159.86	185.40	4.84	290.10	14.18	33.94	17250	11539	24.84	103864	1344.5	1122.5	1118.1	451.5	193.5	192.6	-12.7	-59.1	-103.7	293.4
2022-08-17	12:10:00	32.73	6.82	158.49	185.94	4.76	285.83	14.18	34.89	16850	11573	24.68	103352	1343.0	1123.0	1120.1	451.8	194.5	192.6	-11.8	-53.6	-99.8	302.6
2022-08-17	12:11:00	32.84	6.62	159.11	185.04	4.77	286.35	14.18	34.23	17125	11534	25.04	104734	1341.8	1120.6	1117.9	452.0	194.0	192.6	-11.6	-55.0	-100.5	323.4
2022-08-17	12:12:00	36.62	6.80	159.82	186.48	4.73	283.88	14.18	34.18	16738	11399	24.52	102697	1347.1	1120.9	1117.0	452.0	193.5	192.6	-4.7	-44.5	-87.4	332.6
2022-08-17	12:13:00	33.12	6.65	157.92	185.85	4.31	258.38	14.18	35.12	17506	11534	25.12	105288	1349.4	1127.8	1123.7	451.8	193.0	192.6	-20.2	-68.4	-116.4	283.5
2022-08-17	12:14:00	35.43	6.75	158.25	186.48	4.85	291.08	14.18	34.73	16881	11326	24.76	104026	1346.5	1122.3	1119.0	452.1	193.0	192.6	-10.6	-57.3	-96.4	316.6
2022-08-17	12:15:00	35.24	6.62	159.05	184.46	4.77	286.43	14.18	33.94	17375	11421	26.95	112903	1349.0	1125.2	1121.2	451.9	193.0	192.6	-25.9	-78.6	-126.1	240.8
2022-08-17	12:16:00	33.56	6.62	158.02	185.94	4.79	287.55	14.18	35.10	17319	11438	24.90	104330	1346.6	1124.8	1121.2	452.1	194.0	192.6	-18.4	-64.1	-111.1	296.5
2022-08-17	12:17:00	33.68	6.73	158.25	185.67	4.86	291.45	14.18	34.73	17288	11438	26.96	112901	1343.0	1122.0	1119.0	451.8	194.0	192.6	-24.6	-74.6	-120.5	249.6
2022-08-17	12:18:00	34.50	6.78	160.20	186.35	4.81	288.38	14.18	34.52	16869	11315	24.92	104310	1347.1	1120.7	1116.9	451.9	194.0	192.6	-11.8	-56.5	-101.7	294.6
2022-08-17	12:19:00	34.26	6.73	157.64	185.40	4.83	289.58	14.18	33.92	16756	11427	24.92	104077	1348.3	1123.9	1120.1	451.6	194.0	192.6	-9.6	-51.8	-96.9	301.9
2022-08-17	12:20:00	34.07	6.77	162.56	187.29	4.82	288.98	14.18	33.89	16744	11337	24.50	102552	1344.3	1121.7	1119.0	451.7	193.5	192.6	-6.2	-48.5	-90.6	326.6
2022-08-17	12:21:00	34.47	6.71	154.70	185.81	4.79	287.63	14.18	34.31	16544	11371	24.18	101323	1348.5	1123.3	1119.0	451.5	192.5	192.6	-6.3	-49.0	-86.9	336.8
2022-08-17	12:22:00	34.70	6.71	158.02	185.36	4.87	291.98	14.18	34.10	16994	11500	25.40	106501	1351.1	1125.9	1122.1	451.2	192.0	192.6	-11.9	-57.3	-106.9	307.9
2022-08-17	12:23:00	33.33	6.56	157.16	185.22	4.79	287.55	14.18	34.89	17006	11354	24.63	103238	1345.8	1124.2	1120.9	451.0	192.5	192.6	-9.7	-52.3	-98.7	321.5
2022-08-17	12:24:00	34.70	6.58	157.97	184.91	4.81	288.30	14.18	33.76	17256	11472	25.83	107984	1340.8	1120.7	1117.9	450.8	192.0	192.6	-18.9	-67.5	-115.4	288.9
2022-08-17	12:25:00	35.76	6.79	158.54	186.57	4.79	287.63	14.18	33.86	16919	11551	25.98	108877	1337.5	1117.3	1114.8	451.1	192.5	192.6	-15.4	-62.5	-108.3	301.1
2022-08-17	12:26:00	35.97	6.61	159.48	185.90	4.79	287.48	14.18	33.81	17019	11461	26.08	109332	1344.6	1121.3	1117.0	451.0	193.0	192.6	-13.8	-59.1	-107.6	292.0
2022-08-17	12:27:00	35.03	6.73	157.40	186.26	4.77	285.90	14.18	34.20	16919	11461	25.16	105480	1345.8	1125.5	1121.1	451.0	193.5	192.6	-10.0	-54.0	-98.5	300.8
2022-08-17	12:28:00	33.26	6.65	155.88	186.08	4.72	283.20	14.18	34.49	17288	11444	25.40	106442	1349.8	1127.6	1124.1	450.8	193.5	192.6	-11.7	-55.6	-102.8	322.8
2022-08-17	12:29:00	34.25	6.76	158.06	186.39	4.82	289.20	14.18	34.78	16606	11438	25.18	105564	1347.1	1124.2	1120.8	450.7	193.0	192.6	-5.2	-45.3	-89.1	332.4
2022-08-17	12:30:00	33.08	6.54	157.35	185.04	4.81	288.30	14.18	34.41	17588	11517	26.03	109180	1347.8	1127.1	1123.0	450.5	192.0	192.6	-22.6	-70.3	-122.3	271.8
2022-08-17	12:31:00	35.27	6.62	159.24	185.54	4.84	290.48	14.18	34.47	16750	11511	24.94	104583	1346.1	1124.9	1120.9	450.4	192.5	192.6	-8.1	-51.9	-98.1	315.7
2022-08-17	12:32:00	34.65	6.54	156.65	185.72	4.78	286.73	14.18	33.92	17313	11562	27.37	114534	1345.8	1125.4	1122.0	450.3	192.0	192.6	-26.8	-79.0	-125.5	241.2
2022-08-17	12:33:00	34.98	6.82	159.72	186.26	4.74	284.33	14.18	34.62	17138	11579	26.59	111488	1343.4	1122.6	1119.9	450.2	193.0	192.6	-15.0	-63.9	-109.7	295.6
2022-08-17	12:34:00	35.33	6.82	158.82	186.26	4.73	284.03	14.18	33.99	16956	11365	26.88	112703	1341.9	1119.3	1116.8	450.4	193.0	192.6	-21.7	-77.3	-112.1	255.1
2022-08-17	12:35:00	34.43	6.70	158.49	185.72	4.79	287.40	14.18	34.28	17125	11371	25.94	108713	1342.8	1121.1	1116.8	450.2	193.5	192.6	-12.7	-58.0	-102.9	294.8
2022-08-17	12:36:00	33.38	6.69	158.87	185.31	4.77	286.35	14.18	34.34	16888	11461	25.72	107819	1342.1	1118.8	1115.8	450.1	193.0	192.6	-9.7	-54.3	-98.4	304.1
2022-08-17	12:37:00	34.35	6.71	159.01	185.58	4.75	284.78	14.18	34.55	17056	11320	25.90	108654	1341.4	1117.5	1114.8	449.7	193.0	192.6	-7.1	-49.5	-93.1	327.0
2022-08-17	12:38:00	36.74	6.62	162.52	184.55	4.76	285.38	14.18	35.02	16725	11320	24.81	104449	1344.1	1118.3	1114.8	449.8	192.0	192.6	-1.6	-43.3	-87.5	338.6
2022-08-17	12:39:00	34.53	6.67	155.84	183.78	4.78	286.50	14.18	35.07	17194	11433	25.72	107936	1347.1	1123.5	1119.2	449.7	192.5	191.6	-14.7	-58.5	-106.2	308.1
2022-08-17	12:40:00	34.86	6.68	160.14	185.67	4.81	288.53	14.18	34.83	16825	11405	25.45	106798	1342.4	1122.1	1119.2	449.7	192.5	191.6	-8.3	-50.6	-96.4	320.6
2022-08-17	12:41:00	34.58	6.73	159.20	185.31	4.77	285.98	14.18	34.55	17419	11393	25.92	108784	1340.4	1121.3	1118.1	449.7	192.5	191.6	-17.7	-65.4	-115.6	287.8
2022-08-17	12:42:00	33.51	6.87	161.52	186.08	4.77	285.98	14.18	34.44	17275	11534	26.10	109448	1342.1	1119.4	1117.0	449.3	193.0	191.6	-15.4	-60.4	-108.3	298.3
2022-08-17	12:43:00	33.63	6.60	158.25	185.31	4.89	293.63	13.24	35.02	17044	11635	26.01	109122	1336.6	1117.4	1114.9	449.5	193.0	191.6	-13.5	-58.9	-106.1	290.6
2022-08-17	12:44:00	34.40	6.75	159.48	186.35	4.81	288.68	14.29	33.97	17138	11500	25.93	108806	1340.8	1119.7	1116.0	449.1	193.0	191.6	-10.6	-54.3	-100.6	299.8
2022-08-17	12:45:00	34.98	6.57	157.21	184.73	4.81	288.45	14.29	34.68	17288	11646	25.54	107368	1339.4	1122.3	1118.2	449.1	192.5	191.6	-12.7	-58.4	-107.3	316.8
2022-08-17	12:46:00	34.64	6.68	156.74	186.35	4.80	287.78	14.29	34.49	16638	11500	25.70	107760	1342.4	1125.2	1121.2	449.4	193.0	191.6	-6.1	-46.8	-90.5	331.8
2022-08-17	12:47:00	31.86	6.53	157.16	185.13	4.85	291.08	14.29	34.57	17525	11697	27.39	114946	1345.5	1126.0	1122.2	449.2	192.0	191.6	-29.3	-80.1	-128.6	242.9
2022-08-17	12:48:00	34.97	6.80	158.02	185.81	4.83	289.73	14.29	33.92	16894	11433	25.11	105403	1343.4	1121.3	1117.8	448.9	192.0	191.6	-9.5	-54.5	-98.4	316.0
2022-08-17	12:49:00	33.63	6.64	157.25	184.55	4.74	284.25	14.29	34.68	17219	11551	27.50	115398	1346.4	1121.4	1117.8	449.0	192.0	191.6	-27.1	-77.6	-121.4	245.1
2022-08-17	12:50:00	35.10	6.76	160.20	184.91	4.74	284.55	14.29	34.91	17413	11545	25.76	108125	1342.1	1117.6	1114.7	448.7	192.0	191.6	-15.2	-62.1	-109.1	293.7
2022-08-17	12:51:00	34.47	6.73	162.90	185.13	4.75	284.93	14.29	34.31	17169	11494	26.36	110583	1344.5	1121.7	1117.9	448.7	193.0	191.6	-12.3	-56.8	-107.3	302.7

		Waste Flows								Air Flows					Temperatures						Pressures			
		Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PAC	Primary	Secondary	Stack Velocity	Stack Flow	Primary	Secondary A	Secondary B	Quench	SDA	Stack	Incinerator	SDA Inlet	BH Inlet	BH dP
		LPM	LPM	LPM	LPM	LPM	SCFM	LPM	Lbs/h	m3/h	m3/h	m/s	Rm3/s	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C	mmH2O	mmH2O	mmH2O	mmH2O
$Date	$Time	FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT	PV-236	PV-209	FT-260-VEL	FT-260-REFDRY	TE-240	TE-241		TE-203	TE-204	TE-258	PT-242A	PT-249	PT-615	PDT-622
2022-08-17	12:52:00	35.27	6.71	160.05	186.08	4.76	285.45	14.29	34.36	17044	11489	25.62	107357	1344.1	1123.1	1119.0	448.8	193.5	191.6	-12.2	-57.1	-103.6	296.1
2022-08-17	12:53:00	32.67	6.55	157.21	185.67	4.74	284.40	14.29	34.36	17138	11376	25.38	106452	1345.1	1124.2	1120.1	448.9	194.0	191.6	-9.7	-51.8	-100.0	304.0
2022-08-17	12:54:00	31.70	6.74	162.71	184.59	4.75	285.00	14.29	34.62	17194	11511	24.99	104824	1340.3	1118.4	1115.7	448.7	193.5	191.6	-5.8	-46.5	-93.8	326.0
2022-08-17	12:55:00	33.95	6.63	158.96	185.81	4.72	283.28	14.29	33.92	16694	11393	25.00	104849	1343.4	1115.4	1112.4	448.5	192.0	191.6	-5.7	-45.9	-88.4	335.4
2022-08-17	12:56:00	35.55	6.78	160.14	185.36	4.81	288.60	14.29	34.91	17363	11489	25.46	106809	1343.4	1116.3	1113.5	448.1	191.5	191.6	-11.8	-56.1	-104.3	308.3
2022-08-17	12:57:00	35.16	6.80	159.54	186.17	4.72	282.98	14.29	34.62	17031	11365	25.94	108935	1347.5	1121.5	1117.7	447.9	191.5	191.6	-8.9	-50.5	-99.1	319.7
2022-08-17	12:58:00	34.34	6.72	159.63	184.91	4.76	285.75	14.29	33.76	17469	11539	26.41	110919	1342.1	1121.2	1118.7	447.7	191.5	191.6	-17.2	-65.6	-116.7	285.5
2022-08-17	12:59:00	35.10	6.65	159.01	185.54	4.75	285.08	14.29	33.84	17275	11618	25.91	108783	1339.4	1116.9	1114.4	447.5	192.0	191.6	-16.5	-62.3	-109.4	298.8
2022-08-17	13:00:00	33.98	6.56	162.75	184.10	4.81	288.68	14.29	34.18	17250	11579	26.32	110527	1339.0	1116.3	1113.4	447.3	192.0	191.6	-13.9	-60.9	-111.0	289.9
2022-08-17	13:01:00	32.54	6.56	159.01	184.86	4.72	282.90	14.29	33.92	17056	11523	24.97	104903	1340.0	1115.4	1112.4	447.6	192.5	191.6	-11.9	-55.9	-101.8	300.8
2022-08-17	13:02:00	31.26	6.56	158.06	183.65	4.72	283.13	14.29	34.91	17613	11770	25.35	106449	1343.8	1118.2	1114.6	447.5	192.0	191.6	-18.3	-64.5	-117.1	306.1

August 17/2022	Waste Flows								Air Flows					Temperatures						Pressures			
	Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PAC Flow	Primary	Secondary	Stack Velocity	Stack Flow	Primary	Secondary A	Secondary B	Quench	SprayDryer	Stack	Incinerator	SDA Inlet	SD Outlet	Baghouse
Test	FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT	PV-236	PV-209	FT-260-VEL	FT-260-REFDRY	TE-240	TE-241A	TE-241B	TE-203	TE-204	TE-258	PT-242A	PT-249	PT-615	PDT-622
Units	LPM	LPM	LPM	LPM	LPM	SCFM	LPM	Lbs/h	m3/h	m3/h	m/s	Rm3/s	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C	mmH2O	mmH2O	mmH2O	mmH2O
Max	37.86	7.10	163.08	187.29	4.94	296.55	14.29	35.25	18125	11770	28.41	118909	1361.4	1137.7	1132.8	457.0	198.5	194.7	-1.6	-40.4	-84.1	341.2
Min	31.26	6.21	153.24	183.65	4.28	256.58	13.13	33.47	16544	11264	24.07	100800	1332.9	1108.0	1105.4	447.3	188.0	189.6	-30.1	-82.8	-128.6	240.8
Average	35.09	6.75	158.21	185.46	4.72	283.29	14.11	34.38	17247	11514	25.82	108016	1345.7	1122.6	1119.0	453.3	194.5	193.0	-14.3	-58.6	-103.9	302.1
Variance	1.63	0.02	2.69	0.42	0.02	84.37	0.04	0.21	86961	9773	0.76	13365572	30.6	21.3	19.6	5.6	3.4	1.2	40.5	91.2	110.8	603.2

		Waste Flows								Air Flows					Temperatures						Pressures			
		Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PAC	Primary	Secondary	Stack Velocity	Stack Flow	Primary	Secondary A	Secondary B	Quench	SDA	Stack	Incinerator	SDA Inlet	BH Inlet	BH dP
		LPM	LPM	LPM	LPM	LPM	SCFM	LPM	Lbs/h	m3/h	m3/h	m/s	Rm3/s	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C	mmH2O	mmH2O	mmH2O	mmH2O
$Date	$Time	FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT	PV-236	PV-209	FT-260-VEL	FT-260-REFDRY	TE-240	TE-241		TE-203	TE-204	TE-258	PT-242A	PT-249	PT-615	PDT-622
2022-08-17	13:53:00	36.83	6.69	156.41	185.76	4.73	283.88	14.33	34.31	17013	11556	27.01	112568	1356.1	1140.0	1135.7	450.7	197.5	194.9	-22.8	-75.1	-118.8	252.9
2022-08-17	13:54:00	33.29	6.75	163.18	185.94	4.79	287.63	14.33	34.99	16569	11427	25.34	105619	1354.5	1139.9	1136.7	450.8	197.5	194.9	-5.0	-48.0	-89.5	328.4
2022-08-17	13:55:00	37.74	6.61	157.59	184.86	4.95	297.08	14.33	33.81	16700	11427	24.63	102666	1359.1	1140.5	1136.7	450.6	196.5	194.9	-1.6	-42.6	-86.3	336.2
2022-08-17	13:56:00	35.64	6.64	163.37	185.36	4.75	284.85	14.33	34.70	17044	11343	24.82	103557	1361.1	1143.6	1139.7	450.7	196.5	194.9	-6.0	-52.0	-99.3	311.4
2022-08-17	13:57:00	36.15	6.49	152.28	184.68	4.81	288.38	14.33	34.91	16700	11376	24.87	103730	1358.5	1141.8	1138.6	450.9	197.0	194.9	-7.8	-52.4	-92.0	322.4
2022-08-17	13:58:00	35.97	6.57	158.54	185.13	4.85	291.00	14.33	33.86	16981	11455	25.41	105895	1360.4	1141.2	1137.5	451.0	197.5	194.9	-13.1	-62.3	-109.5	291.2
2022-08-17	13:59:00	35.27	6.66	154.61	185.94	4.80	288.23	14.33	35.02	16875	11607	24.98	103995	1361.5	1143.0	1138.6	451.0	198.5	194.9	-12.3	-60.6	-104.3	301.1
2022-08-17	14:00:00	33.98	6.60	158.96	186.12	4.89	293.18	14.33	34.15	16831	11511	25.15	104675	1356.1	1142.8	1139.6	451.5	199.0	195.9	-11.5	-57.5	-103.7	292.6
2022-08-17	14:01:00	33.44	6.76	156.31	186.12	4.75	284.85	14.33	33.84	16744	11388	25.04	104180	1352.3	1138.4	1135.1	451.4	199.0	195.9	-8.3	-51.0	-98.5	301.3
2022-08-17	14:02:00	36.86	6.50	156.65	185.76	4.92	295.35	14.33	34.99	16950	11506	24.42	101581	1358.4	1138.9	1135.1	451.5	198.0	195.9	-6.6	-49.1	-95.1	324.8
2022-08-17	14:03:00	36.05	6.61	155.32	185.81	4.91	294.45	14.33	34.44	16613	11287	24.16	100515	1361.1	1145.5	1141.2	451.8	198.0	195.9	-0.6	-43.6	-83.8	336.3
2022-08-17	14:04:00	34.28	6.50	162.18	185.76	4.95	296.78	14.33	34.28	17075	11528	25.28	105194	1358.4	1146.2	1143.2	451.7	197.5	195.9	-11.6	-59.5	-111.5	301.1
2022-08-17	14:05:00	37.86	6.71	157.16	186.21	4.75	285.15	14.33	34.89	16831	11410	25.15	104722	1359.8	1144.9	1141.0	451.6	197.5	195.9	-4.0	-47.9	-91.2	319.3
2022-08-17	14:06:00	34.04	6.52	157.78	184.77	4.86	291.60	14.33	34.70	17425	11618	25.98	108119	1363.0	1150.8	1146.4	451.8	198.0	195.9	-19.1	-65.9	-121.8	274.2
2022-08-17	14:07:00	35.06	6.67	161.19	186.03	4.92	294.98	14.33	33.94	16988	11539	25.79	107229	1357.3	1143.1	1139.9	452.2	198.5	195.9	-13.1	-59.6	-104.4	299.3
2022-08-17	14:08:00	34.86	6.52	161.19	185.94	4.93	295.80	14.33	34.62	17306	11410	26.62	110670	1358.5	1141.3	1137.9	452.3	198.5	195.9	-20.1	-71.5	-121.5	250.1
2022-08-17	14:09:00	35.96	6.73	156.07	186.26	4.85	291.08	14.33	33.99	16800	11511	25.07	104209	1359.9	1140.6	1136.9	452.3	199.0	195.9	-10.5	-54.5	-98.5	296.1
2022-08-17	14:10:00	35.28	6.53	155.41	185.67	4.84	290.10	14.33	34.89	16919	11393	26.93	111939	1357.1	1140.7	1136.9	452.3	198.0	195.9	-22.4	-73.4	-111.3	260.4
2022-08-17	14:11:00	35.78	6.76	159.95	185.63	4.94	296.25	14.33	35.02	16481	11511	24.43	101570	1364.6	1141.3	1136.9	452.2	197.5	195.9	-1.9	-42.9	-89.4	327.4
2022-08-17	14:12:00	34.89	6.61	159.48	184.95	4.95	297.15	14.33	33.78	16488	11506	24.37	101357	1363.8	1145.7	1141.1	452.3	197.0	195.9	-1.5	-43.3	-84.5	337.6
2022-08-17	14:13:00	32.48	6.65	157.50	185.09	4.86	291.53	14.33	34.94	16869	11337	25.01	104261	1361.4	1145.4	1141.1	452.2	196.5	195.9	-11.0	-54.9	-100.9	308.7
2022-08-17	14:14:00	34.95	6.61	156.45	185.49	4.88	292.65	14.33	34.70	16631	11427	24.92	103729	1362.6	1145.7	1141.1	452.3	196.5	195.9	-6.8	-50.1	-94.7	320.7
2022-08-17	14:15:00	34.02	6.72	158.54	186.12	4.93	295.95	14.33	34.68	17163	11551	25.49	106125	1358.6	1143.6	1141.0	452.2	196.5	195.9	-14.9	-63.0	-111.9	289.6
2022-08-17	14:16:00	35.37	6.73	162.28	186.44	4.99	299.55	14.33	34.15	16963	11348	25.11	104541	1350.4	1137.8	1134.9	451.9	197.0	195.9	-11.8	-58.5	-104.4	300.8
2022-08-17	14:17:00	35.49	6.63	161.38	186.21	4.80	287.78	14.33	33.92	17000	11455	25.03	103860	1355.4	1139.0	1134.9	452.1	197.0	195.9	-10.3	-56.4	-102.6	292.5
2022-08-17	14:18:00	34.82	6.65	157.50	185.94	4.89	293.10	14.33	34.81	16694	11449	25.06	104239	1356.4	1140.5	1136.0	452.0	197.0	195.9	-7.7	-51.4	-96.5	301.8
2022-08-17	14:19:00	32.34	6.50	154.85	185.40	4.91	294.75	14.33	34.10	16850	11393	24.71	102928	1355.5	1142.1	1138.1	452.3	196.5	195.9	-11.3	-54.0	-100.0	322.9
2022-08-17	14:20:00	36.12	6.58	158.25	185.76	4.78	286.95	14.33	33.89	16381	11399	24.59	102389	1357.4	1140.5	1136.9	452.2	196.0	195.9	-2.0	-44.0	-89.3	334.1
2022-08-17	14:21:00	35.22	6.38	161.66	185.27	4.93	295.95	14.33	33.76	17269	11511	25.62	106788	1359.0	1146.3	1141.5	451.7	195.5	195.9	-15.4	-63.8	-116.7	289.6
2022-08-17	14:22:00	36.05	6.56	159.91	185.63	4.80	287.85	14.33	34.10	16694	11388	24.97	104379	1355.8	1138.9	1135.8	452.0	195.5	194.8	-5.8	-49.0	-95.5	317.6
2022-08-17	14:23:00	35.97	6.50	162.00	186.48	4.87	291.90	14.33	34.28	17113	11567	26.75	111553	1362.6	1141.3	1137.1	451.7	195.0	194.8	-22.8	-78.6	-124.2	242.6
2022-08-17	14:24:00	36.30	6.68	159.91	185.99	4.90	293.85	14.33	33.81	16988	11421	25.24	105234	1361.6	1143.4	1139.1	452.0	196.5	194.8	-13.3	-61.1	-107.3	294.6
2022-08-17	14:25:00	34.91	6.52	157.35	186.17	4.93	295.50	14.33	34.68	17138	11573	26.64	110970	1358.4	1141.6	1138.0	452.1	196.5	194.8	-22.7	-74.9	-117.8	249.8
2022-08-17	14:26:00	36.35	6.56	158.87	186.44	4.88	292.88	14.33	33.68	16813	11337	24.85	103564	1359.8	1139.6	1135.9	452.0	197.0	194.8	-8.7	-54.5	-99.2	295.4
2022-08-17	14:27:00	33.11	6.49	154.08	184.77	4.82	289.43	14.33	33.94	16675	11303	24.40	101657	1356.8	1139.5	1136.0	452.0	196.5	194.8	-8.5	-50.3	-95.0	294.9
2022-08-17	14:28:00	35.42	6.49	168.20	185.58	4.92	295.20	14.33	34.60	16638	11287	25.07	104499	1356.4	1136.1	1132.9	452.1	196.0	194.8	-4.2	-45.9	-91.4	328.1
2022-08-17	14:29:00	35.60	6.54	154.18	185.99	4.99	299.33	14.33	34.57	16481	11185	24.03	100087	1360.8	1139.1	1135.1	452.2	196.0	194.8	-2.0	-41.5	-85.0	336.9
2022-08-17	14:30:00	32.78	6.59	158.34	185.67	4.95	297.08	14.33	34.91	16831	11545	25.27	105448	1364.4	1141.9	1138.2	451.9	196.0	194.8	-11.2	-55.0	-102.4	309.1
2022-08-17	14:31:00	34.14	6.52	158.45	186.89	4.93	295.50	14.33	33.92	16706	11298	24.89	103770	1359.6	1138.4	1134.9	451.8	196.0	194.8	-8.4	-53.8	-93.5	321.8
2022-08-17	14:32:00	36.96	6.67	158.92	185.99	4.96	297.60	14.33	34.65	17175	11517	25.24	105223	1363.8	1139.4	1134.9	452.2	196.0	194.8	-15.0	-62.1	-109.6	289.6
2022-08-17	14:33:00	33.41	6.57	157.31	186.03	4.89	293.55	14.33	33.78	17038	11528	25.12	104800	1357.9	1137.6	1134.8	452.1	197.0	194.8	-12.1	-56.5	-106.6	299.1
2022-08-17	14:34:00	33.09	6.49	155.75	184.64	4.85	290.85	14.33	34.20	17181	11523	25.17	104875	1358.3	1132.0	1129.4	452.1	196.5	194.8	-14.3	-59.3	-104.6	292.2
2022-08-17	14:35:00	34.10	6.52	153.65	186.08	4.90	294.23	14.33	33.71	16731	11405	24.96	104062	1361.4	1134.6	1130.6	452.1	196.5	194.8	-11.0	-55.4	-102.5	300.5
2022-08-17	14:36:00	31.74	6.41	157.44	185.90	4.91	294.53	14.33	35.04	17125	11371	24.75	103193	1356.1	1136.0	1133.6	451.9	196.0	194.8	-9.9	-53.0	-101.4	324.3
2022-08-17	14:37:00	36.33	6.62	157.50	186.71	4.93	295.50	14.33	34.99	16394	11444	24.41	101785	1358.5	1133.4	1129.4	451.7	195.5	194.8	-1.8	-43.4	-85.1	333.9
2022-08-17	14:38:00	34.98	6.61	161.00	186.03	4.93	296.03	14.33	35.07	17263	11523	25.94	108211	1365.8	1140.8	1135.8	451.7	194.5	194.8	-16.2	-66.0	-119.7	272.9
2022-08-17	14:39:00	33.08	6.69	154.74	186.03	4.81	288.45	14.33	33.84	16775	11449	25.09	104711	1360.1	1139.7	1136.9	451.6	195.0	194.8	-7.4	-52.3	-95.1	316.9
2022-08-17	14:40:00	35.24	6.47	155.94	185.94	4.93	295.50	13.35	35.28	16925	11506	26.78	111771	1364.4	1140.9	1137.2	451.7	194.5	194.8	-27.5	-80.4	-122.8	243.0
2022-08-17	14:41:00	37.64	6.65	158.25	186.08	5.02	300.98	13.35	34.26	17100	11500	25.38	105928	1368.1	1143.1	1139.2	451.5	195.5	194.8	-13.8	-60.1	-111.6	294.9
2022-08-17	14:42:00	31.76	6.44	156.17	184.86	4.96	297.83	13.35	34.02	16931	11388	26.44	110228	1370.0	1148.9	1144.3	451.6	197.0	194.8	-24.8	-79.1	-115.1	255.5
2022-08-17	14:43:00	34.68	6.60	158.34	185.76	4.82	289.43	14.40	34.07	16763	11494	24.92	103890	1367.3	1145.7	1142.3	451.9	198.0	194.8	-8.6	-51.0	-100.9	295.4
2022-08-17	14:44:00	36.45	6.45	154.32	185.94	4.83	289.58	14.40	34.89	16769	11410	24.81	103322	1368.9	1146.8	1142.3	452.3	198.0	194.8	-7.7	-52.4	-98.0	305.3
2022-08-17	14:45:00	34.32	6.53	157.40	186.84	4.88	292.88	14.40	33.78	16663	11427	24.68	102808	1364.4	1147.8	1143.4	452.1	198.0	194.8	-4.5	-46.5	-92.4	326.8
2022-08-17	14:46:00	34.64	6.50	159.11	186.98	4.92	295.43	14.40	35.04	16694	11309	24.34	101347	1362.4	1145.7	1142.4	452.1	197.0	194.8	0.1	-38.8	-85.1	336.9
2022-08-17	14:47:00	36.42	6.54	159.54	186.66	4.85	290.93	14.40	34.76	16981	11433	25.86	107732	1363.6	1145.6	1142.4	452.0	196.0	194.8	-7.4	-52.4	-98.0	310.1
2022-08-17	14:48:00	35.42	6.53	162.14	185.81	4.92	295.43	14.40	34.05	16506	11348	25.53	106454	1366.3	1148.0	1143.5	452.1	196.5	194.8	-3.7	-45.8	-92.7	321.8
2022-08-17	14:49:00	36.05	6.54	158.30	186.08	4.97	298.43	14.40	33.99	17063	11483	26.19	109004	1363.4	1144.1	1141.3	451.9	196.5	194.8	-13.7	-62.5	-111.6	289.6
2022-08-17	14:50:00	36.29	6.56	154.74	185.45	4.84	290.10	14.40	33.63	16788	11388	26.12	108748	1368.8	1143.2	1140.2	452.4	197.5	194.8	-12.4	-58.0	-104.7	299.7
2022-08-17	14:51:00	36.17	6.55	158.40	184.55	4.86	291.83	14.40	35.04	17013	11360	25.50	106139	1367.0	1145.8	1141.2	452.1	198.0	194.8	-10.4	-57.6	-107.4	291.2
2022-08-17	14:52:00	32.28	6.57	165.74	185.94	4.81	288.68	14.40	34.89	16538	11315	25.51	106138	1360.8	1145.0	1141.3	452.4	198.5	194.8	-6.3	-47.6	-99.1	300.3
2022-08-17	14:53:00	34.28	6.70	158.92	186.21	4.94	296.18	14.40	34.78	17156	11483	25.30	105289	1360.6	1141.2	1138.3	452.4	197.5	195.9	-9.1	-54.8	-103.0	319.1
2022-08-17	14:54:00	36.35	6.74	159.72	186.30	4.89	293.10	14.40	33.81	16656	11348	25.52	106199	1363.3	1143.9	1139.5	452.5	197.0	195.9	-2.7	-43.9	-88.8	334.3
2022-08-17	14:55:00	33.78	6.50	157.40	185.94	4.90	293.78	14.40	34.81	17325	11562	27.59	114876	1363.6	1147.9	1143.7	452.4	196.5	195.9	-22.2	-74.5	-126.2	245.9
2022-08-17	14:56:00	34.80	6.48	158.92	185.81	4.80	287.78	14.40	33.86	16688	11478	26.11	108714	1364.9	1142.1	1139.4	452.5	196.0	195.9	-7.4	-51.4	-100.1	316.7
2022-08-17	14:57:00	36.18	6.51	157.35	185.99	4.91	294.45	14.40	35.07	16769	11483	27.62	115102	1364.0	1142.0	1138.4	452.1	196.0	195.9	-22.4	-75.1	-118.5	246.5
2022-08-17	14:58:00	33.71	6.51	157.50	185.72	4.92	295.35	14.40	34.05	16994	11489	25.53	106384	1363.1	1143.3	1139.5	452.0	197.0	194.8	-14.4	-62.1	-110.5	295.8
2022-08-17	14:59:00	36.59	6.53	155.08	185.31	4.79	287.10	14.40	34.97	16738	11506	25.78	107356	1362.4	1138.6	1135.4	452.1	197.5	194.8	-10.0	-55.1	-102.8	304.7
2022-08-17	15:00:00	35.67	6.53	155.98	185.81	4.80	287.78	14.40	34.13	16644	11343	25.22	104964	1366.9	1141.2	1137.6	452.5	197.5	194.8	-9.8	-55.9	-99.3	298.1
2022-08-17	15:01:00	33.72	6.59	157.50	185.72	4.84	290.25	14.40	34.44	16731	11332	25.29	104950	1363.8	1140.1	1137.6	452.2	197.5	194.8	-8.0	-53.1	-94.8	306.8

		Waste Flows								Air Flows				Temperatures						Pressures			
		Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PAC	Primary	Secondary	Stack Velocity	Stack Flow	Primary	Secondary A	Secondary B	Quench	SDA	Stack	Incinerator	SDA Inlet	BH Inlet	BH dP
		LPM	LPM	LPM	LPM	LPM	SCFM	LPM	Lbs/h	m3/h	m3/h	m/s	Rm3/s	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C	mmH2O	mmH2O	mmH2O	mmH2O
$Date	$Time	FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT	PV-236	PV-209	FT-260-VEL	FT-260-REFDRY	TE-240	TE-241		TE-203	TE-204	TE-258	PT-242A	PT-249	PT-615	PDT-622
2022-08-17	15:02:00	34.26	6.59	159.35	185.67	4.91	294.83	14.40	34.44	16475	11472	25.28	105286	1367.8	1140.0	1136.5	452.3	197.0	194.8	-6.5	-48.6	-92.7	327.4
2022-08-17	15:03:00	35.24	6.54	162.65	186.08	4.80	288.15	14.40	35.07	16431	11292	25.20	104650	1373.0	1143.2	1138.6	452.1	196.0	194.8	-0.3	-40.5	-87.4	339.8
2022-08-17	15:04:00	34.22	6.55	159.86	186.30	4.81	288.45	14.40	34.57	16788	11354	25.62	106729	1369.1	1144.5	1141.7	452.1	196.0	194.8	-9.5	-54.3	-102.3	310.1
2022-08-17	15:05:00	32.30	6.71	155.88	186.08	4.74	285.00	14.40	33.94	16788	11466	25.77	107379	1365.9	1141.4	1138.4	452.1	195.5	194.8	-10.5	-55.6	-95.8	322.3
2022-08-17	15:06:00	35.24	6.35	155.27	185.00	4.80	288.23	14.40	34.15	17094	11472	26.60	110938	1366.4	1139.3	1136.4	451.9	195.5	194.8	-15.1	-64.4	-112.4	288.5
2022-08-17	15:07:00	36.21	6.65	160.10	186.21	4.75	285.08	14.40	33.99	16956	11466	25.38	105787	1365.1	1139.1	1135.4	451.6	196.0	194.8	-11.6	-59.5	-104.3	300.6
2022-08-17	15:08:00	33.80	6.50	154.23	186.03	4.89	293.33	14.40	33.71	17463	11461	25.46	106111	1361.8	1139.0	1136.5	452.0	196.5	194.8	-14.5	-61.1	-106.8	291.3
2022-08-17	15:09:00	34.73	6.57	158.34	185.72	4.86	291.75	14.40	34.83	16719	11343	25.37	105716	1364.8	1138.2	1134.4	451.7	196.5	194.8	-9.5	-54.1	-98.6	301.2
2022-08-17	15:10:00	33.09	6.57	158.40	184.95	4.80	288.00	14.40	34.49	17463	11590	25.72	107166	1362.5	1137.5	1134.4	451.6	196.0	194.8	-13.1	-55.4	-113.3	304.6
2022-08-17	15:11:00	33.48	6.57	153.18	185.76	4.91	294.30	14.40	34.70	16481	11433	24.68	102910	1360.8	1134.4	1131.3	451.5	195.5	194.8	-6.9	-47.5	-93.7	331.3
2022-08-17	15:12:00	32.52	6.56	163.61	185.63	4.80	288.00	14.40	34.89	16850	11405	27.57	115283	1364.3	1136.1	1132.4	451.1	194.0	194.8	-22.3	-74.9	-122.3	246.3
2022-08-17	15:13:00	34.37	6.44	158.06	186.30	4.85	291.00	14.40	35.18	16700	11416	25.68	107187	1359.4	1132.7	1130.4	450.7	194.0	194.8	-7.2	-50.5	-98.1	316.1
2022-08-17	15:14:00	33.84	6.38	160.34	184.55	4.87	292.05	14.40	35.10	16613	11320	27.22	113754	1359.6	1131.7	1129.4	450.1	193.5	193.8	-19.3	-72.5	-106.5	258.9
2022-08-17	15:15:00	36.12	6.66	162.14	186.98	4.79	287.55	14.40	34.81	17050	11455	26.20	109457	1359.5	1132.0	1128.4	450.1	193.5	193.8	-12.9	-59.5	-110.5	292.7
2022-08-17	15:16:00	35.88	6.46	159.30	185.27	4.79	287.18	14.40	34.07	16925	11360	26.08	108911	1357.5	1131.0	1128.4	449.7	194.0	193.8	-9.8	-53.6	-105.8	304.9
2022-08-17	15:17:00	36.15	6.55	162.09	186.44	4.81	288.60	14.40	33.86	16713	11444	25.53	106675	1360.8	1130.6	1126.4	449.8	194.0	193.8	-9.8	-55.0	-103.4	296.2
2022-08-17	15:18:00	33.71	6.51	154.08	185.27	4.87	292.20	14.40	34.97	16806	11230	25.63	106805	1367.4	1134.2	1129.8	449.6	194.5	193.8	-9.9	-53.0	-99.4	302.8
2022-08-17	15:19:00	32.75	6.65	158.15	185.49	4.76	285.45	14.40	34.44	16688	11478	25.51	106638	1364.8	1134.4	1132.0	449.5	194.5	193.8	-7.6	-49.6	-96.6	328.3
2022-08-17	15:20:00	34.43	6.54	161.75	186.26	4.82	289.35	14.40	33.97	16319	11376	25.06	104765	1362.4	1128.5	1125.8	449.1	193.0	193.8	-2.1	-42.9	-86.9	336.1
2022-08-17	15:21:00	34.76	6.44	156.17	184.64	4.78	287.03	14.40	33.76	17188	11466	25.90	108386	1367.8	1130.7	1126.9	448.9	192.0	192.8	-11.5	-57.9	-103.9	308.4
2022-08-17	15:22:00	33.24	6.47	154.51	186.12	4.77	285.98	14.40	34.28	16713	11562	25.19	105496	1366.4	1133.8	1130.1	448.5	192.5	192.8	-10.5	-52.5	-97.6	320.8
2022-08-17	15:23:00	34.08	6.60	157.59	186.21	4.89	293.10	14.40	34.65	17050	11562	26.04	108950	1364.8	1132.8	1130.1	448.1	192.5	192.8	-17.6	-65.5	-115.8	286.2
2022-08-17	15:24:00	34.43	6.43	158.45	186.30	4.91	294.68	14.40	34.73	16844	11511	25.95	108688	1363.9	1133.2	1130.1	448.2	193.0	192.8	-11.3	-59.1	-108.6	300.0
2022-08-17	15:25:00	33.32	6.40	156.54	185.31	4.87	292.43	14.40	34.28	17244	11449	25.93	108512	1360.5	1131.8	1129.0	448.1	193.5	192.8	-13.5	-59.9	-114.1	287.9
2022-08-17	15:26:00	33.15	6.57	160.05	185.99	4.77	286.13	14.40	33.86	16725	11556	25.65	107362	1357.5	1126.2	1123.9	447.8	193.5	192.8	-10.0	-54.0	-100.9	299.4
2022-08-17	15:27:00	33.54	6.48	153.47	186.53	4.85	290.85	14.40	33.89	17219	11421	27.56	115401	1363.4	1128.5	1125.1	447.9	193.0	192.8	-26.4	-78.0	-127.5	252.3
2022-08-17	15:28:00	32.45	6.49	160.85	185.99	4.91	294.38	14.40	34.18	16556	11253	25.52	106863	1359.5	1128.3	1125.1	447.5	193.0	192.8	-3.5	-45.3	-88.7	331.5
2022-08-17	15:29:00	33.51	6.34	136.37	184.32	4.96	297.38	14.40	33.94	16925	11292	27.52	115317	1359.5	1127.9	1125.1	447.4	191.5	192.8	-32.9	-85.0	-123.8	246.7
2022-08-17	15:30:00	32.40	6.52	80.04	185.94	4.71	282.83	14.40	33.92	17125	11399	23.74	99597	1375.4	1129.5	1125.1	447.2	190.0	192.8	-7.0	-41.3	-80.9	279.3
2022-08-17	15:31:00	16.05	0.00	0.00	186.21	4.76	285.30	14.40	35.02	14069	11551	20.81	87347	1417.9	1160.8	1154.7	446.6	185.0	191.8	-16.1	-37.1	-64.4	232.4
2022-08-17	15:32:00	0.00	0.00	0.00	165.60	4.91	294.60	14.40	34.94	14100	11539	21.34	89943	1423.0	1181.1	1174.3	445.3	176.5	189.8	-35.8	-55.0	-82.8	199.7
2022-08-17	15:33:00	0.00	0.00	0.00	164.16	4.81	288.38	14.40	34.26	14838	11657	20.91	88593	1414.0	1175.2	1169.7	443.7	170.0	187.8	-40.2	-61.1	-93.2	203.3
2022-08-17	15:34:00	0.00	0.00	0.00	152.15	4.77	286.20	14.40	34.20	15406	11871	21.35	90934	1403.4	1160.7	1155.8	442.0	167.0	185.6	-51.1	-73.3	-108.3	202.1
2022-08-17	15:35:00	0.00	0.00	0.00	140.04	4.82	289.35	14.40	34.70	15294	11899	20.85	89407	1396.9	1149.6	1144.6	441.5	166.5	183.5	-52.9	-76.0	-110.6	208.8
2022-08-17	15:36:00	0.00	0.00	0.00	139.10	4.78	287.03	14.40	33.78	15263	11815	20.56	88116	1391.6	1141.7	1136.4	441.0	168.0	182.4	-52.6	-76.3	-110.0	225.8
2022-08-17	15:37:00	0.00	0.00	0.00	140.22	4.80	287.78	14.40	33.60	15000	11680	21.09	90442	1389.5	1138.4	1133.4	440.8	170.5	182.4	-49.2	-70.9	-105.2	231.0
2022-08-17	15:38:00	0.00	0.00	0.00	139.95	4.76	285.45	14.40	33.76	15444	11787	20.76	89148	1389.3	1135.1	1129.4	440.8	171.5	181.3	-55.5	-82.9	-116.7	217.6
2022-08-17	15:39:00	0.00	0.00	0.00	140.99	4.86	291.68	14.40	33.78	15313	11803	20.94	89767	1388.0	1132.5	1127.4	441.3	173.5	181.3	-53.3	-77.3	-110.4	223.3
2022-08-17	15:40:00	0.00	0.00	0.00	139.14	4.93	295.65	14.40	34.31	15806	11955	21.30	91493	1383.0	1126.5	1121.1	442.4	175.0	181.3	-60.9	-87.8	-125.6	200.5
2022-08-17	15:41:00	0.00	0.00	0.00	140.18	4.87	291.90	14.40	35.10	15600	11742	21.34	91601	1381.0	1124.3	1118.9	443.8	176.5	181.3	-59.6	-83.9	-120.0	207.3
2022-08-17	15:42:00	0.00	0.00	0.00	139.59	4.82	289.13	14.40	33.68	15831	11871	21.51	92279	1379.6	1124.5	1118.9	444.7	178.0	181.3	-63.5	-89.8	-127.5	193.9
2022-08-17	15:43:00	0.00	0.00	0.00	141.08	4.81	288.68	14.40	34.41	15313	11736	21.17	90794	1378.8	1123.5	1117.9	445.9	178.5	181.3	-54.7	-80.9	-114.7	208.5
2022-08-17	15:44:00	7.02	0.00	0.00	141.66	4.87	292.13	14.40	33.92	15231	11736	22.86	97952	1380.3	1125.8	1119.0	446.6	179.0	181.3	-48.4	-77.9	-117.5	174.4
2022-08-17	15:45:00	27.47	0.00	0.00	142.11	4.80	287.85	14.40	33.76	14250	11624	20.62	88087	1408.6	1165.1	1155.2	448.8	182.5	182.4	-35.4	-63.0	-96.8	236.9
2022-08-17	15:46:00	30.57	0.00	0.00	161.46	4.72	283.35	14.40	33.94	14744	11624	21.92	93628	1442.1	1205.7	1194.9	453.1	187.5	183.4	-52.9	-85.3	-107.5	189.0
2022-08-17	15:47:00	31.02	6.46	59.68	175.77	4.77	285.90	14.40	33.97	18119	11854	23.78	101429	1440.9	1190.4	1182.3	456.0	186.0	184.4	-52.9	-87.8	-126.9	266.8
2022-08-17	15:48:00	31.68	6.54	118.89	175.05	4.80	288.00	14.40	35.10	17050	11489	25.31	107980	1424.0	1167.6	1161.2	455.9	183.0	184.4	-23.2	-65.1	-109.9	297.1
2022-08-17	15:49:00	31.34	6.47	148.74	182.97	4.93	295.80	14.40	34.34	17125	11697	25.57	109237	1401.9	1155.9	1150.7	455.6	183.5	183.3	-26.1	-62.0	-113.7	277.5
2022-08-17	15:50:00	31.50	6.54	155.84	183.65	4.83	289.65	14.40	34.23	16919	11478	24.97	106544	1378.6	1145.6	1140.8	455.7	185.0	183.3	-20.8	-57.4	-105.8	287.3
2022-08-17	15:51:00	31.62	6.39	154.98	183.56	4.77	285.98	14.40	33.81	16619	11348	24.66	105178	1360.8	1137.5	1132.9	455.3	186.0	184.4	-14.3	-46.0	-96.2	284.6
2022-08-17	15:52:00	31.77	6.31	162.05	183.47	4.82	288.90	13.80	34.26	16388	11371	24.81	106012	1356.1	1131.9	1127.4	455.1	186.0	184.4	-13.6	-47.0	-92.1	293.8
2022-08-17	15:53:00	31.62	6.45	152.10	182.61	4.82	289.05	13.80	34.91	16463	11489	24.95	106233	1365.8	1135.4	1130.6	454.4	186.5	184.4	-8.2	-38.8	-86.1	322.4
2022-08-17	15:54:00	31.49	6.66	160.48	184.05	4.78	287.03	13.80	35.18	16213	11388	24.74	105284	1370.5	1138.3	1133.6	454.0	187.0	185.4	-10.2	-42.3	-85.9	339.8
2022-08-17	15:55:00	31.88	6.50	160.62	183.11	4.89	293.33	13.80	33.76	17050	11511	25.86	109767	1364.4	1134.9	1131.4	453.4	186.5	185.4	-22.0	-57.0	-110.5	309.4
2022-08-17	15:56:00	32.04	6.57	160.05	184.14	4.85	291.08	13.80	34.86	16563	11500	25.03	106432	1362.1	1129.1	1125.3	453.0	187.0	185.4	-15.5	-49.4	-96.9	321.9
2022-08-17	15:57:00	31.19	6.45	160.38	182.66	4.90	294.08	13.80	34.52	17338	11478	26.08	110829	1362.5	1126.6	1123.3	452.5	187.0	185.4	-30.0	-66.8	-122.4	285.1
2022-08-17	15:58:00	31.76	6.55	156.88	183.65	4.82	289.05	13.80	34.60	16825	11579	25.91	110070	1353.9	1119.0	1115.9	452.0	188.0	186.4	-24.6	-61.9	-110.4	302.3
2022-08-17	15:59:00	31.61	6.58	159.20	183.42	4.80	287.93	13.80	34.99	17131	11584	26.72	113246	1349.5	1116.0	1112.8	451.2	188.0	186.4	-36.5	-78.9	-126.2	254.8
2022-08-17	16:00:00	31.83	6.55	159.95	182.70	4.78	286.73	13.80	34.57	16713	11483	25.75	109272	1351.9	1114.8	1111.8	450.6	188.5	186.4	-17.5	-53.5	-102.4	302.8
2022-08-17	16:01:00	32.90	6.53	159.30	182.97	4.87	292.20	13.80	34.68	16894	11523	27.47	116464	1357.1	1115.8	1111.9	450.4	188.0	186.4	-32.2	-74.1	-122.8	257.3
2022-08-17	16:02:00	32.66	6.55	161.00	183.65	4.85	290.93	13.80	33.76	16581	11410	25.10	106389	1356.6	1117.1	1113.0	449.6	188.0	186.4	-12.9	-46.0	-93.3	333.8
2022-08-17	16:03:00	32.79	6.46	159.72	183.06	4.79	287.10	13.80	34.52	16300	11298	24.84	105358	1362.5	1121.2	1116.1	449.3	187.5	186.4	-11.5	-43.1	-86.6	342.8
2022-08-17	16:04:00	32.93	6.51	162.56	183.74	4.75	285.00	13.80	33.76	16831	11410	25.54	108470	1361.0	1119.3	1116.0	448.8	187.5	186.4	-17.7	-54.4	-101.0	311.8
2022-08-17	16:05:00	32.97	6.56	160.81	182.52	4.77	285.98	13.80	33.84	16588	11405	25.13	106546	1361.3	1120.6	1116.0	448.9	188.5	186.4	-14.5	-47.4	-94.8	322.6
2022-08-17	16:06:00	33.00	6.50	160.67	182.75	4.79	287.63	13.80	34.10	17019	11506	26.02	110301	1361.8	1120.0	1117.1	448.6	189.0	187.4	-26.0	-64.0	-114.6	290.9
2022-08-17	16:07:00	32.33	6.52	160.38	183.78	4.79	287.63	13.80	35.15	16963	11506	25.75	108965	1359.1	1115.9	1112.9	449.0	190.0	187.4	-23.2	-60.8	-109.9	301.8
2022-08-17	16:08:00	33.87	6.57	159.48	183.60	4.85	291.23	13.80	34.10	16775	11416	26.10	110390	1361.8	1115.6	1111.9	448.9	190.5	187.4	-19.8	-58.0	-105.3	295.3
2022-08-17	16:09:00	33.81	6.56	159.44	183.92	4.82	289.28	13.80	33.92	16638	11416	25.71	108741	1366.3	1120.7	1116.1	448.8	191.0	188.4	-17.1	-53.0	-98.7	303.9
2022-08-17	16:10:00	34.20	6.56	159.54	182.30	4.87	291.90	13.80	35.07	16756	11326	26.00	109889	1370.8	1123.2	1118.2	448.9	191.0	188.4	-13.8	-47.4	-96.8	325.7

		Waste Flows								Air Flows					Temperatures						Pressures			
		Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PAC	Primary	Secondary	Stack Velocity	Stack Flow	Primary	Secondary A	Secondary B	Quench	SDA	Stack	Incinerator	SDA Inlet	BH Inlet	BH dP
		LPM	LPM	LPM	LPM	LPM	SCFM	LPM	Lbs/h	m3/h	m3/h	m/s	Rm3/s	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C	mmH2O	mmH2O	mmH2O	mmH2O
SDate	STime	FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT	PV-236	PV-209	FT-260-VEL	FT-260-REFDRY	TE-240	TE-241		TE-203	TE-204	TE-258	PT-242A	PT-249	PT-615	PDT-622
2022-08-17	16:11:00	34.22	6.65	161.38	183.33	4.82	289.43	13.80	33.76	16331	11421	24.62	104073	1372.8	1127.6	1122.4	448.7	191.0	188.4	-10.6	-43.3	-87.7	335.5
2022-08-17	16:12:00	34.34	6.36	159.77	181.80	4.81	288.68	13.80	34.97	17113	11433	25.07	105904	1371.8	1130.6	1125.6	448.9	191.0	188.4	-25.5	-63.3	-117.9	299.6
2022-08-17	16:13:00	34.97	6.70	160.34	184.28	4.87	292.35	13.80	34.34	16588	11449	25.88	109281	1373.0	1129.3	1125.6	449.2	192.0	188.4	-14.0	-48.8	-97.5	318.8
2022-08-17	16:14:00	34.44	6.58	159.58	183.56	4.80	287.93	13.80	34.41	17094	11736	26.08	109991	1377.8	1133.7	1128.7	449.4	192.0	189.4	-30.0	-68.8	-129.4	271.2
2022-08-17	16:15:00	35.34	6.63	160.38	183.65	4.73	283.50	13.80	35.02	16838	11405	25.87	109035	1378.4	1133.7	1128.7	449.7	193.5	189.4	-20.8	-59.5	-108.8	295.3
2022-08-17	16:16:00	34.98	6.44	160.72	182.97	4.75	285.23	13.80	33.78	16994	11489	27.20	114451	1377.0	1134.1	1128.7	450.1	194.0	190.4	-31.1	-73.3	-121.8	250.6
2022-08-17	16:17:00	35.75	6.70	159.82	183.74	4.77	286.05	13.80	34.76	16594	11382	25.83	108366	1379.6	1134.1	1129.7	450.6	195.0	190.4	-17.0	-53.0	-99.5	297.7
2022-08-17	16:18:00	34.76	6.65	159.30	182.61	4.73	283.88	13.80	33.73	16625	11506	27.45	115354	1381.6	1137.3	1131.7	451.3	195.5	190.4	-27.8	-72.3	-109.6	264.1
2022-08-17	16:19:00	35.21	6.57	159.20	184.19	4.70	281.78	13.80	34.89	16319	11382	25.53	107221	1384.3	1137.7	1132.7	451.6	196.0	191.4	-10.1	-44.9	-91.6	329.0
2022-08-17	16:20:00	35.15	6.53	158.25	183.24	4.74	284.48	13.80	33.63	16150	11270	25.03	105077	1383.8	1140.1	1134.7	452.0	196.0	191.4	-9.3	-40.6	-85.7	337.7
2022-08-17	16:21:00	34.62	6.62	160.76	183.87	4.77	286.43	13.80	33.76	16756	11405	25.50	106974	1385.4	1140.0	1134.7	452.3	196.0	191.4	-16.6	-53.6	-102.0	310.3
2022-08-17	16:22:00	35.51	6.51	159.91	183.51	4.74	284.33	13.80	33.63	16381	11601	25.35	106426	1385.1	1139.5	1134.7	452.3	196.5	192.4	-9.8	-43.1	-94.7	319.4
2022-08-17	16:23:00	35.30	6.64	162.00	183.92	4.72	283.28	13.80	34.97	17025	11466	26.59	111370	1384.9	1139.3	1134.6	452.7	197.0	192.4	-20.6	-58.0	-109.4	287.8
2022-08-17	16:24:00	34.97	6.58	160.91	183.60	4.71	282.60	13.80	33.78	16881	11511	25.80	107945	1385.4	1138.0	1133.5	453.0	197.5	193.4	-18.7	-56.8	-107.0	299.6
2022-08-17	16:25:00	35.04	6.64	160.25	184.05	4.72	283.43	13.80	35.12	16725	11545	26.35	110094	1382.4	1136.5	1132.4	453.3	198.5	193.4	-17.4	-53.1	-102.8	293.0
2022-08-17	16:26:00	35.01	6.59	161.85	183.74	4.79	287.25	13.80	34.47	16550	11410	25.63	107346	1384.0	1136.9	1132.4	453.2	198.5	193.4	-12.5	-49.5	-94.1	301.7
2022-08-17	16:27:00	34.49	6.49	158.96	182.16	4.77	286.05	13.80	34.44	16806	11416	25.71	107394	1387.3	1140.0	1134.6	453.5	198.0	193.4	-12.7	-47.3	-95.3	324.2
2022-08-17	16:28:00	35.25	6.70	159.58	184.05	4.73	283.65	13.80	34.57	16181	11332	24.48	102181	1387.0	1140.2	1134.6	453.7	198.0	193.4	-7.1	-39.9	-83.2	334.0
2022-08-17	16:29:00	34.59	6.38	155.17	183.78	4.80	287.85	13.80	34.62	17313	11556	24.88	103830	1389.3	1144.7	1139.6	453.7	197.0	194.4	-22.8	-61.3	-114.0	286.9
2022-08-17	16:30:00	34.85	6.70	161.10	184.95	4.83	289.58	13.80	33.81	16456	11247	25.81	107764	1387.0	1142.3	1138.5	453.8	197.5	194.4	-10.9	-46.0	-94.0	316.4
2022-08-17	16:31:00	34.77	6.62	158.34	183.78	4.78	286.65	13.80	34.86	16856	11607	27.17	113398	1391.0	1144.6	1139.6	453.8	197.5	194.4	-32.9	-75.6	-124.6	241.1
2022-08-17	16:32:00	35.33	6.67	159.77	184.46	4.79	287.18	13.80	34.99	16744	11500	26.13	109028	1384.5	1141.2	1137.4	453.7	198.0	194.4	-18.8	-56.5	-108.2	295.6
2022-08-17	16:33:00	34.85	6.53	159.24	184.05	4.76	285.83	13.80	33.84	16938	11517	27.01	112584	1389.0	1142.2	1137.5	453.8	198.5	194.4	-29.4	-71.0	-121.1	249.8
2022-08-17	16:34:00	35.03	6.67	160.67	184.50	4.73	283.50	13.80	34.99	16588	11405	25.88	108187	1386.4	1140.9	1136.4	454.1	199.0	194.4	-14.0	-51.0	-98.7	296.9
2022-08-17	16:35:00	35.13	6.37	159.44	183.51	4.76	285.60	13.80	34.99	16444	11489	25.13	104736	1388.9	1144.3	1138.7	454.2	199.0	194.4	-11.2	-47.0	-95.3	303.1
2022-08-17	16:36:00	34.85	6.65	159.48	184.05	4.81	288.30	13.80	33.92	16225	11365	25.29	105435	1386.3	1143.8	1139.7	454.3	199.0	194.4	-11.4	-45.1	-89.6	328.2
2022-08-17	16:37:00	34.82	6.45	159.15	183.87	4.76	285.60	13.80	34.15	16156	11253	24.58	102392	1388.6	1146.9	1141.7	454.2	198.0	194.4	-6.4	-39.6	-87.1	338.4
2022-08-17	16:38:00	35.00	6.59	160.76	183.96	4.79	287.25	13.80	34.99	16513	11517	25.79	107765	1388.3	1147.5	1142.7	454.4	198.0	194.4	-13.9	-51.1	-100.1	308.3
2022-08-17	16:39:00	35.21	6.57	132.77	184.41	4.78	287.03	13.80	33.84	16425	11601	25.73	107188	1388.9	1146.5	1142.7	454.5	198.0	194.4	-19.7	-53.1	-99.7	320.3
2022-08-17	16:40:00	34.46	6.51	114.95	183.83	4.82	288.90	13.80	34.41	17544	11618	26.64	111065	1388.0	1139.5	1135.4	454.4	197.0	195.4	-35.0	-70.3	-122.6	288.1
2022-08-17	16:41:00	34.56	6.49	140.64	184.19	4.78	286.95	13.80	33.94	16863	11523	26.55	110711	1388.6	1133.8	1129.9	453.4	194.0	195.4	-25.8	-64.3	-109.7	299.1
2022-08-17	16:42:00	35.15	6.57	157.55	184.19	4.73	283.50	13.80	33.86	16913	11489	25.57	106840	1385.0	1134.7	1129.9	452.5	193.5	194.3	-18.8	-57.5	-106.6	291.2
2022-08-17	16:43:00	35.03	6.54	160.38	183.78	4.83	289.50	13.80	35.10	16681	11483	26.44	110544	1384.6	1140.1	1135.2	451.9	194.0	194.3	-15.6	-53.4	-97.7	301.6
2022-08-17	16:44:00	34.43	6.37	159.01	183.20	4.72	282.90	13.80	35.02	16844	11466	25.75	107665	1383.4	1142.1	1137.2	451.7	195.0	194.3	-15.8	-53.6	-101.8	323.0
2022-08-17	16:45:00	34.74	6.57	159.58	183.92	4.76	285.38	13.80	34.97	16400	11393	25.17	105226	1386.6	1143.1	1138.2	452.2	196.0	193.3	-9.0	-43.6	-88.1	332.9
2022-08-17	16:46:00	35.06	6.46	160.25	184.32	4.79	287.55	13.80	33.92	17150	11629	26.96	112595	1390.0	1147.4	1141.6	452.2	195.5	193.3	-23.1	-63.8	-119.3	274.8
2022-08-17	16:47:00	34.02	6.50	158.87	183.69	4.90	293.70	13.80	34.94	16475	11506	25.91	108182	1390.5	1145.9	1141.6	452.6	197.0	193.3	-13.6	-50.1	-96.4	316.4
2022-08-17	16:48:00	33.48	6.57	159.77	184.14	4.82	289.13	13.80	34.49	16838	11511	27.44	114518	1387.5	1143.8	1139.4	453.4	197.0	194.4	-29.5	-72.3	-123.3	244.3
2022-08-17	16:49:00	33.33	6.49	159.63	183.47	4.73	283.65	13.80	34.65	16888	11433	27.63	115207	1383.9	1136.6	1137.4	453.6	197.5	194.4	-29.6	-70.5	-114.6	254.4
2022-08-17	16:50:00	33.71	6.36	160.20	183.15	4.75	284.85	13.80	34.55	16656	11444	25.80	107480	1379.4	1133.5	1130.2	453.7	197.5	194.4	-14.7	-50.0	-99.6	298.5
2022-08-17	16:51:00	33.56	6.52	158.45	183.60	4.86	291.60	13.80	34.02	16575	11455	25.66	106950	1378.6	1134.3	1130.2	453.2	197.0	194.4	-14.1	-51.0	-95.7	307.4
2022-08-17	16:52:00	33.23	6.45	160.48	183.69	4.81	288.30	13.80	33.89	16369	11455	25.30	105689	1377.0	1133.0	1129.1	452.9	197.0	194.4	-9.6	-42.5	-90.5	328.9
2022-08-17	16:53:00	33.45	6.58	159.54	184.19	4.80	287.93	13.80	33.94	16256	11573	25.47	106535	1379.4	1135.3	1130.1	452.9	196.0	194.4	-9.0	-43.1	-86.1	340.4
2022-08-17	16:54:00	33.06	6.56	161.28	183.60	4.81	288.38	13.80	35.15	16619	11449	25.47	106320	1378.4	1134.7	1131.0	452.5	196.0	194.4	-15.0	-52.3	-101.3	309.5
2022-08-17	16:55:00	33.68	6.56	159.30	183.96	4.77	286.13	13.80	33.68	16544	11309	25.78	107608	1379.1	1132.7	1128.9	452.1	195.5	194.4	-14.7	-53.3	-96.6	322.3
2022-08-17	16:56:00	32.85	6.42	159.54	183.69	4.75	285.08	13.80	33.68	16944	11545	25.96	108334	1379.0	1131.9	1128.9	452.1	195.5	194.4	-22.7	-62.9	-114.4	288.3
2022-08-17	16:57:00	33.95	6.43	160.67	183.29	4.70	282.08	13.80	35.02	16913	11433	26.24	109460	1377.1	1127.6	1123.9	452.0	196.5	194.4	-18.6	-55.6	-107.4	300.6
2022-08-17	16:58:00	33.36	6.32	158.92	182.79	4.81	288.30	13.80	33.97	16869	11579	26.63	111169	1378.6	1125.2	1121.9	451.7	196.5	194.4	-17.4	-55.5	-104.9	292.2
2022-08-17	16:59:00	33.89	6.45	159.72	184.05	4.81	288.68	13.80	34.91	16381	11455	25.61	106831	1375.6	1125.9	1121.9	451.5	196.5	194.4	-11.2	-47.3	-92.8	295.0
2022-08-17	17:00:00	33.87	6.45	159.54	183.33	4.77	286.35	13.80	34.70	16919	11539	25.32	105676	1376.0	1131.5	1127.2	451.4	195.5	194.4	-12.7	-47.9	-97.7	315.8
2022-08-17	17:01:00	33.50	6.54	153.95	184.28	4.79	287.18	13.80	33.99	16369	11416	25.10	105064	1379.4	1132.9	1128.2	451.0	195.0	194.4	-6.9	-39.0	-82.1	327.4
2022-08-17	17:02:00	33.93	6.56	156.07	184.14	4.77	286.13	13.80	35.04	16838	11545	27.13	113358	1385.4	1136.9	1131.2	450.8	193.5	194.4	-29.9	-70.9	-121.0	247.6
2022-08-17	17:03:00	33.99	6.65	159.11	184.05	4.76	285.53	13.80	34.73	16425	11444	25.25	105586	1383.6	1137.1	1132.2	450.2	193.5	193.3	-10.9	-45.8	-92.1	310.7
2022-08-17	17:04:00	33.51	6.38	158.49	183.78	4.74	285.00	13.80	33.89	16575	11596	26.94	112655	1383.1	1138.7	1134.2	450.1	193.5	193.3	-26.0	-67.4	-117.6	239.1
2022-08-17	17:05:00	34.34	6.48	157.78	183.92	4.71	282.38	13.80	34.31	16744	11472	26.16	109694	1382.6	1137.7	1134.2	450.0	194.0	193.3	-17.0	-54.8	-103.5	290.2
2022-08-17	17:06:00	33.51	6.40	158.06	182.97	4.72	283.35	13.80	33.71	16638	11365	25.85	108135	1379.8	1134.4	1130.9	450.1	194.0	193.3	-15.3	-51.9	-99.8	284.6
2022-08-17	17:07:00	34.43	6.41	160.76	182.25	4.82	289.28	13.80	33.86	16569	11494	25.47	106552	1382.4	1133.2	1128.9	449.9	194.5	193.3	-11.8	-46.9	-96.8	291.1
2022-08-17	17:08:00	33.69	6.50	159.11	183.33	4.73	283.73	13.80	34.10	16394	11427	25.37	106159	1380.6	1135.4	1131.1	449.8	194.0	193.3	-10.1	-45.9	-91.8	300.2
2022-08-17	17:09:00	33.75	6.53	161.00	184.37	4.77	286.43	13.80	34.94	16419	11399	25.29	105789	1383.0	1136.2	1131.1	449.8	194.0	193.3	-7.0	-41.4	-86.3	321.6
2022-08-17	17:10:00	34.40	6.43	159.24	183.38	4.73	283.80	13.80	35.04	16000	11427	24.86	103988	1383.8	1139.7	1135.1	449.5	193.5	193.3	-6.6	-39.8	-82.2	330.3
2022-08-17	17:11:00	33.54	6.41	160.14	183.51	4.76	285.83	13.80	33.76	16663	11449	25.21	105577	1381.6	1141.2	1137.1	449.8	193.0	193.3	-12.5	-49.0	-97.9	303.1
2022-08-17	17:12:00	33.33	6.53	160.76	184.37	4.72	283.35	13.80	33.89	16400	11539	25.29	105868	1385.0	1140.2	1136.0	449.7	193.5	193.3	-8.7	-43.9	-90.5	315.8
2022-08-17	17:13:00	33.96	6.42	160.76	182.79	4.77	285.90	13.80	34.73	16906	11556	25.74	107727	1385.4	1138.3	1134.9	449.6	193.5	193.3	-19.5	-57.0	-110.4	281.9
2022-08-17	17:14:00	34.38	6.42	160.25	183.74	4.75	285.23	13.80	33.89	16731	11489	26.30	110052	1386.3	1135.8	1131.9	449.4	194.0	193.3	-14.6	-51.4	-103.0	292.4
2022-08-17	17:15:00	34.49	6.43	159.91	183.15	4.75	284.85	13.80	33.92	16925	11612	25.72	107586	1381.0	1134.3	1130.8	449.5	194.5	193.3	-13.7	-51.4	-102.0	283.4
2022-08-17	17:16:00	34.16	6.53	160.29	184.10	4.80	288.00	13.80	35.04	16450	11376	25.18	105317	1381.5	1135.6	1130.8	449.6	195.0	193.3	-10.8	-46.8	-94.6	293.9
2022-08-17	17:17:00	34.22	6.50	159.44	183.87	4.73	283.80	13.80	33.89	16944	11511	25.35	106121	1382.5	1137.6	1133.0	449.3	194.5	193.3	-12.9	-49.1	-106.4	301.7
2022-08-17	17:18:00	33.65	6.59	160.85	183.47	4.73	283.95	13.43	33.97	16331	11517	25.41	106372	1383.0	1138.5	1134.1	449.2	194.5	193.3	-7.1	-41.4	-85.8	323.5
2022-08-17	17:19:00	34.01	6.44	161.10	183.15	4.73	283.88	13.20	34.89	16675	11444	27.10	113399	1390.6	1141.6	1136.2	449.0	193.5	193.3	-28.7	-73.3	-119.7	238.5

		Waste Flows								Air Flows				Temperatures							Pressures			
		Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PAC	Primary	Secondary	Stack Velocity	Stack Flow	Primary	Secondary A	Secondary B	Quench	SDA	Stack		Incinerator	SDA Inlet	BH Inlet	BH dP
		LPM	LPM	LPM	LPM	LPM	SCFM	LPM	Lbs/h	m3/h	m3/h	m/s	Rm3/s	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C		mmH2O	mmH2O	mmH2O	mmH2O
$Date	$Time	FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT	PV-236	PV-209	FT-260-VEL	FT-260-REFDRY	TE-240	TE-241		TE-203	TE-204	TE-258		PT-242A	PT-249	PT-615	PDT-622
2022-08-17	17:20:00	34.38	6.56	160.57	184.19	4.76	285.75	14.21	34.47	16525	11287	25.44	106323	1386.8	1140.1	1136.1	449.1	194.0	193.3		-9.0	-44.0	-93.0	308.8
2022-08-17	17:21:00	33.39	6.33	159.54	183.15	4.71	282.38	14.21	35.04	16369	11388	26.88	112748	1384.6	1140.1	1136.1	448.9	194.0	193.3		-26.0	-66.5	-106.4	249.3
2022-08-17	17:22:00	33.71	6.41	161.04	183.29	4.71	282.75	14.21	34.28	16781	11506	26.13	109252	1382.6	1138.0	1133.9	449.0	194.5	193.3		-18.3	-56.4	-106.4	288.3
2022-08-17	17:23:00	34.07	6.38	159.77	183.20	4.72	283.28	14.21	33.71	16681	11416	26.01	108773	1383.5	1136.4	1132.9	449.1	195.0	193.3		-13.6	-51.0	-99.3	297.7
2022-08-17	17:24:00	34.23	6.35	160.44	184.05	4.76	285.75	14.21	33.76	16550	11315	26.07	109019	1385.0	1134.2	1130.9	448.9	195.5	193.3		-11.7	-47.0	-97.0	289.7
2022-08-17	17:25:00	33.81	6.43	159.54	183.47	4.76	285.30	14.21	34.07	16425	11433	25.43	106315	1385.9	1135.3	1130.9	448.9	195.0	193.3		-10.1	-43.3	-91.0	298.1
2022-08-17	17:26:00	33.83	6.72	160.76	184.59	4.73	283.80	14.21	33.81	16406	11545	25.34	106291	1385.4	1135.2	1130.9	449.1	195.0	193.3		-6.9	-38.5	-88.8	323.7
2022-08-17	17:27:00	34.08	6.51	159.67	183.96	4.75	285.00	14.21	34.05	16138	11281	25.34	105967	1387.6	1139.4	1134.2	448.9	194.5	193.3		-4.6	-36.1	-83.2	330.6
2022-08-17	17:28:00	34.52	6.51	161.47	184.14	4.74	284.40	14.21	34.31	16831	11438	25.81	107976	1385.4	1140.0	1136.2	448.9	193.5	193.3		-12.7	-48.5	-97.4	301.1

August 17/2022		Waste Flows								Air Flows				Temperatures							Pressures			
		Rich	Emulsion	Lean	Alkaline	TDU Flow	TDU Flow	Leachate	PAC Flow	Primary	Secondary	Stack Velocity	Stack Flow	Primary	Secondary A	Secondary B	Quench	SprayDryer	Stack		Incinerator	SDA Inlet	SD Outlet	Baghouse
Test		FT-229	FT-219C	FT-223	PV-207	FT-313B	FT-313	PV-211	SC-PAC-FT	PV-236	PV-209	FT-260-VEL	FT-260-REFDRY	TE-240	TE-241A	TE-241B	TE-203	TE-204	TE-258		PT-242A	PT-249	PT-615	PDT-622
Units		LPM	LPM	LPM	LPM	LPM	SCFM	LPM	Lbs/h	m3/h	m3/h	m/s	Rm3/s	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C	Degrees C		mmH2O	mmH2O	mmH2O	mmH2O
Max		37.86	6.76	168.20	186.98	5.02	300.98	14.40	35.28	18119	11955	27.63	116464	1442.1	1205.7	1194.9	456.0	199.0	195.9		0.1	-36.1	-64.4	342.8
Min		0.00	0.00	0.00	139.10	4.70	281.78	13.20	33.60	14069	11185	20.56	87347	1349.5	1114.8	1111.8	440.8	166.5	181.3		-63.5	-89.8	-129.4	174.4
Average		32.11	6.05	145.59	181.91	4.82	289.20	14.11	34.36	16646	11473	25.30	106002	1373.1	1138.5	1134.4	450.9	193.4	192.4		-16.7	-56.5	-102.6	293.6
Variance		67.86	2.95	1804.97	106.12	0.01	18.48	0.09	0.24	300763	15555	1.94	29971764	236.2	115.5	104.8	7.3	39.1	15.7		153.4	136.8	138.6	1176.5