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Report:

Annual Compliance Emission Testing Program at the Clean Harbors Sarnia Incineration Facility (2022)

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EXECUTIVE SUMMARY

ORTECH Consulting Inc. (ORTECH) was requested by Clean Harbors to conduct a comprehensive emission testing program at the incineration facility located at 4090 Telfer Road in Corunna, Ontario. The emission testing is required annually as part of the Ontario Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) No. 8-1030-94-006 (formerly Certificate of Approval (Air) No. 8-1030-94-006), dated April 19, 1994. A Notice of Amendment to the ECA was issued on January 24, 2003, ECA Waste/Air No. 6547-5G5MSP (referred to herein as "Notice of Amendment").

The primary objective of the testing program was to determine the emission rates of specific contaminants and to demonstrate the facility's ability to meet the allowable emission levels for these contaminants according to the specified point of impingement concentration limits.

In addition to the requirements of Regulation 419, the ECA provides criteria for the total hydrocarbon (THC) concentration at the Main Stack. The ECA also provides concentration limits for carbon monoxide, oxygen, particulate matter, mercury, and the toxic equivalent concentration of dioxins and furans in the stack gases.

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

Stack Gas Concentration Criterion	Allowable Value	Test Average Value
Particulate Matter	maximum 20 mg/Rm$^{3(1)}$	<0.27 mg/Rm$^{3(1)}$
Mercury	maximum 50 µg/Rm$^{3(1)}$	6.77 µg/Rm$^{3(1)}$
Dioxin and Furan TEQ	maximum 80 pg TEQ/Rm$^{3(1)}$	<9.59 pg TEQ/Rm$^{3(1)}$
Carbon Monoxide	maximum 100 ppm$^{(1)}$	51.3 ppm$^{(1)}$
Oxygen	minimum 8.0 %$^{(2)}$	10.00 %$^{(2)}$
Total Hydrocarbons$^{(3)}$	maximum 100 ppm	10.0 ppm$^{(1)}$
Total Hydrocarbons$^{(4)}$	maximum 100 ppm	5.9 ppm$^{(4)}$
Total Hydrocarbons$^{(5)}$	maximum 100 ppm	14.3 ppm$^{(5)}$

(1) adjusted to 11% oxygen, dry at 25°C and 1 atmosphere
(2) dry by volume
(3) as per ECA No. 6547-5G5MSP (dry adjusted stack concentration)
(4) 10-minute rolling average - wet basis, expressed as equivalent methane
(5) maximum 10-minute average during the test program - wet basis, expressed as equivalent methane

Note: The dioxin and furan concentration in the above table was calculated using the calculation method detailed in Schedule 3 of the ECA.

The emission testing program was conducted over three days between November 8 and November 10, 2022 during which three tests were completed for each emission component group using several types of sampling trains and sampling methods. The particulate and metals, semi-volatile organics and combustion gas tests were performed simultaneously at the main stack location. During the time required to complete these tests, acid gas and volatile organics tests were also run.

Testing was performed at a high feed rate, as specified by the ECA, to demonstrate compliance with MECP emission criteria. During the emission tests the average combined rich, lean and emulsion feed rates were 204, 207 and 192 L/min for Test No. 1, Test No. 2, and Test No. 3, respectively. The Thermal Desorber Unit (TDU) was exhausting to the incinerator during each test.

During the emission testing program, process data was recorded and composite samples of the liquid waste materials being incinerated were collected for subsequent analysis. The results of these analyses, coupled with the stack gas emission rate measurements, were used to calculate destruction and removal efficiencies (DREs) for select volatile organic compounds. Note prior to the 2021 emission testing program, six target principal organic hazardous compounds (2-Butanone, Ethyl Acetate, Tetrachloroethene, Toluene, 1,2,4-Trichlorobenzene and Total Xylenes) were used in the DRE calculations however most of these contaminants were less than the method detection limit in the feeds and the stack gas samples. As the result of discussions with Clean Harbors and the MECP and consistent with the 2021 testing program, ORTECH calculated DREs for those volatile organic compounds that were detected in quantities greater than the detection limit in at least one feed stream in all three tests; DREs were determined for seven volatile organic compounds. Note that although the Thermal Desorber Unit (TDU) was in operation during the emission testing program, the contribution of the TDU to the feed was not included in the DRE calculations (i.e. the contribution of the TDU is not taken into account as a feed therefore the DRE results may be biased low).

All tables referenced in this report (excluding the internal QA/QC summary tables) are provided in Appendix 1. Summary results tables for the 2022 emission testing program are provided on the following pages based on calculated ground level point of impingement concentrations for the stack emissions and the DREs. Please note that the dispersion modelling was conducted using the AERMOD model. Point of impingement calculations for testing programs prior to 2013 were conducted using the Regulation 346 model.

None of the analytical data was blank corrected, although analytical data for some metals (aluminum, boron, calcium, magnesium, silicon and sodium) does not include amounts detected in the hydrofluoric acid extracts of the sampling train filters because of the normally high background levels of these metals resulting in an over-estimation of the contaminant emission rates.

At the request of the MECP the volatile organic compounds emission data was calculated using the detection limit for those compounds not found in quantities greater than the detection limit. Prior to the 2021 emission testing program zero was used for the volatile organic compounds less than the detection limit.

Regulation 419 Dispersion Modelling Results
for Inorganic and Semi-Volatile Organic Compounds

Contaminant	Average Emission Rate	Calculated Impingement Concentration	Allowable Impingement Concentration	Percentage of Allowable Concentration	Status of Allowable Concentration
Base Case - Annual	1.00 g/s	0.0500 µg/m^3			
Base Case - 30 Day	1.00 g/s	0.1437 µg/m^3			
Base Case - 24 hour	1.00 g/s	0.4915 µg/m^3			
Base Case - 1 hour	1.00 g/s	1.8423 µg/m^3			
Base Case - 1/2 hour	1.00 g/s	2.2107 µg/m^3			
Particulate matter	<0.0051 g/s	0.0025 µg/m^3	120 µg/m^3	0.0021	S
Sulphur dioxide	0.30 g/s	0.15 µg/m^3	275 µg/m^3	0.054	S - 24 hour
Sulphur dioxide	0.30 g/s	0.55 µg/m^3	690 µg/m^3	0.080	S - 1 hour
Nitrogen oxides	3.21 g/s	1.58 µg/m^3	200 µg/m^3	0.79	S - 24 hour
Nitrogen oxides	3.21 g/s	5.91 µg/m^3	400 µg/m^3	1.48	S - 1 hour
Carbon monoxide	1.11 g/s	2.45 µg/m^3	6000 µg/m^3	0.041	S - 1/2 hour
Carbon dioxide	2397 g/s	1178 µg/m^3	255800 µg/m^3	0.46	SL
Hydrogen chloride	0.26 g/s	0.13 µg/m^3	20 µg/m^3	0.64	S
Fluorides (as hydrogen fluoride)	0.51 g/s	0.25 µg/m^3	0.86 µg/m^3	29.1	S - 24 hour
Fluorides (as hydrogen fluoride)	0.51 g/s	0.073 µg/m^3	0.34 µg/m^3	21.6	S - 30 day
Hydrogen bromide	<0.033 g/s	0.061 µg/m^3	668 µg/m^3	0.0091	G - 1 hour
Hydrogen iodide	<0.024 g/s	0.012 µg/m^3	0.5 µg/m^3	2.36	SL
Hydrogen cyanide	<0.000023 g/s	0.000011 µg/m^3	8 µg/m^3	0.00014	S
Dioxins & Furans (TEQ) *	<0.18 ng TEQ/s	0.000088 pg TEQ/m^3			
Dioxins, Furans and Dioxin-Like PCBs (TEQ) **	0.12 ng TEQ/s	0.000059 pg TEQ/m^3	0.1 pg TEQ/m^3	0.059	S
Benzo(a)Pyrene	<0.061 µg/s	0.0000000031 µg/m^3	0.00001 µg/m^3	0.031	S - Annual
Biphenyl	1.03 µg/s	0.0000019 µg/m^3	60 µg/m^3	<0.0001	G - 1 hour
2-Chloronaphthalene	<0.061 µg/s	0.000000030 µg/m^3	1 µg/m^3	<0.0001	SL
1-Methylnaphthalene	0.36 µg/s	0.00000018 µg/m^3	35.5 µg/m^3	<0.0001	SL
Naphthalene	3.58 µg/s	0.0000018 µg/m^3	22.5 µg/m^3	<0.0001	G
Quinoline	<0.061 µg/s	0.000000030 µg/m^3	0.005 µg/m^3	0.00060	SL
Terphenyls (m, o, p)	<0.21 µg/s	0.00000010 µg/m^3	15 µg/m^3	<0.0001	SL
1,2-Dichlorobenzene	0.88 µg/s	0.0000016 µg/m^3	30500 µg/m^3	<0.0001	G - 1 hour
1,3-Dichlorobenzene	1.15 µg/s	0.00000057 µg/m^3	50 µg/m^3	<0.0001	SL
1,4-Dichlorobenzene	0.78 µg/s	0.00000038 µg/m^3	95 µg/m^3	<0.0001	S
1,3,5-Trichlorobenzene	<0.086 µg/s	0.000000042 µg/m^3	3.6 µg/m^3	<0.0001	SL
1,2,4-Trichlorobenzene	0.50 µg/s	0.00000025 µg/m^3	400 µg/m^3	<0.0001	G
1,2,3-Trichlorobenzene	0.45 µg/s	0.00000022 µg/m^3	135 µg/m^3	<0.0001	SL
1,2,4,5-Tetrachlorobenzene	<0.21 µg/s	0.00000010 µg/m^3	1 µg/m^3	<0.0001	SL
1,2,3,4-Tetrachlorobenzene	0.20 µg/s	0.000000098 µg/m^3	600 µg/m^3	<0.0001	SL
Pentachlorobenzene	0.37 µg/s	0.00000018 µg/m^3	80 µg/m^3	<0.0001	SL
Hexachlorobenzene	<0.11 µg/s	0.000000054 µg/m^3	0.011 µg/m^3	0.00049	SL
2,4-Dichlorophenol	<0.46 µg/s	0.00000023 µg/m^3	33.5 µg/m^3	<0.0001	SL
2,6-Dichlorophenol	<0.30 µg/s	0.00000015 µg/m^3	19 µg/m^3	<0.0001	SL
2,4,5-Trichlorophenol	<0.30 µg/s	0.00000015 µg/m^3	220 µg/m^3	<0.0001	SL
2,4,6-Trichlorophenol	<0.55 µg/s	0.00000027 µg/m^3	1.5 µg/m^3	<0.0001	SL
2,3,4,6-Tetrachlorophenol	<0.30 µg/s	0.00000015 µg/m^3	0.75 µg/m^3	<0.0001	SL
Pentachlorophenol	<0.30 µg/s	0.00000015 µg/m^3	20 µg/m^3	<0.0001	G
Polychlorinated biphenyls	<1.58 µg/s	0.00000078 µg/m^3	0.15 µg/m^3	0.00052	G
Hexachlorobutadiene	<0.0033 µg/s	0.0000000016 µg/m^3	0.225 µg/m^3	<0.0001	SL
Hexachloroethane	<0.061 µg/s	0.000000030 µg/m^3	115 µg/m^3	<0.0001	SL
Heptachlor	<0.14 µg/s	0.000000069 µg/m^3	0.004 µg/m^3	0.0017	SL
Toxaphene	<0.58 µg/s	0.00000029 µg/m^3	0.015 µg/m^3	0.0019	SL
Hexachlorophene	<0.30 µg/s	0.00000015 µg/m^3	0.5 µg/m^3	<0.0001	SL

S - Standard
G - Guideline
SL - Screening Level
*   Calculated using the detection limit for those isomers not detected in quantities greater than the reportable detection limit.
** Calculated using half the detection limit for those isomers not detected in quantities greater than the reportable detection limit.

Regulation 419 Dispersion Modelling Results for Metals

Contaminant	Average Emission Rate	Calculated Impingement Concentration	Allowable Impingement Concentration	Percentage of Allowable Concentration	Status of Allowable Concentration
Base Case - Annual	1.00 g/s	0.0500 µg/m^3			
Base Case - 30 Day	1.00 g/s	0.1437 µg/m^3			
Base Case - 24 hour	1.00 g/s	0.4915 µg/m^3			
Aluminum	3.25 mg/s	0.0016 µg/m^3	12 µg/m^3	0.013	SL
Antimony	0.0018 mg/s	0.00000088 µg/m^3	25 µg/m^3	<0.0001	S
Arsenic	<0.0010 mg/s	0.00000051 µg/m^3	0.3 µg/m^3	0.00017	G
Barium (as water soluble)	0.031 mg/s	0.000015 µg/m^3	10 µg/m^3	0.00015	G
Beryllium	<0.00038 mg/s	0.00000019 µg/m^3	0.01 µg/m^3	0.0019	S
Boron	30.1 mg/s	0.015 µg/m^3	120 µg/m^3	0.012	S
Cadmium	0.0011 mg/s	0.00000053 µg/m^3	0.025 µg/m^3	0.0021	S
Calcium oxide	<6.22 mg/s	0.0031 µg/m^3	10 µg/m^3	0.031	S
Chromium	0.071 mg/s	0.000035 µg/m^3	0.5 µg/m^3	0.0070	G
Cobalt	0.0024 mg/s	0.0000012 µg/m^3	0.1 µg/m^3	0.0012	G
Copper	0.037 mg/s	0.000018 µg/m^3	50 µg/m^3	<0.0001	S
Iron (as metal)	0.92 mg/s	0.00045 µg/m^3	4 µg/m^3	0.011	S
Lead	0.011 mg/s	0.0000055 µg/m^3	0.5 µg/m^3	0.0011	S - 24 hour
Lead	0.011 mg/s	0.0000016 µg/m^3	0.2 µg/m^3	0.00081	S - 30 day
Lithium	0.016 mg/s	0.0000081 µg/m^3	20 µg/m^3	<0.0001	S
Magnesium	0.29 mg/s	0.00014 µg/m^3	72 µg/m^3	0.00020	SL
Manganese (as compounds)	0.067 mg/s	0.000033 µg/m^3	0.4 µg/m^3	0.0082	G
Mercury	0.12 mg/s	0.000061 µg/m^3	2 µg/m^3	0.0031	S
Molybdenum	0.13 mg/s	0.000065 µg/m^3	120 µg/m^3	<0.0001	G
Nickel	0.059 mg/s	0.0000029 µg/m^3	0.04 µg/m^3	0.0074	S - Annual
Phosphorus	<0.38 mg/s	0.00019 µg/m^3	0.5 µg/m^3	0.037	SL
Potassium	0.92 mg/s	0.00045 µg/m^3	1 µg/m^3	0.045	SL
Selenium	0.14 mg/s	0.000071 µg/m^3	10 µg/m^3	0.00071	G
Silicon	65.7 mg/s	0.032 µg/m^3	27 µg/m^3	0.12	SL
Silver	<0.00046 mg/s	0.00000023 µg/m^3	1 µg/m^3	<0.0001	S
Sodium hydroxide	23.4 mg/s	0.011 µg/m^3	10 µg/m^3	0.11	G
Strontium	0.014 mg/s	0.0000067 µg/m^3	120 µg/m^3	<0.0001	G
Tin	0.11 mg/s	0.000056 µg/m^3	10 µg/m^3	0.00056	S
Titanium	<0.036 mg/s	0.000017 µg/m^3	120 µg/m^3	<0.0001	S
Vanadium	0.0018 mg/s	0.00000090 µg/m^3	2 µg/m^3	<0.0001	S
Zinc	0.077 mg/s	0.000038 µg/m^3	120 µg/m^3	<0.0001	S

S - Standard
G - Guideline
SL - Screening Level

Regulation 419 Dispersion Modelling Results for Volatile Organic Compounds

Contaminant	Average Emission Rate	Calculated Impingement Concentration	Allowable Impingement Concentration	Percentage of Allowable Concentration	Status of Allowable Concentration
Base Case - Annual	1.00 g/s	0.0500 µg/m^3			
Base Case - 24 hour	1.00 g/s	0.4915 µg/m^3			
Base Case - 1 hour	1.00 g/s	1.8423 µg/m^3			
Benzene	0.097 mg/s	0.0000049 µg/m^3	0.45 µg/m^3	0.0011	S - Annual
Bromodichloromethane	0.038 mg/s	0.0000019 µg/m^3	350 µg/m^3	<0.0001	SL
Bromomethane (methyl bromide)	<0.070 mg/s	0.0000035 µg/m^3	1350 µg/m^3	<0.0001	G
2-Butanone (methyl ethyl ketone)	0.028 mg/s	0.0000014 µg/m^3	1000 µg/m^3	<0.0001	S
Chloroethene (vinyl chloride)	<0.016 mg/s	0.00000078 µg/m^3	1 µg/m^3	<0.0001	S
Dibromochloromethane	0.033 mg/s	0.0000016 µg/m^3	0.2 µg/m^3	0.00082	SL
1,2-Dibromoethane (Ethylene dibromide)	<0.016 mg/s	0.00000078 µg/m^3	3 µg/m^3	<0.0001	G
Dichlorodifluoromethane	<0.020 mg/s	0.0000010 µg/m^3	500000 µg/m^3	<0.0001	G
1,1-Dichloroethane (ethylene dichloride)	<0.0078 mg/s	0.00000039 µg/m^3	165 µg/m^3	<0.0001	S
1,1-Dichloroethene	<0.0078 mg/s	0.00000039 µg/m^3	10 µg/m^3	<0.0001	S
trans-1,2-Dichloroethene	<0.0078 mg/s	0.00000039 µg/m^3	105 µg/m^3	<0.0001	G
Dichloromethane (methylene chloride)	<0.43 mg/s	0.000022 µg/m^3	220 µg/m^3	<0.0001	G
1,2-Dichloropropane	<0.0078 mg/s	0.00000039 µg/m^3	2400 µg/m^3	<0.0001	G
Ethyl Acetate	<0.078 mg/s	0.0000039 µg/m^3	19000 µg/m^3	<0.0001	G - 1 hour
Ethylbenzene	<0.0084 mg/s	0.00000042 µg/m^3	1000 µg/m^3	<0.0001	S
Isopropylbenzene (cumene)	<0.016 mg/s	0.00000078 µg/m^3	400 µg/m^3	<0.0001	S
2-Propanone (acetone)	0.31 mg/s	0.000016 µg/m^3	11880 µg/m^3	<0.0001	S
Styrene	<0.016 mg/s	0.00000080 µg/m^3	400 µg/m^3	<0.0001	S
Tetrachloroethene (perchloroethylene)	<0.0078 mg/s	0.00000039 µg/m^3	360 µg/m^3	<0.0001	S
Tetrachloromethane (carbon tetrachloride)	<0.010 mg/s	0.00000050 µg/m^3	2.4 µg/m^3	<0.0001	S
Toluene	0.23 mg/s	0.000011 µg/m^3	2000 µg/m^3	<0.0001	S
Tribromomethane (bromoform)	0.071 mg/s	0.0000036 µg/m^3	55 µg/m^3	<0.0001	G
1,1,1-Trichloroethane (methyl chloroform)	<0.0078 mg/s	0.00000039 µg/m^3	115000 µg/m^3	<0.0001	S
Trichloroethene	<0.010 mg/s	0.00000051 µg/m^3	12 µg/m^3	<0.0001	S
Trichlorofluoromethane	<0.016 mg/s	0.00000078 µg/m^3	6000 µg/m^3	<0.0001	G
Trichloromethane (chloroform)	0.037 mg/s	0.0000018 µg/m^3	1 µg/m^3	0.00018	S
Trichlorotrifluoroethane	<0.0078 mg/s	0.00000039 µg/m^3	800000 µg/m^3	<0.0001	S
1,2,4-Trimethylbenzene (pseudocumene)	<0.017 mg/s	0.00000087 µg/m^3	220 µg/m^3	<0.0001	S
1,3,5-Trimethylbenzene	<0.016 mg/s	0.00000078 µg/m^3	220 µg/m^3	<0.0001	S
Xylenes	<0.033 mg/s	0.0000016 µg/m^3	730 µg/m^3	<0.0001	S

S - Standard
G - Guideline
SL - Screening Level

Summary of Destruction and Removal Efficiencies for Volatile Organic Compounds

Compound	Destruction and Removal Efficiency Test No. 1 %	 Test No. 2 %	 Test No. 3 %	 Average %	Coefficient of Variation %
Benzene	99.9329	99.9756	99.9626	99.9570	0.022
Dichloromethane	99.9280	99.9949	99.9724	99.9651	0.034
Ethylbenzene	99.9985	99.9998	99.9993	99.9992	0.00061
2-Propanone	99.9992	99.9997	99.9988	99.9993	0.00043
Styrene	99.9987	99.9995	99.9986	99.9989	0.00052
Toluene	99.9955	99.9997	99.9993	99.9982	0.0023
Total Xylenes	99.9987	99.9998	99.9994	99.9993	0.00053

Note: the above calculations do not take into account the contribution of the TDU to the incinerator feed.

1. INTRODUCTION

Clean Harbors Canada Inc. (Clean Harbors) owns and operates an incineration facility located at 4090 Telfer Road, in Corunna, Ontario.

ORTECH Consulting Inc. (ORTECH) was requested by Clean Harbors to conduct a comprehensive emission testing program at the incineration facility. The emission testing is required annually as part of the Ontario Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) No. 8-1030-94-006 (formerly Certificate of Approval (Air) No. 8-1030-94-006), dated April 19, 1994. A Notice of Amendment to the ECA was issued on January 24, 2003, ECA Waste/Air No. 6547-5G5MSP. Copies of these two documents are contained in Appendix 2.

The objective of the testing program was to determine the emission rates of specific compounds and to demonstrate the facility's ability to meet the emission levels for contaminants according to the limits as specified by the plant’s ECA. Process samples were also collected and analyzed for specific compounds.

Included (and conducted by ORTECH) as part of the emission testing program was an internal Quality Assurance/Quality Control (QA/QC) program.

All tables referenced in this report (excluding the internal QA/QC summary tables) are provided in Appendix 1. The air emission test and process sample components are summarized in Table 1 to Table 8.

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, 1.52 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 1379°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 191°C (must not exceed 220°C).

Average process feed conditions measured for the rich, lean and emulsion streams for the emission testing program were as follows:

Feed Stream	Average Process Feed Conditions		
	Flow (L/min)	Density (g/mL)	Heating Value (MJ/kg)
Rich	34.6	0.92	26.4
Lean	157	1.05	4.15
Emulsion	9.03	1.00	13.6
Total	201		

The density data for each test was used to calculate the DREs.

The average powdered activated carbon (PAC) injection rate during the test program was 11.7 kg/h (25.9 lb/h).

3. EMISSION TESTING PROGRAM

The emission testing program was conducted over three days between November 8 and November 10, 2022 during which three tests were completed for each emission and process component group (as shown in Table 1 to Table 8).

Testing was performed at the highest possible waste feed rate attainable as specified by the ECA (not to exceed 245 L/min), to demonstrate compliance with MECP emission criteria.

Several types of sampling trains and sampling methods were used to sample for the emission test components. The test matrix is summarized in Table 9.

Particulate matter and metals were collected by a single sampling train, as were the semi-volatile organics. The acid gases and volatile organic compounds were also collected by individual sampling trains. The ORTECH continuous emission monitors (CEMs) used to sample for combustion gases consisted of carbon monoxide (CO), carbon dioxide (CO_2), nitric oxide (NO) and nitrogen oxides (NO_X), oxygen (O_2), sulphur dioxide (SO_2) and total hydrocarbon (THC) analyzers which are mounted in ORTECHs Mobile Source Monitoring Laboratory (MSML).

Table 10 summarizes the particulate and metals, semi-volatile organics and acid gases test schedules. Table 11 summarizes the combustion gases test schedule, and Table 12 summarizes the volatile organics test schedule.

The sampling methodologies and analytical methodologies are discussed further in Section 6 and Section 7, respectively, of this report. The internal QA/QC program is discussed in Section 8.

4. PROGRAM ORGANIZATION AND RESPONSIBILITIES

The principal organizations involved in the emission testing program were:

- Ontario Ministry of the Environment, Conservation and Parks (MECP)
- Clean Harbors Canada Inc. (Clean Harbors)
- ORTECH Consulting Inc. (ORTECH)
- ALS Laboratory Group
- Petro Laboratories Inc.

The program responsibilities of the various organizations are summarized as follows. The MECP was responsible for evaluating and approving the Pre-Test Plan (PTP), and reviewing the final emission testing report. The MECP was also notified of the testing schedule so that the testing could be witnessed.

Clean Harbors was responsible for the overall program and issuing the contract with ORTECH. Clean Harbors was also responsible to the MECP for compliance with the conditions as stipulated in the ECA and for the performance of the incinerator and pollution control equipment during the emission testing program. The responsibilities included operating the incineration facility according to the required test operating conditions, generating all incinerator process data and process descriptions and ensuring that the scope of the emission testing program was in compliance with the terms set out in the ECA. Clean Harbors personnel were also responsible for the collection of the feed material and the baghouse dust samples. Clean Harbors laboratories were responsible for analysis of the feed samples for organic chlorine, heating value, viscosity and density.

ORTECH was responsible for conducting the emission testing according to the MECP approved Pre-Test Plan, attending meetings with the MECP as required, liaising with Clean Harbors and submitting a final report. ORTECH and Clean Harbors were both involved in the selection of the analytical laboratories used for the emission testing program.

ALS Laboratory Group was responsible for cleaning and proving of the semi-volatile organics trains as well as the subsequent analysis of these train samples, and for dioxin, furan and PCB analysis of the feed samples provided. They were also responsible for metal and halide analysis of the emission samples and metal analysis of the feed samples and baghouse dust samples. ALS provided the volatile organic analysis of the feed samples and of the Volatile Organic Sampling Train (VOST) tubes.

Petro Laboratories Inc. was responsible for the ultimate analysis of the feed samples as well as sulphur and ash content analysis.

5. SAMPLING LOCATIONS

The Main 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. Note the stack was replaced prior to the 2022 testing program. The new stack has a slightly smaller diameter at the sampling ports than the previous stack (1.52 meters).

Sampling for particulate and metals and semi-volatile organics 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. Acid gases and volatile organics were sampled through a third port located on the same sampling platform.

The plant opacity monitor which was previously installed at the sample port level and could not function during the earlier emission testing programs has been moved to another, higher location on the stack, thereby enabling opacity data to be obtained during the emission testing program.

The sampling ports were located at an "ideal" location as defined by the Ontario Source Testing Code**(1)**. 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 Main 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.

6. SAMPLING METHODOLOGY

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.

6.1 Isokinetic Sampling Trains

Particulate matter and metals 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**(2)**. The modification to this procedure, to accommodate the high stack gas moisture content, was the inclusion of a knock-out bottle prior to the hydrogen peroxide/nitric acid impingers and an empty impinger between the hydrogen peroxide/nitric acid impingers and the acidified potassium permanganate impingers.

Major components of the sampling train, which is shown in Figure 2, were as follows:

- A one-piece glass nozzle and probe liner assembly was used to minimize background metal contamination.
- A quartz fiber filter with low metal background was used.
- The first impinger contained 100 mL of distilled, de-ionized water.
- The second (knock-out) impinger was initially empty.
- The third and fourth impingers contained 100 mL each of 5% nitric acid/10% hydrogen peroxide solution to collect metals.
- The fifth impinger was initially empty.
- The sixth and seventh impingers contained 100 mL each of 4% potassium permanganate/10% sulphuric acid solution to collect mercury.
- The eighth impinger contained silica gel.

Semi-volatile organics were sampled using the sampling train and sampling procedures outlined in Environment Canada Report EPS 1/RM/2**(3)**. Major components of the sampling train, which is shown in Figure 3, were as follows:

- A one-piece glass nozzle and probe liner assembly was used to minimize background contamination.
- A clean and proven glass fiber filter was used.
- XAD-2 sorbent was used in a trap to collect semi-volatile organics.
- The first impinger (knock-out) was initially empty.
- The second impinger contained 100 mL of ethylene glycol.
- The third impinger was initially empty.
- The fourth impinger contained silica gel.

All test train and auxiliary glassware was cleaned and proven clean (where required) according to the appropriate methods as outlined in the Pre-Test Plan**(4)**. Proving data for the semi-volatile organics train components is provided in Appendix 3. ALS also loaded and spiked the XAD-2 resin traps used in the semi-volatile organics trains with a surrogate standard (field spike) before the emission testing program started.

A single test for each of the above mentioned trains 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 twelve minutes for a total actual sampling time of two hundred and forty minutes per test.

At three minute time increments for each of the two test trains, 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
- Trap outlet temperature (semi-volatile organics train only)
- 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. The leak-check data is summarized in Section 8 of this report.

Field data sheets for the three particulate and metals tests performed at the main stack are provided in Appendix 4. Field data sheets for the three semi-volatile organics tests performed at the main stack are provided in Appendix 5.

A field blank semi-volatile organics train was prepared and recovered in an identical manner to the test sampling trains. It was assembled, transported and left on site for a period of time equal to the test sampling trains. For the semi-volatile organics blank train, a volume of ambient air similar to the leak-check volume sampled through a test train was drawn through the blank train. The metals 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. All sampling schedules are shown in Table 10 to Table 12.

6.2 Acid Gases

Hydrogen chloride, hydrogen fluoride, hydrogen bromide, hydrogen iodide and hydrogen cyanide were sampled at the incinerator stack using the sampling train and sampling procedures outlined in US EPA Method 26**(5)**. The acid gases sampling train is shown in Figure 4.

A single test for these components involved the collection of stack gas sampled at a single point in the main 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(5) 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(5). Field data sheets for the three Method 26 tests performed are provided in Appendix 6.

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

6.3 Volatile Organics

Volatile organics were sampled at the main stack using the sampling train and sampling procedures outlined in US EPA SW-846 Method 0030**(6)**.

The volatile organics sampling train is shown in Figure 5. Briefly, the volatile organic sampling method involved withdrawing a sample of the stack gas through a heated glass lined sampling probe containing a glass wool plug to remove particulate matter. The sample was then passed through a water cooled condenser and a Tenax GC adsorbent tube as the primary volatile organic compound collection device.

Any condensate was then collected in an initial condensate trap and the sample was then drawn through a second condenser and a combined Tenax GC/charcoal adsorbent tube as the secondary volatile organic compound collection device. The sampled gas stream then passed through a silica gel trap to remove any remaining traces of moisture prior to the rotameter, pump and dry gas meter.

Three tube pairs were collected for each compliance test, with a backup tube pair collected during Test No. 2, at an approximate actual flowrate of one liter per minute, for twenty minutes each. Three tube pairs per test were analyzed for volatile organic compounds. The backup tube pair was archived for future analysis, if necessary.

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

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

At the start and finish of each sampling run the sampling train was leak-checked. If a tube pair did not have an acceptable initial leak check, the leak was found and repaired and/or the tubes were replaced with a new pair until no leak was discernible. All the leak checks performed for the tubes used showed no discernible leak through the test train. The leak check data for the tests is summarized in Section 8 of this report.

Prior to use in the field the sampling train components were cleaned using the procedures described in US EPA SW-846 Method 0030(6). Briefly, the VOST tubes were conditioned thermally by passing a stream of nitrogen through each tube overnight in an oven at 280°C. The tubes were conditioned on a manifold capable of treating up to 25 pairs at a time. For each batch of tubes, a minimum of 1 pair in 10 was analyzed as a proof to demonstrate an absence of significant background from the tubes. The proof analysis was done via the same instrumental approach as for VOST samples using the process described as follows: A Tenax tube for proofing is spiked with internal standards and surrogates, then the corresponding pair (a Tenax and Tenax/charcoal tube pair) is thermally desorbed via a clamshell heater and the desorbed gas stream purged through a water purge into an intermediate sorbant tube. This intermediate sorbant tube is then back flushed with nitrogen as an initial 'dry out' of the sample, then thermally desorbed into an Envirochem 810A VOC concentrator. The captured volatiles are, in turn, processed within the sample concentrator and thermally desorbed into a GC column within a Hewlett-Packard 5890 GC and analyzed for volatiles via GC/MS. Those tube pairs which met the 2 ng benzene-equivalents proofing criterion (relative to the most concentrated sample split to be taken for analysis) were sent to the field. The tube proving data is supplied in Appendix 3.

Field testing data sheets for the volatile organic tests performed are provided in Appendix 7.

In addition to the field blank tube pair, which was taken on each test day, a trip blank pair of tubes was also analyzed. A method blank pair of tubes was retained by the analytical laboratory after tube cleaning and proofing, as a control pair of tubes, was also analyzed with the samples.

6.4 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 main 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 with the exception of the total hydrocarbon analyzer. A portion of the hot, wet gas stream was delivered directly to the total hydrocarbon analyzer. The continuous emission monitoring (CEM) system is shown schematically in Figure 6.

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**(7)**.

A Teledyne API 200EH chemiluminescence analyzer was used to measure the nitrogen oxides concentrations. The method used for sampling was US EPA (40 CFR 60) Method 7E**(8)**.

A Teledyne API T100H analyzer was used to measure sulphur dioxide concentrations. The method used was EPA (40 CFR 60) Method 6C**(9)**.

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**(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**(11)**.

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.

6.5 Process Sample Collection

Liquid waste (rich, lean, alkaline, emulsion and leachate) samples were collected and composited by Clean Harbors personnel based on US EPA Method S004 (Tap) in SW-846, 3rd Edition. A sample was collected every thirty minutes during the stack testing periods and placed in a large chilled container for compositing. Clean Harbors personnel also collected a sample of baghouse dust every thirty minutes during the stack testing periods. ORTECH personnel obtained sub-samples for each liquid waste stream and baghouse dust at the conclusion of each sampling day. Four composite sub-samples were obtained, one sample for Clean Harbors, one sample as a spare and two samples were retained by ORTECH.

ORTECH made a composite sample of each feed for the test program for metals, dioxins and furans and PCBs analysis. The baghouse dust composite sample collected during the test program was analyzed for metals. Individual process stream (rich, lean, alkaline, emulsion and leachate) composite samples collected during each test were analyzed for volatile organic compounds to facilitate DRE calculations. The individual process stream samples, except for alkaline and leachate, also underwent an elemental analysis.

7. ANALYTICAL METHODOLOGY

7.1 Particulate Matter and Metals

Before loading of the field test trains commenced, recovery data sheets were prepared to record the initial weights of the test train components. These sheets were also used during sample recovery to record final weights and determine moisture gains and sample volumes. The train recovery data sheets are provided in Appendix 8.

Following the conclusion of each test performed with the metals sampling train, the probe was disconnected, and all openings were sealed with Teflon tape. The probe was recovered in the ORTECH on-site mobile laboratory in preparation for the next test. The test train was transported to the ORTECH Sarnia laboratory for sample recovery.

At the ORTECH laboratory the test trains were visually inspected to ensure that no damage during transportation had occurred. The train recovery procedures are detailed in the Pre-Test Plan as well as in the recovery data sheets and are described briefly as follows.

The condition of the test train was noted. Filter and impinger content colours 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 of the impingers were wiped dry on the outside then weighed and the results used to determine the volume of stack gas moisture condensed.

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 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 fifth impingers were then combined. Triplicate rinses of the impingers and connecting glassware back to and including the Teflon filter support were performed with 0.1N nitric acid and combined with the impinger solution sample.

The contents of the sixth and seventh impingers were transferred to an amber glass sample bottle and the impingers with connecting glassware were 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 then added to the impinger solution sample.

Any brown residue, which was present in the sixth and seventh impingers, was removed by rinsing with 8N hydrochloric acid (HCl). These acid rinses were added to a separate amber glass sample bottle that initially contained 150 mL of distilled, de-ionized water. The impingers were then rinsed with distilled, de-ionized water to remove remaining traces of 8N HCl and this rinse was 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 metals trains underwent gravimetric determination before metals analysis. When gravimetric determinations were completed, the samples were processed and analyzed by ALS Laboratory Group for metals.

The analytical reports for the particulate and metals analyses are provided in Appendix 9.

7.2 Semi-Volatile Organics

Prior to loading the field test trains, recovery data sheets were prepared to record the initial weights of the test train components. These sheets were also used during sample recovery to record final weights and determine moisture gains and sample volumes. The train recovery data sheets are provided in Appendix 10.

Following the conclusion of each test performed with the semi-volatile organics trains, the probe was disconnected and all openings were sealed with Teflon tape. The probe was cleaned on-site by brushing and rinsing with a Teflon probe brush and acetone into a pre-cleaned sample bottle. The probe was then rinsed with hexane into the same sample bottle and the test train and probe rinse sample were then transported to the ORTECH Sarnia laboratory for sample recovery.

At the ORTECH laboratory the test trains were visually inspected to ensure that no damage during transportation had occurred. The train recovery procedures are detailed in the Pre-Test Plan as well as in the recovery data sheets (Appendix 10) and are described briefly as follows.

The condition of the test train was noted. Filter, XAD-2 trap and impinger content colours were recorded. The filter housing was disassembled and the filter carefully transferred, with the use of Teflon coated tweezers, to a piece of pre-cleaned aluminum foil. The filter was then folded in half onto itself within the foil, the foil ends crimped, then placed in a pre-cleaned glass petri dish. Both the foil containing the filter and the glass Petri dish were labeled.

All of the impingers were wiped dry on the outside then weighed and the results used to determine the volume of stack gas moisture condensed.

The front half of the sampling train (up to but not including the trap) was brushed and rinsed thoroughly with acetone. A Teflon probe brush was used to assist in dislodging particulate material that may have adhered to the inside surfaces of the cyclone bypass and filter top assembly. This front half rinse was then repeated using hexane, with no brushing, and all rinsing was combined with the probe rinse sample recovered in the field.

The XAD-2 trap was drained of excess cooling water and weighed. The ends were then sealed with Teflon tape and the trap was labeled and wrapped in aluminum foil. Since ORTECH uses a one piece trap and condenser, the five minute soak of this component was performed by the analytical laboratory.

The contents of the first three impingers were combined in a pre-cleaned amber glass sample bottle. Triplicate rinses of the impingers and connecting glassware back to and including the trap bottom u-tube were performed first with HPLC water, which was added to the impinger solution sample, and then with acetone followed by hexane. The acetone and hexane rinses were combined in a separate sample bottle from the impinger solutions.

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 then refrigerated until they were delivered to ALS for analysis.

The analytical reports prepared by ALS are provided in Appendix 11.

7.3 Acid Gases

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 for the three tests is provided in Appendix 12.

After sampling but prior to recovery, the sampling train was purged with nitrogen at two liters per minute for approximately fifteen minutes to ensure that any cyanide present in the stack gas was collected in the fifth impinger.

On site, the train was disassembled, and the volumes of the first impinger to the fourth 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 volume of the fifth impinger, which initially contained 15 mL of 0.1N sodium hydroxide was measured and then the impinger with connecting glassware back to but not including the fourth impinger were rinsed in triplicate with distilled, deionized water and made up to a known volume then added to a second sample container.

These 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 13.

7.4 Volatile Organics

Following the conclusion of each tube run performed with the volatile organic compounds train, the tubes were removed from the train, capped and placed in appropriately labeled test tubes which were also capped. The tubes were sent to ALS for volatile organics analysis.

The VOST samples were analyzed via SW846 Method 5041A/8260B. Briefly, after spiking with internal and surrogate standards, the traps were thermally desorbed through a clam shell heater then through a chilled aqueous purge to remove the bulk of the moisture onto a secondary trap. These secondary traps are further dried using a counter current flow of helium. The secondary traps are then thermally desorbed into a VOC sample concentrator and again the VOCs are thermally transferred/concentrated onto a GC column. The VOC compounds are separated by gas chromatography (GC) and analyzed via GC/MS.

The analytical report for the volatile organic tests is provided in Appendix 14.

7.5 Feed and Baghouse Dust Samples

Various analytical methods were used for the feed and baghouse dust sample analyses. The analytical methods used are discussed in the analytical reports for the feed and baghouse dust samples. The semi-volatile organic compound analytical report contained in Appendix 11 includes feed analysis performed by ALS. The ALS volatile organic compound analytical report is contained in Appendix 14. The volatile organic compound analysis of the feeds samples performed by ALS is also provided in Appendix 14. Appendix 15 contains the metals feed analytical report also provided by ALS Laboratory Group.

The master sample logs/chain of custody forms for all of the samples collected and submitted for analysis (sampling trains and feeds) are presented in Appendix 16.

8. INTERNAL AND EXTERNAL QA/QC PROGRAM

8.1 General

As with other emission testing programs conducted by ORTECH, a comprehensive internal quality assurance/quality control (QA/QC) program was included. Details of ORTECH's pre-test internal QA/QC program are discussed in Section 8.2. Details of ORTECH's internal emission testing QA/QC results are discussed in Section 8.3 and include ORTECH's CEM QA/QC program. Details of the sample recovery, handling and custody are discussed in Section 8.4. Details of the analytical results are discussed in Section 8.5 and data QA/QC results are discussed in Section 8.6.

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. For the particulate and metals and SVOC blanks a spare test train was prepared and taken to site. The spare trains were recovered in a manner identical to that for the test trains. For each of the above mentioned blank trains, the blank probe rinse was performed on the appropriate probe after the test train recovery was performed. Reagent blanks were obtained on site for the Method 26 tests.

For the volatile organic tests, in addition to the field blank tube pair analyzed, a method blank pair of tubes was also analyzed.

All tables referenced in this section can be found in Appendix 17.

8.2 Pre-Test Activities

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

- Preparation, pre-cleaning and proofing of the manual stack sampling trains and sample containers;
- Preparation and quality checks of chemicals, reagents, filters and XAD-2 adsorbent resin;
- 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 proving data for the semi-volatile organics test train glassware and auxiliary equipment was deemed acceptable prior to the test program. As previously mentioned, proving data received prior to the field testing program is given in Appendix 3.

For each batch of VOC tubes, a minimum of 1 pair in 10 is analyzed as a ‘proof’ to demonstrate an absence of significant background from the traps. All proving data for the tubes was deemed to be acceptable before the test program.

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 18.

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 letter, dated August 27, 2022, was sent to the MECP stating that the testing would be conducted following the procedures detailed in ORTECH Pre-Test Plan No. 21607, “Annual Compliance Emission Testing Program at the Clean Harbors Sarnia Incineration Facility”, June 17, 2015. Provided in Appendix 19 is a copy of the letter, dated August 24, 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.

As part of the pre-test activities linearization checks were performed on the ORTECH CEMs. The linearization check data is provided in Appendix 20. All analyzer linearization results met the recommended acceptable limits of >0.995.

8.3 Emission Testing QA/QC Results

On the day of set up for the field testing program, the following activities were performed. Preliminary testing at the Main Stack 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 main stack was measured, 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 and proven clean (where applicable) 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.

Equipment calibration details are summarized in Table 1 (Appendix 17).

Percent isokineticity data is summarized in Table 2. The average percent isokineticity fell within the QA/QC criteria limits of 90 to 110% for each test.

Leak-check data for all leak-checks performed on the manual sampling trains are shown on the field data sheets. A summary of the isokinetic sampling train leak checks is given in Table 3. The leak check data for all of the leak-checks performed for the volatile organic sampling tubes are also summarized in the field data sheets (Appendix 7).

As previously discussed in Section 6.4, the ORTECH CEM system was not formally leak checked at the beginning and end of each test. Other indicators were used to determine leaks, such as oxygen levels during calibrations.

Prior to and at the end of each test, ORTECH's CEMs were zeroed and spanned. The QA/QC acceptance criterion for the daily zero and span drifts set out in the PTP was ±3% of span. The zero and span drift data for ORTECH's CEMs are summarized in Table 4. All analyzer zero drift data and span drift data was within the acceptable limit of ±3%. The calibration data for ORTECH's CEM systems is supplied in Appendix 21.

The sampling system bias checks for ORTECH's CEMs are provided in Table 5. All system bias results were within the stated guidelines of ±5% of span.

8.4 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.

As previously mentioned the master sample logs/chain of custody forms are presented in Appendix 16.

8.5 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.

8.5.1 Metal Sample Analysis QA/QC

The analyses for mercury on the Method 29 stack samples employed cold vapour atomic absorption (CVAA). The analysis of all other metals on the feed and stack samples involved sample digestion followed by Inductively Coupled Argon Plasma Mass Spectroscopy (ICP-MS) analysis. The analytical QA/QC is described as follows and the results are provided in Appendix 9.

ICPMS Analysis

- An instrument calibration check standard was analyzed immediately after the calibration curve and must be within 90%-110% of the actual concentrations.
- Instrument calibration blank check sample were analyzed with every 10 samples and must be within three times the minimum detection limit.
- A continuing calibration check is run every 10 samples and must be within 85%-115% of the actual concentrations.
- Instrument (interference) check sample for ICAP analysis was analyzed before and after each analytical run. The value(s) found for the interference check sample must be within 80%-120% of the true value.
- One duplicate sample analysis was performed for this program on Test No. 1. The relative percent difference was less than 17.3% within the acceptable limit of less than ±20%, for elements 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 recoveries were between 89-111% of the true value (limit of 80-120).
- One matrix spike (performed as a post digestion spike) was analyzed for this program. All of the results were between 83-110% of the true value (limit of 80-120). The spike recovery for several of the target compounds could not be quantified due to the high concentration in the sample relative to the spike amount.

Mercury Analysis

- 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 0.6% 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 90-97% 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 89-98% within the acceptable limit of 80-120% of the true value.

8.5.2 Dioxin and Furan Sample Analysis QA/QC

Semi-volatile organic analyses were performed on single composite extracts for each test according to EPS 1/RM/3 and EPS 1/RM/23.

Samples were analyzed by an enhanced version of Environment Canada method EPS 1/RM/3. The method was modified to include enhancements available from US EPA Method 23 including (a) a larger list of C-13 labeled extraction standards for more accurate determination of the PCDF targets, (b) a list of 5 C-13 labeled field standards added to the XAD-2 traps prior to sampling (to demonstrate an absence of target losses during the sampling event) and (c) the use of high resolution mass spectrometry (to improve limits of detection and help eliminate potential interferences).

After extraction of the dioxin and furan train samples, staff at ALS Laboratory Group added internal standards to all samples prior to analysis and surrogate standards were added to the filters and XAD resin prior to extraction. The analytical report contained in Appendix 11 details the sample clean-up, analytical procedures, and analytical QA/QC employed by the laboratory. The analytical report includes the lists of the analytical surrogate standards and internal standards used.

Two of the samples, Test No. 2 and Test No. 3, were partially lost by the analytical laboratory during sample preparation and extraction. There were poor extraction standard recoveries for these samples, well below the method criteria. For dioxins, furans, PCBs, chlorobenzenes and chlorophenols, the native results were recovery corrected by Isotope Dilution so the Estimated Detection Limits may be elevated. Sample data could not be reported by the analytical laboratory for PAHs and Heptachlor for Test No. 2. As a result the emission data presented is the average of Test No. 1 and Test No. 3 for PAHs and Heptachlor.

8.5.3 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.
- An instrument calibration blank check sample was 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 except for hydrogen cyanide, and the results had a relative percent difference of less than 1.3%, for analyses that are greater than 5 times the minimum detection limit.
- One blank spike was analyzed for this program. All of the results were between 94-102% 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 95-105%.

8.5.4 Volatile Organic Compound Analysis QA/QC

Prior to sampling, VOST tube pairs were cleaned and conditioned under helium sweep (approximately 50 mL/min flow) through each tube in an oven at 280°C for at least 12 hours. One VOST pair was proofed for every 10 pairs cleaned. VOST tubes were end-capped and stored sealed in individual screw-capped vials at 4°C between conditioning and shipment to the field.

A field blank and a laboratory method blank were analyzed with the test sample tubes that were taken in the field. VOST tubes were desorbed and analyzed combined as pairs and analyzed according to SW846 Method 5041A/8260B.

The surrogate recoveries for each of the surrogates should be between 50-150%. Recoveries that were below or above the control limit were flagged in the analytical report. The surrogate recoveries for the test samples were between 83.7-100.6%.

The analysis of the waste feeds was via US EPA SW-846 Methods 5035 (waste dilution into methanol), dilution of the methanolic extract into water, 5030B (purge-and-trap) VOC concentration, and 8260B (capillary GC/MS instrumental analysis). The condensates were analyzed via SW846 method 5030B and 8260B.

For the wastes, where percentage levels were expected, care was taken to generate a representative sub-sample by accurately weighing multiple aliquots upon repeated mixing of the non-homogenous waste liquid into clean methanol, then quantitatively diluting the “extract” to a level suitable for further purge-and-trap analysis.

Appropriate volumes of either the waste “extract” or the aqueous condensate were taken for direct purge-and-trap processing onto a GC/MSD. Before analysis commenced, the MSD was tuned to BFB specifications. A 5 point calibration was run for both native and deuterated analogues, with a minimum correlation coefficient of 0.995 enforced (from linear least squares regression using internal standard calculations). Deuterated surrogates and internal standards were added to the samples just prior to sparging to allow sample-to-sample performance monitoring. Surrogate standards were not added to the waste samples prior to sample dilution since the appropriate levels to obtain an analytical response were not known. The analysis sequence included system blanks at appropriate intervals to monitor potential carryover. Calibration validations were run at least once every 12 hours of uninterrupted analysis after full system calibration to monitor calibration stability (±20% was deemed acceptable for revalidating the existing calibration table).

For a compound response to be accepted as a positive identification, in addition to a proper retention time match, not only was the presence of a primary quantitation ion necessary, but the secondary and tertiary ions had to be present to within 20% of the ion ratios established from the standard runs. This criterion was met for the sample analysis.

Refer to the volatile organic analytical report in Appendix 14 for a detailed explanation of the analytical methodologies, sample preparation, and discussion of results for the feed and volatile organic tube samples.

9. RESULTS AND DISCUSSION

9.1 Stack Gas Sampling Parameters

Emission test calculations for the particulate and metals tests are provided in Appendix 22. Emission test calculations for the semi-volatile organics tests are provided in Appendix 23.

Stack gas sampling parameters for the particulate and metals, and semi-volatile organics tests are summarized in Table 13. These parameters include calibration data, nozzle diameter, dry gas volume sampled and average percentage of isokineticity for each test.

9.2 Stack Gas Physical Parameters

Stack gas physical parameters for the particulate and metals, and semi-volatile organics tests are presented in Table 14. The average values (average of three tests) for each of the two types of test trains, which show good agreement, are summarized below:

Stack Gas Parameter	Particulate and Metals Trains	Semi-Volatile Organics Trains
Gas Temperature (°C)	190	191
Moisture by Volume (%)	46.8	46.9
Velocity (m/s)	29.7	29.8
Absolute Pressure (kPa)	101.0	101.0
Carbon Dioxide by Volume (%)*	7.73	7.73
Oxygen by Volume (%)*	10.00	10.00

* dry at 25°C and 1 atmosphere

9.3 Volumetric Flowrate Data

Stack gas volumetric flowrates for the particulate and metals, and semi-volatile organics tests are given in Table 15. The average flowrate values (average of three tests) for each of the two types of test trains, which show good agreement, are summarized below:

Stack Gas Parameter	Particulate and Metals Trains	Semi-Volatile Organics Trains
Actual Flowrate (m^3/s)	50.6	50.8
Dry Reference Flowrate (Rm^3/s)*	17.3	17.3
Dry Adjusted Flowrate (Rm^3/s)**	19.0	19.0
Wet Reference Flowrate (Rm^3/s)*	32.5	32.5

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

9.4 Particulate Emission Data

Particulate emission data obtained from each of the three particulate and metals tests are given in Table 16. The results for the three particulate tests were consistent. The average particulate emission results are presented below:

Particulate Emission Parameter	Average
Actual Concentration (mg/m^3)	<0.10
Dry Reference Concentration (mg/Rm^3)*	<0.29
Dry Adjusted Concentration (mg/Rm^3)**	<0.27
Wet Reference Concentration (mg/Rm^3)*	<0.16
Particulate Emission Rate (g/s)	<0.0051

* at 25°C and 1 atmosphere

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

9.5 Acid Gases Emission Data

Hydrogen chloride, hydrogen fluoride, hydrogen bromide, hydrogen iodide and hydrogen cyanide emission data obtained from each of the three acid gas tests are given in Table 17.

Hydrogen chloride and hydrogen fluoride were detected in quantities greater than the detect limit in all three tests. Hydrogen bromide was not detected in quantities greater than the detection limit in any of the tests and hydrogen iodide and hydrogen cyanide was not detected in quantities greater than the detection limit in at least one of the three tests. The emission calculations are based on the value of the detection limit where the analytical result is less than the detection limit. The average acid gas emission results are presented below:

Parameter	HCl	HF	HBr	HI	HCN
Actual Conc. (mg/m^3)	5.05	10.0	<0.66	<0.47	<0.00046
Dry Reference Conc. (mg/Rm^3)*	14.9	29.6	<1.94	<1.38	<0.0014
Dry Adjusted Conc. (mg/Rm^3)**	13.3	26.4	<1.76	<1.24	<0.0012
Dry Conc. (ppm)	7.86	15.6	<1.03	<0.73	<0.00072
Emission Rate (g/s)	0.26	0.51	<0.033	<0.024	<0.000023

* at 25°C and 1 atmosphere

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

The blank analysis data is supplied in Table 18.

9.6 Combustion Gas Emission Data

Average combustion gas analysis data for each of the tests are summarized in Table 19 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 19.

Combustion gas emission data for the three tests performed at the incinerator stack are given in Table 20. The combustion gas emission data are summarized in Table 21.

The average combustion gas emission results were as follows:

Combustion Gas Parameter	Average Value						
	CO_2	CO	NO_X	NO	O_2	SO_2	THC
Actual Conc. (mg/m^3)	47283	21.9	63.3	39.9	44511	5.91	2.44
Dry Reference Conc. (mg/Rm^3)**	138957	64.2	186	117	130794	17.4	7.17
Dry Adjusted Conc. (mg/Rm^3)***	126295	58.7	169	106	143873	15.5	6.56
Dry Conc. (ppm)	77300	56.1	98.9	95.6	10000	6.7	5.8*
Emission Rate (g/s)	2397	1.11	3.21	2.02	2257	0.30	0.12

* 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 three tests performed at the incinerator stack are provided in Appendix 24. The average results are calculated for the approximate isokinetic test periods. The gas analysis results are presented graphically in Appendix 25.

9.7 Metal and Sulphur Emission Data

Metal analytical results including sulphur, are given in Tables 22, 23 and 24 for Test No. 1, Test No. 2 and Test No. 3, respectively. Metal concentrations and emission rates are shown in Tables 25, 26 and 27 for Test No. 1, Test No. 2 and Test No. 3, respectively.

Summaries of the metal actual concentrations, dry reference concentrations, dry adjusted concentrations, wet reference concentrations, and emission rates including the coefficients of variation for the three tests performed during the emission testing program are provided in Tables 28, 29, 30, 31, and 32, respectively. The highest average metal emission rates were reported for aluminum (3.25 mg/s), boron (30.1 mg/s), calcium (<4.44 mg/s), silicon (65.7 mg/s) and sodium (13.4 mg/s). The average sulphur emission rate was <182 mg/s. All other average metal emission rates, including mercury, were at or below 1.0 mg/s.

The metals analysis of the Method 29 test trains is performed on three separate analytical fractions, the probe and filter nitric acid digest, the probe and filter hydrofluoric acid digest, and the analysis of the train impingers and associated rinses. In instances where all analyses were reported to be below the detection limit for a given metal, the value of the detection limit for the fraction most likely to contain that metal was used to calculate emission data, and the remaining fractions were assigned a value of zero. In instances where any given fraction(s) was detected that value was used to calculate emission data and the remaining undetected fraction(s) was assigned a value of zero. Table 33 summarizes the average metal emission data for the three tests performed.

The relatively high blank analyses for aluminum, boron, calcium, magnesium, silicon and sodium (Table 34) were likely caused by the harsh digestion conditions for the filter.

9.8 Mercury Emission Data

Mercury analysis, concentration and emission data are also summarized in the metal emission tables. Mercury was detected in samples from each test primarily in the impinger sample analysis. Blank train analysis data (Table 34) shows that mercury was not detected in any of the fractions in quantities greater than the reportable detection limit. The mercury analytical results are not blank corrected.

The average mercury emission data for the three tests is as follows:

Mercury Emission Parameter	Average Values
Actual Concentration (µg/m^3)	2.50
Dry Reference Concentration (µg/Rm^3)*	7.30
Dry Adjusted Concentration (µg/Rm^3)**	6.77
Wet Reference Concentration (µg/Rm^3)*	3.90
Emission Rate (mg/s)	0.12

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

9.9 Semi-Volatile Organic Emission Data

The combined filter and probe rinse, and combined Amberlite XAD-2 cartridge and impinger solutions for each of the semi-volatile organics trains were analyzed together (one analysis per test) for the semi-volatile organic compounds.

Two of the samples, Test No. 2 and Test No. 3, were partially lost by the analytical laboratory during sample preparation and extraction. As a result there were poor extraction standard recoveries for these samples, well below the method criteria. For dioxins, furans, PCBs, chlorobenzenes and chlorophenols, the native results were recovery corrected by Isotope Dilution so the Estimated Detection Limits may be elevated. Sample data could not be reported by the analytical laboratory for PAHs and Heptachlor for Test No. 2. The emission data presented is the average of Test No. 1 and Test No. 3 for PAHs and Heptachlor.

9.9.1 Dioxins and Furans Emission Data

Dioxins and furans are groups of chemically related chlorinated organic compounds or congeners. There are seventy-five dioxin congeners and one hundred and thirty five furan congeners. The individual congeners all have different molecular structures and they may also have different molecular formulae. Individual congeners, which have the same molecular formula but different molecular structure, are referred to as isomers. Groups of isomers are referred to as congener groups or homologues. The basic dioxin and furan molecules have the molecular formulae $C_{12}H_8O_2$ and $C_{12}H_8O$, respectively. In chlorinated dioxin and furans, between one and eight chlorine atoms may replace an equal number of hydrogen atoms in the basic molecule.

The following table lists the chlorinated dioxin and furan congener groups, and the number of isomers present in each group:

Congener Group Abbreviation		Number of Chlorine Atoms Per Molecule	Molecular Formula	Number of Isomers Per Congener Group
Dioxins	M1CDD	1	$C_{12}H_7ClO_2$	2
	D2CDD	2	$C_{12}H_6Cl_2O_2$	10
	T3CDD	3	$C_{12}H_5Cl_3O_2$	14
	T4CDD	4	$C_{12}H_4Cl_4O_2$	22
	P5CDD	5	$C_{12}H_3Cl_5O_2$	14
	H6CDD	6	$C_{12}H_2Cl_6O_2$	10
	H7CDD	7	$C_{12}H_1Cl_7O_2$	2
	O8CDD	8	$C_{12}Cl_8O_2$	1
Furans	M1CDF	1	$C_{12}H_7ClO$	4
	D2CDF	2	$C_{12}H_6Cl_2O$	16
	T3CDF	3	$C_{12}H_5Cl_3O$	28
	T4CDF	4	$C_{12}H_4Cl_4O$	38
	P5CDF	5	$C_{12}H_3Cl_5O$	28
	H6CDF	6	$C_{12}H_2Cl_6O$	16
	H7CDF	7	$C_{12}H_1Cl_7O$	4
	O8CDF	8	$C_{12}Cl_8O$	1

In Ontario, the MECP normally requires that only the higher tetra to octa (T4CDD to O8CDD) dioxin congeners and the higher tetra to octa (T4CDF to O8CDF) furan congeners are included in air emission testing. This is because the lower mono to tri congener groups (M1CDD to T3CDD and M1CDF to T3CDF) are considered to be generally less toxic than the higher congener groups and the test procedures have not been validated for these lower groups. In addition, it is acceptable to the MECP to use only specific isomers in the higher congener groups to compare emission data with the MECP interim guideline for dioxin and furan emissions.

Dioxin and furan congener group analytical results and emission data for the three tests performed are given in Table 35, Table 36 and Table 37 for Test No. 1, Test No. 2 and Test No. 3, respectively. These analyses are shown as congener groups from T4CDF to O8CDF and T4CDD to O8CDD, as normally required by the MECP.

For the dioxins and furans, as with the other semi-volatile organic components, amounts collected were assumed to be equivalent to the detection limit, where the analytical results were below the reportable detection limit.

Summaries of the dioxin and furan congener group actual concentrations, dry reference concentrations, dry adjusted concentrations, wet reference concentrations, and emission rates, including the coefficients of variation for the tests performed during the emission testing program are provided in Tables 38, 39, 40, 41, and 42, respectively. A summary of the dioxin and furan congener group emission data is detailed in Table 43.

The total dioxin and furan congener emission rates were <1.25 ng/s for dioxins and <1.51 ng/s for furans.

The amounts of dioxins and furans detected in the blank sampling train and in the lab blank were significant when compared to the amounts detected in the test trains since most of the congener groups were at or slightly above the detection limit. The blank sampling train analytical results are shown in Table 44. The blank analyses were not subtracted from the test sample analyses during calculation of the dioxin and furan emission data.

Dioxin and furan isomer analytical results and emission data for the three tests performed are given in Table 45, Table 46 and Table 47 for Test No. 1, Test No. 2 and Test No. 3, respectively. The isomers included in these tables are considered the most toxic of all the dioxin and furan isomers. They are characterized by having chlorine atoms located at the 2, 3, 7 and 8 positions of the basic dioxin and furan molecules.

Summaries of the dioxin and furan isomer actual concentrations, dry reference concentrations, dry adjusted concentrations, wet reference concentrations, and emission rates including the coefficients of variation for the three tests performed during the emission testing program are provided in Tables 48, 49, 50, 51, and 52, respectively.

A summary of the dioxin and furan specific isomer emission data is detailed in Table 53.

The amounts of dioxins and furans detected in the blank sampling train (<44.2 pg) and in the lab blank (<29.0 pg) were significant compared to the amounts detected in the test trains (from <207 to <812 pg) since most of the isomers were at or near the reportable detection limit. The blank analyses were not subtracted from the test sample analyses during the calculation of the emission data. The specific isomer blank analysis is provided in Table 54.

Several schemes have been proposed for calculating dioxin and furan toxic equivalents (TEQ's) in which different factors have been assigned to the various isomers and congener groups. Calculations in this report are based on the method preferred by the MECP, which uses International Toxicity Equivalency Factors (I-TEFs).

The purpose in calculating dioxin and furan emission rates as toxic equivalents is to provide a means of assessing and comparing the effects of dioxin and furan emission rates for different emission sources. In these calculations, 2,3,7,8-T4CDD, the most toxic of all the dioxin and furan isomers, is assigned an arbitrary value of 1.0 for a toxic equivalency factor. Then, other dioxin and furan isomers are assigned toxic equivalency factors which are based on their relative toxicity compared with 2,3,7,8-T4CDD. Emission rates for each isomer are multiplied by their assigned factor and the products are summed to provide the toxic equivalency emission rate.

Dioxin and furan TEQ actual concentrations, dry reference concentrations, dry adjusted concentrations, wet reference concentrations and emission rates are shown in Tables 55, 56, 57, 58 and 59, respectively. A summary of the average dioxin and furan toxicity equivalent emission data is given in Table 60.

The MECP "Summary of Standards and Guidelines to Support Ontario Regulation 419/05 – Air Pollution – Local Air Quality", dated April 2012, provided a new framework for calculating dioxin and furan toxicity equivalent concentrations which includes emission data for 12 dioxin-like PCBs. This document was replaced by "Air Contaminants Benchmarks List: standards, guidelines and screening levels for assessing point of impingement concentrations of air contaminants", published on January 4, 2017 and updated April 2018, however the dioxin and furan toxicity equivalent calculation methodology remains the same.

Table 55 to 60 show the total dioxins and furan emission data calculated using the toxicity equivalent calculation method detailed in Schedule 3 of the ECA. The calculation methodology detailed in Schedule 3 of the ECA was used to assess the emission data against the criteria listed in the ECA.

The average test result (<10.6 pg I-TEQ/Rm^3 calculated using Schedule 3) is well below the Environment Canada level of quantification (LOQ) for dioxin and furan emissions (32 pg I-TEQ Rm^3) at dry reference conditions.

The dioxins and furans point of impingement concentration was calculated using the methodology detailed in the "Air Contaminants Benchmarks List: standards, guidelines and screening levels for assessing point of impingement concentrations of air contaminants", published on January 4, 2017 and updated April 2018, and includes the 12 dioxin-like PCBs. Table 61 shows the dioxins, furans and dioxin-like PCBs emission data calculated using the framework detailed in the MECP document (using half the detection limit for those compounds not found in quantities greater than the reportable detection limit).

A summary of the dioxin and furan toxicity equivalent emission data obtained during the test program is presented below:

Dioxin and Furan Emission Parameter	Calculated using Schedule 3 of the ECA (Table 60)	Calculated using O. Reg. 419***** (Table 61)
Actual Conc. (pg TEQ/m^3)	<3.58	2.36
Dry Reference Conc. (pg TEQ/Rm^3)******	<10.6	6.99
Dry Adjusted Conc. (pg TEQ/Rm^3)*******	<9.59	6.33
Wet Reference Conc. (pg TEQ/Rm^3)******	<5.60	3.69
Emission Rate (ng TEQ/s)	<0.18	0.12

* includes the 12 dioxin-like PCBs and using half the detection limit
** at 25°C and 1 atmosphere
*** at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume

9.9.2 Polychlorinated Biphenyl Emission Data

Polychlorinated Biphenyl's (PCB's) are also a family of congeners with different molecular structures and different numbers of chlorine atoms in the molecular structure. The results are shown as congener groups that include congeners with the same number of chlorine atoms. Normally, the MECP requires that dichlorinated PCB (D2PCB) congeners to decachlorinated PCB (D10PCB) congeners are included in PCB emission data.

PCB analytical results and emission data are given in Table 62, Table 63 and Table 64 for Test No. 1, Test No. 2 and Test No. 3, respectively. The amount collected in a test train was assumed to be equivalent to the detection limit, where the analytical results were below the reportable detection limit.

A summary of the PCB actual concentrations, dry reference concentrations, dry adjusted concentrations, wet reference concentrations, and emission rates are shown in Tables 65, 66, 67, 68 and 69, respectively. A summary of the average PCB emission data is given in Table 70.

The average total PCB emission rate was calculated to be <1.58 µg/s for the tests performed.

Blank sampling train and laboratory blank analytical results for PCBs are given in Table 71. As with all other analytical results reported the test train samples were not blank corrected.

9.9.3 *Chlorobenzene and Chlorophenol Emission Data*

As with dioxins and furans, chlorobenzenes and chlorophenols are groups of compounds that have different molecular structures and may also have different numbers of chlorine atoms in the basic molecule. Chlorobenzenes have the structure of the benzene molecule except that between one and six chlorine atoms are substituted for an equal number of hydrogen atoms in the benzene ring. Benzene has the molecular formula C_6H_6. Chlorobenzene congener groups have the molecular formulae C_6H_5Cl, $C_6H_4Cl_2$, $C_6H_3Cl_3$, $C_6H_2Cl_4$, C_6HCl_5 and C_6Cl_6. Chlorophenols have the structure of the phenol molecule except that between one and five chlorine atoms are substituted for an equal number of hydrogen atoms in the benzene ring. Phenol has the molecular formula C_6H_5OH. Chlorophenol congener groups have the molecular formulae C_6H_4ClOH, $C_6H_3Cl_2OH$, $C_6H_2Cl_3OH$, C_6HCl_4OH and C_6Cl_5OH.

Chlorobenzene isomer and congener group analytical results and emission data are provided in Table 72, Table 73 and Table 74 for Test No. 1, Test No. 2 and Test No. 3, respectively. Chlorobenzene isomer and congener group actual concentrations, dry reference concentrations, dry adjusted concentrations, wet reference concentrations, and emission rates are shown in Tables 75, 76, 77, 78 and 79, respectively.

A summary of the average isomer and congener group emission data for chlorobenzenes, and other related chlorinated compounds, is given in Table 80.

The average chlorobenzene congener group emission rates were as follows:

Congener Group	Average Emission Rates (µg/s)
Dichlorobenzenes	2.81
Trichlorobenzenes	<1.04
Tetrachlorobenzenes	<0.41
Pentachlorobenzene	0.37
Hexachlorobenzene	<0.11

The total chlorobenzene congener group emission rate averaged <4.74 µg/s for the tests performed.

Two additional related chlorinated compounds were analyzed (hexachloroethane and a,2,6-trichlorotoluene). However, these compounds were not detected in levels greater than the reportable detection limit in any of the tests performed.

The chlorobenzene isomer and congener lab blank and blank train analyses are summarized in Table 81. The analytical results for the test train samples were not blank corrected.

Chlorophenol isomer and congener group analytical results and emission data are provided in Table 82, Table 83 and Table 84 for Test No. 1, Test No. 2 and Test No. 3, respectively. Chlorophenol isomer and congener group actual concentrations, dry reference concentrations, dry adjusted concentrations, wet reference concentrations, and emission rates are shown in Tables 85, 86, 87, 88 and 89, respectively.

A summary of the average chlorophenol emission data is given in Table 90.

The average chlorophenol congener emission rates were as follows:

Congener Group	Average Emission Rates (µg/s)
Dichlorophenols	<1.68
Trichlorophenols	<2.76
Tetrachlorophenols	<0.61
Pentachlorophenol	<0.30

The total chlorophenol congener group emission rate averaged <5.35 µg/s for the tests performed.

Seven additional related compounds were included in the chlorophenol tables (total heptachlor as its three major constituents, total chlorodane as its three major constituents, toxaphene as its three major constituents, hexachlorophene, hexachlorobutadiene, octachlorostyrene and tributyltin). However, only hexachlorobutadiene was detected in quantities greater than the reportable detection limit in at least one of the tests.

The blank analyses data for the chlorophenols and related compounds is detailed in Table 91. The analytical results for the test train samples were not blank corrected.

9.9.4 Polycyclic Aromatic Hydrocarbon Emission Data

The SVOC samples were analyzed for 42 polycyclic aromatic hydrocarbons. Dibenzo(a,h)anthracene co-elutes with dibenzo(a,c)anthracene on the GC/MS. The data reported for dibenzo(a,c)anthracene represents the total of the (a,h) and (a,c) isomers. Similarly, triphenylene and chrysene co-elute. Analytical results and emission data are provided in Table 92, Table 93 and Table 94 for Test No. 1, Test No. 2 and Test No. 3, respectively. Note, Test No. 2 was compromised by the analytical laboratory during sample preparation and extraction and no data was provided for this sample. The average emission data was calculated using the Test No. 1 and Test No. 3 results.

PAH actual concentrations, dry reference concentrations, dry adjusted concentrations, wet reference concentrations, and emission rates are shown in Tables 95, 96, 97, 98 and 99, respectively.

A summary of the average PAH emission data is given in Table 100.

The total PAH emission rate averaged <14.2 µg/s with naphthalene representing approximately 25% of the total PAH emissions.

Table 101 summarizes the lab blank and blank train PAH analysis. Note that naphthalene was also detected in the blank train in significant amounts when compared to the amounts collected in the test samples. The blank train sample analyses were not subtracted from the test train sample analyses for the purposes of emission rate calculations.

9.9.5 Volatile Organic Emission Data

Volatile organic analysis data is provided in Table 102, Table 103 and Table 104 for Test No. 1, Test No. 2 and Test No. 3, respectively. These tables indicate the total amount of the thirty volatile organics analyzed in the adsorbent tube samples from each volatile organics sampling train (VOST). Concentrations and emission rates are shown in Tables 105, 106 and 107 for Test No. 1, Test No. 2 and Test No. 3, respectively.

The average test results of volatile organic actual concentrations, dry reference concentrations, dry adjusted concentrations, wet reference concentrations, and emission rates are shown in Tables 108, 109, 110, 111 and 112, respectively. The volatile organic emission data are summarized in Table 113 for the three tests performed.

Note at the request of the MECP the volatile organic compounds emission data was calculated using the detection limit for those compounds not found in quantities greater than the detection limit. Prior to the 2021 emission testing program, a value of zero was used for the volatile organic compounds reported as less than the detection limit.

The average emission rate for each compound was less than 1.0 mg/s.

The total average volatile organic emission rate was <1.67 mg/s for the three tests performed.

Analysis of the blank adsorbent tubes is provided in Table 114. One pair of field blank adsorbent tubes was analyzed for the test program. The field blank tubes were taken to the test site and uncapped in order to expose the tubes to the ambient environment at the sampling location. Test sample analyses were not blank corrected during the calculation of the emission data. In addition, one pair of trip blank tubes was also analyzed.

Mesitylene (1,3,5-trimethylbenzene) is included in the volatile organic emission tables (Table 102 to Table 110) but it is incorrectly identified in Schedule A of the ECA as 1,2,4-trimethylbenzene. Mesitylene is again listed in Schedule B of the ECA, Volatile Organics in Stack Samples, but it is assumed that this is again referring to 1,2,4-trimethylbenzene. Both compounds were included in the test program.

10. DESTRUCTION AND REMOVAL EFFICIENCIES

Although not a requirement of the ECA, destruction and removal efficiencies (DREs) for the target compounds were calculated by expressing the combined amounts of these compounds destroyed by the incinerator and removed by the air pollution control equipment as a percentage of the feed rates of the compounds (equivalent to the [FEED RATE – EMISSION RATE]/[FEED RATE]%). The organic analysis report (Appendix 14) describes the DRE compound feed analysis program.

Note that prior to the 2021 emission testing program, six target principal organic hazardous compounds (2-Butanone, Ethyl Acetate, Tetrachloroethene, Toluene, 1,2,4-Trichlorobenzene and Total Xylenes) were used in the DRE calculations however most of these contaminants were less than the method detection limit in the feeds and the stack gas samples. As the result of discussions with Clean Harbors and the MECP and consistent with the 2021 testing report, ORTECH calculated DREs for all of the volatile organic compounds that were detected in quantities greater than the detection limit in all three tests in at least one of the feed streams. DREs were determined for a total of seven volatile organic compounds. Note that although the Thermal Desorber Unit (TDU) is operating during compliance testing, the contribution of the TDU is not included in the DRE calculations (i.e. the contribution of the TDU is not taken into account as a feed therefore the DRE results may be biased low).

Equivalent emission data for the seven DRE compounds from the volatile organics emission test samples are provided in Table 115 for Test No. 1, Table 116 for Test No. 2 and Table 117 for Test No. 3. A summary of the emission data is provided in Table 118. For those compounds whose analysis was indicated as being lower than the analytical detection limit, the value of the detection limit was used for DRE calculation purposes.

The field and lab blank tube analyses for the ten DRE compounds are provided in Table 119. Blank analyses were not subtracted from the test tube sample analyses during the calculation of DRE compound emission rates.

Incineration feed material analyses and feed rates for the seven DRE volatile organic compounds are provided in Table 120, Table 121 and Table 122 for Test No. 1, Test No. 2 and Test No. 3, respectively. For compounds whose analytical results were less than the method detection limit, the detection limits were used in the total organic feed rate calculation.

DRE results are provided in Table 123, Table 124 and Table 125 for Test No. 1, Test No. 2 and Test No. 3, respectively. The DRE results are summarized and averaged in Table 126.

11. DISPERSION MODELLING

The AERMOD dispersion model (version 19191) has been used to assess compliance for the facility. The dispersion modelling was completed in accordance with the MECP publication, “Air Dispersion Modelling Guideline for Ontario, Version 3.0” (ADMGO), dated July 2016.

The AERMOD model was run using default regulatory options. The Universal Transverse Mercator (UTM) projection (NAD 83, Zone 17) was used as the coordinate system for defining all model objects.

Since over 50% of the land surrounding the facility is rural, the model was run with rural dispersion coefficients.

11.1 Receptors

A receptor grid was defined as per the ADMGO and is described below. Distances are defined as the distance from any emission source.

- 20 m spacing within 200 m;
- 50 m spacing from 200 – 500 m;
- 100 m spacing from 500 – 1,000 m;
- 200 m spacing from 1,000 – 2,000 m;
- 500 m spacing from 2,000 – 5,000 m; and,
- 10 m spacing along the property boundary.

No receptors were placed inside the property boundary. The property boundary coordinates are presented in the following table:

Property Boundary

#	X (m)	Y (m)
1	393617	4748831
2	393685	4748896
3	394286	4748883
4	394527	4748877
5	394500	4747539
6	394174	4747547
7	393594	4747560

11.2 Sources

Only emissions from the Incinerator Exhaust Stack were modelled. The emission rate was set to a unit emission rate (1 g/s), and assumed to be constant and continuous. Subsequently the dispersion factors were applied to all the contaminants for calculating the maximum off-property ground-level concentrations associated with the Incinerator Exhaust Stack.

The temperature and velocity parameters used in the dispersion modelling were average values obtained during testing with the isokinetic sampling trains. The average velocity measured at the sampling port level (stack diameter 1.52 m) has been adjusted to account for the stack exit diameter (1.22 m).

Modelling Input Parameters

Modelling ID	Source Description	Release Height (m)	Temp. (°C)	Exit Diameter (m)	Exit Velocity (m/s)	X (m)	Y (m)
I01	Incinerator Stack	68.8	191	1.22	43.3	393878	4747950

11.3 Buildings

A building or structure is considered sufficiently close to a stack to cause wake effects when the distance between the stack and the nearest part of the building is less than or equal to five (5) times the lesser of the building height or the projected width of the building. All buildings and structures within the Area of Influence were input into the current version of the Building Profile Input Program for Prime (BPIP-PRIME) for calculating downwash effects.

11.4 Terrain

The USGS 7.5-minute Ontario data set was used as digital terrain input to the AERMAP preprocessor as outlined in the ADMGO. AERMAP was run to determine the elevations for receptors, sources and buildings.

11.5 Meteorological Data

The MECP provides pre-processed 5-year (1996-2000) regional meteorological data sets for use with the AERMOD dispersion model. The data sets are processed for urban, crops or forest land uses. The London meteorological data set for the Southwestern region processed for crops surface conditions was selected. The data set was downloaded directly from the MECP website and used in AERMOD without any additional processing.

11.6 Elimination of Meteorological Anomalies

As described in Section 6.6 of the ADMGO, for 1-hr concentrations, the eight hours with the highest 1-hour concentrations in each single meteorological year may be discarded. For 24-hour concentrations, the 1 day with the highest 24-hour concentration in each meteorological year may be discarded. For compliance assessments the MECP will consider the highest concentration after elimination of these meteorological anomalies. As a consequence, the meteorological anomalies were discarded for the 1-hr and 24-hour dispersion factors. Meteorological outliers were not removed from the 30-day and annual dispersion factors.

11.7 Averaging Period Conversions

AERMOD cannot model averaging periods less than 1-hour. Therefore, for the ½ hour dispersion factor, the 1-hour predicted concentration was converted to the applicable shorter averaging period using the MECP recommended factor described in Section 17(3) of O.Reg.419/05.

11.8 Modelling Results

As previously mentioned, the dispersion modelling was only carried out for the Incinerator Exhaust Stack and the dispersion factors, as shown in the following table, were determined for ½-hour, 1-hour, 24-hour, 30-day and annual averaging periods for a unit emission rate (1 g/s).

Dispersion Factors Predicted by the AERMOD Model

Averaging Period	Dispersion Factor (µg/m^3/g/s)
½-hour	2.2107
1-hour	1.8423
24-hour	0.4915
30-day	0.1437
Annual	0.0500

The dispersion factors were then multiplied by the emission rates of the individual contaminants to derive the maximum POI concentrations.

The predicted maximum POI concentrations for contaminants were compared to the MECP "Air Contaminants Benchmarks List: standards, guidelines and screening levels for assessing point of impingement concentrations of air contaminants" (April 2018) where available.

The AERMOD model files are provided on a CD in Appendix 26.

Dispersion modelling results for the actual stack gas component average emissions are provided in Table 127 for semi-volatile organic compounds and inorganic compounds, Table 128 for metals and metallic compounds and Table 129 for volatile organic compounds. These tables indicate the maximum ground level impingement concentrations for each component and the calculated maximum impingement concentrations allowed by the Regulation 419 standards and guidelines. Calculated maximum concentrations are expressed as percentages of the allowable concentrations.

As indicated in Tables 127 to 129, all of the calculated point of impingement concentrations were well below the allowable impingement concentrations, based on the average emission rates.

Of the calculated maximum point-of-impingement concentrations for inorganic and semi-volatile organic compounds (Table 127) the only percentage of allowable concentrations that were higher than 1% were for nitrogen oxides (1.48% for the 1-hour standard), fluorides (29.1% for the 24-hour standard and 21.6% for the 30-day standard) and hydrogen iodide (2.36% for the 24-hour screening level).

The calculated maximum point-of-impingement concentrations for metals and metallic compounds (Table 128) were less than 1% of the allowable concentration for all metals and metallic compounds.

All of the calculated maximum point-of-impingement concentrations for the volatile organic compounds (Table 129) were less than 0.1% of the allowable concentration for these compounds.

12. 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, HCl, CO_2, H_2O, THC, O_2, SO_2)
- stack gas opacity

The Clean Harbors feed analysis results (Daily Incineration Report of Analysis) are provided in Appendix 27. The one-minute average CEM combustion gas results are provided in Appendix 28, and the one-minute average process data including waste flows, PAC feed and incinerator temperatures and pressures are provided in Appendix 29.

13. OTHER EMISSION CRITERIA

In addition to requiring that the incineration facility comply with Regulation 419/05, the ECA also provided maximum allowable concentrations for particulate matter, mercury, and carbon monoxide in the stack gases, a minimum concentration of oxygen in the stack gases, and a maximum concentration for total hydrocarbons (measured at the stack and reported on a dry basis adjusted to 11% oxygen). For the emission test program, total hydrocarbon concentrations were measured at the breaching leading to the stack.

The following table summarizes the average test results for the three tests conducted by ORTECH and the corresponding emission criteria:

Stack Gas Concentration Criterion	Allowable Value	Test Average Value
Particulate Matter	maximum 20 mg/Rm$^{3(1)}$	<0.27 mg/Rm$^{3(1)}$
Mercury	maximum 50 µg/Rm$^{3(1)}$	6.77 µg/Rm$^{3(1)}$
Dioxin and Furan TEQ	maximum 80 pg TEQ/Rm$^{3(1)}$	<9.59 pg TEQ/Rm$^{3(1)}$
Carbon Monoxide	maximum 100 ppm(1)	51.3 ppm(1)
Oxygen	minimum 8.0 %(2)	10.00 %(2)
Total Hydrocarbons(3)	maximum 100 ppm	10.0 ppm(1)
Total Hydrocarbons(4)	maximum 100 ppm	5.9 ppm(4)
Total Hydrocarbons(5)	maximum 100 ppm	14.3 ppm(5)

(1) adjusted to 11% oxygen, dry at 25°C and 1 atmosphere
(2) dry by volume
(3) as per ECA No. 6547-5G5MSP (dry adjusted stack concentration)
(4) 10-minute rolling average - wet basis, expressed as equivalent methane
(5) maximum 10-minute average during the test program - wet basis, expressed as equivalent methane

Note: The dioxin and furan concentration in the above table was calculated using the calculation method detailed in Schedule 3 of the ECA.

14. FEED SAMPLE ANALYSIS

Presented in Appendix 30 are the results of the ultimate analysis conducted by Petro Laboratories on samples of the rich, lean and emulsion feeds. This data is summarized in Table 130. Other analysis performed on the feed samples can be found in the appropriate analytical reports.

Metals analyses of the feed samples are summarized in Table 131. Table 132 summarizes the metals analyses performed on the baghouse dust samples.

Congener group analyses for dioxin and furans in the rich, lean, emulsion and alkaline feed samples are summarized in Table 133. These analyses are reported as picograms per gram (pg/g). Dioxin and furan isomer analyses in the rich, lean, emulsion and alkaline feed samples are summarized in Table 134. The detected levels in the rich feed sample and the laboratory duplicate did not replicate well, although the observed patterns were similar. The sample consisted of a liquid containing solids. Although efforts were taken to homogenize the sample, the two replicates may have contained varying amounts of solids. The original analysis is included in Tables 133 and 134.

Total polychlorinated biphenyl analyses in the rich, lean, emulsion and alkaline feed samples are summarized in Table 135 reported as picograms per gram (pg/g).

15. LIMITATION ON WASTES

As well as the emission criteria limitations stated in Section 13, the Notice of Amendment to the ECA also specifies limitations on the feeding rates of each of the wastes (the combined feed rate of the rich, lean, and emulsion waste streams not to exceed 245 L/min). The individual heating values are provided in Appendix 27 and the waste feed rates are provided in Appendix 29. During the emission tests, the rich, lean and emulsion feed rates combined were 204, 207 and 192 L/min for Test No. 1, Test No. 2, and Test No. 3, respectively. The Thermal Desorber Unit (TDU) was exhausting to the incinerator during each test.

In addition, the waste fed into the incinerator should not contain more than 2% organic chlorine by weight. Organic chlorine is analyzed and reported as total chloride by the Clean Harbors laboratory. The organic chlorine content in the individual waste feed streams and the weighted average based on the waste feed rates during each test was as follows:

Test No.	Total Chlorine Content (% w/w)			Total Organic Chlorine in Combined Waste Feed (% w/w)
	Rich	Lean	Emulsion	
1	0.16	0	0.71	0.059
2	0.32	0.01	0.44	0.086
3	0.28	0	0.40	0.063
Average	0.25	0.003	0.52	0.070

Total chlorine analyses of the individual waste streams fed to the incinerator are shown in Table 130.

16. CONTINUOUS EMISSION MONITORING DATA

Average one-minute combustion gas concentrations recorded by the Clean Harbors stack gas continuous emission monitors (CEMs) for the emission testing periods are provided in Appendix 28.

The stack gas opacity was also recorded as one-minute average concentrations for each test period. The opacity at the exit of the main stack cannot be more than 5%, calculated on a 2 hour average, and 10%, calculated on a 6 minute average. The minimum, maximum and average opacity measurements for each test, using the one-minute data, are as follows:

Test No.	Maximum Opacity (%)	Minimum Opacity (%)	Average Opacity (%)
1	0.6	0	0.2
2	0.6	0.2	0.3
3	0.5	0.2	0.4

The one-minute average concentrations are shown in Appendix 28.

17. CONCLUSIONS

The main conclusions which can be drawn from the present emission testing program, carried out as a requirement of the Ontario Ministry of Environment ECA No. 8-1030-94-006 and Notice of Amendment are:

- Using the dispersion equations contained in the Appendix to the previous Air Quality Regulation (R.R.O.) 1990, Reg. 346 under the Ontario Environmental Protection Act, the predicted maximum ground level point of impingement concentrations, based on average test results, show that the incineration process is operating well below the standards and guidelines in Regulation 419/05 under the Ontario Environmental Protection Act**(12)** at an average combined rich, lean and emulsion feed rate of 201 L/min.
- The average total hydrocarbon concentration at the stack was 5.8 ppm (wet basis) for the three tests performed. The average total dry adjusted hydrocarbon concentration in the stack was 10.0 ppm for the three tests performed which is well below the maximum criterion (100 ppm).
- The average particulate concentration in the stack gas for the tests performed during the emission testing program was within the criteria provided in the ECA for the incinerator. The average particulate dry adjusted concentration (adjusted to 11% oxygen, dry at 25°C and 1 atmosphere) for the three tests performed was <0.27 mg/Rm^3, which is below the maximum criterion (20 mg/Rm^3).
- The average mercury concentration in the stack gas for the tests performed during the emission testing program was within the criteria provided in the Notice of Amendment to the ECA for the incinerator. The average mercury dry adjusted concentration (adjusted to 11% oxygen, dry at 25°C and 1 atmosphere) for the three tests performed was 6.77 µg/Rm^3, which is well below the maximum mercury concentration criterion of 50 µg/Rm^3.
- The average dry adjusted (adjusted to 11% oxygen, dry at 25°C and 1 atmosphere) carbon monoxide concentration in the stack gas for all of the tests performed during the emission testing program (58.7 mg/Rm^3 or 51.3 ppm) is within the criterion provided in the ECA for the incinerator (110 mg/Rm^3 or 100 ppm).
- The average dioxin and furan toxicity equivalent dry adjusted concentration in the stack gas for the tests performed during the emission testing program (<9.59 pg TEQ/Rm^3) is well below the criterion provided in the Notice of Amendment to the ECA for the incinerator (80 pg TEQ/Rm^3).
- The average oxygen concentration in the stack gas for the tests performed was 10.00%, which is above the minimum 8.0% oxygen criterion.
- DREs were calculated for 12 volatile organic compounds. The DREs ranged from 99.9570% for benzene to 99.9993% for 2-propanone and total xylenes. The DREs were greater than 99.99% for five of the seven compounds detected in at least one of the feed streams.
- The average opacity measurements recorded by Clean Harbors (the test average opacity measurements are all less than 0.6%) are lower than the criterion provided in the Notice of Amendment to the ECA.

REFERENCES

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5. “Determination of Hydrogen Halide and Halogen Emissions from Stationary Sources Non-Isokinetic Method”, U.S. Environmental Protection Agency, Method 26. Federal Register, Part 60, Appendix A. October 7, 2020.
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7. “Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)”. U.S. Environmental Protection Agency, Method 3A, Federal Register, Part 60, Appendix A. August 3, 2017.
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10. “Determination of Carbon Monoxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)”. U.S. Environmental Protection Agency, Method 10, Federal Register, Part 60, Appendix A. August 2, 2017.
11. “Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer”. U.S. Environmental Protection Agency, Method 25A, Federal Register, Part 60, Appendix A. August 3, 2017.
12. “Environmental Protection Act”. Revised Statutes of Ontario, 1990, c.E.19.
13. “Air Contaminants Benchmarks List: standards, guidelines and screening levels for assessing point of impingement concentrations of air contaminants”. Standards Development Branch, Ontario Ministry of the Environment, April 2018.

Figure 1
Incinerator Schematic

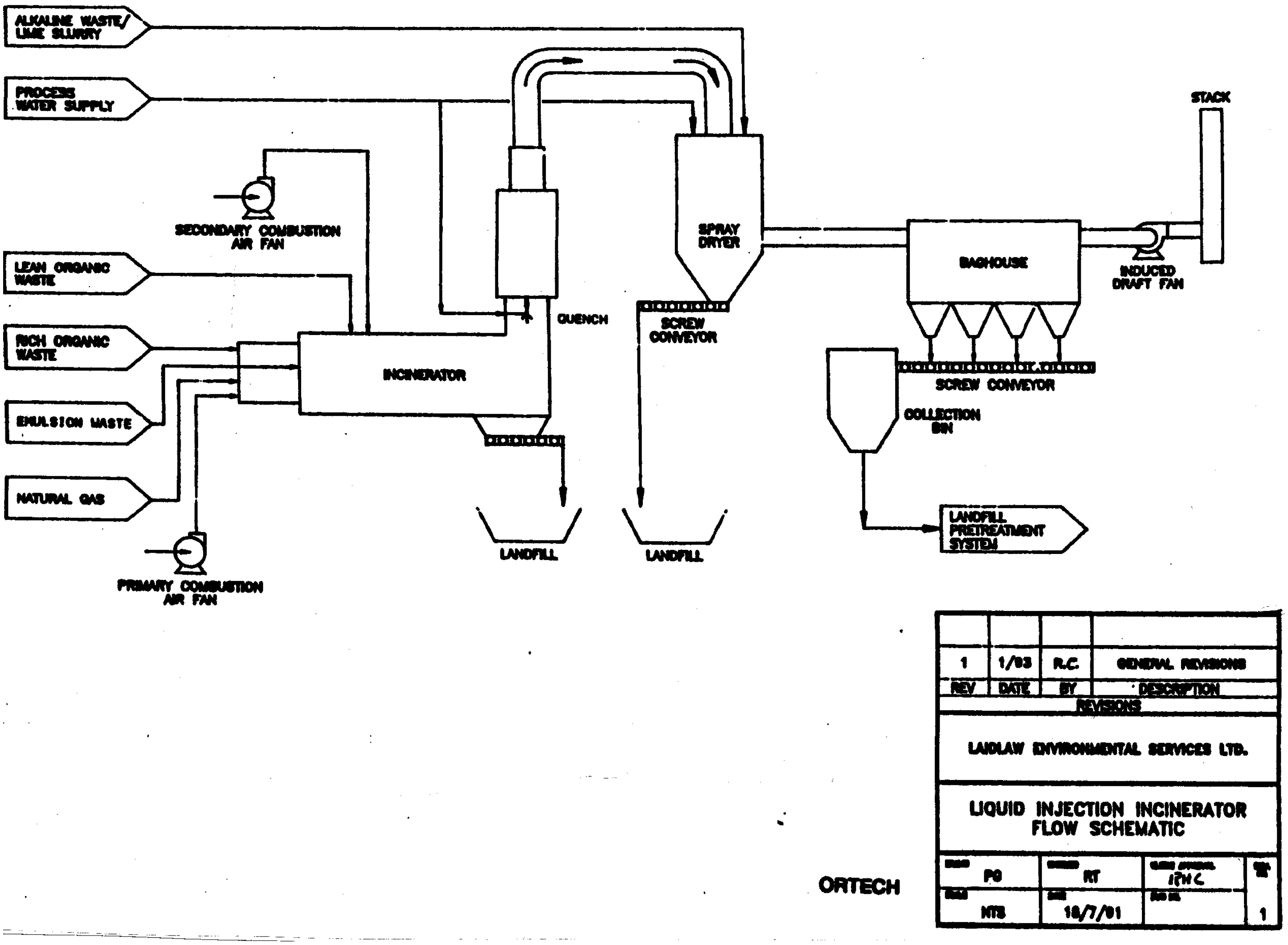
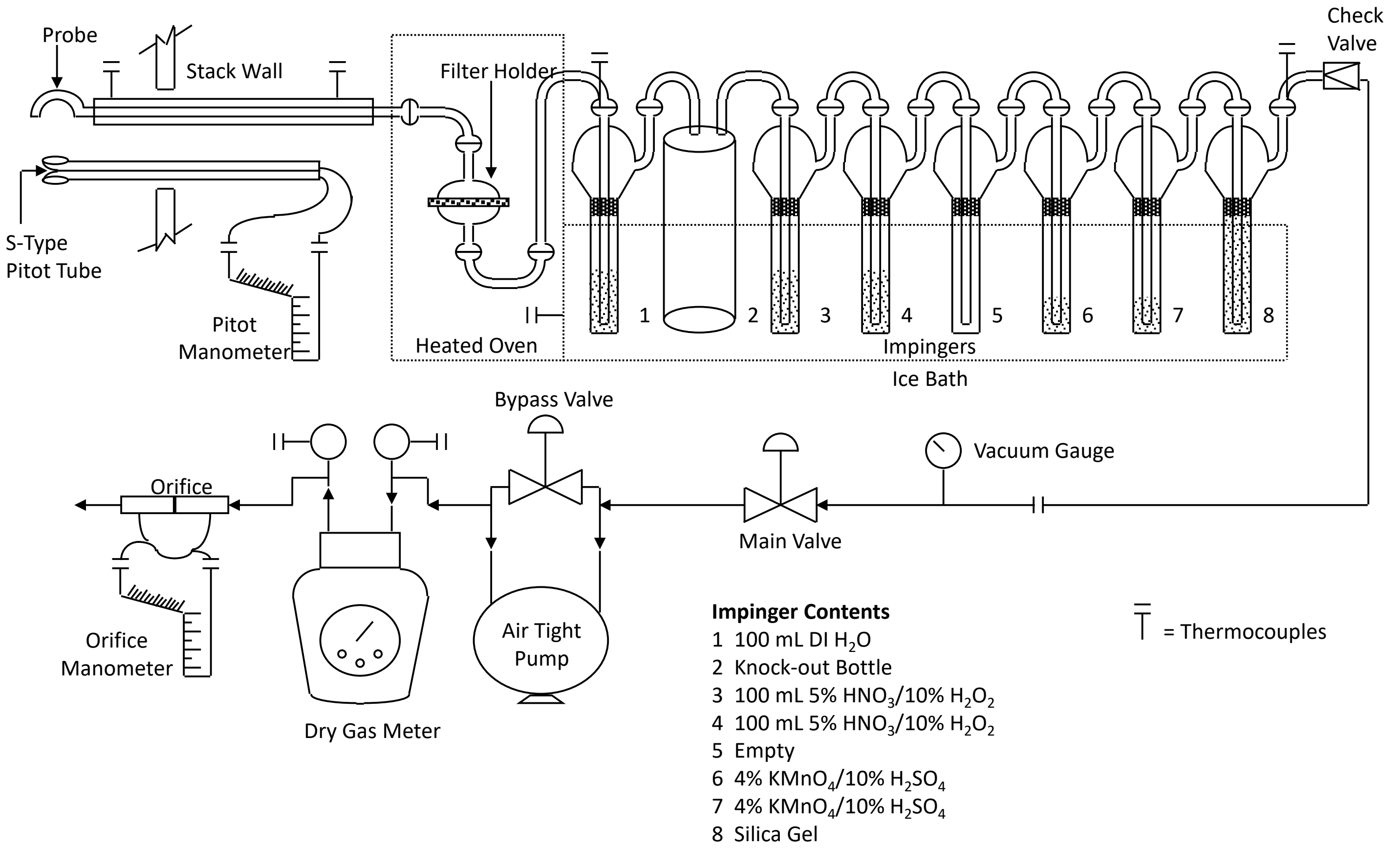
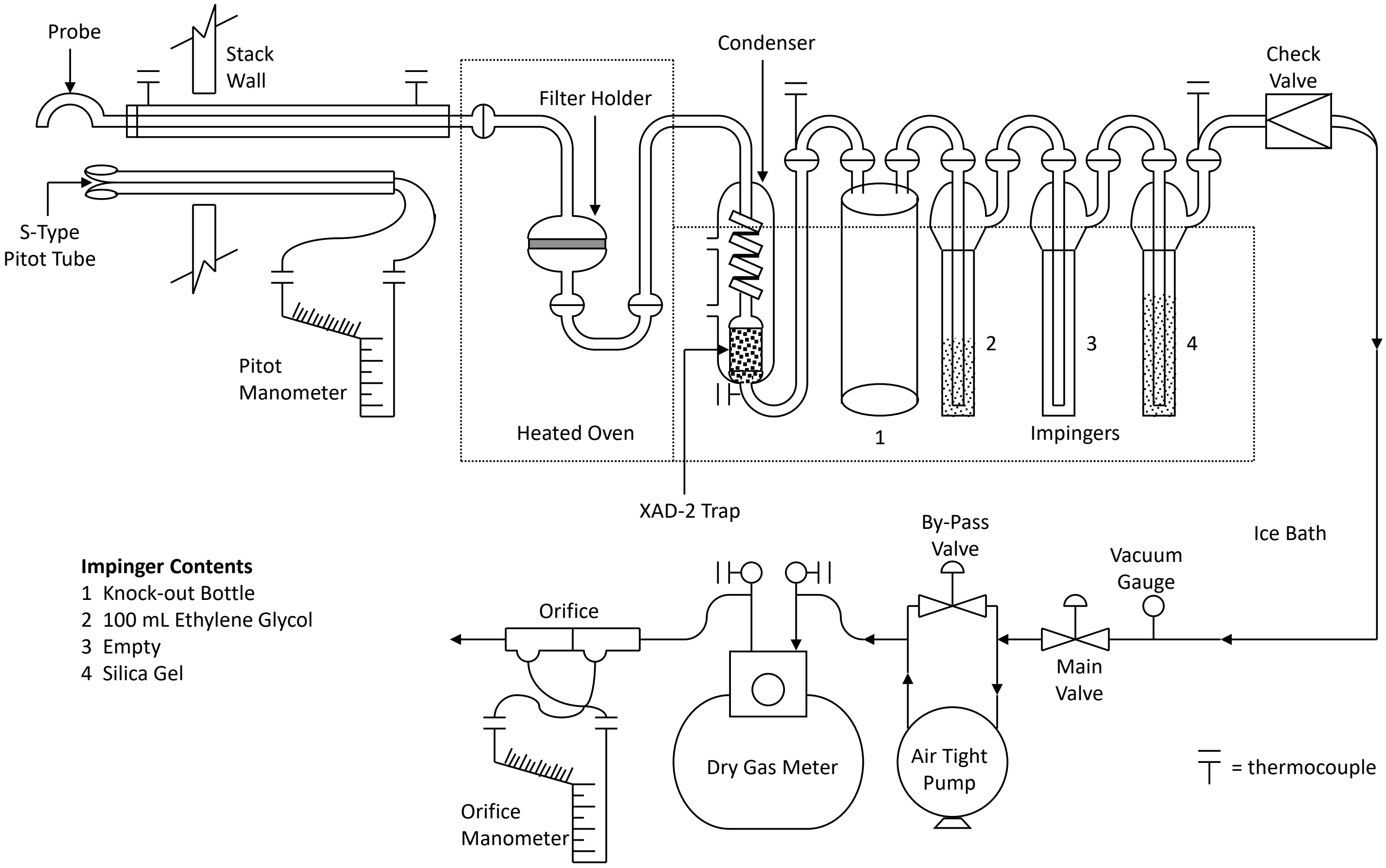


Figure 2
Particulate Matter and Metals Sampling Train



Impinger Contents
1 100 mL DI H_2O
2 Knock-out Bottle
3 100 mL 5% HNO_3/10% H_2O_2
4 100 mL 5% HNO_3/10% H_2O_2
5 Empty
6 4% $KMnO_4$/10% H_2SO_4
7 4% $KMnO_4$/10% H_2SO_4
8 Silica Gel

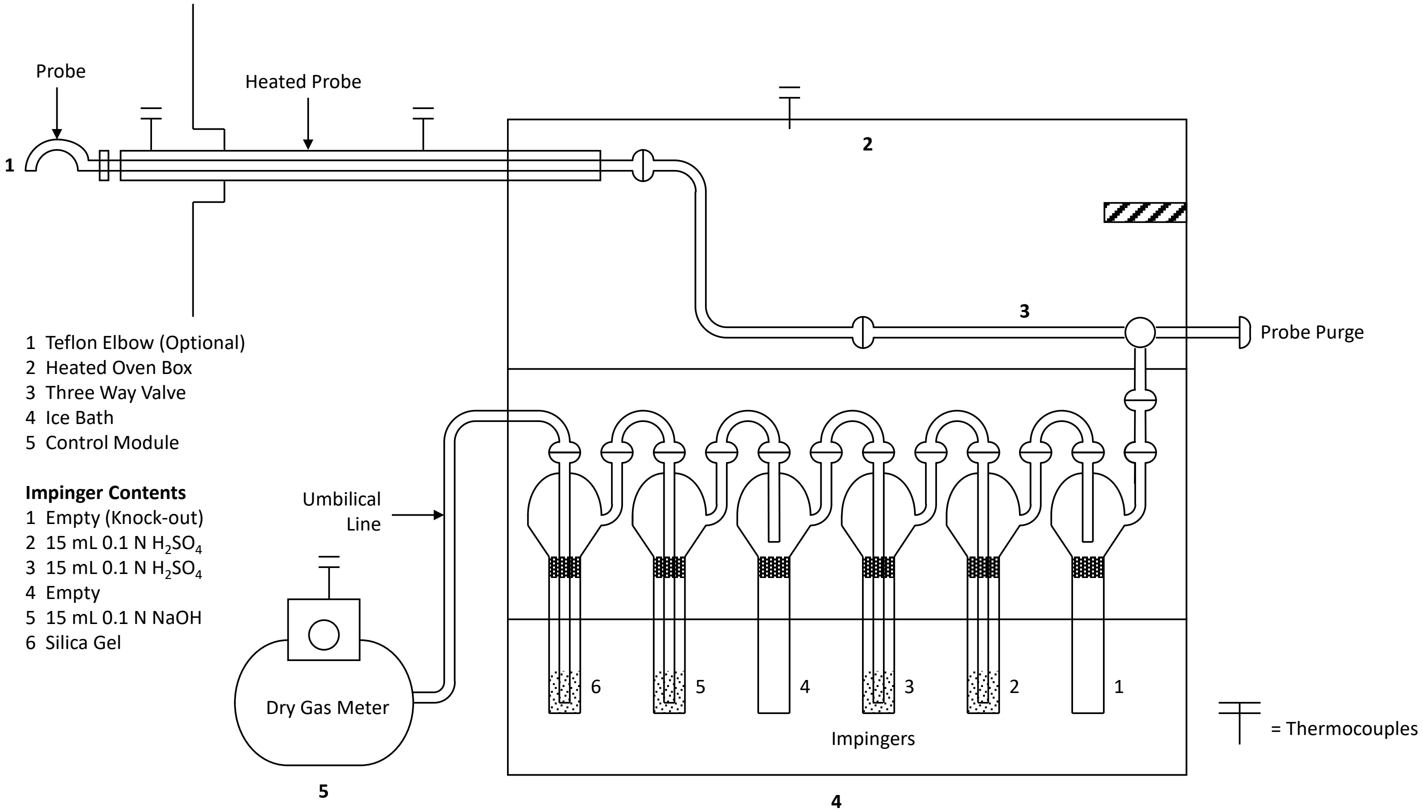
Figure 3
Semi-Volatile Organic Compounds Sampling Train



Impinger Contents

1 Knock-out Bottle
2 100 mL Ethylene Glycol
3 Empty
4 Silica Gel

Figure 4
Acid Gases Sampling Train



1 Teflon Elbow (Optional)
2 Heated Oven Box
3 Three Way Valve
4 Ice Bath
5 Control Module

Impinger Contents
1 Empty (Knock-out)
2 15 mL 0.1 N H_2SO_4
3 15 mL 0.1 N H_2SO_4
4 Empty
5 15 mL 0.1 N NaOH
6 Silica Gel

Figure 5
Volatile Organics Sampling Train

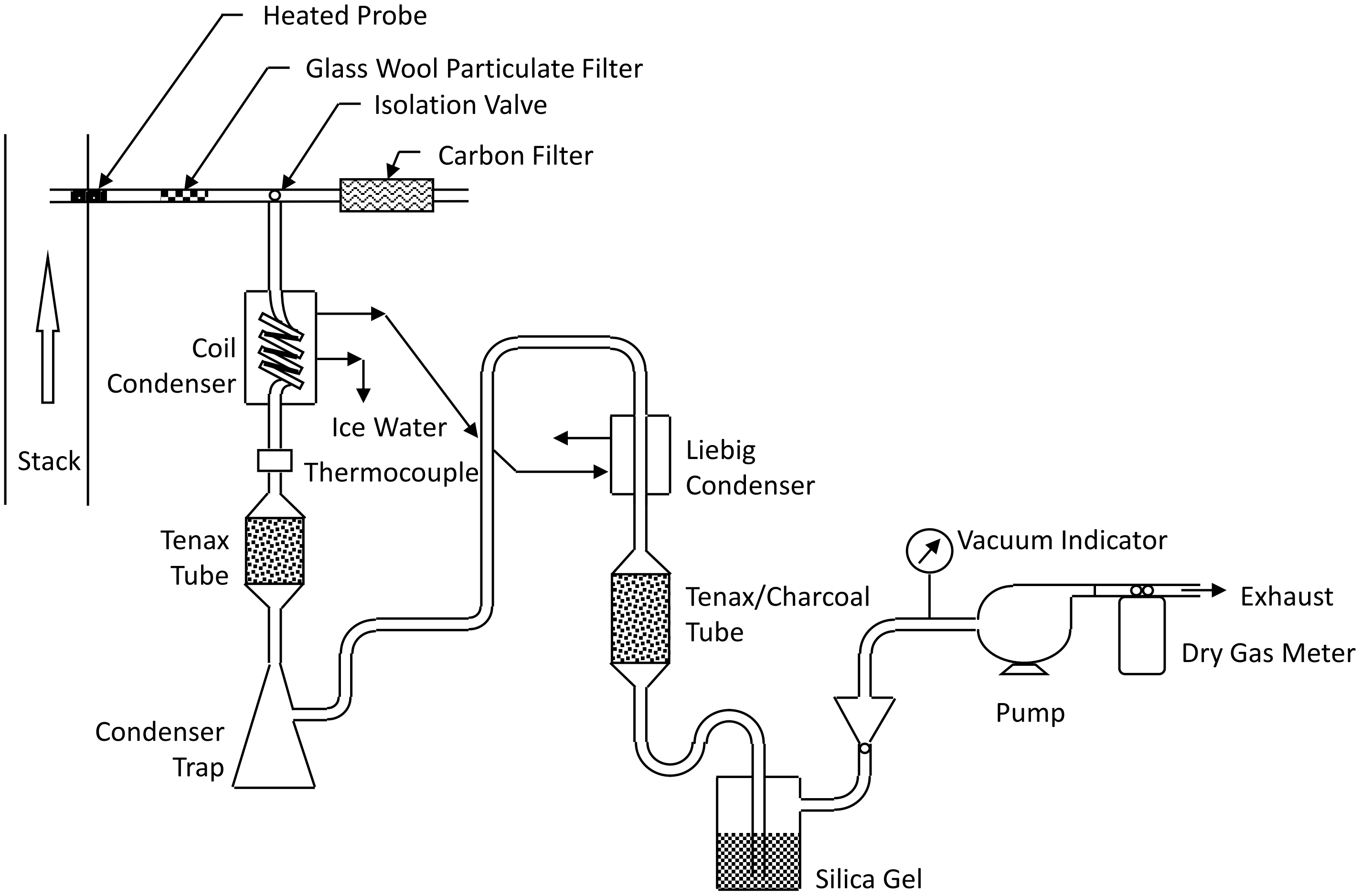
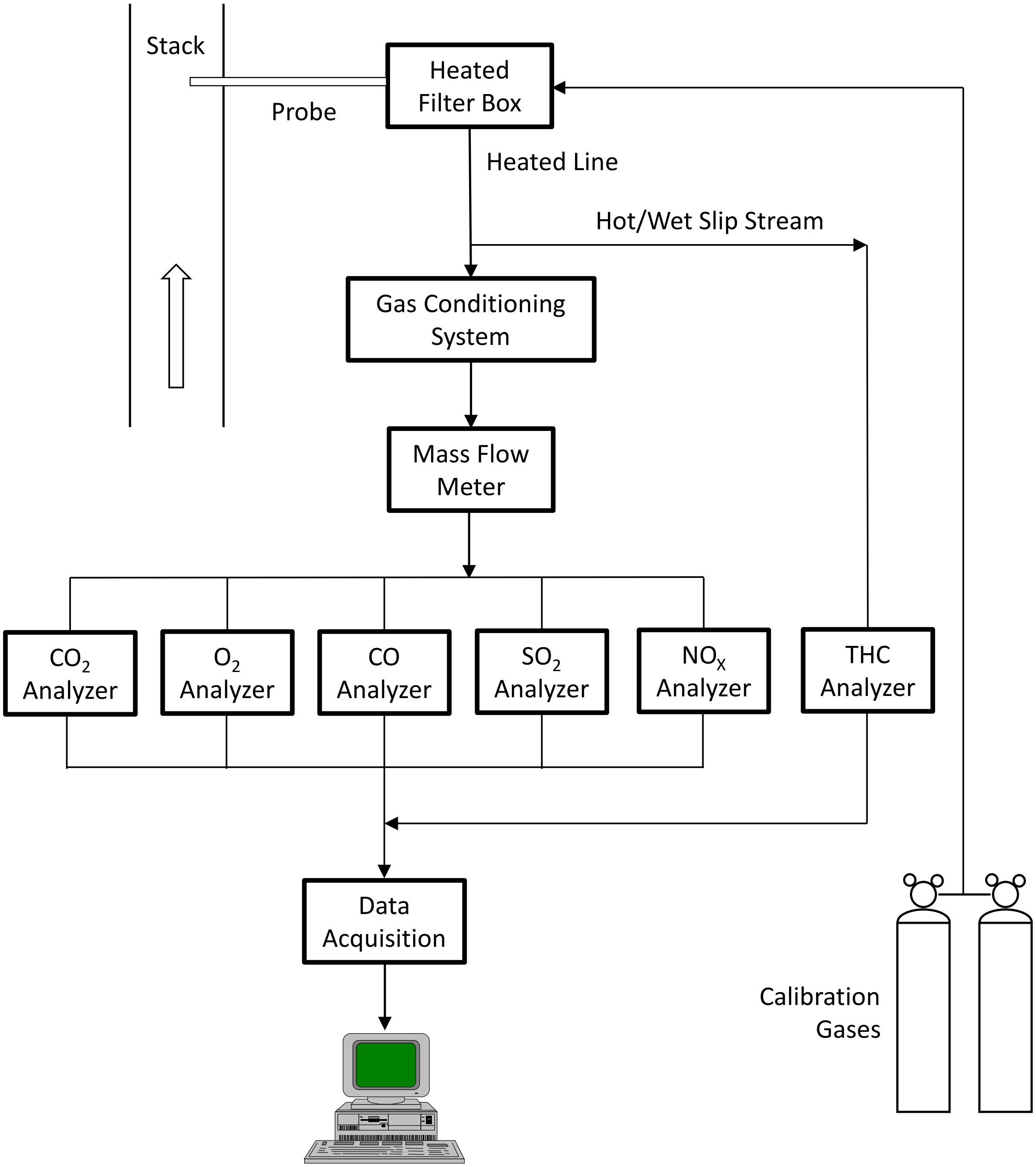


Figure 6
CEM System Schematic



APPENDIX 1

Data Tables

(135 pages)

TABLE 1
Clean Harbors Sarnia
Polychlorinated Aromatic Congener Group Emission Components

Contaminant Groups	Contaminants
Compound Groups	Polychlorinated dibenzo-p-dioxins Polychlorinated dibenzofurans Chlorobenzenes Chlorophenols Polychlorinated biphenyls
Congener Groups	Tetrachloro dibenzo-p-dioxins (T4CDD) Pentachloro dibenzo-p-dioxins (P5CDD) Hexachloro dibenzo-p-dioxins (H6CDD) Heptachloro dibenzo-p-dioxins (H7CDD) Octachloro dibenzo-p-dioxin (O8CDD)
	Tetrachloro dibenzofurans (T4CDF) Pentachloro dibenzofurans (P5CDF) Hexachloro dibenzofurans (H6CDF) Heptachloro dibenzofurans (H7CDF) Octachloro dibenzofuran (O8CDF)
	Dichlorobenzenes (D2CB) Trichlorobenzenes (T3CB) Tetrachlorobenzenes (T4CB) Pentachlorobenzene (P5CB) Hexachlorobenzene (H6CB)
	Dichlorophenols (D2CP) Trichlorophenols (T3CP) Tetrachlorophenols (T4CP) Pentachlorophenol (P5CP)
	Dichlorobiphenyls (D2PCB) Trichlorobiphenyls (T3PCB) Tetrachlorobiphenyls (T4PCB) Pentachlorobiphenyls (P5PCB) Hexachlorobiphenyls (H6PCB) Heptachlorobiphenyls (H7PCB) Octachlorobiphenyls (O8PCB) Nonachlorobiphenyls (N9BCB) Decachlorobiphenyl (D10PCB)
	Heptachlor Chlorodane Toxaphene
	Hexachlorophene
	Tributyltin

TABLE 2
Clean Harbors Sarnia
Polychlorinated Aromatic Isomer Emission Components

Contaminant Groups	Contaminants
Isomers	2,3,7,8 Tetrachloro dibenzo-p-dioxin
	1,2,3,7,8 Pentachloro dibenzo-p-dioxin
	1,2,3,4,7,8 Hexachloro dibenzo-p-dioxin
	1,2,3,6,7,8 Hexachloro dibenzo-p-dioxin
	1,2,3,7,8,9 Hexachloro dibenzo-p-dioxin
	1,2,3,4,6,7,8 Heptachloro dibenzo-p-dioxin
	2,3,7,8 Tetrachloro dibenzofuran
	1,2,3,7,8 Pentachloro dibenzofuran
	2,3,4,7,8 Pentachloro dibenzofuran
	1,2,3,4,7,8 Hexachloro dibenzofuran
	1,2,3,6,7,8 Hexachloro dibenzofuran
	1,2,3,7,8,9 Hexachloro dibenzofuran
	2,3,4,6,7,8 Hexachloro dibenzofuran
	1,2,3,4,6,7,8 Heptachloro dibenzofuran
	1,2,3,4,7,8,9 Heptachloro dibenzofuran
	PCB 77
	PCB 81
	PCB 126
	PCB 169
	PCB 105
	PCB 114
	PCB 118
	PCB 123
	PCB 156/157
	PCB 167
	PCB 189
	1,2-Dichlorobenzene
	1,3-Dichlorobenzene
	1,4-Dichlorobenzene
	1,3,5-Trichlorobenzene
	1,2,3-Trichlorobenzene
	1,2,4-Trichlorobenzene
	1,2,4,5-Tetrachlorobenzene
	1,2,3,5-Tetrachlorobenzene
	1,2,3,4-Tetrachlorobenzene
	2,3-dichlorophenol
	2,4-dichlorophenol
	2,6-dichlorophenol
	2,5-dichlorophenol
	3,4-dichlorophenol
	3,5-dichlorophenol
	2,4,6-trichlorophenol
	2,3,6-trichlorophenol
	2,3,5-trichlorophenol
	2,4,5-trichlorophenol
	2,3,4-trichlorophenol
	3,4,5-trichlorophenol
	2,3,5,6-tetrachlorophenol
	2,3,4,6-tetrachlorophenol
	2,3,4,5-tetrachlorophenol
	Pentachlorophenol
Compounds (aliphatic)	Hexachlorobutadiene
	Hexachloroethane
	a,2,6-Trichlorotoluene
	Octachlorostyrene

TABLE 3
Clean Harbors Sarnia
Polycyclic Aromatic Hydrocarbon Emission Components

Contaminant Groups	Contaminants
Compound Group	Acenaphthene
	Acenaphthylene
	Anthracene
	Benzo(a)Anthracene
	Benzo(b)Fluoranthene
	Benzo(k)Fluoranthene
	Benzo(a)fluorene
	Benzo(b)fluorene
	Benzo(g,h,i)Perylene
	Benzo(a)Pyrene
	Benzo(e)Pyrene
	Biphenyl
	2-Chloronaphthalene
	Chrysene/Triphenylene*
	Coronene
	Dibenzo(a,c/a,h)Anthracene*
	Dibenzo(a,e)pyrene
	9,10-dimethylanthracene
	7,12-Dimethylbenzo(a)anthracene
	Fluoranthene
	Fluorene
	Indeno(1,2,3-cd)Pyrene
	2-methylanthracene
	3-Methylcholanthrene
	1-Methylnaphthalene
	2-Methylnaphthalene
	1-Methylphenanthrene
	9-Methylphenanthrene
	Naphthalene
	Perylene
	Phenanthrene
	Picene
	Pyrene
	Quinoline
	m-terphenyl
	o-Terphenyl
	p-terphenyl
	Tetralin

* compounds coelute

TABLE 4
Clean Harbors Sarnia
Metal Emission Components

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

TABLE 5
Clean Harbors Sarnia
Particulate, Acid Gas and Combustion Gas Emission Components

Particulate Matter

Contaminant Group	Contaminants
Acid Gas Group	Chloride Fluoride Bromide Iodide Cyanide

Contaminant Group	Contaminants
Combustion Gas Group	Carbon dioxide Carbon monoxide Moisture Nitrogen oxides Oxygen Sulphur dioxide Total hydrocarbons

TABLE 6
Clean Harbors Sarnia
Volatile Organic Compound Emission Components

Contaminant Group	Contaminants
Volatile Organic Compound Group	Benzene Bromodichloromethane Bromomethane (Methyl bromide) 2-Butanone (Methyl ethyl ketone) Chloroethene (Vinyl chloride) Dibromochloromethane 1,2-Dibromoethane (Ethylene dibromide) Dichlorodifluoromethane 1,1-Dichloroethane trans-1,2-Dichloroethene 1,1-Dichloroethene Dichloromethane (Methylene chloride) 1,2-Dichloropropane Ethyl Acetate Ethylbenzene Isopropylbenzene (Cumene) 2-Propanone (Acetone) Styrene Tetrachloroethene (Perchloroethylene) Tetrachloromethane (Carbon tetrachloride) Toluene Tribromomethane (Bromoform) 1,1,1-Trichloroethane (Methyl chloroform) Trichloroethene Trichlorofluoromethane Trichloromethane (Chloroform) Trichlorotrifluoroethane 1,3,5-Trimethyl benzene (Mesitylene) 1,2,4-Trimethyl benzene (Pseudocumene) Xylenes (Total)

TABLE 7
Clean Harbors Sarnia
Destruction and Removal Efficiency (DRE) Compounds

Contaminant Group	DRE Compounds
Volatile Organic Compound Group	Benzene Dichloromethane Ethylbenzene 2-Propanone Styrene Toluene Total Xylenes

TABLE 8
Clean Harbors Sarnia
Incinerator Feed Stream and Baghouse Dust Sampling and Analysis Components

Sampling or Analysis Group	Sampling or Analysis Components
Process Sampling Components	Rich feed stream Lean feed stream Emulsion feed stream Alkaline feed stream Leachate feed stream Baghouse dust
Feed Stream Analysis Components	Organic chlorine content Ash Heating value Viscosity Density Water content Sulphur content Ultimate analysis Polychlorinated dibenzo-p-dioxins Polychlorinated dibenzofurans Polychlorinated biphenyls DRE compounds (Table 7) Metals (Table 4)
Baghouse Dust Analysis Components	Metals (Table 4)

TABLE 9
Clean Harbors Sarnia
Emission Testing Program Test Matrix

Contaminant	Number of Tests	Sampling Location	Sampling Duration/Gas Volume	Sampling Frequency	Sampling Method	Analytical Method
Particulate, Metals	3	Main Stack	240 minutes / >4m^3	Integrated	Modified US EPA Method 29	Gravimetric (MECP Method 5) ICAP, HGAA, CVAA
Semi-Volatile Organics	3	Main Stack	240 minutes / >4m^3	Integrated	EPS 1/RM/2	Modified EPS 1/RM/2 Modified EPS 1/RM/3* EPS 1/RM/23 US EPA Method 23 High and Low Res. GC/MS
Acid Gas	3	Main Stack	60 minutes /~0.12 m^3	Continuous	Modified US EPA Method 26	Modified US EPA Method 26, APHA 4500CN
Volatile Organics	3	Main Stack	3 pair @ 20 minutes / ~0.02 m^3	Continuous	US EPA SW-846 Method 0030	US EPA SW-846 Method 5040 US EPA SW-846 Method 8260
Carbon Dioxide	3	Breaching	Continuous	1 minute	US EPA Method 3A	CEM
Carbon Monoxide	3	Breaching	Continuous	1 minute	US EPA Method 10	CEM
Nitrogen Oxides	3	Breaching	Continuous	1 minute	US EPA Method 7E	CEM
Oxygen	3	Breaching	Continuous	1 minute	US EPA Method 3A	CEM
Sulfur Dioxide	3	Breaching	Continuous	1 minute	US EPA Method 6C	CEM
Total Hydrocarbons	3	Breaching	Continuous	1 minute	US EPA Method 25A	CEM (as CH_4)
Feed Samples and Baghouse Dust	3	Various	NA	Grab Sample	NA	ASTM D-808, D-240 (mod) D-1744, D-2983 (mod), D-70 (mod), D-1552, D-3176 (mod), HRGC/LRMS, HRGC/HRMS ICP/FAA, CVAA.

* Includes Environment Canada methodology for PAHs, CPs and CBs from the NITEP/Mid Connecticut combustion procedures
CEM: Continuous Emission Monitor

TABLE 10
Clean Harbors Sarnia
Isokinetic Sampling Trains and Acid Gases Train Test Schedules

Particulate and Metals Trains

Test Number	Test Date	Sampling Period		Sampling Time* min
		Start	Finish	
1	November 8, 2022	9:57	14:54	240
2	November 9, 2022	8:32	13:05	240
3	November 10, 2022	8:35	13:07	240

Semi-Volatile Organics Trains

Test Number	Test Date	Sampling Period		Sampling Time* min
		Start	Finish	
1	November 8, 2022	9:57	14:54	240
2	November 9, 2022	8:32	13:05	240
3	November 10, 2022	8:35	13:07	240

Acid Gases Trains

Test Number	Test Date	Sampling Period		Sampling Time* min
		Start	Finish	
1	November 8, 2022	13:04	14:04	60
2	November 9, 2022	8:34	9:34	60
3	November 10, 2022	8:36	9:36	60

* Actual sampling time excluding leak-checks and traverse changes.

TABLE 11
Clean Harbors Sarnia
Combustion Gases Train Test Schedule

Test Number	Test Date	Sampling Period *		Sampling Time min
		Start	Finish	
1	November 8, 2022	9:57	14:54	242
2	November 9, 2022	8:38	13:05	236
3	November 10, 2022	8:40	13:07	237

* Covers the sampling periods for the isokinetic sampling trains

TABLE 12
Clean Harbors Sarnia
Volatile Organics Train Test Schedule

Test Number	Tube Pair	Test Date	Sampling Period Start	Sampling Period Finish	Sampling Time min
1	1	November 8, 2022	9:57	10:17	20
1	2	November 8, 2022	10:28	10:48	20
1	3	November 8, 2022	11:00	11:20	20
2	1	November 9, 2022	10:06	10:26	20
2	2	November 9, 2022	11:05	11:25	20
2	3	November 9, 2022	11:36	11:56	20
2	4	November 9, 2022	12:07	12:27	20
3	1	November 10, 2022	11:07	11:27	20
3	2	November 10, 2022	11:36	11:56	20
3	3	November 10, 2022	12:05	12:25	20

TABLE 13
Clean Harbors Sarnia
Stack Gas Sampling Parameters

Particulate and Metals Trains

Test No.	Pitot Tube Coefficient	Dry Gas Meter Factor	Nozzle Diameter mm	Gas Volume Sampled Rm³ *	Percentage of Isokineticity %
1	0.847	1.010	6.37	4.625	99.7
2	0.847	1.010	6.37	4.679	97.6
3	0.847	1.010	6.37	4.372	96.7

Semi-Volatile Organics Trains

Test No.	Pitot Tube Coefficient	Dry Gas Meter Factor	Nozzle Diameter mm	Gas Volume Sampled Rm³ *	Percentage of Isokineticity %
1	0.843	0.973	6.33	4.564	100.5
2	0.843	0.973	6.33	4.659	99.4
3	0.843	0.973	6.33	4.395	97.2

* Dry at 25°C and 1 atmosphere

TABLE 14
Clean Harbors Sarnia
Stack Gas Physical Parameters

Particulate and Metals Trains

Test No.	Gas Temp. °C	Moisture by Volume %	Gas Velocity m/s	Absolute Pressure kPa	Carbon Dioxide by Volume % *	Oxygen by Volume % *
1	192	47.4	29.8	102.0	7.80	9.70
2	192	46.8	30.6	101.2	7.56	9.94
3	187	46.3	28.7	99.9	7.82	10.36
Average	190	46.8	29.7	101.0	7.73	10.00

Semi-Volatile Organics Trains

Test No.	Gas Temp. °C	Moisture by Volume %	Gas Velocity m/s	Absolute Pressure kPa	Carbon Dioxide by Volume % *	Oxygen by Volume % *
1	194	47.4	29.7	102.0	7.80	9.70
2	193	47.2	30.7	101.2	7.56	9.94
3	187	46.2	29.0	99.9	7.82	10.36
Average	191	46.9	29.8	101.0	7.73	10.00

Averaged Metals and Semi-Volatile Organics Trains

Test No.	Gas Temp. °C	Moisture by Volume %	Gas Velocity m/s	Absolute Pressure kPa	Carbon Dioxide by Volume % *	Oxygen by Volume % *
1	193	47.4	29.8	102.0	7.80	9.70
2	192	47.0	30.7	101.2	7.56	9.94
3	187	46.3	28.9	99.9	7.82	10.36
Average	191	46.9	29.8	101.0	7.73	10.00
Coefficient of Variation, %	1.7	1.2	3.0	1.0	1.9	3.3

* Dry basis

TABLE 15
Clean Harbors Sarnia
Stack Gas Volumetric Flowrates

Particulate and Metals Trains

Test No.	Actual Flowrate m^3/s	Dry Reference Flowrate Rm^3/s *	Dry Adjusted Flowrate Rm^3/s **	Wet Reference Flowrate Rm^3/s*
1	50.8	17.2	19.5	32.8
2	52.2	17.8	19.7	33.4
3	48.9	16.8	17.9	31.3
Average	50.6	17.3	19.0	32.5

Semi-Volatile Organics Trains

Test No.	Actual Flowrate m^3/s	Dry Reference Flowrate Rm^3/s *	Dry Adjusted Flowrate Rm^3/s **	Wet Reference Flowrate Rm^3/s*
1	50.6	17.1	19.3	32.6
2	52.3	17.6	19.5	33.4
3	49.5	17.0	18.1	31.6
Average	50.8	17.3	19.0	32.5

Averaged Metals and Semi-Volatile Organics Trains

Test No.	Actual Flowrate m^3/s	Dry Reference Flowrate Rm^3/s *	Dry Adjusted Flowrate Rm^3/s **	Wet Reference Flowrate Rm^3/s*
1	50.7	17.2	19.4	32.7
2	52.3	17.7	19.6	33.4
3	49.2	16.9	18.0	31.5
Average	50.7	17.3	19.0	32.5
Coefficient of Variation, %	3.0	2.4	4.7	3.1

* At 25°C and 1 atmosphere

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

TABLE 16
Clean Harbors Sarnia
Particulate Emission Data

Test No.	Particulate Collected Probe Rinse mg	Particulate Collected Main Filter mg	Particulate Collected Total mg	Dry Gas Volume Sampled Rm^3*	Particulate Concentration Actual mg/m^3	Particulate Concentration Dry Reference mg/Rm^3*	Particulate Concentration Dry Adjusted mg/Rm^3**	Particulate Concentration Wet Reference mg/Rm^3*	Particulate Emission Rate g/s
1	1.1	0.1	1.2	4.625	0.088	0.26	0.23	0.14	0.0045
2	0.9	0.2	1.1	4.679	0.080	0.24	0.21	0.13	0.0042
3	1.6	<0.1	<1.7	4.372	<0.13	<0.39	<0.37	<0.21	<0.0065
Average					<0.10	<0.29	<0.27	<0.16	<0.0051
Coefficient of Variation, %					28.5	28.2	31.2	28.9	25.2

* At 25 °C and 1 atmosphere

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

TABLE 17
Clean Harbors Sarnia
Acid Gas Emission Data

Hydrogen Chloride

	HCl	Dry Volume	Hydrogen Chloride Concentration				HCl
Test	Collected	Sampled	Actual	Dry Reference	Dry Adjusted	Wet Reference	Emission Rate
No.	mg	Rm^3*	mg/m^3	mg/Rm^3*	mg/Rm^3**	mg/Rm^3*	g/s
1	4.41	0.1230	12.1	35.9	31.7	18.8	0.62
2	1.02	0.1265	2.73	8.06	7.28	4.27	0.14
3	0.104	0.1235	0.29	0.84	0.79	0.45	0.014
Average			5.05	14.9	13.3	7.86	0.26

Hydrogen Fluoride

	HF	Dry Volume	Hydrogen Fluoride Concentration				HF
Test	Collected	Sampled	Actual	Dry Reference	Dry Adjusted	Wet Reference	Emission Rate
No.	mg	Rm^3*	mg/m^3	mg/Rm^3*	mg/Rm^3**	mg/Rm^3*	g/s
1	6.74	0.1230	18.5	54.8	48.4	28.8	0.94
2	4.24	0.1265	11.4	33.5	30.3	17.8	0.59
3	0.0730	0.1235	0.20	0.59	0.56	0.32	0.010
Average			10.0	29.6	26.4	15.6	0.51

Hydrogen Bromide

	HBr	Dry Volume	Hydrogen Bromide Concentration				HBr
Test	Collected	Sampled	Actual	Dry Reference	Dry Adjusted	Wet Reference	Emission Rate
No.	mg	Rm^3*	mg/m^3	mg/Rm^3*	mg/Rm^3**	mg/Rm^3*	g/s
1	<0.244	0.1230	<0.67	<1.98	<1.75	<1.04	<0.034
2	<0.241	0.1265	<0.65	<1.91	<1.72	<1.01	<0.034
3	<0.237	0.1235	<0.66	<1.92	<1.80	<1.03	<0.032
Average			<0.66	<1.94	<1.76	<1.03	<0.033

Hydrogen Iodide

	HI	Dry Volume	Hydrogen Iodide Concentration				HI
Test	Collected	Sampled	Actual	Dry Reference	Dry Adjusted	Wet Reference	Emission Rate
No.	mg	Rm^3*	mg/m^3	mg/Rm^3*	mg/Rm^3**	mg/Rm^3*	g/s
1	0.275	0.1230	0.76	2.24	1.98	1.18	0.038
2	0.168	0.1265	0.45	1.33	1.20	0.70	0.024
3	<0.0709	0.1235	<0.20	<0.57	<0.54	<0.31	<0.0097
Average			<0.47	<1.38	<1.24	<0.73	<0.024

Hydrogen Cyanide

	HCN	Dry Volume	Hydrogen Cyanide Concentration				HCN
Test	Collected	Sampled	Actual	Dry Reference	Dry Adjusted	Wet Reference	Emission Rate
No.	µg	Rm^3*	mg/m^3	mg/Rm^3*	mg/Rm^3**	mg/Rm^3*	g/s
1	<0.21	0.1230	<0.00057	<0.0017	<0.0015	<0.00089	<0.000029
2	0.086	0.1265	0.00023	0.00068	0.00062	0.00036	0.000012
3	<0.21	0.1235	<0.00058	<0.0017	<0.0016	<0.00090	<0.000028
Average			<0.00046	<0.0014	<0.0012	<0.00072	<0.000023

* 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 except for hydrogen cyanide.
"<" 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 18
Clean Harbors Sarnia
Halide Blank and Test Analyses Comparison

Hydrogen Chloride

Method Blank Analysis mg	Reagent Blank Analysis mg	Average Analysis of Test No. 1 to No. 3 mg
<0.00241	<0.0733	1.84

Hydrogen Fluoride

Method Blank Analysis mg	Reagent Blank Analysis mg	Average Analysis of Test No. 1 to No. 3 mg
<0.00165	<0.0500	4.68

Hydrogen Bromide

Method Blank Analysis mg	Reagent Blank Analysis mg	Average Analysis of Test No. 1 to No. 3 mg
<0.00791	<0.241	<0.241

Hydrogen Iodide

Method Blank Analysis mg	Reagent Blank Analysis mg	Average Analysis of Test No. 1 to No. 3 mg
<0.00236	<0.0718	<0.171

Hydrogen Cyanide

Method Blank Analysis µg	Reagent Blank Analysis µg	Average Analysis of Test No. 1 to No. 3 µg
<0.020	<0.20	<0.17

Note: "<" indicates that the analyte was not detected (was less than the analytical detection limit).

TABLE 19
Clean Harbors Sarnia
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	7.80	33.9	101	97.7	9.70	18.1	3.0
2	7.56	69.6	103	99.2	9.94	1.1	6.9
3	7.82	64.9	93.4	89.8	10.36	0.8	7.6
Average	7.73	56.1	98.9	95.6	10.00	6.7	5.8

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	6.89	30.0	88.8	86.4	-	16.0	5.0
2	6.83	62.9	92.9	89.6	-	1.0	11.8
3	7.35	61.0	87.7	84.3	-	0.8	13.3
Average	7.02	51.3	89.8	86.8	-	5.9	10.0

* Nitric oxide and nitrogen dioxide

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

TABLE 20
Clean Harbors Sarnia
Combustion Gas Emission Data

Test No.	Combustion Gas	Dry Actual Concentration	Dry Adjusted Concentration	Dry Concentration by Weight		Wet Concentration by Weight		Emission Rate
				Reference**	Adjusted ***	Actual	Reference**	
		ppm	ppm	mg/Rm^3	mg/Rm^3	mg/m^3	mg/Rm^3	g/s
1	Carbon Dioxide	78000	68961	140276	124020	47483	73736	2408
	Carbon Monoxide	33.9	30.0	38.8	34.3	13.1	20.4	0.67
	Nitrogen Oxides ****	101	88.9	189	167	64.0	99.3	3.24
	Nitric Oxide	97.7	86.4	120	106	40.6	63.0	2.06
	Oxygen	97000	110000	126870	143873	42945	66689	2178
	Sulphur Dioxide	18.1	16.0	47.3	41.9	16.0	24.9	0.81
	Total Hydrocarbons	3.0 *	5.0	3.73	3.30	1.26	1.96	0.064
2	Carbon Dioxide	75600	68277	135960	122790	46083	72069	2409
	Carbon Monoxide	69.6	62.9	79.7	71.9	27.0	42.2	1.41
	Nitrogen Oxides ****	103	92.9	193	175	65.6	103	3.43
	Nitric Oxide	99.2	89.6	122	110	41.2	64.5	2.15
	Oxygen	99400	110000	130009	143873	44066	68914	2303
	Sulphur Dioxide	1.1	1.0	2.88	2.60	0.98	1.53	0.051
	Total Hydrocarbons	6.9 *	11.8	8.51	7.69	2.89	4.51	0.15
3	Carbon Dioxide	78200	73440	140636	132076	48284	75550	2376
	Carbon Monoxide	64.9	60.9	74.3	69.8	25.5	39.9	1.25
	Nitrogen Oxides ****	93.4	87.7	176	165	60.3	94.3	2.97
	Nitric Oxide	89.8	84.3	110	103	37.8	59.2	1.86
	Oxygen	103600	110000	135502	143873	46521	72792	2289
	Sulphur Dioxide	0.8	0.8	2.09	1.97	0.72	1.12	0.035
	Total Hydrocarbons	7.6 *	13.3	9.25	8.69	3.18	4.97	0.16

* 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 21
Clean Harbors Sarnia
Summary of Combustion Gas Emission Data

Combustion Gas		Actual Concentration			Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	mg/m^3	mg/m^3	mg/m^3	mg/m^3	%
Carbon Dioxide	47483	46083	48284	47283	2.4
Carbon Monoxide	13.1	27.0	25.5	21.9	34.8
Nitrogen Oxides ***	64.0	65.6	60.3	63.3	4.3
Nitric Oxide	40.6	41.2	37.8	39.9	4.5
Oxygen	42945	44066	46521	44511	4.1
Sulphur Dioxide	16.0	0.98	0.72	5.91	148
Total Hydrocarbons	1.26	2.89	3.18	2.44	42.2

Combustion Gas		Dry Reference Concentration			Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	mg/Rm^3*	mg/Rm^3*	mg/Rm^3*	mg/Rm^3*	%
Carbon Dioxide	140276	135960	140636	138957	1.9
Carbon Monoxide	38.8	79.7	74.3	64.2	34.6
Nitrogen Oxides ***	189	193	176	186	5.0
Nitric Oxide	120	122	110	117	5.3
Oxygen	126870	130009	135502	130794	3.3
Sulphur Dioxide	47.3	2.88	2.09	17.4	149
Total Hydrocarbons	3.73	8.51	9.25	7.17	41.8

Combustion Gas		Dry Adjusted Concentration			Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	mg/Rm^3**	mg/Rm^3**	mg/Rm^3**	mg/Rm^3**	%
Carbon Dioxide	124020	122790	132076	126295	4.0
Carbon Monoxide	34.3	71.9	69.8	58.7	36.0
Nitrogen Oxides ***	167	175	165	169	3.1
Nitric Oxide	106	110	103	106	3.1
Oxygen	143873	143873	143873	143873	-
Sulphur Dioxide	41.9	2.60	1.97	15.5	148
Total Hydrocarbons	3.30	7.69	8.69	6.56	43.7

Combustion Gas		Emission Rate			Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	g/s	g/s	g/s	g/s	%
Carbon Dioxide	2408	2409	2376	2397	0.8
Carbon Monoxide	0.67	1.41	1.25	1.11	35.4
Nitrogen Oxides ***	3.24	3.43	2.97	3.21	7.2
Nitric Oxide	2.06	2.15	1.86	2.02	7.4
Oxygen	2178	2303	2289	2257	3.0
Sulphur Dioxide	0.81	0.051	0.035	0.30	148
Total Hydrocarbons	0.064	0.15	0.16	0.12	41.8

* Dry at 25°C and 1 atmosphere.

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

*** Nitrogen oxides are expressed as the equivalent amount of nitrogen dioxide.

TABLE 22
Clean Harbors Sarnia
Metal Analyses, Test No. 1

Metal	Probe & Filter Nitric Acid Digest µg	Probe & Filter Hydrofluoric Acid Digest µg	Impingers & Rinses µg	Total Collected µg
Aluminum *	<20	139	1710	1710
Antimony	0.58	0.32	<0.1	0.89
Arsenic	<1	<1	0.41	0.41
Barium	<5	13.9	7.71	21.6
Beryllium	<0.2	<0.2	<0.1	<0.10
Boron *	<30	<30	12800	12800
Cadmium	0.11	<0.1	0.11	0.22
Calcium *	<500	<500	3380	3380
Chromium	4.46	3.75	14.5	22.7
Cobalt	<0.2	<0.2	1.17	1.17
Copper	3.50	4.76	3.36	11.6
Iron	<200	<200	634	634
Lead	0.62	<0.5	2.01	2.63
Lithium	<0.5	<0.5	4.72	4.72
Magnesium *	14.6	44.6	133	148
Manganese	6.47	2.47	6.61	15.6
Mercury **	0.017	<0.015	7.38	7.40
Molybdenum	0.30	35.4	0.14	35.8
Nickel	4.52	1.82	8.38	14.7
Phosphorus	<100	<100	<25	<100
Potassium	114	<100	317	431
Selenium	3.08	<2	89.6	92.7
Silicon *	282	-	42800	43082
Silver	<0.2	<0.2	0.14	0.14
Sodium *	376	69.0	7470	7846
Strontium	0.60	0.83	5.84	7.28
Sulphur	<10000	<10000	140000	140000
Tin	7.38	2.66	24.4	34.4
Titanium	<10	<10	22.1	22.1
Vanadium	<1	<1	0.63	0.63
Zinc	8.80	<6	17.9	26.7
Total				<210454

* Hydrofluoric acid digest not included in the total.

** Includes the permanganate impingers

Note: "<" indicates that the analyte was not detected (was less than the analytical detection limit, "<MDL"). Where all values were reported below the detection limit for a given metal, the value of the detection limit for the fraction most likely to contain that metal was used to calculate emission data, the remaining fractions were assigned a value of zero. In instances where only one fraction was below the detection limit, that fraction was assigned a value of zero to calculate emission data.

TABLE 23
Clean Harbors Sarnia
Metal Analyses, Test No. 2

Metal	Probe & Filter Nitric Acid Digest µg	Probe & Filter Hydrofluoric Acid Digest µg	Impingers & Rinses µg	Total Collected µg
Aluminum *	<20	133	825	825
Antimony	0.26	<0.2	<0.1	0.26
Arsenic	<1	<1	<0.2	<0.20
Barium	<0.5	<5	1.76	1.76
Beryllium	<0.2	<0.2	<0.1	<0.10
Boron *	<30	<30	9130	9130
Cadmium	<0.1	0.32	0.091	0.41
Calcium *	<500	<500	<100	<100
Chromium	5.60	5.40	10.9	21.9
Cobalt	0.32	<0.2	0.25	0.57
Copper	2.87	4.88	<0.3	7.75
Iron	<200	<200	71.1	71.1
Lead	<0.5	<0.5	4.70	4.70
Lithium	<0.5	<0.5	5.01	5.01
Magnesium *	11.0	43.7	36.6	47.6
Manganese	7.75	3.04	4.37	15.2
Mercury **	<0.015	<0.015	21.1	21.1
Molybdenum	0.25	34.6	<0.1	34.8
Nickel	14.7	3.62	6.66	25.0
Phosphorus	<100	<100	<25	<100
Potassium	<100	<100	131	131
Selenium	2.65	<2	14.6	17.3
Silicon *	<150	-	9210	9210
Silver	<0.2	<0.2	<0.1	<0.10
Sodium *	351	78.8	1870	2221
Strontium	0.44	0.63	0.99	2.06
Sulphur	<10000	<10000	3350	3350
Tin	6.43	2.60	22.1	31.1
Titanium	<10	<10	5.41	5.41
Vanadium	<1	<1	0.42	0.42
Zinc	9.52	<6	6.14	15.7
Total				<25396

* Hydrofluoric acid digest not included in the total.

** Includes the permanganate impingers

Note: "<" indicates that the analyte was not detected (was less than the analytical detection limit, "<MDL"). Where all values were reported below the detection limit for a given metal, the value of the detection limit for the fraction most likely to contain that metal was used to calculate emission data, the remaining fractions were assigned a value of zero. In instances where only one fraction was below the detection limit, that fraction was assigned a value of zero to calculate emission data.

TABLE 24
Clean Harbors Sarnia
Metal Analyses, Test No. 3

Metal	Probe & Filter Nitric Acid Digest µg	Probe & Filter Hydrofluoric Acid Digest µg	Impingers & Rinses µg	Total Collected µg
Aluminum *	23.7	140	38.2	61.9
Antimony	0.27	<0.2	<0.1	0.27
Arsenic	<1	<1	0.21	0.21
Barium	<5	<5	1.20	1.20
Beryllium	<0.2	<0.2	<0.1	<0.10
Boron *	<30	<30	2050	2050
Cadmium	<0.1	<0.1	0.22	0.22
Calcium *	<500	<500	<100	<100
Chromium	2.86	3.72	5.00	11.6
Cobalt	<0.2	<0.2	0.21	0.21
Copper	4.71	4.88	<0.3	9.59
Iron	<200	<200	33.2	33.2
Lead	<0.5	<0.5	1.55	1.55
Lithium	<0.5	<0.5	3.33	3.33
Magnesium *	15.4	44.9	22.3	37.7
Manganese	11.9	3.16	6.88	21.9
Mercury **	0.32	<0.015	68.7	69.0
Molybdenum	<0.2	34.4	0.16	34.6
Nickel	2.56	1.70	2.78	7.04
Phosphorus	<100	<100	<25	<100
Potassium	173	<100	<100	173
Selenium	2.98	<2	3.20	6.18
Silicon *	<150	-	476	476
Silver	<0.2	<0.2	0.13	0.13
Sodium *	422	85.9	267	689
Strontium	0.52	0.64	0.34	1.49
Sulphur	<10000	<10000	<3000	<3000
Tin	5.98	2.49	16.4	24.9
Titanium	<10	<10	<1	<1.00
Vanadium	<1	<1	0.40	0.40
Zinc	13.3	<6	5.56	18.9
Total				<6935

* Hydrofluoric acid digest not included in the total.

** Includes the permanganate impingers

Note: "<" indicates that the analyte was not detected (was less than the analytical detection limit, "<MDL"). Where all values were reported below the detection limit for a given metal, the value of the detection limit for the fraction most likely to contain that metal was used to calculate emission data, the remaining fractions were assigned a value of zero. In instances where only one fraction was below the detection limit, that fraction was assigned a value of zero to calculate emission data.

TABLE 25
Clean Harbors Sarnia
Metal Emission Data, Test No. 1

Metal	Total Collected µg	Actual Concentration µg/m^3	Dry Reference Concentration µg/Rm^3*	Dry Adjusted Concentration µg/Rm^3**	Wet Reference Concentration µg/Rm^3*	Emission Rate mg/s
Aluminum	1710	125	370	326	194	6.36
Antimony	0.89	0.065	0.19	0.17	0.10	0.0033
Arsenic	0.41	0.030	0.089	0.079	0.047	0.0015
Barium	21.6	1.58	4.67	4.12	2.45	0.080
Beryllium	<0.10	<0.0073	<0.022	<0.019	<0.011	<0.00037
Boron	12800	937	2768	2441	1451	47.6
Cadmium	0.22	0.016	0.048	0.042	0.025	0.00082
Calcium	3380	247	731	645	383	12.6
Chromium	22.7	1.66	4.91	4.33	2.57	0.084
Cobalt	1.17	0.086	0.25	0.22	0.13	0.0044
Copper	11.6	0.85	2.51	2.22	1.32	0.043
Iron	634	46.4	137	121	71.9	2.36
Lead	2.63	0.19	0.57	0.50	0.30	0.0098
Lithium	4.72	0.35	1.02	0.90	0.54	0.018
Magnesium	148	10.8	31.9	28.1	16.7	0.55
Manganese	15.6	1.14	3.36	2.97	1.76	0.058
Mercury	7.40	0.54	1.60	1.41	0.84	0.028
Molybdenum	35.8	2.62	7.75	6.84	4.06	0.13
Nickel	14.7	1.08	3.18	2.81	1.67	0.055
Phosphorus	<100	<7.32	<21.6	<19.1	<11.3	<0.37
Potassium	431	31.6	93.2	82.2	48.9	1.60
Selenium	92.7	6.78	20.0	17.7	10.5	0.34
Silicon	43082	3154	9315	8216	4885	160
Silver	0.14	0.010	0.030	0.026	0.016	0.00051
Sodium	7846	574	1696	1496	890	29.2
Strontium	7.28	0.53	1.57	1.39	0.83	0.027
Sulphur	140000	10249	30270	26700	15873	521
Tin	34.4	2.52	7.45	6.57	3.90	0.13
Titanium	22.1	1.62	4.78	4.21	2.51	0.082
Vanadium	0.63	0.046	0.14	0.12	0.072	0.0024
Zinc	26.7	1.95	5.77	5.09	3.03	0.099
Total	<210454	<15407	<45504	<40137	<23862	<783

Dry Gas Volume Sampled (Rm^3*) :	4.625
Actual Flowrate (m^3/s) :	50.8
Dry Reference Flowrate (Rm^3/s*) :	17.2
Dry Adjusted Flowrate (Rm^3/s**) :	19.5
Wet Reference Flowrate (Rm^3/s*) :	32.8

* At 25°C and 1 atmosphere

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

TABLE 26
Clean Harbors Sarnia
Metal Emission Data, Test No. 2

Metal	Total Collected µg	Actual Concentration µg/m³	Dry Reference Concentration µg/Rm³*	Dry Adjusted Concentration µg/Rm³**	Wet Reference Concentration µg/Rm³*	Emission Rate mg/s
Aluminum	825	60.1	176	159	94.0	3.14
Antimony	0.26	0.019	0.056	0.050	0.030	0.00099
Arsenic	<0.20	<0.015	<0.043	<0.039	<0.023	<0.00076
Barium	1.76	0.13	0.38	0.34	0.20	0.0067
Beryllium	<0.10	<0.0073	<0.021	<0.019	<0.011	<0.00038
Boron	9130	665	1951	1763	1040	34.7
Cadmium	0.41	0.030	0.087	0.078	0.046	0.0015
Calcium	<100	<7.29	<21.4	<19.3	<11.4	<0.38
Chromium	21.9	1.60	4.68	4.23	2.49	0.083
Cobalt	0.57	0.042	0.12	0.11	0.065	0.0022
Copper	7.75	0.56	1.66	1.50	0.88	0.029
Iron	71.1	5.18	15.2	13.7	8.10	0.27
Lead	4.70	0.34	1.00	0.91	0.54	0.018
Lithium	5.01	0.37	1.07	0.97	0.57	0.019
Magnesium	47.6	3.47	10.2	9.19	5.42	0.18
Manganese	15.2	1.10	3.24	2.93	1.73	0.058
Mercury	21.1	1.54	4.50	4.07	2.40	0.080
Molybdenum	34.8	2.54	7.45	6.73	3.97	0.13
Nickel	25.0	1.82	5.34	4.82	2.85	0.095
Phosphorus	<100	<7.29	<21.4	<19.3	<11.4	<0.38
Potassium	131	9.55	28.0	25.3	14.9	0.50
Selenium	17.3	1.26	3.69	3.33	1.96	0.066
Silicon	9210	671	1968	1779	1049	35.0
Silver	<0.10	<0.0073	<0.021	<0.019	<0.011	<0.00038
Sodium	2221	162	475	429	253	8.45
Strontium	2.06	0.15	0.44	0.40	0.23	0.0078
Sulphur	3350	244	716	647	382	12.7
Tin	31.1	2.27	6.65	6.01	3.55	0.12
Titanium	5.41	0.39	1.16	1.04	0.62	0.021
Vanadium	0.42	0.030	0.089	0.080	0.047	0.0016
Zinc	15.7	1.14	3.35	3.02	1.78	0.060
Total	<25396	<1851	<5428	<4904	<2893	<96.6

Dry Gas Volume Sampled (Rm³*) :	4.679
Actual Flowrate (m³/s) :	52.2
Dry Reference Flowrate (Rm³/s*) :	17.8
Dry Adjusted Flowrate (Rm³/s**) :	19.7
Wet Reference Flowrate (Rm³/s*) :	33.4

* At 25°C and 1 atmosphere

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

TABLE 27
Clean Harbors Sarnia
Metal Emission Data, Test No. 3

Metal	Total Collected µg	Actual Concentration µg/m^3	Dry Reference Concentration µg/Rm^3*	Dry Adjusted Concentration µg/Rm^3**	Wet Reference Concentration µg/Rm^3*	Emission Rate mg/s
Aluminum	61.9	4.86	14.2	13.3	7.60	0.24
Antimony	0.27	0.021	0.061	0.057	0.033	0.0010
Arsenic	0.21	0.016	0.048	0.045	0.026	0.00080
Barium	1.20	0.094	0.27	0.26	0.15	0.0046
Beryllium	<0.10	<0.0079	<0.023	<0.021	<0.012	<0.00038
Boron	2050	161	469	440	252	7.88
Cadmium	0.22	0.017	0.050	0.047	0.027	0.00084
Calcium	<100	<7.86	<22.9	<21.5	<12.3	<0.38
Chromium	11.6	0.91	2.65	2.49	1.42	0.044
Cobalt	0.21	0.016	0.048	0.045	0.026	0.00080
Copper	9.59	0.75	2.19	2.06	1.18	0.037
Iron	33.2	2.61	7.59	7.13	4.08	0.13
Lead	1.55	0.12	0.35	0.33	0.19	0.0060
Lithium	3.33	0.26	0.76	0.71	0.41	0.013
Magnesium	37.7	2.96	8.62	8.09	4.63	0.14
Manganese	21.9	1.72	5.02	4.71	2.69	0.084
Mercury	69.0	5.42	15.8	14.8	8.47	0.27
Molybdenum	34.6	2.72	7.91	7.42	4.24	0.13
Nickel	7.04	0.55	1.61	1.51	0.86	0.027
Phosphorus	<100	<7.86	<22.9	<21.5	<12.3	<0.38
Potassium	173	13.6	39.6	37.1	21.2	0.66
Selenium	6.18	0.49	1.41	1.33	0.76	0.024
Silicon	476	37.4	109	102	58.4	1.83
Silver	0.13	0.010	0.029	0.027	0.016	0.00049
Sodium	689	54.1	158	148	84.6	2.65
Strontium	1.49	0.12	0.34	0.32	0.18	0.0057
Sulphur	<3000	<236	<686	<644	<368	<11.5
Tin	24.9	1.95	5.69	5.34	3.05	0.096
Titanium	<1.00	<0.079	<0.23	<0.21	<0.12	<0.0038
Vanadium	0.40	0.032	0.092	0.087	0.050	0.0016
Zinc	18.9	1.48	4.31	4.05	2.32	0.072
Total	<6935	<545	<1586	<1489	<851	<26.6

Dry Gas Volume Sampled (Rm^3*) :	4.372
Actual Flowrate (m^3/s) :	48.9
Dry Reference Flowrate (Rm^3/s*) :	16.8
Dry Adjusted Flowrate (Rm^3/s**) :	17.9
Wet Reference Flowrate (Rm^3/s*) :	31.3

* At 25°C and 1 atmosphere

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

TABLE 28
Clean Harbors Sarnia
Summary of Metal Actual Concentrations

Metal	Actual Concentration Test No. 1 µg/m³	Test No. 2 µg/m³	Test No. 3 µg/m³	Average µg/m³	Coefficient of Variation %
Aluminum	125	60.1	4.86	63.4	95.0
Antimony	0.065	0.019	0.021	0.035	74.7
Arsenic	0.030	<0.015	0.016	<0.020	42.1
Barium	1.58	0.13	0.094	0.60	141
Beryllium	<0.0073	<0.0073	<0.0079	<0.0075	4.3
Boron	937	665	161	588	67.0
Cadmium	0.016	0.030	0.017	0.021	35.5
Calcium	247	<7.29	<7.86	<87.5	158
Chromium	1.66	1.60	0.91	1.39	30.0
Cobalt	0.086	0.042	0.016	0.048	73.3
Copper	0.85	0.56	0.75	0.72	20.1
Iron	46.4	5.18	2.61	18.1	136
Lead	0.19	0.34	0.12	0.22	51.5
Lithium	0.35	0.37	0.26	0.32	17.0
Magnesium	10.8	3.47	2.96	5.75	76.4
Manganese	1.14	1.10	1.72	1.32	26.3
Mercury	0.54	1.54	5.42	2.50	103
Molybdenum	2.62	2.54	2.72	2.63	3.4
Nickel	1.08	1.82	0.55	1.15	55.4
Phosphorus	<7.32	<7.29	<7.86	<7.49	4.3
Potassium	31.6	9.55	13.6	18.2	64.2
Selenium	6.78	1.26	0.49	2.84	121
Silicon	3154	671	37.4	1288	128
Silver	0.010	<0.0073	0.010	<0.0091	17.4
Sodium	574	162	54.1	263	104
Strontium	0.53	0.15	0.12	0.27	86.6
Sulphur	10249	244	<236	<3576	162
Tin	2.52	2.27	1.95	2.25	12.6
Titanium	1.62	0.39	<0.079	<0.70	117
Vanadium	0.046	0.030	0.032	0.036	24.6
Zinc	1.95	1.14	1.48	1.53	26.8
Total	<15407	<1851	<545	<5934	139

TABLE 29
Clean Harbors Sarnia
Summary of Metal Dry Reference Concentrations

Metal	Dry Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	µg/Rm³*	µg/Rm³*	µg/Rm³*	µg/Rm³*	%
Aluminum	370	176	14.2	187	95.3
Antimony	0.19	0.056	0.061	0.10	75.4
Arsenic	0.089	<0.043	0.048	<0.060	42.8
Barium	4.67	0.38	0.27	1.77	141
Beryllium	<0.022	<0.021	<0.023	<0.022	3.7
Boron	2768	1951	469	1729	67.4
Cadmium	0.048	0.087	0.050	0.062	35.5
Calcium	731	<21.4	<22.9	<258	158
Chromium	4.91	4.68	2.65	4.08	30.5
Cobalt	0.25	0.12	0.048	0.14	73.8
Copper	2.51	1.66	2.19	2.12	20.4
Iron	137	15.2	7.59	53.3	136
Lead	0.57	1.00	0.35	0.64	51.5
Lithium	1.02	1.07	0.76	0.95	17.4
Magnesium	31.9	10.2	8.62	16.9	77.0
Manganese	3.36	3.24	5.02	3.87	25.6
Mercury	1.60	4.50	15.8	7.30	103
Molybdenum	7.75	7.45	7.91	7.70	3.0
Nickel	3.18	5.34	1.61	3.38	55.4
Phosphorus	<21.6	<21.4	<22.9	<22.0	3.7
Potassium	93.2	28.0	39.6	53.6	64.9
Selenium	20.0	3.69	1.41	8.38	121
Silicon	9315	1968	109	3797	128
Silver	0.030	<0.021	0.029	<0.027	17.5
Sodium	1696	475	158	776	105
Strontium	1.57	0.44	0.34	0.78	87.2
Sulphur	30270	716	<686	<10557	162
Tin	7.45	6.65	5.69	6.60	13.3
Titanium	4.78	1.16	<0.23	<2.05	117
Vanadium	0.14	0.089	0.092	0.11	25.3
Zinc	5.77	3.35	4.31	4.48	27.3
Total	<45504	<5428	<1586	<17506	139

* At 25°C and 1 atmosphere

TABLE 30
Clean Harbors Sarnia
Summary of Metal Dry Adjusted Concentrations

Metal	Dry Adjusted Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	µg/Rm^3*	µg/Rm^3*	µg/Rm^3*	µg/Rm^3*	%
Aluminum	326	159	13.3	166	94.2
Antimony	0.17	0.050	0.057	0.093	72.7
Arsenic	0.079	<0.039	0.045	<0.054	40.1
Barium	4.12	0.34	0.26	1.57	140
Beryllium	<0.019	<0.019	<0.021	<0.020	6.6
Boron	2441	1763	440	1548	65.7
Cadmium	0.042	0.078	0.047	0.056	35.2
Calcium	645	<19.3	<21.5	<228	158
Chromium	4.33	4.23	2.49	3.68	28.2
Cobalt	0.22	0.11	0.045	0.13	71.6
Copper	2.22	1.50	2.06	1.92	19.7
Iron	121	13.7	7.13	47.3	135
Lead	0.50	0.91	0.33	0.58	50.9
Lithium	0.90	0.97	0.71	0.86	15.2
Magnesium	28.1	9.19	8.09	15.1	74.5
Manganese	2.97	2.93	4.71	3.53	28.8
Mercury	1.41	4.07	14.8	6.77	105
Molybdenum	6.84	6.73	7.42	6.99	5.3
Nickel	2.81	4.82	1.51	3.05	54.8
Phosphorus	<19.1	<19.3	<21.5	<19.9	6.6
Potassium	82.2	25.3	37.1	48.2	62.3
Selenium	17.7	3.33	1.33	7.44	120
Silicon	8216	1779	102	3366	127
Silver	0.026	<0.019	0.027	<0.024	17.9
Sodium	1496	429	148	691	103
Strontium	1.39	0.40	0.32	0.70	84.8
Sulphur	26700	647	<644	<9330	161
Tin	6.57	6.01	5.34	5.97	10.3
Titanium	4.21	1.04	<0.21	<1.82	116
Vanadium	0.12	0.080	0.087	0.096	22.7
Zinc	5.09	3.02	4.05	4.05	25.5
Total	<40137	<4904	<1489	<15510	138

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

TABLE 31

Clean Harbors Sarnia

Summary of Metal Wet Reference Concentrations

Metal	Wet Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	μg/Rm^{3}*	μg/Rm^{3}*	μg/Rm^{3}*	μg/Rm^{3}*	%
Aluminum	194	94.0	7.60	98.5	94.7
Antimony	0.10	0.030	0.033	0.055	74.2
Arsenic	0.047	<0.023	0.026	<0.032	41.5
Barium	2.45	0.20	0.15	0.93	141
Beryllium	<0.011	<0.011	<0.012	<0.012	4.5
Boron	1451	1040	252	914	66.7
Cadmium	0.025	0.046	0.027	0.033	35.8
Calcium	383	<11.4	<12.3	<136	158
Chromium	2.57	2.49	1.42	2.16	29.8
Cobalt	0.13	0.065	0.026	0.074	72.8
Copper	1.32	0.88	1.18	1.13	19.7
Iron	71.9	8.10	4.08	28.0	136
Lead	0.30	0.54	0.19	0.34	51.7
Lithium	0.54	0.57	0.41	0.50	16.8
Magnesium	16.7	5.42	4.63	8.93	75.9
Manganese	1.76	1.73	2.69	2.06	26.6
Mercury	0.84	2.40	8.47	3.90	103
Molybdenum	4.06	3.97	4.24	4.09	3.4
Nickel	1.67	2.85	0.86	1.79	55.6
Phosphorus	<11.3	<11.4	<12.3	<11.7	4.5
Potassium	48.9	14.9	21.2	28.3	63.7
Selenium	10.5	1.96	0.76	4.41	121
Silicon	4885	1049	58.4	1997	128
Silver	0.016	<0.011	0.016	<0.014	17.2
Sodium	890	253	84.6	409	104
Strontium	0.83	0.23	0.18	0.41	86.1
Sulphur	15873	382	<368	<5541	161
Tin	3.90	3.55	3.05	3.50	12.2
Titanium	2.51	0.62	<0.12	<1.08	116
Vanadium	0.072	0.047	0.050	0.056	24.1
Zinc	3.03	1.78	2.32	2.38	26.3
Total	<23862	<2893	<851	<9202	138

* At 25°C and 1 atmosphere

TABLE 32
Clean Harbors Sarnia
Summary of Metal Emission Rates

Metal	Emission Rate				Coefficient
	Test No. 1 mg/s	Test No. 2 mg/s	Test No. 3 mg/s	Average mg/s	of Variation %
Aluminum	6.36	3.14	0.24	3.25	94.4
Antimony	0.0033	0.00099	0.0010	0.0018	75.1
Arsenic	0.0015	<0.00076	0.00080	<0.0010	42.3
Barium	0.080	0.0067	0.0046	0.031	141
Beryllium	<0.00037	<0.00038	<0.00038	<0.00038	1.7
Boron	47.6	34.7	7.88	30.1	67.4
Cadmium	0.00082	0.0015	0.00084	0.0011	38.5
Calcium	12.6	<0.38	<0.38	<4.44	158
Chromium	0.084	0.083	0.044	0.071	32.1
Cobalt	0.0044	0.0022	0.00080	0.0024	73.4
Copper	0.043	0.029	0.037	0.037	18.8
Iron	2.36	0.27	0.13	0.92	136
Lead	0.0098	0.018	0.0060	0.011	54.3
Lithium	0.018	0.019	0.013	0.016	19.9
Magnesium	0.55	0.18	0.14	0.29	76.7
Manganese	0.058	0.058	0.084	0.067	23.0
Mercury	0.028	0.080	0.27	0.12	100
Molybdenum	0.13	0.13	0.13	0.13	0.3
Nickel	0.055	0.095	0.027	0.059	58.0
Phosphorus	<0.37	<0.38	<0.38	<0.38	1.7
Potassium	1.60	0.50	0.66	0.92	64.6
Selenium	0.34	0.066	0.024	0.14	121
Silicon	160	35.0	1.83	65.7	127
Silver	0.00051	<0.00038	0.00049	<0.00046	15.3
Sodium	29.2	8.45	2.65	13.4	104
Strontium	0.027	0.0078	0.0057	0.014	86.8
Sulphur	521	12.7	<11.5	<182	162
Tin	0.13	0.12	0.096	0.11	14.6
Titanium	0.082	0.021	<0.0038	<0.036	116
Vanadium	0.0024	0.0016	0.0016	0.0018	24.9
Zinc	0.099	0.060	0.072	0.077	26.3
Total	<783	<96.6	<26.6	<302	138

TABLE 33
Clean Harbors Sarnia
Summary of Metal Emission Data

Metal	Actual Concentration µg/m³	Dry Reference Concentration µg/Rm³*	Dry Adjusted Concentration µg/Rm³**	Wet Reference Concentration µg/Rm³*	Emission Rate mg/s
Aluminum	63.4	187	166	98.5	3.25
Antimony	0.035	0.10	0.093	0.055	0.0018
Arsenic	<0.020	<0.060	<0.054	<0.032	<0.0010
Barium	0.60	1.77	1.57	0.93	0.031
Beryllium	<0.0075	<0.022	<0.020	<0.012	<0.00038
Boron	588	1729	1548	914	30.1
Cadmium	0.021	0.062	0.056	0.033	0.0011
Calcium	<87.5	<258	<228	<136	<4.44
Chromium	1.39	4.08	3.68	2.16	0.071
Cobalt	0.048	0.14	0.13	0.074	0.0024
Copper	0.72	2.12	1.92	1.13	0.037
Iron	18.1	53.3	47.3	28.0	0.92
Lead	0.22	0.64	0.58	0.34	0.011
Lithium	0.32	0.95	0.86	0.50	0.016
Magnesium	5.75	16.9	15.1	8.93	0.29
Manganese	1.32	3.87	3.53	2.06	0.067
Mercury	2.50	7.30	6.77	3.90	0.12
Molybdenum	2.63	7.70	6.99	4.09	0.13
Nickel	1.15	3.38	3.05	1.79	0.059
Phosphorus	<7.49	<22.0	<19.9	<11.7	<0.38
Potassium	18.2	53.6	48.2	28.3	0.92
Selenium	2.84	8.38	7.44	4.41	0.14
Silicon	1288	3797	3366	1997	65.7
Silver	<0.0091	<0.027	<0.024	<0.014	<0.00046
Sodium	263	776	691	409	13.4
Strontium	0.27	0.78	0.70	0.41	0.014
Sulphur	<3576	<10557	<9330	<5541	<182
Tin	2.25	6.60	5.97	3.50	0.11
Titanium	<0.70	<2.05	<1.82	<1.08	<0.036
Vanadium	0.036	0.11	0.096	0.056	0.0018
Zinc	1.53	4.48	4.05	2.38	0.077
Total	<5934	<17506	<15510	<9202	<302

* At 25°C and 1 atmosphere

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

TABLE 34
Clean Harbors Sarnia
Blank Train Metal Analyses

Metal	Probe & Filter Nitric Acid Digest µg	Probe & Filter Hydrofluoric Acid Digest µg	Impingers & Rinses µg	Total Collected µg
Aluminum *	<20	129	10.1	10.1
Antimony	<0.2	<0.2	<0.1	<0.20
Arsenic	<1	<1	<0.2	<1.00
Barium	<5	<5	1.79	1.79
Beryllium	<0.2	<0.2	<0.1	<0.20
Boron *	<30	<30	13.3	13.3
Cadmium	<0.1	<0.1	<0.05	<0.10
Calcium *	<500	<500	<100	<100
Chromium	<1	1.71	0.41	2.12
Cobalt	<0.2	<0.2	<0.1	<0.20
Copper	1.14	4.62	1.52	7.28
Iron	<200	<200	<15	<15.0
Lead	<0.5	<0.5	0.32	0.32
Lithium	<0.5	<0.5	0.64	0.64
Magnesium *	<10	41.3	5.12	5.12
Manganese	<0.5	1.16	0.31	1.47
Mercury **	<0.015	<0.015	<0.16	<0.16
Molybdenum	<0.2	34.9	<0.1	34.9
Nickel	<0.2	0.85	0.92	1.77
Phosphorus	<100	<100	<25	<100
Potassium	<100	<100	<100	<100
Selenium	<2	<2	<1	<1.00
Silicon *	337	-	115	452
Silver	<0.2	<0.2	<0.1	<0.20
Sodium *	232	65.8	286	518
Strontium	<0.2	0.57	0.39	0.96
Sulphur	<10000	<10000	<3000	<3000
Tin	5.17	1.90	18.0	25.1
Titanium	<10	<10	<1	<10.0
Vanadium	<1	<1	<0.1	<1.00
Zinc	<6	<6	<3	<6.00
Total				<4410

* Hydrofluoric acid digest not included in the total.
** Includes the permanganate impingers.

Note: "<" indicates that the analyte was not detected (was less than the analytical detection limit). Where all values are reported below the detection limit for a given metal, the value of the detection limit for the fraction most likely to contain that metal was used to calculate the total collected in the blank, the remaining fractions are assigned a value of zero. In instances where only one fraction was below the detection limit, that fraction was assigned a value of zero to calculate the total collected in the blank.

TABLE 35
Clean Harbors Sarnia
Dioxin and Furan Congener Group Emission Data
Test No. 1

Dioxins

Congener Group	Total Collected pg	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate ng/s
Tetrachlorodibenzo-p-dioxins	87.6	0.0065	0.019	0.017	0.010	0.33
Pentachlorodibenzo-p-dioxins	112	0.0083	0.025	0.022	0.013	0.42
Hexachlorodibenzo-p-dioxins	97.9	0.0072	0.021	0.019	0.011	0.37
Heptachlorodibenzo-p-dioxins	<4.8	<0.00036	<0.0011	<0.00093	<0.00055	<0.018
Octachlorodibenzo-p-dioxin	59.2	0.0044	0.013	0.011	0.0068	0.22
Total	<362	<0.027	<0.079	<0.070	<0.042	<1.35

Furans

Congener Group	Total Collected pg	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate ng/s
Tetrachlorodibenzofurans	108	0.0080	0.024	0.021	0.012	0.40
Pentachlorodibenzofurans	52.9	0.0039	0.012	0.010	0.0061	0.20
Hexachlorodibenzofurans	47.7	0.0035	0.010	0.0093	0.0055	0.18
Heptachlorodibenzofurans	21.5	0.0016	0.0047	0.0042	0.0025	0.081
Octachlorodibenzofuran	<12.0	<0.00089	<0.0026	<0.0023	<0.0014	<0.045
Total	<242	<0.018	<0.053	<0.047	<0.028	<0.91

Dry Gas Volume Sampled (Rm³*) :	4.564
Actual Flowrate (m³/s) :	50.6
Dry Reference Flowrate (Rm³/s*) :	17.1
Dry Adjusted Flowrate (Rm³/s**) :	19.3
Wet Reference Flowrate (Rm³/s*) :	32.6

* At 25°C and 1 atmosphere

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

Note: "<" indicates that the amount detected is less than the analytical detection limit (<MDL). In these cases the value of the detection limit was used to calculate the emission data.

TABLE 36
Clean Harbors Sarnia
Dioxin and Furan Congener Group Emission Data
Test No. 2

Dioxins

Congener Group	Total Collected pg	Actual Concentration ng/m^3	Dry Reference Concentration ng/Rm^3*	Dry Adjusted Concentration ng/Rm^3**	Wet Reference Concentration ng/Rm^3*	Emission Rate ng/s
Tetrachlorodibenzo-p-dioxins	162	0.012	0.035	0.031	0.018	0.61
Pentachlorodibenzo-p-dioxins	<30	<0.0022	<0.0064	<0.0058	<0.0034	<0.11
Hexachlorodibenzo-p-dioxins	<27	<0.0020	<0.0058	<0.0052	<0.0031	<0.10
Heptachlorodibenzo-p-dioxins	187	0.014	0.040	0.036	0.021	0.71
Octachlorodibenzo-p-dioxin	<110	<0.0079	<0.024	<0.021	<0.012	<0.42
Total	<516	<0.037	<0.11	<0.10	<0.058	<1.95

Furans

Congener Group	Total Collected pg	Actual Concentration ng/m^3	Dry Reference Concentration ng/Rm^3*	Dry Adjusted Concentration ng/Rm^3**	Wet Reference Concentration ng/Rm^3*	Emission Rate ng/s
Tetrachlorodibenzofurans	411	0.030	0.088	0.080	0.046	1.55
Pentachlorodibenzofurans	176	0.013	0.038	0.034	0.020	0.66
Hexachlorodibenzofurans	<41	<0.0030	<0.0088	<0.0079	<0.0046	<0.15
Heptachlorodibenzofurans	61.9	0.0045	0.013	0.012	0.0070	0.23
Octachlorodibenzofuran	<84	<0.0061	<0.018	<0.016	<0.0095	<0.32
Total	<774	<0.056	<0.17	<0.15	<0.088	<2.92

Dry Gas Volume Sampled (Rm^3*) :	4.659
Actual Flowrate (m^3/s) :	52.3
Dry Reference Flowrate (Rm^3/s*) :	17.6
Dry Adjusted Flowrate (Rm^3/s**) :	19.5
Wet Reference Flowrate (Rm^3/s*) :	33.4

* At 25°C and 1 atmosphere

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

Note: "<" indicates that the amount detected is less than the analytical detection limit (<MDL). In these cases the value of the detection limit was used to calculate the emission data.

TABLE 37
Clean Harbors Sarnia
Dioxin and Furan Congener Group Emission Data
Test No. 3

Dioxins

Congener Group	Total Collected pg	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate ng/s
Tetrachlorodibenzo-p-dioxins	<8.2	<0.00064	<0.0019	<0.0018	<0.0010	<0.032
Pentachlorodibenzo-p-dioxins	44.4	0.0035	0.010	0.0095	0.0054	0.17
Hexachlorodibenzo-p-dioxins	<6.3	<0.00049	<0.0014	<0.0013	<0.00077	<0.024
Heptachlorodibenzo-p-dioxins	<10	<0.00078	<0.0023	<0.0021	<0.0012	<0.039
Octachlorodibenzo-p-dioxin	46.1	0.0036	0.010	0.0099	0.0056	0.18
Total	<115	<0.0090	<0.026	<0.025	<0.014	<0.44

Furans

Congener Group	Total Collected pg	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate ng/s
Tetrachlorodibenzofurans	105	0.0082	0.024	0.022	0.013	0.41
Pentachlorodibenzofurans	26.6	0.0021	0.0061	0.0057	0.0033	0.10
Hexachlorodibenzofurans	<5.7	<0.00045	<0.0013	<0.0012	<0.00070	<0.022
Heptachlorodibenzofurans	10.0	0.00078	0.0023	0.0021	0.0012	0.039
Octachlorodibenzofuran	<30	<0.0023	<0.0068	<0.0064	<0.0037	<0.12
Total	<177	<0.014	<0.040	<0.038	<0.022	<0.69

Dry Gas Volume Sampled (Rm³*) :	4.395
Actual Flowrate (m³/s) :	49.5
Dry Reference Flowrate (Rm³/s*) :	17.0
Dry Adjusted Flowrate (Rm³/s**) :	18.1
Wet Reference Flowrate (Rm³/s*) :	31.6

* At 25°C and 1 atmosphere

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

Note: "<" indicates that the amount detected is less than the analytical detection limit (<MDL). In these cases the value of the detection limit was used to calculate the emission data.

TABLE 38

Clean Harbors Sarnia

Dioxin and Furan Congener Group Actual Concentrations

Dioxins

Congener Group	Actual Concentration Test No. 1 ng/m³	Test No. 2 ng/m³	Test No. 3 ng/m³	Average ng/m³	Coefficient of Variation %
Tetrachlorodibenzo-p-dioxins	0.0065	0.012	<0.00064	<0.0063	88.2
Pentachlorodibenzo-p-dioxins	0.0083	<0.0022	0.0035	<0.0046	69.5
Hexachlorodibenzo-p-dioxins	0.0072	<0.0020	<0.00049	<0.0032	110
Heptachlorodibenzo-p-dioxins	<0.00036	0.014	<0.00078	<0.0049	153
Octachlorodibenzo-p-dioxin	0.0044	<0.0079	0.0036	<0.0053	43.6
Total	<0.027	<0.037	<0.0090	<0.024	58.7

Furans

Congener Group	Actual Concentration Test No. 1 ng/m³	Test No. 2 ng/m³	Test No. 3 ng/m³	Average ng/m³	Coefficient of Variation %
Tetrachlorodibenzofurans	0.0080	0.030	0.0082	0.015	81.5
Pentachlorodibenzofurans	0.0039	0.013	0.0021	0.0062	91.1
Hexachlorodibenzofurans	0.0035	<0.0030	<0.00045	<0.0023	71.0
Heptachlorodibenzofurans	0.0016	0.0045	0.00078	0.0023	85.0
Octachlorodibenzofuran	<0.00089	<0.0061	<0.0023	<0.0031	86.2
Total	<0.018	<0.056	<0.014	<0.029	79.3

TABLE 39
Clean Harbors Sarnia
Dioxin and Furan Congener Group Dry Reference Concentrations

Dioxins

Congener Group	Dry Reference Concentration Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	Coefficient of Variation %
Tetrachlorodibenzo-p-dioxins	0.019	0.035	<0.0019	<0.019	88.4
Pentachlorodibenzo-p-dioxins	0.025	<0.0064	0.010	<0.014	69.9
Hexachlorodibenzo-p-dioxins	0.021	<0.0058	<0.0014	<0.0096	110
Heptachlorodibenzo-p-dioxins	<0.0011	0.040	<0.0023	<0.014	153
Octachlorodibenzo-p-dioxin	0.013	<0.024	0.010	<0.016	44.4
Total	<0.079	<0.11	<0.026	<0.072	59.3

Furans

Congener Group	Dry Reference Concentration Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	Coefficient of Variation %
Tetrachlorodibenzofurans	0.024	0.088	0.024	0.045	82.2
Pentachlorodibenzofurans	0.012	0.038	0.0061	0.018	91.7
Hexachlorodibenzofurans	0.010	<0.0088	<0.0013	<0.0068	71.2
Heptachlorodibenzofurans	0.0047	0.013	0.0023	0.0068	85.6
Octachlorodibenzofuran	<0.0026	<0.018	<0.0068	<0.0092	86.9
Total	<0.053	<0.17	<0.040	<0.086	80.0

* At 25°C and 1 atmosphere

TABLE 40
Clean Harbors Sarnia
Dioxin and Furan Congener Group Dry Adjusted Concentrations

Dioxins

Congener Group	Dry Adjusted Concentration Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	Coefficient of Variation %
Tetrachlorodibenzo-p-dioxins	0.017	0.031	<0.0018	<0.017	88.7
Pentachlorodibenzo-p-dioxins	0.022	<0.0058	0.0095	<0.012	67.6
Hexachlorodibenzo-p-dioxins	0.019	<0.0052	<0.0013	<0.0085	109
Heptachlorodibenzo-p-dioxins	<0.00093	0.036	<0.0021	<0.013	153
Octachlorodibenzo-p-dioxin	0.011	<0.021	0.0099	<0.014	43.6
Total	<0.070	<0.10	<0.025	<0.065	58.5

Furans

Congener Group	Dry Adjusted Concentration Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	Coefficient of Variation %
Tetrachlorodibenzofurans	0.021	0.080	0.022	0.041	81.6
Pentachlorodibenzofurans	0.010	0.034	0.0057	0.017	91.4
Hexachlorodibenzofurans	0.0093	<0.0079	<0.0012	<0.0061	70.2
Heptachlorodibenzofurans	0.0042	0.012	0.0021	0.0061	85.3
Octachlorodibenzofuran	<0.0023	<0.016	<0.0064	<0.0083	86.0
Total	<0.047	<0.15	<0.038	<0.078	79.5

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

TABLE 41
Clean Harbors Sarnia
Dioxin and Furan Congener Group Wet Reference Concentrations

Dioxins

Congener Group	Wet Reference Concentration Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	Coefficient of Variation %
Tetrachlorodibenzo-p-dioxins	0.010	0.018	<0.0010	<0.0098	88.4
Pentachlorodibenzo-p-dioxins	0.013	<0.0034	0.0054	<0.0072	69.0
Hexachlorodibenzo-p-dioxins	0.011	<0.0031	<0.00077	<0.0050	110
Heptachlorodibenzo-p-dioxins	<0.00055	0.021	<0.0012	<0.0076	153
Octachlorodibenzo-p-dioxin	0.0068	<0.012	0.0056	<0.0083	43.8
Total	<0.042	<0.058	<0.014	<0.038	58.8

Furans

Congener Group	Wet Reference Concentration Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	Coefficient of Variation %
Tetrachlorodibenzofurans	0.012	0.046	0.013	0.024	81.7
Pentachlorodibenzofurans	0.0061	0.020	0.0033	0.0097	91.4
Hexachlorodibenzofurans	0.0055	<0.0046	<0.00070	<0.0036	70.8
Heptachlorodibenzofurans	0.0025	0.0070	0.0012	0.0036	85.3
Octachlorodibenzofuran	<0.0014	<0.0095	<0.0037	<0.0049	86.3
Total	<0.028	<0.088	<0.022	<0.046	79.6

* At 25°C and 1 atmosphere

TABLE 42
Clean Harbors Sarnia
Dioxin and Furan Congener Group Emission Rates

Dioxins

Congener Group	Emission Rate Test No. 1 ng/s	Test No. 2 ng/s	Test No. 3 ng/s	Average ng/s	Coefficient of Variation %
Tetrachlorodibenzo-p-dioxins	0.33	0.61	<0.032	<0.32	89.6
Pentachlorodibenzo-p-dioxins	0.42	<0.11	0.17	<0.23	69.2
Hexachlorodibenzo-p-dioxins	0.37	<0.10	<0.024	<0.16	109
Heptachlorodibenzo-p-dioxins	<0.018	0.71	<0.039	<0.25	154
Octachlorodibenzo-p-dioxin	0.22	<0.42	0.18	<0.27	46.5
Total	<1.35	<1.95	<0.44	<1.25	60.6

Furans

Congener Group	Emission Rate Test No. 1 ng/s	Test No. 2 ng/s	Test No. 3 ng/s	Average ng/s	Coefficient of Variation %
Tetrachlorodibenzofurans	0.40	1.55	0.41	0.79	84.1
Pentachlorodibenzofurans	0.20	0.66	0.10	0.32	93.4
Hexachlorodibenzofurans	0.18	<0.15	<0.022	<0.12	71.2
Heptachlorodibenzofurans	0.081	0.23	0.039	0.12	87.3
Octachlorodibenzofuran	<0.045	<0.32	<0.12	<0.16	88.6
Total	<0.91	<2.92	<0.69	<1.51	81.9

TABLE 43

Clean Harbors Sarnia

Summary of Dioxin and Furan Congener Group Emission Data

Dioxins

Congener Group	Actual Concentration ng/m^3	Dry Reference Concentration ng/Rm^3*	Dry Adjusted Concentration ng/Rm^3**	Wet Reference Concentration ng/Rm^3*	Emission Rate ng/s
Tetrachlorodibenzo-p-dioxins	<0.0063	<0.019	<0.017	<0.0098	<0.32
Pentachlorodibenzo-p-dioxins	<0.0046	<0.014	<0.012	<0.0072	<0.23
Hexachlorodibenzo-p-dioxins	<0.0032	<0.0096	<0.0085	<0.0050	<0.16
Heptachlorodibenzo-p-dioxins	<0.0049	<0.014	<0.013	<0.0076	<0.25
Octachlorodibenzo-p-dioxin	<0.0053	<0.016	<0.014	<0.0083	<0.27
Total	<0.024	<0.072	<0.065	<0.038	<1.25

Furans

Congener Group	Actual Concentration ng/m^3	Dry Reference Concentration ng/Rm^3*	Dry Adjusted Concentration ng/Rm^3**	Wet Reference Concentration ng/Rm^3*	Emission Rate ng/s
Tetrachlorodibenzofurans	0.015	0.045	0.041	0.024	0.79
Pentachlorodibenzofurans	0.0062	0.018	0.017	0.0097	0.32
Hexachlorodibenzofurans	<0.0023	<0.0068	<0.0061	<0.0036	<0.12
Heptachlorodibenzofurans	0.0023	0.0068	0.0061	0.0036	0.12
Octachlorodibenzofuran	<0.0031	<0.0092	<0.0083	<0.0049	<0.16
Total	<0.029	<0.086	<0.078	<0.046	<1.51

* At 25°C and 1 atmosphere

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

TABLE 44
Clean Harbors Sarnia
Blank Dioxin and Furan Congener Group Analyses

Dioxins

Congener Group	Blank Train pg	Laboratory Blank pg
Tetrachlorodibenzo-p-dioxins	<3.3	<2.4
Pentachlorodibenzo-p-dioxins	<1.9	<1.5
Hexachlorodibenzo-p-dioxins	<2.7	<1.6
Heptachlorodibenzo-p-dioxins	<3.2	<1.9
Octachlorodibenzo-p-dioxin	<8.4	<2.9
Total	<19.5	<10.3

Furans

Congener Group	Blank Train pg	Laboratory Blank pg
Tetrachlorodibenzofurans	<2.3	<1.8
Pentachlorodibenzofurans	<1.6	<1.1
Hexachlorodibenzofurans	<1.4	<1.1
Heptachlorodibenzofurans	<2.2	<1.8
Octachlorodibenzofuran	<4.1	<2.9
Total	<11.6	<8.7

"<" indicates that the amount detected is less than the analytical detection limit (<MDL). In these cases the value of the detection limit was used to calculate the total collected.

TABLE 45
Clean Harbors Sarnia
Dioxin and Furan Specific Isomer Emission Data
Test No. 1

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	pg/m³	pg/Rm³*	pg/Rm³**	pg/Rm³*	ng/s
2378-tetrachlorodibenzo-p-dioxin	<6.1	<0.45	<1.34	<1.18	<0.70	<0.023
12378-pentachlorodibenzo-p-dioxin	<6.8	<0.50	<1.49	<1.32	<0.78	<0.025
123478-hexachlorodibenzo-p-dioxin	<3.9	<0.29	<0.85	<0.76	<0.45	<0.015
123678-hexachlorodibenzo-p-dioxin	11.8	0.87	2.59	2.29	1.36	0.044
123789-hexachlorodibenzo-p-dioxin	8.15	0.60	1.79	1.58	0.94	0.031
1234678-heptachlorodibenzo-p-dioxin	<43	<3.18	<9.42	<8.35	<4.94	<0.16
Octachlorodibenzo-p-dioxin	59.2	4.38	13.0	11.5	6.80	0.22
2378-tetrachlorodibenzofuran	<15	<1.11	<3.29	<2.91	<1.72	<0.056
12378-pentachlorodibenzofuran	<8.0	<0.59	<1.75	<1.55	<0.92	<0.030
23478-pentachlorodibenzofuran	21.9	1.62	4.80	4.25	2.52	0.082
123478-hexachlorodibenzofuran	5.23	0.39	1.15	1.02	0.60	0.020
123678-hexachlorodibenzofuran	<9.0	<0.67	<1.97	<1.75	<1.03	<0.034
234678-hexachlorodibenzofuran	12.8	0.95	2.80	2.48	1.47	0.048
123789-hexachlorodibenzofuran	<7.1	<0.53	<1.56	<1.38	<0.82	<0.027
1234678-heptachlorodibenzofuran	21.5	1.59	4.71	4.17	2.47	0.081
1234789-heptachlorodibenzofuran	<7.0	<0.52	<1.53	<1.36	<0.80	<0.026
Octachlorodibenzofuran	<12	<0.89	<2.63	<2.33	<1.38	<0.045
PCB 77	518	38.4	113	101	59.5	1.94
PCB 81	<29	<2.15	<6.35	<5.63	<3.33	<0.11
PCB 126	<17	<1.26	<3.72	<3.30	<1.95	<0.064
PCB 169	<10	<0.74	<2.19	<1.94	<1.15	<0.037
PCB 105	3700	274	811	718	425	13.9
PCB 114	302	22.4	66.2	58.6	34.7	1.13
PCB 118	11300	837	2476	2194	1299	42.3
PCB 123	<190	<14.1	<41.6	<36.9	<21.8	<0.71
PCB 156/157	257	19.0	56.3	49.9	29.5	0.96
PCB 167	106	7.85	23.2	20.6	12.2	0.40
PCB 189	<8.3	<0.61	<1.82	<1.61	<0.95	<0.031
Total Dioxins & Furans Only	<258	<19.1	<56.6	<50.2	<29.7	<0.97

Dry Gas Volume Sampled (Rm³*) :	4.564
Actual Flowrate (m³/s) :	50.6
Dry Reference Flowrate (Rm³/s*) :	17.1
Dry Adjusted Flowrate (Rm³/s**) :	19.3
Wet Reference Flowrate (Rm³/s*) :	32.6

* At 25°C and 1 atmosphere

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

Note: "<" 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 46
Clean Harbors Sarnia
Dioxin and Furan Specific Isomer Emission Data
Test No. 2

Specific Isomer	Total Collected pg	Actual Concentration pg/m^3	Dry Reference Concentration pg/Rm^3*	Dry Adjusted Concentration pg/Rm^3**	Wet Reference Concentration pg/Rm^3*	Emission Rate ng/s
2378-tetrachlorodibenzo-p-dioxin	<33	<2.38	<7.08	<6.39	<3.73	<0.12
12378-pentachlorodibenzo-p-dioxin	<30	<2.17	<6.44	<5.81	<3.39	<0.11
123478-hexachlorodibenzo-p-dioxin	<27	<1.95	<5.80	<5.23	<3.05	<0.10
123678-hexachlorodibenzo-p-dioxin	<26	<1.88	<5.58	<5.04	<2.94	<0.098
123789-hexachlorodibenzo-p-dioxin	<27	<1.95	<5.80	<5.23	<3.05	<0.10
1234678-heptachlorodibenzo-p-dioxin	98.5	7.11	21.1	19.1	11.1	0.37
Octachlorodibenzo-p-dioxin	<110	<7.95	<23.6	<21.3	<12.4	<0.42
2378-tetrachlorodibenzofuran	<53	<3.83	<11.4	<10.3	<5.99	<0.20
12378-pentachlorodibenzofuran	45.2	3.26	9.70	8.76	5.11	0.17
23478-pentachlorodibenzofuran	<30	<2.17	<6.44	<5.81	<3.39	<0.11
123478-hexachlorodibenzofuran	<34	<2.46	<7.30	<6.59	<3.85	<0.13
123678-hexachlorodibenzofuran	<33	<2.38	<7.08	<6.39	<3.73	<0.12
234678-hexachlorodibenzofuran	<33	<2.38	<7.08	<6.39	<3.73	<0.12
123789-hexachlorodibenzofuran	<41	<2.96	<8.80	<7.94	<4.64	<0.15
1234678-heptachlorodibenzofuran	61.9	4.47	13.3	12.0	7.00	0.23
1234789-heptachlorodibenzofuran	<45	<3.25	<9.66	<8.72	<5.09	<0.17
Octachlorodibenzofuran	<84	<6.07	<18.0	<16.3	<9.50	<0.32
PCB 77	1450	105	311	281	164	5.48
PCB 81	<92	<6.65	<19.7	<17.8	<10.4	<0.35
PCB 126	<66	<4.77	<14.2	<12.8	<7.46	<0.25
PCB 169	<8.1	<0.59	<1.74	<1.57	<0.92	<0.031
PCB 105	4420	319	949	856	500	16.7
PCB 114	319	23.0	68.5	61.8	36.1	1.21
PCB 118	14800	1069	3177	2867	1674	55.9
PCB 123	<160	<11.6	<34.3	<31.0	<18.1	<0.60
PCB 156/157	304	22.0	65.3	58.9	34.4	1.15
PCB 167	<110	<7.95	<23.6	<21.3	<12.4	<0.42
PCB 189	<10	<0.72	<2.15	<1.94	<1.13	<0.038
Total Dioxins & Furans Only	<812	<58.6	<174	<157	<91.8	<3.07

Dry Gas Volume Sampled (Rm^3*) :	4.659
Actual Flowrate (m^3/s) :	52.3
Dry Reference Flowrate (Rm^3/s*) :	17.6
Dry Adjusted Flowrate (Rm^3/s**) :	19.5
Wet Reference Flowrate (Rm^3/s*) :	33.4

* At 25°C and 1 atmosphere

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

Note: "<" 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 47
Clean Harbors Sarnia
Dioxin and Furan Specific Isomer Emission Data
Test No. 3

Specific Isomer	Total Collected pg	Actual Concentration pg/m^3	Dry Reference Concentration pg/Rm^3*	Dry Adjusted Concentration pg/Rm^3**	Wet Reference Concentration pg/Rm^3*	Emission Rate ng/s
2378-tetrachlorodibenzo-p-dioxin	<8.2	<0.64	<1.87	<1.75	<1.00	<0.032
12378-pentachlorodibenzo-p-dioxin	<7.0	<0.55	<1.59	<1.50	<0.86	<0.027
123478-hexachlorodibenzo-p-dioxin	<6.3	<0.49	<1.43	<1.35	<0.77	<0.024
123678-hexachlorodibenzo-p-dioxin	<6.1	<0.48	<1.39	<1.30	<0.75	<0.024
123789-hexachlorodibenzo-p-dioxin	<6.2	<0.48	<1.41	<1.32	<0.76	<0.024
1234678-heptachlorodibenzo-p-dioxin	<23	<1.80	<5.23	<4.92	<2.82	<0.089
Octachlorodibenzo-p-dioxin	46.1	3.60	10.5	9.85	5.64	0.18
2378-tetrachlorodibenzofuran	<16	<1.25	<3.64	<3.42	<1.96	<0.062
12378-pentachlorodibenzofuran	<8.1	<0.63	<1.84	<1.73	<0.99	<0.031
23478-pentachlorodibenzofuran	<7.5	<0.59	<1.71	<1.60	<0.92	<0.029
123478-hexachlorodibenzofuran	<4.8	<0.38	<1.09	<1.03	<0.59	<0.019
123678-hexachlorodibenzofuran	<4.6	<0.36	<1.05	<0.98	<0.56	<0.018
234678-hexachlorodibenzofuran	<4.7	<0.37	<1.07	<1.00	<0.58	<0.018
123789-hexachlorodibenzofuran	<11	<0.86	<2.50	<2.35	<1.35	<0.043
1234678-heptachlorodibenzofuran	10.0	0.78	2.28	2.14	1.22	0.039
1234789-heptachlorodibenzofuran	<7.6	<0.59	<1.73	<1.62	<0.93	<0.029
Octachlorodibenzofuran	<30	<2.34	<6.83	<6.41	<3.67	<0.12
PCB 77	554	43.3	126	118	67.8	2.14
PCB 81	<130	<10.2	<29.6	<27.8	<15.9	<0.50
PCB 126	<91	<7.11	<20.7	<19.4	<11.1	<0.35
PCB 169	<76	<5.94	<17.3	<16.2	<9.30	<0.29
PCB 105	<4300	<336	<978	<919	<526	<16.6
PCB 114	<280	<21.9	<63.7	<59.8	<34.3	<1.08
PCB 118	13600	1063	3094	2906	1665	52.6
PCB 123	<190	<14.8	<43.2	<40.6	<23.3	<0.73
PCB 156/157	417	32.6	94.9	89.1	51.0	1.61
PCB 167	<160	<12.5	<36.4	<34.2	<19.6	<0.62
PCB 189	<29	<2.27	<6.60	<6.20	<3.55	<0.11
Total Dioxins & Furans Only	<207	<16.2	<47.1	<44.3	<25.4	<0.80

Dry Gas Volume Sampled (Rm^3*) :	4.395
Actual Flowrate (m^3/s) :	49.5
Dry Reference Flowrate (Rm^3/s*) :	17.0
Dry Adjusted Flowrate (Rm^3/s**) :	18.1
Wet Reference Flowrate (Rm^3/s*) :	31.6

* At 25°C and 1 atmosphere

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

Note: "<" 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 48
Clean Harbors Sarnia
Dioxin and Furan Specific Isomer Actual Concentrations

Specific Isomer	Actual Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	pg/m^3	pg/m^3	pg/m^3	pg/m^3	%
2378-tetrachlorodibenzo-p-dioxin	<0.45	<2.38	<0.64	<1.16	91.9
12378-pentachlorodibenzo-p-dioxin	<0.50	<2.17	<0.55	<1.07	88.4
123478-hexachlorodibenzo-p-dioxin	<0.29	<1.95	<0.49	<0.91	99.5
123678-hexachlorodibenzo-p-dioxin	0.87	<1.88	<0.48	<1.08	67.1
123789-hexachlorodibenzo-p-dioxin	0.60	<1.95	<0.48	<1.01	80.4
1234678-heptachlorodibenzo-p-dioxin	<3.18	7.11	<1.80	<4.03	68.4
Octachlorodibenzo-p-dioxin	4.38	<7.95	3.60	<5.31	43.6
2378-tetrachlorodibenzofuran	<1.11	<3.83	<1.25	<2.06	74.2
12378-pentachlorodibenzofuran	<0.59	3.26	<0.63	<1.50	102
23478-pentachlorodibenzofuran	1.62	<2.17	<0.59	<1.46	55.1
123478-hexachlorodibenzofuran	0.39	<2.46	<0.38	<1.07	112
123678-hexachlorodibenzofuran	<0.67	<2.38	<0.36	<1.14	96.0
234678-hexachlorodibenzofuran	0.95	<2.38	<0.37	<1.23	84.2
123789-hexachlorodibenzofuran	<0.53	<2.96	<0.86	<1.45	91.1
1234678-heptachlorodibenzofuran	1.59	4.47	0.78	2.28	85.0
1234789-heptachlorodibenzofuran	<0.52	<3.25	<0.59	<1.45	107
Octachlorodibenzofuran	<0.89	<6.07	<2.34	<3.10	86.2
PCB 77	38.4	105	43.3	62.1	59.5
PCB 81	<2.15	<6.65	<10.2	<6.32	63.6
PCB 126	<1.26	<4.77	<7.11	<4.38	67.3
PCB 169	<0.74	<0.59	<5.94	<2.42	126
PCB 105	274	319	<336	<310	10.4
PCB 114	22.4	23.0	<21.9	<22.4	2.6
PCB 118	837	1069	1063	989	13.4
PCB 123	<14.1	<11.6	<14.8	<13.5	12.7
PCB 156/157	19.0	22.0	32.6	24.5	29.1
PCB 167	7.85	<7.95	<12.5	<9.43	28.2
PCB 189	<0.61	<0.72	<2.27	<1.20	76.9
Total Dioxins & Furans Only	<19.1	<58.6	<16.2	<31.3	75.7

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 49
Clean Harbors Sarnia
Dioxin and Furan Specific Isomer Dry Reference Concentrations

Specific Isomer	Dry Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	pg/Rm^3*	pg/Rm^3*	pg/Rm^3*	pg/Rm^3*	%
2378-tetrachlorodibenzo-p-dioxin	<1.34	<7.08	<1.87	<3.43	92.6
12378-pentachlorodibenzo-p-dioxin	<1.49	<6.44	<1.59	<3.17	89.1
123478-hexachlorodibenzo-p-dioxin	<0.85	<5.80	<1.43	<2.69	100
123678-hexachlorodibenzo-p-dioxin	2.59	<5.58	<1.39	<3.18	67.8
123789-hexachlorodibenzo-p-dioxin	1.79	<5.80	<1.41	<3.00	81.1
1234678-heptachlorodibenzo-p-dioxin	<9.42	21.1	<5.23	<11.9	69.1
Octachlorodibenzo-p-dioxin	13.0	<23.6	10.5	<15.7	44.4
2378-tetrachlorodibenzofuran	<3.29	<11.4	<3.64	<6.10	74.9
12378-pentachlorodibenzofuran	<1.75	9.70	<1.84	<4.43	103
23478-pentachlorodibenzofuran	4.80	<6.44	<1.71	<4.31	55.7
123478-hexachlorodibenzofuran	1.15	<7.30	<1.09	<3.18	112
123678-hexachlorodibenzofuran	<1.97	<7.08	<1.05	<3.37	96.6
234678-hexachlorodibenzofuran	2.80	<7.08	<1.07	<3.65	84.7
123789-hexachlorodibenzofuran	<1.56	<8.80	<2.50	<4.29	91.9
1234678-heptachlorodibenzofuran	4.71	13.3	2.28	6.76	85.6
1234789-heptachlorodibenzofuran	<1.53	<9.66	<1.73	<4.31	108
Octachlorodibenzofuran	<2.63	<18.0	<6.83	<9.16	86.9
PCB 77	113	311	126	184	60.3
PCB 81	<6.35	<19.7	<29.6	<18.6	62.8
PCB 126	<3.72	<14.2	<20.7	<12.9	66.6
PCB 169	<2.19	<1.74	<17.3	<7.07	125
PCB 105	811	949	<978	<913	9.8
PCB 114	66.2	68.5	<63.7	<66.1	3.6
PCB 118	2476	3177	3094	2916	13.1
PCB 123	<41.6	<34.3	<43.2	<39.7	11.9
PCB 156/157	56.3	65.3	94.9	72.1	28.0
PCB 167	23.2	<23.6	<36.4	<27.7	27.0
PCB 189	<1.82	<2.15	<6.60	<3.52	75.8
Total Dioxins & Furans Only	<56.6	<174	<47.1	<92.7	76.4

* At 25°C and 1 atmosphere

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 50
Clean Harbors Sarnia
Dioxin and Furan Specific Isomer Dry Adjusted Concentrations

Specific Isomer	Dry Adjusted Concentration Test No. 1 pg/Rm³*	Test No. 2 pg/Rm³*	Test No. 3 pg/Rm³*	Average pg/Rm³*	Coefficient of Variation %
2378-tetrachlorodibenzo-p-dioxin	<1.18	<6.39	<1.75	<3.11	91.9
12378-pentachlorodibenzo-p-dioxin	<1.32	<5.81	<1.50	<2.88	88.5
123478-hexachlorodibenzo-p-dioxin	<0.76	<5.23	<1.35	<2.44	99.4
123678-hexachlorodibenzo-p-dioxin	2.29	<5.04	<1.30	<2.88	67.2
123789-hexachlorodibenzo-p-dioxin	1.58	<5.23	<1.32	<2.71	80.5
1234678-heptachlorodibenzo-p-dioxin	<8.35	19.1	<4.92	<10.8	68.5
Octachlorodibenzo-p-dioxin	11.5	<21.3	9.85	<14.2	43.6
2378-tetrachlorodibenzofuran	<2.91	<10.3	<3.42	<5.53	74.2
12378-pentachlorodibenzofuran	<1.55	8.76	<1.73	<4.01	102
23478-pentachlorodibenzofuran	4.25	<5.81	<1.60	<3.89	54.7
123478-hexachlorodibenzofuran	1.02	<6.59	<1.03	<2.88	112
123678-hexachlorodibenzofuran	<1.75	<6.39	<0.98	<3.04	96.3
234678-hexachlorodibenzofuran	2.48	<6.39	<1.00	<3.29	84.5
123789-hexachlorodibenzofuran	<1.38	<7.94	<2.35	<3.89	91.1
1234678-heptachlorodibenzofuran	4.17	12.0	2.14	6.10	85.3
1234789-heptachlorodibenzofuran	<1.36	<8.72	<1.62	<3.90	107
Octachlorodibenzofuran	<2.33	<16.3	<6.41	<8.34	86.0
PCB 77	101	281	118	167	59.6
PCB 81	<5.63	<17.8	<27.8	<17.1	65.0
PCB 126	<3.30	<12.8	<19.4	<11.8	68.5
PCB 169	<1.94	<1.57	<16.2	<6.58	127
PCB 105	718	856	<919	<831	12.4
PCB 114	58.6	61.8	<59.8	<60.1	2.7
PCB 118	2194	2867	2906	2656	15.1
PCB 123	<36.9	<31.0	<40.6	<36.2	13.4
PCB 156/157	49.9	58.9	89.1	66.0	31.1
PCB 167	20.6	<21.3	<34.2	<25.4	30.2
PCB 189	<1.61	<1.94	<6.20	<3.25	78.8
Total Dioxins & Furans Only	<50.2	<157	<44.3	<83.9	75.8

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

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 51
Clean Harbors Sarnia
Dioxin and Furan Specific Isomer Wet Reference Concentrations

Specific Isomer	Wet Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	pg/Rm^3*	pg/Rm^3*	pg/Rm^3*	pg/Rm^3*	%
2378-tetrachlorodibenzo-p-dioxin	<0.70	<3.73	<1.00	<1.81	92.1
12378-pentachlorodibenzo-p-dioxin	<0.78	<3.39	<0.86	<1.68	88.6
123478-hexachlorodibenzo-p-dioxin	<0.45	<3.05	<0.77	<1.42	99.7
123678-hexachlorodibenzo-p-dioxin	1.36	<2.94	<0.75	<1.68	67.4
123789-hexachlorodibenzo-p-dioxin	0.94	<3.05	<0.76	<1.58	80.6
1234678-heptachlorodibenzo-p-dioxin	<4.94	11.1	<2.82	<6.30	68.7
Octachlorodibenzo-p-dioxin	6.80	<12.4	5.64	<8.30	43.8
2378-tetrachlorodibenzofuran	<1.72	<5.99	<1.96	<3.23	74.4
12378-pentachlorodibenzofuran	<0.92	5.11	<0.99	<2.34	103
23478-pentachlorodibenzofuran	2.52	<3.39	<0.92	<2.28	55.1
123478-hexachlorodibenzofuran	0.60	<3.85	<0.59	<1.68	112
123678-hexachlorodibenzofuran	<1.03	<3.73	<0.56	<1.78	96.3
234678-hexachlorodibenzofuran	1.47	<3.73	<0.58	<1.93	84.5
123789-hexachlorodibenzofuran	<0.82	<4.64	<1.35	<2.27	91.3
1234678-heptachlorodibenzofuran	2.47	7.00	1.22	3.57	85.3
1234789-heptachlorodibenzofuran	<0.80	<5.09	<0.93	<2.27	107
Octachlorodibenzofuran	<1.38	<9.50	<3.67	<4.85	86.3
PCB 77	59.5	164	67.8	97.1	59.8
PCB 81	<3.33	<10.4	<15.9	<9.88	63.8
PCB 126	<1.95	<7.46	<11.1	<6.85	67.5
PCB 169	<1.15	<0.92	<9.30	<3.79	126
PCB 105	425	500	<526	<484	10.8
PCB 114	34.7	36.1	<34.3	<35.0	2.7
PCB 118	1299	1674	1665	1546	13.8
PCB 123	<21.8	<18.1	<23.3	<21.1	12.7
PCB 156/157	29.5	34.4	51.0	38.3	29.4
PCB 167	12.2	<12.4	<19.6	<14.7	28.5
PCB 189	<0.95	<1.13	<3.55	<1.88	77.2
Total Dioxins & Furans Only	<29.7	<91.8	<25.4	<49.0	75.9

* At 25°C and 1 atmosphere

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 52
Clean Harbors Sarnia
Dioxin and Furan Specific Isomer Emission Rates

Specific Isomer	Emission Rate				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/s	ng/s	ng/s	ng/s	%
2378-tetrachlorodibenzo-p-dioxin	<0.023	<0.12	<0.032	<0.060	94.4
12378-pentachlorodibenzo-p-dioxin	<0.025	<0.11	<0.027	<0.055	90.9
123478-hexachlorodibenzo-p-dioxin	<0.015	<0.10	<0.024	<0.047	102
123678-hexachlorodibenzo-p-dioxin	0.044	<0.098	<0.024	<0.055	69.6
123789-hexachlorodibenzo-p-dioxin	0.031	<0.10	<0.024	<0.052	82.9
1234678-heptachlorodibenzo-p-dioxin	<0.16	0.37	<0.089	<0.21	70.9
Octachlorodibenzo-p-dioxin	0.22	<0.42	0.18	<0.27	46.5
2378-tetrachlorodibenzofuran	<0.056	<0.20	<0.062	<0.11	76.9
12378-pentachlorodibenzofuran	<0.030	0.17	<0.031	<0.077	105
23478-pentachlorodibenzofuran	0.082	<0.11	<0.029	<0.075	57.0
123478-hexachlorodibenzofuran	0.020	<0.13	<0.019	<0.056	114
123678-hexachlorodibenzofuran	<0.034	<0.12	<0.018	<0.059	98.2
234678-hexachlorodibenzofuran	0.048	<0.12	<0.018	<0.064	86.4
123789-hexachlorodibenzofuran	<0.027	<0.15	<0.043	<0.075	93.6
1234678-heptachlorodibenzofuran	0.081	0.23	0.039	0.12	87.3
1234789-heptachlorodibenzofuran	<0.026	<0.17	<0.029	<0.075	109
Octachlorodibenzofuran	<0.045	<0.32	<0.12	<0.16	88.6
PCB 77	1.94	5.48	2.14	3.19	62.3
PCB 81	<0.11	<0.35	<0.50	<0.32	62.1
PCB 126	<0.064	<0.25	<0.35	<0.22	65.9
PCB 169	<0.037	<0.031	<0.29	<0.12	124
PCB 105	13.9	16.7	<16.6	<15.7	10.3
PCB 114	1.13	1.21	<1.08	<1.14	5.4
PCB 118	42.3	55.9	52.6	50.3	14.1
PCB 123	<0.71	<0.60	<0.73	<0.68	10.2
PCB 156/157	0.96	1.15	1.61	1.24	27.0
PCB 167	0.40	<0.42	<0.62	<0.48	25.8
PCB 189	<0.031	<0.038	<0.11	<0.060	74.6
Total Dioxins & Furans Only	<0.97	<3.07	<0.80	<1.61	78.3

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 53
Clean Harbors Sarnia
Summary of Dioxin and Furan Specific Isomer Emission Data

Specific Isomer	Actual Concentration pg/m^3	Dry Reference Concentration pg/Rm^3*	Dry Adjusted Concentration pg/Rm^3**	Wet Reference Concentration pg/Rm^3*	Emission Rate ng/s
2378-tetrachlorodibenzo-p-dioxin	<1.16	<3.43	<3.11	<1.81	<0.060
12378-pentachlorodibenzo-p-dioxin	<1.07	<3.17	<2.88	<1.68	<0.055
123478-hexachlorodibenzo-p-dioxin	<0.91	<2.69	<2.44	<1.42	<0.047
123678-hexachlorodibenzo-p-dioxin	<1.08	<3.18	<2.88	<1.68	<0.055
123789-hexachlorodibenzo-p-dioxin	<1.01	<3.00	<2.71	<1.58	<0.052
1234678-heptachlorodibenzo-p-dioxin	<4.03	<11.9	<10.8	<6.30	<0.21
Octachlorodibenzo-p-dioxin	<5.31	<15.7	<14.2	<8.30	<0.27
2378-tetrachlorodibenzofuran	<2.06	<6.10	<5.53	<3.23	<0.11
12378-pentachlorodibenzofuran	<1.50	<4.43	<4.01	<2.34	<0.077
23478-pentachlorodibenzofuran	<1.46	<4.31	<3.89	<2.28	<0.075
123478-hexachlorodibenzofuran	<1.07	<3.18	<2.88	<1.68	<0.056
123678-hexachlorodibenzofuran	<1.14	<3.37	<3.04	<1.78	<0.059
234678-hexachlorodibenzofuran	<1.23	<3.65	<3.29	<1.93	<0.064
123789-hexachlorodibenzofuran	<1.45	<4.29	<3.89	<2.27	<0.075
1234678-heptachlorodibenzofuran	2.28	6.76	6.10	3.57	0.12
1234789-heptachlorodibenzofuran	<1.45	<4.31	<3.90	<2.27	<0.075
Octachlorodibenzofuran	<3.10	<9.16	<8.34	<4.85	<0.16
PCB 77	62.1	184	167	97.1	3.19
PCB 81	<6.32	<18.6	<17.1	<9.88	<0.32
PCB 126	<4.38	<12.9	<11.8	<6.85	<0.22
PCB 169	<2.42	<7.07	<6.58	<3.79	<0.12
PCB 105	<310	<913	<831	<484	<15.7
PCB 114	<22.4	<66.1	<60.1	<35.0	<1.14
PCB 118	989	2916	2656	1546	50.3
PCB 123	<13.5	<39.7	<36.2	<21.1	<0.68
PCB 156/157	24.5	72.1	66.0	38.3	1.24
PCB 167	<9.43	<27.7	<25.4	<14.7	<0.48
PCB 189	<1.20	<3.52	<3.25	<1.88	<0.060
Total Dioxins & Furans Only	<31.3	<92.7	<83.9	<49.0	<1.61

* At 25°C and 1 atmosphere

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

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 54
Clean Harbors Sarnia
Blank Dioxin and Furan Specific Isomer Analyses

Specific Isomer	Blank Train pg	Laboratory Blank pg
2378-tetrachlorodibenzo-p-dioxin	<3.3	<2.4
12378-pentachlorodibenzo-p-dioxin	<1.9	<1.5
123478-hexachlorodibenzo-p-dioxin	<2.7	<1.6
123678-hexachlorodibenzo-p-dioxin	<2.6	<1.6
123789-hexachlorodibenzo-p-dioxin	<2.6	<1.6
1234678-heptachlorodibenzo-p-dioxin	<3.2	<1.9
Octachlorodibenzo-p-dioxin	<8.4	<2.9
2378-tetrachlorodibenzofuran	<2.3	<1.8
12378-pentachlorodibenzofuran	<1.8	<2.0
23478-pentachlorodibenzofuran	<1.5	<1.0
123478-hexachlorodibenzofuran	<1.2	<0.95
123678-hexachlorodibenzofuran	<1.1	<0.91
234678-hexachlorodibenzofuran	<1.1	<0.93
123789-hexachlorodibenzofuran	<2.4	<1.7
1234678-heptachlorodibenzofuran	<1.8	<1.5
1234789-heptachlorodibenzofuran	<2.2	<1.8
Octachlorodibenzofuran	<4.1	<2.9
PCB 77	<2.8	<4.2
PCB 81	<1.9	<4.2
PCB 126	<4.1	<4.4
PCB 169	<2.0	<3.8
PCB 105	14.6	15.9
PCB 114	<2.4	<4.1
PCB 118	34.6	<26
PCB 123	<2.5	<4.1
PCB 156/157	<2.5	<5.4
PCB 167	2.22	4.36
PCB 189	<1.0	<4.4
Total Dioxins & Furans Only	<44.2	<29.0

"<" indicates that the amount detected is less than the analytical detection limit (<MDL). In these cases the value of the detection limit was used to calculate the total collected.

TABLE 55
Clean Harbors Sarnia
Dioxin and Furan Toxicity Equivalent Actual Concentrations

Specific Isomer	Toxicity Equivalency Factor	Actual Concentration			
		Test No. 1 pg TEQ/m^3	Test No. 2 pg TEQ/m^3	Test No. 3 pg TEQ/m^3	Average pg TEQ/m^3
2378-tetrachlorodibenzo-p-dioxin	1.000	<0.45	<2.38	<0.64	<1.16
12378-pentachlorodibenzo-p-dioxin	0.500	<0.25	<1.08	<0.27	<0.54
123478-hexachlorodibenzo-p-dioxin	0.100	<0.029	<0.20	<0.049	<0.091
123678-hexachlorodibenzo-p-dioxin	0.100	0.087	<0.19	<0.048	<0.11
123789-hexachlorodibenzo-p-dioxin	0.100	0.060	<0.20	<0.048	<0.10
1234678-heptachlorodibenzo-p-dioxin	0.010	<0.032	0.071	<0.018	<0.040
Octachlorodibenzo-p-dioxin	0.001	0.0044	<0.0079	0.0036	<0.0053
2378-tetrachlorodibenzofuran	0.100	<0.11	<0.38	<0.13	<0.21
12378-pentachlorodibenzofuran	0.050	<0.030	0.16	<0.032	<0.075
23478-pentachlorodibenzofuran	0.500	0.81	<1.08	<0.29	<0.73
123478-hexachlorodibenzofuran	0.100	0.039	<0.25	<0.038	<0.11
123678-hexachlorodibenzofuran	0.100	<0.067	<0.24	<0.036	<0.11
234678-hexachlorodibenzofuran	0.100	0.095	<0.24	<0.037	<0.12
123789-hexachlorodibenzofuran	0.100	<0.053	<0.30	<0.086	<0.14
1234678-heptachlorodibenzofuran	0.010	0.016	0.045	0.0078	0.023
1234789-heptachlorodibenzofuran	0.010	<0.0052	<0.033	<0.0059	<0.015
Octachlorodibenzofuran	0.001	<0.00089	<0.006	<0.0023	<0.0031
PCB 77	0.0001	0.0038	0.010	0.0043	0.0062
PCB 81	0.0003	<0.00064	<0.0020	<0.0030	<0.0019
PCB 126	0.1000	<0.13	<0.48	<0.71	<0.44
PCB 169	0.0300	<0.022	<0.018	<0.18	<0.073
PCB 105	0.00003	0.0082	0.0096	<0.010	<0.0093
PCB 114	0.00003	0.00067	0.00069	<0.00066	<0.00067
PCB 118	0.00003	0.025	0.032	0.032	0.030
PCB 123	0.00003	<0.00042	<0.00035	<0.00045	<0.00040
PCB 156/157	0.00003	0.00057	0.00066	0.00098	0.00074
PCB 167	0.00003	0.00024	<0.00024	<0.00038	<0.00028
PCB 189	0.00003	<0.000018	<0.000022	<0.000068	<0.000036
Total Dioxins & Furans Only		<2.14	<6.86	<1.74	<3.58

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 56
Clean Harbors Sarnia
Dioxin and Furan Toxicity Equivalent Dry Reference Concentrations

Specific Isomer	Toxicity Equivalency Factor	Dry Reference Concentration			
		Test No. 1 pg TEQ/Rm^3*	Test No. 2 pg TEQ/Rm^3*	Test No. 3 pg TEQ/Rm^3*	Average pg TEQ/Rm^3*
2378-tetrachlorodibenzo-p-dioxin	1.000	<1.34	<7.08	<1.87	<3.43
12378-pentachlorodibenzo-p-dioxin	0.500	<0.74	<3.22	<0.80	<1.59
123478-hexachlorodibenzo-p-dioxin	0.100	<0.085	<0.58	<0.14	<0.27
123678-hexachlorodibenzo-p-dioxin	0.100	0.26	<0.56	<0.14	<0.32
123789-hexachlorodibenzo-p-dioxin	0.100	0.18	<0.58	<0.14	<0.30
1234678-heptachlorodibenzo-p-dioxin	0.010	<0.094	0.21	<0.052	<0.12
Octachlorodibenzo-p-dioxin	0.001	0.013	<0.024	0.010	<0.016
2378-tetrachlorodibenzofuran	0.100	<0.33	<1.14	<0.36	<0.61
12378-pentachlorodibenzofuran	0.050	<0.088	0.49	<0.092	<0.22
23478-pentachlorodibenzofuran	0.500	2.40	<3.22	<0.85	<2.16
123478-hexachlorodibenzofuran	0.100	0.11	<0.73	<0.11	<0.32
123678-hexachlorodibenzofuran	0.100	<0.20	<0.71	<0.10	<0.34
234678-hexachlorodibenzofuran	0.100	0.28	<0.71	<0.11	<0.37
123789-hexachlorodibenzofuran	0.100	<0.16	<0.88	<0.25	<0.43
1234678-heptachlorodibenzofuran	0.010	0.047	0.13	0.023	0.068
1234789-heptachlorodibenzofuran	0.010	<0.015	<0.097	<0.017	<0.043
Octachlorodibenzofuran	0.001	<0.0026	<0.018	<0.0068	<0.0092
PCB 77	0.0001	0.011	0.031	0.013	0.018
PCB 81	0.0003	<0.0019	<0.0059	<0.0089	<0.0056
PCB 126	0.1000	<0.37	<1.42	<2.07	<1.29
PCB 169	0.0300	<0.066	<0.052	<0.52	<0.21
PCB 105	0.00003	0.024	0.028	<0.029	<0.027
PCB 114	0.00003	0.0020	0.0021	<0.0019	<0.0020
PCB 118	0.00003	0.074	0.095	0.093	0.087
PCB 123	0.00003	<0.0012	<0.0010	<0.0013	<0.0012
PCB 156/157	0.00003	0.0017	0.0020	0.0028	0.0022
PCB 167	0.00003	0.00070	<0.00071	<0.0011	<0.00083
PCB 189	0.00003	<0.000055	<0.000064	<0.00020	<0.00011
Total Dioxins & Furans Only		<6.34	<20.4	<5.08	<10.6

* At 25°C and 1 atmosphere

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 57
Clean Harbors Sarnia
Dioxin and Furan Toxicity Equivalent Dry Adjusted Concentrations

Specific Isomer	Toxicity Equivalency Factor	Dry Adjusted Concentration			
		Test No. 1 pg TEQ/Rm^3*	Test No. 2 pg TEQ/Rm^3*	Test No. 3 pg TEQ/Rm^3*	Average pg TEQ/Rm^3*
2378-tetrachlorodibenzo-p-dioxin	1.000	<1.18	<6.39	<1.75	<3.11
12378-pentachlorodibenzo-p-dioxin	0.500	<0.66	<2.91	<0.75	<1.44
123478-hexachlorodibenzo-p-dioxin	0.100	<0.076	<0.52	<0.13	<0.24
123678-hexachlorodibenzo-p-dioxin	0.100	0.23	<0.50	<0.13	<0.29
123789-hexachlorodibenzo-p-dioxin	0.100	0.16	<0.52	<0.13	<0.27
1234678-heptachlorodibenzo-p-dioxin	0.010	<0.083	0.19	<0.049	<0.11
Octachlorodibenzo-p-dioxin	0.001	0.011	<0.021	0.0099	<0.014
2378-tetrachlorodibenzofuran	0.100	<0.29	<1.03	<0.34	<0.55
12378-pentachlorodibenzofuran	0.050	<0.078	0.44	<0.087	<0.20
23478-pentachlorodibenzofuran	0.500	2.13	<2.91	<0.80	<1.94
123478-hexachlorodibenzofuran	0.100	0.10	<0.66	<0.10	<0.29
123678-hexachlorodibenzofuran	0.100	<0.17	<0.64	<0.098	<0.30
234678-hexachlorodibenzofuran	0.100	0.25	<0.64	<0.10	<0.33
123789-hexachlorodibenzofuran	0.100	<0.14	<0.79	<0.24	<0.39
1234678-heptachlorodibenzofuran	0.010	0.042	0.12	0.021	0.061
1234789-heptachlorodibenzofuran	0.010	<0.014	<0.087	<0.016	<0.039
Octachlorodibenzofuran	0.001	<0.0023	<0.016	<0.0064	<0.0083
PCB 77	0.0001	0.010	0.028	0.012	0.017
PCB 81	0.0003	<0.0017	<0.0053	<0.0083	<0.0051
PCB 126	0.1000	<0.33	<1.28	<1.94	<1.18
PCB 169	0.0300	<0.058	<0.047	<0.49	<0.20
PCB 105	0.00003	0.022	0.026	<0.028	<0.025
PCB 114	0.00003	0.0018	0.0019	<0.0018	<0.0018
PCB 118	0.00003	0.066	0.086	0.087	0.080
PCB 123	0.00003	<0.0011	<0.00093	<0.0012	<0.0011
PCB 156/157	0.00003	0.0015	0.0018	0.0027	0.0020
PCB 167	0.00003	0.00062	<0.00064	<0.0010	<0.00076
PCB 189	0.00003	<0.000048	<0.000058	<0.00019	<0.000097
Total Dioxins & Furans Only		<5.62	<18.4	<4.77	<9.59

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

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 58
Clean Harbors Sarnia
Dioxin and Furan Toxicity Equivalent Wet Reference Concentrations

Specific Isomer	Toxicity Equivalency Factor	Wet Reference Concentration			
		Test No. 1 pg TEQ/Rm^{3}*	Test No. 2 pg TEQ/Rm^{3}*	Test No. 3 pg TEQ/Rm^{3}*	Average pg TEQ/Rm^{3}*
2378-tetrachlorodibenzo-p-dioxin	1.000	<0.70	<3.73	<1.00	<1.81
12378-pentachlorodibenzo-p-dioxin	0.500	<0.39	<1.70	<0.43	<0.84
123478-hexachlorodibenzo-p-dioxin	0.100	<0.045	<0.31	<0.077	<0.14
123678-hexachlorodibenzo-p-dioxin	0.100	0.14	<0.29	<0.075	<0.17
123789-hexachlorodibenzo-p-dioxin	0.100	0.094	<0.31	<0.076	<0.16
1234678-heptachlorodibenzo-p-dioxin	0.010	<0.049	0.11	<0.028	<0.063
Octachlorodibenzo-p-dioxin	0.001	0.0068	<0.012	0.0056	<0.0083
2378-tetrachlorodibenzofuran	0.100	<0.17	<0.60	<0.20	<0.32
12378-pentachlorodibenzofuran	0.050	<0.046	0.26	<0.050	<0.12
23478-pentachlorodibenzofuran	0.500	1.26	<1.70	<0.46	<1.14
123478-hexachlorodibenzofuran	0.100	0.060	<0.38	<0.059	<0.17
123678-hexachlorodibenzofuran	0.100	<0.10	<0.37	<0.056	<0.18
234678-hexachlorodibenzofuran	0.100	0.15	<0.37	<0.058	<0.19
123789-hexachlorodibenzofuran	0.100	<0.082	<0.46	<0.13	<0.23
1234678-heptachlorodibenzofuran	0.010	0.025	0.070	0.012	0.036
1234789-heptachlorodibenzofuran	0.010	<0.0080	<0.051	<0.0093	<0.023
Octachlorodibenzofuran	0.001	<0.0014	<0.010	<0.0037	<0.0049
PCB 77	0.0001	0.0060	0.016	0.0068	0.0097
PCB 81	0.0003	<0.0010	<0.0031	<0.0048	<0.0030
PCB 126	0.1000	<0.20	<0.75	<1.11	<0.69
PCB 169	0.0300	<0.034	<0.027	<0.28	<0.11
PCB 105	0.00003	0.013	0.015	<0.016	<0.015
PCB 114	0.00003	0.0010	0.0011	<0.0010	<0.0011
PCB 118	0.00003	0.039	0.050	0.050	0.046
PCB 123	0.00003	<0.00066	<0.00054	<0.00070	<0.00063
PCB 156/157	0.00003	0.00089	0.0010	0.0015	0.0011
PCB 167	0.00003	0.00037	<0.00037	<0.00059	<0.00044
PCB 189	0.00003	<0.000029	<0.000034	<0.00011	<0.000056
Total Dioxins & Furans Only		<3.33	<10.7	<2.73	<5.60

* At 25°C and 1 atmosphere

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 59
Clean Harbors Sarnia
Dioxin and Furan Toxicity Equivalent Emission Rates

Specific Isomer	Toxicity Equivalency Factor	Emission Rate			
		Test No. 1 ng TEQ/s	Test No. 2 ng TEQ/s	Test No. 3 ng TEQ/s	Average ng TEQ/s
2378-tetrachlorodibenzo-p-dioxin	1.000	<0.023	<0.12	<0.032	<0.060
12378-pentachlorodibenzo-p-dioxin	0.500	<0.013	<0.057	<0.014	<0.028
123478-hexachlorodibenzo-p-dioxin	0.100	<0.0015	<0.010	<0.0024	<0.0047
123678-hexachlorodibenzo-p-dioxin	0.100	0.0044	<0.0098	<0.0024	<0.0055
123789-hexachlorodibenzo-p-dioxin	0.100	0.0031	<0.010	<0.0024	<0.0052
1234678-heptachlorodibenzo-p-dioxin	0.010	<0.0016	0.0037	<0.00089	<0.0021
Octachlorodibenzo-p-dioxin	0.001	0.00022	<0.00042	0.00018	<0.00027
2378-tetrachlorodibenzofuran	0.100	<0.0056	<0.020	<0.0062	<0.011
12378-pentachlorodibenzofuran	0.050	<0.0015	0.0085	<0.0016	<0.0039
23478-pentachlorodibenzofuran	0.500	0.041	<0.057	<0.015	<0.037
123478-hexachlorodibenzofuran	0.100	0.0020	<0.013	<0.0019	<0.0056
123678-hexachlorodibenzofuran	0.100	<0.0034	<0.012	<0.0018	<0.0059
234678-hexachlorodibenzofuran	0.100	0.0048	<0.012	<0.0018	<0.0064
123789-hexachlorodibenzofuran	0.100	<0.0027	<0.015	<0.0043	<0.0075
1234678-heptachlorodibenzofuran	0.010	0.00081	0.0023	0.00039	0.0012
1234789-heptachlorodibenzofuran	0.010	<0.00026	<0.0017	<0.00029	<0.00075
Octachlorodibenzofuran	0.001	<0.000045	<0.00032	<0.00012	<0.00016
PCB 77	0.0001	0.00019	0.00055	0.00021	0.00032
PCB 81	0.0003	<0.000033	<0.00010	<0.00015	<0.000096
PCB 126	0.1000	<0.0064	<0.025	<0.035	<0.022
PCB 169	0.0300	<0.0011	<0.00092	<0.0088	<0.0036
PCB 105	0.00003	0.00042	0.00050	<0.00050	<0.00047
PCB 114	0.00003	0.000034	0.000036	<0.000032	<0.000034
PCB 118	0.00003	0.0013	0.0017	0.0016	0.0015
PCB 123	0.00003	<0.000021	<0.000018	<0.000022	<0.000021
PCB 156/157	0.00003	0.000029	0.000034	0.000048	0.000037
PCB 167	0.00003	0.000012	<0.000012	<0.000019	<0.000014
PCB 189	0.00003	<0.00000093	<0.0000011	<0.0000034	<0.0000018
Total Dioxins & Furans Only		<0.11	<0.36	<0.086	<0.18

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the emission data.

TABLE 60

Clean Harbors Sarnia

Summary of Dioxin and Furan Toxicity Equivalent Emission Data

Calculated Using the Full Detection Limit

Specific Isomer	Actual Concentration pg TEQ/m^3	Dry Reference Concentration pg TEQ/Rm^3*	Dry Adjusted Concentration pg TEQ/Rm^3**	Wet Reference Concentration pg TEQ/Rm^3*	Emission Rate ng TEQ/s
2378-tetrachlorodibenzo-p-dioxin	<1.16	<3.43	<3.11	<1.81	<0.060
12378-pentachlorodibenzo-p-dioxin	<0.54	<1.59	<1.44	<0.84	<0.028
123478-hexachlorodibenzo-p-dioxin	<0.091	<0.27	<0.24	<0.14	<0.0047
123678-hexachlorodibenzo-p-dioxin	<0.11	<0.32	<0.29	<0.17	<0.0055
123789-hexachlorodibenzo-p-dioxin	<0.10	<0.30	<0.27	<0.16	<0.0052
1234678-heptachlorodibenzo-p-dioxin	<0.040	<0.12	<0.11	<0.063	<0.0021
Octachlorodibenzo-p-dioxin	<0.0053	<0.016	<0.014	<0.0083	<0.00027
2378-tetrachlorodibenzofuran	<0.21	<0.61	<0.55	<0.32	<0.011
12378-pentachlorodibenzofuran	<0.075	<0.22	<0.20	<0.12	<0.0039
23478-pentachlorodibenzofuran	<0.73	<2.16	<1.94	<1.14	<0.037
123478-hexachlorodibenzofuran	<0.11	<0.32	<0.29	<0.17	<0.0056
123678-hexachlorodibenzofuran	<0.11	<0.34	<0.30	<0.18	<0.0059
234678-hexachlorodibenzofuran	<0.12	<0.37	<0.33	<0.19	<0.0064
123789-hexachlorodibenzofuran	<0.14	<0.43	<0.39	<0.23	<0.0075
1234678-heptachlorodibenzofuran	0.023	0.068	0.061	0.036	0.0012
1234789-heptachlorodibenzofuran	<0.015	<0.043	<0.039	<0.023	<0.00075
Octachlorodibenzofuran	<0.0031	<0.0092	<0.0083	<0.0049	<0.00016
PCB 77	0.0062	0.018	0.017	0.0097	0.00032
PCB 81	<0.0019	<0.0056	<0.0051	<0.0030	<0.000096
PCB 126	<0.44	<1.29	<1.18	<0.69	<0.022
PCB 169	<0.073	<0.21	<0.20	<0.11	<0.0036
PCB 105	<0.0093	<0.027	<0.025	<0.015	<0.00047
PCB 114	<0.00067	<0.0020	<0.0018	<0.0011	<0.000034
PCB 118	0.030	0.087	0.080	0.046	0.0015
PCB 123	<0.00040	<0.0012	<0.0011	<0.00063	<0.000021
PCB 156/157	0.00074	0.0022	0.0020	0.0011	0.000037
PCB 167	<0.00028	<0.00083	<0.00076	<0.00044	<0.000014
PCB 189	<0.000036	<0.00011	<0.000097	<0.000056	<0.0000018
Total Dioxins & Furans Only	<3.58	<10.6	<9.59	<5.60	<0.18

* At 25°C and 1 atmosphere

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

Note: Emission data calculated using the full detection limit for those isomers below the analytical detection limit.

TABLE 61
Clean Harbors Sarnia
Summary of Dioxin and Furan Toxicity Equivalent Emission Data Calculated Using Half the Detection Limit

Specific Isomer	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg TEQ/m^3	pg TEQ/Rm^3*	pg TEQ/Rm^3**	pg TEQ/Rm^3*	ng TEQ/s
2378-tetrachlorodibenzo-p-dioxin	0.58	1.71	1.55	0.91	0.030
12378-pentachlorodibenzo-p-dioxin	0.54	1.59	1.44	0.84	0.028
123478-hexachlorodibenzo-p-dioxin	0.046	0.13	0.12	0.071	0.0023
123678-hexachlorodibenzo-p-dioxin	0.068	0.20	0.18	0.11	0.0035
123789-hexachlorodibenzo-p-dioxin	0.061	0.18	0.16	0.095	0.0031
1234678-heptachlorodibenzo-p-dioxin	0.032	0.095	0.086	0.050	0.0017
Octachlorodibenzo-p-dioxin	0.0012	0.0035	0.0032	0.0019	0.000061
2378-tetrachlorodibenzofuran	0.10	0.31	0.28	0.16	0.0053
12378-pentachlorodibenzofuran	0.039	0.11	0.10	0.061	0.0020
23478-pentachlorodibenzofuran	0.30	0.89	0.80	0.47	0.015
123478-hexachlorodibenzofuran	0.060	0.18	0.16	0.094	0.0031
123678-hexachlorodibenzofuran	0.057	0.17	0.15	0.089	0.0029
234678-hexachlorodibenzofuran	0.077	0.23	0.21	0.12	0.0040
123789-hexachlorodibenzofuran	0.072	0.21	0.19	0.11	0.0037
1234678-heptachlorodibenzofuran	0.023	0.068	0.061	0.036	0.0012
1234789-heptachlorodibenzofuran	0.0073	0.022	0.020	0.011	0.00038
Octachlorodibenzofuran	0.00047	0.0014	0.0013	0.00073	0.000024
PCB 77	0.0062	0.018	0.017	0.0097	0.00032
PCB 81	0.00095	0.0028	0.0026	0.0015	0.000048
PCB 126	0.22	0.64	0.59	0.34	0.011
PCB 169	0.036	0.11	0.099	0.057	0.0018
PCB 105	0.0076	0.022	0.020	0.012	0.00039
PCB 114	0.00056	0.0017	0.0015	0.00088	0.000029
PCB 118	0.030	0.087	0.080	0.046	0.0015
PCB 123	0.00020	0.00060	0.00054	0.00032	0.000010
PCB 156/157	0.00074	0.0022	0.0020	0.0011	0.000037
PCB 167	0.00018	0.00053	0.00048	0.00028	0.0000091
PCB 189	0.000018	0.000053	0.000049	0.000028	0.00000091
Total Dioxins & Furans Only	2.06	6.10	5.52	3.22	0.11
Total Dioxins, Furans and PCBs	2.36	6.99	6.33	3.69	0.12

* At 25°C and 1 atmosphere

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

Note: Emission data calculated using half the detection limit for those isomers below the analytical detection limit.

TABLE 62
Clean Harbors Sarnia
Polychlorinated Biphenyl Congener Group Emission Data
Test No. 1

Congener Group	Total Collected pg	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate µg/s
Dichlorinated biphenyls	9390	0.70	2.06	1.82	1.08	0.035
Trichlorinated biphenyls	12000	0.89	2.63	2.33	1.38	0.045
Tetrachlorinated biphenyls	90200	6.68	19.8	17.5	10.4	0.34
Pentachlorinated biphenyls	150000	11.1	32.9	29.1	17.2	0.56
Hexachlorinated biphenyls	30600	2.27	6.70	5.94	3.52	0.11
Heptachlorinated biphenyls	2590	0.19	0.57	0.50	0.30	0.0097
Octachlorinated biphenyls	381	0.028	0.083	0.074	0.044	0.0014
Nonachlorinated biphenyls	41.5	0.0031	0.0091	0.0081	0.0048	0.00016
Decachlorinated biphenyl	10.0	0.00074	0.0022	0.0019	0.0011	0.000037
Total	295213	21.9	64.7	57.3	33.9	1.11

Dry Gas Volume Sampled (Rm^3*) :	4.564
Actual Flowrate (m^3/s) :	50.6
Dry Reference Flowrate (Rm^3/s*) :	17.1
Dry Adjusted Flowrate (Rm^3/s**) :	19.3
Wet Reference Flowrate (Rm^3/s*) :	32.6

* At 25°C and 1 atmosphere

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

TABLE 63
Clean Harbors Sarnia
Polychlorinated Biphenyl Congener Group Emission Data
Test No. 2

Congener Group	Total Collected pg	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate µg/s
Dichlorinated biphenyls	56400	4.07	12.1	10.9	6.38	0.21
Trichlorinated biphenyls	33600	2.43	7.21	6.51	3.80	0.13
Tetrachlorinated biphenyls	177000	12.8	38.0	34.3	20.0	0.67
Pentachlorinated biphenyls	259000	18.7	55.6	50.2	29.3	0.98
Hexachlorinated biphenyls	37000	2.67	7.94	7.17	4.18	0.14
Heptachlorinated biphenyls	2910	0.21	0.62	0.56	0.33	0.011
Octachlorinated biphenyls	489	0.035	0.10	0.095	0.055	0.0018
Nonachlorinated biphenyls	30.0	0.0022	0.0064	0.0058	0.0034	0.00011
Decachlorinated biphenyl	16.0	0.0012	0.0034	0.0031	0.0018	0.000060
Total	566445	40.9	122	110	64.1	2.14

Dry Gas Volume Sampled (Rm³*) :	4.659
Actual Flowrate (m³/s) :	52.3
Dry Reference Flowrate (Rm³/s*) :	17.6
Dry Adjusted Flowrate (Rm³/s**) :	19.5
Wet Reference Flowrate (Rm³/s*) :	33.4

* At 25°C and 1 atmosphere

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

TABLE 64
Clean Harbors Sarnia
Polychlorinated Biphenyl Congener Group Emission Data
Test No. 3

Congener Group	Total Collected pg	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate µg/s
Dichlorinated biphenyls	9870	0.77	2.25	2.11	1.21	0.038
Trichlorinated biphenyls	14100	1.10	3.21	3.01	1.73	0.055
Tetrachlorinated biphenyls	110000	8.60	25.0	23.5	13.5	0.43
Pentachlorinated biphenyls	199000	15.6	45.3	42.5	24.4	0.77
Hexachlorinated biphenyls	47200	3.69	10.7	10.1	5.78	0.18
Heptachlorinated biphenyls	3700	0.29	0.84	0.79	0.45	0.014
Octachlorinated biphenyls	573	0.045	0.13	0.12	0.070	0.0022
Nonachlorinated biphenyls	<53	<0.0041	<0.012	<0.011	<0.0065	<0.00021
Decachlorinated biphenyl	<31	<0.0024	<0.0071	<0.0066	<0.0038	<0.00012
Total	<384527	<30.0	<87.5	<82.2	<47.1	<1.49

Dry Gas Volume Sampled (Rm³*) :	4.395
Actual Flowrate (m³/s) :	49.5
Dry Reference Flowrate (Rm³/s*) :	17.0
Dry Adjusted Flowrate (Rm³/s**) :	18.1
Wet Reference Flowrate (Rm³/s*) :	31.6

* At 25°C and 1 atmosphere

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

Note: "<" 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 65
Clean Harbors Sarnia
Polychlorinated Biphenyl Congener Group Actual Concentrations

Congener Group	Actual Concentration Test No. 1 ng/m³	Test No. 2 ng/m³	Test No. 3 ng/m³	Average ng/m³	Coefficient of Variation %
Dichlorinated biphenyls	0.70	4.07	0.77	1.85	104
Trichlorinated biphenyls	0.89	2.43	1.10	1.47	56.6
Tetrachlorinated biphenyls	6.68	12.8	8.60	9.35	33.4
Pentachlorinated biphenyls	11.1	18.7	15.6	15.1	25.3
Hexachlorinated biphenyls	2.27	2.67	3.69	2.88	25.5
Heptachlorinated biphenyls	0.19	0.21	0.29	0.23	22.4
Octachlorinated biphenyls	0.028	0.035	0.045	0.036	23.0
Nonachlorinated biphenyls	0.0031	0.0022	<0.0041	<0.0031	31.6
Decachlorinated biphenyl	0.00074	0.0012	<0.0024	<0.0014	60.9
Total	21.9	40.9	<30.0	<30.9	30.9

TABLE 66
Clean Harbors Sarnia
Polychlorinated Biphenyl Congener Group Dry Reference Concentrations

Congener Group	Dry Reference Concentration Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	Coefficient of Variation %
Dichlorinated biphenyls	2.06	12.1	2.25	5.47	105
Trichlorinated biphenyls	2.63	7.21	3.21	4.35	57.4
Tetrachlorinated biphenyls	19.8	38.0	25.0	27.6	34.0
Pentachlorinated biphenyls	32.9	55.6	45.3	44.6	25.5
Hexachlorinated biphenyls	6.70	7.94	10.7	8.46	24.4
Heptachlorinated biphenyls	0.57	0.62	0.84	0.68	21.4
Octachlorinated biphenyls	0.083	0.10	0.13	0.11	22.1
Nonachlorinated biphenyls	0.0091	0.0064	<0.012	<0.0092	30.6
Decachlorinated biphenyl	0.0022	0.0034	<0.0071	<0.0042	59.8
Total	64.7	122	<87.5	<91.3	31.4

* At 25°C and 1 atmosphere

TABLE 67
Clean Harbors Sarnia
Polychlorinated Biphenyl Congener Group Dry Adjusted Concentrations

Congener Group	Dry Adjusted Concentration Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	Coefficient of Variation %
Dichlorinated biphenyls	1.82	10.9	2.11	4.95	104
Trichlorinated biphenyls	2.33	6.51	3.01	3.95	56.7
Tetrachlorinated biphenyls	17.5	34.3	23.5	25.1	33.9
Pentachlorinated biphenyls	29.1	50.2	42.5	40.6	26.2
Hexachlorinated biphenyls	5.94	7.17	10.1	7.73	27.5
Heptachlorinated biphenyls	0.50	0.56	0.79	0.62	24.5
Octachlorinated biphenyls	0.074	0.095	0.12	0.097	25.1
Nonachlorinated biphenyls	0.0081	0.0058	<0.011	<0.0084	33.0
Decachlorinated biphenyl	0.0019	0.0031	<0.0066	<0.0039	62.7
Total	57.3	110	<82.2	<83.1	31.6

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

TABLE 68
Clean Harbors Sarnia
Polychlorinated Biphenyl Congener Group Wet Reference Concentrations

Congener Group	Wet Reference Concentration Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	Coefficient of Variation %
Dichlorinated biphenyls	1.08	6.38	1.21	2.89	105
Trichlorinated biphenyls	1.38	3.80	1.73	2.30	56.9
Tetrachlorinated biphenyls	10.4	20.0	13.5	14.6	33.7
Pentachlorinated biphenyls	17.2	29.3	24.4	23.6	25.6
Hexachlorinated biphenyls	3.52	4.18	5.78	4.49	25.8
Heptachlorinated biphenyls	0.30	0.33	0.45	0.36	22.8
Octachlorinated biphenyls	0.044	0.055	0.070	0.056	23.4
Nonachlorinated biphenyls	0.0048	0.0034	<0.0065	<0.0049	31.7
Decachlorinated biphenyl	0.0011	0.0018	<0.0038	<0.0023	61.2
Total	33.9	64.1	<47.1	<48.4	31.2

* At 25°C and 1 atmosphere

TABLE 69
Clean Harbors Sarnia
Polychlorinated Biphenyl Emission Rates

Congener Group	Emission Rate Test No. 1 µg/s	Test No. 2 µg/s	Test No. 3 µg/s	Average µg/s	Coefficient of Variation %
Dichlorinated biphenyls	0.035	0.21	0.038	0.095	107
Trichlorinated biphenyls	0.045	0.13	0.055	0.075	59.4
Tetrachlorinated biphenyls	0.34	0.67	0.43	0.48	35.9
Pentachlorinated biphenyls	0.56	0.98	0.77	0.77	27.0
Hexachlorinated biphenyls	0.11	0.14	0.18	0.15	23.6
Heptachlorinated biphenyls	0.0097	0.011	0.014	0.012	20.4
Octachlorinated biphenyls	0.0014	0.0018	0.0022	0.0018	21.6
Nonachlorinated biphenyls	0.00016	0.00011	<0.00021	<0.00016	29.1
Decachlorinated biphenyl	0.000037	0.000060	<0.00012	<0.000073	58.6
Total	1.11	2.14	<1.49	<1.58	33.1

TABLE 70
Clean Harbors Sarnia
Summary of Polychlorinated Biphenyl Emission Data

Congener Group	Actual Concentration ng/m^3	Dry Reference Concentration ng/Rm^3*	Dry Adjusted Concentration ng/Rm^3**	Wet Reference Concentration ng/Rm^3*	Emission Rate µg/s
Dichlorinated biphenyls	1.85	5.47	4.95	2.89	0.095
Trichlorinated biphenyls	1.47	4.35	3.95	2.30	0.075
Tetrachlorinated biphenyls	9.35	27.6	25.1	14.6	0.48
Pentachlorinated biphenyls	15.1	44.6	40.6	23.6	0.77
Hexachlorinated biphenyls	2.88	8.46	7.73	4.49	0.15
Heptachlorinated biphenyls	0.23	0.68	0.62	0.36	0.012
Octachlorinated biphenyls	0.036	0.11	0.097	0.056	0.0018
Nonachlorinated biphenyls	<0.0031	<0.0092	<0.0084	<0.0049	<0.00016
Decachlorinated biphenyl	<0.0014	<0.0042	<0.0039	<0.0023	<0.000073
Total	<30.9	<91.3	<83.1	<48.4	<1.58

* At 25°C and 1 atmosphere

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

TABLE 71
Clean Harbors Sarnia
Blank Polychlorinated Biphenyl Analyses

Congener Group	Blank Train pg	Laboratory Blank pg
Dichlorinated biphenyls	129	56.0
Trichlorinated biphenyls	148	119
Tetrachlorinated biphenyls	703	345
Pentachlorinated biphenyls	379	348
Hexachlorinated biphenyls	150	156
Heptachlorinated biphenyls	23.8	27.3
Octachlorinated biphenyls	12.5	11.6
Nonachlorinated biphenyls	<1.3	<3.6
Decachlorinated biphenyl	2.14	<1.9
Total	<1549	<1068

"<" indicates that the amount detected is less than the analytical detection limit (<MDL). In these cases the value of the detection limit was used to calculate the total collected.

TABLE 72
Clean Harbors Sarnia
Emission Data for Chlorobenzenes and Related Chlorinated Compounds
Test No. 1

Specific Isomer	Total Collected ng	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate µg/s
1,3-Dichlorobenzene	332	24.6	72.7	64.5	38.2	1.24
1,4-Dichlorobenzene	147	10.9	32.2	28.5	16.9	0.55
1,2-Dichlorobenzene	252	18.7	55.2	48.9	29.0	0.94
Total Dichlorobenzene	731	54.1	160	142	84.0	2.74
1,3,5-trichlorobenzene	35.9	2.66	7.87	6.97	4.13	0.13
1,2,4-trichlorobenzene	140	10.4	30.7	27.2	16.1	0.52
1,2,3-trichlorobenzene	51.0	3.78	11.2	9.90	5.86	0.19
Total Trichlorobenzene	227	16.8	49.7	44.0	26.1	0.85
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	76.2	5.64	16.7	14.8	8.76	0.29
1,2,3,4-tetrachlorobenzene	21.7	1.61	4.75	4.21	2.49	0.081
Total Tetrachlorobenzene	97.9	7.25	21.5	19.0	11.3	0.37
Pentachlorobenzene	31.0	2.30	6.79	6.02	3.56	0.12
Hexachlorobenzene	<16	<1.18	<3.51	<3.11	<1.84	<0.060
Total Chlorobenzenes	<1103	<81.7	<242	<214	<127	<4.13
Hexachloroethane	<16	<1.18	<3.51	<3.11	<1.84	<0.060
a,2,6-Trichlorotoluene	<16	<1.18	<3.51	<3.11	<1.84	<0.060

Dry Gas Volume Sampled (Rm^3*) :	4.564
Actual Flowrate (m^3/s) :	50.6
Dry Reference Flowrate (Rm^3/s*) :	17.1
Dry Adjusted Flowrate (Rm^3/s**) :	19.3
Wet Reference Flowrate (Rm^3/s*) :	32.6

* At 25°C and 1 atmosphere

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

Note: "<" 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 73
Clean Harbors Sarnia
Emission Data for Chlorobenzenes and Related Chlorinated Compounds
Test No. 2

Specific Isomer	Total Collected ng	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate µg/s
1,3-Dichlorobenzene	360	26.0	77.3	69.7	40.7	1.36
1,4-Dichlorobenzene	332	24.0	71.3	64.3	37.6	1.25
1,2-Dichlorobenzene	246	17.8	52.8	47.7	27.8	0.93
Total Dichlorobenzene	938	67.8	201	182	106	3.54
1,3,5-trichlorobenzene	<16	<1.16	<3.43	<3.10	<1.81	<0.060
1,2,4-trichlorobenzene	222	16.0	47.6	43.0	25.1	0.84
1,2,3-trichlorobenzene	229	16.5	49.2	44.4	25.9	0.87
Total Trichlorobenzene	<467	<33.7	<100	<90.5	<52.8	<1.76
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	75.2	5.43	16.1	14.6	8.51	0.28
1,2,3,4-tetrachlorobenzene	74.2	5.36	15.9	14.4	8.39	0.28
Total Tetrachlorobenzene	149	10.8	32.1	28.9	16.9	0.56
Pentachlorobenzene	114	8.23	24.5	22.1	12.9	0.43
Hexachlorobenzene	33.4	2.41	7.17	6.47	3.78	0.13
Total Chlorobenzenes	<1702	<123	<365	<330	<192	<6.43
Hexachloroethane	<16	<1.16	<3.43	<3.10	<1.81	<0.060
a,2,6-Trichlorotoluene	<16	<1.16	<3.43	<3.10	<1.81	<0.060

Dry Gas Volume Sampled (Rm³*) :	4.659
Actual Flowrate (m³/s) :	52.3
Dry Reference Flowrate (Rm³/s*) :	17.6
Dry Adjusted Flowrate (Rm³/s**) :	19.5
Wet Reference Flowrate (Rm³/s*) :	33.4

* At 25°C and 1 atmosphere

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

Note: "<" 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 74
Clean Harbors Sarnia
Emission Data for Chlorobenzenes
Related Chlorinated Compounds
Test No. 3

Specific Isomer	Total Collected ng	Actual Concentration ng/m^3	Dry Reference Concentration ng/Rm^3*	Dry Adjusted Concentration ng/Rm^3**	Wet Reference Concentration ng/Rm^3*	Emission Rate µg/s
1,3-Dichlorobenzene	218	17.0	49.6	46.6	26.7	0.84
1,4-Dichlorobenzene	142	11.1	32.3	30.3	17.4	0.55
1,2-Dichlorobenzene	195	15.2	44.4	41.7	23.9	0.75
Total Dichlorobenzene	555	43.4	126	119	67.9	2.15
1,3,5-trichlorobenzene	<16	<1.25	<3.64	<3.42	<1.96	<0.062
1,2,4-trichlorobenzene	36.1	2.82	8.21	7.71	4.42	0.14
1,2,3-trichlorobenzene	76.2	5.95	17.3	16.3	9.33	0.29
Total Trichlorobenzene	<128	<10.0	<29.2	<27.4	<15.7	<0.50
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<16	<1.25	<3.64	<3.42	<1.96	<0.062
1,2,3,4-tetrachlorobenzene	61.2	4.78	13.9	13.1	7.49	0.24
Total Tetrachlorobenzene	<77	<6.03	<17.6	<16.5	<9.45	<0.30
Pentachlorobenzene	149	11.6	33.9	31.8	18.2	0.58
Hexachlorobenzene	37.5	2.93	8.53	8.01	4.59	0.15
Total Chlorobenzenes	<947	<74.0	<215	<202	<116	<3.66
Hexachloroethane	<16	<1.25	<3.64	<3.42	<1.96	<0.062
a,2,6-Trichlorotoluene	<16	<1.25	<3.64	<3.42	<1.96	<0.062

Dry Gas Volume Sampled (Rm^3*) :	4.395
Actual Flowrate (m^3/s) :	49.5
Dry Reference Flowrate (Rm^3/s*) :	17.0
Dry Adjusted Flowrate (Rm^3/s**) :	18.1
Wet Reference Flowrate (Rm^3/s*) :	31.6

* At 25°C and 1 atmosphere

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

Note: "<" 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 75
Clean Harbors Sarnia
Actual Concentrations for Chlorobenzenes and Related Chlorinated Compounds

Specific Isomer	Actual Concentration Test No. 1 ng/m³	Test No. 2 ng/m³	Test No. 3 ng/m³	Average ng/m³	Coefficient of Variation %
1,3-Dichlorobenzene	24.6	26.0	17.0	22.5	21.4
1,4-Dichlorobenzene	10.9	24.0	11.1	15.3	49.0
1,2-Dichlorobenzene	18.7	17.8	15.2	17.2	10.3
Total Dichlorobenzene	54.1	67.8	43.4	55.1	22.2
1,3,5-trichlorobenzene	2.66	<1.16	<1.25	<1.69	49.9
1,2,4-trichlorobenzene	10.4	16.0	2.82	9.74	68.1
1,2,3-trichlorobenzene	3.78	16.5	5.95	8.76	78.0
Total Trichlorobenzene	16.8	<33.7	<10.0	<20.2	60.5
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	5.64	5.43	<1.25	<4.11	60.3
1,2,3,4-tetrachlorobenzene	1.61	5.36	4.78	3.92	51.6
Total Tetrachlorobenzene	7.25	10.8	<6.03	<8.02	30.8
Pentachlorobenzene	2.30	8.23	11.6	7.39	64.0
Hexachlorobenzene	<1.18	2.41	2.93	<2.18	41.2
Total Chlorobenzenes	<81.7	<123	<74.0	<92.9	28.3
Hexachloroethane	<1.18	<1.16	<1.25	<1.20	4.0
a,2,6-Trichlorotoluene	<1.18	<1.16	<1.25	<1.20	4.0

TABLE 76
Clean Harbors Sarnia
Dry Reference Concentrations for Chlorobenzenes and Related Chlorinated Compounds

Specific Isomer	Dry Reference Concentration Test No. 1 ng/Rm^3*	Test No. 2 ng/Rm^3*	Test No. 3 ng/Rm^3*	Average ng/Rm^3*	Coefficient of Variation %
1,3-Dichlorobenzene	72.7	77.3	49.6	66.5	22.3
1,4-Dichlorobenzene	32.2	71.3	32.3	45.3	49.8
1,2-Dichlorobenzene	55.2	52.8	44.4	50.8	11.2
Total Dichlorobenzene	160	201	126	163	23.1
1,3,5-trichlorobenzene	7.87	<3.43	<3.64	<4.98	50.2
1,2,4-trichlorobenzene	30.7	47.6	8.21	28.8	68.6
1,2,3-trichlorobenzene	11.2	49.2	17.3	25.9	78.7
Total Trichlorobenzene	49.7	<100	<29.2	<59.7	61.2
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	16.7	16.1	<3.64	<12.2	60.7
1,2,3,4-tetrachlorobenzene	4.75	15.9	13.9	11.5	51.6
Total Tetrachlorobenzene	21.5	32.1	<17.6	<23.7	31.7
Pentachlorobenzene	6.79	24.5	33.9	21.7	63.4
Hexachlorobenzene	<3.51	7.17	8.53	<6.40	40.6
Total Chlorobenzenes	<242	<365	<215	<274	29.2
Hexachloroethane	<3.51	<3.43	<3.64	<3.53	3.0
a,2,6-Trichlorotoluene	<3.51	<3.43	<3.64	<3.53	3.0

* At 25°C and 1 atmosphere

TABLE 77
Clean Harbors Sarnia
Dry Adjusted Concentrations for Chlorobenzenes and Related Chlorinated Compounds

Specific Isomer	Dry Adjusted Concentration Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	Coefficient of Variation %
1,3-Dichlorobenzene	64.5	69.7	46.6	60.3	20.1
1,4-Dichlorobenzene	28.5	64.3	30.3	41.1	49.1
1,2-Dichlorobenzene	48.9	47.7	41.7	46.1	8.4
Total Dichlorobenzene	142	182	119	147	21.6
1,3,5-trichlorobenzene	6.97	<3.10	<3.42	<4.50	47.8
1,2,4-trichlorobenzene	27.2	43.0	7.71	26.0	68.1
1,2,3-trichlorobenzene	9.90	44.4	16.3	23.5	78.0
Total Trichlorobenzene	44.0	<90.5	<27.4	<54.0	60.5
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	14.8	14.6	<3.42	<10.9	59.5
1,2,3,4-tetrachlorobenzene	4.21	14.4	13.1	10.6	52.4
Total Tetrachlorobenzene	19.0	28.9	<16.5	<21.5	30.6
Pentachlorobenzene	6.02	22.1	31.8	20.0	65.3
Hexachlorobenzene	<3.11	6.47	8.01	<5.86	42.8
Total Chlorobenzenes	<214	<330	<202	<249	28.3
Hexachloroethane	<3.11	<3.10	<3.42	<3.21	5.7
a,2,6-Trichlorotoluene	<3.11	<3.10	<3.42	<3.21	5.7

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

TABLE 78
Clean Harbors Sarnia
Wet Reference Concentrations for Chlorobenzenes and Related Chlorinated Compounds

Specific Isomer	Wet Reference Concentration				Coefficient
	Test No. 1	Test No. 2	Test No. 3	Average	of Variation
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
1,3-Dichlorobenzene	38.2	40.7	26.7	35.2	21.2
1,4-Dichlorobenzene	16.9	37.6	17.4	23.9	49.2
1,2-Dichlorobenzene	29.0	27.8	23.9	26.9	9.9
Total Dichlorobenzene	84.0	106	67.9	86.0	22.3
1,3,5-trichlorobenzene	4.13	<1.81	<1.96	<2.63	49.3
1,2,4-trichlorobenzene	16.1	25.1	4.42	15.2	68.2
1,2,3-trichlorobenzene	5.86	25.9	9.33	13.7	78.2
Total Trichlorobenzene	26.1	<52.8	<15.7	<31.5	60.7
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	8.76	8.51	<1.96	<6.41	60.2
1,2,3,4-tetrachlorobenzene	2.49	8.39	7.49	6.13	51.9
Total Tetrachlorobenzene	11.3	16.9	<9.45	<12.5	31.0
Pentachlorobenzene	3.56	12.9	18.2	11.6	64.2
Hexachlorobenzene	<1.84	3.78	4.59	<3.40	41.5
Total Chlorobenzenes	<127	<192	<116	<145	28.6
Hexachloroethane	<1.84	<1.81	<1.96	<1.87	4.2
a,2,6-Trichlorotoluene	<1.84	<1.81	<1.96	<1.87	4.2

* At 25°C and 1 atmosphere

TABLE 79
Clean Harbors Sarnia
Emission Rates for Chlorobenzenes and Related Chlorinated Compounds

Specific Isomer	Emission Rate Test No. 1 µg/s	Test No. 2 µg/s	Test No. 3 µg/s	Average µg/s	Coefficient of Variation %
1,3-Dichlorobenzene	1.24	1.36	0.84	1.15	23.6
1,4-Dichlorobenzene	0.55	1.25	0.55	0.78	51.8
1,2-Dichlorobenzene	0.94	0.93	0.75	0.88	12.1
Total Dichlorobenzene	2.74	3.54	2.15	2.81	25.0
1,3,5-trichlorobenzene	0.13	<0.060	<0.062	<0.086	49.5
1,2,4-trichlorobenzene	0.52	0.84	0.14	0.50	69.9
1,2,3-trichlorobenzene	0.19	0.87	0.29	0.45	80.6
Total Trichlorobenzene	0.85	<1.76	<0.50	<1.04	63.1
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	0.29	0.28	<0.062	<0.21	61.1
1,2,3,4-tetrachlorobenzene	0.081	0.28	0.24	0.20	52.4
Total Tetrachlorobenzene	0.37	0.56	<0.30	<0.41	33.7
Pentachlorobenzene	0.12	0.43	0.58	0.37	62.8
Hexachlorobenzene	<0.060	0.13	0.15	<0.11	40.5
Total Chlorobenzenes	<4.13	<6.43	<3.66	<4.74	31.2
Hexachloroethane	<0.060	<0.060	<0.062	<0.061	1.7
a,2,6-Trichlorotoluene	<0.060	<0.060	<0.062	<0.061	1.7

TABLE 80
Clean Harbors Sarnia
Summary of Emission Data for Chlorobenzenes and Related Chlorinated Compounds

Specific Isomer	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate µg/s
1,3-Dichlorobenzene	22.5	66.5	60.3	35.2	1.15
1,4-Dichlorobenzene	15.3	45.3	41.1	23.9	0.78
1,2-Dichlorobenzene	17.2	50.8	46.1	26.9	0.88
Total Dichlorobenzene	55.1	163	147	86.0	2.81
1,3,5-trichlorobenzene	<1.69	<4.98	<4.50	<2.63	<0.086
1,2,4-trichlorobenzene	9.74	28.8	26.0	15.2	0.50
1,2,3-trichlorobenzene	8.76	25.9	23.5	13.7	0.45
Total Trichlorobenzene	<20.2	<59.7	<54.0	<31.5	<1.04
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<4.11	<12.2	<10.9	<6.41	<0.21
1,2,3,4-tetrachlorobenzene	3.92	11.5	10.6	6.13	0.20
Total Tetrachlorobenzene	<8.02	<23.7	<21.5	<12.5	<0.41
Pentachlorobenzene	7.39	21.7	20.0	11.6	0.37
Hexachlorobenzene	<2.18	<6.40	<5.86	<3.40	<0.11
Total Chlorobenzenes	<92.9	<274	<249	<145	<4.74
Hexachloroethane	<1.20	<3.53	<3.21	<1.87	<0.061
a,2,6-Trichlorotoluene	<1.20	<3.53	<3.21	<1.87	<0.061

* At 25°C and 1 atmosphere

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

TABLE 81
Clean Harbors Sarnia
Chlorobenzene and Other Related Chlorinated Compounds
Blank Analyses

Isomers and Congener Group Totals	Lab Blank Total ng	Blank Train Total ng
1,3-Dichlorobenzene	<16	<8
1,4-Dichlorobenzene	<16	21.3
1,2-Dichlorobenzene	<16	<8
Total Dichlorobenzene	<48.0	<37.3
1,3,5-trichlorobenzene	<16	<8
1,2,4-trichlorobenzene	<16	<8
1,2,3-trichlorobenzene	<16	<8
Total Trichlorobenzene	<48.0	<24.0
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<16	<8
1,2,3,4-tetrachlorobenzene	<16	<8
Total Tetrachlorobenzene	<32.0	<16.0
Pentachlorobenzene	<16	<8
Hexachlorobenzene	<16	<8
Total Chlorobenzenes	<160	<93.3
Hexachloroethane	<16	<16
a,2,6-Trichlorotoluene	<16	<16

"<" indicates that the amount detected is less than the analytical detection limit (<MDL).
In these cases the value of the detection limit was used to calculate the total collected.

TABLE 82
Clean Harbors Sarnia
Isomer and Congener Group Analysis and Emission Data for Chlorophenols and Related Compounds
Test No. 1

Specific Isomer	Total Collected ng	Actual Concentration ng/m^3	Dry Reference Concentration ng/Rm^3*	Dry Adjusted Concentration ng/Rm^3**	Wet Reference Concentration ng/Rm^3*	Emission Rate µg/s
2,6-dichlorophenol	<80	<5.92	<17.5	<15.5	<9.19	<0.30
2,4 & 2,5-dichlorophenol	207	15.3	45.4	40.2	23.8	0.78
3,5-dichlorophenol	<80	<5.92	<17.5	<15.5	<9.19	<0.30
2,3-dichlorophenol	<80	<5.92	<17.5	<15.5	<9.19	<0.30
3,4-dichlorophenol	<80	<5.92	<17.5	<15.5	<9.19	<0.30
Total Dichlorophenols	<527	<39.0	<115	<102	<60.6	<1.97
2,4,6-trichlorophenol	278	20.6	60.9	54.0	32.0	1.04
2,3,6-trichlorophenol	115	8.52	25.2	22.3	13.2	0.43
2,3,5-trichlorophenol	599	44.4	131	116	68.8	2.24
2,4,5-trichlorophenol	<80	<5.92	<17.5	<15.5	<9.19	<0.30
2,3,4-trichlorophenol	<80	<5.92	<17.5	<15.5	<9.19	<0.30
3,4,5-trichlorophenol	<80	<5.92	<17.5	<15.5	<9.19	<0.30
Total Trichlorophenols	<1232	<91.2	<270	<239	<142	<4.62
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<80	<5.92	<17.5	<15.5	<9.19	<0.30
2,3,4,5-tetrachlorophenol	<80	<5.92	<17.5	<15.5	<9.19	<0.30
Total Tetrachlorophenols	<160	<11.8	<35.1	<31.1	<18.4	<0.60
Pentachlorophenol	<80	<5.92	<17.5	<15.5	<9.19	<0.30
Total Chlorophenols	<1999	<148	<438	<388	<230	<7.49
Heptachlor	<0.49	<0.036	<0.11	<0.095	<0.056	<0.0018
Heptachlor Epoxide A	<4.4	<0.33	<0.96	<0.85	<0.51	<0.016
Heptachlor Epoxide B	<0.68	<0.050	<0.15	<0.13	<0.078	<0.0025
Total Heptachlor	<5.57	<0.41	<1.22	<1.08	<0.64	<0.021
Oxychlorodane	<0.92	<0.068	<0.20	<0.18	<0.11	<0.0034
trans-Chlorodane	<4.6	<0.34	<1.01	<0.89	<0.53	<0.017
cis-Chlorodane	<4.4	<0.33	<0.96	<0.85	<0.51	<0.016
Total Chlorodane	<9.92	<0.73	<2.17	<1.93	<1.14	<0.037
Parlar-26	<16.0	<1.18	<3.51	<3.11	<1.84	<0.060
Parlar-50	<9.8	<0.73	<2.15	<1.90	<1.13	<0.037
Parlar-62	<19.0	<1.41	<4.16	<3.69	<2.18	<0.071
Total Toxaphene	<44.8	<3.32	<9.82	<8.70	<5.15	<0.17
Hexachlorophene	<80	<5.92	<17.5	<15.5	<9.19	<0.30
Hexachlorobutadiene	1.26	0.093	0.28	0.24	0.14	0.0047
Octachlorostyrene	<0.48	<0.036	<0.11	<0.093	<0.055	<0.0018
Tributyltin	<200	<14.8	<43.8	<38.8	<23.0	<0.75

Dry Gas Volume Sampled (Rm^3*) :	4.564
Actual Flowrate (m^3/s) :	50.6
Dry Reference Flowrate (Rm^3/s*) :	17.1
Dry Adjusted Flowrate (Rm^3/s**) :	19.3
Wet Reference Flowrate (Rm^3/s*) :	32.6

* At 25°C and 1 atmosphere

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

Note: "<" 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 83
Clean Harbors Sarnia
Isomer and Congener Group Analysis and Emission Data for Chlorophenols and Related Compounds
Test No. 2

Specific Isomer	Total Collected ng	Actual Concentration ng/m^3	Dry Reference Concentration ng/Rm^3*	Dry Adjusted Concentration ng/Rm^3**	Wet Reference Concentration ng/Rm^3*	Emission Rate µg/s
2,6-dichlorophenol	<80	<5.78	<17.2	<15.5	<9.05	<0.30
2,4 & 2,5-dichlorophenol	<80	<5.78	<17.2	<15.5	<9.05	<0.30
3,5-dichlorophenol	<80	<5.78	<17.2	<15.5	<9.05	<0.30
2,3-dichlorophenol	<80	<5.78	<17.2	<15.5	<9.05	<0.30
3,4-dichlorophenol	<80	<5.78	<17.2	<15.5	<9.05	<0.30
Total Dichlorophenols	<400	<28.9	<85.9	<77.5	<45.2	<1.51
2,4,6-trichlorophenol	<80	<5.78	<17.2	<15.5	<9.05	<0.30
2,3,6-trichlorophenol	<80	<5.78	<17.2	<15.5	<9.05	<0.30
2,3,5-trichlorophenol	<80	<5.78	<17.2	<15.5	<9.05	<0.30
2,4,5-trichlorophenol	<80	<5.78	<17.2	<15.5	<9.05	<0.30
2,3,4-trichlorophenol	<80	<5.78	<17.2	<15.5	<9.05	<0.30
3,4,5-trichlorophenol	<80	<5.78	<17.2	<15.5	<9.05	<0.30
Total Trichlorophenols	<480	<34.7	<103	<93.0	<54.3	<1.81
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<80	<5.78	<17.2	<15.5	<9.05	<0.30
2,3,4,5-tetrachlorophenol	<80	<5.78	<17.2	<15.5	<9.05	<0.30
Total Tetrachlorophenols	<160	<11.6	<34.3	<31.0	<18.1	<0.60
Pentachlorophenol	<80	<5.78	<17.2	<15.5	<9.05	<0.30
Total Chlorophenols	<1120	<80.9	<240	<217	<127	<4.23
Heptachlor	NA	-	-	-	-	-
Heptachlor Epoxide A	<77	<5.56	<16.5	<14.9	<8.71	<0.29
Heptachlor Epoxide B	<12	<0.87	<2.58	<2.32	<1.36	<0.045
Total Heptachlor	<89.0	<6.43	<19.1	<17.2	<10.1	<0.34
Oxychlorodane	<24	<1.73	<5.15	<4.65	<2.71	<0.091
trans-Chlorodane	<35	<2.53	<7.51	<6.78	<3.96	<0.13
cis-Chlorodane	<34	<2.46	<7.30	<6.59	<3.85	<0.13
Total Chlorodane	<93.0	<6.72	<20.0	<18.0	<10.5	<0.35
Parlar-26	<75	<5.42	<16.1	<14.5	<8.48	<0.28
Parlar-50	<45	<3.25	<9.66	<8.72	<5.09	<0.17
Parlar-62	<88	<6.36	<18.9	<17.0	<9.95	<0.33
Total Toxaphene	<208	<15.0	<44.6	<40.3	<23.5	<0.79
Hexachlorophene	<80	<5.78	<17.2	<15.5	<9.05	<0.30
Hexachlorobutadiene	<0.57	<0.041	<0.12	<0.11	<0.064	<0.0022
Octachlorostyrene	<5.4	<0.39	<1.16	<1.05	<0.61	<0.020
Tributyltin	<200	<14.4	<42.9	<38.7	<22.6	<0.76

Dry Gas Volume Sampled (Rm^3*) :	4.659
Actual Flowrate (m^3/s) :	52.3
Dry Reference Flowrate (Rm^3/s*) :	17.6
Dry Adjusted Flowrate (Rm^3/s**) :	19.5
Wet Reference Flowrate (Rm^3/s*) :	33.4

* At 25°C and 1 atmosphere

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

Note: "<" 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.

"NA" indicates that the data is not available due to an error during extraction of the sample by the analyatical laboratory.

TABLE 84
Clean Harbors Sarnia
Isomer and Congener Group Analysis and Emission Data for Chlorophenols and Related Compounds
Test No. 3

Specific Isomer	Total Collected ng	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate µg/s
2,6-dichlorophenol	<80	<6.25	<18.2	<17.1	<9.79	<0.31
2,4 & 2,5-dichlorophenol	<80	<6.25	<18.2	<17.1	<9.79	<0.31
3,5-dichlorophenol	<80	<6.25	<18.2	<17.1	<9.79	<0.31
2,3-dichlorophenol	<80	<6.25	<18.2	<17.1	<9.79	<0.31
3,4-dichlorophenol	<80	<6.25	<18.2	<17.1	<9.79	<0.31
Total Dichlorophenols	<400	<31.3	<91.0	<85.5	<49.0	<1.55
2,4,6-trichlorophenol	<80	<6.25	<18.2	<17.1	<9.79	<0.31
2,3,6-trichlorophenol	<80	<6.25	<18.2	<17.1	<9.79	<0.31
2,3,5-trichlorophenol	<80	<6.25	<18.2	<17.1	<9.79	<0.31
2,4,5-trichlorophenol	<80	<6.25	<18.2	<17.1	<9.79	<0.31
2,3,4-trichlorophenol	<80	<6.25	<18.2	<17.1	<9.79	<0.31
3,4,5-trichlorophenol	<80	<6.25	<18.2	<17.1	<9.79	<0.31
Total Trichlorophenols	<480	<37.5	<109	<103	<58.8	<1.86
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<80	<6.25	<18.2	<17.1	<9.79	<0.31
2,3,4,5-tetrachlorophenol	<80	<6.25	<18.2	<17.1	<9.79	<0.31
Total Tetrachlorophenols	<160	<12.5	<36.4	<34.2	<19.6	<0.62
Pentachlorophenol	<80	<6.25	<18.2	<17.1	<9.79	<0.31
Total Chlorophenols	<1120	<87.5	<255	<239	<137	<4.33
Heptachlor	<1.7	<0.13	<0.39	<0.36	<0.21	<0.0066
Heptachlor Epoxide A	<14	<1.09	<3.19	<2.99	<1.71	<0.054
Heptachlor Epoxide B	<2.2	<0.17	<0.50	<0.47	<0.27	<0.0085
Total Heptachlor	<17.9	<1.40	<4.07	<3.83	<2.19	<0.069
Oxychlorodane	<5.9	<0.46	<1.34	<1.26	<0.72	<0.023
trans-Chlorodane	<8.6	<0.67	<1.96	<1.84	<1.05	<0.033
cis-Chlorodane	<8.3	<0.65	<1.89	<1.77	<1.02	<0.032
Total Chlorodane	<22.8	<1.78	<5.19	<4.87	<2.79	<0.088
Parlar-26	<71	<5.55	<16.2	<15.2	<8.69	<0.27
Parlar-50	<46	<3.59	<10.5	<9.83	<5.63	<0.18
Parlar-62	<88	<6.88	<20.0	<18.8	<10.8	<0.34
Total Toxaphene	<205	<16.0	<46.6	<43.8	<25.1	<0.79
Hexachlorophene	<80	<6.25	<18.2	<17.1	<9.79	<0.31
Hexachlorobutadiene	<0.76	<0.059	<0.17	<0.16	<0.093	<0.0029
Octachlorostyrene	<2.1	<0.16	<0.48	<0.45	<0.26	<0.0081
Tributyltin	<200	<15.6	<45.5	<42.7	<24.5	<0.77

Dry Gas Volume Sampled (Rm³*) :	4.395
Actual Flowrate (m³/s) :	49.5
Dry Reference Flowrate (Rm³/s*) :	17.0
Dry Adjusted Flowrate (Rm³/s**) :	18.1
Wet Reference Flowrate (Rm³/s*) :	31.6

* At 25°C and 1 atmosphere

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

Note: "<" 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 85
Clean Harbors Sarnia
Chlorophenol Isomer and Congener Group and Related Compounds
Actual Concentrations

Specific Isomer	Actual Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/m^3	ng/m^3	ng/m^3	ng/m^3	%
2,6-dichlorophenol	<5.92	<5.78	<6.25	<5.98	4.0
2,4 & 2,5-dichlorophenol	15.3	<5.78	<6.25	<9.12	59.0
3,5-dichlorophenol	<5.92	<5.78	<6.25	<5.98	4.0
2,3-dichlorophenol	<5.92	<5.78	<6.25	<5.98	4.0
3,4-dichlorophenol	<5.92	<5.78	<6.25	<5.98	4.0
Total Dichlorophenols	<39.0	<28.9	<31.3	<33.1	16.0
2,4,6-trichlorophenol	20.6	<5.78	<6.25	<10.9	77.4
2,3,6-trichlorophenol	8.52	<5.78	<6.25	<6.85	21.4
2,3,5-trichlorophenol	44.4	<5.78	<6.25	<18.8	118
2,4,5-trichlorophenol	<5.92	<5.78	<6.25	<5.98	4.0
2,3,4-trichlorophenol	<5.92	<5.78	<6.25	<5.98	4.0
3,4,5-trichlorophenol	<5.92	<5.78	<6.25	<5.98	4.0
Total Trichlorophenols	<91.2	<34.7	<37.5	<54.5	58.5
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<5.92	<5.78	<6.25	<5.98	4.0
2,3,4,5-tetrachlorophenol	<5.92	<5.78	<6.25	<5.98	4.0
Total Tetrachlorophenols	<11.8	<11.6	<12.5	<12.0	4.0
Pentachlorophenol	<5.92	<5.78	<6.25	<5.98	4.0
Total Chlorophenols	<148	<80.9	<87.5	<105	35.1
Heptachlor	<0.036	-	<0.13	<0.085	80.7
Heptachlor Epoxide A	<0.33	<5.56	<1.09	<2.33	121
Heptachlor Epoxide B	<0.050	<0.87	<0.17	<0.36	121
Total Heptachlor	<0.41	<6.43	<1.40	<2.75	117
Oxychlorodane	<0.068	<1.73	<0.46	<0.75	115
trans-Chlorodane	<0.34	<2.53	<0.67	<1.18	99.9
cis-Chlorodane	<0.33	<2.46	<0.65	<1.14	100
Total Chlorodane	<0.73	<6.72	<1.78	<3.08	104
Parlar-26	<1.18	<5.42	<5.55	<4.05	61.3
Parlar-50	<0.73	<3.25	<3.59	<2.52	62.1
Parlar-62	<1.41	<6.36	<6.88	<4.88	61.9
Total Toxaphene	<3.32	<15.0	<16.0	<11.5	61.7
Hexachlorophene	<5.92	<5.78	<6.25	<5.98	4.0
Hexachlorobutadiene	0.093	<0.041	<0.059	<0.065	40.9
Octachlorostyrene	<0.036	<0.39	<0.16	<0.20	91.3
Tributyltin	<14.8	<14.4	<15.6	<15.0	4.0

TABLE 86
Clean Harbors Sarnia
Chlorophenol Isomer and Congener Group and Related Compounds
Dry Reference Concentrations

Specific Isomer	Dry Reference Concentration Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	Coefficient of Variation %
2,6-dichlorophenol	<17.5	<17.2	<18.2	<17.6	3.0
2,4 & 2,5-dichlorophenol	45.4	<17.2	<18.2	<26.9	59.4
3,5-dichlorophenol	<17.5	<17.2	<18.2	<17.6	3.0
2,3-dichlorophenol	<17.5	<17.2	<18.2	<17.6	3.0
3,4-dichlorophenol	<17.5	<17.2	<18.2	<17.6	3.0
Total Dichlorophenols	<115	<85.9	<91.0	<97.4	16.2
2,4,6-trichlorophenol	60.9	<17.2	<18.2	<32.1	77.8
2,3,6-trichlorophenol	25.2	<17.2	<18.2	<20.2	21.6
2,3,5-trichlorophenol	131	<17.2	<18.2	<55.5	118
2,4,5-trichlorophenol	<17.5	<17.2	<18.2	<17.6	3.0
2,3,4-trichlorophenol	<17.5	<17.2	<18.2	<17.6	3.0
3,4,5-trichlorophenol	<17.5	<17.2	<18.2	<17.6	3.0
Total Trichlorophenols	<270	<103	<109	<161	58.9
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<17.5	<17.2	<18.2	<17.6	3.0
2,3,4,5-tetrachlorophenol	<17.5	<17.2	<18.2	<17.6	3.0
Total Tetrachlorophenols	<35.1	<34.3	<36.4	<35.3	3.0
Pentachlorophenol	<17.5	<17.2	<18.2	<17.6	3.0
Total Chlorophenols	<438	<240	<255	<311	35.4
Heptachlor	<0.11	-	<0.39	<0.25	80.0
Heptachlor Epoxide A	<0.96	<16.5	<3.19	<6.89	122
Heptachlor Epoxide B	<0.15	<2.58	<0.50	<1.08	122
Total Heptachlor	<1.22	<19.1	<4.07	<8.13	118
Oxychlorodane	<0.20	<5.15	<1.34	<2.23	116
trans-Chlorodane	<1.01	<7.51	<1.96	<3.49	101
cis-Chlorodane	<0.96	<7.30	<1.89	<3.38	101
Total Chlorodane	<2.17	<20.0	<5.19	<9.11	105
Parlar-26	<3.51	<16.1	<16.2	<11.9	61.1
Parlar-50	<2.15	<9.66	<10.5	<7.42	61.8
Parlar-62	<4.16	<18.9	<20.0	<14.4	61.6
Total Toxaphene	<9.82	<44.6	<46.6	<33.7	61.5
Hexachlorophene	<17.5	<17.2	<18.2	<17.6	3.0
Hexachlorobutadiene	0.28	<0.12	<0.17	<0.19	41.1
Octachlorostyrene	<0.11	<1.16	<0.48	<0.58	92.0
Tributyltin	<43.8	<42.9	<45.5	<44.1	3.0

* At 25°C and 1 atmosphere

TABLE 87
Clean Harbors Sarnia
Chlorophenol Isomer and Congener Group and Related Compounds
Dry Adjusted Concentrations

Specific Isomer	Dry Adjusted Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm^3*	ng/Rm^3*	ng/Rm^3*	ng/Rm^3*	%
2,6-dichlorophenol	<15.5	<15.5	<17.1	<16.0	5.7
2,4 & 2,5-dichlorophenol	40.2	<15.5	<17.1	<24.3	56.9
3,5-dichlorophenol	<15.5	<15.5	<17.1	<16.0	5.7
2,3-dichlorophenol	<15.5	<15.5	<17.1	<16.0	5.7
3,4-dichlorophenol	<15.5	<15.5	<17.1	<16.0	5.7
Total Dichlorophenols	<102	<77.5	<85.5	<88.4	14.3
2,4,6-trichlorophenol	54.0	<15.5	<17.1	<28.9	75.4
2,3,6-trichlorophenol	22.3	<15.5	<17.1	<18.3	19.5
2,3,5-trichlorophenol	116	<15.5	<17.1	<49.6	116
2,4,5-trichlorophenol	<15.5	<15.5	<17.1	<16.0	5.7
2,3,4-trichlorophenol	<15.5	<15.5	<17.1	<16.0	5.7
3,4,5-trichlorophenol	<15.5	<15.5	<17.1	<16.0	5.7
Total Trichlorophenols	<239	<93.0	<103	<145	56.4
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<15.5	<15.5	<17.1	<16.0	5.7
2,3,4,5-tetrachlorophenol	<15.5	<15.5	<17.1	<16.0	5.7
Total Tetrachlorophenols	<31.1	<31.0	<34.2	<32.1	5.7
Pentachlorophenol	<15.5	<15.5	<17.1	<16.0	5.7
Total Chlorophenols	<388	<217	<239	<281	33.0
Heptachlor	<0.095	-	<0.36	<0.23	82.7
Heptachlor Epoxide A	<0.85	<14.9	<2.99	<6.25	121
Heptachlor Epoxide B	<0.13	<2.32	<0.47	<0.98	121
Total Heptachlor	<1.08	<17.2	<3.83	<7.38	117
Oxychlorodane	<0.18	<4.65	<1.26	<2.03	115
trans-Chlorodane	<0.89	<6.78	<1.84	<3.17	99.7
cis-Chlorodane	<0.85	<6.59	<1.77	<3.07	100
Total Chlorodane	<1.93	<18.0	<4.87	<8.27	104
Parlar-26	<3.11	<14.5	<15.2	<10.9	62.1
Parlar-50	<1.90	<8.72	<9.83	<6.82	63.0
Parlar-62	<3.69	<17.0	<18.8	<13.2	62.7
Total Toxaphene	<8.70	<40.3	<43.8	<30.9	62.5
Hexachlorophene	<15.5	<15.5	<17.1	<16.0	5.7
Hexachlorobutadiene	0.24	<0.11	<0.16	<0.17	39.2
Octachlorostyrene	<0.093	<1.05	<0.45	<0.53	91.0
Tributyltin	<38.8	<38.7	<42.7	<40.1	5.7

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

TABLE 88
Clean Harbors Sarnia
Chlorophenol Isomer and Congener Group and Related Compounds
Wet Reference Concentrations

Specific Isomer	Wet Reference Concentration Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	Coefficient of Variation %
2,6-dichlorophenol	<9.19	<9.05	<9.79	<9.35	4.2
2,4 & 2,5-dichlorophenol	23.8	<9.05	<9.79	<14.2	58.4
3,5-dichlorophenol	<9.19	<9.05	<9.79	<9.35	4.2
2,3-dichlorophenol	<9.19	<9.05	<9.79	<9.35	4.2
3,4-dichlorophenol	<9.19	<9.05	<9.79	<9.35	4.2
Total Dichlorophenols	<60.6	<45.2	<49.0	<51.6	15.5
2,4,6-trichlorophenol	32.0	<9.05	<9.79	<16.9	76.9
2,3,6-trichlorophenol	13.2	<9.05	<9.79	<10.7	20.8
2,3,5-trichlorophenol	68.8	<9.05	<9.79	<29.2	117
2,4,5-trichlorophenol	<9.19	<9.05	<9.79	<9.35	4.2
2,3,4-trichlorophenol	<9.19	<9.05	<9.79	<9.35	4.2
3,4,5-trichlorophenol	<9.19	<9.05	<9.79	<9.35	4.2
Total Trichlorophenols	<142	<54.3	<58.8	<84.9	57.9
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<9.19	<9.05	<9.79	<9.35	4.2
2,3,4,5-tetrachlorophenol	<9.19	<9.05	<9.79	<9.35	4.2
Total Tetrachlorophenols	<18.4	<18.1	<19.6	<18.7	4.2
Pentachlorophenol	<9.19	<9.05	<9.79	<9.35	4.2
Total Chlorophenols	<230	<127	<137	<165	34.5
Heptachlor	<0.056	-	<0.21	<0.13	81.2
Heptachlor Epoxide A	<0.51	<8.71	<1.71	<3.64	122
Heptachlor Epoxide B	<0.078	<1.36	<0.27	<0.57	121
Total Heptachlor	<0.64	<10.1	<2.19	<4.30	118
Oxychlorodane	<0.11	<2.71	<0.72	<1.18	115
trans-Chlorodane	<0.53	<3.96	<1.05	<1.85	100
cis-Chlorodane	<0.51	<3.85	<1.02	<1.79	101
Total Chlorodane	<1.14	<10.5	<2.79	<4.82	104
Parlar-26	<1.84	<8.48	<8.69	<6.34	61.5
Parlar-50	<1.13	<5.09	<5.63	<3.95	62.3
Parlar-62	<2.18	<9.95	<10.8	<7.6	62.1
Total Toxaphene	<5.15	<23.5	<25.1	<17.9	61.9
Hexachlorophene	<9.19	<9.05	<9.79	<9.35	4.2
Hexachlorobutadiene	0.14	<0.064	<0.093	<0.10	40.4
Octachlorostyrene	<0.055	<0.61	<0.26	<0.31	91.4
Tributyltin	<23.0	<22.6	<24.5	<23.4	4.2

* At 25°C and 1 atmosphere

TABLE 89
Clean Harbors Sarnia
Chlorophenol Isomer and Congener Group and Related Compounds Emission Rates

Specific Isomer	Emission Rate				Coefficient of Variation %
	Test No. 1 µg/s	Test No. 2 µg/s	Test No. 3 µg/s	Average µg/s	
2,6-dichlorophenol	<0.30	<0.30	<0.31	<0.30	1.7
2,4 & 2,5-dichlorophenol	0.78	<0.30	<0.31	<0.46	58.7
3,5-dichlorophenol	<0.30	<0.30	<0.31	<0.30	1.7
2,3-dichlorophenol	<0.30	<0.30	<0.31	<0.30	1.7
3,4-dichlorophenol	<0.30	<0.30	<0.31	<0.30	1.7
Total Dichlorophenols	<1.97	<1.51	<1.55	<1.68	15.4
2,4,6-trichlorophenol	1.04	<0.30	<0.31	<0.55	77.1
2,3,6-trichlorophenol	0.43	<0.30	<0.31	<0.35	20.8
2,3,5-trichlorophenol	2.24	<0.30	<0.31	<0.95	118
2,4,5-trichlorophenol	<0.30	<0.30	<0.31	<0.30	1.7
2,3,4-trichlorophenol	<0.30	<0.30	<0.31	<0.30	1.7
3,4,5-trichlorophenol	<0.30	<0.30	<0.31	<0.30	1.7
Total Trichlorophenols	<4.62	<1.81	<1.86	<2.76	58.1
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<0.30	<0.30	<0.31	<0.30	1.7
2,3,4,5-tetrachlorophenol	<0.30	<0.30	<0.31	<0.30	1.7
Total Tetrachlorophenols	<0.60	<0.60	<0.62	<0.61	1.7
Pentachlorophenol	<0.30	<0.30	<0.31	<0.30	1.7
Total Chlorophenols	<7.49	<4.23	<4.33	<5.35	34.6
Heptachlor	<0.0018	-	<0.0066	<0.0042	79.7
Heptachlor Epoxide A	<0.016	<0.29	<0.054	<0.12	123
Heptachlor Epoxide B	<0.0025	<0.045	<0.0085	<0.019	123
Total Heptachlor	<0.021	<0.34	<0.069	<0.14	120
Oxychlorodane	<0.0034	<0.091	<0.023	<0.039	117
trans-Chlorodane	<0.017	<0.13	<0.033	<0.061	102
cis-Chlorodane	<0.016	<0.13	<0.032	<0.059	103
Total Chlorodane	<0.037	<0.35	<0.088	<0.16	106
Parlar-26	<0.060	<0.28	<0.27	<0.21	61.4
Parlar-50	<0.037	<0.17	<0.18	<0.13	61.9
Parlar-62	<0.071	<0.33	<0.34	<0.25	61.8
Total Toxaphene	<0.17	<0.79	<0.79	<0.58	61.6
Hexachlorophene	<0.30	<0.30	<0.31	<0.30	1.7
Hexachlorobutadiene	0.0047	<0.0022	<0.0029	<0.0033	40.2
Octachlorostyrene	<0.0018	<0.020	<0.0081	<0.010	93.6
Tributyltin	<0.75	<0.76	<0.77	<0.76	1.7

TABLE 90
Clean Harbors Sarnia
Summary of Emission Data
for Chlorophenol Isomer and Congener Groups and Related Compounds

Specific Isomer	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate µg/s
2,6-dichlorophenol	<5.98	<17.6	<16.0	<9.35	<0.30
2,4 & 2,5-dichlorophenol	<9.12	<26.9	<24.3	<14.2	<0.46
3,5-dichlorophenol	<5.98	<17.6	<16.0	<9.35	<0.30
2,3-dichlorophenol	<5.98	<17.6	<16.0	<9.35	<0.30
3,4-dichlorophenol	<5.98	<17.6	<16.0	<9.35	<0.30
Total Dichlorophenols	<33.1	<97.4	<88.4	<51.6	<1.68
2,4,6-trichlorophenol	<10.9	<32.1	<28.9	<16.9	<0.55
2,3,6-trichlorophenol	<6.85	<20.2	<18.3	<10.7	<0.35
2,3,5-trichlorophenol	<18.8	<55.5	<49.6	<29.2	<0.95
2,4,5-trichlorophenol	<5.98	<17.6	<16.0	<9.35	<0.30
2,3,4-trichlorophenol	<5.98	<17.6	<16.0	<9.35	<0.30
3,4,5-trichlorophenol	<5.98	<17.6	<16.0	<9.35	<0.30
Total Trichlorophenols	<54.5	<161	<145	<84.9	<2.76
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<5.98	<17.6	<16.0	<9.35	<0.30
2,3,4,5-tetrachlorophenol	<5.98	<17.6	<16.0	<9.35	<0.30
Total Tetrachlorophenols	<12.0	<35.3	<32.1	<18.7	<0.61
Pentachlorophenol	<5.98	<17.63	<16.04	<9.35	<0.30
Total Chlorophenols	<105	<311	<281	<165	<5.35
Heptachlor	<0.085	<0.25	<0.23	<0.13	<0.0042
Heptachlor Epoxide A	<2.33	<6.89	<6.25	<3.64	<0.12
Heptachlor Epoxide B	<0.36	<1.08	<0.98	<0.57	<0.019
Total Heptachlor	<2.75	<8.13	<7.38	<4.30	<0.14
Oxychlorodane	<0.75	<2.23	<2.03	<1.18	<0.039
trans-Chlorodane	<1.18	<3.49	<3.17	<1.85	<0.061
cis-Chlorodane	<1.14	<3.38	<3.07	<1.79	<0.059
Total Chlorodane	<3.08	<9.11	<8.27	<4.82	<0.16
Parlar-26	<4.05	<11.9	<10.9	<6.34	<0.21
Parlar-50	<2.52	<7.42	<6.82	<3.95	<0.13
Parlar-62	<4.88	<14.4	<13.2	<7.64	<0.25
Total Toxaphene	<11.5	<33.7	<30.9	<17.9	<0.58
Hexachlorophene	<5.98	<17.6	<16.0	<9.35	<0.30
Hexachlorobutadiene	<0.065	<0.19	<0.17	<0.10	<0.0033
Octachlorostyrene	<0.20	<0.58	<0.53	<0.31	<0.010
Tributyltin	<15.0	<44.1	<40.1	<23.4	<0.76

* At 25°C and 1 atmosphere

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

TABLE 91
Clean Harbors Sarnia
Chlorophenol and Related Compounds
Blank Analyses

Congener Group	Lab Blank ng	Blank Train ng
2,6-dichlorophenol	<80	<80
2,4 & 2,5-dichlorophenol	<80	<80
3,5-dichlorophenol	<80	<80
2,3-dichlorophenol	<80	<80
3,4-dichlorophenol	<80	<80
Total Dichlorophenols	<400	<400
2,4,6-trichlorophenol	<80	<80
2,3,6-trichlorophenol	<80	<80
2,3,5-trichlorophenol	<80	<80
2,4,5-trichlorophenol	<80	<80
2,3,4-trichlorophenol	<80	<80
3,4,5-trichlorophenol	<80	<80
Total Trichlorophenols	<480	<480
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<80	<80
2,3,4,5-tetrachlorophenol	<80	<80
Total Tetrachlorophenols	<160	<160
Pentachlorophenol	<80	<80
Total Chlorophenols	<1120	<1120
Heptachlor	<0.30	<0.40
Heptachlor Epoxide A	<4.3	<6.0
Heptachlor Epoxide B	<0.66	<0.93
Total Heptachlor	<5.26	<7.33
Oxychlorodane	<0.7	<1.0
trans-Chlorodane	<4.2	<5.0
cis-Chlorodane	<4.1	<4.8
Total Chlorodane	<9.01	<10.8
Parlar-26	<13	<21
Parlar-50	<14	<13
Parlar-62	<27	<25
Total Toxaphene	<54.0	<59.0
Hexachlorophene	<80	<80
Hexachlorobutadiene	<0.061	0.16
Octachlorostyrene	<0.63	<0.53
Tributyltin	-	<200

"<" indicates that the amount detected is less than the analytical detection limit (<MDL). In these cases the value of the detection limit was used to calculate the total collected.

TABLE 92
Clean Harbors Sarnia
Polycyclic Aromatic Hydrocarbon Emission Data
Test No. 1

Compound	Total Collected ng	Actual Concentration ng/m^3	Dry Reference Concentration ng/Rm^3*	Dry Adjusted Concentration ng/Rm^3**	Wet Reference Concentration ng/Rm^3*	Emission Rate µg/s
Acenaphthene	17.7	1.31	3.88	3.44	2.03	0.066
Acenaphthylene	16.1	1.19	3.53	3.13	1.85	0.060
Anthracene	23.4	1.73	5.13	4.54	2.69	0.088
Benzo(a)Anthracene	<16	<1.18	<3.51	<3.11	<1.84	<0.060
Benzo(b)Fluoranthene	<16	<1.18	<3.51	<3.11	<1.84	<0.060
Benzo(k)Fluoranthene	<16	<1.18	<3.51	<3.11	<1.84	<0.060
Benzo(a)fluorene	<16	<1.18	<3.51	<3.11	<1.84	<0.060
Benzo(b)fluorene	<16	<1.18	<3.51	<3.11	<1.84	<0.060
Benzo(g,h,i)Perylene	<16	<1.18	<3.51	<3.11	<1.84	<0.060
Benzo(a)Pyrene	<16	<1.18	<3.51	<3.11	<1.84	<0.060
Benzo(e)Pyrene	<16	<1.18	<3.51	<3.11	<1.84	<0.060
Biphenyl	331	24.5	72.5	64.3	38.0	1.24
2-Chloronaphthalene	<16	<1.18	<3.51	<3.11	<1.84	<0.060
Chrysene/Triphenylene	24.8	1.84	5.43	4.81	2.85	0.093
Coronene	<80	<5.92	<17.5	<15.5	<9.19	<0.30
Dibenzo(a,c/a,h)Anthracene	<16	<1.18	<3.51	<3.11	<1.84	<0.060
Dibenzo(a,e)pyrene	<80	<5.92	<17.5	<15.5	<9.19	<0.30
9,10-dimethylanthracene	<16	<1.18	<3.51	<3.11	<1.84	<0.060
7,12-Dimethylbenzo(a)anthracene	<16	<1.18	<3.51	<3.11	<1.84	<0.060
Fluoranthene	208	15.4	45.6	40.4	23.9	0.78
Fluorene	40.3	2.98	8.83	7.82	4.63	0.15
Indeno(1,2,3-cd)Pyrene	<16	<1.18	<3.51	<3.11	<1.84	<0.060
2-methylanthracene	128	9.48	28.0	24.8	14.7	0.48
3-Methylcholanthrene	<80	<5.92	<17.5	<15.5	<9.19	<0.30
1-Methylnaphthalene	115	8.52	25.2	22.3	13.2	0.43
2-Methylnaphthalene	198	14.7	43.4	38.4	22.8	0.74
1-Methylphenanthrene	<16	<1.18	<3.51	<3.11	<1.84	<0.060
9-Methylphenanthrene	59.8	4.43	13.1	11.6	6.87	0.22
Naphthalene	1040	77.0	228	202	120	3.90
Perylene	<16	<1.18	<3.51	<3.11	<1.84	<0.060
Phenanthrene	612	45.3	134	119	70.3	2.29
Picene	<80	<5.92	<17.5	<15.5	<9.19	<0.30
Pyrene	256	19.0	56.1	49.7	29.4	0.96
Quinoline	<16	<1.18	<3.51	<3.11	<1.84	<0.060
m-terphenyl	<16	<1.18	<3.51	<3.11	<1.84	<0.060
o-Terphenyl	17.4	1.29	3.81	3.38	2.00	0.065
p-terphenyl	<16	<1.18	<3.51	<3.11	<1.84	<0.060
Tetralin	237	17.5	51.9	46.0	27.2	0.89
Total	<3933	<291	<862	<763	<452	<14.7

Dry Gas Volume Sampled (Rm^3*) :	4.564
Actual Flowrate (m^3/s) :	50.6
Dry Reference Flowrate (Rm^3/s*) :	17.1
Dry Adjusted Flowrate (Rm^3/s**) :	19.3
Wet Reference Flowrate (Rm^3/s*) :	32.6

* At 25°C and 1 atmosphere

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

Note: "<" 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 93
Clean Harbors Sarnia
Polycyclic Aromatic Hydrocarbon Emission Data
Test No. 2

Compound	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
Acenaphthene	NA	-	-	-	-	-
Acenaphthylene	NA	-	-	-	-	-
Anthracene	NA	-	-	-	-	-
Benzo(a)Anthracene	NA	-	-	-	-	-
Benzo(b)Fluoranthene	NA	-	-	-	-	-
Benzo(k)Fluoranthene	NA	-	-	-	-	-
Benzo(a)fluorene	NA	-	-	-	-	-
Benzo(b)fluorene	NA	-	-	-	-	-
Benzo(g,h,i)Perylene	NA	-	-	-	-	-
Benzo(a)Pyrene	NA	-	-	-	-	-
Benzo(e)Pyrene	NA	-	-	-	-	-
Biphenyl	NA	-	-	-	-	-
2-Chloronaphthalene	NA	-	-	-	-	-
Chrysene/Triphenylene	NA	-	-	-	-	-
Coronene	NA	-	-	-	-	-
Dibenzo(a,c/a,h)Anthracene	NA	-	-	-	-	-
Dibenzo(a,e)pyrene	NA	-	-	-	-	-
9,10-dimethylanthracene	NA	-	-	-	-	-
7,12-Dimethylbenzo(a)anthracene	NA	-	-	-	-	-
Fluoranthene	NA	-	-	-	-	-
Fluorene	NA	-	-	-	-	-
Indeno(1,2,3-cd)Pyrene	NA	-	-	-	-	-
2-methylanthracene	NA	-	-	-	-	-
3-Methylcholanthrene	NA	-	-	-	-	-
1-Methylnaphthalene	NA	-	-	-	-	-
2-Methylnaphthalene	NA	-	-	-	-	-
1-Methylphenanthrene	NA	-	-	-	-	-
9-Methylphenanthrene	NA	-	-	-	-	-
Naphthalene	NA	-	-	-	-	-
Perylene	NA	-	-	-	-	-
Phenanthrene	NA	-	-	-	-	-
Picene	NA	-	-	-	-	-
Pyrene	NA	-	-	-	-	-
Quinoline	NA	-	-	-	-	-
m-terphenyl	NA	-	-	-	-	-
o-Terphenyl	NA	-	-	-	-	-
p-terphenyl	NA	-	-	-	-	-
Tetralin	NA	-	-	-	-	-
Total	NA	-	-	-	-	-

Dry Gas Volume Sampled (Rm³*) :	4.659
Actual Flowrate (m³/s) :	52.3
Dry Reference Flowrate (Rm³/s*) :	17.6
Dry Adjusted Flowrate (Rm³/s**) :	19.5
Wet Reference Flowrate (Rm³/s*) :	33.4

* At 25°C and 1 atmosphere

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

Note: "NA" indicates that the data is not available due to an extraction error by the analytical laboratory.

TABLE 94
Clean Harbors Sarnia
Polycyclic Aromatic Hydrocarbon Emission Data
Test No. 3

Compound	Total Collected ng	Actual Concentration ng/m^3	Dry Reference Concentration ng/Rm^3*	Dry Adjusted Concentration ng/Rm^3**	Wet Reference Concentration ng/Rm^3*	Emission Rate µg/s
Acenaphthene	17.6	1.38	4.00	3.76	2.15	0.068
Acenaphthylene	<16	<1.25	<3.64	<3.42	<1.96	<0.062
Anthracene	23.9	1.87	5.44	5.11	2.93	0.092
Benzo(a)Anthracene	<16	<1.25	<3.64	<3.42	<1.96	<0.062
Benzo(b)Fluoranthene	<16	<1.25	<3.64	<3.42	<1.96	<0.062
Benzo(k)Fluoranthene	<16	<1.25	<3.64	<3.42	<1.96	<0.062
Benzo(a)fluorene	<16	<1.25	<3.64	<3.42	<1.96	<0.062
Benzo(b)fluorene	<16	<1.25	<3.64	<3.42	<1.96	<0.062
Benzo(g,h,i)Perylene	<16	<1.25	<3.64	<3.42	<1.96	<0.062
Benzo(a)Pyrene	<16	<1.25	<3.64	<3.42	<1.96	<0.062
Benzo(e)Pyrene	<16	<1.25	<3.64	<3.42	<1.96	<0.062
Biphenyl	212	16.6	48.2	45.3	26.0	0.82
2-Chloronaphthalene	<16	<1.25	<3.64	<3.42	<1.96	<0.062
Chrysene/Triphenylene	93.8	7.33	21.3	20.0	11.5	0.36
Coronene	<80	<6.25	<18.2	<17.1	<9.79	<0.31
Dibenzo(a,c/a,h)Anthracene	<16	<1.25	<3.64	<3.42	<1.96	<0.062
Dibenzo(a,e)pyrene	<80	<6.25	<18.2	<17.1	<9.79	<0.31
9,10-dimethylanthracene	<16	<1.25	<3.64	<3.42	<1.96	<0.062
7,12-Dimethylbenzo(a)anthracene	<16	<1.25	<3.64	<3.42	<1.96	<0.062
Fluoranthene	164	12.8	37.3	35.0	20.1	0.63
Fluorene	43.2	3.38	9.83	9.23	5.29	0.17
Indeno(1,2,3-cd)Pyrene	<16	<1.25	<3.64	<3.42	<1.96	<0.062
2-methylanthracene	180	14.1	41.0	38.5	22.0	0.70
3-Methylcholanthrene	<80	<6.25	<18.2	<17.1	<9.79	<0.31
1-Methylnaphthalene	75.6	5.91	17.2	16.2	9.25	0.29
2-Methylnaphthalene	147	11.5	33.4	31.4	18.0	0.57
1-Methylphenanthrene	25.4	1.98	5.78	5.43	3.11	0.098
9-Methylphenanthrene	68.6	5.36	15.6	14.7	8.40	0.27
Naphthalene	842	65.8	192	180	103	3.26
Perylene	<16	<1.25	<3.64	<3.42	<1.96	<0.062
Phenanthrene	652	50.9	148	139	79.8	2.52
Picene	<80	<6.25	<18.2	<17.1	<9.79	<0.31
Pyrene	137	10.7	31.2	29.3	16.8	0.53
Quinoline	<16	<1.25	<3.64	<3.42	<1.96	<0.062
m-terphenyl	26.1	2.04	5.94	5.58	3.19	0.10
o-Terphenyl	16.0	1.25	3.64	3.42	1.96	0.062
p-terphenyl	<16	<1.25	<3.64	<3.42	<1.96	<0.062
Tetralin	207	16.2	47.1	44.2	25.3	0.80
Total	<3523	<275	<802	<753	<431	<13.6

Dry Gas Volume Sampled (Rm^3*) :	4.395
Actual Flowrate (m^3/s) :	49.5
Dry Reference Flowrate (Rm^3/s*) :	17.0
Dry Adjusted Flowrate (Rm^3/s**) :	18.1
Wet Reference Flowrate (Rm^3/s*) :	31.6

* At 25°C and 1 atmosphere

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

Note: "<" 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 95
Clean Harbors Sarnia
Polycyclic Aromatic Hydrocarbon Actual Concentrations

Compound	Actual Concentration				Coefficient
	Test No. 1	Test No. 2	Test No. 3	Average	of Variation
	ng/m^3	ng/m^3	ng/m^3	ng/m^3	%
Acenaphthene	1.31	-	1.38	1.34	3.4
Acenaphthylene	1.19	-	<1.25	<1.22	3.4
Anthracene	1.73	-	1.87	1.80	5.3
Benzo(a)Anthracene	<1.18	-	<1.25	<1.22	3.8
Benzo(b)Fluoranthene	<1.18	-	<1.25	<1.22	3.8
Benzo(k)Fluoranthene	<1.18	-	<1.25	<1.22	3.8
Benzo(a)fluorene	<1.18	-	<1.25	<1.22	3.8
Benzo(b)fluorene	<1.18	-	<1.25	<1.22	3.8
Benzo(g,h,i)Perylene	<1.18	-	<1.25	<1.22	3.8
Benzo(a)Pyrene	<1.18	-	<1.25	<1.22	3.8
Benzo(e)Pyrene	<1.18	-	<1.25	<1.22	3.8
Biphenyl	24.5	-	16.6	20.5	27.3
2-Chloronaphthalene	<1.18	-	<1.25	<1.22	3.8
Chrysene/Triphenylene	1.84	-	7.33	4.58	84.8
Coronene	<5.92	-	<6.25	<6.09	3.8
Dibenzo(a,c/a,h)Anthracene	<1.18	-	<1.25	<1.22	3.8
Dibenzo(a,e)pyrene	<5.92	-	<6.25	<6.09	3.8
9,10-dimethylanthracene	<1.18	-	<1.25	<1.22	3.8
7,12-Dimethylbenzo(a)anthracene	<1.18	-	<1.25	<1.22	3.8
Fluoranthene	15.4	-	12.8	14.1	13.0
Fluorene	2.98	-	3.38	3.18	8.7
Indeno(1,2,3-cd)Pyrene	<1.18	-	<1.25	<1.22	3.8
2-methylanthracene	9.48	-	14.1	11.8	27.6
3-Methylcholanthrene	<5.92	-	<6.25	<6.09	3.8
1-Methylnaphthalene	8.52	-	5.91	7.21	25.6
2-Methylnaphthalene	14.7	-	11.5	13.1	17.2
1-Methylphenanthrene	<1.18	-	1.98	<1.58	35.7
9-Methylphenanthrene	4.43	-	5.36	4.89	13.5
Naphthalene	77.0	-	65.8	71.4	11.1
Perylene	<1.18	-	<1.25	<1.22	3.8
Phenanthrene	45.3	-	50.9	48.1	8.3
Picene	<5.92	-	<6.25	<6.09	3.8
Pyrene	19.0	-	10.7	14.8	39.3
Quinoline	<1.18	-	<1.25	<1.22	3.8
m-terphenyl	<1.18	-	2.04	<1.61	37.5
o-Terphenyl	1.29	-	1.25	1.27	2.1
p-terphenyl	<1.18	-	<1.25	<1.22	3.8
Tetralin	17.5	-	16.2	16.9	5.8
Total	<291	-	<275	<283	4.0

TABLE 96
Clean Harbors Sarnia
Polycyclic Aromatic Hydrocarbon Dry Reference Concentrations

Compound	Dry Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Acenaphthene	3.88	-	4.00	3.94	2.3
Acenaphthylene	3.53	-	<3.64	<3.58	2.2
Anthracene	5.13	-	5.44	5.28	4.2
Benzo(a)Anthracene	<3.51	-	<3.64	<3.57	2.7
Benzo(b)Fluoranthene	<3.51	-	<3.64	<3.57	2.7
Benzo(k)Fluoranthene	<3.51	-	<3.64	<3.57	2.7
Benzo(a)fluorene	<3.51	-	<3.64	<3.57	2.7
Benzo(b)fluorene	<3.51	-	<3.64	<3.57	2.7
Benzo(g,h,i)Perylene	<3.51	-	<3.64	<3.57	2.7
Benzo(a)Pyrene	<3.51	-	<3.64	<3.57	2.7
Benzo(e)Pyrene	<3.51	-	<3.64	<3.57	2.7
Biphenyl	72.5	-	48.2	60.4	28.4
2-Chloronaphthalene	<3.51	-	<3.64	<3.57	2.7
Chrysene/Triphenylene	5.43	-	21.3	13.4	84.0
Coronene	<17.5	-	<18.2	<17.9	2.7
Dibenzo(a,c/a,h)Anthracene	<3.51	-	<3.64	<3.57	2.7
Dibenzo(a,e)pyrene	<17.5	-	<18.2	<17.9	2.7
9,10-dimethylanthracene	<3.51	-	<3.64	<3.57	2.7
7,12-Dimethylbenzo(a)anthracene	<3.51	-	<3.64	<3.57	2.7
Fluoranthene	45.6	-	37.3	41.4	14.1
Fluorene	8.83	-	9.83	9.33	7.6
Indeno(1,2,3-cd)Pyrene	<3.51	-	<3.64	<3.57	2.7
2-methylanthracene	28.0	-	41.0	34.5	26.5
3-Methylcholanthrene	<17.5	-	<18.2	<17.9	2.7
1-Methylnaphthalene	25.2	-	17.2	21.2	26.7
2-Methylnaphthalene	43.4	-	33.4	38.4	18.3
1-Methylphenanthrene	<3.51	-	5.78	<4.64	34.6
9-Methylphenanthrene	13.1	-	15.6	14.4	12.3
Naphthalene	228	-	192	210	12.2
Perylene	<3.51	-	<3.64	<3.57	2.7
Phenanthrene	134	-	148	141	7.1
Picene	<17.5	-	<18.2	<17.9	2.7
Pyrene	56.1	-	31.2	43.6	40.4
Quinoline	<3.51	-	<3.64	<3.57	2.7
m-terphenyl	<3.51	-	5.94	<4.72	36.4
o-Terphenyl	3.81	-	3.64	3.73	3.3
p-terphenyl	<3.51	-	<3.64	<3.57	2.7
Tetralin	51.9	-	47.1	49.5	6.9
Total	<862	-	<802	<832	5.1

* At 25°C and 1 atmosphere

TABLE 97
Clean Harbors Sarnia
Polycyclic Aromatic Hydrocarbon Dry Adjusted Concentrations

Compound	Dry Adjusted Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Acenaphthene	3.44	-	3.76	3.60	6.4
Acenaphthylene	3.13	-	<3.42	<3.27	6.3
Anthracene	4.54	-	5.11	4.83	8.3
Benzo(a)Anthracene	<3.11	-	<3.42	<3.26	6.8
Benzo(b)Fluoranthene	<3.11	-	<3.42	<3.26	6.8
Benzo(k)Fluoranthene	<3.11	-	<3.42	<3.26	6.8
Benzo(a)fluorene	<3.11	-	<3.42	<3.26	6.8
Benzo(b)fluorene	<3.11	-	<3.42	<3.26	6.8
Benzo(g,h,i)Perylene	<3.11	-	<3.42	<3.26	6.8
Benzo(a)Pyrene	<3.11	-	<3.42	<3.26	6.8
Benzo(e)Pyrene	<3.11	-	<3.42	<3.26	6.8
Biphenyl	64.3	-	45.3	54.8	24.5
2-Chloronaphthalene	<3.11	-	<3.42	<3.26	6.8
Chrysene/Triphenylene	4.81	-	20.0	12.4	86.6
Coronene	<15.5	-	<17.1	<16.3	6.8
Dibenzo(a,c/a,h)Anthracene	<3.11	-	<3.42	<3.26	6.8
Dibenzo(a,e)pyrene	<15.5	-	<17.1	<16.3	6.8
9,10-dimethylanthracene	<3.11	-	<3.42	<3.26	6.8
7,12-Dimethylbenzo(a)anthracene	<3.11	-	<3.42	<3.26	6.8
Fluoranthene	40.4	-	35.0	37.7	10.0
Fluorene	7.82	-	9.23	8.53	11.7
Indeno(1,2,3-cd)Pyrene	<3.11	-	<3.42	<3.26	6.8
2-methylanthracene	24.8	-	38.5	31.7	30.4
3-Methylcholanthrene	<15.5	-	<17.1	<16.3	6.8
1-Methylnaphthalene	22.3	-	16.2	19.2	22.7
2-Methylnaphthalene	38.4	-	31.4	34.9	14.2
1-Methylphenanthrene	<3.11	-	5.43	<4.27	38.5
9-Methylphenanthrene	11.6	-	14.7	13.1	16.4
Naphthalene	202	-	180	191	8.1
Perylene	<3.11	-	<3.42	<3.26	6.8
Phenanthrene	119	-	139	129	11.2
Picene	<15.5	-	<17.1	<16.3	6.8
Pyrene	49.7	-	29.3	39.5	36.6
Quinoline	<3.11	-	<3.42	<3.26	6.8
m-terphenyl	<3.11	-	5.58	<4.34	40.3
o-Terphenyl	3.38	-	3.42	3.40	0.9
p-terphenyl	<3.11	-	<3.42	<3.26	6.8
Tetralin	46.0	-	44.2	45.1	2.8
Total	<763	-	<753	<758	1.0

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

TABLE 98
Clean Harbors Sarnia
Polycyclic Aromatic Hydrocarbon Wet Reference Concentrations

Compound	Wet Reference Concentration				Coefficient
	Test No. 1	Test No. 2	Test No. 3	Average	of Variation
	ng/Rm^3*	ng/Rm^3*	ng/Rm^3*	ng/Rm^3*	%
Acenaphthene	2.03	-	2.15	2.09	4.1
Acenaphthylene	1.85	-	<1.96	<1.90	4.0
Anthracene	2.69	-	2.93	2.81	5.9
Benzo(a)Anthracene	<1.84	-	<1.96	<1.90	4.5
Benzo(b)Fluoranthene	<1.84	-	<1.96	<1.90	4.5
Benzo(k)Fluoranthene	<1.84	-	<1.96	<1.90	4.5
Benzo(a)fluorene	<1.84	-	<1.96	<1.90	4.5
Benzo(b)fluorene	<1.84	-	<1.96	<1.90	4.5
Benzo(g,h,i)Perylene	<1.84	-	<1.96	<1.90	4.5
Benzo(a)Pyrene	<1.84	-	<1.96	<1.90	4.5
Benzo(e)Pyrene	<1.84	-	<1.96	<1.90	4.5
Biphenyl	38.0	-	26.0	32.0	26.7
2-Chloronaphthalene	<1.84	-	<1.96	<1.90	4.5
Chrysene/Triphenylene	2.85	-	11.5	7.17	85.2
Coronene	<9.19	-	<9.79	<9.49	4.5
Dibenzo(a,c/a,h)Anthracene	<1.84	-	<1.96	<1.90	4.5
Dibenzo(a,e)pyrene	<9.19	-	<9.79	<9.49	4.5
9,10-dimethylanthracene	<1.84	-	<1.96	<1.90	4.5
7,12-Dimethylbenzo(a)anthracene	<1.84	-	<1.96	<1.90	4.5
Fluoranthene	23.9	-	20.1	22.0	12.3
Fluorene	4.63	-	5.29	4.96	9.4
Indeno(1,2,3-cd)Pyrene	<1.84	-	<1.96	<1.90	4.5
2-methylanthracene	14.7	-	22.0	18.4	28.2
3-Methylcholanthrene	<9.19	-	<9.79	<9.49	4.5
1-Methylnaphthalene	13.2	-	9.25	11.2	24.9
2-Methylnaphthalene	22.8	-	18.0	20.4	16.5
1-Methylphenanthrene	<1.84	-	3.11	<2.47	36.3
9-Methylphenanthrene	6.87	-	8.40	7.63	14.1
Naphthalene	120	-	103	111	10.5
Perylene	<1.84	-	<1.96	<1.90	4.5
Phenanthrene	70.3	-	79.8	75.1	8.9
Picene	<9.19	-	<9.79	<9.49	4.5
Pyrene	29.4	-	16.8	23.1	38.7
Quinoline	<1.84	-	<1.96	<1.90	4.5
m-terphenyl	<1.84	-	3.19	<2.52	38.1
o-Terphenyl	2.00	-	1.96	1.98	1.5
p-terphenyl	<1.84	-	<1.96	<1.90	4.5
Tetralin	27.2	-	25.3	26.3	5.1
Total	<452	-	<431	<442	3.3

* At 25°C and 1 atmosphere

TABLE 99
Clean Harbors Sarnia
Polycyclic Aromatic Hydrocarbon Emission Rates

Compound	Emission Rate Test No. 1 µg/s	Test No. 2 µg/s	Test No. 3 µg/s	Average µg/s	Coefficient of Variation %
Acenaphthene	0.066	-	0.068	0.067	1.9
Acenaphthylene	0.060	-	<0.062	<0.061	1.8
Anthracene	0.088	-	0.092	0.090	3.7
Benzo(a)Anthracene	<0.060	-	<0.062	<0.061	2.3
Benzo(b)Fluoranthene	<0.060	-	<0.062	<0.061	2.3
Benzo(k)Fluoranthene	<0.060	-	<0.062	<0.061	2.3
Benzo(a)fluorene	<0.060	-	<0.062	<0.061	2.3
Benzo(b)fluorene	<0.060	-	<0.062	<0.061	2.3
Benzo(g,h,i)Perylene	<0.060	-	<0.062	<0.061	2.3
Benzo(a)Pyrene	<0.060	-	<0.062	<0.061	2.3
Benzo(e)Pyrene	<0.060	-	<0.062	<0.061	2.3
Biphenyl	1.24	-	0.82	1.03	28.8
2-Chloronaphthalene	<0.060	-	<0.062	<0.061	2.3
Chrysene/Triphenylene	0.093	-	0.36	0.23	83.8
Coronene	<0.30	-	<0.31	<0.30	2.3
Dibenzo(a,c/a,h)Anthracene	<0.060	-	<0.062	<0.061	2.3
Dibenzo(a,e)pyrene	<0.30	-	<0.31	<0.30	2.3
9,10-dimethylanthracene	<0.060	-	<0.062	<0.061	2.3
7,12-Dimethylbenzo(a)anthracene	<0.060	-	<0.062	<0.061	2.3
Fluoranthene	0.78	-	0.63	0.71	14.5
Fluorene	0.15	-	0.17	0.16	7.2
Indeno(1,2,3-cd)Pyrene	<0.060	-	<0.062	<0.061	2.3
2-methylanthracene	0.48	-	0.70	0.59	26.1
3-Methylcholanthrene	<0.30	-	<0.31	<0.30	2.3
1-Methylnaphthalene	0.43	-	0.29	0.36	27.1
2-Methylnaphthalene	0.74	-	0.57	0.66	18.7
1-Methylphenanthrene	<0.060	-	0.098	<0.079	34.2
9-Methylphenanthrene	0.22	-	0.27	0.24	11.9
Naphthalene	3.90	-	3.26	3.58	12.6
Perylene	<0.060	-	<0.062	<0.061	2.3
Phenanthrene	2.29	-	2.52	2.41	6.7
Picene	<0.30	-	<0.31	<0.30	2.3
Pyrene	0.96	-	0.53	0.74	40.8
Quinoline	<0.060	-	<0.062	<0.061	2.3
m-terphenyl	<0.060	-	0.10	<0.080	36.0
o-Terphenyl	0.065	-	0.062	0.064	3.7
p-terphenyl	<0.060	-	<0.062	<0.061	2.3
Tetralin	0.89	-	0.80	0.84	7.3
Total	<14.7	-	<13.6	<14.2	5.5

TABLE 100
Clean Harbors Sarnia
Summary of Polycyclic Aromatic Hydrocarbon Emission Data

Compound	Actual Concentration ng/m^3	Dry Reference Concentration ng/Rm^3*	Dry Adjusted Concentration ng/Rm^3**	Wet Reference Concentration ng/Rm^3*	Emission Rate µg/s
Acenaphthene	1.34	3.94	3.60	2.09	0.067
Acenaphthylene	<1.22	<3.58	<3.27	<1.90	<0.061
Anthracene	1.80	5.28	4.83	2.81	0.090
Benzo(a)Anthracene	<1.22	<3.57	<3.26	<1.90	<0.061
Benzo(b)Fluoranthene	<1.22	<3.57	<3.26	<1.90	<0.061
Benzo(k)Fluoranthene	<1.22	<3.57	<3.26	<1.90	<0.061
Benzo(a)fluorene	<1.22	<3.57	<3.26	<1.90	<0.061
Benzo(b)fluorene	<1.22	<3.57	<3.26	<1.90	<0.061
Benzo(g,h,i)Perylene	<1.22	<3.57	<3.26	<1.90	<0.061
Benzo(a)Pyrene	<1.22	<3.57	<3.26	<1.90	<0.061
Benzo(e)Pyrene	<1.22	<3.57	<3.26	<1.90	<0.061
Biphenyl	20.5	60.4	54.8	32.0	1.03
2-Chloronaphthalene	<1.22	<3.57	<3.26	<1.90	<0.061
Chrysene/Triphenylene	4.58	13.4	12.4	7.17	0.23
Coronene	<6.09	<17.9	<16.3	<9.49	<0.30
Dibenzo(a,c/a,h)Anthracene	<1.22	<3.57	<3.26	<1.90	<0.061
Dibenzo(a,e)pyrene	<6.09	<17.9	<16.3	<9.49	<0.30
9,10-dimethylanthracene	<1.22	<3.57	<3.26	<1.90	<0.061
7,12-Dimethylbenzo(a)anthracene	<1.22	<3.57	<3.26	<1.90	<0.061
Fluoranthene	14.1	41.4	37.7	22.0	0.71
Fluorene	3.18	9.33	8.53	4.96	0.16
Indeno(1,2,3-cd)Pyrene	<1.22	<3.57	<3.26	<1.90	<0.061
2-methylanthracene	11.8	34.5	31.7	18.4	0.59
3-Methylcholanthrene	<6.09	<17.9	<16.3	<9.49	<0.30
1-Methylnaphthalene	7.21	21.2	19.2	11.2	0.36
2-Methylnaphthalene	13.1	38.4	34.9	20.4	0.66
1-Methylphenanthrene	<1.58	<4.64	<4.27	<2.47	<0.079
9-Methylphenanthrene	4.89	14.4	13.1	7.63	0.24
Naphthalene	71.4	210	191	111	3.58
Perylene	<1.22	<3.57	<3.26	<1.90	<0.061
Phenanthrene	48.1	141	129	75.1	2.41
Picene	<6.09	<17.9	<16.3	<9.49	<0.30
Pyrene	14.8	43.6	39.5	23.1	0.74
Quinoline	<1.22	<3.57	<3.26	<1.90	<0.061
m-terphenyl	<1.61	<4.72	<4.34	<2.52	<0.080
o-Terphenyl	1.27	3.73	3.40	1.98	0.064
p-terphenyl	<1.22	<3.57	<3.26	<1.90	<0.061
Tetralin	16.9	49.5	45.1	26.3	0.84
Total	<283	<832	<758	<442	<14.2

* At 25°C and 1 atmosphere

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

TABLE 101
Clean Harbors Sarnia
Blank Polycyclic Aromatic Hydrocarbon Analyses

Compound	Blank Train ng	Laboratory Blank ng
Acenaphthene	<16	<16
Acenaphthylene	<16	<16
Anthracene	<16	<16
Benzo(a)Anthracene	<16	<16
Benzo(b)Fluoranthene	<16	<16
Benzo(k)Fluoranthene	<16	<16
Benzo(a)fluorene	<16	<16
Benzo(b)fluorene	<16	<16
Benzo(g,h,i)Perylene	<16	<16
Benzo(a)Pyrene	<16	<16
Benzo(e)Pyrene	<16	<16
Biphenyl	23.8	20.6
2-Chloronaphthalene	<16	<16
Chrysene/Triphenylene	<16	<16
Coronene	<80	<80
Dibenzo(a,c/a,h)Anthracene	<16	<16
Dibenzo(a,e)pyrene	<80	<80
9,10-dimethylanthracene	<16	<16
7,12-Dimethylbenzo(a)anthracene	<16	<16
Fluoranthene	<16	<16
Fluorene	<16	<16
Indeno(1,2,3-cd)Pyrene	<16	<16
2-methylanthracene	<16	<16
3-Methylcholanthrene	<80	<80
1-Methylnaphthalene	<16	<16
2-Methylnaphthalene	27.4	19.9
1-Methylphenanthrene	<16	<16
9-Methylphenanthrene	<16	<16
Naphthalene	334	92.4
Perylene	<16	<16
Phenanthrene	17.2	17.0
Picene	<80	<80
Pyrene	<16	<16
Quinoline	<16	<16
m-terphenyl	<16	<16
o-Terphenyl	<16	<16
p-terphenyl	<16	<16
Tetralin	182	<16
Total	<1368	<950

"<" indicates that the amount detected is less than the analytical detection limit (<MDL). In these cases the value of the detection limit was used to calculate the total collected.

TABLE 102
Clean Harbors Sarnia
Volatile Organic Analyses
Test No. 1

Compound	Cartridge Amount Collected Run No. 1 Tube 13A/13B	Run No. 2 Tube 14A/14B	Run No. 3 Tube 15A/15B	Average	Coefficient of Variation	Total Collected
	µg	µg	µg	µg	%	µg
Benzene	0.14	0.13	0.11	0.13	12.0	0.38
Bromodichloromethane	0.067	0.065	0.063	0.065	3.1	0.20
Bromomethane	<0.09	<0.09	<0.09	<0.090	-	<0.27
2-Butanone	0.030	0.058	0.047	0.045	31.3	0.14
Chloroethene	<0.02	<0.02	<0.02	<0.020	-	<0.060
Dibromochloromethane	0.055	0.050	0.049	0.051	6.3	0.15
1,2-Dibromoethane	<0.02	<0.02	<0.02	<0.020	-	<0.060
Dichlorodifluoromethane	0.029	0.024	0.027	0.027	9.4	0.080
1,1-Dichloroethane	<0.01	<0.01	<0.01	<0.010	-	<0.030
1,1-Dichloroethene	<0.01	<0.01	<0.01	<0.010	-	<0.030
trans-1,2-Dichloroethene	<0.01	<0.01	<0.01	<0.010	-	<0.030
Dichloromethane	0.24	0.26	2.71	1.07	133	3.21
1,2-Dichloropropane	<0.01	<0.01	<0.01	<0.010	-	<0.030
Ethyl Acetate	<0.1	<0.1	<0.1	<0.10	-	<0.30
Ethylbenzene	<0.01	0.012	0.013	<0.012	13.1	<0.035
Isopropylbenzene	<0.02	<0.02	<0.02	<0.020	-	<0.060
2-Propanone	0.24	0.29	0.28	0.27	9.5	0.81
Styrene	0.021	<0.02	<0.02	<0.020	2.8	<0.061
Tetrachloroethene	<0.01	0.010	<0.01	<0.010	-	<0.030
Tetrachloromethane	0.023	0.015	0.019	0.019	21.1	0.057
Toluene	0.38	0.44	0.45	0.42	9.1	1.27
Tribromomethane	0.12	0.11	0.11	0.11	7.4	0.34
1,1,1-Trichloroethane	<0.01	<0.01	<0.01	<0.010	-	<0.030
Trichloroethene	<0.01	0.030	0.018	<0.019	52.1	<0.058
Trichlorofluoromethane	<0.02	<0.02	<0.02	<0.020	-	<0.060
Trichloromethane	0.064	0.065	0.064	0.064	0.9	0.19
Trichlorotrifluoroethane	<0.01	<0.01	<0.01	<0.010	-	<0.030
1,2,4-Trimethylbenzene	0.022	0.025	0.021	0.023	9.2	0.068
1,3,5-Trimethylbenzene	<0.02	<0.02	<0.02	<0.020	-	<0.060
Xylenes (total)	<0.04	0.035	0.047	<0.041	14.8	<0.12
Total	<1.86	<1.99	<4.40	<2.75	52.1	<8.25

Dry Gas Volume Sampled (Rm^3*) :

Run No. 1	0.0237
Run No. 2	0.0227
Run No. 3	0.0219

* At 25°C and 1 atmosphere.

Note: "<" indicates that the analyte was not detected. Any analyte that was not detected was assigned a value equal to the detection limit for calculation purposes.

TABLE 103
Clean Harbors Sarnia
Volatile Organic Analyses
Test No. 2

Compound	Cartridge Amount Collected				Coefficient	Total
	Run No. 1 Tube 5A/5B	Run No. 3 Tube 7A/7B	Run No. 4 Tube 8A/8B	Average	of Variation	Collected
	µg	µg	µg	µg	%	µg
Benzene	0.13	0.12	0.12	0.13	6.2	0.38
Bromodichloromethane	0.070	0.056	0.057	0.061	12.8	0.18
Bromomethane	<0.09	<0.09	<0.09	<0.090	-	<0.27
2-Butanone	0.023	0.028	0.020	0.024	17.1	0.071
Chloroethene	<0.02	<0.02	<0.02	<0.020	-	<0.060
Dibromochloromethane	0.062	0.056	0.054	0.057	7.3	0.17
1,2-Dibromoethane	<0.02	<0.02	<0.02	<0.020	-	<0.060
Dichlorodifluoromethane	<0.02	0.028	0.023	<0.024	17.1	<0.071
1,1-Dichloroethane	<0.01	<0.01	<0.01	<0.010	-	<0.030
1,1-Dichloroethene	<0.01	<0.01	<0.01	<0.010	-	<0.030
trans-1,2-Dichloroethene	<0.01	<0.01	<0.01	<0.010	-	<0.030
Dichloromethane	0.14	0.20	0.13	0.16	23.8	0.48
1,2-Dichloropropane	<0.01	<0.01	<0.01	<0.010	-	<0.030
Ethyl Acetate	<0.1	<0.1	<0.1	<0.10	-	<0.30
Ethylbenzene	0.012	<0.01	<0.01	<0.011	10.8	<0.032
Isopropylbenzene	<0.02	<0.02	<0.02	<0.020	-	<0.060
2-Propanone	0.12	0.25	0.15	0.17	40.8	0.52
Styrene	0.023	<0.02	<0.02	<0.021	8.2	<0.063
Tetrachloroethene	<0.01	<0.01	<0.01	<0.010	-	<0.030
Tetrachloromethane	<0.01	<0.01	<0.01	<0.010	-	<0.030
Toluene	0.27	0.17	0.18	0.20	27.1	0.61
Tribromomethane	0.10	0.13	0.12	0.12	10.5	0.35
1,1,1-Trichloroethane	<0.01	<0.01	<0.01	<0.010	-	<0.030
Trichloroethene	<0.01	<0.01	<0.01	<0.010	-	<0.030
Trichlorofluoromethane	<0.02	<0.02	<0.02	<0.020	-	<0.060
Trichloromethane	0.050	0.048	0.050	0.049	2.3	0.15
Trichlorotrifluoroethane	<0.01	<0.01	<0.01	<0.010	-	<0.030
1,2,4-Trimethylbenzene	<0.02	<0.02	<0.02	<0.020	-	<0.060
1,3,5-Trimethylbenzene	<0.02	<0.02	<0.02	<0.020	-	<0.060
Xylenes (total)	0.054	<0.04	<0.04	<0.045	18.1	<0.13
Total	<1.48	<1.55	<1.37	<1.47	6.3	<4.40

Dry Gas Volume Sampled (Rm^{3}*) :

Run No. 1	0.0227
Run No. 3	0.0215
Run No. 4	0.0215

* At 25°C and 1 atmosphere.

Note: "<" indicates that the analyte was not detected. Any analyte that was not detected was assigned a value equal to the detection limit for calculation purposes.

TABLE 104
Clean Harbors Sarnia
Volatile Organic Analyses
Test No. 3

Compound	Cartridge Amount Collected Run No. 1 Tube 9A/9B µg	Run No. 2 Tube 10A/10B µg	Run No. 3 Tube 11A/11B µg	Average µg	Coefficient of Variation %	Total Collected µg
Benzene	0.12	0.11	0.13	0.12	5.5	0.36
Bromodichloromethane	0.018	0.019	0.019	0.019	3.1	0.056
Bromomethane	<0.09	<0.09	<0.09	<0.090	-	<0.27
2-Butanone	0.039	0.027	0.047	0.038	26.7	0.11
Chloroethene	<0.02	<0.02	<0.02	<0.020	-	<0.060
Dibromochloromethane	0.016	0.017	0.016	0.016	3.5	0.049
1,2-Dibromoethane	<0.02	<0.02	<0.02	<0.020	-	<0.060
Dichlorodifluoromethane	0.029	<0.02	0.030	<0.026	20.9	<0.079
1,1-Dichloroethane	<0.01	<0.01	<0.01	<0.010	-	<0.030
1,1-Dichloroethene	<0.01	<0.01	<0.01	<0.010	-	<0.030
trans-1,2-Dichloroethene	<0.01	<0.01	<0.01	<0.010	-	<0.030
Dichloromethane	0.27	<0.1	1.00	<0.45	105	<1.36
1,2-Dichloropropane	<0.01	<0.01	<0.01	<0.010	-	<0.030
Ethyl Acetate	<0.1	<0.1	<0.1	<0.10	-	<0.30
Ethylbenzene	<0.01	<0.01	0.010	<0.010	-	<0.030
Isopropylbenzene	<0.02	<0.02	<0.02	<0.020	-	<0.060
2-Propanone	1.65	0.22	0.42	0.76	101	2.28
Styrene	<0.02	<0.02	<0.02	<0.020	-	<0.060
Tetrachloroethene	<0.01	<0.01	<0.01	<0.010	-	<0.030
Tetrachloromethane	<0.01	<0.01	<0.01	<0.010	-	<0.030
Toluene	0.21	0.23	0.35	0.26	30.1	0.79
Tribromomethane	0.041	0.042	0.046	0.043	6.2	0.13
1,1,1-Trichloroethane	<0.01	<0.01	<0.01	<0.010	-	<0.030
Trichloroethene	<0.01	<0.01	<0.01	<0.010	-	<0.030
Trichlorofluoromethane	<0.02	<0.02	<0.02	<0.020	-	<0.060
Trichloromethane	0.028	0.025	0.028	0.027	6.4	0.081
Trichlorotrifluoroethane	<0.01	<0.01	<0.01	<0.010	-	<0.030
1,2,4-Trimethylbenzene	0.032	<0.02	0.021	<0.024	27.4	<0.073
1,3,5-Trimethylbenzene	<0.02	<0.02	<0.02	<0.020	-	<0.060
Xylenes (total)	<0.04	<0.04	<0.04	<0.040	-	<0.12
Total	<2.90	<1.28	<2.55	<2.24	38.0	<6.73

Dry Gas Volume Sampled (Rm^3*) :

Run No. 1	0.0214
Run No. 2	0.0215
Run No. 3	0.0218

* At 25°C and 1 atmosphere.

Note: "<" indicates that the analyte was not detected. Any analyte that was not detected was assigned a value equal to the detection limit for calculation purposes.

TABLE 105
Clean Harbors Sarnia
Volatile Organic Emission Data
Test No. 1

Compound	Total Collected µg	Actual Concentration µg/m^3	Dry Reference Concentration µg/Rm^3*	Dry Adjusted Concentration µg/Rm^3**	Wet Reference Concentration µg/Rm^3*	Emission Rate mg/s
Benzene	0.38	1.91	5.62	4.98	2.96	0.097
Bromodichloromethane	0.20	0.97	2.85	2.53	1.50	0.049
Bromomethane	<0.27	<1.34	<3.95	<3.50	<2.08	<0.068
2-Butanone	0.14	0.67	1.98	1.75	1.04	0.034
Chloroethene	<0.060	<0.30	<0.88	<0.78	<0.46	<0.015
Dibromochloromethane	0.15	0.76	2.25	2.00	1.19	0.039
1,2-Dibromoethane	<0.060	<0.30	<0.88	<0.78	<0.46	<0.015
Dichlorodifluoromethane	0.080	0.40	1.17	1.04	0.62	0.020
1,1-Dichloroethane	<0.030	<0.15	<0.44	<0.39	<0.23	<0.0076
1,1-Dichloroethene	<0.030	<0.15	<0.44	<0.39	<0.23	<0.0076
trans-1,2-Dichloroethene	<0.030	<0.15	<0.44	<0.39	<0.23	<0.0076
Dichloromethane	3.21	15.9	46.9	41.6	24.7	0.81
1,2-Dichloropropane	<0.030	<0.15	<0.44	<0.39	<0.23	<0.0076
Ethyl Acetate	<0.30	<1.49	<4.39	<3.89	<2.31	<0.076
Ethylbenzene	<0.035	<0.17	<0.51	<0.45	<0.27	<0.0088
Isopropylbenzene	<0.060	<0.30	<0.88	<0.78	<0.46	<0.015
2-Propanone	0.81	4.02	11.8	10.5	6.23	0.20
Styrene	<0.061	<0.30	<0.89	<0.79	<0.47	<0.015
Tetrachloroethene	<0.030	<0.15	<0.44	<0.39	<0.23	<0.0076
Tetrachloromethane	0.057	0.28	0.83	0.74	0.44	0.014
Toluene	1.27	6.31	18.6	16.5	9.78	0.32
Tribromomethane	0.34	1.70	5.02	4.45	2.64	0.086
1,1,1-Trichloroethane	<0.030	<0.15	<0.44	<0.39	<0.23	<0.0076
Trichloroethene	<0.058	<0.29	<0.85	<0.75	<0.45	<0.015
Trichlorofluoromethane	<0.060	<0.30	<0.88	<0.78	<0.46	<0.015
Trichloromethane	0.19	0.96	2.82	2.50	1.49	0.049
Trichlorotrifluoroethane	<0.030	<0.15	<0.44	<0.39	<0.23	<0.0076
1,2,4-Trimethylbenzene	0.068	0.34	1.00	0.88	0.52	0.017
1,3,5-Trimethylbenzene	<0.060	<0.30	<0.88	<0.78	<0.46	<0.015
Xylenes (total)	<0.12	<0.61	<1.79	<1.58	<0.94	<0.031
Total	<8.25	<41.0	<121	<107	<63.5	<2.08

Dry Gas Volume Sampled (Rm^3*) :	0.0683
Actual Flowrate (m^3/s) :	50.7
Dry Reference Flowrate (Rm^3/s*) :	17.2
Dry Adjusted Flowrate (Rm^3/s**) :	19.4
Wet Reference Flowrate (Rm^3/s*) :	32.7

* At 25°C and 1 atmosphere

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

TABLE 106
Clean Harbors Sarnia
Volatile Organic Emission Data
Test No. 2

Compound	Total Collected µg	Actual Concentration µg/m^3	Dry Reference Concentration µg/Rm^3*	Dry Adjusted Concentration µg/Rm^3**	Wet Reference Concentration µg/Rm^3*	Emission Rate mg/s
Benzene	0.38	1.93	5.71	5.16	3.03	0.10
Bromodichloromethane	0.18	0.94	2.79	2.52	1.48	0.049
Bromomethane	<0.27	<1.39	<4.11	<3.71	<2.18	<0.073
2-Butanone	0.071	0.37	1.08	0.98	0.57	0.019
Chloroethene	<0.060	<0.31	<0.91	<0.825	<0.48	<0.016
Dibromochloromethane	0.17	0.89	2.62	2.37	1.39	0.046
1,2-Dibromoethane	<0.060	<0.31	<0.91	<0.83	<0.48	<0.016
Dichlorodifluoromethane	<0.071	<0.37	<1.08	<0.98	<0.57	<0.019
1,1-Dichloroethane	<0.030	<0.15	<0.46	<0.41	<0.24	<0.0081
1,1-Dichloroethene	<0.030	<0.15	<0.46	<0.41	<0.24	<0.0081
trans-1,2-Dichloroethene	<0.030	<0.15	<0.46	<0.41	<0.24	<0.0081
Dichloromethane	0.48	2.46	7.26	6.56	3.85	0.13
1,2-Dichloropropane	<0.030	<0.15	<0.46	<0.41	<0.24	<0.0081
Ethyl Acetate	<0.30	<1.55	<4.57	<4.13	<2.42	<0.081
Ethylbenzene	<0.032	<0.16	<0.49	<0.44	<0.26	<0.0086
Isopropylbenzene	<0.060	<0.31	<0.91	<0.83	<0.48	<0.016
2-Propanone	0.52	2.67	7.90	7.14	4.19	0.14
Styrene	<0.063	<0.32	<0.96	<0.87	<0.51	<0.017
Tetrachloroethene	<0.030	<0.15	<0.46	<0.41	<0.24	<0.0081
Tetrachloromethane	<0.030	<0.15	<0.46	<0.41	<0.24	<0.0081
Toluene	0.61	3.13	9.26	8.36	4.91	0.16
Tribromomethane	0.35	1.79	5.30	4.79	2.81	0.094
1,1,1-Trichloroethane	<0.030	<0.15	<0.46	<0.41	<0.24	<0.0081
Trichloroethene	<0.030	<0.15	<0.46	<0.41	<0.24	<0.0081
Trichlorofluoromethane	<0.060	<0.31	<0.91	<0.83	<0.48	<0.016
Trichloromethane	0.15	0.76	2.25	2.04	1.19	0.040
Trichlorotrifluoroethane	<0.030	<0.15	<0.46	<0.41	<0.24	<0.0081
1,2,4-Trimethylbenzene	<0.060	<0.31	<0.91	<0.83	<0.48	<0.016
1,3,5-Trimethylbenzene	<0.060	<0.31	<0.91	<0.83	<0.48	<0.016
Xylenes (total)	<0.13	<0.69	<2.04	<1.84	<1.08	<0.036
Total	<4.40	<22.7	<67.0	<60.5	<35.5	<1.19

Dry Gas Volume Sampled (Rm^3*) :	0.0657
Actual Flowrate (m^3/s) :	52.3
Dry Reference Flowrate (Rm^3/s*) :	17.7
Dry Adjusted Flowrate (Rm^3/s**) :	19.6
Wet Reference Flowrate (Rm^3/s*) :	33.4

* At 25°C and 1 atmosphere

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

TABLE 107
Clean Harbors Sarnia
Volatile Organic Emission Data
Test No. 3

Compound	Total Collected µg	Actual Concentration µg/m³	Dry Reference Concentration µg/Rm³*	Dry Adjusted Concentration µg/Rm³**	Wet Reference Concentration µg/Rm³*	Emission Rate mg/s
Benzene	0.36	1.92	5.59	5.24	3.00	0.094
Bromodichloromethane	0.056	0.30	0.86	0.81	0.46	0.015
Bromomethane	<0.27	<1.43	<4.17	<3.91	<2.24	<0.070
2-Butanone	0.11	0.60	1.74	1.64	0.94	0.029
Chloroethene	<0.060	<0.32	<0.93	<0.87	<0.50	<0.016
Dibromochloromethane	0.049	0.26	0.76	0.71	0.41	0.013
1,2-Dibromoethane	<0.060	<0.32	<0.93	<0.87	<0.50	<0.016
Dichlorodifluoromethane	<0.079	<0.42	<1.22	<1.14	<0.65	<0.021
1,1-Dichloroethane	<0.030	<0.16	<0.46	<0.43	<0.25	<0.0078
1,1-Dichloroethene	<0.030	<0.16	<0.46	<0.43	<0.25	<0.0078
trans-1,2-Dichloroethene	<0.030	<0.16	<0.46	<0.43	<0.25	<0.0078
Dichloromethane	<1.36	<7.23	<21.0	<19.8	<11.3	<0.36
1,2-Dichloropropane	<0.030	<0.16	<0.46	<0.43	<0.25	<0.0078
Ethyl Acetate	<0.30	<1.59	<4.63	<4.35	<2.48	<0.078
Ethylbenzene	<0.030	<0.16	<0.46	<0.43	<0.25	<0.0078
Isopropylbenzene	<0.060	<0.32	<0.93	<0.87	<0.50	<0.016
2-Propanone	2.28	12.1	35.2	33.1	18.9	0.60
Styrene	<0.060	<0.32	<0.93	<0.87	<0.50	<0.016
Tetrachloroethene	<0.030	<0.16	<0.46	<0.43	<0.25	<0.0078
Tetrachloromethane	<0.030	<0.16	<0.46	<0.43	<0.25	<0.0078
Toluene	0.79	4.16	12.1	11.4	6.50	0.20
Tribromomethane	0.13	0.68	1.99	1.87	1.07	0.034
1,1,1-Trichloroethane	<0.030	<0.16	<0.46	<0.43	<0.25	<0.0078
Trichloroethene	<0.030	<0.16	<0.46	<0.43	<0.25	<0.0078
Trichlorofluoromethane	<0.060	<0.32	<0.93	<0.87	<0.50	<0.016
Trichloromethane	0.081	0.43	1.25	1.17	0.67	0.021
Trichlorotrifluoroethane	<0.030	<0.16	<0.46	<0.43	<0.25	<0.0078
1,2,4-Trimethylbenzene	<0.073	<0.39	<1.13	<1.06	<0.60	<0.019
1,3,5-Trimethylbenzene	<0.060	<0.32	<0.93	<0.87	<0.50	<0.016
Xylenes (total)	<0.12	<0.64	<1.85	<1.74	<0.99	<0.031
Total	<6.73	<35.6	<104	<97.4	<55.7	<1.75

Dry Gas Volume Sampled (Rm³*) :	0.0648
Actual Flowrate (m³/s) :	49.2
Dry Reference Flowrate (Rm³/s*) :	16.9
Dry Adjusted Flowrate (Rm³/s**) :	18.0
Wet Reference Flowrate (Rm³/s*) :	31.5

* At 25°C and 1 atmosphere

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

TABLE 108
Clean Harbors Sarnia
Volatile Organic Actual Concentrations

Compound	Actual Concentration Test No. 1	 Test No. 2	 Test No. 3	 Average
	µg/m^3	µg/m^3	µg/m^3	µg/m^3
Benzene	1.91	1.93	1.92	1.92
Bromodichloromethane	0.97	0.94	0.30	0.74
Bromomethane	<1.34	<1.39	<1.43	<1.39
2-Butanone	0.67	0.37	0.60	0.55
Chloroethene	<0.30	<0.31	<0.32	<0.31
Dibromochloromethane	0.76	0.89	0.26	0.64
1,2-Dibromoethane	<0.30	<0.31	<0.32	<0.31
Dichlorodifluoromethane	0.40	<0.37	<0.42	<0.39
1,1-Dichloroethane	<0.15	<0.15	<0.16	<0.15
1,1-Dichloroethene	<0.15	<0.15	<0.16	<0.15
trans-1,2-Dichloroethene	<0.15	<0.15	<0.16	<0.15
Dichloromethane	15.9	2.46	<7.23	<8.53
1,2-Dichloropropane	<0.15	<0.15	<0.16	<0.15
Ethyl Acetate	<1.49	<1.55	<1.59	<1.54
Ethylbenzene	<0.17	<0.16	<0.16	<0.17
Isopropylbenzene	<0.30	<0.31	<0.32	<0.31
2-Propanone	4.02	2.67	12.1	6.27
Styrene	<0.30	<0.32	<0.32	<0.32
Tetrachloroethene	<0.15	<0.15	<0.16	<0.15
Tetrachloromethane	0.28	<0.15	<0.16	<0.20
Toluene	6.31	3.13	4.16	4.53
Tribromomethane	1.70	1.79	0.68	1.39
1,1,1-Trichloroethane	<0.15	<0.15	<0.16	<0.15
Trichloroethene	<0.29	<0.15	<0.16	<0.20
Trichlorofluoromethane	<0.30	<0.31	<0.32	<0.31
Trichloromethane	0.96	0.76	0.43	0.72
Trichlorotrifluoroethane	<0.15	<0.15	<0.16	<0.15
1,2,4-Trimethylbenzene	0.34	<0.31	<0.39	<0.34
1,3,5-Trimethylbenzene	<0.30	<0.31	<0.32	<0.31
Xylenes (total)	<0.61	<0.69	<0.64	<0.64
Total	<41.0	<22.7	<35.6	<33.1

TABLE 109
Clean Harbors Sarnia
Volatile Organic Dry Reference Concentrations

Compound	Dry Reference Concentration Test No. 1 µg/Rm³*	Test No. 2 µg/Rm³*	Test No. 3 µg/Rm³*	Average µg/Rm³*
Benzene	5.62	5.71	5.59	5.64
Bromodichloromethane	2.85	2.79	0.86	2.17
Bromomethane	<3.95	<4.11	<4.17	<4.08
2-Butanone	1.98	1.08	1.74	1.60
Chloroethene	<0.88	<0.91	<0.93	<0.91
Dibromochloromethane	2.25	2.62	0.76	1.88
1,2-Dibromoethane	<0.88	<0.91	<0.93	<0.91
Dichlorodifluoromethane	1.17	<1.08	<1.22	<1.16
1,1-Dichloroethane	<0.44	<0.46	<0.46	<0.45
1,1-Dichloroethene	<0.44	<0.46	<0.46	<0.45
trans-1,2-Dichloroethene	<0.44	<0.46	<0.46	<0.45
Dichloromethane	46.9	7.26	<21.0	<25.1
1,2-Dichloropropane	<0.44	<0.46	<0.46	<0.45
Ethyl Acetate	<4.39	<4.57	<4.63	<4.53
Ethylbenzene	<0.51	<0.49	<0.46	<0.49
Isopropylbenzene	<0.88	<0.91	<0.93	<0.91
2-Propanone	11.8	7.90	35.2	18.3
Styrene	<0.89	<0.96	<0.93	<0.93
Tetrachloroethene	<0.44	<0.46	<0.46	<0.45
Tetrachloromethane	0.83	<0.46	<0.46	<0.58
Toluene	18.6	9.26	12.1	13.3
Tribromomethane	5.02	5.30	1.99	4.10
1,1,1-Trichloroethane	<0.44	<0.46	<0.46	<0.45
Trichloroethene	<0.85	<0.46	<0.46	<0.59
Trichlorofluoromethane	<0.88	<0.91	<0.93	<0.91
Trichloromethane	2.82	2.25	1.25	2.11
Trichlorotrifluoroethane	<0.44	<0.46	<0.46	<0.45
1,2,4-Trimethylbenzene	1.00	<0.91	<1.13	<1.01
1,3,5-Trimethylbenzene	<0.88	<0.91	<0.93	<0.91
Xylenes (total)	<1.79	<2.04	<1.85	<1.89
Total	<121	<67.0	<104	<97.2

* At 25°C and 1 atmosphere

TABLE 110

Clean Harbors Sarnia

Volatile Organic Dry Adjusted Concentrations

Compound	Dry Adjusted Concentration Test No. 1 μg/Rm³*	Test No. 2 μg/Rm³*	Test No. 3 μg/Rm³*	Average μg/Rm³*
Benzene	4.98	5.16	5.24	5.13
Bromodichloromethane	2.53	2.52	0.81	1.95
Bromomethane	<3.50	<3.71	<3.91	<3.71
2-Butanone	1.75	0.98	1.64	1.46
Chloroethene	<0.78	<0.825	<0.87	<0.82
Dibromochloromethane	2.00	2.37	0.71	1.69
1,2-Dibromoethane	<0.78	<0.83	<0.87	<0.82
Dichlorodifluoromethane	1.04	<0.98	<1.14	<1.05
1,1-Dichloroethane	<0.39	<0.41	<0.43	<0.41
1,1-Dichloroethene	<0.39	<0.41	<0.43	<0.41
trans-1,2-Dichloroethene	<0.39	<0.41	<0.43	<0.41
Dichloromethane	41.6	6.56	<19.8	<22.6
1,2-Dichloropropane	<0.39	<0.41	<0.43	<0.41
Ethyl Acetate	<3.89	<4.13	<4.35	<4.12
Ethylbenzene	<0.45	<0.44	<0.43	<0.44
Isopropylbenzene	<0.78	<0.83	<0.87	<0.82
2-Propanone	10.5	7.14	33.1	16.9
Styrene	<0.79	<0.87	<0.87	<0.84
Tetrachloroethene	<0.39	<0.41	<0.43	<0.41
Tetrachloromethane	0.74	<0.41	<0.43	<0.53
Toluene	16.5	8.36	11.4	12.1
Tribromomethane	4.45	4.79	1.87	3.70
1,1,1-Trichloroethane	<0.39	<0.41	<0.43	<0.41
Trichloroethene	<0.75	<0.41	<0.43	<0.53
Trichlorofluoromethane	<0.78	<0.83	<0.87	<0.82
Trichloromethane	2.50	2.04	1.17	1.90
Trichlorotrifluoroethane	<0.39	<0.41	<0.43	<0.41
1,2,4-Trimethylbenzene	0.88	<0.83	<1.06	<0.92
1,3,5-Trimethylbenzene	<0.78	<0.83	<0.87	<0.82
Xylenes (total)	<1.58	<1.84	<1.74	<1.72
Total	<107	<60.5	<97.4	<88.3

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

TABLE 111
Clean Harbors Sarnia
Volatile Organic Wet Reference Concentrations

Compound	Wet Reference Concentration			
	Test No. 1	Test No. 2	Test No. 3	Average
	µg/Rm^3*	µg/Rm^3*	µg/Rm^3*	µg/Rm^3*
Benzene	2.96	3.03	3.00	2.99
Bromodichloromethane	1.50	1.48	0.46	1.15
Bromomethane	<2.08	<2.18	<2.24	<2.16
2-Butanone	1.04	0.57	0.94	0.85
Chloroethene	<0.46	<0.48	<0.50	<0.48
Dibromochloromethane	1.19	1.39	0.41	0.99
1,2-Dibromoethane	<0.46	<0.48	<0.50	<0.48
Dichlorodifluoromethane	0.62	<0.57	<0.65	<0.61
1,1-Dichloroethane	<0.23	<0.24	<0.25	<0.24
1,1-Dichloroethene	<0.23	<0.24	<0.25	<0.24
trans-1,2-Dichloroethene	<0.23	<0.24	<0.25	<0.24
Dichloromethane	24.7	3.85	<11.3	<13.3
1,2-Dichloropropane	<0.23	<0.24	<0.25	<0.24
Ethyl Acetate	<2.31	<2.42	<2.48	<2.40
Ethylbenzene	<0.27	<0.26	<0.25	<0.26
Isopropylbenzene	<0.46	<0.48	<0.50	<0.48
2-Propanone	6.23	4.19	18.9	9.77
Styrene	<0.47	<0.51	<0.50	<0.49
Tetrachloroethene	<0.23	<0.24	<0.25	<0.24
Tetrachloromethane	0.44	<0.24	<0.25	<0.31
Toluene	9.78	4.91	6.50	7.06
Tribromomethane	2.64	2.81	1.07	2.17
1,1,1-Trichloroethane	<0.23	<0.24	<0.25	<0.24
Trichloroethene	<0.45	<0.24	<0.25	<0.31
Trichlorofluoromethane	<0.46	<0.48	<0.50	<0.48
Trichloromethane	1.49	1.19	0.67	1.12
Trichlorotrifluoroethane	<0.23	<0.24	<0.25	<0.24
1,2,4-Trimethylbenzene	0.52	<0.48	<0.60	<0.54
1,3,5-Trimethylbenzene	<0.46	<0.48	<0.50	<0.48
Xylenes (total)	<0.94	<1.08	<0.99	<1.00
Total	<63.5	<35.5	<55.7	<51.6

* At 25°C and 1 atmosphere

TABLE 112
Clean Harbors Sarnia
Volatile Organic Emission Rates

Compound	Emission Rate			
	Test No. 1 mg/s	Test No. 2 mg/s	Test No. 3 mg/s	Average mg/s
Benzene	0.097	0.10	0.094	0.097
Bromodichloromethane	0.049	0.049	0.015	0.038
Bromomethane	<0.068	<0.073	<0.070	<0.070
2-Butanone	0.034	0.019	0.029	0.028
Chloroethene	<0.015	<0.016	<0.016	<0.016
Dibromochloromethane	0.039	0.046	0.013	0.033
1,2-Dibromoethane	<0.015	<0.016	<0.016	<0.016
Dichlorodifluoromethane	0.020	<0.019	<0.021	<0.020
1,1-Dichloroethane	<0.0076	<0.0081	<0.0078	<0.0078
1,1-Dichloroethene	<0.0076	<0.0081	<0.0078	<0.0078
trans-1,2-Dichloroethene	<0.0076	<0.0081	<0.0078	<0.0078
Dichloromethane	0.81	0.13	<0.36	<0.43
1,2-Dichloropropane	<0.0076	<0.0081	<0.0078	<0.0078
Ethyl Acetate	<0.076	<0.081	<0.078	<0.078
Ethylbenzene	<0.0088	<0.0086	<0.0078	<0.0084
Isopropylbenzene	<0.015	<0.016	<0.016	<0.016
2-Propanone	0.20	0.14	0.60	0.31
Styrene	<0.015	<0.017	<0.016	<0.016
Tetrachloroethene	<0.0076	<0.0081	<0.0078	<0.0078
Tetrachloromethane	0.014	<0.0081	<0.0078	<0.010
Toluene	0.32	0.16	0.20	0.23
Tribromomethane	0.086	0.094	0.034	0.071
1,1,1-Trichloroethane	<0.0076	<0.0081	<0.0078	<0.0078
Trichloroethene	<0.015	<0.0081	<0.0078	<0.010
Trichlorofluoromethane	<0.015	<0.016	<0.016	<0.016
Trichloromethane	0.049	0.040	0.021	0.037
Trichlorotrifluoroethane	<0.0076	<0.0081	<0.0078	<0.0078
1,2,4-Trimethylbenzene	0.017	<0.016	<0.019	<0.017
1,3,5-Trimethylbenzene	<0.015	<0.016	<0.016	<0.016
Xylenes (total)	<0.031	<0.036	<0.031	<0.033
Total	<2.08	<1.19	<1.75	<1.67

TABLE 113
Clean Harbors Sarnia
Summary of Volatile Organic Emission Data

Compound	Actual Concentration µg/m^3	Dry Reference Concentration µg/Rm^3*	Dry Adjusted Concentration µg/Rm^3*	Wet Reference Concentration µg/Rm^3*	Emission Rate mg/s
Benzene	1.92	5.64	5.13	2.99	0.097
Bromodichloromethane	0.74	2.17	1.95	1.15	0.038
Bromomethane	<1.39	<4.08	<3.71	<2.16	<0.070
2-Butanone	0.55	1.60	1.46	0.85	0.028
Chloroethene	<0.31	<0.91	<0.82	<0.48	<0.016
Dibromochloromethane	0.64	1.88	1.69	0.99	0.033
1,2-Dibromoethane	<0.31	<0.91	<0.82	<0.48	<0.016
Dichlorodifluoromethane	<0.39	<1.16	<1.05	<0.61	<0.020
1,1-Dichloroethane	<0.15	<0.45	<0.41	<0.24	<0.0078
1,1-Dichloroethene	<0.15	<0.45	<0.41	<0.24	<0.0078
trans-1,2-Dichloroethene	<0.15	<0.45	<0.41	<0.24	<0.0078
Dichloromethane	<8.53	<25.1	<22.6	<13.3	<0.43
1,2-Dichloropropane	<0.15	<0.45	<0.41	<0.24	<0.0078
Ethyl Acetate	<1.54	<4.53	<4.12	<2.40	<0.078
Ethylbenzene	<0.17	<0.49	<0.44	<0.26	<0.0084
Isopropylbenzene	<0.31	<0.91	<0.82	<0.48	<0.016
2-Propanone	6.27	18.3	16.9	9.77	0.31
Styrene	<0.32	<0.93	<0.84	<0.49	<0.016
Tetrachloroethene	<0.15	<0.45	<0.41	<0.24	<0.0078
Tetrachloromethane	<0.20	<0.58	<0.53	<0.31	<0.010
Toluene	4.53	13.3	12.1	7.06	0.23
Tribromomethane	1.39	4.10	3.70	2.17	0.071
1,1,1-Trichloroethane	<0.15	<0.45	<0.41	<0.24	<0.0078
Trichloroethene	<0.20	<0.59	<0.53	<0.31	<0.010
Trichlorofluoromethane	<0.31	<0.91	<0.82	<0.48	<0.016
Trichloromethane	0.72	2.11	1.90	1.12	0.037
Trichlorotrifluoroethane	<0.15	<0.45	<0.41	<0.24	<0.0078
1,2,4-Trimethylbenzene	<0.34	<1.01	<0.92	<0.54	<0.017
1,3,5-Trimethylbenzene	<0.31	<0.91	<0.82	<0.48	<0.016
Xylenes (total)	<0.64	<1.89	<1.72	<1.00	<0.033
Total	<33.1	<97.2	<88.3	<51.6	<1.67

* At 25°C and 1 atmosphere

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

TABLE 114
Clean Harbors Sarnia
Blank Volatile Organic Analyses

Compound	Field Blank Tube 3A/3B µg	Trip Blank Tube 12A/12B µg
Benzene	<0.05	<0.05
Bromodichloromethane	<0.01	<0.01
Bromomethane	<0.09	<0.09
2-Butanone	<0.01	<0.01
Chloroethene	<0.02	<0.02
Dibromochloromethane	<0.01	<0.01
1,2-Dibromoethane	<0.02	<0.02
Dichlorodifluoromethane	<0.02	<0.02
1,1-Dichloroethane	<0.01	<0.01
1,1-Dichloroethene	<0.01	<0.01
trans-1,2-Dichloroethene	<0.01	<0.01
Dichloromethane	0.25	0.48
1,2-Dichloropropane	<0.01	<0.01
Ethyl Acetate	<0.1	<0.1
Ethylbenzene	<0.01	<0.01
Isopropylbenzene	<0.02	<0.02
2-Propanone	<0.1	<0.1
Styrene	<0.02	<0.02
Tetrachloroethene	<0.01	<0.01
Tetrachloromethane	<0.01	<0.01
Toluene	<0.05	<0.05
Tribromomethane	<0.01	<0.01
1,1,1-Trichloroethane	<0.01	<0.01
Trichloroethene	<0.01	<0.01
Trichlorofluoromethane	<0.02	<0.02
Trichloromethane	<0.01	<0.01
Trichlorotrifluoroethane	<0.01	<0.01
1,2,4-Trimethylbenzene	<0.02	<0.02
1,3,5-Trimethylbenzene	<0.02	<0.02
Xylenes (total)	<0.04	<0.04
Total	<0.99	<1.22

Note: "<" indicates that the analyte was not detected. Any analyte that was not detected was assigned a value equal to the detection limit for calculation purposes.

TABLE 115
Clean Harbors Sarnia
DRE Compound Emission Data
Test No. 1

Run No.	Compound	Amount Collected ng	Dry Gas Volume Sampled Rm³ *	Dry Reference Concentration µg/Rm³ *	Dry Reference Flowrate Rm³/s *	Emission Rate mg/s
1	Benzene	141	0.0237	5.95	17.2	0.10
	Dichloromethane	239	0.0237	10.1	17.2	0.17
	Ethylbenzene	<10	0.0237	<0.42	17.2	<0.0073
	2-Propanone	241	0.0237	10.2	17.2	0.17
	Styrene	21	0.0237	0.89	17.2	0.015
	Toluene	380	0.0237	16.0	17.2	0.28
	Total Xylenes	<40	0.0237	<1.69	17.2	<0.029
2	Benzene	132	0.0227	5.83	17.2	0.10
	Dichloromethane	261	0.0227	11.5	17.2	0.20
	Ethylbenzene	12	0.0227	0.53	17.2	0.0091
	2-Propanone	290	0.0227	12.8	17.2	0.22
	Styrene	<20	0.0227	<0.88	17.2	<0.015
	Toluene	437	0.0227	19.3	17.2	0.33
	Total Xylenes	35	0.0227	1.54	17.2	0.027
3	Benzene	111	0.0219	5.06	17.2	0.087
	Dichloromethane	2705	0.0219	123	17.2	2.12
	Ethylbenzene	13	0.0219	0.59	17.2	0.010
	2-Propanone	278	0.0219	12.7	17.2	0.22
	Styrene	<20	0.0219	<0.91	17.2	<0.016
	Toluene	453	0.0219	20.6	17.2	0.35
	Total Xylenes	47	0.0219	2.14	17.2	0.037
Total	Benzene	384	0.0683	5.62	17.2	0.097
	Dichloromethane	3205	0.0683	46.9	17.2	0.81
	Ethylbenzene	<35.0	0.0683	<0.51	17.2	<0.0088
	2-Propanone	809	0.0683	11.8	17.2	0.20
	Styrene	<61.0	0.0683	<0.89	17.2	<0.015
	Toluene	1270	0.0683	18.6	17.2	0.32
	Total Xylenes	<122	0.0683	<1.79	17.2	<0.031

* At 25°C and 1 atmosphere.

Note: DRE compound emission data is calculated using the detection limit where none was detected (<MDL).

TABLE 116
Clean Harbors Sarnia
DRE Compound Emission Data
Test No. 2

Run No.	Compound	Amount Collected ng	Dry Gas Volume Sampled Rm^3 *	Dry Reference Concentration µg/Rm^3 *	Dry Reference Flowrate Rm^3/s *	Emission Rate mg/s
1	Benzene	134	0.0227	5.91	17.7	0.10
	Dichloromethane	144	0.0227	6.35	17.7	0.11
	Ethylbenzene	12	0.0227	0.53	17.7	0.0094
	2-Propanone	116	0.0227	5.12	17.7	0.091
	Styrene	23	0.0227	1.01	17.7	0.018
	Toluene	266	0.0227	11.7	17.7	0.21
	Total Xylenes	54	0.0227	2.38	17.7	0.042
3	Benzene	120	0.0215	5.58	17.7	0.099
	Dichloromethane	202	0.0215	9.40	17.7	0.17
	Ethylbenzene	<10	0.0215	<0.47	17.7	<0.0082
	2-Propanone	252	0.0215	11.7	17.7	0.21
	Styrene	<20	0.0215	<0.93	17.7	<0.016
	Toluene	167	0.0215	7.77	17.7	0.14
	Total Xylenes	<40	0.0215	<1.86	17.7	<0.033
4	Benzene	121	0.0215	5.62	17.7	0.10
	Dichloromethane	131	0.0215	6.09	17.7	0.11
	Ethylbenzene	<10	0.0215	<0.46	17.7	<0.0082
	2-Propanone	151	0.0215	7.02	17.7	0.12
	Styrene	<20	0.0215	<0.93	17.7	<0.016
	Toluene	175	0.0215	8.13	17.7	0.14
	Total Xylenes	<40	0.0215	<1.86	17.7	<0.033
Total	Benzene	375	0.0657	5.71	17.7	0.10
	Dichloromethane	477	0.0657	7.26	17.7	0.13
	Ethylbenzene	<32.0	0.0657	<0.49	17.7	<0.0086
	2-Propanone	519	0.0657	7.90	17.7	0.14
	Styrene	<63.0	0.0657	<0.96	17.7	<0.017
	Toluene	608	0.0657	9.26	17.7	0.16
	Total Xylenes	<134	0.0657	<2.04	17.7	<0.036

* At 25°C and 1 atmosphere.

Note: DRE compound emission data is calculated using the detection limit where none was detected (<MDL).

TABLE 117
Clean Harbors Sarnia
DRE Compound Emission Data
Test No. 3

Run No.	Compound	Amount Collected ng	Dry Gas Volume Sampled Rm^3 *	Dry Reference Concentration µg/Rm^3 *	Dry Reference Flowrate Rm^3/s *	Emission Rate mg/s
1	Benzene	124	0.0214	5.79	16.9	0.098
	Dichloromethane	265	0.0214	12.4	16.9	0.21
	Ethylbenzene	<10	0.0214	<0.47	16.9	<0.0079
	2-Propanone	1645	0.0214	76.8	16.9	1.30
	Styrene	<20	0.0214	<0.93	16.9	<0.016
	Toluene	208	0.0214	9.71	16.9	0.16
	Total Xylenes	<40	0.0214	<1.87	16.9	<0.032
2	Benzene	113	0.0215	5.24	16.9	0.089
	Dichloromethane	<100	0.0215	<4.64	16.9	<0.078
	Ethylbenzene	<10	0.0215	<0.46	16.9	<0.0078
	2-Propanone	221	0.0215	10.3	16.9	0.17
	Styrene	<20	0.0215	<0.93	16.9	<0.016
	Toluene	225	0.0215	10.4	16.9	0.18
	Total Xylenes	<40	0.0215	<1.86	16.9	<0.031
3	Benzene	125	0.0218	5.72	16.9	0.097
	Dichloromethane	999	0.0218	45.7	16.9	0.77
	Ethylbenzene	<10	0.0218	<0.46	16.9	<0.0077
	2-Propanone	418	0.0218	19.1	16.9	0.32
	Styrene	<20	0.0218	<0.92	16.9	<0.015
	Toluene	352	0.0218	16.1	16.9	0.27
	Total Xylenes	<40	0.0218	<1.83	16.9	<0.031
Total	Benzene	362	0.0648	5.59	16.9	0.094
	Dichloromethane	<1364	0.0648	<21.0	16.9	<0.36
	Ethylbenzene	<30.0	0.0648	<0.46	16.9	<0.0078
	2-Propanone	2284	0.0648	35.2	16.9	0.60
	Styrene	<60.0	0.0648	<0.93	16.9	<0.016
	Toluene	785	0.0648	12.1	16.9	0.20
	Total Xylenes	<120	0.0648	<1.85	16.9	<0.031

* At 25°C and 1 atmosphere.

Note: DRE compound emission data is calculated using the detection limit where none was detected (<MDL).

TABLE 118
Clean Harbors Sarnia
Summary of DRE Compound Emission Rates

Compound	Average Emission Rate Test No. 1 mg/s	Test No. 2 mg/s	Test No. 3 mg/s	Average mg/s	Coefficient of Variation %
Benzene	0.097	0.10	0.094	0.097	3.5
Dichloromethane	0.81	0.13	<0.36	<0.43	80.2
Ethylbenzene	<0.0088	<0.0086	<0.0078	<0.0084	6.2
2-Propanone	0.20	0.14	0.60	0.31	78.8
Styrene	<0.015	<0.017	<0.016	<0.016	5.4
Toluene	0.32	0.16	0.20	0.23	35.2
Total Xylenes	<0.031	<0.036	<0.031	<0.033	9.1

TABLE 119
Clean Harbors Sarnia
Blank Volatile Organic Analyses

Compound	Field Blank Tube 3A/3B µg	Trip Blank Tube 12A/12B µg
Benzene	<0.05	<0.05
Dichloromethane	0.25	0.48
Ethylbenzene	<0.01	<0.01
2-Propanone	<0.1	<0.1
Styrene	<0.02	<0.02
Toluene	<0.05	<0.05
Total Xylenes	<0.04	<0.04

Note: "<" indicates that the analyte was not detected (was less than the analytical detection limit). For the purpose of determining average and total analytical results for each compound, any result that was not detected was assigned a value of zero for calculation purposes.

TABLE 120
Clean Harbors Sarnia
DRE Compound Feed Rates
Test No. 1

Feed Type	Compound	Stream Feed Rate L/min	Feed Density g/mL	Stream Feed Rate kg/s	Compound Concentration mg/kg	Compound Feed Rate g/s
Rich	Benzene	35.0	0.96	0.56	46	0.026
	Dichloromethane	35.0	0.96	0.56	<200	<0.11
	Ethylbenzene	35.0	0.96	0.56	563	0.32
	2-Propanone	35.0	0.96	0.56	17400	9.75
	Styrene	35.0	0.96	0.56	850	0.48
	Toluene	35.0	0.96	0.56	4740	2.66
	Total Xylenes	35.0	0.96	0.56	<2400	<1.34
Lean	Benzene	160	1.07	2.86	19	0.054
	Dichloromethane	160	1.07	2.86	<100	<0.29
	Ethylbenzene	160	1.07	2.86	44	0.13
	2-Propanone	160	1.07	2.86	3500	10.0
	Styrene	160	1.07	2.86	<100	<0.29
	Toluene	160	1.07	2.86	1190	3.40
	Total Xylenes	160	1.07	2.86	235	0.67
Emulsion	Benzene	9.03	1.01	0.15	82	0.012
	Dichloromethane	9.03	1.01	0.15	2340	0.36
	Ethylbenzene	9.03	1.01	0.15	203	0.031
	2-Propanone	9.03	1.01	0.15	21000	3.19
	Styrene	9.03	1.01	0.15	<100	<0.015
	Toluene	9.03	1.01	0.15	3130	0.48
	Total Xylenes	9.03	1.01	0.15	980	0.15
Alkaline	Benzene	197	1.00	3.28	<14	<0.046
	Dichloromethane	197	1.00	3.28	<100	<0.33
	Ethylbenzene	197	1.00	3.28	<36	<0.12
	2-Propanone	197	1.00	3.28	<1000	<3.28
	Styrene	197	1.00	3.28	<100	<0.33
	Toluene	197	1.00	3.28	<160	<0.52
	Total Xylenes	197	1.00	3.28	<72	<0.24
Leachate	Benzene	23.7	1.00	0.40	<14	<0.0055
	Dichloromethane	23.7	1.00	0.40	<100	<0.040
	Ethylbenzene	23.7	1.00	0.40	<36	<0.014
	2-Propanone	23.7	1.00	0.40	<1000	<0.40
	Styrene	23.7	1.00	0.40	<100	<0.040
	Toluene	23.7	1.00	0.40	<160	<0.063
	Total Xylenes	23.7	1.00	0.40	<72	<0.028
Total	Benzene					<0.14
	Dichloromethane					<1.12
	Ethylbenzene					<0.60
	2-Propanone					<26.6
	Styrene					<1.14
	Toluene					<7.12
	Total Xylenes					<2.43

Note: DRE compound emission data is calculated using the detection limit where none was detected (<MDL).

TABLE 121
Clean Harbors Sarnia
DRE Compound Feed Rates
Test No. 2

Feed Type	Compound	Stream Feed Rate L/min	Feed Density g/mL	Stream Feed Rate kg/s	Compound Concentration mg/kg	Compound Feed Rate g/s
Rich	Benzene	38.5	0.89	0.57	33	0.019
	Dichloromethane	38.5	0.89	0.57	740	0.42
	Ethylbenzene	38.5	0.89	0.57	459	0.26
	2-Propanone	38.5	0.89	0.57	20300	11.6
	Styrene	38.5	0.89	0.57	550	0.31
	Toluene	38.5	0.89	0.57	4750	2.72
	Total Xylenes	38.5	0.89	0.57	<2100	<1.20
Lean	Benzene	159	1.05	2.79	123	0.34
	Dichloromethane	159	1.05	2.79	600	1.67
	Ethylbenzene	159	1.05	2.79	1120	3.12
	2-Propanone	159	1.05	2.79	10200	28.4
	Styrene	159	1.05	2.79	1030	2.87
	Toluene	159	1.05	2.79	16300	45.4
	Total Xylenes	159	1.05	2.79	5550	15.5
Emulsion	Benzene	9.05	0.99	0.15	19	0.0028
	Dichloromethane	9.05	0.99	0.15	420	0.063
	Ethylbenzene	9.05	0.99	0.15	58	0.0087
	2-Propanone	9.05	0.99	0.15	10100	1.51
	Styrene	9.05	0.99	0.15	<100	<0.015
	Toluene	9.05	0.99	0.15	820	0.12
	Total Xylenes	9.05	0.99	0.15	271	0.040
Alkaline	Benzene	192	1.00	3.20	<14	<0.045
	Dichloromethane	192	1.00	3.20	100	0.32
	Ethylbenzene	192	1.00	3.20	<36	<0.12
	2-Propanone	192	1.00	3.20	<1000	<3.20
	Styrene	192	1.00	3.20	<100	<0.32
	Toluene	192	1.00	3.20	<160	<0.51
	Total Xylenes	192	1.00	3.20	<72	<0.23
Leachate	Benzene	23.6	1.00	0.39	<14	<0.0055
	Dichloromethane	23.6	1.00	0.39	100	0.039
	Ethylbenzene	23.6	1.00	0.39	<36	<0.014
	2-Propanone	23.6	1.00	0.39	<1000	<0.39
	Styrene	23.6	1.00	0.39	<100	<0.039
	Toluene	23.6	1.00	0.39	<160	<0.063
	Total Xylenes	23.6	1.00	0.39	<72	<0.028
Total	Benzene					<0.41
	Dichloromethane					<2.52
	Ethylbenzene					<3.52
	2-Propanone					<45.1
	Styrene					<3.56
	Toluene					<48.8
	Total Xylenes					<17.0

Note: DRE compound emission data is calculated using the detection limit where none was detected (<MDL).

TABLE 122
Clean Harbors Sarnia
DRE Compound Feed Rates
Test No. 3

Feed Type	Compound	Stream Feed Rate L/min	Feed Density g/mL	Stream Feed Rate kg/s	Compound Concentration mg/kg	Compound Feed Rate g/s
Rich	Benzene	30.4	0.91	0.46	62	0.029
	Dichloromethane	30.4	0.91	0.46	810	0.37
	Ethylbenzene	30.4	0.91	0.46	1080	0.50
	2-Propanone	30.4	0.91	0.46	61900	28.5
	Styrene	30.4	0.91	0.46	1050	0.48
	Toluene	30.4	0.91	0.46	11000	5.07
	Total Xylenes	30.4	0.91	0.46	5140	2.37
Lean	Benzene	152	1.04	2.64	62	0.16
	Dichloromethane	152	1.04	2.64	<100	<0.26
	Ethylbenzene	152	1.04	2.64	187	0.49
	2-Propanone	152	1.04	2.64	4300	11.4
	Styrene	152	1.04	2.64	<100	<0.26
	Toluene	152	1.04	2.64	8620	22.8
	Total Xylenes	152	1.04	2.64	1010	2.67
Emulsion	Benzene	9.07	1.00	0.15	70	0.011
	Dichloromethane	9.07	1.00	0.15	1990	0.30
	Ethylbenzene	9.07	1.00	0.15	139	0.021
	2-Propanone	9.07	1.00	0.15	51100	7.72
	Styrene	9.07	1.00	0.15	<100	<0.015
	Toluene	9.07	1.00	0.15	2520	0.38
	Total Xylenes	9.07	1.00	0.15	659	0.10
Alkaline	Benzene	191	0.99	3.15	<14	<0.044
	Dichloromethane	191	0.99	3.15	<100	<0.31
	Ethylbenzene	191	0.99	3.15	<36	<0.11
	2-Propanone	191	0.99	3.15	<1000	<3.15
	Styrene	191	0.99	3.15	<100	<0.31
	Toluene	191	0.99	3.15	<160	<0.50
	Total Xylenes	191	0.99	3.15	<72	<0.23
Leachate	Benzene	22.2	1.00	0.37	<14	<0.0052
	Dichloromethane	22.2	1.00	0.37	<100	<0.037
	Ethylbenzene	22.2	1.00	0.37	<36	<0.013
	2-Propanone	22.2	1.00	0.37	<1000	<0.37
	Styrene	22.2	1.00	0.37	<100	<0.037
	Toluene	22.2	1.00	0.37	<160	<0.059
	Total Xylenes	22.2	1.00	0.37	<72	<0.027
Total	Benzene					<0.25
	Dichloromethane					<1.29
	Ethylbenzene					<1.14
	2-Propanone					<51.1
	Styrene					<1.11
	Toluene					<28.8
	Total Xylenes					<5.39

Note: DRE compound emission data is calculated using the detection limit where none was detected (<MDL).

TABLE 123
Clean Harbors Sarnia
Destruction and Removal Efficiencies
Test No. 1

Run No.	Compound	Total Feed Rate g/s	Emission Rate mg/s	Destruction and Removal Efficiency %
1	Benzene	<0.14	0.10	99.9290
	Dichloromethane	<1.12	0.17	99.9845
	Ethylbenzene	<0.60	<0.0073	99.9988
	2-Propanone	<26.6	0.17	99.9993
	Styrene	<1.14	0.015	99.9987
	Toluene	<7.12	0.28	99.9961
	Total Xylenes	<2.43	<0.029	99.9988
2	Benzene	<0.14	0.10	99.9304
	Dichloromethane	<1.12	0.20	99.9823
	Ethylbenzene	<0.60	0.0091	99.9985
	2-Propanone	<26.6	0.22	99.9992
	Styrene	<1.14	<0.015	99.9987
	Toluene	<7.12	0.33	99.9953
	Total Xylenes	<2.43	0.027	99.9989
3	Benzene	<0.14	0.087	99.9396
	Dichloromethane	<1.12	2.12	99.8109
	Ethylbenzene	<0.60	0.010	99.9983
	2-Propanone	<26.6	0.22	99.9992
	Styrene	<1.14	<0.016	99.9986
	Toluene	<7.12	0.35	99.9950
	Total Xylenes	<2.43	0.037	99.9985
Total	Benzene	<0.14	0.097	99.9329
	Dichloromethane	<1.12	0.81	99.9280
	Ethylbenzene	<0.60	<0.0088	99.9985
	2-Propanone	<26.6	0.20	99.9992
	Styrene	<1.14	<0.015	99.9987
	Toluene	<7.12	0.32	99.9955
	Total Xylenes	<2.43	<0.031	99.9987

TABLE 124
Clean Harbors Sarnia
Destruction and Removal Efficiencies
Test No. 2

Run No.	Compound	Total Feed Rate g/s	Emission Rate mg/s	Destruction and Removal Efficiency %
1	Benzene	<0.41	0.10	99.9748
	Dichloromethane	<2.52	0.11	99.9955
	Ethylbenzene	<3.52	0.0094	99.9997
	2-Propanone	<45.1	0.091	99.9998
	Styrene	<3.56	0.018	99.9995
	Toluene	<48.8	0.21	99.9996
	Total Xylenes	<17.0	0.042	99.9998
3	Benzene	<0.41	0.099	99.9762
	Dichloromethane	<2.52	0.17	99.9934
	Ethylbenzene	<3.52	<0.0082	99.9998
	2-Propanone	<45.1	0.21	99.9995
	Styrene	<3.56	<0.016	99.9995
	Toluene	<48.8	0.14	99.9997
	Total Xylenes	<17.0	<0.033	99.9998
4	Benzene	<0.41	0.10	99.9760
	Dichloromethane	<2.52	0.11	99.9957
	Ethylbenzene	<3.52	<0.0082	99.9998
	2-Propanone	<45.1	0.12	99.9997
	Styrene	<3.56	<0.016	99.9995
	Toluene	<48.8	0.14	99.9997
	Total Xylenes	<17.0	<0.033	99.9998
Total	Benzene	<0.41	0.10	99.9756
	Dichloromethane	<2.52	0.13	99.9949
	Ethylbenzene	<3.52	<0.0086	99.9998
	2-Propanone	<45.1	0.14	99.9997
	Styrene	<3.56	<0.017	99.9995
	Toluene	<48.8	0.16	99.9997
	Total Xylenes	<17.0	<0.036	99.9998

TABLE 125
Clean Harbors Sarnia
Destruction and Removal Efficiencies
Test No. 3

Run No.	Compound	Total Feed Rate g/s	Emission Rate mg/s	Destruction and Removal Efficiency %
1	Benzene	<0.25	0.098	99.9612
	Dichloromethane	<1.29	0.21	99.9838
	Ethylbenzene	<1.14	<0.0079	99.9993
	2-Propanone	<51.1	1.30	99.9975
	Styrene	<1.11	<0.016	99.9986
	Toluene	<28.8	0.16	99.9994
	Total Xylenes	<5.39	<0.032	99.9994
2	Benzene	<0.25	0.089	99.9649
	Dichloromethane	<1.29	<0.078	99.9939
	Ethylbenzene	<1.14	<0.0078	99.9993
	2-Propanone	<51.1	0.17	99.9997
	Styrene	<1.11	<0.016	99.9986
	Toluene	<28.8	0.18	99.9994
	Total Xylenes	<5.39	<0.031	99.9994
3	Benzene	<0.25	0.097	99.9617
	Dichloromethane	<1.29	0.77	99.9401
	Ethylbenzene	<1.14	<0.0077	99.9993
	2-Propanone	<51.1	0.32	99.9994
	Styrene	<1.11	<0.015	99.9986
	Toluene	<28.8	0.27	99.9991
	Total Xylenes	<5.39	<0.031	99.9994
Total	Benzene	<0.25	0.094	99.9626
	Dichloromethane	<1.29	<0.36	99.9724
	Ethylbenzene	<1.14	<0.0078	99.9993
	2-Propanone	<51.1	0.60	99.9988
	Styrene	<1.11	<0.016	99.9986
	Toluene	<28.8	0.20	99.9993
	Total Xylenes	<5.39	<0.031	99.9994

TABLE 126
Clean Harbors Sarnia
Summary of Destruction and Removal Efficiencies for Volatile Organic Compounds

Compound	Destruction and Removal Efficiency				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	%	%	%	%	%
Benzene	99.9329	99.9756	99.9626	99.9570	0.022
Dichloromethane	99.9280	99.9949	99.9724	99.9651	0.034
Ethylbenzene	99.9985	99.9998	99.9993	99.9992	0.00061
2-Propanone	99.9992	99.9997	99.9988	99.9993	0.00043
Styrene	99.9987	99.9995	99.9986	99.9989	0.00052
Toluene	99.9955	99.9997	99.9993	99.9982	0.0023
Total Xylenes	99.9987	99.9998	99.9994	99.9993	0.00053

Note: the above calculations do not take into account the contribution of the TDU to the incinerator feed.

TABLE 127
Clean Harbors Sarnia
Regulation 419 Dispersion Modeling Results using AERMOD for Inorganic and Semi-Volatile Organic Compounds

Contaminant	Average Emission Rate	Calculated Impingement Concentration	Allowable Impingement Concentration	Percentage of Allowable Concentration	Status of Allowable Concentration
Base Case - Annual	1.00 g/s	0.0500 μg/m^3			
Base Case - 30 Day	1.00 g/s	0.1437 μg/m^3			
Base Case - 24 hour	1.00 g/s	0.4915 μg/m^3			
Base Case - 1 hour	1.00 g/s	1.8423 μg/m^3			
Base Case - 1/2 hour	1.00 g/s	2.2107 μg/m^3			
Particulate matter	<0.0051 g/s	0.0025 μg/m^3	120 μg/m^3	0.0021	S
Sulphur dioxide	0.30 g/s	0.15 μg/m^3	275 μg/m^3	0.054	S - 24 hour
Sulphur dioxide	0.30 g/s	0.55 μg/m^3	690 μg/m^3	0.080	S - 1 hour
Nitrogen oxides	3.21 g/s	1.58 μg/m^3	200 μg/m^3	0.79	S - 24 hour
Nitrogen oxides	3.21 g/s	5.91 μg/m^3	400 μg/m^3	1.48	S - 1 hour
Carbon monoxide	1.11 g/s	2.45 μg/m^3	6000 μg/m^3	0.041	S - 1/2 hour
Carbon dioxide	2397 g/s	1178 μg/m^3	255800 μg/m^3	0.46	SL
Hydrogen chloride	0.26 g/s	0.13 μg/m^3	20 μg/m^3	0.64	S
Fluorides (as hydrogen fluoride)	0.51 g/s	0.25 μg/m^3	0.86 μg/m^3	29.1	S - 24 hour
Fluorides (as hydrogen fluoride)	0.51 g/s	0.073 μg/m^3	0.34 μg/m^3	21.6	S - 30 day
Hydrogen bromide	<0.033 g/s	0.061 μg/m^3	668 μg/m^3	0.0091	G - 1 hour
Hydrogen iodide	<0.024 g/s	0.012 μg/m^3	0.5 μg/m^3	2.36	SL
Hydrogen cyanide	<0.000023 g/s	0.000011 μg/m^3	8 μg/m^3	0.00014	S
Dioxins & Furans (TEQ) *	<0.18 ng TEQ/s	0.000088 pg TEQ/m^3			
Dioxins, Furans and Dioxin-Like PCBs (TEQ) **	0.12 ng TEQ/s	0.000059 pg TEQ/m^3	0.1 pg TEQ/m^3	0.059	S
Benzo(a)Pyrene	<0.061 μg/s	0.0000000031 μg/m^3	0.00001 μg/m^3	0.031	S - Annual
Biphenyl	1.03 μg/s	0.0000019 μg/m^3	60 μg/m^3	<0.0001	G - 1 hour
2-Chloronaphthalene	<0.061 μg/s	0.000000030 μg/m^3	1 μg/m^3	<0.0001	SL
1-Methylnaphthalene	0.36 μg/s	0.00000018 μg/m^3	35.5 μg/m^3	<0.0001	SL
Naphthalene	3.58 μg/s	0.0000018 μg/m^3	22.5 μg/m^3	<0.0001	G
Quinoline	<0.061 μg/s	0.000000030 μg/m^3	0.005 μg/m^3	0.00060	SL
Terphenyls (m, o, p)	<0.21 μg/s	0.00000010 μg/m^3	15 μg/m^3	<0.0001	SL
1,2-Dichlorobenzene	0.88 μg/s	0.0000016 μg/m^3	30500 μg/m^3	<0.0001	G - 1 hour
1,3-Dichlorobenzene	1.15 μg/s	0.00000057 μg/m^3	50 μg/m^3	<0.0001	SL
1,4-Dichlorobenzene	0.78 μg/s	0.00000038 μg/m^3	95 μg/m^3	<0.0001	S
1,3,5-Trichlorobenzene	<0.086 μg/s	0.000000042 μg/m^3	3.6 μg/m^3	<0.0001	SL
1,2,4-Trichlorobenzene	0.50 μg/s	0.00000025 μg/m^3	400 μg/m^3	<0.0001	G
1,2,3-Trichlorobenzene	0.45 μg/s	0.00000022 μg/m^3	135 μg/m^3	<0.0001	SL
1,2,4,5-Tetrachlorobenzene	<0.21 μg/s	0.00000010 μg/m^3	1 μg/m^3	<0.0001	SL
1,2,3,4-Tetrachlorobenzene	0.20 μg/s	0.000000098 μg/m^3	600 μg/m^3	<0.0001	SL
Pentachlorobenzene	0.37 μg/s	0.00000018 μg/m^3	80 μg/m^3	<0.0001	SL
Hexachlorobenzene	<0.11 μg/s	0.000000054 μg/m^3	0.011 μg/m^3	0.00049	SL
2,4-Dichlorophenol	<0.46 μg/s	0.00000023 μg/m^3	33.5 μg/m^3	<0.0001	SL
2,6-Dichlorophenol	<0.30 μg/s	0.00000015 μg/m^3	19 μg/m^3	<0.0001	SL
2,4,5-Trichlorophenol	<0.30 μg/s	0.00000015 μg/m^3	220 μg/m^3	<0.0001	SL
2,4,6-Trichlorophenol	<0.55 μg/s	0.00000027 μg/m^3	1.5 μg/m^3	<0.0001	SL
2,3,4,6-Tetrachlorophenol	<0.30 μg/s	0.00000015 μg/m^3	0.75 μg/m^3	<0.0001	SL
Pentachlorophenol	<0.30 μg/s	0.00000015 μg/m^3	20 μg/m^3	<0.0001	G
Polychlorinated biphenyls	<1.58 μg/s	0.00000078 μg/m^3	0.15 μg/m^3	0.00052	G
Hexachlorobutadiene	<0.0033 μg/s	0.0000000016 μg/m^3	0.225 μg/m^3	<0.0001	SL
Hexachloroethane	<0.061 μg/s	0.000000030 μg/m^3	115 μg/m^3	<0.0001	SL
Heptachlor	<0.14 μg/s	0.000000069 μg/m^3	0.004 μg/m^3	0.0017	SL
Toxaphene	<0.58 μg/s	0.00000029 μg/m^3	0.015 μg/m^3	0.0019	SL
Hexachlorophene	<0.30 μg/s	0.00000015 μg/m^3	0.5 μg/m^3	<0.0001	SL

S - Standard
G - Guideline
SL - Screening Level
* Calculated using the detection limit for those isomers not detected in quantities greater than the reportable detection limit.
** Calculated using half the detection limit for those isomers not detected in quantities greater than the reportable detection limit.

TABLE 128
Clean Harbors Sarnia
Regulation 419 Dispersion Modeling Results using AERMOD for Metals

Contaminant	Average Emission Rate	Calculated Impingement Concentration	Allowable Impingement Concentration	Percentage of Allowable Concentration	Status of Allowable Concentration
Base Case - Annual	1.00 g/s	0.0500 µg/m^3			
Base Case - 30 Day	1.00 g/s	0.1437 µg/m^3			
Base Case - 24 hour	1.00 g/s	0.4915 µg/m^3			
Aluminum	3.25 mg/s	0.0016 µg/m^3	12 µg/m^3	0.013	SL
Antimony	0.0018 mg/s	0.00000088 µg/m^3	25 µg/m^3	<0.0001	S
Arsenic	<0.0010 mg/s	0.00000051 µg/m^3	0.3 µg/m^3	0.00017	G
Barium (as water soluble)	0.031 mg/s	0.000015 µg/m^3	10 µg/m^3	0.00015	G
Beryllium	<0.00038 mg/s	0.00000019 µg/m^3	0.01 µg/m^3	0.0019	S
Boron	30.1 mg/s	0.015 µg/m^3	120 µg/m^3	0.012	S
Cadmium	0.0011 mg/s	0.00000053 µg/m^3	0.025 µg/m^3	0.0021	S
Calcium oxide	<6.22 mg/s	0.0031 µg/m^3	10 µg/m^3	0.031	S
Chromium	0.071 mg/s	0.000035 µg/m^3	0.5 µg/m^3	0.0070	G
Cobalt	0.0024 mg/s	0.0000012 µg/m^3	0.1 µg/m^3	0.0012	G
Copper	0.037 mg/s	0.000018 µg/m^3	50 µg/m^3	<0.0001	S
Iron (as metal)	0.92 mg/s	0.00045 µg/m^3	4 µg/m^3	0.011	S
Lead	0.011 mg/s	0.0000055 µg/m^3	0.5 µg/m^3	0.0011	S - 24 hour
Lead	0.011 mg/s	0.0000016 µg/m^3	0.2 µg/m^3	0.00081	S - 30 day
Lithium	0.016 mg/s	0.0000081 µg/m^3	20 µg/m^3	<0.0001	S
Magnesium	0.29 mg/s	0.00014 µg/m^3	72 µg/m^3	0.00020	SL
Manganese (as compounds)	0.067 mg/s	0.000033 µg/m^3	0.4 µg/m^3	0.0082	G
Mercury	0.12 mg/s	0.000061 µg/m^3	2 µg/m^3	0.0031	S
Molybdenum	0.13 mg/s	0.000065 µg/m^3	120 µg/m^3	<0.0001	G
Nickel	0.059 mg/s	0.0000029 µg/m^3	0.04 µg/m^3	0.0074	S - Annual
Phosphorus	<0.38 mg/s	0.00019 µg/m^3	0.5 µg/m^3	0.037	SL
Potassium	0.92 mg/s	0.00045 µg/m^3	1 µg/m^3	0.045	SL
Selenium	0.14 mg/s	0.000071 µg/m^3	10 µg/m^3	0.00071	G
Silicon	65.7 mg/s	0.032 µg/m^3	27 µg/m^3	0.12	SL
Silver	<0.00046 mg/s	0.00000023 µg/m^3	1 µg/m^3	<0.0001	S
Sodium hydroxide	23.4 mg/s	0.011 µg/m^3	10 µg/m^3	0.11	G
Strontium	0.014 mg/s	0.0000067 µg/m^3	120 µg/m^3	<0.0001	G
Tin	0.11 mg/s	0.000056 µg/m^3	10 µg/m^3	0.00056	S
Titanium	<0.036 mg/s	0.000017 µg/m^3	120 µg/m^3	<0.0001	S
Vanadium	0.0018 mg/s	0.00000090 µg/m^3	2 µg/m^3	<0.0001	S
Zinc	0.077 mg/s	0.000038 µg/m^3	120 µg/m^3	<0.0001	S

S - Standard
G - Guideline
SL - Screening Level

TABLE 129

Clean Harbors Sarnia

Regulation 419 Dispersion Modeling Results using AERMOD for Volatile Organic Compounds

Contaminant	Average Emission Rate	Calculated Impingement Concentration	Allowable Impingement Concentration	Percentage of Allowable Concentration	Status of Allowable Concentration
Base Case - Annual	1.00 g/s	0.0500 µg/m^3			
Base Case - 24 hour	1.00 g/s	0.4915 µg/m^3			
Base Case - 1 hour	1.00 g/s	1.8423 µg/m^3			
Benzene	0.097 mg/s	0.0000049 µg/m^3	0.45 µg/m^3	0.0011	S - Annual
Bromodichloromethane	0.038 mg/s	0.0000019 µg/m^3	350 µg/m^3	<0.0001	SL
Bromomethane (methyl bromide)	<0.070 mg/s	0.0000035 µg/m^3	1350 µg/m^3	<0.0001	G
2-Butanone (methyl ethyl ketone)	0.028 mg/s	0.0000014 µg/m^3	1000 µg/m^3	<0.0001	S
Chloroethene (vinyl chloride)	<0.016 mg/s	0.00000078 µg/m^3	1 µg/m^3	<0.0001	S
Dibromochloromethane	0.033 mg/s	0.0000016 µg/m^3	0.2 µg/m^3	0.00082	SL
1,2-Dibromoethane (Ethylene dibromide)	<0.016 mg/s	0.00000078 µg/m^3	3 µg/m^3	<0.0001	G
Dichlorodifluoromethane	<0.020 mg/s	0.0000010 µg/m^3	500000 µg/m^3	<0.0001	G
1,1-Dichloroethane (ethylene dichloride)	<0.0078 mg/s	0.00000039 µg/m^3	165 µg/m^3	<0.0001	S
1,1-Dichloroethene	<0.0078 mg/s	0.00000039 µg/m^3	10 µg/m^3	<0.0001	S
trans-1,2-Dichloroethene	<0.0078 mg/s	0.00000039 µg/m^3	105 µg/m^3	<0.0001	G
Dichloromethane (methylene chloride)	<0.43 mg/s	0.000022 µg/m^3	220 µg/m^3	<0.0001	G
1,2-Dichloropropane	<0.0078 mg/s	0.00000039 µg/m^3	2400 µg/m^3	<0.0001	G
Ethyl Acetate	<0.078 mg/s	0.0000039 µg/m^3	19000 µg/m^3	<0.0001	G - 1 hour
Ethylbenzene	<0.0084 mg/s	0.00000042 µg/m^3	1000 µg/m^3	<0.0001	S
Isopropylbenzene (cumene)	<0.016 mg/s	0.00000078 µg/m^3	400 µg/m^3	<0.0001	S
2-Propanone (acetone)	0.31 mg/s	0.000016 µg/m^3	11880 µg/m^3	<0.0001	S
Styrene	<0.016 mg/s	0.00000080 µg/m^3	400 µg/m^3	<0.0001	S
Tetrachloroethene (perchloroethylene)	<0.0078 mg/s	0.00000039 µg/m^3	360 µg/m^3	<0.0001	S
Tetrachloromethane (carbon tetrachloride)	<0.010 mg/s	0.00000050 µg/m^3	2.4 µg/m^3	<0.0001	S
Toluene	0.23 mg/s	0.000011 µg/m^3	2000 µg/m^3	<0.0001	S
Tribromomethane (bromoform)	0.071 mg/s	0.0000036 µg/m^3	55 µg/m^3	<0.0001	G
1,1,1-Trichloroethane (methyl chloroform)	<0.0078 mg/s	0.00000039 µg/m^3	115000 µg/m^3	<0.0001	S
Trichloroethene	<0.010 mg/s	0.00000051 µg/m^3	12 µg/m^3	<0.0001	S
Trichlorofluoromethane	<0.016 mg/s	0.00000078 µg/m^3	6000 µg/m^3	<0.0001	G
Trichloromethane (chloroform)	0.037 mg/s	0.0000018 µg/m^3	1 µg/m^3	0.00018	S
Trichlorotrifluoroethane	<0.0078 mg/s	0.00000039 µg/m^3	800000 µg/m^3	<0.0001	S
1,2,4-Trimethylbenzene (pseudocumene)	<0.017 mg/s	0.00000087 µg/m^3	220 µg/m^3	<0.0001	S
1,3,5-Trimethylbenzene	<0.016 mg/s	0.00000078 µg/m^3	220 µg/m^3	<0.0001	S
Xylenes	<0.033 mg/s	0.0000016 µg/m^3	730 µg/m^3	<0.0001	S

S - Standard
G - Guideline
SL - Screening Level

TABLE 130
Clean Harbors Sarnia
Physical and Elemental Analyses
Feed Samples

Rich Feed

Test No.	Heat of Combustion MJ/kg	Viscosity cps @ 25°C	Density g/mL	Organic Chlorine % wt.**	Carbon % wt.	Hydrogen % wt.	Nitrogen % wt.	Oxygen* % wt.	Sulphur % wt.	Ash % wt.
1	30.0	<100	0.96	0.16	49.07	11.04	1.47	35.66	1.47	1.29
2	25.0	<100	0.89	0.32	41.19	11.03	1.64	42.89	1.63	1.62
3	24.2	<100	0.91	0.28	45.97	10.42	2.28	36.81	2.14	2.38
Average	26.4	<100	0.92	0.25	45.41	10.83	1.80	38.45	1.75	1.76

Lean Feed

Test No.	Heat of Combustion MJ/kg	Viscosity cps @ 25°C	Density g/mL	Organic Chlorine % wt.**	Carbon % wt.	Hydrogen % wt.	Nitrogen % wt.	Oxygen* % wt.	Sulphur % wt.	Ash % wt.
1	3.90	-	1.07	0.00	7.73	9.87	0.88	76.17	0.87	4.48
2	4.68	-	1.05	0.01	11.21	10.78	1.04	70.98	1.13	4.86
3	3.86	-	1.04	0.00	6.79	10.26	0.88	77.44	0.84	3.79
Average	4.15	-	1.05	0.003	8.58	10.30	0.93	74.86	0.947	4.38

Emulsion Feed

Test No.	Heat of Combustion MJ/kg	Viscosity cps @ 25°C	Density g/mL	Organic Chlorine % wt.**	Carbon % wt.	Hydrogen % wt.	Nitrogen % wt.	Oxygen* % wt.	Sulphur % wt.	Ash % wt.
1	15.0	<100	1.01	0.71	32.47	10.98	1.68	50.98	1.66	2.23
2	13.1	<100	0.99	0.44	21.11	10.46	1.38	63.29	1.43	2.33
3	12.7	<100	1.00	0.40	26.88	10.64	2.02	56.66	1.86	1.94
Average	13.6	<100	1.00	0.52	26.82	10.69	1.69	56.98	1.65	2.17

Note: The hydrogen and oxygen results do not include the hydrogen and oxygen associated with water.

* Oxygen is determined by difference = 100-(carbon+hydrogen+nitrogen+ash+sulphur).

** Organic chlorine is reported as choride on the daily incineration reports provided by Clean Harbors.

TABLE 131
Clean Harbors Sarnia
Metal Analysis of the Liquid Feed Samples

Metal	Rich Feed mg/kg	Lean Feed mg/kg	Alkaline Feed mg/kg	Emulsion Feed mg/kg	Leachate Feed mg/kg
Aluminum	465	191	<10	229	<10
Antimony	11.3	1.34	<0.4	2.39	<0.4
Arsenic	2.55	42.0	<0.4	2.75	0.42
Barium	105	23.7	<1	202	<1
Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5
Boron	15.9	17.1	<10	<10	27.3
Cadmium	2.60	2.17	<0.1	6.00	<0.1
Calcium	495	390	891	451	111
Chromium	164	15.2	<4	19.4	<4
Cobalt	7.08	1.08	<1	2.49	<1
Copper	46.8	271	<2.5	47.0	3.93
Iron	722	<200	<200	554	<200
Lead	72.7	8.39	<0.2	37.5	0.45
Lithium	2.01	13.4	<1	<1	3.06
Magnesium	64.8	157	32.5	79.4	84.0
Manganese	312	1480	<15	28.8	<15
Mercury	0.11	0.40	<0.0095	0.23	<0.0086
Molybdenum	9.83	4.43	<1	5.65	3.84
Nickel	13.9	11.2	<0.5	7.16	1.34
Phosphorus	<100	<100	<100	<100	<100
Potassium	1260	15400	<150	9660	2000
Selenium	<2	14.3	<2	3.81	<2
Silicon	1500	381	116	714	104
Silver	0.26	0.35	<0.1	0.50	<0.1
Sodium	2810	13600	116	1880	6630
Strontium	228	21.9	<2	26.5	2.09
Sulphur	<1000	7430	<1000	2120	<1000
Tin	10.6	15.9	<2	13.8	<2
Titanium	21.5	10.8	<1	11.5	8.04
Vanadium	10.6	6.26	<1	29.2	<1
Zinc	106	42.9	<20	167	<20
Total	<9562	<39853	<2681	<16413	<10337

Note: "<" 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 total.

TABLE 132
Clean Harbors Sarnia
Metal Analyses in Baghouse Dust Samples

Metal	Concentration mg/kg
Aluminum	7320
Antimony	105
Arsenic	280
Barium	67.7
Beryllium	<0.5
Boron	199
Cadmium	39.4
Calcium	20800
Chromium	1470
Cobalt	159
Copper	3720
Iron	5950
Lead	307
Lithium	156
Magnesium	5480
Manganese	22800
Mercury	6.28
Molybdenum	101
Nickel	233
Phosphorus	1950
Potassium	161000
Selenium	174
Silicon	870
Silver	7.61
Sodium	148000
Strontium	1040
Sulphur	97300
Tin	175
Titanium	18100
Vanadium	126
Zinc	872
Total	<498808

Note: "<" indicates that the analyte was not detected and the value of the detection limit was used to calculate the total.

TABLE 133
Clean Harbors Sarnia
Dioxin and Furan Congener Group Analyses in the Feed Samples

Dioxins

Congener Group	Rich Feed pg/g	Lean Feed pg/g	Alkaline Feed pg/g	Emulsion Feed pg/g
Tetrachlorodibenzo-p-dioxins	1.78	<2.7	<2.3	<2.5
Pentachlorodibenzo-p-dioxins	5.27	<1.8	5.19	<1.9
Hexachlorodibenzo-p-dioxins	13.7	17.0	23.0	17.2
Heptachlorodibenzo-p-dioxins	61.1	<3.5	43.7	51.4
Octachlorodibenzo-p-dioxin	118	145	142	144
Total	200	<170	<216	<217

Furans

Congener Group	Rich Feed pg/g	Lean Feed pg/g	Alkaline Feed pg/g	Emulsion Feed pg/g
Tetrachlorodibenzofurans	7.31	<2.4	9.20	1.75
Pentachlorodibenzofurans	<0.52	<1.7	<1.4	3.29
Hexachlorodibenzofurans	1.65	<1.9	4.85	3.31
Heptachlorodibenzofurans	6.83	11.6	7.73	13.8
Octachlorodibenzofuran	<16	<15	<15	<9.6
Total	<32.3	<32.6	<38.2	<31.8

Note: "<" 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 averages.

TABLE 134
Clean Harbors Sarnia
Dioxin and Furan Specific Isomer Analyses in the Feed Samples

Specific Isomer	Rich Feed pg/g	Lean Feed pg/g	Alkaline Feed pg/g	Emulsion Feed pg/g
2378-tetrachlorodibenzo-p-dioxin	<0.94	<2.7	<2.3	<2.5
12378-pentachlorodibenzo-p-dioxin	1.47	<2.8	<3.1	<1.9
123478-hexachlorodibenzo-p-dioxin	<0.94	<2.9	<2.1	<2.6
123678-hexachlorodibenzo-p-dioxin	<9.3	17.0	<16	<9.7
123789-hexachlorodibenzo-p-dioxin	<3.5	<5.1	<7.4	5.00
1234678-heptachlorodibenzo-p-dioxin	22.8	<24	<26	19.6
Octachlorodibenzo-p-dioxin	118	145	142	144
2378-tetrachlorodibenzofuran	6.10	<8.2	5.93	<4.8
12378-pentachlorodibenzofuran	<0.96	<1.7	<1.4	<1.6
23478-pentachlorodibenzofuran	<0.47	<1.7	<1.3	<1.5
123478-hexachlorodibenzofuran	1.00	<1.2	<1.0	<1.4
123678-hexachlorodibenzofuran	<0.57	<1.2	<1.0	<1.4
234678-hexachlorodibenzofuran	0.65	<1.2	<1.1	<1.5
123789-hexachlorodibenzofuran	<0.76	<1.9	<1.5	<2.3
1234678-heptachlorodibenzofuran	6.83	<6.9	<2.6	6.76
1234789-heptachlorodibenzofuran	<1.2	<1.7	<3.2	<2.7
Octachlorodibenzofuran	<16	<15	<15	<9.6
Total	<191	<240	<233	<219

Note: "<" 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 averages.

TABLE 135
Clean Harbors Sarnia
Polychlorinated Biphenyl Analyses in the Feed Samples

Specific Isomer	Rich Feed pg/g	Lean Feed pg/g	Alkaline Feed pg/g	Emulsion Feed pg/g
Dichlorinated biphenyls	151	423	368	699
Trichlorinated biphenyls	283	475	477	544
Tetrachlorinated biphenyls	502	566	472	654
Pentachlorinated biphenyls	569	641	619	424
Hexachlorinated biphenyls	488	620	579	407
Heptachlorinated biphenyls	220	282	283	230
Octachlorinated biphenyls	79.4	83.8	88.0	58.0
Nonachlorinated biphenyls	12.4	14.0	16.0	7.90
Decachlorinated biphenyl	23.2	22.0	23.0	17.0
Total	2328	3127	2925	3041

Note: "<" 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 averages.

APPENDIX 2

Environmental Compliance Approval No. 8-1030-94-006

(29 pages)

Ontario

Ministry of Environment and Energy

Ministère de l'Environnement et de l'Énergie

CERTIFICATE OF APPROVA
A I
NUMBER 8-1030-94-00
Page 1 of 1

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, 141-15 inclusive, 211-213 inclusive, 221, 222, 231-233 inclusive, 241, 242, 251-25 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 o 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;

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

g. "certificate" means this entire certificate of approval includin its schedules issued in accordance with Section 8 of th 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 Ministe 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 an the associated piping and pumps, and air pollution control syste as described in the Application for Certificate of Approval fo Plant Modifications at Tricil (Sarnia) Limited, Corunna, Ontario b 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 an DX-03-0-192 by Four Nines, Inc.; and in the document title 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 Valua 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 stature or regulation.

Adverse Impact

8. The company shall take all reasonable steps to minimize any advers 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 facility 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 bellow 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 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 anc time constraints, attempt to accumulate sufficient quantities of waste which are representative of waste causing highest stack emissions ir 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 minimu temperatures in the incinerator imposed by subcondition 16b anc 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 complianc 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 continu 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 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 <u>each</u> 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

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

** ng/cubic metre = nanograms per cubic metre

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

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
P_5CDD
H_6CDD
H_7CDD
O_8CDD

T_4CDF
P_5CDF
H_6CDF
H_7CDF
O_8CDF

2,3,7,8-T_4CDD
1,2,3,7,8-P_5CDD
1,2,3,4,7,8-H_6CDD
1,2,3,6,7,8-H_6CDD
1,2,3,7,8,9-H_6CDD
1,2,3,4,6,7,8-H_7CDD

2,3,7,8-T_4CDF
1,2,3,7,8-P_5CDF
2,3,4,7,8-P_5CDF
1,2,3,4,7,8-H_6CDF
1,2,3,6,7,8-H_6CDF
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 B - MONITORING PARAMETERS

TABLE 4: 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 Draf Report to: Tricil Limited, 89 The Queensway West, Mississauga, Ontario, P.90-43-E125 CI, January 30, 1990, Ortech International, 2395 Speakman Drive, Mississauga, Ontario.

5. Application for Certificata of Approval (Air) for the modification to the incineration feed system received at the Approvals Branch o 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 Systen (a three page description of a system).

9. Drawing no. 1C-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,
2 St. 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* day of January, 2003

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

Proving Data
(17 pages)

ALS Life Sciences
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 Rd. Mississauga, ON L5J 2Y4 Canada
ALS WO#:	L2729774		
Date of Report	8-Sep-22		
Date of Sample Receipt	24-Aug-22	**Client Contact:**	Chris Belore
		Client Project ID:	22180 Clean Harbors

COMMENTS: **CB by LRGC/MS - Isotope dilution**

Certified by:

Bradley Reimer
GC/MS Laboratory Senior Technical Specialist

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	**Method Blank**		**GLASSWARE PROOF**	
ALS Sample ID	WG3759982-1		L2729774-29	
Sample Size	1		1	
Sample units	sample		sample	
Moisture Content	n/a		n/a	
Matrix	QC		Media Prep	
Sampling Date	n/a		n/a	
Extraction Date	30-Aug-22		30-Aug-22	
Target Analytes	**ng/sample**		**ng/sample**	
Chlorobenzene	NR		NR	
1,3-Dichlorobenzene	<10	U	<10	U
1,4-Dichlorobenzene	23.4		<10	U
1,2-Dichlorobenzene	<10	U	<10	U
1,3,5-Trichlorobenzene	<10	U	<10	U
1,2,4-Trichlorobenzene	<10	U	<10	U
1,2,3-Trichlorobenzene	<10	U	<10	U
1,2,3,5/1,2,4,5-Tetrachlorobenzene	<10	U	<10	U
1,2,3,4-Tetrachlorobenzene	<10	U	<10	U
Pentachlorobenzene	<10	U	<10	U
Hexachlorobenzene	<10	U	<10	U
Field Sampling Standards	**%Rec**		**%Rec**	
1-Bromo-2,3-Dichlorobenzene	NS		NS	
Extraction Standards	**%Rec**		**%Rec**	
13C6-Chlorobenzene	NR		NR	
13C6-1,4-Dichlorobenzene	88		134	
13C6-1,2,3-Trichlorobenzene	110		142	
13C6-1,2,3,4-Tetrachlorobenzene	55		73	
13C6-Pentachlorobenzene	98		134	
13C6-Hexachlorobenzene	88		128	

U	Indicates that this compound was not detected above the LOD.
NS	Indicates that the compound was not added to the sample
NR	Indicates that the compound could not be quantified

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
ALS Project ID: ORT100
ALS WO#: L2729774
Date of Report 14-Sep-22
Date of Sample Receipt 24-Aug-22

Client Name: ORTECH
Client Address: 804 Southdown Rd.
Mississauga, ON L5J 2Y4
Canada
Client Contact: Chris Belore
Client Project ID: 22180 Clean Harbors

COMMENTS: **Chlorophenols as acetate derivatives by SIM GC/MS**

The recoveries of a few labelled standards were below the method control limit. The associated native targets have not been detected in the proof.

Certified by: Kennedy

Steve Kennedy, C.Chem.
Technical Supervisor

ALS Environmental

Sample Analysis Summary Report

Sample Name	**Method Blank**		**GLASSWARE PROOF**	
ALS Sample ID	WG3759982-1		L2729774-29	
Sample Size	1		1	
Sample units	sample		sample	
Moisture Content	n/a		n/a	
Matrix	QC		Media Prep	
Sampling Date	n/a		n/a	
Extraction Date	30-Aug-22		30-Aug-22	
Target Analytes	**ng/sample**		**ng/sample**	
2-Chlorophenol	<50	U	<50	U
3-Chlorophenol	<50	U	<50	U
4-Chlorophenol	<50	U	<50	U
2,6-Dichlorophenol	<50	U	<50	U
2,4/2,5-Dichlorophenol	<50	U	<50	U
3,5-Dichlorophenol	<50	U	<50	U
2,3-Dichlorophenol	<50	U	<50	U
3,4-Dichlorophenol	<50	U	<50	U
2,4,6-Trichlorophenol	<50	U	<50	U
2,3,6-Trichlorophenol	<50	U	<50	U
2,3,5-Trichlorophenol	<50	U	<50	U
2,4,5-Trichlorophenol	<50	U	<50	U
2,3,4-Trichlorophenol	<50	U	<50	U
3,4,5-Trichlorophenol	<50	U	<50	U
2,3,5,6/2,3,4,6-Tetrachlorophenol	<50	U	<50	U
2,3,4,5-Tetrachlorophenol	<50	U	<50	U
Pentachlorophenol	<50	U	<50	U
Hexachlorophene	<50	U	<50	U
Extraction Standards	**% Rec**		**% Rec**	
13C6-4-Chlorophenol (ES)	32		34	
13C6-2,4-Dichlorophenol (ES)	32		31	
13C6-2,4,5-Trichlorophenol (ES)	20		21	
13C6-2,3,4,5-Tetrachlorophenol (ES)	18		20	
13C6-Pentachlorophenol (ES)	14		17	

U Indicates that this compound was not detected above the LOR.

ALS Life Sciences
1435 Norjohn Court, Unit 1, Burlington, ON, Canada 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 Mississauga, ON L5J 2Y4
ALS WO#:	L2729774		
Date of Report	7-Sep-22		
Date of Sample Receipt	24-Aug-22	**Client Contact:**	Chris Belore
		Client Project ID:	22180 Clean Harbors

COMMENTS: **PCDD/F by EPA M23**

The Extraction Standard recoveries in the proof were below the method criteria. Native results, including Estimated Detection Limits (EDLs) calculated by Isotope Dilution are inherently recovery corrected and are not expected to be biased (though EDLs may be elevated).

Certified by:

Bradley Reimer
GC/MS Laboratory Senior Technical Specialist

ALS Life Sciences

Sample Analysis summary Report

Sample Name	**GLASSWARE PROOF**
ALS Sample ID	L2729774-29
Sample Size	1
Sample size units	sample
Percent Moisture	n/a
Sample Matrix	Media prep
Sampling Date	n/a
Extraction Date	30-Aug-22
Target Analytes	**pg**
2,3,7,8-TCDD	<8.4
1,2,3,7,8-PeCDD	<9.8
1,2,3,4,7,8-HxCDD	<8.5
1,2,3,6,7,8-HxCDD	<8.3
1,2,3,7,8,9-HxCDD	<8.1
1,2,3,4,6,7,8-HpCDD	<10
OCDD	67.4
2,3,7,8-TCDF	<7.2
1,2,3,7,8-PeCDF	<8.3
2,3,4,7,8-PeCDF	<7.6
1,2,3,4,7,8-HxCDF	<5.8
1,2,3,6,7,8-HxCDF	<5.7
2,3,4,6,7,8-HxCDF	<5.7
1,2,3,7,8,9-HxCDF	9.01
1,2,3,4,6,7,8-HpCDF	<8.6
1,2,3,4,7,8,9-HpCDF	<8.2
OCDF	<20
Extraction Standards	**% Rec**
13C12-2,3,7,8-TCDD	25
13C12-1,2,3,7,8-PeCDD	18
13C12-1,2,3,6,7,8-HxCDD	23
13C12-1,2,3,4,6,7,8-HpCDD	22
13C12-OCDD	19
13C12-2,3,7,8-TCDF	24
13C12-1,2,3,7,8-PeCDF	21
13C12-1,2,3,6,7,8-HxCDF	26
13C12-1,2,3,4,6,7,8-HpCDF	25
Homologue Group Totals	**pg**
Total-TCDD	<8.4
Total-PeCDD	<9.8
Total-HxCDD	<8.5
Total-HpCDD	<10
Total-TCDF	<7.2
Total-PeCDF	<8.3
Total-HxCDF	9.01
Total-HpCDF	<8.2
Toxic Equivalency - (WHO 2005)	
Lower Bound PCDD/F TEQ (WHO 2005)	0.921
Mid Point PCDD/F TEQ (WHO 2005)	13.9
Upper Bound PCDD/F TEQ (WHO 2005)	26.9

ALS Life Sciences

Quality Control Summary Report

Sample Name	**Method Blank**
ALS Sample ID	WG3759982-1
Sample Size	1
Sample size units	sample
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	30-Aug-22
Target Analytes	**pg**
2,3,7,8-TCDD	<2.7
1,2,3,7,8-PeCDD	<2.8
1,2,3,4,7,8-HxCDD	<1.8
1,2,3,6,7,8-HxCDD	<1.7
1,2,3,7,8,9-HxCDD	<1.7
1,2,3,4,6,7,8-HpCDD	6.47
OCDD	<31
2,3,7,8-TCDF	<1.5
1,2,3,7,8-PeCDF	<3.1
2,3,4,7,8-PeCDF	<2.9
1,2,3,4,7,8-HxCDF	<2.2
1,2,3,6,7,8-HxCDF	<2.1
2,3,4,6,7,8-HxCDF	<2.1
1,2,3,7,8,9-HxCDF	<2.4
1,2,3,4,6,7,8-HpCDF	<2.4
1,2,3,4,7,8,9-HpCDF	<2.2
OCDF	16.1
Extraction Standards	**% Rec**
13C12-2,3,7,8-TCDD	61
13C12-1,2,3,7,8-PeCDD	61
13C12-1,2,3,6,7,8-HxCDD	64
13C12-1,2,3,4,6,7,8-HpCDD	55
13C12-OCDD	40
13C12-2,3,7,8-TCDF	62
13C12-1,2,3,7,8-PeCDF	64
13C12-1,2,3,6,7,8-HxCDF	66
13C12-1,2,3,4,6,7,8-HpCDF	62
Homologue Group Totals	**pg**
Total-TCDD	<2.7
Total-PeCDD	<2.8
Total-HxCDD	6.49
Total-HpCDD	6.47
Total-TCDF	<1.5
Total-PeCDF	<3.1
Total-HxCDF	<2.4
Total-HpCDF	<2.2
Toxic Equivalency - (WHO 2005)	
Lower Bound PCDD/F TEQ (WHO 2005)	0.0695
Mid Point PCDD/F TEQ (WHO 2005)	4.12
Upper Bound PCDD/F TEQ (WHO 2005)	8.14

ALS Life Sciences
1435 Norjohn Court, Unit 1, Burlington, ON, Canada 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 Mississauga, ON L5J 2Y4
ALS WO#:	L2729774		
Date of Report	7-Sep-22		
Date of Sample Receipt	24-Aug-22	**Client Contact:**	Chris Belore
		Client Project ID:	22180 Clean Harbors

COMMENTS: **Chlorinated Pesticides by EPA 1699 (modified)**

Certified by:
Bradley Reimer
GC/MS Laboratory Senior Technical Specialist

ALS Life Sciences

Sample Analysis summary Report

Sample Name	**GLASSWARE PROOF**
ALS Sample ID	L2729774-29
Sample Size	1
Sample size units	Sample
Percent Moisture	n/a
Sample Matrix	Media prep
Sampling Date	n/a
Extraction Date	30-Aug-22
Target Analytes	**ng**
Hexachlorobutadiene	<0.035
Heptachlor	<0.16
Heptachlor Epoxide B	<0.20
Heptachlor Epoxide A	<0.95
Oxychlordane	<0.41
trans-Chlordane	<0.69
cis-Chlordane	<0.65
Parlar 26	<1.8
Parlar 50	<1.3
Parlar 62	<1.6
Extraction Standards	**% Rec**
Heptachlor, 13C10-	137
Oxychlordane, 13C10-	119
trans-Nonachlor, 13C10-	121
Dieldrin, 13C12-	100
Endrin, 13C12-	158
Methoxychlor, 13C12-	115
Mirex, 13C10-	124

ALS Life Sciences

Quality Control Summary Report

Sample Name	**Method Blank**
ALS Sample ID	WG3759982-1
Sample Size	1
Sample size units	Sample
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	30-Aug-22
Target Analytes	**ng**
Hexachlorobutadiene	<0.035
Heptachlor	<0.18
Heptachlor Epoxide B	<0.21
Heptachlor Epoxide A	<1.0
Oxychlordane	<0.33
trans-Chlordane	<0.72
cis-Chlordane	<0.68
Parlar 26	<1.8
Parlar 50	<1.5
Parlar 62	<1.8
Extraction Standards	**% Rec**
Heptachlor, 13C10-	107
Oxychlordane, 13C10-	101
trans-Nonachlor, 13C10-	109
Dieldrin, 13C12-	93
Endrin, 13C12-	119
Methoxychlor, 13C12-	92
Mirex, 13C10-	119

ALS Life Sciences
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 Rd. Mississauga, ON L5J 2Y4 Canada
ALS WO#:	L2729774		
Date of Report	7-Sep-22		
Date of Sample Receipt	24-Aug-22	**Client Contact:**	Chris Belore
		Client Project ID:	22180 Clean Harbors

COMMENTS: **PAH by CARB method 429 (LR option)- Isotope dilution**

Certified by:

Bradley Reimer
GC/MS Laboratory Senior Technical Specialist

Results in this certificate relate only to the samples as submitted to the laboratory.
This report shall not be reproduced, except in full, without the written permission of ALS Canada Ltd.

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	**Method Blank**		**GLASSWARE PROOF**	
ALS Sample ID	WG3759982-1		L2729774-29	
Sample Size	1		1	
Sample units	sample		sample	
Moisture Content	n/a		n/a	
Matrix	QC		Media Prep	
Sampling Date	n/a		n/a	
Extraction Date	30-Aug-22		30-Aug-22	
Target Analytes	**ng/sample**		**ng/sample**	
Naphthalene	18.3	M,R	51.9	M,R,B
2-Methylnaphthalene	<12	U	<12	U
1-Methylnaphthalene	<12	U	<12	U
Acenaphthylene	<12	U	<12	U
Acenaphthene	<12	U	<12	U
Fluorene	<12	U	<12	U
Phenanthrene	<12	U	21.2	
Anthracene	<12	U	<12	U
Fluoranthene	<12	U	<12	U
Pyrene	<12	U	<12	U
Benzo(a)Anthracene	<12	U	<12	U
Chrysene	<12	U	<12	U
Benzo(b)Fluoranthene	<12	U	<12	U
Benzo(k)Fluoranthene	<12	U	<12	U
Benzo(e)Pyrene	<12	U	<12	U
Benzo(a)Pyrene	<12	U	<12	U
Perylene	<12	U	<12	U
Indeno(1,2,3-cd)Pyrene	<12	U	<12	U
Dibenzo(a,h)Anthracene	<12	U	<12	U
Benzo(g,h,i)Perylene	<12	U	<12	U
Additional Analytes	**% Rec**		**% Rec**	
Tetralin	2.65		<2.0	
Quinoline	<2.0	U	<2.0	U
2-Chloronaphthalene	<2.0	U	<2.0	U
Biphenyl	<2.0	U	<2.0	U
o-Terphenyl	<2.0	U	<2.0	U
1-Methylphenanthrene	<2.0	U	<2.0	U
9-Methylphenanthrene	<2.0	U	<2.0	U
2-methylanthracene	<2.0	U	<2.0	U
9,10-dimethylanthracene	<2.0	U	<2.0	U
m-terphenyl	<2.0	U	<2.0	U
p-terphenyl	<2.0	U	<2.0	U
Benzo(a)fluorene	<2.0	U	<2.0	U
Benzo(b)fluorene	<2.0	U	<2.0	U
Benzo(b)anthracene	<2.0	U	<2.0	U
Benzo(j)fluoranthene	<2.0	U	<2.0	U
7,12-Dimethylbenzo(a)anthracene	<2.0	U	<2.0	U
3-Methylcholanthrene	<10	U	<10	U
Dibenz(a,j)acridine	<10	U	<10	U
7H-Dibenzo(c,g)carbazole	<10	U	<10	U
Picene	<10	U	<10	U
Dibenzo(a,e)pyrene	<10	U	<10	U
dibenzo(a,i)pyrene	<10	U	<10	U
Coronene	<10	U	<10	U
Extraction Standards	**% Rec**		**% Rec**	
Naphthalene D8	81.6		89.9	
2-Methylnaphthalene-D10	93		102.3	
Acenaphthylene D8	111.8		132.2	M
Phenanthrene D10	94.4		106	
Anthracene-D10	105		125.9	
Fluoranthene D10	96.3		119.3	
Benz(a)Anthracene-D12	89		132.2	M
Chrysene D12	85.2		117.4	
Benzo(b)Fluoranthene-D12	95.1		115.7	
Benzo(k)Fluoranthene-D12	113.5		103.7	
Benzo(a)Pyrene D12	107.3		112.9	
Perylene D12	104.6		107.2	
Indeno(1,2,3,cd)Pyrene-D12	71.7	M	82.7	
Dibenz(a,h)Anthracene-D14	80.4		89.5	
Benzo(g,h,i)Perylene D12	90.5		96	

U	Indicates that this compound was not detected above the LOD.
M	Indicates that a peak has been manually integrated.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

ALS Life Sciences
1435 Norjohn Court, Unit 1, Burlington, ON, Canada 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 Mississauga, ON L5J 2Y4 Canada
ALS WO#:	L2729774		
Date of Report	14-Sep-22		
Date of Sample Receipt	24-Aug-22	**Client Contact:**	Chris Belore
		Client Project ID:	22180 Clean Harbors

COMMENTS: **PCB Congeners by EPA 1668C**

PCB Congener Group Totals and Total PCB are a sum of detected values, including EMPC values, consistent with USEPA CLP SOW CBC1.2

Certified by: ______________________
Sabrina Jin
Technical Specialist

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	**GLASSWARE PROOF**
ALS Sample ID	L2729774-29
Sample Size	1
Sample size units	PROOF
Percent Moisture	n/a
Sample Matrix	Media prep
Sampling Date	n/a
Extraction Date	9-Sep-22

Target Analytes	**pg**
PCB-081	<0.51
PCB-077	<0.54
PCB-123	<0.38
PCB-118	5.71
PCB-114	<0.39
PCB-105	3.06
PCB-126	<0.40
PCB-167	0.959
PCB-156/157	<0.56
PCB-169	<0.47
PCB-189	<0.47

Extraction Standards	**% Rec**
13C12-PCB-001	39
13C12-PCB-003	43
13C12-PCB-004	42
13C12-PCB-015	53
13C12-PCB-019	38
13C12-PCB-037	60
13C12-PCB-054	45
13C12-PCB-081	63
13C12-PCB-077	61
13C12-PCB-104	51
13C12-PCB-123	58
13C12-PCB-118	55
13C12-PCB-114	57
13C12-PCB-105	55
13C12-PCB-126	57
13C12-PCB-155	47
13C12-PCB-167	51
13C12-PCB-156/157	50
13C12-PCB-169	49
13C12-PCB-188	46
13C12-PCB-189	53
13C12-PCB-202	42
13C12-PCB-205	19
13C12-PCB-208	45
13C12-PCB-206	46
13C12-PCB-209	57

Homologue Group Totals	
Total MonoCB	<2.0
Total DiCB	45.2
Total TriCB	25.7
Total TetraCB	46.5
Total PentaCB	62.5
Total HexaCB	28.7
Total HeptaCB	2.62
Total OctaCB	3.42
Total NonaCB	<0.46
DecaCB	0.630
Total PCB	215

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.000292
Mid Point PCB TEQ	0.0275
Upper Bound PCB TEQ	0.0547

ALS Life Sciences

Quality Control Summary Report

Sample Name	**Method Blank**
ALS Sample ID	WG3761929-1
Sample Size	1
Sample size units	BLANK
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	9-Sep-22

Target Analytes	**pg**
PCB-081	<0.65
PCB-077	<0.66
PCB-123	<0.41
PCB-118	<0.99
PCB-114	<0.40
PCB-105	<0.49
PCB-126	<0.41
PCB-167	<0.33
PCB-156/157	<0.51
PCB-169	<0.35
PCB-189	<0.24

Extraction Standards	**% Rec**
13C12-PCB-001	42
13C12-PCB-003	43
13C12-PCB-004	43
13C12-PCB-015	38
13C12-PCB-019	34
13C12-PCB-037	37
13C12-PCB-054	41
13C12-PCB-081	47
13C12-PCB-077	47
13C12-PCB-104	45
13C12-PCB-123	49
13C12-PCB-118	47
13C12-PCB-114	49
13C12-PCB-105	51
13C12-PCB-126	53
13C12-PCB-155	42
13C12-PCB-167	52
13C12-PCB-156/157	56
13C12-PCB-169	58
13C12-PCB-188	48
13C12-PCB-189	67
13C12-PCB-202	48
13C12-PCB-205	62
13C12-PCB-208	55
13C12-PCB-206	60
13C12-PCB-209	68

Homologue Group Totals	
Total MonoCB	5.57
Total DiCB	<1.2
Total TriCB	5.46
Total TetraCB	8.01
Total PentaCB	10.7
Total HexaCB	4.15
Total HeptaCB	0.346
Total OctaCB	2.66
Total NonaCB	<0.38
DecaCB	0.320
Total PCB	37.3

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.00
Mid Point PCB TEQ	0.0260
Upper Bound PCB TEQ	0.0519

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
ALS Project ID: ORT100
ALS WO#: L2737125
Date of Report 3-Nov-22
Date of Sample Receipt 18-Oct-22

Client Name: ORTECH
Client Address: 804 Southdown Road
Mississauga, ON L5J 2Y4
Canada
Client Contact: Chris Belore
Client Project ID: 22180 Clean Harbors

COMMENTS: **VOCs via SW846 Method 5041A/8260C**

Ketone data by VOST analyses are estimated values only

Target analytes not detected in the proof.
Media are approved for the collection of samples for the analysis of VOCs via SW846 Method 5041A/8260C.

Certified by: SKennedy
Steve Kennedy
Technical Supervisor

ALS Environmental

Sample Analysis Summary Report

Sample Name	**Method Blank**		**VOST Proof**	
ALS Sample ID	WG3770852-1		L2737125-23	
Sample units	sample		sample	
Matrix	QC		Media Prep	
Sampling Date	n/a		n/a	
Extraction Date	3-Nov-22		3-Nov-22	
Target Analytes	**ug/sample**		**ug/sample**	
Dichlorodifluoromethane	<0.02	U	<0.02	U
Vinyl Chloride	<0.02	U	<0.02	U
Bromomethane	<0.09	U	<0.09	U
Trichlorofluoromethane	<0.02	U	<0.02	U
1,1-Dichloroethene	<0.01	U	<0.01	U
Acetone	<0.1	U	<0.1	U
Methylene Chloride	<0.1	U	<0.1	U
trans,1,2-Dichloroethene	<0.01	U	<0.01	U
2-Butanone	<0.01	U	<0.01	U
Chloroform	<0.01	U	<0.01	U
1,1,1-Trichloroethane	<0.01	U	<0.01	U
Carbon Tetrachloride	<0.01	U	<0.01	U
Benzene	<0.05	U	<0.05	U
1,2-Dichloroethane	<0.01	U	<0.01	U
Trichloroethene	<0.01	U	<0.01	U
1,2-Dichloropropane	<0.01	U	<0.01	U
Bromodichloromethane	<0.01	U	<0.01	U
Toluene	<0.05	U	<0.05	U
1,1,2-Trichloroethane	<0.02	U	<0.02	U
Tetrachloroethene	<0.01	U	<0.01	U
Chlorodibromomethane	<0.01	U	<0.01	U
Ethylene Dibromide	<0.02	U	<0.02	U
Ethylbenzene	<0.01	U	<0.01	U
M&P-Xylene	<0.03	U	<0.03	U
O-Xylene	<0.01	U	<0.01	U
Styrene	<0.02	U	<0.02	U
Bromoform	<0.01	U	<0.01	U
Isopropylbenzene	<0.02	U	<0.02	U
1,3,5-Trimethylbenzene	<0.02	U	<0.02	U
Trichlorotrifluoroethane	<0.02	U	<0.02	U
Ethyl Acetate	<0.1	U	<0.1	U
Field Standard	**% Rec**		**% Rec**	
d10-Ethylbenzene(SPK)	97.6		93.5	
Surrogate Standards	**% Rec**		**% Rec**	
d4-1,2-Dichloroethane(SURR)	81.6		90.9	M
d8-Toluene(SURR)	97.4		100.7	
4-Bromofluorobenzene(SURR)	78.2		78.8	
Internal Standards	**% Rec**		**% Rec**	
d14-Hexane	103.6		97.8	
d6-Benzene	102.6		93.4	
d5-Chlorobenzene	97.5		92.5	

U	Indicates that this compound was not detected above the RL.
M	Indicates that a peak has been manually integrated.

APPENDIX 4

Metals Train Field Data Sheets
(15 pages)

ORTECH Consulting Inc.

Plant	Clean Harbors
Plant Location	Corunna, Ontario
Test No.:	1- M29
Test Date	November 8th / 2022
Test Location	Incinerator Exhaust Stack
Operator Signature	

Pitot Factor	0.847	
DGMCF	1.010	
Barometric Pressure	30.66	"Hg
Static Pressure	0.66	"H2O
Nozzle Size	0.2508	inches
Stack Diameter	4.833 ~~5~~	
Length	0	feet
Width	0	feet
Port length:	12 ~~8~~	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	0.1	mg
Probe	1.1	mg

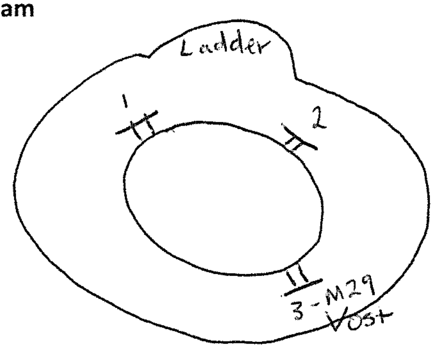
Moisture Gain

CWTR	3031.6	~~3019.7~~	g
WCBDA	30.4	~~8.7~~	g

Combustion Gas Concentration

Oxygen	9.70	%
Carbon Dioxide	7.80	%
Carbon Monoxide	33.9	ppm

Site Diagram



Project No.:	22180
Page	1 of 5
Probe No.:	
Meter Box No.:	Team 2
Impinger Box No.:	

Measuring Device	MII Numbers
Probe / Pitot	58
Trendicator	COE20092
Control Box	
Incline Manometer	
Comb.Gas.Analyzer	MSML
Micromanometer	
Barometer	Env.Can
Calipers	B03906

Nozzle Measurements

1	.2510
2	.2505
3	.2510
4	.2505
Average:	.2508

Notes:

Field Data Sheet

Date: Nov 8th/2022	Plant:	Clean Harbors	Test No.: 1 - M29	Page 2 of 5
	Plant Location:	Corunna, Ontario	Test Location:	Incinerator Exhaust Stack

Point	Clock Time	Dry Gas Meter ft³	Pitot Δ P "H₂O	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 "H₂O	Pump Vacuum "Hg Gauge
	*	*	*		*			*		*	*	*	*
1	0	136.91	0.98	0.5	379	262	255	48	57	62	65	0.9	3
	3	138.85	6.97	0.5	380	267	256	45	228	64	66	0.91	2.5
	6	140.04	0.98	0.5	379	269	255	45	241	64	66	0.89	2.5
	9	141.61	1.0	0.5	379	269	256	44	244	64	66	0.93	2.5
2	12	143.09	1.0	0.51	378	269	254	44	243	65	66	0.91	2.5
	15	144.76	0.96	0.49	378	269	256	44	242	65	66	0.92	2.5
	18	146.30	1.0	0.51	378	269	254	44	240	65	66	0.87	2.5
	21	147.88	0.98	0.50	378	270	256	44	240	66	67	0.89	2.5
3	24	149.47	1.0	0.51	377	269	257	45	238	65	68	0.82	2.0
	27	150.93	1.1	0.53	377	270	256	44	239	65	68	0.9	2.0
	30	152.60	1.0	0.51	377	270	250	44	243	66	68	1.0	2.0
	33	153.10	1.0	0.51	378	271	250	45	243	70	68	1.0	2.0
4	36	155.92	1.7	0.66	378	271	256	46	240	66	69	0.84	2.0
	39	157.85	1.3	0.58	380	270	257	46	249	66	70	1.3	2.0
	42	159.68	1.5	0.62	380	271	257	46	250	67	71	1.4	2.0
	45	161.54	1.2	0.56	380	273	257	46	249	67	72	1.3	2
5	48	163.43	1.8	0.68	380	273	257	47	250	67	72	1.2	2
	51	165.44	1.8	0.68	380	273	257	46	254	67	72	1.6	4.5
	54	167.55	1.9	0.7	380	274	257	46	256	68	71	1.7	4.5
	57	169.68	1.9	0.7	380	273	257	46	253	68	73	1.7	4.5
6	60	171.84	2.0	0.72	380	274	258	46	253	68	73	1.8	4.5

Traverse: 2				
Start Time: 9:57am	Initial Leak Check:	0.004	cfm@ 16	"Hg
Finish Time: 11:57am	Final Leak Check:	0.002	cfm@ 20	"Hg

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

Project No.: 22180

Operator : Adam Petrossi

Field Data Sheet

Date: Nov 8th/2022	Plant:	Clean Harbors	Test No.:	1 - M29	Page 3 of 5
	Plant Location:	Corunna, Ontario	Test Location:	Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft^3	Pitot ΔP "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp		Meter Temp		Meter Pressure ΔH "H_2O	Pump Vacuum "Hg Gauge
								Outlet °F	Inlet/~~Trap~~ °F	Outlet °F	Inlet °F		
	*	*	*		*			*		*	*	*	*
	63	174.04	2.0	0.72	379	272	256	42	252	68	73	1.8	4.5
	66	176.23	1.9	0.70	378	273	257	41	255	69	73	1.7	4.5
	69	178.48	2.1	0.74	378	275	256	41	255	68	73	1.7	4.5
7	72	180.68	2.0	0.72	378	273	256	41	252	68	73	1.8	4.5
	75	182.80	1.9	0.7	377	275	259	41	260	69	74	1.8	4.5
	78	185.02	2.0	0.72	378	275	258	42	260	70	74	1.7	4.5
	81	187.2	2.0	0.72	378	275	258	43	259	70	74	1.8	4.5
8	84	189.39	1.9	0.71	376	274	256	42	261	70	74	1.8	5.0
	87	191.57	2.0	0.72	376	274	256	42	260	70	74	1.7	5.0
	90	193.77	1.9	0.71	376	273	260	43	261	70	74	1.7	4.5
	93	195.93	1.8	0.69	375	279	258	45	263	70	74	1.6	4.5
9	96	198.04	1.9	0.71	375	278	258	45	261	70	71	1.6	4.5
	99	200.16	1.9	0.70	376	279	259	45	261	70	71	1.6	4.5
	102	202.25	1.8	0.69	376	281	259	50	263	71	75	1.7	4.5
	105	204.39	2.0	0.72	377	276	256	50	262	71	74	1.7	4.5
10	108	206.54	1.9	0.71	376	276	259	52	263	71	74	1.8	4.5
	111	208.79	1.85	0.70	375	278	259	55	266	71	74	1.6	4.5
	114	210.89	1.9	0.71	375	278	259	55	262	71	74	1.6	4.5
	117	213.07	1.8	0.69	375	280	260	58	210	71	74	1.6	4.5
	120	214.94											

Traverse:					
Start Time: /	Initial Leak Check:	/	cfm@	/	"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.: 22180

Operator : Adam Petrossi

Field Data Sheet

Date: Nov 8th/22	Plant: Clean Harbors	Test No.: 1 - M29	Page 4 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft³	Pitot Δ P "H₂O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp		Meter Temp		Meter Pressure Δ H "H₂O	Pump Vacuum "Hg Gauge
	*	*	*		*			*		*	*	*	*
								Outlet °F	Inlet/~~Trap~~ °F	Outlet °F	Inlet °F		
1	0	216.29	1.0	0.51	374	265	260	65	76	73	75	0.98	3.5
	3	217.88	0.97	0.51	374	272	260	51	211	73	75	0.95	3.5
	6	219.50	1.0	0.51	376	276	262	49	211	73	74	0.93	3.5
	9	221.09	1.1	0.54	375	274	260	48	227	74	74	0.92	3.5
2	12	222.69	1.4	0.61	377	275	260	48	257	74	75	0.92	3.5
	15	224.42	1.0	0.51	376	276	256	49	257	74	74	1.4	4.0
	18	226.15	1.0	0.51	376	275	258	49	257	74	74	0.96	4.0
	21	227.82	1.2	0.56	376	275	257	49	257	74	74	0.96	4.0
3	24	229.55	1.2	0.56	376	277	261	51	260	74	77	1.2	4.0
	27	231.38	1.6	0.65	377	277	256	53	261	75	78	1.1	4
	30	233.36	1.7	0.67	377	276	257	53	263	75	78	1.5	4.5
	33	235.39	1.6	0.65	377	277	263	52	267	75	74	1.5	4.5
4	36	237.41	1.4	0.61	377	276	257	53	265	75	74	1.5	4.5
	39	239.42	1.4	6.61	376	277	259	53	267	75	74	1.3	4.5
	42	241.3	1.7	0.67	376	277	261	53	267	74	74	1.2	4.5
	45	243.18	1.6	0.65	376	275	261	53	267	74	74	1.3	4.5
5	48	245.19	1.6	0.65	376	275	261	53	265	74	74	1.5	4.5
	51	247.22	1.5	0.63	376	277	259	53	265	74	75	1.4	4.5
	54	249.21	1.6	0.65	376	276	257	53	266	74	75	1.4	4.5
	57	251.23	1.9	0.71	376	275	256	53	265	74	75	1.8	4.5
6	60	253.34	1.9	0.71	377	277	256	53	266	74	75	1.8	4.5

Traverse: 1				
Start Time: 12:54 pm	Initial Leak Check:	.006	cfm@ 15	"Hg
Finish Time: 2:54 pm	Final Leak Check:	.004	cfm@ 15	"Hg

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

Project No.: 22180

Operator : Adam Petrossi

Field Data Sheet

Date: Nov 8th/22	Plant: Clean Harbors	Test No.: 1-M29	Page 5 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

	*	*	*		*			*		*	*	*	*
Point	Clock Time	Dry Gas Meter ft³	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp		Meter Temp		Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
								Outlet °F	Inlet/Trap °F	Outlet °F	Inlet °F		
	63	255.53	1.9	0.71	377	276	261	51	259	77	79	1.8	4.5
	66	257.61	2.0	0.73	377	275	260	51	256	77	79	1.8	4.5
	69	259.79	2.0	0.73	377	275	260	51	259	77	78	1.9	4.5
7	72	262.42	2.2	0.76	378	276	260	52	258	75	78	1.9	4.5
	75	264.68	2.1	0.75	378	276	261	52	262	75	78	2.0	5.0
	78	267.01	2.0	0.73	378	276	261	52	262	75	78	1.8	5.0
	81	269.19	2.1	0.75	376	276	261	52	260	77	78	1.9	5.0
8	84	271.46	2.1	0.75	380	272	260	52	260	77	78	1.9	5.0
	87	273.73	1.9	0.71	381	273	261	52	261	77	79	1.8	5.0
	90	275.94	1.9	0.71	381	273	261	52	262	76	79	1.8	5.0
	93	278.17	1.8	0.69	381	273	261	51	262	76	79	1.7	5.0
9	96	280.32	1.8	0.69	384	276	261	51	259	76	77	1.6	5.0
	99	282.44	1.7	0.67	383	275	259	51	254	76	77	1.5	5.0
	102	284.51	1.7	0.67	383	276	259	51	253	76	77	1.5	5.0
	105	286.54	1.8	0.69	385	272	258	51	254	76	77	1.7	5.0
10	108	288.66	2.0	0.73	385	273	258	53	251	76	77	1.8	5.0
	111	290.87	1.9	0.71	384	271	256	53	254	76	77	1.8	5.0
	114	293.06	1.7	0.67	382	272	260	49	259	76	78	1.6	5.0
	117	295.18	1.7	0.67	382	272	261	50	258	76	78	1.5	4.5
	120	297.22											

Traverse: 1			
Start Time:	Initial Leak Check:	cfm@	"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.: 22180

Operator : Adam Petrossi

ORTECH Consulting Inc.

Plant	Clean Harbors
Plant Location	Corunna, Ontario
Test No.:	2-M29
Test Date	Nov 9th /2022
Test Location	Incinerator Exhaust Stack
Operator Signature	

Project No.:	22180
Page	1 of 5
Probe No.:	
Meter Box No.:	Team 2
Impinger Box No.:	

Pitot Factor	0.847	
DGMCF	1.010	
Barometric Pressure	29.82	"Hg
Static Pressure	0.72	"H2O
Nozzle Size	0.2508	inches
Stack Diameter	4.833 5	
Length	0	feet
Width	0	feet
Port length:	12 8	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	0.2	mg
Probe	0.9	mg

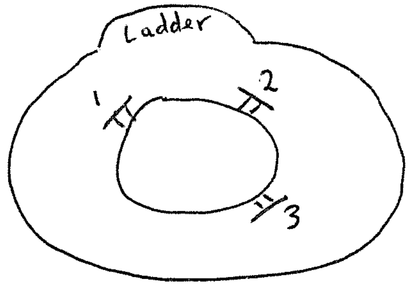
Moisture Gain

CWTR	2991.0	~~3040.4~~	g
WCBDA	29.6	~~7.4~~	g

Combustion Gas Concentration

Oxygen	9.94	%
Carbon Dioxide	7.56	%
Carbon Monoxide	69.6	ppm

Site Diagram



Measuring Device	MII Numbers
Probe / Pitot	58
Trendicator	COE 20092
Control Box	COE 20092
Incline Manometer	COE 20092
Comb.Gas.Analyzer	MSML
Micromanometer	
Barometer	Env.Can
Calipers	BO 3906

Nozzle Measurements

1	0.2510
2	0.2505
3	0.2510
4	0.2505
Average:	0.2508

Notes:

Field Data Sheet

Date: Nov 9th/2022	Plant:	Clean Harbors	Test No.: 2 - M29		Page 2 of 5
	Plant Location:	Corunna, Ontario	Test Location:	Incinerator Exhaust Stack	

	*	*	*		*			*		*	*	*	*
Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp		Meter Temp		Meter Pressure ΔH "H_2O	Pump Vacuum "Hg Gauge
								Outlet °F	Inlet/~~Trap~~ °F	Outlet °F	Inlet °F		
1	0	298.57	1.4	0.59	380	259	252	40	79	61	63	1.3	2.5
	3	300.42	1.3	0.57	382	267	256	40	232	61	63	1.2	2.5
	6	302.19	1.4	0.59	381	267	256	40	235	61	62	1.2	2.5
	9	303.98	1.4	0.59	381	267	257	40	235	61	62	1.2	2.5
2	12	305.77	1.5	0.61	382	268	257	40	236	61	62	1.3	2.5
	15	307.65	1.5	0.61	383	268	257	40	235	61	62	1.3	2.5
	18	309.50	1.5	0.61	384	266	258	40	236	61	64	1.3	2.5
	21	311.38	1.4	0.59	386	266	257	40	236	61	64	1.2	2.5
3	24	313.18	1.4	0.59	384	266	257	41	243	61	64	1.2	2.5
	27	314.98	1.5	0.61	382	266	257	41	244	62	65	1.3	2.5
	30	316.86	1.6	0.64	380	268	257	41	243	62	65	1.4	2.5
	33	318.81	1.5	0.62	378	266	258	41	244	62	65	1.4	2.5
4	36	320.73	1.6	0.64	378	267	258	41	244	62	65	1.4	2.5
	39	322.68	1.6	0.64	378	267	258	42	244	63	67	1.4	2.5
	42	324.66	1.6	0.64	378	267	258	42	244	63	67	1.4	2.5
	45	326.57	1.7	0.66	377	268	259	40	248	63	68	1.5	2.5
5	48	328.57	1.7	0.66	376	268	259	40	248	63	68	1.5	2.5
	51	330.58	1.7	0.66	375	269	259	39	248	63	68	1.5	3.0
	54	332.58	1.7	0.66	376	269	259	39	249	63	68	1.5	3.0
	57	334.59	1.7	0.66	376	268	259	39	249	63	68	1.5	3.0
6	60	336.6	1.8	0.68	376	268	259	39	249	63	68	1.6	3.0

Traverse: 2					
Start Time: 8:32am	Initial Leak Check:	0.006	cfm@	15	"Hg
Finish Time: 10:32am	Final Leak Check:	0.008	cfm@	13	"Hg

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

Project No.: 22180

Operator : Adam Petrossi

Field Data Sheet

Date: Nov 9th/2022	Plant: Clean Harbors	Test No.: 2-M29	Page 3 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

	*	*	*		*			*		*	*	*	*
Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP "H₂O	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 ΔH "H₂O	Pump Vacuum "Hg Gauge
	63	338.67	1.8	0.68	379	271	254	39	247	64	69	1.6	3.0
	66	340.7	2.0	0.72	379	271	254	39	247	64	69	1.7	3.0
	69	342.85	1.9	0.70	379	272	259	39	248	64	69	1.7	3.0
7	72	345.03	1.8	0.68	381	272	259	38	248	64	70	1.6	3.0
	75	347.12	1.8	0.68	382	272	258	38	249	64	70	1.6	3.5
	78	349.17	1.8	0.68	382	272	258	38	249	64	70	1.6	3.5
	81	351.23	2.1	0.73	382	272	258	38	249	64	70	1.9	3.5
8	84	353.45	1.9	0.70	382	273	259	38	251	64	71	1.6	3.5
	87	355.57	1.7	0.86	383	273	259	38	251	64	71	1.5	3.5
	90	357.60	1.9	0.70	382	273	259	39	251	64	70	1.6	3.5
	93	359.67	1.7	0.66	381	272	256	39	251	63	70	1.6	3.5
9	96	361.74	1.9	0.70	381	272	256	39	253	63	71	1.6	3.5
	99	363.83	1.7	0.66	381	272	256	39	253	63	71	1.6	3.5
	102	365.90	1.9	0.70	380	272	256	39	253	63	71	1.7	3.5
	105	368.03	1.7	0.66	380	272	256	40	253	64	71	1.6	3.5
10	108	370.08	1.7	0.66	379	273	256	40	253	64	69	1.5	3.5
	111	372.12	2.0	0.72	378	273	256	40	250	64	69	1.7	3.5
	114	374.27	1.7	0.66	379	274	257	44	260	67	71	1.6	3.5
	117	376.33	1.8	0.68	377	274	257	44	260	67	71	1.6	3.5
	120	378.41											

Traverse:			
Start Time:	Initial Leak Check:	cfm@	"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.: 22180

Operator : Adam Petrossi

Field Data Sheet

Date: Nov 9th /2022	Plant: Clean Harbors	Test No.: 2-M29	Page 4 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

	*	*	*		*			*		*	*	*	*
								Impinger Temp		Meter Temp			
Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP "H₂O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Outlet °F	Inlet/~~Trap~~ °F	Outlet °F	Inlet °F	Meter Pressure ΔH "H₂O	Pump Vacuum "Hg Gauge
1	0	378.99	1.4	0.60	379	205	253	50	76	67	68	1.3	3.5
	3	380.81	1.4	0.60	379	269	260	42	240	67	68	1.3	3.5
	6	382.66	1.4	0.60	378	274	260	42	243	67	69	1.2	3.5
	9	384.45	1.3	0.58	378	274	259	42	245	67	69	1.3	3.5
2	12	386.31	1.3	0.58	377	274	259	42	245	67	69	1.1	3.5
	15	388.06	1.3	0.58	376	274	259	42	245	67	69	1.2	3.5
	18	389.82	1.3	0.58	374	273	257	44	247	67	70	1.2	3.5
	21	391.58	1.3	0.58	374	273	257	44	247	67	70	1.2	3.5
3	24	393.34	1.3	0.58	374	273	257	44	247	67	70	1.2	3.5
	27	395.11	1.2	0.56	372	273	257	44	247	68	72	1.1	3.5
	30	396.82	1.0	0.51	374	273	257	44	247	68	72	0.95	3.0
	33	398.44	1.4	0.60	373	273	259	44	248	68	73	1.4	3.0
4	36	400.30	1.4	0.61	372	273	259	44	248	68	73	1.3	3.0
	39	402.18	1.3	0.58	372	273	259	44	248	68	73	1.2	3.0
	42	403.95	1.5	0.63	370	273	259	44	248	68	73	1.4	3.0
	45	405.86	1.5	0.63	370	273	258	43	248	69	73	1.3	3.0
5	48	407.77	1.5	0.63	370	273	258	44	249	68	73	1.3	3.0
	51	409.67	1.7	0.67	371	273	258	44	249	68	73	1.5	3.0
	54	411.70	1.6	0.65	372	272	259	44	249	68	74	1.5	3.5
	57	413.70	2.0	0.72	374	272	259	44	249	69	75	1.8	3.5
6	60	415.89	2.0	0.72	377	272	260	46	250	70	75	1.8	3.5

Traverse: 1				
Start Time: 11:05am	Initial Leak Check:	.004	cfm@ 13	"Hg
Finish Time: 1:05pm	Final Leak Check:	.002	cfm@ 13	"Hg

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

Project No.: 22180

Operator : Adam Petrossi

Field Data Sheet

Date: Nov 9th /2022	Plant: Clean Harbors	Test No.: 2 - M29	Page 5 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

	*	*	*		*			*		*	*	*	*
Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP "H₂O	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 ΔH "H₂O	Pump Vacuum "Hg Gauge
	63	418.08	1.8	0.69	374	272	258	46	250	70	75	1.7	4.0
	66	420.23	2.1	0.74	374	272	258	47	250	70	75	1.9	4.0
	69	422.50	2.1	0.75	369	272	258	47	250	70	75	1.9	4.0
7	72	424.77	2.1	0.75	369	272	258	47	255	71	76	1.9	4.0
	75	427.05	2.0	0.73	371	273	260	47	255	71	76	1.8	4.0
	78	429.38	2.1	0.75	372	273	260	47	255	71	76	1.8	4.0
	81	431.53	1.9	0.71	375	273	260	47	255	71	76	1.9	4.0
8	84	433.78	1.9	0.71	375	273	261	47	258	71	76	1.7	4.0
	87	435.96	2.1	0.71	376	273	261	47	258	71	76	1.8	4.0
	90	438.20	1.9	0.71	377	273	261	47	258	71	75	1.7	4.0
	93	440.38	2.0	0.72	376	273	261	46	258	71	75	1.8	4.0
9	96	442.52	1.8	0.69	376	273	261	47	258	70	75	1.7	4.0
	99	444.72	1.9	0.71	376	273	260	47	259	70	75	1.7	4.0
	102	446.86	2.1	0.74	376	273	260	47	259	70	75	1.9	4.0
	105	449.13	1.9	0.71	377	273	261	47	260	70	75	1.7	4.0
10	108	451.3	1.9	0.71	377	273	261	47	260	70	75	1.7	4.0
	111	453.46	1.9	0.71	377	273	261	47	258	70	75	1.7	4.0
	114	455.6	1.9	0.71	377	273	261	47	257	70	75	1.7	4.0
	117	457.73	1.8	0.69	377	273	261	47	256	70	75	1.7	4.0
	120	459.86											

Traverse:			
Start Time:	Initial Leak Check:	cfm@	"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.: 22180

Operator : Adam Petrossi

ORTECH Consulting Inc.

Plant	Clean Harbors
Plant Location	Corunna, Ontario
Test No.:	3-M29
Test Date	November 10th/2022
Test Location	Incinerator Exhaust Stack
Operator Signature	Adam Petrossi

Project No.:	22180	
Page	1 of 5	
Probe No.:		
Meter Box No.:	Team 2	
Impinger Box No.:		

Pitot Factor	0.847	
DGMCF	1.010	
Barometric Pressure	29.46	"Hg
Static Pressure	0.72	"H2O
Nozzle Size	0.2508	inches
Stack Diameter	4.833 ~~5~~	
Length	0	feet
Width	0	feet
Port length:	12 ~~8~~	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	<0.1	mg
Probe	1.6	mg

Moisture Gain

CWTR	2633.4	g
WCBDA	24.5	g

Combustion Gas Concentration

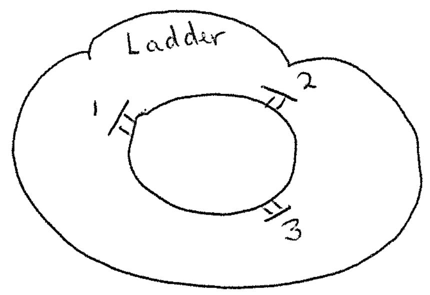
Oxygen	10.36	%
Carbon Dioxide	7.82	%
Carbon Monoxide	64.9	ppm

Measuring Device	MII Numbers
Probe / Pitot	58
Trendicator	
Control Box	COE20092
Incline Manometer	
Comb.Gas.Analyzer	MSML
Micromanometer	
Barometer	Env.Can
Calipers	B03906

Nozzle Measurements

1	0.2510
2	0.2505
3	0.2510
4	0.2505
Average:	0.2508

Site Diagram



Notes:

Field Data Sheet

Date: Nov 16th/2022	Plant:	Clean Harbors	Test No.:	3-M29	Page 2 of 5
	Plant Location:	Corunna, Ontario	Test Location:	Incinerator Exhaust Stack	

	*	✱	✱		✱			✱		✱	✱	✱	✱
Point	Clock Time	Dry Gas Meter ft³	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp		Meter Temp		Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
								Outlet °F	Inlet/~~Trap~~ °F	Outlet °F	Inlet °F		
1	0	460.92	1.1	0.53	368	264	250	49	46	61	62	1.1	2.5
	3	462.63	1.3	0.58	362	274	260	47	235	61	64	1.1	2.5
	6	464.33	1.2	0.56	361	272	257	46	233	62	64	1.1	2.5
	9	466.06	1.1	0.53	362	273	257	46	233	62	64	1.0	2.5
2	12	467.72	1.1	0.53	364	272	254	46	229	62	64	1.0	2.5
	15	469.45	1.1	0.53	367	272	255	46	231	63	66	0.95	2.5
	18	470.98	1.0	0.51	367	272	255	46	230	63	66	0.97	2.5
	21	472.64	1.0	0.51	369	272	257	47	230	63	67	0.9	2.5
3	24	474.20	1.1	0.53	370	277	256	47	231	64	67	0.95	2.0
	27	475.82	1.1	0.53	371	276	256	47	204	64	67	0.95	2.0
	30	477.44	1.1	0.53	371	277	256	47	210	64	67	0.95	2.0
	33	479.05	1.2	0.56	371	278	257	47	209	66	69	0.95	2.5
4	36	480.67	1.3	0.58	372	278	257	45	209	65	70	1.0	2.5
	39	482.31	1.2	0.56	372	278	256	45	231	65	72	1.1	2.5
	42	484.04	1.4	0.60	371	275	256	45	239	65	71	1.2	2.5
	45	485.83	1.2	0.56	371	275	256	45	238	65	71	1.2	2.5
5	48	487.63	1.4	0.60	372	276	258	45	210	65	71	1.2	3.0
	51	489.43	1.5	0.62	372	275	257	45	209	65	71	1.3	3.0
	54	491.30	1.3	0.58	372	275	258	45	229	66	71	1.2	3.0
	57	493.14	1.8	0.68	371	275	258	45	241	66	71	1.6	3.5
6	60	495.20	1.9	0.70	372	275	257	45	244	66	71	1.7	3.5

Traverse: 2					
Start Time: 8:35am	Initial Leak Check:	0.006	cfm@	13	"Hg
Finish Time: 10:35	Final Leak Check:	.004	cfm@	12	"Hg

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

Project No.: 22180

Operator : Adam Petrossi

Field Data Sheet

Date: Nov 10th/22	Plant: Clean Harbors	Test No.: 3-M29	Page 3 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft^3	Pitot ΔP "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 ΔH "H_2O	Pump Vacuum "Hg Gauge
	*	*	*		*			*		*	*	*	*
	63	497.33	1.8	0.68	373	276	256	45	245	66	71	1.7	3.5
	66	499.47	1.9	0.70	374	276	256	45	245	66	71	1.6	3.5
	69	501.57	1.9	0.70	372	276	256	45	245	66	71	1.6	3.5
7	72	503.67	2.1	0.74	371	276	256	45	245	66	71	1.4	3.5
	75	505.81	1.8	0.68	370	272	260	45	245	66	71	1.8	3.5
	78	508.02	1.8	0.68	370	272	261	45	245	66	71	1.6	3.5
	81	510.10	1.8	0.68	370	272	261	45	245	66	71	1.6	3.5
8	84	512.17	1.7	0.67	369	272	261	46	245	69	74	1.6	3.5
	87	514.24	1.8	0.69	368	272	261	46	241	69	74	1.6	3.5
	90	516.33	1.6	0.65	370	269	259	45	242	70	75	1.5	3.5
	93	518.38	1.7	0.67	369	269	257	44	243	70	75	1.5	3.5
9	96	520.42	1.6	0.65	369	269	259	44	243	70	74	1.5	3.5
	99	522.43	1.6	0.65	370	275	257	45	243	70	75	1.5	3.5
	102	524.45	1.9	0.71	369	276	257	46	242	71	75	1.7	3.5
	105	526.58	1.5	0.63	369	275	257	46	243	71	75	1.5	3.5
10	108	528.47	1.5	0.63	370	275	258	46	243	71	75	1.5	3.5
	111	530.37	1.5	0.63	370	275	258	46	243	71	75	1.5	3.5
	114	532.27	1.5	0.63	370	275	258	46	243	71	75	1.4	3.5
	117	534.74	1.7	0.67	370	276	260	47	242	71	76	1.4	3.5
	120	536.80											

Traverse:			
Start Time:	Initial Leak Check:	cfm@	"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.: 22180

Operator : Adam Petrossi

Field Data Sheet

Date: Nov 10th/22	Plant: Clean Harbors	Test No.: 3 - M29	Page 4 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

	*	*	*		*			*		*	*	*	*
Point	Clock Time	Dry Gas Meter ft^3	Pitot ΔP "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp		Meter Temp		Meter Pressure ΔH "H_2O	Pump Vacuum "Hg Gauge
								Outlet °F	Inlet/~~Trap~~ °F	Outlet °F	Inlet °F		
1	0	537.32	1.3	0.59	370	259	255	44	49	72	74	1.2	3.0
	3	539.10	1.2	0.56	369	279	263	44	234	72	74	1.2	3.0
	6	540.92	1.4	0.61	369	281	264	44	252	73	74	1.2	3.0
	9	542.73	1.3	0.59	369	280	260	44	252	73	74	1.2	3.0
2	12	544.55	1.3	0.59	369	280	259	44	253	73	74	1.1	3.0
	15	546.33	1.3	0.59	368	279	260	44	249	73	75	1.2	3.0
	18	548.14	1.3	0.59	368	279	260	46	247	73	76	1.2	3.0
	21	549.93	1.4	0.61	367	279	260	46	247	73	76	1.2	3.0
3	24	551.76	1.3	0.59	367	277	257	46	244	73	76	1.2	3.0
	27	553.58	1.5	0.63	367	278	261	41	245	73	76	1.3	3.0
	30	555.50	1.4	0.61	366	280	262	41	249	73	76	1.3	3.0
	33	557.4	1.3	0.59	365	277	260	41	247	73	76	1.3	3.0
4	36	559.3	1.6	0.65	365	277	260	42	247	73	76	1.3	3.0
	39	561.2	1.6	0.65	365	277	261	42	247	72	75	1.4	3.0
	42	563.28	1.5	0.63	365	277	261	42	247	72	75	1.3	3.5
	45	565.1	1.7	0.67	366	278	262	42	211	72	75	1.5	3.5
5	48	567.13	1.6	0.66	367	277	262	41	211	75	79	1.5	3.5
	51	569.17	1.8	0.70	366	276	262	41	211	75	79	1.5	3.5
	54	571.22	1.7	0.68	367	276	261	44	206	75	80	1.5	3.5
	57	573.28	1.5	0.64	368	276	261	44	255	76	79	1.5	3.5
6	60	575.32	1.7	0.68	368	276	261	44	66	76	80	1.4	3.5

Traverse: 1					
Start Time: 11:07am	Initial Leak Check:	0.006	cfm@	12	"Hg
Finish Time: 1:07pm	Final Leak Check:	0.004	cfm@	13	"Hg

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

Project No.: 22180

Operator : Adam Petrossi

Field Data Sheet

Date: Nov 10th/22
Plant: Clean Harbors
Plant Location: Corunna, Ontario
Test No.: 3 - M29
Test Location: Incinerator Exhaust Stack
Page 5 of 5

	*	*	*		*			*		*	*	*	*
Point	Clock Time	Dry Gas Meter ft³	Pitot Δ P "H₂O	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 "H₂O	Pump Vacuum "Hg Gauge
	63	577.33	1.7	0.68	368	280	258	43	210	76	80	1.5	3.5
	66	579.40	1.6	0.66	368	281	259	43	216	76	79	1.5	3.5
	69	581.45	1.7	0.68	369	281	261	42	211	76	81	1.5	3.5
7	72	583.52	1.6	0.66	369	282	262	42	211	76	81	1.5	3.5
	75	585.55	1.5	6.64	369	282	264	43	210	77	81	1.4	3.5
	78	587.55	1.6	0.66	369	280	262	44	206	77	81	1.4	3.5
	81	589.56	1.5	0.64	368	280	264	44	249	77	81	1.4	3.5
8	84	591.56	1.4	0.62	368	281	259	44	250	77	81	1.3	3.5
	87	593.46	1.5	6.64	367	281	262	44	202	77	81	1.3	3.5
	90	595.45	1.5	0.64	367	281	261	42	210	78	82	1.4	3.5
	93	597.42	1.4	0.62	367	283	263	41	210	78	82	1.3	3.5
9	96	599.47	1.7	0.68	366	283	261	41	210	81	82	1.3	3.5
	99	601.32	1.4	0.62	367	282	266	43	211	78	82	1.5	3.5
	102	603.38	1.5	0.64	367	283	259	44	207	78	82	1.2	3.5
	105	605.24	1.6	0.66	366	283	263	44	248	78	82	1.3	3.5
10	108	607.16	1.4	0.62	366	283	263	44	252	78	82	1.4	3.5
	111	609.12	1.3	0.60	365	282	261	44	247	78	82	1.2	3.5
	114	611.00	1.5	0.64	365	282	261	48	248	79	82	1.3	3.5
	117	612.90	1.3	0.60	365	282	261	48	248	79	82	1.3	3.5
	120	614.82											

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

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

Project No.: 22180
Operator : Adam Petrossi

APPENDIX 5

Semi-Volatile Organics Train
Field Data sheets
(15 pages)

ORTECH Consulting Inc.

Plant	Clean Harbors
Plant Location	Corunna, Ontario
Test No.:	1 – SVOC
Test Date	NOVEMBER 8 2022
Test Location	Incinerator Exhaust Stack
Operator Signature	

Project No.:	22180	
Page	1 of 5	
Probe No.:	6	
Meter Box No.:	T 1	
Impinger Box No.:		

Pitot Factor	0.843	
DGMCF	0.973	
Barometric Pressure	30.66	"Hg
Static Pressure	.66	"H2O
Nozzle Size	.2491	inches
Stack Diameter	4.833 ~~5~~	
Length	0	feet
Width	0	feet
Port length:	8	inches

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

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	3019.7	g
WCBDA	8.7	g

Combustion Gas Concentration

Oxygen	9.70	%
Carbon Dioxide	7.80	%
Carbon Monoxide	33.9	ppm

Measuring Device	MII Numbers
Probe / Pitot	SP5
Trendicator	
Control Box	CDE20094
Incline Manometer	
Comb.Gas.Analyzer	M5M
Micromanometer	
Barometer	Env.Can
Calipers	B03706

Nozzle Measurements

1	.2490
2	.2495
3	.2490
4	.2490
Average:	

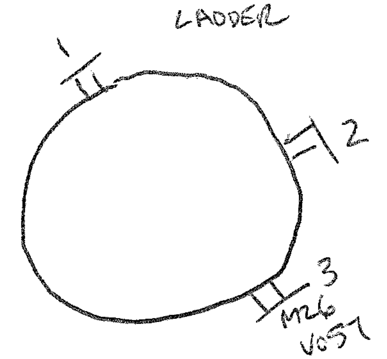
Probe Liner [✓ Glass] / Metal /Teflon / Other

Nozzle [✓ Glass] / Metal / Other

Union [✓ None] /Metal / Teflon / Other

Pitot Leak Checked? [✓ Yes] No

Site Diagram



Notes:

Field Data Sheet

Date: Nov 8/22	Plant: Clean Harbors	Test No.: 1 - ~~M29~~ SVOC	Page 2 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

	*	*	*		*			*		*	*	*	*
Point	Clock Time	Dry Gas Meter ft³	Pitot Δ P "H₂O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp		Meter Temp		Meter Pressure Δ H "H₂O	Pump Vacuum "Hg Gauge
								Outlet °F	Inlet/Trap °F	Outlet °F	Inlet °F		
1	0	31.87	1.3	.59	380	253	253	43	47	65	63	1.2	3
	3	33.71	1.25		380	255	254	43	36	70	66	1.2	3
	6	35.46	1.3		380	255	254	43	36	70	66	1.2	3
	9	37.27	1.3		379	255	254	43	36	68	65	1.2	3
2	12	39.08	1.25		379	255	254	43	36	68	65	1.2	3
	15	40.91	1.3		379	257	249	41	37	69	68 66	1.2	3
	18	42.71	1.25		380	257	254	40	37	70	65	1.2	3
	21	44.54	1.25		379	256	251	40	37	68	66	1.2	3
3	24	46.33	1.3	.58	379	258	259	40	38	68	66	1.2	3
	27	48.13	1.25		380	258	259	40	37	68	66	1.2	3
	30	49.91	1.25		379	260	254	40	38	70	67	1.2	3
	33	51.69	1.25		380	260	255	40	38	73	67	1.2	3
4	36	53.49	1.4	.61	379	260	255	40	38	68	66	1.35	4
	39	55.37	1.3	.59	381	260	255	40	38	68	66	1.3	4
	42	57.28	1.3	.59	380	260	264	39	37	68	66	1.2 ~~1.3~~	4
	45	59.15	1.4	.61	380	260	264	35	37	68	66	1.3	4
5	48	60.98	1.35	.60	386	260	264	35	37	68	66	1.3	4
	51	62.93	1.3	.59	391	257	253	40	38	71	68	1.3	4
	54	64.82	1.3	.59	380	257	254	40	38	70	68	1.2	4
	57	66.69	1.25	.58	380	257	255	40	38	70	68	1.2	4
6	60	68.60	1.45	.62	379	257	255	40	39	70	69	1.4	4

Traverse: 1				
Start Time: 957	Initial Leak Check: .007	cfm@	13	"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.: 22180

Operator : DW

9.8

Field Data Sheet

Date: NOV 8/22 | Plant: Clean Harbors | Test No.: 1 - M29 | Page 3 of 5
Plant Location: Corunna, Ontario | Test Location: Incinerator Exhaust Stack

	*	*	*		*			*		*	*	*	*
Point	Clock Time	Dry Gas Meter ft³	Pitot Δ P "H₂O	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 "H₂O	Pump Vacuum "Hg Gauge
	63	70.48	1.9	.72	379	260	261	39	37	69	67	1.7	4.5
	66	72.67	1.9	.71	379	260	261	39	37	69	67	1.7	4.5
	69	74.82	1.95	.72	379	260	261	39	37	70	67	1.7	4.5
7	72	77.02	1.9	.71	379	260	261	39	38	70	67	1.7	4.5
	75	79.22	2.1	.75	379	260	261	41	40	72	69	1.9	5
	78	81.49	2.0	.74	379	260	261	41	41	72	69	1.9	5
	81	83.80	1.9	.72	379	260	261	40	41	72	68	1.8	5
8	84	86.00	1.8	.70	378	259	260	41	41	71	69	1.7	5
	87	88.09	1.8	.70	378	257	263	41	40	71	69	1.7	5
	90	90.44	1.9	.72	377	256	260	41	40	71	69	1.7	5
	93	92.63	1.8	.70	377	255	264	41	41	71	69	1.7	5
9	96	94.81	1.85	.71	378	256	263	42	41	71	70	1.7	5
	99	97.00	1.8	.70	378	256	263	42	44	71	70	1.7	5
	102	99.17	1.75	.69	378	257	262	42	41	73	70	1.6	4.5
	105	101.29	1.9	.72	377	255	263	42	41	73	70	1.8	5
10	108	103.51	1.7	.68	377	258	259	43	41	72	70	1.6	4.5
	111	105.66	1.7	.68	377	257	258	43	41	72	70	1.6	4.5
	114	107.90	1.7	.68	377	257	258	43	41	72	70	1.6	4.5
	117	109.90	1.7	.68	376	256	258	42	41	72	70	1.6	4.5
	120	111.94											

Traverse:
Start Time: | Initial Leak Check: cfm@ "Hg
Finish Time: 1157 | Final Leak Check: .005 cfm@ 15 "Hg

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

Project No.: 22180
Operator :

Field Data Sheet

Date: Nov 8/22	Plant: Clean Harbors	Test No.: 1- SVOC	Page 4 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft³	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	112.61	1.4	.62	375	255	262	52	35	79	73	1.4	3.5
	3	114.55	1.4	.62	376	258	267	44	37	75	73	1.4	3.5
	6	116.52	1.4	.62	377	261	264	43	38	75	73	1.3 ~~1.4~~	3.5
	9	118.44	1.4	.62	377	265	263	43	39	78	74	1.3	3.5
2	12	120.38	1.4	.62	377	265	263	43	35	78	74	1.3	3.5
	15	122.30	1.4	.62	378	265	265	43	39	78	74	1.3	3.5
	18	124.22	1.35	.61	378	264	264	43	39	76	73	1.3	3.5
	21	126.14	1.4	.61	378	264	264	43	39	77	74	1.3	3.5
3	24	128.05	1.5	.64	383	266	264	44	41	80	75	1.4	4
	27	130.05	1.65	.68	379	257	260	43	40	77	74	1.6	4
	30	132.14	1.55	.65	379	252	260	43	40	77	74	1.5	4
	33	134.21	1.5	.64	377	257	260	43	40	77	73	1.4	4
4	36	136.22	1.5	.64	378	257	260	43	39	77	73	1.4	4
	39	138.20	1.5	.64	380	255	259	41	37	75	74	1.4	4
	42	140.20	1.8	.70	380	260	262	42	39	75	74	1.7	4
	45	142.31	1.5	.64	383	256	264	42	39	76	74	1.4	4
5	48	144.33	1.5	.64	383	262	264	42	39	76	74	1.4	4
	51	146.34	1.65	.67	383	262	264	42	39	76	74	1.5	4
	54	148.38	1.6	.66	383	264	264	41	39	76	74	1.5	4
	57	150.43	1.8		383	264	264	40	39	76	74	1.7	4
6	60	152.56	1.7	.69	383	263	263	40	39	76	74	1.6	4

Traverse: 2				
Start Time: 1254	Initial Leak Check:	.003	cfm@ 12	"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.: 22180

Operator :

Field Data Sheet

Date: NOV 8/22	Plant:	Clean Harbors	Test No.:	1 - SVOC	Page 5 of 5
	Plant Location:	Corunna, Ontario	Test Location:	Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft³	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
	*	*	*		*			*		*	*	*	*
	63	154.67	1.65	.67	383	260	260	40	39	76	74	1.6	4
	66	156.76	1.8	.70	383	260	261	40	39	76	74	1.6	4
	69	158.88	1.7	.70	384	260	261	40	39	76	74	1.6	4
7	72	161.03	1.9	.72	385	260	261	40	39	76	74	1.7	4
	75	163.10	1.85	.71	385	267	261	40	40	76	74	1.7	4
	78	165.26	1.7	.68	385	268	261	40	40	76	74	1.6	4
	81	167.25	1.9	.72	385	269	261	41	39	76	74	1.7	4
8	84	169.52	1.85	.71	387	265	261	41	39	76	74	1.7	4
	87	171.69	2.0	.74	387	265	261	41	38	75	74	1.8	4.5
	90	173.91	1.8	.70	386	265	260	40	40	75	74	1.6	4.5
	93	176.05	1.8	.70	386	264	261	41	41	74	73	1.6	4.5
9	96	178.20	1.7	.68	384	264	262	41	41	74	73	1.6	4.5
	99	180.35	1.7	.68	384	264	265	41	43	74	73	1.6	4.5
	102	182.50	1.7	.68	384	264	264	40	45	74	73	1.6	4.5
	105	184.64	1.7	.68	385	263	264	40	46	74	73	1.6	4.5
10	108	186.73	1.7	.68	385	262	264	48	46	74	73	1.6	4.5
	111	188.82	1.7	.69	386	260	260	41	49	75	73	1.6	4.5
	114	190.86	1.7	.69	385	266	264	42	51	75	72	1.6	4.5
	117	193.04	1.7	.69	385	266	264	42	51	75	72	1.6	4.5
	120	195.10											

Traverse:			
Start Time:	Initial Leak Check:	cfm@	"Hg
Finish Time: 1454	Final Leak Check: .004	cfm@ 15	"Hg

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

Project No.: 22180

Operator :

ORTECH Consulting Inc.

Plant	Clean Harbors
Plant Location	Corunna, Ontario
Test No.:	2 SVOC
Test Date	NOVEMBER 9, 2022
Test Location	Incinerator Exhaust Stack
Operator Signature	

Project No.:	22180	
Page	1 of 5	
Probe No.:	6	
Meter Box No.:	T1	
Impinger Box No.:		

Pitot Factor	0.843	
DGMCF	0.973	
Barometric Pressure	29.82	"Hg
Static Pressure	0.77	"H2O
Nozzle Size	.2491	inches
Stack Diameter	4.833 ~~5~~	
Length	0	feet
Width	0	feet
Port length:	8	inches

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

Particulate Gain

Filter		mg
Probe		mg

Moisture Gain

CWTR	3050.3	g
WCBDA	7.9	g

Combustion Gas Concentration

Oxygen	9.94	%
Carbon Dioxide	7.56	%
Carbon Monoxide	69.6	ppm

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

Nozzle Measurements

1 ____________
2 ____________
3 ____________
4 ____________
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: Nov 9/22	Plant: Clean Harbors	Test No.: 2 - SVOC	Page 2 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP "H₂O	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 ΔH "H₂O	Pump Vacuum "Hg Gauge
	*	*	*		*			*		*	*	*	*
1	0	95.80	1.4	.62	385	253	258	42	35	72	64	1.4	2.5
	3	97.77	1.3	.59	385	260	260	43	37	69	63	1.3	3
	6	99.62	1.4	.61	385	265	259	43	37	71	64	1.3	3
	9	101.42	1.3	.59	385	263	260	43	38	69	63	1.3	3
2	12	103.31	1.35	.60	386	263	260	43	39	69	63	1.3	3
	15	105.21	1.35	.60	388	263	261	43	40	69	63	1.3	3
	18	107.12	1.3	.59	389	264	262	43	40	69	64	1.2	3.5
	21	108.97	1.4	.61	389	267	260	42	40	67	63	1.25	3.5
3	24	110.82	1.45	.62	387	265	260	41	41	67	63	1.3	3.5
	27	112.71	1.6	.65	387	265	260	41	41	67	63	1.4	4
	30	114.67	1.5	.63	383	261	261	41	43	68	62	1.4	4
	33	116.65	1.55	.65	382	267	262	41	44	69	63	1.4	4
4	36	118.62	1.55	.65	381	267	261	41	46	70	63	1.4	4
	39	120.58	1.55	.65	380	266	261	41	49	71	63	1.4	4
	42	122.55	1.5	.64	380	265	261	41	43	70	63	1.4	4
	45	124.53	1.55	.65	380	268	262	42	42	69	63	1.4	4
5	48	126.50	1.7	.68	379	264	261	41	40	73	63	1.5	4
	51	128.55	1.75	.69	379	262	261	41	41	71	64	1.5	4
	54	130.57	1.6	.66	379	262	261	41	41	70	64	1.5	4
	57	132.62	1.75	.69	378	261	262	41	40	70	64	1.5	4
6	60	134.65	1.9	.72	380	261	261	41	40	71	64	1.7	4

Traverse: 1			
Start Time: 832	Initial Leak Check: .003	cfm@ 13	"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.: 22180

Operator : RM

Field Data Sheet

Date: Nov 9/22 | Plant: Clean Harbors | Test No.: 2 - SVOC | Page 3 of 5

Plant Location: Corunna, Ontario | Test Location: Incinerator Exhaust Stack

	*	*	*		*			*		*	*	*	*
Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp		Meter Temp		Meter Pressure ΔH "H_2O	Pump Vacuum "Hg Gauge
								Outlet °F	Inlet/Trap °F	Outlet °F	Inlet °F		
	63	136.81	1.9	.72	382	262	261	41	42	71	64	1.7	4
	66	139.00	2.0	.74	383	266	261	42	42	73	65	1.7	4
	69	141.18	2.2	.77	384	266	261	42	42	73	64	1.9	5
7	72	143.45	2.2	.77	384	266	261	42	42	73	64	1.9	5
	75	145.75	2.0	.74	387	261	261	43	43	73	65	1.7	5
	78	148.00	1.9	.72	386	263	262	43	43	74	65	1.7	5
150.25	81	~~149.50~~	1.9	.72	387	263	260	44	43	74	65	1.7	5
8	84	152.49	1.85	.71	386	265	262	41	44	72	65	1.7	5
	87	154.68	1.8	.70	386	265	260	43	44	74	65	1.7	5
	90	156.91	1.9	.72	386	264	261	43	44	74	65	1.7	5
	93	159.10	1.85	.71	384	264	261	42	41	74	65	1.7	5
9	96	161.30	1.8	.70	384	264	261	42	41	74	66	1.7	5
	99	163.53	1.7	.68	385	260	261	41	41	74	66	1.7	5
	102	165.70	1.7	.68	384	260	261	41	41	75	67	1.7	5
	105	167.90	1.75	.69	384	259	256	44	43	73	67	1.6	4
10	108	170.02	1.65	.67	383	260	260	44	42	75	67	1.5	4
	111	172.08	1.75	.69	382	260	261	44	42	76	67	1.6	4
	114	174.18	1.7	.68	382	260	261	44	42	76	67	1.6	4
	117	176.28	1.75	.69	381	260	261	44	42	76	67	1.6	4
	120	178.38											

Traverse:
Start Time: | Initial Leak Check: cfm@ "Hg
Finish Time: 1032 | Final Leak Check: .003 cfm@ 13 "Hg

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

Project No.: 22180
Operator :

Field Data Sheet

Date: NOV 9/22	Plant: Clean Harbors	Test No.: 2-SVOC	Page 4 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

	*	*	*		*			*		*	*	*	*
Point	Clock Time	Dry Gas Meter ft³	Pitot Δ P "H₂O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp		Meter Temp		Meter Pressure Δ H "H₂O	Pump Vacuum "Hg Gauge
								Outlet °F	Inlet/Trap °F	Outlet °F	Inlet °F		
1	0	178.88	1.45	.63	379	250	254	62	36	70	66	1.3	3
	3	180.75	1.45	.63	380	257	263	46	37	68	66	1.3	3.5
	6	182.67	1.5	.64	380	264	258	44	38	68	66	1.3	3.5
	9	184.60	1.5	.64	380	264	260	45	40	68	67	1.3	3.5
2	12	186.53	1.5	.64	379	265	261	45	40	68	67	1.3	3.5
	15	188.47	1.5	.64	378	269	258	44	44	70	67	1.3	3.5
	18	190.37	1.55	.65	376	268	260	44	43	68	67	1.4	4
	21	192.35	1.45	.63	376	265	265	45	42	68	67	1.3	3.5
3	24	194.31	1.6	.66	375	266	266	45	42	69	67	1.5	3/4
	27	196.35	1.65	.67	374	266	255	44	42	69	67	1.5	4
	30	198.46	1.55	.65	375	267	253	44	43	69	68	1.5	4
	33	200.43	1.55	.65	375	267	257	44	43	69	69	1.5	4
4	36	202.50	1.65	.67	373	267	255	44	43	69	67	1.5	4
	39	204.52	1.6	.66	372	260	252	43	43	69	67	1.5	4
	42	206.55	1.65	.67	371	267	255	43	42	70	68	1.5	4
*	45	208.60	1.65	.68	370	259	262	42	42	69	68	1.5	4
5	48	210.65	1.65	.68	370	259	262	42	42	69	68	1.5	4
	51	212.69	1.65	.68	371	259	261	41	42	69	68	1.5	4
	54	214.74	1.75	.70	372	259	255	43	44	70	68	1.6	4
	57	216.87	1.75	.70	374	266	263	42	44	70	68	1.6	4
6	60	218.95	1.85	.71	377	260	255	42	44	70	69	1.6	4

Traverse: 2		NW				
Start Time: 1105	Initial Leak Check:	.003	cfm@	13	"Hg	
Finish Time:	Final Leak Check:	.003	cfm@	15	"Hg	

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

TDU

Project No.: 22180

Operator : RM

Field Data Sheet

Date: NOV 9/22	Plant: Clean Harbors	Test No.: 2 - SVOC	Page 5 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft³	Pitot Δ P "H₂O	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 "H₂O	Pump Vacuum "Hg Gauge
	*	*	*		*			*		*	*	*	*
	63	221.05	1.75	.69	375	264	255	42	44	71	69	1.6	4
	66	223.17	1.95	.73	372	260	256	43	42	70	69	1.7	4
	69	225.37	1.85	.72	369	260	258	42	41	70	69	1.7	4
7	72	227.53	1.8	.71	370	266	258	42	41	70	69	1.7	4
	75	229.70	1.8	.71	371	262	258	41	41	70	69	1.7	4
	78	231.86	1.85	.72	~~38~~ 376	262	258	43	42	71	70	1.7	4
	81	234.05	1.85	.72	376	262	258	43	42	71	70	1.7	4
8	84	236.20	1.8	.71	378	262	265	44	42	71	70	1.7	4
	87	238.40	1.8	.70	377	265	265	41	43	71	70	1.7	4
	90	240.58	1.75	.70	377	265	259	41	43	71	70	1.7	4
	93	242.73	1.85	.71	377	267	261	41	44	71	70	1.7	4
9	96	244.92	1.8	.71	378	266	261	41	45	71	70	1.7	4
	99	247.07	1.8	.70	379	267	255	40	46	71	70	1.7	4
	102	249.25	2.05	.75	378	262	259	40	45	72	70	1.8	4.5
	105	251.47	1.8	.71	378	269	268	41	45	72	70	1.7	4
10	108	253.76	1.9	.72	378	267	268	41	45	72	70	1.7	4
	111	255.90	1.85	.72	378	267	258	40	46	72	71	1.7	4
	114	258.11	1.75	.70	378	267	260	41	46	72	71	1.7	4
	117	260.52	1.9	.73	378	267	260	41	45	72	71	1.7	4
	120	262.56											

Traverse:			
Start Time:	Initial Leak Check:	cfm@	"Hg
Finish Time: 1305	Final Leak Check: .001	cfm@ 15	"Hg

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

.72

Project No.: 22180

Operator : RW

ORTECH Consulting Inc.

Plant	Clean Harbors
Plant Location	Corunna, Ontario
Test No.:	3 SVOC
Test Date	NOVEMBER 10, 2022
Test Location	Incinerator Exhaust Stack
Operator Signature	

Project No.:	22180	
Page	1 of 5	
Probe No.:	6	
Meter Box No.:	T1	
Impinger Box No.:		

Pitot Factor	.843	
DGMCF	.973	
Barometric Pressure	29.46	"Hg
Static Pressure	.72	"H2O
Nozzle Size	.2491	inches
Stack Diameter	~~4.883~~ 5 4.833	
Length	0	feet
Width	0	feet
Port length:	8	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	2760.3	g
WCBDA	10.9	g

Combustion Gas Concentration

Oxygen	10.36	%
Carbon Dioxide	7.82	%
Carbon Monoxide	64.9	ppm

Site Diagram

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

Nozzle Measurements

1 __________

2 __________

3 __________

4 __________

Average:

Notes:

Field Data Sheet

Date: Nov 10/22	Plant:	Clean Harbors	Test No.: 3 SVOC	Page 2 of 5
	Plant Location:	Corunna, Ontario	Test Location:	Incinerator Exhaust Stack

	*	*	*		*			*		*	*	*	*
Point	Clock Time	Dry Gas Meter ft³	Pitot Δ P "H₂O	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 "H₂O	Pump Vacuum "Hg Gauge
1	0	63.49	1.4	.61	370	253	260	56	44	63	61	1.3	3
	3	65.39	1.55	.65	364	264	264	49	35	63	61	1.4	3
	6	67.30	1.4	.62	363	270	265	47	37	64	62	1.3	3
	9	69.18	1.4	.62	363	263	267	46	37	63	62	1.3	3
2	12	71.06	1.4	.62	366	263	260	45	38	64	62	1.3	3
	15	72.94	1.4	.62	368	266	253	43	38	63	62	1.3	3
	18	74.81	1.4	.62	363	262	253	44	38	64	62	1.3	3
	21	76.68	1.4	.62	370	263	258	44	33	64	62	1.3	3
3	24	78.55	1.4	.62	372	263	257	44	34	64	62	1.3	3
	27	80.42	1.4	.61	372	263	258	44	35	64	62	1.3	3
	30	82.28	1.4	.61	372	263	258	44	35	64	62	1.3	3
	33	84.15	1.55	.65	373	264	264	41	33	66	63	1.4	3.5
4	36	86.13	1.5	.64	373	263	264	40	38	66	63	1.4	3.5
	39	88.09	1.5	.64	374	262	264	40	38	66	63	1.4	3.5
	42	90.08	1.5	.64	373	261	261	40	33	66	63	1.4	3.5
	45	92.06	1.5	.64	373	263	253	41	41	67	64	1.4	3.5
5	48	94.05	1.7	.69	373	263	254	41	41	67	64	1.5	3.5
	51	96.09	1.65	.67	373	263	261	40	43	68	65	1.5	3.5
	54	98.15	1.55	.65	373	263	261	40	43	68	65	1.5	3.5
	57	100.20	1.7	.68	373	264	261	40	43	68	65	1.5	3.5
6	60	102.29	1.65	.67	373	263	262	40	43	68	65	1.5	3.5

Traverse: 1		
Start Time: 835	Initial Leak Check: 0.003 cfm@ 13 "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.: 22180

Operator : DM

Field Data Sheet

Date:	NOV 10/22	Plant:	Clean Harbors	Test No.:	3 SVOC	Page 3 of 5
		Plant Location:	Corunna, Ontario	Test Location:	Incinerator Exhaust Stack	

	*	*	*		*			*		*	*	*	*
Point	Clock Time	Dry Gas Meter ft³	Pitot Δ P "H₂O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp		Meter Temp		Meter Pressure Δ H "H₂O	Pump Vacuum "Hg Gauge
								Outlet °F	Inlet/Trap °F	Outlet °F	Inlet °F		
	63	104.34	1.55	.65	374	261	258	40	44	68	65	1.5	3.5
	66	106.42	1.7	.68	374	261	263	41	43	68	65	1.5	3.5
	69	108.48	1.65	.67	373	266	262	41	43	68	65	1.5	3.5
7	72	110.55	1.6	.66	372	265	257	41	43	68	65	1.5	3.5
	75	112.57	1.65	.67	371	266	263	41	43	68	66	1.5	3.5
	78	114.66	1.6	.66	370	267	264	41	43	69	66	1.5	4
	81	116.72	1.65	.67	370	267	264	42	43	69	66	1.5	4
8	84	118.77	1.55	.65	370	267	264	42	44	69	67	1.5	4
	87	120.82	1.8	.71	370	260	260	42	44	70	67	1.6	4
	90	122.97	1.5	.64	370	264	265	42	44	70	67	1.4	4
	93	124.99	1.5	.64	370	264	264	40	44	69	67	1.4	4
9	96	126.99	1.5	.64	370	260	262	39	41	70	67	1.35	4
	99	128.96	1.5	.64	370	267	262	38	39	70	67	1.35	4
	102	130.93	1.85	.72	370	263	265	38	39	70	68	1.6	4
	105	133.04	1.5	.64	371	265	261	38	40	71	68	1.4	4
10	108	135.01	1.4	.62	372	265	261	38	40	71	69	1.3	4
	111	136.95	1.6	.67	372	265	263	39	40	72	69	1.4	4
	114	138.95	1.4	.62	371	265	262	39	41	72	69	1.3	4
	117	140.92	1.8	.77	372	264	262	39	41	72	69	1.6	4
	120	143.01											

Traverse:			
Start Time:		Initial Leak Check:	cfm@ "Hg
Finish Time:	1035	Final Leak Check:	.003 cfm@ 13 "Hg

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

Project No.: 22180

Operator : QM

Field Data Sheet

Date: NOV 10/22	Plant:	Clean Harbors	Test No.:	3 SVOC	Page 4 of 5
	Plant Location:	Corunna, Ontario	Test Location:	Incinerator Exhaust Stack	

Point	Clock Time *	Dry Gas Meter ft³ *	Pitot ΔP "H₂O *	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 ΔH "H₂O *	Pump Vacuum "Hg Gauge *
1	0	143.51	1.1	.55	370	256	253	56	43	73	70	1.0	2
	3	145.17	1.1	.55	370	262	252	43	37	73	71	1.0	4
	6	146.89	1.25	.59	370	261	259	42	38	73	71	1.2	3
	9	148.72	1.2	.58	370	261	259	42	38	73	71	1.2	3
2	12	150.55	1.3	.66	369	260	259	42	38	72	71	1.2	3
	15	152.40	1.2	.58	369	260	259	42	39	72	71	1.2	3
	18	154.26	1.2	.58	368	263	259	43	39	72	71	1.1	3
	21	156.05	1.2	.58	367	265	262	44	39	73	71	1.1	3
3	24	157.85	1.3	.58	367	265	263	44	39	73	72	1.1	3
	27	159.77	1.3	.58	366	265	263	44	39	73	72	1.1	3
	30	161.47	1.2	.58	366	265	264	43	39	73	72	1.1	3
	33	163.~~9~~18	1.2	.58	366	262	252	44	39	74	72	1.1	3
4	36	165.08	1.4	.63	366	260	252	44	40	74	72	1.3	3
	39	166.95	1.3	.61	366	364	258	44	40	74	72	1.3	3
	42	168.87	1.5 ~~1.2~~	.65	366	264	258	43	40	74	72	1.4	3
	45	170.81	1.35	.62	366	266	255	42	41	75	72	1.4	3
5	48	172.80	1.35	.62	367	265	263	42	42	75	72	1.3	3
	51	174.77	1.7	.69	367	265	263	42	43	75	72	1.6	4
	54	176.86	1.45	.64	368	266	254	43	44	75	73	1.4	4
	57	178.90	1.45	.64	368	265	260	43	44	75	73	1.4	4
6	60	180.89	1.8	.71	369	265	260	43	45	76	73	1.6	4

Traverse:	2						
Start Time:	1107	Initial Leak Check:	.003	cfm@	13	"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.: 22180

Operator :

Field Data Sheet

Date: NOV 10/22	Plant: Clean Harbors	Test No.: 3 SVOC	Page 5 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft³	Pitot Δ P "H₂O	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 "H₂O	Pump Vacuum "Hg Gauge
	*	*	*		*			*		*	*	*	*
	63	183.07	1.8	.71	369	266	255	42	44	76	74	1.6	4
	66	185.22	1.9 ~~1.7~~	.73	369	265	255	42	44	76	74	1.6	4
	69	187.42	1.9	.73	370	264	255	43	42	77	75	1.6	4
7	72	189.66	1.8	.72	369	264	249	42	43	76	74	1.6	4
	75	191.80	1.8	.71	371	262	264	43	44	76	75	1.6	4
	78	194.01	1.85	.72	370	263	265	43	45	76	75	1.6	4
	81	196.18	1.85	.72	370	264	265	44	45	76	75	1.6	4
8	84	198.41	1.7	.69	369	261	258	45	46	77	75	1.5	4
	87	200.53	1.7	.70	368	257	265	46	44	76	75	1.5	4
	90	202.60	1.7	.70	367	258	261	45	41	75	74	1.5	4
	93	204.68	1.7	.70	367	258	261	45	41	75	74	1.5	4
9	96	206.78	1.55	.66	367	260	258	42	43	76	74	1.4	4
	99	208.83	1.55	.66	367	263	259	43	43	76	75	1.4	4
	102	210.88	1.5	.65	368	264	260	43	44	76	75	1.4	4
	105	212.93	1.6	.67	367	257	260	43	44	76	75	1.4	4
10	108	215.00	1.6 ~~1.4~~	.68	367	259	260	44	44	76	75	1.4	4
	111	217.06	1.7	.70	366	259	260	44	44	76	75	1.4	4
	114	219.08	1.65	.69	365	259	261	44	43	76	75	1.4	4
	117	221.15	1.65	.69	365	259	260	44	43	76	75	1.4	4
	120	223.21											

Traverse:			
Start Time:		Initial Leak Check:	cfm@ "Hg
Finish Time:	1307	Final Leak Check: .003	cfm@ 15 "Hg

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

Project No.: 22180

Operator :

APPENDIX 6

Acid Gases Train Field Data Sheets and Gas Volumes Sampled

(4 pages)

Clean Harbors Canada Inc. (Sarnia, ON)
Acid Gases Train Gas Volume Sampled

Test Location	Test No.	Dry Gas Meter Correction Factor	Initial Dry Gas Meter Reading litres	Final Dry Gas Meter Reading litres	Actual Volume Sampled litres	Barometric Pressure in. mercury	Average Dry Gas Meter Pressure in. water	Average Dry Gas Meter Temperature °C	Corrected Gas Volume Sampled Rm^3 *
Stack	1	0.980	54.55	175.50	121.0	30.06	3.4	17.9	0.1230
	2	0.980	76.35	199.00	122.7	29.82	3.5	11.7	0.1265
	3	0.980	88.00	211.80	123.8	29.46	3.5	17.9	0.1235

* Dry at 25°C and 1 atmosphere

ORTECH Consulting Inc.
Method 26 Data Sheet

Plant:	Clean Harbors
Plant Location:	Corunna, On
Test No.:	1
Test location:	Incinerator Exhaust Stack
Date:	NOV 8/22
Project No.:	22180

Measuring Device	**MII Number**
Control Module	M05498
Barometer	**Env. Can.**

P$_{Bar}$	30.06

Clock Time	**Dry Gas Meter** L	**Probe Temp** °C	**Stack Temp** °C	**Oven Temp** °C	**Impinger Outlet** °C	**Meter Temperature** ~~Outlet~~ AVG °C	**Meter Temperature** ~~Inlet~~ °C	**Meter Pressure** Δ H "H_2O	**Pump Vacuum** "Hg Gauge
0	54.55	152	172	—	15	14	—	3.0	4
5	64.3	157	173		12	15		3.0	4
10	74.2	157	174		12	17		3.5	4.2
15	84.4	156	174		12	17		3.5	4.2
20	94.5	157	173		12	17		3.5	4.2
25	104.4	158	174		12	17		3.5	4.2
30	114.4	155	175		13	18		3.5	4.2
35	124.2	155	176		12	18		3.5	4.5
40	134.8	155	178		13	19		3.5	4.5
45	145.1	156	178		12	20		3.5	4.5
50	155.3	156	178		11	20		3.5	4.5
55	165.4	156	178		11	20		3.5	4.5
60	175.5	157	178		12	21		3.5	4.5

Start Time:	~~12:40~~ 13:04		
Finish Time:	14:04		
Initial Leak Check:	.005	**Lpm @** 18	**" Hg**
Final Leak Check:		**Lpm @**	**" Hg**

DGMCF:	.980
Sample Volume:	
Average DGM Temp:	
Average DGM Δ H:	

Comments:

Probe Purge On: 12:30 @

Off: 12:50 @

~2 LPM for 60 min,

Operator : DT

ORTECH Consulting Inc.
Method 26 Data Sheet

Plant:	Clean Harbors
Plant Location:	Corunna, On
Test No.:	2
Test location:	Incinerator Exhaust Stack
Date:	NOV 9/22
Project No.:	22180

Measuring Device	MII Number
Control Module	M05428
Barometer	Env. Can.

P_{Bar}	2982

Clock Time	Dry Gas Meter L	Probe Temp °C	Stack Temp °C	~~Oven~~ ~~Temp~~ °C	Impinger Outlet °C	Meter Temperature ~~Outlet~~ AVG °C	~~Inlet~~ °C	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
0	76.35	154	161	—	5	6	—	3-5	4
5	85.90	156	164		4	7		3.5	4.2
10	95.9	156	166		4	8		3.5	4.2
15	107.0	158	169		5	10		3.5	4.2
20	117.7	158	170		7	11		3.5	4.2
25	127.8	158	170		8	11		3.5	4.2
30	137.9	159	169		10	13		3.5	4.2
35	147.7	159	169		12	13		3.5	4.5
40	157.7	159	168		12	14		3.5	4.5
45	168.4	159	167		11	14		3.5	4.5
50	178.6	159	166		11	14		3.5	4.5
55	188.9	159	166		11	15		3.5	4.5
60	199.0	160	167		12	16		3-5	4.5

Start Time:	08:34			
Finish Time:	09:34			
Initial Leak Check:	.03	Lpm @	20	" Hg
Final Leak Check:	.05	Lpm @	15	" Hg

DGMCF:	.980
Sample Volume:	
Average DGM Temp:	
Average DGM Δ H:	

Comments:

Probe Purge On: 0825 @

Off: 08 33 @

~2 LPM for 60 min,

Operator : DT

ORTECH Consulting Inc.
Method 26 Data Sheet

Plant:	Clean Harbors
Plant Location:	Corunna, On
Test No.:	3 M26
Test location:	Incinerator Exhaust Stack
Date:	NOV 10/22
Project No.:	22180

Measuring Device	MII Number
Control Module	M05498
Barometer	Env. Can.

P_{Bar}	29.46

Clock Time	Dry Gas Meter L	Probe Temp °C	Stack Temp °C	~~Oven~~ Temp °C	Impinger Outlet °C	Meter Temperature ~~Outlet~~ AVG °C	Meter Temperature Inlet °C	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
0	88.0	160	181	—	12	14	—	3.5	4.5
5	98.5	161	177		17	16		3.5	4.5
10	109.3	161	178		18	17		3.5	4.5
15	119.6	160	180		18	17		3.5	4.5
20	129.9	161	180		18	18		3.5	4.5
25	140.1	161	181		18	18		3.5	4.5
30	150.3	161	182		10	18		3.5	4.5
35	160.4	161	182		8	19		3.5	4.5
40	170.4	162	182		8	19		3.5	4.5
45	181.0	160	182		9	19		3.5	4.5
50	191.4	160	182		10	19		3.5	4.5
55	201.5	160	182		10	19		3.5	4.5
60	211.8	160	182		10	19		3.5	4.5

Start Time:	08:36			
Finish Time:	09:36			
Initial Leak Check:	.002	Lpm @	21	" Hg
Final Leak Check:	.002	Lpm @	18	" Hg

DGMCF:	.980
Sample Volume:	
Average DGM Temp:	
Average DGM Δ H:	

Comments:

Probe Purge On: 0825 @

Off: 0835 @

~2 LPM for 60 min,

Operator : DT

APPENDIX 7

Volatile Organics Train Field Data Sheets and Gas Volumes Sampled

(4 pages)

Clean Harbors Canada Inc. (Sarnia, ON)
Volatile Organics Train Gas Volume Sampled

Test No.	Run No.	Tube Pair No.	Dry Gas Meter Correction Factor	Initial Dry Gas Meter Reading litres	Final Dry Gas Meter Reading litres	Actual Volume Sampled litres	Barometric Pressure in. mercury	Average Dry Gas Meter Pressure in. water	Average Dry Gas Meter Temperature °C	Corrected Gas Volume Sampled Rm^3 *
1	1	13A/13B	0.993	79.13	101.70	22.57	30.06	2.0	11.4	0.0237
	2	14A/14B	0.993	2.30	24.10	21.80	30.06	2.0	14.4	0.0227
	3	15A/15B	0.993	24.50	45.70	21.20	30.06	1.8	15.4	0.0219
2	1	5A/5B	0.993	0.10	22.15	22.05	29.82	1.8	15.2	0.0227
	2	6A/6B	0.993	22.60	43.70	21.10	29.82	1.8	18.0	0.0215
	3	7A/7B	0.993	44.10	65.30	21.20	29.82	1.8	19.2	0.0215
	4	8A/8B	0.993	65.70	87.00	21.30	29.82	1.8	20.2	0.0215
3	1	9A/9B	0.993	12.45	33.85	21.40	29.46	1.8	19.4	0.0214
	2	10A/10B	0.993	34.26	55.78	21.52	29.46	1.7	19.2	0.0215
	3	11A/11B	0.993	56.27	78.14	21.87	29.46	1.7	20.0	0.0218

* Dry at 25°C and 1 atmosphere

ORTECH Consulting Inc.

Vost Data Sheet

Plant: Clean Harbors	**Test Condition:** Compliance	
Plant Location: Corunna, ON	**Test No:** 1	**Control Box ID:** M05498
Test location: Incinerator Exhuast Stack	**DGMCF:** .993	**Operator:** D TURTON
Date: NOV 8/22	**Barometric:** 30.06	**Project No:** 22180
~ 1 LPM for 20 minutes	**NDL - No Dectectable Leak**	**Field Blank Pair ID:** 3A 3B

Tube Pair 1 Start Time: 9:57	**Initial Leak Check** NDL **@** 21 **"Hg**	**Sample ID:** 13 A B
Tube Pair 1 End Time: 10:17	**Final Leak Check** NDL **@** 21 **"Hg**	**Lab ID:** 13 AB

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	79.13	150	187	10	10	2	4
5	84.55	150	188	9	11	2	4.5
10	90.4	150	188	9	12	2	4.5
15	96.1	155	187	9	12	2	4.5
20	101.7	155	187	9	12	2	4.5

Tube Pair 2 Start Time: 10:28	**Initial Leak Check** NDL **@** 22 **"Hg**	**Sample ID:** 14 AB
Tube Pair 2 End Time: 10:48	**Final Leak Check** NDL **@** 22 **"Hg**	**Lab ID:** 14 AB

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	2.3	157	188	9	13	2	4.5
5	8.0	158	188	10	14	2	5
10	13.4	158	188	10	14	2	5
15	18.8	159	188	10	15	2	5
20	24.1	156	188	11	16	2	5

Tube Pair 3 Start Time: ~~10~~ 11:00	**Initial Leak Check** NDL **@** 21 **"Hg**	**Sample ID:** 15 AB
Tube Pair 3 End Time: 11:20	**Final Leak Check** NDL **@** 22 **"Hg**	**Lab ID:** 15 AB

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	24.5	156	188	10	14	1.8	4
5	29.65	156	188	10	15	1.8	5
10	35.00	156	188	10	16	1.8	5
15	40.3	156	188	10	16	1.8	5
20	45.7	156	188	10	16	1.8	5

Tube Pair 4 Start Time:	**Initial Leak Check @ "Hg**	**Sample ID:**
Tube Pair 4 End Time:	**Final Leak Check @ "Hg**	**Lab ID:**

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0							
5							
10							
15							
20							

ORTECH Consulting Inc.

Vost Data Sheet

Plant: Clean Harbors	Test Condition: Compliance	
Plant Location: Corunna, ON	Test No: 2	Control Box ID: M05498
Test location: Incinerator Exhuast Stack	DGMCF: .993	Operator: D TURTON
Date: NOV 9/22	Barometric: 29.82	Project No: 22180
~ 1 LPM for 20 minutes	NDL - No Dectectable Leak	Field Blank Pair ID: 3A 3B

Tube Pair 1 Start Time: 10:06
Tube Pair 1 End Time: 10:26
Initial Leak Check NDL @ 20 "Hg
Final Leak Check NDL @ 22 "Hg
Sample ID: 5A B
Lab ID: 5A/B

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	0.16	159	177	11	13	1.8	4.2
5	5.6	160	179	12	15	1.8	5
10	11.05	160	178	12	15	1.8	5
15	16.5	160	179	11	16	1.8	5
20	22.15	159	179	11	17	1.8	5

Tube Pair 2 Start Time: 11:05
Tube Pair 2 End Time: 11:25
Initial Leak Check NDL @ 22 "Hg
Final Leak Check NDL @ 20 "Hg
Sample ID: 6A B
Lab ID: 6A B

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	22.6	158	187	15	17	1.8	4.6
5	27.4	159	186	14	17	1.8	5.5
10	33.2	159	186	14	18	1.8	5.5
15	38.5	159	183	15	19	1.8	5.5
20	43.7	160	184	14	19	1.8	5.5

Tube Pair 3 Start Time: 11:36
Tube Pair 3 End Time: 11:56
Initial Leak Check NDL @ 21 "Hg
Final Leak Check NDL @ 22 "Hg
Sample ID: 7A B
Lab ID: 7A B

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	44.1	158	183	14	18	1.8	4.2
5	49.6	159	182	15	19	1.8	5
10	54.7	159	182	15	19	1.8	5
15	60.1	160	180	16	20	1.8	5
20	65.3	159	181	16	20	1.8	5

Tube Pair 4 Start Time: 12:07
Tube Pair 4 End Time: 12:27
Initial Leak Check NDL @ 21 "Hg
Final Leak Check NDL @ 21 "Hg
Sample ID: 8A 8B
Lab ID: 8A B

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	65.7	159	185	16	19	1.8	4
5	70.9	160	183	16	20	1.8	4.5
10	76.4	159	181	15	20	1.8	4.5
15	81.7	159	182	16	21	1.8	4.5
20	87.0	160	182	16	21	1.8	4.5

ORTECH Consulting Inc.

Vost Data Sheet

Plant: Clean Harbors
Test Condition: Compliance
Plant Location: Corunna, ON
Test No: 3
Control Box ID: M05498
Test location: Incinerator Exhuast Stack
DGMCF: .993
Operator: D T
Date: Nov 10/22
Barometric: .29.46
Project No: 22180
~ 1 LPM for 20 minutes
NDL - No Dectectable Leak
Field Blank Pair ID: 3A/3B

Tube Pair 1 Start Time: 11:07
Initial Leak Check NDL @ 21 "Hg
Sample ID: 9AB
Tube Pair 1 End Time: 11:27
Final Leak Check NDL @ 22 "Hg
Lab ID: 9AB

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	12.45	161	175	14	19	1.8	4.5
5	17.8	161	175	14	19	1.8	5
10	23.2	161	176	15	21	1.8	5
15	28.5	163	178	15	19	1.8	5
20	33.85	162	175	14	19	1.8	5

Tube Pair 2 Start Time: 11:38
Initial Leak Check NDL @ 20 "Hg
Sample ID: 10AB
Tube Pair 2 End Time: 11:56
Final Leak Check NDL @ 20 "Hg
Lab ID: 10AB

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	34.26	162	175	14	18	1.7	4.5
5	39.7	161	174	15	19	1.7	5.0
10	45.1	161	174	14	19	1.7	5.5
15	50.5	161	175	15	20	1.7	5.0
20	55.78	162	175	15	20	1.7	5.0

Tube Pair 3 Start Time: 12:05
Initial Leak Check NDL @ 21 "Hg
Sample ID: 11AB
Tube Pair 3 End Time: 12:25
Final Leak Check NDL @ 22 "Hg
Lab ID: 11AB

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	56.27	162	175	16	19	1.7	4.5
5	61.8	163	176	16	20	1.7	4.5
10	67.4	162	176	16	21	1.7	5
15	72.8	162	176	15	20	1.7	5
20	78.14	161	176	15	20	1.7	5

Tube Pair 4 Start Time:
Initial Leak Check @ "Hg
Sample ID:
Tube Pair 4 End Time:
Final Leak Check @ "Hg
Lab ID:

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0							
5							
10							
15							
20							

APPENDIX 8

Metals Train Recovery Data Sheets
(4 pages)

ORTECH Particulate and Metals Train Recovery Data Sheet
Clean Harbors Sarnia

ct No. 22180
Date: Nov 8th / 2022

Test No. 1
Test Location: Incinerator Exhaust

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

CONTAINER TS1

Container TS1 Weights	
Empty Wt:	284.0
After Act. Rinse:	402.5
Total TS1:	118.5

MARK FLUID LEVEL

SEAL AND LABEL TS1

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	2840
with Nitric rinse	481.8
Total TS2:	197.8

MARK FLUID LEVEL

SEAL AND LABEL TS2

Filter

Filter ID: QZ95B

CONTAINER TS3

Initial Wt:	
Final Wt:	
Gain:	
Colour:	WHITE

SEAL AND LABEL TS3

Sample Batch Number	22-22180-PM-
TS1 (Probe Rinse-Acetone)	1
TS2 (Probe Rinse-0.1N HNO_3)	2
TS3 (Filter)	3
TS4 (Impinger 1,2,3,4 & 5 Sol'n-HNO_3)	4
TS5-A (Impinger 6 & 7 Sol'n-$KMnO_4$)	5
TS5-B (Impinger 6 & 7 Rinse HCl)	6

TS1,TS2, TS5-B - 500 ml Amber Glass Bottle
TS3- Petri Dish

TS4 4 L Amber Glass Bottle
TS5-A - 1000 ml Amber Glass Bottle

CWTR = add 1 thru 7:	3031.6
WCBDA= 8:	30.4

Loaded By:
Train Recovered By: AP/DU

2510.2
− 1364.2
1146.0 × + → 2090.4

Impingers 1, 2, 3, 4 & 5

CONTAINER TS4

	Impinger #1 (100 ml H_2O)	
	Empty Wt:	671.0
	Initial Wt:	769.0
	Final Wt:	932.4
1	Gain:	163.4
	Colour:	Clear

	Impinger #2 Empty (Knock-out)	
	Empty Wt:	715.1
	Final Wt:	3236.4
2	Gain:	2521.3
	Colour:	Clear

	Impinger #3 HNO_3/H_2O_2	
	Empty Wt:	666.8
	Initial Wt:	781.1
	Final Wt:	952.5
3	Gain:	171.4
	Colour:	Clear

	Impinger #4 HNO_3/H_2O_2	
	Empty Wt:	-
	Initial Wt:	757.1
	Final Wt:	907.6
4	Gain:	150.5
	Colour:	Clear

	Impinger #5 Empty	
	Empty Wt:	619.7
	Final Wt:	643.2
5	Gain:	23.5
	Colour:	Clear

CONTAINER TS4 WEIGHTS	
Empty Wt:	1364.2
With Imp. 1 to 5 Soln:	4689.7
Imp. 1 to 5 Volume:	3325.5
After HNO_3 Rinse:	5092.6
Total TS4:	3728.4

Box # 9

Impinger 6 & 7

CONTAINER TS5-A

	Impinger #6 $KMnO_4/H_2SO_4$	
	Empty Wt:	681.7
	Initial Wt:	795.3
	Final Wt:	794.5
6	Gain:	-0.8
	Colour:	Purple

	Impinger #7 $KMnO_4/H_2SO_4$	
	Empty Wt:	647.9
	Initial Wt:	767.5
	Final Wt:	769.8
7	Gain:	2.3
	Colour:	Purple

CONTAINER TS5-A	
Empty Wt:	406.4
With Imp. Soln:	629.4
Imp. 6&7 Volume:	1.5
After $KMnO_4$ Rinse:	745.3
After D.I. Water Rinse:	847.5
Total TS5-A:	441.1

MARK FLUID LEVEL

SEAL & LABEL TS5-A

CONTAINER TS5-B	
Empty Wt:	406.1
With 150 mL DI Water:	586.6
After HCl Rinse:	627.2
After D.I. Water Rinse:	816.7
Total TS5-B:	410.6

MARK FLUID LEVEL

SEAL & LABEL TS5-B

	Impinger #8 Silica Gel	
	Initial Wt:	972.4
	Final Wt:	1002.8
8	Gain:	30.4
	% spent :	40

ORTECH Particulate and Metals Train Recovery Data Sheet
Clean Harbors Sarnia

:t No. 22180

Date: Nov 9/22

Test No. 2

Test Location: Incinerator Exhaust

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

CONTAINER TS1

Container TS1 Weights	
Empty Wt:	283.0
After Act. Rinse:	408.2
Total TS1:	125.2

MARK FLUID LEVEL

SEAL AND LABEL TS1

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	283.0
with Nitric rinse	479.6
Total TS2:	196.6

MARK FLUID LEVEL

SEAL AND LABEL TS2

Filter

Filter ID: Q2~~9~~89517

CONTAINER TS3

Initial Wt:	
Final Wt:	
Gain:	
Colour:	WHITE

SEAL AND LABEL TS3

Sample Batch Number	22-22180-PM-
TS1 (Probe Rinse-Acetone)	7
TS2 (Probe Rinse-0.1N HNO_3)	8
TS3 (Filter)	9
TS4 (Impinger 1,2,3,4 & 5 Sol'n-HNO_3)	10
TS5-A (Impinger 6 & 7 Sol'n-$KMnO_4$)	11
TS5-B (Impinger 6 & 7 Rinse HCl)	12

TS1,TS2, TS5-B - 500 ml Amber Glass Bottle

TS3- Petri Dish

TS4 4 L Amber Glass Bottle

TS5-A - 1000 ml Amber Glass Bottle

2502.3
- 1361.2
1141.1 + 2111.2

CWTR = add 1 thr<u>u</u> 7:	~~2990.9~~ 2991.0
WCBDA= 8:	29.6

..., Loaded By: RM BP

Train Recovered By: RM/BD

Impingers 1, 2, 3, 4 & 5

CONTAINER TS4

Impinger #1 (100 ml H_2O)	
Empty Wt:	673.2
Initial Wt:	772.5
Final Wt:	956.1
1 Gain:	183.6
Colour:	—

Impinger #2 Empty (Knock-out)	
Empty Wt:	715.7
Final Wt:	3252.3
2 Gain:	2536.6
Colour:	—

Impinger #3 HNO_3/H_2O_2	
Empty Wt:	667.6
Initial Wt:	768.9
Final Wt:	969.0
3 Gain:	200.1
Colour:	—

Impinger #4 HNO_3/H_2O_2	
Empty Wt:	663.1
Initial Wt:	771.6
Final Wt:	843.8
4 Gain:	72.2
Colour:	—

Impinger #5 Empty	
Empty Wt:	621.6
Final Wt:	623.1
5 Gain:	1.5
Colour:	—

CONTAINER TS4 WEIGHTS	
Empty Wt:	1361.2
With Imp. 1 to 5 Soln:	4658.6
Imp. 1 to 5 Volume:	3297.4
After HNO_3 Rinse:	4937.4
Total TS4:	3576.2

Box # 9

Impinger 6 & 7

CONTAINER TS5-A

Impinger #6 $KMnO_4/H_2SO_4$	
Empty Wt:	684.2
Initial Wt:	800.2
Final Wt:	795.2
6 Gain:	-5.0
Colour:	PURPLE

Impinger #7 $KMnO_4/H_2SO_4$	
Empty Wt:	650.4
Initial Wt:	767.7
Final Wt:	769.7
7 Gain:	2.0
Colour:	PURPLE

CONTAINER TS5-A	
Empty Wt:	405.9
With Imp. Soln:	7222.1
Imp. 6&7 Volume:	628.0
After $KMnO_4$ Rinse:	746.5
After D.I. Water Rinse:	894.9
Total TS5-A:	489.0

MARK FLUID LEVEL

SEAL & LABEL TS5-A

CONTAINER TS5-B	
Empty Wt:	406.1
With 150 mL DI Water:	554.6
After HCl Rinse:	621.8
After D.I. Water Rinse:	793.4
Total TS5-B:	387.3

MARK FLUID LEVEL

SEAL & LABEL TS5-B

Impinger #8 Silica Gel	
Initial Wt:	996.9
Final Wt:	1026.0
8 Gain:	29.6
% spent :	25(?)

ORTECH Particulate and Metals Train Recovery Data Sheet
Clean Harbors Sarnia

ct No. 22180

Date: NOV 10/22

Test No. 3

Test Location: Incinerator Exhaust

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

CONTAINER TS1

Container TS1 Weights	
Empty Wt:	284
After Act. Rinse:	430
Total TS1:	146

MARK FLUID LEVEL

SEAL AND LABEL TS1

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	284
with Nitric rinse	480.5
Total TS2:	196.5

MARK FLUID LEVEL

SEAL AND LABEL TS2

Filter

Filter ID: QZ 9516

CONTAINER TS3

Initial Wt:	
Final Wt:	
Gain:	
Colour:	White

SEAL AND LABEL TS3

Impingers 1, 2, 3, 4 & 5

CONTAINER TS4

Impinger #1 (100 ml H_2O)		
Empty Wt:	673.9	
Initial Wt:	975.4 ~~7739~~	
Final Wt:		
Gain:	~~301.5~~ ~~[illegible]~~	1
Colour:	— 301.5	

Impinger #2 Empty (Knock-out)		
Empty Wt:	719.2	
Final Wt:	2985.3	
Gain:	2266.1	2
Colour:	—	

Impinger #3 HNO_3/H_2O_2		
Empty Wt:	669.3	
Initial Wt:	772.6	
Final Wt:	934.8	
Gain:	162.2	3
Colour:	—	

Impinger #4 HNO_3/H_2O_2		
Empty Wt:	665.0	
Initial Wt:	769.5	
Final Wt:	790.0	
Gain:	20.5	4
Colour:	—	

Impinger #5 Empty		
Empty Wt:	622.6	
Final Wt:	624.6	
Gain:	2.0	5
Colour:	—	

CONTAINER TS4 WEIGHTS	
Empty Wt:	1361.0
With Imp. 1 to 5 Soln:	4321.3
Imp. 1 to 5 Volume:	2960.3
After HNO_3 Rinse:	4541.3
Total TS4:	3180

Impinger 6 & 7

CONTAINER TS5-A

Impinger #6 $KMnO_4/H_2SO_4$		
Empty Wt:	686.5	
Initial Wt:	794.1	
Final Wt:	790.0	
Gain:	-4.1	6
Colour:	PURPLE	

Impinger #7 $KMnO_4/H_2SO_4$		
Empty Wt:	653.2	
Initial Wt:	769.4	
Final Wt:	772.6	
Gain:	3.2	7
Colour:	PURPLE	

CONTAINER TS5-A	
Empty Wt:	405.2
With Imp. Soln:	624.7
Imp. 6&7 Volume:	219.5
After $KMnO_4$ Rinse:	704.8
After D.I. Water Rinse:	~~729~~ 804.8
Total TS5-A:	399.6

MARK FLUID LEVEL

SEAL & LABEL TS5-A

CONTAINER TS5-B	
Empty Wt:	405.9
With 150 mL DI Water:	559.3
After HCl Rinse:	600
After D.I. Water Rinse:	757.4
Total TS5-B:	351.5

MARK FLUID LEVEL

SEAL & LABEL TS5-B

Impinger #8 Silica Gel		
Initial Wt:	1025.5	
Final Wt:	1050.0	
Gain:	24.5	8
% spent :	30	

Sample Batch Number	22-22180-PM-
TS1 (Probe Rinse-Acetone)	~~13~~ 15
TS2 (Probe Rinse-0.1N HNO_3)	~~14~~ 16
TS3 (Filter)	~~15~~ 17
TS4 (Impinger 1,2,3,4 & 5 Sol'n-HNO_3)	~~16~~ 18
TS5-A (Impinger 6 & 7 Sol'n-$KMnO_4$)	~~17~~ 19
TS5-B (Impinger 6 & 7 Rinse HCl)	~~18~~ 20

TS1,TS2, TS5-B - 500 ml Amber Glass Bottle

TS3- Petri Dish

TS4 4 L Amber Glass Bottle

TS5-A - 1000 ml Amber Glass Bottle

2386.1
-1361.0
1025.1 + 1960.2 =

CWTR = add 1 thru 7:	2751.4 ~~2745.0~~ ~~[illegible]~~
WCBDA= 8:	24.5

Loaded By: DU BP

Train Recovered By: DU BP

Box # 9

ORTECH Particulate and Metals Train Recovery Data Sheet
Clean Harbors Sarnia

ct No. 22180

Date: NOV 10/22

Test No. BLANK

Test Location: Incinerator Exhaust

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

CONTAINER TS1

Container TS1 Weights	
Empty Wt:	283.3
After Act. Rinse:	458.3
Total TS1:	175.0

MARK FLUID LEVEL

SEAL AND LABEL TS1

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	284.0
with Nitric rinse	424.2
Total TS2:	140.2

MARK FLUID LEVEL

SEAL AND LABEL TS2

Filter

Filter ID: Q29518

CONTAINER TS3

Initial Wt:	
Final Wt:	
Gain:	
Colour:	WHITE

SEAL AND LABEL TS3

Impingers 1, 2, 3, 4 & 5

CONTAINER TS4

Impinger #1 (100 ml H_2O)	
Empty Wt:	627.4
Initial Wt:	723.3
Final Wt:	
1 Gain:	
Colour:	

Impinger #2 Empty (Knock-out)	
Empty Wt:	692.8
Final Wt:	
2 Gain:	
Colour:	

Impinger #3 HNO_3/H_2O_2	
Empty Wt:	656.9
Initial Wt:	773.9
Final Wt:	
3 Gain:	
Colour:	

Impinger #4 HNO_3/H_2O_2	
Empty Wt:	656.6
Initial Wt:	754.2
Final Wt:	
4 Gain:	
Colour:	

Impinger #5 Empty	
Empty Wt:	565.8
Final Wt:	
5 Gain:	
Colour:	

CONTAINER TS4 WEIGHTS	
Empty Wt:	428.2
With Imp. 1 to 5 Soln:	638.0
Imp. 1 to 5 Volume:	209.8
After HNO_3 Rinse:	757.3
Total TS4:	329.1

Impinger 6 & 7

CONTAINER TS5-A

Impinger #6 $KMnO_4/H_2SO_4$	
Empty Wt:	628.3
Initial Wt:	744.6
Final Wt:	
6 Gain:	
Colour:	

Impinger #7 $KMnO_4/H_2SO_4$	
Empty Wt:	644.3
Initial Wt:	767.5
Final Wt:	
7 Gain:	
Colour:	

CONTAINER TS5-A	
Empty Wt:	406.3
With Imp. Soln:	629.3
Imp. 6&7 Volume:	223.0
After $KMnO_4$ Rinse:	774.9
After D.I. Water Rinse:	882.3
Total TS5-A:	476.0

MARK FLUID LEVEL

SEAL & LABEL TS5-A

CONTAINER TS5-B	
Empty Wt:	426.8
With 150 mL DI Water:	576.8
After HCl Rinse:	620.0
After D.I. Water Rinse:	741.5
Total TS5-B:	314.7

MARK FLUID LEVEL

SEAL & LABEL TS5-B

Impinger #8 Silica Gel	
Initial Wt:	969.0
Final Wt:	
8 Gain:	
% spent :	

Sample Batch Number	22-22180-PM-
TS1 (Probe Rinse-Acetone)	22
TS2 (Probe Rinse-0.1N HNO_3)	23
TS3 (Filter)	24
TS4 (Impinger 1,2,3,4 & 5 Sol'n-HNO_3)	25
TS5-A (Impinger 6 & 7 Sol'n-$KMnO_4$)	26
TS5-B (Impinger 6 & 7 Rinse HCl)	27

TS1,TS2, TS5-B - 500 ml Amber Glass Bottle
TS3- Petri Dish

TS4 4 L Amber Glass Bottle
TS5-A - 1000 ml Amber Glass Bottle

CWTR = add 1 thru 7:	
WCBDA= 8:	

Loaded By:
Train Recovered By:

Box # 5

APPENDIX 9

Particulate and Metals Analytical Reports
(16 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
ALS Project ID: ORT100
ALS WO#: L2740266
Date of Report 30-Nov-22
Date of Sample Receipt 14-Nov-22

Client Name: ORTECH
Client Address: 804 Southdown Road
Mississauga, ON L5J 2Y4
Canada
Client Contact: Chris Belore
Client Project ID: 22180 Clean Harbors

COMMENTS:
Sample Particulate Analysis via Gravimetric USEPA Method 5 (LL5 30-NOV-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

Results in this certificate relate only to the samples as submitted to the laboratory.

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ALS Environmental

Sample Analysis Summary Report

Sample Name		**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(8 THRU 13) TEST#2**	**22-22180-PM-(15 THRU 20) TEST#3**	**22-22180-PM-(22 THRU 27) BLANK**	**MB**
ALS Sample ID		L2740266-1	L2740266-2	L2740266-3	L2740266-4	L2740266-MB
Matrix		Stack	Stack	Stack	Stack	n/a
Analysis type		Sample	Sample	Sample	Sample	Sample
Sampling Date/Time		8-Nov-22	9-Nov-22	10-Nov-22	10-Nov-22	n/a
Date of Receipt		14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22	n/a
PM via Gravimetric Analysis Method 5	**LOR mg**	**mg**	**mg**	**mg**	**mg**	**mg**
Filter Particulate Matter	0.8	0.1 J	0.2 J	<0.1 J	0.2 J	<0.1
Acetone Particulate Matter	0.4	1.1	0.9	1.6	0.1 J	0.2 J
	g	**g**	**g**	**g**	**g**	**g**
Acetone Mass	0.02	118	124	145	175	32.3

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
ALS Project ID: ORT100
ALS WO#: L2740266
Date of Report 7-Dec-22
Date of Sample Receipt 14-Nov-22

Client Name: ORTECH
Client Address: 804 Southdown Road
Mississauga, ON L5J 2Y4
Canada
Client Contact: Chris Belore
Client Project ID: 22180 Clean Harbors

COMMENTS:

Sample Preparation via USEPA Method 29 (KC11 01-Dec-2022)
Mercury Analysis via CVAA using Method USEPA 7470A (KC11 02-Dec-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

Results in this certificate relate only to the samples as submitted to the laboratory.

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ALS Environmental

Sample Analysis Summary Report

Sample Name		**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(8 THRU 13) TEST#2**	**22-22180-PM-(15 THRU 20) TEST#3**	**22-22180-PM-(22 THRU 27) BLANK**
ALS Sample ID		L2740266-1	L2740266-2	L2740266-3	L2740266-4
Matrix		Stack	Stack	Stack	Stack
Analysis type		Sample	Sample	Sample	Sample
Sampling Date/Time		8-Nov-22	9-Nov-22	10-Nov-22	10-Nov-22
Date of Receipt		14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22
Mercury via CVAA	**LOR**				
Method 29	**ug**	**ug**	**ug**	**ug**	**ug**
Analytical Fraction 1B (Nitric)	0.015	0.0174	<0.015	0.0324	<0.015
Analytical Fraction 1B	0.015	<0.015	<0.015	<0.015	<0.015
Analytical Fraction 2B	0.050	6.79	20.0	4.74	<0.1575
Analytical Fraction 3B	0.025	<0.025	<0.025	2.96	<0.025
Analytical Fraction 3C	0.25	0.590	1.07	61.0	<0.25

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 (Nitric)	0.015	<0.015	0.292	97%	0.293	98%
Analytical Fraction 1B	0.015	<0.015	0.288	96%	0.284	94%
Analytical Fraction 2B	0.050	<0.05	0.926	93%	0.907	91%
Analytical Fraction 3B	0.025	<0.025	0.452	90%	0.456	91%
Analytical Fraction 3C	0.25	<0.25	4.60	92%	4.71	94%

ALS Environmental

Sample QC Summary Report

Sample Name		**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**
ALS Sample ID		L2740266-1	L2740266-1DUP	L2740266-1MS	L2740266-1MS	L2740266-1MSD	L2740266-1MSD
Matrix		Stack	Stack	Stack	Stack	Stack	Stack
Analysis type		Sample	Duplicate	Matrix Spike	Matrix Spike	Matrix Spike Dup	Matrix Spike Dup
Sampling Date/Time		8-Nov-22	8-Nov-22	8-Nov-22	8-Nov-22	8-Nov-22	8-Nov-22
Date of Receipt		14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22
Mercury via CVAA	**LOR**						
Method 29	**ug**	**ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Analytical Fraction 1B (Nitric)	0.015	0.0174	0.0174	0.312	98%	0.312	98%
Analytical Fraction 1B	0.015	<0.015	<0.015	0.282	92%	0.283	93%
Analytical Fraction 2B	0.050	6.79	6.83	40.4	92%	40.4	92%
Analytical Fraction 3B	0.025	<0.025	<0.025	0.451	89%	0.448	88%
Analytical Fraction 3C	0.250	0.590	0.560	5.30	94%	5.25	93%

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
ALS Project ID: ORT100
ALS WO#: L2740266
Date of Report 7-Dec-22
Date of Sample Receipt 14-Nov-22

Client Name: ORTECH
Client Address: 804 Southdown Road
Mississauga, ON L5J 2Y4
Canada
Client Contact: Chris Belore
Client Project ID: 22180 Clean Harbors

COMMENTS:
Metals analysed via ICP-MS Method USEPA 6020B (SA 2-Dec-22 and 5-Dec-22)
Sample Preparation via USEPA Method 29 (KC11 01-Dec-22)

ANALYST COMMENTS:

Fraction 1A (HNO3):

B observed in the reagent blank (RB) due to carry-over from a high-level sample. B was not observed in the samples. No impact to data quality.

Fraction 1A (HF):

Si cannot be quantified in this fraction due to the very high background resulting from the total digestion of the filter matrix.

Al, Cr, Cu, Mg, Mo, and Ni observed in the method blank (MB) at levels significantly above their LORs. These analytes were not quantified in the reagent blank, indicating they represent the background contribution of the filter matrix. Sample data within a factor of 5x this background is expected to be biased high.

Fraction 2A:

High volumes for back-half fractions required non-routine sample processing. Samples were homogenized and a sub-sample of the bulk was taken. All sample data within this report has been scaled to reflect the total in the entire sample, with the exception of MS and MSD (values and recoveries) which are reported on the sub-sample only.

Sn observed in the reagent blank at a level significantly above its LOR. This is likely due to the contribution of the tin-containing stabilizer present in the peroxide reagent. Sample data may be similarly biased.

Recoveries for B and S in the MS and MSD cannot be quantified due to high levels of these analytes in the sample, relative to the spiked amount. This is not expected to have any impact on data quality.

PE 7-Dec-22

LCB = Laboratory Control Blank
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
LOR = Limit of Reporting
nq = Indicates that this value was not quantifiable.

Certified by: L. Wrona
Lynne Wrona
Project Manager

ALS Environmental

Sample Analysis Summary Report

Sample Name		**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(8 THRU 13) TEST#2**	**22-22180-PM-(15 THRU 20) TEST#3**	**22-22180-PM-(22 THRU 27) BLANK**	**MB**
ALS Sample ID		L2740266-1	L2740266-2	L2740266-3	L2740266-4	L2740266-MB
Matrix		Stack	Stack	Stack	Stack	n/a
Analysis Type		Sample	Sample	Sample	Sample	Sample
Sampling Date		8-Nov-22	9-Nov-22	10-Nov-22	10-Nov-22	n/a
Date of Receipt		14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22	n/a
Multi-Metals via ICP-MS	**LOR ug**	**ug**	**ug**	**ug**	**ug**	**ug**
Front Half HNO3 Fraction 1A						
Aluminum	20	<	<	23.7	<	<
Antimony	0.2	0.576	0.261	0.267	<	<
Arsenic	1	<	<	<	<	<
Barium	5	<	<	<	<	<
Beryllium	0.2	<	<	<	<	<
Boron	30	<	<	<	<	<
Cadmium	0.1	0.111	<	<	<	<
Calcium	500	<	<	<	<	<
Chromium	1	4.46	5.60	2.86	<	<
Cobalt	0.2	<	0.324	<	<	<
Copper	1	3.50	2.87	4.71	1.14	<
Iron	200	<	<	<	<	<
Lead	0.5	0.621	<	<	<	<
Lithium	0.5	<	<	<	<	<
Magnesium	10	14.6	11.0	15.4	<	<
Manganese	0.5	6.47	7.75	11.9	<	<
Molybdenum	0.2	0.303	0.246	<	<	<
Nickel	0.2	4.52	14.7	2.56	<	<
Phosphorus	100	<	<	<	<	<
Potassium	100	114	<	173	<	<
Selenium	2	3.08	2.65	2.98	<	<
Silver	0.2	<	<	<	<	<
Sodium	30	376	351	422	232	<
Strontium	0.2	0.603	0.441	0.522	<	<
Tin	0.3	7.38	6.43	5.98	5.17	<
Titanium	10	<	<	<	<	<
Vanadium	1	<	<	<	<	<
Zinc	6	8.80	9.52	13.3	<	<
Sulphur	10000	<	<	<	<	<
Silicon	150	282	<	<	337	<

ALS Environmental

Sample QC Summary Report

Sample Name		**RB**	**LCS**	**LCS**	**LCSD**	**LCSD**
ALS Sample ID		RB	LCS	LCS	LCSD	LCSD
Matrix		Stack	Stack	Stack	Stack	Stack
Analysis Type		Blank	LCS	LCS	LCS	LCS
Sampling Date		n/a	n/a	n/a	n/a	n/a
Date of Receipt		n/a	n/a	n/a	n/a	n/a
Multi-Metals via ICP-MS	**LOR** **ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Front Half HNO3 Fraction 1A						
Aluminum	20	<	123	95	123	95
Antimony	0.2	<	11.3	94	10.9	91
Arsenic	1	<	58.6	98	56.9	95
Barium	5	<	60.0	96	57.7	92
Beryllium	0.2	<	61.3	102	58.3	97
Boron	30	63.9	120	93	102	63
Cadmium	0.1	<	28.5	95	27.5	92
Calcium	500	<	1560	102	1520	99
Chromium	1	<	61.3	102	59.1	98
Cobalt	0.2	<	60.1	100	59.2	99
Copper	1	<	60.0	100	58.7	98
Iron	200	<	307	101	302	99
Lead	0.5	<	59.7	99	58.2	97
Lithium	0.5	<	10.8	94	9.58	84
Magnesium	10	<	304	100	297	97
Manganese	0.5	<	62.0	103	60.1	99
Molybdenum	0.2	<	29.7	99	29.4	98
Nickel	0.2	<	60.8	101	59.4	99
Phosphorus	100	<	1550	104	1400	94
Potassium	100	<	1450	98	1410	95
Selenium	2	<	57.2	95	55.3	92
Silver	0.2	<	29.9	100	29.6	99
Sodium	30	<	1390	92	1370	91
Strontium	0.2	<	57.1	95	58.6	98
Tin	0.3	<	28.6	95	27.1	90
Titanium	10	<	60.8	101	58.8	98
Vanadium	1	<	59.4	99	57.7	96
Zinc	6	<	119	98	117	96
Sulphur	10000	<	13200	104	13300	105
Silicon	150	<	3080	102	2760	92

ALS Environmental

Sample QC Summary Report

Sample Name		**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**
ALS Sample ID		L2740266-1	L2740266-1	MS	MS	MSD	MSD
Matrix		Stack	Stack	Stack	Stack	Stack	Stack
Analysis Type		Sample	Duplicate	Matrix Spike	Matrix Spike	Matrix Spike Dup	Matrix Spike Dup
Sampling Date		8-Nov-22	8-Nov-22	8-Nov-22	8-Nov-22	8-Nov-22	8-Nov-22
Date of Receipt		14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22
Multi-Metals via ICP-MS	**LOR ug**	**ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Front Half HNO3 Fraction 1A							
Aluminum	20	<	<	252	97	249	96
Antimony	0.2	0.576	0.564	23.8	97	22.3	90
Arsenic	1	<	<	115	96	113	94
Barium	5	<	<	120	98	118	96
Beryllium	0.2	<	<	123	103	113	94
Boron	30	<	<	132	93	132	93
Cadmium	0.1	0.111	0.108	59.0	98	54.9	91
Calcium	500	<	<	3130	99	3080	98
Chromium	1	4.46	4.60	123	99	120	97
Cobalt	0.2	<	<	116	97	116	97
Copper	1	3.50	3.46	121	98	119	96
Iron	200	<	<	679	104	650	100
Lead	0.5	0.621	0.576	117	97	114	95
Lithium	0.5	<	<	23.4	98	19.0	79
Magnesium	10	14.6	13.7	604	98	597	97
Manganese	0.5	6.47	6.56	123	97	124	98
Molybdenum	0.2	0.303	0.315	56.7	94	57.1	95
Nickel	0.2	4.52	4.53	122	98	121	97
Phosphorus	100	<	<	2770	93	2840	95
Potassium	100	114	110	2890	93	2880	92
Selenium	2	3.08	3.03	119	96	115	93
Silver	0.2	<	<	57.3	96	58.2	97
Sodium	30	376	370	3280	97	3460	103
Strontium	0.2	0.603	0.531	116	96	117	97
Tin	0.3	7.38	7.17	66.6	99	61.5	90
Titanium	10	<	<	123	97	122	97
Vanadium	1	<	<	116	96	114	95
Zinc	6	8.80	9.35	245	99	238	96
Sulphur	10000	<	<	26000	91	30400	106
Silicon	150	282	211	9130	98	9160	99

ALS Environmental

Sample Analysis Summary Report

Sample Name		**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(8 THRU 13) TEST#2**	**22-22180-PM-(15 THRU 20) TEST#3**	**22-22180-PM-(22 THRU 27) BLANK**	**MB**
ALS Sample ID		L2740266-1	L2740266-2	L2740266-3	L2740266-4	L2740266-MB
Matrix		Stack	Stack	Stack	Stack	n/a
Analysis Type		Sample	Sample	Sample	Sample	Sample
Sampling Date		8-Nov-22	9-Nov-22	10-Nov-22	10-Nov-22	n/a
Date of Receipt		14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22	n/a
Multi-Metals via ICP-MS	**LOR ug**	**ug**	**ug**	**ug**	**ug**	**ug**
Front Half HF Fraction 1A						
Aluminum	20	139	133	140	129	129
Antimony	0.2	0.318	<	<	<	<
Arsenic	1	<	<	<	<	<
Barium	5	13.9	<	<	<	<
Beryllium	0.2	<	<	<	<	<
Boron	30	<	<	<	<	<
Cadmium	0.1	<	0.315	<	<	<
Calcium	500	<	<	<	<	<
Chromium	1	3.75	5.40	3.72	1.71	3.16
Cobalt	0.2	<	<	<	<	<
Copper	1	4.76	4.88	4.88	4.62	4.78
Iron	200	<	<	<	<	<
Lead	0.5	<	<	<	<	<
Lithium	0.5	<	<	<	<	<
Magnesium	10	44.6	43.7	44.9	41.3	43.8
Manganese	0.5	2.47	3.04	3.16	1.16	1.19
Molybdenum	0.2	35.4	34.6	34.4	34.9	37.4
Nickel	0.2	1.82	3.62	1.70	0.852	0.933
Phosphorus	100	<	<	<	<	<
Potassium	100	<	<	<	<	<
Selenium	2	<	<	<	<	<
Silver	0.2	<	<	<	<	<
Sodium	30	69.0	78.8	85.9	65.8	35.0
Strontium	0.2	0.834	0.630	0.636	0.570	0.579
Tin	0.3	2.66	2.60	2.49	1.90	0.735
Titanium	10	<	<	<	<	<
Vanadium	1	<	<	<	<	<
Zinc	6	<	<	<	<	<
Sulphur	10000	<	<	<	<	<
Silicon	150	nq	nq	nq	nq	nq

ALS Environmental

Sample QC Summary Report

Sample Name	RB	LCS	LCS	LCSD	LCSD
ALS Sample ID	RB	LCS	LCS	LCSD	LCSD
Matrix	Stack	Stack	Stack	Stack	Stack
Analysis Type	Blank	LCS	LCS	LCS	LCS
Sampling Date	n/a	n/a	n/a	n/a	n/a
Date of Receipt	n/a	n/a	n/a	n/a	n/a

Multi-Metals via ICP-MS	**LOR** **ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Front Half HF Fraction 1A						
Aluminum	20	<	126	103	121	99
Antimony	0.2	<	11.4	95	11.1	93
Arsenic	1	<	58.2	97	56.5	94
Barium	5	<	59.9	100	58.8	98
Beryllium	0.2	<	62.0	103	61.1	102
Boron	30	<	65.4	100	64.9	99
Cadmium	0.1	<	29.0	97	28.5	95
Calcium	500	<	1620	107	1610	106
Chromium	1	<	60.9	102	59.4	99
Cobalt	0.2	<	61.9	103	58.7	98
Copper	1	<	60.8	102	58.8	98
Iron	200	<	311	103	298	99
Lead	0.5	<	60.1	100	59.3	99
Lithium	0.5	<	10.7	95	10.7	95
Magnesium	10	<	306	102	302	101
Manganese	0.5	<	62.1	103	60.0	100
Molybdenum	0.2	<	29.9	100	29.3	98
Nickel	0.2	<	61.8	103	59.5	99
Phosphorus	100	<	1550	104	1460	98
Potassium	100	<	1460	98	1420	95
Selenium	2	<	59.9	100	55.6	93
Silver	0.2	<	28.5	95	29.7	99
Sodium	30	<	1420	94	1380	92
Strontium	0.2	<	59.3	99	56.9	95
Tin	0.3	<	28.7	95	28.5	95
Titanium	10	<	60.6	101	59.6	99
Vanadium	1	<	60.2	100	57.9	97
Zinc	6	<	119	99	118	98
Sulphur	10000	<	14500	111	11800	93
Silicon	150	nq	nq	nq	nq	nq

ALS Environmental

Sample QC Summary Report

Sample Name		**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**
ALS Sample ID		L2740266-1	L2740266-1	MS	MS	MSD	MSD
Matrix		Stack	Stack	Stack	Stack	Stack	Stack
Analysis Type		Sample	Duplicate	Matrix Spike	Matrix Spike	Matrix Spike Dup	Matrix Spike Dup
Sampling Date		8-Nov-22	8-Nov-22	8-Nov-22	8-Nov-22	8-Nov-22	8-Nov-22
Date of Receipt		14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22
Multi-Metals via ICP-MS	**LOR ug**	**ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Front Half HF Fraction 1A							
Aluminum	20	139	139	364	94	338	83
Antimony	0.2	0.318	0.309	21.9	90	20.1	82
Arsenic	1	<	<	113	94	100	83
Barium	5	13.9	13.5	128	95	119	87
Beryllium	0.2	<	<	113	94	102	85
Boron	30	<	<	118	94	108	86
Cadmium	0.1	<	<	56.2	94	49.3	82
Calcium	500	<	<	3050	97	2770	88
Chromium	1	3.75	3.77	118	95	107	86
Cobalt	0.2	<	<	115	96	104	87
Copper	1	4.76	4.97	121	97	108	86
Iron	200	<	<	687	103	612	91
Lead	0.5	<	<	118	98	106	88
Lithium	0.5	<	<	19.0	83	17.1	75
Magnesium	10	44.6	44.8	612	95	559	86
Manganese	0.5	2.47	2.48	120	98	109	88
Molybdenum	0.2	35.4	35.2	89.9	91	87.8	87
Nickel	0.2	1.82	1.82	117	96	106	87
Phosphorus	100	<	<	2800	93	2560	86
Potassium	100	<	<	2710	90	2480	83
Selenium	2	<	<	111	91	98.2	81
Silver	0.2	<	<	57.0	95	52.7	88
Sodium	30	69.0	71.1	3040	99	2720	88
Strontium	0.2	0.834	0.828	111	92	106	88
Tin	0.3	2.66	2.67	58.1	92	52.0	82
Titanium	10	<	<	129	103	109	86
Vanadium	1	<	<	112	94	102	85
Zinc	6	<	<	231	94	205	83
Sulphur	10000	<	<	23000	96	19900	86
Silicon	150	nq	nq	nq	nq	nq	nq

ALS Environmental

Sample Analysis Summary Report

Sample Name		**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(8 THRU 13) TEST#2**	**22-22180-PM-(15 THRU 20) TEST#3**	**22-22180-PM-(22 THRU 27) BLANK**
ALS Sample ID		L2740266-1	L2740266-2	L2740266-3	L2740266-4
Matrix		Stack	Stack	Stack	Stack
Analysis Type		Sample	Sample	Sample	Sample
Sampling Date		8-Nov-22	9-Nov-22	10-Nov-22	10-Nov-22
Date of Receipt		14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22
Multi-Metals via ICP-MS	**LOR**				
	ug	**ug**	**ug**	**ug**	**ug**
Back Half (HNO3 / H2O2) Fraction 2A					
Aluminum	5	1710	825	38.2	10.1
Antimony	0.1	<	<	<	<
Arsenic	0.2	0.413	<	0.208	<
Barium	0.5	7.71	1.76	1.20	1.79
Beryllium	0.1	<	<	<	<
Boron	10	12800	9130	2050	13.3
Cadmium	0.05	0.110	0.0908	0.219	<
Calcium	100	3380	<	<	<
Chromium	0.15	14.5	10.9	5.00	0.413
Cobalt	0.1	1.17	0.247	0.208	<
Copper	0.3	3.36	<	<	1.52
Iron	15	634	71.1	33.2	<
Lead	0.05	2.01	4.70	1.55	0.351
Lithium	0.25	4.72	5.01	3.33	0.642
Magnesium	5	133	36.6	22.3	5.12
Manganese	0.15	6.61	4.37	6.88	0.314
Molybdenum	0.1	0.138	<	0.162	<
Nickel	0.1	8.38	6.66	2.78	0.915
Phosphorus	25	<	<	<	<
Potassium	100	317	131	<	<
Selenium	1	89.6	14.6	3.20	<
Silver	0.1	0.138	<	0.127	<
Sodium	20	7470	1870	267	286
Strontium	0.1	5.84	0.986	0.335	0.393
Tin	0.1	24.4	22.1	16.4	18.0
Titanium	1	22.1	5.41	<	<
Vanadium	0.1	0.633	0.415	0.404	<
Zinc	3	17.9	6.14	5.56	<
Sulphur	3000	140000	3350	<	<
Silicon	75	42800	9210	476	115

ALS Environmental

Sample QC Summary Report

Sample Name		**RB**	**LCS**	**LCS**	**LCSD**	**LCSD**
ALS Sample ID		RB	LCS	LCS	LCSD	LCSD
Matrix		Stack	Stack	Stack	Stack	Stack
Analysis Type		Blank	LCS	LCS	LCS	LCS
Sampling Date		n/a	n/a	n/a	n/a	n/a
Date of Receipt		n/a	n/a	n/a	n/a	n/a
Multi-Metals via ICP-MS	**LOR ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Back Half (HNO3 / H2O2) Fraction 2A						
Aluminum	5	<	63.4	105	60.8	100
Antimony	0.1	<	5.69	95	5.69	95
Arsenic	0.2	<	29.1	97	28.4	95
Barium	0.5	<	30.7	102	29.7	99
Beryllium	0.1	<	30.9	103	30.7	103
Boron	10	<	32.9	110	32.6	109
Cadmium	0.05	<	14.7	98	14.3	96
Calcium	100	<	770	104	744	101
Chromium	0.15	0.275	30.2	100	29.5	97
Cobalt	0.1	<	29.7	99	28.9	96
Copper	0.3	<	29.9	101	29.0	98
Iron	15	<	152	100	148	98
Lead	0.05	<	31.0	103	30.3	101
Lithium	0.25	<	5.76	93	5.78	93
Magnesium	5	<	151	100	147	98
Manganese	0.15	<	30.3	101	29.7	99
Molybdenum	0.1	<	14.3	95	14.1	94
Nickel	0.1	<	29.9	99	29.4	98
Phosphorus	25	<	703	94	678	90
Potassium	100	<	732	97	699	92
Selenium	1	<	28.6	95	28.0	93
Silver	0.1	<	14.3	95	14.3	95
Sodium	20	<	781	104	675	90
Strontium	0.1	<	28.0	93	28.3	94
Tin	0.1	5.64	15.1	101	14.7	98
Titanium	1	<	30.2	101	29.0	97
Vanadium	0.1	<	30.0	100	28.9	96
Zinc	3	<	59.6	99	58.5	97
Sulphur	3000	<	7620	108	6430	93
Silicon	75	<	1340	89	1330	89

ALS Environmental

Sample QC Summary Report

Sample Name		**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**	**22-22180-PM-(1 THRU 6) TEST#1**
ALS Sample ID		L2740266-1	L2740266-1	MS	MS	MSD	MSD
Matrix		Stack	Stack	Stack	Stack	Stack	Stack
Analysis Type		Sample	Duplicate	Matrix Spike	Matrix Spike	Matrix Spike Dup	Matrix Spike Dup
Sampling Date		8-Nov-22	8-Nov-22	8-Nov-22	8-Nov-22	8-Nov-22	8-Nov-22
Date of Receipt		14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22
Multi-Metals via ICP-MS	**LOR ug**	**ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Back Half (HNO3 / H2O2) Fraction 2A							
Aluminum	5	1710	1780	305	100	310	104
Antimony	0.1	<	<	11.4	95	11.5	96
Arsenic	0.2	0.413	0.344	57.3	95	57.9	96
Barium	0.5	7.71	7.73	57.3	94	59.0	97
Beryllium	0.1	<	<	59.1	99	61.1	102
Boron	10	12800	13200	1490	nq	1490	nq
Cadmium	0.05	0.110	0.0688	29.2	97	30.5	102
Calcium	100	3380	3490	1850	99	1830	97
Chromium	0.15	14.5	14.9	60.1	98	60.8	99
Cobalt	0.1	1.17	1.07	58.3	97	58.5	97
Copper	0.3	3.36	3.94	59.6	99	60.4	100
Iron	15	634	641	367	99	372	101
Lead	0.05	2.01	2.13	58.4	97	58.9	98
Lithium	0.25	4.72	4.56	11.1	88	11.6	92
Magnesium	5	133	121	304	96	309	98
Manganese	0.15	6.61	7.10	58.6	96	60.7	100
Molybdenum	0.1	0.138	0.165	28.4	95	28.5	95
Nickel	0.1	8.38	8.62	59.1	97	59.9	98
Phosphorus	25	<	<	1420	95	1380	92
Potassium	100	317	289	1390	91	1410	92
Selenium	1	89.6	91.1	66.3	94	66.6	95
Silver	0.1	0.138	0.151	28.6	95	28.5	95
Sodium	20	7470	7630	2460	110	2380	104
Strontium	0.1	5.84	5.81	56.8	94	58.5	96
Tin	0.1	24.4	23.0	31.8	97	33.6	103
Titanium	1	22.1	21.8	59.5	95	59.9	96
Vanadium	0.1	0.633	0.716	57.4	96	58.5	97
Zinc	3	17.9	16.5	116	95	119	98
Sulphur	3000	140000	180000	34800	nq	33900	nq
Silicon	75	42800	43600	9310	103	9210	101

APPENDIX 10

Semi-Volatile Organics Train
Recovery Data Sheets
(4 pages)

ORTECH Semi-Volatile Organics Train Recovery Data Sheet

Client : Clean Habors
Project No.: 22180
Sample Batch No.: 22-22180-SVOC-

Test No.: ~~1-M29~~ 1
Test Date: NOV 8th/2022
Test Location: Incinerator Stack

Sample ID 1

Nozzle, Probe Liner, Cyclone Bypass, F.H. & B.H. Filter Housing, Frit & Connecting Glassware to Top of Condenser

CONTAINER TS1

Empty Wt:	405.0
After Acetone/ Hexane Rinse:	689.5
Total TS1:	284.5

MARK FLUID LEVEL

SEAL AND LABEL CONTAINER TS1

Sample ID 2

Filter

CONTAINER TS2

Colour: White

FOLD IN FOIL

SEAL AND LABEL CONTAINER TS2

Sample ID 3

XAD-II Trap

CONTAINER TS3

	Initial Wt:	~~675.4~~ 654.6
	Final Wt:	677.1
1	Gain:	22.5
	Colour:	WHITE

SEAL TRAP

WRAP IN FOIL

LABEL AS CONTAINER TS3

Sample ID 4

Impingers 1, 2 & 3

CONTAINER TS4

	Impinger #1 Jumbo K.O.	
	Empty Wt:	730.1 ~~722.2~~
	Final Wt:	3703.9
2	Gain:	2973.8
	Colour:	clear

	Impinger #2 Ethylene Glycol	
	Empty Wt:	529.1
	Initial Wt:	~~644.0~~ 633.6
	Final Wt:	656.6
3	Gain:	23.0
	Colour:	Clear

	Impinger #3 Empty	
	Empty Wt:	563.5
	Final Wt:	563.9
4	Gain:	0.4
	Colour:	Clear

Container TS4 Weights	
Empty Wt:	1352.7
With Imp Soln:	4451.1
Imp Volume:	3098.4
After ~100g H_2O Rinse:	4660.4
Total TS4:	3307.7

Sample ID 5

Back-Half Rinses Trap Bottom U-Tube, Imp. Inlet Stem, U-Tubes and Impingers

CONTAINER TS5

Empty Wt:	406.4
After Acetone Rinse:	516.4
Acetone Rinse Gain:	110.0
After Hexane Rinse:	651.3
Hexane Rinse Gain:	134.9
Total TS5:	244.9

Use 100 - 150g acetone total & 100- 150g of hexane total for rinses

Impinger Box ID: 8

Impinger 4 Silica Gel

CONTAINER TS6 (Impinger)

	Initial Wt:	~~975.9~~ 970.0
	Final Wt:	978.7
5	Gain:	8.7
	% Spent:	

Train & Proofing Identification	
Glassware Train Proofing Provided By:	ALS
Trap ID:	4 ~~-32~~
HPLC Batch No.:	ALS
Ethylene Gylcol Batch No.:	lot # 212170
Hexane Batch No.:	lot # 106953
Acetone Batch No.:	lot # 106906

Train Loaded By: C. BELORE
Train Recovered By: AP/DL

CWTR = 1 + 2 + 3 + 4: 3019.7

WCBDA=5: 8.7

TS1, TS4, TS5 - 1L Amber Glass Bottle
TS2 - Glass Petri Dish
TS3 - Glass Trap

2814.2
\- 1352.7
1461.5

2242.4g.

ORTECH Semi-Volatile Organics Train Recovery Data Sheet

Client : Clean Habors
Project No.: 22180
Sample Batch No.: 22-22180-SVOC-

Test No.: 2-SVOC
Test Date: Nov 9th /2022
Test Location: Incinerator Stack

Sample ID 6

Nozzle, Probe Liner, Cyclone Bypass, F.H. & B.H. Filter Housing, Frit & Connecting Glassware to Top of Condenser

CONTAINER TS1

Empty Wt:	405.6
After Acetone/ Hexane Rinse:	733.3
Total TS1:	327.7

MARK FLUID LEVEL

SEAL AND LABEL CONTAINER TS1

Sample ID 7

Filter

CONTAINER TS2

Colour: WHITE

FOLD IN FOIL

SEAL AND LABEL CONTAINER TS2

Sample ID 8

XAD-II Trap

CONTAINER TS3

Initial Wt:	~~677.3~~ 647.2
Final Wt:	674.1
1 Gain:	26.9
Colour:	WHITE

SEAL TRAP

WRAP IN FOIL

LABEL AS CONTAINER TS3

Sample ID 9

Impingers 1, 2 & 3

CONTAINER TS4

Impinger #1 Jumbo K.O.	
Empty Wt:	700.6
Final Wt:	~~2184.2~~ 3702.8
2 Gain:	3002.2
Colour:	—

Impinger #2 Ethylene Glycol	
Empty Wt:	660.1
Initial Wt:	787.1
Final Wt:	807.9
3 Gain:	20.8
Colour:	—

Impinger #3 Empty	
Empty Wt:	529.0
Final Wt:	529.4
4 Gain:	0.4
Colour:	—

Container TS4 Weights	
Empty Wt:	1351.8
With Imp Soln:	4492.6
Imp Volume:	3140.8
After ~100g H_2O Rinse:	4666.1
Total TS4:	3314.3

CWTR = 1 + 2 + 3 + 4: ~~3040.4~~ 3050.3

WCBDA=5: 7.9

2870.4
−1351.8
1518.6
+1483.6

Sample ID 10

Back-Half Rinses Trap Bottom U-Tube, Imp. Inlet Stem, U-Tubes and Impingers

CONTAINER TS5

Empty Wt:	406.4
After Acetone Rinse:	459.1
Acetone Rinse Gain:	52.7
After Hexane Rinse:	495.9
Hexane Rinse Gain:	36.8
Total TS5:	89.5

Use 100 - 150g acetone total & 100- 150g of hexane total for rinses

Impinger Box ID: 13

Impinger 4 Silica Gel

CONTAINER TS6 (Impinger)

Initial Wt:	954.3
Final Wt:	962.2
5 Gain:	7.9
% Spent:	

Train & Proofing Identification	
Glassware Train Proofing Provided By:	ALS
Trap ID:	S ~~30~~
HPLC Batch No.:	ALS
Ethylene Gylcol Batch No.:	lot # 212170
Hexane Batch No.:	lot # 106753
Acetone Batch No.:	lot # 106906

Train Loaded By: C. BELORE
Train Recovered By: AP/DU

TS1, TS4, TS5 - 1L Amber Glass Bottle
TS2 - Glass Petri Dish
TS3 - Glass Trap

ORTECH Semi-Volatile Organics Train Recovery Data Sheet

Client : Clean Habors
Project No.: 22180
Sample Batch No.: 22-22180-SVOC-

Test No.: 3
Test Date: NOV 10/22
Test Location: Incinerator Stack

Sample ID 11

Nozzle, Probe Liner, Cyclone Bypass, F.H. & B.H. Filter Housing, Frit & Connecting Glassware to Top of Condenser

CONTAINER TS1

Empty Wt:	426.
After Acetone/ Hexane Rinse:	702.9
Total TS1:	276.9

MARK FLUID LEVEL

SEAL AND LABEL CONTAINER TS1

Sample ID 12

Filter

CONTAINER TS2

Colour: WHITE

FOLD IN FOIL

SEAL AND LABEL CONTAINER TS2

Sample ID 13

XAD-II Trap

CONTAINER TS3

	Initial Wt:	655.5 ~~682.1~~
	Final Wt:	680.8
1	Gain:	25.3
	Colour:	WHITE

SEAL TRAP

WRAP IN FOIL

LABEL AS CONTAINER TS3

Sample ID 14

Impingers 1, 2 & 3

CONTAINER TS4

	Impinger #1 Jumbo K.O.	
	Empty Wt:	699.3
	Final Wt:	3411.5 -
2	Gain:	2712.2
	Colour:	Clear

	Impinger #2 Ethylene Glycol	
	Empty Wt:	659.0
	Initial Wt:	762.7
	Final Wt:	785.2
3	Gain:	22.5
	Colour:	clear

	Impinger #3 Empty	
	Empty Wt:	663.2
	Final Wt:	663.5
4	Gain:	0.3
	Colour:	clear

Container TS4 Weights	
Empty Wt:	1354.3
With Imp Soln:	4185.6
Imp Volume:	2831.3
After ~100g H_2O Rinse:	2943.2
Total TS4:	1588.9

CWTR = 1 + 2 + 3 + 4: ~~1399.5~~ ~~2734.5~~ 2760.3

WCBDA=5: 10.9

Sample ID 15

Back-Half Rinses
Trap Bottom U-Tube, Imp. Inlet Stem, U-Tubes and Impingers

CONTAINER TS5

Empty Wt:	405.0
After Acetone Rinse:	486.8
Acetone Rinse Gain:	81.8
After Hexane Rinse:	612.9
Hexane Rinse Gain:	126.1
Total TS5:	207.9

Use 100 - 150g acetone total & 100- 150g of hexane total for rinses

Impinger Box ID: 12

TS1, TS4, TS5 - 1L Amber Glass Bottle
TS2 - Glass Petri Dish
TS3 - Glass Trap

Impinger 4
Silica Gel

CONTAINER TS6 (Impinger)

	Initial Wt:	984.5
	Final Wt:	995.4
5	Gain:	10.9
	% Spent:	15

Train & Proofing Identification	
Glassware Train Proofing Provided By:	ALS
Trap ID:	2 ~~31~~
HPLC Batch No.:	ALS
Ethylene Gylcol Batch No.:	lot # 212170
Hexane Batch No.:	
Acetone Batch No.:	

2715.1
-1354.3

+ ~~1354~~ 2050.7

Train Loaded By: C. BELORE
Train Recovered By: AP/DU

ORTECH Semi-Volatile Organics Train Recovery Data Sheet

Client : Clean Habors
Project No.: 22180
Sample Batch No.: 22-22180-SVOC-

Test No.: BLANK
Test Date: NOV 9/22
Test Location: Incinerator Stack

Sample ID 16

Nozzle, Probe Liner, Cyclone Bypass, F.H. & B.H. Filter Housing, Frit & Connecting Glassware to Top of Condenser

CONTAINER TS1

Empty Wt:	405.8
After Acetone/ Hexane Rinse:	697.3
Total TS1:	291.5

MARK FLUID LEVEL

SEAL AND LABEL CONTAINER TS1

Sample ID 17

Filter

CONTAINER TS2

Colour: WHITE

FOLD IN FOIL

SEAL AND LABEL CONTAINER TS2

Sample ID 18

XAD-II Trap

CONTAINER TS3

Initial Wt:	~~622.7~~ 646.2
Final Wt:	646.2
1 Gain:	—
Colour:	WHITE

SEAL TRAP

WRAP IN FOIL

LABEL AS CONTAINER TS3

Sample ID 19

Impingers 1, 2 & 3

CONTAINER TS4

Impinger #1 Jumbo K.O.	
Empty Wt:	708.7
Final Wt:	
2 Gain:	
Colour:	

Impinger #2 Ethylene Glycol	
Empty Wt:	657.5
Initial Wt:	763.1
Final Wt:	
3 Gain:	
Colour:	

Impinger #3 Empty,	
Empty Wt:	644.4
Final Wt:	
4 Gain:	
Colour:	

Container TS4 Weights	
Empty Wt:	404.9
With Imp Soln:	
Imp Volume:	581.5
After ~100g H_2O Rinse:	711.6
Total TS4:	

CWTR = 1 + 2 + 3 + 4:

WCBDA=5:

Sample ID 20

Back-Half Rinses Trap Bottom U-Tube, Imp. Inlet Stem, U-Tubes and Impingers

CONTAINER TS5

Empty Wt:	405.4
After Acetone Rinse:	—
Acetone Rinse Gain:	—
After Hexane Rinse:	651.1
Hexane Rinse Gain:	—
Total TS5:	245.7

Use 100 - 150g acetone total & 100- 150g of hexane total for rinses

Impinger Box ID: 4

Impinger 4 Silica Gel

CONTAINER TS6 (Impinger)

Initial Wt:	959.1
Final Wt:	
5 Gain:	
% Spent:	

Train & Proofing Identification	
Glassware Train Proofing Provided By:	ALS
Trap ID:	#1 ~~33~~
HPLC Batch No.:	ALS
Ethylene Gylcol Batch No.:	lot # 212170
Hexane Batch No.:	106953
Acetone Batch No.:	106906

Train Loaded By: C. BELUTE
Train Recovered By:

TS1, TS4, TS5 - 1L Amber Glass Bottle
TS2 - Glass Petri Dish
TS3 - Glass Trap

APPENDIX 11

Semi-Volatile Organics Analytical Reports
(76 pages)

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

Certificate of Analysis

ALS Project Contact: Lynne Wrona
ALS Project ID: ORT100
ALS WO#: L2740270
Date of Report 9-Jan-23
Date of Sample Receipt 14-Nov-22

Client Name: ORTECH Environmental
Client Address: 804 Southdown Road
Mississauga ON
L5J 2Y4
Client Contact: Chris Belore
Client Project ID: 22180 Clean Harbors

COMMENTS: **PCDD/F by EPA M23**

Two of the client samples, "22-22180-SVOC-(6 THRU 10) TEST#2" and "22-22180-SVOC-(11 THRU 15) TEST#3" (lab id's L2740270-2 and L2740270-3) were partially lost during sample preparation. While the Extraction Standard recoveries were below the method criteria, the native results were recovery corrected by Isotope Dilution so, while the Estimated Detection Limits may be elevated, the sample results are considered accurate. The control demonstrated by the Sample Standards (Field Spikes) verifies the accuracy of the native results since they are similarly calculated.

Certified by:

Bradley Reimer
GC/MS Laboratory Senior Technical Specialist

ALS Life Sciences

Sample Analysis summary Report

Sample Name	**22-22180-SVOC-(1 THRU 5) TEST#1**	**22-22180-SVOC-(6 THRU 10) TEST#2**	**22-22180-SVOC-(11 THRU 15) TEST#3**	**22-22180-SVOC-(16 THRU 20) BLANK**
ALS Sample ID	L2740270-1	L2740270-2	L2740270-3	L2740270-4
Sample Size	1	1	1	1
Sample size units	sample	sample	sample	sample
Percent Moisture	n/a	n/a	n/a	n/a
Sample Matrix	Stack	Stack	Stack	Stack
Sampling Date	8-Nov-22	9-Nov-22	10-Nov-22	10-Nov-22
Extraction Date	22-Nov-23	22-Nov-23	22-Nov-23	22-Nov-23
Target Analytes	**pg**	**pg**	**pg**	**pg**
2,3,7,8-TCDD	<6.1	<33	<8.2	<3.3
1,2,3,7,8-PeCDD	<6.8	<30	<7.0	<1.9
1,2,3,4,7,8-HxCDD	<3.9	<27	<6.3	<2.7
1,2,3,6,7,8-HxCDD	11.8	<26	<6.1	<2.6
1,2,3,7,8,9-HxCDD	8.15	<27	<6.2	<2.6
1,2,3,4,6,7,8-HpCDD	<43	98.5	<23	<3.2
OCDD	59.2	<110	46.1	<8.4
2,3,7,8-TCDF	<15	<53	<16	<2.3
1,2,3,7,8-PeCDF	<8.0	45.2	<8.1	<1.8
2,3,4,7,8-PeCDF	21.9	<30	<7.5	<1.5
1,2,3,4,7,8-HxCDF	5.23	<34	<4.8	<1.2
1,2,3,6,7,8-HxCDF	<9.0	<33	<4.6	<1.1
2,3,4,6,7,8-HxCDF	12.8	<33	<4.7	<1.1
1,2,3,7,8,9-HxCDF	<7.1	<41	<11	<2.4
1,2,3,4,6,7,8-HpCDF	21.5	61.9	10.0	<1.8
1,2,3,4,7,8,9-HpCDF	<7.0	<45	<7.6	<2.2
OCDF	<12	<84	<30	<4.1
Field Spike Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**
37Cl4-2,3,7,8-TCDD	101	106	101	103
13C12-1,2,3,4,7,8-HxCDD	106	101	113	112
13C12-2,3,4,7,8-PeCDF	100	100	103	101
13C12-1,2,3,4,7,8-HxCDF	80	91	80	77
13C12-1,2,3,4,7,8,9-HpCDF	99	97	98	104
Extraction Standards				
13C12-2,3,7,8-TCDD	64	7	27	93
13C12-1,2,3,7,8-PeCDD	71	9	33	112
13C12-1,2,3,6,7,8-HxCDD	64	8	26	90
13C12-1,2,3,4,6,7,8-HpCDD	55	7	23	80
13C12-OCDD	50	4	18	64
13C12-2,3,7,8-TCDF	68	9	29	102
13C12-1,2,3,7,8-PeCDF	77	11	35	120
13C12-1,2,3,6,7,8-HxCDF	78	10	33	121
13C12-1,2,3,4,6,7,8-HpCDF	62	7	26	88
Cleanup Standard				
13C12-1,2,3,7,8,9-HxCDF	76	86	100	100
Homologue Group Totals	**pg**	**pg**	**pg**	**pg**
Total-TCDD	87.6	162	<8.2	<3.3
Total-PeCDD	112	<30	44.4	<1.9
Total-HxCDD	97.9	<27	<6.3	<2.7
Total-HpCDD	<4.8	187	<10	<3.2
Total-TCDF	108	411	105	<2.3
Total-PeCDF	52.9	176	26.6	<1.6
Total-HxCDF	47.7	<41	<5.7	<1.4
Total-HpCDF	21.5	61.9	10.0	<2.2
Toxic Equivalency - (WHO 2005)				
Lower Bound PCDD/F TEQ (WHO 2005)	10.6	2.96	0.114	0.00
Mid Point PCDD/F TEQ (WHO 2005)	21.1	60.1	12.8	3.84
Upper Bound PCDD/F TEQ (WHO 2005)	27.7	103	24.1	7.38

ALS Life Sciences

Quality Control Summary Report

Sample Name	**Method Blank**	**Laboratory Control Sample**
ALS Sample ID	WG3773490-1	WG3773490-2
Sample Size	1	1
Sample size units	sample	n/a
Percent Moisture	n/a	n/a
Sample Matrix	QC	QC
Sampling Date	n/a	n/a
Extraction Date	22-Nov-23	22-Nov-23
Target Analytes	**pg**	**% Rec**
2,3,7,8-TCDD	<2.4	100
1,2,3,7,8-PeCDD	<1.5	112
1,2,3,4,7,8-HxCDD	<1.6	101
1,2,3,6,7,8-HxCDD	<1.6	104
1,2,3,7,8,9-HxCDD	<1.6	113
1,2,3,4,6,7,8-HpCDD	<1.9	99
OCDD	<2.9	95
2,3,7,8-TCDF	<1.8	97
1,2,3,7,8-PeCDF	<2.0	111
2,3,4,7,8-PeCDF	<1.0	106
1,2,3,4,7,8-HxCDF	<0.95	91
1,2,3,6,7,8-HxCDF	<0.91	112
2,3,4,6,7,8-HxCDF	<0.93	91
1,2,3,7,8,9-HxCDF	<1.7	97
1,2,3,4,6,7,8-HpCDF	<1.5	107
1,2,3,4,7,8,9-HpCDF	<1.8	99
OCDF	<2.9	122
Field Spike Standards	**% Rec**	**% Rec**
37Cl4-2,3,7,8-TCDD	NS	NS
13C12-1,2,3,4,7,8-HxCDD	NS	NS
13C12-2,3,4,7,8-PeCDF	NS	NS
13C12-1,2,3,4,7,8-HxCDF	NS	NS
13C12-1,2,3,4,7,8,9-HpCDF	NS	NS
Extraction Standards		
13C12-2,3,7,8-TCDD	91	30
13C12-1,2,3,7,8-PeCDD	110	36
13C12-1,2,3,6,7,8-HxCDD	101	31
13C12-1,2,3,4,6,7,8-HpCDD	90	27
13C12-OCDD	69	20
13C12-2,3,7,8-TCDF	101	37
13C12-1,2,3,7,8-PeCDF	119	40
13C12-1,2,3,6,7,8-HxCDF	123	38
13C12-1,2,3,4,6,7,8-HpCDF	104	31
Cleanup Standard		
13C12-1,2,3,7,8,9-HxCDF	92	85
Homologue Group Totals	**pg**	
Total-TCDD	<2.4	
Total-PeCDD	<1.5	
Total-HxCDD	<1.6	
Total-HpCDD	<1.9	
Total-TCDF	<1.8	
Total-PeCDF	<1.1	
Total-HxCDF	<1.1	
Total-HpCDF	<1.8	
Toxic Equivalency - (WHO 2005)		
Lower Bound PCDD/F TEQ (WHO 2005)	0.00	
Mid Point PCDD/F TEQ (WHO 2005)	2.83	
Upper Bound PCDD/F TEQ (WHO 2005)	5.42	

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-SVOC-(1 THRU 5) TEST#1**	Sampling Date	8-Nov-22	
ALS Sample ID	L2740270-1	Extraction Date	22-Nov-23	
Analysis Method	EPA M23	Sample Size	1	sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	Stack	Split Ratio	8	

Approved:
K.NGUYEN
--e-signature--
04-Jan-2023

Run Information	**Run 1**
Filename	7-221230A10
Run Date	30-Dec-22 17:00
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS 7 ZB-DX-1094142

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<6.1	6.1	U		40
1,2,3,7,8-PeCDD	1	NotFnd	<6.8	6.8	U		200
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<3.9	3.9	U		200
1,2,3,6,7,8-HxCDD	0.1	33.85	11.8	3.7	J		200
1,2,3,7,8,9-HxCDD	0.1	34.05	8.15	3.8	J		200
1,2,3,4,6,7,8-HpCDD	0.01	36.32	<43	4.8	J,R	43	200
OCDD	0.0003	39.17	59.2	7.3	M,J		400
2,3,7,8-TCDF	0.1	27.91	<15	7.7	1.	15	40
1,2,3,7,8-PeCDF	0.03	30.81	<8.0	3.6	J,R	8.0	200
2,3,4,7,8-PeCDF	0.3	31.43	21.9	3.4	M,J		200
1,2,3,4,7,8-HxCDF	0.1	33.20	5.23	4.5	J		200
1,2,3,6,7,8-HxCDF	0.1	33.29	<9.0	4.3	1.	9.0	200
2,3,4,6,7,8-HxCDF	0.1	33.74	12.8	4.4	M,J		200
1,2,3,7,8,9-HxCDF	0.1	34.42	<7.1	5.4	J,R	7.1	200
1,2,3,4,6,7,8-HpCDF	0.01	35.40	21.5	5.8	M,J		200
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<7.0	7.0	U		200
OCDF	0.0003	39.51	<12	8.3	M,J,R	12	400

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	1400	28.46	101	70-130
13C12-1,2,3,4,7,8-HxCDD	14000	33.77	106	70-130
13C12-2,3,4,7,8-PeCDF	14000	31.42	100	70-130
13C12-1,2,3,4,7,8-HxCDF	14000	33.19	80	70-130
13C12-1,2,3,4,7,8,9-HpCDF	14000	36.94	99	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	16000	28.45	64	40-130
13C12-1,2,3,7,8-PeCDD	16000	31.53	71	40-130
13C12-1,2,3,6,7,8-HxCDD	16000	33.84	64	40-130
13C12-1,2,3,4,6,7,8-HpCDD	16000	36.32	55	25-130
13C12-OCDD	32000	39.17	50	25-130
13C12-2,3,7,8-TCDF	16000	27.89	68	40-130
13C12-1,2,3,7,8-PeCDF	16000	30.80	77	40-130
13C12-1,2,3,6,7,8-HxCDF	16000	33.29	78	40-130
13C12-1,2,3,4,6,7,8-HpCDF	16000	35.39	62	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	16000	34.40	76	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	1	87.6	6.1		40
Total-PeCDD	3	112	6.8		200
Total-HxCDD	3	97.9	3.9		200
Total-HpCDD	0	<4.8	4.8	U	200
Total-TCDF	5	108	7.7		40
Total-PeCDF	3	52.9	3.6		200
Total-HxCDF	5	47.7	5.4		200
Total-HpCDF	1	21.5	7.0		200

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	10.6
Mid Point PCDD/F TEQ (WHO 2005)	21.1
Upper Bound PCDD/F TEQ (WHO 2005)	27.7

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure
1.	This result is an EMPC

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-SVOC-(6 THRU 10) TEST#2**	Sampling Date	9-Nov-22
ALS Sample ID	L2740270-2	Extraction Date	22-Nov-23
Analysis Method	EPA M23	Sample Size	1 sample
Analysis Type	Sample	Percent Moisture	n/a
Sample Matrix	Stack	Split Ratio	8

Approved:
K.NGUYEN
--e-signature--
04-Jan-2023

Run Information	**Run 1**
Filename	7-221230A11
Run Date	30-Dec-22 17:45
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS 7 ZB-DX-1094142

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<33	33	U		40
1,2,3,7,8-PeCDD	1	NotFnd	<30	30	U		200
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<27	27	U		200
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<26	26	U		200
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<27	27	U		200
1,2,3,4,6,7,8-HpCDD	0.01	36.31	98.5	38	M,J		200
OCDD	0.0003	39.19	<110	73	M,J,R	110	400
2,3,7,8-TCDF	0.1	27.94	<53	32	1.	53	40
1,2,3,7,8-PeCDF	0.03	30.80	45.2	18	J		200
2,3,4,7,8-PeCDF	0.3	31.45	<30	17	J,R	30	200
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<34	34	U		200
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<33	33	U		200
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<33	33	U		200
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<41	41	U		200
1,2,3,4,6,7,8-HpCDF	0.01	35.39	61.9	37	J		200
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<45	45	U		200
OCDF	0.0003	NotFnd	<84	84	U		400

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	1400	28.46	106	70-130
13C12-1,2,3,4,7,8-HxCDD	14000	33.77	101	70-130
13C12-2,3,4,7,8-PeCDF	14000	31.42	100	70-130
13C12-1,2,3,4,7,8-HxCDF	14000	33.19	91	70-130
13C12-1,2,3,4,7,8,9-HpCDF	14000	36.94	97	70-130

Extraction Standards				
13C12-2,3,7,8-TCDD	16000	28.45	7	40-130
13C12-1,2,3,7,8-PeCDD	16000	31.53	9	40-130
13C12-1,2,3,6,7,8-HxCDD	16000	33.84	8	40-130
13C12-1,2,3,4,6,7,8-HpCDD	16000	36.31	7	25-130
13C12-OCDD	32000	39.17	4	25-130
13C12-2,3,7,8-TCDF	16000	27.89	9	40-130
13C12-1,2,3,7,8-PeCDF	16000	30.80	11	40-130
13C12-1,2,3,6,7,8-HxCDF	16000	33.28	10	40-130
13C12-1,2,3,4,6,7,8-HpCDF	16000	35.38	7	25-130

Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	16000	34.40	86	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	1	162	33		40
Total-PeCDD	0	<30	30	U	200
Total-HxCDD	0	<27	27	U	200
Total-HpCDD	2	187	38		200
Total-TCDF	4	411	32		40
Total-PeCDF	3	176	18		200
Total-HxCDF	0	<41	41	U	200
Total-HpCDF	1	61.9	45		200

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	2.96
Mid Point PCDD/F TEQ (WHO 2005)	60.1
Upper Bound PCDD/F TEQ (WHO 2005)	103

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure
1.	This result is an EMPC

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-SVOC-(11 THRU 15) TEST#3**	Sampling Date	10-Nov-22	
ALS Sample ID	L2740270-3	Extraction Date	22-Nov-23	
Analysis Method	EPA M23	Sample Size	1	sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	Stack	Split Ratio	8	

Approved:
K.NGUYEN
--e-signature--
04-Jan-2023

Run Information	**Run 1**
Filename	7-221230A12
Run Date	30-Dec-22 18:29
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS 7 ZB-DX-1094142

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<8.2	8.2	U		40
1,2,3,7,8-PeCDD	1	NotFnd	<7.0	7.0	U		200
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<6.3	6.3	U		200
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<6.1	6.1	U		200
1,2,3,7,8,9-HxCDD	0.1	34.04	<6.2	6.2	U	5.9	200
1,2,3,4,6,7,8-HpCDD	0.01	36.33	<23	10	J,R	23	200
OCDD	0.0003	39.18	46.1	22	M,J		400
2,3,7,8-TCDF	0.1	NotFnd	<16	16	U		40
1,2,3,7,8-PeCDF	0.03	NotFnd	<8.1	8.1	U		200
2,3,4,7,8-PeCDF	0.3	NotFnd	<7.5	7.5	U		200
1,2,3,4,7,8-HxCDF	0.1	33.20	<4.8	4.8	U	4.4	200
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<4.6	4.6	U		200
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<4.7	4.7	U		200
1,2,3,7,8,9-HxCDF	0.1	34.43	<11	5.7	M,J,R	11	200
1,2,3,4,6,7,8-HpCDF	0.01	35.40	10.0	6.2	M,J		200
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<7.6	7.6	U		200
OCDF	0.0003	39.51	<30	13	M,J,R	30	400

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	1400	28.48	101	70-130
13C12-1,2,3,4,7,8-HxCDD	14000	33.78	113	70-130
13C12-2,3,4,7,8-PeCDF	14000	31.43	103	70-130
13C12-1,2,3,4,7,8-HxCDF	14000	33.19	80	70-130
13C12-1,2,3,4,7,8,9-HpCDF	14000	36.94	98	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	16000	28.46	27	40-130
13C12-1,2,3,7,8-PeCDD	16000	31.54	33	40-130
13C12-1,2,3,6,7,8-HxCDD	16000	33.85	26	40-130
13C12-1,2,3,4,6,7,8-HpCDD	16000	36.32	23	25-130
13C12-OCDD	32000	39.17	18	25-130
13C12-2,3,7,8-TCDF	16000	27.91	29	40-130
13C12-1,2,3,7,8-PeCDF	16000	30.80	35	40-130
13C12-1,2,3,6,7,8-HxCDF	16000	33.29	33	40-130
13C12-1,2,3,4,6,7,8-HpCDF	16000	35.39	26	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	16000	34.41	100	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<8.2	8.2	U	40
Total-PeCDD	1	44.4	7.0		200
Total-HxCDD	0	<6.3	6.3	U	200
Total-HpCDD	0	<10	10	U	200
Total-TCDF	3	105	16		40
Total-PeCDF	1	26.6	8.1		200
Total-HxCDF	0	<5.7	5.7	U	200
Total-HpCDF	1	10.0	7.6		200

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.114
Mid Point PCDD/F TEQ (WHO 2005)	12.8
Upper Bound PCDD/F TEQ (WHO 2005)	24.1

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-SVOC-(16 THRU 20) BLANK**	Sampling Date	10-Nov-22
ALS Sample ID	L2740270-4	Extraction Date	22-Nov-23
Analysis Method	EPA M23	Sample Size	1 sample
Analysis Type	Sample	Percent Moisture	n/a
Sample Matrix	Stack	Split Ratio	8

Approved:
K.NGUYEN
--e-signature--
04-Jan-2023

Run Information	**Run 1**
Filename	7-221230A13
Run Date	30-Dec-22 19:14
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS 7 ZB-DX-1094142

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<3.3	3.3	U		40
1,2,3,7,8-PeCDD	1	NotFnd	<1.9	1.9	U		200
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<2.7	2.7	U		200
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<2.6	2.6	U		200
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<2.6	2.6	U		200
1,2,3,4,6,7,8-HpCDD	0.01	NotFnd	<3.2	3.2	U		200
OCDD	0.0003	39.19	<8.4	5.1	M,J,R	8.4	400
2,3,7,8-TCDF	0.1	NotFnd	<2.3	2.3	U		40
1,2,3,7,8-PeCDF	0.03	30.82	<1.8	1.6	M,J,R	1.8	200
2,3,4,7,8-PeCDF	0.3	NotFnd	<1.5	1.5	U		200
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<1.2	1.2	U		200
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<1.1	1.1	U		200
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<1.1	1.1	U		200
1,2,3,7,8,9-HxCDF	0.1	34.43	<2.4	1.4	J,R	2.4	200
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<1.8	1.8	U		200
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<2.2	2.2	U		200
OCDF	0.0003	39.51	<4.1	4.1	M,U		400
Field Spike Standards	**pg**		**% Rec**	**Limits**			
37Cl4-2,3,7,8-TCDD	1400	28.48	103	70-130			
13C12-1,2,3,4,7,8-HxCDD	14000	33.78	112	70-130			
13C12-2,3,4,7,8-PeCDF	14000	31.43	101	70-130			
13C12-1,2,3,4,7,8-HxCDF	14000	33.20	77	70-130			
13C12-1,2,3,4,7,8,9-HpCDF	14000	36.95	104	70-130			
Extraction Standards							
13C12-2,3,7,8-TCDD	16000	28.46	93	40-130			
13C12-1,2,3,7,8-PeCDD	16000	31.55	112	40-130			
13C12-1,2,3,6,7,8-HxCDD	16000	33.86	90	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	16000	36.33	80	25-130			
13C12-OCDD	32000	39.18	64	25-130			
13C12-2,3,7,8-TCDF	16000	27.91	102	40-130			
13C12-1,2,3,7,8-PeCDF	16000	30.81	120	40-130			
13C12-1,2,3,6,7,8-HxCDF	16000	33.30	121	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	16000	35.40	88	25-130			
Cleanup Standard	**pg**						
13C12-1,2,3,7,8,9-HxCDF	16000	34.42	100	40-130			
Homologue Group Totals		**# peaks**	**Conc. pg**	**EDL pg**			
Total-TCDD		0	<3.3	3.3	U		40
Total-PeCDD		0	<1.9	1.9	U		200
Total-HxCDD		0	<2.7	2.7	U		200
Total-HpCDD		0	<3.2	3.2	U		200
Total-TCDF		0	<2.3	2.3	U		40
Total-PeCDF		0	<1.6	1.6	U		200
Total-HxCDF		0	<1.4	1.4	U		200
Total-HpCDF		0	<2.2	2.2	U		200

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.00
Mid Point PCDD/F TEQ (WHO 2005)	3.84
Upper Bound PCDD/F TEQ (WHO 2005)	7.38

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a
ALS Sample ID	WG3773490-1	Extraction Date	22-Nov-23
Analysis Method	EPA M23	Sample Size	1 sample
Analysis Type	Blank	Percent Moisture	n/a
Sample Matrix	QC	Split Ratio	8

Approved:
K.NGUYEN
--e-signature--
04-Jan-2023

Run Information	**Run 1**
Filename	7-221230A07
Run Date	30-Dec-22 14:46
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS 7 ZB-DX-1094142

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<2.4	2.4	U		40
1,2,3,7,8-PeCDD	1	NotFnd	<1.5	1.5	U		200
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<1.6	1.6	U		200
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<1.6	1.6	U		200
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<1.6	1.6	U		200
1,2,3,4,6,7,8-HpCDD	0.01	NotFnd	<1.9	1.9	U		200
OCDD	0.0003	NotFnd	<2.9	2.9	U		400
2,3,7,8-TCDF	0.1	NotFnd	<1.8	1.8	U		40
1,2,3,7,8-PeCDF	0.03	30.82	<2.0	1.1	J,R	2.0	200
2,3,4,7,8-PeCDF	0.3	NotFnd	<1.0	1.0	U		200
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.95	0.95	U		200
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.91	0.91	U		200
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.93	0.93	U		200
1,2,3,7,8,9-HxCDF	0.1	34.42	<1.7	1.1	J,R	1.7	200
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<1.5	1.5	U		200
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.8	1.8	U		200
OCDF	0.0003	NotFnd	<2.9	2.9	U		400

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	1400		NS	
13C12-1,2,3,4,7,8-HxCDD	14000		NS	
13C12-2,3,4,7,8-PeCDF	14000		NS	
13C12-1,2,3,4,7,8-HxCDF	14000		NS	
13C12-1,2,3,4,7,8,9-HpCDF	14000		NS	
Extraction Standards				
13C12-2,3,7,8-TCDD	16000	28.45	91	40-130
13C12-1,2,3,7,8-PeCDD	16000	31.53	110	40-130
13C12-1,2,3,6,7,8-HxCDD	16000	33.84	101	40-130
13C12-1,2,3,4,6,7,8-HpCDD	16000	36.31	90	25-130
13C12-OCDD	32000	39.17	69	25-130
13C12-2,3,7,8-TCDF	16000	27.89	101	40-130
13C12-1,2,3,7,8-PeCDF	16000	30.79	119	40-130
13C12-1,2,3,6,7,8-HxCDF	16000	33.28	123	40-130
13C12-1,2,3,4,6,7,8-HpCDF	16000	35.38	104	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	16000	34.40	92	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<2.4	2.4	U	40
Total-PeCDD	0	<1.5	1.5	U	200
Total-HxCDD	0	<1.6	1.6	U	200
Total-HpCDD	0	<1.9	1.9	U	200
Total-TCDF	0	<1.8	1.8	U	40
Total-PeCDF	0	<1.1	1.1	U	200
Total-HxCDF	0	<1.1	1.1	U	200
Total-HpCDF	0	<1.8	1.8	U	200

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.00
Mid Point PCDD/F TEQ (WHO 2005)	2.83
Upper Bound PCDD/F TEQ (WHO 2005)	5.42

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalenc
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
NS	Indicates that this compound was not spiked
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a	
ALS Sample ID	WG3773490-2	Extraction Date	22-Nov-23	
Analysis Method	EPA M23	Sample Size	1	n/a
Analysis Type	LCS	Percent Moisture	n/a	
Sample Matrix	QC	Split Ratio	8	

Approved:
K.NGUYEN
--e-signature--
04-Jan-2023

Run Information	**Run 1**
Filename	7-221230A02
Run Date	30-Dec-22 11:05
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS 7 ZB-DX-1094142

Target Analytes	**pg**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	1600	28.49	100	70-130	
1,2,3,7,8-PeCDD	8000	31.57	112	70-130	
1,2,3,4,7,8-HxCDD	8000	33.80	101	70-130	
1,2,3,6,7,8-HxCDD	8000	33.87	104	70-130	
1,2,3,7,8,9-HxCDD	8000	34.06	113	70-130	
1,2,3,4,6,7,8-HpCDD	8000	36.34	99	70-130	
OCDD	16000	39.20	95	70-130	
2,3,7,8-TCDF	1600	27.95	97	70-130	
1,2,3,7,8-PeCDF	8000	30.82	111	70-130	
2,3,4,7,8-PeCDF	8000	31.46	106	70-130	
1,2,3,4,7,8-HxCDF	8000	33.23	91	70-130	
1,2,3,6,7,8-HxCDF	8000	33.31	112	70-130	
2,3,4,6,7,8-HxCDF	8000	33.74	91	70-130	
1,2,3,7,8,9-HxCDF	8000	34.43	97	70-130	
1,2,3,4,6,7,8-HpCDF	8000	35.41	107	70-130	
1,2,3,4,7,8,9-HpCDF	8000	36.97	99	70-130	
OCDF	16000	39.54	122	70-130	
Field Spike Standards	**pg**		**% Rec**	**Limits**	
37Cl4-2,3,7,8-TCDD	1400		NS		
13C12-1,2,3,4,7,8-HxCDD	14000		NS		
13C12-2,3,4,7,8-PeCDF	14000		NS		
13C12-1,2,3,4,7,8-HxCDF	14000		NS		
13C12-1,2,3,4,7,8,9-HpCDF	14000		NS		
Extraction Standards					
13C12-2,3,7,8-TCDD	16000	28.48	30	40-130	
13C12-1,2,3,7,8-PeCDD	16000	31.55	36	40-130	
13C12-1,2,3,6,7,8-HxCDD	16000	33.86	31	40-130	
13C12-1,2,3,4,6,7,8-HpCDD	16000	36.34	27	25-130	
13C12-OCDD	32000	39.18	20	25-130	
13C12-2,3,7,8-TCDF	16000	27.92	37	40-130	
13C12-1,2,3,7,8-PeCDF	16000	30.81	40	40-130	
13C12-1,2,3,6,7,8-HxCDF	16000	33.30	38	40-130	
13C12-1,2,3,4,6,7,8-HpCDF	16000	35.40	31	25-130	
Cleanup Standard	**pg**				
13C12-1,2,3,7,8,9-HxCDF	16000	34.42	85	40-130	

NS Indicates that this compound was not spiked

ALS Life Sciences
1435 Norjohn Court, Unit 1, Burlington, ON, Canada 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 Mississauga ON L5J 2Y4
ALS WO#:	L2740270	**Client Contact:**	Chris Belore
Date of Report	12-Jan-23	**Client Project ID:**	22180 Clean Harbors
Date of Sample Receipt	14-Nov-22		

COMMENTS: **PCB Congeners by EPA 1668C**

PCB Congener Group Totals and Total PCB are a sum of detected values, including EMPC values, consistent with USEPA CLP SOW CBC1.2

Two of the client samples, "22-22180-SVOC-(6 THRU 10) TEST#2" and "22-22180-SVOC-(11 THRU 15) TEST#3" (lab id's L2740270-2 and L2740270-3) were partially lost during sample preparation. While the Extraction Standard recoveries were below the method criteria, the native results were recovery corrected by Isotope Dilution so, while the Estimated Detection Limits may be elevated, the sample results are considered accurate. The control demonstrated by the Sample Standards (Field Spikes) in the PCDD/F analysis verifies the accuracy of the native results since they are similarly calculated.

While charring was identified in sample L2740270-2 sample extract which negatively impacted the PAH analyses. there is no evidence of compromise or bias to the chlorinated analytes.

Certified by:

Ron McLeod, PhD
Director, Air Toxics & Special Chemistries, Life Sciences

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	22-22180-SVOC-(1 THRU 5) TEST#1	22-22180-SVOC-(6 THRU 10) TEST#2	22-22180-SVOC-(11 THRU 15) TEST#3	22-22180-SVOC-(16 THRU 20) BLANK
ALS Sample ID	L2740270-1	L2740270-2	L2740270-3	L2740270-4
Sample Size	1	1	1	1
Sample size units	sample	sample	sample	sample
Percent Moisture	n/a	n/a	n/a	n/a
Sample Matrix	Stack	Stack	Stack	Stack
Sampling Date	8-Nov-22	9-Nov-22	10-Nov-22	10-Nov-22
Extraction Date	23-Nov-22	23-Nov-22	23-Nov-22	23-Nov-22
Target Analytes	pg	pg	pg	pg
PCB-081	<29	<92	<130	<1.9
PCB-077	518	1450	554	<2.8
PCB-123	<190	<160	<190	<2.5
PCB-118	11300	14800	13600	34.6
PCB-114	302	319	<280	<2.4
PCB-105	3700	4420	<4300	14.6
PCB-126	<17	<66	<91	<4.1
PCB-167	106	<110	<160	2.22
PCB-156/157	257	304	417	<2.5
PCB-169	<10	<8.1	<76	<2.0
PCB-189	<8.3	<10	<29	<1.0
Extraction Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**
13C12-PCB-001	7	2	4	19
13C12-PCB-003	9	2	4	21
13C12-PCB-004	9	3	4	24
13C12-PCB-015	12	5	4	25
13C12-PCB-019	12	5	5	29
13C12-PCB-037	16	9	5	32
13C12-PCB-054	11	6	5	27
13C12-PCB-081	17	11	6	33
13C12-PCB-077	17	11	6	35
13C12-PCB-104	16	8	6	33
13C12-PCB-123	16	12	7	35
13C12-PCB-118	17	12	7	37
13C12-PCB-114	16	12	6	36
13C12-PCB-105	17	12	7	37
13C12-PCB-126	17	13	6	38
13C12-PCB-155	22	11	4	39
13C12-PCB-167	20	14	9	42
13C12-PCB-156/157	19	14	8	42
13C12-PCB-169	20	15	8	44
13C12-PCB-188	23	14	7	43
13C12-PCB-189	19	15	9	40
13C12-PCB-202	25	17	10	52
13C12-PCB-205	21	16	9	45
13C12-PCB-208	24	15	9	47
13C12-PCB-206	22	17	10	47
13C12-PCB-209	20	16	6	43
Cleanup Standards				
13C12-PCB-028	17	44	20	31
13C12-PCB-111	21	51	27	38
13C12-PCB-178	28	57	33	49
Homologue Group Totals				
Total DiCB	9390	56400	9870	129
Total TriCB	12000	33600	14100	148
Total TetraCB	90200	177000	110000	703
Total PentaCB	150000	259000	199000	379
Total HexaCB	30600	37000	47200	150
Total HeptaCB	2590	2910	3700	23.8
Total OctaCB	381	489	573	12.5
Total NonaCB	41.5	30.0	<53	<1.3
DecaCB	10.0	16.0	<31	2.14
Total PCB	296000	664000	385000	1570
Toxic Equivalency - (WHO 2005)				
Lower Bound PCB TEQ	0.522	0.740	0.476	0.00154
Mid Point PCB TEQ	1.53	7.62	6.33	0.472
Upper Bound PCB TEQ	2.54	7.62	12.0	0.473

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Quality Control Summary Report

Sample Name	**Method Blank**
ALS Sample ID	WG3773490-1
Sample Size	1
Sample size units	sample
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	23-Nov-22

Target Analytes	**pg**
PCB-081	<4.2
PCB-077	<4.2
PCB-123	<4.1
PCB-118	<26
PCB-114	<4.1
PCB-105	15.9
PCB-126	<4.4
PCB-167	4.36
PCB-156/157	<5.4
PCB-169	<3.8
PCB-189	<4.4
Extraction Standards	**% Rec**
13C12-PCB-001	17
13C12-PCB-003	18
13C12-PCB-004	20
13C12-PCB-015	19
13C12-PCB-019	22
13C12-PCB-037	23
13C12-PCB-054	21
13C12-PCB-081	24
13C12-PCB-077	24
13C12-PCB-104	26
13C12-PCB-123	25
13C12-PCB-118	25
13C12-PCB-114	25
13C12-PCB-105	25
13C12-PCB-126	24
13C12-PCB-155	28
13C12-PCB-167	29
13C12-PCB-156/157	28
13C12-PCB-169	28
13C12-PCB-188	33
13C12-PCB-189	27
13C12-PCB-202	37
13C12-PCB-205	31
13C12-PCB-208	37
13C12-PCB-206	32
13C12-PCB-209	28
Cleanup Standards	
13C12-PCB-028	20
13C12-PCB-111	24
13C12-PCB-178	30
Homologue Group Totals	
Total DiCB	56.0
Total TriCB	119
Total TetraCB	345
Total PentaCB	348
Total HexaCB	156
Total HeptaCB	27.3
Total OctaCB	11.6
Total NonaCB	<3.6
DecaCB	<1.9
Total PCB	1080
Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.000608
Mid Point PCB TEQ	0.280
Upper Bound PCB TEQ	0.558

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Sample Analysis Summary Report

Sample Name	**Laboratory Control Sample**
ALS Sample ID	WG3773490-2
Sample Size	1
Sample size units	n/a
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	23-Nov-22

Target Analytes	**% Rec**
PCB-001	99
PCB-003	97
PCB-004	96
PCB-015	99
PCB-019	93
PCB-037	102
PCB-054	93
PCB-081	96
PCB-077	95
PCB-104	86
PCB-123	95
PCB-118	93
PCB-114	97
PCB-105	94
PCB-126	94
PCB-155	89
PCB-167	92
PCB-156/157	90
PCB-169	91
PCB-188	92
PCB-189	97
PCB-202	94
PCB-205	93
PCB-208	89
PCB-206	89
PCB-209	108
Extraction Standards	**% Rec**
13C12-PCB-001	10
13C12-PCB-003	11
13C12-PCB-004	13
13C12-PCB-015	14
13C12-PCB-019	17
13C12-PCB-037	27
13C12-PCB-054	20
13C12-PCB-081	34
13C12-PCB-077	35
13C12-PCB-104	28
13C12-PCB-123	36
13C12-PCB-118	37
13C12-PCB-114	37
13C12-PCB-105	37
13C12-PCB-126	37
13C12-PCB-155	31
13C12-PCB-167	43
13C12-PCB-156/157	42
13C12-PCB-169	45
13C12-PCB-188	43
13C12-PCB-189	41
13C12-PCB-202	53
13C12-PCB-205	46
13C12-PCB-208	48
13C12-PCB-206	49
13C12-PCB-209	35
Cleanup Standards	
13C12-PCB-028	20
13C12-PCB-111	36
13C12-PCB-178	46

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Sample Analysis Report

Sample Name	**22-22180-SVOC-(1 THRU 5) TEST#1**	Sampling Date	8-Nov-22
ALS Sample ID	L2740270-1	Extraction Date	23-Nov-22
Analysis Method	EPA 1668C	Sample Size	1 sample
Analysis Type	Sample	Percent Moisture	n/a
Sample Matrix	Stack	Split Ratio	8

Approved:
B.SINGH
--e-signature--
05-Jan-2023

Run Information	**Run 1**
Filename	5-221231A20
Run Date	01-Jan-23 04:04
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOCTYL271790-03

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	NotFnd	<29	29	U		200
PCB-077	0.0001	22.14	518	28			200
PCB-123	0.00003	23.10	<190	16	J,R	190	200
PCB-118	0.00003	23.27	11300	14			200
PCB-114	0.00003	23.58	302	17			200
PCB-105	0.00003	23.93	3700	15			200
PCB-126	0.1	25.52	<17	17	M,U	13	200
PCB-167	0.00003	26.37	106	9.3	J		200
PCB-156/157	0.00003	27.01	257	15	J		400
PCB-169	0.03	28.63	<10	10	M,U	3.5	200
PCB-189	0.00003	29.93	<8.3	7.5	M,J,R	8.3	200

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-001	16000	9.01	7	5-145
13C12-PCB-003	16000	10.52	9	5-145
13C12-PCB-004	16000	10.69	9	5-145
13C12-PCB-015	16000	14.35	12	5-145
13C12-PCB-019	16000	12.68	12	5-145
13C12-PCB-037	16000	18.28	16	5-145
13C12-PCB-054	16000	14.53	11	5-145
13C12-PCB-081	16000	21.83	17	10-145
13C12-PCB-077	16000	22.13	17	10-145
13C12-PCB-104	16000	17.54	16	10-145
13C12-PCB-123	16000	23.09	16	10-145
13C12-PCB-118	16000	23.26	17	10-145
13C12-PCB-114	16000	23.56	16	10-145
13C12-PCB-105	16000	23.92	17	10-145
13C12-PCB-126	16000	25.50	17	10-145
13C12-PCB-155	16000	20.49	22	10-145
13C12-PCB-167	16000	26.36	20	10-145
13C12-PCB-156/157	32000	27.01	19	10-145
13C12-PCB-169	16000	28.66	20	10-145
13C12-PCB-188	16000	23.47	23	10-145
13C12-PCB-189	16000	29.92	19	10-145
13C12-PCB-202	16000	26.25	25	10-145
13C12-PCB-205	16000	31.28	21	10-145
13C12-PCB-208	16000	29.65	24	10-145
13C12-PCB-206	16000	32.32	22	10-145
13C12-PCB-209	16000	33.41	20	10-145
Cleanup Standards				
13C12-PCB-028	16000	16.03	17	5-145
13C12-PCB-111	16000	22.01	21	10-145
13C12-PCB-178	16000	25.06	28	10-145

Homologue Group Totals				
Total DiCB	9390	37	J	1600
Total TriCB	12000	10	J	1600
Total TetraCB	90200	8.3	J	3200
Total PentaCB	150000	6.2	J	3200
Total HexaCB	30600	4.6	J	3200
Total HeptaCB	2590	7.5	J	1600
Total OctaCB	381	4.4	J	1600
Total NonaCB	41.5	8.9	J	800
DecaCB	10.0	3.2	J	800
Total PCB	296000		J	6400

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.522
Mid Point PCB TEQ	1.53
Upper Bound PCB TEQ	2.54

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-SVOC-(6 THRU 10) TEST#2**	Sampling Date	9-Nov-22	
ALS Sample ID	L2740270-2	Extraction Date	23-Nov-22	
Analysis Method	EPA 1668C	Sample Size	1	sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	Stack	Split Ratio	8	

Approved:
B.SINGH
--e-signature--
05-Jan-2023

Run Information	**Run 1**
Filename	S-221231A21
Run Date	01-Jan-23 04:47
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOCTYL271790-03

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	21.82	<92	13	J,R	92	200
PCB-077	0.0001	22.12	1450	13			200
PCB-123	0.00003	23.09	<160	15	J,R	160	200
PCB-118	0.00003	23.26	14800	14			200
PCB-114	0.00003	23.56	319	14			200
PCB-105	0.00003	23.92	4420	14			200
PCB-126	0.1	25.49	<66	14	J,1.	66	200
PCB-167	0.00003	26.37	<110	6.9	J,R	110	200
PCB-156/157	0.00003	26.99	304	11	J		400
PCB-169	0.03	28.66	<8.1	7.0	J,R	8.1	200
PCB-189	0.00003	29.93	<10	5.4	M,J,R	10	200

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**	
13C12-PCB-001	16000	9.01	2	5-145	
13C12-PCB-003	16000	10.52	2	5-145	
13C12-PCB-004	16000	10.69	3	5-145	
13C12-PCB-015	16000	14.32	5	5-145	
13C12-PCB-019	16000	12.67	5	5-145	
13C12-PCB-037	16000	18.25	9	5-145	
13C12-PCB-054	16000	14.52	6	5-145	R
13C12-PCB-081	16000	21.80	11	10-145	
13C12-PCB-077	16000	22.11	11	10-145	
13C12-PCB-104	16000	17.52	8	10-145	
13C12-PCB-123	16000	23.07	12	10-145	
13C12-PCB-118	16000	23.24	12	10-145	
13C12-PCB-114	16000	23.55	12	10-145	
13C12-PCB-105	16000	23.91	12	10-145	
13C12-PCB-126	16000	25.48	13	10-145	
13C12-PCB-155	16000	20.48	11	10-145	
13C12-PCB-167	16000	26.35	14	10-145	
13C12-PCB-156/157	32000	27.00	14	10-145	
13C12-PCB-169	16000	28.65	15	10-145	
13C12-PCB-188	16000	23.46	14	10-145	
13C12-PCB-189	16000	29.90	15	10-145	
13C12-PCB-202	16000	26.24	17	10-145	
13C12-PCB-205	16000	31.27	16	10-145	
13C12-PCB-208	16000	29.64	15	10-145	
13C12-PCB-206	16000	32.32	17	10-145	
13C12-PCB-209	16000	33.39	16	10-145	
Cleanup Standards					
13C12-PCB-028	16000	16.01	44	5-145	
13C12-PCB-111	16000	22.00	51	10-145	
13C12-PCB-178	16000	25.04	57	10-145	

Homologue Group Totals				
Total DiCB	56400	45	J	1600
Total TriCB	33600	9.8	J	1600
Total TetraCB	177000	6.3	J	3200
Total PentaCB	259000	6.0	J	3200
Total HexaCB	37000	3.6	J	3200
Total HeptaCB	2910	5.4	J	1600
Total OctaCB	489	4.3	J	1600
Total NonaCB	30.0	9.5	J	800
DecaCB	16.0	3.2	J	800
Total PCB	664000		J	6400

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.740
Mid Point PCB TEQ	7.62
Upper Bound PCB TEQ	7.62

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
1.	This result is an EMPC
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-SVOC-(11 THRU 15) TEST#3**	Sampling Date	10-Nov-22
ALS Sample ID	L2740270-3	Extraction Date	23-Nov-22
Analysis Method	EPA 1668C	Sample Size	1 sample
Analysis Type	Sample	Percent Moisture	n/a
Sample Matrix	Stack	Split Ratio	8

Approved:
B.SINGH
--e-signature--
05-Jan-2023

Run Information	**Run 1**
Filename	5-221231A22
Run Date	01-Jan-23 05:29
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOCTYL271790-03

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	21.85	<130	130	M,U	40	200
PCB-077	0.0001	22.15	554	130	M		200
PCB-123	0.00003	23.11	<190	79	J,R	190	200
PCB-118	0.00003	23.27	13600	78			200
PCB-114	0.00003	23.58	<280	84	R	280	200
PCB-105	0.00003	23.93	<4300	85	R	4300	200
PCB-126	0.1	25.50	<91	91	M,U	54	200
PCB-167	0.00003	26.39	<160	57	J,R	160	200
PCB-156/157	0.00003	27.01	417	98			400
PCB-169	0.03	NotFnd	<76	76	U		200
PCB-189	0.00003	NotFnd	<29	29	U		200

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**	
13C12-PCB-001	16000	9.02	4	5-145	R
13C12-PCB-003	16000	10.54	4	5-145	
13C12-PCB-004	16000	10.69	4	5-145	
13C12-PCB-015	16000	14.37	4	5-145	
13C12-PCB-019	16000	12.68	5	5-145	
13C12-PCB-037	16000	18.29	5	5-145	
13C12-PCB-054	16000	14.54	5	5-145	
13C12-PCB-081	16000	21.83	6	10-145	
13C12-PCB-077	16000	22.14	6	10-145	
13C12-PCB-104	16000	17.54	6	10-145	
13C12-PCB-123	16000	23.09	7	10-145	
13C12-PCB-118	16000	23.26	7	10-145	
13C12-PCB-114	16000	23.57	6	10-145	
13C12-PCB-105	16000	23.92	7	10-145	
13C12-PCB-126	16000	25.50	6	10-145	
13C12-PCB-155	16000	20.49	4	10-145	
13C12-PCB-167	16000	26.36	9	10-145	
13C12-PCB-156/157	32000	27.01	8	10-145	
13C12-PCB-169	16000	28.67	8	10-145	
13C12-PCB-188	16000	23.49	7	10-145	
13C12-PCB-189	16000	29.92	9	10-145	
13C12-PCB-202	16000	26.24	10	10-145	
13C12-PCB-205	16000	31.28	9	10-145	
13C12-PCB-208	16000	29.65	9	10-145	
13C12-PCB-206	16000	32.32	10	10-145	
13C12-PCB-209	16000	33.41	6	10-145	
Cleanup Standards					
13C12-PCB-028	16000	16.04	20	5-145	
13C12-PCB-111	16000	22.01	27	10-145	
13C12-PCB-178	16000	25.06	33	10-145	

Homologue Group Totals

Total DiCB	9870	300	J	1600
Total TriCB	14100	69	J	1600
Total TetraCB	110000	58	J	3200
Total PentaCB	199000	40	J	3200
Total HexaCB	47200	48	J	3200
Total HeptaCB	3700	29	J	1600
Total OctaCB	573	21	J	1600
Total NonaCB	<53	53	U	800
DecaCB	<31	31	U	800
Total PCB	385000		J	6400

Toxic Equivalency - (WHO 2005)

Lower Bound PCB TEQ	0.476
Mid Point PCB TEQ	6.33
Upper Bound PCB TEQ	12.0

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-SVOC-(16 THRU 20) BLANK**	Sampling Date	10-Nov-22	
ALS Sample ID	L2740270-4	Extraction Date	23-Nov-22	
Analysis Method	EPA 1668C	Sample Size	1	sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	Stack	Split Ratio	8	

Approved:
B.SINGH
--e-signature--
05-Jan-2023

Run Information	**Run 1**
Filename	5-221231A23
Run Date	01-Jan-23 06:11
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOCTYL271790-03

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	NotFnd	<1.9	1.9	U		200
PCB-077	0.0001	22.12	<2.8	1.9	M,J,R	2.8	200
PCB-123	0.00003	NotFnd	<2.5	2.5	U		200
PCB-118	0.00003	23.26	34.6	2.3	J		200
PCB-114	0.00003	NotFnd	<2.4	2.4	U		200
PCB-105	0.00003	23.92	14.6	2.4	J,B		200
PCB-126	0.1	25.48	<4.1	2.4	M,J,R	4.1	200
PCB-167	0.00003	26.37	2.22	1.3	J,B		200
PCB-156/157	0.00003	27.00	<2.5	2.0	J,R	2.5	400
PCB-169	0.03	28.67	<2.0	1.3	J,R	2.0	200
PCB-189	0.00003	29.92	<1.0	1.0	M,U	0.58	200

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-001	16000	9.01	19	5-145
13C12-PCB-003	16000	10.52	21	5-145
13C12-PCB-004	16000	10.69	24	5-145
13C12-PCB-015	16000	14.33	25	5-145
13C12-PCB-019	16000	12.67	29	5-145
13C12-PCB-037	16000	18.25	32	5-145
13C12-PCB-054	16000	14.52	27	5-145
13C12-PCB-081	16000	21.81	33	10-145
13C12-PCB-077	16000	22.11	35	10-145
13C12-PCB-104	16000	17.52	33	10-145
13C12-PCB-123	16000	23.07	35	10-145
13C12-PCB-118	16000	23.24	37	10-145
13C12-PCB-114	16000	23.55	36	10-145
13C12-PCB-105	16000	23.91	37	10-145
13C12-PCB-126	16000	25.49	38	10-145
13C12-PCB-155	16000	20.48	39	10-145
13C12-PCB-167	16000	26.35	42	10-145
13C12-PCB-156/157	32000	27.00	42	10-145
13C12-PCB-169	16000	28.65	44	10-145
13C12-PCB-188	16000	23.47	43	10-145
13C12-PCB-189	16000	29.90	40	10-145
13C12-PCB-202	16000	26.24	52	10-145
13C12-PCB-205	16000	31.27	45	10-145
13C12-PCB-208	16000	29.64	47	10-145
13C12-PCB-206	16000	32.32	47	10-145
13C12-PCB-209	16000	33.39	43	10-145
Cleanup Standards				
13C12-PCB-028	16000	16.01	31	5-145
13C12-PCB-111	16000	22.00	38	10-145
13C12-PCB-178	16000	25.04	49	10-145

Homologue Group Totals				
Total DiCB	129	4.8	J	1600
Total TriCB	148	1.8	J	1600
Total TetraCB	703	1.4	J	3200
Total PentaCB	379	0.96	J	3200
Total HexaCB	150	0.55	J	3200
Total HeptaCB	23.8	0.96	J	1600
Total OctaCB	12.5	0.43	J	1600
Total NonaCB	<1.3	1.3	U	800
DecaCB	2.14	0.53	J	800
Total PCB	1570		J	6400

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.00154
Mid Point PCB TEQ	0.472
Upper Bound PCB TEQ	0.473

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.		
TEF	Indicates the Toxic Equivalency Factor	TEQ	Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.		
M	Indicates that a peak has been manually integrated.		
U	Indicates that this compound was not detected above the EDL.		
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.		
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.		
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.		
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure		

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a	
ALS Sample ID	WG3773490-1	Extraction Date	23-Nov-22	
Analysis Method	EPA 1668C	Sample Size	1	sample
Analysis Type	Blank	Percent Moisture	n/a	
Sample Matrix	QC	Split Ratio	8	

Approved:
B.SINGH
--e-signature--
05-Jan-2023

Run Information	**Run 1**
Filename	5-221231A19
Run Date	01-Jan-23 03:22
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOCTYL271790-03

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	NotFnd	<4.2	4.2	U		200
PCB-077	0.0001	22.13	<4.2	4.2	M,U		200
PCB-123	0.00003	NotFnd	<4.1	4.1	U		200
PCB-118	0.00003	23.27	<26	3.8	J,R	26	200
PCB-114	0.00003	NotFnd	<4.1	4.1	U		200
PCB-105	0.00003	23.93	15.9	4.0	M,J		200
PCB-126	0.1	NotFnd	<4.4	4.4	U		200
PCB-167	0.00003	26.36	4.36	3.3	J		200
PCB-156/157	0.00003	27.06	<5.4	5.4	M,U	2.5	400
PCB-169	0.03	NotFnd	<3.8	3.8	U		200
PCB-189	0.00003	29.92	<4.4	3.6	J,R	4.4	200

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-001	16000	9.02	17	5-145
13C12-PCB-003	16000	10.52	18	5-145
13C12-PCB-004	16000	10.69	20	5-145
13C12-PCB-015	16000	14.34	19	5-145
13C12-PCB-019	16000	12.68	22	5-145
13C12-PCB-037	16000	18.27	23	5-145
13C12-PCB-054	16000	14.53	21	5-145
13C12-PCB-081	16000	21.82	24	10-145
13C12-PCB-077	16000	22.12	24	10-145
13C12-PCB-104	16000	17.53	26	10-145
13C12-PCB-123	16000	23.09	25	10-145
13C12-PCB-118	16000	23.26	25	10-145
13C12-PCB-114	16000	23.56	25	10-145
13C12-PCB-105	16000	23.92	25	10-145
13C12-PCB-126	16000	25.49	24	10-145
13C12-PCB-155	16000	20.49	28	10-145
13C12-PCB-167	16000	26.36	29	10-145
13C12-PCB-156/157	32000	27.01	28	10-145
13C12-PCB-169	16000	28.66	28	10-145
13C12-PCB-188	16000	23.47	33	10-145
13C12-PCB-189	16000	29.92	27	10-145
13C12-PCB-202	16000	26.24	37	10-145
13C12-PCB-205	16000	31.28	31	10-145
13C12-PCB-208	16000	29.65	37	10-145
13C12-PCB-206	16000	32.32	32	10-145
13C12-PCB-209	16000	33.41	28	10-145

Cleanup Standards				
13C12-PCB-028	16000	16.03	20	5-145
13C12-PCB-111	16000	22.01	24	10-145
13C12-PCB-178	16000	25.04	30	10-145

Homologue Group Totals				
Total DiCB	56.0	13	J	1600
Total TriCB	119	5.2	J	1600
Total TetraCB	345	2.1	J	3200
Total PentaCB	348	2.0	J	3200
Total HexaCB	156	1.5	J	3200
Total HeptaCB	27.3	3.2	J	1600
Total OctaCB	11.6	1.7	J	1600
Total NonaCB	<3.6	3.6	U	800
DecaCB	<1.9	1.9	U	800
Total PCB	1080		J	6400

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.000608
Mid Point PCB TEQ	0.280
Upper Bound PCB TEQ	0.558

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a
ALS Sample ID	WG3773490-2	Extraction Date	23-Nov-22
Analysis Method	EPA 1668C	Sample Size	1 n/a
Analysis Type	LCS	Percent Moisture	n/a
Sample Matrix	QC	Split Ratio	8

Approved:
B.SINGH
--e-signature--
05-Jan-2023

Run Information	**Run 1**
Filename	5-221231A17
Run Date	01-Jan-23 01:58
Final Volume	25 ul
Dilution Factor	1
Analysis Units	% Rec
Instrument - Column	HRMS-5 SPBOCTYL271790-03

Target Analytes	**pg**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
PCB-001	8000	9.02	99	60-135	
PCB-003	8000	10.54	97	60-135	
PCB-004	8000	10.70	96	60-135	
PCB-015	8000	14.36	99	60-135	
PCB-019	8000	12.69	93	60-135	
PCB-037	8000	18.28	102	60-135	
PCB-054	8000	14.55	93	60-135	
PCB-081	8000	21.83	96	60-135	
PCB-077	8000	22.14	95	60-135	
PCB-104	8000	17.55	86	60-135	
PCB-123	8000	23.10	95	60-135	
PCB-118	8000	23.27	93	60-135	
PCB-114	8000	23.57	97	60-135	
PCB-105	8000	23.93	94	60-135	
PCB-126	8000	25.52	94	60-135	
PCB-155	8000	20.49	89	60-135	
PCB-167	8000	26.37	92	60-135	
PCB-156/157	16000	27.03	90	60-135	
PCB-169	8000	28.67	91	60-135	
PCB-188	8000	23.50	92	60-135	
PCB-189	8000	29.93	97	60-135	
PCB-202	8000	26.26	94	60-135	
PCB-205	8000	31.30	93	60-135	
PCB-208	8000	29.67	89	60-135	
PCB-206	8000	32.34	89	60-135	
PCB-209	8000	33.44	108	60-135	
Extraction Standards		**Time**	**% Rec**	**Limits**	
13C12-PCB-001	16000	9.01	10	15-145	
13C12-PCB-003	16000	10.52	11	15-145	
13C12-PCB-004	16000	10.69	13	15-145	
13C12-PCB-015	16000	14.35	14	15-145	
13C12-PCB-019	16000	12.68	17	15-145	
13C12-PCB-037	16000	18.27	27	15-145	
13C12-PCB-054	16000	14.54	20	15-145	
13C12-PCB-081	16000	21.82	34	40-145	
13C12-PCB-077	16000	22.12	35	40-145	
13C12-PCB-104	16000	17.54	28	40-145	
13C12-PCB-123	16000	23.09	36	40-145	
13C12-PCB-118	16000	23.26	37	40-145	
13C12-PCB-114	16000	23.56	37	40-145	
13C12-PCB-105	16000	23.92	37	40-145	
13C12-PCB-126	16000	25.50	37	40-145	
13C12-PCB-155	16000	20.49	31	40-145	
13C12-PCB-167	16000	26.36	43	40-145	
13C12-PCB-156/157	32000	27.01	42	40-145	
13C12-PCB-169	16000	28.66	45	40-145	
13C12-PCB-188	16000	23.47	43	40-145	
13C12-PCB-189	16000	29.92	41	40-145	
13C12-PCB-202	16000	26.25	53	40-145	
13C12-PCB-205	16000	31.28	46	40-145	
13C12-PCB-208	16000	29.65	48	40-145	
13C12-PCB-206	16000	32.32	49	40-145	
13C12-PCB-209	16000	33.41	35	40-145	
Cleanup Standards					
13C12-PCB-028	16000	16.03	20	15-145	
13C12-PCB-111	16000	22.01	36	40-145	
13C12-PCB-178	16000	25.04	46	40-145	

ALS Life Sciences
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 Mississauga, ON, L5J 2Y4 Canada
ALS WO#:	L2740270		
Date of Report	3-Jan-23		
Date of Sample Receipt	14-Nov-22	**Client Contact:**	Chris Belore
		Client Project ID:	22180 Clean Harbors

COMMENTS: **CB by LRGC/MS - Isotope dilution**

The Soxhlet extract went dry for the Run 2 (L2740270-2) sample which explains the low extraction standard recoveries for the organic targets. All chlorinated organic targets patterns (i.e. for PCDD/F, PCB, CB, OCP, and CPs) compare well between runs 1, 2 and 3. Therefore isotope dilution correction of data employed for these analysis has successfully corrected for losses when the extract went dry and there is no evidence for data compromise for these target group determinations.

Certified by: ______________________
Ron McLeod, Ph.D.
Technical Director

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	**Method Blank**		**22-22180-SVOC-(1 THRU 5) TEST#1**		**22-22180-SVOC-(6 THRU 10) TEST#2**		**22-22180-SVOC-(11 THRU 15) TEST#3**		**22-22180-SVOC-(16 THRU 20) BLANK**		**Laboratory Control Sample**	
ALS Sample ID	WG3773490-1		L2740270-1		L2740270-2		L2740270-3		L2740270-4		WG3773490-2	
Sample Size	1		1		1		1		1		1	
Sample units	sample		sample		sample		sample		sample		n/a	
Moisture Content	n/a		n/a		n/a		n/a		n/a		n/a	
Matrix	QC		Stack		Stack		Stack		Stack		QC	
Sampling Date	n/a		8-Nov-22		9-Nov-22		10-Nov-22		10-Nov-22		n/a	
Extraction Date	22-Nov-22		22-Nov-22		22-Nov-22		22-Nov-22		22-Nov-22		22-Nov-22	
Target Analytes	**ng/sample**		**ng/sample**		**ng/sample**		**ng/sample**		**ng/sample**		**% Recovery**	
1,3-Dichlorobenzene	<16	U	332		360		218		<8	U	108	
1,4-Dichlorobenzene	<16	U	147	M	332		142		21.3		97	M
1,2-Dichlorobenzene	<16	U	252		246		195		<8	U	128	M
1,3,5-Trichlorobenzene	<16	U	35.9		<16	U	<16	U	<8	U	109	
1,2,4-Trichlorobenzene	<16	U	140		222		36.1		<8	U	128	M
1,2,3-Trichlorobenzene	<16	U	51	M	229	M	76.2		<8	U	102	
1,2,3,5/1,2,4,5-Tetrachlorobenzene	<16	U	76.2		75.2		<16	U	<8	U	87	
1,2,3,4-Tetrachlorobenzene	<16	U	21.7		74.2		61.2		<8	U	130	
Pentachlorobenzene	<16	U	31		114		149		<8	U	115	
Hexachlorobenzene	<16	U	<16	U	33.4		37.5	M	<8	U	96	
Field Sampling Standards	**%Rec**		**%Rec**		**%Rec**		**%Rec**		**%Rec**		**%Rec**	
1-Bromo-2,3-Dichlorobenzene	NS		69		91		98		79		NS	
Extraction Standards	**%Rec**		**%Rec**		**%Rec**		**%Rec**		**%Rec**		**%Rec**	
13C6-1,4-Dichlorobenzene	37		22		2		3		32		48	
13C6-1,2,3-Trichlorobenzene	86		45		4		14		51		123	
13C6-1,2,3,4-Tetrachlorobenzene	94		52		6		12		48		138	
13C6-Pentachlorobenzene	98		63		8		4		60		122	
13C6-Hexachlorobenzene	94		64		13		6		56		129	

U	Indicates that this compound was not detected above the LOD.
M	Indicates that a peak has been manually integrated.
NS	Indicates that this compound was not spiked in

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	**Laboratory Control Sample**	
ALS Sample ID	WG3773490-4	
Sample Size	1	
Sample units	n/a	
Moisture Content	n/a	
Matrix	QC	
Sampling Date	n/a	
Extraction Date	22-Nov-22	
Target Analytes	**% Recovery**	
1,3-Dichlorobenzene	103	
1,4-Dichlorobenzene	121	M
1,2-Dichlorobenzene	120	M
1,3,5-Trichlorobenzene	114	M
1,2,4-Trichlorobenzene	127	M
1,2,3-Trichlorobenzene	131	
1,2,3,5/1,2,4,5-Tetrachlorobenzene	190	
1,2,3,4-Tetrachlorobenzene	108	
Pentachlorobenzene	90	
Hexachlorobenzene	88	
Field Sampling Standards	**%Rec**	
1-Bromo-2,3-Dichlorobenzene	NS	
Extraction Standards	**%Rec**	
13C6-1,4-Dichlorobenzene	53	
13C6-1,2,3-Trichlorobenzene	113	
13C6-1,2,3,4-Tetrachlorobenzene	122	
13C6-Pentachlorobenzene	120	
13C6-Hexachlorobenzene	107	

M Indicates that a peak has been manually integrated.
NS Indicates that this compound was not spiked in.

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**		Sampling Date	n/a
ALS Sample ID	WG3773490-1		Extraction Date	22-Nov-22
Analysis Method	SIM GC/MS			
Analysis Type	blank			
Sample Matrix	QC			
Sample Size	1	sample		
Percent Moisture	n/a			
Split Ratio	8			

Approved:
Andrew Reid
--e-signature--
22-Dec-2022

Run Information	**Run 1**
Filename	22122108.D
Run Date	12/21/2022 18:27
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-2
Column	HP-5MS US1315321H

Target Analytes		**Ret. Time**	**Concentration ng/sample**	**Flags**
1,3-Dichlorobenzene		NotFnd	<16	U
1,4-Dichlorobenzene		6.80	<16	U
1,2-Dichlorobenzene		NotFnd	<16	U
1,3,5-Trichlorobenzene		NotFnd	<16	U
1,2,4-Trichlorobenzene		NotFnd	<16	U
1,2,3-Trichlorobenzene		NotFnd	<16	U
1,2,3,5/1,2,4,5-Tetrachlorobenzen		NotFnd	<16	U
1,2,3,4-Tetrachlorobenzene		NotFnd	<16	U
Pentachlorobenzene		NotFnd	<16	U
Hexachlorobenzene		NotFnd	<16	U
Field Sampling Standards	**ng spiked**		**%Rec**	
1-Bromo-2,3-Dichlorobenzene			NS	
Extraction Standards			**%Rec**	
13C6-1,4-Dichlorobenzene	400	6.80	37	
13C6-1,2,3-Trichlorobenzene	400	9.19	86	
13C6-1,2,3,4-Tetrachlorobenzene	400	10.90	94	
13C6-Pentachlorobenzene	400	12.23	98	
13C6-Hexachlorobenzene	400	13.87	94	

U	Indicates that this compound was not detected above the MDL.
NS	Indicates that this compound was not spiked in.

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-SVOC-(1 THRU 5) TEST#1**	Sampling Date	8-Nov-22
ALS Sample ID	L2740270-1	Extraction Date	22-Nov-22
Analysis Method	SIM GC/MS		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	8		

Approved:
Andrew Reid
--e-signature--
22-Dec-2022

Run Information	**Run 1**
Filename	22122110.D
Run Date	12/21/2022 19:08
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-2
Column	HP-5MS US1315321H

Target Analytes		**Ret. Time**	**Concentration ng/sample**	**Flags**
1,3-Dichlorobenzene		6.72	332	
1,4-Dichlorobenzene		6.80	147	M
1,2-Dichlorobenzene		7.10	252	
1,3,5-Trichlorobenzene		8.27	35.9	
1,2,4-Trichlorobenzene		8.78	140	
1,2,3-Trichlorobenzene		9.19	51	M
1,2,3,5/1,2,4,5-Tetrachlorobenzen		10.40	76.2	
1,2,3,4-Tetrachlorobenzene		10.90	21.7	
Pentachlorobenzene		12.23	31	
Hexachlorobenzene		13.86	<16	U
Field Sampling Standards	**ng spiked**		**%Rec**	
1-Bromo-2,3-Dichlorobenzene	400	10.20	69	
Extraction Standards			**%Rec**	
13C6-1,4-Dichlorobenzene	400	6.80	22	
13C6-1,2,3-Trichlorobenzene	400	9.19	45	
13C6-1,2,3,4-Tetrachlorobenzene	400	10.90	52	
13C6-Pentachlorobenzene	400	12.23	63	
13C6-Hexachlorobenzene	400	13.86	64	

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-SVOC-(6 THRU 10) TEST#2**	Sampling Date	9-Nov-22
ALS Sample ID	L2740270-2	Extraction Date	22-Nov-22
Analysis Method	SIM GC/MS		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	8		

Approved:
Andrew Reid
--e-signature--
22-Dec-2022

Run Information	**Run 1**
Filename	22122111.D
Run Date	12/21/2022 19:29
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-2
Column	HP-5MS US1315321H

Target Analytes		**Ret. Time**	**Concentration ng/sample**	**Flags**
1,3-Dichlorobenzene		6.72	360	
1,4-Dichlorobenzene		6.80	332	
1,2-Dichlorobenzene		7.10	246	
1,3,5-Trichlorobenzene		NotFnd	<16	U
1,2,4-Trichlorobenzene		8.78	222	
1,2,3-Trichlorobenzene		9.19	229	M
1,2,3,5/1,2,4,5-Tetrachlorobenzen		10.40	75.2	
1,2,3,4-Tetrachlorobenzene		10.90	74.2	
Pentachlorobenzene		12.23	114	
Hexachlorobenzene		13.87	33.4	
Field Sampling Standards	**ng spiked**		**%Rec**	
1-Bromo-2,3-Dichlorobenzene	400	10.20	91	
Extraction Standards			**%Rec**	
13C6-1,4-Dichlorobenzene	400	6.80	2	M
13C6-1,2,3-Trichlorobenzene	400	9.19	4	
13C6-1,2,3,4-Tetrachlorobenzene	400	10.90	6	
13C6-Pentachlorobenzene	400	12.23	8	
13C6-Hexachlorobenzene	400	13.86	13	

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-SVOC-(11 THRU 15) TEST#3**		Sampling Date	10-Nov-22
ALS Sample ID	L2740270-3		Extraction Date	22-Nov-22
Analysis Method	SIM GC/MS			
Analysis Type	sample			
Sample Matrix	Stack			
Sample Size	1	sample		
Percent Moisture	n/a			
Split Ratio	8			

Approved:
Andrew Reid
--e-signature--
22-Dec-2022

Run Information	**Run 1**
Filename	22122112.D
Run Date	12/21/2022 19:49
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-2
Column	HP-5MS US1315321H

Target Analytes		**Ret. Time**	**Concentration ng/sample**	**Flags**
1,3-Dichlorobenzene		6.72	218	
1,4-Dichlorobenzene		6.81	142	
1,2-Dichlorobenzene		7.10	195	
1,3,5-Trichlorobenzene		NotFnd	<16	U
1,2,4-Trichlorobenzene		8.79	36.1	
1,2,3-Trichlorobenzene		9.20	76.2	
1,2,3,5/1,2,4,5-Tetrachlorobenzen		10.41	<16	U
1,2,3,4-Tetrachlorobenzene		10.90	61.2	
Pentachlorobenzene		12.23	149	
Hexachlorobenzene		13.87	37.5	M
Field Sampling Standards	**ng spiked**		**%Rec**	
1-Bromo-2,3-Dichlorobenzene	400	10.20	98	
Extraction Standards			**%Rec**	
13C6-1,4-Dichlorobenzene	400	6.80	3	M
13C6-1,2,3-Trichlorobenzene	400	9.19	14	
13C6-1,2,3,4-Tetrachlorobenzene	400	10.90	12	
13C6-Pentachlorobenzene	400	12.23	4	
13C6-Hexachlorobenzene	400	13.87	6	

M Indicates that a peak has been manually integrated.
U Indicates that this compound was not detected above the MDL.

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-SVOC-(16 THRU 20) BLANK**		Sampling Date	10-Nov-22
ALS Sample ID	L2740270-4		Extraction Date	22-Nov-22
Analysis Method	SIM GC/MS			
Analysis Type	sample			
Sample Matrix	Stack			
Sample Size	1	sample		
Percent Moisture	n/a			
Split Ratio	8			

Approved:
Andrew Reid
--e-signature--
22-Dec-2022

Run Information	**Run 1**
Filename	22122109.D
Run Date	12/21/2022 18:47
Final Volume	0.5 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-2
Column	HP-5MS USN267447H

Target Analytes		**Ret. Time**	**Concentration ng/sample**	**Flags**
1,3-Dichlorobenzene		NotFnd	<8	U
1,4-Dichlorobenzene		6.80	21.3	
1,2-Dichlorobenzene		NotFnd	<8	U
1,3,5-Trichlorobenzene		NotFnd	<8	U
1,2,4-Trichlorobenzene		NotFnd	<8	U
1,2,3-Trichlorobenzene		NotFnd	<8	U
1,2,3,5/1,2,4,5-Tetrachlorobenzen		NotFnd	<8	U
1,2,3,4-Tetrachlorobenzene		NotFnd	<8	U
Pentachlorobenzene		NotFnd	<8	U
Hexachlorobenzene		NotFnd	<8	U
Field Sampling Standards	**ng spiked**		**%Rec**	
1-Bromo-2,3-Dichlorobenzene	400	10.19	79	
Extraction Standards			**%Rec**	
13C6-1,4-Dichlorobenzene	400	6.80	32	
13C6-1,2,3-Trichlorobenzene	400	9.19	51	
13C6-1,2,3,4-Tetrachlorobenzene	400	10.90	48	
13C6-Pentachlorobenzene	400	12.23	60	
13C6-Hexachlorobenzene	400	13.86	56	

U Indicates that this compound was not detected above the MDL.

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**		Sampling Date	n/a
ALS Sample ID	WG3773490-2		Extraction Date	22-Nov-22
Analysis Method	SIM GC/MS			
Analysis Type	LCS			
Sample Matrix	QC			
Sample Size	1	n/a		
Percent Moisture	n/a			
Split Ratio	8			

Approved:
Andrew Reid
--e-signature--
22-Dec-2022

Run Information	**Run 1**
Filename	22122106.D
Run Date	12/21/2022 17:45
Final Volume	0.5 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-2
Column	HP-5MS USN267447H

Target Analytes	**ug spiked**	**Ret. Time**	**% Recovery**	**Flags**
1,3-Dichlorobenzene	400	6.74	108	
1,4-Dichlorobenzene	400	6.81	97	M
1,2-Dichlorobenzene	400	7.10	128	M
1,3,5-Trichlorobenzene	400	8.27	109	
1,2,4-Trichlorobenzene	400	8.78	128	M
1,2,3-Trichlorobenzene	400	9.19	102	
1,2,3,5/1,2,4,5-Tetrachlorobenzen	400	10.41	87	
1,2,3,4-Tetrachlorobenzene	400	10.90	130	
Pentachlorobenzene	400	12.23	115	
Hexachlorobenzene	400	13.86	96	
Field Sampling Standards	**ng spiked**		**%Rec**	
1-Bromo-2,3-Dichlorobenzene			NS	
Extraction Standards			**%Rec**	
13C6-1,4-Dichlorobenzene	400	6.81	48	
13C6-1,2,3-Trichlorobenzene	400	9.19	123	M
13C6-1,2,3,4-Tetrachlorobenzene	400	10.90	138	
13C6-Pentachlorobenzene	400	12.23	122	
13C6-Hexachlorobenzene	400	13.86	129	

M	Indicates that a peak has been manually integrated.
NS	Indicates that this compound was not spiked in.

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**		Sampling Date	n/a
ALS Sample ID	WG3773490-4		Extraction Date	22-Nov-22
Analysis Method	SIM GC/MS			
Analysis Type	LCS			
Sample Matrix	QC			
Sample Size	1	n/a		
Percent Moisture	n/a			
Split Ratio	8			

Approved:
Andrew Reid
--e-signature--
22-Dec-2022

Run Information	**Run 1**
Filename	22122104.D
Run Date	12/21/2022 17:04
Final Volume	0.5 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-2
Column	HP-5MS USN267447H

Target Analytes	**ug spiked**	**Ret. Time**	**% Recovery**	**Flags**
1,3-Dichlorobenzene	40	6.73	103	
1,4-Dichlorobenzene	40	6.80	121	M
1,2-Dichlorobenzene	40	7.10	120	M
1,3,5-Trichlorobenzene	40	8.27	114	M
1,2,4-Trichlorobenzene	40	8.79	127	M
1,2,3-Trichlorobenzene	40	9.19	131	
1,2,3,5/1,2,4,5-Tetrachlorobenzen	40	10.41	190	
1,2,3,4-Tetrachlorobenzene	40	10.90	108	
Pentachlorobenzene	40	12.23	90	
Hexachlorobenzene	40	13.87	88	
Field Sampling Standards	**ng spiked**		**%Rec**	
1-Bromo-2,3-Dichlorobenzene			NS	
Extraction Standards			**%Rec**	
13C6-1,4-Dichlorobenzene	400	6.80	53	
13C6-1,2,3-Trichlorobenzene	400	9.19	113	
13C6-1,2,3,4-Tetrachlorobenzene	400	10.90	122	
13C6-Pentachlorobenzene	400	12.23	120	
13C6-Hexachlorobenzene	400	13.87	107	

M Indicates that a peak has been manually integrated.

NS Indicates that this compound was not spiked in.

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
ALS Project ID: ORT100
ALS WO#: L2740270
Date of Report 3-Jan-23
Date of Sample Receipt 14-Nov-22

Client Name: Ortech Environmental
Client Address: 804 Southdown Road
Mississauga, ON, L5J 2Y4
Canada
Client Contact: Chris Belore
Client Project ID: 22180 Clean Harbors

COMMENTS: **Chlorophenols as acetate derivatives by SIM GC/MS**

The Soxhlet extract went dry for the Run 2 (L2740270-2) sample which explains the low extraction standard recoveries for the organic targets. All chlorinated organic targets patterns (i.e. for PCDD/F, PCB, CB, OCP, and CPs) compare well between runs 1, 2 and 3. Therefore isotope dilution correction of data employed for these analysis has successfully corrected for losses when the extract went dry and there is no evidence for data compromise for these target group determinations.

Certified by:

Ron McLeod, PhD
Laboratory Manager and Technical Director

ALS Environmental

Sample Analysis Summary Report

Sample Name	Method Blank		22-22180-SVOC- (1 THRU 5) TEST#1		22-22180-SVOC- (6 THRU 10) TEST#2		22-22180-SVOC- (11 THRU 15) TEST#3		22-22180-SVOC- (16 THRU 20) BLANK		Laboratory Control Sample	
ALS Sample ID	WG3773490-1		L2740270-1		L2740270-2		L2740270-3		L2740270-4		WG3773490-2	
Sample Size	1		1		1		1		1		1	
Sample units	sample		sample		sample		sample		sample		n/a	
Moisture Content	n/a		n/a		n/a		n/a		n/a		n/a	
Matrix	QC		Stack		Stack		Stack		Stack		QC	
Sampling Date	n/a		8-Nov-22		9-Nov-22		10-Nov-22		10-Nov-22		n/a	
Extraction Date	22-Nov-22		22-Nov-22		22-Nov-22		22-Nov-22		22-Nov-22		22-Nov-22	
Target Analytes	**ng/sample**		**ng/sample**		**ng/sample**		**ng/sample**		**ng/sample**		**% Recovery**	
2,6-Dichlorophenol	<80	U	<80	U	<80	U	<80	U	<80	U	88	
2,4/2,5-Dichlorophenol	<80	U	207	M	<80	U	<80	U	<80	U	65	
3,5-Dichlorophenol	<80	U	<80	U	<80	U	<80	U	<80	U		
2,3-Dichlorophenol	<80	U	<80	U	<80	U	<80	U	<80	U		
3,4-Dichlorophenol	<80	U	<80	U	<80	U	<80	U	<80	U		
2,4,6-Trichlorophenol	<80	U	278	M	<80	U	<80	U	<80	U	103	
2,3,6-Trichlorophenol	<80	U	115	M	<80	U	<80	U	<80	U		
2,3,5-Trichlorophenol	<80	U	599		<80	U	<80	U	<80	U		
2,4,5-Trichlorophenol	<80	U	<80	U	<80	U	<80	U	<80	U	126	
2,3,4-Trichlorophenol	<80	U	<80	U	<80	U	<80	U	<80	U		
3,4,5-Trichlorophenol	<80	U	<80	U	<80	U	<80	U	<80	U		
2,3,5,6/2,3,4,6-Tetrachlorophenol	<80	U	<80	U	<80	U	<80	U	<80	U	104	
2,3,4,5-Tetrachlorophenol	<80	U	<80	U	<80	U	<80	U	<80	U	119	
Pentachlorophenol	<80	U	<80	U	<80	U	<80	U	<80	U	131	
Hexachlorophene	<80	U	<80	U	<80	U	<80	U	<80	U		
Extraction Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
13C6-2,4-Dichlorophenol (ES)	33		50		5	M	22		43		51	
13C6-2,4,5-Trichlorophenol (ES)	28		38		4	M	16	M	33		42	
13C6-2,3,4,5-Tetrachlorophenol (ES)	26		23		6	M	15	M	37		41	
13C6-Pentachlorophenol (ES)	19	M	4	M	6	M	11	M	19	M	23	M

U	Indicates that this compound was not detected above the LOR.
M	Indicates that a peak has been manually integrated.

ALS Environmental

Sample Analysis Summary Report

Sample Name	**Laboratory Control Sample**	
ALS Sample ID	WG3773490-4	
Sample Size	1	
Sample units	n/a	
Moisture Content	n/a	
Matrix	QC	
Sampling Date	n/a	
Extraction Date	22-Nov-22	
Target Analytes	**% Recovery**	
2,6-Dichlorophenol	102	M
2,4/2,5-Dichlorophenol	104	M
3,5-Dichlorophenol		
2,3-Dichlorophenol		
3,4-Dichlorophenol		
2,4,6-Trichlorophenol	85	M
2,3,6-Trichlorophenol		
2,3,5-Trichlorophenol		
2,4,5-Trichlorophenol	127	M
2,3,4-Trichlorophenol		
3,4,5-Trichlorophenol		
2,3,5,6/2,3,4,6-Tetrachlorophenol	109	M
2,3,4,5-Tetrachlorophenol	104	M
Pentachlorophenol	113	M
Hexachlorophene		
Extraction Standards	**% Rec**	
13C6-2,4-Dichlorophenol (ES)	42	
13C6-2,4,5-Trichlorophenol (ES)	26	M
13C6-2,3,4,5-Tetrachlorophenol (ES)	21	M
13C6-Pentachlorophenol (ES)	10	M

M Indicates that a peak has been manually integrated.

ALS Environmental

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**		Sampling Date	n/a
ALS Sample ID	WG3773490-1		Extraction Date	22-Nov-22
Analysis Method	SIM GC/MS			
Analysis Type	blank			
Sample Matrix	QC			
Sample Size	1	sample		
Percent Moisture	n/a			
Split Ratio	8			

Approved:
Andrew Reid
--e-signature--
27-Dec-2022

Run Information	**Run 1**
Filename	22122121.D
Run Date	12/21/2022 23:11
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-2
Column	HP5MS US0411816H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
2,6-Dichlorophenol	NotFnd	<80	U
2,4/2,5-Dichlorophenol	NotFnd	<80	U
3,5-Dichlorophenol	NotFnd	<80	U
2,3-Dichlorophenol	NotFnd	<80	U
3,4-Dichlorophenol	NotFnd	<80	U
2,4,6-Trichlorophenol	NotFnd	<80	U
2,3,6-Trichlorophenol	NotFnd	<80	U
2,3,5-Trichlorophenol	NotFnd	<80	U
2,4,5-Trichlorophenol	NotFnd	<80	U
2,3,4-Trichlorophenol	NotFnd	<80	U
3,4,5-Trichlorophenol	NotFnd	<80	U
2,3,5,6/2,3,4,6-Tetrachlorophenol	NotFnd	<80	U
2,3,4,5-Tetrachlorophenol	NotFnd	<80	U
Pentachlorophenol	NotFnd	<80	U
Hexachlorophene	NotFnd	<80	U

Extraction Standards			**% Rec**		
13C6-2,4-Dichlorophenol (ES)	1600	9.55	33		20-150
13C6-2,4,5-Trichlorophenol (ES)	1600	11.02	28		20-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.62	26		20-150
13C6-Pentachlorophenol (ES)	1600	13.59	19	M	20-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the LOR.

ALS Environmental

Sample Analysis Report

Sample Name	**22-22180-SVOC-(1 THRU 5) TEST#1**
ALS Sample ID	L2740270-1
Analysis Method	SIM GC/MS
Analysis Type	sample
Sample Matrix	Stack
Sample Size	1 sample
Percent Moisture	n/a
Split Ratio	8

Sampling Date	8-Nov-22
Extraction Date	22-Nov-22

Approved:
Andrew Reid
--e-signature--
27-Dec-2022

Run Information	**Run 1**
Filename	22122123.D
Run Date	12/21/2022 23:58
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-2
Column	HP5MS US0411816H

Target Analytes		**Ret. Time**	**Concentration ng/sample**	**Flags**	
2,6-Dichlorophenol		9.35	<80	U	
2,4/2,5-Dichlorophenol		9.54	207	M	
3,5-Dichlorophenol		9.66	<80	U	
2,3-Dichlorophenol		NotFnd	<80	U	
3,4-Dichlorophenol		NotFnd	<80	U	
2,4,6-Trichlorophenol		10.47	278	M	
2,3,6-Trichlorophenol		10.90	115	M	
2,3,5-Trichlorophenol		10.67	599		
2,4,5-Trichlorophenol		NotFnd	<80	U	
2,3,4-Trichlorophenol		NotFnd	<80	U	
3,4,5-Trichlorophenol		NotFnd	<80	U	
2,3,5,6/2,3,4,6-Tetrachlorophenol		NotFnd	<80	U	
2,3,4,5-Tetrachlorophenol		NotFnd	<80	U	
Pentachlorophenol		NotFnd	<80	U	
Hexachlorophene		NotFnd	<80	U	
Extraction Standards			**% Rec**		
13C6-2,4-Dichlorophenol (ES)	1600	9.55	50		20-150
13C6-2,4,5-Trichlorophenol (ES)	1600	11.01	38		20-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.62	23		20-150
13C6-Pentachlorophenol (ES)	1600	13.59	4	M	20-150

M Indicates that a peak has been manually integrated.
U Indicates that this compound was not detected above the LOR.

ALS Environmental

Sample Analysis Report

Sample Name	**22-22180-SVOC-(6 THRU 10) TEST#2**		Sampling Date	9-Nov-22
ALS Sample ID	L2740270-2		Extraction Date	22-Nov-22
Analysis Method	SIM GC/MS			
Analysis Type	sample			
Sample Matrix	Stack			
Sample Size	1	sample		
Percent Moisture	n/a			
Split Ratio	8			

Approved:
Andrew Reid
--e-signature--
27-Dec-2022

Run Information	**Run 1**	
Filename	22122124.D	
Run Date	12/22/2022 0:22	
Final Volume	1	mL
Dilution Factor	1	
Analysis Units	ng/sample	
Instrument	MSD-2	
Column	HP5MS US0411816H	

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
2,6-Dichlorophenol	NotFnd	<80	U
2,4/2,5-Dichlorophenol	NotFnd	<80	U
3,5-Dichlorophenol	NotFnd	<80	U
2,3-Dichlorophenol	NotFnd	<80	U
3,4-Dichlorophenol	NotFnd	<80	U
2,4,6-Trichlorophenol	NotFnd	<80	U
2,3,6-Trichlorophenol	NotFnd	<80	U
2,3,5-Trichlorophenol	NotFnd	<80	U
2,4,5-Trichlorophenol	NotFnd	<80	U
2,3,4-Trichlorophenol	NotFnd	<80	U
3,4,5-Trichlorophenol	NotFnd	<80	U
2,3,5,6/2,3,4,6-Tetrachlorophenol	NotFnd	<80	U
2,3,4,5-Tetrachlorophenol	NotFnd	<80	U
Pentachlorophenol	NotFnd	<80	U
Hexachlorophene	NotFnd	<80	U

Extraction Standards			**% Rec**		
13C6-2,4-Dichlorophenol (ES)	1600	9.54	5	M	20-150
13C6-2,4,5-Trichlorophenol (ES)	1600	11.01	4	M	20-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.62	6	M	20-150
13C6-Pentachlorophenol (ES)	1600	13.59	6	M	20-150

M Indicates that a peak has been manually integrated.
U Indicates that this compound was not detected above the LOR.

ALS Environmental

Sample Analysis Report

Sample Name	**22-22180-SVOC-(11 THRU 15) TEST#3**	Sampling Date	10-Nov-22
ALS Sample ID	L2740270-3	Extraction Date	22-Nov-22
Analysis Method	SIM GC/MS		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	8		

Approved:
Andrew Reid
--e-signature--
27-Dec-2022

Run Information	**Run 1**
Filename	22122125.D
Run Date	12/22/2022 0:46
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-2
Column	HP5MS US0411816H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
2,6-Dichlorophenol	NotFnd	<80	U
2,4/2,5-Dichlorophenol	NotFnd	<80	U
3,5-Dichlorophenol	NotFnd	<80	U
2,3-Dichlorophenol	NotFnd	<80	U
3,4-Dichlorophenol	NotFnd	<80	U
2,4,6-Trichlorophenol	NotFnd	<80	U
2,3,6-Trichlorophenol	NotFnd	<80	U
2,3,5-Trichlorophenol	NotFnd	<80	U
2,4,5-Trichlorophenol	NotFnd	<80	U
2,3,4-Trichlorophenol	NotFnd	<80	U
3,4,5-Trichlorophenol	NotFnd	<80	U
2,3,5,6/2,3,4,6-Tetrachlorophenol	NotFnd	<80	U
2,3,4,5-Tetrachlorophenol	NotFnd	<80	U
Pentachlorophenol	NotFnd	<80	U
Hexachlorophene	NotFnd	<80	U

Extraction Standards			**% Rec**		
13C6-2,4-Dichlorophenol (ES)	1600	9.55	22		20-150
13C6-2,4,5-Trichlorophenol (ES)	1600	11.01	16	M	20-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.62	15	M	20-150
13C6-Pentachlorophenol (ES)	1600	13.59	11	M	20-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the LOR.

ALS Environmental

Sample Analysis Report

Sample Name	**22-22180-SVOC-(16 THRU 20) BLANK**		Sampling Date	10-Nov-22
ALS Sample ID	L2740270-4		Extraction Date	22-Nov-22
Analysis Method	SIM GC/MS			
Analysis Type	sample			
Sample Matrix	Stack			
Sample Size	1	sample		
Percent Moisture	n/a			
Split Ratio	8			

Approved:
Andrew Reid
--e-signature--
27-Dec-2022

Run Information	**Run 1**
Filename	22122122.D
Run Date	12/21/2022 23:35
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-2
Column	HP5MS US0411816H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
2,6-Dichlorophenol	NotFnd	<80	U
2,4/2,5-Dichlorophenol	NotFnd	<80	U
3,5-Dichlorophenol	NotFnd	<80	U
2,3-Dichlorophenol	NotFnd	<80	U
3,4-Dichlorophenol	NotFnd	<80	U
2,4,6-Trichlorophenol	NotFnd	<80	U
2,3,6-Trichlorophenol	NotFnd	<80	U
2,3,5-Trichlorophenol	NotFnd	<80	U
2,4,5-Trichlorophenol	NotFnd	<80	U
2,3,4-Trichlorophenol	NotFnd	<80	U
3,4,5-Trichlorophenol	NotFnd	<80	U
2,3,5,6/2,3,4,6-Tetrachlorophenol	NotFnd	<80	U
2,3,4,5-Tetrachlorophenol	NotFnd	<80	U
Pentachlorophenol	NotFnd	<80	U
Hexachlorophene	NotFnd	<80	U

Extraction Standards			**% Rec**		
13C6-2,4-Dichlorophenol (ES)	1600	9.55	43		20-150
13C6-2,4,5-Trichlorophenol (ES)	1600	11.02	33		20-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.62	37		20-150
13C6-Pentachlorophenol (ES)	1600	13.59	19	M	20-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the LOR.

ALS Environmental

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a
ALS Sample ID	WG3773490-2	Extraction Date	22-Nov-22
Analysis Method	SIM GC/MS		
Analysis Type	LCS		
Sample Matrix	QC		
Sample Size	1 n/a		
Percent Moisture	n/a		
Split Ratio	8		

Approved:
Andrew Reid
--e-signature--
27-Dec-2022

Run Information	**Run 1**
Filename	22122119.D
Run Date	12/21/2022 22:23
Final Volume	1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-2
Column	HP5MS US0411816H

Target Analytes	**ug spiked**	**Ret. Time**	**% Recovery**	**Flags**	
2,6-Dichlorophenol	1600	9.35	88		10-110
2,4/2,5-Dichlorophenol	3200	9.55	65		35-98
3,5-Dichlorophenol					
2,3-Dichlorophenol					
3,4-Dichlorophenol					
2,4,6-Trichlorophenol	1600	10.48	103		10-102
2,3,6-Trichlorophenol					
2,3,5-Trichlorophenol					
2,4,5-Trichlorophenol	1600	11.02	126		45-95
2,3,4-Trichlorophenol					
3,4,5-Trichlorophenol					
2,3,5,6/2,3,4,6-Tetrachlorophenol	3200	12.08	104	M	30-109
2,3,4,5-Tetrachlorophenol	1600	12.62	119		44-103
Pentachlorophenol	1600	13.60	131		32-121
Hexachlorophene					
Extraction Standards			**% Rec**		
13C6-2,4-Dichlorophenol (ES)	1600	9.55	51		50-150
13C6-2,4,5-Trichlorophenol (ES)	1600	11.02	42		50-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.62	41		50-150
13C6-Pentachlorophenol (ES)	1600	13.60	23	M	50-150

M Indicates that a peak has been manually integrated.

ALS Environmental

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**		Sampling Date	n/a
ALS Sample ID	WG3773490-4		Extraction Date	22-Nov-22
Analysis Method	SIM GC/MS			
Analysis Type	LCS			
Sample Matrix	QC			
Sample Size	1	n/a		
Percent Moisture	n/a			
Split Ratio	8			

Approved:
Andrew Reid
--e-signature--
27-Dec-2022

Run Information	**Run 1**	
Filename	22122118.D	
Run Date	12/21/2022 22:00	
Final Volume	1	mL
Dilution Factor	1	
Analysis Units	n/a	
Instrument	MSD-2	
Column	HP5MS US0411816H	

Target Analytes	**ug spiked**	**Ret. Time**	**% Recovery**	**Flags**	
2,6-Dichlorophenol	160	9.35	102	M	10-110
2,4/2,5-Dichlorophenol	160	9.55	104	M	35-98
3,5-Dichlorophenol					
2,3-Dichlorophenol					
3,4-Dichlorophenol					
2,4,6-Trichlorophenol	160	10.47	85	M	10-102
2,3,6-Trichlorophenol					
2,3,5-Trichlorophenol					
2,4,5-Trichlorophenol	160	11.02	127	M	45-95
2,3,4-Trichlorophenol					
3,4,5-Trichlorophenol					
2,3,5,6/2,3,4,6-Tetrachlorophenol	320	12.13	109	M	30-109
2,3,4,5-Tetrachlorophenol	160	12.63	104	M	44-103
Pentachlorophenol	160	13.60	113	M	32-121
Hexachlorophene					

Extraction Standards			**% Rec**		
13C6-2,4-Dichlorophenol (ES)	1600	9.55	42		50-150
13C6-2,4,5-Trichlorophenol (ES)	1600	11.02	26	M	50-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.63	21	M	50-150
13C6-Pentachlorophenol (ES)	1600	13.60	10	M	50-150

M Indicates that a peak has been manually integrated.

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

Certificate of Analysis

ALS Project Contact: Lynne Wrona
ALS Project ID: ORT100
ALS WO#: L2740270
Date of Report Revision 31-Jan-23
Date of Sample Receipt 14-Nov-22

Client Name: Ortech Environmental
Client Address: 804 Southdown Road
Mississauga, ON, L5J 2Y4
Canada
Client Contact: Chris Belore
Client Project ID: 22180 Clean Harbors

COMMENTS: **Chlorinated Pesticides by EPA 1699 (modified)**
Organotins by derivatization and GC/FPD at ALS Kelso WA

*** Revised Report ***

This report supersedes all prior reports for the above-noted workorder and test. The report has been revised as follows:
The target list has been amended.

*** Original Report Comments ***

The Soxhlet extract went dry for the Run 2 (L2740270-2) sample which explains the low extraction standard recoveries for the organic targets. All chlorinated organic targets patterns (i.e. for PCDD/F, PCB, CB, OCP, and CPs) compare well between runs 1, 2 and 3. Therefore isotope dilution correction of data employed for these analysis has successful corrected for losses when the extract went dry and there is no evidence for data compromise for these target group determinations.

Heptachlor data is not available for Run 2 due to an absence of recovery of the corresponding C-13 labelled extraction/internal standard.

Certified by:

Ron McLeod, PhD
Director, Air Toxics and Special Chemistries, Life Sciences

ALS Life Sciences

Sample Analysis summary Report

Sample Name	**22-22180-SVOC-(1 THRU 5) TEST#1**	**22-22180-SVOC-(6 THRU 10) TEST#2**	**22-22180-SVOC-(11 THRU 15) TEST#3**	**22-22180-SVOC-(16 THRU 20) BLANK**
ALS Sample ID	L2740270-1	L2740270-2	L2740270-3	L2740270-4
Sample Size	1	1	1	1
Sample size units	Sample	Sample	Sample	Sample
Percent Moisture	n/a	n/a	n/a	n/a
Sample Matrix	Stack	Stack	Stack	Stack
Sampling Date	8-Nov-22	9-Nov-22	10-Nov-22	10-Nov-22
Extraction Date	22-Nov-22	22-Nov-22	22-Nov-22	22-Nov-22
Target Analytes	**ng**	**ng**	**ng**	**ng**
Heptachlor	<0.49	n/a	<1.7	<0.40
Octachlorostyrene	<0.48	<5.4	<2.1	<0.53
Heptachlor Epoxide B	<0.68	<12	<2.2	<0.93
Heptachlor Epoxide A	<4.4	<77	<14	<6.0
Oxychlordane	<0.92	<24	<5.9	<1.0
trans-Chlordane	<4.6	<35	<8.6	<5.0
cis-Chlordane	<4.4	<34	<8.3	<4.8
Parlar 26	<16	<75	<71	<21
Parlar 50	<9.8	<45	<46	<13
Parlar 62	<19	<88	<88	<25
	ng	**ng**	**ng**	**ng**
Tributyl Tins	<200	<200	<200	<200
Extraction Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**
Heptachlor, 13C10-	49	n/r	13	59
Oxychlordane, 13C10-	54	3	13	64
trans-Nonachlor, 13C10-	52	8	16	66
Mirex, 13C10-	24	4	7	30

ALS Life Sciences

Quality Control Summary Report

Sample Name	**Method Blank**	**Laboratory Control Sample**
ALS Sample ID	WG3773490-1	WG3773490-2
Sample Size	1	1
Sample size units	Sample	n/a
Percent Moisture	n/a	n/a
Sample Matrix	QC	QC
Sampling Date	n/a	n/a
Extraction Date	22-Nov-22	22-Nov-22
Target Analytes	**ng**	**% Rec**
Heptachlor	<0.30	98
Octachlorostyrene	<0.63	90
Heptachlor Epoxide B	<0.66	110
Heptachlor Epoxide A	<4.3	107
Oxychlordane	<0.71	104
trans-Chlordane	<4.2	109
cis-Chlordane	<4.1	115
Parlar 26	<13	206
Parlar 50	<14	113
Parlar 62	<27	80
Extraction Standards	**% Rec**	**% Rec**
Heptachlor, 13C10-	64	62
Oxychlordane, 13C10-	72	74
trans-Nonachlor, 13C10-	85	68
Mirex, 13C10-	36	31

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-SVOC-(1 THRU 5) TEST#1**	Sampling Date	8-Nov-22	
ALS Sample ID	L2740270-1	Extraction Date	22-Nov-22	
Analysis Method	EPA 1699 (mod)	Sample Size	1	Sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	Stack	Split Ratio	8	

Approved:
T.Patterson
--e-signature--
12-Dec-2022

Run Information	**Run 1**
Filename	10-221209A23
Run Date	10-Dec-22 05:34
Final Volume	1020 uL
Dilution Factor	1
Analysis Units	ng
Instrument - Column	HRMS10 HP5MSUS2361737H

Target Analytes		**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**
Heptachlor		NotFnd	<0.49	0.49	U		16
Octachlorostyrene		NotFnd	<0.48	0.48	U		16
Heptachlor Epoxide B		NotFnd	<0.68	0.68	U		16
Heptachlor Epoxide A		NotFnd	<4.4	4.4	U		16
Oxychlordane		NotFnd	<0.92	0.92	U		16
trans-Chlordane		NotFnd	<4.6	4.6	U		16
cis-Chlordane		NotFnd	<4.4	4.4	U		16
Parlar 26		NotFnd	<16	16	U		16
Parlar 50		NotFnd	<9.8	9.8	U		16
Parlar 62		NotFnd	<19	19	U		16
Extraction Standards	**ng**						
Heptachlor, 13C10-	200	17.65	49	5-120			
Oxychlordane, 13C10-	200	19.95	54	23-135			
trans-Nonachlor, 13C10-	200	21.23	52	14-136			
Mirex, 13C10-	100	26.63	24	5-120			

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
U	Indicates that this compound was not detected above the EDL.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-SVOC-(6 THRU 10) TEST#2**	Sampling Date	9-Nov-22	
ALS Sample ID	L2740270-2	Extraction Date	22-Nov-22	
Analysis Method	EPA 1699 (mod)	Sample Size	1	Sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	Stack	Split Ratio	8	

Approved:
T.Patterson
--e-signature--
12-Dec-2022

Run Information	**Run 1**
Filename	10-221209A24
Run Date	10-Dec-22 06:11
Final Volume	1020 uL
Dilution Factor	1
Analysis Units	ng
Instrument - Column	HRMS10 HP5MSUS2361737H

Target Analytes		**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**
Heptachlor		NotFnd	n/a	160	U		16
Octachlorostyrene		NotFnd	<5.4	5.4	U		16
Heptachlor Epoxide B		NotFnd	<12	12	U		16
Heptachlor Epoxide A		NotFnd	<77	77	U		16
Oxychlordane		NotFnd	<24	24	U		16
trans-Chlordane		NotFnd	<35	35	U		16
cis-Chlordane		NotFnd	<34	34	U		16
Parlar 26		NotFnd	<75	75	U		16
Parlar 50		NotFnd	<45	45	U		16
Parlar 62		NotFnd	<88	88	U		16
Extraction Standards	**ng**						
Heptachlor, 13C10-	200	17.65	0	5-120	n/r		
Oxychlordane, 13C10-	200	19.95	3	23-135	M		
trans-Nonachlor, 13C10-	200	21.23	8	14-136	M		
Mirex, 13C10-	100	26.62	4	5-120			

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
n/r	Indicates that this compound was not recovered.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-SVOC-(11 THRU 15) TEST#3**	Sampling Date	10-Nov-22	
ALS Sample ID	L2740270-3	Extraction Date	22-Nov-22	
Analysis Method	EPA 1699 (mod)	Sample Size	1	Sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	Stack	Split Ratio	8	

Approved:
T.Patterson
--e-signature--
12-Dec-2022

Run Information	**Run 1**
Filename	10-221209A25
Run Date	10-Dec-22 06:48
Final Volume	1020 uL
Dilution Factor	1
Analysis Units	ng
Instrument - Column	HRMS10 HP5MSUS2361737H

Target Analytes		**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**
Heptachlor		NotFnd	<1.7	1.7	U		16
Octachlorostyrene		NotFnd	<2.1	2.1	U		16
Heptachlor Epoxide B		NotFnd	<2.2	2.2	U		16
Heptachlor Epoxide A		NotFnd	<14	14	U		16
Oxychlordane		NotFnd	<5.9	5.9	U		16
trans-Chlordane		NotFnd	<8.6	8.6	U		16
cis-Chlordane		NotFnd	<8.3	8.3	U		16
Parlar 26		NotFnd	<71	71	U		16
Parlar 50		NotFnd	<46	46	U		16
Parlar 62		NotFnd	<88	88	U		16
Extraction Standards	**ng**						
Heptachlor, 13C10-	200	17.64	13	5-120			
Oxychlordane, 13C10-	200	19.94	13	23-135			
trans-Nonachlor, 13C10-	200	21.21	16	14-136	M,R		
Mirex, 13C10-	100	26.62	7	5-120			

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-SVOC-(16 THRU 20) BLANK**	Sampling Date	10-Nov-22	
ALS Sample ID	L2740270-4	Extraction Date	22-Nov-22	
Analysis Method	EPA 1699 (mod)	Sample Size	1	Sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	Stack	Split Ratio	8	

Approved:
T.Patterson
--e-signature--
12-Dec-2022

Run Information	**Run 1**
Filename	10-221209A22
Run Date	10-Dec-22 04:56
Final Volume	1020 uL
Dilution Factor	1
Analysis Units	ng
Instrument - Column	HRMS10 HP5MSUS2361737H

Target Analytes		**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**
Heptachlor		NotFnd	<0.40	0.40	U		16
Octachlorostyrene		NotFnd	<0.53	0.53	U		16
Heptachlor Epoxide B		NotFnd	<0.93	0.93	U		16
Heptachlor Epoxide A		NotFnd	<6.0	6.0	U		16
Oxychlordane		NotFnd	<1.0	1.0	U		16
trans-Chlordane		NotFnd	<5.0	5.0	U		16
cis-Chlordane		NotFnd	<4.8	4.8	U		16
Parlar 26		NotFnd	<21	21	U		16
Parlar 50		NotFnd	<13	13	U		16
Parlar 62		NotFnd	<25	25	U		16
Extraction Standards	**ng**						
Heptachlor, 13C10-	200	17.65	59	5-120			
Oxychlordane, 13C10-	200	19.95	64	23-135			
trans-Nonachlor, 13C10-	200	21.23	66	14-136			
Mirex, 13C10-	100	26.63	30	5-120			

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
U	Indicates that this compound was not detected above the EDL.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a	
ALS Sample ID	WG3773490-1	Extraction Date	22-Nov-22	
Analysis Method	EPA 1699 (mod)	Sample Size	1	Sample
Analysis Type	Blank	Percent Moisture	n/a	
Sample Matrix	QC	Split Ratio	8	

Approved:
T.Patterson
--e-signature--
12-Dec-2022

Run Information	**Run 1**
Filename	10-221209A17
Run Date	10-Dec-22 01:40
Final Volume	1020 uL
Dilution Factor	1
Analysis Units	ng
Instrument - Column	HRMS10 HP5MSUS2361737H

Target Analytes		**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**
Heptachlor		NotFnd	<0.30	0.30	U		16
Octachlorostyrene		NotFnd	<0.63	0.63	U		16
Heptachlor Epoxide B		NotFnd	<0.66	0.66	U		16
Heptachlor Epoxide A		NotFnd	<4.3	4.3	U		16
Oxychlordane		NotFnd	<0.71	0.71	U		16
trans-Chlordane		NotFnd	<4.2	4.2	U		16
cis-Chlordane		NotFnd	<4.1	4.1	U		16
Parlar 26		NotFnd	<13	13	U		16
Parlar 50		NotFnd	<14	14	U		16
Parlar 62		NotFnd	<27	27	U		16
Extraction Standards	**ng**						
Heptachlor, 13C10-	200	17.64	64	5-120			
Oxychlordane, 13C10-	200	19.95	72	23-135			
trans-Nonachlor, 13C10-	200	21.21	85	14-136			
Mirex, 13C10-	100	26.62	36	5-120			

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
U	Indicates that this compound was not detected above the EDL.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a	
ALS Sample ID	WG3773490-2	Extraction Date	22-Nov-22	
Analysis Method	EPA 1699 (mod)	Sample Size	1	n/a
Analysis Type	LCS	Percent Moisture	n/a	
Sample Matrix	QC	Split Ratio	8	

Approved:
T.Patterson
--e-signature--
12-Dec-2022

Run Information	**Run 1**
Filename	10-221209A13
Run Date	09-Dec-22 23:11
Final Volume	1020 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS10 HP5MSUS2361737H

Target Analytes	**ng**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
Heptachlor	200	17.66	98	50-120	
Octachlorostyrene	200	19.83	90	50-175	
Heptachlor Epoxide B	200	19.93	110	20-200	
Heptachlor Epoxide A	200	20.06	107	50-120	
Oxychlordane	200	19.96	104	50-120	
trans-Chlordane	200	20.64	109	50-120	
cis-Chlordane	200	21.08	115	50-120	
Parlar 26	200	22.36	206	20-200	
Parlar 50	200	24.93	113	20-200	
Parlar 62	200	26.35	80	20-200	M
Extraction Standards	**ng**				
Heptachlor, 13C10-	200	17.64	62	5-128	
Oxychlordane, 13C10-	200	19.95	74	5-144	
trans-Nonachlor, 13C10-	200	21.21	68	13-149	
Mirex, 13C10-	100	26.63	31	5-138	

M	Indicates that a peak has been manually integrated.

ALS Life Sciences
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 Mississauga, ON, L5J 2Y4 Canada
ALS WO#:	L2740270		
Date of Report	3-Jan-23		
Date of Sample Receipt	14-Nov-22	**Client Contact:**	Chris Belore
		Client Project ID:	22180 Clean Harbors

COMMENTS: **PAH by CARB method 429 (LR option)- Isotope dilution**

Source emission data for PAHs in Run 2 (L2740270-2) is not available.
The Soxhlet extract went dry for the Run 2 sample during the extraction process. The heated residue showed charring in the flask. The PAH analytical data for this run showed a PAH pattern vastly different from Run 1 and Run 3. Since there was charring PAHs were likely created due to the extracts going dry. Therefore the dominant PAH pattern cannot be attributed to source emissions.

Certified by:

Ron McLeod, Ph.D.
Technical Director

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Method Blank		22-22180-SVOC- (1 THRU 5) TEST#1		22-22180-SVOC- (6 THRU 10) TEST#2		22-22180-SVOC- (11 THRU 15) TEST#3		22-22180-SVOC- (16 THRU 20) BLANK		Laboratory Control Sample
ALS Sample ID	WG3773490-1		L2740270-1		L2740270-2		L2740270-3		L2740270-4		WG3773490-2
Sample Size	1		1		1		1		1		1
Sample units	sample		sample		sample		sample		sample		n/a
Moisture Content	n/a		n/a		n/a		n/a		n/a		n/a
Matrix	QC		Stack		Stack		Stack		Stack		QC
Sampling Date	n/a		8-Nov-22		9-Nov-22		10-Nov-22		10-Nov-22		n/a
Extraction Date	22-Nov-22		22-Nov-22		22-Nov-22		22-Nov-22		22-Nov-22		22-Nov-22
Target Analytes	**ng/sample**		**ng/sample**		**ng/sample**		**ng/sample**		**ng/sample**		**%**
Naphthalene	92.4		1040		n/a		842	B	334	B	132.5
2-Methylnaphthalene	19.9		198	B	n/a		147	B	27.4	B	106.2
1-Methylnaphthalene	<16	U	115		n/a		75.6		<16	U	100.0
Acenaphthylene	<16	U	16.1		n/a		<16	U	<16	U	100.4
Acenaphthene	<16	U	17.7		n/a		17.6		<16	U	88.8
Fluorene	<16	U	40.3		n/a		43.2		<16	U	84.0
Phenanthrene	17.0		612		n/a		652		17.2	B	94.3
Anthracene	<16	U	23.4		n/a		23.9		<16	U	90.4
Fluoranthene	<16	U	208		n/a		164		<16	U	88.4
Pyrene	<16	U	256		n/a		137		<16	U	99.0
Benzo(a)Anthracene	<16	U	<16	U	n/a		<16	U	<16	U	82.0
Chrysene/Triphenylene/Benzo(b)anthr	<16	U	24.8		n/a		93.8		<16	U	99.3
Benzo(b)Fluoranthene	<16	U	<16	U	n/a		<16	U	<16	U	98.0
Benzo(k/j)Fluoranthene	<16	U	<16	U	n/a		<16	U	<16	U	96.3
Benzo(e)Pyrene	<16	U	<16	U	n/a		<16	U	<16	U	92.5
Benzo(a)Pyrene	<16	U	<16	U	n/a		<16	U	<16	U	76.1
Perylene	<16	U	<16	U	n/a		<16	U	<16	U	103.1
Indeno(1,2,3-cd)Pyrene	<16	U	<16	U	n/a		<16	U	<16	U	84.8
Dibenzo(a,h/a,c)Anthracene	<16	U	<16	U	n/a		<16	U	<16	U	100.1
Benzo(g,h,i)Perylene	<16	U	<16	U	n/a		<16	U	<16	U	84.7
Additional Analytes											
Tetralin	<16	U	237		n/a		207		182		
Quinoline	<16	U	<16	U	n/a		<16	U	<16	U	
2-Chloronaphthalene	<16	U	<16	U	n/a		<16	U	<16	U	
Biphenyl	20.6		331		n/a		212		23.8	B	
o-Terphenyl	<16	U	17.4		n/a		16.0		<16	U	
1-Methylphenanthrene	<16	U	<16	U	n/a		25.4		<16	U	
9-Methylphenanthrene	<16	U	59.8		n/a		68.6		<16	U	
2-methylanthracene	<16	U	128		n/a		180		<16	U	
9,10-dimethylanthracene	<16	U	<16	U	n/a		<16	U	<16	U	
m-terphenyl	<16	U	<16	U	n/a		26.1		<16	U	
p-terphenyl	<16	U	<16	U	n/a		<16	U	<16	U	
Benzo(a)fluorene	<16	U	<16	U	n/a		<16	U	<16	U	
Benzo(b)fluorene	<16	U	<16	U	n/a		<16	U	<16	U	
7,12-Dimethylbenzo(a)anthracene	<16	U	<16	U	n/a		<16	U	<16	U	
3-Methylcholanthrene	<80	U	<80	U	n/a		<80	U	<80	U	
Picene	<80	U	<80	U	n/a		<80	U	<80	U	
Dibenzo(a,e)pyrene	<80	U	<80	U	n/a		<80	U	<80	U	
Coronene	<80	U	<80	U	n/a		<80	U	<80	U	
Field Sampling Standards	**% Rec**		**% Rec**				**% Rec**		**% Rec**		**% Rec**
1-Methylnaphthalene-D10	NS		67.8				71.5		76.7		NS
Fluorene D10	NS		65.6				72.0		74.5		NS
Terphenyl D14(Surr.)	NS		81.4				80.0		64.9		NS
Extraction Standards	**% Rec**		**% Rec**				**% Rec**		**% Rec**		**% Rec**
Naphthalene D8	83.6		67.7				23.3		71.1		79.0
2-Methylnaphthalene-D10	94.0		78.3				26.6		79.8		89.0
Acenaphthylene D8	92.5		79.1				29.1		78.8		87.4
Phenanthrene D10	101.8		86.6				28.9		97.3		93.6
Anthracene-D10	88.9		78.9				27.9		80.8		85.9
Fluoranthene D10	102.9		94.9				34.2		98.1		87.4
Benz(a)Anthracene-D12	62.7		60.0				23.3		55.5		49.7
Chrysene D12	55.5		53.7				18.2		50.2		43.9
Benzo(b)Fluoranthene-D12	80.0		80.7				21.5		69.4		54.8
Benzo(k)Fluoranthene-D12	63.7		59.3				17.0		52.0		45.5
Benzo(a)Pyrene D12	67.0		61.6				22.0		59.8		52.6
Perylene D12	21.6		38.9				9.6		24.5		19.9
Indeno(1,2,3,cd)Pyrene-D12	82.1		77.5				22.8		70.3		57.2
Dibenz(a,h)Anthracene-D14	87.4		81.2				23.2		50.8		57.5
Benzo(g,h,i)Perylene D12	76.6		73.2				20.5		70.0		53.4

U Indicates that this compound was not detected above the LOD.

B Indicates that this compound was detected in the method blank at greater than 10% of the sample value.
NS Indicates that this compound was not spiked in

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a
ALS Sample ID	WG3773490-1	Extraction Date	22-Nov-22
Analysis Method	PAH by CARB 429		
Analysis Type	blank		
Sample Matrix	QC		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	8	Workgroup	WG3773490

Approved:
Andrew Reid
--e-signature--
29-Dec-2022

Run Information	**Run 1**
Filename	22122122.D
Run Date	12/22/2022 4:13
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US2543815H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
Naphthalene	2.80	92.4	
2-Methylnaphthalene	3.38	19.9	
1-Methylnaphthalene	3.50	<16	U
Acenaphthylene	4.52	<16	U
Acenaphthene	4.82	<16	U
Fluorene	5.75	<16	U
Phenanthrene	7.95	17.0	
Anthracene	8.07	<16	U
Fluoranthene	11.36	<16	U
Pyrene	12.00	<16	U
Benzo(a)Anthracene	NotFnd	<16	U
Chrysene/Triphenylene/Benzo(b)A	NotFnd	<16	U
Benzo(b)Fluoranthene	NotFnd	<16	U
Benzo(k/j)Fluoranthene	NotFnd	<16	U
Benzo(e)Pyrene	NotFnd	<16	U
Benzo(a)Pyrene	NotFnd	<16	U
Perylene	NotFnd	<16	U
Indeno(1,2,3-cd)Pyrene	NotFnd	<16	U
Dibenzo(a,h/a,c)Anthracene	NotFnd	<16	U
Benzo(g,h,i)Perylene	NotFnd	<16	U
Additional Analytes			
Tetralin	2.67	<16	U
Quinoline	NotFnd	<16	U
2-Chloronaphthalene	NotFnd	<16	U
Biphenyl	3.92	20.6	
o-Terphenyl	NotFnd	<16	U
1-Methylphenanthrene	NotFnd	<16	U
9-Methylphenanthrene	NotFnd	<16	U
2-methylanthracene	NotFnd	<16	U
9,10-dimethylanthracene	NotFnd	<16	U
m-terphenyl	NotFnd	<16	U
p-terphenyl	NotFnd	<16	U
Benzo(a)fluorene	NotFnd	<16	U
Benzo(b)fluorene	NotFnd	<16	U
7,12-Dimethylbenzo(a)anthracene	NotFnd	<16	U
3-Methylcholanthrene	NotFnd	<80	U
Picene	NotFnd	<80	U
Dibenzo(a,e)pyrene	NotFnd	<80	U
Coronene	NotFnd	<80	U

Field Sampling Standards	**ng spiked**		**% Rec**
1-Methylnaphthalene-D10			NS
Fluorene D10			NS
Terphenyl D14(Surr.)			NS

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	800	2.79	83.6	50-150
2-Methylnaphthalene-D10	800	3.35	94.0	50-150
Acenaphthylene D8	800	4.51	92.5	50-150
Phenanthrene D10	800	7.90	101.8	50-150
Anthracene-D10	800	8.02	88.9	50-150
Fluoranthene D10	800	11.31	102.9	50-150
Benz(a)Anthracene-D12	800	15.84	62.7	50-150
Chrysene D12	800	15.95	55.5	50-150
Benzo(b)Fluoranthene-D12	800	19.17	80.0	50-150
Benzo(k)Fluoranthene-D12	800	19.26	63.7	50-150
Benzo(a)Pyrene D12	800	20.05	67.0	50-150
Perylene D12	800	20.29	21.6	50-150
Indeno(1,2,3,cd)Pyrene-D12	800	23.73	82.1	50-150
Dibenz(a,h)Anthracene-D14	800	23.90	87.4	50-150
Benzo(g,h,i)Perylene D12	800	24.70	76.6	50-150

U	Indicates that this compound was not detected above the MDL.
NS	Indicates that this compound was not spiked in.

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-SVOC-(1 THRU 5) TEST#1**	Sampling Date	8-Nov-22
ALS Sample ID	L2740270-1	Extraction Date	22-Nov-22
Analysis Method	PAH by CARB 429		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	8	Workgroup	WG3773490

Approved:
Andrew Reid
--e-signature--
29-Dec-2022

Run Information	**Run 1**
Filename	22122125.D
Run Date	12/22/2022 6:09
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US2543815H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
Naphthalene	2.79	1040	
2-Methylnaphthalene	3.38	198	B
1-Methylnaphthalene	3.49	115	
Acenaphthylene	4.53	16.1	
Acenaphthene	4.82	17.7	
Fluorene	5.75	40.3	
Phenanthrene	7.95	612	
Anthracene	8.07	23.4	
Fluoranthene	11.36	208	
Pyrene	12.00	256	
Benzo(a)Anthracene	15.92	<16	U
Chrysene/Triphenylene/Benzo(b)	16.02	24.8	
Benzo(b)Fluoranthene	NotFnd	<16	U
Benzo(k/j)Fluoranthene	NotFnd	<16	U
Benzo(e)Pyrene	NotFnd	<16	U
Benzo(a)Pyrene	NotFnd	<16	U
Perylene	NotFnd	<16	U
Indeno(1,2,3-cd)Pyrene	NotFnd	<16	U
Dibenzo(a,h/a,c)Anthracene	NotFnd	<16	U
Benzo(g,h,i)Perylene	NotFnd	<16	U
Additional Analytes			
Tetralin	2.66	237	
Quinoline	NotFnd	<16	U
2-Chloronaphthalene	NotFnd	<16	U
Biphenyl	3.91	331	
o-Terphenyl	9.23	17.4	
1-Methylphenanthrene	NotFnd	<16	U
9-Methylphenanthrene	9.62	59.8	
2-methylanthracene	9.69	128	
9,10-dimethylanthracene	NotFnd	<16	U
m-terphenyl	12.39	<16	U
p-terphenyl	12.87	<16	U
Benzo(a)fluorene	NotFnd	<16	U
Benzo(b)fluorene	NotFnd	<16	U
7,12-Dimethylbenzo(a)anthracene	NotFnd	<16	U
3-Methylcholanthrene	NotFnd	<80	U
Picene	NotFnd	<80	U
Dibenzo(a,e)pyrene	NotFnd	<80	U
Coronene	NotFnd	<80	U

Field Sampling Standards	**ng spiked**		**% Rec**
1-Methylnaphthalene-D10	800	3.46	67.8
Fluorene D10	800	5.69	65.6
Terphenyl D14(Surr.)	800	12.80	81.4

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	800	2.78	67.7	50-150
2-Methylnaphthalene-D10	800	3.35	78.3	50-150
Acenaphthylene D8	800	4.51	79.1	50-150
Phenanthrene D10	800	7.90	86.6	50-150
Anthracene-D10	800	8.02	78.9	50-150
Fluoranthene D10	800	11.30	94.9	50-150
Benz(a)Anthracene-D12	800	15.84	60.0	50-150
Chrysene D12	800	15.95	53.7	50-150
Benzo(b)Fluoranthene-D12	800	19.17	80.7	50-150
Benzo(k)Fluoranthene-D12	800	19.26	59.3	50-150
Benzo(a)Pyrene D12	800	20.05	61.6	50-150
Perylene D12	800	20.29	38.9	50-150
Indeno(1,2,3,cd)Pyrene-D12	800	23.73	77.5	50-150
Dibenz(a,h)Anthracene-D14	800	23.90	81.2	50-150
Benzo(g,h,i)Perylene D12	800	24.70	73.2	50-150

U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-SVOC-(11 THRU 15) TEST#3**	Sampling Date	10-Nov-22
ALS Sample ID	L2740270-3	Extraction Date	22-Nov-22
Analysis Method	PAH by CARB 429		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	8	Workgroup	WG3773490

Approved:
Andrew Reid
--e-signature--
29-Dec-2022

Run Information	**Run 1**
Filename	22122130.D
Run Date	12/22/2022 9:22
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US2543815H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
Naphthalene	2.79	842	B
2-Methylnaphthalene	3.38	147	B
1-Methylnaphthalene	3.50	75.6	
Acenaphthylene	4.52	<16	U
Acenaphthene	4.82	17.6	
Fluorene	5.74	43.2	
Phenanthrene	7.95	652	
Anthracene	8.07	23.9	
Fluoranthene	11.36	164	
Pyrene	12.00	137	
Benzo(a)Anthracene	15.89	<16	U
Chrysene/Triphenylene/Benzo(b)	16.01	93.8	
Benzo(b)Fluoranthene	NotFnd	<16	U
Benzo(k/j)Fluoranthene	NotFnd	<16	U
Benzo(e)Pyrene	NotFnd	<16	U
Benzo(a)Pyrene	NotFnd	<16	U
Perylene	NotFnd	<16	U
Indeno(1,2,3-cd)Pyrene	NotFnd	<16	U
Dibenzo(a,h/a,c)Anthracene	NotFnd	<16	U
Benzo(g,h,i)Perylene	NotFnd	<16	U
Additional Analytes			
Tetralin	2.67	207	
Quinoline	NotFnd	<16	U
2-Chloronaphthalene	NotFnd	<16	U
Biphenyl	3.91	212	
o-Terphenyl	9.23	16.0	
1-Methylphenanthrene	9.50	25.4	
9-Methylphenanthrene	9.63	68.6	
2-methylanthracene	9.69	180	
9,10-dimethylanthracene	NotFnd	<16	U
m-terphenyl	12.39	26.1	
p-terphenyl	12.87	<16	U
Benzo(a)fluorene	NotFnd	<16	U
Benzo(b)fluorene	NotFnd	<16	U
7,12-Dimethylbenzo(a)anthracen	NotFnd	<16	U
3-Methylcholanthrene	NotFnd	<80	U
Picene	NotFnd	<80	U
Dibenzo(a,e)pyrene	NotFnd	<80	U
Coronene	NotFnd	<80	U

Field Sampling Standards	**ng spiked**		**% Rec**
1-Methylnaphthalene-D10	800	3.46	71.5
Fluorene D10	800	5.69	72
Terphenyl D14(Surr.)	800	12.80	80

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	800	2.79	23.3	50-150
2-Methylnaphthalene-D10	800	3.35	26.6	50-150
Acenaphthylene D8	800	4.51	29.1	50-150
Phenanthrene D10	800	7.90	28.9	50-150
Anthracene-D10	800	8.02	27.9	50-150
Fluoranthene D10	800	11.30	34.2	50-150
Benz(a)Anthracene-D12	800	15.84	23.3	50-150
Chrysene D12	800	15.95	18.2	50-150
Benzo(b)Fluoranthene-D12	800	19.17	21.5	50-150
Benzo(k)Fluoranthene-D12	800	19.26	17.0	50-150
Benzo(a)Pyrene D12	800	20.06	22.0	50-150
Perylene D12	800	20.29	9.6	50-150
Indeno(1,2,3,cd)Pyrene-D12	800	23.74	22.8	50-150
Dibenz(a,h)Anthracene-D14	800	23.91	23.2	50-150
Benzo(g,h,i)Perylene D12	800	24.71	20.5	50-150

U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-SVOC-(16 THRU 20) BLANK**	Sampling Date	10-Nov-22
ALS Sample ID	L2740270-4	Extraction Date	22-Nov-22
Analysis Method	PAH by CARB 429		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	8	Workgroup	WG3773490

Approved:
Andrew Reid
--e-signature--
29-Dec-2022

Run Information	**Run 1**
Filename	22122124.D
Run Date	12/22/2022 5:30
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-5
Column	HP-5MS US2543815H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
Naphthalene	2.80	334	B
2-Methylnaphthalene	3.39	27.4	B
1-Methylnaphthalene	3.50	<16	U
Acenaphthylene	NotFnd	<16	U
Acenaphthene	NotFnd	<16	U
Fluorene	NotFnd	<16	U
Phenanthrene	7.95	17.2	B
Anthracene	NotFnd	<16	U
Fluoranthene	NotFnd	<16	U
Pyrene	NotFnd	<16	U
Benzo(a)Anthracene	NotFnd	<16	U
Chrysene/Triphenylene/Benzo(b)A	16.02	<16	U
Benzo(b)Fluoranthene	NotFnd	<16	U
Benzo(k/j)Fluoranthene	NotFnd	<16	U
Benzo(e)Pyrene	NotFnd	<16	U
Benzo(a)Pyrene	NotFnd	<16	U
Perylene	NotFnd	<16	U
Indeno(1,2,3-cd)Pyrene	NotFnd	<16	U
Dibenzo(a,h/a,c)Anthracene	NotFnd	<16	U
Benzo(g,h,i)Perylene	NotFnd	<16	U
Additional Analytes			
Tetralin	2.67	182	
Quinoline	NotFnd	<16	U
2-Chloronaphthalene	NotFnd	<16	U
Biphenyl	3.92	23.8	B
o-Terphenyl	NotFnd	<16	U
1-Methylphenanthrene	NotFnd	<16	U
9-Methylphenanthrene	NotFnd	<16	U
2-methylanthracene	NotFnd	<16	U
9,10-dimethylanthracene	NotFnd	<16	U
m-terphenyl	NotFnd	<16	U
p-terphenyl	NotFnd	<16	U
Benzo(a)fluorene	NotFnd	<16	U
Benzo(b)fluorene	NotFnd	<16	U
7,12-Dimethylbenzo(a)anthracene	NotFnd	<16	U
3-Methylcholanthrene	NotFnd	<80	U
Picene	NotFnd	<80	U
Dibenzo(a,e)pyrene	NotFnd	<80	U
Coronene	NotFnd	<80	U

Field Sampling Standards	**ng spiked**		**% Rec**	
1-Methylnaphthalene-D10	800	3.46	76.7	
Fluorene D10	800	5.70	74.5	
Terphenyl D14(Surr.)	800	12.81	64.9	
Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	800	2.79	71.1	50-150
2-Methylnaphthalene-D10	800	3.36	79.8	50-150
Acenaphthylene D8	800	4.51	78.8	50-150
Phenanthrene D10	800	7.90	97.3	50-150
Anthracene-D10	800	8.03	80.8	50-150
Fluoranthene D10	800	11.31	98.1	50-150
Benz(a)Anthracene-D12	800	15.84	55.5	50-150
Chrysene D12	800	15.95	50.2	50-150
Benzo(b)Fluoranthene-D12	800	19.17	69.4	50-150
Benzo(k)Fluoranthene-D12	800	19.26	52.0	50-150
Benzo(a)Pyrene D12	800	20.05	59.8	50-150
Perylene D12	800	20.29	24.5	50-150
Indeno(1,2,3,cd)Pyrene-D12	800	23.74	70.3	50-150
Dibenz(a,h)Anthracene-D14	800	23.91	50.8	50-150
Benzo(g,h,i)Perylene D12	800	24.71	70.0	50-150

U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a
ALS Sample ID	WG3773490-2	Extraction Date	22-Nov-22
Analysis Method	PAH by CARB 429		
Analysis Type	LCS		
Sample Matrix	QC		
Sample Size	1 n/a		
Percent Moisture	n/a		
Split Ratio	8	Workgroup	WG3773490

Approved:
Andrew Reid
--e-signature--
29-Dec-2022

Run Information	**Run 1**
Filename	22122120.D
Run Date	12/22/2022 2:55
Final Volume	1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-5
Column	HP-5MS US2543815H

Target Analytes	**ug spiked**	**Ret. Time**	**%**	**Flags**	**Limits**
Naphthalene	800	2.81	132.5		50-150
2-Methylnaphthalene	800	3.39	106.2		50-150
1-Methylnaphthalene	800	3.50	100		50-150
Acenaphthylene	800	4.53	100.4		50-150
Acenaphthene	800	4.83	88.8		50-150
Fluorene	800	5.75	84		50-150
Phenanthrene	800	7.95	94.3		50-150
Anthracene	800	8.07	90.4		50-150
Fluoranthene	800	11.36	88.4		50-150
Pyrene	800	12.00	99		50-150
Benzo(a)Anthracene	800	15.90	82		50-150
Chrysene/Triphenylene/Benzo(b)A	800	16.02	99.3		50-150
Benzo(b)Fluoranthene	800	19.24	98		50-150
Benzo(k/j)Fluoranthene	800	19.32	96.3		50-150
Benzo(e)Pyrene	800	19.98	92.5		50-150
Benzo(a)Pyrene	800	20.11	76.1		50-150
Perylene	800	20.35	103.1		50-150
Indeno(1,2,3-cd)Pyrene	800	23.82	84.8		50-150
Dibenzo(a,h/a,c)Anthracene	800	24.02	100.1		50-150
Benzo(g,h,i)Perylene	800	24.81	84.7		50-150

Additional Analytes

Tetralin
Quinoline
2-Chloronaphthalene
Biphenyl
o-Terphenyl
1-Methylphenanthrene
9-Methylphenanthrene
2-methylanthracene
9,10-dimethylanthracene
m-terphenyl
p-terphenyl
Benzo(a)fluorene
Benzo(b)fluorene
7,12-Dimethylbenzo(a)anthracene
3-Methylcholanthrene
Picene
Dibenzo(a,e)pyrene
Coronene

Field Sampling Standards	**ng spiked**	**% Rec**
1-Methylnaphthalene-D10		NS
Fluorene D10		NS
Terphenyl D14(Surr.)		NS

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	800	2.79	79.0	30-150
2-Methylnaphthalene-D10	800	3.36	89.0	30-150
Acenaphthylene D8	800	4.51	87.4	30-150
Phenanthrene D10	800	7.90	93.6	50-150
Anthracene-D10	800	8.02	85.9	50-150
Fluoranthene D10	800	11.31	87.4	50-150
Benz(a)Anthracene-D12	800	15.84	49.7	50-150
Chrysene D12	800	15.95	43.9	50-150
Benzo(b)Fluoranthene-D12	800	19.17	54.8	50-150
Benzo(k)Fluoranthene-D12	800	19.26	45.5	50-150
Benzo(a)Pyrene D12	800	20.05	52.6	30-150
Perylene D12	800	20.29	19.9	50-150
Indeno(1,2,3,cd)Pyrene-D12	800	23.73	57.2	50-150
Dibenz(a,h)Anthracene-D14	800	23.90	57.5	50-150
Benzo(g,h,i)Perylene D12	800	24.70	53.4	50-150

NS Indicates that this compound was not spiked in

ALS Life Sciences
1435 Norjohn Court, Unit 1, Burlington, ON, Canada 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 Mississauga,ON L5J 2Y4
ALS WO#:	L2740399		
Date of Report	16-Jan-23		
Date of Sample Receipt	14-Nov-22	**Client Contact:**	Chris Belore
		Client Project ID:	22180 Clean Harbors

COMMENTS: **PCDD/F by EPA 1613B via Isotope Dilution**

Certified by: ______________________
Sabrina Jin
Technical Specialist

Results in this certificate relate only to the samples as submitted to the laboratory.
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ALS Life Sciences

Sample Analysis Summary Report

Sample Name	**22-22180-RC-4 (RICH FEED)**	**Duplicate of 22-22180-RC-4 (RICH FEED)**	**22-22180-LC-4 (LEAN FEED)**	**22-22180-AC-4 (ALKALINE FEED)**	**22-22180-EC-4 (EMULSION FEED)**
ALS Sample ID	L2740399-1	WG3775203-4	L2740399-2	L2740399-3	L2740399-4
Sample Size	0.49	0.50	0.39	0.41	0.48
Sample size units	g	g	g	g	g
Percent Moisture	64.40%	64.40%	69.40%	70.40%	66.50%
Sample Matrix	Stack	QC	Stack	Stack	Stack
Sampling Date	n/a	n/a	n/a	n/a	n/a
Extraction Date	13-Dec-22	13-Dec-22	13-Dec-22	13-Dec-22	13-Dec-22
Target Analytes	**pg/g**	**pg/g**	**pg/g**	**pg/g**	**pg/g**
2,3,7,8-TCDD	<0.94	<0.96	<2.7	<2.3	<2.5
1,2,3,7,8-PeCDD	1.47	<1.9	<2.8	<3.1	<1.9
1,2,3,4,7,8-HxCDD	<0.94	<1.0	<2.9	<2.1	<2.6
1,2,3,6,7,8-HxCDD	<9.3	<11	17.0	<16	<9.7
1,2,3,7,8,9-HxCDD	<3.5	<5.1	<5.1	<7.4	5.00
1,2,3,4,6,7,8-HpCDD	22.8	28.5	<24	<26	19.6
OCDD	118	128	145	142	144
2,3,7,8-TCDF	6.10	<7.2	<8.2	5.93	<4.8
1,2,3,7,8-PeCDF	<0.96	<1.2	<1.7	<1.4	<1.6
2,3,4,7,8-PeCDF	<0.47	<0.93	<1.7	<1.3	<1.5
1,2,3,4,7,8-HxCDF	1.00	<0.74	<1.2	<1.0	<1.4
1,2,3,6,7,8-HxCDF	<0.57	<0.82	<1.2	<1.0	<1.4
2,3,4,6,7,8-HxCDF	0.651	<0.82	<1.2	<1.1	<1.5
1,2,3,7,8,9-HxCDF	<0.76	<1.2	<1.9	<1.5	<2.3
1,2,3,4,6,7,8-HpCDF	6.83	<6.7	<6.9	<2.6	6.76
1,2,3,4,7,8,9-HpCDF	<1.2	<1.1	<1.7	<3.2	<2.7
OCDF	<16	14.9	<15	<15	<9.6
Extraction Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**	**% Rec**
13C12-2,3,7,8-TCDD	76	71	63	67	47
13C12-1,2,3,7,8-PeCDD	85	73	68	65	45
13C12-1,2,3,4,7,8-HxCDD	86	79	71	76	60
13C12-1,2,3,6,7,8-HxCDD	89	80	73	78	63
13C12-1,2,3,4,6,7,8-HpCDD	66	60	56	58	49
13C12-OCDD	47	45	43	42	33
13C12-2,3,7,8-TCDF	82	73	68	73	54
13C12-1,2,3,7,8-PeCDF	93	77	75	72	49
13C12-2,3,4,7,8-PeCDF	93	80	76	73	52
13C12-1,2,3,4,7,8-HxCDF	93	85	78	87	68
13C12-1,2,3,6,7,8-HxCDF	96	88	80	89	70
13C12-2,3,4,6,7,8-HxCDF	90	80	76	85	66
13C12-1,2,3,7,8,9-HxCDF	80	81	69	83	59
13C12-1,2,3,4,6,7,8-HpCDF	76	71	67	72	52
13C12-1,2,3,4,7,8,9-HpCDF	74	71	68	72	52
Cleanup Standard					
37Cl4-2,3,7,8-TCDD (Cleanup)	82	72	69	71	55
Homologue Group Totals	**pg/g**	**pg/g**	**pg/g**	**pg/g**	**pg/g**
Total-TCDD	1.78	2.27	<2.7	<2.3	<2.5
Total-PeCDD	5.27	6.07	<1.8	5.19	<1.9
Total-HxCDD	13.7	14.0	17.0	23.0	17.2
Total-HpCDD	61.1	65.5	<3.5	43.7	51.4
Total-TCDF	7.31	9.38	<2.4	9.20	1.75
Total-PeCDF	<0.52	<1.1	<1.7	<1.4	3.29
Total-HxCDF	1.65	3.28	<1.9	4.85	3.31
Total-HpCDF	6.83	8.03	11.6	7.73	13.8
Toxic Equivalency - (WHO 2005)					
Lower Bound PCDD/F TEQ (WHO 2005)	2.58	0.328	1.74	0.636	0.807
Mid Point PCDD/F TEQ (WHO 2005)	4.58	4.56	8.25	8.08	5.18
Upper Bound PCDD/F TEQ (WHO 2005)	5.21	6.37	10.3	9.80	8.10

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Quality Control Summary Report

Sample Name	**Method Blank**	**Laboratory Control Sample**
ALS Sample ID	WG3775203-1	WG3775203-2
Sample Size	0.45	1
Sample size units	g	n/a
Percent Moisture	n/a	n/a
Sample Matrix	QC	QC
Sampling Date	n/a	n/a
Extraction Date	13-Dec-22	13-Dec-22
Target Analytes	**pg/g**	**% Rec**
2,3,7,8-TCDD	<1.1	88
1,2,3,7,8-PeCDD	<1.4	102
1,2,3,4,7,8-HxCDD	<2.2	92
1,2,3,6,7,8-HxCDD	<2.3	96
1,2,3,7,8,9-HxCDD	<2.3	94
1,2,3,4,6,7,8-HpCDD	<2.3	97
OCDD	<3.4	91
2,3,7,8-TCDF	<0.84	98
1,2,3,7,8-PeCDF	<0.98	104
2,3,4,7,8-PeCDF	<0.89	95
1,2,3,4,7,8-HxCDF	<0.75	92
1,2,3,6,7,8-HxCDF	<0.74	97
2,3,4,6,7,8-HxCDF	<0.76	92
1,2,3,7,8,9-HxCDF	<1.1	98
1,2,3,4,6,7,8-HpCDF	<1.2	100
1,2,3,4,7,8,9-HpCDF	<1.6	95
OCDF	<4.3	110
Extraction Standards	**% Rec**	**% Rec**
13C12-2,3,7,8-TCDD	66	52
13C12-1,2,3,7,8-PeCDD	59	54
13C12-1,2,3,4,7,8-HxCDD	78	61
13C12-1,2,3,6,7,8-HxCDD	80	59
13C12-1,2,3,4,6,7,8-HpCDD	62	47
13C12-OCDD	48	39
13C12-2,3,7,8-TCDF	75	54
13C12-1,2,3,7,8-PeCDF	64	54
13C12-2,3,4,7,8-PeCDF	66	60
13C12-1,2,3,4,7,8-HxCDF	84	63
13C12-1,2,3,6,7,8-HxCDF	86	67
13C12-2,3,4,6,7,8-HxCDF	84	64
13C12-1,2,3,7,8,9-HxCDF	77	62
13C12-1,2,3,4,6,7,8-HpCDF	71	55
13C12-1,2,3,4,7,8,9-HpCDF	72	57
Cleanup Standard		
37Cl4-2,3,7,8-TCDD (Cleanup)	65	52
Homologue Group Totals	**pg/g**	
Total-TCDD	<1.1	
Total-PeCDD	<1.4	
Total-HxCDD	<2.3	
Total-HpCDD	<2.3	
Total-TCDF	<0.84	
Total-PeCDF	<0.98	
Total-HxCDF	<1.1	
Total-HpCDF	<1.6	
Toxic Equivalency - (WHO 2005)		
Lower Bound PCDD/F TEQ (WHO 2005)	0.00	
Mid Point PCDD/F TEQ (WHO 2005)	1.97	
Upper Bound PCDD/F TEQ (WHO 2005)	3.95	

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Sample Analysis Report

Sample Name	**22-22180-RC-4 (RICH FEED)**	Sampling Date	n/a
ALS Sample ID	L2740399-1	Extraction Date	13-Dec-22
Analysis Method	EPA 1613B	Sample Size	0.49 g
Analysis Type	Sample	Percent Moisture	64.4%
Sample Matrix	Stack	Split Ratio	2

Approved:
K.NGUYEN
--e-signature--
14-Jan-2023

Run Information	**Run 1**
Filename	7-230111B07
Run Date	12-Jan-23 03:25
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HMRS 7 ZB-DX-1098142

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<0.94	0.94	U		20
1,2,3,7,8-PeCDD	1	31.54	1.47	0.89	J		100
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.94	0.94	U		100
1,2,3,6,7,8-HxCDD	0.1	33.85	<9.3	0.97	J,R	9.3	100
1,2,3,7,8,9-HxCDD	0.1	34.05	<3.5	0.95	J,R	3.5	100
1,2,3,4,6,7,8-HpCDD	0.01	36.33	22.8	1.3	J		100
OCDD	0.0003	39.18	118	2.2	J		200
2,3,7,8-TCDF	0.1	27.89	6.10	0.96	J		20
1,2,3,7,8-PeCDF	0.03	30.80	<0.96	0.52	M,J,R	0.96	100
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.47	0.47	U		100
1,2,3,4,7,8-HxCDF	0.1	33.20	1.00	0.45	J		100
1,2,3,6,7,8-HxCDF	0.1	33.31	<0.57	0.48	J,R	0.57	100
2,3,4,6,7,8-HxCDF	0.1	33.73	0.651	0.49	M,J		100
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<0.76	0.76	U		100
1,2,3,4,6,7,8-HpCDF	0.01	35.40	6.83	0.82	M,J		100
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.2	1.2	U		100
OCDF	0.0003	39.51	<16	2.2	M,J,R	16	200

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	28.45	76	25-164
13C12-1,2,3,7,8-PeCDD	2000	31.53	85	25-181
13C12-1,2,3,4,7,8-HxCDD	2000	33.77	86	32-141
13C12-1,2,3,6,7,8-HxCDD	2000	33.85	89	28-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	36.32	66	23-140
13C12-OCDD	4000	39.17	47	17-157
13C12-2,3,7,8-TCDF	2000	27.88	82	24-169
13C12-1,2,3,7,8-PeCDF	2000	30.80	93	24-185
13C12-2,3,4,7,8-PeCDF	2000	31.42	93	21-178
13C12-1,2,3,4,7,8-HxCDF	2000	33.19	93	26-152
13C12-1,2,3,6,7,8-HxCDF	2000	33.29	96	26-123
13C12-2,3,4,6,7,8-HxCDF	2000	33.71	90	28-136
13C12-1,2,3,7,8,9-HxCDF	2000	34.41	80	29-147
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.39	76	28-143
13C12-1,2,3,4,7,8,9-HpCDF	2000	36.95	74	26-138

Cleanup Standard	**pg**			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	28.46	82	35-197

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**		**LQL**
Total-TCDD	1.00	1.78	0.94		20
Total-PeCDD	3.00	5.27	0.89		100
Total-HxCDD	1.00	13.7	0.97		100
Total-HpCDD	2.00	61.1	1.3		100
Total-TCDF	2.00	7.31	0.96		20
Total-PeCDF	0.00	<0.52	0.52	U	100
Total-HxCDF	2.00	1.65	0.76		100
Total-HpCDF	1.00	6.83	1.2		100

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	2.58
Mid Point PCDD/F TEQ (WHO 2005)	4.58
Upper Bound PCDD/F TEQ (WHO 2005)	5.21

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

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Sample Analysis Report

Sample Name	**Duplicate of 22-22180-RC-4 (RICH FEED)**	Sampling Date	n/a
ALS Sample ID	WG3775203-4	Extraction Date	13-Dec-22
Analysis Method	EPA 1613B	Sample Size	0.50 g
Analysis Type	Sample	Percent Moisture	64.4%
Sample Matrix	QC	Split Ratio	2

Approved:
K.NGUYEN
--e-signature--
14-Jan-2023

Run Information	**Run 1**
Filename	7-230111B08
Run Date	12-Jan-23 04:10
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HMRS 7 ZB-DX-1098142

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<0.96	0.96	U		20
1,2,3,7,8-PeCDD	1	NotFnd	<1.9	1.9	U		100
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<1.0	1.0	U		100
1,2,3,6,7,8-HxCDD	0.1	33.84	<11	1.1	J,R	11	100
1,2,3,7,8,9-HxCDD	0.1	34.05	<5.1	1.1	J,R	5.1	100
1,2,3,4,6,7,8-HpCDD	0.01	36.32	28.5	1.3	J		100
OCDD	0.0003	39.17	128	3.6	J		200
2,3,7,8-TCDF	0.1	27.89	<7.2	1.1	M,J,R	7.2	20
1,2,3,7,8-PeCDF	0.03	30.80	<1.2	1.1	J,R	1.2	100
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.93	0.93	U		100
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.74	0.74	U		100
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.82	0.82	U		100
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.82	0.82	U		100
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<1.2	1.2	U		100
1,2,3,4,6,7,8-HpCDF	0.01	35.39	<6.7	0.80	M,J,R	6.7	100
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.1	1.1	U		100
OCDF	0.0003	39.50	14.9	2.1	J		200

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	28.43	71	25-164
13C12-1,2,3,7,8-PeCDD	2000	31.52	73	25-181
13C12-1,2,3,4,7,8-HxCDD	2000	33.76	79	32-141
13C12-1,2,3,6,7,8-HxCDD	2000	33.84	80	28-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	36.31	60	23-140
13C12-OCDD	4000	39.16	45	17-157
13C12-2,3,7,8-TCDF	2000	27.88	73	24-169
13C12-1,2,3,7,8-PeCDF	2000	30.79	77	24-185
13C12-2,3,4,7,8-PeCDF	2000	31.41	80	21-178
13C12-1,2,3,4,7,8-HxCDF	2000	33.18	85	26-152
13C12-1,2,3,6,7,8-HxCDF	2000	33.28	88	26-123
13C12-2,3,4,6,7,8-HxCDF	2000	33.70	80	28-136
13C12-1,2,3,7,8,9-HxCDF	2000	34.40	81	29-147
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.38	71	28-143
13C12-1,2,3,4,7,8,9-HpCDF	2000	36.93	71	26-138
Cleanup Standard	**pg**			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	28.45	72	35-197

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**		
Total-TCDD	1.00	2.27	0.96		20
Total-PeCDD	1.00	6.07	1.9		100
Total-HxCDD	1.00	14.0	1.1		100
Total-HpCDD	2.00	65.5	1.3		100
Total-TCDF	4.00	9.38	1.1		20
Total-PeCDF	0.00	<1.1	1.1	U	100
Total-HxCDF	1.00	3.28	1.2		100
Total-HpCDF	1.00	8.03	1.1		100

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	0.328
Mid Point PCDD/F TEQ (WHO 2005)	4.56
Upper Bound PCDD/F TEQ (WHO 2005)	6.37

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

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Sample Analysis Report

Sample Name	**22-22180-LC-4 (LEAN FEED)**	Sampling Date	n/a
ALS Sample ID	L2740399-2	Extraction Date	13-Dec-22
Analysis Method	EPA 1613B	Sample Size	0.39 g
Analysis Type	Sample	Percent Moisture	69.4%
Sample Matrix	Stack	Split Ratio	2

Approved:
K.NGUYEN
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14-Jan-2023

Run Information	**Run 1**
Filename	7-230111B09
Run Date	12-Jan-23 04:55
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HMRS 7 ZB-DX-1098142

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<2.7	2.7	U		26
1,2,3,7,8-PeCDD	1	31.53	<2.8	1.8	M,J,R	2.8	130
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<2.9	2.9	U		130
1,2,3,6,7,8-HxCDD	0.1	33.85	17.0	2.8	J		130
1,2,3,7,8,9-HxCDD	0.1	34.05	<5.1	2.8	J,R	5.1	130
1,2,3,4,6,7,8-HpCDD	0.01	36.32	<24	3.5	J,R	24	130
OCDD	0.0003	39.17	145	6.5	J		260
2,3,7,8-TCDF	0.1	27.89	<8.2	2.4	J,R	8.2	26
1,2,3,7,8-PeCDF	0.03	NotFnd	<1.7	1.7	U		130
2,3,4,7,8-PeCDF	0.3	NotFnd	<1.7	1.7	U		130
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<1.2	1.2	U		130
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<1.2	1.2	U		130
2,3,4,6,7,8-HxCDF	0.1	33.72	<1.2	1.2	U		130
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<1.9	1.9	U		130
1,2,3,4,6,7,8-HpCDF	0.01	35.39	<6.9	1.3	M,J,R	6.9	130
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.7	1.7	U		130
OCDF	0.0003	39.51	<15	5.1	M,J,R	15	260

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	28.43	63	25-164
13C12-1,2,3,7,8-PeCDD	2000	31.52	68	25-181
13C12-1,2,3,4,7,8-HxCDD	2000	33.76	71	32-141
13C12-1,2,3,6,7,8-HxCDD	2000	33.84	73	28-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	36.32	56	23-140
13C12-OCDD	4000	39.17	43	17-157
13C12-2,3,7,8-TCDF	2000	27.88	68	24-169
13C12-1,2,3,7,8-PeCDF	2000	30.79	75	24-185
13C12-2,3,4,7,8-PeCDF	2000	31.41	76	21-178
13C12-1,2,3,4,7,8-HxCDF	2000	33.18	78	26-152
13C12-1,2,3,6,7,8-HxCDF	2000	33.28	80	26-123
13C12-2,3,4,6,7,8-HxCDF	2000	33.70	76	28-136
13C12-1,2,3,7,8,9-HxCDF	2000	34.40	69	29-147
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.38	67	28-143
13C12-1,2,3,4,7,8,9-HpCDF	2000	36.94	68	26-138
Cleanup Standard	**pg**			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	28.45	69	35-197

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**		
Total-TCDD	0.00	<2.7	2.7	U	26
Total-PeCDD	0.00	<1.8	1.8	U	130
Total-HxCDD	1.00	17.0	2.9		130
Total-HpCDD	0.00	<3.5	3.5	U	130
Total-TCDF	0.00	<2.4	2.4	U	26
Total-PeCDF	0.00	<1.7	1.7	U	130
Total-HxCDF	0.00	<1.9	1.9	U	130
Total-HpCDF	1.00	11.6	1.7		130

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	1.74
Mid Point PCDD/F TEQ (WHO 2005)	8.25
Upper Bound PCDD/F TEQ (WHO 2005)	10.3

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-AC-4 (ALKALINE FEED)**	Sampling Date	n/a	
ALS Sample ID	L2740399-3	Extraction Date	13-Dec-22	
Analysis Method	EPA 1613B	Sample Size	0.41	g
Analysis Type	Sample	Percent Moisture	70.4%	
Sample Matrix	Stack	Split Ratio	2	

Approved:
K.NGUYEN
--e-signature--
14-Jan-2023

Run Information	**Run 1**
Filename	7-230111B10
Run Date	12-Jan-23 05:39
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HMRS 7 ZB-DX-1098142

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<2.3	2.3	U		24
1,2,3,7,8-PeCDD	1	31.53	<3.1	1.8	M,J,R	3.1	120
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<2.1	2.1	U		120
1,2,3,6,7,8-HxCDD	0.1	33.85	<16	2.1	J,R	16	120
1,2,3,7,8,9-HxCDD	0.1	34.05	<7.4	2.1	M,J,R	7.4	120
1,2,3,4,6,7,8-HpCDD	0.01	36.32	<26	4.0	M,J,R	26	120
OCDD	0.0003	39.17	142	5.8	J		240
2,3,7,8-TCDF	0.1	27.89	5.93	2.0	J		24
1,2,3,7,8-PeCDF	0.03	30.80	<1.4	1.4	M,U	1.1	120
2,3,4,7,8-PeCDF	0.3	NotFnd	<1.3	1.3	U		120
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<1.0	1.0	U		120
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<1.0	1.0	U		120
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<1.1	1.1	U		120
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<1.5	1.5	U		120
1,2,3,4,6,7,8-HpCDF	0.01	35.40	<2.6	2.3	M,J,R	2.6	120
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<3.2	3.2	U		120
OCDF	0.0003	39.51	<15	5.4	M,J,R	15	240

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	28.43	67	25-164
13C12-1,2,3,7,8-PeCDD	2000	31.52	65	25-181
13C12-1,2,3,4,7,8-HxCDD	2000	33.76	76	32-141
13C12-1,2,3,6,7,8-HxCDD	2000	33.84	78	28-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	36.31	58	23-140
13C12-OCDD	4000	39.16	42	17-157
13C12-2,3,7,8-TCDF	2000	27.88	73	24-169
13C12-1,2,3,7,8-PeCDF	2000	30.79	72	24-185
13C12-2,3,4,7,8-PeCDF	2000	31.41	73	21-178
13C12-1,2,3,4,7,8-HxCDF	2000	33.18	87	26-152
13C12-1,2,3,6,7,8-HxCDF	2000	33.28	89	26-123
13C12-2,3,4,6,7,8-HxCDF	2000	33.70	85	28-136
13C12-1,2,3,7,8,9-HxCDF	2000	34.40	83	29-147
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.38	72	28-143
13C12-1,2,3,4,7,8,9-HpCDF	2000	36.94	72	26-138
Cleanup Standard	**pg**			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	28.45	71	35-197

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**		
Total-TCDD	0.00	<2.3	2.3	U	24
Total-PeCDD	1.00	5.19	1.8		120
Total-HxCDD	2.00	23.0	2.1		120
Total-HpCDD	1.00	43.7	4.0		120
Total-TCDF	2.00	9.20	2.0		24
Total-PeCDF	0.00	<1.4	1.4	U	120
Total-HxCDF	1.00	4.85	1.5		120
Total-HpCDF	1.00	7.73	3.2		120

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	0.636
Mid Point PCDD/F TEQ (WHO 2005)	8.08
Upper Bound PCDD/F TEQ (WHO 2005)	9.80

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.		
TEF	Indicates the Toxic Equivalency Factor	TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.		
U	Indicates that this compound was not detected above the EDL.		
J	Indicates that a target analyte was detected below the calibrated range.		
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.		
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.		
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure		

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-EC-4 (EMULSION FEED)**	Sampling Date	n/a
ALS Sample ID	L2740399-4	Extraction Date	13-Dec-22
Analysis Method	EPA 1613B	Sample Size	0.48 g
Analysis Type	Sample	Percent Moisture	66.5%
Sample Matrix	Stack	Split Ratio	2

Approved:
K.NGUYEN
--e-signature--
14-Jan-2023

Run Information	**Run 1**
Filename	7-230113A05
Run Date	13-Jan-23 16:02
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HMRS 7 ZB-DX-1098142

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg/g	EDL pg/g	Flags	EMPC pg/g	LQL
2,3,7,8-TCDD	1	NotFnd	<2.5	2.5	U		21
1,2,3,7,8-PeCDD	1	NotFnd	<1.9	1.9	U		100
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<2.6	2.6	U		100
1,2,3,6,7,8-HxCDD	0.1	33.86	<9.7	2.5	M,J,R	9.7	100
1,2,3,7,8,9-HxCDD	0.1	34.05	5.00	2.6	J		100
1,2,3,4,6,7,8-HpCDD	0.01	36.35	19.6	3.9	M,J		100
OCDD	0.0003	39.19	144	7.3	J		210
2,3,7,8-TCDF	0.1	27.91	<4.8	1.7	M,J,R	4.8	21
1,2,3,7,8-PeCDF	0.03	NotFnd	<1.6	1.6	U		100
2,3,4,7,8-PeCDF	0.3	NotFnd	<1.5	1.5	U		100
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<1.4	1.4	U		100
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<1.4	1.4	U		100
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<1.5	1.5	U		100
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<2.3	2.3	U		100
1,2,3,4,6,7,8-HpCDF	0.01	35.40	6.76	2.0	J		100
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<2.7	2.7	U		100
OCDF	0.0003	39.52	<9.6	6.7	M,J,R	9.6	210

Extraction Standards	pg		% Rec	Limits
13C12-2,3,7,8-TCDD	2000	28.45	47	25-164
13C12-1,2,3,7,8-PeCDD	2000	31.53	45	25-181
13C12-1,2,3,4,7,8-HxCDD	2000	33.78	60	32-141
13C12-1,2,3,6,7,8-HxCDD	2000	33.85	63	28-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	36.32	49	23-140
13C12-OCDD	4000	39.17	33	17-157
13C12-2,3,7,8-TCDF	2000	27.88	54	24-169
13C12-1,2,3,7,8-PeCDF	2000	30.80	49	24-185
13C12-2,3,4,7,8-PeCDF	2000	31.42	52	21-178
13C12-1,2,3,4,7,8-HxCDF	2000	33.19	68	26-152
13C12-1,2,3,6,7,8-HxCDF	2000	33.29	70	26-123
13C12-2,3,4,6,7,8-HxCDF	2000	33.72	66	28-136
13C12-1,2,3,7,8,9-HxCDF	2000	34.41	59	29-147
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.39	52	28-143
13C12-1,2,3,4,7,8,9-HpCDF	2000	36.95	52	26-138
Cleanup Standard	pg			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	28.46	55	35-197

Homologue Group Totals	# peaks	Conc. pg/g	EDL pg/g		
Total-TCDD	0.00	<2.5	2.5	U	21
Total-PeCDD	0.00	<1.9	1.9	U	100
Total-HxCDD	2.00	17.2	2.6		100
Total-HpCDD	2.00	51.4	3.9		100
Total-TCDF	1.00	1.75	1.7		21
Total-PeCDF	1.00	3.29	1.6		100
Total-HxCDF	1.00	3.31	2.3		100
Total-HpCDF	2.00	13.8	2.7		100

Toxic Equivalency - (WHO 2005)	pg/g
Lower Bound PCDD/F TEQ (WHO 2005)	0.807
Mid Point PCDD/F TEQ (WHO 2005)	5.18
Upper Bound PCDD/F TEQ (WHO 2005)	8.10

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a	
ALS Sample ID	WG3775203-1	Extraction Date	13-Dec-22	
Analysis Method	EPA 1613B	Sample Size	0.45	g
Analysis Type	Blank	Percent Moisture	n/a	
Sample Matrix	QC	Split Ratio	2	

Approved:
K.NGUYEN
--e-signature--
14-Jan-2023

Run Information	**Run 1**
Filename	7-230111B06
Run Date	12-Jan-23 02:41
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HMRS 7 ZB-DX-1098142

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<1.1	1.1	U		22
1,2,3,7,8-PeCDD	1	NotFnd	<1.4	1.4	U		110
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<2.2	2.2	U		110
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<2.3	2.3	U		110
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<2.3	2.3	U		110
1,2,3,4,6,7,8-HpCDD	0.01	NotFnd	<2.3	2.3	U		110
OCDD	0.0003	39.18	<3.4	3.4	M,U		220
2,3,7,8-TCDF	0.1	NotFnd	<0.84	0.84	U		22
1,2,3,7,8-PeCDF	0.03	NotFnd	<0.98	0.98	U		110
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.89	0.89	U		110
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.75	0.75	U		110
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.74	0.74	U		110
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.76	0.76	U		110
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<1.1	1.1	U		110
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<1.2	1.2	U		110
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.6	1.6	U		110
OCDF	0.0003	39.51	<4.3	4.3	M,U		220

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	28.45	66	25-164
13C12-1,2,3,7,8-PeCDD	2000	31.53	59	25-181
13C12-1,2,3,4,7,8-HxCDD	2000	33.77	78	32-141
13C12-1,2,3,6,7,8-HxCDD	2000	33.85	80	28-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	36.32	62	23-140
13C12-OCDD	4000	39.17	48	17-157
13C12-2,3,7,8-TCDF	2000	27.89	75	24-169
13C12-1,2,3,7,8-PeCDF	2000	30.80	64	24-185
13C12-2,3,4,7,8-PeCDF	2000	31.42	66	21-178
13C12-1,2,3,4,7,8-HxCDF	2000	33.19	84	26-152
13C12-1,2,3,6,7,8-HxCDF	2000	33.29	86	26-123
13C12-2,3,4,6,7,8-HxCDF	2000	33.71	84	28-136
13C12-1,2,3,7,8,9-HxCDF	2000	34.41	77	29-147
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.39	71	28-143
13C12-1,2,3,4,7,8,9-HpCDF	2000	36.95	72	26-138
Cleanup Standard	**pg**			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	28.46	65	35-197

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**		
Total-TCDD	0.00	<1.1	1.1	U	22
Total-PeCDD	0.00	<1.4	1.4	U	110
Total-HxCDD	0.00	<2.3	2.3	U	110
Total-HpCDD	0.00	<2.3	2.3	U	110
Total-TCDF	0.00	<0.84	0.84	U	22
Total-PeCDF	0.00	<0.98	0.98	U	110
Total-HxCDF	0.00	<1.1	1.1	U	110
Total-HpCDF	0.00	<1.6	1.6	U	110

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	0.00
Mid Point PCDD/F TEQ (WHO 2005)	1.97
Upper Bound PCDD/F TEQ (WHO 2005)	3.95

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a	
ALS Sample ID	WG3775203-2	Extraction Date	13-Dec-22	
Analysis Method	EPA 1613B	Sample Size	1	n/a
Analysis Type	LCS	Percent Moisture	n/a	
Sample Matrix	QC	Split Ratio	2	

Approved:
K.NGUYEN
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14-Jan-2023

Run Information	**Run 1**
Filename	7-230111B02
Run Date	11-Jan-23 23:42
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HMRS 7 ZB-DX-1098142

Target Analytes	**pg**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	200	28.46	88	67-158	
1,2,3,7,8-PeCDD	1000	31.54	102	70-142	
1,2,3,4,7,8-HxCDD	1000	33.78	92	70-164	
1,2,3,6,7,8-HxCDD	1000	33.86	96	76-134	
1,2,3,7,8,9-HxCDD	1000	34.05	94	64-162	
1,2,3,4,6,7,8-HpCDD	1000	36.33	97	70-140	
OCDD	2000	39.18	91	78-144	
2,3,7,8-TCDF	200	27.91	98	75-158	
1,2,3,7,8-PeCDF	1000	30.80	104	80-134	
2,3,4,7,8-PeCDF	1000	31.43	95	68-160	
1,2,3,4,7,8-HxCDF	1000	33.20	92	72-134	
1,2,3,6,7,8-HxCDF	1000	33.30	97	84-130	
2,3,4,6,7,8-HxCDF	1000	33.72	92	70-156	
1,2,3,7,8,9-HxCDF	1000	34.42	98	78-130	
1,2,3,4,6,7,8-HpCDF	1000	35.40	100	82-122	
1,2,3,4,7,8,9-HpCDF	1000	36.96	95	78-138	
OCDF	2000	39.52	110	63-170	
Extraction Standards	**pg**		**% Rec**	**Limits**	
13C12-2,3,7,8-TCDD	2000	28.43	52	20-175	
13C12-1,2,3,7,8-PeCDD	2000	31.53	54	21-227	
13C12-1,2,3,4,7,8-HxCDD	2000	33.77	61	21-193	
13C12-1,2,3,6,7,8-HxCDD	2000	33.85	59	25-163	
13C12-1,2,3,4,6,7,8-HpCDD	2000	36.32	47	26-166	
13C12-OCDD	4000	39.17	39	13-138	
13C12-2,3,7,8-TCDF	2000	27.88	54	22-152	
13C12-1,2,3,7,8-PeCDF	2000	30.80	54	21-192	
13C12-2,3,4,7,8-PeCDF	2000	31.42	60	13-328	
13C12-1,2,3,4,7,8-HxCDF	2000	33.19	63	19-202	
13C12-1,2,3,6,7,8-HxCDF	2000	33.29	67	21-159	
13C12-2,3,4,6,7,8-HxCDF	2000	33.71	64	22-176	
13C12-1,2,3,7,8,9-HxCDF	2000	34.41	62	17-205	
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.39	55	21-158	
13C12-1,2,3,4,7,8,9-HpCDF	2000	36.95	57	20-186	
Cleanup Standard	**pg**				
37Cl4-2,3,7,8-TCDD (Cleanup)	40	28.46	52	31-191	

ALS Life Sciences
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Certificate of Analysis

ALS Project Contact: Lynne Wrona
ALS Project ID: ORT100
ALS WO#: L2740399
Date of Report 16-Jan-23
Date of Sample Receipt 14-Nov-22

Client Name: ORTECH Environmental
Client Address: 804 Southdown Road
Mississauga,ON
L5J 2Y4
Client Contact: Chris Belore
Client Project ID: 22180 Clean Harbors

COMMENTS: **PCB Congeners by EPA 1668C**

PCB Congener Group Totals and Total PCB are a sum of detected values, including EMPC values, consistent with USEPA CLP SOW CBC1.2

Certified by:

Sabrina Jin
Technical Specialist

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	**22-22180-RC-4 (RICH FEED)**	**Duplicate of 22-22180-RC-4 (RICH FEED)**	**22-22180-LC-4 (LEAN FEED)**	**22-22180-AC-4 (ALKALINE FEED)**	**22-22180-EC-4 (EMULSION FEED)**
ALS Sample ID	L2740399-1	WG3775203-4	L2740399-2	L2740399-3	L2740399-4
Sample Size	0.49	0.50	0.39	0.40	0.48
Sample size units	g	g	g	g	g
Percent Moisture	64.4%	64.5%	69.4%	70.4%	66.5%
Sample Matrix	Stack	QC	Stack	Stack	Stack
Sampling Date	n/a	n/a	n/a	n/a	n/a
Extraction Date	13-Dec-22	13-Dec-22	13-Dec-22	13-Dec-22	13-Dec-22
Target Analytes	**pg/g**	**pg/g**	**pg/g**	**pg/g**	**pg/g**
PCB-081	<5.6	<3.6	<4.1	<3.6	<12
PCB-077	<11	14.7	15.6	14.0	<9.8
PCB-123	<5.3	<4.4	<4.1	<4.6	<3.3
PCB-118	110	118	131	130	91.7
PCB-114	<5.0	<4.2	<4.0	<4.2	<3.1
PCB-105	48.7	56.1	55.4	<44	<35
PCB-126	<5.5	<4.7	<4.4	<4.6	<3.1
PCB-167	<6.8	<5.3	<6.3	<6.0	<2.2
PCB-156/157	<14	17.0	<9.4	14.3	8.42
PCB-169	<5.3	<2.5	<2.7	<3.5	<1.5
PCB-189	<2.9	<2.2	<1.9	<1.4	<1.7
Extraction Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**	**% Rec**
13C12-PCB-081	29	39	51	60	44
13C12-PCB-077	33	43	53	60	56
13C12-PCB-123	33	44	55	60	56
13C12-PCB-118	33	44	54	61	58
13C12-PCB-114	36	47	57	67	58
13C12-PCB-105	35	45	54	64	60
13C12-PCB-126	35	46	58	64	62
13C12-PCB-167	36	46	48	48	58
13C12-PCB-156/157	36	48	49	49	59
13C12-PCB-169	39	54	55	54	64
13C12-PCB-189	39	51	56	55	64
Cleanup Standards					
13C12-PCB-028	35	44	42	45	53
13C12-PCB-111	35	47	57	68	57
13C12-PCB-178	38	47	49	52	58
Homologue Group Totals					
Total MonoCB	33.0	51.0	108	103	82.0
Total DiCB	151	160	423	368	699
Total TriCB	283	324	475	477	544
Total TetraCB	502	516	566	472	654
Total PentaCB	569	607	641	619	424
Total HexaCB	488	597	620	579	407
Total HeptaCB	220	330	282	283	230
Total OctaCB	79.4	87.2	83.8	88.0	58.0
Total NonaCB	12.4	11.3	14.0	16.0	7.90
DecaCB	23.2	27.0	22.0	23.0	17.0
Total PCB	2360	2710	3230	3030	3120
oxic Equivalency - (WHO 2005)					
Lower Bound PCB TEQ	0.00476	0.00720	0.00715	0.00573	0.00300
Mid Point PCB TEQ	0.362	0.281	0.269	0.290	0.185
Upper Bound PCB TEQ	0.718	0.554	0.530	0.574	0.364

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Quality Control Summary Report

Sample Name	**Method Blank**
ALS Sample ID	WG3775203-1
Sample Size	0.40
Sample size units	g
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	13-Dec-02
Target Analytes	**pg/g**
PCB-081	<40
PCB-077	<3.9
PCB-123	<3.3
PCB-118	<9.2
PCB-114	<3.2
PCB-105	4.77
PCB-126	<3.2
PCB-167	<1.6
PCB-156/157	<2.2
PCB-169	<1.6
PCB-189	<1.1
Extraction Standards	**% Rec**
13C12-PCB-081	18
13C12-PCB-077	42
13C12-PCB-123	45
13C12-PCB-118	46
13C12-PCB-114	45
13C12-PCB-105	47
13C12-PCB-126	50
13C12-PCB-167	53
13C12-PCB-156/157	56
13C12-PCB-169	62
13C12-PCB-189	59
Cleanup Standards	
13C12-PCB-028	47
13C12-PCB-111	42
13C12-PCB-178	55
Homologue Group Totals	
Total MonoCB	<6.0
Total DiCB	30.4
Total TriCB	56.8
Total TetraCB	28.0
Total PentaCB	43.0
Total HexaCB	13.8
Total HeptaCB	1.90
Total OctaCB	3.90
Total NonaCB	<5.0
DecaCB	<7.1
Total PCB	178
oxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.000143
Mid Point PCB TEQ	0.187
Upper Bound PCB TEQ	0.373

Sample Analysis Summary Report

Sample Name	**Laboratory Control Sample**
ALS Sample ID	WG3775203-2
Sample Size	1
Sample size units	n/a
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	13-Dec-22
Target Analytes	**% Rec**
PCB-081	93
PCB-077	91
PCB-123	96
PCB-118	97
PCB-114	91
PCB-105	90
PCB-126	93
PCB-167	98
PCB-156/157	95
PCB-169	92
PCB-189	91
Extraction Standards	**% Rec**
13C12-PCB-081	29
13C12-PCB-077	30
13C12-PCB-123	29
13C12-PCB-118	29
13C12-PCB-114	31
13C12-PCB-105	29
13C12-PCB-126	28
13C12-PCB-167	32
13C12-PCB-156/157	33
13C12-PCB-169	34
13C12-PCB-189	32
Cleanup Standards	
13C12-PCB-028	31
13C12-PCB-111	30
13C12-PCB-178	33

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Sample Analysis Report

Sample Name	**22-22180-RC-4 (RICH FEED)**	Sampling Date	n/a	
ALS Sample ID	L2740399-1	Extraction Date	13-Dec-22	
Analysis Method	EPA 1668C	Sample Size	0.49 g	
Analysis Type	Sample	Percent Moisture	64.4%	
Sample Matrix	Stack	Split Ratio	2	

Approved:
Ella Gdyczynski
--e-signature--
16-Jan-2023

Run Information	**Run 1**
Filename	6-230107A24
Run Date	08-Jan-23 01:28
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-6 SPB OCTYL 273027-03

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
PCB-081	0.0003	NotFnd	<5.6	5.6	U		100
PCB-077	0.0001	22.69	<11	5.1	M,J,R	11	100
PCB-123	0.00003	NotFnd	<5.3	5.3	U		100
PCB-118	0.00003	23.83	110	5.1			100
PCB-114	0.00003	NotFnd	<5.0	5.0	U		100
PCB-105	0.00003	24.48	48.7	4.9	J		100
PCB-126	0.1	NotFnd	<5.5	5.5	U		100
PCB-167	0.00003	26.95	<6.8	5.1	J,R	6.8	100
PCB-156/157	0.00003	27.57	<14	7.1	M,J,R	14	200
PCB-169	0.03	NotFnd	<5.3	5.3	U		100
PCB-189	0.00003	30.50	<2.9	2.9	U	1.5	100

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	2000	22.37	29	10-145
13C12-PCB-077	2000	22.68	33	10-145
13C12-PCB-123	2000	23.64	33	10-145
13C12-PCB-118	2000	23.81	33	10-145
13C12-PCB-114	2000	24.11	36	10-145
13C12-PCB-105	2000	24.47	35	10-145
13C12-PCB-126	2000	26.05	35	10-145
13C12-PCB-167	2000	26.93	36	10-145
13C12-PCB-156/157	4000	27.57	36	10-145
13C12-PCB-169	2000	29.23	39	10-145
13C12-PCB-189	2000	30.48	39	10-145
Cleanup Standards				
13C12-PCB-028	2000	16.58	35	5-145
13C12-PCB-111	2000	22.59	35	10-145
13C12-PCB-178	2000	25.61	38	10-145

Homologue Group Totals				
Total MonoCB	33.0	4.4	J	410
Total DiCB	151	6.4	J	820
Total TriCB	283	5.9	J	820
Total TetraCB	502	2.2	J	1600
Total PentaCB	569	3.0	J	1600
Total HexaCB	488	3.2	J	1600
Total HeptaCB	220	2.9	J	820
Total OctaCB	79.4	2.2	J	820
Total NonaCB	12.4	5.6	J	410
DecaCB	23.2	13	J	410
Total PCB	2360		J	3300

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.00476
Mid Point PCB TEQ	0.362
Upper Bound PCB TEQ	0.718

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**Duplicate of 22-22180-RC-4 (RICH FEED)**	Sampling Date	n/a	
ALS Sample ID	WG3775203-4	Extraction Date	13-Dec-22	
Analysis Method	EPA 1668C	Sample Size	0.50	g
Analysis Type	Sample	Percent Moisture	64.5%	
Sample Matrix	QC	Split Ratio	2	

Approved:
Ella Gdyczynski
--e-signature--
16-Jan-2023

Run Information	**Run 1**
Filename	6-230107A25
Run Date	08-Jan-23 02:16
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-6 SPB OCTYL 273027-03

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
PCB-081	0.0003	NotFnd	<3.6	3.6	U		100
PCB-077	0.0001	22.68	14.7	3.5	M,J		100
PCB-123	0.00003	NotFnd	<4.4	4.4	U		100
PCB-118	0.00003	23.81	118	4.3			100
PCB-114	0.00003	NotFnd	<4.2	4.2	U		100
PCB-105	0.00003	24.45	56.1	4.4	J		100
PCB-126	0.1	26.05	<4.7	4.7	U	0.87	100
PCB-167	0.00003	26.94	<5.3	2.5	J,R	5.3	100
PCB-156/157	0.00003	27.55	17.0	3.5	J		200
PCB-169	0.03	29.21	<2.5	2.5	M,U	1.2	100
PCB-189	0.00003	30.48	<2.2	2.2	U	1.2	100

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	2000	22.35	39	10-145
13C12-PCB-077	2000	22.66	43	10-145
13C12-PCB-123	2000	23.63	44	10-145
13C12-PCB-118	2000	23.80	44	10-145
13C12-PCB-114	2000	24.09	47	10-145
13C12-PCB-105	2000	24.44	45	10-145
13C12-PCB-126	2000	26.04	46	10-145
13C12-PCB-167	2000	26.92	46	10-145
13C12-PCB-156/157	4000	27.55	48	10-145
13C12-PCB-169	2000	29.21	54	10-145
13C12-PCB-189	2000	30.47	51	10-145
Cleanup Standards				
13C12-PCB-028	2000	16.54	44	5-145
13C12-PCB-111	2000	22.58	47	10-145
13C12-PCB-178	2000	25.60	47	10-145

Homologue Group Totals				
Total MonoCB	51.0	3.0	J	400
Total DiCB	160	5.8	J	800
Total TriCB	324	5.2	J	800
Total TetraCB	516	1.5	J	1600
Total PentaCB	607	2.1	J	1600
Total HexaCB	597	2.4	J	1600
Total HeptaCB	330	2.0	J	800
Total OctaCB	87.2	1.6	J	800
Total NonaCB	11.3	4.4	J	400
DecaCB	27.0	9.7	J	400
Total PCB	2710		J	3200

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.00720
Mid Point PCB TEQ	0.281
Upper Bound PCB TEQ	0.554

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-LC-4 (LEAN FEED)**	Sampling Date	n/a
ALS Sample ID	L2740399-2	Extraction Date	13-Dec-22
Analysis Method	EPA 1668C	Sample Size	0.39 g
Analysis Type	Sample	Percent Moisture	69.4%
Sample Matrix	Stack	Split Ratio	2

Approved:
Ella Gdyczynski
--e-signature--
16-Jan-2023

Run Information	**Run 1**
Filename	6-230107A26
Run Date	08-Jan-23 03:04
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-6 SPB OCTYL 273027-03

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
PCB-081	0.0003	NotFnd	<4.1	4.1	U		130
PCB-077	0.0001	22.70	15.6	4.1	J		130
PCB-123	0.00003	23.66	<4.1	4.1	M,U	2.5	130
PCB-118	0.00003	23.83	131	4.0			130
PCB-114	0.00003	NotFnd	<4.0	4.0	U		130
PCB-105	0.00003	24.48	55.4	4.3	J		130
PCB-126	0.1	26.02	<4.4	4.4	M,U	0.97	130
PCB-167	0.00003	26.94	<6.3	2.7	M,J,R	6.3	130
PCB-156/157	0.00003	27.56	<9.4	3.9	J,R	9.4	260
PCB-169	0.03	NotFnd	<2.7	2.7	U		130
PCB-189	0.00003	NotFnd	<1.9	1.9	U		130

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	2000	22.38	51	10-145
13C12-PCB-077	2000	22.68	53	10-145
13C12-PCB-123	2000	23.64	55	10-145
13C12-PCB-118	2000	23.81	54	10-145
13C12-PCB-114	2000	24.11	57	10-145
13C12-PCB-105	2000	24.45	54	10-145
13C12-PCB-126	2000	26.05	58	10-145
13C12-PCB-167	2000	26.93	48	10-145
13C12-PCB-156/157	4000	27.56	49	10-145
13C12-PCB-169	2000	29.21	55	10-145
13C12-PCB-189	2000	30.48	56	10-145
Cleanup Standards				
13C12-PCB-028	2000	16.55	42	5-145
13C12-PCB-111	2000	22.59	57	10-145
13C12-PCB-178	2000	25.60	49	10-145

Homologue Group Totals				
Total MonoCB	108	4.5	J	510
Total DiCB	423	7.7	J	1000
Total TriCB	475	8.1	J	1000
Total TetraCB	566	2.4	J	2100
Total PentaCB	641	2.7	J	2100
Total HexaCB	620	2.6	J	2100
Total HeptaCB	282	1.9	J	1000
Total OctaCB	83.8	1.7	J	1000
Total NonaCB	14.0	3.9	J	510
DecaCB	22.0	5.1	J	510
Total PCB	3230		J	4100

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.00715
Mid Point PCB TEQ	0.269
Upper Bound PCB TEQ	0.530

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-AC-4 (ALKALINE FEED)**	Sampling Date	n/a
ALS Sample ID	L2740399-3	Extraction Date	13-Dec-22
Analysis Method	EPA 1668C	Sample Size	0.40 g
Analysis Type	Sample	Percent Moisture	70.4%
Sample Matrix	Stack	Split Ratio	2

Approved:
Ella Gdyczynski
--e-signature--
16-Jan-2023

Run Information	**Run 1**
Filename	6-230107A27
Run Date	08-Jan-23 03:52
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-6 SPB OCTYL 273027-03

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
PCB-081	0.0003	NotFnd	<3.6	3.6	U		130
PCB-077	0.0001	22.69	14.0	3.7	J		130
PCB-123	0.00003	NotFnd	<4.6	4.6	U		130
PCB-118	0.00003	23.83	130	4.3			130
PCB-114	0.00003	24.15	<4.2	4.2	U	1.4	130
PCB-105	0.00003	24.47	<44	4.4	M,J,R	44	130
PCB-126	0.1	NotFnd	<4.6	4.6	U		130
PCB-167	0.00003	26.94	<6.0	3.5	J,R	6.0	130
PCB-156/157	0.00003	27.55	14.3	4.6	J		250
PCB-169	0.03	NotFnd	<3.5	3.5	U		130
PCB-189	0.00003	30.48	<1.4	1.4	U	0.51	130

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	2000	22.39	60	10-145
13C12-PCB-077	2000	22.68	60	10-145
13C12-PCB-123	2000	23.64	60	10-145
13C12-PCB-118	2000	23.81	61	10-145
13C12-PCB-114	2000	24.11	67	10-145
13C12-PCB-105	2000	24.45	64	10-145
13C12-PCB-126	2000	26.04	64	10-145
13C12-PCB-167	2000	26.93	48	10-145
13C12-PCB-156/157	4000	27.56	49	10-145
13C12-PCB-169	2000	29.21	54	10-145
13C12-PCB-189	2000	30.48	55	10-145
Cleanup Standards				
13C12-PCB-028	2000	16.54	45	5-145
13C12-PCB-111	2000	22.59	68	10-145
13C12-PCB-178	2000	25.60	52	10-145

Homologue Group Totals				
Total MonoCB	103	3.3	J	500
Total DiCB	368	7.1	J	1000
Total TriCB	477	6.1	J	1000
Total TetraCB	472	2.3	J	2000
Total PentaCB	619	2.4	J	2000
Total HexaCB	579	2.6	J	2000
Total HeptaCB	283	1.4	J	1000
Total OctaCB	88.0	1.1	J	1000
Total NonaCB	16.0	3.9	J	500
DecaCB	23.0	7.0	J	500
Total PCB	3030		J	4000

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.00573
Mid Point PCB TEQ	0.290
Upper Bound PCB TEQ	0.574

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**22-22180-EC-4 (EMULSION FEED)**	Sampling Date	n/a	
ALS Sample ID	L2740399-4	Extraction Date	13-Dec-22	
Analysis Method	EPA 1668C	Sample Size	0.48	g
Analysis Type	Sample	Percent Moisture	66.5%	
Sample Matrix	Stack	Split Ratio	2	

Approved:
Ella Gdyczynski
--e-signature--
16-Jan-2023

Run Information	**Run 1**	**Run 2**
Filename	6-230107A28	6-230114A09
Run Date	08-Jan-23 04:39	14-Jan-23 15:02
Final Volume	25 ul	25 uL
Dilution Factor	1	10
Analysis Units	pg/g	pg/g
Instrument - Column	HRMS-6 SPB OCTYL 273027-03	HRMS-6 SPB OCTYL 273027-03

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
PCB-081	0.0003							NotFnd	<12	12	U		1000
PCB-077	0.0001	22.71	<9.8	3.1	J,R	9.8	100						
PCB-123	0.00003	NotFnd	<3.3	3.3	U		100						
PCB-118	0.00003	23.83	91.7	3.0	M,J		100						
PCB-114	0.00003	NotFnd	<3.1	3.1	U		100						
PCB-105	0.00003	24.48	<35	3.1	J,R	35	100						
PCB-126	0.1	NotFnd	<3.1	3.1	U		100						
PCB-167	0.00003	26.94	<2.2	1.5	M,J,R	2.2	100						
PCB-156/157	0.00003	27.57	8.42	2.0	M,J		210						
PCB-169	0.03	NotFnd	<1.5	1.5	U		100						
PCB-189	0.00003	NotFnd	<1.7	1.7	U		100						

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	2000				22.33	44	10-145
13C12-PCB-077	2000	22.70	56	10-145			
13C12-PCB-123	2000	23.66	56	10-145			
13C12-PCB-118	2000	23.81	58	10-145			
13C12-PCB-114	2000	24.11	58	10-145			
13C12-PCB-105	2000	24.47	60	10-145			
13C12-PCB-126	2000	26.05	62	10-145			
13C12-PCB-167	2000	26.93	58	10-145			
13C12-PCB-156/157	4000	27.57	59	10-145			
13C12-PCB-169	2000	29.23	64	10-145			
13C12-PCB-189	2000	30.48	64	10-145			
Cleanup Standards							
13C12-PCB-028	2000	16.57	53	5-145			
13C12-PCB-111	2000	22.62	57	10-145			
13C12-PCB-178	2000	25.61	58	10-145			

Homologue Group Totals

Total MonoCB	82.0	3.0	J	420
Total DiCB	699	3.7	J	830
Total TriCB	544	4.3	J	830
Total TetraCB	654	0.90	J	1700
Total PentaCB	424	2.2	J	1700
Total HexaCB	407	1.5	J	1700
Total HeptaCB	230	1.7	J	830
Total OctaCB	58.0	1.2	J	830
Total NonaCB	7.90	3.4	J	420
DecaCB	17.0	6.1	J	420
Total PCB	3120		J	3300

Toxic Equivalency - (WHO 2005)

Lower Bound PCB TEQ	0.00300
Mid Point PCB TEQ	0.185
Upper Bound PCB TEQ	0.364

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a
ALS Sample ID	WG3775203-1	Extraction Date	13-Dec-02
Analysis Method	EPA 1668C	Sample Size	0.40 g
Analysis Type	Blank	Percent Moisture	n/a
Sample Matrix	QC	Split Ratio	2

Approved:
Ella Gdyczynski
--e-signature--
16-Jan-2023

Run Information	**Run 1**	**Run 2**
Filename	6-230107A23	6-230114A06
Run Date	08-Jan-23 00:41	14-Jan-23 12:38
Final Volume	25 ul	25 uL
Dilution Factor	1	10
Analysis Units	pg/g	pg/g
Instrument - Column	HRMS-6 SPB OCTYL 273027-03	HRMS-6 SPB OCTYL 273027-03

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
PCB-081	0.0003							22.37	<40	40	M,U	2.3	1300
PCB-077	0.0001	22.73	<3.9	3.9	U	0.72	130						
PCB-123	0.00003	NotFnd	<3.3	3.3	U		130						
PCB-118	0.00003	23.83	<9.2	3.1	J,R	9.2	130						
PCB-114	0.00003	NotFnd	<3.2	3.2	U		130						
PCB-105	0.00003	24.50	4.77	3.2	J		130						
PCB-126	0.1	26.07	<3.2	3.2	U	0.74	130						
PCB-167	0.00003	26.95	<1.6	1.6	M,U	0.60	130						
PCB-156/157	0.00003	27.56	<2.2	2.2	M,U	1.5	250						
PCB-169	0.03	NotFnd	<1.6	1.6	U		130						
PCB-189	0.00003	NotFnd	<1.1	1.1	U		130						

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**		**Time**	**% Rec**	**Limits**	
13C12-PCB-081	2000					22.38	18	10-145	M
13C12-PCB-077	2000	22.74	42	10-145	M				
13C12-PCB-123	2000	23.67	45	10-145					
13C12-PCB-118	2000	23.83	46	10-145					
13C12-PCB-114	2000	24.13	45	10-145					
13C12-PCB-105	2000	24.48	47	10-145					
13C12-PCB-126	2000	26.06	50	10-145					
13C12-PCB-167	2000	26.94	53	10-145					
13C12-PCB-156/157	4000	27.57	56	10-145					
13C12-PCB-169	2000	29.23	62	10-145					
13C12-PCB-189	2000	30.48	59	10-145					
Cleanup Standards									
13C12-PCB-028	2000	16.60	47	5-145					
13C12-PCB-111	2000	22.65	42	10-145					
13C12-PCB-178	2000	25.63	55	10-145					

Homologue Group Totals				
Total MonoCB	<6.0	6.0	U	500
Total DiCB	30.4	6.9	J	1000
Total TriCB	56.8	3.0	J	1000
Total TetraCB	28.0	1.5	J	2000
Total PentaCB	43.0	2.1	J	2000
Total HexaCB	13.8	1.2	J	2000
Total HeptaCB	1.90	1.1	J	1000
Total OctaCB	3.90	1.4	J	1000
Total NonaCB	<5.0	5.0	U	500
DecaCB	<7.1	7.1	U	500
Total PCB	178		J	4000

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.000143
Mid Point PCB TEQ	0.187
Upper Bound PCB TEQ	0.373

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a	
ALS Sample ID	WG3775203-2	Extraction Date	13-Dec-22	
Analysis Method	EPA 1668C	Sample Size	1	n/a
Analysis Type	LCS	Percent Moisture	n/a	
Sample Matrix	QC	Split Ratio	2	

Approved:
Ella Gdyczynski
--e-signature--
16-Jan-2023

Run Information	**Run 1**
Filename	6-230107A19
Run Date	07-Jan-23 21:29
Final Volume	25 ul
Dilution Factor	1
Analysis Units	% Rec
Instrument - Column	HRMS-6 SPB OCTYL 273027-03

Target Analytes	**pg**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
PCB-081	1000	22.37	93	60-135	
PCB-077	1000	22.68	91	60-135	
PCB-123	1000	23.66	96	60-135	
PCB-118	1000	23.83	97	60-135	
PCB-114	1000	24.13	91	60-135	
PCB-105	1000	24.48	90	60-135	
PCB-126	1000	26.06	93	60-135	
PCB-167	1000	26.95	98	60-135	
PCB-156/157	2000	27.58	95	60-135	
PCB-169	1000	29.24	92	60-135	
PCB-189	1000	30.51	91	60-135	
Extraction Standards		**Time**	**% Rec**	**Limits**	
13C12-PCB-081	2000	22.36	29	40-145	
13C12-PCB-077	2000	22.67	30	40-145	
13C12-PCB-123	2000	23.64	29	40-145	
13C12-PCB-118	2000	23.81	29	40-145	
13C12-PCB-114	2000	24.11	31	40-145	
13C12-PCB-105	2000	24.47	29	40-145	
13C12-PCB-126	2000	26.05	28	40-145	
13C12-PCB-167	2000	26.94	32	40-145	
13C12-PCB-156/157	4000	27.57	33	40-145	
13C12-PCB-169	2000	29.23	34	40-145	
13C12-PCB-189	2000	30.50	32	40-145	
Cleanup Standards					
13C12-PCB-028	2000	16.57	31	15-145	
13C12-PCB-111	2000	22.58	30	40-145	
13C12-PCB-178	2000	25.61	33	40-145	

APPENDIX 12

Acid Gases Train Recovery Data Sheet
(1 page)

ORTECH Recovery & Sample Log
Method 26
Incinerator Stack

Client: Clean Harbors Sarnia
Job/Report Number: 22180
Received By: C Belore
How Received: Train Recovery
Job Assigned To: ALS
PO #: 22810-J2866

Test Number	ORTECH Sample ID 22-22180-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	Nov 8/22	0.1N H2SO4	30.0	110.0	80.0	30	140	Halides
	2	Nov 8/22	0.1N NaOH	15.0	10.0	-5.0	15.0	25.0	Cyanide
2	3	Nov 9/22	0.1N H2SO4	30.0	108	78.0	32.0	140	Halides
	4	Nov 9/22	0.1N NaOH	15.0	15.0	0.0	10.0	25.0	Cyanide
3	5	Nov 10/22	0.1N H2SO4	30.0	115.0	85.0	25.0	140	Halides
	6	Nov 10/22	0.1N NaOH	15.0	15.00	0.0	10.0	25.0	Cyanide
Blank	7	Nov 8/22	0.1N H2SO4	30.0	30.0	0	110	140	Halides
	8	Nov 9/22	0.1N NaOH	15.0	15.0	0	10.	25	Cyanide

Impinger 1 empty, Imp 2+3 30ml split 0.1n H2SO4, Imp 4 empty, Imp 5 15ml 0.1n NaOH, Imp 6 Si Gel

Relinquished by: ____________________ Date: ____________________

Relinquished to: ____________________ Date: ____________________

APPENDIX 13

Acid Gases Analytical Reports
(12 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
ALS Project ID: ORT100
ALS WO#: L2740267
Date of Report 25-Nov-22
Date of Sample Receipt 14-Nov-22

Client Name: Ortech Environmental
Client Address: 804 Southdown Road
MIssissauga, ON L5J 2Y4
Canada
Client Contact: Chris Belore
Client Project ID: 22180 Clean Harbors

COMMENTS:

F as HF Anion Analyzed via Ion Chromatography USEPA Method 26/26A (GN 17-Nov-22)
Cl as HCl Anion Analyzed via Ion Chromatography USEPA Method 26/26A (GN 17-Nov-22)
Br as HBr Anion Analyzed via Ion Chromatography USEPA Method 26/26A (GN 17-Nov-22)
I as HI Anion Analyzed via Ion Chromatography USEPA Method 26/26A (GN 16, 17-Nov-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	**22-22180-M26-1** **TEST#1**	**22-22180-M26-3** **TEST#2**	**22-22180-M26-5** **TEST#3**	**22-22180-M26-7** **BLANK**
ALS Sample ID	L2740267-1	L2740267-3	L2740267-5	L2740267-7
Matrix	Stack	Stack	Stack	Stack
Analysis type	Sample	Sample	Sample	Sample
Sampling Date/Time	8-Nov-22	9-Nov-22	10-Nov-22	8-Nov-22
Date of Receipt	14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22
Ion Chromatography Analysis				
USEPA Method 26/26A	**mg**	**mg**	**mg**	**mg**
Total F^- as HF (ave)	6.74	4.24	0.0730	<0.0500
Analysis 1	6.79	4.25	0.0733	<0.0500
Analysis 2	6.70	4.24	0.0727	<0.0500
Total Cl^- as HCl (ave)	4.41	1.02	0.104	<0.0733
Analysis 1	4.41	1.02	0.104	<0.0733
Analysis 2	4.41	1.02	0.104	<0.0733
Total Br^- as HBr (ave)	<0.244	<0.241	<0.237	<0.241
Analysis 1	<0.244	<0.241	<0.237	<0.241
Analysis 2	<0.244	<0.241	<0.237	<0.241
Total I^- as HI (ave)	0.275	0.168	<0.0709	<0.0718
Analysis 1	0.275	0.168	<0.0709	<0.0718
Analysis 2	0.275	0.168	<0.0709	<0.0718

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)	<0.00165	0.0550	102%
Analysis 1	<0.00165	0.0550	
Analysis 2	<0.00165	0.0550	
Total Cl^- as HCl (ave)	<0.00241	0.0798	102%
Analysis 1	<0.00241	0.0800	
Analysis 2	<0.00241	0.0797	
Total Br^- as HBr (ave)	<0.00791	0.255	101%
Analysis 1	<0.00791	0.256	
Analysis 2	<0.00791	0.254	
Total I^- as HI (ave)	<0.00236	0.0746	99%
Analysis 1	<0.00236	0.0746	
Analysis 2	<0.00236	0.0746	

ALS Environmental

Sample QC Summary Report

Sample Name	**22-22180-M26-1 TEST#1**	**22-22180-M26-1 TEST#1**	**22-22180-M26-1 TEST#1**	**22-22180-M26-1 TEST#1**
ALS Sample ID	L2740267-1	L2740267-1DUP	L2740267-1MS	L2740267-1MS
Matrix	Stack	Stack	Stack	Stack
Analysis type	Sample	Duplicate	Matrix Spike	Matrix Spike
Sampling Date/Time	8-Nov-22	8-Nov-22	8-Nov-22	8-Nov-22
Date of Receipt	14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22
Ion Chromatography Analysis				
USEPA Method 26/26A	**mg**	**mg**	**mg**	**% Rec**
Total F^- as HF (ave)	6.74	6.78	13.5	105%
Analysis 1	6.79	6.78	13.5	
Analysis 2	6.70	6.77	13.5	
Total Cl^- as HCl (ave)	4.41	4.38	6.84	102%
Analysis 1	4.41	4.38	6.84	
Analysis 2	4.41	4.38	6.83	
Total Br^- as HBr (ave)	<0.244	<0.244	7.93	102%
Analysis 1	<0.244	<0.244	7.96	
Analysis 2	<0.244	<0.244	7.91	
Total I^- as HI (ave)	0.275	0.277	2.62	101%
Analysis 1	0.275	0.277	2.62	
Analysis 2	0.275	0.277	2.62	

ORTECH Environmental
ATTN: Chris Belore
804 Southdown Road
Mississauga ON L5J 2Y4

Date Received: 14-NOV-22
Report Date: 25-NOV-22 10:37 (MT)
Version: FINAL

Client Phone: 905-822-4120

Certificate of Analysis

Lab Work Order #: L2740267
Project P.O. #: 22180-J2866
Job Reference: 22180 CLEAN HARBORS
C of C Numbers:
Legal Site Desc:

L. Wrona

Lynne Wrona, M.Sc.
Project Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2740267-2 22-22180-M26-2 TEST#1							
Sampled By: Client on 08-NOV-22							
Matrix: Stack							
Miscellaneous Parameters							
Air volume	.025			L		24-NOV-22	R5897320
Volume	0.0250		0.0010	L		24-NOV-22	R5897320
Cyanide, Total							
Cyanide, Total	<8.0	RRR	8.0	mg/m3	16-NOV-22	23-NOV-22	R5896496
Cyanide, Total	<0.20	RRR	0.20	ug	16-NOV-22	23-NOV-22	R5896496
Note: RRR: Sample Received Unpreserved. Results may be biased low for indicated parameter(s) Sample was Preserved at the laboratory Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).							
L2740267-4 22-22180-M26-4 TEST#2							
Sampled By: Client on 09-NOV-22							
Matrix: Stack							
Miscellaneous Parameters							
Air volume	.025			L		24-NOV-22	R5897320
Volume	0.0250		0.0010	L		24-NOV-22	R5897320
Cyanide, Total							
Cyanide, Total	3.3	RRR	0.80	mg/m3	16-NOV-22	22-NOV-22	R5896496
Cyanide, Total	0.083	RRR	0.020	ug	16-NOV-22	22-NOV-22	R5896496
Note: RRV: Sample Received Unpreserved. Results may be biased low for indicated parameter(s) Sample was Preserved at the laboratory							
L2740267-6 22-22180-M26-6 TEST#3							
Sampled By: Client on 10-NOV-22							
Matrix: Stack							
Miscellaneous Parameters							
Air volume	.025			L		24-NOV-22	R5897320
Volume	0.0250		0.0010	L		24-NOV-22	R5897320
Cyanide, Total							
Cyanide, Total	<8.0	RRR	8.0	mg/m3	16-NOV-22	23-NOV-22	R5896496
Cyanide, Total	<0.20	RRR	0.20	ug	16-NOV-22	23-NOV-22	R5896496
Note: RRR: Sample Received Unpreserved. Results may be biased low for indicated parameter(s) Sample was Preserved at the laboratory Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).							
L2740267-8 22-22180-M26-8 BLANK							
Sampled By: Client on 08-NOV-22							
Matrix: Stack							
Miscellaneous Parameters							
Air volume	.025			L		24-NOV-22	R5897320
Volume	0.0250		0.0010	L		24-NOV-22	R5897320
Cyanide, Total							
Cyanide, Total	<8.0	RRR	8.0	mg/m3	16-NOV-22	23-NOV-22	R5896496
Cyanide, Total	<0.20	RRR	0.20	ug	16-NOV-22	23-NOV-22	R5896496
Note: RRR: Sample was Preserved at the laboratory Detection Limit Adjusted due to sample matrix							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2740267-8 22-22180-M26-8 BLANK Sampled By: Client on 08-NOV-22 Matrix: Stack effects (e.g. chemical interference, colour, turbidity).							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
RRR	Refer to Report Remarks for issues regarding this analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
AIR VOLUME-WT	Misc.	Air volume (L)	DATA ENTRY
CN-TOT-WT	Impinger	Cyanide, Total	APHA 4500CN C E-STRONG ACID DIST COLORIM
VOLUME-WT	Water	Volume	-

Sample volume is measured prior to any sub-sampling.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2740267 Report Date: 25-NOV-22

Client: ORTECH Environmental
804 Southdown Road
Mississauga ON L5J 2Y4
Contact: Chris Belore

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	Impinger							
Batch R5896496								
WG3773787-3 DUP		**L2740267-2**						
Cyanide, Total		<0.20	<0.20	RPD-NA	ug	N/A	25	23-NOV-22
WG3773787-2 LCS								
Cyanide, Total			94.1		%		70-130	22-NOV-22
Cyanide, Total			0.235		ug		70-130	22-NOV-22
WG3773787-1 MB								
Cyanide, Total			<0.020		ug		0.02	22-NOV-22
WG3773787-4 MS		**L2740267-2**						
Cyanide, Total			95.34		%		70-130	23-NOV-22
Cyanide, Total			5.96		ug		70-130	23-NOV-22
WG3773787-6 MS		**L2740267-6**						
Cyanide, Total			94.06		%		70-130	23-NOV-22
Cyanide, Total			5.88		ug		70-130	23-NOV-22
WG3773787-7 MS		**L2740267-8**						
Cyanide, Total			96.35		%		70-130	23-NOV-22
Cyanide, Total			6.02		ug		70-130	23-NOV-22

Quality Control Report

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Cyanides							
Cyanide, Total							
	2	08-NOV-22	23-NOV-22 00:00	14	15	days	EHT
	8	08-NOV-22	23-NOV-22 00:00	14	15	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2740267 were received on 14-NOV-22 11:00.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

L2740267-COFC

ORTECH Recovery & Sample Log
Method 26
Incinerator Stack

Client: Clean Harbors Sarnia
Job/Report Number: 22180
Received By: C Belore
How Received: Train Recovery
Job Assigned To: ALS
PO #: 22810-J2866

Test Number	ORTECH Sample ID 22-22180-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	NOV 8/22	0.1N H2SO4	30.0	110.0	80.0	30.	140	Halides
	2	NOV 8/22	0.1N NaOH	15.0	10.0	-5.0	15.0	25.0	Cyanide
2	3	NOV 9/22	0.1N H2SO4	30.0	108	78.0	32.0	140	Halides
	4	NOV 9/22	0.1N NaOH	15.0	15.0	0.0	10.0	25.0	Cyanide
3	5	NOV 10/22	0.1N H2SO4	30.0	115.0	85.0	25.0	140	Halides
	6	NOV 10/22	0.1N NaOH	15.0	15.00	0.0	10.0	25.0	Cyanide
Blank	7	NOV 8/22	0.1N H2SO4	30.0	30.0	0	110	140	Halides
	8	NOV 9/22	0.1N NaOH	15.0	15.0	0	10.	25	Cyanide

Impinger 1 empty, Imp 2+3 30ml split 0.1n H2SO4, Imp 4 empty, Imp 5 15ml 0.1n NaOH, Imp 6 Si Gel

Relinquished by: Date:

Relinquished to: Aaron Bolton Date: 14-Nov-2022 11:00

9.8°C

APPENDIX 14

Volatile Organics Analytical Reports and DRE Compound Analysis in Feeds Report

(27 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
ALS Project ID: ORT100
ALS WO#: L2740291
Date of Report 29-Nov-22
Date of Sample Receipt 14-Nov-22

Client Name: ORTECH
Client Address: 804 Southdown Road
Mississauga, ON L5J 2Y4
Canada
Client Contact: Chris Belore
Client Project ID: 22180 Clean Harbors

COMMENTS: **VOCs via SW846 Method 5041A/8260C**

Ketone data by VOST analyses are estimated values only

Certified by:
Steve Kennedy
Technical Supervisor

ALS Environmental

Sample Analysis Summary Report

Sample Name	22-22180-VOST-13A/B TEST#1		22-22180-VOST-14A/B TEST#1		22-22180-VOST-15A/B TEST#1		22-22180-VOST-5A/B TEST#2		22-22180-VOST-7A/B TEST#2		22-22180-VOST-8A/B TEST#2	
ALS Sample ID	L2740291-1		L2740291-2		L2740291-3		L2740291-4		L2740291-6		L2740291-7	
Sample units	sample		sample		sample		sample		sample		sample	
Matrix	VOST		VOST		VOST		VOST		VOST		VOST	
Sampling Date	8-Nov-22		8-Nov-22		8-Nov-22		9-Nov-22		9-Nov-22		9-Nov-22	
Extraction Date	22-Nov-22		22-Nov-22		22-Nov-22		22-Nov-22		22-Nov-22		22-Nov-22	
Target Analytes	**ug/sample**		**ug/sample**		**ug/sample**		**ug/sample**		**ug/sample**		**ug/sample**	
Dichlorodifluoromethane	0.029		0.024		0.027		<0.02	U	0.028		0.023	
Vinyl Chloride	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Bromomethane	<0.09	U	<0.09	U	<0.09	U	<0.09	U	<0.09	U	<0.09	U
Trichlorofluoromethane	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
1,1-Dichloroethene	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Acetone	0.241		0.29		0.278		0.116		0.252		0.151	
Methylene Chloride	0.239		0.261		2.71	E	0.144		0.202		0.131	
trans,1,2-Dichloroethene	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
1,1-Dichloroethane	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
2-Butanone	0.03		0.058		0.047		0.023		0.028		0.02	
Chloroform	0.064		0.065		0.064		0.05		0.048		0.05	
1,1,1-Trichloroethane	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Carbon Tetrachloride	0.023		0.015		0.019		<0.01	U	<0.01	U	<0.01	U
Benzene	0.141		0.132		0.111		0.134		0.12		0.121	
Trichloroethene	<0.01	U	0.03		0.018		<0.01	U	<0.01	U	<0.01	U
1,2-Dichloropropane	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Bromodichloromethane	0.067		0.065		0.063		0.07		0.056		0.057	
Toluene	0.38		0.437		0.453		0.266		0.167		0.175	
Tetrachloroethene	<0.01	U	0.01		<0.01	U	<0.01	U	<0.01	U	<0.01	U
Chlorodibromomethane	0.055		0.05		0.049		0.062		0.056		0.054	
Ethylene Dibromide	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Ethylbenzene	<0.01	U	0.012		0.013		0.012		<0.01	U	<0.01	U
M&P-Xylene	<0.03	U	0.035		0.037		0.042		<0.03	U	<0.03	U
O-Xylene	<0.01	U	<0.01	U	0.01		0.012		<0.01	U	<0.01	U
Styrene	0.021		<0.02	U	<0.02	U	0.023		<0.02	U	<0.02	U
Bromoform	0.124		0.111		0.108		0.103		0.127		0.118	
Isopropylbenzene	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
1,3,5-Trimethylbenzene	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
1,2,4-Trimethylbenzene	0.022	M	0.025	M	0.021	M	<0.02	U	<0.02	U	<0.02	U
Trichlorotrifluoroethane	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Ethyl Acetate	<0.1	U	<0.1	U	<0.1	U	<0.1	U	<0.1	U	<0.1	U
Field Standard	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
d10-Ethylbenzene(SPK)	119.7		114.8		94.7		101.3		113.6		106.1	
Surrogate Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
d4-1,2-Dichloroethane(SURR)	89.0		89.0		94.3		89.1		93.8		100.6	
d8-Toluene(SURR)	89.1		89.1		87.7		91.1		88.0		91.0	
4-Bromofluorobenzene(SURR)	86.0		91.9		91.0		86.1		88.3		84.4	
Internal Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
d14-Hexane	89.0		87.6		92.0		88.6		87.1		161.6	
d6-Benzene	86.4		86.0		89.9		86.0		86.7		79.5	
d5-Chlorobenzene	91.2		91.2		99.3		87.9		97.8		89.3	

U	Indicates that this compound was not detected above the RL.
M	Indicates that a peak has been manually integrated.
E	Indicates Estimated value. Instrument response exceeds instrument calibration range of 1.0 ug.

ALS Environmental

Sample Analysis Summary Report

Sample Name	**22-22180-VOST-9A/B TEST#3**		**22-22180-VOST-10A/B TEST#3**		**22-22180-VOST-11A/B TEST#3**		**22-22180-VOST-3A/B FIELD BLANK**		**22-22180-VOST-12A/B TRIP BLANK**	
ALS Sample ID	L2740291-8		L2740291-9		L2740291-10		L2740291-11		L2740291-12	
Sample units	sample		sample		sample		sample		sample	
Matrix	VOST		VOST		VOST		VOST		VOST	
Sampling Date	10-Nov-22		10-Nov-22		10-Nov-22		10-Nov-22		10-Nov-22	
Extraction Date	22-Nov-22		22-Nov-22		22-Nov-22		22-Nov-22		22-Nov-22	
Target Analytes	**ug/sample**		**ug/sample**		**ug/sample**		**ug/sample**		**ug/sample**	
Dichlorodifluoromethane	0.029		<0.02	U	0.03		<0.02	U	<0.02	U
Vinyl Chloride	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Bromomethane	<0.09	U	<0.09	U	<0.09	U	<0.09	U	<0.09	U
Trichlorofluoromethane	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
1,1-Dichloroethene	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Acetone	1.65		0.221		0.418		<0.1	U	<0.1	U
Methylene Chloride	0.265		<0.1	U	0.999		0.248		0.477	
trans,1,2-Dichloroethene	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
1,1-Dichloroethane	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
2-Butanone	0.039		0.027		0.047		<0.01	U	<0.01	U
Chloroform	0.028		0.025		0.028		<0.01	U	<0.01	U
1,1,1-Trichloroethane	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Carbon Tetrachloride	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Benzene	0.124		0.113		0.125		<0.05	U	<0.05	U
Trichloroethene	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
1,2-Dichloropropane	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Bromodichloromethane	0.018		0.019		0.019		<0.01	U	<0.01	U
Toluene	0.208		0.225		0.352		<0.05	U	<0.05	U
Tetrachloroethene	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Chlorodibromomethane	0.016		0.017		0.016		<0.01	U	<0.01	U
Ethylene Dibromide	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Ethylbenzene	<0.01	U	<0.01	U	0.01		<0.01	U	<0.01	U
M&P-Xylene	<0.03	U	<0.03	U	<0.03	U	<0.03	U	<0.03	U
O-Xylene	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Styrene	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Bromoform	0.041		0.042		0.046		<0.01	U	<0.01	U
Isopropylbenzene	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
1,3,5-Trimethylbenzene	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
1,2,4-Trimethylbenzene	0.032	M	<0.02	U	0.021	M	<0.02	U	<0.02	U
Trichlorotrifluoroethane	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Ethyl Acetate	<0.1	U	<0.1	U	<0.1	U	<0.1	U	<0.1	U
Field Standard	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
d10-Ethylbenzene(SPK)	80.2		93.8		112.2		117.9		135.8	
Surrogate Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
d4-1,2-Dichloroethane(SURR)	91.8		87.0	M	92.5	M	87.0	M	89.4	
d8-Toluene(SURR)	85.7		88.9		86.0		91.3		93.9	
4-Bromofluorobenzene(SURR)	94.6		88.7		93.0		83.7		85.8	
Internal Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
d14-Hexane	178.1		178.9		185.5		188.6		183.4	
d6-Benzene	87.9		86.2		89.3		90.4		88.7	
d5-Chlorobenzene	101.1		91.8		100.4		95.0		87.7	

U Indicates that this compound was not detected above the RL.
M Indicates that a peak has been manually integrated.

ALS Environmental

Sample Analysis Summary Report

Sample Name	**Method Blank**		**Laboratory Control Sample**
ALS Sample ID	WG3773591-1		WG3773591-2
Sample units	sample		n/a
Matrix	QC		QC
Sampling Date	n/a		n/a
Extraction Date	22-Nov-22		22-Nov-22
Target Analytes	**ug/sample**		**% Rec**
Dichlorodifluoromethane	<0.02	U	111.3
Vinyl Chloride	<0.02	U	92.1
Bromomethane	<0.09	U	79.9
Trichlorofluoromethane	<0.02	U	81.8
1,1-Dichloroethene	<0.01	U	93.8
Acetone	<0.1	U	100.6
Methylene Chloride	<0.1	U	113.7
trans,1,2-Dichloroethene	<0.01	U	76.1
1,1-Dichloroethane	<0.01	U	81.1
2-Butanone	<0.01	U	78.7
Chloroform	<0.01	U	72.1
1,1,1-Trichloroethane	<0.01	U	62.9
Carbon Tetrachloride	<0.01	U	83.1
Benzene	<0.05	U	114.7
Trichloroethene	<0.01	U	96.5
1,2-Dichloropropane	<0.01	U	99.3
Bromodichloromethane	<0.01	U	91.9
Toluene	<0.05	U	115
Tetrachloroethene	<0.01	U	108.3
Chlorodibromomethane	<0.01	U	75.7
Ethylene Dibromide	<0.02	U	114.7
Ethylbenzene	<0.01	U	113.3
M&P-Xylene	<0.03	U	99.8
O-Xylene	<0.01	U	94.2
Styrene	<0.02	U	93.8
Bromoform	<0.01	U	122.9
Isopropylbenzene	<0.02	U	108.5
1,3,5-Trimethylbenzene	<0.02	U	81.1
1,2,4-Trimethylbenzene	<0.02	U	79.1
Trichlorotrifluoroethane	<0.01	U	0.00
Ethyl Acetate	<0.1	U	0.00
Field Standard	**% Rec**		**% Rec**
d10-Ethylbenzene(SPK)	74.6		55.9
Surrogate Standards	**% Rec**		**% Rec**
d4-1,2-Dichloroethane(SURR)	91.9	M	85.6
d8-Toluene(SURR)	94.9		96.9
4-Bromofluorobenzene(SURR)	79.2		79.6
Internal Standards	**% Rec**		**% Rec**
d14-Hexane	90.1		97.7
d6-Benzene	87.3		96.2
d5-Chlorobenzene	91.1		94.4

U Indicates that this compound was not detected above the RL.
M Indicates that a peak has been manually integrated.

ALS

ORTECH Environmental
ATTN: Chris Belore
804 Southdown Road
Mississauga ON L5J 2Y4

Date Received: 14-NOV-22
Report Date: 20-DEC-22 13:35 (MT)
Version: FINAL

Client Phone: 905-822-4120

Certificate of Analysis

Lab Work Order #: L2740410
Project P.O. #: NOT SUBMITTED
Job Reference: 22180 CLEAN HARBORS
C of C Numbers:
Legal Site Desc:

L. Wrona
Lynne Wrona, M.Sc.
Project Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2740410-1 22-22180-FR-3 (RICH FEED) TEST#1							
Sampled By: Client on 08-NOV-22							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	16-NOV-22	17-NOV-22	R5894498
Xylenes (Total)	<2400		2400	ug/g		13-DEC-22	
Total THMs	<200		200	ug/g		09-DEC-22	
Volatile Organic Compounds							
Ethyl Acetate	1000	NSS	1000	mg/kg	05-DEC-22	08-DEC-22	R5904156
Ethylbenzene	560	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
m+p-Xylenes	<2400	DLQ	2400	mg/kg	05-DEC-22	08-DEC-22	R5904156
Methyl Ethyl Ketone	<6000	DLQ	6000	mg/kg	05-DEC-22	08-DEC-22	R5904156
o-Xylene	665	NSS	40	mg/kg	05-DEC-22	08-DEC-22	R5904156
Tetrachloroethylene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Toluene	4740	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2,4-Trimethylbenzene	<2600	DLQ	2600	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dibromoethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dichloropropane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,3,5-Trimethylbenzene	<800	DLQ	800	ug/g	05-DEC-22	09-DEC-22	R5904337
Acetone	17400	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
Benzene	46	NSS	14	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromodichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromoform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromomethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Carbon tetrachloride	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Chloroform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dibromochloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichlorodifluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichloromethane	<200	DLQ	200	ug/g	05-DEC-22	09-DEC-22	R5904337
Ethylbenzene	563	NSS	36	ug/g	05-DEC-22	09-DEC-22	R5904337
Isopropylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
m+p-Xylenes	<2400	DLQ	2400	ug/g	05-DEC-22	09-DEC-22	R5904337
Methyl Ethyl Ketone	<6000	DLQ	6000	ug/g	05-DEC-22	09-DEC-22	R5904337
o-Xylene	665	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Styrene	850	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Tetrachloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Toluene	4740	NSS	160	ug/g	05-DEC-22	09-DEC-22	R5904337
trans-1,2-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichloroethylene	<20	NSS	20	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichlorofluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Vinyl chloride	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
L2740410-2 22-22180-FL-3 (LEAN FEED) TEST#1							
Sampled By: Client on 08-NOV-22							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	16-NOV-22	17-NOV-22	R5894498
Xylenes (Total)	235		72	ug/g		13-DEC-22	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2740410-2 22-22180-FL-3 (LEAN FEED) TEST#1							
Sampled By: Client on 08-NOV-22							
Matrix: Stack							
Total THMs	<200		200	ug/g		09-DEC-22	
Volatile Organic Compounds							
Ethyl Acetate	<1000	NSS	1000	mg/kg	05-DEC-22	08-DEC-22	R5904156
Ethylbenzene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
m+p-Xylenes	177	NSS	60	mg/kg	05-DEC-22	08-DEC-22	R5904156
Methyl Ethyl Ketone	<1000	NSS	1000	mg/kg	05-DEC-22	08-DEC-22	R5904156
o-Xylene	58	NSS	40	mg/kg	05-DEC-22	08-DEC-22	R5904156
Tetrachloroethylene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Toluene	1190	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2,4-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dibromoethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dichloropropane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,3,5-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
Acetone	3500	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
Benzene	19	NSS	14	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromodichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromoform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromomethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Carbon tetrachloride	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Chloroform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dibromochloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichlorodifluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Ethylbenzene	44	NSS	36	ug/g	05-DEC-22	09-DEC-22	R5904337
Isopropylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
m+p-Xylenes	177	NSS	60	ug/g	05-DEC-22	09-DEC-22	R5904337
Methyl Ethyl Ketone	<1000	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
o-Xylene	58	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Styrene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Tetrachloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Toluene	1190	NSS	160	ug/g	05-DEC-22	09-DEC-22	R5904337
trans-1,2-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichloroethylene	<20	NSS	20	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichlorofluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Vinyl chloride	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
L2740410-3 22-22180-FE-3 (EMULSION FEED) TEST#1							
Sampled By: Client on 08-NOV-22							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	16-NOV-22	17-NOV-22	R5894498
Xylenes (Total)	980		72	ug/g		13-DEC-22	
Total THMs	<200		200	ug/g		09-DEC-22	
Volatile Organic Compounds							
Ethyl Acetate	<1000	NSS	1000	mg/kg	05-DEC-22	08-DEC-22	R5904156

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2740410-3 22-22180-FE-3 (EMULSION FEED) TEST#1							
Sampled By: Client on 08-NOV-22							
Matrix: Stack							
Volatile Organic Compounds							
Ethylbenzene	200	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
m+p-Xylenes	749	NSS	60	mg/kg	05-DEC-22	08-DEC-22	R5904156
Methyl Ethyl Ketone	3200	NSS	1000	mg/kg	05-DEC-22	08-DEC-22	R5904156
o-Xylene	231	NSS	40	mg/kg	05-DEC-22	08-DEC-22	R5904156
Tetrachloroethylene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Toluene	3130	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2,4-Trimethylbenzene	<400	DLQ	400	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dibromoethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dichloropropane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,3,5-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
Acetone	21000	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
Benzene	82	NSS	14	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromodichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromoform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromomethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Carbon tetrachloride	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Chloroform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dibromochloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichlorodifluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichloromethane	2340	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Ethylbenzene	203	NSS	36	ug/g	05-DEC-22	09-DEC-22	R5904337
Isopropylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
m+p-Xylenes	749	NSS	60	ug/g	05-DEC-22	09-DEC-22	R5904337
Methyl Ethyl Ketone	3200	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
o-Xylene	231	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Styrene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Tetrachloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Toluene	3130	NSS	160	ug/g	05-DEC-22	09-DEC-22	R5904337
trans-1,2-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichloroethylene	<20	NSS	20	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichlorofluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Vinyl chloride	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
L2740410-4 22-22180-FA-3 (ALKALINE FEED) TEST#1							
Sampled By: Client on 08-NOV-22							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	16-NOV-22	17-NOV-22	R5894498
Xylenes (Total)	<72		72	ug/g		13-DEC-22	
Total THMs	<200		200	ug/g		09-DEC-22	
Volatile Organic Compounds							
Ethyl Acetate	<1000	NSS	1000	mg/kg	05-DEC-22	08-DEC-22	R5904156
Ethylbenzene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
m+p-Xylenes	<60	NSS	60	mg/kg	05-DEC-22	08-DEC-22	R5904156

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2740410-4 22-22180-FA-3 (ALKALINE FEED) TEST#1							
Sampled By: Client on 08-NOV-22							
Matrix: Stack							
Volatile Organic Compounds							
Methyl Ethyl Ketone	<1000	NSS	1000	mg/kg	05-DEC-22	08-DEC-22	R5904156
o-Xylene	<40	NSS	40	mg/kg	05-DEC-22	08-DEC-22	R5904156
Tetrachloroethylene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Toluene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2,4-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dibromoethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dichloropropane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,3,5-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
Acetone	<1000	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
Benzene	<14	NSS	14	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromodichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromoform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromomethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Carbon tetrachloride	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Chloroform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dibromochloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichlorodifluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Ethylbenzene	<36	NSS	36	ug/g	05-DEC-22	09-DEC-22	R5904337
Isopropylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
m+p-Xylenes	<60	NSS	60	ug/g	05-DEC-22	09-DEC-22	R5904337
Methyl Ethyl Ketone	<1000	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
o-Xylene	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Styrene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Tetrachloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Toluene	<160	NSS	160	ug/g	05-DEC-22	09-DEC-22	R5904337
trans-1,2-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichloroethylene	<20	NSS	20	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichlorofluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Vinyl chloride	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
L2740410-5 22-22180-LW-3 (LEACHATE FEED) TEST#1							
Sampled By: Client on 08-NOV-22							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	16-NOV-22	17-NOV-22	R5894498
Xylenes (Total)	<72		72	ug/g		13-DEC-22	
Total THMs	<200		200	ug/g		09-DEC-22	
Volatile Organic Compounds							
Ethyl Acetate	<1000	NSS	1000	mg/kg	05-DEC-22	08-DEC-22	R5904156
Ethylbenzene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
m+p-Xylenes	<60	NSS	60	mg/kg	05-DEC-22	08-DEC-22	R5904156
Methyl Ethyl Ketone	<1000	NSS	1000	mg/kg	05-DEC-22	08-DEC-22	R5904156
o-Xylene	<40	NSS	40	mg/kg	05-DEC-22	08-DEC-22	R5904156

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2740410-5 22-22180-LW-3 (LEACHATE FEED) TEST#1							
Sampled By: Client on 08-NOV-22							
Matrix: Stack							
Volatile Organic Compounds							
Tetrachloroethylene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Toluene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2,4-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dibromoethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dichloropropane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,3,5-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
Acetone	<1000	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
Benzene	<14	NSS	14	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromodichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromoform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromomethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Carbon tetrachloride	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Chloroform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dibromochloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichlorodifluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Ethylbenzene	<36	NSS	36	ug/g	05-DEC-22	09-DEC-22	R5904337
Isopropylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
m+p-Xylenes	<60	NSS	60	ug/g	05-DEC-22	09-DEC-22	R5904337
Methyl Ethyl Ketone	<1000	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
o-Xylene	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Styrene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Tetrachloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Toluene	<160	NSS	160	ug/g	05-DEC-22	09-DEC-22	R5904337
trans-1,2-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichloroethylene	<20	NSS	20	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichlorofluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Vinyl chloride	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
L2740410-6 22-22180-FR-8 (RICH FEED) TEST#2							
Sampled By: Client on 09-NOV-22							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	16-NOV-22	17-NOV-22	R5894498
Xylenes (Total)	<2100		2100	ug/g		13-DEC-22	
Total THMs	<200		200	ug/g		09-DEC-22	
Volatile Organic Compounds							
Ethyl Acetate	<1000	NSS	1000	mg/kg	05-DEC-22	08-DEC-22	R5904156
Ethylbenzene	460	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
m+p-Xylenes	<2100	DLQ	2100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Methyl Ethyl Ketone	<5000	DLQ	5000	mg/kg	05-DEC-22	08-DEC-22	R5904156
o-Xylene	489	NSS	40	mg/kg	05-DEC-22	08-DEC-22	R5904156
Tetrachloroethylene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Toluene	4750	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2740410-6 22-22180-FR-8 (RICH FEED) TEST#2							
Sampled By: Client on 09-NOV-22							
Matrix: Stack							
Volatile Organic Compounds							
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2,4-Trimethylbenzene	<1400	DLQ	1400	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dibromoethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dichloropropane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,3,5-Trimethylbenzene	<400	DLQ	400	ug/g	05-DEC-22	09-DEC-22	R5904337
Acetone	20300	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
Benzene	33	NSS	14	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromodichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromoform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromomethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Carbon tetrachloride	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Chloroform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dibromochloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichlorodifluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichloromethane	740	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Ethylbenzene	459	NSS	36	ug/g	05-DEC-22	09-DEC-22	R5904337
Isopropylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
m+p-Xylenes	<2100	DLQ	2100	ug/g	05-DEC-22	09-DEC-22	R5904337
Methyl Ethyl Ketone	<5000	DLQ	5000	ug/g	05-DEC-22	09-DEC-22	R5904337
o-Xylene	489	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Styrene	550	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Tetrachloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Toluene	4750	NSS	160	ug/g	05-DEC-22	09-DEC-22	R5904337
trans-1,2-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichloroethylene	<20	NSS	20	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichlorofluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Vinyl chloride	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
L2740410-7 22-22180-FL-8 (LEAN FEED) TEST#2							
Sampled By: Client on 09-NOV-22							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	16-NOV-22	17-NOV-22	R5894498
Xylenes (Total)	5550		72	ug/g		13-DEC-22	
Total THMs	<200		200	ug/g		09-DEC-22	
Volatile Organic Compounds							
Ethyl Acetate	<1000	NSS	1000	mg/kg	05-DEC-22	08-DEC-22	R5904156
Ethylbenzene	1120	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
m+p-Xylenes	4300	NSS	60	mg/kg	05-DEC-22	08-DEC-22	R5904156
Methyl Ethyl Ketone	<2000	DLQ	2000	mg/kg	05-DEC-22	08-DEC-22	R5904156
o-Xylene	1250	NSS	40	mg/kg	05-DEC-22	08-DEC-22	R5904156
Tetrachloroethylene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Toluene	16300	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2740410-7 22-22180-FL-8 (LEAN FEED) TEST#2							
Sampled By: Client on 09-NOV-22							
Matrix: Stack							
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2,4-Trimethylbenzene	<3000	DLQ	3000	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dibromoethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dichloropropane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,3,5-Trimethylbenzene	<1000	DLQ	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
Acetone	10200	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
Benzene	123	NSS	14	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromodichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromoform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromomethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Carbon tetrachloride	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Chloroform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dibromochloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichlorodifluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichloromethane	600	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Ethylbenzene	1120	NSS	36	ug/g	05-DEC-22	09-DEC-22	R5904337
Isopropylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
m+p-Xylenes	4300	NSS	60	ug/g	05-DEC-22	09-DEC-22	R5904337
Methyl Ethyl Ketone	<2000	DLQ	2000	ug/g	05-DEC-22	09-DEC-22	R5904337
o-Xylene	1250	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Styrene	1030	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Tetrachloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Toluene	16300	NSS	160	ug/g	05-DEC-22	09-DEC-22	R5904337
trans-1,2-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichloroethylene	<20	NSS	20	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichlorofluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Vinyl chloride	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
L2740410-8 22-22180-FE-8 (EMULSION FEED) TEST#2							
Sampled By: Client on 09-NOV-22							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	16-NOV-22	17-NOV-22	R5894498
Xylenes (Total)	271		72	ug/g		13-DEC-22	
Total THMs	<200		200	ug/g		09-DEC-22	
Volatile Organic Compounds							
Ethyl Acetate	<1000	NSS	1000	mg/kg	05-DEC-22	08-DEC-22	R5904156
Ethylbenzene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
m+p-Xylenes	207	NSS	60	mg/kg	05-DEC-22	08-DEC-22	R5904156
Methyl Ethyl Ketone	<1000	NSS	1000	mg/kg	05-DEC-22	08-DEC-22	R5904156
o-Xylene	64	NSS	40	mg/kg	05-DEC-22	08-DEC-22	R5904156
Tetrachloroethylene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Toluene	820	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2740410-8 22-22180-FE-8 (EMULSION FEED) TEST#2							
Sampled By: Client on 09-NOV-22							
Matrix: Stack							
Volatile Organics by GC/MS-Headspace							
1,1-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2,4-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dibromoethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dichloropropane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,3,5-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
Acetone	10100	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
Benzene	19	NSS	14	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromodichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromoform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromomethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Carbon tetrachloride	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Chloroform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dibromochloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichlorodifluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichloromethane	420	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Ethylbenzene	58	NSS	36	ug/g	05-DEC-22	09-DEC-22	R5904337
Isopropylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
m+p-Xylenes	207	NSS	60	ug/g	05-DEC-22	09-DEC-22	R5904337
Methyl Ethyl Ketone	<1000	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
o-Xylene	64	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Styrene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Tetrachloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Toluene	820	NSS	160	ug/g	05-DEC-22	09-DEC-22	R5904337
trans-1,2-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichloroethylene	<20	NSS	20	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichlorofluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Vinyl chloride	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
L2740410-9 22-22180-FA-8 (ALKALINE FEED) TEST#2							
Sampled By: Client on 09-NOV-22							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	16-NOV-22	17-NOV-22	R5894498
Xylenes (Total)	<72		72	ug/g		13-DEC-22	
Total THMs	<200		200	ug/g		09-DEC-22	
Volatile Organic Compounds							
Ethyl Acetate	<1000	NSS	1000	mg/kg	05-DEC-22	08-DEC-22	R5904156
Ethylbenzene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
m+p-Xylenes	<60	NSS	60	mg/kg	05-DEC-22	08-DEC-22	R5904156
Methyl Ethyl Ketone	<1000	NSS	1000	mg/kg	05-DEC-22	08-DEC-22	R5904156
o-Xylene	<40	NSS	40	mg/kg	05-DEC-22	08-DEC-22	R5904156
Tetrachloroethylene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Toluene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2,4-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2740410-9 22-22180-FA-8 (ALKALINE FEED) TEST#2							
Sampled By: Client on 09-NOV-22							
Matrix: Stack							
Volatile Organics by GC/MS-Headspace							
1,2-Dibromoethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dichloropropane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,3,5-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
Acetone	<1000	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
Benzene	<14	NSS	14	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromodichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromoform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromomethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Carbon tetrachloride	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Chloroform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dibromochloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichlorodifluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Ethylbenzene	<36	NSS	36	ug/g	05-DEC-22	09-DEC-22	R5904337
Isopropylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
m+p-Xylenes	<60	NSS	60	ug/g	05-DEC-22	09-DEC-22	R5904337
Methyl Ethyl Ketone	<1000	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
o-Xylene	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Styrene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Tetrachloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Toluene	<160	NSS	160	ug/g	05-DEC-22	09-DEC-22	R5904337
trans-1,2-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichloroethylene	<20	NSS	20	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichlorofluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Vinyl chloride	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
L2740410-10 22-22180-LW-8 (LEACHATE FEED) TEST#2							
Sampled By: Client on 09-NOV-22							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	16-NOV-22	17-NOV-22	R5894498
Xylenes (Total)	<72		72	ug/g		13-DEC-22	
Total THMs	<200		200	ug/g		09-DEC-22	
Volatile Organic Compounds							
Ethyl Acetate	<1000	NSS	1000	mg/kg	05-DEC-22	08-DEC-22	R5904156
Ethylbenzene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
m+p-Xylenes	<60	NSS	60	mg/kg	05-DEC-22	08-DEC-22	R5904156
Methyl Ethyl Ketone	<1000	NSS	1000	mg/kg	05-DEC-22	08-DEC-22	R5904156
o-Xylene	<40	NSS	40	mg/kg	05-DEC-22	08-DEC-22	R5904156
Tetrachloroethylene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Toluene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2,4-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dibromoethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dichloropropane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2740410-10 22-22180-LW-8 (LEACHATE FEED) TEST#2							
Sampled By: Client on 09-NOV-22							
Matrix: Stack							
Volatile Organics by GC/MS-Headspace							
1,3,5-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
Acetone	<1000	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
Benzene	<14	NSS	14	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromodichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromoform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromomethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Carbon tetrachloride	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Chloroform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dibromochloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichlorodifluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Ethylbenzene	<36	NSS	36	ug/g	05-DEC-22	09-DEC-22	R5904337
Isopropylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
m+p-Xylenes	<60	NSS	60	ug/g	05-DEC-22	09-DEC-22	R5904337
Methyl Ethyl Ketone	<1000	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
o-Xylene	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Styrene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Tetrachloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Toluene	<160	NSS	160	ug/g	05-DEC-22	09-DEC-22	R5904337
trans-1,2-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichloroethylene	<20	NSS	20	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichlorofluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Vinyl chloride	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
L2740410-11 22-22180-FR-13 (RICH FEED) TEST#3							
Sampled By: Client on 10-NOV-22							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	16-NOV-22	17-NOV-22	R5894498
Xylenes (Total)	5140		72	ug/g		13-DEC-22	
Total THMs	<200		200	ug/g		09-DEC-22	
Volatile Organic Compounds							
Ethyl Acetate	1200	NSS	1000	mg/kg	05-DEC-22	08-DEC-22	R5904156
Ethylbenzene	1080	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
m+p-Xylenes	3930	NSS	60	mg/kg	05-DEC-22	08-DEC-22	R5904156
Methyl Ethyl Ketone	<6000	DLQ	6000	mg/kg	05-DEC-22	08-DEC-22	R5904156
o-Xylene	1200	NSS	40	mg/kg	05-DEC-22	08-DEC-22	R5904156
Tetrachloroethylene	<100	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Toluene	11000	NSS	100	mg/kg	05-DEC-22	08-DEC-22	R5904156
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	08-DEC-22	R5904156
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2,4-Trimethylbenzene	<2000	DLQ	2000	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dibromoethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dichloropropane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,3,5-Trimethylbenzene	<600	DLQ	600	ug/g	05-DEC-22	09-DEC-22	R5904337
Acetone	61900	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2740410-11 22-22180-FR-13 (RICH FEED) TEST#3							
Sampled By: Client on 10-NOV-22							
Matrix: Stack							
Volatile Organics by GC/MS-Headspace							
Benzene	62	NSS	14	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromodichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromoform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromomethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Carbon tetrachloride	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Chloroform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dibromochloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichlorodifluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichloromethane	810	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Ethylbenzene	1080	NSS	36	ug/g	05-DEC-22	09-DEC-22	R5904337
Isopropylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
m+p-Xylenes	3930	NSS	60	ug/g	05-DEC-22	09-DEC-22	R5904337
Methyl Ethyl Ketone	<6000	DLQ	6000	ug/g	05-DEC-22	09-DEC-22	R5904337
o-Xylene	1200	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Styrene	1050	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Tetrachloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Toluene	11000	NSS	160	ug/g	05-DEC-22	09-DEC-22	R5904337
trans-1,2-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichloroethylene	<20	NSS	20	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichlorofluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Vinyl chloride	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
L2740410-12 22-22180-FL-13 (LEAN FEED) TEST#3							
Sampled By: Client on 10-NOV-22							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	16-NOV-22	17-NOV-22	R5894498
Xylenes (Total)	1010		72	ug/g		13-DEC-22	
Total THMs	<200		200	ug/g		09-DEC-22	
Volatile Organic Compounds							
Ethyl Acetate	<1000	NSS	1000	mg/kg	05-DEC-22	09-DEC-22	R5904156
Ethylbenzene	190	NSS	100	mg/kg	05-DEC-22	09-DEC-22	R5904156
m+p-Xylenes	763	NSS	60	mg/kg	05-DEC-22	09-DEC-22	R5904156
Methyl Ethyl Ketone	<1000	NSS	1000	mg/kg	05-DEC-22	09-DEC-22	R5904156
o-Xylene	246	NSS	40	mg/kg	05-DEC-22	09-DEC-22	R5904156
Tetrachloroethylene	<100	NSS	100	mg/kg	05-DEC-22	09-DEC-22	R5904156
Toluene	8620	NSS	100	mg/kg	05-DEC-22	09-DEC-22	R5904156
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	09-DEC-22	R5904156
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	09-DEC-22	R5904156
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2,4-Trimethylbenzene	<400	DLQ	400	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dibromoethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dichloropropane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,3,5-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
Acetone	4300	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
Benzene	62	NSS	14	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromodichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2740410-12 22-22180-FL-13 (LEAN FEED) TEST#3							
Sampled By: Client on 10-NOV-22							
Matrix: Stack							
Volatile Organics by GC/MS-Headspace							
Bromoform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromomethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Carbon tetrachloride	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Chloroform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dibromochloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichlorodifluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Ethylbenzene	187	NSS	36	ug/g	05-DEC-22	09-DEC-22	R5904337
Isopropylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
m+p-Xylenes	763	NSS	60	ug/g	05-DEC-22	09-DEC-22	R5904337
Methyl Ethyl Ketone	<1000	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
o-Xylene	246	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Styrene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Tetrachloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Toluene	8620	NSS	160	ug/g	05-DEC-22	09-DEC-22	R5904337
trans-1,2-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichloroethylene	<20	NSS	20	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichlorofluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Vinyl chloride	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
L2740410-13 22-22180-FE-13 (EMULSION FEED) TEST#3							
Sampled By: Client on 10-NOV-22							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	16-NOV-22	17-NOV-22	R5894498
Xylenes (Total)	659		72	ug/g		13-DEC-22	
Total THMs	<200		200	ug/g		09-DEC-22	
Volatile Organic Compounds							
Ethyl Acetate	<1000	NSS	1000	mg/kg	05-DEC-22	09-DEC-22	R5904156
Ethylbenzene	140	NSS	100	mg/kg	05-DEC-22	09-DEC-22	R5904156
m+p-Xylenes	499	NSS	60	mg/kg	05-DEC-22	09-DEC-22	R5904156
Methyl Ethyl Ketone	2400	NSS	1000	mg/kg	05-DEC-22	09-DEC-22	R5904156
o-Xylene	160	NSS	40	mg/kg	05-DEC-22	09-DEC-22	R5904156
Tetrachloroethylene	<100	NSS	100	mg/kg	05-DEC-22	09-DEC-22	R5904156
Toluene	2520	NSS	100	mg/kg	05-DEC-22	09-DEC-22	R5904156
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	09-DEC-22	R5904156
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	09-DEC-22	R5904156
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2,4-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dibromoethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dichloropropane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,3,5-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
2,2-Dichloropropane	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
Acetone	51100	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
Benzene	70	NSS	14	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromodichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromoform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2740410-13 22-22180-FE-13 (EMULSION FEED) TEST#3							
Sampled By: Client on 10-NOV-22							
Matrix: Stack							
Volatile Organics by GC/MS-Headspace							
Bromomethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Carbon tetrachloride	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Chloroform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dibromochloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichlorodifluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichloromethane	1990	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Ethylbenzene	139	NSS	36	ug/g	05-DEC-22	09-DEC-22	R5904337
Isopropylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
m+p-Xylenes	499	NSS	60	ug/g	05-DEC-22	09-DEC-22	R5904337
Methyl Ethyl Ketone	2400	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
o-Xylene	160	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Styrene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Tetrachloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Toluene	2520	NSS	160	ug/g	05-DEC-22	09-DEC-22	R5904337
trans-1,2-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichloroethylene	<20	NSS	20	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichlorofluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Vinyl chloride	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
L2740410-14 22-22180-FA-13 (ALKALINE FEED) TEST#3							
Sampled By: Client on 10-NOV-22							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	16-NOV-22	17-NOV-22	R5894498
Xylenes (Total)	<72		72	ug/g		13-DEC-22	
Total THMs	<200		200	ug/g		09-DEC-22	
Volatile Organic Compounds							
Ethyl Acetate	<1000	NSS	1000	mg/kg	05-DEC-22	09-DEC-22	R5904156
Ethylbenzene	<100	NSS	100	mg/kg	05-DEC-22	09-DEC-22	R5904156
m+p-Xylenes	<60	NSS	60	mg/kg	05-DEC-22	09-DEC-22	R5904156
Methyl Ethyl Ketone	<1000	NSS	1000	mg/kg	05-DEC-22	09-DEC-22	R5904156
o-Xylene	<40	NSS	40	mg/kg	05-DEC-22	09-DEC-22	R5904156
Tetrachloroethylene	<100	NSS	100	mg/kg	05-DEC-22	09-DEC-22	R5904156
Toluene	<100	NSS	100	mg/kg	05-DEC-22	09-DEC-22	R5904156
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	09-DEC-22	R5904156
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	09-DEC-22	R5904156
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2,4-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dibromoethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dichloropropane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,3,5-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
Acetone	<1000	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
Benzene	<14	NSS	14	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromodichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromoform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromomethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Carbon tetrachloride	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2740410-14 22-22180-FA-13 (ALKALINE FEED) TEST#3							
Sampled By: Client on 10-NOV-22							
Matrix: Stack							
Volatile Organics by GC/MS-Headspace							
Chloroform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dibromochloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichlorodifluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Ethylbenzene	<36	NSS	36	ug/g	05-DEC-22	09-DEC-22	R5904337
Isopropylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
m+p-Xylenes	<60	NSS	60	ug/g	05-DEC-22	09-DEC-22	R5904337
Methyl Ethyl Ketone	<1000	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
o-Xylene	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Styrene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Tetrachloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Toluene	<160	NSS	160	ug/g	05-DEC-22	09-DEC-22	R5904337
trans-1,2-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichloroethylene	<20	NSS	20	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichlorofluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Vinyl chloride	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
L2740410-15 22-22180-LW-13 (LEACHATE FEED) TEST#3							
Sampled By: Client on 10-NOV-22							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	16-NOV-22	17-NOV-22	R5894498
Xylenes (Total)	<72		72	ug/g		13-DEC-22	
Total THMs	<200		200	ug/g		09-DEC-22	
Volatile Organic Compounds							
Ethyl Acetate	<1000	NSS	1000	mg/kg	05-DEC-22	09-DEC-22	R5904156
Ethylbenzene	<100	NSS	100	mg/kg	05-DEC-22	09-DEC-22	R5904156
m+p-Xylenes	<60	NSS	60	mg/kg	05-DEC-22	09-DEC-22	R5904156
Methyl Ethyl Ketone	<1000	NSS	1000	mg/kg	05-DEC-22	09-DEC-22	R5904156
o-Xylene	<40	NSS	40	mg/kg	05-DEC-22	09-DEC-22	R5904156
Tetrachloroethylene	<100	NSS	100	mg/kg	05-DEC-22	09-DEC-22	R5904156
Toluene	<100	NSS	100	mg/kg	05-DEC-22	09-DEC-22	R5904156
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	09-DEC-22	R5904156
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	50-150	%	05-DEC-22	09-DEC-22	R5904156
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,1-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2,4-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dibromoethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,2-Dichloropropane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
1,3,5-Trimethylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
Acetone	<1000	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
Benzene	<14	NSS	14	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromodichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromoform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Bromomethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Carbon tetrachloride	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Chloroform	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dibromochloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2740410-15 22-22180-LW-13 (LEACHATE FEED) TEST#3							
Sampled By: Client on 10-NOV-22							
Matrix: Stack							
Volatile Organics by GC/MS-Headspace							
Dichlorodifluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Dichloromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Ethylbenzene	<36	NSS	36	ug/g	05-DEC-22	09-DEC-22	R5904337
Isopropylbenzene	<200	NSS	200	ug/g	05-DEC-22	09-DEC-22	R5904337
m+p-Xylenes	<60	NSS	60	ug/g	05-DEC-22	09-DEC-22	R5904337
Methyl Ethyl Ketone	<1000	NSS	1000	ug/g	05-DEC-22	09-DEC-22	R5904337
o-Xylene	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Styrene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Tetrachloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Toluene	<160	NSS	160	ug/g	05-DEC-22	09-DEC-22	R5904337
trans-1,2-Dichloroethylene	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichloroethylene	<20	NSS	20	ug/g	05-DEC-22	09-DEC-22	R5904337
Trichlorofluoromethane	<100	NSS	100	ug/g	05-DEC-22	09-DEC-22	R5904337
Vinyl chloride	<40	NSS	40	ug/g	05-DEC-22	09-DEC-22	R5904337
Surrogate: 1,4-Difluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337
Surrogate: 4-Bromofluorobenzene	0.0	NR:SNA	70-130	%	05-DEC-22	09-DEC-22	R5904337

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLQ	Detection Limit raised due to co-eluting interference. Mass Spectrometry qualifier ion ratio did not meet acceptance criteria.
NR:SNA	No Result: Surrogate Not Added
NSS	Non-standard sample matrix. Modified methods were used for sample processing and analysis.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
THM-SUM-CALC-WT	Soil	Total Trihalomethanes (THMs)	CALCULATION

Total Trihalomethanes (THMs) represents the sum of bromodichloromethane, bromoform, chlorodibromomethane and chloroform. For the purpose of calculation, results less than the detection limit (DL) are treated as zero.

ALS Test Code	Matrix	Test Description	Method Reference**
VOC-FEED-WT	Soil	Volatile Organic Compounds	SW846 8260

An subsample of the sample is extracted in methanol and analyzed by headspace-GC/MS using internal standard quantitation.

ALS Test Code	Matrix	Test Description	Method Reference**
VOC-ROU1-HS-WT	Soil	Volatile Organics by GC/MS-Headspace	SW846 8260

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

ALS Test Code	Matrix	Test Description	Method Reference**
XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Quality Control Report

Workorder: L2740410　Report Date: 20-DEC-22

Client: ORTECH Environmental
804 Southdown Road
Mississauga ON L5J 2Y4
Contact: Chris Belore

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-WT	Soil							
Batch R5894498								
WG3772936-2 LCS								
% Moisture			99.7		%		90-110	17-NOV-22
WG3772936-1 MB								
% Moisture			<0.25		%		0.25	17-NOV-22
VOC-FEED-WT	Soil							
Batch R5904156								
WG3775134-8 DUP		**L2740410-1**						
Ethyl Acetate		1000	1000		mg/kg	1.0	50	08-DEC-22
Ethylbenzene		560	570		mg/kg	1.7	50	08-DEC-22
m+p-Xylenes		<2400	<2400	RPD-NA	mg/kg	N/A	50	08-DEC-22
Methyl Ethyl Ketone		<6000	<6000	RPD-NA	mg/kg	N/A	50	08-DEC-22
o-Xylene		665	678		mg/kg	1.9	50	08-DEC-22
Tetrachloroethylene		<100	<100	RPD-NA	mg/kg	N/A	50	08-DEC-22
Toluene		4740	4750		mg/kg	0.2	50	08-DEC-22
COMMENTS: RRQC-Surrogate not used for this test. Non standard sample matrix.								
WG3775134-6 MB								
Ethyl Acetate			<1000		mg/kg		1000	08-DEC-22
Ethylbenzene			<100		mg/kg		100	08-DEC-22
m+p-Xylenes			<60		mg/kg		60	08-DEC-22
Methyl Ethyl Ketone			<1000		mg/kg		1000	08-DEC-22
o-Xylene			<40		mg/kg		40	08-DEC-22
Tetrachloroethylene			<100		mg/kg		100	08-DEC-22
Toluene			<100		mg/kg		100	08-DEC-22
Surrogate: 1,4-Difluorobenzene			0.0	RRQC	%		50-150	08-DEC-22
Surrogate: 4-Bromofluorobenzene			0.0	RRQC	%		50-150	08-DEC-22
COMMENTS: RRQC-Surrogate not used for this test. Non standard sample matrix.								
VOC-ROU1-HS-WT	Soil							
Batch R5904337								
WG3775134-8 DUP		**L2740410-1**						
1,1,1-Trichloroethane		<100	<100	RPD-NA	ug/g	N/A	40	09-DEC-22
1,1-Dichloroethane		<100	<100	RPD-NA	ug/g	N/A	40	09-DEC-22
1,1-Dichloroethylene		<100	<100	RPD-NA	ug/g	N/A	40	09-DEC-22
1,2,4-Trimethylbenzene		<2600	<2600	RPD-NA	ug/g	N/A	40	09-DEC-22
1,2-Dibromoethane		<100	<100	RPD-NA	ug/g	N/A	40	09-DEC-22
1,2-Dichloropropane		<100	<100	RPD-NA	ug/g	N/A	40	09-DEC-22
1,3,5-Trimethylbenzene		<800	<800	RPD-NA	ug/g	N/A	40	09-DEC-22

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU1-HS-WT	Soil							
Batch R5904337								
WG3775134-8 DUP		**L2740410-1**						
Acetone		17400	17900		ug/g	2.6	40	09-DEC-22
Benzene		46	47		ug/g	1.1	40	09-DEC-22
Bromodichloromethane		<100	<100	RPD-NA	ug/g	N/A	40	09-DEC-22
Bromoform		<100	<100	RPD-NA	ug/g	N/A	40	09-DEC-22
Bromomethane		<100	<100	RPD-NA	ug/g	N/A	40	09-DEC-22
Carbon tetrachloride		<100	<100	RPD-NA	ug/g	N/A	40	09-DEC-22
Chloroform		<100	<100	RPD-NA	ug/g	N/A	40	09-DEC-22
Dibromochloromethane		<100	<100	RPD-NA	ug/g	N/A	40	09-DEC-22
Dichlorodifluoromethane		<100	<100	RPD-NA	ug/g	N/A	40	09-DEC-22
Dichloromethane		<200	<200	RPD-NA	ug/g	N/A	40	09-DEC-22
Ethylbenzene		563	572		ug/g	1.7	40	09-DEC-22
Isopropylbenzene		<200	<200	RPD-NA	ug/g	N/A	40	09-DEC-22
m+p-Xylenes		<2400	<2400	RPD-NA	ug/g	N/A	40	09-DEC-22
Methyl Ethyl Ketone		<6000	<6000	RPD-NA	ug/g	N/A	40	09-DEC-22
o-Xylene		665	678		ug/g	1.9	40	09-DEC-22
Styrene		850	870		ug/g	2.0	40	09-DEC-22
Tetrachloroethylene		<100	<100	RPD-NA	ug/g	N/A	40	09-DEC-22
Toluene		4740	4750		ug/g	0.2	40	09-DEC-22
trans-1,2-Dichloroethylene		<100	<100	RPD-NA	ug/g	N/A	40	09-DEC-22
Trichloroethylene		<20	<20	RPD-NA	ug/g	N/A	40	09-DEC-22
Trichlorofluoromethane		<100	<100	RPD-NA	ug/g	N/A	40	09-DEC-22
Vinyl chloride		<40	<40	RPD-NA	ug/g	N/A	40	09-DEC-22
COMMENTS: RRQC-no surrogate was added for this test. Non-standard sample matrix.								
WG3775134-6 MB								
1,1,1-Trichloroethane			<100		ug/g		100	09-DEC-22
1,1-Dichloroethane			<100		ug/g		100	09-DEC-22
1,1-Dichloroethylene			<100		ug/g		100	09-DEC-22
1,2,4-Trimethylbenzene			<200		ug/g		200	09-DEC-22
1,2-Dibromoethane			<100		ug/g		100	09-DEC-22
1,2-Dichloropropane			<100		ug/g		100	09-DEC-22
1,3,5-Trimethylbenzene			<200		ug/g		200	09-DEC-22
2,2-Dichloropropane			<200		ug/g		200	09-DEC-22
Acetone			<1000		ug/g		1000	09-DEC-22
Benzene			<14		ug/g		13.6	09-DEC-22
Bromodichloromethane			<100		ug/g		100	09-DEC-22

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU1-HS-WT	Soil							
Batch R5904337								
WG3775134-6 MB								
Bromoform			<100		ug/g		100	09-DEC-22
Bromomethane			<100		ug/g		100	09-DEC-22
Carbon tetrachloride			<100		ug/g		100	09-DEC-22
Chloroform			<100		ug/g		100	09-DEC-22
Dibromochloromethane			<100		ug/g		100	09-DEC-22
Dichlorodifluoromethane			<100		ug/g		100	09-DEC-22
Dichloromethane			<100		ug/g		100	09-DEC-22
Ethylbenzene			<36		ug/g		36	09-DEC-22
Isopropylbenzene			<200		ug/g		200	09-DEC-22
m+p-Xylenes			<60		ug/g		60	09-DEC-22
Methyl Ethyl Ketone			<1000		ug/g		1000	09-DEC-22
o-Xylene			<40		ug/g		40	09-DEC-22
Styrene			<100		ug/g		100	09-DEC-22
Tetrachloroethylene			<100		ug/g		100	09-DEC-22
Toluene			<160		ug/g		160	09-DEC-22
trans-1,2-Dichloroethylene			<100		ug/g		100	09-DEC-22
Trichloroethylene			<20		ug/g		20	09-DEC-22
Trichlorofluoromethane			<100		ug/g		100	09-DEC-22
Vinyl chloride			<40		ug/g		40	09-DEC-22
Surrogate: 1,4-Difluorobenzene			0.0	RRQC	%		70-130	09-DEC-22
Surrogate: 4-Bromofluorobenzene			0.0	RRQC	%		70-130	09-DEC-22

COMMENTS: RRQC-no surrogate was added for this test. Non-standard sample matrix.

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.
RRQC	Refer to report remarks for information regarding this QC result.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Volatile Organic Compounds							
Volatile Organic Compounds							
	1	08-NOV-22	05-DEC-22 12:58	7	27	days	EHT
	2	08-NOV-22	05-DEC-22 13:01	7	27	days	EHT
	3	08-NOV-22	05-DEC-22 13:02	7	27	days	EHT
	4	08-NOV-22	05-DEC-22 13:03	7	27	days	EHT
	5	08-NOV-22	05-DEC-22 13:04	7	27	days	EHT
	6	09-NOV-22	05-DEC-22 13:05	7	26	days	EHT
	7	09-NOV-22	05-DEC-22 13:06	7	26	days	EHT
	8	09-NOV-22	05-DEC-22 13:07	7	26	days	EHT
	9	09-NOV-22	05-DEC-22 13:08	7	26	days	EHT
	10	09-NOV-22	05-DEC-22 13:09	7	26	days	EHT
	11	10-NOV-22	05-DEC-22 13:10	7	25	days	EHT
	12	10-NOV-22	05-DEC-22 13:11	7	25	days	EHT
	13	10-NOV-22	05-DEC-22 13:12	7	25	days	EHT
	14	10-NOV-22	05-DEC-22 13:13	7	25	days	EHT
	15	10-NOV-22	05-DEC-22 13:14	7	25	days	EHT
Volatile Organics by GC/MS-Headspace							
	1	08-NOV-22	05-DEC-22 11:50	14	27	days	EHT
	2	08-NOV-22	05-DEC-22 11:53	14	27	days	EHT
	3	08-NOV-22	05-DEC-22 11:54	14	27	days	EHT
	4	08-NOV-22	05-DEC-22 11:55	14	27	days	EHT
	5	08-NOV-22	05-DEC-22 11:56	14	27	days	EHT
	6	09-NOV-22	05-DEC-22 11:57	14	26	days	EHT
	7	09-NOV-22	05-DEC-22 11:58	14	26	days	EHT
	8	09-NOV-22	05-DEC-22 11:59	14	26	days	EHT
	9	09-NOV-22	05-DEC-22 12:00	14	26	days	EHT
	10	09-NOV-22	05-DEC-22 12:01	14	26	days	EHT
	11	10-NOV-22	05-DEC-22 12:02	14	25	days	EHT
	12	10-NOV-22	05-DEC-22 12:03	14	25	days	EHT
	13	10-NOV-22	05-DEC-22 12:04	14	25	days	EHT
	14	10-NOV-22	05-DEC-22 12:05	14	25	days	EHT
	15	10-NOV-22	05-DEC-22 12:06	14	25	days	EHT

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2740410 were received on 14-NOV-22 11:00.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Clean Harbors Lambton
ORTECH Project # 22180
Process Samples
Sample List for ALS DRE Analysis

Test Number	Test Date	ORTECH Sample Identification	Sample Description
1	November 8, 2022	22- 22180- FR-3	Rich Feed (250 ml bottle)
1		22- 22180- FL-3	Lean Feed (250 ml bottle)
1		22- 22180- FE-3	Emulsion Feed (250 ml bottle)
1		22- 22180- FA-3	Alkaline Feed (250 ml bottle)
1		22- 22180- LW-3	Leachate Feed (250 ml bottle)
2	November 9, 2022	22- 22180- FR-8	Rich Feed (250 ml bottle)
2		22- 22180- FL-8	Lean Feed (250 ml bottle)
2		22- 22180- FE-8	Emulsion Feed (250 ml bottle)
2		22- 22180- FA-8	Alkaline Feed (250 ml bottle)
2		22- 22180- LW-8	Leachate Feed (250 ml bottle)
3	November 10, 2022	22- 22180- FR-13	Rich Feed (250 ml bottle)
3		22- 22180- FL-13	Lean Feed (250 ml bottle)
3		22- 22180- FE-13	Emulsion Feed (250 ml bottle)
3		22- 22180- FA-13	Alkaline Feed (250 ml bottle)
3		22- 22180- LW-13	Leachate Feed (250 ml bottle)

Custody Relinquished by: Date:

Custody Received by: ARRAN BULTON Date: 14-Nov-2022

11:00

18.0°C

L2740410-COFC

APPENDIX 15

Feed and Baghouse Dust Metals Analytical Report
(9 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
ALS Project ID: ORT100
ALS WO#: L2740407
Date of Report 22-Nov-22
Date of Sample Receipt 14-Nov-22

Client Name: ORTECH
Client Address: 804 Southdown Road
Mississauga, ON L5J 2Y4
Canada
Client Contact: Chris Belore
Client Project ID: 22180 Clean Harbors

COMMENTS:

Sample Preparation and Mercury Analysis via CVAA using Method USEPA 7471B (KC11 21-Nov-2022)

ANALYST COMMENTS:

Samples L2740407-1 and L2740407-4 (FEED samples) cleared during heating, indicating the permanganate was exhausted during the digestion. Samples were re-processed with a smaller sub-sample size, and a larger excess of permanganate, but they cleared during heating again. Data for these two digestions are consistent, however the results for these two samples may be biased low due to matrix interferences. **PE 23-Nov-22**

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

Results in this certificate relate only to the samples as submitted to the laboratory.

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ALS Environmental

Sample Analysis Summary Report

Sample Name		22-22180-RC-1 (RICH FEED)	22-22180-LC-1 (LEAN FEED)	22-22180-AC-1 (ALKALINE FEED)	22-22180-EC-1 (EMULSION FEED)	22-22180-BDC-1 (BAGHOUSE DUST)
ALS Sample ID		L2740407-1	L2740407-2	L2740407-3	L2740407-4	L2740407-5
Matrix		Stack	Stack	Stack	Stack	Stack
Analysis type		Sample	Sample	Sample	Sample	Sample
Sampling Date/Time		n/a	n/a	n/a	n/a	n/a
Date of Receipt		14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22
Mercury via CVAA	**LOR**					
Method 7471B	**ug/g**	**ug/g**	**ug/g**	**ug/g**	**ug/g**	**ug/g**
Mercury in Solid Matrices	0.010	0.105	0.398	<0.00952	0.231	6.28

ALS Environmental

Sample Analysis Summary Report

Sample Name		**22-22180-LWC-1 (LEACHATE FEED)**
ALS Sample ID		L2740407-6
Matrix		Stack
Analysis type		Sample
Sampling Date/Time		n/a
Date of Receipt		14-Nov-22
Mercury via CVAA	**LOR**	
Method 7471B	**ug/g**	**ug/g**
Mercury in Solid Matrices	0.010	<0.00863

ALS Environmental

Sample QC Summary Report

Sample Name		**LCB**	**LCS**	**LCS**
ALS Sample ID		LCB	LCS	LCS
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
Mercury via CVAA	**LOR**			
Method 7471B	**ug/g**	**ug/g**	**ug/g**	**% Rec**
Mercury in Solid Matrices	0.010	<0.0100	0.195	98%

ALS Environmental

Sample QC Summary Report

Sample Name		**Sample**	**Sample DUP**	**Sample MS**	**Sample MSD**
ALS Sample ID		L2740668-1	L2740668-1DUP	L2740668-1MS	L2740668-1MS
Matrix		Solid	Solid	Solid	Solid
Analysis type		Sample	Duplicate	Matrix Spike	Matrix Spike
Sampling Date/Time		16-Nov-22	16-Nov-22	16-Nov-22	16-Nov-22
Date of Receipt		17-Nov-22	17-Nov-22	17-Nov-22	17-Nov-22
Mercury via CVAA	**LOR**				
Method 7471B	**ug/g**	**ug/g**	**ug/g**	**ug/g**	**% Rec**
Mercury in Solid Matrices	0.010	0.0107	0.0111	0.166	78%

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
ALS Project ID: ORT100
ALS WO#: L2740407
Date of Report 25-Nov-22
Date of Sample Receipt 14-Nov-22

Client Name: ORTECH Environmental
Client Address: 804 Southdown Road
Mississauga, ON L5J 2Y4
Canada
Client Contact: Chris Belore
Client Project ID: 22180 Clean Harbors

COMMENTS:

Metals analysed via ICP-MS Method USEPA 6020B (KC11/SA 21-Nov-22)
Sample Preparation via Hotblock Digestion for Metals in Soils USEPA 200.2 (SA 22-Nov-22)

ANALYST COMMENTS:

Many target analyte recoveries cannot be quantified in the MS due to high levels in the sample, relative to the spiked amounts. This is not expected to have any impact on data quality. **PE 25-Nov-22**

LCB = Laboratory Control Blank
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
LOR = Limit of Reporting
nq = Indicates that this value was not quantifiable.

Certified by: L. Wrona
Lynne Wrona
Project Manager

ALS Environmental

Sample Analysis Summary Report

Sample Name		**22-22180-RC-1 (RICH FEED)**	**22-22180-LC-1 (LEAN FEED)**	**22-22180-AC-1 (ALKALINE FEED)**	**22-22180-EC-1 (EMULSION FEED)**	**22-22180-BDC-1 (BAGHOUSE DUST)**	**22-22180-LWC-1 (LEACHATE FEED)**
ALS Sample ID		L2740407-1	L2740407-2	L2740407-3	L2740407-4	L2740407-5	L2740407-6
Matrix		Stack	Stack	Stack	Stack	Stack	Stack
Analysis Type		Sample	Sample	Sample	Sample	Sample	Sample
Sampling Date		n/a	n/a	n/a	n/a	n/a	n/a
Date of Receipt		14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22
Multi-Metals via ICP-MS	**LOR mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Aluminum	10	465	191	<	229	7320	<
Antimony	0.4	11.3	1.34	<	2.39	105	<
Arsenic	0.4	2.55	42.0	<	2.75	280	0.418
Barium	1	105	23.7	<	202	67.7	<
Beryllium	0.5	<	<	<	<	<	<
Boron	10	15.9	17.1	<	<	199	27.3
Cadmium	0.1	2.60	2.17	<	6.00	39.4	<
Calcium	50	495	390	891	451	20800	111
Chromium	4	164	15.2	<	19.4	1470	<
Cobalt	1	7.08	1.08	<	2.49	159	<
Copper	2.5	46.8	271	<	47.0	3720	3.93
Iron	200	722	<	<	554	5950	<
Lead	0.2	72.7	8.39	<	37.5	307	0.452
Lithium	1	2.01	13.4	<	<	156	3.06
Magnesium	15	64.8	157	32.5	79.4	5480	84.0
Manganese	15	312	1480	<	28.8	22800	<
Molybdenum	1	9.83	4.43	<	5.65	101	3.84
Nickel	0.5	13.9	11.2	<	7.16	233	1.34
Phosphorus	100	<	<	<	<	1950	<
Potassium	150	1260	15400	<	9660	161000	2000
Selenium	2	<	14.3	<	3.81	174	<
Silver	0.1	0.259	0.349	<	0.504	7.61	<
Sodium	10	2810	13600	116	1880	148000	6630
Strontium	2	228	21.9	<	26.5	1040	2.09
Tin	2	10.6	15.9	<	13.8	175	<
Titanium	1	21.5	10.8	<	11.5	18100	8.04
Vanadium	1	10.6	6.26	<	29.2	126	<
Zinc	20	106	42.9	<	167	872	<
Sulfur	1000	<	7430	<	2120	97300	<
Silicon	100	1500	381	116	714	870	104

ALS Environmental

Sample QC Summary Report

Sample Name		**RB**	**LCS**	**LCS**
ALS Sample ID		RB	LCS	LCS
Matrix		Solid	Solid	Solid
Analysis Type		Blank	LCS	LCS
Sampling Date		n/a	n/a	n/a
Date of Receipt		n/a	n/a	n/a
Multi-Metals via ICP-MS	**LOR mg/kg**	**mg/kg**	**mg/kg**	**% Rec**
Aluminum	10	<	64.6	96
Antimony	0.4	<	6.26	94
Arsenic	0.4	<	32.1	96
Barium	1	<	34.1	102
Beryllium	0.5	<	33.0	99
Boron	10	<	33.9	87
Cadmium	0.1	<	16.4	98
Calcium	50	<	834	99
Chromium	4	<	34.2	103
Cobalt	1	<	33.7	101
Copper	2.5	<	34.1	102
Iron	200	<	169	102
Lead	0.2	<	33.1	99
Lithium	1	<	5.75	86
Magnesium	15	<	167	100
Manganese	15	<	33.2	100
Molybdenum	1	<	16.1	96
Nickel	0.5	<	34.2	103
Phosphorus	100	<	755	92
Potassium	150	<	820	98
Selenium	2	<	32.4	97
Silver	0.1	<	16.4	98
Sodium	10	<	812	97
Strontium	2	<	33.6	101
Tin	2	<	16.1	97
Titanium	1	<	32.8	98
Vanadium	1	<	33.6	101
Zinc	20	<	65.7	98
Sulfur	1000	<	10300	107
Silicon	100	<	1010	99

ALS Environmental

Sample QC Summary Report

Sample Name		**22-22180-RC-1 (RICH FEED)**	**22-22180-RC-1 (RICH FEED)**	**22-22180-RC-1 (RICH FEED)**	**22-22180-RC-1 (RICH FEED)**
ALS Sample ID		L2740407-1	L2740407-1	MS	MS
Matrix		Stack	Stack	Stack	Stack
Analysis Type		Sample	Duplicate	Matrix Spike	Matrix Spike
Sampling Date		n/a	n/a	n/a	n/a
Date of Receipt		14-Nov-22	14-Nov-22	14-Nov-22	14-Nov-22
Multi-Metals via ICP-MS	**LOR mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**% Rec**
Aluminum	10	465	560	607	nq
Antimony	0.4	11.3	13.1	17.1	nq
Arsenic	0.4	2.55	2.72	34.5	95
Barium	1	105	159	152	nq
Beryllium	0.5	<	<	31.6	94
Boron	10	15.9	16.9	45.5	nq
Cadmium	0.1	2.60	2.95	18.9	96
Calcium	50	495	646	1270	nq
Chromium	4	164	207	190	nq
Cobalt	1	7.08	9.73	43.2	106
Copper	2.5	46.8	52.9	80.0	95
Iron	200	722	810	883	nq
Lead	0.2	72.7	85.7	113	nq
Lithium	1	2.01	2.38	7.74	84
Magnesium	15	64.8	79.6	255	112
Manganese	15	312	356	337	nq
Molybdenum	1	9.83	10.5	26.1	nq
Nickel	0.5	13.9	18.8	51.3	110
Phosphorus	100	<	<	892	96
Potassium	150	1260	1350	2090	nq
Selenium	2	<	<	34.7	99
Silver	0.1	0.259	0.292	17.0	99
Sodium	10	2810	2960	3800	nq
Strontium	2	228	277	256	nq
Tin	2	10.6	11.5	26.4	nq
Titanium	1	21.5	28.1	61.2	nq
Vanadium	1	10.6	11.9	43.8	98
Zinc	20	106	122	174	nq
Sulfur	1000	<	<	12100	114
Silicon	100	1500	1250	1610	nq

APPENDIX 16

Master Sample Log/Chains of Custody Forms
(4 pages)

Clean Harbors Lambton
ORTECH Project # 22180
Process Samples
Sample List for ALS Metals Analysis

ORTECH Sample Identification	Sample Description
22- 22180- RC-1	Rich Feed (500 ml bottle)
22- 22180- LC-1	Lean Feed (500 ml bottle)
22- 22180- AC-1	Alkaline Feed (500 ml bottle)
22- 22180- EC-1	Emulsion Feed (500 ml bottle)
22- 22180- BDC-1	Baghouse Dust (500 ml bottle)
22- 22180- LWC-1	Leachate Feed (500 ml bottle)

Custody Relinquished by: Date:

Custody Received by: Aaron Bolton Date: 14-Nov.2022 11:00

18.0°C

L2740407-COFC

ORTECH Sample Log
Particulate and Metals Samples
Clean Harbors Sarnia

Client: Clean Harbors Sarnia
Job/Report Number: 22180
Received By: C Belore
How Received: Train recovery
Job Assigned To: ALS
PO #: 22180 - J2866

ORTECH Sample ID 22-22180-PM-	Sample Date	Sample Description	Hazardous Material	Sample Analysis
1	08-Nov-22	Test 1 Probe Rinse Acetone	Acetone	Particulate & Metals
2		Test 1 Probe Rinse Nitric	0.1N Nitric	Metals
3		Test 1 Filter	Particulate	Particulate & Metals
4		Test 1 Impinger 1,2,3,4 & 5 Solution	Nitric/Peroxide	Metals
5		Test 1 Impinger 6, 7 Solution	Acid. KMnO4	Metals
6		Test 1 Impinger 6, 7 Rinse	8N HCl	Metals
8	09-Nov-22	Test 2 Probe Rinse Acetone	Acetone	Particulate & Metals
9		Test 2 Probe Rinse Nitric	0.1N Nitric	Metals
10		Test 2 Filter	Particulate	Particulate & Metals
11		Test 2 Impinger 1,2,3,4 & 5 Solution	Nitric/Peroxide	Metals
12		Test 2 Impinger 6, 7 Solution	Acid. KMnO4	Metals
13		Test 2 Impinger 6, 7 Rinse	8N HCl	Metals
15	10-Nov-22	Test 3 Probe Rinse Acetone	Acetone	Particulate & Metals
16		Test 3 Probe Rinse Nitric	0.1N Nitric	Metals
17		Test 3 Filter	Particulate	Particulate & Metals
18		Test 3 Impinger 1,2,3,4 & 5 Solution	Nitric/Peroxide	Metals
19		Test 3 Impinger 6, 7 Solution	Acid. KMnO4	Metals
20		Test 3 Impinger 6, 7 Rinse	8N HCl	Metals
22		Blank Probe Rinse Acetone	Acetone	Particulate & Metals
23		Blank Probe Rinse Nitric	0.1N Nitric	Metals
24		Blank Filter	Particulate	Particulate & Metals
25		Blank Impinger 1,2,3,4 & 5 Solution	Nitric/Peroxide	Metals
26		Blank Impinger 6, 7 Solution	Acid. KMnO4	Metals
27		Blank Impinger 6, 7 Rinse	8N HCl	Metals

Relinquished By: Date:

Relinquished To: Date:

ORTECH Sample Log
Semi-Volatile Organics Samples
Clean Harbors Sarnia

Client: Clean Harbors Sarnia
Job/Report Number: 22180
Received By: C Belore
How Received: Train recovery
Job Assigned To: ALS
PO #: 22180-J2866

ORTECH Sample ID 22-22180-SVOC-	Sample Date	Sample Description	Hazardous Material	Sample Analysis
1	08-Nov-22	Test 1 Probe Rinse	Hexane/Acetone	SVOC
2		Test 1 Filter	Particulate	SVOC
3		Test 1 XAD-II Trap	N.A.	SVOC
4		Test 1 Impinger Solution	Ethylene Glycol	SVOC
5		Test 1 Impinger Rinse	Hexane/Acetone	SVOC
6	09-Nov-22	Test 2 Probe Rinse	Hexane/Acetone	SVOC
7		Test 2 Filter	Particulate	SVOC
8		Test 2 XAD-II Trap	N.A.	SVOC
9		Test 2 Impinger Solution	Ethylene Glycol	SVOC
10		Test 2 Impinger Rinse	Hexane/Acetone	SVOC
11	10-Nov-22	Test 3 Probe Rinse	Hexane/Acetone	SVOC
12		Test 3 Filter	Particulate	SVOC
13		Test 3 XAD-II Trap	N.A.	SVOC
14		Test 3 Impinger Solution	Ethylene Glycol	SVOC
15		Test 3 Impinger Rinse	Hexane/Acetone	SVOC
16		Blank Probe Rinse	Hexane/Acetone	SVOC
17		Blank Filter	Particulate	SVOC
18		Blank XAD-II Trap	N.A.	SVOC
19		Blank Impinger Solution	Ethylene Glycol	SVOC
20		Blank Impinger Rinse	Hexane/Acetone	SVOC

Relinquished By: Date:

Relinquished To: Date:

ORTECH Consulting Inc.
Project # 22180
Vost Sample List
Clean Harbors Sarnia

Test Number	ORTECH Sample ID 22-22180-VOST-	Sample Date	Sample Description	Sample Analysis
1	13A / B	8-Nov-22	Tenax and Tenax/Charcoal (Pair 1)	VOCs
1	14A / B		Tenax and Tenax/Charcoal (Pair 2)	VOCs
1	15A / B		Tenax and Tenax/Charcoal (Pair 3)	VOCs
2	5A / B	9-Nov-22	Tenax and Tenax/Charcoal (Pair 1)	VOCs
2	6A / B		Tenax and Tenax/Charcoal (Pair 2)	Archive
2	7A / B		Tenax and Tenax/Charcoal (Pair 3)	VOCs
2	8A / B		Tenax and Tenax/Charcoal (Pair 4)	VOCs
3	9A / B	10-Nov-22	Tenax and Tenax/Charcoal (Pair 1)	VOCs
3	10A / B		Tenax and Tenax/Charcoal (Pair 2)	VOCs
3	11A / B		Tenax and Tenax/Charcoal (Pair 3)	VOCs
3	3A / B		Field Blank	VOCs
Blank	12A / B	10-Nov-22	Trip Blank	VOCs

* Archived samples to be held for future reference

Custody Relinquished by: Date:

Custody Received by: Date:

APPENDIX 17

Internal QA/QC Tables
(5 pages)

TABLE 1
Clean Harbors Sarnia
Equipment Calibration Details

Item	Recommended Acceptable Limits	Results	QA/QC Status
Nozzle- Metals Train	for n=4 measurements high-low <0.10 mm	average= 0.2508 inches	Acceptable
Nozzle- Semi-Volatile Organics Train	for n=4 measurements high-low <0.10 mm	average= 0.2491 inches	Acceptable
S-Type Pitot #S8 (B03769) Metals Train	coefficient typically 0.84 ± 0.04	0.847	Acceptable
S-Type Pitot #SP5 (B02911) Semi-Volatile Organics Train	coefficient typically 0.84 ± 0.04	0.843	Acceptable
Inclined Manometer # TEAM2 (COE20092) Metals Train	percentage difference within 5%	0.2% to 1.3%	Acceptable
Inclined Manometer # TEAM1 (COE20094) Semi-Volatile Organics Train	percentage difference within 5%	0% to 3.2%	Acceptable
Thermocouples	± 1.5% over the range	± 0.80% for type "K" wire	Acceptable
Aneroid Barometer	± 0.015 in. Hg before testing	within acceptable limit	Acceptable
Acculab V-1200 Balance	± 0.1g (the readability)	< 1% for range used	Acceptable
Acculab V-6000 Balance	± 0.5g (the readability)	< 1% for range used	Acceptable
Dry Gas Meter # TEAM2 (COE20092) Metals Train	± 1% over the working range DGMCF factor of 0.95-1.05	DGMCF: 1.010	Acceptable
Dry Gas Meter M05498 Acid Gases/VOST Trains	± 1% over the working range DGMCF factor of 0.95-1.05	DGMCF: 0.980 (2 lpm) DGMCF: 0.993 (1 lpm)	Acceptable
Dry Gas Meter # TEAM1 (COE20094) Semi-Volatile Organics Train	± 1% over the working range DGMCF factor of 0.95-1.05	DGMCF: 0.973	Acceptable
Trendicator (COE20092)	±1.5% of actual value	-0.5% to 0%	Acceptable
Trendicator (COE20094)	±1.5% of actual value	-0.8% to 1.4%	Acceptable
Trendicator (A10117) (temperature readout)	±1.5% of actual value	-1.0% to 0%	Acceptable
Digimatic Calipers (B03906)	Calibrated annually to manufacturers specifications		Acceptable

Note: Calibration of the thermocouples, balances and digimatic calipers are performed externally, to manufacturers specifications.

TABLE 2
Clean Harbors Sarnia
Percent Isokineticity Summary

Metals Trains

Test No.	Recommended Acceptable Limits	Average Isokineticity %	Number of Non-Isokinetic Readings	Non-Isokinetic Readings as a Percentage of the Total %	QA/QC Status
1	100 ± 10%	99.7	5	6.3	Acceptable
2	100 ± 10%	97.6	0	0	Acceptable
3	100 ± 10%	96.7	3	3.8	Acceptable

Semi-Volatile Organics Trains

Test No.	Recommended Acceptable Limits	Average Isokineticity %	Number of Non-Isokinetic Readings	Non-Isokinetic Readings as a Percentage of the Total %	QA/QC Status
1	100 ± 10%	100.5	0	0.0	Acceptable
2	100 ± 10%	99.4	0	0	Acceptable
3	100 ± 10%	97.2	1	1.3	Acceptable

TABLE 3
Clean Harbors Sarnia
Manual Sampling Train Leak Check Summary

Test Type	Test No.	Recommended Acceptable Limit	Traverse #1 Leak Checks		Traverse #2 Leak Checks		QA/QC Status
			Initial ft^3	Final ft^3	Initial ft^3	Final ft^3	
Metals Trains	1	$\leq$0.02 scfm or 4% of sampling rate, whichever is less	0.004 @ 16"Hg	0.002 @ 20"Hg	0.006 @ 15"Hg	0.004 @ 15"Hg	Acceptable
	2		0.006 @ 15"Hg	0.008 @ 13"Hg	0.004 @ 13"Hg	0.002 @ 13"Hg	Acceptable
	3		0.006 @ 13"Hg	0.004 @ 12"Hg	0.006 @ 12"Hg	0.004 @ 13"Hg	Acceptable
Semi-Volatile Organics Trains	1	$\leq$0.02 scfm or 4% of sampling rate, whichever is less	0.007 @ 13"Hg	0.005 @ 15"Hg	0.003 @ 12"Hg	0.004 @ 15"Hg	Acceptable
	2		0.003 @ 13"Hg	0.003 @ 13"Hg	0.003 @ 13"Hg	0.001 @ 15"Hg	Acceptable
	3		0.003 @ 13"Hg	0.003 @ 13"Hg	0.003 @ 13"Hg	0.003 @ 15"Hg	Acceptable

TABLE 4
Clean Harbors Sarnia
ORTECH CEM Daily Zero and Calibration Drift Summary

Test No.	Analyzer	Recommended Acceptable Limits	Zero Drift %	Calibration Drift %	QA/QC Status
1	SO_2	± 3% of span	0.95	0.18	Acceptable
	O_2	"	0.20	0.04	Acceptable
	CO_2	"	1.40	0.44	Acceptable
	CO	"	0.16	0.48	Acceptable
	NOx	"	0	0.50	Acceptable
	THC	"	0.05	-1.3	Acceptable
2	SO_2	± 3% of span	0	1.55	Acceptable
	O_2	"	0	0.20	Acceptable
	CO_2	"	0.64	0.56	Acceptable
	CO	"	0.06	0.04	Acceptable
	NOx	"	0	0.40	Acceptable
	THC	"	0	-1.3	Acceptable
3	SO_2	± 3% of span	0	0.50	Acceptable
	O_2	"	0.68	0.20	Acceptable
	CO_2	"	0.36	0.40	Acceptable
	CO	"	0.17	1.12	Acceptable
	NOx	"	0	0.02	Acceptable
	THC	"	-0.12	0.3	Acceptable

TABLE 5
Clean Harbors Sarnia
ORTECH CEM Bias Check Summary

Test No.	Analyzer	Analyzer Range	Recommended Acceptable Limits	Initial System Bias Zero %	Initial System Bias Span %	Final System Bias Zero %	Final System Bias Span %	QA/QC Status
1	SO_2	1000 ppm	± 5% of span	0	-3.26	0.95	-3.44	Acceptable
	O_2	25%	"	1.88	-0.60	1.68	-0.56	Acceptable
	CO_2	25%	"	1.68	-1.00	0.28	-1.44	Acceptable
	CO	500 ppm	"	0.16	-0.26	0	-0.74	Acceptable
	NOx	250 ppm	"	0	-1.28	0	-1.78	Acceptable
	THC	100 ppm	"	-1.0	-1.1	-	-	Acceptable
2	SO_2	1000 ppm	± 5% of span	0	-3.47	0	-1.92	Acceptable
	O_2	25%	"	1.80	-0.28	1.80	-0.48	Acceptable
	CO_2	25%	"	1.36	-0.64	0.72	-1.20	Acceptable
	CO	500 ppm	"	0	0.82	0.06	0.86	Acceptable
	NOx	250 ppm	"	0	-2.72	0	-2.32	Acceptable
	THC	100 ppm	"	-2.5	0.4	-	-	Acceptable
3	SO_2	1000 ppm	± 5% of span	0	-2.58	0	-3.08	Acceptable
	O_2	25%	"	1.36	0	2.04	-0.20	Acceptable
	CO_2	25%	"	0.16	1.56	0.52	1.16	Acceptable
	CO	500 ppm	"	0	-1.52	0.17	-0.40	Acceptable
	NOx	250 ppm	"	0	-2.56	0.00	-2.54	Acceptable
	THC	100 ppm	"	-0.1	-0.9	-	-	Acceptable

APPENDIX 18

Equipment Calibration Data
(10 pages)

ORTECH Consulting Inc.
Pitot Tube Calibration

Date	February 8, 2022
Probe/Pitot ID	S8
MII Number	B03769
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	7.18	0.125	0.175	0.843	0.0039
(0.25")	8.85	0.190	0.260	0.853	0.0058
	10.65	0.275	0.380	0.849	0.0017
	13.00	0.410	0.570	0.846	0.0009
	14.78	0.530	0.740	0.844	0.0027
			Mean	0.847	0.0030

Without Nozzle	7.32	0.130	0.180	0.848	0.0049
	8.85	0.190	0.260	0.853	0.0001
	10.93	0.290	0.400	0.850	0.0033
	13.00	0.410	0.560	0.854	0.0009
	14.64	0.520	0.700	0.860	0.0071
			Mean	0.853	0.0033

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 Consulting Inc.
Pitot Tube Calibration

Date	February 8, 2022
Probe/Pitot ID	SP5
MII Number	COE20109
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	DOUG

$$Cp = Cpstd * \sqrt{\frac{Pstd}{Ps}}$$

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	7.46	0.135	0.190	0.841	0.0015
(0.25")	9.41	0.215	0.300	0.845	0.0022
	11.48	0.320	0.450	0.841	0.0011
	13.62	0.450	0.630	0.843	0.0007
	15.33	0.570	0.800	0.842	0.0003
			Mean	0.843	0.0012

Without Nozzle	7.46	0.135	0.190	0.841	0.0051
	9.30	0.210	0.290	0.849	0.0029
	11.30	0.310	0.430	0.847	0.0010
	13.31	0.430	0.600	0.845	0.0015
	15.05	0.550	0.760	0.849	0.0026
			Mean	0.846	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	Team 2
Meter MII Number	COE 20092
Orifice Set ID	COE20999
Barometer ID	COE 20028

Calibration Conditions		
Barometric Pressure	29.47	in Hg
Theoretical Critical Vacuum	13.9	in Hg
System Leak Check	NDL @ 16"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	0.28	19.300	22.355	71.5	73.5	UR-40	0.2352	73.4	73.4	20.5
10.0	0.55	22.355	26.640	73.5	73.5	UR-48	0.3308	73.4	73.4	19.5
10.0	1.10	26.640	32.500	73.5	74.5	UR-55	0.4520	73.4	73.4	18.0
10.0	1.90	41.250	48.850	74.5	75.0	UR-63	0.5874	73.4	73.4	16.5
10.0	3.60	48.850	59.200	75.0	76.5	UR-73	0.8107	73.4	73.4	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	
2.986	0.299	3.001	0.300	1.005	-0.005	0.300	1.749	-0.063
4.183	0.418	4.221	0.422	1.009	-0.001	0.422	1.736	-0.075
5.723	0.572	5.768	0.577	1.008	-0.003	0.577	1.860	0.048
7.426	0.743	7.495	0.750	1.009	-0.001	0.750	1.902	0.091
10.137	1.014	10.345	1.034	1.020	0.010	1.034	1.892	0.080
			DGMCF	1.010			1.812	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 20092
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	NA	0.0
70	70		0.0
100	100		0.0
200	201		-0.5
250	251		-0.4
300	300		0.0
400	400		0.0
500	500		0.0
600	600		0.0
700	700		0.0
800	800		0.0
900	900		0.0
1000	1000		0.0
1100	1100		0.0
1200	1200		0.0
1250	1250		0.0

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

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 2	Signature	
Manometer MII Number	COE 20092	Reviewed/Accepted By	
Calibrated Against	Omega		
MII Number	B02679		
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	NA	0.304	1.3
0-1.0	0.600	↓	0.601	0.2
	0.900		0.905	0.6
	3.00		3.04	1.3
1.0-10.0	5.90		5.96	1.0
	9.00		9.03	0.3

$$\text{Percent Difference} = \frac{(\text{Ref. Manometer - Instrument Reading})}{\text{Ref. Manometer}} \times 100$$

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)

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	CHRIS [illegible]	

Factors/Conversions		
Std Temp	528	^oR
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	^oF	^oF			^oF	^oF	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	CHRIS BELLOTE

Fluke Calibrator Output (COE 20024) (°F)	Tredicator Display Value		Percent Difference (%)
	Before Adjustment (°F)	After Adjustment (°F)	
32	32	NA	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

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

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	CHRIS RELOPE
Calibrated Against	Dual 3		
MII Number	COE 20008		
Calibration Procedure	03 - J010		

Front Leg

Manometer Scale "H_20	Manometer Reading "H_2O		Reference Manometer Reading "H_2O	Percent Difference %
	Before Adjustment	After Adjustment		
	0.300	N/A	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

$$\text{Percent Difference} = \frac{(\text{Ref. Manometer - Instrument Reading})}{\text{Ref. Manometer}} \times 100$$

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)

ORTECH Environmental

Dry Gas Meter Calibration Data

Calibration Procedure	**03-J004**
Meter Number	**M05498**
Date	**October 25, 2022**
Barometric Pressure	**29.50**
System Leak Check	**NDL @ 22" Hg**

MII NUMBERS	
DGM	**M05498**
Gasometer	**A01463**
Barometer	**COE 20028**

Calibrated By	**Brayden Pacheco**
Signature	
Reviewed and Accepted By	CHRIS BELORE

ft^3= cm* 1.332 litres per cm/28.3168 litres per ft^3

$$\text{DGMCF}= \frac{\text{Vstd ft}^3}{\text{Vdgm ft}^3} \quad \frac{\text{Tdgm }^{\circ}\text{F+460}}{\text{Tstd }^{\circ}\text{F+460}} \quad \frac{\text{Pbar ("Hg)}}{\text{(Pbar "Hg+DGMPressure/13.6)}}$$

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
62.20	40.40	21.80	1.025	21.0	9024.00	9053.50	1.042	22.0	3.0	22.0	0.980	15	2.0
61.20	39.50	21.70	1.021	21.0	9053.50	9083.00	1.042	24.0	3.0	24.0	0.982	15	2.0
62.20	40.60	21.60	1.016	21.0	9083.00	9112.65	1.047	25.0	3.0	25.0	0.976	15	2.0
61.60	50.90	10.70	0.503	21.0	9120.00	9134.45	0.510	25.0	1.5	25.0	0.996	15	1.0
61.20	50.50	10.70	0.503	21.0	9163.10	9177.50	0.509	26.0	1.5	26.0	1.003	15	1.0
62.40	52.00	10.40	0.489	21.0	9148.80	9163.10	0.505	26.0	1.5	26.0	0.982	15	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	0.980
1Lpm	0.993

ORTECH Environmental

Trendicator Calibration

Calibration Procedure	**03-J005**
Trendicator Type	**Nutech**
MII	**M05498**
Date	**October 25, 2022**
Calibrated By	**Brayden Pacheco**
Signature	
Reviewed and Accepted By	CHRIS BELUZE

Fluke Calibrator Output (COE 20024) (°C)	**Tredicator Display Value**		**Percent Difference**
	Before Adjustment (°C)	**After Adjustment (°C)**	**(%)**
0	1	0	0.0
20		20	0.0
50		50	0.0
100		101	-1.0
150		150	0.0
200		200	0.0
300		300	0.0
400		400	0.0
500		500	0.0
600		600	0.0

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

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)

APPENDIX 19

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@ortech.ca

TSS File No.: SR:SA: 110103:22

2022/08/24

Mr. Chris Belore
ORTECH

Dear Mr. Belore:

Re.: Pre-test Plan for source testing to be conducted at Clean Harbors Canada Inc.

We received your pre-test plan letter (Project #22180), dated August 17, 2022, prepared on behalf of Clean Harbors Canada Inc. (Clean Harbors) and referring to source testing to be conducted at their facility in Corunna, Ontario.

Testing is a requirement under amended Environmental Compliance Approval No. 6547-5G5MSP, issued on 2003/01/24.

The report for the 2022 test program will follow the format used for the 2021 report submitted by ORTECH for the Clean Harbors facility.

Source to be tested:

- Liquid Waste Incinerator

Target contaminants:

- Total Suspended Particulate Matter (TSP)
- Metals
- Semi-volatile Organic Compounds (SVOCs)
- Volatile Organic Compounds (VOCs)
- Cyanide
- Halides (HF, HCl, HBr, HI)
- Total organic matter (THC)
- Nitrogen oxides (NOx)
- Sulphur dioxide (SO_2)
- Carbon Monoxide (CO)
- Oxygen (O_2) & Carbon Dioxide (CO_2)

***Reference methods*:**

Stack gas parameters	Ontario Source Testing Code (OSTC) Methods ON-1-ON-4
TSP	OSTC Method ON-5
Metals	US EPA Method 29
SVOCs	Environment Canada EPS/1/RM/2
VOCs	US EPA SW-846 Method 0030
Cyanide	Modified US EPA 40CFR60 Method 26
Halides	US EPA Method 26
THC	US EPA Method 25A
NOx	US EPA Method 7E
SO_2	US EPA Method 6C
CO	US EPA Method 10
O_2 and CO_2	US EPA Method 3A

Testing strategy

In July 2022 Clean Harbors replaced the Incinerator Exhaust Stack. It is ORTECH's understanding that the new stack configuration is identical to the previous stack. ORTECH will verify the stack diameter prior to the testing program.

Operating conditions:

Clean Harbors will ensure that there are consistent feed compositions and injection rates for all the waste feed streams during testing. An optimal batch mixture will be created for the stack testing, the composition of which will depend on the waste available at the time of testing (combined feed of rich, lean and emulsion waste streams not to exceed 245 lpm)

The use of the testing plan and modifications as approved for the 2021 testing is approved for the 2022 source testing program.

Please note that there are two source assessment specialists and either may be assigned to the file. Please include both specialists in your letter or simply address it to source assessment specialist.

We noted the testing schedule for the week of September 13, 2022. If changes in the sampling schedule occur, please notify (via email) both the Sarnia District Office and the Technology Standards Section.

Just a reminder that the source testing report is required to be submitted only in electronic format to the Technology Standards Section; and in electronic and hardcopy formats to the Sarnia District Office.

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)
U. Pancholy- Clean Harbors (pancholy.umashree@cleanharbors.com)
D.Baulcomb- Clean Harbors (baulcomb.david@cleanharbors.com)
N. Does- Sarnia District Office (nicole.does@ontario.ca)
J. McKerrall – MECP TASDB TSS (jeffrey.mckerrall@ontario.ca)
B. Fullerton- TSS (bill.fullerton@ontario.ca)

File AQ-02 (Clean Harbors Canada Inc. - Corunna)

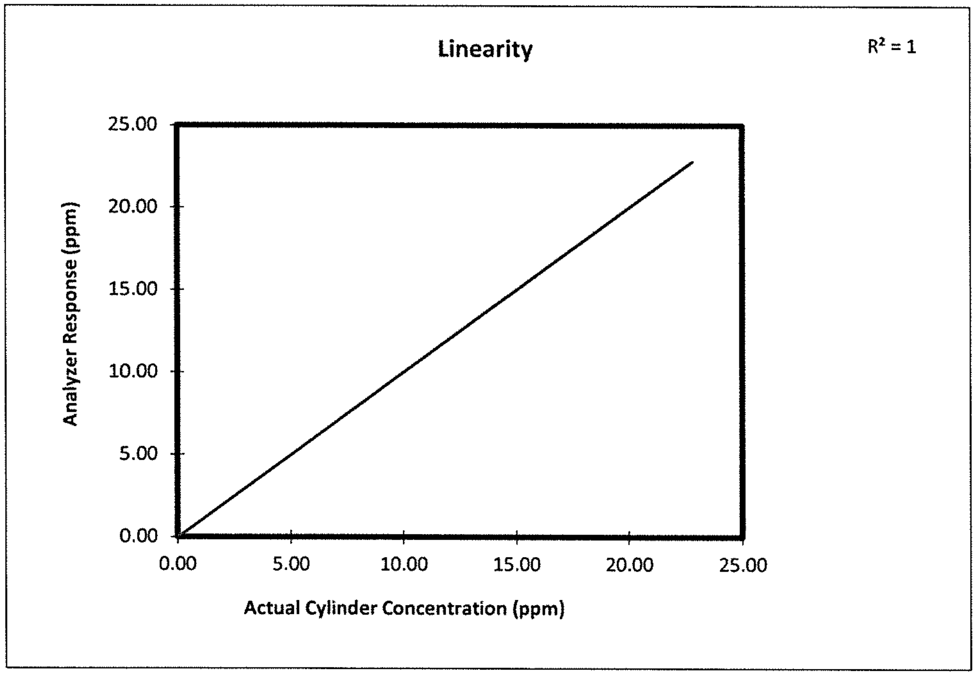
Doc.Mgmt # 5AF080084

APPENDIX 20

ORTECH CEM Linearity Check Data
(14 pages)

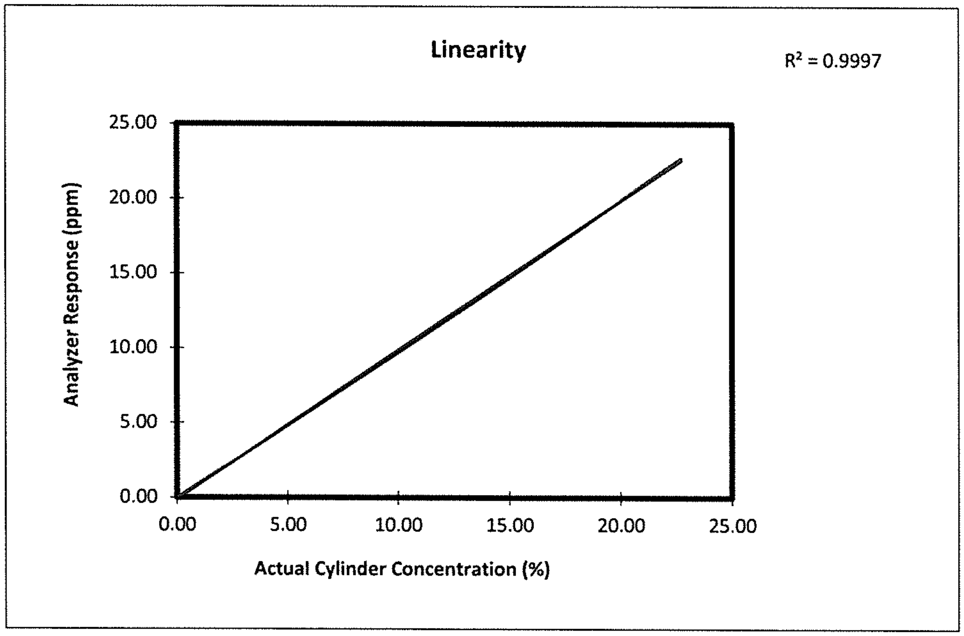
Clean Harbors
November 8, 2022
Analyzer Linearity Determination
Oxygen Analyzer
Siemens Ultramat 23

Range	Analyzer I.D.	Actual Concentration	Instrument Response	Calibration Error (as % of span)
25	COE 20060	0.00	0.00	0.0
		12.59	12.61	0.1
		22.84	22.86	0.1



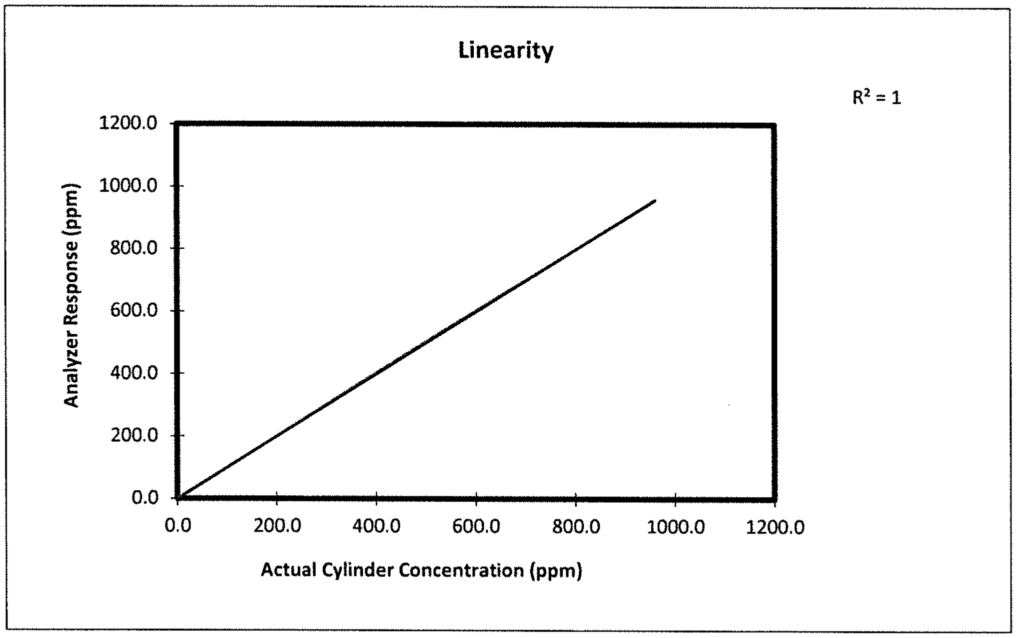
Clean Harbors
November 8, 2022
Analyzer Linearity Determination
Carbon Dioxide Analyzer
Siemens Ultramat 23

Range	Analyzer I.D.	Actual Concentration	Instrument Response	Calibration Error (as % of span)
25	COE 20060	0.00	0.01	0.0
		12.48	12.16	-1.3
		22.71	22.72	0.0



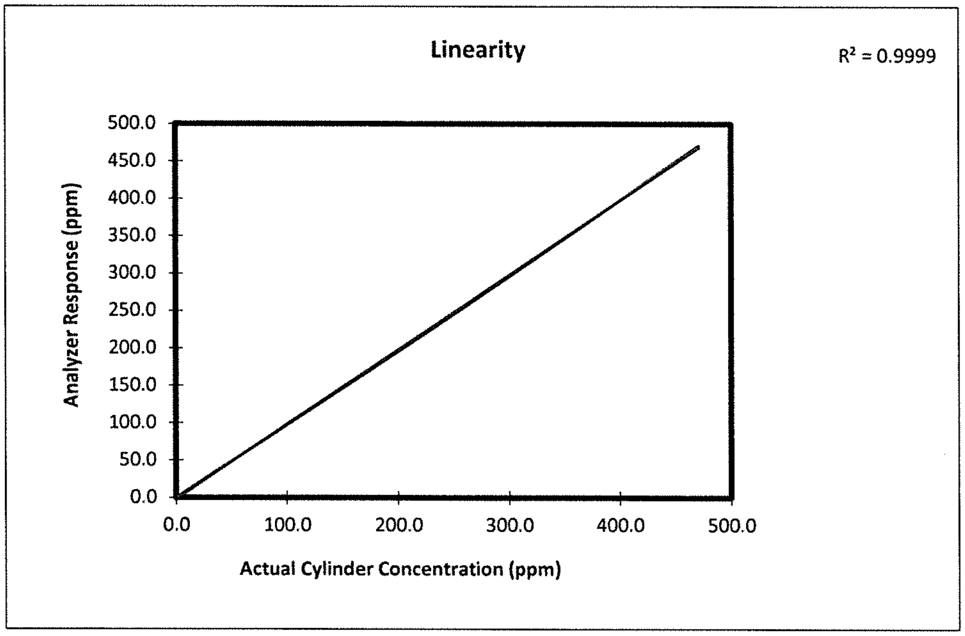
Clean Harbors
November 8, 2022
Analyzer Linearity Determination
Sulphur Dioxide Analyzer
Teledyne API T100H

Range	Analyzer I.D.	Actual Concentration	Instrument Response	Calibration Error (as % of span)
1000	COE 20099	0.0	0.0	0.0
		452.7	455.3	0.3
		960.1	960.0	0.0



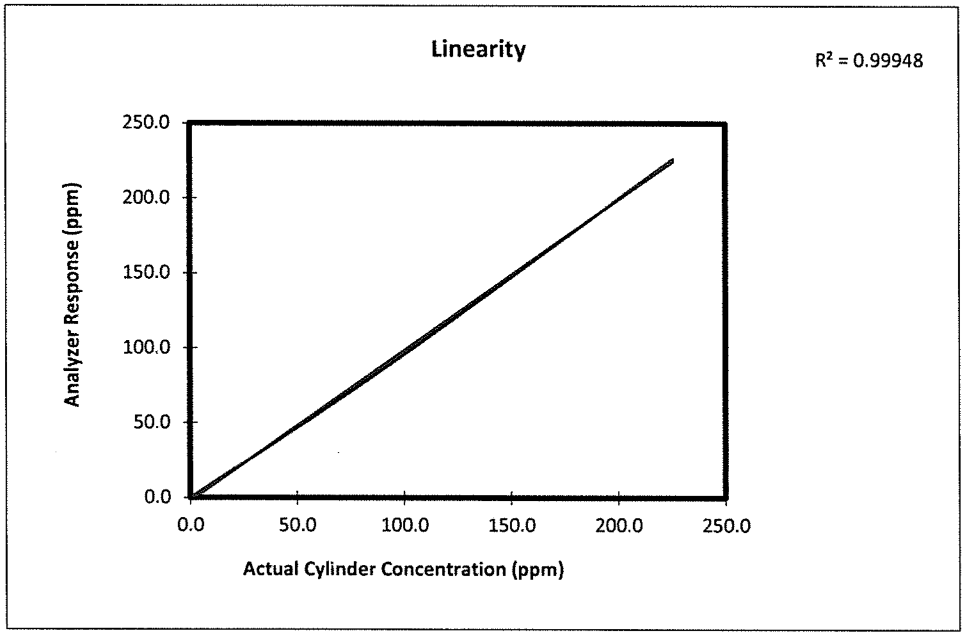
Clean Harbors
November 8, 2022
Analyzer Linearity Determination
Carbon Monoxide Analyzer
Siemens Ultramat 23

Range	Analyzer I.D.	Actual Concentration	Instrument Response	Calibration Error (as % of span)
500	COE 20101	0.0	0.0	0.0
		237.1	233.0	-0.8
		470.8	471.0	0.0



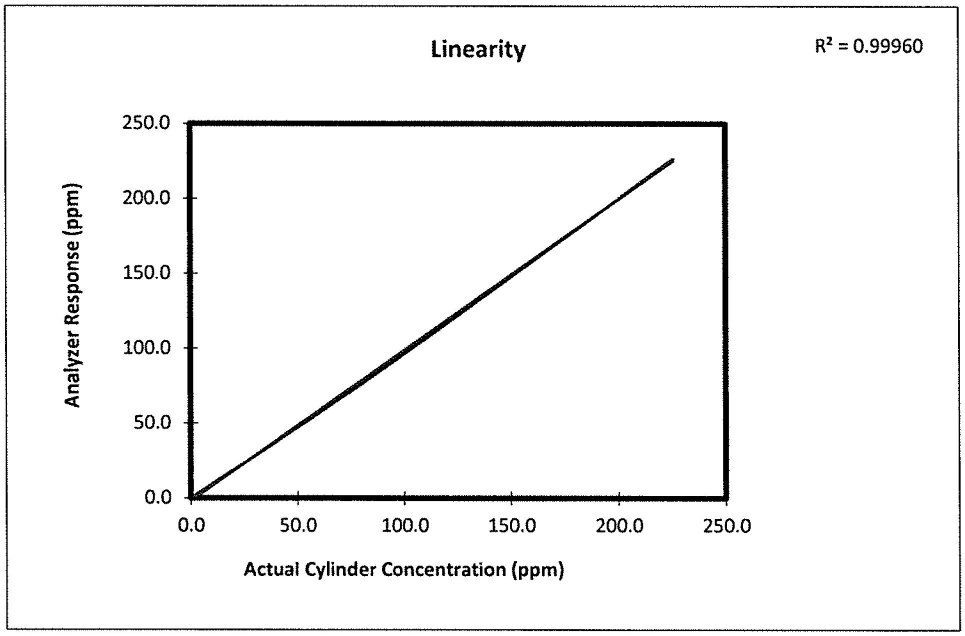
Clean Harbors
November 8, 2022
Analyzer Linearity Determination
Nitric Oxide Analyzer
Teledyne 200EH

Range	Analyzer I.D.	Actual Concentration	Instrument Response	Calibration Error (as % of span)
250	COE 20061	0.0	0.0	0.0
		91.8	87.6	-1.7
		225.6	226.3	0.3



Clean Harbors
November 8, 2022
Analyzer Linearity Determination
Nitrogen Oxides Analyzer
Teledyne 200EH

Range	Analyzer I.D.	Actual Concentration	Instrument Response	Calibration Error (as % of span)
250	COE 20061	0.0	0.0	0.0
		91.8	88.3	-1.4
		225.6	226.7	0.4



Clean Harbors
22180
08-Nov-22
Interference Table

Gas Concentrations	**Analyzer Responses and % Interference**			
	Carbon Dioxide (%)	**Sulphur Dioxide (PPM)**	**Carbon Monoxide (PPM)**	**Nitrogen Oxides (PPM)**
Analyzer ID	Siemens Ultramat 23	Teledyne API T100H	Siemens Ultramat 23	Teledyne 200EH
Analyzer Span	25	1000	500	250
Carbon Dioxide 22.71 %		Analyzer Reading 0.5	Analyzer Reading 0.9	Analyzer Reading 0.4
		% Interference **2.20**	% Interference **3.96**	% Interference 1.76
Sulphur Dioxide 960.1 PPM	Analyzer Reading 0		Analyzer Reading 0.04	Analyzer Reading 0.79
	% Interference **0.00**		% Interference **0.00**	% Interference **0.1**
Carbon Monoxide 470.8 PPM	Analyzer Reading 0.7	Analyzer Reading 1.4		Analyzer Reading 0.5
	% Interference **0.15**	% Interference **0.30**		% Interference **0.11**
Nitrogen Oxides 225.6 PPM	Analyzer Reading 0.7	Analyzer Reading 0.8	Analyzer Reading 0.6	
	% Interference **0.31**	% Interference **0.35**	% Interference **0.27**	
Sum Of Interference	0.46	2.85	4.23	1.95
Difference Percentage	**1.8**	**0.3**	**0.8**	**0.8**
Maximum % Interferenc	2.5%	2.5%	2.5%	2.5%
Analyzer Results	**Pass**	**Pass**	**Pass**	**Pass**

$$\% \text{ Interference} = \frac{\text{Analyzer Response (ppm)}}{\text{Concentration of Gas (ppm)}} \quad \text{X } 100\%$$

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Oxygen
Location	Sarnia, ON	**Analyzer ID.**	Siemens Ultramat 23
Project No.	22180	**Analyzer Span Setting**	25

Span Gas Concentration	22.84

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	46	53
2	46	54
3	46	54

System Response Time* 54 Seconds

Average Time 46 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	22.84
2	22.82
3	22.83
4	22.84
5	22.83
Mean	22.83
Standard Deviation (SD)	0.01
% RSD Criteria <3%	**0.04**

% 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.	22180	**Analyzer Span Setting**	25

Span Gas Concentration	22.71

Response Time Test No.	**Upscale Response Time (seconds)**	**Downscale Response Time (seconds)**
1	50	53
2	51	55
3	51	55

System Response Time* 55 Seconds

Average Time 48 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	22.71
2	22.73
3	22.73
4	22.71
5	22.73
Mean	22.72
Standard Deviation (SD)	0.01
% RSD Criteria <3%	**0.05**

% RSD = SD/Mean X 100

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Sulphur Dioxide
Location	Sarnia, ON	**Analyzer ID.**	Teledyne API T100H
Project No.	22180	**Analyzer Span Setting**	1000

Span Gas Concentration	960.1

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	80	80
2	81	79
3	81	78

System Response Time*	81	Seconds
Average Time	70	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	959.9
2	960
3	959.7
4	959.8
5	960
Mean	960
Standard Deviation (SD)	0.13
% RSD Criteria <3%	**0.01**

% 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.	22180	**Analyzer Span Setting**	500

Span Gas Concentration	470.8

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	41	53
2	44	44
3	40	49

System Response Time*	53	Seconds
Average Time	42	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	470.2
2	470.8
3	470.3
4	470.5
5	470.6
Mean	470
Standard Deviation (SD)	0.24
% RSD Criteria <3%	**0.05**

% RSD = SD/Mean X 100

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Nitric Oxide
Location	Sarnia, ON	**Analyzer ID.**	Teledyne 200EH
Project No.	22180	**Analyzer Span Setting**	226

Span Gas Concentration	225.6

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	60	65
2	62	65
3	62	66

System Response Time* 66 Seconds

Average Time 57 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	225.2
2	225.5
3	225.6
4	225.8
5	225.3
Mean	225
Standard Deviation (SD)	0.24
% RSD Criteria <3%	**0.11**

% RSD = SD/Mean X 100

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Nitrogen Oxides
Location	Sarnia, ON	**Analyzer ID.**	Teledyne 200EH
Project No.	22180	**Analyzer Span Setting**	250

Span Gas Concentration	225.6

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	71	77
2	71	76
3	72	77

System Response Time* 77 Seconds
Average Time 66 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	226.3
2	226.5
3	226.1
4	226.3
5	226.2
Mean	226
Standard Deviation (SD)	0.15
% RSD Criteria <3%	**0.07**

% 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	22180
Date: November 8, 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)

$$\text{Eff}_{NO2} = \frac{\text{Measured Concentration in Direct Mode}}{\text{Manufacturer Certified Concentration of Cal. Gas}} \times 100$$

$$\text{Eff}_{NO2} = \frac{44.76}{48.48} \times 100 = \mathbf{92.3\ \%}$$

Method 7E criteria is >/= 90%

Efficiency Test Result	**Pass**

APPENDIX 21

ORTECH CEM Calibration Data
(6 pages)

Clean Harbors
Mobile Source Monitoring Laboratory # 1
Daily Analyzer Calibration Evaluation
22180
November 8, 2022
Test 1 Final Calculations (Stack)

Analyzer		O2	CO2	SO2	CO	NO	NOx
MII Number/Serial Number		COE 20060	COE 20060	COE 20099	COE 20101	COE 20061	
Model		Siemens Ultramat 23	Siemens Ultramat 23	Teledyne API T100H	Siemens Ultramat 23	Teledyne 200EH	
Range		25	25	1000	500	250	250
Actual Cylinder Value	High	22.84	22.71	960.1	470.8	225.6	225.6
	Mid.	12.59	12.48	452.7	237.1	91.83	91.83
	Zero	0.00	0.00	0	0	0	0

Analyzer Initial Calibration	**Zero**	0.00	0.01	0	0.0	0.0	0.0
	Mid	12.61	12.16	455.3	233.0	87.6	88.3
	High	22.86	22.72	960	471.0	226.3	226.7
System Initial Calibration	**Zero**	0.47	0.43	0	0.8	0.0	0.0
	Upscale	12.46	11.91	422.7	231.7	83.9	85.1
System Final Calibration	**Zero**	0.42	0.08	0.95	0.0	0.0	0.0
	Upscale	12.47	11.80	420.9	229.3	83.0	83.9

Calibration Error Results

Analyzer Calibration Error = (Measured Concentration of Cal Gas in Direct Mode - Manufacturer Certified Cal Gas Concentration)/Analyzer Range)*100

			O2	CO2	SO2	CO	NO	NOx
	Analyzer		**O2**	**CO2**	**SO2**	**CO**	**NO**	**NOx**
	Analyzer Span Range		25.00	25.00	1000	500	250	250
Calibration Error	Zero	%	0.00	0.04	0.00	0.00	0.00	0.00
	Mid	%	0.08	1.28	0.26	0.82	1.69	1.41
	High	%	0.08	0.04	0.01	0.04	0.28	0.44
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 $_{initial}$ |

		O2	CO2	SO2	CO	NO	NOx
	Analyzer	**O2**	**CO2**	**SO2**	**CO**	**NO**	**NOx**
	Span	**25.00**	**25.00**	**1000**	**500**	**250**	**250**
Initial System Bias	Zero	1.88	1.68	0.00	0.16	0.00	0.00
	Upscale	-0.60	-1.00	-3.26	-0.3	-1.5	-1.3
Final System Bias	Zero	1.68	0.28	0.95	0.0	0.0	0.0
	Upscale	-0.56	-1.44	-3.44	-0.7	-1.8	-1.8

System Zero Drift	%	0.20	1.40	0.95	0.16	0.00	0.00
System Cal Drift	%	0.04	0.44	0.18	0.48	0.36	0.50
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**	**1000**	**500**	**250**	**250**
Analyzer Initial	Zero	0.00	0.01	0.00	0.0	0.0	0.0
	Upscale	12.61	12.16	455.30	233.0	87.6	88.3
System Initial	Zero	0.47	0.43	0.00	0.8	0.0	0.0
	Upscale	12.46	11.91	422.70	231.7	83.9	85.1
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	0.42	0.08	0.95	0.0	0.0	0.0
	Upscale	12.47	11.80	420.90	229.3	83.0	83.9

Initial System Bias	Zero	%	1.88	1.68	0.00	0.16	0.00	0.00
	Upscale	%	-0.60	-1.00	-3.26	-0.26	-1.46	-1.28
Final System Bias	Zero	%	1.68	0.28	0.95	0.00	0.00	0.00
	Upscale	%	-0.56	-1.44	-3.44	-0.74	-1.82	-1.78
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
22180
November 9, 2022
Test 2 Final Calculations (Stack)

Analyzer		O2	CO2	SO2	CO	NO	NOx
Mll Number/Serial Number		COE 20060	COE 20060	COE 20099	COE 20101	COE 20061	
Model		Siemens Ultramat 23	Siemens Ultramat 23	Teledyne API T100H	Siemens Ultramat 23	Teledyne 200EH	
Range		25	25	1000	500	250	250
Actual Cylinder Value	High	22.84	22.71	960.1	470.8	225.6	225.6
	Mid.	12.59	12.48	452.7	237.1	91.83	91.83
	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	12.58	12.12	458.8	230.2	89.7	90.3
	High	22.84	22.72	960	470.6	226.4	226.8
System Initial Calibration	**Zero**	0.45	0.34	0	0.0	0.0	0.0
	Upscale	12.51	11.96	424.1	234.3	82.6	83.5
System Final Calibration	**Zero**	0.45	0.18	0	0.3	0.0	0.0
	Upscale	12.46	11.82	439.6	234.5	83.7	84.5

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	1000	500	250	250
Calibration Error	Zero	%		0.00	0.00	0.00	0.00	0.00	0.00
	Mid	%		0.04	1.44	0.61	1.38	0.85	0.61
	High	%		0.00	0.04	0.01	0.04	0.32	0.48
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**	**1000**	**500**	**250**	**250**
Initial System Bias	Zero	1.80	1.36	0.00	0.00	0.00	0.00
	Upscale	-0.28	-0.64	-3.47	0.8	-2.8	-2.7
Final System Bias	Zero	1.80	0.72	0.00	0.1	0.0	0.0
	Upscale	-0.48	-1.20	-1.92	0.9	-2.4	-2.3

System Zero Drift	%	0.00	0.64	0.00	0.06	0.00	0.00
System Cal Drift	%	0.20	0.56	1.55	0.04	0.44	0.40
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**	**1000**	**500**	**250**	**250**
Analyzer Initial	Zero		0.00	0.00	0.00	0.0	0.0	0.0
	Upscale		12.58	12.12	458.80	230.2	89.7	90.3
System Initial	Zero		0.45	0.34	0.00	0.0	0.0	0.0
	Upscale		12.51	11.96	424.10	234.3	82.6	83.5
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		0.45	0.18	0.00	0.3	0.0	0.0
	Upscale		12.46	11.82	439.60	234.5	83.7	84.5
Initial System Bias	Zero	%	1.80	1.36	0.00	0.00	0.00	0.00
	Upscale	%	-0.28	-0.64	-3.47	0.82	-2.84	-2.72
Final System Bias	Zero	%	1.80	0.72	0.00	0.06	0.00	0.00
	Upscale	%	-0.48	-1.20	-1.92	0.86	-2.40	-2.32
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
22180
November 10, 2022
Test 3 Final Calculations (Stack)

Analyzer		O2	CO2	SO2	CO	NO	NOx
MII Number/Serial Number		COE 20060	COE 20060	COE 20099	COE 20101	COE 20061	
Model		Siemens Ultramat 23	Siemens Ultramat 23	Teledyne API T100H	Siemens Ultramat 23	Teledyne 200EH	
Range		25	25	1000	500	250	250
Actual Cylinder Value	High	22.84	22.71	960.1	470.8	225.6	225.6
	Mid.	12.59	12.48	452.7	237.1	91.83	91.83
	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	12.57	12.14	454.1	232.1	89.4	90.7
	High	22.87	22.73	960.3	471.1	225.7	226.4
System Initial Calibration	**Zero**	0.34	0.04	0	0.0	0.0	0.0
	Upscale	12.57	12.53	428.3	224.5	83.5	84.3
System Final Calibration	**Zero**	0.51	0.13	0	0.9	0.0	0.0
	Upscale	12.52	12.43	423.3	230.1	83.2	84.4

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	1000	500	250	250
Calibration Error	Zero	%	0.00	0.00	0.00	0.00	0.00	0.00
	Mid	%	0.08	1.36	0.14	1.00	0.97	0.45
	High	%	0.12	0.08	0.02	0.06	0.04	0.32
Acceptable Limits	**of Span**		+-2%	+-2%	+-2%	+-2%	+-2%	+-2%
Error Results			PASS	PASS	PASS	PASS	PASS	PASS

System Drift

Drift Calculation = $| \text{System Bias}_{final} - \text{System Bias}_{initial} |$

	Analyzer	O2	CO2	SO2	CO	NO	NOx
	Span	25.00	25.00	1000	500	250	250
Initial System Bias	Zero	1.36	0.16	0.00	0.00	0.00	0.00
	Upscale	0.00	1.56	-2.58	-1.5	-2.4	-2.6
Final System Bias	Zero	2.04	0.52	0.00	0.2	0.0	0.0
	Upscale	-0.20	1.16	-3.08	-0.4	-2.5	-2.5

System Zero Drift	%	0.68	0.36	0.00	0.17	0.00	0.00
System Cal Drift	%	0.20	0.40	0.50	1.12	0.12	0.02
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	1000	500	250	250
Analyzer Initial	Zero	0.00	0.00	0.00	0.0	0.0	0.0
	Upscale	12.57	12.14	454.10	232.1	89.4	90.7
System Initial	Zero	0.34	0.04	0.00	0.0	0.0	0.0
	Upscale	12.57	12.53	428.30	224.5	83.5	84.3
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	0.51	0.13	0.00	0.9	0.0	0.0
	Upscale	12.52	12.43	423.30	230.1	83.2	84.4

Initial System Bias	Zero	%	1.36	0.16	0.00	0.00	0.00	0.00
	Upscale	%	0.00	1.56	-2.58	-1.52	-2.36	-2.56
Final System Bias	Zero	%	2.04	0.52	0.00	0.17	0.00	0.00
	Upscale	%	-0.20	1.16	-3.08	-0.40	-2.48	-2.54
Acceptable Limits	**of Span**		+ - 5 %	+ - 5 %	+ - 5 %	+ - 5 %	+ - 5 %	+ - 5 %
Bias Results			PASS	PASS	PASS	PASS	PASS	PASS

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22180	Date:	November 8, 2022
Company:	Clean Harbors	Operator:	T, Timar
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	0.27 B1	0.996 C		
High	90.3 A2	90.24 B2			
Mid	51.9 A4	51.18 B4		51.7 D4	-1.0 E4
Low	30.6 A3	30.15 B3		30.5 D3	-1.1 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	0.27	0.22	0.05
Mid	30.15	31.4	-1.3

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	43		43
Run 2	44		45
Run 3	43		41
Average	**43**		**43**

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22180	Date:	November 9, 2022
Company:	Clean Harbors	Operator:	T, Timar
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 B1	1.010 C		
High	90.3 A2	91.2 B2			
Mid	51.9 A4	51.1 B4		52.4 D4	-2.5 E4
Low	30.6 A3	31.03 B3		30.9 D3	0.4 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	31.03	32.3	-1.3

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	43		43
Run 2	44		45
Run 3	43		41
Average	**43**		**43**

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22180	Date:	November 10, 2022
Company:	Clean Harbors	Operator:	T, Timar
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	0.7 B1	0.991 C		
High	90.3 A2	90.22 B2			
Mid	51.9 A4	51.4 B4		51.5 D4	-0.1 E4
Low	30.6 A3	30.07 B3		30.3 D3	-0.9 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	0.7	0.82	-0.12
Mid	30.07	29.8	0.3

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	43		43
Run 2	44		45
Run 3	43		41
Average	**43**		**43**

APPENDIX 22

Particulate and Metals Test Emission Calculations
(12 pages)

ORTECH Consulting Inc.

Plant:	Clean Harbors
Plant Location:	Corunna, ON
Test Location:	Incinerator Exhaust Stack
Test No.:	1 - Particulate & Metals
Date:	November 8, 2022

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.847
DGM CORRECTION FACTOR	1.01
NOZZLE DIAMETER	6.37 mm
DRY REF GAS VOLUME SAMPLED	4.625 m^3
AVGERGE ISOKINETICITY	99.7 %
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	192.2 °C
AVERAGE GAS MOISTURE BY VOLUME	47.4 %
AVERAGE GAS VELOCITY	29.80 m/s
BAROMETRIC PRESSURE (Station)	101.795 Kpa
STATIC PRESSURE	0.164 Kpa
ABSOLUTE GAS PRESSURE	101.959 Kpa
OXYGEN CONCENTRATION	9.7 %
CARBON DIOXIDE CONCENTRATION	7.80 %
CARBON MONOXIDE CONCENTRATION	33.9 ppm

FLOWRATE

ACTUAL GAS FLOWRATE	50.80 m^3/s
DRY REF GAS FLOWRATE	17.23 Rm^3/s
DRY ADJ GAS FLOWRATE	19.49 Rm^3/s
WET REF GAS FLOWRATE	32.76 Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	1.1 mg
	-FILTER	0.1 mg
	-TOTAL	1.2 mg
DRY REF GAS VOLUME SAMPLED		4.625 m^3
PARTICULATE CONC. - ACTUAL		0.088 mg/m^3
PARTICULATE CONC. - DRY REF		0.259 mg/m^3
PARTICULATE CONC. - DRY ADJ		0.229 mg/m^3
PARTICULATE CONC. - WET REF		0.137 mg/m^3
PARTICULATE EMISSION RATE		0.004471 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 Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	1 - Particulate & Metals	**Test Location:**	Incinerator Exhaust Stack
Date:	November 8, 2022	**Operator:**	AP

Pitot Factor	0.847	**Filter (mg)**	0.1
DGMCF	1.01	**Probe (mg)**	1.1
Barometric Pressure	30.06 "Hg	**CWTR (g)**	3031.6
Static Pressure	0.660 "H_2O	**WCBDA (g)**	30.4
Nozzle	0.2508 inches		
Stack Diameter	4.833 ft	**Leak Check Volume**	1.35 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%	9.7
CO2%	7.80
COppm	33.9

Measured H2O
47.4 %

				Temperatures								
Point	**Time**	**DGM Reading**	**ΔP "H2O**	**Stack °F**	**Imp. Out °F**	**DGM Out °F**	**DGM In °F**	**ΔH "H2O**	**Vacuum "Hg**	**Leak Check Volume**	**Velocity m/s**	**Isokinetic %**
1	0	136.91	0.98	379	48	62	65	0.9	3.0		23.41	
	3	138.85	0.97	380	45	64	66	0.91	2.5		23.30	**125.9**
	6	140.04	0.98	379	45	64	66	0.89	2.5		23.41	**77.5**
	9	141.61	1	379	44	64	66	0.93	2.5		23.65	**101.6**
2	12	143.09	1	378	44	65	66	0.91	2.5		23.63	**94.9**
	15	144.76	0.96	378	44	65	66	0.92	2.5		23.16	**106.9**
	18	146.30	1	378	44	65	66	0.87	2.5		23.63	**100.6**
	21	147.88	0.98	378	44	66	67	0.89	2.5		23.40	**101.1**
3	24	149.47	1	377	45	65	68	0.82	2.0		23.62	**102.6**
	27	150.93	1.1	377	44	65	68	0.9	2.0		24.77	**93.2**
	30	152.60	1	377	44	66	68	1	2.0		23.62	**101.6**
	33	154.13	1	378	45	70	68	1	2.0		23.63	**97.6**
4	36	155.92	1.7	378	46	66	69	0.84	2.0		30.81	**113.8**
	39	157.85	1.3	378	46	66	70	1.3	2.0		26.95	**94.3**
	42	159.68	1.5	380	46	67	71	1.4	2.0		28.98	**102.3**
	45	161.54	1.2	380	46	67	72	1.3	2.0		25.92	**96.8**
5	48	163.43	1.8	380	47	67	72	1.2	2.0		31.75	**109.8**
	51	165.44	1.8	380	46	67	72	1.6	4.5		31.75	**95.3**
	54	167.55	1.9	380	46	68	71	1.7	4.5		32.62	**100.2**
	57	169.68	1.9	380	46	68	73	1.7	4.5		32.62	**98.4**
6	60	171.84	2	380	46	68	73	1.8	4.5		33.46	**99.6**
	63	174.04	2	379	42	68	73	1.8	4.5		33.44	**98.9**
	66	176.23	1.9	378	41	69	73	1.7	4.5		32.58	**98.4**
	69	178.48	2.1	378	41	68	73	1.7	4.5		34.25	**103.6**
7	72	180.68	2	378	41	68	73	1.8	4.5		33.42	**96.4**
	75	182.80	1.9	377	41	69	74	1.8	4.5		32.56	**95.2**
	78	185.02	2	378	42	70	74	1.7	4.5		33.42	**102.1**
	81	187.20	2	378	43	70	74	1.8	4.5		33.42	**97.6**
8	84	189.39	1.9	376	42	70	74	1.8	5.0		32.54	**98.1**
	87	191.57	2	376	42	70	74	1.7	5.0		33.38	**100.1**
	90	193.77	1.9	376	43	70	74	1.7	4.5		32.54	**98.4**
	93	195.93	1.8	375	45	70	74	1.6	4.5		31.65	**99.1**
9	96	198.04	1.9	375	45	70	74	1.6	4.5		32.52	**99.4**
	99	200.16	1.9	376	45	70	71	1.6	4.5		32.54	**97.2**

Plant: Clean Harbors
Test No.: 1 - Particulate & Metals
Date: November 8, 2022

Plant Location: Corunna, ON
Test Location: Incinerator Exhaust Stack
Operator: AP

Pitot Factor 0.847
DGMCF 1.01
Barometric Pressure 30.06 "Hg
Static Pressure 0.660 "H_2O
Nozzle 0.2508 inches
Stack Diameter 4.833 ft
Length 0.000 ft
Width 0.000 ft

Filter (mg) 0.1
Probe (mg) 1.1
CWTR (g) 3031.6
WCBDA (g) 30.4

Leak Check Volume 1.35 ft^3
Reading Interval 3 minutes
Number of Ports 2
Number of points / Port 10

Combustion Gases	
O2%	9.7
CO2%	7.80
COppm	33.9

Measured H2O
47.4 %

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 %
	102	202.25	1.8	376	50	71	75	1.7	4.5		31.67	**96.2**
	105	204.39	2	377	50	71	74	1.7	4.5		33.40	**100.7**
10	108	206.54	1.9	376	52	71	74	1.8	4.5		32.54	**96.1**
	111	208.79	1.85	375	55	71	74	1.6	4.5		32.09	**103.2**
	114	210.89	1.9	375	55	71	74	1.6	4.5		32.52	**97.5**
	117	213.07	1.8	375	55	71	74	1.6	4.5		31.65	**99.9**
	120	214.94								1.35		**88.0**
1	0	216.29	1	374	65	73	75	0.98	3.5		23.58	
	3	217.88	0.97	374	51	73	75	0.95	3.5		23.22	**99.9**
	6	219.50	1	376	49	73	74	0.93	3.5		23.61	**103.3**
	9	221.09	1.1	375	48	74	74	0.92	3.5		24.74	**100.1**
2	12	222.69	1.4	377	48	74	75	0.92	3.5		27.95	**95.9**
	15	224.42	1	376	49	74	74	1.4	4.0		23.61	**91.9**
	18	226.15	1	376	49	74	74	0.96	4.0		23.61	**108.9**
	21	227.82	1.2	376	49	74	74	0.96	4.0		25.86	**105.0**
3	24	229.55	1.2	376	51	74	77	1.2	4.0		25.86	**99.3**
	27	231.38	1.6	377	53	75	78	1.1	4.0		29.88	**104.8**
	30	233.36	1.7	377	53	75	78	1.5	4.0		30.80	**98.1**
	33	235.39	1.6	377	53	75	78	1.5	4.0		29.88	**97.7**
4	36	237.41	1.4	378	53	75	74	1.5	4.5		27.96	**100.2**
	39	239.42	1.4	376	53	74	75	1.3	4.5		27.93	**107.0**
	42	241.30	1.7	376	53	74	74	1.2	4.5		30.78	**99.9**
	45	243.18	1.6	376	53	74	74	1.3	4.5		29.86	**90.7**
5	48	245.19	1.6	376	53	74	74	1.5	4.5		29.86	**100.0**
	51	247.22	1.5	376	53	74	75	1.4	4.5		28.91	**101.1**
	54	249.21	1.6	376	53	74	75	1.4	4.5		29.86	**102.2**
	57	251.23	1.9	376	53	74	75	1.8	4.5		32.54	**100.5**
6	60	253.34	1.9	377	53	74	75	1.8	4.5		32.56	**96.4**
	63	255.53	1.9	377	51	77	79	1.8	4.5		32.56	**100.1**
	66	257.61	2	377	51	77	79	1.8	4.5		33.40	**94.5**
	69	259.79	2	377	51	77	78	1.9	4.5		33.40	**96.5**
7	72	262.42	2.2	378	52	75	78	1.9	4.5		35.05	**116.5**
	75	264.68	2.1	378	52	75	78	2	5.0		34.25	**95.7**
	78	267.01	2	378	52	75	78	1.8	5.0		33.42	**101.0**

Plant: Clean Harbors
Test No.: 1 - Particulate & Metals
Date: November 8, 2022

Plant Location: Corunna, ON
Test Location: Incinerator Exhaust Stack
Operator: AP

Pitot Factor	0.847	**Filter (mg)**	0.1
DGMCF	1.01	**Probe (mg)**	1.1
Barometric Pressure	30.06 "Hg	**CWTR (g)**	3031.6
Static Pressure	0.660 "H_2O	**WCBDA (g)**	30.4
Nozzle	0.2508 inches		
Stack Diameter	4.833 ft	**Leak Check Volume**	1.35 ft³
Length	0.000 ft	**Reading Interval**	3 minutes
Width	0.000 ft	**Number of Ports**	2
		Number of points / Port	10

Combustion Gases	
O2%	9.7
CO2%	7.80
COppm	33.9

Measured H2O
47.4 %

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 %**
	81	269.19	2.1	376	52	77	78	1.9	5.0		34.21	**96.8**
8	84	271.46	2.1	380	52	77	78	1.9	5.0		34.29	**98.1**
	87	273.73	1.9	381	52	77	79	1.8	5.0		32.64	**98.3**
	90	275.94	1.9	381	52	76	79	1.8	5.0		32.64	**100.6**
	93	278.17	1.8	381	51	76	79	1.7	5.0		31.77	**101.6**
9	96	280.32	1.8	384	51	76	77	1.6	5.0		31.82	**100.6**
	99	282.44	1.7	383	51	76	77	1.5	5.0		30.91	**99.6**
	102	284.51	1.7	383	51	76	77	1.5	5.0		30.91	**99.9**
	105	286.54	1.8	385	51	76	77	1.7	5.0		31.84	**98.0**
10	108	288.66	2	385	53	76	77	1.8	5.0		33.56	**99.6**
	111	290.87	1.9	384	53	76	77	1.8	5.0		32.69	**98.6**
	114	293.06	1.7	382	49	76	78	1.6	5.0		30.89	**100.1**
	117	295.18	1.7	382	50	76	78	1.5	4.5		30.89	**102.2**
	120	297.22										**98.3**

ORTECH Consulting Inc.

Plant:	Clean Harbors
Plant Location:	Corunna, ON
Test Location:	Incinerator Exhaust Stack
Test No.:	2 - Particulate & Metals
Date:	November 9, 2022

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.847
DGM CORRECTION FACTOR	1.01
NOZZLE DIAMETER	6.37 mm
DRY REF GAS VOLUME SAMPLED	4.679 m^3
AVGERGE ISOKINETICITY	97.6 %
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	191.8 °C
AVERAGE GAS MOISTURE BY VOLUME	46.8 %
AVERAGE GAS VELOCITY	30.63 m/s
BAROMETRIC PRESSURE (Station)	100.982 Kpa
STATIC PRESSURE	0.179 Kpa
ABSOLUTE GAS PRESSURE	101.161 Kpa
OXYGEN CONCENTRATION	9.94 %
CARBON DIOXIDE CONCENTRATION	7.56 %
CARBON MONOXIDE CONCENTRATION	69.6 ppm

FLOWRATE

ACTUAL GAS FLOWRATE	52.21 m^3/s
DRY REF GAS FLOWRATE	17.79 Rm^3/s
DRY ADJ GAS FLOWRATE	19.70 Rm^3/s
WET REF GAS FLOWRATE	33.43 Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0.9 mg
	-FILTER	0.2 mg
	-TOTAL	1.1 mg
DRY REF GAS VOLUME SAMPLED		4.679 m^3
PARTICULATE CONC. - ACTUAL		0.080 mg/m^3
PARTICULATE CONC. - DRY REF		0.235 mg/m^3
PARTICULATE CONC. - DRY ADJ		0.212 mg/m^3
PARTICULATE CONC. - WET REF		0.125 mg/m^3
PARTICULATE EMISSION RATE		0.004184 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

Plant: Clean Harbors
Test No.: 2 - Particulate & Metals
Date: November 9, 2022

Plant Location: Corunna, ON
Test Location: Incinerator Exhaust Stack
Operator: AP

Pitot Factor	0.847	
DGMCF	1.01	
Barometric Pressure	29.82	"Hg
Static Pressure	0.720	"H_2O
Nozzle	0.2508	inches
Stack Diameter	4.833	ft
Length	0.000	ft
Width	0.000	ft

Filter (mg)	0.2	
Probe (mg)	0.9	
CWTR (g)	2991	
WCBDA (g)	29.6	
Leak Check Volume	0.58	ft^3
Reading Interval	3	minutes
Number of Ports	2	
Number of points / Port	10	

Combustion Gases	
O2%	9.94
CO2%	7.56
COppm	69.6

Measured H2O
46.8 %

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	298.57	1.4	380	40	61	63	1.3	2.5		28.07	
	3	300.42	1.3	382	40	61	63	1.2	2.5		27.08	**99.5**
	6	302.19	1.4	381	40	61	62	1.2	2.5		28.09	**98.8**
	9	303.98	1.4	381	40	61	62	1.2	2.5		28.09	**96.4**
2	12	305.77	1.5	382	40	61	62	1.3	2.5		29.09	**96.4**
	15	307.65	1.5	383	40	61	62	1.3	2.5		29.11	**97.9**
	18	309.50	1.5	384	40	61	64	1.3	2.5		29.13	**96.4**
	21	311.38	1.4	386	40	61	64	1.2	2.5		28.17	**97.8**
3	24	313.18	1.4	384	41	61	64	1.2	2.5		28.14	**97.0**
	27	314.98	1.5	382	41	62	65	1.3	2.5		29.09	**96.9**
	30	316.86	1.6	380	41	62	65	1.4	2.5		30.01	**97.5**
	33	318.81	1.5	378	41	62	65	1.4	2.5		29.02	**97.8**
4	36	320.73	1.6	378	41	62	65	1.4	2.5		29.98	**99.3**
	39	322.68	1.6	378	42	63	67	1.4	2.5		29.98	**97.7**
	42	324.66	1.6	377	42	63	67	1.4	2.5		29.96	**98.9**
	45	326.57	1.7	377	40	63	68	1.5	2.5		30.88	**95.4**
5	48	328.57	1.7	376	40	63	68	1.5	2.5		30.86	**96.8**
	51	330.58	1.7	375	39	63	68	1.5	3.0		30.84	**97.2**
	54	332.58	1.7	376	39	63	68	1.5	3.0		30.86	**96.7**
	57	334.59	1.7	376	39	63	68	1.5	3.0		30.86	**97.2**
6	60	336.60	1.8	376	39	63	68	1.6	3.0		31.76	**97.2**
	63	338.67	1.8	379	39	64	69	1.6	3.0		31.81	**97.3**
	66	340.70	2	379	39	64	69	1.7	3.0		33.53	**95.4**
	69	342.85	1.9	379	39	64	69	1.7	3.0		32.69	**95.9**
7	72	345.03	1.8	381	38	64	70	1.6	3.0		31.85	**99.8**
	75	347.12	1.8	382	38	64	70	1.6	3.5		31.87	**98.3**
	78	349.17	1.8	382	38	64	70	1.6	3.5		31.87	**96.5**
	81	351.23	2.1	382	38	64	70	1.9	3.5		34.42	**96.9**
8	84	353.45	1.9	383	38	63	70	1.6	3.5		32.76	**96.8**
	87	355.57	1.7	383	38	63	70	1.5	3.5		30.99	**97.2**
	90	357.60	1.9	382	39	63	70	1.6	3.5		32.74	**98.4**
	93	359.67	1.7	381	39	63	70	1.6	3.5		30.95	**94.9**
9	96	361.74	1.9	381	39	63	71	1.6	3.5		32.72	**100.3**
	99	363.83	1.7	381	39	63	71	1.6	3.5		30.95	**95.7**

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	2 - Particulate & Metals	**Test Location:**	Incinerator Exhaust Stack
Date:	November 9, 2022	**Operator:**	AP

Pitot Factor	0.847	
DGMCF	1.01	
Barometric Pressure	29.82	"Hg
Static Pressure	0.720	"H_2O
Nozzle	0.2508	inches
Stack Diameter	4.833	ft
Length	0.000	ft
Width	0.000	ft

Filter (mg)	0.2	
Probe (mg)	0.9	
CWTR (g)	2991	
WCBDA (g)	29.6	
Leak Check Volume	0.58	ft³
Reading Interval	3	minutes
Number of Ports	2	
Number of points / Port	10	

Combustion Gases	
O2%	9.94
CO2%	7.56
COppm	69.6

Measured H2O
46.8 %

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 %**
	102	365.90	1.9	380	39	63	71	1.7	3.5		32.71	**100.2**
	105	368.03	1.7	380	40	64	71	1.6	3.5		30.94	**97.5**
10	108	370.08	1.7	379	40	64	69	1.5	3.5		30.92	**99.0**
	111	372.12	2	378	40	64	69	1.7	3.5		33.51	**98.7**
	114	374.27	1.7	379	44	64	71	1.6	3.5		30.92	**95.9**
	117	376.33	1.8	377	44	64	71	1.6	3.5		31.78	**99.5**
	120	378.41								0.58		**97.5**
1	0	378.99	1.4	379	50	67	68	1.3	3.5		28.06	
	3	380.81	1.4	379	42	67	68	1.3	3.5		28.06	**96.8**
	6	382.66	1.4	378	42	67	68	1.2	3.5		28.04	**98.4**
	9	384.45	1.3	378	42	67	68	1.3	3.5		27.02	**95.1**
2	12	386.31	1.3	377	42	67	68	1.1	3.5		27.00	**102.6**
	15	388.06	1.3	376	42	67	68	1.2	3.5		26.99	**96.4**
	18	389.82	1.3	374	44	67	70	1.2	3.5		26.96	**96.9**
	21	391.58	1.3	374	44	67	70	1.2	3.5		26.96	**96.6**
3	24	393.34	1.3	374	44	67	70	1.2	3.5		26.96	**96.6**
	27	395.11	1.2	372	44	68	72	1.1	3.5		25.87	**97.2**
	30	396.82	1	374	44	68	72	0.95	3.0		23.64	**97.3**
	33	398.44	1.4	373	44	68	73	1.4	3.0		27.96	**101.0**
4	36	400.30	1.4	372	44	68	73	1.3	3.0		27.94	**98.0**
	39	402.18	1.3	372	44	68	73	1.2	3.0		26.92	**99.0**
	42	403.95	1.5	370	44	68	73	1.4	3.0		28.89	**96.7**
	45	405.86	1.5	370	43	69	73	1.3	3.0		28.89	**97.1**
5	48	407.77	1.5	370	44	68	73	1.3	3.0		28.89	**96.9**
	51	409.67	1.7	371	44	68	73	1.5	3.0		30.77	**96.5**
	54	411.70	1.6	372	44	68	74	1.5	3.5		29.87	**97.0**
	57	413.70	2	374	44	69	75	1.8	3.5		33.43	**98.4**
6	60	415.89	2	377	46	70	75	1.8	3.5		33.49	**96.4**
	63	418.08	1.8	374	46	70	75	1.7	4.0		31.72	**96.5**
	66	420.23	2.1	374	47	70	75	1.9	4.0		34.26	**99.7**
	69	422.50	2.1	369	47	70	75	1.9	4.0		34.16	**97.5**
7	72	424.77	2.1	369	47	71	76	1.9	4.0		34.16	**97.2**
	75	427.05	2	371	47	71	76	1.8	4.0		33.37	**97.4**
	78	429.38	2.1	372	47	71	76	1.8	4.0		34.22	**102.1**

Plant: Clean Harbors
Test No.: 2 - Particulate & Metals
Date: November 9, 2022

Plant Location: Corunna, ON
Test Location: Incinerator Exhaust Stack
Operator: AP

Pitot Factor 0.847
DGMCF 1.01
Barometric Pressure 29.82 "Hg
Static Pressure 0.720 "H_2O
Nozzle 0.2508 inches
Stack Diameter 4.833 ft
Length 0.000 ft
Width 0.000 ft

Filter (mg) 0.2
Probe (mg) 0.9
CWTR (g) 2991
WCBDA (g) 29.6

Leak Check Volume 0.58 ft^3
Reading Interval 3 minutes
Number of Ports 2
Number of points / Port 10

Combustion Gases	
O2%	9.94
CO2%	7.56
COppm	69.6

Measured H2O
46.8 %

				Temperatures								
Point	Time	DGM Reading	ΔP "H2O	Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	81	431.53	1.9	375	47	71	76	1.9	4.0		32.61	**92.0**
8	84	433.78	1.9	375	47	71	76	1.7	4.0		32.61	**101.4**
	87	435.96	2.1	376	47	71	76	1.8	4.0		34.30	**98.2**
	90	438.20	1.9	377	47	71	75	1.7	4.0		32.65	**96.1**
	93	440.38	2	376	46	71	75	1.8	4.0		33.47	**98.4**
9	96	442.52	1.8	376	47	70	75	1.7	4.0		31.76	**94.2**
	99	444.72	1.9	376	47	70	75	1.7	4.0		32.63	**102.1**
	102	446.86	2.1	377	47	70	75	1.9	4.0		34.32	**96.7**
	105	449.13	1.9	377	47	70	75	1.7	4.0		32.65	**97.6**
10	108	451.30	1.9	377	47	70	75	1.7	4.0		32.65	**98.1**
	111	453.46	1.9	377	47	70	75	1.7	4.0		32.65	**97.6**
	114	455.60	1.9	377	47	70	75	1.7	4.0		32.65	**96.7**
	117	457.73	1.8	377	47	70	75	1.7	4.0		31.78	**96.3**
	120	459.86										**98.9**

ORTECH Consulting Inc.

Plant:	Clean Harbors
Plant Location:	Corunna, ON
Test Location:	Incinerator Exhaust Stack
Test No.:	3 - Particulate & Metals
Date:	November 10, 2022

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.847
DGM CORRECTION FACTOR	1.01
NOZZLE DIAMETER	6.37 mm
DRY REF GAS VOLUME SAMPLED	4.372 m^3
AVGERGE ISOKINETICITY	96.7 %
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	186.9 °C
AVERAGE GAS MOISTURE BY VOLUME	46.3 %
AVERAGE GAS VELOCITY	28.71 m/s
BAROMETRIC PRESSURE (Station)	99.763 Kpa
STATIC PRESSURE	0.179 Kpa
ABSOLUTE GAS PRESSURE	99.942 Kpa
OXYGEN CONCENTRATION	10.36 %
CARBON DIOXIDE CONCENTRATION	7.82 %
CARBON MONOXIDE CONCENTRATION	64.9 ppm

FLOWRATE

ACTUAL GAS FLOWRATE	48.93 m^3/s
DRY REF GAS FLOWRATE	16.78 Rm^3/s
DRY ADJ GAS FLOWRATE	17.87 Rm^3/s
WET REF GAS FLOWRATE	31.29 Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	1.6 mg
	-FILTER	0.1 mg
	-TOTAL	1.7 mg
DRY REF GAS VOLUME SAMPLED		4.372 m^3
PARTICULATE CONC. - ACTUAL		0.133 mg/m^3
PARTICULATE CONC. - DRY REF		0.389 mg/m^3
PARTICULATE CONC. - DRY ADJ		0.365 mg/m^3
PARTICULATE CONC. - WET REF		0.209 mg/m^3
PARTICULATE EMISSION RATE		0.006526 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

Plant: Clean Harbors
Test No.: 3 - Particulate & Metals
Date: November 10, 2022

Plant Location: Corunna, ON
Test Location: Incinerator Exhaust Stack
Operator: AP

Pitot Factor	0.847	
DGMCF	1.01	
Barometric Pressure	29.46	"Hg
Static Pressure	0.720	"H_2O
Nozzle	0.2508	inches
Stack Diameter	4.833	ft
Length	0.000	ft
Width	0.000	ft

Filter (mg)	0.1	
Probe (mg)	1.6	
CWTR (g)	2751.4	
WCBDA (g)	24.5	
Leak Check Volume	0.52	ft³
Reading Interval	3	minutes
Number of Ports	2	
Number of points / Port	10	

Combustion Gases	
O2%	10.36
CO2%	7.82
COppm	64.9

Measured H2O
46.3 %

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	460.92	1.1	368	49	61	62	1.1	2.5		24.82	
	3	462.63	1.3	362	47	61	64	1.1	2.5		26.88	**101.8**
	6	464.33	1.2	361	46	62	64	1.1	2.5		25.81	**92.6**
	9	466.06	1.1	362	46	62	64	1	2.5		24.73	**97.9**
2	12	467.72	1.1	364	46	62	64	1	2.5		24.76	**98.1**
	15	469.45	1.1	367	46	63	66	0.95	2.5		24.80	**102.4**
	18	470.98	1	367	46	63	66	0.97	2.5		23.65	**90.4**
	21	472.64	1	369	47	63	67	0.9	2.5		23.68	**102.9**
3	24	474.20	1.1	370	47	64	67	0.95	2.0		24.85	**96.7**
	27	475.82	1.1	371	47	64	67	0.95	2.0		24.86	**95.8**
	30	477.44	1.1	371	47	64	67	0.95	2.0		24.86	**95.8**
	33	479.05	1.2	371	47	66	69	0.95	2.5		25.97	**95.2**
4	36	480.67	1.3	372	45	65	70	1	2.5		27.04	**91.4**
	39	482.31	1.2	372	45	65	72	1.1	2.5		25.98	**89.0**
	42	484.04	1.4	371	45	65	71	1.2	2.5		28.05	**97.5**
	45	485.83	1.2	371	45	65	71	1.2	2.5		25.97	**93.5**
5	48	487.63	1.4	372	45	65	71	1.2	3.0		28.06	**101.5**
	51	489.43	1.5	372	45	65	71	1.3	3.0		29.05	**94.0**
	54	491.30	1.3	372	45	66	71	1.2	3.0		27.04	**94.4**
	57	493.14	1.8	371	45	66	71	1.6	3.5		31.80	**99.7**
6	60	495.20	1.9	372	45	66	71	1.7	3.5		32.69	**94.9**
	63	497.33	1.8	373	45	66	71	1.7	3.5		31.84	**95.5**
	66	499.47	1.9	374	45	66	71	1.6	3.5		32.73	**98.7**
	69	501.57	1.9	372	45	66	71	1.6	3.5		32.69	**94.3**
7	72	503.67	2.1	371	45	66	71	1.4	3.5		34.35	**94.2**
	75	505.81	1.8	370	45	66	71	1.8	3.5		31.78	**91.2**
	78	508.02	1.8	370	45	66	71	1.6	3.5		31.78	**101.8**
	81	510.10	1.8	370	45	66	71	1.6	3.5		31.78	**95.7**
8	84	512.17	1.7	369	46	69	74	1.6	3.5		30.87	**95.3**
	87	514.24	1.8	368	46	69	74	1.6	3.5		31.74	**97.4**
	90	516.33	1.6	370	46	70	75	1.5	3.5		29.97	**95.5**
	93	518.38	1.7	369	44	70	75	1.5	3.5		30.87	**99.3**
9	96	520.42	1.6	369	44	70	74	1.5	3.5		29.95	**95.8**
	99	522.43	1.6	370	45	70	75	1.5	3.5		29.97	**97.4**

Plant: Clean Harbors
Test No.: 3 - Particulate & Metals
Date: November 10, 2022

Plant Location: Corunna, ON
Test Location: Incinerator Exhaust Stack
Operator: AP

Pitot Factor	0.847		**Filter (mg)**	0.1	
DGMCF	1.01		**Probe (mg)**	1.6	
Barometric Pressure	29.46	"Hg	**CWTR (g)**	2751.4	
Static Pressure	0.720	"H_2O	**WCBDA (g)**	24.5	
Nozzle	0.2508	inches			
Stack Diameter	4.833	ft	**Leak Check Volume**	0.52	ft'
Length	0.000	ft	**Reading Interval**	3	minutes
Width	0.000	ft	**Number of Ports**	2	
			Number of points / Port	10	

Combustion Gases	
O2%	10.36
CO2%	7.82
COppm	64.9

Measured H2O
46.3 %

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 %**
	102	524.45	1.9	369	46	71	75	1.7	3.5		32.63	**97.8**
	105	526.58	1.5	369	46	71	75	1.5	3.5		29.00	**94.6**
10	108	528.47	1.5	370	46	71	75	1.5	3.5		29.01	**94.4**
	111	530.37	1.5	370	46	71	75	1.5	3.5		29.01	**95.0**
	114	532.27	1.5	370	46	71	75	1.4	3.5		29.01	**95.0**
	117	534.74	1.7	370	47	71	76	1.4	3.5		30.89	**123.4**
	120	536.80								0.52		**96.6**
1	0	537.32	1.3	370	44	72	74	1.2	3.0		27.01	
	3	539.10	1.2	369	44	72	74	1.2	3.0		25.94	**95.5**
	6	540.92	1.4	369	44	73	74	1.2	3.0		28.01	**101.6**
	9	542.73	1.3	369	44	73	74	1.2	3.0		26.99	**93.4**
2	12	544.55	1.3	369	44	73	74	1.1	3.0		26.99	**97.5**
	15	546.33	1.3	368	44	73	75	1.2	3.0		26.98	**95.3**
	18	548.14	1.3	368	46	73	76	1.2	3.0		26.98	**96.8**
	21	549.93	1.4	366	46	73	76	1.2	3.0		27.96	**95.6**
3	24	551.76	1.3	367	46	73	76	1.2	3.0		26.96	**94.1**
	27	553.58	1.5	367	41	73	76	1.3	3.0		28.96	**97.2**
	30	555.50	1.4	366	41	73	76	1.3	3.0		27.96	**95.5**
	33	557.40	1.3	366	41	73	76	1.3	3.0		26.95	**97.7**
4	36	559.30	1.6	365	42	73	76	1.3	3.0		29.87	**101.4**
	39	561.20	1.6	365	42	72	75	1.4	3.0		29.87	**91.4**
	42	563.28	1.5	365	42	72	75	1.3	3.5		28.93	**100.2**
	45	565.10	1.7	366	42	72	75	1.5	3.5		30.81	**90.6**
5	48	567.13	1.6	367	41	75	79	1.5	3.5		29.91	**95.0**
	51	569.17	1.8	366	41	75	79	1.5	3.5		31.71	**97.8**
	54	571.22	1.7	367	44	75	80	1.5	3.5		30.83	**92.6**
	57	573.28	1.5	368	44	76	79	1.5	3.5		28.98	**95.7**
6	60	575.32	1.7	368	44	76	79	1.4	3.5		30.85	**101.0**
	63	577.33	1.7	368	43	76	80	1.5	3.5		30.85	**93.4**
	66	579.40	1.6	368	43	76	79	1.5	3.5		29.93	**96.2**
	69	581.45	1.7	369	42	76	81	1.5	3.5		30.87	**98.2**
7	72	583.52	1.6	369	42	76	81	1.5	3.5		29.95	**96.1**
	75	585.55	1.5	369	43	77	81	1.4	3.5		29.00	**97.2**
	78	587.55	1.6	369	44	77	81	1.4	3.5		29.95	**98.8**

Plant: Clean Harbors
Test No.: 3 - Particulate & Metals
Date: November 10, 2022

Plant Location: Corunna, ON
Test Location: Incinerator Exhaust Stack
Operator: AP

Pitot Factor	0.847	**Filter (mg)**	0.1
DGMCF	1.01	**Probe (mg)**	1.6
Barometric Pressure	29.46 "Hg	**CWTR (g)**	2751.4
Static Pressure	0.720 "H_2O	**WCBDA (g)**	24.5
Nozzle	0.2508 inches		
Stack Diameter	4.833 ft	**Leak Check Volume**	0.52 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%	10.36
CO2%	7.82
COppm	64.9

Measured H2O
46.3 %

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 %
	81	589.56	1.5	368	44	77	81	1.4	3.5		28.98	**96.1**
8	84	591.56	1.4	368	44	77	81	1.3	3.5		28.00	**98.7**
	87	593.46	1.5	367	44	77	81	1.3	3.5		28.96	**97.0**
	90	595.45	1.5	367	42	78	82	1.4	3.5		28.96	**98.1**
	93	597.42	1.4	367	41	78	82	1.3	3.5		27.98	**97.0**
9	96	599.47	1.7	366	41	78	82	1.3	3.5		30.81	**104.4**
	99	601.32	1.4	367	43	78	82	1.5	3.5		27.98	**85.5**
	102	603.38	1.5	367	44	78	82	1.2	3.5		28.96	**105.0**
	105	605.24	1.6	366	44	78	82	1.3	3.5		29.89	**91.5**
10	108	607.16	1.4	366	44	78	82	1.4	3.5		27.96	**91.4**
	111	609.12	1.3	365	44	78	82	1.2	3.5		26.93	**99.8**
	114	611.00	1.5	365	48	79	82	1.3	3.5		28.93	**99.2**
	117	612.90	1.3	365	48	79	82	1.3	3.5		26.93	**93.3**
	120	614.82										**101.3**

APPENDIX 23

Semi-Volatile Organics Test Emission Calculations
(12 pages)

ORTECH Consulting Inc.

Plant: Clean Harbors
Plant Location: Corunna, ON
Test Location: Incinerator Exhaust Stack
Test No.: 1 - SVOC
Date: November 8, 2022

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.843
DGM CORRECTION FACTOR	0.973
NOZZLE DIAMETER	6.33 mm
DRY REF GAS VOLUME SAMPLED	4.564 m^3
AVGERGE ISOKINETICITY	100.5 %
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	193.6 ^{o}C
AVERAGE GAS MOISTURE BY VOLUME	47.4 %
AVERAGE GAS VELOCITY	29.70 m/s
BAROMETRIC PRESSURE (Station)	101.795 Kpa
STATIC PRESSURE	0.164 Kpa
ABSOLUTE GAS PRESSURE	101.959 Kpa
OXYGEN CONCENTRATION	9.7 %
CARBON DIOXIDE CONCENTRATION	7.80 %
CARBON MONOXIDE CONCENTRATION	33.9 ppm

FLOWRATE

ACTUAL GAS FLOWRATE	50.62 m^3/s
DRY REF GAS FLOWRATE	17.10 Rm^3/s
DRY ADJ GAS FLOWRATE	19.34 Rm^3/s
WET REF GAS FLOWRATE	32.55 Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0 mg
	-FILTER	0 mg
	-TOTAL	0 mg
DRY REF GAS VOLUME SAMPLED		4.564 m^3
PARTICULATE CONC. - ACTUAL		0.000 mg/m^3
PARTICULATE CONC. - DRY REF		0.000 mg/m^3
PARTICULATE CONC. - DRY ADJ		0.000 mg/m^3
PARTICULATE CONC. - WET REF		0.000 mg/m^3
PARTICULATE EMISSION RATE		0.000000 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 Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	1 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	November 8, 2022	**Operator:**	DU

Pitot Factor	0.843	**Filter (mg)**	0
DGMCF	0.973	**Probe (mg)**	0
Barometric Pressure	30.06 "Hg	**CWTR (g)**	3019.7
Static Pressure	0.660 "H_2O	**WCBDA (g)**	8.7
Nozzle	0.2491 inches		
Stack Diameter	4.833 ft	**Leak Check Volume**	0.67 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%	9.7
CO2%	7.80
COppm	33.9

Measured H2O
47.4 %

				Temperatures								
Point	Time	DGM Reading	ΔP "H2O	Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
1	0	31.87	1.3	380	43	65	63	1.2	3.0		26.86	
	3	33.71	1.25	380	43	70	66	1.2	3.0		26.33	**101.9**
	6	35.46	1.3	380	43	70	66	1.2	3.0		26.86	**98.1**
	9	37.27	1.3	379	43	68	65	1.2	3.0		26.84	**99.5**
2	12	39.08	1.25	379	43	68	65	1.2	3.0		26.32	**99.7**
	15	40.91	1.3	379	41	69	66	1.2	3.0		26.84	**102.8**
	18	42.71	1.25	380	40	70	65	1.2	3.0		26.33	**99.0**
	21	44.54	1.25	379	40	68	66	1.2	3.0		26.32	**102.7**
3	24	46.33	1.3	379	40	68	66	1.2	3.0		26.84	**100.5**
	27	48.13	1.25	380	40	68	66	1.2	3.0		26.33	**99.1**
	30	49.91	1.25	379	40	70	67	1.2	3.0		26.32	**100.0**
	33	51.69	1.25	380	40	73	67	1.2	3.0		26.33	**99.6**
4	36	53.49	1.4	379	40	68	66	1.35	4.0		27.85	**100.5**
	39	55.37	1.3	381	40	68	66	1.3	4.0		26.87	**99.7**
	42	57.28	1.3	380	39	68	66	1.2	4.0		26.86	**105.3**
	45	59.15	1.4	380	39	68	66	1.3	4.0		27.87	**103.0**
5	48	60.98	1.35	380	39	68	66	1.3	4.0		27.37	**97.1**
	51	62.93	1.3	381	40	71	68	1.3	4.0		26.87	**105.4**
	54	64.81	1.3	380	40	70	68	1.3	4.0		26.86	**103.1**
	57	66.69	1.25	380	40	70	68	1.2	4.0		26.33	**103.2**
6	60	68.60	1.45	379	40	70	68	1.4	4.0		28.35	**106.8**
	63	70.48	1.9	379	39	69	67	1.7	4.5		32.45	**97.6**
	66	72.67	1.9	379	39	69	67	1.7	4.5		32.45	**99.6**
	69	74.82	1.95	379	39	70	67	1.7	4.5		32.87	**97.8**
7	72	77.02	1.9	379	39	70	67	1.7	4.5		32.45	**98.7**
	75	79.22	2.1	379	41	72	69	1.9	5.0		34.11	**100.0**
	78	81.49	2	379	41	72	69	1.9	5.0		33.29	**97.8**
	81	83.80	1.9	379	40	72	69	1.8	5.0		32.45	**102.0**
8	84	86.00	1.8	378	41	71	69	1.7	5.0		31.56	**99.6**
	87	88.09	1.8	378	41	71	69	1.7	5.0		31.56	**97.2**
	90	90.44	1.9	377	41	71	69	1.7	5.0		32.41	**109.3**
	93	92.63	1.8	377	41	71	69	1.7	5.0		31.54	**99.1**
9	96	94.81	1.85	378	41	71	70	1.7	5.0		32.00	**101.4**
	99	97.00	1.8	378	41	71	70	1.7	5.0		31.56	**100.4**

Plant: Clean Harbors
Test No.: 1 - SVOC
Date: November 8, 2022

Plant Location: Corunna, ON
Test Location: Incinerator Exhaust Stack
Operator: DU

Pitot Factor	0.843	
DGMCF	0.973	
Barometric Pressure	30.06	"Hg
Static Pressure	0.660	"H_2O
Nozzle	0.2491	inches
Stack Diameter	4.833	ft
Length	0.000	ft
Width	0.000	ft

Filter (mg)	0	
Probe (mg)	0	
CWTR (g)	3019.7	
WCBDA (g)	8.7	
Leak Check Volume	0.67	ft^3
Reading Interval	3	minutes
Number of Ports	2	
Number of points / Port	10	

Combustion Gases	
O2%	9.7
CO2%	7.80
COppm	33.9

Measured H2O
47.4 %

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 %**
	102	99.17	1.75	378	41	73	70	1.6	4.5		31.12	**100.9**
	105	101.29	1.9	377	41	73	70	1.8	5.0		32.41	**99.7**
10	108	103.51	1.7	377	43	72	70	1.6	4.5		30.66	**100.2**
	111	105.66	1.7	377	43	72	70	1.6	4.5		30.66	**102.7**
	114	107.90	1.7	377	43	72	70	1.6	4.5		30.66	**107.0**
	117	109.90	1.7	376	42	72	70	1.6	4.5		30.64	**95.5**
	120	111.94								0.67		**97.4**
1	0	112.61	1.4	375	52	79	73	1.4	3.5		27.79	
	3	114.55	1.4	376	44	75	73	1.4	3.5		27.80	**101.0**
	6	116.52	1.4	377	43	75	73	1.3	3.5		27.82	**103.0**
	9	118.44	1.4	377	43	78	74	1.3	3.5		27.82	**100.4**
2	12	120.38	1.4	377	43	78	74	1.3	3.5		27.82	**101.1**
	15	122.30	1.4	378	43	78	74	1.3	3.5		27.84	**100.0**
	18	124.22	1.35	378	43	76	73	1.3	3.5		27.33	**100.1**
	21	126.14	1.4	378	43	77	74	1.3	3.5		27.84	**102.2**
3	24	128.05	1.5	383	44	80	75	1.4	4.0		28.90	**99.6**
	27	130.05	1.65	379	43	77	74	1.6	4.0		30.24	**100.7**
	30	132.14	1.55	379	43	77	74	1.5	4.0		29.31	**100.6**
	33	134.21	1.5	377	43	77	73	1.4	4.0		28.80	**102.7**
4	36	136.22	1.5	379	43	77	73	1.4	4.0		28.83	**101.4**
	39	138.20	1.5	380	41	75	74	1.4	4.0		28.85	**100.0**
	42	140.20	1.8	380	42	75	74	1.7	4.0		31.60	**101.1**
	45	142.31	1.5	383	42	76	74	1.4	4.0		28.90	**97.5**
5	48	144.33	1.5	383	42	76	74	1.4	4.0		28.90	**102.2**
	51	146.34	1.65	383	42	76	74	1.5	4.0		30.31	**101.7**
	54	148.38	1.6	383	41	76	74	1.5	4.0		29.85	**98.5**
	57	150.43	1.8	383	40	76	74	1.7	4.0		31.66	**100.5**
6	60	152.56	1.7	383	40	76	74	1.6	4.0		30.77	**98.5**
	63	154.67	1.65	383	40	76	74	1.6	4.0		30.31	**100.4**
	66	156.76	1.8	383	40	76	74	1.6	4.0		31.66	**100.9**
	69	158.88	1.7	384	40	76	74	1.6	4.0		30.78	**98.0**
7	72	161.03	1.9	385	40	76	74	1.7	4.0		32.56	**102.3**
	75	163.10	1.85	385	40	76	74	1.7	4.0		32.13	**93.3**
	78	165.26	1.7	385	40	76	74	1.6	4.0		30.80	**98.6**

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	1 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	November 8, 2022	**Operator:**	DU

Pitot Factor	0.843	**Filter (mg)**	0
DGMCF	0.973	**Probe (mg)**	0
Barometric Pressure	30.06 "Hg	**CWTR (g)**	3019.7
Static Pressure	0.660 "H$_2$O	**WCBDA (g)**	8.7
Nozzle	0.2491 inches		
Stack Diameter	4.833 ft	**Leak Check Volume**	0.67 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%	9.7
CO2%	7.80
COppm	33.9

Measured H2O
47.4 %

				Temperatures								
Point	**Time**	**DGM Reading**	**ΔP "H2O**	**Stack °F**	**Imp. Out °F**	**DGM Out °F**	**DGM In °F**	**ΔH "H2O**	**Vacuum "Hg**	**Leak Check Volume**	**Velocity m/s**	**Isokinetic %**
	81	167.25	1.9	385	41	76	74	1.7	4.0		32.56	**94.8**
8	84	169.52	1.85	387	41	76	74	1.7	4.0		32.17	**102.3**
	87	171.69	2	387	41	75	74	1.8	4.0		33.45	**99.2**
	90	173.91	1.8	386	40	75	74	1.6	4.0		31.71	**97.7**
	93	176.05	1.8	386	41	74	73	1.6	4.5		31.71	**99.2**
9	96	178.20	1.7	384	41	74	73	1.6	4.5		30.78	**99.8**
	99	180.35	1.7	384	41	74	73	1.6	4.5		30.78	**102.6**
	102	182.50	1.7	384	40	74	73	1.6	4.5		30.78	**102.6**
	105	184.64	1.7	385	40	74	73	1.6	4.5		30.80	**102.1**
10	108	186.73	1.7	385	48	74	73	1.6	4.5		30.80	**99.8**
	111	188.82	1.7	386	41	75	73	1.6	4.5		30.82	**99.8**
	114	190.86	1.7	385	42	75	72	1.6	4.5		30.80	**97.4**
	117	193.04	1.7	385	42	75	72	1.6	4.5		30.80	**104.1**
	120	195.10										**98.4**

ORTECH Consulting Inc.

Plant:	Clean Harbors
Plant Location:	Corunna, ON
Test Location:	Incinerator Exhaust Stack
Test No.:	2 - SVOC
Date:	November 9, 2022

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.843
DGM CORRECTION FACTOR	0.973
NOZZLE DIAMETER	6.33 mm
DRY REF GAS VOLUME SAMPLED	4.659 m^3
AVGERGE ISOKINETICITY	99.4 %
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	47.2 %
AVERAGE GAS VELOCITY	30.69 m/s
BAROMETRIC PRESSURE (Station)	100.982 Kpa
STATIC PRESSURE	0.179 Kpa
ABSOLUTE GAS PRESSURE	101.161 Kpa
OXYGEN CONCENTRATION	9.94 %
CARBON DIOXIDE CONCENTRATION	7.56 %
CARBON MONOXIDE CONCENTRATION	69.5 ppm

FLOWRATE

ACTUAL GAS FLOWRATE	52.32 m^3/s
DRY REF GAS FLOWRATE	17.64 Rm^3/s
DRY ADJ GAS FLOWRATE	19.53 Rm^3/s
WET REF GAS FLOWRATE	33.41 Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0 mg
	-FILTER	0 mg
	-TOTAL	0 mg
DRY REF GAS VOLUME SAMPLED		4.659 m^3
PARTICULATE CONC. - ACTUAL		0.000 mg/m^3
PARTICULATE CONC. - DRY REF		0.000 mg/m^3
PARTICULATE CONC. - DRY ADJ		0.000 mg/m^3
PARTICULATE CONC. - WET REF		0.000 mg/m^3
PARTICULATE EMISSION RATE		0.000000 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 Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	2 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	November 9, 2022	**Operator:**	DU

Pitot Factor	0.843	**Filter (mg)**	0
DGMCF	0.973	**Probe (mg)**	0
Barometric Pressure	29.82 "Hg	**CWTR (g)**	3050.3
Static Pressure	0.720 "H_2O	**WCBDA (g)**	7.9
Nozzle	0.2491 inches		
Stack Diameter	4.833 ft	**Leak Check Volume**	0.5 ft³
Length	0.000 ft	**Reading Interval**	3 minutes
Width	0.000 ft	**Number of Ports**	2
		Number of points / Port	10

Combustion Gases	
O2%	9.94
CO2%	7.56
COppm	69.5

Measured H2O
47.2 %

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	95.80	1.4	385	42	72	64	1.4	2.5		28.05	
	3	97.77	1.3	385	43	69	63	1.3	3.0		27.03	**103.8**
	6	99.62	1.4	385	43	71	64	1.3	3.0		28.05	**101.5**
	9	101.42	1.3	385	43	69	63	1.3	3.0		27.03	**94.9**
2	12	103.31	1.35	386	43	69	63	1.3	3.0		27.56	**103.7**
	15	105.21	1.35	388	43	69	63	1.3	3.0		27.60	**102.3**
	18	107.12	1.3	389	43	69	64	1.2	3.5		27.10	**103.0**
	21	108.97	1.4	389	42	67	63	1.25	3.5		28.12	**101.6**
3	24	110.82	1.45	387	41	67	63	1.3	3.5		28.58	**98.2**
	27	112.71	1.6	387	41	67	63	1.4	4.0		30.02	**98.5**
	30	114.67	1.5	383	41	68	62	1.4	4.0		29.00	**97.2**
	33	116.65	1.55	382	41	69	63	1.4	4.0		29.46	**101.2**
4	36	118.62	1.55	381	41	70	63	1.4	4.0		29.45	**98.8**
	39	120.58	1.55	380	41	71	63	1.4	4.0		29.43	**98.2**
	42	122.55	1.5	380	41	70	63	1.4	4.0		28.95	**98.5**
	45	124.53	1.55	380	42	69	63	1.4	4.0		29.43	**100.8**
5	48	126.50	1.7	379	41	73	63	1.5	4.0		30.80	**98.7**
	51	128.55	1.75	379	41	71	64	1.5	4.0		31.25	**97.7**
	54	130.57	1.6	379	41	70	64	1.5	4.0		29.88	**94.9**
	57	132.62	1.75	379	41	70	64	1.5	4.0		31.25	**100.9**
6	60	134.65	1.9	380	41	71	64	1.7	4.0		32.58	**95.5**
	63	136.81	1.9	382	42	71	64	1.7	4.0		32.62	**97.5**
	66	139.00	2	383	42	73	65	1.7	4.0		33.49	**99.0**
	69	141.18	2.2	384	42	73	64	1.9	5.0		35.14	**95.9**
7	72	143.45	2.2	384	42	73	64	1.9	5.0		35.14	**95.4**
	75	145.75	2	387	43	73	65	1.7	5.0		33.57	**96.6**
	78	148.00	1.9	386	43	74	65	1.7	5.0		32.70	**99.2**
	81	150.25	1.9	387	44	74	65	1.7	5.0		32.72	**101.6**
8	84	152.49	1.85	386	41	72	65	1.7	5.0		32.27	**101.2**
	87	154.68	1.8	386	43	74	65	1.7	5.0		31.83	**100.4**
	90	156.91	1.9	386	43	74	65	1.7	5.0		32.70	**103.4**
	93	159.10	1.85	384	42	74	65	1.7	5.0		32.23	**98.9**
9	96	161.30	1.8	384	42	74	66	1.7	5.0		31.79	**100.5**
	99	163.53	1.7	385	41	74	66	1.7	5.0		30.91	**103.2**

Plant: Clean Harbors
Test No.: 2 - SVOC
Date: November 9, 2022

Plant Location: Corunna, ON
Test Location: Incinerator Exhaust Stack
Operator: DU

Pitot Factor	0.843	**Filter (mg)**	0
DGMCF	0.973	**Probe (mg)**	0
Barometric Pressure	29.82 "Hg	**CWTR (g)**	3050.3
Static Pressure	0.720 "H_2O	**WCBDA (g)**	7.9
Nozzle	0.2491 inches		
Stack Diameter	4.833 ft	**Leak Check Volume**	0.5 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%	9.94
CO2%	7.56
COppm	69.5

Measured H2O
47.2 %

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					
	102	165.70	1.7	384	41	75	67	1.7	5.0		30.89	**103.4**
	105	167.90	1.75	384	44	73	67	1.6	4.0		31.35	**104.6**
10	108	170.02	1.65	383	44	75	67	1.5	4.0		30.42	**99.5**
	111	172.08	1.75	382	44	76	67	1.6	4.0		31.31	**99.3**
	114	174.18	1.7	382	44	76	67	1.6	4.0		30.86	**98.2**
	117	176.28	1.75	381	44	76	67	1.6	4.0		31.29	**99.6**
	120	178.38								0.5		**98.1**
1	0	178.88	1.45	379	62	70	66	1.3	3.0		28.45	
	3	180.75	1.45	380	46	68	66	1.3	3.5		28.46	**96.4**
	6	182.67	1.5	380	44	68	66	1.3	3.5		28.95	**99.2**
	9	184.60	1.5	380	45	68	67	1.3	3.5		28.95	**98.1**
2	12	186.53	1.5	379	45	68	67	1.3	3.5		28.93	**98.0**
	15	188.47	1.5	378	44	70	67	1.3	3.5		28.92	**98.4**
	18	190.37	1.55	376	44	68	67	1.4	3.5		29.36	**96.2**
	21	192.35	1.45	376	45	68	67	1.3	3.5		28.40	**98.7**
3	24	194.31	1.6	375	45	69	67	1.5	4.0		29.81	**101.0**
	27	196.35	1.65	374	44	69	67	1.5	4.0		30.26	**99.9**
	30	198.40	1.55	375	44	69	68	1.5	4.0		29.34	**98.8**
	33	200.43	1.55	375	44	69	68	1.5	4.0		29.34	**101.0**
4	36	202.50	1.65	373	44	69	67	1.5	4.0		30.24	**102.9**
	39	204.52	1.6	372	43	69	67	1.5	4.0		29.76	**97.3**
	42	206.55	1.65	371	43	70	68	1.5	4.0		30.20	**99.3**
	45	208.60	1.65	370	42	69	68	1.5	4.0		30.18	**98.5**
5	48	210.65	1.65	370	42	69	68	1.5	4.0		30.18	**98.5**
	51	212.69	1.65	371	41	69	68	1.5	4.0		30.20	**98.0**
	54	214.74	1.75	372	43	70	68	1.6	4.0		31.12	**98.6**
	57	216.82	1.75	374	42	70	68	1.6	4.0		31.16	**97.1**
6	60	218.95	1.85	377	42	70	69	1.6	4.0		32.09	**99.6**
	63	221.05	1.75	375	42	71	69	1.6	4.0		31.18	**95.5**
	66	223.17	1.95	372	43	70	69	1.7	4.0		32.85	**99.0**
	69	225.37	1.85	369	42	70	69	1.7	4.0		31.94	**97.2**
7	72	227.53	1.8	370	42	70	69	1.7	4.0		31.52	**97.8**
	75	229.70	1.8	371	41	70	69	1.7	4.0		31.54	**99.7**
	78	231.86	1.85	376	43	71	70	1.7	4.0		32.07	**99.3**

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	2 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	November 9, 2022	**Operator:**	DU

Pitot Factor	0.843	**Filter (mg)**	0
DGMCF	0.973	**Probe (mg)**	0
Barometric Pressure	29.82 "Hg	**CWTR (g)**	3050.3
Static Pressure	0.720 "H_2O	**WCBDA (g)**	7.9
Nozzle	0.2491 inches		
Stack Diameter	4.833 ft	**Leak Check Volume**	0.5 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%	9.94
CO2%	7.56
COppm	69.5

Measured H2O
47.2 %

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 %**
	81	234.05	1.85	376	43	71	70	1.7	4.0		32.07	**99.4**
8	84	236.20	1.8	378	44	71	70	1.7	4.0		31.68	**97.6**
	87	238.40	1.8	377	41	71	70	1.7	4.0		31.66	**101.4**
	90	240.58	1.75	377	41	71	70	1.7	4.0		31.21	**100.4**
	93	242.73	1.85	377	41	71	70	1.7	4.0		32.09	**100.4**
9	96	244.92	1.8	378	41	71	70	1.7	4.0		31.68	**99.5**
	99	247.07	1.8	379	40	71	70	1.7	4.0		31.70	**99.1**
	102	249.25	2.05	378	40	72	70	1.8	4.5		33.80	**100.5**
	105	251.47	1.8	378	41	72	70	1.7	4.0		31.68	**95.8**
10	108	253.70	1.9	378	41	72	70	1.7	4.0		32.54	**102.7**
	111	255.90	1.85	378	40	72	71	1.7	4.0		32.11	**98.6**
	114	258.11	1.75	378	41	72	71	1.7	4.0		31.23	**100.3**
	117	260.32	1.9	378	41	72	71	1.7	4.0		32.54	**103.1**
	120	262.56										**100.3**

ORTECH Consulting Inc.

Plant:	Clean Harbors
Plant Location:	Corunna, ON
Test Location:	Incinerator Exhaust Stack
Test No.:	3 - SVOC
Date:	November 10, 2022

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.843
DGM CORRECTION FACTOR	0.973
NOZZLE DIAMETER	6.33 mm
DRY REF GAS VOLUME SAMPLED	4.395 m^3
AVGERGE ISOKINETICITY	97.2 %
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	187.3 °C
AVERAGE GAS MOISTURE BY VOLUME	46.2 %
AVERAGE GAS VELOCITY	29.03 m/s
BAROMETRIC PRESSURE (Station)	99.763 Kpa
STATIC PRESSURE	0.179 Kpa
ABSOLUTE GAS PRESSURE	99.942 Kpa
OXYGEN CONCENTRATION	10.36 %
CARBON DIOXIDE CONCENTRATION	7.82 %
CARBON MONOXIDE CONCENTRATION	64.9 ppm

FLOWRATE

ACTUAL GAS FLOWRATE	49.49 m^3/s
DRY REF GAS FLOWRATE	17.01 Rm^3/s
DRY ADJ GAS FLOWRATE	18.11 Rm^3/s
WET REF GAS FLOWRATE	31.61 Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0 mg
	-FILTER	0 mg
	-TOTAL	0 mg
DRY REF GAS VOLUME SAMPLED		4.395 m^3
PARTICULATE CONC. - ACTUAL		0.000 mg/m^3
PARTICULATE CONC. - DRY REF		0.000 mg/m^3
PARTICULATE CONC. - DRY ADJ		0.000 mg/m^3
PARTICULATE CONC. - WET REF		0.000 mg/m^3
PARTICULATE EMISSION RATE		0.000000 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

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	3 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	November 10, 2022	**Operator:**	DU

Pitot Factor	0.843	
DGMCF	0.973	
Barometric Pressure	29.46	"Hg
Static Pressure	0.720	"H_2O
Nozzle	0.2491	inches
Stack Diameter	4.833	ft
Length	0.000	ft
Width	0.000	ft

Filter (mg)	0
Probe (mg)	0
CWTR (g)	2760.3
WCBDA (g)	10.9

Leak Check Volume	0.5	ft^3
Reading Interval	3	minutes
Number of Ports	2	
Number of points / Port	10	

Combustion Gases	
O2%	10.36
CO2%	7.82
COppm	64.9

Measured H2O
46.2 %

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	63.49	1.4	370	56	63	61	1.3	3.0		27.89	
	3	65.39	1.55	364	49	63	61	1.4	3.0		29.24	**98.2**
	6	67.30	1.4	363	47	64	62	1.3	3.0		27.77	**93.5**
	9	69.18	1.4	363	46	63	62	1.3	3.0		27.77	**96.5**
2	12	71.06	1.4	366	45	64	62	1.3	3.0		27.82	**96.6**
	15	72.94	1.4	368	43	63	62	1.3	3.0		27.85	**96.7**
	18	74.81	1.4	363	44	64	62	1.3	3.0		27.77	**96.4**
	21	76.68	1.4	370	44	64	62	1.3	3.0		27.89	**96.0**
3	24	78.55	1.4	372	44	64	62	1.3	3.0		27.92	**96.4**
	27	80.42	1.4	372	44	64	62	1.3	3.0		27.92	**96.5**
	30	82.28	1.4	372	44	64	62	1.3	3.0		27.92	**96.0**
	33	84.15	1.55	373	41	66	63	1.4	3.5		29.39	**96.5**
4	36	86.13	1.5	373	40	66	63	1.4	3.5		28.92	**96.9**
	39	88.09	1.5	374	40	66	63	1.4	3.5		28.93	**97.6**
	42	90.08	1.5	373	40	66	63	1.4	3.5		28.92	**99.1**
	45	92.06	1.5	373	41	67	64	1.4	3.5		28.92	**98.5**
5	48	94.05	1.7	373	41	67	64	1.5	3.5		30.78	**98.9**
	51	96.09	1.65	373	40	68	65	1.5	3.5		30.33	**95.2**
	54	98.15	1.55	373	40	68	65	1.5	3.5		29.39	**97.4**
	57	100.20	1.7	373	40	68	65	1.5	3.5		30.78	**100.0**
6	60	102.29	1.65	373	40	68	65	1.5	3.5		30.33	**97.4**
	63	104.34	1.55	374	40	68	65	1.5	3.5		29.41	**96.9**
	66	106.42	1.7	374	41	68	65	1.5	3.5		30.80	**101.5**
	69	108.48	1.65	373	41	68	65	1.5	3.5		30.33	**96.0**
7	72	110.55	1.6	372	41	68	65	1.5	3.5		29.85	**97.9**
	75	112.57	1.65	371	41	68	66	1.5	3.5		30.29	**96.9**
	78	114.66	1.6	370	41	69	66	1.5	4.0		29.81	**98.6**
	81	116.72	1.65	370	42	69	66	1.5	4.0		30.27	**98.6**
8	84	118.77	1.55	370	42	69	67	1.5	4.0		29.34	**96.6**
	87	120.82	1.8	370	42	70	67	1.6	4.0		31.62	**99.6**
	90	122.97	1.5	370	42	70	67	1.4	4.0		28.86	**96.8**
	93	124.99	1.5	370	40	69	67	1.4	4.0		28.86	**99.6**
9	96	126.99	1.5	370	39	70	67	1.35	4.0		28.86	**98.7**
	99	128.96	1.5	370	38	70	67	1.35	4.0		28.86	**97.1**

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	3 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	November 10, 2022	**Operator:**	DU

Pitot Factor	0.843	**Filter (mg)**	0
DGMCF	0.973	**Probe (mg)**	0
Barometric Pressure	29.46 "Hg	**CWTR (g)**	2760.3
Static Pressure	0.720 "H_2O	**WCBDA (g)**	10.9
Nozzle	0.2491 inches		
Stack Diameter	4.833 ft	**Leak Check Volume**	0.5 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%	10.36
CO2%	7.82
COppm	64.9

Measured H2O
46.2 %

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 %
	102	130.93	1.85	370	38	70	68	1.6	4.0		32.06	**97.1**
	105	133.04	1.5	371	38	71	68	1.4	4.0		28.88	**93.6**
10	108	135.01	1.4	372	38	71	69	1.3	4.0		27.92	**97.0**
	111	136.95	1.6	372	39	72	69	1.4	4.0		29.85	**98.8**
	114	138.95	1.4	371	39	72	69	1.3	4.0		27.90	**95.2**
	117	140.92	1.8	372	39	72	69	1.6	4.0		31.66	**100.2**
	120	143.01								0.5		**93.9**
1	0	143.51	1.1	370	56	73	70	1	2.0		24.72	
	3	145.17	1.1	370	43	73	71	1	4.0		24.72	**94.9**
	6	146.89	1.25	370	42	73	71	1.2	3.0		26.35	**98.3**
	9	148.72	1.2	370	42	73	71	1.2	3.0		25.82	**98.1**
2	12	150.55	1.3	369	42	72	71	1.2	3.0		26.86	**100.2**
	15	152.40	1.2	369	42	72	71	1.2	3.0		25.80	**97.3**
	18	154.26	1.2	368	43	72	71	1.1	3.0		25.79	**101.8**
	21	156.05	1.2	367	44	73	71	1.1	3.0		25.77	**97.9**
3	24	157.85	1.3	367	44	73	72	1.1	3.0		26.82	**98.3**
	27	159.77	1.3	366	44	73	72	1.1	3.0		26.81	**100.7**
	30	161.47	1.2	366	43	73	72	1.1	3.0		25.76	**89.1**
	33	163.18	1.2	366	44	74	72	1.1	3.0		25.76	**93.3**
4	36	165.08	1.4	366	44	74	72	1.3	3.0		27.82	**103.5**
	39	166.95	1.3	366	44	74	72	1.3	3.0		26.81	**94.4**
	42	168.87	1.5	366	43	74	72	1.4	3.0		28.80	**100.6**
	45	170.81	1.35	366	42	75	72	1.4	3.0		27.32	**94.6**
5	48	172.80	1.35	367	42	75	72	1.3	3.0		27.33	**102.2**
	51	174.77	1.7	367	42	75	72	1.6	4.0		30.67	**101.2**
	54	176.86	1.45	368	43	75	73	1.4	4.0		28.35	**95.8**
	57	178.90	1.45	368	43	75	73	1.4	4.0		28.35	**101.1**
6	60	180.89	1.8	369	43	76	73	1.6	4.0		31.60	**98.6**
	63	183.07	1.8	369	42	76	74	1.6	4.0		31.60	**97.0**
	66	185.22	1.9	369	42	76	74	1.6	4.0		32.47	**95.6**
	69	187.42	1.9	370	43	77	75	1.6	4.0		32.49	**95.2**
7	72	189.66	1.8	369	42	76	74	1.6	4.0		31.60	**96.8**
	75	191.80	1.8	371	43	76	75	1.6	4.0		31.64	**95.1**
	78	194.01	1.85	370	43	76	75	1.6	4.0		32.06	**98.3**

Plant: Clean Harbors
Test No.: 3 - SVOC
Date: November 10, 2022

Plant Location: Corunna, ON
Test Location: Incinerator Exhaust Stack
Operator: DU

Pitot Factor	0.843	**Filter (mg)**	0
DGMCF	0.973	**Probe (mg)**	0
Barometric Pressure	29.46 "Hg	**CWTR (g)**	2760.3
Static Pressure	0.720 "H_2O	**WCBDA (g)**	10.9
Nozzle	0.2491 inches		
Stack Diameter	4.833 ft	**Leak Check Volume**	0.5 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%	10.36
CO2%	7.82
COppm	64.9

Measured H2O
46.2 %

				Temperatures								
Point	**Time**	**DGM Reading**	**ΔP "H2O**	**Stack °F**	**Imp. Out °F**	**DGM Out °F**	**DGM In °F**	**ΔH "H2O**	**Vacuum "Hg**	**Leak Check Volume**	**Velocity m/s**	**Isokinetic %**
	81	196.18	1.85	370	44	76	75	1.6	4.0		32.06	**95.1**
8	84	198.41	1.7	369	45	77	75	1.5	4.0		30.71	**97.8**
	87	200.53	1.7	368	46	76	75	1.5	4.0		30.69	**96.8**
	90	202.60	1.7	367	45	75	74	1.5	4.0		30.67	**94.5**
	93	204.68	1.7	367	45	75	74	1.5	4.0		30.67	**95.1**
9	96	206.78	1.55	367	42	76	74	1.4	4.0		29.29	**96.0**
	99	208.83	1.55	367	43	76	75	1.4	4.0		29.29	**98.0**
	102	210.88	1.5	368	43	76	75	1.4	4.0		28.83	**98.0**
	105	212.93	1.6	367	43	76	75	1.4	4.0		29.76	**99.6**
10	108	215.00	1.6	367	44	76	75	1.4	4.0		29.76	**97.4**
	111	217.06	1.7	366	44	76	75	1.4	4.0		30.65	**96.9**
	114	219.08	1.65	365	44	76	75	1.4	4.0		30.18	**92.1**
	117	221.15	1.65	365	44	76	75	1.4	4.0		30.18	**95.7**
	120	223.21										**95.3**

APPENDIX 24

ORTECH One-Minute Average Combustion Gas Results

(15 pages)

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - November 8, 2022

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	 10-min	NO ppm	NOx ppm
09:57	9.57	7.92	16.4	57.6	2.5		92.8	97.4
09:58	10.04	7.56	18.1	44.2	3.8		95.4	99.6
09:59	9.80	7.74	15.9	48.8	2.6		98.1	101.9
10:00	10.09	7.53	15.8	43.7	2.8		97.0	97.8
10:01	9.80	7.74	14.5	46.2	2.3		97.7	100.8
10:02	9.93	7.64	15.1	48.4	2.7		98.8	99.6
10:03	9.47	7.96	15.1	57.9	2.7		92.5	96.6
10:04	9.76	7.77	17.3	56.6	4.0		89.6	90.7
10:05	9.44	7.98	19.1	47.3	3.7		95.9	100.2
10:06	9.92	7.67	19.4	49.4	3.2	3.0	88.8	93.1
10:07	9.88	7.67	19.3	34.2	4.3	3.2	100.2	103.1
10:08	9.97	7.62	17.4	40.6	2.6	3.1	97.0	100.1
10:09	9.99	7.58	17.4	30.2	3.3	3.2	100.5	103.1
10:10	9.80	7.74	16.4	39.3	2.7	3.1	97.8	101.2
10:11	9.77	7.74	17.1	35.1	3.1	3.2	99.3	101.5
10:12	9.52	7.94	17.6	44.8	3.3	3.3	92.9	95.6
10:13	9.79	7.74	20.6	34.6	4.8	3.5	98.9	100.3
10:14	9.56	7.93	19.6	36.8	4.0	3.5	96.0	98.5
10:15	10.13	7.50	19.0	32.8	3.4	3.5	93.7	94.8
10:16	9.85	7.69	18.2	29.9	3.5	3.5	101.6	104.0
10:17	10.15	7.49	16.6	31.2	2.5	3.3	98.9	101.1
10:18	9.81	7.73	16.4	29.2	2.8	3.3	100.6	104.4
10:19	9.98	7.61	15.9	31.1	2.4	3.2	98.3	100.2
10:20	9.56	7.90	15.2	33.7	2.8	3.2	98.8	103.0
10:21	9.68	7.84	16.7	40.0	2.9	3.2	92.4	95.0
10:22	9.54	7.91	19.2	33.6	4.2	3.3	101.3	104.0
10:23	9.70	7.83	18.6	40.4	3.3	3.2	92.7	94.7
10:24	9.87	7.68	20.3	25.7	4.3	3.2	102.7	105.2
10:25	9.76	7.78	18.6	27.9	2.7	3.1	100.7	104.2
10:26	9.93	7.65	18.9	24.5	2.5	3.0	103.5	104.7
10:27	9.67	7.84	17.8	31.2	2.3	3.0	99.6	103.0
10:28	9.77	7.75	18.9	29.4	2.9	3.0	102.0	103.7
10:29	9.33	8.09	19.2	39.9	2.8	3.1	92.6	95.6
10:30	9.65	7.85	21.4	31.3	4.2	3.2	92.8	96.1
10:31	9.22	8.15	22.6	34.6	3.6	3.3	98.8	104.9
10:32	9.90	7.70	22.1	34.4	3.4	3.2	92.5	96.0
10:33	9.58	7.90	22.4	24.3	4.2	3.3	105.4	108.7
10:34	9.80	7.77	19.9	27.9	2.4	3.1	101.4	104.7
10:35	9.73	7.80	20.5	23.3	2.8	3.1	105.0	107.0
10:36	9.80	7.76	18.7	24.3	2.1	3.1	102.4	106.0
10:37	9.57	7.90	17.6	26.1	2.2	3.1	103.3	106.8
10:38	9.43	8.02	18.0	35.3	2.0	3.0	93.0	96.3
10:39	9.53	7.93	21.9	25.6	3.5	3.0	105.3	107.1
10:40	9.39	8.06	21.3	29.6	2.5	2.9	95.8	99.8
10:41	9.85	7.71	21.1	23.6	2.6	2.8	101.2	101.5
10:42	9.66	7.86	21.4	26.3	2.3	2.7	105.2	109.0
10:43	9.92	7.67	18.5	23.4	2.1	2.5	105.5	107.6
10:44	9.61	7.89	18.2	29.1	2.0	2.4	103.2	107.5
10:45	9.74	7.79	17.5	26.2	2.2	2.4	103.9	104.6
10:46	9.29	8.12	18.1	30.0	2.4	2.4	99.2	104.5
10:47	9.52	7.97	20.4	30.1	2.6	2.4	97.6	99.0
10:48	9.23	8.16	22.8	26.6	3.3	2.5	102.5	107.2
10:49	9.79	7.80	22.0	27.8	2.5	2.4	96.0	99.6
10:50	9.78	7.77	21.9	23.9	3.1	2.5	107.5	110.6
10:51	9.87	7.72	18.1	27.7	2.0	2.4	103.7	106.7
10:52	9.85	7.72	17.1	27.1	2.5	2.5	106.9	109.6
10:53	9.69	7.85	16.9	31.0	2.0	2.5	102.6	105.1
10:54	9.60	7.89	17.4	28.4	2.5	2.5	103.3	106.3

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - November 8, 2022

	O2	CO2	SO2	CO	THC (ppm)		NO	NOx
Time	%	%	ppm	ppm	1-min	10-min	ppm	ppm
10:55	9.32	8.11	18.6	39.5	2.3	2.5	94.3	97.4
10:56	9.58	7.92	23.6	30.0	3.8	2.7	100.0	102.4
10:57	9.33	8.12	22.9	30.5	2.8	2.7	102.6	107.3
10:58	10.01	7.61	23.7	25.4	2.7	2.6	101.5	103.8
10:59	9.66	7.86	22.4	20.7	2.1	2.6	112.1	115.0
11:00	9.97	7.64	20.6	22.9	1.3	2.4	109.0	111.5
11:01	9.70	7.83	20.1	21.8	1.7	2.4	109.7	112.7
11:02	9.85	7.74	19.6	20.6	1.5	2.3	108.1	111.5
11:03	9.48	7.98	20.1	23.8	1.5	2.2	105.5	108.7
11:04	9.60	7.91	20.9	26.5	1.7	2.1	99.4	101.0
11:05	9.46	7.98	20.5	24.2	2.0	2.1	109.2	112.0
11:06	9.66	7.87	20.6	31.8	1.7	1.9	99.0	101.4
11:07	9.91	7.67	23.2	23.6	2.8	1.9	103.5	106.3
11:08	9.82	7.74	19.0	24.7	1.7	1.8	104.9	108.2
11:09	10.00	7.61	18.7	24.2	1.7	1.7	106.1	107.6
11:10	9.87	7.72	17.4	25.4	1.6	1.8	104.3	106.8
11:11	9.93	7.65	17.3	19.8	1.6	1.8	109.6	111.9
11:12	9.52	7.96	16.6	31.1	1.1	1.7	101.6	106.1
11:13	9.77	7.78	18.1	27.2	2.5	1.8	103.4	104.5
11:14	9.34	8.08	20.3	29.9	2.1	1.9	103.9	108.1
11:15	9.95	7.67	21.7	24.0	2.3	1.9	104.1	106.6
11:16	9.88	7.70	21.1	21.1	1.8	1.9	109.6	112.7
11:17	10.05	7.58	18.6	22.9	1.2	1.8	107.0	109.9
11:18	9.89	7.67	17.0	21.0	1.4	1.7	105.6	108.6
11:19	9.90	7.68	16.9	26.3	1.2	1.7	103.9	108.5
11:20	9.63	7.86	16.7	24.9	1.7	1.7	104.4	107.6
11:21	9.58	7.93	16.6	31.7	1.7	1.7	97.8	100.4
11:22	9.71	7.80	19.5	23.3	2.5	1.9	106.7	107.6
11:23	9.67	7.86	20.6	26.7	1.5	1.7	102.7	107.9
11:24	10.12	7.51	20.6	23.1	1.8	1.7	105.2	107.9
11:25	9.94	7.65	18.4	22.9	1.5	1.6	106.1	109.6
11:26	10.18	7.47	17.9	22.4	1.3	1.6	105.5	109.2
11:27	9.87	7.69	16.0	24.4	1.3	1.6	105.9	108.2
11:28	9.94	7.64	15.7	21.7	1.4	1.6	104.8	106.6
11:29	9.52	7.95	14.2	28.4	1.3	1.6	101.4	103.9
11:30	9.79	7.76	17.6	29.2	2.0	1.6	99.8	100.5
11:31	9.42	8.00	19.0	30.1	2.2	1.7	105.1	110.3
11:32	9.83	7.74	18.5	49.6	2.1	1.6	92.9	95.6
11:33	9.85	7.69	21.1	28.0	5.1	2.0	100.6	102.9
11:34	9.94	7.65	17.8	33.5	1.9	2.0	100.2	102.3
11:35	9.97	7.61	17.1	24.6	2.4	2.1	104.1	106.2
11:36	9.85	7.71	16.0	28.5	1.4	2.1	100.2	103.0
11:37	9.83	7.71	16.1	24.8	1.7	2.1	101.1	103.6
11:38	9.53	7.94	15.9	32.0	1.4	2.1	94.5	98.2
11:39	9.82	7.74	18.9	26.8	2.1	2.2	99.2	98.8
11:40	9.54	7.96	18.6	32.8	1.7	2.2	97.7	102.9
11:41	10.02	7.60	18.9	31.0	2.1	2.2	92.8	98.2
11:42	9.80	7.76	20.4	22.8	2.5	2.2	105.9	108.7
11:43	10.15	7.52	18.6	22.8	1.3	1.9	103.3	106.5
11:44	9.94	7.66	17.2	20.9	1.2	1.8	103.2	106.3
11:45	9.99	7.63	16.6	22.8	1.0	1.6	102.7	105.3
11:46	9.56	7.93	16.3	25.8	1.2	1.6	99.3	103.5
11:47	9.74	7.82	17.4	30.3	1.6	1.6	97.0	98.9
11:48	9.58	7.90	18.5	28.5	2.2	1.7	101.2	101.8
11:49	9.78	7.80	18.7	30.8	1.9	1.7	95.5	99.0
11:50	9.99	7.61	21.1	23.9	2.3	1.7	103.0	104.6
11:51	9.95	7.65	18.2	24.7	1.4	1.7	100.8	103.3
11:52	10.08	7.54	18.9	23.5	1.4	1.5	100.2	103.5

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - November 8, 2022

	O2	CO2	SO2	CO	THC (ppm)		NO	NOx
Time	%	%	ppm	ppm	1-min	10-min	ppm	ppm
11:53	9.77	7.78	16.0	28.9	1.3	1.5	98.8	100.7
11:54	9.92	7.65	16.0	22.6	1.8	1.6	100.4	101.9
11:55	9.48	7.98	16.9	29.4	1.3	1.6	93.7	98.5
11:56	9.83	7.72	19.6	27.4	2.2	1.7	96.8	97.3
11:57	9.52	7.94	19.6	27.6	1.9	1.8	97.2	101.1
12:54	9.90	7.66	13.2	17.5	2.2		98.7	100.6
12:55	9.55	7.91	14.2	20.1	2.1		98.9	102.9
12:56	9.84	7.70	14.9	22.6	2.3		97.8	100.8
12:57	9.48	7.94	14.7	21.0	2.5		99.1	101.8
12:58	9.93	7.65	14.9	25.0	2.3		94.5	98.1
12:59	10.07	7.52	15.7	18.0	2.9		100.6	101.7
13:00	10.11	7.51	14.5	21.1	2.0		99.5	103.2
13:01	10.10	7.50	12.9	22.1	2.1		98.6	101.7
13:02	9.97	7.60	11.8	27.6	2.1		96.0	98.2
13:03	9.84	7.67	11.2	25.2	2.3	2.3	94.9	98.1
13:04	9.47	7.97	12.9	34.6	2.3	2.3	89.0	92.1
13:05	9.77	7.74	16.6	25.0	3.5	2.4	95.5	97.5
13:06	9.58	7.89	16.5	23.4	2.7	2.5	96.9	99.3
13:07	10.02	7.56	15.9	22.3	2.4	2.4	93.2	95.9
13:08	9.81	7.70	16.1	18.5	2.5	2.5	101.2	104.1
13:09	10.13	7.48	15.0	17.0	2.0	2.4	99.5	102.6
13:10	9.90	7.64	14.9	20.6	1.9	2.4	100.5	102.9
13:11	9.98	7.58	13.8	21.8	2.0	2.4	98.2	99.9
13:12	9.63	7.82	15.0	25.2	2.2	2.4	96.1	100.0
13:13	9.63	7.85	14.8	33.9	2.5	2.4	89.0	91.6
13:14	9.58	7.86	18.2	25.2	3.5	2.5	96.8	99.3
13:15	9.76	7.77	18.7	28.1	2.8	2.5	90.9	95.7
13:16	10.09	7.51	19.0	19.2	3.1	2.5	94.9	98.7
13:17	9.92	7.63	17.4	29.9	2.2	2.5	91.4	96.2
13:18	10.14	7.47	15.3	44.6	2.7	2.5	88.1	88.7
13:19	9.92	7.62	14.0	55.4	3.1	2.6	88.5	88.9
13:20	9.98	7.57	13.8	53.8	3.7	2.8	87.3	89.4
13:21	9.57	7.88	12.7	86.2	3.6	2.9	79.6	82.5
13:22	9.92	7.63	13.9	75.4	6.9	3.4	84.2	85.0
13:23	9.51	7.91	13.5	71.3	6.7	3.8	84.9	87.8
13:24	10.10	7.52	14.0	76.8	5.2	4.0	80.2	82.7
13:25	9.94	7.61	14.0	51.8	6.5	4.4	89.9	89.8
13:26	10.15	7.47	13.9	57.5	3.6	4.4	86.3	88.6
13:27	9.79	7.69	13.7	55.8	3.9	4.6	89.0	92.6
13:28	9.81	7.69	12.8	62.7	4.1	4.7	87.0	87.2
13:29	9.54	7.87	14.5	55.0	5.5	5.0	88.3	92.2
13:30	9.44	7.96	15.2	66.2	4.7	5.1	83.4	83.9
13:31	9.51	7.89	18.6	45.8	6.5	5.4	90.5	93.0
13:32	9.42	7.99	18.3	62.8	4.4	5.1	86.8	89.6
13:33	9.85	7.65	21.9	43.4	6.5	5.1	89.4	91.9
13:34	9.68	7.78	19.4	39.9	4.5	5.0	95.9	98.5
13:35	9.93	7.60	16.7	33.4	3.5	4.7	96.4	96.7
13:36	9.62	7.82	16.7	43.8	3.1	4.7	94.3	98.5
13:37	9.78	7.71	15.2	39.9	3.7	4.6	93.3	94.8
13:38	9.27	8.06	14.8	50.6	3.7	4.6	88.7	94.1
13:39	9.59	7.85	16.9	67.8	5.0	4.6	83.2	85.3
13:40	9.10	8.18	18.0	73.0	7.4	4.8	86.1	91.8
13:41	9.57	7.89	18.7	82.1	7.9	5.0	79.9	82.4
13:42	9.63	7.81	19.9	40.8	9.8	5.5	88.3	92.3
13:43	9.73	7.75	17.5	42.9	4.0	5.3	92.2	94.5
13:44	9.68	7.77	16.1	33.6	3.9	5.2	95.1	97.1
13:45	9.49	7.93	14.7	49.3	3.2	5.2	90.7	93.9
13:46	9.51	7.89	16.1	35.1	5.0	5.4	99.9	100.1

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - November 8, 2022

	O2	CO2	SO2	CO	THC (ppm)		NO	NOx
Time	%	%	ppm	ppm	1-min	10-min	ppm	ppm
13:47	9.15	8.17	17.2	67.7	3.6	5.4	87.4	90.3
13:48	9.49	7.91	21.0	45.3	7.8	5.8	93.0	94.0
13:49	9.28	8.08	20.6	48.0	5.4	5.8	91.9	95.4
13:50	9.75	7.72	20.6	41.2	4.7	5.5	90.3	93.3
13:51	9.55	7.88	20.3	38.0	4.6	5.2	98.1	101.0
13:52	9.94	7.61	18.4	32.6	3.6	4.6	98.2	99.6
13:53	9.57	7.86	18.1	35.7	3.2	4.5	98.1	102.7
13:54	9.73	7.76	17.2	32.4	3.3	4.4	97.5	98.5
13:55	9.28	8.05	17.9	40.1	3.3	4.4	95.3	99.8
13:56	9.49	7.93	18.3	47.9	4.0	4.3	90.4	91.4
13:57	9.41	7.96	19.5	39.7	5.2	4.5	98.7	102.4
13:58	9.60	7.85	19.1	48.5	4.0	4.1	92.3	94.1
13:59	9.85	7.65	18.4	33.7	4.9	4.1	97.4	99.7
14:00	9.67	7.80	16.4	38.9	3.2	3.9	96.7	100.7
14:01	9.87	7.63	16.8	29.5	3.3	3.8	101.2	102.3
14:02	9.43	7.95	15.3	37.8	2.6	3.7	96.9	100.7
14:03	9.40	7.97	16.9	34.2	3.5	3.7	96.5	98.9
14:04	8.95	8.32	19.9	53.5	3.6	3.8	88.8	92.9
14:05	9.38	8.00	27.9	47.0	6.4	4.1	87.5	89.1
14:06	9.08	8.21	28.5	33.8	5.9	4.3	96.5	100.3
14:07	9.67	7.81	27.3	42.2	3.7	4.1	88.4	92.9
14:08	9.41	7.97	26.6	24.9	5.0	4.2	102.1	105.5
14:09	9.72	7.77	23.9	27.5	2.9	4.0	100.7	103.5
14:10	9.64	7.80	23.1	22.4	3.0	4.0	105.0	107.0
14:11	9.53	7.90	20.1	26.9	2.4	3.9	100.9	104.1
14:12	9.23	8.10	20.9	28.9	2.9	3.9	100.1	103.7
14:13	9.25	8.11	23.1	39.4	3.2	3.9	91.9	95.0
14:14	9.33	8.02	25.4	26.6	4.7	4.0	99.4	102.7
14:15	9.36	8.03	25.4	31.0	3.0	3.7	97.6	101.7
14:16	9.82	7.69	25.6	22.8	3.6	3.4	102.6	104.9
14:17	9.59	7.85	22.3	20.9	2.6	3.3	104.9	108.5
14:18	9.73	7.75	21.2	24.0	2.2	3.0	103.4	106.0
14:19	9.57	7.87	20.1	25.5	2.6	3.0	101.4	105.7
14:20	9.65	7.82	19.9	26.4	2.6	3.0	101.6	102.0
14:21	9.17	8.15	19.9	33.5	2.8	3.0	95.2	100.6
14:22	9.41	8.01	19.8	44.5	3.6	3.1	88.1	89.3
14:23	9.09	8.22	23.6	31.5	5.6	3.3	99.8	104.3
14:24	9.59	7.89	26.3	30.9	3.7	3.2	91.4	94.1
14:25	9.64	7.82	26.6	19.6	4.0	3.3	108.3	110.2
14:26	9.71	7.79	22.4	21.6	2.4	3.2	105.2	109.1
14:27	9.72	7.76	21.0	22.5	2.6	3.2	104.7	108.4
14:28	9.63	7.85	18.5	31.6	2.4	3.2	98.7	101.6
14:29	9.56	7.88	19.0	25.0	3.5	3.3	99.7	102.3
14:30	9.34	8.05	18.4	41.6	2.7	3.3	92.6	96.8
14:31	9.57	7.88	19.9	40.7	4.5	3.5	95.7	96.3
14:32	9.28	8.11	20.4	47.8	4.5	3.6	92.4	97.3
14:33	9.79	7.71	18.9	36.3	5.1	3.5	92.6	94.1
14:34	9.53	7.92	18.2	34.7	3.8	3.5	100.5	101.3
14:35	9.84	7.69	16.7	26.6	3.5	3.5	101.3	102.5
14:36	9.59	7.86	15.7	28.9	2.6	3.5	101.4	103.1
14:37	9.72	7.77	15.2	27.8	2.6	3.5	101.3	103.1
14:38	9.35	8.02	15.1	32.7	2.7	3.5	99.6	103.2
14:39	9.47	7.96	15.2	38.5	3.3	3.5	93.9	95.9
14:40	9.35	8.02	16.4	33.0	4.0	3.6	100.7	104.0
14:41	9.55	7.92	16.6	42.4	3.1	3.5	91.6	95.8
14:42	9.88	7.65	15.8	29.3	4.2	3.5	98.2	100.2
14:43	9.78	7.73	15.1	34.6	2.9	3.2	98.5	102.3
14:44	10.01	7.55	13.2	32.5	3.0	3.2	99.2	100.7

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - November 8, 2022

	O2	CO2	SO2	CO	THC (ppm)		NO	NOx
Time	**%**	**%**	**ppm**	**ppm**	**1-min**	**10-min**	**ppm**	**ppm**
14:45	9.65	7.82	12.6	43.4	2.8	3.1	93.6	97.5
14:46	9.73	7.75	12.1	35.2	3.5	3.2	95.7	97.4
14:47	9.36	8.02	12.2	44.7	3.1	3.2	90.2	94.2
14:48	9.71	7.78	13.6	37.6	3.9	3.4	93.0	92.7
14:49	9.25	8.10	14.8	39.0	3.7	3.4	94.3	99.3
14:50	10.01	7.58	14.7	43.5	3.6	3.4	89.8	91.5
14:51	9.82	7.69	14.2	30.4	4.4	3.5	97.2	100.3
14:52	10.03	7.55	14.3	32.9	2.5	3.4	94.3	97.7
14:53	9.78	7.71	12.9	36.7	2.7	3.3	94.9	97.3
14:54	9.82	7.70	10.2	43.3	2.9	3.3	94.9	96.7
Min	8.95	7.47	10.2	17.0	1.0	1.5	79.6	82.4
Max	10.18	8.32	28.5	86.2	9.8	5.8	112.1	115.0
Avg	9.70	7.80	18.1	33.9	3.0	3.1	97.7	100.5

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - November 9, 2022

	O2	CO2	SO2	CO	THC (ppm)		NO	NOx
Time	%	%	ppm	ppm	1-min	10-min	ppm	ppm
08:38	9.62	7.67	24.2	22.1	2.6		111.3	115.8
08:39	9.87	7.51	19.6	15.9	2.7		117.8	119.3
08:40	9.57	7.76	15.8	15.9	1.8		114.2	118.8
08:41	9.61	7.73	13.4	18.6	2.3		115.4	118.1
08:42	9.11	8.11	10.3	42.1	2.6		102.1	106.1
08:43	9.38	7.94	9.1	60.8	6.0		90.1	91.3
08:44	9.06	8.16	9.7	40.9	4.8		106.3	116.8
08:45	9.54	7.85	9.1	57.2	5.5		86.6	89.5
08:46	9.47	7.88	9.4	25.0	4.3		114.1	118.7
08:47	9.60	7.81	8.7	27.5	2.5	3.5	104.6	108.2
08:48	9.53	7.84	7.9	21.5	2.8	3.5	112.6	116.6
08:49	9.41	7.94	6.2	37.4	2.9	3.6	100.9	104.6
08:50	9.29	8.00	6.2	34.6	4.0	3.8	105.8	108.2
08:51	9.03	8.21	5.6	103.3	6.0	4.1	82.8	88.4
08:52	9.31	7.99	5.6	82.6	12.2	5.1	95.8	97.7
08:53	9.02	8.21	7.6	71.7	5.3	5.0	89.1	96.7
08:54	9.72	7.70	7.8	70.2	8.9	5.4	94.9	96.3
08:55	9.59	7.79	8.4	27.2	3.8	5.2	114.8	120.3
08:56	9.88	7.57	8.0	22.6	2.3	5.0	114.2	118.6
08:57	9.52	7.82	5.3	27.1	2.0	5.0	111.2	117.3
08:58	9.74	7.66	4.3	31.5	3.0	5.0	106.7	108.4
08:59	9.31	7.97	4.2	42.0	2.5	5.0	101.1	109.0
09:00	9.44	7.87	3.3	58.7	5.7	5.2	89.1	92.0
09:01	9.32	7.95	3.7	50.3	4.6	5.0	98.9	101.6
09:02	9.63	7.76	2.6	75.5	6.5	4.4	91.4	95.4
09:03	9.91	7.53	3.2	43.0	6.1	4.5	105.8	105.4
09:04	9.74	7.65	2.6	63.6	3.3	4.0	105.1	110.0
09:05	9.81	7.60	2.7	62.6	5.5	4.1	108.0	112.4
09:06	9.56	7.79	1.8	84.8	5.7	4.5	100.7	104.7
09:07	9.64	7.72	2.0	56.8	6.9	5.0	104.7	106.6
09:08	9.31	7.97	1.7	68.8	4.6	5.1	94.8	102.0
09:09	9.58	7.77	1.0	71.6	7.6	5.6	96.3	96.3
09:10	9.30	7.98	1.7	76.8	5.8	5.7	97.2	104.9
09:11	9.92	7.54	0.3	63.3	7.7	6.0	94.4	96.0
09:12	9.67	7.70	0.6	51.7	3.9	5.7	110.3	114.4
09:13	9.99	7.49	0.0	64.1	4.9	5.6	104.9	107.9
09:14	9.76	7.64	1.1	61.7	4.5	5.7	107.9	112.6
09:15	9.76	7.64	0.0	72.7	5.6	5.7	103.2	105.4
09:16	9.37	7.91	0.0	79.7	5.3	5.7	100.9	107.8
09:17	9.43	7.89	0.7	95.4	9.7	6.0	86.7	89.8
09:18	9.45	7.85	0.6	58.2	7.4	6.2	101.7	105.2
09:19	9.50	7.84	0.0	90.7	5.5	6.0	91.7	98.1
09:20	9.84	7.57	1.0	70.9	10.1	6.4	102.4	107.2
09:21	9.70	7.68	0.1	65.3	4.2	6.1	106.8	112.2
09:22	9.89	7.54	0.7	62.3	6.3	6.3	108.2	111.2
09:23	9.56	7.78	0.0	71.7	4.4	6.3	101.6	107.1
09:24	9.76	7.63	0.3	68.6	6.5	6.5	103.2	104.3
09:25	9.28	7.98	0.7	89.0	5.4	6.5	89.9	96.8
09:26	9.65	7.73	0.0	100.1	10.6	7.0	87.1	88.1
09:27	9.25	7.99	0.0	77.9	7.1	6.7	99.2	102.2
09:28	9.81	7.62	0.0	86.5	8.8	6.9	88.4	92.6
09:29	9.70	7.68	0.0	49.9	6.0	6.9	110.4	112.5
09:30	9.80	7.62	0.0	56.3	4.1	6.3	104.6	108.4
09:31	9.80	7.61	0.0	46.7	4.0	6.3	111.9	115.5
09:32	9.77	7.64	0.0	54.5	3.5	6.1	104.3	107.1
09:33	9.61	7.74	0.0	55.8	3.8	6.0	106.5	110.9
09:34	9.35	7.95	0.0	93.6	6.7	6.0	90.0	96.7
09:35	9.55	7.79	0.0	70.8	8.7	6.3	100.0	102.1

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - November 9, 2022

	O2	CO2	SO2	CO	THC (ppm)		NO	NOx
Time	%	%	ppm	ppm	1-min	10-min	ppm	ppm
09:36	9.36	7.96	0.0	76.3	5.9	5.9	92.8	98.7
09:37	9.90	7.55	0.0	52.7	7.0	5.9	96.4	97.7
09:38	9.60	7.77	0.0	46.0	2.9	5.3	106.3	111.9
09:39	9.95	7.52	0.0	47.2	4.2	5.1	103.2	106.2
09:40	9.64	7.74	0.0	54.2	3.4	5.0	106.1	111.8
09:41	9.77	7.64	0.0	60.5	4.9	5.1	103.9	105.3
09:42	9.32	7.96	0.0	58.6	4.3	5.2	98.5	105.2
09:43	9.51	7.84	0.0	68.2	6.3	5.4	87.7	91.5
09:44	9.27	7.99	0.0	53.5	5.2	5.3	100.0	105.7
09:45	9.55	7.83	0.0	72.4	5.7	5.0	85.3	89.5
09:46	9.72	7.69	0.0	39.0	5.4	4.9	100.8	103.5
09:47	9.76	7.68	0.7	36.4	2.1	4.4	105.2	110.1
09:48	9.92	7.55	0.0	36.4	2.8	4.4	105.8	111.6
09:49	9.65	7.76	0.0	51.9	3.1	4.3	102.5	106.8
09:50	9.66	7.74	0.0	46.6	4.0	4.4	108.6	108.7
09:51	9.30	8.01	0.0	80.7	4.2	4.3	89.6	94.3
09:52	9.58	7.81	0.0	62.7	8.8	4.8	94.9	95.4
09:53	9.21	8.09	0.0	53.7	3.4	4.5	101.0	105.7
09:54	9.90	7.61	0.0	56.0	5.6	4.5	93.1	95.6
09:55	9.66	7.77	0.0	39.5	3.4	4.3	109.9	113.9
09:56	9.95	7.57	0.0	41.1	3.1	4.1	105.6	107.8
09:57	9.72	7.72	0.0	43.9	2.8	4.1	109.8	115.1
09:58	9.81	7.67	0.0	55.3	4.0	4.2	100.6	103.2
09:59	9.52	7.86	0.0	56.2	3.8	4.3	100.2	106.6
10:00	9.52	7.88	0.0	83.1	7.9	4.7	86.3	89.5
10:01	9.52	7.87	0.0	44.0	6.0	4.9	100.2	105.3
10:02	9.62	7.83	0.0	59.3	3.8	4.4	91.8	97.3
10:03	10.05	7.49	0.0	52.3	6.0	4.6	101.7	104.0
10:04	9.92	7.60	0.0	54.0	3.2	4.4	107.5	112.2
10:05	10.09	7.46	0.0	47.8	4.0	4.5	108.2	108.5
10:06	9.78	7.69	0.0	55.4	3.3	4.5	102.1	106.9
10:07	9.93	7.58	0.0	51.1	4.5	4.6	102.9	105.2
10:08	9.49	7.90	0.0	79.3	4.7	4.7	90.3	97.0
10:09	9.82	7.67	0.0	72.5	9.0	5.2	86.1	87.1
10:10	9.38	7.97	0.0	60.2	4.9	4.9	94.4	101.6
10:11	9.91	7.62	0.0	72.1	7.0	5.0	82.8	86.7
10:12	9.85	7.65	0.0	40.9	5.1	5.2	103.6	107.2
10:13	10.05	7.51	0.0	45.9	3.1	4.9	101.9	106.1
10:14	9.95	7.57	0.0	40.8	3.1	4.9	108.3	109.5
10:15	9.90	7.61	0.0	48.4	3.5	4.8	99.7	103.2
10:16	9.72	7.73	0.0	43.9	3.2	4.8	105.3	109.9
10:17	9.56	7.85	0.0	67.9	4.9	4.8	90.1	93.8
10:18	9.78	7.69	0.0	51.0	6.2	5.0	99.7	101.7
10:19	9.60	7.83	0.0	57.3	3.4	4.4	93.1	99.1
10:20	10.01	7.53	0.0	49.8	5.9	4.5	95.7	99.0
10:21	9.78	7.70	0.0	43.6	3.1	4.1	104.2	108.8
10:22	10.14	7.43	0.0	39.6	3.6	4.0	105.4	106.3
10:23	9.83	7.65	0.0	46.9	2.4	3.9	104.0	108.9
10:24	9.98	7.54	0.0	53.3	4.3	4.0	100.9	102.1
10:25	9.53	7.86	0.0	60.1	3.6	4.1	96.8	102.5
10:26	9.74	7.72	0.0	79.7	7.1	4.4	87.8	90.8
10:27	9.51	7.87	0.0	55.6	6.6	4.6	100.0	104.1
10:28	9.93	7.61	0.0	64.6	5.3	4.5	89.9	95.1
10:29	10.02	7.51	0.0	41.2	4.9	4.7	105.8	107.4
10:30	10.03	7.52	0.0	51.8	3.2	4.4	102.4	106.6
10:31	10.05	7.49	0.0	42.3	3.4	4.4	106.7	108.4
10:32	9.84	7.65	0.0	57.0	3.3	4.4	99.1	104.3
11:05	10.07	7.46	3.8	60.4	6.0		103.1	105.5

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - November 9, 2022

	O2	CO2	SO2	CO	THC (ppm)		NO	NOx
Time	%	%	ppm	ppm	1-min	10-min	ppm	ppm
11:06	9.75	7.69	3.2	76.2	5.9		99.5	103.2
11:07	9.88	7.60	2.7	72.6	8.2		97.4	100.0
11:08	9.47	7.89	1.9	128.5	7.8		88.7	94.5
11:09	9.66	7.76	1.4	127.4	19.4		82.4	84.6
11:10	9.30	8.02	0.7	117.2	17.6		89.3	93.4
11:11	9.83	7.67	0.7	161.2	18.6		79.3	81.5
11:12	9.90	7.60	2.2	77.7	25.0		101.4	105.8
11:13	9.98	7.56	0.3	86.9	8.4		96.3	98.3
11:14	9.97	7.56	0.2	80.1	9.7	12.7	103.1	105.7
11:15	9.96	7.58	1.5	91.8	8.7	12.9	97.5	101.1
11:16	9.78	7.68	1.5	69.5	9.2	13.3	100.6	105.4
11:17	9.55	7.87	0.0	97.6	8.2	13.3	89.9	93.0
11:18	9.93	7.60	0.7	61.1	13.7	13.8	97.4	100.2
11:19	9.83	7.69	0.8	52.6	6.8	12.6	109.1	113.5
11:20	10.41	7.25	0.0	54.2	5.4	11.4	102.7	108.7
11:21	10.25	7.37	0.2	51.3	5.5	10.0	113.5	117.3
11:22	10.60	7.13	0.6	55.9	4.5	8.0	110.6	115.3
11:23	10.32	7.32	0.0	63.0	4.6	7.6	108.0	113.1
11:24	10.44	7.24	0.2	89.7	5.5	7.2	101.1	103.6
11:25	10.07	7.49	0.0	90.1	7.5	7.1	101.8	102.9
11:26	10.26	7.38	0.4	86.4	8.6	7.0	102.3	104.1
11:27	10.10	7.47	0.0	78.2	8.4	7.0	113.0	116.1
11:28	10.30	7.37	0.0	91.0	7.6	6.4	101.1	106.9
11:29	10.60	7.13	0.0	67.6	8.8	6.6	106.1	110.2
11:30	10.53	7.19	0.0	78.3	5.3	6.6	105.2	108.9
11:31	10.66	7.09	0.0	66.1	6.6	6.7	104.6	108.5
11:32	10.35	7.31	0.3	95.6	5.3	6.8	100.2	104.2
11:33	10.30	7.33	0.0	93.3	9.4	7.3	99.0	100.7
11:34	9.82	7.68	0.2	122.6	8.7	7.6	89.3	94.7
11:35	10.04	7.51	0.0	105.9	16.2	8.5	90.3	91.9
11:36	9.64	7.79	0.0	87.4	13.8	9.0	93.8	99.3
11:37	10.50	7.21	0.0	78.0	11.9	9.4	90.3	91.9
11:38	10.37	7.26	0.0	66.6	9.3	9.5	105.6	109.6
11:39	10.62	7.09	0.0	77.6	5.3	9.2	100.6	102.9
11:40	10.53	7.14	0.0	92.0	6.5	9.3	97.8	101.9
11:41	10.55	7.13	0.0	117.8	7.9	9.4	94.0	97.6
11:42	10.28	7.31	0.0	113.8	10.5	10.0	93.4	96.8
11:43	10.23	7.36	0.0	160.1	11.7	10.2	88.9	93.0
11:44	10.41	7.23	0.0	106.6	18.7	11.2	93.8	95.6
11:45	10.36	7.29	0.0	137.6	10.1	10.6	95.6	100.5
11:46	10.85	6.93	0.0	111.8	15.2	10.7	92.0	95.6
11:47	10.53	7.16	0.0	134.1	9.7	10.5	95.3	99.4
11:48	10.76	7.00	0.0	97.8	11.9	10.8	100.6	102.5
11:49	10.34	7.29	0.0	130.4	7.6	11.0	95.1	99.1
11:50	10.44	7.22	0.0	117.3	12.3	11.6	96.8	98.7
11:51	10.02	7.52	0.0	120.3	11.0	11.9	98.4	102.9
11:52	10.29	7.34	0.0	98.5	14.8	12.3	98.5	99.1
11:53	9.99	7.54	0.0	94.2	11.1	12.2	101.3	107.2
11:54	10.35	7.32	0.0	120.9	11.0	11.5	91.5	94.9
11:55	10.36	7.29	0.0	49.6	15.4	12.0	110.6	113.4
11:56	10.50	7.21	0.0	51.0	4.5	10.9	107.7	111.6
11:57	10.37	7.27	0.0	46.7	4.6	10.4	111.3	114.9
11:58	10.12	7.47	0.0	77.3	4.5	9.7	101.7	105.7
11:59	10.03	7.51	0.0	78.0	8.7	9.8	101.8	106.7
12:00	9.88	7.64	0.0	140.3	9.8	9.5	89.7	93.2
12:01	10.24	7.37	0.0	95.5	20.6	10.5	99.1	100.3
12:02	10.02	7.55	0.0	86.7	10.4	10.1	99.7	104.9
12:03	10.57	7.13	0.0	93.6	9.9	9.9	97.9	99.9

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - November 9, 2022

	O2	CO2	SO2	CO	THC (ppm)		NO	NOx
Time	%	%	ppm	ppm	1-min	10-min	ppm	ppm
12:04	10.34	7.30	0.0	91.1	9.7	9.8	100.7	105.1
12:05	10.65	7.08	0.0	100.6	8.9	9.2	97.9	99.7
12:06	10.26	7.35	0.0	120.1	8.7	9.6	95.0	100.7
12:07	10.16	7.44	0.0	159.6	12.9	10.4	88.3	90.6
12:08	9.99	7.54	0.0	163.6	19.7	11.9	87.2	91.7
12:09	10.18	7.42	0.0	176.7	20.6	13.1	86.2	88.3
12:10	10.54	7.15	0.0	97.1	21.8	14.3	98.5	98.7
12:11	10.65	7.10	0.0	59.7	8.3	13.1	102.2	107.3
12:12	10.86	6.93	0.0	51.7	5.1	12.6	103.6	104.5
12:13	10.80	6.99	0.0	59.6	3.3	11.9	101.9	104.6
12:14	10.86	6.93	0.0	60.1	3.9	11.3	98.3	102.1
12:15	10.41	7.25	0.0	98.9	3.8	10.8	92.5	95.5
12:16	10.44	7.22	0.0	85.7	8.9	10.8	95.5	97.7
12:17	10.09	7.49	0.0	120.0	7.4	10.3	92.4	94.7
12:18	10.48	7.20	0.0	86.3	13.5	9.7	97.7	99.0
12:19	10.16	7.44	0.0	67.4	8.3	8.4	98.9	104.2
12:20	10.71	7.05	0.0	76.4	6.3	6.9	91.8	96.9
12:21	10.48	7.20	0.0	40.0	7.0	6.7	109.1	111.6
12:22	10.62	7.12	0.0	48.5	2.6	6.5	104.9	107.1
12:23	10.45	7.22	0.0	37.8	4.0	6.6	109.3	112.9
12:24	10.37	7.29	0.0	37.6	2.7	6.4	107.9	110.6
12:25	10.04	7.50	0.0	35.9	3.1	6.4	107.0	111.2
12:26	9.87	7.64	0.0	71.7	3.5	5.8	93.5	98.1
12:27	9.98	7.55	0.0	44.1	10.0	6.1	103.6	105.6
12:28	10.01	7.55	0.0	51.5	4.6	5.2	100.1	104.7
12:29	10.56	7.12	0.0	38.4	6.0	5.0	102.9	105.9
12:30	10.36	7.27	0.0	41.3	3.4	4.7	108.5	112.9
12:31	10.54	7.12	0.0	45.9	3.5	4.3	103.4	107.2
12:32	10.17	7.39	0.0	48.9	3.7	4.4	103.9	108.1
12:33	10.23	7.33	0.0	47.2	4.6	4.5	101.7	105.6
12:34	9.79	7.64	0.0	61.5	4.4	4.7	95.5	100.9
12:35	10.05	7.47	0.0	66.2	7.7	5.1	89.6	92.2
12:36	9.80	7.63	0.0	63.4	8.2	5.6	98.8	101.8
12:37	10.27	7.32	0.0	65.1	7.9	5.4	92.2	96.8
12:38	10.33	7.25	0.0	41.4	8.0	5.8	106.8	108.3
12:39	10.34	7.26	0.0	60.2	3.7	5.5	101.0	106.5
12:40	10.31	7.27	0.0	55.3	6.2	5.8	103.1	107.5
12:41	10.13	7.41	0.0	70.7	5.0	6.0	98.5	102.3
12:42	10.01	7.49	0.0	57.0	7.7	6.3	100.3	103.6
12:43	9.80	7.66	0.0	71.7	6.2	6.5	87.8	92.1
12:44	10.09	7.44	0.0	55.3	9.3	7.0	93.6	96.7
12:45	9.89	7.61	0.0	67.9	6.1	6.8	93.8	98.0
12:46	10.45	7.19	0.0	58.5	8.5	6.9	95.1	95.1
12:47	10.21	7.36	0.0	47.5	6.4	6.7	103.6	109.0
12:48	10.46	7.19	0.0	48.1	4.4	6.3	101.2	102.5
12:49	10.11	7.44	0.0	53.8	4.3	6.4	100.3	105.1
12:50	10.24	7.36	0.0	57.5	5.4	6.3	97.1	99.1
12:51	9.86	7.62	0.0	68.4	5.9	6.4	93.9	100.3
12:52	9.98	7.56	0.0	75.3	8.2	6.5	85.6	89.3
12:53	9.92	7.58	0.0	53.5	9.7	6.8	95.8	98.7
12:54	10.15	7.45	0.0	68.7	5.8	6.5	92.5	96.6
12:55	10.40	7.26	0.0	70.7	8.1	6.7	95.4	101.9
12:56	10.33	7.34	0.0	86.1	6.9	6.5	98.4	101.6
12:57	10.44	7.25	0.0	54.3	8.0	6.7	99.0	101.2
12:58	10.20	7.45	0.0	53.8	4.7	6.7	99.4	102.2
12:59	10.29	7.37	0.0	45.9	5.2	6.8	101.3	102.1
13:00	9.81	7.73	0.0	91.8	4.6	6.7	90.2	94.0
13:01	10.10	7.51	0.0	119.8	14.1	7.5	83.4	85.4

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - November 9, 2022

	O2	CO2	SO2	CO	THC (ppm)		NO	NOx
Time	%	%	ppm	ppm	1-min	10-min	ppm	ppm
13:02	9.75	7.74	0.0	135.7	16.6	8.4	87.0	90.9
13:03	10.45	7.25	0.0	134.5	19.1	9.3	79.6	83.0
13:04	10.38	7.26	0.0	90.3	18.2	10.5	94.7	97.7
13:05	10.57	7.14	0.0	103.2	8.4	10.6	88.2	91.5
Min	9.02	6.93	0.0	15.9	1.8	3.5	79.3	81.5
Max	10.86	8.21	24.2	176.7	25.0	14.3	117.8	120.3
Avg	9.94	7.56	1.1	69.6	6.9	6.9	99.2	102.9

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - November 10, 2022

	O2	CO2	SO2	CO	THC (ppm)		NO	NOx
Time	%	%	ppm	ppm	1-min	10-min	ppm	ppm
08:40	9.96	7.98	14.2	25.5	4.4		107.1	109.8
08:41	10.20	7.88	10.0	31.5	3.9		95.3	100.0
08:42	10.48	7.68	7.2	28.7	4.3		102.7	107.6
08:43	10.33	7.83	6.2	37.5	3.8		101.8	106.5
08:44	10.62	7.62	3.9	26.7	4.3		107.9	109.8
08:45	10.25	7.92	3.9	29.0	3.2		99.8	105.5
08:46	10.42	7.78	2.9	29.2	3.9		103.2	104.8
08:47	10.05	8.07	1.9	33.7	4.0		94.2	98.8
08:48	10.29	7.89	2.0	30.0	4.8		97.0	96.9
08:49	9.83	8.24	1.3	40.1	4.3	4.1	93.6	99.0
08:50	10.39	7.83	0.8	44.7	6.5	4.3	87.9	91.7
08:51	10.10	8.03	0.6	28.9	5.6	4.5	100.7	104.0
08:52	10.30	7.89	1.0	41.7	4.4	4.5	90.5	94.9
08:53	10.20	7.94	1.2	32.0	5.5	4.7	100.5	104.9
08:54	10.25	7.93	0.9	33.3	4.0	4.6	95.2	100.0
08:55	10.11	8.01	0.0	42.0	5.1	4.8	94.5	100.3
08:56	9.94	8.17	0.2	56.5	6.8	5.1	83.5	87.6
08:57	10.10	8.02	0.8	49.0	8.3	5.5	89.3	90.8
08:58	9.81	8.25	0.0	58.0	7.0	5.8	83.9	90.1
08:59	10.30	7.87	0.2	50.4	10.7	6.4	90.0	87.4
09:00	10.07	8.05	0.5	42.8	6.2	6.4	95.6	100.7
09:01	10.44	7.75	0.5	40.7	6.2	6.4	97.0	98.8
09:02	10.06	8.04	0.0	42.5	4.9	6.5	96.5	100.4
09:03	10.24	7.91	0.1	44.4	6.4	6.6	94.9	97.6
09:04	9.85	8.19	0.0	50.1	5.9	6.8	91.9	99.4
09:05	10.05	8.05	0.0	58.7	9.7	7.2	82.0	82.0
09:06	9.67	8.32	0.3	59.9	8.9	7.4	90.4	96.9
09:07	10.11	8.02	0.0	85.8	12.7	7.9	78.5	81.2
09:08	10.13	7.97	0.0	43.5	14.5	8.6	96.3	100.8
09:09	10.16	7.98	0.5	40.7	5.5	8.1	91.0	95.1
09:10	10.26	7.87	0.6	40.7	6.5	8.1	96.6	101.2
09:11	9.99	8.09	0.5	60.3	6.5	8.2	85.5	91.0
09:12	10.04	8.03	0.0	51.9	10.5	8.7	92.3	94.3
09:13	9.64	8.34	0.0	83.4	8.6	8.9	77.8	83.6
09:14	10.08	8.01	0.0	79.0	23.1	10.6	84.1	85.7
09:15	9.80	8.24	0.0	60.4	11.4	10.8	85.1	91.9
09:16	10.37	7.80	0.6	50.7	11.7	11.1	86.6	88.1
09:17	10.05	8.05	0.0	38.5	6.9	10.5	95.4	101.4
09:18	10.43	7.76	0.0	41.8	6.5	9.7	90.6	92.9
09:19	10.13	7.97	0.0	57.9	5.2	9.7	93.4	98.1
09:20	10.23	7.91	0.1	82.7	9.9	10.0	88.8	91.5
09:21	9.95	8.11	0.0	68.8	10.2	10.4	88.1	91.3
09:22	10.01	8.07	0.3	73.6	10.7	10.4	80.6	83.2
09:23	10.00	8.07	0.0	60.1	11.1	10.7	89.9	93.8
09:24	10.15	7.98	0.0	77.1	8.9	9.3	81.6	87.6
09:25	10.32	7.83	0.0	52.5	11.5	9.3	93.7	96.5
09:26	10.14	7.97	0.0	60.7	6.7	8.8	87.9	93.1
09:27	10.35	7.81	0.0	52.7	10.0	9.1	89.3	92.9
09:28	10.06	8.05	0.2	50.6	6.5	9.1	87.4	91.0
09:29	10.29	7.86	0.0	55.9	7.6	9.3	92.6	94.0
09:30	9.90	8.14	0.0	83.1	7.7	9.1	83.0	88.5
09:31	10.21	7.92	0.0	85.4	12.6	9.3	84.1	85.2
09:32	9.68	8.31	0.4	85.7	10.0	9.3	85.7	93.3
09:33	10.29	7.86	0.2	102.1	16.0	9.8	76.6	80.5
09:34	10.02	8.05	0.0	57.5	13.4	10.2	94.3	99.7
09:35	10.29	7.87	0.3	56.8	7.4	9.8	86.5	89.4
09:36	10.19	7.92	0.0	48.0	7.1	9.8	95.9	101.2
09:37	10.19	7.93	0.0	66.6	7.1	9.5	84.1	88.3

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - November 10, 2022

	O2	CO2	SO2	CO	THC (ppm)		NO	NOx
Time	%	%	ppm	ppm	1-min	10-min	ppm	ppm
09:38	10.06	8.01	0.0	67.2	8.1	9.7	85.9	90.9
09:39	9.71	8.30	0.0	149.2	10.1	9.9	71.0	76.4
09:40	9.91	8.13	0.0	133.9	33.3	12.5	76.4	81.8
09:41	9.76	8.27	0.3	153.4	17.3	13.0	73.3	78.5
09:42	10.38	7.79	0.0	104.3	23.7	14.3	77.2	78.1
09:43	10.29	7.86	0.0	42.0	9.3	13.7	99.6	102.8
09:44	10.70	7.58	0.0	39.2	4.0	12.7	100.5	102.0
09:45	10.37	7.84	0.0	38.9	3.6	12.4	101.4	106.1
09:46	10.61	7.66	0.6	33.2	3.8	12.0	103.5	106.7
09:47	10.18	7.98	0.0	39.4	3.4	11.7	97.2	102.6
09:48	10.46	7.78	0.0	42.2	4.2	11.3	97.6	99.3
09:49	10.10	8.04	0.0	43.1	4.3	10.7	101.2	106.7
09:50	10.69	7.62	0.0	48.9	4.4	7.8	92.7	95.8
09:51	10.47	7.75	0.0	37.4	4.6	6.5	106.2	108.7
09:52	10.61	7.67	0.0	36.3	3.6	4.5	101.5	103.4
09:53	10.58	7.66	0.0	33.0	3.6	3.9	104.4	108.3
09:54	10.41	7.82	0.0	30.7	3.1	3.9	101.6	106.3
09:55	10.28	7.89	0.0	30.7	3.3	3.8	102.3	106.1
09:56	10.07	8.07	0.4	39.8	3.6	3.8	91.2	95.3
09:57	10.28	7.89	0.0	33.4	4.3	3.9	99.5	101.6
09:58	10.07	8.08	0.0	45.5	3.7	3.8	94.8	101.0
09:59	10.65	7.63	0.3	36.8	5.0	3.9	94.9	98.0
10:00	10.32	7.87	0.0	40.5	3.9	3.9	101.5	106.7
10:01	10.68	7.60	0.0	38.1	4.2	3.8	103.5	105.6
10:02	10.39	7.81	0.0	39.5	3.7	3.8	103.7	109.0
10:03	10.49	7.75	0.0	39.0	4.0	3.9	101.2	104.3
10:04	10.09	8.03	0.0	48.6	3.9	4.0	96.6	102.4
10:05	10.24	7.94	0.0	54.3	5.6	4.2	88.0	90.3
10:06	9.99	8.09	0.0	46.3	5.7	4.4	94.6	99.2
10:07	10.24	7.93	0.0	48.0	5.5	4.5	87.8	91.8
10:08	10.34	7.82	0.0	29.9	5.6	4.7	97.0	98.0
10:09	10.25	7.92	0.0	40.4	3.5	4.6	95.2	100.3
10:10	10.47	7.72	0.0	37.2	4.7	4.6	103.1	104.0
10:11	10.18	7.96	0.0	43.8	3.8	4.6	99.8	103.9
10:12	10.31	7.84	0.0	44.1	4.7	4.7	101.1	104.5
10:13	9.94	8.12	0.0	65.9	4.7	4.8	93.0	98.6
10:14	10.24	7.90	0.0	49.3	7.4	5.1	94.5	94.7
10:15	9.84	8.20	0.0	60.2	5.2	5.1	96.5	102.0
10:16	10.49	7.71	0.0	76.3	7.5	5.3	84.5	88.3
10:17	10.23	7.89	0.0	50.5	9.4	5.7	100.0	104.3
10:18	10.49	7.72	0.0	49.7	5.3	5.6	94.2	95.7
10:19	10.31	7.83	0.0	48.9	4.9	5.8	98.0	103.5
10:20	10.39	7.79	0.0	60.3	5.0	5.8	92.8	94.5
10:21	10.08	7.99	0.0	76.6	5.9	6.0	92.3	98.5
10:22	10.03	8.06	0.0	89.5	8.2	6.4	79.8	83.2
10:23	9.92	8.12	0.0	101.9	10.0	6.9	85.0	88.6
10:24	9.94	8.14	0.0	122.0	12.4	7.4	77.9	83.3
10:25	10.37	7.80	0.0	82.5	14.4	8.3	89.8	92.6
10:26	10.17	7.95	0.0	75.9	8.2	8.4	90.2	96.1
10:27	10.48	7.72	0.0	72.8	7.4	8.2	91.6	96.7
10:28	10.11	8.00	0.0	81.3	6.8	8.3	90.6	95.8
10:29	10.34	7.83	0.0	74.0	8.0	8.6	90.2	92.7
10:30	9.87	8.18	0.0	96.7	7.3	8.9	84.2	90.2
10:31	10.21	7.93	0.0	121.6	11.7	9.4	79.5	81.2
10:32	9.86	8.18	0.0	83.9	13.3	10.0	88.4	92.2
10:33	10.50	7.73	0.0	91.6	9.3	9.9	81.8	85.8
10:34	10.36	7.81	0.0	76.7	10.1	9.7	95.5	97.9
10:35	10.51	7.72	0.0	82.2	7.0	8.9	93.0	96.5

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - November 10, 2022

	O2	CO2	SO2	CO	THC (ppm)		NO	NOx
Time	%	%	ppm	ppm	1-min	10-min	ppm	ppm
11:07	10.25	7.93	3.5	72.5	8.6		83.9	88.7
11:08	10.58	7.65	4.3	58.2	8.7		90.1	92.7
11:09	10.34	7.85	2.5	66.1	7.9		91.9	95.8
11:10	10.68	7.58	2.4	47.9	7.2		94.9	95.7
11:11	10.36	7.82	2.6	64.7	6.0		93.0	98.0
11:12	10.55	7.68	3.3	67.2	6.6		94.9	97.1
11:13	10.14	7.98	2.6	78.6	7.6		87.8	93.9
11:14	10.39	7.80	2.9	98.9	8.9		80.7	84.8
11:15	10.01	8.07	1.4	95.6	14.0		88.7	94.8
11:16	10.58	7.67	2.5	96.6	11.0	8.6	77.0	80.9
11:17	10.50	7.70	2.5	59.2	13.4	9.1	94.2	97.1
11:18	10.64	7.62	2.4	65.5	7.7	9.0	93.2	96.6
11:19	10.59	7.62	2.5	70.1	6.9	8.9	94.3	97.2
11:20	10.53	7.69	1.2	89.5	7.0	8.9	89.7	93.8
11:21	10.48	7.70	0.7	95.3	9.2	9.2	92.4	93.3
11:22	10.25	7.90	0.7	132.5	10.3	9.6	81.2	85.6
11:23	10.50	7.69	1.5	103.9	15.9	10.4	88.4	91.1
11:24	10.31	7.87	1.0	115.8	12.6	10.8	84.0	88.2
11:25	10.80	7.47	1.9	88.2	12.3	10.6	86.6	89.4
11:26	10.50	7.70	1.8	99.1	10.1	10.5	90.7	94.8
11:27	10.88	7.42	0.0	93.8	8.7	10.1	90.3	92.2
11:28	10.51	7.69	2.3	82.7	9.3	10.2	89.1	93.6
11:29	10.65	7.60	2.1	85.3	7.6	10.3	89.0	90.7
11:30	10.31	7.83	1.3	128.7	9.3	10.5	87.1	91.7
11:31	10.44	7.76	1.4	129.5	12.2	10.8	78.8	82.4
11:32	10.20	7.92	1.0	74.5	17.1	11.5	87.7	93.9
11:33	10.55	7.69	0.4	91.8	8.3	10.7	78.9	81.3
11:34	10.67	7.57	0.7	61.0	11.1	10.6	92.0	94.2
11:35	10.72	7.55	1.0	65.8	7.0	10.1	90.2	94.5
11:36	10.86	7.43	2.1	42.5	6.8	9.7	95.6	99.8
11:37	10.62	7.62	1.2	53.3	4.5	9.3	93.6	98.3
11:38	10.70	7.55	1.0	43.7	5.1	8.9	94.1	96.4
11:39	10.31	7.85	0.0	49.4	4.7	8.6	84.9	89.4
11:40	10.60	7.64	1.1	47.3	5.1	8.2	90.0	90.2
11:41	10.28	7.89	1.1	56.3	5.7	7.5	88.2	93.7
11:42	10.82	7.47	0.7	68.4	5.9	6.4	81.8	84.0
11:43	10.55	7.66	2.0	58.5	8.0	6.4	91.3	95.8
11:44	10.85	7.46	0.0	69.2	5.4	5.8	90.2	92.5
11:45	10.61	7.62	0.3	77.5	7.0	5.8	91.2	93.7
11:46	10.69	7.57	1.8	76.8	6.4	5.8	89.1	92.8
11:47	10.39	7.77	0.1	78.0	7.9	6.1	91.9	96.4
11:48	10.33	7.85	0.7	75.0	7.7	6.4	82.7	85.0
11:49	10.34	7.81	0.8	58.7	8.5	6.8	92.5	96.2
11:50	10.37	7.83	0.8	81.0	6.4	6.9	82.9	87.4
11:51	10.71	7.54	0.4	73.8	8.6	7.2	88.9	91.1
11:52	10.50	7.72	0.9	67.8	8.2	7.4	86.8	91.9
11:53	10.77	7.50	0.0	65.9	6.5	7.3	89.1	91.2
11:54	10.44	7.75	0.0	74.4	6.3	7.3	87.8	91.0
11:55	10.58	7.64	0.2	65.2	6.7	7.3	89.7	91.1
11:56	10.16	7.96	0.9	80.0	6.6	7.3	80.4	85.8
11:57	10.53	7.68	0.8	79.8	8.0	7.4	80.1	81.2
11:58	10.10	7.99	0.4	93.9	9.7	7.6	85.8	91.6
11:59	10.60	7.65	0.0	103.8	9.7	7.7	78.0	79.6
12:00	10.51	7.70	0.8	57.7	13.3	8.4	95.3	95.1
12:01	10.67	7.59	1.0	69.2	6.5	8.2	86.3	87.2
12:02	10.62	7.60	0.9	54.1	7.0	8.0	90.2	91.4
12:03	10.51	7.71	1.2	60.9	4.9	7.9	86.7	89.1
12:04	10.45	7.73	0.2	71.9	6.1	7.9	87.7	91.0

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - November 10, 2022

	O2	CO2	SO2	CO	THC (ppm)		NO	NOx
Time	%	%	ppm	ppm	1-min	10-min	ppm	ppm
12:05	10.17	7.96	0.7	96.2	6.5	7.8	78.3	80.6
12:06	10.45	7.74	0.2	64.6	10.9	8.3	82.6	83.7
12:07	10.21	7.96	1.0	68.0	8.0	8.3	82.0	86.1
12:08	10.73	7.54	0.4	59.6	7.6	8.1	83.0	83.8
12:09	10.45	7.76	1.4	60.6	8.0	7.9	89.5	93.2
12:10	10.80	7.50	0.9	55.8	5.8	7.1	92.0	94.6
12:11	10.46	7.75	0.0	66.2	5.8	7.1	90.9	94.5
12:12	10.69	7.59	1.3	72.3	6.0	7.0	86.5	88.5
12:13	10.28	7.88	0.0	58.7	7.8	7.2	87.5	92.4
12:14	10.48	7.75	0.6	56.6	6.3	7.3	82.3	84.9
12:15	10.25	7.89	1.2	42.7	6.7	7.3	91.0	96.3
12:16	10.52	7.73	0.4	55.9	4.7	6.7	79.9	83.2
12:17	10.69	7.56	0.5	34.2	7.3	6.6	94.6	98.1
12:18	10.55	7.69	0.0	46.4	4.5	6.3	89.7	93.7
12:19	10.74	7.52	0.4	52.2	4.8	6.0	94.3	96.1
12:20	10.47	7.74	0.2	53.5	5.1	5.9	89.2	92.4
12:21	10.61	7.63	0.2	55.3	5.6	5.9	93.3	95.7
12:22	10.25	7.91	0.5	78.4	5.8	5.9	83.1	88.1
12:23	10.61	7.63	0.0	73.7	8.3	5.9	86.5	86.0
12:24	10.21	7.94	0.9	74.5	8.3	6.1	86.4	92.8
12:25	10.73	7.55	0.0	76.6	7.4	6.2	81.4	85.9
12:26	10.51	7.71	1.0	56.8	9.3	6.6	91.0	94.7
12:27	10.82	7.50	0.5	59.2	5.6	6.5	89.2	91.8
12:28	10.58	7.64	0.1	70.4	5.7	6.6	91.6	95.1
12:29	10.70	7.59	0.8	62.6	6.0	6.7	89.1	92.0
12:30	10.43	7.77	0.5	58.2	6.2	6.8	88.7	93.0
12:31	10.41	7.80	0.2	79.5	5.3	6.8	80.1	83.2
12:32	10.39	7.79	0.8	62.0	8.5	7.0	88.8	89.3
12:33	10.35	7.85	0.6	87.0	6.4	6.9	82.7	87.0
12:34	10.72	7.55	1.4	65.7	9.0	6.9	89.2	91.3
12:35	10.52	7.72	1.4	67.8	8.0	7.0	86.8	91.4
12:36	10.84	7.47	1.2	64.8	6.4	6.7	88.7	92.2
12:37	10.50	7.73	0.5	78.2	6.3	6.8	87.9	91.8
12:38	10.69	7.57	0.4	76.1	6.9	6.9	90.5	92.5
12:39	10.26	7.90	0.7	96.7	6.7	7.0	82.0	86.7
12:40	10.54	7.69	1.2	79.8	9.3	7.3	78.2	81.0
12:41	10.14	7.98	1.3	88.8	9.2	7.7	78.2	81.0
12:42	10.69	7.60	0.4	92.8	8.4	7.7	85.3	91.3
12:43	10.60	7.63	1.3	63.3	11.3	8.2	77.0	79.7
12:44	10.73	7.58	1.2	64.8	6.2	7.9	94.0	95.6
12:45	10.63	7.62	0.9	71.0	6.2	7.7	87.5	91.2
12:46	10.60	7.66	0.3	84.0	6.2	7.7	91.2	95.6
12:47	10.52	7.69	0.0	76.1	8.2	7.9	85.0	88.5
12:48	10.33	7.86	1.1	94.1	7.2	7.9	89.7	94.1
12:49	10.55	7.68	1.2	79.8	10.1	8.2	79.7	83.9
12:50	10.34	7.87	0.2	96.7	8.4	8.1	85.5	88.2
12:51	10.81	7.50	0.0	78.4	9.4	8.2	82.8	88.2
12:52	10.51	7.72	0.4	78.0	9.2	8.2	81.1	85.4
12:53	10.87	7.46	0.7	58.7	7.0	7.8	91.4	96.0
12:54	10.58	7.67	0.4	69.2	5.9	7.8	91.0	92.2
12:55	10.76	7.55	0.6	65.9	6.0	7.7	90.8	96.0
12:56	10.39	7.81	0.4	65.1	6.6	7.8	89.6	91.3
12:57	10.55	7.73	0.1	68.4	6.1	7.6	90.2	93.7
12:58	10.36	7.83	0.8	59.2	8.3	7.7	82.1	85.3
12:59	10.64	7.67	0.0	72.3	6.2	7.3	93.0	97.0
13:00	10.74	7.55	1.2	51.8	8.2	7.3	80.4	84.3
13:01	10.66	7.64	0.0	57.9	5.6	6.9	93.6	96.5
13:02	10.84	7.48	0.7	52.4	5.6	6.5	89.7	93.3

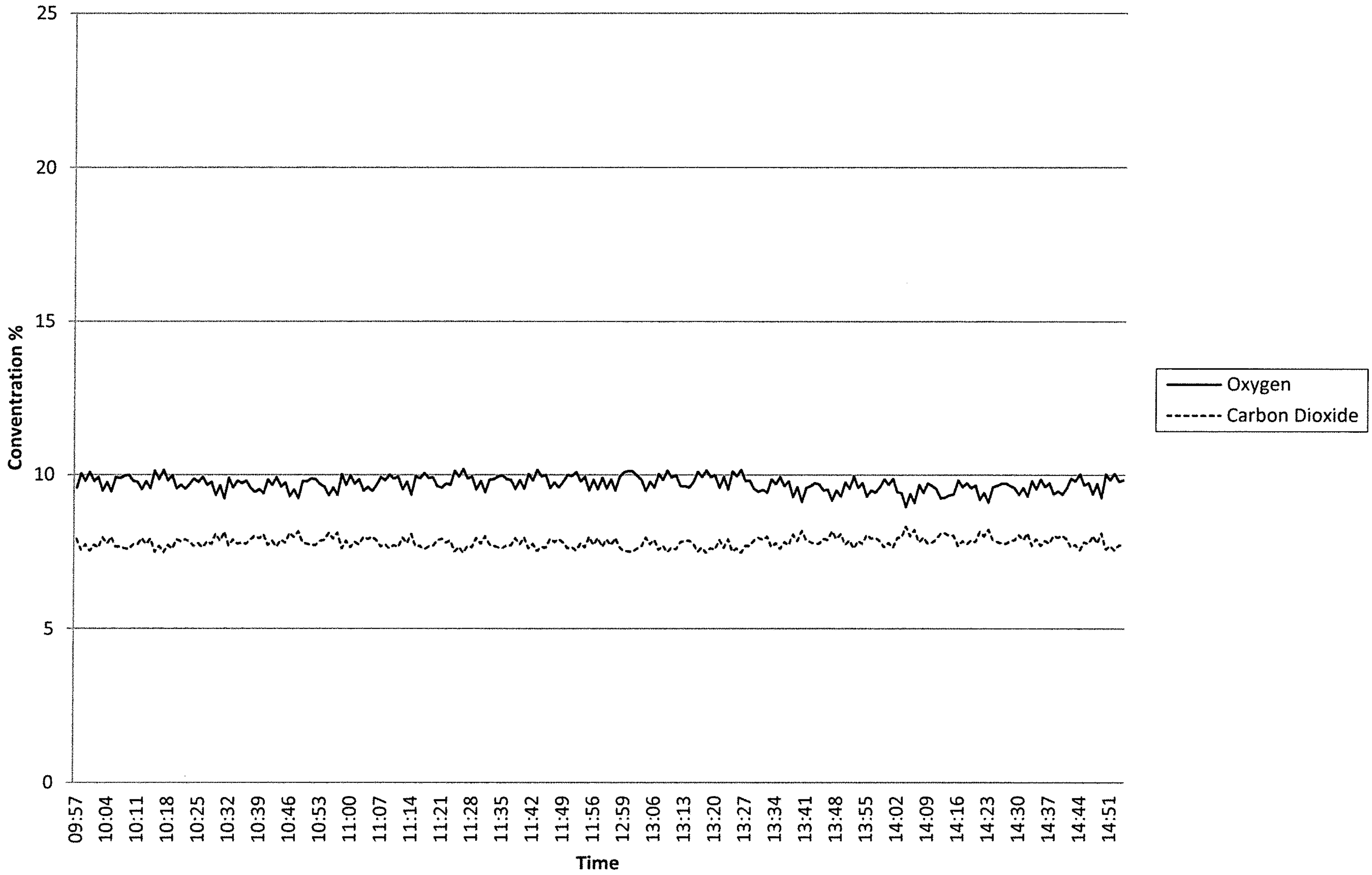
Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - November 10, 2022

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	 10-min	NO ppm	NOx ppm
13:03	10.54	7.72	0.2	65.4	5.3	6.4	95.5	98.7
13:04	10.67	7.60	0.8	61.4	6.2	6.4	88.7	93.7
13:05	10.35	7.86	0.0	79.2	6.0	6.4	92.6	94.3
13:06	10.66	7.62	0.3	76.8	8.4	6.6	81.8	87.4
13:07	10.30	7.90	0.2	78.7	8.4	6.8	84.4	88.0
Min	9.64	7.42	0.0	25.5	3.1	3.8	71.0	76.4
Max	10.88	8.34	14.2	153.4	33.3	14.3	107.9	109.8
Avg	10.36	7.82	0.8	64.9	7.6	7.6	89.8	93.4

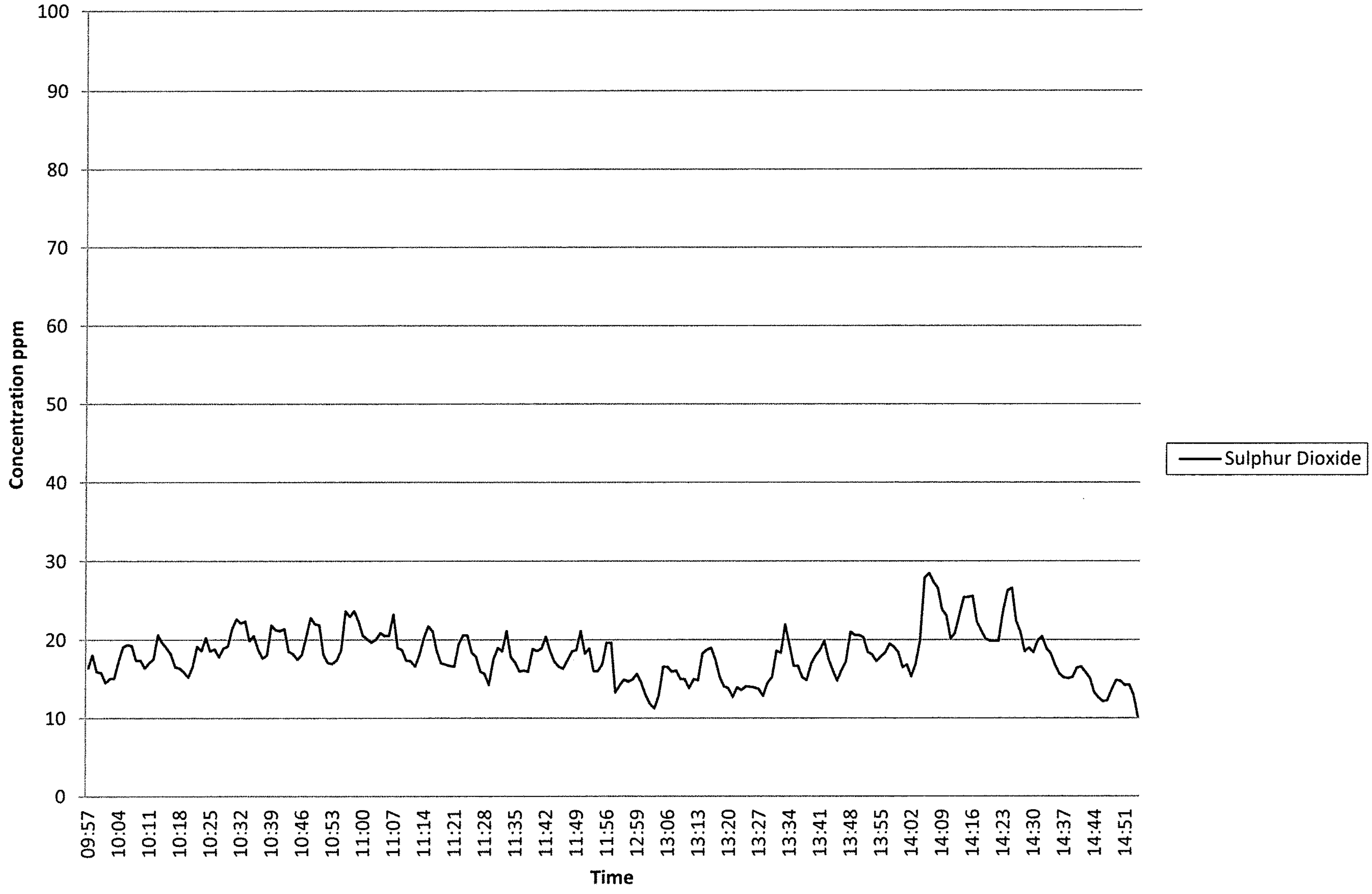
APPENDIX 25

Gas Analysis Graphs
(15 pages)

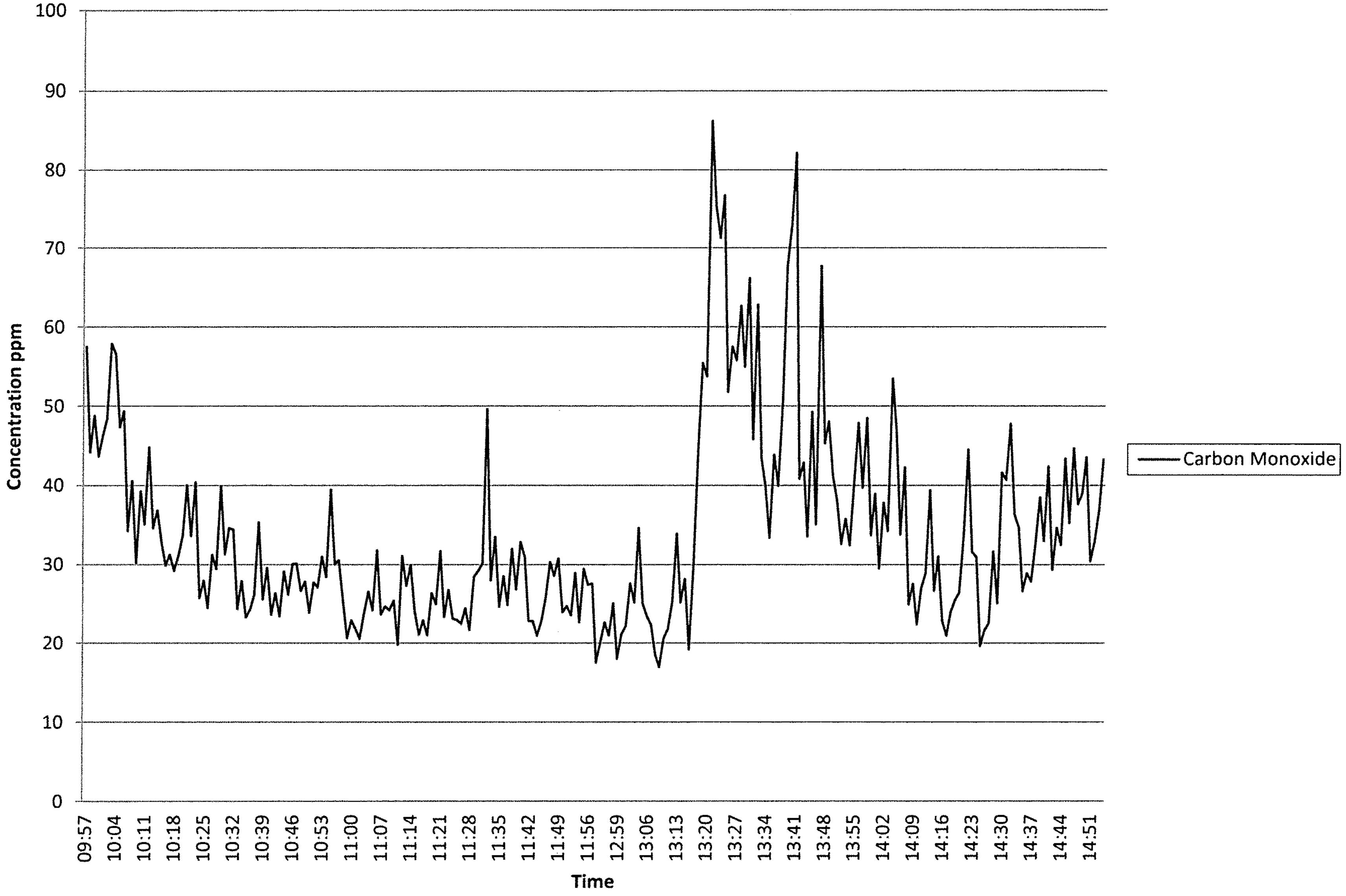
Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - November 8, 2022
Oxygen & Carbon Dioxide

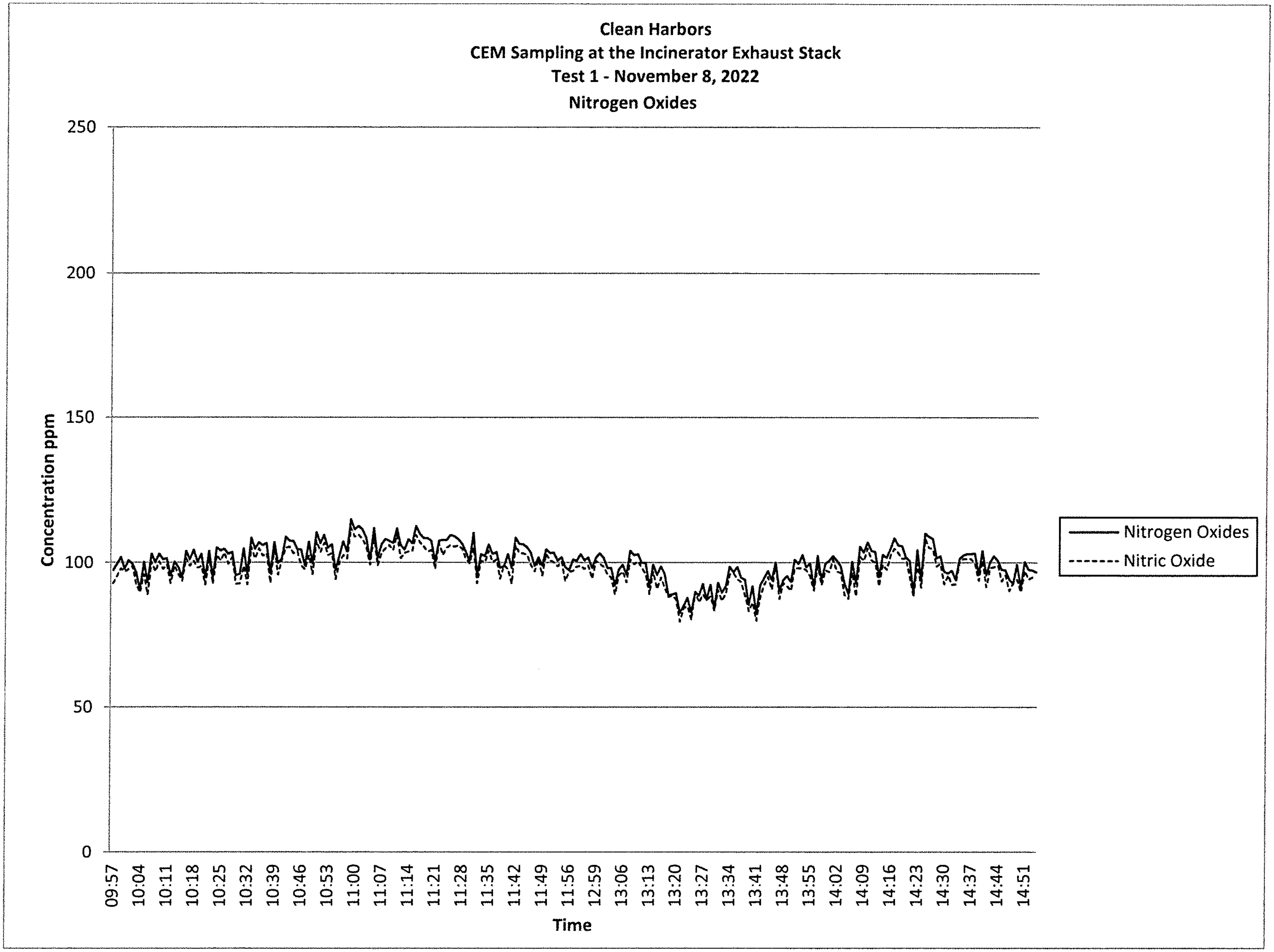


Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - November 8, 2022
Sulphur Dioxide

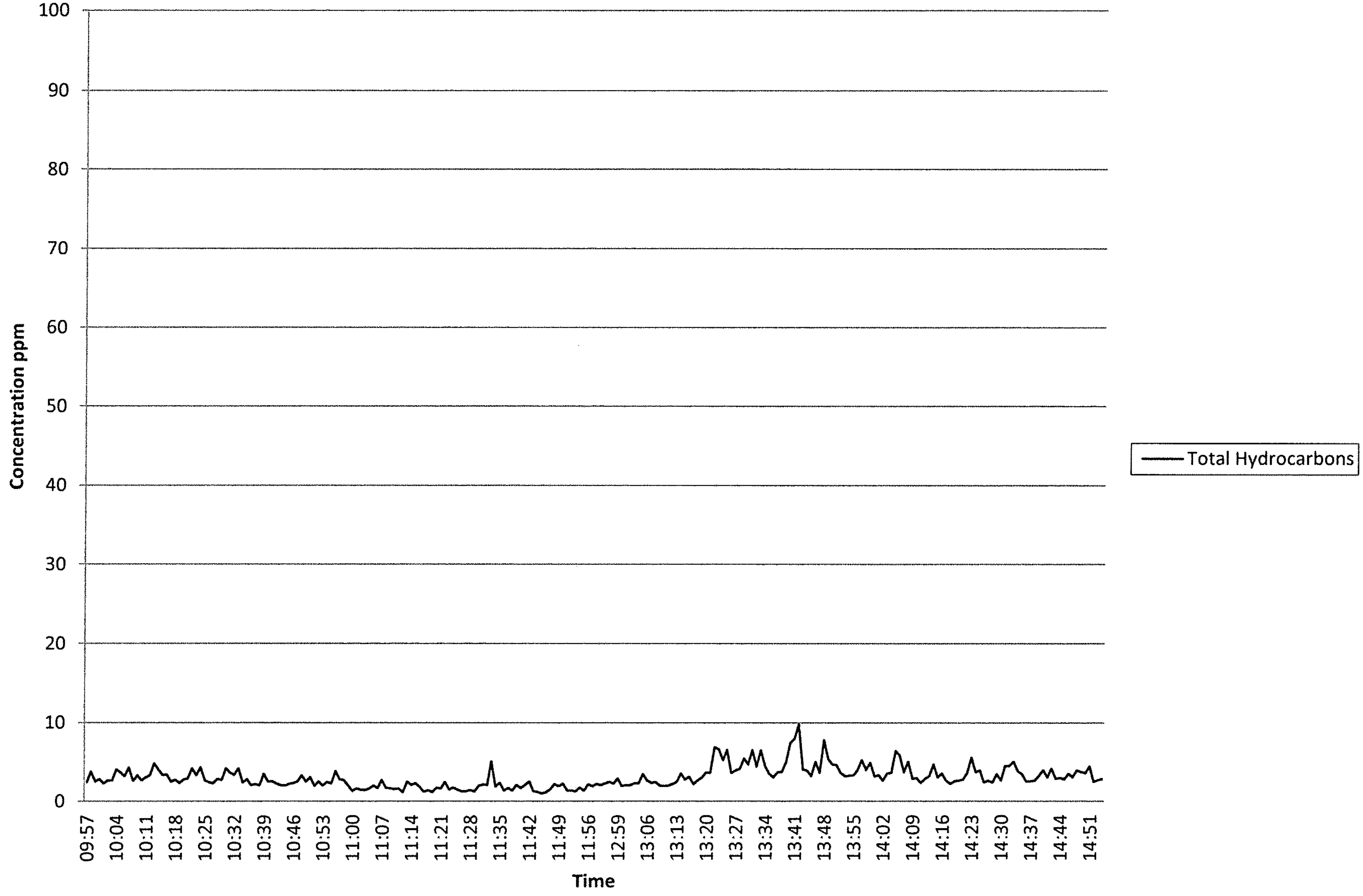


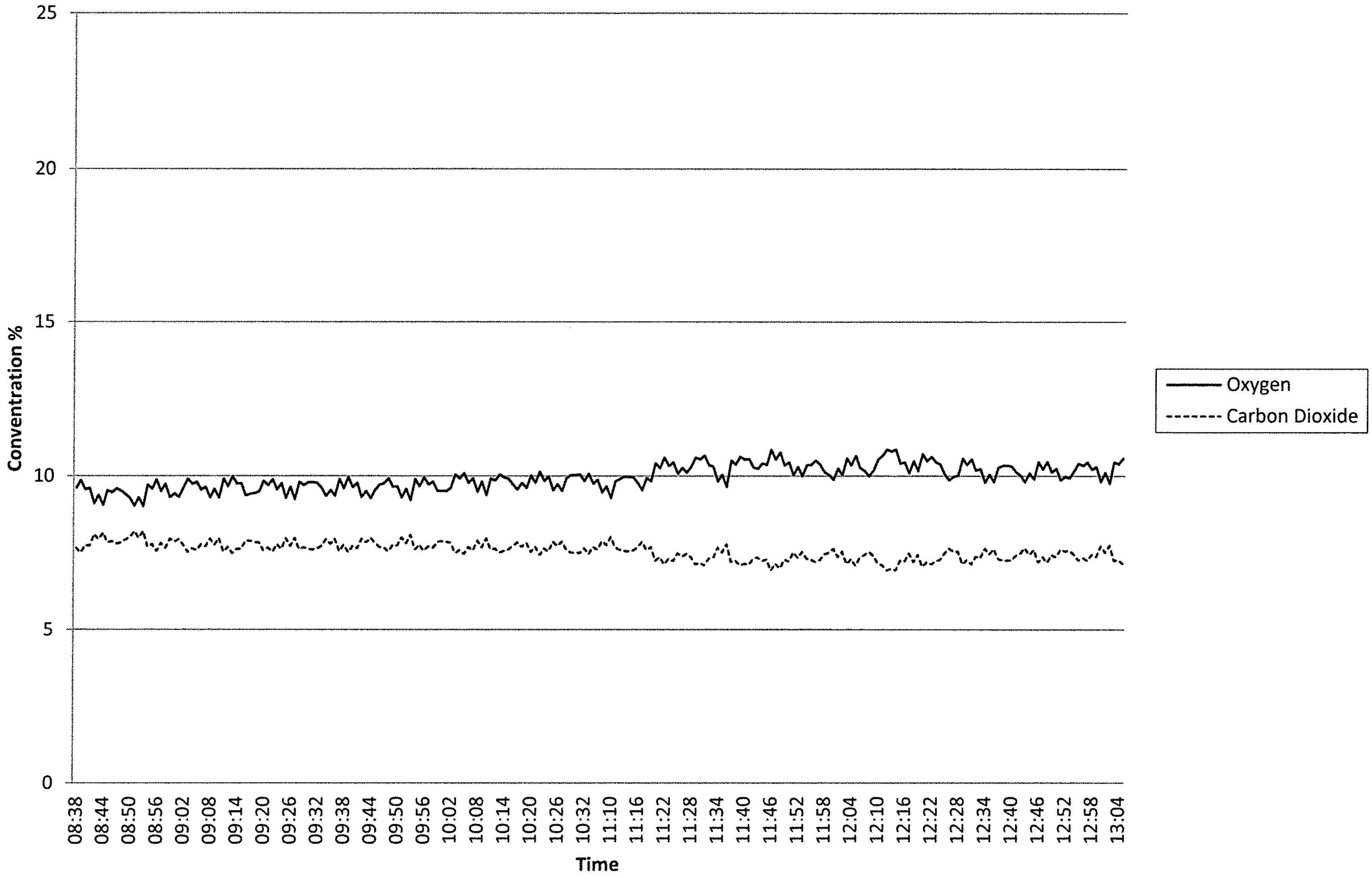
Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - November 8, 2022
Carbon Monoxide




Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - November 8, 2022
Nitrogen Oxides
Concentration ppm
250
200
150
100
50
0
09:57
10:04
10:11
10:18
10:25
10:32
10:39
10:46
10:53
11:00
11:07
11:14
11:21
11:28
11:35
11:42
11:49
11:56
12:59
13:06
13:13
13:20
13:27
13:34
13:41
13:48
13:55
14:02
14:09
14:16
14:23
14:30
14:37
14:44
14:51
Time
Nitrogen Oxides
Nitric Oxide

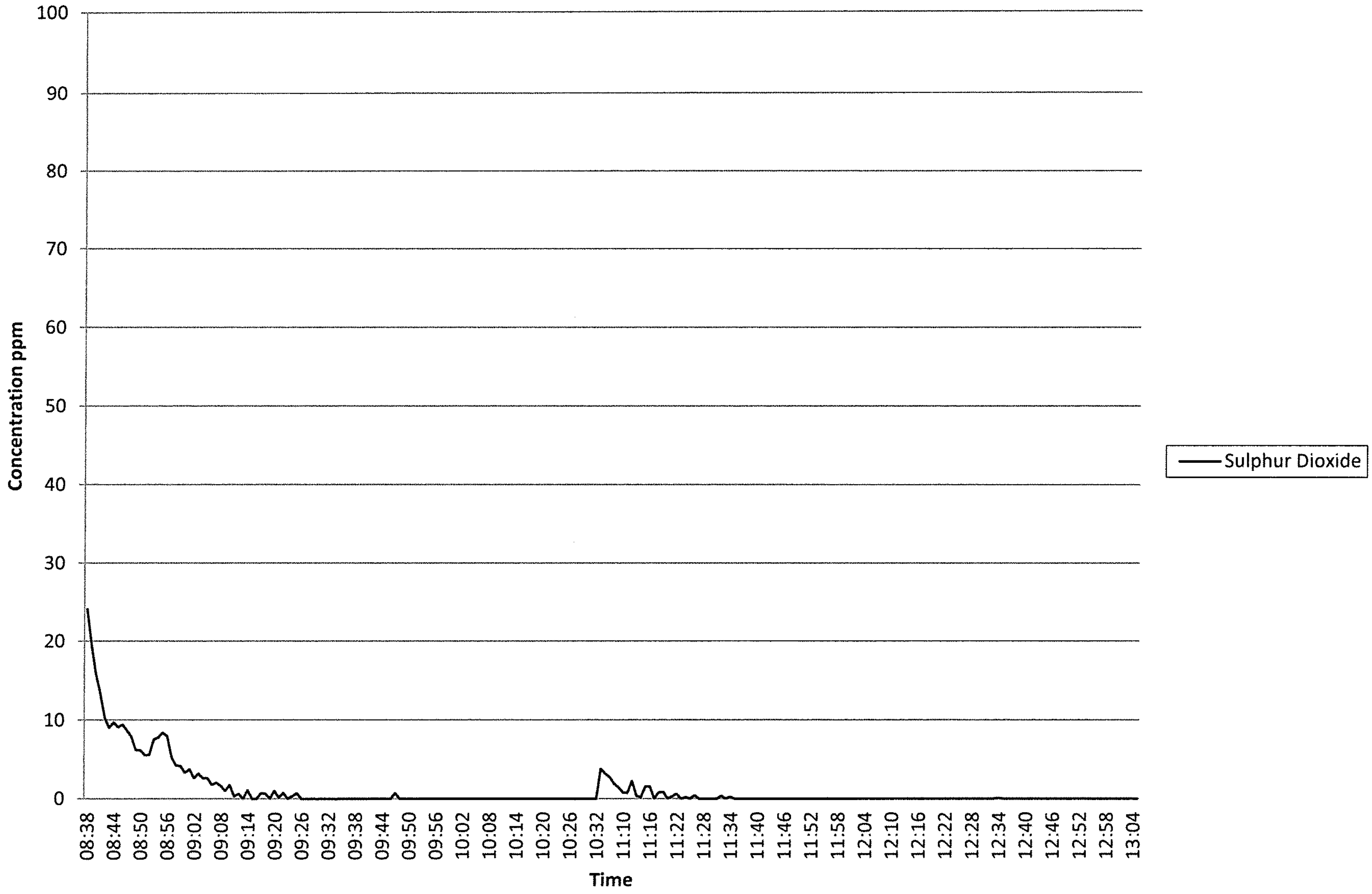
Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - November 8, 2022
Total Hydrocarbons

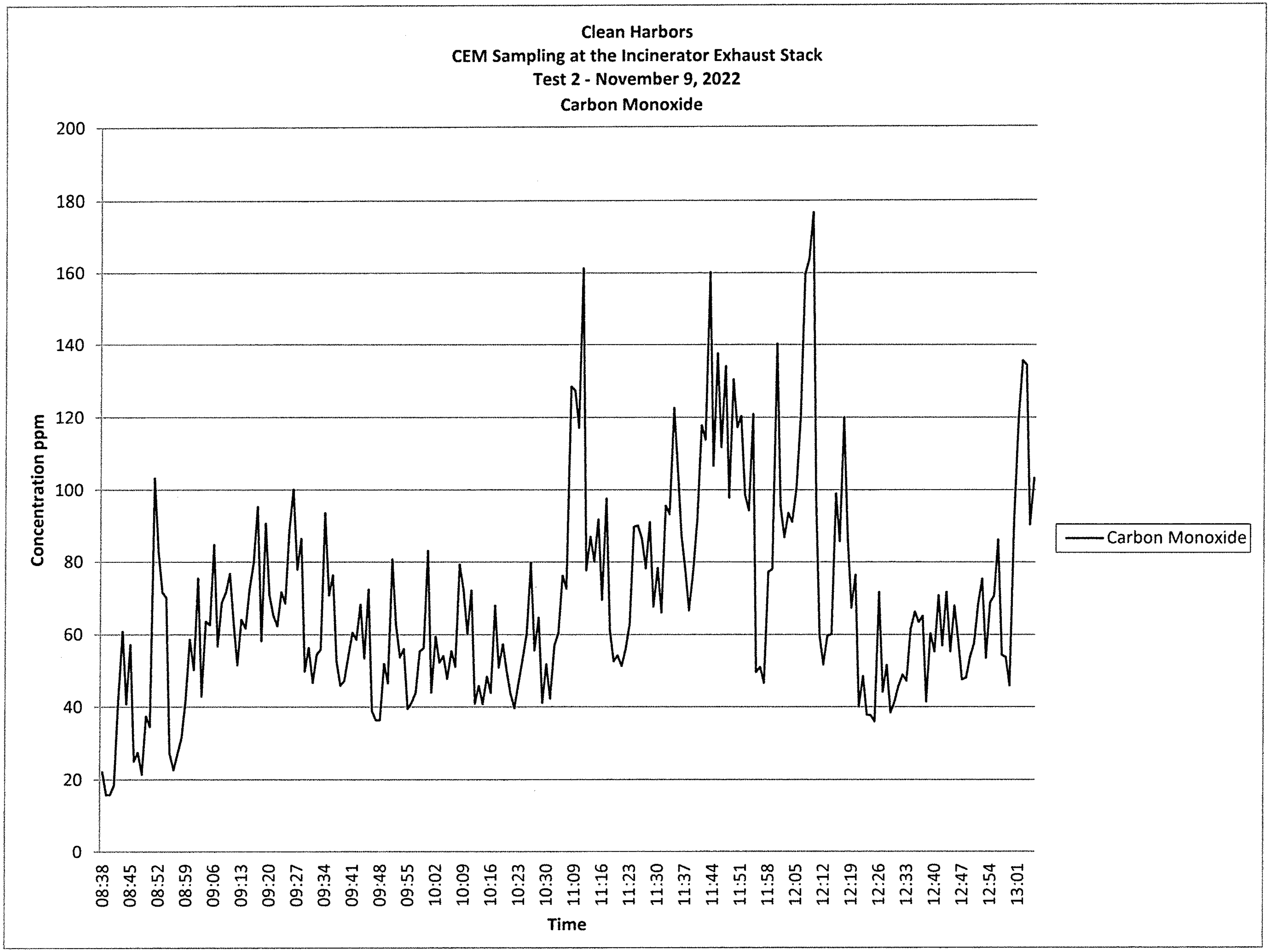




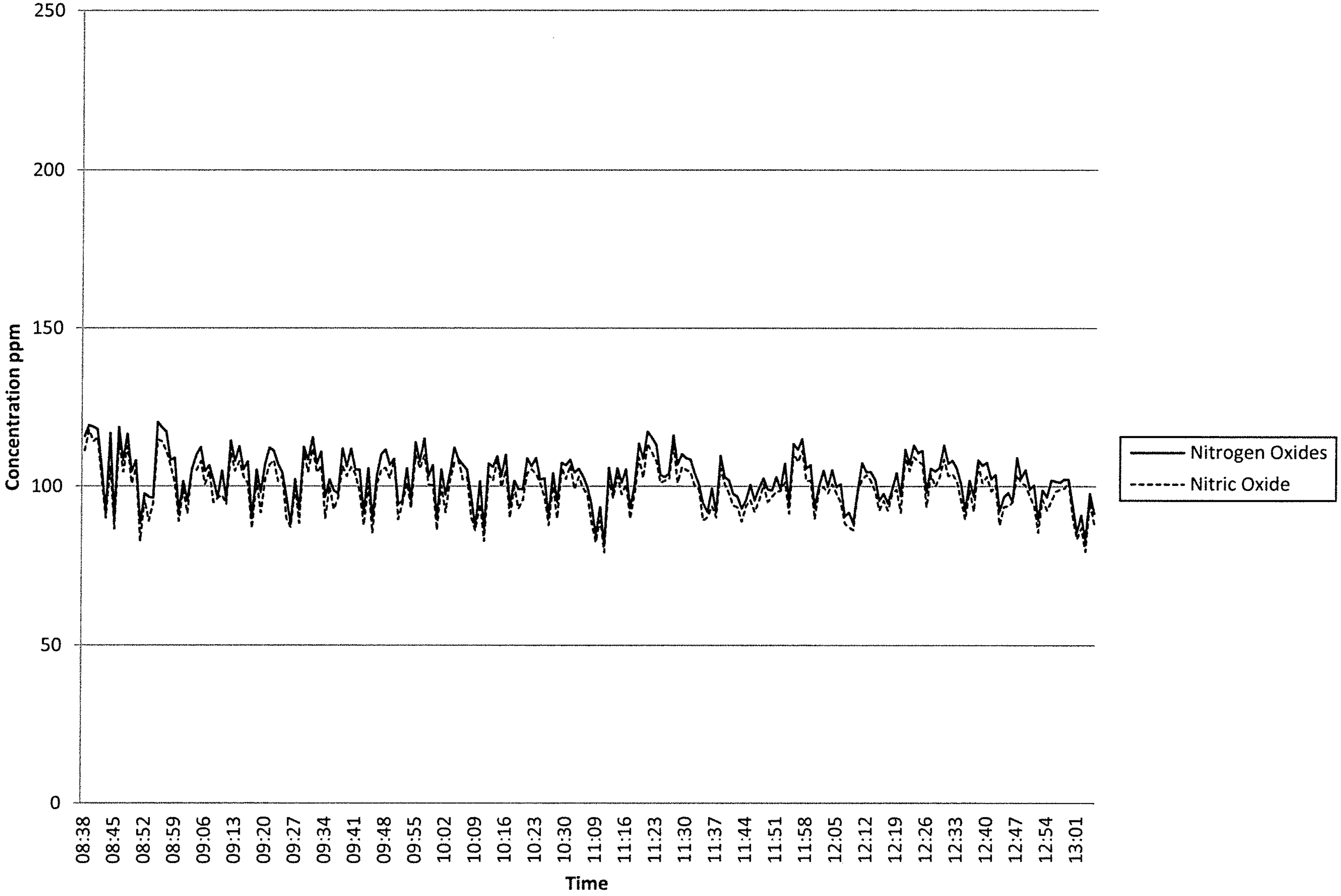
Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - November 9, 2022
Oxygen & Carbon Dioxide

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - November 9, 2022
Sulphur Dioxide

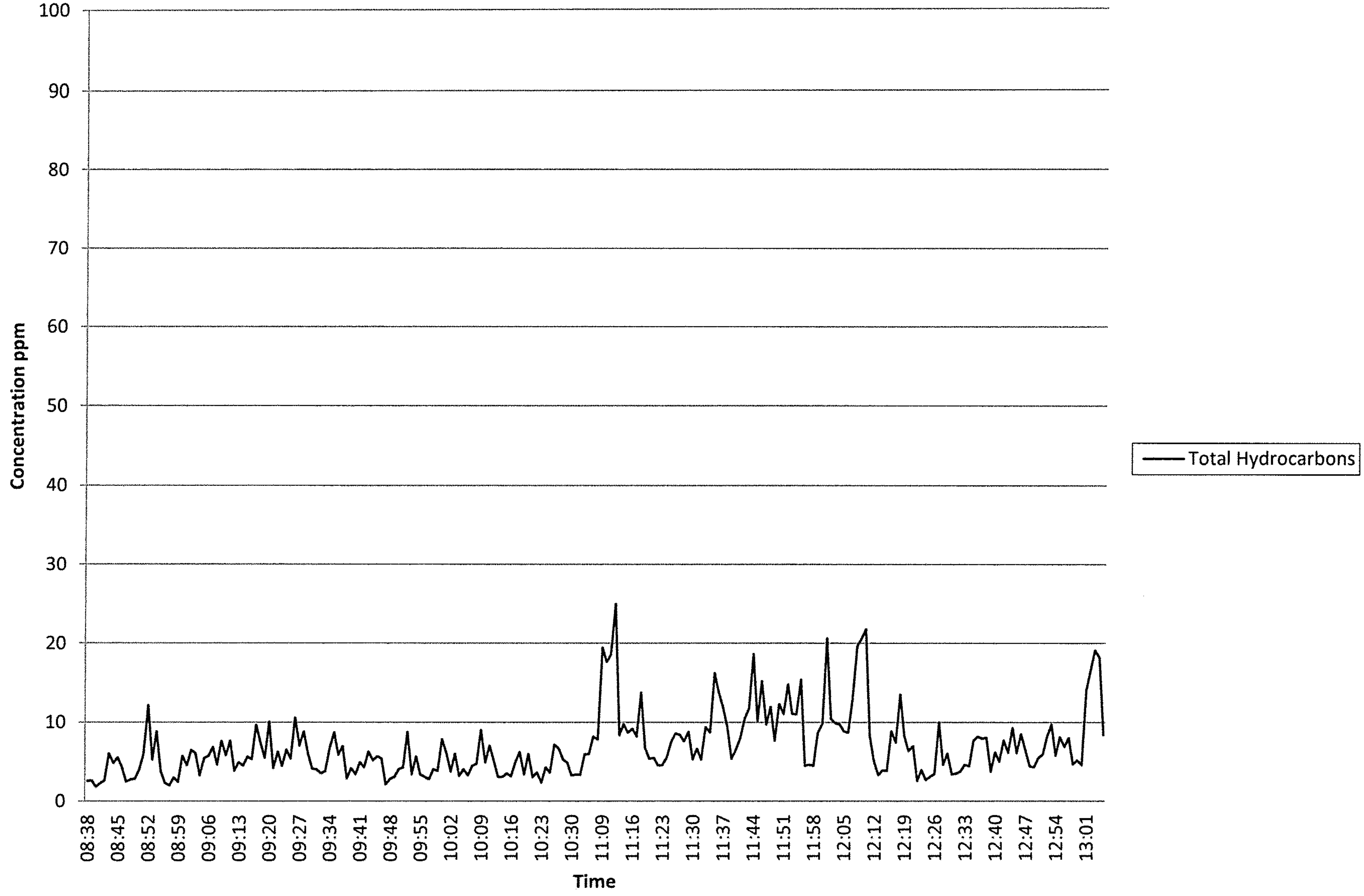



Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - November 9, 2022
Carbon Monoxide
Concentration ppm
200
180
160
140
120
100
80
60
40
20
0
08:38
08:45
08:52
08:59
09:06
09:13
09:20
09:27
09:34
09:41
09:48
09:55
10:02
10:09
10:16
10:23
10:30
11:09
11:16
11:23
11:30
11:37
11:44
11:51
11:58
12:05
12:12
12:19
12:26
12:33
12:40
12:47
12:54
13:01
Time
Carbon Monoxide

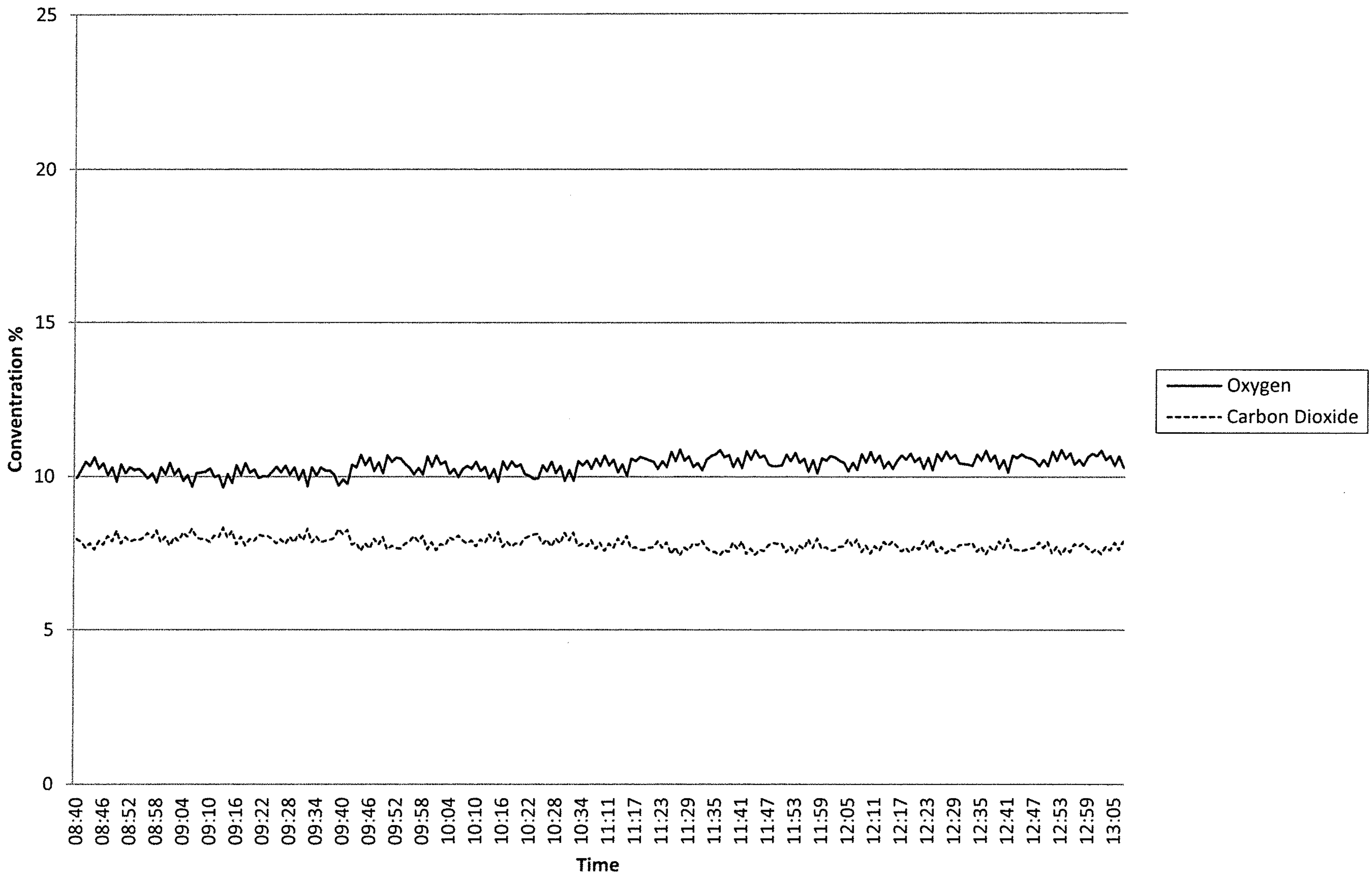
Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - November 9, 2022
Nitrogen Oxides



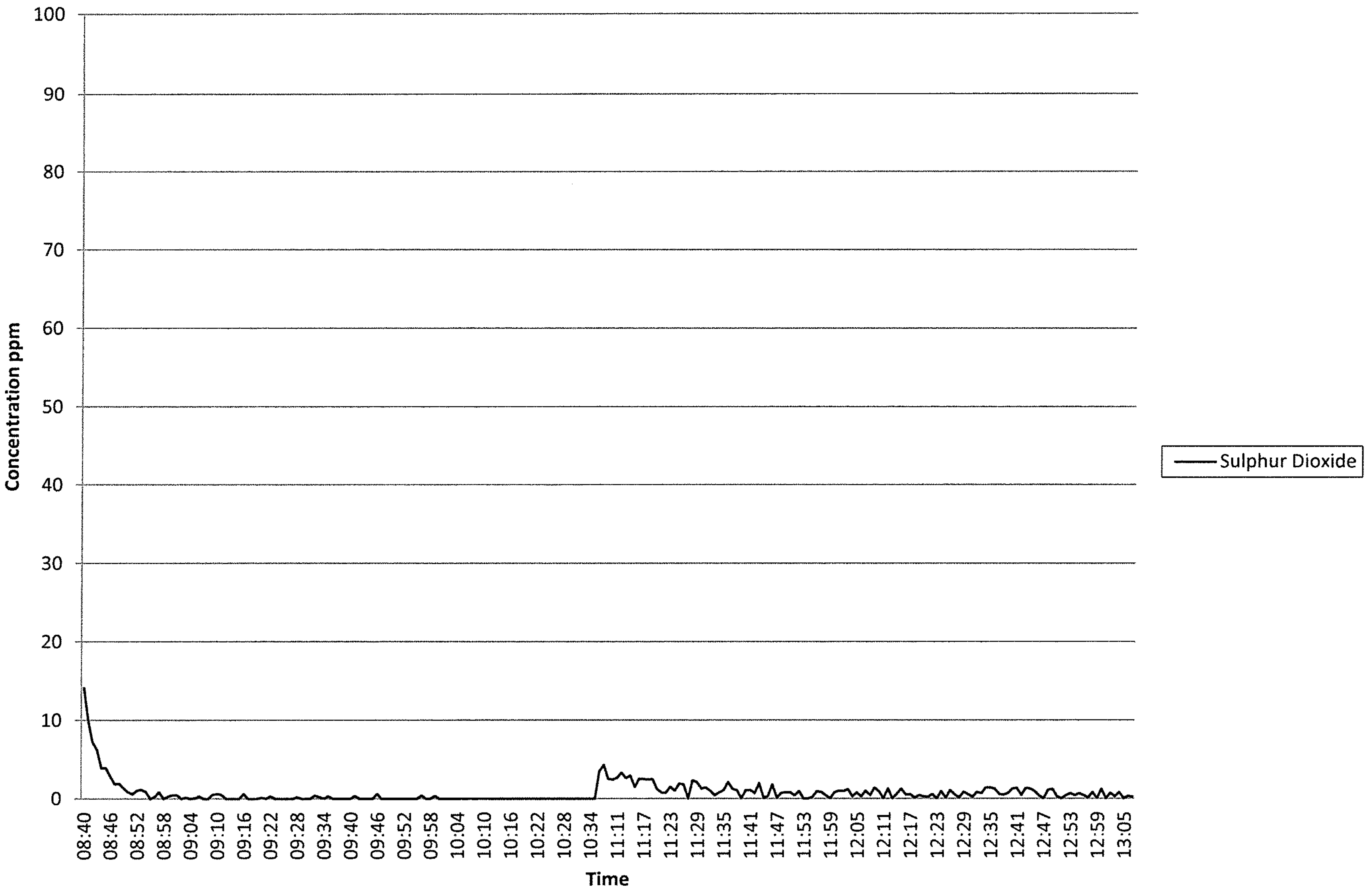
Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - November 9, 2022
Total Hydrocarbons

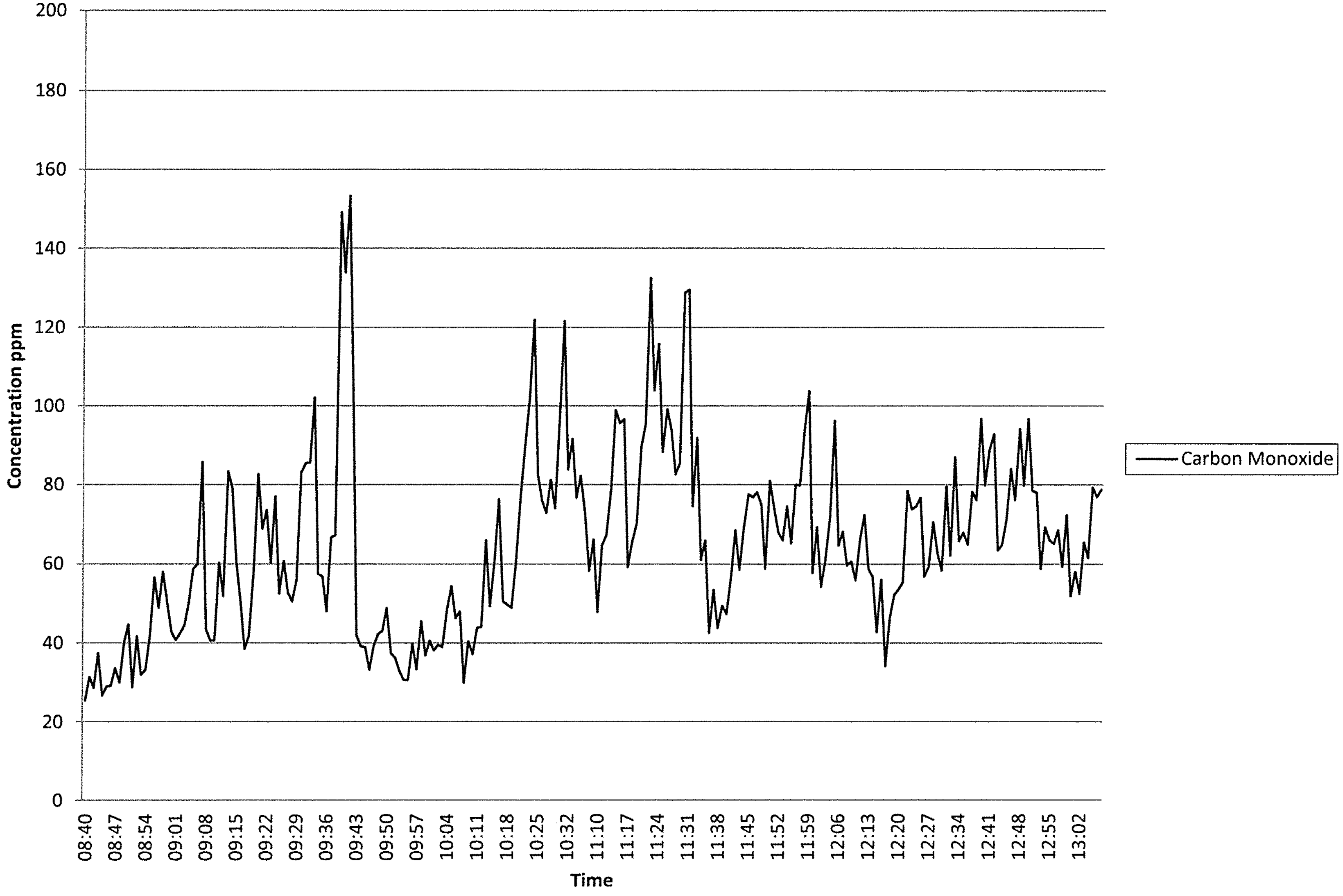


Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - November 10, 2022
Oxygen & Carbon Dioxide



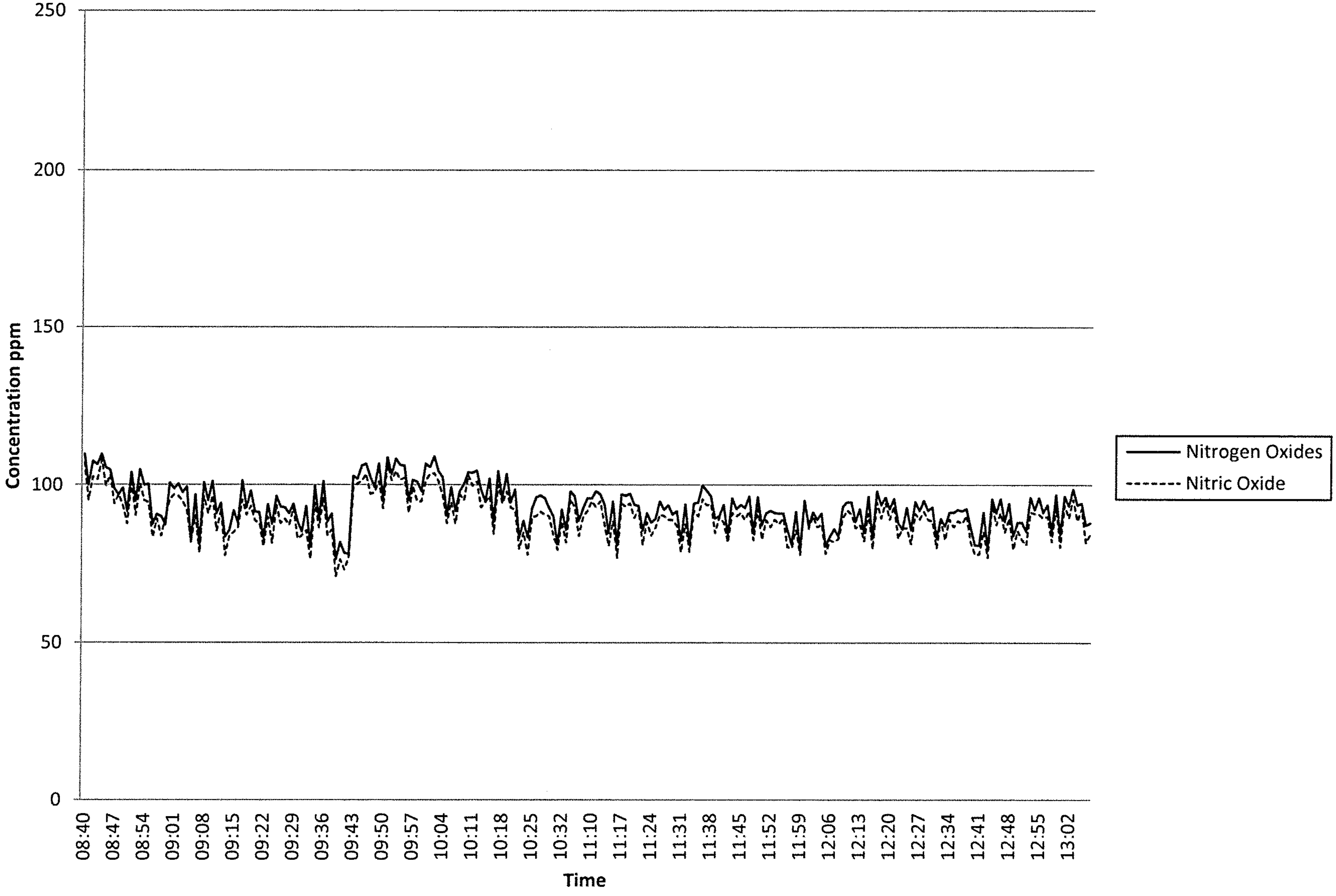
Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - November 10, 2022
Sulphur Dioxide



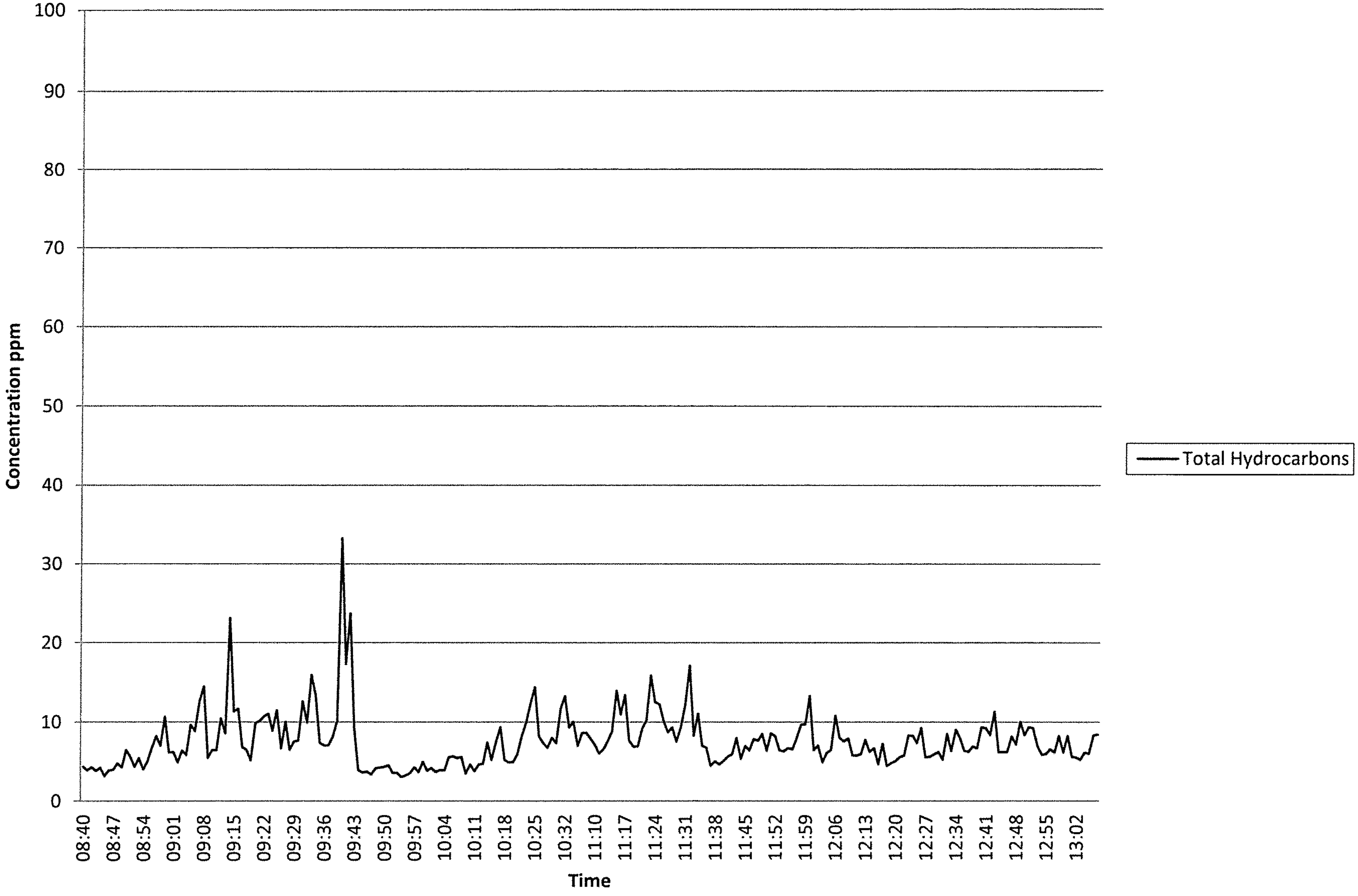


Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - November 10, 2022
Carbon Monoxide

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - November 10, 2022
Nitrogen Oxides



Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - November 10, 2022
Total Hydrocarbons



APPENDIX 26

AERMOD Modelling Files (CD)

APPENDIX 27

Clean Harbors Feed Data Summaries
(3 pages)

CleanHarbors

DAILY INCINERATION REPORT OF ANALYSIS

Incineration Date:

Analysis Date: NOV 8/22

Storage Location: I6

Lab No.: C22-2947

Parameter		Method #	Units	MDL	Lean Storage		Lean Feed		Emulsion	Rich Feed			Alkaline	
					T-801	T-802	T-803	T-804	T-813	T-822	T-824	T-35	T-111	T-113
Date Received at LAB					NOV 8/22	NOV 8/22	NOV 8/22		NOV 8/22		NOV 8/22	NOV 8/22		NOV 8/22
Time Received at LAB					7:00	7:00	7:00		7:00		7:00	7:00		7:00
pH		AM047	pH				13		11		7			12.56
Conductivity @ 20 - 25 C		AM007	mS/cm	0.02										7.53
Specific Gravity		AM045	g/ml				1.07		1.01		0.96			1
Heat Value		AM005	MJ/kg	0.3	3.6	5.2	3.9		15		30	6.7		
Ash @ 750 C		AM129	% mass	0.03			6.54		5.05		6.55			
Fluoride	Total	AM005	% mass F	0.05			0.03		0.066		0.043			
	Soluble	AM036	% mass F	0.05			0.001		0.144		0.003			<0.05
	Organic	AM005	% mass F	0.05			0.029		0		0.04			
Chloride	Total	AM005	% mass Cl	0.05	0.63	1.06	0.764		1.329		0.207	5.99		
	Soluble	AM036	% mass Cl	0.05			0.839		0.617		0.043	3.66		<0.05
	Organic	AM005	% mass Cl	0.05			0		0.712		0.164	2.33		
Nitrite	Soluble	AM005	% massNO2	0.05										
Sulphur	Total	AM005	% mass S	0.02			0.649		0.428		0.199			
	Soluble	AM036	% mass S	0.02			0.179		0.015		0.011			<0.02
	Non Sulphate	AM005	% mass S	0.02			0.47		0.413		0.188			
Alkalinity	as Carbonate	AM001	ppm CaCO3	30										
	Normality	AM046	N	0.01										0.034
Phase Composition	Organic	AM045	% volume	0.5					20		50			
	Emulsion	"	% volume	0.5			20		70		30			
	Aqueous	"	% volume	0.5			76							
	Sludge	"	% volume	0.5							20			
	Solid	"	% volume	0.5			4		10					<1
Viscosity @ 20 - 25 C		AM066	cps	0.1					<100		<100			
Solids @ 110 C		AM003	% mass	0.03										0.19
Total Organic Carbon		AM142	ppm	1										
Water Content by KF :		AM074	% H2O											

Additional Analysis:

Comments:

ANALYST: MS

CleanHarbors

DAILY INCINERATION REPORT OF ANALYSIS

Incineration Date: ____________

Analysis Date: November 9, 2022

Storage Location: ____________

Lab No.: C22-2964

Parameter		Method #	Units	MDL	Lean Storage		Lean Feed		Emulsion	Rich Feed			Alkaline	
					T-801	T-802	T-803	T-804	T-813	T-822	T-824	T-35	T-111	T-113
Date Received at LAB					9-Nov-22	9-Nov-22	9-Nov-22		9-Nov-22		9-Nov-22			9-Nov-22
Time Received at LAB					<6:30	<6:30	<6:30		<6:30		<6:30			<6:30
pH		AM047	pH				13		11		7			12.39
Conductivity @ 20 - 25 C		AM007	mS/cm	0.02										7.5
Specific Gravity		AM045	g/ml				1.05		0.99		0.89			1
Heat Value		AM005	MJ/kg	0.3	4.1	5.8	4.68		13.1		25			
Ash @ 750 C		AM129	% mass	0.03			6.27		4.11		3.42			
Fluoride	Total	AM005	% mass F	0.05			0.04		0.06		0.14			
	Soluble	AM036	% mass F	0.05			0		0		0			0
	Organic	AM005	% mass F	0.05			0.04		0.06		0.14			
Chloride	Total	AM005	% mass Cl	0.05	0.75	1.02	0.81		0.91		0.41			
	Soluble	AM036	% mass Cl	0.05			0.8		0.47		0.09			0.01
	Organic	AM005	% mass Cl	0.05			0.01		0.44		0.32			
Nitrite	Soluble	AM005	% massNO2	0.05										
Sulphur	Total	AM005	% mass S	0.02			0.78		0.32		0.19			
	Soluble	AM036	% mass S	0.02			0.18		0.01		0.03			0.01
	Non Sulphate	AM005	% mass S	0.02			0.6		0.31		0.16			
Alkalinity	as Carbonate	AM001	ppm CaCO3	30										
	Normality	AM046	N	0.01										0.04
Phase Composition	Organic	AM045	% volume	0.5			0		12		30			
	Emulsion	"	% volume	0.5			10		82		60			
	Aqueous	"	% volume	0.5			88		0		0			
	Sludge	"	% volume	0.5			0		0		0			
	Solid	"	% volume	0.5			2		6		10			0.5
Viscosity @ 20 - 25 C		AM066	cps	0.1					<100		<100			
Solids @ 110 C		AM003	% mass	0.03										0.26
Total Organic Carbon		AM142	ppm	1										
Water Content by KF :		AM074	% H2O											

Additional Analysis: ____________

Comments: ____________

ANALYST: JO

CleanHarbors

DAILY INCINERATION REPORT OF ANALYSIS

Incineration Date:

Analysis Date: November 10, 2022

Storage Location:

Lab No.: C22-2973

Parameter		Method #	Units	MDL	Lean Storage		Lean Feed		Emulsion	Rich Feed			Alkaline	
					T-801	T-802	T-803	T-804	T-813	T-822	T-824	T-35	T-111	T-113
Date Received at LAB					10-Nov-22	10-Nov-22	10-Nov-22		10-Nov-22		10-Nov-22			10-Nov-22
Time Received at LAB					<6:30	<6:30	<6:30		<6:30		<6:30			<6:30
pH		AM047	pH				13		11		8			12.38
Conductivity @ 20 - 25 C		AM007	mS/cm	0.02										8.28
Specific Gravity		AM045	g/ml				1.04		1		0.91			0.99
Heat Value		AM005	MJ/kg	0.3	3.9	4.9	3.86		12.7		24.2			
Ash @ 750 C		AM129	% mass	0.03			6.79		4.8		3.28			
Fluoride	Total	AM005	% mass F	0.05			0.04		0.06		0.12			
	Soluble	AM036	% mass F	0.05			0		0		0			0
	Organic	AM005	% mass F	0.05			0.04		0.06		0.12			
Chloride	Total	AM005	% mass Cl	0.05			0.77		0.9		0.36			
	Soluble	AM036	% mass Cl	0.05			0.76		0.47		0.08			0.01
	Organic	AM005	% mass Cl	0.05			0		0.4		0.28			
Nitrite	Soluble	AM005	% massNO2	0.05										
Sulphur	Total	AM005	% mass S	0.02			0.76		0.29		0.17			
	Soluble	AM036	% mass S	0.02			0.18		0.01		0.03			0.01
	Non Sulphate	AM005	% mass S	0.02			0.58		0.28		0.14			
Alkalinity	as Carbonate	AM001	ppm CaCO3	30										
	Normality	AM046	N	0.01										0.05
Phase Composition	Organic	AM045	% volume	0.5			0		10		30			
	Emulsion	"	% volume	0.5			10		82		60			
	Aqueous	"	% volume	0.5			0		0		0			
	Sludge	"	% volume	0.5			88		0		0			
	Solid	"	% volume	0.5			2		8		10			1
Viscosity @ 20 - 25 C		AM066	cps	0.1					<100		<100			
Solids @ 110 C		AM003	% mass	0.03										0.43
Total Organic Carbon		AM142	ppm	1										
Water Content by KF :		AM074	% H2O											

Additional Analysis:

Comments:

ANALYST: JO

APPENDIX 28

Clean Harbors One-Minute Average Combustion Gas Results

(12 pages)

Test No. 1 - November 8, 2022
CEM Analyzers

Time	CO ppm	THC ppm	O2 %	Opacity %	SO2 ppm
9:57:00	42.9	4.7	9.99	0.4	23.3
9:58:00	34.0	4.9	9.48	0.5	23.1
9:59:00	34.1	4.8	9.50	0.4	19.8
10:00:00	34.6	4.8	9.71	0.4	18.7
10:01:00	42.5	5.3	9.31	0.5	17.7
10:02:00	49.8	7.3	9.31	0.5	18.8
10:03:00	55.8	6.4	9.11	0.5	20.8
10:04:00	25.9	4.0	9.56	0.4	23.9
10:05:00	40.9	6.0	8.94	0.6	21.7
10:06:00	17.4	2.7	9.77	0.5	25.9
10:07:00	29.8	4.3	9.35	0.5	20.2
10:08:00	16.5	2.4	9.77	0.5	19.3
10:09:00	30.6	4.1	9.57	0.5	17.2
10:10:00	24.8	3.1	9.36	0.5	18.3
10:11:00	44.8	6.9	9.15	0.5	19.3
10:12:00	28.6	4.2	9.15	0.5	25.9
10:13:00	28.4	4.5	9.18	0.4	23.7
10:14:00	26.3	4.6	9.30	0.5	22.7
10:15:00	17.6	3.4	9.71	0.5	20.7
10:16:00	22.8	4.0	9.50	0.5	16.7
10:17:00	15.7	3.1	9.72	0.4	15.7
10:18:00	23.5	3.8	9.32	0.5	14.6
10:19:00	16.9	4.4	9.74	0.4	15.7
10:20:00	30.2	6.0	9.11	0.4	17.9
10:21:00	13.4	3.4	9.53	0.4	22.3
10:22:00	32.6	6.4	8.90	0.3	20.2
10:23:00	14.2	2.3	9.53	0.4	24.3
10:24:00	17.1	3.5	9.32	0.3	20.2
10:25:00	15.7	2.7	9.55	0.2	20.2
10:26:00	23.4	4.3	9.35	0.3	19.2
10:27:00	19.4	3.0	9.35	0.3	21.3
10:28:00	33.6	6.0	9.13	0.3	20.1
10:29:00	23.4	4.6	8.93	0.3	25.6
10:30:00	20.0	5.4	9.15	0.3	26.7
10:31:00	25.3	5.6	8.73	0.3	24.4
10:32:00	9.7	2.5	9.65	0.2	27.4
10:33:00	22.6	4.1	9.01	0.3	21.6
10:34:00	9.3	2.5	9.64	0.2	22.7
10:35:00	10.9	3.1	9.23	0.3	19.7
10:36:00	10.1	2.6	9.64	0.3	19.7
10:37:00	23.0	5.0	8.95	0.4	17.7
10:38:00	13.7	2.4	9.16	0.3	25.9
10:39:00	17.3	3.8	8.95	0.3	22.6
10:40:00	15.5	2.7	9.86	0.3	26.8
10:41:00	13.0	3.4	9.35	0.3	22.7
10:42:00	11.2	2.7	9.39	0.3	19.6
10:43:00	15.2	3.7	9.40	0.3	17.6
10:44:00	14.9	2.9	9.19	0.3	16.6
10:45:00	19.3	4.0	9.17	0.4	17.8
10:46:00	23.0	4.8	8.97	0.3	20.9
10:47:00	9.1	3.2	9.22	0.3	26.6
10:48:00	21.9	4.0	8.81	0.3	25.5
10:49:00	5.8	2.2	9.53	0.3	27.7
10:50:00	18.5	3.5	9.32	0.2	19.1
10:51:00	9.2	2.4	9.73	0.3	19.1
10:52:00	18.8	3.9	9.50	0.3	17.1
10:53:00	15.3	2.7	9.29	0.3	17.1
10:54:00	31.9	5.3	8.90	0.4	19.4
10:55:00	23.9	3.7	9.11	0.3	28.9
10:56:00	19.2	4.5	8.90	0.3	27.6
10:57:00	20.3	3.5	9.22	0.3	27.7
10:58:00	9.0	2.6	9.64	0.3	25.7
10:59:00	12.3	3.2	9.23	0.3	21.3
11:00:00	8.7	2.5	9.65	0.3	22.3
11:01:00	9.1	2.6	9.23	0.3	21.2
11:02:00	8.8	3.0	9.64	0.3	22.3
11:03:00	15.8	3.3	9.02	0.3	21.2
11:04:00	8.2	2.4	9.47	0.2	26.4
11:05:00	19.9	4.4	9.07	0.3	23.2
11:06:00	14.7	2.3	9.60	0.3	26.3
11:07:00	14.0	3.0	9.40	0.3	22.1
11:08:00	14.6	2.7	9.61	0.4	20.1
11:09:00	14.0	3.0	9.40	0.4	19.1
11:10:00	8.6	2.1	9.60	0.3	18.1

Test No. 1 - November 8, 2022
CEM Analyzers

Time	CO ppm	THC ppm	O2 %	Opacity %	SO2 ppm
11:11:00	21.6	4.5	9.36	0.3	17.1
11:12:00	19.7	3.4	9.15	0.3	20.3
11:13:00	19.2	4.2	9.34	0.3	23.4
11:14:00	13.7	3.2	8.91	0.3	24.3
11:15:00	7.5	2.3	9.65	0.3	26.3
11:16:00	12.1	2.5	9.65	0.3	19.7
11:17:00	6.6	2.1	9.70	0.3	16.7
11:18:00	15.6	3.3	9.49	0.2	15.7
11:19:00	10.6	2.4	9.72	0.2	16.7
11:20:00	18.7	4.2	9.11	0.1	16.7
11:21:00	11.0	2.1	9.31	0.3	24.4
11:22:00	15.3	2.9	9.10	0.4	21.2
11:23:00	15.8	2.7	10.14	0.4	22.3
11:24:00	12.8	2.5	9.71	0.4	18.1
11:25:00	11.7	2.5	9.76	0.5	16.1
11:26:00	14.3	2.6	9.77	0.4	16.1
11:27:00	10.9	2.2	9.57	0.4	15.1
11:28:00	14.8	3.6	9.53	0.3	16.2
11:29:00	20.5	3.9	9.11	0.3	19.3
11:30:00	9.2	2.5	9.53	0.3	22.3
11:31:00	58.5	8.2	8.69	0.2	20.2
11:32:00	11.0	2.7	9.77	0.3	26.6
11:33:00	28.4	4.1	9.55	0.3	19.7
11:34:00	11.3	2.1	9.82	0.2	18.7
11:35:00	17.2	3.0	9.61	0.3	15.7
11:36:00	13.0	2.1	9.40	0.3	15.7
11:37:00	18.8	3.5	9.19	0.3	15.7
11:38:00	17.7	2.6	9.19	0.3	20.9
11:39:00	20.6	3.2	9.23	0.3	20.8
11:40:00	26.9	4.4	9.13	0.2	19.8
11:41:00	10.7	2.6	9.68	0.3	22.8
11:42:00	12.2	2.6	9.48	0.2	18.7
11:43:00	8.2	2.1	9.73	0.3	17.7
11:44:00	12.1	2.4	9.52	0.3	15.7
11:45:00	10.8	3.2	9.73	0.3	15.7
11:46:00	20.1	4.3	9.11	0.2	16.7
11:47:00	11.7	3.1	9.57	0.3	21.1
11:48:00	23.1	3.9	9.14	0.4	19.1
11:49:00	12.6	2.3	9.64	0.4	24.4
11:50:00	12.8	2.8	9.43	0.3	20.1
11:51:00	10.4	2.3	9.92	0.3	19.1
11:52:00	20.4	2.9	9.51	0.2	14.9
11:53:00	11.8	2.3	9.31	0.1	15.9
11:54:00	20.1	3.6	9.32	0.2	16.9
11:55:00	15.7	3.3	9.10	0.2	21.4
11:56:00	15.4	3.1	9.32	0.3	23.4
11:57:00	15.8	3.3	9.11	0.3	21.2
12:54:00	10.3	2.8	9.57	0.3	11.7
12:55:00	22.6	3.1	9.14	0.3	12.7
12:56:00	14.9	2.8	9.81	0.2	13.7
12:57:00	23.7	4.1	9.12	0.2	12.6
12:58:00	10.1	2.2	9.76	0.2	18.3
12:59:00	14.3	2.6	9.76	0.3	13.9
13:00:00	13.2	2.5	9.79	0.3	11.8
13:01:00	21.9	2.8	9.78	0.3	9.8
13:02:00	17.8	2.4	9.78	0.4	9.8
13:03:00	27.7	4.9	9.15	0.3	9.8
13:04:00	22.9	3.2	9.35	0.3	17.6
13:05:00	17.7	3.0	9.35	0.2	18.7
13:06:00	22.4	3.3	9.40	0.2	16.7
13:07:00	12.8	2.5	9.61	0.2	16.7
13:08:00	11.4	2.5	9.61	0.1	14.6
13:09:00	15.0	2.5	9.82	0.2	13.6
13:10:00	16.3	2.9	9.61	0.2	12.6
13:11:00	16.6	3.2	9.83	0.2	13.7
13:12:00	25.9	4.2	9.20	0.2	14.7
13:13:00	14.5	2.8	9.61	0.2	20.2
13:14:00	24.5	4.4	9.18	0.1	19.2
13:15:00	13.7	2.2	9.87	0.1	21.3
13:16:00	15.2	3.0	9.66	0.1	17.7
13:17:00	38.5	3.5	9.90	0.1	14.6
13:18:00	50.1	4.8	9.69	0.1	12.6
13:19:00	49.4	4.2	9.69	0.3	12.6
13:20:00	80.7	10.0	9.47	0.3	11.6

Test No. 1 - November 8, 2022
CEM Analyzers

Time	CO ppm	THC ppm	O2 %	Opacity %	SO2 ppm
13:21:00	87.3	9.7	9.27	0.3	12.7
13:22:00	48.4	6.6	9.68	0.3	14.7
13:23:00	85.1	9.0	9.07	0.2	13.6
13:24:00	33.9	4.0	9.79	0.3	15.7
13:25:00	49.9	5.8	9.58	0.3	13.6
13:26:00	32.8	4.1	10.06	0.4	12.6
13:27:00	57.2	7.4	9.43	0.3	11.6
13:28:00	33.0	4.3	9.65	0.4	14.9
13:29:00	66.3	8.5	9.01	0.3	14.9
13:30:00	36.1	3.6	9.22	0.3	21.4
13:31:00	53.8	9.4	9.00	0.3	21.2
13:32:00	49.1	5.5	9.92	0.3	24.4
13:33:00	37.9	4.8	9.48	0.4	21.0
13:34:00	34.0	4.1	9.51	0.3	17.7
13:35:00	37.9	5.3	9.52	0.4	15.7
13:36:00	43.0	5.1	9.32	0.4	13.6
13:37:00	28.5	5.6	9.35	0.2	14.7
13:38:00	80.7	10.4	8.92	0.2	15.8
13:39:00	32.2	10.5	9.39	0.3	20.3
13:40:00	90.8	12.5	8.77	0.3	16.1
13:41:00	28.4	3.6	9.50	0.1	22.4
13:42:00	40.6	5.1	9.29	0.1	17.2
13:43:00	21.2	3.2	9.49	0.0	15.2
13:44:00	45.8	7.8	9.29	0.0	13.1
13:45:00	25.7	3.3	9.28	0.0	16.2
13:46:00	53.9	12.8	8.85	0.1	16.2
13:47:00	47.0	5.9	8.90	0.1	25.3
13:48:00	40.2	6.2	9.10	0.2	22.9
13:49:00	39.1	7.4	9.21	0.3	21.8
13:50:00	27.4	4.9	9.47	0.3	20.7
13:51:00	31.3	4.2	9.27	0.3	17.7
13:52:00	24.0	4.7	9.73	0.3	17.7
13:53:00	27.7	4.2	9.11	0.3	15.7
13:54:00	18.6	4.9	9.53	0.2	17.8
13:55:00	44.6	6.6	8.86	0.3	18.8
13:56:00	21.4	4.0	9.30	0.3	21.8
13:57:00	47.0	6.2	8.90	0.2	19.7
13:58:00	30.2	3.3	9.56	0.1	18.7
13:59:00	33.6	5.2	9.36	0.2	15.7
14:00:00	26.3	3.1	9.60	0.1	15.7
14:01:00	24.3	4.7	9.39	0.1	13.6
14:02:00	30.7	4.1	8.98	0.0	14.7
14:03:00	44.5	9.2	8.76	0.1	20.9
14:04:00	51.2	8.4	8.56	0.2	35.0
14:05:00	25.1	5.0	9.02	0.1	34.9
14:06:00	45.6	8.1	8.82	0.1	30.7
14:07:00	15.1	3.5	9.37	0.1	30.7
14:08:00	23.5	3.9	9.16	0.1	24.6
14:09:00	12.9	2.8	9.60	0.1	22.6
14:10:00	20.2	4.3	9.19	0.1	18.6
14:11:00	13.8	3.5	9.40	0.1	20.8
14:12:00	35.1	7.1	8.71	0.1	22.8
14:13:00	22.6	2.7	8.97	0.1	30.2
14:14:00	23.1	4.8	8.77	0.1	25.9
14:15:00	23.3	3.3	9.73	0.1	27.9
14:16:00	13.7	2.7	9.46	0.1	23.7
14:17:00	19.3	3.7	9.27	0.0	19.7
14:18:00	18.6	3.4	9.48	0.1	19.7
14:19:00	28.8	4.1	9.27	0.0	19.7
14:20:00	20.0	4.8	9.27	0.1	19.7
14:21:00	48.5	9.0	8.65	0.0	21.9
14:22:00	22.8	5.0	9.31	0.2	30.1
14:23:00	29.5	6.2	8.69	0.1	27.1
14:24:00	8.4	2.4	9.48	0.1	32.3
14:25:00	16.4	3.2	9.26	0.1	22.3
14:26:00	12.2	2.8	9.51	0.1	19.2
14:27:00	29.4	4.9	9.31	0.2	17.2
14:28:00	19.8	2.9	9.31	0.1	17.2
14:29:00	34.5	5.6	8.89	0.1	17.2
14:30:00	44.5	5.8	9.10	0.1	19.3
14:31:00	36.6	6.9	9.10	0.1	20.3
14:32:00	35.2	4.9	9.16	0.1	20.3
14:33:00	41.2	5.8	9.10	0.1	18.1
14:34:00	18.6	3.4	9.10	0.1	16.1

Test No. 1 - November 8, 2022
CEM Analyzers

Time	CO ppm	THC ppm	O2 %	Opacity %	SO2 ppm
14:35:00	23.2	3.3	9.56	0.1	14.1
14:36:00	25.0	3.7	9.15	0.1	13.1
14:37:00	16.7	4.4	9.57	0.1	14.2
14:38:00	26.8	5.4	8.94	0.1	14.2
14:39:00	19.3	3.4	9.37	0.2	16.2
14:40:00	38.0	5.5	8.94	0.2	15.2
14:41:00	25.5	3.0	9.39	0.1	15.2
14:42:00	29.6	3.8	9.60	0.1	14.0
14:43:00	30.3	3.1	9.63	0.1	10.8
14:44:00	36.6	5.4	9.66	0.1	9.8
14:45:00	37.0	3.6	9.24	0.1	8.8
14:46:00	41.4	5.5	9.06	0.1	9.9
14:47:00	44.3	5.2	9.06	0.0	13.0
14:48:00	25.7	4.5	9.27	0.0	15.2
14:49:00	54.6	5.9	8.86	0.0	13.1
14:50:00	22.4	3.2	9.73	0.0	15.4
14:51:00	29.8	3.4	9.52	0.0	12.1
14:52:00	24.8	3.5	9.76	0.0	10.1
14:53:00	36.3	4.8	9.36	0.0	9.1
14:54:00	30.7	3.8	9.77	0.1	9.1
Max	90.8	12.8	10.14	0.6	35.0
Min	5.8	2.1	8.56	0.0	8.8
Average	25.4	4.2	9.36	0.2	19.1

Test No. 2 - November 9, 2022
CEM Analyzers

Time	CO ppm	THC ppm	O2 %	Opacity %	SO2 ppm
8:32:00	14.1	4.7	9.43	0.3	0.2
8:33:00	48.6	7.1	8.78	0.3	0.2
8:34:00	13.1	3.1	9.43	0.3	0.2
8:35:00	31.5	8.7	8.79	0.3	0.2
8:36:00	21.9	3.0	9.41	0.2	0.2
8:37:00	21.6	4.0	9.40	0.3	1.3
8:38:00	16.0	2.6	9.61	0.3	1.3
8:39:00	13.6	3.3	9.39	0.3	0.2
8:40:00	18.8	2.9	9.19	0.2	0.2
8:41:00	39.3	8.0	8.94	0.3	0.2
8:42:00	85.0	11.1	8.73	0.3	0.2
8:43:00	33.3	7.2	8.94	0.3	0.2
8:44:00	63.8	9.3	8.52	0.3	1.3
8:45:00	11.9	3.6	9.35	0.2	3.3
8:46:00	26.6	5.8	9.14	0.3	3.3
8:47:00	13.9	3.6	9.56	0.2	2.2
8:48:00	33.7	9.3	9.15	0.3	1.2
8:49:00	11.5	4.9	9.36	0.3	0.2
8:50:00	99.9	19.4	8.70	0.2	0.2
8:51:00	88.6	7.1	8.71	0.3	2.3
8:52:00	67.2	12.0	8.56	0.3	5.4
8:53:00	83.6	7.7	9.62	0.2	5.4
8:54:00	20.7	4.3	9.37	0.3	5.4
8:55:00	17.3	3.4	9.37	0.3	4.4
8:56:00	19.6	5.1	9.39	0.2	1.4
8:57:00	30.7	4.6	9.19	0.3	0.3
8:58:00	31.4	7.1	9.17	0.4	0.3
8:59:00	52.5	8.9	8.97	0.3	0.3
9:00:00	31.1	8.2	9.42	0.3	0.3
9:01:00	84.5	14.1	8.77	0.3	0.3
9:02:00	23.9	3.5	9.73	0.2	0.3
9:03:00	55.6	10.1	9.52	0.2	0.3
9:04:00	42.3	5.4	9.53	0.2	0.3
9:05:00	76.9	13.3	9.32	0.2	0.3
9:06:00	42.2	4.9	9.32	0.2	0.3
9:07:00	71.1	11.2	9.04	0.3	0.3
9:08:00	74.0	10.5	9.24	0.3	0.3
9:09:00	77.4	12.9	9.01	0.4	0.3
9:10:00	60.8	9.0	9.14	0.3	0.3
9:11:00	43.8	6.3	9.62	0.3	0.3
9:12:00	68.0	8.4	9.40	0.3	0.3
9:13:00	56.2	7.5	9.65	0.3	0.3
9:14:00	65.2	10.0	9.44	0.3	0.3
9:15:00	55.0	14.8	9.64	0.4	0.3
9:16:00	95.4	17.5	8.99	0.3	0.3
9:17:00	35.0	6.4	9.61	0.3	0.3
9:18:00	82.3	14.7	8.97	0.3	0.3
9:19:00	63.8	6.3	9.58	0.3	0.3
9:20:00	50.0	9.8	9.37	0.3	0.3
9:21:00	56.3	6.1	9.60	0.3	0.3
9:22:00	77.3	12.7	9.39	0.3	0.3
9:23:00	70.8	9.2	9.19	0.3	0.3
9:24:00	76.8	16.0	9.17	0.4	0.3
9:25:00	109.5	19.3	8.97	0.4	0.3
9:26:00	62.8	13.8	9.23	0.4	0.3
9:27:00	94.2	15.6	8.81	0.4	0.3
9:28:00	29.7	7.0	9.57	0.4	0.3
9:29:00	48.7	8.7	9.36	0.3	0.3
9:30:00	27.9	5.5	9.79	0.3	0.3
9:31:00	42.2	8.4	9.34	0.3	0.3
9:32:00	30.9	5.6	9.81	0.2	0.3
9:33:00	94.3	15.4	8.97	0.2	0.3
9:34:00	61.5	6.2	9.20	0.2	0.3
9:35:00	71.9	12.2	8.97	0.2	0.3
9:36:00	49.5	6.1	10.03	0.3	0.3
9:37:00	33.5	8.4	9.31	0.4	0.3
9:38:00	42.3	7.3	9.31	0.4	0.3
9:39:00	50.4	7.5	9.56	0.4	0.3
9:40:00	66.2	10.5	9.36	0.3	0.3
9:41:00	46.2	10.7	9.36	0.2	0.3
9:42:00	69.9	11.5	8.94	0.3	0.3
9:43:00	32.7	9.1	9.40	0.4	0.3
9:44:00	73.3	13.4	8.77	0.4	0.3
9:45:00	18.8	3.6	9.53	0.4	0.3

Test No. 2 - November 9, 2022
CEM Analyzers

Time	CO ppm	THC ppm	O2 %	Opacity %	SO2 ppm
9:46:00	25.3	5.4	9.32	0.4	0.3
9:47:00	21.6	3.3	9.75	0.3	0.3
9:48:00	43.3	8.3	9.32	0.2	0.3
9:49:00	37.1	5.1	9.32	0.3	0.3
9:50:00	77.2	17.0	9.04	0.3	0.3
9:51:00	59.3	7.0	9.04	0.2	0.3
9:52:00	45.9	9.2	9.05	0.3	0.3
9:53:00	60.9	9.6	9.08	0.3	0.3
9:54:00	30.6	5.7	9.64	0.3	0.3
9:55:00	38.3	6.1	9.23	0.2	0.3
9:56:00	37.4	7.4	9.69	0.2	0.3
9:57:00	53.6	8.5	9.48	0.3	0.3
9:58:00	34.1	7.3	9.69	0.3	0.3
9:59:00	80.1	14.1	9.02	0.3	0.3
10:00:00	25.2	4.9	9.51	0.4	0.3
10:01:00	59.3	10.3	9.09	0.4	0.3
10:02:00	45.7	4.6	9.68	0.4	0.3
10:03:00	41.3	7.7	9.68	0.4	0.3
10:04:00	41.7	4.9	9.72	0.5	0.3
10:05:00	57.4	8.7	9.56	0.4	0.3
10:06:00	46.5	6.1	9.56	0.4	0.3
10:07:00	74.9	17.5	9.36	0.5	0.3
10:08:00	82.8	12.7	9.14	0.5	0.3
10:09:00	49.7	10.3	9.36	0.4	0.3
10:10:00	77.9	13.0	8.94	0.4	0.3
10:11:00	25.0	5.6	9.68	0.3	0.3
10:12:00	43.2	7.8	9.47	0.4	0.3
10:13:00	26.4	5.7	9.93	0.4	0.3
10:14:00	44.5	7.3	9.52	0.4	0.3
10:15:00	24.8	5.3	9.73	0.4	0.3
10:16:00	67.5	11.6	9.32	0.4	0.3
10:17:00	45.1	4.9	9.35	0.4	0.3
10:18:00	42.2	10.7	9.15	0.4	0.3
10:19:00	48.7	6.8	10.24	0.3	0.3
10:20:00	43.5	6.5	9.68	0.3	0.3
10:21:00	39.4	5.6	9.48	0.3	0.3
10:22:00	32.6	7.9	9.68	0.4	0.3
10:23:00	48.5	8.2	9.48	0.4	0.3
10:24:00	47.4	9.2	9.47	0.3	0.3
10:25:00	78.5	13.6	9.27	0.4	0.3
10:26:00	37.7	7.4	9.74	0.4	0.3
10:27:00	70.9	14.3	9.11	0.5	0.3
10:28:00	25.3	4.1	9.94	0.5	0.3
10:29:00	53.1	7.3	9.73	0.5	0.3
10:30:00	32.1	4.3	9.98	0.6	0.3
10:31:00	58.8	9.7	9.56	0.5	0.3
10:32:00	33.4	4.9	9.56	0.4	0.3
11:05:00	66.0	12.6	9.89	0.4	1.4
11:06:00	71.2	10.4	9.48	0.4	1.4
11:07:00	112.5	21.5	9.67	0.5	1.4
11:08:00	134.5	26.9	9.24	0.5	2.4
11:09:00	62.0	20.8	9.43	0.4	1.4
11:10:00	191.1	37.9	9.01	0.5	2.4
11:11:00	44.8	6.9	9.91	0.4	1.4
11:12:00	96.6	13.4	9.69	0.5	1.4
11:13:00	52.4	7.5	9.92	0.4	1.4
11:14:00	94.7	12.4	9.73	0.4	1.4
11:15:00	48.7	5.7	9.94	0.4	1.4
11:16:00	112.9	16.4	9.27	0.4	1.4
11:17:00	62.8	8.1	9.49	0.4	1.4
11:18:00	42.5	7.9	9.70	0.4	1.4
11:19:00	57.4	11.3	9.69	0.3	1.4
11:20:00	28.6	4.5	10.29	0.4	1.9
11:21:00	50.1	7.4	10.29	0.4	1.9
11:22:00	38.2	3.8	10.48	0.3	1.9
11:23:00	83.2	11.5	10.27	0.4	1.9
11:24:00	91.4	7.7	10.07	0.4	1.9
11:25:00	97.4	12.3	10.03	0.5	1.9
11:26:00	70.2	8.2	10.03	0.4	1.9
11:27:00	127.6	14.5	10.02	0.4	1.9
11:28:00	81.8	11.8	9.82	0.4	1.9
11:29:00	60.8	7.3	10.55	0.4	1.9
11:30:00	93.3	9.7	10.15	0.4	1.9
11:31:00	65.0	9.5	10.57	0.3	1.9

Test No. 2 - November 9, 2022
CEM Analyzers

Time	CO ppm	THC ppm	O2 %	Opacity %	SO2 ppm
11:32:00	88.9	16.8	10.15	0.4	1.9
11:33:00	84.0	12.6	10.14	0.5	1.9
11:34:00	124.3	22.8	9.69	0.4	1.9
11:35:00	51.5	8.2	9.91	0.4	1.9
11:36:00	82.6	14.5	9.28	0.4	1.9
11:37:00	51.0	5.0	10.27	0.4	1.9
11:38:00	69.6	7.3	10.27	0.3	1.9
11:39:00	78.3	7.9	10.52	0.2	1.9
11:40:00	121.9	13.4	10.32	0.4	1.9
11:41:00	110.7	13.3	10.32	0.4	1.9
11:42:00	131.2	21.9	10.09	0.4	2.9
11:43:00	166.9	22.8	9.89	0.4	2.9
11:44:00	102.0	14.4	10.34	0.4	2.9
11:45:00	182.2	22.8	9.94	0.3	2.9
11:46:00	50.9	6.7	10.69	0.4	2.9
11:47:00	147.2	14.3	10.27	0.3	2.9
11:48:00	119.3	18.8	10.41	0.3	2.4
11:49:00	146.5	17.6	9.99	0.3	2.4
11:50:00	97.1	18.8	10.18	0.3	2.4
11:51:00	103.9	14.1	9.77	0.4	2.4
11:52:00	60.9	11.8	10.19	0.4	2.4
11:53:00	142.4	25.6	9.56	0.4	2.4
11:54:00	26.6	4.5	10.38	0.4	2.4
11:55:00	43.7	5.9	10.16	0.4	2.4
11:56:00	27.1	3.3	10.40	0.4	2.4
11:57:00	80.3	12.5	9.98	0.4	2.4
11:58:00	52.8	6.2	9.99	0.3	2.4
11:59:00	152.4	28.0	9.56	0.4	2.4
12:00:00	103.6	13.6	9.78	0.4	3.5
12:01:00	82.9	11.3	9.95	0.5	3.5
12:02:00	112.0	16.5	9.94	0.4	3.5
12:03:00	68.9	10.2	10.35	0.4	3.5
12:04:00	115.8	12.6	10.14	0.5	3.5
12:05:00	89.5	14.8	10.35	0.4	3.5
12:06:00	190.0	26.3	9.73	0.4	3.5
12:07:00	134.0	25.7	10.15	0.3	3.5
12:08:00	171.1	22.3	9.73	0.4	3.5
12:09:00	83.3	9.6	10.19	0.4	3.5
12:10:00	31.6	8.5	10.43	0.4	2.4
12:11:00	40.3	4.1	10.68	0.4	2.4
12:12:00	61.0	5.0	10.48	0.4	2.4
12:13:00	55.0	4.5	10.72	0.3	2.4
12:14:00	95.8	12.0	10.28	0.4	2.4
12:15:00	84.0	10.2	10.07	0.4	2.4
12:16:00	123.6	19.9	9.86	0.4	2.4
12:17:00	120.2	12.7	9.86	0.3	2.4
12:18:00	50.3	8.3	10.07	0.3	2.4
12:19:00	88.5	11.0	9.86	0.4	2.4
12:20:00	32.1	3.6	10.45	0.3	2.4
12:21:00	42.1	5.6	10.24	0.3	2.4
12:22:00	24.8	3.2	10.44	0.3	2.4
12:23:00	24.8	4.9	10.02	0.4	2.4
12:24:00	19.4	4.4	10.23	0.4	2.4
12:25:00	73.6	17.3	9.60	0.3	2.4
12:26:00	37.2	4.1	9.62	0.3	2.4
12:27:00	47.2	7.6	9.44	0.4	2.4
12:28:00	39.8	5.0	10.56	0.4	2.4
12:29:00	33.5	4.2	10.36	0.5	2.4
12:30:00	43.3	5.7	10.15	0.4	2.4
12:31:00	41.7	6.2	10.14	0.4	2.4
12:32:00	46.5	6.4	9.94	0.4	2.4
12:33:00	50.4	10.1	9.71	0.4	2.4
12:34:00	70.6	12.9	9.51	0.4	2.4
12:35:00	47.5	10.3	9.94	0.4	2.4
12:36:00	59.1	11.1	9.52	0.4	2.4
12:37:00	26.1	4.5	10.26	0.4	2.4
12:38:00	51.1	8.4	10.05	0.4	2.4
12:39:00	38.3	4.8	10.29	0.3	2.4
12:40:00	61.9	10.3	9.86	0.3	2.4
12:41:00	47.0	5.6	9.86	0.3	2.4
12:42:00	67.7	12.9	9.64	0.4	2.4
12:43:00	56.1	8.3	9.67	0.4	2.4
12:44:00	67.5	11.6	9.69	0.4	2.4
12:45:00	64.5	12.0	9.86	0.4	2.4

Test No. 2 - November 9, 2022
CEM Analyzers

Time	CO ppm	THC ppm	O2 %	Opacity %	SO2 ppm
12:46:00	38.8	6.2	10.17	0.4	2.4
12:47:00	52.1	7.0	9.97	0.5	2.4
12:48:00	48.8	7.5	10.20	0.2	2.4
12:49:00	55.0	9.0	9.77	0.3	2.4
12:50:00	57.5	12.6	10.18	0.3	2.4
12:51:00	75.9	14.1	9.57	0.3	2.4
12:52:00	31.6	5.8	9.98	0.4	2.4
12:53:00	48.4	9.4	9.54	0.4	2.4
12:54:00	62.2	6.2	10.28	0.4	2.4
12:55:00	93.6	11.0	10.07	0.3	2.4
12:56:00	54.4	5.3	10.27	0.3	2.4
12:57:00	61.2	8.1	10.07	0.3	2.4
12:58:00	38.4	6.6	9.86	0.4	2.4
12:59:00	60.0	16.4	9.86	0.3	2.4
13:00:00	129.9	28.1	9.44	0.3	3.5
13:01:00	114.8	23.1	9.70	0.3	3.5
13:02:00	157.4	26.1	9.48	0.4	3.5
13:03:00	65.3	9.9	10.36	0.4	3.5
13:04:00	101.1	13.1	10.15	0.3	3.5
13:05:00	66.4	9.7	10.36	0.3	3.5
Max	191.1	37.9	10.72	0.6	5.4
Min	11.5	2.6	8.52	0.2	0.2
Average	63.2	10.1	9.67	0.3	1.5

Test No. 3 - November 10, 2022
CEM Analyzers

Time	CO ppm	THC ppm	O2 %	Opacity %	SO2 ppm
8:35:00	-0.3	3.2	10.29	0.4	2.9
8:36:00	-0.3	3.5	9.87	0.4	1.9
8:37:00	-0.3	3.4	10.08	0.4	1.9
8:38:00	-0.3	3.9	9.66	0.4	1.9
8:39:00	-0.3	3.3	10.11	0.3	1.9
8:40:00	-0.3	4.4	9.69	0.4	1.9
8:41:00	-0.3	2.3	10.48	0.4	1.9
8:42:00	-0.3	4.3	10.04	0.4	1.9
8:43:00	-0.3	2.1	10.50	0.4	1.9
8:44:00	-0.3	3.1	10.07	0.3	1.9
8:45:00	-0.3	2.4	9.86	0.4	1.9
8:46:00	-0.3	4.9	9.89	0.5	1.9
8:47:00	-0.3	3.5	9.69	0.4	1.9
8:48:00	-0.3	5.3	9.72	0.4	1.9
8:49:00	-0.3	7.2	9.53	0.4	1.9
8:50:00	-0.3	2.8	10.24	0.4	1.9
8:51:00	-0.3	5.4	9.61	0.4	1.9
8:52:00	-0.3	3.4	10.27	0.4	1.9
8:53:00	-0.3	5.3	9.85	0.4	1.9
8:54:00	-0.3	4.1	10.31	0.4	1.9
8:55:00	-0.3	9.7	9.44	0.4	1.9
8:56:00	-0.3	5.6	10.10	0.4	1.9
8:57:00	-0.3	8.6	9.48	0.4	1.9
8:58:00	-0.3	5.2	9.82	0.4	1.9
8:59:00	-0.3	5.6	9.85	0.4	1.9
9:00:00	-0.3	3.7	9.90	0.4	1.9
9:01:00	-0.3	5.7	9.90	0.4	1.9
9:02:00	-0.3	6.2	9.69	0.4	1.9
9:03:00	-0.3	9.8	9.71	0.4	1.9
9:04:00	-0.3	11.5	9.31	0.5	1.9
9:05:00	-0.3	11.0	9.77	0.4	1.9
9:06:00	-0.3	19.1	9.14	0.5	1.9
9:07:00	-0.3	4.3	10.19	0.4	1.9
9:08:00	-0.3	6.2	9.77	0.4	1.9
9:09:00	-0.3	4.4	10.20	0.4	1.9
9:10:00	-0.3	9.8	9.77	0.4	1.9
9:11:00	-0.3	5.5	9.98	0.4	1.9
9:12:00	-0.3	23.8	9.35	0.3	1.9
9:13:00	-0.3	8.8	9.36	0.4	2.9
9:14:00	-0.3	11.2	9.57	0.4	1.9
9:15:00	-0.3	7.6	10.14	0.4	1.9
9:16:00	-0.3	5.7	9.93	0.3	1.9
9:17:00	-0.3	5.5	9.73	0.4	1.9
9:18:00	-0.3	8.8	9.96	0.5	1.9
9:19:00	-0.3	12.1	9.56	0.4	1.9
9:20:00	-0.3	10.7	10.01	0.5	1.9
9:21:00	-0.3	13.9	9.36	0.4	1.9
9:22:00	-0.3	6.8	10.04	0.4	1.9
9:23:00	-0.3	13.6	9.39	0.4	1.9
9:24:00	-0.3	4.1	10.14	0.4	1.9
9:25:00	-0.3	9.8	9.73	0.4	1.9
9:26:00	-0.3	4.8	10.19	0.3	1.9
9:27:00	-0.3	7.5	9.77	0.4	1.9
9:28:00	-0.3	4.7	9.77	0.4	1.9
9:29:00	-0.3	11.0	9.77	0.4	1.9
9:30:00	-0.3	12.7	9.57	0.4	1.9
9:31:00	-0.3	11.9	9.61	0.4	1.9
9:32:00	-0.3	19.6	9.43	0.5	1.9
9:33:00	-0.3	5.8	9.97	0.4	1.9
9:34:00	-0.3	7.8	9.57	0.4	1.9
9:35:00	-0.3	5.5	10.26	0.4	1.9
9:36:00	-0.3	8.8	9.65	0.4	1.9
9:37:00	-0.3	7.7	10.10	0.4	1.9
9:38:00	-0.3	44.6	9.48	0.4	1.9
9:39:00	-0.3	11.3	9.80	0.4	2.9
9:40:00	-0.3	27.8	9.15	0.4	2.9
9:41:00	-0.3	9.0	9.75	0.4	2.9
9:42:00	-0.3	3.1	10.23	0.4	2.9
9:43:00	-0.3	3.1	10.03	0.4	2.9
9:44:00	-0.3	3.6	10.25	0.5	2.9
9:45:00	-0.3	3.4	10.04	0.4	2.9
9:46:00	-0.3	3.8	10.04	0.4	2.9
9:47:00	-0.3	5.0	9.83	0.4	2.9
9:48:00	-0.3	3.7	10.08	0.5	2.9

Test No. 3 - November 10, 2022
CEM Analyzers

Time	CO ppm	THC ppm	O2 %	Opacity %	SO2 ppm
9:49:00	-0.3	5.1	9.66	0.4	2.9
9:50:00	-0.3	3.1	10.48	0.5	2.9
9:51:00	-0.3	3.3	10.07	0.4	2.9
9:52:00	-0.3	2.7	10.50	0.3	2.9
9:53:00	-0.3	3.0	10.08	0.4	2.9
9:54:00	-0.3	2.2	10.34	0.4	2.9
9:55:00	-0.3	4.1	9.71	0.5	2.9
9:56:00	-0.3	2.9	9.71	0.5	2.9
9:57:00	-0.3	5.2	9.74	0.5	2.9
9:58:00	-0.3	3.8	10.37	0.4	2.9
9:59:00	-0.3	3.9	10.19	0.5	2.9
10:00:00	-0.3	3.4	9.98	0.4	2.9
10:01:00	-0.3	4.1	10.42	0.4	2.9
10:02:00	-0.3	4.5	10.02	0.4	2.9
10:03:00	-0.3	4.6	10.02	0.5	2.9
10:04:00	-0.3	6.9	9.61	0.4	2.9
10:05:00	-0.3	5.2	10.10	0.4	2.9
10:06:00	-0.3	6.1	9.48	0.4	2.9
10:07:00	-0.3	2.6	10.15	0.4	2.9
10:08:00	-0.3	4.9	9.93	0.4	2.9
10:09:00	-0.3	2.8	10.16	0.3	2.9
10:10:00	-0.3	4.4	9.94	0.4	2.9
10:11:00	-0.3	3.2	9.73	0.4	2.9
10:12:00	-0.3	10.3	9.73	0.4	2.9
10:13:00	-0.3	5.8	9.73	0.4	2.9
10:14:00	-0.3	6.8	9.73	0.4	2.9
10:15:00	-0.3	15.0	9.54	0.4	2.9
10:16:00	-0.3	4.7	10.15	0.4	2.9
10:17:00	-0.3	5.4	9.73	0.4	2.9
10:18:00	-0.3	5.2	10.39	0.3	2.9
10:19:00	-0.3	6.8	9.77	0.5	2.9
10:20:00	-0.3	6.7	10.22	0.5	2.9
10:21:00	-0.3	11.8	9.60	0.5	2.9
10:22:00	-0.3	11.5	10.06	0.4	2.9
10:23:00	-0.3	15.1	9.43	0.5	2.9
10:24:00	-0.3	6.8	9.89	0.4	2.9
10:25:00	-0.3	7.3	9.90	0.4	2.9
10:26:00	-0.3	6.5	9.91	0.4	2.9
10:27:00	-0.3	10.1	9.90	0.4	2.9
10:28:00	-0.3	9.0	9.69	0.4	2.9
10:29:00	-0.3	10.8	9.75	0.4	2.9
10:30:00	-0.3	21.2	9.54	0.4	2.9
10:31:00	-0.3	10.7	9.81	0.4	2.9
10:32:00	-0.3	11.5	9.40	0.4	2.9
10:33:00	-0.3	7.3	10.32	0.4	2.9
10:34:00	-0.3	9.6	9.90	0.4	2.9
10:35:00	-0.3	4.7	10.53	0.4	2.9
11:07:00	-0.3	4.4	10.20	0.4	2.9
11:08:00	-0.3	6.6	9.99	0.4	2.9
11:09:00	-0.3	3.7	9.98	0.4	2.9
11:10:00	-0.3	6.0	10.19	0.4	2.9
11:11:00	-0.3	7.4	9.97	0.4	2.9
11:12:00	-0.3	7.2	9.98	0.4	2.9
11:13:00	-0.3	16.8	9.57	0.3	2.9
11:14:00	-0.3	10.5	10.02	0.4	2.9
11:15:00	-0.3	12.7	9.40	0.4	2.9
11:16:00	-0.3	4.9	10.41	0.4	4.0
11:17:00	-0.3	7.0	9.99	0.3	4.0
11:18:00	-0.3	6.2	10.60	0.4	4.0
11:19:00	-0.3	7.4	10.19	0.4	4.0
11:20:00	-0.3	7.5	10.44	0.4	4.0
11:21:00	-0.3	19.0	9.81	0.4	4.0
11:22:00	-0.3	7.0	9.81	0.4	4.0
11:23:00	-0.3	12.0	9.89	0.4	4.0
11:24:00	-0.3	8.8	10.55	0.5	4.0
11:25:00	-0.3	8.7	10.35	0.4	4.0
11:26:00	-0.3	9.1	10.15	0.4	4.0
11:27:00	-0.3	5.0	10.38	0.4	4.0
11:28:00	-0.3	7.5	9.98	0.4	4.0
11:29:00	-0.3	14.5	10.17	0.4	4.0
11:30:00	-0.3	16.7	9.77	0.4	4.0
11:31:00	-0.3	5.8	10.26	0.3	4.0
11:32:00	-0.3	9.9	9.65	0.4	4.0
11:33:00	-0.3	4.3	10.64	0.3	4.0

Test No. 3 - November 10, 2022
CEM Analyzers

Time	CO ppm	THC ppm	O2 %	Opacity %	SO2 ppm
11:34:00	-0.3	7.5	10.23	0.3	4.0
11:35:00	-0.3	2.5	10.64	0.3	4.0
11:36:00	-0.3	4.6	10.43	0.3	4.0
11:37:00	-0.3	3.0	10.23	0.3	4.0
11:38:00	-0.3	4.5	10.01	0.4	4.0
11:39:00	-0.3	5.8	10.02	0.3	4.0
11:40:00	-0.3	4.8	10.02	0.3	4.0
11:41:00	-0.3	8.4	10.07	0.4	4.0
11:42:00	-0.3	3.7	10.59	0.4	4.0
11:43:00	-0.3	6.2	10.16	0.4	4.0
11:44:00	-0.3	6.8	10.60	0.3	4.0
11:45:00	-0.3	8.3	10.19	0.4	4.0
11:46:00	-0.3	7.2	10.60	0.4	4.0
11:47:00	-0.3	9.6	9.92	0.3	4.0
11:48:00	-0.3	3.9	10.39	0.2	4.0
11:49:00	-0.3	8.3	9.77	0.2	4.0
11:50:00	-0.3	5.5	10.31	0.2	4.0
11:51:00	-0.3	6.2	10.32	0.3	4.0
11:52:00	-0.3	4.7	10.31	0.2	4.0
11:53:00	-0.3	6.2	10.32	0.3	4.0
11:54:00	-0.3	5.7	10.11	0.3	4.0
11:55:00	-0.3	8.0	9.93	0.3	4.0
11:56:00	-0.3	8.8	9.73	0.3	4.0
11:57:00	-0.3	10.6	10.20	0.4	4.0
11:58:00	-0.3	13.9	9.56	0.3	4.0
11:59:00	-0.3	3.5	10.43	0.4	4.0
12:00:00	-0.3	7.7	10.02	0.4	4.0
12:01:00	-0.3	3.5	10.65	0.4	4.0
12:02:00	-0.3	5.7	10.23	0.4	4.0
12:03:00	-0.3	4.7	10.44	0.4	4.0
12:04:00	-0.3	11.8	9.78	0.3	4.0
12:05:00	-0.3	4.8	9.78	0.3	4.0
12:06:00	-0.3	7.3	9.83	0.3	4.0
12:07:00	-0.3	6.2	10.51	0.3	4.0
12:08:00	-0.3	5.4	10.29	0.4	4.0
12:09:00	-0.3	4.9	10.08	0.4	4.0
12:10:00	-0.3	6.4	10.31	0.4	4.0
12:11:00	-0.3	7.1	10.11	0.4	4.0
12:12:00	-0.3	6.8	10.35	0.4	4.0
12:13:00	-0.3	7.1	9.91	0.4	4.0
12:14:00	-0.3	3.3	10.35	0.5	4.0
12:15:00	-0.3	8.9	9.73	0.3	4.0
12:16:00	-0.3	2.7	10.52	0.4	4.0
12:17:00	-0.3	5.0	10.11	0.3	4.0
12:18:00	-0.3	4.0	10.37	0.4	4.0
12:19:00	-0.3	5.5	10.15	0.4	4.0
12:20:00	-0.3	3.8	10.15	0.4	4.0
12:21:00	-0.3	10.5	9.94	0.4	4.0
12:22:00	-0.3	9.6	9.93	0.4	4.0
12:23:00	-0.3	8.3	10.15	0.5	4.0
12:24:00	-0.3	11.8	9.73	0.3	4.0
12:25:00	-0.3	4.4	10.49	0.3	4.0
12:26:00	-0.3	5.2	10.06	0.4	4.0
12:27:00	-0.3	5.8	10.54	0.4	4.0
12:28:00	-0.3	5.6	10.12	0.4	4.0
12:29:00	-0.3	3.9	10.61	0.4	4.0
12:30:00	-0.3	8.5	9.97	0.3	4.0
12:31:00	-0.3	4.7	10.48	0.3	4.0
12:32:00	-0.3	9.0	9.85	0.3	4.0
12:33:00	-0.3	4.7	10.23	0.3	4.0
12:34:00	-0.3	6.7	10.27	0.3	4.0
12:35:00	-0.3	4.8	10.27	0.3	4.0
12:36:00	-0.3	6.9	10.29	0.3	4.0
12:37:00	-0.3	6.7	10.08	0.3	4.0
12:38:00	-0.3	9.8	10.15	0.3	4.0
12:39:00	-0.3	9.1	9.92	0.4	4.0
12:40:00	-0.3	8.9	10.16	0.3	4.0
12:41:00	-0.3	11.2	9.73	0.3	4.0
12:42:00	-0.3	5.0	10.48	0.4	4.0
12:43:00	-0.3	5.6	10.07	0.4	4.0
12:44:00	-0.3	5.6	10.69	0.4	4.0
12:45:00	-0.3	8.7	10.07	0.3	4.0
12:46:00	-0.3	5.0	10.48	0.4	4.0
12:47:00	-0.3	9.6	9.85	0.5	4.0

Test No. 3 - November 10, 2022
CEM Analyzers

Time	CO ppm	THC ppm	O2 %	Opacity %	SO2 ppm
12:48:00	-0.3	4.7	9.85	0.3	4.0
12:49:00	-0.3	10.5	9.98	0.3	4.0
12:50:00	-0.3	8.2	10.48	0.2	4.0
12:51:00	-0.3	7.6	10.46	0.3	4.0
12:52:00	-0.3	5.7	10.06	0.2	4.0
12:53:00	-0.3	6.7	10.47	0.3	4.0
12:54:00	-0.3	6.6	10.07	0.3	4.0
12:55:00	-0.3	6.6	10.29	0.2	4.0
12:56:00	-0.3	10.2	9.87	0.3	4.0
12:57:00	-0.3	4.8	10.34	0.3	4.0
12:58:00	-0.3	9.3	9.73	0.3	4.0
12:59:00	-0.3	3.7	10.64	0.3	4.0
13:00:00	-0.3	5.2	10.23	0.3	4.0
13:01:00	-0.3	3.4	10.46	0.3	4.0
13:02:00	-0.3	5.3	10.27	0.3	4.0
13:03:00	-0.3	3.9	10.07	0.3	4.0
13:04:00	-0.3	9.0	9.90	0.3	4.0
13:05:00	-0.3	8.0	9.90	0.3	4.0
13:06:00	-0.3	7.6	10.12	0.3	4.0
13:07:00	-0.3	10.0	10.06	0.3	4.0
Max	-0.3	44.6	10.69	0.5	4.0
Min	-0.3	2.1	9.14	0.2	1.9
Average	-0.3	7.2	10.02	0.4	3.2

APPENDIX 29

Clean Harbors One-Minute Average Process Data

(15 pages)

Test No. 1 - November 8, 2022

	Waste Flows						PAC	Air Flows			Temperatures					Pressures			
Time	Rich Lpm	Emulsion Lpm	Lean Lpm	Alkaline Lpm	Leachate Lpm	TDU Flow SCFM	Flow lbs/h	Primary m^3/h	Secondary m^3/h	Stack Rm^3/h	Primary °C	Secondary °C	Quench °C	SprayDryer °C	Stack °C	Incinerator mm H_2O	SD Inlet mm H_2O	BH Inlet mm H_2O	Baghouse mm H_2O
9:57:00	35.5	8.0	161.6	196.6	23.9	385.1	24.9	17081	11281	155794.4	1401.6	1140.6	459.7	193.0	193.7	-26.1	-70.1	-145.3	347.8
9:58:00	35.6	9.3	160.7	195.8	23.9	383.4	24.5	16813	11287	154421.8	1401.3	1139.7	460.0	193.5	193.7	-20.2	-60.3	-134.0	356.1
9:59:00	35.3	9.4	161.1	195.1	23.9	382.6	24.6	17150	11270	155835.4	1399.1	1138.0	460.2	193.5	194.7	-28.0	-71.3	-144.4	333.2
10:00:00	35.8	9.2	161.0	196.4	23.9	383.8	25.1	16900	11253	156080.4	1399.6	1139.0	459.7	193.5	194.7	-22.2	-63.8	-135.8	343.4
10:01:00	35.4	9.1	160.6	196.3	23.9	386.3	24.2	16875	11264	154290.7	1399.8	1141.0	460.1	193.5	194.7	-19.3	-58.5	-133.9	360.9
10:02:00	35.3	8.7	161.0	196.6	23.9	386.3	24.0	16613	11073	153682.3	1401.6	1140.9	460.1	193.5	194.7	-15.0	-53.6	-124.4	373.9
10:03:00	35.4	9.5	160.2	195.1	23.9	385.0	25.2	17225	11281	160063.4	1403.6	1141.3	460.1	192.5	194.7	-39.8	-88.5	-166.1	312.5
10:04:00	35.9	9.1	161.3	196.3	23.9	384.7	24.7	16588	11039	155111.1	1402.3	1137.6	459.8	192.5	194.7	-15.4	-55.9	-125.4	367.7
10:05:00	35.3	9.0	160.3	196.2	23.9	384.3	24.1	16856	11264	159402.9	1404.3	1138.4	460.0	192.5	194.7	-37.5	-86.0	-158.7	303.0
10:06:00	35.4	9.9	161.5	196.2	23.9	386.4	24.6	16775	11247	154726.5	1399.6	1136.8	459.9	192.5	194.7	-22.4	-64.4	-137.6	348.5
10:07:00	35.3	7.6	159.7	195.3	23.9	382.2	24.9	16763	11292	153590.5	1399.6	1135.9	459.7	192.5	193.6	-20.2	-61.1	-133.6	362.5
10:08:00	35.3	8.8	161.2	196.2	23.9	386.4	24.1	16950	11185	155885.6	1397.3	1135.0	459.6	193.0	193.6	-23.3	-65.9	-140.7	336.6
10:09:00	35.6	10.2	159.7	197.0	23.9	383.4	24.2	16794	11084	155993.5	1398.4	1133.5	459.7	193.0	193.6	-21.0	-61.8	-133.0	345.6
10:10:00	35.3	8.8	161.3	195.8	23.9	384.2	24.2	16744	11073	155479.8	1397.6	1133.4	459.4	193.0	193.6	-17.1	-56.4	-129.0	367.6
10:11:00	35.3	8.5	160.3	196.7	23.9	384.0	24.7	16475	11073	154077.0	1401.5	1132.2	459.6	192.5	193.6	-13.7	-51.3	-122.5	376.1
10:12:00	35.1	8.2	161.2	196.5	23.9	385.1	25.0	16881	11185	154677.3	1399.3	1131.8	459.8	192.0	193.6	-21.2	-62.8	-134.6	361.8
10:13:00	35.5	8.6	160.3	196.2	23.9	384.2	25.1	16663	11185	153631.3	1400.3	1130.0	459.1	192.0	193.6	-14.0	-52.5	-123.9	374.2
10:14:00	35.2	8.9	160.4	194.9	23.9	385.0	24.2	17269	11258	158576.0	1399.3	1129.5	458.9	192.0	193.6	-28.8	-71.6	-150.8	345.1
10:15:00	35.2	7.6	161.1	196.5	23.9	383.4	24.5	16938	11242	155796.8	1397.4	1128.7	459.5	192.5	193.6	-22.7	-65.0	-138.8	356.9
10:16:00	35.5	8.7	160.5	196.6	23.9	386.3	24.9	17394	11253	155682.4	1395.8	1126.9	458.9	192.5	193.6	-30.7	-75.3	-153.6	326.4
10:17:00	35.4	9.3	160.8	196.5	23.9	385.0	25.0	16844	11247	154956.5	1394.4	1126.7	459.2	193.0	193.6	-21.8	-62.5	-137.6	341.1
10:18:00	35.2	9.3	158.9	196.6	23.9	382.4	24.4	17156	11354	158648.1	1395.4	1126.3	459.1	192.5	193.6	-39.6	-86.9	-163.0	315.3
10:19:00	35.7	9.5	160.6	196.5	23.6	386.0	24.9	16675	11112	154702.4	1397.4	1126.0	459.3	192.5	193.6	-16.4	-54.5	-125.3	372.7
10:20:00	35.6	8.8	159.8	195.7	23.6	383.0	24.8	16713	11112	160767.8	1402.1	1126.4	458.8	192.0	193.6	-33.3	-82.3	-147.9	313.9
10:21:00	36.0	8.5	161.4	195.3	23.6	384.7	24.3	16706	11185	154915.3	1399.8	1125.5	459.0	192.0	193.6	-16.8	-58.5	-128.4	366.8
10:22:00	35.6	11.4	159.2	196.1	23.6	384.4	24.8	16625	11079	153450.7	1403.9	1129.8	458.8	192.0	193.6	-13.9	-53.5	-122.7	377.6
10:23:00	36.1	8.3	161.9	195.8	23.6	385.5	24.9	16875	11427	156132.3	1400.0	1130.7	458.6	192.0	193.6	-24.9	-67.8	-142.7	349.3
10:24:00	36.2	8.6	159.5	197.3	23.6	384.3	24.8	16900	11292	155054.8	1400.3	1131.6	458.6	192.5	193.6	-20.5	-61.5	-135.5	361.7
10:25:00	36.3	9.1	161.6	196.7	23.6	382.4	24.6	17113	11326	155896.9	1399.3	1130.8	458.5	192.5	193.6	-23.6	-66.8	-140.8	335.4
10:26:00	35.9	9.0	159.6	195.6	23.6	387.3	25.1	16744	11225	155478.8	1400.8	1130.7	459.1	193.0	193.6	-20.8	-62.5	-133.6	345.4
10:27:00	36.5	8.2	161.0	196.6	23.6	385.0	24.2	16819	11225	155283.9	1399.6	1129.0	458.6	193.0	193.6	-17.5	-56.9	-129.2	368.8
10:28:00	36.2	9.8	160.7	197.2	23.6	385.7	24.7	16569	11129	153532.1	1404.9	1130.9	458.9	193.0	193.6	-13.3	-53.1	-123.9	374.3
10:29:00	36.4	9.9	160.5	196.1	23.6	381.5	25.1	17063	11382	155633.5	1405.0	1133.4	458.3	193.0	193.6	-24.4	-66.8	-140.3	358.3
10:30:00	36.3	9.8	160.6	197.1	23.6	385.0	24.4	16463	11051	154652.2	1405.9	1133.2	458.4	193.0	193.6	-13.9	-53.4	-124.4	371.7
10:31:00	36.0	8.9	160.1	195.8	23.6	384.5	24.3	17213	11264	155796.7	1407.3	1134.6	458.4	193.0	193.6	-35.7	-77.3	-162.5	330.5
10:32:00	37.0	9.2	161.2	196.8	23.6	385.1	25.1	16838	11202	155363.3	1405.0	1133.4	458.6	193.5	193.6	-19.5	-62.5	-135.1	350.5
10:33:00	36.3	8.5	160.7	195.3	23.6	353.4	24.0	16988	11303	160070.0	1407.5	1135.5	458.8	193.5	193.6	-37.2	-85.0	-160.9	306.1
10:34:00	36.6	10.6	161.7	197.5	23.6	353.0	24.5	16931	11191	155885.6	1405.3	1135.2	458.3	194.0	193.6	-21.0	-63.5	-138.0	339.8
10:35:00	36.3	9.3	159.3	195.1	23.6	349.1	24.2	16725	11309	155427.9	1405.6	1137.6	458.8	194.5	193.6	-23.4	-71.3	-138.4	326.3
10:36:00	36.2	9.8	161.6	196.2	23.6	344.9	24.9	16550	11045	154299.7	1404.4	1134.2	458.5	194.5	194.7	-14.6	-54.0	-125.0	367.6
10:37:00	36.2	7.9	159.6	196.7	23.6	339.6	24.9	16406	11146	154265.8	1408.4	1138.8	458.7	194.0	194.7	-12.5	-52.1	-120.6	376.5
10:38:00	36.2	8.2	161.9	196.2	23.6	345.8	24.9	16744	11017	155622.4	1406.6	1138.1	458.7	194.0	194.7	-15.7	-57.0	-128.3	361.6
10:39:00	36.2	9.4	159.5	196.3	23.6	345.6	24.7	16463	11129	153260.7	1409.6	1139.8	458.5	193.5	194.7	-13.0	-53.0	-121.5	372.4
10:40:00	36.1	9.7	161.5	196.3	23.6	386.0	24.3	16981	11146	156870.1	1406.6	1137.6	458.6	193.5	194.7	-25.3	-68.5	-143.1	346.2
10:41:00	36.2	9.5	161.2	196.3	23.6	388.3	25.0	16763	11326	155395.6	1405.8	1135.6	458.5	194.0	194.7	-19.5	-60.6	-134.6	358.4
10:42:00	36.2	7.9	161.8	195.6	23.6	386.2	24.6	17069	11303	156670.5	1403.6	1134.6	458.9	194.0	194.7	-23.5	-67.1	-143.4	330.9
10:43:00	36.0	9.0	161.6	196.4	23.6	387.1	24.9	16788	11309	154504.8	1404.0	1133.7	458.5	194.0	194.7	-19.7	-62.1	-133.4	341.6
10:44:00	35.6	9.0	161.6	196.1	23.6	384.7	24.1	17069	11416	154125.9	1402.8	1133.3	458.5	194.0	194.7	-20.3	-61.5	-137.1	364.3
10:45:00	35.5	9.7	161.0	196.6	23.6	386.8	24.3	16569	11079	153195.7	1405.0	1133.9	458.5	194.0	194.7	-14.0	-54.4	-123.3	372.8
10:46:00	36.5	9.1	161.0	196.8	23.6	384.5	24.1	17188	11348	158470.2	1407.8	1136.2	458.4	193.0	194.7	-37.1	-84.8	-164.1	313.3
10:47:00	35.9	8.7	161.5	197.8	23.6	382.6	24.9	16625	11214	154002.7	1408.0	1137.2	458.4	193.0	194.7	-15.9	-55.8	-126.6	367.9
10:48:00	35.7	9.8	160.1	194.9	23.6	383.9	25.0	16769	11180	161279.8	1410.4	1139.4	458.5	193.0	194.7	-37.4	-86.4	-158.5	302.9

Test No. 1 - November 8, 2022

Time	Waste Flows						PAC	Air Flows			Temperatures					Pressures			
	Rich	Emulsion	Lean	Alkaline	Leachate	TDU Flow	Flow	Primary	Secondary	Stack	Primary	Secondary	Quench	SprayDryer	Stack	Incinerator	SD Inlet	BH Inlet	Baghouse
	Lpm	Lpm	Lpm	Lpm	Lpm	SCFM	lbs/h	m^3/h	m^3/h	Rm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
10:49:00	36.0	8.5	161.6	196.1	23.6	383.5	24.2	16894	11287	156955.1	1405.6	1135.0	459.0	193.0	194.7	-23.6	-66.5	-139.6	351.8
10:50:00	36.2	8.2	160.0	196.4	23.6	387.6	24.2	16713	11197	157508.0	1406.4	1135.4	458.7	193.0	194.7	-17.4	-59.1	-132.5	362.1
10:51:00	35.8	8.4	161.3	196.8	23.6	384.3	24.3	16806	11309	158016.5	1404.0	1131.8	458.8	193.5	194.7	-22.7	-66.3	-138.2	335.9
10:52:00	36.1	9.7	161.0	197.1	23.6	386.8	24.9	16669	11191	155607.9	1405.4	1133.9	458.8	193.5	194.7	-20.2	-60.9	-134.9	345.6
10:53:00	36.2	8.4	161.9	198.2	23.6	386.3	25.1	16681	11039	155551.3	1405.4	1134.1	458.4	193.5	194.7	-14.3	-55.4	-127.4	366.8
10:54:00	35.8	10.0	160.6	197.6	23.6	387.7	25.0	16313	11202	154684.3	1409.6	1133.7	458.9	193.0	194.7	-11.1	-52.5	-121.4	374.6
10:55:00	35.7	9.4	161.7	195.8	23.6	387.1	25.0	16819	11247	154619.5	1408.4	1135.7	458.3	192.5	194.7	-18.4	-61.0	-133.1	358.9
10:56:00	35.8	9.4	159.7	196.8	23.6	387.6	24.8	16481	11112	153359.1	1409.4	1135.4	458.6	192.0	194.7	-12.1	-51.3	-121.9	369.9
10:57:00	35.3	9.2	160.3	195.4	23.6	386.1	24.2	17269	11371	157262.4	1406.4	1135.5	458.2	191.5	194.7	-28.1	-72.4	-149.0	342.8
10:58:00	36.3	10.5	160.4	198.0	23.6	383.9	24.2	16744	11129	156470.3	1404.0	1135.4	458.2	192.0	193.6	-21.3	-63.5	-136.7	357.3
10:59:00	35.9	8.6	160.3	197.4	23.6	387.3	24.2	17169	11298	155038.2	1404.4	1136.9	458.6	192.0	193.6	-27.6	-71.3	-153.0	324.3
11:00:00	36.0	9.9	160.4	197.4	23.6	385.6	24.1	16881	11298	154891.2	1403.0	1135.6	458.2	192.0	193.6	-20.2	-62.6	-136.9	337.6
11:01:00	35.4	10.1	160.2	197.1	23.6	384.5	24.9	17206	11270	159158.2	1404.1	1137.0	458.4	192.0	193.6	-36.2	-85.0	-162.0	313.0
11:02:00	35.6	9.0	161.4	196.9	23.6	383.4	24.4	16500	11124	152986.4	1404.1	1135.4	458.4	192.0	193.6	-13.6	-52.9	-125.9	370.7
11:03:00	35.6	7.6	159.8	196.1	23.6	387.6	24.6	16619	11253	160454.1	1407.1	1136.8	458.3	191.5	193.6	-33.0	-82.8	-147.6	313.9
11:04:00	35.4	8.7	161.0	195.9	24.2	385.2	24.8	16538	11191	154514.4	1403.4	1134.9	458.1	191.5	193.6	-16.1	-57.6	-126.8	365.2
11:05:00	35.4	8.5	159.4	196.2	24.2	386.3	25.1	16400	11090	151751.4	1406.0	1134.9	458.0	191.5	193.6	-12.5	-54.0	-123.1	377.1
11:06:00	35.6	9.9	161.5	196.0	24.2	357.3	24.4	17019	11163	158436.5	1402.0	1133.3	458.1	191.5	193.6	-24.0	-68.8	-143.7	349.1
11:07:00	35.6	9.2	160.2	196.7	24.2	384.8	25.0	16719	11056	154555.2	1401.3	1133.9	458.1	191.5	193.6	-18.6	-60.6	-134.8	356.5
11:08:00	35.4	9.2	162.4	196.6	24.2	388.9	24.3	16875	11174	157357.2	1399.8	1131.8	457.9	191.5	193.6	-23.8	-67.5	-143.0	334.8
11:09:00	35.5	10.1	153.9	196.9	24.2	383.7	24.7	16856	11163	153738.5	1400.3	1131.5	458.1	191.5	193.6	-22.8	-65.5	-138.2	343.8
11:10:00	35.7	8.7	159.6	196.2	24.2	388.6	24.9	16806	11197	154506.3	1398.6	1131.7	458.0	191.5	193.6	-17.8	-60.8	-132.0	366.0
11:11:00	35.6	9.2	159.2	195.8	24.2	386.7	24.2	16538	11090	155016.1	1402.0	1131.5	457.4	191.0	193.6	-14.7	-56.1	-124.5	372.6
11:12:00	35.3	8.5	159.6	196.2	24.2	385.1	24.8	17181	11303	154621.3	1402.3	1133.3	457.8	190.5	192.6	-22.2	-66.0	-142.5	356.1
11:13:00	35.6	9.3	158.0	197.2	24.2	385.2	24.1	16563	11163	154456.2	1404.1	1133.4	457.6	190.5	192.6	-15.8	-55.6	-128.1	369.4
11:14:00	35.3	9.0	159.6	196.2	24.2	386.0	24.9	17238	11449	157036.6	1405.4	1136.3	457.4	190.0	192.6	-34.4	-76.8	-161.1	324.4
11:15:00	35.3	9.3	160.9	196.2	24.2	387.7	24.5	16994	11219	155572.1	1400.5	1133.7	457.1	190.5	192.6	-24.0	-67.1	-141.7	354.8
11:16:00	35.3	8.7	159.5	195.7	24.2	388.5	24.7	17050	11343	158039.3	1399.0	1132.2	457.6	190.5	192.6	-35.9	-84.4	-160.6	300.8
11:17:00	35.6	9.2	160.6	196.6	24.2	358.2	24.1	16844	11124	155965.1	1396.8	1129.8	456.9	190.5	192.6	-22.8	-67.4	-140.6	338.9
11:18:00	35.5	9.7	159.3	196.3	24.2	387.5	25.1	16831	11129	160202.0	1399.8	1131.2	457.3	191.0	192.6	-21.6	-70.4	-138.1	321.9
11:19:00	35.7	8.3	160.2	196.3	24.2	385.4	25.0	16513	11129	158040.4	1400.4	1131.7	456.8	190.5	192.6	-15.8	-56.6	-129.5	369.8
11:20:00	35.0	8.8	158.4	195.9	24.2	387.5	24.4	16513	11006	153887.2	1404.6	1132.1	457.3	190.5	192.6	-13.8	-55.0	-126.0	377.4
11:21:00	35.5	8.5	160.3	197.0	24.2	386.9	24.4	16825	11157	154357.9	1402.0	1132.0	457.1	190.0	192.6	-19.0	-59.5	-133.2	364.6
11:22:00	35.0	9.1	158.1	195.4	24.2	387.5	24.1	16450	11191	154859.9	1404.0	1132.7	456.7	190.0	192.6	-16.3	-58.9	-125.4	376.4
11:23:00	35.1	8.6	160.5	195.7	24.2	386.2	24.9	17063	11208	157122.1	1399.4	1131.0	456.9	190.0	192.6	-26.7	-72.4	-148.8	347.4
11:24:00	35.1	9.2	160.0	196.8	24.2	387.1	24.1	16813	11214	156729.7	1397.4	1130.5	456.5	190.5	192.6	-22.9	-65.8	-140.3	358.7
11:25:00	35.6	9.0	159.9	196.7	24.2	357.8	24.9	17125	11332	158565.6	1394.8	1130.3	456.3	190.5	192.6	-26.8	-71.3	-146.0	332.3
11:26:00	35.3	8.8	159.4	195.8	24.2	373.7	24.7	16856	11230	155221.3	1394.9	1129.5	456.5	190.5	192.6	-21.7	-65.1	-137.1	341.7
11:27:00	35.1	8.5	158.8	197.4	24.2	386.4	23.9	17081	11247	155091.5	1394.3	1130.6	456.4	190.5	192.6	-23.2	-65.8	-140.6	361.7
11:28:00	35.6	9.0	159.1	196.6	24.2	357.5	24.9	16500	11124	154374.8	1397.6	1131.9	456.0	190.5	192.6	-15.8	-57.6	-127.7	372.3
11:29:00	35.4	9.6	158.1	197.6	24.2	389.5	24.5	17213	11253	161116.3	1400.5	1132.3	456.1	190.0	191.6	-40.3	-90.4	-169.0	310.7
11:30:00	35.1	8.0	168.5	197.8	24.2	387.6	25.1	16469	11253	152824.8	1399.1	1130.4	455.9	190.0	191.6	-11.3	-51.0	-126.1	363.1
11:31:00	35.0	9.0	160.7	196.0	24.2	388.7	24.1	16625	11180	162209.6	1401.6	1129.8	456.0	190.0	191.6	-38.2	-89.0	-161.4	302.8
11:32:00	35.1	9.3	162.4	197.5	24.2	387.8	24.2	16825	11146	156246.1	1397.0	1128.7	456.2	190.5	191.6	-22.3	-66.5	-143.4	351.0
11:33:00	34.9	9.0	160.3	195.8	24.2	356.7	25.2	16838	11292	154481.6	1396.6	1129.6	456.1	191.0	191.6	-20.5	-63.0	-136.1	361.4
11:34:00	35.5	9.7	160.7	197.3	24.2	389.6	24.5	17000	11045	156090.1	1394.3	1128.3	455.6	191.0	191.6	-22.8	-67.4	-141.5	335.9
11:35:00	35.3	8.4	160.4	197.1	24.2	357.4	24.6	16769	11084	155729.2	1395.4	1129.8	456.1	191.0	191.6	-21.1	-64.1	-136.8	345.3
11:36:00	35.2	9.5	161.9	198.4	24.2	356.5	24.1	16650	11202	153912.0	1394.5	1134.7	455.5	191.0	191.6	-17.0	-57.8	-130.1	367.4
11:37:00	34.9	8.2	160.1	196.3	24.2	353.3	25.0	16388	11197	152991.9	1398.1	1137.2	455.6	191.0	191.6	-14.2	-53.8	-123.0	374.1
11:38:00	35.1	8.7	161.0	197.7	24.2	352.0	25.1	16850	11230	155558.5	1396.5	1137.6	455.7	190.5	191.6	-20.4	-62.6	-135.9	361.1
11:39:00	36.3	8.5	161.4	196.7	24.2	339.2	24.1	16481	11084	152834.1	1398.0	1140.2	455.3	190.5	191.6	-13.8	-54.4	-124.8	373.4
11:40:00	35.3	8.9	160.2	196.0	24.2	346.8	24.1	17313	11202	157357.6	1399.9	1143.0	455.7	190.0	191.6	-30.3	-75.6	-153.1	345.2

Test No. 1 - November 8, 2022

	Waste Flows						PAC	Air Flows			Temperatures					Pressures			
Time	Rich Lpm	Emulsion Lpm	Lean Lpm	Alkaline Lpm	Leachate Lpm	TDU Flow SCFM	Flow lbs/h	Primary m^3/h	Secondary m^3/h	Stack Rm^3/h	Primary °C	Secondary °C	Quench °C	SprayDryer °C	Stack °C	Incinerator mm H_2O	SD Inlet mm H_2O	BH Inlet mm H_2O	Baghouse mm H_2O
11:41:00	34.9	8.5	159.5	196.6	24.2	346.7	25.0	16875	11225	155410.1	1397.6	1141.4	456.0	190.5	191.6	-21.9	-66.4	-137.4	356.1
11:42:00	35.6	9.0	159.7	195.8	24.2	365.9	24.6	17400	11337	157056.6	1396.1	1139.1	456.0	190.5	191.6	-28.2	-74.0	-154.7	325.2
11:43:00	35.0	8.3	160.2	196.3	24.2	366.2	24.8	16856	11208	157211.9	1394.1	1136.3	455.6	190.5	191.6	-21.9	-64.9	-140.0	338.8
11:44:00	34.8	8.9	158.9	197.1	24.2	362.9	25.0	17238	11225	161578.5	1394.4	1135.6	455.4	190.5	191.6	-36.5	-86.9	-160.5	313.5
11:45:00	35.0	9.3	160.2	197.8	24.2	367.3	24.0	16638	11298	154399.9	1395.5	1136.2	455.2	190.0	191.6	-16.4	-57.8	-127.5	370.1
11:46:00	34.8	8.7	161.7	195.7	24.2	391.7	24.3	16506	11174	160592.6	1397.9	1137.2	455.2	189.5	191.6	-33.6	-84.5	-151.9	312.9
11:47:00	34.9	9.9	160.5	196.7	24.2	394.1	24.2	16688	11169	154961.0	1395.8	1135.4	455.4	189.5	191.6	-17.4	-59.4	-132.6	367.5
11:48:00	35.0	8.3	158.9	196.4	24.2	393.5	24.8	16519	11169	152640.7	1398.4	1138.5	455.5	189.5	191.6	-14.3	-55.0	-125.1	378.9
11:49:00	35.4	9.9	162.9	197.0	24.2	364.1	24.3	17038	11163	157425.3	1394.1	1134.7	455.2	189.5	191.6	-25.2	-70.1	-144.6	349.4
11:50:00	34.8	7.9	159.3	196.6	24.2	363.7	24.3	16713	11180	154689.4	1394.3	1135.9	455.5	190.0	191.6	-22.1	-65.0	-137.6	361.3
11:51:00	35.0	10.6	161.0	196.3	24.2	393.3	25.2	17044	11174	156899.5	1392.1	1131.3	455.2	190.0	191.6	-20.7	-65.9	-139.8	329.7
11:52:00	35.0	9.2	160.1	198.0	24.2	362.3	25.1	16750	11270	155863.2	1393.5	1133.5	455.2	190.0	191.6	-18.6	-62.4	-135.6	338.6
11:53:00	34.6	9.9	161.0	198.0	24.2	393.5	24.8	16919	11247	153107.7	1392.5	1133.1	454.9	189.5	191.6	-18.6	-62.5	-134.1	365.9
11:54:00	34.9	9.8	160.2	197.7	24.2	393.7	25.1	16431	10966	152472.2	1395.1	1136.7	455.2	189.5	191.6	-13.6	-54.1	-126.6	374.6
11:55:00	34.9	9.1	160.6	195.6	24.2	393.0	24.7	17125	11163	155486.8	1394.4	1135.2	455.0	189.0	191.6	-24.1	-68.6	-143.6	355.9
11:56:00	35.0	8.9	159.7	196.3	24.2	359.5	24.3	16513	11062	153754.3	1394.1	1134.3	455.2	189.0	191.6	-14.9	-55.0	-129.2	370.9
11:57:00	34.7	8.4	158.8	195.6	24.2	393.4	24.1	17413	11298	155118.0	1394.3	1133.2	455.1	188.5	191.6	-35.2	-81.1	-166.5	332.3
12:54:00	35.1	8.8	159.9	198.0	24.2	393.6	24.2	16556	11056	151959.5	1402.0	1133.8	453.6	190.0	190.6	-15.1	-56.5	-126.3	373.6
12:55:00	34.9	9.4	159.2	197.2	23.6	362.0	24.6	17244	11180	159255.7	1401.1	1134.2	453.3	189.5	190.6	-40.1	-90.9	-173.0	320.4
12:56:00	35.3	9.2	159.7	197.6	23.6	394.5	24.1	16594	11056	151643.2	1400.9	1134.1	453.4	190.0	190.6	-16.3	-59.3	-129.5	370.1
12:57:00	34.7	8.9	159.6	197.4	23.6	363.2	24.3	16969	11315	161025.9	1402.9	1136.6	453.4	190.0	191.7	-39.0	-89.1	-164.1	303.8
12:58:00	34.4	9.3	160.7	196.7	23.6	393.2	24.3	16981	11191	154244.2	1396.8	1132.0	453.9	190.5	191.7	-24.5	-68.5	-145.3	354.7
12:59:00	34.7	8.4	159.7	196.5	23.6	362.6	24.7	16844	11208	153415.9	1395.9	1131.7	453.3	191.0	191.7	-21.0	-64.4	-137.7	362.1
13:00:00	33.9	9.2	160.4	196.5	23.6	363.2	24.8	16950	11084	153340.8	1393.3	1129.5	453.3	191.5	191.7	-24.4	-69.0	-142.9	338.5
13:01:00	34.0	8.8	158.5	196.5	23.6	391.3	24.2	16825	11073	153531.1	1393.6	1129.8	454.2	191.5	191.7	-21.8	-64.9	-135.9	347.0
13:02:00	35.4	9.1	161.4	197.2	23.6	359.9	24.8	16844	11202	152900.5	1393.6	1129.6	453.5	191.5	191.7	-16.6	-57.9	-131.9	369.9
13:03:00	34.7	9.0	160.3	197.6	23.6	391.7	24.2	16338	11084	149983.7	1399.6	1135.5	454.1	191.0	191.7	-13.4	-55.0	-122.8	374.5
13:04:00	34.7	9.4	161.7	196.5	23.6	360.7	25.0	16919	11112	152004.9	1399.5	1134.4	454.2	191.0	191.7	-19.0	-61.6	-137.4	362.8
13:05:00	35.4	8.7	161.1	198.5	23.6	393.4	24.5	16481	11118	151579.9	1400.5	1134.7	453.8	191.5	191.7	-14.2	-54.5	-128.1	374.5
13:06:00	35.5	8.9	161.0	197.1	23.6	359.9	25.0	17225	11337	154423.7	1398.9	1134.4	454.4	191.0	192.7	-25.2	-70.1	-148.7	339.6
13:07:00	35.1	8.9	159.5	197.4	23.6	362.9	25.0	16975	11124	154194.0	1397.3	1135.1	454.1	191.5	192.7	-22.2	-67.1	-140.5	357.2
13:08:00	33.7	8.8	158.7	197.5	23.6	360.8	24.9	17481	11337	154802.6	1395.5	1135.8	454.3	191.5	192.7	-29.2	-74.5	-157.7	326.6
13:09:00	34.7	9.1	159.8	197.3	23.6	362.7	24.1	16838	11152	152502.1	1394.3	1135.3	454.3	192.0	192.7	-21.3	-65.0	-141.0	341.0
13:10:00	35.1	8.8	160.0	196.5	23.6	361.1	24.8	17113	11303	157571.3	1394.9	1136.9	454.6	192.0	192.7	-37.0	-86.9	-165.2	313.5
13:11:00	33.9	9.0	160.7	196.8	23.6	392.7	25.0	16438	11230	151698.0	1395.3	1135.1	454.4	192.0	192.7	-14.5	-56.3	-128.7	370.3
13:12:00	34.6	9.1	160.2	196.1	23.6	358.6	24.1	16450	11101	158254.9	1400.1	1138.2	454.5	191.5	192.7	-31.9	-82.4	-148.6	309.8
13:13:00	34.4	9.1	161.3	197.6	23.6	360.5	24.9	16669	10989	153399.7	1398.6	1135.6	454.3	191.5	192.7	-18.5	-62.0	-131.4	367.1
13:14:00	34.1	9.0	158.5	196.9	23.6	391.7	24.2	16431	10888	151665.8	1401.6	1138.0	454.7	191.0	192.7	-13.5	-55.0	-124.0	375.8
13:15:00	34.1	9.2	161.0	196.7	23.6	360.2	24.6	16969	11045	154102.0	1397.1	1133.9	454.6	191.0	192.7	-25.2	-70.5	-146.1	350.2
13:16:00	34.0	9.0	159.1	197.3	23.6	363.6	24.2	16844	11112	154999.5	1397.3	1130.4	454.5	191.5	192.7	-21.0	-65.1	-137.4	361.3
13:17:00	34.0	8.1	161.6	196.2	23.6	360.2	25.0	16994	11236	155032.4	1393.5	1127.1	454.5	191.5	192.7	-24.2	-69.6	-143.9	335.3
13:18:00	34.3	8.5	160.2	197.4	23.6	391.1	24.1	16900	11112	155328.7	1395.3	1127.1	454.4	191.5	192.7	-19.2	-62.3	-137.1	344.3
13:19:00	34.4	8.7	160.4	197.0	23.6	360.2	24.9	16913	11090	152901.2	1394.6	1125.0	454.4	191.5	192.7	-17.5	-60.5	-135.4	368.4
13:20:00	34.6	8.4	159.8	197.1	23.6	384.7	24.0	16538	11101	151351.4	1399.9	1126.1	454.3	191.5	192.7	-13.6	-55.4	-127.4	374.8
13:21:00	34.1	8.6	156.7	195.8	23.6	357.7	24.2	17250	11090	154201.3	1401.1	1124.9	454.4	191.0	192.7	-22.2	-66.1	-144.0	358.4
13:22:00	34.8	9.3	160.2	197.4	23.6	391.1	24.2	16650	11118	152032.5	1400.9	1124.8	454.7	191.0	192.7	-14.9	-56.0	-129.2	370.6
13:23:00	35.4	9.0	159.2	196.5	23.6	363.4	24.7	17538	11332	156054.1	1403.5	1127.2	454.7	190.5	192.7	-33.6	-80.6	-167.1	332.3
13:24:00	35.0	8.9	159.5	197.4	23.6	392.1	24.3	16981	11107	153615.4	1401.0	1125.3	454.3	191.0	192.7	-23.7	-68.8	-143.6	354.3
13:25:00	34.8	10.0	158.3	196.0	23.6	361.2	24.8	17175	11180	159427.0	1401.5	1126.2	454.4	191.0	192.7	-37.2	-87.1	-168.0	306.7
13:26:00	34.8	9.9	160.6	197.0	23.6	392.3	24.9	16756	11180	154703.9	1402.8	1124.8	454.9	191.5	192.7	-20.3	-64.3	-138.5	335.3
13:27:00	34.0	8.6	158.6	196.3	23.6	362.0	24.6	16756	11146	159423.5	1408.8	1129.4	454.4	191.5	192.7	-25.8	-77.9	-145.2	324.9
13:28:00	35.1	9.1	159.4	196.9	23.6	362.0	24.2	16563	11129	151050.2	1411.9	1130.0	454.6	192.0	192.7	-12.7	-55.0	-127.6	366.3

Test No. 1 - November 8, 2022

	Waste Flows						PAC	Air Flows			Temperatures					Pressures			
Time	Rich	Emulsion	Lean	Alkaline	Leachate	TDU Flow	Flow	Primary	Secondary	Stack	Primary	Secondary	Quench	SprayDryer	Stack	Incinerator	SD Inlet	BH Inlet	Baghouse
	Lpm	Lpm	Lpm	Lpm	Lpm	SCFM	lbs/h	m^3/h	m^3/h	Rm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
13:29:00	34.9	8.6	158.7	196.6	23.6	362.5	24.4	16438	11017	153002.2	1416.8	1135.2	454.6	192.0	192.7	-10.9	-53.0	-124.0	376.6
13:30:00	34.6	8.5	160.4	196.1	23.6	362.9	24.1	16594	11129	151901.8	1417.1	1135.8	454.8	192.5	192.7	-15.5	-57.6	-131.5	361.9
13:31:00	35.5	9.3	158.4	196.7	23.6	360.2	24.1	16450	11006	149635.2	1421.1	1137.2	454.8	192.5	192.7	-13.1	-54.8	-124.8	373.6
13:32:00	34.7	9.5	160.7	197.2	23.6	360.5	25.1	17056	11056	155316.1	1419.6	1133.5	454.5	193.0	193.7	-25.2	-71.3	-147.9	347.5
13:33:00	34.5	9.4	160.1	198.1	23.6	362.7	24.9	16731	11163	153068.4	1419.8	1134.9	454.6	193.5	193.7	-19.6	-63.8	-138.7	359.5
13:34:00	34.3	8.6	160.3	196.3	23.6	363.5	24.8	16994	11152	152639.0	1418.6	1134.8	455.0	194.0	193.7	-24.2	-70.3	-147.2	332.5
13:35:00	34.9	9.0	159.5	195.9	23.6	392.3	24.1	16744	11017	153550.1	1419.0	1134.3	455.2	194.5	193.7	-19.7	-63.5	-137.4	341.9
13:36:00	34.3	9.0	159.5	195.4	23.6	360.2	24.1	17138	11326	152589.2	1419.0	1134.5	455.5	195.0	193.7	-20.3	-62.9	-139.2	362.7
13:37:00	35.3	8.9	160.2	196.8	23.6	393.2	24.9	16375	10944	151162.0	1422.5	1134.9	455.6	195.5	194.7	-10.7	-52.4	-125.0	371.7
13:38:00	34.3	8.6	159.5	196.4	23.6	361.1	24.4	17388	11152	157927.4	1424.9	1134.4	455.5	195.0	194.7	-37.4	-87.4	-166.5	317.7
13:39:00	34.9	9.6	164.2	197.9	23.6	361.2	24.4	16481	11157	153105.5	1425.1	1134.3	455.6	195.5	194.7	-13.5	-54.5	-126.0	365.0
13:40:00	34.1	8.7	161.5	196.9	23.6	361.3	24.4	16713	10983	159189.3	1427.8	1135.7	455.6	195.5	195.7	-32.1	-81.9	-153.8	298.1
13:41:00	35.1	9.3	161.6	197.7	23.6	358.5	24.5	16819	11214	154470.0	1424.6	1133.4	455.5	196.0	195.7	-19.0	-62.4	-139.3	351.3
13:42:00	34.8	8.7	160.9	196.1	23.6	350.4	25.1	16819	11219	153212.9	1424.9	1134.3	455.9	196.0	195.7	-17.1	-61.3	-133.7	363.4
13:43:00	35.1	9.0	162.3	197.1	23.6	360.3	24.9	16775	11208	153443.4	1422.0	1134.1	456.1	196.5	195.7	-19.6	-64.1	-137.6	336.0
13:44:00	35.2	9.1	159.0	196.3	23.6	393.2	25.1	16675	11107	151605.4	1423.4	1135.0	456.3	196.5	195.7	-17.7	-60.8	-131.5	345.4
13:45:00	34.6	8.9	161.0	196.4	23.6	359.6	24.7	16413	11079	150680.9	1424.0	1135.0	456.7	196.5	195.7	-12.8	-53.5	-126.4	363.8
13:46:00	34.5	8.9	160.3	197.5	23.6	360.0	24.1	16256	11096	150007.6	1429.3	1138.5	456.6	196.5	195.7	-9.2	-49.9	-120.1	372.3
13:47:00	35.0	8.9	160.3	196.2	23.6	363.6	24.3	16863	10961	153946.0	1427.5	1138.3	457.0	196.0	195.7	-17.1	-58.4	-133.9	359.4
13:48:00	33.8	8.9	160.0	197.1	23.6	361.1	24.9	16375	11079	150880.8	1428.0	1136.7	456.9	196.0	195.7	-10.7	-51.9	-122.4	368.9
13:49:00	34.1	9.2	160.7	196.8	23.6	360.4	24.1	17100	11214	152661.8	1426.9	1136.5	457.4	195.5	195.7	-23.8	-66.9	-146.2	337.3
13:50:00	35.0	9.0	159.6	197.0	23.6	393.1	24.3	16738	11067	154273.4	1425.8	1136.9	457.0	196.0	195.7	-19.3	-62.5	-137.6	355.5
13:51:00	34.2	9.4	160.2	196.8	23.6	360.2	23.9	17219	11427	154297.0	1424.6	1136.5	457.4	196.0	195.7	-25.2	-67.5	-150.6	321.6
13:52:00	34.6	9.6	157.7	198.5	23.6	392.1	25.2	16663	11090	152303.6	1423.4	1135.2	457.3	196.0	195.7	-17.7	-60.8	-133.3	335.9
13:53:00	34.7	9.3	158.3	197.5	23.6	363.2	24.1	17125	11315	156715.9	1424.8	1136.6	457.7	196.0	195.7	-33.8	-82.5	-162.1	312.4
13:54:00	34.3	9.0	159.9	198.0	23.6	392.3	24.3	16488	11056	152023.2	1425.5	1137.3	457.7	195.5	195.7	-10.3	-51.0	-120.9	365.4
13:55:00	34.2	9.1	159.2	196.6	23.6	360.8	24.1	16481	10949	158058.7	1428.5	1138.8	457.6	195.0	195.7	-30.3	-82.0	-148.7	312.0
13:56:00	33.8	9.0	160.2	198.1	23.6	392.9	25.0	16525	11337	151507.0	1425.9	1136.0	457.9	195.0	195.7	-14.2	-56.6	-128.1	364.3
13:57:00	33.7	9.0	159.1	197.3	23.6	394.2	24.4	16394	11023	151807.6	1426.6	1137.2	457.9	195.0	195.7	-11.8	-52.3	-122.5	374.3
13:58:00	33.9	9.1	161.0	198.0	23.6	392.0	24.4	16988	11214	153666.8	1422.3	1134.9	458.4	194.5	195.7	-20.8	-63.9	-143.0	347.1
13:59:00	33.8	8.9	158.5	197.7	23.6	392.9	25.0	16819	11107	153674.1	1423.4	1136.9	458.5	195.0	195.7	-19.6	-62.3	-136.9	360.5
14:00:00	34.8	8.8	161.5	197.9	23.6	363.6	25.1	16988	11118	153550.8	1420.1	1136.3	458.6	195.0	195.7	-19.4	-63.5	-138.9	332.9
14:01:00	35.9	9.2	159.2	197.2	23.6	363.6	24.7	16725	11225	151755.3	1421.1	1139.0	458.3	195.5	195.7	-15.2	-59.1	-134.2	343.9
14:02:00	35.6	9.1	160.5	197.5	23.6	393.5	24.2	16781	11197	150266.7	1424.3	1141.4	458.9	196.0	195.7	-11.8	-54.4	-129.6	364.3
14:03:00	35.4	9.1	160.2	197.7	23.6	393.3	24.2	16406	11051	150739.2	1430.3	1145.2	458.7	196.5	195.7	-9.2	-50.0	-120.2	374.1
14:04:00	35.2	9.1	159.3	196.0	23.6	361.1	25.0	16994	11230	153173.3	1431.9	1144.1	459.1	196.5	195.7	-18.7	-62.1	-137.4	356.1
14:05:00	34.6	9.4	159.7	196.8	23.6	393.0	24.2	16419	11258	150525.3	1432.9	1143.5	458.7	197.0	196.7	-10.5	-50.1	-123.5	366.4
14:06:00	34.9	8.8	159.9	196.4	23.6	392.2	24.6	17075	11197	152604.4	1432.3	1145.2	459.2	196.5	196.7	-28.9	-73.3	-160.7	330.3
14:07:00	35.2	9.6	160.8	197.2	23.6	391.7	25.1	16738	11275	154207.5	1429.6	1144.4	459.1	197.0	196.7	-18.6	-62.0	-138.3	353.3
14:08:00	34.6	9.2	159.0	196.3	23.6	362.6	24.6	16806	11315	156816.3	1429.9	1145.0	459.5	197.5	196.7	-30.9	-78.0	-157.4	299.7
14:09:00	34.4	8.8	160.3	197.2	23.6	392.5	24.3	16763	11135	150846.6	1425.6	1140.9	459.4	197.5	196.7	-17.6	-62.9	-137.1	337.4
14:10:00	34.9	8.7	159.1	197.1	23.6	391.4	24.5	16656	11140	158152.0	1427.5	1144.0	459.4	197.5	196.7	-24.8	-76.6	-139.0	321.5
14:11:00	34.7	9.1	161.0	197.7	23.6	369.1	25.0	16388	11045	152010.6	1429.8	1143.0	459.7	197.5	196.7	-7.9	-48.5	-122.0	366.3
14:12:00	34.6	9.1	158.5	196.8	23.6	393.5	24.2	16381	11258	152233.3	1433.0	1142.8	460.2	197.0	196.7	-9.0	-48.5	-120.9	375.0
14:13:00	35.0	9.3	161.4	197.5	23.6	393.0	24.3	16594	11107	151994.5	1431.3	1142.1	460.0	197.0	196.7	-12.7	-54.0	-128.0	360.9
14:14:00	34.3	9.3	158.8	197.2	23.6	391.5	24.1	16338	11096	150911.8	1432.3	1143.6	460.1	197.0	197.7	-9.6	-51.0	-120.1	371.6
14:15:00	34.5	9.0	161.0	197.3	23.6	359.8	25.1	16950	11230	153617.5	1428.8	1141.4	460.3	196.5	197.7	-22.4	-66.0	-145.2	345.4
14:16:00	34.8	8.9	159.2	197.0	23.6	361.1	24.1	16669	11129	152243.9	1425.1	1139.1	460.5	197.0	197.7	-15.1	-56.8	-130.1	356.2
14:17:00	34.6	8.7	159.7	196.9	23.6	393.9	24.5	16881	11292	153240.8	1425.5	1141.0	460.5	196.5	197.7	-21.3	-65.0	-143.4	331.1
14:18:00	33.2	9.6	159.7	198.1	23.6	392.3	24.1	16650	11101	153428.6	1424.8	1138.6	460.6	197.0	197.7	-16.8	-60.4	-133.4	340.7
14:19:00	35.1	8.8	160.0	196.4	23.6	388.2	24.2	17025	11219	153199.4	1424.8	1138.8	460.5	196.5	197.7	-14.8	-56.8	-133.9	361.4
14:20:00	35.0	9.1	159.4	197.6	23.6	387.2	24.8	16231	11090	150755.4	1428.3	1136.9	460.6	196.5	197.7	-9.8	-49.5	-120.1	367.0

Test No. 1 - November 8, 2022

	Waste Flows						PAC	Air Flows			Temperatures					Pressures			
Time	Rich	Emulsion	Lean	Alkaline	Leachate	TDU Flow	Flow	Primary	Secondary	Stack	Primary	Secondary	Quench	SprayDryer	Stack	Incinerator	SD Inlet	BH Inlet	Baghouse
	Lpm	Lpm	Lpm	Lpm	Lpm	SCFM	lbs/h	m^3/h	m^3/h	Rm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
14:21:00	33.6	8.4	159.4	197.0	23.6	392.6	24.9	17131	11421	158058.0	1431.1	1138.9	461.0	196.0	197.7	-35.2	-83.8	-165.6	316.2
14:22:00	34.9	9.2	160.5	196.4	23.6	392.7	24.9	16450	11298	150560.8	1430.6	1138.5	461.0	196.0	197.7	-10.5	-52.1	-125.8	368.4
14:23:00	34.2	8.9	159.3	197.6	23.6	389.0	24.1	16688	11163	157802.7	1433.5	1140.1	461.1	196.0	197.7	-32.5	-80.9	-158.5	301.4
14:24:00	33.8	9.1	161.1	196.6	23.6	392.5	24.2	16719	11146	154818.1	1428.1	1136.6	460.7	196.0	197.7	-19.6	-62.3	-140.8	349.8
14:25:00	34.5	9.0	158.7	196.5	23.6	392.8	25.0	16575	11157	152142.4	1428.0	1137.2	460.9	196.0	197.7	-16.8	-59.5	-134.9	361.8
14:26:00	35.4	9.4	161.0	197.3	23.6	393.5	24.1	16869	11253	154835.1	1425.1	1134.4	461.2	196.5	197.7	-16.2	-58.0	-137.0	334.1
14:27:00	34.5	9.0	159.0	196.7	23.6	391.7	24.5	16631	11247	152416.5	1426.1	1135.5	461.2	196.5	197.7	-15.9	-58.1	-133.3	344.3
14:28:00	34.0	9.1	160.8	197.7	23.6	391.7	25.2	16606	11118	151376.3	1425.0	1135.7	461.3	196.5	197.7	-12.3	-53.3	-125.6	364.3
14:29:00	33.7	9.0	160.1	196.7	23.6	391.8	24.3	16256	11225	150475.0	1429.5	1135.5	461.3	196.0	196.6	-11.0	-52.3	-123.9	373.7
14:30:00	34.0	8.9	161.9	197.6	23.6	392.9	25.1	16769	11332	152753.2	1428.1	1133.0	461.4	195.5	196.6	-15.5	-58.4	-132.0	359.4
14:31:00	33.0	9.2	160.0	197.4	23.6	392.5	24.7	16375	11107	149923.6	1430.6	1135.4	461.5	195.5	196.6	-9.3	-49.1	-121.2	366.9
14:32:00	35.4	8.8	160.5	197.2	23.6	390.2	24.4	16944	11202	153626.3	1427.8	1135.2	461.2	195.0	196.6	-21.6	-67.1	-145.7	338.6
14:33:00	34.2	9.1	160.6	197.4	23.6	392.6	25.0	16700	11202	153140.2	1426.3	1137.2	461.3	195.5	196.6	-18.3	-60.8	-136.8	355.8
14:34:00	34.3	8.8	160.3	196.8	23.6	393.5	24.3	17275	11320	153700.1	1424.9	1136.7	461.1	196.0	196.6	-24.7	-70.6	-150.9	325.4
14:35:00	34.6	9.2	160.1	196.6	23.6	389.6	24.1	16738	11174	152579.6	1422.9	1135.9	461.3	196.5	196.6	-17.8	-62.0	-135.5	339.0
14:36:00	33.8	9.3	159.0	197.9	23.6	387.4	24.9	17044	11174	156826.6	1423.1	1136.3	461.5	196.5	196.6	-33.7	-80.6	-162.0	313.7
14:37:00	33.6	8.8	159.5	196.9	23.6	392.9	24.4	16394	11084	150216.7	1424.4	1135.1	461.3	196.5	196.6	-12.8	-53.0	-125.5	371.2
14:38:00	35.0	9.1	159.6	197.1	23.6	392.2	24.9	16394	11174	158250.3	1427.3	1135.8	461.1	196.0	196.6	-32.7	-82.6	-150.5	313.1
14:39:00	34.8	9.1	161.5	196.9	23.6	390.8	24.5	16588	11202	151942.5	1424.4	1130.9	461.1	196.5	196.6	-12.9	-54.3	-129.5	365.4
14:40:00	35.0	9.0	159.1	197.0	23.6	392.6	24.0	16406	11185	150151.8	1425.5	1131.5	461.3	196.5	196.6	-9.8	-51.4	-121.1	373.3
14:41:00	34.2	9.2	161.0	197.1	23.6	390.2	25.2	16906	11152	154207.5	1422.4	1129.4	461.2	196.5	196.6	-23.0	-66.9	-143.3	348.3
14:42:00	34.1	8.9	159.1	197.4	23.6	391.2	24.7	16613	11152	151918.9	1419.8	1127.6	461.5	196.5	196.6	-18.4	-62.3	-137.4	360.0
14:43:00	33.7	9.4	161.0	196.4	23.6	392.6	24.8	16775	11163	153183.1	1416.5	1124.7	461.8	196.0	196.6	-20.7	-64.4	-142.5	333.1
14:44:00	34.9	8.8	159.7	197.6	23.6	390.2	24.5	16763	11101	152787.2	1417.4	1125.5	461.4	196.0	196.6	-17.2	-59.5	-134.4	341.7
14:45:00	33.8	8.7	160.7	197.5	23.6	380.1	24.4	16713	11421	151593.2	1418.1	1127.7	461.2	196.0	196.6	-15.3	-57.1	-132.6	365.0
14:46:00	34.5	9.2	159.2	197.3	23.6	392.6	24.2	16581	10944	150506.1	1422.1	1128.4	461.3	195.5	196.6	-11.0	-51.5	-122.8	372.3
14:47:00	33.2	8.9	159.3	196.7	23.6	389.1	24.1	16969	11230	153190.6	1420.1	1128.8	461.6	194.5	196.6	-20.7	-63.3	-140.0	355.4
14:48:00	33.8	9.0	158.6	196.7	23.6	392.8	25.1	16406	10994	150597.6	1421.4	1128.2	461.1	194.5	196.6	-12.3	-52.0	-123.7	366.9
14:49:00	33.9	9.2	158.8	196.7	23.6	393.2	24.9	17294	11399	155349.1	1422.4	1127.5	461.5	193.5	196.6	-32.1	-75.6	-163.4	330.6
14:50:00	33.1	9.0	159.4	197.6	23.6	391.8	24.7	16925	11208	153831.1	1417.5	1125.4	461.0	194.0	196.6	-21.4	-65.0	-140.5	353.5
14:51:00	33.1	8.7	158.8	196.3	23.6	392.3	24.8	16931	11343	159014.9	1416.6	1124.3	461.1	193.5	196.6	-35.8	-82.6	-161.3	303.9
14:52:00	34.0	9.1	161.1	197.8	23.6	391.4	24.2	16925	11146	154894.4	1413.8	1124.6	460.9	194.0	195.6	-19.4	-63.4	-138.4	336.8
14:53:00	33.5	8.9	159.2	198.4	23.6	392.1	24.3	16669	11287	157146.9	1415.0	1125.6	460.9	193.5	195.6	-27.3	-76.8	-142.7	322.0
14:54:00	33.4	9.2	161.6	199.1	23.6	391.4	25.0	16431	11174	153163.5	1415.4	1125.6	461.2	193.5	195.6	-12.8	-53.0	-127.0	365.6

Max	37.0	11.4	168.5	199.1	24.2	394.5	25.2	17538	11449	162209.6	1433.5	1145.2	461.8	197.5	197.7	-7.9	-48.5	-120.1	378.9
Min	33.0	7.6	153.9	194.9	23.6	339.2	23.9	16231	10888	149635.2	1392.1	1124.3	453.3	188.5	190.6	-40.3	-90.9	-173.0	298.1
Average	35.0	9.0	160.2	196.8	23.7	379.2	24.6	16790	11183	154653.8	1409.1	1134.2	457.7	193.1	194.1	-20.9	-64.2	-138.1	349.6

Test No. 2 - November 9, 2022

	Waste Flows						PAC	Air Flows			Temperatures					Pressures			
Time	Rich	Emulsion	Lean	Alkaline	Leachate	TDU Flow	Flow	Primary	Secondary	Stack	Primary	Secondary	Quench	SprayDryer	Stack	Incinerator	SD Inlet	BH Inlet	Baghouse
	Lpm	Lpm	Lpm	Lpm	Lpm	SCFM	lbs/h	m^3/h	m^3/h	Rm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
8:32:00	38.9	9.5	159.5	192.2	23.9	361.5	21.9	16419	11006	153751.7	1392.8	1167.0	522.3	198.0	194.9	-7.3	-46.3	-137.4	384.4
8:33:00	38.5	9.2	158.2	192.6	23.9	361.3	21.9	16306	11000	158756.6	1396.6	1169.8	522.6	197.5	195.9	-23.5	-71.6	-157.5	329.4
8:34:00	39.4	9.6	160.2	192.4	23.9	362.9	22.8	16525	11079	153002.5	1394.9	1168.1	522.4	197.5	195.9	-7.7	-48.5	-141.1	381.1
8:35:00	38.7	9.2	157.4	192.2	23.9	360.1	21.8	16269	10978	151167.7	1398.4	1170.5	522.6	197.5	195.9	-3.8	-42.3	-133.5	391.7
8:36:00	38.7	9.4	160.8	192.3	22.9	362.6	22.0	16825	11101	155564.6	1394.9	1164.5	522.0	197.5	195.9	-16.4	-60.1	-155.3	365.5
8:37:00	38.8	9.1	159.1	192.6	23.9	362.5	22.4	16563	11118	152450.0	1395.3	1167.0	522.3	198.0	195.9	-11.7	-54.3	-147.7	375.7
8:38:00	38.6	9.5	160.3	192.8	23.9	359.9	22.6	16775	11112	153110.5	1393.3	1164.9	522.7	198.0	195.9	-14.7	-56.5	-153.5	346.7
8:39:00	38.8	9.2	158.8	192.8	23.9	363.3	21.9	16650	11084	154243.7	1393.8	1167.0	523.0	198.0	195.9	-11.5	-54.1	-143.7	358.6
8:40:00	38.7	9.6	161.4	192.0	23.9	362.4	22.3	16669	11090	152988.3	1393.5	1167.5	523.2	198.5	195.9	-6.8	-45.8	-142.5	380.7
8:41:00	39.2	9.1	160.4	193.2	23.9	363.0	22.8	16300	11006	150845.5	1396.5	1170.8	523.8	198.5	195.9	-4.4	-43.3	-132.2	387.3
8:42:00	38.7	9.3	160.2	192.5	22.9	361.5	22.8	16969	11006	154047.1	1397.3	1168.9	525.2	198.5	195.9	-13.3	-55.6	-153.9	371.4
8:43:00	39.3	9.4	160.5	193.0	22.9	363.8	22.3	16325	11039	150972.8	1398.4	1170.1	525.2	199.0	196.9	-5.2	-43.4	-135.5	384.1
8:44:00	38.7	9.0	160.2	192.4	22.9	360.0	26.5	17044	11023	153193.9	1399.4	1170.3	525.3	198.5	196.9	-26.8	-69.3	-178.3	341.3
8:45:00	38.7	9.7	160.8	192.5	22.9	363.1	26.5	16706	11107	153842.5	1397.3	1169.0	526.0	199.5	196.9	-12.6	-54.3	-151.1	366.9
8:46:00	39.0	8.7	160.5	191.3	22.9	363.2	25.6	16813	11219	157886.9	1397.1	1170.5	526.2	199.5	196.9	-25.5	-71.5	-173.1	319.1
8:47:00	38.9	9.5	161.8	191.4	22.9	362.6	26.8	16531	10882	153736.1	1395.5	1169.0	526.5	200.0	197.9	-11.0	-52.5	-148.2	349.5
8:48:00	38.5	9.7	159.6	191.9	22.9	363.2	26.6	16425	11028	156323.6	1396.4	1171.0	526.8	200.5	197.9	-9.7	-54.6	-146.1	337.4
8:49:00	39.0	9.4	161.3	193.0	22.9	362.7	25.7	16281	11039	151153.3	1397.1	1170.3	526.6	200.5	197.9	-4.9	-44.0	-134.8	382.8
8:50:00	38.8	8.9	160.0	191.5	22.9	363.5	25.7	16119	10966	149464.6	1401.4	1172.8	526.9	200.0	197.9	-2.0	-39.5	-129.5	388.2
8:51:00	38.9	9.3	161.8	192.6	22.9	362.8	26.3	16525	10994	151062.3	1400.1	1169.0	527.1	200.0	197.9	-5.6	-43.3	-139.5	373.5
8:52:00	38.8	9.5	160.1	192.7	22.9	363.5	25.8	16238	10989	150900.3	1402.4	1171.9	527.1	200.0	197.9	-2.3	-39.9	-131.2	385.3
8:53:00	37.7	9.2	161.9	192.3	22.9	363.4	25.7	16775	10989	152530.7	1399.1	1166.3	526.4	200.0	197.9	-16.7	-59.4	-156.2	358.1
8:54:00	37.6	9.5	161.0	192.9	22.9	362.5	26.0	16525	11006	152232.8	1395.8	1164.6	526.0	200.0	197.9	-11.0	-51.4	-146.1	368.9
8:55:00	37.4	9.3	160.9	191.4	23.9	364.4	26.0	16794	11124	153057.0	1392.9	1160.2	523.7	199.5	198.9	-15.3	-56.5	-154.5	343.1
8:56:00	37.5	9.3	161.8	193.1	23.9	361.8	26.1	16519	10921	150896.4	1391.9	1162.7	521.3	199.0	197.8	-9.9	-50.4	-143.7	350.6
8:57:00	37.4	9.3	160.9	192.4	23.9	365.4	25.8	16800	11146	151660.6	1391.3	1160.9	518.0	198.0	197.8	-9.4	-49.5	-146.9	371.8
8:58:00	37.5	9.5	161.2	192.2	23.9	362.3	26.0	16200	10972	150400.1	1392.1	1163.8	516.2	197.0	197.8	-4.5	-44.1	-134.8	383.9
8:59:00	37.6	9.5	161.1	191.9	23.9	363.3	25.9	16856	11124	156870.4	1393.5	1164.1	515.3	195.5	196.8	-29.0	-75.6	-179.5	316.0
9:00:00	37.5	9.8	161.7	192.8	23.9	363.8	26.2	16219	10893	151646.0	1392.5	1162.9	514.1	195.0	196.8	-6.4	-45.3	-138.2	377.8
9:01:00	37.0	9.1	160.7	191.8	23.9	362.9	25.7	16431	11028	159182.4	1394.1	1163.6	513.2	194.0	196.8	-28.1	-75.0	-172.7	315.1
9:02:00	37.2	9.3	161.5	191.4	23.9	363.4	25.9	16806	11140	153498.0	1388.9	1156.2	512.4	193.5	195.8	-15.9	-56.6	-154.6	362.1
9:03:00	38.4	9.2	160.2	192.3	23.9	365.3	26.0	16463	11056	150381.9	1389.9	1157.3	510.9	193.0	195.8	-12.0	-52.3	-147.7	371.3
9:04:00	38.5	9.5	162.1	193.1	23.9	362.8	25.6	16700	10955	153561.8	1389.9	1155.6	511.2	193.0	194.8	-13.9	-55.6	-152.4	344.3
9:05:00	37.9	9.0	159.6	191.9	23.9	365.6	26.0	16469	11006	153339.0	1392.1	1159.8	510.9	192.5	194.8	-11.9	-52.6	-147.6	354.8
9:06:00	38.5	9.1	161.0	191.8	23.9	364.0	25.6	16444	10983	152000.0	1391.3	1159.2	510.4	192.5	193.8	-8.4	-45.9	-142.1	376.7
9:07:00	38.0	9.2	160.3	192.1	23.9	363.2	26.6	16200	10882	151892.3	1395.0	1161.7	509.9	191.5	193.8	-5.1	-43.6	-135.2	384.4
9:08:00	38.3	9.3	161.6	191.7	23.9	364.1	26.0	16613	11011	153354.3	1394.3	1158.3	510.0	191.0	193.8	-10.7	-51.3	-147.2	370.1
9:09:00	38.2	9.3	160.9	192.0	23.9	364.7	26.2	16175	10809	152997.8	1396.1	1160.3	509.7	191.0	193.8	-7.5	-47.0	-138.8	382.5
9:10:00	38.1	9.3	161.0	192.7	23.9	363.2	26.3	16963	10994	155899.9	1395.4	1157.4	509.0	190.5	193.8	-20.9	-63.0	-166.0	353.6
9:11:00	38.4	9.5	160.8	191.7	23.9	362.9	25.7	16550	11006	154747.7	1393.5	1157.7	509.4	191.0	192.8	-13.7	-55.1	-152.7	365.8
9:12:00	38.2	9.3	160.8	190.9	23.9	364.7	25.7	17181	11006	155264.1	1392.3	1156.9	509.0	191.0	192.8	-22.9	-66.6	-171.5	334.2
9:13:00	38.5	9.3	161.4	192.7	23.9	362.9	26.6	16644	10927	154575.5	1391.1	1156.5	508.8	191.0	192.8	-13.6	-54.9	-152.5	347.4
9:14:00	38.4	9.4	160.4	192.2	23.9	363.2	26.1	16850	11051	157729.2	1391.9	1157.6	509.0	191.0	192.8	-27.5	-73.5	-178.5	323.8
9:15:00	38.6	9.1	161.6	193.5	23.9	363.8	26.7	16250	11006	152262.2	1393.9	1159.3	508.8	190.5	192.8	-7.8	-47.4	-139.5	380.6
9:16:00	38.4	8.7	159.8	190.9	23.9	360.0	26.5	16125	10989	159974.3	1397.5	1164.0	508.4	190.5	192.8	-25.6	-75.8	-162.5	330.4
9:17:00	38.3	9.3	162.0	191.8	22.8	365.0	25.8	16331	10809	150942.1	1395.5	1159.5	508.5	190.5	192.8	-8.8	-48.8	-143.9	374.3
9:18:00	37.9	9.1	160.1	192.2	22.8	363.8	26.3	16225	10938	149836.4	1397.4	1163.4	508.5	190.0	192.8	-7.8	-47.6	-138.4	387.7
9:19:00	38.3	9.4	162.1	192.8	23.9	362.6	25.7	16556	11023	155978.4	1394.1	1157.8	508.5	190.0	192.8	-17.7	-61.0	-160.7	356.8
9:20:00	38.8	9.3	159.8	193.0	23.9	365.2	25.8	16519	10905	154073.2	1394.4	1160.0	508.5	190.5	191.8	-15.2	-56.0	-153.0	370.1
9:21:00	38.8	9.2	162.4	192.4	23.9	363.6	25.9	16619	10927	156803.1	1393.1	1157.5	508.4	190.5	191.8	-16.4	-57.0	-158.6	343.4
9:22:00	38.7	9.3	160.7	192.4	23.9	364.4	25.6	16469	10899	153808.4	1394.9	1160.8	508.4	190.5	191.8	-13.2	-54.3	-151.8	352.8
9:23:00	38.7	9.6	161.9	192.3	23.9	363.8	26.8	16450	10899	152219.8	1394.5	1158.2	508.5	190.5	191.8	-10.6	-51.1	-148.4	378.9

Test No. 2 - November 9, 2022

	Waste Flows						PAC	Air Flows			Temperatures					Pressures			
Time	Rich	Emulsion	Lean	Alkaline	Leachate	TDU Flow	Flow	Primary	Secondary	Stack	Primary	Secondary	Quench	SprayDryer	Stack	Incinerator	SD Inlet	BH Inlet	Baghouse
	Lpm	Lpm	Lpm	Lpm	Lpm	SCFM	lbs/h	m^3/h	m^3/h	Rm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
9:24:00	38.7	8.9	161.1	192.3	22.8	364.2	26.6	16206	10798	152184.8	1397.4	1162.1	508.7	190.5	191.8	-5.3	-43.8	-137.6	384.4
9:25:00	38.2	8.9	160.5	191.5	23.0	362.0	26.4	16806	11017	152426.1	1397.8	1160.0	508.9	190.0	191.8	-16.4	-59.1	-158.1	366.5
9:26:00	38.7	9.0	161.7	193.2	23.0	363.2	25.9	16306	10905	152644.8	1398.0	1162.0	508.2	190.5	191.8	-8.2	-47.9	-142.1	378.2
9:27:00	38.6	9.1	160.4	191.3	24.1	362.6	25.9	16969	11169	156403.3	1399.5	1162.3	508.4	190.0	191.8	-27.2	-70.5	-184.9	337.6
9:28:00	38.6	9.0	161.4	192.8	24.1	363.2	26.3	16575	10921	154947.2	1396.5	1160.8	509.0	190.5	191.8	-15.8	-56.4	-156.3	361.8
9:29:00	38.2	8.9	161.0	192.5	23.1	364.0	25.9	16669	11023	158871.9	1396.4	1162.9	508.4	190.5	191.8	-29.6	-78.5	-180.8	315.6
9:30:00	38.5	9.5	161.6	193.9	23.1	362.4	26.0	16450	11045	154156.1	1394.3	1161.0	510.0	191.0	191.8	-15.4	-57.6	-156.6	348.3
9:31:00	37.8	8.9	159.5	191.8	23.1	365.3	25.8	16419	10927	157265.6	1394.8	1163.1	510.8	191.5	191.8	-15.2	-59.3	-155.7	336.7
9:32:00	38.0	9.0	161.9	192.6	23.1	362.4	26.2	16263	10820	153285.8	1394.1	1160.0	511.9	192.5	191.8	-8.2	-47.9	-142.9	380.1
9:33:00	38.2	9.3	159.9	191.1	23.1	363.0	26.0	16025	10949	151119.1	1398.3	1164.6	513.1	192.5	191.8	-6.1	-44.8	-137.0	385.8
9:34:00	38.5	9.4	161.7	191.9	23.1	364.3	26.7	16413	10949	150987.4	1396.6	1161.1	513.7	193.0	191.8	-10.1	-49.5	-145.7	372.8
9:35:00	38.2	9.1	160.0	192.4	23.1	362.5	26.6	16269	10860	149067.0	1398.9	1164.9	514.7	193.5	192.9	-7.0	-46.8	-139.9	385.4
9:36:00	38.4	9.0	161.9	191.7	23.1	362.5	25.7	16675	11011	153494.8	1397.3	1160.6	515.2	193.5	192.9	-18.3	-61.9	-161.2	354.7
9:37:00	38.6	9.3	160.3	192.6	23.1	363.6	25.7	16431	10876	151982.5	1397.3	1163.2	516.4	194.5	193.9	-13.9	-55.3	-152.8	367.8
9:38:00	38.1	8.9	160.8	191.6	23.1	364.4	26.4	16650	10978	152799.9	1395.6	1160.7	517.3	195.0	193.9	-18.2	-59.4	-161.8	340.9
9:39:00	37.9	8.8	160.9	191.7	23.1	363.3	26.7	16381	10725	154088.9	1395.8	1161.8	517.4	195.5	193.9	-14.6	-56.5	-151.4	352.9
9:40:00	37.7	9.0	159.8	191.2	23.1	362.9	26.2	16763	10944	152127.5	1395.9	1160.0	517.8	196.0	193.9	-13.9	-53.8	-152.5	372.3
9:41:00	37.9	9.3	160.7	192.2	23.1	364.4	25.8	16106	10837	150048.4	1397.5	1163.4	517.4	196.0	193.9	-7.6	-49.5	-137.9	383.7
9:42:00	38.0	9.1	160.9	191.9	23.1	362.9	25.7	16913	10978	159668.9	1399.1	1164.1	517.4	195.5	194.9	-30.5	-77.3	-184.1	318.1
9:43:00	37.6	9.5	161.1	192.2	23.1	364.1	25.7	16188	10770	150246.4	1399.1	1164.0	518.1	196.0	194.9	-8.9	-49.4	-141.8	379.9
9:44:00	38.1	9.5	160.3	192.4	23.8	363.8	26.1	16294	11023	157632.9	1402.4	1167.1	518.3	195.5	194.9	-30.3	-78.3	-177.4	315.5
9:45:00	37.9	9.1	162.4	193.5	23.8	363.3	25.7	16488	10803	151704.9	1398.8	1163.0	518.9	196.0	194.9	-15.3	-57.4	-156.5	360.8
9:46:00	37.4	8.9	160.1	191.2	23.8	363.2	26.0	16338	10921	151232.2	1398.1	1164.8	518.9	196.5	194.9	-13.2	-55.4	-149.4	373.4
9:47:00	38.3	9.1	161.8	191.6	23.8	364.4	26.1	16500	11000	153414.3	1395.3	1159.3	519.1	196.5	195.9	-14.7	-57.4	-153.7	346.6
9:48:00	37.8	9.1	159.4	190.9	23.8	363.3	26.6	16244	11006	151341.3	1396.3	1161.8	518.7	197.0	195.9	-11.0	-51.9	-147.3	353.3
9:49:00	37.8	9.1	161.7	191.7	23.8	362.9	25.7	16300	10832	149685.6	1395.9	1160.0	519.3	197.0	195.9	-9.3	-48.3	-141.9	378.0
9:50:00	38.0	8.9	161.0	192.5	23.8	360.2	26.0	16069	10955	149213.0	1399.1	1163.7	519.2	197.0	195.9	-6.0	-46.1	-136.6	385.7
9:51:00	38.1	9.2	162.6	191.6	23.8	364.1	26.4	16394	10944	152290.2	1397.8	1161.5	519.1	196.5	195.9	-10.9	-50.5	-148.4	368.9
9:52:00	38.0	9.2	161.3	193.8	23.8	362.4	25.9	16013	10837	148359.8	1398.9	1165.1	518.9	196.5	195.9	-5.7	-45.0	-136.4	382.0
9:53:00	37.5	9.3	161.0	192.0	23.8	362.7	25.7	16781	10916	152970.5	1397.5	1161.7	519.3	196.5	195.9	-20.6	-63.8	-165.0	350.8
9:54:00	37.8	9.1	161.0	192.8	23.8	362.9	25.7	16400	10921	152250.1	1395.6	1162.9	519.5	196.5	195.9	-14.2	-55.4	-151.2	365.9
9:55:00	37.2	9.0	160.9	192.6	23.8	363.5	26.6	16981	10921	152242.6	1394.0	1160.5	519.2	196.5	195.9	-21.5	-64.8	-169.3	334.5
9:56:00	37.3	9.2	161.0	191.9	23.8	364.1	26.6	16344	10803	151452.0	1392.6	1160.4	518.7	197.0	195.9	-13.5	-57.0	-151.1	349.7
9:57:00	37.8	9.1	160.5	191.8	23.8	363.7	26.7	16550	11056	154505.1	1393.3	1160.4	518.4	197.0	195.9	-28.3	-76.0	-178.6	325.6
9:58:00	37.2	8.8	161.3	191.2	23.8	363.4	25.7	15994	10832	149210.6	1393.6	1160.1	517.8	196.5	195.9	-7.8	-46.8	-139.2	380.3
9:59:00	37.4	9.5	160.5	193.1	23.8	362.9	25.9	16138	10742	157428.6	1397.3	1162.5	517.8	196.0	195.9	-24.6	-74.6	-162.6	326.4
10:00:00	37.2	9.5	161.9	192.8	23.8	363.0	26.6	16256	10899	150882.7	1394.6	1160.9	517.1	196.0	195.9	-8.5	-50.0	-144.9	375.3
10:01:00	36.6	8.9	159.5	192.2	23.8	364.5	25.8	16094	10725	150565.0	1396.3	1162.6	517.1	195.5	195.9	-6.8	-45.8	-137.9	386.4
10:02:00	36.7	8.9	161.7	192.2	23.8	363.8	26.1	16613	10848	151101.4	1392.3	1155.2	516.9	195.0	195.9	-18.4	-61.6	-161.4	358.3
10:03:00	37.1	9.5	160.5	191.8	23.8	364.3	26.6	16344	10910	152117.0	1391.1	1155.4	516.5	195.5	195.9	-13.9	-53.8	-152.4	369.2
10:04:00	37.1	8.8	162.1	191.9	23.8	362.9	26.6	16488	10843	152382.1	1389.3	1152.9	515.9	195.5	195.9	-17.1	-60.4	-158.4	342.7
10:05:00	37.2	9.3	161.0	192.7	23.8	362.9	25.9	16494	10770	152074.7	1390.4	1155.7	516.1	195.5	195.9	-12.7	-54.4	-152.8	352.9
10:06:00	37.0	9.1	161.6	191.5	23.8	363.8	26.0	16375	10781	150375.0	1389.8	1153.5	515.2	195.5	195.9	-10.3	-48.8	-146.9	374.6
10:07:00	37.3	9.1	160.8	192.2	23.8	362.9	26.1	16113	10905	149337.0	1393.4	1156.6	515.3	195.0	195.9	-7.8	-45.4	-140.0	383.3
10:08:00	37.0	9.3	161.5	191.8	23.8	361.4	26.7	16719	11045	152014.9	1393.6	1154.7	514.7	194.5	195.9	-17.7	-59.1	-158.7	365.8
10:09:00	37.8	9.0	161.4	192.7	23.8	363.6	26.1	15969	10843	150696.7	1394.0	1157.1	514.7	194.5	195.9	-9.8	-49.6	-143.9	382.2
10:10:00	37.5	9.1	160.4	191.5	23.8	362.8	26.4	16856	10961	152188.4	1395.5	1159.5	514.7	194.0	195.9	-27.3	-70.1	-184.7	337.8
10:11:00	37.3	9.1	161.2	191.7	23.8	365.2	26.3	16363	10848	152096.1	1393.0	1156.2	514.9	194.0	194.8	-17.0	-60.1	-157.1	362.7
10:12:00	37.3	9.0	160.2	191.0	23.8	362.3	25.6	16600	10876	155518.9	1392.9	1156.4	514.5	194.5	194.8	-31.8	-80.8	-182.1	316.3
10:13:00	37.1	9.1	161.0	191.0	23.8	364.3	26.7	16394	10899	153274.5	1390.3	1154.1	514.3	194.5	194.8	-14.8	-56.5	-157.0	347.8
10:14:00	36.9	8.8	160.1	191.9	23.8	363.5	25.7	16256	10910	156719.5	1391.0	1156.2	513.9	194.5	194.8	-20.6	-70.5	-156.1	335.3
10:15:00	37.8	9.2	161.6	191.7	23.8	363.3	25.8	16119	10938	151519.2	1391.4	1154.2	513.6	194.0	194.8	-9.9	-49.3	-145.7	380.4

Test No. 2 - November 9, 2022

	Waste Flows						PAC	Air Flows			Temperatures					Pressures			
Time	Rich	Emulsion	Lean	Alkaline	Leachate	TDU Flow	Flow	Primary	Secondary	Stack	Primary	Secondary	Quench	SprayDryer	Stack	Incinerator	SD Inlet	BH Inlet	Baghouse
	Lpm	Lpm	Lpm	Lpm	Lpm	SCFM	lbs/h	m^3/h	m^3/h	Rm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
10:16:00	36.8	9.2	159.9	191.3	23.8	363.7	26.6	15994	10815	149861.7	1394.0	1157.2	512.9	193.5	194.8	-6.5	-45.3	-139.1	386.6
10:17:00	36.7	9.2	161.3	191.1	23.8	362.3	26.8	16244	10714	149525.0	1392.3	1153.3	512.4	193.0	194.8	-12.9	-52.1	-149.6	375.6
10:18:00	37.3	9.1	160.4	192.1	23.8	363.5	25.8	16006	10736	148613.5	1393.8	1156.4	512.2	193.0	194.8	-8.2	-47.4	-141.4	383.1
10:19:00	37.2	9.4	162.3	191.9	23.8	364.1	25.9	16588	10949	152883.1	1391.6	1153.8	512.1	192.5	194.8	-20.6	-64.9	-165.8	354.8
10:20:00	37.5	9.5	160.9	191.9	23.8	363.9	26.2	16325	10949	151367.0	1391.0	1155.3	512.0	193.0	193.8	-15.3	-58.0	-154.2	365.1
10:21:00	36.8	9.1	160.9	190.5	23.8	364.2	25.7	16706	10832	149798.9	1389.8	1152.7	511.7	193.0	193.8	-20.6	-61.5	-165.3	341.6
10:22:00	36.9	9.0	160.7	191.3	23.8	362.3	26.6	16175	10882	150977.0	1389.8	1153.5	511.5	193.0	193.8	-13.9	-54.4	-154.8	351.0
10:23:00	36.7	9.2	160.1	190.6	23.8	364.1	26.6	16544	10820	149865.7	1389.0	1152.1	511.5	192.5	193.8	-14.2	-56.3	-155.2	370.8
10:24:00	37.5	9.3	161.6	191.1	23.8	364.2	26.7	15981	10916	149221.1	1390.6	1154.7	510.8	192.5	193.8	-9.0	-48.8	-142.7	380.2
10:25:00	36.8	8.6	160.3	191.3	23.8	360.5	25.6	16738	11051	156920.9	1392.0	1155.2	510.8	192.0	193.8	-33.0	-81.4	-188.8	317.8
10:26:00	37.0	9.1	160.3	191.3	23.8	362.4	26.0	16056	10871	150674.0	1391.4	1154.7	510.6	192.0	193.8	-9.3	-48.5	-145.7	378.7
10:27:00	36.8	9.0	159.8	191.1	23.8	362.7	25.8	16200	10770	157051.6	1393.3	1157.1	510.4	191.5	193.8	-32.5	-81.9	-181.4	313.2
10:28:00	37.3	9.0	161.4	192.1	23.8	362.9	26.4	16394	10899	152281.8	1389.8	1152.7	510.8	192.0	193.8	-17.8	-57.5	-161.2	358.8
10:29:00	37.0	8.9	160.7	192.2	23.8	364.1	25.6	16394	10865	151236.2	1389.6	1154.7	510.5	192.0	193.8	-15.2	-53.5	-156.8	372.5
10:30:00	37.3	9.7	161.9	191.8	23.8	363.9	26.2	16306	10888	152198.0	1387.6	1152.5	510.1	192.5	193.8	-16.6	-59.0	-162.5	344.4
10:31:00	37.0	9.2	159.8	191.1	23.8	362.8	25.7	16125	10815	150199.9	1389.4	1154.8	510.7	192.5	193.8	-16.4	-57.3	-155.4	354.4
10:32:00	36.8	9.1	162.5	191.7	23.8	364.1	25.9	16169	10927	148974.3	1388.4	1153.0	510.4	192.5	193.8	-12.2	-54.8	-147.9	380.5
11:05:00	36.5	9.0	161.4	191.3	24.0	353.8	26.4	16106	10837	148385.7	1389.3	1149.3	512.2	193.5	193.9	-13.4	-55.0	-156.6	348.8
11:06:00	36.6	9.1	161.7	190.5	24.0	360.8	26.2	16544	10972	146817.6	1388.5	1147.8	511.8	193.5	193.9	-15.0	-58.5	-159.0	373.8
11:07:00	36.5	8.9	161.0	191.4	24.0	360.7	26.5	15844	10742	146438.9	1391.4	1148.6	511.6	193.5	193.9	-9.3	-49.0	-145.4	383.9
11:08:00	38.1	9.2	160.3	191.1	24.0	360.5	26.3	16525	10865	153718.0	1394.1	1149.9	510.7	192.5	193.9	-32.9	-81.3	-190.8	318.3
11:09:00	38.6	9.5	162.1	192.6	24.0	359.9	26.3	16094	10719	146812.9	1396.9	1151.8	511.4	192.5	193.9	-9.2	-49.4	-147.9	378.3
11:10:00	37.8	9.2	159.7	191.1	24.0	360.9	25.7	16169	10815	154680.8	1402.1	1152.6	511.4	192.5	193.9	-32.1	-80.5	-184.5	316.1
11:11:00	38.1	9.6	161.0	192.2	24.0	361.7	26.2	16263	10714	147681.7	1398.4	1147.1	511.0	193.0	193.9	-16.8	-57.1	-163.7	358.8
11:12:00	37.5	9.4	159.1	191.7	24.0	359.9	25.7	16156	10753	148149.7	1399.1	1150.0	511.3	193.0	193.9	-15.3	-56.4	-156.7	371.6
11:13:00	37.8	9.4	159.8	191.8	24.0	359.9	26.7	16325	10792	148447.7	1398.4	1146.4	510.6	193.0	193.9	-16.6	-60.8	-162.5	347.3
11:14:00	37.4	9.4	155.9	191.3	24.0	359.5	26.5	16244	10792	149484.4	1398.4	1148.1	510.4	193.0	193.9	-16.9	-58.4	-159.0	355.3
11:15:00	38.2	9.5	157.5	191.1	24.0	363.2	26.7	15881	10775	147113.5	1398.0	1148.0	509.9	193.0	193.9	-8.3	-43.9	-143.3	370.3
11:16:00	38.6	9.7	157.1	192.3	24.0	361.3	26.0	15856	10669	147005.5	1402.4	1152.9	509.5	192.0	193.9	-9.0	-49.0	-144.6	387.4
11:17:00	37.3	9.5	156.8	191.6	24.0	361.6	26.1	16263	10781	149411.6	1401.9	1149.9	509.3	191.5	193.9	-16.5	-56.5	-160.4	372.8
11:18:00	37.8	9.8	156.8	192.5	24.0	247.2	25.7	16038	10736	146221.1	1403.1	1148.7	508.6	191.5	193.9	-12.6	-51.1	-149.7	383.9
11:19:00	38.1	9.5	156.5	191.9	24.0	365.6	25.9	16738	10989	150393.4	1401.8	1144.5	508.0	190.5	193.9	-25.8	-71.6	-178.8	354.3
11:20:00	37.5	9.4	157.9	192.7	24.0	241.5	26.7	16563	10770	148663.9	1399.9	1142.2	507.5	190.5	192.8	-22.7	-66.4	-170.9	361.9
11:21:00	38.2	9.7	156.8	191.4	24.0	255.6	26.5	16288	10994	149475.3	1399.1	1140.7	507.5	190.5	192.8	-17.9	-60.1	-162.8	370.6
11:22:00	38.0	9.4	158.4	190.9	24.0	254.0	26.0	16500	10854	148157.5	1394.1	1135.7	506.3	190.5	192.8	-23.5	-67.6	-171.0	347.8
11:23:00	38.0	9.3	156.7	191.9	24.0	359.3	26.5	16238	10966	148519.0	1393.5	1136.9	506.3	190.0	192.8	-19.4	-59.9	-165.9	356.4
11:24:00	37.7	9.4	158.8	191.6	24.0	238.7	26.0	16406	10983	147678.6	1392.8	1134.2	505.6	190.0	191.8	-16.6	-58.4	-157.3	379.6
11:25:00	38.1	9.7	158.5	192.6	24.0	256.4	26.1	16081	10742	146834.7	1395.3	1137.9	505.1	189.5	191.8	-14.2	-55.3	-151.7	386.8
11:26:00	38.2	9.3	158.9	192.4	24.0	256.2	26.3	16581	10876	147966.8	1392.1	1135.5	505.0	188.5	191.8	-20.9	-63.1	-165.4	372.8
11:27:00	37.9	9.8	158.1	193.1	24.0	245.5	26.6	16094	10719	148651.4	1391.8	1137.9	505.0	188.5	191.8	-15.4	-57.9	-153.2	384.1
11:28:00	37.6	9.9	158.0	192.5	24.0	259.1	26.2	16938	10944	148740.0	1390.6	1135.3	504.4	187.5	191.8	-30.7	-74.8	-185.2	353.8
11:29:00	39.4	9.5	157.9	192.2	24.0	260.0	26.6	16469	10843	150056.6	1387.1	1131.8	504.1	187.5	190.8	-24.7	-69.1	-170.2	368.6
11:30:00	38.8	9.5	157.3	190.0	24.0	258.8	25.8	17175	10832	151330.0	1389.4	1132.7	504.0	187.5	190.8	-40.0	-88.8	-200.4	331.1
11:31:00	38.7	9.4	157.9	191.4	24.0	261.8	26.4	16481	10843	149434.5	1390.6	1132.3	503.8	188.0	190.8	-23.2	-66.3	-169.8	354.1
11:32:00	39.0	9.5	158.0	191.1	24.0	375.4	25.7	16563	10972	151824.8	1392.3	1136.7	503.9	188.0	190.8	-36.7	-83.4	-197.0	331.3
11:33:00	39.3	9.5	158.0	192.6	24.0	363.9	26.6	16231	10803	147998.2	1396.1	1139.9	504.1	188.5	190.8	-16.7	-57.3	-158.6	385.7
11:34:00	39.2	10.1	157.8	191.8	24.0	361.5	26.1	16013	10809	148956.4	1402.3	1145.8	503.9	188.5	190.8	-13.4	-52.9	-154.4	368.4
11:35:00	38.9	9.5	158.1	191.7	24.0	361.6	25.8	16219	10809	147793.8	1403.3	1147.4	504.6	188.5	190.8	-15.9	-57.3	-160.2	381.3
11:36:00	37.3	9.4	156.7	191.9	24.0	362.6	25.9	16075	10708	147881.4	1406.5	1151.4	504.6	189.0	190.8	-14.2	-51.4	-153.6	390.0
11:37:00	37.2	9.7	159.3	190.7	24.0	362.2	26.4	16656	10848	150067.1	1399.3	1141.1	505.4	189.0	190.8	-25.6	-69.3	-175.3	359.1
11:38:00	37.1	9.6	157.8	191.1	24.0	362.3	26.7	16413	10955	148470.6	1396.0	1137.7	504.5	189.5	190.8	-23.0	-68.8	-168.0	371.6
11:39:00	37.4	9.3	158.4	192.0	24.0	362.3	26.5	16544	10854	149337.8	1391.0	1133.2	504.9	189.0	190.8	-24.3	-68.4	-173.3	344.3

Test No. 2 - November 9, 2022

	Waste Flows						PAC	Air Flows			Temperatures					Pressures			
Time	Rich	Emulsion	Lean	Alkaline	Leachate	TDU Flow	Flow	Primary	Secondary	Stack	Primary	Secondary	Quench	SprayDryer	Stack	Incinerator	SD Inlet	BH Inlet	Baghouse
	Lpm	Lpm	Lpm	Lpm	Lpm	SCFM	lbs/h	m^3/h	m^3/h	Rm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
11:40:00	37.2	9.6	158.0	192.0	24.0	361.7	26.6	16419	10803	149048.4	1391.1	1132.5	504.2	189.0	190.8	-22.5	-65.6	-169.3	358.5
11:41:00	37.5	9.2	157.9	191.2	24.0	361.1	26.0	16444	10905	149667.8	1391.0	1130.3	503.5	189.0	190.8	-18.8	-56.3	-164.3	381.8
11:42:00	37.3	9.6	157.8	192.4	24.0	361.8	25.8	16063	10775	146905.6	1393.6	1134.9	503.4	188.5	190.8	-13.6	-51.1	-154.3	387.9
11:43:00	36.9	9.4	157.9	192.1	24.0	275.9	25.8	16975	10994	149396.5	1395.3	1132.1	503.1	187.5	190.8	-26.3	-66.1	-176.7	367.3
11:44:00	37.1	9.8	158.3	192.1	24.0	252.5	26.8	16200	10764	147035.9	1395.5	1130.7	502.9	187.5	189.7	-18.9	-56.9	-156.4	383.9
11:45:00	37.1	9.1	157.5	191.0	24.0	253.3	25.8	16850	10905	154385.2	1396.3	1129.7	502.4	186.5	189.7	-44.3	-94.9	-206.7	316.8
11:46:00	38.1	9.5	158.2	191.7	24.0	368.9	26.5	16594	10899	150222.3	1390.6	1126.7	502.0	186.5	189.7	-24.8	-67.8	-176.7	368.9
11:47:00	37.9	9.4	156.9	191.5	24.0	249.0	26.1	16481	10792	155993.1	1393.0	1130.0	502.0	186.5	189.7	-38.6	-83.8	-196.5	325.0
11:48:00	38.7	9.7	158.3	192.5	23.5	371.0	26.6	16381	11006	149875.3	1392.1	1130.4	501.9	186.5	188.9	-22.0	-63.6	-167.8	354.1
11:49:00	38.6	9.8	157.4	191.3	23.5	254.5	25.8	16763	10899	147682.4	1393.8	1131.8	501.5	186.5	188.9	-22.7	-63.5	-170.0	376.9
11:50:00	39.0	9.6	159.3	192.2	23.5	261.0	25.8	16075	10680	147637.5	1398.4	1136.6	501.9	186.5	188.9	-16.1	-55.0	-157.2	387.9
11:51:00	38.5	9.9	157.4	191.8	23.5	378.0	26.4	16825	11034	154226.0	1397.9	1140.6	501.9	186.0	188.9	-41.3	-88.0	-205.4	336.0
11:52:00	39.5	9.7	158.4	193.6	23.5	362.6	25.9	16256	10809	148430.7	1398.4	1138.4	502.0	186.5	188.9	-14.9	-52.1	-159.4	383.6
11:53:00	39.1	9.5	156.9	191.7	23.5	253.1	26.5	16513	10910	155260.3	1405.0	1142.8	501.6	186.5	188.9	-38.4	-89.4	-198.1	319.4
11:54:00	39.1	9.4	157.8	193.1	23.5	262.6	26.0	16600	10809	152441.3	1401.8	1139.9	502.0	187.0	188.9	-24.0	-70.5	-175.2	367.1
11:55:00	38.9	9.4	157.5	191.7	23.5	262.2	26.6	16400	10798	150652.1	1403.1	1141.4	502.4	187.5	188.9	-23.0	-66.0	-168.5	376.3
11:56:00	39.5	9.7	158.6	193.3	23.5	353.9	25.8	16300	10927	149234.9	1399.8	1140.9	502.3	188.0	188.9	-22.0	-65.1	-173.9	350.1
11:57:00	39.9	9.9	157.4	191.8	23.5	352.1	26.5	16263	10725	147650.4	1401.3	1145.8	502.7	188.5	188.9	-19.6	-61.6	-165.5	359.3
11:58:00	40.1	9.7	159.4	193.2	23.5	347.3	25.7	16125	10685	149138.1	1403.6	1144.1	502.6	189.0	188.9	-15.0	-56.9	-157.4	384.6
11:59:00	38.9	9.9	157.4	192.1	23.5	344.2	25.8	15919	10685	147180.5	1408.9	1147.1	502.8	189.0	190.0	-14.7	-50.8	-155.7	391.9
12:00:00	39.2	9.6	158.6	192.9	23.5	349.0	26.6	16438	10775	146884.8	1406.4	1140.2	503.2	189.0	190.0	-21.9	-62.0	-169.2	379.9
12:01:00	38.6	9.6	158.0	192.6	23.5	347.0	26.7	15950	10775	145506.0	1403.5	1141.8	504.7	190.0	190.0	-13.8	-52.4	-153.4	386.2
12:02:00	38.2	9.6	157.1	190.6	23.5	352.0	26.1	16750	10865	147416.8	1402.0	1136.5	506.1	191.0	190.0	-26.9	-70.6	-180.5	351.4
12:03:00	38.9	9.6	157.6	192.3	23.5	350.9	25.8	16438	10764	147814.0	1399.1	1135.0	507.3	192.5	191.1	-22.3	-64.5	-169.0	367.0
12:04:00	38.4	9.5	157.8	191.3	23.5	354.0	25.8	16875	10764	148629.7	1397.6	1132.7	509.2	193.5	192.2	-28.3	-68.6	-182.6	334.4
12:05:00	39.0	10.5	159.0	192.7	23.5	351.0	25.9	16169	10669	148499.6	1397.6	1131.9	510.1	194.0	192.2	-16.2	-56.6	-159.6	343.1
12:06:00	38.8	7.9	157.3	192.6	23.5	351.9	26.0	16319	10719	148921.3	1400.5	1136.6	510.5	194.0	192.2	-29.0	-73.3	-182.4	316.9
12:07:00	39.2	7.6	157.4	192.9	23.5	354.1	25.9	15806	10618	144868.9	1402.9	1132.5	509.0	193.0	192.2	-11.1	-49.0	-144.6	373.3
12:08:00	39.9	7.6	155.0	192.8	23.5	357.9	26.1	15775	10635	155060.4	1405.9	1134.9	507.9	191.0	192.2	-34.8	-83.5	-181.5	331.9
12:09:00	40.0	7.6	136.3	192.1	23.5	356.0	26.6	16650	10888	147796.0	1403.0	1128.9	506.4	190.0	192.2	-25.6	-60.9	-168.2	379.6
12:10:00	39.6	7.4	152.2	192.1	23.5	357.8	26.7	16131	10674	146760.5	1403.3	1131.2	505.1	188.0	192.2	-17.7	-55.9	-154.9	393.1
12:11:00	40.0	7.9	152.6	192.0	23.5	358.5	25.7	16719	10955	150136.3	1398.1	1125.4	503.6	187.0	191.0	-29.9	-74.1	-177.7	362.4
12:12:00	39.5	7.7	152.0	192.0	23.5	359.6	25.8	16575	10893	149869.4	1396.4	1125.5	502.9	186.5	191.0	-26.4	-68.8	-171.8	374.4
12:13:00	39.7	8.2	152.5	191.6	23.5	358.7	25.8	16469	10674	148203.7	1395.4	1121.0	501.8	186.0	189.9	-23.5	-60.6	-167.7	339.2
12:14:00	40.4	8.1	153.2	192.7	23.5	358.1	25.8	16125	10697	145816.0	1397.6	1126.1	501.0	185.5	189.9	-19.1	-61.3	-156.6	343.1
12:15:00	40.3	7.8	153.1	192.3	23.5	359.0	26.3	16275	10702	145682.8	1399.3	1127.3	500.9	184.5	188.8	-17.0	-54.4	-153.6	370.4
12:16:00	40.2	7.8	153.5	192.2	23.5	361.1	25.8	15875	10590	144920.6	1403.4	1131.9	501.4	184.5	188.8	-15.2	-53.5	-149.0	382.3
12:17:00	40.2	7.3	152.8	191.9	23.5	359.8	26.1	16625	10871	146771.7	1402.5	1130.2	501.9	185.0	188.8	-26.3	-67.8	-169.5	365.6
12:18:00	40.2	7.8	153.8	192.2	23.5	360.8	26.4	16169	10742	144720.3	1404.3	1129.8	503.2	186.0	188.8	-16.2	-52.6	-152.2	380.3
12:19:00	40.6	7.9	152.0	190.7	23.5	360.2	25.8	16694	10798	148074.1	1404.3	1129.4	503.2	186.5	188.8	-34.0	-76.1	-191.0	337.4
12:20:00	40.6	8.1	154.1	192.3	23.5	364.3	25.9	16413	10691	148198.8	1397.6	1131.9	504.1	187.5	188.8	-25.2	-67.5	-168.2	362.4
12:21:00	40.3	8.2	152.8	191.3	23.5	365.9	26.0	16506	10685	149698.6	1395.8	1135.2	504.5	188.0	188.8	-37.6	-83.9	-190.4	313.6
12:22:00	40.4	8.7	153.7	192.0	23.5	365.8	26.5	16194	10820	146807.5	1392.8	1135.8	505.0	189.0	188.8	-22.3	-61.1	-166.4	346.0
12:23:00	40.6	8.1	152.1	191.7	23.5	365.3	25.8	16063	10680	151940.5	1393.4	1139.5	506.1	189.5	189.9	-26.9	-75.9	-166.4	331.2
12:24:00	40.6	8.8	158.0	192.2	23.5	366.4	26.6	15850	10798	145094.2	1392.8	1141.4	507.2	190.0	189.9	-12.9	-51.0	-148.5	374.9
12:25:00	40.7	8.6	154.3	192.5	23.5	367.4	25.7	15713	10635	143480.0	1397.1	1147.4	507.5	190.5	189.9	-10.4	-49.8	-143.4	380.6
12:26:00	40.4	8.5	156.6	192.6	23.5	368.4	26.0	16031	10629	144983.5	1395.4	1145.1	508.7	191.0	189.9	-15.9	-56.1	-154.5	373.3
12:27:00	40.4	8.6	155.6	191.2	23.5	369.3	25.8	15856	10534	143752.4	1397.0	1146.9	510.1	192.0	190.9	-15.5	-54.1	-153.3	393.1
12:28:00	40.2	8.5	157.4	192.0	23.5	368.5	26.4	16494	10910	149244.5	1392.8	1141.3	511.4	193.0	191.9	-28.6	-73.1	-181.3	364.7
12:29:00	40.0	8.4	156.7	191.7	23.5	368.1	26.6	16231	10787	147596.7	1389.5	1140.1	512.4	194.0	191.9	-23.0	-65.5	-167.0	373.6
12:30:00	40.0	8.3	157.4	191.4	23.5	369.5	26.6	16506	10809	149585.8	1387.1	1137.2	511.3	194.0	192.9	-25.0	-70.3	-170.6	346.6
12:31:00	40.5	8.7	157.1	192.2	23.5	369.8	26.0	15994	10697	148660.2	1387.6	1140.8	510.5	193.5	192.9	-20.5	-64.1	-163.5	355.4

Test No. 2 - November 9, 2022

	Waste Flows						PAC	Air Flows			Temperatures					Pressures			
Time	Rich	Emulsion	Lean	Alkaline	Leachate	TDU Flow	Flow	Primary	Secondary	Stack	Primary	Secondary	Quench	SprayDryer	Stack	Incinerator	SD Inlet	BH Inlet	Baghouse
	Lpm	Lpm	Lpm	Lpm	Lpm	SCFM	lbs/h	m^3/h	m^3/h	Rm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
12:32:00	40.6	8.3	157.7	191.7	23.5	369.6	25.9	16356	10719	145618.0	1387.9	1141.4	509.6	193.0	192.9	-18.4	-60.0	-165.9	380.1
12:33:00	40.6	8.5	158.8	191.7	23.5	369.3	26.3	15888	10736	146894.1	1390.9	1144.7	508.9	192.5	192.9	-13.1	-52.5	-151.4	387.8
12:34:00	40.4	8.2	158.0	191.7	23.5	368.8	26.7	16606	10736	152008.9	1393.3	1145.5	508.2	192.0	192.9	-39.6	-91.6	-200.1	335.0
12:35:00	40.4	8.4	159.2	191.9	23.5	368.7	25.9	15844	10747	144952.5	1392.5	1144.7	508.2	192.0	192.9	-15.8	-57.6	-155.9	386.5
12:36:00	40.4	8.5	159.3	191.7	23.5	369.3	25.8	16119	10747	154164.8	1394.5	1146.8	508.2	191.5	192.9	-40.3	-93.6	-196.3	324.6
12:37:00	40.5	8.5	160.1	192.1	23.5	369.1	26.7	16306	10674	148735.9	1389.0	1141.8	508.3	192.0	192.9	-23.8	-63.0	-174.0	368.8
12:38:00	40.5	8.4	158.8	192.5	23.5	369.5	26.4	16056	10781	146254.2	1388.8	1141.9	508.2	192.5	192.9	-21.4	-64.6	-167.2	378.2
12:39:00	40.3	8.3	160.8	193.0	23.5	370.3	26.4	16169	10736	148054.2	1386.1	1139.7	508.4	193.0	192.9	-23.3	-64.9	-171.3	352.1
12:40:00	40.7	8.7	158.6	192.2	23.5	368.3	26.3	16056	10753	146535.3	1387.9	1142.6	508.4	193.0	192.9	-19.1	-62.4	-165.3	360.6
12:41:00	40.4	8.6	160.8	192.5	23.6	370.0	26.5	15869	10764	146004.2	1388.5	1144.1	508.4	193.0	192.9	-15.3	-56.3	-157.3	385.4
12:42:00	40.7	8.3	159.3	193.7	23.6	368.7	26.1	15756	10646	145444.5	1392.1	1147.2	508.4	193.0	192.9	-13.0	-52.5	-152.1	393.5
12:43:00	40.4	8.3	161.0	191.9	23.6	368.7	26.7	16269	10669	148490.6	1390.5	1143.8	508.3	193.0	192.9	-18.7	-61.9	-164.0	379.4
12:44:00	40.4	8.2	160.8	192.6	23.6	369.2	26.0	15838	10708	144532.2	1391.8	1144.4	508.6	193.0	192.9	-14.3	-57.0	-152.3	390.0
12:45:00	40.4	8.1	158.9	191.6	23.6	369.2	26.3	16713	10826	148627.2	1389.9	1141.6	508.5	192.5	192.9	-28.4	-73.3	-182.6	357.8
12:46:00	40.4	8.6	160.3	193.1	23.6	368.9	26.7	16194	10719	147253.8	1387.6	1140.6	508.2	193.0	192.9	-22.3	-67.5	-167.8	370.1
12:47:00	40.2	8.4	159.1	191.4	23.6	369.5	25.8	16700	10910	147968.8	1386.3	1140.1	508.2	193.0	193.9	-29.7	-73.1	-183.3	340.3
12:48:00	40.6	8.5	160.7	193.2	23.6	368.9	25.8	16063	10837	148327.9	1385.8	1141.5	508.5	193.5	193.9	-21.5	-64.6	-167.2	355.1
12:49:00	40.2	8.5	159.7	192.3	23.6	368.0	25.7	16350	10826	151343.1	1386.1	1142.1	508.4	193.5	193.9	-35.1	-86.4	-194.7	331.2
12:50:00	40.5	8.5	159.7	191.6	23.6	369.8	26.0	15725	10809	146149.8	1387.5	1143.5	508.9	193.5	193.9	-13.3	-55.4	-154.1	386.4
12:51:00	40.5	8.3	159.6	192.2	23.6	368.3	26.3	15725	10708	154500.8	1391.3	1145.9	508.8	193.0	193.9	-33.6	-83.9	-180.2	331.4
12:52:00	40.5	8.5	160.7	193.9	23.6	368.1	26.1	15925	10702	144347.9	1388.9	1143.3	508.5	192.5	193.9	-15.4	-58.5	-159.6	381.1
12:53:00	39.9	8.6	159.0	192.0	23.6	368.8	25.7	15813	10708	144575.4	1391.5	1145.5	508.8	192.5	193.9	-12.4	-54.0	-151.6	390.9
12:54:00	40.2	8.6	160.2	192.6	23.6	370.5	26.3	16356	10730	147964.0	1387.4	1140.6	508.8	192.5	193.9	-24.4	-70.6	-173.4	362.6
12:55:00	40.2	8.4	159.3	193.5	23.6	370.6	26.7	16125	10820	148170.5	1386.5	1140.3	508.7	192.5	193.9	-21.1	-67.5	-166.8	376.8
12:56:00	40.4	8.5	161.0	191.8	23.6	369.5	25.7	16350	10747	147133.7	1384.1	1137.9	508.4	193.0	193.9	-23.0	-68.4	-174.2	349.5
12:57:00	40.6	8.7	159.9	194.0	23.6	370.4	26.1	16100	10708	146174.8	1385.4	1140.2	508.5	193.0	193.9	-19.7	-65.1	-164.4	359.2
12:58:00	40.1	8.4	160.0	191.3	23.6	369.8	26.7	16188	10742	146211.5	1385.6	1138.8	508.6	193.0	193.9	-18.6	-60.5	-162.2	384.4
12:59:00	40.4	8.3	159.3	192.4	23.6	368.8	26.8	15763	10646	144242.5	1388.9	1141.4	508.8	193.0	193.9	-12.5	-52.5	-153.0	388.5
13:00:00	39.7	8.5	159.9	192.3	23.6	368.9	25.7	16475	10888	146461.6	1389.9	1137.9	509.2	192.5	193.9	-20.3	-65.8	-168.4	372.6
13:01:00	40.2	8.5	160.3	192.9	23.6	368.5	26.0	15888	10736	144989.4	1391.6	1137.9	509.1	192.5	193.9	-12.3	-52.9	-155.4	387.9
13:02:00	38.4	8.3	159.5	192.0	23.6	369.9	25.8	16713	10798	146730.0	1391.5	1137.7	509.4	192.5	193.9	-33.2	-78.6	-196.0	346.1
13:03:00	39.1	8.3	160.3	192.7	23.6	368.7	26.1	16269	10652	148394.0	1385.1	1129.7	509.1	192.5	193.9	-21.5	-67.5	-170.9	368.4
13:04:00	38.9	8.2	160.0	192.5	23.6	368.6	26.5	16344	10905	152703.4	1384.0	1128.4	508.7	192.5	193.9	-37.5	-86.4	-197.2	322.3
13:05:00	39.0	8.7	160.5	193.5	23.6	370.5	25.8	16138	10714	145330.9	1380.6	1126.3	507.9	192.5	193.9	-21.3	-66.1	-168.3	352.5

Max	40.7	10.5	162.6	194.0	24.1	378.0	26.8	17181	11219	159974.3	1408.9	1172.8	527.1	200.5	198.9	-2.0	-39.5	-129.5	393.5
Min	36.5	7.3	136.3	190.0	22.8	238.7	21.8	15713	10534	143480.0	1380.6	1121.0	500.9	184.5	188.8	-44.3	-94.9	-206.7	313.2
Average	38.5	9.0	159.3	192.1	23.6	354.0	25.9	16364	10864	150564.9	1394.7	1150.0	511.1	192.5	193.3	-18.0	-60.2	-160.2	362.0

Test No. 3 - November 10, 2022

	Waste Flows						PAC	Air Flows			Temperatures					Pressures			
Time	Rich Lpm	Emulsion Lpm	Lean Lpm	Alkaline Lpm	Leachate Lpm	TDU Flow SCFM	Flow lbs/h	Primary m^3/h	Secondary m^3/h	Stack Rm^3/h	Primary °C	Secondary °C	Quench °C	SprayDryer °C	Stack °C	Incinerator mm H_2O	SD Inlet mm H_2O	BH Inlet mm H_2O	Baghouse mm H_2O
8:35:00	31.2	8.6	156.7	193.3	22.4	271.3	20.8	15488	9843	144131.3	1338.3	1122.2	497.9	186.5	188.3	-12.4	-45.4	-130.8	409.1
8:36:00	31.1	8.6	156.2	192.0	22.4	281.0	20.8	16063	9848	143645.3	1337.3	1122.0	496.9	185.0	187.2	-17.1	-50.4	-138.9	424.1
8:37:00	31.0	8.8	156.1	192.9	22.4	281.7	21.0	15369	9742	141190.2	1338.0	1122.0	495.9	184.0	187.2	-10.0	-40.5	-121.4	433.2
8:38:00	30.8	8.7	157.6	192.5	22.4	287.0	20.8	16169	9972	148842.2	1338.9	1121.8	495.5	182.5	186.1	-38.2	-79.6	-172.1	376.0
8:39:00	31.0	8.6	156.1	192.4	22.4	288.3	20.9	15413	9848	142754.4	1337.3	1121.2	494.2	182.0	185.1	-11.0	-41.6	-125.5	432.3
8:40:00	30.8	8.9	156.7	191.5	22.4	286.9	20.8	15781	9809	150660.9	1340.0	1122.8	493.9	181.0	185.1	-37.7	-78.4	-169.8	367.1
8:41:00	31.1	8.5	156.5	192.9	22.4	283.9	20.8	15725	9955	143162.2	1332.9	1118.3	493.2	181.0	184.1	-19.1	-51.4	-139.1	419.2
8:42:00	30.8	8.4	156.6	189.4	22.4	287.1	21.0	15594	9837	142381.4	1332.9	1118.9	492.8	180.5	184.1	-16.8	-47.4	-133.0	433.1
8:43:00	31.2	8.8	157.1	190.6	22.2	282.8	20.8	15838	9938	144868.9	1328.1	1116.9	492.8	181.5	184.1	-21.9	-53.3	-142.8	406.2
8:44:00	31.8	8.7	156.6	190.0	22.2	273.6	21.9	15706	9933	144470.6	1331.1	1120.8	492.5	183.0	184.1	-17.4	-47.4	-136.4	415.9
8:45:00	31.7	8.6	157.3	189.6	22.2	277.1	21.0	15650	9832	141834.7	1331.0	1119.3	493.5	185.0	184.1	-15.1	-45.4	-132.9	433.5
8:46:00	31.6	8.9	156.8	189.2	22.2	283.3	21.3	15544	9725	141112.7	1335.5	1121.3	494.2	186.0	184.1	-10.5	-38.9	-125.4	441.4
8:47:00	31.8	8.8	158.4	189.2	22.2	289.3	21.0	15675	9854	143870.9	1334.9	1120.7	494.8	187.0	184.1	-14.2	-52.0	-136.8	428.1
8:48:00	31.8	8.6	157.5	189.2	22.2	275.4	21.8	15288	9871	141602.5	1338.9	1122.5	495.5	188.0	185.2	-10.5	-42.0	-121.8	441.9
8:49:00	31.5	8.9	156.2	190.6	22.2	284.9	21.5	16138	9994	144081.5	1338.3	1121.8	495.7	188.5	186.3	-24.0	-59.5	-149.6	414.9
8:50:00	31.7	8.8	157.9	190.4	22.2	289.0	21.7	15706	9876	142690.5	1336.9	1121.3	496.3	189.5	186.3	-14.3	-44.9	-132.9	427.8
8:51:00	31.8	8.7	156.7	190.5	22.2	293.9	21.6	16294	9994	142625.7	1337.1	1121.9	496.9	190.0	186.3	-25.1	-59.1	-153.7	392.8
8:52:00	31.7	8.8	156.6	190.2	22.2	291.3	21.4	15481	9775	143056.1	1336.0	1122.7	497.6	190.5	187.4	-15.0	-45.9	-133.3	411.1
8:53:00	31.7	8.5	157.6	189.9	22.2	288.8	21.5	16031	9775	147949.3	1336.8	1122.4	497.9	191.0	187.4	-34.8	-72.4	-168.5	381.9
8:54:00	31.6	8.6	157.9	190.7	22.2	288.3	20.8	15413	9888	141801.3	1337.5	1121.1	497.9	191.0	187.4	-10.5	-42.4	-124.1	437.6
8:55:00	31.5	8.5	157.7	189.1	22.2	286.4	21.1	15263	9770	150498.0	1341.3	1121.7	498.5	191.0	188.4	-30.8	-71.1	-154.6	379.7
8:56:00	31.8	8.5	158.9	189.7	22.2	293.9	20.8	15425	9736	140451.1	1338.8	1118.8	498.7	191.0	188.4	-12.1	-40.4	-125.3	433.8
8:57:00	31.8	8.8	158.0	191.0	22.2	277.7	21.2	15200	9736	141168.7	1343.5	1121.5	499.0	191.0	188.4	-7.2	-36.9	-115.4	444.0
8:58:00	31.7	8.7	157.9	190.2	22.2	286.4	21.8	15794	9837	142547.9	1339.0	1122.2	499.2	191.5	188.4	-16.5	-48.0	-138.2	422.6
8:59:00	31.7	8.6	157.5	188.8	22.2	280.6	21.8	15381	9843	141700.9	1339.4	1122.7	499.9	192.0	189.4	-14.1	-45.6	-127.8	433.9
9:00:00	31.7	8.5	158.4	189.7	22.2	293.6	20.8	15725	9843	143739.3	1336.3	1119.8	500.2	192.5	189.4	-17.8	-52.5	-137.4	406.1
9:01:00	31.5	8.7	158.6	190.1	22.2	285.2	20.9	15469	9736	141760.9	1337.6	1120.0	500.7	193.0	189.4	-12.2	-44.0	-126.0	415.9
9:02:00	31.5	8.6	158.1	189.5	22.2	272.8	21.6	15775	9837	142100.8	1336.6	1120.0	501.1	193.0	189.4	-12.0	-41.1	-129.5	431.6
9:03:00	31.7	8.9	157.7	190.5	22.2	277.8	21.1	15231	9736	140576.7	1341.0	1120.7	501.1	193.0	189.4	-8.1	-35.3	-120.0	440.8
9:04:00	31.7	8.6	157.1	189.5	22.2	289.2	20.9	15963	9848	142812.9	1341.0	1121.0	501.5	192.5	189.4	-16.7	-43.9	-135.9	423.5
9:05:00	31.8	8.8	158.3	191.1	22.2	277.1	21.7	15313	9736	140054.2	1343.6	1121.9	501.7	192.5	189.4	-7.0	-35.6	-116.0	438.3
9:06:00	31.4	8.7	157.2	188.8	22.2	273.8	21.7	16169	9944	141768.0	1345.1	1122.2	501.8	192.0	190.4	-26.1	-56.0	-161.0	396.9
9:07:00	31.5	8.9	158.6	189.7	22.2	279.3	20.9	15606	9742	142263.1	1341.0	1120.7	501.8	192.5	190.4	-14.1	-43.3	-130.4	427.6
9:08:00	31.4	8.6	157.1	188.0	22.2	285.4	21.4	15763	9871	146651.7	1342.0	1120.7	501.8	192.5	190.4	-32.8	-71.6	-164.2	372.4
9:09:00	31.9	8.6	157.9	189.2	22.2	287.0	21.7	15538	9770	142965.9	1339.1	1119.1	502.0	192.5	190.4	-14.4	-45.3	-129.8	409.8
9:10:00	31.6	8.6	158.2	190.5	22.2	276.6	20.9	15406	9781	148891.8	1343.3	1120.6	502.1	192.5	190.4	-22.2	-64.8	-133.8	394.1
9:11:00	32.0	8.9	158.0	190.5	22.2	287.6	21.8	15363	9770	141521.9	1341.4	1120.6	502.4	192.5	190.4	-10.1	-38.6	-122.9	435.9
9:12:00	31.6	8.7	157.8	190.0	22.2	286.1	21.3	15075	9770	140351.1	1347.4	1120.2	502.3	192.5	190.4	-6.2	-36.3	-114.7	442.0
9:13:00	30.9	8.5	158.0	190.7	22.2	291.8	21.6	15463	9753	139033.7	1343.6	1118.7	502.4	192.5	190.4	-11.5	-41.0	-124.5	431.1
9:14:00	30.9	8.6	157.5	189.3	22.2	295.1	28.7	15125	9770	139028.8	1345.3	1119.1	502.6	192.0	190.4	-6.3	-34.9	-114.9	440.8
9:15:00	30.8	8.7	158.9	190.1	22.2	286.8	27.9	15819	9893	143152.5	1339.3	1116.8	502.9	191.5	190.4	-18.7	-51.0	-137.4	418.5
9:16:00	30.9	8.6	158.6	189.9	22.2	287.9	28.5	15456	9905	140860.6	1338.6	1117.0	502.9	192.0	190.4	-10.6	-40.9	-126.5	432.1
9:17:00	30.9	8.4	157.6	189.3	22.2	300.5	28.4	15850	9921	142009.4	1336.0	1116.1	502.7	191.5	190.4	-19.2	-51.0	-140.6	403.2
9:18:00	31.1	9.1	158.2	190.8	22.2	295.4	28.7	15456	9798	143922.7	1336.8	1115.9	503.1	192.0	190.4	-10.7	-41.9	-126.5	412.9
9:19:00	31.1	8.8	157.8	189.6	22.2	282.6	28.3	15950	9899	143182.3	1336.9	1116.4	502.9	191.5	190.4	-15.5	-44.6	-134.0	427.6
9:20:00	31.1	9.0	157.6	190.6	22.2	280.3	28.8	15213	9775	141532.6	1339.0	1116.9	503.1	191.5	190.4	-8.5	-37.3	-119.0	440.6
9:21:00	30.9	8.6	157.5	189.4	22.2	284.7	28.7	16069	10011	146755.1	1340.4	1116.7	502.6	191.0	190.4	-36.2	-74.3	-168.7	378.9
9:22:00	30.9	8.8	159.2	189.7	22.2	279.3	28.5	15294	9893	141180.1	1339.8	1116.7	502.8	191.0	190.4	-8.5	-37.6	-120.5	437.6
9:23:00	30.8	8.9	156.6	189.9	22.2	275.3	28.1	15556	9787	149780.3	1341.4	1116.7	503.0	190.5	190.4	-35.2	-71.3	-163.2	371.6
9:24:00	31.1	8.9	157.4	190.2	22.2	279.8	28.8	15594	9905	143298.7	1335.6	1114.8	502.8	191.0	190.4	-15.7	-47.0	-132.6	425.4
9:25:00	31.0	8.2	156.4	189.6	22.2	290.0	28.8	15344	9803	141397.1	1337.8	1115.6	503.0	191.0	190.4	-12.3	-41.0	-124.8	436.3
9:26:00	31.1	9.0	156.7	191.0	22.2	295.3	28.8	15675	9843	143561.7	1334.0	1115.8	502.6	191.0	190.4	-16.1	-47.3	-132.6	407.7

Test No. 3 - November 10, 2022

	Waste Flows						PAC	Air Flows			Temperatures					Pressures			
Time	Rich Lpm	Emulsion Lpm	Lean Lpm	Alkaline Lpm	Leachate Lpm	TDU Flow SCFM	Flow lbs/h	Primary m^3/h	Secondary m^3/h	Stack Rm^3/h	Primary °C	Secondary °C	Quench °C	SprayDryer °C	Stack °C	Incinerator mm H_2O	SD Inlet mm H_2O	BH Inlet mm H_2O	Baghouse mm H_2O
9:27:00	31.1	8.6	157.4	191.3	22.2	278.9	27.9	15325	9719	141575.0	1335.5	1117.9	502.9	191.5	190.4	-12.6	-42.0	-126.5	420.3
9:28:00	30.8	8.4	157.4	190.3	22.2	280.5	28.4	15338	9848	142424.6	1332.9	1117.9	503.0	191.5	190.4	-11.1	-40.0	-124.4	436.5
9:29:00	30.9	8.7	157.4	190.1	22.2	279.3	28.4	15213	9742	138594.1	1337.1	1118.1	502.8	191.0	190.4	-8.7	-37.8	-117.0	443.8
9:30:00	30.7	8.9	158.1	189.2	22.2	286.7	28.7	15656	9876	142490.0	1334.4	1116.4	502.8	191.0	190.4	-14.5	-45.1	-129.2	427.4
9:31:00	31.1	9.2	159.2	190.8	22.2	291.8	28.8	15013	9635	140796.3	1338.0	1117.1	502.8	191.0	190.4	-7.2	-36.6	-115.2	441.0
9:32:00	30.8	8.5	158.4	190.7	22.2	284.3	28.6	15938	9888	144094.6	1335.6	1117.4	503.3	190.5	190.4	-21.4	-49.9	-143.7	413.8
9:33:00	31.1	9.0	158.6	190.8	22.2	283.5	28.7	15475	9893	142228.6	1335.0	1117.1	503.1	191.0	190.4	-13.5	-43.8	-128.0	429.3
9:34:00	31.0	8.7	156.5	189.5	22.2	292.1	28.5	16119	9893	144355.7	1333.3	1117.9	503.0	191.0	190.4	-24.3	-58.6	-150.6	395.3
9:35:00	30.9	8.5	158.5	190.2	22.2	293.3	28.8	15431	9787	142042.6	1332.1	1116.7	503.5	191.5	190.4	-14.8	-47.0	-129.3	413.6
9:36:00	30.6	8.6	157.7	189.0	22.2	280.7	28.0	15938	9787	145286.5	1333.3	1117.5	503.3	191.5	190.4	-34.1	-68.6	-165.0	381.8
9:37:00	30.8	8.7	157.6	189.9	22.2	281.1	28.7	15288	9747	139335.2	1333.4	1116.0	503.2	191.5	190.4	-10.3	-39.5	-121.1	438.0
9:38:00	30.9	8.7	162.0	189.2	22.2	278.9	27.9	15094	9747	148901.4	1339.4	1115.5	503.2	191.5	190.4	-28.9	-68.9	-151.2	382.4
9:39:00	31.0	8.9	162.8	190.6	22.2	278.4	28.4	15281	9730	138932.2	1337.4	1114.5	503.4	192.0	190.4	-10.1	-39.1	-121.1	433.5
9:40:00	31.0	9.1	160.4	189.8	22.2	273.0	28.4	14938	9736	139095.1	1341.8	1117.3	503.5	192.0	190.4	-5.0	-32.6	-112.2	442.1
9:41:00	31.0	8.8	145.9	190.6	22.2	270.8	28.9	15969	9876	141156.0	1335.9	1114.9	504.0	192.0	190.4	-22.1	-53.4	-139.4	421.4
9:42:00	31.0	8.9	150.7	190.2	22.2	286.3	28.6	15469	9764	140624.7	1335.8	1117.6	504.0	191.5	190.4	-13.6	-42.1	-126.0	433.8
9:43:00	30.8	8.8	151.4	189.7	22.2	289.7	27.8	15631	9792	140860.6	1332.4	1114.6	503.9	191.0	190.4	-20.8	-52.4	-137.7	407.4
9:44:00	30.9	8.6	151.3	189.2	22.2	289.7	28.6	15469	9685	142511.9	1333.6	1116.1	503.2	190.5	190.4	-14.5	-43.9	-127.4	416.3
9:45:00	30.8	8.7	151.5	190.2	22.2	280.2	28.0	15606	9921	140622.0	1331.5	1115.2	503.1	190.0	190.4	-16.2	-44.9	-129.1	432.8
9:46:00	31.1	9.0	151.8	191.5	22.2	284.3	28.4	15356	9787	140163.7	1335.4	1117.6	502.8	189.5	190.4	-10.9	-37.8	-120.4	442.3
9:47:00	30.9	8.8	151.0	190.3	22.2	289.0	27.8	16006	9910	141366.1	1333.8	1116.1	502.7	188.5	190.4	-20.8	-52.1	-140.3	422.4
9:48:00	30.8	9.0	152.3	189.2	22.2	288.4	28.7	15325	9691	140466.3	1334.6	1116.6	502.6	188.5	190.4	-12.6	-39.4	-122.4	439.9
9:49:00	30.8	8.5	150.8	189.4	22.2	278.8	28.0	16294	10023	143246.4	1333.0	1116.0	502.1	187.5	190.4	-31.6	-62.1	-164.5	398.9
9:50:00	31.0	8.9	152.3	191.1	22.2	283.8	28.7	15569	9803	140694.1	1330.1	1114.1	502.3	188.0	189.3	-18.6	-49.5	-133.8	428.3
9:51:00	30.6	8.5	150.2	189.5	22.2	284.7	28.8	15869	9809	147008.0	1331.4	1115.8	502.1	187.5	189.3	-37.3	-74.1	-166.7	373.0
9:52:00	31.1	9.1	149.9	191.0	22.2	286.2	28.5	15550	9826	141910.7	1328.6	1113.3	501.8	187.5	189.3	-18.4	-50.5	-134.4	410.3
9:53:00	31.4	8.4	151.9	190.5	22.2	277.9	28.0	15400	9725	146638.1	1332.1	1116.8	501.7	187.5	189.3	-23.9	-64.3	-137.6	394.7
9:54:00	31.7	8.8	151.9	190.7	22.2	283.4	28.9	15406	9719	140773.4	1331.1	1117.2	501.5	187.5	188.1	-12.2	-41.4	-124.7	438.9
9:55:00	31.2	8.6	151.3	189.5	22.2	287.3	28.2	15288	9730	137692.1	1337.1	1120.5	501.5	187.5	188.1	-9.5	-38.5	-117.8	445.3
9:56:00	31.5	8.8	152.2	190.7	22.2	288.2	28.6	15425	9758	141207.9	1334.0	1118.5	501.3	187.5	188.1	-15.1	-45.5	-128.0	431.6
9:57:00	31.3	8.8	150.8	191.3	22.2	276.2	27.9	15263	9657	138079.5	1339.0	1120.0	501.0	187.0	188.1	-9.4	-38.1	-120.2	445.8
9:58:00	31.5	8.9	152.0	190.0	22.2	275.9	28.3	15838	9876	143247.6	1336.0	1116.4	501.3	187.0	188.1	-21.4	-50.4	-142.7	421.2
9:59:00	31.5	8.5	152.0	189.7	22.2	287.1	27.9	15563	9770	140484.6	1336.1	1118.2	501.0	187.5	188.1	-16.2	-45.9	-130.6	434.9
10:00:00	31.1	8.7	151.1	189.9	21.6	292.7	27.8	15931	9882	142767.6	1333.8	1116.3	501.0	187.5	188.1	-24.1	-57.5	-145.4	407.4
10:01:00	31.4	9.0	152.9	191.8	22.7	274.3	28.8	15519	9815	140883.9	1333.6	1116.7	500.8	187.5	188.1	-17.8	-46.3	-132.3	417.4
10:02:00	31.3	8.6	152.2	190.7	22.7	272.3	28.9	16031	9809	140856.6	1333.6	1117.8	500.7	187.5	188.1	-20.7	-51.6	-139.3	432.5
10:03:00	31.3	8.9	153.5	190.7	22.7	286.6	28.9	15263	9702	139639.6	1336.4	1119.7	500.6	188.0	188.1	-12.0	-39.3	-122.3	441.4
10:04:00	31.2	8.3	152.5	190.0	22.7	288.9	28.4	16119	9921	144009.6	1338.6	1120.1	500.6	187.5	188.1	-39.1	-78.1	-173.0	381.1
10:05:00	31.2	8.7	153.2	189.8	22.7	291.2	27.9	15325	9820	140284.7	1337.8	1119.5	500.5	188.0	188.1	-11.0	-38.3	-125.0	438.4
10:06:00	31.1	8.7	152.6	191.7	22.7	282.4	28.5	15438	9820	149574.7	1342.1	1122.9	500.7	187.5	188.1	-36.5	-75.3	-165.6	370.6
10:07:00	31.4	8.7	153.4	189.9	22.7	279.2	28.0	15531	9837	140391.4	1337.4	1119.6	500.7	188.0	188.1	-17.1	-47.4	-134.4	425.1
10:08:00	31.0	8.7	153.9	189.9	22.7	290.0	28.9	15269	9809	140756.2	1339.8	1120.9	500.8	188.0	188.1	-13.0	-43.9	-126.6	434.9
10:09:00	31.3	9.0	153.0	191.2	22.7	291.5	28.3	15575	9809	140801.9	1335.8	1118.0	500.7	188.5	188.1	-19.5	-49.5	-135.7	410.9
10:10:00	31.2	8.6	154.2	190.6	22.7	296.6	28.5	15475	9798	139796.7	1337.9	1120.5	500.5	188.5	188.1	-13.1	-43.3	-126.0	417.8
10:11:00	31.0	8.6	154.0	189.2	22.7	284.1	28.3	15400	9781	141164.2	1336.3	1118.7	500.6	188.5	188.1	-14.7	-43.9	-127.2	436.6
10:12:00	31.1	8.7	152.4	190.8	22.7	284.4	28.4	15156	9781	139039.4	1340.9	1119.6	500.9	188.5	188.1	-9.9	-39.1	-118.6	441.2
10:13:00	31.2	8.6	152.8	190.9	22.7	290.6	28.0	15525	9787	141164.2	1338.1	1118.8	501.1	188.0	188.1	-17.4	-50.4	-132.9	428.9
10:14:00	31.4	9.0	159.2	191.7	22.7	289.7	28.8	15131	9657	138814.4	1341.1	1120.5	500.5	188.0	188.1	-8.2	-37.4	-117.6	443.2
10:15:00	31.2	8.5	153.1	190.6	22.7	280.6	27.8	16000	9871	140592.2	1339.8	1118.9	500.9	188.0	188.1	-23.8	-57.0	-146.1	414.6
10:16:00	31.2	8.8	155.0	190.6	22.7	293.0	29.0	15456	9758	140233.2	1337.9	1118.8	501.0	188.5	188.1	-16.4	-44.8	-130.7	429.6
10:17:00	31.2	8.6	154.4	190.2	22.7	297.2	27.9	16250	9781	142650.7	1337.4	1117.8	500.7	188.5	188.1	-25.9	-60.1	-152.0	396.9
10:18:00	31.2	8.5	155.1	190.0	22.7	301.1	28.0	15538	9775	141068.4	1336.1	1116.3	501.1	189.0	188.1	-16.3	-47.4	-132.5	414.4

Test No. 3 - November 10, 2022

	Waste Flows						PAC	Air Flows			Temperatures					Pressures			
Time	Rich Lpm	Emulsion Lpm	Lean Lpm	Alkaline Lpm	Leachate Lpm	TDU Flow SCFM	Flow lbs/h	Primary m^3/h	Secondary m^3/h	Stack Rm^3/h	Primary °C	Secondary °C	Quench °C	SprayDryer °C	Stack °C	Incinerator mm H_2O	SD Inlet mm H_2O	BH Inlet mm H_2O	Baghouse mm H_2O
10:19:00	31.2	8.7	155.6	190.0	22.7	281.1	27.9	15844	9893	145061.6	1337.5	1116.5	501.3	189.0	188.1	-35.1	-73.3	-166.9	385.0
10:20:00	31.2	9.0	154.4	190.4	22.7	279.8	28.9	15275	9792	138757.8	1338.1	1116.9	500.8	189.5	188.1	-11.1	-40.3	-122.9	441.1
10:21:00	31.1	8.3	153.0	190.1	22.7	288.5	28.8	15138	9685	146027.5	1344.1	1118.9	501.1	189.0	189.2	-35.0	-75.5	-153.8	383.6
10:22:00	31.4	8.8	157.6	190.6	22.7	287.6	28.5	15269	9809	140000.3	1341.9	1117.1	501.4	189.0	189.2	-10.5	-37.6	-123.6	436.6
10:23:00	31.1	8.7	156.9	189.5	22.7	284.3	28.7	15038	9798	137864.7	1345.9	1118.3	501.2	189.0	189.2	-5.0	-30.0	-112.7	445.7
10:24:00	31.4	8.7	154.5	190.2	22.7	289.3	27.8	15681	9820	141348.0	1341.4	1115.3	501.4	189.5	189.2	-19.3	-49.6	-136.2	425.5
10:25:00	31.1	8.6	154.7	190.0	22.7	288.5	28.9	15281	9719	139250.3	1342.3	1116.0	501.6	189.5	189.2	-13.5	-42.4	-126.3	435.3
10:26:00	31.2	8.8	154.9	191.5	22.7	294.2	28.6	15513	9832	140129.9	1338.8	1113.8	501.5	189.5	189.2	-19.5	-49.0	-138.0	408.2
10:27:00	31.2	8.6	155.1	191.2	22.7	284.1	27.8	15344	9815	141030.1	1340.8	1116.0	501.4	190.0	189.2	-13.9	-43.3	-127.5	417.8
10:28:00	31.1	8.7	155.1	190.2	22.7	287.6	28.1	15488	9837	139289.3	1339.8	1113.8	501.5	189.5	189.2	-14.9	-42.9	-126.8	432.0
10:29:00	31.2	9.0	155.0	190.6	22.7	285.3	28.2	15131	9730	137401.7	1343.8	1115.7	501.6	189.5	189.2	-9.4	-36.6	-118.8	442.1
10:30:00	31.1	8.6	154.8	190.8	22.7	291.5	28.9	15856	9826	140201.7	1343.8	1114.8	501.3	189.0	189.2	-20.2	-52.0	-138.6	424.1
10:31:00	31.2	8.8	153.9	190.7	22.7	291.3	28.6	15138	9820	138850.0	1344.8	1116.1	501.5	189.5	189.2	-9.8	-38.1	-119.9	439.6
10:32:00	30.5	8.7	154.8	190.3	22.7	273.6	28.1	16169	9949	141906.8	1344.5	1115.1	501.5	189.0	189.2	-30.4	-61.4	-164.2	400.6
10:33:00	30.9	8.9	155.2	190.8	22.7	284.9	28.5	15531	9742	140548.3	1339.5	1111.6	501.7	189.5	189.2	-17.3	-47.0	-133.0	429.4
10:34:00	30.8	8.8	153.9	191.6	22.7	283.9	28.5	15656	9848	146033.8	1340.5	1111.8	501.7	189.5	189.2	-36.1	-74.1	-165.1	373.8
10:35:00	30.9	8.8	153.8	191.2	22.7	292.9	28.0	15631	9860	140697.9	1336.5	1109.0	501.7	189.5	189.2	-16.9	-47.3	-135.7	413.0
11:07:00	30.9	9.6	150.9	192.0	22.0	297.2	28.8	15513	9787	137854.6	1339.3	1115.4	500.1	187.0	189.2	-19.0	-50.4	-139.3	423.4
11:08:00	30.7	9.2	150.8	190.8	22.0	292.7	28.5	15356	9787	137282.0	1340.5	1118.1	500.0	187.0	189.2	-15.3	-44.1	-128.9	435.7
11:09:00	31.1	9.3	151.6	192.0	22.0	299.6	28.2	15631	9781	139699.0	1337.5	1115.6	499.7	187.5	189.2	-19.8	-50.0	-138.5	408.4
11:10:00	31.1	9.5	150.9	191.3	22.0	286.4	28.9	15356	9663	139260.5	1339.1	1117.5	499.9	187.5	189.2	-15.0	-42.3	-130.1	417.6
11:11:00	30.6	9.4	150.4	190.9	22.0	280.2	28.5	15413	9865	138511.6	1339.5	1115.7	499.5	187.5	189.2	-15.1	-45.9	-128.9	433.1
11:12:00	30.6	9.4	152.3	190.7	22.0	292.8	28.2	14969	9747	136031.3	1343.9	1116.7	499.6	187.5	189.2	-11.4	-39.0	-121.5	440.9
11:13:00	30.5	9.4	151.2	189.9	22.0	299.3	28.5	15938	9770	139609.4	1342.9	1116.1	499.6	187.0	189.2	-21.3	-51.8	-139.9	423.6
11:14:00	30.7	9.3	153.0	191.8	22.0	298.8	28.7	15150	9770	138112.6	1343.5	1116.1	499.2	187.5	188.1	-10.5	-41.4	-121.4	437.8
11:15:00	30.0	9.2	152.4	190.0	22.0	288.6	27.8	16063	9781	138525.5	1342.5	1115.7	499.4	187.0	188.1	-31.5	-62.1	-165.3	398.4
11:16:00	30.1	9.6	151.1	191.0	22.0	295.4	27.8	15425	9882	137395.7	1337.5	1112.4	499.6	187.5	188.1	-17.3	-50.1	-132.2	427.2
11:17:00	30.1	9.3	151.1	191.5	22.0	297.8	28.4	15638	9882	144514.8	1337.6	1112.8	499.1	187.5	188.1	-37.1	-69.8	-167.1	372.6
11:18:00	30.1	9.6	151.8	190.7	22.0	306.2	27.9	15513	9860	138371.7	1334.1	1109.1	499.2	187.5	188.1	-18.2	-49.5	-135.1	410.0
11:19:00	29.9	9.5	150.8	190.2	22.0	301.9	28.8	15269	9742	140457.2	1337.3	1109.4	499.1	187.5	188.1	-22.4	-64.9	-137.4	395.1
11:20:00	30.2	9.5	151.5	191.9	22.0	296.3	28.4	15213	9770	136823.2	1336.0	1107.8	498.7	187.5	188.1	-13.7	-43.1	-124.9	439.6
11:21:00	30.2	9.6	151.0	190.7	22.0	290.3	28.3	15131	9669	136227.7	1340.1	1110.0	498.8	187.0	188.1	-11.0	-39.5	-119.7	444.9
11:22:00	29.5	9.5	151.9	190.7	22.0	287.4	28.0	15331	9798	137249.4	1336.6	1107.7	498.6	186.5	188.1	-15.3	-44.9	-131.1	433.9
11:23:00	29.7	9.6	150.9	191.5	22.0	295.1	28.1	15094	9697	135892.1	1338.1	1109.6	498.1	186.0	188.1	-10.3	-38.3	-120.1	444.6
11:24:00	29.7	9.4	152.0	190.9	22.0	286.7	28.5	15769	9832	141266.1	1332.9	1107.8	498.3	185.5	188.1	-21.7	-54.6	-142.1	419.9
11:25:00	29.7	9.4	151.1	192.1	22.0	291.0	28.1	15381	9719	139156.3	1332.1	1109.0	498.0	185.5	188.1	-16.5	-45.9	-131.3	432.0
11:26:00	29.7	9.5	151.3	190.1	22.0	299.6	28.8	15781	9826	138230.4	1329.5	1107.0	497.5	185.5	188.1	-22.3	-50.3	-145.9	404.6
11:27:00	29.7	9.6	151.6	190.8	22.0	300.2	28.9	15494	9725	137435.0	1330.3	1108.9	498.0	186.0	188.1	-17.5	-48.1	-132.2	416.6
11:28:00	29.5	9.8	151.4	190.9	22.0	289.6	27.9	15856	9848	138090.9	1328.9	1109.4	497.9	185.5	187.1	-19.4	-49.0	-139.6	430.0
11:29:00	29.4	9.4	151.9	191.5	22.0	285.4	28.5	15225	9635	136745.1	1331.1	1111.8	497.1	185.5	187.1	-14.7	-43.1	-125.3	442.7
11:30:00	29.5	9.3	150.5	189.2	22.0	292.7	27.7	15956	9854	144828.8	1333.6	1112.1	497.8	185.0	187.1	-41.1	-78.1	-175.1	381.9
11:31:00	29.6	9.7	151.3	191.4	22.0	299.7	28.6	15213	9697	138192.7	1332.5	1112.8	497.1	185.5	187.1	-12.9	-40.9	-127.1	439.8
11:32:00	29.6	9.3	148.6	190.7	22.0	292.7	27.8	15456	9809	146329.8	1337.3	1115.4	497.6	185.0	187.1	-40.0	-78.4	-168.1	370.7
11:33:00	29.8	9.6	148.6	191.0	22.0	288.5	27.9	15513	9708	139897.7	1330.9	1113.0	497.0	185.0	187.1	-20.0	-51.4	-137.7	426.8
11:34:00	29.6	9.4	144.2	191.7	22.0	293.2	27.9	15331	9725	138640.9	1332.9	1115.3	497.3	185.5	187.1	-17.2	-42.8	-130.9	437.1
11:35:00	29.6	9.5	146.5	190.8	22.0	293.6	28.8	15569	9820	140286.1	1328.5	1114.0	496.7	185.0	187.1	-20.8	-52.5	-137.5	406.2
11:36:00	29.4	9.0	146.2	191.5	22.0	305.4	28.6	15256	9815	138295.7	1329.9	1116.3	496.9	185.0	187.1	-17.8	-48.5	-131.5	416.9
11:37:00	29.8	9.6	146.6	190.9	22.0	301.6	28.9	15331	9803	137203.4	1327.5	1114.5	496.5	185.0	187.1	-15.8	-44.6	-128.3	433.4
11:38:00	29.6	9.6	147.2	191.1	22.0	299.8	28.4	15069	9596	135033.9	1332.3	1117.5	496.6	184.5	187.1	-11.2	-39.3	-121.9	442.9
11:39:00	29.7	9.5	148.1	190.9	22.0	299.9	28.6	15438	9792	138217.4	1329.6	1115.6	496.7	184.0	187.1	-18.6	-49.6	-134.9	428.6
11:40:00	29.7	9.3	148.4	191.1	22.0	295.8	28.7	15075	9803	135945.6	1332.9	1117.5	496.4	184.0	187.1	-12.2	-40.1	-122.2	440.6
11:41:00	29.7	9.5	148.9	190.8	22.0	296.3	28.4	15931	9803	139624.0	1330.9	1115.9	496.3	184.0	187.1	-26.8	-61.0	-150.2	414.3

Test No. 3 - November 10, 2022

	Waste Flows						PAC	Air Flows			Temperatures					Pressures			
Time	Rich	Emulsion	Lean	Alkaline	Leachate	TDU Flow	Flow	Primary	Secondary	Stack	Primary	Secondary	Quench	SprayDryer	Stack	Incinerator	SD Inlet	BH Inlet	Baghouse
	Lpm	Lpm	Lpm	Lpm	Lpm	SCFM	lbs/h	m^3/h	m^3/h	Rm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
11:42:00	29.5	9.4	148.7	190.4	22.0	295.8	28.0	15319	9792	140531.7	1330.0	1116.0	496.3	184.5	187.1	-18.0	-50.0	-133.7	428.9
11:43:00	29.4	9.3	148.6	190.3	22.0	297.5	28.0	16050	9882	139731.9	1329.9	1114.7	496.0	184.5	187.1	-26.2	-57.4	-156.1	393.4
11:44:00	29.7	9.2	148.4	191.2	22.0	301.0	27.8	15400	9753	139041.2	1327.8	1115.0	496.3	185.0	186.1	-17.1	-49.5	-135.7	410.8
11:45:00	29.6	9.3	149.3	191.1	22.0	293.0	28.7	15713	9871	143502.4	1330.0	1114.5	496.4	185.0	186.1	-37.0	-73.3	-170.0	379.8
11:46:00	29.6	9.4	148.8	190.5	22.0	297.0	27.9	15175	9770	138885.8	1330.3	1115.2	496.1	185.0	186.1	-13.1	-41.4	-125.8	438.3
11:47:00	29.5	9.3	149.0	190.3	22.0	302.1	28.8	15069	9663	147571.4	1335.4	1117.7	496.2	185.0	186.1	-34.4	-73.8	-154.8	380.5
11:48:00	29.6	9.5	149.2	191.3	22.0	301.4	27.9	15194	9781	137573.2	1332.3	1116.6	496.0	185.0	186.1	-13.3	-43.3	-126.6	432.8
11:49:00	29.3	9.2	149.6	190.6	22.0	293.3	28.9	15050	9787	136920.5	1337.4	1119.3	496.5	185.0	186.1	-8.9	-35.9	-118.5	442.0
11:50:00	29.6	9.5	149.7	191.1	22.0	293.9	28.2	15350	9775	139537.0	1330.9	1115.8	496.0	185.0	186.1	-22.3	-56.0	-140.3	421.0
11:51:00	29.4	9.4	148.4	192.4	22.0	296.7	28.2	15238	9775	135903.5	1331.6	1117.1	496.1	185.5	186.1	-17.1	-47.1	-131.6	432.8
11:52:00	29.6	9.3	149.8	191.1	22.0	297.7	28.3	15406	9787	139158.8	1327.6	1114.8	496.4	185.5	186.1	-20.8	-52.3	-140.8	403.8
11:53:00	29.7	9.6	149.4	193.9	22.0	295.0	28.1	15163	9680	137496.6	1328.4	1117.3	496.4	186.0	186.1	-16.2	-49.0	-130.7	414.8
11:54:00	29.5	9.4	148.6	191.7	22.0	296.2	28.5	15400	9803	139394.4	1327.8	1116.4	496.6	186.0	186.1	-15.9	-48.0	-132.2	432.3
11:55:00	29.4	9.5	148.7	190.6	22.0	296.0	28.1	15000	9798	136483.0	1332.0	1118.7	496.7	186.0	186.1	-11.3	-40.3	-121.1	440.6
11:56:00	29.6	9.5	148.3	191.6	22.0	300.8	28.2	15638	9927	138864.7	1330.3	1117.9	497.0	186.0	187.2	-20.4	-50.3	-141.7	422.0
11:57:00	29.6	9.5	149.2	190.6	22.0	299.6	28.0	14906	9764	136676.5	1332.5	1118.7	497.1	186.5	187.2	-9.9	-37.0	-121.7	435.5
11:58:00	29.2	9.0	149.1	190.9	22.0	300.1	28.2	15938	9882	140857.4	1333.9	1119.8	496.7	186.0	187.2	-33.5	-64.3	-164.8	395.7
11:59:00	29.4	9.6	149.3	191.1	22.0	294.9	28.1	15425	9758	138844.8	1329.6	1118.3	496.9	186.5	187.2	-16.9	-47.0	-134.1	426.8
12:00:00	29.2	9.2	149.1	190.9	22.0	298.1	28.7	15544	9871	145616.1	1329.6	1118.5	497.3	186.5	187.2	-38.1	-75.8	-169.1	372.0
12:01:00	29.4	9.4	148.9	190.8	22.0	298.1	28.7	15338	9742	140533.5	1325.8	1117.4	497.5	187.0	187.2	-18.7	-50.6	-135.3	408.7
12:02:00	29.5	9.3	148.6	190.4	22.0	301.1	27.9	15200	9742	146249.4	1329.3	1117.8	497.7	187.0	187.2	-20.8	-60.6	-137.5	393.0
12:03:00	29.3	9.4	149.4	191.2	22.0	296.6	28.7	15206	9736	137560.3	1328.4	1115.9	497.8	187.5	187.2	-14.1	-48.3	-123.8	435.0
12:04:00	29.5	9.4	148.3	191.3	22.0	297.6	28.4	14944	9730	137884.4	1333.6	1119.0	497.7	187.0	187.2	-9.6	-37.5	-118.1	441.5
12:05:00	29.6	9.5	149.3	191.3	22.0	297.5	28.2	15213	9832	137978.1	1331.3	1117.5	497.8	187.0	187.2	-13.5	-44.4	-129.5	429.8
12:06:00	29.5	9.2	149.5	191.9	22.0	303.3	27.8	14881	9708	135242.8	1334.9	1119.3	497.9	187.0	187.2	-9.6	-36.9	-117.9	441.9
12:07:00	29.5	9.2	149.7	191.9	22.2	291.9	27.8	15513	9832	139051.7	1330.9	1117.2	497.7	187.0	187.2	-23.3	-56.4	-142.0	417.1
12:08:00	29.6	9.7	148.7	190.8	22.2	293.4	28.4	15225	9685	138686.2	1330.9	1118.2	497.9	187.0	187.2	-14.8	-45.4	-128.6	429.7
12:09:00	29.4	9.3	148.9	190.1	22.2	297.1	28.7	15638	9893	140849.7	1327.6	1116.8	498.0	187.5	188.2	-21.6	-54.4	-140.3	400.1
12:10:00	29.7	9.3	149.7	191.4	22.2	290.9	28.7	15150	9685	137010.3	1328.6	1117.7	498.5	187.5	188.2	-15.9	-46.9	-128.8	410.4
12:11:00	29.6	9.3	146.6	190.6	22.2	284.3	28.5	15631	9787	136940.3	1328.3	1117.1	498.2	187.5	188.2	-20.3	-51.1	-141.3	427.4
12:12:00	29.4	9.4	148.9	191.1	22.2	298.2	28.7	15094	9669	137009.8	1330.6	1120.1	498.3	187.5	188.2	-11.4	-40.4	-123.3	439.1
12:13:00	29.3	9.6	148.8	190.9	22.2	297.3	28.8	15813	9899	143291.3	1332.5	1119.5	498.9	187.0	188.2	-40.9	-76.9	-174.9	379.8
12:14:00	29.6	9.0	149.3	190.8	22.2	305.2	28.9	15106	9798	136133.3	1332.3	1118.9	498.6	187.5	188.2	-11.0	-40.3	-123.6	434.4
12:15:00	29.3	9.4	148.4	191.3	22.2	304.0	28.3	15213	9893	144561.8	1335.6	1121.4	498.6	187.0	188.2	-37.9	-74.6	-167.1	369.1
12:16:00	29.6	9.5	148.9	190.7	22.2	294.9	27.9	15275	9792	138072.7	1328.9	1116.9	499.1	187.5	188.2	-20.3	-52.3	-137.2	421.7
12:17:00	29.3	9.3	148.3	191.5	22.2	295.9	28.3	15050	9680	136501.8	1330.6	1117.8	498.8	187.5	188.2	-15.6	-45.8	-127.4	432.0
12:18:00	29.3	9.4	149.0	191.6	22.2	293.6	28.2	15263	9798	138235.8	1326.6	1115.2	499.1	188.0	188.2	-19.3	-51.0	-136.9	405.5
12:19:00	29.4	9.5	149.3	190.8	22.2	291.7	28.2	15138	9657	137721.9	1329.3	1118.2	498.7	188.0	188.2	-14.5	-41.4	-130.8	413.6
12:20:00	29.2	9.8	149.9	192.2	22.2	283.3	28.0	15125	9646	136388.7	1326.6	1116.3	498.9	188.0	188.2	-14.3	-45.0	-127.0	431.9
12:21:00	29.2	9.2	148.8	191.5	22.2	289.1	28.3	14981	9646	134812.0	1331.6	1118.1	499.0	188.0	188.2	-10.2	-38.1	-120.1	438.3
12:22:00	28.9	9.1	149.5	190.5	22.2	300.6	28.0	15319	9747	136106.1	1328.6	1115.5	499.5	187.5	188.2	-17.0	-48.9	-133.6	425.8
12:23:00	29.3	9.6	149.1	190.8	22.2	293.6	28.0	14969	9702	136359.1	1331.3	1117.4	499.7	188.0	188.2	-9.3	-38.1	-118.1	437.1
12:24:00	29.1	9.4	148.8	191.1	22.2	297.2	28.4	15663	9871	139949.3	1330.3	1116.3	499.3	187.5	188.2	-23.6	-58.4	-144.1	411.3
12:25:00	29.0	9.5	148.9	191.6	22.2	293.9	27.9	15169	9657	137059.5	1329.6	1116.7	499.4	187.5	188.2	-17.1	-46.3	-131.8	428.3
12:26:00	29.3	9.0	149.5	190.4	22.2	295.7	28.6	15894	9837	137442.2	1327.3	1116.3	499.2	187.0	188.2	-27.7	-58.4	-154.1	391.7
12:27:00	29.2	9.6	149.2	192.3	22.2	300.6	28.9	15125	9736	137623.1	1326.5	1116.4	499.1	187.5	188.2	-17.3	-47.4	-132.5	409.7
12:28:00	28.9	9.2	148.4	191.1	22.2	288.1	28.0	15681	9848	141401.9	1326.9	1116.4	499.0	187.0	188.2	-37.0	-73.1	-167.3	381.3
12:29:00	29.2	9.5	149.0	191.3	22.2	288.2	28.8	15006	9736	136993.8	1327.5	1116.2	499.1	187.0	188.2	-12.3	-39.5	-124.0	437.1
12:30:00	29.0	9.4	149.2	190.3	22.2	291.6	28.3	15056	9742	144216.9	1332.0	1117.9	498.7	186.0	188.2	-33.2	-75.1	-153.4	377.7
12:31:00	29.3	9.4	148.2	191.4	22.2	298.6	28.0	15094	9702	137739.5	1328.1	1116.5	498.6	186.0	188.2	-13.9	-41.8	-125.3	431.3
12:32:00	29.2	9.5	148.5	190.7	22.2	297.5	28.7	14806	9714	134054.5	1333.5	1119.6	498.3	185.5	188.2	-8.4	-35.5	-115.4	440.9
12:33:00	29.3	9.4	149.1	191.6	22.2	291.2	28.6	15406	9714	137056.1	1328.5	1116.5	498.6	185.5	188.2	-20.7	-52.5	-137.9	418.7

Test No. 3 - November 10, 2022

	Waste Flows						PAC	Air Flows			Temperatures					Pressures			
Time	Rich	Emulsion	Lean	Alkaline	Leachate	TDU Flow	Flow	Primary	Secondary	Stack	Primary	Secondary	Quench	SprayDryer	Stack	Incinerator	SD Inlet	BH Inlet	Baghouse
	Lpm	Lpm	Lpm	Lpm	Lpm	SCFM	lbs/h	m^3/h	m^3/h	Rm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
12:34:00	29.1	9.4	148.5	191.1	22.2	299.9	28.5	15156	9714	137576.4	1329.9	1116.9	498.2	185.5	188.2	-15.3	-43.6	-128.5	430.6
12:35:00	29.1	9.3	149.3	191.8	22.2	295.6	28.9	15475	9680	137507.3	1326.3	1115.0	498.0	185.5	188.2	-20.0	-50.5	-139.2	403.3
12:36:00	29.1	9.4	149.1	191.7	22.2	294.2	28.7	15188	9663	136790.8	1327.8	1116.7	497.8	185.5	187.1	-15.8	-45.1	-129.6	413.6
12:37:00	29.0	9.3	148.1	191.3	22.2	298.7	28.4	15294	9770	136168.9	1325.9	1115.4	498.0	185.5	187.1	-15.0	-45.9	-130.1	430.9
12:38:00	29.3	9.5	149.3	190.5	22.2	293.2	28.7	14863	9657	134614.5	1330.8	1117.8	497.9	185.5	187.1	-11.0	-38.4	-121.1	439.8
12:39:00	29.1	9.3	148.4	190.6	22.2	303.7	27.8	15725	9775	137929.4	1330.0	1117.5	497.7	185.0	187.1	-20.6	-51.1	-139.8	419.5
12:40:00	29.3	9.3	148.6	191.9	22.2	305.4	28.0	14931	9674	136804.5	1331.6	1119.3	497.5	185.0	187.1	-11.0	-39.1	-121.7	438.5
12:41:00	29.2	9.5	149.0	190.9	22.2	299.7	28.0	15850	9781	138039.2	1332.3	1118.4	498.0	185.0	187.1	-30.9	-62.5	-164.4	394.1
12:42:00	29.1	9.5	148.7	191.7	22.2	294.4	27.8	15356	9663	137675.5	1328.6	1117.1	497.6	185.5	187.1	-17.5	-48.9	-135.2	424.5
12:43:00	29.3	9.3	148.4	191.5	22.2	303.8	28.6	15569	9775	144467.7	1329.6	1118.5	497.8	185.5	187.1	-37.4	-73.4	-168.3	370.8
12:44:00	29.4	9.8	150.0	190.8	22.2	300.5	28.4	15250	9680	138790.4	1327.3	1116.0	497.9	186.0	187.1	-16.6	-46.1	-133.3	405.5
12:45:00	29.2	9.2	148.4	191.3	22.2	300.2	28.2	15144	9685	143553.3	1329.3	1118.3	497.7	186.0	187.1	-24.6	-65.3	-137.6	393.0
12:46:00	29.3	9.7	149.2	190.9	22.2	298.2	27.8	15200	9674	138318.4	1328.5	1118.0	497.6	186.0	187.1	-13.1	-43.0	-124.7	435.5
12:47:00	29.3	9.5	148.6	191.4	22.2	301.4	28.3	14944	9674	135486.3	1333.3	1120.8	497.4	186.0	187.1	-11.0	-37.9	-120.3	444.4
12:48:00	29.3	9.5	148.7	192.0	22.2	305.6	27.8	15225	9775	136777.8	1330.6	1118.9	497.8	185.5	187.1	-14.6	-43.8	-131.4	432.1
12:49:00	29.2	9.5	148.3	190.8	22.2	303.2	28.0	14869	9579	135800.1	1334.4	1121.5	497.8	185.5	187.1	-10.1	-36.0	-118.4	440.8
12:50:00	29.2	9.6	148.3	190.7	22.2	291.5	28.3	15569	9781	138900.3	1329.9	1118.6	497.7	185.5	187.1	-20.3	-51.3	-142.3	415.4
12:51:00	29.4	9.7	148.0	191.2	22.2	294.6	27.8	15231	9669	136069.1	1329.3	1119.0	497.4	185.5	187.1	-16.5	-43.5	-129.6	427.4
12:52:00	29.4	9.6	149.1	191.6	22.2	299.3	28.6	15594	9781	138586.4	1327.5	1117.8	497.1	185.5	187.1	-22.3	-51.8	-142.1	400.8
12:53:00	29.3	9.6	149.1	193.3	22.2	304.5	27.9	15188	9674	137634.4	1328.3	1118.9	497.1	185.5	187.1	-17.2	-44.8	-133.9	410.7
12:54:00	29.3	9.6	148.5	192.3	22.2	294.8	28.9	15631	9803	135958.0	1326.8	1119.0	497.0	185.0	187.1	-19.7	-50.0	-138.8	427.9
12:55:00	29.1	9.1	148.3	190.1	22.2	295.6	28.7	14963	9685	137748.4	1329.9	1119.6	497.3	185.0	187.1	-12.9	-40.3	-124.0	440.1
12:56:00	29.4	9.5	148.4	191.2	22.2	300.7	28.9	15944	9871	144406.2	1332.1	1120.7	496.8	184.5	187.1	-40.7	-76.3	-176.5	380.4
12:57:00	29.5	9.7	149.3	192.6	22.2	303.5	28.5	15175	9736	136001.2	1330.6	1119.0	496.5	184.5	187.1	-12.9	-38.3	-126.5	437.4
12:58:00	29.2	9.4	148.3	190.6	22.2	283.9	28.6	15338	9736	148208.4	1333.6	1121.7	496.8	184.5	187.1	-38.6	-78.0	-167.4	370.9
12:59:00	29.4	9.7	149.6	190.8	22.2	289.1	28.8	15444	9736	137457.2	1328.3	1118.7	496.4	184.5	187.1	-19.3	-45.1	-136.2	423.5
13:00:00	29.3	9.3	148.6	191.1	22.2	302.4	28.8	15150	9612	137681.1	1329.4	1120.3	496.8	184.5	187.1	-15.5	-45.0	-127.7	434.1
13:01:00	29.3	9.3	149.3	191.9	22.2	303.8	28.1	15325	9837	138509.6	1326.0	1116.5	496.3	185.0	187.1	-20.6	-52.3	-139.4	406.9
13:02:00	29.1	9.2	148.8	191.6	22.2	301.8	28.4	15069	9708	137022.8	1328.1	1118.7	496.2	185.0	187.1	-15.9	-47.3	-129.5	415.0
13:03:00	29.3	9.3	149.7	191.3	22.2	288.8	28.8	15125	9674	137473.3	1326.3	1117.7	496.0	184.5	186.1	-13.3	-44.5	-125.8	432.4
13:04:00	29.1	9.3	148.0	191.2	22.2	293.6	28.8	14856	9556	135705.3	1330.5	1120.8	496.4	184.5	186.1	-11.0	-39.1	-121.8	442.2
13:05:00	29.4	9.8	149.3	191.9	22.2	299.3	28.4	15463	9685	137009.5	1327.6	1117.6	496.1	184.0	186.1	-17.5	-47.9	-133.5	427.2
13:06:00	29.4	9.6	148.2	191.8	22.2	308.7	27.8	15000	9685	135549.1	1331.0	1119.5	496.1	184.0	186.1	-12.1	-38.9	-122.9	441.3
13:07:00	29.1	9.2	148.8	191.7	22.2	297.5	28.6	15825	9764	139844.1	1328.8	1118.4	495.9	183.5	186.1	-24.8	-58.4	-148.0	414.0
Max	32.0	9.8	162.8	193.9	22.7	308.7	29.0	16294	10023	150660.9	1347.4	1122.9	504.0	193.0	190.4	-5.0	-30.0	-112.2	445.8
Min	28.9	8.2	144.2	188.0	21.6	270.8	20.8	14806	9556	134054.5	1325.8	1107.0	492.5	180.5	184.1	-41.1	-79.6	-176.5	367.1
Average	30.4	9.1	152.5	190.7	22.2	290.7	27.2	15449	9785	140395.3	1334.5	1117.3	499.2	187.7	188.1	-18.3	-49.4	-135.5	419.5

APPENDIX 30

Feed Ultimate
Analysis Report
(9 pages)

Petro Laboratories Inc.

1295 Matheson Blvd. East, Mississauga, Ontario, L4W 1R1 Tel: (905) 361-2388 Fax: (905) 361-2411
E-mail: petrolab@gmail.com

LABORATORY REPORT

Ortech Environmental Inc.
804 Southdown Road,
Mississauga, Ontario
L5J 2Y4
Attn: Chris Belore, Tina Sanderson

Lab no.: 19147- 1 to 3
Report date: Feb 13 , 2023
Sample in: Nov 14, 2022
P.O. no.: 22180-J2866

Re: Process Samples from Clean Harbors, Sarnia, November 8, 2022 , Project no.: 22180 for Ultimate analysis - Ash, Sulphur, Carbon, Hydrogen, Nitrogen, Oxygen & Water in % by weight, ASTM D482(modified), D1552, D3176 (modified).

Petro Lab no.	Ortech Sample ID.	Tests / Results						
		1.	2.	3.	4.	5.	6.	7.
19147-	Test #1 Nov 8,2022 22-22180-	Ash ASTM D3174 (A)	Sulphur ASTM D1559 (S)	Carbon ASTM D3178 (C)	Hydrogen ASTM D3178 (H)	Nitrogen ASTM D3179 (N)	Oxygen (O)	Water ASTM D3173
1	FR-4 Rich Feed	1.29	1.47	49.07	11.04	1.47	35.66	21.04
2	FL-4 Lean Feed	4.48	0.87	7.73	9.87	0.88	76.17	89.97
3	FE-4 Emulsion Feed	2.23	1.66	32.47	10.98	1.68	50.98	53.41

* Oxygen is obtained by difference = 100-(C+H+N+A+S)

Tested by : A.C. / P.S.(chemist)

Member of ASTM
JS:LN

Approved James Szeto

James Szeto, B.Sc.
Chief Chemist

Petro Laboratories Inc.

1295 Matheson Blvd. East, Mississauga, Ontario, L4W 1R1 Tel: (905) 361-2388 Fax: (905) 361-2411
E-mail: petrolab@gmail.com

LABORATORY REPORT

Ortech Environmental Inc.
804 Southdown Road,
Mississauga, Ontario
L5J 2Y4

Lab no.: 19147 - 4 to 6
Report date: Feb 13, 2022
Sample in: Nov 14, 2021
P.O. no.: 22180-J2866

Attn: Chris Belore, Tina Sanderson

Re: Process Samples from Clean Harbors, Sarnia, Nov 9,2022 , Project no.: 22180
for Ultimate analysis - Ash, Sulphur, Carbon, Hydrogen, Nitrogen, Oxygen & Water in %wt.

Petro Lab no.	Ortech Sample ID.	Tests / Results						
		1.	2.	3.	4.	5.	6.	7.
19147-	Test #2 Nov 9,2022 22-22180-	Ash ASTM D3174 (A)	Sulphur ASTM D1559 (S)	Carbon ASTM D3178 (C)	Hydrogen ASTM D3178 (H)	Nitrogen ASTM D3179 (N)	Oxygen (O)	Water ASTM D3173
4	FR-9 Rich Feed	1.62	1.63	41.19	11.03	1.64	42.89	37.26
5	FL-9 Lean Feed	4.86	1.13	11.21	10.78	1.04	70.98	79.81
6	FE-9 Emulsion Feed	2.33	1.43	21.11	10.46	1.38	63.29	67.71

* Oxygen is obtained by difference = 100-(C+H+N+A+S)

Tested by : A.C. / P.S.(chemist)

Approved by James Szeto

Member of ASTM
JS:LN

James Szeto, B.Sc.
Chief Chemist

Petro Laboratories Inc.
1295 Matheson Blvd. East, Mississauga, Ontario, L4W 1R1 Tel: (905) 361-2388 Fax: (905) 361-2411
E-mail: petrolab@gmail.com

LABORATORY REPORT

Page 3 of 3

Ortech Environmental Inc.
804 Southdown Road,
Mississauga, Ontario
L5J 2Y4

Lab no.: 19147 - 7 to 9
Report date: Feb 13 , 2022
Sample in: Nov 14, 2022
P.O. no.: 22180 - J2866

Attn: Chris Belore, Tina Sanderson

Re: Process Samples from Clean Harbors, Sarnia, Nov 10,2022 , Project no.: 22180
for Ultimate analysis - Ash, Sulphur, Carbon, Hydrogen, Nitrogen, Oxygen & Water in %wt.

Petro Lab no.	Ortech Sample ID.	Tests / Results						
		1.	2.	3.	4.	5.	6.	7.
19147-	Test #3 Nov 10,2022 22- 22180-	Ash ASTM D3174 (A)	Sulphur ASTM D1559 (S)	Carbon ASTM D3178 (C)	Hydrogen ASTM D3178 (H)	Nitrogen ASTM D3179 (N)	Oxygen (O)	Water ASTM D3173
7	FR-14 Rich Feed	2.38	2.14	45.97	10.42	2.28	36.81	20.77
8	FL-14 Lean Feed	3.79	0.84	6.79	10.26	0.88	77.44	85.91
9	FE-14 Emulsion Feed	1.94	1.86	26.88	10.64	2.02	56.66	50.72

* Oxygen is obtained by difference = 100-(C+H+N+A+S)

Tested by : A.C. / P.S.(chemist)

Member of ASTM
JS:LN

Approved James Szeto
James Szeto, B.Sc.
Chief Chemist

Petro Laboratories Inc.

1295 Matheson Blvd. East, Mississauga, Ontario, L4W 1R1 Tel: (905) 361-2388 Fax: (905) 361-2411
E-mail: petrolab@gmail.com

QA/QC REPORT

QC/QA - page 1

Ortech Environmental Inc.
804 Southdown Road,
Mississauga, Ontario
L5J 2Y4

Lab no.: 19147- 1 to 9
Report date: Feb 13 , 2022
Sample in: Nov 14, 2022
P.O. no.: 22180-J2866

Attn: Chris Belore, Tina Sanderson

Process Samples : Clean Harbors, Sarnia Ortech Project #22180
Sulfur content - % by weight -test method- ASTM D1552

Lab no.	Sample ID#	Run 1	Run 2	Average	Repeatability
19147-	22-22180				Difference between Run 1 and 2
1	FR-4 Rich feed	1.38	1.56	1.47	0.18
2	FL-4 Lean feed	0.82	0.92	0.87	0.10
3	FE-4 Emulsion feed	1.57	1.75	1.66	0.18
4	FR-9 Rich feed	1.71	1.55	1.63	0.16
5	FL-9 Lean feed	1.05	1.21	1.13	0.16
6	FE-9 Emulsion feed	1.33	1.53	1.43	0.20
7	FR-14 Rich feed	2.23	2.05	2.14	0.18
8	FL-14 Lean feed	0.90	0.78	0.84	0.12
9	FE-14 Emulsion feed	1.77	1.95	1.86	0.18

Tested by : P.S. (chemist)

Approved by James Szeto

James Szeto, B.Sc.
Chief Chemist

Member of ASTM
JS:TL

Petro Laboratories Inc.

1295 Matheson Blvd. East, Mississauga, Ontario, L4W 1R1 Tel: (905) 361-2388 Fax: (905) 361-2411
E-mail: petrolab@gmail.com

QA/QC REPORT

Ortech Environmental Inc.
804 Southdown Road,
Mississauga, Ontario
L5J 2Y4

Lab no.: 19147- 1 to 9
Report date: Nov , 2022
Sample in: Nov 14, 2022
P.O. no.: 22180-J2866

Attn: Chris Belore, Tina Sanderson

Process Samples : Clean Harbors, Sarnia Ortech Project #22180
Ash content - % by weight -test method- ASTM D482

Lab no.	**Sample ID#**	**Run 1**	**Run 2**	**Average**	**Repeatability**
19147-	**22-22180-**				Difference between Run 1 and 2
1	FR-4 Rich feed	**1.18**	**1.40**	**1.29**	**0.22**
2	FL-4 Lean feed	**4.58**	**4.38**	**4.48**	**0.20**
3	FE-4 Emulsion feed	**2.15**	**2.31**	**2.23**	**0.16**
4	FR-9 Rich feed	**1.69**	**1.55**	**1.62**	**0.14**
5	FL-9 Lean feed	**4.98**	**4.74**	**4.86**	**0.24**
6	FE-9 Emulsion feed	**2.23**	**2.43**	**2.33**	**0.20**
7	FR-14 Rich feed	**2.29**	**2.47**	**2.38**	**0.18**
8	FL-14 Lean feed	**3.88**	**3.70**	**3.79**	**0.18**
9	FE-14 Emulsion feed	**2.01**	**1.87**	**1.94**	**0.14**

Tested by : P.S.(chemist)

Member of ASTM
JS:LN

Approved by James Szeto

James Szeto, B.Sc.
Chief Chemist

Petro Laboratories Inc.

1295 Matheson Blvd. East, Mississauga, Ontario, L4W 1R1 Tel: (905) 361-2388 Fax: (905) 361-2411
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QA/QC REPORT

Ortech Environmental Inc.
804 Southdown Road,
Mississauga, Ontario
L5J 2Y4

Lab no.: 19147- 1 to 9
Report date: Feb 13 , 2022
Sample in: Nov 14, 2022
P.O. no.: 22180-J2866

Attn: Chris Belore, Tina Sanderson

Process Samples : Clean Harbors, Sarnia Ortech Project #22180
Carbon content - % by weight -test method- ASTM D3176

Lab no.	Sample ID#	Run 1	Run 2	Average	Repeatability
19147-	**22-22180-**				Difference between Run 1 and 2
1	FR-4 Rich feed	**48.96**	**49.18**	**49.07**	**0.22**
2	FL-4 Lean feed	**7.83**	**7.63**	**7.73**	**0.20**
3	FE-4 Emulsion feed	**32.35**	**32.59**	**32.47**	**0.24**
4	FR-9 Rich feed	**41.30**	**41.08**	**41.19**	**0.22**
5	FL-9 Lean feed	**11.12**	**11.30**	**11.21**	**0.18**
6	FE-9 Emulsion feed	**21.20**	**21.02**	**21.11**	**0.18**
7	FR-14 Rich feed	**45.84**	**46.10**	**45.97**	**0.26**
8	FL-14 Lean feed	**6.88**	**6.70**	**6.79**	**0.18**
9	FE-14 Emulsion feed	**26.20**	**25.96**	**26.88**	**0.24**

Tested by : A.C.(chemist)

Approved by James Szeto

Member of ASTM
JS:LN

James Szeto, B.Sc.
Chief Chemist

Petro Laboratories Inc.
1295 Matheson Blvd. East, Mississauga, Ontario, L4W 1R1 Tel: (905) 361-2388 Fax: (905) 361-2411
E-mail: petrolab@gmail.com

QA/QC REPORT

Ortech Environmental Inc.
804 Southdown Road,
Mississauga, Ontario
L5J 2Y4

Lab no.: 19147- 1 to 9
Report date: Feb 13 , 2022
Sample in: Nov 14, 2022
P.O. no.: 22180-J286605

Attn: Chris Belore, Tina Sanderson

Process Samples : Clean Harbors, Sarnia Ortech Project #22180
Hydrogen content - % by weight -test method- ASTM 3176 (Modified)

Lab no.	Sample ID#	Run 1	Run 2	Average	Repeatability
19147-	**22-22180-**				Difference between Run 1 and 2
1	FR-4 Rich feed	**10.94**	**11.14**	**11.04**	**0.20**
2	FL-4 Lean feed	**9.94**	**9.80**	**9.87**	**0.14**
3	FE-4 Emulsion feed	**10.90**	**11.06**	**10.98**	**0.16**
4	FR-9 Rich feed	**11.14**	**10.92**	**11.03**	**0.22**
5	FL-9 Lean feed	**10.68**	**10.88**	**10.78**	**0.20**
6	FE-9 Emulsion feed	**10.55**	**10.37**	**10.46**	**0.18**
7	FR-14 Rich feed	**10.35**	**10.49**	**10.42**	**0.14**
8	FL-14 Lean feed	**10.34**	**10.18**	**10.26**	**0.16**
9	FE-14 Emulsion feed	**10.52**	**10.76**	**10.64**	**0.24**

Tested by : A.C.(chemist)

Member of ASTM
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Approved by James Szeto

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QA/QC REPORT

Ortech Environmental Inc.
804 Southdown Road,
Mississauga, Ontario
L5J 2Y4

Lab no.: 19147- 1 to 9
Report date: Feb 13 , 2022
Sample in: Nov 14, 2022
P.O. no.: 22180-J2866

Attn: Chris Belore, Tina Sanderson

Process Samples : Clean Harbors, Sarnia Ortech Project #22180
Nitrogen content - % by weight -test method- ASTM 3176 (Modified)

Lab no.	Sample ID#	Run 1	Run 2	Average	Repeatability
19147-	22-22180-				Difference between Run 1 and 2
1	FR-4 Rich feed	**1.40**	**1.54**	**1.47**	**0.14**
2	FL-4 Lean feed	**0.94**	**0.82**	**0.88**	**0.12**
3	FE-4 Emulsion feed	**1.61**	**1.75**	**1.68**	**0.14**
4	FR-9 Rich feed	**1.71**	**1.57**	**1.64**	**0.14**
5	FL-9 Lean feed	**1.10**	**0.98**	**1.04**	**0.12**
6	FE-9 Emulsion feed	**1.31**	**1.45**	**1.38**	**0.14**
7	FR-14 Rich feed	**2.34**	**2.22**	**2.28**	**0.12**
8	FL-14 Lean feed	**0.94**	**0.82**	**0.88**	**0.12**
9	FE-14 Emulsion feed	**1.95**	**2.09**	**2.02**	**0.14**

Tested by : A.C.(chemist)

Member of ASTM
JS:LN

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QA/QC REPORT

Ortech Environmental Inc.
804 Southdown Road,
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L5J 2Y4

Lab no.: 19147- 1 to 9
Report date: Feb 13 , 2022
Sample in: Nov 14, 2022
P.O. no.: 22180 -J2866

Attn: Chris Belore, Tina Sanderson

Process Samples : Clean Harbors, Sarnia Ortech Project #22180
Water content - % by weight -test method- ASTM D3113, D1744

Lab no.	Sample ID#	Run 1	Run 2	Average	Repeatability
19147-	22-22180-				Difference between Run 1 and 2
1	FR-4 Rich feed	**20.88**	**21.20**	**21.04**	**0.32**
2	FL-4 Lean feed	**90.16**	**89.78**	**89.97**	**0.38**
3	FE-4 Emulsion feed	**53.22**	**53.60**	**53.41**	**0.38**
4	FR-9 Rich feed	**37.44**	**37.08**	**37.26**	**0.36**
5	FL-9 Lean feed	**80.01**	**79.61**	**79.81**	**0.40**
6	FE-9 Emulsion feed	**67.52**	**67.90**	**67.71**	**0.38**
7	FR-14 Rich feed	**20.89**	**20.65**	**20.77**	**0.24**
8	FL-14 Lean feed	**86.12**	**85.70**	**85.91**	**0.42**
9	FE-14 Emulsion feed	**50.55**	**50.89**	**50.72**	**0.34**

Tested by : A.C.(chemist)

Member of ASTM
JS: LN

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