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ORTECH
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Report:

Annual Compliance Emission Testing Program at the Clean Harbors Sarnia Incineration Facility (2020)

Date: December 18, 2020



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Version	Date	Summary Changes/Purpose of Revision
1	December 18, 2020	None

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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$^{3(1)}$	3.36 mg/Rm$^{3(1)}$
Mercury	maximum 50 µg/Rm$^{3(1)}$	2.68 µg/Rm$^{3(1)}$
Dioxin and Furan TEQ	maximum 80 pg TEQ/Rm$^{3(1)}$	<1.75 pg TEQ/Rm$^{3(1)}$
Carbon Monoxide	maximum 100 ppm$^{(1)}$	57.4 ppm$^{(1)}$
Oxygen	minimum 8.0 %$^{(2)}$	8.81 %$^{(2)}$
Total Hydrocarbons$^{(3)}$	maximum 100 ppm	18.9 ppm$^{(1)}$
Total Hydrocarbons$^{(4)}$	maximum 100 ppm	11.6 ppm$^{(4)}$
Total Hydrocarbons$^{(5)}$	maximum 100 ppm	22.9 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.

Included as part of the emission testing program was a comprehensive, internal Quality Assurance/Quality Control (QA/QC) program. This report describes both the emission testing program and the internal QA/QC program conducted by ORTECH, and summarizes the results.

The emission testing program was conducted over three days between October 6 and October 8, 2020 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 rich, lean and emulsion feed rates combined were 224.9, 223.1 and 217.5 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.

Also 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 six target principal organic hazardous compounds. The average DREs calculated for the emission testing program were as follows: 2-Butanone (99.9995%), Ethyl Acetate (99.9990%), Tetrachloroethene (99.9951%), Toluene (99.9998%), 1,2,4-Trichlorobenzene (100.0000%) and Total Xylenes (99.9999%). Note that the contribution of the Thermal Desorber Unit was not included in the DRE calculations.

All tables referenced in this report (excluding the internal QA/QC summary tables) are provided in Appendix 1.

Summary results tables for the 2020 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.

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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	0.0462 µg/m^3			
Base Case - 30 Day	1.00 g/s	0.1339 µg/m^3			
Base Case - 24 hour	1.00 g/s	0.4605 µg/m^3			
Base Case - 1 hour	1.00 g/s	1.7176 µg/m^3			
Base Case - 1/2 hour	1.00 g/s	2.0611 µg/m^3			
Particulate matter	0.077 g/s	0.036 µg/m^3	120 µg/m^3	0.030	S
Sulphur dioxide	33.3 g/s	15.3 µg/m^3	275 µg/m^3	5.58	S - 24 hour
Sulphur dioxide	33.3 g/s	57.2 µg/m^3	690 µg/m^3	8.29	S - 1 hour
Nitrogen oxides	3.05 g/s	1.40 µg/m^3	200 µg/m^3	0.70	S - 24 hour
Nitrogen oxides	3.05 g/s	5.24 µg/m^3	400 µg/m^3	1.31	S - 1 hour
Carbon monoxide	1.51 g/s	3.11 µg/m^3	6000 µg/m^3	0.052	S - 1/2 hour
Carbon dioxide	3098 g/s	1427 µg/m^3	255800 µg/m^3	0.56	SL
Hydrogen chloride	1.45 g/s	0.67 µg/m^3	20 µg/m^3	3.34	S
Fluorides (as hydrogen fluoride)	0.24 g/s	0.11 µg/m^3	0.86 µg/m^3	12.9	S - 24 hour
Fluorides (as hydrogen fluoride)	0.24 g/s	0.032 µg/m^3	0.34 µg/m^3	9.45	S - 30 day
Hydrogen bromide	0.32 g/s	0.55 µg/m^3	668 µg/m^3	0.082	G - 1 hour
Hydrogen iodide	<0.010 g/s	0.0046 µg/m^3	0.5 µg/m^3	0.92	SL
Hydrogen cyanide	<0.0098 g/s	0.0045 µg/m^3	8 µg/m^3	0.056	S
Dioxins & Furans (TEQ) *	<0.040 ng TEQ/s	0.000018 pg TEQ/m^3			
Dioxins, Furans and Dioxin-Like PCBs (TEQ) **	0.039 ng TEQ/s	0.000018 pg TEQ/m^3	0.1 pg TEQ/m^3	0.018	S
Benzo(a)Pyrene	0.24 µg/s	0.000000011 µg/m^3	0.00001 µg/m^3	0.11	S - Annual
Biphenyl	1.80 µg/s	0.0000031 µg/m^3	60 µg/m^3	<0.0001	G - 1 hour
2-Chloronaphthalene	<0.055 µg/s	0.000000025 µg/m^3	1 µg/m^3	<0.0001	SL
1-Methylnaphthalene	0.96 µg/s	0.00000044 µg/m^3	35.5 µg/m^3	<0.0001	SL
Naphthalene	12.8 µg/s	0.0000059 µg/m^3	22.5 µg/m^3	<0.0001	G
Quinoline	6.44 µg/s	0.0000030 µg/m^3	0.005 µg/m^3	0.059	SL
Terphenyls (m, o, p)	<0.28 µg/s	0.00000013 µg/m^3	15 µg/m^3	<0.0001	SL
1,2-Dichlorobenzene	0.94 µg/s	0.0000016 µg/m^3	30500 µg/m^3	<0.0001	G - 1 hour
1,3-Dichlorobenzene	3.01 µg/s	0.0000014 µg/m^3	50 µg/m^3	<0.0001	SL
1,4-Dichlorobenzene	1.01 µg/s	0.00000047 µg/m^3	95 µg/m^3	<0.0001	S
1,3,5-Trichlorobenzene	0.12 µg/s	0.000000055 µg/m^3	3.6 µg/m^3	<0.0001	SL
1,2,4-Trichlorobenzene	0.63 µg/s	0.00000029 µg/m^3	400 µg/m^3	<0.0001	G
1,2,3-Trichlorobenzene	0.22 µg/s	0.00000010 µg/m^3	135 µg/m^3	<0.0001	SL
1,2,4,5-Tetrachlorobenzene	0.32 µg/s	0.00000015 µg/m^3	1 µg/m^3	<0.0001	SL
1,2,3,4-Tetrachlorobenzene	<0.092 µg/s	0.000000042 µg/m^3	600 µg/m^3	<0.0001	SL
Pentachlorobenzene	0.15 µg/s	0.000000069 µg/m^3	80 µg/m^3	<0.0001	SL
Hexachlorobenzene	<0.063 µg/s	0.000000029 µg/m^3	0.011 µg/m^3	0.00026	SL
2,4-Dichlorophenol	<0.28 µg/s	0.00000013 µg/m^3	33.5 µg/m^3	<0.0001	SL
2,6-Dichlorophenol	<0.28 µg/s	0.00000013 µg/m^3	19 µg/m^3	<0.0001	SL
2,4,5-Trichlorophenol	<0.28 µg/s	0.00000013 µg/m^3	220 µg/m^3	<0.0001	SL
2,4,6-Trichlorophenol	<0.28 µg/s	0.00000013 µg/m^3	1.5 µg/m^3	<0.0001	SL
2,3,4,6-Tetrachlorophenol	<0.28 µg/s	0.00000013 µg/m^3	0.75 µg/m^3	<0.0001	SL
Pentachlorophenol	<0.28 µg/s	0.00000013 µg/m^3	20 µg/m^3	<0.0001	G
Polychlorinated biphenyls	<4.36 µg/s	0.0000020 µg/m^3	0.15 µg/m^3	0.0013	G
Hexachlorobutadiene	<0.016 µg/s	0.0000000074 µg/m^3	0.225 µg/m^3	<0.0001	SL
Hexachloroethane	<0.055 µg/s	0.000000025 µg/m^3	115 µg/m^3	<0.0001	SL
Heptachlor	<0.014 µg/s	0.0000000064 µg/m^3	0.004 µg/m^3	0.00016	SL
Toxaphene	<0.059 µg/s	0.000000027 µg/m^3	0.015 µg/m^3	0.00018	SL
Hexachlorophene	<0.28 µg/s	0.00000013 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	0.0462 µg/m^3			
Base Case - 30 Day	1.00 g/s	0.1339 µg/m^3			
Base Case - 24 hour	1.00 g/s	0.4605 µg/m^3			
Aluminum	1.75 mg/s	0.00080 µg/m^3	12 µg/m^3	0.0067	SL
Antimony	0.0075 mg/s	0.0000035 µg/m^3	25 µg/m^3	<0.0001	S
Arsenic	0.096 mg/s	0.000044 µg/m^3	0.3 µg/m^3	0.015	G
Barium (as water soluble)	0.12 mg/s	0.000056 µg/m^3	10 µg/m^3	0.00056	G
Beryllium*	<0.00034 mg/s	0.00000016 µg/m^3	0.01 µg/m^3	0.0016	S
Boron	13.0 mg/s	0.0060 µg/m^3	120 µg/m^3	0.0050	S
Cadmium	0.0050 mg/s	0.0000023 µg/m^3	0.025 µg/m^3	0.0092	S
Calcium oxide	5.70 mg/s	0.0026 µg/m^3	10 µg/m^3	0.026	S
Chromium	0.065 mg/s	0.000030 µg/m^3	0.5 µg/m^3	0.0060	G
Cobalt	0.0069 mg/s	0.0000032 µg/m^3	0.1 µg/m^3	0.0032	G
Copper	0.095 mg/s	0.000044 µg/m^3	50 µg/m^3	<0.0001	S
Iron (as metal)	2.83 mg/s	0.0013 µg/m^3	4 µg/m^3	0.033	S
Lead	0.020 mg/s	0.0000093 µg/m^3	0.5 µg/m^3	0.0019	S - 24 hour
Lead	0.020 mg/s	0.0000027 µg/m^3	0.2 µg/m^3	0.0013	S - 30 day
Lithium	0.019 mg/s	0.0000086 µg/m^3	20 µg/m^3	<0.0001	S
Magnesium	0.65 mg/s	0.00030 µg/m^3	72 µg/m^3	0.00041	SL
Manganese (as compounds)	0.15 mg/s	0.000067 µg/m^3	0.4 µg/m^3	0.017	G
Mercury	0.061 mg/s	0.000028 µg/m^3	2 µg/m^3	0.0014	S
Molybdenum	0.090 mg/s	0.000042 µg/m^3	120 µg/m^3	<0.0001	G
Nickel	0.083 mg/s	0.0000038 µg/m^3	0.04 µg/m^3	0.0095	S - Annual
Phosphorus	<0.35 mg/s	0.00016 µg/m^3	0.5 µg/m^3	0.032	SL
Potassium	3.33 mg/s	0.0015 µg/m^3	1 µg/m^3	0.15	SL
Selenium	6.66 mg/s	0.0031 µg/m^3	10 µg/m^3	0.031	G
Silicon	7.15 mg/s	0.0033 µg/m^3	27 µg/m^3	0.012	SL
Silver	<0.00069 mg/s	0.00000032 µg/m^3	1 µg/m^3	<0.0001	S
Sodium hydroxide	33.4 mg/s	0.015 µg/m^3	10 µg/m^3	0.15	G
Strontium	0.039 mg/s	0.000018 µg/m^3	120 µg/m^3	<0.0001	G
Tin	0.18 mg/s	0.000081 µg/m^3	10 µg/m^3	0.00081	S
Titanium	0.48 mg/s	0.00022 µg/m^3	120 µg/m^3	0.00018	S
Vanadium	<0.0035 mg/s	0.0000016 µg/m^3	2 µg/m^3	<0.0001	S
Zinc	0.24 mg/s	0.00011 µg/m^3	120 µg/m^3	<0.0001	S

S - Standard
G - Guideline
SL - Screening Level
* These compounds were not detected in any of the emission samples (all analytical results were <MDL).

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	0.0462 µg/m^3			
Base Case - 24 hour	1.00 g/s	0.4605 µg/m^3			
Base Case - 1 hour	1.00 g/s	1.7176 µg/m^3			
Benzene	0.93 mg/s	0.000043 µg/m^3	0.45 µg/m^3	0.0096	S - Annual
Bromodichloromethane	0.18 mg/s	0.000082 µg/m^3	350 µg/m^3	<0.0001	SL
Bromomethane (methyl bromide)	0.54 mg/s	0.00025 µg/m^3	1350 µg/m^3	<0.0001	G
2-Butanone (methyl ethyl ketone)	0.038 mg/s	0.000018 µg/m^3	1000 µg/m^3	<0.0001	S
Chloroethene (vinyl chloride)	0.0025 mg/s	0.0000011 µg/m^3	1 µg/m^3	0.00011	S
Dibromochloromethane	0.069 mg/s	0.000032 µg/m^3	0.2 µg/m^3	0.016	SL
1,2-Dibromoethane (Ethylene dibromide)	0.0039 mg/s	0.0000018 µg/m^3	3 µg/m^3	<0.0001	G
Dichlorodifluoromethane	0.0015 mg/s	0.00000071 µg/m^3	500000 µg/m^3	<0.0001	G
1,1-Dichloroethane (ethylene dichloride) *	0 mg/s	0 µg/m^3	165 µg/m^3	<0.0001	S
1,1-Dichloroethene*	0 mg/s	0 µg/m^3	10 µg/m^3	<0.0001	S
trans-1,2-Dichloroethene *	0 mg/s	0 µg/m^3	105 µg/m^3	<0.0001	G
Dichloromethane (methylene chloride)	0.21 mg/s	0.000096 µg/m^3	220 µg/m^3	<0.0001	G
1,2-Dichloropropane*	0 mg/s	0 µg/m^3	2400 µg/m^3	<0.0001	G
Ethyl Acetate *	0 mg/s	0 µg/m^3	19000 µg/m^3	<0.0001	G - 1 hour
Ethylbenzene *	0 mg/s	0 µg/m^3	1000 µg/m^3	<0.0001	S
Isopropylbenzene (cumene) *	0 mg/s	0 µg/m^3	400 µg/m^3	<0.0001	S
2-Propanone (acetone)	0.15 mg/s	0.000067 µg/m^3	11880 µg/m^3	<0.0001	S
Styrene	0.029 mg/s	0.000013 µg/m^3	400 µg/m^3	<0.0001	S
Tetrachloroethene (perchloroethylene)	0.053 mg/s	0.000024 µg/m^3	360 µg/m^3	<0.0001	S
Tetrachloromethane (carbon tetrachloride)	0.019 mg/s	0.0000088 µg/m^3	2.4 µg/m^3	0.00037	S
Toluene	0.057 mg/s	0.000026 µg/m^3	2000 µg/m^3	<0.0001	S
Tribromomethane (bromoform)	0.063 mg/s	0.000029 µg/m^3	55 µg/m^3	<0.0001	G
1,1,1-Trichloroethane (methyl chloroform)*	0 mg/s	0 µg/m^3	115000 µg/m^3	<0.0001	S
Trichloroethene	0.023 mg/s	0.000011 µg/m^3	12 µg/m^3	<0.0001	S
Trichlorofluoromethane *	0 mg/s	0 µg/m^3	6000 µg/m^3	<0.0001	G
Trichloromethane (chloroform)	0.054 mg/s	0.000025 µg/m^3	1 µg/m^3	0.0025	S
Trichlorotrifluoroethane*	0 mg/s	0 µg/m^3	800000 µg/m^3	<0.0001	S
1,2,4-Trimethylbenzene (pseudocumene) *	0 mg/s	0 µg/m^3	220 µg/m^3	<0.0001	S
1,3,5-Trimethylbenzene *	0 mg/s	0 µg/m^3	220 µg/m^3	<0.0001	S
Xylenes	0.017 mg/s	0.0000079 µg/m^3	730 µg/m^3	<0.0001	S

S - Standard
G - Guideline
SL - Screening Level

* These compounds were not detected in any of the emission samples (all analytical results were <MDL).

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	
	%	%	%	%	%
2-Butanone	99.9996	99.9997	99.9993	99.9995	0.00024
Ethyl Acetate	99.9991	99.9990	99.9989	99.9990	0.00010
Tetrachloroethene	99.9943	99.9957	99.9953	99.9951	0.00072
Toluene	99.9998	99.9999	99.9998	99.9998	0.000042
Total Xylenes	99.9999	99.9999	99.9999	99.9999	0.0000045
1,2,4-Trichlorobenzene	100.0000	100.0000	100.0000	100.0000	0.0000089

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 1404°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	44.0	0.91	32.1
Lean	167	1.05	3.76
Emulsion	10.5	0.97	15.2
Total	222		

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

The powdered activated carbon (PAC) injection rate during the test program was 11.7 kg/h (25.7 lb/h).

3. EMISSION TESTING PROGRAM

The emission testing program was conducted over three days between October 6 and October 8, 2020 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 1.52 meters at the sampling platform and 1.22 meters at the stack exit. The stack height above grade is 68.6 meters.

Sampling for particulate and 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.

Four tube pairs were collected for each compliance test, 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 fourth 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 DRE compounds. 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 DRE feed compound analysis 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 19, 2020, 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 21, 2020, 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 verified and the appropriate number of sampling points was marked on the sampling probes. The number of sampling points to be used was stated in the Pre-Test Plan as well as the required sampling time per point.

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

- All sampling equipment was cleaned 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 11.5% 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 85-107% of the true value (limit of 80-120%), except for silicon in the nitric acid digest sample and the back half sample.
- One matrix spike (performed as a post digestion spike) was analyzed for this program. All of the results were between 80-117% 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 4.1% 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 87-96% 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 88-99% 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.

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.
- Instrument calibration blank check sample were 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 iodide and hydrogen cyanide, and the results had a relative percent difference of less than 2.5%, 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 100-102% 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 92-102%.

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 61-127%, within the acceptance criteria.

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)	187	187
Moisture by Volume (%)	49.7	49.6
Velocity (m/s)	32.3	31.9
Absolute Pressure (kPa)	99.2	99.2
Carbon Dioxide by Volume (%)*	9.19	9.19
Oxygen by Volume (%)*	8.81	8.81

* 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)	59.0	58.3
Dry Reference Flowrate (Rm^3/s)*	18.9	18.6
Dry Adjusted Flowrate (Rm^3/s)**	23.0	22.8
Wet Reference Flowrate (Rm^3/s)*	37.5	37.0

* 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)	1.31
Dry Reference Concentration (mg/Rm^3)*	4.11
Dry Adjusted Concentration (mg/Rm^3)**	3.36
Wet Reference Concentration (mg/Rm^3)*	2.07
Particulate Emission Rate (g/s)	0.077

* 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, hydrogen fluoride and hydrogen bromide were detected in quantities greater than the detect limit in all three tests. Hydrogen iodide and hydrogen cyanide was not detected in quantities greater than the detection limit in any of the 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)	24.8	4.06	5.45	<0.17	<0.17
Dry Reference Conc. (mg/Rm^3)*	77.6	12.7	16.9	<0.55	<0.51
Dry Adjusted Conc. (mg/Rm^3)**	63.7	10.4	13.9	<0.45	<0.41
Dry Conc. (ppm)	52.1	15.5	5.12	<0.11	<0.46
Emission Rate (g/s)	1.45	0.24	0.32	<0.010	<0.0098

* 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)	52840	25.7	52.1	33.7	36848	568	4.80
Dry Reference Conc. (mg/Rm^3)**	165274	80.5	163	105	115229	1777	15.1
Dry Adjusted Conc. (mg/Rm^3)***	135352	65.7	134	86.3	143873	1457	12.3
Dry Conc. (ppm)	91900	70.3	86.7	85.9	88100	679	11.6*
Emission Rate (g/s)	3098	1.51	3.05	1.97	2160	33.3	0.28

* 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; there was a leak in the sampling line during Test No. 2 so the sampling period was shorter than the isokinetic test period. The gas analysis results are shown 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 (1.75 mg/s), boron (13.0 mg/s), calcium (4.07 mg/s), iron (2.83 mg/s), potassium (3.33 mg/s), selenium (6.66 mg/s), silicon (7.15 mg/s) and sodium (19.2 mg/s). The average sulphur emission rate was 18099 mg/s. All other average metal emission rates, including mercury, were 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 was 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)	1.04
Dry Reference Concentration (µg/Rm^3)*	3.26
Dry Adjusted Concentration (µg/Rm^3)**	2.68
Wet Reference Concentration (µg/Rm^3)*	1.64
Emission Rate (mg/s)	0.061

* 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.

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 dioxin 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 <0.75 ng/s for dioxins and <0.20 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 (<36.6 pg) and in the lab blank (<90.7 pg) were significant compared to the amounts detected in the test trains (from <91.3 to <188 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 (<2.13 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)	<0.68	0.67
Dry Reference Conc. (pg TEQ/Rm^3)**	<2.13	3.19
Dry Adjusted Conc. (pg TEQ/Rm^3)***	<1.75	1.71
Wet Reference Conc. (pg TEQ/Rm^3)**	<1.07	1.05
Emission Rate (ng TEQ/s)	<0.040	0.039

* 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 <4.36 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	4.95
Trichlorobenzenes	0.97
Tetrachlorobenzenes	<0.42
Pentachlorobenzene	0.15
Hexachlorobenzene	<0.063

The total chlorobenzene congener group emission rate averaged <6.55 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	<1.38
Trichlorophenols	<1.65
Tetrachlorophenols	<0.55
Pentachlorophenol	<0.28

The total chlorophenol congener group emission rate averaged <3.85 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 two of the three test samples at a low level just above the reportable detection limit.

All of the blank analyses data 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.

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 <34.4 µg/s with two of the PAH compounds (naphthalene and quinoline) representing approximately 56% of the total PAH emissions.

Table 101 summarizes the lab blank and blank train PAH analysis. Note that the above compounds were 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.

Eighteen compounds out of thirty were detected in quantities greater than the reportable detection limit in at least one of the tests. The average emission rate for each compound was less than 1.0 mg/s.

The total average volatile organic emission rate was 2.43 mg/s for the three tests performed with benzene and bromomethane representing 60% of the total.

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.

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

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.

Equivalent emission data for the DRE compounds (2-butanone, ethyl acetate, tetrachloroethene, toluene, and total xylenes) 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. The total for 1,2,4-trichlorobenzene is also included in these tables but this compound is captured and analyzed in the semi-volatile organic compound (SVOC) test trains. 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 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 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. The average DREs calculated for the emission testing program were as follows: 2-Butanone (99.9995%), Ethyl Acetate (99.9990%), Tetrachloroethene (99.9951%), Toluene (99.9998%), Total Xylenes (99.9999%) and 1,2,4-Trichlorobenzene (100.0000%). Note that although the Thermal Desorber (TDU) Unit was operating during testing the contribution of the TDU feed was not included in the DRE calculations.

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	187	1.22	49.8	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 ($\mu g/m^3/g/s$)
½-hour	2.0611
1-hour	1.7176
24-hour	0.4605
30-day	0.1339
Annual	0.0462

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 sulphur dioxide (8.29% for the 1-hour standard and 5.58% for the 24-hour standard), nitrogen oxides (1.31% for the 1-hour standard), hydrogen chloride (3.34% for the 1-hour standard) and fluorides (12.9% for the 24-hour standard and 9.45% for the 30-day standard.

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 in Appendix 27 as average values for each test and as overall average values for the following process parameters:

- 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

One-minute average values for these process parameters are shown in Appendix 28 (combustion gas concentrations) and in Appendix 29 (other process parameters).

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$^{3(1)}$	3.36 mg/Rm$^{3(1)}$
Mercury	maximum 50 µg/Rm$^{3(1)}$	2.68 µg/Rm$^{3(1)}$
Dioxin and Furan TEQ	maximum 80 pg TEQ/Rm$^{3(1)}$	<1.75 pg TEQ/Rm$^{3(1)}$
Carbon Monoxide	maximum 100 ppm$^{(1)}$	57.4 ppm$^{(1)}$
Oxygen	minimum 8.0 %$^{(2)}$	8.81 %$^{(2)}$
Total Hydrocarbons$^{(3)}$	maximum 100 ppm	18.9 ppm$^{(1)}$
Total Hydrocarbons$^{(4)}$	maximum 100 ppm	11.6 ppm$^{(4)}$
Total Hydrocarbons$^{(5)}$	maximum 100 ppm	22.9 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 a particulate. Although efforts were taken to homogenize the sample, the two replicates may have contained varying amounts of solid. 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 waste feed rates and heating values are contained in Appendix 27. During the emission tests, the rich, lean and emulsion feed rates combined were 224.9, 223.1 and 217.5 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 was not reported by the Clean Harbors laboratory; only total chloride was reported for the tanks used during the test program. However, the total chlorine was less than 2%. The total chlorine content in the individual waste feed streams was as follows:

Test No.	Total Chlorine Content (% w/w)		
	Rich	Lean	Emulsion
1	0.56	0.18	0.32
2	0.59	0.12	0.50
3	0.97	0.28	0.35
Average	0.71	0.19	0.39

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	1.2	0.9	1.0
2	1.3	0.8	1.0
3	1.2	0.9	1.0

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 222 L/min.
- The average total hydrocarbon concentration at the stack was 11.6 ppm (wet basis) for the three tests performed. The average total dry adjusted hydrocarbon concentration in the stack was 18.9 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 3.36 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 2.68 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 (65.7 mg/Rm^3 or 57.4 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 (<1.75 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 8.81%, which is above the minimum 8.0% oxygen criterion.
- The average DREs calculated for the emission testing program were as follows: 2-Butanone (99.9995%), Ethyl Acetate (99.9990%), Tetrachloroethene (99.9951%), Toluene (99.9998%), Total Xylenes (99.9999%) and 1,2,4-Trichlorobenzene (100.0000%). Note that during all tests, the Thermal Desorber Unit (TDU) was exhausting through the incinerator however the contribution of the TDU feed was not included in the DRE calculations.
- The average opacity measurements recorded by Clean Harbors (the test average opacity measurements are all less than 1.3%) are lower than the criterion provided in the Notice of Amendment to the ECA.

REFERENCES

1. "Source Testing Code". Ontario Ministry of the Environment Report No. PIBs-1310e03. June 2010.
2. "Determination of Metals Emissions From Stationary Sources". U. S. Environmental Protection Agency, Method 29. August 2, 2017.
3. "Reference Method for Source Testing: Measurement of Releases of Selected Semi-Volatile Organic Compounds from Stationary Sources". Environment Canada Report EPS 1/RM/2. June, 1989.
4. "Annual Compliance Emission Testing Program at the Clean Harbors Sarnia Incineration Facility", Pre-Test Plan No. 21607, June 17, 2015.
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. January 14, 2019.
6. "Volatile Organic Sampling Train", U. S. Environmental Protection Agency, Method 0030. September, 1986.
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.
8. "Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure)". U.S. Environmental Protection Agency, Method 7E, Federal Register, Part 60, Appendix A. May 21, 2018.
9. "Determination of Sulphur Dioxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)". U.S. Environmental Protection Agency, Method 6C, Federal Register, Part 60, Appendix A. August 2, 2017.
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

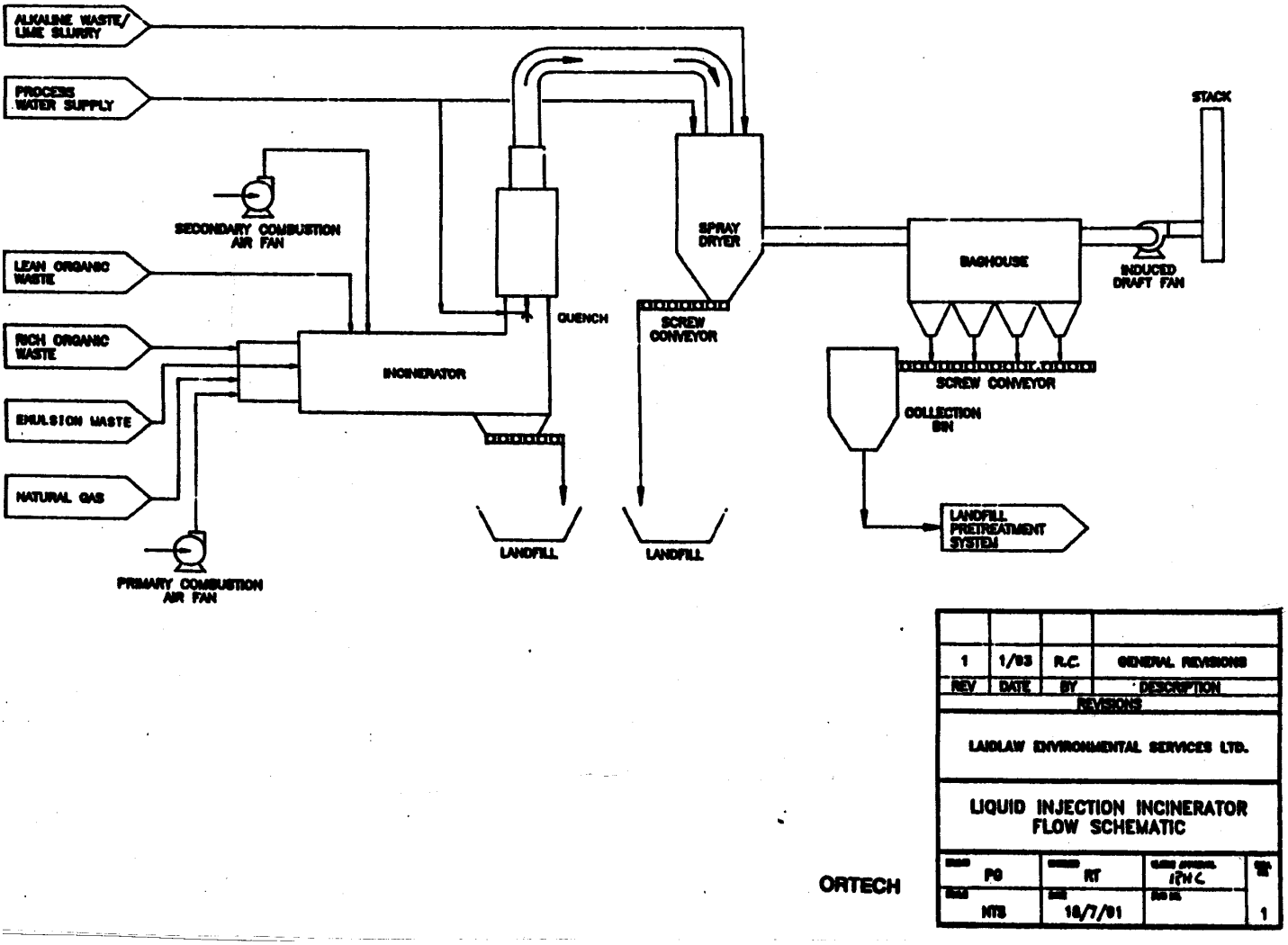


Figure 2
Particulate Matter and Metals Sampling Train

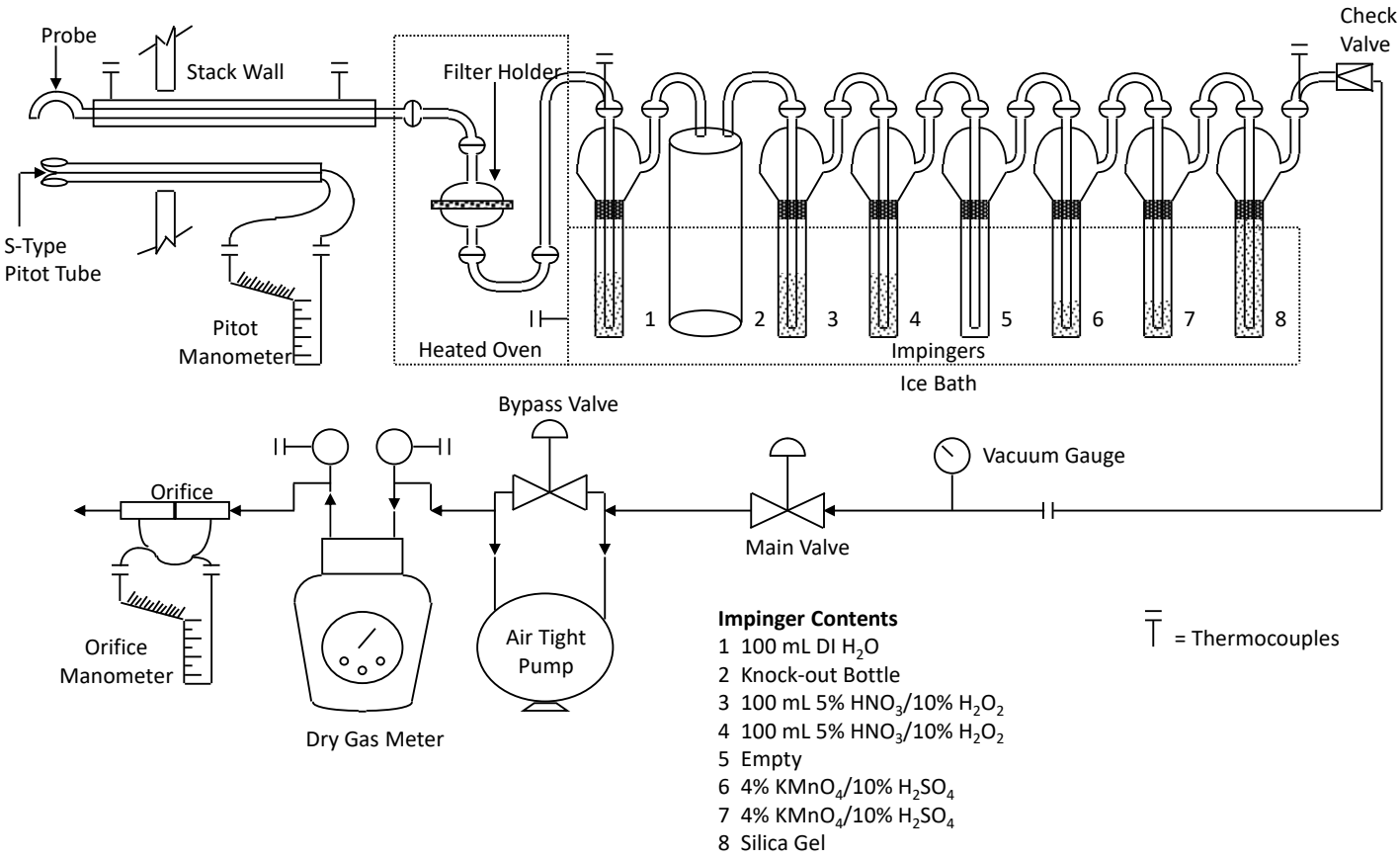
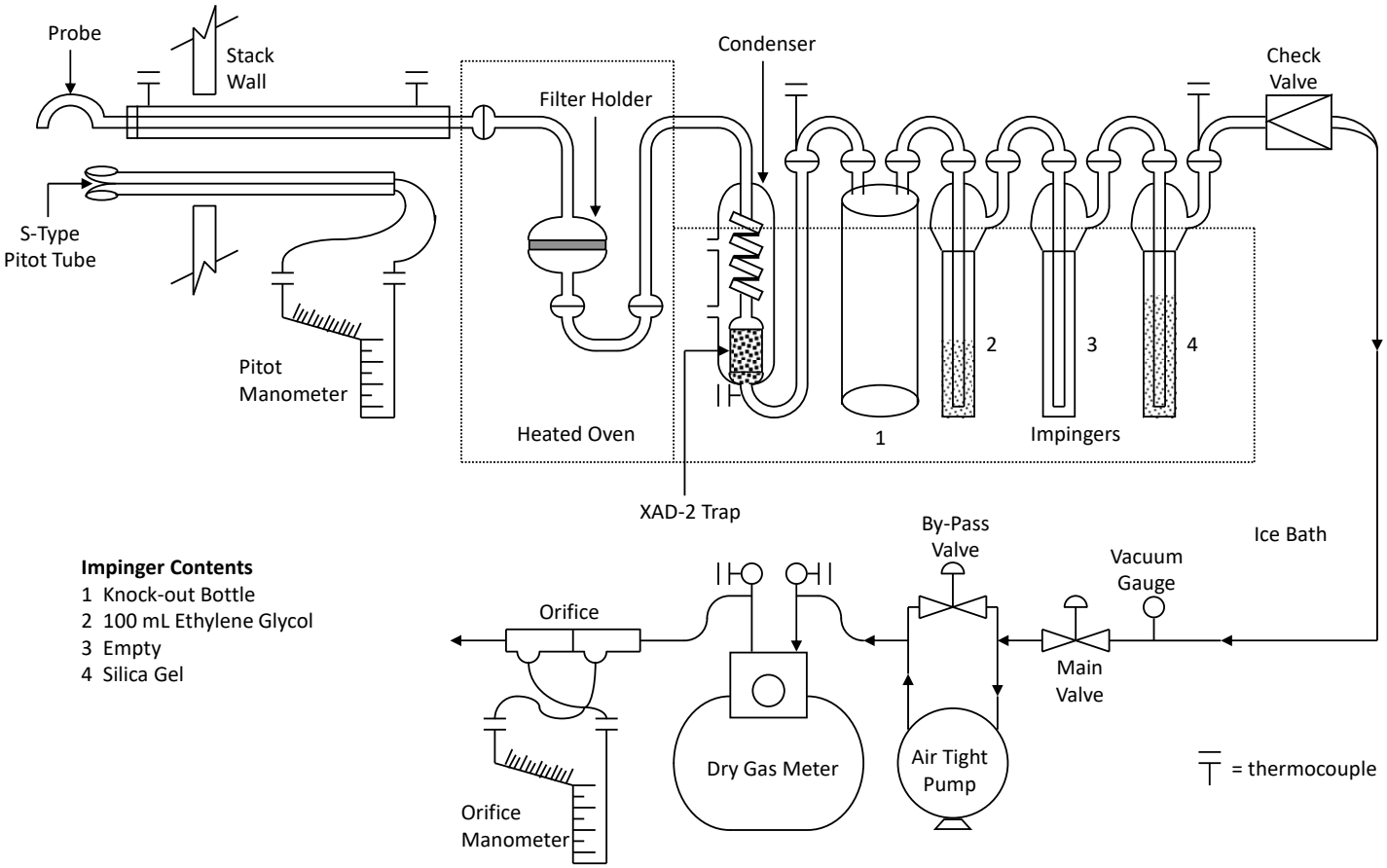


Figure 3
Semi-Volatile Organic Compounds Sampling Train



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

Figure 4
Acid Gases Sampling Train

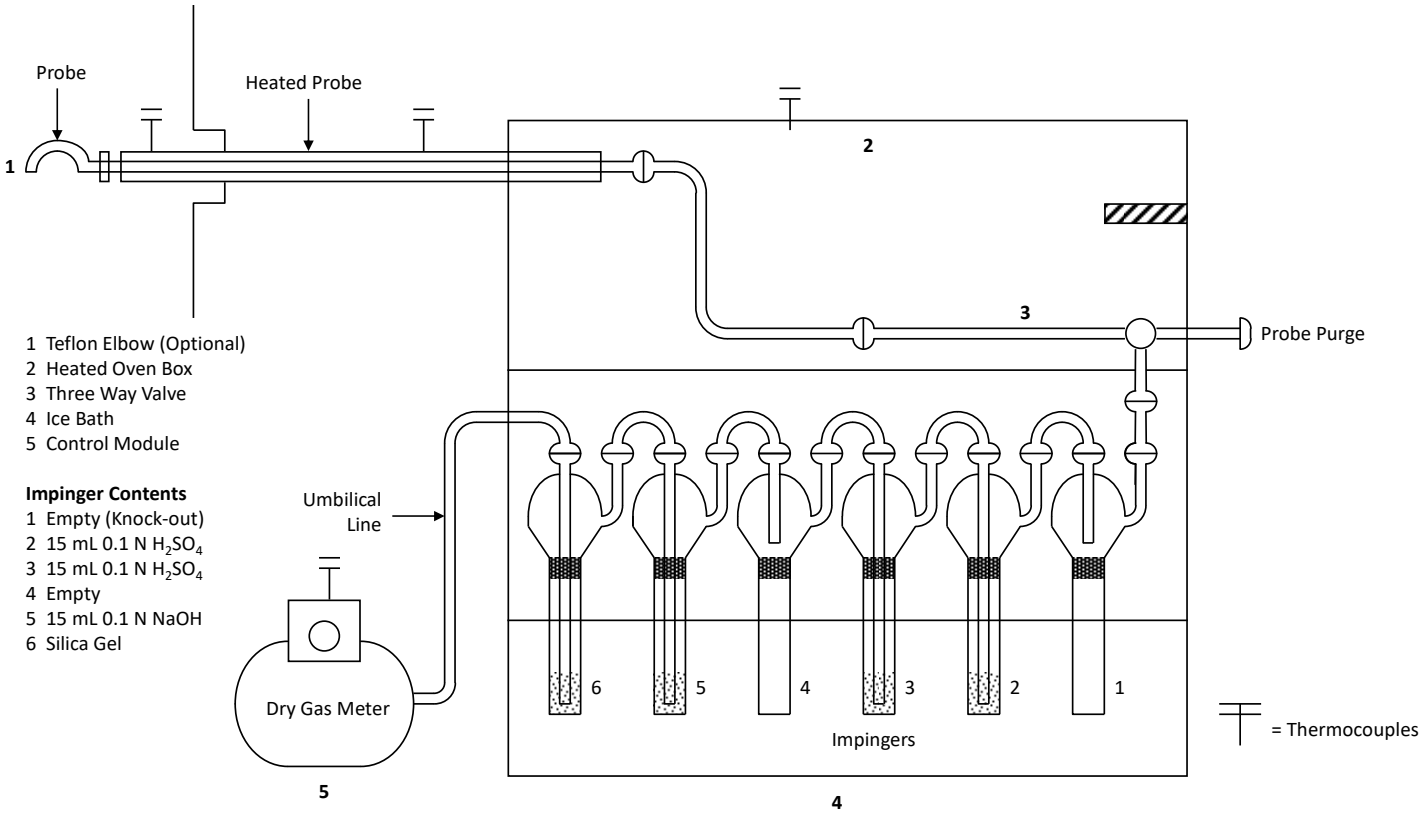


Figure 5
Volatile Organics Sampling Train

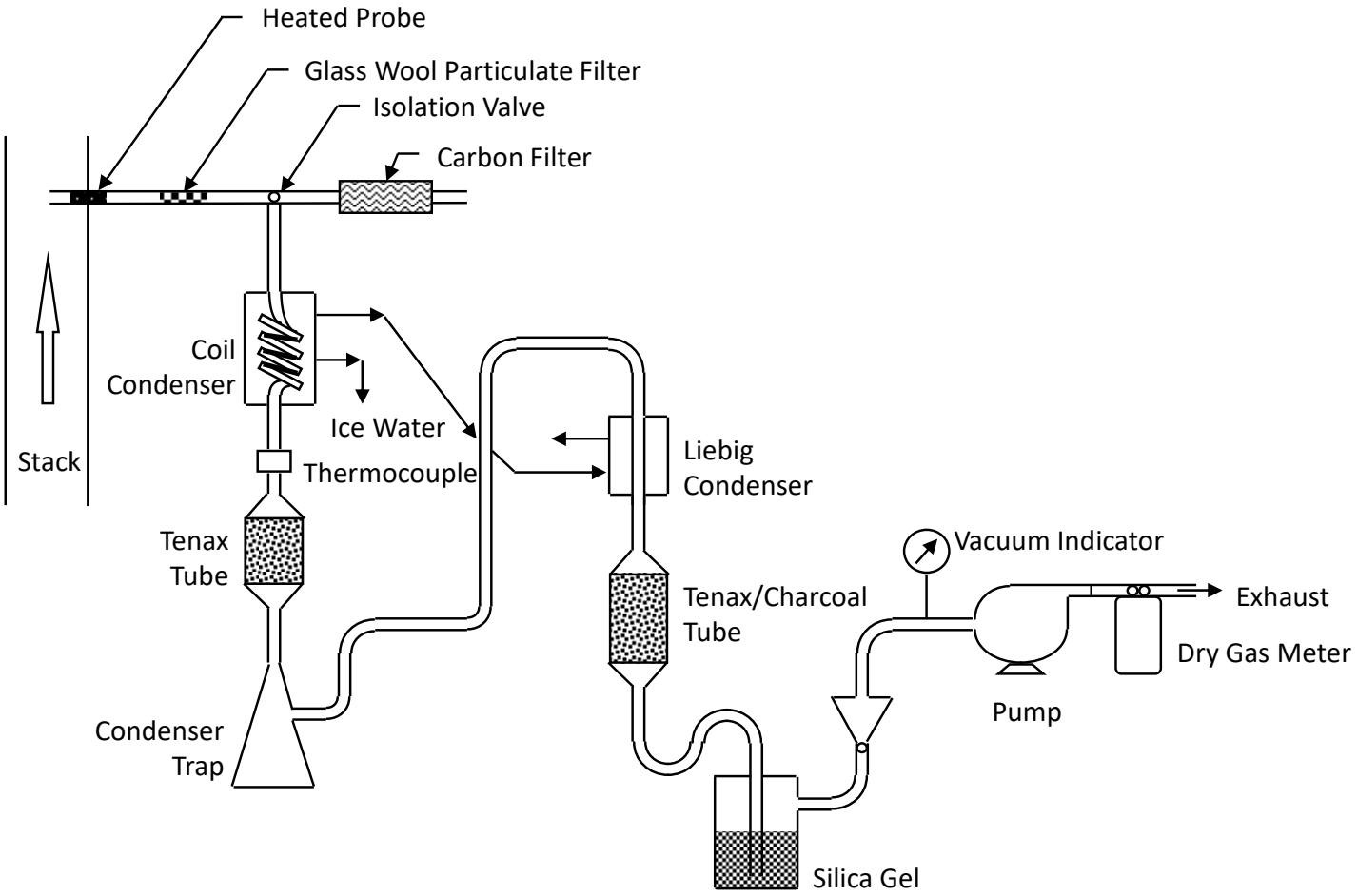
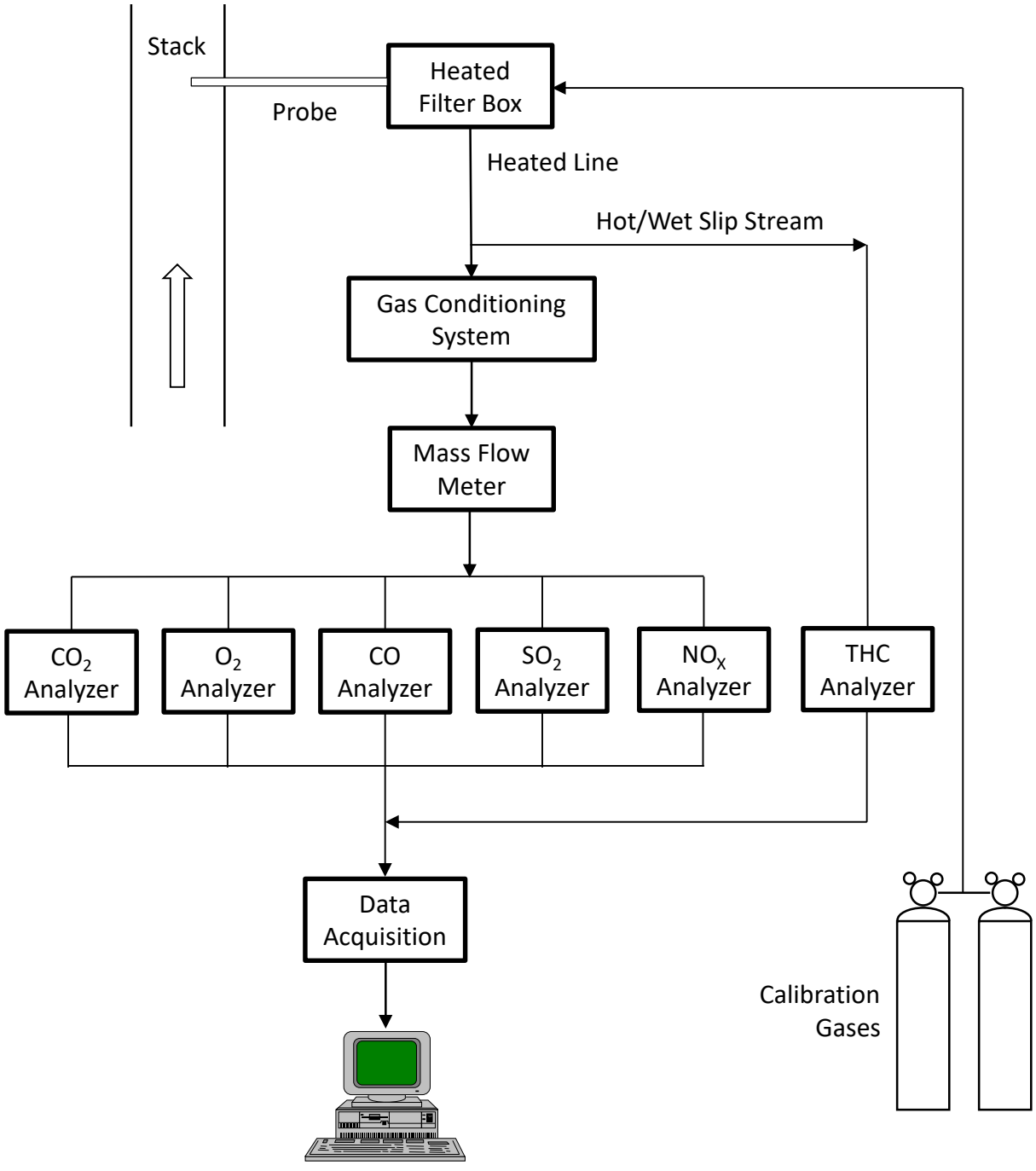


Figure 6
CEM System Schematic



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	2-Butanone (Methyl Ethyl Ketone)
	Ethyl Acetate
	Tetrachloroethene (Perchloroethylene)
	Toluene
	1,2,4-Trichlorobenzene
	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 / >5m^3	Integrated	Modified US EPA Method 29	Gravimetric (MECP Method 5) ICAP, HGAA, CVAA
Semi-Volatile Organics	3	Main Stack	240 minutes / >5m^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	October 6, 2020	10:41	15:39	240
2	October 7, 2020	9:04	14:28	240
3	October 8, 2020	8:37	13:22	240

Semi-Volatile Organics Trains

Test Number	Test Date	Sampling Period		Sampling Time* min
		Start	Finish	
1	October 6, 2020	10:41	15:39	240
2	October 7, 2020	9:04	14:28	240
3	October 8, 2020	8:37	13:22	240

Acid Gases Trains

Test Number	Test Date	Sampling Period		Sampling Time* min
		Start	Finish	
1	October 6, 2020	10:41	11:41	60
2	October 7, 2020	11:00	12:05	65
3	October 8, 2020	8:39	9:39	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 * Start	Finish	Sampling Time min
1	October 6, 2020	10:41	15:32	235
2	October 7, 2020	9:04	14:28	157
3	October 8, 2020	8:37	13:21	242

* 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	October 6, 2020	12:09	12:29	20
1	2	October 6, 2020	12:37	13:07	30
1	3	October 6, 2020	13:48	14:08	20
1	4	October 6, 2020	14:15	14:35	20
2	1	October 7, 2020	9:06	9:26	20
2	2	October 7, 2020	9:33	9:53	20
2	3	October 7, 2020	9:58	10:18	20
2	4	October 7, 2020	10:25	10:45	20
3	1	October 8, 2020	10:00	10:20	20
3	2	October 8, 2020	10:24	10:44	20
3	3	October 8, 2020	11:23	11:43	20
3	4	October 8, 2020	11:47	12:07	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 Rm^3 *	Percentage of Isokineticity %
1	0.848	1.000	6.71	5.726	104.8
2	0.848	1.000	6.71	5.274	106.3
3	0.848	1.000	6.71	5.442	102.7

Semi-Volatile Organics Trains

Test No.	Pitot Tube Coefficient	Dry Gas Meter Factor	Nozzle Diameter mm	Gas Volume Sampled Rm^3 *	Percentage of Isokineticity %
1	0.849	0.999	6.76	5.718	105.6
2	0.849	0.999	6.76	5.297	102.0
3	0.849	0.999	6.76	5.245	99.8

* 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	177	49.6	32.9	99.1	9.22	8.70
2	190	50.7	31.9	98.6	9.31	8.67
3	194	48.7	32.2	100.0	9.04	9.06
Average	187	49.7	32.3	99.2	9.19	8.81

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	177	49.9	32.2	99.1	9.22	8.70
2	189	49.7	31.8	98.6	9.31	8.67
3	194	49.2	31.8	100.0	9.04	9.06
Average	187	49.6	31.9	99.2	9.19	8.81

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	177	49.8	32.6	99.1	9.22	8.70
2	190	50.2	31.9	98.6	9.31	8.67
3	194	49.0	32.0	100.0	9.04	9.06
Average	187	49.6	32.1	99.2	9.19	8.81
Coefficient of Variation, %	4.7	1.3	1.1	0.7	1.5	2.5

* 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	60.0	19.6	24.1	38.9
2	58.2	18.0	22.2	36.5
3	58.8	19.0	22.7	37.1
Average	59.0	18.9	23.0	37.5

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	58.8	19.1	23.5	38.1
2	58.0	18.3	22.6	36.4
3	57.9	18.5	22.1	36.5
Average	58.3	18.6	22.8	37.0

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	59.4	19.3	23.8	38.5
2	58.1	18.2	22.4	36.5
3	58.4	18.8	22.4	36.8
Average	58.6	18.7	22.9	37.2
Coefficient of Variation, %	1.1	3.1	3.5	2.9

* 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			Dry Gas Volume Sampled	Particulate Concentration				Particulate Emission Rate
	Probe Rinse	Main Filter	Total		Actual	Dry Reference	Dry Adjusted	Wet Reference	
	mg	mg	mg	Rm^3*	mg/m^3	mg/Rm^3*	mg/Rm^3**	mg/Rm^3*	g/s
1	4.5	20.3	24.8	5.726	1.41	4.33	3.52	2.18	0.085
2	8.5	15.1	23.6	5.274	1.38	4.48	3.62	2.21	0.081
3	5.4	13.8	19.2	5.442	1.14	3.53	2.95	1.81	0.067
Average					1.31	4.11	3.36	2.07	0.077
Coefficient of Variation, %					11.4	12.4	10.7	10.8	12.0

* 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

Test No.	HCl Collected mg	Dry Volume Sampled Rm^3*	Hydrogen Chloride Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	HCl Emission Rate g/s
1	8.74	0.1365	20.8	64.0	52.0	32.2	1.24
2	8.58	0.1273	21.1	67.4	54.6	33.6	1.22
3	13.2	0.1304	32.5	101	84.7	51.7	1.90
Average			24.8	77.6	63.7	39.1	1.45

Hydrogen Fluoride

Test No.	HF Collected mg	Dry Volume Sampled Rm^3*	Hydrogen Fluoride Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	HF Emission Rate g/s
1	1.40	0.1365	3.34	10.3	8.32	5.15	0.20
2	1.32	0.1273	3.24	10.4	8.40	5.16	0.19
3	2.27	0.1304	5.60	17.4	14.6	8.89	0.33
Average			4.06	12.7	10.4	6.40	0.24

Hydrogen Bromide

Test No.	HBr Collected mg	Dry Volume Sampled Rm^3*	Hydrogen Bromide Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	HBr Emission Rate g/s
1	2.92	0.1365	6.96	21.4	17.4	10.7	0.41
2	0.62	0.1273	1.52	4.88	3.95	2.43	0.089
3	3.19	0.1304	7.86	24.5	20.5	12.5	0.46
Average			5.45	16.9	13.9	8.55	0.32

Hydrogen Iodide

Test No.	HI Collected mg	Dry Volume Sampled Rm^3*	Hydrogen Iodide Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	HI Emission Rate g/s
1	<0.081	0.1365	<0.19	<0.60	<0.48	<0.30	<0.012
2	<0.067	0.1273	<0.16	<0.53	<0.43	<0.26	<0.0096
3	<0.067	0.1304	<0.17	<0.51	<0.43	<0.26	<0.0097
Average			<0.17	<0.55	<0.45	<0.27	<0.010

Hydrogen Cyanide

Test No.	HCN Collected µg	Dry Volume Sampled Rm^3*	Hydrogen Cyanide Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	HCN Emission Rate g/s
1	<208	0.1365	<0.50	<1.52	<1.23	<0.76	<0.029
2	<0.42	0.1273	<0.0010	<0.0033	<0.0026	<0.0016	<0.000059
3	<0.21	0.1304	<0.00051	<0.0016	<0.0013	<0.00081	<0.000030
Average			<0.17	<0.51	<0.41	<0.26	<0.0098

* 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
0.038	<0.0024	10.2

Hydrogen Fluoride

Method Blank Analysis mg	Reagent Blank Analysis mg	Average Analysis of Test No. 1 to No. 3 mg
<0.026	0.0038	1.66

Hydrogen Bromide

Method Blank Analysis mg	Reagent Blank Analysis mg	Average Analysis of Test No. 1 to No. 3 mg
<0.12	<0.0079	2.24

Hydrogen Iodide

Method Blank Analysis mg	Reagent Blank Analysis mg	Average Analysis of Test No. 1 to No. 3 mg
<0.037	<0.0024	<0.072

Hydrogen Cyanide

Method Blank Analysis µg	Reagent Blank Analysis µg	Average Analysis of Test No. 1 to No. 3 µg
<0.21	<0.021	<69.4

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	9.22	77.9	81.6	80.6	8.70	583	7.1
2	9.31	83.7	85.8	84.2	8.67	713	17.4
3	9.04	49.3	92.6	92.9	9.06	742	10.3
Average	9.19	70.3	86.7	85.9	8.81	679	11.6

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	7.48	63.2	66.2	65.4	-	473	11.5
2	7.54	67.8	69.5	68.2	-	577	28.3
3	7.56	41.2	77.4	77.7	-	621	16.9
Average	7.53	57.4	71.0	70.4	-	557	18.9

* 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 Reference**	Dry Concentration by Weight Adjusted ***	Wet Concentration by Weight Actual	Wet Concentration by Weight Reference**	Emission Rate
		ppm	ppm	mg/Rm^3	mg/Rm^3	mg/m^3	mg/Rm^3	g/s
1	Carbon Dioxide	92200	74805	165814	134530	53973	83295	3205
	Carbon Monoxide	77.9	63.2	89.2	72.3	29.0	44.8	1.72
	Nitrogen Oxides ****	81.6	66.2	153	124	49.9	77.1	2.97
	Nitric Oxide	80.6	65.4	98.8	80.2	32.2	49.6	1.91
	Oxygen	87000	110000	113791	143873	37039	57161	2200
	Sulphur Dioxide	583	473	1524	1236	496	765	29.5
	Total Hydrocarbons	7.1 *	11.5	9.24	7.50	3.01	4.64	0.18
2	Carbon Dioxide	93100	75373	167432	135551	52292	83349	3040
	Carbon Monoxide	83.7	67.8	95.8	77.6	29.9	47.7	1.74
	Nitrogen Oxides ****	85.8	69.5	161	131	50.4	80.3	2.93
	Nitric Oxide	84.2	68.2	103	83.6	32.2	51.4	1.87
	Oxygen	86700	110000	113398	143873	35416	56450	2059
	Sulphur Dioxide	713	577	1865	1510	583	928	33.9
	Total Hydrocarbons	17.4 *	28.3	22.9	18.5	7.14	11.4	0.41
3	Carbon Dioxide	90400	75609	162577	135976	52256	82969	3050
	Carbon Monoxide	49.3	41.2	56.4	47.2	18.1	28.8	1.06
	Nitrogen Oxides ****	92.6	77.4	174	146	56.0	88.9	3.27
	Nitric Oxide	92.9	77.7	114	95.3	36.6	58.1	2.14
	Oxygen	90600	110000	118499	143873	38089	60475	2223
	Sulphur Dioxide	742	621	1942	1624	624	991	36.4
	Total Hydrocarbons	10.3 *	16.9	13.2	11.0	4.24	6.74	0.25

* 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 Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	mg/m^3	mg/m^3	mg/m^3	mg/m^3	%
Carbon Dioxide	53973	52292	52256	52840	1.9
Carbon Monoxide	29.0	29.9	18.1	25.7	25.5
Nitrogen Oxides ***	49.9	50.4	56.0	52.1	6.4
Nitric Oxide	32.2	32.2	36.6	33.7	7.6
Oxygen	37039	35416	38089	36848	3.7
Sulphur Dioxide	496	583	624	568	11.5
Total Hydrocarbons	3.01	7.14	4.24	4.80	44.2

Combustion Gas	Dry Reference Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	mg/Rm^3*	mg/Rm^3*	mg/Rm^3*	mg/Rm^3*	%
Carbon Dioxide	165814	167432	162577	165274	1.5
Carbon Monoxide	89.2	95.8	56.4	80.5	26.2
Nitrogen Oxides ***	153	161	174	163	6.4
Nitric Oxide	98.8	103	114	105	7.4
Oxygen	113791	113398	118499	115229	2.5
Sulphur Dioxide	1524	1865	1942	1777	12.5
Total Hydrocarbons	9.24	22.9	13.2	15.1	46.4

Combustion Gas	Dry Adjusted Concentration Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	mg/Rm^3**	mg/Rm^3**	mg/Rm^3**	mg/Rm^3**	%
Carbon Dioxide	134530	135551	135976	135352	0.5
Carbon Monoxide	72.3	77.6	47.2	65.7	24.7
Nitrogen Oxides ***	124	131	146	134	8.1
Nitric Oxide	80.2	83.6	95.3	86.3	9.2
Oxygen	143873	143873	143873	143873	-
Sulphur Dioxide	1236	1510	1624	1457	13.7
Total Hydrocarbons	7.50	18.5	11.0	12.3	45.5

Combustion Gas	Emission Rate Test No. 1	Test No. 2	Test No. 3	Average	Coefficient of Variation
	g/s	g/s	g/s	g/s	%
Carbon Dioxide	3205	3040	3050	3098	3.0
Carbon Monoxide	1.72	1.74	1.06	1.51	25.8
Nitrogen Oxides ***	2.97	2.93	3.27	3.05	6.1
Nitric Oxide	1.91	1.87	2.14	1.97	7.2
Oxygen	2200	2059	2223	2160	4.1
Sulphur Dioxide	29.5	33.9	36.4	33.3	10.6
Total Hydrocarbons	0.18	0.41	0.25	0.28	43.3

* 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	Probe & Filter Hydrofluoric Acid Digest	Impingers & Rinses	Total Collected
	µg	µg	µg	µg
Aluminum *	96.3	181	248	344
Antimony	1.09	1.23	0.20	2.52
Arsenic	20.3	4.71	1.17	26.2
Barium	19.4	14.2	2.56	36.2
Beryllium	<0.2	<0.2	<0.1	<0.10
Boron *	<30	<30	2950	2950
Cadmium	0.31	0.20	0.40	0.90
Calcium *	689	<500	545	1234
Chromium	6.33	5.30	2.01	13.6
Cobalt	0.38	0.74	0.36	1.47
Copper	12.0	14.5	5.28	31.8
Iron	420	557	79.8	1057
Lead	0.86	2.38	1.74	4.98
Lithium	1.41	<0.5	<0.25	1.41
Magnesium *	139	74.9	72.3	211
Manganese	19.5	15.5	10.3	45.3
Mercury **	0.66	0.13	8.97	9.75
Molybdenum	2.39	22.9	0.14	25.4
Nickel	5.47	9.38	3.39	18.2
Phosphorus	105	<100	<25	105
Potassium	781	138	108	1027
Selenium	57.3	17.1	1820	1894
Silicon *	296	-	1700	1996
Silver	<0.20	<0.2	<0.1	<0.20
Sodium *	4290	700	1200	5490
Strontium	5.10	2.31	1.59	9.00
Sulphur	<10000	<10000	4260000	4260000
Tin	5.44	14.1	42.4	61.9
Titanium	55.1	42.6	9.80	108
Vanadium	<1	<1	<0.1	<1.00
Zinc	24.8	31.2	24.1	80.1
Total				<4276786

* 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	Probe & Filter Hydrofluoric Acid Digest	Impingers & Rinses	Total Collected
	µg	µg	µg	µg
Aluminum *	103	173	354	457
Antimony	0.68	0.78	0.17	1.62
Arsenic	18.7	3.00	5.10	26.8
Barium	19.8	11.4	1.67	32.9
Beryllium	<0.2	<0.2	<0.1	<0.10
Boron *	<30	<30	3570	3570
Cadmium	0.64	0.53	0.80	1.96
Calcium *	785	<500	429	1214
Chromium	7.78	4.80	2.25	14.8
Cobalt	0.42	0.68	0.14	1.24
Copper	9.27	13.6	3.78	26.7
Iron	388	350	58.3	796
Lead	0.68	1.78	0.98	3.43
Lithium	6.53	0.58	<0.25	7.11
Magnesium *	136	58.8	55.0	191
Manganese	23.3	12.2	4.62	40.1
Mercury **	0.23	0.034	18.3	18.6
Molybdenum	2.67	24.7	0.19	27.6
Nickel	24.0	9.52	3.66	37.2
Phosphorus	<100	<100	<25	<100
Potassium	966	<100	<100	966
Selenium	52.6	13.4	2650	2716
Silicon *	326	-	275	601
Silver	<0.2	<0.2	<0.1	<0.20
Sodium *	4050	471	1510	5560
Strontium	5.24	1.78	1.35	8.37
Sulphur	<10000	<10000	6020000	6020000
Tin	6.27	9.84	35.2	51.3
Titanium	54.2	28.3	11.4	93.9
Vanadium	<1	<1	<0.1	<1.00
Zinc	19.7	22.3	21.2	63.2
Total				<6036629

* 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	Probe & Filter Hydrofluoric Acid Digest	Impingers & Rinses	Total Collected
	µg	µg	µg	µg
Aluminum *	76.6	178	640	717
Antimony	0.99	1.21	0.20	2.40
Arsenic	14.2	2.74	13.5	30.4
Barium	20.0	15.4	1.62	37.0
Beryllium	<0.2	<0.2	<0.1	<0.10
Boron *	<30	<30	4770	4770
Cadmium	0.48	0.54	0.46	1.47
Calcium *	626	<500	477	1103
Chromium	12.7	13.8	1.85	28.4
Cobalt	0.75	2.50	<0.1	3.25
Copper	7.66	14.2	2.59	24.5
Iron	214	330	71.0	615
Lead	1.29	6.99	0.78	9.06
Lithium	5.61	1.26	0.86	7.73
Magnesium *	113	60.8	49.9	163
Manganese	21.4	16.6	3.81	41.8
Mercury **	0.34	0.076	24.3	24.7
Molybdenum	2.15	23.2	0.24	25.6
Nickel	5.35	8.57	2.77	16.7
Phosphorus	<100	<100	<25	<100
Potassium	789	125	<100	914
Selenium	24.8	9.27	1180	1214
Silicon *	233	-	3370	3603
Silver	<0.2	<0.2	<0.1	<0.20
Sodium *	3620	538	2050	5670
Strontium	9.43	5.46	1.24	16.1
Sulphur	<10000	<10000	5490000	5490000
Tin	5.66	8.40	26.4	40.5
Titanium	118	85.2	11.8	215
Vanadium	1.05	<1	<0.1	1.05
Zinc	22.1	24.6	20.5	67.2
Total				<5509462

* 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	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	µg	µg/m³	µg/Rm³*	µg/Rm³**	µg/Rm³*	mg/s
Aluminum	344	19.6	60.1	48.9	30.3	1.18
Antimony	2.52	0.14	0.44	0.36	0.22	0.0086
Arsenic	26.2	1.49	4.57	3.72	2.30	0.090
Barium	36.2	2.06	6.32	5.14	3.18	0.12
Beryllium	<0.10	<0.0057	<0.017	<0.014	<0.0088	<0.00034
Boron	2950	168	515	419	260	10.1
Cadmium	0.90	0.052	0.16	0.13	0.080	0.0031
Calcium	1234	70.4	216	175	109	4.22
Chromium	13.6	0.78	2.38	1.94	1.20	0.047
Cobalt	1.47	0.084	0.26	0.21	0.13	0.0050
Copper	31.8	1.81	5.55	4.51	2.80	0.11
Iron	1057	60.3	185	150	93.0	3.62
Lead	4.98	0.28	0.87	0.71	0.44	0.017
Lithium	1.41	0.080	0.25	0.20	0.12	0.0048
Magnesium	211	12.1	36.9	30.0	18.6	0.72
Manganese	45.3	2.58	7.91	6.43	3.99	0.16
Mercury	9.75	0.56	1.70	1.39	0.86	0.033
Molybdenum	25.4	1.45	4.44	3.61	2.24	0.087
Nickel	18.2	1.04	3.19	2.59	1.61	0.062
Phosphorus	105	5.99	18.3	14.9	9.24	0.36
Potassium	1027	58.6	179	146	90.4	3.52
Selenium	1894	108	331	269	167	6.48
Silicon	1996	114	349	283	176	6.83
Silver	<0.20	<0.011	<0.035	<0.028	<0.018	<0.00068
Sodium	5490	313	959	780	483	18.8
Strontium	9.00	0.51	1.57	1.28	0.79	0.031
Sulphur	4260000	243032	743975	605058	374856	14582
Tin	61.9	3.53	10.8	8.80	5.45	0.21
Titanium	108	6.13	18.8	15.3	9.46	0.37
Vanadium	<1.00	<0.057	<0.17	<0.14	<0.088	<0.0034
Zinc	80.1	4.57	14.0	11.4	7.05	0.27
Total	<4276786	<243989	<746906	<607443	<376333	<14639

Dry Gas Volume Sampled (Rm³*) :	5.726
Actual Flowrate (m³/s) :	60.0
Dry Reference Flowrate (Rm³/s*) :	19.6
Dry Adjusted Flowrate (Rm³/s**) :	24.1
Wet Reference Flowrate (Rm³/s*) :	38.9

* 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	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	µg	µg/m³	µg/Rm³*	µg/Rm³**	µg/Rm³*	mg/s
Aluminum	457	26.8	86.7	70.3	42.7	1.56
Antimony	1.62	0.095	0.31	0.25	0.15	0.0055
Arsenic	26.8	1.57	5.08	4.12	2.51	0.091
Barium	32.9	1.93	6.23	5.05	3.07	0.11
Beryllium	<0.10	<0.0059	<0.019	<0.015	<0.0094	<0.00034
Boron	3570	209	677	549	334	12.2
Cadmium	1.96	0.12	0.37	0.30	0.18	0.0067
Calcium	1214	71.2	230	187	114	4.14
Chromium	14.8	0.87	2.81	2.28	1.39	0.051
Cobalt	1.24	0.073	0.24	0.19	0.12	0.0042
Copper	26.7	1.56	5.05	4.10	2.49	0.091
Iron	796	46.7	151	122	74.5	2.72
Lead	3.43	0.20	0.65	0.53	0.32	0.012
Lithium	7.11	0.42	1.35	1.09	0.66	0.024
Magnesium	191	11.2	36.2	29.4	17.9	0.65
Manganese	40.1	2.35	7.61	6.17	3.75	0.14
Mercury	18.6	1.09	3.52	2.86	1.74	0.063
Molybdenum	27.6	1.62	5.23	4.24	2.58	0.094
Nickel	37.2	2.18	7.05	5.72	3.48	0.13
Phosphorus	<100	<5.86	<19.0	<15.4	<9.35	<0.34
Potassium	966	56.6	183	149	90.3	3.30
Selenium	2716	159	515	418	254	9.27
Silicon	601	35.2	114	92.4	56.2	2.05
Silver	<0.20	<0.012	<0.038	<0.031	<0.019	<0.00068
Sodium	5560	326	1054	855	520	19.0
Strontium	8.37	0.49	1.59	1.29	0.78	0.029
Sulphur	6020000	353025	1141449	925499	562906	20546
Tin	51.3	3.01	9.73	7.89	4.80	0.18
Titanium	93.9	5.51	17.8	14.4	8.78	0.32
Vanadium	<1.00	<0.059	<0.19	<0.15	<0.094	<0.0034
Zinc	63.2	3.71	12.0	9.72	5.91	0.22
Total	<6036629	<354001	<1144602	<928055	<564461	<20603

Dry Gas Volume Sampled (Rm^3*) :	5.274
Actual Flowrate (m^3/s) :	58.2
Dry Reference Flowrate (Rm^3/s*) :	18.0
Dry Adjusted Flowrate (Rm^3/s**) :	22.2
Wet Reference Flowrate (Rm^3/s*) :	36.5

* 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	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	µg	µg/m³	µg/Rm³*	µg/Rm³**	µg/Rm³*	mg/s
Aluminum	717	42.5	132	110	67.4	2.50
Antimony	2.40	0.14	0.44	0.37	0.23	0.0084
Arsenic	30.4	1.81	5.59	4.68	2.86	0.11
Barium	37.0	2.20	6.80	5.69	3.48	0.13
Beryllium	<0.10	<0.0059	<0.018	<0.015	<0.0094	<0.00035
Boron	4770	283	877	734	449	16.7
Cadmium	1.47	0.088	0.27	0.23	0.14	0.0051
Calcium	1103	65.5	203	170	104	3.85
Chromium	28.4	1.68	5.21	4.36	2.67	0.099
Cobalt	3.25	0.19	0.60	0.50	0.31	0.011
Copper	24.5	1.45	4.49	3.76	2.30	0.085
Iron	615	36.5	113	94.6	57.9	2.15
Lead	9.06	0.54	1.67	1.39	0.85	0.032
Lithium	7.73	0.46	1.42	1.19	0.73	0.027
Magnesium	163	9.67	29.9	25.1	15.3	0.57
Manganese	41.8	2.48	7.68	6.43	3.93	0.15
Mercury	24.7	1.47	4.54	3.80	2.32	0.086
Molybdenum	25.6	1.52	4.70	3.94	2.41	0.089
Nickel	16.7	0.99	3.07	2.57	1.57	0.058
Phosphorus	<100	<5.94	<18.4	<15.4	<9.41	<0.35
Potassium	914	54.3	168	141	86.0	3.19
Selenium	1214	72.1	223	187	114	4.24
Silicon	3603	214	662	554	339	12.6
Silver	<0.20	<0.012	<0.037	<0.031	<0.019	<0.00070
Sodium	5670	337	1042	872	534	19.8
Strontium	16.1	0.96	2.96	2.48	1.52	0.056
Sulphur	5490000	325979	1008820	844387	516647	19168
Tin	40.5	2.40	7.43	6.22	3.81	0.14
Titanium	215	12.8	39.5	33.1	20.2	0.75
Vanadium	1.05	0.062	0.19	0.16	0.099	0.0037
Zinc	67.2	3.99	12.3	10.3	6.32	0.23
Total	<5509462	<327135	<1012396	<847380	<518478	<19236

Dry Gas Volume Sampled (Rm³*) :	5.442
Actual Flowrate (m³/s) :	58.8
Dry Reference Flowrate (Rm³/s*) :	19.0
Dry Adjusted Flowrate (Rm³/s**) :	22.7
Wet Reference Flowrate (Rm³/s*) :	37.1

* 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				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	µg/m³	µg/m³	µg/m³	µg/m³	%
Aluminum	19.6	26.8	42.5	29.7	39.5
Antimony	0.14	0.095	0.14	0.13	21.8
Arsenic	1.49	1.57	1.81	1.62	10.1
Barium	2.06	1.93	2.20	2.06	6.6
Beryllium	<0.0057	<0.0059	<0.0059	<0.0058	2.0
Boron	168	209	283	220	26.4
Cadmium	0.052	0.12	0.088	0.085	37.6
Calcium	70.4	71.2	65.5	69.0	4.5
Chromium	0.78	0.87	1.68	1.11	44.9
Cobalt	0.084	0.073	0.19	0.12	56.9
Copper	1.81	1.56	1.45	1.61	11.5
Iron	60.3	46.7	36.5	47.8	24.9
Lead	0.28	0.20	0.54	0.34	51.4
Lithium	0.080	0.42	0.46	0.32	65.1
Magnesium	12.1	11.2	9.67	11.0	11.0
Manganese	2.58	2.35	2.48	2.47	4.7
Mercury	0.56	1.09	1.47	1.04	44.1
Molybdenum	1.45	1.62	1.52	1.53	5.4
Nickel	1.04	2.18	0.99	1.40	47.9
Phosphorus	5.99	<5.86	<5.94	<5.93	1.1
Potassium	58.6	56.6	54.3	56.5	3.8
Selenium	108	159	72.1	113	38.7
Silicon	114	35.2	214	121	74.0
Silver	<0.011	<0.012	<0.012	<0.012	2.0
Sodium	313	326	337	325	3.6
Strontium	0.51	0.49	0.96	0.65	40.3
Sulphur	243032	353025	325979	307345	18.6
Tin	3.53	3.01	2.40	2.98	19.0
Titanium	6.13	5.51	12.8	8.1	49.4
Vanadium	<0.057	<0.059	0.062	<0.059	4.6
Zinc	4.57	3.71	3.99	4.09	10.8
Total	<243989	<354001	<327135	<308375	18.6

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	60.1	86.7	132	92.8	39.0
Antimony	0.44	0.31	0.44	0.40	19.4
Arsenic	4.57	5.08	5.59	5.08	10.0
Barium	6.32	6.23	6.80	6.45	4.8
Beryllium	<0.017	<0.019	<0.018	<0.018	4.1
Boron	515	677	877	690	26.2
Cadmium	0.16	0.37	0.27	0.27	40.1
Calcium	216	230	203	216	6.4
Chromium	2.38	2.81	5.21	3.47	43.9
Cobalt	0.26	0.24	0.60	0.36	55.8
Copper	5.55	5.05	4.49	5.03	10.5
Iron	185	151	113	150	23.9
Lead	0.87	0.65	1.67	1.06	50.3
Lithium	0.25	1.35	1.42	1.00	65.5
Magnesium	36.9	36.2	29.9	34.4	11.2
Manganese	7.91	7.61	7.68	7.73	2.0
Mercury	1.70	3.52	4.54	3.26	44.1
Molybdenum	4.44	5.23	4.70	4.79	8.3
Nickel	3.19	7.05	3.07	4.43	51.1
Phosphorus	18.3	<19.0	<18.4	<18.6	1.9
Potassium	179	183	168	177	4.5
Selenium	331	515	223	356	41.4
Silicon	349	114	662	375	73.4
Silver	<0.035	<0.038	<0.037	<0.037	4.1
Sodium	959	1054	1042	1018	5.1
Strontium	1.57	1.59	2.96	2.04	39.2
Sulphur	743975	1141449	1008820	964748	21.0
Tin	10.8	9.73	7.43	9.33	18.5
Titanium	18.8	17.8	39.5	25.4	48.3
Vanadium	<0.17	<0.19	0.19	<0.19	5.2
Zinc	14.0	12.0	12.3	12.8	8.4
Total	<746906	<1144602	<1012396	<967968	20.9

* 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/Rm³*	µg/Rm³*	µg/Rm³*	µg/Rm³*	%
Aluminum	48.9	70.3	110	76.5	40.7
Antimony	0.36	0.25	0.37	0.33	20.3
Arsenic	3.72	4.12	4.68	4.17	11.6
Barium	5.14	5.05	5.69	5.29	6.6
Beryllium	<0.014	<0.015	<0.015	<0.015	4.5
Boron	419	549	734	567	27.9
Cadmium	0.13	0.30	0.23	0.22	39.7
Calcium	175	187	170	177	4.9
Chromium	1.94	2.28	4.36	2.86	45.9
Cobalt	0.21	0.19	0.50	0.30	57.8
Copper	4.51	4.10	3.76	4.12	9.2
Iron	150	122	94.6	122	22.7
Lead	0.71	0.53	1.39	0.88	52.2
Lithium	0.20	1.09	1.19	0.83	65.9
Magnesium	30.0	29.4	25.1	28.1	9.6
Manganese	6.43	6.17	6.43	6.34	2.4
Mercury	1.39	2.86	3.80	2.68	45.4
Molybdenum	3.61	4.24	3.94	3.93	8.0
Nickel	2.59	5.72	2.57	3.62	50.0
Phosphorus	14.9	<15.4	<15.4	<15.2	1.8
Potassium	146	149	141	145	2.8
Selenium	269	418	187	291	40.2
Silicon	283	92.4	554	310	74.8
Silver	<0.028	<0.031	<0.031	<0.030	4.5
Sodium	780	855	872	836	5.9
Strontium	1.28	1.29	2.48	1.68	41.1
Sulphur	605058	925499	844387	791648	21.0
Tin	8.80	7.89	6.22	7.64	17.1
Titanium	15.3	14.4	33.1	20.9	50.3
Vanadium	<0.14	<0.15	0.16	<0.15	6.4
Zinc	11.4	9.72	10.3	10.5	8.0
Total	<607443	<928055	<847380	<794293	21.0

* 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/Rm³*	µg/Rm³*	µg/Rm³*	µg/Rm³*	%
Aluminum	30.3	42.7	67.4	46.8	40.4
Antimony	0.22	0.15	0.23	0.20	20.9
Arsenic	2.30	2.51	2.86	2.56	11.1
Barium	3.18	3.07	3.48	3.25	6.5
Beryllium	<0.0088	<0.0094	<0.0094	<0.0092	3.7
Boron	260	334	449	347	27.5
Cadmium	0.080	0.18	0.14	0.13	38.9
Calcium	109	114	104	109	4.5
Chromium	1.20	1.39	2.67	1.75	45.6
Cobalt	0.13	0.12	0.31	0.18	57.6
Copper	2.80	2.49	2.30	2.53	9.9
Iron	93.0	74.5	57.9	75.1	23.4
Lead	0.44	0.32	0.85	0.54	52.0
Lithium	0.12	0.66	0.73	0.51	65.6
Magnesium	18.6	17.9	15.3	17.3	9.9
Manganese	3.99	3.75	3.93	3.89	3.2
Mercury	0.86	1.74	2.32	1.64	45.0
Molybdenum	2.24	2.58	2.41	2.41	7.0
Nickel	1.61	3.48	1.57	2.22	49.2
Phosphorus	9.24	<9.35	<9.41	<9.33	0.9
Potassium	90.4	90.3	86.0	88.9	2.8
Selenium	167	254	114	178	39.6
Silicon	176	56.2	339	190	74.6
Silver	<0.018	<0.019	<0.019	<0.018	3.7
Sodium	483	520	534	512	5.1
Strontium	0.79	0.78	1.52	1.03	40.9
Sulphur	374856	562906	516647	484803	20.2
Tin	5.45	4.80	3.81	4.69	17.7
Titanium	9.46	8.78	20.2	12.8	50.1
Vanadium	<0.088	<0.094	0.099	<0.093	5.8
Zinc	7.05	5.91	6.32	6.43	9.0
Total	<376333	<564461	<518478	<486424	20.2

* At 25°C and 1 atmosphere

TABLE 32
Clean Harbors Sarnia
Summary of Metal Emission Rates

Metal	Emission Rate				Coefficient of Variation
	Test No. 1 mg/s	Test No. 2 mg/s	Test No. 3 mg/s	Average mg/s	%
Aluminum	1.18	1.56	2.50	1.75	39.0
Antimony	0.0086	0.0055	0.0084	0.0075	22.8
Arsenic	0.090	0.091	0.11	0.096	9.5
Barium	0.12	0.11	0.13	0.12	7.2
Beryllium	<0.00034	<0.00034	<0.00035	<0.00034	1.2
Boron	10.1	12.2	16.7	13.0	25.8
Cadmium	0.0031	0.0067	0.0051	0.0050	36.3
Calcium	4.22	4.14	3.85	4.07	4.8
Chromium	0.047	0.051	0.099	0.065	44.5
Cobalt	0.0050	0.0042	0.011	0.0069	56.6
Copper	0.11	0.091	0.085	0.095	12.9
Iron	3.62	2.72	2.15	2.83	26.2
Lead	0.017	0.012	0.032	0.020	51.2
Lithium	0.0048	0.024	0.027	0.019	64.6
Magnesium	0.72	0.65	0.57	0.65	11.9
Manganese	0.16	0.14	0.15	0.15	6.2
Mercury	0.033	0.063	0.086	0.061	43.4
Molybdenum	0.087	0.094	0.089	0.090	4.0
Nickel	0.062	0.13	0.058	0.083	46.6
Phosphorus	0.36	<0.34	<0.35	<0.35	2.6
Potassium	3.52	3.30	3.19	3.33	5.0
Selenium	6.48	9.27	4.24	6.66	37.8
Silicon	6.83	2.05	12.6	7.15	73.7
Silver	<0.00068	<0.00068	<0.00070	<0.00069	1.2
Sodium	18.8	19.0	19.8	19.2	2.8
Strontium	0.031	0.029	0.056	0.039	40.0
Sulphur	14582	20546	19168	18099	17.3
Tin	0.21	0.18	0.14	0.18	20.1
Titanium	0.37	0.32	0.75	0.48	49.2
Vanadium	<0.0034	<0.0034	0.0037	<0.0035	4.1
Zinc	0.27	0.22	0.23	0.24	12.4
Total	<14639	<20603	<19236	<18159	17.2

TABLE 33
Clean Harbors Sarnia
Summary of Metal Emission Data

Metal	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	µg/m³	µg/Rm³*	µg/Rm³**	µg/Rm³*	mg/s
Aluminum	29.7	92.8	76.5	46.8	1.75
Antimony	0.13	0.40	0.33	0.20	0.0075
Arsenic	1.62	5.08	4.17	2.56	0.096
Barium	2.06	6.45	5.29	3.25	0.12
Beryllium	<0.0058	<0.018	<0.015	<0.0092	<0.00034
Boron	220	690	567	347	13.0
Cadmium	0.085	0.27	0.22	0.13	0.0050
Calcium	69.0	216	177	109	4.07
Chromium	1.11	3.47	2.86	1.75	0.065
Cobalt	0.12	0.36	0.30	0.18	0.0069
Copper	1.61	5.03	4.12	2.53	0.095
Iron	47.8	150	122	75.1	2.83
Lead	0.34	1.06	0.88	0.54	0.020
Lithium	0.32	1.00	0.83	0.51	0.019
Magnesium	11.0	34.4	28.1	17.3	0.65
Manganese	2.47	7.73	6.34	3.89	0.15
Mercury	1.04	3.26	2.68	1.64	0.061
Molybdenum	1.53	4.79	3.93	2.41	0.090
Nickel	1.40	4.43	3.62	2.22	0.083
Phosphorus	<5.93	<18.6	<15.2	<9.33	<0.35
Potassium	56.5	177	145	88.9	3.33
Selenium	113	356	291	178	6.66
Silicon	121	375	310	190	7.15
Silver	<0.012	<0.037	<0.030	<0.018	<0.00069
Sodium	325	1018	836	512	19.2
Strontium	0.65	2.04	1.68	1.03	0.039
Sulphur	307345	964748	791648	484803	18099
Tin	2.98	9.33	7.64	4.69	0.18
Titanium	8.1	25.4	20.9	12.8	0.48
Vanadium	<0.059	<0.19	<0.15	<0.093	<0.0035
Zinc	4.09	12.8	10.5	6.43	0.24
Total	<308375	<967968	<794293	<486424	<18159

* 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	142	16.0	16.0
Antimony	<0.2	<0.2	<0.1	<0.20
Arsenic	<1	<1	<0.2	<1.00
Barium	<5	<5	1.21	1.21
Beryllium	<0.2	<0.2	<0.1	<0.20
Boron *	<30	<30	41.9	41.9
Cadmium	<0.1	<0.1	0.21	0.21
Calcium *	<500	<500	318	318
Chromium	<1	2.41	0.78	3.19
Cobalt	<0.2	<0.2	0.15	0.15
Copper	1.07	5.91	2.88	9.86
Iron	<200	<200	31.2	31.2
Lead	<0.5	<0.5	1.04	1.04
Lithium	<0.5	<0.5	0.59	0.59
Magnesium *	13.4	32.0	43.0	56.4
Manganese	1.48	1.20	14.0	16.7
Mercury **	<0.015	<0.015	0.82	0.82
Molybdenum	<0.2	23.1	<0.1	23.1
Nickel	0.88	2.35	4.02	7.25
Phosphorus	<100	<100	<25	<100
Potassium	<100	<100	<100	<100
Selenium	<2		2.91	2.91
Silicon *	260	-	151	411
Silver	<0.2	<0.2	<0.1	<0.20
Sodium *	183	69.0	605	788
Strontium	0.37	0.66	0.96	1.99
Sulphur	<10000	<10000	6670	6670
Tin	1.11	1.79	26.8	29.7
Titanium	<10	<10	<1	<10.0
Vanadium	<1	<1	<0.1	<1.00
Zinc	<6	6.12	11.6	17.7
Total				<8662

* 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	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	ng/s
Tetrachlorodibenzo-p-dioxins	<2.3	<0.00013	<0.00040	<0.00033	<0.00020	<0.0077
Pentachlorodibenzo-p-dioxins	73.9	0.0042	0.013	0.011	0.0065	0.25
Hexachlorodibenzo-p-dioxins	135	0.0077	0.024	0.019	0.012	0.45
Heptachlorodibenzo-p-dioxins	78.4	0.0045	0.014	0.011	0.0069	0.26
Octachlorodibenzo-p-dioxin	46.3	0.0026	0.0081	0.0066	0.0041	0.15
Total	<336	<0.019	<0.059	<0.048	<0.029	<1.12

Furans

Congener Group	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	ng/s
Tetrachlorodibenzofurans	35.1	0.0020	0.0061	0.0050	0.0031	0.12
Pentachlorodibenzofurans	61.5	0.0035	0.011	0.0087	0.0054	0.21
Hexachlorodibenzofurans	19.5	0.0011	0.0034	0.0028	0.0017	0.065
Heptachlorodibenzofurans	<3.1	<0.00018	<0.00054	<0.00044	<0.00027	<0.010
Octachlorodibenzofuran	9.54	0.00054	0.0017	0.0014	0.00084	0.032
Total	<129	<0.0073	<0.023	<0.018	<0.011	<0.43

Dry Gas Volume Sampled (Rm^3*) :	5.718
Actual Flowrate (m^3/s) :	58.8
Dry Reference Flowrate (Rm^3/s*) :	19.1
Dry Adjusted Flowrate (Rm^3/s**) :	23.5
Wet Reference Flowrate (Rm^3/s*) :	38.1

* 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/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate ng/s
Tetrachlorodibenzo-p-dioxins	29.4	0.0018	0.0056	0.0045	0.0028	0.10
Pentachlorodibenzo-p-dioxins	33.7	0.0020	0.0064	0.0052	0.0032	0.12
Hexachlorodibenzo-p-dioxins	<2.3	<0.00014	<0.00043	<0.00035	<0.00022	<0.0079
Heptachlorodibenzo-p-dioxins	46.0	0.0027	0.0087	0.0070	0.0044	0.16
Octachlorodibenzo-p-dioxin	<22	<0.0013	<0.0042	<0.0034	<0.0021	<0.076
Total	<133	<0.0079	<0.025	<0.020	<0.013	<0.46

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	<3.3	<0.00020	<0.00062	<0.00050	<0.00031	<0.011
Pentachlorodibenzofurans	<2.7	<0.00016	<0.00051	<0.00041	<0.00026	<0.0093
Hexachlorodibenzofurans	5.45	0.00032	0.0010	0.00083	0.00052	0.019
Heptachlorodibenzofurans	6.93	0.00041	0.0013	0.0011	0.00066	0.024
Octachlorodibenzofuran	4.85	0.00029	0.00092	0.00074	0.00046	0.017
Total	<23.2	<0.0014	<0.0044	<0.0036	<0.0022	<0.080

Dry Gas Volume Sampled (Rm^3*) :	5.297
Actual Flowrate (m^3/s) :	58.0
Dry Reference Flowrate (Rm^3/s*) :	18.3
Dry Adjusted Flowrate (Rm^3/s**) :	22.6
Wet Reference Flowrate (Rm^3/s*) :	36.4

* 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	23.8	0.0014	0.0045	0.0038	0.0023	0.084
Pentachlorodibenzo-p-dioxins	48.1	0.0029	0.0092	0.0077	0.0046	0.17
Hexachlorodibenzo-p-dioxins	62.1	0.0038	0.012	0.0099	0.0060	0.22
Heptachlorodibenzo-p-dioxins	31.9	0.0019	0.0061	0.0051	0.0031	0.11
Octachlorodibenzo-p-dioxin	<23	<0.0014	<0.0044	<0.0037	<0.0022	<0.081
Total	<189	<0.012	<0.036	<0.030	<0.018	<0.67

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	<4.0	<0.00024	<0.00076	<0.00064	<0.00039	<0.014
Pentachlorodibenzofurans	8.18	0.00050	0.0016	0.0013	0.00079	0.029
Hexachlorodibenzofurans	7.86	0.00048	0.0015	0.0013	0.00076	0.028
Heptachlorodibenzofurans	<1.9	<0.00012	<0.00036	<0.00030	<0.00018	<0.0067
Octachlorodibenzofuran	<3.3	<0.00020	<0.00063	<0.00053	<0.00032	<0.012
Total	<25.2	<0.0015	<0.0048	<0.0040	<0.0024	<0.089

Dry Gas Volume Sampled (Rm^3*) :	5.245
Actual Flowrate (m^3/s) :	57.9
Dry Reference Flowrate (Rm^3/s*) :	18.5
Dry Adjusted Flowrate (Rm^3/s**) :	22.1
Wet Reference Flowrate (Rm^3/s*) :	36.5

* 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				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/m³	ng/m³	ng/m³	ng/m³	%
Tetrachlorodibenzo-p-dioxins	<0.00013	0.0018	0.0014	<0.0011	77.6
Pentachlorodibenzo-p-dioxins	0.0042	0.0020	0.0029	0.0030	36.1
Hexachlorodibenzo-p-dioxins	0.0077	<0.00014	0.0038	<0.0039	97.5
Heptachlorodibenzo-p-dioxins	0.0045	0.0027	0.0019	0.0030	42.1
Octachlorodibenzo-p-dioxin	0.0026	<0.0013	<0.0014	<0.0018	41.4
Total	<0.019	<0.0079	<0.012	<0.013	44.3

Furans

Congener Group	Actual Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/m³	ng/m³	ng/m³	ng/m³	%
Tetrachlorodibenzofurans	0.0020	<0.00020	<0.00024	<0.00081	126
Pentachlorodibenzofurans	0.0035	<0.00016	0.00050	<0.0014	133
Hexachlorodibenzofurans	0.0011	0.00032	0.00048	0.00064	65.1
Heptachlorodibenzofurans	<0.00018	0.00041	<0.00012	<0.00023	66.8
Octachlorodibenzofuran	0.00054	0.00029	<0.00020	<0.00034	51.5
Total	<0.0073	<0.0014	<0.0015	<0.0034	99.1

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	<0.00040	0.0056	0.0045	<0.0035	78.0
Pentachlorodibenzo-p-dioxins	0.013	0.0064	0.0092	0.0095	34.7
Hexachlorodibenzo-p-dioxins	0.024	<0.00043	0.012	<0.012	96.9
Heptachlorodibenzo-p-dioxins	0.014	0.0087	0.0061	0.0095	40.9
Octachlorodibenzo-p-dioxin	0.0081	<0.0042	<0.0044	<0.0055	39.9
Total	<0.059	<0.025	<0.036	<0.040	42.8

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	0.0061	<0.00062	<0.00076	<0.0025	125
Pentachlorodibenzofurans	0.011	<0.00051	0.0016	<0.0043	132
Hexachlorodibenzofurans	0.0034	0.0010	0.0015	0.0020	63.7
Heptachlorodibenzofurans	<0.00054	0.0013	<0.00036	<0.00074	68.1
Octachlorodibenzofuran	0.0017	0.00092	<0.00063	<0.0011	50.1
Total	<0.023	<0.0044	<0.0048	<0.011	97.9

* 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	<0.00033	0.0045	0.0038	<0.0029	77.7
Pentachlorodibenzo-p-dioxins	0.011	0.0052	0.0077	0.0078	34.4
Hexachlorodibenzo-p-dioxins	0.019	<0.00035	0.0099	<0.0098	95.9
Heptachlorodibenzo-p-dioxins	0.011	0.0070	0.0051	0.0078	39.8
Octachlorodibenzo-p-dioxin	0.0066	<0.0034	<0.0037	<0.0045	39.1
Total	<0.048	<0.020	<0.030	<0.033	42.3

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	0.0050	<0.00050	<0.00064	<0.0020	125
Pentachlorodibenzofurans	0.0087	<0.00041	0.0013	<0.0035	131
Hexachlorodibenzofurans	0.0028	0.00083	0.0013	0.0016	62.9
Heptachlorodibenzofurans	<0.00044	0.0011	<0.00030	<0.00060	67.0
Octachlorodibenzofuran	0.0014	0.00074	<0.00053	<0.00087	49.2
Total	<0.018	<0.0036	<0.0040	<0.0086	97.2

* 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	<0.00020	0.0028	0.0023	<0.0018	78.0
Pentachlorodibenzo-p-dioxins	0.0065	0.0032	0.0046	0.0048	34.4
Hexachlorodibenzo-p-dioxins	0.012	<0.00022	0.0060	<0.0060	96.5
Heptachlorodibenzo-p-dioxins	0.0069	0.0044	0.0031	0.0048	40.4
Octachlorodibenzo-p-dioxin	0.0041	<0.0021	<0.0022	<0.0028	39.5
Total	<0.029	<0.013	<0.018	<0.020	42.5

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	0.0031	<0.00031	<0.00039	<0.0013	125
Pentachlorodibenzofurans	0.0054	<0.00026	0.00079	<0.0021	132
Hexachlorodibenzofurans	0.0017	0.00052	0.00076	0.0010	63.3
Heptachlorodibenzofurans	<0.00027	0.00066	<0.00018	<0.00037	68.0
Octachlorodibenzofuran	0.00084	0.00046	<0.00032	<0.00054	49.7
Total	<0.011	<0.0022	<0.0024	<0.0053	97.5

* At 25°C and 1 atmosphere

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

Dioxins

Congener Group	Emission Rate				Coefficient of Variation
	Test No. 1 ng/s	Test No. 2 ng/s	Test No. 3 ng/s	Average ng/s	%
Tetrachlorodibenzo-p-dioxins	<0.0077	0.10	0.084	<0.064	77.5
Pentachlorodibenzo-p-dioxins	0.25	0.12	0.17	0.18	36.9
Hexachlorodibenzo-p-dioxins	0.45	<0.0079	0.22	<0.23	98.1
Heptachlorodibenzo-p-dioxins	0.26	0.16	0.11	0.18	43.0
Octachlorodibenzo-p-dioxin	0.15	<0.076	<0.081	<0.10	42.3
Total	<1.12	<0.46	<0.67	<0.75	45.1

Furans

Congener Group	Emission Rate				Coefficient of Variation
	Test No. 1 ng/s	Test No. 2 ng/s	Test No. 3 ng/s	Average ng/s	%
Tetrachlorodibenzofurans	0.12	<0.011	<0.014	<0.048	127
Pentachlorodibenzofurans	0.21	<0.0093	0.029	<0.081	133
Hexachlorodibenzofurans	0.065	0.019	0.028	0.037	66.0
Heptachlorodibenzofurans	<0.010	0.024	<0.0067	<0.014	66.5
Octachlorodibenzofuran	0.032	0.017	<0.012	<0.020	52.4
Total	<0.43	<0.080	<0.089	<0.20	99.8

TABLE 43
Clean Harbors Sarnia
Summary of Dioxin and Furan Congener Group Emission Data

Dioxins

Congener Group	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	ng/s
Tetrachlorodibenzo-p-dioxins	<0.0011	<0.0035	<0.0029	<0.0018	<0.064
Pentachlorodibenzo-p-dioxins	0.0030	0.0095	0.0078	0.0048	0.18
Hexachlorodibenzo-p-dioxins	<0.0039	<0.012	<0.0098	<0.0060	<0.23
Heptachlorodibenzo-p-dioxins	0.0030	0.0095	0.0078	0.0048	0.18
Octachlorodibenzo-p-dioxin	<0.0018	<0.0055	<0.0045	<0.0028	<0.10
Total	<0.013	<0.040	<0.033	<0.020	<0.75

Furans

Congener Group	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	ng/s
Tetrachlorodibenzofurans	<0.00081	<0.0025	<0.0020	<0.0013	<0.048
Pentachlorodibenzofurans	<0.0014	<0.0043	<0.0035	<0.0021	<0.081
Hexachlorodibenzofurans	0.00064	0.0020	0.0016	0.0010	0.037
Heptachlorodibenzofurans	<0.00023	<0.00074	<0.00060	<0.00037	<0.014
Octachlorodibenzofuran	<0.00034	<0.0011	<0.00087	<0.00054	<0.020
Total	<0.0034	<0.011	<0.0086	<0.0053	<0.20

* 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	Laboratory Blank
	pg	pg
Tetrachlorodibenzo-p-dioxins	<2.4	<5.5
Pentachlorodibenzo-p-dioxins	<1.8	<4.6
Hexachlorodibenzo-p-dioxins	<1.1	<5.1
Heptachlorodibenzo-p-dioxins	<2.5	<4.1
Octachlorodibenzo-p-dioxin	<8.6	<17
Total	<16.4	<36.3

Furans

Congener Group	Blank Train	Laboratory Blank
	pg	pg
Tetrachlorodibenzofurans	<2.3	<4.3
Pentachlorodibenzofurans	<1.7	<3.3
Hexachlorodibenzofurans	4.80	<4.2
Heptachlorodibenzofurans	<1.6	<4.7
Octachlorodibenzofuran	<2.1	12.2
Total	<12.5	<28.7

"<" 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/m^3	pg/Rm^3*	pg/Rm^3**	pg/Rm^3*	ng/s
2378-tetrachlorodibenzo-p-dioxin	<2.3	<0.13	<0.40	<0.33	<0.20	<0.0077
12378-pentachlorodibenzo-p-dioxin	3.05	0.17	0.53	0.43	0.27	0.010
123478-hexachlorodibenzo-p-dioxin	3.59	0.20	0.63	0.51	0.31	0.012
123678-hexachlorodibenzo-p-dioxin	<5.8	<0.33	<1.01	<0.82	<0.51	<0.019
123789-hexachlorodibenzo-p-dioxin	5.75	0.33	1.01	0.82	0.50	0.019
1234678-heptachlorodibenzo-p-dioxin	40.4	2.30	7.07	5.74	3.54	0.13
Octachlorodibenzo-p-dioxin	46.3	2.63	8.10	6.58	4.06	0.15
2378-tetrachlorodibenzofuran	6.20	0.35	1.08	0.88	0.54	0.021
12378-pentachlorodibenzofuran	7.28	0.41	1.27	1.03	0.64	0.024
23478-pentachlorodibenzofuran	12.1	0.69	2.12	1.72	1.06	0.040
123478-hexachlorodibenzofuran	<1.8	<0.10	<0.31	<0.26	<0.16	<0.0060
123678-hexachlorodibenzofuran	<6.0	<0.34	<1.05	<0.85	<0.53	<0.020
234678-hexachlorodibenzofuran	<9.9	<0.56	<1.73	<1.41	<0.87	<0.033
123789-hexachlorodibenzofuran	8.12	0.46	1.42	1.15	0.71	0.027
1234678-heptachlorodibenzofuran	<17	<0.97	<2.97	<2.42	<1.49	<0.057
1234789-heptachlorodibenzofuran	<3.1	<0.18	<0.54	<0.44	<0.27	<0.010
Octachlorodibenzofuran	9.54	0.54	1.67	1.36	0.84	0.032
PCB 77	2550	145	446	362	224	8.52
PCB 81	<10	<0.57	<1.75	<1.42	<0.88	<0.033
PCB 126	36.8	2.09	6.44	5.23	3.23	0.12
PCB 169	<7.8	<0.44	<1.36	<1.11	<0.68	<0.026
PCB 105	38000	2159	6646	5401	3332	127
PCB 114	3420	194	598	486	300	11.4
PCB 118	129000	7328	22560	18336	11310	431
PCB 123	2310	131	404	328	203	7.72
PCB 156/157	1340	76.1	234	190	117	4.48
PCB 167	535	30.4	93.6	76.0	46.9	1.79
PCB 189	<6.7	<0.38	<1.17	<0.95	<0.59	<0.022
Total Dioxins & Furans Only	<188	<10.7	<32.9	<26.8	<16.5	<0.63

Dry Gas Volume Sampled (Rm^3*) :	5.718
Actual Flowrate (m^3/s) :	58.8
Dry Reference Flowrate (Rm^3/s*) :	19.1
Dry Adjusted Flowrate (Rm^3/s**) :	23.5
Wet Reference Flowrate (Rm^3/s*) :	38.1

* 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	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	<3.3	<0.20	<0.62	<0.50	<0.31	<0.011
12378-pentachlorodibenzo-p-dioxin	<2.0	<0.12	<0.38	<0.31	<0.19	<0.0069
123478-hexachlorodibenzo-p-dioxin	<2.3	<0.14	<0.43	<0.35	<0.22	<0.0079
123678-hexachlorodibenzo-p-dioxin	<2.3	<0.14	<0.43	<0.35	<0.22	<0.0079
123789-hexachlorodibenzo-p-dioxin	<2.0	<0.12	<0.38	<0.31	<0.19	<0.0069
1234678-heptachlorodibenzo-p-dioxin	21.2	1.26	4.00	3.24	2.01	0.073
Octachlorodibenzo-p-dioxin	<22	<1.31	<4.15	<3.36	<2.09	<0.076
2378-tetrachlorodibenzofuran	<3.3	<0.20	<0.62	<0.50	<0.31	<0.011
12378-pentachlorodibenzofuran	<2.7	<0.16	<0.51	<0.41	<0.26	<0.0093
23478-pentachlorodibenzofuran	<3.5	<0.21	<0.66	<0.54	<0.33	<0.012
123478-hexachlorodibenzofuran	<2.0	<0.12	<0.38	<0.31	<0.19	<0.0069
123678-hexachlorodibenzofuran	<3.0	<0.18	<0.57	<0.46	<0.28	<0.010
234678-hexachlorodibenzofuran	2.36	0.14	0.45	0.36	0.22	0.0082
123789-hexachlorodibenzofuran	<4.8	<0.29	<0.91	<0.73	<0.46	<0.017
1234678-heptachlorodibenzofuran	6.93	0.41	1.31	1.06	0.66	0.024
1234789-heptachlorodibenzofuran	<2.8	<0.17	<0.53	<0.43	<0.27	<0.0097
Octachlorodibenzofuran	4.85	0.29	0.92	0.74	0.46	0.017
PCB 77	2140	127	404	327	203	7.39
PCB 81	<13	<0.77	<2.45	<1.99	<1.23	<0.045
PCB 126	<34	<2.03	<6.42	<5.20	<3.23	<0.12
PCB 169	<4.9	<0.29	<0.93	<0.75	<0.47	<0.017
PCB 105	2500	149	472	382	237	8.64
PCB 114	216	12.9	40.8	33.0	20.5	0.75
PCB 118	8870	528	1675	1356	842	30.6
PCB 123	156	9.29	29.5	23.8	14.8	0.54
PCB 156/157	176	10.5	33.2	26.9	16.7	0.61
PCB 167	63.5	3.78	12.0	9.71	6.03	0.22
PCB 189	5.60	0.33	1.06	0.86	0.53	0.019
Total Dioxins & Furans Only	<91.3	<5.44	<17.2	<14.0	<8.67	<0.32

Dry Gas Volume Sampled (Rm^3*) :	5.297
Actual Flowrate (m^3/s) :	58.0
Dry Reference Flowrate (Rm^3/s*) :	18.3
Dry Adjusted Flowrate (Rm^3/s**) :	22.6
Wet Reference Flowrate (Rm^3/s*) :	36.4

* 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	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	<3.2	<0.19	<0.61	<0.51	<0.31	<0.011
12378-pentachlorodibenzo-p-dioxin	<3.0	<0.18	<0.57	<0.48	<0.29	<0.011
123478-hexachlorodibenzo-p-dioxin	<3.1	<0.19	<0.59	<0.49	<0.30	<0.011
123678-hexachlorodibenzo-p-dioxin	<4.5	<0.27	<0.86	<0.72	<0.43	<0.016
123789-hexachlorodibenzo-p-dioxin	<2.7	<0.16	<0.51	<0.43	<0.26	<0.0095
1234678-heptachlorodibenzo-p-dioxin	<22	<1.34	<4.19	<3.51	<2.13	<0.078
Octachlorodibenzo-p-dioxin	<23	<1.40	<4.39	<3.67	<2.22	<0.081
2378-tetrachlorodibenzofuran	<4.3	<0.26	<0.82	<0.69	<0.42	<0.015
12378-pentachlorodibenzofuran	<4.4	<0.27	<0.84	<0.70	<0.43	<0.016
23478-pentachlorodibenzofuran	<5.0	<0.30	<0.95	<0.80	<0.48	<0.018
123478-hexachlorodibenzofuran	2.98	0.18	0.57	0.48	0.29	0.011
123678-hexachlorodibenzofuran	<2.6	<0.16	<0.50	<0.41	<0.25	<0.0092
234678-hexachlorodibenzofuran	<3.0	<0.18	<0.57	<0.48	<0.29	<0.011
123789-hexachlorodibenzofuran	<5.3	<0.32	<1.01	<0.85	<0.51	<0.019
1234678-heptachlorodibenzofuran	<7.1	<0.43	<1.35	<1.13	<0.69	<0.025
1234789-heptachlorodibenzofuran	<1.9	<0.12	<0.36	<0.30	<0.18	<0.0067
Octachlorodibenzofuran	<3.3	<0.20	<0.63	<0.53	<0.32	<0.012
PCB 77	202	12.3	38.5	32.2	19.5	0.71
PCB 81	12.6	0.77	2.40	2.01	1.22	0.044
PCB 126	<6.7	<0.41	<1.28	<1.07	<0.65	<0.024
PCB 169	<4.3	<0.26	<0.82	<0.69	<0.42	<0.015
PCB 105	1580	96.3	301	252	153	5.57
PCB 114	109	6.64	20.8	17.4	10.5	0.38
PCB 118	4800	292	915	766	464	16.9
PCB 123	54.2	3.30	10.3	8.65	5.24	0.19
PCB 156/157	108	6.58	20.6	17.2	10.4	0.38
PCB 167	42.4	2.58	8.08	6.77	4.10	0.15
PCB 189	<3.5	<0.21	<0.67	<0.56	<0.34	<0.012
Total Dioxins & Furans Only	<101	<6.18	<19.3	<16.2	<9.80	<0.36

Dry Gas Volume Sampled (Rm^3*) :	5.245
Actual Flowrate (m^3/s) :	57.9
Dry Reference Flowrate (Rm^3/s*) :	18.5
Dry Adjusted Flowrate (Rm^3/s**) :	22.1
Wet Reference Flowrate (Rm^3/s*) :	36.5

* 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/m³	pg/m³	pg/m³	pg/m³	%
2378-tetrachlorodibenzo-p-dioxin	<0.13	<0.20	<0.19	<0.17	21.6
12378-pentachlorodibenzo-p-dioxin	0.17	<0.12	<0.18	<0.16	21.7
123478-hexachlorodibenzo-p-dioxin	0.20	<0.14	<0.19	<0.18	19.9
123678-hexachlorodibenzo-p-dioxin	<0.33	<0.14	<0.27	<0.25	40.1
123789-hexachlorodibenzo-p-dioxin	0.33	<0.12	<0.16	<0.20	53.6
1234678-heptachlorodibenzo-p-dioxin	2.30	1.26	<1.34	<1.63	35.2
Octachlorodibenzo-p-dioxin	2.63	<1.31	<1.40	<1.78	41.4
2378-tetrachlorodibenzofuran	0.35	<0.20	<0.26	<0.27	28.9
12378-pentachlorodibenzofuran	0.41	<0.16	<0.27	<0.28	45.2
23478-pentachlorodibenzofuran	0.69	<0.21	<0.30	<0.40	63.3
123478-hexachlorodibenzofuran	<0.10	<0.12	0.18	<0.13	31.1
123678-hexachlorodibenzofuran	<0.34	<0.18	<0.16	<0.23	44.3
234678-hexachlorodibenzofuran	<0.56	0.14	<0.18	<0.30	78.7
123789-hexachlorodibenzofuran	0.46	<0.29	<0.32	<0.36	25.9
1234678-heptachlorodibenzofuran	<0.97	0.41	<0.43	<0.60	52.0
1234789-heptachlorodibenzofuran	<0.18	<0.17	<0.12	<0.15	21.3
Octachlorodibenzofuran	0.54	0.29	<0.20	<0.34	51.5
PCB 77	145	127	12.3	94.9	75.9
PCB 81	<0.57	<0.77	0.77	<0.70	16.7
PCB 126	2.09	<2.03	<0.41	<1.51	63.2
PCB 169	<0.44	<0.29	<0.26	<0.33	29.2
PCB 105	2159	149	96.3	801	147
PCB 114	194	12.9	6.64	71.3	150
PCB 118	7328	528	292	2716	147
PCB 123	131	9.29	3.30	47.9	151
PCB 156/157	76.1	10.5	6.58	31.1	126
PCB 167	30.4	3.78	2.58	12.3	128
PCB 189	<0.38	0.33	<0.21	<0.31	27.9
Total Dioxins & Furans Only	<10.7	<5.44	<6.18	<7.44	38.2

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/Rm³*	pg/Rm³*	pg/Rm³*	pg/Rm³*	%
2378-tetrachlorodibenzo-p-dioxin	<0.40	<0.62	<0.61	<0.55	22.7
12378-pentachlorodibenzo-p-dioxin	0.53	<0.38	<0.57	<0.49	20.8
123478-hexachlorodibenzo-p-dioxin	0.63	<0.43	<0.59	<0.55	18.7
123678-hexachlorodibenzo-p-dioxin	<1.01	<0.43	<0.86	<0.77	39.0
123789-hexachlorodibenzo-p-dioxin	1.01	<0.38	<0.51	<0.63	52.2
1234678-heptachlorodibenzo-p-dioxin	7.07	4.00	<4.19	<5.09	33.7
Octachlorodibenzo-p-dioxin	8.10	<4.15	<4.39	<5.55	39.9
2378-tetrachlorodibenzofuran	1.08	<0.62	<0.82	<0.84	27.5
12378-pentachlorodibenzofuran	1.27	<0.51	<0.84	<0.87	43.8
23478-pentachlorodibenzofuran	2.12	<0.66	<0.95	<1.24	61.9
123478-hexachlorodibenzofuran	<0.31	<0.38	0.57	<0.42	31.4
123678-hexachlorodibenzofuran	<1.05	<0.57	<0.50	<0.70	42.8
234678-hexachlorodibenzofuran	<1.73	0.45	<0.57	<0.92	77.3
123789-hexachlorodibenzofuran	1.42	<0.91	<1.01	<1.11	24.4
1234678-heptachlorodibenzofuran	<2.97	1.31	<1.35	<1.88	50.5
1234789-heptachlorodibenzofuran	<0.54	<0.53	<0.36	<0.48	21.0
Octachlorodibenzofuran	1.67	0.92	<0.63	<1.07	50.1
PCB 77	446	404	38.5	296	75.7
PCB 81	<1.75	<2.45	2.40	<2.20	17.9
PCB 126	6.44	<6.42	<1.28	<4.71	63.1
PCB 169	<1.36	<0.93	<0.82	<1.04	27.9
PCB 105	6646	472	301	2473	146
PCB 114	598	40.8	20.8	220	149
PCB 118	22560	1675	915	8383	147
PCB 123	404	29.5	10.3	148	150
PCB 156/157	234	33.2	20.6	96.1	125
PCB 167	93.6	12.0	8.08	37.9	127
PCB 189	<1.17	1.06	<0.67	<0.97	27.4
Total Dioxins & Furans Only	<32.9	<17.2	<19.3	<23.2	36.7

* 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				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	pg/Rm³*	pg/Rm³*	pg/Rm³*	pg/Rm³*	%
2378-tetrachlorodibenzo-p-dioxin	<0.33	<0.50	<0.51	<0.45	23.3
12378-pentachlorodibenzo-p-dioxin	0.43	<0.31	<0.48	<0.41	22.1
123478-hexachlorodibenzo-p-dioxin	0.51	<0.35	<0.49	<0.45	19.3
123678-hexachlorodibenzo-p-dioxin	<0.82	<0.35	<0.72	<0.63	39.3
123789-hexachlorodibenzo-p-dioxin	0.82	<0.31	<0.43	<0.52	51.5
1234678-heptachlorodibenzo-p-dioxin	5.74	3.24	<3.51	<4.16	33.0
Octachlorodibenzo-p-dioxin	6.58	<3.36	<3.67	<4.54	39.1
2378-tetrachlorodibenzofuran	0.88	<0.50	<0.69	<0.69	27.3
12378-pentachlorodibenzofuran	1.03	<0.41	<0.70	<0.72	43.4
23478-pentachlorodibenzofuran	1.72	<0.54	<0.80	<1.02	61.1
123478-hexachlorodibenzofuran	<0.26	<0.31	0.48	<0.35	33.3
123678-hexachlorodibenzofuran	<0.85	<0.46	<0.41	<0.58	41.9
234678-hexachlorodibenzofuran	<1.41	0.36	<0.48	<0.75	76.5
123789-hexachlorodibenzofuran	1.15	<0.73	<0.85	<0.91	23.9
1234678-heptachlorodibenzofuran	<2.42	1.06	<1.13	<1.54	49.7
1234789-heptachlorodibenzofuran	<0.44	<0.43	<0.30	<0.39	19.4
Octachlorodibenzofuran	1.36	0.74	<0.53	<0.87	49.2
PCB 77	362	327	32.2	241	75.4
PCB 81	<1.42	<1.99	2.01	<1.81	18.5
PCB 126	5.23	<5.20	<1.07	<3.83	62.4
PCB 169	<1.11	<0.75	<0.69	<0.85	26.9
PCB 105	5401	382	252	2012	146
PCB 114	486	33.0	17.4	179	149
PCB 118	18336	1356	766	6819	146
PCB 123	328	23.8	8.65	120	150
PCB 156/157	190	26.9	17.2	78.2	124
PCB 167	76.0	9.71	6.77	30.8	127
PCB 189	<0.95	0.86	<0.56	<0.79	26.0
Total Dioxins & Furans Only	<26.8	<14.0	<16.2	<19.0	36.0

* 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/Rm³*	pg/Rm³*	pg/Rm³*	pg/Rm³*	%
2378-tetrachlorodibenzo-p-dioxin	<0.20	<0.31	<0.31	<0.27	23.0
12378-pentachlorodibenzo-p-dioxin	0.27	<0.19	<0.29	<0.25	21.1
123478-hexachlorodibenzo-p-dioxin	0.31	<0.22	<0.30	<0.28	18.7
123678-hexachlorodibenzo-p-dioxin	<0.51	<0.22	<0.43	<0.39	39.0
123789-hexachlorodibenzo-p-dioxin	0.50	<0.19	<0.26	<0.32	51.8
1234678-heptachlorodibenzo-p-dioxin	3.54	2.01	<2.13	<2.56	33.3
Octachlorodibenzo-p-dioxin	4.06	<2.09	<2.22	<2.79	39.5
2378-tetrachlorodibenzofuran	0.54	<0.31	<0.42	<0.42	27.2
12378-pentachlorodibenzofuran	0.64	<0.26	<0.43	<0.44	43.5
23478-pentachlorodibenzofuran	1.06	<0.33	<0.48	<0.63	61.5
123478-hexachlorodibenzofuran	<0.16	<0.19	0.29	<0.21	32.0
123678-hexachlorodibenzofuran	<0.53	<0.28	<0.25	<0.35	42.3
234678-hexachlorodibenzofuran	<0.87	0.22	<0.29	<0.46	76.9
123789-hexachlorodibenzofuran	0.71	<0.46	<0.51	<0.56	24.1
1234678-heptachlorodibenzofuran	<1.49	0.66	<0.69	<0.94	50.0
1234789-heptachlorodibenzofuran	<0.27	<0.27	<0.18	<0.24	20.5
Octachlorodibenzofuran	0.84	0.46	<0.32	<0.54	49.7
PCB 77	224	203	19.5	149	75.6
PCB 81	<0.88	<1.23	1.22	<1.11	18.2
PCB 126	3.23	<3.23	<0.65	<2.37	62.9
PCB 169	<0.68	<0.47	<0.42	<0.52	27.4
PCB 105	3332	237	153	1241	146
PCB 114	300	20.5	10.5	110	149
PCB 118	11310	842	464	4205	146
PCB 123	203	14.8	5.24	74.2	150
PCB 156/157	117	16.7	10.4	48.2	125
PCB 167	46.9	6.03	4.10	19.0	127
PCB 189	<0.59	0.53	<0.34	<0.49	26.9
Total Dioxins & Furans Only	<16.5	<8.67	<9.80	<11.7	36.3

* 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	<0.0077	<0.011	<0.011	<0.010	20.9
12378-pentachlorodibenzo-p-dioxin	0.010	<0.0069	<0.011	<0.0092	21.9
123478-hexachlorodibenzo-p-dioxin	0.012	<0.0079	<0.011	<0.010	20.4
123678-hexachlorodibenzo-p-dioxin	<0.019	<0.0079	<0.016	<0.014	40.7
123789-hexachlorodibenzo-p-dioxin	0.019	<0.0069	<0.0095	<0.012	54.5
1234678-heptachlorodibenzo-p-dioxin	0.13	0.073	<0.078	<0.095	36.2
Octachlorodibenzo-p-dioxin	0.15	<0.076	<0.081	<0.10	42.3
2378-tetrachlorodibenzofuran	0.021	<0.011	<0.015	<0.016	29.7
12378-pentachlorodibenzofuran	0.024	<0.0093	<0.016	<0.016	46.0
23478-pentachlorodibenzofuran	0.040	<0.012	<0.018	<0.023	64.2
123478-hexachlorodibenzofuran	<0.0060	<0.0069	0.011	<0.0078	30.5
123678-hexachlorodibenzofuran	<0.020	<0.010	<0.0092	<0.013	45.2
234678-hexachlorodibenzofuran	<0.033	0.0082	<0.011	<0.017	79.6
123789-hexachlorodibenzofuran	0.027	<0.017	<0.019	<0.021	26.8
1234678-heptachlorodibenzofuran	<0.057	0.024	<0.025	<0.035	52.9
1234789-heptachlorodibenzofuran	<0.010	<0.0097	<0.0067	<0.0089	21.8
Octachlorodibenzofuran	0.032	0.017	<0.012	<0.020	52.4
PCB 77	8.52	7.39	0.71	5.54	76.1
PCB 81	<0.033	<0.045	0.044	<0.041	15.9
PCB 126	0.12	<0.12	<0.024	<0.088	63.4
PCB 169	<0.026	<0.017	<0.015	<0.019	30.2
PCB 105	127	8.64	5.57	47.0	147
PCB 114	11.4	0.75	0.38	4.18	150
PCB 118	431	30.6	16.9	159	147
PCB 123	7.72	0.54	0.19	2.82	151
PCB 156/157	4.48	0.61	0.38	1.82	126
PCB 167	1.79	0.22	0.15	0.72	129
PCB 189	<0.022	0.019	<0.012	<0.018	28.6
Total Dioxins & Furans Only	<0.63	<0.32	<0.36	<0.43	39.2

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/m³	Dry Reference Concentration pg/Rm³*	Dry Adjusted Concentration pg/Rm³**	Wet Reference Concentration pg/Rm³*	Emission Rate ng/s
2378-tetrachlorodibenzo-p-dioxin	<0.17	<0.55	<0.45	<0.27	<0.010
12378-pentachlorodibenzo-p-dioxin	<0.16	<0.49	<0.41	<0.25	<0.0092
123478-hexachlorodibenzo-p-dioxin	<0.18	<0.55	<0.45	<0.28	<0.010
123678-hexachlorodibenzo-p-dioxin	<0.25	<0.77	<0.63	<0.39	<0.014
123789-hexachlorodibenzo-p-dioxin	<0.20	<0.63	<0.52	<0.32	<0.012
1234678-heptachlorodibenzo-p-dioxin	<1.63	<5.09	<4.16	<2.56	<0.095
Octachlorodibenzo-p-dioxin	<1.78	<5.55	<4.54	<2.79	<0.10
2378-tetrachlorodibenzofuran	<0.27	<0.84	<0.69	<0.42	<0.016
12378-pentachlorodibenzofuran	<0.28	<0.87	<0.72	<0.44	<0.016
23478-pentachlorodibenzofuran	<0.40	<1.24	<1.02	<0.63	<0.023
123478-hexachlorodibenzofuran	<0.13	<0.42	<0.35	<0.21	<0.0078
123678-hexachlorodibenzofuran	<0.23	<0.70	<0.58	<0.35	<0.013
234678-hexachlorodibenzofuran	<0.30	<0.92	<0.75	<0.46	<0.017
123789-hexachlorodibenzofuran	<0.36	<1.11	<0.91	<0.56	<0.021
1234678-heptachlorodibenzofuran	<0.60	<1.88	<1.54	<0.94	<0.035
1234789-heptachlorodibenzofuran	<0.15	<0.48	<0.39	<0.24	<0.0089
Octachlorodibenzofuran	<0.34	<1.07	<0.87	<0.54	<0.020
PCB 77	94.9	296	241	149	5.54
PCB 81	<0.70	<2.20	<1.81	<1.11	<0.041
PCB 126	<1.51	<4.71	<3.83	<2.37	<0.088
PCB 169	<0.33	<1.04	<0.85	<0.52	<0.019
PCB 105	801	2473	2012	1241	47.0
PCB 114	71.3	220	179	110	4.18
PCB 118	2716	8383	6819	4205	159
PCB 123	47.9	148	120	74.2	2.82
PCB 156/157	31.1	96.1	78.2	48.2	1.82
PCB 167	12.3	37.9	30.8	19.0	0.72
PCB 189	<0.31	<0.97	<0.79	<0.49	<0.018
Total Dioxins & Furans Only	<7.44	<23.2	<19.0	<11.7	<0.43

* 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	<2.4	<5.5
12378-pentachlorodibenzo-p-dioxin	<1.8	<4.6
123478-hexachlorodibenzo-p-dioxin	<1.1	<5.1
123678-hexachlorodibenzo-p-dioxin	<0.88	<4.0
123789-hexachlorodibenzo-p-dioxin	<0.96	<4.4
1234678-heptachlorodibenzo-p-dioxin	<2.5	<4.1
Octachlorodibenzo-p-dioxin	<8.6	<17
2378-tetrachlorodibenzofuran	<2.3	<4.3
12378-pentachlorodibenzofuran	<1.7	<3.3
23478-pentachlorodibenzofuran	<1.6	<3.2
123478-hexachlorodibenzofuran	<1.0	<3.6
123678-hexachlorodibenzofuran	<0.92	<3.2
234678-hexachlorodibenzofuran	<1.0	<3.5
123789-hexachlorodibenzofuran	4.80	<4.2
1234678-heptachlorodibenzofuran	<1.3	<3.8
1234789-heptachlorodibenzofuran	<1.6	<4.7
Octachlorodibenzofuran	<2.1	12.2
PCB 77	36.7	<4.5
PCB 81	<5.7	<4.9
PCB 126	<2.9	<3.1
PCB 169	<2.0	<2.4
PCB 105	416	7.66
PCB 114	32.2	<3.1
PCB 118	1240	15.1
PCB 123	<17	<3.0
PCB 156/157	40.3	3.32
PCB 167	13.7	<2.3
PCB 189	<1.3	<2.2
Total Dioxins & Furans Only	<36.6	<90.7

"<" 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 55
Clean Harbors Sarnia
Dioxin and Furan Toxicity Equivalent Actual Concentrations

Specific Isomer	Toxicity Equivalency Factor	Actual Concentration Test No. 1 pg TEQ/m³	Test No. 2 pg TEQ/m³	Test No. 3 pg TEQ/m³	Average pg TEQ/m³
2378-tetrachlorodibenzo-p-dioxin	1.000	<0.13	<0.20	<0.19	<0.17
12378-pentachlorodibenzo-p-dioxin	0.500	0.087	<0.060	<0.091	<0.079
123478-hexachlorodibenzo-p-dioxin	0.100	0.020	<0.014	<0.019	<0.018
123678-hexachlorodibenzo-p-dioxin	0.100	<0.033	<0.014	<0.027	<0.025
123789-hexachlorodibenzo-p-dioxin	0.100	0.033	<0.012	<0.016	<0.020
1234678-heptachlorodibenzo-p-dioxin	0.010	0.023	0.013	<0.013	<0.016
Octachlorodibenzo-p-dioxin	0.001	0.0026	<0.0013	<0.0014	<0.0018
2378-tetrachlorodibenzofuran	0.100	0.035	<0.020	<0.026	<0.027
12378-pentachlorodibenzofuran	0.050	0.021	<0.0080	<0.013	<0.014
23478-pentachlorodibenzofuran	0.500	0.34	<0.10	<0.15	<0.20
123478-hexachlorodibenzofuran	0.100	<0.010	<0.012	0.018	<0.013
123678-hexachlorodibenzofuran	0.100	<0.034	<0.018	<0.016	<0.023
234678-hexachlorodibenzofuran	0.100	<0.056	0.014	<0.018	<0.030
123789-hexachlorodibenzofuran	0.100	0.046	<0.029	<0.032	<0.036
1234678-heptachlorodibenzofuran	0.010	<0.0097	0.0041	<0.0043	<0.0060
1234789-heptachlorodibenzofuran	0.010	<0.0018	<0.0017	<0.0012	<0.0015
Octachlorodibenzofuran	0.001	0.00054	0.00029	<0.00020	<0.00034
PCB 77	0.0001	0.014	0.013	0.0012	0.0095
PCB 81	0.0003	<0.00017	<0.00023	0.00023	<0.00021
PCB 126	0.1000	0.21	<0.20	<0.041	<0.15
PCB 169	0.0300	<0.013	<0.0088	<0.0079	<0.010
PCB 105	0.00003	0.065	0.0045	0.0029	0.024
PCB 114	0.00003	0.0058	0.00039	0.00020	0.0021
PCB 118	0.00003	0.22	0.016	0.0088	0.081
PCB 123	0.00003	0.0039	0.00028	0.000099	0.0014
PCB 156/157	0.00003	0.0023	0.00031	0.00020	0.00093
PCB 167	0.00003	0.00091	0.00011	0.000077	0.00037
PCB 189	0.00003	<0.000011	0.000010	<0.0000064	<0.0000093
Total Dioxins & Furans Only		<0.89	<0.52	<0.65	<0.68

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/Rm³*	Test No. 2 pg TEQ/Rm³*	Test No. 3 pg TEQ/Rm³*	Average pg TEQ/Rm³*
2378-tetrachlorodibenzo-p-dioxin	1.000	<0.40	<0.62	<0.61	<0.55
12378-pentachlorodibenzo-p-dioxin	0.500	0.27	<0.19	<0.29	<0.25
123478-hexachlorodibenzo-p-dioxin	0.100	0.063	<0.043	<0.059	<0.055
123678-hexachlorodibenzo-p-dioxin	0.100	<0.10	<0.043	<0.086	<0.077
123789-hexachlorodibenzo-p-dioxin	0.100	0.10	<0.038	<0.051	<0.063
1234678-heptachlorodibenzo-p-dioxin	0.010	0.071	0.040	<0.042	<0.051
Octachlorodibenzo-p-dioxin	0.001	0.0081	<0.0042	<0.0044	<0.0055
2378-tetrachlorodibenzofuran	0.100	0.11	<0.062	<0.082	<0.084
12378-pentachlorodibenzofuran	0.050	0.064	<0.025	<0.042	<0.044
23478-pentachlorodibenzofuran	0.500	1.06	<0.33	<0.48	<0.62
123478-hexachlorodibenzofuran	0.100	<0.031	<0.038	0.057	<0.042
123678-hexachlorodibenzofuran	0.100	<0.10	<0.057	<0.050	<0.070
234678-hexachlorodibenzofuran	0.100	<0.17	0.045	<0.057	<0.092
123789-hexachlorodibenzofuran	0.100	0.14	<0.091	<0.10	<0.11
1234678-heptachlorodibenzofuran	0.010	<0.030	0.013	<0.014	<0.019
1234789-heptachlorodibenzofuran	0.010	<0.0054	<0.0053	<0.0036	<0.0048
Octachlorodibenzofuran	0.001	0.0017	0.00092	<0.00063	<0.0011
PCB 77	0.0001	0.045	0.040	0.0039	0.030
PCB 81	0.0003	<0.00052	<0.00074	0.00072	<0.00066
PCB 126	0.1000	0.64	<0.64	<0.13	<0.47
PCB 169	0.0300	<0.041	<0.028	<0.025	<0.031
PCB 105	0.00003	0.20	0.014	0.0090	0.074
PCB 114	0.00003	0.018	0.0012	0.00062	0.0066
PCB 118	0.00003	0.68	0.050	0.027	0.25
PCB 123	0.00003	0.012	0.00088	0.00031	0.0044
PCB 156/157	0.00003	0.0070	0.0010	0.00062	0.0029
PCB 167	0.00003	0.0028	0.00036	0.00024	0.0011
PCB 189	0.00003	<0.000035	0.000032	<0.000020	<0.000029
Total Dioxins & Furans Only		<2.73	<1.65	<2.02	<2.13

* 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/Rm³*	Test No. 2 pg TEQ/Rm³*	Test No. 3 pg TEQ/Rm³*	Average pg TEQ/Rm³*
2378-tetrachlorodibenzo-p-dioxin	1.000	<0.33	<0.50	<0.51	<0.45
12378-pentachlorodibenzo-p-dioxin	0.500	0.22	<0.15	<0.24	<0.20
123478-hexachlorodibenzo-p-dioxin	0.100	0.051	<0.035	<0.049	<0.045
123678-hexachlorodibenzo-p-dioxin	0.100	<0.082	<0.035	<0.072	<0.063
123789-hexachlorodibenzo-p-dioxin	0.100	0.082	<0.031	<0.043	<0.052
1234678-heptachlorodibenzo-p-dioxin	0.010	0.057	0.032	<0.035	<0.042
Octachlorodibenzo-p-dioxin	0.001	0.0066	<0.0034	<0.0037	<0.0045
2378-tetrachlorodibenzofuran	0.100	0.088	<0.050	<0.069	<0.069
12378-pentachlorodibenzofuran	0.050	0.052	<0.021	<0.035	<0.036
23478-pentachlorodibenzofuran	0.500	0.86	<0.27	<0.40	<0.51
123478-hexachlorodibenzofuran	0.100	<0.026	<0.031	0.048	<0.035
123678-hexachlorodibenzofuran	0.100	<0.085	<0.046	<0.041	<0.058
234678-hexachlorodibenzofuran	0.100	<0.14	0.036	<0.048	<0.075
123789-hexachlorodibenzofuran	0.100	0.12	<0.073	<0.085	<0.091
1234678-heptachlorodibenzofuran	0.010	<0.024	0.011	<0.011	<0.015
1234789-heptachlorodibenzofuran	0.010	<0.0044	<0.0043	<0.0030	<0.0039
Octachlorodibenzofuran	0.001	0.0014	0.00074	<0.00053	<0.00087
PCB 77	0.0001	0.036	0.033	0.0032	0.024
PCB 81	0.0003	<0.00043	<0.00060	0.00060	<0.00054
PCB 126	0.1000	0.52	<0.52	<0.11	<0.38
PCB 169	0.0300	<0.033	<0.022	<0.021	<0.025
PCB 105	0.00003	0.16	0.011	0.0076	0.060
PCB 114	0.00003	0.015	0.00099	0.00052	0.0054
PCB 118	0.00003	0.55	0.041	0.023	0.20
PCB 123	0.00003	0.0099	0.00072	0.00026	0.0036
PCB 156/157	0.00003	0.0057	0.00081	0.00052	0.0023
PCB 167	0.00003	0.0023	0.00029	0.00020	0.00093
PCB 189	0.00003	<0.000029	0.000026	<0.000017	<0.000024
Total Dioxins & Furans Only		<2.22	<1.33	<1.69	<1.75

* 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/Rm³*	Test No. 2 pg TEQ/Rm³*	Test No. 3 pg TEQ/Rm³*	Average pg TEQ/Rm³*
2378-tetrachlorodibenzo-p-dioxin	1.000	<0.20	<0.31	<0.31	<0.27
12378-pentachlorodibenzo-p-dioxin	0.500	0.13	<0.095	<0.14	<0.12
123478-hexachlorodibenzo-p-dioxin	0.100	0.031	<0.022	<0.030	<0.028
123678-hexachlorodibenzo-p-dioxin	0.100	<0.051	<0.022	<0.043	<0.039
123789-hexachlorodibenzo-p-dioxin	0.100	0.050	<0.019	<0.026	<0.032
1234678-heptachlorodibenzo-p-dioxin	0.010	0.035	0.020	<0.021	<0.026
Octachlorodibenzo-p-dioxin	0.001	0.0041	<0.0021	<0.0022	<0.0028
2378-tetrachlorodibenzofuran	0.100	0.054	<0.031	<0.042	<0.042
12378-pentachlorodibenzofuran	0.050	0.032	<0.013	<0.021	<0.022
23478-pentachlorodibenzofuran	0.500	0.53	<0.17	<0.24	<0.31
123478-hexachlorodibenzofuran	0.100	<0.016	<0.019	0.029	<0.021
123678-hexachlorodibenzofuran	0.100	<0.053	<0.028	<0.025	<0.035
234678-hexachlorodibenzofuran	0.100	<0.087	0.022	<0.029	<0.046
123789-hexachlorodibenzofuran	0.100	0.071	<0.046	<0.051	<0.056
1234678-heptachlorodibenzofuran	0.010	<0.015	0.0066	<0.0069	<0.0094
1234789-heptachlorodibenzofuran	0.010	<0.0027	<0.0027	<0.0018	<0.0024
Octachlorodibenzofuran	0.001	0.00084	0.00046	<0.00032	<0.00054
PCB 77	0.0001	0.022	0.020	0.0020	0.015
PCB 81	0.0003	<0.00026	<0.00037	0.00037	<0.00033
PCB 126	0.1000	0.32	<0.32	<0.065	<0.24
PCB 169	0.0300	<0.021	<0.014	<0.012	<0.016
PCB 105	0.00003	0.10	0.0071	0.0046	0.037
PCB 114	0.00003	0.0090	0.00062	0.00032	0.0033
PCB 118	0.00003	0.34	0.025	0.014	0.13
PCB 123	0.00003	0.0061	0.00044	0.00016	0.0022
PCB 156/157	0.00003	0.0035	0.00050	0.00031	0.0014
PCB 167	0.00003	0.0014	0.00018	0.00012	0.00057
PCB 189	0.00003	<0.000018	0.000016	<0.000010	<0.000015
Total Dioxins & Furans Only		<1.37	<0.83	<1.02	<1.07

* 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	<0.0077	<0.011	<0.011	<0.010
12378-pentachlorodibenzo-p-dioxin	0.500	0.0051	<0.0035	<0.0053	<0.0046
123478-hexachlorodibenzo-p-dioxin	0.100	0.0012	<0.00079	<0.0011	<0.0010
123678-hexachlorodibenzo-p-dioxin	0.100	<0.0019	<0.00079	<0.0016	<0.0014
123789-hexachlorodibenzo-p-dioxin	0.100	0.0019	<0.00069	<0.00095	<0.0012
1234678-heptachlorodibenzo-p-dioxin	0.010	0.0013	0.00073	<0.00078	<0.00095
Octachlorodibenzo-p-dioxin	0.001	0.00015	<0.000076	<0.000081	<0.00010
2378-tetrachlorodibenzofuran	0.100	0.0021	<0.0011	<0.0015	<0.0016
12378-pentachlorodibenzofuran	0.050	0.0012	<0.00047	<0.00078	<0.00082
23478-pentachlorodibenzofuran	0.500	0.020	<0.0060	<0.0088	<0.012
123478-hexachlorodibenzofuran	0.100	<0.00060	<0.00069	0.0011	<0.00078
123678-hexachlorodibenzofuran	0.100	<0.0020	<0.0010	<0.00092	<0.0013
234678-hexachlorodibenzofuran	0.100	<0.0033	0.00082	<0.0011	<0.0017
123789-hexachlorodibenzofuran	0.100	0.0027	<0.0017	<0.0019	<0.0021
1234678-heptachlorodibenzofuran	0.010	<0.00057	0.00024	<0.00025	<0.00035
1234789-heptachlorodibenzofuran	0.010	<0.00010	<0.000097	<0.000067	<0.000089
Octachlorodibenzofuran	0.001	0.000032	0.000017	<0.000012	<0.000020
PCB 77	0.0001	0.00085	0.00074	0.000071	0.00055
PCB 81	0.0003	<0.000010	<0.000013	0.000013	<0.000012
PCB 126	0.1000	0.012	<0.012	<0.0024	<0.0088
PCB 169	0.0300	<0.00078	<0.00051	<0.00046	<0.00058
PCB 105	0.00003	0.0038	0.00026	0.00017	0.0014
PCB 114	0.00003	0.00034	0.000022	0.000012	0.00013
PCB 118	0.00003	0.013	0.00092	0.00051	0.0048
PCB 123	0.00003	0.00023	0.000016	0.0000057	0.000084
PCB 156/157	0.00003	0.00013	0.000018	0.000011	0.000055
PCB 167	0.00003	0.000054	0.0000066	0.0000045	0.000022
PCB 189	0.00003	<0.00000067	0.00000058	<0.00000037	<0.00000054
Total Dioxins & Furans Only		<0.052	<0.030	<0.037	<0.040

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/m³	Dry Reference Concentration pg TEQ/Rm³*	Dry Adjusted Concentration pg TEQ/Rm³**	Wet Reference Concentration pg TEQ/Rm³*	Emission Rate ng TEQ/s
2378-tetrachlorodibenzo-p-dioxin	<0.17	<0.55	<0.45	<0.27	<0.010
12378-pentachlorodibenzo-p-dioxin	<0.079	<0.25	<0.20	<0.12	<0.0046
123478-hexachlorodibenzo-p-dioxin	<0.018	<0.055	<0.045	<0.028	<0.0010
123678-hexachlorodibenzo-p-dioxin	<0.025	<0.077	<0.063	<0.039	<0.0014
123789-hexachlorodibenzo-p-dioxin	<0.020	<0.063	<0.052	<0.032	<0.0012
1234678-heptachlorodibenzo-p-dioxin	<0.016	<0.051	<0.042	<0.026	<0.00095
Octachlorodibenzo-p-dioxin	<0.0018	<0.0055	<0.0045	<0.0028	<0.00010
2378-tetrachlorodibenzofuran	<0.027	<0.084	<0.069	<0.042	<0.0016
12378-pentachlorodibenzofuran	<0.014	<0.044	<0.036	<0.022	<0.00082
23478-pentachlorodibenzofuran	<0.20	<0.62	<0.51	<0.31	<0.012
123478-hexachlorodibenzofuran	<0.013	<0.042	<0.035	<0.021	<0.00078
123678-hexachlorodibenzofuran	<0.023	<0.070	<0.058	<0.035	<0.0013
234678-hexachlorodibenzofuran	<0.030	<0.092	<0.075	<0.046	<0.0017
123789-hexachlorodibenzofuran	<0.036	<0.11	<0.091	<0.056	<0.0021
1234678-heptachlorodibenzofuran	<0.0060	<0.019	<0.015	<0.0094	<0.00035
1234789-heptachlorodibenzofuran	<0.0015	<0.0048	<0.0039	<0.0024	<0.000089
Octachlorodibenzofuran	<0.00034	<0.0011	<0.00087	<0.00054	<0.000020
PCB 77	0.0095	0.030	0.024	0.015	0.00055
PCB 81	<0.00021	<0.00066	<0.00054	<0.00033	<0.000012
PCB 126	<0.15	<0.47	<0.38	<0.24	<0.0088
PCB 169	<0.010	<0.031	<0.025	<0.016	<0.00058
PCB 105	0.024	0.074	0.060	0.037	0.0014
PCB 114	0.0021	0.0066	0.0054	0.0033	0.00013
PCB 118	0.081	0.25	0.20	0.13	0.0048
PCB 123	0.0014	0.0044	0.0036	0.0022	0.000084
PCB 156/157	0.00093	0.0029	0.0023	0.0014	0.000055
PCB 167	0.00037	0.0011	0.00093	0.00057	0.000022
PCB 189	<0.0000093	<0.000029	<0.000024	<0.000015	<0.00000054
Total Dioxins & Furans Only	<0.68	<2.13	<1.75	<1.07	<0.040

* 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 pg TEQ/m³	Dry Reference Concentration pg TEQ/Rm³*	Dry Adjusted Concentration pg TEQ/Rm³**	Wet Reference Concentration pg TEQ/Rm³*	Emission Rate ng TEQ/s
2378-tetrachlorodibenzo-p-dioxin	0.087	1.37	0.22	0.14	0.0051
12378-pentachlorodibenzo-p-dioxin	0.11	0.34	0.28	0.17	0.0063
123478-hexachlorodibenzo-p-dioxin	0.012	0.038	0.031	0.019	0.00071
123678-hexachlorodibenzo-p-dioxin	0.012	0.038	0.032	0.019	0.00072
123789-hexachlorodibenzo-p-dioxin	0.016	0.048	0.040	0.024	0.00091
1234678-heptachlorodibenzo-p-dioxin	0.014	0.044	0.036	0.022	0.00082
Octachlorodibenzo-p-dioxin	0.00040	0.0012	0.0010	0.00062	0.000023
2378-tetrachlorodibenzofuran	0.019	0.060	0.049	0.030	0.0011
12378-pentachlorodibenzofuran	0.0063	0.019	0.016	0.0098	0.00037
23478-pentachlorodibenzofuran	0.094	0.29	0.24	0.15	0.0055
123478-hexachlorodibenzofuran	0.0097	0.030	0.025	0.015	0.00057
123678-hexachlorodibenzofuran	0.011	0.035	0.029	0.018	0.00066
234678-hexachlorodibenzofuran	0.017	0.053	0.043	0.027	0.0010
123789-hexachlorodibenzofuran	0.026	0.079	0.065	0.040	0.0015
1234678-heptachlorodibenzofuran	0.0037	0.012	0.0094	0.0058	0.00022
1234789-heptachlorodibenzofuran	0.00076	0.0024	0.0020	0.0012	0.000045
Octachlorodibenzofuran	0.000093	0.00029	0.00024	0.00015	0.0000054
PCB 77	0.0095	0.030	0.024	0.015	0.00055
PCB 81	0.00014	0.00045	0.00037	0.00023	0.0000084
PCB 126	0.11	0.34	0.28	0.17	0.0064
PCB 169	0.0050	0.016	0.013	0.0078	0.00029
PCB 105	0.024	0.074	0.060	0.037	0.0014
PCB 114	0.0021	0.0066	0.0054	0.0033	0.00013
PCB 118	0.081	0.25	0.20	0.13	0.0048
PCB 123	0.0014	0.0044	0.0036	0.0022	0.000084
PCB 156/157	0.00093	0.0029	0.0023	0.0014	0.000055
PCB 167	0.00037	0.0011	0.00093	0.00057	0.000022
PCB 189	0.0000063	0.000020	0.000016	0.0000099	0.00000037
Total Dioxins & Furans Only	0.44	2.46	1.12	0.69	0.026
Total Dioxins, Furans and PCBs	0.67	3.19	1.71	1.05	0.039

* 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	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
Dichlorinated biphenyls	21000	1.19	3.67	2.98	1.84	0.070
Trichlorinated biphenyls	48200	2.74	8.43	6.85	4.23	0.16
Tetrachlorinated biphenyls	975000	55.4	171	139	85.5	3.26
Pentachlorinated biphenyls	2230000	127	390	317	196	7.45
Hexachlorinated biphenyls	342000	19.4	59.8	48.6	30.0	1.14
Heptachlorinated biphenyls	14700	0.84	2.57	2.09	1.29	0.049
Octachlorinated biphenyls	1180	0.067	0.21	0.17	0.10	0.0039
Nonachlorinated biphenyls	94.2	0.0054	0.016	0.013	0.0083	0.00031
Decachlorinated biphenyl	27.7	0.0016	0.0048	0.0039	0.0024	0.000093
Total	3632202	206	635	516	318	12.1

Dry Gas Volume Sampled (Rm^3*) :	5.718
Actual Flowrate (m^3/s) :	58.8
Dry Reference Flowrate (Rm^3/s*) :	19.1
Dry Adjusted Flowrate (Rm^3/s**) :	23.5
Wet Reference Flowrate (Rm^3/s*) :	38.1

* 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	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
Dichlorinated biphenyls	10700	0.64	2.02	1.64	1.02	0.037
Trichlorinated biphenyls	12200	0.73	2.30	1.86	1.16	0.042
Tetrachlorinated biphenyls	64900	3.87	12.3	9.92	6.16	0.22
Pentachlorinated biphenyls	79900	4.76	15.1	12.2	7.58	0.28
Hexachlorinated biphenyls	12100	0.72	2.28	1.85	1.15	0.042
Heptachlorinated biphenyls	1150	0.069	0.22	0.18	0.11	0.0040
Octachlorinated biphenyls	278	0.017	0.052	0.042	0.026	0.00096
Nonachlorinated biphenyls	21.5	0.0013	0.0041	0.0033	0.0020	0.000074
Decachlorinated biphenyl	23.0	0.0014	0.0043	0.0035	0.0022	0.000079
Total	181273	10.8	34.2	27.7	17.2	0.63

Dry Gas Volume Sampled (Rm³*) :	5.297
Actual Flowrate (m³/s) :	58.0
Dry Reference Flowrate (Rm³/s*) :	18.3
Dry Adjusted Flowrate (Rm³/s**) :	22.6
Wet Reference Flowrate (Rm³/s*) :	36.4

* 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	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
Dichlorinated biphenyls	8610	0.52	1.64	1.37	0.83	0.030
Trichlorinated biphenyls	4940	0.30	0.94	0.79	0.48	0.017
Tetrachlorinated biphenyls	29900	1.82	5.70	4.77	2.89	0.11
Pentachlorinated biphenyls	41100	2.50	7.84	6.56	3.97	0.14
Hexachlorinated biphenyls	7560	0.46	1.44	1.21	0.73	0.027
Heptachlorinated biphenyls	714	0.043	0.14	0.11	0.069	0.0025
Octachlorinated biphenyls	118	0.0072	0.022	0.019	0.011	0.00042
Nonachlorinated biphenyls	<7.5	<0.00046	<0.0014	<0.0012	<0.00072	<0.000026
Decachlorinated biphenyl	25.0	0.0015	0.0048	0.0040	0.0024	0.000088
Total	<92975	<5.66	<17.7	<14.8	<8.98	<0.33

Dry Gas Volume Sampled (Rm^3*) :	5.245
Actual Flowrate (m^3/s) :	57.9
Dry Reference Flowrate (Rm^3/s*) :	18.5
Dry Adjusted Flowrate (Rm^3/s**) :	22.1
Wet Reference Flowrate (Rm^3/s*) :	36.5

* 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				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/m³	ng/m³	ng/m³	ng/m³	%
Dichlorinated biphenyls	1.19	0.64	0.52	0.78	45.6
Trichlorinated biphenyls	2.74	0.73	0.30	1.26	104
Tetrachlorinated biphenyls	55.4	3.87	1.82	20.4	149
Pentachlorinated biphenyls	127	4.76	2.50	44.6	159
Hexachlorinated biphenyls	19.4	0.72	0.46	6.87	158
Heptachlorinated biphenyls	0.84	0.069	0.043	0.32	143
Octachlorinated biphenyls	0.067	0.017	0.0072	0.030	106
Nonachlorinated biphenyls	0.0054	0.0013	<0.00046	<0.0024	111
Decachlorinated biphenyl	0.0016	0.0014	0.0015	0.0015	7.1
Total	206	10.8	<5.66	<74.3	154

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

Congener Group	Dry Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Dichlorinated biphenyls	3.67	2.02	1.64	2.44	44.2
Trichlorinated biphenyls	8.43	2.30	0.94	3.89	102
Tetrachlorinated biphenyls	171	12.3	5.70	62.8	149
Pentachlorinated biphenyls	390	15.1	7.84	138	159
Hexachlorinated biphenyls	59.8	2.28	1.44	21.2	158
Heptachlorinated biphenyls	2.57	0.22	0.14	0.97	142
Octachlorinated biphenyls	0.21	0.052	0.022	0.094	105
Nonachlorinated biphenyls	0.016	0.0041	<0.0014	<0.0073	110
Decachlorinated biphenyl	0.0048	0.0043	0.0048	0.0047	5.8
Total	635	34.2	<17.7	<229	154

* At 25°C and 1 atmosphere

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

Congener Group	Dry Adjusted Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Dichlorinated biphenyls	2.98	1.64	1.37	2.00	43.3
Trichlorinated biphenyls	6.85	1.86	0.79	3.17	102
Tetrachlorinated biphenyls	139	9.92	4.77	51.1	148
Pentachlorinated biphenyls	317	12.2	6.56	112	159
Hexachlorinated biphenyls	48.6	1.85	1.21	17.2	158
Heptachlorinated biphenyls	2.09	0.18	0.11	0.79	142
Octachlorinated biphenyls	0.17	0.042	0.019	0.076	105
Nonachlorinated biphenyls	0.013	0.0033	<0.0012	<0.0060	109
Decachlorinated biphenyl	0.0039	0.0035	0.0040	0.0038	6.8
Total	516	27.7	<14.8	<186	153

* 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				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Dichlorinated biphenyls	1.84	1.02	0.83	1.23	43.7
Trichlorinated biphenyls	4.23	1.16	0.48	1.95	102
Tetrachlorinated biphenyls	85.5	6.16	2.89	31.5	148
Pentachlorinated biphenyls	196	7.58	3.97	69.0	159
Hexachlorinated biphenyls	30.0	1.15	0.73	10.6	158
Heptachlorinated biphenyls	1.29	0.11	0.069	0.49	142
Octachlorinated biphenyls	0.10	0.026	0.011	0.047	105
Nonachlorinated biphenyls	0.0083	0.0020	<0.00072	<0.0037	110
Decachlorinated biphenyl	0.0024	0.0022	0.0024	0.0023	5.9
Total	318	17.2	<8.98	<115	154

* 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	0.070	0.037	0.030	0.046	46.5
Trichlorinated biphenyls	0.16	0.042	0.017	0.074	104
Tetrachlorinated biphenyls	3.26	0.22	0.11	1.20	149
Pentachlorinated biphenyls	7.45	0.28	0.14	2.62	159
Hexachlorinated biphenyls	1.14	0.042	0.027	0.40	159
Heptachlorinated biphenyls	0.049	0.0040	0.0025	0.019	143
Octachlorinated biphenyls	0.0039	0.00096	0.00042	0.0018	107
Nonachlorinated biphenyls	0.00031	0.000074	<0.000026	<0.00014	112
Decachlorinated biphenyl	0.000093	0.000079	0.000088	0.000087	7.7
Total	12.1	0.63	<0.33	<4.36	154

TABLE 70
Clean Harbors Sarnia
Summary of Polychlorinated Biphenyl Emission Data

Congener Group	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
Dichlorinated biphenyls	0.78	2.44	2.00	1.23	0.046
Trichlorinated biphenyls	1.26	3.89	3.17	1.95	0.074
Tetrachlorinated biphenyls	20.4	62.8	51.1	31.5	1.20
Pentachlorinated biphenyls	44.6	138	112	69.0	2.62
Hexachlorinated biphenyls	6.87	21.2	17.2	10.6	0.40
Heptachlorinated biphenyls	0.32	0.97	0.79	0.49	0.019
Octachlorinated biphenyls	0.030	0.094	0.076	0.047	0.0018
Nonachlorinated biphenyls	<0.0024	<0.0073	<0.0060	<0.0037	<0.00014
Decachlorinated biphenyl	0.0015	0.0047	0.0038	0.0023	0.000087
Total	<74.3	<229	<186	<115	<4.36

* 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	759	97.1
Trichlorinated biphenyls	814	95.1
Tetrachlorinated biphenyls	4040	69.1
Pentachlorinated biphenyls	10800	93.0
Hexachlorinated biphenyls	2920	30.5
Heptachlorinated biphenyls	301	<1.5
Octachlorinated biphenyls	52.3	5.81
Nonachlorinated biphenyls	<6.9	<7.3
Decachlorinated biphenyl	20.1	23.0
Total	<19713	<422

"<" 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	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
1,3-Dichlorobenzene	437	24.8	76.4	62.1	38.3	1.46
1,4-Dichlorobenzene	126	7.16	22.0	17.9	11.0	0.42
1,2-Dichlorobenzene	114	6.48	19.9	16.2	9.99	0.38
Total Dichlorobenzene	677	38.5	118	96.2	59.4	2.26
1,3,5-trichlorobenzene	18.2	1.03	3.18	2.59	1.60	0.061
1,2,4-trichlorobenzene	116	6.59	20.3	16.5	10.2	0.39
1,2,3-trichlorobenzene	31.3	1.78	5.47	4.45	2.74	0.10
Total Trichlorobenzene	166	9.40	28.9	23.5	14.5	0.55
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	52.8	3.00	9.23	7.51	4.63	0.18
1,2,3,4-tetrachlorobenzene	<16	<0.91	<2.80	<2.27	<1.40	<0.053
Total Tetrachlorobenzene	<68.8	<3.91	<12.0	<9.78	<6.03	<0.23
Pentachlorobenzene	30.9	1.76	5.40	4.39	2.71	0.10
Hexachlorobenzene	<16	<0.91	<2.80	<2.27	<1.40	<0.053
Total Chlorobenzenes	<958	<54.4	<168	<136	<84.0	<3.20
Hexachloroethane	<16	<0.91	<2.80	<2.27	<1.40	<0.053
a,2,6-Trichlorotoluene	<16	<0.91	<2.80	<2.27	<1.40	<0.053

Dry Gas Volume Sampled (Rm³*) :	5.718
Actual Flowrate (m³/s) :	58.8
Dry Reference Flowrate (Rm³/s*) :	19.1
Dry Adjusted Flowrate (Rm³/s**) :	23.5
Wet Reference Flowrate (Rm³/s*) :	38.1

* 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	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
1,3-Dichlorobenzene	576	34.3	109	88.1	54.7	1.99
1,4-Dichlorobenzene	303	18.0	57.2	46.3	28.8	1.05
1,2-Dichlorobenzene	167	9.95	31.5	25.5	15.9	0.58
Total Dichlorobenzene	1046	62.3	197	160	99.3	3.61
1,3,5-trichlorobenzene	54.6	3.25	10.3	8.35	5.18	0.19
1,2,4-trichlorobenzene	154	9.17	29.1	23.5	14.6	0.53
1,2,3-trichlorobenzene	60.2	3.59	11.4	9.20	5.71	0.21
Total Trichlorobenzene	269	16.0	50.7	41.1	25.5	0.93
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	69.3	4.13	13.1	10.6	6.58	0.24
1,2,3,4-tetrachlorobenzene	25.3	1.51	4.78	3.87	2.40	0.087
Total Tetrachlorobenzene	94.6	5.63	17.9	14.5	8.98	0.33
Pentachlorobenzene	49.1	2.92	9.27	7.51	4.66	0.17
Hexachlorobenzene	19.0	1.13	3.59	2.90	1.80	0.066
Total Chlorobenzenes	1478	88.0	279	226	140	5.10
Hexachloroethane	<16	<0.95	<3.02	<2.45	<1.52	<0.055
a,2,6-Trichlorotoluene	<16	<0.95	<3.02	<2.45	<1.52	<0.055

Dry Gas Volume Sampled (Rm³*) :	5.297
Actual Flowrate (m³/s) :	58.0
Dry Reference Flowrate (Rm³/s*) :	18.3
Dry Adjusted Flowrate (Rm³/s**) :	22.6
Wet Reference Flowrate (Rm³/s*) :	36.4

* 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	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
1,3-Dichlorobenzene	1580	96.3	301	252	153	5.57
1,4-Dichlorobenzene	440	26.8	83.9	70.2	42.5	1.55
1,2-Dichlorobenzene	526	32.0	100	83.9	50.8	1.86
Total Dichlorobenzene	2546	155	485	406	246	8.98
1,3,5-trichlorobenzene	31.9	1.94	6.08	5.09	3.08	0.11
1,2,4-trichlorobenzene	271	16.5	51.7	43.3	26.2	0.96
1,2,3-trichlorobenzene	98.8	6.02	18.8	15.8	9.55	0.35
Total Trichlorobenzene	402	24.5	76.6	64.1	38.8	1.42
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	158	9.63	30.1	25.2	15.3	0.56
1,2,3,4-tetrachlorobenzene	38.6	2.35	7.36	6.16	3.73	0.14
Total Tetrachlorobenzene	197	12.0	37.5	31.4	19.0	0.69
Pentachlorobenzene	54.2	3.30	10.3	8.65	5.24	0.19
Hexachlorobenzene	19.4	1.18	3.70	3.10	1.87	0.068
Total Chlorobenzenes	3218	196	614	514	311	11.4
Hexachloroethane	<16	<0.97	<3.05	<2.55	<1.55	<0.056
a,2,6-Trichlorotoluene	<16	<0.97	<3.05	<2.55	<1.55	<0.056

Dry Gas Volume Sampled (Rm^3*) :	5.245
Actual Flowrate (m^3/s) :	57.9
Dry Reference Flowrate (Rm^3/s*) :	18.5
Dry Adjusted Flowrate (Rm^3/s**) :	22.1
Wet Reference Flowrate (Rm^3/s*) :	36.5

* 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				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/m³	ng/m³	ng/m³	ng/m³	%
1,3-Dichlorobenzene	24.8	34.3	96.3	51.8	74.9
1,4-Dichlorobenzene	7.16	18.0	26.8	17.3	56.8
1,2-Dichlorobenzene	6.48	9.95	32.0	16.2	85.8
Total Dichlorobenzene	38.5	62.3	155	85.3	72.3
1,3,5-trichlorobenzene	1.03	3.25	1.94	2.08	53.7
1,2,4-trichlorobenzene	6.59	9.17	16.5	10.8	47.8
1,2,3-trichlorobenzene	1.78	3.59	6.02	3.79	56.1
Total Trichlorobenzene	9.40	16.0	24.5	16.6	45.4
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	3.00	4.13	9.63	5.58	63.5
1,2,3,4-tetrachlorobenzene	<0.91	1.51	2.35	<1.59	45.6
Total Tetrachlorobenzene	<3.91	5.63	12.0	<7.17	59.2
Pentachlorobenzene	1.76	2.92	3.30	2.66	30.3
Hexachlorobenzene	<0.91	1.13	1.18	<1.07	13.5
Total Chlorobenzenes	<54.4	88.0	196	<113	65.6
Hexachloroethane	<0.91	<0.95	<0.97	<0.95	3.5
a,2,6-Trichlorotoluene	<0.91	<0.95	<0.97	<0.95	3.5

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

Specific Isomer	Dry Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
1,3-Dichlorobenzene	76.4	109	301	162	75.0
1,4-Dichlorobenzene	22.0	57.2	83.9	54.4	57.1
1,2-Dichlorobenzene	19.9	31.5	100	50.6	85.9
Total Dichlorobenzene	118	197	485	267	72.3
1,3,5-trichlorobenzene	3.18	10.3	6.08	6.52	54.9
1,2,4-trichlorobenzene	20.3	29.1	51.7	33.7	48.1
1,2,3-trichlorobenzene	5.47	11.4	18.8	11.9	56.3
Total Trichlorobenzene	28.9	50.7	76.6	52.1	45.8
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	9.23	13.1	30.1	17.5	63.6
1,2,3,4-tetrachlorobenzene	<2.80	4.78	7.36	<4.98	45.9
Total Tetrachlorobenzene	<12.0	17.9	37.5	<22.5	59.4
Pentachlorobenzene	5.40	9.27	10.3	8.34	31.1
Hexachlorobenzene	<2.80	3.59	3.70	<3.36	14.6
Total Chlorobenzenes	<168	279	614	<353	65.7
Hexachloroethane	<2.80	<3.02	<3.05	<2.96	4.7
a,2,6-Trichlorotoluene	<2.80	<3.02	<3.05	<2.96	4.7

* 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				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
1,3-Dichlorobenzene	62.1	88.1	252	134	76.8
1,4-Dichlorobenzene	17.9	46.3	70.2	44.8	58.4
1,2-Dichlorobenzene	16.2	25.5	83.9	41.9	87.6
Total Dichlorobenzene	96.2	160	406	221	74.2
1,3,5-trichlorobenzene	2.59	8.35	5.09	5.34	54.1
1,2,4-trichlorobenzene	16.5	23.5	43.3	27.8	50.0
1,2,3-trichlorobenzene	4.45	9.20	15.8	9.81	58.0
Total Trichlorobenzene	23.5	41.1	64.1	42.9	47.4
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	7.51	10.6	25.2	14.4	65.5
1,2,3,4-tetrachlorobenzene	<2.27	3.87	6.16	<4.10	47.6
Total Tetrachlorobenzene	<9.78	14.5	31.4	<18.5	61.3
Pentachlorobenzene	4.39	7.51	8.65	6.85	32.2
Hexachlorobenzene	<2.27	2.90	3.10	<2.76	15.6
Total Chlorobenzenes	<136	226	514	<292	67.5
Hexachloroethane	<2.27	<2.45	<2.55	<2.42	5.8
a,2,6-Trichlorotoluene	<2.27	<2.45	<2.55	<2.42	5.8

* 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 of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
1,3-Dichlorobenzene	38.3	54.7	153	81.9	75.5
1,4-Dichlorobenzene	11.0	28.8	42.5	27.4	57.5
1,2-Dichlorobenzene	9.99	15.9	50.8	25.6	86.4
Total Dichlorobenzene	59.4	99.3	246	135	72.9
1,3,5-trichlorobenzene	1.60	5.18	3.08	3.29	54.8
1,2,4-trichlorobenzene	10.2	14.6	26.2	17.0	48.7
1,2,3-trichlorobenzene	2.74	5.71	9.55	6.00	56.8
Total Trichlorobenzene	14.5	25.5	38.8	26.3	46.3
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	4.63	6.58	15.3	8.82	64.2
1,2,3,4-tetrachlorobenzene	<1.40	2.40	3.73	<2.51	46.5
Total Tetrachlorobenzene	<6.03	8.98	19.0	<11.3	60.0
Pentachlorobenzene	2.71	4.66	5.24	4.20	31.5
Hexachlorobenzene	<1.40	1.80	1.87	<1.69	15.0
Total Chlorobenzenes	<84.0	140	311	<178	66.3
Hexachloroethane	<1.40	<1.52	<1.55	<1.49	5.1
a,2,6-Trichlorotoluene	<1.40	<1.52	<1.55	<1.49	5.1

* 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	1.46	1.99	5.57	3.01	74.4
1,4-Dichlorobenzene	0.42	1.05	1.55	1.01	56.3
1,2-Dichlorobenzene	0.38	0.58	1.86	0.94	85.4
Total Dichlorobenzene	2.26	3.61	8.98	4.95	71.8
1,3,5-trichlorobenzene	0.061	0.19	0.11	0.12	53.3
1,2,4-trichlorobenzene	0.39	0.53	0.96	0.63	47.3
1,2,3-trichlorobenzene	0.10	0.21	0.35	0.22	55.6
Total Trichlorobenzene	0.55	0.93	1.42	0.97	44.8
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	0.18	0.24	0.56	0.32	62.9
1,2,3,4-tetrachlorobenzene	<0.053	0.087	0.14	<0.092	45.0
Total Tetrachlorobenzene	<0.23	0.33	0.69	<0.42	58.7
Pentachlorobenzene	0.10	0.17	0.19	0.15	29.6
Hexachlorobenzene	<0.053	0.066	0.068	<0.063	12.7
Total Chlorobenzenes	<3.20	5.10	11.4	<6.55	65.1
Hexachloroethane	<0.053	<0.055	<0.056	<0.055	2.7
a,2,6-Trichlorotoluene	<0.053	<0.055	<0.056	<0.055	2.7

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	51.8	162	134	81.9	3.01
1,4-Dichlorobenzene	17.3	54.4	44.8	27.4	1.01
1,2-Dichlorobenzene	16.2	50.6	41.9	25.6	0.94
Total Dichlorobenzene	85.3	267	221	135	4.95
1,3,5-trichlorobenzene	2.08	6.52	5.34	3.29	0.12
1,2,4-trichlorobenzene	10.8	33.7	27.8	17.0	0.63
1,2,3-trichlorobenzene	3.79	11.9	9.81	6.00	0.22
Total Trichlorobenzene	16.6	52.1	42.9	26.3	0.97
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	5.58	17.5	14.4	8.82	0.32
1,2,3,4-tetrachlorobenzene	<1.59	<4.98	<4.10	<2.51	<0.092
Total Tetrachlorobenzene	<7.17	<22.5	<18.5	<11.3	<0.42
Pentachlorobenzene	2.66	8.34	6.85	4.20	0.15
Hexachlorobenzene	<1.07	<3.36	<2.76	<1.69	<0.063
Total Chlorobenzenes	<113	<353	<292	<178	<6.55
Hexachloroethane	<0.95	<2.96	<2.42	<1.49	<0.055
a,2,6-Trichlorotoluene	<0.95	<2.96	<2.42	<1.49	<0.055

* 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	<16
1,4-Dichlorobenzene	<16	<16
1,2-Dichlorobenzene	<16	<16
Total Dichlorobenzene	<48.0	<48.0
1,3,5-trichlorobenzene	<16	<16
1,2,4-trichlorobenzene	<16	<16
1,2,3-trichlorobenzene	<16	<16
Total Trichlorobenzene	<48.0	<48.0
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	<16	<16
1,2,3,4-tetrachlorobenzene	<16	<16
Total Tetrachlorobenzene	<32.0	<32.0
Pentachlorobenzene	<16	<16
Hexachlorobenzene	<16	<16
Total Chlorobenzenes	<160	<160
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	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
2,6-dichlorophenol	<80	<4.54	<14.0	<11.4	<7.01	<0.27
2,4 & 2,5-dichlorophenol	<80	<4.54	<14.0	<11.4	<7.01	<0.27
3,5-dichlorophenol	<80	<4.54	<14.0	<11.4	<7.01	<0.27
2,3-dichlorophenol	<80	<4.54	<14.0	<11.4	<7.01	<0.27
3,4-dichlorophenol	<80	<4.54	<14.0	<11.4	<7.01	<0.27
Total Dichlorophenols	<400	<22.7	<70.0	<56.9	<35.1	<1.34
2,4,6-trichlorophenol	<80	<4.54	<14.0	<11.4	<7.01	<0.27
2,3,6-trichlorophenol	<80	<4.54	<14.0	<11.4	<7.01	<0.27
2,3,5-trichlorophenol	<80	<4.54	<14.0	<11.4	<7.01	<0.27
2,4,5-trichlorophenol	<80	<4.54	<14.0	<11.4	<7.01	<0.27
2,3,4-trichlorophenol	<80	<4.54	<14.0	<11.4	<7.01	<0.27
3,4,5-trichlorophenol	<80	<4.54	<14.0	<11.4	<7.01	<0.27
Total Trichlorophenols	<480	<27.3	<83.9	<68.2	<42.1	<1.60
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<80	<4.54	<14.0	<11.4	<7.01	<0.27
2,3,4,5-tetrachlorophenol	<80	<4.54	<14.0	<11.4	<7.01	<0.27
Total Tetrachlorophenols	<160	<9.09	<28.0	<22.7	<14.0	<0.53
Pentachlorophenol	<80	<4.54	<14.0	<11.4	<7.01	<0.27
Total Chlorophenols	<1120	<63.6	<196	<159	<98.2	<3.74
Heptachlor	<0.24	<0.014	<0.042	<0.034	<0.021	<0.00080
Heptachlor Epoxide A	<1.7	<0.097	<0.30	<0.24	<0.15	<0.0057
Heptachlor Epoxide B	<0.30	<0.017	<0.052	<0.043	<0.026	<0.0010
Total Heptachlor	<2.24	<0.13	<0.39	<0.32	<0.20	<0.0075
Oxychlorodane	<0.51	<0.029	<0.089	<0.072	<0.045	<0.0017
trans-Chlorodane	<6.2	<0.35	<1.08	<0.88	<0.54	<0.021
cis-Chlorodane	<5.8	<0.33	<1.01	<0.82	<0.51	<0.019
Total Chlorodane	<12.5	<0.71	<2.19	<1.78	<1.10	<0.042
Parlar-26	<4.8	<0.27	<0.84	<0.68	<0.42	<0.016
Parlar-50	<4.7	<0.27	<0.82	<0.67	<0.41	<0.016
Parlar-62	<6.1	<0.35	<1.07	<0.87	<0.53	<0.020
Total Toxaphene	<15.6	<0.89	<2.73	<2.22	<1.37	<0.052
Hexachlorophene	<80	<4.54	<14.0	<11.4	<7.01	<0.27
Hexachlorobutadiene	4.14	0.24	0.72	0.59	0.36	0.014
Octachlorostyrene	<0.78	<0.044	<0.14	<0.11	<0.068	<0.0026
Tributyltin	<200	<11.4	<35.0	<28.4	<17.5	<0.67

Dry Gas Volume Sampled (Rm³*) :	5.718
Actual Flowrate (m³/s) :	58.8
Dry Reference Flowrate (Rm³/s*) :	19.1
Dry Adjusted Flowrate (Rm³/s**) :	23.5
Wet Reference Flowrate (Rm³/s*) :	38.1

* 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	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
2,6-dichlorophenol	<80	<4.77	<15.1	<12.2	<7.59	<0.28
2,4 & 2,5-dichlorophenol	<80	<4.77	<15.1	<12.2	<7.59	<0.28
3,5-dichlorophenol	<80	<4.77	<15.1	<12.2	<7.59	<0.28
2,3-dichlorophenol	<80	<4.77	<15.1	<12.2	<7.59	<0.28
3,4-dichlorophenol	<80	<4.77	<15.1	<12.2	<7.59	<0.28
Total Dichlorophenols	<400	<23.8	<75.5	<61.1	<38.0	<1.38
2,4,6-trichlorophenol	<80	<4.77	<15.1	<12.2	<7.59	<0.28
2,3,6-trichlorophenol	<80	<4.77	<15.1	<12.2	<7.59	<0.28
2,3,5-trichlorophenol	<80	<4.77	<15.1	<12.2	<7.59	<0.28
2,4,5-trichlorophenol	<80	<4.77	<15.1	<12.2	<7.59	<0.28
2,3,4-trichlorophenol	<80	<4.77	<15.1	<12.2	<7.59	<0.28
3,4,5-trichlorophenol	<80	<4.77	<15.1	<12.2	<7.59	<0.28
Total Trichlorophenols	<480	<28.6	<90.6	<73.4	<45.6	<1.66
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<80	<4.77	<15.1	<12.2	<7.59	<0.28
2,3,4,5-tetrachlorophenol	<80	<4.77	<15.1	<12.2	<7.59	<0.28
Total Tetrachlorophenols	<160	<9.53	<30.2	<24.5	<15.2	<0.55
Pentachlorophenol	<80	<4.77	<15.1	<12.2	<7.59	<0.28
Total Chlorophenols	<1120	<66.7	<211	<171	<106	<3.87
Heptachlor	<0.59	<0.035	<0.11	<0.090	<0.056	<0.0020
Heptachlor Epoxide A	<2.8	<0.17	<0.53	<0.43	<0.27	<0.0097
Heptachlor Epoxide B	<0.49	<0.029	<0.093	<0.075	<0.047	<0.0017
Total Heptachlor	<3.88	<0.23	<0.73	<0.59	<0.37	<0.013
Oxychlorodane	<0.69	<0.041	<0.13	<0.11	<0.065	<0.0024
trans-Chlorodane	<6.4	<0.38	<1.21	<0.98	<0.61	<0.022
cis-Chlorodane	<6.0	<0.36	<1.13	<0.92	<0.57	<0.021
Total Chlorodane	<13.1	<0.78	<2.47	<2.00	<1.24	<0.045
Parlar-26	<5.0	<0.30	<0.94	<0.76	<0.47	<0.017
Parlar-50	<4.4	<0.26	<0.83	<0.67	<0.42	<0.015
Parlar-62	<5.7	<0.34	<1.08	<0.87	<0.54	<0.020
Total Toxaphene	<15.1	<0.90	<2.85	<2.31	<1.43	<0.052
Hexachlorophene	<80	<4.77	<15.1	<12.2	<7.59	<0.28
Hexachlorobutadiene	<4.2	<0.25	<0.79	<0.64	<0.40	<0.015
Octachlorostyrene	<0.54	<0.032	<0.10	<0.083	<0.051	<0.0019
Tributyltin	<200	<11.9	<37.8	<30.6	<19.0	<0.69

Dry Gas Volume Sampled (Rm³*) :	5.297
Actual Flowrate (m³/s) :	58.0
Dry Reference Flowrate (Rm³/s*) :	18.3
Dry Adjusted Flowrate (Rm³/s**) :	22.6
Wet Reference Flowrate (Rm³/s*) :	36.4

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

Specific Isomer	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
2,6-dichlorophenol	<80	<4.87	<15.3	<12.8	<7.73	<0.28
2,4 & 2,5-dichlorophenol	<80	<4.87	<15.3	<12.8	<7.73	<0.28
3,5-dichlorophenol	<80	<4.87	<15.3	<12.8	<7.73	<0.28
2,3-dichlorophenol	<80	<4.87	<15.3	<12.8	<7.73	<0.28
3,4-dichlorophenol	<80	<4.87	<15.3	<12.8	<7.73	<0.28
Total Dichlorophenols	<400	<24.4	<76.3	<63.8	<38.7	<1.41
2,4,6-trichlorophenol	<80	<4.87	<15.3	<12.8	<7.73	<0.28
2,3,6-trichlorophenol	<80	<4.87	<15.3	<12.8	<7.73	<0.28
2,3,5-trichlorophenol	<80	<4.87	<15.3	<12.8	<7.73	<0.28
2,4,5-trichlorophenol	<80	<4.87	<15.3	<12.8	<7.73	<0.28
2,3,4-trichlorophenol	<80	<4.87	<15.3	<12.8	<7.73	<0.28
3,4,5-trichlorophenol	<80	<4.87	<15.3	<12.8	<7.73	<0.28
Total Trichlorophenols	<480	<29.2	<91.5	<76.6	<46.4	<1.69
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<80	<4.87	<15.3	<12.8	<7.73	<0.28
2,3,4,5-tetrachlorophenol	<80	<4.87	<15.3	<12.8	<7.73	<0.28
Total Tetrachlorophenols	<160	<9.75	<30.5	<25.5	<15.5	<0.56
Pentachlorophenol	<80	<4.87	<15.3	<12.8	<7.73	<0.28
Total Chlorophenols	<1120	<68.2	<214	<179	<108	<3.95
Heptachlor	<0.27	<0.016	<0.051	<0.043	<0.026	<0.00095
Heptachlor Epoxide A	<4.9	<0.30	<0.93	<0.78	<0.47	<0.017
Heptachlor Epoxide B	<0.85	<0.052	<0.16	<0.14	<0.082	<0.0030
Total Heptachlor	<6.02	<0.37	<1.15	<0.96	<0.58	<0.021
Oxychlorodane	<0.56	<0.034	<0.11	<0.089	<0.054	<0.0020
trans-Chlorodane	<4.4	<0.27	<0.84	<0.70	<0.43	<0.016
cis-Chlorodane	<4.1	<0.25	<0.78	<0.65	<0.40	<0.014
Total Chlorodane	<9.1	<0.55	<1.73	<1.45	<0.88	<0.032
Parlar-26	<6.9	<0.42	<1.32	<1.10	<0.67	<0.024
Parlar-50	<5.8	<0.35	<1.11	<0.93	<0.56	<0.020
Parlar-62	<7.5	<0.46	<1.43	<1.20	<0.72	<0.026
Total Toxaphene	<20.2	<1.23	<3.85	<3.22	<1.95	<0.071
Hexachlorophene	<80	<4.87	<15.3	<12.8	<7.73	<0.28
Hexachlorobutadiene	5.91	0.36	1.13	0.94	0.57	0.021
Octachlorostyrene	<0.78	<0.048	<0.15	<0.12	<0.075	<0.0028
Tributyltin	<200	<12.2	<38.1	<31.9	<19.3	<0.71

Dry Gas Volume Sampled (Rm³*) :	5.245
Actual Flowrate (m³/s) :	57.9
Dry Reference Flowrate (Rm³/s*) :	18.5
Dry Adjusted Flowrate (Rm³/s**) :	22.1
Wet Reference Flowrate (Rm³/s*) :	36.5

* 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/m³	ng/m³	ng/m³	ng/m³	%
2,6-dichlorophenol	<4.54	<4.77	<4.87	<4.73	3.5
2,4 & 2,5-dichlorophenol	<4.54	<4.77	<4.87	<4.73	3.5
3,5-dichlorophenol	<4.54	<4.77	<4.87	<4.73	3.5
2,3-dichlorophenol	<4.54	<4.77	<4.87	<4.73	3.5
3,4-dichlorophenol	<4.54	<4.77	<4.87	<4.73	3.5
Total Dichlorophenols	<22.7	<23.8	<24.4	<23.6	3.5
2,4,6-trichlorophenol	<4.54	<4.77	<4.87	<4.73	3.5
2,3,6-trichlorophenol	<4.54	<4.77	<4.87	<4.73	3.5
2,3,5-trichlorophenol	<4.54	<4.77	<4.87	<4.73	3.5
2,4,5-trichlorophenol	<4.54	<4.77	<4.87	<4.73	3.5
2,3,4-trichlorophenol	<4.54	<4.77	<4.87	<4.73	3.5
3,4,5-trichlorophenol	<4.54	<4.77	<4.87	<4.73	3.5
Total Trichlorophenols	<27.3	<28.6	<29.2	<28.4	3.5
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<4.54	<4.77	<4.87	<4.73	3.5
2,3,4,5-tetrachlorophenol	<4.54	<4.77	<4.87	<4.73	3.5
Total Tetrachlorophenols	<9.09	<9.53	<9.75	<9.46	3.5
Pentachlorophenol	<4.54	<4.77	<4.87	<4.73	3.5
Total Chlorophenols	<63.6	<66.7	<68.2	<66.2	3.5
Heptachlor	<0.014	<0.035	<0.016	<0.022	53.8
Heptachlor Epoxide A	<0.097	<0.17	<0.30	<0.19	54.7
Heptachlor Epoxide B	<0.017	<0.029	<0.052	<0.033	54.0
Total Heptachlor	<0.13	<0.23	<0.37	<0.24	49.7
Oxychlorodane	<0.029	<0.041	<0.034	<0.035	17.5
trans-Chlorodane	<0.35	<0.38	<0.27	<0.33	17.6
cis-Chlorodane	<0.33	<0.36	<0.25	<0.31	17.9
Total Chlorodane	<0.71	<0.78	<0.55	<0.68	17.2
Parlar-26	<0.27	<0.30	<0.42	<0.33	23.9
Parlar-50	<0.27	<0.26	<0.35	<0.29	17.4
Parlar-62	<0.35	<0.34	<0.46	<0.38	17.3
Total Toxaphene	<0.89	<0.90	<1.23	<1.01	19.4
Hexachlorophene	<4.54	<4.77	<4.87	<4.73	3.5
Hexachlorobutadiene	0.24	<0.25	0.36	<0.28	24.2
Octachlorostyrene	<0.044	<0.032	<0.048	<0.041	19.6
Tributyltin	<11.4	<11.9	<12.2	<11.8	3.5

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

Specific Isomer	Dry Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
2,6-dichlorophenol	<14.0	<15.1	<15.3	<14.8	4.7
2,4 & 2,5-dichlorophenol	<14.0	<15.1	<15.3	<14.8	4.7
3,5-dichlorophenol	<14.0	<15.1	<15.3	<14.8	4.7
2,3-dichlorophenol	<14.0	<15.1	<15.3	<14.8	4.7
3,4-dichlorophenol	<14.0	<15.1	<15.3	<14.8	4.7
Total Dichlorophenols	<70.0	<75.5	<76.3	<73.9	4.7
2,4,6-trichlorophenol	<14.0	<15.1	<15.3	<14.8	4.7
2,3,6-trichlorophenol	<14.0	<15.1	<15.3	<14.8	4.7
2,3,5-trichlorophenol	<14.0	<15.1	<15.3	<14.8	4.7
2,4,5-trichlorophenol	<14.0	<15.1	<15.3	<14.8	4.7
2,3,4-trichlorophenol	<14.0	<15.1	<15.3	<14.8	4.7
3,4,5-trichlorophenol	<14.0	<15.1	<15.3	<14.8	4.7
Total Trichlorophenols	<83.9	<90.6	<91.5	<88.7	4.7
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<14.0	<15.1	<15.3	<14.8	4.7
2,3,4,5-tetrachlorophenol	<14.0	<15.1	<15.3	<14.8	4.7
Total Tetrachlorophenols	<28.0	<30.2	<30.5	<29.6	4.7
Pentachlorophenol	<14.0	<15.1	<15.3	<14.8	4.7
Total Chlorophenols	<196	<211	<214	<207	4.7
Heptachlor	<0.042	<0.11	<0.051	<0.068	55.1
Heptachlor Epoxide A	<0.30	<0.53	<0.93	<0.59	55.0
Heptachlor Epoxide B	<0.052	<0.093	<0.16	<0.10	54.2
Total Heptachlor	<0.39	<0.73	<1.15	<0.76	50.0
Oxychlorodane	<0.089	<0.13	<0.11	<0.11	18.9
trans-Chlorodane	<1.08	<1.21	<0.84	<1.04	18.0
cis-Chlorodane	<1.01	<1.13	<0.78	<0.98	18.3
Total Chlorodane	<2.19	<2.47	<1.73	<2.13	17.6
Parlar-26	<0.84	<0.94	<1.32	<1.03	24.2
Parlar-50	<0.82	<0.83	<1.11	<0.92	17.6
Parlar-62	<1.07	<1.08	<1.43	<1.19	17.4
Total Toxaphene	<2.73	<2.85	<3.85	<3.14	19.6
Hexachlorophene	<14.0	<15.1	<15.3	<14.8	4.7
Hexachlorobutadiene	0.72	<0.79	1.13	<0.88	24.4
Octachlorostyrene	<0.14	<0.10	<0.15	<0.13	18.8
Tributyltin	<35.0	<37.8	<38.1	<37.0	4.7

* 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/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
2,6-dichlorophenol	<11.4	<12.2	<12.8	<12.1	5.8
2,4 & 2,5-dichlorophenol	<11.4	<12.2	<12.8	<12.1	5.8
3,5-dichlorophenol	<11.4	<12.2	<12.8	<12.1	5.8
2,3-dichlorophenol	<11.4	<12.2	<12.8	<12.1	5.8
3,4-dichlorophenol	<11.4	<12.2	<12.8	<12.1	5.8
Total Dichlorophenols	<56.9	<61.1	<63.8	<60.6	5.8
2,4,6-trichlorophenol	<11.4	<12.2	<12.8	<12.1	5.8
2,3,6-trichlorophenol	<11.4	<12.2	<12.8	<12.1	5.8
2,3,5-trichlorophenol	<11.4	<12.2	<12.8	<12.1	5.8
2,4,5-trichlorophenol	<11.4	<12.2	<12.8	<12.1	5.8
2,3,4-trichlorophenol	<11.4	<12.2	<12.8	<12.1	5.8
3,4,5-trichlorophenol	<11.4	<12.2	<12.8	<12.1	5.8
Total Trichlorophenols	<68.2	<73.4	<76.6	<72.7	5.8
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<11.4	<12.2	<12.8	<12.1	5.8
2,3,4,5-tetrachlorophenol	<11.4	<12.2	<12.8	<12.1	5.8
Total Tetrachlorophenols	<22.7	<24.5	<25.5	<24.2	5.8
Pentachlorophenol	<11.4	<12.2	<12.8	<12.1	5.8
Total Chlorophenols	<159	<171	<179	<170	5.8
Heptachlor	<0.034	<0.090	<0.043	<0.056	54.0
Heptachlor Epoxide A	<0.24	<0.43	<0.78	<0.48	56.7
Heptachlor Epoxide B	<0.043	<0.075	<0.14	<0.084	56.0
Total Heptachlor	<0.32	<0.59	<0.96	<0.62	51.6
Oxychlorodane	<0.072	<0.11	<0.089	<0.089	18.5
trans-Chlorodane	<0.88	<0.98	<0.70	<0.85	16.4
cis-Chlorodane	<0.82	<0.92	<0.65	<0.80	16.7
Total Chlorodane	<1.78	<2.00	<1.45	<1.74	16.0
Parlar-26	<0.68	<0.76	<1.10	<0.85	26.1
Parlar-50	<0.67	<0.67	<0.93	<0.76	19.5
Parlar-62	<0.87	<0.87	<1.20	<0.98	19.3
Total Toxaphene	<2.22	<2.31	<3.22	<2.58	21.6
Hexachlorophene	<11.4	<12.2	<12.8	<12.1	5.8
Hexachlorobutadiene	0.59	<0.64	0.94	<0.72	26.4
Octachlorostyrene	<0.11	<0.083	<0.12	<0.11	20.2
Tributyltin	<28.4	<30.6	<31.9	<30.3	5.8

* 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				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
2,6-dichlorophenol	<7.01	<7.59	<7.73	<7.45	5.1
2,4 & 2,5-dichlorophenol	<7.01	<7.59	<7.73	<7.45	5.1
3,5-dichlorophenol	<7.01	<7.59	<7.73	<7.45	5.1
2,3-dichlorophenol	<7.01	<7.59	<7.73	<7.45	5.1
3,4-dichlorophenol	<7.01	<7.59	<7.73	<7.45	5.1
Total Dichlorophenols	<35.1	<38.0	<38.7	<37.2	5.1
2,4,6-trichlorophenol	<7.01	<7.59	<7.73	<7.45	5.1
2,3,6-trichlorophenol	<7.01	<7.59	<7.73	<7.45	5.1
2,3,5-trichlorophenol	<7.01	<7.59	<7.73	<7.45	5.1
2,4,5-trichlorophenol	<7.01	<7.59	<7.73	<7.45	5.1
2,3,4-trichlorophenol	<7.01	<7.59	<7.73	<7.45	5.1
3,4,5-trichlorophenol	<7.01	<7.59	<7.73	<7.45	5.1
Total Trichlorophenols	<42.1	<45.6	<46.4	<44.7	5.1
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<7.01	<7.59	<7.73	<7.45	5.1
2,3,4,5-tetrachlorophenol	<7.01	<7.59	<7.73	<7.45	5.1
Total Tetrachlorophenols	<14.0	<15.2	<15.5	<14.9	5.1
Pentachlorophenol	<7.01	<7.59	<7.73	<7.45	5.1
Total Chlorophenols	<98.2	<106	<108	<104	5.1
Heptachlor	<0.021	<0.056	<0.026	<0.034	55.0
Heptachlor Epoxide A	<0.15	<0.27	<0.47	<0.30	55.5
Heptachlor Epoxide B	<0.026	<0.047	<0.082	<0.052	54.7
Total Heptachlor	<0.20	<0.37	<0.58	<0.38	50.5
Oxychlorodane	<0.045	<0.065	<0.054	<0.055	19.0
trans-Chlorodane	<0.54	<0.61	<0.43	<0.53	17.6
cis-Chlorodane	<0.51	<0.57	<0.40	<0.49	17.9
Total Chlorodane	<1.10	<1.24	<0.88	<1.07	17.2
Parlar-26	<0.42	<0.47	<0.67	<0.52	24.8
Parlar-50	<0.41	<0.42	<0.56	<0.46	18.2
Parlar-62	<0.53	<0.54	<0.72	<0.60	18.0
Total Toxaphene	<1.37	<1.43	<1.95	<1.58	20.2
Hexachlorophene	<7.01	<7.59	<7.73	<7.45	5.1
Hexachlorobutadiene	0.36	<0.40	0.57	<0.44	25.1
Octachlorostyrene	<0.068	<0.051	<0.075	<0.065	19.1
Tributyltin	<17.5	<19.0	<19.3	<18.6	5.1

* 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 Test No. 1 µg/s	Test No. 2 µg/s	Test No. 3 µg/s	Average µg/s	Coefficient of Variation %
2,6-dichlorophenol	<0.27	<0.28	<0.28	<0.28	2.7
2,4 & 2,5-dichlorophenol	<0.27	<0.28	<0.28	<0.28	2.7
3,5-dichlorophenol	<0.27	<0.28	<0.28	<0.28	2.7
2,3-dichlorophenol	<0.27	<0.28	<0.28	<0.28	2.7
3,4-dichlorophenol	<0.27	<0.28	<0.28	<0.28	2.7
Total Dichlorophenols	<1.34	<1.38	<1.41	<1.38	2.7
2,4,6-trichlorophenol	<0.27	<0.28	<0.28	<0.28	2.7
2,3,6-trichlorophenol	<0.27	<0.28	<0.28	<0.28	2.7
2,3,5-trichlorophenol	<0.27	<0.28	<0.28	<0.28	2.7
2,4,5-trichlorophenol	<0.27	<0.28	<0.28	<0.28	2.7
2,3,4-trichlorophenol	<0.27	<0.28	<0.28	<0.28	2.7
3,4,5-trichlorophenol	<0.27	<0.28	<0.28	<0.28	2.7
Total Trichlorophenols	<1.60	<1.66	<1.69	<1.65	2.7
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<0.27	<0.28	<0.28	<0.28	2.7
2,3,4,5-tetrachlorophenol	<0.27	<0.28	<0.28	<0.28	2.7
Total Tetrachlorophenols	<0.53	<0.55	<0.56	<0.55	2.7
Pentachlorophenol	<0.27	<0.28	<0.28	<0.28	2.7
Total Chlorophenols	<3.74	<3.87	<3.95	<3.85	2.7
Heptachlor	<0.00080	<0.0020	<0.00095	<0.0013	53.4
Heptachlor Epoxide A	<0.0057	<0.010	<0.017	<0.011	54.2
Heptachlor Epoxide B	<0.0010	<0.0017	<0.0030	<0.0019	53.4
Total Heptachlor	<0.0075	<0.013	<0.021	<0.014	49.1
Oxychlorodane	<0.0017	<0.0024	<0.0020	<0.0020	16.9
trans-Chlorodane	<0.021	<0.022	<0.016	<0.019	17.9
cis-Chlorodane	<0.019	<0.021	<0.014	<0.018	18.1
Total Chlorodane	<0.042	<0.045	<0.032	<0.040	17.4
Parlar-26	<0.016	<0.017	<0.024	<0.019	23.3
Parlar-50	<0.016	<0.015	<0.020	<0.017	16.9
Parlar-62	<0.020	<0.020	<0.026	<0.022	16.8
Total Toxaphene	<0.052	<0.052	<0.071	<0.059	18.9
Hexachlorophene	<0.27	<0.28	<0.28	<0.28	2.7
Hexachlorobutadiene	0.014	<0.015	0.021	<0.016	23.6
Octachlorostyrene	<0.0026	<0.0019	<0.0028	<0.0024	19.7
Tributyltin	<0.67	<0.69	<0.71	<0.69	2.7

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

Specific Isomer	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
2,6-dichlorophenol	<4.73	<14.8	<12.1	<7.45	<0.28
2,4 & 2,5-dichlorophenol	<4.73	<14.8	<12.1	<7.45	<0.28
3,5-dichlorophenol	<4.73	<14.8	<12.1	<7.45	<0.28
2,3-dichlorophenol	<4.73	<14.8	<12.1	<7.45	<0.28
3,4-dichlorophenol	<4.73	<14.8	<12.1	<7.45	<0.28
Total Dichlorophenols	<23.6	<73.9	<60.6	<37.2	<1.38
2,4,6-trichlorophenol	<4.73	<14.8	<12.1	<7.45	<0.28
2,3,6-trichlorophenol	<4.73	<14.8	<12.1	<7.45	<0.28
2,3,5-trichlorophenol	<4.73	<14.8	<12.1	<7.45	<0.28
2,4,5-trichlorophenol	<4.73	<14.8	<12.1	<7.45	<0.28
2,3,4-trichlorophenol	<4.73	<14.8	<12.1	<7.45	<0.28
3,4,5-trichlorophenol	<4.73	<14.8	<12.1	<7.45	<0.28
Total Trichlorophenols	<28.4	<88.7	<72.7	<44.7	<1.65
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<4.73	<14.8	<12.1	<7.45	<0.28
2,3,4,5-tetrachlorophenol	<4.73	<14.8	<12.1	<7.45	<0.28
Total Tetrachlorophenols	<9.46	<29.6	<24.2	<14.9	<0.55
Pentachlorophenol	<4.73	<14.8	<12.1	<7.45	<0.28
Total Chlorophenols	<66.2	<207	<170	<104	<3.85
Heptachlor	<0.022	<0.068	<0.056	<0.034	<0.0013
Heptachlor Epoxide A	<0.19	<0.59	<0.48	<0.30	<0.011
Heptachlor Epoxide B	<0.033	<0.10	<0.084	<0.052	<0.0019
Total Heptachlor	<0.24	<0.76	<0.62	<0.38	<0.014
Oxychlorodane	<0.035	<0.11	<0.089	<0.055	<0.0020
trans-Chlorodane	<0.33	<1.04	<0.85	<0.53	<0.019
cis-Chlorodane	<0.31	<0.98	<0.80	<0.49	<0.018
Total Chlorodane	<0.68	<2.13	<1.74	<1.07	<0.040
Parlar-26	<0.33	<1.03	<0.85	<0.52	<0.019
Parlar-50	<0.29	<0.92	<0.76	<0.46	<0.017
Parlar-62	<0.38	<1.19	<0.98	<0.60	<0.022
Total Toxaphene	<1.01	<3.14	<2.58	<1.58	<0.059
Hexachlorophene	<4.73	<14.8	<12.1	<7.45	<0.28
Hexachlorobutadiene	<0.28	<0.88	<0.72	<0.44	<0.016
Octachlorostyrene	<0.041	<0.13	<0.11	<0.065	<0.0024
Tributyltin	<11.8	<37.0	<30.3	<18.6	<0.69

* 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	<0.26
Heptachlor Epoxide A	<1.5	<3.7
Heptachlor Epoxide B	<0.26	<0.65
Total Heptachlor	<2.06	<4.61
Oxychlorodane	<0.58	<0.18
trans-Chlorodane	<3.2	<3.6
cis-Chlorodane	<3.0	<3.4
Total Chlorodane	<6.78	<7.18
Parlar-26	<5.7	<3.6
Parlar-50	<3.0	<3.1
Parlar-62	<3.8	<4.0
Total Toxaphene	<12.5	<10.7
Hexachlorophene	<80	<80
Hexachlorobutadiene	<0.27	<0.60
Octachlorostyrene	<0.35	<0.53
Tributyltin	<200	<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	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	179	10.2	31.3	25.4	15.7	0.60
Acenaphthylene	144	8.18	25.2	20.5	12.6	0.48
Anthracene	244	13.9	42.7	34.7	21.4	0.82
Benzo(a)Anthracene	<16	<0.91	<2.80	<2.27	<1.40	<0.053
Benzo(b)Fluoranthene	<16	<0.91	<2.80	<2.27	<1.40	<0.053
Benzo(k)Fluoranthene	<16	<0.91	<2.80	<2.27	<1.40	<0.053
Benzo(a)fluorene	<16	<0.91	<2.80	<2.27	<1.40	<0.053
Benzo(b)fluorene	<16	<0.91	<2.80	<2.27	<1.40	<0.053
Benzo(g,h,i)Perylene	70.6	4.01	12.3	10.0	6.19	0.24
Benzo(a)Pyrene	144	8.18	25.2	20.5	12.6	0.48
Benzo(e)Pyrene	26.2	1.49	4.58	3.72	2.30	0.088
Biphenyl	426	24.2	74.5	60.6	37.3	1.42
2-Chloronaphthalene	<16	<0.91	<2.80	<2.27	<1.40	<0.053
Chrysene/Triphenylene	39.2	2.23	6.86	5.57	3.44	0.13
Coronene	<80	<4.54	<14.0	<11.4	<7.01	<0.27
Dibenzo(a,c/a,h)Anthracene	<16	<0.91	<2.80	<2.27	<1.40	<0.053
Dibenzo(a,e)pyrene	<80	<4.54	<14.0	<11.4	<7.01	<0.27
9,10-dimethylanthracene	<16	<0.91	<2.80	<2.27	<1.40	<0.053
7,12-Dimethylbenzo(a)anthracene	<16	<0.91	<2.80	<2.27	<1.40	<0.053
Fluoranthene	254	14.4	44.4	36.1	22.3	0.85
Fluorene	970	55.1	170	138	85.0	3.24
Indeno(1,2,3-cd)Pyrene	16.0	0.91	2.80	2.27	1.40	0.053
2-methylanthracene	237	13.5	41.4	33.7	20.8	0.79
3-Methylcholanthrene	<80	<4.54	<14.0	<11.4	<7.01	<0.27
1-Methylnaphthalene	350	19.9	61.2	49.7	30.7	1.17
2-Methylnaphthalene	545	31.0	95.3	77.5	47.8	1.82
1-Methylphenanthrene	671	38.1	117	95.4	58.8	2.24
9-Methylphenanthrene	88.0	5.00	15.4	12.5	7.72	0.29
Naphthalene	3240	184	567	461	284	10.8
Perylene	<16	<0.91	<2.80	<2.27	<1.40	<0.053
Phenanthrene	731	41.5	128	104	64.1	2.44
Picene	<80	<4.54	<14.0	<11.4	<7.01	<0.27
Pyrene	166	9.43	29.0	23.6	14.6	0.55
Quinoline	5030	286	880	715	441	16.8
m-terphenyl	58.2	3.31	10.2	8.27	5.10	0.19
o-Terphenyl	62.2	3.53	10.9	8.84	5.45	0.21
p-terphenyl	32.7	1.86	5.72	4.65	2.87	0.11
Tetralin	554	31.5	96.9	78.7	48.6	1.85
Total	<14758	<838	<2581	<2098	<1294	<49.3

Dry Gas Volume Sampled (Rm³*) :	5.718
Actual Flowrate (m³/s) :	58.8
Dry Reference Flowrate (Rm³/s*) :	19.1
Dry Adjusted Flowrate (Rm³/s**) :	23.5
Wet Reference Flowrate (Rm³/s*) :	38.1

* 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	91.4	5.44	17.3	14.0	8.67	0.32
Acenaphthylene	48.2	2.87	9.10	7.37	4.57	0.17
Anthracene	61.7	3.68	11.6	9.43	5.86	0.21
Benzo(a)Anthracene	<16	<0.95	<3.02	<2.45	<1.52	<0.055
Benzo(b)Fluoranthene	<16	<0.95	<3.02	<2.45	<1.52	<0.055
Benzo(k)Fluoranthene	<16	<0.95	<3.02	<2.45	<1.52	<0.055
Benzo(a)fluorene	<16	<0.95	<3.02	<2.45	<1.52	<0.055
Benzo(b)fluorene	<16	<0.95	<3.02	<2.45	<1.52	<0.055
Benzo(g,h,i)Perylene	34.2	2.04	6.46	5.23	3.25	0.12
Benzo(a)Pyrene	41.9	2.50	7.91	6.41	3.98	0.14
Benzo(e)Pyrene	<16	<0.95	<3.02	<2.45	<1.52	<0.055
Biphenyl	234	13.9	44.2	35.8	22.2	0.81
2-Chloronaphthalene	<16	<0.95	<3.02	<2.45	<1.52	<0.055
Chrysene/Triphenylene	<16	<0.95	<3.02	<2.45	<1.52	<0.055
Coronene	<80	<4.77	<15.1	<12.2	<7.59	<0.28
Dibenzo(a,c/a,h)Anthracene	17.0	1.01	3.21	2.60	1.61	0.059
Dibenzo(a,e)pyrene	<80	<4.77	<15.1	<12.2	<7.59	<0.28
9,10-dimethylanthracene	<16	<0.95	<3.02	<2.45	<1.52	<0.055
7,12-Dimethylbenzo(a)anthracene	<16	<0.95	<3.02	<2.45	<1.52	<0.055
Fluoranthene	59.9	3.57	11.3	9.16	5.69	0.21
Fluorene	766	45.6	145	117	72.7	2.65
Indeno(1,2,3-cd)Pyrene	<16	<0.95	<3.02	<2.45	<1.52	<0.055
2-methylanthracene	90.7	5.40	17.1	13.9	8.61	0.31
3-Methylcholanthrene	84.7	5.05	16.0	12.9	8.04	0.29
1-Methylnaphthalene	252	15.0	47.6	38.5	23.9	0.87
2-Methylnaphthalene	292	17.4	55.1	44.6	27.7	1.01
1-Methylphenanthrene	166	9.89	31.3	25.4	15.8	0.57
9-Methylphenanthrene	37.1	2.21	7.00	5.67	3.52	0.13
Naphthalene	3190	190	602	488	303	11.0
Perylene	<16	<0.95	<3.02	<2.45	<1.52	<0.055
Phenanthrene	327	19.5	61.7	50.0	31.0	1.13
Picene	<80	<4.77	<15.1	<12.2	<7.59	<0.28
Pyrene	59.9	3.57	11.3	9.16	5.69	0.21
Quinoline	633	37.7	120	96.8	60.1	2.19
m-terphenyl	<16	<0.95	<3.02	<2.45	<1.52	<0.055
o-Terphenyl	<16	<0.95	<3.02	<2.45	<1.52	<0.055
p-terphenyl	<16	<0.95	<3.02	<2.45	<1.52	<0.055
Tetralin	287	17.1	54.2	43.9	27.2	0.99
Total	<7254	<432	<1369	<1109	<688	<25.1

Dry Gas Volume Sampled (Rm³*) :	5.297
Actual Flowrate (m³/s) :	58.0
Dry Reference Flowrate (Rm³/s*) :	18.3
Dry Adjusted Flowrate (Rm³/s**) :	22.6
Wet Reference Flowrate (Rm³/s*) :	36.4

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

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	16.7	1.02	3.18	2.67	1.61	0.059
Acenaphthylene	83.8	5.10	16.0	13.4	8.10	0.30
Anthracene	42.7	2.60	8.14	6.81	4.13	0.15
Benzo(a)Anthracene	<16	<0.97	<3.05	<2.55	<1.55	<0.056
Benzo(b)Fluoranthene	<16	<0.97	<3.05	<2.55	<1.55	<0.056
Benzo(k)Fluoranthene	<16	<0.97	<3.05	<2.55	<1.55	<0.056
Benzo(a)fluorene	<16	<0.97	<3.05	<2.55	<1.55	<0.056
Benzo(b)fluorene	<16	<0.97	<3.05	<2.55	<1.55	<0.056
Benzo(g,h,i)Perylene	71.8	4.37	13.7	11.5	6.94	0.25
Benzo(a)Pyrene	29.8	1.82	5.68	4.76	2.88	0.11
Benzo(e)Pyrene	36.2	2.21	6.90	5.78	3.50	0.13
Biphenyl	898	54.7	171	143	86.8	3.17
2-Chloronaphthalene	<16	<0.97	<3.05	<2.55	<1.55	<0.056
Chrysene/Triphenylene	<16	<0.97	<3.05	<2.55	<1.55	<0.056
Coronene	<80	<4.87	<15.3	<12.8	<7.73	<0.28
Dibenzo(a,c/a,h)Anthracene	16.6	1.01	3.16	2.65	1.60	0.059
Dibenzo(a,e)pyrene	<80	<4.87	<15.3	<12.8	<7.73	<0.28
9,10-dimethylanthracene	<16	<0.97	<3.05	<2.55	<1.55	<0.056
7,12-Dimethylbenzo(a)anthracene	<16	<0.97	<3.05	<2.55	<1.55	<0.056
Fluoranthene	73.8	4.50	14.1	11.8	7.13	0.26
Fluorene	113	6.88	21.5	18.0	10.9	0.40
Indeno(1,2,3-cd)Pyrene	19.1	1.16	3.64	3.05	1.85	0.067
2-methylanthracene	104	6.34	19.8	16.6	10.1	0.37
3-Methylcholanthrene	<80	<4.87	<15.3	<12.8	<7.73	<0.28
1-Methylnaphthalene	235	14.3	44.8	37.5	22.7	0.83
2-Methylnaphthalene	180	11.0	34.3	28.7	17.4	0.63
1-Methylphenanthrene	160	9.75	30.5	25.5	15.5	0.56
9-Methylphenanthrene	39.7	2.42	7.57	6.34	3.84	0.14
Naphthalene	4710	287	898	752	455	16.6
Perylene	<16	<0.97	<3.05	<2.55	<1.55	<0.056
Phenanthrene	295	18.0	56.2	47.1	28.5	1.04
Picene	<80	<4.87	<15.3	<12.8	<7.73	<0.28
Pyrene	75.4	4.59	14.4	12.0	7.29	0.27
Quinoline	93.9	5.72	17.9	15.0	9.07	0.33
m-terphenyl	17.1	1.04	3.26	2.73	1.65	0.060
o-Terphenyl	17.2	1.05	3.28	2.75	1.66	0.061
p-terphenyl	<16	<0.97	<3.05	<2.55	<1.55	<0.056
Tetralin	340	20.7	64.8	54.3	32.9	1.20
Total	<8165	<497	<1557	<1303	<789	<28.8

Dry Gas Volume Sampled (Rm³*) :	5.245
Actual Flowrate (m³/s) :	57.9
Dry Reference Flowrate (Rm³/s*) :	18.5
Dry Adjusted Flowrate (Rm³/s**) :	22.1
Wet Reference Flowrate (Rm³/s*) :	36.5

* 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 of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/m³	ng/m³	ng/m³	ng/m³	%
Acenaphthene	10.2	5.44	1.02	5.54	82.6
Acenaphthylene	8.18	2.87	5.10	5.39	49.5
Anthracene	13.9	3.68	2.60	6.71	92.6
Benzo(a)Anthracene	<0.91	<0.95	<0.97	<0.95	3.5
Benzo(b)Fluoranthene	<0.91	<0.95	<0.97	<0.95	3.5
Benzo(k)Fluoranthene	<0.91	<0.95	<0.97	<0.95	3.5
Benzo(a)fluorene	<0.91	<0.95	<0.97	<0.95	3.5
Benzo(b)fluorene	<0.91	<0.95	<0.97	<0.95	3.5
Benzo(g,h,i)Perylene	4.01	2.04	4.37	3.47	36.2
Benzo(a)Pyrene	8.18	2.50	1.82	4.16	83.9
Benzo(e)Pyrene	1.49	<0.95	2.21	<1.55	40.6
Biphenyl	24.2	13.9	54.7	30.9	68.5
2-Chloronaphthalene	<0.91	<0.95	<0.97	<0.95	3.5
Chrysene/Triphenylene	2.23	<0.95	<0.97	<1.38	52.7
Coronene	<4.54	<4.77	<4.87	<4.73	3.5
Dibenzo(a,c/a,h)Anthracene	<0.91	1.01	1.01	<0.98	6.1
Dibenzo(a,e)pyrene	<4.54	<4.77	<4.87	<4.73	3.5
9,10-dimethylanthracene	<0.91	<0.95	<0.97	<0.95	3.5
7,12-Dimethylbenzo(a)anthracene	<0.91	<0.95	<0.97	<0.95	3.5
Fluoranthene	14.4	3.57	4.50	7.50	80.3
Fluorene	55.1	45.6	6.88	35.9	71.2
Indeno(1,2,3-cd)Pyrene	0.91	<0.95	1.16	<1.01	13.5
2-methylanthracene	13.5	5.40	6.34	8.40	52.5
3-Methylcholanthrene	<4.54	5.05	<4.87	<4.82	5.3
1-Methylnaphthalene	19.9	15.0	14.3	16.4	18.5
2-Methylnaphthalene	31.0	17.4	11.0	19.8	51.6
1-Methylphenanthrene	38.1	9.89	9.75	19.3	84.9
9-Methylphenanthrene	5.00	2.21	2.42	3.21	48.4
Naphthalene	184	190	287	220	26.2
Perylene	<0.91	<0.95	<0.97	<0.95	3.5
Phenanthrene	41.5	19.5	18.0	26.3	50.1
Picene	<4.54	<4.77	<4.87	<4.73	3.5
Pyrene	9.43	3.57	4.59	5.86	53.4
Quinoline	286	37.7	5.72	110	140
m-terphenyl	3.31	<0.95	1.04	<1.77	75.5
o-Terphenyl	3.53	<0.95	1.05	<1.84	79.3
p-terphenyl	1.86	<0.95	<0.97	<1.26	40.9
Tetralin	31.5	17.1	20.7	23.1	32.4
Total	<838	<432	<497	<589	37.0

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	31.3	17.3	3.18	17.2	81.5
Acenaphthylene	25.2	9.10	16.0	16.8	48.2
Anthracene	42.7	11.6	8.14	20.8	91.3
Benzo(a)Anthracene	<2.80	<3.02	<3.05	<2.96	4.7
Benzo(b)Fluoranthene	<2.80	<3.02	<3.05	<2.96	4.7
Benzo(k)Fluoranthene	<2.80	<3.02	<3.05	<2.96	4.7
Benzo(a)fluorene	<2.80	<3.02	<3.05	<2.96	4.7
Benzo(b)fluorene	<2.80	<3.02	<3.05	<2.96	4.7
Benzo(g,h,i)Perylene	12.3	6.46	13.7	10.8	35.5
Benzo(a)Pyrene	25.2	7.91	5.68	12.9	82.6
Benzo(e)Pyrene	4.58	<3.02	6.90	<4.83	40.4
Biphenyl	74.5	44.2	171	96.6	68.7
2-Chloronaphthalene	<2.80	<3.02	<3.05	<2.96	4.7
Chrysene/Triphenylene	6.86	<3.02	<3.05	<4.31	51.2
Coronene	<14.0	<15.1	<15.3	<14.8	4.7
Dibenzo(a,c/a,h)Anthracene	<2.80	3.21	3.16	<3.06	7.4
Dibenzo(a,e)pyrene	<14.0	<15.1	<15.3	<14.8	4.7
9,10-dimethylanthracene	<2.80	<3.02	<3.05	<2.96	4.7
7,12-Dimethylbenzo(a)anthracene	<2.80	<3.02	<3.05	<2.96	4.7
Fluoranthene	44.4	11.3	14.1	23.3	79.0
Fluorene	170	145	21.5	112	70.8
Indeno(1,2,3-cd)Pyrene	2.80	<3.02	3.64	<3.15	13.9
2-methylanthracene	41.4	17.1	19.8	26.1	51.0
3-Methylcholanthrene	<14.0	16.0	<15.3	<15.1	6.7
1-Methylnaphthalene	61.2	47.6	44.8	51.2	17.2
2-Methylnaphthalene	95.3	55.1	34.3	61.6	50.3
1-Methylphenanthrene	117	31.3	30.5	59.7	83.5
9-Methylphenanthrene	15.4	7.00	7.57	9.99	46.9
Naphthalene	567	602	898	689	26.4
Perylene	<2.80	<3.02	<3.05	<2.96	4.7
Phenanthrene	128	61.7	56.2	81.9	48.6
Picene	<14.0	<15.1	<15.3	<14.8	4.7
Pyrene	29.0	11.3	14.4	18.2	51.9
Quinoline	880	120	17.9	339	139
m-terphenyl	10.2	<3.02	3.26	<5.49	74.1
o-Terphenyl	10.9	<3.02	3.28	<5.73	78.0
p-terphenyl	5.72	<3.02	<3.05	<3.93	39.4
Tetralin	96.9	54.2	64.8	72.0	30.9
Total	<2581	<1369	<1557	<1836	35.5

* 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	25.4	14.0	2.67	14.0	81.2
Acenaphthylene	20.5	7.37	13.4	13.7	47.7
Anthracene	34.7	9.43	6.81	17.0	90.7
Benzo(a)Anthracene	<2.27	<2.45	<2.55	<2.42	5.8
Benzo(b)Fluoranthene	<2.27	<2.45	<2.55	<2.42	5.8
Benzo(k)Fluoranthene	<2.27	<2.45	<2.55	<2.42	5.8
Benzo(a)fluorene	<2.27	<2.45	<2.55	<2.42	5.8
Benzo(b)fluorene	<2.27	<2.45	<2.55	<2.42	5.8
Benzo(g,h,i)Perylene	10.0	5.23	11.5	8.91	36.7
Benzo(a)Pyrene	20.5	6.41	4.76	10.5	81.9
Benzo(e)Pyrene	3.72	<2.45	5.78	<3.98	42.2
Biphenyl	60.6	35.8	143	79.9	70.5
2-Chloronaphthalene	<2.27	<2.45	<2.55	<2.42	5.8
Chrysene/Triphenylene	5.57	<2.45	<2.55	<3.52	50.4
Coronene	<11.4	<12.2	<12.8	<12.1	5.8
Dibenzo(a,c/a,h)Anthracene	<2.27	2.60	2.65	<2.51	8.1
Dibenzo(a,e)pyrene	<11.4	<12.2	<12.8	<12.1	5.8
9,10-dimethylanthracene	<2.27	<2.45	<2.55	<2.42	5.8
7,12-Dimethylbenzo(a)anthracene	<2.27	<2.45	<2.55	<2.42	5.8
Fluoranthene	36.1	9.16	11.8	19.0	78.2
Fluorene	138	117	18.0	91.0	70.4
Indeno(1,2,3-cd)Pyrene	2.27	<2.45	3.05	<2.59	15.7
2-methylanthracene	33.7	13.9	16.6	21.4	50.2
3-Methylcholanthrene	<11.4	12.9	<12.8	<12.4	7.0
1-Methylnaphthalene	49.7	38.5	37.5	41.9	16.2
2-Methylnaphthalene	77.5	44.6	28.7	50.3	49.4
1-Methylphenanthrene	95.4	25.4	25.5	48.8	82.8
9-Methylphenanthrene	12.5	5.67	6.34	8.17	46.1
Naphthalene	461	488	752	567	28.4
Perylene	<2.27	<2.45	<2.55	<2.42	5.8
Phenanthrene	104	50.0	47.1	67.0	47.8
Picene	<11.4	<12.2	<12.8	<12.1	5.8
Pyrene	23.6	9.16	12.0	14.9	51.2
Quinoline	715	96.8	15.0	276	139
m-terphenyl	8.27	<2.45	2.73	<4.48	73.3
o-Terphenyl	8.84	<2.45	2.75	<4.68	77.2
p-terphenyl	4.65	<2.45	<2.55	<3.22	38.6
Tetralin	78.7	43.9	54.3	59.0	30.4
Total	<2098	<1109	<1303	<1503	34.9

* 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 of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	ng/Rm³*	ng/Rm³*	ng/Rm³*	ng/Rm³*	%
Acenaphthene	15.7	8.67	1.61	8.66	81.3
Acenaphthylene	12.6	4.57	8.10	8.43	47.9
Anthracene	21.4	5.86	4.13	10.5	90.9
Benzo(a)Anthracene	<1.40	<1.52	<1.55	<1.49	5.1
Benzo(b)Fluoranthene	<1.40	<1.52	<1.55	<1.49	5.1
Benzo(k)Fluoranthene	<1.40	<1.52	<1.55	<1.49	5.1
Benzo(a)fluorene	<1.40	<1.52	<1.55	<1.49	5.1
Benzo(b)fluorene	<1.40	<1.52	<1.55	<1.49	5.1
Benzo(g,h,i)Perylene	6.19	3.25	6.94	5.46	35.8
Benzo(a)Pyrene	12.6	3.98	2.88	6.49	82.2
Benzo(e)Pyrene	2.30	<1.52	3.50	<2.44	40.9
Biphenyl	37.3	22.2	86.8	48.8	69.2
2-Chloronaphthalene	<1.40	<1.52	<1.55	<1.49	5.1
Chrysene/Triphenylene	3.44	<1.52	<1.55	<2.17	50.7
Coronene	<7.01	<7.59	<7.73	<7.45	5.1
Dibenzo(a,c/a,h)Anthracene	<1.40	1.61	1.60	<1.54	7.7
Dibenzo(a,e)pyrene	<7.01	<7.59	<7.73	<7.45	5.1
9,10-dimethylanthracene	<1.40	<1.52	<1.55	<1.49	5.1
7,12-Dimethylbenzo(a)anthracene	<1.40	<1.52	<1.55	<1.49	5.1
Fluoranthene	22.3	5.69	7.13	11.7	78.5
Fluorene	85.0	72.7	10.9	56.2	70.6
Indeno(1,2,3-cd)Pyrene	1.40	<1.52	1.85	<1.59	14.5
2-methylanthracene	20.8	8.61	10.1	13.1	50.6
3-Methylcholanthrene	<7.01	8.04	<7.73	<7.59	6.9
1-Methylnaphthalene	30.7	23.9	22.7	25.8	16.7
2-Methylnaphthalene	47.8	27.7	17.4	31.0	49.9
1-Methylphenanthrene	58.8	15.8	15.5	30.0	83.1
9-Methylphenanthrene	7.72	3.52	3.84	5.02	46.5
Naphthalene	284	303	455	347	27.0
Perylene	<1.40	<1.52	<1.55	<1.49	5.1
Phenanthrene	64.1	31.0	28.5	41.2	48.2
Picene	<7.01	<7.59	<7.73	<7.45	5.1
Pyrene	14.6	5.69	7.29	9.18	51.5
Quinoline	441	60.1	9.07	170	139
m-terphenyl	5.10	<1.52	1.65	<2.76	73.7
o-Terphenyl	5.45	<1.52	1.66	<2.88	77.5
p-terphenyl	2.87	<1.52	<1.55	<1.98	39.0
Tetralin	48.6	27.2	32.9	36.2	30.5
Total	<1294	<688	<789	<924	35.1

* At 25°C and 1 atmosphere

TABLE 99
Clean Harbors Sarnia
Polycyclic Aromatic Hydrocarbon Emission Rates

Compound	Emission Rate				Coefficient of Variation
	Test No. 1 µg/s	Test No. 2 µg/s	Test No. 3 µg/s	Average µg/s	%
Acenaphthene	0.60	0.32	0.059	0.32	83.2
Acenaphthylene	0.48	0.17	0.30	0.31	50.3
Anthracene	0.82	0.21	0.15	0.39	93.4
Benzo(a)Anthracene	<0.053	<0.055	<0.056	<0.055	2.7
Benzo(b)Fluoranthene	<0.053	<0.055	<0.056	<0.055	2.7
Benzo(k)Fluoranthene	<0.053	<0.055	<0.056	<0.055	2.7
Benzo(a)fluorene	<0.053	<0.055	<0.056	<0.055	2.7
Benzo(b)fluorene	<0.053	<0.055	<0.056	<0.055	2.7
Benzo(g,h,i)Perylene	0.24	0.12	0.25	0.20	36.3
Benzo(a)Pyrene	0.48	0.14	0.11	0.24	84.8
Benzo(e)Pyrene	0.088	<0.055	0.13	<0.090	40.2
Biphenyl	1.42	0.81	3.17	1.80	68.0
2-Chloronaphthalene	<0.053	<0.055	<0.056	<0.055	2.7
Chrysene/Triphenylene	0.13	<0.055	<0.056	<0.081	53.6
Coronene	<0.27	<0.28	<0.28	<0.28	2.7
Dibenzo(a,c/a,h)Anthracene	<0.053	0.059	0.059	<0.057	5.3
Dibenzo(a,e)pyrene	<0.27	<0.28	<0.28	<0.28	2.7
9,10-dimethylanthracene	<0.053	<0.055	<0.056	<0.055	2.7
7,12-Dimethylbenzo(a)anthracene	<0.053	<0.055	<0.056	<0.055	2.7
Fluoranthene	0.85	0.21	0.26	0.44	81.2
Fluorene	3.24	2.65	0.40	2.10	71.5
Indeno(1,2,3-cd)Pyrene	0.053	<0.055	0.067	<0.059	12.9
2-methylanthracene	0.79	0.31	0.37	0.49	53.4
3-Methylcholanthrene	<0.27	0.29	<0.28	<0.28	4.5
1-Methylnaphthalene	1.17	0.87	0.83	0.96	19.4
2-Methylnaphthalene	1.82	1.01	0.63	1.15	52.5
1-Methylphenanthrene	2.24	0.57	0.56	1.13	85.7
9-Methylphenanthrene	0.29	0.13	0.14	0.19	49.4
Naphthalene	10.8	11.0	16.6	12.8	25.6
Perylene	<0.053	<0.055	<0.056	<0.055	2.7
Phenanthrene	2.44	1.13	1.04	1.54	51.0
Picene	<0.27	<0.28	<0.28	<0.28	2.7
Pyrene	0.55	0.21	0.27	0.34	54.3
Quinoline	16.8	2.19	0.33	6.44	140
m-terphenyl	0.19	<0.055	0.060	<0.10	76.4
o-Terphenyl	0.21	<0.055	0.061	<0.11	80.2
p-terphenyl	0.11	<0.055	<0.056	<0.074	41.8
Tetralin	1.85	0.99	1.20	1.35	33.3
Total	<49.3	<25.1	<28.8	<34.4	37.9

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

Compound	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	ng/m³	ng/Rm³*	ng/Rm³**	ng/Rm³*	µg/s
Acenaphthene	5.54	17.2	14.0	8.66	0.32
Acenaphthylene	5.39	16.8	13.7	8.43	0.31
Anthracene	6.71	20.8	17.0	10.5	0.39
Benzo(a)Anthracene	<0.95	<2.96	<2.42	<1.49	<0.055
Benzo(b)Fluoranthene	<0.95	<2.96	<2.42	<1.49	<0.055
Benzo(k)Fluoranthene	<0.95	<2.96	<2.42	<1.49	<0.055
Benzo(a)fluorene	<0.95	<2.96	<2.42	<1.49	<0.055
Benzo(b)fluorene	<0.95	<2.96	<2.42	<1.49	<0.055
Benzo(g,h,i)Perylene	3.47	10.8	8.91	5.46	0.20
Benzo(a)Pyrene	4.16	12.9	10.5	6.49	0.24
Benzo(e)Pyrene	<1.55	<4.83	<3.98	<2.44	<0.090
Biphenyl	30.9	96.6	79.9	48.8	1.80
2-Chloronaphthalene	<0.95	<2.96	<2.42	<1.49	<0.055
Chrysene/Triphenylene	<1.38	<4.31	<3.52	<2.17	<0.081
Coronene	<4.73	<14.8	<12.1	<7.45	<0.28
Dibenzo(a,c/a,h)Anthracene	<0.98	<3.06	<2.51	<1.54	<0.057
Dibenzo(a,e)pyrene	<4.73	<14.8	<12.1	<7.45	<0.28
9,10-dimethylanthracene	<0.95	<2.96	<2.42	<1.49	<0.055
7,12-Dimethylbenzo(a)anthracene	<0.95	<2.96	<2.42	<1.49	<0.055
Fluoranthene	7.50	23.3	19.0	11.7	0.44
Fluorene	35.9	112	91.0	56.2	2.10
Indeno(1,2,3-cd)Pyrene	<1.01	<3.15	<2.59	<1.59	<0.059
2-methylanthracene	8.40	26.1	21.4	13.1	0.49
3-Methylcholanthrene	<4.82	<15.1	<12.4	<7.59	<0.28
1-Methylnaphthalene	16.4	51.2	41.9	25.8	0.96
2-Methylnaphthalene	19.8	61.6	50.3	31.0	1.15
1-Methylphenanthrene	19.3	59.7	48.8	30.0	1.13
9-Methylphenanthrene	3.21	9.99	8.17	5.02	0.19
Naphthalene	220	689	567	347	12.8
Perylene	<0.95	<2.96	<2.42	<1.49	<0.055
Phenanthrene	26.3	81.9	67.0	41.2	1.54
Picene	<4.73	<14.8	<12.1	<7.45	<0.28
Pyrene	5.86	18.2	14.9	9.18	0.34
Quinoline	110	339	276	170	6.44
m-terphenyl	<1.77	<5.49	<4.48	<2.76	<0.10
o-Terphenyl	<1.84	<5.73	<4.68	<2.88	<0.11
p-terphenyl	<1.26	<3.93	<3.22	<1.98	<0.074
Tetralin	23.1	72.0	59.0	36.2	1.35
Total	<589	<1836	<1503	<924	<34.4

* 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	116	<16
Acenaphthylene	19.9	<16
Anthracene	21.7	<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	44.6	<16
Benzo(a)Pyrene	18.7	<16
Benzo(e)Pyrene	<16	<16
Biphenyl	98.7	<16
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	50.8	<16
7,12-Dimethylbenzo(a)anthracene	<16	<16
Fluoranthene	17.8	<16
Fluorene	1190	21.8
Indeno(1,2,3-cd)Pyrene	<16	<16
2-methylanthracene	<16	<16
3-Methylcholanthrene	<80	<80
1-Methylnaphthalene	<16	<16
2-Methylnaphthalene	<16	<16
1-Methylphenanthrene	351	473
9-Methylphenanthrene	<16	<16
Naphthalene	215	110
Perylene	<16	<16
Phenanthrene	41.0	<16
Picene	<80	<80
Pyrene	21.9	<16
Quinoline	815	<16
m-terphenyl	<16	<16
o-Terphenyl	<16	<16
p-terphenyl	<16	<16
Tetralin	315	63.5
Total	<3961	<1468

"<" 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				Coefficient of Variation	Total Collected
	Run No. 2 Tube 2A/2B	Run No. 3 Tube 3A/3B	Run No. 4 Tube 4A/4B	Average		
	µg	µg	µg	µg	%	µg
Benzene	1.21	1.23	1.38	1.27	7.4	3.82
Bromodichloromethane	0.35	0.34	0.41	0.37	11.0	1.10
Bromomethane	<0.09	0.59	1.13	0.57	98.9	1.72
2-Butanone	0.073	0.019	0.044	0.045	59.6	0.14
Chloroethene	<0.02	<0.02	<0.02	0	-	0
Dibromochloromethane	0.14	0.12	0.13	0.13	6.9	0.39
1,2-Dibromoethane	0.021	<0.02	0.029	0.017	89.9	0.050
Dichlorodifluoromethane	<0.02	<0.02	0.020	0.0067	173	0.020
1,1-Dichloroethane	<0.01	<0.01	<0.01	0	-	0
1,1-Dichloroethene	<0.01	<0.01	<0.01	0	-	0
trans-1,2-Dichloroethene	<0.01	<0.01	<0.01	0	-	0
Dichloromethane	0.21	0.20	0.31	0.24	24.8	0.72
1,2-Dichloropropane	<0.01	<0.01	<0.01	0	-	0
Ethyl Acetate	<0.1	<0.1	<0.1	0	-	0
Ethylbenzene	<0.01	<0.01	<0.01	0	-	0
Isopropylbenzene	<0.02	<0.02	<0.02	0	-	0
2-Propanone	0.30	<0.1	0.14	0.15	103	0.44
Styrene	0.073	0.046	0.064	0.061	22.5	0.18
Tetrachloroethene	0.11	0.073	0.097	0.093	20.1	0.28
Tetrachloromethane	0.027	0.032	0.042	0.034	22.7	0.10
Toluene	0.15	0.096	0.10	0.11	24.5	0.34
Tribromomethane	0.12	0.075	0.12	0.11	25.4	0.32
1,1,1-Trichloroethane	<0.01	<0.01	<0.01	0	-	0
Trichloroethene	0.023	0.031	0.045	0.033	33.7	0.10
Trichlorofluoromethane	<0.02	<0.02	<0.02	0	-	0
Trichloromethane	0.14	0.076	0.085	0.10	35.0	0.30
Trichlorotrifluoroethane	<0.02	<0.02	<0.02	0	-	0
1,2,4-Trimethylbenzene	<0.02	<0.02	<0.02	0	-	0
1,3,5-Trimethylbenzene	<0.02	<0.02	<0.02	0	-	0
Xylenes (total)	0.077	0.045	0.048	0.057	31.2	0.17
Total	3.02	2.97	4.20	3.40	20.5	10.2

Dry Gas Volume Sampled (Rm^3*) :

Run No. 2	0.0341
Run No. 3	0.0245
Run No. 4	0.0248

* At 25°C and 1 atmosphere.

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 analyte that was not detected was assigned a value of zero for calculation purposes.

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

Compound	Cartridge Amount Collected			Average	Coefficient of Variation	Total Collected
	Run No. 2 Tube 7A/7B	Run No. 3 Tube 8A/8B	Run No. 4 Tube 9A/9B			
	µg	µg	µg	µg	%	µg
Benzene	1.14	0.81	0.94	0.96	17.1	2.89
Bromodichloromethane	0.21	0.032	0.17	0.14	68.0	0.42
Bromomethane	0.64	0.52	0.64	0.60	11.4	1.79
2-Butanone	0.033	0.012	0.044	0.030	54.8	0.089
Chloroethene	<0.02	<0.02	<0.02	0	-	0
Dibromochloromethane	0.10	0.11	0.054	0.090	35.1	0.27
1,2-Dibromoethane	<0.02	<0.02	<0.02	0	-	0
Dichlorodifluoromethane	<0.02	<0.02	<0.02	0	-	0
1,1-Dichloroethane	<0.01	<0.01	<0.01	0	-	0
1,1-Dichloroethene	<0.01	<0.01	<0.01	0	-	0
trans-1,2-Dichloroethene	<0.01	<0.01	<0.01	0	-	0
Dichloromethane	0.42	0.19	0.57	0.39	48.2	1.18
1,2-Dichloropropane	<0.01	<0.01	<0.01	0	-	0
Ethyl Acetate	<0.1	<0.1	<0.1	0	-	0
Ethylbenzene	<0.01	<0.01	<0.01	0	-	0
Isopropylbenzene	<0.02	<0.02	<0.02	0	-	0
2-Propanone	0.14	<0.1	0.23	0.12	93.7	0.37
Styrene	0.037	0.054	<0.02	0.030	91.0	0.091
Tetrachloroethene	0.072	0.070	0.043	0.062	26.3	0.19
Tetrachloromethane	0.013	<0.01	0.020	0.011	92.3	0.033
Toluene	0.072	0.074	<0.05	0.049	86.6	0.15
Tribromomethane	0.092	0.099	0.065	0.085	21.0	0.26
1,1,1-Trichloroethane	<0.01	<0.01	<0.01	0	-	0
Trichloroethene	0.027	0.015	0.022	0.021	28.3	0.064
Trichlorofluoromethane	<0.02	<0.02	<0.02	0	-	0
Trichloromethane	0.067	0.071	0.046	0.061	21.9	0.18
Trichlorotrifluoroethane	<0.02	<0.02	<0.02	0	-	0
1,2,4-Trimethylbenzene	<0.02	<0.02	<0.02	0	-	0
1,3,5-Trimethylbenzene	<0.02	<0.02	<0.02	0	-	0
Xylenes (total)	<0.04	0.047	<0.04	0.016	173	0.047
Total	3.06	2.11	2.85	2.67	18.8	8.01

Dry Gas Volume Sampled (Rm^3*) :

Run No. 2	0.0215
Run No. 3	0.0235
Run No. 4	0.0261

* At 25°C and 1 atmosphere.

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 analyte that was not detected was assigned a value of zero for calculation purposes.

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

Compound	Cartridge Amount Collected			Average	Coefficient of Variation	Total Collected
	Run No. 2 Tube 12A/12B	Run No. 3 Tube 13A/13B	Run No. 4 Tube 14A/14B			
	µg	µg	µg	µg	%	µg
Benzene	1.54	1.34	1.69	1.52	11.6	4.57
Bromodichloromethane	0.26	0.20	0.21	0.22	13.7	0.67
Bromomethane	1.02	0.98	0.93	0.97	4.7	2.92
2-Butanone	0.066	0.068	0.099	0.078	23.8	0.23
Chloroethene	<0.02	<0.02	0.029	0.0097	173	0.029
Dibromochloromethane	0.053	0.062	0.063	0.059	9.3	0.18
1,2-Dibromoethane	<0.02	<0.02	<0.02	0	-	0
Dichlorodifluoromethane	<0.02	<0.02	<0.02	0	-	0
1,1-Dichloroethane	<0.01	<0.01	<0.01	0	-	0
1,1-Dichloroethene	<0.01	<0.01	<0.01	0	-	0
trans-1,2-Dichloroethene	<0.01	<0.01	<0.01	0	-	0
Dichloromethane	0.24	0.20	0.17	0.20	16.5	0.61
1,2-Dichloropropane	<0.01	<0.01	<0.01	0	-	0
Ethyl Acetate	<0.1	<0.1	<0.1	0	-	0
Ethylbenzene	<0.01	<0.01	<0.01	0	-	0
Isopropylbenzene	<0.02	<0.02	<0.02	0	-	0
2-Propanone	0.28	0.29	0.37	0.31	15.4	0.94
Styrene	0.026	0.026	0.030	0.027	8.4	0.082
Tetrachloroethene	0.056	0.062	0.065	0.061	7.5	0.18
Tetrachloromethane	0.046	0.028	0.024	0.033	35.9	0.098
Toluene	0.053	0.061	0.094	0.069	31.3	0.21
Tribromomethane	0.065	0.062	0.068	0.065	4.6	0.20
1,1,1-Trichloroethane	<0.01	<0.01	<0.01	0	-	0
Trichloroethene	0.040	0.036	0.038	0.038	5.3	0.11
Trichlorofluoromethane	<0.02	<0.02	<0.02	0	-	0
Trichloromethane	0.062	0.055	0.060	0.059	6.1	0.18
Trichlorotrifluoroethane	<0.02	<0.02	<0.02	0	-	0
1,2,4-Trimethylbenzene	<0.02	<0.02	<0.02	0	-	0
1,3,5-Trimethylbenzene	<0.02	<0.02	<0.02	0	-	0
Xylenes (total)	<0.04	<0.04	<0.04	0	-	0
Total	3.80	3.46	3.94	3.73	6.6	11.2

Dry Gas Volume Sampled (Rm^3*) :

Run No. 2	0.0250
Run No. 3	0.0241
Run No. 4	0.0239

* At 25°C and 1 atmosphere.

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 analyte that was not detected was assigned a value of zero for calculation purposes.

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

Compound	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	µg	µg/m^3	µg/Rm^3*	µg/Rm^3**	µg/Rm^3*	mg/s
Benzene	3.82	14.9	45.9	37.2	23.0	0.89
Bromodichloromethane	1.10	4.29	13.2	10.7	6.61	0.25
Bromomethane	1.72	6.70	20.6	16.7	10.3	0.40
2-Butanone	0.14	0.53	1.63	1.32	0.82	0.032
Chloroethene	0	0	0	0	0	0
Dibromochloromethane	0.39	1.53	4.72	3.83	2.37	0.091
1,2-Dibromoethane	0.050	0.20	0.60	0.49	0.30	0.012
Dichlorodifluoromethane	0.020	0.078	0.24	0.19	0.12	0.0046
1,1-Dichloroethane	0	0	0	0	0	0
1,1-Dichloroethene	0	0	0	0	0	0
trans-1,2-Dichloroethene	0	0	0	0	0	0
Dichloromethane	0.72	2.82	8.69	7.05	4.36	0.17
1,2-Dichloropropane	0	0	0	0	0	0
Ethyl Acetate	0	0	0	0	0	0
Ethylbenzene	0	0	0	0	0	0
Isopropylbenzene	0	0	0	0	0	0
2-Propanone	0.44	1.70	5.25	4.25	2.63	0.10
Styrene	0.18	0.71	2.20	1.78	1.10	0.042
Tetrachloroethene	0.28	1.09	3.36	2.73	1.69	0.065
Tetrachloromethane	0.10	0.39	1.21	0.98	0.61	0.023
Toluene	0.34	1.34	4.13	3.35	2.07	0.080
Tribromomethane	0.32	1.24	3.82	3.10	1.91	0.074
1,1,1-Trichloroethane	0	0	0	0	0	0
Trichloroethene	0.10	0.39	1.19	0.96	0.60	0.023
Trichlorofluoromethane	0	0	0	0	0	0
Trichloromethane	0.30	1.18	3.63	2.94	1.82	0.070
Trichlorotrifluoroethane	0	0	0	0	0	0
1,2,4-Trimethylbenzene	0	0	0	0	0	0
1,3,5-Trimethylbenzene	0	0	0	0	0	0
Xylenes (total)	0.17	0.66	2.04	1.65	1.02	0.039
Total	10.2	39.8	122	99.2	61.3	2.36

Dry Gas Volume Sampled (Rm^3*) :	0.0833
Actual Flowrate (m^3/s) :	59.4
Dry Reference Flowrate (Rm^3/s*) :	19.3
Dry Adjusted Flowrate (Rm^3/s**) :	23.8
Wet Reference Flowrate (Rm^3/s*) :	38.5

* 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	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	µg	µg/m^3	µg/Rm^3*	µg/Rm^3**	µg/Rm^3*	mg/s
Benzene	2.89	12.7	40.6	33.0	20.2	0.74
Bromodichloromethane	0.42	1.83	5.83	4.74	2.91	0.11
Bromomethane	1.79	7.90	25.2	20.5	12.6	0.46
2-Butanone	0.089	0.39	1.25	1.02	0.62	0.023
Chloroethene	0	0	0	0	0	0
Dibromochloromethane	0.27	1.19	3.80	3.08	1.89	0.069
1,2-Dibromoethane	0	0	0	0	0	0
Dichlorodifluoromethane	0	0	0	0	0	0
1,1-Dichloroethane	0	0	0	0	0	0
1,1-Dichloroethene	0	0	0	0	0	0
trans-1,2-Dichloroethene	0	0	0	0	0	0
Dichloromethane	1.18	5.21	16.6	13.5	8.29	0.30
1,2-Dichloropropane	0	0	0	0	0	0
Ethyl Acetate	0	0	0	0	0	0
Ethylbenzene	0	0	0	0	0	0
Isopropylbenzene	0	0	0	0	0	0
2-Propanone	0.37	1.62	5.17	4.20	2.58	0.094
Styrene	0.091	0.40	1.28	1.04	0.64	0.023
Tetrachloroethene	0.19	0.81	2.60	2.11	1.30	0.047
Tetrachloromethane	0.033	0.15	0.46	0.38	0.23	0.0084
Toluene	0.15	0.64	2.05	1.67	1.02	0.037
Tribromomethane	0.26	1.13	3.60	2.92	1.79	0.065
1,1,1-Trichloroethane	0	0	0	0	0	0
Trichloroethene	0.064	0.28	0.90	0.73	0.45	0.016
Trichlorofluoromethane	0	0	0	0	0	0
Trichloromethane	0.18	0.81	2.59	2.10	1.29	0.047
Trichlorotrifluoroethane	0	0	0	0	0	0
1,2,4-Trimethylbenzene	0	0	0	0	0	0
1,3,5-Trimethylbenzene	0	0	0	0	0	0
Xylenes (total)	0.047	0.21	0.66	0.54	0.33	0.012
Total	8.01	35.3	113	91.5	56.2	2.05

Dry Gas Volume Sampled (Rm^3*) :	0.0711
Actual Flowrate (m^3/s) :	58.1
Dry Reference Flowrate (Rm^3/s*) :	18.2
Dry Adjusted Flowrate (Rm^3/s**) :	22.4
Wet Reference Flowrate (Rm^3/s*) :	36.5

* 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	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	µg	µg/m^3	µg/Rm^3*	µg/Rm^3**	µg/Rm^3*	mg/s
Benzene	4.57	20.2	62.7	52.6	32.0	1.18
Bromodichloromethane	0.67	2.97	9.24	7.75	4.72	0.17
Bromomethane	2.92	12.9	40.0	33.6	20.4	0.75
2-Butanone	0.23	1.03	3.19	2.68	1.63	0.060
Chloroethene	0.029	0.13	0.40	0.33	0.20	0.0075
Dibromochloromethane	0.18	0.79	2.44	2.05	1.25	0.046
1,2-Dibromoethane	0	0	0	0	0	0
Dichlorodifluoromethane	0	0	0	0	0	0
1,1-Dichloroethane	0	0	0	0	0	0
1,1-Dichloroethene	0	0	0	0	0	0
trans-1,2-Dichloroethene	0	0	0	0	0	0
Dichloromethane	0.61	2.68	8.32	6.98	4.25	0.16
1,2-Dichloropropane	0	0	0	0	0	0
Ethyl Acetate	0	0	0	0	0	0
Ethylbenzene	0	0	0	0	0	0
Isopropylbenzene	0	0	0	0	0	0
2-Propanone	0.94	4.13	12.8	10.8	6.55	0.24
Styrene	0.082	0.36	1.12	0.94	0.57	0.021
Tetrachloroethene	0.18	0.81	2.51	2.11	1.28	0.047
Tetrachloromethane	0.098	0.43	1.34	1.13	0.69	0.025
Toluene	0.21	0.92	2.85	2.39	1.46	0.054
Tribromomethane	0.20	0.86	2.67	2.24	1.37	0.050
1,1,1-Trichloroethane	0	0	0	0	0	0
Trichloroethene	0.11	0.50	1.56	1.31	0.80	0.029
Trichlorofluoromethane	0	0	0	0	0	0
Trichloromethane	0.18	0.78	2.43	2.04	1.24	0.046
Trichlorotrifluoroethane	0	0	0	0	0	0
1,2,4-Trimethylbenzene	0	0	0	0	0	0
1,3,5-Trimethylbenzene	0	0	0	0	0	0
Xylenes (total)	0	0	0	0	0	0
Total	11.2	49.4	154	129	78.4	2.89

Dry Gas Volume Sampled (Rm^3*) :	0.0730
Actual Flowrate (m^3/s) :	58.4
Dry Reference Flowrate (Rm^3/s*) :	18.8
Dry Adjusted Flowrate (Rm^3/s**) :	22.4
Wet Reference Flowrate (Rm^3/s*) :	36.8

* 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	14.9	12.7	20.2	15.9
Bromodichloromethane	4.29	1.83	2.97	3.03
Bromomethane	6.70	7.90	12.9	9.16
2-Butanone	0.53	0.39	1.03	0.65
Chloroethene	0	0	0.13	0.043
Dibromochloromethane	1.53	1.19	0.79	1.17
1,2-Dibromoethane	0.20	0	0	0.065
Dichlorodifluoromethane	0.078	0	0	0.026
1,1-Dichloroethane	0	0	0	0
1,1-Dichloroethene	0	0	0	0
trans-1,2-Dichloroethene	0	0	0	0
Dichloromethane	2.82	5.21	2.68	3.57
1,2-Dichloropropane	0	0	0	0
Ethyl Acetate	0	0	0	0
Ethylbenzene	0	0	0	0
Isopropylbenzene	0	0	0	0
2-Propanone	1.70	1.62	4.13	2.48
Styrene	0.71	0.40	0.36	0.49
Tetrachloroethene	1.09	0.81	0.81	0.90
Tetrachloromethane	0.39	0.15	0.43	0.32
Toluene	1.34	0.64	0.92	0.97
Tribromomethane	1.24	1.13	0.86	1.08
1,1,1-Trichloroethane	0	0	0	0
Trichloroethene	0.39	0.28	0.50	0.39
Trichlorofluoromethane	0	0	0	0
Trichloromethane	1.18	0.81	0.78	0.92
Trichlorotrifluoroethane	0	0	0	0
1,2,4-Trimethylbenzene	0	0	0	0
1,3,5-Trimethylbenzene	0	0	0	0
Xylenes (total)	0.66	0.21	0	0.29
Total	39.8	35.3	49.4	41.5

TABLE 109
Clean Harbors Sarnia
Volatile Organic Dry Reference Concentrations

Compound	Dry 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	45.9	40.6	62.7	49.7
Bromodichloromethane	13.2	5.83	9.24	9.42
Bromomethane	20.6	25.2	40.0	28.6
2-Butanone	1.63	1.25	3.19	2.03
Chloroethene	0	0	0.40	0.13
Dibromochloromethane	4.72	3.80	2.44	3.65
1,2-Dibromoethane	0.60	0	0	0.20
Dichlorodifluoromethane	0.24	0	0	0.080
1,1-Dichloroethane	0	0	0	0
1,1-Dichloroethene	0	0	0	0
trans-1,2-Dichloroethene	0	0	0	0
Dichloromethane	8.69	16.6	8.32	11.2
1,2-Dichloropropane	0	0	0	0
Ethyl Acetate	0	0	0	0
Ethylbenzene	0	0	0	0
Isopropylbenzene	0	0	0	0
2-Propanone	5.25	5.17	12.8	7.74
Styrene	2.20	1.28	1.12	1.53
Tetrachloroethene	3.36	2.60	2.51	2.82
Tetrachloromethane	1.21	0.46	1.34	1.01
Toluene	4.13	2.05	2.85	3.01
Tribromomethane	3.82	3.60	2.67	3.36
1,1,1-Trichloroethane	0	0	0	0
Trichloroethene	1.19	0.90	1.56	1.22
Trichlorofluoromethane	0	0	0	0
Trichloromethane	3.63	2.59	2.43	2.88
Trichlorotrifluoroethane	0	0	0	0
1,2,4-Trimethylbenzene	0	0	0	0
1,3,5-Trimethylbenzene	0	0	0	0
Xylenes (total)	2.04	0.66	0	0.90
Total	122	113	154	130

* At 25°C and 1 atmosphere

TABLE 110
Clean Harbors Sarnia
Volatile Organic Dry Adjusted Concentrations

Compound	Dry Adjusted Concentration			
	Test No. 1 µg/Rm^3*	Test No. 2 µg/Rm^3*	Test No. 3 µg/Rm^3*	Average µg/Rm^3*
Benzene	37.2	33.0	52.6	40.9
Bromodichloromethane	10.7	4.74	7.75	7.73
Bromomethane	16.7	20.5	33.6	23.6
2-Butanone	1.32	1.02	2.68	1.67
Chloroethene	0	0	0.33	0.11
Dibromochloromethane	3.83	3.08	2.05	2.99
1,2-Dibromoethane	0.49	0	0	0.16
Dichlorodifluoromethane	0.19	0	0	0.065
1,1-Dichloroethane	0	0	0	0
1,1-Dichloroethene	0	0	0	0
trans-1,2-Dichloroethene	0	0	0	0
Dichloromethane	7.05	13.5	6.98	9.18
1,2-Dichloropropane	0	0	0	0
Ethyl Acetate	0	0	0	0
Ethylbenzene	0	0	0	0
Isopropylbenzene	0	0	0	0
2-Propanone	4.25	4.20	10.8	6.40
Styrene	1.78	1.04	0.94	1.25
Tetrachloroethene	2.73	2.11	2.11	2.31
Tetrachloromethane	0.98	0.38	1.13	0.83
Toluene	3.35	1.67	2.39	2.47
Tribromomethane	3.10	2.92	2.24	2.75
1,1,1-Trichloroethane	0	0	0	0
Trichloroethene	0.96	0.73	1.31	1.00
Trichlorofluoromethane	0	0	0	0
Trichloromethane	2.94	2.10	2.04	2.36
Trichlorotrifluoroethane	0	0	0	0
1,2,4-Trimethylbenzene	0	0	0	0
1,3,5-Trimethylbenzene	0	0	0	0
Xylenes (total)	1.65	0.54	0	0.73
Total	99.2	91.5	129	107

* 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	23.0	20.2	32.0	25.1
Bromodichloromethane	6.61	2.91	4.72	4.75
Bromomethane	10.3	12.6	20.4	14.4
2-Butanone	0.82	0.62	1.63	1.02
Chloroethene	0	0	0.20	0.068
Dibromochloromethane	2.37	1.89	1.25	1.83
1,2-Dibromoethane	0.30	0	0	0.10
Dichlorodifluoromethane	0.12	0	0	0.040
1,1-Dichloroethane	0	0	0	0
1,1-Dichloroethene	0	0	0	0
trans-1,2-Dichloroethene	0	0	0	0
Dichloromethane	4.36	8.29	4.25	5.63
1,2-Dichloropropane	0	0	0	0
Ethyl Acetate	0	0	0	0
Ethylbenzene	0	0	0	0
Isopropylbenzene	0	0	0	0
2-Propanone	2.63	2.58	6.55	3.92
Styrene	1.10	0.64	0.57	0.77
Tetrachloroethene	1.69	1.30	1.28	1.42
Tetrachloromethane	0.61	0.23	0.69	0.51
Toluene	2.07	1.02	1.46	1.52
Tribromomethane	1.91	1.79	1.37	1.69
1,1,1-Trichloroethane	0	0	0	0
Trichloroethene	0.60	0.45	0.80	0.61
Trichlorofluoromethane	0	0	0	0
Trichloromethane	1.82	1.29	1.24	1.45
Trichlorotrifluoroethane	0	0	0	0
1,2,4-Trimethylbenzene	0	0	0	0
1,3,5-Trimethylbenzene	0	0	0	0
Xylenes (total)	1.02	0.33	0	0.45
Total	61.3	56.2	78.4	65.3

* 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	0.89	0.74	1.18	0.93
Bromodichloromethane	0.25	0.11	0.17	0.18
Bromomethane	0.40	0.46	0.75	0.54
2-Butanone	0.032	0.023	0.060	0.038
Chloroethene	0	0	0.0075	0.0025
Dibromochloromethane	0.091	0.069	0.046	0.069
1,2-Dibromoethane	0.012	0	0	0.0039
Dichlorodifluoromethane	0.0046	0	0	0.0015
1,1-Dichloroethane	0	0	0	0
1,1-Dichloroethene	0	0	0	0
trans-1,2-Dichloroethene	0	0	0	0
Dichloromethane	0.17	0.30	0.16	0.21
1,2-Dichloropropane	0	0	0	0
Ethyl Acetate	0	0	0	0
Ethylbenzene	0	0	0	0
Isopropylbenzene	0	0	0	0
2-Propanone	0.10	0.094	0.24	0.15
Styrene	0.042	0.023	0.021	0.029
Tetrachloroethene	0.065	0.047	0.047	0.053
Tetrachloromethane	0.023	0.0084	0.025	0.019
Toluene	0.080	0.037	0.054	0.057
Tribromomethane	0.074	0.065	0.050	0.063
1,1,1-Trichloroethane	0	0	0	0
Trichloroethene	0.023	0.016	0.029	0.023
Trichlorofluoromethane	0	0	0	0
Trichloromethane	0.070	0.047	0.046	0.054
Trichlorotrifluoroethane	0	0	0	0
1,2,4-Trimethylbenzene	0	0	0	0
1,3,5-Trimethylbenzene	0	0	0	0
Xylenes (total)	0.039	0.012	0	0.017
Total	2.36	2.05	2.89	2.43

TABLE 113
Clean Harbors Sarnia
Summary of Volatile Organic Emission Data

Compound	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	µg/m^3	µg/Rm^3*	µg/Rm^3*	µg/Rm^3*	mg/s
Benzene	15.9	49.7	40.9	25.1	0.93
Bromodichloromethane	3.03	9.42	7.73	4.75	0.18
Bromomethane	9.16	28.6	23.6	14.4	0.54
2-Butanone	0.65	2.03	1.67	1.02	0.038
Chloroethene	0.043	0.13	0.11	0.068	0.0025
Dibromochloromethane	1.17	3.65	2.99	1.83	0.069
1,2-Dibromoethane	0.065	0.20	0.16	0.10	0.0039
Dichlorodifluoromethane	0.026	0.080	0.065	0.040	0.0015
1,1-Dichloroethane	0	0	0	0	0
1,1-Dichloroethene	0	0	0	0	0
trans-1,2-Dichloroethene	0	0	0	0	0
Dichloromethane	3.57	11.2	9.18	5.63	0.21
1,2-Dichloropropane	0	0	0	0	0
Ethyl Acetate	0	0	0	0	0
Ethylbenzene	0	0	0	0	0
Isopropylbenzene	0	0	0	0	0
2-Propanone	2.48	7.74	6.40	3.92	0.15
Styrene	0.49	1.53	1.25	0.77	0.029
Tetrachloroethene	0.90	2.82	2.31	1.42	0.053
Tetrachloromethane	0.32	1.01	0.83	0.51	0.019
Toluene	0.97	3.01	2.47	1.52	0.057
Tribromomethane	1.08	3.36	2.75	1.69	0.063
1,1,1-Trichloroethane	0	0	0	0	0
Trichloroethene	0.39	1.22	1.00	0.61	0.023
Trichlorofluoromethane	0	0	0	0	0
Trichloromethane	0.92	2.88	2.36	1.45	0.054
Trichlorotrifluoroethane	0	0	0	0	0
1,2,4-Trimethylbenzene	0	0	0	0	0
1,3,5-Trimethylbenzene	0	0	0	0	0
Xylenes (total)	0.29	0.90	0.73	0.45	0.017
Total	41.5	130	107	65.3	2.43

* 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 15A/15B	Trip Blank Tube 43A/43B	Method Blank
	µg	µg	µg
Benzene	<0.05	<0.05	<0.05
Bromodichloromethane	<0.01	<0.01	<0.01
Bromomethane	<0.09	<0.09	<0.09
2-Butanone	<0.01	<0.01	<0.01
Chloroethene	<0.02	<0.02	<0.02
Dibromochloromethane	<0.01	<0.01	<0.01
1,2-Dibromoethane	<0.02	<0.02	<0.02
Dichlorodifluoromethane	<0.02	<0.02	<0.02
1,1-Dichloroethane	<0.01	<0.01	<0.01
1,1-Dichloroethene	<0.01	<0.01	<0.01
trans-1,2-Dichloroethene	<0.01	<0.01	<0.01
Dichloromethane	0.10	<0.1	<0.1
1,2-Dichloropropane	<0.01	<0.01	<0.01
Ethyl Acetate	<0.1	<0.1	<0.1
Ethylbenzene	<0.01	<0.01	<0.01
Isopropylbenzene	<0.02	<0.02	<0.02
2-Propanone	0.11	<0.1	<0.1
Styrene	<0.02	<0.02	<0.02
Tetrachloroethene	<0.01	<0.01	<0.01
Tetrachloromethane	<0.01	<0.01	<0.01
Toluene	<0.05	<0.05	<0.05
Tribromomethane	<0.01	<0.01	<0.01
1,1,1-Trichloroethane	<0.01	<0.01	<0.01
Trichloroethene	<0.01	<0.01	<0.01
Trichlorofluoromethane	<0.02	<0.02	<0.02
Trichloromethane	<0.01	<0.01	<0.01
Trichlorotrifluoroethane	<0.02	<0.02	<0.02
1,2,4-Trimethylbenzene	<0.02	<0.02	<0.02
1,3,5-Trimethylbenzene	<0.02	<0.02	<0.02
Xylenes (total)	<0.04	<0.04	<0.04
Total	0.22	0	0

Note: "<" indicates that the analyte was not detected (was less than the analytical detection limit). For the purpose of determining the total analytical results for each compound, any analyte that was not detected was assigned a value of zero 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 Rm^3 *	Dry Reference Concentration $\mu g/Rm^3$ *	Dry Reference Flowrate Rm^3/s *	Emission Rate mg/s
2	2-Butanone	73	0.0341	2.14	19.3	0.041
	Ethyl Acetate	< 100	0.0341	<2.94	19.3	<0.057
	Tetrachloroethene	110	0.0341	3.23	19.3	0.062
	Toluene	147	0.0341	4.32	19.3	0.083
	Total Xylenes	77	0.0341	2.26	19.3	0.044
	1,2,4-Trichlorobenzene**	-	-	-	-	-
3	2-Butanone	19	0.0245	0.78	19.3	0.015
	Ethyl Acetate	< 100	0.0245	<4.09	19.3	<0.079
	Tetrachloroethene	73	0.0245	2.98	19.3	0.058
	Toluene	96	0.0245	3.92	19.3	0.076
	Total Xylenes	45	0.0245	1.84	19.3	0.035
	1,2,4-Trichlorobenzene**	-	-	-	-	-
4	2-Butanone	44	0.0248	1.78	19.3	0.034
	Ethyl Acetate	< 100	0.0248	<4.04	19.3	<0.078
	Tetrachloroethene	97	0.0248	3.92	19.3	0.076
	Toluene	101	0.0248	4.08	19.3	0.079
	Total Xylenes	48	0.0248	1.94	19.3	0.037
	1,2,4-Trichlorobenzene**	-	-	-	-	-
Total	2-Butanone	136	0.0833	1.63	19.3	0.032
	Ethyl Acetate	< 300	0.0833	<3.60	19.3	<0.070
	Tetrachloroethene	280	0.0833	3.36	19.3	0.065
	Toluene	344	0.0833	4.13	19.3	0.080
	Total Xylenes	170	0.0833	2.04	19.3	0.039
	1,2,4-Trichlorobenzene**	116	5.718	0.020	19.1	0.00039

* At 25°C and 1 atmosphere.

** Emission data are based on the average results from the Isokinetic Sampling Trains.

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 $\mu g/Rm^3$ *	Dry Reference Flowrate Rm^3/s *	Emission Rate mg/s
2	2-Butanone	33	0.0215	1.53	18.2	0.028
	Ethyl Acetate	< 100	0.0215	<4.65	18.2	<0.085
	Tetrachloroethene	72	0.0215	3.35	18.2	0.061
	Toluene	72	0.0215	3.35	18.2	0.061
	Total Xylenes	< 40	0.0215	<1.86	18.2	<0.034
	1,2,4-Trichlorobenzene**	-	-	-	-	-
3	2-Butanone	12	0.0235	0.51	18.2	0.0093
	Ethyl Acetate	< 100	0.0235	<4.25	18.2	<0.077
	Tetrachloroethene	70	0.0235	2.98	18.2	0.054
	Toluene	74	0.0235	3.15	18.2	0.057
	Total Xylenes	47	0.0235	2.00	18.2	0.036
	1,2,4-Trichlorobenzene**	-	-	-	-	-
4	2-Butanone	44	0.0261	1.68	18.2	0.031
	Ethyl Acetate	< 100	0.0261	<3.83	18.2	<0.070
	Tetrachloroethene	43	0.0261	1.65	18.2	0.030
	Toluene	< 50	0.0261	<1.91	18.2	<0.035
	Total Xylenes	< 40	0.0261	<1.53	18.2	<0.028
	1,2,4-Trichlorobenzene**	-	-	-	-	-
Total	2-Butanone	89	0.0711	1.25	18.2	0.023
	Ethyl Acetate	< 300	0.0711	<4.22	18.2	<0.077
	Tetrachloroethene	185	0.0711	2.60	18.2	0.047
	Toluene	< 196	0.0711	<2.76	18.2	<0.050
	Total Xylenes	< 127	0.0711	<1.79	18.2	<0.032
	1,2,4-Trichlorobenzene**	154	5.297	0.029	18.3	0.00053

* At 25°C and 1 atmosphere.

** Emission data are based on the average results from the Isokinetic Sampling Trains.

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 $\mu g/Rm^3$ *	Dry Reference Flowrate Rm^3/s *	Emission Rate mg/s
2	2-Butanone	66	0.0250	2.64	18.8	0.050
	Ethyl Acetate	< 100	0.0250	<4.00	18.8	<0.075
	Tetrachloroethene	56	0.0250	2.24	18.8	0.042
	Toluene	53	0.0250	2.12	18.8	0.040
	Total Xylenes	< 40	0.0250	<1.60	18.8	<0.030
	1,2,4-Trichlorobenzene**	-	-	-	-	-
3	2-Butanone	68	0.0241	2.82	18.8	0.053
	Ethyl Acetate	< 100	0.0241	<4.15	18.8	<0.078
	Tetrachloroethene	62	0.0241	2.57	18.8	0.048
	Toluene	61	0.0241	2.53	18.8	0.048
	Total Xylenes	< 40	0.0241	<1.66	18.8	<0.031
	1,2,4-Trichlorobenzene**	-	-	-	-	-
4	2-Butanone	99	0.0239	4.15	18.8	0.078
	Ethyl Acetate	< 100	0.0239	<4.19	18.8	<0.079
	Tetrachloroethene	65	0.0239	2.72	18.8	0.051
	Toluene	94	0.0239	3.94	18.8	0.074
	Total Xylenes	< 40	0.0239	<1.68	18.8	<0.032
	1,2,4-Trichlorobenzene**	-	-	-	-	-
Total	2-Butanone	233	0.0730	3.19	18.8	0.060
	Ethyl Acetate	< 300	0.0730	<4.11	18.8	<0.077
	Tetrachloroethene	183	0.0730	2.51	18.8	0.047
	Toluene	208	0.0730	2.85	18.8	0.054
	Total Xylenes	< 120	0.0730	<1.64	18.8	<0.031
	1,2,4-Trichlorobenzene**	271	5.245	0.052	18.5	0.00096

* At 25°C and 1 atmosphere.

** Emission data are based on the average results from the Isokinetic Sampling Trains.

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				Coefficient of Variation
	Test No. 1 mg/s	Test No. 2 mg/s	Test No. 3 mg/s	Average mg/s	%
2-Butanone	0.032	0.023	0.060	0.038	51.1
Ethyl Acetate	<0.070	<0.077	<0.077	<0.075	5.8
Tetrachloroethene	0.065	0.047	0.047	0.053	19.2
Toluene	0.080	<0.050	0.054	<0.061	26.4
Total Xylenes	0.039	<0.032	<0.031	<0.034	13.1
1,2,4-Trichlorobenzene	0.00039	0.00053	0.00096	0.00063	47.3

TABLE 119
Clean Harbors Sarnia
Blank Volatile Organic Analyses

Compound	Field Blank Tube 15A/15B	Trip Blank Tube 43A/43B	Method Blank
	µg	µg	µg
2-Butanone	<0.01	<0.01	<0.01
Ethyl Acetate	<0.1	<0.1	<0.1
Tetrachloroethene	<0.01	<0.01	<0.01
Toluene	<0.05	<0.05	<0.05
Total Xylenes	<0.04	<0.04	<0.04
Total	0	0	0

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	2-Butanone	44.8	0.93	0.69	2000	1.39
	Ethyl Acetate	44.8	0.93	0.69	1000	0.69
	Tetrachloroethene	44.8	0.93	0.69	440	0.31
	Toluene	44.8	0.93	0.69	47300	32.8
	Total Xylenes	44.8	0.93	0.69	71600	49.7
	1,2,4-Trichlorobenzene	44.8	0.93	0.69	<500	<0.35
Lean	2-Butanone	170	1.06	3.00	<1000	<3.00
	Ethyl Acetate	170	1.06	3.00	<1000	<3.00
	Tetrachloroethene	170	1.06	3.00	<100	<0.30
	Toluene	170	1.06	3.00	<100	<0.30
	Total Xylenes	170	1.06	3.00	<100	<0.30
	1,2,4-Trichlorobenzene	170	1.06	3.00	<500	<1.50
Emulsion	2-Butanone	10.1	0.98	0.16	<3000	<0.49
	Ethyl Acetate	10.1	0.98	0.16	1100	0.18
	Tetrachloroethene	10.1	0.98	0.16	910	0.15
	Toluene	10.1	0.98	0.16	40500	6.68
	Total Xylenes	10.1	0.98	0.16	62200	10.3
	1,2,4-Trichlorobenzene	10.1	0.98	0.16	<500	<0.082
Alkaline	2-Butanone	216	1.01	3.63	<1000	<3.63
	Ethyl Acetate	216	1.01	3.63	<1000	<3.63
	Tetrachloroethene	216	1.01	3.63	<100	<0.36
	Toluene	216	1.01	3.63	<100	<0.36
	Total Xylenes	216	1.01	3.63	<100	<0.36
	1,2,4-Trichlorobenzene	216	1.01	3.63	<500	<1.81
Leachate	2-Butanone	9.84	1.00	0.16	<1000	<0.16
	Ethyl Acetate	9.84	1.00	0.16	<1000	<0.16
	Tetrachloroethene	9.84	1.00	0.16	<100	<0.016
	Toluene	9.84	1.00	0.16	<100	<0.016
	Total Xylenes	9.84	1.00	0.16	<100	<0.016
	1,2,4-Trichlorobenzene	9.84	1.00	0.16	<500	<0.082
Total	2-Butanone					<8.68
	Ethyl Acetate					<7.67
	Tetrachloroethene					<1.14
	Toluene					<40.2
	Total Xylenes					<60.7
	1,2,4-Trichlorobenzene					<3.83

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	2-Butanone	44.4	0.92	0.68	<2500	<1.70
	Ethyl Acetate	44.4	0.92	0.68	1200	0.82
	Tetrachloroethene	44.4	0.92	0.68	450	0.31
	Toluene	44.4	0.92	0.68	53000	36.1
	Total Xylenes	44.4	0.92	0.68	67300	45.8
	1,2,4-Trichlorobenzene	44.4	0.92	0.68	<500	<0.34
Lean	2-Butanone	167	1.06	2.95	<1000	<2.95
	Ethyl Acetate	167	1.06	2.95	<1000	<2.95
	Tetrachloroethene	167	1.06	2.95	<100	<0.30
	Toluene	167	1.06	2.95	<100	<0.30
	Total Xylenes	167	1.06	2.95	<100	<0.30
	1,2,4-Trichlorobenzene	167	1.06	2.95	<500	<1.48
Emulsion	2-Butanone	11.5	0.98	0.19	<3000	<0.56
	Ethyl Acetate	11.5	0.98	0.19	<1000	<0.19
	Tetrachloroethene	11.5	0.98	0.19	830	0.16
	Toluene	11.5	0.98	0.19	37200	6.99
	Total Xylenes	11.5	0.98	0.19	58300	11.0
	1,2,4-Trichlorobenzene	11.5	0.98	0.19	<500	<0.094
Alkaline	2-Butanone	188	1.01	3.17	<1000	<3.17
	Ethyl Acetate	188	1.01	3.17	<1000	<3.17
	Tetrachloroethene	188	1.01	3.17	<100	<0.32
	Toluene	188	1.01	3.17	<100	<0.32
	Total Xylenes	188	1.01	3.17	<100	<0.32
	1,2,4-Trichlorobenzene	188	1.01	3.17	<500	<1.59
Leachate	2-Butanone	11.0	1.00	0.18	<1000	<0.18
	Ethyl Acetate	11.0	1.00	0.18	<1000	<0.18
	Tetrachloroethene	11.0	1.00	0.18	<100	<0.018
	Toluene	11.0	1.00	0.18	<100	<0.018
	Total Xylenes	11.0	1.00	0.18	<100	<0.018
	1,2,4-Trichlorobenzene	11.0	1.00	0.18	<500	<0.092
Total	2-Butanone					<8.57
	Ethyl Acetate					<7.31
	Tetrachloroethene					<1.09
	Toluene					<43.7
	Total Xylenes					<57.4
	1,2,4-Trichlorobenzene					<3.59

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	2-Butanone	42.8	0.88	0.63	<2000	<1.26
	Ethyl Acetate	42.8	0.88	0.63	<1000	<0.63
	Tetrachloroethene	42.8	0.88	0.63	410	0.26
	Toluene	42.8	0.88	0.63	43400	27.2
	Total Xylenes	42.8	0.88	0.63	59900	37.6
	1,2,4-Trichlorobenzene	42.8	0.88	0.63	<500	<0.31
Lean	2-Butanone	165	1.04	2.86	<1000	<2.86
	Ethyl Acetate	165	1.04	2.86	<1000	<2.86
	Tetrachloroethene	165	1.04	2.86	<100	<0.29
	Toluene	165	1.04	2.86	270	0.77
	Total Xylenes	165	1.04	2.86	374	1.07
	1,2,4-Trichlorobenzene	165	1.04	2.86	<500	<1.43
Emulsion	2-Butanone	9.80	0.96	0.16	<5000	<0.78
	Ethyl Acetate	9.80	0.96	0.16	<1000	<0.16
	Tetrachloroethene	9.80	0.96	0.16	830	0.13
	Toluene	9.80	0.96	0.16	40400	6.33
	Total Xylenes	9.80	0.96	0.16	93600	14.7
	1,2,4-Trichlorobenzene	9.80	0.96	0.16	<500	<0.078
Alkaline	2-Butanone	193	0.99	3.18	<1000	<3.18
	Ethyl Acetate	193	0.99	3.18	<1000	<3.18
	Tetrachloroethene	193	0.99	3.18	<100	<0.32
	Toluene	193	0.99	3.18	<100	<0.32
	Total Xylenes	193	0.99	3.18	<100	<0.32
	1,2,4-Trichlorobenzene	193	0.99	3.18	<500	<1.59
Leachate	2-Butanone	10.8	1.00	0.18	<1000	<0.18
	Ethyl Acetate	10.8	1.00	0.18	<1000	<0.18
	Tetrachloroethene	10.8	1.00	0.18	<100	<0.018
	Toluene	10.8	1.00	0.18	<100	<0.018
	Total Xylenes	10.8	1.00	0.18	<100	<0.018
	1,2,4-Trichlorobenzene	10.8	1.00	0.18	<500	<0.090
Total	2-Butanone					<8.26
	Ethyl Acetate					<7.00
	Tetrachloroethene					<1.01
	Toluene					<34.7
	Total Xylenes					<53.7
	1,2,4-Trichlorobenzene					<3.50

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 %
2	2-Butanone	<8.68	0.041	99.9995
	Ethyl Acetate	<7.67	<0.057	99.9993
	Tetrachloroethene	<1.14	0.062	99.9945
	Toluene	<40.2	0.083	99.9998
	Total Xylenes	<60.7	0.044	99.9999
3	2-Butanone	<8.68	0.015	99.9998
	Ethyl Acetate	<7.67	<0.079	99.9990
	Tetrachloroethene	<1.14	0.058	99.9949
	Toluene	<40.2	0.076	99.9998
	Total Xylenes	<60.7	0.035	99.9999
4	2-Butanone	<8.68	0.034	99.9996
	Ethyl Acetate	<7.67	<0.078	99.9990
	Tetrachloroethene	<1.14	0.076	99.9933
	Toluene	<40.2	0.079	99.9998
	Total Xylenes	<60.7	0.037	99.9999
Total	2-Butanone	<8.68	0.032	99.9996
	Ethyl Acetate	<7.67	<0.070	99.9991
	Tetrachloroethene	<1.14	0.065	99.9943
	Toluene	<40.2	0.080	99.9998
	Total Xylenes	<60.7	0.039	99.9999
	1,2,4-Trichlorobenzene	<3.83	0.00039	100.0000

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 %
2	2-Butanone	<8.57	0.028	99.9997
	Ethyl Acetate	<7.31	<0.085	99.9988
	Tetrachloroethene	<1.09	0.061	99.9944
	Toluene	<43.7	0.061	99.9999
	Total Xylenes	<57.4	<0.034	99.9999
3	2-Butanone	<8.57	0.0093	99.9999
	Ethyl Acetate	<7.31	<0.077	99.9989
	Tetrachloroethene	<1.09	0.054	99.9950
	Toluene	<43.7	0.057	99.9999
	Total Xylenes	<57.4	0.036	99.9999
4	2-Butanone	<8.57	0.031	99.9996
	Ethyl Acetate	<7.31	<0.070	99.9990
	Tetrachloroethene	<1.09	0.030	99.9973
	Toluene	<43.7	<0.035	99.9999
	Total Xylenes	<57.4	<0.028	100.0000
Total	2-Butanone	<8.57	0.023	99.9997
	Ethyl Acetate	<7.31	<0.077	99.9990
	Tetrachloroethene	<1.09	0.047	99.9957
	Toluene	<43.7	<0.050	99.9999
	Total Xylenes	<57.4	<0.032	99.9999
	1,2,4-Trichlorobenzene	<3.59	0.00053	100.0000

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 %
2	2-Butanone	<8.26	0.050	99.9994
	Ethyl Acetate	<7.00	<0.075	99.9989
	Tetrachloroethene	<1.01	0.042	99.9958
	Toluene	<34.7	0.040	99.9999
	Total Xylenes	<53.7	<0.030	99.9999
3	2-Butanone	<8.26	0.053	99.9994
	Ethyl Acetate	<7.00	<0.078	99.9989
	Tetrachloroethene	<1.01	0.048	99.9952
	Toluene	<34.7	0.048	99.9999
	Total Xylenes	<53.7	<0.031	99.9999
4	2-Butanone	<8.26	0.078	99.9991
	Ethyl Acetate	<7.00	<0.079	99.9989
	Tetrachloroethene	<1.01	0.051	99.9949
	Toluene	<34.7	0.074	99.9998
	Total Xylenes	<53.7	<0.032	99.9999
Total	2-Butanone	<8.26	0.060	99.9993
	Ethyl Acetate	<7.00	<0.077	99.9989
	Tetrachloroethene	<1.01	0.047	99.9953
	Toluene	<34.7	0.054	99.9998
	Total Xylenes	<53.7	<0.031	99.9999
	1,2,4-Trichlorobenzene	<3.50	0.00096	100.0000

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	
	%	%	%	%	%
2-Butanone	99.9996	99.9997	99.9993	99.9995	0.00024
Ethyl Acetate	99.9991	99.9990	99.9989	99.9990	0.00010
Tetrachloroethene	99.9943	99.9957	99.9953	99.9951	0.00072
Toluene	99.9998	99.9999	99.9998	99.9998	0.000042
Total Xylenes	99.9999	99.9999	99.9999	99.9999	0.0000045
1,2,4-Trichlorobenzene	100.0000	100.0000	100.0000	100.0000	0.0000089

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	0.0462 µg/m³			
Base Case - 30 Day	1.00 g/s	0.1339 µg/m³			
Base Case - 24 hour	1.00 g/s	0.4605 µg/m³			
Base Case - 1 hour	1.00 g/s	1.7176 µg/m³			
Base Case - 1/2 hour	1.00 g/s	2.0611 µg/m³			
Particulate matter	0.077 g/s	0.036 µg/m³	120 µg/m³	0.030	S
Sulphur dioxide	33.3 g/s	15.3 µg/m³	275 µg/m³	5.58	S - 24 hour
Sulphur dioxide	33.3 g/s	57.2 µg/m³	690 µg/m³	8.29	S - 1 hour
Nitrogen oxides	3.05 g/s	1.40 µg/m³	200 µg/m³	0.70	S - 24 hour
Nitrogen oxides	3.05 g/s	5.24 µg/m³	400 µg/m³	1.31	S - 1 hour
Carbon monoxide	1.51 g/s	3.11 µg/m³	6000 µg/m³	0.052	S - 1/2 hour
Carbon dioxide	3098 g/s	1427 µg/m³	255800 µg/m³	0.56	SL
Hydrogen chloride	1.45 g/s	0.67 µg/m³	20 µg/m³	3.34	S
Fluorides (as hydrogen fluoride)	0.24 g/s	0.11 µg/m³	0.86 µg/m³	12.9	S - 24 hour
Fluorides (as hydrogen fluoride)	0.24 g/s	0.032 µg/m³	0.34 µg/m³	9.45	S - 30 day
Hydrogen bromide	0.32 g/s	0.55 µg/m³	668 µg/m³	0.082	G - 1 hour
Hydrogen iodide	<0.010 g/s	0.0046 µg/m³	0.5 µg/m³	0.92	SL
Hydrogen cyanide	<0.0098 g/s	0.0045 µg/m³	8 µg/m³	0.056	S
Dioxins & Furans (TEQ) *	<0.040 ng TEQ/s	0.000018 pg TEQ/m³			
Dioxins, Furans and Dioxin-Like PCBs (TEQ) **	0.039 ng TEQ/s	0.000018 pg TEQ/m³	0.1 pg TEQ/m³	0.018	S
Benzo(a)Pyrene	0.24 µg/s	0.000000011 µg/m³	0.00001 µg/m³	0.11	S - Annual
Biphenyl	1.80 µg/s	0.0000031 µg/m³	60 µg/m³	<0.0001	G - 1 hour
2-Chloronaphthalene	<0.055 µg/s	0.000000025 µg/m³	1 µg/m³	<0.0001	SL
1-Methylnaphthalene	0.96 µg/s	0.00000044 µg/m³	35.5 µg/m³	<0.0001	SL
Naphthalene	12.8 µg/s	0.0000059 µg/m³	22.5 µg/m³	<0.0001	G
Quinoline	6.44 µg/s	0.0000030 µg/m³	0.005 µg/m³	0.059	SL
Terphenyls (m, o, p)	<0.28 µg/s	0.00000013 µg/m³	15 µg/m³	<0.0001	SL
1,2-Dichlorobenzene	0.94 µg/s	0.0000016 µg/m³	30500 µg/m³	<0.0001	G - 1 hour
1,3-Dichlorobenzene	3.01 µg/s	0.0000014 µg/m³	50 µg/m³	<0.0001	SL
1,4-Dichlorobenzene	1.01 µg/s	0.00000047 µg/m³	95 µg/m³	<0.0001	S
1,3,5-Trichlorobenzene	0.12 µg/s	0.000000055 µg/m³	3.6 µg/m³	<0.0001	SL
1,2,4-Trichlorobenzene	0.63 µg/s	0.00000029 µg/m³	400 µg/m³	<0.0001	G
1,2,3-Trichlorobenzene	0.22 µg/s	0.00000010 µg/m³	135 µg/m³	<0.0001	SL
1,2,4,5-Tetrachlorobenzene	0.32 µg/s	0.00000015 µg/m³	1 µg/m³	<0.0001	SL
1,2,3,4-Tetrachlorobenzene	<0.092 µg/s	0.000000042 µg/m³	600 µg/m³	<0.0001	SL
Pentachlorobenzene	0.15 µg/s	0.000000069 µg/m³	80 µg/m³	<0.0001	SL
Hexachlorobenzene	<0.063 µg/s	0.000000029 µg/m³	0.011 µg/m³	0.00026	SL
2,4-Dichlorophenol	<0.28 µg/s	0.00000013 µg/m³	33.5 µg/m³	<0.0001	SL
2,6-Dichlorophenol	<0.28 µg/s	0.00000013 µg/m³	19 µg/m³	<0.0001	SL
2,4,5-Trichlorophenol	<0.28 µg/s	0.00000013 µg/m³	220 µg/m³	<0.0001	SL
2,4,6-Trichlorophenol	<0.28 µg/s	0.00000013 µg/m³	1.5 µg/m³	<0.0001	SL
2,3,4,6-Tetrachlorophenol	<0.28 µg/s	0.00000013 µg/m³	0.75 µg/m³	<0.0001	SL
Pentachlorophenol	<0.28 µg/s	0.00000013 µg/m³	20 µg/m³	<0.0001	G
Polychlorinated biphenyls	<4.36 µg/s	0.0000020 µg/m³	0.15 µg/m³	0.0013	G
Hexachlorobutadiene	<0.016 µg/s	0.0000000074 µg/m³	0.225 µg/m³	<0.0001	SL
Hexachloroethane	<0.055 µg/s	0.000000025 µg/m³	115 µg/m³	<0.0001	SL
Heptachlor	<0.014 µg/s	0.0000000064 µg/m³	0.004 µg/m³	0.00016	SL
Toxaphene	<0.059 µg/s	0.000000027 µg/m³	0.015 µg/m³	0.00018	SL
Hexachlorophene	<0.28 µg/s	0.00000013 µg/m³	0.5 µg/m³	<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	0.0462 µg/m^3			
Base Case - 30 Day	1.00 g/s	0.1339 µg/m^3			
Base Case - 24 hour	1.00 g/s	0.4605 µg/m^3			
Aluminum	1.75 mg/s	0.00080 µg/m^3	12 µg/m^3	0.0067	SL
Antimony	0.0075 mg/s	0.0000035 µg/m^3	25 µg/m^3	<0.0001	S
Arsenic	0.096 mg/s	0.000044 µg/m^3	0.3 µg/m^3	0.015	G
Barium (as water soluble)	0.12 mg/s	0.000056 µg/m^3	10 µg/m^3	0.00056	G
Beryllium*	<0.00034 mg/s	0.00000016 µg/m^3	0.01 µg/m^3	0.0016	S
Boron	13.0 mg/s	0.0060 µg/m^3	120 µg/m^3	0.0050	S
Cadmium	0.0050 mg/s	0.0000023 µg/m^3	0.025 µg/m^3	0.0092	S
Calcium oxide	5.70 mg/s	0.0026 µg/m^3	10 µg/m^3	0.026	S
Chromium	0.065 mg/s	0.000030 µg/m^3	0.5 µg/m^3	0.0060	G
Cobalt	0.0069 mg/s	0.0000032 µg/m^3	0.1 µg/m^3	0.0032	G
Copper	0.095 mg/s	0.000044 µg/m^3	50 µg/m^3	<0.0001	S
Iron (as metal)	2.83 mg/s	0.0013 µg/m^3	4 µg/m^3	0.033	S
Lead	0.020 mg/s	0.0000093 µg/m^3	0.5 µg/m^3	0.0019	S - 24 hour
Lead	0.020 mg/s	0.0000027 µg/m^3	0.2 µg/m^3	0.0013	S - 30 day
Lithium	0.019 mg/s	0.0000086 µg/m^3	20 µg/m^3	<0.0001	S
Magnesium	0.65 mg/s	0.00030 µg/m^3	72 µg/m^3	0.00041	SL
Manganese (as compounds)	0.15 mg/s	0.000067 µg/m^3	0.4 µg/m^3	0.017	G
Mercury	0.061 mg/s	0.000028 µg/m^3	2 µg/m^3	0.0014	S
Molybdenum	0.090 mg/s	0.000042 µg/m^3	120 µg/m^3	<0.0001	G
Nickel	0.083 mg/s	0.0000038 µg/m^3	0.04 µg/m^3	0.0095	S - Annual
Phosphorus	<0.35 mg/s	0.00016 µg/m^3	0.5 µg/m^3	0.032	SL
Potassium	3.33 mg/s	0.0015 µg/m^3	1 µg/m^3	0.15	SL
Selenium	6.66 mg/s	0.0031 µg/m^3	10 µg/m^3	0.031	G
Silicon	7.15 mg/s	0.0033 µg/m^3	27 µg/m^3	0.012	SL
Silver	<0.00069 mg/s	0.00000032 µg/m^3	1 µg/m^3	<0.0001	S
Sodium hydroxide	33.4 mg/s	0.015 µg/m^3	10 µg/m^3	0.15	G
Strontium	0.039 mg/s	0.000018 µg/m^3	120 µg/m^3	<0.0001	G
Tin	0.18 mg/s	0.000081 µg/m^3	10 µg/m^3	0.00081	S
Titanium	0.48 mg/s	0.00022 µg/m^3	120 µg/m^3	0.00018	S
Vanadium	<0.0035 mg/s	0.0000016 µg/m^3	2 µg/m^3	<0.0001	S
Zinc	0.24 mg/s	0.00011 µg/m^3	120 µg/m^3	<0.0001	S

S - Standard
G - Guideline
SL - Screening Level
* These compounds were not detected in any of the emission samples (all analytical results were <MDL).

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	0.0462 µg/m^3			
Base Case - 24 hour	1.00 g/s	0.4605 µg/m^3			
Base Case - 1 hour	1.00 g/s	1.7176 µg/m^3			
Benzene	0.93 mg/s	0.000043 µg/m^3	0.45 µg/m^3	0.0096	S - Annual
Bromodichloromethane	0.18 mg/s	0.000082 µg/m^3	350 µg/m^3	<0.0001	SL
Bromomethane (methyl bromide)	0.54 mg/s	0.00025 µg/m^3	1350 µg/m^3	<0.0001	G
2-Butanone (methyl ethyl ketone)	0.038 mg/s	0.000018 µg/m^3	1000 µg/m^3	<0.0001	S
Chloroethene (vinyl chloride)	0.0025 mg/s	0.0000011 µg/m^3	1 µg/m^3	0.00011	S
Dibromochloromethane	0.069 mg/s	0.000032 µg/m^3	0.2 µg/m^3	0.016	SL
1,2-Dibromoethane (Ethylene dibromide)	0.0039 mg/s	0.0000018 µg/m^3	3 µg/m^3	<0.0001	G
Dichlorodifluoromethane	0.0015 mg/s	0.00000071 µg/m^3	500000 µg/m^3	<0.0001	G
1,1-Dichloroethane (ethylene dichloride) *	0 mg/s	0 µg/m^3	165 µg/m^3	<0.0001	S
1,1-Dichloroethene*	0 mg/s	0 µg/m^3	10 µg/m^3	<0.0001	S
trans-1,2-Dichloroethene *	0 mg/s	0 µg/m^3	105 µg/m^3	<0.0001	G
Dichloromethane (methylene chloride)	0.21 mg/s	0.000096 µg/m^3	220 µg/m^3	<0.0001	G
1,2-Dichloropropane*	0 mg/s	0 µg/m^3	2400 µg/m^3	<0.0001	G
Ethyl Acetate *	0 mg/s	0 µg/m^3	19000 µg/m^3	<0.0001	G - 1 hour
Ethylbenzene *	0 mg/s	0 µg/m^3	1000 µg/m^3	<0.0001	S
Isopropylbenzene (cumene) *	0 mg/s	0 µg/m^3	400 µg/m^3	<0.0001	S
2-Propanone (acetone)	0.15 mg/s	0.000067 µg/m^3	11880 µg/m^3	<0.0001	S
Styrene	0.029 mg/s	0.000013 µg/m^3	400 µg/m^3	<0.0001	S
Tetrachloroethene (perchloroethylene)	0.053 mg/s	0.000024 µg/m^3	360 µg/m^3	<0.0001	S
Tetrachloromethane (carbon tetrachloride)	0.019 mg/s	0.0000088 µg/m^3	2.4 µg/m^3	0.00037	S
Toluene	0.057 mg/s	0.000026 µg/m^3	2000 µg/m^3	<0.0001	S
Tribromomethane (bromoform)	0.063 mg/s	0.000029 µg/m^3	55 µg/m^3	<0.0001	G
1,1,1-Trichloroethane (methyl chloroform)*	0 mg/s	0 µg/m^3	115000 µg/m^3	<0.0001	S
Trichloroethene	0.023 mg/s	0.000011 µg/m^3	12 µg/m^3	<0.0001	S
Trichlorofluoromethane *	0 mg/s	0 µg/m^3	6000 µg/m^3	<0.0001	G
Trichloromethane (chloroform)	0.054 mg/s	0.000025 µg/m^3	1 µg/m^3	0.0025	S
Trichlorotrifluoroethane*	0 mg/s	0 µg/m^3	800000 µg/m^3	<0.0001	S
1,2,4-Trimethylbenzene (pseudocumene) *	0 mg/s	0 µg/m^3	220 µg/m^3	<0.0001	S
1,3,5-Trimethylbenzene *	0 mg/s	0 µg/m^3	220 µg/m^3	<0.0001	S
Xylenes	0.017 mg/s	0.0000079 µg/m^3	730 µg/m^3	<0.0001	S

S - Standard
G - Guideline
SL - Screening Level

* These compounds were not detected in any of the emission samples (all analytical results were <MDL).

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	27.3	<100	0.93	0.56	56.04	11.72	1.03	29.26	0.15	1.80
2	27.6	<100	0.92	0.59	51.79	11.41	1.07	33.16	0.33	2.24
3	41.3	<100	0.88	0.97	48.08	10.83	1.06	35.78	0.27	3.98
Average	32.1	<100	0.91	0.71	51.97	11.32	1.05	32.73	0.25	2.67

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	2.80	-	1.06	0.18	9.12	11.19	0.86	74.21	0.29	4.33
2	3.80	-	1.06	0.12	9.58	11.33	0.98	73.34	0.60	4.17
3	4.68	-	1.04	0.28	9.66	10.67	1.08	73.84	0.62	4.13
Average	3.76	-	1.05	0.19	9.45	11.06	0.97	73.80	0.503	4.21

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	15.9	<100	0.98	0.32	34.83	11.54	0.54	51.08	0.12	1.89
2	11.8	<100	0.98	0.50	34.35	10.88	0.67	51.84	0.17	2.09
3	18.0	<100	0.96	0.35	35.41	10.81	0.67	50.55	0.22	2.34
Average	15.2	<100	0.97	0.39	34.86	11.08	0.63	51.16	0.17	2.11

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 was not recorded on the daily incineration reports provided by Clean Harbors. Total chlorine data has been reported which includes organic and soluble chlorine.

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	175	213	<20	29.3	<20
Antimony	1.96	3.81	<0.2	0.25	<0.2
Arsenic	1.01	86.5	<1	<1	1.17
Barium	65.5	34.3	<5	<5	<5
Beryllium	<0.2	<0.2	<0.2	<0.2	<0.2
Boron	<30	<30	<30	<30	35.3
Cadmium	0.11	1.00	<0.1	<0.1	0.15
Calcium	<500	1210	1040	<500	759
Chromium	30.9	4.12	<1	1.75	<1
Cobalt	2.64	1.65	<0.2	2.27	<0.2
Copper	17.8	12.4	<1	6.37	<1
Iron	<200	886	<200	<200	<200
Lead	12.5	1.67	<0.5	0.71	<0.5
Lithium	2.05	17.2	<0.5	<0.5	6.32
Magnesium	59.8	366	41.2	40.0	193
Manganese	15.8	46.7	0.66	8.38	2.33
Mercury	0.041	0.72	<0.019	<0.029	<0.026
Molybdenum	5.72	4.27	0.30	0.53	3.37
Nickel	10.5	11.4	<0.2	61.8	2.75
Phosphorus	260	272	<100	512	<100
Potassium	<100	2150	<100	<100	7350
Selenium	<2	19.0	<2	<2	<2
Silicon	6110	1180	169	3670	1170
Silver	<0.2	<0.2	<0.2	<0.2	<0.2
Sodium	3380	10300	156	197	19700
Strontium	33.6	15.5	1.16	2.10	6.71
Sulphur	<10000	<10000	<10000	<10000	<10000
Tin	3.47	24.0	<0.3	1.84	0.48
Titanium	499	142	<10	<10	<10
Vanadium	3.34	2.93	<1	<1	<1
Zinc	38.0	23.2	<6	15.4	<6
Total	<21561	<27060	<11888	<15400	<39578

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	5180
Antimony	111
Arsenic	1280
Barium	1170
Beryllium	0.23
Boron	241
Cadmium	37.7
Calcium	26700
Chromium	121
Cobalt	52.8
Copper	626
Iron	18400
Lead	71.5
Lithium	332
Magnesium	6200
Manganese	995
Mercury	19.7
Molybdenum	127
Nickel	423
Phosphorus	8260
Potassium	45400
Selenium	459
Silicon	54400
Silver	1.68
Sodium	195000
Strontium	325
Sulphur	33600
Tin	519
Titanium	6780
Vanadium	81.1
Zinc	1030
Total	407944

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	<0.44	<0.83	<0.42	<0.82
Pentachlorodibenzo-p-dioxins	0.91	1.65	<0.20	<1.1
Hexachlorodibenzo-p-dioxins	56.0	15.8	<0.15	92.2
Heptachlorodibenzo-p-dioxins	1330	136	<0.54	808
Octachlorodibenzo-p-dioxin	6060	606	<17	3030
Total	<7447	<760	<18.3	<3932

Furans

Congener Group	Rich Feed pg/g	Lean Feed pg/g	Alkaline Feed pg/g	Emulsion Feed pg/g
Tetrachlorodibenzofurans	0.75	6.63	<0.20	1.19
Pentachlorodibenzofurans	<0.50	0.96	<0.19	1.46
Hexachlorodibenzofurans	16.7	6.28	<0.15	3.96
Heptachlorodibenzofurans	108	59.8	<0.35	104
Octachlorodibenzofuran	232	108	<2.1	196
Total	<358	182	<2.99	307

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	<0.44	<0.83	<0.42	<0.82
12378-pentachlorodibenzo-p-dioxin	<0.79	1.65	<0.20	<1.1
123478-hexachlorodibenzo-p-dioxin	<1.5	<2.0	<0.24	<3.2
123678-hexachlorodibenzo-p-dioxin	<6.8	<2.1	<0.21	<4.3
123789-hexachlorodibenzo-p-dioxin	<2.5	<2.0	<0.15	<6.4
1234678-heptachlorodibenzo-p-dioxin	454	51.3	<1.0	226
Octachlorodibenzo-p-dioxin	6060	606	<17	3030
2378-tetrachlorodibenzofuran	<0.75	1.26	<0.20	1.19
12378-pentachlorodibenzofuran	<0.50	<0.77	<0.19	<0.77
23478-pentachlorodibenzofuran	<0.68	0.96	<0.17	1.46
123478-hexachlorodibenzofuran	<1.2	<1.4	<0.11	<1.8
123678-hexachlorodibenzofuran	<1.2	<1.5	<0.14	<1.7
234678-hexachlorodibenzofuran	<3.2	<1.4	<0.15	<1.8
123789-hexachlorodibenzofuran	<1.5	<1.8	<0.16	<2.2
1234678-heptachlorodibenzofuran	<23	12.7	<0.24	20.0
1234789-heptachlorodibenzofuran	<1.0	3.21	<0.35	<1.8
Octachlorodibenzofuran	232	108	<2.1	196.0
Total	<6791	<799	<23.0	<3501

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	18000	16600	3230	12500
Trichlorinated biphenyls	23000	8700	1930	17300
Tetrachlorinated biphenyls	143000	34600	1570	404000
Pentachlorinated biphenyls	358000	82100	1710	1070000
Hexachlorinated biphenyls	548000	46800	727	504000
Heptachlorinated biphenyls	436000	14700	<65	115000
Octachlorinated biphenyls	103000	2770	<67	21700
Nonachlorinated biphenyls	8280	314	<300	1790
Decachlorinated biphenyl	627	588	672	714
Total	1637907	207172	<10271	2147004

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)

Ministry of Environment and Energy
Ontario

Ministère de l'Environnement et de l'Énergie

CERTIFICATE OF APPROVAL
AIR
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, 141-150 inclusive, 211-213 inclusive, 221, 222, 231-233 inclusive, 241, 242, 251-254 inclusive, 261-270 inclusive, 281, 282, 311 and 321 which may bring about the emissions of air pollutants from an exhaust stack with the height of approximately 68 metres above ground, with the diameter of approximately 1.5 metres and equipped with an exhaust cone 1.22 metres in diameter in accordance with the application from Laidlaw Environmental Services Ltd. dated December 23, 1994 and supporting documentation listed in Appendix A, subject to conditions as described in Schedule I.

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

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

TERMS AND CONDITIONS

DEFINITIONS

1. For the purpose of this Certificate of Approval:

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

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

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

   d. "°C" means degrees Celsius;

   e. "CEM" means continuous emission monitor;

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

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

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

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

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

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

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

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

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

o. "kPa" means kiloPascals;

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

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

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

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

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

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

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

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

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

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

Applicability of the Certificate

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

Requirements

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

Interpretation (Severability and Conflicts)

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

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

Compliance

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

Changes to be Reported

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

a. change of address of the company;

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

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

Information

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

a. the receipt of said information by the Ministry;

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

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

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

Adverse Impact

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

Conditions for Ministry Order of Immediate Shutdown

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

SECTION 2: OPERATION AND MAINTENANCE

Operation and Maintenance

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

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

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

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

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

(2) any fire or explosion;

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

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

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

Operating Manual

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

Due Diligence

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

Stack Emission Criteria

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

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

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

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

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

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

Limitation on Wastes

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

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

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

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

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

Detailed Operating Conditions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

vii. Spray dryer outlet temperature exceeds 225°C.

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

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

ii. Loss of flame in the incinerator.

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

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

SECTION 3: CONTINUOUS MONITORING AND STACK TESTING

Continuous Emission and Process Monitoring

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

a. opacity;

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

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

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

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

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

Stack Testing

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

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

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

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

d. Oxides of nitrogen;

e. Sulphur dioxide;

f. Hydrogen chloride.

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

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

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

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

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

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

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

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

Incinerator Operation During Stack Testing

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

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

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

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

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

Sampling of Process Effluents

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

Reporting of Stack Testing Results

25. The company shall provide to the District Manager;

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

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

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

Reporting of Continuous Emission Monitoring Data

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

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

SECTION 1: GENERAL CONDITIONS

Definitions

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

Applicability of the Certificate

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

Requirements

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

Interpretation (Severability and Conflict)

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

Compliance

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

Changes to be Reported

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

Information

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

Adverse Impact

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

Conditions for Ministry Order of Immediate Shutdown

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

SECTION 2: OPERATION AND MAINTENANCE

Operation and Maintenance

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

Operating Manual

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

Due Diligence

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

Stack Emission Criteria

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

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

Limitation on Wastes

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

Detailed Operating Conditions

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

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

SECTION 3: CONTINUOUS MONITORING AND STACK TESTING

Continuous Emission and Process Monitoring

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

Stack Testing

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

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

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

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

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

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

Reporting

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

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

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

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

The Notice should also include:

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

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

This Notice must be served upon:

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

AND

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

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

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

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

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

SCHEDULE A - POINT OF IMPINGEMENT CONCENTRATIONS

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

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

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

** ng/cubic metre = nanograms per cubic metre

SCHEDULE B - MONITORING PARAMETERS

TABLE 1: PCBs and Chlorobenzenes in Stack Samples

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

TABLE 2: Polychlorinated Dibenzodioxins and Polychlorinated Furans

T_4CDD	T_4CDF
P_5CDD	P_5CDF
H_6CDD	H_6CDF
H_7CDD	H_7CDF
O_8CDD	O_8CDF

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

SCHEDULE B - MONITORING PARAMETERS

TABLE 3: Volatile Organics in Stack Samples

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

SCHEDULE B - MONITORING PARAMETERS

TABLE 1: PAH's in Stack Samples

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

SCHEDULE B - MONITORING PARAMETERS

TABLE 5: Chlorophenols in Stack Samples

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

TABLE 6: Inorganics in Stack Samples

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

APPENDIX A

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Ministry of the Environment | Ministère de l'Environnement

Ontario

CERTIFICATE OF APPROVAL
WASTE/AIR
NUMBER 6547-5G5MSP

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

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

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

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

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

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

a facility to incinerate hauled liquid industrial waste class numbers:

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

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

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

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

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

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

Concentration Limits:

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

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

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

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

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

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

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

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

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

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

Interpretation:

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

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

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

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

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

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

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

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

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

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

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

This Notice must be served upon:

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

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

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

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

DATED AT TORONTO this 24th *day of* day of January, 2023

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

c: District Manager, Sarnia

SCHEDULE "A"

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

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

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

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

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

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

APPENDIX 3

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 Road
ALS WO#:	L2503298		Mississauga, ON L5J 2Y4
Date of Report	30-Sep-20		Canada
Date of Sample Receipt	15-Sep-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 Clean Harbors

COMMENTS: CB by LRGC/MS - Isotope dilution

Certified by: _____
Ron McLeod, Ph.D.
Technical Director

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Method Blank		GLASSWARE PROOF	
ALS Sample ID	WG3411630-1		L2503298-13	
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	25-Sep-20		25-Sep-20	
Target Analytes	**ng/sample**		**ng/sample**	
1,3-Dichlorobenzene	<10	U	<10	U
1,4-Dichlorobenzene	<10	U	<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
Extraction Standards	**%Rec**		**%Rec**	
13C6-1,4-Dichlorobenzene	29		28	
13C6-1,2,3-Trichlorobenzene	29		33	
13C6-1,2,3,4-Tetrachlorobenzene	50		46	
13C6-Pentachlorobenzene	102		96	
13C6-Hexachlorobenzene	90		87	

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

ALS Environmental

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2503298		Mlssissauga, ON L5J 2Y4
Date of Report	6-Oct-20		Canada
Date of Sample Receipt	15-Sep-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 Clean Harbors

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

Certified by:

Ron McLeod, PhD
Technical Director

ALS Environmental

Sample Analysis Summary Report

Sample Name	Method Blank		GLASSWARE PROOF	
ALS Sample ID	WG3411630-1		L2503298-13	
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	25-Sep-20		25-Sep-20	
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
Extraction Standards	**% Rec**		**% Rec**	
13C6-4-Chlorophenol (ES)	80		86	
13C6-2,4-Dichlorophenol (ES)	81		88	
13C6-2,4,5-Trichlorophenol (ES)	67		65	
13C6-2,3,4,5-Tetrachlorophenol (ES)	75		68	
13C6-Pentachlorophenol (ES)	63		61	

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

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Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2503298		Mlssissauga, ON L5J 2Y4
Date of Report	2-Oct-20		Canada
Date of Sample Receipt	15-Sep-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 Clean Harbors

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

Proof consisted of the pooled solvent rinses from 6-sets of SVOC sampling glassware.

Low levels of target analytes were detected in the proof and blank.
Glassware is approved for the collection of samples for the analysis of PCDD/F

Certified by:

Steve Kennedy
Technical Supervisor

ALS Life Sciences

Sample Analysis summary Report

Sample Name	Method Blank	GLASSWARE PROOF
ALS Sample ID	WG3411630-1	L2503298-13
Sample Size	1	1
Sample size units	sample	Sample
Percent Moisture	n/a	n/a
Sample Matrix	QC	Media Prep
Sampling Date	n/a	n/a
Extraction Date	25-Sep-20	25-Sep-20
Target Analytes	**pg**	**pg**
2,3,7,8-TCDD	<3.0	<1.4
1,2,3,7,8-PeCDD	<3.5	<1.4
1,2,3,4,7,8-HxCDD	<2.3	<1.7
1,2,3,6,7,8-HxCDD	<2.0	<1.5
1,2,3,7,8,9-HxCDD	<2.2	1.88
1,2,3,4,6,7,8-HpCDD	<10	<4.4
OCDD	45.6	<20
2,3,7,8-TCDF	<1.5	<1.3
1,2,3,7,8-PeCDF	<2.5	<3.0
2,3,4,7,8-PeCDF	<2.3	<1.2
1,2,3,4,7,8-HxCDF	<3.6	<1.1
1,2,3,6,7,8-HxCDF	<3.5	<1.7
2,3,4,6,7,8-HxCDF	<3.8	<1.2
1,2,3,7,8,9-HxCDF	<4.4	<1.4
1,2,3,4,6,7,8-HpCDF	<20	8.76
1,2,3,4,7,8,9-HpCDF	<2.4	<1.0
OCDF	33.9	<12
Extraction Standards		
13C12-2,3,7,8-TCDD	78	89
13C12-1,2,3,7,8-PeCDD	67	96
13C12-1,2,3,6,7,8-HxCDD	77	82
13C12-1,2,3,4,6,7,8-HpCDD	73	82
13C12-OCDD	62	97
13C12-2,3,7,8-TCDF	75	95
13C12-1,2,3,7,8-PeCDF	77	95
13C12-1,2,3,6,7,8-HxCDF	81	80
13C12-1,2,3,4,6,7,8-HpCDF	92	83
Homologue Group Totals	**pg**	**pg**
Total-TCDD	<3.0	5.67
Total-PeCDD	<3.5	<1.4
Total-HxCDD	<2.3	1.88
Total-HpCDD	10.6	<1.4
Total-TCDF	<1.5	<1.3
Total-PeCDF	<2.5	<1.3
Total-HxCDF	5.03	<1.4
Total-HpCDF	<2.4	8.76
Toxic Equivalency - (WHO 2005)		
Lower Bound PCDD/F TEQ (WHO 2005)	0.0239	0.276
Mid Point PCDD/F TEQ (WHO 2005)	5.13	2.58
Upper Bound PCDD/F TEQ (WHO 2005)	9.94	4.58

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Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2503298		Mississauga, ON L5J 2Y4
Date of Report	1-Oct-20		Canada
Date of Sample Receipt	15-Sep-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 Clean Harbors

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

Proof consisted of the pooled solvent rinses from 6-sets of SVOC sampling glassware.

Target analytes were not positively identified in the proof.
Glassware is approved for the collection of samples for the analysis of Chlorinated Pesticides.

Certified by:

Steve Kennedy
Technical Supervisor

ALS Life Sciences

Sample Analysis summary Report

Sample Name	Method Blank	GLASSWARE PROOF
ALS Sample ID	WG3411630-1	L2503298-13
Sample Size	1	1
Sample size units	sample	sample
Percent Moisture	n/a	n/a
Sample Matrix	QC	Media Prep
Sampling Date	n/a	n/a
Extraction Date	25-Sep-20	25-Sep-20
Target Analytes	**ng**	**ng**
Hexachlorobutadiene	<0.042	<0.034
1,2,4,5-Tetrachlorobenzene	<0.014	<0.015
1,2,3,4-Tetrachlorobenzene	<0.016	<0.018
Pentachlorobenzene	<0.015	0.0173
Hexachlorobenzene	0.0880	<0.053
3,4,5,6-Tetrachloroveratrole	<0.21	<0.20
Pentachloroanisole	<0.25	<0.28
alpha-BHC	<0.80	<0.80
beta-BHC	<1.1	<1.1
gamma-BHC	<0.91	<0.98
delta-BHC	<1.1	<1.0
Pentachloronitrobenzene	<0.50	<0.56
Heptachlor	<0.065	<0.071
Aldrin	<0.13	<0.12
4,4'-DDNU	<0.27	<0.22
Dacthal	<0.28	<0.28
Chlorpyrifos	<1.2	<1.1
Isodrin	<0.23	<0.18
Octachlorostyrene	<0.14	<0.15
Heptachlor Epoxide B	<0.14	<0.24
Heptachlor Epoxide A	<0.98	<1.6
Oxychlordane	<0.12	<0.19
4,4'-DDMU	<2.4	<1.8
trans-Chlordane	<0.54	<0.73
cis-Chlordane	<0.51	<0.69
trans-Nonachlor	<0.49	<0.66
Dieldrin	<1.0	<0.55
Endrin	<1.5	<0.61
cis-Nonachlor	<0.48	<0.70
Endosulfan I	<0.55	<0.79
Endosulfan II	<1.3	<1.5
Endosulfan Sulfate	<0.35	<0.34
2,4'-DDE	<0.50	<0.40
4,4'-DDE	<0.57	<0.46
2,4'-DDD	<0.42	<0.52
4,4'-DDD	<0.41	<0.61
2,4'-DDT	<0.51	<0.76
4,4'-DDT	<1.1	<0.93
Endrin Aldehyde	<0.88	<0.43
Endrin Ketone	<1.5	<1.2
Methoxychlor	<0.26	<0.29
Dicofol	<4.9	<8.8
Mirex	<0.028	<0.036
Parlar 26	<2.4	<2.5
Parlar 50	<0.83	<1.0
Parlar 62	<1.0	<1.3
Extraction Standards	**% Rec**	**% Rec**
Pentachlorobenzene, 13C6-	188	187
Hexachlorobenzene, 13C6-	174	174
alpha-BHC, 13C6-	88	89
beta-BHC, 13C6-	92	92
gamma-BHC, 13C6-	91	93
delta-BHC, 13C6-	90	93
Heptachlor, 13C10-	88	89
Oxychlordane, 13C10-	89	89
trans-Nonachlor, 13C10-	107	104
Dieldrin, 13C12-	102	100
Endrin, 13C12-	84	105
Endosulfan II, 13C9-	96	101
2,4'-DDE, 13C12-	100	98
4,4'-DDE, 13C12-	103	104
4,4'-DDD, 13C12-	115	116
4,4'-DDT, 13C12-	110	110
Methoxychlor, 13C12-	97	99
Mirex, 13C10-	102	103

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Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2503298 Revision 1		Mlssissauga, ON L5J 2Y4
Date of Report	9-Oct-20		Canada
Date of Sample Receipt	15-Sep-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 Clean Harbors

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

REVISED REPORT: to remove interference on benzo(g,h,i)perylene

Interference on the Benzo(g,h,i)Perylene peak in the original run was removed by column cleanup.

Certified by: _____

Ron McLeod, Ph.D.
Technical Director

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Method Blank		GLASSWARE PROOF	
ALS Sample ID	WG3411630-1		L2503298-13	
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	25-Sep-20		25-Sep-20	
Target Analytes	**ng**		**ng**	
Naphthalene	11.2	R	15.7	R
2-Methylnaphthalene	<10	U	14.8	
1-Methylnaphthalene	<10	U	<10	U
Acenaphthylene	<10	U	<10	U
Acenaphthene	<10	U	47.6	
Fluorene	34.2	R	65.1	R
Phenanthrene	<10	U	73.0	
Anthracene	<10	U	<10	U
Fluoranthene	<10	U	<10	U
Pyrene	<10	U	<10	U
Benzo(a)Anthracene	<10	U	<10	U
Chrysene	<10	U	<10	U
Benzo(b)Fluoranthene	<10	U	<10	U
Benzo(k)Fluoranthene	<10	U	<10	U
Benzo(e)Pyrene	<10	U	<10	U
Benzo(a)Pyrene	<10	U	<10	U
Perylene	<10	U	<10	U
Indeno(1,2,3-cd)Pyrene	<10	U	<10	U
Dibenzo(a,h)Anthracene	<10	U	<10	U
Benzo(g,h,i)Perylene	<10	U	<10	U
Extraction Standards	**% Rec**		**% Rec**	
Naphthalene D8	71		79.5	R
2-Methylnaphthalene-D10	76.8		88.6	
Acenaphthylene D8	74.3		93.4	
Phenanthrene D10	62.9		72.5	
Anthracene-D10	68		83	
Fluoranthene D10	67.4		83.6	
Benz(a)Anthracene-D12	65.4		100.1	
Chrysene D12	54.6		75.9	
Benzo(b)Fluoranthene-D12	88.8		107.9	
Benzo(k)Fluoranthene-D12	47.3		58.8	
Benzo(a)Pyrene D12	64.4		83.9	
Perylene D12	66.3		89.2	
Indeno(1,2,3,cd)Pyrene-D12	101.2		145.7	
Dibenz(a,h)Anthracene-D14	79.1	M	112.5	M
Benzo(g,h,i)Perylene D12	72.3	M	52.7	M

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

M Indicates that a peak has been manually integrated.

R Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

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Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2503298		Mississauga, ON L5J 2Y4
Date of Report	28-Sep-20		Canada
Date of Sample Receipt	15-Sep-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 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:

Ron McLeod, PhD
Director, Air Toxics & Special Chemistries, Life Sciences

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	GLASSWARE PROOF
ALS Sample ID	L2503298-13
Sample Size	1
Sample size units	Sample
Percent Moisture	n/a
Sample Matrix	Media Prep
Sampling Date	n/a
Extraction Date	25-Sep-20

Target Analytes	pg
PCB-081	<17
PCB-077	<17
PCB-123	<5.4
PCB-118	<22
PCB-114	<5.2
PCB-105	<5.2
PCB-126	<5.0
PCB-167	<4.1
PCB-156/157	<5.3
PCB-169	<4.5
PCB-189	<4.9

Extraction Standards	% Rec
13C12-PCB-001	82
13C12-PCB-003	76
13C12-PCB-004	83
13C12-PCB-015	79
13C12-PCB-019	90
13C12-PCB-037	80
13C12-PCB-054	84
13C12-PCB-081	81
13C12-PCB-077	89
13C12-PCB-104	75
13C12-PCB-123	80
13C12-PCB-118	82
13C12-PCB-114	81
13C12-PCB-105	82
13C12-PCB-126	88
13C12-PCB-155	86
13C12-PCB-167	93
13C12-PCB-156/157	96
13C12-PCB-169	101
13C12-PCB-188	101
13C12-PCB-189	102
13C12-PCB-202	107
13C12-PCB-205	75
13C12-PCB-208	87
13C12-PCB-206	79
13C12-PCB-209	78

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	GLASSWARE PROOF
ALS Sample ID	L2503298-13
Sample Size	1
Sample size units	Sample
Percent Moisture	n/a
Sample Matrix	Media Prep
Sampling Date	n/a
Extraction Date	25-Sep-20

Target Analytes	pg
Homologue Group Totals	
Total MonoCB	20.0
Total DiCB	<14
Total TriCB	103
Total TetraCB	31.3
Total PentaCB	123
Total HexaCB	27.2
Total HeptaCB	5.30
Total OctaCB	<2.8
Total NonaCB	<20
DecaCB	<7.6
Total PCB	310
Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.00
Mid Point PCB TEQ	0.322
Upper Bound PCB TEQ	0.643

ALS Life Sciences

Quality Control Summary Report

Sample Name	Method Blank
ALS Sample ID	WG3411630-1
Sample Size	1
Sample size units	Sample
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	25-Sep-20

Target Analytes	pg
PCB-081	<5.7
PCB-077	<6.0
PCB-123	<2.2
PCB-118	<2.0
PCB-114	<2.2
PCB-105	<2.3
PCB-126	<2.3
PCB-167	<1.2
PCB-156/157	<1.9
PCB-169	<1.8
PCB-189	<1.9
Extraction Standards	**% Rec**
13C12-PCB-001	72
13C12-PCB-003	71
13C12-PCB-004	67
13C12-PCB-015	72
13C12-PCB-019	66
13C12-PCB-037	72
13C12-PCB-054	68
13C12-PCB-081	71
13C12-PCB-077	76
13C12-PCB-104	66
13C12-PCB-123	64
13C12-PCB-118	64
13C12-PCB-114	62
13C12-PCB-105	60
13C12-PCB-126	62
13C12-PCB-155	69
13C12-PCB-167	75
13C12-PCB-156/157	69
13C12-PCB-169	72
13C12-PCB-188	87
13C12-PCB-189	72
13C12-PCB-202	75
13C12-PCB-205	69
13C12-PCB-208	76
13C12-PCB-206	69
13C12-PCB-209	67

ALS Life Sciences

Quality Control Summary Report

Sample Name	Method Blank
ALS Sample ID	WG3411630-1
Sample Size	1
Sample size units	Sample
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	25-Sep-20

Target Analytes	pg
Homologue Group Totals	
Total MonoCB	10.2
Total DiCB	59.3
Total TriCB	188
Total TetraCB	41.9
Total PentaCB	4.40
Total HexaCB	7.91
Total HeptaCB	<0.96
Total OctaCB	2.50
Total NonaCB	<8.6
DecaCB	<2.9
Total PCB	314
Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.00
Mid Point PCB TEQ	0.170
Upper Bound PCB TEQ	0.287

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Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2503298		Mississauga, ON L5J 2Y4
Date of Report	29-Sep-20		Canada
Date of Sample Receipt	15-Sep-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 Clean Harbors

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

Ketone data by VOST analyses are estimated values only

Certified by:

Ron McLeod, Ph.D.
Technical Director

ALS Environmental

Sample Analysis Summary Report

Sample Name	Method Blank		VOST PROOF 1/2		VOST PROOF 2/2	
ALS Sample ID	WG3414221-1		L2503298-44		L2503298-45	
Sample units	sample		sample		sample	
Matrix	QC		Media Prep		Media Prep	
Sampling Date	n/a		n/a		n/a	
Extraction Date	29-Sep-20		29-Sep-20		29-Sep-20	
Target Analytes	**ug/sample**		**ug/sample**		**ug/sample**	
Dichlorodifluoromethane	<0.02	U	<0.02	U	<0.02	U
Vinyl Chloride	<0.02	U	<0.02	U	<0.02	U
Bromomethane	<0.09	U	<0.09	U	<0.09	U
Acetone	<0.1	U	<0.1	U	<0.1	U
Methylene Chloride	<0.1	U	<0.1	U	<0.1	U
trans,1,2-Dichloroethene	<0.01	U	<0.01	U	<0.01	U
1,1-Dichloroethane	<0.01	U	<0.01	U	<0.01	U
2-Butanone	<0.01	U	<0.01	U	<0.01	U
Chloroform	<0.01	U	<0.01	U	<0.01	U
1,1,1-Trichloroethane	<0.01	U	<0.01	U	<0.01	U
Carbon Tetrachloride	<0.01	U	<0.01	U	<0.01	U
Benzene	<0.05	U	<0.05	U	<0.05	U
1,2-Dichloroethane	<0.01	U	<0.01	U	<0.01	U
Trichloroethene	<0.01	U	<0.01	U	<0.01	U
1,2-Dichloropropane	<0.01	U	<0.01	U	<0.01	U
Bromodichloromethane	<0.01	U	<0.01	U	<0.01	U
Toluene	<0.05	U	<0.05	U	<0.05	U
Tetrachloroethene	<0.01	U	<0.01	U	<0.01	U
Chlorodibromomethane	<0.01	U	<0.01	U	<0.01	U
Ethylene Dibromide	<0.02	U	<0.02	U	<0.02	U
Ethylbenzene	<0.01	U	<0.01	U	<0.01	U
M&P-Xylene	<0.03	U	<0.03	U	<0.03	U
O-Xylene	<0.01	U	<0.01	U	<0.01	U
Styrene	<0.02	U	<0.02	U	<0.02	U
Bromoform	<0.01	U	<0.01	U	<0.01	U
Isopropylbenzene	<0.02	U	<0.02	U	<0.02	U
1,3,5-Trimethylbenzene	<0.02	U	<0.02	U	<0.02	U
1,2,4-Trichlorobenzene	<0.02	U	<0.02	U	<0.02	U
Ethyl Acetate	<0.1	U	<0.1	U	<0.1	U
Trichlorotrifluoroethane	<0.02	U	<0.02	U	<0.02	U
Field Standard	**% Rec**		**% Rec**		**% Rec**	
d10-Ethylbenzene(SPK)	83.2		79.9		75.7	
Surrogate Standards	**% Rec**		**% Rec**		**% Rec**	
d4-1,2-Dichloroethane(SURR)	102.6		102.8		97.4	
d8-Toluene(SURR)	91.2		84.8		80.3	
4-Bromofluorobenzene(SURR)	73.1		74		70.1	
Internal Standards	**% Rec**		**% Rec**		**% Rec**	
Bromochloromethane	94.2		107.1		84.8	
1,4-Difluorobenzene	90.2		107.2		84.9	
d5-Chlorobenzene	84.9		112.7		89.3	

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

APPENDIX 4

Metals Train Field Data Sheets
(15 pages)

ORTECH Consulting Inc.

Plant	Clean Harbors
Plant Location	Corunna, Ontario
Test No.:	1 – METALS & PARTICULATE
Test Date	OCTOBER 6, 2020
Test Location	Incinerator Exhaust Stack
Operator Signature	D.O'L

Project No.:	22030
Page	1 of 5
Probe No.:	6.5
Meter Box No.:	COE TEAM 2
Impinger Box No.:	

Pitot Factor	0.848	
DGMCF	1.000	
Barometric Pressure	29.21	"Hg
Static Pressure	0.66	"H2O
Nozzle Size	0.2641	inches
Stack Diameter	5	
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	20.3	mg
Probe	4.5	mg

Moisture Gain

CWTR	4100.0	g
WCBDA	46.1	g

Combustion Gas Concentration

Oxygen	8.70	%
Carbon Dioxide	9.22	%
Carbon Monoxide	77.9	ppm

Site Diagram

Measuring Device	MII Numbers
Probe / Pitot	SPS
Trendicator	} COE 2092
Control Box	
Incline Manometer	
Comb.Gas.Analyzer	
Micromanometer	
Barometer	Env.Can
Calipers	BO 2103

Nozzle Measurements	
1	.2655
2	.2640
3	.2650
4	.2620
Average:	

Notes:

Field Data Sheet

Date: Oct 6-20	Plant: Clean Harbors	Test No.: 1 - PM	Page 2 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	10.83	1.6	.76	360	250	232	57	99	69	69	2.8	4
	3	13.15	1.5	.74	362	250	250	49	252	65	65	2.7	4
	6	15.73	1.5	.73	362	250	250	49	238	69	69	2.7	4
	9	18.11	1.5	.73	363	250	255	52	238	68	68	2.8	4
2	12	20.43	1.5	.73	363	250	248	57	239	68	68	2.8	4
	15	22.65	1.5	.73	363	250	249	57	239	68	68	1.8	4
	18	24.82	1.6	.76	363	251	248	57	239	68	68	1.9	4
	21	27.03	1.5	.73	360	251	248	59	239	68	69	1.9	4
3	24	29.24	1.8	.80	361	251	249	59	239	68	68	2.1	4
	27	31.51	1.6	.80	361	251	249	59	239	68	68	2.1	4
	30	33.79	1.5	.80	360	250	253	63	247	68	68	2.1	4
	33	36.05	1.5	.80	361	251	248	64	246	68	67	2.1	4
4	36	38.34	1.5	.73	361	251	248	63	246	68	68	2.0	4
	39	40.60	1.6	.76	361	252	249	63	247	68	69	2.0	4
	42	42.87	1.6	.76	361	250	249	63	247	68	68	2.0	4
	45	45.14	1.6	.76	361	250	250	64	247	67	67	2.0	4
5	48	47.38	1.7	.78	360	250	251	66	244	67	68	2.0	4
	51	49.60	1.7	.78	361	251	251	67	244	67	68	2.0	4
	54	51.91	1.7	.76	359	251	252	57	242	68	68	2.0	4
	57	54.18	1.6	.76	356	251	252	56	241	68	69	2.0	4
6	60	56.50	1.6	.76	354	249	248	53	242	68	68	2.0	4

Traverse: NE					Traverse:			
Start Time: 1041	Initial Leak Check: .008	cfm@ 15	"Hg		Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg		Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22030

Operator : [signature]

Field Data Sheet

Date: Oct 6/20	Plant: Clean Harbors	Test No.: 1 R+M	Page 3 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	63	58.80	2.0	.85	352	250	248	57	242	68	68	2.4	4
	66	61.29	2.1	.93	346	250	249	57	241	68	68	2.5	4
	69	63.80	2.2	.90	347	251	247	53	240	68	68	2.6	4
7	72	66.40	2.4	.94	345	250	250	57	242	68	68	2.9	5
	75	69.10	2.4	.94	345	251	250	55	247	68	68	2.9	5
	78	71.82	2.1	.86	346	251	250	55	247	68	68	2.7	5
	81	74.50	2.2	.90	345	252	251	59	248	67	67	2.7	5
8	84	77.12	2.5	.95	345	252	251	59	248	67	67	2.9	5
	87	80.00	2.4	.94	345	252	251	58	248	67	67	2.9	5
	90	82.55	2.5	.95	344	252	251	59	248	67	67	2.9	5
	93	85.33	2.6	.97	344	252	251	59	248	67	67	3.2	5
9	96	88.23	2.6	.97	343	252	251	55	249	68	68	3.2	5
	99	91.20	2.6	.96	343	252	251	55	249	68	68	3.2	5
	102	94.03	2.7	1.0	344	252	251	55	248	68	68	3.4	5
	105	96.94	2.6	.98	344	252	251	55	248	68	68	3.4	5
10	108	99.88	2.6	.98	344	252	251	55	248	68	68	3.4	5
	111	102.90	~~3.0~~ 2.8	1.01	345	252	251	55	248	68	68	3.6	6
	114	105.91	2.2	.90	345	252	251	55	249	68	68	2.9	5
	117	108.57	2.2	.90	345	251	252	55	249	68	68	2.9	5
	120	111.31											

Traverse:				Traverse:			
Start Time:	Initial Leak Check:	cfm@	"Hg	Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time: 1241	Final Leak Check: .004	cfm@ 15	"Hg	Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22030

Operator :

Field Data Sheet

Date: OCT 6/20	Plant: Clean Harbors	Test No.: 1 - P&M	Page 4 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O" 1.50	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	112.06	2	.91	347	250	245	61	73	70	70	2.4	5
	3	114.55	1.9	.84	346	251	250	58	236	70	70	2.6	5
	6	117.14	2.1	.86	345	251	251	57	242	70	70	2.8	5
	9	119.81	1.9	.84	347	249	248	56	243	70	70	2.6	5
2	12	122.47	1.9	.81	346	248	248	58	244	70	70	2.5	5
	15	125.05	1.9	.84	346	249	248	60	241	70	70	2.5	5
	18	127.63	1.9	.84	346	249	249	60	242	70	71	2.5	5
	21	130.18	1.9	.84	345	249	248	60	243	70	71	2.5	5
3	24	132.76	1.9	.84	346	249	248	60	243	70	71	2.5	5
	27	135.30	1.8	.82	345	248	249	60	244	71	71	2.5	5
	30	137.86	1.8	.82	346	248	249	56	242	71	71	2.5	5
	33	140.40	1.8	.82	346	246	248	55	242	71	71	2.5	5
4	36	142.97	1.9	.84	346	248	250	55	243	71	71	2.5	5
	39	145.50	1.9	.84	346	248	250	55	243	71	71	2.5	5
	42	148.04	1.8	.82	346	248	250	55	244	71	71	2.5	5
	45	150.55	2.0	.86	347	248	250	55	244	72	72	2.5	5
5	48	153.14	1.8	.82	346	248	250	59	244	72	72	2.5	5
	51	155.66	1.9	.84	346	249	250	66	244	72	72	2.5	5
	54	158.20	1.9	.84	346	248	250	67	244	72	72	2.5	5
	57	160.75	1.9	.84	349	249	251	68	244	72	72	2.5	5
6	60	163.29	2.0	.86	350	248	252	67	245	72	72	2.5	5

Traverse:					
Start Time: 1339	Initial Leak Check:	.004	cfm@	15	"Hg
Finish Time:	Final Leak Check:		cfm@		"Hg

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

Project No.: 22030

Operator :

Field Data Sheet

Date: Oct 6/20	Plant: Clean Harbors	Test No.: 1 - P+M	Page 5 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	63	165.83	1.9	.84	350	251	240	65	240	73	73	2.5	5
	66	168.35	1.9	.84	350	251	240	66	240	73	73	2.5	5
	69	170.92	1.9	.84	350	251	241	66	240	73	73	2.5	5
7	72	173.44	2.0	.86	349	252	258	64	236	73	73	2.5	5
	75	175.99	2.0	.86	349	252	258	64	236	73	73	2.5	5
	78	178.55	1.9	.84	348	251	257	64	237	73	73	2.5	5
	81	181.08	1.9	.84	348	252	254	58	240	73	73	2.5	5
8	84	183.63	1.9	.84	346	252	254	56	240	73	73	2.5	5
	87	186.16	2.0	.86	346	251	253	56	241	73	73	2.5	5
	90	188.69	1.9	.84	346	252	261	55	240	73	74	2.5	5
	93	191.23	1.9	.84	344	252	261	58	245	73	74	2.5	5
9	96	193.78	2.0	.87	345	253	260	58	245	73	74	2.5	5
	99	196.33	1.8	.82	345	254	259	63	245	73	74	2.5	5
	102	198.90	2.1	.89	344	254	257	67	245	73	73	2.6	5
	105	201.56	1.9	.84	344	254	257	67	245	73	73	2.6	5
10	108	204.14	1.8	.82	342	254	257	61	242	73	73	2.5	5
	111	206.69	2.0	.87	343	253	256	60	243	73	73	2.5	5
	114	209.29	2.0	.86	343	252	256	55	242	73	73	2.5	5
	117	211.91	1.9	.84	380	251	255	53	243	73	73	2.5	5
	120	214.55											

Traverse:					
Start Time:	Initial Leak Check:		cfm@		"Hg
Finish Time: 1539	Final Leak Check:	.004	cfm@	15	"Hg

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

Project No.: 22030

Operator :

ORTECH Consulting Inc.

Plant	Clean Harbors
Plant Location	Corunna, Ontario
Test No.:	2 PARTICULATE & METALS
Test Date	OCTOBER 7, 2020
Test Location	Incinerator Exhaust Stack
Operator Signature	D. O Ua

Project No.:	22030
Page	1 of 5
Probe No.:	6.5
Meter Box No.:	TEAM 2
Impinger Box No.:	

Pitot Factor	0.848	
DGMCF	1.000	
Barometric Pressure	29.09	"Hg
Static Pressure	0.2641	"H2O
Nozzle Size	0.45	inches
Stack Diameter	5	
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	15.1	mg
Probe	8.5	mg

Moisture Gain

CWTR	3938.7	g
WCBDA	43.2	g

Combustion Gas Concentration

Oxygen	8.67	%
Carbon Dioxide	9.31	%
Carbon Monoxide	83.7	ppm

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:	

Site Diagram

Notes:

Field Data Sheet

Date: Oct 7/20	Plant: Clean Harbors	Test No.: 2 - P+M	Page 2 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/~~Trap~~ °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	17.00	1.5	0.72	369	248	254	55	86	67	67	1.9	3
	3	19.23	1.4	.70	369	248	259	50	240	66	66	1.8	3
	6	21.43	1.6	.74	368	249	259	48	244	66	66	1.8	3
	9	23.58	1.4	.69	368	248	259	49	245	66	66	1.8	3
2	12	25.72	1.4	.69	368	249	258	50	244	66	66	1.8	3
	15	27.85	1.5	.72	369	248	258	50	244	66	66	1.8	3
	18	29.95	1.4	.69	368	246	260	53	246	66	66	1.8	3
	21	32.05	1.5	.72	369	248	260	55	246	67	67	1.8	3
3	24	34.14	1.5	.72	370	249	258	57	246	67	67	1.9	3
	27	36.28	1.5	.72	369	249	258	60	245	67	67	1.9	3
	30	38.42	2.2	.87	371	249	258	60	245	67	67	2.7	4
	33	40.6	1.6	.74	370	249	258	65	247	67	67	1.9	3
4	36	43.22	1.6	.74	370	249	258	63	243	67	67	1.9	3
	39	45.44	1.6	.74	372	250	258	63	246	67	67	2.0	3
	42	47.70	1.7	.77	371	250	258	64	245	67	68	2.1	3
	45	50.03	1.6	.74	36371	250	257	64	244	67	67	2.0	3
5	48	52.31	1.6	.74	373	249	257	68	244	67	68	2.0	3
	51	54.58	1.6	.74	373	249	257	67	245	67	68	2.0	3
	54	56.86	1.6	.74	374	249	249	63	238	6766	68	2.0	3
	57	59.14	1.8	.79	374	248	249	63	234	67	68	2.2	3
6	60	61.52	1.7	.77	374	248	248	63	233	67	68	2.2	3

Traverse:						Traverse:				
Start Time:	904	Initial Leak Check:	.005	cfm@	21 "Hg	Start Time:		Initial Leak Check:		cfm @ "Hg
Finish Time:		Final Leak Check:		cfm@	"Hg	Finish Time:		Final Leak Check:		cfm @ "Hg

Project No.: 22030

Operator :

Field Data Sheet

Date: OCT 7/20	Plant: Clean Harbors	Test No.: 2 - R+M	Page 3 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	63	63.91	1.7	.77	373	250	248	68	235	67	67	2.2	3
	66	66.30	1.7	.76	374	250	249	68	235	67	67	2.1	3
	69	68.66	1.6	.74	374	250	249	65	234	68	69	2.0	3
7	72	70.96	2.0	.83	374	250	246	64	239	68	69	2.5	4
	75	73.46	1.8	.78	375	249	247	64	239	69	69	2.2	4
	78	75.90	1.7	.77	373	250	250	67	244	68	69	2.1	4
	81	78.26	1.9	.81	373	250	250	65	240	68	69	2.4	4
8	84	80.75	1.9	.81	373	250	250	67	241	68	69	2.4	4
	87	83.26	2.1	.85	372	251	250	68	241	68	69	2.6	4
	90	85.86	1.9	.81	373	250	249	67	251	69	69	2.4	4
	93	88.37	1.9	.81	373	250	248	63	251	69	70	2.4	4
9	96	90.89	1.9	.81	371	250	248	60	251	69	70	2.4	4
	99	93.38	1.9	.81	371	250	249	57	250	70	70	2.4	4
	102	95.886	2.0	.84	371	248	250	56	251	70	70	2.4	4
	105	98.39	1.9	.81	370	248	251	56	250	70	70	2.4	4
10	108	100.90	1.9	.81	370	246	249	56	238	70	70	2.4	4
	111	103.38	2.0	.81	370	249	250	54	238	70	70	2.4	4
	114	105.88	1.8	.79	370	245	250	55	226	70	70	2.2	4
	117	108.30	1.9	.81	370	248	250	57	231	70	70	2.3	4
	120	110.76											

Traverse:					Traverse:			
Start Time:	Initial Leak Check:	cfm@	"Hg		Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time: 1104	Final Leak Check: .005	cfm@ 14	"Hg		Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22030

Operator : D.O.

Field Data Sheet

Date: OCT 7/20	Plant: Clean Harbors	Test No.: 2 - Run	Page 4 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	111.43	1.6	.75	376	250	246	64	73	73	74	2.0	4
	3	113.63	1.6	.75	374	250	246	52	222	74	74	2.0	4
	6	116.03	1.6	.75	374	250	246	51	240	74	75	2.0	4
	9	118.30	2.0	.84	376	250	251	53	249	74	74	2.5	4
2	12	120.80	2.0	.84	377	251	253	53	252	74	74	2.5	4
	15	123.32	2.0	.84	376	251	252	54	252	74	74	2.5	4
	18	125.88	1.9	.82	378	250	254	55	248	75	75	2.4 2.5	4
	21	128.39	1.7	.77	377	250	254	55	249	75	75	2.2	4
3	24	130.93	1.7	.77	378	251	253	55	248	75	75	2.2	4
	27	133.27	1.6	.75	378	251	253	55	247	75	75	2.2	4
	30	135.67	1.7	.77	377	250	249	52	241	75	75	2.1	4
	33	138.05	1.7	.77	378	250	250	52	240	75	75	2.1	4
4	36	140.42	1.7	.77	377	252	250	52	240	76	76	2.1	4
	39	142.78	1.6	.75	377	252	250	52	240	76	76	2.1	4
	42	145.15	1.7	.80	377	252	250	54	235	76	76	2.1	4
	45	147.52	1.8	.80	377	252	250	54	235	76	76	2.1	4
5	48	149.87	1.5	.73	377	252	252	56	235	76	76	1.9	4
	51	152.13	1.7	.76	376	252	251	59	234	76	76	2.2	4
	54	154.48	2.1	.86	376	252	251	53	235	76	76	2.6	4.5
	57	157.09	1.8	.80	371	252	253	59	237	76	76	2.3	4
6	60	159.60	1.9	.82	372	252	253	58	236	76	76	2.3	4

Traverse:				
Start Time: 1228	Initial Leak Check:	004	cfm@ 14	"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.: 22030

Operator : RDM

Field Data Sheet

Date: Oct 7/20	Plant: Clean Harbors	Test No.: 2 - R+M	Page 5 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	63	162.11	1.9	.80	372	249	252	54	241	76	76	2.3	4.5
	66	164.59	1.8	.80	372	249	252	54	240	76	76	2.3	4.5
	69	167.07	1.8	.80	372	248	252	54	239	76	76	2.3	4.5
7	72	169.55	1.9	.80	370	248	252	56	238	76	76	2.3	4.5
	75	172.05	1.8	.80	371	248	252	56	238	76	76	2.3	4.5
	78	174.53	1.9	.80	371	249	252	56	236	76	76	2.3	4.5
	81	177.00	1.8	.80	370	249	252	60	239	77	77	2.3	4.5
8	84	179.47	1.9	.83	374	249	252	63	240	77	77	2.3	4.5
	87	181.94	1.9	.80	375	249	252	65	239	77	77	2.3	4.5
	90	184.40	1.9	.82	377	249	252	68	239	77	77	2.3	4.5
	93	186.85	1.9	.82	380	249	252	68	239	77	77	2.3	4.5
9	96	189.33	1.7	.78	383	249	252	64	238	77	77	2.2	4.5
	99	191.79	1.8	.80	376	249	251	62	237	77	77	2.2	4.5
	102	194.18	1.8	.80	378	249	251	60	238	77	77	2.2	4.5
	105	196.58	1.8	.81	378	248	251	60	230	78	78	2.2	4.5
10	108	199.02	1.8	.80	379	248	251	61	233	78	78	2.2	4.5
	111	201.43	1.8	.80	377	248	251	60	241	78	78	2.2	4.5
	114	203.83	1.8	.80	375	248	252	60	240	78	78	2.2	4.5
	117	206.24	1.8	.80	374	248	251	60	240	78	78	2.2	4.5
	120	208.66											

Traverse:			
Start Time:	Initial Leak Check:	cfm@	"Hg
Finish Time: 1424	Final Leak Check: .005	cfm@ 15	"Hg

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

Project No.: 22030

Operator: D. O'Leary

ORTECH Consulting Inc.

Plant	Clean Harbors
Plant Location	Corunna, Ontario
Test No.:	3 - PARTICULATE & METALS
Test Date	OCTOBER 8, 2020
Test Location	Incinerator Exhaust Stack
Operator Signature	D. OLG

Project No.:	22030
Page	1 of 5
Probe No.:	6.5
Meter Box No.:	TEAM 2
Impinger Box No.:	9

Pitot Factor	0.848	
DGMCF	1.000	
Barometric Pressure	29.47	"Hg
Static Pressure	0.65	"H2O
Nozzle Size	0.2641	inches
Stack Diameter	5	
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	13.8	mg
Probe	5.4	mg

Moisture Gain

CWTR	3760.2	g
WCBDA	39.3	g

Combustion Gas Concentration

Oxygen	9.06	%
Carbon Dioxide	9.04	%
Carbon Monoxide	49.3	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: OCT 9/20	Plant: Clean Harbors	Test No.: 3 - P+M	Page 2 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O 1.8	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	9.81	2.1	.83	383	249	243	46	.77	57	57	2.1	3
	3	12.2	1.8	.77	384	249	254	45	210	56	56	2.1	3
	6	14.53	1.8	.77	384	249	254	44	223	56	56	2.1	3
	9	16.81	1.8	.77	384	248	252	45	233	56	56	2.1	3
2	12	19.07	1.8	.77	383	249	253	46	233	57	57	2.1	3
	15	21.38	1.7	.75	382	248	251	47	231	57	57	2.1	3
	18	23.65	1.9	.79	382	248	253	47	232	57	57	2.1	3
	21	25.93	1.8	.77	381	247	252	48	233	57	57	2.1	3
3	24	28.22	1.9	.79	381	251	251	49	233	57	57	2.2	3
	27	30.61	1.9	.79	381	251	251	48	233	57	58	2.2	3
	30	33.00	1.8	.77	379	251	251	48	232	58	59	2.2	3
	33	35.36	1.9	.79	378	251	251	48	232	58	59	2.2	3
4	36	37.72	1.9	.79	378	250	251	48	233	59	59	2.2	3
	39	40.10	1.9	.79	377	250	251	48	233	59	59	2.2	3
	42	42.45	1.9	.79	377	250	251	48	233	59	59	2.2	3
	45	44.82	1.8	.77	376	251	251	48	232	58	60	2.2	3
5	48	47.17	1.9	.79	375	250	252	46	232	59	60	2.2	3
	51	49.52	1.9	.80	376	247	249	46	230	60	60	2.2	3.5
	54	51.87	2.0	.82	375	247	251	48	235	59	61	2.2	3.5
	57	54.24	1.9	.80	375	247	251	48	235	59	61	2.2	3.5
6	60	56.65	1.9	.80	378	249	251	45	234	59	61	2.2	4

Traverse: N6				
Start Time: 0851	Initial Leak Check: .003	cfm@	11	"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.: 22030

Operator: DOL

Field Data Sheet

Date: OCT 8/20	Plant: Clean Harbors	Test No.: 3 - P+M	Page 3 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	63	59.05	1.9	.80	381	249	252	52	232	60	60	2.2	4
	66	61.43	1.8	.77	380	249	252	54	235	60	60	2.2	4
	69	63.81	2.1	.84	384	249	252	44	235	60	62	2.5	4
7	72	66.31	1.8	.77	383	250	251	45	234	60	62	2.2	4
	75	68.74	1.8	.77	382	251	250	45	233	60	62	2.2	4
	78	71.12	1.8	.75	383	251	251	45	233	60	62	2.2	4
	81	73.55	1.8	.77	385	251	251	45	232	61	61	2.2	4
8	84	75.97	1.92	.79	380	251	251	44	237	61	62	2.2	4
	87	78.36	1.9	.80	385	250	252	45	235	61	63	2.2	4
	90	80.77	1.7	.75	385	250	252	45	235	61	63	2.0	4
	93	83.09	2.0	.82	385	249	247	45	231	62	63	2.4	4
9	96	85.55	1.9	.80	383	249	248	45	232	62	63	2.4	4
	99	88.04	1.8	.79	380	250	252	49	238	62	64	2.2	4
	102	90.45	1.8	.78	379	250	251	51	234	62	63	2.2	4
	105	92.81	1.7	.76	378	251	251	54	233	63	64	2.2	4
10	108	95.18	1.7	.76	377	250	249	56	233	63	64	2.2	4
	111	97.56	1.7	.76	378	251	251	56	232	63	64	2.2	4
	114	99.95	1.7	.76	380	251	250	56	231	63	64	2.2	4
	117	102.31	1.7	.76	381	252	250	60	233	63	64	2.2	4
	120	104.67											

Traverse:				
Start Time:	Initial Leak Check:		cfm@	"Hg
Finish Time: 1037	Final Leak Check:	.004	cfm@ 15	"Hg

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

Project No.: 22030

Operator : D. Ols

Field Data Sheet

Date: OCT 8/20	Plant: Clean Harbors	Test No.: 3 - PM	Page 4 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	105.25	2.0	.82	382	249	248	65	90	66	66	2.4	4
	3	107.72	1.9	.80	382	248	248	56	240	66	68	2.4	4
	6	110.17	1.9	.80	382	249	250	54	238	66	68	2.2	4
	9	112.57	1.9	.80	383	249	250	52	240	67	68	2.2	4
2	12	114.99	1.9	.80	382	250	250	52	240	67	68	2.2	4
	15	117.38	2.1	.85	382	250	252	51	240	67	68	2.2	4
	18	119.75	1.9	.80	382	251	252	51	241	67	68	2.2	4
	21	122.07	1.8	.76	382	250	252	53	243	68	69	2.2	4
3	24	124.42	2.0	.83	384	251	250	54	243	68	69	2.2	4
	27	126.76	1.9	.81	383	250	251	51	241	70	70	2.2	4
	30	129.07	2.0	.83	382	250	251	54	241	70	70	2.2	4
	33	131.40	2.0	.83	383	250	251	53	242	70	70	2.2	4
4	36	133.81	1.9	.81	381	250	251	53	242	70	70	2.2	4
	39	136.22	2.0	.83	381	251	252	55	240	70	70	2.2	4
	42	138.67	2.0	.83	381	251	252	58	241	70	70	2.2	4
	45	141.10	2.0	.83	381	252	251	56	242	70	70	2.2	4
5	48	143.55	1.9	.81	382	252	251	54	241	71	71	2.3	4
	51	146.05	1.8	.79	382	251	252	54	242	71	71	2.3	4
	54	148.50	1.9	.81	382	249	253	57	242	71	71	2.3	4
	57	150.95	1.8	.79	383	248	253	57	242	71	71	2.3	4
6	60	153.41	1.8	.79	382	249	252	81	242	71	71	2.3	4

Traverse:				
Start Time: 1127	Initial Leak Check: .003	cfm@ 5	"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.: 22030

Operator :

Field Data Sheet

Date: OCT 8/20 | Plant: Clean Harbors | Test No.: 3 P+M | Page 5 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	155.82	1.8	.79	380	251	252	63	241	71	71	2.2	4
	66	158.25	1.8	.79	381	251	252	66	241	71	71	2.2	4
	69	160.67	1.8	.79	381	250	252	62	241	72	72	2.2	4
7	72	163.14	1.7	.77	381	250	252	56	241	73	73	2.2	4
	75	165.55	1.7	.77	381	250	252	53	241	73	73	2.1	4
	78	167.93	1.6	.75	379	250	252	52	241	73	73	2.1	4
	81	170.29	1.5	.72	380	251	252	55	242	73	73	2.1	4
8	84	172.64	1.6	.75	380	251	252	54	242	73	73	2.1	4
	87	174.97	1.6	.75	379	252	253	54	242	73	73	2.0	4
	90	177.29	1.7	.77	380	252	251	51	243	73	73	2.0	4
	93	179.60	1.6	.75	379	252	253	50	249	73	74	2.0	4
9	96	181.92	1.8	.79	379	252	253	50	249	73	74	2.0	4
	99	184.22	1.6	.75	379	252	252	50	249	73	74	2.0	4
	102	186.54	1.6	.75	379	252	251	50	249	73	74	2.0	4
	105	188.82	1.6	.75	379	250	252	55	249	74	74	2.0	4
10	108	191.14	1.5	.73	379	251	253	55	249	74	74	1.9	4
	111	193.41	1.6	.75	379	251	252	57	250	74	74	1.9	4
	114	195.65	1.5	.73	379	251	252	57	251	74	74	1.9	4
	117	197.90	1.5	.73	379	251	252	58	251	74	74	1.9	4
	120	200.16											

Traverse:
Start Time:
Finish Time: 1322
Initial Leak Check: .01 cfm@ 11 "Hg
Final Leak Check: .003 cfm@ 15 "Hg

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

Project No.: 22030
Operator : [signature]

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	October 6, 2020
Test Location	Incinerator Exhaust Stack
Operator Signature	Chris Belore

Project No.:	22030
Page	1 of 5
Probe No.:	
Meter Box No.:	TEAM #1
Impinger Box No.:	

Pitot Factor	0.849	
DGMCF	~~1.0~~ 0.999	
Barometric Pressure	29.21	"Hg
Static Pressure	0.66	"H2O
Nozzle Size	0.2663	inches
Stack Diameter	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	4160.8	g
WCBDA	21.9	g

Combustion Gas Concentration

Oxygen	8.70	%
Carbon Dioxide	9.22	%
Carbon Monoxide	72.9	ppm

Measuring Device	MII Numbers
Probe / Pitot	150
Trendicator	COE 20094
Control Box	TEAM #1
Incline Manometer	"
Comb.Gas.Analyzer	MSML
Micromanometer	
Barometer	Env.Can
Calipers	R02103

Nozzle Measurements	
1	.2650
2	.2670
3	.2675
4	.2655
Average:	.2663

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: Oct. 6/20	Plant: Clean Harbors	Test No.: 1 SVOC	Page 2 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

*	*	*	*	*	*	*	*	*	*	*	*

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp ~~Inlet~~/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	19.55	1.7	.79	361	259	256	57	46	70	69	2.6	6.8
	3	22.18	1.75	.80	361	255	254	50	53	69	68	2.6	6.8
	6	24.81	1.75	.80	363	256	262	51	55	69	69	2.6	6.5
	9	27.44	1.75	.80	365	257	265	51	58	69	69	2.5	6.5
2	12	30.02	1.75	.80	364	259	257	49	57	69	69	2.5	6.5
	15	32.56	1.75	.80	364	260	260	49	57	69	69	2.5	6.5
	18	35.13	1.75	.80	363	260	256	47	55	68	69	2.5	6.5
	21	37.67	1.75	.80	363	259	256	48	57	69	69	2.5	6.5
3	24	40.20	1.80	.80	361	261	259	46	60	70	70	2.5	6.5
	27	42.72	1.80	.81	361	258	257	47	65	71	69	2.5	6.5
	30	45.22	1.90	.84	360	260	260	47	59	70	69	2.5	6.5
	33	47.78	1.90	.84	360	258	259	47	54	70	69	2.5	6.5
4	36	50.35	1.8	.80	361	261	260	47	54	71	69	2.5	6.5
	39	52.90	1.8	.80	360	261	260	48	55	71	69	2.5	6.5
	42	55.43	1.85	.82	361	262	258	48	56	72	69	2.5	6.5
	45	57.99	1.85	.82	361	262	261	49	60	72	69	2.5	6.5
5	48	60.51	1.80	.80	360	259	259	48	62	72	69	2.5	6.5
	51	63.04	1.90	.84	360	260	261	48	60	72	69	2.5	6.5
	54	65.55	1.90	.84	360	261	257	49	62	73	70	2.5	6.5
	57	68.12	1.90	.84	355	260	260	50	66	73	70	2.5	6.5
6	60	70.61	1.95	.85	355	261	259	50	63	73	70	2.5	6.5

Traverse: NW				Traverse:			
Start Time: 10:41	Initial Leak Check: .008	cfm@	14 "Hg	Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg	Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22030

Operator: C. RELOTE

Field Data Sheet

Date: Oct. 6/20	Plant: Clean Harbors	Test No.: 1 SVOC	Page 3 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp ~~Inlet~~/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	63	73.12	1.90	.85	353	259	262	50	56	73	70	2.5	6.5
	66	75.68	1.90	.85	349	257	249	49	55	73	70	2.5	6.5
	69	78.20	1.95	.86	347	260	258	49	57	74	70	2.5	6.5
7	72	80.74	2.05	.88	346	260	260	49	57	74	70	2.55	6.5
	75	83.32	2.0	.87	345	260	260	49	59	74	70	2.55	6.5
	78	85.93	2.0	.87	346	260	260	49	60	74	70	2.55	6.5
	81	88.48	2.0	.87	344	257	264	50	55	74	71	2.50	6.5
8	84	91.20	1.8	.83	346	258	257	51	54	74	71	2.4	6.2
	87	93.64	1.8	.83	345	257	254	52	53	74	71	2.45	6.2
	90	96.17	2.0	.87	345	257	255	52	53	74	71	2.50	6.8
	93	98.74	2.2	.91	344	254	258	53	54	74	71	2.7	7.2
9	96	101.45	2.2	.91	344	254	258	53	54	74	71	2.9	7.2
	99	104.24	2.2	.91	342	258	262	53	56	75	72	2.9	7.2
	102	107.04	2.2	.91	342	258	264	53	58	75	72	2.9	7.2
	105	109.82	2.2	.91	344	257	261	55	56	75	72	2.9	7.2
10	108	112.65	2.15	.91	344	259	256	56	53	75	72	2.9	7.0
	111	115.44	2.15	.91	344	260	252	56	54	75	72	2.9	7.0
	114	118.09	2.15	.91	345	255	259	52	52	76	73	2.6	6.8
	117	120.77	2.10	.90	345	257	252	52	52	76	73	2.6	6.2
	120	123.43											

Traverse: NW			
Start Time: —	Initial Leak Check: —	cfm@ —	"Hg
Finish Time: 12:41	Final Leak Check: .008	cfm@ 14	"Hg

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

Project No.: 22030

Operator: C. RELAPE

Field Data Sheet

Date: Oct. 6/20	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 ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp ~~Inlet~~/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	124.20	2.0	.87	346	250	257	65	56	75	73	2.5	6.1
	3	126.62	1.9	.86	346	255	261	56	54	74	73	2.5	6.1
	6	129.17	1.9	.89	346	255	261	51	56	73	73	2.5	6.1
	9	131.73	1.9	.88	346	257	260	48	60	73	73	2.5	6.1
2	12	134.35	1.9	.85	346	257	260	48	61	73	73	2.5	6.1
	15	136.93	1.95	.86	345	260	261	47	64	73	74	2.5	6.1
	18	139.57	1.9	.85	346	257	261	47	65	74	74	2.5	6.1
	21	142.08	1.9	.85	346	258	261	47	64	74	74	2.5	6.1
3	24	144.69	1.88	.83	345	260	261	47	57	74	74	2.5	6.1
	27	147.24	1.85	.84	346	262	261	47	55	74	74	2.5	6.0
	30	149.83	1.9	.85	346	262	261	47	55	74	74	2.5	6.0
	33	152.41	1.85	.84	346	262	261	48	56	75	74	2.5	6.0
4	36	154.97	2.0	.87	347	260	262	48	57	75	74	2.5	6.0
	39	157.59	2.0	.87	347	260	262	48	57	75	74	2.6	6.1
	42	160.20	2.0	.87	346	262	262	49	57	76	74	2.6	6.1
	45	162.82	2.0	.87	351	259	261	51	51	76	74	2.6	6.1
5	48	165.47	1.8	.83	348	262	261	53	52	77	75	2.5	6.0
	51	168.08	1.85	.84	354	263	262	55	54	77	75	2.4	6.0
	54	170.68	1.85	.84	351	261	262	56	50	77	75	2.4	6.0
	57	173.14	1.8	.83	348	260	261	54	51	77	75	2.4	6.0
6	60	175.68	1.8	.83	350	262	262	54	52	78	76	2.4	6.0

Traverse: NE			
Start Time: 13:39	Initial Leak Check: .008	cfm@ 15	"Hg
Finish Time: —	Final Leak Check: —	cfm@ —	"Hg

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

Project No.: 22030

Operator: C. RELATIVE

Field Data Sheet

Date: Oct. 6 /20	Plant: Clean Harbors	Test No.: (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	178.22	1.8	.83	349	261	261	54	52	77	75	2.4	6.0
	66	180.77	1.8	.83	349	261	261	54	55	78	76	2.4	6.0
	69	183.32	1.8	.83	349	261	260	55	56	78	76	2.4	6.0
7	72	185.85	1.75	.82	349	261	261	55	56	78	76	2.4	6.0
	75	188.40	1.70	.81	348	261	259	54	56	78	76	2.3	5.7
	78	190.90	1.70	.81	348	261	263	55	57	78	76	2.3	5.7
	81	193.42	1.70	.81	348	259	258	55	53	78	76	2.3	5.5
8	84	195.92	1.60	.78	348	260	261	55	53	78	76	2.2	5
	87	198.35	1.60	.78	345	257	260	56	55	78	76	2.2	5
	90	200.77	1.60	.78	345	257	261	56	56	78	76	2.2	5
	93	203.18	1.60	.78	344	258	261	57	66	78	79	2.2	5
9	96	205.59	1.60	.78	345	259	258	57	65	78	79	2.2	5
	99	208.02	1.55	.77	345	259	259	58	58	79	77	2.2	5
	102	210.42	1.55	.77	342	260	260	58	59	79	77	2.2	5
	105	212.83	1.56	.77	343	260	260	58	59	79	77	2.2	5
10	108	215.22	1.5	.76	342	260	262	59	64	79	77	2.0	4.8
	111	217.58	1.5	.76	342	260	262	59	58	79	77	2.0	4.8
	114	219.84	1.6	.78	356	260	260	53	54	79	77	2.1	5
	117	222.22	1.6	.78	378	258	260	51	50	79	77	2.1	5
	120	224.63											

Traverse: NE		
Start Time: ~~15:39~~	Initial Leak Check:	cfm@ "Hg
Finish Time: 15:39	Final Leak Check: .004	cfm@ 15 "Hg

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

Project No.: 22030

Operator : C. BELORE

ORTECH Consulting Inc.

Plant	Clean Harbors
Plant Location	Corunna, Ontario
Test No.:	2 SVOC
Test Date	October 7, 2020
Test Location	Incinerator Exhaust Stack
Operator Signature	CHRIS RELOTE

Project No.:	22030
Page	1 of 5
Probe No.:	
Meter Box No.:	TEAM # 1
Impinger Box No.:	—

Pitot Factor	0.849	
DGMCF	0.999	
Barometric Pressure	29.09	"Hg
Static Pressure	+0.45	"H2O
Nozzle Size	0.2663	inches
Stack Diameter	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	3802.1	g
WCBDA	39.7	g

Combustion Gas Concentration

Oxygen	8.67	%
Carbon Dioxide	9.31	%
Carbon Monoxide	83.7	ppm

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

Nozzle Measurements	
1	SEE
2	TEST
3	#1
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: Oct. 7/20	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 ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp ~~Inlet~~/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	26.83	1.7	.76	369	251	246	58	42	71	69	2.4	5.6
	3	29.34	1.7	.76	369	253	259	56	44	69	68	2.2	5.6
	6	31.81	1.8	.78	368	255	253	57	45	69	68	2.3	5.6
	9	34.22	1.7	.76	368	258	249	57	46	69	68	2.3	5.6
2	12	36.65	1.7	.76	368	255	251	57	48	69	69	2.3	5.6
	15	39.08	1.7	.76	368	255	251	57	48	69	69	2.3	5.6
	18	41.47	1.7	.76	369	258	253	58	50	69	69	2.2	5.6
	21	43.88	1.7	.76	369	260	259	58	52	69	69	2.2	5.6
3	24	46.28	1.7	.76	369	260	260	58	53	69	69	2.2	5.6
	27	48.65	1.7	.76	369	260	254	58	59	70	69	2.2	5.6
	30	51.02	1.75	.77	369	271	258	58	48	71	69	2.2	5.6
	33	53.40	1.75	.77	370	266	259	58	45	71	69	2.2	5.6
4	36	55.80	1.75	.77	370	259	252	58	45	71	69	2.2	5.6
	39	58.16	1.75	.77	371	259	259	58	46	72	70	2.2	5.6
	42	60.54	1.75	.77	371	260	259	58	46	72	69	2.2	5.6
	45	62.91	1.75	.77	371	260	263	59	47	73	69	2.2	5.6
5	48	65.28	1.75	.77	372	261	253	60	48	73	70	2.2	5.6
	51	67.66	1.75	.77	373	261	251	59	48	73	70	2.2	5.6
	54	70.04	1.75	.77	373	260	252	60	48	73	70	2.2	5.6
	57	72.36	1.75	.77	373	260	249	60	49	74	71	2.2	5.6
6	60	74.73	1.7	.76	373	260	250	60	50	74	71	2.2	5.6

Traverse: NW.				
Start Time: 09:04	Initial Leak Check:	.005	cfm@	15 "Hg
Finish Time: —	Final Leak Check:	—	cfm@	— "Hg

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

Project No.: 22030

Operator: CHRIS RECOTTE

Field Data Sheet

Date: Oct. 7 / 20	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 ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp ~~Inlet~~/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
	63	77.98	1.7	.76	372	251	248	62	50	74	71	2.2	5.6
	66	79.40	1.75	.77	373	260	246	62	48	74	72	2.2	5.6
	69	81.80	1.75	.77	373	258	248	62	47	74	72	2.2	5.6
7	72	84.33	1.9	.81	374	257	247	62	47	75	72	2.3	5.8
	75	86.64	1.85	.80	374	259	247	62	48	75	72	2.3	5.8
	78	89.17	1.85	.81	374	259	248	62	48	75	72	2.3	5.8
	81	91.57	1.85	.81	377	258	245	63	46	76	72	2.3	5.8
8	84	94.08	1.8	.80	373	259	245	63	46	75	72	2.3	5.8
	87	96.57	1.85	.81	373	260	242	63	46	75	72	2.3	5.8
	90	99.18	1.85	.81	372	259	242	64	47	76	73	2.3	5.8
	93	101.57	1.85	.81	372	258	242	63	48	76	73	2.3	5.8
9	96	104.07	1.7	.77	370	256	262	65	49	76	73	2.15	5.5
	99	106.48	1.7	.77	370	256	263	66	50	76	73	2.15	5.5
	102	108.90	1.7	.77	370	258	259	64	49	76	73	2.1	5.5
	105	111.25	1.7	.77	369	258	259	64	48	76	73	2.1	5.5
10	108	113.61	1.6	.75	368	256	257	64	48	76	73	2.0	5.2
	111	115.96	1.6	.75	369	258	258	66	47	76	74	2.0	5.2
	114	118.30	1.6	.75	368	257	260	65	47	76	73	2.0	5.2
	117	120.56	1.6	.75	369	256	252	64	47	76	74	2.0	5.2
	120	122.84											

Traverse:			
Start Time: —	Initial Leak Check: —	cfm@ —	"Hg
Finish Time: 11:04	Final Leak Check: .004	cfm@ 17	"Hg

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

Project No.: 22030

Operator: CHRIS RECORE

Field Data Sheet

Date: OCT. 7 / 20	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 ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp ~~Inlet~~/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	126.11	1.6	.75	375	251	232	72	54	78	76	2.0	4.8
	3	128.40	1.6	.75	372	254	267	70	44	78	77	2.0	4.8
	6	130.66	1.6	.75	374	258	265	70	45	78	77	2.0	4.8
	9	132.97	1.6	.75	374	256	269	71	47	77	76	2.0	4.8
2	12	135.17	1.6	.75	375	257	258	73	48	77	76	2.0	5.0
	15	137.46	1.6	.75	377	258	254	74	48	77	76	2.0	5.0
	18	139.64	1.6	.75	377	258	252	75	52	77	76	2.0	5.0
	21	141.89	1.6	.75	377	258	255	75	51	79	78	2.0	5.0
3	24	144.13	1.6	.75	377	258	255	75	48	79	78	2.0	5.0
	27	146.35	1.6	.75	377	258	253	74	47	80	78	2.0	5.0
	30	148.58	1.6	.75	376	256	254	75	47	80	78	2.0	5.0
	33	150.82	1.6	.75	377	256	254	65	46	80	78	2.0	5.0
4	36	153.06	1.7	.77	377	256	254	65	46	80	78	2.0	5.0
	39	155.28	1.7	.77	377	256	254	65	46	80	78	2.0	5.0
	42	157.67	1.7	.77	376	255	254	65	49	81	79	2.0	5.0
	45	160.06	1.7	.77	374	258	255	65	51	81	79	2.0	5.0
5	48	162.42	1.7	.77	374	258	257	65	46	81	79	2.0	5.0
	51	164.72	1.7	.77	376	258	254	65	46	81	79	2.0	5.0
	54	167.06	1.7	.77	376	257	251	65	45	81	79	2.0	5.0
	57	169.45	1.7	.77	375	256	253	65	45	81	79	2.0	5.0
6	60	171.75	1.7	.77	374	259	256	64	46	82	80	2.0	5.0

Traverse: NE				
Start Time: 12:28	Initial Leak Check: .004	cfm@ 17	"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.: 22030

Operator: CHRIS BELCOURT

Field Data Sheet

Date: Oct. 7 / 20	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 ft^3	Pitot Δ P $"H_2O$	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp ~~Inlet~~/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H $"H_2O$	Pump Vacuum "Hg Gauge
	63	174.08	1.7	.78	373	257	250	63	47	82	80	2.0	5.0
	66	176.45	1.75	.79	373	257	257	63	48	82	80	2.1	5.2
	69	178.81	1.75	.79	372	258	253	63	47	82	80	2.1	5.2
7	72	181.16	1.8	.80	371	258	252	63	47	82	80	2.2	5.6
	75	183.57	1.85	.81	371	258	253	63	53	82	80	2.3	5.8
	78	186.07	1.85	.81	371	258	252	63	45	82	81	2.3	5.8
	81	188.56	1.85	.81	370	259	256	63	47	82	81	2.3	5.8
8	84	191.05	1.9	.82	373	260	254	62	46	82	81	2.3	6
	87	193.54	1.9	.81	374	260	254	63	48	82	81	2.3	6
	90	196.03	1.9	.82	376	260	256	63	49	83	81	2.3	6
	93	198.54	1.9	.82	377	258	257	63	48	83	81	2.3	6
9	96	201.02	1.95	.83	377	258	256	62	51	82	81	2.3	6
	99	203.55	1.95	.83	378	258	260	62	53	83	81	2.3	6
	102	206.06	1.95	.83	377	260	264	62	51	82	81	2.3	6
	105	208.56	1.95	.83	377	260	262	62	52	82	81	2.3	6
10	108	211.10	1.90	.82	376	260	262	62	52	82	81	2.3	6
	111	213.60	1.90	.82	377	260	262	62	48	81	81	2.3	6
	114	216.09	1.90	.82	377	258	265	63	48	82	81	2.3	6
	117	218.61	1.90	.82	377	258	259	61	42	82	81	2.3	6
	120	221.14											

Traverse: NE				Traverse:			
Start Time: —	Initial Leak Check: —	cfm@ —	"Hg	Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time: 14:28	Final Leak Check: .005	cfm@ 17	"Hg	Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22030

Operator: CHRIS BELORE

ORTECH Consulting Inc.

Plant	Clean Harbors
Plant Location	Corunna, Ontario
Test No.:	3 SVOC
Test Date	October 8, 2020
Test Location	Incinerator Exhaust Stack
Operator Signature	Chris Rolore

Project No.:	22030
Page	1 of 5
Probe No.:	S series
Meter Box No.:	TEAM #1
Impinger Box No.:	—

Pitot Factor	0.849	
DGMCF	0.999	
Barometric Pressure	29.47	"Hg
Static Pressure	+0.65	"H2O
Nozzle Size	0.2663	inches
Stack Diameter	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	3712.3	g
WCBDA	24.7	g

Combustion Gas Concentration

Oxygen	9.06	%
Carbon Dioxide	9.04	%
Carbon Monoxide	49.3	ppm

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

Nozzle Measurements	
1	SEE
2	TEST
3	#1
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: Oct. 8/20	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 ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp ~~Inlet~~/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	22.11	1.65	.73	384	253	258	51	35	61	59	2	5
	3	24.33	1.65	.73	384	255	255	54	42	59	58	2	5.5
	6	26.56	1.65	.73	384	255	257	58	54	59	58	2	5.5
	9	28.81	1.65	.73	384	258	257	61	55	58	58	2	5.5
2	12	30.96	1.65	.73	384	258	257	63	48	59	59	2	5.5
	15	33.19	1.65	.73	384	258	257	63	46	59	59	2	5.5
	18	35.41	1.65	.73	383	258	258	64	46	60	59	2	5.8
	21	37.63	1.65	.73	383	258	257	64	46	60	59	2	5.8
3	24	39.86	1.65	.73	382	258	259	65	49	61	59	2	5.8
	27	42.04	1.65	.73	382	258	259	64	42	61	59	2	5.8
	30	44.23	1.65	.73	380	258	258	65	42	61	59	2	5.8
	33	46.44	1.65	.73	378	258	262	64	42	62	59	2	5.8
4	36	48.63	1.65	.73	378	258	262	65	42	62	59	2	5.8
	39	50.84	1.65	.73	378	258	260	66	43	62	59	2	5.8
	42	53.04	1.65	.73	377	258	260	67	43	63	60	2	5.8
	45	55.18	1.65	.73	376	258	259	67	43	63	59	2	5.8
5	48	57.41	1.65	.73	376	259	259	68	46	64	60	2	5.8
	51	59.63	1.65	.73	376	259	259	68	45	64	60	2	5.8
	54	61.84	1.65	.73	376	260	260	68	45	64	60	2	5.8
	57	64.06	1.65	.73	376	259	260	70	45	65	61	2	5.8
6	60	66.24	1.70	.74	376	260	260	70	45	65	61	2	6

Traverse: NW				
Start Time: 08:37	Initial Leak Check: .004	cfm@	15	"Hg
Finish Time: —	Final Leak Check: —	cfm@	—	"Hg

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

Project No.: 22030

Operator: CHRIS RECOSTE

Field Data Sheet

Date: Oct. 8/20	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 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	68.49	1.7	.75	382	259	260	71	44	65	61	2	6
	66	70.74	1.7	.75	382	257	260	72	45	66	61	2	6
	69	73.00	1.7	.75	384	259	259	73	45	66	61	2	6
7	72	75.24	1.7	.75	384	259	259	73	45	66	61	2	6
	75	77.53	1.7	.75	386	259	261	74	48	67	62	2	6
	78	79.80	1.7	.75	388	259	261	75	45	67	62	2	6
	81	82.01	1.7	.75	388	260	262	76	44	67	63	2	6
8	84	84.30	1.9	.79	388	259	260	75	43	67	63	2.3	7
	87	86.65	1.9	.79	385	258	259	72	46	68	63	2.3	7
	90	89.03	1.9	.79	386	260	261	70	49	68	63	2.3	7
	93	91.50	1.95	.80	386	260	261	70	49	66	63	2.3	7
9	96	94.04	2.00	.81	386	261	262	65	48	68	64	2.3	7
	99	96.53	2.00	.81	386	261	260	59	57	68	64	2.3	7
	102	98.97	2.00	.81	386	258	260	57	57	69	64	2.3	7
	105	101.32	2.00	.81	386	259	262	56	59	69	65	2.3	7
10	108	103.74	1.95	.80	382	261	261	55	59	69	65	2.3	7
	111	106.18	1.95	.80	383	261	262	55	59	69	66	2.3	7
	114	108.60	1.95	.80	384	259	261	54	60	70	65	2.3	7
	117	111.03	1.95	.80	383	261	260	55	61	70	66	2.3	7
	120	113.51											

Traverse: NW			
Start Time: —	Initial Leak Check: —	cfm@ —	"Hg
Finish Time: 10:37	Final Leak Check: .004	cfm@ 15	"Hg

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

Project No.: 22030

Operator: CHRIS BELOVE

Field Data Sheet

Date: Oct. 8/20	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 ft^3	Pitot Δ P "H_2O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp ~~Inlet~~/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure Δ H "H_2O	Pump Vacuum "Hg Gauge
1	0	114.28	1.7	.76	381	259	259	56	41	70	68	2	5.6
	3	116.55	1.7	.76	381	253	258	55	42	70	69	2	5.6
	6	118.80	1.7	.76	381	254	260	55	43	70	69	2	5.6
	9	121.05	1.7	.76	382	256	263	54	41	70	69	2	5.6
2	12	123.23	1.7	.76	382	256	260	55	42	70	69	2	5.6
	15	125.60	1.7	.76	383	255	265	55	42	70	69	2	5.6
	18	127.72	1.6	.75	382	257	263	56	43	71	70	2	5.6
	21	129.95	1.6	.75	383	256	261	56	45	71	69	2	5.6
3	24	132.23	1.7	.76	383	257	258	57	43	72	70	2	5.6
	27	134.51	1.7	.76	383	256	260	57	43	72	70	2	5.6
	30	136.77	1.7	.76	382	258	260	57	42	73	70	2	5.8
	33	139.05	1.7	.76	382	259	260	58	42	74	71	2	5.8
4	36	141.32	1.7	.76	382	260	263	63	43	74	71	2	5.8
	39	143.58	1.8	.78	381	257	255	63	42	75	71	2.1	6
	42	145.91	1.8	.78	381	258	260	64	43	75	71	2.1	6
	45	148.23	1.8	.78	380	259	262	64	43	75	71	2.1	6
5	48	150.57	1.8	.78	381	257	262	65	45	76	72	2.1	6
	51	152.90	1.8	.78	381	255	262	65	46	76	72	2.1	6
	54	155.22	1.8	.78	382	256	258	62	45	76	72	2.1	6
	57	157.57	1.8	.78	382	259	264	68	47	77	73	2.1	6
6	60	159.88	1.8	.78	382	257	259	67	49	77	73	2.1	6

Traverse: NE				
Start Time: 11:42	Initial Leak Check: .006	cfm@	15	"Hg
Finish Time: —	Final Leak Check: —	cfm@	—	"Hg

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

Project No.: 22030

Operator: CHRIS RELOIRE

Field Data Sheet

Date: Oct. 8/20	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 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	162.19	1.8	.79	381	257	260	64	51	76	72	2.1	6
	66	164.54	1.8	.79	380	257	257	64	55	76	73	2.1	6
	69	166.90	1.8	.79	380	259	259	64	47	77	74	2.1	6
7	72	169.24	1.75	.78	379	259	261	69	44	78	74	2.1	6
	75	171.60	1.75	.78	380	259	258	70	46	77	74	2.1	6
	78	173.96	1.75	.78	379	257	262	70	45	77	74	2.1	6
	81	176.31	1.75	.78	379	259	261	70	44	78	75	2.1	6
8	84	178.68	1.75	.78	380	258	263	70	43	78	75	2.1	6
	87	181.00	1.75	.78	379	258	261	69	43	78	75	2.1	6
	90	183.43	1.75	.78	378	257	259	68	46	78	75	2.1	6
	93	185.76	1.75	.78	379	259	261	66	42	78	75	2.1	6
9	96	188.18	1.75	.78	378	257	260	64	49	79	76	2.1	6
	99	190.48	1.75	.78	378	260	260	64	52	79	76	2.1	6
	102	192.83	1.75	.78	378	258	261	66	56	79	76	2.1	6
	105	195.18	1.75	.78	379	260	263	65	61	79	76	2.1	6
10	108	197.54	1.75	.78	378	260	263	65	61	79	76	2.1	6
	111	199.91	1.75	.78	379	260	259	59	47	79	77	2.1	6
	114	202.26	1.75	.78	379	260	260	60	42	80	76	2.1	6
	117	204.62	1.75	.78	379	259	259	61	42	79	77	2.1	6
	120	207.01											

Traverse: NE				
Start Time: —	Initial Leak Check: —	cfm@ —	"Hg
Finish Time: ~~13:37~~ 13:20	Final Leak Check: .016	cfm@ 17	"Hg

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

Project No.: 22030

Operator: CHRIS RELOPE

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	0.999	263.55	398.75	135.2	29.26	4.5	18.7	0.1365
	2	0.999	610.92	738.30	127.4	29.09	4.5	20.0	0.1273
	3	0.999	740.14	866.47	126.3	29.48	4.5	14.4	0.1304

* 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:	October 6, 2020
Project No.:	22030

Measuring Device	MII Number
Control Module	M 05798
Barometer	Env. Can.

P_{Bar}	29.20

Clock Time	Dry Gas Meter L	Probe Temp °C	Stack Temp °C	Oven Temp °C	Impinger Outlet °C	Meter Temperature Outlet (duct) °C	Meter Temperature Inlet °C	Meter Pressure Δ H "H_2O"	Pump Vacuum "Hg Gauge
0	2263.55	139	183	128	14	16		4.5	3
5	2284.1	141	184	129	13	19		4.5	3
10	2294.48	140	183	129	13	17		4.5	3
15	2305.0	138	183	127	13	16		4.5	3
20	2315.32	139	183	129	13	20		4.5	3
25	2325.65	141	183	130	13	20		4.5	3
30	2335.89	139	183	130	13	19		4.5	3
35	2345.80	139	183	130	12	19		4.5	3
40	2355.42	140	183	129	13	19		4.5	3
45	2367.50	141	183	128	13	19		4.5	3
50	2378.00	140	183	129	13	19		4.5	3
55	2388.50	140	183	128	13	19		4.5	3
60	2398.75	139	179	130	13	20		4.5	3

Start Time:	1041		
Finish Time:	1141		
Initial Leak Check:	<.01	Lpm @	14 " Hg
Final Leak Check:	<.01	Lpm @	16 " Hg

DGMCF:	0.999
Sample Volume:	
Average DGM Temp:	
Average DGM Δ H:	

Comments:

Probe Purge On: 2291.0 @ 1020

Off: 2263.55 @ 1030

~2 LPM for 60 min,

Operator :

ORTECH Consulting Inc.
Method 26 Data Sheet

Plant:	Clean Harbors
Plant Location:	Corunna, On
Test No.:	2
Test location:	Incinerator Exhaust Stack
Date:	OCTOBER 7, 2020
Project No.:	22030

Measuring Device	MII Number
Control Module	M05498
Barometer	Env. Can.

P_{Bar}	29.09

Clock Time	Dry Gas Meter L	Probe Temp °C	Stack Temp °C	Oven Temp °C	Impinger Outlet °C	Meter Temperature Outlet °C	Meter Temperature Inlet °C	Meter Pressure ΔH "H_2O"	Pump Vacuum "Hg Gauge
						AVG			
0	2610.92	140	180	135	21	20		4.5	3.0
5	2621.84	140	188	135	20	20		4.5	3
10	2631.80	139	189	135	19	20		4.5	3
15	2642.48	139	189	135	18	20		4.5	3
20	2653.06	137	189	135	17	20		4.5	3
25	2663.68	138	190	135	16	20		4.5	3
30	2674.32	138	190	135	15	20		4.5	3
35	2684.86	139	190	135	15	20		4.5	3
40	2695.48	139	189	136	14	20		4.5	3
45	2706.08	140	189	136	14	20		4.5	3
50	2716.84	140	189	136	14	20		4.5	3
55	2727.58	140	190	136	14	20		4.5	3
60	2738.30	140	190	136	14	20		4.5	3.0
65									

Start Time:	11:00		
Finish Time:	12:05		
Initial Leak Check:	<.01	Lpm @	27 " Hg
Final Leak Check:		Lpm @	" Hg

DGMCF:	0.999
Sample Volume:	
Average DGM Temp:	
Average DGM Δ H:	

Comments: * LACK OF READINGS AND EXTRA 5MIN DUE TO SHOC TRAIN LEAK CHECK ISSUES AND TAKV CHANGE

Probe Purge On: @

Off: @

~2 LPM for 60 min,

Operator :

ORTECH Consulting Inc.
Method 26 Data Sheet

Plant:	Clean Harbors
Plant Location:	Corunna, On
Test No.:	3
Test location:	Incinerator Exhaust Stack
Date:	OCT 8, 2020
Project No.:	22030

Measuring Device	MII Number
Control Module	M05498
Barometer	Env. Can.

P_{Bar}	29.48

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	2740.14	137	195	133	13	10		4.5	3
5	2751.20	137	195	132	10	10		4.5	3
10	2761.30	137	195	132	8	13		4.5	3
15	2772.20	136	195	128	7	13		4.5	3
20	2783.40	137	194	128	7	13		4.5	3
25	2793.1	137	193	127	7	13		4.5	3
30	28017	137	193	126	7	16		4.5	3
35	2813.90	138	192	125	8	16		4.5	3
40	2825.70	139	191	124	8	17		4.5	3
45	2835.60	139	191	125	8	17		4.5	3
50	2846.11	139	191	126	8	18		4.5	3
55	2856.3	138	190	126	8	19		4.5	3
60	2866.47	138	190	126	8	19		4.5	3

Start Time:	0829		
Finish Time:	0939		
Initial Leak Check:	<0.01	Lpm @ 20	" Hg
Final Leak Check:	<0.01	Lpm @ 20	" Hg

DGMCF:	0.999
Sample Volume:	
Average DGM Temp:	
Average DGM Δ H:	

Comments:

Probe Purge On: 0825 @ 2L/Min

Off: 0830 @ 2L/Min.

~2 LPM for 60 min

Operator : Jay MC

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	1A/1B	0.997	400.50	424.50	24.00	29.19	2.0	19.0	0.0239
	2	2A/2B	0.997	25.50	59.75	34.25	29.19	2.0	20.0	0.0341
	3	3A/3B	0.997	60.30	84.90	24.60	29.19	2.0	19.8	0.0245
	4	4A/4B	0.997	85.15	110.20	25.05	29.19	2.0	21.6	0.0248
2	1	6A/6B	0.997	11.15	34.80	23.65	29.05	2.0	15.4	0.0238
	2	7A/7B	0.997	36.70	58.30	21.60	29.05	2.0	18.0	0.0215
	3	8A/8B	0.997	58.85	82.50	23.65	29.05	2.0	18.8	0.0235
	4	9A/9B	0.997	83.35	109.65	26.30	29.05	2.0	19.0	0.0261
3	1	11A/11B	0.997	68.90	89.40	20.50	29.48	2.0	16.6	0.0208
	2	12A/12B	0.997	90.00	114.85	24.85	29.48	2.0	19.5	0.0250
	3	13A/13B	0.997	15.71	40.00	24.29	29.48	2.0	23.6	0.0241
	4	14A/14B	0.997	40.10	64.20	24.10	29.48	2.0	24.0	0.0239

* 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: 0.997	Operator: JG
Date:	October 6, 2020	Barometric: 29.19	Project No: [redacted]30
~ 1 LPM for 20 minutes	NDL - No Dectectable Leak	Field Blank Pair ID:	

Tube Pair 1 Start Time: 1209	Initial Leak Check NDL @ 21 "Hg	Sample ID: 1A + 1B	
Tube Pair 1 End Time: 1229	Final Leak Check @ "Hg	Lab ID: L2503298-28	

Clock Time	Dry Gas Meter L	Temperatures Probe °C	Stack °C	Condensor °C	Meter Avg °C	Meter Pressure "H_2O	Pump Vacuum "Hg
0	2400.5	141	175	10	17	2.0	5
5	2406.5	142	173	9	19	2.0	5
10	2412.5	142	173	8	19	2.0	5
15	2418.4	142	173	9	20	2.0	5
20	2424.5	142	172	9	20	2.0	5

Tube Pair 2 Start Time: 1237	Initial Leak Check NDL @ 23 "Hg	Sample ID: 2A 2B	
Tube Pair 2 End Time: 1307	Final Leak Check NDL @ 20 "Hg	Lab ID: L2503298-29	

Clock Time	Dry Gas Meter L	Temperatures Probe °C	Stack °C	Condensor °C	Meter Avg °C	Meter Pressure "H_2O	Pump Vacuum "Hg
0	2425.5	140	174	10	20	2.0	5
5	2431.4	140	174	10	20	2.0	5
10	2436.1	140	174	10	20	2.0	5
15	2442.8	140	173	11	21	2.0	5
20	2448.1	140	173	11	21	2.0	5
30	2459.75	140	173	11	21	2.0	5

Tube Pair 3 Start Time: 1348	Initial Leak Check NDL @ 21 "Hg	Sample ID: 3A 3B	
Tube Pair 3 End Time: 1408	Final Leak Check NDL @ 21 "Hg	Lab ID: L2503298-30	

Clock Time	Dry Gas Meter L	Temperatures Probe °C	Stack °C	Condensor °C	Meter Avg °C	Meter Pressure "H_2O	Pump Vacuum "Hg
0	2460.3	147	175	10	19	2.0	5.0
5	2465.8	151	173	10	20	2.0	5.5
10	2471.5	154	174	9	20	2.0	5.5
15	2478.2	153	174	9	20	2.0	5.5
20	2484.9	152	175	9	20	2.0	5.5

Tube Pair 4 Start Time: 1415	Initial Leak Check NDL @ 23 "Hg	Sample ID: 4A 4B	
Tube Pair 4 End Time: 1435	Final Leak Check NDL @ 21 "Hg	Lab ID: L2503298-31	

Clock Time	Dry Gas Meter L	Temperatures Probe °C	Stack °C	Condensor °C	Meter Avg °C	Meter Pressure "H_2O	Pump Vacuum "Hg
0	2485.15	152	174	10	21	2.0	6.0
5	2491.80	154	174	9	21	2.0	6.5
10	2497.15	155	174	9	22	2.0	9.0
15	2503.50	156	174	9	22	2.0	9.0
20	2510.20	156	174	9	22	2.0	9

ORTECH Consulting Inc.

Vost Data Sheet

Plant: Clean Harbors	Test Condition: Compliance		
Plant Location: Corunna, ON	Test No: 2	Control Box ID: M0549B	
Test location: Incinerator Exhuast Stack	DGMCF: 0.997	Operator: JG	
Date: October 7, 2020	Barometric: 29.05	Project No: 22030	
~ 1 LPM for 20 minutes	NDL - No Dectectable Leak	Field Blank Pair ID:	

Tube Pair 1 Start Time: 0906	Initial Leak Check NDL @ 23 "Hg	Sample ID: 6A 6B	
Tube Pair 1 End Time: 0926	Final Leak Check NDL @ 21 "Hg	Lab ID: L2503298-33	

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	2511.15	~~204~~	192	8	14	2.0	6.0
5	2516.70	149	186	7	15	2.0	6.0
10	2522.40	140	187	7	16	2.0	6.0
15	2528.0	140	187	7	16	2.0	6.0
20	2534.8	140	187	7	16	2.0	6.0

Tube Pair 2 Start Time: 0933	Initial Leak Check NDL @ 23 "Hg	Sample ID: 7A 7B	
Tube Pair 2 End Time: 0953	Final Leak Check NDL @ 23 "Hg	Lab ID: L2503298-34	

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	2536.7	139	187	8	18	2.0	4.5
5	2541.7	140	186	7	18	2.0	5.0
10	2547.0	141	188	7	18	2.0	5.0
15	2552.5	141	188	6	18	2.0	5.0
20	2558.3	140	188	6	18	2.0	5.0

Tube Pair 3 Start Time: 0958	Initial Leak Check NDL @ 21 "Hg	Sample ID: 8A 8B	
Tube Pair 3 End Time: ~~0978~~ 1018	Final Leak Check NDL @ 23 "Hg	Lab ID: L2503298-35	

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	2558.85	143	189	9	18	2.0	4.0
5	2565.0	145	189	9	19	2.0	4.0
10	2571.0	146	190	8	19	2.0	4.0
15	2576.75	146	190	8	19	2.0	4.0
20	2582.5	145	190	8	19	2.0	4.0

Tube Pair 4 Start Time: 1025	Initial Leak Check NDL @ 23 "Hg	Sample ID: 9A 9B	
Tube Pair 4 End Time: 1045	Final Leak Check NDL @ 22 "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	2583.35	146	189	10	19	2.0	5
5	2590.0	145	189	10	19	2.0	5
10	2596.50	145	190	10	19	2.0	5
15	2603.1	145	190	10	19	2.0	5
20	2609.65	145	190	10	19	2.0	6

ORTECH Consulting Inc.

Vost Data Sheet

Plant:	Clean Harbors	Test Condition:	Compliance		
Plant Location:	Corunna, ON	Test No:	3	Control Box ID:	M0549B
Test location:	Incinerator Exhuast Stack	DGMCF:	0.997	Operator:	JG
Date:	OCTOBER 8, 2020	Barometric:	29.48	Project No:	22030
~ 1 LPM for 20 minutes	NDL - No Dectectable Leak			Field Blank Pair ID:	15A 15B

L2503298-42

Tube Pair 1 Start Time: 1000	Initial Leak Check @ NDL "Hg 21	Sample ID: 11A 11B
Tube Pair 1 End Time: 1020	Final Leak Check @ NDL "Hg 21	Lab ID: L2503298-38

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	2868.9	143	198	8	15	2.0	5.0
5	2873.4	143	197	7	16	2.0	5.0
10	2878.0	143	197	7	16	2.0	8.0
15	2883.2	143	195	7	18	2.0	8.0
20	2889.4	143	195	7	18	2.0	8.0

Tube Pair 2 Start Time: 1024	Initial Leak Check NDL @ 22 "Hg	Sample ID: 12A 12B
Tube Pair 2 End Time: 1044	Final Leak Check NDL @ 15 "Hg	Lab ID: L2503298-39

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	2890.0	142	193	8	19	2.0	7
5	2895.4	153	195	8	19	2.0	8
10	2902.1	143	194	8	20	2.0	8
15	2907.0	143	194	8	20	2.0	8
20	2914.85	143	194	8	20	2.0	8

Tube Pair 3 Start Time: 1120 1123	Initial Leak Check NDL @ 24 "Hg	Sample ID: 13A 13B
Tube Pair 3 End Time: 1143	Final Leak Check NDL @ 16 "Hg	Lab ID: L2503298-40

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	2915.71	153	195	10	25	2.0	7.0
5	2921.90	142	193	9	23	2.0	7.0
10	2927.65	142	195	8	23	2.0	7.0
15	2933.50	157	195	7	24	2.0	8.0
20	2940.0	157	195	7	23	2.0	8.0

Tube Pair 4 Start Time: 1147	Initial Leak Check NDL @ 19 "Hg	Sample ID: 14A 14B
Tube Pair 4 End Time: 1207	Final Leak Check NDL @ 22 "Hg	Lab ID: L2503298-41

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	2940.1	146	194	12	24	2.0	5.0
5	2946.9	143	194	10	24	2.0	5.0
10	2952.7	146	193	8	24	2.0	5.0
15	2958.45	146	193	8	24	2.0	5.0
20	2964.2	146	193	8	24	2.0	5.0

APPENDIX 8

Metals Train Recovery Data Sheets
(4 pages)

Particulate and Metals Train Recovery Data Sheet

Clean Harbors Sarnia

Project No. 22030

Date: OCT 6/20

Test No. 1

Test Location: Incinerator Exhaust

Nozzle, Probe Liner Cyclone Bypass & F.H. Filter Housing	Filter Q2 7897 Filter ID: ~~Q2 7897~~	Impingers 1, 2, 3, 4 & 5	Impinger 6 & 7

CONTAINER TS1	CONTAINER TS3	CONTAINER TS4	CONTAINER TS5-A

Container TS1 Weights	
Empty Wt:	2581.9
After Act. Rinse:	402.3
Total TS1:	

Container TS3	
Initial Wt:	0.8753 ~~0.8718~~
Final Wt:	
Gain:	
Colour:	BEIGE

Impinger #1 (100 ml H_2O)	
Empty Wt:	670.7
Initial Wt:	771.2
Final Wt:	~~834.0~~
1 Gain:	112.8
Colour:	—

Impinger #6 $KMnO_4/H_2SO_4$	
Empty Wt:	656.8
Initial Wt:	776.0
Final Wt:	813.5
6 Gain:	37.5
Colour:	BROWN/PURPLE

MARK FLUID LEVEL

SEAL AND LABEL TS3

SEAL AND LABEL TS1

48

MT 400.4

1317.1

GAIN 916.7

Impinger #2 Empty (Knock-out)	
Empty Wt:	713.2
Final Wt:	7936.7 ~~8022.35~~
2 Gain:	
Colour:	—

Impinger #7 $KMnO_4/H_2SO_4$	
Empty Wt:	573.6
Initial Wt:	683.9
Final Wt:	696.9
7 Gain:	13.0
Colour:	PURPLE

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	2834
with Nitric rinse	457.5
Total TS2:	

Impinger #3 HNO_3/H_2O_2	
Empty Wt:	558.8
Initial Wt:	668.7
Final Wt:	857.5
3 Gain:	188.8
Colour:	—

CONTAINER TS5-A	
Empty Wt:	400.4
With Imp. Soln:	676.5
Imp. 6&7 Volume:	
After $KMnO_4$ Rinse:	801.3
After D.I. Water Rinse:	979.6
Total TS5-A:	

MARK FLUID LEVEL

SEAL AND LABEL TS2

Impinger #4 HNO_3/H_2O_2	
Empty Wt:	569.0
Initial Wt:	672.1
Final Wt:	873.7
4 Gain:	~~209~~ 201.6
Colour:	—

MARK FLUID LEVEL

SEAL & LABEL TS5-A

Sample Batch Number	20-22030-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

Impinger #5 Empty	
Empty Wt:	489.1
Final Wt:	895 ~~2951~~
5 Gain:	406.1 ~~1462~~
Colour:	—

CONTAINER TS5-B	
Empty Wt:	400.6
With 150 mL DI Water:	553.5
After HCl Rinse:	616.4
After D.I. Water Rinse:	806.8
Total TS5-B:	

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:	~~4443.2~~ 4100.6
WCBDA= 8:	46.1

4A

CONTAINER TS4 WEIGHTS	
Empty Wt:	1368.0
With Imp. 1 to 5 Soln:	4887.9
Imp. 1 to 5 Volume:	5173.6
After HNO_3 Rinse:	
Total TS4:	

MARK FLUID LEVEL

SEAL & LABEL TS5-B

Impinger #8 Silica Gel	
Initial Wt:	878.0
Final Wt:	924.1
8 Gain:	46.1
% spent :	60

Train Loaded By: DM

Train Recovered By: DM

4100.6

Impinger Box ID. 9

ORTECH

Particulate and Metals Train Recovery Data Sheet
Clean Harbors Sarnia

Project No. 22030
Date: OCT 7/20

Test No. 2
Test Location: Incinerator Exhaust

Nozzle, Probe Liner Cyclone Bypass & F.H. Filter Housing	Filter Filter ID: QZ7899	Impingers 1, 2, 3, 4 & 5	Impinger 6 & 7

CONTAINER TS1

Container TS1 Weights	
Empty Wt:	282.9
After Act. Rinse:	
Total TS1:	

MARK FLUID LEVEL

SEAL AND LABEL TS1

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	
with Nitric rinse	
Total TS2:	

MARK FLUID LEVEL

SEAL AND LABEL TS2

CONTAINER TS3

Initial Wt:	0.8932
Final Wt:	
Gain:	
Colour:	BEIGE

SEAL AND LABEL TS3

1357.6
3168.3
1810.7
2B 358

11B 401.7
W/IMP 523.0
RINSE 821.0

Sample Batch Number	20-22030-PM-
TS1 (Probe Rinse-Acetone)	8
TS2 (Probe Rinse-0.1N HNO_3)	9
TS3 (Filter)	10
TS4 (Impinger 1,2,3,4 & 5 Sol'n-HNO_3)	11A, B
TS5-A (Impinger 6 & 7 Sol'n-$KMnO_4$)	12
TS5-B (Impinger 6 & 7 Rinse HCl)	13

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:	3958.7
WCBDA= 8:	43.2

Train Loaded By: DM
Train Recovered By: DM

CONTAINER TS4

Impinger #1 (100 ml H_2O)	
Empty Wt:	672.5
Initial Wt:	770.8
Final Wt:	947.8
1 Gain:	177.0
Colour:	—

Impinger #2 Empty (Knock-out)	
Empty Wt:	715.5
Final Wt:	2165.7
A 2 Gain:	1450.2
Colour:	—

Impinger #3 HNO_3/H_2O_2	
Empty Wt:	559.7
Initial Wt:	667.8
Final Wt:	856.4
3 Gain:	188.6
Colour:	—

Impinger #4 HNO_3/H_2O_2	
Empty Wt:	574.6
Initial Wt:	674.8
Final Wt:	877.5
4 Gain:	202.7
Colour:	—

Impinger #5 Empty	
Empty Wt:	490.9
Final Wt:	610.0
5 Gain:	119.1
Colour:	—

1357.6

CONTAINER TS4 WEIGHTS

Empty Wt:	368.4
With Imp. 1 to 5 Soln:	5483.9
Imp. 1 to 5 Volume:	
After HNO_3 Rinse:	—
Total TS4:	4126.3

Impinger Box ID. 9

CONTAINER TS5-A

Impinger #6 $KMnO_4/H_2SO_4$	
Empty Wt:	656.7
Initial Wt:	770.4
Final Wt:	759.0
6 Gain:	−11.4
Colour:	PURPLE

Impinger #7 $KMnO_4/H_2SO_4$	
Empty Wt:	573.1
Initial Wt:	689.6
Final Wt:	691.4
7 Gain:	1.8
Colour:	PURPLE

CONTAINER TS5-A

Empty Wt:	401.5
With Imp. Soln:	618.6
Imp. 6&7 Volume:	730.9
After $KMnO_4$ Rinse:	730.9
After D.I. Water Rinse:	910.7
Total TS5-A:	509.2

MARK FLUID LEVEL

SEAL & LABEL TS5-A

CONTAINER TS5-B

Empty Wt:	400.6
With 150 mL DI Water:	560.1
After HCl Rinse:	608.3
After D.I. Water Rinse:	785.4
Total TS5-B:	384.8

MARK FLUID LEVEL

SEAL & LABEL TS5-B

Impinger #8 Silica Gel	
Initial Wt:	835.0
Final Wt:	879.2
8 Gain:	44.2
% spent :	50

43.2

ORTECH

Particulate and Metals Train Recovery Data Sheet

Clean Harbors Sarnia

Project No. 22030

Date: OCT 15/20

Test No. 3

Test Location: Incinerator Exhaust

Nozzle, Probe Liner Cyclone Bypass & F.H. Filter Housing	Filter Filter ID: QZ 7980	Impingers 1, 2, 3, 4 & 5	Impinger 6&7

CONTAINER TS1	CONTAINER TS3	CONTAINER TS4	CONTAINER TS5-A

Container TS1 Weights	
Empty Wt:	282.6
After Act. Rinse:	410.6
Total TS1:	128.0

Initial Wt:	.8813
Final Wt:	
Gain:	
Colour:	biege

Impinger #1 (100 ml H_2O)	
Empty Wt:	672.3
Initial Wt:	772.2
Final Wt:	927.5
1 Gain:	155.3
Colour:	clear

Impinger #6 $KMnO_4/H_2SO_4$	
Empty Wt:	656.6
Initial Wt:	766.3
Final Wt:	769.8
6 Gain:	3.5
Colour:	purple

MARK FLUID LEVEL	SEAL AND LABEL TS3

SEAL AND LABEL TS1

Impinger #2 Empty (Knock-out)	
Empty Wt:	715.0
Final Wt:	1993.3
2 Gain:	1278.3
Colour:	clear

Impinger #7 $KMnO_4/H_2SO_4$	
Empty Wt:	572.6
Initial Wt:	689.6
Final Wt:	701.0
7 Gain:	11.4
Colour:	purple

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	282.9
with Nitric rinse	462.5
Total TS2:	

1357.8
2984.7
GAIN 1626.9
19B 400.9
689.8
RINSE 248.9 g

Impinger #3 HNO_3/H_2O_2	
Empty Wt:	560.7
Initial Wt:	668.5
Final Wt:	889.4
3 Gain:	220.9
Colour:	clear

CONTAINER TS5-A	
Empty Wt:	400.8
With Imp. Soln:	637.7
Imp. 6&7 Volume:	750.5
After $KMnO_4$ Rinse:	750.8
After D.I. Water Rinse:	899.5
Total TS5-A:	498.7

MARK FLUID LEVEL

SEAL AND LABEL TS2

Impinger #4 HNO_3/H_2O_2	
Empty Wt:	574.2
Initial Wt:	675.9
Final Wt:	913.1
4 Gain:	237.2
Colour:	clear

SEAL & LABEL TS5-A

Sample Batch Number	20-22030-PM-
TS1 (Probe Rinse-Acetone)	15
TS2 (Probe Rinse-0.1N HNO_3)	16
TS3 (Filter)	17
TS4 (Impinger 1,2,3,4 & 5 Sol'n-HNO_3)	19A, B
TS5-A (Impinger 6 & 7 Sol'n-$KMnO_4$)	19
TS5-B (Impinger 6 & 7 Rinse HCl)	90

Impinger #5 Empty	
Empty Wt:	490.1
Final Wt:	712.8
5 Gain:	222.7
Colour:	clear

CONTAINER TS5-B	
Empty Wt:	400.6
With 150 mL DI Water:	548.6
After HCl Rinse:	616.3
After D.I. Water Rinse:	804.2
Total TS5-B:	403.6

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

CONTAINER TS4 WEIGHTS	
Empty Wt:	1357.8
With Imp. 1 to 5 Soln:	5398.0
Imp. 1 to 5 Volume:	4040.2
After HNO_3 Rinse:	—
Total TS4:	4040.2

MARK FLUID LEVEL

SEAL & LABEL TS5-B

CWTR = add 1 thru 7:	3760.2
WCBDA= 8:	39.3

Impinger #8 Silica Gel	
Initial Wt:	850.6
Final Wt:	889.9
8 Gain:	39.3
% spent :	

Train Loaded By:

Train Recovered By:

Impinger Box ID. 9

ORTECH

Particulate and Metals Train Recovery Data Sheet

Clean Harbors Sarnia

Project No. 22030

Date: Oct. 7, 2020

Test No. Blank

Test Location: Incinerator Exhaust

Nozzle, Probe Liner Cyclone Bypass & F.H. Filter Housing	Filter Filter ID: Q27899	Impingers 1, 2, 3, 4 & 5	Impinger 6 & 7

CONTAINER TS1	CONTAINER TS3	CONTAINER TS4	CONTAINER TS5-A

Container TS1 Weights	
Empty Wt:	281.3
After Act. Rinse:	428.0
Total TS1:	

Initial Wt:	0.8718
Final Wt:	
Gain:	
Colour:	white

Impinger #1 (100 ml H_2O)	
Empty Wt:	667.0
Initial Wt:	764.0
Final Wt:	764.0
1 Gain:	0
Colour:	clear

Impinger #6 $KMnO_4/H_2SO_4$	
Empty Wt:	670.1
Initial Wt:	785.1
Final Wt:	784.9
6 Gain:	-0.2
Colour:	purple

MARK FLUID LEVEL

SEAL AND LABEL TS3

SEAL AND LABEL TS1

Impinger #2 Empty (Knock-out)	
Empty Wt:	717.2
Final Wt:	717.2
2 Gain:	0
Colour:	empty

Impinger #7 $KMnO_4/H_2SO_4$	
Empty Wt:	670.7
Initial Wt:	789.2
Final Wt:	788.9
7 Gain:	-0.3
Colour:	purple

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	280.8
with Nitric rinse	487.1
Total TS2:	

Impinger #3 HNO_3/H_2O_2	
Empty Wt:	647.8
Initial Wt:	745.6
Final Wt:	745.6
3 Gain:	0
Colour:	clear

CONTAINER TS5-A	
Empty Wt:	400.6
With Imp. Soln:	631.4
Imp. 6&7 Volume:	
After $KMnO_4$ Rinse:	749.0
After D.I. Water Rinse:	878.1
Total TS5-A:	

MARK FLUID LEVEL

SEAL AND LABEL TS2

Impinger #4 HNO_3/H_2O_2	
Empty Wt:	651.3
Initial Wt:	760.8
Final Wt:	760.8
4 Gain:	0
Colour:	clear

MARK FLUID LEVEL

SEAL & LABEL TS5-A

Sample Batch Number	20-22030-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

Impinger #5 Empty	
Empty Wt:	610.4
Final Wt:	610.4
5 Gain:	0
Colour:	empty

CONTAINER TS5-B	
Empty Wt:	400.8
With 150 mL DI Water:	549.3
After HCl Rinse:	588.4
After D.I. Water Rinse:	771.0
Total TS5-B:	

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

CONTAINER TS4 WEIGHTS	
Empty Wt:	400.1
With Imp. 1 to 5 Soln:	703.6
Imp. 1 to 5 Volume:	
After HNO_3 Rinse:	917.5
Total TS4:	

MARK FLUID LEVEL

SEAL & LABEL TS5-B

CWTR = add 1 thru 7:	
WCBDA= 8:	

Impinger #8 Silica Gel	
Initial Wt:	945.2
Final Wt:	945.5
8 Gain:	0.3
% spent :	—

Train Loaded By: DM

Train Recovered By: DM / CB

Impinger Box ID. 8

ORTECH

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	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2515220		Mlssissauga, ON L5J 2Y4
Date of Report	28-Oct-20		Canada
Date of Sample Receipt	9-Oct-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 Clean Harbors

COMMENTS:

Sample Particulate Analysis via Gravimetric USEPA Method 5 TPH 26-OCT-2020)

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
Account Manager

ALS Environmental

Sample Analysis Summary Report

Sample Name		20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(8 THRU 13) TEST#2	20-22030-PM-(15 THRU 20) TEST#3	20-22030-PM-(22 THRU 27) BLANK	MB	
ALS Sample ID		L2515220-1	L2515220-2	L2515220-3	L2515220-4	L2515220-MB	
Matrix		Stack	Stack	Stack	Stack	n/a	
Analysis type		Sample	Sample	Sample	Sample	Sample	
Sampling Date/Time		6-Oct-20	7-Oct-20	8-Oct-20	7-Oct-20	n/a	
Date of Receipt		9-Oct-20	9-Oct-20	9-Oct-20	9-Oct-20	n/a	
PM via Gravimetric Analysis Method 5	**LOR**						
	mg	**mg**	**mg**	**mg**	**mg**	**mg**	
Filter Particulate Matter	0.8	20.3	15.1	13.8	<0.1	0.1	J
Acetone Particulate Matter	0.4	4.5	8.5	5.4	<0.1	<0.1	
	g	**g**	**g**	**g**	**g**	**g**	
Acetone Mass	0.02	120	152	124	146	31.5	

ALS Environmental

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2515220		Mlssissauga, ON L5J 2Y4
Date of Report	5-Nov-20		Canada
Date of Sample Receipt	9-Oct-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 Clean Harbors

COMMENTS:

Sample Preparation via USEPA Method 29 (AB 28-OCT-2020,04-NOV-2020)
Mercury Analysis via CVAA using Method USEPA 7470A (AB 29-OCT-2020,04-NOV-2020)

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
Account Manager

ALS Environmental

Sample Analysis Summary Report

Sample Name			20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(8 THRU 13) TEST#2	20-22030-PM-(15 THRU 20) TEST#3	20-22030-PM-(22 THRU 27) BLANK
ALS Sample ID			L2515220-1	L2515220-2	L2515220-3	L2515220-4
Matrix			Stack	Stack	Stack	Stack
Analysis type			Sample	Sample	Sample	Sample
Sampling Date/Time			6-Oct-20	7-Oct-20	8-Oct-20	7-Oct-20
Date of Receipt			9-Oct-20	9-Oct-20	9-Oct-20	9-Oct-20
Mercury via CVAA		**LOR**				
	Method 29	**ug**	**ug**	**ug**	**ug**	**ug**
	Analytical Fraction 1B (Nitric)	0.015	0.657	0.230	0.336	<0.015
	Analytical Fraction 1B	0.015	0.127	0.0342	0.0759	<0.015
	Analytical Fraction 2B	0.050	5.88	14.4	18.3	0.417
	Analytical Fraction 3B	0.025	<0.03	<0.025	<0.025	<0.0225
	Analytical Fraction 3C	0.25	3.09	3.92	5.99	0.405

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	0.286	95%	0.288	96%
Analytical Fraction 1B	0.015	<0.015	0.282	94%	0.285	95%
Analytical Fraction 2B	0.050	<0.05	0.868	87%	0.931	93%
Analytical Fraction 3B	0.025	<0.025	0.483	96%	0.480	95%
Analytical Fraction 3C	0.25	<0.25	4.73	95%	4.75	95%

ALS Environmental

Sample QC Summary Report

Sample Name		20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1
ALS Sample ID		L2515220-1	L2515220-1DUP	L2515220-1MS	L2515220-1MS	L2515220-1MSD	L2515220-1MSD
Matrix		Stack	Stack	Stack	Stack	Stack	Stack
Analysis type		Sample	Duplicate	Matrix Spike	Matrix Spike	Matrix Spike Dup	Matrix Spike Dup
Sampling Date/Time		6-Oct-20	6-Oct-20	6-Oct-20	6-Oct-20	6-Oct-20	6-Oct-20
Date of Receipt		9-Oct-20	9-Oct-20	9-Oct-20	9-Oct-20	9-Oct-20	9-Oct-20
Mercury via CVAA	**LOR**						
Method 29	**ug**	**ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Analytical Fraction 1B (Nitric)	0.015	0.657	0.651	0.948	97%	0.936	93%
Analytical Fraction 1B	0.015	0.127	0.129	0.423	99%	0.417	97%
Analytical Fraction 2B	0.050	5.88	5.65	40.5	91%	40.1	90%
Analytical Fraction 3B	0.025	<0.03	<0.03	0.541	88%	0.539	88%
Analytical Fraction 3C	0.250	3.09	3.00	7.16	90%	7.29	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	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2515220		Mississauga, ON L5J 2Y4
Date of Report	5-Nov-20		Canada
Date of Sample Receipt	9-Oct-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 Clean Harbors

COMMENTS:

Metals analysed via ICP-MS Method USEPA 6020B (SA 04-Nov-20)

Sample Preparation via USEPA Method 29 (TPH 03-Nov-20)

ANALYST COMMENTS:

1A HNO3:

Si recoveries in the LCS and LCSD are outside ALS DQOs (found: 79, 76%, limits: 85-115%). Data for this analyte is likely to be baised low.

1A HF:

Silicon cannot be quantified in this fraction due to the incredibly high background resulting from complete digestion of the filter matrix.

Mo observed in the method blank (MB) above the LOR. This represents the contribution of the filter matrix. Data for this analyte is likely to be biased high.

Si recoveries in the LCS and LCSD are outside ALS DQOs (found: 81, 80%, limits: 85-115%). Data for this analyte is likely to be baised low in this fraction.

2A:

Sn observed in the reagent blank (RB) above the LOR. This represents the contribution of the tin stabilizer present in the peroxide reagent. Data for this analyte is likely to be biased high.

Si recoveries in the LCS and LCSD are outside ALS DQOs (found: 41, 53%, limits: 85-115%). Data for this analyte is likely to be baised by as much as 60% low in this fraction.

Recoveries for Sn, Si, and S in the MS and MSD cannot be quantified due to high levels of the target analytes in the sample, relative to the spiked amount. This is not expected to indicate any impact to data quality.

PE 5-Nov-2020

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
Account Manager

ALS Environmental

Sample Analysis Summary Report

Sample Name		20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(8 THRU 13) TEST#2	20-22030-PM-(15 THRU 20) TEST#3	20-22030-PM-(22 THRU 27) BLANK	MB
ALS Sample ID		L2515220-1	L2515220-2	L2515220-3	L2515220-4	L2515220-MB
Matrix		Stack	Stack	Stack	Stack	n/a
Analysis Type		Sample	Sample	Sample	Sample	Sample
Sampling Date		6-Oct-20	7-Oct-20	8-Oct-20	7-Oct-20	n/a
Date of Receipt		9-Oct-20	9-Oct-20	9-Oct-20	9-Oct-20	n/a
Multi-Metals via ICP-MS	**LOR**					
	ug	**ug**	**ug**	**ug**	**ug**	**ug**
Front Half HNO3 Fraction 1A						
Aluminum	20	96.3	103	76.6	<	<
Antimony	0.2	1.09	0.681	0.991	<	<
Arsenic	1	20.3	18.7	14.2	<	<
Barium	5	19.4	19.8	20.0	<	<
Beryllium	0.2	<	<	<	<	<
Boron	30	<	<	<	<	<
Cadmium	0.1	0.306	0.637	0.476	<	<
Calcium	500	689	785	626	<	<
Chromium	1	6.33	7.78	12.7	<	<
Cobalt	0.2	0.377	0.418	0.749	<	<
Copper	1	12.0	9.27	7.66	1.07	<
Iron	200	420	388	214	<	<
Lead	0.5	0.862	0.677	1.29	<	<
Lithium	0.5	1.41	6.53	5.61	<	<
Magnesium	10	139	136	113	13.4	<
Manganese	0.5	19.5	23.3	21.4	1.48	<
Molybdenum	0.2	2.39	2.67	2.15	<	<
Nickel	0.2	5.47	24.0	5.35	0.875	<
Phosphorus	100	105	<	<	<	<
Potassium	100	781	966	789	<	<
Selenium	2	57.3	52.6	24.8	<	<
Silver	0.2	<	<	<	<	<
Sodium	30	4290	4050	3620	183	<
Strontium	0.2	5.10	5.24	9.43	0.370	<
Tin	0.3	5.44	6.27	5.66	1.11	<
Titanium	10	55.1	54.2	118	<	<
Vanadium	1	<	<	1.05	<	<
Zinc	6	24.8	19.7	22.1	<	<
Sulfur	10000	<	<	<	<	<
Silicon	150	296	326	233	260	<

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	<	110	91	109	89
Antimony	0.2	<	11.4	95	11.5	95
Arsenic	1	<	57.9	96	57.3	95
Barium	5	<	59.9	100	60.4	101
Beryllium	0.2	<	58.3	97	56.6	94
Boron	30	<	51.3	85	50.2	83
Cadmium	0.1	<	28.6	95	28.7	96
Calcium	500	<	1440	95	1450	95
Chromium	1	<	58.5	97	58.4	97
Cobalt	0.2	<	58.2	97	57.3	96
Copper	1	<	59.1	98	58.6	98
Iron	200	<	312	103	306	102
Lead	0.5	<	57.3	95	56.3	94
Lithium	0.5	<	11.7	100	11.2	95
Magnesium	10	<	298	98	292	96
Manganese	0.5	<	59.0	98	57.4	96
Molybdenum	0.2	<	28.9	96	29.8	99
Nickel	0.2	<	58.7	98	58.1	97
Phosphorus	100	<	1490	100	1400	93
Potassium	100	<	1510	101	1510	100
Selenium	2	<	57.1	95	57.1	95
Silver	0.2	<	29.0	97	29.1	97
Sodium	30	<	1460	96	1430	94
Strontium	0.2	<	56.4	94	56.3	94
Tin	0.3	<	28.4	95	28.3	94
Titanium	10	<	59.3	99	58.4	97
Vanadium	1	<	59.4	99	58.0	97
Zinc	6	<	117	97	117	97
Sulfur	10000	<	14100	98	13900	97
Silicon	150	<	2420	79	2340	76

ALS Environmental

Sample QC Summary Report

Sample Name		20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1
ALS Sample ID		L2515220-1	L2515220-1	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		6-Oct-20	6-Oct-20	6-Oct-20	6-Oct-20	6-Oct-20	6-Oct-20
Date of Receipt		9-Oct-20	9-Oct-20	9-Oct-20	9-Oct-20	9-Oct-20	9-Oct-20
Multi-Metals via ICP-MS	**LOR**						
	ug	**ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Front Half HNO3 Fraction 1A							
Aluminum	20	96.3	95.6	308	88	316	92
Antimony	0.2	1.09	1.13	22.9	91	23.5	93
Arsenic	1	20.3	20.8	135	95	135	96
Barium	5	19.4	20.2	116	81	118	82
Beryllium	0.2	<	<	112	94	114	95
Boron	30	<	<	110	84	112	86
Cadmium	0.1	0.306	0.293	57.7	96	58.7	97
Calcium	500	689	709	3510	94	3700	100
Chromium	1	6.33	6.68	122	96	122	96
Cobalt	0.2	0.377	0.391	115	96	116	97
Copper	1	12.0	12.3	129	98	129	98
Iron	200	420	457	1010	98	1020	100
Lead	0.5	0.862	0.913	104	86	108	89
Lithium	0.5	1.41	1.48	24.7	97	24.4	96
Magnesium	10	139	142	722	97	716	96
Manganese	0.5	19.5	19.0	134	95	135	96
Molybdenum	0.2	2.39	2.61	57.9	93	59.7	95
Nickel	0.2	5.47	5.50	120	95	121	97
Phosphorus	100	105	<	2950	95	2920	94
Potassium	100	781	811	3730	98	3720	98
Selenium	2	57.3	58.9	167	91	174	97
Silver	0.2	<	<	55.2	92	56.7	94
Sodium	30	4290	4460	7250	99	7390	103
Strontium	0.2	5.10	5.39	115	91	117	93
Tin	0.3	5.44	5.68	62.1	94	62.6	95
Titanium	10	55.1	56.4	170	96	172	97
Vanadium	1	<	<	116	96	117	96
Zinc	6	24.8	25.4	256	96	262	99
Sulfur	10000	<	<	28000	94	28000	94
Silicon	150	296	268	7450	80	7520	80

ALS Environmental

Sample Analysis Summary Report

Sample Name		20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(8 THRU 13) TEST#2	20-22030-PM-(15 THRU 20) TEST#3	20-22030-PM-(22 THRU 27) BLANK	MB
ALS Sample ID		L2515220-1	L2515220-2	L2515220-3	L2515220-4	L2515220-MB
Matrix		Stack	Stack	Stack	Stack	n/a
Analysis Type		Sample	Sample	Sample	Sample	Sample
Sampling Date		6-Oct-20	7-Oct-20	8-Oct-20	7-Oct-20	n/a
Date of Receipt		9-Oct-20	9-Oct-20	9-Oct-20	9-Oct-20	n/a
Multi-Metals via ICP-MS	**LOR ug**	**ug**	**ug**	**ug**	**ug**	**ug**
Front Half HF Fraction 1A						
Aluminum	20	181	173	178	142	41.5
Antimony	0.2	1.23	0.775	1.21	<	<
Arsenic	1	4.71	3.00	2.74	<	<
Barium	5	14.2	11.4	15.4	<	<
Beryllium	0.2	<	<	<	<	<
Boron	30	<	<	<	<	<
Cadmium	0.1	0.200	0.528	0.542	<	<
Calcium	500	<	<	<	<	<
Chromium	1	5.30	4.80	13.8	2.41	<
Cobalt	0.2	0.739	0.680	2.50	<	<
Copper	1	14.5	13.6	14.2	5.91	<
Iron	200	557	350	330	<	<
Lead	0.5	2.38	1.78	6.99	<	<
Lithium	0.5	<	0.579	1.26	<	<
Magnesium	10	74.9	58.8	60.8	32.0	16.6
Manganese	0.5	15.5	12.2	16.6	1.20	0.501
Molybdenum	0.2	22.9	24.7	23.2	23.1	9.26
Nickel	0.2	9.38	9.52	8.57	2.35	0.279
Phosphorus	100	<	<	<	<	<
Potassium	100	138	<	125	<	<
Selenium	2	17.1	13.4	9.27	<	<
Silver	0.2	<	<	<	<	<
Sodium	30	700	471	538	69.0	30.7
Strontium	0.2	2.31	1.78	5.46	0.660	0.237
Tin	0.3	14.1	9.84	8.40	1.79	<
Titanium	10	42.6	28.3	85.2	<	<
Vanadium	1	<	<	<	<	<
Zinc	6	31.2	22.3	24.6	6.12	<
Sulfur	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	<	112	91	116	94
Antimony	0.2	<	11.5	96	11.1	93
Arsenic	1	1.55	58.1	94	58.2	94
Barium	5	<	61.1	102	57.2	95
Beryllium	0.2	<	57.2	95	56.7	94
Boron	30	<	49.0	81	48.4	80
Cadmium	0.1	<	28.8	96	29.0	97
Calcium	500	<	1480	98	1450	96
Chromium	1	<	59.1	99	60.0	100
Cobalt	0.2	<	58.5	98	58.5	97
Copper	1	<	59.8	100	59.3	99
Iron	200	<	311	103	313	104
Lead	0.5	<	56.4	94	56.1	94
Lithium	0.5	<	11.3	100	11.2	98
Magnesium	10	<	296	98	297	99
Manganese	0.5	<	59.4	99	58.6	98
Molybdenum	0.2	<	29.0	97	28.4	95
Nickel	0.2	<	58.5	97	58.6	98
Phosphorus	100	<	1410	96	1410	95
Potassium	100	<	1510	102	1520	102
Selenium	2	<	58.3	97	57.4	96
Silver	0.2	<	28.9	96	28.3	94
Sodium	30	<	1460	97	1460	96
Strontium	0.2	<	55.8	93	54.9	91
Tin	0.3	<	29.1	97	28.5	95
Titanium	10	<	59.8	100	60.4	101
Vanadium	1	<	59.3	99	59.3	99
Zinc	6	<	118	99	120	100
Sulfur	10000	<	13200	103	13100	102
Silicon	150	nq	nq	nq	nq	nq

ALS Environmental

Sample QC Summary Report

Sample Name		20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1
ALS Sample ID		L2515220-1	L2515220-1	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		6-Oct-20	6-Oct-20	6-Oct-20	6-Oct-20	6-Oct-20	6-Oct-20
Date of Receipt		9-Oct-20	9-Oct-20	9-Oct-20	9-Oct-20	9-Oct-20	9-Oct-20
Multi-Metals via ICP-MS	**LOR**						
	ug	**ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Front Half HF Fraction 1A							
Aluminum	20	181	182	400	91	399	91
Antimony	0.2	1.23	1.17	23.8	94	23.5	93
Arsenic	1	4.71	4.63	119	95	118	94
Barium	5	14.2	14.2	111	81	111	81
Beryllium	0.2	<	<	112	93	112	93
Boron	30	<	<	106	82	108	84
Cadmium	0.1	0.200	0.200	57.5	95	57.9	96
Calcium	500	<	<	3110	96	3100	96
Chromium	1	5.30	5.44	120	96	116	92
Cobalt	0.2	0.739	0.692	113	94	112	93
Copper	1	14.5	14.4	129	95	128	95
Iron	200	557	560	1160	101	1150	100
Lead	0.5	2.38	2.26	112	91	111	90
Lithium	0.5	<	<	22.6	95	23.1	97
Magnesium	10	74.9	72.8	653	96	639	94
Manganese	0.5	15.5	15.4	131	96	131	96
Molybdenum	0.2	22.9	23.4	79.2	94	80.4	96
Nickel	0.2	9.38	9.33	123	95	122	94
Phosphorus	100	<	<	2830	93	2830	93
Potassium	100	138	133	3100	99	2990	95
Selenium	2	17.1	17.0	132	95	132	96
Silver	0.2	<	<	56.7	94	57.0	95
Sodium	30	700	706	3680	99	3640	98
Strontium	0.2	2.31	2.22	117	96	114	93
Tin	0.3	14.1	14.2	71.8	96	71.9	96
Titanium	10	42.6	43.2	158	96	157	95
Vanadium	1	<	<	114	95	114	94
Zinc	6	31.2	30.3	262	96	259	95
Sulfur	10000	<	<	22800	91	22700	91
Silicon	150	nq	nq	nq	nq	nq	nq

ALS Environmental

Sample Analysis Summary Report

Sample Name		20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(8 THRU 13) TEST#2	20-22030-PM-(15 THRU 20) TEST#3	20-22030-PM-(22 THRU 27) BLANK
ALS Sample ID		L2515220-1	L2515220-2	L2515220-3	L2515220-4
Matrix		Stack	Stack	Stack	Stack
Analysis Type		Sample	Sample	Sample	Sample
Sampling Date		6-Oct-20	7-Oct-20	8-Oct-20	7-Oct-20
Date of Receipt		9-Oct-20	9-Oct-20	9-Oct-20	9-Oct-20
Multi-Metals via ICP-MS	**LOR ug**	**ug**	**ug**	**ug**	**ug**
Back Half (HNO3 / H2O2) Fraction 2A					
Aluminum	5	248	354	640	16.0
Antimony	0.1	0.202	0.167	0.199	<
Arsenic	0.2	1.17	5.10	13.5	<
Barium	0.5	2.56	1.67	1.62	1.21
Beryllium	0.1	<	<	<	<
Boron	10	2950	3570	4770	41.9
Cadmium	0.05	0.398	0.797	0.456	0.211
Calcium	100	545	429	477	318
Chromium	0.15	2.01	2.25	1.85	0.783
Cobalt	0.1	0.357	0.144	<	0.146
Copper	0.3	5.28	3.78	2.59	2.88
Iron	15	79.8	58.3	71.0	31.2
Lead	0.05	1.74	0.976	0.784	1.04
Lithium	0.25	<	<	0.857	0.590
Magnesium	5	72.3	55.0	49.9	43.0
Manganese	0.15	10.3	4.62	3.81	14.0
Molybdenum	0.1	0.143	0.189	0.241	<
Nickel	0.1	3.39	3.66	2.77	4.02
Phosphorus	25	<	<	<	<
Potassium	100	108	<	<	<
Selenium	1	1820	2650	1180	2.91
Silver	0.1	<	<	<	<
Sodium	20	1200	1510	2050	605
Strontium	0.1	1.59	1.35	1.24	0.957
Tin	0.1	42.4	35.2	26.4	26.8
Titanium	1	9.80	11.4	11.8	<
Vanadium	0.1	<	<	<	<
Zinc	3	24.1	21.2	20.5	11.6
Sulfur	3000	4260000	6020000	5490000	6670
Silicon	75	1700	275	3370	151

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	<	61.8	102	62.6	103
Antimony	0.1	<	5.92	99	5.52	92
Arsenic	0.2	<	30.0	100	28.3	94
Barium	0.5	<	32.2	107	30.3	101
Beryllium	0.1	<	29.8	99	28.7	96
Boron	10	<	30.3	99	33.1	108
Cadmium	0.05	<	14.8	99	13.7	92
Calcium	100	<	784	104	725	96
Chromium	0.15	<	29.9	100	28.4	94
Cobalt	0.1	<	29.9	100	27.9	93
Copper	0.3	<	30.1	100	28.1	94
Iron	15	<	159	106	148	99
Lead	0.05	<	29.7	99	27.5	92
Lithium	0.25	<	6.17	103	5.88	99
Magnesium	5	<	155	103	145	97
Manganese	0.15	<	30.5	102	29.1	97
Molybdenum	0.1	<	15.5	103	14.3	95
Nickel	0.1	<	29.8	99	27.7	92
Phosphorus	25	<	734	98	706	94
Potassium	100	<	787	105	750	100
Selenium	1	<	29.3	98	27.3	91
Silver	0.1	<	15.1	101	14.2	94
Sodium	20	<	759	100	726	96
Strontium	0.1	<	30.9	103	28.3	94
Tin	0.1	5.69	15.1	101	14.3	95
Titanium	1	<	30.9	103	29.0	97
Vanadium	0.1	<	30.5	102	28.5	95
Zinc	3	<	60.4	101	56.7	95
Sulfur	3000	<	5970	106	5660	102
Silicon	75	84.0	703	41	882	53

ALS Environmental

Sample QC Summary Report

Sample Name		20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1	20-22030-PM-(1 THRU 6) TEST#1
ALS Sample ID		L2515220-1	L2515220-1	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		6-Oct-20	6-Oct-20	6-Oct-20	6-Oct-20	6-Oct-20	6-Oct-20
Date of Receipt		9-Oct-20	9-Oct-20	9-Oct-20	9-Oct-20	9-Oct-20	9-Oct-20
Multi-Metals via ICP-MS	**LOR ug**	**ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Back Half (HNO3 / H2O2) Fraction 2A							
Aluminum	5	248	248	351	86	359	93
Antimony	0.1	0.202	0.228	11.3	93	11.7	96
Arsenic	0.2	1.17	1.17	68.9	113	69.2	113
Barium	0.5	2.56	2.61	53.2	84	52.1	83
Beryllium	0.1	<	<	54.9	92	56.5	94
Boron	10	2950	2990	3020	117	3040	138
Cadmium	0.05	0.398	0.385	28.4	93	27.9	92
Calcium	100	545	566	2030	99	2020	99
Chromium	0.15	2.01	2.01	58.1	94	58.7	94
Cobalt	0.1	0.357	0.374	56.2	93	56.3	93
Copper	0.3	5.28	5.27	61.8	94	61.3	93
Iron	15	79.8	79.5	380	100	378	99
Lead	0.05	1.74	1.75	55.0	89	53.9	87
Lithium	0.25	<	<	11.5	96	11.8	98
Magnesium	5	72.3	74.8	360	96	358	95
Manganese	0.15	10.3	10.7	67.7	96	68.8	97
Molybdenum	0.1	0.143	0.179	28.9	96	29.9	99
Nickel	0.1	3.39	3.39	59.9	94	59.4	93
Phosphorus	25	<	<	1570	103	1700	112
Potassium	100	108	109	1610	100	1610	100
Selenium	1	1820	1870	7500	95	7490	95
Silver	0.1	<	<	28.1	94	29.0	96
Sodium	20	1200	1200	2690	nq	2670	nq
Strontium	0.1	1.59	1.66	60.7	98	61.5	100
Tin	0.1	42.4	42.2	71.4	nq	71.2	nq
Titanium	1	9.80	9.98	67.0	95	67.6	96
Vanadium	0.1	<	<	57.0	95	57.1	95
Zinc	3	24.1	23.5	135	93	136	93
Sulfur	3000	4260000	4380000	5970000	nq	5890000	nq
Silicon	75	1700	1700	5200	nq	5130	nq

APPENDIX 10

Semi-Volatile Organics Train
Recovery Data Sheets
(4 pages)

Semi-Volatile Organics Train Recovery Data Sheet

Client :	Clean Harbors
Project No.:	22030
Sample Batch No.:	20-22030-SVOC-

Test No.:	1 SVOC
Test Date:	Oct. 6, 2020
Test Location:	Incinerator Stack

Sample ID	Sample ID	Sample ID	Sample ID	Sample ID
-1	-2	-3	-4 A+B	5
Nozzle, Probe Liner, Cyclone Bypass, F.H. & B.H. Filter Housing, Frit & Connecting Glassware to Top of Condenser	Filter	XAD-II Trap	Impingers 1, 2 & 3	Back-Half Rinses Trap Bottom U-Tube, Imp. Inlet Stem, U-Tubes and Impingers
CONTAINER TS1	CONTAINER TS2	CONTAINER TS3	CONTAINER TS4	CONTAINER TS5
Empty Wt: 400.3	Colour: pink	Initial Wt: 672.1	Impinger #1 Jumbo K.O.	Empty Wt: 400.1
After Acetone/ Hexane Rinse: 709.6	FOLD IN FOIL	1 Final Wt: 680.1	Empty Wt: 700.5	After Acetone/ Hexane Rinse: 651.7
Total TS1: 309.3	SEAL AND LABEL CONTAINER TS2	Gain: 58.0	Final Wt: 2942.1	Total TS5: 251.6
MARK FLUID LEVEL		Colour: white	2 Gain: 2241.6	
SEAL AND LABEL CONTAINER TS1		SEAL TRAP	Colour: clear	
		WRAP IN FOIL	Impinger #2 Ethylene Glycol	
		LABEL AS CONTAINER TS3	Empty Wt: 642.0	
			Initial Wt: 768.6	
			Final Wt: 821.7	
			3 Gain: 53.1	
			Colour: clear	
			Impinger #3 Empty	
			Empty Wt: 499.8	
			Final Wt: 500.0	
			4 Gain: 0.2	
			Colour: clear	

~small amount of XAD-2

126.6

Train & Proofing Identification	
Glassware Train Proofing Provided	ALS
Glassware Train ID:	C
Trap ID:	3
HPLC Batch No.:	ALS 41.D.
Ethylene Gylcol Batch No.:	L-100083
Hexane Batch No.:	104334
Acetone Batch No.:	105484

1 of 2

Container TS4 Weights	
Empty Wt:	1353.6
With Imp Soln:	~~4521.3~~ 4695.
Imp Volume:	3341.4
After ~100g H_2O Rinse:	4900.8
Total TS4:	3447.2

Impinger Box ID: 12

2 of 2

401.1

1289.1

888.0

Train Loaded By: JG

Train Recovered By: CB.

CWTR = 1 + 2 + 3 + 4:	4160.8
WCBDA=5:	21.9

TS1, TS4, TS5 - 1L Amber Glass Bottle
TS2 - Glass Petri Dish
TS3 - Glass Trap

5	Initial Wt:	972.8
	Final Wt:	999.7
	Gain:	21.9
	% Spent:	50 %

Semi-Volatile Organics Train Recovery Data Sheet

Client :	Clean Harbors
Project No.:	22030
Sample Batch No.:	20-22030-SVOC-

Test No.:	2
Test Date:	Oct. 3, 2022
Test Location:	Incinerator Stack

Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	
-6	-7	-8	-9	-10	
Nozzle, Probe Liner, Cyclone Bypass, F.H. & B.H. Filter Housing, Frit & Connecting Glassware to Top of Condenser	Filter	XAD-II Trap	Impingers 1, 2 & 3	Back-Half Rinses Trap Bottom U-Tube, Imp. Inlet Stem, U-Tubes and Impingers	Impinger 4 Silica Gel
CONTAINER TS1	CONTAINER TS2	CONTAINER TS3	CONTAINER TS4	CONTAINER TS5	CONTAINER TS6 (Impinger)
Empty Wt: 400.1	Colour: pink/tan	Initial Wt: 690.4	Impinger #1 Jumbo K.O.	Empty Wt: 400.4	Initial Wt: 680.9
After Acetone/ Hexane Rinse: 859.7	FOLD IN FOIL	1 Final Wt: 690.7	Empty Wt: 708.3	After Acetone/ Hexane Rinse: 608.0	5 Final Wt: 1013.6
Total TS1: 459.6		Gain: 0.3	Final Wt: 2582.4	Total TS5:	Gain: 332.7
	SEAL AND LABEL CONTAINER TS2	Colour: white	2 Gain: 1873.7		% Spent: 80 %
		SEAL TRAP	Colour: clear		
MARK FLUID LEVEL		WRAP IN FOIL	Impinger #2 Ethylene Glycol		
			Empty Wt: 651.0		
SEAL AND LABEL CONTAINER TS1		LABEL AS CONTAINER TS3	Initial Wt: 758.6		
			Final Wt: 796.7		
			3 Gain: 43.1		
			Colour: clear		
			Impinger #3 Empty		
			Empty Wt: 479.9		
			Final Wt: 479.9		
			4 Gain: 0		
			Colour: clear		

3263.0
1360.0
1903.0 (gain)

Train & Proofing Identification	
Glassware Train Proofing Provided	ALS
Glassware Train ID:	B4
Trap ID:	
HPLC Batch No.:	
Ethylene Gylcol Batch No.:	
Hexane Batch No.:	
Acetone Batch No.:	

Impinger Box ID: 2

Container TS4 Weights	
Empty Wt:	1360.0
With Imp Soln:	4698.7
Imp Volume:	3338.7
After ~100g H_2O Rinse:	
Total TS4:	3338.7

9B
401.7
974.5
572.8
1197.5
795.8 g

Train Loaded By: JG

Train Recovered By: C. Belore

CWTR = 1 + 2 + 3 + 4:	3844.8
	3812.1
WCBDA=5:	32.7

TS1, TS4, TS5 - 1L Amber Glass Bottle
TS2 - Glass Petri Dish
TS3 - Glass Trap

Semi-Volatile Organics Train Recovery Data Sheet

Client : Clean Harbors
Project No.: 22030
Sample Batch No.: 20-22030-SVOC-

Test No.: 3 SVOC
Test Date: Oct. 8, 2020
Test Location: Incinerator Stack

Sample ID -11	Sample ID -12	Sample ID -13	Sample ID -14	Sample ID -15	
Nozzle, Probe Liner, Cyclone Bypass, F.H. & B.H. Filter Housing, Frit & Connecting Glassware to Top of Condenser	Filter	XAD-II Trap	Impingers 1, 2 & 3	Back-Half Rinses Trap Bottom U-Tube, Imp. Inlet Stem, U-Tubes and Impingers	Impinger 4 Silica Gel
CONTAINER TS1	CONTAINER TS2	CONTAINER TS3	CONTAINER TS4	CONTAINER TS5	CONTAINER TS6 (Impinger)
Empty Wt: 400.0	Colour: pink/tan	Initial Wt: 674.0	Impinger #1 Jumbo K.O.	Empty Wt: 400.8	Initial Wt: 909.9
After Acetone/ Hexane Rinse: 800.4	FOLD IN FOIL	1 Final Wt: 679.8	Empty Wt: 699.2	After Acetone/ Hexane Rinse: 725.4	5 Final Wt: 934.6
Total TS1: 400.4	SEAL AND LABEL CONTAINER TS2	Gain: 5.8	Final Wt: 2464.2	Total TS5: 324.6	Gain: 24.7
MARK FLUID LEVEL		SEAL TRAP	2 Gain: 1765.0		% Spent: 80 %
SEAL AND LABEL CONTAINER TS1		WRAP IN FOIL	Colour: clear		
		LABEL AS CONTAINER TS3	Impinger #2 Ethylene Glycol		
			Empty Wt: 677.4		
			Initial Wt: 781.6		
			Final Wt: 816.2		
			3 Gain: 34.6		
			Colour: clear		
			Impinger #3 Empty		
			Empty Wt: 667.5		
			Final Wt: 674.4		
			4 Gain: 6.9		
			Colour: clear		

1352.7
3252.7
1900.0

Train & Proofing Identification	
Glassware Train Proofing Provided	ALS
Glassware Train ID:	
Trap ID:	5
HPLC Batch No.:	
Ethylene Gylcol Batch No.:	
Hexane Batch No.:	
Acetone Batch No.:	

14 A

Container TS4 Weights	
Empty Wt:	1352.7
With Imp Soln:	4914.2
Imp Volume:	
After ~100g H_2O Rinse:	
Total TS4:	3561.5

Impinger Box ID: 4

14 B
400.0
534.5
134.5
719.1
319.1

Train Loaded By: JG

Train Recovered By: C. Belcher

CWTR = 1 + 2 + 3 + 4: 3212.3

WCBDA=5: 24.7

TS1, TS4, TS5 - 1L Amber Glass Bottle
TS2 - Glass Petri Dish
TS3 - Glass Trap

Semi-Volatile Organics Train Recovery Data Sheet

Client : Clean Harbors
Project No.: 22030
Sample Batch No.: 20-22030-SVOC-

Test No.: Blank
Test Date: Oct. 8, 2020
Test Location: Incinerator Stack

Sample ID -16	Sample ID -17	Sample ID -18	Sample ID -19	Sample ID -20	
Nozzle, Probe Liner, Cyclone Bypass, F.H. & B.H. Filter Housing, Frit & Connecting Glassware to Top of Condenser	Filter	XAD-II Trap	Impingers 1, 2 & 3	Back-Half Rinses Trap Bottom U-Tube, Imp. Inlet Stem, U-Tubes and Impingers	Impinger 4 Silica Gel
CONTAINER TS1	CONTAINER TS2	CONTAINER TS3	CONTAINER TS4	CONTAINER TS5	CONTAINER TS6 (Impinger)
Empty Wt: 400.6	Colour: white	Initial Wt: 668.6	Impinger #1 Jumbo K.O.	Empty Wt: 399.9	Initial Wt: 927.6
After Acetone/ Hexane Rinse: 536.0	FOLD IN FOIL	Final Wt: 665.0	Empty Wt: 708.6	After Acetone/ Hexane Rinse: 586.1	Final Wt: 939.4
Total TS1:	SEAL AND LABEL CONTAINER TS2	1 Gain:	Final Wt: 708.1	Total TS5:	5 Gain: 1.8
MARK FLUID LEVEL	SEAL TRAP	Colour: white	2 Gain: -0.5		% Spent: 0
SEAL AND LABEL CONTAINER TS1	WRAP IN FOIL	LABEL AS CONTAINER TS3	Colour: —		
			Impinger #2 Ethylene Glycol		
			Empty Wt: 581.3		
			Initial Wt: 697.6		
			Final Wt: 698.1		
			3 Gain: 0.5		
			Colour: clear		
			Impinger #3 Empty		
			Empty Wt: 406.8		
			Final Wt: 406.8		
			4 Gain: 0		
			Colour: —		

Impinger Box ID: 10

Train & Proofing Identification	
Glassware Train Proofing Provided	ALS
Glassware Train ID:	
Trap ID:	6
HPLC Batch No.:	ALS
Ethylene Gylcol Batch No.:	
Hexane Batch No.:	
Acetone Batch No.:	

Container TS4 Weights	
Empty Wt:	400.4
With Imp Soln:	510.8
Imp Volume:	110.4
After ~100g H_2O Rinse:	731.6
Total TS4:	

Train Loaded By: DT

Train Recovered By: CR / DH

CWTR = 1 + 2 + 3 + 4:

WCBDA=5:

TS1, TS4, TS5 - 1L Amber Glass Bottle
TS2 - Glass Petri Dish
TS3 - Glass Trap

APPENDIX 11

Semi-Volatile Organics Analytical Reports
(93 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	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2515221		Mississauga, ON, L5J 2Y4
Date of Report	17-Nov-20		Canada
Date of Sample Receipt	9-Oct-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 Clean Harbors

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

Certified by:

Steve Kennedy
Technical Supervisor

ALS Life Sciences

Sample Analysis summary Report

Sample Name	20-22030-SVOC-(1 THRU 5) TEST#1	20-22030-SVOC-(6 THRU 10) TEST#2	20-22030-SVOC-(11 THRU 15) TEST#3	20-22030-SVOC-(16 THRU 20) BLANK
ALS Sample ID	L2515221-1	L2515221-2	L2515221-3	L2515221-4
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	6-Oct-20	7-Oct-20	8-Oct-20	8-Oct-20
Extraction Date	20-Oct-20	20-Oct-20	20-Oct-20	20-Oct-20
Target Analytes	**pg**	**pg**	**pg**	**pg**
2,3,7,8-TCDD	<2.3	<3.3	<3.2	<2.4
1,2,3,7,8-PeCDD	3.05	<2.0	<3.0	<1.8
1,2,3,4,7,8-HxCDD	3.59	<2.3	<3.1	<1.1
1,2,3,6,7,8-HxCDD	<5.8	<2.3	<4.5	<0.88
1,2,3,7,8,9-HxCDD	5.75	<2.0	<2.7	<0.96
1,2,3,4,6,7,8-HpCDD	40.4	21.2	<22	<2.5
OCDD	46.3	<22	<23	<8.6
2,3,7,8-TCDF	6.20	<3.3	<4.3	<2.3
1,2,3,7,8-PeCDF	7.28	<2.7	<4.4	<1.7
2,3,4,7,8-PeCDF	12.1	<3.5	<5.0	<1.6
1,2,3,4,7,8-HxCDF	<1.8	<2.0	2.98	<1.0
1,2,3,6,7,8-HxCDF	<6.0	<3.0	<2.6	<0.92
2,3,4,6,7,8-HxCDF	<9.9	2.36	<3.0	<1.0
1,2,3,7,8,9-HxCDF	8.12	<4.8	<5.3	4.80
1,2,3,4,6,7,8-HpCDF	<17	6.93	<7.1	<1.3
1,2,3,4,7,8,9-HpCDF	<3.1	<2.8	<1.9	<1.6
OCDF	9.54	4.85	<3.3	<2.1
Field Spike Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**
37Cl4-2,3,7,8-TCDD	87	92	94	84
13C12-1,2,3,4,7,8-HxCDD	101	105	99	83
13C12-2,3,4,7,8-PeCDF	99	103	108	98
13C12-1,2,3,4,7,8-HxCDF	90	94	97	90
13C12-1,2,3,4,7,8,9-HpCDF	84	97	94	84
Extraction Standards				
13C12-2,3,7,8-TCDD	69	64	51	59
13C12-1,2,3,7,8-PeCDD	68	63	48	61
13C12-1,2,3,6,7,8-HxCDD	71	64	55	72
13C12-1,2,3,4,6,7,8-HpCDD	63	61	47	60
13C12-OCDD	57	50	39	49
13C12-2,3,7,8-TCDF	62	60	47	54
13C12-1,2,3,7,8-PeCDF	59	55	43	53
13C12-1,2,3,6,7,8-HxCDF	64	60	49	64
13C12-1,2,3,4,6,7,8-HpCDF	65	59	48	62
Cleanup Standard				
13C12-1,2,3,7,8,9-HxCDF	74	68	62	71
Homologue Group Totals	**pg**	**pg**	**pg**	**pg**
Total-TCDD	<2.3	29.4	23.8	<2.4
Total-PeCDD	73.9	33.7	48.1	<1.8
Total-HxCDD	135	<2.3	62.1	<1.1
Total-HpCDD	78.4	46.0	31.9	<2.5
Total-TCDF	35.1	<3.3	<4.0	<2.3
Total-PeCDF	61.5	<2.7	8.18	<1.7
Total-HxCDF	19.5	5.45	7.86	4.80
Total-HpCDF	<3.1	6.93	<1.9	<1.6
Toxic Equivalency - (WHO 2005)				
Lower Bound PCDD/F TEQ (WHO 2005)	9.69	0.519	0.298	0.480
Mid Point PCDD/F TEQ (WHO 2005)	13.3	5.77	7.60	3.28
Upper Bound PCDD/F TEQ (WHO 2005)	14.5	8.95	11.0	6.08

ALS Life Sciences

Quality Control Summary Report

Sample Name	Method Blank	Laboratory Control Sample
ALS Sample ID	WG3423049-1	WG3423049-2
Sample Size	1	1
Sample size units	Blank	n/a
Percent Moisture	n/a	n/a
Sample Matrix	MEDIA	QC
Sampling Date	n/a	n/a
Extraction Date	20-Oct-20	20-Oct-20
Target Analytes	**pg**	**% Rec**
2,3,7,8-TCDD	<5.5	81
1,2,3,7,8-PeCDD	<4.6	109
1,2,3,4,7,8-HxCDD	<5.1	100
1,2,3,6,7,8-HxCDD	<4.0	113
1,2,3,7,8,9-HxCDD	<4.4	122
1,2,3,4,6,7,8-HpCDD	<4.1	103
OCDD	<17	98
2,3,7,8-TCDF	<4.3	91
1,2,3,7,8-PeCDF	<3.3	98
2,3,4,7,8-PeCDF	<3.2	91
1,2,3,4,7,8-HxCDF	<3.6	96
1,2,3,6,7,8-HxCDF	<3.2	117
2,3,4,6,7,8-HxCDF	<3.5	109
1,2,3,7,8,9-HxCDF	<4.2	120
1,2,3,4,6,7,8-HpCDF	<3.8	101
1,2,3,4,7,8,9-HpCDF	<4.7	90
OCDF	12.2	96
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	50	62
13C12-1,2,3,7,8-PeCDD	43	58
13C12-1,2,3,6,7,8-HxCDD	52	63
13C12-1,2,3,4,6,7,8-HpCDD	45	67
13C12-OCDD	41	56
13C12-2,3,7,8-TCDF	47	56
13C12-1,2,3,7,8-PeCDF	42	55
13C12-1,2,3,6,7,8-HxCDF	51	58
13C12-1,2,3,4,6,7,8-HpCDF	50	68
Cleanup Standard		
13C12-1,2,3,7,8,9-HxCDF	57	73
Homologue Group Totals	**pg**	
Total-TCDD	<5.5	
Total-PeCDD	<4.6	
Total-HxCDD	<5.1	
Total-HpCDD	<4.1	
Total-TCDF	<4.3	
Total-PeCDF	<3.3	
Total-HxCDF	<4.2	
Total-HpCDF	<4.7	
Toxic Equivalency - (WHO 2005)		
Lower Bound PCDD/F TEQ (WHO 2005)	0.00366	
Mid Point PCDD/F TEQ (WHO 2005)	7.27	
Upper Bound PCDD/F TEQ (WHO 2005)	14.5	

ALS Life Sciences

Sample Analysis Report

Sample Name	**20-22030-SVOC-(1 THRU 5) TEST#1**	Sampling Date	6-Oct-20		Approved:
ALS Sample ID	L2515221-1	Extraction Date	20-Oct-20		*E. Sabljic*
Analysis Method	EPA M23	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		16-Nov-2020
Sample Matrix	Stack	Split Ratio	8		

Run Information	**Run 1**
Filename	10-201113A13
Run Date	13-Nov-20 21:25
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-10 DB5MSUSO703636H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<2.3	2.3	U		40
1,2,3,7,8-PeCDD	1	31.57	3.05	2.0	M,J		200
1,2,3,4,7,8-HxCDD	0.1	33.70	3.59	2.1	M,J		200
1,2,3,6,7,8-HxCDD	0.1	33.75	<5.8	1.6	M,J,R	5.8	200
1,2,3,7,8,9-HxCDD	0.1	33.88	5.75	1.8	M,J		200
1,2,3,4,6,7,8-HpCDD	0.01	35.34	40.4	1.9	J		200
OCDD	0.0003	36.78	46.3	2.6	M,J		400
2,3,7,8-TCDF	0.1	26.01	6.20	3.2	J		40
1,2,3,7,8-PeCDF	0.03	30.53	7.28	2.3	J		200
2,3,4,7,8-PeCDF	0.3	31.33	12.1	2.2	J		200
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<1.8	1.8	U		200
1,2,3,6,7,8-HxCDF	0.1	33.26	<6.0	1.6	J,R	6.0	200
2,3,4,6,7,8-HxCDF	0.1	33.61	<9.9	1.8	J,R	9.9	200
1,2,3,7,8,9-HxCDF	0.1	34.03	8.12	2.1	J		200
1,2,3,4,6,7,8-HpCDF	0.01	34.79	<17	2.5	M,J,R	17	200
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<3.1	3.1	U		200
OCDF	0.0003	36.88	9.54	2.2	M,J,B		400

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	1200	26.91	87	70-130
13C12-1,2,3,4,7,8-HxCDD	12000	33.69	101	70-130
13C12-2,3,4,7,8-PeCDF	12000	31.32	99	70-130
13C12-1,2,3,4,7,8-HxCDF	12000	33.18	90	70-130
13C12-1,2,3,4,7,8,9-HpCDF	12000	35.58	84	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	16000	26.88	69	40-130
13C12-1,2,3,7,8-PeCDD	16000	31.55	68	40-130
13C12-1,2,3,6,7,8-HxCDD	16000	33.74	71	40-130
13C12-1,2,3,4,6,7,8-HpCDD	16000	35.33	63	25-130
13C12-OCDD	32000	36.77	57	25-130
13C12-2,3,7,8-TCDF	16000	25.98	62	40-130
13C12-1,2,3,7,8-PeCDF	16000	30.52	59	40-130
13C12-1,2,3,6,7,8-HxCDF	16000	33.25	64	40-130
13C12-1,2,3,4,6,7,8-HpCDF	16000	34.78	65	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	21340	34.01	74	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<2.3	2.3	U	40
Total-PeCDD	5	73.9	2.0		200
Total-HxCDD	5	135	2.1		200
Total-HpCDD	2	78.4	1.9		200
Total-TCDF	6	35.1	3.2		40
Total-PeCDF	7	61.5	2.3		200
Total-HxCDF	2	19.5	2.1		200
Total-HpCDF	0	<3.1	3.1	U	200

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	9.69
Mid Point PCDD/F TEQ (WHO 2005)	13.3
Upper Bound PCDD/F TEQ (WHO 2005)	14.5

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.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
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	**20-22030-SVOC-(6 THRU 10) TEST#2**	Sampling Date	7-Oct-20		Approved:
ALS Sample ID	L2515221-2	Extraction Date	20-Oct-20		*E. Sabljic*
Analysis Method	EPA M23	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		16-Nov-2020
Sample Matrix	Stack	Split Ratio	8		

Run Information	**Run 1**
Filename	10-201113A14
Run Date	13-Nov-20 22:06
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-10 DB5MSUSO703636H

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	<2.0	2.0	U		200
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<2.3	2.3	U		200
1,2,3,6,7,8-HxCDD	0.1	33.74	<2.3	1.8	M,J,R	2.3	200
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<2.0	2.0	U		200
1,2,3,4,6,7,8-HpCDD	0.01	35.33	21.2	2.3	J		200
OCDD	0.0003	36.77	<22	3.4	M,J,R	22	400
2,3,7,8-TCDF	0.1	NotFnd	<3.3	3.3	U		40
1,2,3,7,8-PeCDF	0.03	30.53	<2.7	2.7	M,U	2.4	200
2,3,4,7,8-PeCDF	0.3	31.33	<3.5	2.6	M,J,R	3.5	200
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<2.0	2.0	U		200
1,2,3,6,7,8-HxCDF	0.1	33.25	<3.0	1.8	M,J,R	3.0	200
2,3,4,6,7,8-HxCDF	0.1	33.61	2.36	2.0	M,J		200
1,2,3,7,8,9-HxCDF	0.1	34.01	<4.8	2.4	M,J,R	4.8	200
1,2,3,4,6,7,8-HpCDF	0.01	34.77	6.93	2.3	M,J		200
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<2.8	2.8	U		200
OCDF	0.0003	36.85	4.85	3.8	M,J,B		400
Field Spike Standards	**pg**		**% Rec**	**Limits**			
37Cl4-2,3,7,8-TCDD	1200	26.90	92	70-130			
13C12-1,2,3,4,7,8-HxCDD	12000	33.68	105	70-130			
13C12-2,3,4,7,8-PeCDF	12000	31.31	103	70-130			
13C12-1,2,3,4,7,8-HxCDF	12000	33.17	94	70-130			
13C12-1,2,3,4,7,8,9-HpCDF	12000	35.56	97	70-130			
Extraction Standards							
13C12-2,3,7,8-TCDD	16000	26.87	64	40-130			
13C12-1,2,3,7,8-PeCDD	16000	31.54	63	40-130			
13C12-1,2,3,6,7,8-HxCDD	16000	33.73	64	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	16000	35.32	61	25-130			
13C12-OCDD	32000	36.76	50	25-130			
13C12-2,3,7,8-TCDF	16000	25.98	60	40-130			
13C12-1,2,3,7,8-PeCDF	16000	30.51	55	40-130			
13C12-1,2,3,6,7,8-HxCDF	16000	33.24	60	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	16000	34.77	59	25-130			
Cleanup Standard	**pg**						
13C12-1,2,3,7,8,9-HxCDF	21340	34.00	68	40-130			

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	2	29.4	3.3		40
Total-PeCDD	2	33.7	2.0		200
Total-HxCDD	0	<2.3	2.3	U	200
Total-HpCDD	2	46.0	2.3		200
Total-TCDF	0	<3.3	3.3	U	40
Total-PeCDF	0	<2.7	2.7	U	200
Total-HxCDF	2	5.45	2.4		200
Total-HpCDF	1	6.93	2.8		200

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.519
Mid Point PCDD/F TEQ (WHO 2005)	5.77
Upper Bound PCDD/F TEQ (WHO 2005)	8.95

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.
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.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
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	**20-22030-SVOC-(11 THRU 15) TEST#3**	Sampling Date	8-Oct-20		
ALS Sample ID	L2515221-3	Extraction Date	20-Oct-20		Approved:
Analysis Method	EPA M23	Sample Size	1	Sample	*E. Sabljic*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	Stack	Split Ratio	8		16-Nov-2020

Run Information	**Run 1**
Filename	10-201113A15
Run Date	13-Nov-20 22:48
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-10 DB5MSUSO703636H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<3.2	3.2	U		40
1,2,3,7,8-PeCDD	1	NotFnd	<3.0	3.0	U		200
1,2,3,4,7,8-HxCDD	0.1	33.69	<3.1	3.1	M,U	1.8	200
1,2,3,6,7,8-HxCDD	0.1	33.74	<4.5	2.4	M,J,R	4.5	200
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<2.7	2.7	U		200
1,2,3,4,6,7,8-HpCDD	0.01	35.33	<22	2.0	J,R	22	200
OCDD	0.0003	36.77	<23	2.8	M,J,R	23	400
2,3,7,8-TCDF	0.1	26.01	<4.3	4.0	M,J,R	4.3	40
1,2,3,7,8-PeCDF	0.03	30.53	<4.4	3.6	M,J,R	4.4	200
2,3,4,7,8-PeCDF	0.3	31.33	<5.0	3.4	M,J,R	5.0	200
1,2,3,4,7,8-HxCDF	0.1	33.19	2.98	2.6	M,J		200
1,2,3,6,7,8-HxCDF	0.1	33.24	<2.6	2.3	M,J,R	2.6	200
2,3,4,6,7,8-HxCDF	0.1	33.61	<3.0	2.5	M,J,R	3.0	200
1,2,3,7,8,9-HxCDF	0.1	34.01	<5.3	3.0	J,R	5.3	200
1,2,3,4,6,7,8-HpCDF	0.01	34.77	<7.1	1.5	M,J,R	7.1	200
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.9	1.9	U		200
OCDF	0.0003	36.85	<3.3	3.3	M,J,R	3.3	400
Field Spike Standards	**pg**		**% Rec**	**Limits**			
37Cl4-2,3,7,8-TCDD	1200	26.90	94	70-130			
13C12-1,2,3,4,7,8-HxCDD	12000	33.68	99	70-130	R		
13C12-2,3,4,7,8-PeCDF	12000	31.31	108	70-130			
13C12-1,2,3,4,7,8-HxCDF	12000	33.17	97	70-130			
13C12-1,2,3,4,7,8,9-HpCDF	12000	35.57	94	70-130			
Extraction Standards							
13C12-2,3,7,8-TCDD	16000	26.87	51	40-130			
13C12-1,2,3,7,8-PeCDD	16000	31.54	48	40-130			
13C12-1,2,3,6,7,8-HxCDD	16000	33.73	55	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	16000	35.32	47	25-130			
13C12-OCDD	32000	36.76	39	25-130			
13C12-2,3,7,8-TCDF	16000	25.98	47	40-130			
13C12-1,2,3,7,8-PeCDF	16000	30.51	43	40-130			
13C12-1,2,3,6,7,8-HxCDF	16000	33.24	49	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	16000	34.77	48	25-130			
Cleanup Standard	**pg**						
13C12-1,2,3,7,8,9-HxCDF	21340	34.00	62	40-130			

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		**LQL**
Total-TCDD	1	23.8	3.2		40
Total-PeCDD	3	48.1	3.0		200
Total-HxCDD	1	62.1	3.1		200
Total-HpCDD	1	31.9	2.0		200
Total-TCDF	0	<4.0	4.0	U	40
Total-PeCDF	2	8.18	3.6		200
Total-HxCDF	2	7.86	3.0		200
Total-HpCDF	0	<1.9	1.9	U	200

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.298
Mid Point PCDD/F TEQ (WHO 2005)	7.60
Upper Bound PCDD/F TEQ (WHO 2005)	11.0

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
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	**20-22030-SVOC-(16 THRU 20) BLANK**	Sampling Date	8-Oct-20		Approved:
ALS Sample ID	L2515221-4	Extraction Date	20-Oct-20		*E. Sabljic*
Analysis Method	EPA M23	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		16-Nov-2020
Sample Matrix	Stack	Split Ratio	8		

Run Information	**Run 1**
Filename	10-201113A16
Run Date	13-Nov-20 23:30
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-10 DB5MSUSO703636H

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	<1.8	1.8	U		200
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<1.1	1.1	U		200
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<0.88	0.88	U		200
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.96	0.96	U		200
1,2,3,4,6,7,8-HpCDD	0.01	NotFnd	<2.5	2.5	U		200
OCDD	0.0003	36.78	<8.6	2.5	M,J,R	8.6	400
2,3,7,8-TCDF	0.1	NotFnd	<2.3	2.3	U		40
1,2,3,7,8-PeCDF	0.03	NotFnd	<1.7	1.7	U		200
2,3,4,7,8-PeCDF	0.3	NotFnd	<1.6	1.6	U		200
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<1.0	1.0	U		200
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.92	0.92	U		200
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<1.0	1.0	U		200
1,2,3,7,8,9-HxCDF	0.1	34.03	4.80	1.2	M,J		200
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<1.3	1.3	U		200
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.6	1.6	U		200
OCDF	0.0003	NotFnd	<2.1	2.1	U		400
Field Spike Standards	**pg**		**% Rec**	**Limits**			
37Cl4-2,3,7,8-TCDD	1200	26.91	84	70-130			
13C12-1,2,3,4,7,8-HxCDD	12000	33.69	83	70-130			
13C12-2,3,4,7,8-PeCDF	12000	31.32	98	70-130			
13C12-1,2,3,4,7,8-HxCDF	12000	33.18	90	70-130			
13C12-1,2,3,4,7,8,9-HpCDF	12000	35.57	84	70-130			
Extraction Standards							
13C12-2,3,7,8-TCDD	16000	26.88	59	40-130			
13C12-1,2,3,7,8-PeCDD	16000	31.55	61	40-130			
13C12-1,2,3,6,7,8-HxCDD	16000	33.74	72	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	16000	35.33	60	25-130			
13C12-OCDD	32000	36.77	49	25-130			
13C12-2,3,7,8-TCDF	16000	25.98	54	40-130			
13C12-1,2,3,7,8-PeCDF	16000	30.52	53	40-130			
13C12-1,2,3,6,7,8-HxCDF	16000	33.25	64	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	16000	34.78	62	25-130			
Cleanup Standard	**pg**						
13C12-1,2,3,7,8,9-HxCDF	21340	34.01	71	40-130			

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<2.4	2.4	U	40
Total-PeCDD	0	<1.8	1.8	U	200
Total-HxCDD	0	<1.1	1.1	U	200
Total-HpCDD	0	<2.5	2.5	U	200
Total-TCDF	0	<2.3	2.3	U	40
Total-PeCDF	0	<1.7	1.7	U	200
Total-HxCDF	1	4.80	1.2		200
Total-HpCDF	0	<1.6	1.6	U	200

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.480
Mid Point PCDD/F TEQ (WHO 2005)	3.28
Upper Bound PCDD/F TEQ (WHO 2005)	6.08

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	WG3423049-1	Extraction Date	20-Oct-20		Approved:
Analysis Method	EPA M23	Sample Size	1	Blank	*E. Sabljic*
Analysis Type	Blank	Percent Moisture	n/a		--e-signature--
Sample Matrix	MEDIA	Split Ratio	8		16-Nov-2020

Run Information	**Run 1**
Filename	10-201113A11
Run Date	13-Nov-20 20:01
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-10 DB5MSUSO703636H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<5.5	5.5	U		40
1,2,3,7,8-PeCDD	1	NotFnd	<4.6	4.6	U		200
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<5.1	5.1	U		200
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<4.0	4.0	U		200
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<4.4	4.4	U		200
1,2,3,4,6,7,8-HpCDD	0.01	NotFnd	<4.1	4.1	U		200
OCDD	0.0003	36.79	<17	4.4	M,J,R	17	400
2,3,7,8-TCDF	0.1	NotFnd	<4.3	4.3	U		40
1,2,3,7,8-PeCDF	0.03	NotFnd	<3.3	3.3	U		200
2,3,4,7,8-PeCDF	0.3	NotFnd	<3.2	3.2	U		200
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<3.6	3.6	U		200
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<3.2	3.2	U		200
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<3.5	3.5	U		200
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<4.2	4.2	U		200
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<3.8	3.8	U		200
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<4.7	4.7	U		200
OCDF	0.0003	36.88	12.2	5.2	M,J		400

Field Spike Standards	**pg**	**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	0	NS	
13C12-1,2,3,4,7,8-HxCDD	0	NS	
13C12-2,3,4,7,8-PeCDF	0	NS	
13C12-1,2,3,4,7,8-HxCDF	0	NS	
13C12-1,2,3,4,7,8,9-HpCDF	0	NS	

Extraction Standards				
13C12-2,3,7,8-TCDD	16000	26.90	50	40-130
13C12-1,2,3,7,8-PeCDD	16000	31.56	43	40-130
13C12-1,2,3,6,7,8-HxCDD	16000	33.75	52	40-130
13C12-1,2,3,4,6,7,8-HpCDD	16000	35.34	45	25-130
13C12-OCDD	32000	36.78	41	25-130
13C12-2,3,7,8-TCDF	16000	26.01	47	40-130
13C12-1,2,3,7,8-PeCDF	16000	30.53	42	40-130
13C12-1,2,3,6,7,8-HxCDF	16000	33.25	51	40-130
13C12-1,2,3,4,6,7,8-HpCDF	16000	34.78	50	25-130

Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	21340	34.03	57	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<5.5	5.5	U	40
Total-PeCDD	0	<4.6	4.6	U	200
Total-HxCDD	0	<5.1	5.1	U	200
Total-HpCDD	0	<4.1	4.1	U	200
Total-TCDF	0	<4.3	4.3	U	40
Total-PeCDF	0	<3.3	3.3	U	200
Total-HxCDF	0	<4.2	4.2	U	200
Total-HpCDF	0	<4.7	4.7	U	200

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.00366
Mid Point PCDD/F TEQ (WHO 2005)	7.27
Upper Bound PCDD/F TEQ (WHO 2005)	14.5

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
NS	Indicates that this standard has not been added.

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a		
ALS Sample ID	WG3423049-2	Extraction Date	20-Oct-20		Approved:
Analysis Method	EPA M23	Sample Size	1	n/a	*E. Sabljic*
Analysis Type	LCS	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	8		16-Nov-2020

Run Information	**Run 1**
Filename	10-201113A08
Run Date	13-Nov-20 17:58
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-10 DB5MSUSO703636H

Target Analytes	**pg**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	1600	26.93	81	70-130	
1,2,3,7,8-PeCDD	8000	31.56	109	70-130	
1,2,3,4,7,8-HxCDD	8000	33.70	100	70-130	
1,2,3,6,7,8-HxCDD	8000	33.75	113	70-130	
1,2,3,7,8,9-HxCDD	8000	33.88	122	70-130	
1,2,3,4,6,7,8-HpCDD	8000	35.33	103	70-130	
OCDD	16000	36.77	98	70-130	
2,3,7,8-TCDF	1600	26.02	91	70-130	
1,2,3,7,8-PeCDF	8000	30.54	98	70-130	
2,3,4,7,8-PeCDF	8000	31.34	91	70-130	
1,2,3,4,7,8-HxCDF	8000	33.19	96	70-130	
1,2,3,6,7,8-HxCDF	8000	33.25	117	70-130	
2,3,4,6,7,8-HxCDF	8000	33.60	109	70-130	
1,2,3,7,8,9-HxCDF	8000	34.03	120	70-130	
1,2,3,4,6,7,8-HpCDF	8000	34.78	101	70-130	
1,2,3,4,7,8,9-HpCDF	8000	35.58	90	70-130	
OCDF	16000	36.86	96	70-130	
Field Spike Standards	**pg**		**% Rec**	**Limits**	
37Cl4-2,3,7,8-TCDD	0		NS		
13C12-1,2,3,4,7,8-HxCDD	0		NS		
13C12-2,3,4,7,8-PeCDF	0		NS		
13C12-1,2,3,4,7,8-HxCDF	0		NS		
13C12-1,2,3,4,7,8,9-HpCDF	0		NS		
Extraction Standards					
13C12-2,3,7,8-TCDD	16000	26.90	62	40-130	
13C12-1,2,3,7,8-PeCDD	16000	31.55	58	40-130	
13C12-1,2,3,6,7,8-HxCDD	16000	33.74	63	40-130	
13C12-1,2,3,4,6,7,8-HpCDD	16000	35.33	67	25-130	
13C12-OCDD	32000	36.77	56	25-130	
13C12-2,3,7,8-TCDF	16000	26.01	56	40-130	
13C12-1,2,3,7,8-PeCDF	16000	30.53	55	40-130	
13C12-1,2,3,6,7,8-HxCDF	16000	33.24	58	40-130	
13C12-1,2,3,4,6,7,8-HpCDF	16000	34.77	68	25-130	
Cleanup Standard	**pg**				
13C12-1,2,3,7,8,9-HxCDF	21340	34.01	73	40-130	

NS Indicates that this standard has not been added.

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:	Alastair Blythe	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2515221		Mississauga, ON L5J 2Y4
Date of Report	9-Nov-20		Canada
Date of Sample Receipt	9-Oct-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 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:

Ron McLeod, PhD
Director, Air Toxics & Special Chemistries, Life Sciences

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	20-22030-SVOC-(1 THRU 5) TEST#1	20-22030-SVOC-(6 THRU 10) TEST#2	20-22030-SVOC-(11 THRU 15) TEST#3	20-22030-SVOC-(16 THRU 20) BLANK
ALS Sample ID	L2515221-1	L2515221-2	L2515221-3	L2515221-4
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	6-Oct-20	7-Oct-20	8-Oct-20	8-Oct-20
Extraction Date	20-Oct-20	20-Oct-20	20-Oct-20	20-Oct-20
Target Analytes	**pg**	**pg**	**pg**	**pg**
PCB-081	<10	<13	12.6	<5.7
PCB-077	2550	2140	202	36.7
PCB-123	2310	156	54.2	<17
PCB-118	129000	8870	4800	1240
PCB-114	3420	216	109	32.2
PCB-105	38000	2500	1580	416
PCB-126	36.8	<34	<6.7	<2.9
PCB-167	535	63.5	42.4	13.7
PCB-156/157	1340	176	108	40.3
PCB-169	<7.8	<4.9	<4.3	<2.0
PCB-189	<6.7	5.60	<3.5	<1.3
Extraction Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**
13C12-PCB-081	71	62	54	64
13C12-PCB-077	76	71	61	75
13C12-PCB-123	69	59	52	61
13C12-PCB-118	68	57	51	59
13C12-PCB-114	67	57	51	59
13C12-PCB-105	73	66	58	70
13C12-PCB-126	73	65	58	69
13C12-PCB-167	79	67	60	71
13C12-PCB-156/157	76	62	56	67
13C12-PCB-169	89	75	69	80
13C12-PCB-189	80	66	61	71
Field Spike Standards				
13C12-PCB-031	132	95	96	95
13C12-PCB-095	118	73	73	64
13C12-PCB-153	136	103	103	100
Cleanup Standards				
13C12-PCB-028	89	83	73	82
13C12-PCB-111	108	97	94	98
13C12-PCB-178	118	99	98	102

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Sample Analysis Summary Report

Sample Name	20-22030-SVOC-(1 THRU 5) TEST#1	20-22030-SVOC-(6 THRU 10) TEST#2	20-22030-SVOC-(11 THRU 15) TEST#3	20-22030-SVOC-(16 THRU 20) BLANK
ALS Sample ID	L2515221-1	L2515221-2	L2515221-3	L2515221-4
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	6-Oct-20	7-Oct-20	8-Oct-20	8-Oct-20
Extraction Date	20-Oct-20	20-Oct-20	20-Oct-20	20-Oct-20
Target Analytes	**pg**	**pg**	**pg**	**pg**
Homologue Group Totals				
Total MonoCB	2470	1320	3720	36.5
Total DiCB	21000	10700	8610	759
Total TriCB	48200	12200	4940	814
Total TetraCB	975000	64900	29900	4040
Total PentaCB	2230000	79900	41100	10800
Total HexaCB	342000	12100	7560	2920
Total HeptaCB	14700	1150	714	301
Total OctaCB	1180	278	118	52.3
Total NonaCB	94.2	21.5	<7.5	<6.9
DecaCB	27.7	23.0	25.0	20.1
Total PCB	3640000	183000	96600	19700
Toxic Equivalency - (WHO 2005)				
Lower Bound PCB TEQ	9.17	0.574	0.225	0.0559
Mid Point PCB TEQ	9.41	4.12	0.689	0.232
Upper Bound PCB TEQ	9.41	4.12	1.02	0.408

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Quality Control Summary Report

Sample Name	Method Blank
ALS Sample ID	WG3423049-1
Sample Size	1
Sample size units	Sample
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	20-Oct-20

Target Analytes	pg
PCB-081	<4.9
PCB-077	<4.5
PCB-123	<3.0
PCB-118	15.1
PCB-114	<3.1
PCB-105	7.66
PCB-126	<3.1
PCB-167	<2.3
PCB-156/157	3.32
PCB-169	<2.4
PCB-189	<2.2
Extraction Standards	**% Rec**
13C12-PCB-081	57
13C12-PCB-077	67
13C12-PCB-123	52
13C12-PCB-118	51
13C12-PCB-114	50
13C12-PCB-105	61
13C12-PCB-126	59
13C12-PCB-167	56
13C12-PCB-156/157	53
13C12-PCB-169	64
13C12-PCB-189	57
Field Spike Standards	
13C12-PCB-031	NS
13C12-PCB-095	NS
13C12-PCB-153	NS
Cleanup Standards	
13C12-PCB-028	69
13C12-PCB-111	85
13C12-PCB-178	83

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Quality Control Summary Report

Sample Name	Method Blank
ALS Sample ID	WG3423049-1
Sample Size	1
Sample size units	Sample
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	20-Oct-20

Target Analytes	pg
Homologue Group Totals	
Total MonoCB	8.52
Total DiCB	97.1
Total TriCB	95.1
Total TetraCB	69.1
Total PentaCB	93.0
Total HexaCB	30.5
Total HeptaCB	<1.5
Total OctaCB	5.81
Total NonaCB	<7.3
DecaCB	23.0
Total PCB	422
Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.000782
Mid Point PCB TEQ	0.193
Upper Bound PCB TEQ	0.385

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Sample Analysis Summary Report

Sample Name	Laboratory Control Sample
ALS Sample ID	WG3423049-2
Sample Size	1
Sample size units	n/a
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	20-Oct-20

Target Analytes	% Rec
PCB-081	99
PCB-077	97
PCB-123	100
PCB-118	98
PCB-114	100
PCB-105	99
PCB-126	101
PCB-167	96
PCB-156/157	96
PCB-169	97
PCB-189	100
Extraction Standards	**% Rec**
13C12-PCB-081	64
13C12-PCB-077	74
13C12-PCB-123	64
13C12-PCB-118	63
13C12-PCB-114	61
13C12-PCB-105	71
13C12-PCB-126	70
13C12-PCB-167	72
13C12-PCB-156/157	66
13C12-PCB-169	79
13C12-PCB-189	75
Field Spike Standards	
13C12-PCB-031	NS
13C12-PCB-095	NS
13C12-PCB-153	NS
Cleanup Standards	
13C12-PCB-028	78
13C12-PCB-111	99
13C12-PCB-178	104

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Sample Analysis Report

Sample Name	**20-22030-SVOC-(1 THRU 5) TEST#1**	Sampling Date	6-Oct-20		Approved:
ALS Sample ID	L2515221-1	Extraction Date	20-Oct-20		*S. Jin*
Analysis Method	EPA 1668C	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		06-Nov-2020
Sample Matrix	Stack	Split Ratio	8		

Run Information	**Run 1**
Filename	5-201102A13
Run Date	02-Nov-20 17:24
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	NotFnd	<10	10	U		200
PCB-077	0.0001	22.08	2550	10	M		200
PCB-123	0.00003	23.08	2310	8.9			200
PCB-118	0.00003	23.26	129000	7.9			200
PCB-114	0.00003	23.55	3420	8.8			200
PCB-105	0.00003	23.89	38000	8.4			200
PCB-126	0.1	25.51	36.8	8.9	M,J		200
PCB-167	0.00003	26.41	535	5.0			200
PCB-156/157	0.00003	27.03	1340	6.7			400
PCB-169	0.03	28.69	<7.8	5.1	M,J,R	7.8	200
PCB-189	0.00003	29.99	<6.7	2.0	J,R	6.7	200

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	16000	21.76	71	10-145
13C12-PCB-077	16000	22.06	76	10-145
13C12-PCB-123	16000	23.08	69	10-145
13C12-PCB-118	16000	23.25	68	10-145
13C12-PCB-114	16000	23.54	67	10-145
13C12-PCB-105	16000	23.88	73	10-145
13C12-PCB-126	16000	25.48	73	10-145
13C12-PCB-167	16000	26.40	79	10-145
13C12-PCB-156/157	32000	27.02	76	10-145
13C12-PCB-169	16000	28.69	89	10-145
13C12-PCB-189	16000	29.97	80	10-145
Field Spike Standards				
13C12-PCB-031	12000	15.76	132	50-150
13C12-PCB-095	12000	19.07	118	50-150
13C12-PCB-153	12000	24.19	136	50-150
Cleanup Standards				
13C12-PCB-028	16000	15.93	89	5-145
13C12-PCB-111	16000	22.02	108	10-145
13C12-PCB-178	16000	25.07	118	10-145

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Sample Analysis Report

Sample Name	**20-22030-SVOC-(1 THRU 5) TEST#1**	Sampling Date	6-Oct-20		Approved:
ALS Sample ID	L2515221-1	Extraction Date	20-Oct-20		*S. Jin*
Analysis Method	EPA 1668C	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		06-Nov-2020
Sample Matrix	Stack	Split Ratio	8		

Run Information	**Run 1**
Filename	5-201102A13
Run Date	02-Nov-20 17:24
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
Homologue Group Totals							
Total MonoCB			2470	4.1	J		800
Total DiCB			21000	4.3	J		1600
Total TriCB			48200	3.5	J		1600
Total TetraCB			975000	3.1	J		3200
Total PentaCB			2230000	1.6	J		3200
Total HexaCB			342000	1.4	J		3200
Total HeptaCB			14700	1.7	J		1600
Total OctaCB			1180	1.1	J		1600
Total NonaCB			94.2	6.1	J		800
DecaCB			27.7	2.2	J		800
Total PCB			3640000		J		6400
Toxic Equivalency - (WHO 2005)							
Lower Bound PCB TEQ			9.17				
Mid Point PCB TEQ			9.41				
Upper Bound PCB TEQ			9.41				

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

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Sample Analysis Report

Sample Name	**20-22030-SVOC-(6 THRU 10) TEST#2**	Sampling Date	7-Oct-20		
ALS Sample ID	L2515221-2	Extraction Date	20-Oct-20		Approved:
Analysis Method	EPA 1668C	Sample Size	1	Sample	*S. Jin*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	Stack	Split Ratio	8		06-Nov-2020

Run Information	**Run 1**
Filename	5-201102A14
Run Date	02-Nov-20 18:07
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	21.78	<13	8.5	M,J,R	13	200
PCB-077	0.0001	22.08	2140	7.7			200
PCB-123	0.00003	23.07	156	5.0	M,J		200
PCB-118	0.00003	23.26	8870	4.8	M		200
PCB-114	0.00003	23.55	216	5.1	M		200
PCB-105	0.00003	23.90	2500	4.6			200
PCB-126	0.1	25.50	<34	5.0	M,J,R	34	200
PCB-167	0.00003	26.43	63.5	3.0	J		200
PCB-156/157	0.00003	27.03	176	4.0	J		400
PCB-169	0.03	28.70	<4.9	3.1	M,J,R	4.9	200
PCB-189	0.00003	30.00	5.60	2.1	M,J		200

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	16000	21.77	62	10-145
13C12-PCB-077	16000	22.07	71	10-145
13C12-PCB-123	16000	23.08	59	10-145
13C12-PCB-118	16000	23.25	57	10-145
13C12-PCB-114	16000	23.54	57	10-145
13C12-PCB-105	16000	23.89	66	10-145
13C12-PCB-126	16000	25.48	65	10-145
13C12-PCB-167	16000	26.40	67	10-145
13C12-PCB-156/157	32000	27.03	62	10-145
13C12-PCB-169	16000	28.69	75	10-145
13C12-PCB-189	16000	29.99	66	10-145
Field Spike Standards				
13C12-PCB-031	12000	15.76	95	50-150
13C12-PCB-095	12000	19.07	73	50-150
13C12-PCB-153	12000	24.19	103	50-150
Cleanup Standards				
13C12-PCB-028	16000	15.93	83	5-145
13C12-PCB-111	16000	22.02	97	10-145
13C12-PCB-178	16000	25.07	99	10-145

ALS Life Sciences

Sample Analysis Report

Sample Name	**20-22030-SVOC-(6 THRU 10) TEST#2**	Sampling Date	7-Oct-20		Approved:
ALS Sample ID	L2515221-2	Extraction Date	20-Oct-20		*S. Jin*
Analysis Method	EPA 1668C	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		06-Nov-2020
Sample Matrix	Stack	Split Ratio	8		

Run Information	**Run 1**
Filename	5-201102A14
Run Date	02-Nov-20 18:07
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
Homologue Group Totals							
Total MonoCB			1320	2.4	J		800
Total DiCB			10700	4.7	J		1600
Total TriCB			12200	2.8	J		1600
Total TetraCB			64900	3.7	J		3200
Total PentaCB			79900	3.0	J		3200
Total HexaCB			12100	1.2	J		3200
Total HeptaCB			1150	1.6	J		1600
Total OctaCB			278	1.1	J		1600
Total NonaCB			21.5	6.7	J		800
DecaCB			23.0	2.0	J		800
Total PCB			183000		J		6400
Toxic Equivalency - (WHO 2005)							
Lower Bound PCB TEQ			0.574				
Mid Point PCB TEQ			4.12				
Upper Bound PCB TEQ			4.12				

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.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**20-22030-SVOC-(11 THRU 15) TEST#3**	Sampling Date	8-Oct-20		Approved:
ALS Sample ID	L2515221-3	Extraction Date	20-Oct-20		*S. Jin*
Analysis Method	EPA 1668C	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		06-Nov-2020
Sample Matrix	Stack	Split Ratio	8		

Run Information	**Run 1**
Filename	5-201102A15
Run Date	02-Nov-20 18:49
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	21.76	12.6	8.7	M,J		200
PCB-077	0.0001	22.07	202	8.1			200
PCB-123	0.00003	23.07	54.2	6.6	M,J		200
PCB-118	0.00003	23.25	4800	6.2			200
PCB-114	0.00003	23.54	109	6.7	J		200
PCB-105	0.00003	23.89	1580	6.0			200
PCB-126	0.1	25.48	<6.7	6.7	M,U	2.7	200
PCB-167	0.00003	26.40	42.4	3.2	J		200
PCB-156/157	0.00003	27.02	108	4.3	M,J		400
PCB-169	0.03	28.67	<4.3	3.2	M,J,R	4.3	200
PCB-189	0.00003	29.99	<3.5	1.9	M,J,R	3.5	200

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	16000	21.76	54	10-145
13C12-PCB-077	16000	22.06	61	10-145
13C12-PCB-123	16000	23.07	52	10-145
13C12-PCB-118	16000	23.24	51	10-145
13C12-PCB-114	16000	23.54	51	10-145
13C12-PCB-105	16000	23.88	58	10-145
13C12-PCB-126	16000	25.47	58	10-145
13C12-PCB-167	16000	26.39	60	10-145
13C12-PCB-156/157	32000	27.02	56	10-145
13C12-PCB-169	16000	28.67	69	10-145
13C12-PCB-189	16000	29.97	61	10-145
Field Spike Standards				
13C12-PCB-031	12000	15.75	96	50-150
13C12-PCB-095	12000	19.06	73	50-150
13C12-PCB-153	12000	24.18	103	50-150
Cleanup Standards				
13C12-PCB-028	16000	15.92	73	5-145
13C12-PCB-111	16000	22.01	94	10-145
13C12-PCB-178	16000	25.06	98	10-145

ALS Life Sciences

Sample Analysis Report

Sample Name	**20-22030-SVOC-(11 THRU 15) TEST#3**	Sampling Date	8-Oct-20		Approved:
ALS Sample ID	L2515221-3	Extraction Date	20-Oct-20		*S. Jin*
Analysis Method	EPA 1668C	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		06-Nov-2020
Sample Matrix	Stack	Split Ratio	8		

Run Information	**Run 1**
Filename	5-201102A15
Run Date	02-Nov-20 18:49
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
Homologue Group Totals							
Total MonoCB			3720	3.5	J		800
Total DiCB			8610	6.3	J		1600
Total TriCB			4940	3.5	J		1600
Total TetraCB			29900	5.8	J		3200
Total PentaCB			41100	3.3	J		3200
Total HexaCB			7560	1.4	J		3200
Total HeptaCB			714	1.7	J		1600
Total OctaCB			118	1.6	J		1600
Total NonaCB			<7.5	7.5	U		800
DecaCB			25.0	2.7	J		800
Total PCB			96600		J		6400
Toxic Equivalency - (WHO 2005)							
Lower Bound PCB TEQ			0.225				
Mid Point PCB TEQ			0.689				
Upper Bound PCB TEQ			1.02				

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.
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	**20-22030-SVOC-(16 THRU 20) BLANK**	Sampling Date	8-Oct-20		
ALS Sample ID	L2515221-4	Extraction Date	20-Oct-20		Approved:
Analysis Method	EPA 1668C	Sample Size	1	Sample	*S. Jin*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	Stack	Split Ratio	8		06-Nov-2020

Run Information	**Run 1**
Filename	5-201102A12
Run Date	02-Nov-20 16:42
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	NotFnd	<5.7	5.7	U		200
PCB-077	0.0001	22.07	36.7	5.1	J		200
PCB-123	0.00003	23.08	<17	2.9	J,R	17	200
PCB-118	0.00003	23.26	1240	2.9			200
PCB-114	0.00003	23.55	32.2	2.9	J		200
PCB-105	0.00003	23.89	416	2.6			200
PCB-126	0.1	NotFnd	<2.9	2.9	U		200
PCB-167	0.00003	26.40	13.7	1.9	M,J		200
PCB-156/157	0.00003	27.02	40.3	2.5	J		400
PCB-169	0.03	28.69	<2.0	2.0	M,U	1.4	200
PCB-189	0.00003	NotFnd	<1.3	1.3	U		200

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	16000	21.76	64	10-145
13C12-PCB-077	16000	22.06	75	10-145
13C12-PCB-123	16000	23.07	61	10-145
13C12-PCB-118	16000	23.24	59	10-145
13C12-PCB-114	16000	23.54	59	10-145
13C12-PCB-105	16000	23.88	70	10-145
13C12-PCB-126	16000	25.48	69	10-145
13C12-PCB-167	16000	26.40	71	10-145
13C12-PCB-156/157	32000	27.02	67	10-145
13C12-PCB-169	16000	28.69	80	10-145
13C12-PCB-189	16000	29.97	71	10-145
Field Spike Standards				
13C12-PCB-031	12000	15.75	95	50-150
13C12-PCB-095	12000	19.07	64	50-150
13C12-PCB-153	12000	24.19	100	50-150
Cleanup Standards				
13C12-PCB-028	16000	15.93	82	5-145
13C12-PCB-111	16000	22.01	98	10-145
13C12-PCB-178	16000	25.07	102	10-145

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Sample Analysis Report

Sample Name	**20-22030-SVOC-(16 THRU 20) BLANK**	Sampling Date	8-Oct-20		Approved:
ALS Sample ID	L2515221-4	Extraction Date	20-Oct-20		*S. Jin*
Analysis Method	EPA 1668C	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		06-Nov-2020
Sample Matrix	Stack	Split Ratio	8		

Run Information	**Run 1**
Filename	5-201102A12
Run Date	02-Nov-20 16:42
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
Homologue Group Totals							
Total MonoCB			36.5	1.9	J		800
Total DiCB			759	3.9	J		1600
Total TriCB			814	2.0	J		1600
Total TetraCB			4040	3.2	J		3200
Total PentaCB			10800	1.6	J		3200
Total HexaCB			2920	0.86	J		3200
Total HeptaCB			301	1.1	J		1600
Total OctaCB			52.3	1.2	J		1600
Total NonaCB			<6.9	6.9	U		800
DecaCB			20.1	2.3	J		800
Total PCB			19700		J		6400
Toxic Equivalency - (WHO 2005)							
Lower Bound PCB TEQ			0.0559				
Mid Point PCB TEQ			0.232				
Upper Bound PCB TEQ			0.408				

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

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a		
ALS Sample ID	WG3423049-1	Extraction Date	20-Oct-20		Approved:
Analysis Method	EPA 1668C	Sample Size	1	Sample	*S. Jin*
Analysis Type	Blank	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	8		06-Nov-2020

Run Information	**Run 1**
Filename	5-201102A05
Run Date	02-Nov-20 11:47
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-081	0.0003	NotFnd	<4.9	4.9	U		200
PCB-077	0.0001	NotFnd	<4.5	4.5	U		200
PCB-123	0.00003	NotFnd	<3.0	3.0	U		200
PCB-118	0.00003	23.28	15.1	3.0	M,J		200
PCB-114	0.00003	NotFnd	<3.1	3.1	U		200
PCB-105	0.00003	23.91	7.66	2.7	J		200
PCB-126	0.1	NotFnd	<3.1	3.1	U		200
PCB-167	0.00003	NotFnd	<2.3	2.3	U		200
PCB-156/157	0.00003	27.04	3.32	3.1	M,J		400
PCB-169	0.03	NotFnd	<2.4	2.4	U		200
PCB-189	0.00003	NotFnd	<2.2	2.2	U		200

Extraction Standards	pg	Time	% Rec	Limits
13C12-PCB-081	16000	21.79	57	10-145
13C12-PCB-077	16000	22.08	67	10-145
13C12-PCB-123	16000	23.09	52	10-145
13C12-PCB-118	16000	23.26	51	10-145
13C12-PCB-114	16000	23.56	50	10-145
13C12-PCB-105	16000	23.90	61	10-145
13C12-PCB-126	16000	25.51	59	10-145
13C12-PCB-167	16000	26.43	56	10-145
13C12-PCB-156/157	32000	27.04	53	10-145
13C12-PCB-169	16000	28.71	64	10-145
13C12-PCB-189	16000	30.00	57	10-145
Field Spike Standards				
13C12-PCB-031			NS	50-150
13C12-PCB-095			NS	50-150
13C12-PCB-153			NS	50-150
Cleanup Standards				
13C12-PCB-028	16000	15.95	69	5-145
13C12-PCB-111	16000	22.04	85	10-145
13C12-PCB-178	16000	25.09	83	10-145

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Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a		Approved:
ALS Sample ID	WG3423049-1	Extraction Date	20-Oct-20		*S. Jin*
Analysis Method	EPA 1668C	Sample Size	1	Sample	--e-signature--
Analysis Type	Blank	Percent Moisture	n/a		06-Nov-2020
Sample Matrix	QC	Split Ratio	8		

Run Information	**Run 1**
Filename	5-201102A05
Run Date	02-Nov-20 11:47
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
Homologue Group Totals							
Total MonoCB			8.52	1.7	J		800
Total DiCB			97.1	3.5	J		1600
Total TriCB			95.1	2.8	J		1600
Total TetraCB			69.1	3.9	J		3200
Total PentaCB			93.0	1.9	J		3200
Total HexaCB			30.5	1.2	J		3200
Total HeptaCB			<1.5	1.5	U		1600
Total OctaCB			5.81	1.4	J		1600
Total NonaCB			<7.3	7.3	U		800
DecaCB			23.0	2.8	J		800
Total PCB			422		J		6400

Toxic Equivalency - (WHO 2005)

Lower Bound PCB TEQ	0.000782
Mid Point PCB TEQ	0.193
Upper Bound PCB TEQ	0.385

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.
NS	Indicates that this compound was not added.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

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Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a		
ALS Sample ID	WG3423049-2	Extraction Date	20-Oct-20		Approved:
Analysis Method	EPA 1668C	Sample Size	1	n/a	*S. Jin*
Analysis Type	LCS	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	1		06-Nov-2020

Run Information	**Run 1**
Filename	5-201102A02
Run Date	02-Nov-20 09:41
Final Volume	25 ul
Dilution Factor	1
Analysis Units	% Rec
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**pg**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
PCB-081	8000	21.80	99	60-135	
PCB-077	8000	22.09	97	60-135	
PCB-123	8000	23.10	100	60-135	
PCB-118	8000	23.27	98	60-135	
PCB-114	8000	23.57	100	60-135	
PCB-105	8000	23.91	99	60-135	
PCB-126	8000	25.52	101	60-135	
PCB-167	8000	26.44	96	60-135	
PCB-156/157	16000	27.05	96	60-135	
PCB-169	8000	28.72	97	60-135	
PCB-189	8000	30.01	100	60-135	
Extraction Standards		**Time**	**% Rec**	**Limits**	
13C12-PCB-081	16000	21.78	64	40-145	
13C12-PCB-077	16000	22.08	74	40-145	
13C12-PCB-123	16000	23.09	64	40-145	
13C12-PCB-118	16000	23.26	63	40-145	
13C12-PCB-114	16000	23.56	61	40-145	
13C12-PCB-105	16000	23.90	71	40-145	
13C12-PCB-126	16000	25.51	70	40-145	
13C12-PCB-167	16000	26.43	72	40-145	
13C12-PCB-156/157	32000	27.04	66	40-145	
13C12-PCB-169	16000	28.71	79	40-145	
13C12-PCB-189	16000	30.00	75	40-145	
Field Spike Standards					
13C12-PCB-031			NS	70-130	
13C12-PCB-095			NS	70-130	
13C12-PCB-153			NS	70-130	
Cleanup Standards					
13C12-PCB-028	16000	15.95	78	15-145	
13C12-PCB-111	16000	22.04	99	40-145	
13C12-PCB-178	16000	25.09	104	40-145	

NS Indicates that this compound was not added.

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
ALS WO#:	L2515221		Mississauga, ON L5J 2Y4
Date of Report	10-Nov-20		Canada
Date of Sample Receipt	9-Oct-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 Clean Harbors

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

Certified by:

Ron McLeod, Ph.D.
Technical Director

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Method Blank (Media)		20-22030-SVOC-(1 THRU 5) TEST#1		20-22030-SVOC-(6 THRU 10) TEST#2		20-22030-SVOC-(11 THRU 15) TEST#3		20-22030-SVOC-(16 THRU 20) BLANK	
ALS Sample ID	WG3423049-1		L2515221-1		L2515221-2		L2515221-3		L2515221-4	
Sample Size	1		1		1		1		1	
Sample units	sample		sample		sample		sample		sample	
Moisture Content	n/a		n/a		n/a		n/a		n/a	
Matrix	QC		Stack		Stack		Stack		Stack	
Sampling Date	n/a		6-Oct-20		7-Oct-20		8-Oct-20		8-Oct-20	
Extraction Date	20-Oct-20		20-Oct-20		20-Oct-20		20-Oct-20		20-Oct-20	
Target Analytes	**ng**		**ng**		**ng**		**ng**		**ng**	
Chlorobenzene	<16	U	2240		3950		14900		<16	U
1,3-Dichlorobenzene	<16	U	437		576		1580		<16	U
1,4-Dichlorobenzene	<16	U	126	M	303	M	440	M	<16	U
1,2-Dichlorobenzene	<16	U	114	M	167	M	526		<16	U
1,3,5-Trichlorobenzene	<16	U	18.2		54.6		31.9		<16	U
1,2,4-Trichlorobenzene	<16	U	116		154		271		<16	U
1,2,3-Trichlorobenzene	<16	U	31.3	M	60.2	M,R	98.8		<16	U
1,2,3,5/1,2,4,5-Tetrachlorobenzene	<16	U	52.8		69.3		158		<16	U
1,2,3,4-Tetrachlorobenzene	<16	U	<16	U	25.3		38.6		<16	U
Pentachlorobenzene	<16	U	30.9	M	49.1		54.2		<16	U
Hexachlorobenzene	<16	U	<16	U	19		19.4		<16	U
Hexachloroethane	<16	U	<16	U	<16	U	<16	U	<16	U
a,2,6-Trichlorotoluene	<16	U	<16	U	<16	U	<16	U	<16	U
Field Sampling Standards	**%Rec**		**%Rec**		**%Rec**		**%Rec**		**%Rec**	
1-Bromo-2,3-Dichlorobenzene	NS		88		81		73		63	
Extraction Standards	**%Rec**		**%Rec**		**%Rec**		**%Rec**		**%Rec**	
13C6-Chlorobenzene	7		4		5		4		5	
13C6-1,4-Dichlorobenzene	51		41		47		52		48	
13C6-1,2,3-Trichlorobenzene	71		59		69		83		69	
13C6-1,2,3,4-Tetrachlorobenzene	105		60		61		61		73	
13C6-Pentachlorobenzene	127		129		135		136		149	
13C6-Hexachlorobenzene	123		123		126		127		135	

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.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

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Sample Analysis Summary Report

Sample Name	Laboratory Control Sample (400ng)		Laboratory Control Sample (40ng)	
ALS Sample ID	WG3423049-2		WG3423049-5	
Sample Size	1		1	
Sample units	n/a		n/a	
Moisture Content	n/a		n/a	
Matrix	QC		QC	
Sampling Date	n/a		n/a	
Extraction Date	20-Oct-20		20-Oct-20	
Target Analytes	**% Recovery**		**% Recovery**	
1,3-Dichlorobenzene	120		125	
1,4-Dichlorobenzene	110	M	138	M
1,2-Dichlorobenzene	122	M	115	M
1,3,5-Trichlorobenzene	100		107	
1,2,4-Trichlorobenzene	136	M	124	M
1,2,3-Trichlorobenzene	124		143	
1,2,3,5/1,2,4,5-Tetrachlorobenzene	135		135	
1,2,3,4-Tetrachlorobenzene	135		147	
Pentachlorobenzene	103		148	
Hexachlorobenzene	129		139	
Extraction Standards	**%Rec**		**%Rec**	
13C6-Chlorobenzene	4		7	
13C6-1,4-Dichlorobenzene	42		40	
13C6-1,2,3-Trichlorobenzene	67		62	
13C6-1,2,3,4-Tetrachlorobenzene	104		86	
13C6-Pentachlorobenzene	57		105	
13C6-Hexachlorobenzene	52		102	

M Indicates that a peak has been manually integrated.

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Sample Analysis Report

Sample Name	**Method Blank (Media)**	Sampling Date	n/a
ALS Sample ID	WG3423049-1	Extraction Date	20-Oct-20
Analysis Method	SIM GC/MS		
Analysis Type	sample		
Sample Matrix	QC		
Sample Size	1 sample		
Percent Moisture	n/a		
Split Ratio	8		

Approved:
Andrew Reid
--e-signature--
10-Nov-2020

Run Information	**Run 1**
Filename	20103006.D
Run Date	10/30/2020 7:45
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng
Instrument	MSD-2
Column	HP-5MS US0411816H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**
Chlorobenzene	NotFnd	<16	U
1,3-Dichlorobenzene	NotFnd	<16	U
1,4-Dichlorobenzene	6.73	<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
Hexachloroethane	NotFnd	<16	U
a,2,6-Trichlorotoluene	NotFnd	<16	U

Extraction Standards	**ng spiked**		**%Rec**
13C6-Chlorobenzene	400	4.45	7
13C6-1,4-Dichlorobenzene	400	6.72	51
13C6-1,2,3-Trichlorobenzene	400	9.13	71
13C6-1,2,3,4-Tetrachlorobenzene	400	10.85	105
13C6-Pentachlorobenzene	400	12.18	127
13C6-Hexachlorobenzene	400	13.82	123

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

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Sample Analysis Report

Sample Name	**20-22030-SVOC-(1 THRU 5) TEST#1**	Sampling Date	6-Oct-20
ALS Sample ID	L2515221-1	Extraction Date	20-Oct-20
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--
10-Nov-2020

Run Information	**Run 1**
Filename	20103009.D
Run Date	10/30/2020 8:47
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng
Instrument	MSD-2
Column	HP-5MS US0411816H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**
Chlorobenzene	4.46	2240	
1,3-Dichlorobenzene	6.63	437	
1,4-Dichlorobenzene	6.72	126	M
1,2-Dichlorobenzene	7.02	114	M
1,3,5-Trichlorobenzene	8.20	18.2	
1,2,4-Trichlorobenzene	8.72	116	
1,2,3-Trichlorobenzene	9.13	31.3	M
1,2,3,5/1,2,4,5-Tetrachlorobenzen	10.36	52.8	
1,2,3,4-Tetrachlorobenzene	10.85	<16	U
Pentachlorobenzene	12.18	30.9	M
Hexachlorobenzene	13.82	<16	U
Hexachloroethane	NotFnd	<16	U
a,2,6-Trichlorotoluene	NotFnd	<16	U

Field Sampling Standards	**ng spiked**		**%Rec**
1-Bromo-2,3-Dichlorobenzene	800	9.85	88

Extraction Standards			**%Rec**
13C6-Chlorobenzene	400	4.45	4
13C6-1,4-Dichlorobenzene	400	6.72	41
13C6-1,2,3-Trichlorobenzene	400	9.13	59
13C6-1,2,3,4-Tetrachlorobenzene	400	10.85	60
13C6-Pentachlorobenzene	400	12.18	129
13C6-Hexachlorobenzene	400	13.81	123

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	**20-22030-SVOC-(6 THRU 10) TEST#2**	Sampling Date	7-Oct-20
ALS Sample ID	L2515221-2	Extraction Date	20-Oct-20
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--
10-Nov-2020

Run Information	**Run 1**
Filename	20103010.D
Run Date	10/30/2020 9:08
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng
Instrument	MSD-2
Column	HP-5MS US0411816H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**	
Chlorobenzene	4.45	3950		
1,3-Dichlorobenzene	6.63	576		
1,4-Dichlorobenzene	6.72	303	M	
1,2-Dichlorobenzene	7.02	167	M	
1,3,5-Trichlorobenzene	8.20	54.6		
1,2,4-Trichlorobenzene	8.72	154		
1,2,3-Trichlorobenzene	9.13	60.2	M	R
1,2,3,5/1,2,4,5-Tetrachlorobenzen	10.34	69.3		
1,2,3,4-Tetrachlorobenzene	10.85	25.3		
Pentachlorobenzene	12.18	49.1		
Hexachlorobenzene	13.82	19		
Hexachloroethane	NotFnd	<16	U	
a,2,6-Trichlorotoluene	NotFnd	<16	U	

Field Sampling Standards	**ng spiked**		**%Rec**
1-Bromo-2,3-Dichlorobenzene	800	9.85	81

Extraction Standards			**%Rec**
13C6-Chlorobenzene	400	4.45	5
13C6-1,4-Dichlorobenzene	400	6.72	47
13C6-1,2,3-Trichlorobenzene	400	9.13	69
13C6-1,2,3,4-Tetrachlorobenzene	400	10.85	61
13C6-Pentachlorobenzene	400	12.18	135
13C6-Hexachlorobenzene	400	13.82	126

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

ALS Life Sciences

Sample Analysis Report

Sample Name	**20-22030-SVOC-(11 THRU 15) TEST#3**	Sampling Date	8-Oct-20
ALS Sample ID	L2515221-3	Extraction Date	20-Oct-20
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--
10-Nov-2020

Run Information	**Run 1**
Filename	20103011.D
Run Date	10/30/2020 9:28
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng
Instrument	MSD-2
Column	HP-5MS US0411816H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**
Chlorobenzene	4.46	14900	
1,3-Dichlorobenzene	6.63	1580	
1,4-Dichlorobenzene	6.72	440	M
1,2-Dichlorobenzene	7.02	526	
1,3,5-Trichlorobenzene	8.20	31.9	
1,2,4-Trichlorobenzene	8.72	271	
1,2,3-Trichlorobenzene	9.13	98.8	
1,2,3,5/1,2,4,5-Tetrachlorobenzen	10.36	158	
1,2,3,4-Tetrachlorobenzene	10.85	38.6	
Pentachlorobenzene	12.18	54.2	
Hexachlorobenzene	13.82	19.4	
Hexachloroethane	NotFnd	<16	U
a,2,6-Trichlorotoluene	NotFnd	<16	U

Field Sampling Standards	**ng spiked**		**%Rec**
1-Bromo-2,3-Dichlorobenzene	800	9.85	73

Extraction Standards			**%Rec**
13C6-Chlorobenzene	400	4.46	4
13C6-1,4-Dichlorobenzene	400	6.72	52
13C6-1,2,3-Trichlorobenzene	400	9.13	83
13C6-1,2,3,4-Tetrachlorobenzene	400	10.85	61
13C6-Pentachlorobenzene	400	12.18	136
13C6-Hexachlorobenzene	400	13.82	127

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	**20-22030-SVOC-(16 THRU 20) BLANK**	Sampling Date	8-Oct-20
ALS Sample ID	L2515221-4	Extraction Date	20-Oct-20
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--
10-Nov-2020

Run Information	**Run 1**
Filename	20103008.D
Run Date	10/30/2020 8:26
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng
Instrument	MSD-2
Column	HP-5MS US0411816H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**
Chlorobenzene	NotFnd	<16	U
1,3-Dichlorobenzene	NotFnd	<16	U
1,4-Dichlorobenzene	6.72	<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
Hexachloroethane	NotFnd	<16	U
a,2,6-Trichlorotoluene	NotFnd	<16	U

Field Sampling Standards	**ng spiked**		**%Rec**	
1-Bromo-2,3-Dichlorobenzene	800	9.85	63	M

Extraction Standards			**%Rec**
13C6-Chlorobenzene	400	4.44	5
13C6-1,4-Dichlorobenzene	400	6.72	48
13C6-1,2,3-Trichlorobenzene	400	9.13	69
13C6-1,2,3,4-Tetrachlorobenzene	400	10.85	73
13C6-Pentachlorobenzene	400	12.18	149
13C6-Hexachlorobenzene	400	13.82	135

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

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample (400ng)**	Sampling Date	n/a
ALS Sample ID	WG3423049-2	Extraction Date	20-Oct-20
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--
10-Nov-2020

Run Information	**Run 1**
Filename	20103005.D
Run Date	10/30/2020 7:24
Final Volume	1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-2
Column	HP-5MS US0411816H

Target Analytes	**ng spiked**	**Ret. Time**	**% Recovery**	**Flags**
Chlorobenzene				
1,3-Dichlorobenzene	400	6.63	120	
1,4-Dichlorobenzene	400	6.72	110	M
1,2-Dichlorobenzene	400	7.01	122	M
1,3,5-Trichlorobenzene	400	8.20	100	
1,2,4-Trichlorobenzene	400	8.72	136	M
1,2,3-Trichlorobenzene	400	9.13	124	
1,2,3,5/1,2,4,5-Tetrachlorobenzen	800	10.36	135	
1,2,3,4-Tetrachlorobenzene	400	10.85	135	
Pentachlorobenzene	600	12.18	103	
Hexachlorobenzene	600	13.82	129	
Extraction Standards	**ng spiked**		**%Rec**	
13C6-Chlorobenzene	400	4.44	4	
13C6-1,4-Dichlorobenzene	400	6.71	42	
13C6-1,2,3-Trichlorobenzene	400	9.13	67	
13C6-1,2,3,4-Tetrachlorobenzene	400	10.85	104	
13C6-Pentachlorobenzene	800	12.18	57	
13C6-Hexachlorobenzene	800	13.82	52	

M Indicates that a peak has been manually integrated.

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample (40ng)**	Sampling Date	n/a
ALS Sample ID	WG3423049-5	Extraction Date	20-Oct-20
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--
10-Nov-2020

Run Information	**Run 1**
Filename	20103004.D
Run Date	10/30/2020 7:03
Final Volume	1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-2
Column	HP-5MS US0411816H

Target Analytes	**ng spiked**	**Ret. Time**	**% Recovery**	**Flags**
Chlorobenzene				
1,3-Dichlorobenzene	40	6.63	125	
1,4-Dichlorobenzene	40	6.72	138	M
1,2-Dichlorobenzene	40	7.01	115	M
1,3,5-Trichlorobenzene	40	8.21	107	
1,2,4-Trichlorobenzene	40	8.72	124	M
1,2,3-Trichlorobenzene	40	9.13	143	
1,2,3,5/1,2,4,5-Tetrachlorobenzen	80	10.36	135	
1,2,3,4-Tetrachlorobenzene	40	10.85	147	
Pentachlorobenzene	50	12.18	148	
Hexachlorobenzene	50	13.82	139	

Extraction Standards	**ng spiked**		**%Rec**
13C6-Chlorobenzene	400	4.46	7
13C6-1,4-Dichlorobenzene	400	6.72	40
13C6-1,2,3-Trichlorobenzene	400	9.13	62
13C6-1,2,3,4-Tetrachlorobenzene	400	10.85	86
13C6-Pentachlorobenzene	400	12.18	105
13C6-Hexachlorobenzene	400	13.82	102

M Indicates that a peak has been manually integrated.

ALS Environmental

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2515221		Mississauga, ON L5J 2Y4
Date of Report	9-Nov-20		Canada
Date of Sample Receipt	9-Oct-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 Clean Harbors

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

Certified by:

Ron McLeod, PhD
Laboratory Manager and Technical Director

ALS Environmental

Sample Analysis Summary Report

Sample Name	Method Blank (Media)	20-22030-SVOC- (1 THRU 5) TEST#1	20-22030-SVOC- (6 THRU 10) TEST#2	20-22030-SVOC- (11 THRU 15) TEST#3	20-22030-SVOC- (16 THRU 20) BLANK
ALS Sample ID	WG3423049-1	L2515221-1	L2515221-2	L2515221-3	L2515221-4
Sample Size	1	1	1	1	1
Sample units	sample	sample	sample	sample	sample
Moisture Content	n/a	n/a	n/a	n/a	n/a
Matrix	QC	Stack	Stack	Stack	Stack
Sampling Date	n/a	6-Oct-20	7-Oct-20	8-Oct-20	8-Oct-20
Extraction Date	20-Oct-20	20-Oct-20	20-Oct-20	20-Oct-20	20-Oct-20
Target Analytes	**ng/sample**	**ng/sample**	**ng/sample**	**ng/sample**	**ng/sample**
2,6-Dichlorophenol	<80 U	<80 U	<80 U	<80 U	<80 U
2,4/2,5-Dichlorophenol	<80 U	<80 U	<80 U	<80 U	<80 U
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	<80 U	<80 U	<80 U	<80 U
2,3,6-Trichlorophenol	<80 U	<80 U	<80 U	<80 U	<80 U
2,3,5-Trichlorophenol	<80 U	<80 U	<80 U	<80 U	<80 U
2,4,5-Trichlorophenol	<80 U	<80 U	<80 U	<80 U	<80 U
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
2,3,4,5-Tetrachlorophenol	<80 U	<80 U	<80 U	<80 U	<80 U
Pentachlorophenol	<80 U	<80 U	<80 U	<80 U	<80 U
Hexachlorophene	<80 U	<80 U	<80 U	<80 U	<80 U
Extraction Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**	**% Rec**
13C6-2,4-Dichlorophenol (ES)	66	57	122	112	60
13C6-2,4,5-Trichlorophenol (ES)	68	75	92	77	61
13C6-2,3,4,5-Tetrachlorophenol (ES)	72	70	91 M	65	76
13C6-Pentachlorophenol (ES)	44	41	69	32	55

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 (800ng)		Laboratory Control Sample (80ng)	
ALS Sample ID	WG3423049-2		WG3423049-5	
Sample Size	1		1	
Sample units	n/a		n/a	
Moisture Content	n/a		n/a	
Matrix	QC		QC	
Sampling Date	n/a		n/a	
Extraction Date	20-Oct-20		20-Oct-20	
Target Analytes	**% Recovery**		**% Recovery**	
2,6-Dichlorophenol	90		75	M
2,4/2,5-Dichlorophenol	112		114	M
3,5-Dichlorophenol				
2,3-Dichlorophenol				
3,4-Dichlorophenol				
2,4,6-Trichlorophenol	71	M	84	M
2,3,6-Trichlorophenol				
2,3,5-Trichlorophenol				
2,4,5-Trichlorophenol	110		118	M
2,3,4-Trichlorophenol				
3,4,5-Trichlorophenol				
2,3,5,6/2,3,4,6-Tetrachlorophenol	88	M	80	M
2,3,4,5-Tetrachlorophenol	109		97	M
Pentachlorophenol	112		113	M
Hexachlorophene				
Extraction Standards	**% Rec**		**% Rec**	
13C6-2,4-Dichlorophenol (ES)	67		28	
13C6-2,4,5-Trichlorophenol (ES)	60		59	
13C6-2,3,4,5-Tetrachlorophenol (ES)	84		80	
13C6-Pentachlorophenol (ES)	60		34	

M	Indicates that a peak has been manually integrated.

ALS Environmental

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank (Media)**	Sampling Date	n/a
ALS Sample ID	WG3423049-1	Extraction Date	20-Oct-20
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--
02-Nov-2020

Run Information	**Run 1**
Filename	20110210.D
Run Date	11/2/2020 10:20
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	9.53	66	20-150
13C6-2,4,5-Trichlorophenol (ES)	1600	10.99	68	20-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.60	72	20-150
13C6-Pentachlorophenol (ES)	1600	13.57	44	20-150

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

ALS Environmental

Sample Analysis Report

Sample Name	**20-22030-SVOC-(1 THRU 5) TEST#1**	Sampling Date	6-Oct-20
ALS Sample ID	L2515221-1	Extraction Date	20-Oct-20
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--
02-Nov-2020

Run Information	**Run 1**
Filename	20110214.D
Run Date	11/2/2020 11:59
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	9.53	57	20-150
13C6-2,4,5-Trichlorophenol (ES)	1600	11.00	75	20-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.60	70	20-150
13C6-Pentachlorophenol (ES)	1600	13.57	41	20-150

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

ALS Environmental

Sample Analysis Report

Sample Name	**20-22030-SVOC-(6 THRU 10) TEST#2**	Sampling Date	7-Oct-20
ALS Sample ID	L2515221-2	Extraction Date	20-Oct-20
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--
02-Nov-2020

Run Information	**Run 1**
Filename	20110215.D
Run Date	11/2/2020 12:22
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	9.53	122		20-150
13C6-2,4,5-Trichlorophenol (ES)	1600	11.00	92		20-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.60	91	M	20-150
13C6-Pentachlorophenol (ES)	1600	13.57	69		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	**20-22030-SVOC-(11 THRU 15) TEST#3**	Sampling Date	8-Oct-20
ALS Sample ID	L2515221-3	Extraction Date	20-Oct-20
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--
02-Nov-2020

Run Information	**Run 1**
Filename	20110216.D
Run Date	11/2/2020 12:46
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	9.53	112	20-150
13C6-2,4,5-Trichlorophenol (ES)	1600	10.99	77	20-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.60	65	20-150
13C6-Pentachlorophenol (ES)	1600	13.57	32	20-150

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

ALS Environmental

Sample Analysis Report

Sample Name	**20-22030-SVOC-(16 THRU 20) BLANK**	Sampling Date	8-Oct-20
ALS Sample ID	L2515221-4	Extraction Date	20-Oct-20
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--
02-Nov-2020

Run Information	**Run 1**
Filename	20110212.D
Run Date	11/2/2020 11:08
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	9.53	60	20-150
13C6-2,4,5-Trichlorophenol (ES)	1600	10.99	61	20-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.60	76	20-150
13C6-Pentachlorophenol (ES)	1600	13.57	55	20-150

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

ALS Environmental

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample (800ng)**	Sampling Date	n/a
ALS Sample ID	WG3423049-2	Extraction Date	20-Oct-20
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--
02-Nov-2020

Run Information	**Run 1**
Filename	20110208.D
Run Date	11/2/2020 9:33
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	800	9.33	90		10-110
2,4/2,5-Dichlorophenol	800	9.53	112		35-98
3,5-Dichlorophenol					
2,3-Dichlorophenol					
3,4-Dichlorophenol					
2,4,6-Trichlorophenol	800	10.45	71	M	10-102
2,3,6-Trichlorophenol					
2,3,5-Trichlorophenol					
2,4,5-Trichlorophenol	800	10.99	110		45-95
2,3,4-Trichlorophenol					
3,4,5-Trichlorophenol					
2,3,5,6/2,3,4,6-Tetrachlorophenol	1600	12.06	88	M	30-109
2,3,4,5-Tetrachlorophenol	800	12.60	109		44-103
Pentachlorophenol	800	13.57	112		32-121
Hexachlorophene					
Extraction Standards			**% Rec**		
13C6-2,4-Dichlorophenol (ES)	1600	9.53	67		50-150
13C6-2,4,5-Trichlorophenol (ES)	1600	10.99	60		50-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.60	84		50-150
13C6-Pentachlorophenol (ES)	1600	13.57	60		50-150

M Indicates that a peak has been manually integrated.

ALS Environmental

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample (80ng)**	Sampling Date	n/a
ALS Sample ID	WG3423049-5	Extraction Date	20-Oct-20
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--
02-Nov-2020

Run Information	**Run 1**
Filename	20110207.D
Run Date	11/2/2020 9:09
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	80	9.32	75	M	10-110
2,4/2,5-Dichlorophenol	80	9.52	114	M	35-98
3,5-Dichlorophenol					
2,3-Dichlorophenol					
3,4-Dichlorophenol					
2,4,6-Trichlorophenol	80	10.45	84	M	10-102
2,3,6-Trichlorophenol					
2,3,5-Trichlorophenol					
2,4,5-Trichlorophenol	80	10.99	118	M	45-95
2,3,4-Trichlorophenol					
3,4,5-Trichlorophenol					
2,3,5,6/2,3,4,6-Tetrachlorophenol	160	12.06	80	M	30-109
2,3,4,5-Tetrachlorophenol	80	12.60	97	M	44-103
Pentachlorophenol	80	13.57	113	M	32-121
Hexachlorophene					
Extraction Standards			**% Rec**		
13C6-2,4-Dichlorophenol (ES)	1600	9.53	28		50-150
13C6-2,4,5-Trichlorophenol (ES)	1600	10.99	59		50-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.60	80		50-150
13C6-Pentachlorophenol (ES)	1600	13.57	34		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	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road Mississauga, ON L5J 2Y4 Canada
ALS WO#:	L2515221 Revision 1		
Date of Report	14-Dec-20		
Date of Sample Receipt	9-Oct-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 Clean Harbors

COMMENTS: **Chlorinated Pesticides by EPA 1699 (modified)**
Organotins Congeners by derivatization and GC/FPD
REVISED REPORT: To include organotin data

Organotin analyses was performed at ALS Kelso Washington from a separate portion of the raw extract.

Certified by:

Ron McLeod, PhD
Director, Air Toxics and Special Chemistries, Life Sciences

ALS Life Sciences

Sample Analysis summary Report

Sample Name	20-22030-SVOC-(1 THRU 5) TEST#1	20-22030-SVOC-(6 THRU 10) TEST#2	20-22030-SVOC-(11 THRU 15) TEST#3	20-22030-SVOC-(16 THRU 20) BLANK
ALS Sample ID	L2515221-1	L2515221-2	L2515221-3	L2515221-4
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	6-Oct-20	7-Oct-20	8-Oct-20	8-Oct-20
Extraction Date	20-Oct-20	20-Oct-20	20-Oct-20	20-Oct-20
Target Analytes	**ng**	**ng**	**ng**	**ng**
Hexachlorobutadiene	4.14	<4.2	5.91	<0.60
Heptachlor	<0.24	<0.59	<0.27	<0.26
Octachlorostyrene	<0.78	<0.54	<0.78	<0.53
Heptachlor Epoxide B	<0.30	<0.49	<0.85	<0.65
Heptachlor Epoxide A	<1.7	<2.8	<4.9	<3.7
Oxychlordane	<0.51	<0.69	<0.56	<0.18
trans-Chlordane	<6.2	<6.4	<4.4	<3.6
cis-Chlordane	<5.8	<6.0	<4.1	<3.4
trans-Nonachlor	<5.9	<6.1	<4.2	<3.5
cis-Nonachlor	<2.6	<3.8	<5.2	<3.0
Toxaphene Congener, Parlar 26	<4.8	<5.0	<6.9	<3.6
Toxaphene Congener, Parlar 50	<4.7	<4.4	<5.8	<3.1
Toxaphene Congener, Parlar 62	<6.1	<5.7	<7.5	<4.0
Tributyltin	<200	<200	<200	<200
Extraction Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**
Pentachlorobenzene, 13C6-	83	93	80	89
Hexachlorobenzene, 13C6-	85	94	80	96
alpha-BHC, 13C6-	84	85	67	86
beta-BHC, 13C6-	80	78	67	79
gamma-BHC, 13C6-	84	87	76	83
delta-BHC, 13C6-	77	73	61	73
Heptachlor, 13C10-	106	112	94	104
Oxychlordane, 13C10-	97	102	86	103
trans-Nonachlor, 13C10-	91	91	83	103
Mirex, 13C10-	81	90	83	90

ALS Life Sciences

Quality Control Summary Report

Sample Name	Method Media Blank	Laboratory Control Sample
ALS Sample ID	WG3423049-1	WG3423049-2
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	20-Oct-20	20-Oct-20
Target Analytes	**ng**	**% Rec**
Hexachlorobutadiene	<0.27	116
Heptachlor	<0.30	102
Octachlorostyrene	<0.35	106
Heptachlor Epoxide B	<0.26	100
Heptachlor Epoxide A	<1.5	91
Oxychlordane	<0.58	101
trans-Chlordane	<3.2	86
cis-Chlordane	<3.0	98
trans-Nonachlor	<3.0	91
cis-Nonachlor	<2.7	91
Parlar 26	<5.7	104
Parlar 50	<3.0	106
Parlar 62	<3.8	78
Tributyltin	<200	
Extraction Standards	**% Rec**	**% Rec**
Pentachlorobenzene, 13C6-	89	87
Hexachlorobenzene, 13C6-	101	96
alpha-BHC, 13C6-	90	91
beta-BHC, 13C6-	75	78
gamma-BHC, 13C6-	86	87
delta-BHC, 13C6-	73	71
Heptachlor, 13C10-	98	100
Oxychlordane, 13C10-	95	94
trans-Nonachlor, 13C10-	100	97
Mirex, 13C10-	90	89

ALS Life Sciences

Sample Analysis Report

Sample Name	**20-22030-SVOC-(1 THRU 5) TEST#1**	Sampling Date	6-Oct-20	
ALS Sample ID	L2515221-1	Extraction Date	20-Oct-20	
Analysis Method	EPA 1699 (mod)	Sample Size	1	sample
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	Stack	Split Ratio	8	

Approved:
Ella Gdyczynski
--e-signature--
04-Nov-2020

Run Information	**Run 1**	**Run 2**
Filename	9-201104A02	9-201104A02
Run Date	04-Nov-20 14:21	04-Nov-20 14:21
Final Volume	1020 uL	1020 uL
Dilution Factor	1	1
Analysis Units	ng	ng
Instrument - Column	HRMS-9 HP5ms USO378361H	HRMS-9 HP5ms USO378361H

Target Analytes	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**
Hexachlorobutadiene							6.96	4.14	0.35	M,J		16
Heptachlor	17.81	<0.24	0.24	M,U	0.20	16						
Octachlorostyrene	NotFnd	<0.78	0.78	U		16						
Heptachlor Epoxide B	NotFnd	<0.30	0.30	U		16						
Heptachlor Epoxide A	NotFnd	<1.7	1.7	U		61						
Oxychlordane	NotFnd	<0.51	0.51	U		16						
trans-Chlordane	NotFnd	<6.2	6.2	U		16						
cis-Chlordane	NotFnd	<5.8	5.8	U		16						
trans-Nonachlor	NotFnd	<5.9	5.9	U		16						
cis-Nonachlor	NotFnd	<2.6	2.6	U		16						
Parlar 26	NotFnd	<4.8	4.8	U		61						
Parlar 50	NotFnd	<4.7	4.7	U		16						
Parlar 62	NotFnd	<6.1	6.1	U		61						

Extraction Standards	**ng**			
Pentachlorobenzene, 13C6-	800	11.61	83	5-120
Hexachlorobenzene, 13C6-	800	14.75	85	5-120
alpha-BHC, 13C6-	800	14.55	84	16-129
beta-BHC, 13C6-	800	15.42	80	11-120
gamma-BHC, 13C6-	800	15.59	84	11-120
delta-BHC, 13C6-	800	16.37	77	11-120
Heptachlor, 13C10-	800	17.79	106	5-120
Oxychlordane, 13C10-	800	20.07	97	23-135
trans-Nonachlor, 13C10-	800	21.34	91	14-136
Mirex, 13C10-	400	26.80	81	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.
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.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**20-22030-SVOC-(6 THRU 10) TEST#2**	Sampling Date	7-Oct-20	
ALS Sample ID	L2515221-2	Extraction Date	20-Oct-20	Approved:
Analysis Method	EPA 1699 (mod)	Sample Size	1 sample	*Ella Gdyczynski*
Analysis Type	Sample	Percent Moisture	n/a	--e-signature--
Sample Matrix	Stack	Split Ratio	8	04-Nov-2020

Run Information	**Run 1**	**Run 2**
Filename	9-201104A03	9-201104A03
Run Date	04-Nov-20 14:58	04-Nov-20 14:58
Final Volume	1020 uL	1020 uL
Dilution Factor	1	1
Analysis Units	ng	ng
Instrument - Column	HRMS-9 HP5ms USO378361H	HRMS-9 HP5ms USO378361H

Target Analytes	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**
Hexachlorobutadiene							6.95	<4.2	0.40	M,J,R	4.2	16
Heptachlor		NotFnd	<0.59	0.59	U	16						
Octachlorostyrene		NotFnd	<0.54	0.54	U	16						
Heptachlor Epoxide B		NotFnd	<0.49	0.49	U	16						
Heptachlor Epoxide A		NotFnd	<2.8	2.8	U	61						
Oxychlordane		NotFnd	<0.69	0.69	U	16						
trans-Chlordane		NotFnd	<6.4	6.4	U	16						
cis-Chlordane		NotFnd	<6.0	6.0	U	16						
trans-Nonachlor		NotFnd	<6.1	6.1	U	16						
cis-Nonachlor		NotFnd	<3.8	3.8	U	16						
Parlar 26		NotFnd	<5.0	5.0	U	61						
Parlar 50		NotFnd	<4.4	4.4	U	16						
Parlar 62		NotFnd	<5.7	5.7	U	61						

Extraction Standards	**ng**			
Pentachlorobenzene, 13C6-	800	11.60	93	5-120
Hexachlorobenzene, 13C6-	800	14.75	94	5-120
alpha-BHC, 13C6-	800	14.54	85	16-129
beta-BHC, 13C6-	800	15.41	78	11-120
gamma-BHC, 13C6-	800	15.59	87	11-120
delta-BHC, 13C6-	800	16.36	73	11-120
Heptachlor, 13C10-	800	17.78	112	5-120
Oxychlordane, 13C10-	800	20.06	102	23-135
trans-Nonachlor, 13C10-	800	21.34	91	14-136
Mirex, 13C10-	400	26.79	90	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.
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.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**20-22030-SVOC-(11 THRU 15) TEST#3**	Sampling Date	8-Oct-20	
ALS Sample ID	L2515221-3	Extraction Date	20-Oct-20	Approved:
Analysis Method	EPA 1699 (mod)	Sample Size	1 sample	*Ella Gdyczynski*
Analysis Type	Sample	Percent Moisture	n/a	--e-signature--
Sample Matrix	Stack	Split Ratio	8	04-Nov-2020

Run Information	**Run 1**	**Run 2**
Filename	9-201104A04	9-201104A04
Run Date	04-Nov-20 15:35	04-Nov-20 15:35
Final Volume	1020 uL	1020 uL
Dilution Factor	1	1
Analysis Units	ng	ng
Instrument - Column	HRMS-9 HP5ms USO378361H	HRMS-9 HP5ms USO378361H

Target Analytes	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**
Hexachlorobutadiene							6.95	5.91	0.51	M,J		16
Heptachlor	NotFnd	<0.27	0.27	U		16						
Octachlorostyrene	NotFnd	<0.78	0.78	U		16						
Heptachlor Epoxide B	NotFnd	<0.85	0.85	U		16						
Heptachlor Epoxide A	NotFnd	<4.9	4.9	U		61						
Oxychlordane	NotFnd	<0.56	0.56	U		16						
trans-Chlordane	NotFnd	<4.4	4.4	U		16						
cis-Chlordane	NotFnd	<4.1	4.1	U		16						
trans-Nonachlor	NotFnd	<4.2	4.2	U		16						
cis-Nonachlor	NotFnd	<5.2	5.2	U		16						
Parlar 26	NotFnd	<6.9	6.9	U		61						
Parlar 50	NotFnd	<5.8	5.8	U		16						
Parlar 62	NotFnd	<7.5	7.5	U		61						

Extraction Standards	**ng**			
Pentachlorobenzene, 13C6-	800	11.60	80	5-120
Hexachlorobenzene, 13C6-	800	14.75	80	5-120
alpha-BHC, 13C6-	800	14.54	67	16-129
beta-BHC, 13C6-	800	15.42	67	11-120
gamma-BHC, 13C6-	800	15.58	76	11-120
delta-BHC, 13C6-	800	16.36	61	11-120
Heptachlor, 13C10-	800	17.78	94	5-120
Oxychlordane, 13C10-	800	20.06	86	23-135
trans-Nonachlor, 13C10-	800	21.34	83	14-136
Mirex, 13C10-	400	26.79	83	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.
J	Indicates that a target analyte was detected below the calibrated range.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**20-22030-SVOC-(16 THRU 20) BLANK**	Sampling Date	8-Oct-20		Approved:
ALS Sample ID	L2515221-4	Extraction Date	20-Oct-20		*Ella Gdyczynski*
Analysis Method	EPA 1699 (mod)	Sample Size	1	sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		04-Nov-2020
Sample Matrix	Stack	Split Ratio	8		

Run Information	**Run 1**	**Run 2**
Filename	9-201104A01	9-201104A01
Run Date	04-Nov-20 13:44	04-Nov-20 13:44
Final Volume	1020 uL	1020 uL
Dilution Factor	1	1
Analysis Units	ng	ng
Instrument - Column	HRMS-9 HP5ms USO378361H	HRMS-9 HP5ms USO378361H

Target Analytes	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**
Hexachlorobutadiene							6.95	<0.60	0.24	M,J,R	0.60	16
Heptachlor	17.79	<0.26	0.26	M,U	0.13	16						
Octachlorostyrene	NotFnd	<0.53	0.53	U		16						
Heptachlor Epoxide B	NotFnd	<0.65	0.65	U		16						
Heptachlor Epoxide A	NotFnd	<3.7	3.7	U		61						
Oxychlordane	NotFnd	<0.18	0.18	U		16						
trans-Chlordane	NotFnd	<3.6	3.6	U		16						
cis-Chlordane	NotFnd	<3.4	3.4	U		16						
trans-Nonachlor	NotFnd	<3.5	3.5	U		16						
cis-Nonachlor	NotFnd	<3.0	3.0	U		16						
Parlar 26	NotFnd	<3.6	3.6	U		61						
Parlar 50	NotFnd	<3.1	3.1	U		16						
Parlar 62	NotFnd	<4.0	4.0	U		61						

Extraction Standards	**ng**			
Pentachlorobenzene, 13C6-	800	11.60	89	5-120
Hexachlorobenzene, 13C6-	800	14.75	96	5-120
alpha-BHC, 13C6-	800	14.54	86	16-129
beta-BHC, 13C6-	800	15.40	79	11-120
gamma-BHC, 13C6-	800	15.58	83	11-120
delta-BHC, 13C6-	800	16.35	73	11-120
Heptachlor, 13C10-	800	17.78	104	5-120
Oxychlordane, 13C10-	800	20.06	103	23-135
trans-Nonachlor, 13C10-	800	21.34	103	14-136
Mirex, 13C10-	400	26.79	90	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.
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.
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 Media Blank**	Sampling Date	n/a		
ALS Sample ID	WG3423049-1	Extraction Date	20-Oct-20		Approved:
Analysis Method	EPA 1699 (mod)	Sample Size	1	sample	*Ella Gdyczynski*
Analysis Type	Blank	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	8		04-Nov-2020

Run Information	**Run 1**	**Run 2**
Filename	9-201103A22	9-201103A22
Run Date	04-Nov-20 06:05	04-Nov-20 06:05
Final Volume	1010 uL	1020 uL
Dilution Factor	1	1
Analysis Units	ng	ng
Instrument - Column	HRMS-9 HP5ms USO378361H	HRMS-9 HP5ms USO378361H

Target Analytes	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**
Hexachlorobutadiene							NotFnd	<0.27	0.27	U		16
Heptachlor	NotFnd	<0.30	0.30	U		16						
Octachlorostyrene	NotFnd	<0.35	0.35	U		16						
Heptachlor Epoxide B	NotFnd	<0.26	0.26	U		16						
Heptachlor Epoxide A	NotFnd	<1.5	1.5	U		61						
Oxychlordane	NotFnd	<0.58	0.58	U		16						
trans-Chlordane	NotFnd	<3.2	3.2	U		16						
cis-Chlordane	NotFnd	<3.0	3.0	U		16						
trans-Nonachlor	NotFnd	<3.0	3.0	U		16						
cis-Nonachlor	NotFnd	<2.7	2.7	U		16						
Parlar 26	NotFnd	<5.7	5.7	U		61						
Parlar 50	NotFnd	<3.0	3.0	U		16						
Parlar 62	NotFnd	<3.8	3.8	U		61						

Extraction Standards	**ng**			
Pentachlorobenzene, 13C6-	800	11.60	89	5-120
Hexachlorobenzene, 13C6-	800	14.75	101	5-120
alpha-BHC, 13C6-	800	14.54	90	16-129
beta-BHC, 13C6-	800	15.41	75	11-120
gamma-BHC, 13C6-	800	15.58	86	11-120
delta-BHC, 13C6-	800	16.35	73	11-120
Heptachlor, 13C10-	800	17.78	98	5-120
Oxychlordane, 13C10-	800	20.06	95	23-135
trans-Nonachlor, 13C10-	800	21.34	100	14-136
Mirex, 13C10-	400	26.79	90	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	WG3423049-2	Extraction Date	20-Oct-20		Approved:
Analysis Method	EPA 1699 (mod)	Sample Size	1	n/a	*Ella Gdyczynski*
Analysis Type	LCS	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	8		04-Nov-2020

Run Information	**Run 1**	**Run 2**
Filename	9-201103A15	9-201103A15
Run Date	04-Nov-20 01:37	04-Nov-20 01:37
Final Volume	1010 uL	1020 uL
Dilution Factor	1	1
Analysis Units	%	%
Instrument - Column	HRMS-9 HP5ms USO378361H	HRMS-9 HP5ms USO378361H

Target Analytes	**ng**	**Ret. Time**	**% Rec**	**Limits**	**Flags**	**Ret. Time**	**% Rec**	**Flags**
Hexachlorobutadiene	500					6.94	116	
Heptachlor	100	17.79	102	50-120				
Octachlorostyrene	100	19.95	106	50-175				
Heptachlor Epoxide B	100	20.04	100	20-200				
Heptachlor Epoxide A	100	20.17	91	50-120				
Oxychlordane	100	20.07	101	50-120				
trans-Chlordane	100	20.74	86	50-120				
cis-Chlordane	100	21.19	98	50-120				
trans-Nonachlor	100	21.34	91	50-120				
cis-Nonachlor	100	23.15	91	50-120				
Parlar 26	100	22.46	104	20-200				
Parlar 50	100	25.01	106	20-200				
Parlar 62	100	26.45	78	20-200				
Extraction Standards	**ng**							
Pentachlorobenzene, 13C6-	800	11.59	87	5-120				
Hexachlorobenzene, 13C6-	800	14.75	96	5-120				
alpha-BHC, 13C6-	800	14.54	91	13-138				
beta-BHC, 13C6-	800	15.39	78	5-124				
gamma-BHC, 13C6-	800	15.57	87	5-124				
delta-BHC, 13C6-	800	16.34	71	5-124				
Heptachlor, 13C10-	800	17.77	100	5-128				
Oxychlordane, 13C10-	800	20.05	94	5-144				
trans-Nonachlor, 13C10-	800	21.33	97	13-149				
Mirex, 13C10-	400	26.78	89	5-138				

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2515221		Mlssissauga, ON L5J 2Y4
Date of Report	9-Nov-20		Canada
Date of Sample Receipt	9-Oct-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 Clean Harbors

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

Selected deuterium labelled extraction recoveries are biased low indicating losses of extract during sample processing. Such losses do not impact negatively the quantification of the target analytes due to isotope dilution corrections as confirmed by the favorable field spike recoveries.

A bias to high LCS (laboratory control sample) recoveries were observed. The calibration stardard levels have been confirmed by the analysis of a reference standard. The fluorene-d10 and terphenyl-d14 field spike recoveries centering around 100% confirmes the spiking levels of extraction and field spike standards. Therefore the high bias in the LCS recoveries are assigned to a high spiking of the native LCS spiking levels for PAHs and therefore the reported PAH levels in the samples are not believe to be similarly impacted and not biased high

Certified by: 

Ron McLeod, Ph.D.
Technical Director

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Method Blank		20-22030-SVOC-(1 THRU 5) TEST#1		20-22030-SVOC-(6 THRU 10) TEST#2		20-22030-SVOC-(11 THRU 15) TEST#3		20-22030-SVOC-(16 THRU 20) BLANK	
ALS Sample ID	WG3423049-1		L2515221-1		L2515221-2		L2515221-3		L2515221-4	
Sample Size	1		1		1		1		1	
Sample units	Sample		Sample		Sample		Sample		Sample	
Moisture Content	n/a		n/a		n/a		n/a		n/a	
Matrix	QC		Stack		Stack		Stack		Stack	
Sampling Date	n/a		6-Oct-20		7-Oct-20		8-Oct-20		8-Oct-20	
Extraction Date	20-Oct-20		20-Oct-20		20-Oct-20		20-Oct-20		20-Oct-20	
Target Analytes	**ng**		**ng**		**ng**		**ng**		**ng**	
Naphthalene	110	M,R	3240	R	3190	M	4710		215	M,R
2-Methylnaphthalene	<16	U	545		292		180		<16	U
1-Methylnaphthalene	<16	U	350	M,R	252	M,R	235	M,R	<16	U
Acenaphthylene	<16	U	144	R	48.2	M,R	83.8	R	19.9	M,R
Acenaphthene	<16	U	179	M,R	91.4	R	16.7	M	116	R
Fluorene	21.8	R	970	R	766	R	113	R	1190	R
Phenanthrene	<16	U	731		327		295		41.0	
Anthracene	<16	U	244	R	61.7	M	42.7	R	21.7	
Fluoranthene	<16	U	254	M,R	59.9	R	73.8		17.8	M
Pyrene	<16	U	166	R	59.9	R	75.4	R	21.9	M,R
Benzo(a)Anthracene	<16	U	<16	U	<16	U	<16	U	<16	U
Chrysene/Triphenylene	<16	U	39.2	M	<16	U	<16	U	<16	U
Benzo(b)Fluoranthene	<16	U	<16	U	<16	U	<16	U	<16	U
Benzo(k)Fluoranthene	<16	U	<16	U	<16	U	<16	U	<16	U
Benzo(e)Pyrene	<16	U	26.2		<16	U	36.2	M,R	<16	U
Benzo(a)Pyrene	<16	U	144	M,R	41.9	M	29.8	R	18.7	M
Perylene	<16	U	<16	U	<16	U	<16	U	<16	U
Indeno(1,2,3-cd)Pyrene	<16	U	16.0	M	<16	U	19.1		<16	U
Dibenzo(a,c/a,h)Anthracene	<16	U	<16	U	17.0	R	16.6	R	<16	U
Benzo(g,h,i)Perylene	<16	U	70.6		34.2		71.8		44.6	
Additional Analytes										
Tetralin	63.5	R	554	M,R,B	287	M,B	340	M,B	315	R
Quinoline	<16	U	5030	M	633	M	93.9	M,R	815	
2-Chloronaphthalene	<16	U	<16	U	<16	U	<16	U	<16	U
Biphenyl	<16	U	426	M	234	M	898		98.7	M
o-Terphenyl	<16	U	62.2	M	<16	U	17.2		<16	U
1-Methylphenanthrene	473	R	671	R	166	R	160	R	351	R
9-Methylphenanthrene	<16	U	88.0		37.1		39.7		<16	U
2-methylanthracene	<16	U	237		90.7	M	104		<16	U
9,10-dimethylanthracene	<16	U	<16	U	<16	U	<16	U	50.8	M
m-terphenyl	<16	U	58.2	M	<16	U	17.1	R	<16	U
p-terphenyl	<16	U	32.7	M	<16	U	<16	U	<16	U
Benzo(a)fluorene	<16	U	<16	U	<16	U	<16	U	<16	U
Benzo(b)fluorene	<16	U	<16	U	<16	U	<16	U	<16	U
Benzo(b)anthracene	<16	U	39.8	M	<16	U	<16	U	<16	U
7,12-Dimethylbenzo(a)anthracene	<16	U	<16	U	<16	U	<16	U	<16	U
3-Methylcholanthrene	<80	U	<80	U	84.7	R	<80	U	<80	U
Picene	<80	U	<80	U	<80	U	<80	U	<80	U
Dibenzo(a,e)pyrene	<80	U	<80	U	<80	U	<80	U	<80	U
Coronene	<80	U	<80	U	<80	U	<80	U	<80	U
Field Sampling Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
1-Methylnaphthalene-D10	NS		27.9		71.6		71.7	R	83.9	
Fluorene D10	NS		INT		97.8	M	102.1	M	126.0	
Terphenyl D14(Surr.)	NS		44.3	M	97.6		100.3		97.0	
Extraction Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
Naphthalene D8	78.9	R	52.2	R	55.6		40.2	R	65.9	R
2-Methylnaphthalene-D10	98.1		67.6		92.7		62.6		77.2	
Acenaphthylene D8	82.4		8.8		46.7		33.7		43.8	
Phenanthrene D10	82.7		66.5	R	81.7	R	58.5		78.9	
Anthracene-D10	77.5		8.8	M	37.8	R	34.5		46.5	
Fluoranthene D10	84.5		72.1		87.6		60.2		79.6	
Benz(a)Anthracene-D12	87.7		37.2		68.0		52.2		71.8	
Chrysene D12	88.1		69.5		85.3		60.1		82.2	
Benzo(b)Fluoranthene-D12	106.8		82.8		112.3		78.2		101.1	
Benzo(k)Fluoranthene-D12	109.8		76.2		117.7		79.8		99.9	
Benzo(a)Pyrene D12	114.2		9.7	M,R	37.9		51.1		65.6	
Perylene D12	104.7		10.6	R	14.4	R	58.0		70.8	
Indeno(1,2,3,cd)Pyrene-D12	97.5		68.7		108.9		79.7		89.5	
Dibenz(a,h)Anthracene-D14	97.2		77.1		111.2		81.4		94.7	
Benzo(g,h,i)Perylene D12	102.2		79.4		112.0		83.6		99.4	

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

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Laboratory Control Sample	
ALS Sample ID	WG3423049-2	
Sample Size	1	
Sample units	LCS	
Moisture Content	n/a	
Matrix	QC	
Sampling Date	n/a	
Extraction Date	20-Oct-20	
Target Analytes	**%**	
Naphthalene	173	M,R
2-Methylnaphthalene	132	
1-Methylnaphthalene	138	
Acenaphthylene	172	
Acenaphthene	152	
Fluorene	156	
Phenanthrene	157	
Anthracene	153	
Fluoranthene	152	
Pyrene	152	
Benzo(a)Anthracene	151	
Chrysene/Triphenylene	152	
Benzo(b)Fluoranthene	137	
Benzo(k)Fluoranthene	149	
Benzo(e)Pyrene	140	
Benzo(a)Pyrene	144	
Perylene	159	
Indeno(1,2,3-cd)Pyrene	143	
Dibenzo(a,c/a,h)Anthracene	138	
Benzo(g,h,i)Perylene	144	
Field Sampling Standards	**% Rec**	
1-Methylnaphthalene-D10	NS	
Fluorene D10	NS	
Terphenyl D14(Surr.)	NS	
Extraction Standards	**% Rec**	
Naphthalene D8	58.7	R
2-Methylnaphthalene-D10	68.2	
Acenaphthylene D8	55.0	
Phenanthrene D10	59.4	
Anthracene-D10	55.4	
Fluoranthene D10	60.6	
Benz(a)Anthracene-D12	63.2	
Chrysene D12	62.8	
Benzo(b)Fluoranthene-D12	80.5	
Benzo(k)Fluoranthene-D12	81.4	
Benzo(a)Pyrene D12	86.2	
Perylene D12	77.7	
Indeno(1,2,3,cd)Pyrene-D12	75.2	
Dibenz(a,h)Anthracene-D14	75.4	
Benzo(g,h,i)Perylene D12	77.9	

M Indicates that a peak has been manually integrated.

R Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a
ALS Sample ID	WG3423049-1	Extraction Date	20-Oct-20
Analysis Method	PAH by CARB 429		
Analysis Type	blank		
Sample Matrix	QC		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	8	Workgroup	WG3423049

Approved:
T.Patterson
--e-signature--
28-Oct-2020

Run Information	**Run 1**
Filename	201027A25.D
Run Date	10/28/2020 4:13
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng
Instrument	MSD-5
Column	HP5MS USO179454H

Target Analytes	**Ret. Time**	**Concentration ng**		**Flags**
Naphthalene	2.91	110	M	R
2-Methylnaphthalene	3.53	<16		U
1-Methylnaphthalene	3.65	<16		U
Acenaphthylene	4.74	<16		U
Acenaphthene	5.01	<16		U
Fluorene	5.95	21.8		R
Phenanthrene	8.18	<16		U
Anthracene	8.30	<16		U
Fluoranthene	11.61	<16		U
Pyrene	12.26	<16		U
Benzo(a)Anthracene	NotFnd	<16		U
Chrysene/Triphenylene	16.32	<16		U
Benzo(b)Fluoranthene	19.58	<16		U
Benzo(k)Fluoranthene	NotFnd	<16		U
Benzo(e)Pyrene	NotFnd	<16		U
Benzo(a)Pyrene	20.42	<16		U
Perylene	NotFnd	<16		U
Indeno(1,2,3-cd)Pyrene	24.21	<16		U
Dibenzo(a,c/a,h)Anthracene	24.43	<16		U
Benzo(g,h,i)Perylene	25.23	<16		U
Additional Analytes				
Tetralin	2.78	63.5		R
Quinoline	3.18	<16		U
2-Chloronaphthalene	4.11	<16		U
Biphenyl	4.09	<16		U
o-Terphenyl	NotFnd	<16		U
1-Methylphenanthrene	9.77	473		R
9-Methylphenanthrene	NotFnd	<16		U
2-methylanthracene	NotFnd	<16		U
9,10-dimethylanthracene	12.52	<16		U
m-terphenyl	12.64	<16		U
p-terphenyl	NotFnd	<16		U
Benzo(a)fluorene	NotFnd	<16		U
Benzo(b)fluorene	13.62	<16		U
Benzo(b)anthracene	16.32	<16		U
7,12-Dimethylbenzo(a)anthracene	19.66	<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	**% Rec**
1-Methylnaphthalene-D10	NS
Fluorene D10	NS
Terphenyl D14(Surr.)	NS

Extraction Standards			**% Rec**		**Limits**
Naphthalene D8	800	2.90	78.9	R	50-150
2-Methylnaphthalene-D10	800	3.50	98.1		50-150
Acenaphthylene D8	800	4.68	82.4		50-150
Phenanthrene D10	800	8.12	82.7		50-150
Anthracene-D10	440	8.24	77.5		50-150
Fluoranthene D10	800	11.56	84.5		50-150
Benz(a)Anthracene-D12	800	16.14	87.7		50-150
Chrysene D12	800	16.24	88.1		50-150
Benzo(b)Fluoranthene-D12	800	19.50	106.8		50-150
Benzo(k)Fluoranthene-D12	800	19.59	109.8		50-150
Benzo(a)Pyrene D12	800	20.39	114.2		50-150
Perylene D12	800	20.63	104.7		50-150
Indeno(1,2,3,cd)Pyrene-D12	800	24.14	97.5		50-150
Dibenz(a,h)Anthracene-D14	800	24.30	97.2		50-150
Benzo(g,h,i)Perylene D12	800	25.12	102.2		50-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
NS	Indicates that this standard was not spiked to sample

ALS Life Sciences

Sample Analysis Report

Sample Name	**20-22030-SVOC-(1 THRU 5) TEST#1**	Sampling Date	6-Oct-20
ALS Sample ID	L2515221-1	Extraction Date	20-Oct-20
Analysis Method	PAH by CARB 429		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	8	Workgroup	WG3423049

Approved:
T.Patterson
--e-signature--
28-Oct-2020

Run Information	**Run 1**
Filename	201027A28.D
Run Date	10/28/2020 6:04
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng
Instrument	MSD-5
Column	HP5MS USO179454H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**
Naphthalene	2.91	3240	R
2-Methylnaphthalene	3.53	545	
1-Methylnaphthalene	3.65	350 M	R
Acenaphthylene	4.71	144	R
Acenaphthene	5.02	179 M	R
Fluorene	5.96	970	R
Phenanthrene	8.18	731	
Anthracene	8.30	244	R
Fluoranthene	11.61	254 M	R
Pyrene	12.27	166	R
Benzo(a)Anthracene	16.21	<16	U
Chrysene/Triphenylene	16.32	39.2 M	
Benzo(b)Fluoranthene	19.57	<16	U
Benzo(k)Fluoranthene	19.62	<16	U
Benzo(e)Pyrene	20.31	26.2	
Benzo(a)Pyrene	20.42	144 M	R
Perylene	NotFnd	<16	U
Indeno(1,2,3-cd)Pyrene	24.22	16.0 M	
Dibenzo(a,c/a,h)Anthracene	24.44	<16	U
Benzo(g,h,i)Perylene	25.23	70.6	
Additional Analytes			
Tetralin	2.78	554 M B	R
Quinoline	3.17	5030 M	
2-Chloronaphthalene	NotFnd	<16	U
Biphenyl	4.09	426 M	
o-Terphenyl	9.47	62.2 M	
1-Methylphenanthrene	9.77	671	R
9-Methylphenanthrene	9.87	88.0	
2-methylanthracene	9.93	237	
9,10-dimethylanthracene	NotFnd	<16	U
m-terphenyl	12.66	58.2 M	
p-terphenyl	13.14	32.7 M	
Benzo(a)fluorene	13.41	<16	U
Benzo(b)fluorene	13.62	<16	U
Benzo(b)anthracene	16.32	39.8 M	
7,12-Dimethylbenzo(a)anthracene	19.71	<16	U
3-Methylcholanthrene	NotFnd	<80	U
Picene	NotFnd	<80	U
Dibenzo(a,e)pyrene	NotFnd	<80	U
Coronene	29.88	<80	U

Field Sampling Standards	**ng spiked**		**% Rec**	
1-Methylnaphthalene-D10	600	3.61	27.9	
Fluorene D10	600	5.93	INT	
Terphenyl D14(Surr.)	600	13.08	44.3 M	

Extraction Standards			**% Rec**		**Limits**
Naphthalene D8	800	2.90	52.2	R	50-150
2-Methylnaphthalene-D10	800	3.50	67.6		50-150
Acenaphthylene D8	800	4.69	8.8		50-150
Phenanthrene D10	800	8.13	66.5	R	50-150
Anthracene-D10	440	8.25	8.8 M		50-150
Fluoranthene D10	800	11.56	72.1		50-150
Benz(a)Anthracene-D12	800	16.14	37.2		50-150
Chrysene D12	800	16.24	69.5		50-150
Benzo(b)Fluoranthene-D12	800	19.51	82.8		50-150
Benzo(k)Fluoranthene-D12	800	19.59	76.2		50-150
Benzo(a)Pyrene D12	800	20.39	9.7 M	R	50-150
Perylene D12	800	20.63	10.6	R	50-150
Indeno(1,2,3,cd)Pyrene-D12	800	24.14	68.7		50-150
Dibenz(a,h)Anthracene-D14	800	24.31	77.1		50-150
Benzo(g,h,i)Perylene D12	800	25.12	79.4		50-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	The analyte was detected in the method blank at > 10% of the sample concentration
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
INT	Interference

ALS Life Sciences

Sample Analysis Report

Sample Name	**20-22030-SVOC-(6 THRU 10) TEST#2**	Sampling Date	7-Oct-20
ALS Sample ID	L2515221-2	Extraction Date	20-Oct-20
Analysis Method	PAH by CARB 429		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	8	Workgroup	WG3423049

Approved:
T.Patterson
--e-signature--
28-Oct-2020

Run Information	**Run 1**
Filename	201027A29.D
Run Date	10/28/2020 6:41
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng
Instrument	MSD-5
Column	HP5MS USO179454H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**	
Naphthalene	2.91	3190	M	
2-Methylnaphthalene	3.53	292		
1-Methylnaphthalene	3.65	252	M	R
Acenaphthylene	4.71	48.2	M	R
Acenaphthene	5.02	91.4		R
Fluorene	5.96	766		R
Phenanthrene	8.18	327		
Anthracene	8.30	61.7	M	
Fluoranthene	11.61	59.9		R
Pyrene	12.27	59.9		R
Benzo(a)Anthracene	16.21	<16	U	
Chrysene/Triphenylene	16.32	<16	U	
Benzo(b)Fluoranthene	19.59	<16	U	
Benzo(k)Fluoranthene	19.63	<16	U	
Benzo(e)Pyrene	20.32	<16	U	
Benzo(a)Pyrene	20.42	41.9	M	
Perylene	20.70	<16	U	
Indeno(1,2,3-cd)Pyrene	24.21	<16	U	
Dibenzo(a,c/a,h)Anthracene	24.50	17.0		R
Benzo(g,h,i)Perylene	25.24	34.2		
Additional Analytes				
Tetralin	2.78	287	M	B
Quinoline	3.20	633	M	
2-Chloronaphthalene	NotFnd	<16	U	
Biphenyl	4.09	234	M	
o-Terphenyl	9.47	<16	U	
1-Methylphenanthrene	9.77	166		R
9-Methylphenanthrene	9.88	37.1		
2-methylanthracene	9.93	90.7	M	
9,10-dimethylanthracene	12.53	<16	U	
m-terphenyl	12.66	<16	U	
p-terphenyl	13.14	<16	U	
Benzo(a)fluorene	NotFnd	<16	U	
Benzo(b)fluorene	13.63	<16	U	
Benzo(b)anthracene	16.32	<16	U	
7,12-Dimethylbenzo(a)anthracene	NotFnd	<16	U	
3-Methylcholanthrene	21.78	84.7		R
Picene	NotFnd	<80	U	
Dibenzo(a,e)pyrene	NotFnd	<80	U	
Coronene	29.90	<80	U	

Field Sampling Standards	**ng spiked**		**% Rec**		
1-Methylnaphthalene-D10	600	3.61	71.6		
Fluorene D10	600	5.90	97.8	M	
Terphenyl D14(Surr.)	600	13.08	97.6		

Extraction Standards			**% Rec**		**Limits**
Naphthalene D8	800	2.89	55.6		50-150
2-Methylnaphthalene-D10	800	3.50	92.7		50-150
Acenaphthylene D8	800	4.69	46.7		50-150
Phenanthrene D10	800	8.13	81.7	R	50-150
Anthracene-D10	440	8.25	37.8	R	50-150
Fluoranthene D10	800	11.56	87.6		50-150
Benz(a)Anthracene-D12	800	16.14	68.0		50-150
Chrysene D12	800	16.24	85.3		50-150
Benzo(b)Fluoranthene-D12	800	19.51	112.3		50-150
Benzo(k)Fluoranthene-D12	800	19.59	117.7		50-150
Benzo(a)Pyrene D12	800	20.40	37.9		50-150
Perylene D12	800	20.63	14.4	R	50-150
Indeno(1,2,3,cd)Pyrene-D12	800	24.14	108.9		50-150
Dibenz(a,h)Anthracene-D14	800	24.31	111.2		50-150
Benzo(g,h,i)Perylene D12	800	25.13	112.0		50-150

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

ALS Life Sciences

Sample Analysis Report

Sample Name	**20-22030-SVOC-(11 THRU 15) TEST#3**		Sampling Date	8-Oct-20	
ALS Sample ID	L2515221-3		Extraction Date	20-Oct-20	
Analysis Method	PAH by CARB 429				
Analysis Type	sample				
Sample Matrix	Stack				Approved:
Sample Size	1	Sample			*T.Patterson*
Percent Moisture	n/a				--e-signature--
Split Ratio	8		Workgroup	WG3423049	28-Oct-2020

Run Information	**Run 1**
Filename	201027A30.D
Run Date	10/28/2020 7:18
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng
Instrument	MSD-5
Column	HP5MS USO179454H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**	
Naphthalene	2.91	4710		
2-Methylnaphthalene	3.53	180		
1-Methylnaphthalene	3.65	235	M	R
Acenaphthylene	4.71	83.8		R
Acenaphthene	5.03	16.7	M	
Fluorene	5.96	113		R
Phenanthrene	8.18	295		
Anthracene	8.31	42.7		R
Fluoranthene	11.61	73.8		
Pyrene	12.27	75.4		R
Benzo(a)Anthracene	16.17	<16	U	
Chrysene/Triphenylene	16.32	<16	U	
Benzo(b)Fluoranthene	19.59	<16	U	
Benzo(k)Fluoranthene	19.60	<16	U	
Benzo(e)Pyrene	20.32	36.2	M	R
Benzo(a)Pyrene	20.42	29.8		R
Perylene	NotFnd	<16	U	
Indeno(1,2,3-cd)Pyrene	24.22	19.1		
Dibenzo(a,c/a,h)Anthracene	24.50	16.6		R
Benzo(g,h,i)Perylene	25.23	71.8		
Additional Analytes				
Tetralin	2.77	340	M	B
Quinoline	3.20	93.9	M	R
2-Chloronaphthalene	4.11	<16	U	
Biphenyl	4.09	898		
o-Terphenyl	9.48	17.2		
1-Methylphenanthrene	9.77	160		R
9-Methylphenanthrene	9.88	39.7		
2-methylanthracene	9.93	104		
9,10-dimethylanthracene	NotFnd	<16	U	
m-terphenyl	12.66	17.1		R
p-terphenyl	13.14	<16	U	
Benzo(a)fluorene	13.45	<16	U	
Benzo(b)fluorene	13.63	<16	U	
Benzo(b)anthracene	16.32	<16	U	
7,12-Dimethylbenzo(a)anthracene	19.72	<16	U	
3-Methylcholanthrene	NotFnd	<80	U	
Picene	24.98	<80	U	
Dibenzo(a,e)pyrene	NotFnd	<80	U	
Coronene	29.89	<80	U	

Field Sampling Standards	**ng spiked**	**Ret. Time**	**% Rec**		
1-Methylnaphthalene-D10	600	3.61	71.7		R
Fluorene D10	600	5.91	102.1	M	
Terphenyl D14(Surr.)	600	13.08	100.3		

Extraction Standards			**% Rec**		**Limits**
Naphthalene D8	800	2.89	40.2	R	50-150
2-Methylnaphthalene-D10	800	3.50	62.6		50-150
Acenaphthylene D8	800	4.69	33.7		50-150
Phenanthrene D10	800	8.13	58.5		50-150
Anthracene-D10	440	8.25	34.5		50-150
Fluoranthene D10	800	11.57	60.2		50-150
Benz(a)Anthracene-D12	800	16.14	52.2		50-150
Chrysene D12	800	16.25	60.1		50-150
Benzo(b)Fluoranthene-D12	800	19.51	78.2		50-150
Benzo(k)Fluoranthene-D12	800	19.59	79.8		50-150
Benzo(a)Pyrene D12	800	20.40	51.1		50-150
Perylene D12	800	20.63	58.0		50-150
Indeno(1,2,3,cd)Pyrene-D12	800	24.14	79.7		50-150
Dibenz(a,h)Anthracene-D14	800	24.31	81.4		50-150
Benzo(g,h,i)Perylene D12	800	25.13	83.6		50-150

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

ALS Life Sciences

Sample Analysis Report

Sample Name	**20-22030-SVOC-(16 THRU 20) BLANK**	Sampling Date	8-Oct-20
ALS Sample ID	L2515221-4	Extraction Date	20-Oct-20
Analysis Method	PAH by CARB 429		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	8	Workgroup	WG3423049

Approved:
T.Patterson
--e-signature--
28-Oct-2020

Run Information	**Run 1**
Filename	201027A27.D
Run Date	10/28/2020 5:27
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng
Instrument	MSD-5
Column	HP5MS USO179454H

Target Analytes	**Ret. Time**	**Concentration ng**	**Flags**
Naphthalene	2.91	215 M	R
2-Methylnaphthalene	3.53	<16	U
1-Methylnaphthalene	3.65	<16	U
Acenaphthylene	4.72	19.9 M	R
Acenaphthene	5.01	116	R
Fluorene	5.95	1190	R
Phenanthrene	8.17	41.0	
Anthracene	8.30	21.7	
Fluoranthene	11.61	17.8 M	
Pyrene	12.26	21.9 M	R
Benzo(a)Anthracene	NotFnd	<16	U
Chrysene/Triphenylene	16.32	<16	U
Benzo(b)Fluoranthene	19.59	<16	U
Benzo(k)Fluoranthene	19.62	<16	U
Benzo(e)Pyrene	20.31	<16	U
Benzo(a)Pyrene	20.42	18.7 M	
Perylene	NotFnd	<16	U
Indeno(1,2,3-cd)Pyrene	24.23	<16	U
Dibenzo(a,c/a,h)Anthracene	24.48	<16	U
Benzo(g,h,i)Perylene	25.23	44.6	
Additional Analytes			
Tetralin	2.78	315	R
Quinoline	3.16	815	
2-Chloronaphthalene	NotFnd	<16	U
Biphenyl	4.09	98.7 M	
o-Terphenyl	9.47	<16	U
1-Methylphenanthrene	9.77	351	R
9-Methylphenanthrene	9.87	<16	U
2-methylanthracene	9.93	<16	U
9,10-dimethylanthracene	12.54	50.8 M	
m-terphenyl	12.65	<16	U
p-terphenyl	13.15	<16	U
Benzo(a)fluorene	13.44	<16	U
Benzo(b)fluorene	13.62	<16	U
Benzo(b)anthracene	16.32	<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	29.88	<80	U

Field Sampling Standards	**ng spiked**		**% Rec**	
1-Methylnaphthalene-D10	600	3.61	83.9	
Fluorene D10	600	5.89	126	
Terphenyl D14(Surr.)	600	13.07	97	

Extraction Standards			**% Rec**		**Limits**
Naphthalene D8	800	2.90	65.9	R	50-150
2-Methylnaphthalene-D10	800	3.50	77.2		50-150
Acenaphthylene D8	800	4.68	43.8		50-150
Phenanthrene D10	800	8.12	78.9		50-150
Anthracene-D10	440	8.24	46.5		50-150
Fluoranthene D10	800	11.56	79.6		50-150
Benz(a)Anthracene-D12	800	16.13	71.8		50-150
Chrysene D12	800	16.24	82.2		50-150
Benzo(b)Fluoranthene-D12	800	19.51	101.1		50-150
Benzo(k)Fluoranthene-D12	800	19.59	99.9		50-150
Benzo(a)Pyrene D12	800	20.39	65.6		50-150
Perylene D12	800	20.63	70.8		50-150
Indeno(1,2,3,cd)Pyrene-D12	800	24.14	89.5		50-150
Dibenz(a,h)Anthracene-D14	800	24.30	94.7		50-150
Benzo(g,h,i)Perylene D12	800	25.12	99.4		50-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a
ALS Sample ID	WG3423049-2	Extraction Date	20-Oct-20
Analysis Method	PAH by CARB 429		
Analysis Type	LCS		
Sample Matrix	QC		
Sample Size	1 LCS		
Percent Moisture	n/a		
Split Ratio	8	Workgroup	WG3423049

Approved:
T.Patterson
--e-signature--
28-Oct-2020

Run Information	**Run 1**
Filename	201027A23.D
Run Date	10/28/2020 2:59
Final Volume	1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-5
Column	HP5MS USO179454H

Target Analytes	**ug spiked**	**Ret. Time**	**%**		**Flags**	**Limits**
Naphthalene	800	2.91	173.4	M	R	50-150
2-Methylnaphthalene	800	3.53	132.2			50-150
1-Methylnaphthalene	800	3.65	137.6			50-150
Acenaphthylene	800	4.70	171.7			50-150
Acenaphthene	800	5.00	152			50-150
Fluorene	800	5.94	156.3			50-150
Phenanthrene	800	8.17	157			50-150
Anthracene	800	8.29	152.7			50-150
Fluoranthene	800	11.61	151.5			50-150
Pyrene	800	12.26	152.1			50-150
Benzo(a)Anthracene	800	16.20	151.4			50-150
Chrysene/Triphenylene	800	16.32	152.4			50-150
Benzo(b)Fluoranthene	800	19.57	136.7			50-150
Benzo(k)Fluoranthene	800	19.64	149			50-150
Benzo(e)Pyrene	800	20.31	139.6			50-150
Benzo(a)Pyrene	800	20.45	143.5			50-150
Perylene	800	20.69	159.2			50-150
Indeno(1,2,3-cd)Pyrene	800	24.22	143			50-150
Dibenzo(a,c/a,h)Anthracene	800	24.43	138			50-150
Benzo(g,h,i)Perylene	800	25.23	143.5			50-150

Field Sampling Standards	**% Rec**
1-Methylnaphthalene-D10	NS
Fluorene D10	NS
Terphenyl D14(Surr.)	NS

Extraction Standards			**% Rec**		**Limits**
Naphthalene D8	800	2.90	58.7	R	30-150
2-Methylnaphthalene-D10	800	3.49	68.2		30-150
Acenaphthylene D8	800	4.68	55.0		30-150
Phenanthrene D10	800	8.12	59.4		50-150
Anthracene-D10	440	8.24	55.4		50-150
Fluoranthene D10	800	11.56	60.6		50-150
Benz(a)Anthracene-D12	800	16.13	63.2		50-150
Chrysene D12	800	16.24	62.8		50-150
Benzo(b)Fluoranthene-D12	800	19.50	80.5		50-150
Benzo(k)Fluoranthene-D12	800	19.59	81.4		50-150
Benzo(a)Pyrene D12	800	20.39	86.2		30-150
Perylene D12	800	20.63	77.7		50-150
Indeno(1,2,3,cd)Pyrene-D12	800	24.14	75.2		50-150
Dibenz(a,h)Anthracene-D14	800	24.30	75.4		50-150
Benzo(g,h,i)Perylene D12	800	25.12	77.9		50-150

M	Indicates that a peak has been manually integrated.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
NS	Indicates that this standard was not spiked to sample

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
ALS WO#:	L2515810		Mississauga
Date of Report	19-Nov-20		ON L5J 2Y4
Date of Sample Receipt	13-Oct-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 Clean Harbors

COMMENTS: **PCDD/F by EPA 1613B via Isotope Dilution**

All results have been reported on an as-received basis.

Certified by:

Steve Kennedy, C.Chem.
Technical Supervisor

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	20-22030-RC-4 RICH FEED	Duplicate	20-22030-LC-4 LEAN FEED	20-22030-AC-4 ALKALINE FEED	20-22030-EC-4 EMULSION FEED
ALS Sample ID	L2515810-1	WG3423769-4	L2515810-2	L2515810-3	L2515810-4
Sample Size	1.5045	1.1391	1.3066	1.4864	1.2800
Sample size units	g	g	g	g	g
Percent Moisture	73.4%	73.9%	88.7%	99.3%	84.7%
Sample Matrix	Stack	QC	Stack	Stack	Stack
Sampling Date	n/a	n/a	n/a	n/a	n/a
Extraction Date	7-Nov-20	7-Nov-20	7-Nov-20	7-Nov-20	7-Nov-20
Target Analytes	**pg/g**	**pg/g**	**pg/g**	**pg/g**	**pg/g**
2,3,7,8-TCDD	<0.44	<1.2	<0.83	<0.42	<0.82
1,2,3,7,8-PeCDD	<0.79	<1.4	1.65	<0.20	<1.1
1,2,3,4,7,8-HxCDD	<1.5	<3.7	<2.0	<0.24	<3.2
1,2,3,6,7,8-HxCDD	<6.8	<6.7	<2.1	<0.21	<4.3
1,2,3,7,8,9-HxCDD	<2.5	<3.7	<2.0	<0.15	<6.4
1,2,3,4,6,7,8-HpCDD	454	375	51.3	<1.0	226
OCDD	6060	5170	606	<17	3030
2,3,7,8-TCDF	<0.75	<1.3	1.26	<0.20	1.19
1,2,3,7,8-PeCDF	<0.50	<0.99	<0.77	<0.19	<0.77
2,3,4,7,8-PeCDF	<0.68	<1.6	0.964	<0.17	1.46
1,2,3,4,7,8-HxCDF	<1.2	<2.1	<1.4	<0.11	<1.8
1,2,3,6,7,8-HxCDF	<1.2	<2.1	<1.5	<0.14	<1.7
2,3,4,6,7,8-HxCDF	<3.2	<2.8	<1.4	<0.15	<1.8
1,2,3,7,8,9-HxCDF	<1.5	<2.5	<1.8	<0.16	<2.2
1,2,3,4,6,7,8-HpCDF	<23	29.6	12.7	<0.24	20.0
1,2,3,4,7,8,9-HpCDF	<1.0	<5.9	3.21	<0.35	<1.8
OCDF	232	273	108	<2.1	196
Extraction Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**	**% Rec**
13C12-2,3,7,8-TCDD	69	74	72	68	71
13C12-1,2,3,7,8-PeCDD	52	56	58	66	53
13C12-1,2,3,4,7,8-HxCDD	65	72	75	76	71
13C12-1,2,3,6,7,8-HxCDD	69	70	70	71	72
13C12-1,2,3,4,6,7,8-HpCDD	53	72	56	62	53
13C12-OCDD	50	76	50	54	45
13C12-2,3,7,8-TCDF	66	80	77	75	76
13C12-1,2,3,7,8-PeCDF	54	59	60	70	57
13C12-2,3,4,7,8-PeCDF	57	61	59	66	56
13C12-1,2,3,4,7,8-HxCDF	68	70	73	71	71
13C12-1,2,3,6,7,8-HxCDF	71	68	71	72	72
13C12-2,3,4,6,7,8-HxCDF	72	75	78	79	75
13C12-1,2,3,7,8,9-HxCDF	64	68	68	64	71
13C12-1,2,3,4,6,7,8-HpCDF	53	67	57	60	55
13C12-1,2,3,4,7,8,9-HpCDF	46	60	51	52	48
Cleanup Standard					
37Cl4-2,3,7,8-TCDD (Cleanup)	76	69	73	66	71
Homologue Group Totals	**pg/g**	**pg/g**	**pg/g**	**pg/g**	**pg/g**
Total-TCDD	<0.44	<1.2	<0.83	<0.42	<0.82
Total-PeCDD	0.911	<1.4	1.65	<0.20	<1.1
Total-HxCDD	56.0	93.4	15.8	<0.15	92.2
Total-HpCDD	1330	1150	136	<0.54	808
Total-TCDF	0.751	<1.3	6.63	<0.20	1.19
Total-PeCDF	<0.50	<0.84	0.964	<0.19	1.46
Total-HxCDF	16.7	15.2	6.28	<0.15	3.96
Total-HpCDF	108	29.6	59.8	<0.35	104
Toxic Equivalency - (WHO 2005)					
Lower Bound PCDD/F TEQ (WHO 2005)	6.43	5.68	2.95	0.00	3.98
Mid Point PCDD/F TEQ (WHO 2005)	9.08	9.27	4.09	0.470	6.57
Upper Bound PCDD/F TEQ (WHO 2005)	9.98	11.3	5.02	0.834	8.09

ALS Life Sciences

Quality Control Summary Report

Sample Name	Method Blank	Laboratory Control Sample
ALS Sample ID	WG3423769-1	WG3423769-2
Sample Size	1.00	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	7-Nov-20	7-Nov-20
Target Analytes	**pg/g**	**% Rec**
2,3,7,8-TCDD	<0.60	95
1,2,3,7,8-PeCDD	<0.36	118
1,2,3,4,7,8-HxCDD	<0.41	107
1,2,3,6,7,8-HxCDD	<0.59	99
1,2,3,7,8,9-HxCDD	<0.70	111
1,2,3,4,6,7,8-HpCDD	<1.6	99
OCDD	<25	102
2,3,7,8-TCDF	<0.41	105
1,2,3,7,8-PeCDF	<0.33	107
2,3,4,7,8-PeCDF	<0.29	96
1,2,3,4,7,8-HxCDF	<0.22	106
1,2,3,6,7,8-HxCDF	<0.21	103
2,3,4,6,7,8-HxCDF	<0.20	100
1,2,3,7,8,9-HxCDF	<0.29	104
1,2,3,4,6,7,8-HpCDF	0.850	115
1,2,3,4,7,8,9-HpCDF	<0.83	107
OCDF	<5.1	93
Extraction Standards	**% Rec**	**% Rec**
13C12-2,3,7,8-TCDD	52	52
13C12-1,2,3,7,8-PeCDD	49	52
13C12-1,2,3,4,7,8-HxCDD	56	52
13C12-1,2,3,6,7,8-HxCDD	55	59
13C12-1,2,3,4,6,7,8-HpCDD	53	47
13C12-OCDD	45	36
13C12-2,3,7,8-TCDF	56	52
13C12-1,2,3,7,8-PeCDF	51	53
13C12-2,3,4,7,8-PeCDF	50	52
13C12-1,2,3,4,7,8-HxCDF	52	48
13C12-1,2,3,6,7,8-HxCDF	53	56
13C12-2,3,4,6,7,8-HxCDF	58	54
13C12-1,2,3,7,8,9-HxCDF	48	45
13C12-1,2,3,4,6,7,8-HpCDF	50	44
13C12-1,2,3,4,7,8,9-HpCDF	44	39
Cleanup Standard		
37Cl4-2,3,7,8-TCDD (Cleanup)	50	68
Homologue Group Totals	**pg/g**	
Total-TCDD	<0.60	
Total-PeCDD	<0.36	
Total-HxCDD	<0.41	
Total-HpCDD	0.730	
Total-TCDF	<0.41	
Total-PeCDF	<0.33	
Total-HxCDF	<0.29	
Total-HpCDF	0.850	
Toxic Equivalency - (WHO 2005)		
Lower Bound PCDD/F TEQ (WHO 2005)	0.00850	
Mid Point PCDD/F TEQ (WHO 2005)	0.782	
Upper Bound PCDD/F TEQ (WHO 2005)	1.40	

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Sample Analysis Report

Sample Name	**20-22030-RC-4 RICH FEED**	Sampling Date	n/a		Approved:
ALS Sample ID	L2515810-1	Extraction Date	7-Nov-20		*N Ashtari*
Analysis Method	EPA 1613B	Sample Size	1.5045	g	--e-signature--
Analysis Type	Sample	Percent Moisture	73.4%		18-Nov-2020
Sample Matrix	Stack	Split Ratio	2		

Run Information	**Run 1**
Filename	7-201113A23
Run Date	14-Nov-20 06:38
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS7 DB5MSUS0287846H

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	<0.44	0.44	U		6.6
1,2,3,7,8-PeCDD	1	NotFnd	<0.79	0.79	U		33
1,2,3,4,7,8-HxCDD	0.1	33.99	<1.5	1.5	M,U		33
1,2,3,6,7,8-HxCDD	0.1	34.06	<6.8	1.4	J,R	6.8	33
1,2,3,7,8,9-HxCDD	0.1	34.18	<2.5	1.5	M,J,R	2.5	33
1,2,3,4,6,7,8-HpCDD	0.01	35.64	454	3.3			33
OCDD	0.0003	37.07	6060	6.2			66
2,3,7,8-TCDF	0.1	26.38	<0.75	0.70	M,J,R	0.75	6.6
1,2,3,7,8-PeCDF	0.03	NotFnd	<0.50	0.50	U		33
2,3,4,7,8-PeCDF	0.3	31.65	<0.68	0.43	M,J,R	0.68	33
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<1.2	1.2	U		33
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<1.2	1.2	U		33
2,3,4,6,7,8-HxCDF	0.1	33.92	<3.2	1.2	J,R	3.2	33
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<1.5	1.5	U		33
1,2,3,4,6,7,8-HpCDF	0.01	35.08	<23	0.66	M,J,R	23	33
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.0	1.0	U		33
OCDF	0.0003	37.17	232	1.7			66

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	27.26	69	25-164
13C12-1,2,3,7,8-PeCDD	2000	31.86	52	25-181
13C12-1,2,3,4,7,8-HxCDD	2000	33.99	65	32-141
13C12-1,2,3,6,7,8-HxCDD	2000	34.05	69	28-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.63	53	23-140
13C12-OCDD	4000	37.07	50	17-157
13C12-2,3,7,8-TCDF	2000	26.35	66	24-169
13C12-1,2,3,7,8-PeCDF	2000	30.85	54	24-185
13C12-2,3,4,7,8-PeCDF	2000	31.64	57	21-178
13C12-1,2,3,4,7,8-HxCDF	2000	33.48	68	26-152
13C12-1,2,3,6,7,8-HxCDF	2000	33.55	71	26-123
13C12-2,3,4,6,7,8-HxCDF	2000	33.90	72	28-136
13C12-1,2,3,7,8,9-HxCDF	2000	34.32	64	29-147
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.08	53	28-143
13C12-1,2,3,4,7,8,9-HpCDF	2000	35.87	46	26-138

Cleanup Standard	**pg**				
37Cl4-2,3,7,8-TCDD {Cleanup}	40	27.28	76	35-197	M

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**		
Total-TCDD	0	<0.44	0.44	U	6.6
Total-PeCDD	1	0.911	0.79		33
Total-HxCDD	2	56.0	1.5		33
Total-HpCDD	2	1330	3.3		33
Total-TCDF	1	0.751	0.70		6.6
Total-PeCDF	0	<0.50	0.50	U	33
Total-HxCDF	1	16.7	1.5		33
Total-HpCDF	1	108	1.0		33

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	6.43
Mid Point PCDD/F TEQ (WHO 2005)	9.08
Upper Bound PCDD/F TEQ (WHO 2005)	9.98

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**	Sampling Date	n/a	
ALS Sample ID	WG3423769-4	Extraction Date	7-Nov-20	
Analysis Method	EPA 1613B	Sample Size	1.1391 g	
Analysis Type	Sample	Percent Moisture	73.9%	
Sample Matrix	QC	Split Ratio	2	

Approved:
N Ashtari
--e-signature--
18-Nov-2020

Run Information	**Run 1**
Filename	7-201113A24
Run Date	14-Nov-20 07:20
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS7 DB5MSUS0287846H

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	<1.2	1.2	U		8.8
1,2,3,7,8-PeCDD	1	NotFnd	<1.4	1.4	U		44
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<3.7	3.7	U		44
1,2,3,6,7,8-HxCDD	0.1	34.08	<6.7	3.6	J,R	6.7	44
1,2,3,7,8,9-HxCDD	0.1	34.18	<3.7	3.7	M,U	0.39	44
1,2,3,4,6,7,8-HpCDD	0.01	35.64	375	6.9			44
OCDD	0.0003	37.08	5170	8.3			88
2,3,7,8-TCDF	0.1	NotFnd	<1.3	1.3	U		8.8
1,2,3,7,8-PeCDF	0.03	30.89	<0.99	0.84	M,J,R	0.99	44
2,3,4,7,8-PeCDF	0.3	31.65	<1.6	0.67	J,R	1.6	44
1,2,3,4,7,8-HxCDF	0.1	33.49	<2.1	2.1	U	2.1	44
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<2.1	2.1	U		44
2,3,4,6,7,8-HxCDF	0.1	33.92	<2.8	1.9	M,J,R	2.8	44
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<2.5	2.5	U		44
1,2,3,4,6,7,8-HpCDF	0.01	35.09	29.6	1.6	J		44
1,2,3,4,7,8,9-HpCDF	0.01	35.88	<5.9	2.2	M,J,R	5.9	44
OCDF	0.0003	37.17	273	2.4			88

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	27.28	74	25-164
13C12-1,2,3,7,8-PeCDD	2000	31.88	56	25-181
13C12-1,2,3,4,7,8-HxCDD	2000	34.00	72	32-141
13C12-1,2,3,6,7,8-HxCDD	2000	34.06	70	28-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.64	72	23-140
13C12-OCDD	4000	37.08	76	17-157
13C12-2,3,7,8-TCDF	2000	26.37	80	24-169
13C12-1,2,3,7,8-PeCDF	2000	30.86	59	24-185
13C12-2,3,4,7,8-PeCDF	2000	31.64	61	21-178
13C12-1,2,3,4,7,8-HxCDF	2000	33.49	70	26-152
13C12-1,2,3,6,7,8-HxCDF	2000	33.56	68	26-123
13C12-2,3,4,6,7,8-HxCDF	2000	33.90	75	28-136
13C12-1,2,3,7,8,9-HxCDF	2000	34.32	68	29-147
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.08	67	28-143
13C12-1,2,3,4,7,8,9-HpCDF	2000	35.88	60	26-138

Cleanup Standard	**pg**			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	27.29	69	35-197

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**		
Total-TCDD	0	<1.2	1.2	U	8.8
Total-PeCDD	0	<1.4	1.4	U	44
Total-HxCDD	2	93.4	3.7		44
Total-HpCDD	2	1150	6.9		44
Total-TCDF	0	<1.3	1.3	U	8.8
Total-PeCDF	0	<0.84	0.84	U	44
Total-HxCDF	1	15.2	2.5		44
Total-HpCDF	1	29.6	2.2		44

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	5.68
Mid Point PCDD/F TEQ (WHO 2005)	9.27
Upper Bound PCDD/F TEQ (WHO 2005)	11.3

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

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Sample Analysis Report

Sample Name	**20-22030-LC-4 LEAN FEED**	Sampling Date	n/a		Approved:
ALS Sample ID	L2515810-2	Extraction Date	7-Nov-20		*N Ashtari*
Analysis Method	EPA 1613B	Sample Size	1.3066	g	--e-signature--
Analysis Type	Sample	Percent Moisture	88.7%		18-Nov-2020
Sample Matrix	Stack	Split Ratio	2		

Run Information	**Run 1**
Filename	7-201113A25
Run Date	14-Nov-20 08:02
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS7 DB5MSUS0287846H

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	<0.83	0.83	U		7.7
1,2,3,7,8-PeCDD	1	31.90	1.65	1.2	M,J		38
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<2.0	2.0	U		38
1,2,3,6,7,8-HxCDD	0.1	34.06	<2.1	2.0	M,J,R	2.1	38
1,2,3,7,8,9-HxCDD	0.1	34.19	<2.0	2.0	M,U	1.5	38
1,2,3,4,6,7,8-HpCDD	0.01	35.65	51.3	0.84			38
OCDD	0.0003	37.09	606	2.9			77
2,3,7,8-TCDF	0.1	26.40	1.26	0.93	J		7.7
1,2,3,7,8-PeCDF	0.03	NotFnd	<0.77	0.77	U		38
2,3,4,7,8-PeCDF	0.3	31.66	0.964	0.68	M,J		38
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<1.4	1.4	U		38
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<1.5	1.5	U		38
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<1.4	1.4	U		38
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<1.8	1.8	U		38
1,2,3,4,6,7,8-HpCDF	0.01	35.09	12.7	1.0	J		38
1,2,3,4,7,8,9-HpCDF	0.01	35.89	3.21	1.5	M,J		38
OCDF	0.0003	37.17	108	1.1			77

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	27.28	72	25-164
13C12-1,2,3,7,8-PeCDD	2000	31.88	58	25-181
13C12-1,2,3,4,7,8-HxCDD	2000	34.01	75	32-141
13C12-1,2,3,6,7,8-HxCDD	2000	34.06	70	28-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.64	56	23-140
13C12-OCDD	4000	37.08	50	17-157
13C12-2,3,7,8-TCDF	2000	26.37	77	24-169
13C12-1,2,3,7,8-PeCDF	2000	30.86	60	24-185
13C12-2,3,4,7,8-PeCDF	2000	31.65	59	21-178
13C12-1,2,3,4,7,8-HxCDF	2000	33.50	73	26-152
13C12-1,2,3,6,7,8-HxCDF	2000	33.57	71	26-123
13C12-2,3,4,6,7,8-HxCDF	2000	33.90	78	28-136
13C12-1,2,3,7,8,9-HxCDF	2000	34.32	68	29-147
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.09	57	28-143
13C12-1,2,3,4,7,8,9-HpCDF	2000	35.88	51	26-138

Cleanup Standard	**pg**			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	27.31	73	35-197

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**		
Total-TCDD	0	<0.83	0.83	U	7.7
Total-PeCDD	1	1.65	1.2		38
Total-HxCDD	2	15.8	2.0		38
Total-HpCDD	2	136	0.84		38
Total-TCDF	3	6.63	0.93		7.7
Total-PeCDF	1	0.964	0.77		38
Total-HxCDF	1	6.28	1.8		38
Total-HpCDF	3	59.8	1.5		38

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	2.95
Mid Point PCDD/F TEQ (WHO 2005)	4.09
Upper Bound PCDD/F TEQ (WHO 2005)	5.02

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	**20-22030-AC-4 ALKALINE FEED**	Sampling Date	n/a		
ALS Sample ID	L2515810-3	Extraction Date	7-Nov-20		Approved:
Analysis Method	EPA 1613B	Sample Size	1.4864	g	*N Ashtari*
Analysis Type	Sample	Percent Moisture	99.3%		--e-signature--
Sample Matrix	Stack	Split Ratio	2		18-Nov-2020

Run Information	**Run 1**
Filename	7-201113A26
Run Date	14-Nov-20 08:45
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS7 DB5MSUS0287846H

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	<0.42	0.42	U		6.7
1,2,3,7,8-PeCDD	1	NotFnd	<0.20	0.20	U		34
1,2,3,4,7,8-HxCDD	0.1	34.01	<0.24	0.15	M,J,R	0.24	34
1,2,3,6,7,8-HxCDD	0.1	34.06	<0.21	0.15	M,J,R	0.21	34
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.15	0.15	U		34
1,2,3,4,6,7,8-HpCDD	0.01	35.64	<1.0	0.54	M,J,R	1.0	34
OCDD	0.0003	37.07	<17	0.36	M,J,R	17	67
2,3,7,8-TCDF	0.1	NotFnd	<0.20	0.20	U		6.7
1,2,3,7,8-PeCDF	0.03	NotFnd	<0.19	0.19	U		34
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.17	0.17	U		34
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.11	0.11	U		34
1,2,3,6,7,8-HxCDF	0.1	33.55	<0.14	0.11	M,J,R	0.14	34
2,3,4,6,7,8-HxCDF	0.1	33.92	<0.15	0.11	M,J,R	0.15	34
1,2,3,7,8,9-HxCDF	0.1	34.32	<0.16	0.15	M,J,R	0.16	34
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<0.24	0.24	U		34
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.35	0.35	U		34
OCDF	0.0003	37.16	<2.1	0.34	J,R	2.1	67

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	27.26	68	25-164
13C12-1,2,3,7,8-PeCDD	2000	31.86	66	25-181
13C12-1,2,3,4,7,8-HxCDD	2000	33.99	76	32-141
13C12-1,2,3,6,7,8-HxCDD	2000	34.05	71	28-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.63	62	23-140
13C12-OCDD	4000	37.07	54	17-157
13C12-2,3,7,8-TCDF	2000	26.35	75	24-169
13C12-1,2,3,7,8-PeCDF	2000	30.85	70	24-185
13C12-2,3,4,7,8-PeCDF	2000	31.63	66	21-178
13C12-1,2,3,4,7,8-HxCDF	2000	33.48	71	26-152
13C12-1,2,3,6,7,8-HxCDF	2000	33.55	72	26-123
13C12-2,3,4,6,7,8-HxCDF	2000	33.89	79	28-136
13C12-1,2,3,7,8,9-HxCDF	2000	34.31	64	29-147
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.08	60	28-143
13C12-1,2,3,4,7,8,9-HpCDF	2000	35.87	52	26-138

Cleanup Standard	**pg**			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	27.28	66	35-197

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**		**LQL**
Total-TCDD	0	<0.42	0.42	U	6.7
Total-PeCDD	0	<0.20	0.20	U	34
Total-HxCDD	0	<0.15	0.15	U	34
Total-HpCDD	0	<0.54	0.54	U	34
Total-TCDF	0	<0.20	0.20	U	6.7
Total-PeCDF	0	<0.19	0.19	U	34
Total-HxCDF	0	<0.15	0.15	U	34
Total-HpCDF	0	<0.35	0.35	U	34

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	0.00
Mid Point PCDD/F TEQ (WHO 2005)	0.470
Upper Bound PCDD/F TEQ (WHO 2005)	0.834

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	**20-22030-EC-4 EMULSION FEED**	Sampling Date	n/a		Approved:
ALS Sample ID	L2515810-4	Extraction Date	7-Nov-20		*N Ashtari*
Analysis Method	EPA 1613B	Sample Size	1.2800	g	--e-signature--
Analysis Type	Sample	Percent Moisture	84.7%		18-Nov-2020
Sample Matrix	Stack	Split Ratio	2		

Run Information	**Run 1**
Filename	7-201113A27
Run Date	14-Nov-20 09:27
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS7 DB5MSUS0287846H

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	<0.82	0.82	U		7.8
1,2,3,7,8-PeCDD	1	NotFnd	<1.1	1.1	U		39
1,2,3,4,7,8-HxCDD	0.1	33.99	<3.2	3.2	U		39
1,2,3,6,7,8-HxCDD	0.1	34.06	<4.3	2.6	J,R	4.3	39
1,2,3,7,8,9-HxCDD	0.1	34.15	<6.4	2.9	M,J,R	6.4	39
1,2,3,4,6,7,8-HpCDD	0.01	35.64	226	2.4			39
OCDD	0.0003	37.08	3030	4.6			78
2,3,7,8-TCDF	0.1	26.40	1.19	0.57	M,J		7.8
1,2,3,7,8-PeCDF	0.03	NotFnd	<0.77	0.77	U		39
2,3,4,7,8-PeCDF	0.3	31.65	1.46	0.64	J		39
1,2,3,4,7,8-HxCDF	0.1	33.50	<1.8	1.8	U	1.1	39
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<1.7	1.7	U		39
2,3,4,6,7,8-HxCDF	0.1	33.91	<1.8	1.8	M,U		39
1,2,3,7,8,9-HxCDF	0.1	34.32	<2.2	2.2	M,U	0.68	39
1,2,3,4,6,7,8-HpCDF	0.01	35.09	20.0	1.2	J		39
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.8	1.8	U		39
OCDF	0.0003	37.17	196	1.8			78

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	27.28	71	25-164
13C12-1,2,3,7,8-PeCDD	2000	31.88	53	25-181
13C12-1,2,3,4,7,8-HxCDD	2000	33.99	71	32-141
13C12-1,2,3,6,7,8-HxCDD	2000	34.05	72	28-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.63	53	23-140
13C12-OCDD	4000	37.07	45	17-157
13C12-2,3,7,8-TCDF	2000	26.35	76	24-169
13C12-1,2,3,7,8-PeCDF	2000	30.85	57	24-185
13C12-2,3,4,7,8-PeCDF	2000	31.64	56	21-178
13C12-1,2,3,4,7,8-HxCDF	2000	33.49	71	26-152
13C12-1,2,3,6,7,8-HxCDF	2000	33.56	72	26-123
13C12-2,3,4,6,7,8-HxCDF	2000	33.90	75	28-136
13C12-1,2,3,7,8,9-HxCDF	2000	34.32	71	29-147
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.08	55	28-143
13C12-1,2,3,4,7,8,9-HpCDF	2000	35.87	48	26-138

Cleanup Standard	**pg**						
37Cl4-2,3,7,8-TCDD (Cleanup)	40	27.29	71	35-197	M		

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**			
Total-TCDD	0	<0.82	0.82	U		7.8
Total-PeCDD	0	<1.1	1.1	U		39
Total-HxCDD	5	92.2	3.2			39
Total-HpCDD	2	808	2.4			39
Total-TCDF	1	1.19	0.57			7.8
Total-PeCDF	1	1.46	0.77			39
Total-HxCDF	2	3.96	2.2			39
Total-HpCDF	2	104	1.8			39

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	3.98
Mid Point PCDD/F TEQ (WHO 2005)	6.57
Upper Bound PCDD/F TEQ (WHO 2005)	8.09

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	WG3423769-1	Extraction Date	7-Nov-20		Approved:
Analysis Method	EPA 1613B	Sample Size	1.00	g	*N Ashtari*
Analysis Type	Blank	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	2		18-Nov-2020

Run Information	**Run 1**
Filename	7-201113A21
Run Date	14-Nov-20 05:13
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS7 DB5MSUS0287846H

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	<0.60	0.60	U		10
1,2,3,7,8-PeCDD	1	NotFnd	<0.36	0.36	U		50
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.41	0.41	U		50
1,2,3,6,7,8-HxCDD	0.1	34.05	<0.59	0.38	M,J,R	0.59	50
1,2,3,7,8,9-HxCDD	0.1	34.18	<0.70	0.41	M,J,R	0.70	50
1,2,3,4,6,7,8-HpCDD	0.01	35.64	<1.6	0.47	M,J,R	1.6	50
OCDD	0.0003	37.07	<25	0.60	J,R	25	100
2,3,7,8-TCDF	0.1	NotFnd	<0.41	0.41	U		10
1,2,3,7,8-PeCDF	0.03	NotFnd	<0.33	0.33	U		50
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.29	0.29	U		50
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.22	0.22	U		50
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.21	0.21	U		50
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.20	0.20	U		50
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<0.29	0.29	U		50
1,2,3,4,6,7,8-HpCDF	0.01	35.08	0.850	0.54	M,J		50
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.83	0.83	U		50
OCDF	0.0003	37.16	<5.1	0.78	M,J,R	5.1	100

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	27.25	52	25-164
13C12-1,2,3,7,8-PeCDD	2000	31.86	49	25-181
13C12-1,2,3,4,7,8-HxCDD	2000	33.99	56	32-141
13C12-1,2,3,6,7,8-HxCDD	2000	34.05	55	28-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.63	53	23-140
13C12-OCDD	4000	37.07	45	17-157
13C12-2,3,7,8-TCDF	2000	26.34	56	24-169
13C12-1,2,3,7,8-PeCDF	2000	30.84	51	24-185
13C12-2,3,4,7,8-PeCDF	2000	31.63	50	21-178
13C12-1,2,3,4,7,8-HxCDF	2000	33.48	52	26-152
13C12-1,2,3,6,7,8-HxCDF	2000	33.55	53	26-123
13C12-2,3,4,6,7,8-HxCDF	2000	33.89	58	28-136
13C12-1,2,3,7,8,9-HxCDF	2000	34.31	48	29-147
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.07	50	28-143
13C12-1,2,3,4,7,8,9-HpCDF	2000	35.87	44	26-138

Cleanup Standard	**pg**			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	27.28	50	35-197

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**		**LQL**
Total-TCDD	0	<0.60	0.60	U	10
Total-PeCDD	0	<0.36	0.36	U	50
Total-HxCDD	0	<0.41	0.41	U	50
Total-HpCDD	1	0.730	0.47		50
Total-TCDF	0	<0.41	0.41	U	10
Total-PeCDF	0	<0.33	0.33	U	50
Total-HxCDF	0	<0.29	0.29	U	50
Total-HpCDF	1	0.850	0.83		50

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	0.00850
Mid Point PCDD/F TEQ (WHO 2005)	0.782
Upper Bound PCDD/F TEQ (WHO 2005)	1.40

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 Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a		Approved:
ALS Sample ID	WG3423769-2	Extraction Date	7-Nov-20		*N Ashtari*
Analysis Method	EPA 1613B	Sample Size	1	n/a	--e-signature--
Analysis Type	LCS	Percent Moisture	n/a		18-Nov-2020
Sample Matrix	QC	Split Ratio	2		

Run Information	**Run 1**
Filename	7-201118A02
Run Date	18-Nov-20 11:38
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS7 DB5MSUS0287846H

Target Analytes	**pg**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	200	27.28	95	67-158	
1,2,3,7,8-PeCDD	1000	31.88	118	70-142	
1,2,3,4,7,8-HxCDD	1000	34.00	107	70-164	
1,2,3,6,7,8-HxCDD	1000	34.06	99	76-134	
1,2,3,7,8,9-HxCDD	1000	34.18	111	64-162	
1,2,3,4,6,7,8-HpCDD	1000	35.64	99	70-140	
OCDD	2000	37.08	102	78-144	
2,3,7,8-TCDF	200	26.37	105	75-158	
1,2,3,7,8-PeCDF	1000	30.86	107	80-134	
2,3,4,7,8-PeCDF	1000	31.64	96	68-160	
1,2,3,4,7,8-HxCDF	1000	33.50	106	72-134	
1,2,3,6,7,8-HxCDF	1000	33.57	103	84-130	
2,3,4,6,7,8-HxCDF	1000	33.90	100	70-156	
1,2,3,7,8,9-HxCDF	1000	34.32	104	78-130	
1,2,3,4,6,7,8-HpCDF	1000	35.09	115	82-122	
1,2,3,4,7,8,9-HpCDF	1000	35.88	107	78-138	
OCDF	2000	37.17	93	63-170	

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	27.26	52	20-175
13C12-1,2,3,7,8-PeCDD	2000	31.86	52	21-227
13C12-1,2,3,4,7,8-HxCDD	2000	33.99	52	21-193
13C12-1,2,3,6,7,8-HxCDD	2000	34.05	59	25-163
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.63	47	26-166
13C12-OCDD	4000	37.07	36	13-138
13C12-2,3,7,8-TCDF	2000	26.34	52	22-152
13C12-1,2,3,7,8-PeCDF	2000	30.85	53	21-192
13C12-2,3,4,7,8-PeCDF	2000	31.63	52	13-328
13C12-1,2,3,4,7,8-HxCDF	2000	33.48	48	19-202
13C12-1,2,3,6,7,8-HxCDF	2000	33.55	56	21-159
13C12-2,3,4,6,7,8-HxCDF	2000	33.90	54	22-176
13C12-1,2,3,7,8,9-HxCDF	2000	34.32	45	17-205
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.08	44	21-158
13C12-1,2,3,4,7,8,9-HpCDF	2000	35.87	39	20-186

Cleanup Standard	**pg**			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	27.28	68	31-191

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
ALS WO#:	L2515810		Mississauga
Date of Report	13-Nov-20		ON L5J 2Y4
Date of Sample Receipt	13-Oct-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 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:

Ron McLeod, PhD
Director, Air Toxics & Special Chemistries, Life Sciences

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	20-22030-RC-4 RICH FEED	Duplicate of 20-22030-RC-4 RICH FEED	20-22030-LC-4 LEAN FEED	20-22030-AC-4 ALKALINE FEED	20-22030-EC-4 EMULSION FEED
ALS Sample ID	L2515810-1	WG3423769-4	L2515810-2	L2515810-3	L2515810-4
Sample Size	0.4007	0.2976	0.1479	0.0102	0.1961
Sample size units	g dwt	g dwt	g dwt	g dwt	g dwt
Percent Moisture	73.37%	73.87%	88.68%	99.31%	84.68%
Sample Matrix	Stack	QC	Stack	Stack	Stack
Sampling Date	n/a	n/a	n/a	n/a	n/a
Extraction Date	22-Oct-20	22-Oct-20	22-Oct-20	22-Oct-20	22-Oct-20
Target Analytes	**pg/g**	**pg/g**	**pg/g**	**pg/g**	**pg/g**
PCB-081	60.3	57.9	<13	<160	185
PCB-077	1510	1850	703	<170	3610
PCB-123	1320	1340	266	<72	4300
PCB-118	60200	69400	14500	445	208000
PCB-114	2110	2560	530	<69	8480
PCB-105	31900	36900	8140	<150	122000
PCB-126	66.5	65.6	38.9	<77	245
PCB-167	3330	3880	482	<57	6700
PCB-156/157	11200	13100	1860	<68	26700
PCB-169	403	422	<10	<61	120
PCB-189	1490	1750	77.4	<77	819
Extraction Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**	**% Rec**
13C12-PCB-081	78	68	69	59	69
13C12-PCB-077	84	78	66	59	72
13C12-PCB-123	80	68	65	60	67
13C12-PCB-118	79	67	65	61	67
13C12-PCB-114	78	61	65	60	66
13C12-PCB-105	85	72	67	63	70
13C12-PCB-126	81	63	66	64	65
13C12-PCB-167	77	62	67	65	71
13C12-PCB-156/157	69	56	66	66	67
13C12-PCB-169	71	58	63	69	71
13C12-PCB-189	62	53	52	63	64
Cleanup Standards					
13C12-PCB-028	79	67	70	53	73
13C12-PCB-111	83	70	68	62	73
13C12-PCB-178	82	70	69	66	72

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	20-22030-RC-4 RICH FEED	Duplicate of 20-22030-RC-4 RICH FEED	20-22030-LC-4 LEAN FEED	20-22030-AC-4 ALKALINE FEED	20-22030-EC-4 EMULSION FEED
ALS Sample ID	L2515810-1	WG3423769-4	L2515810-2	L2515810-3	L2515810-4
Sample Size	0.4007	0.2976	0.1479	0.0102	0.1961
Sample size units	g dwt	g dwt	g dwt	g dwt	g dwt
Percent Moisture	73.37%	73.87%	88.68%	99.31%	84.68%
Sample Matrix	Stack	QC	Stack	Stack	Stack
Sampling Date	n/a	n/a	n/a	n/a	n/a
Extraction Date	22-Oct-20	22-Oct-20	22-Oct-20	22-Oct-20	22-Oct-20
Target Analytes	**pg/g**	**pg/g**	**pg/g**	**pg/g**	**pg/g**
Homologue Group Totals					
Total MonoCB	18000	19500	124000	841	39000
Total DiCB	18000	22900	16600	3230	12500
Total TriCB	23000	24600	8700	1930	17300
Total TetraCB	143000	178000	34600	1570	404000
Total PentaCB	358000	421000	82100	1710	1070000
Total HexaCB	548000	676000	46800	727	504000
Total HeptaCB	436000	484000	14700	<65	115000
Total OctaCB	103000	117000	2770	<67	21700
Total NonaCB	8280	9650	314	<300	1790
DecaCB	627	718	588	672	714
Total PCB	1660000	1950000	331000	10700	2190000
Toxic Equivalency - (WHO 2005)					
Lower Bound PCB TEQ	22.3	23.3	4.74	0.0134	39.8
Mid Point PCB TEQ	22.3	23.3	4.89	4.82	39.8
Upper Bound PCB TEQ	22.3	23.3	5.04	9.62	39.8

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Quality Control Summary Report

Sample Name	Method Blank
ALS Sample ID	WG3423769-1
Sample Size	0.2105
Sample size units	g dwt
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	22-Oct-20

Target Analytes	pg/g
PCB-081	<10
PCB-077	<20
PCB-123	<4.8
PCB-118	<93
PCB-114	6.08
PCB-105	60.7
PCB-126	<6.7
PCB-167	<3.5
PCB-156/157	<9.2
PCB-169	<3.7
PCB-189	<3.2
Extraction Standards	**% Rec**
13C12-PCB-081	60
13C12-PCB-077	60
13C12-PCB-123	61
13C12-PCB-118	61
13C12-PCB-114	62
13C12-PCB-105	62
13C12-PCB-126	63
13C12-PCB-167	63
13C12-PCB-156/157	64
13C12-PCB-169	69
13C12-PCB-189	66
Cleanup Standards	
13C12-PCB-028	59
13C12-PCB-111	67
13C12-PCB-178	67

ALS Life Sciences

Quality Control Summary Report

Sample Name	Method Blank
ALS Sample ID	WG3423769-1
Sample Size	0.2105
Sample size units	g dwt
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	22-Oct-20

Target Analytes	pg/g
Homologue Group Totals	
Total MonoCB	30.7
Total DiCB	1400
Total TriCB	1020
Total TetraCB	1370
Total PentaCB	724
Total HexaCB	431
Total HeptaCB	104
Total OctaCB	<2.9
Total NonaCB	<14
DecaCB	33.6
Total PCB	5110
Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.00200
Mid Point PCB TEQ	0.734
Upper Bound PCB TEQ	0.791

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Laboratory Control Sample
ALS Sample ID	WG3423769-2
Sample Size	1
Sample size units	n/a
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	22-Oct-20

Target Analytes	% Rec
PCB-081	95
PCB-077	93
PCB-123	97
PCB-118	96
PCB-114	98
PCB-105	94
PCB-126	96
PCB-167	93
PCB-156/157	92
PCB-169	94
PCB-189	95
Extraction Standards	**% Rec**
13C12-PCB-081	49
13C12-PCB-077	50
13C12-PCB-123	50
13C12-PCB-118	51
13C12-PCB-114	51
13C12-PCB-105	53
13C12-PCB-126	53
13C12-PCB-167	53
13C12-PCB-156/157	53
13C12-PCB-169	58
13C12-PCB-189	55
Cleanup Standards	
13C12-PCB-028	59
13C12-PCB-111	65
13C12-PCB-178	66

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Sample Analysis Report

Sample Name	**20-22030-RC-4 RICH FEED**	Sampling Date	n/a		Approved:
ALS Sample ID	L2515810-1	Extraction Date	22-Oct-20		*S. Jin*
Analysis Method	EPA 1668C	Sample Size	0.4007	g dwt	--e-signature--
Analysis Type	Sample	Percent Moisture	73.4%		11-Nov-2020
Sample Matrix	Stack	Split Ratio	2		

Run Information	**Run 1**
Filename	5-201103A05
Run Date	03-Nov-20 10:36
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
PCB-081	0.0003	21.76	60.3	19	M,J		120
PCB-077	0.0001	22.08	1510	18	M		120
PCB-123	0.00003	23.07	1320	8.5	M		120
PCB-118	0.00003	23.26	60200	7.9			120
PCB-114	0.00003	23.55	2110	8.8			120
PCB-105	0.00003	23.90	31900	8.2			120
PCB-126	0.1	25.51	66.5	9.6	M,J		120
PCB-167	0.00003	26.41	3330	9.0			120
PCB-156/157	0.00003	27.03	11200	12			250
PCB-169	0.03	28.69	403	11	M		120
PCB-189	0.00003	30.00	1490	7.9			120

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	2000	21.77	78	10-145
13C12-PCB-077	2000	22.07	84	10-145
13C12-PCB-123	2000	23.08	80	10-145
13C12-PCB-118	2000	23.25	79	10-145
13C12-PCB-114	2000	23.54	78	10-145
13C12-PCB-105	2000	23.89	85	10-145
13C12-PCB-126	2000	25.48	81	10-145
13C12-PCB-167	2000	26.40	77	10-145
13C12-PCB-156/157	4000	27.03	69	10-145
13C12-PCB-169	2000	28.70	71	10-145
13C12-PCB-189	2000	29.99	62	10-145
Cleanup Standards				
13C12-PCB-028	2000	15.93	79	5-145 R
13C12-PCB-111	2000	22.02	83	10-145
13C12-PCB-178	2000	25.07	82	10-145

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Sample Analysis Report

Sample Name	**20-22030-RC-4 RICH FEED**	Sampling Date	n/a		Approved:
ALS Sample ID	L2515810-1	Extraction Date	22-Oct-20		*S. Jin*
Analysis Method	EPA 1668C	Sample Size	0.4007	g dwt	--e-signature--
Analysis Type	Sample	Percent Moisture	73.4%		11-Nov-2020
Sample Matrix	Stack	Split Ratio	2		

Run Information	**Run 1**
Filename	5-201103A05
Run Date	03-Nov-20 10:36
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
Homologue Group Totals							
Total MonoCB			18000	4.9	J		500
Total DiCB			18000	9.2	J		1000
Total TriCB			23000	5.1	J		1000
Total TetraCB			143000	6.9	J		2000
Total PentaCB			358000	1.8	J		2000
Total HexaCB			548000	2.7	J		2000
Total HeptaCB			436000	5.3	J		1000
Total OctaCB			103000	2.5	J		1000
Total NonaCB			8280	11	J		500
DecaCB			627	6.5	J		500
Total PCB			1660000		J		4000
Toxic Equivalency - (WHO 2005)							
Lower Bound PCB TEQ			22.3				
Mid Point PCB TEQ			22.3				
Upper Bound PCB TEQ			22.3				

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
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.
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 20-2230-RC-4 RICH FEED**	Sampling Date	n/a		Approved:
ALS Sample ID	WG3423769-4	Extraction Date	22-Oct-20		*S. Jin*
Analysis Method	EPA 1668C	Sample Size	0.2976	g dwt	--e-signature--
Analysis Type	Sample	Percent Moisture	73.9%		11-Nov-2020
Sample Matrix	QC	Split Ratio	2		

Run Information	**Run 1**
Filename	5-201103A06
Run Date	03-Nov-20 11:19
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
PCB-081	0.0003	21.83	57.9	11	M,J		170
PCB-077	0.0001	22.15	1850	9.0			170
PCB-123	0.00003	23.14	1340	9.9	M		170
PCB-118	0.00003	23.32	69400	9.7			170
PCB-114	0.00003	23.62	2560	11			170
PCB-105	0.00003	23.96	36900	9.5			170
PCB-126	0.1	25.57	65.6	12	M,J		170
PCB-167	0.00003	26.49	3880	14			170
PCB-156/157	0.00003	27.10	13100	18			340
PCB-169	0.03	28.76	422	18	M		170
PCB-189	0.00003	30.08	1750	15			170

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	2000	21.83	68	10-145
13C12-PCB-077	2000	22.13	78	10-145
13C12-PCB-123	2000	23.14	68	10-145
13C12-PCB-118	2000	23.31	67	10-145
13C12-PCB-114	2000	23.61	61	10-145
13C12-PCB-105	2000	23.95	72	10-145
13C12-PCB-126	2000	25.56	63	10-145
13C12-PCB-167	2000	26.47	62	10-145
13C12-PCB-156/157	4000	27.10	56	10-145
13C12-PCB-169	2000	28.78	58	10-145
13C12-PCB-189	2000	30.07	53	10-145
Cleanup Standards				
13C12-PCB-028	2000	15.99	67	5-145
13C12-PCB-111	2000	22.09	70	10-145
13C12-PCB-178	2000	25.13	70	10-145

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Sample Analysis Report

Sample Name	**Duplicate of 20-2230-RC-4 RICH FEED**	Sampling Date	n/a		Approved:
ALS Sample ID	WG3423769-4	Extraction Date	22-Oct-20		*S. Jin*
Analysis Method	EPA 1668C	Sample Size	0.2976	g dwt	--e-signature--
Analysis Type	Sample	Percent Moisture	73.9%		11-Nov-2020
Sample Matrix	QC	Split Ratio	2		

Run Information	**Run 1**
Filename	5-201103A06
Run Date	03-Nov-20 11:19
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
Homologue Group Totals							
Total MonoCB			19500	4.2	J		670
Total DiCB			22900	9.0	J		1300
Total TriCB			24600	4.0	J		1300
Total TetraCB			178000	4.7	J		2700
Total PentaCB			421000	2.0	J		2700
Total HexaCB			676000	2.5	J		2700
Total HeptaCB			484000	6.3	J		1300
Total OctaCB			117000	6.8	J		1300
Total NonaCB			9650	16	J		670
DecaCB			718	9.7	J		670
Total PCB			1950000		J		5400
Toxic Equivalency - (WHO 2005)							
Lower Bound PCB TEQ			23.3				
Mid Point PCB TEQ			23.3				
Upper Bound PCB TEQ			23.3				

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
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.
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	**20-2230-LC-4 LEAN FEED**	Sampling Date	n/a		
ALS Sample ID	L2515810-2	Extraction Date	22-Oct-20		Approved:
Analysis Method	EPA 1668C	Sample Size	0.1479	g dwt	*S. Jin*
Analysis Type	Sample	Percent Moisture	88.7%		--e-signature--
Sample Matrix	Stack	Split Ratio	2		11-Nov-2020

Run Information	**Run 1**
Filename	5-201103A07
Run Date	03-Nov-20 12:01
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
PCB-081	0.0003	21.82	<13	13	M,U	11	340
PCB-077	0.0001	22.11	703	14			340
PCB-123	0.00003	23.10	266	8.5	M,J		340
PCB-118	0.00003	23.28	14500	7.9			340
PCB-114	0.00003	23.57	530	8.5			340
PCB-105	0.00003	23.92	8140	8.6			340
PCB-126	0.1	25.53	38.9	9.5	M,J		340
PCB-167	0.00003	26.44	482	7.9			340
PCB-156/157	0.00003	27.04	1860	9.9			680
PCB-169	0.03	NotFnd	<10	10	U		340
PCB-189	0.00003	30.01	77.4	8.3	J		340

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	2000	21.81	69	10-145
13C12-PCB-077	2000	22.10	66	10-145
13C12-PCB-123	2000	23.10	65	10-145
13C12-PCB-118	2000	23.27	65	10-145
13C12-PCB-114	2000	23.56	65	10-145
13C12-PCB-105	2000	23.90	67	10-145
13C12-PCB-126	2000	25.51	66	10-145
13C12-PCB-167	2000	26.43	67	10-145
13C12-PCB-156/157	4000	27.04	66	10-145
13C12-PCB-169	2000	28.71	63	10-145
13C12-PCB-189	2000	30.00	52	10-145
Cleanup Standards				
13C12-PCB-028	2000	15.94	70	5-145
13C12-PCB-111	2000	22.06	68	10-145
13C12-PCB-178	2000	25.09	69	10-145

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Sample Analysis Report

Sample Name	**20-2230-LC-4 LEAN FEED**	Sampling Date	n/a		Approved:
ALS Sample ID	L2515810-2	Extraction Date	22-Oct-20		*S. Jin*
Analysis Method	EPA 1668C	Sample Size	0.1479	g dwt	--e-signature--
Analysis Type	Sample	Percent Moisture	88.7%		11-Nov-2020
Sample Matrix	Stack	Split Ratio	2		

Run Information	**Run 1**
Filename	5-201103A07
Run Date	03-Nov-20 12:01
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
Homologue Group Totals							
Total MonoCB			124000	13	J		1400
Total DiCB			16600	13	J		2700
Total TriCB			8700	6.1	J		2700
Total TetraCB			34600	6.0	J		5400
Total PentaCB			82100	3.4	J		5400
Total HexaCB			46800	4.2	J		5400
Total HeptaCB			14700	6.6	J		2700
Total OctaCB			2770	8.9	J		2700
Total NonaCB			314	20	J		1400
DecaCB			588	14	J		1400
Total PCB			331000		J		11000
Toxic Equivalency - (WHO 2005)							
Lower Bound PCB TEQ			4.74				
Mid Point PCB TEQ			4.89				
Upper Bound PCB TEQ			5.04				

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.
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	**20-2230-AC-4 ALKALINE FEED**	Sampling Date	n/a		Approved:
ALS Sample ID	L2515810-3	Extraction Date	22-Oct-20		*S. Jin*
Analysis Method	EPA 1668C	Sample Size	0.0102	g dwt	--e-signature--
Analysis Type	Sample	Percent Moisture	99.3%		11-Nov-2020
Sample Matrix	Stack	Split Ratio	2		

Run Information	**Run 1**
Filename	5-201103A08
Run Date	03-Nov-20 12:43
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
PCB-081	0.0003	NotFnd	<160	160	U		4900
PCB-077	0.0001	NotFnd	<170	170	U		4900
PCB-123	0.00003	NotFnd	<72	72	U		4900
PCB-118	0.00003	23.27	445	66	J		4900
PCB-114	0.00003	NotFnd	<69	69	U		4900
PCB-105	0.00003	23.90	<150	71	M,J,R	150	4900
PCB-126	0.1	NotFnd	<77	77	U		4900
PCB-167	0.00003	NotFnd	<57	57	U		4900
PCB-156/157	0.00003	NotFnd	<68	68	U		9800
PCB-169	0.03	NotFnd	<61	61	U		4900
PCB-189	0.00003	NotFnd	<77	77	U		4900

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	2000	21.78	59	10-145
13C12-PCB-077	2000	22.08	59	10-145
13C12-PCB-123	2000	23.08	60	10-145
13C12-PCB-118	2000	23.26	61	10-145
13C12-PCB-114	2000	23.55	60	10-145
13C12-PCB-105	2000	23.89	63	10-145
13C12-PCB-126	2000	25.50	64	10-145
13C12-PCB-167	2000	26.41	65	10-145
13C12-PCB-156/157	4000	27.03	66	10-145
13C12-PCB-169	2000	28.70	69	10-145
13C12-PCB-189	2000	29.99	63	10-145

Cleanup Standards				
13C12-PCB-028	2000	15.94	53	5-145
13C12-PCB-111	2000	22.03	62	10-145
13C12-PCB-178	2000	25.07	66	10-145

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Sample Analysis Report

Sample Name	**20-2230-AC-4 ALKALINE FEED**	Sampling Date	n/a		Approved:
ALS Sample ID	L2515810-3	Extraction Date	22-Oct-20		*S. Jin*
Analysis Method	EPA 1668C	Sample Size	0.0102	g dwt	--e-signature--
Analysis Type	Sample	Percent Moisture	99.3%		11-Nov-2020
Sample Matrix	Stack	Split Ratio	2		

Run Information	**Run 1**
Filename	5-201103A08
Run Date	03-Nov-20 12:43
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
Homologue Group Totals							
Total MonoCB			841	82	J		20000
Total DiCB			3230	280	J		39000
Total TriCB			1930	140	J		39000
Total TetraCB			1570	90	J		78000
Total PentaCB			1710	49	J		78000
Total HexaCB			727	41	J		78000
Total HeptaCB			<65	65	U		39000
Total OctaCB			<67	67	U		39000
Total NonaCB			<300	300	U		20000
DecaCB			672	370	J		20000
Total PCB			10700		J		160000
Toxic Equivalency - (WHO 2005)							
Lower Bound PCB TEQ			0.0134				
Mid Point PCB TEQ			4.82				
Upper Bound PCB TEQ			9.62				

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.
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	**20-2230-EC-4 EMULSION FEED**	Sampling Date	n/a		
ALS Sample ID	L2515810-4	Extraction Date	22-Oct-20		Approved:
Analysis Method	EPA 1668C	Sample Size	0.1961	g dwt	*S. Jin*
Analysis Type	Sample	Percent Moisture	84.7%		--e-signature--
Sample Matrix	Stack	Split Ratio	2		11-Nov-2020

Run Information	**Run 1**
Filename	5-201103A09
Run Date	03-Nov-20 13:25
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
PCB-081	0.0003	21.78	185	15	M,J		250
PCB-077	0.0001	22.10	3610	15			250
PCB-123	0.00003	23.09	4300	13	M		250
PCB-118	0.00003	23.27	208000	12			250
PCB-114	0.00003	23.57	8480	13			250
PCB-105	0.00003	23.91	122000	13			250
PCB-126	0.1	25.52	245	16	M,J		250
PCB-167	0.00003	26.43	6700	81			250
PCB-156/157	0.00003	27.04	26700	110			510
PCB-169	0.03	28.69	120	98	M,J		250
PCB-189	0.00003	30.00	819	8.8			250

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	2000	21.79	69	10-145
13C12-PCB-077	2000	22.08	72	10-145
13C12-PCB-123	2000	23.09	67	10-145
13C12-PCB-118	2000	23.26	67	10-145
13C12-PCB-114	2000	23.56	66	10-145
13C12-PCB-105	2000	23.90	70	10-145
13C12-PCB-126	2000	25.50	65	10-145
13C12-PCB-167	2000	26.41	71	10-145
13C12-PCB-156/157	4000	27.03	67	10-145
13C12-PCB-169	2000	28.70	71	10-145
13C12-PCB-189	2000	29.99	64	10-145
Cleanup Standards				
13C12-PCB-028	2000	15.95	73	5-145
13C12-PCB-111	2000	22.04	73	10-145
13C12-PCB-178	2000	25.09	72	10-145

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Sample Analysis Report

Sample Name	**20-2230-EC-4 EMULSION FEED**	Sampling Date	n/a		
ALS Sample ID	L2515810-4	Extraction Date	22-Oct-20		Approved:
Analysis Method	EPA 1668C	Sample Size	0.1961	g dwt	*S. Jin*
Analysis Type	Sample	Percent Moisture	84.7%		--e-signature--
Sample Matrix	Stack	Split Ratio	2		11-Nov-2020

Run Information	**Run 1**
Filename	5-201103A09
Run Date	03-Nov-20 13:25
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
Homologue Group Totals							
Total MonoCB			39000	6.9	J		1000
Total DiCB			12500	9.8	J		2000
Total TriCB			17300	7.2	J		2000
Total TetraCB			404000	6.7	J		4100
Total PentaCB			1070000	2.7	J		4100
Total HexaCB			504000	11	J		4100
Total HeptaCB			115000	5.2	J		2000
Total OctaCB			21700	3.9	J		2000
Total NonaCB			1790	16	J		1000
DecaCB			714	9.1	J		1000
Total PCB			2190000		J		8200
Toxic Equivalency - (WHO 2005)							
Lower Bound PCB TEQ			39.8				
Mid Point PCB TEQ			39.8				
Upper Bound PCB TEQ			39.8				

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.
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	WG3423769-1	Extraction Date	22-Oct-20		Approved:
Analysis Method	EPA 1668C	Sample Size	0.2105	g dwt	*S. Jin*
Analysis Type	Blank	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	2		11-Nov-2020

Run Information	**Run 1**
Filename	5-201103A04
Run Date	03-Nov-20 09:54
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
PCB-081	0.0003	NotFnd	<10	10	U		240
PCB-077	0.0001	22.08	<20	11	J,R	20	240
PCB-123	0.00003	NotFnd	<4.8	4.8	M,U		240
PCB-118	0.00003	23.25	<93	4.4	M,J,R	93	240
PCB-114	0.00003	23.55	6.08	4.7	M,J		240
PCB-105	0.00003	23.89	60.7	4.8	J		240
PCB-126	0.1	25.52	<6.7	5.5	M,J,R	6.7	240
PCB-167	0.00003	NotFnd	<3.5	3.5	U		240
PCB-156/157	0.00003	27.02	<9.2	4.4	J,R	9.2	480
PCB-169	0.03	NotFnd	<3.7	3.7	U		240
PCB-189	0.00003	NotFnd	<3.2	3.2	U		240

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	2000	21.76	60	10-145
13C12-PCB-077	2000	22.07	60	10-145
13C12-PCB-123	2000	23.07	61	10-145
13C12-PCB-118	2000	23.24	61	10-145
13C12-PCB-114	2000	23.53	62	10-145
13C12-PCB-105	2000	23.88	62	10-145
13C12-PCB-126	2000	25.47	63	10-145
13C12-PCB-167	2000	26.39	63	10-145
13C12-PCB-156/157	4000	27.01	64	10-145
13C12-PCB-169	2000	28.67	69	10-145
13C12-PCB-189	2000	29.96	66	10-145

Cleanup Standards				
13C12-PCB-028	2000	15.93	59	5-145
13C12-PCB-111	2000	22.00	67	10-145
13C12-PCB-178	2000	25.06	67	10-145

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a		
ALS Sample ID	WG3423769-1	Extraction Date	22-Oct-20		Approved:
Analysis Method	EPA 1668C	Sample Size	0.2105	g dwt	*S. Jin*
Analysis Type	Blank	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	2		11-Nov-2020

Run Information	**Run 1**
Filename	5-201103A04
Run Date	03-Nov-20 09:54
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg/g	EDL pg/g	Flags	EMPC pg/g	LQL
Homologue Group Totals							
Total MonoCB			30.7	3.7	J		950
Total DiCB			1400	14	J		1900
Total TriCB			1020	5.9	J		1900
Total TetraCB			1370	5.4	J		3800
Total PentaCB			724	3.2	J		3800
Total HexaCB			431	2.3	J		3800
Total HeptaCB			104	3.0	J		1900
Total OctaCB			<2.9	2.9	U		1900
Total NonaCB			<14	14	U		950
DecaCB			33.6	7.4	J		950
Total PCB			5110		J		7600
Toxic Equivalency - (WHO 2005)							
Lower Bound PCB TEQ			0.00200				
Mid Point PCB TEQ			0.734				
Upper Bound PCB TEQ			0.791				

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	WG3423769-2	Extraction Date	22-Oct-20		Approved:
Analysis Method	EPA 1668C	Sample Size	1	n/a	*S. Jin*
Analysis Type	LCS	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	2		11-Nov-2020

Run Information	**Run 1**
Filename	5-201103A02
Run Date	03-Nov-20 08:30
Final Volume	25 ul
Dilution Factor	1
Analysis Units	% Rec
Instrument - Column	HRMS-5 SPBOctyl 256001-01

Target Analytes	**pg**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
PCB-001	1000	8.83	100	60-135	
PCB-003	1000	10.37	100	60-135	
PCB-004	1000	10.52	101	60-135	
PCB-015	1000	14.20	99	60-135	
PCB-019	1000	12.51	103	60-135	
PCB-037	1000	18.16	98	60-135	
PCB-054	1000	14.36	100	60-135	
PCB-081	1000	21.74	95	60-135	
PCB-077	1000	22.05	93	60-135	
PCB-104	1000	17.45	87	60-135	
PCB-123	1000	23.04	97	60-135	
PCB-118	1000	23.22	96	60-135	
PCB-114	1000	23.51	98	60-135	
PCB-105	1000	23.85	94	60-135	
PCB-126	1000	25.46	96	60-135	
PCB-155	1000	20.47	92	60-135	
PCB-167	1000	26.38	93	60-135	
PCB-156/157	2000	26.99	92	60-135	
PCB-169	1000	28.66	94	60-135	
PCB-188	1000	23.47	93	60-135	
PCB-189	1000	29.94	95	60-135	
PCB-202	1000	26.25	99	60-135	
PCB-205	1000	31.34	94	60-135	
PCB-208	1000	29.68	95	60-135	
PCB-206	1000	32.43	94	60-135	
PCB-209	1000	33.57	108	60-135	
Extraction Standards		**Time**	**% Rec**	**Limits**	
13C12-PCB-081	2000	21.73	49	40-145	
13C12-PCB-077	2000	22.04	50	40-145	
13C12-PCB-123	2000	23.03	50	40-145	
13C12-PCB-118	2000	23.21	51	40-145	
13C12-PCB-114	2000	23.50	51	40-145	
13C12-PCB-105	2000	23.84	53	40-145	
13C12-PCB-126	2000	25.45	53	40-145	
13C12-PCB-167	2000	26.37	53	40-145	
13C12-PCB-156/157	4000	26.98	53	40-145	
13C12-PCB-169	2000	28.65	58	40-145	
13C12-PCB-189	2000	29.93	55	40-145	
Cleanup Standards					
13C12-PCB-028	2000	15.90	59	15-145	
13C12-PCB-111	2000	21.97	65	40-145	
13C12-PCB-178	2000	25.02	66	40-145	

APPENDIX 12

Acid Gases Train Recovery Data Sheet
(1 page)

ORTECH Consulting Inc. Recovery & Sample Log

Method 26

Incinerator Stack

L2515222

Client: Clean Harbors Sarnia
Job/Report Number: 22030
Received By:
How Received: Train Recovery
Job Assigned To: ALS
PO #:

Test Number	ORTECH Sample ID 20-22030-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	Oct. 6/20	0.1N H2SO4	30.0	118	88	40	158	Halides
	2	"	0.1N NaOH	15.0	18	3	10	28	Cyanide
2	3	Oct. 7/20	0.1N H2SO4	30.0	86	56	40	126	Halides
	4	"	0.1N NaOH	15.0	15	0	10	25	Cyanide
3	5	Oct. 8/20	0.1N H2SO4	30.0	92	62	40	132	Halides
	6	"	0.1N NaOH	15.0	15	0	10	25	Cyanide
Blank	7	OCT 8/20	0.1N H2SO4	30.0	30.0	0	40.0	70.0	Halides
	8	"	0.1N NaOH	15.0	15.0	0	10.0	250	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: [signature] Date: Oct 9 2020

Relinquished to: AARON BURTON Date: 9-Oct-2020 11:30

7.4°C

APPENDIX 13

Acid Gases Analytical Reports
(11 pages)

ALS Environmental

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	Ortech Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2515222		Mississauga, ON L5J 2Y4
Date of Report	26-Oct-20		Canada
Date of Sample Receipt	9-Oct-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 Clean Harbors

COMMENTS:

F as HF Anion Analyzed via Ion Chromatography USEPA Method 26/26A (GN 13, 14, 15-Oct-20)
Cl as HCl Anion Analyzed via Ion Chromatography USEPA Method 26/26A (GN 13, 14, 15-Oct-20))
Br as HBr Anion Analyzed via Ion Chromatography USEPA Method 26/26A (GN 13, 14, 15-Oct-20)
I as HI Anion Analyzed via Ion Chromatography USEPA Method 26/26A (GN 15-Oct-20)

ANALYST COMMENTS:

Chloride observed in the client-supplied blank at a level equivalent to the LOR (observed: 0.0380 mg, LOR: 0.0376 mg). Data for this analyte may be very slightly elevated, however sample data is well above this threshold. Impact to data quality is expected to be negligible. **PE 19-Oct-2020**

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
Account Manager

ALS Environmental

Sample Analysis Summary Report

Sample Name	20-22030-M26-1 TEST#1	20-22030-M26-3 TEST#2	20-22030-M26-5 TEST#3	20-22030-M26-7 BLANK
ALS Sample ID	L2515222-1	L2515222-3	L2515222-5	L2515222-7
Matrix	Stack	Stack	Stack	Stack
Analysis type	Sample	Sample	Sample	Sample
Sampling Date/Time	6-Oct-20	7-Oct-20	8-Oct-20	8-Oct-20
Date of Receipt	9-Oct-20	9-Oct-20	9-Oct-20	9-Oct-20
Ion Chromatography Analysis USEPA Method 26/26A	**mg**	**mg**	**mg**	**mg**
Total F^- as HF (ave)	1.40	1.32	2.27	<0.0257
Analysis 1	1.40	1.32	2.27	<0.0257
Analysis 2	1.40	1.32	2.27	<0.0257
Total Cl^- as HCl (ave)	8.74	8.58	13.2	0.0380
Analysis 1	8.74	8.57	13.2	0.0379
Analysis 2	8.73	8.58	13.2	0.0381
Total Br^- as HBr (ave)	2.92	0.621	3.19	<0.123
Analysis 1	2.92	0.622	3.23	<0.123
Analysis 2	2.92	0.620	3.15	<0.123
Total I^- as HI (ave)	<0.0813	<0.0671	<0.0671	<0.0369
Analysis 1	<0.0813	<0.0671	<0.0671	<0.0369

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)	0.00376	0.0576	102%
Analysis 1	0.00380	0.0577	
Analysis 2	0.00372	0.0575	
Total Cl^- as HCl (ave)	<0.00241	0.0788	100%
Analysis 1	<0.00241	0.0791	
Analysis 2	<0.00241	0.0786	
Total Br^- as HBr (ave)	<0.00791	0.258	102%
Analysis 1	<0.00791	0.259	
Analysis 2	<0.00791	0.258	
Total I^- as HI (ave)	<0.00236	0.0757	100%
Analysis 1	<0.00236	0.0757	

ALS Environmental

Sample QC Summary Report

Sample Name	20-22030-M26-1 TEST#1	20-22030-M26-1 TEST#1	20-22030-M26-1 TEST#1	20-22030-M26-1 TEST#1
ALS Sample ID	L2515222-1	L2515222-1DUP	L2515222-1MS	L2515222-1MS
Matrix	Stack	Stack	Stack	Stack
Analysis type	Sample	Duplicate	Matrix Spike	Matrix Spike
Sampling Date/Time	6-Oct-20	6-Oct-20	6-Oct-20	6-Oct-20
Date of Receipt	9-Oct-20	9-Oct-20	9-Oct-20	9-Oct-20
Ion Chromatography Analysis USEPA Method 26/26A	**mg**	**mg**	**mg**	**% Rec**
Total F^- as HF (ave)	1.40	1.38	3.18	98%
Analysis 1	1.40	1.38	3.17	
Analysis 2	1.40	1.38	3.19	
Total Cl^- as HCl (ave)	8.74	8.73	19.2	98%
Analysis 1	8.74	8.70	19.1	
Analysis 2	8.73	8.76	19.2	
Total Br^- as HBr (ave)	2.92	2.88	11.0	92%
Analysis 1	2.92	2.88	11.0	
Analysis 2	2.92	2.88	10.9	
Total I^- as HI (ave)	<0.0813	<0.0813	2.68	102%
Analysis 1	<0.0813	<0.0813	2.68	

ORTECH Environmental
ATTN: Chris Belore
804 Southdown Road
Mississauga ON L5J 2Y4

Date Received: 09-OCT-20
Report Date: 17-DEC-20 12:13 (MT)
Version: FINAL REV. 2

Client Phone: 905-822-4120

Certificate of Analysis

Lab Work Order #: L2515222
Project P.O. #: 22030-J2725
Job Reference: 22030 CLEAN HARBORS
C of C Numbers:
Legal Site Desc:

L. Wrona

Lynne Wrona, M.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2515222-2 20-22030-M26-2 TEST#1 Sampled By: Client on 06-OCT-20 Matrix: Stack **Miscellaneous Parameters** Cyanide, Total	<200	DLM	200	ug	29-OCT-20	30-OCT-20	R5280517
L2515222-4 20-22030-M26-4 TEST#2 Sampled By: Client on 07-OCT-20 Matrix: Stack **Miscellaneous Parameters** Cyanide, Total Note: RRR: LOR raised due to low Matrix spike recovery	<0.4	RRR	0.40	ug	29-OCT-20	29-OCT-20	R5280517
L2515222-6 20-22030-M26-6 TEST#3 Sampled By: Client on 08-OCT-20 Matrix: Stack **Miscellaneous Parameters** Cyanide, Total	<0.2	DLM	0.20	ug	29-OCT-20	29-OCT-20	R5280517
L2515222-8 20-22030-M26-8 BLANK Sampled By: Client on 08-OCT-20 Matrix: Stack **Miscellaneous Parameters** Cyanide, Total	<0.2	DLM	0.20	ug	30-OCT-20	30-OCT-20	R5280517

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
RRR	Refer to Report Remarks for issues regarding this analysis
SP	Sample was Preserved at the laboratory

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

** 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: L2515222 Report Date: 17-DEC-20

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 R5280517								
WG3439718-3 DUP		**L2515222-2**						
Cyanide, Total		<200	<200	RPD-NA	ug	N/A	25	30-OCT-20
WG3439718-2 LCS								
Cyanide, Total			97.6		%		70-130	29-OCT-20
Cyanide, Total			0.244		ug		70-130	29-OCT-20
WG3439718-1 MB								
Cyanide, Total			<0.020		ug		0.02	29-OCT-20
WG3439718-4 MS		**L2515222-2**						
Cyanide, Total			97.9		%		70-130	30-OCT-20
Cyanide, Total			0.261		ug		70-130	30-OCT-20

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.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Cyanides							
Cyanide, Total							
	2	06-OCT-20	30-OCT-20 00:00	14	24	days	EHT
	4	07-OCT-20	29-OCT-20 00:00	14	22	days	EHT
	6	08-OCT-20	29-OCT-20 00:00	14	21	days	EHT
	8	08-OCT-20	30-OCT-20 00:01	14	22	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 L2515222 were received on 09-OCT-20 11:30.

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.

ORTECH Consulting Inc. Recovery & Sample Log

Method 26

Incinerator Stack

L2515222

Client: Clean Harbors Sarnia
Job/Report Number: 22030
Received By:
How Received: Train Recovery
Job Assigned To: ALS
PO #:

Test Number	ORTECH Sample ID 20-22030-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	Oct. 6/20	0.1N H2SO4	30.0	118	88	40	158	Halides
	2	"	0.1N NaOH	15.0	18	3	10	28	Cyanide
2	3	Oct. 7/20	0.1N H2SO4	30.0	86	56	40	126	Halides
	4	"	0.1N NaOH	15.0	15	0	10	25	Cyanide
3	5	Oct. 8/20	0.1N H2SO4	30.0	92	62	40	132	Halides
	6	"	0.1N NaOH	15.0	15	0	10	25	Cyanide
Blank	7	OCT 8/20	0.1N H2SO4	30.0	30.0	0	40.0	70.0	Halides
	8	"	0.1N NaOH	15.0	15.0	0	10.0	250	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: [signature] Date: OCT 9 2020

Relinquished to: AARON BARTON Date: 9-oct-2020 11:30

7.4°C

APPENDIX 14

Volatile Organics Analytical Reports
and DRE Compound Analysis in Feeds Report
(15 pages)

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

Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2515283		Mississauga, ON L5J 2Y4
Date of Report	26-Oct-20		Canada
Date of Sample Receipt	9-Oct-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 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	20-22030-VOST 2A/2B TEST#1 PAIR#2		20-22030-VOST 3A/3B TEST#1 PAIR#3		20-22030-VOST 4A/4B TEST#1 PAIR#4		20-22030-VOST 7A/7B TEST#2 PAIR#2		20-22030-VOST 8A/8B TEST#2 PAIR#3		20-22030-VOST 9A/9B TEST#2 PAIR#4	
ALS Sample ID	L2515283-2		L2515283-3		L2515283-4		L2515283-6		L2515283-7		L2515283-8	
Sample units	sample		sample		sample		sample		sample		sample	
Matrix	VOST		VOST		VOST		VOST		VOST		VOST	
Sampling Date	6-Oct-20		6-Oct-20		6-Oct-20		7-Oct-20		7-Oct-20		7-Oct-20	
Extraction Date	20-Oct-20		20-Oct-20		20-Oct-20		20-Oct-20		20-Oct-20		20-Oct-20	
Target Analytes	**ug/sample**		**ug/sample**		**ug/sample**		**ug/sample**		**ug/sample**		**ug/sample**	
Dichlorodifluoromethane	<0.02	U	<0.02	U	0.02		<0.02	U	<0.02	U	<0.02	U
Vinyl Chloride	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Bromomethane	<0.09	U	0.585		1.132		0.637		0.519		0.638	
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	0.300		<0.1	U	0.137		0.140		<0.1	U	0.228	
Methylene Chloride	0.213		0.201		0.310		0.422		0.192		0.569	
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	0.073		0.019		0.044		0.033		0.012		0.044	
Chloroform	0.141		0.076		0.085		0.067		0.071		0.046	
1,1,1-Trichloroethane	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Carbon Tetrachloride	0.027		0.032		0.042		0.013		<0.01	U	0.020	
Benzene	1.21		1.23		1.38		1.14		0.808		0.944	
Trichloroethene	0.023		0.031		0.045		0.027		0.015		0.022	
1,2-Dichloropropane	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Bromodichloromethane	0.345		0.341		0.413		0.211		0.032		0.172	
Toluene	0.147		0.096		0.101		0.072		0.074		<0.05	U
Tetrachloroethene	0.110		0.073		0.097		0.072		0.070		0.043	
Chlorodibromomethane	0.140		0.122		0.131		0.103		0.113		0.054	
Ethylene Dibromide	0.021	R	<0.02	U	0.029	R	<0.02	U	<0.02	U	<0.02	U
Ethylbenzene	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
M&P-Xylene	0.058		0.034		0.036		<0.03	U	0.036		<0.03	U
O-Xylene	0.019		0.011		0.012		<0.01	U	0.011		<0.01	U
Styrene	0.073		0.046		0.064		0.037		0.054		<0.02	U
Bromoform	0.120		0.075		0.123		0.092		0.099		0.065	
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	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Trichlorotrifluoroethane	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	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)	82.3		96.5		89.3		102		88.6		98.5	
Surrogate Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
d4-1,2-Dichloroethane(SURR)	83.6		114.0	M	101.4	M	107.6	M	97.9	M	103.9	
d8-Toluene(SURR)	112.4		126.7		105.9		87.3		105.5		71.4	
4-Bromofluorobenzene(SURR)	67.8		76.9		95.8		68.9		84.4		62.6	
Internal Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
Bromochloromethane	97.3		79.5		94.6		94.6		84.9		98.0	
1,4-Difluorobenzene	82.7		82.0	M	60.6		69.3		89.9		77.7	
d5-Chlorobenzene	58.9		54.2		51.3		54.7		58.7		107.9	

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	20-22030-VOST-12A/12B TEST#3 PAIR#2		20-22030-VOST-13A/13B TEST#3 PAIR#3		20-22030-VOST-14A/14B TEST#3 PAIR#4		20-22030-VOST-15A/15B FIELD BLANK		20-22030-VOST-43A/43B TRIP BLANK	
ALS Sample ID	L2515283-10		L2515283-11		L2515283-12		L2515283-13		L2515283-14	
Sample units	sample		sample		sample		sample		sample	
Matrix	VOST		VOST		VOST		VOST		VOST	
Sampling Date	8-Oct-20		8-Oct-20		8-Oct-20		8-Oct-20		9-Oct-20	
Extraction Date	20-Oct-20		20-Oct-20		20-Oct-20		20-Oct-20		20-Oct-20	
Target Analytes	**ug/sample**		**ug/sample**		**ug/sample**		**ug/sample**		**ug/sample**	
Dichlorodifluoromethane	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Vinyl Chloride	<0.02	U	<0.02	U	0.029	R	<0.02	U	<0.02	U
Bromomethane	1.02		0.975		0.926		<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	0.283		0.285		0.367		0.114		<0.1	U
Methylene Chloride	0.238		0.197		0.172		0.101		<0.1	U
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	0.066		0.068		0.099		<0.01	U	<0.01	U
Chloroform	0.062		0.055		0.060		<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	0.046		0.028		0.024		<0.01	U	<0.01	U
Benzene	1.54		1.34		1.69		<0.05	U	<0.05	U
Trichloroethene	0.040		0.036		0.038		<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	0.260		0.203		0.211		<0.01	U	<0.01	U
Toluene	0.053		0.061		0.094		<0.05	U	<0.05	U
Tetrachloroethene	0.056		0.062		0.065		<0.01	U	<0.01	U
Chlorodibromomethane	0.053		0.062		0.063		<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	U	<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	0.026		0.026		0.030		<0.02	U	<0.02	U
Bromoform	0.065		0.062		0.068		<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	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Trichlorotrifluoroethane	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	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)	93.0		74.1		94.9		99.7		92.6	
Surrogate Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
d4-1,2-Dichloroethane(SURR)	96.0	M	100.5	M	99.4	M	92.8		88.6	
d8-Toluene(SURR)	69.7		79.8		92.7		103.6		90.9	
4-Bromofluorobenzene(SURR)	63.4		60.9		76.2		107.5		93.4	
Internal Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
Bromochloromethane	90.6		85.0		81.1		83.9		97.1	
1,4-Difluorobenzene	63.5		70.2		75.7	M	117.5		131.0	
d5-Chlorobenzene	99.9		89.3		102.6		136.5		153.2	

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	WG3427833-1		WG3427833-2	
Sample units	sample		n/a	
Matrix	QC		QC	
Sampling Date	n/a		n/a	
Extraction Date	20-Oct-20		20-Oct-20	
Target Analytes	**ug/sample**		**% Rec**	
Dichlorodifluoromethane	<0.02	U	99.4	
Vinyl Chloride	<0.02	U	86.4	M
Bromomethane	<0.09	U	81.1	
Trichlorofluoromethane	<0.02	U	86.7	
1,1-Dichloroethene	<0.01	U	94.5	
Acetone	<0.1	U	110.9	
Methylene Chloride	<0.1	U	101.9	
trans,1,2-Dichloroethene	<0.01	U	102.8	M
1,1-Dichloroethane	<0.01	U	97.4	
2-Butanone	<0.01	U	115.4	
Chloroform	<0.01	U	87.0	
1,1,1-Trichloroethane	<0.01	U	106.5	
Carbon Tetrachloride	<0.01	U	105.8	
Benzene	<0.05	U	96.6	
1,2-Dichloroethane	<0.01	U	92.2	
Trichloroethene	<0.01	U	114.7	
1,2-Dichloropropane	<0.01	U	113.5	
Bromodichloromethane	<0.01	U	116.5	
Toluene	<0.05	U	83.9	
1,1,2-Trichloroethane	<0.02	U	115.7	
Tetrachloroethene	<0.01	U	95.8	
Chlorodibromomethane	<0.01	U	105.3	
Ethylene Dibromide	<0.02	U	119.5	
Ethylbenzene	<0.01	U	89.6	
M&P-Xylene	<0.03	U	81.3	
O-Xylene	<0.01	U	79.7	
Styrene	<0.02	U	82.9	
Bromoform	<0.01	U	115.3	
Isopropylbenzene	<0.02	U	82.9	
1,3,5-Trimethylbenzene	<0.02	U	102.4	
1,2,4-Trimethylbenzene	<0.02	U	90.3	
Trichlorotrifluoroethane	<0.02	U		
Ethyl Acetate	<0.1	U		
Field Standard	**% Rec**		**% Rec**	
d10-Ethylbenzene(SPK)	77		100.8	
Surrogate Standards	**% Rec**		**% Rec**	
d4-1,2-Dichloroethane(SURR)	96.6		85.3	
d8-Toluene(SURR)	101.2		92.7	
4-Bromofluorobenzene(SURR)	105.4		85.5	
Internal Standards	**% Rec**		**% Rec**	
Bromochloromethane	95.9		83.1	
1,4-Difluorobenzene	127.8		107.0	
d5-Chlorobenzene	150.1		115.6	

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

ORTECH Environmental
ATTN: Chris Belore
804 Southdown Road
Mississauga ON L5J 2Y4

Date Received: 13-OCT-20
Report Date: 21-OCT-20 15:39 (MT)
Version: FINAL

Client Phone: 905-822-4120

Certificate of Analysis

Lab Work Order #: L2515816
Project P.O. #: NOT SUBMITTED
Job Reference: 22030 CLEAN HARBORS
C of C Numbers:
Legal Site Desc:

L. Wrona

Lynne Wrona, M.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2515816-1 20-22030-FR-3 RICH FEED TEST#1							
Sampled By: Client on 06-OCT-20							
Matrix: Stack							
Volatile Organic Compounds							
1,2,4-Trichlorobenzene	<500		500	mg/kg	20-OCT-20	21-OCT-20	R5260320
1,2-Dichlorobenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethyl Acetate	1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethylbenzene	16900		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
m+p-Xylenes	55200		60	mg/kg	20-OCT-20	21-OCT-20	R5260320
Methyl Ethyl Ketone	2000	DLQ	2000	mg/kg	20-OCT-20	21-OCT-20	R5260320
o-Xylene	16400		40	mg/kg	20-OCT-20	21-OCT-20	R5260320
Tetrachloroethylene	440		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Toluene	47300	DLHC	500	mg/kg	20-OCT-20	21-OCT-20	R5260320
Surrogate: 1,4-Difluorobenzene	100.7		50-150	%	20-OCT-20	21-OCT-20	R5260320
Surrogate: 4-Bromofluorobenzene	104.2		50-150	%	20-OCT-20	21-OCT-20	R5260320
L2515816-2 20-22030-FL-3 LEAN FEED TEST#1							
Sampled By: Client on 06-OCT-20							
Matrix: Stack							
Volatile Organic Compounds							
1,2,4-Trichlorobenzene	<500		500	mg/kg	20-OCT-20	21-OCT-20	R5260320
1,2-Dichlorobenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethyl Acetate	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethylbenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
m+p-Xylenes	<60		60	mg/kg	20-OCT-20	21-OCT-20	R5260320
Methyl Ethyl Ketone	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
o-Xylene	<40		40	mg/kg	20-OCT-20	21-OCT-20	R5260320
Tetrachloroethylene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Toluene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Surrogate: 1,4-Difluorobenzene	101.0		50-150	%	20-OCT-20	21-OCT-20	R5260320
Surrogate: 4-Bromofluorobenzene	96.5		50-150	%	20-OCT-20	21-OCT-20	R5260320
L2515816-3 20-22030-FE-3 EMULSION FEED TEST#1							
Sampled By: Client on 06-OCT-20							
Matrix: Stack							
Volatile Organic Compounds							
1,2,4-Trichlorobenzene	<500		500	mg/kg	20-OCT-20	21-OCT-20	R5260320
1,2-Dichlorobenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethyl Acetate	1100		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethylbenzene	13900		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
m+p-Xylenes	47800		60	mg/kg	20-OCT-20	21-OCT-20	R5260320
Methyl Ethyl Ketone	<3000	DLQ	3000	mg/kg	20-OCT-20	21-OCT-20	R5260320
o-Xylene	14400		40	mg/kg	20-OCT-20	21-OCT-20	R5260320
Tetrachloroethylene	910		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Toluene	40500		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Surrogate: 1,4-Difluorobenzene	100.2		50-150	%	20-OCT-20	21-OCT-20	R5260320
Surrogate: 4-Bromofluorobenzene	102.0		50-150	%	20-OCT-20	21-OCT-20	R5260320
L2515816-4 20-22030-FA-3 ALKALINE FEED TEST#1							
Sampled By: Client on 06-OCT-20							
Matrix: Stack							
Volatile Organic Compounds							
1,2,4-Trichlorobenzene	<500		500	mg/kg	20-OCT-20	21-OCT-20	R5260320

* 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
L2515816-4 20-22030-FA-3 ALKALINE FEED TEST#1							
Sampled By: Client on 06-OCT-20							
Matrix: Stack							
Volatile Organic Compounds							
1,2-Dichlorobenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethyl Acetate	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethylbenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
m+p-Xylenes	<60		60	mg/kg	20-OCT-20	21-OCT-20	R5260320
Methyl Ethyl Ketone	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
o-Xylene	<40		40	mg/kg	20-OCT-20	21-OCT-20	R5260320
Tetrachloroethylene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Toluene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Surrogate: 1,4-Difluorobenzene	100.8		50-150	%	20-OCT-20	21-OCT-20	R5260320
Surrogate: 4-Bromofluorobenzene	95.8		50-150	%	20-OCT-20	21-OCT-20	R5260320
L2515816-5 20-22030-LW-3 LEACHATE FEED TEST#1							
Sampled By: Client on 06-OCT-20							
Matrix: Stack							
Volatile Organic Compounds							
1,2,4-Trichlorobenzene	<500		500	mg/kg	20-OCT-20	21-OCT-20	R5260320
1,2-Dichlorobenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethyl Acetate	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethylbenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
m+p-Xylenes	<60		60	mg/kg	20-OCT-20	21-OCT-20	R5260320
Methyl Ethyl Ketone	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
o-Xylene	<40		40	mg/kg	20-OCT-20	21-OCT-20	R5260320
Tetrachloroethylene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Toluene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Surrogate: 1,4-Difluorobenzene	101.2		50-150	%	20-OCT-20	21-OCT-20	R5260320
Surrogate: 4-Bromofluorobenzene	90.3		50-150	%	20-OCT-20	21-OCT-20	R5260320
L2515816-6 20-22030-FR-8 RICH FEED TEST#2							
Sampled By: Client on 07-OCT-20							
Matrix: Stack							
Volatile Organic Compounds							
1,2,4-Trichlorobenzene	<500		500	mg/kg	20-OCT-20	21-OCT-20	R5260320
1,2-Dichlorobenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethyl Acetate	1200		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethylbenzene	15800		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
m+p-Xylenes	51700		60	mg/kg	20-OCT-20	21-OCT-20	R5260320
Methyl Ethyl Ketone	<2500	DLQ	2500	mg/kg	20-OCT-20	21-OCT-20	R5260320
o-Xylene	15600		40	mg/kg	20-OCT-20	21-OCT-20	R5260320
Tetrachloroethylene	450		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Toluene	53000	DLHC	500	mg/kg	20-OCT-20	21-OCT-20	R5260320
Surrogate: 1,4-Difluorobenzene	100.6		50-150	%	20-OCT-20	21-OCT-20	R5260320
Surrogate: 4-Bromofluorobenzene	99.3		50-150	%	20-OCT-20	21-OCT-20	R5260320
L2515816-7 20-22030-FL-8 LEAN FEED TEST#2							
Sampled By: Client on 07-OCT-20							
Matrix: Stack							
Volatile Organic Compounds							
1,2,4-Trichlorobenzene	<500		500	mg/kg	20-OCT-20	21-OCT-20	R5260320
1,2-Dichlorobenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethyl Acetate	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320

* 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
L2515816-7 20-22030-FL-8 LEAN FEED TEST#2							
Sampled By: Client on 07-OCT-20							
Matrix: Stack							
Volatile Organic Compounds							
Ethylbenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
m+p-Xylenes	<60		60	mg/kg	20-OCT-20	21-OCT-20	R5260320
Methyl Ethyl Ketone	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
o-Xylene	<40		40	mg/kg	20-OCT-20	21-OCT-20	R5260320
Tetrachloroethylene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Toluene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Surrogate: 1,4-Difluorobenzene	101.4		50-150	%	20-OCT-20	21-OCT-20	R5260320
Surrogate: 4-Bromofluorobenzene	98.8		50-150	%	20-OCT-20	21-OCT-20	R5260320
L2515816-8 20-22030-FE-8 EMULSION FEED TEST#2							
Sampled By: Client on 07-OCT-20							
Matrix: Stack							
Volatile Organic Compounds							
1,2,4-Trichlorobenzene	<500		500	mg/kg	20-OCT-20	21-OCT-20	R5260320
1,2-Dichlorobenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethyl Acetate	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethylbenzene	13000		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
m+p-Xylenes	44700		60	mg/kg	20-OCT-20	21-OCT-20	R5260320
Methyl Ethyl Ketone	<3000	DLQ	3000	mg/kg	20-OCT-20	21-OCT-20	R5260320
o-Xylene	13600		40	mg/kg	20-OCT-20	21-OCT-20	R5260320
Tetrachloroethylene	830		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Toluene	37200		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Surrogate: 1,4-Difluorobenzene	100.1		50-150	%	20-OCT-20	21-OCT-20	R5260320
Surrogate: 4-Bromofluorobenzene	102.4		50-150	%	20-OCT-20	21-OCT-20	R5260320
L2515816-9 20-22030-FA-8 ALKALINE FEED TEST#2							
Sampled By: Client on 07-OCT-20							
Matrix: Stack							
Volatile Organic Compounds							
1,2,4-Trichlorobenzene	<500		500	mg/kg	20-OCT-20	21-OCT-20	R5260320
1,2-Dichlorobenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethyl Acetate	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethylbenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
m+p-Xylenes	<60		60	mg/kg	20-OCT-20	21-OCT-20	R5260320
Methyl Ethyl Ketone	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
o-Xylene	<40		40	mg/kg	20-OCT-20	21-OCT-20	R5260320
Tetrachloroethylene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Toluene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Surrogate: 1,4-Difluorobenzene	100.4		50-150	%	20-OCT-20	21-OCT-20	R5260320
Surrogate: 4-Bromofluorobenzene	87.8		50-150	%	20-OCT-20	21-OCT-20	R5260320
L2515816-10 20-22030-LW-8 LEACHATE FEED TEST#2							
Sampled By: Client on 07-OCT-20							
Matrix: Stack							
Volatile Organic Compounds							
1,2,4-Trichlorobenzene	<500		500	mg/kg	20-OCT-20	21-OCT-20	R5260320
1,2-Dichlorobenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethyl Acetate	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethylbenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
m+p-Xylenes	<60		60	mg/kg	20-OCT-20	21-OCT-20	R5260320

* 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
L2515816-10 20-22030-LW-8 LEACHATE FEED TEST#2							
Sampled By: Client on 07-OCT-20							
Matrix: Stack							
Volatile Organic Compounds							
Methyl Ethyl Ketone	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
o-Xylene	<40		40	mg/kg	20-OCT-20	21-OCT-20	R5260320
Tetrachloroethylene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Toluene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Surrogate: 1,4-Difluorobenzene	100.8		50-150	%	20-OCT-20	21-OCT-20	R5260320
Surrogate: 4-Bromofluorobenzene	97.0		50-150	%	20-OCT-20	21-OCT-20	R5260320
L2515816-11 20-22030-FR-13 RICH FEED TEST#3							
Sampled By: Client on 08-OCT-20							
Matrix: Stack							
Volatile Organic Compounds							
1,2,4-Trichlorobenzene	<500		500	mg/kg	20-OCT-20	21-OCT-20	R5260320
1,2-Dichlorobenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethyl Acetate	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethylbenzene	13800		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
m+p-Xylenes	45700		60	mg/kg	20-OCT-20	21-OCT-20	R5260320
Methyl Ethyl Ketone	<2000	DLQ	2000	mg/kg	20-OCT-20	21-OCT-20	R5260320
o-Xylene	14200		40	mg/kg	20-OCT-20	21-OCT-20	R5260320
Tetrachloroethylene	410		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Toluene	43400	DLHC	500	mg/kg	20-OCT-20	21-OCT-20	R5260320
Surrogate: 1,4-Difluorobenzene	99.7		50-150	%	20-OCT-20	21-OCT-20	R5260320
Surrogate: 4-Bromofluorobenzene	106.2		50-150	%	20-OCT-20	21-OCT-20	R5260320
L2515816-12 20-22030-FL-13 LEAN FEED TEST#3							
Sampled By: Client on 08-OCT-20							
Matrix: Stack							
Volatile Organic Compounds							
1,2,4-Trichlorobenzene	<500		500	mg/kg	20-OCT-20	21-OCT-20	R5260320
1,2-Dichlorobenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethyl Acetate	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethylbenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
m+p-Xylenes	270		60	mg/kg	20-OCT-20	21-OCT-20	R5260320
Methyl Ethyl Ketone	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
o-Xylene	104		40	mg/kg	20-OCT-20	21-OCT-20	R5260320
Tetrachloroethylene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Toluene	270		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Surrogate: 1,4-Difluorobenzene	100.4		50-150	%	20-OCT-20	21-OCT-20	R5260320
Surrogate: 4-Bromofluorobenzene	96.8		50-150	%	20-OCT-20	21-OCT-20	R5260320
L2515816-13 20-22030-FE-13 EMULSION FEED TEST#3							
Sampled By: Client on 08-OCT-20							
Matrix: Stack							
Volatile Organic Compounds							
1,2,4-Trichlorobenzene	<500		500	mg/kg	20-OCT-20	21-OCT-20	R5260320
1,2-Dichlorobenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethyl Acetate	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethylbenzene	21100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
m+p-Xylenes	72100		60	mg/kg	20-OCT-20	21-OCT-20	R5260320
Methyl Ethyl Ketone	<5000	DLQ	5000	mg/kg	20-OCT-20	21-OCT-20	R5260320
o-Xylene	21500		40	mg/kg	20-OCT-20	21-OCT-20	R5260320

* 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
L2515816-13 20-22030-FE-13 EMULSION FEED TEST#3							
Sampled By: Client on 08-OCT-20							
Matrix: Stack							
Volatile Organic Compounds							
Tetrachloroethylene	830		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Toluene	40400	DLHC	500	mg/kg	20-OCT-20	21-OCT-20	R5260320
Surrogate: 1,4-Difluorobenzene	99.0		50-150	%	20-OCT-20	21-OCT-20	R5260320
Surrogate: 4-Bromofluorobenzene	98.4		50-150	%	20-OCT-20	21-OCT-20	R5260320
L2515816-14 20-22030-FA-13 ALKALINE FEED TEST#3							
Sampled By: Client on 08-OCT-20							
Matrix: Stack							
Volatile Organic Compounds							
1,2,4-Trichlorobenzene	<500		500	mg/kg	20-OCT-20	21-OCT-20	R5260320
1,2-Dichlorobenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethyl Acetate	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethylbenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
m+p-Xylenes	<60		60	mg/kg	20-OCT-20	21-OCT-20	R5260320
Methyl Ethyl Ketone	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
o-Xylene	<40		40	mg/kg	20-OCT-20	21-OCT-20	R5260320
Tetrachloroethylene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Toluene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Surrogate: 1,4-Difluorobenzene	99.3		50-150	%	20-OCT-20	21-OCT-20	R5260320
Surrogate: 4-Bromofluorobenzene	88.4		50-150	%	20-OCT-20	21-OCT-20	R5260320
L2515816-15 20-22030-LW-13 LEACHATE FEED TEST#3							
Sampled By: Client on 08-OCT-20							
Matrix: Stack							
Volatile Organic Compounds							
1,2,4-Trichlorobenzene	<500		500	mg/kg	20-OCT-20	21-OCT-20	R5260320
1,2-Dichlorobenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethyl Acetate	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
Ethylbenzene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
m+p-Xylenes	<60		60	mg/kg	20-OCT-20	21-OCT-20	R5260320
Methyl Ethyl Ketone	<1000		1000	mg/kg	20-OCT-20	21-OCT-20	R5260320
o-Xylene	<40		40	mg/kg	20-OCT-20	21-OCT-20	R5260320
Tetrachloroethylene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Toluene	<100		100	mg/kg	20-OCT-20	21-OCT-20	R5260320
Surrogate: 1,4-Difluorobenzene	100.5		50-150	%	20-OCT-20	21-OCT-20	R5260320
Surrogate: 4-Bromofluorobenzene	99.2		50-150	%	20-OCT-20	21-OCT-20	R5260320

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.

Test Method References:

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 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: L2515816 Report Date: 21-OCT-20

Client: ORTECH Environmental
804 Southdown Road
Mississauga ON L5J 2Y4
Contact: Chris Belore

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-FEED-WT	Soil							
Batch R5260320								
WG3428096-2 DUP		**L2515816-1**						
1,2,4-Trichlorobenzene		<500	<500	RPD-NA	mg/kg	N/A	50	21-OCT-20
1,2-Dichlorobenzene		<100	<100	RPD-NA	mg/kg	N/A	50	21-OCT-20
Ethyl Acetate		1000	1300		mg/kg	23	50	21-OCT-20
Ethylbenzene		16900	16200		mg/kg	4.4	50	21-OCT-20
m+p-Xylenes		55200	52700		mg/kg	4.7	50	21-OCT-20
Methyl Ethyl Ketone		2000	<3000	RPD-NA	mg/kg	N/A	50	21-OCT-20
o-Xylene		16400	16000		mg/kg	2.7	50	21-OCT-20
Tetrachloroethylene		440	410		mg/kg	6.3	50	21-OCT-20
Toluene		47300	47300		mg/kg	0.1	50	21-OCT-20
WG3428096-1 MB								
1,2,4-Trichlorobenzene			<500		mg/kg		500	21-OCT-20
1,2-Dichlorobenzene			<100		mg/kg		100	21-OCT-20
Ethyl Acetate			<1000		mg/kg		1000	21-OCT-20
Ethylbenzene			<100		mg/kg		100	21-OCT-20
m+p-Xylenes			<60		mg/kg		60	21-OCT-20
Methyl Ethyl Ketone			<1000		mg/kg		1000	21-OCT-20
o-Xylene			<40		mg/kg		40	21-OCT-20
Tetrachloroethylene			<100		mg/kg		100	21-OCT-20
Toluene			<100		mg/kg		100	21-OCT-20
Surrogate: 1,4-Difluorobenzene			101.7		%		50-150	21-OCT-20
Surrogate: 4-Bromofluorobenzene			102.1		%		50-150	21-OCT-20

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.

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	06-OCT-20	20-OCT-20 11:45	7	14	days	EHTR
	2	06-OCT-20	20-OCT-20 11:47	7	14	days	EHTR
	3	06-OCT-20	20-OCT-20 11:48	7	14	days	EHTR
	4	06-OCT-20	20-OCT-20 11:49	7	14	days	EHTR
	5	06-OCT-20	20-OCT-20 11:50	7	14	days	EHTR
	6	07-OCT-20	20-OCT-20 11:51	7	13	days	EHTL
	7	07-OCT-20	20-OCT-20 11:52	7	13	days	EHTL
	8	07-OCT-20	20-OCT-20 11:53	7	13	days	EHTL
	9	07-OCT-20	20-OCT-20 11:54	7	13	days	EHTL
	10	07-OCT-20	20-OCT-20 11:55	7	13	days	EHTL
	11	08-OCT-20	20-OCT-20 11:56	7	12	days	EHT
	12	08-OCT-20	20-OCT-20 11:57	7	12	days	EHT
	13	08-OCT-20	20-OCT-20 11:58	7	12	days	EHT
	14	08-OCT-20	20-OCT-20 11:59	7	12	days	EHT
	15	08-OCT-20	20-OCT-20 12:00	7	12	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 L2515816 were received on 13-OCT-20 12:15.

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 # 21939
Process Samples
Sample List for ALS DRE Analysis

L2515816

Test Number	Test Date	ORTECH Sample Identification	Sample Description
1	oct 6, 20	20- 22030- FR-3	Rich Feed (250 ml bottle) 1
1		20- 22030- FL-3	Lean Feed (250 ml bottle) 2
1		20- 22030- FE-3	Emulsion Feed (250 ml bottle) 3
1		20- 22030- FA-3	Alkaline Feed (250 ml bottle) 4
1		20- 22030- LW-3	Leachate Feed (250 ml bottle) 5
2	oct 7, 20	20- 22030- FR-8	Rich Feed (250 ml bottle) 6
2		20- 22030- FL-8	Lean Feed (250 ml bottle) 7
2		20- 22030- FE-8	Emulsion Feed (250 ml bottle) 8
2		20- 22030- FA-8	Alkaline Feed (250 ml bottle) 9
2		20- 22030- LW-8	Leachate Feed (250 ml bottle) 10
3	oct 8, 20	20- 22030- FR-13	Rich Feed (250 ml bottle) 11
3		20- 22030- FL-13	Lean Feed (250 ml bottle) 12
3		20- 22030- FE-13	Emulsion Feed (250 ml bottle) 13
3		20- 22030- FA-13	Alkaline Feed (250 ml bottle) 14
3		20- 22030- LW-13	Leachate Feed (250 ml bottle) 15

Custody Relinquished by: [signature] Date: oct 13, 20

Custody Received by: AARON BRETON Date: 13-oct-22 12:15

14.2°C

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	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2515814		Mississauga, ON L5J 2Y4
Date of Report	5-Nov-20		Canada
Date of Sample Receipt	13-Oct-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 Clean Harbors

COMMENTS:

Sample Preparation via method 29 (SA 03-NOV-2020)
Mercury Analysis via CVAA using Method USEPA 7470A (AB 04-NOV-2020)

ANALYST COMMENTS:

Samples digested according to M29 FH digestion. Results are normalized to account for sub-samples taken, and are reported in mg/kg units.
PE 5-Nov-2020

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
Account Manager

ALS Environmental

Sample Analysis Summary Report

Sample Name			20-22030-RC-1 RICH FEED	20-22030-LC-1 LEAN FEED	20-22030-AC-1 ALKALINE FEED	20-22030-EC-1 EMULSION FEED	20-22030-BDC-1 BAGHOUSE DUST
ALS Sample ID			L2515814-1	L2515814-2	L2515814-3	L2515814-4	L2515814-5
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			13-Oct-20	13-Oct-20	13-Oct-20	13-Oct-20	13-Oct-20
Mercury via CVAA		**LOR**					
	Method 29	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
	Analytical Fraction 1B	0.03	0.0413	0.720	<0.0190	<0.029	19.7

ALS Environmental

Sample Analysis Summary Report

Sample Name	20-22030-LWC-1 LEACHATE FEED
ALS Sample ID	L2515814-6
Matrix	Stack
Analysis type	Sample
Sampling Date/Time	n/a
Date of Receipt	13-Oct-20

Mercury via CVAA	LOR	
Method 29	mg/kg	mg/kg
Analytical Fraction 1B	0.03	<0.0257

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	**mg/kg**	**mg/kg**	**mg/kg**	**% Rec**	**mg/kg**	**% Rec**
Analytical Fraction 1B	0.03	<0.03	0.570	94%	0.562	93%

ALS Environmental

Sample QC Summary Report

Sample Name			20-22030-RC-1 RICH FEED	20-22030-RC-1 RICH FEED	20-22030-RC-1 RICH FEED	20-22030-RC-1 RICH FEED	20-22030-RC-1 RICH FEED	20-22030-RC-1 RICH FEED
ALS Sample ID			L2515814-1	L2515814-1DUP	L2515814-1MS	L2515814-1MS	L2515814-1MSD	L2515814-1MSD
Matrix			Stack	Stack	Stack	Stack	Stack	Stack
Analysis type			Sample	Duplicate	Matrix Spike	Matrix Spike	Matrix Spike Dup	Matrix Spike Dup
Sampling Date/Time			n/a	n/a	n/a	n/a	n/a	n/a
Date of Receipt			13-Oct-20	13-Oct-20	13-Oct-20	13-Oct-20	13-Oct-20	13-Oct-20
Mercury via CVAA		**LOR**						
	Method 29	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**% Rec**	**mg/kg**	**% Rec**
	Analytical Fraction 1B	0.03	0.0413	0.0441	0.515	85%	0.558	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	**Client Name:**	ORTECH Environmental
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2515814		Mississauga, ON L5J 2Y4
Date of Report	4-Nov-20		Canada
Date of Sample Receipt	13-Oct-20	**Client Contact:**	Chris Belore
		Client Project ID:	22030 Clean Harbors

COMMENTS:

Metals analysed via ICP-MS Method USEPA 6020B (SA 03-Nov-20)
Sample Preparation via USEPA Method 29 (SA 03-Nov-20)

ANALYST COMMENTS:

Si observed in the reagent blank above the LOR. This is likely due to carry-over from high-levels of this analyte in client samples. This is not expected to have any impact on data quality.
B recoveries in the LCS and LCSD are outside ALS DQOs (found: 80, 81%, limits: 85-115%). Data for this analyte may be biased low.
PE 4-Nov-2020

Samples digested according to M29 FH digestion. Results are normalized to account for sub-samples taken, and are reported in mg/kg units.
PE 5-Nov-2020

LCB = Laboratory Control Blank
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
LOR = Limit of Reporting

Certified by: L. Wrona
Lynne Wrona
Account Manager

ALS Environmental

Sample Analysis Summary Report

Sample Name		20-22030-RC-1 RICH FEED	20-22030-LC-1 LEAN FEED	20-22030-AC-1 ALKALINE FEED	20-22030-EC-1 EMULSION FEED	20-22030-BDC-1 BAGHOUSE DUST	20-22030-LWC-1 LEACHATE FEED
ALS Sample ID		L2515814-1	L2515814-2	L2515814-3	L2515814-4	L2515814-5	L2515814-6
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		13-Oct-20	13-Oct-20	13-Oct-20	13-Oct-20	13-Oct-20	13-Oct-20
Multi-Metals via ICP-MS	**LOR mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Front Half HF Fraction 1A							
Aluminum	20	175	213	<	29.3	5180	<
Antimony	0.2	1.96	3.81	<	0.252	111	<
Arsenic	1	1.01	86.5	<	<	1280	1.17
Barium	5	65.5	34.3	<	<	1170	<
Beryllium	0.2	<	<	<	<	0.227	<
Boron	30	<	<	<	<	241	35.3
Cadmium	0.1	0.110	1.00	<	<	37.7	0.148
Calcium	500	<	1210	1040	<	26700	759
Chromium	1	30.9	4.12	<	1.75	121	<
Cobalt	0.2	2.64	1.65	<	2.27	52.8	<
Copper	1	17.8	12.4	<	6.37	626	<
Iron	200	<	886	<	<	18400	<
Lead	0.5	12.5	1.67	<	0.714	71.5	<
Lithium	0.5	2.05	17.2	<	<	332	6.32
Magnesium	10	59.8	366	41.2	40.0	6200	193
Manganese	0.5	15.8	46.7	0.661	8.38	995	2.33
Molybdenum	0.2	5.72	4.27	0.298	0.530	127	3.37
Nickel	0.2	10.5	11.4	<	61.8	423	2.75
Phosphorus	100	260	272	<	512	8260	<
Potassium	100	<	2150	<	<	45400	7350
Selenium	2	<	19.0	<	<	459	<
Silver	0.2	<	<	<	<	1.68	<
Sodium	30	3380	10300	156	197	195000	19700
Strontium	0.2	33.6	15.5	1.16	2.10	325	6.71
Tin	0.3	3.47	24.0	<	1.84	519	0.477
Titanium	10	499	142	<	<	6780	<
Vanadium	1	3.34	2.93	<	<	81.1	<
Zinc	6	38.0	23.2	<	15.4	1030	<
Sulphur	10000	<	<	<	<	33600	<
Silicon	150	6110	1180	169	3670	54400	1170

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 mg/kg**	**mg/kg**	**mg/kg**	**% Rec**	**mg/kg**	**% Rec**
Front Half HF Fraction 1A						
Aluminum	20	<	238	97	229	93
Antimony	0.2	<	23.6	98	22.7	94
Arsenic	1	<	119	99	118	98
Barium	5	<	123	102	118	98
Beryllium	0.2	<	117	97	114	95
Boron	30	<	98.2	81	96.2	80
Cadmium	0.1	<	59.3	99	58.4	97
Calcium	500	<	3020	101	2880	96
Chromium	1	<	120	100	121	101
Cobalt	0.2	<	121	101	119	99
Copper	1	<	157	130	121	101
Iron	200	<	622	103	614	102
Lead	0.5	<	124	103	118	99
Lithium	0.5	<	21.0	97	20.6	95
Magnesium	10	<	600	100	609	101
Manganese	0.5	<	120	100	117	98
Molybdenum	0.2	<	59.6	99	57.4	96
Nickel	0.2	<	120	100	120	100
Phosphorus	100	<	2750	93	2870	97
Potassium	100	<	3000	100	3030	101
Selenium	2	<	117	98	114	95
Silver	0.2	<	59.9	100	57.0	95
Sodium	30	<	3060	101	3060	102
Strontium	0.2	<	117	97	112	94
Tin	0.3	<	58.6	97	58.1	97
Titanium	10	<	118	98	115	96
Vanadium	1	<	120	100	120	100
Zinc	6	<	261	109	243	101
Sulphur	10000	<	23400	96	22900	94
Silicon	150	1780	6620	110	5180	86

ALS Environmental

Sample QC Summary Report

Sample Name		20-22030-RC 1 RICH FEED	20-22030-RC 1 RICH FEED	20-22030-RC 1 RICH FEED	20-22030-RC 1 RICH FEED	20-22030-RC 1 RICH FEED	20-22030-RC 1 RICH FEED
ALS Sample ID		L2515814-1	L2515814-1	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		n/a	n/a	n/a	n/a	n/a	n/a
Date of Receipt		13-Oct-20	13-Oct-20	13-Oct-20	13-Oct-20	13-Oct-20	13-Oct-20
Multi-Metals via ICP-MS	**LOR mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**% Rec**	**mg/kg**	**% Rec**
Front Half HF Fraction 1A							
Aluminum	20	175	175	649	96	651	96
Antimony	0.2	1.96	1.95	48.1	96	47.4	94
Arsenic	1	1.01	1.31	239	99	236	98
Barium	5	65.5	67.6	302	97	293	93
Beryllium	0.2	<	<	237	99	239	100
Boron	30	<	<	213	85	214	85
Cadmium	0.1	0.110	0.113	117	98	117	97
Calcium	500	<	<	6170	98	6190	99
Chromium	1	30.9	32.5	274	100	268	98
Cobalt	0.2	2.64	2.76	241	99	236	97
Copper	1	17.8	18.1	261	101	257	99
Iron	200	<	<	1430	102	1420	101
Lead	0.5	12.5	12.5	243	96	245	96
Lithium	0.5	2.05	2.03	49.9	99	49.7	99
Magnesium	10	59.8	63.2	1270	100	1270	101
Manganese	0.5	15.8	15.7	256	100	255	99
Molybdenum	0.2	5.72	5.61	122	96	120	95
Nickel	0.2	10.5	11.2	249	99	246	98
Phosphorus	100	260	216	6270	100	6300	100
Potassium	100	<	<	6180	102	6150	101
Selenium	2	<	<	236	98	235	97
Silver	0.2	<	<	116	97	116	96
Sodium	30	3380	3430	9990	106	10300	112
Strontium	0.2	33.6	32.8	272	98	274	99
Tin	0.3	3.47	3.60	121	98	120	97
Titanium	10	499	514	785	103	791	106
Vanadium	1	3.34	3.67	244	100	241	99
Zinc	6	38.0	38.1	523	101	511	98
Sulphur	10000	<	<	52600	103	52300	102
Silicon	150	6110	6320	21400	82	20700	78

APPENDIX 16

Master Sample Log/Chains of Custody Forms
(4 pages)

ORTECH Environmental Sample Log
Particulate and Metals Samples
Clean Harbors Sarnia

Client: Clean Harbors Sarnia
Job/Report Number: 22030
Received By: C Belore
How Received: Train recovery
Job Assigned To: ALS
PO #: 22030 - J2725

ORTECH Sample ID 20-22030-PM-	Sample Date	Sample Description	Hazardous Material	Sample Analysis
1		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 A,B		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		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 A,B		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		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 A,B		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: [signature] Date: OCT 9 2020

Relinquished To: ARRON BELTON Date: 9-oct-2020 11:30

2.4°C

ORTECH

ORTECH Consulting Inc. Recovery & Sample Log
Method 26
Incinerator Stack

Client: Clean Harbors Sarnia
~~Job/Report Number:~~ 22030
Received By:
How Received: Train Recovery
Job Assigned To: ALS
PO #:

Test Number	ORTECH Sample ID 20-22030-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	Oct. 6/20	0.1N H2SO4	30.0	118	88	40	158	Halides
	2	"	0.1N NaOH	15.0	18	3	10	28	Cyanide
2	3	Oct. 7/20	0.1N H2SO4	30.0	86	56	40	126	Halides
	4	"	0.1N NaOH	15.0	15	0	10	25	Cyanide
3	5	Oct. 8/20	0.1N H2SO4	30.0	92	62	40	132	Halides
	6	"	0.1N NaOH	15.0	15	0	10	25	Cyanide
Blank	7	OCT 8/20	0.1N H2SO4	30.0	30.0	0	40.0	70.0	Halides
	8	"	0.1N NaOH	15.0	15.0	0	10.0	25.0	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: [signature] Date: Oct 9 2020

Relinquished to: Adrian Burton Date: 9-Oct-2020 11:30
7.4°C

ORTECH Consulting Inc.
Project # 22030
Vost Sample List
Clean Harbors Sarnia

Test Number	ORTECH Sample ID 20-22030-VOST-	Sample Date	Sample Description	Sample Analysis
1	1A/1B	oct 6 2020	Tenax and Tenax/Charcoal (Pair 1)	Archive
1	2A/2B	oct. 6 2020	Tenax and Tenax/Charcoal (Pair 2)	VOCs
1	3A/3B	oct. 6 2020	Tenax and Tenax/Charcoal (Pair 3)	VOCs
1	4A/4B	oct. 6 2020	Tenax and Tenax/Charcoal (Pair 4)	VOCs
~~1~~	~~5A/5B~~		~~Field Blank~~	~~Archive~~
2	6A/6B	oct. 7 2020	Tenax and Tenax/Charcoal (Pair 1)	Archive
2	7A/7B	oct 7 2020	Tenax and Tenax/Charcoal (Pair 2)	VOCs
2	8A/8B	oct 7 2020	Tenax and Tenax/Charcoal (Pair 3)	VOCs
2	9A/9B	oct. 7 2020	Tenax and Tenax/Charcoal (Pair 4)	VOCs
~~2~~	~~10A/10B~~		~~Field Blank~~	~~Archive~~
3	11A/11B	oct. 8 2020	Tenax and Tenax/Charcoal (Pair 1)	Archive
3	12A/12B	oct. 8 2020	Tenax and Tenax/Charcoal (Pair 2)	VOCs
3	13A/13B		Tenax and Tenax/Charcoal (Pair 3)	VOCs
4	14A/14B	oct. 8 2020	Tenax and Tenax/Charcoal (Pair 4)	VOCs
3	15A/15B	oct. 8 2020	Field Blank	VOCs
Trip Blank	16A/16B	OCT 9 2020	Trip Blank	VOCs

* Archived samples to be held for future reference

Custody Relinquished by: [signature] Date: oct 9/2020

Custody Received by: AARON PORTER Date: 9-oct-2020 11:30 7.4°C

ORTECH Environmental Sample Log
Semi-Volatile Organics Samples
Clean Harbors Sarnia

Client: Clean Harbors Sarnia
Job/Report Number: 22030
Received By: C Belore
How Received: Train recovery
Job Assigned To: ALS
PO #: 22030 - J2725

ORTECH Sample ID 20-22030-SVOC-	Sample Date	Sample Description	Hazardous Material	Sample Analysis
1	OCT 6/20	Test 1 Probe Rinse ✓	Hexane/Acetone	SVOC
2		Test 1 Filter ✓	Particulate	SVOC
3		Test 1 XAD-II Trap ✓	N.A.	SVOC
4 A,B		Test 1 Impinger Solution ✓✓	Ethylene Glycol	SVOC
5		Test 1 Impinger Rinse ✓	Hexane/Acetone	SVOC
6	OCT 7/20	Test 2 Probe Rinse ✓	Hexane/Acetone	SVOC
7		Test 2 Filter ✓	Particulate	SVOC
8		Test 2 XAD-II Trap ✓	N.A.	SVOC
9 A,B		Test 2 Impinger Solution ✓✓	Ethylene Glycol	SVOC
10		Test 2 Impinger Rinse ✓	Hexane/Acetone	SVOC
11	OCT 8/20	Test 3 Probe Rinse ✓	Hexane/Acetone	SVOC
12		Test 3 Filter ✓	Particulate	SVOC
13		Test 3 XAD-II Trap ✓	N.A.	SVOC
14 A,B		Test 3 Impinger Solution ✓✓	Ethylene Glycol	SVOC
15		Test 3 Impinger Rinse ✓	Hexane/Acetone	SVOC
16	OCT 8/20	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: [signature] Date: OCT 9/20

Relinquished To: Adam Bretan Date: 9-Oct-2020 11:30

7.4°C

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= 0.2641 inches	Acceptable
Nozzle- Semi-Volatile Organics Train	for n=4 measurements high-low <0.10 mm	average= 0.2663 inches	Acceptable
S-Type Pitot #SP5 (COE20109) Metals Train	coefficient typically 0.84 ± 0.04	0.848	Acceptable
S-Type Pitot #15E (COE20113) Semi-Volatile Organics Train	coefficient typically 0.84 ± 0.04	0.849	Acceptable
Inclined Manometer # TEAM2 (COE20092) Metals Train	percentage difference within 5%	-1.1% to 0.6%	Acceptable
Inclined Manometer # TEAM1 (COE20094) Semi-Volatile Organics Train	percentage difference within 5%	-0.6% to 2.6%	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: 1.000	Acceptable
Dry Gas Meter M05498 Acid Gases/VOST Trains	± 1% over the working range DGMCF factor of 0.95-1.05	DGMCF: 0.997 (2 lpm) DGMCF: 0.999 (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: 0.999	Acceptable
Trendicator (COE20092)	±1.5% of actual value	0.0%	Acceptable
Trendicator (COE20094)	±1.5% of actual value	-1.0% to 0%	Acceptable
Trendicator (M05498) (temperature readout)	±1.5% of actual value	-1.0% to 0.2%	Acceptable
Digimatic Calipers (B02103)	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%	104.8	4	5.1	Acceptable
2	100 ± 10%	106.3	4	5.1	Acceptable
3	100 ± 10%	102.7	0	0	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%	105.6	5	6.3	Acceptable
2	100 ± 10%	102.0	0	0	Acceptable
3	100 ± 10%	99.8	0	0	Acceptable

TABLE 3
Clean Harbors Sarnia
Manual Sampling Train Leak Check Summary

Test Type	Test No.	Recommended Acceptable Limit	Traverse #1 Leak Checks Initial ft^3	Traverse #1 Leak Checks Final ft^3	Traverse #2 Leak Checks Initial ft^3	Traverse #2 Leak Checks Final ft^3	QA/QC Status
Metals Trains	1	≤0.02 scfm or 4% of sampling rate, whichever is less	0.008 @ 15"Hg	0.004 @ 15"Hg	0.004 @ 15"Hg	0.004 @ 15"Hg	Acceptable
	2		0.005 @ 21"Hg	0.005 @ 14"Hg	0.004 @ 14"Hg	0.005 @ 15"Hg	Acceptable
	3		0.003 @ 11"Hg	0.004 @ 15"Hg	0.003 @ 15"Hg	0.003 @ 15"Hg	Acceptable
Semi-Volatile Organics Trains	1	≤0.02 scfm or 4% of sampling rate, whichever is less	0.008 @ 14"Hg	0.008 @ 14"Hg	0.008 @ 15"Hg	0.004 @ 15"Hg	Acceptable
	2		0.005 @ 15"Hg	0.004 @ 17"Hg	0.004 @ 17"Hg	0.005 @ 17"Hg	Acceptable
	3		0.004 @ 15"Hg	0.004 @ 15"Hg	0.006 @ 15"Hg	0.016 @ 17"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	1.73	0.36	Acceptable
	O_2	"	0.16	0.76	Acceptable
	CO_2	"	0.04	0.04	Acceptable
	CO	"	0	2.00	Acceptable
	NOx	"	0.24	1.24	Acceptable
	THC	"	-0.47	1.5	Acceptable
2	SO_2	± 3% of span	1.00	0.25	Acceptable
	O_2	"	0.92	0.44	Acceptable
	CO_2	"	0.16	0.48	Acceptable
	CO	"	0.90	1.50	Acceptable
	NOx	"	0.32	0.84	Acceptable
	THC	"	0.3	-2.0	Acceptable
3	SO_2	± 3% of span	0.93	0.44	Acceptable
	O_2	"	0.72	0.24	Acceptable
	CO_2	"	0.12	0.28	Acceptable
	CO	"	0	2.80	Acceptable
	NOx	"	0.08	0.44	Acceptable
	THC	"	0.3	1.5	Acceptable

TABLE 5
Clean Harbors Sarnia
ORTECH CEM Bias Check Summary

Test No.	Analyzer	Analyzer Range	Recommended Acceptable Limits	Initial System Bias		Final System Bias		QA/QC Status
				Zero %	Span %	Zero %	Span %	
1	SO_2	1000 ppm	± 5% of span	0.07	-0.60	1.80	-0.96	Acceptable
	O_2	25%	"	0.60	-0.16	0.44	0.60	Acceptable
	CO_2	25%	"	0.04	-0.80	0.08	-0.84	Acceptable
	CO	100 ppm	"	0	0.50	0	-1.50	Acceptable
	NOx	250 ppm	"	0.24	-0.08	0	-1.32	Acceptable
	THC	100 ppm	"	-1.8	-2.6	-	-	Acceptable
2	SO_2	1000 ppm	± 5% of span	0	-0.56	1.00	-0.81	Acceptable
	O_2	25%	"	0.12	0	1.04	0.44	Acceptable
	CO_2	25%	"	0	-0.48	0.16	0	Acceptable
	CO	100 ppm	"	-0.20	1.70	0.70	0.20	Acceptable
	NOx	250 ppm	"	0.28	-0.56	-0.04	-1.40	Acceptable
	THC	100 ppm	"	-2.5	-2.8	-	-	Acceptable
3	SO_2	1000 ppm	± 5% of span	0.07	-0.27	1.00	-0.71	Acceptable
	O_2	25%	"	0	0.04	0.72	0.28	Acceptable
	CO_2	25%	"	0.08	-0.48	0.20	-0.20	Acceptable
	CO	100 ppm	"	0	0.40	0	-2.40	Acceptable
	NOx	250 ppm	"	0.16	-0.96	0.08	-1.40	Acceptable
	THC	100 ppm	"	-1.6	-1.5	-	-	Acceptable

APPENDIX 18

Equipment Calibration Data
(10 pages)

ORTECH
Pitot Tube Calibration

Date	February 4, 2020
Probe/Pitot ID	15E
Mil Number	COE 20113
Calibrated Against	B02911
Cp standard	0.99948
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	7.74	0.145	0.200	0.851	0.0023
(0.25")	9.43	0.215	0.300	0.846	0.0026
	11.94	0.345	0.475	0.852	0.0031
	14.38	0.500	0.690	0.851	0.0021
	16.01	0.620	0.870	0.844	0.0050
			Mean	0.849	0.0030
Without Nozzle	7.25	0.127	0.180	0.840	0.0080
	9.43	0.215	0.300	0.846	0.0014
	11.50	0.320	0.450	0.843	0.0047
	13.79	0.460	0.630	0.854	0.0065
	15.75	0.600	0.820	0.855	0.0075
			Mean	0.847	0.0056

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
Pitot Tube Calibration

Date	February 4, 2020
Probe/Pitot ID	SP5
MII Number	COE20109
Calibrated Against	B02911
Cp standard	0.99948
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	7.53	0.137	0.190	0.849	0.0011
(0.25")	9.65	0.225	0.310	0.851	0.0039
	11.50	0.320	0.450	0.843	0.0048
	13.79	0.460	0.640	0.847	0.0003
	15.62	0.590	0.820	0.848	0.0002
			Mean	0.848	0.0020
Without Nozzle	7.61	0.140	0.195	0.847	0.0030
	9.75	0.230	0.315	0.854	0.0042
	11.59	0.325	0.450	0.849	0.0005
	14.16	0.485	0.670	0.850	0.0005
	16.01	0.620	0.860	0.849	0.0012
			Mean	0.850	0.0019

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 Mil Number	COE 20092
Orifice Set ID	COE20999
Barometer ID	COE 20028

Calibration Conditions		
Barometric Pressure	29.39	in Hg
Theoretical Critical Vacuum	13.9	in Hg
System Leak Check	<.001 @ 25"	
Calibration Date	July 30, 2020	
Calibration Technician	J. Batten	
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
8.0	0.67	313.300	315.783	77.0	77.0	UR-40	0.2352	76.0	76.0	22.0
8.5	0.91	315.783	319.462	77.0	77.0	UR-48	0.3308	76.0	76.0	21.0
8.0	1.70	319.462	324.205	77.0	77.0	UR-55	0.4520	76.0	76.0	19.5
8.0	2.90	324.205	330.345	77.0	77.0	UR-63	0.5874	76.0	76.0	18.0
8.0	4.10	330.345	338.730	77.0	77.0	UR-73	0.8107	76.0	76.0	15.0

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	
2.402	0.300	2.389	0.299	0.994	-0.006	0.299	4.228	0.985
3.561	0.419	3.569	0.420	1.002	0.002	0.420	2.903	-0.339
4.600	0.575	4.590	0.574	0.998	-0.002	0.574	2.904	-0.338
5.973	0.747	5.965	0.746	0.999	-0.001	0.746	2.934	-0.308
8.181	1.023	8.233	1.029	1.006	0.006	1.029	2.177	-1.065
			DGMCF	1.000			3.242	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	July 30, 2020
Calibrated By	JB
Reviewed and Accepted By	

Fluke Calibrator Output (COE 20024) (°F)	Tredicator Display Value		Percent Difference
	Before Adjustment (°F)	After Adjustment (°F)	(%)
32	32	N/A	0.0
70	70		0.0
100	100		0.0
200	200		0.0
250	250		0.0
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

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

Acceptance Criteria:

'Trendicator display must read within ± 1.5%, and ± 3 degrees F of the standard value at each output. Otherwise, the Trendicator must be repaired and/or adjusted as necessary, and recalibrated prior to use.

(Ontario Source Testing Code, June 2010, Part C: Method ON-2, 7.5 Appendix 2E)

ORTECH

Manometer Calibration Data

Date	July 30, 2020	Calibrated By	JB
Manometer Number	Team 2	Signature	
Manometer MII Number	COE 20092	Reviewed/Accepted By	
Calibrated Against	Dual 3		
MII Number	COE 20008		
Calibration Procedure	03 - J010		

Front Leg

Manometer Scale "H_2O	Manometer Reading "H_2O		Reference Manometer Reading "H_2O	Percent Difference %
	Before Adjustment	After Adjustment		
	0.240	NA	0.239	-0.4
0-1.0	0.510		0.513	0.6
	0.850		0.848	-0.2
	1.90		1.88	-1.1
1.0-10.0	5.50		5.49	-0.2
	9.20		9.21	0.1

$$\text{Percent Difference} = \frac{(\text{Ref. Manometer} - \text{Instrument Reading})}{\text{Ref. Manometer}} \times 100$$

Acceptance Criteria:
The manometer being calibrated must be within ± 5.0% of the Standard value at each reading. Otherwise, the manometer must be repaired and/or adjusted as necessary and recalibrated prior to use. Manometers must be capable of measuring velocity pressure to within 0.005 "H_2O on the 0 to 1 inch scale, and 0.05 "H_2O on the 1 to 10 inch scales.
(Environment Canada Reference Method 1/RM/8, Section 2)

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	28.29	in Hg
Theoretical Critical Vacuum	13.4	in Hg
System Leak Check	<0.001 cfm @ 26" Hg	
Calibration Date	October 30, 2020	
Calibration Technician	J. Grollman	
Reviewed and Accepted By	CHRIS BELOFF	

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
13.0	0.26	768.945	772.910	67.5	70.5	UR-40	0.2352	69.8	70.7	24.0
12.0	0.59	772.910	778.048	69.5	69.5	UR-48	0.3308	70.7	70.7	23.5
19.0	1.20	778.048	789.200	69.5	69.5	UR-55	0.4520	70.7	70.7	22.0
18.0	2.00	789.200	802.969	69.5	69.5	UR-63	0.5874	70.7	70.7	20.0
15.0	3.80	802.969	818.777	70.5	70.5	UR-73	0.8107	70.7	70.7	16.0

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	
3.744	0.288	3.756	0.289	1.003	0.004	0.289	1.752	-0.277
4.852	0.404	4.875	0.406	1.005	0.005	0.406	2.011	-0.018
10.547	0.555	10.546	0.555	1.000	0.001	0.555	2.191	0.162
13.049	0.725	12.984	0.721	0.995	-0.004	0.721	2.162	0.133
15.023	1.002	14.933	0.996	0.994	-0.005	0.996	2.157	0.128
			DGMCF	0.999			2.029	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	October 1, 2020
Calibrated By	J. Grollman
Reviewed and Accepted By	CHRIS BELCOURT

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	202		-1.0
250	251		-0.4
300	303		-1.0
400	401		-0.3
500	500		0.0
600	601		-0.2
700	700		0.0
800	801		-0.1
900	901		-0.1
1000	1001		-0.1
1100	1102		-0.2
1200	1201		-0.1
1250	1250		0.0

% 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	October 1, 2020	Calibrated By	J. Grollman
Manometer Number	Team 1	Signature	
Manometer MII Number	COE 20094	Reviewed/Accepted By	CHRIS BELORE
Calibrated Against	Dual 3		
MII Number	COE 20008		
Calibration Procedure	03 - J010		

Front Leg

Manometer Scale "H_2O	Manometer Reading "H_2O		Reference Manometer Reading "H_2O	Percent Difference %
	Before Adjustment	After Adjustment		
	0.930	NA	0.930	0.0
0-1.0	0.560		0.561	0.2
	0.152		0.156	2.6
	9.20		9.20	0.0
1.0-10.0	5.39		5.36	-0.6
	1.92		1.91	-0.5

Percent Difference = (Ref. Manometer - Instrument Reading) x 100
Ref. Manometer

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 Data

Calibration Procedure	03-J004
Meter Number	M05498
Date	September 30, 2020
Barometric Pressure	29.06
System Leak Check	NDL @ 24' Hg

MII NUMBERS	
DGM	M05498
Gasometer	A01463
Barometer	COE 20028

Calibrated By	J. Grollman
Signature	
Reviewed and Accepted By	CHRIS BEDRE

ft^3= cm* 1.332 litres per cm/28.3168 litres per ft^3

$$DGMCF = \frac{Vstd\ ft^3}{Vdgm\ ft^3} \quad \frac{Tdgm\ ^oF+460}{Tstd\ ^oF+460} \quad \frac{Pbar\ ("Hg)}{(Pbar\ "Hg+DGMPressure/13.6)}$$

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
75.10	53.00	22.10	1.040	21.0	2127.80	2157.37	1.044	24.0	4.5	24.0	0.994	14	2.1
53.00	31.50	21.50	1.011	21.0	2157.37	2186.04	1.012	25.0	4.5	25.0	1.001	14	2.0
76.10	51.20	24.90	1.171	21.0	2186.04	2219.50	1.182	26.0	4.5	26.0	0.997	16	2.1
75.10	58.50	16.60	0.781	21.0	2219.50	2241.77	0.786	26.0	2.0	26.0	1.005	22	1.0
74.10	62.70	11.40	0.536	21.0	2241.77	2257.24	0.546	26.0	2.0	26.0	0.993	15	1.0
62.70	51.10	11.60	0.546	21.0	2257.24	2272.94	0.554	27.0	2.0	27.0	0.999	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	0.997
1Lpm	0.999

ORTECH
Trendicator Calibration

Calibration Procedure	03-J005
Trendicator Type	Nutech
MII	M05498
Date	September 30, 2020
Calibrated By	J. Grollman
Signature	
Reviewed and Accepted By	CHRIS BELORE

Fluke Calibrator Output (COE 20024) (°C)	Tredicator Display Value		Percent Difference
	Before Adjustment (°C)	After Adjustment (°C)	(%)
0	0	NA	0.0
10	10		0.0
20	20		0.0
50	50		0.0
75	75		0.0
100	101		-1.0
125	126		-0.8
150	151		-0.7
200	200		0.0
300	300		0.0
400	400		0.0
500	499		0.2
600	599		0.2

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

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
(4 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:109909:20

2020/08/21

Mr. Chris Belore
ORTECH Consulting Inc.
804 Southdown Rd.
Mississauga, ON
L5J 2Y4

Re.: Pre-test Plan for source testing to be conducted at Clean Harbors Canada Inc. Environmental Compliance Approval No. 6547-5G5MSP.

Dear Mr. Belore:

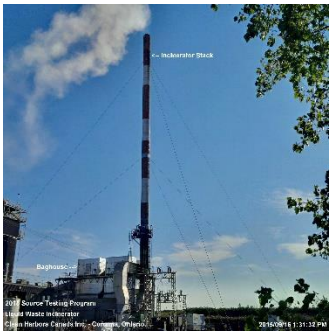
We received your letter, dated 2020/08/19, prepared and submitted on behalf of Clean Harbors Canada Inc. (Corunna facility), and referring to the annual source testing to be conducted at Clean Harbors' Corunna facility, located at 4090 Telfer Road; and to be undertaken by ORTECH under Project No. 22030.

The testing is required under Condition 2 of the Environmental Compliance Approval No. 6547-5G5MSP, issued on 2003/01/24.

Your letter indicates your intention at using the 2015 pre-test plan (dated 2015/06/17), approved by this section (on 2015/07/07), for the 2020 source testing program.

***Target source*:**

- Liquid Waste Incinerator



(Doc.Mgmt.5AD080114)

***Target contaminants*:**

- Total Suspended Particulate Matter (TSP),
- Metals (31 selected metals),
- Semivolatile Organic Compounds (17 dioxins and furans isomers, 12 dioxin-like PCBs, 40 selected PAHs, 11 chlorobenzenes, 16 chlorophenols, di to penta Polychorinated biphenyls congener groups),
- Other Semivolatile Organic Compounds (heptachlor, chlorodane, hexachlorophene, toxaphene, tributyltin),
- Volatile Organic Compounds (29 selected VOCs),
- Halides (HF, HCl, HBr, HI),
- Nitrogen oxides (NOX),
- Sulphur dioxide (SO_2),
- Cyanide,
- Combustion gases (oxygen, CO, and CO_2), and
- Total organic matter (THC).

***Reference methods*:**

- TSP: OSTC Method ON-5,
- Metals: US EPA 40CFR60 Method 29.
- SVOCs: Environment Canada's Report EPS 1/RM/2,
- VOCs: US EPA SW-846 Method 0030,
- Halides: US EPA 40CFR60 Method 26,
- Cyanide: Modified US EPA 40CFR60 Method 26,
- NOx: US EPA 40CFR60 Method 7E,
- SO_2: US EPA 40CFR60 Method 6C,
- O_2/CO_2: US EPA 40CFR60 Method 3A,
- CO: US EPA 40CFR60 Method 10,
- THC: US EPA 40CFR60 Method 25A, and
- Stack Gas Parameters: Ontario Source Testing Code (OSTC) Method ON-1 to ON-4.

Comments: *TSP and metals will be sampled together using a modified Method 5 sampling train.*

> *TSP and metals sampling will be referenced primarily to the US EPA 40CFR60 Method 29; but if conflicting requirements occur, the OSTC Method ON-5's TSP requirements take precedence.*

***Operating Conditions during the source testing program*:**

During the source testing program, Clean Harbors is targeting a waste processing rate of 245 lpm of all combined feed waste streams (i.e., rich, lean and emulsion).

Clean Harbors will ensure there is a consistent composition and injection rates for all the waste 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.

***Process Parameters to be monitored and reported during the source testing program*:**

Clean Harbors' personnel will be responsible for the monitoring, collection, compilation and reporting of pertinent process data during the test program, to establish waste combustion rate levels; in order to correlate the emission results with the incinerator's waste combustion rate levels (emissions generator).

Clean Harbors will gather/compile the process data for each day of source testing and ORTECH will append it to the source testing report. The process parameters to be monitored and recorded include:

- Waste feed rates to incinerator (rich, emulsion, lean, alkaline, leachate streams)
- Volumetric flows (TDU, secondary air, and stack exhaust gases)
- Temperatures (primary and secondary combustion chambers, spray dryer – inlet/outlet, stack)
- Pressures (burner, spray dryer outlet, baghouse differential pressure)
- Clean Harbors CEMS data during the source testing program (CO, HCl, CO_2, H_2O, THC, O_2, SO_2, and opacity).

Liquid waste (rich, lean, alkaline and emulsion) samples will be collected by Clean Harbors personnel, based on US EPA Method S004 (Tap) in SW-846, 3rd Edition. A sample will be collected every thirty minutes during each of the three (3) stack test-runs and placed in a large chilled container for compositing. Clean Harbors personnel will also collect a sample of baghouse dust every thirty minutes for each of the stack test-runs.

Four composite sub-samples will be prepared, one sample for Clean Harbors, one sample as a spare and two samples will be retained by ORTECH.

For each of the stack test-runs, a set of liquid waste composite sub-samples will be analysed for metals, dioxins and furans, polychlorinated biphenyls, select volatile organic compounds, and an elemental analysis will be done. A composite sub-sample of the baghouse dust collected during the three tests will be analyzed for metals.

We do not have any objection with your intention at using the 2015 pre-test plan (dated 2015/06/17) approved by this section (on 2015/07/07) for the 2020 source testing program.

The 2015 pre-test plan is acceptable, based on the proposed reference methodologies, sampling strategies, and process data monitoring/collection.

We noted the source testing program schedule for the week of 2020/10/05, with actual testing starting on Tuesday (2020/10/06) and extending for three consecutive days. If changes in the

sampling schedule occur, please notify both the MECP's 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 MECP's Sarnia District Office.

If you have any questions regarding this assessment, I can be reached by phone at 416-994-5449, or by email at sourcetesting@ontario.ca.

Sincerely yours,

Guillermo Azocar
Source Assessment Specialist
Technology Standards Section

cc: M. Parker – Clean Harbors Canada Inc. (via email: parker.michaele@cleanharbors.com)
E. Carabott – Clean Harbors Canada Inc. (via email: carabott.erica@cleanharbors.com)
D. Baulcomb – Clean Harbors Canada Inc. (via email: baulcomb.david@cleanharbors.com)
T. Sanderson – ORTECH (via email: tsanderson@ortech.ca)
M.J. Corda – MECP Sarnia District Office (via email: maryjane.corda@ontario.ca)
S. Mercer – MECP EAPB ASU (via email: steve.mercer@ontario.ca)
J. McKerrall – MECP TASDB TSS (via email: jeffrey.mckerrall@ontario.ca)
B. Fullerton – MECP TASDB TSS (via email: bill.fullerton@ontario.ca)

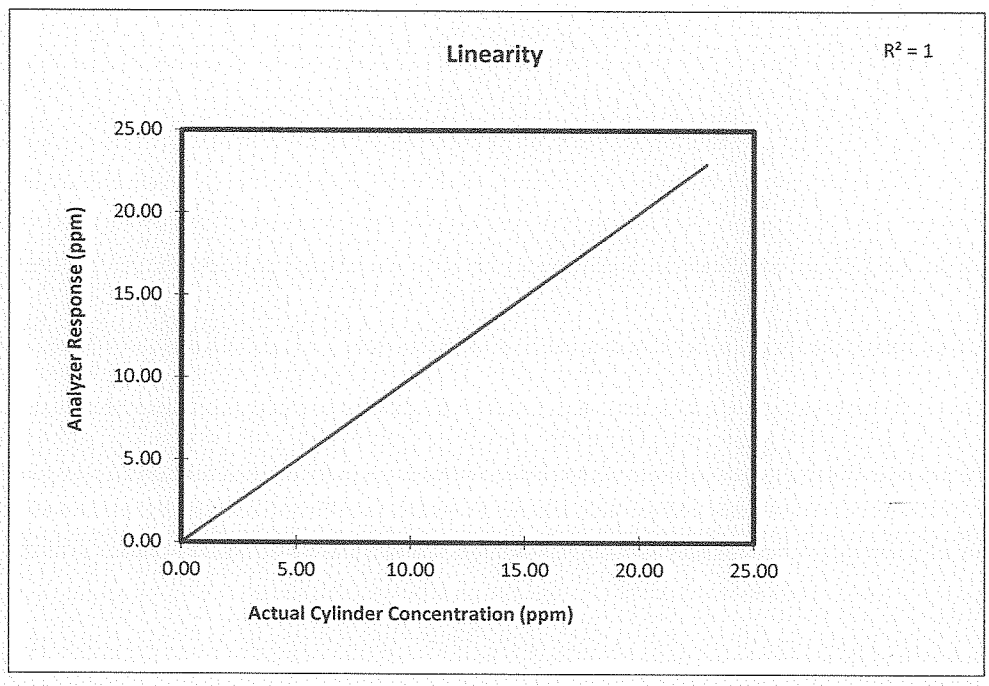
File AQ-02 (Clean Harbors Canada Inc. - Corunna)

APPENDIX 20

ORTECH CEM Linearity Check Data
(6 pages)

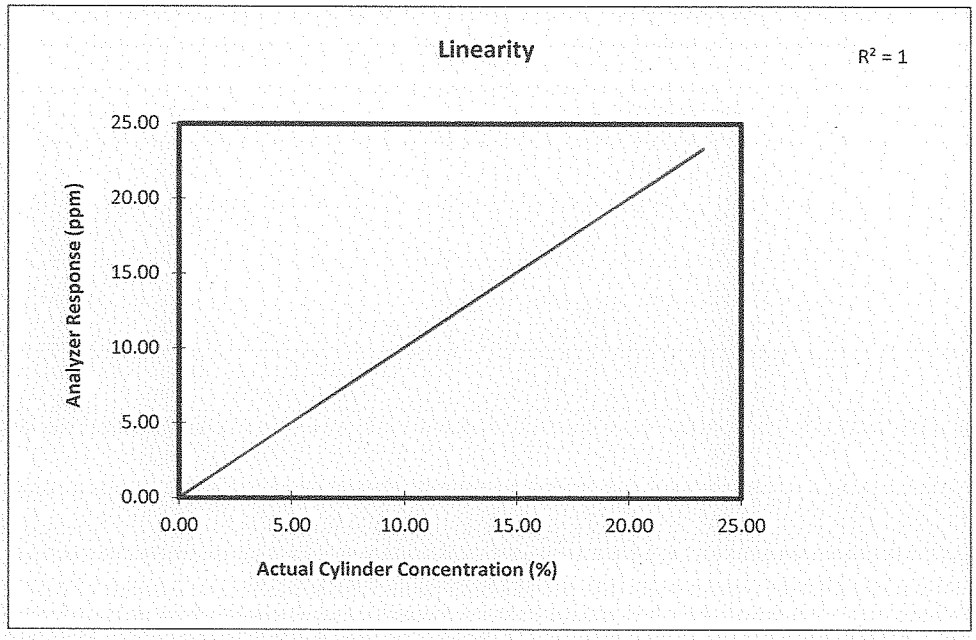
Clean Harbors
October 6, 2020
Analyzer Linearity Determination
Oxygen Analyzer
Siemens Ultramat 23

Range	Analyzer I.D.	Actual Concentration	Instrument Response	Calibration Error (as % of span)
25	COE 20060	0.00	0.00	0.0
		12.55	12.46	-0.4
		22.94	22.94	0.0



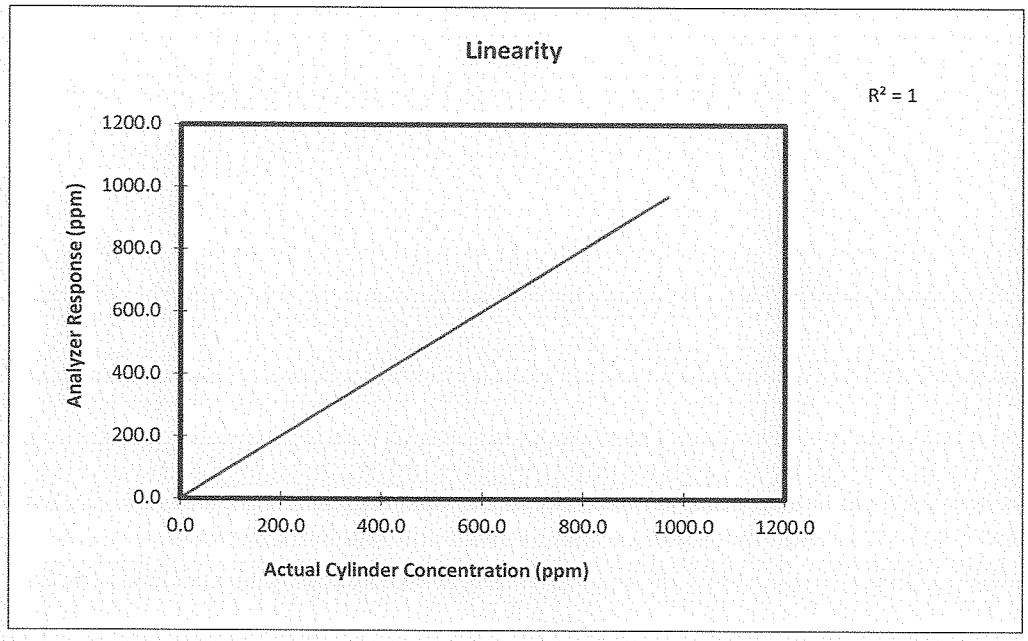
Clean Harbors
October 6, 2020
Analyzer Linearity Determination
Carbon Dioxide Analyzer
Siemens Ultramat 23

Range	Analyzer I.D.	Actual Concentration	Instrument Response	Calibration Error (as % of span)
25	COE 20060	0.00	0.00	0.0
		12.58	12.66	0.3
		23.33	23.31	-0.1



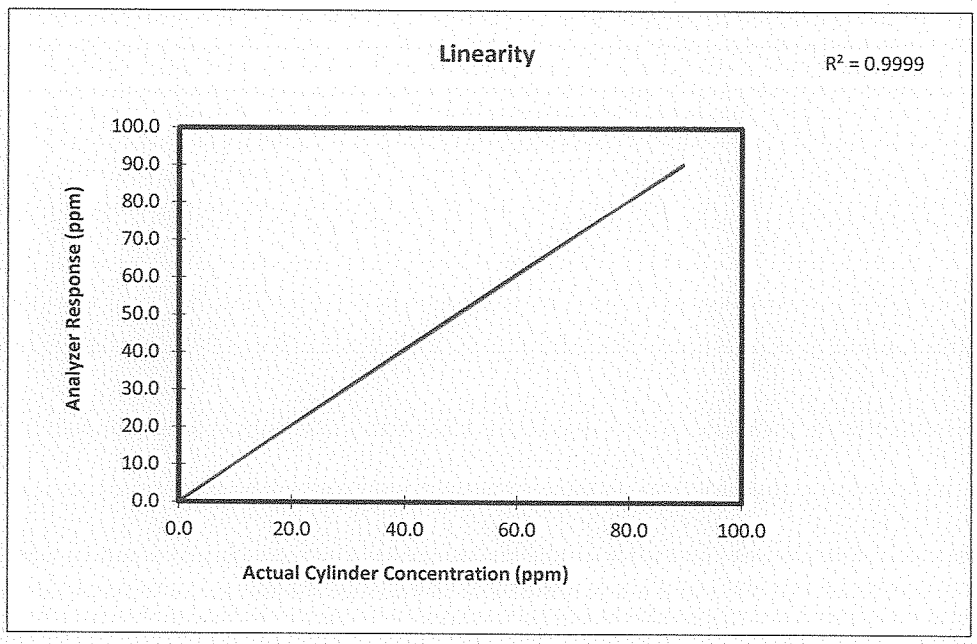
Clean Harbors
October 6, 2020
Analyzer Linearity Determination
Sulphur Dioxide Analyzer
Teledyne API T100H

Range	Analyzer I.D.	Actual Concentration	Instrument Response	Calibration Error (as % of span)
1000	COE 20099	0.0	0.0	0.0
		452.7	452.8	0.0
		968.0	969.0	0.1



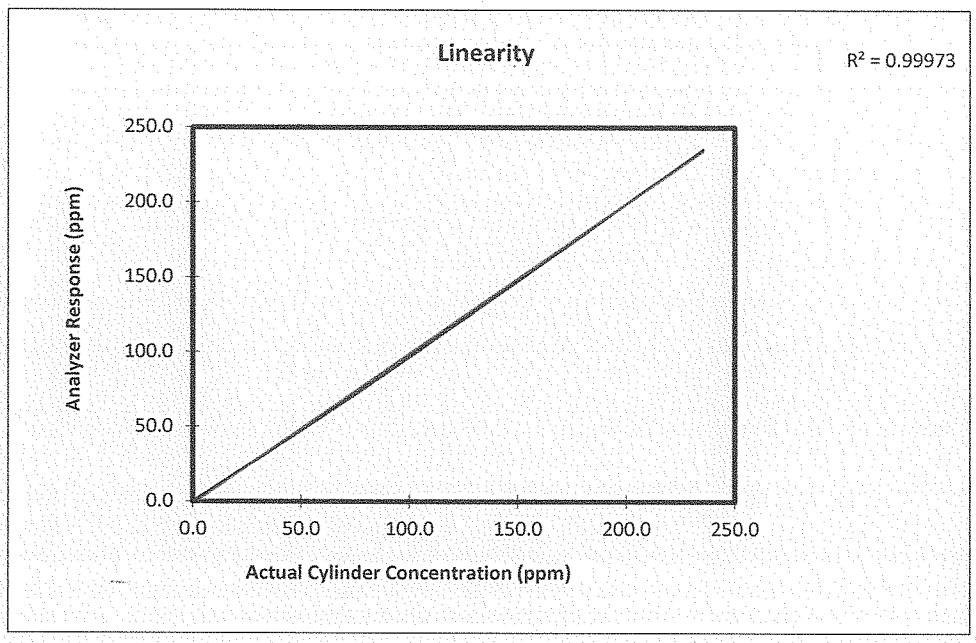
Clean Harbors
October 6, 2020
Analyzer Linearity Determination
Carbon Monoxide Analyzer
Siemens Ultramat 23

Range	Analyzer I.D.	Actual Concentration	Instrument Response	Calibration Error (as % of span)
100	COE 20101	0.0	0.0	0.0
		52.1	53.2	1.1
		89.6	90.1	0.5



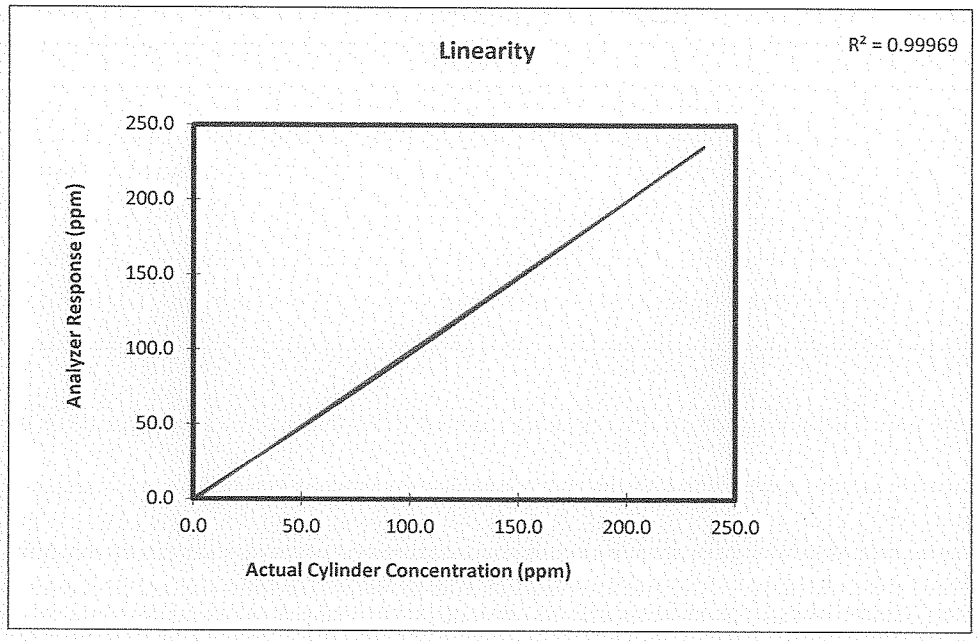
Clean Harbors
October 6, 2020
Analyzer Linearity Determination
Nitric Oxide Analyzer
Teledyne 200EH

Range	Analyzer I.D.	Actual Concentration	Instrument Response	Calibration Error (as % of span)
250	COE 20061	0.0	0.0	0.0
		91.0	87.5	-1.4
		235.4	235.1	-0.1



Clean Harbors
October 6, 2020
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
		91.0	87.5	-1.4
		235.4	235.9	0.2



APPENDIX 21

ORTECH CEM Calibration Data
(13 pages)

Clean Harbors
Mobile Source Monitoring Laboratory # 1
Daily Analyzer Calibration Evaluation
Project No. 22030
October 6, 2020
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	100	250	250
Actual Cylinder Value	High	22.94	23.33	968	89.6	235.4	235.4
	Mid.	12.55	12.58	452.7	52.07	91	91
	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	12.46	12.66	452.8	53.2	87.5	87.5
	High	22.94	23.31	969	90.1	235.1	235.9
System Initial Calibration	Zero	0.15	0.01	0.7	0.0	0.2	0.6
	Upscale	12.42	12.46	446.8	53.7	86.6	87.3
System Final Calibration	Zero	0.11	0.02	1.8	0.0	0.0	0.0
	Upscale	12.61	12.45	443.2	51.7	83.9	84.2

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	100	250	250
Calibration Error	Zero	%	0.00	0.00	0.00	0.00	0.00	0.00
	Mid	%	0.36	0.32	0.01	1.13	1.40	1.40
	High	%	0.00	0.08	0.10	0.50	0.12	0.20
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	100	250	250
Initial System Bias	Zero	0.60	0.04	0.07	0.00	0.08	0.24
	Upscale	-0.16	-0.80	-0.60	0.5	-0.4	-0.1
Final System Bias	Zero	0.44	0.08	1.80	0.0	0.0	0.0
	Upscale	0.60	-0.84	-0.96	-1.5	-1.4	-1.3

System Zero Drift	%	0.16	0.04	1.73	0.00	0.08	0.24
System Cal Drift	%	0.76	0.04	0.36	2.00	1.08	1.24
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	100	250	250
Analyzer Initial	Zero	0.00	0.00	0.00	0.0	0.0	0.0
	Upscale	12.46	12.66	452.80	53.2	87.5	87.5
System Initial	Zero	0.15	0.01	0.70	0.0	0.2	0.6
	Upscale	12.42	12.46	446.80	53.7	86.6	87.3
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	0.11	0.02	1.80	0.0	0.0	0.0
	Upscale	12.61	12.45	443.20	51.7	83.9	84.2

Initial System Bias	Zero %	0.60	0.04	0.07	0.00	0.08	0.24
	Upscale %	-0.16	-0.80	-0.60	0.50	-0.36	-0.08
Final System Bias	Zero %	0.44	0.08	1.80	0.00	0.00	0.00
	Upscale %	0.60	-0.84	-0.96	-1.50	-1.44	-1.32
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
Project No. 22030
October 7, 2020
Test 2 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	100	250	250
Actual Cylinder Value	High	22.94	23.33	968	89.6	235.4	235.4
	Mid.	12.55	12.58	452.7	52.07	91	91
	Zero	0.00	0.00	0	0	0	0

Analyzer Initial Calibration	Zero	0.01	0.00	0	0.2	0.0	0.1
	Mid	12.52	12.52	448.8	51.2	88.3	88.7
	High	22.95	23.33	968.2	89.4	235.1	235.9
System Initial Calibration	Zero	0.04	0.00	0	0.0	0.1	0.8
	Upscale	12.52	12.40	443.2	52.9	86.8	87.3
System Final Calibration	Zero	0.27	0.04	1	0.9	0.1	0.0
	Upscale	12.63	12.52	440.7	51.4	84.9	85.2

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	100	250	250
Calibration Error	Zero	%	0.04	0.00	0.00	0.20	0.00	0.04
	Mid	%	0.12	0.24	0.39	0.87	1.08	0.92
	High	%	0.04	0.00	0.02	0.20	0.12	0.20
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	100	250	250
Initial System Bias	Zero	0.12	0.00	0.00	-0.20	0.04	0.28
	Upscale	0.00	-0.48	-0.56	1.7	-0.6	-0.6
Final System Bias	Zero	1.04	0.16	1.00	0.7	0.0	0.0
	Upscale	0.44	0.00	-0.81	0.2	-1.4	-1.4

System Zero Drift	%	0.92	0.16	1.00	0.90	0.00	0.32
System Cal Drift	%	0.44	0.48	0.25	1.50	0.76	0.84
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	100	250	250
Analyzer Initial	Zero	0.01	0.00	0.00	0.2	0.0	0.1
	Upscale	12.52	12.52	448.80	51.2	88.3	88.7
System Initial	Zero	0.04	0.00	0.00	0.0	0.1	0.8
	Upscale	12.52	12.40	443.20	52.9	86.8	87.3
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	0.27	0.04	1.00	0.9	0.1	0.0
	Upscale	12.63	12.52	440.70	51.4	84.9	85.2

Initial System Bias	Zero %	0.12	0.00	0.00	-0.20	0.04	0.28
	Upscale %	0.00	-0.48	-0.56	1.70	-0.60	-0.56
Final System Bias	Zero %	1.04	0.16	1.00	0.70	0.04	-0.04
	Upscale %	0.44	0.00	-0.81	0.20	-1.36	-1.40
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
Project No. 22030
October 8, 2020
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	100	250	250
Actual Cylinder Value	High	22.94	23.33	968	89.6	235.4	235.4
	Mid.	12.55	12.58	452.7	52.07	91	91
	Zero	0.00	0.00	0	0	0	0

Analyzer Initial Calibration	Zero	0.00	0.00	0	0.0	0.0	0.1
	Mid	12.49	12.57	447.4	50.8	88.0	89.4
	High	22.93	23.30	968.3	89.6	235.1	235.9
System Initial Calibration	Zero	0.00	0.02	0.7	0.0	0.1	0.5
	Upscale	12.50	12.45	444.7	51.2	86.4	87.0
System Final Calibration	Zero	0.18	0.05	1	0.0	0.1	0.3
	Upscale	12.56	12.52	440.3	48.4	85.8	85.9

Calibration Error Results

Analyzer Calibration Error = (Measured Concentration of Cal Gas in Direct Mode - Manufacturer Certified Cal Gas Concentration)/Analyzer Range)*100

	Analyzer		O2	CO2	SO2	CO	NO	NOx
Analyzer Span Range			25.00	25.00	1000	100	250	250
Calibration Error	Zero	%	0.00	0.00	0.00	0.00	0.00	0.04
	Mid	%	0.24	0.04	0.53	1.27	1.20	0.64
	High	%	0.04	0.12	0.03	0.00	0.12	0.20
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	100	250	250
Initial System Bias	Zero	0.00	0.08	0.07	0.00	0.04	0.16
	Upscale	0.04	-0.48	-0.27	0.4	-0.6	-1.0
Final System Bias	Zero	0.72	0.20	1.00	0.0	0.0	0.1
	Upscale	0.28	-0.20	-0.71	-2.4	-0.9	-1.4

System Zero Drift	%	0.72	0.12	0.93	0.00	0.00	0.08
System Cal Drift	%	0.24	0.28	0.44	2.80	0.24	0.44
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	100	250	250
Analyzer Initial	Zero	0.00	0.00	0.00	0.0	0.0	0.1
	Upscale	12.49	12.57	447.40	50.8	88.0	89.4
System Initial	Zero	0.00	0.02	0.70	0.0	0.1	0.5
	Upscale	12.50	12.45	444.70	51.2	86.4	87.0
Analyzer Final	Zero	0.00	0.00	0.00	0.0	0.0	0.0
	Upscale	0.00	0.00	0.00	0.0	0.0	0.0
System Final	Zero	0.18	0.05	1.00	0.0	0.1	0.3
	Upscale	12.56	12.52	440.30	48.4	85.8	85.9

Initial System Bias	Zero %	0.00	0.08	0.07	0.00	0.04	0.16
	Upscale %	0.04	-0.48	-0.27	0.40	-0.64	-0.96
Final System Bias	Zero %	0.72	0.20	1.00	0.00	0.04	0.08
	Upscale %	0.28	-0.20	-0.71	-2.40	-0.88	-1.40
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:	22030	Date:	Octobr 6, 2020
Company:	Clean Harbors	Operator:	T, Timar
Location:	Corunna, ON	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	0.3	B1	0.996	C				
High	89.4	A2	89.38	B2						
Mid	51.6	A4	50.5	B4			51.4	D4	-1.8	E4
Low	30.51	A3	29.6	B3			30.4	D3	-2.6	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	0.3	0.77	-0.47
Mid	29.6	28.2	1.5

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	51		51
Run 2	52		50
Run 3	52		52
Average	**52**		**51**

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22030	Date:	October 7, 2020
Company:	Clean Harbors	Operator:	T, Timar
Location:	Corunna, ON	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	0.5	B1	0.998					
High	89.4	A2	89.75	B2		C				
Mid	51.6	A4	50.22	B4			51.5	D4	-2.5	E4
Low	30.51	A3	29.6	B3			30.5	D3	-2.8	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	0.5	0.2	0.3
Mid	29.6	31.6	-2.0

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	51		51
Run 2	52		50
Run 3	52		52
Average	**52**		**51**

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22030	Date:	October 8, 2020
Company:	Clean Harbors	Operator:	T, Timar
Location:	Corunna, ON	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	0.3	B1	1.002					
High	89.4	A2	89.88	B2		C				
Mid	51.6	A4	50.9	B4			51.7	D4	-1.6	E4
Low	30.51	A3	30.1	B3			30.6	D3	-1.5	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	0.3	0	0.3
Mid	30.1	28.6	1.5

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	51		51
Run 2	52		50
Run 3	52		52
Average	**52**		**51**

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Oxygen
Location	Corunna, ON	**Analyzer ID.**	Siemens Ultra Met
Project No.	22030	**Analyzer Span Setting**	25

Span Gas Concentration	22.94

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	52	60
2	53	60
3	53	60

System Response Time*	60	Seconds
Average Time	52	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	22.95
2	22.93
3	22.94
4	22.93
5	22.95
Mean	22.94
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	Corunna, ON	**Analyzer ID.**	Siemens Ultramat 23
Project No.	22030	**Analyzer Span Setting**	25

Span Gas Concentration	23.33

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	62	63
2	62	62
3	62	63

System Response Time*	63	Seconds
Average Time	56	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	23.31
2	23.3
3	23.32
4	23.31
5	23.3
Mean	23.31
Standard Deviation (SD)	0.01
% RSD Criteria <3%	**0.04**

% RSD = SD/Mean X 100

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Sulphur Dioxide
Location	Corunna, ON	**Analyzer ID.**	Teledyne API T100H
Project No.	22030	**Analyzer Span Setting**	1000

Span Gas Concentration	968

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	90	90
2	92	93
3	92	92

System Response Time* 93 Seconds
Average Time 80 Seconds

* Reported as Greatest Value of all Response Time Checks
Criteria: < 200 seconds for a 95% response to a step change in concentration of gas at the probe exit

REPRODUCIBILITY CHECKS

Run	Analyzer Value
1	969
2	968
3	969
4	970
5	967
Mean	969
Standard Deviation (SD)	1.14
% RSD Criteria <3%	**0.12**

% RSD = SD/Mean X 100

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Carbon Monoxide
Location	Corunna, ON	**Analyzer ID.**	Siemens Ultramat
Project No.	22030	**Analyzer Span Setting**	100

Span Gas Concentration	89.6

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	90.1
2	89.8
3	90.2
4	89.8
5	90.1
Mean	90
Standard Deviation (SD)	0.19
% RSD Criteria <3%	**0.21**

% RSD = SD/Mean X 100

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Nitric Oxide
Location	Corunna, ON	**Analyzer ID.**	Teledyne 200EH
Project No.	22030	**Analyzer Span Setting**	250

Span Gas Concentration	235.4

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	75	78
2	74	80
3	75	80

System Response Time*	80	Seconds
Average Time	68	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	235.1
2	235.3
3	235.2
4	235.4
5	235.3
Mean	235
Standard Deviation (SD)	0.11
% RSD Criteria <3%	**0.05**

% RSD = SD/Mean X 100

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Nitrogen Oxides
Location	Corunna, ON	**Analyzer ID.**	Teledyne 200EH
Project No.	22030	**Analyzer Span Setting**	250

Span Gas Concentration	235.4

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	80	89
2	85	85
3	85	89

System Response Time*	89	Seconds
Average Time	76	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	235.9
2	235.7
3	235.8
4	235.7
5	235.9
Mean	236
Standard Deviation (SD)	0.10
% RSD Criteria <3%	**0.04**

% 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	22030	
Date:	October 6, 2020	Location:	Corunna, ON

Certified Concentration of NO_2 Calibration Gas	**49.5**

Analyzer Reading in Direct Mode	**46**

Equation 7E-7 (EPA Method 7E Section 12.7)

$$Eff_{NO2} = \frac{\text{Measured Concentration in Direct Mode}}{\text{Manufacturer Certified Concentration of Cal. Gas}} \times 100$$

$$Eff_{NO2} = \frac{46}{49.5} \times 100 = \mathbf{92.9\ \%}$$

Method 7E criteria is >/= 90%

Efficiency Test Result	**Pass**

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:	October 6, 2020

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.848
DGM CORRECTION FACTOR	1
NOZZLE DIAMETER	6.71 mm
DRY REF GAS VOLUME SAMPLED	5.726 m^3
AVGERGE ISOKINETICITY	104.8 %
STACK DIAMETER	1.52 m
LENGTH	0.00 m
WIDTH	0.00 m
AREA OF STACK or DUCT	1.82 m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	176.8 ^oC
AVERAGE GAS MOISTURE BY VOLUME	49.6 %
AVERAGE GAS VELOCITY	32.87 m/s
BAROMETRIC PRESSURE (Station)	98.916 Kpa
STATIC PRESSURE	0.164 Kpa
ABSOLUTE GAS PRESSURE	99.081 Kpa
OXYGEN CONCENTRATION	8.7 %
CARBON DIOXIDE CONCENTRATION	9.22 %
CARBON MONOXIDE CONCENTRATION	77.9 ppm

FLOWRATE

ACTUAL GAS FLOWRATE	59.96 m^3/s
DRY REF GAS FLOWRATE	19.57 Rm^3/s
DRY ADJ GAS FLOWRATE	24.12 Rm^3/s
WET REF GAS FLOWRATE	38.86 Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	4.5 mg
	-FILTER	20.3 mg
	-TOTAL	24.8 mg
DRY REF GAS VOLUME SAMPLED		5.726 m^3
PARTICULATE CONC. - ACTUAL		1.414 mg/m^3
PARTICULATE CONC. - DRY REF		4.331 mg/m^3
PARTICULATE CONC. - DRY ADJ		3.515 mg/m^3
PARTICULATE CONC. - WET REF		2.182 mg/m^3
PARTICULATE EMISSION RATE		0.084776 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:	October 6, 2020	**Operator:**	DU

Pitot Factor	0.848	**Filter (mg)**	20.3		
DGMCF	1	**Probe (mg)**	4.5		
Barometric Pressure	29.21 "Hg	**CWTR (g)**	4100		
Static Pressure	0.660 "H_2O	**WCBDA (g)**	46.1		
Nozzle	0.2641 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**	0.75	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%	8.7
CO2%	9.22
COppm	77.9

Measured H2O
49.6 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
1	0	10.83	1.6	360	57	69	69	2.8	4.0		30.14	
	3	13.15	1.5	362	49	69	69	2.7	4.0		29.22	106.0
	6	15.73	1.5	362	49	69	69	2.2	4.0		29.22	121.9
	9	18.11	1.5	363	52	68	68	2.2	4.0		29.24	112.3
2	12	20.43	1.5	363	52	68	68	1.8	4.0		29.24	109.7
	15	22.65	1.5	363	52	68	68	1.8	4.0		29.24	104.9
	18	24.82	1.6	363	57	68	68	1.9	4.0		30.19	102.5
	21	27.03	1.5	360	59	68	68	1.9	4.0		29.18	101.1
3	24	29.24	1.8	361	59	68	68	2.1	4.0		31.99	104.3
	27	31.51	1.6	361	59	68	68	2.1	4.0		30.16	97.9
	30	33.79	1.5	360	63	68	68	2.1	4.0		29.18	104.3
	33	36.05	1.5	361	64	68	67	2.1	4.0		29.20	106.7
4	36	38.34	1.5	361	63	68	68	2	4.0		29.20	108.3
	39	40.60	1.6	361	63	68	68	2	4.0		30.16	106.7
	42	42.87	1.6	361	63	68	68	2	4.0		30.16	103.8
	45	45.14	1.6	361	64	67	67	2	4.0		30.16	103.8
5	48	47.38	1.7	360	66	67	68	2	4.0		31.07	102.6
	51	49.60	1.7	361	62	67	68	2	4.0		31.09	98.5
	54	51.91	1.7	359	57	68	68	2	4.0		31.05	102.6
	57	54.18	1.6	356	56	68	68	2	4.0		30.07	100.6
6	60	56.50	1.6	354	57	68	68	2	4.0		30.03	105.7
	63	58.80	2	352	57	68	68	2.4	4.0		33.53	104.7
	66	61.29	2.1	348	57	68	68	2.5	4.0		34.28	101.4
	69	63.80	2.2	347	53	68	68	2.6	4.0		35.06	99.5
7	72	66.40	2.4	345	57	68	68	2.9	5.0		36.57	100.7
	75	69.10	2.4	345	55	68	68	2.9	5.0		36.57	100.0
	78	71.82	2.1	346	55	68	68	2.7	5.0		34.23	100.8
	81	74.50	2.2	345	59	67	67	2.7	5.0		35.02	106.2
8	84	77.12	2.5	345	59	67	67	2.9	5.0		37.33	101.5
	87	80.00	2.4	345	59	67	67	2.9	5.0		36.57	104.7
	90	82.55	2.5	344	59	67	67	2.9	5.0		37.30	94.7
	93	85.33	2.6	344	59	67	67	3.2	5.0		38.04	101.0
9	96	88.23	2.6	343	55	68	68	3.2	5.0		38.02	103.4
	99	91.20	2.6	343	55	68	68	3.2	5.0		38.02	105.7

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	1 - Particulate & Metals	**Test Location:**	Incinerator Exhaust Stack
Date:	October 6, 2020	**Operator:**	DU

Pitot Factor	0.848	**Filter (mg)**	20.3		
DGMCF	1	**Probe (mg)**	4.5		
Barometric Pressure	29.21 "Hg	**CWTR (g)**	4100		
Static Pressure	0.660 "H_2O	**WCBDA (g)**	46.1		
Nozzle	0.2641 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**	0.75	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%	8.7
CO2%	9.22
COppm	77.9

Measured H2O
49.6 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	102	94.03	2.7	344	55	68	68	3.4	5.0		38.77	100.7
	105	96.94	2.6	344	55	68	68	3.4	5.0		38.04	101.7
10	108	99.88	2.6	344	55	68	68	3.4	5.0		38.04	104.7
	111	102.80	2.8	345	55	68	68	3.6	6.0		39.50	104.0
	114	105.81	2.2	345	55	68	68	2.9	5.0		35.02	103.4
	117	108.57	2.2	345	55	68	68	2.9	5.0		35.02	106.8
	120	111.31								0.75		106.0
1	0	112.06	1.8	347	61	70	70	2.4	5.0		31.71	
	3	114.55	1.9	346	58	70	70	2.6	5.0		32.56	106.1
	6	117.14	2.1	345	57	70	70	2.8	5.0		34.21	107.4
	9	119.81	1.9	347	56	70	70	2.6	5.0		32.58	105.3
2	12	122.47	1.8	346	56	70	70	2.5	5.0		31.69	110.4
	15	125.05	1.9	346	60	70	70	2.5	5.0		32.56	109.9
	18	127.63	1.9	346	60	70	71	2.5	5.0		32.56	107.0
	21	130.18	1.9	345	60	70	71	2.5	5.0		32.54	105.6
3	24	132.76	1.9	346	60	70	71	2.5	5.0		32.56	106.8
	27	135.30	1.8	345	60	71	71	2.5	5.0		31.67	105.2
	30	137.86	1.8	346	56	71	71	2.5	5.0		31.69	108.8
	33	140.40	1.8	346	55	71	71	2.5	5.0		31.69	108.0
4	36	142.97	1.9	346	55	71	71	2.5	5.0		32.56	109.3
	39	145.50	1.9	346	55	71	71	2.5	5.0		32.56	104.7
	42	148.04	1.8	346	55	71	71	2.5	5.0		31.69	105.1
	45	150.59	2	347	55	72	72	2.5	5.0		33.43	108.4
5	48	153.14	1.8	346	59	72	72	2.5	5.0		31.69	102.7
	51	155.66	1.9	346	68	72	72	2.5	5.0		32.56	107.0
	54	158.20	1.9	346	67	72	72	2.5	5.0		32.56	104.9
	57	160.75	1.9	349	68	72	72	2.5	5.0		32.62	105.3
6	60	163.29	2	350	67	72	72	2.5	5.0		33.49	105.1
	63	165.83	1.9	350	65	73	73	2.5	5.0		32.64	102.5
	66	168.35	1.9	350	66	73	73	2.5	5.0		32.64	104.2
	69	170.92	1.9	350	66	73	73	2.5	5.0		32.64	106.2
7	72	173.44	2	349	64	73	73	2.5	5.0		33.47	104.2
	75	175.99	2	349	64	73	73	2.5	5.0		33.47	102.7
	78	178.55	1.9	348	64	73	73	2.5	5.0		32.60	103.1

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	1 - Particulate & Metals	**Test Location:**	Incinerator Exhaust Stack
Date:	October 6, 2020	**Operator:**	DU

Pitot Factor	0.848	**Filter (mg)**	20.3		
DGMCF	1	**Probe (mg)**	4.5		
Barometric Pressure	29.21 "Hg	**CWTR (g)**	4100		
Static Pressure	0.660 "H_2O	**WCBDA (g)**	46.1		
Nozzle	0.2641 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**	0.75	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%	8.7
CO2%	9.22
COppm	77.9

Measured H2O
49.6 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	81	181.08	1.9	348	58	73	73	2.5	5.0		32.60	104.4
8	84	183.63	1.9	346	56	73	73	2.5	5.0		32.56	105.3
	87	186.16	2	346	56	73	73	2.5	5.0		33.41	104.3
	90	188.69	1.9	346	55	73	74	2.5	5.0		32.56	101.7
	93	191.23	1.9	344	58	73	74	2.5	5.0		32.52	104.6
9	96	193.78	2	345	58	73	74	2.5	5.0		33.39	104.9
	99	196.33	1.8	345	63	73	74	2.5	5.0		31.67	102.3
	102	198.90	2.1	344	67	73	73	2.6	5.0		34.19	108.7
	105	201.58	1.9	344	67	73	73	2.6	5.0		32.52	105.0
10	108	204.14	1.8	342	61	73	73	2.5	5.0		31.61	105.5
	111	206.69	2	343	60	73	73	2.5	5.0		33.35	107.8
	114	209.29	2	343	55	73	73	2.5	5.0		33.35	104.3
	117	211.91	1.9	380	53	73	73	2.5	5.0		33.24	105.1
	120	214.55										111.1

ORTECH Consulting Inc.

Plant:	Clean Harbors
Plant Location:	Corunna, ON
Test Location:	Incinerator Exhaust Stack
Test No.:	2 - Particulate & Metals
Date:	October 7, 2020

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.848
DGM CORRECTION FACTOR	1
NOZZLE DIAMETER	6.71 mm
DRY REF GAS VOLUME SAMPLED	5.274 m^3
AVGERGE ISOKINETICITY	106.3 %
STACK DIAMETER	1.52 m
LENGTH	0.00 m
WIDTH	0.00 m
AREA OF STACK or DUCT	1.82 m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	189.7 °C
AVERAGE GAS MOISTURE BY VOLUME	50.7 %
AVERAGE GAS VELOCITY	31.91 m/s
BAROMETRIC PRESSURE (Station)	98.510 Kpa
STATIC PRESSURE	0.112 Kpa
ABSOLUTE GAS PRESSURE	98.622 Kpa
OXYGEN CONCENTRATION	8.67 %
CARBON DIOXIDE CONCENTRATION	9.31 %
CARBON MONOXIDE CONCENTRATION	83.7 ppm

FLOWRATE

ACTUAL GAS FLOWRATE	58.22 m^3/s
DRY REF GAS FLOWRATE	18.01 Rm^3/s
DRY ADJ GAS FLOWRATE	22.24 Rm^3/s
WET REF GAS FLOWRATE	36.51 Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	8.5 mg
	-FILTER	15.1 mg
	-TOTAL	23.6 mg
DRY REF GAS VOLUME SAMPLED		5.274 m^3
PARTICULATE CONC. - ACTUAL		1.384 mg/m^3
PARTICULATE CONC. - DRY REF		4.475 mg/m^3
PARTICULATE CONC. - DRY ADJ		3.623 mg/m^3
PARTICULATE CONC. - WET REF		2.208 mg/m^3
PARTICULATE EMISSION RATE		0.080578 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 - Particulate & Metals	**Test Location:**	Incinerator Exhaust Stack
Date:	October 7, 2020	**Operator:**	DU

Pitot Factor	0.848	**Filter (mg)**	15.1		
DGMCF	1	**Probe (mg)**	8.5		
Barometric Pressure	29.09 "Hg	**CWTR (g)**	3938.7		
Static Pressure	0.450 "H_2O	**WCBDA (g)**	43.2		
Nozzle	0.2641 inches				
Stack Diameter	5.000 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%	8.67
CO2%	9.31
COppm	83.7

Measured H2O
50.7 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures				ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
				Stack °F	Imp. Out °F	DGM Out °F	DGM In °F					
1	0	17.00	1.5	369	55	67	67	1.9	3.0		29.48	
	3	19.23	1.4	369	50	66	66	1.8	3.0		28.48	107.8
	6	21.43	1.6	368	48	66	66	1.8	3.0		30.43	110.2
	9	23.58	1.4	368	48	66	66	1.8	3.0		28.47	100.7
2	12	25.72	1.4	368	50	66	66	1.8	3.0		28.47	107.2
	15	27.85	1.5	369	50	66	66	1.8	3.0		29.48	106.7
	18	29.95	1.4	368	53	66	66	1.8	3.0		28.47	101.7
	21	32.05	1.5	369	55	67	67	1.8	3.0		29.48	105.2
3	24	34.14	1.5	370	57	67	67	1.8	3.0		29.50	101.0
	27	36.28	1.5	369	60	67	67	1.9	3.0		29.48	103.5
	30	38.42	2.2	371	60	67	67	2.7	4.0		35.75	103.4
	33	41.00	1.6	370	65	67	67	1.9	3.0		30.47	103.3
4	36	43.22	1.6	370	63	67	67	1.9	3.0		30.47	103.9
	39	45.44	1.6	372	63	67	67	2	3.0		30.50	103.9
	42	47.70	1.7	371	64	67	68	2.1	3.0		31.42	106.0
	45	50.03	1.6	371	64	67	67	2	3.0		30.49	105.9
5	48	52.31	1.6	373	68	67	68	2	3.0		30.52	106.9
	51	54.58	1.6	373	67	67	68	2	3.0		30.52	106.4
	54	56.86	1.6	374	63	67	68	2	3.0		30.54	106.9
	57	59.14	1.8	374	63	67	68	2.2	3.0		32.39	106.9
6	60	61.52	1.7	374	63	67	68	2.2	3.0		31.48	105.3
	63	63.91	1.7	373	68	67	67	2.2	3.0		31.46	108.8
	66	66.30	1.7	374	68	67	67	2.1	3.0		31.48	108.8
	69	68.66	1.6	374	65	68	69	2	3.0		30.54	107.5
7	72	70.96	2	374	64	68	69	2.5	4.0		34.15	107.7
	75	73.46	1.8	375	64	69	69	2.2	4.0		32.41	104.8
	78	75.90	1.7	373	67	68	69	2.1	4.0		31.46	107.7
	81	78.26	1.9	373	65	68	69	2.4	4.0		33.26	107.1
8	84	80.75	1.9	373	67	68	69	2.4	4.0		33.26	107.0
	87	83.26	2.1	372	68	68	69	2.6	4.0		34.95	107.9
	90	85.86	1.9	373	67	69	69	2.4	4.0		33.26	106.3
	93	88.37	1.9	373	63	69	70	2.4	4.0		33.26	107.8
9	96	90.89	1.9	371	60	69	70	2.4	4.0		33.22	108.1
	99	93.38	1.9	371	57	70	70	2.4	4.0		33.22	106.7

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	2 - Particulate & Metals	**Test Location:**	Incinerator Exhaust Stack
Date:	October 7, 2020	**Operator:**	DU

Pitot Factor	0.848	**Filter (mg)**	15.1		
DGMCF	1	**Probe (mg)**	8.5		
Barometric Pressure	29.09 "Hg	**CWTR (g)**	3938.7		
Static Pressure	0.450 "H_2O	**WCBDA (g)**	43.2		
Nozzle	0.2641 inches				
Stack Diameter	5.000 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%	8.67
CO2%	9.31
COppm	83.7

Measured H2O
50.7 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	102	95.88	2	371	56	70	70	2.4	4.0		34.09	107.0
	105	98.39	1.9	370	56	70	70	2.4	4.0		33.20	104.7
10	108	100.90	1.9	370	56	70	70	2.4	4.0		33.20	107.4
	111	103.38	2	370	54	70	70	2.4	4.0		34.06	106.1
	114	105.88	1.8	370	55	70	70	2.4	4.0		32.32	104.2
	117	108.30	1.9	370	57	70	70	2.3	4.0		33.20	106.4
	120	110.76								0.67		105.2
1	0	111.43	1.6	376	64	73	73	2	4.0		30.58	
	3	113.63	1.6	374	52	74	74	2	4.0		30.54	102.2
	6	116.03	1.6	374	51	74	75	2	4.0		30.54	111.2
	9	118.30	2	376	53	74	74	2.5	4.0		34.19	105.1
2	12	120.80	2	377	53	74	74	2.5	4.0		34.21	103.9
	15	123.32	2	378	54	74	74	2.5	4.0		34.23	104.8
	18	125.88	1.9	378	55	75	75	2.4	4.0		33.36	106.5
	21	128.39	1.7	377	55	75	75	2.2	4.0		31.54	106.9
3	24	130.83	1.7	378	55	75	75	2.2	4.0		31.56	109.7
	27	133.27	1.6	378	55	75	75	2.2	4.0		30.61	109.8
	30	135.67	1.7	377	52	75	75	2.1	4.0		31.54	111.3
	33	138.05	1.7	378	52	75	75	2.1	4.0		31.56	107.0
4	36	140.42	1.7	377	52	76	76	2.1	4.0		31.54	106.6
	39	142.78	1.6	377	52	76	76	2.1	4.0		30.60	105.9
	42	145.15	1.8	377	54	76	76	2.1	4.0		32.45	109.6
	45	147.52	1.8	377	54	76	76	2.1	4.0		32.45	103.4
5	48	149.87	1.5	377	58	76	76	2.1	4.0		29.62	102.5
	51	152.13	1.7	376	59	76	76	2.2	4.0		31.52	108.0
	54	154.48	2.1	376	59	76	76	2.6	4.5		35.03	105.4
	57	157.09	1.8	371	59	76	76	2.3	4.0		32.34	105.4
6	60	159.60	1.9	372	58	76	76	2.3	4.0		33.24	109.1
	63	162.11	1.8	372	54	76	76	2.3	4.5		32.36	106.3
	66	164.58	1.8	372	54	76	76	2.3	4.5		32.36	107.4
	69	167.07	1.8	372	54	76	76	2.3	4.5		32.36	108.3
7	72	169.55	1.8	370	56	76	76	2.3	4.5		32.32	107.9
	75	172.05	1.8	371	56	76	76	2.3	4.5		32.34	108.6
	78	174.53	1.8	371	56	76	76	2.3	4.5		32.34	107.8

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	2 - Particulate & Metals	**Test Location:**	Incinerator Exhaust Stack
Date:	October 7, 2020	**Operator:**	DU

Pitot Factor	0.848	**Filter (mg)**	15.1		
DGMCF	1	**Probe (mg)**	8.5		
Barometric Pressure	29.09 "Hg	**CWTR (g)**	3938.7		
Static Pressure	0.450 "H_2O	**WCBDA (g)**	43.2		
Nozzle	0.2641 inches				
Stack Diameter	5.000 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%	8.67
CO2%	9.31
COppm	83.7

Measured H2O
50.7 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	81	177.00	1.8	370	60	77	77	2.3	4.5		32.32	107.4
8	84	179.47	1.9	374	63	77	77	2.3	4.5		33.28	107.1
	87	181.94	1.8	375	65	77	77	2.3	4.5		32.41	104.5
	90	184.40	1.9	377	68	77	77	2.3	4.5		33.34	107.0
	93	186.85	1.9	380	68	77	77	2.3	4.5		33.40	103.9
9	96	189.33	1.7	383	64	77	77	2.2	4.5		31.65	105.3
	99	191.79	1.8	376	62	77	77	2.2	4.5		32.43	110.6
	102	194.18	1.8	378	60	77	77	2.2	4.5		32.47	104.0
	105	196.58	1.8	378	60	78	78	2.2	4.5		32.47	104.6
10	108	199.02	1.8	379	61	78	78	2.2	4.5		32.49	106.1
	111	201.43	1.8	377	60	78	78	2.2	4.5		32.45	104.9
	114	203.83	1.8	375	60	78	78	2.2	4.5		32.41	104.3
	117	206.24	1.8	374	60	78	78	2.2	4.5		32.39	104.6
	120											

ORTECH Consulting Inc.

Plant:	Clean Harbors
Plant Location:	Corunna, ON
Test Location:	Incinerator Exhaust Stack
Test No.:	3 - Particulate & Metals
Date:	October 8, 2020

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.848
DGM CORRECTION FACTOR	1
NOZZLE DIAMETER	6.71 mm
DRY REF GAS VOLUME SAMPLED	5.442 m^3
AVGERGE ISOKINETICITY	102.7 %
STACK DIAMETER	1.52 m
LENGTH	0.00 m
WIDTH	0.00 m
AREA OF STACK or DUCT	1.82 m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	193.7 ^{o}C
AVERAGE GAS MOISTURE BY VOLUME	48.7 %
AVERAGE GAS VELOCITY	32.23 m/s
BAROMETRIC PRESSURE (Station)	99.797 Kpa
STATIC PRESSURE	0.162 Kpa
ABSOLUTE GAS PRESSURE	99.959 Kpa
OXYGEN CONCENTRATION	9.06 %
CARBON DIOXIDE CONCENTRATION	9.04 %
CARBON MONOXIDE CONCENTRATION	49.3 ppm

FLOWRATE

ACTUAL GAS FLOWRATE	58.80 m^3/s
DRY REF GAS FLOWRATE	19.00 Rm^3/s
DRY ADJ GAS FLOWRATE	22.72 Rm^3/s
WET REF GAS FLOWRATE	37.05 Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	5.4 mg
	-FILTER	13.8 mg
	-TOTAL	19.2 mg
DRY REF GAS VOLUME SAMPLED		5.442 m^3
PARTICULATE CONC. - ACTUAL		1.140 mg/m^3
PARTICULATE CONC. - DRY REF		3.528 mg/m^3
PARTICULATE CONC. - DRY ADJ		2.950 mg/m^3
PARTICULATE CONC. - WET REF		1.810 mg/m^3
PARTICULATE EMISSION RATE		0.067030 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.:	3 - Particulate & Metals	**Test Location:**	Incinerator Exhaust Stack
Date:	October 8, 2020	**Operator:**	DU

Pitot Factor	0.848	**Filter (mg)**	13.8		
DGMCF	1	**Probe (mg)**	5.4		
Barometric Pressure	29.47 "Hg	**CWTR (g)**	3760.2		
Static Pressure	0.650 "H_2O	**WCBDA (g)**	39.3		
Nozzle	0.2641 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.58 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%	9.06
CO2%	9.04
COppm	49.3

Measured H2O
48.7 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
1	0	9.81	1.8	383	46	57	57	2.4	3.0		32.20	
	3	12.20	1.8	384	45	56	56	2.1	3.0		32.22	105.5
	6	14.53	1.8	384	44	56	56	2.1	3.0		32.22	103.0
	9	16.81	1.8	384	45	56	56	2.1	3.0		32.22	100.8
2	12	19.07	1.8	383	46	57	57	2.1	3.0		32.20	100.0
	15	21.38	1.7	382	47	57	57	2.1	3.0		31.28	101.9
	18	23.65	1.9	382	47	57	57	2.1	3.0		33.07	103.0
	21	25.93	1.8	381	48	57	57	2.1	3.0		32.16	97.8
3	24	28.22	1.9	381	49	57	57	2.2	3.0		33.05	100.9
	27	30.61	1.9	381	48	57	58	2.2	3.0		33.05	102.5
	30	33.00	1.8	379	48	58	59	2.2	3.0		32.13	102.4
	33	35.36	1.9	378	48	59	59	2.2	3.0		32.99	103.6
4	36	37.72	1.9	378	48	59	59	2.2	3.0		32.99	100.7
	39	40.10	1.9	377	48	59	59	2.2	3.0		32.97	101.5
	42	42.45	1.9	377	48	59	59	2.2	3.0		32.97	100.2
	45	44.82	1.8	376	48	58	60	2.2	3.0		32.07	101.0
5	48	47.17	1.9	375	46	59	60	2.2	3.0		32.93	102.9
	51	49.52	1.9	376	46	60	60	2.2	3.5		32.95	100.0
	54	51.87	2	375	48	59	61	2.2	3.5		33.78	99.9
	57	54.24	1.9	375	48	59	61	2.2	3.5		32.93	98.2
6	60	56.65	1.9	378	45	59	61	2.2	4.0		32.99	102.4
	63	59.05	1.9	381	52	60	60	2.2	4.0		33.05	102.2
	66	61.43	1.8	380	44	60	60	2.2	4.0		32.15	101.5
	69	63.81	2.1	384	44	60	62	2.5	4.0		34.80	104.2
7	72	66.31	1.8	383	45	60	62	2.2	4.0		32.20	101.5
	75	68.74	1.8	382	45	60	62	2.2	4.0		32.18	106.4
	78	71.12	1.8	383	45	60	62	2.2	4.0		32.20	104.2
	81	73.55	1.8	385	45	61	61	2.2	4.0		32.24	106.4
8	84	75.97	1.9	380	44	61	62	2.2	4.0		33.03	106.1
	87	78.36	1.9	385	45	61	63	2.2	4.0		33.12	101.6
	90	80.77	1.7	385	45	61	63	2	4.0		31.33	102.6
	93	83.08	2	385	45	62	63	2.4	4.0		33.98	104.0
9	96	85.55	1.9	383	45	62	63	2.4	4.0		33.08	102.5
	99	88.04	1.8	380	49	60	64	2.2	4.0		32.15	105.9

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	3 - Particulate & Metals	**Test Location:**	Incinerator Exhaust Stack
Date:	October 8, 2020	**Operator:**	DU

Pitot Factor	0.848	**Filter (mg)**	13.8		
DGMCF	1	**Probe (mg)**	5.4		
Barometric Pressure	29.47 "Hg	**CWTR (g)**	3760.2		
Static Pressure	0.650 "H_2O	**WCBDA (g)**	39.3		
Nozzle	0.2641 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.58 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%	9.06
CO2%	9.04
COppm	49.3

Measured H2O
48.7 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	102	90.45	1.8	379	51	62	63	2.2	4.0		32.13	105.1
	105	92.81	1.7	378	54	63	64	2.2	4.0		31.20	102.8
10	108	95.18	1.7	377	56	63	64	2.2	4.0		31.18	106.0
	111	97.56	1.7	378	56	63	64	2.2	4.0		31.20	106.3
	114	99.95	1.7	380	56	63	64	2.2	4.0		31.24	106.9
	117	102.31	1.7	381	60	63	64	2.2	4.0		31.26	105.6
	120	104.67								0.58		105.7
1	0	105.25	2	382	65	66	66	2.4	4.0		33.92	
	3	107.72	1.9	382	56	66	68	2.2	4.0		33.07	101.6
	6	110.17	1.9	382	54	66	68	2.2	4.0		33.07	103.2
	9	112.57	1.9	383	52	67	68	2.2	4.0		33.08	101.1
2	12	114.99	1.9	382	52	67	68	2.2	4.0		33.07	101.9
	15	117.38	2.1	382	51	67	68	2.2	4.0		34.76	100.5
	18	119.75	1.9	382	51	67	68	2.2	4.0		33.07	94.8
	21	122.07	1.8	382	53	68	69	2.2	4.0		32.18	97.6
3	24	124.42	2	384	54	68	69	2.2	4.0		33.96	101.4
	27	126.76	1.9	383	54	70	70	2.2	4.0		33.08	95.9
	30	129.07	2	382	54	70	70	2.2	4.0		33.92	96.8
	33	131.40	2	383	53	70	70	2.2	4.0		33.94	95.1
4	36	133.81	1.9	381	53	70	70	2.2	4.0		33.05	98.4
	39	136.22	2	381	56	70	70	2.2	4.0		33.90	100.8
	42	138.67	2	381	58	70	70	2.2	4.0		33.90	99.9
	45	141.10	2	381	58	70	70	2.2	4.0		33.90	99.1
5	48	143.55	1.9	382	54	71	71	2.3	4.0		33.07	99.9
	51	146.05	1.8	382	54	71	71	2.3	4.0		32.18	104.5
	54	148.50	1.9	382	57	71	71	2.3	4.0		33.07	105.2
	57	150.95	1.8	383	57	71	71	2.3	4.0		32.20	102.4
6	60	153.41	1.8	382	61	71	71	2.3	4.0		32.18	105.7
	63	155.82	1.8	380	63	71	71	2.2	4.0		32.15	103.5
	66	158.25	1.8	381	66	71	71	2.2	4.0		32.16	104.2
	69	160.67	1.7	381	62	72	72	2.2	4.0		31.26	103.8
7	72	163.14	1.7	381	56	73	73	2.2	4.0		31.26	108.9
	75	165.55	1.7	381	53	73	73	2.2	4.0		31.26	106.0
	78	167.93	1.6	379	52	73	73	2.2	4.0		30.29	104.7

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	3 - Particulate & Metals	**Test Location:**	Incinerator Exhaust Stack
Date:	October 8, 2020	**Operator:**	DU

Pitot Factor	0.848	**Filter (mg)**	13.8		
DGMCF	1	**Probe (mg)**	5.4		
Barometric Pressure	29.47 "Hg	**CWTR (g)**	3760.2		
Static Pressure	0.650 "H_2O	**WCBDA (g)**	39.3		
Nozzle	0.2641 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.58 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%	9.06
CO2%	9.04
COppm	49.3

Measured H2O
48.7 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	81	170.29	1.5	380	55	73	73	2.2	4.0		29.34	106.9
8	84	172.64	1.6	380	54	73	73	2.2	4.0		30.31	110.0
	87	174.97	1.6	379	54	73	73	2	4.0		30.29	105.6
	90	177.29	1.7	380	51	73	73	2	4.0		31.24	105.0
	93	179.60	1.6	379	50	73	74	2	4.0		30.29	101.5
9	96	181.92	1.8	379	50	73	74	2	4.0		32.13	104.9
	99	184.22	1.6	379	50	73	74	2	4.0		30.29	98.1
	102	186.54	1.6	379	50	73	74	2	4.0		30.29	104.9
	105	188.82	1.6	379	55	74	74	2	4.0		30.29	103.1
10	108	191.14	1.5	379	55	74	74	1.9	4.0		29.33	104.8
	111	193.41	1.6	379	57	74	74	1.9	4.0		30.29	105.9
	114	195.65	1.5	379	57	74	74	1.9	4.0		29.33	101.2
	117	197.90	1.5	379	58	74	74	1.9	4.0		29.33	105.0
	120	200.16										105.4

APPENDIX 23

Semi-Volatile Organics Test Emission Calculations
(12 pages)

ORTECH Environmental

Plant:	Clean Harbors
Plant Location:	Corunna, ON
Test Location:	Incinerator Exhaust Stack
Test No.:	1 - SVOC
Date:	October 6, 2020

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.849	
DGM CORRECTION FACTOR	0.999	
NOZZLE DIAMETER	6.76	mm
DRY REF GAS VOLUME SAMPLED	5.718	m^3
AVGERGE ISOKINETICITY	105.6	%
STACK DIAMETER	1.52	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.82	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	177.0	°C
AVERAGE GAS MOISTURE BY VOLUME	49.9	%
AVERAGE GAS VELOCITY	32.24	m/s
BAROMETRIC PRESSURE (Station)	98.916	Kpa
STATIC PRESSURE	0.164	Kpa
ABSOLUTE GAS PRESSURE	99.081	Kpa
OXYGEN CONCENTRATION	8.7	%
CARBON DIOXIDE CONCENTRATION	9.22	%
CARBON MONOXIDE CONCENTRATION	77.9	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	58.81	m^3/s
DRY REF GAS FLOWRATE	19.09	Rm^3/s
DRY ADJ GAS FLOWRATE	23.53	Rm^3/s
WET REF GAS FLOWRATE	38.10	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0	mg
	-FILTER	0	mg
	-TOTAL	0	mg
DRY REF GAS VOLUME SAMPLED		5.718	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 Environmental

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	1 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	October 6, 2020	**Operator:**	CB

Pitot Factor	0.849	**Filter (mg)**	0		
DGMCF	0.999	**Probe (mg)**	0		
Barometric Pressure	29.21 "Hg	**CWTR (g)**	4160.8		
Static Pressure	0.660 "H_2O	**WCBDA (g)**	21.9		
Nozzle	0.2663 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.77 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%	8.7
CO2%	9.22
COppm	77.9

Measured H2O
49.9 %

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	19.55	1.7	361	57	70	69	2.1	6.8		31.14	
	3	22.18	1.75	361	50	69	68	2.6	6.8		31.60	114.7
	6	24.81	1.75	363	51	69	69	2.6	6.5		31.64	113.4
	9	27.44	1.75	365	51	69	69	2.5	6.5		31.67	113.4
2	12	30.02	1.75	364	49	69	69	2.5	6.5		31.65	111.4
	15	32.56	1.75	364	46	69	69	2.5	6.5		31.65	109.6
	18	35.13	1.75	363	47	68	69	2.5	6.5		31.64	110.9
	21	37.67	1.75	363	48	69	69	2.5	6.5		31.64	109.6
3	24	40.20	1.8	361	46	70	70	2.5	6.5		32.05	109.1
	27	42.72	1.8	361	47	71	69	2.5	6.5		32.05	106.8
	30	45.22	1.9	360	47	70	69	2.5	6.5		32.90	106.0
	33	47.78	1.9	360	47	70	69	2.5	6.5		32.90	105.6
4	36	50.35	1.8	361	47	71	69	2.5	6.5		32.05	106.1
	39	52.90	1.8	360	48	71	69	2.5	6.5		32.03	108.1
	42	55.43	1.85	361	48	72	69	2.5	6.5		32.49	107.2
	45	57.99	1.85	361	49	72	69	2.5	6.5		32.49	106.9
5	48	60.51	1.8	360	48	72	69	2.5	6.5		32.03	105.3
	51	63.02	1.9	360	48	72	69	2.5	6.5		32.90	106.2
	54	65.55	1.9	360	49	73	70	2.5	6.5		32.90	104.2
	57	68.12	1.9	355	50	73	70	2.5	6.5		32.80	105.7
6	60	70.61	1.95	355	50	73	70	2.5	6.5		33.23	102.1
	63	73.12	1.9	352	50	73	70	2.5	6.5		32.74	101.6
	66	75.68	1.9	349	49	73	70	2.5	6.5		32.68	104.7
	69	78.20	1.95	347	49	74	70	2.5	6.5		33.07	102.9
7	72	80.74	2.05	346	49	74	70	2.55	6.5		33.88	102.2
	75	83.32	2	345	49	74	70	2.55	6.5		33.45	101.2
	78	85.93	2	346	49	74	70	2.55	6.5		33.47	103.5
	81	88.48	2	344	50	74	71	2.5	6.5		33.43	101.2
8	84	91.20	1.8	346	51	74	71	2.4	6.2		31.75	107.7
	87	93.64	1.8	345	52	74	71	2.4	6.2		31.73	102.0
	90	96.17	2	345	52	74	71	2.5	6.8		33.45	105.7
	93	98.74	2.2	344	53	74	71	2.7	7.2		35.06	101.8
9	96	101.45	2.2	344	53	74	71	2.7	7.2		35.06	102.4
	99	104.24	2.2	342	53	75	72	2.9	7.2		35.01	105.4

ORTECH Environmental

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	1 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	October 6, 2020	**Operator:**	CB

Pitot Factor	0.849	**Filter (mg)**	0		
DGMCF	0.999	**Probe (mg)**	0		
Barometric Pressure	29.21 "Hg	**CWTR (g)**	4160.8		
Static Pressure	0.660 "H_2O	**WCBDA (g)**	21.9		
Nozzle	0.2663 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.77 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%	8.7
CO2%	9.22
COppm	77.9

Measured H2O
49.9 %

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	107.04	2.2	342	53	75	72	2.9	7.2		35.01	105.5
	105	109.82	2.2	344	55	75	72	2.9	7.2		35.06	104.8
10	108	112.65	2.15	344	56	75	72	2.9	7.0		34.66	106.8
	111	115.44	2.15	344	56	75	72	2.9	7.0		34.66	106.5
	114	118.09	2.15	345	57	76	73	2.6	6.2		34.68	101.1
	117	120.77	2.1	345	57	76	73	2.6	6.2		34.27	102.1
	120	123.43								0.77		102.5
1	0	124.20	2	346	65	75	73	2.5	6.1		33.47	
	3	126.62	1.9	346	56	74	73	2.5	6.1		32.62	95.7
	6	129.17	1.9	346	51	73	73	2.5	6.1		32.62	103.5
	9	131.73	1.9	346	48	73	73	2.5	6.1		32.62	104.1
2	12	134.35	1.9	346	48	73	73	2.5	6.1		32.62	106.5
	15	136.93	1.95	345	47	73	74	2.5	6.1		33.03	104.9
	18	139.57	1.9	346	47	74	74	2.5	6.1		32.62	105.8
	21	142.08	1.9	346	47	74	74	2.5	6.1		32.62	101.8
3	24	144.69	1.8	345	47	74	74	2.5	6.1		31.73	105.9
	27	147.27	1.85	346	47	74	74	2.5	6.0		32.19	107.5
	30	149.83	1.9	346	47	74	74	2.5	6.0		32.62	105.3
	33	152.41	1.85	346	48	75	74	2.5	6.0		32.19	104.7
4	36	154.97	2	347	48	75	74	2.5	6.0		33.49	105.2
	39	157.59	2	347	48	75	74	2.6	6.1		33.49	103.6
	42	160.20	2	346	49	76	74	2.6	6.1		33.47	103.2
	45	162.82	2	351	51	76	74	2.6	6.1		33.57	103.4
5	48	165.47	1.8	348	53	77	75	2.5	6.0		31.79	104.9
	51	168.08	1.85	354	55	77	75	2.4	6.0		32.35	108.5
	54	170.68	1.85	351	55	77	75	2.4	6.0		32.29	107.0
	57	173.14	1.8	348	54	77	75	2.4	6.0		31.79	101.0
6	60	175.68	1.8	350	54	78	76	2.4	6.0		31.83	105.6
	63	178.22	1.8	349	54	77	75	2.4	6.0		31.81	105.5
	66	180.77	1.8	349	54	78	76	2.4	6.0		31.81	106.1
	69	183.32	1.8	349	55	78	76	2.4	6.0		31.81	105.9
7	72	185.85	1.75	349	55	78	76	2.4	6.0		31.36	105.0
	75	188.40	1.7	348	54	78	76	2.3	5.7		30.89	107.4
	78	190.90	1.7	348	55	78	76	2.3	5.7		30.89	106.7

ORTECH Environmental

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	1 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	October 6, 2020	**Operator:**	CB

Pitot Factor	0.849	**Filter (mg)**	0		
DGMCF	0.999	**Probe (mg)**	0		
Barometric Pressure	29.21 "Hg	**CWTR (g)**	4160.8		
Static Pressure	0.660 "H_2O	**WCBDA (g)**	21.9		
Nozzle	0.2663 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.77 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%	8.7
CO2%	9.22
COppm	77.9

Measured H2O
49.9 %

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	193.42	1.7	348	55	78	76	2.3	5.5		30.89	107.6
8	84	195.92	1.6	348	55	78	76	2.2	5.0		29.97	106.7
	87	198.35	1.6	345	56	78	76	2.2	5.0		29.92	106.9
	90	200.77	1.6	345	56	78	76	2.2	5.0		29.92	106.2
	93	203.18	1.6	344	57	78	79	2.2	5.0		29.90	105.8
9	96	205.59	1.6	345	57	78	79	2.2	5.0		29.92	105.4
	99	208.02	1.55	345	58	79	77	2.2	5.0		29.45	106.4
	102	210.42	1.55	343	58	79	77	2.2	5.0		29.41	106.9
	105	212.83	1.55	343	58	79	77	2.2	5.0		29.41	107.2
10	108	215.22	1.5	342	59	79	77	2	4.8		28.91	106.3
	111	217.58	1.5	342	59	79	77	2	4.8		28.91	106.6
	114	219.84	1.6	356	53	79	77	2.1	5.0		30.12	102.0
	117	222.22	1.6	378	51	79	77	2.1	5.0		30.52	105.0
	120	224.63										107.7

ORTECH Environmental

Plant:	Clean Harbors
Plant Location:	Corunna, ON
Test Location:	Incinerator Exhaust Stack
Test No.:	2 - SVOC
Date:	October 7, 2020

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT		0.849
DGM CORRECTION FACTOR		0.999
NOZZLE DIAMETER		6.76 mm
DRY REF GAS VOLUME SAMPLED		5.297 m^3
AVGERGE ISOKINETICITY		102.0 %
STACK DIAMETER		1.52 m
LENGTH		0.00 m
WIDTH		0.00 m
AREA OF STACK or DUCT		1.82 m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	189.4 °C
AVERAGE GAS MOISTURE BY VOLUME	49.7 %
AVERAGE GAS VELOCITY	31.82 m/s
BAROMETRIC PRESSURE (Station)	98.510 Kpa
STATIC PRESSURE	0.112 Kpa
ABSOLUTE GAS PRESSURE	98.622 Kpa
OXYGEN CONCENTRATION	8.67 %
CARBON DIOXIDE CONCENTRATION	9.31 %
CARBON MONOXIDE CONCENTRATION	83.7 ppm

FLOWRATE

ACTUAL GAS FLOWRATE	58.04 m^3/s
DRY REF GAS FLOWRATE	18.30 Rm^3/s
DRY ADJ GAS FLOWRATE	22.61 Rm^3/s
WET REF GAS FLOWRATE	36.43 Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0 mg
	-FILTER	0 mg
	-TOTAL	0 mg
DRY REF GAS VOLUME SAMPLED		5.297 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 Environmental

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	2 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	October 7, 2020	**Operator:**	CB

Pitot Factor	0.849	**Filter (mg)**	0		
DGMCF	0.999	**Probe (mg)**	0		
Barometric Pressure	29.09 "Hg	**CWTR (g)**	3822.1		
Static Pressure	0.450 "H_2O	**WCBDA (g)**	32.7		
Nozzle	0.2663 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		3.27 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%	8.67
CO2%	9.31
COppm	83.7

Measured H2O
49.7 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
1	0	26.83	1.7	369	58	71	69	2.1	6.8		31.35	
	3	29.34	1.7	369	56	69	68	2.2	5.6		31.35	109.5
	6	31.81	1.8	368	57	69	68	2.3	5.6		32.24	108.1
	9	34.22	1.7	368	57	69	68	2.3	5.6		31.33	102.4
2	12	36.65	1.7	368	57	69	69	2.3	5.6		31.33	106.3
	15	39.08	1.7	368	57	69	69	2.3	5.6		31.33	106.2
	18	41.47	1.7	369	58	69	69	2.2	5.6		31.35	104.4
	21	43.88	1.7	369	58	69	69	2.2	5.6		31.35	105.3
3	24	46.28	1.7	369	58	69	69	2.2	5.6		31.35	104.9
	27	48.65	1.7	369	58	70	69	2.2	5.6		31.35	103.6
	30	51.02	1.75	369	58	71	69	2.2	5.6		31.81	103.5
	33	53.40	1.75	370	58	71	69	2.2	5.6		31.83	102.3
4	36	55.80	1.75	370	58	71	69	2.2	5.6		31.83	103.2
	39	58.16	1.75	371	58	72	70	2.2	5.6		31.85	101.5
	42	60.54	1.75	371	58	72	69	2.2	5.6		31.85	102.3
	45	62.91	1.75	371	59	73	69	2.2	5.6		31.85	101.9
5	48	65.28	1.75	372	60	73	70	2.2	5.6		31.87	101.8
	51	67.66	1.75	373	59	73	70	2.2	5.6		31.89	102.2
	54	70.02	1.75	373	60	73	70	2.2	5.6		31.89	101.4
	57	72.36	1.75	373	60	74	71	2.2	5.6		31.89	100.6
6	60	74.73	1.7	373	60	74	71	2.2	5.6		31.43	101.7
	63	77.08	1.7	372	62	74	71	2.2	5.6		31.41	102.3
	66	79.40	1.75	373	62	74	72	2.2	5.6		31.89	100.9
	69	81.80	1.75	373	62	74	72	2.2	5.6		31.89	102.9
7	72	84.23	1.9	374	62	75	72	2.3	5.8		33.24	104.1
	75	86.64	1.85	374	62	75	72	2.3	5.8		32.80	99.1
	78	89.12	1.85	374	62	75	72	2.3	5.8		32.80	103.4
	81	91.57	1.85	373	63	76	72	2.3	5.8		32.78	102.1
8	84	94.08	1.8	373	63	75	72	2.3	5.8		32.34	104.5
	87	96.57	1.85	373	63	75	72	2.3	5.8		32.78	105.1
	90	99.18	1.85	372	64	76	73	2.3	5.8		32.76	108.7
	93	101.57	1.85	372	63	76	73	2.3	5.8		32.76	99.3
9	96	104.07	1.7	370	65	76	73	2.15	5.5		31.37	103.9
	99	106.48	1.7	370	66	76	73	2.15	5.5		31.37	104.3

ORTECH Environmental

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	2 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	October 7, 2020	**Operator:**	CB

Pitot Factor	0.849	**Filter (mg)**	0		
DGMCF	0.999	**Probe (mg)**	0		
Barometric Pressure	29.09 "Hg	**CWTR (g)**	3822.1		
Static Pressure	0.450 "H_2O	**WCBDA (g)**	32.7		
Nozzle	0.2663 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		3.27 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%	8.67
CO2%	9.31
COppm	83.7

Measured H2O
49.7 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	102	108.90	1.7	370	64	76	73	2.1	5.5		31.37	104.7
	105	111.25	1.7	369	64	76	73	2.1	5.5		31.35	101.7
10	108	113.61	1.6	368	64	76	73	2	5.2		30.40	102.1
	111	115.96	1.6	369	66	76	74	2	5.2		30.42	104.7
	114	118.30	1.6	368	65	76	73	2	5.2		30.40	104.2
	117	120.56	1.6	369	64	76	74	2	5.2		30.42	100.7
	120	122.84								3.27		101.5
1	0	126.11	1.6	375	72	78	76	2	4.8		30.53	
	3	128.40	1.6	372	70	78	77	2	4.8		30.47	101.9
	6	130.66	1.6	374	70	78	77	2	4.8		30.51	100.3
	9	132.92	1.6	374	62	77	76	2	4.8		30.51	100.5
2	12	135.17	1.6	375	63	77	76	2	5.0		30.53	100.2
	15	137.40	1.6	377	64	77	76	2	5.0		30.56	99.4
	18	139.64	1.6	377	65	77	76	2	5.0		30.56	99.9
	21	141.89	1.6	377	65	79	78	2	5.0		30.56	100.4
3	24	144.13	1.6	377	65	79	78	2	5.0		30.56	99.6
	27	146.35	1.6	377	64	80	78	2	5.0		30.56	98.7
	30	148.58	1.6	376	65	80	78	2	5.0		30.54	99.0
	33	150.82	1.6	377	65	80	78	2	5.0		30.56	99.4
4	36	153.06	1.7	377	65	80	78	2	5.0		31.50	99.5
	39	155.38	1.7	377	65	80	78	2	5.0		31.50	99.9
	42	157.67	1.7	376	65	81	79	2	5.0		31.48	98.7
	45	160.06	1.7	374	65	81	79	2	5.0		31.45	102.7
5	48	162.42	1.7	374	65	81	79	2	5.0		31.45	101.3
	51	164.72	1.7	376	65	81	79	2	5.0		31.48	98.7
	54	167.06	1.7	376	65	81	79	2	5.0		31.48	100.6
	57	169.45	1.7	375	65	81	79	2	5.0		31.47	102.7
6	60	171.75	1.7	374	64	82	80	2	5.0		31.45	98.8
	63	174.08	1.7	373	63	82	80	2	5.0		31.43	99.8
	66	176.45	1.75	373	63	82	80	2.1	5.2		31.89	101.5
	69	178.81	1.75	372	63	82	80	2.1	5.2		31.87	99.6
7	72	181.16	1.8	371	63	82	80	2.2	5.6		32.30	99.1
	75	183.57	1.85	371	63	82	80	2.3	5.8		32.75	100.2
	78	186.07	1.85	371	63	82	81	2.3	5.8		32.75	102.6

ORTECH Environmental

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	2 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	October 7, 2020	**Operator:**	CB

Pitot Factor	0.849	**Filter (mg)**	0		
DGMCF	0.999	**Probe (mg)**	0		
Barometric Pressure	29.09 "Hg	**CWTR (g)**	3822.1		
Static Pressure	0.450 "H_2O	**WCBDA (g)**	32.7		
Nozzle	0.2663 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		3.27 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%	8.67
CO2%	9.31
COppm	83.7

Measured H2O
49.7 %

				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	188.56	1.85	370	62	82	81	2.3	5.8		32.73	102.1
8	84	191.05	1.9	373	62	82	81	2.3	6.0		33.22	102.0
	87	193.54	1.9	374	63	82	81	2.3	6.0		33.24	100.8
	90	196.03	1.9	376	63	83	81	2.3	6.0		33.28	100.9
	93	198.54	1.9	377	63	83	81	2.3	6.0		33.30	101.7
9	96	201.02	1.95	377	62	82	81	2.3	6.0		33.74	100.6
	99	203.55	1.95	378	62	83	81	2.3	6.0		33.76	101.4
	102	206.06	1.95	377	62	82	81	2.3	6.0		33.74	100.5
	105	208.56	1.95	377	62	82	81	2.3	6.0		33.74	100.2
10	108	211.10	1.9	376	62	82	81	2.3	6.0		33.28	101.8
	111	213.60	1.9	377	62	81	81	2.3	6.0		33.30	101.4
	114	216.09	1.9	377	63	82	81	2.3	6.0		33.30	101.2
	117	218.61	1.9	377	61	82	81	2.3	6.0		33.30	102.3
	120	221.14										102.7

ORTECH Environmental

Plant:	Clean Harbors
Plant Location:	Corunna, ON
Test Location:	Incinerator Exhaust Stack
Test No.:	3
Date:	October 8, 2020

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.849	
DGM CORRECTION FACTOR	0.999	
NOZZLE DIAMETER	6.76	mm
DRY REF GAS VOLUME SAMPLED	5.245	m^3
AVGERGE ISOKINETICITY	99.8	%
STACK DIAMETER	1.52	m
LENGTH	0.00	m
WIDTH	0.00	m
AREA OF STACK or DUCT	1.82	m^3

STACK GAS PHYSICAL PARAMETERS

AVERAGE GAS TEMPERATURE	194.1	$^{\circ}C$
AVERAGE GAS MOISTURE BY VOLUME	49.2	%
AVERAGE GAS VELOCITY	31.76	m/s
BAROMETRIC PRESSURE (Station)	99.797	Kpa
STATIC PRESSURE	0.162	Kpa
ABSOLUTE GAS PRESSURE	99.959	Kpa
OXYGEN CONCENTRATION	9.06	%
CARBON DIOXIDE CONCENTRATION	9.04	%
CARBON MONOXIDE CONCENTRATION	49.3	ppm

FLOWRATE

ACTUAL GAS FLOWRATE	57.93	m^3/s
DRY REF GAS FLOWRATE	18.52	Rm^3/s
DRY ADJ GAS FLOWRATE	22.14	Rm^3/s
WET REF GAS FLOWRATE	36.47	Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0	mg
	-FILTER	0	mg
	-TOTAL	0	mg
DRY REF GAS VOLUME SAMPLED		5.245	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 Environmental

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	3	**Test Location:**	Incinerator Exhaust Stack
Date:	October 8, 2020	**Operator:**	CB

Pitot Factor	0.849	**Filter (mg)**	0		
DGMCF	0.999	**Probe (mg)**	0		
Barometric Pressure	29.47 "Hg	**CWTR (g)**	3712.3		
Static Pressure	0.650 "H_2O	**WCBDA (g)**	24.7		
Nozzle	0.2663 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.77 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%	9.06
CO2%	9.04
COppm	49.3

Measured H2O
49.2 %

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	22.11	1.65	384	51	61	59	2	5.0		30.93	
	3	24.33	1.65	384	54	59	58	2	5.5		30.93	100.7
	6	26.56	1.65	384	58	59	58	2	5.5		30.93	101.5
	9	28.81	1.65	384	61	58	58	2	5.5		30.93	102.4
2	12	30.96	1.65	384	63	59	59	2	5.5		30.93	97.9
	15	33.19	1.65	384	63	59	59	2	5.5		30.93	101.4
	18	35.41	1.65	383	64	60	59	2	5.8		30.91	100.9
	21	37.63	1.65	383	64	60	59	2	5.8		30.91	100.8
3	24	39.86	1.65	382	65	61	59	2	5.8		30.89	101.2
	27	42.04	1.65	382	64	61	59	2	5.8		30.89	98.8
	30	44.23	1.65	380	65	61	59	2	5.8		30.85	99.2
	33	46.44	1.65	378	64	62	59	2	5.8		30.81	100.0
4	36	48.63	1.65	378	65	62	59	2	5.8		30.81	98.9
	39	50.84	1.65	378	66	62	59	2	5.8		30.81	99.8
	42	53.04	1.65	377	67	63	60	2	5.8		30.80	99.4
	45	55.18	1.65	376	67	63	59	2	5.8		30.78	96.4
5	48	57.41	1.65	376	68	64	60	2	5.8		30.78	100.5
	51	59.63	1.65	376	68	64	60	2	5.8		30.78	99.9
	54	61.84	1.65	376	68	64	60	2	5.8		30.78	99.4
	57	64.06	1.65	376	70	65	61	2	5.8		30.78	99.9
6	60	66.24	1.7	376	70	65	61	2	6.0		31.24	97.9
	63	68.49	1.7	382	71	65	61	2	6.0		31.35	99.5
	66	70.74	1.7	382	72	66	61	2	6.0		31.35	99.9
	69	73.00	1.7	384	73	66	61	2	6.0		31.39	100.2
7	72	75.24	1.7	384	73	66	61	2	6.0		31.39	99.4
	75	77.53	1.7	386	74	67	62	2	6.0		31.43	101.7
	78	79.80	1.7	388	76	67	62	2	6.0		31.46	100.7
	81	82.01	1.7	388	76	67	63	2	6.0		31.46	98.2
8	84	84.30	1.9	388	75	67	63	2.3	7.0		33.26	101.6
	87	86.65	1.9	388	72	68	63	2.3	7.0		33.26	98.7
	90	89.03	1.9	386	70	68	63	2.3	7.0		33.22	99.9
	93	91.50	1.95	386	70	68	63	2.3	7.0		33.66	103.5
9	96	94.04	2	386	65	68	64	2.3	7.0		34.09	105.1
	99	96.53	2	386	59	68	64	2.3	7.0		34.09	101.6

ORTECH Environmental

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	3	**Test Location:**	Incinerator Exhaust Stack
Date:	October 8, 2020	**Operator:**	CB

Pitot Factor	0.849	**Filter (mg)**	0		
DGMCF	0.999	**Probe (mg)**	0		
Barometric Pressure	29.47 "Hg	**CWTR (g)**	3712.3		
Static Pressure	0.650 "H_2O	**WCBDA (g)**	24.7		
Nozzle	0.2663 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.77 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%	9.06
CO2%	9.04
COppm	49.3

Measured H2O
49.2 %

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	98.92	2	386	57	69	64	2.3	7.0		34.09	97.5
	105	101.32	2	386	56	69	65	2.3	7.0		34.09	97.9
10	108	103.74	1.95	382	55	69	65	2.3	7.0		33.58	98.6
	111	106.18	1.95	383	55	69	66	2.3	7.0		33.60	100.4
	114	108.60	1.95	384	54	70	65	2.3	7.0		33.62	99.6
	117	111.03	1.95	383	55	70	66	2.3	7.0		33.60	100.0
	120	113.51								0.77		101.9
1	0	114.28	1.7	381	56	70	68	2	5.5		31.33	
	3	116.55	1.7	381	55	70	69	2	5.6		31.33	99.6
	6	118.80	1.7	381	55	70	69	2	5.6		31.33	98.6
	9	121.05	1.7	382	54	70	69	2	5.6		31.35	98.6
2	12	123.23	1.7	382	55	70	69	2	5.6		31.35	95.6
	15	125.60	1.7	383	55	70	69	2	5.6		31.37	103.9
	18	127.72	1.6	382	56	71	70	2	5.6		30.42	93.0
	21	129.95	1.6	383	56	71	69	2	5.6		30.43	100.6
3	24	132.23	1.7	383	57	72	70	2	5.6		31.37	103.0
	27	134.51	1.7	383	57	72	70	2	5.6		31.37	99.7
	30	136.77	1.7	382	57	73	70	2	5.8		31.35	98.9
	33	139.05	1.7	383	58	74	71	2	5.8		31.37	99.6
4	36	141.32	1.7	381	63	74	71	2	5.8		31.33	99.0
	39	143.58	1.8	381	63	75	71	2.1	6.0		32.24	98.5
	42	145.92	1.8	381	64	75	71	2.1	6.0		32.24	99.0
	45	148.23	1.8	380	64	75	71	2.1	6.0		32.22	97.7
5	48	150.57	1.8	381	65	76	72	2.1	6.0		32.24	98.9
	51	152.90	1.8	381	65	76	72	2.1	6.0		32.24	98.4
	54	155.22	1.8	382	67	76	72	2.1	6.0		32.26	98.0
	57	157.57	1.8	382	68	77	73	2.1	6.0		32.26	99.3
6	60	159.88	1.8	382	67	77	73	2.1	6.0		32.26	97.4
	63	162.19	1.8	381	64	76	72	2.1	6.0		32.24	97.4
	66	164.54	1.8	380	64	76	73	2.1	6.0		32.22	99.2
	69	166.90	1.8	380	64	77	74	2.1	6.0		32.22	99.5
7	72	169.24	1.75	379	69	78	74	2.1	6.0		31.75	98.5
	75	171.60	1.75	380	70	77	74	2.1	6.0		31.77	100.6
	78	173.96	1.75	379	70	77	74	2.1	6.0		31.75	100.7

ORTECH Environmental

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	3	**Test Location:**	Incinerator Exhaust Stack
Date:	October 8, 2020	**Operator:**	CB

Pitot Factor	0.849	**Filter (mg)**	0		
DGMCF	0.999	**Probe (mg)**	0		
Barometric Pressure	29.47 "Hg	**CWTR (g)**	3712.3		
Static Pressure	0.650 "H_2O	**WCBDA (g)**	24.7		
Nozzle	0.2663 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.77 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%	9.06
CO2%	9.04
COppm	49.3

Measured H2O
49.2 %

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	176.31	1.75	379	70	78	75	2.1	6.0		31.75	100.3
8	84	178.68	1.75	380	70	78	75	2.1	6.0		31.77	100.9
	87	181.00	1.75	379	69	78	75	2.1	6.0		31.75	98.8
	90	183.43	1.75	378	68	78	75	2.1	6.0		31.73	103.5
	93	185.76	1.75	379	68	78	75	2.1	6.0		31.75	99.2
9	96	188.18	1.75	378	61	79	76	2.1	6.0		31.73	103.0
	99	190.48	1.75	378	64	79	76	2.1	6.0		31.73	97.7
	102	192.83	1.75	378	66	79	76	2.1	6.0		31.73	99.8
	105	195.18	1.75	378	65	79	76	2.1	6.0		31.73	99.8
10	108	197.54	1.75	378	65	79	76	2.1	6.0		31.73	100.2
	111	199.91	1.75	379	59	79	77	2.1	6.0		31.75	100.7
	114	202.26	1.75	379	60	80	76	2.1	6.0		31.75	99.8
	117	204.62	1.75	379	61	79	77	2.1	6.0		31.75	100.2
	120	207.02										101.9

APPENDIX 24

ORTECH One-Minute Average
Combustion Gas Results
(13 pages)

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - October 6, 2020

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
10:41	8.55	9.36	609	56.9	6.8		87.5	88.7
10:42	8.54	9.36	606	55.5	6.6		84.3	84.7
10:43	8.56	9.37	600	55.7	7.1		86.8	88.6
10:44	8.34	9.50	604	62.3	7.4		80.6	82.1
10:45	8.33	9.55	597	63.0	8.4		82.4	85.0
10:46	8.02	9.76	623	79.6	8.9		72.6	73.0
10:47	8.44	9.45	595	60.7	7.4		85.5	86.7
10:48	7.93	9.82	621	84.7	9.8		71.6	74.7
10:49	8.72	9.20	563	57.4	6.0		79.9	80.5
10:50	8.40	9.46	573	54.3	6.9	7.5	81.9	84.0
10:51	8.82	9.15	562	57.3	5.8	7.4	83.3	83.2
10:52	8.54	9.38	575	54.6	6.7	7.4	83.7	84.7
10:53	8.71	9.24	562	60.5	6.5	7.4	86.2	86.4
10:54	8.34	9.55	587	68.7	8.0	7.4	78.7	79.8
10:55	8.60	9.30	575	65.8	6.7	7.3	79.3	80.6
10:56	8.35	9.52	582	62.1	7.4	7.1	82.6	84.4
10:57	8.62	9.29	564	60.3	6.2	7.0	78.8	79.2
10:58	8.76	9.20	553	62.8	6.4	6.7	85.4	87.6
10:59	8.69	9.25	552	57.3	6.1	6.7	82.3	82.0
11:00	8.85	9.15	546	61.6	6.5	6.6	85.4	86.7
11:01	8.74	9.21	542	68.0	6.8	6.7	83.0	83.5
11:02	8.67	9.29	547	74.8	8.0	6.9	79.9	81.0
11:03	8.25	9.59	581	71.0	8.0	7.0	73.9	73.9
11:04	8.72	9.25	561	66.2	7.1	6.9	79.3	81.9
11:05	8.27	9.59	581	64.1	7.9	7.0	77.4	77.8
11:06	8.84	9.12	549	69.3	6.2	6.9	83.0	83.5
11:07	8.60	9.33	560	65.6	6.9	7.0	80.7	82.0
11:08	8.88	9.12	550	62.2	6.0	6.9	86.0	85.2
11:09	8.56	9.34	562	59.6	6.6	7.0	83.3	83.5
11:10	8.74	9.23	559	60.4	6.4	7.0	84.1	84.7
11:11	8.22	9.63	591	65.6	8.0	7.1	77.3	78.8
11:12	8.53	9.37	583	65.3	6.6	7.0	76.5	75.3
11:13	8.41	9.51	579	61.9	7.4	6.9	82.2	84.0
11:14	8.45	9.43	578	65.1	6.5	6.9	77.2	77.8
11:15	8.75	9.21	564	59.4	6.1	6.7	85.6	87.0
11:16	8.57	9.35	574	58.4	6.1	6.7	82.1	82.7
11:17	8.70	9.26	572	65.8	6.2	6.6	87.5	88.1
11:18	8.47	9.44	589	58.9	6.2	6.6	82.1	82.2
11:19	8.60	9.35	583	59.6	6.7	6.6	84.7	86.9
11:20	8.15	9.68	607	59.4	7.2	6.7	77.5	78.4
11:21	8.66	9.30	593	63.0	6.5	6.6	83.8	85.2
11:22	8.14	9.69	612	62.8	7.9	6.7	78.5	80.0
11:23	8.82	9.17	573	61.2	5.8	6.5	84.2	86.0
11:24	8.58	9.36	584	53.1	6.4	6.5	86.4	87.5
11:25	8.77	9.21	577	57.3	5.6	6.5	86.1	86.9
11:26	8.53	9.41	592	57.6	6.3	6.5	82.7	84.5
11:27	8.65	9.31	584	57.3	6.0	6.5	84.0	84.9
11:28	8.24	9.63	605	62.3	7.4	6.6	80.5	82.2
11:29	8.47	9.45	605	58.6	5.9	6.5	78.4	79.2
11:30	8.40	9.52	594	57.0	6.7	6.4	83.6	85.3
11:31	8.32	9.53	594	59.2	6.4	6.4	75.7	77.1
11:32	8.74	9.22	578	57.2	5.9	6.2	87.1	89.0
11:33	8.52	9.37	587	52.9	5.7	6.2	82.3	82.7
11:34	8.80	9.19	577	57.7	6.0	6.2	86.4	87.1
11:35	8.47	9.42	587	53.9	6.3	6.3	82.5	82.6
11:36	8.60	9.35	579	58.6	6.7	6.3	84.4	85.6
11:37	8.13	9.69	613	64.8	8.1	6.5	75.5	77.6
11:38	8.67	9.27	575	60.4	6.3	6.4	87.1	87.5

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - October 6, 2020

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
11:39	8.32	9.55	592	53.7	6.9	6.5	80.5	81.9
11:40	8.91	9.07	550	65.7	6.2	6.4	86.2	86.8
11:41	8.79	9.18	556	62.1	6.6	6.5	85.4	86.0
11:42	9.05	8.97	541	69.9	6.3	6.5	84.2	83.5
11:43	8.89	9.12	546	73.7	6.7	6.6	84.0	83.4
11:44	8.97	9.04	539	76.2	6.5	6.6	83.4	82.5
11:45	8.76	9.23	550	78.0	7.3	6.7	82.3	81.6
11:46	8.89	9.08	557	76.6	6.6	6.7	81.0	80.0
11:47	8.98	9.05	540	86.0	6.6	6.6	80.5	79.4
11:48	8.91	9.08	533	81.1	6.4	6.6	80.1	78.9
11:49	9.40	8.72	510	109.0	6.4	6.5	79.6	78.7
11:50	9.19	8.89	515	101.1	6.4	6.6	79.0	77.8
11:51	9.41	8.72	504	116.8	6.4	6.6	78.6	77.7
11:52	9.17	8.91	511	111.9	6.8	6.6	77.4	76.2
11:53	9.25	8.86	518	115.3	7.0	6.6	76.2	75.6
11:54	8.60	9.34	568	96.9	8.1	6.8	70.1	70.7
11:55	8.95	9.04	555	93.8	7.1	6.8	73.2	73.8
11:56	8.52	9.38	619	85.5	8.1	6.9	76.2	76.3
11:57	9.01	8.98	577	85.8	6.2	6.9	81.2	81.0
11:58	8.93	9.06	569	85.5	6.2	6.9	82.6	82.7
11:59	9.06	8.97	565	81.4	5.8	6.8	83.1	82.7
12:00	8.86	9.12	568	83.7	6.4	6.8	81.4	81.8
12:01	8.95	9.04	559	81.2	5.9	6.8	82.4	81.8
12:02	8.68	9.28	570	78.9	7.0	6.8	79.0	80.3
12:03	8.69	9.25	601	75.2	6.5	6.7	76.3	76.4
12:04	8.87	9.13	585	81.1	6.8	6.6	83.3	84.7
12:05	8.70	9.23	584	76.1	6.9	6.6	78.3	78.3
12:06	9.31	8.78	548	95.9	6.3	6.4	85.4	85.8
12:07	9.01	9.00	556	87.7	6.2	6.4	81.8	81.6
12:08	9.18	8.88	555	94.4	6.3	6.4	83.6	84.0
12:09	8.87	9.12	581	82.7	6.3	6.5	80.6	80.0
12:10	8.98	9.04	584	79.6	6.2	6.4	83.7	84.7
12:11	8.58	9.36	622	66.5	6.6	6.5	79.2	78.9
12:12	9.02	9.01	605	74.6	5.8	6.4	85.4	85.7
12:13	8.64	9.31	625	66.5	6.1	6.3	82.5	82.6
12:14	9.11	8.93	606	71.5	5.5	6.2	86.0	87.0
12:15	9.10	8.97	597	80.9	5.8	6.1	87.1	87.9
12:16	9.18	8.87	599	80.4	5.6	6.0	86.1	86.2
12:17	9.00	9.03	607	78.4	5.8	6.0	86.5	86.5
12:18	9.00	9.01	612	72.0	5.7	5.9	85.4	83.8
12:19	8.78	9.21	625	67.9	6.2	5.9	85.3	83.6
12:20	8.71	9.24	648	57.1	5.8	5.9	85.7	84.7
12:21	8.90	9.11	620	68.4	5.8	5.8	88.3	88.6
12:22	8.55	9.36	637	57.2	5.9	5.8	81.6	82.0
12:23	9.12	8.92	634	70.5	5.2	5.7	90.7	90.7
12:24	8.88	9.12	645	61.9	5.4	5.7	87.9	88.7
12:25	9.10	8.95	630	69.5	5.2	5.6	93.2	93.4
12:26	8.78	9.19	650	61.0	5.6	5.6	89.3	89.9
12:27	8.92	9.09	643	65.4	5.7	5.6	91.1	91.6
12:28	8.47	9.45	682	58.1	6.6	5.7	82.7	83.9
12:29	8.87	9.12	660	60.3	5.2	5.6	86.7	85.7
12:30	8.46	9.45	690	55.7	6.1	5.7	86.5	88.1
12:31	8.85	9.12	656	56	5.3	5.6	86.9	87.1
12:32	8.86	9.16	659	59.2	5.5	5.6	92.8	94.0
12:33	8.92	9.07	641	58.5	5.2	5.6	92.0	92.6
12:34	8.85	9.15	622	60.4	5.6	5.6	92.4	92.9
12:35	8.80	9.16	637	55.9	5.5	5.6	90.2	89.8
12:36	8.65	9.31	661	57.8	6.3	5.7	87.4	89.6

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - October 6, 2020

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
12:37	8.44	9.43	674	49.6	6.0	5.7	80.4	80.5
12:38	8.81	9.18	645	54.4	5.4	5.6	90.0	91.4
12:39	8.46	9.43	673	49.1	5.9	5.7	83.7	84.1
12:40	9.11	8.94	628	62	5.1	5.6	91.2	91.1
12:41	8.79	9.17	643	54.2	5.4	5.6	89.9	90.7
13:39	8.50	9.29	609	76.6	8.0		75.4	76.0
13:40	8.88	8.99	574	70.3	7.0		85.9	88.3
13:41	8.73	9.12	584	76.0	7.0		81.1	81.1
13:42	9.00	9.02	571	81.7	7.3		84.9	86.4
13:43	8.66	9.22	588	82.1	7.5		79.1	80.7
13:44	8.81	9.16	582	86.1	8.5		81.5	83.6
13:45	8.21	9.52	625	100.8	10.5		72.8	73.8
13:46	8.83	9.14	605	78.2	6.8		76.1	77.0
13:47	8.39	9.51	626	98.8	9.9		75.7	77.8
13:48	8.92	9.00	562	86.4	6.6	7.9	77.7	78.0
13:49	8.87	9.07	560	92.5	7.5	7.9	81.5	83.1
13:50	9.03	8.91	543	85.3	6.4	7.8	83.2	83.4
13:51	8.77	9.12	554	97.9	8.2	7.9	80.1	81.5
13:52	8.87	9.08	566	87.0	6.8	7.9	80.3	82.0
13:53	8.47	9.36	634	81.0	8.2	7.9	80.2	82.2
13:54	8.50	9.29	601	89.0	8.6	8.0	73.5	74.8
13:55	8.60	9.23	587	97	9.3	7.8	80.3	83.2
13:56	8.55	9.29	587	106	9.2	8.1	72.6	73.2
13:57	9.01	8.95	549	91.6	7.5	7.8	83.1	84.1
13:58	8.78	9.11	560	107.7	8.6	8.0	79.0	79.8
13:59	8.99	8.96	547	101.2	7.7	8.1	82.1	83.1
14:00	8.73	9.15	554	102.8	8.4	8.2	78.9	79.4
14:01	8.95	9.00	548	100.5	7.8	8.2	80.4	82.8
14:02	8.46	9.36	573	108.4	10.0	8.5	73.5	74.5
14:03	8.89	9.05	551	100.3	8.0	8.5	80.5	81.8
14:04	8.39	9.43	581	114.6	11.0	8.7	72.0	74.5
14:05	8.87	9.03	556	96.5	7.5	8.6	72.6	74.4
14:06	8.72	9.19	554	111.4	9.5	8.6	78.7	80.4
14:07	8.79	9.06	552	104.2	8.4	8.7	78.7	78.7
14:08	8.72	9.20	557	119.8	10.1	8.8	79.6	81.3
14:09	8.77	9.12	554	110.8	9.0	9.0	79.8	79.2
14:10	8.48	9.38	569	105.5	9.3	9.1	76.3	78.1
14:11	8.37	9.36	580	94.6	7.7	9.0	70.7	71.4
14:12	8.70	9.18	558	76.7	6.8	8.7	83.4	86.2
14:13	8.38	9.43	570	96.2	8.2	8.7	69.9	71.8
14:14	8.93	8.99	540	75.2	5.3	8.2	85.4	87.0
14:15	8.64	9.23	558	77.1	6.2	8.1	77.7	79.5
14:16	8.89	9.05	557	70.0	5.2	7.6	86.1	86.4
14:17	8.59	9.25	567	76.8	6.3	7.4	80.6	81.2
14:18	8.80	9.12	557	74.7	5.9	7.0	82.3	84.2
14:19	8.31	9.48	594	77.2	7.8	6.9	72.5	73.5
14:20	8.74	9.15	568	70.9	5.7	6.5	78.1	77.9
14:21	8.39	9.44	578	80.4	7.3	6.5	76.0	79.0
14:22	8.86	9.03	556	73.9	5.5	6.4	79.2	79.7
14:23	8.79	9.09	555	79.3	5.9	6.1	83.2	85.0
14:24	8.92	8.99	543	70.1	5.4	6.1	82.5	84.4
14:25	8.77	9.15	563	75.8	6.1	6.1	81.2	83.4
14:26	8.74	9.15	562	74.0	6.0	6.2	79.3	79.6
14:27	8.47	9.39	578	87.0	8.6	6.4	75.7	79.3
14:28	8.27	9.47	604	96.9	8.5	6.7	68.5	69.6
14:29	8.57	9.29	583	81.6	7.5	6.6	75.8	78.5
14:30	8.17	9.58	612	83.1	7.8	6.9	68.7	70.5
14:31	8.86	9.09	591	59.6	5.4	6.7	79.7	81.2

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - October 6, 2020

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
14:32	8.53	9.32	608	68.2	6.3	6.7	79.6	81.6
14:33	8.76	9.14	594	68.0	6.0	6.8	83.6	84.9
14:34	8.37	9.44	615	87.2	8.0	7.0	75.8	78.0
14:35	8.53	9.32	600	79.3	7.7	7.2	80.4	82.5
14:36	8.05	9.70	629	123.6	12.2	7.8	67.9	71.9
14:37	8.53	9.31	592	87.9	7.5	7.7	73.1	73.5
14:38	8.11	9.67	623	104.0	11.2	8.0	72.0	78.0
14:39	8.45	9.37	582	101.8	8.6	8.1	68.2	71.4
14:40	8.55	9.31	574	82.0	7.5	8.0	82.4	85.7
14:41	8.64	9.22	572	70.0	6.3	8.1	81.0	81.7
14:42	8.54	9.30	570	87.9	8.0	8.3	80.8	84.1
14:43	8.51	9.33	576	88.4	7.9	8.5	76.7	77.7
14:44	8.37	9.46	587	97.9	9.9	8.7	75.0	78.8
14:45	8.16	9.58	603	109.6	10.0	8.9	64.7	65.5
14:46	8.56	9.31	576	82.1	8.1	8.5	79.4	81.9
14:47	8.15	9.62	587	123.0	12.0	8.9	66.5	71.2
14:48	8.79	9.10	550	78.0	6.9	8.5	80.5	80.1
14:49	8.53	9.29	566	76.4	7.3	8.4	79.7	80.6
14:50	8.91	9.01	544	71.1	6.2	8.3	80.4	82.0
14:51	8.68	9.21	557	80.6	7.2	8.3	80.1	80.8
14:52	8.85	9.06	554	76.4	6.6	8.2	82.0	83.2
14:53	8.38	9.45	577	91.3	8.8	8.3	72.9	75.4
14:54	8.76	9.13	561	78.8	6.6	8.0	75.6	76.8
14:55	8.51	9.35	571	76.0	7.7	7.7	78.8	80.9
14:56	8.74	9.15	557	80.1	7.0	7.6	75.0	76.5
14:57	8.73	9.16	677	87.1	7.6	7.2	82.6	85.1
14:58	8.81	9.08	611	73.6	6.2	7.1	81.3	81.7
14:59	8.89	9.05	569	77.9	6.6	7.0	83.9	87.0
15:00	8.81	9.11	565	71.8	6.4	7.1	79.7	80.2
15:01	8.80	9.13	569	72.3	6.8	7.0	82.1	84.6
15:02	8.43	9.38	595	77.7	7.7	7.1	73.4	74.3
15:03	8.86	9.08	571	87.6	7.8	7.0	78.3	82.8
15:04	8.33	9.47	591	97.3	9.1	7.3	71.5	73.3
15:05	8.99	8.96	552	81.6	6.1	7.1	80.7	81.5
15:06	8.74	9.14	564	85.1	7.2	7.2	80.0	82.1
15:07	8.94	9.00	556	80.3	6.6	7.1	83.5	83.2
15:08	8.66	9.24	575	87.2	7.5	7.2	77.5	78.8
15:09	8.91	9.03	559	78.9	6.7	7.2	81.6	82.7
15:10	8.44	9.38	587	96.3	9.0	7.4	73.0	74.8
15:11	8.81	9.11	574	83.0	7.1	7.5	72.9	72.5
15:12	8.59	9.30	579	85.6	8.0	7.5	78.9	81.5
15:13	8.83	9.07	562	87.3	7.2	7.5	76.1	76.8
15:14	9.06	8.93	551	86.4	6.8	7.2	83.2	84.4
15:15	8.93	8.99	554	81.8	6.7	7.3	80.6	80.9
15:16	9.06	8.92	551	87.1	6.9	7.2	82.9	83.8
15:17	8.84	9.07	561	91.9	7.4	7.3	79.8	80.6
15:18	8.79	9.15	569	96.0	8.6	7.4	79.0	81.1
15:19	8.40	9.42	609	94.4	8.7	7.6	71.0	71.7
15:20	8.88	9.07	586	91.4	7.5	7.5	80.2	82.4
15:21	8.42	9.42	625	92.0	8.7	7.6	75.5	76.4
15:22	9.05	8.92	600	80.6	6.3	7.5	82.7	83.8
15:23	8.83	9.11	591	94.9	7.9	7.5	79.9	81.3
15:24	9.10	8.89	567	86.4	6.3	7.5	82.7	83.3
15:25	8.84	9.11	581	100.8	8.2	7.6	80.0	81.1
15:26	8.95	9.02	573	91.0	7.3	7.7	81.7	82.0
15:27	8.59	9.32	590	107.3	9.9	7.9	75.1	77.6
15:28	8.82	9.11	581	96.2	8.1	7.9	75.0	75.6
15:29	8.62	9.29	582	112.2	9.8	8.0	76.3	78.4

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - October 6, 2020

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
15:30	8.70	9.19	568	91.3	7.7	8.0	73.4	73.7
15:31	9.12	8.88	549	91.8	6.9	7.8	82.8	83.1
15:32	9.01	8.95	550	91.1	7.0	7.9	79.3	79.9
Min	7.93	8.72	504	49.1	5.1	5.6	64.7	65.5
Max	9.41	9.82	690	124	12.2	9.1	93.2	94.0
Avg	8.70	9.22	583	77.9	7.1	7.1	80.6	81.6

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - October 7, 2020

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
09:04	8.69	9.29	720	78.9	15.4		88.6	89.4
09:05	8.37	9.58	752	88.9	17.9		83.9	87.5
09:06	8.48	9.45	746	89.0	16.8		82.5	83.6
09:07	8.64	9.35	735	78.4	16.1		90.5	93.0
09:08	8.53	9.40	725	84.9	16.4		87.3	88.0
09:09	9.03	9.07	697	71.9	14.7		93.0	94.8
09:10	8.67	9.25	711	80.0	15.8		86.8	90.1
09:11	8.98	9.08	696	70.5	14.4		90.9	92.4
09:12	8.56	9.31	720	78.2	15.6		86.9	87.7
09:13	8.82	9.22	709	77.2	15.3	15.8	88.4	90.6
09:14	8.16	9.57	755	95.7	18.2	16.1	82.1	84.8
09:15	8.82	9.20	722	72.7	14.2	15.7	86.9	89.9
09:16	8.29	9.54	750	91.5	17.7	15.8	83.6	85.2
09:17	8.78	9.10	702	78.5	14.3	15.6	84.8	85.5
09:18	8.73	9.25	719	78.5	15.3	15.5	88.0	90.0
09:19	8.84	9.14	704	70.5	14.2	15.5	88.3	88.8
09:20	8.63	9.36	730	79.6	15.8	15.5	86.0	88.2
09:21	8.72	9.25	725	74.2	14.9	15.5	88.6	87.7
09:22	8.44	9.45	742	81.4	16.7	15.7	85.9	88.7
09:23	8.55	9.36	754	80.6	16.0	15.7	85.5	85.9
09:24	8.73	9.28	714	76.7	16.2	15.5	89.0	92.1
09:25	8.49	9.40	725	89.3	16.8	15.8	83.2	84.5
09:26	8.91	9.04	706	71.5	14.7	15.5	92.9	93.7
09:27	8.74	9.22	721	79.0	16.0	15.7	85.7	87.0
09:28	8.98	9.07	706	74.5	15.7	15.7	88.4	90.5
09:29	8.64	9.35	737	88.2	17.4	16.0	84.4	86.1
09:30	8.73	9.23	729	83.5	16.6	16.1	86.0	88.1
09:31	8.23	9.60	775	104.3	20.0	16.6	80.9	81.8
09:32	8.69	9.25	742	80.4	16.2	16.6	86.3	88.0
09:33	8.28	9.51	763	90.8	19.0	16.9	84.8	86.2
09:34	8.82	9.14	705	81.1	15.9	16.8	89.2	88.7
09:35	8.71	9.23	709	80.6	16.7	16.8	87.8	89.7
09:36	8.94	9.11	695	78.5	16.0	16.9	87.3	88.1
09:37	8.66	9.28	709	82.3	16.8	17.0	87.3	88.1
09:38	8.70	9.26	715	81.7	16.5	17.1	87.5	87.8
09:39	8.44	9.45	726	93.9	18.7	17.2	86.4	88.0
09:40	8.35	9.43	742	89.8	17.6	17.3	81.9	83.0
09:41	8.67	9.25	713	79.1	16.7	17.0	88.3	90.4
09:42	8.50	9.43	734	94.1	17.8	17.2	86.3	86.7
09:43	9.01	9.04	715	69.5	14.8	16.8	92.0	94.0
09:44	8.76	9.26	740	77.1	16.5	16.8	87.2	88.8
09:45	8.90	9.15	737	67.0	14.7	16.6	92.4	93.8
09:46	8.55	9.43	768	77.8	16.8	16.7	87.5	89.6
09:47	8.63	9.31	759	78.4	16.4	16.7	89.0	91.7
09:48	8.12	9.69	801	100.0	20.2	17.0	81.9	84.0
09:49	8.63	9.32	759	73.2	15.9	16.7	85.0	87.3
09:50	8.29	9.62	775	91.3	19.2	16.9	85.4	87.6
09:51	8.58	9.29	725	80.6	16.1	16.8	88.0	88.4
09:52	8.69	9.27	722	73.3	16.2	16.7	89.7	92.1
09:53	8.85	9.19	707	76.3	15.8	16.8	89.9	90.7
09:54	8.65	9.32	704	84.5	17.3	16.9	87.9	90.2
09:55	8.50	9.32	705	83.0	16.6	17.1	86.6	88.4
09:56	8.51	9.46	723	98.5	19.2	17.3	86.1	87.7
09:57	8.36	9.59	748	107.0	20.3	17.7	83.5	83.6
09:58	8.57	9.35	719	82.9	17.5	17.4	88.2	90.6
09:59	8.13	9.64	744	108.2	20.7	17.9	82.2	83.3
10:00	8.82	9.11	690	67.9	14.8	17.5	89.0	90.7
10:01	8.58	9.28	701	78.5	16.9	17.5	87.5	88.0

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - October 7, 2020

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
10:02	8.91	9.15	687	72.6	15.6	17.5	87.5	87.6
10:03	8.39	9.46	722	94.8	19.4	17.8	84.9	85.6
10:04	8.60	9.33	644	86.8	18.4	17.9	87.5	89.1
12:28	8.56	9.44	821	66.7	15.9		85.8	87.5
12:29	8.66	9.37	810	62.1	14.8		89.2	91.4
12:30	8.17	9.75	856	85.5	19.5		80.7	83.1
12:31	8.63	9.36	820	68.9	15.6		84.8	86.1
12:32	8.30	9.66	852	78.2	18.3		85.2	88.4
12:33	8.56	9.43	819	78.0	17.3		79.5	80.2
12:34	8.62	9.39	805	65.0	15.8		88.9	92.5
12:35	8.67	9.36	799	65.6	16.0		83.8	84.6
12:36	8.56	9.45	784	70.9	16.8		85.9	88.6
12:37	8.51	9.48	795	65.5	15.7	16.6	82.8	83.8
12:38	8.38	9.58	792	73.8	17.4	16.7	84.7	88.0
12:39	8.14	9.75	829	94.5	21.1	17.3	76.8	78.0
12:40	8.55	9.44	787	64.1	16.0	17.0	87.5	90.2
12:41	8.15	9.76	814	87.3	20.2	17.4	78.7	81.2
12:42	8.81	9.23	746	57.1	13.9	17.0	90.1	89.8
12:43	8.55	9.43	749	61.9	16.0	16.9	87.7	90.8
12:44	8.84	9.20	734	55.4	14.0	16.7	91.7	92.7
12:45	8.48	9.46	744	70.3	17.3	16.8	84.7	87.8
12:46	8.64	9.31	690	67.5	15.9	16.7	86.3	88.4
12:47	8.30	9.61	684	85.2	19.9	17.2	82.1	86.3
12:48	8.49	9.41	649	76.0	16.5	17.1	81.3	82.0
12:49	8.57	9.40	639	65.9	16.8	16.6	88.5	91.5
12:50	8.52	9.41	613	78.2	16.9	16.7	82.7	84.7
12:51	8.92	9.12	563	58.6	14.2	16.1	91.1	94.2
12:52	8.71	9.29	548	69.7	15.5	16.3	88.1	89.7
12:53	8.87	9.17	525	76.8	17.3	16.4	87.5	89.3
12:54	8.57	9.40	541	82.7	18.1	16.8	82.9	84.7
12:55	8.66	9.33	543	85.4	19.2	17.0	83.8	86.7
12:56	8.18	9.70	577	118.3	23.6	17.8	75.7	77.0
12:57	8.71	9.28	543	80.3	17.2	17.5	80.9	82.7
12:58	8.25	9.64	556	106.8	22.4	18.1	78.4	80.4
12:59	8.82	9.15	309	81.4	16.3	18.1	80.0	80.4
13:25	8.89	8.83	953	79.5	15.2		85.9	87.5
13:26	8.75	8.92	955	85.4	16.4		81.5	83.2
13:27	8.87	8.83	956	79.9	15.3		83.7	85.7
13:28	8.39	8.88	892	100.3	18.8		78.6	79.9
13:29	8.43	8.75	707	93.5	17.7		80.0	81.8
13:30	8.43	9.38	720	121.5	22.4		75.1	76.4
13:31	8.86	9.06	664	83.8	15.8		84.5	85.6
13:32	8.70	9.36	688	104.4	19.8		78.8	81.1
13:33	9.25	8.96	652	84.6	15.8		83.4	85.6
13:34	9.06	9.08	652	86.1	17.0	17.4	80.6	82.0
13:35	9.25	8.91	647	76.0	15.3	17.4	83.1	83.8
13:36	8.96	9.11	663	83.2	17.5	17.5	80.4	81.7
13:37	9.20	8.97	652	86.9	16.5	17.7	81.3	81.7
13:38	8.86	9.23	674	107.6	20.1	17.8	76.7	78.9
13:39	9.21	8.92	654	94.5	16.7	17.7	76.8	76.5
13:40	9.11	9.07	653	100.6	18.5	17.3	77.9	77.7
13:41	8.97	9.12	656	110.8	19.2	17.6	78.2	77.8
13:42	9.39	8.82	636	90	15.7	17.2	80.8	81.5
13:43	9.11	9.01	647	100.3	18.2	17.5	77.2	77.3
13:44	9.25	8.92	645	92.7	16.2	17.4	77.4	77.1
13:45	9.01	9.10	651	102.3	18.5	17.7	76.9	76.4
13:46	9.00	9.08	662	100.6	19.0	17.9	77.7	79.3
13:47	8.56	9.45	718	125.0	24.1	18.6	72.4	72.9

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - October 7, 2020

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
13:48	8.96	9.15	716	88.9	18.0	18.4	80.0	80.5
13:49	8.51	9.53	772	96.8	20.8	18.8	77.7	79.2
13:50	8.94	9.16	749	80.5	17.2	18.7	82.8	83.8
13:51	8.72	9.33	733	87	19.1	18.7	81.8	83.4
13:52	8.90	9.21	729	85.6	18.2	18.9	81.5	82.1
13:53	8.65	9.41	712	90.3	20.1	19.1	80.7	81.8
13:54	8.65	9.35	706	94.1	19.8	19.5	80.9	80.8
13:55	8.29	9.61	727	111.3	23.3	20.0	76.2	79.4
13:56	8.43	9.53	731	123.7	24.4	20.5	73.1	75.0
13:57	8.53	9.49	725	100.9	21.4	20.2	81.8	85.7
13:58	8.42	9.63	735	120.6	24.8	20.9	75.3	76.4
13:59	8.88	9.24	691	75.4	16.7	20.5	84.5	86.3
14:00	8.55	9.47	716	103.3	21.4	20.9	78.9	81.6
14:01	8.78	9.29	702	84.1	17.9	20.8	81.5	85.7
14:02	8.46	9.57	740	110.2	23.0	21.3	75.9	77.1
14:03	8.51	9.51	729	108.2	22.4	21.5	75.4	78.1
14:04	8.00	9.90	778	166.8	31.5	22.7	68.1	70.1
14:05	8.44	9.53	731	117.4	22.1	22.5	74.5	74.9
14:06	8.13	9.81	756	144.7	27.6	22.9	73.5	77.2
14:07	8.56	9.43	707	110.3	21.5	22.9	78.5	79.1
14:08	8.52	9.51	710	97.8	20.6	22.5	82.7	86.4
14:09	8.72	9.33	699	77	16.7	22.5	81.9	82.0
14:10	8.65	9.41	688	69	16.2	21.9	88.7	92.0
14:11	8.74	9.35	690	70.3	15.4	21.7	87.6	89.1
14:12	8.60	9.49	695	70.0	16.5	21.0	87.4	91.1
14:13	8.56	9.46	709	78.5	17.2	20.5	81.4	82.7
14:14	8.81	9.31	665	62.8	14.5	18.8	91.1	93.7
14:15	8.49	9.52	678	82.4	17.9	18.4	84.8	86.7
14:16	9.06	9.08	673	56.2	12.7	16.9	92.9	94.7
14:17	8.77	9.30	684	60.3	14.4	16.2	88.7	89.0
14:18	9.00	9.10	666	54.0	13.1	15.5	92.3	93.6
14:19	8.72	9.33	690	61.6	15.2	15.3	88.3	89.6
14:20	8.88	9.20	685	59.0	14.1	15.1	91.3	92.9
14:21	8.50	9.52	726	67.7	16.4	15.2	86.1	87.3
14:22	9.00	9.13	697	59.5	13.8	14.9	87.9	88.7
14:23	8.70	9.37	706	67.8	15.7	14.8	87.1	89.2
14:24	9.17	8.98	661	59.8	12.9	14.6	88.2	89.4
14:25	9.14	9.02	665	62.1	13.5	14.2	89.0	90.3
14:26	9.21	8.95	652	61.4	13.2	14.2	88.4	89.0
14:27	9.13	9.03	655	67.3	14.2	14.2	87.2	88.7
14:28	9.11	9.03	659	69.6	14.1	14.3	85.0	85.9
Min	8.00	8.75	309	54.0	12.7	14.2	68.1	70.1
Max	9.39	9.90	956	167	31.5	22.9	93.0	94.8
Avg	8.67	9.31	713	83.7	17.4	17.5	84.2	85.8

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - October 8, 2020

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
08:37	8.99	9.06	707	43.7	8.3		98.9	101.0
08:38	8.74	9.24	721	50.6	9.4		96.5	97.9
08:39	9.00	9.04	710	41.9	8.2		96.8	97.5
08:40	8.67	9.28	732	46.9	9.2		96.7	97.6
08:41	8.80	9.19	728	47.2	9.2		97.4	98.1
08:42	8.34	9.54	771	55.1	10.6		96.2	96.8
08:43	8.93	9.07	722	44.2	8.4		98.4	100.7
08:44	8.46	9.44	760	47.7	9.9		96.5	97.5
08:45	9.05	8.94	699	44.3	8.0		99.6	100.3
08:46	8.96	9.08	708	44.8	8.7	9.0	97.5	99.8
08:47	9.12	8.95	704	44.4	8.2	9.0	97.1	98.2
08:48	8.91	9.12	713	48.9	9.5	9.0	96.8	97.5
08:49	8.97	9.07	715	44.4	8.7	9.0	96.5	96.8
08:50	8.66	9.35	742	46.4	9.4	9.1	96.2	96.6
08:51	8.68	9.27	749	53.5	9.7	9.1	97.3	97.4
08:52	8.80	9.23	736	44.5	9.3	9.0	97.8	99.2
08:53	8.63	9.34	736	52.6	10.0	9.1	96.6	97.6
08:54	9.13	8.97	706	45.2	8.5	9.0	97.5	97.6
08:55	8.90	9.13	714	46.8	10.1	9.2	97.7	97.6
08:56	9.14	8.97	701	43.0	9.2	9.3	98.1	98.2
08:57	8.79	9.23	729	48.9	10.4	9.5	98.0	98.1
08:58	8.97	9.08	718	46.7	9.8	9.5	97.8	98.2
08:59	8.50	9.46	760	50.9	11.6	9.8	96.9	97.2
09:00	9.07	9.02	715	46.4	9.5	9.8	96.5	96.8
09:01	8.72	9.30	739	46.3	10.7	9.9	96.7	96.8
09:02	9.19	8.91	694	43.7	9.1	9.9	97.1	97.3
09:03	9.09	9.02	706	47.0	10.0	9.9	96.3	96.7
09:04	9.22	8.89	699	45.4	9.2	10.0	96.0	96.0
09:05	9.00	9.07	713	48.9	10.1	10.0	95.7	95.6
09:06	9.01	9.05	716	49.3	10.3	10.1	95.7	95.2
09:07	8.70	9.31	741	51.1	11.5	10.2	95.4	95.5
09:08	8.71	9.26	749	47.2	10.7	10.3	96.5	96.4
09:09	8.98	9.09	721	44.9	10.1	10.1	96.8	98.5
09:10	8.78	9.22	725	44.3	10.3	10.2	96.1	97.0
09:11	9.33	8.82	695	48.7	9.4	10.1	97.0	97.2
09:12	9.05	9.01	707	47.9	10.2	10.2	96.3	96.4
09:13	9.27	8.86	699	50.3	9.6	10.1	95.1	95.2
09:14	8.92	9.12	724	50.1	10.7	10.3	94.3	94.3
09:15	9.11	8.97	710	50.4	10.3	10.3	94.1	94.0
09:16	8.71	9.27	743	50.4	11.6	10.4	93.3	93.1
09:17	9.15	8.93	715	51.9	10.2	10.3	93.6	92.8
09:18	8.87	9.17	733	48.3	10.9	10.3	93.9	93.2
09:19	9.36	8.78	709	51.7	9.4	10.3	94.4	93.9
09:20	9.40	8.79	703	51.7	9.8	10.2	93.8	94.0
09:21	9.48	8.69	700	52.6	9.5	10.2	93.4	93.4
09:22	9.35	8.83	724	53.2	10.2	10.2	91.9	92.0
09:23	9.34	8.81	716	51.9	9.9	10.3	91.4	90.9
09:24	9.08	9.03	735	53.7	11.2	10.3	90.7	90.3
09:25	8.96	9.07	736	50.3	10.8	10.3	91.4	90.9
09:26	9.24	8.89	723	52.2	10.3	10.2	92.1	92.8
09:27	8.94	9.10	728	50.3	11.2	10.3	90.0	90.5
09:28	9.47	8.70	685	57.3	9.5	10.2	90.6	90.2
09:29	9.22	8.90	700	52.5	10.5	10.3	90.7	90.0
09:30	9.47	8.70	684	55.7	9.8	10.3	90.7	90.1
09:31	9.14	8.95	708	54.9	11.1	10.4	90.0	88.9
09:32	9.32	8.81	690	53.6	10.3	10.4	90.0	88.8
09:33	8.80	9.22	733	55.1	12.1	10.7	89.9	89.0
09:34	9.21	8.90	704	53.1	10.0	10.6	90.4	89.1

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - October 8, 2020

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
09:35	8.97	9.09	725	52.9	11.0	10.6	91.0	89.5
09:36	9.30	8.80	684	53.1	9.5	10.5	91.9	90.5
09:37	9.27	8.85	690	54.1	9.7	10.4	92.2	91.1
09:38	9.30	8.82	697	53.3	9.6	10.4	92.4	91.2
09:39	9.09	8.99	707	54.5	10.7	10.4	92.0	90.9
09:40	9.00	9.05	709	55.0	10.9	10.5	91.9	90.6
09:41	8.79	9.24	716	53.7	11.6	10.5	91.9	90.8
09:42	8.57	9.38	745	59.9	12.9	10.8	91.6	90.1
09:43	8.91	9.16	722	49.5	10.6	10.6	95.0	95.9
09:44	8.50	9.42	735	50.5	11.4	10.8	93.7	93.4
09:45	9.19	8.90	687	45.1	8.9	10.6	97.8	98.2
09:46	8.86	9.16	710	48.1	10.9	10.7	95.3	95.5
09:47	9.05	9.02	696	47.9	10.0	10.7	97.5	98.0
09:48	8.73	9.25	723	48.7	11.1	10.9	94.8	95.1
09:49	8.88	9.12	724	47.8	10.0	10.8	98.0	98.6
09:50	8.38	9.52	752	60.7	13.2	11.1	91.7	93.2
09:51	8.83	9.17	717	50.8	10.4	10.9	96.5	97.4
09:52	8.50	9.45	753	51.8	11.8	10.8	96.9	98.3
09:53	8.79	9.17	707	56.8	11.6	10.9	98.2	98.8
09:54	8.92	9.11	698	47.0	10.5	10.8	98.9	99.2
09:55	8.93	9.08	691	46.2	10.3	11.0	97.7	97.5
09:56	8.85	9.18	697	50.2	11.1	11.0	97.6	97.0
09:57	8.73	9.25	710	52.4	11.3	11.1	97.5	97.2
09:58	8.64	9.35	717	50.7	11.6	11.2	96.8	98.5
09:59	8.39	9.51	744	62.9	13.2	11.5	94.3	94.7
10:00	8.90	9.14	710	46.8	10.4	11.2	99.5	101.1
10:01	8.52	9.43	726	55.1	12.4	11.4	96.1	97.0
10:02	9.15	8.94	681	47.9	9.5	11.2	100.8	101.2
10:03	8.88	9.15	702	45.2	10.5	11.1	96.8	96.9
10:04	9.11	8.97	689	46.7	9.7	11.0	96.8	96.5
10:05	8.84	9.21	710	48.2	10.8	11.0	96.3	96.4
10:06	8.96	9.10	699	47.3	10.1	11.0	95.9	95.6
10:07	8.52	9.44	737	50.9	11.8	11.0	95.0	94.8
10:08	8.97	9.08	702	49.7	10.3	10.9	94.8	93.8
10:09	8.86	9.19	722	50.1	10.8	10.6	94.5	93.7
10:10	9.11	8.97	684	48.7	9.9	10.6	94.5	93.8
10:11	9.32	8.85	673	49.7	9.4	10.3	94.0	93.6
10:12	9.22	8.88	678	49.7	9.7	10.3	93.7	92.9
10:13	9.26	8.89	678	53.3	10.2	10.3	92.4	92.1
10:14	9.15	8.96	685	49.5	10.6	10.4	91.6	90.8
10:15	9.13	9.00	689	54.2	11.1	10.4	91.0	90.4
10:16	8.85	9.21	718	53.6	11.9	10.6	90.1	89.2
10:17	9.33	8.84	685	55.1	10.1	10.4	89.8	89.1
10:18	8.93	9.15	713	53.6	11.4	10.5	89.9	89.0
10:19	9.41	8.77	694	58.5	9.8	10.4	89.9	89.1
10:20	9.18	8.96	684	58.6	10.8	10.5	89.1	88.6
10:21	9.39	8.80	675	54.8	9.9	10.5	88.8	88.2
10:22	9.05	9.06	703	52.0	11.1	10.7	88.6	87.9
10:23	9.17	8.96	689	53.7	10.5	10.7	89.5	88.5
10:24	8.68	9.36	734	60.0	13.0	11.0	89.2	88.8
10:25	9.01	9.07	721	53.9	10.8	10.9	89.8	88.8
10:26	8.86	9.21	720	57.3	11.9	10.9	91.2	92.7
10:27	8.99	9.09	704	50.4	10.6	11.0	91.0	91.4
10:28	9.21	8.93	694	51.7	10.2	10.9	93.8	94.4
10:29	9.08	9.04	700	56.3	11.1	11.0	90.4	90.3
10:30	9.09	9.04	703	55.9	11.1	11.0	90.9	90.2
10:31	8.82	9.22	721	54.7	11.8	11.2	91.2	89.9
10:32	8.85	9.22	723	53.9	11.5	11.2	93.5	94.1

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - October 8, 2020

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
10:33	8.45	9.52	767	79.7	16.0	11.8	89.7	90.6
10:34	8.94	9.13	727	52.7	10.9	11.6	96.7	97.4
10:35	8.55	9.44	748	57.4	12.7	11.8	93.5	93.7
10:36	9.19	8.93	696	50.2	9.7	11.5	97.8	98.7
10:37	8.96	9.12	710	47.7	10.5	11.5	96.4	96.4
11:21	9.35	8.85	705	49.3	10.0		89.7	89.0
11:22	9.02	9.11	738	51.5	10.9		89.7	89.0
11:23	9.11	9.04	806	47.1	10.0		93.1	93.6
11:24	8.68	9.40	868	51.6	12.0		90.8	91.3
11:25	9.09	9.06	836	45.1	9.9		95.8	97.2
11:26	8.71	9.35	883	49.8	11.6		94.7	95.6
11:27	9.28	8.92	831	44.3	9.4		98.2	98.4
11:28	9.09	9.06	855	45.5	10.3		95.8	97.6
11:29	9.21	8.96	834	44.5	9.3		97.0	97.7
11:30	9.07	9.09	852	43.5	10.0	10.3	95.7	96.3
11:31	9.09	9.05	857	44.6	10.0	10.3	95.9	95.7
11:32	8.71	9.24	871	44.1	10.4	10.3	94.7	95.7
11:33	8.87	9.27	892	46.9	10.7	10.4	93.9	93.4
11:34	9.13	9.07	855	43.2	9.9	10.1	96.0	96.1
11:35	8.83	9.25	888	43.0	10.4	10.2	95.9	95.1
11:36	9.40	8.81	828	41.6	8.5	9.9	100.5	101.1
11:37	9.15	9.03	849	41.2	9.6	9.9	98.7	98.6
11:38	9.33	8.88	838	41.1	8.9	9.8	98.9	97.9
11:39	8.99	9.15	870	44.0	10.5	9.9	97.7	97.2
11:40	9.07	9.09	866	42.4	10.1	9.9	97.3	96.5
11:41	8.52	9.53	930	52.2	13.0	10.2	94.1	93.3
11:42	8.99	9.17	891	44.3	10.6	10.2	98.4	99.1
11:43	8.66	9.41	925	48.4	12.0	10.4	97.3	98.6
11:44	9.17	8.96	855	44.2	9.9	10.4	100.2	100.4
11:45	9.27	8.92	855	40.0	9.3	10.2	100.1	101.2
11:46	9.30	8.88	855	40.5	9.3	10.3	99.1	99.1
11:47	9.22	8.96	846	39.6	9.4	10.3	98.7	98.3
11:48	9.19	8.96	853	40.4	9.6	10.4	98.5	97.5
11:49	9.01	9.11	860	41.1	10.2	10.3	98.2	97.6
11:50	8.83	9.22	880	40.5	10.7	10.4	96.5	96.4
11:51	9.19	8.98	845	40.8	9.8	10.1	98.2	99.0
11:52	8.85	9.21	850	41.8	10.7	10.1	96.1	95.7
11:53	9.53	8.69	787	43.2	9.1	9.8	96.5	96.0
11:54	9.25	8.93	791	43.3	9.9	9.8	95.9	96.0
11:55	9.42	8.78	783	43.9	9.1	9.8	95.1	94.8
11:56	9.15	9.00	803	45.2	10.4	9.9	94.1	93.4
11:57	9.32	8.87	789	43.9	9.5	9.9	94.1	93.1
11:58	8.89	9.21	825	41.7	10.9	10.0	93.7	92.6
11:59	9.30	8.87	799	44.4	9.6	10.0	93.7	92.4
12:00	9.10	9.04	801	43.3	10.0	9.9	93.4	92.2
12:01	9.49	8.71	754	48.0	9.1	9.8	93.3	92.2
12:02	9.51	8.75	768	51.1	9.3	9.7	92.7	91.7
12:03	9.46	8.75	766	47.4	9.6	9.7	92.2	90.9
12:04	9.27	8.90	786	46.3	9.6	9.7	91.8	90.7
12:05	9.21	8.95	804	45.7	9.6	9.8	92.4	90.7
12:06	9.12	9.03	820	44.4	9.8	9.7	93.6	92.0
12:07	8.86	9.18	799	52.4	11.6	9.9	93.5	92.0
12:08	9.25	8.90	732	50.2	9.8	9.8	92.5	91.3
12:09	8.89	9.18	745	52.3	11.7	10.0	91.1	90.0
12:10	9.42	8.75	688	51.5	9.1	9.9	90.8	89.4
12:11	9.21	8.92	706	51.3	10.4	10.0	90.7	89.7
12:12	9.50	8.73	700	53.1	9.6	10.1	90.9	90.0
12:13	9.15	8.99	736	53.5	10.9	10.2	89.4	88.9

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - October 8, 2020

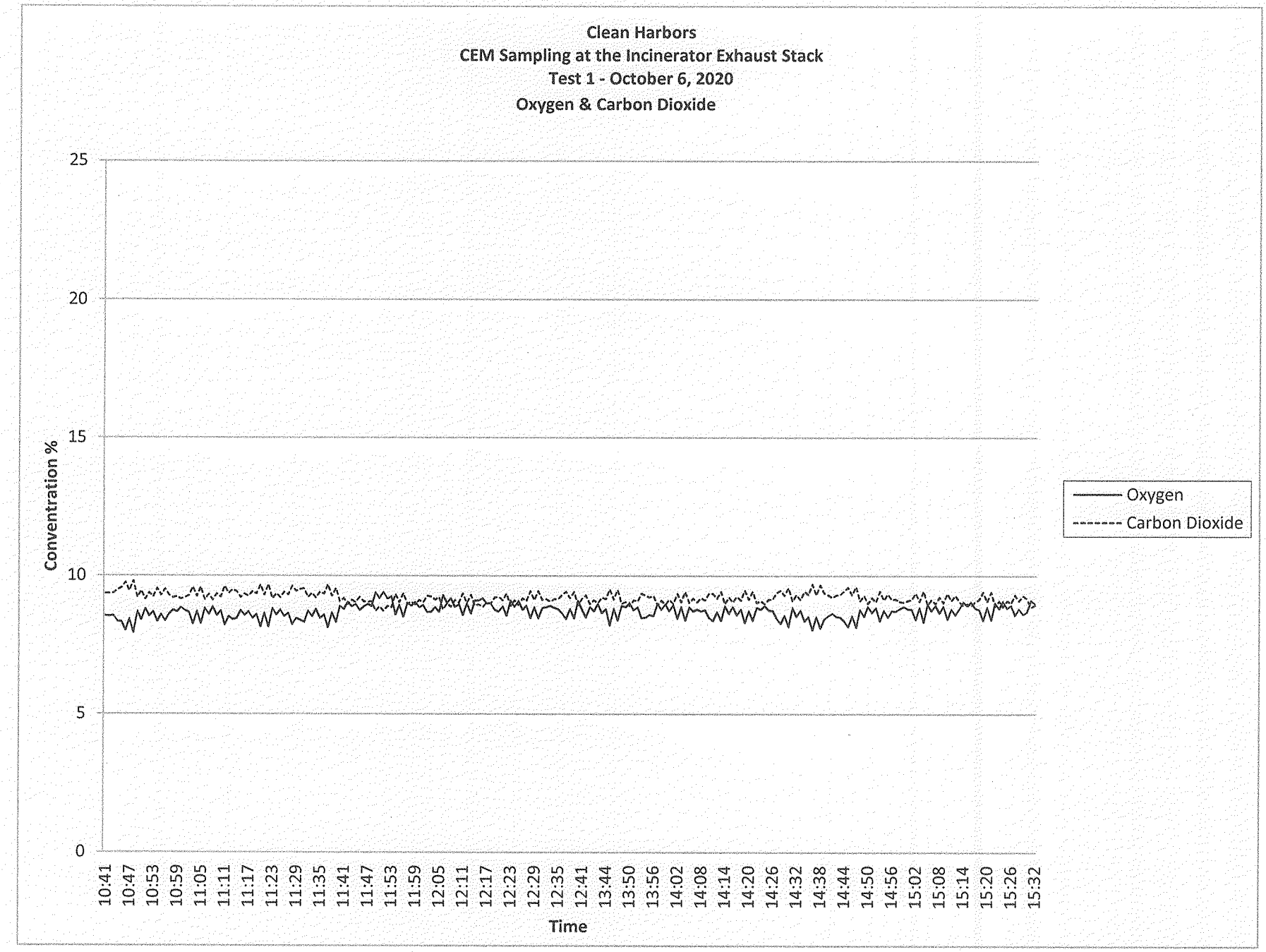
Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
12:14	9.22	8.89	736	49.7	10.0	10.2	89.5	88.6
12:15	8.89	9.21	777	52.3	11.8	10.5	89.0	88.2
12:16	9.21	8.92	758	47.7	10.0	10.5	90.5	89.4
12:17	9.01	9.12	770	50.2	10.9	10.4	91.0	91.0
12:18	9.16	8.92	759	51.4	10.4	10.5	91.5	91.1
12:19	9.35	8.87	736	49.3	10.2	10.3	91.5	91.9
12:20	9.32	8.86	736	49.9	10.2	10.4	90.4	90.3
12:21	9.32	8.90	730	51.6	10.1	10.4	89.7	88.9
12:22	9.18	9.02	741	45.7	10.7	10.5	89.0	87.7
12:23	9.14	9.01	734	58.6	12.5	10.7	87.1	86.9
12:24	8.87	9.20	755	52.9	12.8	11.0	85.0	84.9
12:25	9.38	8.82	709	51.2	10.5	10.8	89.2	90.0
12:26	8.97	9.13	729	45.9	11.7	11.0	86.1	85.9
12:27	9.51	8.68	682	53.3	9.7	10.9	90.9	91.5
12:28	9.28	8.88	694	51.8	10.7	10.9	88.1	88.2
12:29	9.52	8.72	680	54.4	9.6	10.8	88.1	87.3
12:30	9.21	8.92	695	48.4	10.3	10.8	88.6	87.2
12:31	9.41	8.83	691	50.4	10.1	10.8	88.8	87.3
12:32	9.04	9.13	722	46.2	11.2	10.9	87.9	86.6
12:33	9.31	8.86	709	49.8	10.4	10.7	87.5	85.9
12:34	9.14	9.01	709	48.9	11.1	10.5	87.6	86.1
12:35	9.28	8.88	692	50.4	10.5	10.5	87.8	86.3
12:36	9.46	8.75	683	52.2	9.8	10.3	87.8	86.6
12:37	9.33	8.83	686	47.5	10.1	10.4	88.1	86.9
12:38	9.39	8.82	686	50.2	9.9	10.3	88.0	87.0
12:39	9.15	8.95	702	46.3	10.9	10.4	87.9	86.4
12:40	9.22	8.92	699	49.4	10.8	10.5	87.6	86.0
12:41	8.89	9.16	723	47.4	12.1	10.7	86.7	85.4
12:42	9.37	8.81	694	53.8	9.8	10.5	88.9	89.5
12:43	9.01	9.10	721	48.9	11.0	10.6	84.6	84.7
12:44	9.52	8.67	677	53.8	9.1	10.4	90.0	90.0
12:45	9.30	8.87	694	46.7	10.0	10.3	88.0	87.6
12:46	9.52	8.69	686	51.9	9.5	10.3	87.4	86.2
12:47	9.25	8.94	703	50.8	10.5	10.4	87.1	85.4
12:48	9.37	8.82	693	51.2	9.7	10.3	87.0	85.1
12:49	9.02	9.11	722	47.8	11.0	10.3	86.6	85.0
12:50	9.18	8.91	717	49.8	10.5	10.3	86.3	84.6
12:51	9.07	9.01	711	50.6	10.6	10.2	86.2	84.7
12:52	9.14	8.94	704	50.5	10.2	10.2	86.4	84.7
12:53	9.48	8.71	683	55.0	9.3	10.0	86.8	84.9
12:54	9.34	8.86	694	47.9	9.8	10.1	87.2	84.9
12:55	9.43	8.79	685	55.4	9.6	10.1	86.7	85.0
12:56	9.18	9.00	696	48.7	10.1	10.1	85.8	84.1
12:57	9.31	8.90	711	53.0	9.9	10.1	85.7	83.8
12:58	8.94	9.18	737	47.9	11.4	10.2	84.9	83.3
12:59	9.40	8.81	699	52.3	9.0	10.0	85.4	86.4
13:00	9.00	9.09	722	48.9	10.8	10.1	84.7	84.6
13:01	9.57	8.66	670	55.9	8.6	9.9	87.9	87.9
13:02	9.32	8.83	684	62.2	9.3	9.8	86.5	85.8
13:03	9.44	8.77	673	56.0	9.3	9.8	85.5	84.1
13:04	9.11	9.02	699	50.7	10.2	9.8	85.1	83.0
13:05	9.26	8.91	698	55.7	10.2	9.9	85.4	82.8
13:06	8.71	9.23	755	50.5	11.5	10.0	85.1	83.0
13:07	8.99	9.11	745	56.3	11.6	10.2	85.3	83.3
13:08	9.07	9.11	765	47.3	10.6	10.1	88.3	88.4
13:09	8.78	9.14	765	49.0	10.6	10.3	87.5	86.6
13:10	9.22	8.84	750	46.5	8.6	10.1	93.2	93.6
13:11	9.10	9.03	793	40.7	9.2	10.1	90.9	89.1

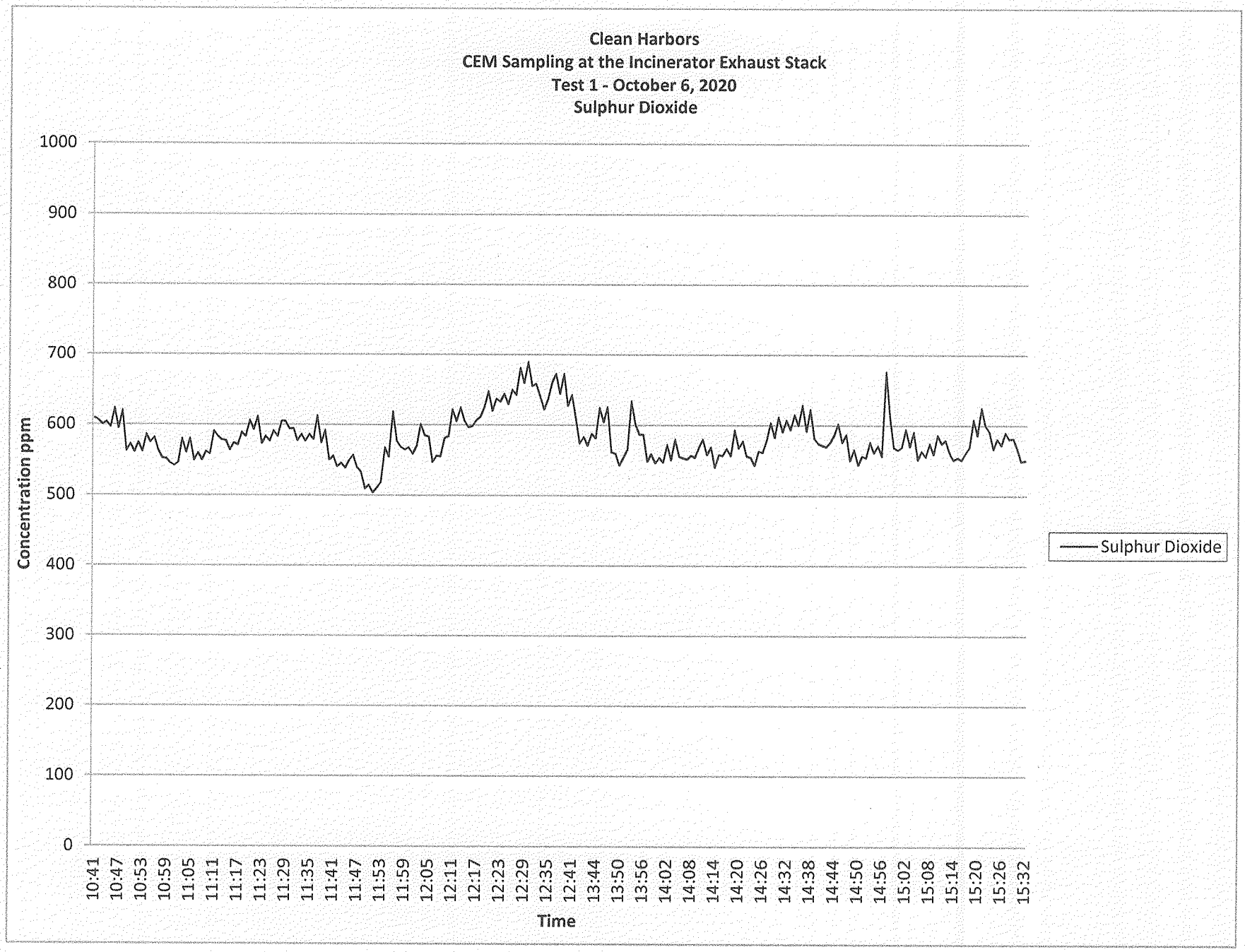
Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - October 8, 2020

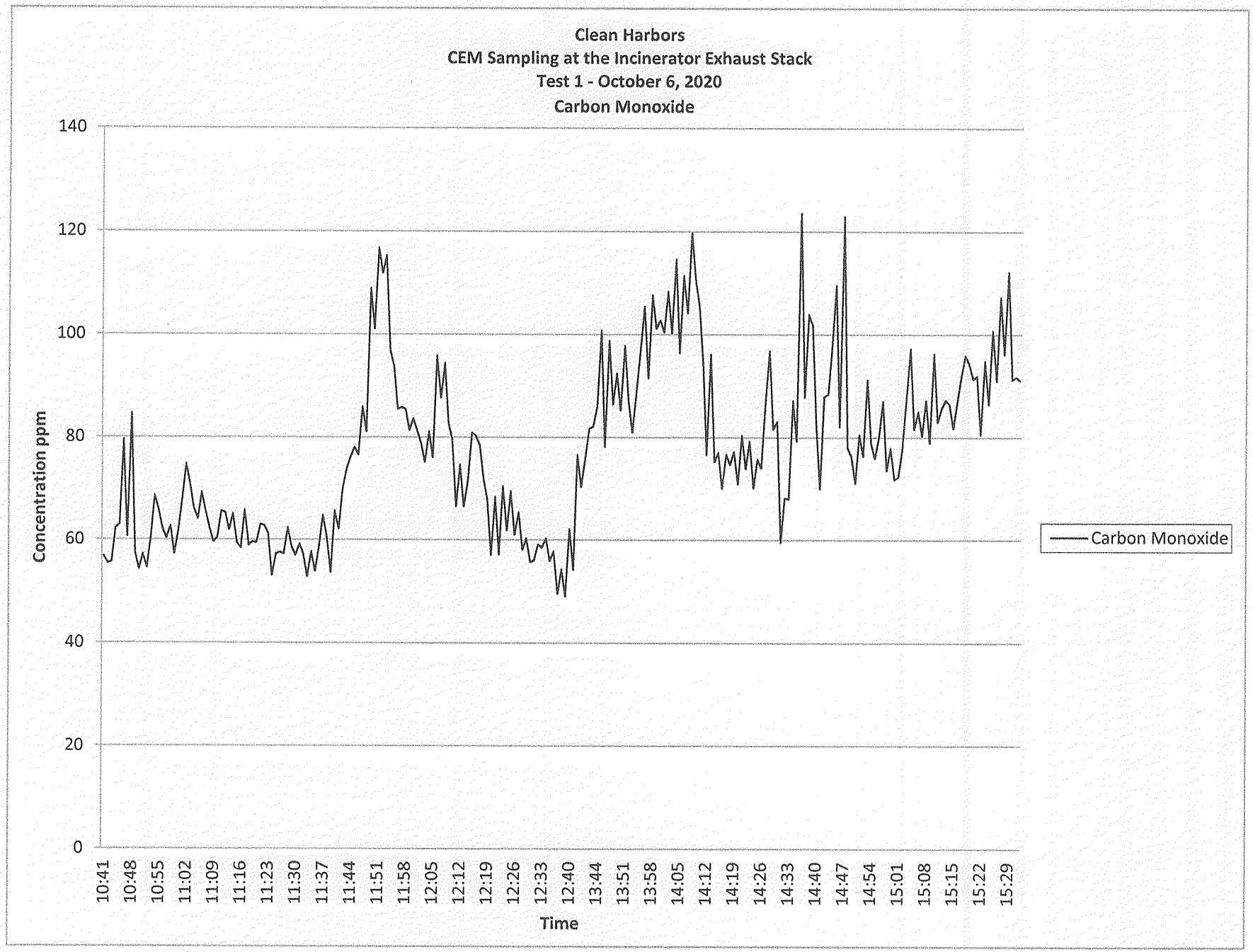
Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
13:12	9.27	8.91	810	43.0	8.5	10.0	95.2	95.3
13:13	9.01	9.16	844	37.4	9.5	10.1	91.9	91.2
13:14	9.18	9.07	838	43.3	9.4	10.0	93.2	91.3
13:15	8.64	9.39	883	45.2	11.2	10.1	91.2	89.8
13:16	9.10	9.07	847	41.5	8.9	9.8	92.0	93.0
13:17	8.57	9.37	880	40.4	10.5	9.7	90.8	90.6
13:18	9.17	8.94	837	42.6	8.7	9.5	96.0	95.0
13:19	9.04	9.07	830	38.6	8.9	9.3	94.0	94.0
13:20	9.31	8.95	829	37.0	8.4	9.3	94.9	93.9
13:21	9.07	9.11	840	37.0	9.4	9.3	93.4	94.4
Min	8.34	8.66	670	37.0	8.0	9.0	84.6	82.8
Max	9.57	9.54	930	79.7	16.0	11.8	100.8	101.2
Avg	9.06	9.04	742	49.3	10.3	10.3	92.9	92.6

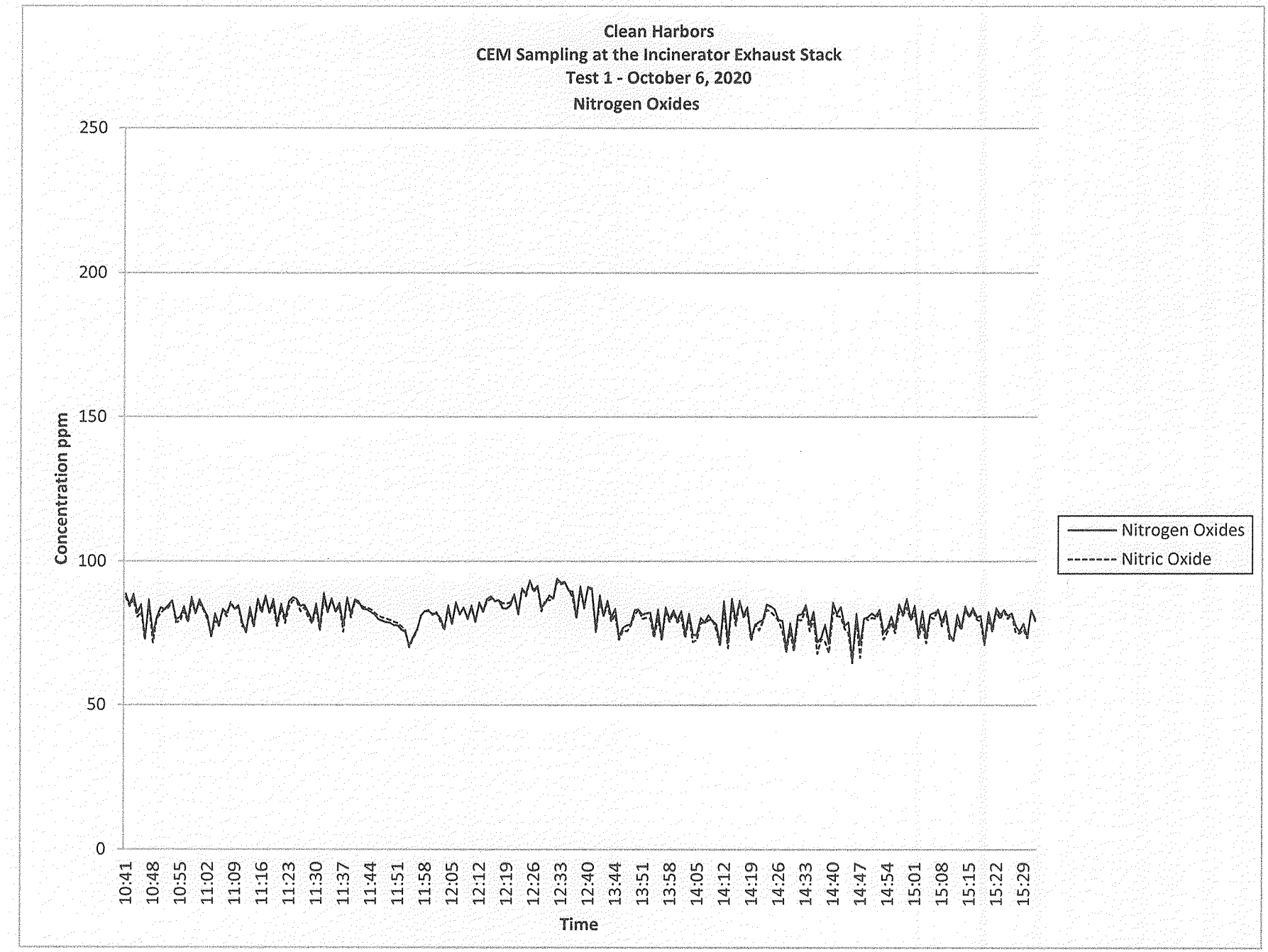
APPENDIX 25

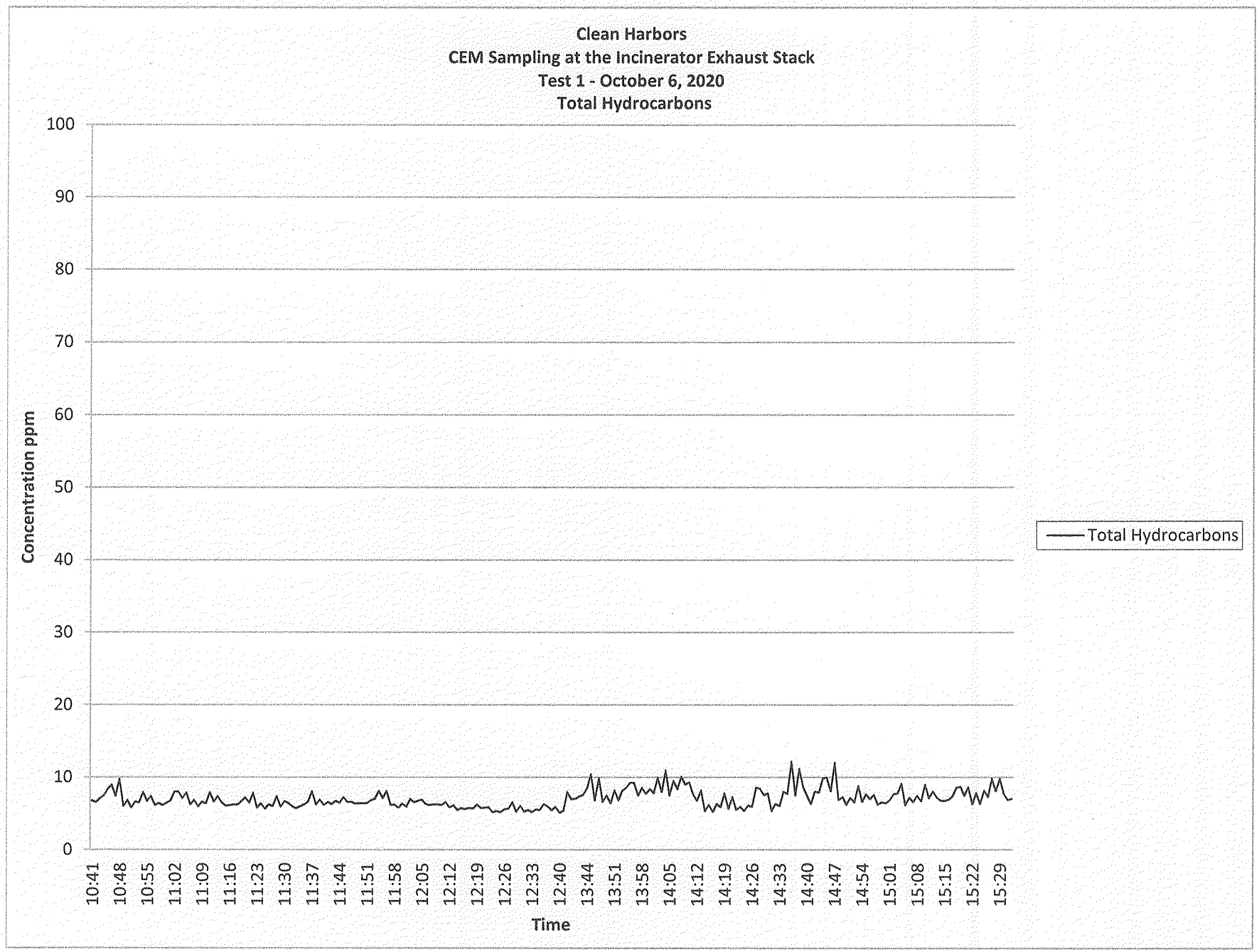
Gas Analysis Graphs
(15 pages)

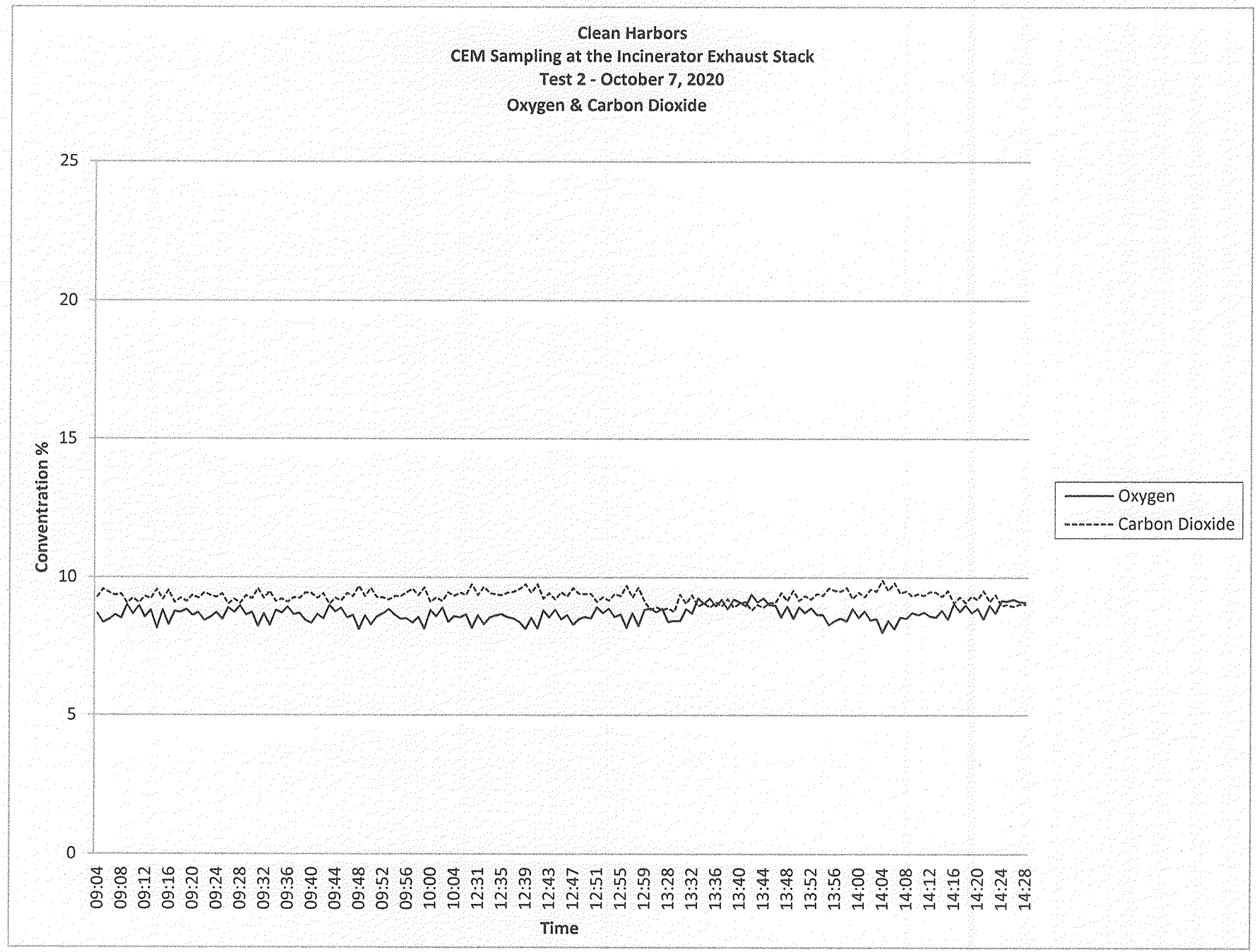

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - October 6, 2020
Oxygen & Carbon Dioxide
Conventration %
25
20
15
10
5
0
10:41
10:47
10:53
10:59
11:05
11:11
11:17
11:23
11:29
11:35
11:41
11:47
11:53
11:59
12:05
12:11
12:17
12:23
12:29
12:35
12:41
13:44
13:50
13:56
14:02
14:08
14:14
14:20
14:26
14:32
14:38
14:44
14:50
14:56
15:02
15:08
15:14
15:20
15:26
15:32
Time
Oxygen
Carbon Dioxide

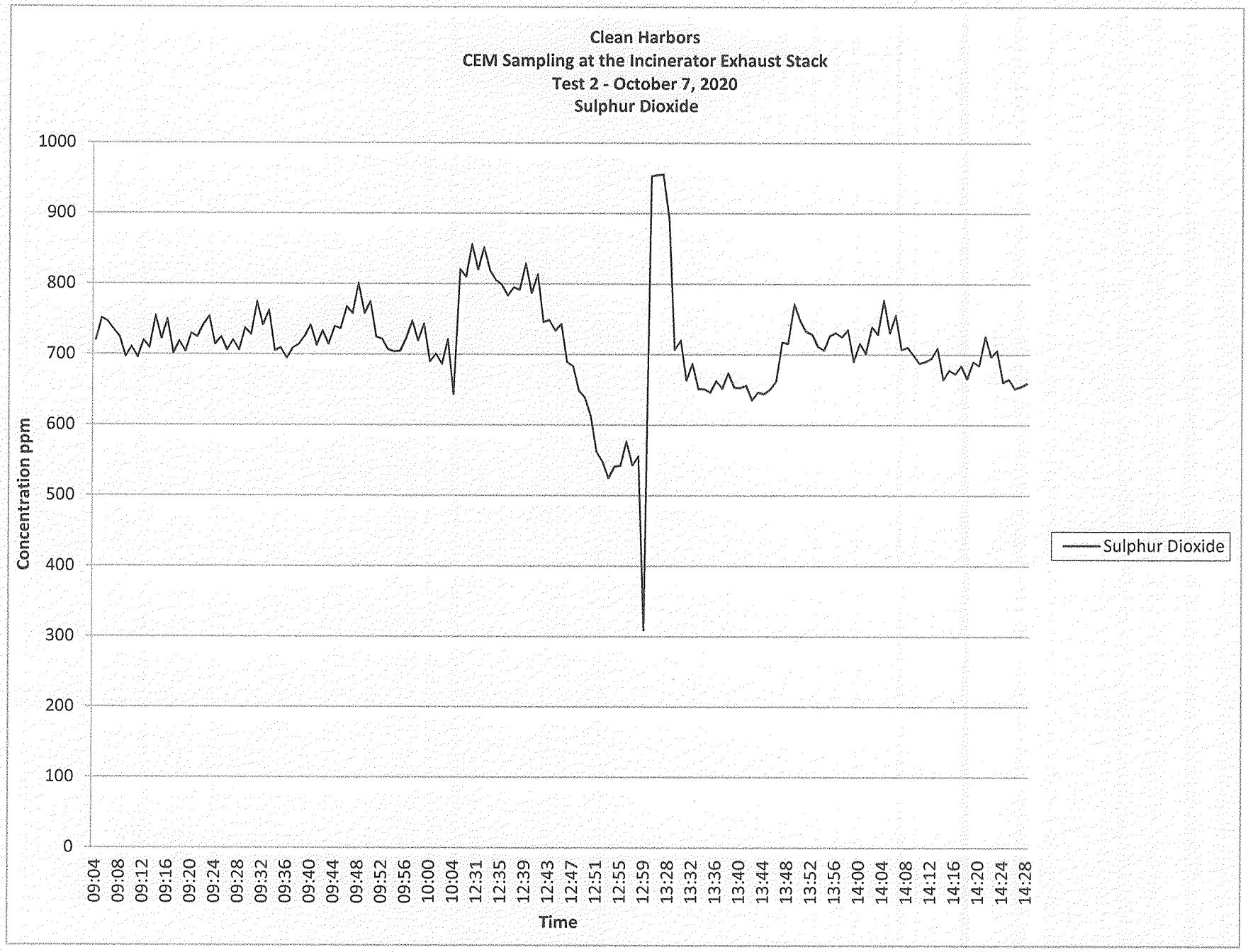

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - October 6, 2020
Sulphur Dioxide
Concentration ppm
1000
900
800
700
600
500
400
300
200
100
0
10:41
10:47
10:53
10:59
11:05
11:11
11:17
11:23
11:29
11:35
11:41
11:47
11:53
11:59
12:05
12:11
12:17
12:23
12:29
12:35
12:41
13:44
13:50
13:56
14:02
14:08
14:14
14:20
14:26
14:32
14:38
14:44
14:50
14:56
15:02
15:08
15:14
15:20
15:26
15:32
Time
Sulphur Dioxide

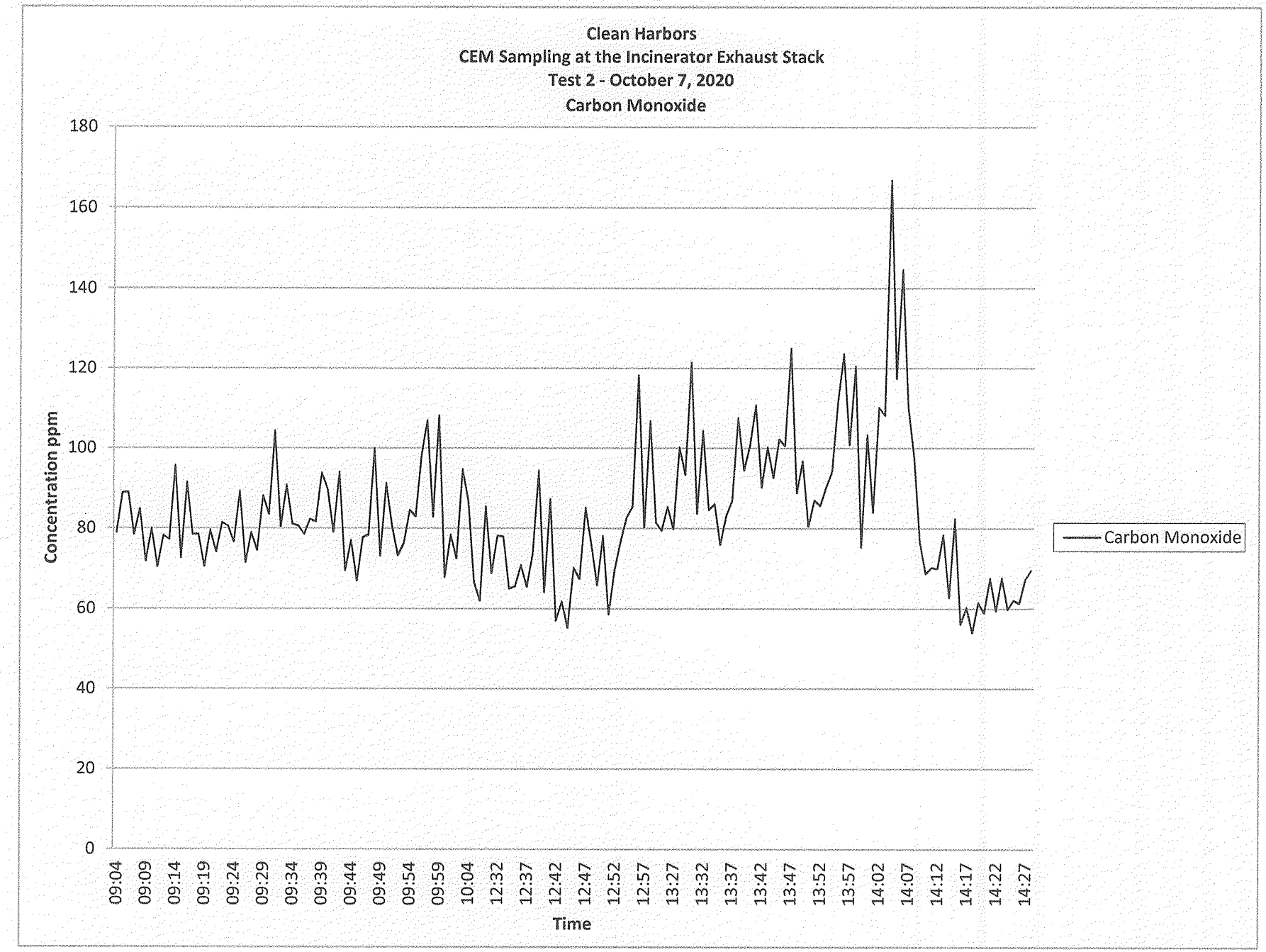

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - October 6, 2020
Carbon Monoxide
Concentration ppm
140
120
100
80
60
40
20
0
10:41
10:48
10:55
11:02
11:09
11:16
11:23
11:30
11:37
11:44
11:51
11:58
12:05
12:12
12:19
12:26
12:33
12:40
13:44
13:51
13:58
14:05
14:12
14:19
14:26
14:33
14:40
14:47
14:54
15:01
15:08
15:15
15:22
15:29
Time
Carbon Monoxide

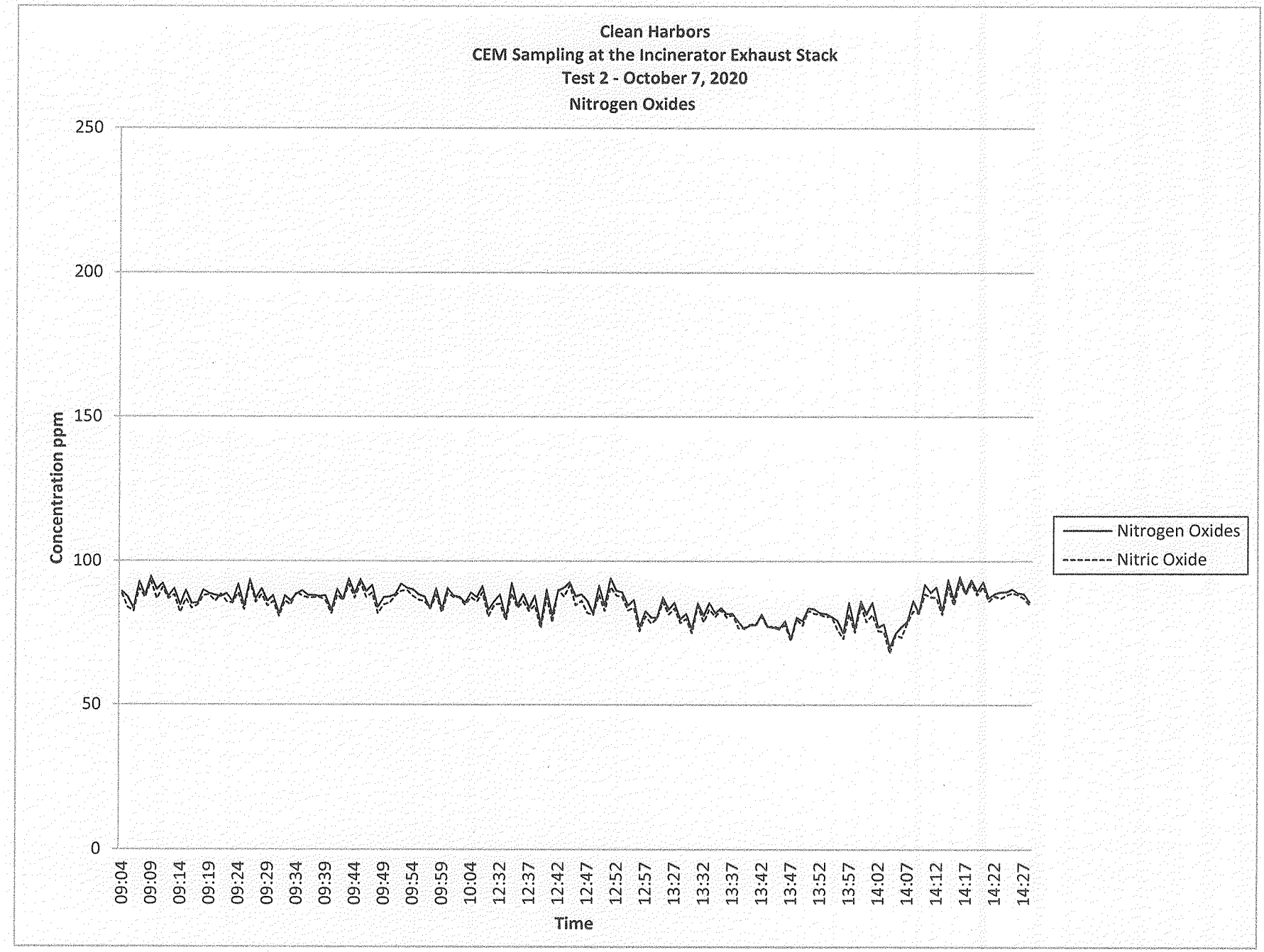

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - October 6, 2020
Nitrogen Oxides
250
200
150
100
50
0
Concentration ppm
10:41
10:48
10:55
11:02
11:09
11:16
11:23
11:30
11:37
11:44
11:51
11:58
12:05
12:12
12:19
12:26
12:33
12:40
13:44
13:51
13:58
14:05
14:12
14:19
14:26
14:33
14:40
14:47
14:54
15:01
15:08
15:15
15:22
15:29
Time
Nitrogen Oxides
Nitric Oxide

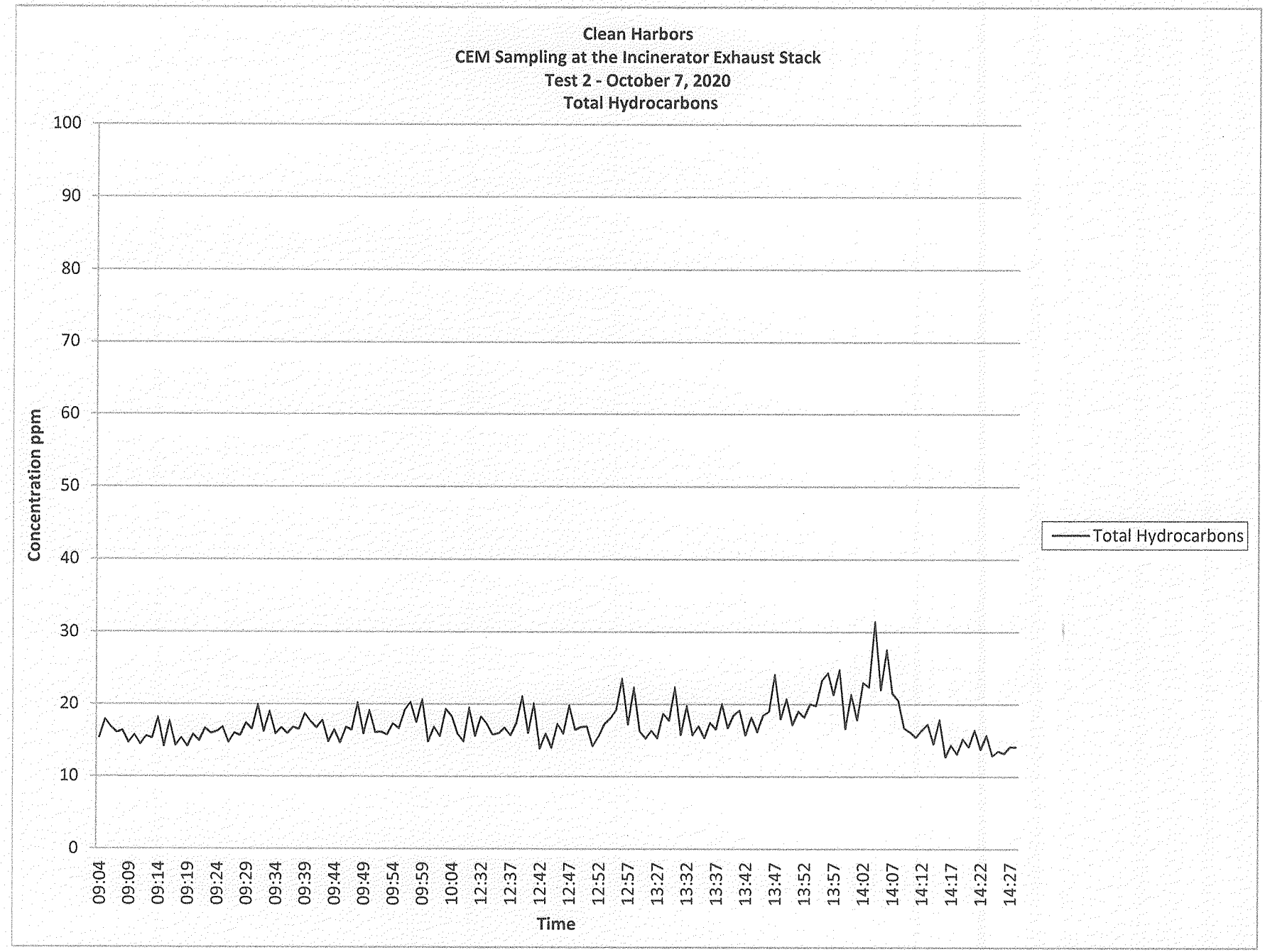

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - October 6, 2020
Total Hydrocarbons
Concentration ppm
100
90
80
70
60
50
40
30
20
10
0
10:41
10:48
10:55
11:02
11:09
11:16
11:23
11:30
11:37
11:44
11:51
11:58
12:05
12:12
12:19
12:26
12:33
12:40
13:44
13:51
13:58
14:05
14:12
14:19
14:26
14:33
14:40
14:47
14:54
15:01
15:08
15:15
15:22
15:29
Time
Total Hydrocarbons


Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - October 7, 2020
Oxygen & Carbon Dioxide
Conventration %
25
20
15
10
5
0
09:04
09:08
09:12
09:16
09:20
09:24
09:28
09:32
09:36
09:40
09:44
09:48
09:52
09:56
10:00
10:04
12:31
12:35
12:39
12:43
12:47
12:51
12:55
12:59
13:28
13:32
13:36
13:40
13:44
13:48
13:52
13:56
14:00
14:04
14:08
14:12
14:16
14:20
14:24
14:28
Time
Oxygen
Carbon Dioxide

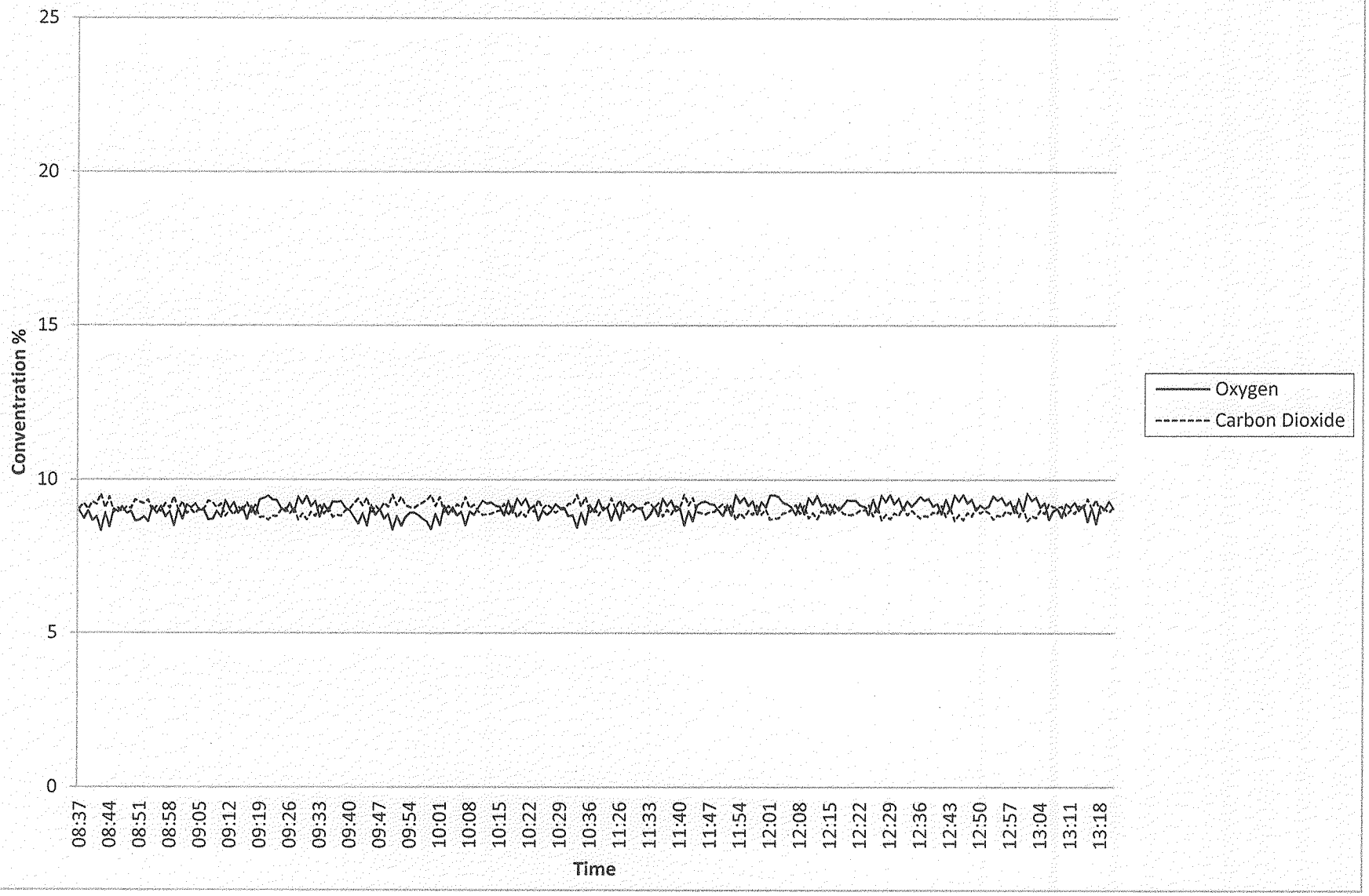

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - October 7, 2020
Sulphur Dioxide
Concentration ppm
1000
900
800
700
600
500
400
300
200
100
0
09:04
09:08
09:12
09:16
09:20
09:24
09:28
09:32
09:36
09:40
09:44
09:48
09:52
09:56
10:00
10:04
12:31
12:35
12:39
12:43
12:47
12:51
12:55
12:59
13:28
13:32
13:36
13:40
13:44
13:48
13:52
13:56
14:00
14:04
14:08
14:12
14:16
14:20
14:24
14:28
Time
Sulphur Dioxide

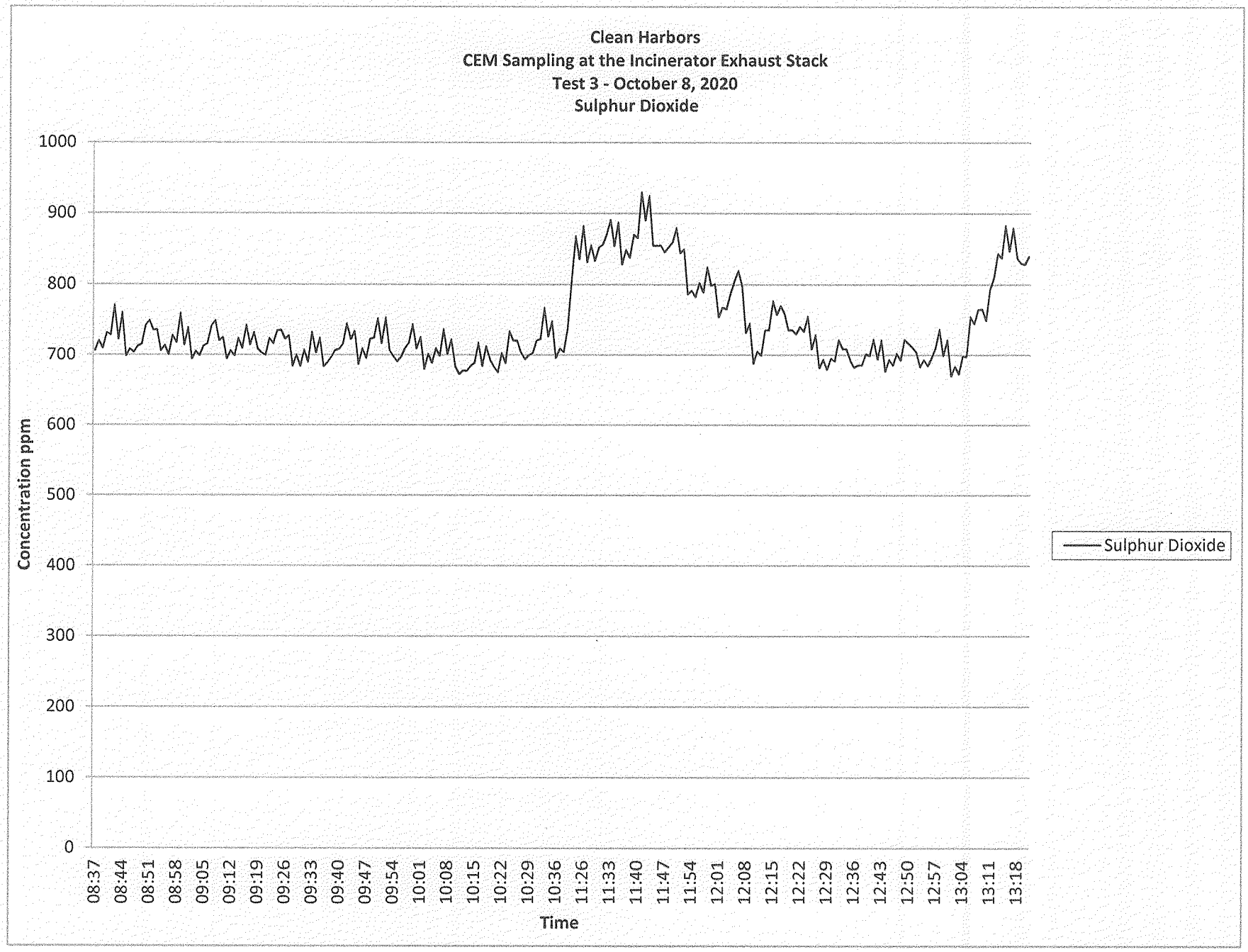

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - October 7, 2020
Carbon Monoxide
Concentration ppm
180
160
140
120
100
80
60
40
20
0
09:04
09:09
09:14
09:19
09:24
09:29
09:34
09:39
09:44
09:49
09:54
09:59
10:04
12:32
12:37
12:42
12:47
12:52
12:57
13:27
13:32
13:37
13:42
13:47
13:52
13:57
14:02
14:07
14:12
14:17
14:22
14:27
Time
Carbon Monoxide

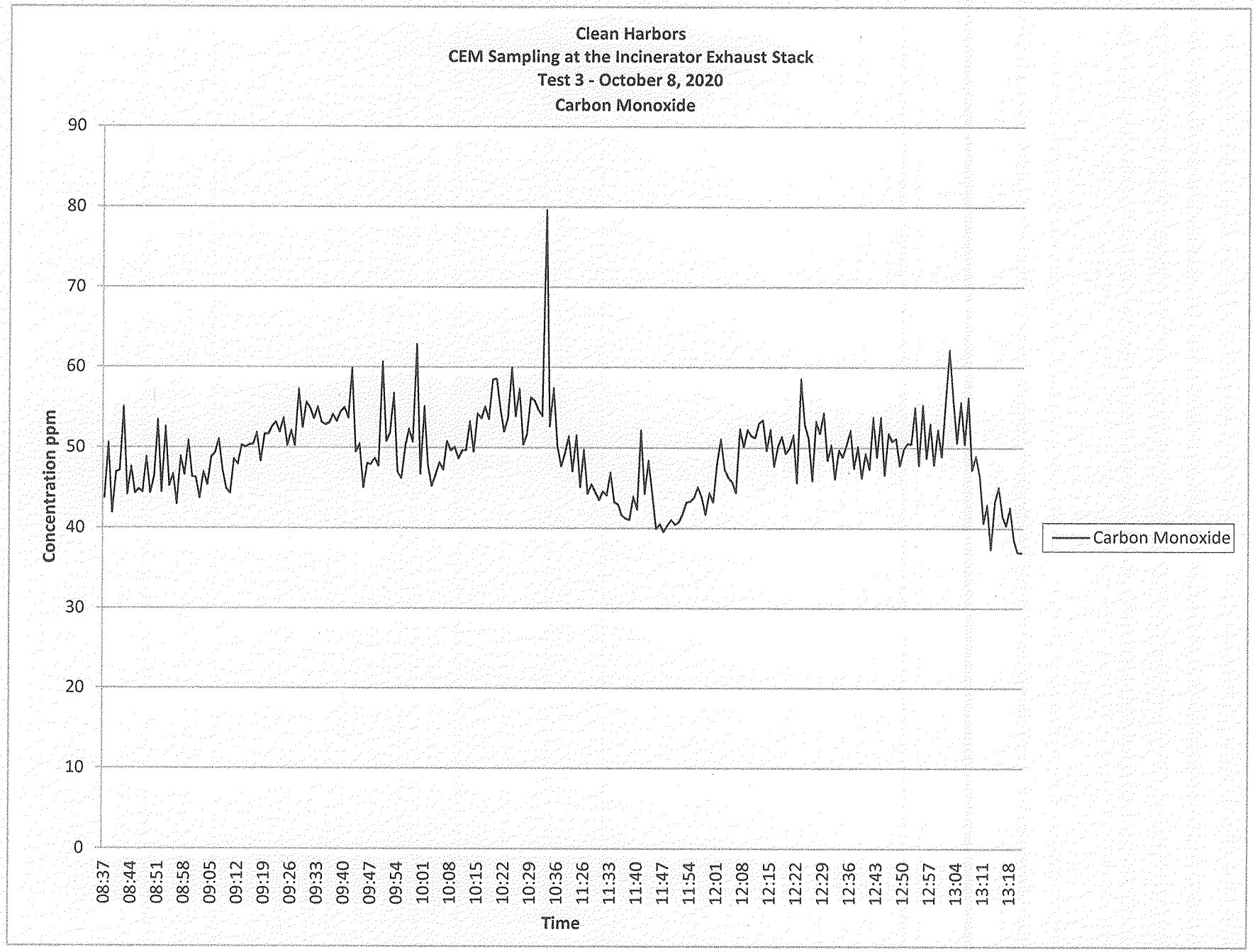

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - October 7, 2020
Nitrogen Oxides
Concentration ppm
250
200
150
100
50
0
09:04
09:09
09:14
09:19
09:24
09:29
09:34
09:39
09:44
09:49
09:54
09:59
10:04
12:32
12:37
12:42
12:47
12:52
12:57
13:27
13:32
13:37
13:42
13:47
13:52
13:57
14:02
14:07
14:12
14:17
14:22
14:27
Time
Nitrogen Oxides
Nitric Oxide

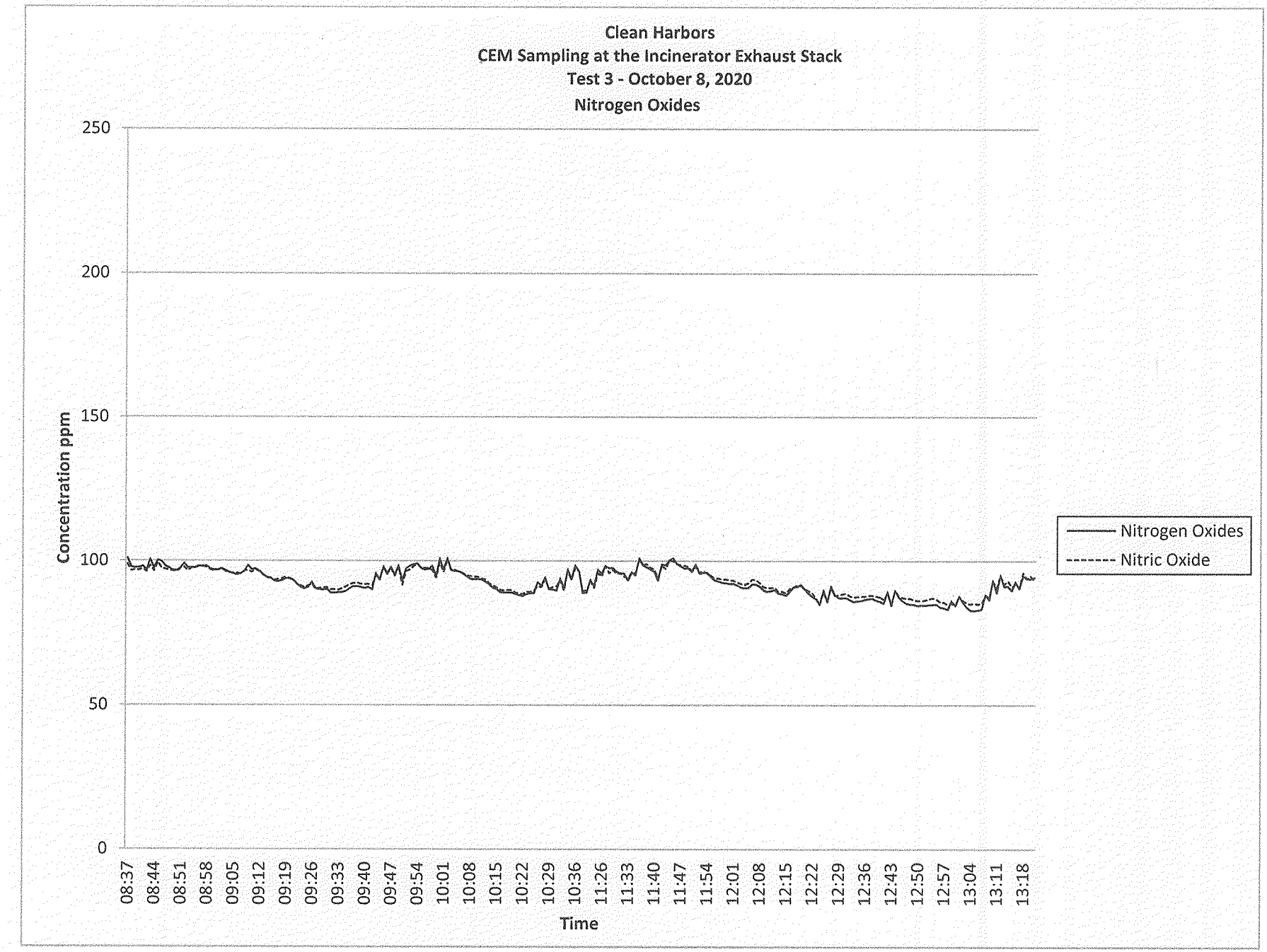

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - October 7, 2020
Total Hydrocarbons
Concentration ppm
100
90
80
70
60
50
40
30
20
10
0
09:04
09:09
09:14
09:19
09:24
09:29
09:34
09:39
09:44
09:49
09:54
09:59
10:04
12:32
12:37
12:42
12:47
12:52
12:57
13:27
13:32
13:37
13:42
13:47
13:52
13:57
14:02
14:07
14:12
14:17
14:22
14:27
Time
Total Hydrocarbons

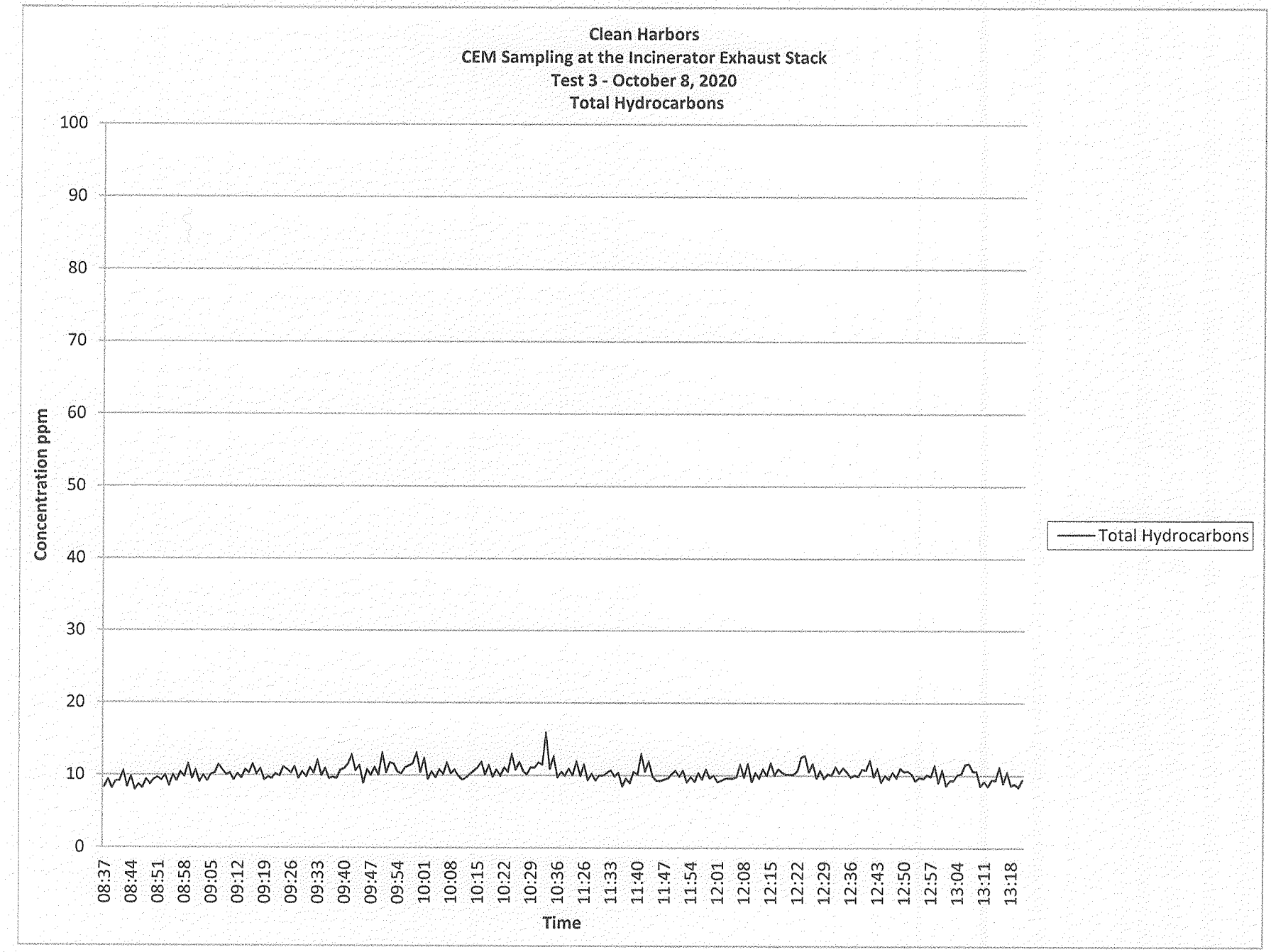
Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - October 8, 2020
Oxygen & Carbon Dioxide




Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - October 8, 2020
Sulphur Dioxide
Concentration ppm
1000
900
800
700
600
500
400
300
200
100
0
08:37
08:44
08:51
08:58
09:05
09:12
09:19
09:26
09:33
09:40
09:47
09:54
10:01
10:08
10:15
10:22
10:29
10:36
11:26
11:33
11:40
11:47
11:54
12:01
12:08
12:15
12:22
12:29
12:36
12:43
12:50
12:57
13:04
13:11
13:18
Time
Sulphur Dioxide


Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - October 8, 2020
Carbon Monoxide
Concentration ppm
90
80
70
60
50
40
30
20
10
0
08:37
08:44
08:51
08:58
09:05
09:12
09:19
09:26
09:33
09:40
09:47
09:54
10:01
10:08
10:15
10:22
10:29
10:36
11:26
11:33
11:40
11:47
11:54
12:01
12:08
12:15
12:22
12:29
12:36
12:43
12:50
12:57
13:04
13:11
13:18
Time
Carbon Monoxide


Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - October 8, 2020
Nitrogen Oxides
250
200
150
100
50
0
Concentration ppm
08:37
08:44
08:51
08:58
09:05
09:12
09:19
09:26
09:33
09:40
09:47
09:54
10:01
10:08
10:15
10:22
10:29
10:36
11:26
11:33
11:40
11:47
11:54
12:01
12:08
12:15
12:22
12:29
12:36
12:43
12:50
12:57
13:04
13:11
13:18
Time
Nitrogen Oxides
Nitric Oxide


Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - October 8, 2020
Total Hydrocarbons
Concentration ppm
100
90
80
70
60
50
40
30
20
10
0
08:37
08:44
08:51
08:58
09:05
09:12
09:19
09:26
09:33
09:40
09:47
09:54
10:01
10:08
10:15
10:22
10:29
10:36
11:26
11:33
11:40
11:47
11:54
12:01
12:08
12:15
12:22
12:29
12:36
12:43
12:50
12:57
13:04
13:11
13:18
Time
Total Hydrocarbons

APPENDIX 26

AERMOD Modelling Files
(1 CD)

APPENDIX 27

Clean Harbors Feed Data Summaries
(3 pages)

Clean Harbors

DAILY INCINERATION REPORT OF ANALYSIS

Incineration Date: _____ Analysis Date: OCT. 6/20

Storage Location: I2 Lab No.: Y20-2465/C20-2466

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-118	T-111	T-113
Date Received at LAB					OCT. 6/20		OCT. 6/20		OCT. 6/20	OCT. 6/20				OCT. 6/20
Time Received at LAB					8:35		8:35		8:35	8:35				8:35
pH		AM047	pH				10		10	10				12.15
Conductivity @ 20 - 25 C		AM007	mS/cm	0.02										8.8
Specific Gravity		AM045	g/ml				1.06		0.98	0.93				1.01
Heat Value		AM005	MJ/kg	0.3	3.6	7.2	2.8		15.9	27.3				
Ash @ 750 C		AM129	% mass	0.03			4.4		2.5	1.7				
Fluoride	Total	AM005	% mass F	0.05			0.025		0.055	0.09				
	Soluble	AM036	% mass F	0.05			0.064		0.024	0.057				0.001
	Organic	AM005	% mass F	0.05			0		0.031	0.033				
Chloride	Total	AM005	% mass Cl	0.05	0.62	0.9	0.756		0.547	0.718				
	Soluble	AM036	% mass Cl	0.05	0.61	1.21	0.577		0.228	0.155				0.015
	Organic	AM005	% mass Cl	0.05	0.01	0	0.179		0.319	0.563				
Nitrite	Soluble	AM005	% massNO2	0.05										
Sulphur	Total	AM005	% mass S	0.02			0.406		0.277	0.188				
	Soluble	AM036	% mass S	0.02			0.223		0.122	0.049				0.007
	Non Sulphate	AM005	% mass S	0.02			0.183		0.155	0.139				
Alkalinity	as Carbonate	AM001	ppm CaCO3	30										
	Normality	AM046	N	0.01										0.06
Phase Composition	Organic	AM045	% volume	0.5			4		35	55				
	Emulsion	"	% volume	0.5					60	40				
	Aqueous	"	% volume	0.5			87							
	Sludge	"	% volume	0.5										
	Solid	"	% volume	0.5			9		5	5				<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						47.3	22.9				

Additional Analysis: _____

Comments: _____

ANALYST: LH

Clean Harbors

DAILY INCINERATION REPORT OF ANALYSIS

Incineration Date: _____ **Analysis Date:** OCT. 7/20

Storage Location: I2 **Lab No.:** Y20-2475/C20-2476

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-118	T-111	T-113
Date Received at LAB					OCT. 7/20	OCT. 7/20	OCT. 7/20		OCT. 7/20		OCT. 7/20			OCT. 7/20
Time Received at LAB					6:35	6:35	6:35		6:35		6:35			6:35
pH		AM047	pH				9		10		10			12.13
Conductivity @ 20 - 25 C		AM007	mS/cm	0.02										8.6
Specific Gravity		AM045	g/ml				1.06		0.98		0.92			1.01
Heat Value		AM005	MJ/kg	0.3	2	7.6	3.8		11.8		27.6			
Ash @ 750 C		AM129	% mass	0.03			4.8		6.5		1.7			
Fluoride	Total	AM005	% mass F	0.05			0.036		0.059		0.091			
	Soluble	AM036	% mass F	0.05			0.077		0.025		0.054			0
	Organic	AM005	% mass F	0.05			0		0.034		0.037			
Chloride	Total	AM005	% mass Cl	0.05	0.76	0.87	0.652		0.729		0.709			
	Soluble	AM036	% mass Cl	0.05	0.66	0.28	0.53		0.229		0.116			0.013
	Organic	AM005	% mass Cl	0.05	0.1	0.59	0.122		0.5		0.593			
Nitrite	Soluble	AM005	% massNO2	0.05										
Sulphur	Total	AM005	% mass S	0.02			0.423		0.341		0.184			
	Soluble	AM036	% mass S	0.02			0.342		0.041		0.036			0.007
	Non Sulphate	AM005	% mass S	0.02			0.081		0.3		0.148			
Alkalinity	as Carbonate	AM001	ppm CaCO3	30										
	Normality	AM046	N	0.01										0.06
Phase Composition	Organic	AM045	% volume	0.5			4		36		54			
	Emulsion	"	% volume	0.5			88		58		41			
	Aqueous	"	% volume	0.5										
	Sludge	"	% volume	0.5										
	Solid	"	% volume	0.5			8		6		5			0.5
Viscosity @ 20 - 25 C		AM066	cps	0.1					<100		<100			
Solids @ 110 C		AM003	% mass	0.03										0.4
Total Organic Carbon		AM142	ppm	1										
Water Content by KF :		AM074	% H2O						57.7		23.6			

Additional Analysis: _____

Comments: _____

ANALYST: LJ

Clean Harbors

DAILY INCINERATION REPORT OF ANALYSIS

Incineration Date:

Analysis Date: Thursday, October 08, 2020

Storage Location:

Lab No.: C20-2489

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-118	T-111	T-113
Date Received at LAB					8-Oct-20	8-Oct-20	8-Oct-20		8-Oct-20		8-Oct-20			8-Oct-20
Time Received at LAB					7:50	7:50	7:50		7:50		7:50			7:50
pH		AM047	pH				8.05		9		7			12.33
Conductivity @ 20 - 25 C		AM007	mS/cm	0.02										9.36
Specific Gravity		AM045	g/ml				1.04		0.96		0.88			0.99
Heat Value		AM005	MJ/kg	0.3	2.9	7.6	4.68		18		41.3			
Ash @ 750 C		AM129	% mass	0.03			4.63		2.27		0.29			
Fluoride	Total	AM005	% mass F	0.05			0.05		0.06		0.08			
	Soluble	AM036	% mass F	0.05			0		0		0			0
	Organic	AM005	% mass F	0.05			0.05		0.06		0.08			
Chloride	Total	AM005	% mass Cl	0.05	0.63	1.15	0.83		0.59		0.99			
	Soluble	AM036	% mass Cl	0.05	0.38	0.59	0.55		0.24		0.02			0.02
	Organic	AM005	% mass Cl	0.05	0.25	0.56	0.28		0.35		0.97			
Nitrite	Soluble	AM005	% massNO2	0.05										
Sulphur	Total	AM005	% mass S	0.02			0.81		0.27		0.31			
	Soluble	AM036	% mass S	0.02			0.52		0.08		0			0.01
	Non Sulphate	AM005	% mass S	0.02			0.29		0.19		0.31			
Alkalinity	as Carbonate	AM001	ppm CaCO3	30										0.07
	Normality	AM046	N	0.01										
Phase Composition	Organic	AM045	% volume	0.5			4		34		94			
	Emulsion	"	% volume	0.5			0		62		0			
	Aqueous	"	% volume	0.5			88		0		6			
	Sludge	"	% volume	0.5			0		0		0			
	Solid	"	% volume	0.5			8		4		0			1
Viscosity @ 20 - 25 C		AM066	cps	0.1					<100		<100			
Solids @ 110 C		AM003	% mass	0.03										0.34
Total Organic Carbon		AM142	ppm	1										
Water Content by KF :		AM074	% H2O						44		2			

Additional Analysis:

Comments:

ANALYST: JO

APPENDIX 28

Clean Harbors One-Minute Average
Combustion Gas Results
(12 pages)

Test No. 1 - October 6, 2020
CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
10:41:00	80.8	38.1	9.5	49.6	6.9	8.7	1.0	585.5
10:42:00	77.0	38.1	9.6	49.9	9.8	8.9	1.0	595.1
10:43:00	77.0	38.1	9.7	50.1	7.4	8.9	1.0	607.9
10:44:00	76.5	38.1	9.8	50.2	9.5	8.9	1.0	616.8
10:45:00	69.5	38.1	9.8	50.2	9.3	8.9	1.0	619.3
10:46:00	70.1	38.1	9.8	50.2	7.1	8.9	1.0	628.3
10:47:00	59.7	39.3	9.6	49.9	8.0	8.5	1.0	620.8
10:48:00	55.8	39.3	9.6	50.0	7.0	8.7	1.0	626.9
10:49:00	55.8	39.3	9.6	49.7	9.3	8.5	1.0	621.7
10:50:00	57.5	39.3	9.7	49.9	8.9	8.7	1.0	620.2
10:51:00	61.1	39.3	9.8	50.2	11.1	8.9	1.1	615.4
10:52:00	69.5	39.3	9.9	50.4	7.7	8.9	1.0	621.5
10:53:00	68.5	39.3	9.9	50.3	12.9	8.9	1.1	616.6
10:54:00	71.2	39.3	9.9	50.6	5.9	8.7	1.0	623.7
10:55:00	68.9	39.3	9.8	50.3	7.6	8.5	1.0	610.7
10:56:00	52.7	39.3	9.6	49.7	5.6	8.5	1.0	587.0
10:57:00	54.9	39.3	9.6	49.7	6.7	8.5	1.0	582.1
10:58:00	55.3	39.3	9.5	49.8	6.1	8.3	1.0	582.1
10:59:00	56.8	39.3	9.2	49.6	9.0	8.9	1.0	582.1
11:00:00	62.2	39.3	9.3	49.9	6.9	8.9	0.9	589.0
11:01:00	67.0	39.3	9.7	50.4	7.9	8.9	1.0	595.3
11:02:00	61.4	39.3	9.7	50.2	7.2	8.9	1.0	596.8
11:03:00	60.8	39.3	9.7	50.1	6.7	8.9	1.0	591.0
11:04:00	61.6	39.3	9.4	49.7	7.0	8.7	1.0	568.2
11:05:00	59.4	39.3	9.4	49.7	6.7	8.7	0.9	568.2
11:06:00	58.9	39.3	9.4	49.5	7.9	8.7	1.0	562.1
11:07:00	63.6	39.3	9.5	49.9	8.4	8.9	1.0	562.1
11:08:00	72.6	39.3	9.3	50.3	9.7	8.9	1.0	565.6
11:09:00	71.6	39.3	9.7	50.3	7.6	8.9	1.0	582.2
11:10:00	68.0	39.3	9.7	50.2	9.2	9.1	1.0	582.2
11:11:00	64.6	39.3	9.7	50.5	6.2	9.1	1.0	590.2
11:12:00	65.0	38.3	9.3	50.0	7.7	8.9	1.0	580.1
11:13:00	66.9	39.3	8.8	49.9	5.9	8.7	1.0	572.2
11:14:00	65.0	39.3	9.6	50.4	7.1	8.7	0.9	578.2
11:15:00	62.1	39.3	9.6	50.0	6.1	8.7	1.0	577.0
11:16:00	58.1	39.3	8.9	49.7	8.7	8.9	1.0	578.9
11:17:00	62.3	39.3	9.0	50.2	7.5	8.9	1.0	593.4
11:18:00	66.3	39.3	9.9	50.6	7.3	8.9	1.0	599.9
11:19:00	63.6	39.3	9.8	50.3	8.1	8.9	1.0	593.8
11:20:00	63.2	39.3	9.7	50.4	6.2	8.9	1.0	598.2
11:21:00	58.9	39.3	9.4	49.6	6.9	8.7	1.1	581.1
11:22:00	58.6	39.3	9.5	49.8	6.7	8.7	0.9	586.4
11:23:00	62.6	39.3	9.5	49.9	6.9	8.7	1.0	592.7
11:24:00	61.9	39.3	9.5	49.9	7.0	8.7	1.0	594.9
11:25:00	57.6	39.3	9.6	50.1	8.0	8.9	1.0	601.5
11:26:00	58.9	39.3	9.7	50.3	6.6	8.9	1.0	616.6
11:27:00	60.3	39.3	9.7	50.2	8.9	8.9	1.1	613.8
11:28:00	62.6	40.7	9.7	50.2	6.1	8.9	1.0	617.3
11:29:00	61.7	40.7	9.7	50.0	6.9	8.9	1.1	608.5
11:30:00	55.3	40.7	9.5	49.7	5.5	8.7	1.0	591.0
11:31:00	55.3	40.7	9.5	49.8	6.4	8.7	1.1	597.4
11:32:00	56.8	40.7	9.5	49.9	5.9	8.5	1.0	602.9
11:33:00	56.5	40.7	9.6	50.0	7.7	8.9	1.1	604.0
11:34:00	58.4	40.7	9.7	50.3	6.6	8.9	1.1	609.7
11:35:00	59.2	40.7	9.7	50.5	6.8	8.9	1.0	616.5
11:36:00	57.5	40.7	9.7	50.4	7.9	8.9	1.1	611.5
11:37:00	58.2	40.7	9.7	50.4	6.3	8.9	1.1	612.9
11:38:00	55.9	39.4	9.6	49.9	6.3	8.7	1.1	593.8
11:39:00	54.0	39.4	9.6	50.0	6.2	8.7	1.0	595.3
11:40:00	54.4	40.4	9.5	50.1	6.8	8.7	1.0	598.7
11:41:00	55.1	40.4	9.5	50.1	6.6	8.5	1.1	597.7
11:42:00	56.1	39.3	9.6	50.4	10.2	8.9	1.1	598.9
11:43:00	61.9	39.3	9.8	51.0	6.2	8.9	1.0	614.3
11:44:00	61.9	39.3	9.7	50.8	7.3	8.9	1.1	607.3
11:45:00	56.4	39.3	9.7	50.6	6.2	8.9	1.0	599.7
11:46:00	58.5	39.3	9.3	50.4	7.0	8.7	1.1	589.7
11:47:00	64.2	39.3	8.8	50.0	6.5	8.5	1.0	567.4
11:48:00	68.3	39.3	8.8	50.0	7.3	8.7	1.0	560.9
11:49:00	72.1	38.0	8.5	49.9	7.1	8.7	1.1	560.9
11:50:00	75.5	38.0	8.7	49.9	8.1	9.1	1.1	558.1
11:51:00	77.1	38.0	9.1	50.0	8.0	9.1	1.0	559.1
11:52:00	78.3	38.0	8.8	50.1	7.2	9.1	1.0	563.9
11:53:00	81.1	38.0	8.5	50.0	7.3	9.3	1.1	560.1
11:54:00	83.9	36.9	8.8	50.1	7.2	9.1	1.0	557.0

Test No. 1 - October 6, 2020
CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
11:55:00	98.1	36.9	8.3	49.3	7.6	9.1	1.0	530.6
11:56:00	104.1	35.6	8.3	49.3	7.3	9.1	1.0	527.3
11:57:00	111.1	35.6	8.3	49.3	8.2	9.3	1.0	529.3
11:58:00	115.2	35.6	8.3	49.4	7.6	9.1	1.0	531.1
11:59:00	113.8	35.6	8.4	49.7	9.5	9.5	1.1	538.0
12:00:00	102.9	35.6	9.1	50.0	7.9	9.5	1.0	568.6
12:01:00	96.6	35.6	9.2	50.0	10.1	9.5	1.0	575.1
12:02:00	89.8	35.6	9.2	50.0	6.6	9.5	1.0	602.2
12:03:00	86.6	35.6	9.2	50.0	6.7	9.5	1.0	606.4
12:04:00	86.3	35.6	8.4	49.4	6.3	9.1	1.1	582.9
12:05:00	83.2	35.6	8.5	49.5	7.2	9.1	1.0	582.9
12:06:00	82.9	35.6	8.5	49.4	6.7	8.9	1.1	580.8
12:07:00	81.5	35.6	8.8	49.5	7.4	9.1		573.8
12:08:00	80.6	35.6	9.1	49.8	8.3	9.1		577.5
12:09:00	76.5	35.6	9.2	50.2	7.3	9.1		606.8
12:10:00	76.8	35.6	8.9	50.0	8.4	9.3		608.2
12:11:00	77.6	35.6	8.9	50.1	7.3	9.1		601.1
12:12:00	87.8	35.6	8.4	49.5	7.1	9.1	1.0	574.0
12:13:00	90.4	34.3	8.4	49.2	7.2	8.9	1.0	566.2
12:14:00	90.1	34.3	8.4	49.3	7.3	9.1	1.0	573.0
12:15:00	89.9	34.3	8.7	49.6	6.7	9.1	1.0	583.4
12:16:00	80.8	34.3	8.8	49.8	7.3	9.3	1.1	598.6
12:17:00	69.9	35.9	9.2	50.2	5.8	9.3	1.0	624.6
12:18:00	69.6	35.9	9.1	50.0	6.9	9.3	1.1	624.6
12:19:00	71.3	35.9	9.1	50.0	5.8	9.3	1.0	629.2
12:20:00	68.8	35.9	9.1	49.9	6.4	9.3	1.1	629.2
12:21:00	76.9	35.9	8.4	49.3	6.3	9.1	1.1	611.0
12:22:00	79.7	35.9	8.4	49.4	6.2	9.1	1.0	614.9
12:23:00	79.5	37.1	8.4	49.4	6.6	9.1	1.1	618.1
12:24:00	74.2	37.1	8.5	49.6	7.0	9.1	1.1	624.8
12:25:00	71.3	37.1	8.5	49.8	6.6	9.3	1.1	632.7
12:26:00	62.6	37.1	9.2	50.1	6.5	9.3	1.0	652.3
12:27:00	62.4	37.1	9.2	50.0	7.1	9.3	1.1	650.4
12:28:00	61.6	38.4	9.2	50.1	5.4	9.3	1.0	659.9
12:29:00	64.8	38.4	8.8	49.7	5.9	9.3	1.1	654.2
12:30:00	65.9	38.4	8.4	49.4	5.5	8.9	1.1	651.3
12:31:00	64.9	38.4	8.5	49.5	6.0	9.1	1.0	651.3
12:32:00	64.1	38.4	9.1	49.5	5.6	8.9	1.1	659.0
12:33:00	63.5	39.7	9.4	49.8	7.5	9.1	1.1	663.2
12:34:00	58.9	39.7	9.5	50.1	5.1	9.1	1.0	681.1
12:35:00	58.1	39.7	9.2	50.0	6.7	9.3	1.0	677.5
12:36:00	57.5	39.7	9.2	50.0	5.6	9.3	1.0	680.4
12:37:00	55.3	41.0	9.5	50.1	5.8	9.1	1.1	681.6
12:38:00	57.4	41.0	9.1	49.7	5.8	8.9	1.1	666.9
12:39:00	58.4	41.0	9.1	49.8	6.1	8.9	1.0	656.1
12:40:00	58.0	41.0	9.1	49.6	6.4	8.9	1.1	640.8
12:41:00	56.3	41.0	9.2	49.7	6.7	8.9	1.0	642.7
13:39:00	63.2	38.7	9.1	49.9	7.3	8.7	1.0	631.1
13:40:00	66.4	38.7	9.2	50.0	6.5	8.7	1.1	634.6
13:41:00	65.4	38.7	9.5	50.1	8.9	8.9	1.0	637.8
13:42:00	68.6	38.7	9.7	50.5	9.6	8.9	1.0	652.6
13:43:00	70.1	38.7	9.7	50.5	8.6	9.1	1.0	655.4
13:44:00	72.6	37.4	9.6	50.3	10.0	9.1	1.1	649.0
13:45:00	75.8	37.4	9.7	50.4	7.1	9.1	1.0	647.4
13:46:00	72.6	37.4	9.2	49.9	8.1	8.9	1.0	606.4
13:47:00	75.0	36.1	9.4	49.9	7.6	8.7	0.9	595.9
13:48:00	78.7	36.1	9.4	49.8	9.3	8.9	1.0	592.5
13:49:00	81.4	36.1	9.5	49.9	9.4	8.7	1.0	598.9
13:50:00	82.7	36.1	9.5	50.1	12.4	9.1	1.0	603.7
13:51:00	93.3	36.1	9.7	50.4	7.3	9.1	1.0	627.2
13:52:00	87.5	36.1	9.6	50.3	11.6	9.1	1.0	631.0
13:53:00	87.2	36.1	9.6	50.4	7.2	9.1	1.0	635.4
13:54:00	91.0	35.0	9.2	50.0	9.3	9.1	1.1	604.8
13:55:00	88.0	35.0	8.8	49.7	7.2	8.7	1.0	582.2
13:56:00	88.4	35.0	8.5	49.6	9.9	8.9	1.0	571.1
13:57:00	94.2	35.0	9.1	49.8	8.5	8.7	1.1	576.9
13:58:00	92.4	35.0	9.2	50.0	9.7	9.1	1.0	590.4
13:59:00	81.1	35.0	9.3	50.3	13.2	9.1	1.0	630.7
14:00:00	84.0	35.0	9.6	50.5	10.5	9.1	1.0	636.4
14:01:00	93.5	35.0	9.6	50.3	12.7	9.1	1.1	610.9
14:02:00	99.1	33.8	9.5	50.3	8.3	9.1	1.0	594.1
14:03:00	97.1	33.8	8.8	50.0	11.4	8.9	1.0	582.9
14:04:00	100.9	33.8	8.8	49.8	9.2	8.7	1.0	574.3
14:05:00	102.6	33.8	8.8	49.7	10.8	8.9	1.0	571.4

Test No. 1 - October 6, 2020
CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
14:06:00	101.7	32.8	8.8	49.8	8.7	8.9	1.1	571.4
14:07:00	101.4	32.8	8.8	49.9	11.8	9.1	1.0	569.0
14:08:00	103.8	32.8	9.2	50.3	8.3	9.1	1.0	581.2
14:09:00	103.5	32.8	9.5	50.1	12.7	9.1	1.1	579.1
14:10:00	106.3	32.8	9.5	50.2	8.1	9.1	1.1	584.7
14:11:00	103.2	32.8	9.2	50.0	11.7	9.1	1.0	580.4
14:12:00	101.0	32.8	9.1	49.8	9.9	8.9	1.1	572.1
14:13:00	106.2	32.8	9.2	49.9	13.0	8.9	1.0	573.6
14:14:00	112.1	32.8	9.1	50.0	12.0	8.7	1.0	573.6
14:15:00	114.3	32.8	9.2	50.1	10.4	8.9	1.1	575.1
14:16:00	105.7	32.8	9.3	50.5	11.5	9.1	1.1	589.8
14:17:00	101.4	32.8	9.7	50.7	7.4	9.1	1.0	597.6
14:18:00	83.1	32.8	9.5	50.4	10.7	9.1	1.2	583.8
14:19:00	84.2	33.9	9.6	50.4	6.0	8.9	1.1	583.8
14:20:00	82.7	32.9	8.9	50.0	7.6	8.7	1.1	570.7
14:21:00	75.1	32.9	8.9	50.0	6.1	8.7	1.0	572.3
14:22:00	73.9	32.9	9.2	50.0	8.0	8.9	1.0	575.8
14:23:00	74.4	32.9	9.5	50.2	6.4	8.7	1.0	582.2
14:24:00	75.8	32.9	9.5	50.2	9.2	8.9	1.1	582.2
14:25:00	76.7	32.9	9.6	50.4	5.8	8.9	1.0	596.7
14:26:00	73.3	32.9	9.6	50.4	8.6	8.9	1.1	592.9
14:27:00	73.1	32.9	9.6	50.5	5.8	8.9	1.0	595.2
14:28:00	75.1	32.9	9.2	50.2	6.6	8.9	1.0	581.7
14:29:00	75.7	32.9	9.1	49.9	6.4	8.7	1.1	569.4
14:30:00	74.0	32.9	9.1	49.9	6.9	8.9	1.0	566.9
14:31:00	73.9	32.9	8.9	50.0	7.9	8.7	1.0	575.0
14:32:00	73.7	32.9	9.2	50.2	9.5	8.9	1.1	580.3
14:33:00	81.4	34.4	9.7	50.4	11.8	9.1	1.1	596.5
14:34:00	89.4	34.4	9.8	50.7	8.2	9.1	1.0	609.9
14:35:00	86.3	33.3	9.7	50.6	10.2	9.1	1.1	611.5
14:36:00	78.7	34.4	9.7	50.7	5.6	9.1	1.1	619.8
14:37:00	69.4	34.4	9.6	50.3	7.9	8.9	1.1	616.1
14:38:00	62.8	34.4	9.5	50.2	6.9	8.7	1.1	620.3
14:39:00	66.2	35.5	9.6	50.3	9.4	8.7	1.1	622.3
14:40:00	77.8	35.5	9.6	50.3	6.7	8.5	1.1	626.1
14:41:00	79.5	35.5	9.6	50.4	13.6	8.9	1.1	626.1
14:42:00	99.7	35.5	9.9	50.8	7.3	8.9	1.0	633.9
14:43:00	98.2	35.5	9.8	50.7	12.5	8.9	1.0	622.9
14:44:00	92.5	34.3	9.7	50.7	10.2	8.7	1.0	621.5
14:45:00	99.3	34.3	9.8	50.6	8.8	8.7	1.0	613.9
14:46:00	92.1	34.3	9.7	50.5	7.6	8.5	1.1	600.5
14:47:00	75.8	34.3	9.6	50.3	9.2	8.5	1.0	589.3
14:48:00	80.3	34.3	9.6	50.3	11.1	8.5	1.0	589.5
14:49:00	86.7	34.3	9.7	50.4	11.1	8.5	1.1	591.3
14:50:00	96.2	34.3	9.7	50.7	13.0	8.7	1.1	604.1
14:51:00	103.9	34.3	9.9	51.0	9.6	8.7	1.1	614.7
14:52:00	93.2	34.3	9.7	50.8	17.1	8.9	1.1	603.0
14:53:00	99.9	34.3	9.7	50.7	7.7	8.7	1.0	597.6
14:54:00	95.8	33.3	9.7	50.6	8.7	8.7	1.1	589.1
14:55:00	75.5	33.3	9.6	50.4	6.9	8.5	1.0	580.3
14:56:00	73.0	33.3	9.3	50.3	8.2	8.7	1.0	576.7
14:57:00	75.9	33.3	9.2	50.2	6.7	8.5	1.0	570.7
14:58:00	80.5	33.3	9.5	50.2	10.3	8.7	1.0	571.7
14:59:00	83.8	33.3	9.6	50.5	7.1	8.7	1.0	579.8
15:00:00	81.0	33.3	9.6	50.4	8.0	8.9	1.0	581.2
15:01:00	76.6	33.3	9.6	50.5	9.0	8.9	1.0	582.6
15:02:00	78.8	33.3	9.3	50.5	8.6	8.9	1.0	584.7
15:03:00	83.0	33.3	9.2	50.4	7.8	8.7	1.0	610.7
15:04:00	80.8	33.3	9.2	50.1	7.9	8.9	1.0	653.6
15:05:00	74.2	33.3	9.1	50.0	8.1	8.7	1.0	590.9
15:06:00	74.3	33.3	9.1	50.1	7.9	8.9	1.0	586.6
15:07:00	73.4	34.6	8.9	50.4	9.6	8.9	1.0	592.0
15:08:00	76.3	34.6	9.3	50.7	8.8	9.1	1.0	601.4
15:09:00	84.7	34.6	9.3	50.6	12.0	9.1	1.1	597.6
15:10:00	90.9	33.5	9.3	50.5	6.8	9.1	1.0	599.0
15:11:00	88.4	33.5	8.9	50.2	8.6	8.7	1.0	587.0
15:12:00	82.7	33.5	9.1	49.8	6.9	8.9	1.0	573.2
15:13:00	81.1	33.5	9.1	49.8	9.4	8.7	1.0	574.4
15:14:00	84.4	33.5	9.2	50.3	6.5	9.1	1.0	587.8
15:15:00	84.4	33.5	9.5	50.5	10.8	9.1	1.0	590.0
15:16:00	89.6	33.5	9.5	50.6	8.4	9.1	1.0	596.2
15:17:00	87.8	33.5	9.6	50.6	8.9	8.9	1.0	597.0
15:18:00	84.5	33.5	9.5	50.5	9.2	8.9	1.0	597.0
15:19:00	87.4	33.5	9.2	50.3	7.9	8.9	1.0	589.8

Test No. 1 - October 6, 2020
CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
15:20:00	86.4	33.5	8.8	49.9	8.3	8.7	1.0	574.1
15:21:00	83.3	33.5	8.8	49.8	7.6	8.9	0.9	571.8
15:22:00	83.9	33.5	8.7	49.7	8.9	8.9	0.9	573.6
15:23:00	90.0	33.5	9.1	50.1	9.8	9.1	1.0	578.2
15:24:00	96.1	33.5	9.2	50.3	11.4	9.1	1.0	592.9
15:25:00	96.9	33.5	9.3	50.4	8.8	9.1	1.0	606.4
15:26:00	92.4	33.5	9.3	50.3	11.2	9.1	1.0	613.4
15:27:00	92.8	33.5	9.6	50.5	6.7	9.1	0.9	628.4
15:28:00	87.2	33.5	9.2	50.2	9.6	8.7	1.0	618.2
15:29:00	88.1	33.5	8.5	49.8	6.8	8.9	1.0	603.0
15:30:00	90.3	33.5	8.5	49.9	9.8	8.7	0.9	600.1
15:31:00	95.4	33.5	9.1	50.1	6.9	9.1	1.0	593.5
15:32:00	95.7	32.2	9.2	50.2	11.7	9.1	1.0	595.7
15:33:00	99.5	32.2	9.2	50.4	9.7	9.1	0.9	603.4
15:34:00	103.8	32.2	9.2	50.4	12.1	9.1	0.9	602.8
15:35:00	105.4	32.2	9.3	50.5	10.7	9.1	1.0	601.6
15:36:00	100.7	32.2	9.4	50.5	8.3	8.9	0.9	595.9
15:37:00	93.9	32.2	8.9	50.1	8.6	8.9	1.0	581.3
15:38:00	93.4	32.2	8.5	49.8	9.2	8.9	0.9	571.9
Max	115.2	41.0	9.9	51.0	17.1	9.5	1.2	681.6
Min	52.7	32.2	8.3	49.2	5.1	8.3	0.9	527.3
Average	77.6	36.2	9.3	50.1	8.1	8.9	1.0	599.1

Test No. 2 - October 7, 2020
CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
9:04:00	68.2	63.3	9.1	49.8	18.3	8.7	0.9	723.6
9:05:00	71.2	63.3	9.2	49.8	17.5	8.7	1.0	727.6
9:06:00	79.9	64.5	9.6	50.3	19.9	8.7	0.9	743.6
9:07:00	85.3	64.5	9.8	50.5	21.8	8.7	1.0	764.7
9:08:00	86.7	64.5	9.8	50.8	18.2	8.9	0.9	766.5
9:09:00	79.6	64.5	9.7	50.6	20.5	8.9	1.1	754.1
9:10:00	82.2	64.5	9.7	50.8	16.6	8.9	0.9	755.5
9:11:00	77.5	64.5	9.5	50.3	19.3	8.9	1.0	732.2
9:12:00	74.7	64.5	9.4	50.1	16.5	8.7	0.9	726.6
9:13:00	73.0	64.5	9.2	49.9	18.6	8.5	0.9	724.3
9:14:00	74.6	64.5	9.5	50.0	17.4	8.7	0.9	732.2
9:15:00	76.6	64.5	9.5	50.1	20.6	8.7	1.0	737.9
9:16:00	86.6	64.5	9.7	50.7	15.3	8.9	1.0	763.5
9:17:00	83.3	64.5	9.3	50.6	20.6	8.9	1.0	759.0
9:18:00	80.1	64.5	9.3	50.3	15.7	8.9	0.9	755.7
9:19:00	81.4	64.5	9.6	50.3	17.6	8.9	0.9	744.6
9:20:00	76.3	64.5	9.5	50.0	16.3	8.9	0.9	735.9
9:21:00	72.0	65.7	9.2	49.9	18.2	8.7	0.9	734.9
9:22:00	72.7	65.7	9.2	50.0	17.7	8.7	0.9	740.7
9:23:00	76.0	65.7	9.6	50.3	19.3	8.7	1.0	750.7
9:24:00	75.9	65.7	9.6	50.3	20.7	8.7	1.0	755.0
9:25:00	78.8	65.7	9.6	50.5	17.9	8.9	1.0	769.0
9:26:00	77.4	65.7	9.6	50.2	20.0	8.9	1.0	761.7
9:27:00	80.9	65.7	9.6	50.3	16.3	8.9	0.9	764.1
9:28:00	76.2	65.7	9.2	49.9	18.8	8.9	0.9	739.1
9:29:00	73.7	65.7	9.2	49.8	17.1	8.9	1.0	736.4
9:30:00	75.0	65.7	9.2	49.9	20.4	8.7	1.0	738.0
9:31:00	81.8	65.7	9.5	50.2	18.0	8.7	1.0	750.9
9:32:00	84.2	67.1	9.6	50.3	22.6	8.7	1.0	757.7
9:33:00	94.6	68.2	9.8	50.8	16.3	8.9	0.9	781.5
9:34:00	90.8	68.2	9.7	50.6	21.1	8.9	1.0	775.1
9:35:00	83.3	68.2	9.7	50.5	16.6	8.9	0.9	769.1
9:36:00	84.2	67.1	9.5	50.2	18.6	8.9	1.0	748.0
9:37:00	79.0	67.1	9.4	50.0	18.4	8.9	0.9	732.0
9:38:00	79.6	67.1	9.5	50.2	19.2	8.7	0.9	728.2
9:39:00	80.2	67.1	9.5	50.1	19.9	8.7	1.0	728.2
9:40:00	80.8	67.1	9.6	50.2	21.2	8.7	1.1	735.4
9:41:00	88.3	67.1	9.7	50.5	21.6	8.7	1.0	750.7
9:42:00	91.0	67.1	9.7	50.7	18.7	8.9	0.9	758.2
9:43:00	82.3	67.1	9.6	50.3	21.9	8.9	1.1	747.9
9:44:00	84.9	67.1	9.7	50.4	16.8	8.9	1.0	749.5
9:45:00	77.7	67.1	9.2	50.0	19.4	8.9	1.0	742.0
9:46:00	72.9	68.7	9.2	50.1	16.3	8.9	1.0	749.7
9:47:00	71.2	68.7	9.5	50.3	19.8	8.7	0.9	768.1
9:48:00	71.8	67.6	9.6	50.2	17.2	8.7	1.0	780.4
9:49:00	76.4	67.6	9.7	50.3	23.7	8.7	1.0	785.1
9:50:00	89.8	69.7	9.8	50.7	16.3	8.7	1.0	803.6
9:51:00	86.2	69.7	9.7	50.6	22.2	8.9	1.0	795.9
9:52:00	80.4	68.3	9.7	50.4	18.1	8.9	1.0	782.1
9:53:00	80.5	68.3	9.6	50.2	18.4	8.9	1.1	762.6
9:54:00	74.9	67.2	9.6	49.9	19.1	8.9	1.1	744.7
9:55:00	75.6	67.2	9.5	49.9	19.8	8.7	1.1	737.0
9:56:00	79.2	67.2	9.6	49.9	20.5	8.5	1.1	737.0
9:57:00	83.6	67.2	9.6	50.1	21.4	8.5	1.0	737.0
9:58:00	91.1	67.2	9.7	50.3	23.5	8.5	1.1	746.8
9:59:00	99.3	67.2	9.8	50.5	19.2	8.7	1.0	757.5
10:00:00	91.6	66.0	9.7	50.4	25.9	8.7	1.0	755.5
10:01:00	93.8	66.0	9.8	50.6	16.1	8.9	1.1	762.3
10:02:00	83.0	66.0	9.6	50.3	19.2	8.9	1.1	738.7
10:03:00	75.1	66.0	9.5	50.0	17.2	8.9	1.0	722.5
10:04:00	75.1	66.0	9.5	50.1	22.5	8.7	1.0	721.1
10:05:00	84.3	66.0	9.7	50.3	17.7	8.5	1.0	733.8
10:06:00	89.6	66.0	9.7	50.5	27.0	8.5	1.1	740.3
10:07:00	110.2	66.0	9.9	50.9	18.9	8.5	1.0	762.9
10:08:00	111.2	64.6	9.9	50.8	22.7	8.7	1.0	759.3
10:09:00	93.9	64.6	9.8	50.6	20.8	8.9	1.0	748.3
10:10:00	87.9	63.3	9.7	50.4	17.9	8.9	1.0	743.2
10:11:00	81.1	62.1	9.5	49.8	21.6	8.7	1.0	724.2
10:12:00	83.4	62.1	9.5	49.8	19.0	8.7	1.0	719.3
10:13:00	84.2	62.1	9.5	50.0	21.3	8.5	1.0	724.5
10:14:00	87.1	62.1	9.6	50.1	23.0	8.5	1.1	730.3
10:15:00	103.4	60.8	9.7	50.2	26.3	8.5	1.1	744.4
10:16:00	111.6	60.8	9.7	50.5	17.4	8.7	0.9	750.4
10:17:00	95.5	60.8	9.7	50.2	24.0	8.7	1.1	740.4

Test No. 2 - October 7, 2020
CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
10:18:00	92.4	60.8	9.6	50.3	15.6	8.9	1.0	743.1
10:19:00	82.9	59.5	9.2	50.0	19.5	8.9	1.0	724.6
10:20:00	76.0	58.4	9.2	49.8	16.4	8.9	1.0	716.2
10:21:00	79.5	58.4	9.5	49.7	21.5	8.7	1.0	719.0
10:22:00	85.0	58.4	9.6	50.1	17.1	8.7	1.0	731.9
10:23:00	85.1	58.4	9.7	50.3	22.0	8.7	1.1	734.9
10:24:00	93.3	57.1	9.8	50.6	18.9	8.7	1.0	747.8
10:25:00	96.1	57.1	9.8	50.6	20.7	8.9	1.1	747.8
10:26:00	90.4	55.9	9.7	50.4	21.5	8.9	1.1	742.0
10:27:00	90.5	55.9	9.3	50.1	17.7	8.9	1.0	728.9
10:28:00	83.7	54.1	9.2	49.8	20.1	8.9	1.1	715.5
10:29:00	82.8	54.1	9.5	49.8	19.8	8.7	1.0	716.2
10:30:00	85.0	54.1	9.5	49.8	21.0	8.7	1.0	716.2
10:31:00	91.5	53.1	9.5	49.9	19.5	8.7	1.0	728.8
10:32:00	88.8	53.1	9.6	50.3	25.6	8.7	1.0	742.6
10:33:00	90.8	53.1	9.7	50.4	17.5	8.9	1.0	748.8
10:34:00	84.5	51.7	9.6	50.0	24.2	8.9	1.0	732.4
10:35:00	84.5	51.7	9.6	50.1	15.7	8.9	1.0	734.6
10:36:00	82.0	50.6	9.2	49.8	19.0	8.9	1.1	720.3
10:37:00	77.9	50.6	9.2	49.6	15.9	8.9	1.1	712.0
10:38:00	79.8	50.6	9.2	49.9	19.4	8.7	1.0	717.8
10:39:00	78.9	50.6	9.2	50.0	16.7	8.7	1.0	725.1
10:40:00	79.5	50.6	9.2	49.9	23.3	8.7	1.0	725.1
10:41:00	91.4	50.6	9.3	50.2	20.7	8.7	1.1	742.5
10:42:00	95.5	50.6	9.7	50.5	20.6	8.9	1.1	752.0
10:43:00	83.7	49.1	9.6	50.3	20.9	8.9	1.0	740.6
10:44:00	79.7	49.1	9.3	50.1	17.9	8.9	1.1	730.3
10:45:00	76.3	49.1	9.2	49.8	19.7	8.9	1.1	716.6
10:46:00	74.0	48.0	9.1	49.6	17.8	8.9	1.0	710.6
10:47:00	72.5	48.0	9.1	49.6	19.7	8.7	1.1	710.6
10:48:00	75.3	48.0	9.5	49.9	18.5	8.7	1.1	719.4
10:49:00	79.1	48.0	9.5	49.9	22.8	8.7	1.0	727.4
10:50:00	85.6	48.0	9.6	50.2	16.9	8.9	1.1	735.2
10:51:00	82.6	48.0	9.6	49.9	21.7	8.9	1.1	725.1
10:52:00	82.0	48.0	9.6	50.0	15.5	8.9	1.0	727.6
10:53:00	79.7	47.0	8.9	49.8	20.6	8.9	1.1	715.8
10:54:00	75.8	47.0	8.8	49.6	15.0	8.9	1.1	707.0
10:55:00	75.5	47.0	8.8	49.5	19.0	8.9	1.0	706.7
10:56:00	78.3	46.0	9.1	49.5	17.3	8.9	1.0	717.5
10:57:00	81.6	46.0	9.5	49.7	22.1	8.9	1.0	723.6
10:58:00	86.9	46.0	9.5	50.0	21.3	8.9	1.1	741.5
10:59:00	90.0	46.0	9.6	50.3	19.1	8.9	1.0	747.8
11:00:00	81.6	46.0	9.6	49.9	25.0	8.9	1.1	731.3
11:01:00	90.2	46.0	9.6	50.0	16.7	9.1	1.0	726.8
11:02:00	85.4	46.0	9.2	49.8	18.0	9.1	1.1	711.5
11:03:00	71.3	46.0	9.1	49.7	16.9	9.1	0.9	697.5
11:04:00	70.8	46.0	9.1	49.5	19.6	8.7	0.9	694.8
12:28:00	53.9	50.9	9.5	49.6	13.8	8.9	0.9	824.8
12:29:00	54.0	52.1	9.5	49.6	18.5	8.9	1.0	826.0
12:30:00	59.4	52.1	9.6	49.6	14.6	8.7	1.0	837.1
12:31:00	64.0	52.1	9.7	49.8	21.4	8.7	1.1	856.3
12:32:00	69.8	52.1	9.8	50.1	16.8	8.7	1.1	876.4
12:33:00	76.8	52.1	9.9	50.4	19.8	8.9	1.1	886.5
12:34:00	73.6	52.1	9.9	50.4	22.1	8.9	1.1	880.6
12:35:00	77.3	53.3	9.9	50.3	17.7	8.9	1.1	881.3
12:36:00	67.2	53.3	9.7	49.9	19.5	8.9	1.1	858.1
12:37:00	66.7	53.3	9.7	50.0	18.9	8.7	1.0	854.5
12:38:00	67.3	53.3	9.7	49.8	18.8	8.5	1.0	844.4
12:39:00	68.5	53.3	9.7	49.9	17.9	8.5	1.1	847.6
12:40:00	69.7	54.4	9.8	50.1	25.6	8.5	1.1	855.1
12:41:00	79.5	54.4	9.9	50.3	17.1	8.5	1.0	870.5
12:42:00	78.0	54.4	9.8	50.4	23.3	8.7	1.1	866.4
12:43:00	76.6	54.4	9.9	50.5	14.2	8.7	1.0	872.6
12:44:00	72.7	54.4	9.8	50.3	17.1	8.7	1.1	857.8
12:45:00	59.8	54.4	9.6	49.8	14.0	8.7	1.0	830.5
12:46:00	59.5	54.4	9.6	49.9	18.5	8.7	1.3	831.6
12:47:00	63.5	55.7	9.7	50.0	15.4	8.5	1.0	831.6
12:48:00	71.6	55.7	9.7	50.1	22.3	8.5	1.0	838.3
12:49:00	76.9	55.7	9.8	50.2	17.9	8.5	1.0	849.7
12:50:00	78.2	55.7	9.8	50.3	18.3	8.5	1.1	850.9
12:51:00	72.0	54.5	9.7	50.2	21.7	8.7	1.1	841.7
12:52:00	75.1	54.5	9.7	50.1	15.0	8.7	1.1	832.7
12:53:00	65.9	54.5	9.5	49.6	17.7	8.7	1.1	800.6
12:54:00	65.9	54.5	9.6	49.5	19.0	8.7	1.0	793.6

Test No. 2 - October 7, 2020
CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
12:55:00	77.1	54.5	9.6	49.6	20.0	8.5	1.1	768.9
12:56:00	82.4	54.5	9.6	49.9	20.6	8.5	1.1	762.3
12:57:00	88.7	52.8	9.7	50.0	26.8	8.5	1.1	755.7
12:58:00	104.0	52.8	9.8	50.2	17.8	8.5	1.0	764.2
12:59:00	98.1	52.8	9.8	50.3	25.0	8.8	1.0	755.2
13:00:00	99.2	51.8	9.8	50.4	15.6	8.8	1.1	755.2
13:01:00	96.0	51.8	9.7	50.1	21.6	8.8	1.0	740.9
13:02:00	86.5	50.3	9.5	49.6	16.1	8.8	1.0	711.8
13:03:00	86.9	50.3	9.5	49.6	21.2	8.8	1.0	711.8
13:04:00	88.8	50.3	9.6	49.8	16.8	8.6	0.9	717.1
13:05:00	90.0	50.3	9.6	50.0	22.9	8.6	1.0	718.2
13:06:00	91.8	50.3	9.7	50.1	24.7	8.6	0.9	724.7
13:07:00	100.8	49.2	9.7	50.3	21.2	8.8	1.0	733.5
13:08:00	96.4	49.2	9.7	50.2	22.3	8.8	1.0	727.1
13:09:00	89.5	49.2	9.7	50.1	17.7	8.8	1.0	716.5
13:10:00	81.9	49.2	9.4	49.5	19.9	8.8	0.9	690.0
13:11:00	83.5	49.2	9.5	49.4	19.5	8.8	0.9	686.4
13:12:00	88.8	49.2	9.4	49.5	23.2	8.8	1.0	684.6
13:13:00	93.2	49.2	9.5	49.5	20.7	8.6	1.0	688.3
13:14:00	97.2	49.2	9.6	49.8	27.1	8.6	1.0	698.4
13:15:00	103.4	49.2	9.7	50.1	18.4	8.6	1.0	712.8
13:16:00	103.0	49.2	9.6	50.1	23.8	9.0	1.0	711.0
13:17:00	97.5	49.2	9.7	50.1	16.6	9.0	0.9	704.4
13:18:00	94.5	49.2	9.3	49.8	21.4	9.0	0.9	693.0
13:19:00	90.3	48.0	9.2	49.5	17.5	9.0	0.9	675.4
13:20:00	91.1	48.0	9.5	49.6	20.8	9.0	1.0	677.9
13:21:00	89.4	48.0	9.5	49.5	18.9	8.8	1.0	682.5
13:22:00	94.6	48.0	9.6	49.7	24.6	8.8	0.8	689.1
13:23:00	99.0	48.0	9.6	49.9	24.3	8.8	1.0	696.3
13:24:00	103.3	48.0	9.7	50.1	21.7	8.8	0.9	704.2
13:25:00	98.8	48.0	9.6	50.0	23.5	9.0	1.1	697.5
13:26:00	100.1	48.0	9.6	50.1	18.1	9.0	1.0	697.5
13:27:00	88.8	48.0	9.4	49.7	20.6	9.0	1.0	674.6
13:28:00	87.1	48.0	9.1	49.6	18.7	9.0	1.0	669.5
13:29:00	87.2	48.0	8.8	49.4	23.6	8.8	1.1	668.0
13:30:00	93.2	48.0	9.2	49.5	20.7	8.8	1.0	673.5
13:31:00	103.6	48.0	9.5	49.8	27.7	8.8	1.0	684.6
13:32:00	113.8	48.0	9.7	50.2	17.6	8.8	1.0	704.1
13:33:00	105.8	48.0	9.6	50.0	24.3	9.0	1.0	693.2
13:34:00	98.4	46.6	9.5	49.9	16.7	9.0	0.9	682.3
13:35:00	97.5	46.6	9.2	49.8	20.0	9.0	1.0	673.5
13:36:00	86.5	46.6	8.7	49.3	17.3	9.0	1.0	654.6
13:37:00	85.5	46.6	8.8	49.4	20.3	9.0	0.9	657.3
13:38:00	81.3	46.6	9.1	49.4	19.9	8.8	0.9	663.3
13:39:00	89.5	46.6	9.1	49.4	25.6	8.8	1.0	664.8
13:40:00	97.0	46.6	9.1	49.6	21.2	8.8	1.0	670.1
13:41:00	101.7	46.6	9.1	49.7	21.2	9.0	1.1	664.4
13:42:00	98.5	46.6	8.8	49.5	23.6	9.2	1.1	655.5
13:43:00	106.4	46.6	9.1	49.6	18.1	9.2	1.0	670.2
13:44:00	99.6	46.6	8.7	49.4	22.0	9.2	1.0	652.0
13:45:00	98.2	46.6	8.7	49.0	19.2	9.2	0.9	649.6
13:46:00	97.9	46.6	9.0	49.0	22.1	9.2	1.1	657.5
13:47:00	99.0	46.6	9.0	49.1	20.4	9.2	1.0	663.3
13:48:00	101.6	46.6	9.4	49.3	27.5	9.2	0.9	675.0
13:49:00	107.4	46.6	9.6	49.7	18.4	9.2	0.9	696.2
13:50:00	109.3	46.6	9.6	49.9	23.6	9.2	1.0	731.8
13:51:00	93.1	46.6	9.6	49.8	18.4	9.2	1.0	763.4
13:52:00	90.8	47.7	9.6	49.8	21.8	9.2	1.0	766.2
13:53:00	82.6	47.7	9.5	49.5	21.7	9.2	1.0	745.5
13:54:00	86.7	47.7	9.6	49.5	22.4	9.2	1.0	738.6
13:55:00	87.7	47.7	9.6	49.6	25.3	9.0	1.0	731.9
13:56:00	94.8	47.7	9.7	49.8	25.9	9.0	1.1	723.3
13:57:00	100.9	47.7	9.7	49.8	32.0	9.0	1.0	728.2
13:58:00	116.7	47.7	9.8	50.1	24.7	8.8	1.0	742.4
13:59:00	113.6	46.5	9.8	50.0	30.7	8.8	1.1	736.2
14:00:00	113.3	46.5	9.9	50.2	18.8	8.8	0.9	743.9
14:01:00	93.7	46.5	9.6	49.7	26.9	8.8	1.0	717.7
14:02:00	89.5	46.5	9.6	49.7	19.2	8.8	1.0	716.4
14:03:00	94.4	47.8	9.7	49.8	26.6	8.8	1.0	725.4
14:04:00	95.3	47.8	9.7	49.9	20.9	8.6	0.9	733.0
14:05:00	110.6	47.8	9.8	50.3	32.7	8.6	1.0	751.2
14:06:00	148.8	47.8	10.0	50.7	20.2	8.6	1.0	775.9
14:07:00	142.7	47.8	10.0	50.6	30.8	8.6	1.0	765.2
14:08:00	130.9	47.8	10.0	50.5	24.5	8.6	1.1	754.4

Test No. 2 - October 7, 2020
CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
14:09:00	130.3	47.8	9.9	50.5	22.8	8.8	1.0	749.8
14:10:00	98.7	47.8	9.7	50.0	19.9	8.8	1.0	722.3
14:11:00	91.4	47.8	9.8	50.0	18.4	8.8	1.0	719.2
14:12:00	72.7	47.8	9.7	49.9	20.0	8.4	1.1	707.1
14:13:00	70.8	47.8	9.7	50.0	19.0	8.4	1.0	705.6
14:14:00	70.5	47.8	9.7	50.1	21.1	8.4	1.0	707.5
14:15:00	74.3	47.8	9.7	50.1	16.5	8.4	1.0	713.7
14:16:00	71.4	47.8	9.6	50.0	22.8	8.6	1.1	705.7
14:17:00	72.7	47.8	9.7	50.2	14.5	8.6	1.0	711.9
14:18:00	64.6	47.8	9.5	49.7	17.1	8.6	1.1	699.1
14:19:00	58.7	47.8	9.5	49.5	14.6	8.6	1.0	695.8
14:20:00	56.9	47.8	9.5	49.6	17.6	8.8	1.0	692.7
14:21:00	57.5	48.9	9.5	49.8	14.5	8.8	1.0	698.0
14:22:00	60.2	48.9	9.6	50.0	18.9	8.8	1.0	708.0
14:23:00	64.5	48.9	9.7	50.2	14.4	8.8	0.9	729.1
14:24:00	63.1	48.9	9.6	50.1	17.8	8.8	1.0	725.9
14:25:00	63.1	48.9	9.5	50.0	15.4	8.8	1.0	716.6
14:26:00	63.8	48.9	9.2	49.8	15.5	9.0	1.1	707.7
14:27:00	60.2	48.9	8.5	49.4	16.3	9.0	1.0	679.7
14:28:00	62.1	48.9	8.4	49.5	16.5	9.0	1.0	676.8
Max	148.8	69.7	10.0	50.9	32.7	9.2	1.3	886.5
Min	53.9	46.0	8.4	49.0	13.8	8.4	0.8	649.6
Average	84.9	54.8	9.5	50.0	20.0	8.8	1.0	739.5

Test No. 3 - October 8, 2020
CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
8:37:00	51.0	97.5	9.6	49.6	10.9	9.4	1.2	761.7
8:38:00	49.7	97.5	9.6	49.6	8.9	9.2	1.0	761.5
8:39:00	45.9	97.5	9.2	49.4	10.8	9.2	1.1	749.0
8:40:00	42.7	97.5	9.2	49.1	8.8	9.2	1.0	741.8
8:41:00	43.0	97.5	9.4	49.3	10.1	9.2	1.1	744.8
8:42:00	42.2	97.5	9.5	49.4	9.1	9.2	1.0	747.7
8:43:00	43.5	98.6	9.3	49.5	11.5	9.2	1.1	754.4
8:44:00	46.6	99.9	9.4	49.8	8.4	9.2	1.1	770.0
8:45:00	45.6	98.1	9.6	49.8	10.8	9.0	1.1	768.1
8:46:00	43.2	98.1	9.6	49.9	7.9	9.0	1.0	764.7
8:47:00	43.0	98.1	9.3	49.8	9.2	9.0	1.1	754.4
8:48:00	40.1	98.1	8.8	49.2	8.4	9.0	1.0	726.6
8:49:00	40.5	98.1	9.1	49.2	10.3	9.0	1.1	726.6
8:50:00	43.9	98.1	9.1	49.4	9.6	9.0	1.0	737.8
8:51:00	42.6	98.1	9.1	49.5	10.1	9.0	1.1	747.1
8:52:00	41.8	98.1	9.5	49.7	11.4	9.0	1.0	754.5
8:53:00	46.5	98.1	9.3	49.8	9.8	9.0	1.1	764.3
8:54:00	46.1	98.1	9.3	49.7	11.5	9.0	1.1	759.7
8:55:00	45.3	98.1	9.5	49.7	9.2	9.0	1.1	759.5
8:56:00	45.3	98.1	9.2	49.5	10.6	9.0	1.1	747.9
8:57:00	42.0	96.7	9.1	49.3	9.0	9.0	1.1	735.4
8:58:00	40.8	96.7	9.1	49.2	10.4	9.2	1.1	733.5
8:59:00	42.2	97.8	9.1	49.3	9.4	9.2	1.1	738.1
9:00:00	44.4	97.8	9.5	49.5	11.4	9.2	1.0	746.3
9:01:00	44.8	97.8	9.5	49.7	8.5	9.2	1.0	759.7
9:02:00	44.4	97.8	9.5	49.6	10.4	9.0	1.0	756.1
9:03:00	41.5	97.8	9.4	49.4	8.4	9.0	1.1	747.5
9:04:00	41.0	97.8	9.1	49.4	9.8	9.0	1.1	737.5
9:05:00	41.6	97.8	8.7	49.0	8.9	9.0	1.1	721.2
9:06:00	42.0	97.8	8.7	49.2	9.7	9.0	1.0	725.9
9:07:00	43.7	97.8	8.8	49.2	10.7	9.2	1.1	733.4
9:08:00	45.5	97.8	8.8	49.4	11.0	9.2	1.1	740.5
9:09:00	45.9	99.1	9.1	49.6	11.1	9.2	1.1	753.2
9:10:00	44.7	99.1	9.2	49.9	9.9	9.2	1.0	762.2
9:11:00	42.6	99.1	8.9	49.7	10.5	9.0	1.1	753.2
9:12:00	40.4	98.0	8.8	49.6	9.2	9.0	1.0	750.5
9:13:00	42.4	98.0	8.4	49.5	10.3	9.0	1.1	725.5
9:14:00	43.5	98.0	8.5	49.2	9.1	9.2	1.0	725.5
9:15:00	44.5	98.0	8.4	49.2	10.5	9.2	1.1	729.1
9:16:00	45.2	98.0	8.4	49.2	9.6	9.2	1.1	732.0
9:17:00	46.2	98.0	8.5	49.2	11.1	9.2	1.1	737.2
9:18:00	46.2	98.0	8.8	49.5	9.2	9.2	1.1	748.5
9:19:00	47.1	98.0	8.8	49.6	10.7	9.2	1.1	750.7
9:20:00	44.3	98.0	9.1	49.5	9.1	9.2	1.1	750.8
9:21:00	46.1	98.0	9.0	49.4	9.6	9.2	1.1	745.9
9:22:00	48.6	98.0	8.3	48.7	9.7	9.2	1.1	722.7
9:23:00	47.1	96.8	8.2	48.5	10.2	9.2	1.1	722.7
9:24:00	48.5	96.8	8.3	48.5	10.0	9.4	1.1	735.6
9:25:00	48.3	98.1	8.4	48.8	11.0	9.4	1.0	740.9
9:26:00	48.0	98.1	8.4	48.9	10.8	9.4	1.1	747.6
9:27:00	47.5	98.1	8.7	49.1	10.1	9.4	1.1	755.9
9:28:00	47.7	98.1	9.0	49.1	11.8	9.2	1.1	747.0
9:29:00	47.3	98.1	9.1	49.3	9.5	9.2	1.1	748.6
9:30:00	49.2	98.1	8.7	49.1	10.5	9.2	1.1	735.6
9:31:00	50.1	96.8	8.3	48.6	9.3	9.4	1.0	714.2
9:32:00	50.5	96.8	8.3	48.6	10.7	9.6	1.0	711.8
9:33:00	51.1	96.8	8.4	48.9	9.4	9.6	1.1	719.9
9:34:00	48.7	95.2	8.4	49.0	11.4	9.6	1.1	724.5
9:35:00	49.1	95.2	8.7	49.1	9.0	9.6	1.0	734.2
9:36:00	49.4	95.2	9.0	49.1	10.7	9.4	1.1	739.7
9:37:00	48.0	95.2	9.0	48.7	9.5	9.4	1.1	731.9
9:38:00	48.4	95.2	9.0	48.7	9.6	9.4	1.1	728.3
9:39:00	48.9	95.2	8.3	48.4	9.7	9.4	1.1	713.3
9:40:00	48.9	95.2	8.4	48.4	9.7	9.4	1.0	716.3
9:41:00	49.2	95.2	8.7	48.4	10.7	9.4	1.1	723.6
9:42:00	49.4	95.2	9.0	48.5	10.5	9.4	1.2	727.4
9:43:00	49.1	95.2	9.4	48.9	12.2	9.4	1.1	732.9
9:44:00	51.9	97.3	9.5	49.3	9.9	9.4	1.1	750.3
9:45:00	49.9	96.1	9.5	49.3	11.0	9.4	1.1	744.8
9:46:00	45.0	96.1	9.6	49.5	8.2	9.4	1.1	748.1
9:47:00	43.4	94.7	9.2	49.3	10.1	9.4	1.1	735.4
9:48:00	41.3	93.6	8.8	48.8	8.6	9.4	1.1	717.3
9:49:00	43.1	93.6	9.3	48.8	9.9	9.4	1.1	723.4
9:50:00	43.3	93.6	9.4	49.0	8.5	9.4	1.1	728.9

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Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
9:51:00	44.1	94.8	9.5	49.4	12.1	9.4	1.1	741.7
9:52:00	48.6	96.1	9.6	49.7	9.1	9.4	1.1	754.6
9:53:00	51.6	96.1	9.6	49.5	11.2	9.2	1.1	755.3
9:54:00	46.3	94.8	9.6	49.5	13.0	9.2	1.1	754.2
9:55:00	48.9	94.8	9.6	49.5	9.6	9.0	1.1	751.4
9:56:00	46.2	94.8	9.5	49.1	10.3	9.0	1.1	721.1
9:57:00	43.4	94.8	9.5	49.3	10.2	9.0	1.1	718.9
9:58:00	43.5	94.8	9.4	49.2	11.3	9.0	1.1	719.8
9:59:00	45.4	94.8	9.5	49.3	10.4	9.0	1.1	724.8
10:00:00	45.3	94.8	9.6	49.5	13.0	9.0	1.1	733.0
10:01:00	51.2	94.8	9.7	49.8	9.9	9.0	1.1	751.1
10:02:00	50.1	93.3	9.6	49.6	11.5	9.0	1.1	743.4
10:03:00	47.1	93.3	9.6	49.8	8.5	9.0	1.0	746.1
10:04:00	46.7	93.3	9.2	49.5	9.3	9.0	1.1	733.7
10:05:00	41.7	91.9	9.1	48.8	8.4	9.0	1.0	707.6
10:06:00	41.8	91.9	9.4	49.2	9.7	9.0	1.1	717.2
10:07:00	42.3	91.9	9.4	49.4	8.7	9.0	1.1	725.5
10:08:00	42.1	91.9	9.4	49.4	10.8	9.0	1.1	730.4
10:09:00	43.4	91.9	9.5	49.6	9.6	9.0	1.0	739.7
10:10:00	46.1	91.9	9.2	49.7	10.3	9.0	1.0	741.1
10:11:00	45.1	91.9	9.1	49.5	10.3	9.0	1.1	729.7
10:12:00	45.5	91.9	9.1	49.6	8.9	9.0	1.1	726.6
10:13:00	44.4	90.3	8.3	48.8	9.6	9.0	1.1	697.4
10:14:00	44.3	90.3	8.7	48.7	9.7	9.0	1.0	693.7
10:15:00	46.4	90.3	9.0	48.7	10.0	9.2	1.1	696.2
10:16:00	47.3	90.3	8.7	49.2	10.2	9.2	1.0	705.9
10:17:00	47.1	90.3	8.4	49.2	11.7	9.2	1.1	709.1
10:18:00	48.1	90.3	8.8	49.3	9.2	9.2	1.1	723.7
10:19:00	49.7	89.2	8.8	49.2	11.0	9.2	1.1	718.0
10:20:00	50.8	89.2	9.0	49.2	8.8	9.2	1.0	715.5
10:21:00	51.7	89.2	9.0	49.0	10.6	9.2	1.1	708.4
10:22:00	55.5	89.2	8.3	48.7	8.9	9.2	1.0	698.1
10:23:00	52.2	89.2	8.3	48.5	10.2	9.4	1.1	699.4
10:24:00	49.6	88.0	8.7	48.7	9.5	9.4	1.1	707.9
10:25:00	48.1	88.0	9.0	49.0	12.1	9.4	1.1	720.7
10:26:00	50.8	88.0	9.1	49.2	10.9	9.4	1.0	731.3
10:27:00	54.0	88.0	9.2	49.4	11.7	9.4	1.0	743.7
10:28:00	51.1	88.0	9.2	49.4	11.1	9.4	1.1	740.9
10:29:00	50.3	88.0	9.2	49.5	9.5	9.4	1.1	744.0
10:30:00	45.5	86.7	8.4	48.6	11.0	9.4	1.1	714.9
10:31:00	47.3	86.7	8.7	48.6	10.1	9.4	1.0	716.2
10:32:00	50.6	86.7	9.0	48.8	11.3	9.4	1.0	726.5
10:33:00	50.9	86.7	9.1	48.9	10.4	9.4	1.1	732.3
10:34:00	50.1	86.7	9.5	49.2	16.7	9.4	1.1	744.5
10:35:00	62.5	87.8	9.6	49.8	9.3	9.4	1.0	774.1
10:36:00	61.6	87.8	9.6	49.7	11.4	9.2	1.1	769.3
10:37:00	52.9	87.8	9.6	49.7	8.3	9.2	1.0	763.7
11:22:00	53.2	77.2	8.4	48.9	9.2	9.2	1.1	719.4
11:23:00	51.5	77.2	8.4	48.9	10.7	9.4	1.1	738.5
11:24:00	49.6	78.6	8.7	49.0	9.0	9.4	1.1	782.3
11:25:00	48.4	80.1	9.1	49.1	11.6	9.4	1.1	805.9
11:26:00	48.4	82.7	9.5	49.5	8.5	9.4	1.1	863.7
11:27:00	47.0	82.7	9.2	49.3	11.6	9.4	1.1	869.4
11:28:00	45.9	86.3	9.2	49.4	8.8	9.2	1.0	884.6
11:29:00	47.3	88.6	9.3	49.7	9.9	9.2	1.1	892.7
11:30:00	43.8	89.8	8.7	49.0	9.4	9.2	1.2	870.3
11:31:00	44.4	92.0	8.8	49.0	9.4	9.2	1.0	874.6
11:32:00	44.4	92.0	9.1	49.1	10.1	9.4	1.1	877.3
11:33:00	44.4	93.8	9.1	49.3	10.3	9.4	1.0	886.9
11:34:00	44.4	94.8	9.2	49.4	10.4	9.4	1.1	892.0
11:35:00	45.3	94.8	9.6	49.7	8.9	9.4	1.0	913.2
11:36:00	44.5	94.8	9.5	49.5	10.4	9.2	1.1	901.4
11:37:00	42.9	96.4	9.5	49.6	8.3	9.2	1.1	905.6
11:38:00	41.6	96.4	8.8	49.1	9.6	9.2	1.1	876.8
11:39:00	40.8	96.4	8.4	48.8	8.3	9.2	1.1	866.5
11:40:00	39.4	97.5	8.4	48.9	10.1	9.2	1.0	874.1
11:41:00	40.4	99.4	8.5	49.0	8.6	9.2	1.1	882.0
11:42:00	41.6	99.4	9.1	49.2	11.5	9.2	1.1	899.5
11:43:00	48.3	100.8	9.7	49.9	9.0	9.2	1.0	944.3
11:44:00	47.4	100.8	9.6	49.7	11.0	9.2	1.1	940.3
11:45:00	45.3	100.8	9.5	49.4	9.4	9.2	1.1	931.7
11:46:00	44.7	100.8	9.1	49.0	8.9	9.2	1.1	906.6
11:47:00	41.1	102.1	8.9	48.8	9.5	9.2	1.1	883.6
11:48:00	39.0	104.0	8.7	48.7	9.2	9.2	1.1	879.7

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CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
11:49:00	39.6	106.2	8.7	49.0	9.7	9.2	1.0	883.2
11:50:00	39.6	106.2	8.7	49.2	9.4	9.4	1.1	883.6
11:51:00	39.6	106.2	8.8	49.1	10.3	9.4	1.1	883.6
11:52:00	40.0	106.2	9.5	49.6	9.0	9.2	1.1	905.7
11:53:00	39.8	103.6	9.1	49.3	10.1	9.2	1.1	879.2
11:54:00	41.3	103.6	9.1	49.5	8.3	9.0	1.1	878.1
11:55:00	42.7	101.8	8.7	48.9	9.2	9.0	1.1	835.4
11:56:00	42.5	100.6	8.6	48.7	8.2	9.0	1.0	818.2
11:57:00	42.8	99.6	8.7	48.8	9.9	9.2	1.0	820.7
11:58:00	44.0	98.4	9.0	48.7	8.3	9.4	1.0	820.7
11:59:00	44.6	97.3	9.0	49.0	10.2	9.4	1.1	822.7
12:00:00	42.8	97.3	9.0	49.4	8.6	9.4	1.0	842.7
12:01:00	42.2	95.8	9.1	49.3	9.2	9.4	1.0	840.8
12:02:00	44.3	94.8	8.8	49.1	9.1	9.4		827.0
12:03:00	44.7	94.8	8.7	49.0	8.9	9.4		819.9
12:04:00	49.1	92.5	8.2	48.1	9.4	9.4		785.6
12:05:00	50.5	93.9	8.3	48.7	8.9	9.4		800.4
12:06:00	48.7	93.9	8.3	48.6	9.2	9.4		805.1
12:07:00	46.7	93.9	8.4	48.7	9.0	9.4		827.1
12:08:00	45.7	93.9	8.7	48.9	11.9	9.4	1.0	839.8
12:09:00	48.0	93.9	9.4	49.3	8.7	9.4	1.0	848.0
12:10:00	52.1	88.8	9.0	49.0	10.9	9.4	1.0	781.5
12:11:00	52.9	87.4	9.1	49.2	8.2	9.4	1.0	770.4
12:12:00	53.1	84.1	8.7	48.8	9.6	9.4	1.1	741.6
12:13:00	52.6	82.5	8.6	48.5	8.3	9.4	1.0	727.2
12:14:00	52.6	81.2	8.6	48.4	10.1	9.6	1.0	731.0
12:15:00	54.6	81.2	9.0	48.6	8.5	9.6	1.0	751.4
12:16:00	51.8	81.2	9.0	48.5	10.7	9.6	1.0	759.5
12:17:00	51.6	81.2	9.1	49.1	9.4	9.6	1.0	790.0
12:18:00	51.5	81.2	9.1	49.2	9.7	9.6	1.0	793.2
12:19:00	49.7	81.2	9.0	49.0	10.4	9.4	1.1	791.3
12:20:00	51.8	81.2	9.0	49.1	9.4	9.4	1.1	784.3
12:21:00	52.0	81.2	9.0	48.8	9.9	9.4	1.1	771.2
12:22:00	51.3	81.2	8.6	48.7	9.3	9.4	1.1	762.6
12:23:00	51.9	80.1	8.3	48.5	10.3	9.4	1.1	758.2
12:24:00	49.7	80.1	8.7	48.9	11.4	9.4	1.0	765.4
12:25:00	51.4	80.1	8.7	49.0	12.2	9.4	1.0	763.9
12:26:00	57.1	78.8	9.1	49.3	9.2	9.4	1.1	770.2
12:27:00	52.7	77.6	8.8	49.1	10.5	9.4	1.1	748.5
12:28:00	50.2	77.6	8.8	49.2	8.5	9.4	1.0	748.5
12:29:00	50.7	76.0	8.6	48.8	10.1	9.4	1.1	727.2
12:30:00	53.7	76.0	8.3	48.5	8.3	9.4	1.0	715.9
12:31:00	54.6	76.0	8.3	48.4	9.1	9.4	1.0	711.5
12:32:00	51.7	74.9	8.4	48.5	8.6	9.4	1.0	712.7
12:33:00	51.2	74.9	8.4	48.7	9.9	9.4	1.0	719.7
12:34:00	50.4	74.9	9.0	49.1	10.1	9.4	0.9	738.8
12:35:00	48.5	74.9	9.0	49.0	10.1	9.4	1.0	740.1
12:36:00	51.1	73.1	8.6	48.8	10.3	9.4	1.1	734.6
12:37:00	51.9	73.1	8.7	49.0	9.1	9.4	1.0	734.6
12:38:00	53.0	73.1	8.3	48.6	9.3	9.4	1.0	714.4
12:39:00	52.2	73.1	8.6	48.7	8.9	9.4	1.0	716.2
12:40:00	51.3	73.1	8.6	48.6	10.5	9.4	1.1	716.2
12:41:00	49.0	73.1	8.4	48.8	9.7	9.6	1.0	727.0
12:42:00	49.7	73.1	8.4	49.0	11.7	9.6	1.0	732.8
12:43:00	49.8	73.1	8.8	49.3	8.7	9.6	0.9	750.4
12:44:00	52.6	73.1	8.7	49.0	10.3	9.6	1.0	739.8
12:45:00	54.5	73.1	8.7	49.1	8.1	9.6	1.0	742.2
12:46:00	53.8	73.1	8.7	48.8	9.3	9.4	1.0	730.3
12:47:00	52.3	72.0	8.3	48.4	8.7	9.4	1.0	718.5
12:48:00	50.5	72.0	8.3	48.5	10.2	9.4	1.1	718.5
12:49:00	52.7	72.0	8.3	48.4	9.0	9.6	1.0	721.2
12:50:00	52.9	72.0	8.3	48.5	10.7	9.6	1.0	723.5
12:51:00	52.5	73.0	8.8	49.0	11.3	9.6	1.0	741.0
12:52:00	51.1	73.0	8.8	49.1	10.4	9.6	1.0	746.4
12:53:00	51.7	73.0	8.4	48.9	10.3	9.4	1.1	737.6
12:54:00	53.5	73.0	8.3	49.0	8.9	9.4	1.0	732.1
12:55:00	55.4	71.8	8.3	48.7	9.7	9.4	1.1	718.6
12:56:00	54.2	71.8	8.3	48.7	9.3	9.4	1.1	717.5
12:57:00	54.8	72.9	8.3	48.8	9.6	9.4	1.1	722.7
12:58:00	54.5	72.9	8.4	48.9	9.3	9.6	1.1	732.3
12:59:00	54.2	72.9	8.4	49.0	10.5	9.6	1.1	735.1
13:00:00	52.1	72.9	9.1	49.3	8.3	9.6	1.0	750.6
13:01:00	53.2	72.9	8.8	49.1	10.2	9.6	1.0	745.4
13:02:00	53.8	71.7	8.4	49.0	7.7	9.6	1.1	745.4

Test No. 3 - October 8, 2020
CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
13:03:00	57.2	71.7	8.4	49.0	8.8	9.6	1.1	723.7
13:04:00	62.3	71.7	8.3	48.9	8.6	9.6	1.1	709.0
13:05:00	62.9	71.7	8.4	48.8	9.4	9.6	1.1	709.2
13:06:00	56.4	71.7	9.0	48.8	10.2	9.6	1.0	719.8
13:07:00	55.4	71.7	9.0	48.8	10.8	9.6	1.1	727.0
13:08:00	56.3	71.7	9.1	49.3	13.1	9.6	1.0	760.5
13:09:00	57.0	71.7	9.5	49.7	10.1	9.6	1.0	780.5
13:10:00	54.5	71.7	9.1	49.5	10.8	9.6	1.1	785.9
13:11:00	51.2	72.8	9.2	49.6	8.0	9.6	1.0	794.5
13:12:00	50.7	72.8	8.8	49.1	8.6	9.6	1.1	786.7
13:13:00	45.4	75.7	8.7	48.8	7.7	9.6	1.0	809.0
13:14:00	43.8	77.5	8.7	48.7	8.8	9.6	1.0	826.5
13:15:00	42.1	81.8	9.1	49.3	8.4	9.6	1.0	868.6
13:16:00	43.4	83.4	9.4	49.4	9.1	9.6	1.0	883.8
13:17:00	47.3	85.4	9.5	49.5	7.1	9.6	1.0	899.9
13:18:00	44.9	85.4	9.5	49.3	9.3	9.4	1.0	893.5
13:19:00	42.3	87.1	9.5	49.4	7.5	9.4	1.0	897.0
13:20:00	44.9	87.1	9.2	49.5	8.0	9.4	1.0	891.3
13:21:00	43.7	87.1	8.8	49.0	7.7	9.4	1.0	869.7
13:22:00	38.6	88.6	8.8	48.8	8.3	9.4	1.0	862.0
Max	62.9	106.2	9.7	49.9	16.7	9.6	1.2	944.3
Min	38.6	71.7	8.2	48.1	7.1	9.0	0.9	693.7
Average	47.7	89.4	8.9	49.1	9.8	9.3	1.0	767.8

APPENDIX 29

Clean Harbors One-Minute Average
Process Data
(15 pages)

Test No. 1 - October 6, 2020

	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	Nm^3/h	Nm^3/h	Nm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
10:41:00	44.8	10.5	170.2	199.4	9.0	264.9	26.7	16369	13663	18.2	1452.8	1080.3	489.7	187.0	181.6	-17.4	-29.5	-80.0	379.6
10:42:00	45.2	10.1	170.3	199.4	9.9	262.6	25.2	16194	13663	17.6	1465.9	1082.1	489.4	187.0	181.6	-14.5	-25.1	-72.4	389.1
10:43:00	45.0	10.3	170.5	198.8	10.1	264.2	25.7	16475	13781	18.4	1462.2	1082.8	490.3	186.5	181.6	-20.7	-29.9	-83.8	376.1
10:44:00	44.8	10.5	170.0	199.1	10.7	268.4	25.4	16294	13669	17.7	1468.9	1084.3	490.6	187.0	181.6	-13.5	-24.1	-71.5	382.2
10:45:00	45.0	10.4	170.1	199.7	9.4	265.7	25.2	16931	13792	18.2	1462.8	1085.7	490.9	187.0	181.6	-26.4	-38.5	-93.4	361.6
10:46:00	45.0	10.3	170.2	200.0	9.3	292.7	26.4	16381	13663	18.1	1461.3	1085.1	491.4	187.5	181.6	-19.6	-29.8	-84.1	376.0
10:47:00	44.9	10.2	169.4	198.8	11.9	266.9	25.3	16988	13775	18.5	1458.7	1086.3	492.1	187.5	182.7	-25.5	-37.9	-92.4	350.0
10:48:00	45.0	10.3	169.5	199.8	9.3	263.8	25.8	16406	13753	17.7	1459.9	1085.5	492.2	188.0	182.7	-18.6	-30.4	-80.7	358.5
10:49:00	44.8	10.2	169.6	199.6	9.6	265.1	25.2	16881	13843	18.1	1462.1	1086.4	492.7	188.0	182.7	-23.2	-38.4	-90.9	377.0
10:50:00	44.8	10.3	170.3	198.4	10.0	260.3	25.8	16300	13607	17.5	1466.7	1086.8	493.2	188.5	182.7	-14.1	-24.6	-74.1	387.6
10:51:00	44.8	10.2	170.8	198.4	10.5	263.3	26.6	16581	13736	18.9	1476.6	1088.8	493.3	188.5	182.7	-35.8	-56.1	-106.8	323.9
10:52:00	44.8	10.3	170.1	199.8	11.2	265.0	26.0	16269	13736	17.5	1469.1	1088.2	494.2	188.5	182.7	-15.8	-26.7	-75.9	380.1
10:53:00	44.6	10.3	169.4	199.0	9.9	257.3	25.3	16000	13635	19.1	1481.7	1089.8	494.1	188.5	182.7	-35.5	-55.5	-99.4	317.1
10:54:00	44.4	10.2	170.2	199.2	9.5	258.8	25.6	16638	13798	17.9	1468.1	1088.8	494.6	188.5	182.7	-22.1	-34.3	-86.4	366.9
10:55:00	44.6	10.1	169.2	198.5	9.1	266.2	26.6	16375	13562	18.0	1471.2	1088.2	494.1	189.0	183.7	-17.1	-28.0	-77.9	376.9
10:56:00	44.0	10.4	169.7	199.5	10.0	266.2	26.5	16688	13742	18.2	1460.6	1087.0	494.1	189.0	183.7	-20.8	-34.2	-84.3	349.6
10:57:00	43.9	10.2	170.2	199.4	10.0	265.6	25.7	16294	13629	18.0	1463.1	1085.5	493.1	189.5	183.7	-18.3	-32.2	-77.7	362.8
10:58:00	43.7	10.3	170.4	199.4	10.0	264.8	26.2	16369	13742	18.0	1460.2	1084.4	492.5	189.0	183.7	-19.5	-29.5	-80.2	378.8
10:59:00	44.0	10.4	169.0	198.5	10.1	291.4	26.1	16019	13624	18.2	1468.7	1084.4	491.4	189.0	183.7	-13.2	-21.0	-72.7	384.6
11:00:00	43.7	10.3	168.9	198.6	9.8	265.1	26.2	16613	13758	18.3	1463.4	1084.7	491.2	188.5	183.7	-20.6	-34.0	-84.9	371.4
11:01:00	44.0	10.1	171.2	194.8	9.8	286.4	26.4	16219	13657	17.7	1467.6	1084.3	490.8	188.5	183.7	-14.8	-24.8	-74.7	384.4
11:02:00	43.9	10.0	169.9	203.9	9.8	264.5	26.4	17006	13809	18.1	1461.9	1084.5	491.4	188.5	183.7	-26.2	-41.8	-92.8	356.4
11:03:00	44.3	10.2	170.6	203.9	8.3	262.6	25.4	16613	13708	18.3	1459.6	1082.1	491.2	188.5	183.7	-19.8	-34.1	-82.4	371.3
11:04:00	43.8	10.2	169.8	202.9	10.3	284.9	25.8	17081	13837	18.2	1457.7	1081.7	491.8	188.0	183.7	-27.4	-42.4	-94.3	345.1
11:05:00	43.4	10.0	170.6	205.7	10.1	260.6	25.5	16463	13725	18.2	1454.1	1080.3	491.5	188.0	183.7	-19.3	-31.9	-82.8	357.2
11:06:00	43.5	10.0	169.7	204.2	10.0	287.2	26.6	17113	13832	19.1	1453.2	1079.5	491.0	187.5	183.7	-33.6	-46.4	-103.3	361.3
11:07:00	44.0	10.6	170.8	204.7	10.1	261.8	25.3	16194	13747	17.8	1456.7	1078.1	490.3	187.0	183.7	-16.3	-29.0	-75.2	381.4
11:08:00	44.3	10.3	170.2	204.3	9.5	260.0	26.5	16588	13758	19.5	1467.9	1080.2	489.9	186.5	182.6	-36.0	-55.2	-107.2	320.3
11:09:00	44.3	10.2	170.7	203.7	9.3	258.5	26.6	16263	13663	18.1	1460.3	1080.0	491.1	186.0	182.6	-18.2	-30.1	-78.1	378.5
11:10:00	44.2	9.9	169.0	204.6	9.5	261.0	26.7	16194	13663	17.2	1470.3	1081.3	491.2	185.5	181.6	-17.3	-36.9	-79.0	344.7
11:11:00	44.3	10.4	170.2	204.1	9.5	256.8	25.5	16706	13775	18.5	1457.8	1080.5	492.1	185.5	181.6	-23.4	-36.7	-87.5	365.4
11:12:00	44.4	10.1	170.3	203.9	9.6	289.4	25.6	16356	13680	17.9	1461.4	1080.3	492.2	186.0	181.6	-18.2	-31.2	-79.2	377.1
11:13:00	44.3	10.4	170.4	204.0	9.4	260.0	26.6	16694	13725	18.2	1453.7	1079.8	493.0	186.0	181.6	-23.2	-34.3	-87.7	352.4
11:14:00	44.3	10.1	169.5	203.8	8.1	260.5	25.9	16344	13669	18.1	1456.8	1079.6	493.0	186.0	181.6	-19.7	-29.9	-80.2	362.4
11:15:00	44.8	10.2	170.2	203.9	9.6	263.0	25.2	16444	13663	17.5	1454.1	1079.6	493.4	186.0	181.6	-19.4	-32.7	-80.9	377.6
11:16:00	44.4	10.3	170.0	203.6	9.6	260.5	25.3	16175	13663	17.6	1465.3	1080.4	493.3	186.0	181.6	-13.9	-25.9	-72.5	388.1
11:17:00	44.1	10.0	170.0	204.4	10.3	260.9	25.8	16756	13787	18.0	1461.4	1081.7	494.0	185.5	181.6	-22.4	-35.6	-86.2	373.2
11:18:00	44.8	10.2	170.0	204.2	9.1	288.1	25.5	16156	13680	17.8	1465.4	1081.1	494.0	186.0	181.6	-15.9	-27.0	-74.0	383.9
11:19:00	44.2	10.3	169.6	203.9	8.5	287.9	25.3	16969	13775	18.4	1462.8	1082.6	494.1	185.5	181.6	-27.2	-42.6	-93.5	358.4
11:20:00	44.4	10.4	170.7	203.9	9.9	258.4	25.3	16381	13775	18.1	1457.6	1082.2	494.3	186.0	181.6	-19.5	-31.2	-82.8	372.9
11:21:00	44.4	10.6	169.3	204.3	10.2	264.3	26.4	16994	13775	18.4	1456.8	1083.7	494.6	186.0	181.6	-30.4	-45.2	-98.7	347.1
11:22:00	44.5	10.2	169.6	203.6	10.9	262.5	25.2	16469	13663	18.2	1454.3	1083.7	494.6	186.5	181.6	-18.8	-29.2	-81.0	357.3
11:23:00	44.2	10.4	170.0	203.9	10.6	263.9	25.8	16813	13764	19.0	1458.2	1084.6	494.6	186.5	181.6	-35.9	-53.1	-106.4	336.8
11:24:00	44.3	10.3	169.8	203.5	9.9	265.7	26.6	16263	13652	17.9	1458.8	1083.7	494.3	186.5	181.6	-15.9	-27.4	-75.1	385.1
11:25:00	44.1	10.3	169.9	204.1	9.5	259.8	26.4	16138	13652	19.5	1469.7	1085.7	493.8	186.0	181.6	-34.5	-52.6	-101.0	321.4
11:26:00	44.4	10.3	170.5	204.0	10.4	291.1	26.4	16431	13758	17.8	1459.7	1085.2	494.4	186.0	181.6	-16.8	-27.7	-77.4	376.1
11:27:00	44.4	10.3	170.0	203.7	9.7	295.1	26.6	16194	13629	17.4	1468.7	1086.0	494.6	186.0	181.6	-14.0	-24.2	-71.8	389.0
11:28:00	44.1	10.4	170.0	203.8	8.4	295.0	26.6	16756	13730	18.2	1454.8	1085.4	495.5	186.0	181.6	-22.7	-36.7	-88.2	364.4
11:29:00	44.2	10.1	169.8	203.4	9.8	298.2	26.6	16450	13730	17.9	1456.6	1084.7	494.8	186.5	181.6	-18.6	-31.3	-79.5	376.0
11:30:00	44.6	10.3	170.2	203.4	10.2	299.5	26.5	16544	13635	18.9	1450.3	1084.1	495.0	186.5	181.6	-23.2	-39.1	-86.1	349.6
11:31:00	44.4	10.4	169.7	203.4	9.4	299.3	25.8	16369	13742	18.1	1454.2	1083.7	494.6	187.0	181.6	-18.2	-29.4	-80.7	361.9
11:32:00	44.2	10.2	170.3	206.3	9.9	303.7	26.1	16581	13657	18.4	1451.3	1083.5	494.7	186.5	181.6	-18.9	-31.1	-80.1	377.3

Test No. 1 - October 6, 2020

	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	Nm^3/h	Nm^3/h	Nm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
11:33:00	44.4	10.1	169.8	206.3	9.9	301.7	25.3	16113	13674	17.9	1461.6	1084.2	494.2	186.5	181.6	-14.5	-24.7	-72.6	384.3
11:34:00	44.1	10.3	169.6	205.7	10.2	304.2	26.1	16788	13815	18.2	1457.6	1085.5	494.4	186.0	181.6	-21.4	-36.8	-86.4	368.9
11:35:00	44.5	10.3	169.9	206.1	10.2	305.2	26.6	16206	13612	17.6	1459.7	1084.7	494.2	186.0	181.6	-14.9	-26.1	-73.8	382.2
11:36:00	44.4	10.2	169.8	206.6	10.4	301.1	25.3	17069	13708	18.4	1458.4	1085.9	495.0	185.5	181.6	-28.2	-43.5	-97.2	355.9
11:37:00	44.3	10.3	170.1	205.2	10.1	294.7	25.3	16325	13702	18.1	1452.8	1084.2	495.5	186.0	181.6	-18.6	-31.9	-81.5	366.5
11:38:00	44.2	10.2	170.0	204.0	10.2	297.1	25.6	16956	13803	18.9	1454.1	1084.6	495.5	186.0	181.6	-33.5	-49.3	-104.3	326.1
11:39:00	44.3	10.3	170.2	213.7	9.0	261.8	26.4	16456	13798	18.1	1449.3	1083.2	495.6	186.0	181.6	-20.1	-33.2	-83.5	352.9
11:40:00	44.2	10.3	170.3	214.9	10.1	296.3	26.5	16806	13792	19.2	1455.1	1083.3	494.9	185.5	181.6	-33.2	-49.4	-102.6	327.9
11:41:00	44.5	10.2	169.8	215.6	10.4	294.2	26.5	16294	13691	18.3	1454.6	1082.4	494.8	185.0	181.6	-15.8	-27.6	-76.4	377.5
11:42:00	44.3	10.3	169.0	214.2	10.9	263.9	25.4	16169	13702	17.5	1465.9	1084.0	494.4	184.0	180.5	-16.8	-35.4	-77.9	348.1
11:43:00	44.4	10.1	170.0	214.3	9.6	264.2	25.3	16650	13697	17.7	1455.1	1083.0	494.5	183.0	180.5	-19.6	-32.3	-82.0	371.7
11:44:00	44.1	10.1	169.5	214.6	9.7	252.9	26.7	16219	13697	17.4	1460.6	1082.6	494.3	182.5	180.5	-16.8	-30.1	-74.5	383.6
11:45:00	44.0	10.2	170.3	215.3	9.6	252.5	26.5	16819	13697	18.6	1448.6	1080.9	494.0	182.0	179.4	-25.4	-40.7	-89.9	358.1
11:46:00	43.6	10.2	170.1	216.7	9.7	257.9	26.3	16556	13697	17.7	1447.2	1078.5	493.1	181.5	179.4	-19.6	-31.4	-81.4	372.3
11:47:00	43.7	10.1	169.8	216.2	7.8	246.8	26.0	16794	13719	18.5	1440.1	1076.4	492.2	181.0	179.4	-26.8	-41.2	-91.5	348.9
11:48:00	43.7	10.2	170.0	215.8	10.6	254.1	25.4	16394	13612	18.4	1439.7	1074.3	491.0	180.5	178.3	-21.1	-34.5	-82.1	358.6
11:49:00	43.4	10.0	170.9	216.9	9.8	258.9	26.4	16819	13708	18.8	1435.3	1073.2	490.0	180.0	178.3	-23.0	-34.5	-86.8	377.6
11:50:00	43.4	10.2	169.5	216.7	10.1	249.2	25.4	16331	13742	17.9	1439.8	1072.0	488.8	179.0	177.3	-19.6	-32.0	-77.0	385.2
11:51:00	42.8	10.0	170.0	216.2	9.9	258.8	26.3	17038	13714	18.8	1433.4	1071.6	488.0	178.0	177.3	-28.7	-43.3	-93.9	365.5
11:52:00	43.0	10.3	169.9	216.6	10.0	257.6	25.9	16581	13714	18.1	1431.8	1069.2	486.7	177.5	176.3	-19.9	-33.1	-80.2	377.8
11:53:00	43.0	10.1	170.3	216.5	10.0	256.1	25.9	17413	13921	18.5	1430.4	1066.7	486.0	177.0	176.3	-36.5	-52.5	-108.2	353.2
11:54:00	43.3	10.2	170.2	217.0	10.0	260.9	26.5	16769	13680	18.5	1420.7	1066.5	485.7	176.5	175.3	-26.1	-38.5	-89.6	367.6
11:55:00	43.1	10.2	170.5	217.8	9.9	260.0	25.7	17150	13781	19.8	1422.3	1063.9	484.8	176.0	175.3	-40.9	-60.6	-112.4	320.3
11:56:00	43.0	10.2	170.0	216.9	9.8	259.7	25.4	16863	13792	18.6	1416.1	1063.2	484.5	176.0	175.3	-27.2	-41.9	-91.0	355.1
11:57:00	43.2	10.1	170.1	217.5	10.2	263.4	26.5	16763	13792	19.4	1420.7	1061.2	483.2	175.5	174.3	-39.3	-60.3	-109.6	331.8
11:58:00	44.6	10.3	170.0	217.6	9.5	262.7	26.6	16550	13792	18.4	1420.1	1060.0	482.6	175.0	174.3	-22.5	-34.9	-84.2	381.0
11:59:00	44.7	10.3	169.6	217.4	9.5	262.4	25.4	16425	13691	18.1	1435.7	1057.6	483.1	174.5	174.3	-17.8	-28.3	-77.9	390.1
12:00:00	45.0	10.1	170.4	216.9	10.1	264.1	26.0	16613	13803	18.2	1432.3	1059.1	484.9	174.0	173.3	-24.4	-38.6	-88.5	373.7
12:01:00	44.8	10.2	168.9	218.0	9.7	289.7	25.5	16331	13691	18.0	1440.8	1059.2	486.1	174.5	173.3	-17.9	-29.3	-78.6	384.3
12:02:00	45.0	10.1	170.1	217.8	8.4	261.4	25.3	16981	13809	18.8	1432.9	1061.4	487.9	174.5	173.3	-28.4	-43.5	-97.4	363.8
12:03:00	44.9	10.3	169.6	217.3	10.1	289.9	25.5	16644	13702	18.5	1433.8	1062.7	489.2	175.0	173.3	-23.9	-38.7	-87.9	375.8
12:04:00	44.9	10.1	170.1	218.4	10.5	262.8	25.3	16925	13837	19.2	1430.3	1063.6	490.0	175.0	173.3	-29.2	-44.5	-94.7	347.9
12:05:00	44.2	10.3	170.3	218.3	10.1	260.9	26.0	16463	13736	18.2	1433.8	1064.3	490.0	175.5	173.3	-22.2	-33.9	-85.5	358.5
12:06:00	44.5	10.1	170.5	217.8	9.9	264.8	26.1	16913	13730	18.4	1430.6	1064.7	490.1	175.0	173.3	-25.2	-38.7	-90.3	377.1
12:07:00	44.8	10.3	165.5	219.3	10.3	249.5	26.5	16381	13730	18.4	1437.9	1064.0	490.0	175.0	173.4	-18.8	-30.9	-79.4	384.2
12:08:00	45.0	10.1	170.5	216.9	9.9	240.8	25.5	17131	13781	18.8	1437.4	1063.7	490.4	175.0	173.4	-30.1	-47.1	-98.4	365.7
12:09:00	44.8	10.2	172.1	217.5	10.1	238.6	26.4	16531	13781	18.1	1436.8	1065.0	490.5	175.0	173.4	-21.0	-33.8	-84.8	379.9
12:10:00	44.6	10.1	169.8	216.0	9.4	235.9	25.6	17331	13815	19.7	1439.1	1064.6	490.2	174.5	173.4	-44.2	-64.7	-118.2	331.8
12:11:00	44.9	10.0	169.5	218.4	10.5	237.7	26.6	16950	13815	18.5	1428.2	1066.1	490.8	175.0	173.4	-27.6	-42.3	-94.4	371.8
12:12:00	44.9	10.0	170.1	217.1	10.7	240.7	25.2	16875	13803	19.7	1431.9	1064.1	489.9	175.0	173.4	-39.0	-58.8	-110.4	319.1
12:13:00	45.2	10.1	170.4	217.4	10.3	241.5	25.9	16725	13803	19.0	1428.3	1063.9	490.3	175.0	173.4	-26.5	-40.6	-92.5	354.8
12:14:00	45.0	10.0	170.3	217.6	9.9	244.5	26.5	16563	13697	18.7	1433.7	1062.7	490.4	175.0	173.4	-24.0	-44.5	-85.4	344.9
12:15:00	45.0	10.2	169.3	219.6	9.8	235.2	25.8	16488	13702	18.3	1432.6	1063.3	490.3	175.0	173.4	-22.6	-35.6	-85.5	381.8
12:16:00	45.0	10.2	169.5	219.2	9.8	239.0	25.8	16381	13702	18.1	1443.2	1062.3	489.5	174.5	173.4	-18.5	-28.4	-77.4	389.4
12:17:00	45.2	10.4	170.1	219.4	10.2	244.8	25.3	16813	13702	18.5	1435.7	1064.2	490.3	174.0	173.4	-24.7	-38.5	-88.1	376.6
12:18:00	44.8	10.0	170.5	218.5	10.2	244.7	26.5	16344	13702	18.2	1441.3	1063.1	489.8	174.0	172.3	-19.2	-30.9	-79.4	385.5
12:19:00	44.8	10.3	170.0	219.9	9.4	250.2	25.4	17063	13910	19.0	1432.8	1064.1	490.3	173.5	172.3	-31.7	-48.4	-99.9	364.3
12:20:00	44.9	10.0	168.9	219.2	9.2	249.9	25.3	16738	13663	18.5	1431.6	1064.0	490.0	174.0	172.3	-24.3	-38.8	-88.4	374.3
12:21:00	44.9	10.0	170.7	218.7	10.3	244.2	26.4	16956	13764	18.9	1426.7	1063.3	490.3	174.0	172.3	-29.8	-45.4	-97.8	347.8
12:22:00	45.2	9.9	169.9	219.8	9.2	250.5	25.7	16569	13764	18.7	1430.2	1062.4	490.1	174.0	172.3	-24.5	-34.6	-89.8	360.1
12:23:00	44.9	10.2	169.6	218.9	10.0	247.4	25.3	17100	13775	18.6	1428.3	1062.0	489.8	174.0	172.3	-28.9	-42.7	-94.3	376.4
12:24:00	44.8	10.1	170.4	219.2	9.6	251.1	26.5	16606	13646	18.2	1435.4	1061.7	489.5	174.0	172.3	-20.0	-32.3	-81.9	386.1

Test No. 1 - October 6, 2020

	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	Nm^3/h	Nm^3/h	Nm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
12:25:00	44.6	10.1	170.4	218.2	9.7	254.5	26.3	17294	13747	19.3	1437.4	1061.5	489.5	173.5	172.3	-33.3	-48.4	-103.7	360.6
12:26:00	44.6	10.1	170.4	219.4	9.8	258.1	25.4	16575	13747	18.2	1435.6	1063.4	490.3	173.5	172.3	-21.4	-32.1	-85.2	378.8
12:27:00	44.8	9.9	169.9	218.9	10.5	256.4	26.0	16931	13949	19.6	1442.6	1063.2	491.0	173.5	172.3	-44.1	-66.3	-119.0	320.4
12:28:00	44.7	10.1	170.3	219.2	9.8	260.9	26.6	16900	13848	18.7	1431.4	1065.8	492.6	174.0	172.3	-27.1	-42.5	-93.7	368.1
12:29:00	44.4	9.9	170.2	218.8	8.5	257.7	25.4	16513	13618	20.1	1436.4	1065.5	492.6	174.5	172.3	-37.0	-57.3	-104.6	321.1
12:30:00	44.8	10.0	170.4	219.1	9.1	264.5	25.2	16688	13635	19.0	1429.4	1066.1	493.0	174.5	172.3	-26.8	-40.2	-93.8	353.1
12:31:00	44.8	10.0	169.5	218.0	10.0	262.8	26.5	16494	13641	18.6	1434.8	1065.4	493.1	175.0	172.3	-23.0	-36.8	-86.6	362.9
12:32:00	44.8	10.2	169.6	218.7	10.1	261.1	25.8	16588	13635	18.7	1433.6	1066.2	493.8	175.0	172.3	-22.1	-34.8	-85.0	379.9
12:33:00	45.0	10.2	170.0	219.2	10.2	262.6	25.9	16256	13635	18.1	1444.1	1065.6	493.8	175.0	172.3	-16.9	-27.7	-77.4	387.1
12:34:00	44.9	10.1	170.2	219.7	10.7	257.9	25.5	16931	13747	18.5	1438.2	1067.7	494.9	175.0	172.3	-24.7	-39.5	-90.8	372.8
12:35:00	44.9	10.2	169.9	219.0	9.6	260.8	25.9	16325	13646	17.7	1445.3	1068.0	494.7	175.0	172.3	-19.0	-34.3	-80.6	384.4
12:36:00	45.3	10.4	170.6	219.4	9.8	262.4	26.2	16956	13843	19.2	1439.4	1069.7	495.7	175.0	172.3	-29.6	-46.4	-98.6	358.8
12:37:00	45.2	10.1	172.6	218.9	9.8	252.8	25.6	16619	13730	18.6	1439.4	1070.6	495.9	175.5	172.3	-23.7	-38.0	-88.0	372.0
12:38:00	44.9	10.0	169.8	219.6	9.8	260.9	26.1	17019	13742	19.1	1436.7	1070.4	496.2	175.5	172.3	-31.3	-48.3	-97.1	347.9
12:39:00	44.9	10.1	170.4	219.4	10.5	259.1	26.2	16469	13742	18.3	1438.1	1070.4	495.9	176.0	172.3	-25.0	-39.0	-90.2	359.8
12:40:00	45.0	10.1	169.9	219.5	9.3	255.5	26.5	17056	13792	19.0	1438.2	1070.5	496.4	176.0	173.4	-30.4	-45.8	-96.9	378.6
12:41:00	45.0	10.3	170.6	219.6	9.7	258.8	26.6	16275	13669	18.0	1444.1	1070.6	495.8	176.0	173.4	-20.0	-32.1	-81.8	384.4
13:39:00	45.3	10.2	169.7	220.4	10.5	249.5	25.4	16550	13714	18.2	1453.2	1073.4	499.5	177.5	173.7	-23.5	-38.4	-86.6	361.3
13:40:00	45.4	10.0	170.3	219.5	10.1	253.2	25.2	16438	13601	18.3	1450.6	1073.3	499.1	177.0	173.7	-22.9	-37.1	-85.9	375.3
13:41:00	45.3	10.3	169.8	221.0	9.1	252.5	25.3	16294	13584	17.8	1460.1	1072.3	498.6	177.0	173.7	-17.9	-28.8	-78.1	383.6
13:42:00	45.2	9.9	169.7	220.3	9.9	256.3	26.4	16838	13674	18.3	1457.2	1072.4	499.3	176.5	173.7	-26.9	-40.7	-91.7	367.9
13:43:00	45.5	10.3	169.9	220.5	8.0	256.5	26.4	16238	13674	18.1	1459.8	1072.5	499.4	177.0	173.7	-20.9	-34.9	-83.6	382.8
13:44:00	45.2	9.9	170.0	220.1	10.1	252.5	25.4	17119	13708	18.7	1456.8	1072.7	499.9	176.5	173.7	-34.1	-49.6	-104.1	355.4
13:45:00	45.5	10.0	170.6	220.9	9.7	256.4	26.6	16531	13573	18.4	1451.2	1073.7	499.8	177.0	173.7	-26.2	-41.3	-92.1	369.5
13:46:00	45.5	10.0	170.7	220.3	9.3	253.7	25.4	16925	13775	19.4	1452.6	1072.6	499.5	177.0	173.7	-40.8	-57.7	-114.8	327.3
13:47:00	45.3	10.3	169.5	218.7	9.6	254.2	25.4	16694	13562	18.3	1449.4	1072.2	499.1	177.0	173.7	-25.5	-41.4	-89.5	353.5
13:48:00	45.2	10.1	168.7	219.2	9.8	252.3	26.5	16750	13775	19.6	1454.2	1070.8	498.8	177.0	173.7	-40.4	-57.6	-112.1	332.3
13:49:00	45.4	10.1	170.3	219.8	9.5	259.3	26.4	16438	13556	17.8	1453.4	1070.9	498.7	177.0	173.7	-21.0	-34.3	-81.6	379.8
13:50:00	45.8	10.3	170.0	219.6	10.4	253.1	25.9	16169	13556	17.7	1463.4	1069.5	498.8	177.0	173.7	-24.4	-47.2	-82.5	353.4
13:51:00	45.7	10.2	170.0	220.2	10.4	257.8	26.3	16444	13674	18.1	1455.7	1071.0	499.5	176.5	173.7	-22.5	-34.7	-87.0	374.8
13:52:00	45.6	10.2	170.8	220.5	9.8	254.9	26.2	16194	13573	18.0	1464.1	1070.7	499.8	177.0	173.7	-18.7	-31.0	-80.5	388.2
13:53:00	45.3	10.2	170.5	220.5	10.2	258.2	25.2	16775	13674	18.4	1451.6	1072.1	500.2	177.0	173.7	-29.2	-43.3	-96.5	362.4
13:54:00	44.9	9.9	170.0	219.5	10.5	254.0	26.1	16588	13674	18.2	1450.3	1071.1	499.1	177.0	173.7	-23.2	-36.2	-86.8	376.6
13:55:00	44.8	10.0	169.3	219.8	9.9	252.7	25.5	16694	13652	18.8	1445.4	1070.3	498.5	177.0	173.7	-31.5	-46.8	-97.7	351.4
13:56:00	45.0	10.1	170.0	219.8	10.1	252.1	26.5	16456	13652	18.5	1447.9	1069.3	497.8	177.0	173.7	-23.4	-36.6	-86.8	359.8
13:57:00	44.7	10.1	169.8	219.4	9.9	264.2	25.3	16638	13742	18.5	1446.3	1067.9	497.2	177.0	173.7	-26.8	-39.8	-91.6	381.0
13:58:00	44.9	10.2	168.9	219.9	9.9	266.5	25.3	16163	13652	18.2	1451.9	1067.4	496.8	176.5	173.7	-19.0	-29.2	-79.3	384.8
13:59:00	44.6	10.2	171.4	219.6	10.6	256.4	26.6	16919	13669	18.1	1451.7	1067.3	497.3	176.0	173.7	-29.8	-43.9	-96.9	367.8
14:00:00	44.9	10.1	170.3	221.0	9.6	288.5	25.9	16231	13669	18.0	1452.7	1068.9	497.5	176.5	173.7	-21.0	-34.4	-81.9	379.6
14:01:00	44.5	10.3	169.6	220.5	10.0	263.8	26.5	17063	13775	18.2	1454.2	1068.5	497.8	176.0	173.7	-37.1	-53.9	-109.5	352.1
14:02:00	45.1	10.1	170.5	220.3	10.1	291.5	25.3	16581	13680	18.5	1447.2	1069.3	498.3	176.5	173.7	-27.2	-39.5	-91.7	371.4
14:03:00	44.8	10.1	169.5	219.6	10.8	292.4	26.3	16869	13674	19.1	1449.1	1068.9	498.3	176.5	173.7	-42.7	-60.2	-117.3	323.2
14:04:00	44.7	10.1	170.0	219.2	9.9	294.6	26.3	16550	13612	18.3	1444.8	1068.9	498.1	177.0	173.7	-25.3	-39.8	-89.1	355.9
14:05:00	44.0	10.5	169.7	219.2	10.0	298.4	26.3	16419	13612	19.5	1449.9	1067.9	497.8	177.0	173.7	-38.5	-59.4	-106.7	331.5
14:06:00	44.2	10.2	170.7	217.9	9.8	303.4	26.6	16269	13618	18.3	1445.1	1067.4	497.7	176.5	173.7	-22.8	-34.5	-83.1	379.8
14:07:00	44.0	10.1	169.3	218.0	9.6	293.4	26.5	16169	13607	18.3	1454.9	1066.4	497.8	176.5	173.7	-18.4	-29.7	-78.3	391.3
14:08:00	44.6	10.1	170.9	220.0	10.2	300.3	26.4	16569	13612	17.9	1448.6	1066.9	498.6	176.0	173.7	-22.8	-36.6	-87.3	378.3
14:09:00	45.1	10.2	170.2	219.9	9.9	291.8	26.3	16244	13500	17.8	1458.1	1066.1	499.3	176.5	173.7	-17.6	-27.3	-78.6	386.6
14:10:00	44.8	10.1	170.2	220.5	9.9	291.8	26.5	16806	13815	18.6	1450.3	1066.6	500.0	176.0	173.7	-28.6	-45.3	-96.4	364.3
14:11:00	45.0	10.3	170.0	220.8	10.3	265.2	26.5	16300	13596	18.3	1452.8	1066.8	499.5	176.5	173.7	-23.9	-37.0	-86.1	373.4
14:12:00	44.6	10.0	170.4	219.8	9.9	264.2	26.6	16719	13702	18.5	1449.8	1067.1	499.7	176.5	173.7	-26.7	-41.8	-92.7	348.5
14:13:00	44.6	10.4	169.7	220.5	10.1	261.2	26.6	16231	13596	18.1	1454.1	1067.0	498.9	176.5	173.7	-22.0	-36.3	-84.6	359.1

Test No. 1 - October 6, 2020

	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	Nm^3/h	Nm^3/h	Nm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
14:14:00	44.9	9.9	170.0	219.5	9.6	264.6	25.3	16488	13697	18.3	1449.9	1067.1	499.1	176.5	173.7	-24.2	-37.8	-89.2	378.6
14:15:00	45.0	10.4	170.5	219.7	8.7	256.4	26.6	16225	13685	17.9	1458.3	1066.3	498.6	176.5	173.7	-19.0	-30.2	-78.7	385.0
14:16:00	44.7	9.9	169.7	219.0	9.8	259.2	25.3	16981	13787	18.2	1457.4	1066.7	498.9	176.0	173.7	-31.7	-49.5	-99.8	371.3
14:17:00	45.4	10.0	169.9	219.8	9.9	264.8	25.3	16356	13646	17.5	1455.9	1068.8	499.0	176.5	173.7	-20.1	-32.0	-80.9	381.6
14:18:00	45.1	10.1	170.6	219.6	10.1	253.1	25.8	17044	13775	19.1	1461.6	1069.0	499.2	176.0	173.7	-42.3	-57.7	-118.5	329.6
14:19:00	45.5	10.2	169.7	219.3	9.8	256.1	26.5	16513	13624	17.9	1452.4	1070.6	499.4	176.5	173.7	-25.6	-39.6	-89.3	366.1
14:20:00	45.4	10.2	169.8	219.6	10.4	253.1	25.4	16675	13641	19.6	1457.1	1070.8	499.1	176.5	173.7	-38.2	-57.8	-107.5	317.1
14:21:00	45.6	10.0	169.6	220.4	9.8	243.0	25.4	16513	13612	18.4	1451.2	1071.4	499.4	176.5	173.7	-26.1	-41.2	-90.6	354.9
14:22:00	45.8	10.2	169.5	218.7	9.6	253.9	26.2	16444	13612	18.0	1457.8	1071.2	498.7	177.0	173.7	-21.9	-36.3	-87.7	347.5
14:23:00	45.6	10.2	170.9	219.5	9.6	253.8	25.4	16350	13506	18.4	1455.3	1072.1	499.0	177.0	173.7	-20.8	-30.8	-85.3	381.3
14:24:00	45.6	10.0	170.0	220.2	9.8	249.0	25.8	16106	13494	18.3	1465.8	1071.4	498.7	177.0	173.7	-18.5	-29.3	-78.1	390.1
14:25:00	45.6	10.1	170.7	220.1	10.0	249.5	25.4	16575	13612	18.0	1457.6	1073.3	499.2	176.5	173.7	-23.7	-35.7	-88.1	373.3
14:26:00	45.3	10.2	169.4	219.6	9.9	260.3	25.3	16125	13596	17.8	1464.1	1073.5	498.8	176.5	173.7	-19.6	-31.2	-81.5	385.6
14:27:00	45.3	10.0	170.1	218.9	9.8	257.2	26.0	16756	13747	18.5	1454.3	1074.2	499.1	176.5	173.7	-31.1	-45.8	-99.4	362.5
14:28:00	45.4	10.1	170.3	219.7	10.1	263.9	26.6	16388	13629	18.2	1453.8	1074.1	499.0	177.0	173.7	-24.1	-36.2	-87.5	372.8
14:29:00	45.5	10.1	170.3	219.8	9.9	257.6	26.2	16875	13641	18.8	1449.1	1073.7	498.9	177.0	173.7	-27.7	-42.5	-95.8	348.5
14:30:00	45.2	10.1	168.6	219.0	9.9	291.6	25.4	16363	13641	17.6	1452.9	1073.2	498.0	177.0	173.7	-24.6	-37.0	-88.4	361.1
14:31:00	45.4	10.2	169.8	219.8	10.0	289.1	25.7	16763	13697	18.3	1451.1	1072.5	498.3	177.0	173.7	-24.9	-37.2	-90.6	378.8
14:32:00	45.4	10.1	169.8	220.6	10.0	264.6	25.7	16125	13719	18.0	1459.3	1072.3	498.1	177.0	173.7	-18.7	-30.7	-79.2	383.8
14:33:00	45.2	10.1	169.7	219.6	10.4	260.9	25.3	17106	13702	18.5	1463.3	1072.0	498.7	176.5	173.7	-32.7	-46.0	-101.1	365.8
14:34:00	45.5	10.3	170.3	220.7	9.3	289.6	26.6	16225	13584	17.6	1461.2	1073.2	499.1	176.5	173.7	-19.1	-28.6	-81.0	380.6
14:35:00	45.7	10.3	170.0	219.5	9.3	265.2	25.3	16700	13702	19.0	1469.9	1073.1	500.0	176.5	173.7	-42.3	-62.9	-114.9	319.8
14:36:00	45.6	10.1	169.2	219.7	10.3	286.5	26.5	16450	13590	18.3	1458.8	1075.1	501.0	177.0	173.7	-24.6	-37.5	-89.1	367.3
14:37:00	45.7	10.1	170.1	219.5	10.4	261.7	26.6	16400	13489	19.4	1462.4	1074.6	501.6	177.0	173.7	-34.0	-52.8	-103.0	319.6
14:38:00	46.1	10.3	169.3	220.4	10.1	262.5	25.3	16569	13601	18.3	1455.9	1074.9	502.4	177.5	173.7	-25.8	-38.0	-92.0	355.4
14:39:00	46.0	10.2	169.1	219.6	3.9	288.7	26.5	16331	13624	18.0	1464.1	1074.0	503.1	178.0	173.7	-20.3	-31.7	-83.2	365.4
14:40:00	45.8	9.9	170.9	220.3	9.4	260.9	26.4	16125	13629	17.7	1463.7	1074.5	504.4	178.0	174.7	-20.2	-33.6	-82.4	379.6
14:41:00	46.3	10.3	169.1	219.7	10.2	259.1	25.3	15981	13506	18.0	1474.3	1075.1	504.4	178.0	174.7	-17.4	-29.4	-77.2	391.6
14:42:00	45.8	10.2	170.1	220.7	10.1	291.5	25.6	16531	13669	18.2	1466.4	1076.2	505.8	178.5	174.7	-23.2	-37.0	-87.9	374.1
14:43:00	45.7	10.2	170.8	221.5	8.2	259.9	26.3	16275	13567	17.4	1473.7	1076.3	505.6	178.5	174.7	-16.0	-27.6	-76.2	380.4
14:44:00	45.9	10.1	169.9	221.1	9.9	262.8	26.5	16731	13663	18.2	1468.4	1076.9	506.5	178.5	174.7	-28.0	-44.4	-94.3	360.5
14:45:00	46.4	10.3	169.6	221.6	10.0	264.8	26.6	16394	13534	18.0	1466.8	1077.7	506.6	179.0	174.7	-22.3	-36.2	-86.4	373.5
14:46:00	45.6	9.9	169.2	221.4	10.1	262.7	26.6	16769	13635	18.2	1462.8	1077.3	506.6	179.0	174.7	-27.6	-41.0	-96.0	347.6
14:47:00	45.9	10.0	169.7	221.1	9.3	255.1	26.0	16450	13534	18.1	1465.1	1077.6	506.4	179.5	175.7	-21.9	-34.2	-86.3	360.3
14:48:00	45.4	10.0	170.0	220.4	10.1	257.1	26.1	16825	13657	18.2	1465.1	1077.1	506.6	179.0	175.7	-26.3	-40.3	-93.6	378.9
14:49:00	45.7	10.2	170.9	221.9	10.2	258.1	26.5	16013	13545	18.1	1470.8	1076.6	506.5	179.5	175.7	-17.9	-29.9	-80.7	386.0
14:50:00	45.7	9.9	169.9	220.3	9.8	248.5	25.2	16888	13663	18.6	1474.9	1076.0	506.2	179.0	175.7	-38.2	-56.6	-108.9	338.8
14:51:00	45.9	10.0	169.7	221.7	9.8	252.8	25.3	16344	13556	17.9	1469.7	1077.2	506.1	179.0	175.7	-19.1	-31.0	-81.2	377.6
14:52:00	46.0	10.2	169.4	221.6	9.8	243.6	25.7	16350	13663	19.6	1477.7	1076.8	506.2	179.0	175.7	-40.7	-60.6	-112.5	316.1
14:53:00	45.3	9.6	169.6	221.5	9.9	252.8	26.2	16475	13663	18.2	1465.6	1077.5	506.7	179.0	175.7	-25.9	-40.3	-89.4	365.1
14:54:00	45.2	9.9	169.7	221.0	9.5	254.8	25.4	16225	13562	17.8	1468.2	1077.1	505.7	179.0	175.7	-19.4	-32.4	-83.2	345.3
14:55:00	45.4	10.0	170.9	221.3	9.5	257.1	25.7	16456	13590	18.3	1459.1	1077.5	505.3	179.0	175.7	-24.9	-38.1	-89.6	352.4
14:56:00	45.2	9.9	169.5	221.0	10.8	254.3	25.9	16175	13472	18.2	1462.2	1076.3	503.9	179.0	175.7	-22.7	-33.7	-85.6	364.1
14:57:00	45.3	9.8	170.1	221.4	10.6	259.1	26.0	16469	13601	17.8	1456.8	1076.0	503.2	179.0	175.7	-22.2	-29.2	-85.3	382.1
14:58:00	45.2	9.9	170.7	220.7	9.2	251.0	26.5	16069	13629	18.1	1467.6	1074.4	502.0	178.5	175.7	-18.0	-28.1	-76.8	388.9
14:59:00	45.3	10.0	170.2	221.3	9.9	256.5	25.2	16700	13624	18.1	1461.3	1074.6	502.3	178.0	175.7	-25.5	-38.8	-90.0	373.1
15:00:00	45.7	9.9	171.2	222.6	8.7	256.4	25.3	16200	13506	17.8	1466.6	1073.8	501.3	178.0	175.7	-18.5	-27.3	-78.7	382.6
15:01:00	45.5	10.0	171.3	221.5	10.9	257.8	26.2	17031	13714	18.8	1461.2	1073.7	501.5	177.5	174.6	-30.2	-46.1	-96.8	356.4
15:02:00	45.5	10.0	169.5	222.1	9.8	265.5	26.6	16406	13511	17.9	1459.4	1073.6	501.9	177.5	174.6	-22.8	-37.5	-86.9	369.1
15:03:00	45.3	9.8	170.5	222.1	9.8	259.4	25.3	17019	13629	18.5	1455.3	1073.3	502.5	177.5	174.6	-30.8	-47.2	-99.7	347.4
15:04:00	45.0	9.9	170.2	221.7	9.8	261.8	26.5	16344	13646	18.0	1453.8	1074.2	501.6	178.0	174.6	-25.5	-38.3	-90.2	359.4
15:05:00	44.3	10.0	169.7	222.4	12.3	265.8	26.6	16956	13641	18.1	1452.3	1073.3	500.6	177.5	174.6	-29.2	-41.1	-97.6	376.7

Test No. 1 - October 6, 2020

	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	Nm^3/h	Nm^3/h	Nm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
15:06:00	44.4	10.1	170.1	222.5	10.0	254.0	25.7	16138	13641	18.0	1452.8	1073.1	499.7	177.5	174.6	-19.9	-30.2	-81.2	382.8
15:07:00	44.4	9.8	169.5	221.2	10.1	259.4	25.9	16819	13663	19.6	1461.4	1072.0	499.5	177.0	173.5	-41.6	-61.5	-114.7	323.2
15:08:00	45.6	10.0	170.7	223.4	9.9	262.2	26.5	16344	13523	17.6	1455.6	1073.1	499.8	176.5	173.8	-20.6	-31.5	-84.3	378.3
15:09:00	44.9	9.8	169.0	222.3	10.1	259.4	26.6	16031	13523	19.5	1466.6	1072.0	499.8	176.5	173.8	-39.0	-60.7	-106.5	315.4
15:10:00	45.0	9.7	169.5	222.8	9.8	257.1	26.5	16706	13657	18.4	1452.8	1073.4	500.7	176.0	173.8	-27.2	-43.9	-94.1	367.3
15:11:00	45.0	9.8	169.3	222.6	10.0	257.8	25.9	16306	13657	18.1	1456.2	1072.5	500.1	176.5	173.8	-22.0	-34.0	-84.1	376.2
15:12:00	45.0	9.8	170.0	222.6	9.7	260.2	26.6	16488	13657	18.4	1450.9	1072.2	500.8	176.5	173.8	-24.9	-37.6	-91.6	352.2
15:13:00	45.1	9.7	170.0	223.2	9.7	258.2	25.4	16369	13657	18.5	1455.7	1071.5	500.5	176.5	173.8	-23.9	-36.3	-84.8	362.6
15:14:00	45.0	9.9	170.0	223.2	9.6	249.5	26.6	16338	13657	18.6	1451.6	1071.7	500.6	176.0	173.8	-22.2	-32.7	-87.1	378.9
15:15:00	45.3	10.2	169.7	223.5	10.1	257.1	26.5	16100	13539	18.0	1459.7	1070.4	499.7	176.0	173.8	-17.9	-28.1	-78.7	389.2
15:16:00	45.3	9.9	166.3	223.3	10.0	255.8	26.7	16688	13663	18.5	1455.3	1070.9	500.0	175.5	173.8	-26.0	-37.4	-92.7	372.9
15:17:00	45.1	10.1	169.7	222.4	8.5	252.2	25.5	16163	13562	17.7	1458.3	1070.7	499.4	175.5	173.8	-18.9	-29.8	-81.1	386.0
15:18:00	45.2	10.0	170.0	222.6	9.9	256.6	25.4	17125	13674	18.4	1451.9	1071.1	499.7	175.0	172.8	-32.7	-45.9	-103.4	360.4
15:19:00	45.1	9.9	169.4	222.9	10.5	258.8	25.7	16606	13562	18.6	1448.8	1071.1	499.3	175.5	172.8	-26.0	-38.2	-89.1	369.4
15:20:00	44.9	10.0	170.0	222.0	9.1	258.2	25.8	17100	13803	19.0	1446.7	1069.6	498.8	175.5	172.8	-32.9	-49.0	-100.2	345.6
15:21:00	44.7	9.8	169.4	222.2	10.8	265.0	26.6	16663	13590	18.6	1445.1	1069.2	498.6	175.5	172.8	-25.4	-38.6	-89.2	357.3
15:22:00	45.0	9.6	170.0	223.8	9.9	264.5	26.4	16994	13691	19.4	1446.1	1068.0	498.0	175.0	172.8	-36.1	-48.0	-109.3	359.0
15:23:00	45.1	10.2	169.6	223.2	9.7	286.3	26.6	16163	13579	18.1	1450.1	1067.4	497.7	175.0	172.8	-20.6	-29.8	-82.3	382.8
15:24:00	44.9	9.8	169.3	222.7	9.9	293.0	26.4	16781	13579	19.4	1460.3	1066.7	498.2	174.5	172.8	-41.7	-62.2	-114.9	323.2
15:25:00	44.9	9.9	170.9	223.0	10.2	285.8	26.4	16400	13584	18.2	1450.3	1068.4	499.0	175.0	172.8	-23.5	-32.0	-86.6	378.4
15:26:00	44.9	9.7	170.0	223.1	9.6	285.1	26.5	16200	13478	17.8	1459.1	1067.7	499.1	174.5	172.8	-20.0	-33.8	-85.0	349.5
15:27:00	45.4	10.0	169.9	223.7	10.7	289.9	26.6	16650	13708	18.3	1446.9	1069.2	499.4	174.5	172.8	-29.7	-43.7	-95.4	365.8
15:28:00	44.6	9.5	170.3	222.8	9.4	256.5	26.3	16488	13584	18.8	1448.9	1068.9	499.4	175.0	172.8	-25.3	-38.3	-88.5	378.6
15:29:00	44.7	10.0	169.4	223.5	10.5	262.3	25.6	16531	13714	18.9	1442.3	1068.8	499.2	175.0	172.8	-27.2	-41.1	-94.3	352.7
15:30:00	44.8	9.7	170.3	222.7	9.8	260.8	26.3	16413	13596	18.7	1445.9	1067.9	498.4	175.0	172.8	-24.3	-36.3	-87.5	363.6
15:31:00	44.8	9.9	169.6	223.5	9.8	255.8	26.3	16525	13596	18.8	1442.3	1067.8	498.4	174.5	172.8	-26.1	-38.7	-87.6	378.3
15:32:00	45.0	9.8	170.0	222.5	9.8	258.6	25.5	16288	13590	18.0	1451.7	1067.0	497.5	174.5	172.8	-21.2	-32.2	-81.5	387.8
15:33:00	44.9	9.9	170.6	223.8	9.8	259.4	26.6	16681	13742	18.4	1448.2	1067.4	497.6	174.5	172.8	-26.9	-40.7	-92.7	370.6
15:34:00	45.3	10.2	170.7	224.6	9.9	250.7	25.2	16369	13517	17.7	1453.2	1067.0	497.6	174.5	171.8	-19.8	-31.5	-81.0	379.0
15:35:00	45.1	10.0	170.9	223.4	10.8	254.9	25.4	17125	13837	18.7	1450.1	1067.0	498.1	174.0	171.8	-36.0	-52.8	-106.3	358.0
15:36:00	45.0	9.8	169.4	222.1	10.5	261.1	25.3	16625	13607	18.6	1444.4	1068.1	497.9	174.5	171.8	-27.2	-39.9	-92.2	371.1
15:37:00	45.0	9.7	169.5	223.1	9.9	253.4	26.0	17156	13714	18.5	1443.4	1067.1	497.4	174.5	171.8	-35.8	-52.4	-106.1	343.8
15:38:00	45.2	9.7	170.0	171.6	9.7	249.1	25.6	16219	13573	19.4	1443.6	1067.0	496.7	174.5	171.8	1.5	-5.1	-56.7	335.5
Max	46.4	10.6	172.6	224.6	12.3	305.2	26.7	17413	13949	20.1	1481.7	1089.8	506.7	189.5	183.7	1.5	-5.1	-56.7	391.6
Min	42.8	9.5	165.5	171.6	3.9	235.2	25.2	15981	13472	17.2	1416.1	1057.6	482.6	173.5	171.8	-44.2	-66.3	-119.0	315.4
Average	44.8	10.1	170.0	215.5	9.84	264.3	26.0	16562	13680	18.4	1452.2	1073.4	496.0	179.1	176.0	-24.7	-38.4	-89.2	364.8

Test No. 2 - October 7, 2020

Time	Waste Flows						PAC Flow	Air Flows			Temperatures					Pressures			
	Rich	Emulsion	Lean	Alkaline	Leachate	TDU Flow		Primary	Secondary	Stack	Primary	Secondary	Quench	SprayDryer	Stack	Incinerator	SD Inlet	BH Inlet	Baghouse
	Lpm	Lpm	Lpm	Lpm	Lpm	SCFM	lbs/h	Nm^3/h	Nm^3/h	Nm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
9:04:00	45.7	11.5	164.6	191.1	10.6	201.0	25.2	16269	13500	18.0	1403.9	1077.0	485.0	192.0	187.2	-15.1	-26.0	-73.4	341.4
9:05:00	45.6	11.5	167.3	194.8	12.0	201.9	25.6	16613	13714	18.0	1403.8	1077.5	485.8	192.0	187.2	-16.1	-28.3	-75.7	357.2
9:06:00	45.7	11.4	167.0	194.2	10.5	207.2	25.5	16125	13601	17.2	1415.8	1078.1	485.8	191.5	187.2	-11.0	-19.1	-68.6	366.0
9:07:00	45.5	12.0	167.2	195.0	10.9	205.7	26.4	16806	13719	18.1	1414.6	1079.7	486.4	191.0	187.2	-20.8	-32.1	-85.3	344.5
9:08:00	45.7	11.6	167.3	194.7	11.1	202.7	25.5	16225	13506	17.6	1413.6	1080.2	486.4	191.0	186.1	-16.5	-26.6	-73.4	359.6
9:09:00	45.7	11.9	167.4	194.8	10.4	205.3	25.4	17013	13663	18.3	1413.7	1080.6	486.3	190.5	186.1	-28.2	-42.0	-96.8	330.6
9:10:00	45.5	11.4	167.6	195.2	10.4	206.9	26.5	16563	13562	17.8	1402.7	1079.8	486.8	191.0	186.1	-18.9	-31.5	-80.6	347.9
9:11:00	45.5	11.3	166.7	193.4	10.2	201.8	26.5	16769	13562	18.6	1407.7	1079.4	486.5	191.0	186.1	-32.6	-50.6	-100.8	303.6
9:12:00	45.7	11.7	167.4	193.1	11.0	202.8	26.1	16444	13596	18.0	1402.2	1078.7	486.3	191.0	186.1	-18.5	-30.9	-78.9	334.7
9:13:00	45.4	11.7	166.8	193.4	11.0	203.6	25.3	16325	13596	19.2	1407.6	1078.6	485.4	191.0	186.1	-29.7	-48.4	-93.3	311.7
9:14:00	45.4	11.4	167.0	191.5	11.9	203.1	25.9	16306	13601	17.6	1406.7	1078.1	485.4	191.0	186.1	-15.1	-24.8	-73.8	361.6
9:15:00	45.6	11.6	166.7	191.0	11.3	203.2	26.6	16156	13601	17.4	1418.2	1077.9	484.6	190.5	186.1	-12.0	-22.2	-68.3	368.1
9:16:00	45.6	11.8	166.4	191.3	9.0	202.6	26.6	16475	13596	17.5	1409.6	1079.2	484.7	190.5	186.1	-16.4	-28.4	-76.8	354.6
9:17:00	45.4	11.3	166.9	190.2	11.0	202.6	26.1	16250	13697	17.4	1418.8	1079.3	484.7	190.5	186.1	-12.9	-24.5	-63.5	365.7
9:18:00	45.7	11.6	167.7	190.3	10.4	206.6	26.3	16806	13697	18.3	1406.6	1079.5	485.5	191.0	186.1	-21.1	-34.2	-84.2	342.2
9:19:00	45.6	11.9	166.9	190.5	10.7	206.7	26.3	16294	13584	17.7	1408.6	1078.9	485.4	191.5	186.1	-17.7	-30.9	-76.5	356.0
9:20:00	45.5	11.3	167.4	190.7	12.1	201.3	26.5	16556	13584	18.1	1404.4	1078.8	485.4	191.5	186.1	-19.7	-31.1	-82.0	330.1
9:21:00	45.5	11.6	166.7	192.0	9.9	205.3	25.2	16344	13511	17.9	1411.8	1078.4	484.7	192.0	186.1	-15.4	-24.8	-74.0	341.1
9:22:00	45.7	11.8	166.9	190.7	11.0	201.1	26.5	16631	13590	18.1	1407.3	1078.8	484.4	191.5	186.1	-19.6	-31.9	-78.8	357.5
9:23:00	45.4	11.5	167.5	190.2	11.3	204.7	26.4	16038	13590	17.6	1415.4	1078.8	484.3	191.5	186.1	-13.5	-23.7	-70.1	366.5
9:24:00	45.3	11.5	166.9	190.1	11.2	206.9	26.0	16963	13725	18.0	1414.3	1079.6	484.2	191.0	186.1	-24.2	-37.1	-88.8	345.4
9:25:00	45.6	11.8	167.3	191.2	10.3	207.8	26.4	16388	13511	17.5	1411.9	1079.4	484.3	191.5	186.1	-15.1	-26.1	-74.1	357.6
9:26:00	45.7	11.5	167.6	190.1	10.9	202.4	26.3	16825	13624	18.9	1415.4	1079.7	483.9	191.5	186.1	-34.0	-52.2	-104.2	305.2
9:27:00	45.5	11.7	167.5	191.6	11.2	204.0	26.5	16475	13652	17.9	1404.6	1079.2	484.5	191.5	186.1	-21.3	-34.6	-82.5	346.4
9:28:00	45.4	11.6	166.4	191.6	11.0	203.4	25.3	16625	13528	19.5	1408.7	1078.9	483.8	191.5	186.1	-32.0	-48.6	-97.6	298.3
9:29:00	45.3	10.7	166.5	191.9	11.0	311.2	25.8	16388	13545	18.4	1402.7	1078.1	484.0	192.0	186.1	-18.1	-29.6	-79.2	333.3
9:30:00	45.6	11.5	166.6	190.8	11.4	315.6	25.9	16288	13545	17.6	1411.4	1077.9	483.6	192.0	186.1	-15.4	-31.6	-76.1	326.7
9:31:00	45.7	11.9	166.0	191.0	11.5	324.2	25.3	16156	13539	17.8	1410.2	1077.7	484.0	192.0	186.1	-14.9	-25.6	-70.7	359.6
9:32:00	45.3	11.5	166.4	190.3	11.5	324.2	25.2	15950	13539	17.6	1425.8	1078.0	483.9	191.5	186.1	-10.3	-20.0	-66.9	368.6
9:33:00	45.5	11.3	167.9	190.7	12.2	326.3	26.5	16381	13567	17.7	1414.8	1078.6	484.6	191.5	186.1	-16.6	-26.9	-75.5	352.3
9:34:00	45.6	11.5	167.0	190.2	10.6	326.2	26.5	16006	13579	17.8	1422.1	1078.7	484.7	191.5	186.1	-13.3	-23.0	-69.5	365.9
9:35:00	45.7	11.3	167.1	191.0	11.1	325.0	25.5	16663	13702	17.8	1411.7	1078.6	485.5	191.5	186.1	-21.4	-35.6	-83.9	341.2
9:36:00	45.6	11.1	164.9	190.6	10.9	325.7	26.6	16175	13590	18.1	1411.1	1077.9	485.1	192.0	186.1	-16.3	-28.4	-75.2	352.3
9:37:00	45.8	11.5	167.3	190.0	10.8	327.3	25.4	16631	13697	18.3	1405.7	1077.9	485.2	192.0	186.1	-19.6	-31.7	-82.9	329.3
9:38:00	45.5	11.7	166.5	190.6	10.9	326.6	25.3	16413	13472	18.0	1410.8	1077.0	485.4	192.0	187.2	-15.0	-27.5	-73.5	340.4
9:39:00	45.7	11.7	166.7	190.3	10.5	327.2	25.3	16481	13573	18.0	1409.2	1077.8	485.3	192.0	187.2	-17.7	-29.9	-79.8	357.4
9:40:00	45.7	11.8	167.1	189.9	10.7	328.4	26.4	16081	13573	17.7	1418.3	1077.4	485.4	192.0	187.2	-13.5	-23.3	-69.6	366.2
9:41:00	45.3	11.6	166.9	189.5	11.4	328.2	25.9	17013	13596	17.7	1420.1	1078.8	485.2	192.0	187.2	-25.4	-36.5	-91.5	340.4
9:42:00	45.2	11.7	167.3	189.5	11.1	329.6	26.6	16188	13596	17.5	1413.7	1079.1	485.7	192.0	187.2	-15.2	-27.0	-74.0	356.6
9:43:00	45.3	11.7	167.7	190.2	10.6	329.0	25.5	16869	13730	19.1	1418.9	1079.5	485.5	192.0	187.2	-34.2	-53.4	-103.2	297.7
9:44:00	45.5	11.7	166.5	190.6	10.8	327.6	25.3	16481	13624	17.8	1405.3	1078.9	485.6	192.5	187.2	-19.0	-32.4	-81.2	344.3
9:45:00	45.6	11.1	167.0	190.7	10.4	328.1	25.2	16313	13596	18.8	1411.2	1078.8	485.5	192.5	187.2	-28.4	-46.1	-92.0	299.6
9:46:00	45.8	11.8	167.8	190.6	11.2	329.6	26.6	16544	13489	18.4	1404.3	1078.5	485.8	193.0	187.2	-17.4	-28.4	-77.9	333.4
9:47:00	45.4	11.3	166.4	190.4	10.7	327.5	25.6	16188	13489	17.4	1414.2	1078.8	485.6	193.0	187.2	-13.6	-24.7	-71.8	343.3
9:48:00	45.6	11.5	168.0	190.1	10.5	328.7	25.4	16113	13607	17.8	1411.3	1079.0	485.9	193.0	187.2	-14.3	-23.4	-72.2	360.6
9:49:00	45.9	11.2	167.0	190.3	11.5	331.1	26.4	16013	13506	17.1	1426.8	1079.3	486.0	193.0	187.2	-10.4	-21.4	-66.8	370.8
9:50:00	46.1	11.5	167.6	189.8	11.0	330.5	25.3	16419	13607	17.9	1416.9	1080.9	486.4	193.0	187.2	-15.8	-27.0	-76.7	352.9
9:51:00	45.6	11.8	166.7	190.3	11.0	330.8	26.4	16150	13478	17.3	1424.2	1081.1	486.5	193.0	187.2	-11.8	-22.3	-68.1	363.7
9:52:00	45.8	11.5	167.0	189.9	10.6	331.6	25.7	16531	13607	18.1	1413.3	1081.6	487.5	193.0	187.2	-20.8	-35.4	-84.8	340.3
9:53:00	45.8	11.4	167.4	190.2	11.2	331.0	25.2	16244	13523	18.1	1412.1	1080.8	487.7	193.5	187.2	-17.1	-27.0	-76.8	353.1
9:54:00	45.7	11.4	166.6	189.8	11.0	331.1	26.5	16669	13657	18.4	1407.7	1080.9	488.4	193.5	188.2	-20.0	-33.5	-83.6	326.5
9:55:00	45.9	11.3	167.4	189.7	11.0	329.7	26.1	16325	13534	18.3	1410.6	1080.2	488.4	194.0	188.2	-16.3	-26.4	-74.6	338.3

Test No. 2 - October 7, 2020

	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	Nm^3/h	Nm^3/h	Nm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
9:56:00	45.5	11.8	167.1	190.1	11.0	330.7	26.5	16750	13652	17.7	1409.9	1080.5	488.7	194.0	188.2	-19.1	-31.7	-82.5	357.9
9:57:00	45.8	11.6	167.4	189.9	11.6	330.6	25.2	16131	13551	17.7	1416.8	1080.4	488.9	194.5	188.2	-13.9	-24.9	-69.8	364.9
9:58:00	45.9	11.7	168.5	190.6	11.2	329.7	26.5	16944	13663	18.9	1424.8	1081.8	488.9	194.0	188.2	-29.7	-45.2	-98.9	317.8
9:59:00	46.1	11.4	167.1	189.0	11.3	329.9	26.4	16313	13461	17.7	1416.4	1081.8	490.1	194.5	188.2	-13.8	-22.4	-71.9	353.3
10:00:00	45.8	11.7	166.5	190.4	11.4	331.0	26.6	16675	13562	19.0	1427.6	1082.5	488.6	194.5	188.2	-31.2	-49.9	-99.0	294.6
10:01:00	45.5	11.9	167.5	188.5	11.3	331.6	26.3	16588	13657	17.7	1410.2	1082.1	488.9	195.0	188.2	-19.3	-30.7	-80.1	344.1
10:02:00	45.1	11.1	166.8	189.9	10.9	331.1	26.6	16356	13545	17.5	1411.7	1081.6	488.1	195.0	189.2	-15.8	-28.3	-76.8	331.8
10:03:00	45.4	12.1	167.0	189.3	10.7	330.1	25.6	16388	13539	18.1	1405.4	1081.3	487.5	195.0	189.1	-17.9	-28.7	-78.6	333.7
10:04:00	45.7	11.4	167.0	189.9	10.4	330.5	25.3	16275	13539	17.7	1416.1	1081.1	486.8	195.0	189.1	-14.5	-23.3	-73.5	345.6
10:05:00	45.6	11.9	167.4	189.9	10.2	331.4	26.5	16294	13539	17.6	1414.2	1081.7	487.4	195.0	189.1	-13.1	-22.9	-71.1	359.1
10:06:00	45.9	11.2	166.8	188.7	11.2	330.8	26.5	16031	13528	17.4	1429.4	1082.5	486.9	194.5	189.1	-10.6	-20.6	-65.9	370.1
10:07:00	45.5	11.9	166.4	188.6	9.8	330.6	25.6	16513	13635	17.8	1420.2	1083.3	487.7	194.5	189.1	-17.7	-29.3	-77.6	353.6
10:08:00	45.5	11.9	167.0	188.6	10.8	328.9	25.6	16025	13388	16.9	1424.7	1083.2	486.9	194.5	189.1	-12.1	-20.6	-69.1	363.6
10:09:00	45.3	11.4	166.6	188.4	11.3	330.9	26.0	16638	13714	18.2	1416.4	1083.4	486.9	194.0	189.1	-20.5	-32.9	-84.0	337.1
10:10:00	45.4	11.5	166.9	188.7	10.5	330.1	26.6	16156	13500	18.0	1413.6	1082.3	486.8	194.5	189.1	-16.3	-27.4	-74.8	350.3
10:11:00	45.4	11.2	167.3	187.1	11.8	330.6	26.5	16781	13618	18.5	1410.8	1081.7	486.6	194.5	189.1	-23.0	-35.7	-86.1	330.2
10:12:00	45.4	11.7	166.7	187.4	10.8	330.2	25.7	16106	13618	17.9	1411.1	1081.2	486.0	195.0	189.1	-15.2	-24.8	-73.0	335.9
10:13:00	45.0	11.4	166.2	186.4	11.5	331.3	25.3	16825	13601	17.7	1410.9	1081.1	485.6	195.0	189.1	-21.8	-30.2	-85.2	355.6
10:14:00	45.1	11.6	167.1	187.7	10.9	330.4	26.6	16081	13562	17.5	1414.9	1080.6	484.9	195.0	189.1	-12.8	-19.0	-68.8	364.9
10:15:00	45.0	11.0	167.4	186.6	11.0	331.4	25.6	16688	13629	19.3	1424.9	1081.5	483.9	194.5	189.1	-32.4	-49.7	-101.0	303.5
10:16:00	45.6	11.9	167.4	186.4	11.9	331.0	25.6	16363	13511	17.9	1414.6	1081.1	485.0	194.5	189.1	-15.4	-27.2	-73.5	357.8
10:17:00	45.5	11.4	166.7	186.0	10.7	330.5	26.1	16163	13393	19.1	1422.2	1081.3	484.1	194.5	189.1	-29.9	-48.3	-92.6	297.7
10:18:00	45.3	11.9	166.9	185.4	11.1	330.6	26.6	16644	13590	18.5	1404.6	1080.6	484.7	195.0	189.1	-21.1	-32.5	-82.4	347.6
10:19:00	45.1	11.7	167.2	185.0	11.4	330.9	25.3	16056	13489	18.2	1410.2	1079.8	484.3	195.5	189.1	-16.5	-27.4	-75.0	358.8
10:20:00	45.3	11.3	167.2	188.9	10.4	330.1	26.5	16375	13596	17.9	1404.3	1079.3	484.2	196.0	189.1	-17.5	-29.4	-79.7	333.5
10:21:00	45.2	11.7	166.1	189.3	11.0	329.6	25.6	16263	13601	17.9	1411.4	1078.5	483.5	196.0	189.1	-15.0	-24.1	-72.6	343.9
10:22:00	45.5	11.4	167.8	189.0	9.9	330.3	26.6	16206	13466	17.5	1410.2	1079.1	483.6	195.5	189.1	-14.9	-25.0	-75.1	360.4
10:23:00	45.4	11.3	166.1	188.9	11.0	331.1	25.3	16000	13483	17.5	1420.7	1078.4	483.3	195.0	189.1	-11.6	-22.3	-69.3	370.0
10:24:00	45.3	11.2	167.4	189.2	11.1	330.2	25.7	16506	13579	18.0	1412.7	1079.6	483.9	194.5	189.1	-19.7	-31.8	-79.0	352.7
10:25:00	45.6	11.9	167.4	189.2	11.1	330.0	25.5	16069	13584	17.6	1416.4	1078.7	483.5	194.5	189.1	-13.9	-22.6	-69.6	364.2
10:26:00	45.4	11.4	167.0	188.8	11.1	330.4	25.4	16606	13584	18.4	1410.2	1079.5	483.8	194.0	189.1	-26.7	-40.7	-91.1	340.4
10:27:00	45.5	11.6	166.8	188.3	11.1	331.0	26.3	16350	13579	18.1	1404.8	1077.9	483.4	194.5	189.1	-18.9	-31.0	-76.7	350.3
10:28:00	45.3	11.6	167.0	188.7	10.4	331.3	25.9	16794	13596	18.2	1403.9	1077.5	483.5	194.5	189.1	-22.0	-34.7	-88.2	326.3
10:29:00	45.2	11.3	167.5	188.9	10.9	330.1	26.5	16206	13478	18.1	1404.3	1076.6	482.6	194.5	189.1	-18.0	-29.3	-77.3	338.9
10:30:00	45.1	11.4	166.6	188.5	10.8	330.2	26.1	16269	13708	19.2	1405.8	1077.0	482.2	194.0	189.1	-30.0	-39.2	-97.9	338.2
10:31:00	45.4	11.7	167.0	188.9	10.9	329.9	25.3	16319	13601	17.8	1408.1	1076.9	481.8	194.0	189.1	-14.9	-24.6	-69.7	366.6
10:32:00	45.2	11.3	166.8	189.1	11.3	329.7	26.5	16469	13612	19.1	1419.4	1077.9	480.9	193.5	189.1	-34.1	-50.3	-102.6	305.1
10:33:00	45.5	11.3	166.8	189.6	10.8	329.9	26.5	16388	13506	17.9	1407.9	1077.6	481.3	193.5	189.1	-17.0	-24.9	-73.6	357.9
10:34:00	45.0	11.2	166.2	189.0	11.0	328.1	25.3	15913	13612	17.4	1418.2	1077.6	480.8	193.5	188.1	-18.9	-36.4	-74.8	337.1
10:35:00	45.5	11.8	167.2	189.0	10.7	327.8	25.6	16644	13612	17.7	1402.7	1077.5	481.1	193.0	188.1	-19.4	-32.2	-81.4	345.4
10:36:00	45.3	11.6	166.9	189.2	11.3	315.9	25.4	16006	13612	17.7	1406.9	1076.9	481.2	193.5	188.1	-16.8	-28.4	-76.6	357.3
10:37:00	45.4	11.8	167.0	189.0	11.3	274.1	25.5	16431	13652	18.0	1398.6	1076.3	481.0	193.5	188.1	-19.4	-32.0	-79.5	332.3
10:38:00	45.1	11.4	166.9	189.0	11.4	254.6	25.2	16200	13652	17.9	1405.4	1076.3	480.2	193.5	188.1	-17.0	-28.9	-75.2	345.5
10:39:00	45.3	11.8	167.3	189.2	10.4	250.5	25.3	16394	13635	17.7	1401.1	1076.4	480.8	193.0	188.1	-18.6	-28.4	-77.2	364.3
10:40:00	45.3	11.3	167.6	189.3	11.1	250.5	26.1	16094	13534	17.5	1411.8	1076.6	479.7	193.0	188.1	-11.4	-20.5	-67.2	370.2
10:41:00	45.1	11.8	167.1	189.5	11.1	245.3	26.5	16525	13663	18.2	1407.2	1077.2	479.8	192.5	188.1	-20.6	-32.0	-82.2	351.4
10:42:00	45.3	11.5	167.3	190.0	10.9	248.2	25.6	16225	13562	17.1	1410.1	1077.2	479.7	192.5	188.1	-14.6	-25.7	-71.7	365.6
10:43:00	45.4	11.3	167.3	189.4	10.9	249.0	26.6	16850	13826	18.1	1406.1	1077.6	479.4	192.0	188.1	-29.3	-44.6	-93.0	339.5
10:44:00	45.7	11.2	167.7	190.0	12.6	244.5	26.5	16481	13584	17.6	1401.1	1076.6	479.7	192.5	188.1	-20.4	-31.3	-79.7	353.0
10:45:00	45.3	11.7	167.0	190.4	11.6	245.3	26.5	16969	13584	18.1	1400.8	1076.8	480.0	192.5	188.1	-28.0	-41.4	-94.5	330.8
10:46:00	45.5	11.7	167.4	190.2	10.3	246.3	26.5	16231	13584	18.1	1398.2	1076.2	479.9	192.5	188.1	-17.8	-30.1	-78.6	341.0
10:47:00	45.0	11.6	166.8	189.6	10.6	243.3	26.5	16775	13702	19.0	1403.6	1076.4	479.0	192.5	188.1	-36.3	-52.9	-103.3	321.6

Test No. 2 - October 7, 2020

	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	Nm^3/h	Nm^3/h	Nm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
10:48:00	44.9	11.5	166.7	189.2	10.8	243.8	26.5	16119	13511	17.8	1403.3	1076.1	478.8	192.5	188.1	-14.7	-23.4	-74.0	366.6
10:49:00	45.2	11.2	166.3	189.0	11.4	246.5	26.1	16300	13511	19.3	1413.4	1076.7	477.7	192.0	188.1	-31.2	-50.7	-95.3	302.9
10:50:00	45.3	11.6	167.3	189.5	10.9	242.4	26.1	16331	13517	17.7	1403.1	1076.3	478.5	192.0	188.1	-17.8	-27.3	-75.0	356.1
10:51:00	45.6	11.9	167.3	188.9	10.9	246.8	25.4	16006	13618	17.6	1408.9	1076.3	477.8	191.5	188.1	-14.7	-22.7	-71.1	368.4
10:52:00	45.2	11.5	166.8	190.1	10.9	248.2	25.2	16500	13528	18.4	1396.1	1076.0	478.9	191.5	187.1	-24.0	-37.2	-87.9	349.2
10:53:00	45.2	11.3	167.0	190.3	11.8	244.3	25.4	16338	13646	17.8	1397.9	1075.8	478.0	192.0	187.1	-18.3	-28.8	-77.9	358.7
10:54:00	45.2	11.7	167.4	189.3	10.4	245.6	25.3	16669	13629	18.4	1391.2	1075.4	477.9	192.0	187.1	-22.4	-32.2	-83.7	335.1
10:55:00	45.5	11.4	164.9	189.0	10.4	247.5	25.4	16056	13624	18.3	1398.6	1075.2	477.8	192.0	187.1	-19.7	-28.8	-79.4	347.6
10:56:00	45.6	11.4	167.0	189.0	10.7	242.0	26.6	16488	13579	18.0	1397.4	1075.6	478.3	192.0	187.1	-18.8	-30.2	-77.9	361.6
10:57:00	45.6	11.7	166.9	189.4	10.7	245.6	25.2	16019	13584	17.8	1408.8	1075.9	477.8	192.0	187.1	-13.7	-22.5	-71.2	370.9
10:58:00	45.5	11.7	166.3	189.0	11.0	245.0	25.7	16725	13714	18.2	1403.7	1076.9	478.4	192.0	187.1	-23.3	-34.7	-84.3	351.6
10:59:00	45.7	11.8	167.4	190.2	11.1	242.9	25.3	15906	13506	17.9	1405.6	1076.9	478.4	192.0	187.1	-15.2	-24.3	-72.9	361.0
11:00:00	45.4	11.8	167.6	189.9	10.4	244.4	26.6	16863	13725	19.1	1405.6	1077.7	478.5	192.0	187.1	-28.9	-38.6	-95.3	338.4
11:01:00	44.9	11.6	166.7	188.2	10.7	245.9	25.5	16513	13618	18.3	1396.2	1077.2	478.5	192.5	187.1	-20.4	-30.7	-81.3	352.1
11:02:00	44.7	11.3	167.3	188.2	10.9	242.4	26.4	16713	13719	19.0	1395.9	1076.5	478.2	192.5	187.1	-34.3	-50.1	-103.4	312.4
11:03:00	44.9	11.4	166.3	189.5	10.8	245.0	25.3	16344	13612	18.4	1392.1	1075.5	477.3	192.5	187.1	-21.1	-32.9	-80.7	340.3
11:04:00	45.6	11.6	166.7	189.1	11.1	244.4	26.1	16475	13500	19.2	1400.8	1074.9	477.0	192.0	187.1	-32.7	-53.9	-99.8	314.6
12:28:00	43.2	11.6	166.7	187.4	11.6	323.9	25.6	16544	13567	17.8	1389.2	1083.3	480.1	194.0	189.1	-20.7	-32.1	-80.5	341.4
12:29:00	43.1	11.2	166.3	186.8	10.8	320.4	25.8	16225	13556	18.2	1395.8	1083.5	480.1	194.0	189.1	-15.4	-25.3	-72.8	350.8
12:30:00	43.3	11.8	167.3	186.9	10.8	321.0	26.5	16213	13674	17.9	1395.7	1084.2	480.9	194.0	189.1	-15.9	-23.5	-74.4	364.8
12:31:00	43.2	11.7	168.1	187.8	11.4	321.5	26.3	16131	13472	17.8	1407.7	1086.0	480.9	194.0	189.1	-12.7	-22.3	-68.1	376.3
12:32:00	43.1	11.6	167.4	186.9	10.5	318.3	25.9	16431	13697	18.0	1400.2	1087.2	482.5	194.0	189.1	-20.6	-31.3	-80.6	354.9
12:33:00	43.1	11.2	168.1	187.6	10.4	318.1	26.2	16088	13573	17.3	1404.4	1087.5	482.6	194.5	189.1	-14.2	-23.4	-70.1	365.6
12:34:00	43.1	11.8	167.3	186.5	11.5	317.4	26.0	16663	13596	18.2	1400.2	1088.3	483.8	194.5	189.1	-25.0	-39.0	-89.0	340.6
12:35:00	43.2	11.5	167.6	186.9	11.7	314.3	25.6	16231	13494	17.8	1397.2	1088.0	484.7	195.0	189.1	-18.7	-28.4	-76.2	354.0
12:36:00	43.0	11.1	168.5	185.8	10.8	318.2	25.8	16806	13719	18.2	1396.1	1088.3	485.3	195.5	189.1	-22.7	-33.8	-86.3	328.7
12:37:00	42.9	11.4	167.3	186.5	10.7	308.4	26.1	16169	13596	18.0	1396.6	1088.1	485.5	196.0	190.2	-18.9	-29.9	-75.6	342.8
12:38:00	42.8	11.8	167.5	186.2	11.6	311.6	25.3	16794	13697	18.6	1399.2	1088.5	485.4	196.0	190.2	-27.1	-36.7	-94.1	347.3
12:39:00	43.0	11.7	167.7	185.0	11.0	309.4	25.2	15869	13494	17.7	1402.1	1088.5	485.7	196.5	190.2	-13.2	-19.8	-68.2	367.7
12:40:00	42.8	11.6	167.0	186.2	11.0	309.5	26.6	16338	13551	18.8	1413.2	1089.6	484.8	196.5	190.2	-33.6	-51.8	-98.2	303.2
12:41:00	43.1	11.7	168.0	186.3	11.0	311.0	26.3	16100	13551	17.4	1403.6	1089.6	485.4	196.5	190.2	-16.1	-24.6	-72.6	359.4
12:42:00	42.7	11.4	167.9	185.5	11.0	306.7	25.3	15950	13556	17.2	1412.6	1090.2	485.6	196.5	190.2	-14.9	-27.2	-73.3	325.3
12:43:00	43.0	11.6	168.0	186.5	10.8	301.9	26.4	16431	13556	17.7	1398.7	1090.0	486.4	197.0	190.2	-20.3	-32.1	-80.6	347.3
12:44:00	42.9	11.6	167.6	186.2	11.1	276.4	26.1	16044	13562	17.4	1400.2	1089.8	485.8	197.5	191.2	-16.5	-25.7	-73.4	360.1
12:45:00	43.1	11.5	168.4	186.3	12.8	267.3	25.2	16344	13663	18.2	1393.1	1089.3	486.0	197.5	191.2	-19.6	-29.6	-78.5	334.0
12:46:00	43.0	11.3	167.9	186.6	11.2	270.6	25.9	16106	13545	17.4	1398.9	1089.0	485.7	197.5	191.2	-16.6	-23.2	-73.1	345.8
12:47:00	42.9	11.7	168.5	186.4	11.2	277.2	25.2	16406	13579	17.9	1395.7	1088.8	485.5	197.5	191.2	-15.4	-24.1	-72.6	358.8
12:48:00	43.0	11.5	168.2	186.3	11.2	271.8	26.1	15738	13573	17.7	1403.6	1088.5	484.6	197.5	191.2	-12.2	-17.2	-66.6	368.8
12:49:00	42.9	11.6	167.9	186.5	11.1	261.6	26.5	16588	13674	17.8	1398.1	1089.0	485.2	197.0	191.2	-21.1	-30.9	-81.6	353.4
12:50:00	42.6	11.7	168.0	186.5	11.1	267.8	25.6	16069	13573	17.5	1398.7	1088.5	484.7	197.5	191.2	-13.8	-21.5	-69.3	365.8
12:51:00	42.6	11.4	167.7	186.1	10.8	265.7	25.4	16750	13685	18.1	1394.8	1088.6	484.8	197.0	191.2	-26.8	-39.8	-90.1	339.1
12:52:00	42.8	11.7	168.3	187.0	10.8	272.4	26.4	16319	13680	17.7	1389.6	1087.6	484.4	197.5	191.2	-17.5	-29.5	-76.8	349.2
12:53:00	42.9	11.8	167.8	186.2	10.7	260.6	26.4	16744	13787	18.5	1388.9	1086.9	484.5	197.5	191.2	-29.5	-40.4	-92.9	329.4
12:54:00	43.0	11.2	167.8	187.4	11.9	256.7	25.4	16206	13691	18.2	1388.1	1085.7	484.5	198.0	191.2	-18.3	-27.1	-77.4	339.9
12:55:00	42.7	11.1	168.1	186.7	10.4	264.8	25.3	16494	13567	19.6	1392.2	1084.9	484.2	198.0	191.2	-34.9	-47.4	-101.2	320.5
12:56:00	43.0	11.5	168.5	186.7	11.4	269.3	25.3	16031	13449	17.8	1393.6	1084.3	483.6	198.0	191.2	-13.8	-21.0	-70.1	363.7
12:57:00	42.7	11.7	168.0	186.5	11.2	259.1	25.4	16106	13562	19.3	1407.4	1084.9	483.1	197.5	191.2	-31.6	-47.1	-93.4	305.9
12:58:00	43.0	11.1	168.3	186.9	11.2	272.0	25.3	16225	13708	17.9	1396.2	1085.2	483.7	197.5	191.2	-16.7	-27.0	-75.2	359.2
12:59:00	42.7	11.3	168.3	187.0	11.0	271.8	25.2	15988	13607	17.0	1405.2	1085.1	483.4	197.5	191.2	-12.9	-21.9	-67.9	369.3
13:00:00	42.9	11.1	167.8	186.5	11.0	267.7	25.2	16369	13607	18.2	1391.8	1085.4	484.5	197.5	191.2	-22.8	-33.2	-82.3	346.4
13:01:00	42.2	11.5	167.6	186.1	11.0	268.4	26.4	16338	13607	17.1	1392.7	1084.5	484.3	197.5	192.2	-18.1	-24.7	-74.6	359.6
13:02:00	42.6	11.6	168.0	186.8	11.1	256.7	25.7	16250	13596	18.2	1385.9	1083.7	484.5	197.5	191.1	-21.4	-31.1	-80.3	334.1

Test No. 2 - October 7, 2020

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	Nm^3/h	Nm^3/h	Nm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
13:03:00	42.4	11.6	167.3	186.8	11.4	250.7	25.9	16219	13590	18.0	1391.4	1083.1	484.0	197.5	191.1	-15.5	-25.4	-73.1	344.4
13:04:00	42.9	11.3	168.4	186.9	11.0	248.8	25.7	16225	13702	18.1	1388.1	1083.0	483.8	197.0	191.1	-20.2	-29.1	-76.4	362.8
13:05:00	42.8	11.5	169.5	186.6	10.7	245.5	26.6	16138	13596	17.2	1397.8	1083.1	482.8	197.0	191.1	-12.9	-22.3	-66.2	368.1
13:06:00	43.0	11.5	167.2	186.3	11.0	244.2	25.3	16594	13702	17.5	1396.8	1083.8	482.7	196.5	191.1	-24.4	-28.9	-81.1	351.2
13:07:00	42.9	11.7	168.4	187.0	11.2	244.4	26.0	16231	13596	17.5	1397.3	1083.5	483.0	196.5	191.1	-15.5	-19.8	-70.3	362.4
13:08:00	43.1	11.4	167.7	185.4	10.6	243.8	26.6	16819	13725	18.6	1394.3	1083.6	482.7	196.0	191.1	-28.8	-41.6	-92.7	338.8
13:09:00	43.2	11.7	168.1	187.8	11.1	249.8	26.6	16306	13601	17.9	1387.2	1082.7	482.7	196.5	191.1	-21.2	-29.1	-77.2	352.1
13:10:00	43.2	11.3	168.5	187.1	9.9	249.1	25.4	16769	13753	19.2	1388.1	1082.3	482.3	196.5	191.1	-33.8	-40.2	-96.1	313.9
13:11:00	43.0	11.4	167.8	186.1	11.1	244.9	26.1	16175	13528	18.0	1383.9	1081.3	482.0	197.0	191.1	-20.2	-30.0	-77.1	340.9
13:12:00	43.1	11.6	167.9	186.6	11.0	247.4	25.8	16494	13646	19.0	1390.6	1081.1	481.1	196.5	191.1	-33.3	-47.7	-98.5	318.8
13:13:00	43.3	11.6	168.4	186.6	11.1	250.0	25.7	16256	13489	17.9	1390.2	1080.9	481.1	196.5	191.1	-15.0	-24.7	-69.3	365.3
13:14:00	43.0	11.8	167.5	186.3	10.6	245.4	26.3	15988	13489	17.6	1401.4	1081.3	479.9	196.0	191.1	-21.4	-37.7	-74.1	328.8
13:15:00	42.9	11.2	167.2	186.5	11.1	250.7	25.8	16313	13641	17.8	1390.6	1081.2	480.3	196.0	191.1	-18.7	-22.1	-74.2	361.0
13:16:00	43.1	11.5	168.5	185.9	11.0	242.6	26.4	16050	13646	17.8	1395.8	1081.3	479.8	195.5	191.1	-13.7	-19.8	-69.2	369.3
13:17:00	42.9	11.4	167.6	185.6	11.0	247.3	26.1	16575	13669	18.0	1385.2	1081.0	480.3	195.5	190.1	-22.9	-34.0	-82.7	346.4
13:18:00	43.0	11.2	168.5	185.8	11.0	247.2	25.4	16238	13663	17.8	1386.1	1080.1	480.3	196.0	190.1	-20.0	-24.1	-76.6	359.5
13:19:00	42.9	11.7	168.5	186.3	10.9	245.9	25.6	16531	13669	18.4	1381.2	1079.8	480.2	196.0	190.1	-23.2	-28.2	-80.3	332.2
13:20:00	43.1	11.6	167.8	186.0	10.8	244.0	26.3	16119	13567	17.7	1384.6	1079.4	479.9	196.0	190.1	-17.8	-25.8	-76.3	344.8
13:21:00	43.2	11.7	168.4	186.0	11.3	240.1	26.6	16463	13567	18.0	1382.8	1079.5	479.7	196.0	190.1	-18.4	-29.5	-77.8	361.1
13:22:00	43.0	11.6	168.4	186.6	11.3	241.3	26.5	16094	13567	17.5	1392.7	1079.9	479.5	195.5	190.1	-14.3	-22.9	-70.6	369.6
13:23:00	42.8	11.6	167.1	186.1	10.8	211.7	26.1	16600	13685	18.2	1390.9	1080.4	479.5	195.0	190.1	-23.6	-36.1	-84.7	353.8
13:24:00	43.0	11.8	167.3	186.3	10.8	212.8	26.5	16150	13567	17.7	1390.4	1080.1	479.1	195.5	190.1	-16.2	-23.8	-72.9	363.5
13:25:00	42.7	11.3	167.8	185.8	11.3	205.6	25.1	16806	13680	18.2	1390.6	1080.6	478.5	195.0	190.1	-30.2	-43.3	-95.3	339.1
13:26:00	42.9	11.7	168.7	186.4	11.3	209.0	26.0	16444	13562	18.0	1381.8	1079.5	478.8	195.0	190.1	-20.1	-26.9	-78.4	352.9
13:27:00	43.0	11.6	167.1	186.5	10.8	212.0	25.7	16881	13674	19.2	1381.9	1078.6	478.0	195.0	190.1	-34.3	-39.3	-97.2	309.1
13:28:00	43.3	11.6	167.8	186.6	10.8	214.3	26.1	16350	13674	18.2	1377.1	1077.6	478.4	195.0	190.1	-19.0	-27.3	-77.6	342.1
13:29:00	42.8	11.3	168.1	186.2	10.8	248.6	25.8	16088	13567	19.5	1385.2	1077.6	477.8	195.0	190.1	-31.9	-50.1	-93.0	316.4
13:30:00	43.1	11.6	168.0	187.2	10.7	247.2	26.2	16213	13579	17.9	1383.7	1077.5	477.6	194.5	190.1	-17.8	-15.5	-72.1	367.2
13:31:00	43.1	11.6	168.4	185.9	10.0	251.9	25.9	16069	13579	17.5	1394.9	1077.9	477.1	194.0	190.1	-13.0	-17.1	-66.3	375.9
13:32:00	43.1	11.4	168.4	185.8	11.3	250.3	25.4	16419	13674	18.2	1384.3	1077.6	477.3	194.0	190.1	-20.0	-26.4	-75.9	360.2
13:33:00	43.2	11.4	167.8	187.0	10.0	248.5	26.1	16231	13562	17.9	1388.1	1076.9	476.6	194.0	189.1	-15.9	-23.8	-69.4	372.3
13:34:00	43.2	11.1	168.5	186.0	11.1	238.9	26.1	16650	13708	18.6	1376.4	1076.4	476.2	193.5	189.1	-23.6	-32.9	-84.0	343.3
13:35:00	42.8	11.7	168.1	185.1	11.2	245.3	26.3	16225	13596	18.4	1377.4	1075.4	475.9	193.5	189.1	-20.8	-29.3	-76.8	356.8
13:36:00	43.1	12.0	168.4	187.1	11.5	255.8	26.0	16619	13697	18.8	1371.4	1075.0	475.8	193.5	189.1	-23.9	-34.1	-83.8	335.0
13:37:00	42.9	11.0	168.0	186.2	10.9	253.2	25.7	16338	13601	17.6	1374.9	1074.2	474.4	193.5	189.1	-20.2	-22.4	-76.4	345.8
13:38:00	42.6	11.4	167.5	186.2	10.9	237.7	25.4	16650	13714	18.3	1373.1	1073.9	474.2	193.5	189.1	-22.2	-28.5	-79.6	362.3
13:39:00	42.9	8.8	168.4	185.9	12.5	232.7	25.4	16206	13607	17.8	1380.9	1073.5	473.5	193.0	189.1	-16.2	-25.0	-70.5	368.9
13:40:00	42.8	11.2	167.5	185.1	11.5	222.5	25.5	17113	13719	18.2	1375.2	1072.7	471.5	192.0	189.1	-27.2	-36.0	-88.7	351.1
13:41:00	42.9	11.5	168.2	185.1	10.6	218.0	26.5	16181	13584	18.0	1373.4	1071.5	471.3	192.0	188.1	-18.6	-28.3	-76.0	361.4
13:42:00	42.8	11.1	167.3	185.8	11.1	242.6	25.6	17050	13674	19.0	1376.8	1071.6	471.4	191.5	188.1	-39.8	-46.3	-105.8	323.1
13:43:00	42.8	11.3	168.5	186.0	11.1	212.6	26.5	16538	13685	18.3	1367.2	1071.0	472.2	192.0	188.1	-23.6	-34.0	-82.7	351.6
13:44:00	43.2	11.9	168.5	185.3	11.1	242.3	25.9	16731	13685	19.1	1370.9	1070.6	472.0	192.0	188.1	-33.5	-49.5	-98.3	303.6
13:45:00	42.8	11.5	167.6	185.2	10.7	246.6	26.3	16556	13691	18.5	1367.6	1070.2	472.6	192.0	188.1	-21.5	-34.6	-81.4	340.9
13:46:00	42.9	11.3	168.2	186.4	11.0	248.2	25.3	16388	13562	18.2	1372.1	1070.4	473.2	192.5	188.1	-23.9	-44.8	-80.1	332.6
13:47:00	43.2	11.5	168.1	185.2	11.0	248.9	25.7	16306	13663	18.0	1371.1	1070.3	473.8	192.5	188.1	-17.0	-26.3	-76.1	367.4
13:48:00	43.2	11.5	167.6	184.9	11.2	250.1	25.3	16000	13567	18.1	1384.8	1071.7	473.4	192.5	188.1	-14.6	-20.8	-68.9	375.0
13:49:00	43.4	11.0	168.2	185.7	11.0	252.4	25.2	16400	13556	18.4	1379.1	1073.5	474.6	192.0	188.1	-18.0	-30.4	-77.9	359.9
13:50:00	43.3	11.4	167.7	186.3	11.4	260.5	26.5	16038	13556	17.7	1386.9	1075.0	475.5	192.5	188.1	-16.1	-25.7	-71.5	370.6
13:51:00	43.3	11.6	168.7	186.6	11.4	255.1	25.9	16575	13691	18.0	1380.1	1076.5	477.3	192.5	188.1	-24.4	-37.8	-86.9	346.1
13:52:00	43.7	11.4	167.6	186.7	11.3	254.8	26.5	16306	13674	17.8	1380.9	1077.3	478.6	193.0	188.1	-19.6	-23.8	-77.4	360.7
13:53:00	43.7	11.6	167.9	186.6	10.2	258.4	25.7	16644	13674	18.3	1379.7	1078.9	480.1	193.5	188.1	-23.0	-33.8	-81.8	337.1
13:54:00	43.8	11.9	167.5	185.9	11.2	260.3	26.3	16381	13674	17.8	1385.3	1079.7	480.9	194.5	189.2	-17.5	-28.1	-74.6	346.9

Test No. 2 - October 7, 2020

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	Nm^3/h	Nm^3/h	Nm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
13:55:00	43.5	11.7	167.8	185.5	10.8	261.5	26.7	16719	13652	17.9	1386.2	1080.9	481.6	194.5	189.2	-20.6	-29.6	-78.2	360.9
13:56:00	43.4	11.8	167.8	185.3	11.0	261.9	26.6	16013	13523	17.6	1395.2	1081.7	482.5	195.0	189.2	-14.6	-20.1	-69.6	371.2
13:57:00	43.6	11.4	167.9	185.9	11.0	258.6	25.7	16900	13730	18.5	1398.6	1083.4	483.0	195.0	189.2	-27.9	-38.6	-92.3	350.0
13:58:00	43.5	11.7	167.9	186.8	10.8	257.2	26.5	16150	13506	17.7	1396.4	1083.7	483.8	196.0	190.2	-15.3	-20.5	-71.4	362.0
13:59:00	43.6	11.2	168.5	186.2	10.8	252.5	25.2	16694	13612	19.2	1403.2	1085.0	484.1	196.0	190.2	-35.8	-52.8	-104.0	305.8
14:00:00	44.1	11.6	168.0	186.5	11.1	251.3	25.6	16494	13612	17.3	1392.8	1085.0	485.0	196.5	190.2	-19.6	-28.5	-79.7	350.6
14:01:00	43.2	11.6	168.9	188.5	11.9	254.1	25.5	16256	13607	19.3	1397.1	1085.7	485.2	197.0	191.2	-32.5	-48.4	-90.1	306.6
14:02:00	43.9	11.8	168.0	187.1	11.3	250.4	25.9	16131	13601	18.2	1391.2	1085.3	485.6	197.5	191.2	-20.5	-31.9	-80.0	340.2
14:03:00	44.1	11.5	168.0	189.6	10.9	248.8	25.3	16081	13601	17.8	1398.6	1086.1	485.8	197.5	191.2	-16.3	-25.6	-73.2	350.9
14:04:00	44.4	11.7	167.9	189.6	11.1	250.2	26.6	16031	13601	17.6	1399.9	1086.5	486.5	198.0	191.2	-15.1	-19.2	-71.0	365.4
14:05:00	44.3	11.2	168.0	189.1	11.0	249.8	25.9	15956	13489	17.1	1414.4	1087.9	487.1	197.5	191.2	-11.3	-20.1	-66.4	374.4
14:06:00	44.2	11.7	168.2	189.4	10.7	247.4	26.2	16438	13708	17.0	1407.9	1089.5	487.9	197.5	191.2	-18.2	-27.0	-74.7	358.8
14:07:00	44.4	11.4	168.3	189.0	10.5	243.0	25.6	15888	13483	17.2	1413.6	1090.1	488.4	197.5	191.2	-14.5	-20.5	-66.6	370.9
14:08:00	44.5	11.4	168.3	188.6	11.2	251.0	26.5	16581	13607	18.2	1407.2	1090.9	489.0	197.5	191.2	-22.6	-34.4	-84.7	342.8
14:09:00	44.5	11.9	168.2	189.9	11.3	254.3	25.3	16181	13612	17.4	1406.6	1090.8	489.3	198.0	191.2	-17.0	-28.1	-76.1	354.6
14:10:00	43.8	11.4	165.1	189.8	10.8	248.0	26.5	16644	13624	17.9	1400.9	1091.0	489.5	198.0	191.2	-23.1	-34.7	-83.8	330.3
14:11:00	44.0	11.6	165.4	188.9	10.6	245.3	26.0	16263	13624	17.6	1401.8	1090.7	488.7	198.5	192.2	-18.2	-28.6	-74.9	341.7
14:12:00	43.8	11.0	164.7	189.0	10.6	244.7	25.3	16769	13624	18.1	1400.6	1090.8	487.8	198.0	192.2	-22.2	-33.9	-82.4	358.5
14:13:00	44.3	11.6	165.2	189.4	10.3	221.7	25.4	16150	13618	17.3	1406.1	1090.5	486.7	198.0	192.2	-12.8	-21.6	-69.4	366.2
14:14:00	43.9	11.5	165.5	189.0	11.0	223.8	25.3	16763	13697	19.0	1410.7	1091.0	486.3	197.0	192.2	-33.1	-48.3	-100.8	327.1
14:15:00	43.9	11.7	165.6	188.4	11.0	239.9	26.5	16238	13573	17.5	1403.3	1090.3	486.2	197.0	192.2	-17.7	-28.2	-75.5	358.1
14:16:00	43.8	11.1	164.9	189.5	11.4	236.6	26.3	16406	13584	19.1	1411.4	1090.6	484.9	196.5	192.2	-37.9	-54.8	-103.9	300.3
14:17:00	43.9	11.9	164.7	189.5	11.6	251.2	25.3	16119	13573	17.7	1397.4	1090.0	484.9	196.5	191.1	-20.8	-33.5	-83.6	346.8
14:18:00	44.1	11.5	164.1	189.1	10.8	343.8	25.4	16438	13573	17.5	1400.8	1089.7	484.4	196.5	191.1	-23.4	-43.9	-79.8	325.3
14:19:00	44.1	11.4	164.4	188.5	10.6	434.7	26.4	16463	13567	18.0	1393.9	1088.9	484.3	196.5	191.1	-21.0	-33.0	-79.9	336.3
14:20:00	43.8	11.5	164.8	188.3	10.4	434.6	25.7	16106	13455	17.5	1400.6	1088.3	483.3	196.5	191.1	-17.5	-26.6	-74.4	347.4
14:21:00	43.7	11.6	164.8	188.0	10.7	273.1	26.6	16138	13562	18.0	1396.2	1087.7	482.7	196.0	191.1	-16.3	-27.0	-74.1	364.0
14:22:00	43.9	11.2	165.4	188.6	11.4	417.2	25.6	16169	13551	17.2	1405.7	1086.7	481.6	195.5	191.1	-13.3	-22.6	-67.3	371.8
14:23:00	43.6	11.7	164.6	189.2	10.8	286.9	25.9	16394	13539	18.1	1398.7	1087.0	481.5	195.0	191.1	-19.1	-30.9	-80.5	354.3
14:24:00	43.4	11.7	165.1	188.8	10.8	435.2	26.4	16038	13539	17.4	1400.2	1085.9	480.5	194.5	190.1	-14.2	-21.8	-72.9	368.0
14:25:00	43.8	11.4	165.5	189.1	10.8	309.0	26.5	16750	13669	18.2	1392.4	1085.0	479.9	194.0	190.1	-27.6	-36.4	-88.6	344.7
14:26:00	44.1	11.8	164.9	189.0	10.8	434.9	25.4	16213	13641	17.9	1389.1	1082.8	479.0	194.0	190.1	-21.6	-28.4	-76.8	356.9
14:27:00	43.7	11.1	164.9	188.4	10.8	248.2	25.9	17006	13747	18.8	1386.6	1081.9	478.7	193.5	190.1	-26.4	-36.7	-88.7	332.9
14:28:00	43.9	11.2	164.7	189.2	10.8	244.1	25.9	16313	13629	18.0	1386.3	1080.6	477.3	193.5	190.1	-21.2	-31.5	-78.4	344.2
Max	46.1	12.1	169.5	195.2	12.8	435.2	26.7	17113	13826	19.6	1429.4	1091.0	490.1	198.5	192.2	-10.3	-15.5	-63.5	376.3
Min	42.2	8.8	164.1	184.9	9.0	201.0	25.1	15738	13388	16.9	1367.2	1070.2	471.3	190.5	186.1	-39.8	-54.8	-105.8	294.6
Average	44.4	11.5	167.2	188.4	11.0	275.3	25.9	16378	13600	18.0	1401.3	1080.9	482.7	194.2	188.9	-20.1	-31.0	-79.8	346.8

Test No. 3 - October 8, 2020

	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 Outlet	Baghouse
	Lpm	Lpm	Lpm	Lpm	Lpm	SCFM	lbs/h	Nm^3/h	Nm^3/h	Nm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
8:37:00	44.4	10.3	165.0	193.0	11.4	257.0	25.6	17750	14146	18.3	1370.8	1078.4	497.8	200.0	193.1	-28.5	-43.6	-98.9	337.8
8:38:00	44.2	10.0	164.8	193.1	10.6	250.7	24.9	17269	14045	18.2	1363.6	1078.5	498.7	201.0	193.1	-17.6	-29.5	-80.8	351.8
8:39:00	44.4	9.9	166.2	192.6	10.5	261.2	25.3	17450	13994	19.5	1368.1	1078.8	498.9	201.0	194.2	-31.7	-48.3	-101.8	306.6
8:40:00	44.1	10.2	165.2	193.1	9.8	259.9	24.4	17356	13983	18.2	1361.8	1078.8	499.5	202.0	194.2	-16.2	-27.5	-78.5	338.9
8:41:00	43.9	9.5	165.1	193.6	10.5	259.0	24.6	17363	13983	19.5	1368.7	1079.0	499.2	202.0	194.2	-29.6	-45.9	-93.6	315.1
8:42:00	44.3	9.7	165.8	194.6	11.0	262.7	25.7	16944	13989	17.9	1366.8	1079.1	498.9	202.0	195.2	-12.2	-23.8	-72.1	364.6
8:43:00	44.0	9.8	164.6	193.5	10.6	259.1	25.7	16869	13888	17.6	1381.7	1079.5	498.8	202.0	195.2	-9.4	-19.8	-65.9	374.6
8:44:00	44.4	10.0	165.4	194.0	11.3	249.8	25.8	17106	14034	18.2	1370.3	1079.8	498.9	201.5	195.2	-16.6	-27.9	-77.0	358.1
8:45:00	43.8	9.7	164.7	193.7	11.1	256.7	24.8	16938	13921	17.9	1378.4	1079.9	497.2	201.5	195.2	-11.5	-20.2	-69.9	367.7
8:46:00	43.9	9.7	164.6	193.5	11.1	257.8	24.8	17331	14034	18.3	1365.3	1079.7	496.1	201.0	195.2	-21.5	-36.2	-85.5	344.4
8:47:00	43.5	9.9	164.9	193.9	11.6	257.0	25.1	16931	13916	17.9	1365.1	1078.9	495.5	201.0	195.2	-16.6	-27.2	-76.8	356.7
8:48:00	43.8	9.9	165.0	194.0	11.0	259.7	25.7	17225	14034	18.2	1358.7	1078.4	495.0	201.0	195.2	-20.8	-34.0	-84.0	332.6
8:49:00	43.8	9.6	165.2	193.3	10.9	257.4	24.6	17000	13933	18.3	1363.4	1077.8	493.9	201.0	195.2	-16.1	-25.8	-75.4	343.6
8:50:00	43.8	10.0	164.7	192.8	9.9	252.4	25.7	17219	13905	18.6	1360.8	1078.0	493.6	200.5	195.2	-17.8	-29.8	-78.5	361.7
8:51:00	44.3	10.0	164.7	194.2	11.8	249.8	25.3	16769	14006	17.5	1371.2	1077.9	493.2	200.5	194.1	-10.8	-18.7	-68.4	370.1
8:52:00	44.2	9.9	164.9	194.3	11.1	250.0	24.6	17588	14017	18.4	1372.1	1078.7	492.9	199.5	194.1	-21.2	-34.0	-88.2	350.1
8:53:00	44.2	10.0	164.7	193.8	10.9	244.5	24.6	16894	14017	17.9	1371.8	1078.6	493.0	200.0	194.1	-13.9	-22.8	-72.5	362.8
8:54:00	44.2	9.6	164.5	193.4	10.8	246.2	25.3	17575	14017	19.1	1376.6	1079.1	492.9	199.5	194.1	-33.3	-47.7	-106.7	324.8
8:55:00	44.3	10.2	163.8	193.5	8.7	245.3	25.8	17206	13910	18.3	1366.9	1078.7	494.0	199.5	194.1	-18.9	-30.9	-81.0	351.4
8:56:00	44.1	9.9	164.8	194.1	10.1	243.9	24.6	17338	14034	19.5	1369.1	1078.5	493.8	200.0	194.1	-32.0	-47.2	-98.0	304.6
8:57:00	44.0	9.9	164.7	194.4	10.5	247.9	25.8	17206	13905	18.5	1363.1	1078.2	494.2	200.0	194.1	-17.3	-27.5	-79.4	339.9
8:58:00	44.1	10.1	164.6	193.8	11.1	244.3	25.8	17188	13905	18.1	1370.3	1078.2	493.8	200.0	194.1	-16.6	-35.2	-78.0	326.5
8:59:00	44.0	10.2	165.2	194.1	11.2	247.9	24.4	16988	13910	18.2	1368.1	1077.8	493.8	200.0	194.1	-13.4	-23.8	-74.3	366.6
9:00:00	43.6	9.8	164.7	193.8	11.2	243.3	25.8	16794	13910	17.8	1380.2	1078.2	493.1	199.5	194.1	-10.4	-18.2	-66.3	374.6
9:01:00	43.5	9.6	165.5	194.4	11.1	240.9	25.8	17125	14034	17.6	1366.4	1078.7	494.0	199.0	194.1	-18.0	-28.4	-80.1	358.6
9:02:00	43.3	9.8	164.8	193.5	10.4	250.5	24.9	16744	13927	17.7	1370.4	1078.0	493.2	199.0	193.1	-13.0	-21.6	-70.7	365.9
9:03:00	43.7	9.9	165.1	194.8	11.4	245.7	24.7	17538	13927	18.7	1361.4	1077.5	492.9	198.5	193.1	-23.8	-34.6	-88.5	345.1
9:04:00	43.9	10.1	164.9	194.5	10.6	245.6	24.8	17269	14028	18.3	1359.7	1076.1	492.0	198.5	193.1	-18.5	-29.1	-78.9	357.4
9:05:00	43.8	9.7	165.2	194.2	10.6	245.4	24.8	17494	14039	18.7	1355.6	1075.8	492.2	198.5	193.1	-22.7	-34.2	-87.7	335.4
9:06:00	44.0	10.3	165.0	194.2	9.7	248.8	25.8	16913	13921	18.1	1359.9	1075.3	491.9	198.5	193.1	-15.9	-26.6	-77.3	343.5
9:07:00	43.9	9.6	165.0	194.4	10.6	242.3	25.7	17463	14023	18.2	1359.7	1075.4	491.9	198.5	193.1	-19.2	-31.2	-83.3	362.2
9:08:00	44.0	10.2	165.7	194.6	12.0	240.1	25.6	16775	13916	17.7	1369.3	1075.8	490.4	198.0	193.1	-12.1	-20.1	-70.0	369.5
9:09:00	43.6	9.9	164.4	194.1	11.1	240.5	24.6	17869	14163	18.4	1370.9	1076.6	490.0	197.5	193.1	-25.3	-38.0	-93.1	348.6
9:10:00	43.5	10.0	164.6	194.1	10.9	242.1	24.4	17000	13927	17.5	1366.4	1076.4	489.7	197.0	193.1	-15.5	-25.1	-75.9	364.0
9:11:00	43.7	9.8	164.9	194.2	10.7	238.9	25.7	17438	14045	19.4	1369.6	1076.6	488.7	196.5	192.1	-37.2	-53.1	-107.3	304.9
9:12:00	44.0	10.2	165.1	193.8	11.2	238.0	24.5	17394	14023	18.7	1357.3	1075.9	489.4	196.5	192.1	-21.1	-32.5	-84.5	352.6
9:13:00	44.1	9.7	165.3	193.5	10.1	237.2	25.6	17194	14039	19.4	1362.2	1075.4	488.8	197.0	192.1	-31.1	-48.3	-96.7	303.7
9:14:00	44.0	9.8	164.8	193.7	10.6	232.3	24.4	17050	14017	18.4	1355.6	1074.7	488.5	196.5	192.1	-18.2	-28.3	-81.0	337.8
9:15:00	44.0	10.1	165.2	194.3	11.3	235.1	24.7	16856	13770	18.3	1363.7	1074.5	488.3	196.5	192.1	-15.8	-25.6	-76.4	348.8
9:16:00	43.5	10.1	164.2	194.5	10.6	218.0	25.8	17019	14011	18.2	1359.9	1074.2	487.9	196.5	192.1	-16.3	-25.8	-77.3	365.5
9:17:00	43.7	9.7	164.0	193.6	11.6	231.7	24.9	16763	13899	17.9	1368.7	1073.9	486.7	196.0	192.1	-12.4	-23.1	-70.5	373.9
9:18:00	43.9	10.1	164.9	193.9	10.6	235.4	25.1	17338	13899	18.3	1361.2	1073.8	487.1	195.5	191.1	-20.0	-31.3	-83.7	356.2
9:19:00	43.9	9.8	165.2	193.6	10.7	235.8	24.6	16713	13899	18.0	1365.1	1073.6	486.9	195.5	191.1	-16.3	-25.1	-75.6	368.0
9:20:00	43.7	9.9	165.0	193.2	11.1	211.1	24.5	17494	14023	18.9	1354.6	1073.4	487.9	195.5	191.1	-26.1	-38.9	-93.1	344.7
9:21:00	43.5	9.7	164.9	193.5	9.8	210.1	25.7	17144	13910	18.2	1351.4	1071.9	487.9	195.5	191.1	-20.4	-31.4	-83.7	357.8
9:22:00	43.2	10.0	164.4	192.8	11.0	216.5	24.5	17381	14011	19.0	1346.6	1070.7	487.7	195.5	191.1	-26.1	-39.0	-91.6	333.8
9:23:00	44.0	10.0	164.9	193.7	10.4	192.6	24.7	17163	13905	18.7	1348.6	1069.5	487.5	195.5	191.1	-18.8	-32.7	-82.1	344.6
9:24:00	43.7	9.8	164.4	192.6	11.1	180.7	24.4	17538	14023	18.5	1348.4	1069.0	486.8	195.5	191.1	-23.2	-35.7	-90.0	365.1
9:25:00	43.8	9.7	165.0	193.6	10.8	186.5	25.8	16863	13899	17.9	1355.4	1068.6	486.5	195.5	191.1	-15.4	-24.7	-73.4	371.6
9:26:00	43.6	9.6	165.1	193.5	11.0	208.7	25.6	17569	14107	19.2	1361.8	1069.1	485.8	194.5	191.1	-34.3	-51.0	-108.6	332.0
9:27:00	43.7	9.7	164.8	194.2	11.0	208.9	24.9	17050	13978	18.7	1355.6	1069.0	486.9	194.5	190.1	-19.2	-30.8	-80.4	365.8
9:28:00	43.7	9.8	164.9	192.8	10.8	212.3	25.6	17225	13978	19.9	1363.1	1069.4	486.5	194.5	190.1	-38.8	-56.0	-108.0	305.5

Test No. 3 - October 8, 2020

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 Outlet	Baghouse
	Lpm	Lpm	Lpm	Lpm	Lpm	SCFM	lbs/h	Nm^3/h	Nm^3/h	Nm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
9:29:00	43.8	9.8	165.1	193.7	10.3	209.8	24.5	17513	13972	18.4	1349.1	1069.1	487.4	194.5	190.1	-22.3	-34.1	-87.0	352.1
9:30:00	43.8	9.8	164.9	193.5	10.5	228.2	25.6	17094	13949	18.7	1352.7	1068.7	487.0	195.0	190.1	-23.9	-41.5	-83.1	329.8
9:31:00	43.6	9.9	164.5	194.0	10.3	233.3	24.5	17288	14045	18.8	1346.8	1068.1	486.7	195.0	190.1	-21.5	-33.0	-85.5	340.4
9:32:00	43.7	9.9	162.5	193.7	10.2	233.7	25.3	17031	13921	18.8	1352.4	1067.9	486.4	195.0	190.1	-17.8	-29.1	-79.7	350.8
9:33:00	43.8	10.0	167.2	194.1	11.0	242.9	24.8	17150	14039	18.7	1349.4	1067.8	486.2	194.5	190.1	-17.2	-25.8	-79.1	366.3
9:34:00	43.8	10.1	164.6	193.7	10.9	238.7	25.6	16756	13938	18.1	1361.4	1068.3	486.1	194.5	190.1	-14.3	-25.1	-73.4	375.8
9:35:00	43.5	10.1	164.3	194.2	10.5	239.6	24.8	17219	14017	18.8	1354.1	1069.2	488.7	194.5	190.1	-23.0	-36.0	-88.9	359.7
9:36:00	43.5	9.9	164.4	194.3	11.1	248.6	25.3	16894	13905	17.9	1356.6	1069.7	492.0	195.0	190.1	-17.4	-28.3	-79.3	370.3
9:37:00	43.1	9.6	165.0	194.1	10.1	245.0	25.3	17488	14039	18.7	1349.1	1070.4	495.0	195.5	190.1	-27.9	-40.8	-97.3	346.3
9:38:00	43.7	9.5	164.6	194.1	10.0	245.9	24.8	17356	14039	18.5	1349.4	1070.3	497.6	197.0	190.1	-20.0	-29.8	-83.7	356.1
9:39:00	43.5	9.8	165.0	193.1	10.6	249.1	25.7	17481	14079	18.7	1348.2	1070.7	499.4	198.0	191.2	-25.5	-39.3	-93.2	335.1
9:40:00	43.8	10.3	164.9	193.5	10.9	248.2	25.8	16981	13865	18.7	1351.6	1071.0	500.8	199.0	191.2	-19.0	-32.7	-81.6	345.0
9:41:00	43.5	9.8	163.6	194.6	10.2	244.7	24.9	17575	14051	18.6	1354.7	1072.2	502.3	199.5	192.2	-23.6	-34.3	-92.9	363.0
9:42:00	43.8	10.0	165.5	194.5	11.2	254.3	25.0	16775	13848	18.8	1363.3	1073.4	503.3	200.0	192.2	-13.8	-24.2	-73.7	372.7
9:43:00	43.9	9.8	164.4	193.8	11.3	251.1	24.5	17100	13978	19.4	1373.3	1075.3	504.0	200.5	193.2	-37.4	-55.3	-109.2	312.9
9:44:00	43.8	10.0	165.2	194.4	11.1	248.9	25.5	16775	13899	17.9	1367.4	1076.2	503.9	201.0	193.2	-15.8	-26.2	-77.6	363.3
9:45:00	43.5	9.5	164.3	193.8	11.0	253.7	24.9	16638	13888	19.8	1378.1	1077.6	503.1	201.0	193.2	-33.1	-50.9	-98.2	303.4
9:46:00	43.9	9.9	165.5	193.4	11.4	256.5	24.5	17106	13972	18.3	1362.4	1078.1	504.0	201.5	193.2	-20.4	-32.2	-87.2	350.3
9:47:00	43.7	9.9	164.8	193.7	10.7	260.9	24.6	16725	13860	18.3	1366.8	1078.5	504.5	202.0	194.2	-17.3	-29.4	-80.0	361.0
9:48:00	43.8	10.2	165.9	194.0	10.8	252.5	24.5	16888	13966	18.7	1362.8	1078.9	505.0	202.5	194.2	-19.5	-30.9	-84.3	337.1
9:49:00	43.7	9.8	164.5	193.3	9.6	256.4	25.4	16625	13848	18.2	1369.6	1079.6	504.8	203.0	195.2	-17.2	-27.2	-78.8	348.1
9:50:00	43.8	9.9	164.9	194.1	10.9	252.8	25.7	16719	13865	18.2	1367.8	1080.2	505.2	203.0	195.2	-17.0	-27.4	-78.4	363.3
9:51:00	43.5	10.2	164.6	193.9	11.0	256.5	25.8	16469	13758	18.1	1380.8	1081.1	505.2	203.0	195.2	-11.7	-20.5	-70.2	371.4
9:52:00	43.6	10.0	164.6	193.0	11.3	262.2	25.4	17025	13910	17.9	1375.2	1082.0	506.1	203.0	195.2	-19.6	-32.6	-84.0	356.4
9:53:00	43.9	10.1	165.1	193.7	11.7	260.0	24.5	16863	13899	17.5	1380.3	1082.7	506.1	203.5	195.2	-11.5	-20.2	-74.3	366.3
9:54:00	43.6	9.9	164.7	194.0	10.7	254.2	24.4	17563	14023	18.6	1375.6	1083.4	506.8	203.5	195.2	-24.4	-38.5	-92.6	342.7
9:55:00	43.7	10.2	164.1	193.3	10.4	244.8	24.8	16919	13888	17.9	1371.4	1083.2	507.2	204.5	196.2	-19.2	-30.9	-81.3	356.1
9:56:00	43.6	9.9	165.1	193.5	10.5	252.6	25.7	17375	13921	18.2	1370.3	1083.0	507.3	204.5	196.2	-23.6	-36.1	-91.8	333.1
9:57:00	43.7	9.8	164.7	193.9	11.0	250.0	25.3	16900	13820	18.6	1373.1	1082.6	506.6	205.0	196.2	-15.3	-26.0	-78.1	341.8
9:58:00	43.6	9.6	164.0	193.9	10.1	247.1	24.6	17494	13933	19.0	1375.4	1083.2	506.2	204.5	196.2	-28.3	-37.8	-100.4	347.2
9:59:00	44.0	9.7	164.2	194.0	10.6	250.8	24.4	16688	13865	17.9	1380.6	1083.2	506.0	205.0	196.2	-13.1	-22.9	-73.2	369.0
10:00:00	43.5	9.5	164.1	193.5	11.3	248.9	24.7	16994	13927	19.4	1390.8	1083.9	505.9	204.5	196.2	-32.9	-51.4	-102.9	308.2
10:01:00	42.8	9.9	164.6	193.7	11.7	247.5	25.0	17000	13933	17.6	1378.1	1084.2	506.3	204.5	196.2	-15.5	-26.1	-77.8	364.2
10:02:00	43.5	10.0	165.3	194.0	11.5	247.7	25.6	16644	13927	17.5	1386.3	1084.2	505.6	204.5	197.2	-17.4	-39.7	-75.1	329.8
10:03:00	43.2	9.9	165.2	194.4	11.3	236.6	25.5	17044	13921	18.1	1371.4	1083.5	505.9	204.0	197.2	-21.0	-32.0	-85.7	348.7
10:04:00	43.8	9.6	164.7	193.2	11.0	234.0	25.7	16931	13820	17.8	1373.4	1082.7	505.0	204.5	197.2	-16.6	-27.3	-77.7	360.6
10:05:00	43.8	9.4	164.5	193.7	12.2	213.9	25.8	17006	13921	18.6	1369.1	1082.2	504.6	204.5	197.2	-19.4	-31.7	-83.6	336.4
10:06:00	43.6	10.0	165.5	193.8	10.4	212.0	24.6	16606	13803	17.9	1373.9	1081.7	503.0	204.0	197.2	-15.9	-26.8	-76.8	347.2
10:07:00	44.0	9.9	165.2	194.1	10.1	216.7	24.4	16850	13910	18.0	1372.2	1081.4	502.5	203.5	197.2	-15.3	-25.8	-78.1	365.5
10:08:00	43.6	10.5	165.0	193.2	10.9	214.3	25.6	16525	13787	17.2	1384.2	1081.2	500.7	203.5	197.2	-12.7	-20.1	-71.0	372.7
10:09:00	43.2	10.0	164.6	193.0	11.0	199.8	25.2	16988	13910	18.2	1376.4	1081.1	500.2	202.5	196.1	-21.7	-32.1	-84.2	355.4
10:10:00	43.6	9.5	164.8	193.2	11.4	199.3	24.6	16613	13803	18.0	1378.2	1079.9	498.8	202.5	196.1	-14.4	-22.4	-75.0	366.6
10:11:00	43.4	10.1	164.5	193.6	10.6	196.4	24.9	17325	13938	18.4	1372.1	1079.1	497.8	201.5	196.1	-27.7	-41.8	-95.8	343.8
10:12:00	43.8	10.0	163.3	193.7	10.3	200.0	24.5	16806	13725	18.3	1365.7	1077.6	496.7	201.5	196.1	-21.1	-31.5	-82.6	354.8
10:13:00	43.5	9.8	165.0	193.2	11.6	202.6	25.7	17419	13944	18.7	1365.1	1076.6	495.8	201.0	196.1	-28.5	-42.2	-97.0	331.1
10:14:00	43.7	9.9	165.8	193.3	10.8	214.4	24.8	16819	13916	18.3	1363.1	1075.4	495.4	201.0	195.1	-18.4	-28.9	-81.6	340.8
10:15:00	43.5	10.1	164.6	193.5	10.8	209.5	25.4	17269	13916	19.1	1365.6	1075.1	494.4	200.5	195.1	-34.9	-50.5	-104.4	321.4
10:16:00	43.6	10.0	164.4	193.4	10.2	205.9	25.8	16694	13921	18.5	1363.8	1074.5	493.6	200.0	195.1	-15.6	-24.7	-75.1	368.6
10:17:00	43.3	9.9	164.5	192.6	10.5	230.9	24.8	16594	13708	19.8	1374.7	1074.7	492.3	199.5	195.1	-34.5	-51.8	-98.8	308.2
10:18:00	43.8	9.7	165.1	193.4	8.9	229.7	25.4	16825	13820	17.9	1361.6	1074.2	492.6	199.0	194.1	-18.2	-27.7	-80.0	361.6
10:19:00	43.6	9.6	165.0	192.9	11.0	235.2	24.6	16575	13820	18.2	1369.3	1073.9	491.4	198.5	194.1	-14.5	-25.0	-72.6	371.9
10:20:00	43.9	9.6	165.5	194.6	10.9	234.3	25.6	17156	13916	18.3	1355.3	1073.4	491.9	198.5	194.1	-25.3	-38.2	-89.1	349.9

Test No. 3 - October 8, 2020

	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 Outlet	Baghouse
	Lpm	Lpm	Lpm	Lpm	Lpm	SCFM	lbs/h	Nm^3/h	Nm^3/h	Nm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
10:21:00	43.4	10.1	162.5	192.2	10.6	234.0	24.4	16819	13910	18.3	1358.3	1073.0	492.0	198.5	194.1	-18.2	-29.2	-81.3	360.6
10:22:00	43.6	10.2	164.9	193.1	9.8	240.3	24.9	17300	13792	18.9	1353.6	1072.8	492.1	198.5	194.1	-23.0	-34.8	-86.7	336.2
10:23:00	43.7	10.0	164.1	192.6	11.0	240.4	25.5	16944	13792	18.5	1357.8	1072.6	492.4	198.5	193.1	-18.2	-28.9	-79.2	347.6
10:24:00	43.5	9.9	164.5	191.7	11.1	238.6	24.9	16981	13888	18.7	1355.7	1073.3	492.8	198.5	193.1	-19.3	-30.7	-82.1	363.9
10:25:00	43.4	9.7	164.9	192.9	10.1	243.5	24.8	16494	13770	17.8	1369.1	1074.2	492.8	198.5	193.1	-14.1	-24.5	-73.0	373.6
10:26:00	43.1	9.7	163.8	193.4	9.8	246.0	25.8	17319	13905	18.5	1365.6	1075.3	493.2	198.0	193.1	-23.3	-35.0	-87.9	356.2
10:27:00	43.4	9.9	165.3	191.3	11.1	246.2	25.6	16763	13764	17.7	1368.2	1075.8	494.2	198.5	193.1	-16.1	-26.1	-75.5	366.8
10:28:00	43.1	9.7	164.6	191.0	10.9	249.9	24.6	17600	14023	18.6	1365.8	1076.6	494.5	198.5	193.1	-28.7	-43.6	-98.7	342.8
10:29:00	43.5	10.1	165.4	192.3	10.9	257.5	25.7	16863	13820	17.9	1360.6	1076.3	495.5	199.0	193.1	-20.8	-32.4	-85.9	356.0
10:30:00	43.6	9.9	164.6	192.8	11.0	248.6	24.5	17213	14062	19.4	1362.4	1076.5	495.9	199.5	193.1	-35.7	-50.3	-105.9	318.0
10:31:00	43.3	9.9	164.9	191.7	12.0	252.3	25.4	16838	13854	18.5	1360.3	1076.4	496.1	200.0	193.1	-19.9	-29.7	-83.9	342.3
10:32:00	43.4	10.0	165.2	193.0	10.5	260.0	25.4	17088	13978	19.6	1368.8	1077.1	496.3	200.0	194.2	-33.3	-50.7	-104.7	320.6
10:33:00	43.2	9.8	165.1	192.0	10.6	254.2	25.8	16638	13775	17.8	1368.1	1078.0	497.1	200.5	194.2	-15.3	-25.8	-76.6	369.8
10:34:00	43.5	9.7	165.2	192.9	10.8	262.3	24.9	16419	13775	17.7	1381.4	1079.6	497.2	200.5	194.2	-18.6	-38.6	-78.6	330.9
10:35:00	43.1	9.7	165.1	192.1	10.1	256.5	25.2	16900	13787	17.8	1371.6	1080.6	498.1	200.5	194.2	-17.5	-30.1	-80.0	362.8
10:36:00	43.5	9.7	165.3	192.6	11.4	261.5	25.6	16625	13663	17.6	1378.9	1081.5	498.3	200.5	194.2	-13.4	-22.2	-72.4	372.7
10:37:00	43.3	9.6	165.0	192.5	11.3	252.9	25.4	17150	13803	18.3	1367.2	1081.6	499.1	200.5	194.2	-25.6	-38.6	-90.0	350.3
11:22:00	42.9	9.4	165.0	192.1	10.1	256.4	25.7	16750	13770	18.1	1356.4	1076.0	495.9	199.5	194.1	-20.2	-34.3	-87.1	340.6
11:23:00	42.8	9.2	164.6	192.3	11.0	253.4	24.8	16656	13770	18.0	1364.1	1076.3	495.8	199.5	194.1	-17.3	-30.7	-80.6	350.5
11:24:00	42.8	9.4	165.2	192.9	10.8	254.3	24.4	16425	13882	18.3	1362.4	1076.8	496.3	199.5	194.1	-16.3	-30.1	-79.0	366.5
11:25:00	43.1	9.5	165.1	192.7	11.9	251.0	25.4	16425	13753	17.9	1374.6	1078.0	496.1	199.5	194.1	-12.1	-23.8	-73.1	376.6
11:26:00	42.9	9.2	164.4	192.9	10.3	250.4	25.7	16925	13719	17.7	1366.6	1079.0	496.9	199.5	194.1	-18.3	-32.1	-83.2	361.4
11:27:00	42.7	8.4	164.1	193.8	10.3	251.4	25.3	16738	13742	17.8	1372.8	1079.5	497.3	199.5	194.1	-15.1	-28.4	-75.0	370.4
11:28:00	42.9	9.3	165.1	192.9	10.7	245.2	25.4	17213	13865	18.5	1364.1	1079.6	497.5	199.5	194.1	-25.1	-41.6	-91.6	347.9
11:29:00	42.6	9.3	165.0	193.1	9.5	258.5	24.7	16763	13764	17.8	1364.1	1079.2	497.6	200.0	194.1	-19.1	-33.1	-83.2	359.9
11:30:00	42.9	9.2	164.5	192.3	10.2	251.0	25.1	17144	13865	18.3	1360.7	1079.4	498.2	200.0	194.1	-23.6	-38.3	-90.8	337.3
11:31:00	42.9	9.1	165.1	193.1	11.1	249.2	25.7	16594	13770	18.1	1362.4	1079.1	498.3	200.0	194.1	-19.6	-34.3	-84.2	349.8
11:32:00	42.5	8.7	164.9	192.7	11.0	254.2	24.7	17281	13882	18.3	1361.9	1079.4	497.9	200.0	194.1	-21.2	-35.3	-89.2	363.3
11:33:00	42.8	8.3	165.1	192.9	11.4	252.1	24.6	16588	13775	17.7	1367.8	1079.3	497.3	200.0	194.1	-13.3	-25.7	-74.6	372.1
11:34:00	42.7	8.6	164.4	192.4	12.0	252.5	24.8	17494	13832	19.0	1373.7	1080.3	497.2	199.5	194.1	-35.3	-54.4	-108.8	333.4
11:35:00	43.0	8.8	164.8	192.6	10.7	252.6	25.4	16650	13832	18.0	1366.9	1079.9	498.1	200.0	194.1	-17.2	-31.5	-80.2	365.9
11:36:00	42.9	8.7	165.3	193.5	10.5	253.1	24.5	16875	13865	19.4	1373.8	1080.4	498.2	199.5	194.1	-36.1	-58.1	-107.5	304.4
11:37:00	42.8	8.8	165.0	194.5	11.1	254.6	25.6	16988	13758	17.9	1359.7	1079.7	498.8	200.0	194.1	-22.2	-37.6	-87.6	352.4
11:38:00	42.6	8.7	166.7	194.9	9.6	257.6	24.6	16725	13736	17.5	1362.8	1079.1	498.7	200.0	194.1	-24.0	-46.3	-84.2	330.3
11:39:00	42.6	8.8	165.2	193.0	11.1	247.2	25.9	16900	13843	18.4	1356.3	1078.5	498.5	200.0	194.1	-20.7	-35.6	-86.9	340.1
11:40:00	42.6	9.9	164.7	191.3	11.0	253.7	25.6	16806	13758	18.2	1363.6	1078.3	497.5	200.0	194.1	-17.2	-33.3	-80.1	350.7
11:41:00	42.6	9.6	164.6	192.6	11.0	253.1	25.9	16550	13652	18.1	1361.9	1078.8	498.3	200.5	194.1	-17.2	-28.3	-81.1	367.6
11:42:00	43.1	9.8	165.2	192.6	10.4	255.4	25.0	16325	13764	17.3	1374.9	1080.4	498.2	200.0	194.1	-13.0	-24.4	-74.0	376.0
11:43:00	42.7	10.1	165.2	192.8	10.7	257.9	24.5	17038	13781	17.8	1367.8	1081.9	499.7	200.0	194.1	-20.0	-37.2	-87.7	358.6
11:44:00	43.0	9.6	165.1	191.8	10.8	256.5	25.8	16425	13669	18.2	1372.4	1082.6	500.1	200.5	194.1	-13.9	-26.3	-77.7	369.5
11:45:00	41.5	10.1	165.0	192.6	12.2	250.1	25.7	17275	13927	18.4	1360.3	1082.7	500.7	200.5	194.1	-26.1	-43.2	-95.7	345.1
11:46:00	41.0	9.9	165.1	192.2	11.5	252.3	25.9	16906	13787	18.2	1353.1	1081.1	500.3	201.0	195.2	-20.6	-35.1	-84.0	357.1
11:47:00	41.6	9.6	164.9	191.2	11.0	252.9	24.5	17031	13787	18.7	1350.7	1080.1	499.8	201.0	195.2	-26.5	-43.6	-95.8	334.5
11:48:00	41.6	10.0	164.6	192.4	10.5	247.9	24.9	16806	13775	18.3	1350.7	1078.8	498.1	201.5	195.2	-19.0	-33.3	-83.3	343.3
11:49:00	41.3	9.7	165.3	192.3	10.8	256.9	25.8	17313	13893	18.4	1350.4	1078.4	497.2	201.0	195.2	-23.2	-38.8	-94.6	360.6
11:50:00	41.3	9.9	164.9	192.7	10.1	258.4	25.0	16363	13781	17.7	1353.7	1077.9	496.6	201.0	195.2	-15.9	-31.0	-76.9	370.6
11:51:00	41.3	9.9	164.6	192.7	11.3	257.9	25.8	17056	13792	19.2	1362.2	1078.6	495.6	200.0	195.2	-36.9	-57.8	-110.3	311.1
11:52:00	41.5	9.6	164.8	192.2	11.4	254.0	24.7	16738	13905	18.1	1353.8	1078.1	495.6	200.0	195.2	-17.5	-31.9	-80.8	364.3
11:53:00	41.3	10.0	164.9	192.8	11.6	257.3	24.7	16600	13792	19.3	1361.9	1078.3	495.4	199.5	195.2	-34.5	-55.8	-100.7	303.7
11:54:00	41.4	10.2	164.8	192.2	10.7	258.7	25.0	17125	13876	18.5	1346.3	1077.2	495.2	199.5	194.1	-21.9	-37.2	-88.4	350.8
11:55:00	41.3	9.9	164.6	192.6	10.8	259.4	24.8	16719	13775	18.5	1346.9	1076.2	494.2	200.0	194.1	-19.4	-33.8	-83.7	364.3
11:56:00	41.4	9.9	165.0	192.4	10.5	261.0	25.2	17019	13781	18.5	1341.8	1075.3	494.2	199.5	194.1	-22.3	-38.2	-89.0	336.2

Test No. 3 - October 8, 2020

Time	Waste Flows						PAC Flow	Air Flows			Temperatures					Pressures			
	Rich	Emulsion	Lean	Alkaline	Leachate	TDU Flow		Primary	Secondary	Stack	Primary	Secondary	Quench	SprayDryer	Stack	Incinerator	SD Inlet	BH Outlet	Baghouse
	Lpm	Lpm	Lpm	Lpm	Lpm	SCFM	lbs/h	Nm^3/h	Nm^3/h	Nm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
11:57:00	41.3	9.8	165.1	192.2	10.7	259.4	25.0	16544	13876	18.6	1346.9	1074.9	493.3	199.5	194.1	-19.2	-31.5	-81.8	348.8
11:58:00	41.5	9.9	165.3	191.9	10.7	263.8	25.8	16781	13888	18.5	1344.1	1074.4	493.3	199.5	194.1	-19.4	-36.0	-81.6	364.6
11:59:00	41.6	9.9	164.8	192.1	10.8	247.1	25.5	16694	13742	18.1	1354.1	1074.6	492.2	199.0	194.1	-15.2	-29.3	-75.8	374.8
12:00:00	41.5	10.2	164.3	192.7	10.8	260.0	25.2	16956	13978	18.3	1347.2	1074.7	492.4	198.5	194.1	-22.9	-38.6	-89.7	356.8
12:01:00	40.9	10.1	165.5	191.5	11.8	261.8	24.5	16588	13758	17.7	1347.6	1074.4	492.0	198.5	194.1	-18.5	-31.7	-79.5	366.5
12:02:00	40.9	9.9	164.6	191.5	9.0	252.2	25.0	17331	13882	18.6	1340.7	1073.6	491.7	198.0	193.1	-30.4	-47.3	-100.2	343.3
12:03:00	40.8	9.7	164.5	191.9	10.6	258.3	25.8	17094	13888	18.3	1336.1	1071.8	491.9	198.0	193.1	-21.8	-34.5	-88.5	353.7
12:04:00	41.3	10.0	164.5	191.0	10.1	261.2	24.5	17456	13837	18.9	1334.7	1070.9	491.8	198.0	193.1	-28.5	-45.7	-100.0	332.4
12:05:00	41.9	9.9	164.6	190.9	10.9	249.7	25.1	16838	13832	18.6	1337.9	1070.5	492.3	198.0	193.1	-20.6	-34.7	-86.7	341.8
12:06:00	41.8	9.6	177.0	191.4	11.9	253.9	25.7	17300	13848	19.6	1342.3	1071.0	492.4	198.0	193.1	-32.6	-47.0	-108.0	349.6
12:07:00	41.9	10.1	164.5	191.3	11.0	259.0	25.5	16875	13826	18.5	1345.1	1071.1	492.8	198.0	193.1	-15.5	-29.3	-78.0	368.7
12:08:00	41.4	9.7	164.5	191.9	10.9	252.8	24.5	16994	13944	19.9	1354.6	1072.3	492.8	198.0	193.1	-36.2	-57.6	-109.2	308.1
12:09:00	41.4	9.7	164.4	191.7	10.9	264.6	24.6	16775	13747	17.9	1346.6	1072.2	493.9	198.0	193.1	-18.8	-33.3	-84.6	363.6
12:10:00	41.5	9.8	164.4	191.8	10.5	254.5	25.6	16425	13865	17.9	1354.6	1072.7	494.0	198.0	193.1	-20.1	-43.3	-82.1	329.5
12:11:00	41.7	9.9	165.1	192.2	10.1	258.2	25.7	17331	13888	18.5	1343.6	1072.5	495.1	198.0	193.1	-24.1	-39.3	-92.3	349.6
12:12:00	41.7	9.9	163.8	190.8	11.1	256.9	24.8	16850	13860	18.3	1345.1	1072.0	495.1	198.5	193.1	-21.1	-35.6	-84.3	360.9
12:13:00	41.9	10.0	165.1	191.1	10.6	259.5	25.2	17069	13961	18.6	1338.8	1071.4	495.2	199.0	193.1	-23.9	-38.9	-91.4	336.9
12:14:00	41.6	9.6	164.8	190.7	10.8	253.5	25.6	16806	13730	18.5	1344.4	1071.1	494.9	199.0	193.1	-18.9	-32.3	-83.3	347.1
12:15:00	42.1	10.0	165.6	190.8	11.0	258.9	25.7	16963	13832	18.4	1343.3	1071.1	494.8	199.0	193.1	-18.4	-33.0	-84.4	363.0
12:16:00	41.8	9.8	165.0	190.8	11.0	255.2	24.5	16569	13714	18.4	1352.2	1071.5	494.4	199.0	193.1	-15.0	-27.9	-75.7	373.9
12:17:00	41.4	9.8	164.9	190.5	11.2	258.9	25.6	17194	13826	18.1	1347.2	1072.2	494.9	199.0	193.1	-22.6	-39.9	-90.4	359.4
12:18:00	41.4	9.8	164.7	191.0	11.4	259.4	25.8	16538	13719	18.0	1350.6	1072.0	494.3	199.0	193.1	-17.4	-30.2	-81.2	369.1
12:19:00	41.7	9.7	164.9	190.5	10.9	259.7	25.6	17394	13944	18.5	1348.2	1072.6	494.9	199.0	193.1	-28.0	-43.4	-98.1	343.9
12:20:00	41.9	9.8	164.6	190.7	10.9	251.6	25.8	16925	13725	18.3	1344.1	1072.0	494.8	199.5	193.1	-21.1	-35.8	-87.2	356.1
12:21:00	41.6	9.5	164.8	191.3	10.8	253.7	25.5	17500	13944	18.5	1344.2	1071.9	494.7	199.5	193.1	-29.2	-46.1	-101.8	334.4
12:22:00	41.8	9.8	164.6	191.3	10.8	253.3	25.7	16819	13730	18.1	1343.4	1071.9	494.3	199.5	193.1	-20.4	-34.0	-86.2	344.4
12:23:00	41.6	9.8	165.3	190.9	10.5	256.2	24.6	17244	13933	19.6	1346.9	1072.9	493.8	199.5	194.2	-36.4	-57.6	-110.1	323.1
12:24:00	41.7	9.9	164.6	191.5	10.5	251.3	25.3	16463	13714	18.2	1348.8	1073.4	493.3	199.0	194.2	-16.6	-30.7	-79.6	372.4
12:25:00	41.7	9.7	164.9	191.4	10.4	252.2	25.9	16656	13714	19.4	1358.4	1074.6	492.4	198.5	194.2	-34.8	-55.2	-103.1	312.1
12:26:00	41.5	10.1	164.8	190.7	11.4	251.1	24.9	16781	13820	18.1	1348.4	1074.6	492.6	198.5	193.1	-19.5	-35.4	-85.5	364.8
12:27:00	41.5	9.8	164.5	191.1	11.1	259.0	25.5	16519	13714	17.8	1353.7	1074.7	492.0	198.0	193.1	-17.0	-29.9	-77.3	374.6
12:28:00	41.5	9.6	164.8	191.3	9.9	257.4	24.7	16906	13837	18.8	1341.7	1074.7	492.4	198.0	193.1	-25.9	-42.6	-92.8	353.0
12:29:00	41.2	9.9	164.3	191.7	11.1	254.9	24.5	16675	13725	18.4	1344.1	1074.3	492.0	198.0	193.1	-20.6	-37.6	-85.5	363.4
12:30:00	41.6	9.7	168.1	191.0	11.1	253.8	24.6	16900	13820	18.6	1339.1	1073.9	492.0	198.0	193.1	-23.6	-39.8	-91.5	339.4
12:31:00	41.6	9.8	164.1	191.6	11.1	256.7	25.4	16656	13809	18.7	1342.2	1073.7	491.8	198.0	193.1	-19.2	-32.9	-84.1	349.9
12:32:00	41.6	9.6	164.8	191.4	11.2	257.6	24.6	16813	13809	18.1	1341.1	1073.8	492.0	198.0	193.1	-21.3	-36.9	-85.2	368.9
12:33:00	41.5	9.9	165.1	191.3	11.2	259.8	24.5	16750	13702	18.4	1350.3	1074.3	491.9	197.5	193.1	-14.5	-27.8	-76.7	374.6
12:34:00	41.4	9.6	164.4	190.9	11.0	256.1	25.8	17150	13803	18.3	1346.7	1075.1	491.7	197.0	193.1	-25.6	-40.3	-92.8	356.9
12:35:00	41.7	9.9	164.6	191.0	11.6	262.7	25.5	16738	13697	18.2	1348.1	1074.9	491.4	197.5	193.1	-19.2	-33.4	-82.0	369.3
12:36:00	41.2	10.2	166.2	190.9	11.1	261.3	25.2	17581	13944	18.6	1345.6	1075.3	491.5	197.0	193.1	-30.9	-49.6	-103.0	347.1
12:37:00	41.5	9.5	164.5	191.7	10.1	247.7	25.8	17056	13832	18.5	1340.3	1074.7	491.4	197.5	193.1	-21.6	-38.4	-89.5	357.1
12:38:00	41.7	9.9	165.2	191.1	10.8	261.7	24.5	17519	13826	19.0	1341.1	1074.6	491.6	197.5	193.1	-32.3	-50.5	-107.9	319.3
12:39:00	41.3	9.9	164.9	191.7	10.7	255.7	24.7	16756	13826	18.2	1339.8	1074.2	491.5	197.5	193.1	-20.1	-35.6	-84.2	343.4
12:40:00	41.5	9.6	165.2	191.6	10.7	253.7	25.8	17031	13826	19.8	1345.1	1074.6	491.4	197.5	193.1	-36.0	-58.2	-107.1	322.3
12:41:00	41.6	10.1	165.0	190.9	10.2	256.2	25.5	16706	13826	18.7	1344.1	1074.6	491.6	197.5	193.1	-16.7	-28.8	-79.1	370.9
12:42:00	41.7	9.7	164.8	191.5	10.5	255.2	25.7	16594	13714	17.8	1355.1	1075.3	490.9	197.0	193.1	-20.0	-46.5	-83.0	332.3
12:43:00	41.5	10.0	165.2	190.8	11.3	260.7	25.8	16631	13753	18.2	1345.1	1075.4	491.6	197.0	193.1	-22.5	-36.0	-86.1	363.1
12:44:00	41.5	9.8	165.0	190.4	10.4	252.6	25.9	16525	13770	17.9	1353.7	1075.5	491.0	196.5	192.1	-16.3	-31.4	-78.2	374.8
12:45:00	41.4	9.9	165.3	192.2	11.2	248.3	25.8	17069	13871	18.6	1343.8	1075.2	492.0	196.5	192.1	-26.0	-44.1	-94.1	351.9
12:46:00	41.6	9.7	165.0	192.1	11.0	249.5	24.7	16706	13736	18.3	1345.1	1074.9	491.6	197.0	192.1	-20.5	-35.0	-86.5	362.6
12:47:00	41.7	9.9	164.9	191.6	11.0	253.4	24.7	17044	13837	18.2	1339.2	1074.8	491.7	197.0	192.1	-23.2	-36.5	-92.1	339.0
12:48:00	41.6	9.8	164.6	191.4	10.5	254.0	25.8	16569	13730	18.5	1343.4	1074.5	491.4	197.5	192.1	-19.8	-35.1	-85.4	350.1

Test No. 3 - October 8, 2020

Time	Waste Flows						PAC Flow	Air Flows			Temperatures					Pressures			
	Rich	Emulsion	Lean	Alkaline	Leachate	TDU Flow		Primary	Secondary	Stack	Primary	Secondary	Quench	SprayDryer	Stack	Incinerator	SD Inlet	BH Outlet	Baghouse
	Lpm	Lpm	Lpm	Lpm	Lpm	SCFM	lbs/h	Nm^3/h	Nm^3/h	Nm^3/h	°C	°C	°C	°C	°C	mm H_2O	mm H_2O	mm H_2O	mm H_2O
12:49:00	41.3	9.6	164.8	191.7	10.9	252.6	25.7	16944	13843	18.6	1339.7	1074.4	492.1	197.0	192.1	-21.0	-36.1	-86.4	367.1
12:50:00	41.8	10.0	164.9	191.3	10.7	249.8	25.5	16481	13742	18.3	1348.6	1074.3	491.9	197.0	192.1	-14.9	-29.6	-77.4	374.7
12:51:00	41.4	9.8	166.9	191.8	11.3	247.0	24.6	17063	13815	18.2	1347.1	1074.8	491.9	196.5	192.1	-25.5	-42.9	-92.6	359.0
12:52:00	41.6	9.9	164.6	192.1	10.3	253.6	25.6	16563	13590	18.2	1347.6	1074.4	491.6	197.0	192.1	-16.7	-30.7	-81.9	369.1
12:53:00	41.6	9.8	164.6	192.1	10.1	244.5	24.8	17231	13905	18.8	1348.4	1074.8	491.3	196.5	192.1	-31.9	-51.3	-109.2	345.9
12:54:00	41.5	9.5	164.3	191.6	10.7	251.3	25.6	16756	13691	18.5	1341.2	1073.9	491.4	196.5	192.1	-21.4	-37.0	-89.6	358.3
12:55:00	41.4	9.6	165.2	192.0	10.7	250.3	24.5	17088	13787	19.6	1343.4	1073.8	490.8	196.5	192.1	-36.5	-57.0	-112.0	313.0
12:56:00	41.8	10.0	165.2	192.6	11.7	247.4	25.5	16769	13787	18.5	1339.3	1073.6	491.1	196.5	192.1	-22.3	-38.4	-87.2	346.0
12:57:00	41.9	9.8	164.6	192.4	10.5	252.7	24.5	16719	13764	19.2	1346.4	1073.8	490.8	196.5	192.1	-34.5	-57.5	-103.8	323.0
12:58:00	41.8	10.2	164.7	192.3	10.4	263.7	25.3	16694	13775	18.0	1343.8	1073.5	490.7	196.5	192.1	-17.5	-31.0	-79.9	372.6
12:59:00	41.6	9.7	164.4	192.2	11.1	254.3	25.8	16413	13775	17.8	1353.4	1074.2	490.5	196.0	192.1	-14.2	-25.8	-77.8	380.6
13:00:00	41.9	10.0	164.3	191.9	10.5	257.0	24.7	16788	13792	18.2	1345.1	1074.1	491.2	196.0	192.1	-21.6	-36.2	-89.0	363.9
13:01:00	41.0	9.9	165.1	191.9	11.0	265.6	24.9	16788	13792	17.9	1350.3	1074.8	490.6	196.0	191.1	-16.5	-29.7	-78.4	375.2
13:02:00	41.5	10.0	165.1	191.7	11.5	265.4	24.8	17256	13826	18.4	1338.8	1074.5	491.5	196.0	191.1	-25.5	-42.5	-94.5	350.6
13:03:00	41.6	10.0	164.9	191.9	10.7	261.2	24.5	16731	13826	17.9	1340.4	1073.8	491.2	196.0	191.1	-19.4	-35.3	-86.3	362.4
13:04:00	42.0	9.8	164.1	192.1	10.5	260.6	25.9	16938	13803	18.6	1337.7	1073.4	491.7	196.0	191.1	-23.5	-39.7	-90.5	337.5
13:05:00	42.3	9.9	165.3	191.8	10.5	263.1	25.4	16644	13803	18.3	1345.4	1073.8	492.1	196.0	191.1	-19.4	-35.3	-83.4	349.1
13:06:00	42.0	9.9	163.9	192.3	11.2	257.9	25.8	16844	13803	18.0	1344.4	1074.6	492.9	196.0	191.1	-19.8	-34.6	-86.8	369.1
13:07:00	41.9	10.0	165.3	192.3	10.7	262.7	24.8	16350	13725	18.1	1355.1	1075.3	492.9	196.0	191.1	-14.3	-26.5	-78.4	375.7
13:08:00	41.9	9.9	164.8	192.1	10.7	261.2	25.2	17069	13843	18.8	1356.6	1077.1	493.7	196.0	191.1	-25.2	-40.7	-98.0	358.6
13:09:00	42.2	9.9	165.1	191.6	10.6	264.5	25.6	16456	13629	17.7	1355.3	1077.7	494.1	196.5	191.1	-17.7	-33.2	-83.6	370.9
13:10:00	41.7	9.6	165.1	191.3	10.6	261.7	24.6	17313	13832	19.0	1359.4	1078.8	494.3	196.5	191.1	-40.8	-61.2	-117.3	328.9
13:11:00	41.8	9.8	164.7	191.9	11.4	254.7	25.6	16963	13848	18.2	1347.8	1078.7	494.9	197.0	191.1	-23.5	-41.3	-89.1	356.4
13:12:00	41.8	9.9	165.0	191.8	10.8	263.7	24.5	17063	13742	19.6	1352.1	1079.2	494.8	197.0	192.2	-35.6	-58.6	-109.5	310.1
13:13:00	41.9	9.7	164.5	191.2	10.8	261.5	24.6	16938	13742	18.5	1346.8	1079.1	494.9	197.5	192.2	-19.5	-35.7	-87.0	341.6
13:14:00	41.8	10.1	165.0	191.3	11.2	255.6	24.7	16706	13742	18.2	1353.4	1079.6	495.2	197.5	192.2	-18.7	-40.0	-85.4	330.6
13:15:00	42.2	10.2	164.4	192.3	11.0	260.0	24.4	16881	13736	18.1	1352.6	1079.8	495.5	198.0	192.2	-16.5	-31.1	-80.3	368.2
13:16:00	42.1	9.9	165.3	191.9	10.3	261.2	25.9	16394	13635	17.3	1365.3	1080.6	495.0	198.0	192.2	-14.3	-28.6	-73.4	378.8
13:17:00	42.1	10.0	165.6	191.9	10.4	264.5	24.8	16844	13792	18.1	1356.6	1081.4	495.8	197.5	192.2	-20.0	-36.0	-85.8	362.3
13:18:00	42.0	9.8	165.6	191.9	10.7	257.9	25.4	16519	13685	17.8	1365.7	1082.0	495.7	198.0	192.2	-15.8	-30.8	-76.5	374.3
13:19:00	42.2	9.7	165.1	192.7	10.7	261.5	24.5	17175	13787	18.5	1354.9	1082.5	496.3	197.5	192.2	-26.6	-42.9	-96.7	351.2
13:20:00	42.2	9.9	163.7	191.9	11.0	255.9	25.4	16738	13758	18.1	1354.6	1082.1	496.2	198.0	192.2	-20.0	-35.4	-84.3	362.7
13:21:00	41.9	9.9	164.6	190.9	10.1	260.5	24.6	17063	13893	18.4	1351.6	1082.2	496.3	198.5	192.2	-22.7	-40.1	-91.3	338.6
13:22:00	41.9	9.6	164.0	191.8	11.2	255.4	25.7	16869	13685	18.1	1354.6	1082.0	496.2	198.5	192.2	-18.1	-30.7	-83.2	349.0
Max	44.4	10.5	177.0	194.9	12.2	265.6	25.9	17869	14163	19.9	1390.8	1084.2	507.3	205.0	197.2	-9.4	-18.2	-65.9	380.6
Min	40.8	8.3	162.5	190.4	8.7	180.7	24.4	16325	13590	17.2	1334.7	1067.8	485.8	194.5	190.1	-40.8	-61.2	-117.3	303.4
Average	42.8	9.8	164.9	192.7	10.8	247.7	25.2	16961	13863	18.4	1358.4	1076.3	495.0	199.0	193.4	-21.3	-35.2	-86.1	351.0

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: Christine Belore, Tina Sanderson

Lab no.: 14755 - 1 to 3
Report date: Oct 26, 2019
Sample in: Oct13, 2019
P.O. no.: 22030-J2731

Re: Process Samples from Clean Harbors, Sarnia, Oct 6 ,2020, Project no.: 21939 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.
14755-	Test #1 Oct 6,2020 20-22030-	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	1.80	0.15	56.04	11.72	1.03	29.26	32.34
2	FL-4 Lean Feed	4.33	0.29	9.12	11.19	0.86	74.21	83.09
3	FE-4 Emulsion Feed	1.89	0.12	34.83	11.54	0.54	51.08	60.34

* 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.: 14755 - 4 to 6
Report date: Oct 26, 2020
Sample in: Oct 13, 2020
P.O. no.: 22030-J2731

Attn: Christine Belore, Tina Sanderson

Re: Process Samples from Clean Harbors, Sarnia, Oct 7,2020 Project no.: 21939
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.
14755-	Test #1 Oct 7,2020 20-22030-	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	2.24	0.33	51.79	11.41	1.07	33.16	29.88
5	FL-9 Lean Feed	4.17	0.60	9.58	11.33	0.98	73.34	82.28
6	FE-9 Emulsion Feed	2.09	0.17	34.35	10.88	0.67	51.84	61.90

* Oxygen is obtained by difference = 100-(C+H+N+A+S)

Tested by : A.C. / 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
E-mail: petrolab@gmail.com

LABORATORY REPORT

Ortech Environmental Inc.
804 Southdown Road,
Mississauga, Ontario
L5J 2Y4

Lab no.: 14755 - 7 to 9
Report date: Oct 26 2020
Sample in: Oct 13, 2020
P.O. no.: 22030-J2731

Attn: Christine Belore, Tina Sanderson

Re: Process Samples from Clean Harbors, Sarnia, Oct 8,2020 , Project no.: 21939
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.
14755-	Test #1 Oct 8,2020 20-22030-	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	3.98	0.27	48.08	10.83	1.06	35.78	22.67
8	FL-14 Lean Feed	4.13	0.62	9.66	10.67	1.08	73.84	82.14
9	FE-14 Emulsion Feed	2.34	0.22	35.41	10.81	0.67	50.55	61.53

* 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

Ortech Environmental Inc.
804 Southdown Road,
Mississauga, Ontario
L5J 2Y4

Lab no.: 14755- 1 to 9
Report date: Oct 26, 2020
Sample in: Oct 13, 2020
P.O. no.: 22030-J2731

Attn: Christine Belore, Tina Sanderson

Process Samples : Clean Harbors, Sarnia Ortech Project #21939
Ash content - % by weight -test method- ASTM D482

Lab no.	Sample ID#	Run 1	Run 2	Average	Repeatability
14755-	20-22030-				Difference between Run 1 and 2
1	FR-4 Rich feed	1.83	1.78	1.80	0.05
2	FL-4 Lean feed	4.28	4.38	4.33	0.10
3	FE-4 Emulsion feed	1.88	1.89	1.89	0.01
4	FR-9 Rich feed	2.24	2.23	2.24	0.01
5	FL-9 Lean feed	4.27	4.06	4.17	0.21
6	FE-9 Emulsion feed	2.00	2.18	2.09	0.18
7	FR-14 Rich feed	3.92	4.04	3.98	0.12
8	FL-14 Lean feed	4.11	4.14	4.13	0.03
9	FE-14 Emulsion feed	2.35	2.32	2.34	0.03

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
E-mail: petrolab@gmail.com

QA/QC REPORT

Ortech Environmental Inc.
804 Southdown Road,
Mississauga, Ontario
L5J 2Y4

Lab no.: 14755 - 1 to 9
Report date: Oct 26, 2020
Sample in: Oct13, 2020
P.O. no.: 22030-J2731

Attn: Christine Belore, Tina Sanderson

Process Samples : Clean Harbors, Sarnia Ortech Project #21939
Sulfur content - % by weight -test method- ASTM D1552

Lab no.	Sample ID#	Run 1	Run 2	Average	Repeatability
14755-	20-22030-				Difference between Run 1 and 2
1	FR-4 Rich feed	0.18	0.13	0.15	0.02
2	FL-4 Lean feed	0.24	0.34	0.29	0.05
3	FE-4 Emulsion feed	0.11	0.13	0.12	0.01
4	FR-9 Rich feed	0.31	0.35	0.33	0.02
5	FL-9 Lean feed	0.56	0.64	0.60	0.04
6	FE-9 Emulsion feed	0.14	0.20	0.17	0.03
7	FR-14 Rich feed	0.29	0.25	0.27	0.02
8	FL-14 Lean feed	0.64	0.61	0.62	0.01
9	FE-14 Emulsion feed	0.19	0.25	0.22	0.03

Tested by : P.S. (chemist)

Member of ASTM
JS:TL

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
E-mail: petrolab@gmail.com

QA/QC REPORT

Ortech Environmental Inc.
804 Southdown Road,
Mississauga, Ontario
L5J 2Y4

Lab no.: 14755 - 1 to 9
Report date: Oct 26 , 2020
Sample in: Oct13, 2020
P.O. no.: 22030-J2731

Attn: Christine Belore, Tina Sanderson

Process Samples : Clean Harbors, Sarnia Ortech Project #21939
Carbon content - % by weight -test method- ASTM D3176

Lab no.	Sample ID#	Run 1	Run 2	Average	Repeatability
14755-	20-22030-				Difference between Run 1 and 2
1	FR-4 Rich feed	56.21	55.98	56.04	0.12
2	FL-4 Lean feed	9.06	9.18	9.12	0.12
3	FE-4 Emulsion feed	34.92	34.74	34.83	0.18
4	FR-9 Rich feed	51.68	51.90	51.79	0.22
5	FL-9 Lean feed	9.50	9.66	9.58	0.16
6	FE-9 Emulsion feed	34.44	34.26	34.35	0.18
7	FR-14 Rich feed	47.98	48.18	48.08	0.20
8	FL-14 Lean feed	9.74	9.58	9.66	0.16
9	FE-14 Emulsion feed	35.32	35.49	35.41	0.17

Tested by : A.C.(chemist)

Member of ASTM
JS:LN

Approved by *James Szeto*
James Szeto, B.Sc.
Chief Chemist

Petro Laboratories Inc.

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E-mail: petrolab@gmail.com

QA/QC REPORT

Ortech Environmental Inc.
804 Southdown Road,
Mississauga, Ontario
L5J 2Y4

Lab no.: 14755 - 1 to 9
Report date: Oct 26, 2020
Sample in: Oct 13, 2019
P.O. no.: 22030-J2731

Attn: Christine Belore, Tina Sanderson

Process Samples : Clean Harbors, Sarnia Ortech Project #21939
Hydrogen content - % by weight -test method- ASTM 3176 (Modified)

Lab no.	Sample ID#	Run 1	Run 2	Average	Repeatability
14755-	20-22030-				Difference between Run 1 and 2
1	FR-4 Rich feed	11.80	11.64	11.72	0.16
2	FL-4 Lean feed	11.10	11.28	11.19	0.18
3	FE-4 Emulsion feed	11.46	11.62	11.54	0.16
4	FR-9 Rich feed	11.32	11.49	11.41	0.17
5	FL-9 Lean feed	11.42	11.24	11.33	0.18
6	FE-9 Emulsion feed	10.80	10.95	10.88	0.15
7	FR-14 Rich feed	10.92	10.74	10.83	0.18
8	FL-14 Lean feed	10.76	10.58	10.67	0.18
9	FE-14 Emulsion feed	10.72	10.90	10.81	0.18

Tested by : A.C.(chemist)

Member of ASTM
JS:LN

Approved by *James Szeto*
James Szeto, B.Sc.
Chief Chemist

Petro Laboratories Inc.

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E-mail: petrolab@gmail.com

QA/QC REPORT

Ortech Environmental Inc.
804 Southdown Road,
Mississauga, Ontario
L5J 2Y4

Lab no.: 14755- - 1 to 9
Report date: Oct 26 , 2020
Sample in: Oct13, 2020
P.O. no.: 22030-J2731

Attn: Christine Belore, Tina Sanderson

Process Samples : Clean Harbors, Sarnia Ortech Project #21939
Nitrogen content - % by weight -test method- ASTM 3176 (Modified)

Lab no.	Sample ID#	Run 1	Run 2	Average	Repeatability
14755-	20- 22030-				Difference between Run 1 and 2
1	FR-4 Rich feed	0.98	1.08	1.03	0.10
2	FL-4 Lean feed	0.91	0.81	0.86	0.10
3	FE-4 Emulsion feed	0.50	0.58	0.54	0.08
4	FR-9 Rich feed	1.02	1.12	1.07	0.10
5	FL-9 Lean feed	1.04	0.92	0.98	0.12
6	FE-9 Emulsion feed	0.61	0.73	0.67	0.12
7	FR-14 Rich feed	1.11	1.01	1.06	0.10
8	FL-14 Lean feed	1.03	1.12	1.08	0.09
9	FE-14 Emulsion feed	0.72	0.62	0.67	0.10

Tested by : A.C.(chemist)
Member of ASTM
JS:LN

Approved by *James Szeto*
James Szeto, B.Sc.
Chief Chemist

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QA/QC REPORT

Ortech Environmental Inc.
804 Southdown Road,
Mississauga, Ontario
L5J 2Y4

Lab no.: 14755 - 1 to 9
Report date: Oct 26, 2020
Sample in: Oct 13, 2020
P.O. no.: 22030-J2731

Attn: Christine Belore, Tina Sanderson

Process Samples : Clean Harbors, Sarnia Ortech Project #21939
Water content - % by weight -test method- ASTM D3113, D1744

Lab no.	Sample ID#	Run 1	Run 2	Average	Repeatability
14755-	20- 22030-				Difference between Run 1 and 2
1	FR-4 Rich feed	32.12	32.56	32.34	0.44
2	FL-4 Lean feed	83.36	82.82	83.09	0.54
3	FE-4 Emulsion feed	60.12	60.56	60.34	0.44
4	FR-9 Rich feed	30.08	29.68	29.88	0.40
5	FL-9 Lean feed	82.06	82.50	82.28	0.44
6	FE-9 Emulsion feed	62.12	61.68	61.90	0.44
7	FR-14 Rich feed	22.43	22.91	22.67	0.48
8	FL-14 Lean feed	82.34	81.94	82.14	0.40
9	FE-14 Emulsion feed	61.75	61.31	61.53	0.44

Tested by : A.C.(chemist)

Member of ASTM
JS: LN

Approved by *James Szeto*
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