Report No. 22114

ORTECH
a Kontrol Technologies Company

Report:

Annual Compliance Emission Testing Program at the Clean Harbors Sarnia Incineration Facility (2021)

Date: January 31, 2022



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EXECUTIVE SUMMARY

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

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

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

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

Stack Gas Concentration Criterion	Allowable Value	Test Average Value
Particulate Matter	maximum 20 mg/Rm$^{3(1)}$	6.42 mg/Rm$^{3(1)}$
Mercury	maximum 50 µg/Rm$^{3(1)}$	2.96 µg/Rm$^{3(1)}$
Dioxin and Furan TEQ	maximum 80 pg TEQ/Rm$^{3(1)}$	<3.23 pg TEQ/Rm$^{3(1)}$
Carbon Monoxide	maximum 100 ppm$^{(1)}$	39.8 ppm$^{(1)}$
Oxygen	minimum 8.0 %$^{(2)}$	8.93 %$^{(2)}$
Total Hydrocarbons$^{(3)}$	maximum 100 ppm	10.8 ppm$^{(1)}$
Total Hydrocarbons$^{(4)}$	maximum 100 ppm	6.0 ppm$^{(4)}$
Total Hydrocarbons$^{(5)}$	maximum 100 ppm	10.7 ppm$^{(5)}$

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

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

The emission testing program was conducted over three days between September 14 and September 16, 2021 during which three tests were completed for each emission component group using several types of sampling trains and sampling methods. The particulate and metals, semi-volatile organics and combustion gas tests were performed simultaneously at the main stack location. During the time required to complete these tests, acid gas and volatile organics tests were also run.

Testing was performed at a high feed rate, as specified by the ECA, to demonstrate compliance with MECP emission criteria. During the emission tests the average combined rich, lean and emulsion feed rates were 205.5, 205.8 and 211.4 L/min for Test No. 1, Test No. 2, and Test No. 3, respectively. The Thermal Desorber Unit (TDU) was exhausting to the incinerator during each test.

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

All tables referenced in this report (excluding the internal QA/QC summary tables) are provided in Appendix 1. Summary results tables for the 2021 emission testing program are provided on the following pages based on calculated ground level point of impingement concentrations for the stack emissions and the DREs. Please note that the dispersion modelling was conducted using the AERMOD model. Point of impingement calculations for testing programs prior to 2013 were conducted using the Regulation 346 model.

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

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

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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	0.0461 µg/m^3			
Base Case - 30 Day	1.00 g/s	0.1336 µg/m^3			
Base Case - 24 hour	1.00 g/s	0.4597 µg/m^3			
Base Case - 1 hour	1.00 g/s	1.7115 µg/m^3			
Base Case - 1/2 hour	1.00 g/s	2.0538 µg/m^3			
Particulate matter	0.14 g/s	0.064 µg/m^3	120 µg/m^3	0.054	S
Sulphur dioxide	29.4 g/s	13.5 µg/m^3	275 µg/m^3	4.91	S - 24 hour
Sulphur dioxide	29.4 g/s	50.3 µg/m^3	690 µg/m^3	7.29	S - 1 hour
Nitrogen oxides	3.80 g/s	1.75 µg/m^3	200 µg/m^3	0.87	S - 24 hour
Nitrogen oxides	3.80 g/s	6.50 µg/m^3	400 µg/m^3	1.63	S - 1 hour
Carbon monoxide	1.02 g/s	2.09 µg/m^3	6000 µg/m^3	0.035	S - 1/2 hour
Carbon dioxide	2953 g/s	1357 µg/m^3	255800 µg/m^3	0.53	SL
Hydrogen chloride	2.34 g/s	1.08 µg/m^3	20 µg/m^3	5.38	S
Fluorides (as hydrogen fluoride)	1.81 g/s	0.83 µg/m^3	0.86 µg/m^3	96.8	S - 24 hour
Fluorides (as hydrogen fluoride)	1.81 g/s	0.24 µg/m^3	0.34 µg/m^3	71.1	S - 30 day
Hydrogen bromide	<0.092 g/s	0.16 µg/m^3	668 µg/m^3	0.024	G - 1 hour
Hydrogen iodide	0.023 g/s	0.011 µg/m^3	0.5 µg/m^3	2.11	SL
Hydrogen cyanide	<0.00012 g/s	0.000055 µg/m^3	8 µg/m^3	0.00069	S
Dioxins & Furans (TEQ) *	<0.073 ng TEQ/s	0.000034 pg TEQ/m^3			
Dioxins, Furans and Dioxin-Like PCBs (TEQ) **	0.085 ng TEQ/s	0.000039 pg TEQ/m^3	0.1 pg TEQ/m^3	0.039	S
Benzo(a)Pyrene	<0.060 µg/s	0.0000000028 µg/m^3	0.00001 µg/m^3	0.028	S - Annual
Biphenyl	12.7 µg/s	0.000022 µg/m^3	60 µg/m^3	<0.0001	G - 1 hour
2-Chloronaphthalene	0.26 µg/s	0.00000012 µg/m^3	1 µg/m^3	<0.0001	SL
1-Methylnaphthalene	4.80 µg/s	0.0000022 µg/m^3	35.5 µg/m^3	<0.0001	SL
Naphthalene	35.7 µg/s	0.000016 µg/m^3	22.5 µg/m^3	<0.0001	G
Quinoline	4.70 µg/s	0.0000022 µg/m^3	0.005 µg/m^3	0.043	SL
Terphenyls (m, o, p)	<0.18 µg/s	0.000000083 µg/m^3	15 µg/m^3	<0.0001	SL
1,2-Dichlorobenzene	14.1 µg/s	0.000024 µg/m^3	30500 µg/m^3	<0.0001	G - 1 hour
1,3-Dichlorobenzene	6.97 µg/s	0.0000032 µg/m^3	50 µg/m^3	<0.0001	SL
1,4-Dichlorobenzene	4.18 µg/s	0.0000019 µg/m^3	95 µg/m^3	<0.0001	S
1,3,5-Trichlorobenzene	1.00 µg/s	0.00000046 µg/m^3	3.6 µg/m^3	<0.0001	SL
1,2,4-Trichlorobenzene	3.71 µg/s	0.0000017 µg/m^3	400 µg/m^3	<0.0001	G
1,2,3-Trichlorobenzene	2.61 µg/s	0.0000012 µg/m^3	135 µg/m^3	<0.0001	SL
1,2,4,5-Tetrachlorobenzene	2.27 µg/s	0.0000010 µg/m^3	1 µg/m^3	0.00010	SL
1,2,3,4-Tetrachlorobenzene	0.75 µg/s	0.00000034 µg/m^3	600 µg/m^3	<0.0001	SL
Pentachlorobenzene	0.23 µg/s	0.00000011 µg/m^3	80 µg/m^3	<0.0001	SL
Hexachlorobenzene	<0.060 µg/s	0.000000028 µg/m^3	0.011 µg/m^3	0.00025	SL
2,4-Dichlorophenol	<0.30 µg/s	0.00000014 µg/m^3	33.5 µg/m^3	<0.0001	SL
2,6-Dichlorophenol	<0.30 µg/s	0.00000014 µg/m^3	19 µg/m^3	<0.0001	SL
2,4,5-Trichlorophenol	<0.30 µg/s	0.00000014 µg/m^3	220 µg/m^3	<0.0001	SL
2,4,6-Trichlorophenol	<0.30 µg/s	0.00000014 µg/m^3	1.5 µg/m^3	<0.0001	SL
2,3,4,6-Tetrachlorophenol	<0.30 µg/s	0.00000014 µg/m^3	0.75 µg/m^3	<0.0001	SL
Pentachlorophenol	<0.30 µg/s	0.00000014 µg/m^3	20 µg/m^3	<0.0001	G
Polychlorinated biphenyls	<0.21 µg/s	0.000000097 µg/m^3	0.15 µg/m^3	<0.0001	G
Hexachlorobutadiene	<4.27 µg/s	0.0000020 µg/m^3	0.225 µg/m^3	0.00087	SL
Hexachloroethane	<0.060 µg/s	0.000000028 µg/m^3	115 µg/m^3	<0.0001	SL
Heptachlor	<0.013 µg/s	0.0000000060 µg/m^3	0.004 µg/m^3	0.00015	SL
Toxaphene	<0.044 µg/s	0.000000020 µg/m^3	0.015 µg/m^3	0.00013	SL
Hexachlorophene	<0.30 µg/s	0.00000014 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	0.0461 µg/m^3			
Base Case - 30 Day	1.00 g/s	0.1336 µg/m^3			
Base Case - 24 hour	1.00 g/s	0.4597 µg/m^3			
Aluminum	9.60 mg/s	0.004 µg/m^3	12 µg/m^3	0.037	SL
Antimony	0.017 mg/s	0.0000078 µg/m^3	25 µg/m^3	<0.0001	S
Arsenic	0.24 mg/s	0.00011 µg/m^3	0.3 µg/m^3	0.037	G
Barium (as water soluble)	0.31 mg/s	0.00014 µg/m^3	10 µg/m^3	0.0014	G
Beryllium	<0.00043 mg/s	0.00000020 µg/m^3	0.01 µg/m^3	0.0020	S
Boron	31.0 mg/s	0.014 µg/m^3	120 µg/m^3	0.012	S
Cadmium	0.024 mg/s	0.000011 µg/m^3	0.025 µg/m^3	0.045	S
Calcium oxide	118 mg/s	0.054 µg/m^3	10 µg/m^3	0.54	S
Chromium	0.15 mg/s	0.000070 µg/m^3	0.5 µg/m^3	0.014	G
Cobalt	0.0096 mg/s	0.0000044 µg/m^3	0.1 µg/m^3	0.0044	G
Copper	0.22 mg/s	0.00010 µg/m^3	50 µg/m^3	0.00020	S
Iron (as metal)	7.26 mg/s	0.0033 µg/m^3	4 µg/m^3	0.083	S
Lead	0.075 mg/s	0.000034 µg/m^3	0.5 µg/m^3	0.0069	S - 24 hour
Lead	0.075 mg/s	0.000010 µg/m^3	0.2 µg/m^3	0.0050	S - 30 day
Lithium	0.015 mg/s	0.0000070 µg/m^3	20 µg/m^3	<0.0001	S
Magnesium	14.8 mg/s	0.0068 µg/m^3	72 µg/m^3	0.0094	SL
Manganese (as compounds)	1.61 mg/s	0.00074 µg/m^3	0.4 µg/m^3	0.18	G
Mercury	0.065 mg/s	0.000030 µg/m^3	2 µg/m^3	0.0015	S
Molybdenum	0.14 mg/s	0.000065 µg/m^3	120 µg/m^3	<0.0001	G
Nickel	0.080 mg/s	0.0000037 µg/m^3	0.04 µg/m^3	0.0092	S - Annual
Phosphorus	0.30 mg/s	0.00014 µg/m^3	0.5 µg/m^3	0.027	SL
Potassium	23.5 mg/s	0.011 µg/m^3	1 µg/m^3	1.08	SL
Selenium	0.45 mg/s	0.00021 µg/m^3	10 µg/m^3	0.0021	G
Silicon	209 mg/s	0.096 µg/m^3	27 µg/m^3	0.36	SL
Silver	0.00065 mg/s	0.00000030 µg/m^3	1 µg/m^3	<0.0001	S
Sodium hydroxide	233 mg/s	0.107 µg/m^3	10 µg/m^3	1.07	G
Strontium	0.12 mg/s	0.000057 µg/m^3	120 µg/m^3	<0.0001	G
Tin	0.86 mg/s	0.00039 µg/m^3	10 µg/m^3	0.0039	S
Titanium	1.00 mg/s	0.00046 µg/m^3	120 µg/m^3	0.00038	S
Vanadium	0.015 mg/s	0.0000068 µg/m^3	2 µg/m^3	0.00034	S
Zinc	0.43 mg/s	0.00020 µg/m^3	120 µg/m^3	0.00016	S

S - Standard
G - Guideline
SL - Screening Level

Regulation 419 Dispersion Modelling Results for Volatile Organic Compounds

Contaminant	Average Emission Rate	Calculated Impingement Concentration	Allowable Impingement Concentration	Percentage of Allowable Concentration	Status of Allowable Concentration
Base Case - Annual	1.00 g/s	0.0461 µg/m^3			
Base Case - 24 hour	1.00 g/s	0.4597 µg/m^3			
Base Case - 1 hour	1.00 g/s	1.7115 µg/m^3			
Benzene	0.55 mg/s	0.000026 µg/m^3	0.45 µg/m^3	0.0057	S - Annual
Bromodichloromethane	0.073 mg/s	0.0000034 µg/m^3	350 µg/m^3	<0.0001	SL
Bromomethane (methyl bromide)	0.54 mg/s	0.000025 µg/m^3	1350 µg/m^3	<0.0001	G
2-Butanone (methyl ethyl ketone)	0.076 mg/s	0.0000035 µg/m^3	1000 µg/m^3	<0.0001	S
Chloroethene (vinyl chloride)	<0.017 mg/s	0.00000080 µg/m^3	1 µg/m^3	<0.0001	S
Dibromochloromethane	0.069 mg/s	0.0000032 µg/m^3	0.2 µg/m^3	0.0016	SL
1,2-Dibromoethane (Ethylene dibromide)	<0.019 mg/s	0.00000089 µg/m^3	3 µg/m^3	<0.0001	G
Dichlorodifluoromethane	<0.020 mg/s	0.00000093 µg/m^3	500000 µg/m^3	<0.0001	G
1,1-Dichloroethane (ethylene dichloride)	<0.023 mg/s	0.0000010 µg/m^3	165 µg/m^3	<0.0001	S
1,1-Dichloroethene	<0.017 mg/s	0.00000076 µg/m^3	10 µg/m^3	<0.0001	S
trans-1,2-Dichloroethene	<0.0092 mg/s	0.00000043 µg/m^3	105 µg/m^3	<0.0001	G
Dichloromethane (methylene chloride)	0.67 mg/s	0.000031 µg/m^3	220 µg/m^3	<0.0001	G
1,2-Dichloropropane	0.19 mg/s	0.0000089 µg/m^3	2400 µg/m^3	<0.0001	G
Ethyl Acetate	<0.087 mg/s	0.0000040 µg/m^3	19000 µg/m^3	<0.0001	G - 1 hour
Ethylbenzene	0.13 mg/s	0.0000060 µg/m^3	1000 µg/m^3	<0.0001	S
Isopropylbenzene (cumene)	<0.017 mg/s	0.00000080 µg/m^3	400 µg/m^3	<0.0001	S
2-Propanone (acetone)	0.31 mg/s	0.000014 µg/m^3	11880 µg/m^3	<0.0001	S
Styrene	1.21 mg/s	0.000056 µg/m^3	400 µg/m^3	<0.0001	S
Tetrachloroethene (perchloroethylene)	<0.0087 mg/s	0.00000040 µg/m^3	360 µg/m^3	<0.0001	S
Tetrachloromethane (carbon tetrachloride)	<0.0087 mg/s	0.00000040 µg/m^3	2.4 µg/m^3	<0.0001	S
Toluene	0.74 mg/s	0.000034 µg/m^3	2000 µg/m^3	<0.0001	S
Tribromomethane (bromoform)	0.066 mg/s	0.0000030 µg/m^3	55 µg/m^3	<0.0001	G
1,1,1-Trichloroethane (methyl chloroform)	<0.0087 mg/s	0.00000040 µg/m^3	115000 µg/m^3	<0.0001	S
Trichloroethene	0.051 mg/s	0.0000024 µg/m^3	12 µg/m^3	<0.0001	S
Trichlorofluoromethane	<0.017 mg/s	0.00000080 µg/m^3	6000 µg/m^3	<0.0001	G
Trichloromethane (chloroform)	0.10 mg/s	0.0000047 µg/m^3	1 µg/m^3	0.00047	S
Trichlorotrifluoroethane	<0.017 mg/s	0.00000080 µg/m^3	800000 µg/m^3	<0.0001	S
1,2,4-Trimethylbenzene (pseudocumene)	<0.039 mg/s	0.0000018 µg/m^3	220 µg/m^3	<0.0001	S
1,3,5-Trimethylbenzene	<0.018 mg/s	0.00000081 µg/m^3	220 µg/m^3	<0.0001	S
Xylenes	0.23 mg/s	0.000011 µg/m^3	730 µg/m^3	<0.0001	S

S - Standard
G - Guideline
SL - Screening Level

Summary of Destruction and Removal Efficiencies for Volatile Organic Compounds

Compound	Destruction and Removal Efficiency				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	%	%	%	%	%
Benzene	99.9097	99.9442	99.9666	99.9402	0.029
Dichloromethane	99.9958	99.9905	99.9943	99.9936	0.0027
Ethylbenzene	99.9986	99.9987	99.9965	99.9979	0.0013
2-Propanone	99.9971	99.9978	99.9986	99.9979	0.00077
Styrene	99.9535	99.9684	99.9797	99.9672	0.013
Toluene	99.9988	99.9994	99.9988	99.9990	0.00037
Trichloroethene	99.9543	99.9745	99.9931	99.9739	0.019
1,2,4-Trimethylbenzene	99.9993	99.9993	99.9990	99.9992	0.00017
1,3,5-Trimethylbenzene	99.9991	99.9993	99.9993	99.9992	0.000093
Total Xylenes	99.9992	99.9993	99.9985	99.9990	0.00042

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

1. INTRODUCTION

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

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

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

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

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

2. SOURCE DESCRIPTION

2.1 Process Description

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

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

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

Finally, the gases are directed to a four-compartment baghouse where the fine suspended particulate matter and PAC in the gas phase is filtered out. The hot, humid gases exiting the baghouse are then discharged to the atmosphere through a 68.8 meter high, 1.52 meter inside diameter, insulated steel main stack. The stack gases are monitored by continuous emission monitors (CEMs) located in the induced draft fan discharge ducting with opacity being measured in-situ eight stack diameters downstream of the breaching inlet to the stack (approximately fifteen meters above grade, accessible by a ladder). The CEMs record the oxygen, carbon monoxide, total hydrocarbon, sulphur dioxide and hydrochloric acid concentrations. As well, stack gas flowrate and temperature are recorded.

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

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

2.2 Process Operations

During the emission testing program, the incinerator was operated with an average primary zone temperature of 1459°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 195°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	39.5	0.90	29.2
Lean	160	1.05	5.06
Emulsion	7.8	1.04	10.8
Total	208		

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

The powdered activated carbon (PAC) injection rate during the test program was 12.4 kg/h (27.4 lb/h).

3. EMISSION TESTING PROGRAM

The emission testing program was conducted over three days between September 14 and September 16, 2021 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 volatile organic compounds to facilitate DRE calculations. The individual process stream samples, except for alkaline and leachate, also underwent an elemental analysis.

7. ANALYTICAL METHODOLOGY

7.1 Particulate Matter and Metals

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

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

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

The condition of the test train was noted. Filter and impinger content colours were recorded. The filter housing was disassembled and the filter carefully transferred to its pre-test petri dish with the use of Teflon coated tweezers.

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

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

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

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

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

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

Particulate samples (front half acetone rinse and filter) collected from the metals trains underwent gravimetric determination before metals analysis. When gravimetric determinations were completed, the samples were processed and analyzed by ALS Laboratory Group for metals.

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

7.2 Semi-Volatile Organics

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

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

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

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

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

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

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

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

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

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

7.3 Acid Gases

Prior to loading of the field test trains, a recovery data sheet was prepared to record initial volumes of the test train components. This sheet was also used during sample recovery to record final volumes. The train recovery data sheet for the three tests is provided in Appendix 12.

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

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

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

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

The analytical reports for the acid gas analysis are provided in Appendix 13.

7.4 Volatile Organics

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

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

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

7.5 Feed and Baghouse Dust Samples

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

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

8. INTERNAL AND EXTERNAL QA/QC PROGRAM

8.1 General

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

Testing was conducted in accordance with ECA No. 8-1030-94-006 and the Notice of Amendment, and the Pre-Test Plan detailing the sampling and analytical methodologies submitted to and approved by the MECP.

Blank sampling trains were recovered and analyzed or reagent blanks were analyzed using the same procedures as the test trains to provide background concentrations of the emission test components. For the particulate and metals and SVOC blanks a spare test train was prepared and taken to site. The spare trains were recovered in a manner identical to that for the test trains. For each of the above mentioned blank trains, the blank probe rinse was performed on the appropriate probe after the test train recovery was performed. Reagent blanks were obtained on site for the Method 26 tests.

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

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

8.2 Pre-Test Activities

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

- Preparation, pre-cleaning and proofing of the manual stack sampling trains and sample containers;
- Preparation and quality checks of chemicals, reagents, filters and XAD-2 adsorbent resin;
- Calibration of all sampling and monitoring equipment, as well as CEM system linearity and bias checks;
- Development (and review) of data acquisition, data reduction and summary procedures;
- Development of internal QA/QC field data sheets;
- Review of equipment calibration logs; and
- Review of proposed field and laboratory procedures.

All proving data for the semi-volatile organics test train glassware and auxiliary equipment was deemed acceptable prior to the test program. As previously mentioned, proving data received prior to the field testing program is given in Appendix 3.

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

All equipment used in the field testing program was calibrated and checked prior to the field testing program. Pertinent equipment calibration data is supplied in Appendix 18.

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

A Pre-Test Plan letter, dated August 25, 2021, 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 September 3, 2021, 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 6.7% 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 80-111% of the true value (limit of 80-120%), except for aluminum and silver in the HF digest sample.
- One matrix spike (performed as a post digestion spike) was analyzed for this program. All of the results were between 93-112% of the true value (limit of 80-120%), except for aluminum in the HNO_3 digest sample. 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 2.3% 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 99-102% 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 93-103% 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 cyanide, and the results had a relative percent difference of less than 1%, 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 101-104% 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 91-102%.

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 63.8-135.5%, except 4-Bromofluorobenzene in Test No. 3 Run No. 4 (173.5%).

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)	191	191
Moisture by Volume (%)	50.3	48.9
Velocity (m/s)	31.9	31.8
Absolute Pressure (kPa)	99.6	99.6
Carbon Dioxide by Volume (%)*	8.88	8.88
Oxygen by Volume (%)*	8.93	8.93

* 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)	58.3	58.0
Dry Reference Flowrate (Rm^3/s)*	18.3	18.7
Dry Adjusted Flowrate (Rm^3/s)**	22.1	22.6
Wet Reference Flowrate (Rm^3/s)*	36.8	36.6

* 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)	2.43
Dry Reference Concentration (mg/Rm^3)*	7.76
Dry Adjusted Concentration (mg/Rm^3)**	6.42
Wet Reference Concentration (mg/Rm^3)*	3.85
Particulate Emission Rate (g/s)	0.14

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

Parameter	HCl	HF	HBr	HI	HCN
Actual Conc. (mg/m^3)	40.3	31.0	<1.58	0.39	<0.0020
Dry Reference Conc. (mg/Rm^3)*	127	97.6	<4.98	1.22	<0.0064
Dry Adjusted Conc. (mg/Rm^3)**	105	80.8	<4.12	1.01	<0.0053
Dry Conc. (ppm)	85.0	119	<1.51	0.24	<0.0058
Emission Rate (g/s)	2.34	1.81	<0.092	0.023	<0.00012

* 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)	50796	17.6	65.3	42.1	37154	507	2.71
Dry Reference Conc. (mg/Rm^3)**	159699	55.4	205	132	116799	1596	8.52
Dry Adjusted Conc. (mg/Rm^3)***	132122	45.6	170	110	143873	1317	7.06
Dry Conc. (ppm)	88800	48.4	109	108	89300	610	6.6*
Emission Rate (g/s)	2953	1.02	3.80	2.45	2160	29.4	0.16

* wet basis as methane

** at 25°C and 1 atmosphere

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

Combustion gas concentrations measured by the ORTECH continuous emission monitoring system, expressed as 1-minute average concentrations, for the three tests performed at the incinerator stack are provided in Appendix 24. The average results are calculated for the approximate isokinetic test periods. The gas analysis results are 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 (9.60 mg/s), boron (31.0 mg/s), calcium (84.0 mg/s), iron (7.26 mg/s), magnesium (14.8 mg/s), manganese (1.61 mg/s), potassium (23.5 mg/s), silicon (209 mg/s) and sodium (134 mg/s). The average sulphur emission rate was 16057 mg/s. All other average metal emission rates, including mercury, were at or below 1.0 mg/s.

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

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

9.8 Mercury Emission Data

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

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

Mercury Emission Parameter	Average Values
Actual Concentration (µg/m^3)	1.12
Dry Reference Concentration (µg/Rm^3)*	3.57
Dry Adjusted Concentration (µg/Rm^3)**	2.96
Wet Reference Concentration (µg/Rm^3)*	1.78
Emission Rate (mg/s)	0.065

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

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

The total dioxin and furan congener emission rates were <2.66 ng/s for dioxins and <0.86 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 (<47.3 pg) and in the lab blank (<156 pg) were significant compared to the amounts detected in the test trains (from <166 to <231 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 (<3.91 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)	<1.26	1.46
Dry Reference Conc. (pg TEQ/Rm^3)**	<3.91	4.54
Dry Adjusted Conc. (pg TEQ/Rm^3)***	<3.23	3.75
Wet Reference Conc. (pg TEQ/Rm^3)**	<2.00	2.32
Emission Rate (ng TEQ/s)	<0.073	0.085

* 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 <0.21 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	25.2
Trichlorobenzenes	7.32
Tetrachlorobenzenes	3.02
Pentachlorobenzene	0.23
Hexachlorobenzene	<0.060

The total chlorobenzene congener group emission rate averaged <35.8 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	<1.50
Trichlorophenols	<1.80
Tetrachlorophenols	<0.60
Pentachlorophenol	<0.30

The total chlorophenol congener group emission rate averaged <4.21 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 and octachlorostyrene were detected in quantities greater than the reportable detection limit in at least one of the tests.

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

9.9.4 Polycyclic Aromatic Hydrocarbon Emission Data

The SVOC samples were analyzed for 42 polycyclic aromatic hydrocarbons. Dibenzo(a,h)anthracene co-elutes with dibenzo(a,c)anthracene on the GC/MS. The data reported for dibenzo(a,c)anthracene represents the total of the (a,h) and (a,c) isomers. Similarly, triphenylene and chrysene co-elute. Analytical results and emission data are provided in Table 92, Table 93 and Table 94 for Test No. 1, Test No. 2 and Test No. 3, respectively.

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 <73.6 µg/s with naphthalene representing approximately 48% of the total PAH emissions.

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

9.9.5 Volatile Organic Emission Data

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

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

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

The average emission rate for each compound was less than 1.0 mg/s, except for styrene (1.21 mg/s).

The total average volatile organic emission rate was <5.34 mg/s for the three tests performed.

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

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

10. DESTRUCTION AND REMOVAL EFFICIENCIES

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

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

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

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

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

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

11. DISPERSION MODELLING

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

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

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

11.1 Receptors

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

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

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

Property Boundary

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

11.2 Sources

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

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

Modelling Input Parameters

Modelling ID	Source Description	Release Height (m)	Temp. (°C)	Exit Diameter (m)	Exit Velocity (m/s)	X (m)	Y (m)
I01	Incinerator Stack	68.8	191	1.22	49.5	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	2.0538
1-hour	1.7115
24-hour	0.4597
30-day	0.1336
Annual	0.0461

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 (7.29% for the 1-hour standard and 4.91% for the 24-hour standard), nitrogen oxides (1.63% for the 1-hour standard), hydrogen chloride (5.38% for the 1-hour standard), fluorides (96.8% for the 24-hour standard and 71.1% for the 30-day standard) and hydrogen iodide (2.11% for the 24-hour screening level).

The calculated maximum point-of-impingement concentrations for metals and metallic compounds (Table 128) were less than 1% of the allowable concentration for all metals and metallic compounds, except for potassium (1.08% for the 24-hour screening level), and sodium hydroxide (1.07% of the Guideline).

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

12. FACILITY PROCESS DATA

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

- daily incineration report of analysis
- incinerator feed rates (rich, lean, emulsion, alkaline and leachate streams)
- volumetric flowrates (TDU, secondary air and stack gases)
- PAC feed rate
- temperatures (primary zone, secondary zone, spray dryer inlet and outlet)
- pressures (spray dryer outlet, baghouse differential)
- combustion gas stack concentrations (CO, HCl, CO_2, H_2O, THC, O_2, SO_2)
- stack gas opacity

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

13. OTHER EMISSION CRITERIA

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

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

Stack Gas Concentration Criterion	Allowable Value	Test Average Value
Particulate Matter	maximum 20 mg/Rm$^{3(1)}$	6.42 mg/Rm$^{3(1)}$
Mercury	maximum 50 µg/Rm$^{3(1)}$	2.96 µg/Rm$^{3(1)}$
Dioxin and Furan TEQ	maximum 80 pg TEQ/Rm$^{3(1)}$	<3.23 pg TEQ/Rm$^{3(1)}$
Carbon Monoxide	maximum 100 ppm$^{(1)}$	39.8 ppm$^{(1)}$
Oxygen	minimum 8.0 %$^{(2)}$	8.93 %$^{(2)}$
Total Hydrocarbons$^{(3)}$	maximum 100 ppm	10.8 ppm$^{(1)}$
Total Hydrocarbons$^{(4)}$	maximum 100 ppm	6.0 ppm$^{(4)}$
Total Hydrocarbons$^{(5)}$	maximum 100 ppm	10.7 ppm$^{(5)}$

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

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

14. FEED SAMPLE ANALYSIS

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

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

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

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

15. LIMITATION ON WASTES

As well as the emission criteria limitations stated in Section 13, the Notice of Amendment to the ECA also specifies limitations on the feeding rates of each of the wastes (the combined feed rate of the rich, lean, and emulsion waste streams not to exceed 245 L/min). The individual heating values are provided in Appendix 27 and the waste feed rates are provided in Appendix 29. During the emission tests, the rich, lean and emulsion feed rates combined were 205.5, 205.8 and 211.4 L/min for Test No. 1, Test No. 2, and Test No. 3, respectively. The Thermal Desorber Unit (TDU) was exhausting to the incinerator during each test.

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

Test No.	Total Chlorine Content (% w/w)			Total Organic Chlorine in Combined Waste Feed (% w/w)
	Rich	Lean	Emulsion	
1	0.00	0.05	0.00	0.036
2	0.01	0.26	11.43	0.63
3	0.20	0.22	8.38	0.51
Average	0.07	0.18	6.60	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	1.0	0.5	0.7
2	1.2	0.5	0.8
3	1.0	0.4	0.7

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 208 L/min.
- The average total hydrocarbon concentration at the stack was 6.0 ppm (wet basis) for the three tests performed. The average total dry adjusted hydrocarbon concentration in the stack was 10.8 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 6.42 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 2.96 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 (45.6 mg/Rm^3 or 39.8 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 (<3.23 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 8.93%, which is above the minimum 8.0% oxygen criterion.
- DREs were calculated for 12 volatile organic compounds. The DREs ranged from 99.9402% for benzene to 99.9992% for 1,2,4- & 1,3,5-Trimethylbenzene. The DREs were greater than 99.99% for nine of the twelve compounds detected in at least one of the feed streams.
- The average opacity measurements recorded by Clean Harbors (the test average opacity measurements are all less than 1.2%) are lower than the criterion provided in the Notice of Amendment to the ECA.

REFERENCES

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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.
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5. "Determination of Hydrogen Halide and Halogen Emissions from Stationary Sources Non-Isokinetic Method", U.S. Environmental Protection Agency, Method 26. Federal Register, Part 60, Appendix A. October 7, 2020.
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. October 7, 2020.
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

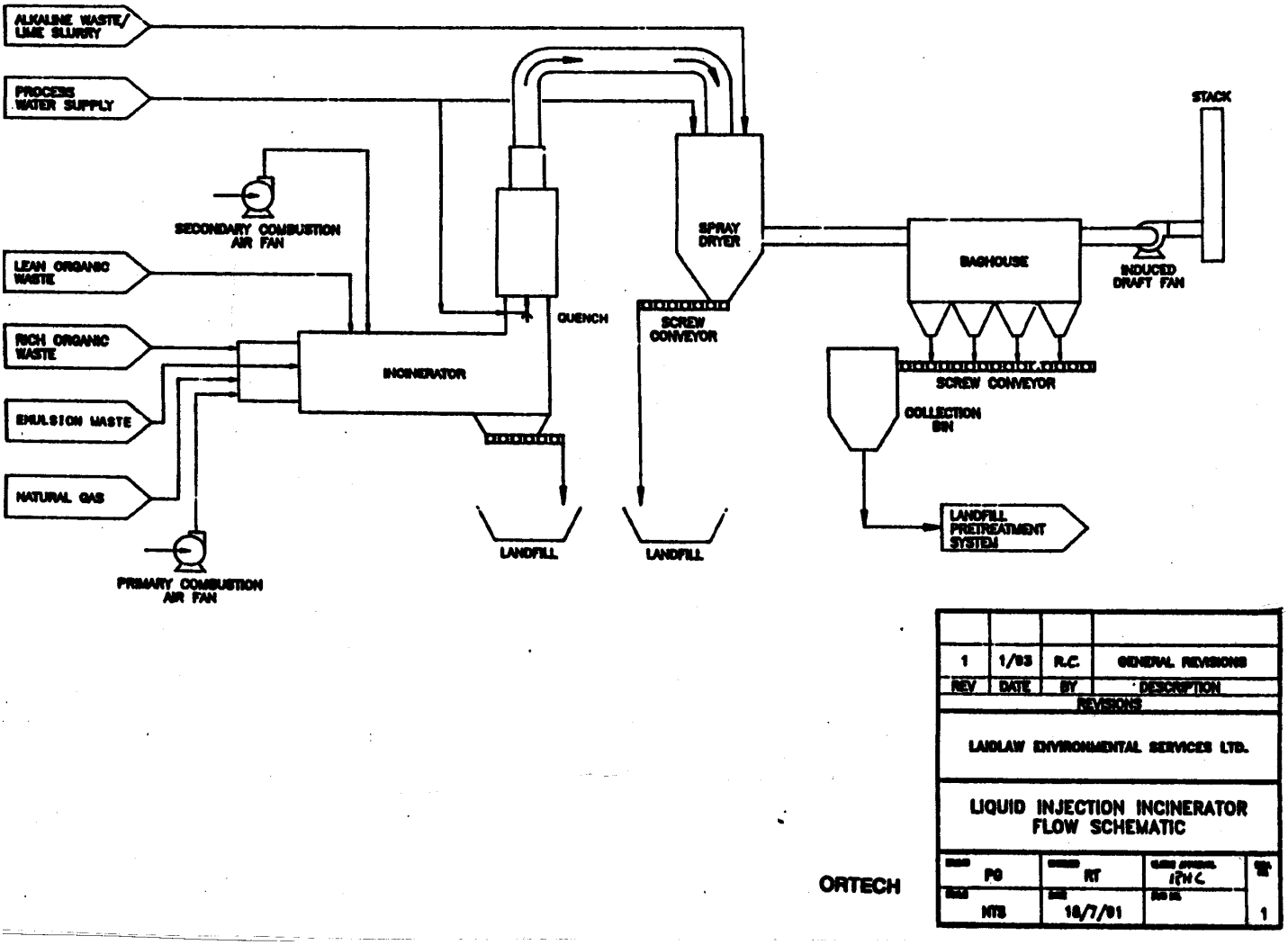
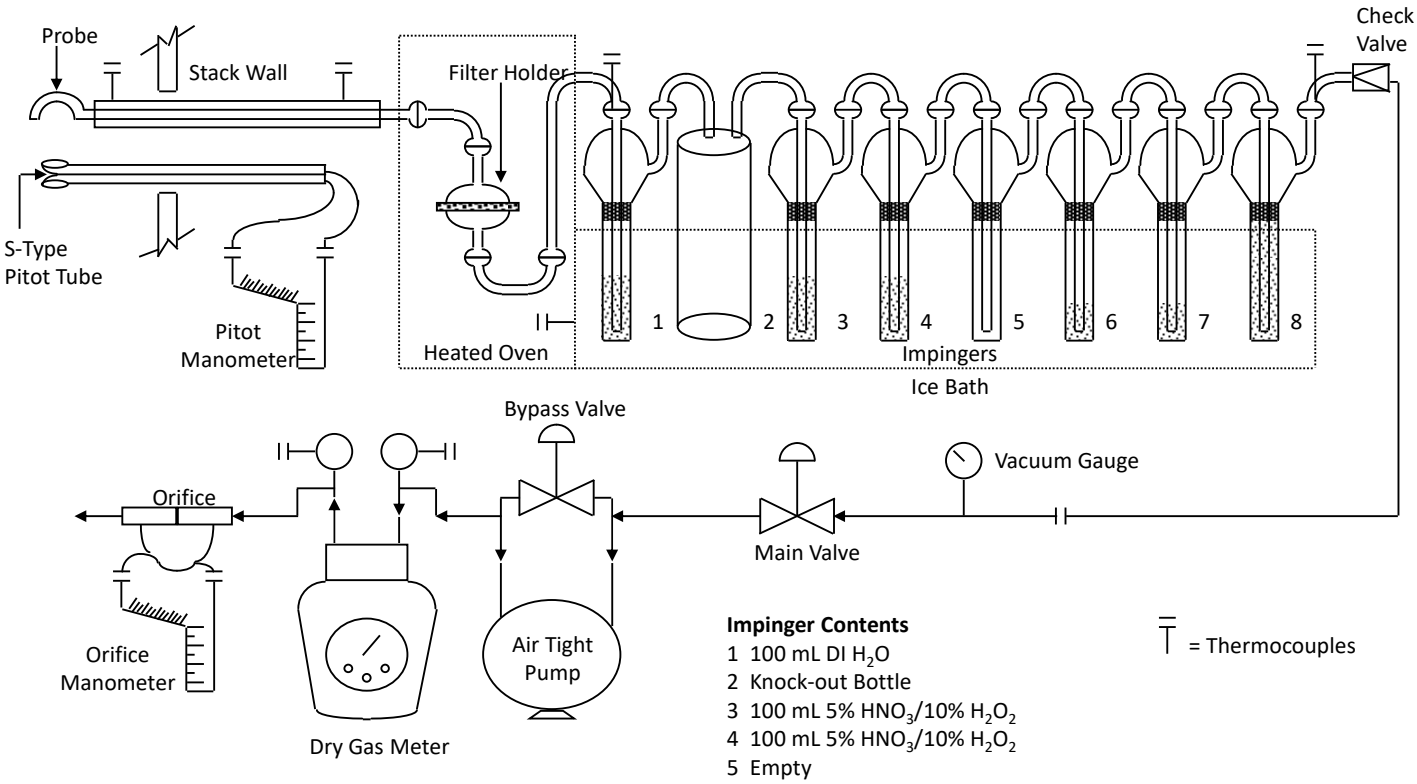


Figure 2
Particulate Matter and Metals Sampling Train



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

Figure 3
Semi-Volatile Organic Compounds Sampling Train

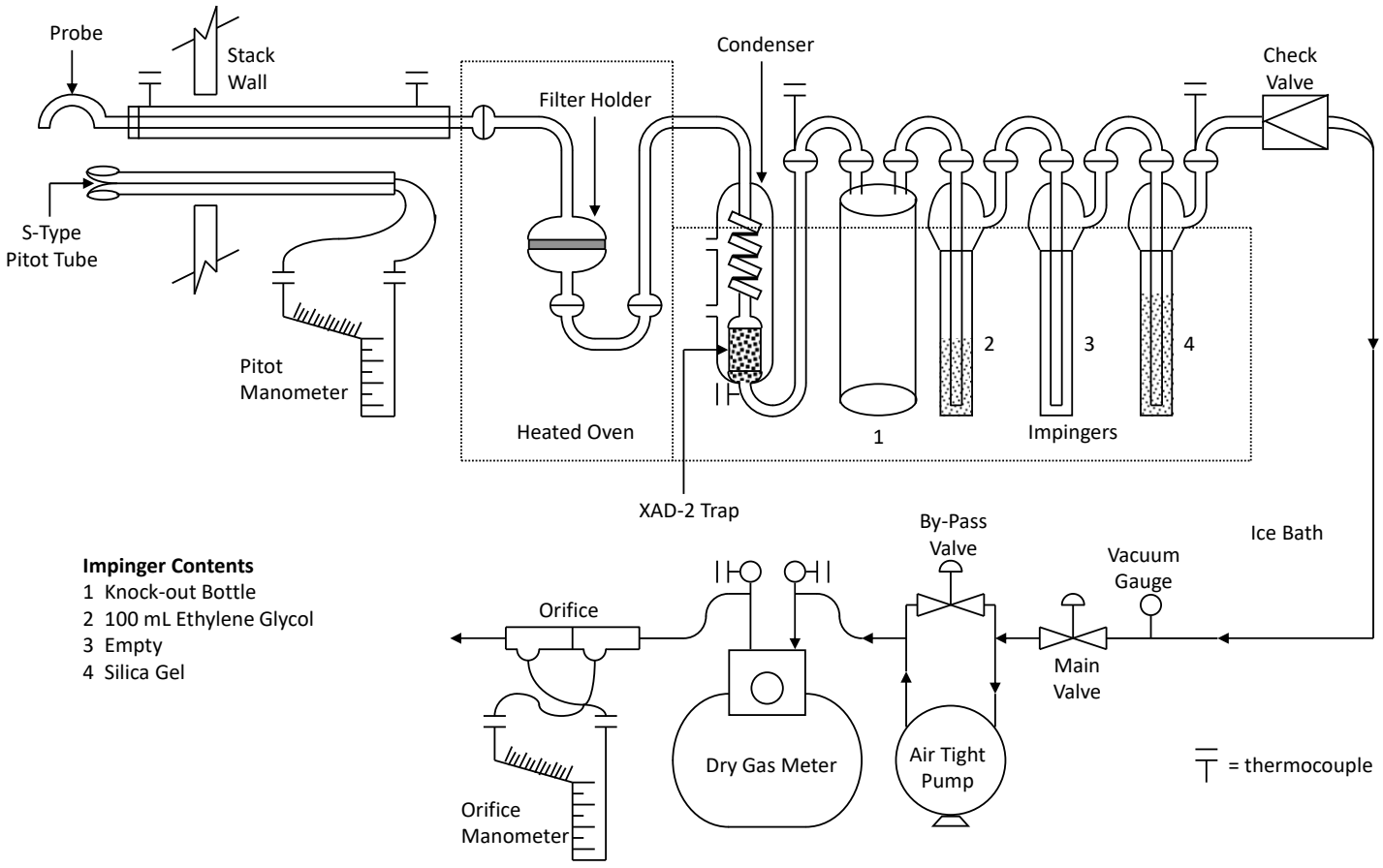


Figure 4
Acid Gases Sampling Train

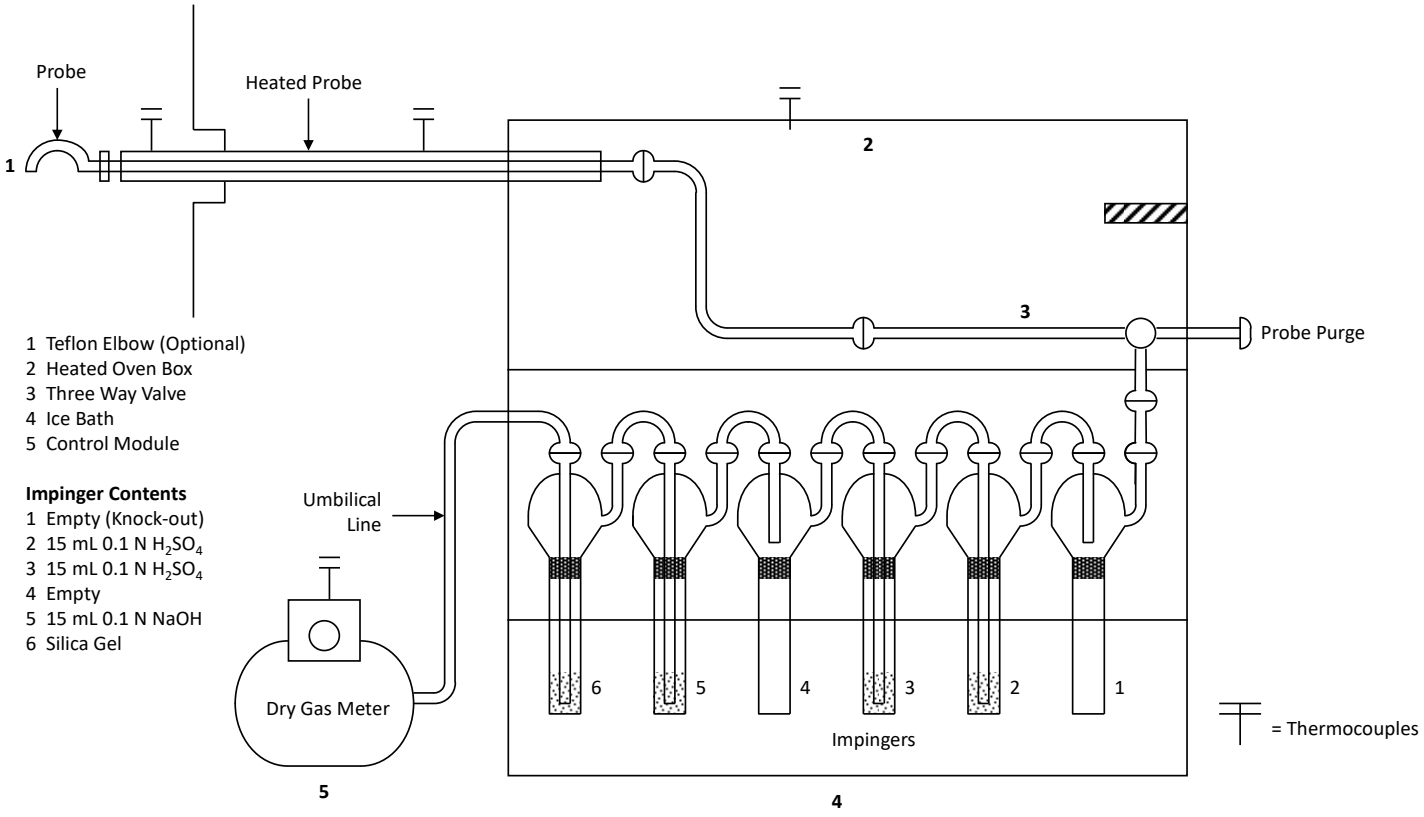


Figure 5
Volatile Organics Sampling Train

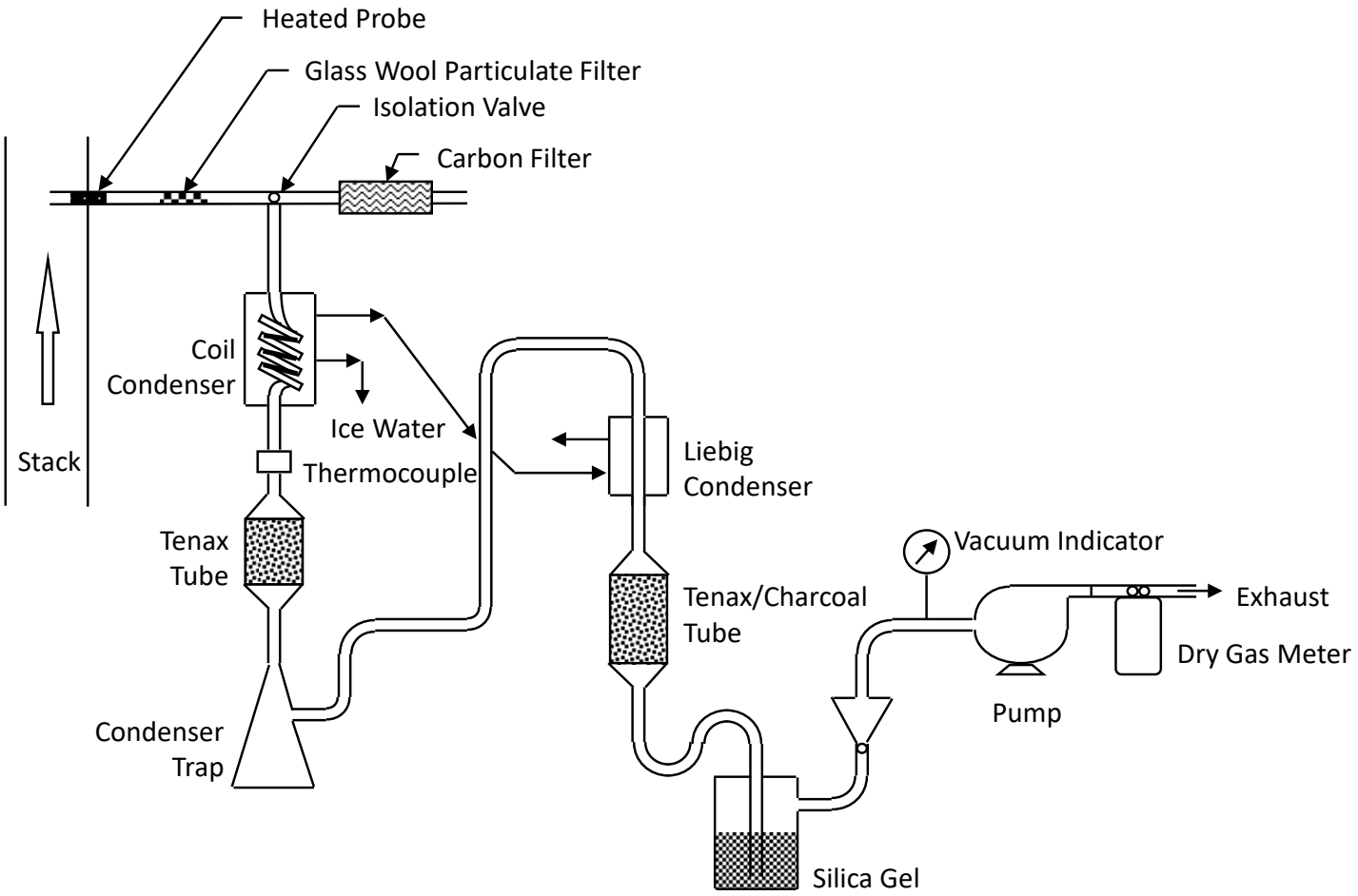
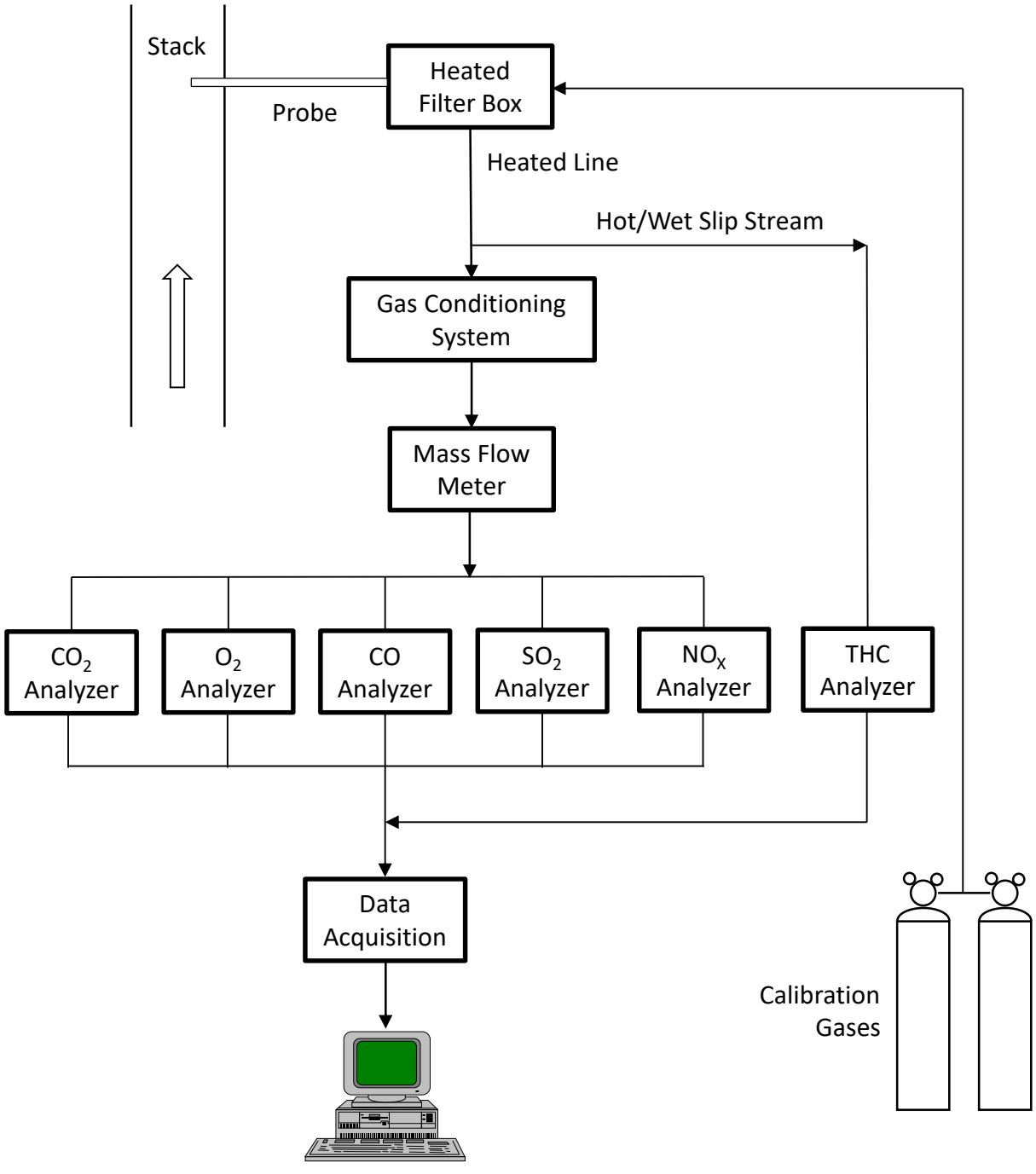


Figure 6
CEM System Schematic



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	Benzene Dichloromethane Ethyl Acetate Ethylbenzene Acetone Styrene Tetrachloroethylene Toluene Trichloroethylene 1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene Xylenes (Total)

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*
		Start	Finish	min
1	September 14, 2021	11:00	16:33	240
2	September 15, 2021	9:37	14:40	240
3	September 16, 2021	8:58	13:54	240

Semi-Volatile Organics Trains

Test Number	Test Date	Sampling Period		Sampling Time*
		Start	Finish	min
1	September 14, 2021	11:00	16:33	240
2	September 15, 2021	9:37	14:40	240
3	September 16, 2021	8:58	13:54	240

Acid Gases Trains

Test Number	Test Date	Sampling Period		Sampling Time*
		Start	Finish	min
1	September 14, 2021	11:00	12:00	60
2	September 15, 2021	12:50	13:50	60
3	September 16, 2021	12:15	13:15	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	September 14, 2021	11:00	16:33	242
2	September 15, 2021	9:37	14:40	242
3	September 16, 2021	8:58	13:54	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	September 14, 2021	14:35	14:55	20
1	2	September 14, 2021	15:15	15:35	20
1	3	September 14, 2021	15:48	16:08	20
1	4	September 14, 2021	16:24	16:44	20
2	1	September 15, 2021	9:39	9:59	20
2	2	September 15, 2021	10:13	10:33	20
2	3	September 15, 2021	10:45	11:05	20
2	4	September 15, 2021	11:14	11:34	20
3	1	September 16, 2021	9:00	9:20	20
3	2	September 16, 2021	9:32	9:52	20
3	3	September 16, 2021	10:06	10:26	20
3	4	September 16, 2021	10:36	10:56	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	0.845	0.995	6.60	5.057	105.9
2	0.845	0.995	6.73	5.243	101.1
3	0.845	0.995	6.73	5.236	99.7

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	0.843	1.000	6.49	5.020	104.1
2	0.843	1.000	6.49	4.915	100.5
3	0.843	1.000	6.49	5.001	100.8

* Dry at 25°C and 1 atmosphere

TABLE 14
Clean Harbors Sarnia
Stack Gas Physical Parameters

Particulate and Metals Trains

Test No.	Gas Temp.	Moisture by Volume	Gas Velocity	Absolute Pressure	Carbon Dioxide by Volume	Oxygen by Volume
	°C	%	m/s	kPa	% *	% *
1	190	50.7	31.3	98.9	8.82	8.72
2	190	50.3	32.2	99.5	8.86	8.99
3	193	49.9	32.3	100.2	8.96	9.08
Average	191	50.3	31.9	99.6	8.88	8.93

Semi-Volatile Organics Trains

Test No.	Gas Temp.	Moisture by Volume	Gas Velocity	Absolute Pressure	Carbon Dioxide by Volume	Oxygen by Volume
	°C	%	m/s	kPa	% *	% *
1	191	49.1	31.7	98.9	8.82	8.72
2	190	48.9	31.8	99.5	8.86	8.99
3	192	48.8	32.0	100.2	8.96	9.08
Average	191	48.9	31.8	99.6	8.88	8.93

Averaged Metals and Semi-Volatile Organics Trains

Test No.	Gas Temp.	Moisture by Volume	Gas Velocity	Absolute Pressure	Carbon Dioxide by Volume	Oxygen by Volume
	°C	%	m/s	kPa	% *	% *
1	190	49.9	31.5	98.9	8.82	8.72
2	190	49.6	32.0	99.5	8.86	8.99
3	192	49.4	32.2	100.2	8.96	9.08
Average	191	49.6	31.9	99.6	8.88	8.93
Coefficient of Variation, %	0.6	0.6	1.2	0.7	0.8	2.1

* 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	57.0	17.7	21.8	35.9
2	58.8	18.5	22.2	37.2
3	59.0	18.7	22.3	37.3
Average	58.3	18.3	22.1	36.8

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	57.8	18.4	22.7	36.3
2	57.9	18.7	22.5	36.6
3	58.4	19.0	22.7	37.1
Average	58.0	18.7	22.6	36.6

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	57.4	18.1	22.2	36.1
2	58.4	18.6	22.4	36.9
3	58.7	18.8	22.5	37.2
Average	58.1	18.5	22.4	36.7
Coefficient of Variation, %	1.1	2.1	0.6	1.6

* 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	1.4	38.1	39.5	5.057	2.42	7.81	6.35	3.85	0.14
2	2.8	41.5	44.3	5.243	2.65	8.45	7.02	4.20	0.16
3	2.8	34.0	36.8	5.236	2.23	7.03	5.89	3.52	0.13
Average					2.43	7.76	6.42	3.85	0.14
Coefficient of Variation, %					8.7	9.2	8.9	8.8	8.9

* 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	15.6	0.1222	40.2	128	104	63.9	2.31
2	13.4	0.1225	34.8	109	91.0	55.1	2.03
3	18.0	0.1260	45.9	143	120	72.3	2.69
Average			40.3	127	105	63.8	2.34

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	11.7	0.1222	30.1	95.7	77.8	48.0	1.73
2	11.1	0.1225	28.9	90.6	75.4	45.6	1.68
3	13.4	0.1260	34.2	106	89.1	53.9	2.00
Average			31.0	97.6	80.8	49.2	1.81

Hydrogen Bromide

Test No.	HBr Collected mg	Dry Volume Sampled Rm^3*	Hydrogen Bromide Concentration Actual mg/m^3	Dry Reference mg/Rm^3*	Dry Adjusted mg/Rm^3**	Wet Reference mg/Rm^3*	HBr Emission Rate g/s
1	<0.631	0.1222	<1.62	<5.16	<4.20	<2.59	<0.093
2	<0.631	0.1225	<1.64	<5.15	<4.28	<2.59	<0.096
3	<0.584	0.1260	<1.49	<4.64	<3.88	<2.35	<0.087
Average			<1.58	<4.98	<4.12	<2.51	<0.092

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	0.099	0.1222	0.26	0.81	0.66	0.41	0.015
2	0.104	0.1225	0.27	0.85	0.71	0.43	0.016
3	0.252	0.1260	0.64	2.00	1.68	1.01	0.038
Average			0.39	1.22	1.01	0.62	0.023

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	0.089	0.1222	0.00023	0.00073	0.00059	0.00037	0.000013
2	0.239	0.1225	0.00062	0.0020	0.0016	0.00098	0.000036
3	<2.08	0.1260	<0.0053	<0.016	<0.014	<0.0083	<0.00031
Average			<0.0020	<0.0064	<0.0053	<0.0032	<0.00012

* 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
0.00399	<0.0521	15.7

Hydrogen Fluoride

Method Blank Analysis mg	Reagent Blank Analysis mg	Average Analysis of Test No. 1 to No. 3 mg
0.0104	<0.0355	12.1

Hydrogen Bromide

Method Blank Analysis mg	Reagent Blank Analysis mg	Average Analysis of Test No. 1 to No. 3 mg
<0.00791	<0.513	0.62

Hydrogen Iodide

Method Blank Analysis mg	Reagent Blank Analysis mg	Average Analysis of Test No. 1 to No. 3 mg
<0.00236	<0.0510	<0.15

Hydrogen Cyanide

Method Blank Analysis µg	Reagent Blank Analysis µg	Average Analysis of Test No. 1 to No. 3 µg
<0.020	0.059	<0.80

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	8.82	81.0	94.7	93.6	8.72	754	6.1
2	8.86	31.8	124	122	8.99	552	5.5
3	8.96	32.5	109	108	9.08	524	8.1
Average	8.88	48.4	109	108	8.93	610	6.6

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	7.17	65.8	77.0	76.1	-	613	9.9
2	7.36	26.4	103	102	-	459	9.1
3	7.50	27.2	91.2	90.2	-	439	13.4
Average	7.35	39.8	90.3	89.3	-	504	10.8

* 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	88200	71687	158620	128923	49916	79442	2865
	Carbon Monoxide	81.0	65.8	92.7	75.3	29.2	46.4	1.67
	Nitrogen Oxides ****	94.7	77.0	178	145	56.0	89.2	3.22
	Nitric Oxide	93.6	76.1	115	93.3	36.1	57.5	2.07
	Oxygen	87200	110000	114052	143873	35891	57121	2060
	Sulphur Dioxide	754	613	1972	1603	621	988	35.6
	Total Hydrocarbons	6.1 *	9.9	7.97	6.47	2.51	3.99	0.14
2	Carbon Dioxide	88600	73655	159339	132462	50737	80231	2961
	Carbon Monoxide	31.8	26.4	36.4	30.3	11.6	18.3	0.68
	Nitrogen Oxides ****	124	103	233	193	74.1	117	4.32
	Nitric Oxide	122	102	150	125	47.8	75.5	2.79
	Oxygen	89900	110000	117584	143873	37441	59206	2185
	Sulphur Dioxide	552	459	1444	1200	460	727	26.8
	Total Hydrocarbons	5.5 *	9.1	7.14	5.94	2.27	3.60	0.13
3	Carbon Dioxide	89600	75055	161138	134980	51735	81587	3035
	Carbon Monoxide	32.5	27.2	37.2	31.2	11.9	18.8	0.70
	Nitrogen Oxides ****	109	91.2	205	172	65.7	104	3.86
	Nitric Oxide	108	90.2	132	111	42.4	66.9	2.49
	Oxygen	90800	110000	118761	143873	38129	60131	2237
	Sulphur Dioxide	524	439	1371	1148	440	694	25.8
	Total Hydrocarbons	8.1 *	13.4	10.5	8.76	3.36	5.30	0.20

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

TABLE 21
Clean Harbors Sarnia
Summary of Combustion Gas Emission Data

Combustion Gas	Actual Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	mg/m^3	mg/m^3	mg/m^3	mg/m^3	%
Carbon Dioxide	49916	50737	51735	50796	1.8
Carbon Monoxide	29.2	11.6	11.9	17.6	57.2
Nitrogen Oxides ***	56.0	74.1	65.7	65.3	13.8
Nitric Oxide	36.1	47.8	42.4	42.1	13.8
Oxygen	35891	37441	38129	37154	3.1
Sulphur Dioxide	621	460	440	507	19.5
Total Hydrocarbons	2.51	2.27	3.36	2.71	21.0

Combustion Gas	Dry Reference Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	mg/Rm^3*	mg/Rm^3*	mg/Rm^3*	mg/Rm^3*	%
Carbon Dioxide	158620	159339	161138	159699	0.8
Carbon Monoxide	92.7	36.4	37.2	55.4	58.2
Nitrogen Oxides ***	178	233	205	205	13.3
Nitric Oxide	115	150	132	132	13.3
Oxygen	114052	117584	118761	116799	2.1
Sulphur Dioxide	1972	1444	1371	1596	20.6
Total Hydrocarbons	7.97	7.14	10.5	8.52	20.3

Combustion Gas	Dry Adjusted Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	mg/Rm^3**	mg/Rm^3**	mg/Rm^3**	mg/Rm^3**	%
Carbon Dioxide	128923	132462	134980	132122	2.3
Carbon Monoxide	75.3	30.3	31.2	45.6	56.5
Nitrogen Oxides ***	145	193	172	170	14.3
Nitric Oxide	93.3	125	111	110	14.4
Oxygen	143873	143873	143873	143873	-
Sulphur Dioxide	1603	1200	1148	1317	18.9
Total Hydrocarbons	6.47	5.94	8.76	7.06	21.3

Combustion Gas	Emission Rate				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	g/s	g/s	g/s	g/s	%
Carbon Dioxide	2865	2961	3035	2953	2.9
Carbon Monoxide	1.67	0.68	0.70	1.02	56.0
Nitrogen Oxides ***	3.22	4.32	3.86	3.80	14.6
Nitric Oxide	2.07	2.79	2.49	2.45	14.6
Oxygen	2060	2185	2237	2160	4.2
Sulphur Dioxide	35.6	26.8	25.8	29.4	18.3
Total Hydrocarbons	0.14	0.13	0.20	0.16	21.8

* Dry at 25°C and 1 atmosphere.
** Dry at 25°C and 1 atmosphere, adjusted to 11% oxygen by volume.
*** Nitrogen oxides are expressed as the equivalent amount of nitrogen dioxide.

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

Metal	Probe & Filter Nitric Acid Digest	Probe & Filter Hydrofluoric Acid Digest	Impingers & Rinses	Total Collected
	µg	µg	µg	µg
Aluminum *	81.3	143	2370	2451
Antimony	0.53	1.92	1.93	4.38
Arsenic	9.60	4.32	66.4	80.3
Barium	12.4	8.19	71.3	91.9
Beryllium	<0.2	<0.2	<0.1	<0.10
Boron *	<30	<30	7280	7280
Cadmium	1.80	1.25	0.21	3.26
Calcium *	<500	<500	22800	22800
Chromium	6.94	6.53	32.7	46.2
Cobalt	0.37	0.91	1.21	2.49
Copper	22.0	19.0	12.0	53.0
Iron	263	264	2490	3017
Lead	0.96	5.32	13.7	20.0
Lithium	<0.5	0.71	2.08	2.79
Magnesium *	49.0	59.3	3270	3319
Manganese	163	211	50.8	425
Mercury **	0.23	0.080	18.2	18.5
Molybdenum	2.80	35.2	1.62	39.6
Nickel	7.55	6.34	9.86	23.8
Phosphorus	<100	<100	44.4	44.4
Potassium	4330	1100	959	6389
Selenium	2.61	<2	130	133
Silicon *	417	-	41300	41717
Silver	<0.2	<0.2	0.18	0.18
Sodium *	5610	1260	29500	35110
Strontium	2.25	1.45	32.1	35.8
Sulphur	<10000	<10000	5510000	5510000
Tin	21.6	5.04	128	155
Titanium	66.4	45.7	147	259
Vanadium	<1	1.02	5.80	6.82
Zinc	20.0	60.1	32.9	113
Total				5633641

* 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 *	77.5	138	2630	2708
Antimony	0.94	2.70	1.07	4.71
Arsenic	10.7	3.55	35.8	50.1
Barium	15.3	8.17	54.5	78.0
Beryllium	<0.2	<0.2	0.11	0.11
Boron *	<30	<30	9000	9000
Cadmium	6.87	3.08	0.46	10.4
Calcium *	<500	<500	23600	23600
Chromium	7.05	7.58	20.6	35.2
Cobalt	0.63	1.07	1.12	2.82
Copper	31.6	18.1	16.4	66.1
Iron	<200	<200	1120	1120
Lead	1.66	5.69	13.8	21.2
Lithium	1.42	<0.5	2.68	4.10
Magnesium *	58.6	60.9	4460	4519
Manganese	224	229	29.3	482
Mercury **	0.41	0.12	13.9	14.5
Molybdenum	3.60	35.1	0.48	39.2
Nickel	4.18	6.79	15.1	26.1
Phosphorus	<100	<100	89.4	89.4
Potassium	5240	1140	672	7052
Selenium	2.74	<2	95.1	97.8
Silicon *	383	-	63200	63583
Silver	<0.2	<0.2	0.20	0.20
Sodium *	6580	1310	32400	38980
Strontium	3.10	1.86	27.9	32.9
Sulphur	<10000	<10000	4340000	4340000
Tin	20.3	4.97	221	246
Titanium	88.6	50.4	125	264
Vanadium	1.19	<1	2.09	3.28
Zinc	20.9	73.1	32.5	127
Total				4492256

* 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 *	85.4	145	2900	2985
Antimony	1.50	2.65	1.11	5.26
Arsenic	9.69	3.18	59.6	72.5
Barium	17.2	9.06	63.3	89.6
Beryllium	<0.2	<0.2	0.16	0.16
Boron *	<30	<30	10000	10000
Cadmium	4.67	2.27	0.084	7.02
Calcium *	<500	<500	24900	24900
Chromium	8.95	8.99	29.8	47.7
Cobalt	0.69	1.17	0.99	2.86
Copper	37.0	15.8	15.0	67.8
Iron	219	384	1430	2033
Lead	3.11	5.21	14.1	22.4
Lithium	1.90	1.24	2.93	6.07
Magnesium *	59.8	64.6	4640	4700
Manganese	232	175	51.4	458
Mercury **	0.23	0.10	22.1	22.5
Molybdenum	3.62	37.5	0.70	41.8
Nickel	4.80	5.87	7.36	18.0
Phosphorus	<100	<100	118	118
Potassium	4490	1110	875	6475
Selenium	3.42	<2	149	152
Silicon *	346	-	71600	71946
Silver	<0.2	<0.2	0.18	0.18
Sodium *	5710	1270	34000	39710
Strontium	3.40	1.95	30.4	35.8
Sulphur	<10000	<10000	3800000	3800000
Tin	25.9	5.85	295	327
Titanium	107	74.4	140	321
Vanadium	<1	<1	2.43	2.43
Zinc	30.3	65.7	28.6	125
Total				3964693

* 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	2451	151	485	394	239	8.58
Antimony	4.38	0.27	0.87	0.70	0.43	0.015
Arsenic	80.3	4.93	15.9	12.9	7.83	0.28
Barium	91.9	5.64	18.2	14.8	8.96	0.32
Beryllium	<0.10	<0.0061	<0.020	<0.016	<0.0097	<0.00035
Boron	7280	447	1440	1169	710	25.5
Cadmium	3.26	0.20	0.65	0.52	0.32	0.011
Calcium	22800	1400	4509	3661	2223	79.8
Chromium	46.2	2.84	9.13	7.41	4.50	0.16
Cobalt	2.49	0.15	0.49	0.40	0.24	0.0087
Copper	53.0	3.25	10.5	8.51	5.17	0.19
Iron	3017	185	597	484	294	10.6
Lead	20.0	1.23	3.95	3.21	1.95	0.070
Lithium	2.79	0.17	0.55	0.45	0.27	0.0098
Magnesium	3319	204	656	533	324	11.6
Manganese	425	26.1	84.0	68.2	41.4	1.49
Mercury	18.5	1.14	3.66	2.98	1.81	0.065
Molybdenum	39.6	2.43	7.83	6.36	3.86	0.14
Nickel	23.8	1.46	4.70	3.81	2.32	0.083
Phosphorus	44.4	2.73	8.78	7.13	4.33	0.16
Potassium	6389	392	1263	1026	623	22.4
Selenium	133	8.14	26.2	21.3	12.9	0.46
Silicon	41717	2562	8249	6698	4067	146
Silver	0.18	0.011	0.035	0.028	0.017	0.00061
Sodium	35110	2156	6943	5637	3423	123
Strontium	35.8	2.20	7.08	5.75	3.49	0.13
Sulphur	5510000	338343	1089579	884658	537202	19286
Tin	155	9.50	30.6	24.8	15.1	0.54
Titanium	259	15.9	51.2	41.6	25.3	0.91
Vanadium	6.82	0.42	1.35	1.09	0.66	0.024
Zinc	113	6.94	22.3	18.1	11.0	0.40
Total	5633641	345935	1114028	904509	549256	19718

Dry Gas Volume Sampled (Rm^3*) :	5.057
Actual Flowrate (m^3/s) :	57.0
Dry Reference Flowrate (Rm^3/s*) :	17.7
Dry Adjusted Flowrate (Rm^3/s**) :	21.8
Wet Reference Flowrate (Rm^3/s*) :	35.9

* 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	2708	162	516	430	257	9.55
Antimony	4.71	0.28	0.90	0.75	0.45	0.017
Arsenic	50.1	3.00	9.55	7.96	4.75	0.18
Barium	78.0	4.68	14.9	12.4	7.40	0.28
Beryllium	0.11	0.0067	0.021	0.018	0.011	0.00039
Boron	9000	540	1717	1430	854	31.8
Cadmium	10.4	0.62	1.99	1.65	0.99	0.037
Calcium	23600	1416	4501	3751	2239	83.3
Chromium	35.2	2.11	6.72	5.60	3.34	0.12
Cobalt	2.82	0.17	0.54	0.45	0.27	0.0099
Copper	66.1	3.97	12.6	10.5	6.27	0.23
Iron	1120	67.2	214	178	106	3.95
Lead	21.2	1.27	4.03	3.36	2.01	0.075
Lithium	4.10	0.25	0.78	0.65	0.39	0.014
Magnesium	4519	271	862	718	429	15.9
Manganese	482	28.9	92.0	76.7	45.7	1.70
Mercury	14.5	0.87	2.76	2.30	1.37	0.051
Molybdenum	39.2	2.35	7.47	6.23	3.72	0.14
Nickel	26.1	1.56	4.97	4.14	2.47	0.092
Phosphorus	89.4	5.36	17.1	14.2	8.48	0.32
Potassium	7052	423	1345	1121	669	24.9
Selenium	97.8	5.87	18.7	15.6	9.28	0.35
Silicon	63583	3816	12127	10106	6031	224
Silver	0.20	0.012	0.038	0.032	0.019	0.00071
Sodium	38980	2339	7435	6196	3697	138
Strontium	32.9	1.97	6.27	5.22	3.12	0.12
Sulphur	4340000	260438	827770	689809	411660	15314
Tin	246	14.8	47.0	39.1	23.4	0.87
Titanium	264	15.8	50	42.0	25.0	0.93
Vanadium	3.28	0.20	0.63	0.52	0.31	0.012
Zinc	127	7.59	24.1	20.1	12.0	0.45
Total	4492256	269575	856810	714009	426102	15851

Dry Gas Volume Sampled (Rm^3*) :	5.243
Actual Flowrate (m^3/s) :	58.8
Dry Reference Flowrate (Rm^3/s*) :	18.5
Dry Adjusted Flowrate (Rm^3/s**) :	22.2
Wet Reference Flowrate (Rm^3/s*) :	37.2

* 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	2985	181	570	478	286	10.7
Antimony	5.26	0.32	1.00	0.84	0.50	0.019
Arsenic	72.5	4.39	13.8	11.6	6.94	0.26
Barium	89.6	5.42	17.1	14.3	8.58	0.32
Beryllium	0.16	0.0094	0.030	0.025	0.015	0.00055
Boron	10000	605	1910	1602	957	35.7
Cadmium	7.02	0.43	1.34	1.12	0.67	0.025
Calcium	24900	1507	4756	3988	2384	88.9
Chromium	47.7	2.89	9.12	7.65	4.57	0.17
Cobalt	2.86	0.17	0.55	0.46	0.27	0.010
Copper	67.8	4.10	12.9	10.9	6.49	0.24
Iron	2033	123	388	326	195	7.26
Lead	22.4	1.36	4.28	3.59	2.15	0.080
Lithium	6.07	0.37	1.16	0.97	0.58	0.022
Magnesium	4700	284	898	753	450	16.8
Manganese	458	27.7	87.5	73.4	43.9	1.64
Mercury	22.5	1.36	4.29	3.60	2.15	0.080
Molybdenum	41.8	2.53	7.99	6.70	4.00	0.15
Nickel	18.0	1.09	3.44	2.89	1.73	0.064
Phosphorus	118	7.14	22.5	18.9	11.3	0.42
Potassium	6475	392	1237	1037	620	23.1
Selenium	152	9.23	29.1	24.4	14.6	0.54
Silicon	71946	4355	13741	11522	6889	257
Silver	0.18	0.011	0.034	0.029	0.017	0.00064
Sodium	39710	2404	7584	6360	3802	142
Strontium	35.8	2.16	6.83	5.73	3.42	0.13
Sulphur	3800000	230024	725745	608584	363845	13571
Tin	327	19.8	62.4	52.3	31.3	1.17
Titanium	321	19.5	61.4	51.5	30.8	1.15
Vanadium	2.43	0.15	0.46	0.39	0.23	0.0087
Zinc	125	7.54	23.8	20.0	11.9	0.45
Total	3964693	239994	757199	634960	379614	14160

Dry Gas Volume Sampled (Rm^3*) :	5.236
Actual Flowrate (m^3/s) :	59.0
Dry Reference Flowrate (Rm^3/s*) :	18.7
Dry Adjusted Flowrate (Rm^3/s**) :	22.3
Wet Reference Flowrate (Rm^3/s*) :	37.3

* At 25°C and 1 atmosphere

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

TABLE 28
Clean Harbors Sarnia
Summary of Metal Actual Concentrations

Metal	Actual Concentration				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	µg/m³	µg/m³	µg/m³	µg/m³	%
Aluminum	151	162	181	165	9.2
Antimony	0.27	0.28	0.32	0.29	8.8
Arsenic	4.93	3.00	4.39	4.11	24.2
Barium	5.64	4.68	5.42	5.25	9.6
Beryllium	<0.0061	0.0067	0.0094	<0.0074	23.5
Boron	447	540	605	531	15.0
Cadmium	0.20	0.62	0.43	0.42	50.9
Calcium	1400	1416	1507	1441	4.0
Chromium	2.84	2.11	2.89	2.61	16.6
Cobalt	0.15	0.17	0.17	0.16	6.3
Copper	3.25	3.97	4.10	3.78	12.1
Iron	185	67.2	123	125	47.2
Lead	1.23	1.27	1.36	1.28	5.2
Lithium	0.17	0.25	0.37	0.26	37.8
Magnesium	204	271	284	253	17.1
Manganese	26.1	28.9	27.7	27.6	5.2
Mercury	1.14	0.87	1.36	1.12	22.0
Molybdenum	2.43	2.35	2.53	2.44	3.7
Nickel	1.46	1.56	1.09	1.37	18.1
Phosphorus	2.73	5.36	7.14	5.08	43.8
Potassium	392	423	392	402	4.5
Selenium	8.14	5.87	9.23	7.75	22.1
Silicon	2562	3816	4355	3577	25.7
Silver	0.011	0.012	0.011	0.011	6.3
Sodium	2156	2339	2404	2300	5.6
Strontium	2.20	1.97	2.16	2.11	5.8
Sulphur	338343	260438	230024	276268	20.2
Tin	9.50	14.8	19.8	14.7	35.0
Titanium	15.9	15.8	19.5	17.1	12.1
Vanadium	0.42	0.20	0.15	0.25	56.9
Zinc	6.94	7.59	7.54	7.36	4.9
Total	345935	269575	239994	285168	19.2

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	485	516	570	524	8.2
Antimony	0.87	0.90	1.00	0.92	7.8
Arsenic	15.9	9.55	13.8	13.1	24.7
Barium	18.2	14.9	17.1	16.7	10.1
Beryllium	<0.020	0.021	0.030	<0.024	22.6
Boron	1440	1717	1910	1689	14.0
Cadmium	0.65	1.99	1.34	1.32	50.6
Calcium	4509	4501	4756	4588	3.2
Chromium	9.13	6.72	9.12	8.32	16.7
Cobalt	0.49	0.54	0.55	0.53	5.4
Copper	10.5	12.6	12.9	12.0	11.1
Iron	597	214	388	399	48.0
Lead	3.95	4.03	4.28	4.09	4.2
Lithium	0.55	0.78	1.16	0.83	36.9
Magnesium	656	862	898	805	16.2
Manganese	84.0	92.0	87.5	87.8	4.6
Mercury	3.66	2.76	4.29	3.57	21.6
Molybdenum	7.83	7.47	7.99	7.76	3.4
Nickel	4.70	4.97	3.44	4.37	18.6
Phosphorus	8.78	17.1	22.5	16.1	43.0
Potassium	1263	1345	1237	1282	4.4
Selenium	26.2	18.7	29.1	24.7	21.9
Silicon	8249	12127	13741	11372	24.8
Silver	0.035	0.038	0.034	0.036	6.1
Sodium	6943	7435	7584	7321	4.6
Strontium	7.08	6.27	6.83	6.72	6.2
Sulphur	1089579	827770	725745	881031	21.3
Tin	30.6	47.0	62.4	46.7	34.1
Titanium	51.2	50	61.4	54.3	11.3
Vanadium	1.35	0.63	0.46	0.81	58.0
Zinc	22.3	24.1	23.8	23.4	4.0
Total	1114028	856810	757199	909346	20.2

* 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	394	430	478	434	9.8
Antimony	0.70	0.75	0.84	0.76	9.3
Arsenic	12.9	7.96	11.6	10.8	23.7
Barium	14.8	12.4	14.3	13.8	9.1
Beryllium	<0.016	0.018	0.025	<0.020	24.0
Boron	1169	1430	1602	1400	15.6
Cadmium	0.52	1.65	1.12	1.10	51.4
Calcium	3661	3751	3988	3800	4.4
Chromium	7.41	5.60	7.65	6.89	16.3
Cobalt	0.40	0.45	0.46	0.44	7.0
Copper	8.51	10.5	10.9	9.96	12.7
Iron	484	178	326	329	46.5
Lead	3.21	3.36	3.59	3.39	5.7
Lithium	0.45	0.65	0.97	0.69	38.2
Magnesium	533	718	753	668	17.7
Manganese	68.2	76.7	73.4	72.8	5.9
Mercury	2.98	2.30	3.60	2.96	22.0
Molybdenum	6.36	6.23	6.70	6.43	3.8
Nickel	3.81	4.14	2.89	3.61	18.0
Phosphorus	7.13	14.2	18.9	13.4	44.2
Potassium	1026	1121	1037	1061	4.9
Selenium	21.3	15.6	24.4	20.4	22.0
Silicon	6698	10106	11522	9442	26.3
Silver	0.028	0.032	0.029	0.030	6.7
Sodium	5637	6196	6360	6064	6.2
Strontium	5.75	5.22	5.73	5.57	5.3
Sulphur	884658	689809	608584	727684	19.5
Tin	24.8	39.1	52.3	38.8	35.5
Titanium	41.6	42.0	51.5	45.0	12.4
Vanadium	1.09	0.52	0.39	0.67	56.1
Zinc	18.1	20.1	20.0	19.4	5.6
Total	904509	714009	634960	751159	18.4

* 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	239	257	286	261	9.1
Antimony	0.43	0.45	0.50	0.46	8.6
Arsenic	7.83	4.75	6.94	6.51	24.4
Barium	8.96	7.40	8.58	8.31	9.8
Beryllium	<0.0097	0.011	0.015	<0.012	23.4
Boron	710	854	957	840	14.8
Cadmium	0.32	0.99	0.67	0.66	50.8
Calcium	2223	2239	2384	2282	3.9
Chromium	4.50	3.34	4.57	4.14	16.7
Cobalt	0.24	0.27	0.27	0.26	6.1
Copper	5.17	6.27	6.49	5.98	11.9
Iron	294	106	195	198	47.4
Lead	1.95	2.01	2.15	2.03	5.0
Lithium	0.27	0.39	0.58	0.41	37.7
Magnesium	324	429	450	401	16.9
Manganese	41.4	45.7	43.9	43.7	5.0
Mercury	1.81	1.37	2.15	1.78	22.0
Molybdenum	3.86	3.72	4.00	3.86	3.7
Nickel	2.32	2.47	1.73	2.17	18.1
Phosphorus	4.33	8.48	11.3	8.04	43.6
Potassium	623	669	620	637	4.3
Selenium	12.9	9.28	14.6	12.3	22.2
Silicon	4067	6031	6889	5662	25.5
Silver	0.017	0.019	0.017	0.018	6.1
Sodium	3423	3697	3802	3641	5.4
Strontium	3.49	3.12	3.42	3.34	6.0
Sulphur	537202	411660	363845	437569	20.5
Tin	15.1	23.4	31.3	23.2	34.9
Titanium	25.3	25.0	30.8	27.0	12.0
Vanadium	0.66	0.31	0.23	0.40	57.2
Zinc	11.0	12.0	11.9	11.6	4.7
Total	549256	426102	379614	451658	19.4

* At 25°C and 1 atmosphere

TABLE 32
Clean Harbors Sarnia
Summary of Metal Emission Rates

Metal	Emission Rate				Coefficient
	Test No. 1 mg/s	Test No. 2 mg/s	Test No. 3 mg/s	Average mg/s	of Variation %
Aluminum	8.58	9.55	10.7	9.60	10.9
Antimony	0.015	0.017	0.019	0.017	10.3
Arsenic	0.28	0.18	0.26	0.24	23.0
Barium	0.32	0.28	0.32	0.31	8.6
Beryllium	<0.00035	0.00039	0.00055	<0.00043	24.9
Boron	25.5	31.8	35.7	31.0	16.7
Cadmium	0.011	0.037	0.025	0.024	51.9
Calcium	79.8	83.3	88.9	84.0	5.5
Chromium	0.16	0.12	0.17	0.15	16.1
Cobalt	0.0087	0.0099	0.010	0.0096	8.2
Copper	0.19	0.23	0.24	0.22	13.8
Iron	10.6	3.95	7.26	7.26	45.5
Lead	0.070	0.075	0.080	0.075	6.8
Lithium	0.0098	0.014	0.022	0.015	39.2
Magnesium	11.6	15.9	16.8	14.8	18.8
Manganese	1.49	1.70	1.64	1.61	6.9
Mercury	0.065	0.051	0.080	0.065	22.3
Molybdenum	0.14	0.14	0.15	0.14	4.4
Nickel	0.083	0.092	0.064	0.080	17.6
Phosphorus	0.16	0.32	0.42	0.30	45.0
Potassium	22.4	24.9	23.1	23.5	5.5
Selenium	0.46	0.35	0.54	0.45	22.2
Silicon	146	224	257	209	27.3
Silver	0.00061	0.00071	0.00064	0.00065	7.4
Sodium	123	138	142	134	7.4
Strontium	0.13	0.12	0.13	0.12	5.0
Sulphur	19286	15314	13571	16057	18.2
Tin	0.54	0.87	1.17	0.86	36.4
Titanium	0.91	0.93	1.15	1.00	13.3
Vanadium	0.024	0.012	0.0087	0.015	54.8
Zinc	0.40	0.45	0.45	0.43	6.8
Total	19718	15851	14160	16576	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	165	524	434	261	9.60
Antimony	0.29	0.92	0.76	0.46	0.017
Arsenic	4.11	13.1	10.8	6.51	0.24
Barium	5.25	16.7	13.8	8.31	0.31
Beryllium	<0.0074	<0.024	<0.020	<0.012	<0.00043
Boron	531	1689	1400	840	31.0
Cadmium	0.42	1.32	1.10	0.66	0.024
Calcium	1441	4588	3800	2282	84.0
Chromium	2.61	8.32	6.89	4.14	0.15
Cobalt	0.16	0.53	0.44	0.26	0.0096
Copper	3.78	12.0	9.96	5.98	0.22
Iron	125	399	329	198	7.26
Lead	1.28	4.09	3.39	2.03	0.075
Lithium	0.26	0.83	0.69	0.41	0.015
Magnesium	253	805	668	401	14.8
Manganese	27.6	87.8	72.8	43.7	1.61
Mercury	1.12	3.57	2.96	1.78	0.065
Molybdenum	2.44	7.76	6.43	3.86	0.14
Nickel	1.37	4.37	3.61	2.17	0.080
Phosphorus	5.08	16.1	13.4	8.04	0.30
Potassium	402	1282	1061	637	23.5
Selenium	7.75	24.7	20.4	12.3	0.45
Silicon	3577	11372	9442	5662	209
Silver	0.011	0.036	0.030	0.018	0.00065
Sodium	2300	7321	6064	3641	134
Strontium	2.11	6.72	5.57	3.34	0.12
Sulphur	276268	881031	727684	437569	16057
Tin	14.7	46.7	38.8	23.2	0.86
Titanium	17.1	54.3	45.0	27.0	1.00
Vanadium	0.25	0.81	0.67	0.40	0.015
Zinc	7.36	23.4	19.4	11.6	0.43
Total	285168	909346	751159	451658	16576

* 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	100	10.9	10.9
Antimony	<0.2	<0.2	<0.1	<0.20
Arsenic	<1	<1	<0.2	<1.00
Barium	<5	<5	1.69	1.69
Beryllium	<0.2	<0.2	<0.1	<0.20
Boron *	<30	<30	60.4	60.4
Cadmium	<0.1	<0.1	<0.05	<0.10
Calcium *	<500	<500	135	135
Chromium	<1	1.93	0.46	2.39
Cobalt	<0.2	<0.2	<0.1	<0.20
Copper	<1	3.77	4.61	8.38
Iron	<200	<200	15.1	15.1
Lead	<0.5	<0.5	0.44	0.44
Lithium	<0.5	<0.5	0.42	0.42
Magnesium *	<10	42.8	20.1	20.1
Manganese	0.85	1.44	0.48	2.77
Mercury **	<0.015	<0.015	<0.2	<0.20
Molybdenum	<0.2	34.2	<0.1	34.2
Nickel	<0.2	0.95	0.60	1.55
Phosphorus	<100	<100	<25	<100
Potassium	<100	<100	<100	<100
Selenium	<2	<2	<1	<1.00
Silicon *	<150	-	235	235
Silver	<0.2	<0.2	<0.1	<0.20
Sodium *	53.3	34.9	222	275
Strontium	<0.2	0.62	0.34	0.95
Sulphur	<10000	<10000	<3000	<3000
Tin	2.69	1.71	22.2	26.6
Titanium	<10	<10	<1	<10.0
Vanadium	<1	<1	<0.1	<1.00
Zinc	<6	<6	<3	<6.00
Total				<4051

* 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	201	0.013	0.040	0.032	0.020	0.74
Pentachlorodibenzo-p-dioxins	295	0.019	0.059	0.048	0.030	1.08
Hexachlorodibenzo-p-dioxins	370	0.023	0.074	0.060	0.037	1.36
Heptachlorodibenzo-p-dioxins	64.7	0.0041	0.013	0.010	0.0065	0.24
Octachlorodibenzo-p-dioxin	51.8	0.0033	0.010	0.0084	0.0052	0.19
Total	983	0.062	0.20	0.16	0.099	3.60

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	172	0.011	0.034	0.028	0.017	0.63
Pentachlorodibenzofurans	35.3	0.0022	0.0070	0.0057	0.0036	0.13
Hexachlorodibenzofurans	5.03	0.00032	0.0010	0.00081	0.00051	0.018
Heptachlorodibenzofurans	<3.3	<0.00021	<0.00066	<0.00053	<0.00033	<0.012
Octachlorodibenzofuran	<5.8	<0.00037	<0.0012	<0.00094	<0.00059	<0.021
Total	<221	<0.014	<0.044	<0.036	<0.022	<0.81

Dry Gas Volume Sampled (Rm^3*) :	5.020
Actual Flowrate (m^3/s) :	57.8
Dry Reference Flowrate (Rm^3/s*) :	18.4
Dry Adjusted Flowrate (Rm^3/s**) :	22.7
Wet Reference Flowrate (Rm^3/s*) :	36.3

* 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	<5.9	<0.00039	<0.0012	<0.0010	<0.00061	<0.022
Pentachlorodibenzo-p-dioxins	149	0.0098	0.030	0.025	0.015	0.57
Hexachlorodibenzo-p-dioxins	212	0.014	0.043	0.036	0.022	0.81
Heptachlorodibenzo-p-dioxins	98.4	0.0065	0.020	0.017	0.010	0.37
Octachlorodibenzo-p-dioxin	<21	<0.0014	<0.0043	<0.0036	<0.0022	<0.080
Total	<486	<0.032	<0.099	<0.082	<0.051	<1.85

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	89.6	0.0059	0.018	0.015	0.0093	0.34
Pentachlorodibenzofurans	<4.9	<0.00032	<0.0010	<0.00083	<0.00051	<0.019
Hexachlorodibenzofurans	7.84	0.00052	0.0016	0.0013	0.00081	0.030
Heptachlorodibenzofurans	<3.8	<0.00025	<0.00077	<0.00064	<0.00040	<0.014
Octachlorodibenzofuran	<8.5	<0.00056	<0.0017	<0.0014	<0.00088	<0.032
Total	<115	<0.0075	<0.023	<0.019	<0.012	<0.44

Dry Gas Volume Sampled (Rm^3*) :	4.915
Actual Flowrate (m^3/s) :	57.9
Dry Reference Flowrate (Rm^3/s*) :	18.7
Dry Adjusted Flowrate (Rm^3/s**) :	22.5
Wet Reference Flowrate (Rm^3/s*) :	36.6

* At 25°C and 1 atmosphere

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

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

TABLE 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	14.1	0.00092	0.0028	0.0024	0.0014	0.054
Pentachlorodibenzo-p-dioxins	267	0.017	0.053	0.045	0.027	1.01
Hexachlorodibenzo-p-dioxins	313	0.020	0.063	0.052	0.032	1.19
Heptachlorodibenzo-p-dioxins	<9.0	<0.00059	<0.0018	<0.0015	<0.00092	<0.034
Octachlorodibenzo-p-dioxin	61.5	0.0040	0.012	0.010	0.0063	0.23
Total	<665	<0.043	<0.13	<0.11	<0.068	<2.52

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	205	0.013	0.041	0.034	0.021	0.78
Pentachlorodibenzofurans	98.0	0.0064	0.020	0.016	0.010	0.37
Hexachlorodibenzofurans	22.4	0.0015	0.0045	0.0037	0.0023	0.085
Heptachlorodibenzofurans	11.3	0.00074	0.0023	0.0019	0.0012	0.043
Octachlorodibenzofuran	<11	<0.00072	<0.0022	<0.0018	<0.0011	<0.042
Total	<348	<0.023	<0.070	<0.058	<0.036	<1.32

Dry Gas Volume Sampled (Rm^3*) :	5.001
Actual Flowrate (m^3/s) :	58.4
Dry Reference Flowrate (Rm^3/s*) :	19.0
Dry Adjusted Flowrate (Rm^3/s**) :	22.7
Wet Reference Flowrate (Rm^3/s*) :	37.1

* 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 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	0.013	<0.00039	0.00092	<0.0047	149
Pentachlorodibenzo-p-dioxins	0.019	0.0098	0.017	0.015	31.4
Hexachlorodibenzo-p-dioxins	0.023	0.014	0.020	0.019	25.3
Heptachlorodibenzo-p-dioxins	0.0041	0.0065	<0.00059	0.0037	79.6
Octachlorodibenzo-p-dioxin	0.0033	<0.0014	0.0040	<0.0029	46.9
Total	0.062	<0.032	<0.043	<0.046	33.5

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	0.011	0.0059	0.013	0.010	37.8
Pentachlorodibenzofurans	0.0022	<0.00032	0.0064	<0.0030	104
Hexachlorodibenzofurans	0.00032	0.00052	0.0015	0.00076	79.7
Heptachlorodibenzofurans	<0.00021	<0.00025	0.00074	<0.00040	73.5
Octachlorodibenzofuran	<0.00037	<0.00056	<0.00072	<0.00055	31.8
Total	<0.014	<0.0075	<0.023	<0.015	51.4

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

Dioxins

Congener Group	Dry Reference Concentration				Coefficient of Variation
	Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	%
Tetrachlorodibenzo-p-dioxins	0.040	<0.0012	0.0028	<0.015	150
Pentachlorodibenzo-p-dioxins	0.059	0.030	0.053	0.047	31.8
Hexachlorodibenzo-p-dioxins	0.074	0.043	0.063	0.060	25.9
Heptachlorodibenzo-p-dioxins	0.013	0.020	<0.0018	0.012	79.4
Octachlorodibenzo-p-dioxin	0.010	<0.0043	0.012	<0.0090	46.6
Total	0.20	<0.099	<0.13	<0.14	34.5

Furans

Congener Group	Dry Reference Concentration				Coefficient of Variation
	Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	%
Tetrachlorodibenzofurans	0.034	0.018	0.041	0.031	37.5
Pentachlorodibenzofurans	0.0070	<0.0010	0.020	<0.0092	103
Hexachlorodibenzofurans	0.0010	0.0016	0.0045	0.0024	78.9
Heptachlorodibenzofurans	<0.00066	<0.00077	0.0023	<0.0012	72.6
Octachlorodibenzofuran	<0.0012	<0.0017	<0.0022	<0.0017	30.9
Total	<0.044	<0.023	<0.070	<0.046	50.7

* 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				Coefficient of Variation
	Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	%
Tetrachlorodibenzo-p-dioxins	0.032	<0.0010	0.0024	<0.012	149
Pentachlorodibenzo-p-dioxins	0.048	0.025	0.045	0.039	31.1
Hexachlorodibenzo-p-dioxins	0.060	0.036	0.052	0.049	24.8
Heptachlorodibenzo-p-dioxins	0.010	0.017	<0.0015	0.0095	79.8
Octachlorodibenzo-p-dioxin	0.0084	<0.0036	0.010	<0.0074	46.9
Total	0.16	<0.082	<0.11	<0.12	32.9

Furans

Congener Group	Dry Adjusted Concentration				Coefficient of Variation
	Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	%
Tetrachlorodibenzofurans	0.028	0.015	0.034	0.026	37.8
Pentachlorodibenzofurans	0.0057	<0.00083	0.016	<0.0076	104
Hexachlorodibenzofurans	0.00081	0.0013	0.0037	0.0020	79.9
Heptachlorodibenzofurans	<0.00053	<0.00064	0.0019	<0.0010	73.8
Octachlorodibenzofuran	<0.00094	<0.0014	<0.0018	<0.0014	32.3
Total	<0.036	<0.019	<0.058	<0.038	51.6

* 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				Coefficient of Variation
	Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	%
Tetrachlorodibenzo-p-dioxins	0.020	<0.00061	0.0014	<0.0075	149
Pentachlorodibenzo-p-dioxins	0.030	0.015	0.027	0.024	31.6
Hexachlorodibenzo-p-dioxins	0.037	0.022	0.032	0.030	25.5
Heptachlorodibenzo-p-dioxins	0.0065	0.010	<0.00092	0.0059	79.5
Octachlorodibenzo-p-dioxin	0.0052	<0.0022	0.0063	<0.0046	46.7
Total	0.099	<0.051	<0.068	<0.073	33.9

Furans

Congener Group	Wet Reference Concentration				Coefficient of Variation
	Test No. 1 ng/Rm³*	Test No. 2 ng/Rm³*	Test No. 3 ng/Rm³*	Average ng/Rm³*	%
Tetrachlorodibenzofurans	0.017	0.0093	0.021	0.016	37.6
Pentachlorodibenzofurans	0.0036	<0.00051	0.010	<0.0047	103
Hexachlorodibenzofurans	0.00051	0.00081	0.0023	0.0012	79.2
Heptachlorodibenzofurans	<0.00033	<0.00040	0.0012	<0.00063	73.0
Octachlorodibenzofuran	<0.00059	<0.00088	<0.0011	<0.00087	31.3
Total	<0.022	<0.012	<0.036	<0.023	51.0

* At 25°C and 1 atmosphere

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

Dioxins

Congener Group	Emission Rate Test No. 1 ng/s	Test No. 2 ng/s	Test No. 3 ng/s	Average ng/s	Coefficient of Variation %
Tetrachlorodibenzo-p-dioxins	0.74	<0.022	0.054	<0.27	149
Pentachlorodibenzo-p-dioxins	1.08	0.57	1.01	0.89	31.5
Hexachlorodibenzo-p-dioxins	1.36	0.81	1.19	1.12	25.2
Heptachlorodibenzo-p-dioxins	0.24	0.37	<0.034	0.22	79.5
Octachlorodibenzo-p-dioxin	0.19	<0.080	0.23	<0.17	47.2
Total	3.60	<1.85	<2.52	<2.66	33.2

Furans

Congener Group	Emission Rate Test No. 1 ng/s	Test No. 2 ng/s	Test No. 3 ng/s	Average ng/s	Coefficient of Variation %
Tetrachlorodibenzofurans	0.63	0.34	0.78	0.58	38.2
Pentachlorodibenzofurans	0.13	<0.019	0.37	<0.17	104
Hexachlorodibenzofurans	0.018	0.030	0.085	0.044	80.2
Heptachlorodibenzofurans	<0.012	<0.014	0.043	<0.023	74.1
Octachlorodibenzofuran	<0.021	<0.032	<0.042	<0.032	32.3
Total	<0.81	<0.44	<1.32	<0.86	51.9

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

Dioxins

Congener Group	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	<0.0047	<0.015	<0.012	<0.0075	<0.27
Pentachlorodibenzo-p-dioxins	0.015	0.047	0.039	0.024	0.89
Hexachlorodibenzo-p-dioxins	0.019	0.060	0.049	0.030	1.12
Heptachlorodibenzo-p-dioxins	0.0037	0.012	0.0095	0.0059	0.22
Octachlorodibenzo-p-dioxin	<0.0029	<0.0090	<0.0074	<0.0046	<0.17
Total	<0.046	<0.14	<0.12	<0.073	<2.66

Furans

Congener Group	Actual Concentration ng/m³	Dry Reference Concentration ng/Rm³*	Dry Adjusted Concentration ng/Rm³**	Wet Reference Concentration ng/Rm³*	Emission Rate ng/s
Tetrachlorodibenzofurans	0.010	0.031	0.026	0.016	0.58
Pentachlorodibenzofurans	<0.0030	<0.0092	<0.0076	<0.0047	<0.17
Hexachlorodibenzofurans	0.00076	0.0024	0.0020	0.0012	0.044
Heptachlorodibenzofurans	<0.00040	<0.0012	<0.0010	<0.00063	<0.023
Octachlorodibenzofuran	<0.00055	<0.0017	<0.0014	<0.00087	<0.032
Total	<0.015	<0.046	<0.038	<0.023	<0.86

* At 25°C and 1 atmosphere

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

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

Dioxins

Congener Group	Blank Train pg	Laboratory Blank pg
Tetrachlorodibenzo-p-dioxins	<2.4	<4.0
Pentachlorodibenzo-p-dioxins	<1.7	<3.3
Hexachlorodibenzo-p-dioxins	<2.4	<8.1
Heptachlorodibenzo-p-dioxins	<4.2	<14
Octachlorodibenzo-p-dioxin	<7.1	<42
Total	<17.8	<71.4

Furans

Congener Group	Blank Train pg	Laboratory Blank pg
Tetrachlorodibenzofurans	<1.9	<2.4
Pentachlorodibenzofurans	<1.2	<2.8
Hexachlorodibenzofurans	<1.4	<5.6
Heptachlorodibenzofurans	<2.1	<9.2
Octachlorodibenzofuran	6.77	<24
Total	<13.4	<44.0

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

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

Specific Isomer	Total Collected	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg	pg/m³	pg/Rm³*	pg/Rm³**	pg/Rm³*	ng/s
2378-tetrachlorodibenzo-p-dioxin	<7.1	<0.45	<1.41	<1.15	<0.72	<0.026
12378-pentachlorodibenzo-p-dioxin	5.60	0.36	1.12	0.90	0.57	0.021
123478-hexachlorodibenzo-p-dioxin	<4.0	<0.25	<0.80	<0.65	<0.40	<0.015
123678-hexachlorodibenzo-p-dioxin	<6.0	<0.38	<1.20	<0.97	<0.61	<0.022
123789-hexachlorodibenzo-p-dioxin	<4.3	<0.27	<0.86	<0.69	<0.43	<0.016
1234678-heptachlorodibenzo-p-dioxin	64.7	4.10	12.9	10.4	6.53	0.24
Octachlorodibenzo-p-dioxin	51.8	3.28	10.3	8.36	5.23	0.19
2378-tetrachlorodibenzofuran	<7.9	<0.50	<1.57	<1.28	<0.80	<0.029
12378-pentachlorodibenzofuran	8.63	0.55	1.72	1.39	0.87	0.032
23478-pentachlorodibenzofuran	8.64	0.55	1.72	1.40	0.87	0.032
123478-hexachlorodibenzofuran	<3.6	<0.23	<0.72	<0.58	<0.36	<0.013
123678-hexachlorodibenzofuran	<3.6	<0.23	<0.72	<0.58	<0.36	<0.013
234678-hexachlorodibenzofuran	<3.5	<0.22	<0.70	<0.57	<0.35	<0.013
123789-hexachlorodibenzofuran	<8.5	<0.54	<1.69	<1.37	<0.86	<0.031
1234678-heptachlorodibenzofuran	<11	<0.70	<2.19	<1.78	<1.11	<0.040
1234789-heptachlorodibenzofuran	<3.3	<0.21	<0.66	<0.53	<0.33	<0.012
Octachlorodibenzofuran	<5.8	<0.37	<1.16	<0.94	<0.59	<0.021
PCB 77	<440	<27.9	<87.6	<71.0	<44.4	<1.61
PCB 81	<170	<10.8	<33.9	<27.4	<17.2	<0.62
PCB 126	<140	<8.88	<27.9	<22.6	<14.1	<0.51
PCB 169	<76	<4.82	<15.1	<12.3	<7.67	<0.28
PCB 105	704	44.6	140	114	71.1	2.58
PCB 114	<110	<6.98	<21.9	<17.8	<11.1	<0.40
PCB 118	1860	118	371	300	188	6.82
PCB 123	<140	<8.88	<27.9	<22.6	<14.1	<0.51
PCB 156/157	<110	<6.98	<21.9	<17.8	<11.1	<0.40
PCB 167	<100	<6.34	<19.9	<16.1	<10.1	<0.37
PCB 189	<41	<2.60	<8.17	<6.62	<4.14	<0.15
Total Dioxins & Furans Only	<208	<13.2	<41.4	<33.6	<21.0	<0.76

Dry Gas Volume Sampled (Rm³*) :	5.020
Actual Flowrate (m³/s) :	57.8
Dry Reference Flowrate (Rm³/s*) :	18.4
Dry Adjusted Flowrate (Rm³/s**) :	22.7
Wet Reference Flowrate (Rm³/s*) :	36.3

* 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	<5.9	<0.39	<1.20	<1.00	<0.61	<0.022
12378-pentachlorodibenzo-p-dioxin	<4.3	<0.28	<0.87	<0.73	<0.45	<0.016
123478-hexachlorodibenzo-p-dioxin	<10	<0.66	<2.03	<1.69	<1.04	<0.038
123678-hexachlorodibenzo-p-dioxin	<9.7	<0.64	<1.97	<1.64	<1.01	<0.037
123789-hexachlorodibenzo-p-dioxin	<9.4	<0.62	<1.91	<1.59	<0.98	<0.036
1234678-heptachlorodibenzo-p-dioxin	48.5	3.19	9.87	8.20	5.04	0.18
Octachlorodibenzo-p-dioxin	<21	<1.38	<4.27	<3.55	<2.18	<0.080
2378-tetrachlorodibenzofuran	<7.6	<0.50	<1.55	<1.29	<0.79	<0.029
12378-pentachlorodibenzofuran	<4.9	<0.32	<1.00	<0.83	<0.51	<0.019
23478-pentachlorodibenzofuran	<4.7	<0.31	<0.96	<0.79	<0.49	<0.018
123478-hexachlorodibenzofuran	<2.8	<0.18	<0.57	<0.47	<0.29	<0.011
123678-hexachlorodibenzofuran	<3.6	<0.24	<0.73	<0.61	<0.37	<0.014
234678-hexachlorodibenzofuran	<3.5	<0.23	<0.71	<0.59	<0.36	<0.013
123789-hexachlorodibenzofuran	7.84	0.52	1.60	1.33	0.81	0.030
1234678-heptachlorodibenzofuran	<10	<0.66	<2.03	<1.69	<1.04	<0.038
1234789-heptachlorodibenzofuran	<3.8	<0.25	<0.77	<0.64	<0.40	<0.014
Octachlorodibenzofuran	<8.5	<0.56	<1.73	<1.44	<0.88	<0.032
PCB 77	<260	<17.1	<52.9	<44.0	<27.0	<0.99
PCB 81	<150	<9.86	<30.5	<25.4	<15.6	<0.57
PCB 126	<220	<14.5	<44.8	<37.2	<22.9	<0.84
PCB 169	<110	<7.23	<22.4	<18.6	<11.4	<0.42
PCB 105	<340	<22.3	<69.2	<57.5	<35.3	<1.29
PCB 114	<150	<9.86	<30.5	<25.4	<15.6	<0.57
PCB 118	<3000	<197	<610	<507	<312	<11.4
PCB 123	<240	<15.8	<48.8	<40.6	<24.9	<0.91
PCB 156/157	<160	<10.5	<32.6	<27.1	<16.6	<0.61
PCB 167	<120	<7.89	<24.4	<20.3	<12.5	<0.46
PCB 189	<38	<2.50	<7.73	<6.43	<3.95	<0.14
Total Dioxins & Furans Only	<166	<10.9	<33.8	<28.1	<17.3	<0.63

Dry Gas Volume Sampled (Rm^3*) :	4.915
Actual Flowrate (m^3/s) :	57.9
Dry Reference Flowrate (Rm^3/s*) :	18.7
Dry Adjusted Flowrate (Rm^3/s**) :	22.5
Wet Reference Flowrate (Rm^3/s*) :	36.6

* At 25°C and 1 atmosphere

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

Note: "<" indicates that the analyte was not detected (was less than the analytical detection limit), and the value of the detection limit was used to calculate the emission data.

TABLE 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	<8.0	<0.52	<1.60	<1.34	<0.82	<0.030
12378-pentachlorodibenzo-p-dioxin	5.73	0.37	1.15	0.96	0.59	0.022
123478-hexachlorodibenzo-p-dioxin	<8.3	<0.54	<1.66	<1.39	<0.85	<0.032
123678-hexachlorodibenzo-p-dioxin	9.34	0.61	1.87	1.56	0.96	0.035
123789-hexachlorodibenzo-p-dioxin	<7.6	<0.49	<1.52	<1.27	<0.78	<0.029
1234678-heptachlorodibenzo-p-dioxin	<53	<3.45	<10.6	<8.87	<5.43	<0.20
Octachlorodibenzo-p-dioxin	61.5	4.00	12.3	10.3	6.30	0.23
2378-tetrachlorodibenzofuran	<9.1	<0.59	<1.82	<1.52	<0.93	<0.035
12378-pentachlorodibenzofuran	<8.1	<0.53	<1.62	<1.36	<0.83	<0.031
23478-pentachlorodibenzofuran	<8.6	<0.56	<1.72	<1.44	<0.88	<0.033
123478-hexachlorodibenzofuran	5.29	0.34	1.06	0.89	0.54	0.020
123678-hexachlorodibenzofuran	<5.2	<0.34	<1.04	<0.87	<0.53	<0.020
234678-hexachlorodibenzofuran	<3.9	<0.25	<0.78	<0.65	<0.40	<0.015
123789-hexachlorodibenzofuran	8.63	0.56	1.73	1.44	0.88	0.033
1234678-heptachlorodibenzofuran	11.3	0.74	2.26	1.89	1.16	0.043
1234789-heptachlorodibenzofuran	<6.5	<0.42	<1.30	<1.09	<0.67	<0.025
Octachlorodibenzofuran	<11	<0.72	<2.20	<1.84	<1.13	<0.042
PCB 77	<140	<9.11	<28.0	<23.4	<14.3	<0.53
PCB 81	<150	<9.76	<30.0	<25.1	<15.4	<0.57
PCB 126	<100	<6.51	<20.0	<16.7	<10.2	<0.38
PCB 169	<120	<7.81	<24.0	<20.1	<12.3	<0.46
PCB 105	<530	<34.5	<106	<88.7	<54.3	<2.01
PCB 114	<100	<6.51	<20.0	<16.7	<10.2	<0.38
PCB 118	1880	122	376	315	193	7.14
PCB 123	<140	<9.11	<28.0	<23.4	<14.3	<0.53
PCB 156/157	<220	<14.3	<44.0	<36.8	<22.5	<0.84
PCB 167	<140	<9.11	<28.0	<23.4	<14.3	<0.53
PCB 189	<31	<2.02	<6.20	<5.19	<3.17	<0.12
Total Dioxins & Furans Only	<231	<15.0	<46.2	<38.7	<23.7	<0.88

Dry Gas Volume Sampled (Rm^3*) :	5.001
Actual Flowrate (m^3/s) :	58.4
Dry Reference Flowrate (Rm^3/s*) :	19.0
Dry Adjusted Flowrate (Rm^3/s**) :	22.7
Wet Reference Flowrate (Rm^3/s*) :	37.1

* 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 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	<0.45	<0.39	<0.52	<0.45	14.7
12378-pentachlorodibenzo-p-dioxin	0.36	<0.28	0.37	<0.34	14.2
123478-hexachlorodibenzo-p-dioxin	<0.25	<0.66	<0.54	<0.48	42.9
123678-hexachlorodibenzo-p-dioxin	<0.38	<0.64	0.61	<0.54	25.9
123789-hexachlorodibenzo-p-dioxin	<0.27	<0.62	<0.49	<0.46	37.9
1234678-heptachlorodibenzo-p-dioxin	4.10	3.19	<3.45	<3.58	13.2
Octachlorodibenzo-p-dioxin	3.28	<1.38	4.00	<2.89	46.9
2378-tetrachlorodibenzofuran	<0.50	<0.50	<0.59	<0.53	10.0
12378-pentachlorodibenzofuran	0.55	<0.32	<0.53	<0.47	26.8
23478-pentachlorodibenzofuran	0.55	<0.31	<0.56	<0.47	30.0
123478-hexachlorodibenzofuran	<0.23	<0.18	0.34	<0.25	32.8
123678-hexachlorodibenzofuran	<0.23	<0.24	<0.34	<0.27	22.9
234678-hexachlorodibenzofuran	<0.22	<0.23	<0.25	<0.24	7.0
123789-hexachlorodibenzofuran	<0.54	0.52	0.56	<0.54	4.3
1234678-heptachlorodibenzofuran	<0.70	<0.66	0.74	<0.70	5.6
1234789-heptachlorodibenzofuran	<0.21	<0.25	<0.42	<0.29	38.6
Octachlorodibenzofuran	<0.37	<0.56	<0.72	<0.55	31.8
PCB 77	<27.9	<17.1	<9.11	<18.0	52.3
PCB 81	<10.8	<9.86	<9.76	<10.1	5.6
PCB 126	<8.88	<14.5	<6.51	<9.95	41.0
PCB 169	<4.82	<7.23	<7.81	<6.62	23.9
PCB 105	44.6	<22.3	<34.5	<33.8	33.0
PCB 114	<6.98	<9.86	<6.51	<7.78	23.3
PCB 118	118	<197	122	<146	30.5
PCB 123	<8.88	<15.8	<9.11	<11.3	34.8
PCB 156/157	<6.98	<10.5	<14.3	<10.6	34.6
PCB 167	<6.34	<7.89	<9.11	<7.78	17.8
PCB 189	<2.60	<2.50	<2.02	<2.37	13.1
Total Dioxins & Furans Only	<13.2	<10.9	<15.0	<13.0	15.8

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	<1.41	<1.20	<1.60	<1.40	14.2
12378-pentachlorodibenzo-p-dioxin	1.12	<0.87	1.15	<1.05	14.2
123478-hexachlorodibenzo-p-dioxin	<0.80	<2.03	<1.66	<1.50	42.4
123678-hexachlorodibenzo-p-dioxin	<1.20	<1.97	1.87	<1.68	25.1
123789-hexachlorodibenzo-p-dioxin	<0.86	<1.91	<1.52	<1.43	37.3
1234678-heptachlorodibenzo-p-dioxin	12.9	9.87	<10.6	<11.1	14.2
Octachlorodibenzo-p-dioxin	10.3	<4.27	12.3	<8.96	46.6
2378-tetrachlorodibenzofuran	<1.57	<1.55	<1.82	<1.65	9.1
12378-pentachlorodibenzofuran	1.72	<1.00	<1.62	<1.45	27.1
23478-pentachlorodibenzofuran	1.72	<0.96	<1.72	<1.47	30.1
123478-hexachlorodibenzofuran	<0.72	<0.57	1.06	<0.78	32.0
123678-hexachlorodibenzofuran	<0.72	<0.73	<1.04	<0.83	21.9
234678-hexachlorodibenzofuran	<0.70	<0.71	<0.78	<0.73	6.0
123789-hexachlorodibenzofuran	<1.69	1.60	1.73	<1.67	4.1
1234678-heptachlorodibenzofuran	<2.19	<2.03	2.26	<2.16	5.3
1234789-heptachlorodibenzofuran	<0.66	<0.77	<1.30	<0.91	37.6
Octachlorodibenzofuran	<1.16	<1.73	<2.20	<1.69	30.9
PCB 77	<87.6	<52.9	<28.0	<56.2	53.3
PCB 81	<33.9	<30.5	<30.0	<31.5	6.7
PCB 126	<27.9	<44.8	<20.0	<30.9	41.0
PCB 169	<15.1	<22.4	<24.0	<20.5	23.0
PCB 105	140	<69.2	<106	<105	33.8
PCB 114	<21.9	<30.5	<20.0	<24.1	23.2
PCB 118	371	<610	376	<452	30.3
PCB 123	<27.9	<48.8	<28.0	<34.9	34.6
PCB 156/157	<21.9	<32.6	<44.0	<32.8	33.6
PCB 167	<19.9	<24.4	<28.0	<24.1	16.8
PCB 189	<8.17	<7.73	<6.20	<7.37	14.0
Total Dioxins & Furans Only	<41.4	<33.8	<46.2	<40.5	15.5

* 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	<1.15	<1.00	<1.34	<1.16	14.7
12378-pentachlorodibenzo-p-dioxin	0.90	<0.73	0.96	<0.86	14.0
123478-hexachlorodibenzo-p-dioxin	<0.65	<1.69	<1.39	<1.24	43.3
123678-hexachlorodibenzo-p-dioxin	<0.97	<1.64	1.56	<1.39	26.4
123789-hexachlorodibenzo-p-dioxin	<0.69	<1.59	<1.27	<1.19	38.3
1234678-heptachlorodibenzo-p-dioxin	10.4	8.20	<8.87	<9.17	12.6
Octachlorodibenzo-p-dioxin	8.36	<3.55	10.3	<7.40	46.9
2378-tetrachlorodibenzofuran	<1.28	<1.29	<1.52	<1.36	10.3
12378-pentachlorodibenzofuran	1.39	<0.83	<1.36	<1.19	26.5
23478-pentachlorodibenzofuran	1.40	<0.79	<1.44	<1.21	29.8
123478-hexachlorodibenzofuran	<0.58	<0.47	0.89	<0.65	33.0
123678-hexachlorodibenzofuran	<0.58	<0.61	<0.87	<0.69	23.2
234678-hexachlorodibenzofuran	<0.57	<0.59	<0.65	<0.60	7.4
123789-hexachlorodibenzofuran	<1.37	1.33	1.44	<1.38	4.3
1234678-heptachlorodibenzofuran	<1.78	<1.69	1.89	<1.79	5.6
1234789-heptachlorodibenzofuran	<0.53	<0.64	<1.09	<0.75	39.0
Octachlorodibenzofuran	<0.94	<1.44	<1.84	<1.40	32.3
PCB 77	<71.0	<44.0	<23.4	<46.1	51.8
PCB 81	<27.4	<25.4	<25.1	<26.0	4.9
PCB 126	<22.6	<37.2	<16.7	<25.5	41.3
PCB 169	<12.3	<18.6	<20.1	<17.0	24.4
PCB 105	114	<57.5	<88.7	<86.6	32.5
PCB 114	<17.8	<25.4	<16.7	<20.0	23.6
PCB 118	300	<507	315	<374	30.9
PCB 123	<22.6	<40.6	<23.4	<28.9	35.2
PCB 156/157	<17.8	<27.1	<36.8	<27.2	35.0
PCB 167	<16.1	<20.3	<23.4	<20.0	18.3
PCB 189	<6.62	<6.43	<5.19	<6.08	12.8
Total Dioxins & Furans Only	<33.6	<28.1	<38.7	<33.4	15.9

* 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	<0.72	<0.61	<0.82	<0.72	14.4
12378-pentachlorodibenzo-p-dioxin	0.57	<0.45	0.59	<0.53	14.1
123478-hexachlorodibenzo-p-dioxin	<0.40	<1.04	<0.85	<0.76	42.7
123678-hexachlorodibenzo-p-dioxin	<0.61	<1.01	0.96	<0.86	25.6
123789-hexachlorodibenzo-p-dioxin	<0.43	<0.98	<0.78	<0.73	37.6
1234678-heptachlorodibenzo-p-dioxin	6.53	5.04	<5.43	<5.67	13.7
Octachlorodibenzo-p-dioxin	5.23	<2.18	6.30	<4.57	46.7
2378-tetrachlorodibenzofuran	<0.80	<0.79	<0.93	<0.84	9.5
12378-pentachlorodibenzofuran	0.87	<0.51	<0.83	<0.74	26.9
23478-pentachlorodibenzofuran	0.87	<0.49	<0.88	<0.75	30.0
123478-hexachlorodibenzofuran	<0.36	<0.29	0.54	<0.40	32.3
123678-hexachlorodibenzofuran	<0.36	<0.37	<0.53	<0.42	22.3
234678-hexachlorodibenzofuran	<0.35	<0.36	<0.40	<0.37	6.5
123789-hexachlorodibenzofuran	<0.86	0.81	0.88	<0.85	4.1
1234678-heptachlorodibenzofuran	<1.11	<1.04	1.16	<1.10	5.4
1234789-heptachlorodibenzofuran	<0.33	<0.40	<0.67	<0.46	38.1
Octachlorodibenzofuran	<0.59	<0.88	<1.13	<0.87	31.3
PCB 77	<44.4	<27.0	<14.3	<28.6	52.8
PCB 81	<17.2	<15.6	<15.4	<16.0	6.1
PCB 126	<14.1	<22.9	<10.2	<15.7	41.1
PCB 169	<7.67	<11.4	<12.3	<10.5	23.5
PCB 105	71.1	<35.3	<54.3	<53.6	33.4
PCB 114	<11.1	<15.6	<10.2	<12.3	23.3
PCB 118	188	<312	193	<231	30.5
PCB 123	<14.1	<24.9	<14.3	<17.8	34.7
PCB 156/157	<11.1	<16.6	<22.5	<16.8	34.1
PCB 167	<10.1	<12.5	<14.3	<12.3	17.3
PCB 189	<4.14	<3.95	<3.17	<3.75	13.6
Total Dioxins & Furans Only	<21.0	<17.3	<23.7	<20.6	15.6

* At 25°C and 1 atmosphere

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

TABLE 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	<0.026	<0.022	<0.030	<0.026	15.1
12378-pentachlorodibenzo-p-dioxin	0.021	<0.016	0.022	<0.020	14.5
123478-hexachlorodibenzo-p-dioxin	<0.015	<0.038	<0.032	<0.028	43.0
123678-hexachlorodibenzo-p-dioxin	<0.022	<0.037	0.035	<0.031	26.2
123789-hexachlorodibenzo-p-dioxin	<0.016	<0.036	<0.029	<0.027	37.9
1234678-heptachlorodibenzo-p-dioxin	0.24	0.18	<0.20	<0.21	12.9
Octachlorodibenzo-p-dioxin	0.19	<0.080	0.23	<0.17	47.2
2378-tetrachlorodibenzofuran	<0.029	<0.029	<0.035	<0.031	10.6
12378-pentachlorodibenzofuran	0.032	<0.019	<0.031	<0.027	26.9
23478-pentachlorodibenzofuran	0.032	<0.018	<0.033	<0.027	30.2
123478-hexachlorodibenzofuran	<0.013	<0.011	0.020	<0.015	33.4
123678-hexachlorodibenzofuran	<0.013	<0.014	<0.020	<0.016	23.5
234678-hexachlorodibenzofuran	<0.013	<0.013	<0.015	<0.014	7.6
123789-hexachlorodibenzofuran	<0.031	0.030	0.033	<0.031	4.7
1234678-heptachlorodibenzofuran	<0.040	<0.038	0.043	<0.040	6.0
1234789-heptachlorodibenzofuran	<0.012	<0.014	<0.025	<0.017	39.2
Octachlorodibenzofuran	<0.021	<0.032	<0.042	<0.032	32.3
PCB 77	<1.61	<0.99	<0.53	<1.04	51.9
PCB 81	<0.62	<0.57	<0.57	<0.59	5.2
PCB 126	<0.51	<0.84	<0.38	<0.58	40.8
PCB 169	<0.28	<0.42	<0.46	<0.38	24.3
PCB 105	2.58	<1.29	<2.01	<1.96	32.9
PCB 114	<0.40	<0.57	<0.38	<0.45	23.1
PCB 118	6.82	<11.4	7.14	<8.46	30.3
PCB 123	<0.51	<0.91	<0.53	<0.65	34.6
PCB 156/157	<0.40	<0.61	<0.84	<0.62	35.1
PCB 167	<0.37	<0.46	<0.53	<0.45	18.3
PCB 189	<0.15	<0.14	<0.12	<0.14	12.6
Total Dioxins & Furans Only	<0.76	<0.63	<0.88	<0.76	16.3

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

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

Specific Isomer	Actual Concentration	Dry Reference Concentration	Dry Adjusted Concentration	Wet Reference Concentration	Emission Rate
	pg/m³	pg/Rm³*	pg/Rm³**	pg/Rm³*	ng/s
2378-tetrachlorodibenzo-p-dioxin	<0.45	<1.40	<1.16	<0.72	<0.026
12378-pentachlorodibenzo-p-dioxin	<0.34	<1.05	<0.86	<0.53	<0.020
123478-hexachlorodibenzo-p-dioxin	<0.48	<1.50	<1.24	<0.76	<0.028
123678-hexachlorodibenzo-p-dioxin	<0.54	<1.68	<1.39	<0.86	<0.031
123789-hexachlorodibenzo-p-dioxin	<0.46	<1.43	<1.19	<0.73	<0.027
1234678-heptachlorodibenzo-p-dioxin	<3.58	<11.1	<9.17	<5.67	<0.21
Octachlorodibenzo-p-dioxin	<2.89	<8.96	<7.40	<4.57	<0.17
2378-tetrachlorodibenzofuran	<0.53	<1.65	<1.36	<0.84	<0.031
12378-pentachlorodibenzofuran	<0.47	<1.45	<1.19	<0.74	<0.027
23478-pentachlorodibenzofuran	<0.47	<1.47	<1.21	<0.75	<0.027
123478-hexachlorodibenzofuran	<0.25	<0.78	<0.65	<0.40	<0.015
123678-hexachlorodibenzofuran	<0.27	<0.83	<0.69	<0.42	<0.016
234678-hexachlorodibenzofuran	<0.24	<0.73	<0.60	<0.37	<0.014
123789-hexachlorodibenzofuran	<0.54	<1.67	<1.38	<0.85	<0.031
1234678-heptachlorodibenzofuran	<0.70	<2.16	<1.79	<1.10	<0.040
1234789-heptachlorodibenzofuran	<0.29	<0.91	<0.75	<0.46	<0.017
Octachlorodibenzofuran	<0.55	<1.69	<1.40	<0.87	<0.032
PCB 77	<18.0	<56.2	<46.1	<28.6	<1.04
PCB 81	<10.1	<31.5	<26.0	<16.0	<0.59
PCB 126	<9.95	<30.9	<25.5	<15.7	<0.58
PCB 169	<6.62	<20.5	<17.0	<10.5	<0.38
PCB 105	<33.8	<105	<86.6	<53.6	<1.96
PCB 114	<7.78	<24.1	<20.0	<12.3	<0.45
PCB 118	<146	<452	<374	<231	<8.46
PCB 123	<11.3	<34.9	<28.9	<17.8	<0.65
PCB 156/157	<10.6	<32.8	<27.2	<16.8	<0.62
PCB 167	<7.78	<24.1	<20.0	<12.3	<0.45
PCB 189	<2.37	<7.37	<6.08	<3.75	<0.14
Total Dioxins & Furans Only	<13.0	<40.5	<33.4	<20.6	<0.76

* 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	Laboratory Blank
	pg	pg
2378-tetrachlorodibenzo-p-dioxin	<2.4	<4.0
12378-pentachlorodibenzo-p-dioxin	<1.7	<3.3
123478-hexachlorodibenzo-p-dioxin	<2.4	<8.1
123678-hexachlorodibenzo-p-dioxin	<2.3	<7.6
123789-hexachlorodibenzo-p-dioxin	<2.2	<7.4
1234678-heptachlorodibenzo-p-dioxin	<4.2	<14
Octachlorodibenzo-p-dioxin	<7.1	<42
2378-tetrachlorodibenzofuran	<1.9	<2.4
12378-pentachlorodibenzofuran	<2.9	<3.4
23478-pentachlorodibenzofuran	<1.3	<2.7
123478-hexachlorodibenzofuran	<1.2	<4.9
123678-hexachlorodibenzofuran	<1.2	<4.9
234678-hexachlorodibenzofuran	<1.3	<5.1
123789-hexachlorodibenzofuran	<4.4	<5.6
1234678-heptachlorodibenzofuran	1.97	<7.6
1234789-heptachlorodibenzofuran	<2.1	<9.2
Octachlorodibenzofuran	6.77	<24
PCB 77	<80	<64
PCB 81	<77	<66
PCB 126	<90	<93
PCB 169	<42	<46
PCB 105	<92	<110
PCB 114	<79	<100
PCB 118	<130	<150
PCB 123	<100	<110
PCB 156/157	<65	<120
PCB 167	<49	<85
PCB 189	<34	<25
Total Dioxins & Furans Only	<47.3	<156

"<" 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	<0.45	<0.39	<0.52	<0.45
12378-pentachlorodibenzo-p-dioxin	0.500	0.18	<0.14	0.19	<0.17
123478-hexachlorodibenzo-p-dioxin	0.100	<0.025	<0.066	<0.054	<0.048
123678-hexachlorodibenzo-p-dioxin	0.100	<0.038	<0.064	0.061	<0.054
123789-hexachlorodibenzo-p-dioxin	0.100	<0.027	<0.062	<0.049	<0.046
1234678-heptachlorodibenzo-p-dioxin	0.010	0.041	0.032	<0.034	<0.036
Octachlorodibenzo-p-dioxin	0.001	0.0033	<0.0014	0.0040	<0.0029
2378-tetrachlorodibenzofuran	0.100	<0.050	<0.050	<0.059	<0.053
12378-pentachlorodibenzofuran	0.050	0.027	<0.016	<0.026	<0.023
23478-pentachlorodibenzofuran	0.500	0.27	<0.15	<0.28	<0.24
123478-hexachlorodibenzofuran	0.100	<0.023	<0.018	0.034	<0.025
123678-hexachlorodibenzofuran	0.100	<0.023	<0.024	<0.034	<0.027
234678-hexachlorodibenzofuran	0.100	<0.022	<0.023	<0.025	<0.024
123789-hexachlorodibenzofuran	0.100	<0.054	0.052	0.056	<0.054
1234678-heptachlorodibenzofuran	0.010	<0.0070	<0.0066	0.0074	<0.0070
1234789-heptachlorodibenzofuran	0.010	<0.0021	<0.0025	<0.0042	<0.0029
Octachlorodibenzofuran	0.001	<0.00037	<0.00056	<0.00072	<0.00055
PCB 77	0.0001	<0.0028	<0.0017	<0.00091	<0.0018
PCB 81	0.0003	<0.0032	<0.0030	<0.0029	<0.0030
PCB 126	0.1000	<0.89	<1.45	<0.65	<0.99
PCB 169	0.0300	<0.14	<0.22	<0.23	<0.20
PCB 105	0.00003	0.0013	<0.00067	<0.0010	<0.0010
PCB 114	0.00003	<0.00021	<0.00030	<0.00020	<0.00023
PCB 118	0.00003	0.0035	<0.0059	0.0037	<0.0044
PCB 123	0.00003	<0.00027	<0.00047	<0.00027	<0.00034
PCB 156/157	0.00003	<0.00021	<0.00032	<0.00043	<0.00032
PCB 167	0.00003	<0.00019	<0.00024	<0.00027	<0.00023
PCB 189	0.00003	<0.000078	<0.000075	<0.000061	<0.000071
Total Dioxins & Furans Only		<1.25	<1.10	<1.44	<1.26

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	<1.41	<1.20	<1.60	<1.40
12378-pentachlorodibenzo-p-dioxin	0.500	0.56	<0.44	0.57	<0.52
123478-hexachlorodibenzo-p-dioxin	0.100	<0.080	<0.20	<0.17	<0.15
123678-hexachlorodibenzo-p-dioxin	0.100	<0.12	<0.20	0.19	<0.17
123789-hexachlorodibenzo-p-dioxin	0.100	<0.086	<0.19	<0.15	<0.14
1234678-heptachlorodibenzo-p-dioxin	0.010	0.13	0.099	<0.11	<0.11
Octachlorodibenzo-p-dioxin	0.001	0.010	<0.0043	0.012	<0.0090
2378-tetrachlorodibenzofuran	0.100	<0.16	<0.15	<0.18	<0.16
12378-pentachlorodibenzofuran	0.050	0.086	<0.050	<0.081	<0.072
23478-pentachlorodibenzofuran	0.500	0.86	<0.48	<0.86	<0.73
123478-hexachlorodibenzofuran	0.100	<0.072	<0.057	0.11	<0.078
123678-hexachlorodibenzofuran	0.100	<0.072	<0.073	<0.10	<0.083
234678-hexachlorodibenzofuran	0.100	<0.070	<0.071	<0.078	<0.073
123789-hexachlorodibenzofuran	0.100	<0.17	0.16	0.17	<0.17
1234678-heptachlorodibenzofuran	0.010	<0.022	<0.020	0.023	<0.022
1234789-heptachlorodibenzofuran	0.010	<0.0066	<0.0077	<0.013	<0.0091
Octachlorodibenzofuran	0.001	<0.0012	<0.0017	<0.0022	<0.0017
PCB 77	0.0001	<0.0088	<0.0053	<0.0028	<0.0056
PCB 81	0.0003	<0.010	<0.0092	<0.0090	<0.0094
PCB 126	0.1000	<2.79	<4.48	<2.00	<3.09
PCB 169	0.0300	<0.45	<0.67	<0.72	<0.62
PCB 105	0.00003	0.0042	<0.0021	<0.0032	<0.0032
PCB 114	0.00003	<0.00066	<0.00092	<0.00060	<0.00072
PCB 118	0.00003	0.011	<0.018	0.011	<0.014
PCB 123	0.00003	<0.00084	<0.0015	<0.00084	<0.0010
PCB 156/157	0.00003	<0.00066	<0.00098	<0.0013	<0.00098
PCB 167	0.00003	<0.00060	<0.00073	<0.00084	<0.00072
PCB 189	0.00003	<0.00025	<0.00023	<0.00019	<0.00022
Total Dioxins & Furans Only		<3.91	<3.41	<4.42	<3.91

* 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	<1.15	<1.00	<1.34	<1.16
12378-pentachlorodibenzo-p-dioxin	0.500	0.45	<0.36	0.48	<0.43
123478-hexachlorodibenzo-p-dioxin	0.100	<0.065	<0.17	<0.14	<0.12
123678-hexachlorodibenzo-p-dioxin	0.100	<0.097	<0.16	0.16	<0.14
123789-hexachlorodibenzo-p-dioxin	0.100	<0.069	<0.16	<0.13	<0.12
1234678-heptachlorodibenzo-p-dioxin	0.010	0.10	0.082	<0.089	<0.092
Octachlorodibenzo-p-dioxin	0.001	0.0084	<0.0036	0.010	<0.0074
2378-tetrachlorodibenzofuran	0.100	<0.13	<0.13	<0.15	<0.14
12378-pentachlorodibenzofuran	0.050	0.070	<0.041	<0.068	<0.060
23478-pentachlorodibenzofuran	0.500	0.70	<0.40	<0.72	<0.60
123478-hexachlorodibenzofuran	0.100	<0.058	<0.047	0.089	<0.065
123678-hexachlorodibenzofuran	0.100	<0.058	<0.061	<0.087	<0.069
234678-hexachlorodibenzofuran	0.100	<0.057	<0.059	<0.065	<0.060
123789-hexachlorodibenzofuran	0.100	<0.14	0.13	0.14	<0.14
1234678-heptachlorodibenzofuran	0.010	<0.018	<0.017	0.019	<0.018
1234789-heptachlorodibenzofuran	0.010	<0.0053	<0.0064	<0.011	<0.0075
Octachlorodibenzofuran	0.001	<0.00094	<0.0014	<0.0018	<0.0014
PCB 77	0.0001	<0.0071	<0.0044	<0.00234	<0.0046
PCB 81	0.0003	<0.0082	<0.0076	<0.0075	<0.0078
PCB 126	0.1000	<2.26	<3.72	<1.67	<2.55
PCB 169	0.0300	<0.37	<0.56	<0.60	<0.51
PCB 105	0.00003	0.0034	<0.0017	<0.0027	<0.0026
PCB 114	0.00003	<0.00053	<0.00076	<0.00050	<0.00060
PCB 118	0.00003	0.0090	<0.015	0.0094	<0.011
PCB 123	0.00003	<0.00068	<0.0012	<0.00070	<0.00087
PCB 156/157	0.00003	<0.00053	<0.00081	<0.0011	<0.00082
PCB 167	0.00003	<0.00048	<0.00061	<0.00070	<0.00060
PCB 189	0.00003	<0.00020	<0.00019	<0.00016	<0.00018
Total Dioxins & Furans Only		<3.17	<2.83	<3.70	<3.23

* 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	<0.72	<0.61	<0.82	<0.72
12378-pentachlorodibenzo-p-dioxin	0.500	0.28	<0.22	0.29	<0.27
123478-hexachlorodibenzo-p-dioxin	0.100	<0.040	<0.10	<0.085	<0.076
123678-hexachlorodibenzo-p-dioxin	0.100	<0.061	<0.10	0.096	<0.086
123789-hexachlorodibenzo-p-dioxin	0.100	<0.043	<0.098	<0.078	<0.073
1234678-heptachlorodibenzo-p-dioxin	0.010	0.065	0.050	<0.054	<0.057
Octachlorodibenzo-p-dioxin	0.001	0.0052	<0.0022	0.0063	<0.0046
2378-tetrachlorodibenzofuran	0.100	<0.080	<0.079	<0.093	<0.084
12378-pentachlorodibenzofuran	0.050	0.044	<0.025	<0.041	<0.037
23478-pentachlorodibenzofuran	0.500	0.44	<0.24	<0.44	<0.37
123478-hexachlorodibenzofuran	0.100	<0.036	<0.029	0.054	<0.040
123678-hexachlorodibenzofuran	0.100	<0.036	<0.037	<0.053	<0.042
234678-hexachlorodibenzofuran	0.100	<0.035	<0.036	<0.040	<0.037
123789-hexachlorodibenzofuran	0.100	<0.086	0.081	0.088	<0.085
1234678-heptachlorodibenzofuran	0.010	<0.011	<0.010	0.012	<0.011
1234789-heptachlorodibenzofuran	0.010	<0.0033	<0.0040	<0.0067	<0.0046
Octachlorodibenzofuran	0.001	<0.00059	<0.00088	<0.0011	<0.00087
PCB 77	0.0001	<0.0044	<0.0027	<0.0014	<0.0029
PCB 81	0.0003	<0.0051	<0.0047	<0.0046	<0.0048
PCB 126	0.1000	<1.41	<2.29	<1.02	<1.57
PCB 169	0.0300	<0.23	<0.34	<0.37	<0.31
PCB 105	0.00003	0.0021	<0.0011	<0.0016	<0.0016
PCB 114	0.00003	<0.00033	<0.00047	<0.00031	<0.00037
PCB 118	0.00003	0.0056	<0.0094	0.0058	<0.0069
PCB 123	0.00003	<0.00042	<0.00075	<0.00043	<0.00053
PCB 156/157	0.00003	<0.00033	<0.00050	<0.00068	<0.00050
PCB 167	0.00003	<0.00030	<0.00037	<0.00043	<0.00037
PCB 189	0.00003	<0.00012	<0.00012	<0.000095	<0.00011
Total Dioxins & Furans Only		<1.98	<1.74	<2.26	<2.00

* 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	<0.026	<0.022	<0.030	<0.026
12378-pentachlorodibenzo-p-dioxin	0.500	0.010	<0.0082	0.011	<0.0098
123478-hexachlorodibenzo-p-dioxin	0.100	<0.0015	<0.0038	<0.0032	<0.0028
123678-hexachlorodibenzo-p-dioxin	0.100	<0.0022	<0.0037	0.0035	<0.0031
123789-hexachlorodibenzo-p-dioxin	0.100	<0.0016	<0.0036	<0.0029	<0.0027
1234678-heptachlorodibenzo-p-dioxin	0.010	0.0024	0.0018	<0.0020	<0.0021
Octachlorodibenzo-p-dioxin	0.001	0.00019	<0.000080	0.00023	<0.00017
2378-tetrachlorodibenzofuran	0.100	<0.0029	<0.0029	<0.0035	<0.0031
12378-pentachlorodibenzofuran	0.050	0.0016	<0.00093	<0.0015	<0.0014
23478-pentachlorodibenzofuran	0.500	0.016	<0.0089	<0.016	<0.014
123478-hexachlorodibenzofuran	0.100	<0.0013	<0.0011	0.0020	<0.0015
123678-hexachlorodibenzofuran	0.100	<0.0013	<0.0014	<0.0020	<0.0016
234678-hexachlorodibenzofuran	0.100	<0.0013	<0.0013	<0.0015	<0.0014
123789-hexachlorodibenzofuran	0.100	<0.0031	0.0030	0.0033	<0.0031
1234678-heptachlorodibenzofuran	0.010	<0.00040	<0.00038	0.00043	<0.00040
1234789-heptachlorodibenzofuran	0.010	<0.00012	<0.00014	<0.00025	<0.00017
Octachlorodibenzofuran	0.001	<0.000021	<0.000032	<0.000042	<0.000032
PCB 77	0.0001	<0.00016	<0.000099	<0.000053	<0.00010
PCB 81	0.0003	<0.00019	<0.00017	<0.00017	<0.00018
PCB 126	0.1000	<0.051	<0.084	<0.038	<0.058
PCB 169	0.0300	<0.0084	<0.013	<0.014	<0.012
PCB 105	0.00003	0.000077	<0.000039	<0.000060	<0.000059
PCB 114	0.00003	<0.000012	<0.000017	<0.000011	<0.000014
PCB 118	0.00003	0.00020	<0.00034	0.00021	<0.00025
PCB 123	0.00003	<0.000015	<0.000027	<0.000016	<0.000020
PCB 156/157	0.00003	<0.000012	<0.000018	<0.000025	<0.000018
PCB 167	0.00003	<0.000011	<0.000014	<0.000016	<0.000014
PCB 189	0.00003	<0.0000045	<0.0000043	<0.0000035	<0.0000041
Total Dioxins & Furans Only		<0.072	<0.064	<0.084	<0.073

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	<0.45	<1.40	<1.16	<0.72	<0.026
12378-pentachlorodibenzo-p-dioxin	<0.17	<0.52	<0.43	<0.27	<0.0098
123478-hexachlorodibenzo-p-dioxin	<0.048	<0.15	<0.12	<0.076	<0.0028
123678-hexachlorodibenzo-p-dioxin	<0.054	<0.17	<0.14	<0.086	<0.0031
123789-hexachlorodibenzo-p-dioxin	<0.046	<0.14	<0.12	<0.073	<0.0027
1234678-heptachlorodibenzo-p-dioxin	<0.036	<0.11	<0.092	<0.057	<0.0021
Octachlorodibenzo-p-dioxin	<0.0029	<0.0090	<0.0074	<0.0046	<0.00017
2378-tetrachlorodibenzofuran	<0.053	<0.16	<0.14	<0.084	<0.0031
12378-pentachlorodibenzofuran	<0.023	<0.072	<0.060	<0.037	<0.0014
23478-pentachlorodibenzofuran	<0.24	<0.73	<0.60	<0.37	<0.014
123478-hexachlorodibenzofuran	<0.025	<0.078	<0.065	<0.040	<0.0015
123678-hexachlorodibenzofuran	<0.027	<0.083	<0.069	<0.042	<0.0016
234678-hexachlorodibenzofuran	<0.024	<0.073	<0.060	<0.037	<0.0014
123789-hexachlorodibenzofuran	<0.054	<0.17	<0.14	<0.085	<0.0031
1234678-heptachlorodibenzofuran	<0.0070	<0.022	<0.018	<0.011	<0.00040
1234789-heptachlorodibenzofuran	<0.0029	<0.0091	<0.0075	<0.0046	<0.00017
Octachlorodibenzofuran	<0.00055	<0.0017	<0.0014	<0.00087	<0.000032
PCB 77	<0.0018	<0.0056	<0.0046	<0.0029	<0.00010
PCB 81	<0.0030	<0.0094	<0.0078	<0.0048	<0.00018
PCB 126	<0.99	<3.09	<2.55	<1.57	<0.058
PCB 169	<0.20	<0.62	<0.51	<0.31	<0.012
PCB 105	<0.0010	<0.0032	<0.0026	<0.0016	<0.000059
PCB 114	<0.00023	<0.00072	<0.00060	<0.00037	<0.000014
PCB 118	<0.0044	<0.014	<0.011	<0.0069	<0.00025
PCB 123	<0.00034	<0.0010	<0.00087	<0.00053	<0.000020
PCB 156/157	<0.00032	<0.00098	<0.00082	<0.00050	<0.000018
PCB 167	<0.00023	<0.00072	<0.00060	<0.00037	<0.000014
PCB 189	<0.000071	<0.00022	<0.00018	<0.00011	<0.0000041
Total Dioxins & Furans Only	<1.26	<3.91	<3.23	<2.00	<0.073

* 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	0.23	0.70	0.58	0.36	0.013
12378-pentachlorodibenzo-p-dioxin	0.29	0.90	0.74	0.46	0.017
123478-hexachlorodibenzo-p-dioxin	0.024	0.075	0.062	0.038	0.0014
123678-hexachlorodibenzo-p-dioxin	0.037	0.12	0.096	0.059	0.0022
123789-hexachlorodibenzo-p-dioxin	0.023	0.071	0.059	0.036	0.0013
1234678-heptachlorodibenzo-p-dioxin	0.030	0.094	0.077	0.048	0.0017
Octachlorodibenzo-p-dioxin	0.00080	0.0025	0.0020	0.0013	0.000046
2378-tetrachlorodibenzofuran	0.027	0.082	0.068	0.042	0.0015
12378-pentachlorodibenzofuran	0.0097	0.030	0.025	0.015	0.00056
23478-pentachlorodibenzofuran	0.098	0.31	0.25	0.16	0.0057
123478-hexachlorodibenzofuran	0.018	0.057	0.047	0.029	0.0011
123678-hexachlorodibenzofuran	0.013	0.041	0.034	0.021	0.00078
234678-hexachlorodibenzofuran	0.012	0.036	0.030	0.019	0.00068
123789-hexachlorodibenzofuran	0.045	0.14	0.12	0.071	0.0026
1234678-heptachlorodibenzofuran	0.0047	0.015	0.012	0.0074	0.00027
1234789-heptachlorodibenzofuran	0.0015	0.0046	0.0038	0.0023	0.000085
Octachlorodibenzofuran	0.000082	0.00025	0.00021	0.00013	0.0000048
PCB 77	0.00090	0.0028	0.0023	0.0014	0.000052
PCB 81	0.0015	0.0047	0.0039	0.0024	0.000088
PCB 126	0.50	1.54	1.28	0.79	0.029
PCB 169	0.099	0.31	0.25	0.16	0.0058
PCB 105	0.00073	0.0023	0.0019	0.0012	0.000042
PCB 114	0.00012	0.00036	0.00030	0.00018	0.0000068
PCB 118	0.0034	0.011	0.0087	0.0054	0.00020
PCB 123	0.00017	0.00052	0.00043	0.00027	0.0000098
PCB 156/157	0.00016	0.00049	0.00041	0.00025	0.0000092
PCB 167	0.00012	0.00036	0.00030	0.00018	0.0000068
PCB 189	0.000036	0.00011	0.000091	0.000056	0.0000021
Total Dioxins & Furans Only	0.86	2.67	2.21	1.36	0.050
Total Dioxins, Furans and PCBs	1.46	4.54	3.75	2.32	0.085

* 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	8480	0.54	1.69	1.37	0.86	0.031
Trichlorinated biphenyls	3220	0.20	0.64	0.52	0.33	0.012
Tetrachlorinated biphenyls	21800	1.38	4.34	3.52	2.20	0.080
Pentachlorinated biphenyls	22000	1.40	4.38	3.55	2.22	0.081
Hexachlorinated biphenyls	3480	0.22	0.69	0.56	0.35	0.013
Heptachlorinated biphenyls	<41	<0.0026	<0.0082	<0.0066	<0.0041	<0.00015
Octachlorinated biphenyls	<30	<0.0019	<0.0060	<0.0048	<0.0030	<0.00011
Nonachlorinated biphenyls	<80	<0.0051	<0.016	<0.013	<0.0081	<0.00029
Decachlorinated biphenyl	150	0.0095	0.030	0.024	0.015	0.00055
Total	<59281	<3.76	<11.8	<9.57	<5.99	<0.22

Dry Gas Volume Sampled (Rm^3*) :	5.020
Actual Flowrate (m^3/s) :	57.8
Dry Reference Flowrate (Rm^3/s*) :	18.4
Dry Adjusted Flowrate (Rm^3/s**) :	22.7
Wet Reference Flowrate (Rm^3/s*) :	36.3

* 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 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	8220	0.54	1.67	1.39	0.85	0.031
Trichlorinated biphenyls	1780	0.12	0.36	0.30	0.19	0.0068
Tetrachlorinated biphenyls	21700	1.43	4.42	3.67	2.26	0.083
Pentachlorinated biphenyls	24500	1.61	4.98	4.14	2.55	0.093
Hexachlorinated biphenyls	3560	0.23	0.72	0.60	0.37	0.014
Heptachlorinated biphenyls	<38	<0.0025	<0.0077	<0.0064	<0.0040	<0.00014
Octachlorinated biphenyls	<19	<0.0012	<0.0039	<0.0032	<0.0020	<0.000072
Nonachlorinated biphenyls	<91	<0.0060	<0.019	<0.015	<0.0095	<0.00035
Decachlorinated biphenyl	<41	<0.0027	<0.0083	<0.0069	<0.0043	<0.00016
Total	<59949	<3.94	<12.2	<10.1	<6.23	<0.23

Dry Gas Volume Sampled (Rm^3*) :	4.915
Actual Flowrate (m^3/s) :	57.9
Dry Reference Flowrate (Rm^3/s*) :	18.7
Dry Adjusted Flowrate (Rm^3/s**) :	22.5
Wet Reference Flowrate (Rm^3/s*) :	36.6

* At 25°C and 1 atmosphere

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

Note: "<" indicates that the analyte was not detected (was less than the analytical detection limit), and the value of the detection limit was used to calculate the emission data.

TABLE 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	5300	0.34	1.06	0.89	0.54	0.020
Trichlorinated biphenyls	2940	0.19	0.59	0.49	0.30	0.011
Tetrachlorinated biphenyls	15200	0.99	3.04	2.54	1.56	0.058
Pentachlorinated biphenyls	18600	1.21	3.72	3.11	1.90	0.071
Hexachlorinated biphenyls	3370	0.22	0.67	0.56	0.35	0.013
Heptachlorinated biphenyls	<31	<0.0020	<0.0062	<0.0052	<0.0032	<0.00012
Octachlorinated biphenyls	<12	<0.00078	<0.0024	<0.0020	<0.0012	<0.000046
Nonachlorinated biphenyls	<70	<0.0046	<0.014	<0.012	<0.0072	<0.00027
Decachlorinated biphenyl	251	0.016	0.050	0.042	0.026	0.00095
Total	<45774	<2.98	<9.15	<7.66	<4.69	<0.17

Dry Gas Volume Sampled (Rm^3*) :	5.001
Actual Flowrate (m^3/s) :	58.4
Dry Reference Flowrate (Rm^3/s*) :	19.0
Dry Adjusted Flowrate (Rm^3/s**) :	22.7
Wet Reference Flowrate (Rm^3/s*) :	37.1

* 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 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	0.54	0.54	0.34	0.47	23.6
Trichlorinated biphenyls	0.20	0.12	0.19	0.17	27.6
Tetrachlorinated biphenyls	1.38	1.43	0.99	1.27	19.0
Pentachlorinated biphenyls	1.40	1.61	1.21	1.41	14.2
Hexachlorinated biphenyls	0.22	0.23	0.22	0.22	3.6
Heptachlorinated biphenyls	<0.0026	<0.0025	<0.0020	<0.0024	13.1
Octachlorinated biphenyls	<0.0019	<0.0012	<0.00078	<0.0013	43.0
Nonachlorinated biphenyls	<0.0051	<0.0060	<0.0046	<0.0052	13.9
Decachlorinated biphenyl	0.0095	<0.0027	0.016	<0.0095	71.7
Total	<3.76	<3.94	<2.98	<3.56	14.4

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	1.69	1.67	1.06	1.47	24.3
Trichlorinated biphenyls	0.64	0.36	0.59	0.53	27.9
Tetrachlorinated biphenyls	4.34	4.42	3.04	3.93	19.7
Pentachlorinated biphenyls	4.38	4.98	3.72	4.36	14.5
Hexachlorinated biphenyls	0.69	0.72	0.67	0.70	3.7
Heptachlorinated biphenyls	<0.0082	<0.0077	<0.0062	<0.0074	14.0
Octachlorinated biphenyls	<0.0060	<0.0039	<0.0024	<0.0041	44.1
Nonachlorinated biphenyls	<0.016	<0.019	<0.014	<0.016	14.0
Decachlorinated biphenyl	0.030	<0.0083	0.050	<0.029	71.0
Total	<11.8	<12.2	<9.15	<11.1	15.0

* 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	1.37	1.39	0.89	1.22	23.4
Trichlorinated biphenyls	0.52	0.30	0.49	0.44	27.2
Tetrachlorinated biphenyls	3.52	3.67	2.54	3.24	18.8
Pentachlorinated biphenyls	3.55	4.14	3.11	3.60	14.3
Hexachlorinated biphenyls	0.56	0.60	0.56	0.58	3.9
Heptachlorinated biphenyls	<0.0066	<0.0064	<0.0052	<0.0061	12.8
Octachlorinated biphenyls	<0.0048	<0.0032	<0.0020	<0.0034	42.4
Nonachlorinated biphenyls	<0.013	<0.015	<0.012	<0.013	14.0
Decachlorinated biphenyl	0.024	<0.0069	0.042	<0.0244	71.9
Total	<9.57	<10.1	<7.66	<9.12	14.2

* 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	0.86	0.85	0.54	0.75	24.0
Trichlorinated biphenyls	0.33	0.19	0.30	0.27	27.7
Tetrachlorinated biphenyls	2.20	2.26	1.56	2.00	19.4
Pentachlorinated biphenyls	2.22	2.55	1.90	2.22	14.4
Hexachlorinated biphenyls	0.35	0.37	0.35	0.36	3.7
Heptachlorinated biphenyls	<0.0041	<0.0040	<0.0032	<0.0038	13.6
Octachlorinated biphenyls	<0.0030	<0.0020	<0.0012	<0.0021	43.5
Nonachlorinated biphenyls	<0.0081	<0.0095	<0.0072	<0.0082	14.0
Decachlorinated biphenyl	0.015	<0.0043	0.026	<0.015	71.3
Total	<5.99	<6.23	<4.69	<5.64	14.7

* At 25°C and 1 atmosphere

TABLE 69
Clean Harbors Sarnia
Polychlorinated Biphenyl Emission Rates

Congener Group	Emission Rate				Coefficient of Variation
	Test No. 1 µg/s	Test No. 2 µg/s	Test No. 3 µg/s	Average µg/s	%
Dichlorinated biphenyls	0.031	0.031	0.020	0.027	23.2
Trichlorinated biphenyls	0.012	0.0068	0.011	0.0099	27.6
Tetrachlorinated biphenyls	0.080	0.083	0.058	0.073	18.6
Pentachlorinated biphenyls	0.081	0.093	0.071	0.082	13.9
Hexachlorinated biphenyls	0.013	0.014	0.013	0.013	3.4
Heptachlorinated biphenyls	<0.00015	<0.00014	<0.00012	<0.00014	12.6
Octachlorinated biphenyls	<0.00011	<0.000072	<0.000046	<0.000076	42.6
Nonachlorinated biphenyls	<0.00029	<0.00035	<0.00027	<0.00030	13.5
Decachlorinated biphenyl	0.00055	<0.00016	0.00095	<0.00055	72.1
Total	<0.22	<0.23	<0.17	<0.21	13.9

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	0.47	1.47	1.22	0.75	0.027
Trichlorinated biphenyls	0.17	0.53	0.44	0.27	0.0099
Tetrachlorinated biphenyls	1.27	3.93	3.24	2.00	0.073
Pentachlorinated biphenyls	1.41	4.36	3.60	2.22	0.082
Hexachlorinated biphenyls	0.22	0.70	0.58	0.36	0.013
Heptachlorinated biphenyls	<0.0024	<0.0074	<0.0061	<0.0038	<0.00014
Octachlorinated biphenyls	<0.0013	<0.0041	<0.0034	<0.0021	<0.000076
Nonachlorinated biphenyls	<0.0052	<0.016	<0.013	<0.0082	<0.00030
Decachlorinated biphenyl	<0.0095	<0.029	<0.024	<0.015	<0.00055
Total	<3.56	<11.1	<9.12	<5.64	<0.21

* 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	3720	1100
Trichlorinated biphenyls	<54	<59
Tetrachlorinated biphenyls	<54	<46
Pentachlorinated biphenyls	<79	<89
Hexachlorinated biphenyls	<42	<46
Heptachlorinated biphenyls	<34	<25
Octachlorinated biphenyls	<39	<47
Nonachlorinated biphenyls	<45	<77
Decachlorinated biphenyl	<24	81
Total	<4091	<1570

"<" 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	1710	108	341	276	173	6.27
1,4-Dichlorobenzene	1120	71.0	223	181	113	4.11
1,2-Dichlorobenzene	4540	288	904	733	458	16.6
Total Dichlorobenzene	7370	467	1468	1190	744	27.0
1,3,5-trichlorobenzene	227	14.4	45.2	36.7	22.9	0.83
1,2,4-trichlorobenzene	911	57.8	181	147	92.0	3.34
1,2,3-trichlorobenzene	920	58.3	183	149	92.9	3.37
Total Trichlorobenzene	2058	131	410	332	208	7.54
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	473	30.0	94.2	76.4	47.8	1.73
1,2,3,4-tetrachlorobenzene	171	10.8	34.1	27.6	17.3	0.63
Total Tetrachlorobenzene	644	40.8	128	104	65.0	2.36
Pentachlorobenzene	56.2	3.56	11.2	9.07	5.67	0.21
Hexachlorobenzene	<16	<1.01	<3.19	<2.58	<1.62	<0.059
Total Chlorobenzenes	<10144	<643	<2021	<1638	<1024	<37.2
Hexachloroethane	<16	<1.01	<3.19	<2.58	<1.62	<0.059
a,2,6-Trichlorotoluene	<16	<1.01	<3.19	<2.58	<1.62	<0.059

Dry Gas Volume Sampled (Rm^3*) :	5.020
Actual Flowrate (m^3/s) :	57.8
Dry Reference Flowrate (Rm^3/s*) :	18.4
Dry Adjusted Flowrate (Rm^3/s**) :	22.7
Wet Reference Flowrate (Rm^3/s*) :	36.3

* 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	2000	131	407	338	208	7.61
1,4-Dichlorobenzene	999	65.6	203	169	104	3.80
1,2-Dichlorobenzene	3510	231	714	594	365	13.4
Total Dichlorobenzene	6509	428	1324	1101	677	24.8
1,3,5-trichlorobenzene	310	20.4	63.1	52.4	32.2	1.18
1,2,4-trichlorobenzene	1000	65.7	203	169	104	3.80
1,2,3-trichlorobenzene	592	38.9	120	100	61.5	2.25
Total Trichlorobenzene	1902	125	387	322	198	7.24
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	613	40.3	125	104	63.7	2.33
1,2,3,4-tetrachlorobenzene	203	13.3	41.3	34.3	21.1	0.77
Total Tetrachlorobenzene	816	53.6	166	138	84.8	3.10
Pentachlorobenzene	50.2	3.30	10.2	8.49	5.22	0.19
Hexachlorobenzene	<16	<1.05	<3.26	<2.71	<1.66	<0.061
Total Chlorobenzenes	<9293	<611	<1891	<1571	<966	<35.4
Hexachloroethane	<16	<1.05	<3.26	<2.71	<1.66	<0.061
a,2,6-Trichlorotoluene	<16	<1.05	<3.26	<2.71	<1.66	<0.061

Dry Gas Volume Sampled (Rm^3*) :	4.915
Actual Flowrate (m^3/s) :	57.9
Dry Reference Flowrate (Rm^3/s*) :	18.7
Dry Adjusted Flowrate (Rm^3/s**) :	22.5
Wet Reference Flowrate (Rm^3/s*) :	36.6

* At 25°C and 1 atmosphere

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

Note: "<" indicates that the analyte was not detected (was less than the analytical detection limit), and the value of the detection limit was used to calculate the emission data.

TABLE 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	1850	120	370	310	189	7.03
1,4-Dichlorobenzene	1220	79.4	244	204	125	4.64
1,2-Dichlorobenzene	3200	208	640	536	328	12.2
Total Dichlorobenzene	6270	408	1254	1049	642	23.8
1,3,5-trichlorobenzene	263	17.1	52.6	44.0	26.9	1.00
1,2,4-trichlorobenzene	1050	68.3	210	176	108	3.99
1,2,3-trichlorobenzene	577	37.5	115	96.6	59.1	2.19
Total Trichlorobenzene	1890	123	378	316	194	7.18
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	724	47.1	145	121	74.1	2.75
1,2,3,4-tetrachlorobenzene	222	14.4	44.4	37.2	22.7	0.84
Total Tetrachlorobenzene	946	61.5	189	158	96.9	3.59
Pentachlorobenzene	78.8	5.13	15.8	13.2	8.07	0.30
Hexachlorobenzene	<16	<1.04	<3.20	<2.68	<1.64	<0.061
Total Chlorobenzenes	<9201	<599	<1840	<1540	<942	<35.0
Hexachloroethane	<16	<1.04	<3.20	<2.68	<1.64	<0.061
a,2,6-Trichlorotoluene	<16	<1.04	<3.20	<2.68	<1.64	<0.061

Dry Gas Volume Sampled (Rm^3*) :	5.001
Actual Flowrate (m^3/s) :	58.4
Dry Reference Flowrate (Rm^3/s*) :	19.0
Dry Adjusted Flowrate (Rm^3/s**) :	22.7
Wet Reference Flowrate (Rm^3/s*) :	37.1

* 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 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	108	131	120	120	9.6
1,4-Dichlorobenzene	71.0	65.6	79.4	72.0	9.6
1,2-Dichlorobenzene	288	231	208	242	17.0
Total Dichlorobenzene	467	428	408	434	7.0
1,3,5-trichlorobenzene	14.4	20.4	17.1	17.3	17.3
1,2,4-trichlorobenzene	57.8	65.7	68.3	63.9	8.6
1,2,3-trichlorobenzene	58.3	38.9	37.5	44.9	25.9
Total Trichlorobenzene	131	125	123	126	3.1
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	30.0	40.3	47.1	39.1	22.0
1,2,3,4-tetrachlorobenzene	10.8	13.3	14.4	12.9	14.3
Total Tetrachlorobenzene	40.8	53.6	61.5	52.0	20.1
Pentachlorobenzene	3.56	3.30	5.13	4.00	24.7
Hexachlorobenzene	<1.01	<1.05	<1.04	<1.04	1.8
Total Chlorobenzenes	<643	<611	<599	<618	3.7
Hexachloroethane	<1.01	<1.05	<1.04	<1.04	1.8
a,2,6-Trichlorotoluene	<1.01	<1.05	<1.04	<1.04	1.8

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	341	407	370	372	8.9
1,4-Dichlorobenzene	223	203	244	223	9.1
1,2-Dichlorobenzene	904	714	640	753	18.1
Total Dichlorobenzene	1468	1324	1254	1349	8.1
1,3,5-trichlorobenzene	45.2	63.1	52.6	53.6	16.7
1,2,4-trichlorobenzene	181	203	210	198	7.5
1,2,3-trichlorobenzene	183	120	115	140	27.1
Total Trichlorobenzene	410	387	378	392	4.2
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	94.2	125	145	121	21.0
1,2,3,4-tetrachlorobenzene	34.1	41.3	44.4	39.9	13.3
Total Tetrachlorobenzene	128	166	189	161	19.1
Pentachlorobenzene	11.2	10.2	15.8	12.4	23.9
Hexachlorobenzene	<3.19	<3.26	<3.20	<3.21	1.1
Total Chlorobenzenes	<2021	<1891	<1840	<1917	4.9
Hexachloroethane	<3.19	<3.26	<3.20	<3.21	1.1
a,2,6-Trichlorotoluene	<3.19	<3.26	<3.20	<3.21	1.1

* 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	276	338	310	308	10.1
1,4-Dichlorobenzene	181	169	204	185	9.7
1,2-Dichlorobenzene	733	594	536	621	16.4
Total Dichlorobenzene	1190	1101	1049	1113	6.4
1,3,5-trichlorobenzene	36.7	52.4	44.0	44.4	17.8
1,2,4-trichlorobenzene	147	169	176	164	9.1
1,2,3-trichlorobenzene	149	100	96.6	115.1	25.2
Total Trichlorobenzene	332	322	316	323	2.5
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	76.4	104	121	100	22.5
1,2,3,4-tetrachlorobenzene	27.6	34.3	37.2	33.0	14.8
Total Tetrachlorobenzene	104	138	158	133	20.6
Pentachlorobenzene	9.07	8.49	13.2	10.3	25.0
Hexachlorobenzene	<2.58	<2.71	<2.68	<2.66	2.4
Total Chlorobenzenes	<1638	<1571	<1540	<1583	3.2
Hexachloroethane	<2.58	<2.71	<2.68	<2.66	2.4
a,2,6-Trichlorotoluene	<2.58	<2.71	<2.68	<2.66	2.4

* 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	173	208	189	190	9.3
1,4-Dichlorobenzene	113	104	125	114	9.3
1,2-Dichlorobenzene	458	365	328	384	17.6
Total Dichlorobenzene	744	677	642	688	7.6
1,3,5-trichlorobenzene	22.9	32.2	26.9	27.4	17.1
1,2,4-trichlorobenzene	92.0	104	108	101	8.0
1,2,3-trichlorobenzene	92.9	61.5	59.1	71.2	26.5
Total Trichlorobenzene	208	198	194	200	3.7
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	47.8	63.7	74.1	61.9	21.5
1,2,3,4-tetrachlorobenzene	17.3	21.1	22.7	20.4	13.8
Total Tetrachlorobenzene	65.0	84.8	96.9	82.2	19.6
Pentachlorobenzene	5.67	5.22	8.07	6.32	24.2
Hexachlorobenzene	<1.62	<1.66	<1.64	<1.64	1.5
Total Chlorobenzenes	<1024	<966	<942	<978	4.3
Hexachloroethane	<1.62	<1.66	<1.64	<1.64	1.5
a,2,6-Trichlorotoluene	<1.62	<1.66	<1.64	<1.64	1.5

* 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	6.27	7.61	7.03	6.97	9.7
1,4-Dichlorobenzene	4.11	3.80	4.64	4.18	10.1
1,2-Dichlorobenzene	16.6	13.4	12.2	14.1	16.5
Total Dichlorobenzene	27.0	24.8	23.8	25.2	6.5
1,3,5-trichlorobenzene	0.83	1.18	1.00	1.00	17.3
1,2,4-trichlorobenzene	3.34	3.80	3.99	3.71	9.0
1,2,3-trichlorobenzene	3.37	2.25	2.19	2.61	25.5
Total Trichlorobenzene	7.54	7.24	7.18	7.32	2.7
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	1.73	2.33	2.75	2.27	22.5
1,2,3,4-tetrachlorobenzene	0.63	0.77	0.84	0.75	14.8
Total Tetrachlorobenzene	2.36	3.10	3.59	3.02	20.6
Pentachlorobenzene	0.21	0.19	0.30	0.23	25.3
Hexachlorobenzene	<0.059	<0.061	<0.061	<0.060	2.1
Total Chlorobenzenes	<37.2	<35.4	<35.0	<35.8	3.3
Hexachloroethane	<0.059	<0.061	<0.061	<0.060	2.1
a,2,6-Trichlorotoluene	<0.059	<0.061	<0.061	<0.060	2.1

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	120	372	308	190	6.97
1,4-Dichlorobenzene	72.0	223	185	114	4.18
1,2-Dichlorobenzene	242	753	621	384	14.1
Total Dichlorobenzene	434	1349	1113	688	25.2
1,3,5-trichlorobenzene	17.3	53.6	44.4	27.4	1.00
1,2,4-trichlorobenzene	63.9	198	164	101	3.71
1,2,3-trichlorobenzene	44.9	140	115	71.2	2.61
Total Trichlorobenzene	126	392	323	200	7.32
1,2,3,5- & 1,2,4,5-tetrachlorobenzenes	39.1	121	100	61.9	2.27
1,2,3,4-tetrachlorobenzene	12.9	39.9	33.0	20.4	0.75
Total Tetrachlorobenzene	52.0	161	133	82.2	3.02
Pentachlorobenzene	4.00	12.4	10.3	6.32	0.23
Hexachlorobenzene	<1.04	<3.21	<2.66	<1.64	<0.060
Total Chlorobenzenes	<618	<1917	<1583	<978	<35.8
Hexachloroethane	<1.04	<3.21	<2.66	<1.64	<0.060
a,2,6-Trichlorotoluene	<1.04	<3.21	<2.66	<1.64	<0.060

* 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	33.8
1,2-Dichlorobenzene	<16	<16
Total Dichlorobenzene	<48.0	<65.8
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	<178
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	<5.07	<15.9	<12.9	<8.08	<0.29
2,4 & 2,5-dichlorophenol	<80	<5.07	<15.9	<12.9	<8.08	<0.29
3,5-dichlorophenol	<80	<5.07	<15.9	<12.9	<8.08	<0.29
2,3-dichlorophenol	<80	<5.07	<15.9	<12.9	<8.08	<0.29
3,4-dichlorophenol	<80	<5.07	<15.9	<12.9	<8.08	<0.29
Total Dichlorophenols	<400	<25.4	<79.7	<64.6	<40.4	<1.47
2,4,6-trichlorophenol	<80	<5.07	<15.9	<12.9	<8.08	<0.29
2,3,6-trichlorophenol	<80	<5.07	<15.9	<12.9	<8.08	<0.29
2,3,5-trichlorophenol	<80	<5.07	<15.9	<12.9	<8.08	<0.29
2,4,5-trichlorophenol	<80	<5.07	<15.9	<12.9	<8.08	<0.29
2,3,4-trichlorophenol	<80	<5.07	<15.9	<12.9	<8.08	<0.29
3,4,5-trichlorophenol	<80	<5.07	<15.9	<12.9	<8.08	<0.29
Total Trichlorophenols	<480	<30.4	<95.6	<77.5	<48.5	<1.76
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<80	<5.07	<15.9	<12.9	<8.08	<0.29
2,3,4,5-tetrachlorophenol	<80	<5.07	<15.9	<12.9	<8.08	<0.29
Total Tetrachlorophenols	<160	<10.1	<31.9	<25.8	<16.2	<0.59
Pentachlorophenol	<80	<5.07	<15.9	<12.9	<8.08	<0.29
Total Chlorophenols	<1120	<71.0	<223	<181	<113	<4.11
Heptachlor	<0.26	<0.016	<0.052	<0.042	<0.026	<0.00095
Heptachlor Epoxide A	<2.2	<0.14	<0.44	<0.36	<0.22	<0.0081
Heptachlor Epoxide B	<0.33	<0.021	<0.066	<0.053	<0.033	<0.0012
Total Heptachlor	<2.79	<0.18	<0.56	<0.45	<0.28	<0.010
Oxychlorodane	<0.63	<0.040	<0.13	<0.10	<0.064	<0.0023
trans-Chlorodane	<1.8	<0.11	<0.36	<0.29	<0.18	<0.0066
cis-Chlorodane	<1.8	<0.11	<0.36	<0.29	<0.18	<0.0066
Total Chlorodane	<4.2	<0.27	<0.84	<0.68	<0.43	<0.016
Parlar-26	<4.7	<0.30	<0.94	<0.76	<0.47	<0.017
Parlar-50	<2.0	<0.13	<0.40	<0.32	<0.20	<0.0073
Parlar-62	<2.5	<0.16	<0.50	<0.40	<0.25	<0.0092
Total Toxaphene	<9.2	<0.58	<1.83	<1.49	<0.93	<0.034
Hexachlorophene	<80	<5.07	<15.9	<12.9	<8.08	<0.29
Hexachlorobutadiene	1600	101	319	258	162	5.86
Octachlorostyrene	1.92	0.12	0.38	0.31	0.19	0.0070
Tributyltin	<300	<19.0	<59.8	<48.4	<30.3	<1.10

Dry Gas Volume Sampled (Rm³*) :	5.020
Actual Flowrate (m³/s) :	57.8
Dry Reference Flowrate (Rm³/s*) :	18.4
Dry Adjusted Flowrate (Rm³/s**) :	22.7
Wet Reference Flowrate (Rm³/s*) :	36.3

* 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	<5.26	<16.3	<13.5	<8.32	<0.30
2,4 & 2,5-dichlorophenol	<80	<5.26	<16.3	<13.5	<8.32	<0.30
3,5-dichlorophenol	<80	<5.26	<16.3	<13.5	<8.32	<0.30
2,3-dichlorophenol	<80	<5.26	<16.3	<13.5	<8.32	<0.30
3,4-dichlorophenol	<80	<5.26	<16.3	<13.5	<8.32	<0.30
Total Dichlorophenols	<400	<26.3	<81.4	<67.6	<41.6	<1.52
2,4,6-trichlorophenol	<80	<5.26	<16.3	<13.5	<8.32	<0.30
2,3,6-trichlorophenol	<80	<5.26	<16.3	<13.5	<8.32	<0.30
2,3,5-trichlorophenol	<80	<5.26	<16.3	<13.5	<8.32	<0.30
2,4,5-trichlorophenol	<80	<5.26	<16.3	<13.5	<8.32	<0.30
2,3,4-trichlorophenol	<80	<5.26	<16.3	<13.5	<8.32	<0.30
3,4,5-trichlorophenol	<80	<5.26	<16.3	<13.5	<8.32	<0.30
Total Trichlorophenols	<480	<31.5	<97.7	<81.2	<49.9	<1.83
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<80	<5.26	<16.3	<13.5	<8.32	<0.30
2,3,4,5-tetrachlorophenol	<80	<5.26	<16.3	<13.5	<8.32	<0.30
Total Tetrachlorophenols	<160	<10.5	<32.6	<27.1	<16.6	<0.61
Pentachlorophenol	<80	<5.26	<16.3	<13.5	<8.32	<0.30
Total Chlorophenols	<1120	<73.6	<228	<189	<116	<4.26
Heptachlor	<0.26	<0.017	<0.053	<0.044	<0.027	<0.00099
Heptachlor Epoxide A	<2.9	<0.19	<0.59	<0.49	<0.30	<0.011
Heptachlor Epoxide B	<0.43	<0.028	<0.087	<0.073	<0.045	<0.0016
Total Heptachlor	<3.59	<0.24	<0.73	<0.61	<0.37	<0.014
Oxychlorodane	<0.65	<0.043	<0.13	<0.11	<0.068	<0.0025
trans-Chlorodane	11.7	0.77	2.38	1.98	1.22	0.045
cis-Chlorodane	<3.4	<0.22	<0.69	<0.57	<0.35	<0.013
Total Chlorodane	<15.8	<1.03	<3.20	<2.66	<1.64	<0.060
Parlar-26	<6.5	<0.43	<1.32	<1.10	<0.68	<0.025
Parlar-50	<2.6	<0.17	<0.53	<0.44	<0.27	<0.0099
Parlar-62	<3.3	<0.22	<0.67	<0.56	<0.34	<0.013
Total Toxaphene	<12.4	<0.81	<2.52	<2.10	<1.29	<0.047
Hexachlorophene	<80	<5.26	<16.3	<13.5	<8.32	<0.30
Hexachlorobutadiene	1810	119	368	306	188	6.89
Octachlorostyrene	776	51.0	158	131	80.7	2.95
Tributyltin	<300	<19.7	<61.0	<50.7	<31.2	<1.14

Dry Gas Volume Sampled (Rm³*) :	4.915
Actual Flowrate (m³/s) :	57.9
Dry Reference Flowrate (Rm³/s*) :	18.7
Dry Adjusted Flowrate (Rm³/s**) :	22.5
Wet Reference Flowrate (Rm³/s*) :	36.6

* At 25°C and 1 atmosphere

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

Note: "<" indicates that the analyte was not detected (was less than the analytical detection limit), and the value of the detection limit was used to calculate the emission data.

TABLE 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	<5.20	<16.0	<13.4	<8.19	<0.30
2,4 & 2,5-dichlorophenol	<80	<5.20	<16.0	<13.4	<8.19	<0.30
3,5-dichlorophenol	<80	<5.20	<16.0	<13.4	<8.19	<0.30
2,3-dichlorophenol	<80	<5.20	<16.0	<13.4	<8.19	<0.30
3,4-dichlorophenol	<80	<5.20	<16.0	<13.4	<8.19	<0.30
Total Dichlorophenols	<400	<26.0	<80.0	<66.9	<41.0	<1.52
2,4,6-trichlorophenol	<80	<5.20	<16.0	<13.4	<8.19	<0.30
2,3,6-trichlorophenol	<80	<5.20	<16.0	<13.4	<8.19	<0.30
2,3,5-trichlorophenol	<80	<5.20	<16.0	<13.4	<8.19	<0.30
2,4,5-trichlorophenol	<80	<5.20	<16.0	<13.4	<8.19	<0.30
2,3,4-trichlorophenol	<80	<5.20	<16.0	<13.4	<8.19	<0.30
3,4,5-trichlorophenol	<80	<5.20	<16.0	<13.4	<8.19	<0.30
Total Trichlorophenols	<480	<31.2	<96.0	<80.3	<49.2	<1.82
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<80	<5.20	<16.0	<13.4	<8.19	<0.30
2,3,4,5-tetrachlorophenol	<80	<5.20	<16.0	<13.4	<8.19	<0.30
Total Tetrachlorophenols	<160	<10.4	<32.0	<26.8	<16.4	<0.61
Pentachlorophenol	<80	<5.20	<16.0	<13.4	<8.19	<0.30
Total Chlorophenols	<1120	<72.9	<224	<187	<115	<4.26
Heptachlor	<0.17	<0.011	<0.034	<0.028	<0.017	<0.00065
Heptachlor Epoxide A	<3.2	<0.21	<0.64	<0.54	<0.33	<0.012
Heptachlor Epoxide B	<0.48	<0.031	<0.10	<0.08	<0.049	<0.0018
Total Heptachlor	<3.85	<0.25	<0.77	<0.64	<0.39	<0.015
Oxychlorodane	<0.54	<0.035	<0.11	<0.090	<0.055	<0.0021
trans-Chlorodane	<1.7	<0.11	<0.34	<0.28	<0.17	<0.0065
cis-Chlorodane	<1.7	<0.11	<0.34	<0.28	<0.17	<0.0065
Total Chlorodane	<3.9	<0.26	<0.79	<0.66	<0.40	<0.015
Parlar-26	<5.5	<0.36	<1.10	<0.92	<0.56	<0.021
Parlar-50	<3.5	<0.23	<0.70	<0.59	<0.36	<0.013
Parlar-62	<4.5	<0.29	<0.90	<0.75	<0.46	<0.017
Total Toxaphene	<13.5	<0.88	<2.70	<2.26	<1.38	<0.051
Hexachlorophene	<80	<5.20	<16.0	<13.4	<8.19	<0.30
Hexachlorobutadiene	<16	<1.04	<3.20	<2.68	<1.64	<0.061
Octachlorostyrene	2.05	0.13	0.41	0.34	0.21	0.0078
Tributyltin	<300	<19.5	<60.0	<50.2	<30.7	<1.14

Dry Gas Volume Sampled (Rm^3*) :	5.001
Actual Flowrate (m^3/s) :	58.4
Dry Reference Flowrate (Rm^3/s*) :	19.0
Dry Adjusted Flowrate (Rm^3/s**) :	22.7
Wet Reference Flowrate (Rm^3/s*) :	37.1

* 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 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	<5.07	<5.26	<5.20	<5.18	1.8
2,4 & 2,5-dichlorophenol	<5.07	<5.26	<5.20	<5.18	1.8
3,5-dichlorophenol	<5.07	<5.26	<5.20	<5.18	1.8
2,3-dichlorophenol	<5.07	<5.26	<5.20	<5.18	1.8
3,4-dichlorophenol	<5.07	<5.26	<5.20	<5.18	1.8
Total Dichlorophenols	<25.4	<26.3	<26.0	<25.9	1.8
2,4,6-trichlorophenol	<5.07	<5.26	<5.20	<5.18	1.8
2,3,6-trichlorophenol	<5.07	<5.26	<5.20	<5.18	1.8
2,3,5-trichlorophenol	<5.07	<5.26	<5.20	<5.18	1.8
2,4,5-trichlorophenol	<5.07	<5.26	<5.20	<5.18	1.8
2,3,4-trichlorophenol	<5.07	<5.26	<5.20	<5.18	1.8
3,4,5-trichlorophenol	<5.07	<5.26	<5.20	<5.18	1.8
Total Trichlorophenols	<30.4	<31.5	<31.2	<31.1	1.8
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<5.07	<5.26	<5.20	<5.18	1.8
2,3,4,5-tetrachlorophenol	<5.07	<5.26	<5.20	<5.18	1.8
Total Tetrachlorophenols	<10.1	<10.5	<10.4	<10.4	1.8
Pentachlorophenol	<5.07	<5.26	<5.20	<5.18	1.8
Total Chlorophenols	<71.0	<73.6	<72.9	<72.5	1.8
Heptachlor	<0.016	<0.017	<0.011	<0.015	22.3
Heptachlor Epoxide A	<0.14	<0.19	<0.21	<0.18	19.9
Heptachlor Epoxide B	<0.021	<0.028	<0.031	<0.027	19.8
Total Heptachlor	<0.18	<0.24	<0.25	<0.22	17.6
Oxychlorodane	<0.040	<0.043	<0.035	<0.039	9.8
trans-Chlorodane	<0.11	0.77	<0.11	<0.33	114
cis-Chlorodane	<0.11	<0.22	<0.11	<0.15	42.9
Total Chlorodane	<0.27	<1.03	<0.26	<0.52	85.8
Parlar-26	<0.30	<0.43	<0.36	<0.36	17.9
Parlar-50	<0.13	<0.17	<0.23	<0.18	28.9
Parlar-62	<0.16	<0.22	<0.29	<0.22	30.2
Total Toxaphene	<0.58	<0.81	<0.88	<0.76	20.5
Hexachlorophene	<5.07	<5.26	<5.20	<5.18	1.8
Hexachlorobutadiene	101	119	<1.04	<73.8	86.2
Octachlorostyrene	0.12	51.0	0.13	17.1	172
Tributyltin	<19.0	<19.7	<19.5	<19.4	1.8

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	<15.9	<16.3	<16.0	<16.1	1.1
2,4 & 2,5-dichlorophenol	<15.9	<16.3	<16.0	<16.1	1.1
3,5-dichlorophenol	<15.9	<16.3	<16.0	<16.1	1.1
2,3-dichlorophenol	<15.9	<16.3	<16.0	<16.1	1.1
3,4-dichlorophenol	<15.9	<16.3	<16.0	<16.1	1.1
Total Dichlorophenols	<79.7	<81.4	<80.0	<80.3	1.1
2,4,6-trichlorophenol	<15.9	<16.3	<16.0	<16.1	1.1
2,3,6-trichlorophenol	<15.9	<16.3	<16.0	<16.1	1.1
2,3,5-trichlorophenol	<15.9	<16.3	<16.0	<16.1	1.1
2,4,5-trichlorophenol	<15.9	<16.3	<16.0	<16.1	1.1
2,3,4-trichlorophenol	<15.9	<16.3	<16.0	<16.1	1.1
3,4,5-trichlorophenol	<15.9	<16.3	<16.0	<16.1	1.1
Total Trichlorophenols	<95.6	<97.7	<96.0	<96.4	1.1
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<15.9	<16.3	<16.0	<16.1	1.1
2,3,4,5-tetrachlorophenol	<15.9	<16.3	<16.0	<16.1	1.1
Total Tetrachlorophenols	<31.9	<32.6	<32.0	<32.1	1.1
Pentachlorophenol	<15.9	<16.3	<16.0	<16.1	1.1
Total Chlorophenols	<223	<228	<224	<225	1.1
Heptachlor	<0.052	<0.053	<0.034	<0.046	23.0
Heptachlor Epoxide A	<0.44	<0.59	<0.64	<0.56	18.9
Heptachlor Epoxide B	<0.066	<0.087	<0.096	<0.083	18.8
Total Heptachlor	<0.56	<0.73	<0.77	<0.69	16.6
Oxychlorodane	<0.13	<0.13	<0.11	<0.12	10.3
trans-Chlorodane	<0.36	2.38	<0.34	<1.03	114
cis-Chlorodane	<0.36	<0.69	<0.34	<0.46	42.7
Total Chlorodane	<0.84	<3.20	<0.79	<1.61	85.6
Parlar-26	<0.94	<1.32	<1.10	<1.12	17.3
Parlar-50	<0.40	<0.53	<0.70	<0.54	27.9
Parlar-62	<0.50	<0.67	<0.90	<0.69	29.2
Total Toxaphene	<1.83	<2.52	<2.70	<2.35	19.5
Hexachlorophene	<15.9	<16.3	<16.0	<16.1	1.1
Hexachlorobutadiene	319	368	<3.20	<230	86.1
Octachlorostyrene	0.38	158	0.41	52.9	172
Tributyltin	<59.8	<61.0	<60.0	<60.3	1.1

* 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	<12.9	<13.5	<13.4	<13.3	2.4
2,4 & 2,5-dichlorophenol	<12.9	<13.5	<13.4	<13.3	2.4
3,5-dichlorophenol	<12.9	<13.5	<13.4	<13.3	2.4
2,3-dichlorophenol	<12.9	<13.5	<13.4	<13.3	2.4
3,4-dichlorophenol	<12.9	<13.5	<13.4	<13.3	2.4
Total Dichlorophenols	<64.6	<67.6	<66.9	<66.4	2.4
2,4,6-trichlorophenol	<12.9	<13.5	<13.4	<13.3	2.4
2,3,6-trichlorophenol	<12.9	<13.5	<13.4	<13.3	2.4
2,3,5-trichlorophenol	<12.9	<13.5	<13.4	<13.3	2.4
2,4,5-trichlorophenol	<12.9	<13.5	<13.4	<13.3	2.4
2,3,4-trichlorophenol	<12.9	<13.5	<13.4	<13.3	2.4
3,4,5-trichlorophenol	<12.9	<13.5	<13.4	<13.3	2.4
Total Trichlorophenols	<77.5	<81.2	<80.3	<79.7	2.4
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<12.9	<13.5	<13.4	<13.3	2.4
2,3,4,5-tetrachlorophenol	<12.9	<13.5	<13.4	<13.3	2.4
Total Tetrachlorophenols	<25.8	<27.1	<26.8	<26.6	2.4
Pentachlorophenol	<12.9	<13.5	<13.4	<13.3	2.4
Total Chlorophenols	<181	<189	<187	<186	2.4
Heptachlor	<0.042	<0.044	<0.028	<0.038	22.1
Heptachlor Epoxide A	<0.36	<0.49	<0.54	<0.46	20.4
Heptachlor Epoxide B	<0.053	<0.073	<0.080	<0.069	20.3
Total Heptachlor	<0.45	<0.61	<0.64	<0.57	18.1
Oxychlorodane	<0.10	<0.11	<0.090	<0.10	9.7
trans-Chlorodane	<0.29	1.98	<0.28	<0.85	115
cis-Chlorodane	<0.29	<0.57	<0.28	<0.38	43.3
Total Chlorodane	<0.68	<2.66	<0.66	<1.34	86.1
Parlar-26	<0.76	<1.10	<0.92	<0.93	18.4
Parlar-50	<0.32	<0.44	<0.59	<0.45	29.3
Parlar-62	<0.40	<0.56	<0.75	<0.57	30.6
Total Toxaphene	<1.49	<2.10	<2.26	<1.95	21.0
Hexachlorophene	<12.9	<13.5	<13.4	<13.3	2.4
Hexachlorobutadiene	258	306	<2.68	<189	86.3
Octachlorostyrene	0.31	131	0.34	44.0	172
Tributyltin	<48.4	<50.7	<50.2	<49.8	2.4

* 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	<8.08	<8.32	<8.19	<8.20	1.5
2,4 & 2,5-dichlorophenol	<8.08	<8.32	<8.19	<8.20	1.5
3,5-dichlorophenol	<8.08	<8.32	<8.19	<8.20	1.5
2,3-dichlorophenol	<8.08	<8.32	<8.19	<8.20	1.5
3,4-dichlorophenol	<8.08	<8.32	<8.19	<8.20	1.5
Total Dichlorophenols	<40.4	<41.6	<41.0	<41.0	1.5
2,4,6-trichlorophenol	<8.08	<8.32	<8.19	<8.20	1.5
2,3,6-trichlorophenol	<8.08	<8.32	<8.19	<8.20	1.5
2,3,5-trichlorophenol	<8.08	<8.32	<8.19	<8.20	1.5
2,4,5-trichlorophenol	<8.08	<8.32	<8.19	<8.20	1.5
2,3,4-trichlorophenol	<8.08	<8.32	<8.19	<8.20	1.5
3,4,5-trichlorophenol	<8.08	<8.32	<8.19	<8.20	1.5
Total Trichlorophenols	<48.5	<49.9	<49.2	<49.2	1.5
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<8.08	<8.32	<8.19	<8.20	1.5
2,3,4,5-tetrachlorophenol	<8.08	<8.32	<8.19	<8.20	1.5
Total Tetrachlorophenols	<16.2	<16.6	<16.4	<16.4	1.5
Pentachlorophenol	<8.08	<8.32	<8.19	<8.20	1.5
Total Chlorophenols	<113	<116	<115	<115	1.5
Heptachlor	<0.026	<0.027	<0.017	<0.024	22.7
Heptachlor Epoxide A	<0.22	<0.30	<0.33	<0.28	19.4
Heptachlor Epoxide B	<0.033	<0.045	<0.049	<0.042	19.3
Total Heptachlor	<0.28	<0.37	<0.39	<0.35	17.1
Oxychlorodane	<0.064	<0.068	<0.055	<0.062	10.1
trans-Chlorodane	<0.18	1.22	<0.17	<0.52	114
cis-Chlorodane	<0.18	<0.35	<0.17	<0.24	42.9
Total Chlorodane	<0.43	<1.64	<0.40	<0.82	85.8
Parlar-26	<0.47	<0.68	<0.56	<0.57	17.6
Parlar-50	<0.20	<0.27	<0.36	<0.28	28.3
Parlar-62	<0.25	<0.34	<0.46	<0.35	29.7
Total Toxaphene	<0.93	<1.29	<1.38	<1.20	20.0
Hexachlorophene	<8.08	<8.32	<8.19	<8.20	1.5
Hexachlorobutadiene	162	188	<1.64	<117	86.1
Octachlorostyrene	0.19	80.7	0.21	27.0	172
Tributyltin	<30.3	<31.2	<30.7	<30.7	1.5

* 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	<0.29	<0.30	<0.30	<0.30	2.1
2,4 & 2,5-dichlorophenol	<0.29	<0.30	<0.30	<0.30	2.1
3,5-dichlorophenol	<0.29	<0.30	<0.30	<0.30	2.1
2,3-dichlorophenol	<0.29	<0.30	<0.30	<0.30	2.1
3,4-dichlorophenol	<0.29	<0.30	<0.30	<0.30	2.1
Total Dichlorophenols	<1.47	<1.52	<1.52	<1.50	2.1
2,4,6-trichlorophenol	<0.29	<0.30	<0.30	<0.30	2.1
2,3,6-trichlorophenol	<0.29	<0.30	<0.30	<0.30	2.1
2,3,5-trichlorophenol	<0.29	<0.30	<0.30	<0.30	2.1
2,4,5-trichlorophenol	<0.29	<0.30	<0.30	<0.30	2.1
2,3,4-trichlorophenol	<0.29	<0.30	<0.30	<0.30	2.1
3,4,5-trichlorophenol	<0.29	<0.30	<0.30	<0.30	2.1
Total Trichlorophenols	<1.76	<1.83	<1.82	<1.80	2.1
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<0.29	<0.30	<0.30	<0.30	2.1
2,3,4,5-tetrachlorophenol	<0.29	<0.30	<0.30	<0.30	2.1
Total Tetrachlorophenols	<0.59	<0.61	<0.61	<0.60	2.1
Pentachlorophenol	<0.29	<0.30	<0.30	<0.30	2.1
Total Chlorophenols	<4.11	<4.26	<4.26	<4.21	2.1
Heptachlor	<0.00095	<0.00099	<0.00065	<0.00086	21.9
Heptachlor Epoxide A	<0.0081	<0.011	<0.012	<0.010	20.3
Heptachlor Epoxide B	<0.0012	<0.0016	<0.0018	<0.0016	20.2
Total Heptachlor	<0.010	<0.014	<0.015	<0.013	18.0
Oxychlorodane	<0.0023	<0.0025	<0.0021	<0.0023	9.3
trans-Chlorodane	<0.0066	0.045	<0.0065	<0.019	114
cis-Chlorodane	<0.0066	<0.013	<0.0065	<0.0087	42.7
Total Chlorodane	<0.016	<0.060	<0.015	<0.030	85.6
Parlar-26	<0.017	<0.025	<0.021	<0.021	17.9
Parlar-50	<0.0073	<0.0099	<0.013	<0.010	29.4
Parlar-62	<0.0092	<0.013	<0.017	<0.013	30.8
Total Toxaphene	<0.034	<0.047	<0.051	<0.044	20.9
Hexachlorophene	<0.29	<0.30	<0.30	<0.30	2.1
Hexachlorobutadiene	5.86	6.89	<0.061	<4.27	86.2
Octachlorostyrene	0.0070	2.95	0.0078	0.99	172
Tributyltin	<1.10	<1.14	<1.14	<1.13	2.1

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	<5.18	<16.1	<13.3	<8.20	<0.30
2,4 & 2,5-dichlorophenol	<5.18	<16.1	<13.3	<8.20	<0.30
3,5-dichlorophenol	<5.18	<16.1	<13.3	<8.20	<0.30
2,3-dichlorophenol	<5.18	<16.1	<13.3	<8.20	<0.30
3,4-dichlorophenol	<5.18	<16.1	<13.3	<8.20	<0.30
Total Dichlorophenols	<25.9	<80.3	<66.4	<41.0	<1.50
2,4,6-trichlorophenol	<5.18	<16.1	<13.3	<8.20	<0.30
2,3,6-trichlorophenol	<5.18	<16.1	<13.3	<8.20	<0.30
2,3,5-trichlorophenol	<5.18	<16.1	<13.3	<8.20	<0.30
2,4,5-trichlorophenol	<5.18	<16.1	<13.3	<8.20	<0.30
2,3,4-trichlorophenol	<5.18	<16.1	<13.3	<8.20	<0.30
3,4,5-trichlorophenol	<5.18	<16.1	<13.3	<8.20	<0.30
Total Trichlorophenols	<31.1	<96.4	<79.7	<49.2	<1.80
2,3,5,6 & 2,3,4,6-tetrachlorophenol	<5.18	<16.1	<13.3	<8.20	<0.30
2,3,4,5-tetrachlorophenol	<5.18	<16.1	<13.3	<8.20	<0.30
Total Tetrachlorophenols	<10.4	<32.1	<26.6	<16.4	<0.60
Pentachlorophenol	<5.18	<16.1	<13.3	<8.20	<0.30
Total Chlorophenols	<72.5	<225	<186	<115	<4.21
Heptachlor	<0.015	<0.046	<0.038	<0.024	<0.00086
Heptachlor Epoxide A	<0.18	<0.56	<0.46	<0.28	<0.010
Heptachlor Epoxide B	<0.027	<0.083	<0.069	<0.042	<0.0016
Total Heptachlor	<0.22	<0.69	<0.57	<0.35	<0.013
Oxychlorodane	<0.039	<0.12	<0.10	<0.062	<0.0023
trans-Chlorodane	<0.33	<1.03	<0.85	<0.52	<0.019
cis-Chlorodane	<0.15	<0.46	<0.38	<0.24	<0.0087
Total Chlorodane	<0.52	<1.61	<1.34	<0.82	<0.030
Parlar-26	<0.36	<1.12	<0.93	<0.57	<0.021
Parlar-50	<0.18	<0.54	<0.45	<0.28	<0.010
Parlar-62	<0.22	<0.69	<0.57	<0.35	<0.013
Total Toxaphene	<0.76	<2.35	<1.95	<1.20	<0.044
Hexachlorophene	<5.18	<16.1	<13.3	<8.20	<0.30
Hexachlorobutadiene	<73.8	<230	<189	<117	<4.27
Octachlorostyrene	17.1	52.9	44.0	27.0	0.99
Tributyltin	<19.4	<60.3	<49.8	<30.7	<1.13

* 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	<0.24	<0.22
Heptachlor Epoxide A	<4.9	<2.1
Heptachlor Epoxide B	<0.74	<0.32
Total Heptachlor	<5.88	<2.64
Oxychlorodane	<1.2	<0.38
trans-Chlorodane	<2.7	<1.2
cis-Chlorodane	<2.6	<1.2
Total Chlorodane	<6.50	<2.78
Parlar-26	<7.0	<3.2
Parlar-50	<3.4	<2.0
Parlar-62	<4.4	<2.5
Total Toxaphene	<14.8	<7.7
Hexachlorophene	<80	<80
Hexachlorobutadiene	<16	<16
Octachlorostyrene	3.87	6.58
Tributyltin	<300	<300

"<" 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	91.4	5.80	18.2	14.8	9.23	0.34
Acenaphthylene	1300	82.4	259	210	131	4.76
Anthracene	105	6.66	20.9	17.0	10.6	0.38
Benzo(a)Anthracene	<16	<1.01	<3.19	<2.58	<1.62	<0.059
Benzo(b)Fluoranthene	23.6	1.50	4.70	3.81	2.38	0.087
Benzo(k)Fluoranthene	<16	<1.01	<3.19	<2.58	<1.62	<0.059
Benzo(a)fluorene	<16	<1.01	<3.19	<2.58	<1.62	<0.059
Benzo(b)fluorene	<16	<1.01	<3.19	<2.58	<1.62	<0.059
Benzo(g,h,i)Perylene	60.4	3.83	12.0	9.75	6.10	0.22
Benzo(a)Pyrene	<16	<1.01	<3.19	<2.58	<1.62	<0.059
Benzo(e)Pyrene	<16	<1.01	<3.19	<2.58	<1.62	<0.059
Biphenyl	4090	259	815	660	413	15.0
2-Chloronaphthalene	85.8	5.44	17.1	13.9	8.66	0.31
Chrysene/Triphenylene	21.6	1.37	4.30	3.49	2.18	0.079
Coronene	<80	<5.07	<15.9	<12.9	<8.08	<0.29
Dibenzo(a,c/a,h)Anthracene	<16	<1.01	<3.19	<2.58	<1.62	<0.059
Dibenzo(a,e)pyrene	<80	<5.07	<15.9	<12.9	<8.08	<0.29
9,10-dimethylanthracene	<16	<1.01	<3.19	<2.58	<1.62	<0.059
7,12-Dimethylbenzo(a)anthracene	<16	<1.01	<3.19	<2.58	<1.62	<0.059
Fluoranthene	95.4	6.05	19.0	15.4	9.63	0.35
Fluorene	125	7.93	24.9	20.2	12.6	0.46
Indeno(1,2,3-cd)Pyrene	<16	<1.01	<3.19	<2.58	<1.62	<0.059
2-methylanthracene	66.9	4.24	13.3	10.8	6.76	0.25
3-Methylcholanthrene	563	35.7	112	90.9	56.8	2.06
1-Methylnaphthalene	1570	99.6	313	254	159	5.75
2-Methylnaphthalene	976	61.9	194	158	98.6	3.58
1-Methylphenanthrene	<16	<1.01	<3.19	<2.58	<1.62	<0.059
9-Methylphenanthrene	42.0	2.66	8.37	6.78	4.24	0.15
Naphthalene	10300	653	2052	1663	1040	37.8
Perylene	<16	<1.01	<3.19	<2.58	<1.62	<0.059
Phenanthrene	435	27.6	86.7	70.2	43.9	1.59
Picene	<80	<5.07	<15.9	<12.9	<8.08	<0.29
Pyrene	87.4	5.54	17.4	14.1	8.83	0.32
Quinoline	1830	116	365	295	185	6.71
m-terphenyl	<16	<1.01	<3.19	<2.58	<1.62	<0.059
o-Terphenyl	<16	<1.01	<3.19	<2.58	<1.62	<0.059
p-terphenyl	<16	<1.01	<3.19	<2.58	<1.62	<0.059
Tetralin	607	38.5	121	98.0	61.3	2.22
Total	<22956	<1456	<4573	<3707	<2318	<84.1

Dry Gas Volume Sampled (Rm^3*) :	5.020
Actual Flowrate (m^3/s) :	57.8
Dry Reference Flowrate (Rm^3/s*) :	18.4
Dry Adjusted Flowrate (Rm^3/s**) :	22.7
Wet Reference Flowrate (Rm^3/s*) :	36.3

* 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	52.9	3.48	10.8	8.95	5.50	0.20
Acenaphthylene	554	36.4	113	93.7	57.6	2.11
Anthracene	51.0	3.35	10.4	8.62	5.30	0.19
Benzo(a)Anthracene	<16	<1.05	<3.26	<2.71	<1.66	<0.061
Benzo(b)Fluoranthene	<16	<1.05	<3.26	<2.71	<1.66	<0.061
Benzo(k)Fluoranthene	<16	<1.05	<3.26	<2.71	<1.66	<0.061
Benzo(a)fluorene	<16	<1.05	<3.26	<2.71	<1.66	<0.061
Benzo(b)fluorene	<16	<1.05	<3.26	<2.71	<1.66	<0.061
Benzo(g,h,i)Perylene	<16	<1.05	<3.26	<2.71	<1.66	<0.061
Benzo(a)Pyrene	<16	<1.05	<3.26	<2.71	<1.66	<0.061
Benzo(e)Pyrene	29.8	1.96	6.06	5.04	3.10	0.11
Biphenyl	3080	202	627	521	320	11.7
2-Chloronaphthalene	59.0	3.88	12.0	9.98	6.13	0.22
Chrysene/Triphenylene	<16	<1.05	<3.26	<2.71	<1.66	<0.061
Coronene	<80	<5.26	<16.3	<13.5	<8.32	<0.30
Dibenzo(a,c/a,h)Anthracene	<16	<1.05	<3.26	<2.71	<1.66	<0.061
Dibenzo(a,e)pyrene	<80	<5.26	<16.3	<13.5	<8.32	<0.30
9,10-dimethylanthracene	36.7	2.41	7.47	6.21	3.82	0.14
7,12-Dimethylbenzo(a)anthracene	<16	<1.05	<3.26	<2.71	<1.66	<0.061
Fluoranthene	45.8	3.01	9.32	7.74	4.76	0.17
Fluorene	70.8	4.65	14.4	12.0	7.36	0.27
Indeno(1,2,3-cd)Pyrene	<16	<1.05	<3.26	<2.71	<1.66	<0.061
2-methylanthracene	38.1	2.50	7.75	6.44	3.96	0.14
3-Methylcholanthrene	<80	<5.26	<16.3	<13.5	<8.32	<0.30
1-Methylnaphthalene	942	61.9	192	159	97.9	3.58
2-Methylnaphthalene	714	46.9	145	121	74.2	2.72
1-Methylphenanthrene	<16	<1.05	<3.26	<2.71	<1.66	<0.061
9-Methylphenanthrene	24.4	1.60	4.96	4.13	2.54	0.093
Naphthalene	8020	527	1632	1356	834	30.5
Perylene	<16	<1.05	<3.26	<2.71	<1.66	<0.061
Phenanthrene	237	15.6	48.2	40.1	24.6	0.90
Picene	<80	<5.26	<16.3	<13.5	<8.32	<0.30
Pyrene	50.8	3.34	10.3	8.59	5.28	0.19
Quinoline	1750	115	356	296	182	6.66
m-terphenyl	<16	<1.05	<3.26	<2.71	<1.66	<0.061
o-Terphenyl	<16	<1.05	<3.26	<2.71	<1.66	<0.061
p-terphenyl	<16	<1.05	<3.26	<2.71	<1.66	<0.061
Tetralin	808	53.1	164	137	84.0	3.07
Total	<17140	<1126	<3487	<2898	<1782	<65.2

Dry Gas Volume Sampled (Rm^3*) :	4.915
Actual Flowrate (m^3/s) :	57.9
Dry Reference Flowrate (Rm^3/s*) :	18.7
Dry Adjusted Flowrate (Rm^3/s**) :	22.5
Wet Reference Flowrate (Rm^3/s*) :	36.6

* At 25°C and 1 atmosphere

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

Note: "<" indicates that the analyte was not detected (was less than the analytical detection limit), and the value of the detection limit was used to calculate the emission data.

TABLE 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	147	9.56	29.4	24.6	15.1	0.56
Acenaphthylene	374	24.3	74.8	62.6	38.3	1.42
Anthracene	53.5	3.48	10.7	8.95	5.48	0.20
Benzo(a)Anthracene	<16	<1.04	<3.20	<2.68	<1.64	<0.061
Benzo(b)Fluoranthene	<16	<1.04	<3.20	<2.68	<1.64	<0.061
Benzo(k)Fluoranthene	<16	<1.04	<3.20	<2.68	<1.64	<0.061
Benzo(a)fluorene	<16	<1.04	<3.20	<2.68	<1.64	<0.061
Benzo(b)fluorene	<16	<1.04	<3.20	<2.68	<1.64	<0.061
Benzo(g,h,i)Perylene	68.3	4.44	13.7	11.4	6.99	0.26
Benzo(a)Pyrene	<16	<1.04	<3.20	<2.68	<1.64	<0.061
Benzo(e)Pyrene	46.1	3.00	9.22	7.72	4.72	0.18
Biphenyl	3020	196	604	505	309	11.5
2-Chloronaphthalene	65.7	4.27	13.1	11.0	6.73	0.25
Chrysene/Triphenylene	<16	<1.04	<3.20	<2.68	<1.64	<0.061
Coronene	<80	<5.20	<16.0	<13.4	<8.19	<0.30
Dibenzo(a,c/a,h)Anthracene	<16	<1.04	<3.20	<2.68	<1.64	<0.061
Dibenzo(a,e)pyrene	<80	<5.20	<16.0	<13.4	<8.19	<0.30
9,10-dimethylanthracene	<16	<1.04	<3.20	<2.68	<1.64	<0.061
7,12-Dimethylbenzo(a)anthracene	<16	<1.04	<3.20	<2.68	<1.64	<0.061
Fluoranthene	83.0	5.40	16.6	13.9	8.50	0.32
Fluorene	103	6.70	20.6	17.2	10.5	0.39
Indeno(1,2,3-cd)Pyrene	<16	<1.04	<3.20	<2.68	<1.64	<0.061
2-methylanthracene	61.2	3.98	12.2	10.2	6.27	0.23
3-Methylcholanthrene	<80	<5.20	<16.0	<13.4	<8.19	<0.30
1-Methylnaphthalene	1330	86.5	266	223	136	5.05
2-Methylnaphthalene	1350	87.8	270	226	138	5.13
1-Methylphenanthrene	<16	<1.04	<3.20	<2.68	<1.64	<0.061
9-Methylphenanthrene	39.5	2.57	7.90	6.61	4.05	0.15
Naphthalene	10200	664	2040	1707	1045	38.8
Perylene	<16	<1.04	<3.20	<2.68	<1.64	<0.061
Phenanthrene	398	25.9	79.6	66.6	40.8	1.51
Picene	<80	<5.20	<16.0	<13.4	<8.19	<0.30
Pyrene	160	10.4	32.0	26.8	16.4	0.61
Quinoline	197	12.8	39.4	33.0	20.2	0.75
m-terphenyl	<16	<1.04	<3.20	<2.68	<1.64	<0.061
o-Terphenyl	<16	<1.04	<3.20	<2.68	<1.64	<0.061
p-terphenyl	<16	<1.04	<3.20	<2.68	<1.64	<0.061
Tetralin	571	37.1	114	95.6	58.5	2.17
Total	<18843	<1226	<3768	<3154	<1930	<71.6

Dry Gas Volume Sampled (Rm^3*) :	5.001
Actual Flowrate (m^3/s) :	58.4
Dry Reference Flowrate (Rm^3/s*) :	19.0
Dry Adjusted Flowrate (Rm^3/s**) :	22.7
Wet Reference Flowrate (Rm^3/s*) :	37.1

* 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 95
Clean Harbors Sarnia
Polycyclic Aromatic Hydrocarbon Actual Concentrations

Compound	Actual Concentration				Coefficient
	Test No. 1	Test No. 2	Test No. 3	Average	of Variation
	ng/m³	ng/m³	ng/m³	ng/m³	%
Acenaphthene	5.80	3.48	9.56	6.28	48.9
Acenaphthylene	82.4	36.4	24.3	47.7	64.3
Anthracene	6.66	3.35	3.48	4.50	41.7
Benzo(a)Anthracene	<1.01	<1.05	<1.04	<1.04	1.8
Benzo(b)Fluoranthene	1.50	<1.05	<1.04	<1.20	21.7
Benzo(k)Fluoranthene	<1.01	<1.05	<1.04	<1.04	1.8
Benzo(a)fluorene	<1.01	<1.05	<1.04	<1.04	1.8
Benzo(b)fluorene	<1.01	<1.05	<1.04	<1.04	1.8
Benzo(g,h,i)Perylene	3.83	<1.05	4.44	<3.11	58.2
Benzo(a)Pyrene	<1.01	<1.05	<1.04	<1.04	1.8
Benzo(e)Pyrene	<1.01	1.96	3.00	<1.99	49.9
Biphenyl	259	202	196	219	15.8
2-Chloronaphthalene	5.44	3.88	4.27	4.53	17.9
Chrysene/Triphenylene	1.37	<1.05	<1.04	<1.15	16.2
Coronene	<5.07	<5.26	<5.20	<5.18	1.8
Dibenzo(a,c/a,h)Anthracene	<1.01	<1.05	<1.04	<1.04	1.8
Dibenzo(a,e)pyrene	<5.07	<5.26	<5.20	<5.18	1.8
9,10-dimethylanthracene	<1.01	2.41	<1.04	<1.49	53.7
7,12-Dimethylbenzo(a)anthracene	<1.01	<1.05	<1.04	<1.04	1.8
Fluoranthene	6.05	3.01	5.40	4.82	33.2
Fluorene	7.93	4.65	6.70	6.43	25.7
Indeno(1,2,3-cd)Pyrene	<1.01	<1.05	<1.04	<1.04	1.8
2-methylanthracene	4.24	2.50	3.98	3.58	26.2
3-Methylcholanthrene	35.7	<5.26	<5.20	<15.4	114
1-Methylnaphthalene	99.6	61.9	86.5	82.7	23.1
2-Methylnaphthalene	61.9	46.9	87.8	65.5	31.6
1-Methylphenanthrene	<1.01	<1.05	<1.04	<1.04	1.8
9-Methylphenanthrene	2.66	1.60	2.57	2.28	25.8
Naphthalene	653	527	664	615	12.4
Perylene	<1.01	<1.05	<1.04	<1.04	1.8
Phenanthrene	27.6	15.6	25.9	23.0	28.2
Picene	<5.07	<5.26	<5.20	<5.18	1.8
Pyrene	5.54	3.34	10.4	6.43	56.3
Quinoline	116	115	12.8	81.3	73.0
m-terphenyl	<1.01	<1.05	<1.04	<1.04	1.8
o-Terphenyl	<1.01	<1.05	<1.04	<1.04	1.8
p-terphenyl	<1.01	<1.05	<1.04	<1.04	1.8
Tetralin	38.5	53.1	37.1	42.9	20.6
Total	<1456	<1126	<1226	<1269	13.3

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	18.2	10.8	29.4	19.5	48.2
Acenaphthylene	259	113	74.8	149	65.3
Anthracene	20.9	10.4	10.7	14.0	42.8
Benzo(a)Anthracene	<3.19	<3.26	<3.20	<3.21	1.1
Benzo(b)Fluoranthene	4.70	<3.26	<3.20	<3.72	22.9
Benzo(k)Fluoranthene	<3.19	<3.26	<3.20	<3.21	1.1
Benzo(a)fluorene	<3.19	<3.26	<3.20	<3.21	1.1
Benzo(b)fluorene	<3.19	<3.26	<3.20	<3.21	1.1
Benzo(g,h,i)Perylene	12.0	<3.26	13.7	<9.65	58.0
Benzo(a)Pyrene	<3.19	<3.26	<3.20	<3.21	1.1
Benzo(e)Pyrene	<3.19	6.06	9.22	<6.16	49.0
Biphenyl	815	627	604	682	17.0
2-Chloronaphthalene	17.1	12.0	13.1	14.1	19.0
Chrysene/Triphenylene	4.30	<3.26	<3.20	<3.59	17.3
Coronene	<15.9	<16.3	<16.0	<16.1	1.1
Dibenzo(a,c/a,h)Anthracene	<3.19	<3.26	<3.20	<3.21	1.1
Dibenzo(a,e)pyrene	<15.9	<16.3	<16.0	<16.1	1.1
9,10-dimethylanthracene	<3.19	7.47	<3.20	<4.62	53.4
7,12-Dimethylbenzo(a)anthracene	<3.19	<3.26	<3.20	<3.21	1.1
Fluoranthene	19.0	9.32	16.6	15.0	33.7
Fluorene	24.9	14.4	20.6	20.0	26.4
Indeno(1,2,3-cd)Pyrene	<3.19	<3.26	<3.20	<3.21	1.1
2-methylanthracene	13.3	7.75	12.2	11.1	26.6
3-Methylcholanthrene	112	<16.3	<16.0	<48.1	115
1-Methylnaphthalene	313	192	266	257	23.8
2-Methylnaphthalene	194	145	270	203	30.9
1-Methylphenanthrene	<3.19	<3.26	<3.20	<3.21	1.1
9-Methylphenanthrene	8.37	4.96	7.90	7.08	26.1
Naphthalene	2052	1632	2040	1908	12.5
Perylene	<3.19	<3.26	<3.20	<3.21	1.1
Phenanthrene	86.7	48.2	79.6	71.5	28.6
Picene	<15.9	<16.3	<16.0	<16.1	1.1
Pyrene	17.4	10.3	32.0	19.9	55.5
Quinoline	365	356	39.4	253	73.2
m-terphenyl	<3.19	<3.26	<3.20	<3.21	1.1
o-Terphenyl	<3.19	<3.26	<3.20	<3.21	1.1
p-terphenyl	<3.19	<3.26	<3.20	<3.21	1.1
Tetralin	121	164	114	133	20.5
Total	<4573	<3487	<3768	<3943	14.3

* 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	14.8	8.95	24.6	16.1	49.2
Acenaphthylene	210	93.7	62.6	122	63.6
Anthracene	17.0	8.62	8.95	11.5	41.0
Benzo(a)Anthracene	<2.58	<2.71	<2.68	<2.66	2.4
Benzo(b)Fluoranthene	3.81	<2.71	<2.68	<3.06	21.1
Benzo(k)Fluoranthene	<2.58	<2.71	<2.68	<2.66	2.4
Benzo(a)fluorene	<2.58	<2.71	<2.68	<2.66	2.4
Benzo(b)fluorene	<2.58	<2.71	<2.68	<2.66	2.4
Benzo(g,h,i)Perylene	9.75	<2.71	11.4	<7.96	58.1
Benzo(a)Pyrene	<2.58	<2.71	<2.68	<2.66	2.4
Benzo(e)Pyrene	<2.58	5.04	7.72	<5.11	50.2
Biphenyl	660	521	505	562	15.2
2-Chloronaphthalene	13.9	9.98	11.0	11.6	17.3
Chrysene/Triphenylene	3.49	<2.71	<2.68	<2.96	15.5
Coronene	<12.9	<13.5	<13.4	<13.3	2.4
Dibenzo(a,c/a,h)Anthracene	<2.58	<2.71	<2.68	<2.66	2.4
Dibenzo(a,e)pyrene	<12.9	<13.5	<13.4	<13.3	2.4
9,10-dimethylanthracene	<2.58	6.21	<2.68	<3.82	54.0
7,12-Dimethylbenzo(a)anthracene	<2.58	<2.71	<2.68	<2.66	2.4
Fluoranthene	15.4	7.74	13.9	12.3	32.9
Fluorene	20.2	12.0	17.2	16.5	25.3
Indeno(1,2,3-cd)Pyrene	<2.58	<2.71	<2.68	<2.66	2.4
2-methylanthracene	10.8	6.44	10.2	9.16	25.9
3-Methylcholanthrene	90.9	<13.5	<13.4	<39.3	114
1-Methylnaphthalene	254	159	223	212	22.7
2-Methylnaphthalene	158	121	226	168	31.8
1-Methylphenanthrene	<2.58	<2.71	<2.68	<2.66	2.4
9-Methylphenanthrene	6.78	4.13	6.61	5.84	25.5
Naphthalene	1663	1356	1707	1575	12.1
Perylene	<2.58	<2.71	<2.68	<2.66	2.4
Phenanthrene	70.2	40.1	66.6	59.0	27.9
Picene	<12.9	<13.5	<13.4	<13.3	2.4
Pyrene	14.1	8.59	26.8	16.5	56.5
Quinoline	295	296	33.0	208	72.9
m-terphenyl	<2.58	<2.71	<2.68	<2.66	2.4
o-Terphenyl	<2.58	<2.71	<2.68	<2.66	2.4
p-terphenyl	<2.58	<2.71	<2.68	<2.66	2.4
Tetralin	98.0	137	95.6	110	20.9
Total	<3707	<2898	<3154	<3253	12.7

* 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	9.23	5.50	15.1	9.93	48.5
Acenaphthylene	131	57.6	38.3	75.7	64.8
Anthracene	10.6	5.30	5.48	7.13	42.2
Benzo(a)Anthracene	<1.62	<1.66	<1.64	<1.64	1.5
Benzo(b)Fluoranthene	2.38	<1.66	<1.64	<1.89	22.3
Benzo(k)Fluoranthene	<1.62	<1.66	<1.64	<1.64	1.5
Benzo(a)fluorene	<1.62	<1.66	<1.64	<1.64	1.5
Benzo(b)fluorene	<1.62	<1.66	<1.64	<1.64	1.5
Benzo(g,h,i)Perylene	6.10	<1.66	6.99	<4.92	58.0
Benzo(a)Pyrene	<1.62	<1.66	<1.64	<1.64	1.5
Benzo(e)Pyrene	<1.62	3.10	4.72	<3.14	49.4
Biphenyl	413	320	309	347	16.4
2-Chloronaphthalene	8.66	6.13	6.73	7.17	18.4
Chrysene/Triphenylene	2.18	<1.66	<1.64	<1.83	16.8
Coronene	<8.08	<8.32	<8.19	<8.20	1.5
Dibenzo(a,c/a,h)Anthracene	<1.62	<1.66	<1.64	<1.64	1.5
Dibenzo(a,e)pyrene	<8.08	<8.32	<8.19	<8.20	1.5
9,10-dimethylanthracene	<1.62	3.82	<1.64	<2.36	53.6
7,12-Dimethylbenzo(a)anthracene	<1.62	<1.66	<1.64	<1.64	1.5
Fluoranthene	9.63	4.76	8.50	7.63	33.4
Fluorene	12.6	7.36	10.5	10.2	26.0
Indeno(1,2,3-cd)Pyrene	<1.62	<1.66	<1.64	<1.64	1.5
2-methylanthracene	6.76	3.96	6.27	5.66	26.4
3-Methylcholanthrene	56.8	<8.32	<8.19	<24.5	115
1-Methylnaphthalene	159	97.9	136	131	23.4
2-Methylnaphthalene	98.6	74.2	138	104	31.2
1-Methylphenanthrene	<1.62	<1.66	<1.64	<1.64	1.5
9-Methylphenanthrene	4.24	2.54	4.05	3.61	25.9
Naphthalene	1040	834	1045	973	12.4
Perylene	<1.62	<1.66	<1.64	<1.64	1.5
Phenanthrene	43.9	24.6	40.8	36.4	28.4
Picene	<8.08	<8.32	<8.19	<8.20	1.5
Pyrene	8.83	5.28	16.4	10.2	55.8
Quinoline	185	182	20.2	129	73.1
m-terphenyl	<1.62	<1.66	<1.64	<1.64	1.5
o-Terphenyl	<1.62	<1.66	<1.64	<1.64	1.5
p-terphenyl	<1.62	<1.66	<1.64	<1.64	1.5
Tetralin	61.3	84.0	58.5	67.9	20.6
Total	<2318	<1782	<1930	<2010	13.8

* 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	0.34	0.20	0.56	0.36	49.5
Acenaphthylene	4.76	2.11	1.42	2.76	63.9
Anthracene	0.38	0.19	0.20	0.26	41.3
Benzo(a)Anthracene	<0.059	<0.061	<0.061	<0.060	2.1
Benzo(b)Fluoranthene	0.087	<0.061	<0.061	<0.069	21.4
Benzo(k)Fluoranthene	<0.059	<0.061	<0.061	<0.060	2.1
Benzo(a)fluorene	<0.059	<0.061	<0.061	<0.060	2.1
Benzo(b)fluorene	<0.059	<0.061	<0.061	<0.060	2.1
Benzo(g,h,i)Perylene	0.22	<0.061	0.26	<0.18	58.4
Benzo(a)Pyrene	<0.059	<0.061	<0.061	<0.060	2.1
Benzo(e)Pyrene	<0.059	0.11	0.18	<0.12	50.4
Biphenyl	15.0	11.7	11.5	12.7	15.4
2-Chloronaphthalene	0.31	0.22	0.25	0.26	17.7
Chrysene/Triphenylene	0.079	<0.061	<0.061	<0.067	15.8
Coronene	<0.29	<0.30	<0.30	<0.30	2.1
Dibenzo(a,c/a,h)Anthracene	<0.059	<0.061	<0.061	<0.060	2.1
Dibenzo(a,e)pyrene	<0.29	<0.30	<0.30	<0.30	2.1
9,10-dimethylanthracene	<0.059	0.14	<0.061	<0.086	53.4
7,12-Dimethylbenzo(a)anthracene	<0.059	<0.061	<0.061	<0.060	2.1
Fluoranthene	0.35	0.17	0.32	0.28	33.2
Fluorene	0.46	0.27	0.39	0.37	25.7
Indeno(1,2,3-cd)Pyrene	<0.059	<0.061	<0.061	<0.060	2.1
2-methylanthracene	0.25	0.14	0.23	0.21	26.3
3-Methylcholanthrene	2.06	<0.30	<0.30	<0.89	114
1-Methylnaphthalene	5.75	3.58	5.05	4.80	23.1
2-Methylnaphthalene	3.58	2.72	5.13	3.81	32.1
1-Methylphenanthrene	<0.059	<0.061	<0.061	<0.060	2.1
9-Methylphenanthrene	0.15	0.093	0.15	0.13	25.9
Naphthalene	37.8	30.5	38.8	35.7	12.6
Perylene	<0.059	<0.061	<0.061	<0.060	2.1
Phenanthrene	1.59	0.90	1.51	1.34	28.3
Picene	<0.29	<0.30	<0.30	<0.30	2.1
Pyrene	0.32	0.19	0.61	0.37	56.8
Quinoline	6.71	6.66	0.75	4.70	72.8
m-terphenyl	<0.059	<0.061	<0.061	<0.060	2.1
o-Terphenyl	<0.059	<0.061	<0.061	<0.060	2.1
p-terphenyl	<0.059	<0.061	<0.061	<0.060	2.1
Tetralin	2.22	3.07	2.17	2.49	20.4
Total	<84.1	<65.2	<71.6	<73.6	13.1

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	6.28	19.5	16.1	9.93	0.36
Acenaphthylene	47.7	149	122	75.7	2.76
Anthracene	4.50	14.0	11.5	7.13	0.26
Benzo(a)Anthracene	<1.04	<3.21	<2.66	<1.64	<0.060
Benzo(b)Fluoranthene	<1.20	<3.72	<3.06	<1.89	<0.069
Benzo(k)Fluoranthene	<1.04	<3.21	<2.66	<1.64	<0.060
Benzo(a)fluorene	<1.04	<3.21	<2.66	<1.64	<0.060
Benzo(b)fluorene	<1.04	<3.21	<2.66	<1.64	<0.060
Benzo(g,h,i)Perylene	<3.11	<9.65	<7.96	<4.92	<0.18
Benzo(a)Pyrene	<1.04	<3.21	<2.66	<1.64	<0.060
Benzo(e)Pyrene	<1.99	<6.16	<5.11	<3.14	<0.12
Biphenyl	219	682	562	347	12.7
2-Chloronaphthalene	4.53	14.1	11.6	7.17	0.26
Chrysene/Triphenylene	<1.15	<3.59	<2.96	<1.83	<0.067
Coronene	<5.18	<16.1	<13.3	<8.20	<0.30
Dibenzo(a,c/a,h)Anthracene	<1.04	<3.21	<2.66	<1.64	<0.060
Dibenzo(a,e)pyrene	<5.18	<16.1	<13.3	<8.20	<0.30
9,10-dimethylanthracene	<1.49	<4.62	<3.82	<2.36	<0.086
7,12-Dimethylbenzo(a)anthracene	<1.04	<3.21	<2.66	<1.64	<0.060
Fluoranthene	4.82	15.0	12.3	7.63	0.28
Fluorene	6.43	20.0	16.5	10.2	0.37
Indeno(1,2,3-cd)Pyrene	<1.04	<3.21	<2.66	<1.64	<0.060
2-methylanthracene	3.58	11.1	9.16	5.66	0.21
3-Methylcholanthrene	<15.4	<48.1	<39.3	<24.5	<0.89
1-Methylnaphthalene	82.7	257	212	131	4.80
2-Methylnaphthalene	65.5	203	168	104	3.81
1-Methylphenanthrene	<1.04	<3.21	<2.66	<1.64	<0.060
9-Methylphenanthrene	2.28	7.08	5.84	3.61	0.13
Naphthalene	615	1908	1575	973	35.7
Perylene	<1.04	<3.21	<2.66	<1.64	<0.060
Phenanthrene	23.0	71.5	59.0	36.4	1.34
Picene	<5.18	<16.1	<13.3	<8.20	<0.30
Pyrene	6.43	19.9	16.5	10.2	0.37
Quinoline	81.3	253	208	129	4.70
m-terphenyl	<1.04	<3.21	<2.66	<1.64	<0.060
o-Terphenyl	<1.04	<3.21	<2.66	<1.64	<0.060
p-terphenyl	<1.04	<3.21	<2.66	<1.64	<0.060
Tetralin	42.9	133	110	67.9	2.49
Total	<1269	<3943	<3253	<2010	<73.6

* At 25°C and 1 atmosphere

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

TABLE 101
Clean Harbors Sarnia
Blank Polycyclic Aromatic Hydrocarbon Analyses

Compound	Blank Train ng	Laboratory Blank ng
Acenaphthene	<16	<16
Acenaphthylene	<16	<16
Anthracene	<16	<16
Benzo(a)Anthracene	<16	<16
Benzo(b)Fluoranthene	<16	<16
Benzo(k)Fluoranthene	<16	<16
Benzo(a)fluorene	<16	<16
Benzo(b)fluorene	<16	<16
Benzo(g,h,i)Perylene	<16	<16
Benzo(a)Pyrene	<16	<16
Benzo(e)Pyrene	<16	<16
Biphenyl	50.6	25.5
2-Chloronaphthalene	<16	<16
Chrysene/Triphenylene	<16	<16
Coronene	<80	<80
Dibenzo(a,c/a,h)Anthracene	<16	<16
Dibenzo(a,e)pyrene	<80	<80
9,10-dimethylanthracene	<16	<16
7,12-Dimethylbenzo(a)anthracene	<16	<16
Fluoranthene	<16	<16
Fluorene	<16	<16
Indeno(1,2,3-cd)Pyrene	<16	<16
2-methylanthracene	<16	<16
3-Methylcholanthrene	<80	<80
1-Methylnaphthalene	26.9	<16
2-Methylnaphthalene	34.7	22.2
1-Methylphenanthrene	<16	<16
9-Methylphenanthrene	<16	<16
Naphthalene	384	182
Perylene	<16	<16
Phenanthrene	<16	<16
Picene	<80	<80
Pyrene	<16	<16
Quinoline	<16	<16
m-terphenyl	<16	<16
o-Terphenyl	<16	<16
p-terphenyl	<16	<16
Tetralin	112	68.1
Total	<1392	<1098

"<" 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			Average	Coefficient of Variation	Total Collected
	Run No. 1 Tube 1A/1B	Run No. 2 Tube 3A/3B	Run No. 3 Tube 5A/5B			
	µg	µg	µg	µg	%	µg
Benzene	0.75	0.85	0.77	0.79	7.1	2.37
Bromodichloromethane	0.078	0.13	0.084	0.096	27.7	0.29
Bromomethane	0.57	0.84	0.41	0.60	35.6	1.81
2-Butanone	0.078	0.12	0.084	0.093	22.0	0.28
Chloroethene	<0.02	<0.02	<0.02	<0.020	-	<0.060
Dibromochloromethane	0.094	0.067	0.077	0.079	17.2	0.24
1,2-Dibromoethane	<0.02	0.022	<0.02	<0.021	5.6	<0.062
Dichlorodifluoromethane	0.047	<0.02	<0.02	<0.029	53.8	<0.087
1,1-Dichloroethane	0.032	0.044	0.043	0.040	16.8	0.12
1,1-Dichloroethene	0.024	0.030	0.026	0.027	11.5	0.080
trans-1,2-Dichloroethene	0.010	0.016	<0.01	<0.012	28.9	<0.036
Dichloromethane	0.59	0.77	0.37	0.58	35.2	1.73
1,2-Dichloropropane	0.35	0.41	0.37	0.37	7.9	1.12
Ethyl Acetate	<0.1	<0.1	<0.1	<0.10	-	<0.30
Ethylbenzene	0.066	0.078	0.060	0.068	13.5	0.20
Isopropylbenzene	<0.02	<0.02	<0.02	<0.020	-	<0.060
2-Propanone	0.43	0.42	0.41	0.42	2.6	1.25
Styrene	1.42	1.87	1.49	1.59	15.2	4.77
Tetrachloroethene	<0.01	<0.01	<0.01	<0.010	-	<0.030
Tetrachloromethane	<0.01	<0.01	<0.01	<0.010	-	<0.030
Toluene	0.41	0.87	0.83	0.70	36.3	2.10
Tribromomethane	0.074	0.062	0.071	0.069	9.1	0.21
1,1,1-Trichloroethane	<0.01	<0.01	<0.01	<0.010	-	<0.030
Trichloroethene	0.085	0.090	0.080	0.085	5.9	0.26
Trichlorofluoromethane	<0.02	<0.02	<0.02	<0.020	-	<0.060
Trichloromethane	0.10	0.13	0.14	0.12	14.2	0.37
Trichlorotrifluoroethane	<0.02	<0.02	<0.02	<0.020	-	<0.060
1,2,4-Trimethylbenzene	<0.02	0.046	0.027	<0.031	43.4	<0.093
1,3,5-Trimethylbenzene	<0.02	<0.02	<0.02	<0.020	-	<0.060
Xylenes (total)	0.12	0.16	0.12	0.13	19.0	0.40
Total	<5.58	<7.27	<5.73	<6.19	15.1	<18.6

Dry Gas Volume Sampled (Rm^3*) :

Run No. 1	0.0208
Run No. 2	0.0206
Run No. 3	0.0219

* At 25°C and 1 atmosphere.

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

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

Compound	Cartridge Amount Collected			Average	Coefficient of Variation	Total Collected
	Run No. 1 Tube 7A/7B	Run No. 2 Tube 8A/8B	Run No. 3 Tube 9A/9B			
	µg	µg	µg	µg	%	µg
Benzene	0.60	0.70	0.61	0.64	8.9	1.92
Bromodichloromethane	0.096	0.10	0.085	0.095	9.6	0.28
Bromomethane	0.93	0.98	0.55	0.82	29.1	2.46
2-Butanone	0.10	0.069	0.037	0.069	45.9	0.21
Chloroethene	<0.02	<0.02	<0.02	<0.020	-	<0.060
Dibromochloromethane	0.093	0.092	0.12	0.10	14.1	0.30
1,2-Dibromoethane	0.033	<0.02	<0.02	<0.024	30.8	<0.073
Dichlorodifluoromethane	<0.02	0.021	<0.02	<0.020	2.8	<0.061
1,1-Dichloroethane	0.023	0.030	0.027	0.027	13.2	0.080
1,1-Dichloroethene	0.017	0.023	0.019	0.020	15.5	0.059
trans-1,2-Dichloroethene	<0.01	0.010	<0.01	<0.010	-	<0.030
Dichloromethane	1.01	1.46	0.72	1.06	35.2	3.19
1,2-Dichloropropane	0.21	0.23	0.22	0.22	3.7	0.66
Ethyl Acetate	<0.1	<0.1	<0.1	<0.10	-	<0.30
Ethylbenzene	0.10	0.087	0.10	0.097	9.0	0.29
Isopropylbenzene	<0.02	<0.02	<0.02	<0.020	-	<0.060
2-Propanone	0.54	0.39	0.26	0.39	35.5	1.18
Styrene	1.72	1.41	2.04	1.72	18.1	5.17
Tetrachloroethene	<0.01	<0.01	<0.01	<0.010	-	<0.030
Tetrachloromethane	<0.01	<0.01	<0.01	<0.010	-	<0.030
Toluene	0.56	0.60	0.57	0.58	4.2	1.73
Tribromomethane	0.083	0.082	0.095	0.087	8.3	0.26
1,1,1-Trichloroethane	<0.01	<0.01	<0.01	<0.010	-	<0.030
Trichloroethene	0.065	0.058	0.052	0.058	11.2	0.18
Trichlorofluoromethane	<0.02	<0.02	<0.02	<0.020	-	<0.060
Trichloromethane	0.11	0.15	0.14	0.14	16.7	0.41
Trichlorotrifluoroethane	<0.02	<0.02	<0.02	<0.020	-	<0.060
1,2,4-Trimethylbenzene	0.034	0.039	0.057	0.043	27.9	0.13
1,3,5-Trimethylbenzene	<0.02	<0.02	<0.02	<0.020	-	<0.060
Xylenes (total)	0.20	0.18	0.24	0.21	13.8	0.62
Total	<6.78	<6.98	<6.20	<6.65	6.1	<20.0

Dry Gas Volume Sampled (Rm^3*) :

Run No. 1	0.0208
Run No. 2	0.0215
Run No. 3	0.0217

* At 25°C and 1 atmosphere.

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

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

Compound	Cartridge Amount Collected			Average	Coefficient of Variation	Total Collected
	Run No. 1 Tube 12A/12B	Run No. 2 Tube 13A/13B	Run No. 4 Tube 15A/15B			
	µg	µg	µg	µg	%	µg
Benzene	0.36	0.62	0.49	0.49	26.1	1.48
Bromodichloromethane	0.043	0.091	0.051	0.062	41.7	0.19
Bromomethane	0.30	0.54	0.49	0.45	28.8	1.34
2-Butanone	0.050	0.16	0.10	0.103	53.3	0.31
Chloroethene	<0.02	<0.02	<0.02	<0.020	-	<0.060
Dibromochloromethane	0.055	0.069	0.048	0.057	18.7	0.17
1,2-Dibromoethane	<0.02	0.026	<0.02	<0.022	15.7	<0.066
Dichlorodifluoromethane	<0.02	0.021	<0.02	<0.020	2.8	<0.061
1,1-Dichloroethane	<0.01	0.016	<0.01	<0.012	28.9	<0.036
1,1-Dichloroethene	<0.01	0.013	<0.01	<0.011	15.7	<0.033
trans-1,2-Dichloroethene	<0.01	<0.01	<0.01	<0.010	-	<0.030
Dichloromethane	0.47	1.11	0.45	0.68	54.9	2.04
1,2-Dichloropropane	0.054	0.11	0.076	0.078	32.7	0.24
Ethyl Acetate	<0.1	<0.1	<0.1	<0.10	-	<0.30
Ethylbenzene	0.22	0.34	0.29	0.28	21.8	0.84
Isopropylbenzene	<0.02	<0.02	<0.02	<0.020	-	<0.060
2-Propanone	0.18	0.38	0.24	0.27	38.0	0.80
Styrene	0.57	0.72	1.31	0.87	45.3	2.60
Tetrachloroethene	<0.01	<0.01	<0.01	<0.010	-	<0.030
Tetrachloromethane	<0.01	<0.01	<0.01	<0.010	-	<0.030
Toluene	1.56	1.36	0.90	1.27	26.6	3.81
Tribromomethane	0.078	0.066	0.074	0.073	8.4	0.22
1,1,1-Trichloroethane	<0.01	<0.01	<0.01	<0.010	-	<0.030
Trichloroethene	0.029	0.043	0.029	0.034	24.0	0.10
Trichlorofluoromethane	<0.02	<0.02	<0.02	<0.020	-	<0.060
Trichloromethane	0.077	0.13	0.077	0.096	34.3	0.29
Trichlorotrifluoroethane	<0.02	<0.02	<0.02	<0.020	-	<0.060
1,2,4-Trimethylbenzene	0.075	0.044	0.058	0.059	26.3	0.18
1,3,5-Trimethylbenzene	<0.02	<0.02	0.023	<0.021	8.2	<0.063
Xylenes (total)	0.33	0.53	0.51	0.46	23.4	1.37
Total	<4.75	<6.63	<5.50	<5.63	16.7	<16.9

Dry Gas Volume Sampled (Rm^3*) :

Run No. 1	0.0216
Run No. 2	0.0221
Run No. 4	0.0212

* At 25°C and 1 atmosphere.

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

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

Compound	Total Collected	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	2.37	11.8	37.4	30.5	18.8	0.68
Bromodichloromethane	0.29	1.44	4.57	3.72	2.29	0.083
Bromomethane	1.81	9.04	28.7	23.4	14.4	0.52
2-Butanone	0.28	1.39	4.39	3.58	2.20	0.080
Chloroethene	<0.060	<0.30	<0.95	<0.77	<0.48	<0.017
Dibromochloromethane	0.24	1.19	3.76	3.07	1.89	0.068
1,2-Dibromoethane	<0.062	<0.31	<0.98	<0.80	<0.49	<0.018
Dichlorodifluoromethane	<0.087	<0.43	<1.37	<1.12	<0.69	<0.025
1,1-Dichloroethane	0.12	0.59	1.88	1.53	0.94	0.034
1,1-Dichloroethene	0.080	0.40	1.26	1.03	0.63	0.023
trans-1,2-Dichloroethene	<0.036	<0.18	<0.57	<0.46	<0.29	<0.010
Dichloromethane	1.73	8.63	27.4	22.3	13.7	0.50
1,2-Dichloropropane	1.12	5.58	17.7	14.4	8.88	0.32
Ethyl Acetate	<0.30	<1.49	<4.74	<3.86	<2.38	<0.086
Ethylbenzene	0.20	1.02	3.22	2.63	1.62	0.058
Isopropylbenzene	<0.060	<0.30	<0.95	<0.77	<0.48	<0.017
2-Propanone	1.25	6.25	19.8	16.2	9.93	0.36
Styrene	4.77	23.8	75.4	61.5	37.8	1.36
Tetrachloroethene	<0.030	<0.15	<0.47	<0.39	<0.24	<0.0086
Tetrachloromethane	<0.030	<0.15	<0.47	<0.39	<0.24	<0.0086
Toluene	2.10	10.5	33.2	27.1	16.7	0.60
Tribromomethane	0.21	1.03	3.27	2.67	1.64	0.059
1,1,1-Trichloroethane	<0.030	<0.15	<0.47	<0.39	<0.24	<0.0086
Trichloroethene	0.26	1.27	4.03	3.28	2.02	0.073
Trichlorofluoromethane	<0.060	<0.30	<0.95	<0.77	<0.48	<0.017
Trichloromethane	0.37	1.86	5.89	4.80	2.95	0.11
Trichlorotrifluoroethane	<0.060	<0.30	<0.95	<0.77	<0.48	<0.017
1,2,4-Trimethylbenzene	<0.093	<0.46	<1.47	<1.20	<0.74	<0.027
1,3,5-Trimethylbenzene	<0.060	<0.30	<0.95	<0.77	<0.48	<0.017
Xylenes (total)	0.40	1.99	6.30	5.14	3.16	0.11
Total	<18.6	<92.6	<294	<239	<147	<5.31

Dry Gas Volume Sampled (Rm^3*) :	0.0633
Actual Flowrate (m^3/s) :	57.4
Dry Reference Flowrate (Rm^3/s*) :	18.1
Dry Adjusted Flowrate (Rm^3/s**) :	22.2
Wet Reference Flowrate (Rm^3/s*) :	36.1

* 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	1.92	9.52	29.9	24.8	15.1	0.56
Bromodichloromethane	0.28	1.41	4.43	3.68	2.23	0.082
Bromomethane	2.46	12.2	38.3	31.8	19.3	0.71
2-Butanone	0.21	1.02	3.22	2.67	1.62	0.060
Chloroethene	<0.060	<0.30	<0.94	<0.78	<0.47	<0.017
Dibromochloromethane	0.30	1.50	4.71	3.91	2.38	0.088
1,2-Dibromoethane	<0.073	<0.36	<1.14	<0.95	<0.57	<0.021
Dichlorodifluoromethane	<0.061	<0.30	<0.95	<0.79	<0.48	<0.018
1,1-Dichloroethane	0.080	0.40	1.25	1.04	0.63	0.023
1,1-Dichloroethene	0.059	0.29	0.92	0.76	0.46	0.017
trans-1,2-Dichloroethene	<0.030	<0.15	<0.47	<0.39	<0.24	<0.0087
Dichloromethane	3.19	15.8	49.7	41.3	25.1	0.92
1,2-Dichloropropane	0.66	3.29	10.3	8.57	5.20	0.19
Ethyl Acetate	<0.30	<1.49	<4.68	<3.89	<2.36	<0.087
Ethylbenzene	0.29	1.45	4.54	3.77	2.29	0.084
Isopropylbenzene	<0.060	<0.30	<0.94	<0.78	<0.47	<0.017
2-Propanone	1.18	5.88	18.5	15.3	9.31	0.34
Styrene	5.17	25.7	80.7	67.0	40.7	1.50
Tetrachloroethene	<0.030	<0.15	<0.47	<0.39	<0.24	<0.0087
Tetrachloromethane	<0.030	<0.15	<0.47	<0.39	<0.24	<0.0087
Toluene	1.73	8.59	27.0	22.4	13.6	0.50
Tribromomethane	0.26	1.29	4.06	3.37	2.05	0.075
1,1,1-Trichloroethane	<0.030	<0.15	<0.47	<0.39	<0.24	<0.0087
Trichloroethene	0.18	0.87	2.73	2.27	1.38	0.051
Trichlorofluoromethane	<0.060	<0.30	<0.94	<0.78	<0.47	<0.017
Trichloromethane	0.41	2.02	6.35	5.27	3.20	0.12
Trichlorotrifluoroethane	<0.060	<0.30	<0.94	<0.78	<0.47	<0.017
1,2,4-Trimethylbenzene	0.13	0.65	2.03	1.68	1.02	0.038
1,3,5-Trimethylbenzene	<0.060	<0.30	<0.94	<0.78	<0.47	<0.017
Xylenes (total)	0.62	3.07	9.65	8.01	4.86	0.18
Total	<20.0	<99.2	<312	<259	<157	<5.80

Dry Gas Volume Sampled (Rm^3*) :	0.0641
Actual Flowrate (m^3/s) :	58.4
Dry Reference Flowrate (Rm^3/s*) :	18.6
Dry Adjusted Flowrate (Rm^3/s**) :	22.4
Wet Reference Flowrate (Rm^3/s*) :	36.9

* 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	1.48	7.30	22.8	19.0	11.5	0.43
Bromodichloromethane	0.19	0.91	2.85	2.39	1.44	0.054
Bromomethane	1.34	6.60	20.6	17.2	10.4	0.39
2-Butanone	0.31	1.53	4.78	4.00	2.42	0.090
Chloroethene	<0.060	<0.30	<0.93	<0.77	<0.47	<0.017
Dibromochloromethane	0.17	0.85	2.65	2.22	1.34	0.050
1,2-Dibromoethane	<0.066	<0.33	<1.02	<0.85	<0.51	<0.019
Dichlorodifluoromethane	<0.061	<0.30	<0.94	<0.79	<0.48	<0.018
1,1-Dichloroethane	<0.036	<0.18	<0.56	<0.46	<0.28	<0.010
1,1-Dichloroethene	<0.033	<0.16	<0.51	<0.43	<0.26	<0.0096
trans-1,2-Dichloroethene	<0.030	<0.15	<0.46	<0.39	<0.23	<0.0087
Dichloromethane	2.04	10.1	31.4	26.3	15.9	0.59
1,2-Dichloropropane	0.24	1.16	3.63	3.03	1.83	0.068
Ethyl Acetate	<0.30	<1.48	<4.63	<3.87	<2.34	<0.087
Ethylbenzene	0.84	4.17	13.0	10.9	6.57	0.24
Isopropylbenzene	<0.060	<0.30	<0.93	<0.77	<0.47	<0.017
2-Propanone	0.80	3.95	12.3	10.3	6.24	0.23
Styrene	2.60	12.8	40.1	33.5	20.3	0.75
Tetrachloroethene	<0.030	<0.15	<0.46	<0.39	<0.23	<0.0087
Tetrachloromethane	<0.030	<0.15	<0.46	<0.39	<0.23	<0.0087
Toluene	3.81	18.8	58.8	49.1	29.7	1.11
Tribromomethane	0.22	1.08	3.36	2.81	1.70	0.063
1,1,1-Trichloroethane	<0.030	<0.15	<0.46	<0.39	<0.23	<0.0087
Trichloroethene	0.10	0.50	1.56	1.30	0.79	0.029
Trichlorofluoromethane	<0.060	<0.30	<0.93	<0.77	<0.47	<0.017
Trichloromethane	0.29	1.42	4.44	3.71	2.25	0.084
Trichlorotrifluoroethane	<0.060	<0.30	<0.93	<0.77	<0.47	<0.017
1,2,4-Trimethylbenzene	0.18	0.87	2.73	2.28	1.38	0.051
1,3,5-Trimethylbenzene	<0.063	<0.31	<0.97	<0.81	<0.49	<0.018
Xylenes (total)	1.37	6.79	21.2	17.7	10.7	0.40
Total	<16.9	<83.4	<260	<218	<132	<4.90

Dry Gas Volume Sampled (Rm^3*) :	0.0648
Actual Flowrate (m^3/s) :	58.7
Dry Reference Flowrate (Rm^3/s*) :	18.8
Dry Adjusted Flowrate (Rm^3/s**) :	22.5
Wet Reference Flowrate (Rm^3/s*) :	37.2

* 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	11.8	9.52	7.30	9.54
Bromodichloromethane	1.44	1.41	0.91	1.26
Bromomethane	9.04	12.2	6.60	9.28
2-Butanone	1.39	1.02	1.53	1.31
Chloroethene	<0.30	<0.30	<0.30	<0.30
Dibromochloromethane	1.19	1.50	0.85	1.18
1,2-Dibromoethane	<0.31	<0.36	<0.33	<0.33
Dichlorodifluoromethane	<0.43	<0.30	<0.30	<0.35
1,1-Dichloroethane	0.59	0.40	<0.18	<0.39
1,1-Dichloroethene	0.40	0.29	<0.16	<0.28
trans-1,2-Dichloroethene	<0.18	<0.15	<0.15	<0.16
Dichloromethane	8.63	15.8	10.1	11.5
1,2-Dichloropropane	5.58	3.29	1.16	3.34
Ethyl Acetate	<1.49	<1.49	<1.48	<1.49
Ethylbenzene	1.02	1.45	4.17	2.21
Isopropylbenzene	<0.30	<0.30	<0.30	<0.30
2-Propanone	6.25	5.88	3.95	5.36
Styrene	23.8	25.7	12.8	20.8
Tetrachloroethene	<0.15	<0.15	<0.15	<0.15
Tetrachloromethane	<0.15	<0.15	<0.15	<0.15
Toluene	10.5	8.59	18.8	12.6
Tribromomethane	1.03	1.29	1.08	1.13
1,1,1-Trichloroethane	<0.15	<0.15	<0.15	<0.15
Trichloroethene	1.27	0.87	0.50	0.88
Trichlorofluoromethane	<0.30	<0.30	<0.30	<0.30
Trichloromethane	1.86	2.02	1.42	1.77
Trichlorotrifluoroethane	<0.30	<0.30	<0.30	<0.30
1,2,4-Trimethylbenzene	<0.46	0.65	0.87	<0.66
1,3,5-Trimethylbenzene	<0.30	<0.30	<0.31	<0.30
Xylenes (total)	1.99	3.07	6.79	3.95
Total	<92.6	<99.2	<83.4	<91.7

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	37.4	29.9	22.8	30.0
Bromodichloromethane	4.57	4.43	2.85	3.95
Bromomethane	28.7	38.3	20.6	29.2
2-Butanone	4.39	3.22	4.78	4.13
Chloroethene	<0.95	<0.94	<0.93	<0.94
Dibromochloromethane	3.76	4.71	2.65	3.71
1,2-Dibromoethane	<0.98	<1.14	<1.02	<1.05
Dichlorodifluoromethane	<1.37	<0.95	<0.94	<1.09
1,1-Dichloroethane	1.88	1.25	<0.56	<1.23
1,1-Dichloroethene	1.26	0.92	<0.51	<0.90
trans-1,2-Dichloroethene	<0.57	<0.47	<0.46	<0.50
Dichloromethane	27.4	49.7	31.4	36.2
1,2-Dichloropropane	17.7	10.3	3.63	10.6
Ethyl Acetate	<4.74	<4.68	<4.63	<4.68
Ethylbenzene	3.22	4.54	13.0	6.92
Isopropylbenzene	<0.95	<0.94	<0.93	<0.94
2-Propanone	19.8	18.5	12.3	16.9
Styrene	75.4	80.7	40.1	65.4
Tetrachloroethene	<0.47	<0.47	<0.46	<0.47
Tetrachloromethane	<0.47	<0.47	<0.46	<0.47
Toluene	33.2	27.0	58.8	39.7
Tribromomethane	3.27	4.06	3.36	3.56
1,1,1-Trichloroethane	<0.47	<0.47	<0.46	<0.47
Trichloroethene	4.03	2.73	1.56	2.77
Trichlorofluoromethane	<0.95	<0.94	<0.93	<0.94
Trichloromethane	5.89	6.35	4.44	5.56
Trichlorotrifluoroethane	<0.95	<0.94	<0.93	<0.94
1,2,4-Trimethylbenzene	<1.47	2.03	2.73	<2.08
1,3,5-Trimethylbenzene	<0.95	<0.94	<0.97	<0.95
Xylenes (total)	6.30	9.65	21.2	12.4
Total	<294	<312	<260	<289

* 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	30.5	24.8	19.0	24.8
Bromodichloromethane	3.72	3.68	2.39	3.26
Bromomethane	23.4	31.8	17.2	24.1
2-Butanone	3.58	2.67	4.00	3.42
Chloroethene	<0.77	<0.78	<0.77	<0.77
Dibromochloromethane	3.07	3.91	2.22	3.07
1,2-Dibromoethane	<0.80	<0.95	<0.85	<0.87
Dichlorodifluoromethane	<1.12	<0.79	<0.79	<0.90
1,1-Dichloroethane	1.53	1.04	<0.46	<1.01
1,1-Dichloroethene	1.03	0.76	<0.43	<0.74
trans-1,2-Dichloroethene	<0.46	<0.39	<0.39	<0.41
Dichloromethane	22.3	41.3	26.3	30.0
1,2-Dichloropropane	14.4	8.57	3.03	8.68
Ethyl Acetate	<3.86	<3.89	<3.87	<3.87
Ethylbenzene	2.63	3.77	10.9	5.76
Isopropylbenzene	<0.77	<0.78	<0.77	<0.77
2-Propanone	16.2	15.3	10.3	13.9
Styrene	61.5	67.0	33.5	54.0
Tetrachloroethene	<0.39	<0.39	<0.39	<0.39
Tetrachloromethane	<0.39	<0.39	<0.39	<0.39
Toluene	27.1	22.4	49.1	32.9
Tribromomethane	2.67	3.37	2.81	2.95
1,1,1-Trichloroethane	<0.39	<0.39	<0.39	<0.39
Trichloroethene	3.28	2.27	1.30	2.29
Trichlorofluoromethane	<0.77	<0.78	<0.77	<0.77
Trichloromethane	4.80	5.27	3.71	4.60
Trichlorotrifluoroethane	<0.77	<0.78	<0.77	<0.77
1,2,4-Trimethylbenzene	<1.20	1.68	2.28	<1.72
1,3,5-Trimethylbenzene	<0.77	<0.78	<0.81	<0.79
Xylenes (total)	5.14	8.01	17.7	10.3
Total	<239	<259	<218	<239

* 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	18.8	15.1	11.5	15.1
Bromodichloromethane	2.29	2.23	1.44	1.99
Bromomethane	14.4	19.3	10.4	14.7
2-Butanone	2.20	1.62	2.42	2.08
Chloroethene	<0.48	<0.47	<0.47	<0.47
Dibromochloromethane	1.89	2.38	1.34	1.87
1,2-Dibromoethane	<0.49	<0.57	<0.51	<0.53
Dichlorodifluoromethane	<0.69	<0.48	<0.48	<0.55
1,1-Dichloroethane	0.94	0.63	<0.28	<0.62
1,1-Dichloroethene	0.63	0.46	<0.26	<0.45
trans-1,2-Dichloroethene	<0.29	<0.24	<0.23	<0.25
Dichloromethane	13.7	25.1	15.9	18.2
1,2-Dichloropropane	8.88	5.20	1.83	5.30
Ethyl Acetate	<2.38	<2.36	<2.34	<2.36
Ethylbenzene	1.62	2.29	6.57	3.49
Isopropylbenzene	<0.48	<0.47	<0.47	<0.47
2-Propanone	9.93	9.31	6.24	8.49
Styrene	37.8	40.7	20.3	32.9
Tetrachloroethene	<0.24	<0.24	<0.23	<0.24
Tetrachloromethane	<0.24	<0.24	<0.23	<0.24
Toluene	16.7	13.6	29.7	20.0
Tribromomethane	1.64	2.05	1.70	1.80
1,1,1-Trichloroethane	<0.24	<0.24	<0.23	<0.24
Trichloroethene	2.02	1.38	0.79	1.39
Trichlorofluoromethane	<0.48	<0.47	<0.47	<0.47
Trichloromethane	2.95	3.20	2.25	2.80
Trichlorotrifluoroethane	<0.48	<0.47	<0.47	<0.47
1,2,4-Trimethylbenzene	<0.74	1.02	1.38	<1.05
1,3,5-Trimethylbenzene	<0.48	<0.47	<0.49	<0.48
Xylenes (total)	3.16	4.86	10.7	6.24
Total	<147	<157	<132	<145

* 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	0.68	0.56	0.43	0.55
Bromodichloromethane	0.083	0.082	0.054	0.073
Bromomethane	0.52	0.71	0.39	0.54
2-Butanone	0.080	0.060	0.090	0.076
Chloroethene	<0.017	<0.017	<0.017	<0.017
Dibromochloromethane	0.068	0.088	0.050	0.069
1,2-Dibromoethane	<0.018	<0.021	<0.019	<0.019
Dichlorodifluoromethane	<0.025	<0.018	<0.018	<0.020
1,1-Dichloroethane	0.034	0.023	<0.010	<0.023
1,1-Dichloroethene	0.023	0.017	<0.0096	<0.017
trans-1,2-Dichloroethene	<0.010	<0.0087	<0.0087	<0.0092
Dichloromethane	0.50	0.92	0.59	0.67
1,2-Dichloropropane	0.32	0.19	0.068	0.19
Ethyl Acetate	<0.086	<0.087	<0.087	<0.087
Ethylbenzene	0.058	0.084	0.24	0.13
Isopropylbenzene	<0.017	<0.017	<0.017	<0.017
2-Propanone	0.36	0.34	0.23	0.31
Styrene	1.36	1.50	0.75	1.21
Tetrachloroethene	<0.0086	<0.0087	<0.0087	<0.0087
Tetrachloromethane	<0.0086	<0.0087	<0.0087	<0.0087
Toluene	0.60	0.50	1.11	0.74
Tribromomethane	0.059	0.075	0.063	0.066
1,1,1-Trichloroethane	<0.0086	<0.0087	<0.0087	<0.0087
Trichloroethene	0.073	0.051	0.029	0.051
Trichlorofluoromethane	<0.017	<0.017	<0.017	<0.017
Trichloromethane	0.11	0.12	0.084	0.10
Trichlorotrifluoroethane	<0.017	<0.017	<0.017	<0.017
1,2,4-Trimethylbenzene	<0.027	0.038	0.051	<0.039
1,3,5-Trimethylbenzene	<0.017	<0.017	<0.018	<0.018
Xylenes (total)	0.11	0.18	0.40	0.23
Total	<5.31	<5.80	<4.90	<5.34

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	9.54	30.0	24.8	15.1	0.55
Bromodichloromethane	1.26	3.95	3.26	1.99	0.073
Bromomethane	9.28	29.2	24.1	14.7	0.54
2-Butanone	1.31	4.13	3.42	2.08	0.076
Chloroethene	<0.30	<0.94	<0.77	<0.47	<0.017
Dibromochloromethane	1.18	3.71	3.07	1.87	0.069
1,2-Dibromoethane	<0.33	<1.05	<0.87	<0.53	<0.019
Dichlorodifluoromethane	<0.35	<1.09	<0.90	<0.55	<0.020
1,1-Dichloroethane	<0.39	<1.23	<1.01	<0.62	<0.023
1,1-Dichloroethene	<0.28	<0.90	<0.74	<0.45	<0.017
trans-1,2-Dichloroethene	<0.16	<0.50	<0.41	<0.25	<0.0092
Dichloromethane	11.5	36.2	30.0	18.2	0.67
1,2-Dichloropropane	3.34	10.6	8.68	5.30	0.19
Ethyl Acetate	<1.49	<4.68	<3.87	<2.36	<0.087
Ethylbenzene	2.21	6.92	5.76	3.49	0.13
Isopropylbenzene	<0.30	<0.94	<0.77	<0.47	<0.017
2-Propanone	5.36	16.9	13.9	8.49	0.31
Styrene	20.8	65.4	54.0	32.9	1.21
Tetrachloroethene	<0.15	<0.47	<0.39	<0.24	<0.0087
Tetrachloromethane	<0.15	<0.47	<0.39	<0.24	<0.0087
Toluene	12.6	39.7	32.9	20.0	0.74
Tribromomethane	1.13	3.56	2.95	1.80	0.066
1,1,1-Trichloroethane	<0.15	<0.47	<0.39	<0.24	<0.0087
Trichloroethene	0.88	2.77	2.29	1.39	0.051
Trichlorofluoromethane	<0.30	<0.94	<0.77	<0.47	<0.017
Trichloromethane	1.77	5.56	4.60	2.80	0.10
Trichlorotrifluoroethane	<0.30	<0.94	<0.77	<0.47	<0.017
1,2,4-Trimethylbenzene	<0.66	<2.08	<1.72	<1.05	<0.039
1,3,5-Trimethylbenzene	<0.30	<0.95	<0.79	<0.48	<0.018
Xylenes (total)	3.95	12.4	10.3	6.24	0.23
Total	<91.7	<289	<239	<145	<5.34

* 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 11A/11B	Trip Blank Tube 16A/16B
	µg	µg
Benzene	<0.05	<0.05
Bromodichloromethane	<0.01	<0.01
Bromomethane	<0.09	<0.09
2-Butanone	<0.01	<0.01
Chloroethene	<0.02	<0.02
Dibromochloromethane	<0.01	<0.01
1,2-Dibromoethane	<0.02	<0.02
Dichlorodifluoromethane	<0.02	<0.02
1,1-Dichloroethane	<0.01	<0.01
1,1-Dichloroethene	<0.01	<0.01
trans-1,2-Dichloroethene	<0.01	<0.01
Dichloromethane	<0.1	0.29
1,2-Dichloropropane	<0.01	<0.01
Ethyl Acetate	<0.1	<0.1
Ethylbenzene	<0.01	<0.01
Isopropylbenzene	<0.02	<0.02
2-Propanone	0.13	0.20
Styrene	<0.02	<0.02
Tetrachloroethene	<0.01	<0.01
Tetrachloromethane	<0.01	<0.01
Toluene	<0.05	0.12
Tribromomethane	<0.01	<0.01
1,1,1-Trichloroethane	<0.01	<0.01
Trichloroethene	<0.01	0.023
Trichlorofluoromethane	<0.02	<0.02
Trichloromethane	<0.01	<0.01
Trichlorotrifluoroethane	<0.02	<0.02
1,2,4-Trimethylbenzene	<0.02	<0.02
1,3,5-Trimethylbenzene	<0.02	<0.02
Xylenes (total)	<0.04	<0.04
Total	<0.88	<1.22

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

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

Run No.	Compound	Amount Collected ng	Dry Gas Volume Sampled Rm^3 *	Dry Reference Concentration $\mu g/Rm^3$ *	Dry Reference Flowrate Rm^3/s *	Emission Rate mg/s
1	Benzene	745	0.0208	35.8	18.1	0.65
	Dichloromethane	591	0.0208	28.4	18.1	0.51
	Ethylbenzene	66	0.0208	3.17	18.1	0.057
	2-Propanone	427	0.0208	20.5	18.1	0.37
	Styrene	1416	0.0208	68.0	18.1	1.23
	Toluene	408	0.0208	19.6	18.1	0.35
	Trichloroethene	85	0.0208	4.08	18.1	0.074
	1,2,4-Trimethylbenzene	< 20	0.0208	<0.96	18.1	<0.017
	1,3,5-Trimethylbenzene	< 20	0.0208	<0.96	18.1	<0.017
	Total Xylenes	116	0.0208	5.57	18.1	0.10
2	Benzene	852	0.0206	41.3	18.1	0.75
	Dichloromethane	774	0.0206	37.5	18.1	0.68
	Ethylbenzene	78	0.0206	3.78	18.1	0.068
	2-Propanone	421	0.0206	20.4	18.1	0.37
	Styrene	1867	0.0206	90.6	18.1	1.64
	Toluene	867	0.0206	42.1	18.1	0.76
	Trichloroethene	90	0.0206	4.37	18.1	0.079
	1,2,4-Trimethylbenzene	46	0.0206	2.23	18.1	0.040
	1,3,5-Trimethylbenzene	< 20	0.0206	<0.97	18.1	<0.018
	Total Xylenes	162	0.0206	7.86	18.1	0.14
3	Benzene	771	0.0219	35.3	18.1	0.64
	Dichloromethane	368	0.0219	16.8	18.1	0.30
	Ethylbenzene	60	0.0219	2.74	18.1	0.050
	2-Propanone	406	0.0219	18.6	18.1	0.34
	Styrene	1490	0.0219	68.2	18.1	1.23
	Toluene	829	0.0219	37.9	18.1	0.69
	Trichloroethene	80	0.0219	3.66	18.1	0.066
	1,2,4-Trimethylbenzene	27	0.0219	1.24	18.1	0.022
	1,3,5-Trimethylbenzene	< 20	0.0219	<0.91	18.1	<0.017
	Total Xylenes	121	0.0219	5.54	18.1	0.10
Total	Benzene	2368	0.0633	37.4	18.1	0.68
	Dichloromethane	1733	0.0633	27.4	18.1	0.50
	Ethylbenzene	204	0.0633	3.22	18.1	0.058
	2-Propanone	1254	0.0633	19.8	18.1	0.36
	Styrene	4773	0.0633	75.4	18.1	1.36
	Toluene	2104	0.0633	33.2	18.1	0.60
	Trichloroethene	255	0.0633	4.03	18.1	0.073
	1,2,4-Trimethylbenzene	< 93	0.0633	<1.47	18.1	<0.027
	1,3,5-Trimethylbenzene	< 60	0.0633	<0.95	18.1	<0.017
	Total Xylenes	399	0.0633	6.30	18.1	0.11

* At 25°C and 1 atmosphere.

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

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

Run No.	Compound	Amount Collected ng	Dry Gas Volume Sampled Rm^3 *	Dry Reference Concentration $\mu g/Rm^3$ *	Dry Reference Flowrate Rm^3/s *	Emission Rate mg/s
1	Benzene	603	0.0208	28.9	18.6	0.54
	Dichloromethane	1006	0.0208	48.3	18.6	0.90
	Ethylbenzene	101	0.0208	4.85	18.6	0.090
	2-Propanone	536	0.0208	25.7	18.6	0.48
	Styrene	1720	0.0208	82.6	18.6	1.54
	Toluene	558	0.0208	26.8	18.6	0.50
	Trichloroethene	65	0.0208	3.12	18.6	0.058
	1,2,4-Trimethylbenzene	34	0.0208	1.63	18.6	0.030
	1,3,5-Trimethylbenzene	< 20	0.0208	<0.96	18.6	<0.018
	Total Xylenes	200	0.0208	9.60	18.6	0.18
2	Benzene	704	0.0215	32.8	18.6	0.61
	Dichloromethane	1460	0.0215	67.9	18.6	1.26
	Ethylbenzene	87	0.0215	4.05	18.6	0.075
	2-Propanone	391	0.0215	18.2	18.6	0.34
	Styrene	1414	0.0215	65.8	18.6	1.22
	Toluene	603	0.0215	28.1	18.6	0.52
	Trichloroethene	58	0.0215	2.70	18.6	0.050
	1,2,4-Trimethylbenzene	39	0.0215	1.81	18.6	0.034
	1,3,5-Trimethylbenzene	< 20	0.0215	<0.93	18.6	<0.017
	Total Xylenes	181	0.0215	8.42	18.6	0.16
3	Benzene	608	0.0217	28.0	18.6	0.52
	Dichloromethane	719	0.0217	33.1	18.6	0.62
	Ethylbenzene	103	0.0217	4.74	18.6	0.088
	2-Propanone	256	0.0217	11.8	18.6	0.22
	Styrene	2038	0.0217	93.7	18.6	1.74
	Toluene	566	0.0217	26.0	18.6	0.48
	Trichloroethene	52	0.0217	2.39	18.6	0.044
	1,2,4-Trimethylbenzene	57	0.0217	2.62	18.6	0.049
	1,3,5-Trimethylbenzene	< 20	0.0217	<0.92	18.6	<0.017
	Total Xylenes	237	0.0217	10.9	18.6	0.20
Total	Benzene	1915	0.0641	29.9	18.6	0.56
	Dichloromethane	3185	0.0641	49.7	18.6	0.92
	Ethylbenzene	291	0.0641	4.54	18.6	0.084
	2-Propanone	1183	0.0641	18.5	18.6	0.34
	Styrene	5172	0.0641	80.7	18.6	1.50
	Toluene	1727	0.0641	27.0	18.6	0.50
	Trichloroethene	175	0.0641	2.73	18.6	0.051
	1,2,4-Trimethylbenzene	130	0.0641	2.03	18.6	0.038
	1,3,5-Trimethylbenzene	< 60	0.0641	<0.94	18.6	<0.017
	Total Xylenes	618	0.0641	9.65	18.6	0.18

* At 25°C and 1 atmosphere.

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

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

Run No.	Compound	Amount Collected ng	Dry Gas Volume Sampled Rm^3 *	Dry Reference Concentration $\mu g/Rm^3$ *	Dry Reference Flowrate Rm^3/s *	Emission Rate mg/s
1	Benzene	364	0.0216	16.9	18.8	0.32
	Dichloromethane	474	0.0216	22.0	18.8	0.41
	Ethylbenzene	217	0.0216	10.1	18.8	0.19
	2-Propanone	182	0.0216	8.43	18.8	0.16
	Styrene	566	0.0216	26.2	18.8	0.49
	Toluene	1556	0.0216	72.1	18.8	1.35
	Trichloroethene	29	0.0216	1.34	18.8	0.025
	1,2,4-Trimethylbenzene	75	0.0216	3.47	18.8	0.065
	1,3,5-Trimethylbenzene	< 20	0.0216	<0.93	18.8	<0.017
	Total Xylenes	334	0.0216	15.5	18.8	0.29
2	Benzene	621	0.0221	28.2	18.8	0.53
	Dichloromethane	1110	0.0221	50.3	18.8	0.95
	Ethylbenzene	339	0.0221	15.4	18.8	0.29
	2-Propanone	379	0.0221	17.2	18.8	0.32
	Styrene	723	0.0221	32.8	18.8	0.62
	Toluene	1359	0.0221	61.6	18.8	1.16
	Trichloroethene	43	0.0221	1.95	18.8	0.037
	1,2,4-Trimethylbenzene	44	0.0221	1.99	18.8	0.038
	1,3,5-Trimethylbenzene	< 20	0.0221	<0.91	18.8	<0.017
	Total Xylenes	525	0.0221	23.8	18.8	0.45
4	Benzene	492	0.0212	23.3	18.8	0.44
	Dichloromethane	454	0.0212	21.5	18.8	0.40
	Ethylbenzene	287	0.0212	13.6	18.8	0.26
	2-Propanone	239	0.0212	11.3	18.8	0.21
	Styrene	1310	0.0212	61.9	18.8	1.16
	Toluene	897	0.0212	42.4	18.8	0.80
	Trichloroethene	29	0.0212	1.37	18.8	0.026
	1,2,4-Trimethylbenzene	58	0.0212	2.74	18.8	0.052
	1,3,5-Trimethylbenzene	23	0.0212	1.09	18.8	0.020
	Total Xylenes	514	0.0212	24.3	18.8	0.46
Total	Benzene	1477	0.0648	22.8	18.8	0.43
	Dichloromethane	2038	0.0648	31.4	18.8	0.59
	Ethylbenzene	843	0.0648	13.0	18.8	0.24
	2-Propanone	800	0.0648	12.3	18.8	0.23
	Styrene	2599	0.0648	40.1	18.8	0.75
	Toluene	3812	0.0648	58.8	18.8	1.11
	Trichloroethene	101	0.0648	1.56	18.8	0.029
	1,2,4-Trimethylbenzene	177	0.0648	2.73	18.8	0.051
	1,3,5-Trimethylbenzene	< 63	0.0648	<0.97	18.8	<0.018
	Total Xylenes	1373	0.0648	21.2	18.8	0.40

* At 25°C and 1 atmosphere.

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

TABLE 118
Clean Harbors Sarnia
Summary of DRE Compound Emission Rates

Compound	Average Emission Rate				Coefficient of Variation
	Test No. 1 mg/s	Test No. 2 mg/s	Test No. 3 mg/s	Average mg/s	%
Benzene	0.68	0.56	0.43	0.55	22.5
Dichloromethane	0.50	0.92	0.59	0.67	33.6
Ethylbenzene	0.058	0.084	0.24	0.13	78.1
2-Propanone	0.36	0.34	0.23	0.31	22.2
Styrene	1.36	1.50	0.75	1.21	33.0
Toluene	0.60	0.50	1.11	0.74	44.0
Trichloroethene	0.073	0.051	0.029	0.051	42.8
1,2,4-Trimethylbenzene	<0.027	0.038	0.051	<0.039	32.1
1,3,5-Trimethylbenzene	<0.017	<0.017	<0.018	<0.018	3.3
Total Xylenes	0.11	0.18	0.40	0.23	64.5

TABLE 119
Clean Harbors Sarnia
Blank Volatile Organic Analyses

Compound	Field Blank Tube 11A/11B µg	Trip Blank Tube 16A/16B µg
Benzene	<0.05	<0.05
Dichloromethane	<0.1	0.29
Ethylbenzene	<0.01	<0.01
2-Propanone	0.13	0.20
Styrene	<0.02	<0.02
Toluene	<0.05	0.12
Trichloroethene	<0.01	0.023
1,2,4-Trimethylbenzene	<0.02	<0.02
1,3,5-Trimethylbenzene	<0.02	<0.02
Total Xylenes	<0.04	<0.04

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

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

Feed Type	Compound	Stream Feed Rate L/min	Feed Density g/mL	Stream Feed Rate kg/s	Compound Concentration mg/kg	Compound Feed Rate g/s
Rich	Benzene	38.5	0.91	0.58	529	0.31
	Dichloromethane	38.5	0.91	0.58	<12000	<7.01
	Ethylbenzene	38.5	0.91	0.58	2160	1.26
	2-Propanone	38.5	0.91	0.58	1400	0.82
	Styrene	38.5	0.91	0.58	1180	0.69
	Toluene	38.5	0.91	0.58	21300	12.4
	Trichloroethene	38.5	0.91	0.58	41	0.024
	1,2,4-Trimethylbenzene	38.5	0.91	0.58	3040	1.78
	1,3,5-Trimethylbenzene	38.5	0.91	0.58	890	0.52
	Total Xylenes	38.5	0.91	0.58	8010	4.68
Lean	Benzene	159	1.04	2.75	140	0.38
	Dichloromethane	159	1.04	2.75	870	2.39
	Ethylbenzene	159	1.04	2.75	975	2.68
	2-Propanone	159	1.04	2.75	2400	6.59
	Styrene	159	1.04	2.75	670	1.84
	Toluene	159	1.04	2.75	13700	37.6
	Trichloroethene	159	1.04	2.75	<20	<0.055
	1,2,4-Trimethylbenzene	159	1.04	2.75	530	1.46
	1,3,5-Trimethylbenzene	159	1.04	2.75	210	0.58
	Total Xylenes	159	1.04	2.75	3460	9.51
Emulsion	Benzene	8.6	1.01	0.14	<14	<0.0020
	Dichloromethane	8.6	1.01	0.14	13000	1.88
	Ethylbenzene	8.6	1.01	0.14	<36	<0.0052
	2-Propanone	8.6	1.01	0.14	7600	1.10
	Styrene	8.6	1.01	0.14	<100	<0.014
	Toluene	8.6	1.01	0.14	<160	<0.023
	Trichloroethene	8.6	1.01	0.14	<20	<0.0029
	1,2,4-Trimethylbenzene	8.6	1.01	0.14	<200	<0.029
	1,3,5-Trimethylbenzene	8.6	1.01	0.14	<200	<0.029
	Total Xylenes	8.6	1.01	0.14	<72	<0.010
Alkaline	Benzene	218	1.00	3.64	<14	<0.051
	Dichloromethane	218	1.00	3.64	150	0.55
	Ethylbenzene	218	1.00	3.64	<36	<0.13
	2-Propanone	218	1.00	3.64	<1000	<3.64
	Styrene	218	1.00	3.64	<100	<0.36
	Toluene	218	1.00	3.64	<160	<0.58
	Trichloroethene	218	1.00	3.64	<20	<0.073
	1,2,4-Trimethylbenzene	218	1.00	3.64	<200	<0.73
	1,3,5-Trimethylbenzene	218	1.00	3.64	<200	<0.73
	Total Xylenes	218	1.00	3.64	<72	<0.26
Leachate	Benzene	15.0	1.00	0.25	<14	<0.0035
	Dichloromethane	15.0	1.00	0.25	140	0.035
	Ethylbenzene	15.0	1.00	0.25	<36	<0.0090
	2-Propanone	15.0	1.00	0.25	<1000	<0.25
	Styrene	15.0	1.00	0.25	<100	<0.025
	Toluene	15.0	1.00	0.25	<160	<0.040
	Trichloroethene	15.0	1.00	0.25	<20	<0.0050
	1,2,4-Trimethylbenzene	15.0	1.00	0.25	<200	<0.050
	1,3,5-Trimethylbenzene	15.0	1.00	0.25	<200	<0.050
	Total Xylenes	15.0	1.00	0.25	<72	<0.018
Total	Benzene					<0.75
	Dichloromethane					<11.9
	Ethylbenzene					<4.09
	2-Propanone					<12.4
	Styrene					<2.93
	Toluene					<50.7
	Trichloroethene					<0.16
	1,2,4-Trimethylbenzene					<4.04
	1,3,5-Trimethylbenzene					<1.90
	Total Xylenes					<14.5

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

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

Feed Type	Compound	Stream Feed Rate L/min	Feed Density g/mL	Stream Feed Rate kg/s	Compound Concentration mg/kg	Compound Feed Rate g/s
Rich	Benzene	38.2	0.89	0.57	269	0.15
	Dichloromethane	38.2	0.89	0.57	<8500	<4.82
	Ethylbenzene	38.2	0.89	0.57	1590	0.90
	2-Propanone	38.2	0.89	0.57	5200	2.95
	Styrene	38.2	0.89	0.57	760	0.43
	Toluene	38.2	0.89	0.57	14600	8.27
	Trichloroethene	38.2	0.89	0.57	72	0.041
	1,2,4-Trimethylbenzene	38.2	0.89	0.57	2290	1.30
	1,3,5-Trimethylbenzene	38.2	0.89	0.57	660	0.37
	Total Xylenes	38.2	0.89	0.57	6530	3.70
Lean	Benzene	160	1.05	2.81	281	0.79
	Dichloromethane	160	1.05	2.81	1150	3.23
	Ethylbenzene	160	1.05	2.81	2020	5.67
	2-Propanone	160	1.05	2.81	2700	7.58
	Styrene	160	1.05	2.81	1400	3.93
	Toluene	160	1.05	2.81	28700	80.6
	Trichloroethene	160	1.05	2.81	28	0.079
	1,2,4-Trimethylbenzene	160	1.05	2.81	1070	3.00
	1,3,5-Trimethylbenzene	160	1.05	2.81	430	1.21
	Total Xylenes	160	1.05	2.81	7200	20.2
Emulsion	Benzene	7.1	1.09	0.13	<14	<0.0018
	Dichloromethane	7.1	1.09	0.13	9570	1.23
	Ethylbenzene	7.1	1.09	0.13	<36	<0.0046
	2-Propanone	7.1	1.09	0.13	10000	1.29
	Styrene	7.1	1.09	0.13	<100	<0.013
	Toluene	7.1	1.09	0.13	<160	<0.021
	Trichloroethene	7.1	1.09	0.13	<20	<0.0026
	1,2,4-Trimethylbenzene	7.1	1.09	0.13	<200	<0.026
	1,3,5-Trimethylbenzene	7.1	1.09	0.13	<200	<0.026
	Total Xylenes	7.1	1.09	0.13	<72	<0.0093
Alkaline	Benzene	220	1.01	3.70	<14	<0.052
	Dichloromethane	220	1.01	3.70	130	0.48
	Ethylbenzene	220	1.01	3.70	<36	<0.13
	2-Propanone	220	1.01	3.70	<1000	<3.70
	Styrene	220	1.01	3.70	<100	<0.37
	Toluene	220	1.01	3.70	<160	<0.59
	Trichloroethene	220	1.01	3.70	<20	<0.074
	1,2,4-Trimethylbenzene	220	1.01	3.70	<200	<0.74
	1,3,5-Trimethylbenzene	220	1.01	3.70	<200	<0.74
	Total Xylenes	220	1.01	3.70	<72	<0.27
Leachate	Benzene	9.2	1.00	0.15	<14	<0.0021
	Dichloromethane	9.2	1.00	0.15	120	0.018
	Ethylbenzene	9.2	1.00	0.15	<36	<0.0055
	2-Propanone	9.2	1.00	0.15	<1000	<0.15
	Styrene	9.2	1.00	0.15	<100	<0.015
	Toluene	9.2	1.00	0.15	<160	<0.025
	Trichloroethene	9.2	1.00	0.15	<20	<0.0031
	1,2,4-Trimethylbenzene	9.2	1.00	0.15	<200	<0.031
	1,3,5-Trimethylbenzene	9.2	1.00	0.15	<200	<0.031
	Total Xylenes	9.2	1.00	0.15	<72	<0.011
Total	Benzene					<1.00
	Dichloromethane					<9.78
	Ethylbenzene					<6.71
	2-Propanone					<15.7
	Styrene					<4.76
	Toluene					<89.5
	Trichloroethene					<0.20
	1,2,4-Trimethylbenzene					<5.10
	1,3,5-Trimethylbenzene					<2.38
	Total Xylenes					<24.2

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

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

Feed Type	Compound	Stream Feed Rate L/min	Feed Density g/mL	Stream Feed Rate kg/s	Compound Concentration mg/kg	Compound Feed Rate g/s
Rich	Benzene	41.8	0.89	0.62	202	0.13
	Dichloromethane	41.8	0.89	0.62	<6000	<3.72
	Ethylbenzene	41.8	0.89	0.62	3210	1.99
	2-Propanone	41.8	0.89	0.62	7800	4.84
	Styrene	41.8	0.89	0.62	510	0.32
	Toluene	41.8	0.89	0.62	22000	13.6
	Trichloroethene	41.8	0.89	0.62	417	0.26
	1,2,4-Trimethylbenzene	41.8	0.89	0.62	3440	2.13
	1,3,5-Trimethylbenzene	41.8	0.89	0.62	1150	0.71
	Total Xylenes	41.8	0.89	0.62	15000	9.30
Lean	Benzene	162	1.05	2.84	389	1.10
	Dichloromethane	162	1.05	2.84	1570	4.45
	Ethylbenzene	162	1.05	2.84	1700	4.82
	2-Propanone	162	1.05	2.84	2600	7.37
	Styrene	162	1.05	2.84	1060	3.01
	Toluene	162	1.05	2.84	27300	77.4
	Trichloroethene	162	1.05	2.84	30	0.085
	1,2,4-Trimethylbenzene	162	1.05	2.84	820	2.32
	1,3,5-Trimethylbenzene	162	1.05	2.84	330	0.94
	Total Xylenes	162	1.05	2.84	6010	17.0
Emulsion	Benzene	7.6	1.01	0.13	<14	<0.0018
	Dichloromethane	7.6	1.01	0.13	13900	1.78
	Ethylbenzene	7.6	1.01	0.13	<36	<0.0046
	2-Propanone	7.6	1.01	0.13	8500	1.09
	Styrene	7.6	1.01	0.13	<100	<0.013
	Toluene	7.6	1.01	0.13	210	0.027
	Trichloroethene	7.6	1.01	0.13	<20	<0.0026
	1,2,4-Trimethylbenzene	7.6	1.01	0.13	<200	<0.026
	1,3,5-Trimethylbenzene	7.6	1.01	0.13	<200	<0.026
	Total Xylenes	7.6	1.01	0.13	<72	<0.0092
Alkaline	Benzene	213	1.00	3.55	<14	<0.050
	Dichloromethane	213	1.00	3.55	130	0.46
	Ethylbenzene	213	1.00	3.55	<36	<0.13
	2-Propanone	213	1.00	3.55	<1000	<3.55
	Styrene	213	1.00	3.55	<100	<0.36
	Toluene	213	1.00	3.55	<160	<0.57
	Trichloroethene	213	1.00	3.55	<20	<0.071
	1,2,4-Trimethylbenzene	213	1.00	3.55	<200	<0.71
	1,3,5-Trimethylbenzene	213	1.00	3.55	<200	<0.71
	Total Xylenes	213	1.00	3.55	<72	<0.26
Leachate	Benzene	15.7	1.00	0.26	<14	<0.0037
	Dichloromethane	15.7	1.00	0.26	150	0.039
	Ethylbenzene	15.7	1.00	0.26	<36	<0.0094
	2-Propanone	15.7	1.00	0.26	<1000	<0.26
	Styrene	15.7	1.00	0.26	<100	<0.026
	Toluene	15.7	1.00	0.26	<160	<0.042
	Trichloroethene	15.7	1.00	0.26	<20	<0.0052
	1,2,4-Trimethylbenzene	15.7	1.00	0.26	<200	<0.052
	1,3,5-Trimethylbenzene	15.7	1.00	0.26	<200	<0.052
	Total Xylenes	15.7	1.00	0.26	<72	<0.019
Total	Benzene					<1.28
	Dichloromethane					<10.5
	Ethylbenzene					<6.95
	2-Propanone					<17.1
	Styrene					<3.72
	Toluene					<91.7
	Trichloroethene					<0.42
	1,2,4-Trimethylbenzene					<5.25
	1,3,5-Trimethylbenzene					<2.44
	Total Xylenes					<26.6

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

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

Run No.	Compound	Total Feed Rate g/s	Emission Rate mg/s	Destruction and Removal Efficiency %
1	Benzene	<0.75	0.65	99.9136
	Dichloromethane	<11.9	0.51	99.9957
	Ethylbenzene	<4.09	0.057	99.9986
	2-Propanone	<12.4	0.37	99.9970
	Styrene	<2.93	1.23	99.9580
	Toluene	<50.7	0.35	99.9993
	Trichloroethene	<0.16	0.074	99.9537
	1,2,4-Trimethylbenzene	<4.04	<0.017	99.9996
	1,3,5-Trimethylbenzene	<1.90	<0.017	99.9991
	Total Xylenes	<14.5	0.10	99.9993
2	Benzene	<0.75	0.75	99.9003
	Dichloromethane	<11.9	0.68	99.9943
	Ethylbenzene	<4.09	0.068	99.9983
	2-Propanone	<12.4	0.37	99.9970
	Styrene	<2.93	1.64	99.9441
	Toluene	<50.7	0.76	99.9985
	Trichloroethene	<0.16	0.079	99.9505
	1,2,4-Trimethylbenzene	<4.04	0.040	99.9990
	1,3,5-Trimethylbenzene	<1.90	<0.018	99.9991
	Total Xylenes	<14.5	0.14	99.9990
3	Benzene	<0.75	0.64	99.9149
	Dichloromethane	<11.9	0.30	99.9974
	Ethylbenzene	<4.09	0.050	99.9988
	2-Propanone	<12.4	0.34	99.9973
	Styrene	<2.93	1.23	99.9579
	Toluene	<50.7	0.69	99.9986
	Trichloroethene	<0.16	0.066	99.9585
	1,2,4-Trimethylbenzene	<4.04	0.022	99.9994
	1,3,5-Trimethylbenzene	<1.90	<0.017	99.9991
	Total Xylenes	<14.5	0.10	99.9993
Total	Benzene	<0.75	0.68	99.9097
	Dichloromethane	<11.9	0.50	99.9958
	Ethylbenzene	<4.09	0.058	99.9986
	2-Propanone	<12.4	0.36	99.9971
	Styrene	<2.93	1.36	99.9535
	Toluene	<50.7	0.60	99.9988
	Trichloroethene	<0.16	0.073	99.9543
	1,2,4-Trimethylbenzene	<4.04	<0.027	99.9993
	1,3,5-Trimethylbenzene	<1.90	<0.017	99.9991
	Total Xylenes	<14.5	0.11	99.9992

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

Run No.	Compound	Total Feed Rate g/s	Emission Rate mg/s	Destruction and Removal Efficiency %
1	Benzene	<1.00	0.54	99.9460
	Dichloromethane	<9.78	0.90	99.9908
	Ethylbenzene	<6.71	0.090	99.9987
	2-Propanone	<15.7	0.48	99.9969
	Styrene	<4.76	1.54	99.9677
	Toluene	<89.5	0.50	99.9994
	Trichloroethene	<0.20	0.058	99.9709
	1,2,4-Trimethylbenzene	<5.10	0.030	99.9994
	1,3,5-Trimethylbenzene	<2.38	<0.018	99.9992
	Total Xylenes	<24.2	0.18	99.9993
2	Benzene	<1.00	0.61	99.9389
	Dichloromethane	<9.78	1.26	99.9871
	Ethylbenzene	<6.71	0.075	99.9989
	2-Propanone	<15.7	0.34	99.9978
	Styrene	<4.76	1.22	99.9743
	Toluene	<89.5	0.52	99.9994
	Trichloroethene	<0.20	0.050	99.9748
	1,2,4-Trimethylbenzene	<5.10	0.034	99.9993
	1,3,5-Trimethylbenzene	<2.38	<0.017	99.9993
	Total Xylenes	<24.2	0.16	99.9994
3	Benzene	<1.00	0.52	99.9478
	Dichloromethane	<9.78	0.62	99.9937
	Ethylbenzene	<6.71	0.088	99.9987
	2-Propanone	<15.7	0.22	99.9986
	Styrene	<4.76	1.74	99.9634
	Toluene	<89.5	0.48	99.9995
	Trichloroethene	<0.20	0.044	99.9777
	1,2,4-Trimethylbenzene	<5.10	0.049	99.9990
	1,3,5-Trimethylbenzene	<2.38	<0.017	99.9993
	Total Xylenes	<24.2	0.20	99.9992
Total	Benzene	<1.00	0.56	99.9442
	Dichloromethane	<9.78	0.92	99.9905
	Ethylbenzene	<6.71	0.084	99.9987
	2-Propanone	<15.7	0.34	99.9978
	Styrene	<4.76	1.50	99.9684
	Toluene	<89.5	0.50	99.9994
	Trichloroethene	<0.20	0.051	99.9745
	1,2,4-Trimethylbenzene	<5.10	0.038	99.9993
	1,3,5-Trimethylbenzene	<2.38	<0.017	99.9993
	Total Xylenes	<24.2	0.18	99.9993

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

Run No.	Compound	Total Feed Rate g/s	Emission Rate mg/s	Destruction and Removal Efficiency %
1	Benzene	<1.28	0.32	99.9753
	Dichloromethane	<10.5	0.41	99.9961
	Ethylbenzene	<6.95	0.19	99.9973
	2-Propanone	<17.1	0.16	99.9991
	Styrene	<3.72	0.49	99.9867
	Toluene	<91.7	1.35	99.9985
	Trichloroethene	<0.42	0.025	99.9940
	1,2,4-Trimethylbenzene	<5.25	0.065	99.9988
	1,3,5-Trimethylbenzene	<2.44	<0.017	99.9993
	Total Xylenes	<26.6	0.29	99.9989
2	Benzene	<1.28	0.53	99.9588
	Dichloromethane	<10.5	0.95	99.9909
	Ethylbenzene	<6.95	0.29	99.9958
	2-Propanone	<17.1	0.32	99.9981
	Styrene	<3.72	0.62	99.9834
	Toluene	<91.7	1.16	99.9987
	Trichloroethene	<0.42	0.037	99.9913
	1,2,4-Trimethylbenzene	<5.25	0.038	99.9993
	1,3,5-Trimethylbenzene	<2.44	<0.017	99.9993
	Total Xylenes	<26.6	0.45	99.9983
4	Benzene	<1.28	0.44	99.9659
	Dichloromethane	<10.5	0.40	99.9961
	Ethylbenzene	<6.95	0.26	99.9963
	2-Propanone	<17.1	0.21	99.9988
	Styrene	<3.72	1.16	99.9687
	Toluene	<91.7	0.80	99.9991
	Trichloroethene	<0.42	0.026	99.9939
	1,2,4-Trimethylbenzene	<5.25	0.052	99.9990
	1,3,5-Trimethylbenzene	<2.44	0.020	99.9992
	Total Xylenes	<26.6	0.46	99.9983
Total	Benzene	<1.28	0.43	99.9666
	Dichloromethane	<10.5	0.59	99.9943
	Ethylbenzene	<6.95	0.24	99.9965
	2-Propanone	<17.1	0.23	99.9986
	Styrene	<3.72	0.75	99.9797
	Toluene	<91.7	1.11	99.9988
	Trichloroethene	<0.42	0.029	99.9931
	1,2,4-Trimethylbenzene	<5.25	0.051	99.9990
	1,3,5-Trimethylbenzene	<2.44	<0.018	99.9993
	Total Xylenes	<26.6	0.40	99.9985

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

Compound	Destruction and Removal Efficiency				Coefficient of Variation
	Test No. 1	Test No. 2	Test No. 3	Average	
	%	%	%	%	%
Benzene	99.9097	99.9442	99.9666	99.9402	0.029
Dichloromethane	99.9958	99.9905	99.9943	99.9936	0.0027
Ethylbenzene	99.9986	99.9987	99.9965	99.9979	0.0013
2-Propanone	99.9971	99.9978	99.9986	99.9979	0.00077
Styrene	99.9535	99.9684	99.9797	99.9672	0.013
Toluene	99.9988	99.9994	99.9988	99.9990	0.00037
Trichloroethene	99.9543	99.9745	99.9931	99.9739	0.019
1,2,4-Trimethylbenzene	99.9993	99.9993	99.9990	99.9992	0.00017
1,3,5-Trimethylbenzene	99.9991	99.9993	99.9993	99.9992	0.000093
Total Xylenes	99.9992	99.9993	99.9985	99.9990	0.00042

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

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

Contaminant	Average Emission Rate	Calculated Impingement Concentration	Allowable Impingement Concentration	Percentage of Allowable Concentration	Status of Allowable Concentration
Base Case - Annual	1.00 g/s	0.0461 µg/m^3			
Base Case - 30 Day	1.00 g/s	0.1336 µg/m^3			
Base Case - 24 hour	1.00 g/s	0.4597 µg/m^3			
Base Case - 1 hour	1.00 g/s	1.7115 µg/m^3			
Base Case - 1/2 hour	1.00 g/s	2.0538 µg/m^3			
Particulate matter	0.14 g/s	0.064 µg/m^3	120 µg/m^3	0.054	S
Sulphur dioxide	29.4 g/s	13.5 µg/m^3	275 µg/m^3	4.91	S - 24 hour
Sulphur dioxide	29.4 g/s	50.3 µg/m^3	690 µg/m^3	7.29	S - 1 hour
Nitrogen oxides	3.80 g/s	1.75 µg/m^3	200 µg/m^3	0.87	S - 24 hour
Nitrogen oxides	3.80 g/s	6.50 µg/m^3	400 µg/m^3	1.63	S - 1 hour
Carbon monoxide	1.02 g/s	2.09 µg/m^3	6000 µg/m^3	0.035	S - 1/2 hour
Carbon dioxide	2953 g/s	1357 µg/m^3	255800 µg/m^3	0.53	SL
Hydrogen chloride	2.34 g/s	1.08 µg/m^3	20 µg/m^3	5.38	S
Fluorides (as hydrogen fluoride)	1.81 g/s	0.83 µg/m^3	0.86 µg/m^3	96.8	S - 24 hour
Fluorides (as hydrogen fluoride)	1.81 g/s	0.24 µg/m^3	0.34 µg/m^3	71.1	S - 30 day
Hydrogen bromide	<0.092 g/s	0.16 µg/m^3	668 µg/m^3	0.024	G - 1 hour
Hydrogen iodide	0.023 g/s	0.011 µg/m^3	0.5 µg/m^3	2.11	SL
Hydrogen cyanide	<0.00012 g/s	0.000055 µg/m^3	8 µg/m^3	0.00069	S
Dioxins & Furans (TEQ) *	<0.073 ng TEQ/s	0.000034 pg TEQ/m^3			
Dioxins, Furans and Dioxin-Like PCBs (TEQ) **	0.085 ng TEQ/s	0.000039 pg TEQ/m^3	0.1 pg TEQ/m^3	0.039	S
Benzo(a)Pyrene	<0.060 µg/s	0.0000000028 µg/m^3	0.00001 µg/m^3	0.028	S - Annual
Biphenyl	12.7 µg/s	0.000022 µg/m^3	60 µg/m^3	<0.0001	G - 1 hour
2-Chloronaphthalene	0.26 µg/s	0.00000012 µg/m^3	1 µg/m^3	<0.0001	SL
1-Methylnaphthalene	4.80 µg/s	0.0000022 µg/m^3	35.5 µg/m^3	<0.0001	SL
Naphthalene	35.7 µg/s	0.000016 µg/m^3	22.5 µg/m^3	<0.0001	G
Quinoline	4.70 µg/s	0.0000022 µg/m^3	0.005 µg/m^3	0.043	SL
Terphenyls (m, o, p)	<0.18 µg/s	0.000000083 µg/m^3	15 µg/m^3	<0.0001	SL
1,2-Dichlorobenzene	14.1 µg/s	0.000024 µg/m^3	30500 µg/m^3	<0.0001	G - 1 hour
1,3-Dichlorobenzene	6.97 µg/s	0.0000032 µg/m^3	50 µg/m^3	<0.0001	SL
1,4-Dichlorobenzene	4.18 µg/s	0.0000019 µg/m^3	95 µg/m^3	<0.0001	S
1,3,5-Trichlorobenzene	1.00 µg/s	0.00000046 µg/m^3	3.6 µg/m^3	<0.0001	SL
1,2,4-Trichlorobenzene	3.71 µg/s	0.0000017 µg/m^3	400 µg/m^3	<0.0001	G
1,2,3-Trichlorobenzene	2.61 µg/s	0.0000012 µg/m^3	135 µg/m^3	<0.0001	SL
1,2,4,5-Tetrachlorobenzene	2.27 µg/s	0.0000010 µg/m^3	1 µg/m^3	0.00010	SL
1,2,3,4-Tetrachlorobenzene	0.75 µg/s	0.00000034 µg/m^3	600 µg/m^3	<0.0001	SL
Pentachlorobenzene	0.23 µg/s	0.00000011 µg/m^3	80 µg/m^3	<0.0001	SL
Hexachlorobenzene	<0.060 µg/s	0.000000028 µg/m^3	0.011 µg/m^3	0.00025	SL
2,4-Dichlorophenol	<0.30 µg/s	0.00000014 µg/m^3	33.5 µg/m^3	<0.0001	SL
2,6-Dichlorophenol	<0.30 µg/s	0.00000014 µg/m^3	19 µg/m^3	<0.0001	SL
2,4,5-Trichlorophenol	<0.30 µg/s	0.00000014 µg/m^3	220 µg/m^3	<0.0001	SL
2,4,6-Trichlorophenol	<0.30 µg/s	0.00000014 µg/m^3	1.5 µg/m^3	<0.0001	SL
2,3,4,6-Tetrachlorophenol	<0.30 µg/s	0.00000014 µg/m^3	0.75 µg/m^3	<0.0001	SL
Pentachlorophenol	<0.30 µg/s	0.00000014 µg/m^3	20 µg/m^3	<0.0001	G
Polychlorinated biphenyls	<0.21 µg/s	0.000000097 µg/m^3	0.15 µg/m^3	<0.0001	G
Hexachlorobutadiene	<4.27 µg/s	0.0000020 µg/m^3	0.225 µg/m^3	0.00087	SL
Hexachloroethane	<0.060 µg/s	0.000000028 µg/m^3	115 µg/m^3	<0.0001	SL
Heptachlor	<0.013 µg/s	0.0000000060 µg/m^3	0.004 µg/m^3	0.00015	SL
Toxaphene	<0.044 µg/s	0.000000020 µg/m^3	0.015 µg/m^3	0.00013	SL
Hexachlorophene	<0.30 µg/s	0.00000014 µg/m^3	0.5 µg/m^3	<0.0001	SL

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

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

Contaminant	Average Emission Rate	Calculated Impingement Concentration	Allowable Impingement Concentration	Percentage of Allowable Concentration	Status of Allowable Concentration
Base Case - Annual	1.00 g/s	0.0461 µg/m³			
Base Case - 30 Day	1.00 g/s	0.1336 µg/m³			
Base Case - 24 hour	1.00 g/s	0.4597 µg/m³			
Aluminum	9.60 mg/s	0.004 µg/m³	12 µg/m³	0.037	SL
Antimony	0.017 mg/s	0.0000078 µg/m³	25 µg/m³	<0.0001	S
Arsenic	0.24 mg/s	0.00011 µg/m³	0.3 µg/m³	0.037	G
Barium (as water soluble)	0.31 mg/s	0.00014 µg/m³	10 µg/m³	0.0014	G
Beryllium	<0.00043 mg/s	0.00000020 µg/m³	0.01 µg/m³	0.0020	S
Boron	31.0 mg/s	0.014 µg/m³	120 µg/m³	0.012	S
Cadmium	0.024 mg/s	0.000011 µg/m³	0.025 µg/m³	0.045	S
Calcium oxide	118 mg/s	0.054 µg/m³	10 µg/m³	0.54	S
Chromium	0.15 mg/s	0.000070 µg/m³	0.5 µg/m³	0.014	G
Cobalt	0.0096 mg/s	0.0000044 µg/m³	0.1 µg/m³	0.0044	G
Copper	0.22 mg/s	0.00010 µg/m³	50 µg/m³	0.00020	S
Iron (as metal)	7.26 mg/s	0.0033 µg/m³	4 µg/m³	0.083	S
Lead	0.075 mg/s	0.000034 µg/m³	0.5 µg/m³	0.0069	S - 24 hour
Lead	0.075 mg/s	0.000010 µg/m³	0.2 µg/m³	0.0050	S - 30 day
Lithium	0.015 mg/s	0.0000070 µg/m³	20 µg/m³	<0.0001	S
Magnesium	14.8 mg/s	0.0068 µg/m³	72 µg/m³	0.0094	SL
Manganese (as compounds)	1.61 mg/s	0.00074 µg/m³	0.4 µg/m³	0.18	G
Mercury	0.065 mg/s	0.000030 µg/m³	2 µg/m³	0.0015	S
Molybdenum	0.14 mg/s	0.000065 µg/m³	120 µg/m³	<0.0001	G
Nickel	0.080 mg/s	0.0000037 µg/m³	0.04 µg/m³	0.0092	S - Annual
Phosphorus	0.30 mg/s	0.00014 µg/m³	0.5 µg/m³	0.027	SL
Potassium	23.5 mg/s	0.011 µg/m³	1 µg/m³	1.08	SL
Selenium	0.45 mg/s	0.00021 µg/m³	10 µg/m³	0.0021	G
Silicon	209 mg/s	0.096 µg/m³	27 µg/m³	0.36	SL
Silver	0.00065 mg/s	0.00000030 µg/m³	1 µg/m³	<0.0001	S
Sodium hydroxide	233 mg/s	0.107 µg/m³	10 µg/m³	1.07	G
Strontium	0.12 mg/s	0.000057 µg/m³	120 µg/m³	<0.0001	G
Tin	0.86 mg/s	0.00039 µg/m³	10 µg/m³	0.0039	S
Titanium	1.00 mg/s	0.00046 µg/m³	120 µg/m³	0.00038	S
Vanadium	0.015 mg/s	0.0000068 µg/m³	2 µg/m³	0.00034	S
Zinc	0.43 mg/s	0.00020 µg/m³	120 µg/m³	0.00016	S

S - Standard
G - Guideline
SL - Screening Level

TABLE 129
Clean Harbors Sarnia
Regulation 419 Dispersion Modeling Results using AERMOD for Volatile Organic Compounds

Contaminant	Average Emission Rate	Calculated Impingement Concentration	Allowable Impingement Concentration	Percentage of Allowable Concentration	Status of Allowable Concentration
Base Case - Annual	1.00 g/s	0.0461 µg/m³			
Base Case - 24 hour	1.00 g/s	0.4597 µg/m³			
Base Case - 1 hour	1.00 g/s	1.7115 µg/m³			
Benzene	0.55 mg/s	0.000026 µg/m³	0.45 µg/m³	0.0057	S - Annual
Bromodichloromethane	0.073 mg/s	0.0000034 µg/m³	350 µg/m³	<0.0001	SL
Bromomethane (methyl bromide)	0.54 mg/s	0.000025 µg/m³	1350 µg/m³	<0.0001	G
2-Butanone (methyl ethyl ketone)	0.076 mg/s	0.0000035 µg/m³	1000 µg/m³	<0.0001	S
Chloroethene (vinyl chloride)	<0.017 mg/s	0.00000080 µg/m³	1 µg/m³	<0.0001	S
Dibromochloromethane	0.069 mg/s	0.0000032 µg/m³	0.2 µg/m³	0.0016	SL
1,2-Dibromoethane (Ethylene dibromide)	<0.019 mg/s	0.00000089 µg/m³	3 µg/m³	<0.0001	G
Dichlorodifluoromethane	<0.020 mg/s	0.00000093 µg/m³	500000 µg/m³	<0.0001	G
1,1-Dichloroethane (ethylene dichloride)	<0.023 mg/s	0.0000010 µg/m³	165 µg/m³	<0.0001	S
1,1-Dichloroethene	<0.017 mg/s	0.00000076 µg/m³	10 µg/m³	<0.0001	S
trans-1,2-Dichloroethene	<0.0092 mg/s	0.00000043 µg/m³	105 µg/m³	<0.0001	G
Dichloromethane (methylene chloride)	0.67 mg/s	0.000031 µg/m³	220 µg/m³	<0.0001	G
1,2-Dichloropropane	0.19 mg/s	0.0000089 µg/m³	2400 µg/m³	<0.0001	G
Ethyl Acetate	<0.087 mg/s	0.0000040 µg/m³	19000 µg/m³	<0.0001	G - 1 hour
Ethylbenzene	0.13 mg/s	0.0000060 µg/m³	1000 µg/m³	<0.0001	S
Isopropylbenzene (cumene)	<0.017 mg/s	0.00000080 µg/m³	400 µg/m³	<0.0001	S
2-Propanone (acetone)	0.31 mg/s	0.000014 µg/m³	11880 µg/m³	<0.0001	S
Styrene	1.21 mg/s	0.000056 µg/m³	400 µg/m³	<0.0001	S
Tetrachloroethene (perchloroethylene)	<0.0087 mg/s	0.00000040 µg/m³	360 µg/m³	<0.0001	S
Tetrachloromethane (carbon tetrachloride)	<0.0087 mg/s	0.00000040 µg/m³	2.4 µg/m³	<0.0001	S
Toluene	0.74 mg/s	0.000034 µg/m³	2000 µg/m³	<0.0001	S
Tribromomethane (bromoform)	0.066 mg/s	0.0000030 µg/m³	55 µg/m³	<0.0001	G
1,1,1-Trichloroethane (methyl chloroform)	<0.0087 mg/s	0.00000040 µg/m³	115000 µg/m³	<0.0001	S
Trichloroethene	0.051 mg/s	0.0000024 µg/m³	12 µg/m³	<0.0001	S
Trichlorofluoromethane	<0.017 mg/s	0.00000080 µg/m³	6000 µg/m³	<0.0001	G
Trichloromethane (chloroform)	0.10 mg/s	0.0000047 µg/m³	1 µg/m³	0.00047	S
Trichlorotrifluoroethane	<0.017 mg/s	0.00000080 µg/m³	800000 µg/m³	<0.0001	S
1,2,4-Trimethylbenzene (pseudocumene)	<0.039 mg/s	0.0000018 µg/m³	220 µg/m³	<0.0001	S
1,3,5-Trimethylbenzene	<0.018 mg/s	0.00000081 µg/m³	220 µg/m³	<0.0001	S
Xylenes	0.23 mg/s	0.000011 µg/m³	730 µg/m³	<0.0001	S

S - Standard
G - Guideline
SL - Screening Level

TABLE 130
Clean Harbors Sarnia
Physical and Elemental Analyses
Feed Samples

Rich Feed

Test No.	Heat of Combustion MJ/kg	Viscosity cps @ 25°C	Density g/mL	Organic Chlorine % wt.**	Carbon % wt.	Hydrogen % wt.	Nitrogen % wt.	Oxygen* % wt.	Sulphur % wt.	Ash % wt.
1	30.7	<100	0.91	0.00	48.72	11.08	3.05	35.70	<0.01	1.45
2	30.5	<100	0.89	0.01	49.84	10.61	2.07	36.19	<0.01	1.29
3	26.5	<100	0.89	0.20	51.90	10.88	1.21	33.96	<0.01	2.05
Average	29.2	<100	0.90	0.07	50.15	10.86	2.11	35.28	0.01	1.60

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	4.88	-	1.04	0.05	9.20	10.73	1.04	73.26	0.67	5.10
2	5.21	-	1.05	0.26	10.40	10.71	1.07	70.97	0.75	6.10
3	5.10	-	1.05	0.22	7.41	10.33	1.66	76.57	0.66	3.37
Average	5.06	-	1.05	0.18	9.00	10.59	1.26	73.60	0.693	4.86

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	11.6	<100	1.01	0.00	18.69	10.21	1.71	66.41	0.22	2.76
2	11.4	<100	1.09	11.43	20.41	10.05	1.44	65.30	0.31	2.49
3	9.3	<100	1.01	8.38	20.38	10.00	1.46	66.26	0.19	1.71
Average	10.8	<100	1.04	6.60	19.83	10.09	1.54	65.99	0.24	2.32

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

* Oxygen is determined by difference = 100-(carbon+hydrogen+nitrogen+ash+sulphur).
** Organic chlorine is reported as choride on the daily incineration reports provided by Clean Harbors.

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

Metal	Rich Feed mg/kg	Lean Feed mg/kg	Alkaline Feed mg/kg	Emulsion Feed mg/kg	Leachate Feed mg/kg
Aluminum	61.7	242	<10	108	<10
Antimony	7.41	2.92	<0.4	1.64	<0.4
Arsenic	0.95	26.4	<0.4	14.5	<0.4
Barium	17.5	24.1	<1	20.5	<1
Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5
Boron	<10	17.0	<10	15.4	26.6
Cadmium	22.7	2.09	<0.1	0.16	<0.1
Calcium	801	769	1380	435	297
Chromium	7.71	7.33	<4	4.64	<4
Cobalt	1.97	2.37	<1	1.83	<1
Copper	19.6	51.4	<2.5	41.0	<2.5
Iron	261	254	<200	235	<200
Lead	7.92	7.62	<0.2	5.03	<0.2
Lithium	6.33	4.35	<1	1.16	4.32
Magnesium	41.7	144	25.6	52.5	141
Manganese	<15	1230	<15	104	<15
Mercury	0.019	0.31	<0.010	0.030	<0.010
Molybdenum	3.80	5.39	<1	4.83	3.25
Nickel	5.05	8.78	<0.5	16.5	1.59
Phosphorus	<100	223	<100	<100	<100
Potassium	235	10900	<150	3220	2092
Selenium	<2	<2	<2	<2	<2
Silicon	3140	203	226	2280	58.7
Silver	<0.1	0.15	<0.1	<0.1	<0.1
Sodium	693	12600	151	3900	6660
Strontium	16.7	6.06	<2	4.79	2.89
Sulphur	<1670	6970	<1670	1840	<1670
Tin	4.93	3.01	<2	4.37	<2
Titanium	5.92	25.7	<1	7.71	<1
Vanadium	1.00	3.10	<1	1.53	<1
Zinc	55.6	96.6	<20	113	<20
Total	<7216	<33832	<3978	<12536	<11319

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	3520
Antimony	20.5
Arsenic	290
Barium	250
Beryllium	<0.5
Boron	81.8
Cadmium	31.7
Calcium	21100
Chromium	71.5
Cobalt	17.5
Copper	477
Iron	2850
Lead	13.7
Lithium	26.2
Magnesium	2170
Manganese	9230
Mercury	6.40
Molybdenum	88.0
Nickel	48.2
Phosphorus	3050
Potassium	134000
Selenium	18.8
Silicon	1480
Silver	2.54
Sodium	164000
Strontium	99.6
Sulphur	32600
Tin	13.0
Titanium	3380
Vanadium	34.2
Zinc	196
Total	379167

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	<0.88	10.6	<0.24	0.90
Pentachlorodibenzo-p-dioxins	1.50	20.2	<0.67	<0.71
Hexachlorodibenzo-p-dioxins	256	151	<0.80	50.3
Heptachlorodibenzo-p-dioxins	5880	2670	<0.74	1570
Octachlorodibenzo-p-dioxin	25000	12200	45.6	6320
Total	<31138	15052	<48.1	<7942

Furans

Congener Group	Rich Feed pg/g	Lean Feed pg/g	Alkaline Feed pg/g	Emulsion Feed pg/g
Tetrachlorodibenzofurans	3.92	62.7	<0.23	25.2
Pentachlorodibenzofurans	1.47	17.2	<0.27	0.70
Hexachlorodibenzofurans	85.6	28.8	<0.80	20.1
Heptachlorodibenzofurans	286	117	<1.5	80.5
Octachlorodibenzofuran	399	54.5	<1.1	119
Total	776	280	<3.90	246

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	<0.88	1.49	<0.24	<0.50
12378-pentachlorodibenzo-p-dioxin	<3.0	<3.1	<0.67	<0.71
123478-hexachlorodibenzo-p-dioxin	<9.5	<2.6	<0.80	<0.87
123678-hexachlorodibenzo-p-dioxin	67.0	19.9	<0.80	8.46
123789-hexachlorodibenzo-p-dioxin	59.0	<9.1	<0.80	<1.3
1234678-heptachlorodibenzo-p-dioxin	3210	1380	<3.2	849
Octachlorodibenzo-p-dioxin	25000	12200	45.6	6320
2378-tetrachlorodibenzofuran	<1.3	2.01	<0.23	<0.64
12378-pentachlorodibenzofuran	<1.4	2.31	<0.37	0.70
23478-pentachlorodibenzofuran	<1.4	<2.9	<0.25	<0.63
123478-hexachlorodibenzofuran	<1.9	<3.4	<0.54	<0.69
123678-hexachlorodibenzofuran	<1.4	<2.2	<0.50	<0.69
234678-hexachlorodibenzofuran	25.9	<9.9	<0.53	1.37
123789-hexachlorodibenzofuran	<1.7	<1.6	<0.80	<0.96
1234678-heptachlorodibenzofuran	<89	45.9	<1.0	19.6
1234789-heptachlorodibenzofuran	<3.5	<1.8	<1.5	<1.5
Octachlorodibenzofuran	399	54.5	<1.1	119
Total	<28876	<13743	<58.9	<7327

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	5110	6440	<130	2680
Trichlorinated biphenyls	4810	2060	<9.5	1960
Tetrachlorinated biphenyls	31000	2260	45.0	3170
Pentachlorinated biphenyls	73300	2750	103	3390
Hexachlorinated biphenyls	42100	4120	18.0	2680
Heptachlorinated biphenyls	14800	2520	<3.7	1690
Octachlorinated biphenyls	3010	788	16.0	652
Nonachlorinated biphenyls	243	62.0	<10	48.0
Decachlorinated biphenyl	231	97.6	<4.9	72.3
Total	174604	21098	<340	16342

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.

** TOTAL PAGE.09 **

APPENDIX 3

Proving Data
(25 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
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2627362		Mississauga, ON L5J 2Y4
Date of Report	10-Sep-21		Canada
Date of Sample Receipt	17-Aug-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors Sarnia

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

Certified by:

Ron McLeod
Technical Director

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

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Method Blank		GLASSWARE PROOF	
ALS Sample ID	WG3598692-1		L2627362-21	
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	27-Aug-21		27-Aug-21	
Target Analytes	**ng/sample**		**ng/sample**	
Chlorobenzene	<14	U	<14	U
1,3-Dichlorobenzene	<14	U	<14	U
1,4-Dichlorobenzene	<14	U	<14	U
1,2-Dichlorobenzene	<14	U	<14	U
1,3,5-Trichlorobenzene	<14	U	<14	U
1,2,4-Trichlorobenzene	<14	U	<14	U
1,2,3-Trichlorobenzene	<14	U	<14	U
1,2,3,5/1,2,4,5-Tetrachlorobenzene	<14	U	<14	U
1,2,3,4-Tetrachlorobenzene	<14	U	<14	U
Pentachlorobenzene	<14	U	<14	U
Hexachlorobenzene	<14	U	<14	U
Extraction Standards	**%Rec**		**%Rec**	
13C6-Chlorobenzene	32		25	
13C6-1,4-Dichlorobenzene	71		57	
13C6-1,2,3-Trichlorobenzene	85		75	
13C6-1,2,3,4-Tetrachlorobenzene	125		111	
13C6-Pentachlorobenzene	132		118	
13C6-Hexachlorobenzene	124		122	

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

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
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2627362		Mlssissauga, ON L5J 2Y4
Date of Report	10-Sep-21		Canada
Date of Sample Receipt	17-Aug-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors Sarnia

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

Certified by:

Ron McLeod, PhD
Technical Director

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

ALS Environmental

Sample Analysis Summary Report

Sample Name	Method Blank		GLASSWARE PROOF	
ALS Sample ID	WG3598692-1		L2627362-21	
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	27-Aug-21		27-Aug-21	
Target Analytes	**ng/sample**		**ng/sample**	
2-Chlorophenol	<70	U	<70	U
3-Chlorophenol	<70	U	<70	U
4-Chlorophenol	<70	U	<70	U
2,6-Dichlorophenol	<70	U	<70	U
2,4/2,5-Dichlorophenol	<70	U	<70	U
3,5-Dichlorophenol	<70	U	<70	U
2,3-Dichlorophenol	<70	U	<70	U
3,4-Dichlorophenol	<70	U	<70	U
2,4,6-Trichlorophenol	<70	U	<70	U
2,3,6-Trichlorophenol	<70	U	<70	U
2,3,5-Trichlorophenol	<70	U	<70	U
2,4,5-Trichlorophenol	<70	U	<70	U
2,3,4-Trichlorophenol	<70	U	<70	U
3,4,5-Trichlorophenol	<70	U	<70	U
2,3,5,6/2,3,4,6-Tetrachlorophenol	<70	U	<70	U
2,3,4,5-Tetrachlorophenol	<70	U	<70	U
Pentachlorophenol	<70	U	<70	U
Hexachlorophene	<70	U	<70	U
Extraction Standards	**% Rec**		**% Rec**	
13C6-4-Chlorophenol (ES)	106		103	
13C6-2,4-Dichlorophenol (ES)	98		101	
13C6-2,4,5-Trichlorophenol (ES)	60		65	
13C6-2,3,4,5-Tetrachlorophenol (ES)	45		60	
13C6-Pentachlorophenol (ES)	17		41	

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

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
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2627362		Mlssissauga, ON L5J 2Y4
Date of Report	5-Oct-21		Canada
Date of Sample Receipt	17-Aug-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors Sarnia

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

Certified by:

Bradley Reimer
GC/MS Laboratory Senior Technical Specialist

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

ALS Life Sciences

Sample Analysis summary Report

Sample Name	GLASSWARE PROOF
ALS Sample ID	L2627362-21
Sample Size	1
Sample size units	Sample
Percent Moisture	n/a
Sample Matrix	Media prep
Sampling Date	n/a
Extraction Date	27-Aug-21
Target Analytes	**pg**
2,3,7,8-TCDD	<6.8
1,2,3,7,8-PeCDD	<5.1
1,2,3,4,7,8-HxCDD	<4.5
1,2,3,6,7,8-HxCDD	<4.4
1,2,3,7,8,9-HxCDD	<4.6
1,2,3,4,6,7,8-HpCDD	<8.8
OCDD	53.6
2,3,7,8-TCDF	<4.8
1,2,3,7,8-PeCDF	<5.2
2,3,4,7,8-PeCDF	<4.9
1,2,3,4,7,8-HxCDF	<4.0
1,2,3,6,7,8-HxCDF	<3.7
2,3,4,6,7,8-HxCDF	<4.0
1,2,3,7,8,9-HxCDF	<4.8
1,2,3,4,6,7,8-HpCDF	<4.0
1,2,3,4,7,8,9-HpCDF	<5.1
OCDF	<10
Extraction Standards	**% Rec**
13C12-2,3,7,8-TCDD	91
13C12-1,2,3,7,8-PeCDD	89
13C12-1,2,3,6,7,8-HxCDD	91
13C12-1,2,3,4,6,7,8-HpCDD	85
13C12-OCDD	71
13C12-2,3,7,8-TCDF	88
13C12-1,2,3,7,8-PeCDF	87
13C12-1,2,3,6,7,8-HxCDF	87
13C12-1,2,3,4,6,7,8-HpCDF	95
Homologue Group Totals	**pg**
Total-TCDD	<6.8
Total-PeCDD	<5.1
Total-HxCDD	<4.6
Total-HpCDD	<8.8
Total-TCDF	<4.8
Total-PeCDF	<5.2
Total-HxCDF	<4.8
Total-HpCDF	<5.1
Toxic Equivalency - (WHO 2005)	
Lower Bound PCDD/F TEQ (WHO 2005)	0.0161
Mid Point PCDD/F TEQ (WHO 2005)	8.61
Upper Bound PCDD/F TEQ (WHO 2005)	17.2

ALS Life Sciences

Quality Control Summary Report

Sample Name	Method Blank
ALS Sample ID	WG3598692-1
Sample Size	1
Sample size units	Sample
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	27-Aug-21
Target Analytes	**pg**
2,3,7,8-TCDD	<6.9
1,2,3,7,8-PeCDD	<4.6
1,2,3,4,7,8-HxCDD	<5.4
1,2,3,6,7,8-HxCDD	<5.2
1,2,3,7,8,9-HxCDD	<5.4
1,2,3,4,6,7,8-HpCDD	<10
OCDD	60.1
2,3,7,8-TCDF	<4.1
1,2,3,7,8-PeCDF	<3.7
2,3,4,7,8-PeCDF	<3.5
1,2,3,4,7,8-HxCDF	<3.9
1,2,3,6,7,8-HxCDF	<3.6
2,3,4,6,7,8-HxCDF	<3.9
1,2,3,7,8,9-HxCDF	<4.7
1,2,3,4,6,7,8-HpCDF	<3.1
1,2,3,4,7,8,9-HpCDF	<4.0
OCDF	<11
Extraction Standards	**% Rec**
13C12-2,3,7,8-TCDD	99
13C12-1,2,3,7,8-PeCDD	100
13C12-1,2,3,6,7,8-HxCDD	100
13C12-1,2,3,4,6,7,8-HpCDD	92
13C12-OCDD	70
13C12-2,3,7,8-TCDF	96
13C12-1,2,3,7,8-PeCDF	95
13C12-1,2,3,6,7,8-HxCDF	98
13C12-1,2,3,4,6,7,8-HpCDF	105
Homologue Group Totals	**pg**
Total-TCDD	<6.9
Total-PeCDD	<4.6
Total-HxCDD	<5.4
Total-HpCDD	<10
Total-TCDF	<4.1
Total-PeCDF	<3.7
Total-HxCDF	<4.7
Total-HpCDF	<4.0
Toxic Equivalency - (WHO 2005)	
Lower Bound PCDD/F TEQ (WHO 2005)	0.0180
Mid Point PCDD/F TEQ (WHO 2005)	8.25
Upper Bound PCDD/F TEQ (WHO 2005)	16.5

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1435 Norjohn Court, Unit 1, Burlington, ON, Canada L7L 0E6
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Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2627362		Mlssissauga, ON L5J 2Y4
Date of Report	8-Oct-21		Canada
Date of Sample Receipt	17-Aug-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors Sarnia

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

Certified by:

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

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Sample Analysis summary Report

Sample Name	GLASSWARE PROOF
ALS Sample ID	L2627362-21
Sample Size	1
Sample size units	sample
Percent Moisture	n/a
Sample Matrix	Media prep
Sampling Date	n/a
Extraction Date	27-Aug-21
Target Analytes	**ng**
Hexachlorobutadiene	<0.044
1,2,4,5-Tetrachlorobenzene	<0.046
1,2,3,4-Tetrachlorobenzene	<0.055
Pentachlorobenzene	<0.018
Hexachlorobenzene	<0.041
3,4,5,6-Tetrachloroveratrole	<0.13
Pentachloroanisole	<0.28
alpha-BHC	<1.6
beta-BHC	<2.0
gamma-BHC	<2.1
delta-BHC	<2.3
Pentachloronitrobenzene	<0.49
Heptachlor	<0.16
Aldrin	<0.26
4,4'-DDNU	<0.49
Dacthal	<0.24
Chlorpyrifos	<1.3
Isodrin	<0.17
Octachlorostyrene	<0.23
Heptachlor Epoxide B	<0.20
Heptachlor Epoxide A	<1.3
Oxychlordane	<0.25
4,4'-DDMU	<3.0
trans-Chlordane	<1.4
cis-Chlordane	<1.3
trans-Nonachlor	<1.3
Dieldrin	<0.81
Endrin	<0.85
cis-Nonachlor	<0.94
Endosulfan I	<1.6
Endosulfan II	<3.6
Endosulfan Sulfate	<0.70
2,4'-DDE	<0.46
4,4'-DDE	<1.1
2,4'-DDD	<0.77
4,4'-DDD	<0.73
2,4'-DDT	<0.88
4,4'-DDT	<0.87
Endrin Aldehyde	<0.43
Endrin Ketone	<1.0
Methoxychlor	<0.47
Dicofol	<11
Mirex	<0.054
Parlar 26	<1.9
Parlar 50	<1.1
Parlar 62	<0.99
Extraction Standards	**% Rec**
Pentachlorobenzene, 13C6-	205
Hexachlorobenzene, 13C6-	203
alpha-BHC, 13C6-	100
beta-BHC, 13C6-	113
gamma-BHC, 13C6-	92
delta-BHC, 13C6-	95
Heptachlor, 13C10-	89
Oxychlordane, 13C10-	108
trans-Nonachlor, 13C10-	87
Dieldrin, 13C12-	89
Endrin, 13C12-	159
Endosulfan II, 13C9-	95
2,4'-DDE, 13C12-	97
4,4'-DDE, 13C12-	96
4,4'-DDD, 13C12-	106
4,4'-DDT, 13C12-	106
Methoxychlor, 13C12-	104
Mirex, 13C10-	99

ALS Life Sciences

Quality Control Summary Report

Sample Name	Method Blank
ALS Sample ID	WG3598692-1
Sample Size	1
Sample size units	sample
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	27-Aug-21
Target Analytes	**ng**
Hexachlorobutadiene	<0.049
1,2,4,5-Tetrachlorobenzene	<0.037
1,2,3,4-Tetrachlorobenzene	<0.043
Pentachlorobenzene	<0.015
Hexachlorobenzene	<0.019
3,4,5,6-Tetrachloroveratrole	<0.16
Pentachloroanisole	<0.31
alpha-BHC	<1.9
beta-BHC	<2.1
gamma-BHC	<2.7
delta-BHC	<3.0
Pentachloronitrobenzene	<0.67
Heptachlor	<0.14
Aldrin	<0.16
4,4'-DDNU	<0.43
Dacthal	<0.39
Chlorpyrifos	<1.2
Isodrin	<0.38
Octachlorostyrene	<0.37
Heptachlor Epoxide B	<0.36
Heptachlor Epoxide A	<2.5
Oxychlordane	<0.16
4,4'-DDMU	<2.7
trans-Chlordane	<0.68
cis-Chlordane	<0.62
trans-Nonachlor	<0.63
Dieldrin	<0.78
Endrin	<1.9
cis-Nonachlor	<1.5
Endosulfan I	<0.99
Endosulfan II	<1.8
Endosulfan Sulfate	<0.57
2,4'-DDE	<0.46
4,4'-DDE	<0.94
2,4'-DDD	<0.83
4,4'-DDD	<0.46
2,4'-DDT	<0.55
4,4'-DDT	<0.55
Endrin Aldehyde	<0.93
Endrin Ketone	<2.5
Methoxychlor	<0.36
Dicofol	<10
Mirex	<0.049
Parlar 26	<1.6
Parlar 50	<0.63
Parlar 62	<0.58
Extraction Standards	**% Rec**
Pentachlorobenzene, 13C6-	213
Hexachlorobenzene, 13C6-	211
alpha-BHC, 13C6-	106
beta-BHC, 13C6-	130
gamma-BHC, 13C6-	95
delta-BHC, 13C6-	101
Heptachlor, 13C10-	91
Oxychlordane, 13C10-	103
trans-Nonachlor, 13C10-	95
Dieldrin, 13C12-	97
Endrin, 13C12-	74
Endosulfan II, 13C9-	104
2,4'-DDE, 13C12-	104
4,4'-DDE, 13C12-	108
4,4'-DDD, 13C12-	114
4,4'-DDT, 13C12-	115
Methoxychlor, 13C12-	102
Mirex, 13C10-	114

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Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2627362		Mississauga, ON L5J 2Y4
Date of Report	3-Sep-21		Canada
Date of Sample Receipt	17-Aug-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors Sarnia

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

Certified by:

Ron McLeod
Technical Director

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Sample Analysis Summary Report

Sample Name	Method Blank		GLASSWARE PROOF	
ALS Sample ID	WG3598692-1		L2627362-21	
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	21-Apr-21		21-Apr-21	
Target Analytes	**ng/sample**		**ng/sample**	
Naphthalene	<14	U	<14	U
2-Methylnaphthalene	<14	U	<14	U
1-Methylnaphthalene	<14	U	<14	U
Acenaphthylene	<14	U	<14	U
Acenaphthene	<14	U	<14	U
Fluorene	<14	U	<14	U
Phenanthrene	<14	U	<14	U
Anthracene	<14	U	<14	U
Fluoranthene	<14	U	<14	U
Pyrene	<14	U	<14	U
Benzo(a)Anthracene	<14	U	<14	U
Chrysene	<14	U	<14	U
Benzo(b)Fluoranthene	<14	U	<14	U
Benzo(k)Fluoranthene	<14	U	<14	U
Benzo(e)Pyrene	<14	U	<14	U
Benzo(a)Pyrene	<14	U	<14	U
Perylene	<14	U	<14	U
Indeno(1,2,3-cd)Pyrene	<14	U	<14	U
Dibenzo(a,h)Anthracene	<14	U	<14	U
Benzo(g,h,i)Perylene	<14	U	<14	U
Field Sampling Standards	**% Rec**		**% Rec**	
1-Methylnaphthalene-D10	NS		NS	
Fluorene D10	NS		NS	
Terphenyl D14(Surr.)	NS		NS	
Extraction Standards	**% Rec**		**% Rec**	
Naphthalene D8	84.3		57.6	
2-Methylnaphthalene-D10	121.4		81.7	
Acenaphthylene D8	83.9		65.5	
Phenanthrene D10	110.1		72.8	
Anthracene-D10	77.6		56.5	
Fluoranthene D10	105.4		73.4	
Benz(a)Anthracene-D12	58.8		57	
Chrysene D12	72		62.2	
Benzo(b)Fluoranthene-D12	97		68.2	
Benzo(k)Fluoranthene-D12	90.8	M	52.8	
Benzo(a)Pyrene D12	74.6		57.9	
Perylene D12	59.9		59.4	
Indeno(1,2,3,cd)Pyrene-D12	78.5		51	
Dibenz(a,h)Anthracene-D14	88.3	M	57.4	M
Benzo(g,h,i)Perylene D12	109.5	M	68.3	M

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

M Indicates that a peak has been manually integrated.

ALS Life Sciences
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Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2627362		Mlssissauga, ON L5J 2Y4
Date of Report	3-Sep-21		Canada
Date of Sample Receipt	17-Aug-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors Sarnia

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

Certified by:

Ron McLeod
Technical Director

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ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Method Blank		GLASSWARE PROOF	
ALS Sample ID	WG3598692-1		L2627362-21	
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	21-Apr-21		21-Apr-21	
Target Analytes	**ng/sample**		**ng/sample**	
Naphthalene	<14	U	<14	U
2-Methylnaphthalene	<14	U	<14	U
1-Methylnaphthalene	<14	U	<14	U
Acenaphthylene	<14	U	<14	U
Acenaphthene	<14	U	<14	U
Fluorene	<14	U	<14	U
Phenanthrene	<14	U	<14	U
Anthracene	<14	U	<14	U
Fluoranthene	<14	U	<14	U
Pyrene	<14	U	<14	U
Benzo(a)Anthracene	<14	U	<14	U
Chrysene	<14	U	<14	U
Benzo(b)Fluoranthene	<14	U	<14	U
Benzo(k)Fluoranthene	<14	U	<14	U
Benzo(e)Pyrene	<14	U	<14	U
Benzo(a)Pyrene	<14	U	<14	U
Perylene	<14	U	<14	U
Indeno(1,2,3-cd)Pyrene	<14	U	<14	U
Dibenzo(a,h)Anthracene	<14	U	<14	U
Benzo(g,h,i)Perylene	<14	U	<14	U
Field Sampling Standards	**% Rec**		**% Rec**	
1-Methylnaphthalene-D10	NS		NS	
Fluorene D10	NS		NS	
Terphenyl D14(Surr.)	NS		NS	
Extraction Standards	**% Rec**		**% Rec**	
Naphthalene D8	84.3		57.6	
2-Methylnaphthalene-D10	121.4		81.7	
Acenaphthylene D8	83.9		65.5	
Phenanthrene D10	110.1		72.8	
Anthracene-D10	77.6		56.5	
Fluoranthene D10	105.4		73.4	
Benz(a)Anthracene-D12	58.8		57	
Chrysene D12	72		62.2	
Benzo(b)Fluoranthene-D12	97		68.2	
Benzo(k)Fluoranthene-D12	90.8	M	52.8	
Benzo(a)Pyrene D12	74.6		57.9	
Perylene D12	59.9		59.4	
Indeno(1,2,3,cd)Pyrene-D12	78.5		51	
Dibenz(a,h)Anthracene-D14	88.3	M	57.4	M
Benzo(g,h,i)Perylene D12	109.5	M	68.3	M

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

M Indicates that a peak has been manually integrated.

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1435 Norjohn Court, Unit 1, Burlington, ON, Canada L7L 0E6
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Certificate of Analysis

ALS Project Contact:	Lynne Wrona	**Client Name:**	ORTECH
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2627362		Mississauga, ON L5J 2Y4
Date of Report	1-Oct-21		Canada
Date of Sample Receipt	17-Aug-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors Sarnia

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

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ALS Life Sciences

Sample Analysis Summary Report

Sample Name	GLASSWARE PROOF
ALS Sample ID	L2627362-21
Sample Size	1
Sample size units	Sample
Percent Moisture	n/a
Sample Matrix	Media prep
Sampling Date	n/a
Extraction Date	27-Aug-21

Target Analytes	pg
PCB-001	<5.9
PCB-002	<5.7
PCB-003	<30
PCB-004	<10
PCB-010	<3.5
PCB-009	<3.3
PCB-007	<3.3
PCB-006	6.86
PCB-005	<3.6
PCB-008	<18
PCB-014	<3.6
PCB-011	85.5
PCB-012/013	<3.8
PCB-015	9.67
PCB-019	<2.9
PCB-018/030	17.7
PCB-017	6.92
PCB-027	<1.6
PCB-024	<1.7
PCB-016	<6.4
PCB-032	<2.7
PCB-034	<3.1
PCB-023	<3.1
PCB-026/029	<3.0
PCB-025	<2.8
PCB-031	20.2
PCB-020/028	24.6
PCB-021/033	16.1
PCB-022	<7.3
PCB-036	<2.6
PCB-039	<2.9
PCB-038	<2.9
PCB-035	<3.2
PCB-037	14.8
PCB-054	<1.8
PCB-050/053	<3.1
PCB-045/051	<3.2
PCB-046	<3.6
PCB-052	72.2
PCB-073	<2.5
PCB-043	<3.4
PCB-049/069	22.1
PCB-048	<3.8
PCB-044/047/065	51.4
PCB-059/062/075	<2.3
PCB-042	<6.8
PCB-040/041/071	<14
PCB-064	15.0
PCB-072	<2.6
PCB-068	<2.5
PCB-057	<2.7
PCB-058	<2.7
PCB-067	<2.6
PCB-063	<2.6
PCB-061/070/074/076	98.3
PCB-066	26.8
PCB-055	<2.8
PCB-056	<14
PCB-060	<5.3
PCB-080	<2.5
PCB-079	<2.4
PCB-078	<2.8
PCB-081	<2.9
PCB-077	<61
PCB-104	<1.3
PCB-096	<1.2
PCB-103	1570
PCB-094	<3.2
PCB-095	85.3
PCB-093/098/100/102	<3.0

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	GLASSWARE PROOF
ALS Sample ID	L2627362-21
Sample Size	1
Sample size units	Sample
Percent Moisture	n/a
Sample Matrix	Media prep
Sampling Date	n/a
Extraction Date	27-Aug-21

Target Analytes	pg
PCB-088/091	<10
PCB-084	32.0
PCB-089	<3.1
PCB-121	<2.2
PCB-092	21.7
PCB-090/101/113	113
PCB-083/099	<49
PCB-112	<2.2
PCB-086/087/097/109/119/125	<60
PCB-085/110/115/116/117	99.1
PCB-082	<11
PCB-111	<11
PCB-120	<2.1
PCB-108/124	<1.9
PCB-107	5.78
PCB-123	<2.1
PCB-106	<1.8
PCB-118	74.4
PCB-122	<2.0
PCB-114	<2.5
PCB-105	<25
PCB-127	<1.9
PCB-126	<2.2
PCB-155	<1.1
PCB-152	<1.2
PCB-150	<1.2
PCB-136	11.1
PCB-145	<1.2
PCB-148	<1.6
PCB-135/151	<14
PCB-154	<1.4
PCB-144	<2.3
PCB-147/149	<35
PCB-134/143	<3.3
PCB-139/140	<2.8
PCB-131	<3.3
PCB-142	<3.1
PCB-132	<20
PCB-133	<2.9
PCB-165	<2.3
PCB-146	<4.2
PCB-161	<2.1
PCB-153/168	37.4
PCB-141	11.0
PCB-130	<3.3
PCB-137/164	<2.6
PCB-129/138/163	58.9
PCB-160	<2.2
PCB-158	<5.1
PCB-128/166	<5.1
PCB-159	<2.2
PCB-162	<2.3
PCB-167	<2.2
PCB-156/157	<5.8
PCB-169	<2.7
PCB-188	<3.6
PCB-179	<7.8
PCB-184	<4.4
PCB-176	<4.6
PCB-186	<4.7
PCB-178	<7.3
PCB-175	<6.0
PCB-187	19.8
PCB-182	<6.1
PCB-183	<15
PCB-185	<6.1
PCB-174	17.2
PCB-177	<11
PCB-181	<6.5
PCB-171/173	<6.9
PCB-172	<6.4

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	GLASSWARE PROOF
ALS Sample ID	L2627362-21
Sample Size	1
Sample size units	Sample
Percent Moisture	n/a
Sample Matrix	Media prep
Sampling Date	n/a
Extraction Date	27-Aug-21

Target Analytes	pg
PCB-192	<5.6
PCB-180/193	<24
PCB-191	<5.2
PCB-170	<7.0
PCB-190	<4.7
PCB-189	<6.6
PCB-202	<1.3
PCB-201	<1.3
PCB-204	<1.3
PCB-197	<1.4
PCB-200	<1.3
PCB-198/199	<1.9
PCB-196	<1.9
PCB-203	<1.8
PCB-195	<2.8
PCB-194	<5.1
PCB-205	<2.8
PCB-208	<4.4
PCB-207	<5.0
PCB-206	<7.9
PCB-209	<2.1
Extraction Standards	**% Rec**
13C12-PCB-001	50
13C12-PCB-003	56
13C12-PCB-004	30
13C12-PCB-015	76
13C12-PCB-019	71
13C12-PCB-037	94
13C12-PCB-054	60
13C12-PCB-081	78
13C12-PCB-077	90
13C12-PCB-104	59
13C12-PCB-123	86
13C12-PCB-118	78
13C12-PCB-114	73
13C12-PCB-105	78
13C12-PCB-126	92
13C12-PCB-155	70
13C12-PCB-167	82
13C12-PCB-156/157	77
13C12-PCB-169	83
13C12-PCB-188	38
13C12-PCB-189	24
13C12-PCB-202	85
13C12-PCB-205	82
13C12-PCB-208	91
13C12-PCB-206	86
13C12-PCB-209	63

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	GLASSWARE PROOF
ALS Sample ID	L2627362-21
Sample Size	1
Sample size units	Sample
Percent Moisture	n/a
Sample Matrix	Media prep
Sampling Date	n/a
Extraction Date	27-Aug-21

Target Analytes	pg
Homologue Group Totals	
Total MonoCB	30.0
Total DiCB	120
Total TriCB	117
Total TetraCB	391
Total PentaCB	2170
Total HexaCB	210
Total HeptaCB	102
Total OctaCB	5.10
Total NonaCB	<4.4
DecaCB	<2.1
Total PCB	3140
Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.00223
Mid Point PCB TEQ	0.160
Upper Bound PCB TEQ	0.312

ALS Life Sciences

Quality Control Summary Report

Sample Name	Method Blank
ALS Sample ID	WG3598692-1
Sample Size	1
Sample size units	Blank
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	27-Aug-21

Target Analytes	pg
PCB-001	<8.4
PCB-002	8.85
PCB-003	<26
PCB-004	<6.3
PCB-010	<3.3
PCB-009	<3.2
PCB-007	<3.1
PCB-006	<3.2
PCB-005	<3.4
PCB-008	<9.5
PCB-014	<3.6
PCB-011	<20
PCB-012/013	<3.8
PCB-015	<8.7
PCB-019	<3.1
PCB-018/030	<10
PCB-017	<4.6
PCB-027	<3.1
PCB-024	<3.3
PCB-016	<5.1
PCB-032	<3.4
PCB-034	<3.4
PCB-023	<3.5
PCB-026/029	<3.3
PCB-025	<3.1
PCB-031	<15
PCB-020/028	24.7
PCB-021/033	<10
PCB-022	9.32
PCB-036	<2.9
PCB-039	<3.2
PCB-038	<3.2
PCB-035	<3.5
PCB-037	<4.9
PCB-054	<2.3
PCB-050/053	<4.3
PCB-045/051	<4.4
PCB-046	<5.1
PCB-052	<13
PCB-073	<3.4
PCB-043	<4.7
PCB-049/069	<10
PCB-048	<4.2
PCB-044/047/065	19.4
PCB-059/062/075	<3.2
PCB-042	<4.7
PCB-040/041/071	<7.6
PCB-064	<7.0
PCB-072	<3.5
PCB-068	<3.3
PCB-057	<3.6
PCB-058	<3.6
PCB-067	<3.4
PCB-063	<3.4
PCB-061/070/074/076	22.6
PCB-066	14.8
PCB-055	<3.7
PCB-056	<3.6
PCB-060	<3.8
PCB-080	<3.3
PCB-079	<3.1
PCB-078	<3.7
PCB-081	<3.8
PCB-077	<47
PCB-104	<2.1
PCB-096	<1.9
PCB-103	1770
PCB-094	<5.5
PCB-095	16.8
PCB-093/098/100/102	<5.1

ALS Life Sciences

Quality Control Summary Report

Sample Name	Method Blank
ALS Sample ID	WG3598692-1
Sample Size	1
Sample size units	Blank
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	27-Aug-21

Target Analytes	pg
PCB-088/091	<5.1
PCB-084	<6.0
PCB-089	<5.4
PCB-121	<3.7
PCB-092	<5.2
PCB-090/101/113	20.0
PCB-083/099	12.0
PCB-112	<3.8
PCB-086/087/097/109/119/125	<7.6
PCB-085/110/115/116/117	<19
PCB-082	<5.8
PCB-111	<7.6
PCB-120	<3.6
PCB-108/124	<2.0
PCB-107	<2.1
PCB-123	<2.3
PCB-106	<1.9
PCB-118	20.5
PCB-122	<2.2
PCB-114	<2.3
PCB-105	<6.3
PCB-127	<2.0
PCB-126	<2.2
PCB-155	<1.3
PCB-152	<1.3
PCB-150	<1.2
PCB-136	4.10
PCB-145	<1.3
PCB-148	<1.7
PCB-135/151	<3.5
PCB-154	<1.5
PCB-144	<1.7
PCB-147/149	15.3
PCB-134/143	<2.3
PCB-139/140	<1.9
PCB-131	<2.2
PCB-142	<2.1
PCB-132	6.86
PCB-133	<2.0
PCB-165	<1.6
PCB-146	<1.9
PCB-161	<1.4
PCB-153/168	<21
PCB-141	<3.5
PCB-130	<2.3
PCB-137/164	<3.6
PCB-129/138/163	25.2
PCB-160	<1.5
PCB-158	<1.4
PCB-128/166	<3.8
PCB-159	<1.5
PCB-162	<1.6
PCB-167	<1.5
PCB-156/157	<4.2
PCB-169	<1.8
PCB-188	<1.8
PCB-179	<1.6
PCB-184	<1.6
PCB-176	<1.7
PCB-186	<1.7
PCB-178	<2.3
PCB-175	<2.2
PCB-187	7.39
PCB-182	<2.2
PCB-183	<2.2
PCB-185	<2.2
PCB-174	6.94
PCB-177	5.31
PCB-181	<2.4
PCB-171/173	<2.5
PCB-172	<2.3

ALS Life Sciences

Quality Control Summary Report

Sample Name	Method Blank
ALS Sample ID	WG3598692-1
Sample Size	1
Sample size units	Blank
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	27-Aug-21

Target Analytes	pg
PCB-192	<2.0
PCB-180/193	14.8
PCB-191	<1.9
PCB-170	5.66
PCB-190	<1.7
PCB-189	<1.8
PCB-202	<1.3
PCB-201	<1.3
PCB-204	<1.4
PCB-197	<1.4
PCB-200	<1.3
PCB-198/199	<1.9
PCB-196	<1.9
PCB-203	<1.8
PCB-195	<3.2
PCB-194	8.72
PCB-205	<3.2
PCB-208	<5.1
PCB-207	<5.9
PCB-206	<9.6
PCB-209	<1.8
Extraction Standards	**% Rec**
13C12-PCB-001	44
13C12-PCB-003	50
13C12-PCB-004	50
13C12-PCB-015	63
13C12-PCB-019	55
13C12-PCB-037	64
13C12-PCB-054	44
13C12-PCB-081	62
13C12-PCB-077	69
13C12-PCB-104	44
13C12-PCB-123	64
13C12-PCB-118	59
13C12-PCB-114	63
13C12-PCB-105	64
13C12-PCB-126	72
13C12-PCB-155	52
13C12-PCB-167	68
13C12-PCB-156/157	68
13C12-PCB-169	72
13C12-PCB-188	59
13C12-PCB-189	62
13C12-PCB-202	75
13C12-PCB-205	61
13C12-PCB-208	72
13C12-PCB-206	69
13C12-PCB-209	52

ALS Life Sciences

Quality Control Summary Report

Sample Name	Method Blank
ALS Sample ID	WG3598692-1
Sample Size	1
Sample size units	Blank
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	27-Aug-21
Target Analytes	**pg**
Homologue Group Totals	
Total MonoCB	43.3
Total DiCB	38.2
Total TriCB	77.3
Total TetraCB	146
Total PentaCB	1880
Total HexaCB	91.1
Total HeptaCB	40.1
Total OctaCB	8.72
Total NonaCB	<5.1
DecaCB	<1.8
Total PCB	2330
Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.000615
Mid Point PCB TEQ	0.143
Upper Bound PCB TEQ	0.281

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
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road Mlssissauga, ON L5J 2Y4 Canada
ALS WO#:	L2627362		
Date of Report	9-Sep-21		
Date of Sample Receipt	17-Aug-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors Sarnia

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

Ketone data by VOST analyses are estimated values only

Certified by:

Ron McLeod
Technical Director

Results in this certificate relate only to the samples as submitted to the laboratory.
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ALS Environmental

Sample Analysis Summary Report

Sample Name	Method Blank		VOST PROOF	
ALS Sample ID	WG3614137-1		L2627362-44	
Sample units	sample		sample	
Matrix	QC		Media Prep	
Sampling Date	n/a		n/a	
Extraction Date	9-Sep-21		9-Sep-21	
Target Analytes	**ug/sample**		**ug/sample**	
Dichlorodifluoromethane	<0.02	U	<0.02	U
Vinyl Chloride	<0.02	U	<0.02	U
Bromomethane	<0.09	U	<0.09	U
Trichlorofluoromethane	<0.02	U	<0.02	U
1,1-Dichloroethene	<0.01	U	<0.01	U
Acetone	<0.1	U	<0.1	U
Methylene Chloride	<0.1	U	<0.1	U
trans,1,2-Dichloroethene	<0.01	U	<0.01	U
1,1-Dichloroethane	<0.01	U	<0.01	U
2-Butanone	<0.01	U	<0.01	U
Chloroform	<0.01	U	<0.01	U
1,1,1-Trichloroethane	<0.01	U	<0.01	U
Carbon Tetrachloride	<0.01	U	<0.01	U
Benzene	<0.05	U	<0.05	U
Trichloroethene	<0.01	U	<0.01	U
1,2-Dichloropropane	<0.01	U	<0.01	U
Bromodichloromethane	<0.01	U	<0.01	U
Toluene	<0.05	U	<0.05	U
Tetrachloroethene	<0.01	U	<0.01	U
Chlorodibromomethane	<0.01	U	<0.01	U
Ethylene Dibromide	<0.02	U	<0.02	U
Ethylbenzene	<0.01	U	<0.01	U
M&P-Xylene	<0.03	U	<0.03	U
O-Xylene	<0.01	U	<0.01	U
Styrene	<0.02	U	<0.02	U
Bromoform	<0.01	U	<0.01	U
Isopropylbenzene	<0.02	U	<0.02	U
1,3,5-Trimethylbenzene	<0.02	U	<0.02	U
1,2,4-Trimethylbenzene	<0.02	U	<0.02	U
Ethyl Acetate	<0.02	U	<0.02	U
Trichlorotrifluoroethane	<0.02	U	<0.02	U
Field Standard	**% Rec**		**% Rec**	
d10-Ethylbenzene(SPK)	101.5		85.6	
Surrogate Standards	**% Rec**		**% Rec**	
d4-1,2-Dichloroethane(SURR)	88.8		96.8	
d8-Toluene(SURR)	98		96.4	
4-Bromofluorobenzene(SURR)	110.2		108.3	
Internal Standards	**% Rec**		**% Rec**	
Bromochloromethane	115.4		109.5	
1,4-Difluorobenzene	87.7		83.1	
d5-Chlorobenzene	86.2		81.8	

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 P+M -M29
Test Date	SEPTEMBER 14, 2021
Test Location	Incinerator Exhaust Stack
Operator Signature	

Project No.:	22114
Page	1 of 5
Probe No.:	5
Meter Box No.:	TEAM 2
Impinger Box No.:	16

Pitot Factor	0.845	
DGMCF	0.995	
Barometric Pressure	29.16	"Hg
Static Pressure	0.66	"H2O
Nozzle Size	0.2600	inches
Stack Diameter	5	
Length	0	feet
Width	0	feet
Port length:	~~8~~ 11	inches

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

Particulate Gain

Filter	38.1	mg
Probe	1.4	mg

Moisture Gain

CWTR	3797.4	g
WCBDA	30.6	g

Combustion Gas Concentration

Oxygen	8.72	%
Carbon Dioxide	8.82	%
Carbon Monoxide	810	ppm

Measuring Device	MII Numbers
Probe / Pitot	S4
Trendicator	} COE 20092
Control Box	
Incline Manometer	
Comb.Gas.Analyzer	MSML
Micromanometer	
Barometer	Env.Can
Calipers	B03906

Nozzle Measurements	
1	.2605
2	.2600
3	.2600
4	.2595
Average:	

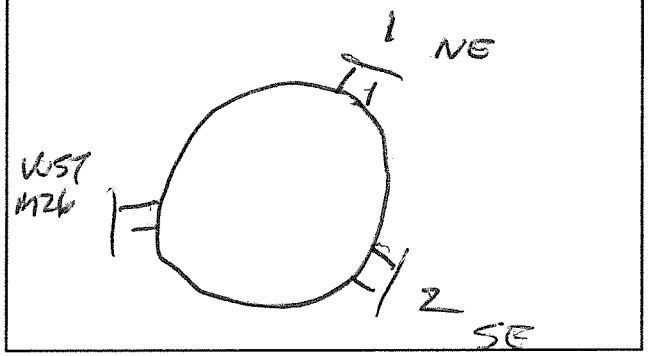
Probe Liner (Glass) / Metal /Teflon / Other_____

Nozzle (Glass) / Metal / Other_____

Union (None) / Metal / Teflon / Other_____

Pitot Leak Checked? (Yes) No

Site Diagram



Notes:

Field Data Sheet

Date: SEPT 14/21	Plant: Clean Harbors	Test No.: 1 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	47.62	1.1	.61	344	250	250	82	97	75	75	1.5	3
	3	49.60	1.15	.68	345	253	245	57	200	77	77	1.5	3
	6	51.60	1.15	.63	345	253	245	52	199	77	78	1.5	3
	9	53.63	1.1	.62	344	256	245	54	195	77	78	1.4	3
2	12	55.57	1.15	.65	345	259	245	54	199	77	78	1.3	3
	15	57.51	1.15	.63	345	259	245	57	188	78	79	1.3	3
	18	59.41	1.25	.66	346	253	245	58	199	78	79	1.5	3
	21	61.36	1.25	.66	350	253	245	59	199	78	79	1.5	3
3	24	63.42	1.5	.72	356	259	245	59	200	79	80	1.9	4
	27	65.53	1.5	.70	365	259	245	60	200	79	80	1.9	4
	30	67.80	1.5	.70	361	255	245	60	200	79	80	1.8	3.5
	33	70.08	1.7	.75	379	252	246	56	199	79	81	2.0	4
4	36	72.38	1.7	.75	379	252	246	55	199	80	81	2.0	4
	39	74.67	1.6	.75	377	249	246	55	198	80	81	2.0	4
	42	76.96	1.6	.73	376	260	247	55	198	80	81	2.0	4
	45	79.23	1.6	.73	378	260	246	56	199	80	81	2.0	4
5	48	81.55	1.7	.75	378	260	246	59	198	81	82	2.0	4
	51	83.80	1.6	.73	380	260	246	59	196	81	82	2.0	4
	54	86.10	1.65	.74	382	260	246	61	197	81	82	2.0	4
	57	88.36	1.6	.73	378	260	246	59	197	82	83	2.0	4
6	60	90.66	1.7	.76	375	261	247	57	199	82	83	2.1	4

Traverse: 1 (Nxl)					Traverse:			
Start Time: 1100	Initial Leak Check: .004	cfm@	15	"Hg	Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time:	Final Leak Check:	cfm@		"Hg	Finish Time:	Final Leak Check:	cfm @	"Hg

READY TO TEST @ 1030

Project No.: 22114

Operator : RM

Field Data Sheet

Date: SEPT 14/21	Plant: Clean Harbors	Test No.: 1 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	92.97	1.8	.78	375	259	246	56	202	82	83	2.1	4.5
	66	95.33	1.85	.79	373	259	246	57	196	82	83	2.1	4.5
	69	97.70	1.86	.78	372	258	246	57	199	82	83	2.1	4.5
7	72	100.05	1.9	.80	375	253	247	57	199	82	84	2.2	4.5
	75	102.50	1.85	.79	376	250	247	58	196	83	84	2.2	4.5
	78	104.86	1.9	.80	379	249	247	59	196	83	84	2.2	4.5
	81	107.27	1.85	.79	379	249	247	59	197	83	84	2.2	4.5
8	84	109.67	1.9	.80	381	249	247	58	197	83	84	2.2	4.5
	87	112.06	2.0	.82	384	249	247	59	197	83	84	2.2	4.5
	90	114.46	1.9	.80	383	249	247	59	197	83	84	2.2	4.5
	93	116.85	1.9	.80	383	248	247	59	197	83	84	2.2	4.5
9	96	119.23	2.0	.82	383	248	246	59	198	83	84	2.2	4.5
	99	121.65	2.1	.84	381	248	246	59	198	83	84	2.3	4.5
	102	124.09	1.9	.80	379	250	248	59	200	84	85	2.2	4.5
	105	126.57	1.95	.81	380	250	248	60	200	84	85	2.2	4.5
10	108	~~128.0805~~	2.0	.82	380	251	247	59	200	84	85	2.2	4.5
	111	131.47	1.9	.80	374	251	247	59	200	84	85	2.2	4.5
	114	133.93	2.0	.83	376	250	246	58	211	84	85	2.2	4.5
	117	136.40	2.0	.83	375	260	246	57	205	84	85	2.2	4.5
	120	138.83											

Traverse:					
Start Time:	—	Initial Leak Check:	—	cfm@	"Hg
Finish Time:	1300	Final Leak Check:	29,005	cfm@ 22	"Hg

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

Project No.: 22114

Operator : DM

Field Data Sheet

Date: SEPT 14/12	Plant: Clean Harbors	Test No.: 1 R+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	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	139.59	1.5	.72	371	259	240	85	86	87	87	1.8	4
	3	141.76	1.6	.74	372	254	244	65	190	87	88	1.9	4
	6	144.03	1.7	.77	371	249	245	64		88	88	2.0	4.5
	9	146.35	1.6	.75	370	256	244	65		87	88	2.0	4.5
2	12	148.65	1.7	.77	372	256	245	65		88	88	2.0	4.5
	15	151.00	1.6	.75	373	253	246	63		87	88	2.0	4.5
	18	153.26	1.5	.72	374	251	246	63		87	88	2.0	4.5
	21	155.55	1.55	.73	374	250	246	63		87	88	2.0	4.5
3	24	157.85	1.6	.74	371	249	244	65		88	88	2.0	4.5
	27	160.15	1.7	.77	373	249	244	63		88	88	2.0	4.5
	30	162.45	1.6	.74	372	250	245	63		88	89	2.0	4.5
	33	164.77	1.6	.75	372	250	245	61		88	88	2.0	4.5
4	36	167.04	1.7	.77	374	259	245	63		88	89	2.0	4.5
	39	169.30	1.65	.76	373	259	245	64		88	88	2.0	4.5
	42	171.65	1.75	.78	373	259	245	62		88	88	2.0	4.5
	45	173.99	1.75	.78	36	259	245	62		88	88	2.0	4.5
5	48	176.30	1.8	.79	374	259	245	65		88	88	2.0	4.5
	51	178.70	1.6	.74	375	257	245	64		88	89	2.0	4.5
	54	180.92	1.95	.82	377	257	245	64		88	89	2.2	5
	57	183.35	1.85	.79	376	257	245	62		88	89	2.2	5
6	60	185.80	1.75	.78	376	250	245	63	↓	88	89	2.2	5

Traverse:						Traverse:					
Start Time:	1433	Initial Leak Check:	.003	cfm@	16 "Hg	Start Time:	/	Initial Leak Check:	/	cfm @	"Hg
Finish Time:		Final Leak Check:		cfm@	"Hg	Finish Time:		Final Leak Check:		cfm @	"Hg

Project No.: 22114

Operator : RM

Field Data Sheet

Date: SEPT 14/21	Plant: Clean Harbors	Test No.: 1 PM	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	188.28	1.75	.78	377	251	249	65		88	89	2.0	5
	66	190.65	1.8	.79	377	258	249	66		88	89	2.0	5
	69	192.99	1.8	.79	377	254	249	66		88	89	2.0	5
7	72	195.40	1.85	.80	376	258	250	55		89	89	2.0	5
	75	197.69	1.85	.80	375	258	250	55		89	89	2.1	5
	78	200.07	2.0	.83	375	257	250	55		89	90	2.3	5
	81	202.55	1.75	.76	375	253	250	55		89	90	2.1	5
8	84	205.00	1.75	.76	375	253	250	53		89	90	2.1	5
	87	207.38	1.86	.79	375	252	251	53		89	90	2.1	5
	90	209.75	1.75	.76	374	253	251	54		89	90	2.1	5
	93	212.16	1.9	.81	374	254	251	54		89	90	2.2	5
9	96	214.61	1.75	.76	376	254	251	54		89	90	2.2	5
	99	217.07	1.75	.76	374	254	252	55		89	90	2.2	5
	102	219.41	1.75	.76	375	255	252	55		89	90	2.2	5
	105	222.05	1.75	.76	377	255	252	55		89	90	2.2	5
10	108	224.48	1.8	.79	375	254	252	55		89	90	2.2	5
	111	226.95	1.75	.78	374	251	252	55		89	90	2.1	5
	114	229.35	1.75	.78	375	253	251	55		89	90	2.1	5
	117	231.82	1.75	.78	373	253	251	54		89	90	2.1	5
	120	234.24											

Traverse:					
Start Time:	Initial Leak Check:		cfm@		"Hg
Finish Time: 1633	Final Leak Check:	.003	cfm@	15	"Hg

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

Project No.: 22114

Operator :

ORTECH Consulting Inc.

Plant	Clean Harbors
Plant Location	Corunna, Ontario
Test No.:	2 PARTICULATE & METALS
Test Date	SEPTEMBER 15, 2021
Test Location	Incinerator Exhaust Stack
Operator Signature	

Project No.:	22114
Page	1 of 5
Probe No.:	5
Meter Box No.:	T2
Impinger Box No.:	11

Pitot Factor	0.845	
DGMCF	0.995	
Barometric Pressure	29.34	"Hg
Static Pressure	0.66	"H2O
Nozzle Size	0.2650 ~~0.2600~~	inches
Stack Diameter	5	
Length	0	feet
Width	0	feet
Port length:	~~8~~ 11	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	~~5.5~~	41.5	mg
Probe	~~2.8~~	2.8	mg

Moisture Gain

CWTR	38.76.6	g
WCBDA	32.9	g

Combustion Gas Concentration

Oxygen	8.99	%
Carbon Dioxide	8.86	%
Carbon Monoxide	31.9	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	0.26500
2	0.26600
3	0.26400
4	0.26500
Average:	

Site Diagram

Notes:

Field Data Sheet

Date: SEPT 15/21	Plant: Clean Harbors	Test No.: 2 RM	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	34.85	1.5	.70	364	265	249	71		68	69	1.8	5
	3	37.05	1.6	.72	367	265	256	48		69	70	1.8	5
	6	39.20	1.6	.72	367	265	256	48		69	70	1.8	5
	9	41.39	1.7	.75	368	266	254	49		69	70	1.9	5
2	12	43.58	1.6	.72	367	265	255	49		69	70	1.9	5
	15	45.80	1.55	.71	369	264	255	50		69	71	1.9	5
	18	48.01	1.65	.74	371	264	255	50		70	71	1.9	5
	21	50.17	1.6	.72	371	264	255	50		70	71	1.9	5
3	24	52.35	1.7	.75	371	264	254	50		70	72	1.9	5
	27	54.56	1.7	.75	374	263	255	50		70	72	1.9	5
	30	56.86	1.75	.76	373	265	255	48		71	72	1.9	5
	33	59.05	1.65	.74	373	265	254	48		71	72	1.9	5
4	36	61.30	1.75	.76	375	264	255	46		71	72	1.9	5
	39	63.56	1.7	.75	373	265	255	46		71	72	1.9	5
	42	65.80	1.7	.75	373	264	256	46		71	72	1.9	5
	45	68.04	1.8	.77	375	264	255	46		71	72	2.0	5
5	48	70.31	1.8	.77	374	265	252	51		72	74	2.0	5
	51	72.62	1.9	.79	376	264	252	52		72	74	2.1	5.5
	54	74.93	1.7	.75	375	264	254	51		73	75	2.1	5.5
	57	77.27	1.7	.75	374	265	254	50		73	75	2.1	5.5
6	60	79.65	2.0	.81	373	265	254	50		73	75	2.2	5.5

Traverse:	L NE				
Start Time: 937	Initial Leak Check:	.003	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.: 22114

Operator : DM

Field Data Sheet

Date: SEPT 15/21	Plant: Clean Harbors	Test No.: 2 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	92.04	1.9	.79	374	266	257	48		73	75	2.2	5.5
	66	84.49	1.85	.78	373	265	265	49		74	76	2.1	5.5
	69	86.86	1.9	.80	375	264	263	45		74	76	2.1	5.5
7	72	89.29	1.9	.79	374	264	263	49		74	76	2.1	5.5
	75	91.68	2.1	.84	374	264	263	45		74	76	2.3	6
	78	94.15	2.0	.82	375	264	264	45		74	76	2.3	6
	81	96.61	1.9	.79	375	264	264	44		75	76	2.3	6
8	84	99.07	1.9	.80	375	260	263	44		75	76	2.2	6
	87	101.54	2.0	.82	375	260	263	44		75	76	2.2	6
	90	103.97	2.1	.84	376	261	264	47		75	77	2.3	6
	93	106.45	2.1	.84	375	262	263	48		75	77	2.3	6
9	96	109.00	1.9	.80	376	262	263	47		76	77	2.3	6
	99	111.39	1.9	.80	377	261	264	46		76	77	2.3	6
	102	113.92	1.9	.80	376	260	263	46		76	77	2.2	6
	105	116.31	1.9	.80	376	260	262	45		76	77	2.2	6
10	108	118.82	1.9	.80	377	260	262	51		76	77	2.1	6
	111	121.21	1.9	.80	380	260	262	47		76	77	2.1	6
	114	123.59	1.9	.80	377	261	262	47		76	77	2.1	6
	117	126.05	1.9	.80	374	260	263	47		76	77	2.1	6
	120	128.44											

Traverse:				
Start Time:	Initial Leak Check:		cfm@	"Hg
Finish Time: 1137	Final Leak Check:	0.005	cfm@ 14	"Hg

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

Project No.: 22114

Operator : RM

Field Data Sheet

Date: SEPT 15/21	Plant: Clean Harbors	Test No.: 2 RH	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	129.20	1.6	.73	378	264	247	46		78	80	1.9	5
	3	131.40	1.75	.77	378	264	250	44		78	78	2.0	5.5
	6	133.69	1.7	.75	380	264	263	42		79	79	2.0	5.5
	9	135.95	1.6	.73	379	264	263	42		79	79	1.9	5.5
2	12	138.29	1.6	.73	378	265	263	42		79	79	1.9	5.5
	15	140.54	1.6	.73	379	264	263	42		79	79	1.9	5.5
	18	142.80	1.75	.77	377	264	263	42		79	79	2.0	6
	21	145.10	1.75	.77	372	264	263	42		79	79	2.0	6
3	24	147.41	1.8	.76	373	265	262	42		79	79	2.0	6
	27	149.70	1.8	.76	372	265	262	42		79	79	2.0	6
	30	152.02	1.8	.76	370	265	262	42		79	79	2.0	6
	33	154.34	1.8	.78	369	265	262	42		79	79	2.0	6
4	36	156.69	1.85	.79	368	264	262	43		79	79	2.0	6
	39	158.94	1.85	.79	366	265	260	43		80	80	2.0	6
	42	161.29	1.85	.80	368	264	260	43		80	80	2.1	6
	45	163.66	1.8	.78	367	263	260	43		80	80	2.1	6
5	48	166.05	1.9	.81	369	263	265	45		80	80	2.2	6
	51	168.47	1.85	.79	369	262	264	45		80	80	2.2	6
	54	170.85	1.9	.80	370	263	265	44		80	80	2.2	6
	57	173.28	1.8	.78	370	264	265	45		80	80	2.2	6
6	60	175.69	1.9	.80	370	264	264	44		80	80	2.2	6

Traverse: 2			
Start Time: 1240	Initial Leak Check: .003	cfm@ 13	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg

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

Project No.: 22114

Operator : DLa

Field Data Sheet

Date: SEPT 15/21	Plant: Clean Harbors	Test No.: 2 RM	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	178.4	1.95	.81	370	261	264	49		80	81	2.2	6
	66	180.54	1.95	.81	370	263	264	52		80	81	2.2	6
	69	182.99	2.1	.84	371	264	263	51		81	82	2.3	6.5
7	72	185.50	1.7	.76	373	264	262	49		81	82	2.1	6
	75	187.90	1.85	.79	378	263	263	48		81	82	2.1	6
	78	190.32	1.8	.78	378	264	263	47		81	82	2.1	6
	81	192.66	1.7	.76	376	263	260	46		81	82	2.1	6
8	84	195.10	1.7	.76	379	263	261	46		81	82	2.0	6
	87	197.50	1.7	.76	379	262	261	45		81	82	2.0	6
	90	199.82	2.0	.82	378	262	260	44		82	82	2.2	6.5
	93	202.28	1.9	.80	380	262	260	47		82	83	2.2	6.5
9	96	204.70	1.75	.70	379	261	260	47		82	83	2.2	6.5
	99	207.16	1.9	.80	378	260	261	48		82	83	2.2	6.5
	102	209.65	1.9	.80	379	261	261	54		82	83	2.2	6.5
	105	212.10	1.8	.78	379	262	260	52		82	83	2.2	6.5
10	108	214.52	1.9	.80	382	262	260	51		83	83	2.2	6.5
	111	216.94	1.8	.78	381	263	261	50		83	83	2.2	6.5
	114	219.42	2.0	.82	382	262	262	50		83	83	2.2	6.5
	117	221.83	1.95	.81	382	264	262	49		83	83	2.2	6.5
	120	224.28											

Traverse:				
Start Time:	Initial Leak Check:		cfm@	"Hg
Finish Time: 1440	Final Leak Check:	.002	cfm@ 16	"Hg

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

Project No.: 22114

Operator :

ORTECH Consulting Inc.

Plant	Clean Harbors
Plant Location	Corunna, Ontario
Test No.:	3 PARTICULATE & METALS
Test Date	SEPTEMBER 16, 2021
Test Location	Incinerator Exhaust Stack
Operator Signature	

Project No.:	22114
Page	1 of 5
Probe No.:	5
Meter Box No.:	T2
Impinger Box No.:	16

Pitot Factor	0.845	
DGMCF	0.995	
Barometric Pressure	29.55	"Hg
Static Pressure	0.69	"H2O
Nozzle Size	0.2650	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	~~17.1~~ 34.0	mg
Probe	2.8	mg

Moisture Gain

CWTR	3800.4	g
WCBDA	37.8	g

Combustion Gas Concentration

Oxygen	9.08	%
Carbon Dioxide	8.96	%
Carbon Monoxide	32.5	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	SEE
2	TEST
3	2
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: SEPT 16/21	Plant: Clean Harbors	Test No.: 3 RM	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	24.68	1.6	.72	373	250	248	70		65	66	1.8	3.5
	3	26.586	1.75	.75	373	262	257	51		66	68	1.9	3.5
	6	29.10	1.6	.72	372	263	262	49		66	68	1.8	3.5
	9	31.33	1.65	.73	374	263	265	48		67	68	1.9	3.5
2	12	33.53	1.65	.73	373	263	265	48		67	68	1.9	3.5
	15	35.70	1.6	.72	372	263	265	48		67	68	1.9	3.5
	18	37.91	1.75	.75	374	263	261	48		67	68	1.9	3.5
	21	40.07	1.6	.72	374	264	262	50		68	69	1.9	3.5
3	24	42.24	1.7	.74	374	264	264	50		68	69	1.9	3.5
	27	44.43	1.65	.73	376	265	264	51		68	69	1.9	3.5
	30	46.65	1.65	.73	376	265	265	50		68	70	1.9	3.5
	33	48.85	1.7	.74	377	265	265	50		68	70	1.9	3.5
4	36	51.06	1.85	.77	376	265	265	50		69	71	1.9	3.5
	39	53.29	1.85	.76	376	265	264	50		69	71	2.0	4
	42	55.55	1.85	.76	378	265	265	54		69	71	2.0	4
	45	57.886	1.9	.79	375	265	265	50		69	71	2.1	4
5	48	60.18	1.95	.80	374	264	264	52		70	72	2.1	4
	51	62.54	2.1	.83	375	263	264	52		70	72	2.2	4
	54	65.00	2.0	.81	375	264	264	56		70	72	2.2	4
	57	67.31	2.05	.82	373	264	264	51		70	72	2.2	4
6	60	69.74	2.1	.83	377	264	264	51		70	72	2.2	4

Traverse:	1				
Start Time:	858	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.: 22114

Operator : RM

Field Data Sheet

Date: Sept 16/21	Plant: Clean Harbors	Test No.: 3 Run	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	72.15	1.95	.78	375	264	264	49		71	73	2.2	4
	66	74.49	2.0	.81	375	265	264	48		71	73	2.2	4
	69	76.95	2.0	.81	376	265	263	48		71	73	2.2	4
7	72	79.37	1.95	.80	377	265	264	48		71	73	2.2	4
	75	81.78	1.9	.79	376	265	264	57		72	73	2.2	4
	78	84.20	1.95	.80	376	264	265	59		72	73	2.2	4
	81	86.57	1.95	.80	375	264	265	60		72	73	2.2	4
8	84	89.00	2.05	.82	375	264	265	56		72	73	2.2	4
	87	91.40	1.95	.80	376	265	265	57		72	73	2.2	4
	90	93.80	1.95	.80	376	265	265	57		72	73	2.2	4
	93	96.21	2.05	.82	378	266	266	52		72	73	2.2	4
9	96	98.65	1.95	.80	377	265	266	49		73	74	2.2	4
	99	101.05	1.95	.80	376	265	266	49		73	74	2.2	4
	102	103.43	2.0	.81	377	266	264	54		73	75	2.2	4
	105	105.85	1.9	.79	373	266	265	55		73	75	2.2	4
10	108	108.30	1.95	.80	371	266	265	51		74	75	2.2	4
	111	110.67	2.0	.82	373	266	266	50		74	75	2.2	4
	114	113.06	2.0	.82	370	266	266	50		74	75	2.2	4
	117	115.48	2.0	.82	368	266	265	49		74	75	2.2	4
	120	117.95											

Traverse:				
Start Time:	Initial Leak Check:		cfm@	"Hg
Finish Time: 1056	Final Leak Check: .003		cfm@ 15	"Hg

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

Project No.: 22114

Operator : Ryan

Field Data Sheet

Date: Sept 16/21	Plant: Clean Harbors	Test No.: 3 RM	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	118.52	1.5	.71	377	264	259	73		77	78	1.8	4
	3	120.70	1.5	.71	383	264	259	49		77	79	1.8	4
	6	122.84	1.5	.71	380	264	259	49		77	79	1.8	4
	9	125.04	1.4	.68	380	265	260	50		77	79	1.8	4
2	12	~~126.~~127.18	1.75	.76	378	265	265	48		78	80	2.0	4
	15	129.46	1.7	.76	378	264	264	49		78	80	2.0	4
	18	131.78	1.65	.74	378	264	263	48		78	80	2.0	4
	21	134.10	1.8	.78	379	264	263	48		78	80	2.0	4
3	24	136.38	1.7	.76	378	265	265	49		78	80	2.0	4
	27	138.67	1.65	.74	377	266	267	50		79	81	2.0	4
	30	140.97	1.65	.75	379	266	267	52		79	81	2.0	4
	33	143.29	1.65	.75	378	267	267	48		79	81	2.0	4
4	36	145.56	1.85	.79	382	267	267	49		79	81	2.1	4
	39	147.93	1.7	.76	380	267	266	49		79	81	2.1	4
	42	150.30	1.75	.77	381	266	265	49		79	81	2.1	4
	45	152.66	1.85	.79	381	266	266	48		80	82	2.1	4
5	48	155.03	1.8	.78	381	266	265	49		80	82	2.1	4
	51	157.40	2.0	.82	381	266	265	50		80	82	2.2	4.5
	54	159.80	2.0	.82	383	266	265	50		80	82	2.2	4.5
	57	162.22	1.9	.78	382	263	266	53		81	83	2.1	4.5
6	60	164.56	1.8	.78	380	263	266	53		81	83	2.1	4.5

Traverse: 2			
Start Time: 1154	Initial Leak Check:	cfm@	"Hg
Finish Time:	Final Leak Check:	cfm@	"Hg

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

Project No.: 22114

Operator : RM

Field Data Sheet

Date: SEPT 16/21	Plant: Clean Harbors	Test No.: 3 PM	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	167.00	1.85	.79	383	266	267	57		81	83	2.1	4.5
	66	169.35	1.85	.79	383	266	267	57		81	83	2.1	4.5
	69	171.71	1.8	.78	383	266	267	55		81	83	2.1	4.5
7	72	174.15	1.9	.80	385	266	267	56		82	84	2.1	4.5
	75	176.42	1.9	.80	385	266	267	52		82	84	2.1	4.5
	78	178.80	1.8	.78	384	265	266	51		82	84	2.1	4.5
	81	181.05	1.95	.81	387	265	265	50		82	84	2.1	4.5
8	84	183.48	1.9	.80	386	265	266	50		82	84	2.1	4.5
	87	185.86	1.8	.78	386	265	266	50		82	84	2.1	4.5
	90	188.22	1.85	.78	386	260	263	50		82	84	2.1	4.5
	93	190.58	1.8	.78	386	260	262	51		82	84	2.1	4.5
9	96	192.93	1.95	.81	386	265	263	51		83	84	2.1	4.5
	99	195.36	1.9	.80	386	265	263	51		83	84	2.1	4.5
	102	197.60	2	.82	388	265	264	51		83	84	2.2	4.5
	105	200.06	2	.82	390	264	263	50		83	84	2.2	4.5
10	108	202.53	1.9	.78	389	264	263	50		83	84	2.2	4.5
	111	204.87	1.85	.78	386	264	263	50		83	84	2.2	4.5
	114	207.21	1.8	.78	388	264	263	52		83	84	2.2	4.5
	117	209.5855	2.0	.82	386	264	263	52		83	84	2.2	4.5
	120	212.02											

Traverse:					Traverse:			
Start Time:	Initial Leak Check:	cfm@	"Hg		Start Time:	Initial Leak Check:	cfm @	"Hg
Finish Time: 1354	Final Leak Check: <.003	cfm@	15 "Hg		Finish Time:	Final Leak Check:	cfm @	"Hg

Project No.: 22114

Operator :

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	SEPTEMBER 14, 2021
Test Location	Incinerator Exhaust Stack
Operator Signature	

Project No.:	22114
Page	1 of 5
Probe No.:	6
Meter Box No.:	TEAM 1
Impinger Box No.:	12

Pitot Factor	0.843	
DGMCF	1.000	
Barometric Pressure	29.16	"Hg
Static Pressure	0.66	"H2O
Nozzle Size	0.2556	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	mg
Probe	mg

Moisture Gain

CWTR	3539.8	g
WCBDA	22.0	g

Combustion Gas Concentration

Oxygen	8.70	%
Carbon Dioxide	8.82	%
Carbon Monoxide	81.0	ppm

Site Diagram

Measuring Device	MII Numbers
Probe / Pitot S1	Ba3761
Trendicator Team 4	Cor 2009 4
Control Box Team 4	Cor 2009 4
Incline Manometer	Cor 2009 4
Comb.Gas.Analyzer	MSI ML
Micromanometer	
Barometer	Env.Can
Calipers	Ba3906

Nozzle Measurements	
1	.2550
2	.2560
3	.2555
4	.2560
Average:	0.2556

Notes:

Field Data Sheet

Date: Sept 14, 2021	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 0.77	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	34.32	1.7	~~0.65~~	389	246	244	46	56	~~42~~ 76	42	1.5	30
	3	36.37	1.7	0.74	386	269	268	58	52	76	76	1.5	4.0
	6	38.41	1.7	0.74	385	269	264	57	52	76	74	1.8	4.5
	9	40.20	1.7	0.74	385	260	257	60	53	77	75	1.8	5.0
2	12	42.84	1.8	0.77	384	261	253	58	53	77	75	1.9	5.0
	15	45.15	1.8	0.77	382	263	256	59	49	77	75	1.9	5.0
	18	47.45	1.8	0.78	382	261	254	55	51	79	75	1.9	5.0
	21	49.75	1.8	0.77	381	260	253	55	51	79	75	1.9	5.0
3	24	52.09	1.7	0.75	385	262	252	52	51	80	76	1.8	5.0
	27	54.30	1.7	0.73	382	260	252	53	51	81	77	1.8	5.0
	30	56.62	1.7	0.73	377	263	253	53	53	82	77	1.75	5.0
	33	58.85	1.7	0.73	378	260	252	53	53	83	78	1.75	5.0
4	36	61.05	1.8	0.76	374	263	256	53	53	83	78	1.9	5.0
	39	63.31	1.8	0.76	374	260	256	52	55	84	78	1.9	5.0
	42	65.62	1.8	0.76	375	260	251	55	54	84	79	1.9	5.0
	45	67.95	1.8	0.75	375	263	254	56	56	84	79	1.9	5.0
5	48	70.27	1.9	0.78	377	260	254	56	55	85	79	2.0	5.0
	51	72.63	1.8	0.76	378	262	253	58	56	86	80	1.9	5.0
	54	74.96	1.8	0.76	381	263	255	59	56	86	81	1.9	5.0
	57	77.30	1.8	0.76	379	263	255	59	54	87	81	1.9	5.0
6	60	79.60	1.7	0.74	376	262	257	52	52	85	82	1.8	5.0

Traverse: Z (FW)					Traverse: —				
Start Time: 11:00	Initial Leak Check: < .005	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.: 22114

Operator :

Field Data Sheet

Date: Sept 14, 22	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	81.97	1.7	0.74	374	262	254	51	55	87	82	1.8	5
	66	84.13	1.8	0.76	372	262	261	51	55	87	82	1.9	5
	69	86.44	1.8	0.77	371	259	254	52	55	88	83	1.9	5
7	72	88.72	1.8	0.77	372	261	257	52	56	88	82	1.9	5
	75	91.05	1.7	0.74	373	261	251	49	56	88	83	1.8	5
	78	93.31	1.8	0.77	373	260	255	48	54	88	82	1.9	5
	81	95.62	1.8	0.76	379	257	260	49	56	89	84	1.9	5
8	84	97.94	1.6	0.72	378	261	252	50	58	89	84	1.7	5.0
	87	100.10	1.6	0.72	379	258	249	50	56	89	84	1.7	5.0
	90	102.38	1.8	0.76	381	261	250	51	57	89	84	1.9	5.0
	93	104.70	1.8	0.76	381	261	250	50	58	89	84	1.9	5.0
9	96	106.93	1.8	0.76	385	260	251	47	56	90	85	1.9	5.0
	99	109.23	1.8	0.76	381	260	252	49	56	90	85	1.9	5.0
	102	111.54	1.7	0.75	378	260	252	50	56	90	86	1.8	5.0
	105	113.82	1.7	0.74	377	258	249	51	56	90	85	1.8	5.0
10	108	116.12	1.7	0.75	376	258	256	52	57	90	86	1.8	5.0
	111	118.40	1.7	0.75	374	258	256	52	53	90	86	1.8	5.0
	114	120.68	1.9	0.79	375	260	252	53	53	90	86	2.0	5.0
	117	122.04	1.9	0.79	374	261	256	53	54	90	86	2.0	5.0
	120	125.40											

Traverse: 2			
Start Time:	Initial Leak Check: —	cfm@ —	"Hg
Finish Time: 1300	Final Leak Check: <.005	cfm@ 15	"Hg

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

Project No.: 22114

Operator :

Field Data Sheet

Date: Sept 14, 2021	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	126.06	2.0	0.81	370	256	246	80	83	88	87	2.1	5.0
	3	128.46	2.1	0.83	370	256	247	58	51	88	87	2.2	6.0
	6	130.97	2.1	0.83	370	257	258	62	62	88	87	2.2	6.0
	9	133.50	1.9	0.79	370	260	256	50	54	88	88	2.0	6.0
2	12	136.94	1.9	0.79	371	260	257	50	54	89	88	2.0	6.0
	15	138.36	1.6	0.73	371	261	257	50	55	89	88	1.8	6.0 6.0
	18	140.69	1.8	0.79	372	261	258	60	52	90	88	2.0	5.0
	21	143.04	1.6	0.72	376	263	264	61	64	90	88	1.7	5.0
3	24	145.30	1.8	0.77	372	260	266	61	66	90	87	1.9	5.0
	27	147.64	2.2	0.85	371	260	268	61	53	91	88	2.3	6.0
	30	150.13	2.0	0.81	372	264	267	60	54	92	88	2.1	6.0
	33	152.61	2.0	0.81	371	262	268	46	53	92	90	2.1	6.0
4	36	155.08	2.0	0.82	370	264	267	46	54	92	89	2.1	6.0
	39	157.60	1.8	0.77	372	264	269	46	54	93	88	2.0	6.0
	42	160.03	2.2	0.86	371	260	267	46	56	93	89	2.3	6
	45	162.55	2.0	0.82	371	263	269	46	56	93	88	2.1	6.0
5	48	165.06	1.8	0.77	372	263	269	46	57	93	89	1.9	6.0
	51	167.45	1.9	0.77	372	263	269	47	57	93	90	1.9	6.0
	54	169.81	1.8	0.76	374	263	267	49	57	93	88	1.9	6.0
	57	172.18	1.9	0.79	374	264	267	47	54	94	89	2.0	6.0
6	60	174.65	1.9	0.80	374	263	261	44	55	94	90	2.0	6.0

Traverse: 1					
Start Time: 1433	Initial Leak Check:	1.605	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.: 22114

Operator: Jay

Field Data Sheet

Date: Sept 14, 22	Plant: Clean Harbors	Test No.: 1 – SVOC	Page 5 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter 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	176.94	1.6	0.72	376	263	254	46	64	93	90	1.8	6.6
	66	179.24	1.6	0.73	371	261	255	46	54	94	90	1.7	6.0
	69	181.47	1.6	0.71	374	263	256	44	55	94	90	1.7	6.0
7	72	183.64	1.6	0.71	376	262	258	48	55	94	90	1.7	6.0
	75	185.92	1.5	0.71	374	263	260	46	56	95	91	1.6	5.0
	78	188.08	1.5	0.71	373	261	258	46	56	95	91	1.6	5.0
	81	190.28	1.6	0.73	376	263	258	47	55	96	90	1.7	6.0
8	84	192.46	1.7	0.76	373	262	260	48	55	95	91	1.8	6.0
	87	194.76	1.7	0.75	372	262	256	48	55	96	91	1.8	6.0
	90	197.05	1.6	0.71	373	261	257	49	56	96	90	1.7	6.0
	93	199.27	1.6	0.71	372	262	257	49	56	96	90	1.7	5.0
9	96	201.46	1.6	0.71	372	260	253	51	56	95	91	1.7	6.0
	99	203.70	1.6	0.71	372	260	253	51	56	96	91	1.7	6.0
	102	206.92	1.6	0.73	372	260	255	48	55	96	91	1.7	5.0
	105	208.15	1.6	0.72	375	261	255	47	54	96	92	1.7	6.0
10	108	210.35	1.6	0.73	373	260	257	48	53	95	92	1.7	5.0
	111	212.66	1.6	0.73	373	261	257	48	53	95	91	1.7	6.0
	114	214.86	1.6	0.73	372	262	257	48	56	96	92	1.7	5.0
	117	217.61	1.6	0.73	371	262	264	49	07	96	92	1.7	5.0
	120	219.21											

Traverse: 1				
Start Time: —	Initial Leak Check: —	cfm@ —	"Hg
Finish Time: 1633	Final Leak Check: <.005	cfm@ 25	"Hg

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

Project No.: 22114

Operator :

ORTECH Consulting Inc.

Plant	Clean Harbors
Plant Location	Corunna, Ontario
Test No.:	2-SVOC
Test Date	SEPTEMBER 15, 2021
Test Location	Incinerator Exhaust Stack
Operator Signature	

Project No.:	22114
Page	1 of 5
Probe No.:	6
Meter Box No.:	TEAM 1
Impinger Box No.:	

Pitot Factor	0.843	
DGMCF	1.000	
Barometric Pressure	29.34	"Hg
Static Pressure	0.00	"H2O
Nozzle Size	0.2556	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	342.2	g
WCBDA	15.0	g

Combustion Gas Concentration

Oxygen	8.99	%
Carbon Dioxide	8.8	%
Carbon Monoxide	31.8	ppm

Measuring Device	MII Numbers
Probe / Pitot S1	Bo3761
Trendicator TEAM #1	Coe 20094
Control Box TEAM #1	Coe 20094
Incline Manometer	Coe 20094
Comb.Gas.Analyzer	MSML
Micromanometer	
Barometer	Env.Can
Calipers	Bo3906

Nozzle Measurements	
1	0.2550
2	0.2560
3	0.2555
4	0.2560
Average:	0.2556

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: September 16 2021	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 364	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	120.18	1.5	0.66	375	262	240	72	64	72	71	1.6	4.0
	3	122.30	1.9	0.74	367	261	249	66	39	72	70	1.8	4.0
	6	124.56	1.9	0.74	367	264	255	66	41	72	70	1.8	4.0
	9	126.76	2.0	0.76	368	265	257	67	42	71	72	1.9	5.0
2	12	129.07	1.9	0.74	372	268	252	67	42	72	72	1.8	5.0
	15	131.36	1.9	0.74	371	266	259	67	42	72	70	1.8	5.0
	18	133.62	1.9	0.74	370	263	259	67	42	72	70	1.8	5.0
	21	136.90	1.9	0.74	374	267	253	66	42	73	70	1.8	5.0
3	24	138.17	1.9	0.74	374	264	248	67	43	73	70	1.8	5.0
	27	140.44	1.9	0.74	371	263	260	62	43	74	70	1.8	5.0
	30	142.70	1.9	0.74	373	263	264	56	41	74	70	1.8	5.0
	33	146.0	1.9	0.74	372	266	259	53	41	75	71	1.8	5.0
4	36	147.26	1.8	0.72	371	264	253	51	42	76	71	1.7	5.0
	39	149.49	1.8	0.72	373	266	254	50	42	76	71	1.7	5.0
	42	151.70	1.8	0.72	373	266	254	50	42	76	74	1.7	5.0
	45	153.85	1.8	0.72	376	266	261	48	42	77	72	1.7	5.0
5	48	156.05	1.8	0.72	374	266	249	48	42	78	73	1.7	5.0
	51	158.26	1.9	0.73	373	260	260	48	42	78	73	1.7	5.0
	54	160.46	1.8	0.73	375	266	248	47	43	79	73	1.7	5.0
	57	162.66	1.8	0.73	374	266	248	47	45	79	73	1.7	5.0
6	60	164.85	1.8	0.73	373	265	257	44	42	80	74	1.7	5.0

Traverse: 2				
Start Time: 0937	Initial Leak Check: <.005	cfm@ 25	"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.: 22114

Operator : Jay

Field Data Sheet

Date: SEPTEMBER 15 2021	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	167.06	1.8	0.73	375	264	265	42	41	80	74	1.7	5.0
	66	169.25	1.8	0.73	375	264	260	43	42	80	74	1.7	5.0
	69	171.46	1.8	0.73	374	266	261	43	42	80	74	1.7	5.0
7	72	173.66	1.8	0.72	374	265	260	43	42	80	74	1.7	5.0
	75	175.85	1.8	0.73	373	266	244	45	42	80	75	1.7	5.0
	78	178.06	1.8	0.73	372	266	262	46	42	81	75	1.7	5.0
	81	180.25	1.8	0.73	374	264	256	46	42	80	75	1.7	5.0
8	84	182.45	1.6	0.69	374	264	247	46	42	81	75	1.6	5.0
	87	184.58	1.6	0.69	375	264	263	46	42	82	76	1.6	5.0
	90	186.76	1.6	0.69	375	263	264	46	42	82	76	1.6	5.0
	93	188.86	1.6	0.69	377	263	261	46	42	82	76	1.6	5.0
9	96	190.96	1.6	0.69	374	264	247	47	42	82	77	1.6	5.0
	99	193.06	1.6	0.69	374	264	247	47	42	82	77	1.6	5.0
	102	195.16	1.6	0.68	374	264	264	46	41	83	77	1.6	5.0
	105	197.26	1.6	0.69	377	263	264	46	46	83	78	1.6	5.0
10	108	199.36	1.6	0.69	376	264	263	46	42	83	78	1.6	5.0
	111	201.46	1.6	0.69	376	265	264	46	42	83	78	1.6	5.0
	114	203.56	1.6	0.69	378	263	262	46	42	83	78	1.6	5.0
	117	205.68	1.6	0.69	374	263	254	46	43	83	78	1.6	5.0
	120	207.77											

Traverse: 2			
Start Time: —	Initial Leak Check: —	cfm@ —	"Hg
Finish Time: 1137	Final Leak Check: <.006	cfm@ 14	"Hg

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

Project No.: 22114

Operator : Jay

Field Data Sheet

Date: SEPTEMBER 15 2021	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	208.4	1.9	0.76	379	259	260	78	57	83	80	1.8	5.0
	3	210.6	2.0	0.77	382	261	260	68	44	81	80	1.9	6.0
	6	212.96	2.0	0.77	381	263	259	62	49	81	80	1.9	6.0
	9	215.24	1.9	0.75	386	267	259	60	50	81	80	1.9	5.0
2	12	217.57	2.0	0.77	386	267	267	60	51	81	80	1.9	5.0
	15	219.90	2.0	0.77	383	265	261	60	52	82	80	1.9	5.0
	18	222.22	2.0	0.77	383	268	264	60	53	82	80	1.9	6.0
	21	224.55	2.0	0.77	382	266	249	60	54	82	80	1.9	5.0
3	24	226.87	2.0	0.77	378	266	268	51	57	83	80	1.9	6.0
	27	229.20	2.0	0.77	375	269	260	48	46	83	80	1.9	6.0
	30	231.53	2.0	0.77	374	267	258	48	39	83	80	1.9	5.0
	33	233.86	2.0	0.77	370	269	261	48	40	83	80	1.9	5.0
4	36	236.20	2.0	0.77	369	268	260	48	40	84	80	1.9	5.0
	39	238.53	2.0	0.78	368	268	258	44	40	84	80	1.9	5.0
	42	240.90	2.0	0.78	367	268	262	44	40	84	80	1.9	5.0
	45	243.25	2.0	0.78	369	267	260	44	40	85	81	1.9	5.0
5	48	246.63	2.0	0.78	368	267	260	44	40	85	81	1.9	6.0
	51	247.97	2.0	0.78	372	265	259	44	43	86	82	1.9	6.0
	54	250.32	2.0	0.78	371	267	263	44	43	86	82	1.9	5.0
	57	252.70	2.0	0.78	370	267	255	45	43	86	82	1.9	5.0
6	60	256.05	1.7	0.72	371	260	264	46	43	86	83	1.7	5.0

Traverse: 1					
Start Time: 1240	Initial Leak Check:	<.005	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.: 22114

Operator :

Field Data Sheet

Date: September 16 2024	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	267.3	1.7	.72	368	267	261	46	43	86	83	1.7	5.0
	66	269.50	1.7	.72	369	268	258	48	43	86	83	1.7	5.0
	69	261.64	1.7	.72	370	267	258	46	43	87	83	1.7	5.0
7	72	263.80	1.7	.72	368	269	261	46	44	87	83	1.7	5.0
	75	266.01	1.7	.72	371	268	266	46	46	87	83	1.7	5.0
	78	268.20	1.7	.72	374	269	263	43	44	88	84	1.7	5.0
	81	270.40	1.7	.72	374	270	262	42	44	88	83	1.7	5.0
8	84	272.60	1.7	.72	376	268	261	42	44	87	83	1.7	5.0
	87	274.80	1.7	.72	377	266	266	42	45	87	83	1.7	5.0
	90	276.97	1.6	.68	375	269	265	43	46	88	84	1.6	6.0
	93	279.10	1.6	.68	376	269	255	43	46	88	84	1.6	6.0
9	96	281.17	1.6	.68	375	269	258	43	46	88	84	1.6	6.0
	99	283.20	1.6	.68	380	268	262	46	46	89	84	1.6	5.0
	102	286.26	1.6	.67	379	268	264	44	44	89	84	1.6	6.0
	105	287.30	1.6	.67	379	268	263	46	46	86	84	1.6	6.0
10	108	289.46	1.6	.70	378	268	257	44	43	88	84	1.6	5.0
	111	291.57	1.6	.69	384	266	257	46	43	89	84	1.6	5.0
	114	293.63	1.6	.67	382	267	260	46	44	89	86	1.6	5.0
	117	295.76	1.6	.67	380	267	262	46	44	89	86	1.6	6.0
	120	297.83											

Traverse:	1
Start Time:	1440
Finish Time:	

Initial Leak Check:	–	cfm@	–	"Hg
Final Leak Check:	.000	cfm@	14	"Hg

Traverse:	–
Start Time:	–
Finish Time:	–

Initial Leak Check:	–	cfm @	–	"Hg
Final Leak Check:	–	cfm @	–	"Hg

Project No.: 22114

Operator :

ORTECH Consulting Inc.

Plant	Clean Harbors
Plant Location	Corunna, Ontario
Test No.:	3 - SVOC
Test Date	SEPTEMBER 16, 2021
Test Location	Incinerator Exhaust Stack
Operator Signature	

Project No.:	22114
Page	1 of 5
Probe No.:	
Meter Box No.:	
Impinger Box No.:	

Pitot Factor	0.843	
DGMCF	1.000	
Barometric Pressure	29.55	"Hg
Static Pressure	0.69	"H2O
Nozzle Size		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	3477.7	g
WCBDA	30.6	g

Combustion Gas Concentration

Oxygen	9.08	%
Carbon Dioxide	8.96	%
Carbon Monoxide	32.5	ppm

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

Nozzle Measurements	
1	
2	
3	
4	
Average:	

Probe Liner Glass / Metal /Teflon / Other_____

Nozzle Glass / Metal / Other_____

Union None /Metal / Teflon / Other_____

Pitot Leak Checked? Yes No

Site Diagram

Notes:

Field Data Sheet

Date: SEPTEMBER 16 2021	Plant: Clean Harbors	Test No.: 3 - SVOC	Page 2 of 5
	Plant Location: Corunna, Ontario	Test Location: Incinerator Exhaust Stack	

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP "H₂O	Desired cfm	Stack Temp °F	Probe Temp °F	Oven Temp °F	Impinger Temp Outlet °F	Impinger Temp Inlet/Trap °F	Meter Temp Outlet °F	Meter Temp Inlet °F	Meter Pressure ΔH "H₂O	Pump Vacuum "Hg Gauge
1	0	98.56	2.5	0.84	373	268	253	65	57	65	64	2.2	5.0
	3	101.1	~~2.0~~	.75	374	262	250	61	47	67	66	1.8	5.0
	6	103.41	1.9	.73	373	266	260	62	42	67	66	1.7	5.0
	9	105.60	1.9	.73	372	267	263	62	43	67	66	1.7	5.0
2	12	107.88	1.9	~~.75~~	372	266	262	64	43	68	66	1.8	5.0
	15	110.05	1.8	.72	373	268	265	65	45	69	67	1.8	5.0
	18	112.28	1.9	.74	375	267	262	63	46	70	67	1.8	5.0
	21	114.50	1.9	.74	375	267	262	63	46	70	67	1.8	5.0
3	24	116.75	1.9	.74	374	268	263	60	48	71	67	1.8	5.0
	27	118.97	1.9	.74	377	268	260	60	46	72	68	1.8	5.0
	30	121.21	1.9	.74	375	268	261	60	46	72	68	1.8	5.0
	33	123.45	1.9	.74	375	269	260	60	45	72	68	1.8	5.0
4	36	125.68	1.9	.74	376	269	265	57	45	74	68	1.8	5.0
	39	127.94	1.9	.74	375	269	263	55	45	74	69	1.8	5.0
	42	130.19	1.9	.74	375	269	263	56	45	74	69	1.8	5.0
	45	132.43	1.9	.74	375	269	265	54	45	75	70	1.8	5.0
5	48	134.66	1.9	.74	375	269	265	53	47	75	70	1.8	5.0
	51	136.92	1.9	.74	373	269	261	52	45	75	70	1.8	5.0
	54	139.16	1.9	.74	373	269	261	51	44	76	71	1.8	5.0
	57	141.40	1.9	.74	372	267	261	51	44	76	71	1.8	5.0
6	60	143.63	1.9	.74	372	266	258	52	45	76	71	1.8	5.0

Traverse:						
Start Time:	0858	Initial Leak Check:	<.005	cfm@	25	"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.: 22114

Operator :

Field Data Sheet

Date: SEPTEMBER 16 2021	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 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	145.88	1.9	0.74	375	269	259	49	43	76	71	1.8	5.0
	66	148.15	1.9	0.74	374	269	262	49	43	77	72	1.8	5.0
	69	150.37	1.9	.74	378	268	264	48	45	77	72	1.8	5.0
7	72	152.61	1.9	.74	376	269	261	49	45	77	72	1.8	5.0
	75	154.87	1.9	.74	375	267	261	48	42	78	73	1.8	5.0
	78	157.13	1.9	.74	375	267	261	48	42	78	73	1.8	5.0
	81	159.38	1.9	.74	374	267	259	48	43	78	73	1.8	5.0
8	84	161.65	1.9	.74	374	267	259	48	43	79	73	1.8	5.0
	87	163.91	1.6	.69	374	267	258	48	44	79	73	1.6	5.0
	90	166.0	1.6	.69	374	267	258	48	44	79	73	1.6	5.0
	93	168.19	1.6	.69	374	267	258	48	44	79	73	1.6	5.0
9	96	170.3	1.6	.67	376	267	258	48	44	79	73	1.6	5.0
	99	172.39	1.6	.67	375	260	258	48	44	79	73	1.6	5.0
	102	174.49	1.6	.67	374	260	259	48	44	79	73	1.6	5.0
	105	176.56	1.6	.69	374	260	259	48	44	79	73	1.6	5.0
10	108	178.65	1.6	.69	374	260	259	48	44	79	73	1.6	5.0
	111	180.76	1.6	.69	370	261	260	49	45	79	73	1.6	5.0
	114	182.85	1.6	.69	370	261	260	49	45	79	73	1.6	5.0
	117	184.98	1.6	.69	367	260	260	49	45	79	73	1.6	5.0
	120	~~187.27~~											
		187.07											

Traverse: 2					Traverse: —				
Start Time: —	Initial Leak Check: —	cfm@ —	"Hg		Start Time: —	Initial Leak Check: —	cfm @ —	"Hg
Finish Time: 1058	Final Leak Check: .003	cfm@ 15	"Hg		Finish Time: —	Final Leak Check: —	cfm @ —	"Hg

Project No.: 22114

Operator:

Field Data Sheet

Date: Sept 16 2024	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	187.78	1.9	0.75	378	262	264	71	46	78	77	1.8	5.0
	3	190.06	1.9	0.75	379	264	261	62	42	79	77	1.8	5.0
	6	192.35	1.9	0.75	382	264	264	60	43	79	77	1.8	5.0
	9	194.65	1.9	0.75	379	264	264	58	43	79	77	1.8	5.0
2	12	196.94	1.9	0.75	378	264	264	55	43	79	77	1.8	5.0
	15	199.21	1.9	0.75	378	265	265	56	44	79	77	1.8	5.0
	18	201.50	1.9	0.75	378	265	265	56	44	79	77	1.8	5.0
	21	203.78	1.9	0.75	379	265	265	57	44	79	77	1.8	5.0
3	24	206.07	1.9	0.75	378	265	265	57	44	79	77	1.8	5.0
	27	208.35	1.9	0.75	378	270	265	54	42	83	79	1.8	5.0
	30	210.64	2.0	0.77	379	268	265	54	41	83	79	1.8	5.0
	33	213.0	2.0	0.77	378	268	264	54	41	83	79	1.9	5.0
4	36	215.29	1.9	0.75	377	268	260	53	45	84	79	1.9	5.0
	39	217.53	1.9	0.75	378	268	260	52	46	84	80	1.9	5.0
	42	219.85	1.9	0.75	377	270	264	53	46	84	80	1.9	5.0
	45	222.16	1.9	0.75	378	270	265	54	47	84	80	1.9	5.0
5	48	224.48	1.9	0.75	380	269	258	50	40	86	80	1.9	5.0
	51	226.78	1.9	0.76	378	270	258	50	40	87	81	1.9	5.0
	54	229.08	1.9	0.76	378	270	269	50	41	87	82	1.9	5.0
	57	231.40	1.9	0.76	380	271	260	50	41	87	82	1.9	5.0
6	60	233.69	1.9	0.76	379	271	260	50	41	87	82	1.9	6.0

Traverse:					
Start Time: 1154	Initial Leak Check:	<.005	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.: 22114

Operator :

Field Data Sheet

Date: SEPTEMBER 16 2021	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 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	235.96	1.9	0.76	379	269	267	51	52	87	82	1.9	5.0
	66	238.29	1.9	0.76	379	269	267	51	53	87	82	1.9	5.0
	69	240.60	1.9	0.76	379	269	267	51	53	87	82	1.9	5.0
7	72	242.92	1.9	0.76	379	269	269	51	53	87	82	1.9	5.0
	75	245.23	1.9	0.76	382	270	261	46	44	87	82	1.9	5.0
	78	247.55	1.9	0.76	382	270	264	46	44	87	82	1.9	5.0
	81	249.84	1.6	0.69	384	270	265	48	47	88	82	1.6	6.0
8	84	252.0	1.6	0.69	384	270	265	48	47	88	82	1.6	5.0
	87	254.10	1.6	0.69	382	270	255	47	44	88	83	1.6	6.0
	90	256.30	1.6	0.69	384	269	254	46	45	88	83	1.6	6.0
	93	258.43	1.6	0.69	384	269	254	46	46	88	83	1.16	6.0
9	96	260.55	1.6	0.69	383	265	254	47	46	88	83	1.6	5.0
	99	262.70	1.6	0.69	383	260	254	50	47	89	84	1.6	5.0
	102	264.85	1.6	0.69	382	260	254	50	47	89	84	1.6	6.0
	105	267.0	1.6	0.69	382	260	254	50	47	89	84	1.5	5.0
10	108	269.05	1.6	0.70	380	260	260	50	43	88	84	1.6	5.0
	111	271.2	1.6	0.70	380	260	260	50	43	88	84	1.6	5.0
	114	273.30	1.6	0.70	381	265	267	50	44	88	84	1.6	5.0
	117	275.30	1.6	0.70	381	265	263	50	44	88	84	1.6	5.0
	120	277.41											

Traverse:	1				
Start Time:	—	Initial Leak Check:	—	cfm@	— "Hg
Finish Time:	1354	Final Leak Check:	<.005	cfm@	15 "Hg

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

Project No.: 22114

Operator : Jay

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	1.015	61.60	187.50	125.9	29.16	6.6	35.8	0.1222
	2	1.015	64.80	187.70	122.9	29.34	6.5	29.5	0.1225
	3	1.015	76.80	201.90	125.1	29.55	6.4	28.4	0.1260

* 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:	SEPT 14, 21
Project No.:	22114

Measuring Device	MII Number
Control Module	~~A10463~~ A10117
Barometer	Env. Can.

P_{Bar}	29.16

VOST 2

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 ΔH "H_2O"	Pump Vacuum "Hg Gauge
0	61.6	175	190	130	26	29		6.6	1
5	72.2	180	195	130	25	31		6.6	1
10	82.9	179	195	128	25	33		6.6	1
15	93.3	180	195	125	26	35		6.6	2
20	104.0	180	196	126	26	35		6.6	2
25	114.6	179	196	128	26	37		6.6	2
30	125.2	178	193	126	25	37		6.6	2
35	135.7	177	191	127	26	37		6.6	2
40	146.3	175	190	127	26	38		6.6	2
45	156.9	174	191	124	26	38		6.6	2
50	167.1	174	191	124	28	38		6.6	2
55	177.6	174	193	126	25	38		6.6	2
60	187.5	176	191	129	25	39		6.6	2

Start Time:	11:00	
Finish Time:	12:00	
Initial Leak Check:	.002	Lpm @ 15 " Hg
Final Leak Check:	.002	Lpm @ 15 " Hg

DGMCF:	1.015
Sample Volume:	
Average DGM Temp:	
Average DGM Δ H:	6.6

Comments:

Probe Purge On: @

Off: @

~2 LPM for 60 min,

Operator : DT

ORTECH Consulting Inc.
Method 26 Data Sheet

Plant:	Clean Harbors
Plant Location:	Corunna, On
Test No.:	2
Test location:	Incinerator Exhaust Stack
Date:	SEPT 15, 21
Project No.:	22114

Measuring Device	MII Number
Control Module	A10117
Barometer	Env. Can.

POST 2

P_{Bar}	29.31

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	64.8	156	192	137	17	26		6.5	2
5	75.4	175	191	134	23	29		6.5	2
10	85.5	175	191	134	23	29		6.5	2
15	95.7	175	190	134	24	29		6.5	2
20	105.9	175	187	130	24	29		6.5	2
25	116.0	175	188	126	24	29		6.5	2
30	126.2	175	184	126	25	30		6.5	2
35	136.6	175	184	123	26	30		6.5	2
40	147.2	175	185	121	25	30		6.5	2
45	157.4	175	185	122	24	30		6.5	2
50	167.6	176	186	119	26	31		6.5	2
55	177.7	176	186	122	26	31		6.5	2
60	187.7	176	186	120	23	31		6.5	2

Start Time:	12:50		
Finish Time:	15:50		
Initial Leak Check:	.002	Lpm @ 15	" Hg
Final Leak Check:		Lpm @	" Hg

DGMCF:	1.015
Sample Volume:	
Average DGM Temp:	
Average DGM Δ H:	

Comments:

Probe Purge On: @

Off: @

~2 LPM for 60 min,

Operator : DJ

ORTECH Consulting Inc.
Method 26 Data Sheet

Plant:	Clean Harbors
Plant Location:	Corunna, On
Test No.:	3
Test location:	Incinerator Exhaust Stack
Date:	SEPT 16, 21
Project No.:	22114

Measuring Device	MII Number
Control Module	A10917 VOLT 2
Barometer	Env. Can.

P_{Bar}	29.55

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	76.8	168	191	130	20	25		6.6	1
5	87.2	178	190	131	19	27		6.6	1
10	97.7	179	190	130	20	28		6.6	1
15	108.2	179	190	127	21	28		6.6	1
20	118.7	179	190	127	21	28		6.6	1
25	129.1	179	192	125	22	28		6.6	1
30	139.1	180	191	124	22	29		6.2	1
35	149.7	181	192	120	23	29		6.2	2
40	160.1	180	191	120	25	30		6.4	2
45	170.6	181	192	122	24	30		6.3	2
50	180.9	181	194	119	24	29		6.1	2
55	191.6	181	193	120	24	29		6.1	2
60	201.9	181	193	120	24	29		6.1	2

Start Time:	12:15		
Finish Time:	13:15		
Initial Leak Check:	.002	Lpm @ 15	" Hg
Final Leak Check:	.002	Lpm @ 15	" Hg

DGMCF:	1.045
Sample Volume:	
Average DGM Temp:	
Average DGM Δ H:	

Comments:

Probe Purge On: @

Off: @

~2 LPM for 60 min,

Operator : DT

APPENDIX 7

Volatile Organics Train Field Data Sheets
and Gas Volumes Sampled
(4 pages)

Clean Harbors Canada Inc. (Sarnia, ON)
Volatile Organics Train Gas Volume Sampled

Test No.	Run No.	Tube Pair No.	Dry Gas Meter Correction Factor	Initial Dry Gas Meter Reading litres	Final Dry Gas Meter Reading litres	Actual Volume Sampled litres	Barometric Pressure in. mercury	Average Dry Gas Meter Pressure in. water	Average Dry Gas Meter Temperature °C	Corrected Gas Volume Sampled Rm^3 *
1	1	1A/1B	1.020	88.20	109.60	21.40	29.16	2.4	33.4	0.0208
	2	3A/3B	1.020	11.30	32.60	21.30	29.16	2.5	35.0	0.0206
	3	4A/4B	1.020	33.20	55.80	22.60	29.16	2.5	35.2	0.0219
	4	5A/5B	1.020	58.10	77.70	19.60	29.16	2.5	36.4	0.0189
2	1	7A/7B	1.020	78.00	98.70	20.70	29.34	2.5	25.0	0.0208
	2	8A/8B	1.020	99.20	120.60	21.40	29.34	2.5	25.6	0.0215
	3	9A/9B	1.020	21.00	42.70	21.70	29.34	2.5	26.4	0.0217
	4	10A/10B	1.020	43.00	63.80	20.80	29.34	2.5	26.6	0.0208
3	1	12A/12B	1.020	87.90	109.10	21.20	29.55	2.5	23.6	0.0216
	2	13A/13B	1.020	9.50	31.10	21.60	29.55	2.5	22.8	0.0221
	3	14A/14B	1.020	31.50	53.70	22.20	29.55	2.5	24.6	0.0225
	4	15A/15B	1.020	54.10	75.10	21.00	29.55	2.5	26.8	0.0212

* Dry at 25°C and 1 atmosphere

ORTECH Consulting Inc.

Vost Data Sheet

Plant:	Clean Harbors	Test Condition:	Compliance		Vost 2
Plant Location:	Corunna, ON	Test No:	1	Control Box ID:	AP117
Test location:	Incinerator Exhuast Stack	DGMCF:	1.020	Operator:	DT
Date:	SEPT 14, 21	Barometric:	29.16	Project No:	22114
~ 1 LPM for 20 minutes		NDL - No Dectectable Leak		Field Blank Pair ID:	6A 6B

Tube Pair 1 Start Time:	14:35	Initial Leak Check	NDL @ 20 "Hg	Sample ID:	1A 1B
Tube Pair 1 End Time:	14:55	Final Leak Check	@ 21 "Hg	Lab ID:	1A 1B

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	88.2	141	187	19	31	2.4	1
5	93.1	141	187	21	32	2.4	1.5
10	98.7	139	188	22	34	2.4	1.5
15	104.4	143	189	22	35	2.4	1.5
20	109.6	137	189	22	35	2.4	1.5

Tube Pair 2 Start Time:	15:15	Initial Leak Check	NDL @ 20 "Hg	Sample ID:	2A 2B
Tube Pair 2 End Time:	15:35	Final Leak Check	NDL @ 21 "Hg	Lab ID:	2A 2B

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	11.3	137	188	18	33	2.5	1
5	16.7	144	189	18	33	2.5	1.7
10	22.0	141	189	18	35	2.5	1.7
15	27.0	141	189	19	37	2.5	1.7
20	32.0	141	189	19	37	2.5	1.7

Tube Pair 3 Start Time:	15:48	Initial Leak Check	NDL @ 21 "Hg	Sample ID:	4AB
Tube Pair 3 End Time:	16:08	Final Leak Check	NDL @ 21 "Hg	Lab ID:	4A 4B

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	33.2	143	190	20	34	2.5	1.5
5	39.0	143	190	20	36	2.5	1.5
10	44.5	141	190	19	37	2.5	2.5
15	50.0	141	189	21	37	2.5	2.5
20	55.8	139	189	21	38	2.5	2.5

Tube Pair 4 Start Time:	16:24	Initial Leak Check	NDL @ 20 "Hg	Sample ID:	5A 5B
Tube Pair 4 End Time:	16:44	Final Leak Check	@ "Hg	Lab ID:	5A 5B

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	56.1	144	189	22	34	2.5	2
5	61.7	142	189	23	37	2.5	2
10	66.9	142	188	22	37	2.5	2
15	72.5	141	187	22	37	2.5	2
20	77.7	141	187	21	37	2.5	2

ORTECH Consulting Inc.

Vost Data Sheet

Plant:	Clean Harbors	Test Condition:	Compliance	VOST 2	
Plant Location:	Corunna, ON	Test No:	2	Control Box ID:	A10 117
Test location:	Incinerator Exhuast Stack	DGMCF:	11020	Operator:	DT
Date:	SEPT 15, 21	Barometric:	29.34	Project No:	22114
~ 1 LPM for 20 minutes		NDL - No Dectectable Leak		Field Blank Pair ID:	11A 11B

Tube Pair 1 Start Time:	09:39	Initial Leak Check	NDL @ 20 "Hg	Sample ID:	7A 7B
Tube Pair 1 End Time:	09:59	Final Leak Check	NDL @ 20 "Hg	Lab ID:	7A 7B

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	78.0	135	180	16	22	2.5	2
5	87.0	138	186	16	25	2.5	2
10	88.4	139	187	17	26	2.5	2
15	93.5	139	187	17	26	2.5	2
20	99.7	140	187	17	26	2.5	4.5

Tube Pair 2 Start Time:	10:13	Initial Leak Check	NDL @ 20.5 "Hg	Sample ID:	8A 8B
Tube Pair 2 End Time:	10:33	Final Leak Check	NDL @ 21 "Hg	Lab ID:	8A 8B

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	99.2	140	188	12	24	2.5	1.5
5	104.7	141	188	13	26	2.5	1.5
10	110.3	141	189	14	26	2.5	1.5
15	115.6	141	189	14	26	2.5	1.5
20	120.6	141	190	14	26	2.5	1.5

Tube Pair 3 Start Time:	10:45	Initial Leak Check	NDL @ 20 "Hg	Sample ID:	9A 9B
Tube Pair 3 End Time:	11:05	Final Leak Check	NDL @ 20.5 "Hg	Lab ID:	9A 9B

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	21.0	140	189	14	24	2.5	2
5	26.5	141	189	15	27	2.5	2
10	31.9	142	189	15	26	2.5	2
15	37.4	140	189	15	28	2.5	2.5
20	42.7	140	189	15	27	2.5	2.5

Tube Pair 4 Start Time:	11:14	Initial Leak Check	NDL @ 20 "Hg	Sample ID:	10A 10B
Tube Pair 4 End Time:	11:34	Final Leak Check	NDL @ 20 "Hg	Lab ID:	10A 10B

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	43.0	139	191	14	26	2.5	1.5
5	48.4	141	191	14	26	2.5	1.5
10	53.7	142	192	14	27	2.5	1.5
15	58.6	142	192	13	27	2.5	4.5
20	63.8	141	192	14	27	2.5	4.5

ORTECH Consulting Inc.

Vost Data Sheet

Plant: Clean Harbors	Test Condition: Compliance		VOST2
Plant Location: Corunna, ON	Test No: 3		Control Box ID: R1017
Test location: Incinerator Exhuast Stack	DGMCF: 1.020		Operator: JT
Date: SEPT 16, 21	Barometric: 29.55 TRIP		Project No: 22114
~ 1 LPM for 20 minutes	NDL - No Dectectable Leak	Field Blank Pair ID:	16A 16B

Tube Pair 1 Start Time: 9:00	Initial Leak Check NDL @ 21 "Hg		Sample ID: 12A 12B
Tube Pair 1 End Time: 9:20	Final Leak Check NDL @ 21 "Hg		Lab ID: 12A 12B

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	87.9	165	191	24	26	2.5	1.5
5	93.1	162	187	20	23	2.5	2
10	98.4	161	187	20	23	2.5	2
15	103.7	161	187	20	23	2.5	2
20	109.1	161	187	19	23	2.5	2

Tube Pair 2 Start Time: 9:32	Initial Leak Check NDL @ 21 "Hg		Sample ID: 13A 13B
Tube Pair 2 End Time: 9:52	Final Leak Check NDL @ 21 "Hg		Lab ID: 13A 13B

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	9.5	157	189	15	21	2.5	2.5
5	14.8	156	189	15	23	2.5	2.5
10	20.3	156	190	15	23	2.5	5
15	25.7	155	188	15	24	2.5	5
20	31.1	156	188	13	23	2.5	5

Tube Pair 3 Start Time: 10:06	Initial Leak Check NDL @ 21 "Hg		Sample ID: 14A 14B
Tube Pair 3 End Time: 10:26	Final Leak Check NDL @ 21 "Hg		Lab ID: 14A 14B

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	31.5	154	189	15	21	2.5	1.5
5	36.3	156	189	14	23	2.5	2
10	42.9	156	189	16	25	2.5	1.5
15	48.2	156	189	15	26	2.5	1.5
20	53.7	156	189	15	26	2.5	1.5

Tube Pair 4 Start Time: 10:36	Initial Leak Check NDL @ 21 "Hg		Sample ID: 15A 15B
Tube Pair 4 End Time: 10:56	Final Leak Check NDL @ 21 "Hg		Lab ID: 15A 15B

Clock Time	Dry Gas Meter L	Temperatures				Meter Pressure "H_2O	Pump Vacuum "Hg
		Probe °C	Stack °C	Condensor °C	Meter Avg °C		
0	54.1	155	189	15	23	2.5	1.5
5	59.6	155	189	16	25	2.5	1.5
10	64.9	156	187	16	27	2.5	1.5
15	70.4	157	187	17	29	2.5	1.5
20	75.1	156	185	17	30	2.5	1.5

APPENDIX 8

Metals Train Recovery Data Sheets
(4 pages)

ORTECH Particulate and Metals Train Recovery Data Sheet
Clean Harbors Sarnia

Project No. 22114
Date: SEPT 14, 2021

Test No. 1
Test Location: Incinerator Exhaust

Nozzle, Probe Liner Cyclone Bypass & F.H. Filter Housing	Filter	Impingers 1, 2, 3, 4 & 5	Impinger 6 & 7
	Filter ID: QZ5756		

CONTAINER TS1

Container TS1 Weights	
Empty Wt:	282.4
After Act. Rinse:	468.7
Total TS1:	186.3

MARK FLUID LEVEL

SEAL AND LABEL TS1

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	284.1
with Nitric rinse	472.2
Total TS2:	188.1

MARK FLUID LEVEL

SEAL AND LABEL TS2

CONTAINER TS3

Initial Wt:	
Final Wt:	
Gain:	
Colour:	LIGHT TAN

SEAL AND LABEL TS3

2792.8
INC 2601.2
− 1367.0

Sample Batch Number	21-22114-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)	4A/4B
TS5-A (Impinger 6 & 7 Sol'n-$KMnO_4$)	5
TS5-B (Impinger 6 & 7 Rinse HCl)	6

TS1,TS2, TS5-B - 500 ml Amber Glass Bottle
TS3- Petri Dish

TS4 4 L Amber Glass Bottle
TS5-A - 1000 ml Amber Glass Bottle

CWTR = add 1 thru 7:	3797.4
WCBDA= 8:	30.6

Train Loaded By: DM
Train Recovered By:

1000 g = 1000.6

Impinger #1 (100 ml H_2O)

Empty Wt:	668.7
Initial Wt:	769.0
Final Wt:	936.9
1 Gain:	167.9
Colour:	—

Impinger #2 Empty (Knock-out)

Empty Wt:	769.9
Final Wt:	4027.0
2 Gain:	3257.1
Colour:	

Impinger #3 HNO_3/H_2O_2

Empty Wt:	665.4
Initial Wt:	781.6
Final Wt:	988.1
3 Gain:	203.5
Colour:	—

Impinger #4 HNO_3/H_2O_2

Empty Wt:	666.7
Initial Wt:	773.0
Final Wt:	918.2
4 Gain:	146.2
Colour:	

Impinger #5 Empty

Empty Wt:	613.5
Final Wt:	621.7
5 Gain:	8.2
Colour:	—

CONTAINER TS4 WEIGHTS

Empty Wt:	1367.0
With Imp. 1 to 5 Soln:	5207.5
After HNO_3 Rinse:	
Total TS4A	3840.5

B EMPTY WT 406.7
W/ IMP 4 & 5 AFTER HNO_3 662.4
Box # 16 732.9

TOTAL TS4B 326.2

Impinger #6 $KMnO_4/H_2SO_4$

Empty Wt:	646.9
Initial Wt:	778.0
Final Wt:	789.2
6 Gain:	11.2
Colour:	PURPLE

Impinger #7 $KMnO_4/H_2SO_4$

Empty Wt:	644.8
Initial Wt:	758.3
Final Wt:	761.6
7 Gain:	3.3
Colour:	PURPLE

CONTAINER TS5-A

Empty Wt:	407.0
With Imp. Soln:	659.7
After $KMnO_4$ Rinse:	793.2
After D.I. Water Rinse:	850.3
Total TS5-A:	443.3

MARK FLUID LEVEL

SEAL & LABEL TS5-A

CONTAINER TS5-B

Empty Wt:	284.8
With 150 mL DI Water:	434.5
After HCl Rinse:	469.2
After D.I. Water Rinse:	544.8
Total TS5-B:	260.0

MARK FLUID LEVEL

SEAL & LABEL TS5-B

Impinger #8 Silica Gel

Initial Wt:	935.2
Final Wt:	965.8
Gain:	30.6
8 % spent :	80

ORTECH Particulate and Metals Train Recovery Data Sheet
Clean Harbors Sarnia

Project No. 22114
Date: SEPT 15, 2024

Test No. 2
Test Location: Incinerator Exhaust

Nozzle, Probe Liner Cyclone Bypass & F.H. Filter Housing	Filter	Impingers 1, 2, 3, 4 & 5	Impinger 6 & 7
	Filter ID: Q28755		

CONTAINER TS1

Container TS1 Weights	
Empty Wt:	294.0
After Act. Rinse:	414.0
Total TS1:	130.0

MARK FLUID LEVEL

SEAL AND LABEL TS1

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	263.2
with Nitric rinse	457.0
Total TS2:	173.8

MARK FLUID LEVEL

SEAL AND LABEL TS2

CONTAINER TS3

Initial Wt:	
Final Wt:	
Gain:	
Colour:	LIGHT TAN

SEAL AND LABEL TS3

2481.7
- 736.4
2806
- 1354.1

CONTAINER TS4

Impinger #1 (100 ml H_2O)	
Empty Wt:	628.3
Initial Wt:	726.3
Final Wt:	901.2
1 Gain:	174.9
Colour:	—

Impinger #2 Empty (Knock-out)	
Empty Wt:	736.4
Final Wt:	4014.2
2 Gain:	3277.8
Colour:	—

Impinger #3 HNO_3/H_2O_2	
Empty Wt:	650.4
Initial Wt:	773.8
Final Wt:	941.0
3 Gain:	167.2
Colour:	—

Impinger #4 HNO_3/H_2O_2	
Empty Wt:	673.9
Initial Wt:	759.4
Final Wt:	991.5
4 Gain:	232.1
Colour:	

Impinger #5 Empty	
Empty Wt:	493.1
Final Wt:	509.3
5 Gain:	16.2
Colour:	—

CONTAINER TS5-A

Impinger #6 $KMnO_4/H_2SO_4$	
Empty Wt:	642.0
Initial Wt:	744.0
Final Wt:	748.8
6 Gain:	4.8
Colour:	PURPLE

Impinger #7 $KMnO_4/H_2SO_4$	
Empty Wt:	640.0
Initial Wt:	790.3
Final Wt:	793.9
7 Gain:	3.6
Colour:	PURPLE

CONTAINER TS5-A	
Empty Wt:	406.3
With Imp. Soln:	635.9
After $KMnO_4$ Rinse:	778.1
After D.I. Water Rinse:	877.2
Total TS5-A:	470.9

MARK FLUID LEVEL

SEAL & LABEL TS5-A

Sample Batch Number	21-22114-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

CONTAINER TS4 WEIGHTS	
A Empty Wt:	1354.1
With Imp. 1 to 3 Soln:	5183.7
After HNO_3 Rinse:	
Total TS4A	3829.6

CONTAINER TS5-B

Empty Wt:	407.1
With 150 mL DI Water:	547.3
After HCl Rinse:	599.2
After D.I. Water Rinse:	689.3
Total TS5-B:	282.2

MARK FLUID LEVEL

SEAL & LABEL TS5-B

CWTR = add 1 thru 7:	3876.6
WCBDA= 8:	32.9

Impinger #8 Silica Gel	
Initial Wt:	970.6
Final Wt:	1003.5
Gain:	32.9
8 % spent :	70

Train Loaded By:
Train Recovered By:

Box # 11

B EMPTY WT 407.2
W/ IMP 4+5 737.0
AFTER HNO_3 854.1?
TOTAL TS4B 446.9

ORTECH Particulate and Metals Train Recovery Data Sheet
Clean Harbors Sarnia

Project No. 22114
Date: SEPT 16/21

Test No. 3
Test Location: Incinerator Exhaust

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

CONTAINER TS1

Container TS1 Weights	
Empty Wt:	284.2
After Act. Rinse:	406.5
Total TS1:	122.3

MARK FLUID LEVEL

SEAL AND LABEL TS1

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	285.0
with Nitric rinse	482.9
Total TS2:	197.9

MARK FLUID LEVEL

SEAL AND LABEL TS2

Filter

Filter ID: Q28757

CONTAINER TS3

Initial Wt:	
Final Wt:	
Gain:	
Colour:	TAN

SEAL AND LABEL TS3

JUG 2818.2
MT 1357.9

Impingers 1, 2, 3, 4 & 5

CONTAINER TS4

Impinger #1 (100 ml H_2O)	
Empty Wt:	669.3
Initial Wt:	758.7
Final Wt:	944.8
1 Gain:	186.1
Colour:	—

Impinger #2 Empty (Knock-out)	
Empty Wt:	~~664.2~~ 710.3
Final Wt:	~~[illegible]~~ 3.3 ~~3925~~3
2 Gain:	~~+6~~ ~~3925.3~~ 3155
Colour:	

Impinger #3 HNO_3/H_2O_2	
Empty Wt:	~~667.3~~ 666.1
Initial Wt:	780.8
Final Wt:	978.3
3 Gain:	197.5
Colour:	—

Impinger #4 HNO_3/H_2O_2	
Empty Wt:	667.3
Initial Wt:	761.4
Final Wt:	978.3
4 Gain:	216.9
Colour:	—

Impinger #5 Empty	
Empty Wt:	614.0
Final Wt:	651.5
5 Gain:	37.5
Colour:	—

A

CONTAINER TS4 WEIGHTS	
Empty Wt:	1357.9
With Imp. 1 to 5 Soln:	5407.6
After HNO_3 Rinse:	—
Total TS4:	4049.7

Box # 16

B MT 407.6
W/ IMP RINSE 636.5
TOTAL 228.9

Impinger 6 & 7

CONTAINER TS5-A

Impinger #6 $KMnO_4/H_2SO_4$	
Empty Wt:	647.4
Initial Wt:	756.0
Final Wt:	757.7
6 Gain:	1.7
Colour:	PURPLE

Impinger #7 $KMnO_4/H_2SO_4$	
Empty Wt:	645.7
Initial Wt:	774.3
Final Wt:	780.0
7 Gain:	5.7
Colour:	PURPLE

CONTAINER TS5-A	
Empty Wt:	408.2
With Imp. Soln:	772.4
After $KMnO_4$ Rinse:	882.4
After D.I. Water Rinse:	950.4
Total TS5-A:	542.2

MARK FLUID LEVEL

SEAL & LABEL TS5-A

CONTAINER TS5-B	
Empty Wt:	406.0
With 150 mL DI Water:	553.7
After HCl Rinse:	602.5
After D.I. Water Rinse:	712.8
Total TS5-B:	306.8

MARK FLUID LEVEL

SEAL & LABEL TS5-B

Impinger #8 Silica Gel	
Initial Wt:	966.4
Final Wt:	1004.2
Gain:	37.8
8 % spent :	70

Sample Batch Number	21-22114-PM-
TS1 (Probe Rinse-Acetone)	~~14~~ 15
TS2 (Probe Rinse-0.1N HNO_3)	~~15~~ 16
TS3 (Filter)	~~16~~ 17
TS4 (Impinger 1,2,3,4 & 5 Sol'n-HNO_3)	~~17A/B~~ 18A/B
TS5-A (Impinger 6 & 7 Sol'n-$KMnO_4$)	~~18~~ 19
TS5-B (Impinger 6 & 7 Rinse HCl)	~~19~~ 20

TS1,TS2, TS5-B - 500 ml Amber Glass Bottle
TS3- Petri Dish

TS4 4 L Amber Glass Bottle
TS5-A - 1000 ml Amber Glass Bottle

CWTR = add 1 thru 7:	~~3769.7~~ 3800.4
WCBDA= 8:	37.8

Train Loaded By: [signature]
Train Recovered By: [signature]

ORTECH Particulate and Metals Train Recovery Data Sheet
Clean Harbors Sarnia

Project No. 22114

Date: SEPT 15/21

Test No. BLANK

Test Location: Incinerator Exhaust

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

Filter
Filter ID: Q285758

Impingers 1, 2, 3, 4 & 5

Impinger 6 & 7

CONTAINER TS1

Container TS1 Weights	
Empty Wt:	284.6
After Act. Rinse:	475.2
Total TS1:	

MARK FLUID LEVEL

SEAL AND LABEL TS1

CONTAINER TS2

Container TS2 Weights	
Empty Wt:	286.1
with Nitric rinse	734.4
Total TS2:	

MARK FLUID LEVEL

SEAL AND LABEL TS2

CONTAINER TS3

Initial Wt:	
Final Wt:	
Gain:	
Colour:	WHITE

SEAL AND LABEL TS3

CONTAINER TS4

Impinger #1 (100 ml H_2O)	
Empty Wt:	668.0
Initial Wt:	768.0
Final Wt:	768.0
1 Gain:	—
Colour:	—

Impinger #2 Empty (Knock-out)	
Empty Wt:	769.2
Final Wt:	769.2
2 Gain:	—
Colour:	—

Impinger #3 HNO_3/H_2O_2	
Empty Wt:	666.4
Initial Wt:	776.3
Final Wt:	776.3
3 Gain:	—
Colour:	—

Impinger #4 HNO_3/H_2O_2	
Empty Wt:	666.7
Initial Wt:	771.3
Final Wt:	771.3
4 Gain:	—
Colour:	—

Impinger #5 Empty	
Empty Wt:	614.0
Final Wt:	614.0
5 Gain:	—
Colour:	—

CONTAINER TS4 WEIGHTS	
Empty Wt:	407.5
With Imp. 1 to 5 Soln:	720.8
After HNO_3 Rinse:	858.0
Total TS4:	

CONTAINER TS5-A

Impinger #6 $KMnO_4/H_2SO_4$	
Empty Wt:	646.9
Initial Wt:	779.0
Final Wt:	779.0
6 Gain:	—
Colour:	PURPLE

Impinger #7 $KMnO_4/H_2SO_4$	
Empty Wt:	645.0
Initial Wt:	759.1
Final Wt:	759.1
7 Gain:	—
Colour:	PURPLE

CONTAINER TS5-A	
Empty Wt:	406.9
With Imp. Soln:	622.5
After $KMnO_4$ Rinse:	700.0
After D.I. Water Rinse:	797.2
Total TS5-A:	

MARK FLUID LEVEL

SEAL & LABEL TS5-A

CONTAINER TS5-B	
Empty Wt:	406.3
With 150 mL DI Water:	556.9
After HCl Rinse:	614.7
After D.I. Water Rinse:	697.0
Total TS5-B:	

MARK FLUID LEVEL

SEAL & LABEL TS5-B

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

Sample Batch Number	21-22114-PM-
TS1 (Probe Rinse-Acetone)	22
TS2 (Probe Rinse-0.1N HNO_3)	23
TS3 (Filter)	24
TS4 (Impinger 1,2,3,4 & 5 Sol'n-HNO_3)	25
TS5-A (Impinger 6 & 7 Sol'n-$KMnO_4$)	26
TS5-B (Impinger 6 & 7 Rinse HCl)	27

TS1,TS2, TS5-B - 500 ml Amber Glass Bottle

TS3- Petri Dish

TS4 4 L Amber Glass Bottle

TS5-A - 1000 ml Amber Glass Bottle

CWTR = add 1 thru 7:
WCBDA= 8:

Train Loaded By: DM

Train Recovered By: DM

Box #

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#:	L2641466		Mlssissauga, ON L5J 2Y4
Date of Report	13-Oct-21		Canada
Date of Sample Receipt	17-Sep-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors

COMMENTS:

Sample Preparation via USEPA Method 29 (SA 8-Oct-2021)
Mercury Analysis via CVAA using Method USEPA 7470A (GN 7, 12-Oct-2021)

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

Results in this certificate relate only to the samples as submitted to the laboratory.
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ALS Environmental

Sample Analysis Summary Report

Sample Name		21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(8 THRU 13) TEST#2	21-22114-PM-(15 THRU 20) TEST#3	21-22114-PM-(22 THRU 27) BLANK
ALS Sample ID		L2641466-1	L2641466-2	L2641466-3	L2641466-4
Matrix		Stack	Stack	Stack	Stack
Analysis type		Sample	Sample	Sample	Sample
Sampling Date/Time		14-Sep-21	15-Sep-21	16-Sep-21	15-Sep-21
Date of Receipt		17-Sep-21	17-Sep-21	17-Sep-21	17-Sep-21
Mercury via CVAA	**LOR**				
Method 29	**ug**	**ug**	**ug**	**ug**	**ug**
Analytical Fraction 1B (Nitric)	0.015	0.233	0.405	0.226	<0.015
Analytical Fraction 1B	0.015	0.0801	0.122	0.104	<0.015
Analytical Fraction 2B	0.050	7.27	3.46	10.0	<0.2175
Analytical Fraction 3B	0.025	0.350	3.15	0.126	<0.025
Analytical Fraction 3C	0.25	10.6	7.32	12.0	<0.2

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	0.306	102%	0.303	101%
Analytical Fraction 1B	0.015	<0.015	0.299	100%	0.299	100%
Analytical Fraction 2B	0.050	<0.05	1.01	101%	0.985	99%
Analytical Fraction 3B	0.025	<0.025	0.497	100%	0.492	99%
Analytical Fraction 3C	0.25	<0.25	4.94	99%	4.88	98%

ALS Environmental

Sample QC Summary Report

Sample Name		21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1
ALS Sample ID		L2641466-1	L2641466-1DUP	L2641466-1MS	L2641466-1MS	L2641466-1MSD	L2641466-1MSD
Matrix		Stack	Stack	Stack	Stack	Stack	Stack
Analysis type		Sample	Duplicate	Matrix Spike	Matrix Spike	Matrix Spike Dup	Matrix Spike Dup
Sampling Date/Time		14-Sep-21	14-Sep-21	14-Sep-21	14-Sep-21	14-Sep-21	14-Sep-21
Date of Receipt		17-Sep-21	17-Sep-21	17-Sep-21	17-Sep-21	17-Sep-21	17-Sep-21
Mercury via CVAA	**LOR**						
Method 29	**ug**	**ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Analytical Fraction 1B (Nitric)	0.015	0.233	0.237	0.519	96%	0.549	106%
Analytical Fraction 1B	0.015	0.0801	0.0792	0.375	98%	0.387	102%
Analytical Fraction 2B	0.050	7.27	7.44	48.9	100%	50.2	103%
Analytical Fraction 3B	0.025	0.350	0.353	0.815	93%	0.810	92%
Analytical Fraction 3C	0.250	10.6	10.5	14.7	103%	14.6	99%

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#:	L2641466		Mlssissauga, ON L5J 2Y4
Date of Report	15-Oct-21		Canada
Date of Sample Receipt	17-Sep-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors

COMMENTS:

Metals analysed via ICP-MS Method USEPA 6020B (SA 12-Oct-21)

Sample Preparation via USEPA Method 29 (SA/TP 08-Oct-21)

ANALYST COMMENTS:

1A HNO3:

Mo observed in the method blank at a level significantly above its LOR. Data for this analyte is likely to be elevated.

Al recoveries in the LCS and LCSD are outside ALS DQOs (found: 80, 74%, limits: 85-115%). Al recoveries in the MS and MSD are also outside ALS DQOs (found: 78, 75%, limits: 80-120%). Data for this analyte is likely to be biased low.

1A HF:

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

Al, Cu, Mg, Mo, and Ni observed in the method blank at a level significantly above its LOR. Data for these analytse are likely to be elevated.

Al recoveries in the LCS and LCSD are outside ALS DQOs (found: 78,79%, limits: 85-115%). Ag recoveries in the LCS and LCSD are also outside ALS DQOs (found: 8, 74%, limits: 85-115%). In the case of Silver, this is likely due to the analyte binding other elements in solution; the presence of the filter matrix has been found to effectively retain this analyte in solution. Data for Al is likely to be biased low, however no impact is expected to Ag data.

Al and Mn recoveries in the MS and MSD cannot be quantified due to high levels of these targets in the sample, relative to the spiked amount. This is not expected to indicate any impact to data quality.

2A:

Sn and Si observed in the reagent blank (RB) at levels significantly above their LORs. In the case of Sn this likely represents the contribution of the tin-containing stabilizer present in the peroxide reagent. Data for these analytes is likely to be biased high.

Al recoveries in the LCS and LCSD are outside ALS DQOs (found: 81,82%, limits: 85-115%). Data for this analyte is likely to be biased low.

Recoveries for Al, As, Ba, B, Ca, Fe, Mg, Na, Sn, Ti, S, and Si cannot be quantified in the MS and MSD 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 15-Oct-21

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

Results in this certificate relate only to the samples as submitted to the laboratory.

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ALS Environmental

Sample Analysis Summary Report

Sample Name		21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(8 THRU 13) TEST#2	21-22114-PM-(15 THRU 20) TEST#3	21-22114-PM-(22 THRU 27) BLANK	MB
ALS Sample ID		L2641466-1	L2641466-2	L2641466-3	L2641466-4	L2641466-MB
Matrix		Stack	Stack	Stack	Stack	n/a
Analysis Type		Sample	Sample	Sample	Sample	Sample
Sampling Date		14-Sep-21	15-Sep-21	16-Sep-21	15-Sep-21	n/a
Date of Receipt		17-Sep-21	17-Sep-21	17-Sep-21	17-Sep-21	n/a
Multi-Metals via ICP-MS	**LOR ug**	**ug**	**ug**	**ug**	**ug**	**ug**
Front Half HNO3 Fraction 1A						
Aluminum	20	81.3	77.5	85.4	<	<
Antimony	0.2	0.532	0.941	1.50	<	<
Arsenic	1	9.60	10.7	9.69	<	<
Barium	5	12.4	15.3	17.2	<	<
Beryllium	0.2	<	<	<	<	<
Boron	30	<	<	<	<	<
Cadmium	0.1	1.80	6.87	4.67	<	<
Calcium	500	<	<	<	<	<
Chromium	1	6.94	7.05	8.95	<	<
Cobalt	0.2	0.373	0.626	0.692	<	<
Copper	1	22.0	31.6	37.0	<	<
Iron	200	263	<	219	<	<
Lead	0.5	0.955	1.66	3.11	<	<
Lithium	0.5	<	1.42	1.90	<	<
Magnesium	10	49.0	58.6	59.8	<	<
Manganese	0.5	163	224	232	0.852	<
Molybdenum	0.2	2.80	3.60	3.62	<	0.807
Nickel	0.2	7.55	4.18	4.80	<	<
Phosphorus	100	<	<	<	<	<
Potassium	100	4330	5240	4490	<	<
Selenium	2	2.61	2.74	3.42	<	<
Silver	0.2	<	<	<	<	<
Sodium	30	5610	6580	5710	53.3	<
Strontium	0.2	2.25	3.10	3.40	<	<
Tin	0.3	21.6	20.3	25.9	2.69	<
Titanium	10	66.4	88.6	107	<	<
Vanadium	1	<	1.19	<	<	<
Zinc	6	20.0	20.9	30.3	<	<
Sulfur	10000	<	<	<	<	<
Silicon	150	417	383	346	<	231

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	<	97.1	80	94.4	78
Antimony	0.2	<	11.8	99	11.7	97
Arsenic	1	<	60.7	101	60.0	100
Barium	5	<	61.4	102	61.3	102
Beryllium	0.2	<	57.1	95	59.1	99
Boron	30	<	56.8	94	57.5	95
Cadmium	0.1	<	29.9	100	30.0	100
Calcium	500	<	1580	105	1540	102
Chromium	1	<	62.9	105	61.0	102
Cobalt	0.2	<	63.2	105	62.3	104
Copper	1	<	63.2	105	61.5	102
Iron	200	<	320	107	318	106
Lead	0.5	<	60.5	101	60.9	101
Lithium	0.5	<	10.5	93	10.9	97
Magnesium	10	<	313	104	307	102
Manganese	0.5	<	63.1	105	62.9	104
Molybdenum	0.2	<	30.1	100	30.1	100
Nickel	0.2	<	63.8	106	62.4	104
Phosphorus	100	<	1560	102	1450	95
Potassium	100	<	1480	99	1440	97
Selenium	2	<	61.1	102	59.4	99
Silver	0.2	<	20.9	70	29.7	99
Sodium	30	<	1440	95	1420	94
Strontium	0.2	<	62.6	104	61.0	102
Tin	0.3	<	29.4	98	29.2	97
Titanium	10	<	59.4	99	58.5	98
Vanadium	1	<	62.6	104	62.0	103
Zinc	6	<	127	105	124	103
Sulfur	10000	<	14000	102	13900	101
Silicon	150	<	3120	102	3040	99

ALS Environmental

Sample QC Summary Report

Sample Name		21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1
ALS Sample ID		L2641466-1	L2641466-1	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		14-Sep-21	14-Sep-21	14-Sep-21	14-Sep-21	14-Sep-21	14-Sep-21
Date of Receipt		17-Sep-21	17-Sep-21	17-Sep-21	17-Sep-21	17-Sep-21	17-Sep-21
Multi-Metals via ICP-MS	**LOR**						
	ug	**ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Front Half HNO3 Fraction 1A							
Aluminum	20	81.3	81.1	268	78	262	75
Antimony	0.2	0.532	0.535	23.5	96	23.9	97
Arsenic	1	9.60	9.73	127	98	128	98
Barium	5	12.4	12.2	129	97	129	97
Beryllium	0.2	<	<	116	97	121	101
Boron	30	<	<	122	95	128	100
Cadmium	0.1	1.80	1.91	62.2	101	61.9	100
Calcium	500	<	<	3330	100	3470	104
Chromium	1	6.94	6.99	129	101	128	101
Cobalt	0.2	0.373	0.376	122	102	122	102
Copper	1	22.0	22.3	143	101	144	101
Iron	200	263	268	907	107	879	103
Lead	0.5	0.955	0.973	117	96	121	100
Lithium	0.5	<	<	23.8	97	25.2	103
Magnesium	10	49.0	49.3	653	101	644	99
Manganese	0.5	163	168	289	105	289	105
Molybdenum	0.2	2.80	2.92	61.2	97	62.5	99
Nickel	0.2	7.55	7.47	131	103	131	103
Phosphorus	100	<	<	2940	95	2840	92
Potassium	100	4330	4400	7260	98	7100	92
Selenium	2	2.61	2.58	120	98	122	100
Silver	0.2	<	<	58.0	97	59.8	99
Sodium	30	5610	5680	8500	96	8470	95
Strontium	0.2	2.25	2.32	120	98	123	101
Tin	0.3	21.6	22.7	81.7	100	79.7	97
Titanium	10	66.4	68.5	183	97	184	98
Vanadium	1	<	<	121	100	121	100
Zinc	6	20.0	20.9	265	102	262	101
Sulfur	10000	<	<	34300	112	33500	109
Silicon	150	417	425	9940	106	9840	105

ALS Environmental

Sample Analysis Summary Report

Sample Name		21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(8 THRU 13) TEST#2	21-22114-PM-(15 THRU 20) TEST#3	21-22114-PM-(22 THRU 27) BLANK	MB
ALS Sample ID		L2641466-1	L2641466-2	L2641466-3	L2641466-4	L2641466-MB
Matrix		Stack	Stack	Stack	Stack	n/a
Analysis Type		Sample	Sample	Sample	Sample	Sample
Sampling Date		14-Sep-21	15-Sep-21	16-Sep-21	15-Sep-21	n/a
Date of Receipt		17-Sep-21	17-Sep-21	17-Sep-21	17-Sep-21	n/a
Multi-Metals via ICP-MS	**LOR**					
	ug	**ug**	**ug**	**ug**	**ug**	**ug**
Front Half HF Fraction 1A						
Aluminum	20	143	138	145	100	100
Antimony	0.2	1.92	2.70	2.65	<	<
Arsenic	1	4.32	3.55	3.18	<	<
Barium	5	8.19	8.17	9.06	<	<
Beryllium	0.2	<	<	<	<	<
Boron	30	<	<	<	<	<
Cadmium	0.1	1.25	3.08	2.27	<	<
Calcium	500	<	<	<	<	<
Chromium	1	6.53	7.58	8.99	1.93	2.40
Cobalt	0.2	0.910	1.07	1.17	<	<
Copper	1	19.0	18.1	15.8	3.77	4.08
Iron	200	264	<	384	<	<
Lead	0.5	5.32	5.69	5.21	<	<
Lithium	0.5	0.713	<	1.24	<	<
Magnesium	10	59.3	60.9	64.6	42.8	45.7
Manganese	0.5	211	229	175	1.44	1.37
Molybdenum	0.2	35.2	35.1	37.5	34.2	33.7
Nickel	0.2	6.34	6.79	5.87	0.952	0.949
Phosphorus	100	<	<	<	<	<
Potassium	100	1100	1140	1110	<	<
Selenium	2	<	<	<	<	<
Silver	0.2	<	<	<	<	<
Sodium	30	1260	1310	1270	34.9	38.4
Strontium	0.2	1.45	1.86	1.95	0.617	0.515
Tin	0.3	5.04	4.97	5.85	1.71	0.574
Titanium	10	45.7	50.4	74.4	<	<
Vanadium	1	1.02	<	<	<	<
Zinc	6	60.1	73.1	65.7	<	<
Sulfur	10000	<	<	<	<	<
Silicon	150	nq	nq	nq	nq	nq

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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	<	95.5	78	96.4	79
Antimony	0.2	<	11.4	95	12.0	99
Arsenic	1	<	59.3	99	61.1	102
Barium	5	<	58.4	97	58.6	98
Beryllium	0.2	<	59.4	99	60.6	101
Boron	30	<	57.7	96	60.2	100
Cadmium	0.1	<	30.4	101	29.8	99
Calcium	500	<	1580	105	1590	106
Chromium	1	<	61.2	102	63.3	106
Cobalt	0.2	<	61.9	103	64.0	107
Copper	1	<	62.1	104	63.5	106
Iron	200	<	315	105	326	109
Lead	0.5	<	58.8	98	61.7	103
Lithium	0.5	<	11.5	102	11.6	103
Magnesium	10	<	316	105	327	109
Manganese	0.5	<	62.2	103	64.1	106
Molybdenum	0.2	<	29.8	99	30.8	102
Nickel	0.2	<	62.6	104	64.6	108
Phosphorus	100	<	1450	102	1390	98
Potassium	100	<	1460	98	1520	102
Selenium	2	<	61.0	102	61.6	103
Silver	0.2	<	2.50	8	22.2	74
Sodium	30	<	1440	96	1490	99
Strontium	0.2	<	58.1	97	61.6	103
Tin	0.3	<	29.9	100	29.2	97
Titanium	10	<	58.7	98	60.1	100
Vanadium	1	<	62.2	104	63.3	106
Zinc	6	<	125	104	126	105
Sulfur	10000	<	12000	87	12800	92
Silicon	150	nq	nq	nq	nq	nq

ALS Environmental

Sample QC Summary Report

Sample Name		21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1
ALS Sample ID		L2641466-1	L2641466-1	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		14-Sep-21	14-Sep-21	14-Sep-21	14-Sep-21	14-Sep-21	14-Sep-21
Date of Receipt		17-Sep-21	17-Sep-21	17-Sep-21	17-Sep-21	17-Sep-21	17-Sep-21
Multi-Metals via ICP-MS	**LOR ug**	**ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Front Half HF Fraction 1A							
Aluminum	20	143	138	322	nq	329	nq
Antimony	0.2	1.92	1.85	24.5	94	25.0	96
Arsenic	1	4.32	4.32	119	95	119	96
Barium	5	8.19	8.19	125	97	123	95
Beryllium	0.2	<	<	117	97	114	95
Boron	30	<	<	144	95	142	94
Cadmium	0.1	1.25	1.24	60.2	98	59.2	97
Calcium	500	<	<	3280	103	3220	101
Chromium	1	6.53	6.77	126	99	127	100
Cobalt	0.2	0.910	0.973	120	99	122	101
Copper	1	19.0	19.3	139	100	139	100
Iron	200	264	268	886	104	893	105
Lead	0.5	5.32	5.09	126	100	127	101
Lithium	0.5	0.713	<	24.3	98	23.8	96
Magnesium	10	59.3	63.3	655	99	659	100
Manganese	0.5	211	213	333	nq	340	nq
Molybdenum	0.2	35.2	34.2	93.6	97	95.2	100
Nickel	0.2	6.34	6.60	126	100	128	101
Phosphorus	100	<	<	2750	93	2840	97
Potassium	100	1100	1100	3920	94	3950	95
Selenium	2	<	<	121	100	113	93
Silver	0.2	<	<	57.2	95	58.5	97
Sodium	30	1260	1260	4230	99	4260	100
Strontium	0.2	1.45	1.48	119	98	120	99
Tin	0.3	5.04	5.04	63.5	97	62.0	95
Titanium	10	45.7	46.5	159	95	159	95
Vanadium	1	1.02	<	120	99	121	100
Zinc	6	60.1	60.6	301	100	303	101
Sulfur	10000	<	<	24300	93	22100	85
Silicon	150	nq	nq	nq	nq	nq	nq

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Sample Analysis Summary Report

Sample Name		21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(8 THRU 13) TEST#2	21-22114-PM-(15 THRU 20) TEST#3	21-22114-PM-(22 THRU 27) BLANK
ALS Sample ID		L2641466-1	L2641466-2	L2641466-3	L2641466-4
Matrix		Stack	Stack	Stack	Stack
Analysis Type		Sample	Sample	Sample	Sample
Sampling Date		14-Sep-21	15-Sep-21	16-Sep-21	15-Sep-21
Date of Receipt		17-Sep-21	17-Sep-21	17-Sep-21	17-Sep-21
Multi-Metals via ICP-MS	**LOR ug**	**ug**	**ug**	**ug**	**ug**
Back Half (HNO3 / H2O2) Fraction 2A					
Aluminum	5	2370	2630	2900	10.9
Antimony	0.1	1.93	1.07	1.11	<
Arsenic	0.2	66.4	35.8	59.6	<
Barium	0.5	71.3	54.5	63.3	1.69
Beryllium	0.1	<	0.111	0.155	<
Boron	10	7280	9000	10000	60.4
Cadmium	0.05	0.212	0.460	0.0844	<
Calcium	100	22800	23600	24900	135
Chromium	0.15	32.7	20.6	29.8	0.455
Cobalt	0.1	1.21	1.12	0.993	<
Copper	0.3	12.0	16.4	15.0	4.61
Iron	15	2490	1120	1430	15.1
Lead	0.05	13.7	13.8	14.1	0.439
Lithium	0.25	2.08	2.68	2.93	0.417
Magnesium	5	3270	4460	4640	20.1
Manganese	0.15	50.8	29.3	51.4	0.480
Molybdenum	0.1	1.62	0.477	0.703	<
Nickel	0.1	9.86	15.1	7.36	0.596
Phosphorus	25	44.4	89.4	118	<
Potassium	100	959	672	875	<
Selenium	1	130	95.1	149	<
Silver	0.1	0.175	0.200	0.179	<
Sodium	20	29500	32400	34000	222
Strontium	0.1	32.1	27.9	30.4	0.337
Tin	0.1	128	221	295	22.2
Titanium	1	147	125	140	<
Vanadium	0.1	5.80	2.09	2.43	<
Zinc	3	32.9	32.5	28.6	<
Sulfur	3000	5510000	4340000	3800000	<
Silicon	75	41300	63200	71600	235

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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	<	50.0	81	50.4	82
Antimony	0.1	<	5.69	95	5.74	96
Arsenic	0.2	<	30.6	102	30.0	100
Barium	0.5	<	30.2	101	30.7	102
Beryllium	0.1	<	29.8	99	30.0	100
Boron	10	<	29.9	97	31.9	104
Cadmium	0.05	<	14.7	98	14.9	100
Calcium	100	<	789	105	784	104
Chromium	0.15	<	31.4	104	31.3	104
Cobalt	0.1	<	31.4	105	31.4	105
Copper	0.3	<	31.1	104	31.2	104
Iron	15	<	161	107	164	109
Lead	0.05	0.0789	30.4	101	30.7	102
Lithium	0.25	<	5.97	102	6.23	106
Magnesium	5	<	158	105	158	105
Manganese	0.15	<	31.6	105	31.8	106
Molybdenum	0.1	<	14.8	98	14.9	99
Nickel	0.1	<	31.5	105	31.8	106
Phosphorus	25	<	728	100	752	103
Potassium	100	<	751	100	749	100
Selenium	1	<	29.8	99	30.5	102
Silver	0.1	<	14.5	97	14.6	97
Sodium	20	<	768	102	748	99
Strontium	0.1	<	30.2	101	30.3	101
Tin	0.1	5.82	14.7	95	15.0	100
Titanium	1	<	30.0	100	30.1	100
Vanadium	0.1	<	31.3	104	31.5	105
Zinc	3	<	61.4	102	61.7	103
Sulfur	3000	<	6870	111	7190	115
Silicon	75	238	1750	101	1750	101

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Sample QC Summary Report

Sample Name		21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(1 THRU 6) TEST#1
ALS Sample ID		L2641466-1	L2641466-1	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		14-Sep-21	14-Sep-21	14-Sep-21	14-Sep-21	14-Sep-21	14-Sep-21
Date of Receipt		17-Sep-21	17-Sep-21	17-Sep-21	17-Sep-21	17-Sep-21	17-Sep-21
Multi-Metals via ICP-MS	**LOR ug**	**ug**	**ug**	**ug**	**% Rec**	**ug**	**% Rec**
Back Half (HNO3 / H2O2) Fraction 2A							
Aluminum	5	2370	2400	2470	nq	2470	nq
Antimony	0.1	1.93	1.86	13.3	95	13.2	94
Arsenic	0.2	66.4	67.2	139	nq	136	nq
Barium	0.5	71.3	70.3	137	nq	132	nq
Beryllium	0.1	<	<	59.7	99	60.8	101
Boron	10	7280	7230	8290	nq	7490	nq
Cadmium	0.05	0.212	0.203	29.0	96	29.5	98
Calcium	100	22800	23000	39500	nq	37200	nq
Chromium	0.15	32.7	33.0	91.3	98	91.3	98
Cobalt	0.1	1.21	1.20	60.1	98	60.0	98
Copper	0.3	12.0	12.2	70.0	97	70.0	97
Iron	15	2490	2500	2780	nq	2800	nq
Lead	0.05	13.7	13.8	73.5	100	72.8	99
Lithium	0.25	2.08	2.02	14.0	99	14.8	106
Magnesium	5	3270	3300	3560	nq	3540	nq
Manganese	0.15	50.8	50.7	110	99	112	102
Molybdenum	0.1	1.62	1.52	30.5	96	30.3	95
Nickel	0.1	9.86	9.90	68.6	98	68.4	98
Phosphorus	25	44.4	67.5	1710	111	1740	113
Potassium	100	959	962	2330	91	2310	90
Selenium	1	130	127	796	111	780	108
Silver	0.1	0.175	0.171	27.8	92	27.6	91
Sodium	20	29500	29500	43300	nq	43000	nq
Strontium	0.1	32.1	30.2	90.7	98	90.0	96
Tin	0.1	128	127	157	nq	158	nq
Titanium	1	147	146	201	nq	198	nq
Vanadium	0.1	5.80	5.87	64.9	99	64.8	98
Zinc	3	32.9	32.3	148	96	149	97
Sulfur	3000	5510000	5440000	5600000	nq	5560000	nq
Silicon	75	41300	42000	47600	nq	45000	80

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#:	L2641466		Mississauga, ON L5J 2Y4
Date of Report Revision	18-Oct-21		Canada
Date of Sample Receipt	17-Sep-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors

COMMENTS:

Sample Particulate Analysis via Gravimetric USEPA Method 5 (TPH 07-OCT-2021)

*** **Revised Report** ***

This report supersedes all prior reports for the above-noted workorder and test. The report has been revised as follows:

Sample data was reported for L2641466-2 through -4 under incorrect sample IDs, and also having been compared to incorrect tare weights. Data has been revised to account for both of these errors. **PE 18-Oct-21**

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

Results in this certificate relate only to the samples as submitted to the laboratory.

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ALS Environmental

Sample Analysis Summary Report

Sample Name		21-22114-PM-(1 THRU 6) TEST#1	21-22114-PM-(8 THRU 13) TEST#2	21-22114-PM-(15 THRU 20) TEST#3	21-22114-PM-(22 THRU 27) BLANK		MB	
ALS Sample ID		L2641466-1	L2641466-2	L2641466-3	L2641466-4		L2641466-MB	
Matrix		Stack	Stack	Stack	Stack		n/a	
Analysis type		Sample	Sample	Sample	Sample		Sample	
Sampling Date/Time		14-Sep-21	15-Sep-21	16-Sep-21	15-Sep-21		n/a	
Date of Receipt		17-Sep-21	17-Sep-21	17-Sep-21	17-Sep-21		n/a	
PM via Gravimetric Analysis	**LOR**							
Method 5	**mg**	**mg**	**mg**	**mg**	**mg**		**mg**	
Filter Particulate Matter	0.8	38.1	41.5	34.0	1.2		<0.1	
Acetone Particulate Matter	0.4	1.4	2.80	2.80	0.300	J	0.100	J
	g	**g**	**g**	**g**	**g**		**g**	
Acetone Mass	0.02	183	134	121	190		30.9	

APPENDIX 10

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

ORTECH Semi-Volatile Organics Train Recovery Data Sheet

Client :	Clean Habors
Project No.:	22114
Sample Batch No.:	21-22114-SVOC-

Test No.:	1
Test Date:	SEPTEMBER 19,202
Test Location:	Incinerator Stack

Sample ID 1	Sample ID 2	Sample ID 3	Sample ID 4A + 4B	Sample ID 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	Impinger 4 Silica Gel
CONTAINER TS1	CONTAINER TS2	CONTAINER TS3	CONTAINER TS4	CONTAINER TS5	CONTAINER TS6 (Impinger)
Empty Wt: 406.9	Colour: REDDISH	Initial Wt: 666.0	Impinger #1 Jumbo K.O.	Empty Wt: 285.4	Initial Wt: 828.1
After Acetone/ Hexane Rinse: 790.0	FOLD IN FOIL	1 Final Wt: 679.4	Empty Wt: 708.7	After Acetone Rinse: > 436.7	Final Wt: 850.1
Total TS1: 384.1		Gain: 13.4	Final Wt: 2505.0	After Hexane Rinse: /	5 Gain: 22.0
	SEAL AND LABEL CONTAINER TS2	Colour: WHITE	2 Gain# 1796.3	Total TS5: 150.3	% Spent: 100
MARK FLUID LEVEL		SEAL TRAP	Colour: CLEAR.		
			* TRAY #1 ONLY		
SEAL AND LABEL CONTAINER TS1		WRAP IN FOIL	Impinger #2 Ethylene Glycol		
		LABEL AS CONTAINER TS3	Empty Wt: 675.6		
			Initial Wt: 827.8		
			Final Wt: 881.9		
			3 Gain: 54.1		
			Colour: CLEAR		
			Impinger #3 Empty		
			Empty Wt: 583.5		
			Final Wt: 584.0		
			4 Gain: 0.5		
			Colour: CLEAR		
			JMP SOLUT TRAY 1 + 2		
			Container TS4 Weights 4A		
			Empty Wt: 1358.4		
			With Imp Soln: 5037.0		
			Imp Volume: —		
			After ~100g H_2O Rinse: —		
			Total TS4: 3678.6		
			3539.8		
			CWTR = 1 + 2 + 3 + 4: 3526.4		
			WCBDA=5: 22.0		

Train & Proofing Identification	
Glassware Train Proofing Provided By:	ALS
Glassware Train ID:	
Trap ID:	L2627362-15 #1
HPLC Batch No.:	ALS
Ethylene Gylcol Batch No.:	
Hexane Batch No.:	
Acetone Batch No.:	

Impinger Box ID: 12

H_2O RINSE
TS 4B
283.6.

401.7
118.1

Train Loaded By:	JG
Train Recovered By:	JG

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

ORTECH Semi-Volatile Organics Train Recovery Data Sheet

Client : Clean Habors
Project No.: 22114
Sample Batch No.: 21-22114-SVOC-

Test No.: 2
Test Date: SEPT 15/21
Test Location: Incinerator Stack

Sample ID 6 — Nozzle, Probe Liner, Cyclone Bypass, F.H. & B.H. Filter Housing, Frit & Connecting Glassware to Top of Condenser

CONTAINER TS1

Empty Wt:	405.9
After Acetone/ Hexane Rinse:	725.5
Total TS1:	319.6

MARK FLUID LEVEL

SEAL AND LABEL CONTAINER TS1

Sample ID 7 — Filter

CONTAINER TS2

Colour: WHITE

FOLD IN FOIL

SEAL AND LABEL CONTAINER TS2

Sample ID 8 — XAD-II Trap

CONTAINER TS3

Initial Wt:	667.1
Final Wt:	686.6
1 Gain:	19.8
Colour:	WHITE

SEAL TRAP

WRAP IN FOIL

LABEL AS CONTAINER TS3

Re: Jumbo Chain 700.5
2417.8
1717.3
1670.2
3387.5

Sample ID 9 A+B — Impingers 1, 2 & 3

CONTAINER TS4

Impinger #1 Jumbo K.O.	
Empty Wt:	700.5
Final Wt:	'
2 Gain:	~~1670.2~~ → 3387.5
Colour:	CLEAR

Impinger #2 Ethylene Glycol	
Empty Wt:	660.7
Initial Wt:	771.4
Final Wt:	806.6
3 Gain:	35.2
Colour:	CLEAR

Impinger #3 Empty	
Empty Wt:	607.1
Final Wt:	607.8
4 Gain:	0.7
Colour:	CLEAR

Container TS4 Weights	
Empty Wt:	1361.0
With Imp Soln:	4867.2
Imp Volume:	3506.2
After ~100g H_2O Rinse:	→
Total TS4:	→

TS4B: 283.7
RS: RS: 460.3

Sample ID 10 — Back-Half Rinses: Trap Bottom U-Tube, Imp. Inlet Stem, U-Tubes and Impingers

CONTAINER TS5

Empty Wt:	284.3
After Acetone Rinse:	384.5
After Hexane Rinse:	462.2
Total TS5:	77.7

Impinger 4 Silica Gel

CONTAINER TS6 (Impinger)

Initial Wt:	914.6
Final Wt:	929.8
5 Gain:	15.2
% Spent:	80

Impinger Box ID: 14

Train & Proofing Identification	
Glassware Train Proofing Provided By:	ALS
Glassware Train ID:	
Trap ID:	L2627362-16 #2
HPLC Batch No.:	ALS
Ethylene Gylcol Batch No.:	
Hexane Batch No.:	
Acetone Batch No.:	

Train Loaded By: JG
Train Recovered By: JG

CWTR = 1 + 2 + 3 + 4: 3442.2

WCBDA=5: 15.2

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

ORTECH Semi-Volatile Organics Train Recovery Data Sheet

Client :	Clean Habors
Project No.:	22114
Sample Batch No.:	21-22114-SVOC-

Test No.:	3
Test Date:	SEPTEMBER 16, 2021
Test Location:	Incinerator Stack

Sample ID 4	Sample ID 12	Sample ID 13	Sample ID 14 A+B	Sample ID 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: 406.0	Colour:	Initial Wt: 675.5	Impinger #1 Jumbo K.O.	Empty Wt: 283.9	Initial Wt: 906.9
After Acetone/ Hexane Rinse: C820	FOLD IN FOIL	1 Final Wt: 705.7 / Gain: 30.2	Empty Wt: 708.0	After Acetone Rinse: 379.9	Final Wt: 927.5
Total TS1:		Colour: WHITE	Final Wt: 2429.4	After Hexane Rinse: 480.6	5 Gain: 20.6
	SEAL AND LABEL CONTAINER TS2	SEAL TRAP	2 Gain: 1721.4	5 Total TS5: 476.0	% Spent:
MARK FLUID LEVEL		WRAP IN FOIL	Colour: CLEAR		
SEAL AND LABEL CONTAINER TS1		LABEL AS CONTAINER TS3	Impinger #2 Ethylene Glycol		
		TRAV 1	Empty Wt: 653.2		
		MT 1363.6 g	Initial Wt: 773.7		
		3052.0	Final Wt: 810.7		
		1688.4	3 Gain: 37.0		
			Colour: CLEAR		
			Impinger #3 Empty		
			Empty Wt: 693.4		
			Final Wt: 694.1		
			4 Gain: 0.7		
			Colour: CLEAR		

Train & Proofing Identification	
Glassware Train Proofing Provided By:	ALS
Glassware Train ID:	
Trap ID:	L2627362-17
HPLC Batch No.:	ALS
Ethylene Gylcol Batch No.:	
Hexane Batch No.:	
Acetone Batch No.:	

Container TS4 Weights	A
Empty Wt:	1363.6
With Imp Soln:	1904.0
Imp Volume:	
After ~100g H_2O Rinse:	
Total TS4:	

TS4B 284.2

414.4

Impinger Box ID: 13

Train Loaded By:

Train Recovered By:

CWTR = 1 + 2 + 3 + 4:	3477.7
WCBDA=5:	20.6

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

ORTECH Semi-Volatile Organics Train Recovery Data Sheet

Client : Clean Habors
Project No.: 22114
Sample Batch No.: 21-22114-SVOC-

Test No.: BLANK
Test Date: SEPT 16/24
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: 407.0 After Acetone/ Hexane Rinse: 660.9 Total TS1:	Colour: WHITE FOLD IN FOIL SEAL AND LABEL CONTAINER TS2	Initial Wt: 676.1 Final Wt: 676.1 1 Gain: — Colour: WHITE SEAL TRAP WRAP IN FOIL LABEL AS CONTAINER TS3	**Impinger #1 Jumbo K.O.** Empty Wt: 566.2 Final Wt: 566.2 2 Gain: — Colour: — **Impinger #2 Ethylene Glycol** Empty Wt: 568.3 Initial Wt: 675.3 Final Wt: 675.3 3 Gain: — Colour: — **Impinger #3 Empty** Empty Wt: 614.0 Final Wt: 614.0 4 Gain: — Colour: —	Empty Wt: 284.0 After Acetone Rinse: 388.1 After Hexane Rinse: 477.9 5 Total TS5:	Initial Wt: — Final Wt: — Gain: % Spent:
MARK FLUID LEVEL SEAL AND LABEL CONTAINER TS1					

Train & Proofing Identification	
Glassware Train Proofing Provided By:	ALS
Glassware Train ID:	F
Trap ID:	5
HPLC Batch No.:	ALS
Ethylene Gylcol Batch No.:	198612
Hexane Batch No.:	105522
Acetone Batch No.:	106330

Container TS4 Weights

Empty Wt:	406.1
With Imp Soln:	510.2
Imp Volume:	
After ~100g H_2O Rinse:	650.8
Total TS4:	

Impinger Box ID:

Train Loaded By: DM
Train Recovered By: DM

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
(78 pages)

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
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2641450		Mississauga, ON L5J 2Y4
Date of Report	16-Nov-21		Canada
Date of Sample Receipt	17-Sep-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors Sarnia

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

Certified by:

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

Results in this certificate relate only to the samples as submitted to the laboratory.
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Sample Analysis summary Report

Sample Name	21-22114-SVOC-(1 THRU 5) TEST#1	21-22114-SVOC-(6 THRU 10) TEST#2	21-22114-SVOC-(11 THRU 15) TEST#3	21-22114-SVOC-(16 THRU 20) BLANK
ALS Sample ID	L2641450-1	L2641450-2	L2641450-3	L2641450-4
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	14-Sep-21	15-Sep-21	16-Sep-21	16-Sep-21
Extraction Date	28-Sep-21	28-Sep-21	28-Sep-21	28-Sep-21
Target Analytes	**pg**	**pg**	**pg**	**pg**
2,3,7,8-TCDD	<7.1	<5.9	<8.0	<2.4
1,2,3,7,8-PeCDD	5.60	<4.3	5.73	<1.7
1,2,3,4,7,8-HxCDD	<4.0	<10	<8.3	<2.4
1,2,3,6,7,8-HxCDD	<6.0	<9.7	9.34	<2.3
1,2,3,7,8,9-HxCDD	<4.3	<9.4	<7.6	<2.2
1,2,3,4,6,7,8-HpCDD	64.7	48.5	<53	<4.2
OCDD	51.8	<21	61.5	<7.1
2,3,7,8-TCDF	<7.9	<7.6	<9.1	<1.9
1,2,3,7,8-PeCDF	8.63	<4.9	<8.1	<2.9
2,3,4,7,8-PeCDF	8.64	<4.7	<8.6	<1.3
1,2,3,4,7,8-HxCDF	<3.6	<2.8	5.29	<1.2
1,2,3,6,7,8-HxCDF	<3.6	<3.6	<5.2	<1.2
2,3,4,6,7,8-HxCDF	<3.5	<3.5	<3.9	<1.3
1,2,3,7,8,9-HxCDF	<8.5	7.84	8.63	<4.4
1,2,3,4,6,7,8-HpCDF	<11	<10	11.3	1.97
1,2,3,4,7,8,9-HpCDF	<3.3	<3.8	<6.5	<2.1
OCDF	<5.8	<8.5	<11	6.77
Field Spike Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**
37Cl4-2,3,7,8-TCDD	92	98	99	48
13C12-1,2,3,4,7,8-HxCDD	89	78	90	39
13C12-2,3,4,7,8-PeCDF	98	103	100	49
13C12-1,2,3,4,7,8-HxCDF	84	81	87	41
13C12-1,2,3,4,7,8,9-HpCDF	81	84	83	38
Extraction Standards				
13C12-2,3,7,8-TCDD	36	37	37	40
13C12-1,2,3,7,8-PeCDD	42	39	39	42
13C12-1,2,3,6,7,8-HxCDD	44	52	49	55
13C12-1,2,3,4,6,7,8-HpCDD	36	34	37	44
13C12-OCDD	26	23	25	32
13C12-2,3,7,8-TCDF	34	35	35	37
13C12-1,2,3,7,8-PeCDF	38	36	37	40
13C12-1,2,3,6,7,8-HxCDF	41	48	47	52
13C12-1,2,3,4,6,7,8-HpCDF	36	36	39	48
Cleanup Standard				
13C12-1,2,3,7,8,9-HxCDF	64	64	65	57
Homologue Group Totals	**pg**	**pg**	**pg**	**pg**
Total-TCDD	201	<5.9	14.1	<2.4
Total-PeCDD	295	149	267	<1.7
Total-HxCDD	370	212	313	<2.4
Total-HpCDD	64.7	98.4	<9.0	<4.2
Total-TCDF	172	89.6	205	<1.9
Total-PeCDF	35.3	<4.9	98.0	<1.2
Total-HxCDF	5.03	7.84	22.4	<1.4
Total-HpCDF	<3.3	<3.8	11.3	<2.1
Toxic Equivalency - (WHO 2005)				
Lower Bound PCDD/F TEQ (WHO 2005)	9.11	1.27	8.19	0.0217
Mid Point PCDD/F TEQ (WHO 2005)	16.3	10.1	17.5	3.65
Upper Bound PCDD/F TEQ (WHO 2005)	20.5	17.8	23.0	6.35

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Quality Control Summary Report

Sample Name	Method Blank	Laboratory Control Sample
ALS Sample ID	WG3622486-1	WG3622486-2
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	28-Sep-21	28-Sep-21
Target Analytes	**pg**	**% Rec**
2,3,7,8-TCDD	<4.0	94
1,2,3,7,8-PeCDD	<3.3	111
1,2,3,4,7,8-HxCDD	<8.1	97
1,2,3,6,7,8-HxCDD	<7.6	111
1,2,3,7,8,9-HxCDD	<7.4	113
1,2,3,4,6,7,8-HpCDD	<14	98
OCDD	<42	97
2,3,7,8-TCDF	<2.4	106
1,2,3,7,8-PeCDF	<3.4	108
2,3,4,7,8-PeCDF	<2.7	102
1,2,3,4,7,8-HxCDF	<4.9	89
1,2,3,6,7,8-HxCDF	<4.9	114
2,3,4,6,7,8-HxCDF	<5.1	104
1,2,3,7,8,9-HxCDF	<5.6	97
1,2,3,4,6,7,8-HpCDF	<7.6	100
1,2,3,4,7,8,9-HpCDF	<9.2	84
OCDF	<24	109
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	39	43
13C12-1,2,3,7,8-PeCDD	30	48
13C12-1,2,3,6,7,8-HxCDD	52	55
13C12-1,2,3,4,6,7,8-HpCDD	29	42
13C12-OCDD	15	27
13C12-2,3,7,8-TCDF	38	41
13C12-1,2,3,7,8-PeCDF	31	45
13C12-1,2,3,6,7,8-HxCDF	59	53
13C12-1,2,3,4,6,7,8-HpCDF	36	45
Cleanup Standard		
13C12-1,2,3,7,8,9-HxCDF	62	62
Homologue Group Totals	**pg**	
Total-TCDD	<4.0	
Total-PeCDD	<3.3	
Total-HxCDD	<8.1	
Total-HpCDD	<14	
Total-TCDF	<2.4	
Total-PeCDF	<2.8	
Total-HxCDF	<5.6	
Total-HpCDF	<9.2	
Toxic Equivalency - (WHO 2005)		
Lower Bound PCDD/F TEQ (WHO 2005)	0.00	
Mid Point PCDD/F TEQ (WHO 2005)	6.62	
Upper Bound PCDD/F TEQ (WHO 2005)	13.1	

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Sample Analysis Report

Sample Name	**21-22114-SVOC-(1 THRU 5) TEST#1**	Sampling Date	14-Sep-21		Approved:
ALS Sample ID	L2641450-1	Extraction Date	28-Sep-21		*T.Patterson*
Analysis Method	EPA M23	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		02-Nov-2021
Sample Matrix	Stack	Split Ratio	8		

Run Information	**Run 1**
Filename	6-211030A11
Run Date	30-Oct-21 17:49
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-6 DB5MSUS1221927H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<7.1	7.1	U		40
1,2,3,7,8-PeCDD	1	32.02	5.60	4.9	M,J		200
1,2,3,4,7,8-HxCDD	0.1	34.06	<4.0	4.0	M,U	3.1	200
1,2,3,6,7,8-HxCDD	0.1	34.11	<6.0	3.8	M,J,R	6.0	200
1,2,3,7,8,9-HxCDD	0.1	34.24	<4.3	3.7	M,J,R	4.3	200
1,2,3,4,6,7,8-HpCDD	0.01	35.72	64.7	5.5	J		200
OCDD	0.0003	37.22	51.8	5.7	M,J		400
2,3,7,8-TCDF	0.1	27.07	<7.9	7.9	M,U		40
1,2,3,7,8-PeCDF	0.03	31.10	8.63	2.1	J		200
2,3,4,7,8-PeCDF	0.3	31.74	8.64	2.0	J		200
1,2,3,4,7,8-HxCDF	0.1	33.57	<3.6	2.7	M,J,R	3.6	200
1,2,3,6,7,8-HxCDF	0.1	33.64	<3.6	2.7	M,J,R	3.6	200
2,3,4,6,7,8-HxCDF	0.1	33.98	<3.5	2.8	M,J,R	3.5	200
1,2,3,7,8,9-HxCDF	0.1	34.38	<8.5	3.1	J,R	8.5	200
1,2,3,4,6,7,8-HpCDF	0.01	35.16	<11	2.7	M,J,R	11	200
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<3.3	3.3	U		200
OCDF	0.0003	37.31	<5.8	5.6	M,J,R	5.8	400

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	1400	27.99	92	70-130
13C12-1,2,3,4,7,8-HxCDD	14000	34.05	89	70-130
13C12-2,3,4,7,8-PeCDF	14000	31.80	98	70-130
13C12-1,2,3,4,7,8-HxCDF	14000	33.57	84	70-130
13C12-1,2,3,4,7,8,9-HpCDF	14000	35.96	81	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	16000	27.97	36	40-130
13C12-1,2,3,7,8-PeCDD	16000	32.01	42	40-130
13C12-1,2,3,6,7,8-HxCDD	16000	34.10	44	40-130
13C12-1,2,3,4,6,7,8-HpCDD	16000	35.71	36	25-130
13C12-OCDD	32000	37.22	26	25-130
13C12-2,3,7,8-TCDF	16000	27.05	34	40-130
13C12-1,2,3,7,8-PeCDF	16000	31.09	38	40-130
13C12-1,2,3,6,7,8-HxCDF	16000	33.63	41	40-130
13C12-1,2,3,4,6,7,8-HpCDF	16000	35.15	36	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	21300	34.37	64	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		**LQL**
Total-TCDD	4	201	7.1		40
Total-PeCDD	5	295	4.9		200
Total-HxCDD	2	370	4.0		200
Total-HpCDD	1	64.7	5.5		200
Total-TCDF	9	172	7.9		40
Total-PeCDF	3	35.3	2.1		200
Total-HxCDF	1	5.03	3.1		200
Total-HpCDF	0	<3.3	3.3	U	200

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	9.11
Mid Point PCDD/F TEQ (WHO 2005)	16.3
Upper Bound PCDD/F TEQ (WHO 2005)	20.5

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

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Sample Analysis Report

Sample Name	**21-22114-SVOC-(6 THRU 10) TEST#2**	Sampling Date	15-Sep-21		Approved:
ALS Sample ID	L2641450-2	Extraction Date	28-Sep-21		*T.Patterson*
Analysis Method	EPA M23	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		02-Nov-2021
Sample Matrix	Stack	Split Ratio	8		

Run Information	**Run 1**
Filename	6-211030A12
Run Date	30-Oct-21 18:34
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-6 DB5MSUS1221927H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<5.9	5.9	U		40
1,2,3,7,8-PeCDD	1	NotFnd	<4.3	4.3	U		200
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<10	10	U		200
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<9.7	9.7	U		200
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<9.4	9.4	U		200
1,2,3,4,6,7,8-HpCDD	0.01	35.72	48.5	3.6	J		200
OCDD	0.0003	37.21	<21	6.7	M,J,R	21	400
2,3,7,8-TCDF	0.1	NotFnd	<7.6	7.6	U		40
1,2,3,7,8-PeCDF	0.03	31.10	<4.9	4.9	M,U		200
2,3,4,7,8-PeCDF	0.3	31.73	<4.7	4.7	M,U	4.3	200
1,2,3,4,7,8-HxCDF	0.1	33.57	<2.8	2.8	M,J,R	2.8	200
1,2,3,6,7,8-HxCDF	0.1	33.62	<3.6	2.8	M,J,R	3.6	200
2,3,4,6,7,8-HxCDF	0.1	33.99	<3.5	2.9	M,J,R	3.5	200
1,2,3,7,8,9-HxCDF	0.1	34.37	7.84	3.2	J		200
1,2,3,4,6,7,8-HpCDF	0.01	35.16	<10	3.2	M,J,R	10	200
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<3.8	3.8	U		200
OCDF	0.0003	NotFnd	<8.5	8.5	U		400
Field Spike Standards	**pg**		**% Rec**	**Limits**			
37Cl4-2,3,7,8-TCDD	1400	27.99	98	70-130			
13C12-1,2,3,4,7,8-HxCDD	14000	34.05	78	70-130			
13C12-2,3,4,7,8-PeCDF	14000	31.80	103	70-130			
13C12-1,2,3,4,7,8-HxCDF	14000	33.56	81	70-130			
13C12-1,2,3,4,7,8,9-HpCDF	14000	35.96	84	70-130			
Extraction Standards							
13C12-2,3,7,8-TCDD	16000	27.96	37	40-130			
13C12-1,2,3,7,8-PeCDD	16000	32.01	39	40-130			
13C12-1,2,3,6,7,8-HxCDD	16000	34.10	52	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	16000	35.71	34	25-130			
13C12-OCDD	32000	37.21	23	25-130			
13C12-2,3,7,8-TCDF	16000	27.05	35	40-130			
13C12-1,2,3,7,8-PeCDF	16000	31.08	36	40-130			
13C12-1,2,3,6,7,8-HxCDF	16000	33.63	48	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	16000	35.15	36	25-130			
Cleanup Standard	**pg**						
13C12-1,2,3,7,8,9-HxCDF	21300	34.37	64	40-130			

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<5.9	5.9	U	40
Total-PeCDD	2	149	4.3		200
Total-HxCDD	2	212	10		200
Total-HpCDD	2	98.4	3.6		200
Total-TCDF	4	89.6	7.6		40
Total-PeCDF	0	<4.9	4.9	U	200
Total-HxCDF	1	7.84	3.2		200
Total-HpCDF	0	<3.8	3.8	U	200

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	1.27
Mid Point PCDD/F TEQ (WHO 2005)	10.1
Upper Bound PCDD/F TEQ (WHO 2005)	17.8

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
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	**21-22114-SVOC-(11 THRU 15) TEST#3**	Sampling Date	16-Sep-21		Approved:
ALS Sample ID	L2641450-3	Extraction Date	28-Sep-21		*T.Patterson*
Analysis Method	EPA M23	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		02-Nov-2021
Sample Matrix	Stack	Split Ratio	8		

Run Information	**Run 1**
Filename	6-211030A13
Run Date	30-Oct-21 19:18
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-6 DB5MSUS1221927H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<8.0	8.0	U		40
1,2,3,7,8-PeCDD	1	32.03	5.73	4.7	M,J		200
1,2,3,4,7,8-HxCDD	0.1	34.06	<8.3	8.3	M,U		200
1,2,3,6,7,8-HxCDD	0.1	34.11	9.34	7.8	M,J		200
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<7.6	7.6	U		200
1,2,3,4,6,7,8-HpCDD	0.01	35.72	<53	9.0	M,J,R	53	200
OCDD	0.0003	37.23	61.5	30	J		400
2,3,7,8-TCDF	0.1	NotFnd	<9.1	9.1	U		40
1,2,3,7,8-PeCDF	0.03	31.09	<8.1	4.1	M,J,R	8.1	200
2,3,4,7,8-PeCDF	0.3	31.74	<8.6	3.9	M,J,R	8.6	200
1,2,3,4,7,8-HxCDF	0.1	33.58	5.29	3.7	M,J		200
1,2,3,6,7,8-HxCDF	0.1	33.64	<5.2	3.7	M,J,R	5.2	200
2,3,4,6,7,8-HxCDF	0.1	33.97	<3.9	3.9	M,U	3.4	200
1,2,3,7,8,9-HxCDF	0.1	34.38	8.63	4.3	M,J		200
1,2,3,4,6,7,8-HpCDF	0.01	35.16	11.3	5.3	M,J		200
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<6.5	6.5	U		200
OCDF	0.0003	37.32	<11	6.4	M,J,R	11	400
Field Spike Standards	**pg**		**% Rec**	**Limits**			
37Cl4-2,3,7,8-TCDD	1400	27.99	99	70-130			
13C12-1,2,3,4,7,8-HxCDD	14000	34.06	90	70-130			
13C12-2,3,4,7,8-PeCDF	14000	31.80	100	70-130			
13C12-1,2,3,4,7,8-HxCDF	14000	33.57	87	70-130			
13C12-1,2,3,4,7,8,9-HpCDF	14000	35.97	83	70-130			
Extraction Standards							
13C12-2,3,7,8-TCDD	16000	27.97	37	40-130			
13C12-1,2,3,7,8-PeCDD	16000	32.01	39	40-130			
13C12-1,2,3,6,7,8-HxCDD	16000	34.10	49	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	16000	35.71	37	25-130			
13C12-OCDD	32000	37.22	25	25-130			
13C12-2,3,7,8-TCDF	16000	27.05	35	40-130			
13C12-1,2,3,7,8-PeCDF	16000	31.09	37	40-130			
13C12-1,2,3,6,7,8-HxCDF	16000	33.63	47	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	16000	35.15	39	25-130			
Cleanup Standard	**pg**						
13C12-1,2,3,7,8,9-HxCDF	21300	34.37	65	40-130			

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		**LQL**
Total-TCDD	1	14.1	8.0		40
Total-PeCDD	4	267	4.7		200
Total-HxCDD	3	313	8.3		200
Total-HpCDD	0	<9.0	9.0	U	200
Total-TCDF	8	205	9.1		40
Total-PeCDF	5	98.0	4.1		200
Total-HxCDF	3	22.4	4.3		200
Total-HpCDF	1	11.3	6.5		200

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	8.19
Mid Point PCDD/F TEQ (WHO 2005)	17.5
Upper Bound PCDD/F TEQ (WHO 2005)	23.0

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

ALS Life Sciences

Sample Analysis Report

Sample Name	**21-22114-SVOC-(16 THRU 20) BLANK**	Sampling Date	16-Sep-21		Approved:
ALS Sample ID	L2641450-4	Extraction Date	28-Sep-21		*T.Patterson*
Analysis Method	EPA M23	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		02-Nov-2021
Sample Matrix	Stack	Split Ratio	8		

Run Information	**Run 1**
Filename	6-211030A10
Run Date	30-Oct-21 17:04
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-6 DB5MSUS1221927H

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	<1.7	1.7	U		200
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<2.4	2.4	U		200
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<2.3	2.3	U		200
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<2.2	2.2	U		200
1,2,3,4,6,7,8-HpCDD	0.01	NotFnd	<4.2	4.2	U		200
OCDD	0.0003	37.22	<7.1	7.1	M,U	5.6	400
2,3,7,8-TCDF	0.1	NotFnd	<1.9	1.9	U		40
1,2,3,7,8-PeCDF	0.03	31.12	<2.9	1.2	M,J,R	2.9	200
2,3,4,7,8-PeCDF	0.3	31.83	<1.3	1.1	M,J,R	1.3	200
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<1.2	1.2	U		200
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<1.2	1.2	U		200
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<1.3	1.3	U		200
1,2,3,7,8,9-HxCDF	0.1	34.37	<4.4	1.4	J,R	4.4	200
1,2,3,4,6,7,8-HpCDF	0.01	35.15	1.97	1.7	M,J		200
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<2.1	2.1	U		200
OCDF	0.0003	37.32	6.77	5.7	J		400
Field Spike Standards	**pg**		**% Rec**	**Limits**			
37Cl4-2,3,7,8-TCDD	1400	27.98	48	70-130			
13C12-1,2,3,4,7,8-HxCDD	14000	34.05	39	70-130			
13C12-2,3,4,7,8-PeCDF	14000	31.80	49	70-130			
13C12-1,2,3,4,7,8-HxCDF	14000	33.57	41	70-130			
13C12-1,2,3,4,7,8,9-HpCDF	14000	35.96	38	70-130			
Extraction Standards							
13C12-2,3,7,8-TCDD	16000	27.97	40	40-130			
13C12-1,2,3,7,8-PeCDD	16000	32.01	42	40-130			
13C12-1,2,3,6,7,8-HxCDD	16000	34.10	55	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	16000	35.71	44	25-130			
13C12-OCDD	32000	37.21	32	25-130			
13C12-2,3,7,8-TCDF	16000	27.05	37	40-130			
13C12-1,2,3,7,8-PeCDF	16000	31.09	40	40-130			
13C12-1,2,3,6,7,8-HxCDF	16000	33.63	52	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	16000	35.15	48	25-130			
Cleanup Standard	**pg**						
13C12-1,2,3,7,8,9-HxCDF	21300	34.37	57	40-130			

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<2.4	2.4	U	40
Total-PeCDD	0	<1.7	1.7	U	200
Total-HxCDD	0	<2.4	2.4	U	200
Total-HpCDD	0	<4.2	4.2	U	200
Total-TCDF	0	<1.9	1.9	U	40
Total-PeCDF	0	<1.2	1.2	U	200
Total-HxCDF	0	<1.4	1.4	U	200
Total-HpCDF	0	<2.1	2.1	U	200

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.0217
Mid Point PCDD/F TEQ (WHO 2005)	3.65
Upper Bound PCDD/F TEQ (WHO 2005)	6.35

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		Approved:
ALS Sample ID	WG3622486-1	Extraction Date	28-Sep-21		*T.Patterson*
Analysis Method	EPA M23	Sample Size	1	Sample	--e-signature--
Analysis Type	Blank	Percent Moisture	n/a		02-Nov-2021
Sample Matrix	QC	Split Ratio	8		

Run Information	**Run 1**
Filename	6-211030A06
Run Date	30-Oct-21 14:05
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-6 DB5MSUS1221927H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<4.0	4.0	U		40
1,2,3,7,8-PeCDD	1	NotFnd	<3.3	3.3	U		200
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<8.1	8.1	U		200
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<7.6	7.6	U		200
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<7.4	7.4	U		200
1,2,3,4,6,7,8-HpCDD	0.01	NotFnd	<14	14	U		200
OCDD	0.0003	37.21	<42	42	M,U		400
2,3,7,8-TCDF	0.1	NotFnd	<2.4	2.4	U		40
1,2,3,7,8-PeCDF	0.03	31.10	<3.4	2.8	M,J,R	3.4	200
2,3,4,7,8-PeCDF	0.3	NotFnd	<2.7	2.7	U		200
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<4.9	4.9	U		200
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<4.9	4.9	U		200
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<5.1	5.1	U		200
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<5.6	5.6	U		200
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<7.6	7.6	U		200
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<9.2	9.2	U		200
OCDF	0.0003	NotFnd	<24	24	U		400
Field Spike Standards			**% Rec**				
37Cl4-2,3,7,8-TCDD			NS				
13C12-1,2,3,4,7,8-HxCDD			NS				
13C12-2,3,4,7,8-PeCDF			NS				
13C12-1,2,3,4,7,8-HxCDF			NS				
13C12-1,2,3,4,7,8,9-HpCDF			NS				
Extraction Standards							
13C12-2,3,7,8-TCDD	16000	27.97	39	40-130			
13C12-1,2,3,7,8-PeCDD	16000	32.01	30	40-130			
13C12-1,2,3,6,7,8-HxCDD	16000	34.11	52	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	16000	35.72	29	25-130			
13C12-OCDD	32000	37.22	15	25-130			
13C12-2,3,7,8-TCDF	16000	27.06	38	40-130			
13C12-1,2,3,7,8-PeCDF	16000	31.09	31	40-130			
13C12-1,2,3,6,7,8-HxCDF	16000	33.63	59	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	16000	35.15	36	25-130			
Cleanup Standard	**pg**						
13C12-1,2,3,7,8,9-HxCDF	21300	34.38	62	40-130			

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<4.0	4.0	U	40
Total-PeCDD	0	<3.3	3.3	U	200
Total-HxCDD	0	<8.1	8.1	U	200
Total-HpCDD	0	<14	14	U	200
Total-TCDF	0	<2.4	2.4	U	40
Total-PeCDF	0	<2.8	2.8	U	200
Total-HxCDF	0	<5.6	5.6	U	200
Total-HpCDF	0	<9.2	9.2	U	200

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.00
Mid Point PCDD/F TEQ (WHO 2005)	6.62
Upper Bound PCDD/F TEQ (WHO 2005)	13.1

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure
NS	Indicates that this standard was not spiked to sample

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a		
ALS Sample ID	WG3622486-2	Extraction Date	28-Sep-21		Approved:
Analysis Method	EPA M23	Sample Size	1	n/a	*T.Patterson*
Analysis Type	LCS	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	8		02-Nov-2021

Run Information	**Run 1**
Filename	6-211030A02
Run Date	30-Oct-21 11:06
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-6 DB5MSUS1221927H

Target Analytes	**pg**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	1600	27.99	94	70-130	
1,2,3,7,8-PeCDD	8000	32.03	111	70-130	
1,2,3,4,7,8-HxCDD	8000	34.07	97	70-130	
1,2,3,6,7,8-HxCDD	8000	34.11	111	70-130	
1,2,3,7,8,9-HxCDD	8000	34.24	113	70-130	
1,2,3,4,6,7,8-HpCDD	8000	35.72	98	70-130	
OCDD	16000	37.22	97	70-130	
2,3,7,8-TCDF	1600	27.07	106	70-130	
1,2,3,7,8-PeCDF	8000	31.10	108	70-130	
2,3,4,7,8-PeCDF	8000	31.83	102	70-130	
1,2,3,4,7,8-HxCDF	8000	33.58	89	70-130	
1,2,3,6,7,8-HxCDF	8000	33.64	114	70-130	
2,3,4,6,7,8-HxCDF	8000	33.97	104	70-130	
1,2,3,7,8,9-HxCDF	8000	34.38	97	70-130	
1,2,3,4,6,7,8-HpCDF	8000	35.16	100	70-130	
1,2,3,4,7,8,9-HpCDF	8000	35.98	84	70-130	
OCDF	16000	37.32	109	70-130	
Field Spike Standards			**% Rec**		
37Cl4-2,3,7,8-TCDD			NS		
13C12-1,2,3,4,7,8-HxCDD			NS		
13C12-2,3,4,7,8-PeCDF			NS		
13C12-1,2,3,4,7,8-HxCDF			NS		
13C12-1,2,3,4,7,8,9-HpCDF			NS		
Extraction Standards					
13C12-2,3,7,8-TCDD	16000	27.97	43	40-130	
13C12-1,2,3,7,8-PeCDD	16000	32.02	48	40-130	
13C12-1,2,3,6,7,8-HxCDD	16000	34.11	55	40-130	
13C12-1,2,3,4,6,7,8-HpCDD	16000	35.72	42	25-130	
13C12-OCDD	32000	37.22	27	25-130	
13C12-2,3,7,8-TCDF	16000	27.06	41	40-130	
13C12-1,2,3,7,8-PeCDF	16000	31.09	45	40-130	
13C12-1,2,3,6,7,8-HxCDF	16000	33.64	53	40-130	
13C12-1,2,3,4,6,7,8-HpCDF	16000	35.15	45	25-130	
Cleanup Standard	**pg**				
13C12-1,2,3,7,8,9-HxCDF	21300	34.38	62	40-130	

NS Indicates that this standard was not spiked to sample

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#:	L2641450		Mississauga, ON L5J 2Y4
Date of Report Revision	26-Nov-21		Canada
Date of Sample Receipt	17-Sep-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors Sarnia

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

***** Revised Report *****

This report supersedes all prior reports for the above-noted workorder and test. The report has been revised as follows:
The analyte target list has been amended.

***** Original Report Comments *****

Selected field spikes are biased below targeted recovery limits. There is no obvious explanation for this bias especially since the trend is toward poorer recoveries on the higher molecular weight field spikes, a pattern contrary to volatility losses during sampling.
Extraction Standard recoveries for 13C12-PCB-205 on two of the samples are biased high however there were not octachlorobiphenyls observed in the samples and therefore this has no significant impact to data quality.

Certified by:

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

Results in this certificate relate only to the samples as submitted to the laboratory.
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ALS Life Sciences

Sample Analysis Summary Report

Sample Name	21-22114-SVOC-(1 THRU 5) TEST#1	21-22114-SVOC-(6 THRU 10) TEST#2	21-22114-SVOC-(11 THRU 15) TEST#3	21-22114-SVOC-(16 THRU 20) BLANK
ALS Sample ID	L2641450-1	L2641450-2	L2641450-3	L2641450-4
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	14-Sep-21	15-Sep-21	16-Sep-21	16-Sep-21
Extraction Date	13-Oct-21	13-Oct-21	13-Oct-21	13-Oct-21
Target Analytes	**pg**	**pg**	**pg**	**pg**
PCB-081	<170	<150	<150	<77
PCB-077	<440	<260	<140	<80
PCB-123	<140	<240	<140	<100
PCB-118	1860	<3000	1880	<130
PCB-114	<110	<150	<100	<79
PCB-105	704	<340	<530	<92
PCB-126	<140	<220	<100	<90
PCB-167	<100	<120	<140	<49
PCB-156/157	<110	<160	<220	<65
PCB-169	<76	<110	<120	<42
PCB-189	<41	<38	<31	<34
Extraction Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**
13C12-PCB-001	23	21	28	30
13C12-PCB-003	65	54	57	29
13C12-PCB-004	22	19	24	32
13C12-PCB-015	27	31	41	42
13C12-PCB-019	24	22	28	29
13C12-PCB-037	56	52	47	50
13C12-PCB-054	30	29	27	26
13C12-PCB-081	42	44	40	54
13C12-PCB-077	40	44	41	54
13C12-PCB-104	24	26	23	25
13C12-PCB-123	39	42	40	62
13C12-PCB-118	42	54	41	38
13C12-PCB-114	49	56	50	70
13C12-PCB-105	45	40	34	71
13C12-PCB-126	40	52	57	75
13C12-PCB-155	29	35	29	33
13C12-PCB-167	46	46	54	62
13C12-PCB-156/157	53	46	47	59
13C12-PCB-169	64	57	74	81
13C12-PCB-188	41	35	36	34
13C12-PCB-189	118	102	121	129
13C12-PCB-202	40	37	53	51
13C12-PCB-205	102	151	191	62
13C12-PCB-208	33	31	31	42
13C12-PCB-206	43	34	44	54
13C12-PCB-209	76	68	59	89
Field Spike Standards				
13C12-PCB-031	99	102	122	96
13C12-PCB-095	78	59	84	74
13C12-PCB-153	37	68	93	81
Cleanup Standards				
13C12-PCB-028	76	64	71	62
13C12-PCB-111	74	71	64	64
13C12-PCB-178	INT	INT	INT	114
Homologue Group Totals	**pg**	**pg**	**pg**	**pg**
Total DiCB	8480	8220	5300	3720
Total TriCB	3220	1780	2940	<54
Total TetraCB	21800	21700	15200	<54
Total PentaCB	22000	24500	18600	<79
Total HexaCB	3480	3560	3370	<42
Total HeptaCB	<41	<38	<31	<34
Total OctaCB	<30	<19	<12	<39
Total NonaCB	<80	<91	<70	<45
DecaCB	150	<41	251	<24
Total PCB	86700	81000	59900	3720
Toxic Equivalency - (WHO 2005)				
Lower Bound PCB TEQ	0.0769	0.00	0.0564	0.00
Mid Point PCB TEQ	8.29	12.8	6.91	5.15
Upper Bound PCB TEQ	16.5	25.5	13.8	10.3

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Quality Control Summary Report

Sample Name	Media Blank
ALS Sample ID	WG3622486-1
Sample Size	1
Sample size units	Sample
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	13-Oct-21

Target Analytes	pg
PCB-081	<66
PCB-077	<64
PCB-123	<110
PCB-118	<150
PCB-114	<100
PCB-105	<110
PCB-126	<93
PCB-167	<85
PCB-156/157	<120
PCB-169	<46
PCB-189	<25
Extraction Standards	**% Rec**
13C12-PCB-001	40
13C12-PCB-003	37
13C12-PCB-004	32
13C12-PCB-015	45
13C12-PCB-019	29
13C12-PCB-037	55
13C12-PCB-054	27
13C12-PCB-081	60
13C12-PCB-077	66
13C12-PCB-104	31
13C12-PCB-123	71
13C12-PCB-118	43
13C12-PCB-114	70
13C12-PCB-105	70
13C12-PCB-126	89
13C12-PCB-155	36
13C12-PCB-167	49
13C12-PCB-156/157	46
13C12-PCB-169	97
13C12-PCB-188	40
13C12-PCB-189	166
13C12-PCB-202	44
13C12-PCB-205	60
13C12-PCB-208	35
13C12-PCB-206	46
13C12-PCB-209	85
Field Spike Standards	
13C12-PCB-031	NS
13C12-PCB-095	NS
13C12-PCB-153	NS
Cleanup Standards	
13C12-PCB-028	65
13C12-PCB-111	80
13C12-PCB-178	76

Homologue Group Totals	pg
Total DiCB	1100
Total TriCB	<59
Total TetraCB	<46
Total PentaCB	<89
Total HexaCB	<46
Total HeptaCB	<25
Total OctaCB	<47
Total NonaCB	<77
DecaCB	81.0
Total PCB	1180
Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.00
Mid Point PCB TEQ	5.36
Upper Bound PCB TEQ	10.7

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Sample Analysis Summary Report

Sample Name	Laboratory Control Sample
ALS Sample ID	WG3622486-2
Sample Size	1
Sample size units	n/a
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	13-Oct-21

Target Analytes	% Rec
PCB-001	100
PCB-003	97
PCB-004	109
PCB-015	113
PCB-019	109
PCB-037	111
PCB-054	111
PCB-081	105
PCB-077	104
PCB-104	98
PCB-123	103
PCB-118	106
PCB-114	105
PCB-105	100
PCB-126	98
PCB-155	105
PCB-167	106
PCB-156/157	105
PCB-169	106
PCB-188	110
PCB-189	108
PCB-202	111
PCB-205	101
PCB-208	92
PCB-206	90
PCB-209	107
Extraction Standards	**% Rec**
13C12-PCB-001	35
13C12-PCB-003	36
13C12-PCB-004	32
13C12-PCB-015	41
13C12-PCB-019	29
13C12-PCB-037	51
13C12-PCB-054	30
13C12-PCB-081	52
13C12-PCB-077	55
13C12-PCB-104	29
13C12-PCB-123	56
13C12-PCB-118	52
13C12-PCB-114	60
13C12-PCB-105	60
13C12-PCB-126	71
13C12-PCB-155	33
13C12-PCB-167	60
13C12-PCB-156/157	60
13C12-PCB-169	73
13C12-PCB-188	43
13C12-PCB-189	71
13C12-PCB-202	49
13C12-PCB-205	58
13C12-PCB-208	55
13C12-PCB-206	54
13C12-PCB-209	53
Field Spike Standards	
13C12-PCB-031	0
13C12-PCB-095	0
13C12-PCB-153	0
Cleanup Standards	
13C12-PCB-028	56
13C12-PCB-111	67
13C12-PCB-178	76

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Sample Analysis Report

Sample Name	**21-22114-SVOC-(1 THRU 5) TEST#1**	Sampling Date	14-Sep-21		Approved:
ALS Sample ID	L2641450-1	Extraction Date	13-Oct-21		*N Ashtari*
Analysis Method	EPA 1668C	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		23-Nov-2021
Sample Matrix	Stack	Split Ratio	8		

Run Information	**Run 1**
Filename	5_211119A18
Run Date	20-Nov-21 04:51
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOCTYL256001-02

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	NotFnd	<170	170	U		200
PCB-077	0.0001	22.17	<440	200	M,R	440	200
PCB-123	0.00003	NotFnd	<140	140	U		200
PCB-118	0.00003	23.33	1860	120			200
PCB-114	0.00003	NotFnd	<110	110	U		200
PCB-105	0.00003	23.98	704	110			200
PCB-126	0.1	NotFnd	<140	140	U		200
PCB-167	0.00003	NotFnd	<100	100	U		200
PCB-156/157	0.00003	NotFnd	<110	110	U		400
PCB-169	0.03	NotFnd	<76	76	U		200
PCB-189	0.00003	NotFnd	<41	41	U		200
Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**			
13C12-PCB-001	16000	8.94	23	5-145			
13C12-PCB-003	16000	10.51	65	5-145	R		
13C12-PCB-004	16000	10.65	22	5-145			
13C12-PCB-015	16000	14.32	27	5-145			
13C12-PCB-019	16000	12.64	24	5-145			
13C12-PCB-037	16000	18.30	56	5-145	R		
13C12-PCB-054	16000	14.49	30	5-145			
13C12-PCB-081	16000	21.86	42	10-145			
13C12-PCB-077	16000	22.16	40	10-145			
13C12-PCB-104	16000	17.56	24	10-145			
13C12-PCB-123	16000	23.15	39	10-145			
13C12-PCB-118	16000	23.30	42	10-145			
13C12-PCB-114	16000	23.62	49	10-145	R		
13C12-PCB-105	16000	23.97	45	10-145			
13C12-PCB-126	16000	25.56	40	10-145			
13C12-PCB-155	16000	20.55	29	10-145			
13C12-PCB-167	16000	26.46	46	10-145			
13C12-PCB-156/157	32000	27.10	53	10-145			
13C12-PCB-169	16000	28.75	64	10-145	R		
13C12-PCB-188	16000	23.54	41	10-145			
13C12-PCB-189	16000	30.02	118	10-145			
13C12-PCB-202	16000	26.32	40	10-145			
13C12-PCB-205	16000	31.43	102	10-145			
13C12-PCB-208	16000	29.74	33	10-145	R		
13C12-PCB-206	16000	32.49	43	10-145	R		
13C12-PCB-209	16000	33.62	76	10-145			
Field Spike Standards							
13C12-PCB-031	14000	15.85	99	70-130			
13C12-PCB-095	14000	19.16	78	70-130	R		
13C12-PCB-153	14000	24.26	37	70-130	R		
Cleanup Standards							
13C12-PCB-028	21400	16.03	76	5-145			
13C12-PCB-111	21400	22.08	74	10-145			
13C12-PCB-178	21400	25.13	INT	10-145			

Homologue Group Totals				
Total DiCB	8480	260	J	1600
Total TriCB	3220	89	J	1600
Total TetraCB	21800	65	J	3200
Total PentaCB	22000	79	J	3200
Total HexaCB	3480	76	J	3200
Total HeptaCB	<41	41	U	1600
Total OctaCB	<30	30	U	1600
Total NonaCB	<80	80	U	800
DecaCB	150	31	J	800
Total PCB	86700		J	6400

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.0769
Mid Point PCB TEQ	8.29
Upper Bound PCB TEQ	16.5

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
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.
INT	Interference
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	**21-22114-SVOC-(6 THRU 10) TEST#2**	Sampling Date	15-Sep-21		Approved:
ALS Sample ID	L2641450-2	Extraction Date	13-Oct-21		*N Ashtari*
Analysis Method	EPA 1668C	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		23-Nov-2021
Sample Matrix	Stack	Split Ratio	8		

Run Information	**Run 1**
Filename	5_211119A19
Run Date	20-Nov-21 05:33
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOCTYL256001-02

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	NotFnd	<150	150	U		200
PCB-077	0.0001	22.16	<260	170	M,R	260	200
PCB-123	0.00003	NotFnd	<240	240	U		200
PCB-118	0.00003	23.31	<3000	170	R	3000	200
PCB-114	0.00003	NotFnd	<150	150	U		200
PCB-105	0.00003	23.97	<340	230	R	340	200
PCB-126	0.1	NotFnd	<220	220	U		200
PCB-167	0.00003	NotFnd	<120	120	U		200
PCB-156/157	0.00003	NotFnd	<160	160	U		400
PCB-169	0.03	NotFnd	<110	110	U		200
PCB-189	0.00003	NotFnd	<38	38	U		200
Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**			
13C12-PCB-001	16000	8.94	21	5-145			
13C12-PCB-003	16000	10.49	54	5-145	R		
13C12-PCB-004	16000	10.63	19	5-145	R		
13C12-PCB-015	16000	14.32	31	5-145			
13C12-PCB-019	16000	12.62	22	5-145			
13C12-PCB-037	16000	18.29	52	5-145			
13C12-PCB-054	16000	14.49	29	5-145			
13C12-PCB-081	16000	21.85	44	10-145			
13C12-PCB-077	16000	22.15	44	10-145			
13C12-PCB-104	16000	17.54	26	10-145			
13C12-PCB-123	16000	23.13	42	10-145			
13C12-PCB-118	16000	23.30	54	10-145			
13C12-PCB-114	16000	23.60	56	10-145			
13C12-PCB-105	16000	23.97	40	10-145			
13C12-PCB-126	16000	25.56	52	10-145			
13C12-PCB-155	16000	20.55	35	10-145			
13C12-PCB-167	16000	26.46	46	10-145			
13C12-PCB-156/157	32000	27.08	46	10-145			
13C12-PCB-169	16000	28.75	57	10-145	R		
13C12-PCB-188	16000	23.54	35	10-145			
13C12-PCB-189	16000	30.02	102	10-145			
13C12-PCB-202	16000	26.31	37	10-145			
13C12-PCB-205	16000	31.43	151	10-145			
13C12-PCB-208	16000	29.74	31	10-145			
13C12-PCB-206	16000	32.49	34	10-145			
13C12-PCB-209	16000	33.62	68	10-145			
Field Spike Standards							
13C12-PCB-031	14000	15.85	102	70-130			
13C12-PCB-095	14000	19.15	59	70-130			
13C12-PCB-153	14000	24.23	68	70-130	R		
Cleanup Standards							
13C12-PCB-028	21400	16.03	64	5-145	R		
13C12-PCB-111	21400	22.07	71	10-145	R		
13C12-PCB-178	21400	25.13	INT	10-145			

Homologue Group Totals				
Total DiCB	8220	270	J	1600
Total TriCB	1780	160	J	1600
Total TetraCB	21700	98	J	3200
Total PentaCB	24500	110	J	3200
Total HexaCB	3560	91	J	3200
Total HeptaCB	<38	38	U	1600
Total OctaCB	<19	19	U	1600
Total NonaCB	<91	91	U	800
DecaCB	<41	41	U	800
Total PCB	81000		J	6400

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.00
Mid Point PCB TEQ	12.8
Upper Bound PCB TEQ	25.5

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
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.
INT	Interference
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	**21-22114-SVOC-(11 THRU 15) TEST#3**	Sampling Date	16-Sep-21		Approved:
ALS Sample ID	L2641450-3	Extraction Date	13-Oct-21		*N Ashtari*
Analysis Method	EPA 1668C	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		23-Nov-2021
Sample Matrix	Stack	Split Ratio	8		

Run Information	**Run 1**
Filename	5_211119A20
Run Date	20-Nov-21 06:15
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOCTYL256001-02

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	NotFnd	<150	150	U		200
PCB-077	0.0001	NotFnd	<140	140	U		200
PCB-123	0.00003	NotFnd	<140	140	U		200
PCB-118	0.00003	23.31	1880	130			200
PCB-114	0.00003	NotFnd	<100	100	U		200
PCB-105	0.00003	23.98	<530	170	R	530	200
PCB-126	0.1	NotFnd	<100	100	U		200
PCB-167	0.00003	NotFnd	<140	140	U		200
PCB-156/157	0.00003	NotFnd	<220	220	U		400
PCB-169	0.03	NotFnd	<120	120	U		200
PCB-189	0.00003	NotFnd	<31	31	U		200
Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**			
13C12-PCB-001	16000	8.94	28	5-145			
13C12-PCB-003	16000	10.48	57	5-145	R		
13C12-PCB-004	16000	10.63	24	5-145	R		
13C12-PCB-015	16000	14.31	41	5-145	R		
13C12-PCB-019	16000	12.62	28	5-145			
13C12-PCB-037	16000	18.27	47	5-145			
13C12-PCB-054	16000	14.47	27	5-145	R		
13C12-PCB-081	16000	21.85	40	10-145			
13C12-PCB-077	16000	22.15	41	10-145			
13C12-PCB-104	16000	17.54	23	10-145			
13C12-PCB-123	16000	23.13	40	10-145			
13C12-PCB-118	16000	23.30	41	10-145			
13C12-PCB-114	16000	23.60	50	10-145			
13C12-PCB-105	16000	23.94	34	10-145			
13C12-PCB-126	16000	25.55	57	10-145			
13C12-PCB-155	16000	20.54	29	10-145			
13C12-PCB-167	16000	26.44	54	10-145			
13C12-PCB-156/157	32000	27.08	47	10-145			
13C12-PCB-169	16000	28.75	74	10-145			
13C12-PCB-188	16000	23.53	36	10-145			
13C12-PCB-189	16000	30.01	121	10-145			
13C12-PCB-202	16000	26.31	53	10-145			
13C12-PCB-205	16000	31.43	191	10-145			
13C12-PCB-208	16000	29.73	31	10-145			
13C12-PCB-206	16000	32.49	44	10-145	R		
13C12-PCB-209	16000	33.60	59	10-145			
Field Spike Standards							
13C12-PCB-031	14000	15.84	122	70-130	R		
13C12-PCB-095	14000	19.15	84	70-130			
13C12-PCB-153	14000	24.23	93	70-130			
Cleanup Standards							
13C12-PCB-028	21400	16.02	71	5-145			
13C12-PCB-111	21400	22.07	64	10-145			
13C12-PCB-178	21400	25.13	INT	10-145			

Homologue Group Totals				
Total DiCB	5300	310	J	1600
Total TriCB	2940	110	J	1600
Total TetraCB	15200	84	J	3200
Total PentaCB	18600	70	J	3200
Total HexaCB	3370	120	J	3200
Total HeptaCB	<31	31	U	1600
Total OctaCB	<12	12	U	1600
Total NonaCB	<70	70	U	800
DecaCB	251	35	J	800
Total PCB	59900		J	6400

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.0564
Mid Point PCB TEQ	6.91
Upper Bound PCB TEQ	13.8

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.
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.
INT	Interference
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**21-22114-SVOC-(16 THRU 20) BLANK**	Sampling Date	16-Sep-21		Approved:
ALS Sample ID	L2641450-4	Extraction Date	13-Oct-21		*N Ashtari*
Analysis Method	EPA 1668C	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		23-Nov-2021
Sample Matrix	Stack	Split Ratio	8		

Run Information	**Run 1**
Filename	5_211119A21
Run Date	20-Nov-21 06:57
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOCTYL256001-02

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	NotFnd	<77	77	U		200
PCB-077	0.0001	NotFnd	<80	80	U		200
PCB-123	0.00003	NotFnd	<100	100	U		200
PCB-118	0.00003	NotFnd	<130	130	U		200
PCB-114	0.00003	NotFnd	<79	79	U		200
PCB-105	0.00003	NotFnd	<92	92	U		200
PCB-126	0.1	NotFnd	<90	90	U		200
PCB-167	0.00003	NotFnd	<49	49	U		200
PCB-156/157	0.00003	NotFnd	<65	65	U		400
PCB-169	0.03	NotFnd	<42	42	U		200
PCB-189	0.00003	NotFnd	<34	34	U		200
Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**			
13C12-PCB-001	16000	8.94	30	5-145			
13C12-PCB-003	16000	10.48	29	5-145			
13C12-PCB-004	16000	10.63	32	5-145			
13C12-PCB-015	16000	14.32	42	5-145			
13C12-PCB-019	16000	12.62	29	5-145			
13C12-PCB-037	16000	18.28	50	5-145			
13C12-PCB-054	16000	14.49	26	5-145			
13C12-PCB-081	16000	21.85	54	10-145			
13C12-PCB-077	16000	22.16	54	10-145			
13C12-PCB-104	16000	17.54	25	10-145			
13C12-PCB-123	16000	23.15	62	10-145	R		
13C12-PCB-118	16000	23.30	38	10-145			
13C12-PCB-114	16000	23.62	70	10-145			
13C12-PCB-105	16000	23.95	71	10-145			
13C12-PCB-126	16000	25.55	75	10-145			
13C12-PCB-155	16000	20.54	33	10-145	R		
13C12-PCB-167	16000	26.46	62	10-145			
13C12-PCB-156/157	32000	27.08	59	10-145			
13C12-PCB-169	16000	28.75	81	10-145	R		
13C12-PCB-188	16000	23.53	34	10-145			
13C12-PCB-189	16000	30.02	129	10-145			
13C12-PCB-202	16000	26.32	51	10-145			
13C12-PCB-205	16000	31.41	62	10-145			
13C12-PCB-208	16000	29.74	42	10-145	R		
13C12-PCB-206	16000	32.49	54	10-145			
13C12-PCB-209	16000	33.62	89	10-145			
Field Spike Standards							
13C12-PCB-031	14000	15.85	96	70-130			
13C12-PCB-095	14000	19.15	74	70-130	R		
13C12-PCB-153	14000	24.24	81	70-130			
Cleanup Standards							
13C12-PCB-028	21400	16.03	62	5-145			
13C12-PCB-111	21400	22.08	64	10-145			
13C12-PCB-178	21400	25.13	114	10-145			

Homologue Group Totals					
Total DiCB	3720	230	J		1600
Total TriCB	<54	54	U		1600
Total TetraCB	<54	54	U		3200
Total PentaCB	<79	79	U		3200
Total HexaCB	<42	42	U		3200
Total HeptaCB	<34	34	U		1600
Total OctaCB	<39	39	U		1600
Total NonaCB	<45	45	U		800
DecaCB	<24	24	U		800
Total PCB	3720		J		6400

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.00
Mid Point PCB TEQ	5.15
Upper Bound PCB TEQ	10.3

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
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.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Media Blank**	Sampling Date	n/a		
ALS Sample ID	WG3622486-1	Extraction Date	13-Oct-21		
Analysis Method	EPA 1668C	Sample Size	1	Sample	Approved:
Analysis Type	Blank	Percent Moisture	n/a		*N Ashtari*
Sample Matrix	QC	Split Ratio	8		--e-signature--
					23-Nov-2021

Run Information	**Run 1**
Filename	5_211119A16
Run Date	20-Nov-21 03:27
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-5 SPBOCTYL256001-02

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
PCB-081	0.0003	NotFnd	<66	66	U		200
PCB-077	0.0001	NotFnd	<64	64	U		200
PCB-123	0.00003	NotFnd	<110	110	U		200
PCB-118	0.00003	NotFnd	<150	150	U		200
PCB-114	0.00003	NotFnd	<100	100	U		200
PCB-105	0.00003	NotFnd	<110	110	U		200
PCB-126	0.1	NotFnd	<93	93	U		200
PCB-167	0.00003	NotFnd	<85	85	U		200
PCB-156/157	0.00003	NotFnd	<120	120	U		400
PCB-169	0.03	NotFnd	<46	46	U		200
PCB-189	0.00003	NotFnd	<25	25	U		200
Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**			
13C12-PCB-001	16000	8.95	40	5-145			
13C12-PCB-003	16000	10.48	37	5-145			
13C12-PCB-004	16000	10.63	32	5-145			
13C12-PCB-015	16000	14.32	45	5-145	R		
13C12-PCB-019	16000	12.64	29	5-145			
13C12-PCB-037	16000	18.28	55	5-145			
13C12-PCB-054	16000	14.49	27	5-145			
13C12-PCB-081	16000	21.85	60	10-145			
13C12-PCB-077	16000	22.17	66	10-145			
13C12-PCB-104	16000	17.54	31	10-145	R		
13C12-PCB-123	16000	23.15	71	10-145			
13C12-PCB-118	16000	23.31	43	10-145	R		
13C12-PCB-114	16000	23.62	70	10-145			
13C12-PCB-105	16000	23.97	70	10-145			
13C12-PCB-126	16000	25.56	89	10-145	R		
13C12-PCB-155	16000	20.54	36	10-145			
13C12-PCB-167	16000	26.46	49	10-145	R		
13C12-PCB-156/157	32000	27.10	46	10-145			
13C12-PCB-169	16000	28.75	97	10-145	R		
13C12-PCB-188	16000	23.54	40	10-145			
13C12-PCB-189	16000	30.02	166	10-145	R		
13C12-PCB-202	16000	26.32	44	10-145			
13C12-PCB-205	16000	31.41	60	10-145			
13C12-PCB-208	16000	29.74	35	10-145			
13C12-PCB-206	16000	32.49	46	10-145			
13C12-PCB-209	16000	33.62	85	10-145			
Field Spike Standards							
13C12-PCB-031	0		NS				
13C12-PCB-095	0		NS				
13C12-PCB-153	0		NS				
Cleanup Standards							
13C12-PCB-028	21400	16.03	65	5-145			
13C12-PCB-111	21400	22.08	80	10-145			
13C12-PCB-178	21400	25.13	76	10-145			

Homologue Group Totals				
Total DiCB	1100	250	J	1600
Total TriCB	<59	59	U	1600
Total TetraCB	<46	46	U	3200
Total PentaCB	<89	89	U	3200
Total HexaCB	<46	46	U	3200
Total HeptaCB	<25	25	U	1600
Total OctaCB	<47	47	U	1600
Total NonaCB	<77	77	U	800
DecaCB	81.0	23	J	800
Total PCB	1180		J	6400

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.00
Mid Point PCB TEQ	5.36
Upper Bound PCB TEQ	10.7

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
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.
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.
NS	Not Spiked
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	WG3622486-2	Extraction Date	13-Oct-21		Approved:
Analysis Method	EPA 1668C	Sample Size	1	n/a	*N Ashtari*
Analysis Type	LCS	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	1		23-Nov-2021

Run Information	**Run 1**
Filename	5_211122A03
Run Date	22-Nov-21 17:45
Final Volume	25 ul
Dilution Factor	1
Analysis Units	% Rec
Instrument - Column	HRMS-5 SPBOCTYL256001-02

Target Analytes	**pg**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
PCB-001	8000	8.95	100	60-135	
PCB-003	8000	10.49	97	60-135	
PCB-004	8000	10.65	109	60-135	
PCB-015	8000	14.35	113	60-135	
PCB-019	8000	12.65	109	60-135	
PCB-037	8000	18.30	111	60-135	
PCB-054	8000	14.52	111	60-135	
PCB-081	8000	21.88	105	60-135	
PCB-077	8000	22.19	104	60-135	
PCB-104	8000	17.57	98	60-135	
PCB-123	8000	23.17	103	60-135	
PCB-118	8000	23.34	106	60-135	
PCB-114	8000	23.64	105	60-135	
PCB-105	8000	23.99	100	60-135	
PCB-126	8000	25.59	98	60-135	
PCB-155	8000	20.57	105	60-135	
PCB-167	8000	26.48	106	60-135	
PCB-156/157	16000	27.12	105	60-135	
PCB-169	8000	28.79	106	60-135	
PCB-188	8000	23.57	110	60-135	
PCB-189	8000	30.05	108	60-135	
PCB-202	8000	26.35	111	60-135	
PCB-205	8000	31.46	101	60-135	
PCB-208	8000	29.77	92	60-135	
PCB-206	8000	32.53	90	60-135	
PCB-209	8000	33.68	107	60-135	
Extraction Standards		**Time**	**% Rec**	**Limits**	
13C12-PCB-001	16000	8.94	35	15-145	
13C12-PCB-003	16000	10.48	36	15-145	
13C12-PCB-004	16000	10.63	32	15-145	
13C12-PCB-015	16000	14.34	41	15-145	
13C12-PCB-019	16000	12.64	29	15-145	
13C12-PCB-037	16000	18.29	51	15-145	
13C12-PCB-054	16000	14.50	30	15-145	
13C12-PCB-081	16000	21.87	52	40-145	
13C12-PCB-077	16000	22.18	55	40-145	
13C12-PCB-104	16000	17.56	29	40-145	
13C12-PCB-123	16000	23.16	56	40-145	
13C12-PCB-118	16000	23.33	52	40-145	
13C12-PCB-114	16000	23.63	60	40-145	
13C12-PCB-105	16000	23.98	60	40-145	
13C12-PCB-126	16000	25.57	71	40-145	
13C12-PCB-155	16000	20.56	33	40-145	
13C12-PCB-167	16000	26.47	60	40-145	
13C12-PCB-156/157	32000	27.11	60	40-145	
13C12-PCB-169	16000	28.78	73	40-145	
13C12-PCB-188	16000	23.56	43	40-145	
13C12-PCB-189	16000	30.03	71	40-145	
13C12-PCB-202	16000	26.34	49	40-145	
13C12-PCB-205	16000	31.44	58	40-145	
13C12-PCB-208	16000	29.75	55	40-145	
13C12-PCB-206	16000	32.52	54	40-145	
13C12-PCB-209	16000	33.65	53	40-145	
Field Spike Standards					
13C12-PCB-031	0		NS		
13C12-PCB-095	0		NS		
13C12-PCB-153	0		NS		
Cleanup Standards					
13C12-PCB-028	21400	16.04	56	15-145	
13C12-PCB-111	21400	22.09	67	40-145	
13C12-PCB-178	21400	25.14	76	40-145	

NS Not Spiked

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
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2641450		Mlssissauga, ON L5J 2Y4
Date of Report Revision	26-Nov-21		Canada
Date of Sample Receipt	17-Sep-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors Sarnia

COMMENTS: **CB by LRGC/MS - Isotope dilution**
Organotins by derivatization and GC/FPD.

*** **Revised Report** ***
This report supersedes all prior reports for the above-noted workorder and test. The report has been revised as follows:
The analyte target list has been amended.

*** **Original Report Comments** ***
Organotin analyses was performed at the ALS Kelso Washington lab from a separate portion of the raw extract.

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

Results in this certificate relate only to the samples as submitted to the laboratory.
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ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Media Blank		21-22114-SVOC-(1 THRU 5) TEST#1		21-22114-SVOC-(6 THRU 10) TEST#2		21-22114-SVOC-(11 THRU 15) TEST#3		21-22114-SVOC-(16 THRU 20) BLANK	
ALS Sample ID	WG3622486-1		L2641450-1		L2641450-2		L2641450-3		L2641450-4	
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		14-Sep-21		15-Sep-21		16-Sep-21		16-Sep-21	
Extraction Date	28-Sep-21		28-Sep-21		28-Sep-21		28-Sep-21		28-Sep-21	
Target Analytes	**ng/sample**		**ng/sample**		**ng/sample**		**ng/sample**		**ng/sample**	
1,3-Dichlorobenzene	<16	U	1710		2000		1850		<16	U
1,4-Dichlorobenzene	<16	U	1120		999		1220		33.8	
1,2-Dichlorobenzene	<16	U	4540		3510		3200		<16	U
1,3,5-Trichlorobenzene	<16	U	227		310		263		<16	U
1,2,4-Trichlorobenzene	<16	U	911		1000		1050		<16	U
1,2,3-Trichlorobenzene	<16	U	920	M	592	M,R	577	M,R	<16	U
1,2,3,5/1,2,4,5-Tetrachlorobenzene	<16	U	473		613		724		<16	U
1,2,3,4-Tetrachlorobenzene	<16	U	171		203		222		<16	U
Pentachlorobenzene	<16	U	56.2		50.2		78.8		<16	U
Hexachlorobenzene	<16	U	<16	U	<16	U	<16	U	<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
Hexachlorobutadiene	<16	U	1600	M	1810	M	<16	U	<16	U
Tributyltin	<300	U	<300	U	<300	U	<300	U	<300	U
Field Sampling Standards	**%Rec**		**%Rec**		**%Rec**		**%Rec**		**%Rec**	
1-Bromo-2,3-Dichlorobenzene	NS		87		91		102		NS	
Extraction Standards	**%Rec**		**%Rec**		**%Rec**		**%Rec**		**%Rec**	
13C6-Chlorobenzene	13		9		20		18		10	
13C6-1,4-Dichlorobenzene	50		33		71		50		35	
13C6-1,2,3-Trichlorobenzene	61		40		65		86		41	
13C6-1,2,3,4-Tetrachlorobenzene	51		15		12		15		17	
13C6-Pentachlorobenzene	116		34		38		34		37	
13C6-Hexachlorobenzene	104		32		35		30		33	

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.

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Laboratory Control Sample (40 ng)	Laboratory Control Sample (20ng)	
ALS Sample ID	WG3622486-2	WG3622486-5	
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	28-Sep-21	28-Sep-21	
Target Analytes	**% Recovery**	**% Recovery**	
1,3-Dichlorobenzene	88	86	
1,4-Dichlorobenzene	148	129	
1,2-Dichlorobenzene	104	93	
1,3,5-Trichlorobenzene	76	102	M
1,2,4-Trichlorobenzene	88	101	M
1,2,3-Trichlorobenzene	84	119	
1,2,3,5/1,2,4,5-Tetrachlorobenzene	133	113	R
1,2,3,4-Tetrachlorobenzene	96	132	
Pentachlorobenzene	120	79	M
Hexachlorobenzene	132	94	M
Hexachloroethane	NS	NS	
a,2,6-Trichlorotoluene	NS	NS	
Hexachlorobutadiene	NS	NS	
Field Sampling Standards	**%Rec**	**%Rec**	
1-Bromo-2,3-Dichlorobenzene	NS	NS	
Extraction Standards	**%Rec**	**%Rec**	
13C6-Chlorobenzene	23	18	
13C6-1,4-Dichlorobenzene	68	55	
13C6-1,2,3-Trichlorobenzene	103	62	
13C6-1,2,3,4-Tetrachlorobenzene	64	44	
13C6-Pentachlorobenzene	128	131	
13C6-Hexachlorobenzene	129	127	

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.

ALS Life Sciences

Sample Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a
ALS Sample ID	WG3622486-1	Extraction Date	28-Sep-21
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--
17-Nov-2021

Run Information	**Run 1**
Filename	21102710.D
Run Date	10/27/2021 17:45
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-2
Column	HP-5MS US1315321H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
1,3-Dichlorobenzene	NotFnd	<16	U
1,4-Dichlorobenzene	NotFnd	<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
Hexachlorobutadiene	NotFnd	<16	U

Field Sampling Standards	**ng spiked**		**%Rec**	
1-Bromo-2,3-Dichlorobenzene			NS	
Extraction Standards			**%Rec**	
13C6-Chlorobenzene	400	4.46	13	
13C6-1,4-Dichlorobenzene	400	6.75	50	R
13C6-1,2,3-Trichlorobenzene	400	9.17	61	
13C6-1,2,3,4-Tetrachlorobenzene	400	10.91	51	
13C6-Pentachlorobenzene	400	12.24	116	
13C6-Hexachlorobenzene	400	13.87	104	

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

ALS Life Sciences

Sample Analysis Report

Sample Name	**21-22114-SVOC-(1 THRU 5) TEST#1**	Sampling Date	14-Sep-21
ALS Sample ID	L2641450-1	Extraction Date	28-Sep-21
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--
17-Nov-2021

Run Information	**Run 1**
Filename	21102713.D
Run Date	10/27/2021 18:48
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-2
Column	HP-5MS US1315321H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
1,3-Dichlorobenzene	6.66	1710	
1,4-Dichlorobenzene	6.74	1120	
1,2-Dichlorobenzene	7.04	4540	
1,3,5-Trichlorobenzene	8.23	227	
1,2,4-Trichlorobenzene	8.75	911	
1,2,3-Trichlorobenzene	8.75	920	M
1,2,3,5/1,2,4,5-Tetrachlorobenzen	10.38	473	
1,2,3,4-Tetrachlorobenzene	10.89	171	
Pentachlorobenzene	12.23	56.2	
Hexachlorobenzene	13.88	<16	U
Hexachloroethane	NotFnd	<16	U
a,2,6-Trichlorotoluene	NotFnd	<16	U
Hexachlorobutadiene	8.38	1600	M

Field Sampling Standards	**ng spiked**		**%Rec**	
1-Bromo-2,3-Dichlorobenzene	400	9.79	87	M

Extraction Standards			**%Rec**
13C6-Chlorobenzene	400	4.48	9
13C6-1,4-Dichlorobenzene	400	6.74	33
13C6-1,2,3-Trichlorobenzene	400	9.16	40
13C6-1,2,3,4-Tetrachlorobenzene	400	10.89	15
13C6-Pentachlorobenzene	400	12.23	34
13C6-Hexachlorobenzene	400	13.87	32

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	**21-22114-SVOC-(6 THRU 10) TEST#2**	Sampling Date	15-Sep-21
ALS Sample ID	L2641450-2	Extraction Date	28-Sep-21
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--
17-Nov-2021

Run Information	**Run 1**
Filename	21102714.D
Run Date	10/27/2021 19:08
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-2
Column	HP-5MS US1315321H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
1,3-Dichlorobenzene	6.66	2000	
1,4-Dichlorobenzene	6.74	999	
1,2-Dichlorobenzene	7.04	3510	
1,3,5-Trichlorobenzene	8.23	310	
1,2,4-Trichlorobenzene	8.75	1000	
1,2,3-Trichlorobenzene	9.16	592 M	R
1,2,3,5/1,2,4,5-Tetrachlorobenzen	10.39	613	
1,2,3,4-Tetrachlorobenzene	10.89	203	
Pentachlorobenzene	12.23	50.2	
Hexachlorobenzene	13.87	<16	U
Hexachloroethane	NotFnd	<16	U
a,2,6-Trichlorotoluene	NotFnd	<16	U
Hexachlorobutadiene	8.38	1810 M	

Field Sampling Standards	**ng spiked**		**%Rec**	
1-Bromo-2,3-Dichlorobenzene	400	9.79	91 M	

Extraction Standards			**%Rec**	
13C6-Chlorobenzene	400	4.48	20	
13C6-1,4-Dichlorobenzene	400	6.74	71	
13C6-1,2,3-Trichlorobenzene	400	9.16	85	
13C6-1,2,3,4-Tetrachlorobenzene	400	10.89	12	R
13C6-Pentachlorobenzene	400	12.23	38	
13C6-Hexachlorobenzene	400	13.87	35	

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	**21-22114-SVOC-(11 THRU 15) TEST#3**	Sampling Date	16-Sep-21
ALS Sample ID	L2641450-3	Extraction Date	28-Sep-21
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--
17-Nov-2021

Run Information	**Run 1**
Filename	21102715.D
Run Date	10/27/2021 19:29
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-2
Column	HP-5MS US1315321H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
1,3-Dichlorobenzene	6.66	1850	
1,4-Dichlorobenzene	6.75	1220	
1,2-Dichlorobenzene	7.04	3200	
1,3,5-Trichlorobenzene	8.23	263	
1,2,4-Trichlorobenzene	8.75	1050	
1,2,3-Trichlorobenzene	9.16	577 M	R
1,2,3,5/1,2,4,5-Tetrachlorobenzen	10.39	724	
1,2,3,4-Tetrachlorobenzene	10.90	222	
Pentachlorobenzene	12.24	78.8	
Hexachlorobenzene	13.87	<16	U
Hexachloroethane	NotFnd	<16	U
a,2,6-Trichlorotoluene	NotFnd	<16	U
Hexachlorobutadiene	NotFnd	<16	U

Field Sampling Standards	**ng spiked**		**%Rec**	
1-Bromo-2,3-Dichlorobenzene	400	9.79	102 M	

Extraction Standards			**%Rec**	
13C6-Chlorobenzene	400	4.48	18	
13C6-1,4-Dichlorobenzene	400	6.75	50	
13C6-1,2,3-Trichlorobenzene	400	9.16	86	R
13C6-1,2,3,4-Tetrachlorobenzene	400	10.89	15	
13C6-Pentachlorobenzene	400	12.23	34	
13C6-Hexachlorobenzene	400	13.87	30	

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	**21-22114-SVOC-(16 THRU 20) BLANK**	Sampling Date	16-Sep-21
ALS Sample ID	L2641450-4	Extraction Date	28-Sep-21
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--
17-Nov-2021

Run Information	**Run 1**
Filename	21102712.D
Run Date	10/27/2021 18:27
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-2
Column	HP-5MS US1315321H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
1,3-Dichlorobenzene	NotFnd	<16	U
1,4-Dichlorobenzene	6.75	33.8	
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
Hexachlorobutadiene	NotFnd	<16	U

Field Sampling Standards	**ng spiked**		**%Rec**	
1-Bromo-2,3-Dichlorobenzene			NS	
Extraction Standards			**%Rec**	
13C6-Chlorobenzene	400	4.45	10	
13C6-1,4-Dichlorobenzene	400	6.75	35	R
13C6-1,2,3-Trichlorobenzene	400	9.16	41	
13C6-1,2,3,4-Tetrachlorobenzene	400	10.91	17	
13C6-Pentachlorobenzene	400	12.24	37	
13C6-Hexachlorobenzene	400	13.87	33	

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
NS	Indicates that this compound was not spiked in.

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a
ALS Sample ID	WG3622486-2	Extraction Date	28-Sep-21
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--
17-Nov-2021

Run Information	**Run 1**
Filename	21102709.D
Run Date	10/27/2021 17:24
Final Volume	1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-2
Column	HP-5MS US1315321H

Target Analytes	**ng spiked**	**Ret. Time**	**% Recovery**	**Flags**
1,3-Dichlorobenzene	40	6.68	88	
1,4-Dichlorobenzene	40	6.76	148	
1,2-Dichlorobenzene	40	7.05	104	
1,3,5-Trichlorobenzene	40	8.23	76	
1,2,4-Trichlorobenzene	40	8.77	88	
1,2,3-Trichlorobenzene	40	9.17	84	
1,2,3,5/1,2,4,5-Tetrachlorobenzen	80	10.40	133	
1,2,3,4-Tetrachlorobenzene	40	10.91	96	
Pentachlorobenzene	40	12.24	120	
Hexachlorobenzene	40	13.87	132	
Hexachloroethane	0			
a,2,6-Trichlorotoluene	0			
Hexachlorobutadiene	0			
Field Sampling Standards	**ng spiked**		**%Rec**	
1-Bromo-2,3-Dichlorobenzene			NS	
Extraction Standards			**%Rec**	
13C6-Chlorobenzene	400	4.46	23	
13C6-1,4-Dichlorobenzene	400	6.76	68	
13C6-1,2,3-Trichlorobenzene	400	9.16	103	
13C6-1,2,3,4-Tetrachlorobenzene	400	10.91	64	
13C6-Pentachlorobenzene	400	12.24	128	M
13C6-Hexachlorobenzene	400	13.87	129	

M	Indicates that a peak has been manually integrated.
NS	Indicates that this compound was not spiked in

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a
ALS Sample ID	WG3622486-5	Extraction Date	28-Sep-21
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--
17-Nov-2021

Run Information	**Run 1**
Filename	21102708.D
Run Date	10/27/2021 17:04
Final Volume	1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-2
Column	HP-5MS US1315321H

Target Analytes	**ng spiked**	**Ret. Time**	**% Recovery**	**Flags**
1,3-Dichlorobenzene	20	6.66	86	
1,4-Dichlorobenzene	20	6.75	129	
1,2-Dichlorobenzene	20	7.04	93	
1,3,5-Trichlorobenzene	20	8.23	102	M
1,2,4-Trichlorobenzene	20	8.76	101	M
1,2,3-Trichlorobenzene	20	9.18	119	
1,2,3,5/1,2,4,5-Tetrachlorobenzen	40	10.41	113	R
1,2,3,4-Tetrachlorobenzene	20	10.91	132	
Pentachlorobenzene	20	12.25	79	M
Hexachlorobenzene	20	13.86	94	M
Hexachloroethane	0			
a,2,6-Trichlorotoluene	0			
Hexachlorobutadiene	0			

Field Sampling Standards	**ng spiked**	**%Rec**
1-Bromo-2,3-Dichlorobenzene		NS

Extraction Standards			**%Rec**
13C6-Chlorobenzene	400	4.46	18
13C6-1,4-Dichlorobenzene	400	6.75	55
13C6-1,2,3-Trichlorobenzene	400	9.17	62
13C6-1,2,3,4-Tetrachlorobenzene	400	10.91	44
13C6-Pentachlorobenzene	400	12.24	131
13C6-Hexachlorobenzene	400	13.87	127

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.

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
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2641450		Mlssissauga, ON L5J 2Y4
Date of Report Revision	26-Nov-21		Canada
Date of Sample Receipt	17-Sep-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors Sarnia

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

*** **Revised Report** ***

This report supersedes all prior reports for the above-noted workorder and test. The report has been revised as follows:
The analyte target list has been amended.

Certified by:

Ron McLeod, PhD
Laboratory Manager and Technical Director

Results in this certificate relate only to the samples as submitted to the laboratory.
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ALS Environmental

Sample Analysis Summary Report

Sample Name	Media Blank		21-22114-SVOC- (1 THRU 5) TEST#1		21-22114-SVOC- (6 THRU 10) TEST#2		21-22114-SVOC- (11 THRU 15) TEST#3		21-22114-SVOC- (16 THRU 20) BLANK	
ALS Sample ID	WG3622486-1		L2641450-1		L2641450-2		L2641450-3		L2641450-4	
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		14-Sep-21		15-Sep-21		16-Sep-21		16-Sep-21	
Extraction Date	28-Sep-21		28-Sep-21		28-Sep-21		28-Sep-21		28-Sep-21	
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**	
13C6-4-Chlorophenol (ES)	66		47		62		28		21	
13C6-2,4-Dichlorophenol (ES)	82		25		66		49		24	
13C6-2,4,5-Trichlorophenol (ES)	95		38		60		65		38	
13C6-2,3,4,5-Tetrachlorophenol (ES)	54		61		61		72		64	
13C6-Pentachlorophenol (ES)	48		49		57		71		61	

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

ALS Environmental

Sample Analysis Summary Report

Sample Name	Laboratory Control Sample (1600ng)		Laboratory Control Sample (80 ng)	
ALS Sample ID	WG3622486-2		WG3622486-5	
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	28-Sep-21		28-Sep-21	
Target Analytes	**% Recovery**		**% Recovery**	
2,6-Dichlorophenol	84		83	M
2,4/2,5-Dichlorophenol	112		96	M
3,5-Dichlorophenol				
2,3-Dichlorophenol				
3,4-Dichlorophenol				
2,4,6-Trichlorophenol	75	M	93	M
2,3,6-Trichlorophenol				
2,3,5-Trichlorophenol				
2,4,5-Trichlorophenol	127		88	M
2,3,4-Trichlorophenol				
3,4,5-Trichlorophenol				
2,3,5,6/2,3,4,6-Tetrachlorophenol	78	M	87	M
2,3,4,5-Tetrachlorophenol	109		116	M
Pentachlorophenol	101		97	M
Hexachlorophene				
Extraction Standards	**% Rec**		**% Rec**	
13C6-4-Chlorophenol (ES)	114		70	
13C6-2,4-Dichlorophenol (ES)	94		56	
13C6-2,4,5-Trichlorophenol (ES)	120		83	
13C6-2,3,4,5-Tetrachlorophenol (ES)	82		75	
13C6-Pentachlorophenol (ES)	91		79	

M Indicates that a peak has been manually integrated.

ALS Environmental

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a
ALS Sample ID	WG3622486-1	Extraction Date	28-Sep-21
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--
03-Nov-2021

Run Information	**Run 1**
Filename	21102910.D
Run Date	10/29/2021 11:35
Final Volume	1 mL
Dilution Factor	1
Analysis Units	ng/sample
Instrument	MSD-2
Column	HP5MS US0411816H

Target Analytes	**Ret. Time**	**Concentration ng/sample**	**Flags**
2,6-Dichlorophenol	NotFnd	<80	U
2,4/2,5-Dichlorophenol	NotFnd	<80	U
3,5-Dichlorophenol	NotFnd	<80	U
2,3-Dichlorophenol	NotFnd	<80	U
3,4-Dichlorophenol	NotFnd	<80	U
2,4,6-Trichlorophenol	NotFnd	<80	U
2,3,6-Trichlorophenol	NotFnd	<80	U
2,3,5-Trichlorophenol	NotFnd	<80	U
2,4,5-Trichlorophenol	NotFnd	<80	U
2,3,4-Trichlorophenol	NotFnd	<80	U
3,4,5-Trichlorophenol	NotFnd	<80	U
2,3,5,6/2,3,4,6-Tetrachlorophenol	NotFnd	<80	U
2,3,4,5-Tetrachlorophenol	NotFnd	<80	U
Pentachlorophenol	NotFnd	<80	U
Hexachlorophene	NotFnd	<80	U

Extraction Standards			**% Rec**	
13C6-4-Chlorophenol (ES)	1600	8.36	66	20-150
13C6-2,4-Dichlorophenol (ES)	1600	9.53	82	20-150
13C6-2,4,5-Trichlorophenol (ES)	1600	10.99	95	20-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.60	54	20-150
13C6-Pentachlorophenol (ES)	1600	13.57	48	20-150

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

ALS Environmental

Sample Analysis Report

Sample Name	**21-22114-SVOC-(1 THRU 5) TEST#1**	Sampling Date	14-Sep-21
ALS Sample ID	L2641450-1	Extraction Date	28-Sep-21
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--
03-Nov-2021

Run Information	**Run 1**
Filename	21102913.D
Run Date	10/29/2021 13:03
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**	
13C6-4-Chlorophenol (ES)	1600	8.36	47	20-150
13C6-2,4-Dichlorophenol (ES)	1600	9.53	25	20-150
13C6-2,4,5-Trichlorophenol (ES)	1600	11.00	38	20-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.60	61	20-150
13C6-Pentachlorophenol (ES)	1600	13.57	49	20-150

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

ALS Environmental

Sample Analysis Report

Sample Name	**21-22114-SVOC-(6 THRU 10) TEST#2**	Sampling Date	15-Sep-21
ALS Sample ID	L2641450-2	Extraction Date	28-Sep-21
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--
03-Nov-2021

Run Information	**Run 1**
Filename	21102914.D
Run Date	10/29/2021 13:29
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**	
13C6-4-Chlorophenol (ES)	1600	8.36	62	20-150
13C6-2,4-Dichlorophenol (ES)	1600	9.53	66	20-150
13C6-2,4,5-Trichlorophenol (ES)	1600	11.00	60	20-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.60	61 M	20-150
13C6-Pentachlorophenol (ES)	1600	13.57	57	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	**21-22114-SVOC-(11 THRU 15) TEST#3**	Sampling Date	16-Sep-21
ALS Sample ID	L2641450-3	Extraction Date	28-Sep-21
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--
03-Nov-2021

Run Information	**Run 1**
Filename	21102915.D
Run Date	10/29/2021 13:55
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**	
13C6-4-Chlorophenol (ES)	1600	8.37	28	20-150
13C6-2,4-Dichlorophenol (ES)	1600	9.53	49	20-150
13C6-2,4,5-Trichlorophenol (ES)	1600	10.99	65	20-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.60	72	20-150
13C6-Pentachlorophenol (ES)	1600	13.57	71	20-150

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

ALS Environmental

Sample Analysis Report

Sample Name	**21-22114-SVOC-(16 THRU 20) BLANK**	Sampling Date	16-Sep-21
ALS Sample ID	L2641450-4	Extraction Date	28-Sep-21
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--
03-Nov-2021

Run Information	**Run 1**
Filename	21102912.D
Run Date	10/29/2021 12:36
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**	
13C6-4-Chlorophenol (ES)	1600	8.37	21	20-150
13C6-2,4-Dichlorophenol (ES)	1600	9.53	24	20-150
13C6-2,4,5-Trichlorophenol (ES)	1600	10.99	38	20-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.60	64	20-150
13C6-Pentachlorophenol (ES)	1600	13.57	61	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**	Sampling Date	n/a
ALS Sample ID	WG3622486-2	Extraction Date	28-Sep-21
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--
03-Nov-2021

Run Information	**Run 1**
Filename	21102908.D
Run Date	10/29/2021 10:31
Final Volume	1 mL
Dilution Factor	1
Analysis Units	n/a
Instrument	MSD-2
Column	HP5MS US0411816H

Target Analytes	**ng spiked**	**Ret. Time**	**% Recovery**	**Flags**	
2,6-Dichlorophenol	1600	9.33	84		10-110
2,4/2,5-Dichlorophenol	1600	9.53	112		35-98
3,5-Dichlorophenol					
2,3-Dichlorophenol					
3,4-Dichlorophenol					
2,4,6-Trichlorophenol	1600	10.45	75	M	10-102
2,3,6-Trichlorophenol					
2,3,5-Trichlorophenol					
2,4,5-Trichlorophenol	1600	10.99	127		45-95
2,3,4-Trichlorophenol					
3,4,5-Trichlorophenol					
2,3,5,6/2,3,4,6-Tetrachlorophenol	3200	12.06	78	M	30-109
2,3,4,5-Tetrachlorophenol	1600	12.60	109		44-103
Pentachlorophenol	1600	13.57	101		32-121
Hexachlorophene					
Extraction Standards			**% Rec**		
13C6-4-Chlorophenol (ES)	1600	8.36	114		50-150
13C6-2,4-Dichlorophenol (ES)	1600	9.53	94		50-150
13C6-2,4,5-Trichlorophenol (ES)	1600	10.99	120		50-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.60	82		50-150
13C6-Pentachlorophenol (ES)	1600	13.57	91		50-150

M Indicates that a peak has been manually integrated.

ALS Environmental

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a
ALS Sample ID	WG3622486-5	Extraction Date	28-Sep-21
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--
03-Nov-2021

Run Information	**Run 1**
Filename	21102907.D
Run Date	10/29/2021 10:09
Final Volume	1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-2
Column	HP5MS US0411816H

Target Analytes	**ng spiked**	**Ret. Time**	**% Recovery**	**Flags**	
2,6-Dichlorophenol	80	9.32	83	M	10-110
2,4/2,5-Dichlorophenol	80	9.52	96	M	35-98
3,5-Dichlorophenol					
2,3-Dichlorophenol					
3,4-Dichlorophenol					
2,4,6-Trichlorophenol	80	10.45	93	M	10-102
2,3,6-Trichlorophenol					
2,3,5-Trichlorophenol					
2,4,5-Trichlorophenol	80	10.99	88	M	45-95
2,3,4-Trichlorophenol					
3,4,5-Trichlorophenol					
2,3,5,6/2,3,4,6-Tetrachlorophenol	160	12.06	87	M	30-109
2,3,4,5-Tetrachlorophenol	80	12.60	116	M	44-103
Pentachlorophenol	80	13.57	97	M	32-121
Hexachlorophene					
Extraction Standards			**% Rec**		
13C6-4-Chlorophenol (ES)	1600	8.36	70		50-150
13C6-2,4-Dichlorophenol (ES)	1600	9.53	56		50-150
13C6-2,4,5-Trichlorophenol (ES)	1600	10.99	83		50-150
13C6-2,3,4,5-Tetrachlorophenol (E	1600	12.60	75		50-150
13C6-Pentachlorophenol (ES)	1600	13.57	79		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
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road Mississauga, ON, L5J 2Y4 Canada
ALS WO#:	L2641450		
Date of Report Revision	29-Nov-21		
Date of Sample Receipt	17-Sep-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors Sarnia

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

*** **Revised Report** ***
This report supersedes all prior reports for the above-noted workorder and test. The report has been revised as follows:
The analyte target list has been amended.

Certified by: _____
Ron McLeod, PhD
Director, Air Toxics and Special Chemistries, Life Sciences

Results in this certificate relate only to the samples as submitted to the laboratory.
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ALS Life Sciences

Sample Analysis summary Report

Sample Name	21-22114-SVOC-(1 THRU 5) TEST#1	21-22114-SVOC-(6 THRU 10) TEST#2	21-22114-SVOC-(11 THRU 15) TEST#3	21-22114-SVOC-(16 THRU 20) BLANK
ALS Sample ID	L2641450-1	L2641450-2	L2641450-3	L2641450-4
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	14-Sep-21	15-Sep-21	16-Sep-21	16-Sep-21
Extraction Date	28-Sep-21	28-Sep-21	28-Sep-21	28-Sep-21
Target Analytes	**ng**	**ng**	**ng**	**ng**
Heptachlor	<0.26	<0.26	<0.17	<0.22
Octachlorostyrene	1.92	776	2.05	6.58
Heptachlor Epoxide B	<0.33	<0.43	<0.48	<0.32
Heptachlor Epoxide A	<2.2	<2.9	<3.2	<2.1
Oxychlordane	<0.63	<0.65	<0.54	<0.38
trans-Chlordane	<1.8	11.7	<1.7	<1.2
cis-Chlordane	<1.8	<3.4	<1.7	<1.2
Parlar 26	<4.7	<6.5	<5.5	<3.2
Parlar 50	<2.0	<2.6	<3.5	<2.0
Parlar 62	<2.5	<3.3	<4.5	<2.5
Extraction Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**
Pentachlorobenzene, 13C6-	97	86	85	94
Heptachlor, 13C10-	39	33	34	38
Oxychlordane, 13C10-	40	32	33	41
trans-Nonachlor, 13C10-	47	38	40	49
Mirex, 13C10-	47	44	40	57

ALS Life Sciences

Quality Control Summary Report

Sample Name	Method Blank	Laboratory Control Sample
ALS Sample ID	WG3622486-1	WG3622486-2
Sample Size	1	1
Sample size units	sample	sample
Percent Moisture	n/a	n/a
Sample Matrix	QC	QC
Sampling Date	n/a	n/a
Extraction Date	28-Sep-21	28-Sep-21
Target Analytes	**ng**	**% Rec**
Heptachlor	<0.24	90
Octachlorostyrene	3.87	119
Heptachlor Epoxide B	<0.74	94
Heptachlor Epoxide A	<4.9	89
Oxychlordane	<1.2	97
trans-Chlordane	<2.7	94
cis-Chlordane	<2.6	104
Parlar 26	<7.0	71
Parlar 50	<3.4	76
Parlar 62	<4.4	70
Extraction Standards	**% Rec**	**% Rec**
Pentachlorobenzene, 13C6-	93	78
Heptachlor, 13C10-	36	36
Oxychlordane, 13C10-	32	38
trans-Nonachlor, 13C10-	40	41
Mirex, 13C10-	47	45

ALS Life Sciences

Sample Analysis Report

Sample Name	**21-22114-SVOC-(1 THRU 5) TEST#1**	Sampling Date	14-Sep-21		Approved:
ALS Sample ID	L2641450-1	Extraction Date	28-Sep-21		*Ella Gdyczynski*
Analysis Method	EPA 1699 (mod)	Sample Size	1	sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		02-Nov-2021
Sample Matrix	Stack	Split Ratio	6		

Run Information	**Run 1**
Filename	10-211102A08
Run Date	02-Nov-21 13:25
Final Volume	1020 uL
Dilution Factor	1
Analysis Units	ng
Instrument - Column	HRMS-10 HP05MS US1489646H

Target Analytes	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**
Heptachlor	NotFnd	<0.26	0.26	U		16
Octachlorostyrene	20.93	1.92	0.35	M,J,B		16
Heptachlor Epoxide B	NotFnd	<0.33	0.33	U		16
Heptachlor Epoxide A	NotFnd	<2.2	2.2	U		16
Oxychlordane	NotFnd	<0.63	0.63	U		16
trans-Chlordane	NotFnd	<1.8	1.8	U		16
cis-Chlordane	NotFnd	<1.8	1.8	U		16
Parlar 26	NotFnd	<4.7	4.7	U		16
Parlar 50	NotFnd	<2.0	2.0	U		16
Parlar 62	NotFnd	<2.5	2.5	U		16

Extraction Standards	**ng**			
Pentachlorobenzene, 13C6-	400	12.58	97	5-120
Heptachlor, 13C10-	800	18.75	39	5-120
Oxychlordane, 13C10-	800	21.03	40	23-135
trans-Nonachlor, 13C10-	800	22.30	47	14-136
Mirex, 13C10-	400	27.76	47	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.
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

Sample Analysis Report

Sample Name	**21-22114-SVOC-(6 THRU 10) TEST#2**	Sampling Date	15-Sep-21		Approved:
ALS Sample ID	L2641450-2	Extraction Date	28-Sep-21		*Ella Gdyczynski*
Analysis Method	EPA 1699 (mod)	Sample Size	1	sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		02-Nov-2021
Sample Matrix	Stack	Split Ratio	8		

Run Information	**Run 1**
Filename	10-211102A09
Run Date	02-Nov-21 14:04
Final Volume	1020 uL
Dilution Factor	1
Analysis Units	ng
Instrument - Column	HRMS-10 HPOSMS US1489646H

Target Analytes	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**
Heptachlor	18.75	<0.26	0.22	M,J,R	0.26	16
Octachlorostyrene	20.92	776	0.56			16
Heptachlor Epoxide B	NotFnd	<0.43	0.43	U		16
Heptachlor Epoxide A	NotFnd	<2.9	2.9	U		16
Oxychlordane	NotFnd	<0.65	0.65	U		16
trans-Chlordane	21.76	11.7	3.5	M,J		16
cis-Chlordane	NotFnd	<3.4	3.4	U		16
Parlar 26	NotFnd	<6.5	6.5	U		16
Parlar 50	NotFnd	<2.6	2.6	U		16
Parlar 62	NotFnd	<3.3	3.3	U		16

Extraction Standards	**ng**			
Pentachlorobenzene, 13C6-	400	12.56	86	5-120
Heptachlor, 13C10-	800	18.73	33	5-120
Oxychlordane, 13C10-	800	21.02	32	23-135
trans-Nonachlor, 13C10-	800	22.29	38	14-136
Mirex, 13C10-	400	27.75	44	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	**21-22114-SVOC-(11 THRU 15) TEST#3**	Sampling Date	16-Sep-21	
ALS Sample ID	L2641450-3	Extraction Date	26-Sep-21	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	02-Nov-2021

Run Information	**Run 1**
Filename	10-211102A10
Run Date	02-Nov-21 14:44
Final Volume	1020 uL
Dilution Factor	1
Analysis Units	ng
Instrument - Column	HRMS-10 HP05MS US1489646H

Target Analytes	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**
Heptachlor	NotFnd	<0.17	0.17	U		16
Octachlorostyrene	20.93	2.05	0.40	M,J,B		16
Heptachlor Epoxide B	NotFnd	<0.48	0.48	U		16
Heptachlor Epoxide A	NotFnd	<3.2	3.2	U		16
Oxychlordane	NotFnd	<0.54	0.54	U		16
trans-Chlordane	NotFnd	<1.7	1.7	U		16
cis-Chlordane	NotFnd	<1.7	1.7	U		16
Parlar 26	NotFnd	<5.5	5.5	U		16
Parlar 50	NotFnd	<3.5	3.5	U		16
Parlar 62	NotFnd	<4.5	4.5	U		16

Extraction Standards	**ng**			
Pentachlorobenzene, 13C6-	400	12.58	85	5-120
Heptachlor, 13C10-	800	18.75	34	5-120
Oxychlordane, 13C10-	800	21.03	33	23-135
trans-Nonachlor, 13C10-	800	22.30	40	14-136
Mirex, 13C10-	400	27.76	40	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.
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

Sample Analysis Report

Sample Name	**21-22114-SVOC-(16 THRU 20) BLANK**	Sampling Date	16-Sep-21		
ALS Sample ID	L2641450-4	Extraction Date	28-Sep-21		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		02-Nov-2021

Run Information	**Run 1**
Filename	10-211102A07
Run Date	02-Nov-21 12:45
Final Volume	1020 uL
Dilution Factor	1
Analysis Units	ng
Instrument - Column	HRMS-10 HP05MS US1489646H

Target Analytes	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**
Heptachlor	NotFnd	<0.22	0.22	U		16
Octachlorostyrene	20.93	6.58	0.47	J,B		16
Heptachlor Epoxide B	NotFnd	<0.32	0.32	U		16
Heptachlor Epoxide A	NotFnd	<2.1	2.1	U		16
Oxychlordane	NotFnd	<0.38	0.38	U		16
trans-Chlordane	NotFnd	<1.2	1.2	U		16
cis-Chlordane	NotFnd	<1.2	1.2	U		16
Parlar 26	NotFnd	<3.2	3.2	U		16
Parlar 50	NotFnd	<2.0	2.0	U		16
Parlar 62	NotFnd	<2.5	2.5	U		16

Extraction Standards	**ng**			
Pentachlorobenzene, 13C6-	400	12.57	94	5-120
Heptachlor, 13C10-	800	18.74	38	5-120
Oxychlordane, 13C10-	800	21.03	41	23-135
trans-Nonachlor, 13C10-	800	22.30	49	14-136
Mirex, 13C10-	400	27.76	57	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.
J	Indicates that a target analyte was detected below the calibrated range.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a		
ALS Sample ID	WG3622486-1	Extraction Date	28-Sep-21		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		02-Nov-2021

Run Information	**Run 1**
Filename	10-211102A05
Run Date	02-Nov-21 11:27
Final Volume	1020 uL
Dilution Factor	1
Analysis Units	ng
Instrument - Column	HRMS-10 HP05MS US1489646H

Target Analytes	**Ret. Time**	**Conc. ng**	**EDL ng**	**Flags**	**EMPC ng**	**LQL**
Heptachlor	NotFnd	<0.24	0.24	U		16
Octachlorostyrene	20.93	3.87	1.2	M,J		16
Heptachlor Epoxide B	NotFnd	<0.74	0.74	U		16
Heptachlor Epoxide A	NotFnd	<4.9	4.9	U		16
Oxychlordane	NotFnd	<1.2	1.2	U		16
trans-Chlordane	NotFnd	<2.7	2.7	U		16
cis-Chlordane	NotFnd	<2.6	2.6	U		16
Parlar 26	NotFnd	<7.0	7.0	U		16
Parlar 50	NotFnd	<3.4	3.4	U		16
Parlar 62	NotFnd	<4.4	4.4	U		16

Extraction Standards	**ng**			
Pentachlorobenzene, 13C6-	400	12.57	93	5-120
Heptachlor, 13C10-	800	18.74	36	5-120
Oxychlordane, 13C10-	800	21.02	32	23-135
trans-Nonachlor, 13C10-	800	22.29	40	14-136
Mirex, 13C10-	400	27.76	47	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

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a		
ALS Sample ID	WG3622486-2	Extraction Date	28-Sep-21		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		02-Nov-2021

Run Information	**Run 1**
Filename	10-211102A01
Run Date	02-Nov-21 08:49
Final Volume	1020 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-10 HPOSMS US1489646H

Target Analytes	**ng**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
Heptachlor	100	18.76	90	50-120	
Octachlorostyrene	100	20.93	119	50-175	
Heptachlor Epoxide B	100	21.02	94	20-200	
Heptachlor Epoxide A	100	21.15	89	50-120	
Oxychlordane	100	21.05	97	50-120	
trans-Chlordane	100	21.72	94	50-120	
cis-Chlordane	100	22.17	104	50-120	
Parlar 26	100	23.43	71	20-200	
Parlar 50	100	26.00	76	20-200	
Parlar 62	100	27.43	70	20-200	
Extraction Standards	**ng**				
Pentachlorobenzene, 13C6-	400	12.58	78	5-120	
Heptachlor, 13C10-	800	18.75	36	5-128	
Oxychlordane, 13C10-	800	21.03	38	5-144	
trans-Nonachlor, 13C10-	800	22.30	41	13-149	
Mirex, 13C10-	400	27.76	45	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
ALS Project ID:	ORTI100	**Client Address:**	804 Southdown Road
ALS WO#:	L2641450		Mississauga, ON, L5J 2Y4
Date of Report Revision	26-Nov-21		Canada
Date of Sample Receipt	17-Sep-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors Sarnia

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

*** **Revised Report** ***

This report supersedes all prior reports for the above-noted workorder and test. The report has been revised as follows:
The analyte target list has been amended.

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

Results in this certificate relate only to the samples as submitted to the laboratory.
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ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Media Blank		21-22114-SVOC- (1 THRU 5) TEST#1		21-22114-SVOC- (6 THRU 10) TEST#2		21-22114-SVOC- (11 THRU 15) TEST#3		21-22114-SVOC- (16 THRU 20) BLANK	
ALS Sample ID	WG3622486-1		L2641450-1		L2641450-2		L2641450-3		L2641450-4	
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		14-Sep-21		15-Sep-21		16-Sep-21		16-Sep-21	
Extraction Date	28-Sep-21		28-Sep-21		28-Sep-21		28-Sep-21		28-Sep-21	
Target Analytes	**n/sample**		**n/sample**		**n/sample**		**n/sample**		**n/sample**	
Naphthalene	182		10300		8020		10200		384	B
2-Methylnaphthalene	22.2		976		714		1350		34.7	B
1-Methylnaphthalene	<16	U	1570		942		1330		26.9	
Acenaphthylene	<16	U	1300	R	554	R	374	M	<16	U
Acenaphthene	<16	U	91.4	M	52.9	M	147		<16	U
Fluorene	<16	U	125		70.8		103	M	<16	U
Phenanthrene	<16	U	435		237		398		<16	U
Anthracene	<16	U	105		51.0		53.5		<16	U
Fluoranthene	<16	U	95.4		45.8		83.0		<16	U
Pyrene	<16	U	87.4	M	50.8	M	160		<16	U
Benzo(a)Anthracene	<16	U	<16	U	<16	U	<16	U	<16	U
Chrysene/Triphenylene	<16	U	21.6	M	<16	U	<16	U	<16	U
Benzo(b)Fluoranthene	<16	U	23.6		<16	U	<16	U	<16	U
Benzo(k)Fluoranthene	<16	U	<16	U	<16	U	<16	U	<16	U
Benzo(e)Pyrene	<16	U	<16	U	29.8	M	46.1		<16	U
Benzo(a)Pyrene	<16	U	<16	U	<16	U	<16	U	<16	U
Perylene	<16	U	<16	U	<16	U	<16	U	<16	U
Indeno(1,2,3-cd)Pyrene	<16	U	<16	U	<16	U	<16	U	<16	U
Dibenzo(a,c/a,h)Anthracene	<16	U	<16	U	<16	U	<16	U	<16	U
Benzo(g,h,i)Perylene	<16	U	60.4	M	<16	U	68.3		<16	U
Additional Analytes										
Tetralin	68.1		607	B	808		571	B	112	B
Quinoline	<16	U	1830	M,R	1750	R	197	M,R	<16	U
2-Chloronaphthalene	<16	U	85.8		59.0		65.7		<16	U
Biphenyl	25.5	M	4090		3080		3020		50.6	B
o-Terphenyl	<16	U	<16	U	<16	U	<16	U	<16	U
1-Methylphenanthrene	<16	U	<16	U	<16	U	<16	U	<16	U
9-Methylphenanthrene	<16	U	42.0		24.4		39.5		<16	U
2-methylanthracene	<16	U	66.9	R	38.1	M,R	61.2	R	<16	U
9,10-dimethylanthracene	<16	U	<16	U	36.7	R	<16	U	<16	U
m-terphenyl	<16	U	<16	U	<16	U	<16	U	<16	U
p-terphenyl	<16	U	<16	U	<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
7,12-Dimethylbenzo(a)anthracene	<16	U	<16	U	<16	U	<16	U	<16	U
3-Methylcholanthrene	<80	U	563	R	<80	U	<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		70.2	M	72.2	M,R	77.8	M	79.4	
Fluorene D10	NS		89.4		89.0		95.5		98.0	
Terphenyl D14(Surr.)	NS		87.2	M	90.5		99.0		96.7	
Extraction Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
Naphthalene D8	65.5		32.6		70.2		51.9		43.4	M
2-Methylnaphthalene-D10	81.1		45.1		96.8		69.4		51.8	
Acenaphthylene D8	53.1		22.5		49.5		47.0		31.4	
Phenanthrene D10	79.7		46.6		93.7		73.4		52.2	
Anthracene-D10	47.8		17.3		41.0		38.7		23.9	
Fluoranthene D10	74.5		43.9		92.4		71.7	M	49.1	M
Benz(a)Anthracene-D12	40.9		19.1		48.3		38.2		26.2	
Chrysene D12	53.9		28.8		66.1	M	55.1	M	38.7	M
Benzo(b)Fluoranthene-D12	56.5		26.5		58.4	M	51.2		34.8	
Benzo(k)Fluoranthene-D12	36.6		31.3		43.9	M	34.3	M	24.9	M
Benzo(a)Pyrene D12	42.5	M	17.8	M	34.0		35.4		22.2	M
Perylene D12	38.7	M	17.7	M	31.9	M	30.5		19.0	M
Indeno(1,2,3,cd)Pyrene-D12	48.5	M	19.2	M	33.5		34.0		26.4	M
Dibenz(a,h)Anthracene-D14	33.1	M	12.2	M	24.8		26.3	M	16.9	M
Benzo(g,h,i)Perylene D12	51.9	M	23.8	M	50.0	M	43.6	M	31.4	M

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

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Laboratory Control Sample	
ALS Sample ID	WG3622486-2	
Sample Size	1	
Sample units	n/a	
Moisture Content	n/a	
Matrix	QC	
Sampling Date	n/a	
Extraction Date	28-Sep-21	
Target Analytes	**%**	
Naphthalene	147.6	
2-Methylnaphthalene	101.5	
1-Methylnaphthalene	105.2	
Acenaphthylene	93.9	
Acenaphthene	109.1	
Fluorene	94.1	
Phenanthrene	110.2	
Anthracene	113	
Fluoranthene	84.8	
Pyrene	87.7	
Benzo(a)Anthracene	95.6	
Chrysene/Triphenylene	99.9	
Benzo(b)Fluoranthene	76.2	
Benzo(k)Fluoranthene	102.3	
Benzo(e)Pyrene	111	
Benzo(a)Pyrene	92.5	
Perylene	87.6	
Indeno(1,2,3-cd)Pyrene	77.5	
Dibenzo(a,c/a,h)Anthracene	83	M
Benzo(g,h,i)Perylene	81.9	M
Field Sampling Standards	**% Rec**	
1-Methylnaphthalene-D10	NS	
Fluorene D10	NS	
Terphenyl D14(Surr.)	NS	
Extraction Standards	**% Rec**	
Naphthalene D8	80.9	
2-Methylnaphthalene-D10	100.9	
Acenaphthylene D8	66.3	
Phenanthrene D10	93.1	
Anthracene-D10	54.2	
Fluoranthene D10	90.9	
Benz(a)Anthracene-D12	56.2	
Benzo(b)Fluoranthene-D12	78.1	
Benzo(k)Fluoranthene-D12	55.9	
Benzo(a)Pyrene D12	53.9	M
Perylene D12	53.5	
Indeno(1,2,3,cd)Pyrene-D12	58.9	
Dibenz(a,h)Anthracene-D14	52.00	M
Benzo(g,h,i)Perylene D12	75.00	M

M	Indicates that a peak has been manually integrated.
NS	Not Spiked

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Media Blank**	Sampling Date	n/a
ALS Sample ID	WG3622486-1	Extraction Date	28-Sep-21
Analysis Method	PAH by CARB 429		
Analysis Type	blank		
Sample Matrix	QC		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	8	Workgroup	WG3622486

Approved:
Peter Nguyen
--e-signature--
17-Nov-2021

Run Information	**Run 1**
Filename	211104A249.D
Run Date	11/17/2021 8:50
Final Volume	1 mL
Dilution Factor	1
Analysis Units	n/sample
Instrument	MSD-5
Column	HP-5MS US1263126H

Target Analytes	**Ret. Time**	**Concentration n/sample**	**Flags**
Naphthalene	2.79	182	
2-Methylnaphthalene	3.37	22.2	
1-Methylnaphthalene	3.49	<16	U
Acenaphthylene	NotFnd	<16	U
Acenaphthene	NotFnd	<16	U
Fluorene	NotFnd	<16	U
Phenanthrene	7.94	<16	U
Anthracene	NotFnd	<16	U
Fluoranthene	NotFnd	<16	U
Pyrene	11.99	<16	U
Benzo(a)Anthracene	NotFnd	<16	U
Chrysene	NotFnd	<16	U
Benzo(b)Fluoranthene	NotFnd	<16	U
Benzo(k)Fluoranthene	NotFnd	<16	U
Benzo(e)Pyrene	NotFnd	<16	U
Benzo(a)Pyrene	NotFnd	<16	U
Perylene	NotFnd	<16	U
Indeno(1,2,3-cd)Pyrene	NotFnd	<16	U
Dibenzo(a,h)Anthracene	NotFnd	<16	U
Benzo(g,h,i)Perylene	NotFnd	<16	U
Additional Analytes			
Tetralin	2.67	68.1	
Quinoline	NotFnd	<16	U
2-Chloronaphthalene	3.89	<16	U
Biphenyl	3.91	25.5	M
o-Terphenyl	NotFnd	<16	U
1-Methylphenanthrene	NotFnd	<16	U
9-Methylphenanthrene	NotFnd	<16	U
2-methylanthracene	NotFnd	<16	U
9,10-dimethylanthracene	NotFnd	<16	U
m-terphenyl	NotFnd	<16	U
p-terphenyl	NotFnd	<16	U
Benzo(a)fluorene	NotFnd	<16	U
Benzo(b)fluorene	NotFnd	<16	U
7,12-Dimethylbenzo(a)anthracene	NotFnd	<16	U
3-Methylcholanthrene	NotFnd	<80	U
Picene	NotFnd	<80	U
Dibenzo(a,e)pyrene	NotFnd	<80	U
Coronene	NotFnd	<80	U

Field Sampling Standards	**ng spiked**	**% Rec**
1-Methylnaphthalene-D10		NS
Fluorene D10		NS
Terphenyl D14(Surr.)		NS

Extraction Standards			**% Rec**		**Limits**
Naphthalene D8	800	2.77	65.5		50-150
2-Methylnaphthalene-D10	800	3.34	81.1		50-150
Acenaphthylene D8	800	4.50	53.1		50-150
Phenanthrene D10	800	7.89	79.7		50-150
Anthracene-D10	800	8.01	47.8		50-150
Fluoranthene D10	800	11.30	74.5		50-150
Benz(a)Anthracene-D12	800	15.83	40.9		50-150
Chrysene D12	800	15.94	53.9		50-150
Benzo(b)Fluoranthene-D12	800	19.16	56.5		50-150
Benzo(k)Fluoranthene-D12	800	19.24	36.6		50-150
Benzo(a)Pyrene D12	800	20.04	42.5	M	50-150
Perylene D12	800	20.27	38.7	M	50-150
Indeno(1,2,3,cd)Pyrene-D12	800	23.74	48.5	M	50-150
Dibenz(a,h)Anthracene-D14	800	23.91	33.1	M	50-150
Benzo(g,h,i)Perylene D12	800	24.70	51.9	M	50-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
NS	Not Spiked

ALS Life Sciences

Sample Analysis Report

Sample Name	**21-22114-SVOC-(1 THRU 5) TEST#1**	Sampling Date	14-Sep-21
ALS Sample ID	L2641450-1	Extraction Date	28-Sep-21
Analysis Method	PAH by CARB 429		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	8	Workgroup	WG3622486

Approved:
Peter Nguyen
--e-signature--
17-Nov-2021

Run Information	**Run 1**
Filename	211104A251.D
Run Date	11/17/2021 10:06
Final Volume	1 mL
Dilution Factor	1
Analysis Units	n/sample
Instrument	MSD-5
Column	HP-5MS US1263126H

Target Analytes	**Ret. Time**	**Concentration n/sample**	**Flags**
Naphthalene	2.78	10300	
2-Methylnaphthalene	3.37	976	
1-Methylnaphthalene	3.48	1570	
Acenaphthylene	4.51	1300	R
Acenaphthene	4.81	91.4	M
Fluorene	5.74	125	
Phenanthrene	7.94	435	
Anthracene	8.06	105	
Fluoranthene	11.34	95.4	
Pyrene	11.99	87.4	M
Benzo(a)Anthracene	15.89	<16	U
Chrysene	16.02	21.6	M
Benzo(b)Fluoranthene	19.24	23.6	
Benzo(k)Fluoranthene	19.29	<16	U
Benzo(e)Pyrene	NotFnd	<16	U
Benzo(a)Pyrene	NotFnd	<16	U
Perylene	NotFnd	<16	U
Indeno(1,2,3-cd)Pyrene	NotFnd	<16	U
Dibenzo(a,h)Anthracene	NotFnd	<16	U
Benzo(g,h,i)Perylene	24.83	60.4	M
Additional Analytes			
Tetralin	2.66	607	B
Quinoline	3.05	1830	M R
2-Chloronaphthalene	3.93	85.8	
Biphenyl	3.90	4090	
o-Terphenyl	NotFnd	<16	U
1-Methylphenanthrene	NotFnd	<16	U
9-Methylphenanthrene	9.62	42.0	
2-methylanthracene	9.68	66.9	R
9,10-dimethylanthracene	NotFnd	<16	U
m-terphenyl	NotFnd	<16	U
p-terphenyl	NotFnd	<16	U
Benzo(a)fluorene	NotFnd	<16	U
Benzo(b)fluorene	NotFnd	<16	U
7,12-Dimethylbenzo(a)anthracene	NotFnd	<16	U
3-Methylcholanthrene	21.39	563	R
Picene	NotFnd	<80	U
Dibenzo(a,e)pyrene	NotFnd	<80	U
Coronene	NotFnd	<80	U

Field Sampling Standards	**ng spiked**		**% Rec**	
1-Methylnaphthalene-D10	700	3.45	70.2	M
Fluorene D10	700	5.68	89.4	
Terphenyl D14(Surr.)	700	12.79	87.2	M

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	800	2.77	32.6	50-150
2-Methylnaphthalene-D10	800	3.33	45.1	50-150
Acenaphthylene D8	800	4.50	22.5	50-150
Phenanthrene D10	800	7.89	46.6	50-150
Anthracene-D10	800	8.01	17.3	50-150
Fluoranthene D10	800	11.30	43.9	50-150
Benz(a)Anthracene-D12	800	15.83	19.1	50-150
Chrysene D12	800	15.94	28.8	50-150
Benzo(b)Fluoranthene-D12	800	19.17	26.5	50-150
Benzo(k)Fluoranthene-D12	800	19.17	31.3	50-150
Benzo(a)Pyrene D12	800	20.04	17.8 M	50-150
Perylene D12	800	20.27	17.7 M	50-150
Indeno(1,2,3,cd)Pyrene-D12	800	23.77	19.2 M	50-150
Dibenz(a,h)Anthracene-D14	800	23.94	12.2 M	50-150
Benzo(g,h,i)Perylene D12	800	24.71	23.8 M	50-150

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

ALS Life Sciences

Sample Analysis Report

Sample Name	**21-22114-SVOC-(6 THRU 10) TEST#2**	Sampling Date	15-Sep-21
ALS Sample ID	L2641450-2	Extraction Date	28-Sep-21
Analysis Method	PAH by CARB 429		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	8	Workgroup	WG3622486

Approved:
Peter Nguyen
--e-signature--
17-Nov-2021

Run Information	**Run 1**
Filename	211104A217.D
Run Date	11/16/2021 12:35
Final Volume	1 mL
Dilution Factor	1
Analysis Units	n/sample
Instrument	MSD-5
Column	HP-5MS US1263126H

Target Analytes	**Ret. Time**	**Concentration n/sample**	**Flags**
Naphthalene	2.78	8020	
2-Methylnaphthalene	3.37	714	
1-Methylnaphthalene	3.48	942	
Acenaphthylene	4.51	554	R
Acenaphthene	4.81	52.9	M
Fluorene	5.74	70.8	
Phenanthrene	7.94	237	
Anthracene	8.06	51.0	
Fluoranthene	11.34	45.8	
Pyrene	11.99	50.8	M
Benzo(a)Anthracene	15.89	<16	U
Chrysene	16.01	<16	U
Benzo(b)Fluoranthene	19.23	<16	U
Benzo(k)Fluoranthene	19.24	<16	U
Benzo(e)Pyrene	19.97	29.8	M
Benzo(a)Pyrene	20.10	<16	U
Perylene	20.34	<16	U
Indeno(1,2,3-cd)Pyrene	NotFnd	<16	U
Dibenzo(a,h)Anthracene	NotFnd	<16	U
Benzo(g,h,i)Perylene	NotFnd	<16	U
Additional Analytes			
Tetralin	2.66	808	
Quinoline	3.05	1750	R
2-Chloronaphthalene	3.93	59.0	
Biphenyl	3.90	3080	
o-Terphenyl	9.22	<16	U
1-Methylphenanthrene	9.50	<16	U
9-Methylphenanthrene	9.62	24.4	
2-methylanthracene	9.68	38.1	M R
9,10-dimethylanthracene	12.33	36.7	R
m-terphenyl	12.38	<16	U
p-terphenyl	NotFnd	<16	U
Benzo(a)fluorene	NotFnd	<16	U
Benzo(b)fluorene	NotFnd	<16	U
7,12-Dimethylbenzo(a)anthracene	NotFnd	<16	U
3-Methylcholanthrene	NotFnd	<80	U
Picene	NotFnd	<80	U
Dibenzo(a,e)pyrene	NotFnd	<80	U
Coronene	NotFnd	<80	U

Field Sampling Standards	**ng spiked**		**% Rec**	
1-Methylnaphthalene-D10	700	3.45	72.2 M	R
Fluorene D10	700	5.68	89	
Terphenyl D14(Surr.)	700	12.79	90.5	

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	800	2.77	70.2	50-150
2-Methylnaphthalene-D10	800	3.33	96.8	50-150
Acenaphthylene D8	800	4.50	49.5	50-150
Phenanthrene D10	800	7.89	93.7	50-150
Anthracene-D10	800	8.01	41.0	50-150
Fluoranthene D10	800	11.29	92.4	50-150
Benz(a)Anthracene-D12	800	15.83	48.3	50-150
Chrysene D12	800	15.94	66.1 M	50-150
Benzo(b)Fluoranthene-D12	800	19.16	58.4 M	50-150
Benzo(k)Fluoranthene-D12	800	19.24	43.9 M	50-150
Benzo(a)Pyrene D12	800	20.04	34.0	50-150
Perylene D12	800	20.27	31.9 M	50-150
Indeno(1,2,3,cd)Pyrene-D12	800	23.73	33.5	50-150
Dibenz(a,h)Anthracene-D14	800	23.91	24.8	50-150
Benzo(g,h,i)Perylene D12	800	24.70	50.0 M	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

Sample Analysis Report

Sample Name	**21-22114-SVOC-(11 THRU 15) TEST#3**	Sampling Date	16-Sep-21
ALS Sample ID	L2641450-3	Extraction Date	28-Sep-21
Analysis Method	PAH by CARB 429		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	8	Workgroup	WG3622486

Approved:
Peter Nguyen
--e-signature--
17-Nov-2021

Run Information	**Run 1**
Filename	211104A252.D
Run Date	11/17/2021 10:44
Final Volume	1 mL
Dilution Factor	1
Analysis Units	n/sample
Instrument	MSD-5
Column	HP-5MS US1263126H

Target Analytes	**Ret. Time**	**Concentration n/sample**	**Flags**
Naphthalene	2.79	10200	
2-Methylnaphthalene	3.37	1350	
1-Methylnaphthalene	3.48	1330	
Acenaphthylene	4.52	374	M
Acenaphthene	4.81	147	
Fluorene	5.74	103	M
Phenanthrene	7.94	398	
Anthracene	8.06	53.5	
Fluoranthene	11.34	83.0	
Pyrene	11.99	160	
Benzo(a)Anthracene	15.89	<16	U
Chrysene	NotFnd	<16	U
Benzo(b)Fluoranthene	NotFnd	<16	U
Benzo(k)Fluoranthene	NotFnd	<16	U
Benzo(e)Pyrene	19.96	46.1	
Benzo(a)Pyrene	NotFnd	<16	U
Perylene	NotFnd	<16	U
Indeno(1,2,3-cd)Pyrene	NotFnd	<16	U
Dibenzo(a,h)Anthracene	NotFnd	<16	U
Benzo(g,h,i)Perylene	24.81	68.3	
Additional Analytes			
Tetralin	2.67	571	B
Quinoline	3.05	197	M R
2-Chloronaphthalene	3.93	65.7	
Biphenyl	3.90	3020	
o-Terphenyl	NotFnd	<16	U
1-Methylphenanthrene	9.49	<16	U
9-Methylphenanthrene	9.62	39.5	
2-methylanthracene	9.68	61.2	R
9,10-dimethylanthracene	NotFnd	<16	U
m-terphenyl	12.38	<16	U
p-terphenyl	NotFnd	<16	U
Benzo(a)fluorene	NotFnd	<16	U
Benzo(b)fluorene	NotFnd	<16	U
7,12-Dimethylbenzo(a)anthracene	NotFnd	<16	U
3-Methylcholanthrene	NotFnd	<80	U
Picene	NotFnd	<80	U
Dibenzo(a,e)pyrene	NotFnd	<80	U
Coronene	NotFnd	<80	U

Field Sampling Standards	**ng spiked**		**% Rec**	
1-Methylnaphthalene-D10	700	3.45	77.8	M
Fluorene D10	700	5.68	95.5	
Terphenyl D14(Surr.)	700	12.79	99	

Extraction Standards			**% Rec**		**Limits**
Naphthalene D8	800	2.77	51.9		50-150
2-Methylnaphthalene-D10	800	3.34	69.4		50-150
Acenaphthylene D8	800	4.50	47.0		50-150
Phenanthrene D10	800	7.89	73.4		50-150
Anthracene-D10	800	8.01	38.7		50-150
Fluoranthene D10	800	11.29	71.7	M	50-150
Benz(a)Anthracene-D12	800	15.82	38.2		50-150
Chrysene D12	800	15.94	55.1	M	50-150
Benzo(b)Fluoranthene-D12	800	19.16	51.2		50-150
Benzo(k)Fluoranthene-D12	800	19.24	34.3	M	50-150
Benzo(a)Pyrene D12	800	20.04	35.4		50-150
Perylene D12	800	20.27	30.5		50-150
Indeno(1,2,3,cd)Pyrene-D12	800	23.73	34.0		50-150
Dibenz(a,h)Anthracene-D14	800	23.91	26.3	M	50-150
Benzo(g,h,i)Perylene D12	800	24.69	43.6	M	50-150

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

ALS Life Sciences

Sample Analysis Report

Sample Name	**21-22114-SVOC-(16 THRU 20) BLANK**	Sampling Date	16-Sep-21
ALS Sample ID	L2641450-4	Extraction Date	28-Sep-21
Analysis Method	PAH by CARB 429		
Analysis Type	sample		
Sample Matrix	Stack		
Sample Size	1 Sample		
Percent Moisture	n/a		
Split Ratio	8	Workgroup	WG3622486

Approved:
Peter Nguyen
--e-signature--
17-Nov-2021

Run Information	**Run 1**
Filename	211104A253.D
Run Date	11/17/2021 11:22
Final Volume	1 mL
Dilution Factor	1
Analysis Units	n/sample
Instrument	MSD-5
Column	HP-5MS US1263126H

Target Analytes	**Ret. Time**	**Concentration n/sample**	**Flags**
Naphthalene	2.78	384	B
2-Methylnaphthalene	3.37	34.7	B
1-Methylnaphthalene	3.48	26.9	
Acenaphthylene	NotFnd	<16	U
Acenaphthene	NotFnd	<16	U
Fluorene	NotFnd	<16	U
Phenanthrene	NotFnd	<16	U
Anthracene	NotFnd	<16	U
Fluoranthene	NotFnd	<16	U
Pyrene	NotFnd	<16	U
Benzo(a)Anthracene	NotFnd	<16	U
Chrysene	NotFnd	<16	U
Benzo(b)Fluoranthene	NotFnd	<16	U
Benzo(k)Fluoranthene	NotFnd	<16	U
Benzo(e)Pyrene	NotFnd	<16	U
Benzo(a)Pyrene	NotFnd	<16	U
Perylene	20.38	<16	U
Indeno(1,2,3-cd)Pyrene	NotFnd	<16	U
Dibenzo(a,h)Anthracene	NotFnd	<16	U
Benzo(g,h,i)Perylene	NotFnd	<16	U
Additional Analytes			
Tetralin	2.66	112	B
Quinoline	NotFnd	<16	U
2-Chloronaphthalene	3.88	<16	U
Biphenyl	3.91	50.6	B
o-Terphenyl	NotFnd	<16	U
1-Methylphenanthrene	NotFnd	<16	U
9-Methylphenanthrene	NotFnd	<16	U
2-methylanthracene	NotFnd	<16	U
9,10-dimethylanthracene	NotFnd	<16	U
m-terphenyl	NotFnd	<16	U
p-terphenyl	NotFnd	<16	U
Benzo(a)fluorene	NotFnd	<16	U
Benzo(b)fluorene	NotFnd	<16	U
7,12-Dimethylbenzo(a)anthracene	NotFnd	<16	U
3-Methylcholanthrene	NotFnd	<80	U
Picene	NotFnd	<80	U
Dibenzo(a,e)pyrene	NotFnd	<80	U
Coronene	NotFnd	<80	U

Field Sampling Standards	**ng spiked**		**% Rec**
1-Methylnaphthalene-D10	700	3.45	79.4
Fluorene D10	700	5.68	98
Terphenyl D14(Surr.)	700	12.79	96.7

Extraction Standards			**% Rec**		**Limits**
Naphthalene D8	800	2.77	43.4	M	50-150
2-Methylnaphthalene-D10	800	3.34	51.8		50-150
Acenaphthylene D8	800	4.50	31.4		50-150
Phenanthrene D10	800	7.89	52.2		50-150
Anthracene-D10	800	8.02	23.9		50-150
Fluoranthene D10	800	11.30	49.1	M	50-150
Benz(a)Anthracene-D12	800	15.83	26.2		50-150
Chrysene D12	800	15.94	38.7	M	50-150
Benzo(b)Fluoranthene-D12	800	19.16	34.8		50-150
Benzo(k)Fluoranthene-D12	800	19.25	24.9	M	50-150
Benzo(a)Pyrene D12	800	20.04	22.2	M	50-150
Perylene D12	800	20.27	19.0	M	50-150
Indeno(1,2,3,cd)Pyrene-D12	800	23.74	26.4	M	50-150
Dibenz(a,h)Anthracene-D14	800	23.95	16.9	M	50-150
Benzo(g,h,i)Perylene D12	800	24.70	31.4	M	50-150

M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the MDL.
B	Indicates that this compound was detected in the method blank at greater than 10% of the sample value.

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Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a
ALS Sample ID	WG3622486-2	Extraction Date	28-Sep-21
Analysis Method	PAH by CARB 429		
Analysis Type	LCS		
Sample Matrix	QC		
Sample Size	1 n/a		
Percent Moisture	n/a		
Split Ratio	8	Workgroup	WG3622486

Approved:
Peter Nguyen
--e-signature--
17-Nov-2021

Run Information	**Run 1**
Filename	211104A247.D
Run Date	11/17/2021 7:34
Final Volume	1 mL
Dilution Factor	1
Analysis Units	%
Instrument	MSD-5
Column	HP-5MS US1263126H

Target Analytes	**ug spiked**	**Ret. Time**	**%**	**Flags**	**Limits**
Naphthalene	800	2.78	147.6		50-150
2-Methylnaphthalene	800	3.37	101.5		50-150
1-Methylnaphthalene	800	3.48	105.2		50-150
Acenaphthylene	800	4.51	93.9		50-150
Acenaphthene	800	4.81	109.1		50-150
Fluorene	800	5.74	94.1		50-150
Phenanthrene	800	7.94	110.2		50-150
Anthracene	800	8.06	113		50-150
Fluoranthene	800	11.34	84.8		50-150
Pyrene	800	11.99	87.7		50-150
Benzo(a)Anthracene	800	15.89	95.6		50-150
Chrysene	800	16.01	99.9		50-150
Benzo(b)Fluoranthene	800	19.22	76.2		50-150
Benzo(k)Fluoranthene	800	19.29	102.3		50-150
Benzo(e)Pyrene	800	19.96	111		50-150
Benzo(a)Pyrene	800	20.09	92.5		50-150
Perylene	800	20.32	87.6		50-150
Indeno(1,2,3-cd)Pyrene	800	23.80	77.5		50-150
Dibenzo(a,h)Anthracene	800	24.01	83	M	50-150
Benzo(g,h,i)Perylene	800	24.78	81.9	M	50-150

Field Sampling Standards	**ng spiked**	**% Rec**
1-Methylnaphthalene-D10		NS
Fluorene D10		NS
Terphenyl D14(Surr.)		NS

Extraction Standards			**% Rec**	**Limits**
Naphthalene D8	800	2.77	80.9	30-150
2-Methylnaphthalene-D10	800	3.33	100.9	30-150
Acenaphthylene D8	800	4.50	66.3	30-150
Phenanthrene D10	800	7.89	93.1	50-150
Anthracene-D10	800	8.01	54.2	50-150
Fluoranthene D10	800	11.29	90.9	50-150
Benz(a)Anthracene-D12	800	15.82	56.2	50-150
Chrysene D12	800	15.93	78.8	50-150
Benzo(b)Fluoranthene-D12	800	19.15	78.1	50-150
Benzo(k)Fluoranthene-D12	800	19.24	55.9	50-150
Benzo(a)Pyrene D12	800	20.03	53.9 M	30-150
Perylene D12	800	20.26	53.5	50-150
Indeno(1,2,3,cd)Pyrene-D12	800	23.71	58.9	50-150
Dibenz(a,h)Anthracene-D14	800	23.88	52.0 M	50-150
Benzo(g,h,i)Perylene D12	800	24.68	75.0 M	50-150

M	Indicates that a peak has been manually integrated.
NS	Not Spiked

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
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2644432		Mississauga, ON L5J 2Y4
Date of Report	29-Nov-21		Canada
Date of Sample Receipt	17-Sep-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors Sarnia

COMMENTS: **PCDD/F by EPA 1613B via Isotope Dilution**

Data are reported on an as received basis.

Certified by:

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

Results in this certificate relate only to the samples as submitted to the laboratory.
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Sample Analysis Summary Report

Sample Name	21-22114-RC-4 RICH FEED	Duplicate of 21-22114-RC-4 RICH FEED	21-22114-LC-4 LEAN FEED	21-22114-AC-4 ALKALINE FEED	21-22114-EC-4 EMULSION FEED
ALS Sample ID	L2644432-1	WG3626818-4	L2644432-2	L2644432-3	L2644432-4
Sample Size	1.018	1.047	1.0092	1.007	1.0446
Sample size units	g	g	g	g	g
Percent Moisture	80.39%	78.75%	89.67%	99.28%	90.95%
Sample Matrix	Stack	QC	Stack	Stack	Stack
Sampling Date	n/a	n/a	n/a	n/a	n/a
Extraction Date	13-Oct-21	13-Oct-21	13-Oct-21	13-Oct-21	13-Oct-21
Target Analytes	**pg/g**	**pg/g**	**pg/g**	**pg/g**	**pg/g**
2,3,7,8-TCDD	<0.88	<0.51	1.49	<0.24	<0.50
1,2,3,7,8-PeCDD	<3.0	<1.4	<3.1	<0.67	<0.71
1,2,3,4,7,8-HxCDD	<9.5	<7.2	<2.6	<0.80	<0.87
1,2,3,6,7,8-HxCDD	67.0	89.9	19.9	<0.80	8.46
1,2,3,7,8,9-HxCDD	59.0	<39	<9.1	<0.80	<1.3
1,2,3,4,6,7,8-HpCDD	3210	6270	1380	<3.2	849
OCDD	25000	25300	12200	45.6	6320
2,3,7,8-TCDF	<1.3	<0.74	2.01	<0.23	<0.64
1,2,3,7,8-PeCDF	<1.4	<0.84	2.31	<0.37	0.695
2,3,4,7,8-PeCDF	<1.4	<0.76	<2.9	<0.25	<0.63
1,2,3,4,7,8-HxCDF	<1.9	<1.7	<3.4	<0.54	<0.69
1,2,3,6,7,8-HxCDF	<1.4	<0.68	<2.2	<0.50	<0.69
2,3,4,6,7,8-HxCDF	25.9	9.46	<9.9	<0.53	1.37
1,2,3,7,8,9-HxCDF	<1.7	1.14	<1.6	<0.80	<0.96
1,2,3,4,6,7,8-HpCDF	<89	<41	45.9	<1.0	19.6
1,2,3,4,7,8,9-HpCDF	<3.5	2.75	<1.8	<1.5	<1.5
OCDF	399	189	54.5	<1.1	119
Extraction Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**	**% Rec**
13C12-2,3,7,8-TCDD	78	77	84	83	100
13C12-1,2,3,7,8-PeCDD	55	69	73	88	87
13C12-1,2,3,4,7,8-HxCDD	97	78	92	101	115
13C12-1,2,3,6,7,8-HxCDD	69	76	91	109	111
13C12-1,2,3,4,6,7,8-HpCDD	75	67	70	93	83
13C12-OCDD	67	51	47	73	59
13C12-2,3,7,8-TCDF	86	86	100	94	114
13C12-1,2,3,7,8-PeCDF	75	83	86	101	102
13C12-2,3,4,7,8-PeCDF	75	84	85	99	101
13C12-1,2,3,4,7,8-HxCDF	121	102	110	122	129
13C12-1,2,3,6,7,8-HxCDF	73	92	105	121	136
13C12-2,3,4,6,7,8-HxCDF	86	86	96	116	121
13C12-1,2,3,7,8,9-HxCDF	82	81	94	110	118
13C12-1,2,3,4,6,7,8-HpCDF	81	76	79	108	100
13C12-1,2,3,4,7,8,9-HpCDF	86	76	80	102	92
Cleanup Standard					
37Cl4-2,3,7,8-TCDD (Cleanup)	86	75	77	86	93
Homologue Group Totals	**pg/g**	**pg/g**	**pg/g**	**pg/g**	**pg/g**
Total-TCDD	<0.88	<0.51	10.6	<0.24	0.895
Total-PeCDD	<1.5	1.50	20.2	<0.67	<0.71
Total-HxCDD	256	535	151	<0.80	50.3
Total-HpCDD	5880	10100	2670	<0.74	1570
Total-TCDF	3.92	1.48	62.7	<0.23	25.2
Total-PeCDF	1.47	1.52	17.2	<0.27	0.695
Total-HxCDF	85.6	39.1	28.8	<0.80	20.1
Total-HpCDF	286	133	117	<1.5	80.5
Toxic Equivalency - (WHO 2005)					
Lower Bound PCDD/F TEQ (WHO 2005)	54.9	80.4	21.7	0.0137	11.6
Mid Point PCDD/F TEQ (WHO 2005)	60.9	87.5	28.5	0.812	12.7
Upper Bound PCDD/F TEQ (WHO 2005)	61.8	87.9	28.6	1.57	13.6

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Quality Control Summary Report

Sample Name	Method Blank	Laboratory Control Sample
ALS Sample ID	WG3626818-1	WG3626818-2
Sample Size	1.60	1
Sample size units	g	n/a
Percent Moisture	n/a	n/a
Sample Matrix	QC	QC
Sampling Date	n/a	n/a
Extraction Date	13-Oct-21	13-Oct-21
Target Analytes	**pg/g**	**% Rec**
2,3,7,8-TCDD	<0.13	93
1,2,3,7,8-PeCDD	<0.078	105
1,2,3,4,7,8-HxCDD	<0.084	99
1,2,3,6,7,8-HxCDD	<0.085	91
1,2,3,7,8,9-HxCDD	<0.084	97
1,2,3,4,6,7,8-HpCDD	<0.25	97
OCDD	0.726	90
2,3,7,8-TCDF	<0.092	102
1,2,3,7,8-PeCDF	0.120	103
2,3,4,7,8-PeCDF	<0.048	95
1,2,3,4,7,8-HxCDF	<0.052	96
1,2,3,6,7,8-HxCDF	<0.050	95
2,3,4,6,7,8-HxCDF	<0.052	94
1,2,3,7,8,9-HxCDF	<0.25	100
1,2,3,4,6,7,8-HpCDF	<0.27	96
1,2,3,4,7,8,9-HpCDF	<0.078	96
OCDF	1.61	94
Extraction Standards	**% Rec**	**% Rec**
13C12-2,3,7,8-TCDD	85	60
13C12-1,2,3,7,8-PeCDD	94	71
13C12-1,2,3,4,7,8-HxCDD	103	71
13C12-1,2,3,6,7,8-HxCDD	111	74
13C12-1,2,3,4,6,7,8-HpCDD	85	67
13C12-OCDD	64	61
13C12-2,3,7,8-TCDF	94	66
13C12-1,2,3,7,8-PeCDF	102	75
13C12-2,3,4,7,8-PeCDF	104	76
13C12-1,2,3,4,7,8-HxCDF	110	73
13C12-1,2,3,6,7,8-HxCDF	121	79
13C12-2,3,4,6,7,8-HxCDF	115	73
13C12-1,2,3,7,8,9-HxCDF	106	75
13C12-1,2,3,4,6,7,8-HpCDF	97	73
13C12-1,2,3,4,7,8,9-HpCDF	89	73
Cleanup Standard		
37Cl4-2,3,7,8-TCDD (Cleanup)	81	59
Homologue Group Totals	**pg/g**	
Total-TCDD	<0.13	
Total-PeCDD	<0.078	
Total-HxCDD	<0.085	
Total-HpCDD	<0.13	
Total-TCDF	<0.092	
Total-PeCDF	0.120	
Total-HxCDF	<0.077	
Total-HpCDF	<0.078	
Toxic Equivalency - (WHO 2005)		
Lower Bound PCDD/F TEQ (WHO 2005)	0.00430	
Mid Point PCDD/F TEQ (WHO 2005)	0.171	
Upper Bound PCDD/F TEQ (WHO 2005)	0.308	

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Sample Analysis Report

Sample Name	**21-22114-RC-4 RICH FEED**	Sampling Date	n/a	
ALS Sample ID	L2644432-1	Extraction Date	13-Oct-21	Approved:
Analysis Method	EPA 1613B	Sample Size	1.018 g	*K.BERG*
Analysis Type	Sample	Percent Moisture	80.4%	--e-signature--
Sample Matrix	Stack	Split Ratio	2	27-Nov-2021

Run Information	**Run 1**
Filename	7-211106A23
Run Date	07-Nov-21 08:05
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS 7 DB5MSUS0287812H

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	<0.88	0.88	U		9.8
1,2,3,7,8-PeCDD	1	32.38	<3.0	1.5	M,J,R	3.0	49
1,2,3,4,7,8-HxCDD	0.1	34.37	<9.5	1.4	J,R	9.5	49
1,2,3,6,7,8-HxCDD	0.1	34.43	67.0	1.4			49
1,2,3,7,8,9-HxCDD	0.1	34.54	59.0	1.4	M		49
1,2,3,4,6,7,8-HpCDD	0.01	36.00	3210	7.4			49
OCDD	0.0003	37.51	25000	7.8			98
2,3,7,8-TCDF	0.1	27.76	<1.3	1.3	M,U	0.79	9.8
1,2,3,7,8-PeCDF	0.03	31.47	<1.4	1.4	M,U	1.4	49
2,3,4,7,8-PeCDF	0.3	32.17	<1.4	1.4	U	1.3	49
1,2,3,4,7,8-HxCDF	0.1	33.89	<1.9	1.1	J,R	1.9	49
1,2,3,6,7,8-HxCDF	0.1	33.95	<1.4	1.4	U	1.2	49
2,3,4,6,7,8-HxCDF	0.1	34.23	25.9	1.4	M,J		49
1,2,3,7,8,9-HxCDF	0.1	34.66	<1.7	1.7	M,U	1.6	49
1,2,3,4,6,7,8-HpCDF	0.01	35.46	<89	2.2	M,1.	89	49
1,2,3,4,7,8,9-HpCDF	0.01	36.25	<3.5	3.0	J,R	3.5	49
OCDF	0.0003	37.61	399	4.5			98

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	28.62	78	25-164
13C12-1,2,3,7,8-PeCDD	2000	32.37	55	25-181
13C12-1,2,3,4,7,8-HxCDD	2000	34.35	97	32-141
13C12-1,2,3,6,7,8-HxCDD	2000	34.42	69	28-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.99	75	23-140
13C12-OCDD	4000	37.51	67	17-157
13C12-2,3,7,8-TCDF	2000	27.73	86	24-169
13C12-1,2,3,7,8-PeCDF	2000	31.46	75	24-185
13C12-2,3,4,7,8-PeCDF	2000	32.16	75	21-178
13C12-1,2,3,4,7,8-HxCDF	2000	33.88	121	26-152
13C12-1,2,3,6,7,8-HxCDF	2000	33.95	73	26-123
13C12-2,3,4,6,7,8-HxCDF	2000	34.26	86	28-136
13C12-1,2,3,7,8,9-HxCDF	2000	34.66	82	29-147
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.44	81	28-143
13C12-1,2,3,4,7,8,9-HpCDF	2000	36.24	86	26-138

Cleanup Standard	**pg**			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	28.63	86	35-197

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**		
Total-TCDD	0.00	<0.88	0.88	U	9.8
Total-PeCDD	0.00	<1.5	1.5	U	49
Total-HxCDD	4.00	256	1.4		49
Total-HpCDD	2.00	5880	7.4		49
Total-TCDF	5.00	3.92	1.3		9.8
Total-PeCDF	1.00	1.47	1.4		49
Total-HxCDF	3.00	85.6	1.7		49
Total-HpCDF	2.00	286	3.0		49

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	54.9
Mid Point PCDD/F TEQ (WHO 2005)	60.9
Upper Bound PCDD/F TEQ (WHO 2005)	61.8

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
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure
1.	This result is an EMPC

ALS Life Sciences

Sample Analysis Report

Sample Name	**Duplicate of 21-22114-RC-4 RICH FEED**	Sampling Date	n/a		
ALS Sample ID	WG3626818-4	Extraction Date	13-Oct-21		Approved:
Analysis Method	EPA 1613B	Sample Size	1.047	g	*K.BERG*
Analysis Type	Sample	Percent Moisture	78.7%		--e-signature--
Sample Matrix	QC	Split Ratio	2		27-Nov-2021

Run Information	**Run 1**
Filename	7-211106A24
Run Date	07-Nov-21 08:49
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS 7 DB5MSUS0287812H

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	<0.51	0.51	U		9.6
1,2,3,7,8-PeCDD	1	32.40	<1.4	1.1	M,J,R	1.4	48
1,2,3,4,7,8-HxCDD	0.1	34.37	<7.2	1.3	J,R	7.2	48
1,2,3,6,7,8-HxCDD	0.1	34.45	89.9	1.1			48
1,2,3,7,8,9-HxCDD	0.1	34.57	<39	1.2	J,R	39	48
1,2,3,4,6,7,8-HpCDD	0.01	36.01	6270	4.8			48
OCDD	0.0003	37.52	25300	5.2			96
2,3,7,8-TCDF	0.1	27.71	<0.74	0.74	M,U	0.59	9.6
1,2,3,7,8-PeCDF	0.03	31.49	<0.84	0.84	M,U		48
2,3,4,7,8-PeCDF	0.3	32.17	<0.76	0.76	M,U	0.37	48
1,2,3,4,7,8-HxCDF	0.1	33.90	<1.7	0.62	J,R	1.7	48
1,2,3,6,7,8-HxCDF	0.1	33.97	<0.68	0.65	J,R	0.68	48
2,3,4,6,7,8-HxCDF	0.1	34.24	9.46	0.74	M,J		48
1,2,3,7,8,9-HxCDF	0.1	34.69	1.14	0.86	M,J		48
1,2,3,4,6,7,8-HpCDF	0.01	35.47	<41	1.1	M,J,1.	41	48
1,2,3,4,7,8,9-HpCDF	0.01	36.28	2.75	1.4	J		48
OCDF	0.0003	37.62	189	2.7			96

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	28.59	77	25-164
13C12-1,2,3,7,8-PeCDD	2000	32.38	69	25-181
13C12-1,2,3,4,7,8-HxCDD	2000	34.37	78	32-141
13C12-1,2,3,6,7,8-HxCDD	2000	34.44	76	28-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	36.00	67	23-140
13C12-OCDD	4000	37.52	51	17-157
13C12-2,3,7,8-TCDF	2000	27.70	86	24-169
13C12-1,2,3,7,8-PeCDF	2000	31.46	83	24-185
13C12-2,3,4,7,8-PeCDF	2000	32.16	84	21-178
13C12-1,2,3,4,7,8-HxCDF	2000	33.89	102	26-152
13C12-1,2,3,6,7,8-HxCDF	2000	33.96	92	26-123
13C12-2,3,4,6,7,8-HxCDF	2000	34.27	86	28-136
13C12-1,2,3,7,8,9-HxCDF	2000	34.68	81	29-147
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.46	76	28-143
13C12-1,2,3,4,7,8,9-HpCDF	2000	36.25	76	26-138

Cleanup Standard	**pg**			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	28.60	75	35-197

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**		
Total-TCDD	0.00	<0.51	0.51	U	9.6
Total-PeCDD	1.00	1.50	1.1		48
Total-HxCDD	3.00	535	1.3		48
Total-HpCDD	2.00	10100	4.8		48
Total-TCDF	2.00	1.48	0.74		9.6
Total-PeCDF	2.00	1.52	0.84		48
Total-HxCDF	4.00	39.1	0.86		48
Total-HpCDF	3.00	133	1.4		48

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	80.4
Mid Point PCDD/F TEQ (WHO 2005)	87.5
Upper Bound PCDD/F TEQ (WHO 2005)	87.9

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor — TEQ: Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure
1.	This result is an EMPC

ALS Life Sciences

Sample Analysis Report

Sample Name	**21-22114-LC-4 LEAN FEED**		Sampling Date	n/a	
ALS Sample ID	L2644432-2		Extraction Date	13-Oct-21	
Analysis Method	EPA 1613B		Sample Size	1.0092	g
Analysis Type	Sample		Percent Moisture	89.7%	
Sample Matrix	Stack		Split Ratio	2	

Approved:
K.BERG
--e-signature--
27-Nov-2021

Run Information	**Run 1**
Filename	7-211106A25
Run Date	07-Nov-21 09:33
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS 7 DB5MSUS0287812H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
2,3,7,8-TCDD	1	28.47	1.49	0.69	J		9.9
1,2,3,7,8-PeCDD	1	32.31	<3.1	1.1	J,R	3.1	50
1,2,3,4,7,8-HxCDD	0.1	34.30	<2.6	1.7	M,J,R	2.6	50
1,2,3,6,7,8-HxCDD	0.1	34.35	19.9	1.7	M,J		50
1,2,3,7,8,9-HxCDD	0.1	34.48	<9.1	1.7	M,J,R	9.1	50
1,2,3,4,6,7,8-HpCDD	0.01	35.97	1380	4.3			50
OCDD	0.0003	37.48	12200	7.3			99
2,3,7,8-TCDF	0.1	27.51	2.01	0.88	M,J		9.9
1,2,3,7,8-PeCDF	0.03	31.40	2.31	1.2	J		50
2,3,4,7,8-PeCDF	0.3	32.10	<2.9	1.1	J,R	2.9	50
1,2,3,4,7,8-HxCDF	0.1	33.82	<3.4	1.1	J,R	3.4	50
1,2,3,6,7,8-HxCDF	0.1	33.89	<2.2	1.0	J,R	2.2	50
2,3,4,6,7,8-HxCDF	0.1	34.20	<9.9	1.2	M,J,1.	9.9	50
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<1.6	1.6	U		50
1,2,3,4,6,7,8-HpCDF	0.01	35.41	45.9	1.2	J		50
1,2,3,4,7,8,9-HpCDF	0.01	36.21	<1.8	1.8	M,U	0.93	50
OCDF	0.0003	37.58	54.5	3.5	J		99

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	28.44	84	25-164
13C12-1,2,3,7,8-PeCDD	2000	32.30	73	25-181
13C12-1,2,3,4,7,8-HxCDD	2000	34.30	92	32-141
13C12-1,2,3,6,7,8-HxCDD	2000	34.34	91	28-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.96	70	23-140
13C12-OCDD	4000	37.47	47	17-157
13C12-2,3,7,8-TCDF	2000	27.51	100	24-169
13C12-1,2,3,7,8-PeCDF	2000	31.38	86	24-185
13C12-2,3,4,7,8-PeCDF	2000	32.08	85	21-178
13C12-1,2,3,4,7,8-HxCDF	2000	33.81	110	26-152
13C12-1,2,3,6,7,8-HxCDF	2000	33.89	105	26-123
13C12-2,3,4,6,7,8-HxCDF	2000	34.20	96	28-136
13C12-1,2,3,7,8,9-HxCDF	2000	34.62	94	29-147
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.40	79	28-143
13C12-1,2,3,4,7,8,9-HpCDF	2000	36.21	80	26-138

Cleanup Standard	**pg**			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	28.46	77	35-197

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**	**LQL**
Total-TCDD	6.00	10.6	0.69	9.9
Total-PeCDD	2.00	20.2	1.1	50
Total-HxCDD	4.00	151	1.7	50
Total-HpCDD	2.00	2670	4.3	50
Total-TCDF	9.00	62.7	0.88	9.9
Total-PeCDF	5.00	17.2	1.2	50
Total-HxCDF	3.00	28.8	1.6	50
Total-HpCDF	2.00	117	1.8	50

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	21.7
Mid Point PCDD/F TEQ (WHO 2005)	28.5
Upper Bound PCDD/F TEQ (WHO 2005)	28.6

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure
1.	This result is an EMPC

ALS Life Sciences

Sample Analysis Report

Sample Name	**21-22114-AC-4 ALKALINE FEED**	Sampling Date	n/a	
ALS Sample ID	L2644432-3	Extraction Date	13-Oct-21	Approved:
Analysis Method	EPA 1613B	Sample Size	1.007 g	*K.BERG*
Analysis Type	Sample	Percent Moisture	99.3%	--e-signature--
Sample Matrix	Stack	Split Ratio	2	27-Nov-2021

Run Information	**Run 1**
Filename	7-211106A26
Run Date	07-Nov-21 10:16
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS 7 DB5MSUS0287812H

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	<0.24	0.24	U		9.9
1,2,3,7,8-PeCDD	1	NotFnd	<0.67	0.67	U		50
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.80	0.80	U		50
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<0.80	0.80	U		50
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.80	0.80	U		50
1,2,3,4,6,7,8-HpCDD	0.01	35.97	<3.2	0.74	J,R	3.2	50
OCDD	0.0003	37.48	45.6	1.7	J		99
2,3,7,8-TCDF	0.1	NotFnd	<0.23	0.23	U		9.9
1,2,3,7,8-PeCDF	0.03	31.37	<0.37	0.27	J,R	0.37	50
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.25	0.25	U		50
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.54	0.54	U		50
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.50	0.50	U		50
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.53	0.53	U		50
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<0.80	0.80	U		50
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<1.0	1.0	U		50
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.5	1.5	U		50
OCDF	0.0003	NotFnd	<1.1	1.1	U		99

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	28.41	83	25-164
13C12-1,2,3,7,8-PeCDD	2000	32.27	88	25-181
13C12-1,2,3,4,7,8-HxCDD	2000	34.29	101	32-141
13C12-1,2,3,6,7,8-HxCDD	2000	34.34	109	28-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.96	93	23-140
13C12-OCDD	4000	37.47	73	17-157
13C12-2,3,7,8-TCDF	2000	27.48	94	24-169
13C12-1,2,3,7,8-PeCDF	2000	31.37	101	24-185
13C12-2,3,4,7,8-PeCDF	2000	32.06	99	21-178
13C12-1,2,3,4,7,8-HxCDF	2000	33.81	122	26-152
13C12-1,2,3,6,7,8-HxCDF	2000	33.88	121	26-123
13C12-2,3,4,6,7,8-HxCDF	2000	34.19	116	28-136
13C12-1,2,3,7,8,9-HxCDF	2000	34.62	110	29-147
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.40	108	28-143
13C12-1,2,3,4,7,8,9-HpCDF	2000	36.21	102	26-138

Cleanup Standard	**pg**			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	28.43	86	35-197

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**		
Total-TCDD	0.00	<0.24	0.24	U	9.9
Total-PeCDD	0.00	<0.67	0.67	U	50
Total-HxCDD	0.00	<0.80	0.80	U	50
Total-HpCDD	0.00	<0.74	0.74	U	50
Total-TCDF	0.00	<0.23	0.23	U	9.9
Total-PeCDF	0.00	<0.27	0.27	U	50
Total-HxCDF	0.00	<0.80	0.80	U	50
Total-HpCDF	0.00	<1.5	1.5	U	50

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	0.0137
Mid Point PCDD/F TEQ (WHO 2005)	0.812
Upper Bound PCDD/F TEQ (WHO 2005)	1.57

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
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	**21-22114-EC-4 EMULSION FEED**	Sampling Date	n/a		
ALS Sample ID	L2644432-4	Extraction Date	13-Oct-21		Approved:
Analysis Method	EPA 1613B	Sample Size	1.0446	g	*K.BERG*
Analysis Type	Sample	Percent Moisture	90.9%		--e-signature--
Sample Matrix	Stack	Split Ratio	2		27-Nov-2021

Run Information	**Run 1**
Filename	7-211106A27
Run Date	07-Nov-21 11:00
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS 7 DB5MSUS0287812H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
2,3,7,8-TCDD	1	28.48	<0.50	0.50	M,U		9.6
1,2,3,7,8-PeCDD	1	32.31	<0.71	0.71	M,U	0.57	48
1,2,3,4,7,8-HxCDD	0.1	34.30	<0.87	0.87	M,U	0.80	48
1,2,3,6,7,8-HxCDD	0.1	34.35	8.46	0.81	M,J		48
1,2,3,7,8,9-HxCDD	0.1	34.48	<1.3	0.84	M,J,R	1.3	48
1,2,3,4,6,7,8-HpCDD	0.01	35.96	849	2.6			48
OCDD	0.0003	37.47	6320	4.1			96
2,3,7,8-TCDF	0.1	27.54	<0.64	0.64	U	0.63	9.6
1,2,3,7,8-PeCDF	0.03	31.38	0.695	0.53	M,J,B		48
2,3,4,7,8-PeCDF	0.3	32.11	<0.63	0.51	M,J,R	0.63	48
1,2,3,4,7,8-HxCDF	0.1	33.83	<0.69	0.69	U	0.45	48
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.69	0.69	U		48
2,3,4,6,7,8-HxCDF	0.1	34.20	1.37	0.81	J		48
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<0.96	0.96	U		48
1,2,3,4,6,7,8-HpCDF	0.01	35.40	19.6	1.0	J		48
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.5	1.5	U		48
OCDF	0.0003	37.57	119	1.7			96

Extraction Standards	**pg**		**% Rec**	**Limits**	
13C12-2,3,7,8-TCDD	2000	28.43	100	25-164	
13C12-1,2,3,7,8-PeCDD	2000	32.29	87	25-181	
13C12-1,2,3,4,7,8-HxCDD	2000	34.29	115	32-141	M
13C12-1,2,3,6,7,8-HxCDD	2000	34.34	111	28-130	M
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.96	83	23-140	
13C12-OCDD	4000	37.46	59	17-157	
13C12-2,3,7,8-TCDF	2000	27.50	114	24-169	
13C12-1,2,3,7,8-PeCDF	2000	31.38	102	24-185	
13C12-2,3,4,7,8-PeCDF	2000	32.08	101	21-178	
13C12-1,2,3,4,7,8-HxCDF	2000	33.81	129	26-152	
13C12-1,2,3,6,7,8-HxCDF	2000	33.88	136	26-123	
13C12-2,3,4,6,7,8-HxCDF	2000	34.19	121	28-136	
13C12-1,2,3,7,8,9-HxCDF	2000	34.62	118	29-147	
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.40	100	28-143	
13C12-1,2,3,4,7,8,9-HpCDF	2000	36.21	92	26-138	

Cleanup Standard	**pg**				
37Cl4-2,3,7,8-TCDD (Cleanup)	40	28.46	93	35-197	

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**		
Total-TCDD	2.00	0.895	0.50		9.6
Total-PeCDD	0.00	<0.71	0.71	U	48
Total-HxCDD	3.00	50.3	0.87		48
Total-HpCDD	2.00	1570	2.6		48
Total-TCDF	9.00	25.2	0.64		9.6
Total-PeCDF	1.00	0.695	0.53		48
Total-HxCDF	3.00	20.1	0.96		48
Total-HpCDF	2.00	80.5	1.5		48

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	11.6
Mid Point PCDD/F TEQ (WHO 2005)	12.7
Upper Bound PCDD/F TEQ (WHO 2005)	13.6

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

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a	
ALS Sample ID	WG3626818-1	Extraction Date	13-Oct-21	Approved:
Analysis Method	EPA 1613B	Sample Size	1.60 g	*K.BERG*
Analysis Type	Blank	Percent Moisture	n/a	--e-signature--
Sample Matrix	QC	Split Ratio	2	27-Nov-2021

Run Information	**Run 1**
Filename	7-211106A21
Run Date	07-Nov-21 06:38
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS 7 DB5MSUS0287812H

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	<0.13	0.13	U		6.3
1,2,3,7,8-PeCDD	1	NotFnd	<0.078	0.078	U		31
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.084	0.084	U		31
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<0.085	0.085	U		31
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.084	0.084	U		31
1,2,3,4,6,7,8-HpCDD	0.01	35.95	<0.25	0.13	M,J,R	0.25	31
OCDD	0.0003	37.46	0.726	0.18	J		63
2,3,7,8-TCDF	0.1	27.45	<0.092	0.092	U		6.3
1,2,3,7,8-PeCDF	0.03	31.37	0.120	0.056	J		31
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.048	0.048	U		31
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.052	0.052	U		31
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.050	0.050	U		31
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.052	0.052	U		31
1,2,3,7,8,9-HxCDF	0.1	34.61	<0.25	0.077	J,R	0.25	31
1,2,3,4,6,7,8-HpCDF	0.01	35.40	<0.27	0.054	J,R	0.27	31
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.078	0.078	U		31
OCDF	0.0003	37.55	1.61	0.17	J		63

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	28.38	85	25-164
13C12-1,2,3,7,8-PeCDD	2000	32.26	94	25-181
13C12-1,2,3,4,7,8-HxCDD	2000	34.28	103	32-141
13C12-1,2,3,6,7,8-HxCDD	2000	34.33	111	28-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.95	85	23-140
13C12-OCDD	4000	37.46	64	17-157
13C12-2,3,7,8-TCDF	2000	27.45	94	24-169
13C12-1,2,3,7,8-PeCDF	2000	31.35	102	24-185
13C12-2,3,4,7,8-PeCDF	2000	32.05	104	21-178
13C12-1,2,3,4,7,8-HxCDF	2000	33.79	110	26-152
13C12-1,2,3,6,7,8-HxCDF	2000	33.87	121	26-123
13C12-2,3,4,6,7,8-HxCDF	2000	34.18	115	28-136
13C12-1,2,3,7,8,9-HxCDF	2000	34.60	106	29-147
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.39	97	28-143
13C12-1,2,3,4,7,8,9-HpCDF	2000	36.20	89	26-138

Cleanup Standard	**pg**			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	28.40	81	35-197

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**		**LQL**
Total-TCDD	0.00	<0.13	0.13	U	6.3
Total-PeCDD	0.00	<0.078	0.078	U	31
Total-HxCDD	0.00	<0.085	0.085	U	31
Total-HpCDD	0.00	<0.13	0.13	U	31
Total-TCDF	0.00	<0.092	0.092	U	6.3
Total-PeCDF	1.00	0.120	0.056		31
Total-HxCDF	0.00	<0.077	0.077	U	31
Total-HpCDF	0.00	<0.078	0.078	U	31

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	0.00430
Mid Point PCDD/F TEQ (WHO 2005)	0.171
Upper Bound PCDD/F TEQ (WHO 2005)	0.308

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		
ALS Sample ID	WG3626818-2	Extraction Date	13-Oct-21		Approved:
Analysis Method	EPA 1613B	Sample Size	1	n/a	*K.BERG*
Analysis Type	LCS	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	2		27-Nov-2021

Run Information	**Run 1**
Filename	7-211106A18
Run Date	07-Nov-21 04:30
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS 7 DB5MSUS0287812H

Target Analytes	**pg**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	200	28.41	93	67-158	
1,2,3,7,8-PeCDD	1000	32.27	105	70-142	
1,2,3,4,7,8-HxCDD	1000	34.28	99	70-164	
1,2,3,6,7,8-HxCDD	1000	34.33	91	76-134	
1,2,3,7,8,9-HxCDD	1000	34.46	97	64-162	
1,2,3,4,6,7,8-HpCDD	1000	35.95	97	70-140	
OCDD	2000	37.46	90	78-144	
2,3,7,8-TCDF	200	27.48	102	75-158	
1,2,3,7,8-PeCDF	1000	31.36	103	80-134	
2,3,4,7,8-PeCDF	1000	32.06	95	68-160	
1,2,3,4,7,8-HxCDF	1000	33.80	96	72-134	
1,2,3,6,7,8-HxCDF	1000	33.87	95	84-130	
2,3,4,6,7,8-HxCDF	1000	34.19	94	70-156	
1,2,3,7,8,9-HxCDF	1000	34.61	100	78-130	
1,2,3,4,6,7,8-HpCDF	1000	35.39	96	82-122	
1,2,3,4,7,8,9-HpCDF	1000	36.20	96	78-138	
OCDF	2000	37.55	94	63-170	
Extraction Standards	**pg**		**% Rec**	**Limits**	
13C12-2,3,7,8-TCDD	2000	28.38	60	20-175	
13C12-1,2,3,7,8-PeCDD	2000	32.26	71	21-227	
13C12-1,2,3,4,7,8-HxCDD	2000	34.28	71	21-193	
13C12-1,2,3,6,7,8-HxCDD	2000	34.32	74	25-163	
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.94	67	26-166	
13C12-OCDD	4000	37.46	61	13-138	
13C12-2,3,7,8-TCDF	2000	27.47	66	22-152	
13C12-1,2,3,7,8-PeCDF	2000	31.35	75	21-192	
13C12-2,3,4,7,8-PeCDF	2000	32.05	76	13-328	
13C12-1,2,3,4,7,8-HxCDF	2000	33.79	73	19-202	
13C12-1,2,3,6,7,8-HxCDF	2000	33.87	79	21-159	
13C12-2,3,4,6,7,8-HxCDF	2000	34.18	73	22-176	
13C12-1,2,3,7,8,9-HxCDF	2000	34.60	75	17-205	
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.38	73	21-158	
13C12-1,2,3,4,7,8,9-HpCDF	2000	36.20	73	20-186	
Cleanup Standard	**pg**				
37Cl4-2,3,7,8-TCDD (Cleanup)	40	28.41	59	31-191	

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
ALS Project ID:	ORT100	**Client Address:**	804 Southdown Road
ALS WO#:	L2644432		Mississauga, ON L5J 2Y4
Date of Report	30-Nov-21		Canada
Date of Sample Receipt	27-Sep-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors Sarnia

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

Data are reported on an as received basis.

Certified by:

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

Results in this certificate relate only to the samples as submitted to the laboratory.
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Sample Analysis Summary Report

Sample Name	21-22114-RC-4 RICH FEED	Duplicate of 21-22114-RC-4 RICH FEED	21-22114-LC-4 LEAN FEED	21-22114-AC-4 ALKALINE FEED	21-22114-EC-4 EMULSION FEED
ALS Sample ID	L2644432-1	WG3626818-4	L2644432-2	L2644432-3	L2644432-4
Sample Size	1.018	1.047	1.0092	1.007	1.0446
Sample size units	g	g	g	g	g
Percent Moisture	80.39%	78.75%	89.67%	99.28%	90.95%
Sample Matrix	Stack	QC	Stack	Stack	Stack
Sampling Date	n/a	n/a	n/a	n/a	n/a
Extraction Date	13-Oct-21	13-Oct-21	13-Oct-21	13-Oct-21	13-Oct-21
Target Analytes	**pg/g**	**pg/g**	**pg/g**	**pg/g**	**pg/g**
PCB-081	<31	<28	<8.7	<15	<15
PCB-077	294	151	72.9	<15	70.9
PCB-123	178	<130	<9.1	<18	<10
PCB-118	14400	7400	481	<45	508
PCB-114	475	242	15.5	<15	20.2
PCB-105	7610	4040	189	<20	275
PCB-126	111	<41	<7.5	<11	<9.5
PCB-167	482	287	31.1	<7.8	<18
PCB-156/157	1880	887	<73	<11	92.0
PCB-169	33.3	<39	<7.1	<6.1	<6.3
PCB-189	<63	37.5	15.1	<4.6	<11
Extraction Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**	**% Rec**
13C12-PCB-081	23	29	40	31	47
13C12-PCB-077	23	30	44	35	50
13C12-PCB-123	26	30	45	40	58
13C12-PCB-118	25	27	43	38	56
13C12-PCB-114	25	30	42	41	58
13C12-PCB-105	26	30	49	48	52
13C12-PCB-126	31	34	60	64	70
13C12-PCB-167	26	21	30	28	37
13C12-PCB-156/157	24	30	32	28	62
13C12-PCB-169	26	28	39	46	57
13C12-PCB-189	27	24	45	87	69
Homologue Group Totals	**pg/g**	**pg/g**	**pg/g**	**pg/g**	**pg/g**
Total DiCB	5110	2060	6440	<130	2680
Total TriCB	4810	2570	2060	<9.5	1960
Total TetraCB	31000	15900	2260	45.0	3170
Total PentaCB	73300	37600	2750	103	3390
Total HexaCB	42100	26500	4120	18.0	2680
Total HeptaCB	14800	9890	2520	<3.7	1690
Total OctaCB	3010	1700	788	16.0	652
Total NonaCB	243	119	62.0	<10	48.0
DecaCB	231	130	97.6	<4.9	72.3
Total PCB	179000	98900	29400	182	18900
Toxic Equivalency - (WHO 2005)					
Lower Bound PCB TEQ	12.9	0.402	0.0292	0.00	0.0339
Mid Point PCB TEQ	12.9	5.10	0.514	0.647	0.607
Upper Bound PCB TEQ	12.9	5.68	0.997	1.29	1.18

ALS Life Sciences

Quality Control Summary Report

Sample Name	Method Blank
ALS Sample ID	WG3626818-1
Sample Size	1
Sample size units	g
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	13-Oct-21

Target Analytes	pg/g
PCB-081	<1.6
PCB-077	<1.6
PCB-123	<2.3
PCB-118	<2.2
PCB-114	<2.2
PCB-105	<2.2
PCB-126	<2.2
PCB-167	<1.0
PCB-156/157	<1.5
PCB-169	<1.0
PCB-189	<1.0
Extraction Standards	**% Rec**
13C12-PCB-081	21
13C12-PCB-077	22
13C12-PCB-123	22
13C12-PCB-118	21
13C12-PCB-114	23
13C12-PCB-105	24
13C12-PCB-126	27
13C12-PCB-167	27
13C12-PCB-156/157	25
13C12-PCB-169	32
13C12-PCB-189	30

Homologue Group Totals	pg/g
Total DiCB	<6.8
Total TriCB	10.6
Total TetraCB	20.1
Total PentaCB	4.50
Total HexaCB	7.25
Total HeptaCB	<0.84
Total OctaCB	3.09
Total NonaCB	<1.4
DecaCB	5.88
Total PCB	51.4
Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.00
Mid Point PCB TEQ	0.126
Upper Bound PCB TEQ	0.251

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Laboratory Control Sample
ALS Sample ID	WG3626818-2
Sample Size	1
Sample size units	n/a
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	13-Oct-21

Target Analytes	% Rec
PCB-081	99
PCB-077	96
PCB-123	102
PCB-118	104
PCB-114	97
PCB-105	96
PCB-126	95
PCB-167	101
PCB-156/157	99
PCB-169	100
PCB-189	100

Extraction Standards	% Rec
13C12-PCB-081	27
13C12-PCB-077	28
13C12-PCB-123	29
13C12-PCB-118	26
13C12-PCB-114	29
13C12-PCB-105	29
13C12-PCB-126	32
13C12-PCB-167	32
13C12-PCB-156/157	32
13C12-PCB-169	38
13C12-PCB-189	36

ALS Life Sciences

Sample Analysis Report

Sample Name	**21-22114-RC-4 RICH FEED**	Sampling Date	n/a	
ALS Sample ID	L2644432-1	Extraction Date	13-Oct-21	Approved:
Analysis Method	EPA 1668C	Sample Size	1.018 g	*N.Vithanage*
Analysis Type	Sample	Percent Moisture	80.4%	--e-signature--
Sample Matrix	Stack	Split Ratio	2	30-Nov-2021

Run Information	**Run 1**
Filename	5_211123A19
Run Date	24-Nov-21 00:11
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-5 SPBOCTYL256001-02

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
PCB-081	0.0003	NotFnd	<31	31	U		49
PCB-077	0.0001	22.22	294	31			49
PCB-123	0.00003	23.21	178	26	M		49
PCB-118	0.00003	23.39	14400	24			49
PCB-114	0.00003	23.68	475	25			49
PCB-105	0.00003	24.03	7610	23			49
PCB-126	0.1	25.68	111	25			49
PCB-167	0.00003	26.52	482	16			49
PCB-156/157	0.00003	27.13	1680	24			98
PCB-169	0.03	28.76	33.3	20	M,J		49
PCB-189	0.00003	30.08	<63	22	M,R	63	49

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	2000	21.91	23	10-145
13C12-PCB-077	2000	22.22	23	10-145
13C12-PCB-123	2000	23.19	26	10-145
13C12-PCB-118	2000	23.37	25	10-145
13C12-PCB-114	2000	23.66	25	10-145
13C12-PCB-105	2000	24.02	26	10-145
13C12-PCB-126	2000	25.61	31	10-145
13C12-PCB-167	2000	26.49	26	10-145
13C12-PCB-156/157	4000	27.13	24	10-145
13C12-PCB-169	2000	28.80	26	10-145
13C12-PCB-189	2000	30.06	27	10-145

Homologue Group Totals	**pg/g**	**pg/g**		
Total MonoCB	4920	23	J	200
Total DiCB	5110	91	J	390
Total TriCB	4810	26	J	390
Total TetraCB	31000	16	J	790
Total PentaCB	73300	13	J	790
Total HexaCB	42100	8.9	J	790
Total HeptaCB	14800	10	J	390
Total OctaCB	3010	13	J	390
Total NonaCB	243	17	J	200
DecaCB	231	7.0	J	200
Total PCB	179000		J	1600

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	12.9
Mid Point PCB TEQ	12.9
Upper Bound PCB TEQ	12.9

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**Duplicate of 21-22114-RC-4 RICH FEED**	Sampling Date	n/a	
ALS Sample ID	WG3626818-4	Extraction Date	13-Oct-21	Approved:
Analysis Method	EPA 1668C	Sample Size	1.047 g	*N.Vithanage*
Analysis Type	Sample	Percent Moisture	78.7%	--e-signature--
Sample Matrix	QC	Split Ratio	2	30-Nov-2021

Run Information	**Run 1**
Filename	S_211123A20
Run Date	24-Nov-21 00:53
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-5 SPBOCTYL256001-02

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
PCB-081	0.0003	NotFnd	<28	28	U		48
PCB-077	0.0001	22.22	151	27			48
PCB-123	0.00003	23.19	<130	25	M,R	130	48
PCB-118	0.00003	23.36	7400	24			48
PCB-114	0.00003	23.66	242	23			48
PCB-105	0.00003	24.02	4040	25			48
PCB-126	0.1	25.66	<41	25	M,J,R	41	48
PCB-167	0.00003	26.49	287	48			48
PCB-156/157	0.00003	27.11	887	44			96
PCB-169	0.03	NotFnd	<39	39	U		48
PCB-189	0.00003	30.06	37.5	20	M,J		48

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**	
13C12-PCB-081	2000	21.89	29	10-145	
13C12-PCB-077	2000	22.20	30	10-145	R
13C12-PCB-123	2000	23.18	30	10-145	
13C12-PCB-118	2000	23.35	27	10-145	
13C12-PCB-114	2000	23.65	30	10-145	
13C12-PCB-105	2000	24.00	30	10-145	
13C12-PCB-126	2000	25.60	34	10-145	
13C12-PCB-167	2000	26.49	21	10-145	
13C12-PCB-156/157	4000	27.12	30	10-145	
13C12-PCB-169	2000	28.79	28	10-145	
13C12-PCB-189	2000	30.05	24	10-145	

Homologue Group Totals	**pg/g**	**pg/g**		
Total MonoCB	2400	9.0	J	190
Total DiCB	2060	110	J	380
Total TriCB	2570	28	J	380
Total TetraCB	15900	14	J	760
Total PentaCB	37600	13	J	760
Total HexaCB	26500	11	J	760
Total HeptaCB	9890	20	J	380
Total OctaCB	1700	22	J	380
Total NonaCB	119	74	J	190
DecaCB	130	39	J	190
Total PCB	98900		J	1500

Toxic Equivalency - (WHO 2005)

Lower Bound PCB TEQ	0.402
Mid Point PCB TEQ	5.10
Upper Bound PCB TEQ	5.68

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	**21-22114-LC-4 LEAN FEED**		Sampling Date	n/a	
ALS Sample ID	L2644432-2		Extraction Date	13-Oct-21	
Analysis Method	EPA 1668C		Sample Size	1.0092	g
Analysis Type	Sample		Percent Moisture	89.7%	
Sample Matrix	Stack		Split Ratio	2	

Approved:
N.Vithanage
--e-signature--
30-Nov-2021

Run Information	**Run 1**
Filename	5_211119A08
Run Date	19-Nov-21 21:40
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-5 SPBOCTYL256001-02

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
PCB-081	0.0003	NotFnd	<8.7	8.7	U		50
PCB-077	0.0001	22.21	72.9	8.0			50
PCB-123	0.00003	NotFnd	<9.1	9.1	U		50
PCB-118	0.00003	23.36	481	8.5			50
PCB-114	0.00003	23.64	15.5	9.1	M,J		50
PCB-105	0.00003	24.02	189	8.4			50
PCB-126	0.1	NotFnd	<7.5	7.5	U		50
PCB-167	0.00003	26.49	31.1	8.4	J		50
PCB-156/157	0.00003	27.12	<73	10	J,R	73	99
PCB-169	0.03	28.82	<7.1	7.1	U	6.4	50
PCB-189	0.00003	30.06	15.1	4.3	M,J		50

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**	
13C12-PCB-081	2000	21.89	40	10-145	
13C12-PCB-077	2000	22.20	44	10-145	
13C12-PCB-123	2000	23.18	45	10-145	
13C12-PCB-118	2000	23.35	43	10-145	
13C12-PCB-114	2000	23.65	42	10-145	
13C12-PCB-105	2000	24.00	49	10-145	
13C12-PCB-126	2000	25.60	60	10-145	
13C12-PCB-167	2000	26.49	30	10-145	
13C12-PCB-156/157	4000	27.12	32	10-145	
13C12-PCB-169	2000	28.79	39	10-145	R
13C12-PCB-189	2000	30.05	45	10-145	

Homologue Group Totals	**pg/g**	**pg/g**		
Total MonoCB	8340	6.2	J	200
Total DiCB	6440	6.5	J	400
Total TriCB	2060	3.4	J	400
Total TetraCB	2260	5.1	J	790
Total PentaCB	2750	3.2	J	790
Total HexaCB	4120	2.8	J	790
Total HeptaCB	2520	4.3	J	400
Total OctaCB	788	8.9	J	400
Total NonaCB	62.0	9.9	J	200
DecaCB	97.6	4.4	J	200
Total PCB	29400		J	1600

Toxic Equivalency - (WHO 2005)

Lower Bound PCB TEQ	0.0292
Mid Point PCB TEQ	0.514
Upper Bound PCB TEQ	0.997

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	**21-22114-AC-4 ALKALINE FEED**	Sampling Date	n/a	
ALS Sample ID	L2644432-3	Extraction Date	13-Oct-21	Approved:
Analysis Method	EPA 1668C	Sample Size	1.007 g	*N.Vithanage*
Analysis Type	Sample	Percent Moisture	99.3%	--e-signature--
Sample Matrix	Stack	Split Ratio	2	30-Nov-2021

Run Information	**Run 1**
Filename	5_211119A09
Run Date	19-Nov-21 22:22
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-5 SPBOCTYL256001-02

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
PCB-081	0.0003	NotFnd	<15	15	U		50
PCB-077	0.0001	NotFnd	<15	15	U		50
PCB-123	0.00003	NotFnd	<18	18	U		50
PCB-118	0.00003	23.33	<45	16	M,J,R	45	50
PCB-114	0.00003	NotFnd	<15	15	U		50
PCB-105	0.00003	23.99	<20	13	J,R	20	50
PCB-126	0.1	NotFnd	<11	11	U		50
PCB-167	0.00003	NotFnd	<7.8	7.8	U		50
PCB-156/157	0.00003	NotFnd	<11	11	U		99
PCB-169	0.03	NotFnd	<6.1	6.1	U		50
PCB-189	0.00003	NotFnd	<4.6	4.6	U		50

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**	
13C12-PCB-081	2000	21.86	31	10-145	
13C12-PCB-077	2000	22.17	35	10-145	
13C12-PCB-123	2000	23.15	40	10-145	R
13C12-PCB-118	2000	23.31	38	10-145	
13C12-PCB-114	2000	23.62	41	10-145	
13C12-PCB-105	2000	23.98	48	10-145	
13C12-PCB-126	2000	25.57	64	10-145	R
13C12-PCB-167	2000	26.46	28	10-145	
13C12-PCB-156/157	4000	27.08	28	10-145	
13C12-PCB-169	2000	28.75	46	10-145	
13C12-PCB-189	2000	30.02	87	10-145	

Homologue Group Totals	**pg/g**	**pg/g**			
Total MonoCB	<33	33	U		200
Total DiCB	<130	130	U		400
Total TriCB	<9.5	9.5	U		400
Total TetraCB	45.0	11	J		790
Total PentaCB	103	8.9	J		790
Total HexaCB	18.0	6.1	J		790
Total HeptaCB	<3.7	3.7	U		400
Total OctaCB	16.0	6.1	J		400
Total NonaCB	<10	10	U		200
DecaCB	<4.9	4.9	U		200
Total PCB	182		J		1600

Toxic Equivalency - (WHO 2005)

Lower Bound PCB TEQ	0.00
Mid Point PCB TEQ	0.647
Upper Bound PCB TEQ	1.29

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	**21-22114-EC-4 EMULSION FEED**	Sampling Date	n/a	
ALS Sample ID	L2644432-4	Extraction Date	13-Oct-21	Approved:
Analysis Method	EPA 1668C	Sample Size	1.0446 g	*N.Vithanage*
Analysis Type	Sample	Percent Moisture	90.9%	--e-signature--
Sample Matrix	Stack	Split Ratio	2	30-Nov-2021

Run Information	**Run 1**
Filename	5_211119A10
Run Date	19-Nov-21 23:04
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-5 SPBOCTYL256001-02

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
PCB-081	0.0003	NotFnd	<15	15	U		48
PCB-077	0.0001	22.20	70.9	15			48
PCB-123	0.00003	NotFnd	<10	10	U		48
PCB-118	0.00003	23.35	508	9.0			48
PCB-114	0.00003	23.64	20.2	9.6	J		48
PCB-105	0.00003	24.00	275	10			48
PCB-126	0.1	NotFnd	<9.5	9.5	U		48
PCB-167	0.00003	26.48	<18	8.5	J,R	18	48
PCB-156/157	0.00003	27.11	92.0	6.7	J		96
PCB-169	0.03	NotFnd	<6.3	6.3	U		48
PCB-189	0.00003	30.06	<11	4.2	M,J,R	11	48

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	2000	21.88	47	10-145
13C12-PCB-077	2000	22.18	50	10-145
13C12-PCB-123	2000	23.16	58	10-145
13C12-PCB-118	2000	23.34	56	10-145
13C12-PCB-114	2000	23.64	58	10-145 R
13C12-PCB-105	2000	23.99	52	10-145
13C12-PCB-126	2000	25.59	70	10-145
13C12-PCB-167	2000	26.48	37	10-145
13C12-PCB-156/157	4000	27.11	62	10-145
13C12-PCB-169	2000	28.78	57	10-145
13C12-PCB-189	2000	30.05	69	10-145

Homologue Group Totals	**pg/g**	**pg/g**		
Total MonoCB	2590	5.0	J	190
Total DiCB	2680	7.9	J	380
Total TriCB	1960	5.5	J	380
Total TetraCB	3170	6.6	J	770
Total PentaCB	3390	3.3	J	770
Total HexaCB	2680	5.1	J	770
Total HeptaCB	1690	4.2	J	380
Total OctaCB	652	4.6	J	380
Total NonaCB	48.0	9.8	J	190
DecaCB	72.3	6.2	J	190
Total PCB	18900		J	1500

Toxic Equivalency - (WHO 2005)

Lower Bound PCB TEQ	0.0339
Mid Point PCB TEQ	0.607
Upper Bound PCB TEQ	1.18

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identifed. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a		
ALS Sample ID	WG3626818-1	Extraction Date	13-Oct-21		Approved:
Analysis Method	EPA 1668C	Sample Size	1	g	*N.Vithanage*
Analysis Type	Blank	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	2		30-Nov-2021

Run Information	**Run 1**
Filename	5_211119A05
Run Date	19-Nov-21 19:34
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-5 SPBOCTYL256001-02

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
PCB-081	0.0003	21.88	<1.6	1.6	U		50
PCB-077	0.0001	22.17	<1.6	1.6	M,U		50
PCB-123	0.00003	NotFnd	<2.3	2.3	U		50
PCB-118	0.00003	NotFnd	<2.2	2.2	U		50
PCB-114	0.00003	NotFnd	<2.2	2.2	U		50
PCB-105	0.00003	NotFnd	<2.2	2.2	U		50
PCB-126	0.1	NotFnd	<2.2	2.2	U		50
PCB-167	0.00003	NotFnd	<1.0	1.0	U		50
PCB-156/157	0.00003	NotFnd	<1.5	1.5	U		100
PCB-169	0.03	NotFnd	<1.0	1.0	U		50
PCB-189	0.00003	NotFnd	<1.0	1.0	U		50

Extraction Standards	**pg**	**Time**	**% Rec**	**Limits**
13C12-PCB-081	2000	21.86	21	10-145
13C12-PCB-077	2000	22.16	22	10-145
13C12-PCB-123	2000	23.15	22	10-145
13C12-PCB-118	2000	23.31	21	10-145
13C12-PCB-114	2000	23.62	23	10-145
13C12-PCB-105	2000	23.97	24	10-145
13C12-PCB-126	2000	25.56	27	10-145
13C12-PCB-167	2000	26.46	27	10-145
13C12-PCB-156/157	4000	27.08	25	10-145
13C12-PCB-169	2000	28.75	32	10-145
13C12-PCB-189	2000	30.02	30	10-145

Homologue Group Totals	**pg/g**	**pg/g**		
Total MonoCB	<2.0	2.0	U	200
Total DiCB	<6.8	6.8	U	400
Total TriCB	10.6	1.9	J	400
Total TetraCB	20.1	1.4	J	800
Total PentaCB	4.50	1.9	J	800
Total HexaCB	7.25	0.85	J	800
Total HeptaCB	<0.84	0.84	U	400
Total OctaCB	3.09	0.83	J	400
Total NonaCB	<1.4	1.4	U	200
DecaCB	5.88	0.62	J	200
Total PCB	51.4		J	1600

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.00
Mid Point PCB TEQ	0.126
Upper Bound PCB TEQ	0.251

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	WG3626818-2	Extraction Date	13-Oct-21		
Analysis Method	EPA 1668C	Sample Size	1	n/a	
Analysis Type	LCS	Percent Moisture	n/a		
Sample Matrix	QC	Split Ratio	1		

Approved:
N.Vithanage
--e-signature--
30-Nov-2021

Run Information	**Run 1**
Filename	5_211119A03
Run Date	19-Nov-21 18:10
Final Volume	25 ul
Dilution Factor	1
Analysis Units	% Rec
Instrument - Column	HRMS-5 SPBOCTYL256001-02

Target Analytes	**pg**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
PCB-081	1000	21.87	99	60-135	
PCB-077	1000	22.18	96	60-135	
PCB-123	1000	23.16	102	60-135	
PCB-118	1000	23.33	104	60-135	
PCB-114	1000	23.63	97	60-135	
PCB-105	1000	23.98	96	60-135	
PCB-126	1000	25.57	95	60-135	
PCB-167	1000	26.47	101	60-135	
PCB-156/157	2000	27.10	99	60-135	
PCB-169	1000	28.76	100	60-135	
PCB-189	1000	30.03	100	60-135	
Extraction Standards		**Time**	**% Rec**	**Limits**	
13C12-PCB-081	2000	21.85	27	40-145	
13C12-PCB-077	2000	22.16	28	40-145	
13C12-PCB-123	2000	23.15	29	40-145	
13C12-PCB-118	2000	23.31	26	40-145	
13C12-PCB-114	2000	23.62	29	40-145	
13C12-PCB-105	2000	23.97	29	40-145	
13C12-PCB-126	2000	25.56	32	40-145	
13C12-PCB-167	2000	26.46	32	40-145	
13C12-PCB-156/157	4000	27.08	32	40-145	
13C12-PCB-169	2000	28.75	38	40-145	
13C12-PCB-189	2000	30.02	36	40-145	

APPENDIX 12

Acid Gases Train Recovery Data Sheet
(1 page)

ORTECH Recovery & Sample Log
Method 26
Incinerator Stack

Client: Clean Harbors Sarnia
Job/Report Number: 22114
Received By: C Belore
How Received: Train Recovery
Job Assigned To: ALS
PO #: 22114 - J2805

Test Number	ORTECH Sample ID 21-22114-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	SEPT 14 21	0.1N H2SO4	30.0	119	89	12	131	Halides
	2	Sept 14, 21	0.1N NaOH	15.0	16	1	4	20	Cyanide
2	3	SEPT 15, 21	0.1N H2SO4	30.0	116	86	19	135	Halides
	4	SEPT 15, 21	0.1N NaOH	15.0	16	201	4	20	Cyanide
3	5	SEPT 16/21	0.1N H2SO4	30.0	115	85	5	120	Halides
	6	SEPT 16/21	0.1N NaOH	15.0	15	0	5	20	Cyanide
Blank	7	SEPT 16/21	0.1N H2SO4	30.0	30	0	70	100	Halides
	8	SEPT 16/21	0.1N NaOH	15.0	15	0	5	20	Cyanide

Impinger 1 empty, Imp 2+3 30ml split 0.1n H2SO4, Imp 4 empty, Imp 5 15ml 0.1n NaOH, Imp 6 Si Gel

Relinquished by: _____ Date: SEPT 17/21

Relinquished to: _____ Date: 17- Sept 21

10.05

APPENDIX 13

Acid Gases Analytical Reports
(10 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#:	L2641473		Mississauga, ON L5J 2Y4
Date of Report	4-Oct-21		Canada
Date of Sample Receipt	17-Sep-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors Sarnia

COMMENTS:

F as HF Anion Analyzed via Ion Chromatography USEPA Method 26/26A (GN 28, 29-Sep-21)
Cl as HCl Anion Analyzed via Ion Chromatography USEPA Method 26/26A (GN 28, 29-Sep-21)
Br as HBr Anion Analyzed via Ion Chromatography USEPA Method 26/26A (GN 28, 29-Sep-21)
I as HI Anion Analyzed via Ion Chromatography USEPA Method 26/26A (GN 29, 30-Sep-21)

ANALYST COMMENTS:

Bromide quantification was complicated due to interference from the closely-eluting sulfate peak. Samples were run at a 30x dilution to resolve the interference, resulting in an increased reporting limit. **PE 4-Oct-21**

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

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

ALS Environmental

Sample Analysis Summary Report

Sample Name	21-22114-M26-1 TEST#1	21-22114-M26-3 TEST#2	21-22114-M26-5 TEST#3	21-22114-M26-7 0.1N H2SO4 BLANK
ALS Sample ID	L2641473-1	L2641473-3	L2641473-5	L2641473-7
Matrix	Stack	Stack	Stack	Stack
Analysis type	Sample	Sample	Sample	Sample
Sampling Date/Time	14-Sep-21	15-Sep-21	16-Sep-21	16-Sep-21
Date of Receipt	17-Sep-21	17-Sep-21	17-Sep-21	17-Sep-21
Ion Chromatography Analysis				
USEPA Method 26/26A	**mg**	**mg**	**mg**	**mg**
Total F^- as HF (ave)	11.7	11.1	13.4	<0.0355
Analysis 1	11.6	11.1	13.5	<0.0355
Analysis 2	11.7	11.1	13.4	<0.0355
Total Cl^- as HCl (ave)	15.6	13.4	18.0	<0.0521
Analysis 1	15.6	13.4	18.1	<0.0521
Analysis 2	15.6	13.5	18.0	<0.0521
Total Br^- as HBr (ave)	<0.631	<0.631	<0.584	<0.513
Analysis 1	<0.631	<0.631	<0.584	<0.513
Analysis 2	<0.631	<0.631	<0.584	<0.513
Total I^- as HI (ave)	0.0993	0.104	0.252	<0.0510
Analysis 1	0.0993	0.104	0.252	<0.0510
Analysis 2	0.0993	0.104	0.252	<0.0510

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)	0.0104	0.0651	104%
Analysis 1	0.0104	0.0650	
Analysis 2	0.0104	0.0651	
Total Cl^- as HCl (ave)	0.00399	0.0815	101%
Analysis 1	0.00401	0.0814	
Analysis 2	0.00396	0.0816	
Total Br^- as HBr (ave)	<0.00791	0.260	101%
Analysis 1	<0.00791	0.261	
Analysis 2	<0.00791	0.260	
Total I^- as HI (ave)	<0.00236	0.0762	101%
Analysis 1	<0.00236	0.0762	
Analysis 2	<0.00236	0.0762	

ALS Environmental

Sample QC Summary Report

Sample Name	21-22114-M26-1 TEST#1	21-22114-M26-1 TEST#1	21-22114-M26-1 TEST#1	21-22114-M26-1 TEST#1
ALS Sample ID	L2641473-1	L2641473-1DUP	L2641473-1MS	L2641473-1MS
Matrix	Stack	Stack	Stack	Stack
Analysis type	Sample	Duplicate	Matrix Spike	Matrix Spike
Sampling Date/Time	14-Sep-21	14-Sep-21	14-Sep-21	14-Sep-21
Date of Receipt	17-Sep-21	17-Sep-21	17-Sep-21	17-Sep-21
Ion Chromatography Analysis				
USEPA Method 26/26A	**mg**	**mg**	**mg**	**% Rec**
Total F^- as HF (ave)	11.7	11.8	16.0	102%
Analysis 1	11.6	11.8	15.9	
Analysis 2	11.7	11.7	16.0	
Total Cl^- as HCl (ave)	15.6	15.6	21.8	101%
Analysis 1	15.6	15.6	21.8	
Analysis 2	15.6	15.6	21.9	
Total Br^- as HBr (ave)	<0.631	<0.631	18.7	91%
Analysis 1	<0.631	<0.631	18.6	
Analysis 2	<0.631	<0.631	18.8	
Total I^- as HI (ave)	0.0993	0.0984	2.11	100%
Analysis 1	0.0993	0.0984	2.11	
Analysis 2	0.0993	0.0984	2.11	

ORTECH Environmental
ATTN: Chris Belore
804 Southdown Road
Mississauga ON L5J 2Y4

Date Received: 17-SEP-21
Report Date: 12-OCT-21 12:11 (MT)
Version: FINAL

Client Phone: 905-822-4120

Certificate of Analysis

Lab Work Order #: L2641473
Project P.O. #: 22114-J2805
Job Reference: 22114 CLEAN HARBORS SARNIA
C of C Numbers:
Legal Site Desc:

L. Wrona

Lynne Wrona, M.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2641473-2 21-22114-M26-2 TEST#1							
Sampled By: Client on 14-SEP-21							
Matrix: Stack							
Miscellaneous Parameters							
Cyanide, Total	0.086	PEHT	0.020	ug	06-OCT-21	06-OCT-21	R5613551
Sample Size	20.0		0.10	mL		29-SEP-21	R5604479
L2641473-4 21-22114-M26-4 TEST#2							
Sampled By: Client on 15-SEP-21							
Matrix: Stack							
Miscellaneous Parameters							
Cyanide, Total	0.23	DLM	0.20	ug	06-OCT-21	07-OCT-21	R5613551
Sample Size	20.0		0.10	mL		29-SEP-21	R5604479
L2641473-6 21-22114-M26-6 TEST#3							
Sampled By: Client on 16-SEP-21							
Matrix: Stack							
Miscellaneous Parameters							
Cyanide, Total	<2.0	DLM	2.0	ug	06-OCT-21	07-OCT-21	R5613551
Sample Size	20.0		0.10	mL		29-SEP-21	R5604479
L2641473-8 21-22114-M26-8 0.1N NAOH BLANK							
Sampled By: Client on 16-SEP-21							
Matrix: Stack							
Miscellaneous Parameters							
Cyanide, Total	0.059		0.020	ug	06-OCT-21	06-OCT-21	R5613551
Sample Size	20.0		0.10	mL		29-SEP-21	R5604479

* 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).
PEHT	Parameter Exceeded Recommended Holding Time Prior to Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
AIR VOLUME-WT	Misc.	Air volume (L)	DATA ENTRY
CN-TOT-WT	Impinger	Cyanide, Total	APHA 4500CN C E-STRONG ACID DIST COLORIM

** 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: L2641473 Report Date: 12-OCT-21

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 R5613551								
WG3632808-2 LCS								
Cyanide, Total			99.2		%		70-130	06-OCT-21
Cyanide, Total			0.248		ug		70-130	06-OCT-21
WG3632808-1 MB								
Cyanide, Total			<0.020		ug		0.02	06-OCT-21

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

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Cyanides							
Cyanide, Total							
	2	14-SEP-21	06-OCT-21 00:00	14	22	days	EHT
	4	15-SEP-21	07-OCT-21 00:00	14	22	days	EHT
	6	16-SEP-21	07-OCT-21 00:00	14	21	days	EHT
	8	16-SEP-21	06-OCT-21 00:00	14	20	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 L2641473 were received on 17-SEP-21 10:05.

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.

APPENDIX 14

Volatile Organics Analytical Reports
and DRE Compound Analysis in Feeds Report
(22 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#:	L2641484		Mississauga, ON L5J 2Y4
Date of Report Revision	25-Oct-21		Canada
Date of Sample Receipt	17-Sep-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors Sarnia

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

***** Revised Report *****

This report supersedes all prior reports for the above-noted workorder and test. The report has been revised as follows:
The target analyte list for samples L2641484-10 through L2641484-15 was amended.

***** Original Report Comments *****

Ketone data by VOST analyses are estimated values only

Sample L2641484-12 showed internal standard recoveries below the targeted 50% recovery limit while all three standards showing a similarly low bias. This is evidence for poor collection efficiency overall but not specific to volatility ranges. Surrogate and target analyte results are corrected for internal standard recoveries. All surrogate recoveries are in control indicating that despite the low IS recoveries, the target data are within nornmal ranges of accuracy.

Sample L2641484-12 was run in replacement for sample L2641484-13 (21-22114-VOST-14A/14B TEST#3) since the latter sample tube broke during desorption. Sample L2641484-12 was run after the recommended 14 day hold time due to the time delay to obtain permission from Ortech to run this archived trap pair.

Certified by: _____
Ron McLeod
Technical Director

Results in this certificate relate only to the samples as submitted to the laboratory.
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ALS Environmental

Sample Analysis Summary Report

Sample Name	21-22114-VOST-1A/1B TEST#1		21-22114-VOST-3A/3B TEST#1		21-22114-VOST-5A/5B TEST#1		21-22114-VOST-7A/7B TEST#2		21-22114-VOST-8A/8B TEST#2		21-22114-VOST-9A/9B TEST#2	
ALS Sample ID	L2641484-1		L2641484-2		L2641484-4		L2641484-6		L2641484-7		L2641484-8	
Matrix	VOST		VOST		VOST		VOST		VOST		VOST	
Sampling Date	14-Sep-21		14-Sep-21		14-Sep-21		15-Sep-21		15-Sep-21		15-Sep-21	
Extraction Date	28-Sep-21		28-Sep-21		28-Sep-21		29-Sep-21		29-Sep-21		29-Sep-21	
Target Analytes	**ug**		**ug**		**ug**		**ug**		**ug**		**ug**	
Dichlorodifluoromethane	0.047		<0.02	U	<0.02	U	<0.02	U	0.021	M	<0.02	U
Vinyl Chloride	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Bromomethane	0.567		0.836		0.411		0.927		0.983		0.545	
Trichlorofluoromethane	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
1,1-Dichloroethene	0.024	R	0.03	R	0.026	R	0.017	R	0.023	R	0.019	R
Acetone	0.427		0.421	M	0.406		0.536	M	0.391		0.256	
Methylene Chloride	0.591	M,R	0.774	R	0.368	R	1.006	M,R	1.46	R	0.719	M,R
trans,1,2-Dichloroethene	0.01	M,R	0.016	M	<0.01	U	<0.01	U	0.01	R	<0.01	U
1,1-Dichloroethane	0.032		0.044		0.043		0.023		0.03		0.027	
2-Butanone	0.078	M,R	0.116	R	0.084	R	0.1	R	0.069	M,R	0.037	R
Chloroform	0.104		0.134		0.135		0.11		0.153		0.144	
1,1,1-Trichloroethane	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Carbon Tetrachloride	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Benzene	0.745		0.852		0.771		0.603		0.704		0.608	
Trichloroethene	0.085		0.09	R	0.08		0.065		0.058		0.052	
1,2-Dichloropropane	0.348		0.406		0.367		0.213		0.229		0.219	
Bromodichloromethane	0.078		0.127		0.084		0.096		0.103		0.085	
Toluene	0.408		0.867		0.829		0.558		0.603		0.566	
Tetrachloroethene	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Chlorodibromomethane	0.094		0.067		0.077		0.093		0.092		0.117	
Ethylene Dibromide	<0.02	U	0.022		<0.02	U	0.033		<0.02	U	<0.02	U
Ethylbenzene	0.066		0.078		0.06		0.101		0.087		0.103	
M&P-Xylene	0.065		0.089		0.066		0.129		0.12		0.15	
O-Xylene	0.051		0.073		0.055		0.071		0.061		0.087	
Styrene	1.416		1.867		1.49		1.72		1.414		2.038	E
Bromoform	0.074		0.062		0.071		0.083		0.082		0.095	
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	0.046	M,R	0.027	M,R	0.034	M,R	0.039	M,R	0.057	M,R
Trichlorotrifluoroethane	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Ethyl Acetane	<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)	91		104.6		96.3		201.1		100		149.4	
Surrogate Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
d4-1,2-Dichloroethane(SURR)	73.1	M,R	96.7	R	92.2	R	97.8	R	88.7	M,R	87.5	M,R
d8-Toluene(SURR)	63.8		86.7		94.6		91.2		82		86.1	
4-Bromofluorobenzene(SURR)	78.1		118.2		87.4		102.5		95.5		135.5	
Internal Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
Bromochloromethane	95.3		105		103.7		91.9		75.6		73.9	
1,4-Difluorobenzene	76.7	M	77.5		84		64.2		58.2		61.3	
d5-Chlorobenzene	102.3		86.5		81		55.6		64.4		45.4	L

U	Indicates that this compound was not detected above the RL.
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.
L	Indicates this value is below the control limit.
E	Indicates Estimated value. Instrument response exceeds instrument calibration range of 2.0 ug.

ALS Environmental

Sample Analysis Summary Report

Sample Name	21-22114-VOST-11A/11B TEST#2 FIELD		21-22114-VOST-12A/12B TEST#3		21-22114-VOST-13A/13B TEST#3		21-22114-VOST-15A/15B TEST#3		21-22114-VOST-16A/16B TRIP BLANK	
ALS Sample ID	L2641484-10		L2641484-11		L2641484-12		L2641484-14		L2641484-15	
Matrix	VOST		VOST		VOST		VOST		VOST	
Sampling Date	15-Sep-21		16-Sep-21		16-Sep-21		16-Sep-21		16-Sep-21	
Extraction Date	28-Sep-21		29-Sep-21		6-Oct-21		29-Sep-21		28-Sep-21	
Target Analytes	**ug**		**ug**		**ug**		**ug**		**ug**	
Dichlorodifluoromethane	<0.02	U	<0.02	U	0.021		<0.02	U	<0.02	U
Vinyl Chloride	<0.02	U	<0.02	U	<0.02	U	<0.02	U	<0.02	U
Bromomethane	<0.09	U	0.3		0.542		0.493		<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	0.013		<0.01	U	<0.01	U
Acetone	0.129		0.182		0.379		0.239	M	0.203	
Methylene Chloride	<0.1	U	0.474	R	1.11		0.454	R	0.285	R
trans,1,2-Dichloroethene	<0.01	U	<0.01	U	<0.01	U	<0.01	R	<0.01	U
1,1-Dichloroethane	<0.01	U	<0.01	U	0.016		<0.01	U	<0.01	U
2-Butanone	<0.01	U	0.05		0.16	R	0.1		<0.01	U
Chloroform	<0.01	U	0.077	R	0.134	M	0.077	R	<0.01	U
1,1,1-Trichloroethane	<0.01	U	<0.01	U	<0.01		<0.01	U	<0.01	U
Carbon Tetrachloride	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Benzene	<0.05	U	0.364		0.621		0.492		<0.05	U
Trichloroethene	<0.01	U	0.029		0.043		0.029		0.023	U
1,2-Dichloropropane	<0.01	U	0.054		0.105	R	0.076	R	<0.01	
Bromodichloromethane	<0.01	U	0.043		0.091		0.051		<0.01	U
Toluene	<0.05	U	1.556		1.359		0.897		0.117	U
Tetrachloroethene	<0.01	U	<0.01	U	<0.01	U	<0.01	U	<0.01	U
Chlorodibromomethane	<0.01	U	0.055		0.069	R	0.048	R	<0.01	U
Ethylene Dibromide	<0.02	U	<0.02	U	0.026		<0.02	U	<0.02	U
Ethylbenzene	<0.01	U	0.217		0.339		0.287		<0.01	U
M&P-Xylene	<0.03	U	0.233		0.372		0.356		<0.03	U
O-Xylene	<0.01	U	0.101		0.153		0.158		<0.01	U
Styrene	<0.02	U	0.566		0.723		1.31		<0.02	U
Bromoform	<0.01	U	0.078		0.066		0.074		<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	0.023		<0.02	U
1,2,4-Trimethylbenzene	<0.02	U	0.075		0.044		0.058		<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)	123		102.5		108.5		140.1		104	
Surrogate Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
d4-1,2-Dichloroethane(SURR)	73.3	M,R	108.8	R	116.8	M,R	106.5	R	75.4	R
d8-Toluene(SURR)	87.7		94.3		89.2		79.9		83.1	
4-Bromofluorobenzene(SURR)	75.6		94		118		173.5	H	67.6	
Internal Standards	**% Rec**		**% Rec**		**% Rec**		**% Rec**		**% Rec**	
Bromochloromethane	94.5		82.4		43.2	L	156.3		97.5	
1,4-Difluorobenzene	103.1		59.9		34	L	120.3		102	
d5-Chlorobenzene	106.6		56.6		37.8	L	101.1		117.9	

U	Indicates that this compound was not detected above the RL.
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.
L	Indicates this value is below the control limit.
H	Indicates this value is above the control limit.

ORTECH Environmental
ATTN: Chris Belore
804 Southdown Road
Mississauga ON L5J 2Y4

Date Received: 27-SEP-21
Report Date: 24-NOV-21 13:36 (MT)
Version: FINAL REV. 2

Client Phone: 905-822-4120

Certificate of Analysis

Lab Work Order #: L2644438
Project P.O. #: NOT SUBMITTED
Job Reference: 22114 CLEAN HARBORS
C of C Numbers:
Legal Site Desc:

Comments: ADDITIONAL 24-NOV-21 10:43
ADDITIONAL 21-OCT-21 12:23

L. Wrona

Lynne Wrona, M.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2644438-1 21-22114-FR-3 RICH FEED TEST#1							
Sampled By: Client on 14-SEP-21							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	22-OCT-21	23-OCT-21	R5627989
Xylenes (Total)	8010		72	ug/g		03-NOV-21	
Total THMs	<280		280	ug/g		03-NOV-21	
Ethyl Acetate	<1000		1000	mg/kg	30-SEP-21	05-OCT-21	R5656636
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2,4-Trimethylbenzene	3040	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dibromoethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dichloropropane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,3,5-Trimethylbenzene	890	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
Acetone	1400	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
Benzene	529	DLA	14	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromodichloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromoform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromomethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Carbon tetrachloride	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Chloroform	<220	DLA	220	ug/g	30-SEP-21	21-OCT-21	R5607938
Dibromochloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichlorodifluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichloromethane	<12000	DLA	12000	ug/g	30-SEP-21	21-OCT-21	R5607938
Ethylbenzene	2160	DLA	36	ug/g	30-SEP-21	21-OCT-21	R5607938
Isopropylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
m+p-Xylenes	5930	DLA	60	ug/g	30-SEP-21	21-OCT-21	R5607938
Methyl Ethyl Ketone	<1000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
o-Xylene	2080	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Styrene	1180	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Tetrachloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Toluene	21300	DLA	160	ug/g	30-SEP-21	21-OCT-21	R5607938
trans-1,2-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichloroethylene	41	DLA	20	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichlorofluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Vinyl chloride	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Surrogate: 1,4-Difluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
Surrogate: 4-Bromofluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
L2644438-2 21-22114-FL-3 LEAN FEED TEST#1							
Sampled By: Client on 14-SEP-21							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	22-OCT-21	23-OCT-21	R5627989
Xylenes (Total)	3460		72	ug/g		03-NOV-21	
Total THMs	<200		200	ug/g		03-NOV-21	
Ethyl Acetate	<1000		1000	mg/kg	30-SEP-21	05-OCT-21	R5656636
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2,4-Trimethylbenzene	530	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dibromoethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938

* 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
L2644438-2 21-22114-FL-3 LEAN FEED TEST#1							
Sampled By: Client on 14-SEP-21							
Matrix: Stack							
Volatile Organics by GC/MS-Headspace							
1,2-Dichloropropane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,3,5-Trimethylbenzene	210	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
Acetone	2400	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
Benzene	140	DLA	14	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromodichloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromoform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromomethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Carbon tetrachloride	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Chloroform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dibromochloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichlorodifluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichloromethane	870	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Ethylbenzene	975	DLA	36	ug/g	30-SEP-21	21-OCT-21	R5607938
Isopropylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
m+p-Xylenes	2650	DLA	60	ug/g	30-SEP-21	21-OCT-21	R5607938
Methyl Ethyl Ketone	<1000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
o-Xylene	813	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Styrene	670	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Tetrachloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Toluene	13700	DLA	160	ug/g	30-SEP-21	21-OCT-21	R5607938
trans-1,2-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichloroethylene	<20	DLA	20	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichlorofluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Vinyl chloride	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Surrogate: 1,4-Difluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
Surrogate: 4-Bromofluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
L2644438-3 21-22114-FE-3 EMULSION FEED TEST#1							
Sampled By: Client on 14-SEP-21							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	22-OCT-21	23-OCT-21	R5627989
Xylenes (Total)	<72		72	ug/g		03-NOV-21	
Total THMs	<200		200	ug/g		03-NOV-21	
Ethyl Acetate	<1000		1000	mg/kg	30-SEP-21	05-OCT-21	R5656636
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2,4-Trimethylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dibromoethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dichloropropane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,3,5-Trimethylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
Acetone	7600	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
Benzene	<14	DLA	14	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromodichloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromoform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromomethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Carbon tetrachloride	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Chloroform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dibromochloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichlorodifluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938

* 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
L2644438-3 21-22114-FE-3 EMULSION FEED TEST#1							
Sampled By: Client on 14-SEP-21							
Matrix: Stack							
Volatile Organics by GC/MS-Headspace							
Dichloromethane	13000	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Ethylbenzene	<36	DLA	36	ug/g	30-SEP-21	21-OCT-21	R5607938
Isopropylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
m+p-Xylenes	<60	DLA	60	ug/g	30-SEP-21	21-OCT-21	R5607938
Methyl Ethyl Ketone	<1000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
o-Xylene	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Styrene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Tetrachloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Toluene	<160	DLA	160	ug/g	30-SEP-21	21-OCT-21	R5607938
trans-1,2-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichloroethylene	<20	DLA	20	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichlorofluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Vinyl chloride	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Surrogate: 1,4-Difluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
Surrogate: 4-Bromofluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
L2644438-4 21-22114-FA-3 ALKALINE FEED TEST#1							
Sampled By: Client on 14-SEP-21							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	22-OCT-21	23-OCT-21	R5627989
Xylenes (Total)	<72		72	ug/g		03-NOV-21	
Total THMs	<200		200	ug/g		03-NOV-21	
Ethyl Acetate	<1000		1000	mg/kg	30-SEP-21	05-OCT-21	R5656636
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2,4-Trimethylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dibromoethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dichloropropane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,3,5-Trimethylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
Acetone	<1000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
Benzene	<14	DLA	14	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromodichloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromoform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromomethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Carbon tetrachloride	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Chloroform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dibromochloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichlorodifluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichloromethane	150	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Ethylbenzene	<36	DLA	36	ug/g	30-SEP-21	21-OCT-21	R5607938
Isopropylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
m+p-Xylenes	<60	DLA	60	ug/g	30-SEP-21	21-OCT-21	R5607938
Methyl Ethyl Ketone	<1000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
o-Xylene	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Styrene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Tetrachloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Toluene	<160	DLA	160	ug/g	30-SEP-21	21-OCT-21	R5607938
trans-1,2-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichloroethylene	<20	DLA	20	ug/g	30-SEP-21	21-OCT-21	R5607938

* 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
L2644438-4 21-22114-FA-3 ALKALINE FEED TEST#1							
Sampled By: Client on 14-SEP-21							
Matrix: Stack							
Volatile Organics by GC/MS-Headspace							
Trichlorofluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Vinyl chloride	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Surrogate: 1,4-Difluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
Surrogate: 4-Bromofluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
L2644438-5 21-22114-LW-3 LEACHATE FEED TEST#1							
Sampled By: Client on 14-SEP-21							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	22-OCT-21	23-OCT-21	R5627989
Xylenes (Total)	<72		72	ug/g		03-NOV-21	
Total THMs	<200		200	ug/g		03-NOV-21	
Ethyl Acetate	<1000		1000	mg/kg	30-SEP-21	05-OCT-21	R5656636
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2,4-Trimethylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dibromoethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dichloropropane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,3,5-Trimethylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
Acetone	<1000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
Benzene	<14	DLA	14	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromodichloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromoform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromomethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Carbon tetrachloride	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Chloroform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dibromochloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichlorodifluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichloromethane	140	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Ethylbenzene	<36	DLA	36	ug/g	30-SEP-21	21-OCT-21	R5607938
Isopropylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
m+p-Xylenes	<60	DLA	60	ug/g	30-SEP-21	21-OCT-21	R5607938
Methyl Ethyl Ketone	<1000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
o-Xylene	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Styrene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Tetrachloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Toluene	<160	DLA	160	ug/g	30-SEP-21	21-OCT-21	R5607938
trans-1,2-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichloroethylene	<20	DLA	20	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichlorofluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Vinyl chloride	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Surrogate: 1,4-Difluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
Surrogate: 4-Bromofluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
L2644438-6 21-22114-FR-8 RICH FEED TEST#2							
Sampled By: Client on 15-SEP-21							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	22-OCT-21	23-OCT-21	R5627989
Xylenes (Total)	6530		72	ug/g		03-NOV-21	

* 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
L2644438-6 21-22114-FR-8 RICH FEED TEST#2							
Sampled By: Client on 15-SEP-21							
Matrix: Stack							
Total THMs	<350		350	ug/g		03-NOV-21	
Ethyl Acetate	<1000		1000	mg/kg	30-SEP-21	05-OCT-21	R5656636
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2,4-Trimethylbenzene	2290	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dibromoethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dichloropropane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,3,5-Trimethylbenzene	660	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
Acetone	5200	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
Benzene	269	DLA	14	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromodichloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromoform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromomethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Carbon tetrachloride	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Chloroform	<300	DLA	300	ug/g	30-SEP-21	21-OCT-21	R5607938
Dibromochloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichlorodifluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichloromethane	<8500	DLA	8500	ug/g	30-SEP-21	21-OCT-21	R5607938
Ethylbenzene	1590	DLA	36	ug/g	30-SEP-21	21-OCT-21	R5607938
Isopropylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
m+p-Xylenes	4900	DLA	60	ug/g	30-SEP-21	21-OCT-21	R5607938
Methyl Ethyl Ketone	<2100	DLA	2100	ug/g	30-SEP-21	21-OCT-21	R5607938
o-Xylene	1630	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Styrene	760	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Tetrachloroethylene	300	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Toluene	14600	DLA	160	ug/g	30-SEP-21	21-OCT-21	R5607938
trans-1,2-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichloroethylene	72	DLA	20	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichlorofluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Vinyl chloride	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Surrogate: 1,4-Difluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
Surrogate: 4-Bromofluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
L2644438-7 21-22114-FL-8 LEAN FEED TEST#2							
Sampled By: Client on 15-SEP-21							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	22-OCT-21	23-OCT-21	R5627989
Xylenes (Total)	7200		72	ug/g		03-NOV-21	
Total THMs	<200		200	ug/g		03-NOV-21	
Ethyl Acetate	<1000		1000	mg/kg	30-SEP-21	05-OCT-21	R5656636
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2,4-Trimethylbenzene	1070	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dibromoethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dichloropropane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,3,5-Trimethylbenzene	430	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
Acetone	2700	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938

* 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
L2644438-7 21-22114-FL-8 LEAN FEED TEST#2							
Sampled By: Client on 15-SEP-21							
Matrix: Stack							
Volatile Organics by GC/MS-Headspace							
Benzene	281	DLA	14	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromodichloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromoform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromomethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Carbon tetrachloride	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Chloroform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dibromochloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichlorodifluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichloromethane	1150	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Ethylbenzene	2020	DLA	36	ug/g	30-SEP-21	21-OCT-21	R5607938
Isopropylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
m+p-Xylenes	5490	DLA	60	ug/g	30-SEP-21	21-OCT-21	R5607938
Methyl Ethyl Ketone	<1000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
o-Xylene	1710	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Styrene	1400	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Tetrachloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Toluene	28700	DLA	160	ug/g	30-SEP-21	21-OCT-21	R5607938
trans-1,2-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichloroethylene	28	DLA	20	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichlorofluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Vinyl chloride	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Surrogate: 1,4-Difluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
Surrogate: 4-Bromofluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
L2644438-8 21-22114-FE-8 EMULSION FEED TEST#2							
Sampled By: Client on 15-SEP-21							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	22-OCT-21	23-OCT-21	R5627989
Xylenes (Total)	<72		72	ug/g		03-NOV-21	
Total THMs	<200		200	ug/g		03-NOV-21	
Ethyl Acetate	<1000		1000	mg/kg	30-SEP-21	05-OCT-21	R5656636
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2,4-Trimethylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dibromoethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dichloropropane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,3,5-Trimethylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
Acetone	10000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
Benzene	<14	DLA	14	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromodichloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromoform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromomethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Carbon tetrachloride	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Chloroform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dibromochloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichlorodifluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichloromethane	9570	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Ethylbenzene	<36	DLA	36	ug/g	30-SEP-21	21-OCT-21	R5607938
Isopropylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938

* 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
L2644438-8 21-22114-FE-8 EMULSION FEED TEST#2							
Sampled By: Client on 15-SEP-21							
Matrix: Stack							
Volatile Organics by GC/MS-Headspace							
m+p-Xylenes	<60	DLA	60	ug/g	30-SEP-21	21-OCT-21	R5607938
Methyl Ethyl Ketone	<1000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
o-Xylene	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Styrene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Tetrachloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Toluene	<160	DLA	160	ug/g	30-SEP-21	21-OCT-21	R5607938
trans-1,2-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichloroethylene	<20	DLA	20	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichlorofluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Vinyl chloride	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Surrogate: 1,4-Difluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
Surrogate: 4-Bromofluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
L2644438-9 21-22114-FA-8 ALKALINE FEED TEST#2							
Sampled By: Client on 15-SEP-21							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	22-OCT-21	23-OCT-21	R5627989
Xylenes (Total)	<72		72	ug/g		03-NOV-21	
Total THMs	<200		200	ug/g		03-NOV-21	
Ethyl Acetate	<1000		1000	mg/kg	30-SEP-21	05-OCT-21	R5656636
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2,4-Trimethylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dibromoethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dichloropropane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,3,5-Trimethylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
Acetone	<1000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
Benzene	<14	DLA	14	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromodichloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromoform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromomethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Carbon tetrachloride	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Chloroform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dibromochloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichlorodifluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichloromethane	130	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Ethylbenzene	<36	DLA	36	ug/g	30-SEP-21	21-OCT-21	R5607938
Isopropylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
m+p-Xylenes	<60	DLA	60	ug/g	30-SEP-21	21-OCT-21	R5607938
Methyl Ethyl Ketone	<1000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
o-Xylene	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Styrene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Tetrachloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Toluene	<160	DLA	160	ug/g	30-SEP-21	21-OCT-21	R5607938
trans-1,2-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichloroethylene	<20	DLA	20	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichlorofluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Vinyl chloride	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Surrogate: 1,4-Difluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938

* 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
L2644438-9 21-22114-FA-8 ALKALINE FEED TEST#2							
Sampled By: Client on 15-SEP-21							
Matrix: Stack							
Volatile Organics by GC/MS-Headspace							
Surrogate: 4-Bromofluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
L2644438-10 21-22114-LW-8 LEACHATE FEED TEST#2							
Sampled By: Client on 15-SEP-21							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	22-OCT-21	23-OCT-21	R5627989
Xylenes (Total)	<72		72	ug/g		03-NOV-21	
Total THMs	<200		200	ug/g		03-NOV-21	
Ethyl Acetate	<1000		1000	mg/kg	30-SEP-21	05-OCT-21	R5656636
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2,4-Trimethylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dibromoethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dichloropropane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,3,5-Trimethylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
Acetone	<1000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
Benzene	<14	DLA	14	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromodichloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromoform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromomethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Carbon tetrachloride	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Chloroform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dibromochloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichlorodifluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichloromethane	120	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Ethylbenzene	<36	DLA	36	ug/g	30-SEP-21	21-OCT-21	R5607938
Isopropylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
m+p-Xylenes	<60	DLA	60	ug/g	30-SEP-21	21-OCT-21	R5607938
Methyl Ethyl Ketone	<1000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
o-Xylene	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Styrene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Tetrachloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Toluene	<160	DLA	160	ug/g	30-SEP-21	21-OCT-21	R5607938
trans-1,2-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichloroethylene	<20	DLA	20	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichlorofluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Vinyl chloride	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Surrogate: 1,4-Difluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
Surrogate: 4-Bromofluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
L2644438-11 21-22114-FR-13 RICH FEED TEST#3							
Sampled By: Client on 16-SEP-21							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	22-OCT-21	23-OCT-21	R5627989
Xylenes (Total)	15000		72	ug/g		03-NOV-21	
Total THMs	<530		530	ug/g		03-NOV-21	
Ethyl Acetate	1700		1000	mg/kg	30-SEP-21	05-OCT-21	R5656636
Volatile Organics by GC/MS-Headspace							

* 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
L2644438-11 21-22114-FR-13 RICH FEED TEST#3							
Sampled By: Client on 16-SEP-21							
Matrix: Stack							
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2,4-Trimethylbenzene	3440	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dibromoethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dichloropropane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,3,5-Trimethylbenzene	1150	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
Acetone	7800	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
Benzene	202	DLA	14	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromodichloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromoform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromomethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Carbon tetrachloride	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Chloroform	<500	DLA	500	ug/g	30-SEP-21	21-OCT-21	R5607938
Dibromochloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichlorodifluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichloromethane	<6000	DLA	6000	ug/g	30-SEP-21	21-OCT-21	R5607938
Ethylbenzene	3210	DLA	36	ug/g	30-SEP-21	21-OCT-21	R5607938
Isopropylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
m+p-Xylenes	11800	DLA	60	ug/g	30-SEP-21	21-OCT-21	R5607938
Methyl Ethyl Ketone	<5500	DLA	5500	ug/g	30-SEP-21	21-OCT-21	R5607938
o-Xylene	3280	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Styrene	510	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Tetrachloroethylene	1060	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Toluene	22000	DLA	160	ug/g	30-SEP-21	21-OCT-21	R5607938
trans-1,2-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichloroethylene	417	DLA	20	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichlorofluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Vinyl chloride	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Surrogate: 1,4-Difluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
Surrogate: 4-Bromofluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
L2644438-12 21-22114-FL-13 LEAN FEED TEST#3							
Sampled By: Client on 16-SEP-21							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	22-OCT-21	23-OCT-21	R5627989
Xylenes (Total)	6010		72	ug/g		03-NOV-21	
Total THMs	<200		200	ug/g		03-NOV-21	
Ethyl Acetate	<1000		1000	mg/kg	30-SEP-21	05-OCT-21	R5656636
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2,4-Trimethylbenzene	820	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dibromoethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dichloropropane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,3,5-Trimethylbenzene	330	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
Acetone	2600	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
Benzene	389	DLA	14	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromodichloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromoform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938

* 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
L2644438-12 21-22114-FL-13 LEAN FEED TEST#3							
Sampled By: Client on 16-SEP-21							
Matrix: Stack							
Volatile Organics by GC/MS-Headspace							
Bromomethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Carbon tetrachloride	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Chloroform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dibromochloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichlorodifluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichloromethane	1570	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Ethylbenzene	1700	DLA	36	ug/g	30-SEP-21	21-OCT-21	R5607938
Isopropylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
m+p-Xylenes	4630	DLA	60	ug/g	30-SEP-21	21-OCT-21	R5607938
Methyl Ethyl Ketone	<1000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
o-Xylene	1380	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Styrene	1060	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Tetrachloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Toluene	27300	DLA	160	ug/g	30-SEP-21	21-OCT-21	R5607938
trans-1,2-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichloroethylene	30	DLA	20	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichlorofluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Vinyl chloride	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Surrogate: 1,4-Difluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
Surrogate: 4-Bromofluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
L2644438-13 21-22114-FE-13 EMULSION FEED TEST#3							
Sampled By: Client on 16-SEP-21							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	22-OCT-21	23-OCT-21	R5627989
Xylenes (Total)	<72		72	ug/g		03-NOV-21	
Total THMs	<200		200	ug/g		03-NOV-21	
Ethyl Acetate	<1000		1000	mg/kg	30-SEP-21	05-OCT-21	R5656636
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2,4-Trimethylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dibromoethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dichloropropane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,3,5-Trimethylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
Acetone	8500	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
Benzene	<14	DLA	14	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromodichloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromoform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromomethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Carbon tetrachloride	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Chloroform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dibromochloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichlorodifluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichloromethane	13900	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Ethylbenzene	<36	DLA	36	ug/g	30-SEP-21	21-OCT-21	R5607938
Isopropylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
m+p-Xylenes	<60	DLA	60	ug/g	30-SEP-21	21-OCT-21	R5607938
Methyl Ethyl Ketone	<1000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
o-Xylene	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938

* 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
L2644438-13 21-22114-FE-13 EMULSION FEED TEST#3							
Sampled By: Client on 16-SEP-21							
Matrix: Stack							
Volatile Organics by GC/MS-Headspace							
Styrene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Tetrachloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Toluene	210	DLA	160	ug/g	30-SEP-21	21-OCT-21	R5607938
trans-1,2-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichloroethylene	<20	DLA	20	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichlorofluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Vinyl chloride	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Surrogate: 1,4-Difluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
Surrogate: 4-Bromofluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
L2644438-14 21-22114-FA-13 ALKALINE FEED TEST#3							
Sampled By: Client on 16-SEP-21							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	22-OCT-21	23-OCT-21	R5627989
Xylenes (Total)	<72		72	ug/g		03-NOV-21	
Total THMs	<200		200	ug/g		03-NOV-21	
Ethyl Acetate	<1000		1000	mg/kg	30-SEP-21	05-OCT-21	R5656636
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2,4-Trimethylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dibromoethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dichloropropane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,3,5-Trimethylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
Acetone	<1000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
Benzene	<14	DLA	14	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromodichloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromoform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromomethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Carbon tetrachloride	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Chloroform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dibromochloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichlorodifluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichloromethane	130	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Ethylbenzene	<36	DLA	36	ug/g	30-SEP-21	21-OCT-21	R5607938
Isopropylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
m+p-Xylenes	<60	DLA	60	ug/g	30-SEP-21	21-OCT-21	R5607938
Methyl Ethyl Ketone	<1000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
o-Xylene	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Styrene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Tetrachloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Toluene	<160	DLA	160	ug/g	30-SEP-21	21-OCT-21	R5607938
trans-1,2-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichloroethylene	<20	DLA	20	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichlorofluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Vinyl chloride	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Surrogate: 1,4-Difluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
Surrogate: 4-Bromofluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938

* 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
L2644438-15 21-22114-LW-13 LEACHATE FEED TEST#3							
Sampled By: Client on 16-SEP-21							
Matrix: Stack							
Miscellaneous Parameters							
% Moisture	<0.25		0.25	%	22-OCT-21	23-OCT-21	R5627989
Xylenes (Total)	<72		72	ug/g		03-NOV-21	
Total THMs	<200		200	ug/g		03-NOV-21	
Ethyl Acetate	<1000		1000	mg/kg	30-SEP-21	05-OCT-21	R5656636
Volatile Organics by GC/MS-Headspace							
1,1,1-Trichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,1-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2,4-Trimethylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dibromoethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,2-Dichloropropane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
1,3,5-Trimethylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
Acetone	<1000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
Benzene	<14	DLA	14	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromodichloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromoform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Bromomethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Carbon tetrachloride	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Chloroform	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dibromochloromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichlorodifluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Dichloromethane	150	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Ethylbenzene	<36	DLA	36	ug/g	30-SEP-21	21-OCT-21	R5607938
Isopropylbenzene	<200	DLA	200	ug/g	30-SEP-21	21-OCT-21	R5607938
m+p-Xylenes	<60	DLA	60	ug/g	30-SEP-21	21-OCT-21	R5607938
Methyl Ethyl Ketone	<1000	DLA	1000	ug/g	30-SEP-21	21-OCT-21	R5607938
o-Xylene	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Styrene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Tetrachloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Toluene	<160	DLA	160	ug/g	30-SEP-21	21-OCT-21	R5607938
trans-1,2-Dichloroethylene	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichloroethylene	<20	DLA	20	ug/g	30-SEP-21	21-OCT-21	R5607938
Trichlorofluoromethane	<100	DLA	100	ug/g	30-SEP-21	21-OCT-21	R5607938
Vinyl chloride	<40	DLA	40	ug/g	30-SEP-21	21-OCT-21	R5607938
Surrogate: 1,4-Difluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938
Surrogate: 4-Bromofluorobenzene	N/A	SDO:RNA	-	%	30-SEP-21	21-OCT-21	R5607938

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
SDO:RNA	Surrogate diluted out:% recovery not available

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
THM-SUM-CALC-WT	Soil	Total Trihalomethanes (THMs)	CALCULATION
Total Trihalomethanes (THMs) represents the sum of bromodichloromethane, bromoform, chlorodibromomethane and chloroform. For the purpose of calculation, results less than the detection limit (DL) are treated as zero.			
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.			
VOC-ROU1-HS-WT	Soil	Volatile Organics by GC/MS-Headspace	SW846 8260
Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.			
XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION
Total xylenes represents the sum of o-xylene and m&p-xylene.			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

Quality Control Report

Workorder: L2644438 Report Date: 24-NOV-21

Client: ORTECH Environmental
804 Southdown Road
Mississauga ON L5J 2Y4
Contact: Chris Belore

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-WT	Soil							
Batch R5627989								
WG3643177-5 LCS								
% Moisture			99.1		%		90-110	23-OCT-21
WG3643177-4 MB								
% Moisture			<0.25		%		0.25	23-OCT-21
VOC-FEED-WT	Soil							
Batch R5656636								
WG3664319-4 DUP		**L2644438-1**						
Ethyl Acetate		<1000	<1000	RPD-NA	mg/kg	N/A	50	05-OCT-21
WG3664319-1 MB								
Ethyl Acetate			<1000		mg/kg		1000	05-OCT-21
VOC-ROU1-HS-WT	Soil							
Batch R5607938								
WG3628773-4 DUP		**L2644438-1**						
1,1,1-Trichloroethane		<100	<100	RPD-NA	ug/g	N/A	40	21-OCT-21
1,1-Dichloroethane		<100	<100	RPD-NA	ug/g	N/A	40	21-OCT-21
1,1-Dichloroethylene		<100	<100	RPD-NA	ug/g	N/A	40	21-OCT-21
1,2,4-Trimethylbenzene		3040	3020		ug/g	0.4	40	21-OCT-21
1,2-Dibromoethane		<100	<100	RPD-NA	ug/g	N/A	40	21-OCT-21
1,2-Dichloropropane		<100	<100	RPD-NA	ug/g	N/A	40	21-OCT-21
1,3,5-Trimethylbenzene		890	880		ug/g	1.1	40	21-OCT-21
Acetone		1400	1600		ug/g	12	40	21-OCT-21
Benzene		529	547		ug/g	3.4	40	21-OCT-21
Bromodichloromethane		<100	<100	RPD-NA	ug/g	N/A	40	21-OCT-21
Bromoform		<100	<100	RPD-NA	ug/g	N/A	40	21-OCT-21
Bromomethane		<100	<100	RPD-NA	ug/g	N/A	40	21-OCT-21
Carbon tetrachloride		<100	<100	RPD-NA	ug/g	N/A	40	21-OCT-21
Chloroform		<220	<220		ug/g	4.0	40	21-OCT-21
Dibromochloromethane		<100	<100	RPD-NA	ug/g	N/A	40	21-OCT-21
Dichlorodifluoromethane		<100	<100	RPD-NA	ug/g	N/A	40	21-OCT-21
Dichloromethane		<12000	<1200	RPD-NA	ug/g	N/A	40	21-OCT-21
Ethylbenzene		2160	2160		ug/g	0.1	40	21-OCT-21
Isopropylbenzene		<200	<200	RPD-NA	ug/g	N/A	40	21-OCT-21
m+p-Xylenes		5930	5890		ug/g	0.7	40	21-OCT-21
Methyl Ethyl Ketone		<1000	<1000	RPD-NA	ug/g	N/A	40	21-OCT-21
o-Xylene		2080	2110		ug/g	1.6	40	21-OCT-21

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU1-HS-WT	Soil							
Batch R5607938								
WG3628773-4 DUP		**L2644438-1**						
Styrene		1180	1230		ug/g	4.2	40	21-OCT-21
Tetrachloroethylene		<100	<100	RPD-NA	ug/g	N/A	40	21-OCT-21
Toluene		21300	21500		ug/g	1.0	40	21-OCT-21
trans-1,2-Dichloroethylene		<100	<100	RPD-NA	ug/g	N/A	40	21-OCT-21
Trichloroethylene		41	40		ug/g	2.5	40	21-OCT-21
Trichlorofluoromethane		<100	<100	RPD-NA	ug/g	N/A	40	21-OCT-21
Vinyl chloride		<40	<40	RPD-NA	ug/g	N/A	40	21-OCT-21
WG3628773-1 MB								
1,1,1-Trichloroethane			<100		ug/g		100	21-OCT-21
1,1-Dichloroethane			<100		ug/g		100	21-OCT-21
1,1-Dichloroethylene			<100		ug/g		100	21-OCT-21
1,2,4-Trimethylbenzene			<200		ug/g		200	21-OCT-21
1,2-Dibromoethane			<100		ug/g		100	21-OCT-21
1,2-Dichloropropane			<100		ug/g		100	21-OCT-21
1,3,5-Trimethylbenzene			<200		ug/g		200	21-OCT-21
Acetone			<1000		ug/g		1000	21-OCT-21
Benzene			<14		ug/g		13.6	21-OCT-21
Bromodichloromethane			<100		ug/g		100	21-OCT-21
Bromoform			<100		ug/g		100	21-OCT-21
Bromomethane			<100		ug/g		100	21-OCT-21
Carbon tetrachloride			<100		ug/g		100	21-OCT-21
Chloroform			<100		ug/g		100	21-OCT-21
Dibromochloromethane			<100		ug/g		100	21-OCT-21
Dichlorodifluoromethane			<100		ug/g		100	21-OCT-21
Dichloromethane			<100		ug/g		100	21-OCT-21
Ethylbenzene			<36		ug/g		36	21-OCT-21
Isopropylbenzene			<200		ug/g		200	21-OCT-21
m+p-Xylenes			<60		ug/g		60	21-OCT-21
Methyl Ethyl Ketone			<1000		ug/g		1000	21-OCT-21
o-Xylene			<40		ug/g		40	21-OCT-21
Styrene			<100		ug/g		100	21-OCT-21
Tetrachloroethylene			<100		ug/g		100	21-OCT-21
Toluene			<160		ug/g		160	21-OCT-21
trans-1,2-Dichloroethylene			<100		ug/g		100	21-OCT-21

ALS Environmental

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU1-HS-WT	Soil							
Batch R5607938								
WG3628773-1 MB								
Trichloroethylene			<20		ug/g		20	21-OCT-21
Trichlorofluoromethane			<100		ug/g		100	21-OCT-21
Vinyl chloride			<40		ug/g		40	21-OCT-21
Surrogate: 1,4-Difluorobenzene			90.7		%		70-130	21-OCT-21
Surrogate: 4-Bromofluorobenzene			72.9		%		70-130	21-OCT-21

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	14-SEP-21	29-SEP-21 14:39	7	15	days	EHTR
	2	14-SEP-21	29-SEP-21 14:43	7	15	days	EHTR
	3	14-SEP-21	29-SEP-21 14:44	7	15	days	EHTR
	4	14-SEP-21	29-SEP-21 14:45	7	15	days	EHTR
	5	14-SEP-21	29-SEP-21 14:46	7	15	days	EHTR
	6	15-SEP-21	29-SEP-21 14:47	7	14	days	EHTR
	7	15-SEP-21	29-SEP-21 14:48	7	14	days	EHTR
	8	15-SEP-21	29-SEP-21 14:49	7	14	days	EHTR
	9	15-SEP-21	29-SEP-21 14:50	7	14	days	EHTR
	10	15-SEP-21	29-SEP-21 14:51	7	14	days	EHTR
	11	16-SEP-21	29-SEP-21 14:52	7	13	days	EHTR
	12	16-SEP-21	29-SEP-21 14:53	7	13	days	EHTR
	13	16-SEP-21	29-SEP-21 14:54	7	13	days	EHTR
	14	16-SEP-21	29-SEP-21 14:55	7	13	days	EHTR
	15	16-SEP-21	29-SEP-21 14:56	7	13	days	EHTR
Volatile Organics by GC/MS-Headspace							
	1	14-SEP-21	30-SEP-21 00:00	14	16	days	EHTL
	2	14-SEP-21	30-SEP-21 00:00	14	16	days	EHTL
	3	14-SEP-21	30-SEP-21 00:00	14	16	days	EHTL
	4	14-SEP-21	30-SEP-21 00:00	14	16	days	EHTL
	5	14-SEP-21	30-SEP-21 00:00	14	16	days	EHTL
	6	15-SEP-21	30-SEP-21 00:00	14	15	days	EHT
	7	15-SEP-21	30-SEP-21 00:00	14	15	days	EHT
	8	15-SEP-21	30-SEP-21 00:00	14	15	days	EHT
	9	15-SEP-21	30-SEP-21 00:00	14	15	days	EHT
	10	15-SEP-21	30-SEP-21 00:00	14	15	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2644438 were received on 27-SEP-21 13:20.

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.

APPENDIX 15

Feed and Baghouse Dust Metals Analytical Report
(10 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#:	L2644435		Mississauga, ON L5J 2Y4
Date of Report	12-Oct-21		Canada
Date of Sample Receipt	27-Sep-21	**Client Contact:**	Chris Belore
		Client Project ID:	22114 Clean Harbors

COMMENTS:
Metals analysed via ICP-MS Method USEPA 6020B (SA 06-Oct-21)
Sample Preparation via Hotblock Digestion for Metals in Soils USEPA 200.2 (SA 04-Oct-21)

ANALYST COMMENTS:
Al recovery in the LCS is outside ALS DQOs (found: 77%, limits: 85-115%). Data for this analyte is expected to be biased slightly low.

MS recoveries for Al, Ca, Fe, Mg ,Mn, Sr, and S 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 12-Oct-21**

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

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

ALS Environmental

Sample Analysis Summary Report

Sample Name			21-22114-RC-1 RICH FEED	21-22114-LC-1 LEAN FEED	21-22114-AC-1 ALKALINE FEED	21-22114-EC-1 EMULSION FEED	21-22114-BDC-1 BAGHOUSE DUST	21-22114-LWC-1 LEACHATE FEED
ALS Sample ID			L2644435-1	L2644435-2	L2644435-3	L2644435-4	L2644435-5	L2644435-6
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			27-Sep-21	27-Sep-21	27-Sep-21	27-Sep-21	27-Sep-21	27-Sep-21
Multi-Metals via ICP-MS		**LOR**						
		mg/kg	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
	Aluminum	10	61.7	242	<	108	3520	<
	Antimony	0.4	7.41	2.92	<	1.64	20.5	<
	Arsenic	0.4	0.952	26.4	<	14.5	290	<
	Barium	1	17.5	24.1	<	20.5	250	<
	Beryllium	0.5	<	<	<	<	<	<
	Boron	10	<	17.0	<	15.4	81.8	26.6
	Cadmium	0.1	22.7	2.09	<	0.163	31.7	<
	Calcium	50	801	769	1380	435	21100	297
	Chromium	4	7.71	7.33	<	4.64	71.5	<
	Cobalt	1	1.97	2.37	<	1.83	17.5	<
	Copper	2.5	19.6	51.4	<	41.0	477	<
	Iron	200	261	254	<	235	2850	<
	Lead	0.2	7.92	7.62	<	5.03	13.7	<
	Lithium	1	6.33	4.35	<	1.16	26.2	4.32
	Magnesium	15	41.7	144	25.6	52.5	2170	141
	Manganese	15	<	1230	<	104	9230	<
	Molybdenum	1	3.80	5.39	<	4.83	88.0	3.25
	Nickel	0.5	5.05	8.78	<	16.5	48.2	1.59
	Phosphorus	100	<	223	<	<	3050	<
	Potassium	150	235	10900	<	3220	134000	2090
	Selenium	2	<	<	<	<	18.8	<
	Silver	0.1	<	0.146	<	<	2.54	<
	Sodium	10	693	12600	151	3900	164000	6660
	Strontium	2	16.7	6.06	<	4.79	99.6	2.89
	Tin	2	4.93	3.01	<	4.37	13.0	<
	Titanium	1	5.92	25.7	<	7.71	3380	<
	Vanadium	1	1.00	3.10	<	1.53	34.2	<
	Zinc	20	55.6	96.6	<	113	196	<
	Sulfur	1670	<	6970	<	1840	32600	<
	Silicon	50	3140	203	226	2280	1480	58.7

ALS Environmental

Sample QC Summary Report

Sample Name			LCB	LCS	LCS
ALS Sample ID			LCB	LCS	LCS
Matrix			Solid	Solid	Solid
Analysis Type			Blank	LCS	LCS
Sampling Date			n/a	n/a	n/a
Date of Receipt			n/a	n/a	n/a
Multi-Metals via ICP-MS		**LOR**			
		mg/kg	**mg/kg**	**mg/kg**	**% Rec**
	Aluminum	10	<	51.9	77
	Antimony	0.4	<	6.36	95
	Arsenic	0.4	<	33.1	100
	Barium	1	<	32.1	96
	Beryllium	0.5	<	33.8	102
	Boron	10	<	33.2	100
	Cadmium	0.1	<	16.7	101
	Calcium	50	<	853	103
	Chromium	4	<	33.5	101
	Cobalt	1	<	34.2	103
	Copper	2.5	<	34.1	102
	Iron	200	<	<	104
	Lead	0.2	<	34.0	102
	Lithium	1	<	6.53	97
	Magnesium	15	<	170	102
	Manganese	15	<	34.4	103
	Molybdenum	1	<	16.4	98
	Nickel	0.5	<	34.5	104
	Phosphorus	100	<	800	97
	Potassium	150	<	812	98
	Selenium	2	<	33.9	102
	Silver	0.1	<	16.2	98
	Sodium	10	<	785	94
	Strontium	2	<	33.3	100
	Tin	2	<	16.4	99
	Titanium	1	<	32.9	99
	Vanadium	1	<	33.8	101
	Zinc	20	<	69.1	104
	Sulfur	1670	<	4860	96
	Silicon	50	<	1080	109

ALS Environmental

Sample QC Summary Report

Sample Name			Sample	Duplicate	MS	MS
ALS Sample ID			Sample	Duplicate	MS	MS
Matrix			Solid	Solid	Solid	Solid
Analysis Type			Sample	Duplicate	Matrix Spike	Matrix Spike
Sampling Date			n/a	n/a	n/a	n/a
Date of Receipt			n/a	n/a	n/a	n/a
Multi-Metals via ICP-MS		**LOR mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**% Rec**
	Aluminum	10	198	193	249	nq
	Antimony	0.4	<	<	6.62	99
	Arsenic	0.4	<	<	35.9	107
	Barium	1	3.61	3.42	35.7	97
	Beryllium	0.5	<	<	33.9	102
	Boron	10	<	<	35.3	100
	Cadmium	0.1	<	<	17.4	104
	Calcium	50	124000	125000	128000	nq
	Chromium	4	<	<	35.2	102
	Cobalt	1	<	<	33.7	101
	Copper	2.5	<	<	32.9	98
	Iron	200	267	260	445	nq
	Lead	0.2	0.258	0.261	32.6	97
	Lithium	1	<	<	6.80	97
	Magnesium	15	1240	1230	1410	nq
	Manganese	15	119	118	153	nq
	Molybdenum	1	<	<	17.6	104
	Nickel	0.5	4.59	4.50	37.6	100
	Phosphorus	100	<	<	890	99
	Potassium	150	<	<	854	98
	Selenium	2	<	<	39.4	118
	Silver	0.1	<	<	16.3	98
	Sodium	10	35.8	34.1	820	95
	Strontium	2	78.2	78.5	111	nq
	Tin	2	<	<	17.5	103
	Titanium	1	12.1	11.4	45.6	101
	Vanadium	1	9.81	9.62	44.1	104
	Zinc	20	<	<	72.4	99
	Sulfur	1670	183000	182000	190000	nq
	Silicon	50	391	459	1520	114

ORTECH Environmental
ATTN: Chris Belore
804 Southdown Road
Mississauga ON L5J 2Y4

Date Received: 27-SEP-21
Report Date: 12-OCT-21 15:42 (MT)
Version: FINAL

Client Phone: 905-822-4120

Certificate of Analysis

Lab Work Order #: L2644435
Project P.O. #: NOT SUBMITTED
Job Reference: 22114 CLEAN HARBORS
C of C Numbers:
Legal Site Desc:

L. Wrona

Lynne Wrona, M.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2644435-1 21-22114-RC-1 RICH FEED Sampled By: Client Matrix: Stack **Miscellaneous Parameters** Mercury (Hg)	0.019		0.010	mg/kg wwt	04-OCT-21	04-OCT-21	R5607406
L2644435-2 21-22114-LC-1 LEAN FEED Sampled By: Client Matrix: Stack **Miscellaneous Parameters** Mercury (Hg)	0.314		0.010	mg/kg wwt	04-OCT-21	04-OCT-21	R5607406
L2644435-3 21-22114-AC-1 ALKALINE FEED Sampled By: Client Matrix: Stack **Miscellaneous Parameters** Mercury (Hg)	<0.010		0.010	mg/kg wwt	04-OCT-21	04-OCT-21	R5607406
L2644435-4 21-22114-EC-1 EMULSION FEED Sampled By: Client Matrix: Stack **Miscellaneous Parameters** Mercury (Hg)	0.030		0.010	mg/kg wwt	04-OCT-21	04-OCT-21	R5607406
L2644435-5 21-22114-BDC-1 BAGHOUSE DUST Sampled By: Client Matrix: Stack **Miscellaneous Parameters** Mercury (Hg)	6.40		0.010	mg/kg wwt	04-OCT-21	04-OCT-21	R5607406
L2644435-6 21-22114-LWC-1 LEACHATE FEED Sampled By: Client Matrix: Stack **Miscellaneous Parameters** Mercury (Hg)	<0.010		0.010	mg/kg wwt	04-OCT-21	04-OCT-21	R5607406

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
HG-7471A-CVAA-BU	Solid	Mercury in Solids	METHOD 7471A

Samples are digested at high temperature in an open vessel using strongly oxidizing, and acidic reagents. Mercury is reduced in the instrument, and released as a vapour. This vapour passes between a lamp and detector and the results quantified relative to calibration standards.

** 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
BU	ALS ENVIRONMENTAL - BURLINGTON, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2644435 Report Date: 12-OCT-21

Client: ORTECH Environmental
804 Southdown Road
Mississauga ON L5J 2Y4
Contact: Chris Belore

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-7471A-CVAA-BU	Solid							
Batch R5607406								
WG3630871-2 LCS								
Mercury (Hg)			97.6		%		85-115	04-OCT-21
WG3630871-1 MB								
Mercury (Hg)			<0.010		mg/kg wwt		0.01	04-OCT-21

Quality Control Report

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

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.

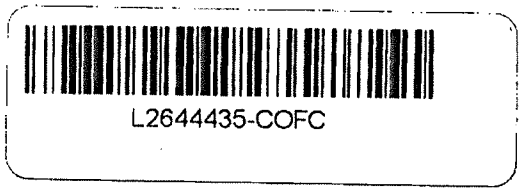
Clean Harbors Lambton
ORTECH Project # 22114
Process Samples
Sample List for ALS Metals Analysis

ORTECH Sample Identification	Sample Description
19- 22114- RC-1	Rich Feed (500 ml bottle)
19- 22114- LC-1	Lean Feed (500 ml bottle)
19- 22114- AC-1	Alkaline Feed (500 ml bottle)
19- 22114- EC-1	Emulsion Feed (500 ml bottle)
19- 22114- BDC-1	Baghouse Dust (500 ml bottle)
19- 22114- LWC-1	Leachate Feed (500 ml bottle)

Custody Relinquished by: [signature] Date: Sept 27, 21

Custody Received by: AARON BURTON Date: 27-Sept-2021 22.0°C

13:20



APPENDIX 16

Master Sample Log/Chains of Custody Forms
(4 pages)

ORTECH Sample Log
Semi-Volatile Organics Samples
Clean Harbors Sarnia

Client: Clean Harbors Sarnia
Job/Report Number: 22114
Received By: C Belore
How Received: Train recovery
Job Assigned To: ALS
PO #: 22114-J2805

ORTECH Sample ID 21-22114-SVOC-	Sample Date	Sample Description	Hazardous Material	Sample Analysis
1	14-Sep-21	Test 1 Probe Rinse	Hexane/Acetone	SVOC
2		Test 1 Filter	Particulate	SVOC
3		Test 1 XAD-II Trap	N.A.	SVOC
4		Test 1 Impinger Solution	Ethylene Glycol	SVOC
5		Test 1 Impinger Rinse	Hexane/Acetone	SVOC
6	15-Sep-21	Test 2 Probe Rinse	Hexane/Acetone	SVOC
7		Test 2 Filter	Particulate	SVOC
8		Test 2 XAD-II Trap	N.A.	SVOC
9		Test 2 Impinger Solution	Ethylene Glycol	SVOC
10		Test 2 Impinger Rinse	Hexane/Acetone	SVOC
11	16-Sep-21	Test 3 Probe Rinse	Hexane/Acetone	SVOC
12		Test 3 Filter	Particulate	SVOC
13		Test 3 XAD-II Trap	N.A.	SVOC
14		Test 3 Impinger Solution	Ethylene Glycol	SVOC
15		Test 3 Impinger Rinse	Hexane/Acetone	SVOC
16	16-Sep-21	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: SEPT 17/21

Relinquished To: Date: 17 Sept 21

10:05

ORTECH Sample Log
Particulate and Metals Samples
Clean Harbors Sarnia

Client: Clean Harbors Sarnia
Job/Report Number: 22114
Received By: C Belore
How Received: Train recovery
Job Assigned To: ALS
PO #: 22114 - J2805

ORTECH Sample ID 21-22114-PM-	Sample Date	Sample Description	Hazardous Material	Sample Analysis
1	14-Sep-21	Test 1 Probe Rinse Acetone	Acetone	Particulate & Metals
2		Test 1 Probe Rinse Nitric	0.1N Nitric	Metals
3		Test 1 Filter	Particulate	Particulate & Metals
4		Test 1 Impinger 1,2,3,4 & 5 Solution	Nitric/Peroxide	Metals
5		Test 1 Impinger 6, 7 Solution	Acid. KMnO4	Metals
6		Test 1 Impinger 6, 7 Rinse	8N HCl	Metals
8	15-Sep-21	Test 2 Probe Rinse Acetone	Acetone	Particulate & Metals
9		Test 2 Probe Rinse Nitric	0.1N Nitric	Metals
10		Test 2 Filter	Particulate	Particulate & Metals
11		Test 2 Impinger 1,2,3,4 & 5 Solution	Nitric/Peroxide	Metals
12		Test 2 Impinger 6, 7 Solution	Acid. KMnO4	Metals
13		Test 2 Impinger 6, 7 Rinse	8N HCl	Metals
15	16-Sep-21	Test 3 Probe Rinse Acetone	Acetone	Particulate & Metals
16		Test 3 Probe Rinse Nitric	0.1N Nitric	Metals
17		Test 3 Filter	Particulate	Particulate & Metals
18		Test 3 Impinger 1,2,3,4 & 5 Solution	Nitric/Peroxide	Metals
19		Test 3 Impinger 6, 7 Solution	Acid. KMnO4	Metals
20		Test 3 Impinger 6, 7 Rinse	8N HCl	Metals
22	15-Sep-21	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: SEPT 17/21

Relinquished To: [signature] Date: 17- Sept 21

10:05

ORTECH Consulting Inc.
Project # 22114
Vost Sample List
Clean Harbors Sarnia

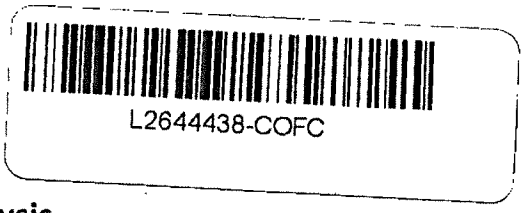
Test Number	ORTECH Sample ID 21-22114-VOST-	Sample Date	Sample Description	Sample Analysis
1	1A/1B	14-Sep-21	Tenax and Tenax/Charcoal (Pair 1)	VOCs
1	3A/3B	14-Sep-21	Tenax and Tenax/Charcoal (Pair 2)	VOCs
1	4A/4B	14-Sep-21	Tenax and Tenax/Charcoal (Pair 3)	Archive
1	5A/5B	14-Sep-21	Tenax and Tenax/Charcoal (Pair 4)	VOCs
1	6A/6B	14-Sep-21	Field Blank	Archive
2	7A/7B	15-Sep-21	Tenax and Tenax/Charcoal (Pair 1)	VOCs
2	8A/8B	15-Sep-21	Tenax and Tenax/Charcoal (Pair 2)	VOCs
2	9A/9B	15-Sep-21	Tenax and Tenax/Charcoal (Pair 3)	VOCs
2	10A/10B	15-Sep-21	Tenax and Tenax/Charcoal (Pair 4)	Archive
2	11A/11B	15-Sep-21	Field Blank	Archive
3	12A/12B	16-Sep-21	Tenax and Tenax/Charcoal (Pair 1)	VOCs
3	13A/13B	16-Sep-21	Tenax and Tenax/Charcoal (Pair 2)	Archive
3	14A/14B	16-Sep-21	Tenax and Tenax/Charcoal (Pair 3)	VOCs
4	15A/15B	16-Sep-21	Tenax and Tenax/Charcoal (Pair 4)	VOCs
3	16A/16B	16-Sep-21	Field Blank	VOCs
~~Blank~~	~~17A/17B~~	~~16-Sep-21~~	~~Trip Blank~~	VOCs

* Archived samples to be held for future reference

Custody Relinquished by: [signature] Date: SEPT 17/21

Custody Received by: [signature] Date: 17- Sept 21

10:05



Clean Harbors Lambton
ORTECH Project # 22114
Process Samples
Sample List for ALS DRE Analysis

Test Number	Test Date	ORTECH Sample Identification	Sample Description
1	Sept 14, 21	19- 22114- FR-3	Rich Feed (250 ml bottle) 1
1		19- 22114- FL-3	Lean Feed (250 ml bottle) 2
1		19- 22114- FE-3	Emulsion Feed (250 ml bottle) 3
1		19- 22114- FA-3	Alkaline Feed (250 ml bottle) 4
1		19- 22114- LW-3	Leachate Feed (250 ml bottle) 5
2	Sept 15, 21	19- 22114- FR-8	Rich Feed (250 ml bottle) 6
2		19- 22114- FL-8	Lean Feed (250 ml bottle) 7
2		19- 22114- FE-8	Emulsion Feed (250 ml bottle) 8
2		19- 22114- FA-8	Alkaline Feed (250 ml bottle) 9
2		19- 22114- LW-8	Leachate Feed (250 ml bottle) 10
3	Sept 16, 21	19- 22114- FR-13	Rich Feed (250 ml bottle) 11
3		19- 22114- FL-13	Lean Feed (250 ml bottle) 12
3		19- 22114- FE-13	Emulsion Feed (250 ml bottle) 13
3		19- 22114- FA-13	Alkaline Feed (250 ml bottle) 14
3		19- 22114- LW-13	Leachate Feed (250 ml bottle) 15

Custody Relinquished by: [signature] Date: Sept 27, 21

Custody Received by: AARON BRETON Date: 27-Sept-2021 13:20

22.0°C

FULL VOC LIST

SAME AS VOST FOR THIS JOB

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= 0.2600 inches	Acceptable
Nozzle- Semi-Volatile Organics Train	for n=4 measurements high-low <0.10 mm	average= 0.2556 inches	Acceptable
S-Type Pitot #S4 (B03765) Metals Train	coefficient typically 0.84 ± 0.04	0.845	Acceptable
S-Type Pitot #S1 (B03761) Semi-Volatile Organics Train	coefficient typically 0.84 ± 0.04	0.843	Acceptable
Inclined Manometer # TEAM2 (COE20092) Metals Train	percentage difference within 5%	0% to 3.7%	Acceptable
Inclined Manometer # TEAM1 (COE20094) Semi-Volatile Organics Train	percentage difference within 5%	-0.8% to 3.7%	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: 0.995	Acceptable
Dry Gas Meter A10117 Acid Gases/VOST Trains	± 1% over the working range DGMCF factor of 0.95-1.05	DGMCF: 1.015 (2 lpm) DGMCF: 1.020 (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: 1.000	Acceptable
Trendicator (COE20092)	±1.5% of actual value	-0.5% to 0%	Acceptable
Trendicator (COE20094)	±1.5% of actual value	-0.8% to 1.4%	Acceptable
Trendicator (A10117) (temperature readout)	±1.5% of actual value	-1.0% to 0.2%	Acceptable
Digimatic Calipers (B03906)	Calibrated annually to manufacturers specifications		Acceptable

Note: Calibration of the thermocouples, balances and digimatic calipers are performed externally, to manufacturers specifications.

TABLE 2
Clean Harbors Sarnia
Percent Isokineticity Summary

Metals Trains

Test No.	Recommended Acceptable Limits average= 0.2556 inches	Average Isokineticity %	Number of Non-Isokinetic Readings	Non-Isokinetic Readings as a Percentage of the Total %	QA/QC Status
1	100 ± 10%	105.9	7	8.8	Acceptable
2	100 ± 10%	101.1	0	0	Acceptable
3	100 ± 10%	99.7	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%	104.1	1	1.3	Acceptable
2	100 ± 10%	100.5	0	0	Acceptable
3	100 ± 10%	100.8	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 average= 0.2556 inches	0.004 @ 15"Hg	0.005 @ 22"Hg	0.003 @ 16"Hg	0.003 @ 15"Hg	Acceptable
	2		0.003 @ 15"Hg	0.005 @ 14"Hg	0.003 @ 13"Hg	0.002 @ 16"Hg	Acceptable
	3		0.003 @ 15"Hg	0.003 @ 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	0.005 @ 15"Hg	0.005 @ 15"Hg	0.005 @ 15"Hg	0.005 @ 25"Hg	Acceptable
	2		0.005 @ 25"Hg	0.005 @ 14"Hg	0.005 @ 14"Hg	0.005 @ 14"Hg	Acceptable
	3		0.005 @ 25"Hg	0.003 @ 15"Hg	0.005 @ 15"Hg	0.005 @ 15"Hg	Acceptable

TABLE 4
Clean Harbors Sarnia
ORTECH CEM Daily Zero and Calibration Drift Summary

Test No.	Analyzer	Recommended Acceptable Limits	Zero Drift %	Calibration Drift %	QA/QC Status
1	SO_2	± 3% of span	0.92	1.17	Acceptable
	O_2	"	0.72	0.36	Acceptable
	CO_2	"	0.24	0.60	Acceptable
	CO	"	0	0.40	Acceptable
	NOx	"	0.10	0.15	Acceptable
	THC	"	-0.40	0.3	Acceptable
2	SO_2	± 3% of span	0.91	0.10	Acceptable
	O_2	"	0.40	0.20	Acceptable
	CO_2	"	0.44	1.00	Acceptable
	CO	"	0	0	Acceptable
	NOx	"	0.23	0.35	Acceptable
	THC	"	-0.5	-0.7	Acceptable
3	SO_2	± 3% of span	0.82	0.40	Acceptable
	O_2	"	0.64	0.56	Acceptable
	CO_2	"	0.12	0.68	Acceptable
	CO	"	0	0	Acceptable
	NOx	"	0.27	1.35	Acceptable
	THC	"	0.1	-0.2	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	0.08	-1.50	1.00	-0.33	Acceptable
	O_2	25%	"	1.48	-0.80	0.76	-1.16	Acceptable
	CO_2	25%	"	0	-1.20	0.24	-0.60	Acceptable
	CO	100 ppm	"	0	-0.50	0	-0.90	Acceptable
	NOx	260 ppm	"	0.27	-1.42	0.37	-1.58	Acceptable
	THC	100 ppm	"	0.2	-0.9	-	-	Acceptable
2	SO_2	1000 ppm	± 5% of span	0.09	-1.00	1.00	-1.10	Acceptable
	O_2	25%	"	0.76	-0.64	0.36	-0.84	Acceptable
	CO_2	25%	"	0.04	-1.40	0.48	-0.40	Acceptable
	CO	100 ppm	"	0	-0.60	0	-0.60	Acceptable
	NOx	260 ppm	"	0	-1.35	0.23	-1.69	Acceptable
	THC	100 ppm	"	-0.6	-2.1	-	-	Acceptable
3	SO_2	1000 ppm	± 5% of span	0.05	-0.10	0.87	-0.50	Acceptable
	O_2	25%	"	1.12	-0.56	0.48	-1.12	Acceptable
	CO_2	25%	"	0.24	-0.64	0.36	0.04	Acceptable
	CO	100 ppm	"	0	-0.80	0	-0.80	Acceptable
	NOx	260 ppm	"	0	0.15	0.27	-1.19	Acceptable
	THC	100 ppm	"	-0.7	-1.8	-	-	Acceptable

APPENDIX 18

Equipment Calibration Data
(10 pages)

ORTECH Consulting Inc.
Pitot Tube Calibration

Date	February 16, 2021
Probe/Pitot ID	S1
MII Number	B03761
Calibrated Against	B02911
Cp standard	0.99777
Calibration Procedure	**93-T62-SP-012**

Calibration Facility	ORTECH Consulting Inc.
Calibrated By	Dan Turton
Signature	
Reviewed/Accepted By	

$$Cp = Cpstd * \sqrt{\frac{Pstd}{Ps}}$$

Configuration	Wind Tunnel Velocity m/s	Velocity Head Standard Pitot in. H_2O Pstd	Velocity Head S-Type Pitot in. H_2O Ps	S-Type Pitot Coefficient Cp_s	Deviation From The Mean
With Nozzle	8.13	0.160	0.225	0.843	0.0007
(0.25")	10.37	0.260	0.360	0.849	0.0059
	12.54	0.380	0.540	0.838	0.0051
	14.52	0.510	0.720	0.841	0.0023
	16.77	0.680	0.950	0.846	0.0021
			Mean	0.843	0.0032
Without Nozzle	7.88	0.150	0.210	0.845	0.0017
	9.96	0.240	0.340	0.840	0.0032
	11.86	0.340	0.480	0.841	0.0018
	14.66	0.520	0.730	0.844	0.0006
	16.14	0.630	0.880	0.846	0.0027
			Mean	0.843	0.0020

Note: Pitots must always be used in the orientation that they are calibrated in (marked F for front and B for back).

Acceptance Criteria:
The Cp of Standard Pitots must be in the range of 0.99 ±0.01.
For Stausscheibe (S-Type) Pitots refer to the measurement criteria as specified in Method 2 of the Ontario Source Testing Code. If the pitot meets these measurement requirements it is assigned a Cp of 0.84. Otherwise, calculate the absolute differences between the average pitot tube coefficient and the coefficient obtained for each of the wind tunnel settings. The average of these differences must not exceed 0.01. Otherwise, the calibration must be repeated. (Environment Canada Reference Method EPS 1/RM/8, Section 6).

ORTECH Consulting Inc.
Pitot Tube Calibration

Date	February 16, 2021
Probe/Pitot ID	S4
MII Number	B03765
Calibrated Against	B02911
Cp standard	0.99777
Calibration Procedure	**93-T62-SP-012**

Calibration Facility	ORTECH Consulting Inc.
Calibrated By	Dan Turton
Signature	
Reviewed/Accepted By	

$$Cp = Cpstd * \sqrt{\frac{Pstd}{Ps}}$$

Configuration	Wind Tunnel Velocity m/s	Velocity Head Standard Pitot in. H_2O Pstd	Velocity Head S-Type Pitot in. H_2O Ps	S-Type Pitot Coefficient Cp_s	Deviation From The Mean
With Nozzle	7.74	0.145	0.205	0.841	0.0007
(0.25")	10.17	0.250	0.350	0.845	0.0034
	12.37	0.370	0.520	0.843	0.0018
	14.45	0.505	0.720	0.837	0.0042
	16.14	0.630	0.890	0.841	0.0004
			Mean	0.841	0.0021
Without Nozzle	8.01	0.155	0.220	0.839	0.0017
	10.27	0.255	0.360	0.841	0.0006
	12.12	0.355	0.500	0.842	0.0016
	14.38	0.500	0.710	0.839	0.0019
	16.52	0.660	0.930	0.842	0.0014
			Mean	0.841	0.0014

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 1
Meter MII Number	COE 20094
Orifice Set ID	COE20999
Barometer ID	COE 20028

Calibration Conditions		
Barometric Pressure	29.41	in Hg
Theoretical Critical Vacuum	13.9	in Hg
System Leak Check	>0.001 cfm @ 24" Hg	
Calibration Date	August 12, 2021	
Calibration Technician	Jake Artibello	
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
11.0	0.25	334.978	338.345	77.0	76.0	UR-40	0.2352	75.2	75.2	21.0
10.0	0.56	338.345	342.683	76.0	76.0	UR-48	0.3308	75.2	75.2	20.0
10.0	1.10	342.683	348.603	76.0	76.0	UR-55	0.4520	75.2	75.2	19.0
10.0	2.00	348.603	356.308	76.0	76.0	UR-63	0.5874	75.2	75.2	17.0
10.0	3.70	356.308	366.894	76.0	76.0	UR-73	0.8107	75.2	75.2	14.0

Results								
Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	DH @	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(DY)	($Q_{m(std)(corr)}$)	(DH@)	(DDH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
3.259	0.296	3.289	0.299	1.009	0.009	0.299	1.573	-0.238
4.206	0.421	4.205	0.421	1.000	0.000	0.421	1.781	-0.030
5.748	0.575	5.746	0.575	1.000	0.000	0.575	1.874	0.063
7.498	0.750	7.467	0.747	0.996	-0.004	0.747	2.017	0.206
10.345	1.035	10.306	1.031	0.996	-0.004	1.031	1.959	0.148
			DGMCF	1.000			1.811	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

Manometer Calibration Data

Date	April 7, 2020	Calibrated By	Jake Artibello
Manometer Number	Team 1	Signature	
Manometer MII Number	COE 20094	Reviewed/Accepted By	
Calibrated Against	Dual 3		
MII Number	COE 20008		
Calibration Procedure	03 - J010		

Front Leg

Manometer Scale "H_2O	Manometer Reading "H_2O		Reference Manometer Reading "H_2O	Percent Difference %
	Before Adjustment	After Adjustment		
	0.300	NA	0.310	3.2
0-1.0	0.520		0.540	3.7
	0.776		0.770	-0.8
	2.50		2.51	0.4
1.0-10.0	4.60		4.64	0.9
	6.54		6.56	0.3

$$\text{Percent Difference} = \frac{(\text{Ref. Manometer} - \text{Instrument Reading}) \times 100}{\text{Ref. Manometer}}$$

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
Trendicator Calibration

Calibration Procedure	03 - J005
Trendicator Type	Omega DP118
MII	COE 20094
Date	August 12, 2021
Calibrated By	Jake Artibello
Reviewed and Accepted By	

Fluke Calibrator Output (COE 20024) (°F)	Tredicator Display Value		Percent Difference
	Before Adjustment (°F)	After Adjustment (°F)	(%)
32	32	NA	0.0
70	69		1.4
100	99		1.0
200	201		-0.5
250	252		-0.8
300	301		-0.3
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	1101		-0.1
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

Dry Gas Meter Calibration Using Calibrated Critical Orifice

Meter Console Information	
Meter Number	Team 2
Meter MII Number	COE 20092
Orifice Set ID	COE20999
Barometer ID	COE 20028

Calibration Conditions		
Barometric Pressure	29.68	in Hg
Theoretical Critical Vacuum	14.0	in Hg
System Leak Check	<0.001 cfm @ 23" Hg	
Calibration Date	August 16, 2021	
Calibration Technician	Blair McIntyre	
Reviewed and Accepted By		

Factors/Conversions		
Std Temp	528	°R
Std Press	29.92	in Hg
K_1	17.647	oR/in Hg

Calibration Data										
Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice DH	Volume Initial	Volume Final	Avg. DGM Temp Initial	Avg. DGM Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Q)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F			°F	°F	in Hg
10.0	0.29	135.360	138.476	77.0	77.5	UR-40	0.2352	75.2	75.2	20.6
10.0	0.58	138.514	142.884	77.5	77.5	UR-48	0.3308	75.2	75.2	20.0
10.0	1.15	142.884	148.854	77.5	77.5	UR-55	0.4520	75.2	75.2	18.5
10.0	1.95	148.854	156.562	77.5	77.5	UR-63	0.5874	75.2	75.2	17.0
10.0	3.65	156.562	167.192	77.5	78.5	UR-73	0.8107	75.2	75.2	14.0

Results								
Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	DH @	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(DY)	($Q_{m(std)(corr)}$)	(DH@)	(DDH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
3.040	0.304	3.017	0.302	0.993	-0.003	0.302	1.792	-0.073
4.264	0.426	4.244	0.424	0.995	0.000	0.424	1.811	-0.053
5.834	0.583	5.799	0.580	0.994	-0.001	0.580	1.924	0.059
7.547	0.755	7.536	0.754	0.998	0.003	0.754	1.931	0.067
10.442	1.044	10.401	1.040	0.996	0.001	1.040	1.898	0.033
			DGMCF	0.995			1.865	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	Aug. 16, 2021
Calibrated By	Blair McIntyre
Reviewed and Accepted By	

Fluke Calibrator Output (COE 20024) (°F)	Tredicator Display Value		Percent Difference
	Before Adjustment (°F)	After Adjustment (°F)	(%)
32	32	NA	0.0
70	70		0.0
100	100		0.0
200	201		-0.5
250	251		-0.4
300	301		-0.3
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	August 16, 2021	Calibrated By	Blair McIntyre
Manometer Number	Team 3 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_20	Manometer Reading "H_2O Before Adjustment	Manometer Reading "H_2O After Adjustment	Reference Manometer Reading "H_2O	Percent Difference %
	0.260	NA	0.270	3.7
0-1.0	0.570		0.570	0.0
	0.750		0.770	2.6
	2.45		2.48	1.2
1.0-10.0	5.00		5.01	0.2
	7.40		7.41	0.1

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	Vost 2
Date	Aug, 10th, 2021
Barometric Pressure	29.47
System Leak Check	>0.01 Lpm @ 21 "Hg

MII NUMBERS	
DGM	A10117
Gasometer	A01463
Barometer	COE20028

Calibrated By	Blair McIntyre
Signature	
Reviewed and Accepted By	

ft^3= cm* 1.332 litres per cm/28.3168 litres per ft^3

$$DGMCF = \frac{Vstd\ ft^3}{Vdgm\ ft^3} \quad \frac{Tdgm\ ^\circ F+460}{Tstd\ ^\circ F+460} \quad \frac{Pbar\ (in.\ Hg)}{(Pbar\ in.\ Hg+DGMPressure/13.6)}$$

Gasometer Reading cm			Gasometer Volume	Gasometer Temperature	DGM Reading L		DGM Volume	DGM Average Temperature	DGM Pressure	DGM Outlet	DGM Calibration	Time	Flow Rate
Initial	Final	cm	ft^3	°C	Initial	Final	ft^3	°C	in. H_2O	°C	Factor	min.	lpm
64.70	41.60	23.10	1.087	24.0	1523.690	1554.360	1.083	30.0	6.5	30.0	1.007	15	2.0
41.60	18.20	23.40	1.101	24.0	1554.360	1585.270	1.092	30.0	6.5	30.0	1.012	15	2.1
67.40	44.00	23.40	1.101	24.0	1585.270	1615.920	1.082	31.0	6.5	31.0	1.024	15	2.0
67.40	56.00	11.40	0.536	24.0	1616.640	1631.520	0.525	27.0	2.4	27.0	1.025	15	1.0
56.00	44.90	11.10	0.522	24.0	1631.520	1646.160	0.517	29.0	2.4	29.0	1.021	15	1.0
44.90	33.50	11.40	0.536	24.0	1646.160	1661.340	0.536	30.0	2.4	30.0	1.014	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	
2 Lpm	1.015
1Lpm	1.020

Revision June 5, 2007

ORTECH
Trendicator Calibration

Calibration Procedure	**03-J005**
Trendicator Type	**Nutech**
MII	**A10117**
Date	**Aug, 10th, 2021**
Calibrated By	**Blair McIntyre**
Signature	
Reviewed and Accepted By	

Fluke Calibrator Output (COE 20024) (°C)	Tredicator Display Value		Percent Difference
	Before Adjustment (°C)	After Adjustment (°C)	(%)
0	0	NA	0.0
20	20		0.0
50	50		0.0
100	101		-1.0
150	151		-0.7
200	200		0.0
300	300		0.0
400	400		0.0
500	499		0.2
600	600		0.0

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

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
(5 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:110006:21

2021/09/03

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 2021/08/25, 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. 22114.

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 2021 source testing program.

Modifications to the 2021 Testing Program:

As a result of discussions (Microsoft Teams meeting 2021/07/20), subsequent to the Ministry of Environment and Parks (MECP) Memorandum (2021/06/23): Comments on the 2020 source testing program conducted at Clean Harbors Canada Inc. (Corunna facility). Environmental Compliance Approval No. 6547-5G5MSP; the following reporting and testing modifications will be implemented for the 2021 program.

- ORTECH will calculate and report volatile organic compound emission data using the detection limit for those compounds reported as less than the reportable detection limit

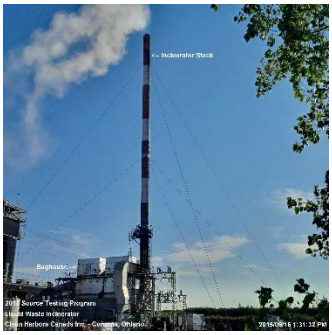
(<RDL) by the analytical laboratory. Previous testing reports used zero values for volatile organic compounds <RDL.

- Clean Harbors will modify the Destruction Removal Efficiency (DRE) surrogate spiking procedures/compounds, to better reflect and quantify the varying and evolving wastes received across all process streams (pages 3-4 of the 2021/06/23 MECP Memorandum).

  Clean Harbors has indicated a revised surrogate spiking procedure will be submitted to MECP Technology Standards Section (TSS) **prior to the 2021 source testing**.

***Target source*:**

- Liquid Waste Incinerator



***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 2021 source testing program.

The 2015 pre-test plan, and 2021 testing/reporting modifications are acceptable, based on the proposed reference methodologies, sampling strategies, and process data monitoring/collection.

We noted the source testing program schedule from 2021/09/14 thru 2021/09/16. If changes in the sampling schedule occur, please notify (via email) 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 416-705-4660, or by email at sourcetesting@ontario.ca.

Regards,

Bill Fullerton
Source Assessment Specialist (A)
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)
H. Mitchell– MECP Sarnia District Office (via email: heather.mitchell@ontario.ca)
S. Mercer – MECP EAPB EPB (via email: steve.mercer@ontario.ca)
J. McKerrall – MECP TASDB TSS (via email: jeffrey.mckerrall@ontario.ca)

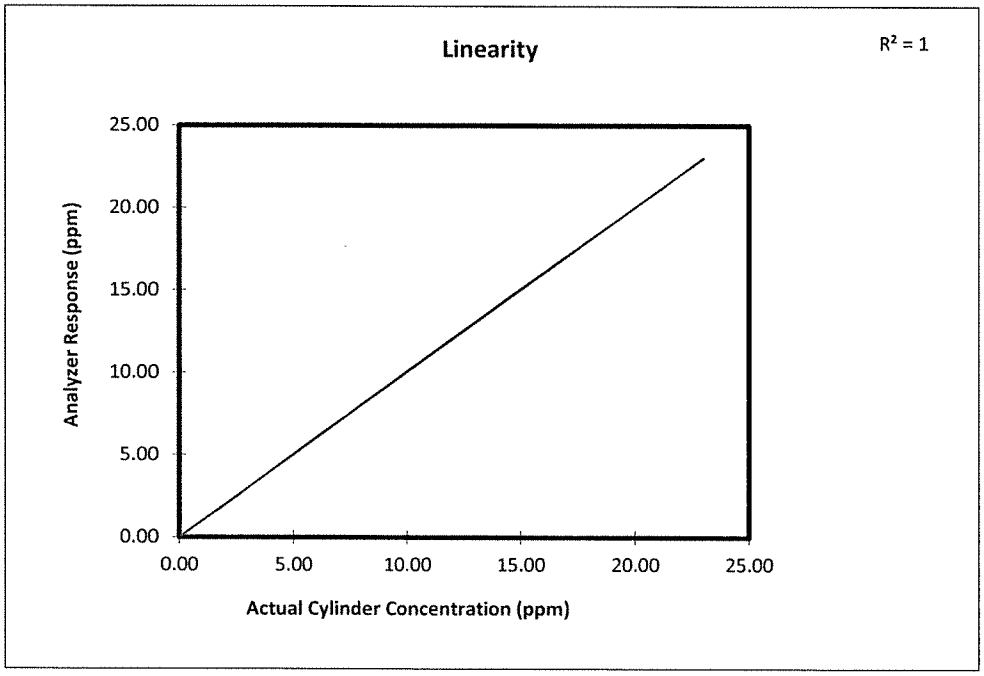
File AQ-02 (Clean Harbors Canada Inc. - Corunna)

APPENDIX 20

ORTECH CEM Linearity Check Data
(6 pages)

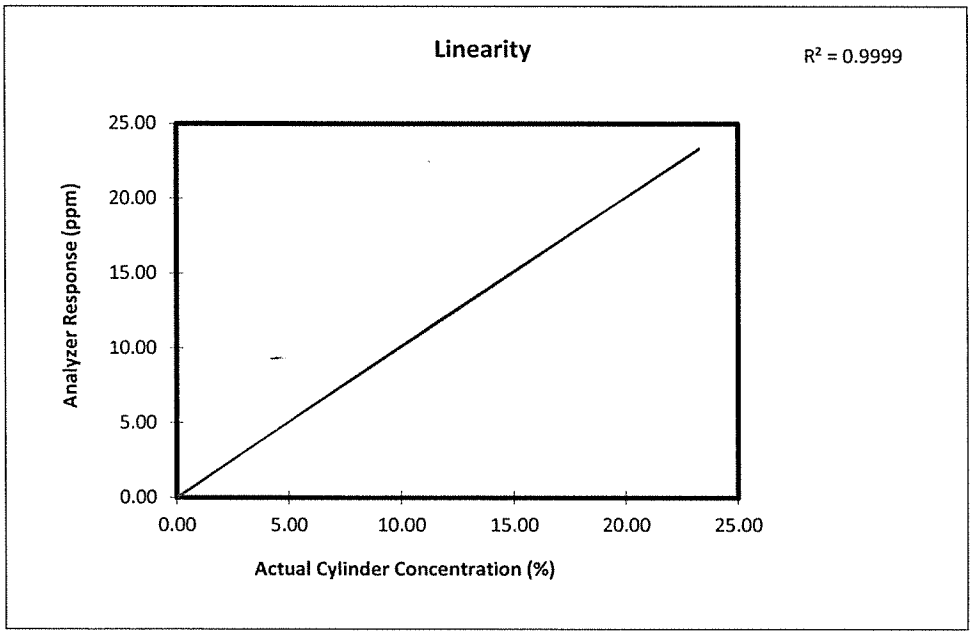
Clean Harbors
September 14, 2021
Analyzer Linearity Determination
Oxygen Analyzer
Siemens Ultramat 23

Range	Analyzer I.D.	Actual Concentration	Instrument Response	Calibration Error (as % of span)
25	COE 20060	0.00	0.02	0.1
		12.69	12.76	0.3
		23.02	23.03	0.0



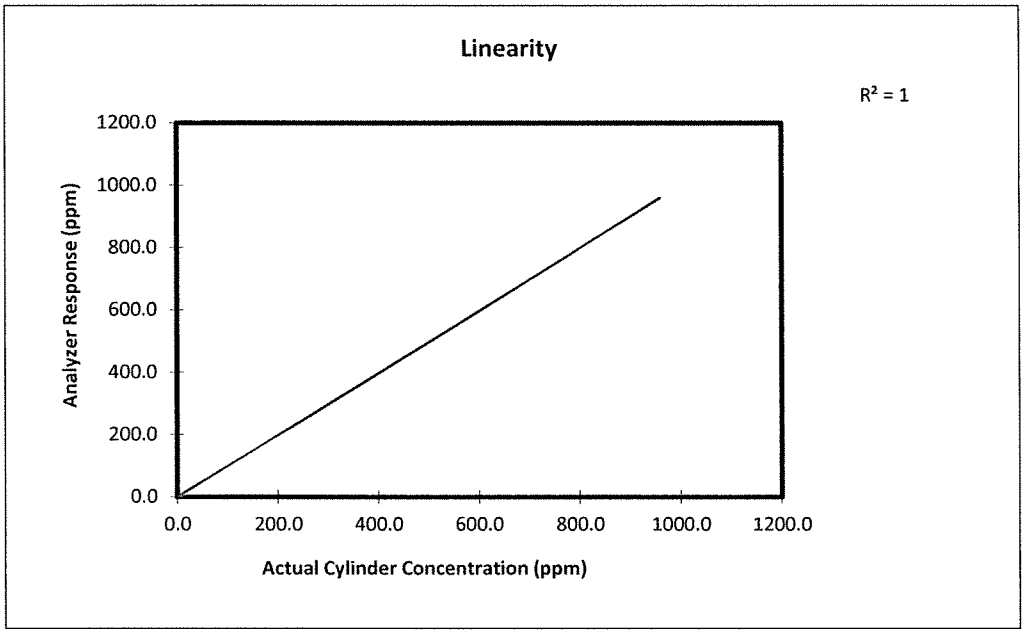
Clean Harbors
September 14, 2021
Analyzer Linearity Determination
Carbon Dioxide Analyzer
Siemens Ultramat 23

Range	Analyzer I.D.	Actual Concentration	Instrument Response	Calibration Error (as % of span)
25	COE 20060	0.00	0.00	0.0
		12.80	12.97	0.7
		23.29	23.31	0.1



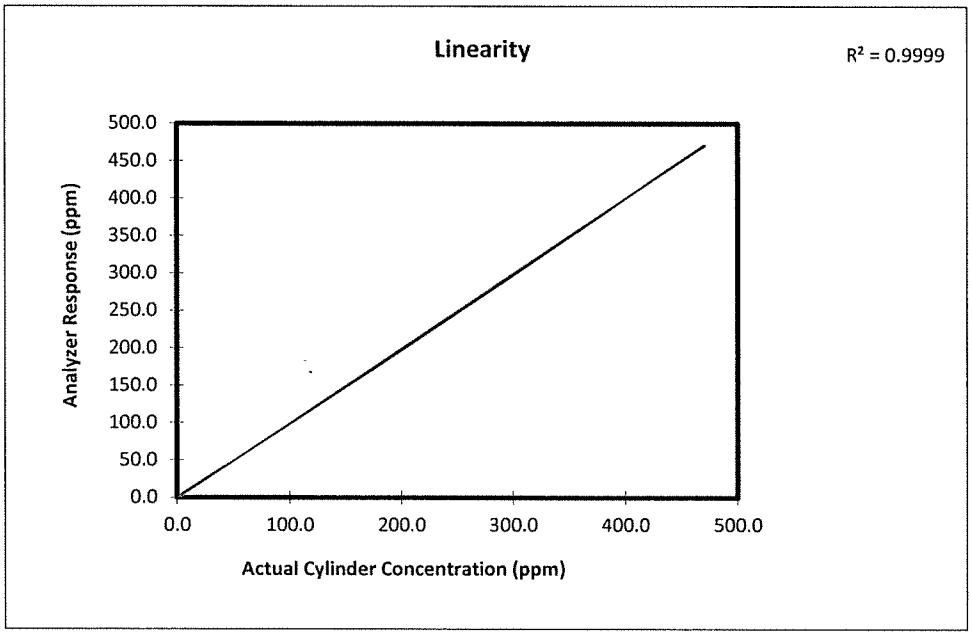
Clean Harbors
September 14, 2021
Analyzer Linearity Determination
Sulphur Dioxide Analyzer
Teledyne API T100H

Range	Analyzer I.D.	Actual Concentration	Instrument Response	Calibration Error (as % of span)
1000	COE 20099	0.0	0.0	0.0
		460.0	455.3	-0.5
		960.1	959.9	0.0



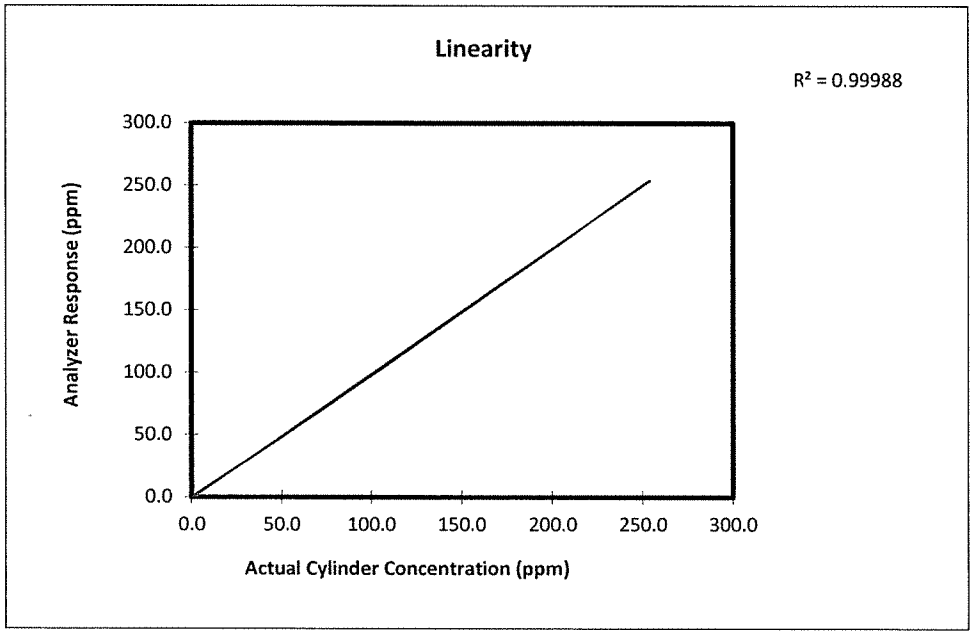
Clean Harbors
September 14, 2021
Analyzer Linearity Determination
Carbon Monoxide Analyzer
Siemens Ultramat 23

Range	Analyzer I.D.	Actual Concentration	Instrument Response	Calibration Error (as % of span)
500	COE 20101	0.0	0.0	0.0
		229.5	226.5	-0.6
		470.8	471.5	0.1



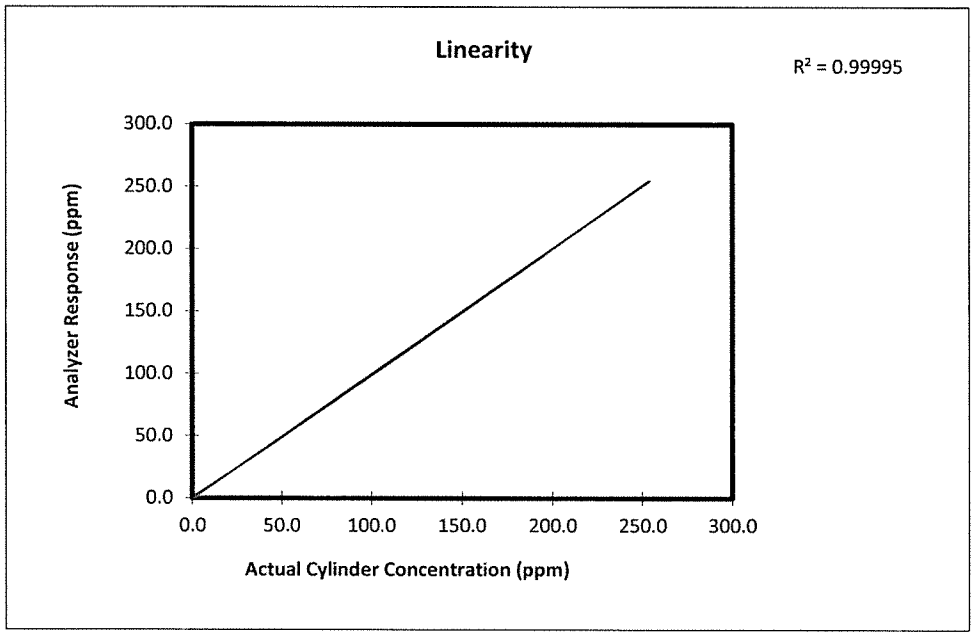
Clean Harbors
September 14, 2021
Analyzer Linearity Determination
Nitric Oxide Analyzer
Teledyne 200EH

Range	Analyzer I.D.	Actual Concentration	Instrument Response	Calibration Error (as % of span)
260	COE 20061	0.0	0.0	0.0
		90.9	88.5	-0.9
		254.1	254.3	0.1



Clean Harbors
September 14, 2021
Analyzer Linearity Determination
Nitrogen Oxides Analyzer
Teledyne 200EH

Range	Analyzer I.D.	Actual Concentration	Instrument Response	Calibration Error (as % of span)
260	COE 20061	0.0	0.0	0.0
		90.9	89.5	-0.5
		254.1	254.8	0.3



APPENDIX 21

ORTECH CEM Calibration Data
(12 pages)

Total Hydrocarbon Reference Method 25A Calibration Data Sheet
Method 25A:SOP Number 95-T62-SP001

Project Number:	22114	Date:	September 14, 2021
Company:	Clean Harbors	Operator:	T, Timar
Location:	Sarnia	Analyzer ID	VIG 20
Test Location:	Incinerator	Test	1

THC Full Scale Setting	**100**
Zero Gas (ppm)	<0.1 ppm
Low Gas Value (ppm)	20-35 % full scale setting
Mid Gas Value (ppm)	45-55 % full scale setting
High Gas Value (ppm)	80-90 % full scale setting

Perform analyzer calibration as per manufacturers instructions.
Calculate the linearity factor "C" based on the zero and high gas values. Based on the calculated linearity, predict the analyzer response for low and mid values (D3 and D4). Calculate calibration error with the low and mid (B3 and B4) gasses.

	Cal.Gas Value (A)		Initial Analyzer Response (B)		Linearity (B2-B1)/(A2-A1)		Predicted Response (A X C)		Calibration Error % ((B)-(D)/AX100	
Zero	0	A1	0	B1	1.002					
High	89.4	A2	89.6	B2		C				
Mid	52.2	A4	52.4	B4			52.3	D4	0.2	E4
Low	30.51	A3	30.31	B3			30.6	D3	-0.9	E3

Criteria +/-5%

Note: If the calibration Error (E3 and E4) are greater than 5%, repeat the procedure until values are acceptable.

Perform test. At the completion of the test or hourly; Calculate the calibration drift as a percent of full scale value.
Introduce the zero and mid level gases at the probe and record data as the system final response.

	System Initial Response (F)	System Final Response (G)	Calibration Drift (G-F)/span*100
Zero	0	0.4	-0.4
Mid	30.31	30.0	0.3

Criteria 3%

Calculate systen response time by introducing zero gas to the probe, record time to reach 95% of calibration gas value.
Repeat with upscale gas. Perform three runs and calculate average of the runs.

	Zero Response Time (seconds)		Upscale Response Time (seconds)
Run 1	43		43
Run 2	44		45
Run 3	43		41
Average	**43**		**43**

Clean Harbors
Mobile Source Monitoring Laboratory # 1
Daily Analyzer Calibration Evaluation
22114
September 14, 2021
Test 1 Final Calculations (Stack)

Analyzer		O2	CO2	SO2	CO	NO	NOx
MII Number/Serial Number		COE 20060	COE 20060	COE 20099	COE 20101	COE 20061	
Model		Siemens Ultramat 23	Siemens Ultramat 23	Teledyne API T100H	Siemens Ultramat 23	Teledyne 200EH	
Range		25	25	1000	500	260	260
Actual Cylinder Value	High	23.02	23.29	960.1	470.8	254.1	254.1
	Mid.	12.69	12.80	460	229.5	90.87	90.87
	Zero	0.00	0.00	0	0	0	0

Analyzer Initial Calibration	Zero	0.02	0.00	0	0.0	0.0	0.0
	Mid	12.76	12.97	455.3	226.5	88.5	89.5
	High	23.03	23.31	959.9	471.5	254.3	254.8
System Initial Calibration	Zero	0.39	0.00	0.8	0.0	0.6	0.7
	Upscale	12.56	12.67	440.3	224.0	85.5	85.8
System Final Calibration	Zero	0.21	0.06	1	0.0	0.9	1.0
	Upscale	12.47	12.82	452	222.0	85.1	85.4

Calibration Error Results

Analyzer Calibration Error = (Measured Concentration of Cal Gas in Direct Mode - Manufacturer Certified Cal Gas Concentration)/Analyzer Range)*100

	Analyzer		O2	CO2	SO2	CO	NO	NOx
	Analyzer Span Range		25.00	25.00	1000	500	260	260
Calibration Error	Zero	%	0.08	0.00	0.00	0.00	0.00	0.00
	Mid	%	0.28	0.68	0.47	0.60	0.91	0.53
	High	%	0.04	0.08	0.02	0.14	0.08	0.27
Acceptable Limits	of Span		+-2%	+-2%	+-2%	+-2%	+-2%	+-2%
Error Results			PASS	PASS	PASS	PASS	PASS	PASS

System Drift

Drift Calculation = | System Bias $_{final}$ - System Bias $_{initial}$ |

	Analyzer	O2	CO2	SO2	CO	NO	NOx
	Span	25.00	25.00	1000	500	260	260
Initial System Bias	Zero	1.48	0.00	0.08	0.00	0.23	0.27
	Upscale	-0.80	-1.20	-1.50	-0.5	-1.2	-1.4
Final System Bias	Zero	0.76	0.24	1.00	0.0	0.4	0.4
	Upscale	-1.16	-0.60	-0.33	-0.9	-1.3	-1.6

System Zero Drift	%	0.72	0.24	0.92	0.00	0.12	0.10
System Cal Drift	%	0.36	0.60	1.17	0.40	0.15	0.15
Acceptable Limits	of Span	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %
Drift Result		PASS	PASS	PASS	PASS	PASS	PASS

System Calibration Bias

System Bias Calculation = ((Measured Concentration of Cal Gas in System Calibration Mode - Measured Concentration of Cal Gas in Direct Mode)/Analyzer Range))* 100

Analyzer		O2	CO2	SO2	CO	NO	Nox
Analyzer Full Scale Span		25	25	1000	500	260	260
Analyzer Initial	Zero	0.02	0.00	0.00	0.0	0.0	0.0
	Upscale	12.76	12.97	455.30	226.5	88.5	89.5
System Initial	Zero	0.39	0.00	0.80	0.0	0.6	0.7
	Upscale	12.56	12.67	440.30	224.0	85.5	85.8
Analyzer Final	Zero	0.00	0.00	0.00	0.0	0.0	0.0
	Upscale	0.00	0.00	0.00	0.0	0.0	0.0
System Final	Zero	0.21	0.06	1.00	0.0	0.9	1.0
	Upscale	12.47	12.82	452.00	222.0	85.1	85.4

Initial System Bias	Zero %	1.48	0.00	0.08	0.00	0.23	0.27
	Upscale %	-0.80	-1.20	-1.50	-0.50	-1.15	-1.42
Final System Bias	Zero %	0.76	0.24	1.00	0.00	0.35	0.37
	Upscale %	-1.16	-0.60	-0.33	-0.90	-1.31	-1.58
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:	22114	Date:	September 15, 2021
Company:	Clean Harbors	Operator:	T, Timar
Location:	Sarnia	Analyzer ID	VIG 20
Test Location:	Incinerator	Test	2

THC Full Scale Setting	**100**
Zero Gas (ppm)	<0.1 ppm
Low Gas Value (ppm)	20-35 % full scale setting
Mid Gas Value (ppm)	45-55 % full scale setting
High Gas Value (ppm)	80-90 % full scale setting

Perform analyzer calibration as per manufacturers instructions.
Calculate the linearity factor "C" based on the zero and high gas values. Based on the calculated linearity, predict the analyzer response for low and mid values (D3 and D4). Calculate calibration error with the low and mid (B3 and B4) gasses.

	Cal.Gas Value (A)		Initial Analyzer Response (B)		Linearity (B2-B1)/(A2-A1)		Predicted Response (A X C)		Calibration Error % ((B)-(D)/AX100	
Zero	0	A1	0.3	B1	0.998	C				
High	89.4	A2	89.54	B2						
Mid	52.2	A4	51.8	B4			52.1	D4	-0.6	E4
Low	30.51	A3	29.82	B3			30.5	D3	-2.1	E3

Criteria +/-5%

Note: If the calibration Error (E3 and E4) are greater than 5%, repeat the procedure until values are acceptable.

Perform test. At the completion of the test or hourly; Calculate the calibration drift as a percent of full scale value.
Introduce the zero and mid level gases at the probe and record data as the system final response.

	System Initial Response (F)	System Final Response (G)	Calibration Drift (G-F)/span*100
Zero	0.3	0.8	-0.5
Mid	29.82	30.5	-0.7

Criteria 3%

Calculate systen response time by introducing zero gas to the probe, record time to reach 95% of calibration gas value.
Repeat with upscale gas. Perform three runs and calculate average of the runs.

	Zero Response Time (seconds)		Upscale Response Time (seconds)
Run 1	43		43
Run 2	44		45
Run 3	43		41
Average	**43**		**43**

Clean Harbors
Mobile Source Monitoring Laboratory # 1
Daily Analyzer Calibration Evaluation
22114
September 15, 2021
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	500	260	260
Actual Cylinder Value	High	23.02	23.29	960.1	470.8	254.1	254.1
	Mid.	12.69	12.80	460	229.5	90.87	90.87
	Zero	0.00	0.00	0	0	0	0

Analyzer Initial Calibration	Zero	0.06	0.03	0	0.0	0.3	0.3
	Mid	12.86	13.04	456	225.0	89.3	89.7
	High	23.03	23.31	961	471.1	254.7	255.1
System Initial Calibration	Zero	0.25	0.04	0.87	0.0	0.4	0.3
	Upscale	12.70	12.69	446	222.0	85.5	86.2
System Final Calibration	Zero	0.15	0.15	1	0.0	0.8	0.9
	Upscale	12.65	12.94	445	222.0	85.1	85.3

Calibration Error Results

Analyzer Calibration Error = (Measured Concentration of Cal Gas in Direct Mode - Manufacturer Certified Cal Gas Concentration)/Analyzer Range)*100

Analyzer			O2	CO2	SO2	CO	NO	NOx
Analyzer Span Range			25.00	25.00	1000	500	260	260
Calibration Error	Zero	%	0.24	0.12	0.00	0.00	0.12	0.12
	Mid	%	0.68	0.96	0.40	0.90	0.60	0.45
	High	%	0.04	0.08	0.09	0.06	0.23	0.38
Acceptable Limits	of Span		+-2%	+-2%	+-2%	+-2%	+-2%	+-2%
Error Results			PASS	PASS	PASS	PASS	PASS	PASS

System Drift

Drift Calculation = | System Bias $_{final}$ - System Bias $_{initial}$ |

	Analyzer	O2	CO2	SO2	CO	NO	NOx
	Span	25.00	25.00	1000	500	260	260
Initial System Bias	Zero	0.76	0.04	0.09	0.00	0.04	0.00
	Upscale	-0.64	-1.40	-1.00	-0.6	-1.5	-1.3
Final System Bias	Zero	0.36	0.48	1.00	0.0	0.2	0.2
	Upscale	-0.84	-0.40	-1.10	-0.6	-1.6	-1.7

System Zero Drift	%	0.40	0.44	0.91	0.00	0.15	0.23
System Cal Drift	%	0.20	1.00	0.10	0.00	0.15	0.35
Acceptable Limits	of Span	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %
Drift Result		PASS	PASS	PASS	PASS	PASS	PASS

System Calibration Bias

System Bias Calculation = {(Measured Concentration of Cal Gas in System Calibration Mode - Measured Concentration of Cal Gas in Direct Mode)/Analyzer Range))* 100

Analyzer		O2	CO2	SO2	CO	NO	Nox
Analyzer Full Scale Span		25	25	1000	500	260	260
Analyzer Initial	Zero	0.06	0.03	0.00	0.0	0.3	0.3
	Upscale	12.86	13.04	456.00	225.0	89.3	89.7
System Initial	Zero	0.25	0.04	0.87	0.0	0.4	0.3
	Upscale	12.70	12.69	446.00	222.0	85.5	86.2
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	0.15	0.15	1.00	0.0	0.8	0.9
	Upscale	12.65	12.94	445.00	222.0	85.1	85.3

Initial System Bias	Zero %	0.76	0.04	0.09	0.00	0.04	0.00
	Upscale %	-0.64	-1.40	-1.00	-0.60	-1.46	-1.35
Final System Bias	Zero %	0.36	0.48	1.00	0.00	0.19	0.23
	Upscale %	-0.84	-0.40	-1.10	-0.60	-1.62	-1.69
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:	22114	Date:	September 16, 2021
Company:	Clean Harbors	Operator:	T, Timar
Location:	Sarnia	Analyzer ID	VIG 20
Test Location:	Incinerator	Test	3

THC Full Scale Setting	**100**
Zero Gas (ppm)	<0.1 ppm
Low Gas Value (ppm)	20-35 % full scale setting
Mid Gas Value (ppm)	45-55 % full scale setting
High Gas Value (ppm)	80-90 % full scale setting

Perform analyzer calibration as per manufacturers instructions.
Calculate the linearity factor "C" based on the zero and high gas values. Based on the calculated linearity, predict the analyzer response for low and mid values (D3 and D4). Calculate calibration error with the low and mid (B3 and B4) gasses.

	Cal.Gas Value (A)		Initial Analyzer Response (B)		Linearity (B2-B1)/(A2-A1)	Predicted Response (A X C)		Calibration Error % ((B)-(D)/AX100	
Zero	0	A1	0.1	B1	1.003				
High	89.4	A2	89.74	B2	C				
Mid	52.2	A4	52	B4		52.3	D4	-0.7	E4
Low	30.51	A3	30.05	B3		30.6	D3	-1.8	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	0.1	0	0.1
Mid	30.05	30.3	-0.2

Criteria 3%

Calculate systen response time by introducing zero gas to the probe, record time to reach 95% of calibration gas value.
Repeat with upscale gas. Perform three runs and calculate average of the runs.

	Zero Response Time (seconds)		Upscale Response Time (seconds)
Run 1	43		43
Run 2	44		45
Run 3	43		41
Average	**43**		**43**

Clean Harbors
Mobile Source Monitoring Laboratory # 1
Daily Analyzer Calibration Evaluation
22114
September 16, 2021
Test 3 Final Calculations (Stack)

Analyzer		O2	CO2	SO2	CO	NO	NOx
MII Number/Serial Number		COE 20060	COE 20060	COE 20099	COE 20101	COE 20061	
Model		Siemens Ultramat 23	Siemens Ultramat 23	Teledyne API T100H	Siemens Ultramat 23	Teledyne 200EH	
Range		25	25	1000	500	260	260
Actual Cylinder Value	High	23.02	23.29	960.1	470.8	254.1	254.1
	Mid.	12.69	12.80	460	229.5	90.87	90.87
	Zero	0.00	0.00	0	0	0	0

Analyzer Initial Calibration	Zero	0.02	0.03	0	0.0	0.3	0.1
	Mid	12.89	12.93	458	225.0	89.2	89.4
	High	23.03	23.31	960	471.1	254.7	255.2
System Initial Calibration	Zero	0.30	0.09	0.5	0.0	0.3	0.1
	Upscale	12.75	12.77	457	221.0	89.1	89.8
System Final Calibration	Zero	0.14	0.12	0.87	0.0	0.9	0.8
	Upscale	12.61	12.94	453	221.0	85.8	86.3

Calibration Error Results

Analyzer Calibration Error = (Measured Concentration of Cal Gas in Direct Mode - Manufacturer Certified Cal Gas Concentration)/Analyzer Range)*100

	Analyzer		O2	CO2	SO2	CO	NO	NOx
	Analyzer Span Range		25.00	25.00	1000	500	260	260
Calibration Error	Zero	%	0.08	0.12	0.00	0.00	0.12	0.04
	Mid	%	0.80	0.52	0.20	0.90	0.64	0.57
	High	%	0.04	0.08	0.01	0.06	0.23	0.42
Acceptable Limits	of Span		+-2%	+-2%	+-2%	+-2%	+-2%	+-2%
Error Results			PASS	PASS	PASS	PASS	PASS	PASS

System Drift

Drift Calculation = | System Bias $_{final}$ - System Bias $_{initial}$ |

	Analyzer	O2	CO2	SO2	CO	NO	NOx
	Span	25.00	25.00	1000	500	260	260
Initial System Bias	Zero	1.12	0.24	0.05	0.00	0.00	0.00
	Upscale	-0.56	-0.64	-0.10	-0.8	0.0	0.2
Final System Bias	Zero	0.48	0.36	0.87	0.0	0.2	0.3
	Upscale	-1.12	0.04	-0.50	-0.8	-1.3	-1.2

System Zero Drift	%	0.64	0.12	0.82	0.00	0.23	0.27
System Cal Drift	%	0.56	0.68	0.40	0.00	1.27	1.35
Acceptable Limits	of Span	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %	+ - 3 %
Drift Result		PASS	PASS	PASS	PASS	PASS	PASS

System Calibration Bias

System Bias Calculation = {(Measured Concentration of Cal Gas in System Calibration Mode - Measured Concentration of Cal Gas in Direct Mode)/Analyzer Range))* 100

Analyzer		O2	CO2	SO2	CO	NO	Nox
Analyzer Full Scale Span		25	25	1000	500	260	260
Analyzer Initial	Zero	0.02	0.03	0.00	0.0	0.3	0.1
	Upscale	12.89	12.93	458.00	225.0	89.2	89.4
System Initial	Zero	0.30	0.09	0.50	0.0	0.3	0.1
	Upscale	12.75	12.77	457.00	221.0	89.1	89.8
Analyzer Final	Zero	0.00	0.00	0.00	0.0	0.0	0.0
	Upscale	0.00	0.00	0.00	0.0	0.0	0.0
System Final	Zero	0.14	0.12	0.87	0.0	0.9	0.8
	Upscale	12.61	12.94	453.00	221.0	85.8	86.3

Initial System Bias	Zero %	1.12	0.24	0.05	0.00	0.00	0.00
	Upscale %	-0.56	-0.64	-0.10	-0.80	-0.04	0.15
Final System Bias	Zero %	0.48	0.36	0.87	0.00	0.23	0.27
	Upscale %	-1.12	0.04	-0.50	-0.80	-1.31	-1.19
Acceptable Limits	of Span	+ - 5 %	+ - 5 %	+ - 5 %	+ - 5 %	+ - 5 %	+ - 5 %
Bias Results		PASS	PASS	PASS	PASS	PASS	PASS

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Oxygen
Location	Sarnia, ON	**Analyzer ID.**	Siemens Ultramat 23
Project No.	22114	**Analyzer Span Setting**	25

Span Gas Concentration	23.02

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	46	53
2	46	54
3	46	54

System Response Time* 54 Seconds
Average Time 46 Seconds

* Reported as Greatest Value of all Response Time Checks
Criteria: < 200 seconds for a 95% response to a step change in concentration of gas at the probe exit

REPRODUCIBILITY CHECKS

Run	Analyzer Value
1	23.03
2	23.02
3	23.03
4	23.02
5	23.02
Mean	23.02
Standard Deviation (SD)	0.01
% RSD Criteria <3%	**0.02**

% RSD = SD/Mean X 100

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Carbon Dioxide
Location	Sarnia, ON	**Analyzer ID.**	Siemens Ultramat 23
Project No.	22114	**Analyzer Span Setting**	25

Span Gas Concentration	23.29

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	50	53
2	51	55
3	51	55

System Response Time* 55 Seconds
Average Time 48 Seconds

* Reported as Greatest Value of all Response Time Checks
Criteria: < 200 seconds for a 95% response to a step change in concentration of gas at the probe exit

REPRODUCIBILITY CHECKS

Run	Analyzer Value
1	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	Sarnia, ON	**Analyzer ID.**	Teledyne API T100H
Project No.	22114	**Analyzer Span Setting**	1000

Span Gas Concentration	960.1

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	80	80
2	81	79
3	81	78

System Response Time* 81 Seconds
Average Time 70 Seconds

* Reported as Greatest Value of all Response Time Checks
Criteria: < 200 seconds for a 95% response to a step change in concentration of gas at the probe exit

REPRODUCIBILITY CHECKS

Run	Analyzer Value
1	959.9
2	960
3	959.7
4	959.8
5	960
Mean	960
Standard Deviation (SD)	0.13
% RSD Criteria <3%	**0.01**

% RSD = SD/Mean X 100

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Carbon Monoxide
Location	Sarnia, ON	**Analyzer ID.**	Siemens Ultramat 23
Project No.	22114	**Analyzer Span Setting**	500

Span Gas Concentration	470.8

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	41	53
2	44	44
3	40	49

System Response Time*	53	Seconds
Average Time	42	Seconds

* Reported as Greatest Value of all Response Time Checks
Criteria: < 200 seconds for a 95% response to a step change in concentration of gas at the probe exit

REPRODUCIBILITY CHECKS

Run	Analyzer Value
1	471.5
2	471.3
3	471.3
4	471.6
5	471.5
Mean	471
Standard Deviation (SD)	0.13
% RSD Criteria <3%	**0.03**

% RSD = SD/Mean X 100

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Nitric Oxide
Location	Sarnia, ON	**Analyzer ID.**	Teledyne 200EH
Project No.	22114	**Analyzer Span Setting**	254

Span Gas Concentration	254.1

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	60	65
2	62	65
3	62	66

System Response Time* 66 Seconds
Average Time 57 Seconds

* Reported as Greatest Value of all Response Time Checks
Criteria: < 200 seconds for a 95% response to a step change in concentration of gas at the probe exit

REPRODUCIBILITY CHECKS

Run	Analyzer Value
1	254.3
2	254.1
3	254.4
4	254.6
5	254.4
Mean	254
Standard Deviation (SD)	0.18
% RSD Criteria <3%	**0.07**

% RSD = SD/Mean X 100

RESPONSE TIME CHECK

Client	Clean Harbors	**Analyzer Type**	Nitrogen Oxides
Location	Sarnia, ON	**Analyzer ID.**	Teledyne 200EH
Project No.	22114	**Analyzer Span Setting**	260

Span Gas Concentration	254.1

Response Time Test No.	Upscale Response Time (seconds)	Downscale Response Time (seconds)
1	71	77
2	71	76
3	72	77

System Response Time* 77 Seconds
Average Time 66 Seconds

* Reported as Greatest Value of all Response Time Checks
Criteria: < 200 seconds for a 95% response to a step change in concentration of gas at the probe exit

REPRODUCIBILITY CHECKS

Run	Analyzer Value
1	254.8
2	254.7
3	254.5
4	254.8
5	254.3
Mean	255
Standard Deviation (SD)	0.22
% RSD Criteria <3%	**0.09**

% RSD = SD/Mean X 100

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:	September 14, 2021

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.845
DGM CORRECTION FACTOR	0.995
NOZZLE DIAMETER	6.60 mm
DRY REF GAS VOLUME SAMPLED	5.057 m^3
AVGERGE ISOKINETICITY	105.9 %
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	189.5 °C
AVERAGE GAS MOISTURE BY VOLUME	50.7 %
AVERAGE GAS VELOCITY	31.25 m/s
BAROMETRIC PRESSURE (Station)	98.747 Kpa
STATIC PRESSURE	0.164 Kpa
ABSOLUTE GAS PRESSURE	98.911 Kpa
OXYGEN CONCENTRATION	8.72 %
CARBON DIOXIDE CONCENTRATION	8.82 %
CARBON MONOXIDE CONCENTRATION	81.0 ppm

FLOWRATE

ACTUAL GAS FLOWRATE	57.01 m^3/s
DRY REF GAS FLOWRATE	17.68 Rm^3/s
DRY ADJ GAS FLOWRATE	21.75 Rm^3/s
WET REF GAS FLOWRATE	35.87 Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	1.4 mg
	-FILTER	38.1 mg
	-TOTAL	39.5 mg
DRY REF GAS VOLUME SAMPLED		5.057 m^3
PARTICULATE CONC. - ACTUAL		2.421 mg/m^3
PARTICULATE CONC. - DRY REF		7.810 mg/m^3
PARTICULATE CONC. - DRY ADJ		6.348 mg/m^3
PARTICULATE CONC. - WET REF		3.850 mg/m^3
PARTICULATE EMISSION RATE		0.138051 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:	September 14, 2021	**Operator:**	DU

Pitot Factor	0.845	**Filter (mg)**	38.1		
DGMCF	0.995	**Probe (mg)**	1.4		
Barometric Pressure	29.16 "Hg	**CWTR (g)**	3794.4		
Static Pressure	0.660 "H_2O	**WCBDA (g)**	30.6		
Nozzle	0.26 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.76 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%	8.72
CO2%	8.82
COppm	81.0

Measured H2O
50.7 %

				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 %**
1	0	47.62	1.1	343	82	75	75	1.5	3.0		24.75	
	3	49.60	1.15	345	57	77	77	1.5	3.0		25.33	111.6
	6	51.60	1.15	345	52	77	78	1.5	3.0		25.33	**110.0**
	9	53.63	1.1	344	54	77	78	1.5	3.0		24.76	111.5
2	12	55.57	1.15	345	54	77	78	1.3	3.0		25.33	**108.9**
	15	57.51	1.15	345	57	78	79	1.3	3.0		25.33	**106.5**
	18	59.41	1.25	346	58	78	79	1.5	3.0		26.43	**104.1**
	21	61.38	1.25	350	59	78	79	1.5	3.0		26.49	**103.7**
3	24	63.42	1.5	386	59	79	80	1.9	4.0		29.66	**107.6**
	27	65.53	1.5	385	60	79	80	1.9	4.0		29.64	**103.8**
	30	67.80	1.5	381	60	79	80	1.8	3.5		29.57	111.6
	33	70.08	1.7	379	56	79	81	2	4.0		31.45	111.8
4	36	72.38	1.7	379	55	80	81	2	4.0		31.45	**105.7**
	39	74.67	1.6	377	55	80	81	2	4.0		30.47	**105.2**
	42	76.96	1.6	376	55	80	81	2	4.0		30.45	**108.3**
	45	79.23	1.6	379	58	80	81	2	4.0		30.51	**107.3**
5	48	81.55	1.7	378	59	81	82	2	4.0		31.43	**109.8**
	51	83.80	1.6	380	59	81	82	2	4.0		30.53	**103.1**
	54	86.10	1.65	382	61	81	82	2	4.0		31.04	**108.8**
	57	88.38	1.6	378	59	82	83	2	4.0		30.49	**106.3**
6	60	90.66	1.7	375	57	82	83	2.1	4.0		31.37	**107.5**
	63	92.97	1.8	375	56	82	83	2.1	4.5		32.28	**105.5**
	66	95.33	1.85	373	57	82	83	2.1	4.5		32.69	**104.7**
	69	97.70	1.8	372	57	82	83	2.1	4.5		32.22	**103.6**
7	72	100.05	1.9	375	57	82	84	2.2	4.5		33.16	**104.1**
	75	102.50	1.85	376	58	83	84	2.2	4.5		32.75	**105.8**
	78	104.86	1.9	379	59	83	84	2.2	4.5		33.24	**103.2**
	81	107.27	1.85	379	59	83	84	2.2	4.5		32.80	**104.2**
8	84	109.67	1.9	381	58	83	84	2.2	4.5		33.28	**105.1**
	87	112.06	2	384	59	83	84	2.2	4.5		34.21	**103.4**
	90	114.46	1.9	383	59	83	84	2.2	4.5		33.32	**101.4**
	93	116.85	1.9	383	59	83	84	2.2	4.5		33.32	**103.6**
9	96	119.23	2	383	59	83	84	2.2	4.5		34.19	**103.1**
	99	121.65	2.1	381	59	83	84	2.3	4.5		34.99	**102.2**

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	1 - Particulate & Metals	**Test Location:**	Incinerator Exhaust Stack
Date:	September 14, 2021	**Operator:**	DU

Pitot Factor	0.845	**Filter (mg)**	38.1		
DGMCF	0.995	**Probe (mg)**	1.4		
Barometric Pressure	29.16 "Hg	**CWTR (g)**	3794.4		
Static Pressure	0.660 "H_2O	**WCBDA (g)**	30.6		
Nozzle	0.26 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.76 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%	8.72
CO2%	8.82
COppm	81.0

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	124.09	1.9	379	59	84	85	2.2	4.5		33.24	**100.5**
	105	126.57	1.95	380	60	84	85	2.2	4.5		33.70	**107.0**
10	108	129.05	2	380	59	84	85	2.2	4.5		34.13	**105.7**
	111	131.47	1.9	374	59	84	85	2.2	4.5		33.14	**101.8**
	114	133.93	2	376	58	84	85	2.2	4.5		34.05	**105.8**
	117	136.40	2	375	57	84	85	2.2	4.5		34.03	**103.7**
	120	138.83								0.76		**102.0**
1	0	139.59	1.5	371	85	87	87	1.8	4.0		29.40	
	3	141.76	1.6	372	65	87	88	1.9	4.0		30.38	**104.3**
	6	144.03	1.7	371	64	88	88	2	4.5		31.30	**105.6**
	9	146.35	1.6	370	65	87	88	2	4.5		30.34	**104.6**
2	12	148.65	1.7	372	65	88	88	2	4.5		31.31	**106.9**
	15	151.00	1.6	373	63	87	88	2	4.5		30.40	**106.0**
	18	153.26	1.5	374	63	87	88	2	4.5		29.45	**105.3**
	21	155.55	1.55	374	63	87	88	2	4.5		29.94	110.2
3	24	157.85	1.6	371	65	88	88	2	4.5		30.36	**108.9**
	27	160.15	1.7	373	63	88	88	2	4.5		31.33	**106.9**
	30	162.45	1.6	372	63	88	89	2	4.5		30.38	**103.8**
	33	164.74	1.6	372	61	88	89	2	4.5		30.38	**106.4**
4	36	167.04	1.7	374	63	88	89	2	4.5		31.35	**106.9**
	39	169.30	1.65	373	64	88	88	2	4.5		30.87	**102.0**
	42	171.65	1.75	373	62	88	88	2	4.5		31.79	**107.7**
	45	173.99	1.75	375	62	88	88	2	4.5		31.83	**104.1**
5	48	176.30	1.8	374	65	88	88	2	4.5		32.26	**102.9**
	51	178.70	1.6	375	64	88	89	2	4.5		30.43	**105.3**
	54	180.92	1.95	377	64	88	89	2.2	5.0		33.64	**103.3**
	57	183.35	1.85	376	62	88	89	2.2	5.0		32.75	**102.6**
6	60	185.80	1.75	376	63	88	89	2.2	5.0		31.85	**106.2**
	63	188.28	1.75	377	65	88	89	2	5.0		31.87	110.5
	66	190.65	1.8	377	66	88	89	2	5.0		32.32	**105.6**
	69	192.99	1.8	377	66	88	89	2	5.0		32.32	**102.8**
7	72	195.40	1.85	376	55	89	89	2	5.0		32.75	**105.9**
	75	197.69	1.85	375	55	89	89	2.1	5.0		32.73	**99.1**
	78	200.07	2	375	55	89	90	2.3	5.0		34.03	**102.9**

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	1 - Particulate & Metals	**Test Location:**	Incinerator Exhaust Stack
Date:	September 14, 2021	**Operator:**	DU

Pitot Factor	0.845	**Filter (mg)**	38.1		
DGMCF	0.995	**Probe (mg)**	1.4		
Barometric Pressure	29.16 "Hg	**CWTR (g)**	3794.4		
Static Pressure	0.660 "H_2O	**WCBDA (g)**	30.6		
Nozzle	0.26 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.76 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%	8.72
CO2%	8.82
COppm	81.0

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	202.55	1.75	375	55	89	90	2.1	5.0		31.83	**103.1**
8	84	205.00	1.75	375	53	89	90	2.1	5.0		31.83	**108.9**
	87	207.38	1.8	375	53	89	90	2.1	5.0		32.28	**105.7**
	90	209.75	1.75	374	54	89	90	2.1	5.0		31.81	**103.8**
	93	212.16	1.9	374	54	89	90	2.2	5.0		33.14	**107.0**
9	96	214.61	1.75	376	54	89	90	2.2	5.0		31.85	**104.4**
	99	217.07	1.75	374	55	89	90	2.2	5.0		31.81	**109.4**
	102	219.41	1.75	375	55	89	90	2.2	5.0		31.83	**103.9**
	105	222.05	1.75	377	55	89	90	2.2	5.0		31.87	117.3
10	108	224.48	1.8	375	55	89	90	2.2	5.0		32.28	**108.1**
	111	226.95	1.75	375	55	89	90	2.1	5.0		31.83	**108.2**
	114	229.35	1.75	375	55	89	90	2.1	5.0		31.83	**106.6**
	117	231.82	1.75	373	54	89	90	2.1	5.0		31.79	**109.7**
	120	234.24										**107.4**

ORTECH Consulting Inc.

Plant:	Clean Harbors
Plant Location:	Corunna, ON
Test Location:	Incinerator Exhaust Stack
Test No.:	2 - Particulate & Metals
Date:	September 15, 2021

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.845
DGM CORRECTION FACTOR	0.995
NOZZLE DIAMETER	6.73 mm
DRY REF GAS VOLUME SAMPLED	5.243 m^3
AVGERGE ISOKINETICITY	101.1 %
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	190.1 °C
AVERAGE GAS MOISTURE BY VOLUME	50.3 %
AVERAGE GAS VELOCITY	32.23 m/s
BAROMETRIC PRESSURE (Station)	99.357 Kpa
STATIC PRESSURE	0.164 Kpa
ABSOLUTE GAS PRESSURE	99.521 Kpa
OXYGEN CONCENTRATION	8.99 %
CARBON DIOXIDE CONCENTRATION	8.86 %
CARBON MONOXIDE CONCENTRATION	31.8 ppm

FLOWRATE

ACTUAL GAS FLOWRATE	58.79 m^3/s
DRY REF GAS FLOWRATE	18.45 Rm^3/s
DRY ADJ GAS FLOWRATE	22.20 Rm^3/s
WET REF GAS FLOWRATE	37.18 Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	2.8 mg
	-FILTER	41.5 mg
	-TOTAL	44.3 mg
DRY REF GAS VOLUME SAMPLED		5.243 m^3
PARTICULATE CONC. - ACTUAL		2.651 mg/m^3
PARTICULATE CONC. - DRY REF		8.449 mg/m^3
PARTICULATE CONC. - DRY ADJ		7.023 mg/m^3
PARTICULATE CONC. - WET REF		4.195 mg/m^3
PARTICULATE EMISSION RATE		0.155887 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:	September 15, 2021	**Operator:**	DU

Pitot Factor	0.845	**Filter (mg)**	41.5		
DGMCF	0.995	**Probe (mg)**	2.8		
Barometric Pressure	29.34 "Hg	**CWTR (g)**	3876.6		
Static Pressure	0.660 "H_2O	**WCBDA (g)**	32.9		
Nozzle	0.265 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.76 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%	8.99
CO2%	8.86
COppm	31.8

Measured H2O
50.3 %

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	34.85	1.5	364	71	68	69	1.8	5.0		29.15	
	3	37.05	1.6	367	48	69	70	1.8	5.0		30.16	**104.6**
	6	39.20	1.6	367	48	69	70	1.8	5.0		30.16	**98.9**
	9	41.39	1.7	368	49	69	70	1.9	5.0		31.11	**100.8**
2	12	43.58	1.6	369	49	69	70	1.9	5.0		30.20	**97.9**
	15	45.80	1.55	369	50	69	71	1.9	5.0		29.72	**102.3**
	18	48.01	1.65	371	50	70	71	1.9	5.0		30.70	**103.4**
	21	50.17	1.6	371	50	70	71	1.9	5.0		30.24	**98.0**
3	24	52.35	1.7	371	50	70	72	1.9	5.0		31.17	**100.4**
	27	54.56	1.7	374	50	70	72	1.9	5.0		31.22	**98.7**
	30	56.86	1.75	373	48	71	72	1.9	5.0		31.66	**102.9**
	33	59.05	1.65	373	48	71	72	1.9	5.0		30.74	**96.4**
4	36	61.30	1.75	375	46	71	72	1.9	5.0		31.70	**102.0**
	39	63.56	1.7	373	46	71	72	1.9	5.0		31.20	**99.6**
	42	65.80	1.7	373	46	71	72	1.9	5.0		31.20	**100.0**
	45	68.04	1.8	375	46	71	72	2	5.0		32.15	**100.0**
5	48	70.31	1.8	374	51	72	74	2	5.0		32.13	**98.6**
	51	72.62	1.9	376	52	72	74	2.1	5.5		33.05	**100.0**
	54	74.93	1.7	375	51	73	75	2.1	5.5		31.24	**97.5**
	57	77.27	1.7	374	50	73	75	2.1	5.5		31.22	**104.2**
6	60	79.65	2	373	50	73	75	2.2	5.5		33.85	**105.9**
	63	82.04	1.9	374	49	73	75	2.2	5.5		33.01	**98.0**
	66	84.49	1.85	373	49	74	76	2.1	5.5		32.55	**103.1**
	69	86.88	1.9	375	49	74	76	2.1	5.5		33.03	**101.7**
7	72	89.29	1.9	374	49	74	76	2.1	5.5		33.01	**101.3**
	75	91.68	2.1	374	45	74	76	2.1	6.0		34.70	**100.4**
	78	94.15	2	375	45	74	76	2.3	6.0		33.89	**98.7**
	81	96.61	1.9	375	44	75	76	2.3	6.0		33.03	**100.8**
8	84	99.07	1.9	375	44	75	76	2.2	6.0		33.03	**103.4**
	87	101.54	2	375	44	75	76	2.2	6.0		33.89	**103.7**
	90	103.97	2.1	376	47	75	77	2.3	6.0		34.74	**99.5**
	93	106.48	2.1	375	48	75	77	2.3	6.0		34.72	**100.3**
9	96	109.00	1.9	375	47	76	77	2.3	6.0		33.03	**100.6**
	99	111.39	1.9	377	46	76	77	2.3	6.0		33.07	**100.2**

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	2 - Particulate & Metals	**Test Location:**	Incinerator Exhaust Stack
Date:	September 15, 2021	**Operator:**	DU

Pitot Factor	0.845	**Filter (mg)**	41.5		
DGMCF	0.995	**Probe (mg)**	2.8		
Barometric Pressure	29.34 "Hg	**CWTR (g)**	3876.6		
Static Pressure	0.660 "H_2O	**WCBDA (g)**	32.9		
Nozzle	0.265 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.76 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%	8.99
CO2%	8.86
COppm	31.8

Measured H2O
50.3 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	102	113.92	1.9	376	46	76	77	2.2	6.0		33.05	**106.2**
	105	116.31	1.9	376	45	76	77	2.2	6.0		33.05	**100.3**
10	108	118.82	1.9	377	51	76	77	2.1	6.0		33.07	**105.3**
	111	121.21	1.9	380	47	76	77	2.1	6.0		33.13	**100.3**
	114	123.59	1.9	377	47	76	77	2.1	6.0		33.07	**100.1**
	117	126.05	1.9	374	47	76	77	2.1	6.0		33.01	**103.2**
	120	128.44								0.76		**100.1**
1	0	129.20	1.6	378	66	78	80	1.9	5.0		30.36	
	3	131.40	1.75	378	44	78	79	2	5.5		31.75	**100.1**
	6	133.69	1.7	380	42	79	79	2	5.5		31.33	**99.8**
	9	135.95	1.6	379	42	79	79	1.9	5.5		30.38	**100.0**
2	12	138.29	1.6	378	42	79	79	1.9	5.5		30.36	**106.6**
	15	140.54	1.6	379	42	79	79	1.9	5.5		30.38	**102.4**
	18	142.80	1.75	377	42	79	79	2	6.0		31.74	**102.9**
	21	145.10	1.75	372	42	79	79	2	6.0		31.64	**100.1**
3	24	147.41	1.8	373	42	79	79	2	6.0		32.11	**100.2**
	27	149.70	1.8	372	42	79	79	2	6.0		32.09	**98.0**
	30	152.02	1.8	370	42	79	79	2	6.0		32.05	**99.2**
	33	154.34	1.8	369	42	79	79	2	6.0		32.03	**99.1**
4	36	156.69	1.85	368	43	79	79	2	6.0		32.45	**100.3**
	39	158.94	1.85	366	43	80	80	2	6.0		32.41	**94.7**
	42	161.29	1.85	368	43	80	80	2.1	6.0		32.45	**98.6**
	45	163.66	1.8	367	43	80	80	2.1	6.0		31.99	**99.6**
5	48	166.05	1.9	369	45	80	80	2.2	6.0		32.91	**101.8**
	51	168.47	1.85	369	45	80	80	2.2	6.0		32.47	**100.4**
	54	170.85	1.9	370	44	80	80	2.2	6.0		32.93	**100.1**
	57	173.28	1.8	370	45	80	80	2.2	6.0		32.05	**100.9**
6	60	175.69	1.9	370	44	80	80	2.2	6.0		32.93	**102.8**
	63	178.14	1.95	370	49	80	81	2.2	6.0		33.36	**101.7**
	66	180.54	1.95	370	56	80	81	2.2	6.0		33.36	**98.3**
	69	182.99	2.1	371	51	81	82	2.3	6.5		34.64	**100.3**
7	72	185.50	1.7	373	49	81	82	2.1	6.0		31.20	**99.0**
	75	187.90	1.85	378	48	81	82	2.1	6.0		32.65	**105.2**
	78	190.32	1.8	378	47	81	82	2.1	6.0		32.20	**102.0**

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	2 - Particulate & Metals	**Test Location:**	Incinerator Exhaust Stack
Date:	September 15, 2021	**Operator:**	DU

Pitot Factor	0.845	**Filter (mg)**	41.5		
DGMCF	0.995	**Probe (mg)**	2.8		
Barometric Pressure	29.34 "Hg	**CWTR (g)**	3876.6		
Static Pressure	0.660 "H_2O	**WCBDA (g)**	32.9		
Nozzle	0.265 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.76 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%	8.99
CO2%	8.86
COppm	31.8

Measured H2O
50.3 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	81	192.66	1.7	376	46	81	82	2.1	6.0		31.26	**100.0**
8	84	195.10	1.7	379	46	81	82	2	6.0		31.32	**107.2**
	87	197.50	1.7	379	45	81	82	2	6.0		31.32	**105.6**
	90	199.82	2	378	44	82	82	2.2	6.5		33.95	**102.1**
	93	202.28	1.9	380	47	82	83	2.2	6.5		33.13	**99.7**
9	96	204.70	1.75	379	47	82	83	2.2	6.5		31.77	**100.6**
	99	207.16	1.9	378	48	82	83	2.2	6.5		33.09	**106.5**
	102	209.65	1.9	379	54	82	83	2.2	6.5		33.11	**103.4**
	105	212.10	1.8	379	52	82	83	2.2	6.5		32.22	**101.8**
10	108	214.52	1.9	382	51	83	83	2.2	6.5		33.17	**103.3**
	111	216.94	1.8	381	50	83	83	2.2	6.5		32.26	**100.7**
	114	219.42	2	382	50	83	83	2.2	6.5		34.03	**105.9**
	117	221.83	1.95	382	49	83	83	2.2	6.5		33.60	**97.7**
	120	224.28										**100.6**

ORTECH Consulting Inc.

Plant:	Clean Harbors
Plant Location:	Corunna, ON
Test Location:	Incinerator Exhaust Stack
Test No.:	3 - Particulate & Metals
Date:	September 16, 2021

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.845
DGM CORRECTION FACTOR	0.995
NOZZLE DIAMETER	6.73 mm
DRY REF GAS VOLUME SAMPLED	5.236 m^3
AVGERGE ISOKINETICITY	99.7 %
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	192.7 °C
AVERAGE GAS MOISTURE BY VOLUME	49.9 %
AVERAGE GAS VELOCITY	32.32 m/s
BAROMETRIC PRESSURE (Station)	100.068 Kpa
STATIC PRESSURE	0.172 Kpa
ABSOLUTE GAS PRESSURE	100.240 Kpa
OXYGEN CONCENTRATION	9.08 %
CARBON DIOXIDE CONCENTRATION	8.96 %
CARBON MONOXIDE CONCENTRATION	32.5 ppm

FLOWRATE

ACTUAL GAS FLOWRATE	58.95 m^3/s
DRY REF GAS FLOWRATE	18.69 Rm^3/s
DRY ADJ GAS FLOWRATE	22.31 Rm^3/s
WET REF GAS FLOWRATE	37.34 Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	2.8 mg
	-FILTER	34 mg
	-TOTAL	36.8 mg
DRY REF GAS VOLUME SAMPLED		5.236 m^3
PARTICULATE CONC. - ACTUAL		2.228 mg/m^3
PARTICULATE CONC. - DRY REF		7.028 mg/m^3
PARTICULATE CONC. - DRY ADJ		5.886 mg/m^3
PARTICULATE CONC. - WET REF		3.519 mg/m^3
PARTICULATE EMISSION RATE		0.131346 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:	September 16, 2021	**Operator:**	DU

Pitot Factor	0.845	**Filter (mg)**	34		
DGMCF	0.995	**Probe (mg)**	2.8		
Barometric Pressure	29.55 "Hg	**CWTR (g)**	3800.4		
Static Pressure	0.690 "H_2O	**WCBDA (g)**	37.8		
Nozzle	0.265 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.57 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%	9.08
CO2%	8.96
COppm	32.5

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	24.68	1.6	373	70	65	66	1.8	3.5		30.13	
	3	26.88	1.75	373	51	66	68	1.9	3.5		31.51	**102.0**
	6	29.10	1.6	372	49	66	68	1.8	3.5		30.11	**98.2**
	9	31.33	1.65	374	48	67	68	1.9	3.5		30.61	**103.0**
2	12	33.53	1.65	373	48	67	68	1.9	3.5		30.59	**100.1**
	15	35.70	1.6	372	48	67	68	1.9	3.5		30.11	**98.7**
	18	37.91	1.75	374	48	67	68	1.9	3.5		31.52	**102.0**
	21	40.07	1.6	374	50	68	69	1.9	3.5		30.14	**95.5**
3	24	42.24	1.7	374	50	68	69	1.9	3.5		31.07	**100.1**
	27	44.43	1.65	376	51	68	69	1.9	3.5		30.65	**98.0**
	30	46.65	1.65	376	50	68	70	1.9	3.5		30.65	**101.0**
	33	48.85	1.7	377	50	68	70	1.9	3.5		31.13	**100.0**
4	36	51.06	1.85	376	50	69	71	1.9	3.5		32.45	**99.0**
	39	53.29	1.85	376	50	69	71	2	4.0		32.45	**95.5**
	42	55.55	1.85	378	54	69	71	2	4.0		32.49	**96.8**
	45	57.88	1.9	375	50	69	71	2.1	4.0		32.87	**100.0**
5	48	60.18	1.95	374	52	70	72	2.1	4.0		33.28	**97.2**
	51	62.54	2.1	375	52	70	72	2.2	4.0		34.55	**98.2**
	54	65.00	2	375	56	70	72	2.2	4.0		33.72	**98.7**
	57	67.31	2.05	373	51	70	72	2.2	4.0		34.10	**95.0**
6	60	69.74	2.1	377	51	70	72	2.2	4.0		34.60	**98.6**
	63	72.15	1.85	375	49	70	73	2.2	4.0		32.43	**96.8**
	66	74.49	2	375	48	71	73	2.2	4.0		33.72	**100.0**
	69	76.95	2	378	48	71	73	2.2	4.0		33.78	**101.0**
7	72	79.37	1.95	377	48	71	73	2.2	4.0		33.34	**99.5**
	75	81.78	1.9	376	57	72	73	2.2	4.0		32.89	**100.3**
	78	84.20	1.95	376	59	72	73	2.2	4.0		33.32	**101.9**
	81	86.57	1.95	375	60	72	73	2.2	4.0		33.30	**98.5**
8	84	89.00	2.05	375	58	72	73	2.2	4.0		34.14	**100.9**
	87	91.40	1.95	376	57	72	73	2.2	4.0		33.32	**97.2**
	90	93.80	1.95	376	57	72	73	2.2	4.0		33.32	**99.7**
	93	96.21	2.05	378	52	72	73	2.2	4.0		34.20	**100.2**
9	96	98.65	1.95	377	49	73	74	2.2	4.0		33.34	**99.0**
	99	101.05	1.95	376	49	73	74	2.2	4.0		33.32	**99.6**

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	3 - Particulate & Metals	**Test Location:**	Incinerator Exhaust Stack
Date:	September 16, 2021	**Operator:**	DU

Pitot Factor	0.845	**Filter (mg)**	34		
DGMCF	0.995	**Probe (mg)**	2.8		
Barometric Pressure	29.55 "Hg	**CWTR (g)**	3800.4		
Static Pressure	0.690 "H_2O	**WCBDA (g)**	37.8		
Nozzle	0.265 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.57 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%	9.08
CO2%	8.96
COppm	32.5

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	103.43	2	377	54	73	75	2.2	4.0		33.76	**98.7**
	105	105.85	1.9	373	55	73	75	2.2	4.0		32.83	**99.1**
10	108	108.30	1.95	371	51	74	75	2.2	4.0		33.22	**102.7**
	111	110.67	2	373	50	74	75	2.2	4.0		33.68	**97.8**
	114	113.06	2	373	50	74	75	2.2	4.0		33.68	**97.5**
	117	115.48	2	368	49	74	75	2.2	4.0		33.58	**98.8**
	120	117.95								0.57		**100.5**
1	0	118.52	1.5	377	73	77	78	1.8	4.0		29.24	
	3	120.70	1.5	383	49	77	79	1.8	4.0		29.34	**102.3**
	6	122.84	1.5	380	49	77	79	1.8	4.0		29.29	**100.7**
	9	125.04	1.4	380	50	77	79	1.8	4.0		28.30	**103.3**
2	12	127.18	1.75	378	48	78	80	2	4.0		31.60	**104.0**
	15	129.46	1.7	378	48	78	80	2	4.0		31.15	**98.9**
	18	131.78	1.65	378	48	78	80	2	4.0		30.68	**102.1**
	21	134.10	1.8	379	48	78	80	2	4.0		32.07	**103.6**
3	24	136.38	1.7	378	49	78	80	2	4.0		31.15	**97.6**
	27	138.67	1.65	377	50	79	81	2	4.0		30.67	**100.8**
	30	140.97	1.65	379	52	79	81	2	4.0		30.70	**102.5**
	33	143.29	1.65	378	48	79	81	2	4.0		30.68	**103.5**
4	36	145.56	1.85	382	48	79	81	2.1	4.0		32.57	**101.2**
	39	147.93	1.7	380	49	79	81	2.1	4.0		31.18	**100.1**
	42	150.30	1.75	381	49	79	81	2.1	4.0		31.66	**104.3**
	45	152.66	1.85	381	48	80	82	2.1	4.0		32.55	**102.4**
5	48	155.03	1.8	381	49	80	82	2.1	4.0		32.11	**99.8**
	51	157.40	2	381	50	80	82	2.2	4.5		33.84	**101.2**
	54	159.80	2	383	50	80	82	2.2	4.5		33.88	**97.2**
	57	162.22	1.8	382	53	81	83	2.1	4.5		32.13	**98.2**
6	60	164.56	1.8	382	53	81	83	2.1	4.5		32.13	**99.8**
	63	167.00	1.85	383	57	81	83	2.1	4.5		32.59	**104.0**
	66	169.35	1.85	383	57	81	83	2.1	4.5		32.59	**98.9**
	69	171.71	1.8	383	55	81	83	2.1	4.5		32.14	**99.3**
7	72	174.15	1.9	385	56	82	84	2.1	4.5		33.06	**104.1**
	75	176.42	1.9	385	52	82	84	2.1	4.5		33.06	**94.2**
	78	178.80	1.8	384	51	82	84	2.1	4.5		32.16	**98.8**

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	3 - Particulate & Metals	**Test Location:**	Incinerator Exhaust Stack
Date:	September 16, 2021	**Operator:**	DU

Pitot Factor	0.845	**Filter (mg)**	34		
DGMCF	0.995	**Probe (mg)**	2.8		
Barometric Pressure	29.55 "Hg	**CWTR (g)**	3800.4		
Static Pressure	0.690 "H_2O	**WCBDA (g)**	37.8		
Nozzle	0.265 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.57 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%	9.08
CO2%	8.96
COppm	32.5

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	181.05	1.95	387	50	82	84	2.1	4.5		33.54	**95.9**
8	84	183.48	1.9	386	50	82	84	2.1	4.5		33.08	**99.7**
	87	185.86	1.8	386	50	82	84	2.1	4.5		32.20	**98.8**
	90	188.22	1.85	386	50	82	84	2.1	4.5		32.65	**100.7**
	93	190.58	1.8	386	51	82	84	2.1	4.5		32.20	**99.3**
9	96	192.93	1.95	388	51	83	84	2.1	4.5		33.56	**100.3**
	99	195.36	1.9	388	51	83	84	2.1	4.5		33.12	**99.6**
	102	197.60	2	388	51	83	84	2.2	4.5		33.98	**93.0**
	105	200.06	2	390	50	83	84	2.2	4.5		34.02	**99.6**
10	108	202.53	1.8	389	50	83	84	2.2	4.5		32.26	**100.1**
	111	204.87	1.8	386	50	83	84	2.2	4.5		32.20	**99.9**
	114	207.21	1.8	388	52	83	84	2.2	4.5		32.24	**99.8**
	117	209.55	2	386	264	83	84	2.2	4.5		33.94	**99.9**
	120	212.02										**99.9**

APPENDIX 23

Semi-Volatile Organics Test Emission Calculations
(12 pages)

ORTECH Consulting Inc.

Plant:	Clean Harbors
Plant Location:	Corunna, ON
Test Location:	Incinerator Exhaust Stack
Test No.:	1 - SVOC
Date:	September 14, 2021

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.843
DGM CORRECTION FACTOR	1
NOZZLE DIAMETER	6.49 mm
DRY REF GAS VOLUME SAMPLED	5.020 m^3
AVGERGE ISOKINETICITY	104.1 %
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	190.8 °C
AVERAGE GAS MOISTURE BY VOLUME	49.1 %
AVERAGE GAS VELOCITY	31.67 m/s
BAROMETRIC PRESSURE (Station)	98.747 Kpa
STATIC PRESSURE	0.164 Kpa
ABSOLUTE GAS PRESSURE	98.911 Kpa
OXYGEN CONCENTRATION	8.72 %
CARBON DIOXIDE CONCENTRATION	8.82 %
CARBON MONOXIDE CONCENTRATION	81.0 ppm

FLOWRATE

ACTUAL GAS FLOWRATE	57.77 m^3/s
DRY REF GAS FLOWRATE	18.44 Rm^3/s
DRY ADJ GAS FLOWRATE	22.69 Rm^3/s
WET REF GAS FLOWRATE	36.25 Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0 mg
	-FILTER	0 mg
	-TOTAL	0 mg
DRY REF GAS VOLUME SAMPLED		5.020 m^3
PARTICULATE CONC. - ACTUAL		0.000 mg/m^3
PARTICULATE CONC. - DRY REF		0.000 mg/m^3
PARTICULATE CONC. - DRY ADJ		0.000 mg/m^3
PARTICULATE CONC. - WET REF		0.000 mg/m^3
PARTICULATE EMISSION RATE		0.000000 g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	1 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	September 14, 2021	**Operator:**	JG

Pitot Factor	0.843	**Filter (mg)**	0		
DGMCF	1	**Probe (mg)**	0		
Barometric Pressure	29.16 "Hg	**CWTR (g)**	3539.8		
Static Pressure	0.660 "H_2O	**WCBDA (g)**	22		
Nozzle	0.2556 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.66 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%	8.72
CO2%	8.82
COppm	81.0

Measured H2O
49.1 %

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	34.32	1.7	389	45	76	76	1.5	3.0		31.43	
	3	36.37	1.7	385	58	76	76	1.5	4.0		31.36	**96.7**
	6	38.41	1.7	385	57	76	74	1.8	4.5		31.36	**96.0**
	9	40.70	1.7	385	60	77	75	1.8	5.0		31.36	**108.0**
2	12	42.84	1.8	384	58	77	75	1.9	5.0		32.25	**100.8**
	15	45.15	1.8	382	59	77	75	1.9	5.0		32.21	**105.7**
	18	47.45	1.8	382	55	79	75	1.9	5.0		32.21	**105.1**
	21	49.75	1.8	381	55	79	75	1.9	5.0		32.19	**104.9**
3	24	52.09	1.7	385	52	80	76	1.8	5.0		31.36	**106.7**
	27	54.30	1.7	382	53	81	77	1.8	5.0		31.30	**103.7**
	30	56.62	1.7	377	53	82	77	1.75	5.0		31.21	**108.5**
	33	58.85	1.7	378	53	83	78	1.75	5.0		31.23	**103.8**
4	36	61.05	1.8	374	53	83	78	1.9	5.0		32.06	**102.3**
	39	63.31	1.8	374	52	84	78	1.9	5.0		32.06	**101.9**
	42	65.62	1.8	375	55	84	79	1.9	5.0		32.08	**104.1**
	45	67.95	1.8	375	56	84	79	1.9	5.0		32.08	**105.0**
5	48	70.27	1.9	377	56	85	79	2	5.0		33.00	**104.5**
	51	72.63	1.8	378	58	86	80	1.9	5.0		32.13	**103.5**
	54	74.95	1.8	381	59	86	81	1.9	5.0		32.19	**104.4**
	57	77.30	1.8	379	59	87	81	1.9	5.0		32.15	**105.8**
6	60	79.60	1.7	376	52	85	82	1.8	5.0		31.19	**103.4**
	63	81.97	1.7	374	51	87	82	1.8	5.0		31.15	**109.5**
	66	84.13	1.8	372	51	87	82	1.9	5.0		32.02	**99.5**
	69	86.44	1.8	371	52	88	83	1.9	5.0		32.00	**103.3**
7	72	88.72	1.8	372	52	88	82	1.9	5.0		32.02	**101.7**
	75	91.05	1.7	373	49	88	83	1.8	5.0		31.14	**104.1**
	78	93.31	1.8	373	48	88	83	1.9	5.0		32.04	**103.8**
	81	95.62	1.8	379	49	89	84	1.9	5.0		32.15	**103.2**
8	84	97.91	1.6	378	50	89	84	1.7	5.0		30.30	**102.5**
	87	100.10	1.6	379	50	89	84	1.7	5.0		30.31	**103.8**
	90	102.38	1.8	381	51	89	84	1.9	5.0		32.19	**108.1**
	93	104.70	1.8	381	50	89	84	1.9	5.0		32.19	**103.9**
9	96	106.93	1.8	385	47	90	85	1.9	5.0		32.27	**99.9**
	99	109.23	1.8	381	49	90	85	1.9	5.0		32.19	**103.1**

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	1 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	September 14, 2021	**Operator:**	JG

Pitot Factor	0.843	**Filter (mg)**	0		
DGMCF	1	**Probe (mg)**	0		
Barometric Pressure	29.16 "Hg	**CWTR (g)**	3539.8		
Static Pressure	0.660 "H_2O	**WCBDA (g)**	22		
Nozzle	0.2556 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.66 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%	8.72
CO2%	8.82
COppm	81.0

Measured H2O
49.1 %

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	111.54	1.7	378	50	90	86	1.8	5.0		31.23	**103.3**
	105	113.82	1.7	377	51	90	85	1.8	5.0		31.21	**104.6**
10	108	116.12	1.7	376	52	90	86	1.8	5.0		31.19	**105.5**
	111	118.40	1.7	374	52	90	86	1.8	5.0		31.15	**104.5**
	114	120.68	1.9	375	53	90	86	2	5.0		32.96	**104.3**
	117	123.04	1.9	374	53	90	86	2	5.0		32.94	**102.3**
	120	125.40								0.66		**102.2**
1	0	126.06	2	370	80	88	87	2.1	5.0		33.71	
	3	128.45	2.1	370	58	88	87	2.2	6.0		34.54	**100.8**
	6	130.97	2.1	370	52	88	87	2.2	6.0		34.54	**103.7**
	9	133.50	1.9	370	50	88	88	2	6.0		32.86	**104.1**
2	12	135.94	1.9	371	50	89	88	2	6.0		32.88	**105.4**
	15	138.36	1.6	371	50	89	88	1.8	5.0		30.17	**104.5**
	18	140.69	1.9	372	50	90	88	2	5.0		32.90	**109.6**
	21	143.04	1.6	376	51	90	88	1.7	5.0		30.26	**101.5**
3	24	145.30	1.8	372	51	90	87	1.9	5.0		32.02	**106.5**
	27	147.64	2.2	371	51	91	88	2.3	6.0		35.38	**103.9**
	30	150.13	2	372	50	92	88	2.1	6.0		33.75	**99.8**
	33	152.61	2	371	46	92	88	2.1	6.0		33.73	**104.2**
4	36	155.08	2	370	45	92	89	2.1	6.0		33.71	**103.7**
	39	157.60	1.8	372	45	93	88	2	6.0		32.02	**105.7**
	42	160.03	2.2	371	45	93	89	2.3	6.0		35.38	**107.5**
	45	162.55	2	371	45	93	88	2.1	6.0		33.73	**100.8**
5	48	165.05	1.8	372	46	93	89	1.9	6.0		32.02	**104.9**
	51	167.45	1.9	372	47	93	90	1.9	6.0		32.90	**106.1**
	54	169.81	1.8	374	49	93	88	1.9	6.0		32.06	**101.4**
	57	172.18	1.9	374	47	94	89	2	6.0		32.94	**104.9**
6	60	174.55	1.9	374	44	94	90	2	6.0		32.94	**102.0**
	63	176.94	1.6	375	45	93	90	1.8	5.5		30.24	**102.8**
	66	179.24	1.6	371	45	94	90	1.7	5.0		30.17	**107.9**
	69	181.47	1.5	374	44	94	90	1.7	5.0		29.26	**104.2**
7	72	183.64	1.5	376	45	94	90	1.7	5.0		29.30	**104.9**
	75	185.92	1.5	374	46	95	91	1.6	5.0		29.26	110.4
	78	188.08	1.5	373	46	95	91	1.6	5.0		29.25	**104.2**

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	1 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	September 14, 2021	**Operator:**	JG

Pitot Factor	0.843	**Filter (mg)**	0		
DGMCF	1	**Probe (mg)**	0		
Barometric Pressure	29.16 "Hg	**CWTR (g)**	3539.8		
Static Pressure	0.660 "H_2O	**WCBDA (g)**	22		
Nozzle	0.2556 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.66 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%	8.72
CO2%	8.82
COppm	81.0

Measured H2O
49.1 %

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	190.28	1.6	376	47	95	90	1.7	5.0		30.26	**106.1**
8	84	192.46	1.7	376	48	95	91	1.8	5.0		31.19	**102.1**
	87	194.75	1.7	372	48	95	91	1.8	5.0		31.12	**104.0**
	90	197.05	1.5	373	49	95	90	1.7	5.0		29.25	**104.2**
	93	199.27	1.5	372	49	95	90	1.7	5.0		29.23	**107.2**
9	96	201.46	1.5	372	51	95	91	1.7	5.0		29.23	**105.7**
	99	203.70	1.5	372	51	95	91	1.7	5.0		29.23	**108.0**
	102	205.92	1.6	372	48	95	91	1.7	5.0		30.19	**107.0**
	105	208.15	1.6	375	47	95	92	1.7	5.0		30.24	**104.1**
10	108	210.35	1.6	373	48	95	92	1.7	5.0		30.21	**102.8**
	111	212.56	1.6	373	48	95	91	1.7	5.0		30.21	**103.1**
	114	214.80	1.6	372	48	96	92	1.7	5.0		30.19	**104.6**
	117	217.01	1.6	371	49	65	92	1.7	5.0		30.17	**103.0**
	120	219.21										**105.4**

ORTECH Consulting Inc.

Plant:	Clean Harbors
Plant Location:	Corunna, ON
Test Location:	Incinerator Exhaust Stack
Test No.:	2 - SVOC
Date:	September 15, 2021

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.843
DGM CORRECTION FACTOR	1
NOZZLE DIAMETER	6.49 mm
DRY REF GAS VOLUME SAMPLED	4.915 m^3
AVGERGE ISOKINETICITY	100.5 %
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	190.1 °C
AVERAGE GAS MOISTURE BY VOLUME	48.9 %
AVERAGE GAS VELOCITY	31.75 m/s
BAROMETRIC PRESSURE (Station)	99.357 Kpa
STATIC PRESSURE	0.164 Kpa
ABSOLUTE GAS PRESSURE	99.521 Kpa
OXYGEN CONCENTRATION	8.99 %
CARBON DIOXIDE CONCENTRATION	8.86 %
CARBON MONOXIDE CONCENTRATION	31.8 ppm

FLOWRATE

ACTUAL GAS FLOWRATE	57.91 m^3/s
DRY REF GAS FLOWRATE	18.71 Rm^3/s
DRY ADJ GAS FLOWRATE	22.50 Rm^3/s
WET REF GAS FLOWRATE	36.62 Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0 mg
	-FILTER	0 mg
	-TOTAL	0 mg
DRY REF GAS VOLUME SAMPLED		4.915 m^3
PARTICULATE CONC. - ACTUAL		0.000 mg/m^3
PARTICULATE CONC. - DRY REF		0.000 mg/m^3
PARTICULATE CONC. - DRY ADJ		0.000 mg/m^3
PARTICULATE CONC. - WET REF		0.000 mg/m^3
PARTICULATE EMISSION RATE		0.000000 g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	2 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	September 15, 2021	**Operator:**	JG

Pitot Factor	0.843	**Filter (mg)**	0		
DGMCF	1	**Probe (mg)**	0		
Barometric Pressure	29.34 "Hg	**CWTR (g)**	3442.2		
Static Pressure	0.660 "H_2O	**WCBDA (g)**	15.2		
Nozzle	0.2556 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.63 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%	8.99
CO2%	8.86
COppm	31.8

Measured H2O
48.9 %

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	120.18	1.5	364	72	72	71	1.5	4.0		28.98	
	3	122.30	1.9	367	65	72	70	1.8	4.0		32.67	**105.7**
	6	124.56	1.9	367	65	72	70	1.8	4.0		32.67	**100.5**
	9	126.76	2	368	67	71	72	1.9	5.0		33.54	**97.8**
2	12	129.07	1.9	372	67	72	72	1.8	5.0		32.77	**100.1**
	15	131.35	1.9	371	67	72	70	1.8	5.0		32.75	**101.5**
	18	133.62	1.9	370	67	72	70	1.8	5.0		32.73	**101.2**
	21	135.90	1.9	374	66	73	70	1.8	5.0		32.81	**101.6**
3	24	138.17	1.9	374	67	73	70	1.8	5.0		32.81	**101.3**
	27	140.44	1.9	371	62	74	70	1.8	5.0		32.75	**101.3**
	30	142.70	1.9	373	55	74	70	1.8	5.0		32.79	**100.5**
	33	145.00	1.9	373	53	75	71	1.8	5.0		32.79	**102.4**
4	36	147.26	1.8	371	51	76	71	1.7	5.0		31.88	**100.5**
	39	149.49	1.8	373	50	76	71	1.7	5.0		31.92	**101.6**
	42	151.70	1.8	373	50	76	71	1.7	5.0		31.92	**100.8**
	45	153.85	1.8	375	48	77	72	1.7	5.0		31.96	**98.1**
5	48	156.05	1.8	374	48	78	73	1.7	5.0		31.94	**100.3**
	51	158.26	1.8	373	48	78	73	1.7	5.0		31.92	**100.5**
	54	160.45	1.8	375	47	79	73	1.7	5.0		31.96	**99.5**
	57	162.66	1.8	374	47	79	73	1.7	5.0		31.94	**100.5**
6	60	164.85	1.8	373	44	80	74	1.7	5.0		31.92	**99.5**
	63	167.06	1.8	375	42	80	74	1.7	5.0		31.96	**100.2**
	66	169.25	1.8	373	43	80	74	1.7	5.0		31.92	**99.4**
	69	171.45	1.8	374	43	80	74	1.7	5.0		31.94	**99.7**
7	72	173.66	1.8	374	43	80	74	1.7	5.0		31.94	**100.2**
	75	175.85	1.8	373	43	80	75	1.7	5.0		31.92	**99.3**
	78	178.05	1.8	372	45	81	75	1.7	5.0		31.90	**99.6**
	81	180.25	1.8	374	46	80	75	1.7	5.0		31.94	**99.5**
8	84	182.45	1.6	374	46	81	75	1.6	5.0		30.11	**99.7**
	87	184.55	1.6	375	46	82	76	1.6	5.0		30.13	**100.8**
	90	186.76	1.6	375	46	82	76	1.6	5.0		30.13	**106.0**
	93	188.86	1.6	373	47	82	76	1.6	5.0		30.09	**100.7**
9	96	190.96	1.6	374	47	82	77	1.6	5.0		30.11	**100.6**
	99	193.06	1.6	374	46	82	77	1.6	5.0		30.11	**100.5**

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	2 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	September 15, 2021	**Operator:**	JG

Pitot Factor	0.843	**Filter (mg)**	0		
DGMCF	1	**Probe (mg)**	0		
Barometric Pressure	29.34 "Hg	**CWTR (g)**	3442.2		
Static Pressure	0.660 "H_2O	**WCBDA (g)**	15.2		
Nozzle	0.2556 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.63 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%	8.99
CO2%	8.86
COppm	31.8

Measured H2O
48.9 %

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	195.16	1.6	374	46	83	77	1.6	5.0		30.11	100.5
	105	197.26	1.6	377	46	83	78	1.6	5.0		30.16	100.4
10	108	199.36	1.6	376	46	83	78	1.6	5.0		30.15	100.5
	111	201.46	1.6	376	46	83	78	1.6	5.0		30.15	100.5
	114	203.56	1.6	378	46	83	78	1.6	5.0		30.18	100.5
	117	205.68	1.6	374	46	83	78	1.6	5.0		30.11	101.5
	120	207.77								0.63		99.9
1	0	208.40	1.9	379	78	83	80	1.8	5.0		32.91	
	3	210.60	2	382	58	81	80	1.9	5.0		33.83	96.6
	6	212.96	2	381	52	81	80	1.9	5.0		33.81	101.4
	9	215.24	1.9	386	50	81	80	1.9	5.0		33.05	97.9
2	12	217.57	2	385	50	81	80	1.9	5.0		33.89	103.0
	15	219.90	2	383	50	82	80	1.9	5.0		33.85	100.3
	18	222.22	2	383	50	82	80	1.9	5.0		33.85	99.7
	21	224.55	2	382	50	82	80	1.9	5.0		33.83	100.1
3	24	226.87	2	378	51	83	80	1.9	5.0		33.74	99.6
	27	229.20	2	375	48	83	80	1.9	5.0		33.68	99.7
	30	231.53	2	374	48	83	80	1.9	5.0		33.66	99.5
	33	233.85	2	370	48	83	80	1.9	5.0		33.58	99.0
4	36	236.20	2	369	48	84	80	1.9	5.0		33.56	100.1
	39	238.53	2	368	44	84	80	1.9	5.0		33.54	99.1
	42	240.90	2	367	44	84	80	1.9	5.0		33.52	100.7
	45	243.25	2	369	44	85	81	1.9	5.0		33.56	99.8
5	48	245.63	2	368	44	85	81	1.9	5.0		33.54	101.0
	51	247.97	2	372	44	86	82	1.9	5.0		33.62	99.3
	54	250.32	2	371	44	85	82	1.9	5.0		33.60	99.7
	57	252.70	2	370	45	86	82	1.9	5.0		33.58	101.0
6	60	255.05	1.7	371	46	86	83	1.7	5.0		30.98	99.6
	63	257.30	1.7	368	46	86	83	1.7	5.0		30.92	103.4
	66	259.50	1.7	369	45	86	83	1.7	5.0		30.94	100.9
	69	261.64	1.7	370	46	87	83	1.7	5.0		30.96	98.2
7	72	263.80	1.7	368	46	87	83	1.7	5.0		30.92	99.1
	75	266.01	1.7	371	46	87	83	1.7	5.0		30.98	101.3
	78	268.20	1.7	374	43	88	84	1.7	5.0		31.04	100.5

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	2 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	September 15, 2021	**Operator:**	JG

Pitot Factor	0.843	**Filter (mg)**	0		
DGMCF	1	**Probe (mg)**	0		
Barometric Pressure	29.34 "Hg	**CWTR (g)**	3442.2		
Static Pressure	0.660 "H_2O	**WCBDA (g)**	15.2		
Nozzle	0.2556 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.63 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%	8.99
CO2%	8.86
COppm	31.8

Measured H2O
48.9 %

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	270.40	1.7	374	42	88	83	1.7	5.0		31.04	**101.0**
8	84	272.60	1.7	376	42	87	83	1.7	5.0		31.07	**101.1**
	87	274.80	1.7	377	42	87	83	1.7	5.0		31.09	**101.3**
	90	276.97	1.5	375	43	88	84	1.5	5.0		29.17	**100.0**
	93	279.10	1.5	375	43	88	84	1.5	5.0		29.17	**104.1**
9	96	281.17	1.5	375	43	88	84	1.5	5.0		29.17	**101.2**
	99	283.20	1.5	380	45	89	84	1.5	5.0		29.26	**99.2**
	102	285.25	1.5	379	44	89	84	1.5	5.0		29.24	**100.4**
	105	287.30	1.6	379	45	85	84	1.5	5.0		30.20	**100.3**
10	108	289.46	1.6	379	44	88	84	1.5	5.0		30.20	**102.7**
	111	291.57	1.6	384	45	89	84	1.5	5.0		30.29	**100.1**
	114	293.63	1.5	382	46	89	85	1.5	5.0		29.29	**97.9**
	117	295.75	1.5	380	46	89	85	1.5	5.0		29.26	**103.8**
	120	297.83										**101.8**

ORTECH Consulting Inc.

Plant:	Clean Harbors
Plant Location:	Corunna, ON
Test Location:	Incinerator Exhaust Stack
Test No.:	3 - SVOC
Date:	September 16, 2021

STACK GAS SAMPLING PARAMETERS

PITOT TUBE COEFFICIENT	0.843
DGM CORRECTION FACTOR	1
NOZZLE DIAMETER	6.49 mm
DRY REF GAS VOLUME SAMPLED	5.001 m^3
AVGERGE ISOKINETICITY	100.8 %
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	191.6 °C
AVERAGE GAS MOISTURE BY VOLUME	48.8 %
AVERAGE GAS VELOCITY	32.01 m/s
BAROMETRIC PRESSURE (Station)	100.068 Kpa
STATIC PRESSURE	0.172 Kpa
ABSOLUTE GAS PRESSURE	100.240 Kpa
OXYGEN CONCENTRATION	9.08 %
CARBON DIOXIDE CONCENTRATION	8.96 %
CARBON MONOXIDE CONCENTRATION	32.5 ppm

FLOWRATE

ACTUAL GAS FLOWRATE	58.38 m^3/s
DRY REF GAS FLOWRATE	18.98 Rm^3/s
DRY ADJ GAS FLOWRATE	22.66 Rm^3/s
WET REF GAS FLOWRATE	37.06 Rm^3/s

PARTICULATE EMISSION DATA

PARTICULATE COLLECTED	-PROBE	0 mg
	-FILTER	0 mg
	-TOTAL	0 mg
DRY REF GAS VOLUME SAMPLED		5.001 m^3
PARTICULATE CONC. - ACTUAL		0.000 mg/m^3
PARTICULATE CONC. - DRY REF		0.000 mg/m^3
PARTICULATE CONC. - DRY ADJ		0.000 mg/m^3
PARTICULATE CONC. - WET REF		0.000 mg/m^3
PARTICULATE EMISSION RATE		0.000000 g/s

Note: * Reference conditions refers to 25 deg C (77 deg F) and 101.325 kPa (29.92 in. Hg)

Note: Dry Adj condition refers to 25 deg C (77 deg F)and 1 atmosphere, adjusted to 11% oxygen by volume

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	3 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	September 16, 2021	**Operator:**	JG

Pitot Factor	0.843	**Filter (mg)**	0		
DGMCF	1	**Probe (mg)**	0		
Barometric Pressure	29.55 "Hg	**CWTR (g)**	3477.7		
Static Pressure	0.690 "H_2O	**WCBDA (g)**	20.6		
Nozzle	0.2556 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.71 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%	9.08
CO2%	8.96
COppm	32.5

Measured H2O
48.8 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
1	0	98.56	2.5	373	65	65	64	2.2	5.0		37.46	
	3	101.10	2	374	61	67	66	1.8	5.0		33.52	**100.3**
	6	103.41	1.9	373	62	67	66	1.7	5.0		32.66	**101.5**
	9	105.60	1.9	372	62	67	66	1.7	5.0		32.64	**98.7**
2	12	107.89	1.9	372	64	68	66	1.8	5.0		32.64	**103.1**
	15	110.05	1.8	373	65	69	67	1.8	5.0		31.79	**97.2**
	18	112.28	1.9	375	63	70	67	1.8	5.0		32.70	**103.0**
	21	114.50	1.9	375	63	70	67	1.8	5.0		32.70	**99.8**
3	24	116.75	1.9	374	60	71	67	1.8	5.0		32.68	**101.1**
	27	118.97	1.9	377	60	72	68	1.8	5.0		32.73	**99.6**
	30	121.21	1.9	375	60	72	68	1.8	5.0		32.70	**100.5**
	33	123.45	1.9	375	60	72	68	1.8	5.0		32.70	**100.4**
4	36	125.68	1.9	376	57	74	68	1.8	5.0		32.72	**100.0**
	39	127.94	1.9	375	55	74	69	1.8	5.0		32.70	**101.2**
	42	130.19	1.9	375	55	74	69	1.8	5.0		32.70	**100.6**
	45	132.43	1.9	375	54	75	70	1.8	5.0		32.70	**100.1**
5	48	134.66	1.9	375	53	75	70	1.8	5.0		32.70	**99.5**
	51	136.92	1.9	373	52	75	70	1.8	5.0		32.66	**100.8**
	54	139.16	1.9	373	51	76	71	1.8	5.0		32.66	**99.8**
	57	141.40	1.9	372	51	76	71	1.8	5.0		32.64	**99.6**
6	60	143.63	1.9	372	52	76	71	1.8	5.0		32.64	**99.1**
	63	145.88	1.9	375	49	76	71	1.8	5.0		32.70	**100.0**
	66	148.15	1.9	374	49	77	72	1.8	5.0		32.68	**101.1**
	69	150.37	1.9	378	48	77	72	1.8	5.0		32.75	**98.6**
7	72	152.61	1.9	376	49	77	72	1.8	5.0		32.72	**99.7**
	75	154.87	1.9	375	48	78	73	1.8	5.0		32.70	**100.5**
	78	157.13	1.9	375	48	78	73	1.8	5.0		32.70	**100.3**
	81	159.38	1.9	374	48	78	73	1.8	5.0		32.68	**99.8**
8	84	161.65	1.9	374	48	79	73	1.8	5.0		32.68	**100.6**
	87	163.91	1.6	374	48	79	73	1.6	5.0		29.99	**100.1**
	90	166.00	1.6	374	48	79	73	1.6	5.0		29.99	**100.8**
	93	168.19	1.6	374	48	79	73	1.6	5.0		29.99	**105.7**
9	96	170.30	1.6	376	48	79	73	1.6	5.0		30.02	**101.8**
	99	172.39	1.6	375	48	79	73	1.6	5.0		30.00	**101.0**

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	3 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	September 16, 2021	**Operator:**	JG

Pitot Factor	0.843	**Filter (mg)**	0		
DGMCF	1	**Probe (mg)**	0		
Barometric Pressure	29.55 "Hg	**CWTR (g)**	3477.7		
Static Pressure	0.690 "H_2O	**WCBDA (g)**	20.6		
Nozzle	0.2556 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.71 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%	9.08
CO2%	8.96
COppm	32.5

Measured H2O
48.8 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures Stack °F	Imp. Out °F	DGM Out °F	DGM In °F	ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
	102	174.49	1.6	374	48	79	73	1.6	5.0		29.99	**101.4**
	105	176.56	1.6	374	48	79	73	1.6	5.0		29.99	**99.9**
10	108	178.65	1.6	374	48	79	73	1.6	5.0		29.99	**100.8**
	111	180.76	1.6	370	49	79	73	1.6	5.0		29.91	**101.8**
	114	182.85	1.6	370	49	79	73	1.6	5.0		29.91	**100.6**
	117	184.97	1.6	367	49	79	73	1.6	5.0		29.86	**102.0**
	120	187.07								0.71		**100.9**
1	0	187.78	1.9	378	71	78	77	1.8	5.0		32.75	
	3	190.06	1.9	379	72	79	77	1.8	5.0		32.77	**101.0**
	6	192.35	1.9	382	60	79	77	1.8	5.0		32.83	**101.4**
	9	194.65	1.9	379	58	79	77	1.8	5.0		32.77	**102.0**
2	12	196.94	1.9	378	55	79	77	1.8	5.0		32.75	**101.4**
	15	199.21	1.9	378	56	79	77	1.8	5.0		32.75	**100.4**
	18	201.50	1.9	378	56	79	77	1.8	5.0		32.75	**101.3**
	21	203.78	1.9	379	57	79	77	1.8	5.0		32.77	**100.9**
3	24	206.07	1.9	378	57	79	77	1.8	5.0		32.75	**101.4**
	27	208.35	1.9	378	54	83	79	1.8	5.0		32.75	**100.9**
	30	210.64	2	379	54	83	79	1.9	5.0		33.63	**100.7**
	33	213.00	2	378	54	83	79	1.9	5.0		33.61	**101.3**
4	36	215.29	1.9	377	53	84	79	1.9	5.0		32.73	**98.2**
	39	217.53	1.9	378	52	84	80	1.9	5.0		32.75	**98.4**
	42	219.85	1.9	377	53	84	80	1.9	5.0		32.73	**101.9**
	45	222.16	1.9	378	54	84	80	1.9	5.0		32.75	**101.4**
5	48	224.48	1.9	380	50	86	80	1.9	5.0		32.79	**101.9**
	51	226.78	1.9	378	50	87	81	1.9	5.0		32.75	**101.0**
	54	229.08	1.9	378	50	87	82	1.9	5.0		32.75	**100.6**
	57	231.40	1.9	380	50	87	82	1.9	5.0		32.79	**101.4**
6	60	233.69	1.9	379	50	87	82	1.9	5.0		32.77	**100.2**
	63	235.96	1.9	379	51	87	82	1.9	5.0		32.77	**99.3**
	66	238.29	1.9	379	51	87	82	1.9	5.0		32.77	**101.9**
	69	240.60	1.9	379	51	87	82	1.9	5.0		32.77	**101.1**
7	72	242.92	1.9	379	51	87	82	1.9	5.0		32.77	**101.5**
	75	245.23	1.9	382	46	87	82	1.9	5.0		32.83	**101.1**
	78	247.55	1.9	382	46	87	82	1.9	5.0		32.83	**101.7**

ORTECH Consulting Inc.

Plant:	Clean Harbors	**Plant Location:**	Corunna, ON
Test No.:	3 - SVOC	**Test Location:**	Incinerator Exhaust Stack
Date:	September 16, 2021	**Operator:**	JG

Pitot Factor	0.843	**Filter (mg)**	0		
DGMCF	1	**Probe (mg)**	0		
Barometric Pressure	29.55 "Hg	**CWTR (g)**	3477.7		
Static Pressure	0.690 "H_2O	**WCBDA (g)**	20.6		
Nozzle	0.2556 inches				
Stack Diameter	5.000 ft	**Leak Check Volume**		0.71 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%	9.08
CO2%	8.96
COppm	32.5

Measured H2O
48.8 %

Point	Time	DGM Reading	ΔP "H2O	Temperatures				ΔH "H2O	Vacuum "Hg	Leak Check Volume	Velocity m/s	Isokinetic %
				Stack °F	Imp. Out °F	DGM Out °F	DGM In °F					
	81	249.84	1.6	384	48	88	82	1.6	5.0		30.16	**100.4**
8	84	252.00	1.6	384	48	88	82	1.6	5.0		30.16	**103.1**
	87	254.10	1.6	382	47	88	83	1.6	5.0		30.13	**100.2**
	90	256.30	1.6	384	46	88	83	1.6	5.0		30.16	**104.8**
	93	258.43	1.6	384	46	88	83	1.6	5.0		30.16	**101.6**
9	96	260.55	1.6	383	47	88	83	1.6	5.0		30.15	**101.1**
	99	262.70	1.6	383	50	89	84	1.6	5.0		30.15	**102.5**
	102	264.85	1.6	382	50	89	84	1.5	5.0		30.13	**102.3**
	105	267.00	1.6	382	50	89	84	1.5	5.0		30.13	**102.2**
10	108	269.05	1.6	380	50	88	84	1.6	5.0		30.09	**97.4**
	111	271.20	1.6	380	50	88	84	1.6	5.0		30.09	**102.2**
	114	273.30	1.6	381	50	88	84	1.6	5.0		30.11	**99.8**
	117	275.30	1.6	381	50	88	84	1.6	5.0		30.11	**95.1**
	120	277.41										**100.4**

APPENDIX 24

ORTECH One-Minute Average
Combustion Gas Results
(15 pages)

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - September 14, 2021

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
11:00	8.57	8.67	797	36.6	4.2		103.4	102.9
11:01	8.60	8.68	797	30.5	4.1		104.0	104.6
11:02	8.98	8.38	747	34.4	3.2		111.0	111.2
11:03	8.96	8.42	749	30.3	3.3		110.1	110.6
11:04	9.03	8.31	716	32.5	3.4		109.3	109.2
11:05	8.39	8.81	783	58.3	5.9		97.4	101.4
11:06	8.88	8.48	742	58.3	4.3		98.3	98.6
11:07	8.60	8.68	760	51.0	4.6		96.3	96.8
11:08	8.72	8.59	757	50.5	4.3		96.9	96.0
11:09	8.17	8.99	799	59.5	6.0	4.3	95.8	96.2
11:10	8.71	8.62	805	62.4	4.8	4.4	94.4	95.0
11:11	8.62	8.64	761	60.4	4.5	4.4	100.6	101.7
11:12	8.92	8.46	748	66.2	4.7	4.6	96.3	97.8
11:13	8.48	8.75	770	60.0	4.9	4.7	94.9	95.4
11:14	8.58	8.71	775	56.2	5.1	4.9	93.5	94.0
11:15	8.60	8.68	750	55.8	4.9	4.8	97.6	98.8
11:16	8.43	8.83	779	64.6	5.9	5.0	89.7	90.9
11:17	8.25	8.92	777	73.8	7.2	5.2	91.6	94.8
11:18	8.00	9.15	823	86.3	8.8	5.7	82.0	83.5
11:19	8.51	8.77	770	55.0	5.0	5.6	94.6	92.6
11:20	8.41	8.85	772	60.8	5.8	5.7	97.3	99.0
11:21	8.39	8.82	753	59.2	6.2	5.8	92.0	93.3
11:22	7.96	9.16	803	89.6	11.3	6.5	85.7	87.8
11:23	8.26	8.99	785	77.2	7.9	6.8	84.1	86.4
11:24	8.45	8.85	769	39.8	4.6	6.7	99.0	98.8
11:25	8.62	8.74	742	46.0	4.7	6.7	100.8	99.9
11:26	8.33	8.95	749	65.3	6.0	6.7	95.1	96.4
11:27	8.93	8.57	719	58.7	4.5	6.5	95.7	95.4
11:28	8.88	8.55	696	63.9	4.0	6.0	98.2	99.3
11:29	9.20	8.35	678	61.0	4.0	5.9	94.3	96.4
11:30	8.70	8.69	697	88.7	5.5	5.9	90.9	91.8
11:31	8.76	8.68	716	87.7	5.5	5.8	87.0	87.4
11:32	9.00	8.48	681	84.9	4.3	5.1	89.4	87.4
11:33	8.91	8.57	683	86.5	4.6	4.8	88.6	88.0
11:34	8.90	8.54	667	110.9	5.6	4.9	85.7	86.3
11:35	8.74	8.69	697	120.9	7.2	5.1	80.4	81.3
11:36	9.28	8.30	662	120.2	4.1	4.9	85.7	85.8
11:37	8.99	8.50	655	127.1	5.1	5.0	85.4	86.6
11:38	9.12	8.38	643	119.7	5.2	5.1	83.8	84.4
11:39	8.60	8.80	683	137.6	9.1	5.6	81.4	82.0
11:40	8.62	8.80	666	130.9	6.9	5.8	78.2	79.0
11:41	8.36	8.98	691	101.1	7.1	5.9	80.9	81.3
11:42	8.51	8.88	700	94.1	6.4	6.1	83.9	83.2
11:43	8.18	9.10	710	96.8	8.5	6.5	82.1	84.2
11:44	8.49	8.93	718	96.6	7.2	6.7	76.0	77.4
11:45	8.50	8.86	676	81.4	4.9	6.4	94.5	95.5
11:46	8.71	8.74	670	64.1	4.5	6.5	90.9	91.7
11:47	8.35	8.97	687	68.5	5.7	6.5	91.6	92.0
11:48	8.27	9.08	712	63.6	5.9	6.6	90.7	90.9
11:49	8.39	8.96	689	57.5	5.0	6.2	93.4	94.9
11:50	8.11	9.17	706	51.6	5.5	6.1	91.9	91.6
11:51	8.16	9.13	697	47.8	5.3	5.9	94.4	96.1
11:52	7.82	9.42	741	72.6	8.6	6.1	82.9	86.6
11:53	8.69	8.80	678	42.7	3.6	5.6	88.3	89.4
11:54	9.03	8.55	645	45.8	3.3	5.2	108.2	109.7
11:55	9.36	8.29	609	57.6	3.3	5.1	97.8	100.6
11:56	8.97	8.59	625	68.0	4.2	5.1	96.4	97.4
11:57	9.15	8.47	658	84.5	4.0	4.9	92.1	92.5

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - September 14, 2021

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
11:58	8.98	8.58	668	86.3	4.2	4.7	91.8	91.5
11:59	9.09	8.51	667	97.2	4.9	4.7	88.4	88.2
12:00	8.74	8.75	683	99.5	5.7	4.7	88.4	87.9
12:01	9.10	8.54	695	92.7	4.7	4.7	86.7	87.6
12:02	9.36	8.28	647	109.0	3.6	4.2	92.2	93.8
12:03	9.47	8.23	644	114.0	3.9	4.2	89.6	91.6
12:04	9.03	8.51	640	126.9	5.0	4.3	88.1	89.2
12:05	8.96	8.62	689	105.6	4.9	4.5	86.2	86.5
12:06	9.20	8.39	654	128.9	4.6	4.5	85.6	85.1
12:07	8.82	8.70	680	147.6	7.1	4.8	84.9	84.5
12:08	8.85	8.68	685	126.6	5.7	5.0	83.6	83.5
12:09	8.58	8.91	716	117.7	7.3	5.2	82.0	81.9
12:10	9.06	8.53	684	113.2	4.5	5.1	87.9	88.0
12:11	8.67	8.79	679	128.4	5.7	5.2	90.1	92.4
12:12	8.71	8.75	694	109.8	6.4	5.5	83.5	85.2
12:13	8.12	9.21	737	90.2	7.6	5.9	80.7	82.0
12:14	8.44	8.99	757	75.1	5.9	6.0	80.0	80.8
12:15	8.26	9.09	725	56.0	4.9	6.0	91.2	91.8
12:16	8.31	9.09	743	53.1	4.9	6.0	93.6	94.1
12:17	7.93	9.35	752	64.8	7.4	6.0	90.3	93.1
12:18	8.17	9.21	776	54.4	5.6	6.0	83.8	85.1
12:19	8.49	8.93	721	44.5	3.7	5.6	102.5	104.0
12:20	8.68	8.80	716	45.0	4.1	5.6	101.6	103.8
12:21	8.41	8.97	699	44.0	4.5	5.5	100.8	101.6
12:22	8.18	9.19	748	55.8	6.2	5.5	94.4	96.6
12:23	8.56	8.89	722	39.1	4.0	5.1	102.8	103.8
12:24	8.21	9.14	729	54.5	5.9	5.1	96.5	99.6
12:25	8.29	9.09	725	54.6	5.8	5.2	97.1	97.5
12:26	7.85	9.43	730	89.2	11.0	5.8	88.1	92.4
12:27	8.48	8.98	735	51.2	4.8	5.5	92.2	92.8
12:28	8.40	9.01	710	62.6	5.3	5.5	102.4	107.0
12:29	8.74	8.75	690	46.1	4.2	5.6	99.4	100.7
12:30	8.15	9.19	730	51.1	5.6	5.7	95.6	97.8
12:31	8.46	8.99	725	47.1	4.5	5.7	96.9	95.2
12:32	8.38	9.01	712	49.9	4.8	5.6	99.3	100.5
12:33	8.28	9.11	730	60.4	6.4	5.8	96.4	97.6
12:34	7.92	9.35	744	90.7	11.2	6.4	89.0	91.5
12:35	8.05	9.31	775	109.5	11.6	6.9	80.1	82.5
12:36	8.56	8.87	697	55.5	4.0	6.2	95.2	96.0
12:37	8.86	8.72	684	48.2	4.0	6.2	102.0	102.1
12:38	8.78	8.72	658	54.8	4.0	6.0	98.9	100.0
12:39	8.54	8.95	708	59.4	4.8	6.1	96.8	99.1
12:40	9.05	8.58	681	68.7	3.8	5.9	96.6	97.4
12:41	8.84	8.73	682	76.4	4.5	5.9	95.2	95.8
12:42	8.99	8.61	672	80.9	4.1	5.8	93.8	94.3
12:43	8.58	8.94	710	69.3	4.6	5.7	92.4	93.1
12:44	9.12	8.53	697	81.0	3.6	4.9	94.2	94.2
12:45	9.09	8.53	663	102.9	3.7	4.1	94.8	96.7
12:46	9.46	8.28	645	116.4	4.1	4.1	89.4	91.0
12:47	8.94	8.64	675	116.6	4.6	4.2	86.4	88.2
12:48	9.13	8.54	685	116.3	5.1	4.3	85.7	86.7
12:49	8.92	8.64	675	139.4	6.0	4.4	86.4	86.3
12:50	8.94	8.67	702	118.8	5.1	4.6	86.2	86.2
12:51	8.75	8.77	696	121.7	6.6	4.8	86.2	86.4
12:52	8.92	8.70	715	119.2	6.6	5.0	86.1	85.4
12:53	9.23	8.43	664	130.6	4.1	5.0	92.0	92.0
12:54	9.26	8.43	677	129.3	4.4	5.0	88.9	89.8
12:55	8.98	8.59	667	150.7	6.1	5.3	86.1	87.0

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - September 14, 2021

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
12:56	8.70	8.83	690	135.1	7.5	5.6	83.9	85.4
12:57	9.01	8.60	701	123.9	4.7	5.6	88.0	87.6
12:58	8.76	8.78	708	112.5	5.6	5.7	87.1	87.1
12:59	8.94	8.64	694	117.6	5.2	5.6	87.3	86.5
13:00	8.40	9.06	728	107.7	7.4	5.8	85.2	85.5
14:33	8.82	8.83	775	83.6	5.0		94.8	97.4
14:34	8.46	9.14	838	96.7	7.7		86.5	88.1
14:35	9.05	8.67	779	87.1	4.7		88.7	88.8
14:36	8.90	8.76	758	92.4	4.3		100.1	101.6
14:37	9.30	8.47	738	94.2	4.5		94.4	94.8
14:38	8.76	8.88	781	100.9	6.4		92.6	94.0
14:39	8.96	8.75	773	93.1	5.1		92.0	93.3
14:40	8.77	8.87	768	100.0	6.1		93.4	94.8
14:41	8.91	8.79	794	90.1	5.6		92.2	92.5
14:42	8.63	8.97	785	101.0	8.0	5.8	94.1	95.6
14:43	8.76	8.92	820	93.4	8.0	6.0	92.4	91.9
14:44	8.89	8.78	780	95.3	5.3	5.8	101.1	101.1
14:45	9.08	8.68	783	92.8	5.3	5.9	97.2	97.8
14:46	8.87	8.76	762	107.9	7.4	6.2	95.9	96.9
14:47	8.49	9.09	827	103.6	8.3	6.5	87.8	89.1
14:48	8.66	8.95	836	79.8	6.4	6.5	89.2	89.6
14:49	8.41	9.14	865	113.8	11.4	7.2	90.1	92.3
14:50	8.53	9.04	864	167.0	17.1	8.3	87.7	86.8
14:51	8.18	9.33	905	233.2	25.2	10.2	77.8	79.1
14:52	8.71	8.92	885	120.7	8.6	10.3	81.3	81.2
14:53	8.65	8.94	840	120.2	9.7	10.5	91.4	93.4
14:54	9.03	8.66	833	120.0	8.0	10.7	85.7	86.5
14:55	9.06	8.62	789	58.5	5.2	10.7	95.4	94.7
14:56	9.07	8.66	825	62.9	6.0	10.6	96.7	103.0
14:57	8.95	8.70	800	47.4	4.2	10.2	106.8	111.0
14:58	8.97	8.71	834	48.9	4.1	9.9	102.6	102.9
14:59	8.59	8.96	839	56.0	5.8	9.4	103.5	106.7
15:00	8.64	8.98	880	61.0	6.1	8.3	95.8	96.9
15:01	8.95	8.70	825	54.7	3.9	6.1	109.6	110.2
15:02	8.96	8.73	833	52.7	4.5	5.7	105.6	106.9
15:03	8.84	8.78	815	63.9	5.3	5.3	101.7	103.3
15:04	8.59	8.99	866	69.4	6.2	5.1	97.1	98.2
15:05	8.85	8.80	850	57.0	5.0	5.1	101.2	102.8
15:06	8.70	8.91	856	63.0	5.5	5.1	97.8	98.5
15:07	8.97	8.70	825	62.9	5.0	5.1	97.5	98.2
15:08	8.40	9.11	832	71.2	7.4	5.5	92.0	93.8
15:09	8.87	8.81	839	72.6	6.3	5.5	86.7	89.2
15:10	8.69	8.90	795	80.1	6.1	5.5	99.6	103.4
15:11	9.15	8.57	795	72.5	5.1	5.7	94.1	94.3
15:12	8.58	8.98	793	75.5	7.0	5.9	94.0	93.7
15:13	8.75	8.90	820	87.7	7.2	6.1	88.5	89.4
15:14	8.76	8.84	777	88.7	7.3	6.2	95.1	95.5
15:15	8.85	8.82	781	90.8	7.2	6.4	89.2	89.2
15:16	8.68	8.90	765	98.0	8.3	6.7	91.7	94.1
15:17	8.54	9.03	813	129.1	12.3	7.4	79.5	82.0
15:18	8.92	8.73	766	92.6	5.1	7.2	91.4	94.8
15:19	8.79	8.85	778	93.4	6.6	7.2	93.6	95.2
15:20	8.77	8.81	764	94.7	7.4	7.4	91.6	93.0
15:21	8.41	9.13	814	117.1	11.3	8.0	85.2	87.2
15:22	8.90	8.77	796	68.1	5.7	7.8	93.4	93.2
15:23	8.62	8.97	789	73.2	6.5	7.8	98.4	101.7
15:24	8.73	8.89	788	71.9	6.9	7.7	97.5	98.8
15:25	8.27	9.23	817	97.2	10.4	8.1	90.4	93.4

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - September 14, 2021

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
15:26	8.86	8.83	824	74.4	6.3	7.8	91.3	91.0
15:27	8.78	8.83	766	55.3	4.2	7.0	109.5	109.2
15:28	9.11	8.62	786	64.4	5.0	7.0	102.5	104.1
15:29	8.67	8.94	789	60.2	5.1	6.9	97.2	98.9
15:30	8.74	8.90	804	54.1	5.2	6.7	96.2	96.8
15:31	8.78	8.85	801	57.9	4.8	6.0	100.2	102.1
15:32	8.75	8.91	831	44.7	4.6	5.9	98.1	98.0
15:33	8.49	9.06	836	48.1	5.1	5.8	98.5	100.2
15:34	8.36	9.20	900	57.1	6.5	5.7	88.2	90.3
15:35	8.86	8.82	849	38.0	3.8	5.1	100.6	101.1
15:36	8.84	8.85	852	40.6	3.9	4.8	105.1	107.3
15:37	9.00	8.68	824	36.5	3.8	4.8	104.2	103.8
15:38	8.59	9.02	869	45.2	5.1	4.8	97.7	99.3
15:39	8.86	8.82	870	31.7	3.6	4.6	106.4	106.0
15:40	8.60	9.00	865	35.7	4.4	4.6	106.0	109.0
15:41	8.82	8.85	879	41.8	4.7	4.5	105.5	106.7
15:42	8.38	9.17	873	73.9	8.9	5.0	97.2	102.1
15:43	8.71	8.96	871	78.3	6.8	5.2	86.0	88.2
15:44	8.75	8.89	807	54.5	4.2	4.9	106.4	107.6
15:45	9.04	8.67	796	52.4	4.9	5.0	102.0	103.2
15:46	8.59	8.99	793	61.9	5.7	5.2	98.0	100.3
15:47	8.65	9.00	829	62.9	5.9	5.4	94.9	94.9
15:48	8.89	8.77	790	63.1	5.3	5.4	100.6	102.8
15:49	8.70	8.93	806	66.8	5.6	5.6	93.2	94.1
15:50	8.67	8.93	797	72.4	6.8	5.9	96.8	99.7
15:51	8.41	9.16	848	92.7	9.7	6.4	85.6	88.7
15:52	8.91	8.77	807	65.3	4.5	5.9	94.6	95.7
15:53	8.74	8.91	797	64.3	5.1	5.8	100.0	103.5
15:54	9.03	8.65	776	66.8	5.1	5.9	94.2	95.2
15:55	8.62	8.98	803	78.1	7.1	6.1	93.4	95.4
15:56	8.86	8.81	806	64.5	4.9	6.0	95.8	96.3
15:57	8.56	9.01	803	77.8	6.4	6.1	92.8	94.7
15:58	8.81	8.85	827	67.7	5.7	6.1	92.0	93.4
15:59	8.34	9.18	830	83.0	8.3	6.4	92.5	96.1
16:00	8.70	8.95	835	76.6	6.3	6.3	87.1	87.7
16:01	8.87	8.78	773	90.1	5.8	5.9	99.7	102.5
16:02	9.11	8.63	766	79.5	5.9	6.1	94.1	95.3
16:03	8.68	8.91	777	130.9	10.8	6.6	87.3	91.2
16:04	8.61	9.00	806	119.5	11.4	7.2	87.1	88.4
16:05	8.82	8.82	774	98.7	7.6	7.3	92.0	94.2
16:06	8.61	8.99	795	121.4	11.0	7.9	87.4	90.7
16:07	8.79	8.85	777	96.5	7.1	8.0	90.5	91.3
16:08	8.56	9.04	803	114.9	11.6	8.6	86.2	89.7
16:09	9.00	8.69	768	90.4	5.4	8.3	92.4	94.1
16:10	8.94	8.74	744	99.8	6.1	8.3	98.0	99.1
16:11	9.16	8.55	722	98.0	6.1	8.3	93.4	94.7
16:12	8.64	8.95	754	111.8	10.5	8.7	90.5	92.6
16:13	9.03	8.69	750	119.1	9.1	8.6	85.4	88.2
16:14	8.46	9.09	777	142.1	12.8	8.7	90.6	93.3
16:15	8.80	8.86	743	95.0	7.7	8.7	91.8	91.5
16:16	8.44	9.11	770	113.1	11.3	8.8	92.2	93.4
16:17	8.84	8.84	767	96.0	7.2	8.8	90.5	90.5
16:18	9.02	8.66	715	92.5	4.7	8.1	101.9	101.1
16:19	9.16	8.57	720	104.3	7.1	8.3	98.1	102.2
16:20	8.84	8.78	708	112.0	8.0	8.5	95.5	96.2
16:21	8.68	8.94	746	99.2	8.7	8.7	94.8	94.5
16:22	8.95	8.71	720	71.5	5.3	8.2	104.5	104.8
16:23	8.66	8.95	740	78.3	6.7	8.0	98.6	99.3

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - September 14, 2021

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
16:24	8.74	8.87	733	83.6	7.0	7.4	98.1	99.2
16:25	8.42	9.14	770	85.0	10.2	7.6	95.7	95.7
16:26	8.86	8.82	749	72.7	5.2	7.0	98.4	98.9
16:27	8.82	8.83	715	66.5	4.5	6.8	109.5	112.3
16:28	9.24	8.51	689	64.4	4.6	6.7	104.8	106.1
16:29	8.95	8.72	700	47.9	3.8	6.4	105.5	105.3
16:30	9.16	8.58	698	56.0	3.9	6.0	103.5	104.9
16:31	9.01	8.66	677	56.1	3.8	5.5	105.2	106.5
16:32	9.09	8.64	689	58.4	4.0	5.4	102.8	104.0
16:33	8.78	8.82	707	61.7	4.7	5.2	100.7	102.7
Min	7.82	8.23	609	30.3	3.2	4.1	76.0	77.4
Max	9.47	9.43	905	233.2	25.2	10.7	111.0	112.3
Avg	8.72	8.82	754	81.0	6.1	6.2	93.6	94.7

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - September 15, 2021

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
09:37	8.52	9.09	570	25.3	5.5		126.5	128.0
09:38	9.12	8.71	577	19.6	4.4		126.8	128.2
09:39	9.12	8.67	543	17.4	4.3		132.1	133.2
09:40	9.41	8.48	539	16.5	4.2		129.7	131.2
09:41	9.03	8.74	540	17.3	4.6		126.2	127.3
09:42	9.07	8.74	559	18.6	4.5		126.3	127.9
09:43	9.03	8.73	556	19.5	4.8		127.4	128.7
09:44	8.96	8.81	564	21.9	4.6		128.1	129.7
09:45	8.89	8.84	554	19.8	4.9		128.6	130.5
09:46	8.75	8.96	578	22.8	4.8	4.7	128.0	129.7
09:47	9.26	8.60	558	15.7	4.0	4.5	133.6	134.6
09:48	9.14	8.68	551	20.1	4.3	4.5	130.4	135.5
09:49	9.27	8.55	538	20.5	4.6	4.5	128.9	132.8
09:50	8.84	8.89	559	30.1	5.2	4.6	127.3	129.9
09:51	9.13	8.69	564	22.2	4.3	4.6	126.3	128.1
09:52	8.94	8.81	555	21.8	4.7	4.6	126.5	128.5
09:53	9.02	8.75	562	21.3	4.6	4.6	127.0	128.7
09:54	8.65	9.01	580	22.8	5.1	4.6	126.9	128.7
09:55	9.10	8.73	584	21.2	4.3	4.6	127.6	128.6
09:56	9.09	8.70	558	19.3	4.3	4.5	133.3	135.1
09:57	9.39	8.51	553	15.8	4.0	4.5	132.8	133.9
09:58	8.93	8.82	545	17.8	4.4	4.5	131.4	133.2
09:59	8.96	8.83	577	18.5	4.3	4.5	128.8	131.3
10:00	8.93	8.81	597	17.8	4.3	4.4	128.4	130.4
10:01	8.88	8.87	594	19.9	4.4	4.4	128.4	130.2
10:02	8.73	8.92	593	23.2	4.8	4.4	128.7	130.6
10:03	8.65	9.01	620	23.1	4.8	4.5	128.1	130.0
10:04	9.15	8.66	575	15.6	3.9	4.3	134.3	135.8
10:05	9.11	8.70	582	18.3	4.1	4.3	135.1	136.9
10:06	9.00	8.73	575	16.5	4.0	4.3	129.0	130.7
10:07	8.69	8.98	613	19.0	4.5	4.3	129.4	131.5
10:08	9.04	8.74	601	16.5	4.0	4.3	130.4	131.6
10:09	8.76	8.93	598	24.2	4.8	4.4	131.8	133.2
10:10	8.90	8.82	599	18.5	4.2	4.3	132.1	133.3
10:11	8.35	9.21	626	18.1	4.7	4.4	131.1	133.1
10:12	8.97	8.81	605	16.5	4.1	4.3	133.5	134.0
10:13	8.92	8.81	577	14.1	3.8	4.2	138.1	140.4
10:14	9.25	8.58	564	16.1	3.9	4.2	132.6	136.2
10:15	8.80	8.89	575	16.4	4.1	4.2	132.0	133.1
10:16	8.82	8.91	601	16.1	4.1	4.2	131.5	133.2
10:17	8.91	8.80	580	14.7	4.0	4.2	132.4	133.7
10:18	8.83	8.91	588	15.7	4.1	4.2	133.0	134.4
10:19	8.67	8.97	586	14.7	4.3	4.1	133.4	135.2
10:20	8.50	9.14	620	19.6	4.7	4.2	131.4	133.3
10:21	9.10	8.70	568	12.9	3.6	4.1	135.4	134.8
10:22	9.07	8.73	572	16.2	3.8	4.0	137.4	139.7
10:23	9.17	8.61	542	17.5	3.9	4.0	135.3	138.0
10:24	8.76	8.94	565	25.9	4.6	4.1	133.1	135.5
10:25	9.06	8.72	571	21.8	4.2	4.1	131.2	133.2
10:26	8.82	8.88	587	19.8	4.1	4.1	131.0	133.1
10:27	8.99	8.77	572	19.3	4.1	4.1	131.5	133.3
10:28	8.55	9.08	605	22.5	4.5	4.2	131.2	133.4
10:29	9.00	8.78	584	23.0	4.2	4.2	131.7	133.3
10:30	8.99	8.75	575	17.2	3.8	4.1	135.8	138.4
10:31	9.32	8.55	565	20.0	4.0	4.1	132.9	134.8
10:32	8.90	8.81	563	23.5	4.2	4.2	129.7	131.7
10:33	8.94	8.82	569	20.6	4.1	4.2	129.9	132.0
10:34	9.01	8.73	567	16.9	4.0	4.1	130.7	132.1

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - September 15, 2021

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
10:35	8.91	8.84	582	21.1	4.3	4.1	131.2	132.8
10:36	8.81	8.87	578	23.6	4.7	4.2	131.3	133.4
10:37	8.61	9.03	610	27.4	5.0	4.3	129.8	132.0
10:38	9.07	8.71	570	18.9	3.9	4.2	135.5	136.1
10:39	8.96	8.80	581	18.7	4.0	4.2	134.2	137.2
10:40	9.23	8.57	546	18.3	3.9	4.2	133.6	135.8
10:41	8.80	8.90	577	21.1	4.2	4.2	132.8	134.6
10:42	9.04	8.74	572	15.2	3.7	4.2	132.2	133.7
10:43	8.85	8.86	576	18.0	4.0	4.2	132.8	134.5
10:44	9.00	8.77	574	15.1	3.7	4.1	133.2	134.5
10:45	8.63	9.01	587	15.4	3.9	4.1	133.0	134.7
10:46	8.99	8.79	586	13.7	3.7	4.0	133.9	134.6
10:47	9.07	8.68	557	13.1	3.5	3.9	139.1	140.1
10:48	9.34	8.52	552	14.6	3.5	3.8	135.3	139.4
10:49	8.96	8.77	563	14.6	3.7	3.8	133.9	134.7
10:50	8.89	8.84	584	13.5	3.7	3.8	134.1	135.5
10:51	9.10	8.67	561	13.8	3.6	3.7	134.6	136.0
10:52	8.96	8.81	573	14.7	3.6	3.7	135.2	136.4
10:53	8.89	8.80	559	16.0	3.9	3.7	136.4	137.4
10:54	8.53	9.11	577	15.8	4.1	3.7	134.6	136.6
10:55	9.07	8.73	565	12.9	3.4	3.7	138.1	139.3
10:56	8.85	8.87	573	16.6	4.0	3.7	139.4	143.1
10:57	9.11	8.67	554	16.7	3.8	3.7	132.1	135.8
10:58	8.61	9.04	589	16.4	4.0	3.8	133.5	134.7
10:59	8.89	8.86	593	16.4	3.8	3.8	133.7	134.7
11:00	8.65	9.01	586	14.1	4.0	3.8	134.2	135.6
11:01	8.78	8.93	598	13.3	3.8	3.8	134.4	135.9
11:02	8.34	9.22	621	16.1	4.3	3.9	133.8	136.4
11:03	8.60	9.08	613	15.1	4.0	3.9	132.5	134.3
11:04	8.90	8.82	569	12.9	3.7	3.9	138.3	140.4
11:05	9.13	8.68	561	13.7	3.7	3.9	138.8	142.0
11:06	8.89	8.80	561	13.1	3.8	3.9	138.0	140.7
11:07	8.68	9.00	595	14.4	4.0	3.9	136.4	138.5
11:08	8.80	8.90	588	14.3	3.9	3.9	136.4	138.0
11:09	8.76	8.93	595	11.8	3.7	3.9	137.1	138.0
11:10	8.84	8.86	578	8.9	3.7	3.9	139.6	140.7
11:11	8.48	9.14	620	10.6	3.8	3.9	140.7	142.2
11:12	8.92	8.83	580	8.9	3.5	3.8	144.6	145.1
11:13	8.78	8.92	585	9.8	3.6	3.7	143.8	147.9
11:14	9.13	8.66	560	10.3	3.6	3.7	142.0	145.4
11:15	8.54	9.08	589	13.4	4.0	3.8	140.4	143.2
11:16	8.79	8.93	599	11.6	3.8	3.8	138.9	141.0
11:17	8.63	9.02	586	10.3	3.7	3.7	139.6	141.3
11:18	8.72	8.97	593	11.2	3.8	3.7	140.4	141.9
11:19	8.39	9.19	600	13.9	4.2	3.8	139.7	142.5
11:20	8.55	9.12	611	15.9	4.2	3.8	134.7	137.2
11:21	8.84	8.87	564	9.1	3.6	3.8	145.0	147.3
11:22	8.97	8.80	568	10.4	3.8	3.8	144.2	146.1
11:23	8.65	8.98	573	11.6	4.0	3.9	139.4	141.2
11:24	8.46	9.17	585	16.1	4.2	3.9	137.4	141.2
11:25	8.79	8.92	590	10.3	3.8	3.9	140.8	142.2
11:26	8.53	9.10	596	11.1	3.9	3.9	140.2	144.2
11:27	8.69	8.99	585	11.5	3.9	3.9	141.2	144.0
11:28	8.23	9.34	627	14.4	4.5	4.0	137.0	139.6
11:29	8.79	8.93	580	9.5	3.6	3.9	138.7	139.3
11:30	9.22	8.60	540	7.1	3.2	3.8	152.6	152.6
11:31	9.68	8.26	501	6.0	3.0	3.8	152.6	155.1
11:32	9.19	8.60	527	6.1	3.1	3.7	153.0	152.8

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - September 15, 2021

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
11:33	9.51	8.42	538	6.1	3.1	3.6	153.2	154.0
11:34	9.49	8.39	519	6.4	3.2	3.5	153.3	155.5
11:35	9.40	8.49	537	6.9	3.2	3.5	154.0	156.0
11:36	9.11	8.65	547	6.5	3.3	3.4	153.7	155.9
11:37	9.21	8.63	569	6.8	3.3	3.3	153.1	155.3
12:40	8.97	8.81	548	9.7	3.9		139.2	141.2
12:41	8.96	8.86	573	9.4	3.9		138.8	141.4
12:42	9.09	8.73	554	9.1	3.9		139.4	141.3
12:43	9.00	8.83	568	9.8	4.0		140.1	141.7
12:44	8.99	8.80	562	9.6	4.1		140.4	142.3
12:45	8.76	8.99	591	10.3	4.3		139.5	141.9
12:46	9.30	8.62	543	8.6	3.9		139.7	141.4
12:47	9.25	8.64	540	8.6	4.0		140.5	142.0
12:48	9.50	8.44	509	9.6	4.0		135.8	138.0
12:49	9.04	8.79	542	10.2	4.2	4.0	135.0	137.2
12:50	9.37	8.57	541	9.1	4.0	4.0	135.9	137.5
12:51	9.17	8.69	529	9.5	4.1	4.0	136.5	138.2
12:52	9.33	8.59	533	8.9	4.0	4.1	136.0	137.9
12:53	8.95	8.84	554	9.3	4.4	4.1	135.4	137.0
12:54	9.31	8.62	531	8.8	4.1	4.1	135.4	137.1
12:55	9.44	8.49	508	8.7	3.9	4.1	135.6	137.6
12:56	9.65	8.36	518	9.3	4.0	4.1	135.3	138.0
12:57	9.32	8.56	515	10.3	4.3	4.1	131.8	132.0
12:58	9.52	8.49	511	13.1	4.3	4.1	132.1	133.3
12:59	9.82	8.27	485	41.5	5.9	4.3	112.7	121.3
13:00	9.76	8.35	500	48.2	6.2	4.5	104.6	106.3
13:01	9.90	8.24	481	73.4	7.3	4.8	96.1	101.3
13:02	9.65	8.45	512	108.1	9.7	5.4	92.1	94.1
13:03	9.93	8.24	486	119.9	8.6	5.8	90.8	92.5
13:04	9.76	8.37	501	118.8	8.9	6.3	88.6	90.3
13:05	10.00	8.19	485	127.8	9.3	6.9	82.7	84.5
13:06	9.44	8.62	523	160.3	12.4	7.7	85.1	84.4
13:07	9.77	8.41	508	123.5	9.1	8.2	86.2	85.4
13:08	9.60	8.50	498	109.9	8.8	8.6	88.4	88.0
13:09	9.84	8.35	505	101.1	7.8	8.8	90.1	89.8
13:10	9.55	8.53	497	118.0	9.2	9.1	90.3	90.9
13:11	9.84	8.37	499	111.8	8.2	9.2	89.9	90.2
13:12	10.03	8.17	465	104.0	7.2	8.9	86.9	88.1
13:13	10.16	8.11	465	119.7	8.0	8.9	84.0	84.8
13:14	9.83	8.31	469	110.0	8.3	8.8	83.4	84.5
13:15	9.41	8.64	498	114.4	9.6	8.9	83.9	84.2
13:16	9.44	8.62	508	72.2	8.0	8.4	91.3	91.1
13:17	9.04	8.94	529	73.3	8.1	8.3	93.5	93.2
13:18	9.11	8.88	521	54.8	7.9	8.2	100.8	99.9
13:19	8.87	9.11	554	64.6	8.5	8.3	100.5	101.4
13:20	9.19	8.83	511	41.3	6.5	8.0	104.5	105.3
13:21	9.07	8.92	522	44.8	6.8	7.9	106.3	106.7
13:22	9.37	8.68	504	37.4	6.3	7.8	106.2	106.3
13:23	8.85	9.07	532	42.3	7.2	7.7	106.3	106.5
13:24	9.11	8.90	534	31.5	6.0	7.5	108.5	108.7
13:25	8.98	8.97	522	31.3	6.2	7.1	111.8	112.7
13:26	9.02	8.95	535	33.4	6.5	7.0	111.3	112.1
13:27	8.73	9.14	541	43.5	7.6	6.9	110.9	111.8
13:28	8.86	9.10	556	42.9	7.4	6.9	110.3	111.2
13:29	9.06	8.91	519	25.0	5.8	6.6	115.7	116.4
13:30	9.23	8.81	519	31.0	6.1	6.6	113.9	116.0
13:31	9.04	8.91	513	34.4	6.4	6.5	112.6	113.6
13:32	8.89	9.07	546	30.8	6.2	6.5	113.3	113.9

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - September 15, 2021

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
13:33	9.32	8.76	509	18.5	5.2	6.3	117.7	119.2
13:34	8.99	8.98	508	24.7	5.7	6.3	117.0	118.7
13:35	9.04	8.96	513	25.8	5.9	6.3	116.9	118.0
13:36	8.66	9.26	558	25.0	6.2	6.2	116.6	117.2
13:37	9.15	8.89	520	21.8	5.5	6.0	116.7	117.2
13:38	8.95	9.03	531	31.9	6.2	5.9	116.5	117.2
13:39	9.34	8.76	510	34.3	6.3	6.0	111.3	113.2
13:40	8.83	9.12	532	44.9	7.4	6.1	110.4	111.3
13:41	9.02	9.00	537	37.5	6.6	6.1	109.4	110.6
13:42	8.89	9.07	530	38.1	6.9	6.2	109.3	110.1
13:43	8.88	9.11	548	32.0	6.5	6.3	109.8	110.4
13:44	8.45	9.38	561	48.0	8.9	6.6	110.1	111.1
13:45	8.58	9.36	583	44.4	7.8	6.8	109.5	110.5
13:46	8.93	9.06	533	27.1	6.2	6.8	115.5	117.3
13:47	9.10	8.96	529	36.8	6.7	7.0	113.1	114.5
13:48	9.00	8.97	518	38.9	7.0	7.0	109.5	110.7
13:49	8.76	9.18	547	37.1	7.0	7.1	108.8	110.7
13:50	8.98	9.02	538	34.2	6.5	7.0	108.6	109.7
13:51	8.73	9.21	550	37.8	7.0	7.1	108.4	109.0
13:52	8.86	9.10	542	27.9	6.4	7.0	109.1	109.5
13:53	8.43	9.43	568	34.8	7.5	7.1	109.3	110.3
13:54	8.95	9.06	544	28.7	6.2	6.8	110.7	111.1
13:55	8.84	9.11	531	27.6	6.1	6.7	112.3	112.9
13:56	9.29	8.79	509	25.9	6.0	6.7	112.3	112.0
13:57	8.77	9.16	526	33.1	6.8	6.7	111.2	111.4
13:58	8.85	9.12	541	35.0	6.9	6.6	109.4	110.3
13:59	8.84	9.11	540	35.4	6.7	6.6	109.6	110.3
14:00	8.82	9.14	545	28.9	6.4	6.6	110.8	111.0
14:01	8.58	9.29	549	33.8	7.2	6.6	111.2	111.6
14:02	8.54	9.35	582	42.5	7.4	6.7	109.5	110.5
14:03	8.96	9.03	533	29.8	6.3	6.6	112.4	112.6
14:04	9.03	9.02	534	36.1	6.7	6.6	112.0	113.0
14:05	8.93	9.01	518	31.6	6.6	6.7	110.1	109.6
14:06	8.63	9.27	556	38.6	7.3	6.8	110.3	109.8
14:07	8.93	9.05	544	30.2	6.3	6.8	110.2	110.1
14:08	8.64	9.26	548	33.4	7.0	6.8	110.4	110.6
14:09	8.80	9.15	540	28.2	6.6	6.8	111.1	111.3
14:10	8.30	9.51	571	44.0	8.0	6.9	110.1	111.8
14:11	8.80	9.16	549	47.4	7.5	6.9	103.5	105.8
14:12	8.75	9.16	533	53.1	7.7	7.0	105.2	106.7
14:13	9.09	8.93	518	50.1	7.6	7.1	103.7	105.3
14:14	8.64	9.25	537	61.8	8.6	7.3	103.1	104.1
14:15	8.79	9.17	547	56.7	7.9	7.4	102.6	103.0
14:16	8.73	9.19	534	59.7	8.7	7.6	102.8	103.2
14:17	8.69	9.24	551	68.3	9.2	7.9	102.6	103.2
14:18	8.55	9.30	547	57.3	9.0	8.1	102.2	103.0
14:19	8.55	9.35	570	63.9	9.1	8.3	101.5	102.1
14:20	9.62	8.55	472	21.6	5.4	8.1	107.5	107.0
14:21	9.29	8.78	486	26.8	6.2	7.9	111.4	113.8
14:22	9.18	8.83	490	34.1	6.8	7.9	104.3	106.1
14:23	8.86	9.09	530	49.0	7.9	7.9	104.2	105.2
14:24	9.12	8.90	521	44.8	7.4	7.8	104.0	104.5
14:25	8.83	9.11	527	60.8	8.4	7.8	103.5	104.2
14:26	8.96	9.01	525	50.8	8.1	7.8	102.8	103.5
14:27	8.45	9.39	528	64.8	9.6	7.8	101.7	102.6
14:28	8.95	9.06	533	48.5	7.6	7.7	101.6	101.6
14:29	8.89	9.06	527	61.6	8.5	7.6	104.3	106.8
14:30	9.23	8.83	517	56.3	7.9	7.8	101.2	102.9

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - September 15, 2021

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
14:31	8.77	9.15	533	75.7	9.7	8.2	100.2	101.4
14:32	8.85	9.12	550	68.3	9.0	8.4	98.9	99.6
14:33	8.89	9.07	528	66.1	8.9	8.5	99.0	98.8
14:34	8.82	9.15	537	65.6	8.9	8.7	99.4	99.2
14:35	8.71	9.19	526	68.7	9.8	8.8	100.0	100.2
14:36	8.58	9.33	559	71.8	9.8	9.0	99.2	99.9
14:37	9.07	8.97	508	47.0	7.3	8.7	102.5	102.6
14:38	9.04	8.99	524	68.0	8.7	8.9	102.0	103.2
14:39	9.19	8.83	500	74.7	9.3	8.9	96.7	97.2
14:40	8.83	9.13	527	95.6	11.2	9.3	94.9	95.9
Min	8.23	8.11	465	6.0	3.0	3.3	82.7	84.2
Max	10.16	9.51	627	160.3	12.4	9.3	154.0	156.0
Avg	8.99	8.86	552	31.8	5.5	5.5	122.3	123.7

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - September 16, 2021

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
08:58	9.24	8.84	523	41.9	8.5		107.3	108.6
08:59	9.23	8.88	537	45.4	9.3		104.3	107.3
09:00	9.13	8.90	516	39.2	8.5		103.8	105.4
09:01	8.85	9.14	554	40.0	9.4		103.3	103.9
09:02	9.14	8.93	533	37.1	8.8		104.8	104.7
09:03	8.89	9.11	539	38.8	9.1		104.7	105.9
09:04	9.11	8.95	531	39.6	8.8		104.5	105.3
09:05	8.64	9.30	559	32.7	9.3		104.3	105.2
09:06	9.11	8.96	539	28.3	8.8		105.2	105.7
09:07	9.04	8.99	519	31.1	8.6	8.9	110.4	111.2
09:08	9.33	8.79	510	25.3	8.2	8.9	108.7	110.0
09:09	8.85	9.13	532	27.4	9.2	8.9	108.0	109.1
09:10	9.06	9.01	548	25.4	8.5	8.9	107.2	107.8
09:11	9.01	9.01	529	25.5	8.6	8.8	107.7	108.5
09:12	9.02	9.04	546	27.0	8.7	8.8	108.5	109.1
09:13	8.82	9.15	547	26.7	9.1	8.8	108.2	109.3
09:14	8.86	9.16	573	23.6	8.5	8.7	106.9	108.1
09:15	9.15	8.93	559	26.5	8.5	8.7	111.4	112.6
09:16	9.14	8.96	544	27.2	8.6	8.7	109.7	110.9
09:17	9.09	8.95	527	26.4	8.7	8.7	108.9	110.1
09:18	8.79	9.20	569	25.8	9.2	8.8	107.4	108.9
09:19	9.05	9.01	543	23.3	8.8	8.7	107.4	108.0
09:20	8.79	9.20	557	23.5	9.2	8.8	107.6	108.3
09:21	8.95	9.08	555	24.1	8.7	8.8	108.7	109.1
09:22	8.46	9.44	602	24.9	9.5	8.9	108.4	109.3
09:23	8.94	9.10	569	24.1	9.0	8.9	105.6	108.2
09:24	8.85	9.14	555	23.8	8.7	8.9	114.7	115.9
09:25	9.17	8.91	553	22.8	8.5	8.9	109.3	113.3
09:26	8.84	9.16	556	21.2	8.7	8.9	111.6	112.4
09:27	9.04	9.04	571	21.3	8.3	8.9	110.9	112.0
09:28	9.09	8.95	537	22.4	8.2	8.8	111.8	112.8
09:29	9.06	9.01	551	20.4	8.1	8.7	112.8	113.5
09:30	8.86	9.12	544	21.2	8.0	8.6	113.1	114.4
09:31	8.69	9.28	587	23.6	9.1	8.6	111.2	113.1
09:32	9.21	8.90	546	23.7	7.8	8.4	113.0	113.3
09:33	9.16	8.93	549	23.2	8.2	8.4	114.5	117.1
09:34	9.22	8.84	527	24.4	7.9	8.3	111.7	114.4
09:35	8.95	9.07	559	22.8	8.0	8.2	110.2	112.2
09:36	9.28	8.82	541	23.3	7.5	8.1	109.6	110.5
09:37	9.09	8.96	537	24.1	7.5	8.0	110.1	110.7
09:38	9.21	8.87	538	23.8	7.5	7.9	109.9	110.6
09:39	8.75	9.20	564	25.8	7.8	7.9	108.5	109.6
09:40	9.23	8.90	571	26.3	7.4	7.9	106.9	107.9
09:41	9.15	8.90	537	32.9	8.0	7.8	107.3	109.6
09:42	9.67	8.56	521	28.9	7.0	7.7	105.0	105.8
09:43	9.32	8.75	510	23.1	6.9	7.5	109.5	111.0
09:44	9.38	8.76	530	23.1	7.2	7.5	108.6	108.7
09:45	9.33	8.77	516	30.9	7.6	7.4	108.3	109.2
09:46	9.30	8.82	523	28.2	7.5	7.4	107.2	108.7
09:47	9.08	8.95	543	29.0	8.0	7.5	106.4	107.7
09:48	9.02	9.03	567	27.7	8.0	7.5	105.5	107.1
09:49	9.40	8.74	527	32.1	7.5	7.5	108.3	108.8
09:50	9.27	8.84	534	32.4	7.9	7.6	106.2	107.6
09:51	9.41	8.69	520	38.6	8.2	7.6	102.8	103.7
09:52	9.11	8.95	545	29.9	8.0	7.7	103.4	103.8
09:53	9.32	8.80	542	32.6	7.8	7.8	104.3	104.6
09:54	9.13	8.93	537	30.3	8.0	7.9	105.2	105.6
09:55	9.16	8.91	547	36.9	8.4	7.9	104.3	105.0

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - September 16, 2021

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
09:56	8.68	9.26	571	44.3	10.1	8.2	102.4	103.6
09:57	9.03	9.05	582	48.9	9.3	8.3	98.6	99.7
09:58	9.14	8.91	539	45.5	8.5	8.4	102.7	104.3
09:59	9.54	8.64	523	37.0	8.0	8.4	100.7	102.4
10:00	8.97	9.02	553	53.6	10.2	8.7	96.7	99.8
10:01	9.00	9.05	572	44.4	9.1	8.7	96.0	95.3
10:02	9.08	8.96	547	38.8	8.7	8.8	101.1	102.6
10:03	9.02	9.04	568	38.2	8.7	8.9	99.1	101.2
10:04	9.06	8.96	550	35.6	9.0	9.0	102.2	103.7
10:05	8.85	9.15	587	35.8	8.6	9.0	98.1	99.0
10:06	9.30	8.82	541	37.7	8.1	8.8	104.9	105.5
10:07	9.20	8.90	538	33.4	8.4	8.7	104.5	105.7
10:08	9.33	8.77	529	40.0	8.6	8.7	100.9	102.6
10:09	8.89	9.11	573	44.0	9.1	8.8	99.8	101.3
10:10	9.35	8.79	547	33.3	7.7	8.6	102.5	102.6
10:11	9.24	8.85	540	33.7	7.9	8.5	105.3	106.5
10:12	9.23	8.86	538	31.4	8.1	8.4	105.1	106.5
10:13	8.76	9.20	570	36.0	9.3	8.5	101.5	102.5
10:14	9.13	8.96	579	41.0	9.0	8.5	100.8	102.1
10:15	9.27	8.81	528	35.0	8.0	8.4	107.6	108.2
10:16	9.58	8.61	521	33.6	8.1	8.4	105.9	106.1
10:17	9.18	8.86	535	34.5	8.8	8.4	105.6	106.3
10:18	9.06	9.00	565	38.4	8.9	8.5	101.4	102.0
10:19	9.21	8.86	543	38.9	8.3	8.4	104.7	103.1
10:20	8.99	9.04	558	36.2	8.5	8.5	104.1	103.3
10:21	9.09	8.96	555	39.4	8.4	8.5	103.5	104.1
10:22	9.25	8.83	552	22.2	7.2	8.4	108.9	108.4
10:23	9.34	8.78	537	29.6	7.3	8.2	111.8	111.6
10:24	8.71	9.25	597	147.2	22.7	9.6	102.6	108.0
10:25	9.43	8.70	533	40.2	8.2	9.6	96.7	98.7
10:26	9.07	8.98	551	34.2	8.4	9.7	104.7	103.8
10:27	9.41	8.73	544	32.1	7.6	9.5	106.4	105.6
10:28	9.33	8.76	533	25.7	7.6	9.4	108.8	110.4
10:29	9.28	8.82	527	30.7	8.0	9.4	109.1	109.9
10:30	8.86	9.12	536	33.0	8.4	9.4	107.5	108.8
10:31	9.16	8.94	536	30.9	8.0	9.3	105.4	106.2
10:32	9.30	8.77	492	34.7	10.4	9.7	109.2	110.1
10:33	9.32	8.82	528	69.4	10.2	9.9	98.9	100.7
10:34	9.18	8.86	507	36.0	8.3	8.5	102.8	102.7
10:35	9.15	8.94	534	30.1	7.7	8.5	102.9	103.5
10:36	9.27	8.82	514	31.4	7.9	8.4	108.8	109.5
10:37	8.98	9.05	538	35.0	8.6	8.5	105.7	108.3
10:38	9.07	8.97	535	31.6	8.3	8.6	105.4	106.7
10:39	8.83	9.18	561	32.6	8.5	8.6	105.4	105.8
10:40	9.34	8.78	516	26.9	7.2	8.5	110.3	110.7
10:41	9.19	8.88	515	24.1	7.2	8.4	111.5	113.6
10:42	9.72	8.50	495	25.4	6.8	8.1	107.6	109.1
10:43	9.56	8.60	490	18.6	6.3	7.7	111.4	110.0
10:44	9.74	8.47	487	19.9	6.5	7.5	112.3	111.5
10:45	9.55	8.62	490	20.6	6.4	7.4	112.2	112.9
10:46	9.99	8.31	482	19.1	5.8	7.1	112.3	112.9
10:47	9.39	8.69	496	22.9	6.9	7.0	111.9	113.4
10:48	9.33	8.83	542	40.7	8.9	7.0	104.6	108.5
10:49	9.54	8.62	496	36.7	6.9	6.9	105.9	107.2
10:50	9.69	8.54	503	36.8	7.4	6.9	103.7	104.1
10:51	9.48	8.65	502	39.2	7.5	6.9	102.4	103.1
10:52	9.39	8.76	522	32.1	7.3	7.0	100.8	101.3
10:53	9.82	8.42	484	29.0	6.5	7.0	104.4	105.0

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - September 16, 2021

Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
10:54	9.58	8.60	494	27.4	6.7	7.0	104.9	105.9
10:55	9.83	8.40	475	27.5	6.0	7.0	105.4	105.9
10:56	9.52	8.65	499	21.1	6.3	7.1	106.2	106.5
10:57	9.87	8.38	484	28.0	6.2	7.0	107.3	107.4
10:58	9.66	8.52	472	29.9	6.3	6.7	108.0	108.4
11:54	9.18	8.91	532	32.3	7.5		100.9	100.6
11:55	8.99	9.01	526	40.0	8.4		101.6	101.5
11:56	8.89	9.12	559	39.2	8.6		100.8	101.2
11:57	9.30	8.81	526	35.9	7.3		100.9	102.6
11:58	9.26	8.85	527	38.7	8.0		102.3	103.8
11:59	9.19	8.86	521	39.4	8.2		98.1	99.9
12:00	8.77	9.21	581	39.0	8.9		99.4	99.7
12:01	9.07	8.98	555	35.9	8.1		103.2	102.8
12:02	8.82	9.15	572	35.5	8.3		103.7	106.0
12:03	8.99	9.04	559	34.6	8.6	8.2	103.2	104.6
12:04	8.53	9.38	589	39.5	9.5	8.4	102.7	103.7
12:05	9.05	9.05	572	36.3	8.3	8.4	102.3	102.8
12:06	9.16	8.89	520	37.0	7.7	8.3	111.1	112.7
12:07	9.37	8.77	520	36.5	7.8	8.3	105.4	107.9
12:08	9.03	8.99	517	37.4	7.8	8.3	103.0	104.1
12:09	9.09	8.99	533	35.4	8.1	8.3	102.9	104.2
12:10	9.17	8.89	514	36.0	8.1	8.2	103.8	104.4
12:11	9.05	8.99	524	35.3	8.2	8.2	104.0	104.7
12:12	9.04	8.98	503	40.0	8.6	8.3	104.2	104.8
12:13	8.90	9.11	538	37.4	8.5	8.3	103.5	103.7
12:14	9.36	8.77	496	35.0	7.3	8.0	107.9	107.7
12:15	9.34	8.79	493	34.6	7.2	7.9	107.0	109.2
12:16	9.54	8.60	472	36.5	7.6	7.9	103.1	104.3
12:17	9.08	8.97	509	38.4	7.9	7.9	102.8	103.7
12:18	9.38	8.75	503	30.7	7.1	7.9	105.0	105.1
12:19	9.07	8.96	500	30.4	7.6	7.8	104.5	106.4
12:20	9.24	8.86	511	30.1	7.5	7.8	104.5	105.2
12:21	8.77	9.18	514	40.4	8.7	7.8	104.5	105.0
12:22	9.15	8.94	522	33.0	7.9	7.7	104.2	105.1
12:23	9.31	8.78	477	38.8	7.3	7.6	108.1	109.0
12:24	9.49	8.67	474	37.0	7.5	7.6	106.0	107.1
12:25	9.14	8.90	487	37.1	7.9	7.7	104.9	105.9
12:26	9.13	8.94	507	32.3	7.9	7.7	104.0	104.6
12:27	9.43	8.69	481	30.7	6.8	7.6	105.6	105.3
12:28	9.19	8.89	489	28.3	7.3	7.6	107.1	107.4
12:29	9.23	8.84	483	29.4	7.2	7.6	108.5	108.9
12:30	8.97	9.08	518	30.9	7.9	7.6	107.5	108.4
12:31	9.34	8.77	477	44.8	8.2	7.6	106.7	107.2
12:32	9.16	8.91	488	36.4	7.7	7.6	106.8	107.3
12:33	9.48	8.65	468	36.8	7.8	7.6	106.5	107.3
12:34	8.91	9.08	502	47.3	9.5	7.8	104.6	105.4
12:35	9.17	8.92	497	37.6	7.8	7.8	105.8	105.9
12:36	8.92	9.08	497	36.4	8.3	7.8	104.6	107.6
12:37	9.13	8.95	501	30.8	7.7	7.9	104.6	105.4
12:38	8.79	9.17	502	33.8	8.6	8.1	105.5	106.5
12:39	9.00	9.06	522	38.2	8.6	8.2	104.5	105.1
12:40	9.16	8.89	485	40.0	7.7	8.2	108.8	109.8
12:41	9.47	8.69	476	33.6	7.3	8.1	106.6	108.4
12:42	9.16	8.88	483	41.4	8.1	8.1	102.5	104.5
12:43	9.05	8.99	510	35.7	8.1	8.2	102.3	103.3
12:44	9.21	8.84	487	39.9	7.9	8.0	103.9	105.5
12:45	8.95	9.06	514	35.7	7.7	8.0	101.1	102.7
12:46	9.05	8.96	509	42.3	8.5	8.0	103.0	103.5

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - September 16, 2021

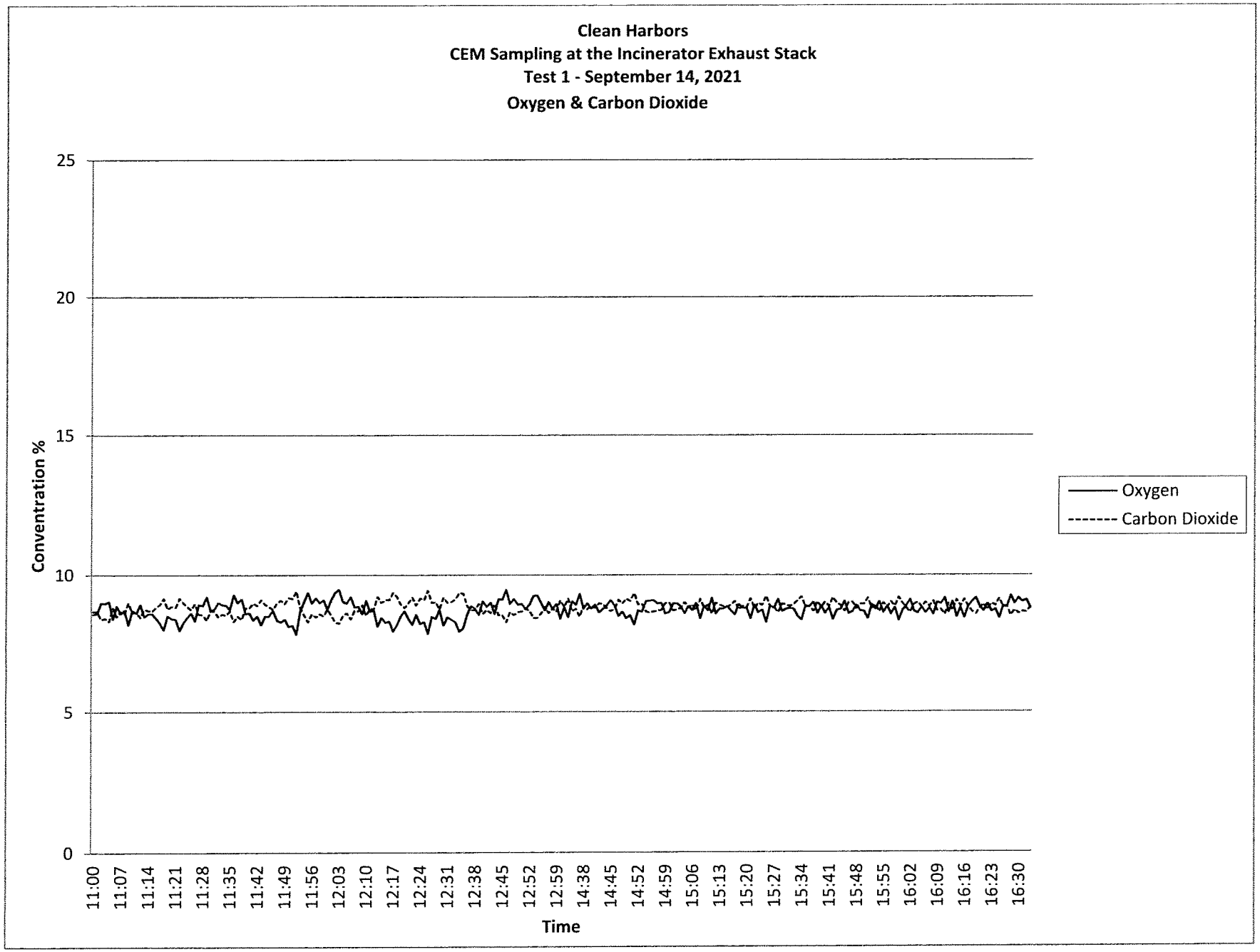
Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
12:47	8.66	9.28	552	38.8	8.7	8.1	103.5	104.2
12:48	9.17	8.90	501	34.7	7.4	8.0	108.4	108.9
12:49	9.10	8.95	495	41.6	8.2	8.0	109.5	111.7
12:50	9.44	8.68	474	37.8	7.8	8.0	104.7	106.4
12:51	8.83	9.14	519	40.9	8.6	8.1	103.9	106.4
12:52	9.17	8.90	495	33.1	7.5	8.0	105.3	106.5
12:53	9.05	8.98	494	35.9	7.7	8.0	106.1	107.9
12:54	9.13	8.93	494	39.3	8.2	8.0	105.2	106.4
12:55	8.71	9.21	502	41.7	9.4	8.2	105.3	106.6
12:56	8.93	9.08	521	42.3	9.0	8.2	104.8	105.6
12:57	9.06	8.93	479	43.1	8.7	8.2	112.7	113.6
12:58	9.12	8.92	490	39.6	8.6	8.4	110.9	111.6
12:59	8.90	9.03	493	56.2	10.7	8.6	109.6	110.3
13:00	8.67	9.26	532	59.3	11.7	9.0	107.1	108.3
13:01	8.89	9.08	515	43.9	9.5	9.1	109.1	110.2
13:02	8.69	9.24	536	51.3	10.1	9.4	106.9	108.2
13:03	9.00	9.00	508	38.6	9.3	9.5	113.3	114.7
13:04	8.66	9.29	550	40.5	9.7	9.7	109.1	111.3
13:05	9.10	8.93	505	37.8	9.1	9.6	107.6	109.4
13:06	8.94	9.04	495	41.5	9.1	9.6	114.9	116.3
13:07	9.25	8.81	487	32.5	8.6	9.6	112.1	114.2
13:08	8.60	9.29	519	42.0	10.1	9.8	111.6	113.3
13:09	8.82	9.16	541	42.1	10.2	9.7	111.5	112.6
13:10	8.72	9.20	525	45.6	10.3	9.6	111.8	114.4
13:11	8.78	9.19	544	37.7	9.4	9.6	110.8	111.6
13:12	8.52	9.34	543	47.9	10.4	9.6	109.9	112.6
13:13	8.70	9.27	566	41.2	9.3	9.6	106.6	109.1
13:14	8.98	9.00	497	39.2	8.4	9.5	115.3	117.3
13:15	9.09	8.96	498	34.2	8.5	9.4	115.9	117.3
13:16	8.85	9.08	497	40.9	9.0	9.4	115.0	116.4
13:17	8.70	9.23	525	29.6	7.6	9.3	113.1	114.7
13:18	9.06	8.96	498	23.5	6.5	9.0	116.3	117.0
13:19	8.81	9.13	500	20.5	6.4	8.6	115.3	117.1
13:20	8.88	9.09	502	22.4	7.2	8.3	115.1	116.4
13:21	8.45	9.42	553	32.9	9.1	8.3	110.3	112.7
13:22	8.82	9.13	509	28.6	8.0	8.0	113.9	115.5
13:23	8.82	9.12	494	22.7	7.3	7.8	118.9	122.0
13:24	9.20	8.84	500	28.2	8.1	7.8	115.0	118.0
13:25	8.68	9.22	504	21.9	7.3	7.6	114.9	115.4
13:26	8.80	9.16	524	19.6	7.2	7.5	114.2	114.8
13:27	8.64	9.23	506	18.7	7.2	7.4	114.2	115.0
13:28	8.76	9.18	521	19.5	7.4	7.5	115.1	115.7
13:29	8.53	9.32	515	20.8	7.5	7.6	115.5	116.8
13:30	8.45	9.43	551	26.8	8.3	7.7	106.8	108.8
13:31	8.93	9.04	494	17.6	6.7	7.5	120.4	120.9
13:32	9.07	8.96	496	19.0	6.4	7.3	117.8	120.9
13:33	8.92	9.02	491	18.9	6.5	7.2	116.6	118.5
13:34	8.51	9.36	538	21.3	7.2	7.2	110.7	112.3
13:35	8.81	9.14	520	20.6	6.8	7.1	114.3	114.8
13:36	8.76	9.17	523	21.3	6.7	7.1	113.8	117.0
13:37	8.77	9.14	515	21.6	6.6	7.0	113.4	115.0
13:38	8.27	9.52	549	21.6	7.1	7.0	112.9	114.5
13:39	8.89	9.11	519	18.7	6.1	6.8	113.7	114.4
13:40	8.92	9.04	485	16.3	5.8	6.6	124.2	126.8
13:41	9.28	8.78	466	18.5	6.4	6.6	119.6	122.5
13:42	8.69	9.21	496	17.7	6.8	6.6	116.6	119.8
13:43	8.90	9.09	512	14.4	6.6	6.6	117.4	119.2
13:44	9.07	8.92	486	13.5	6.2	6.5	122.8	124.0

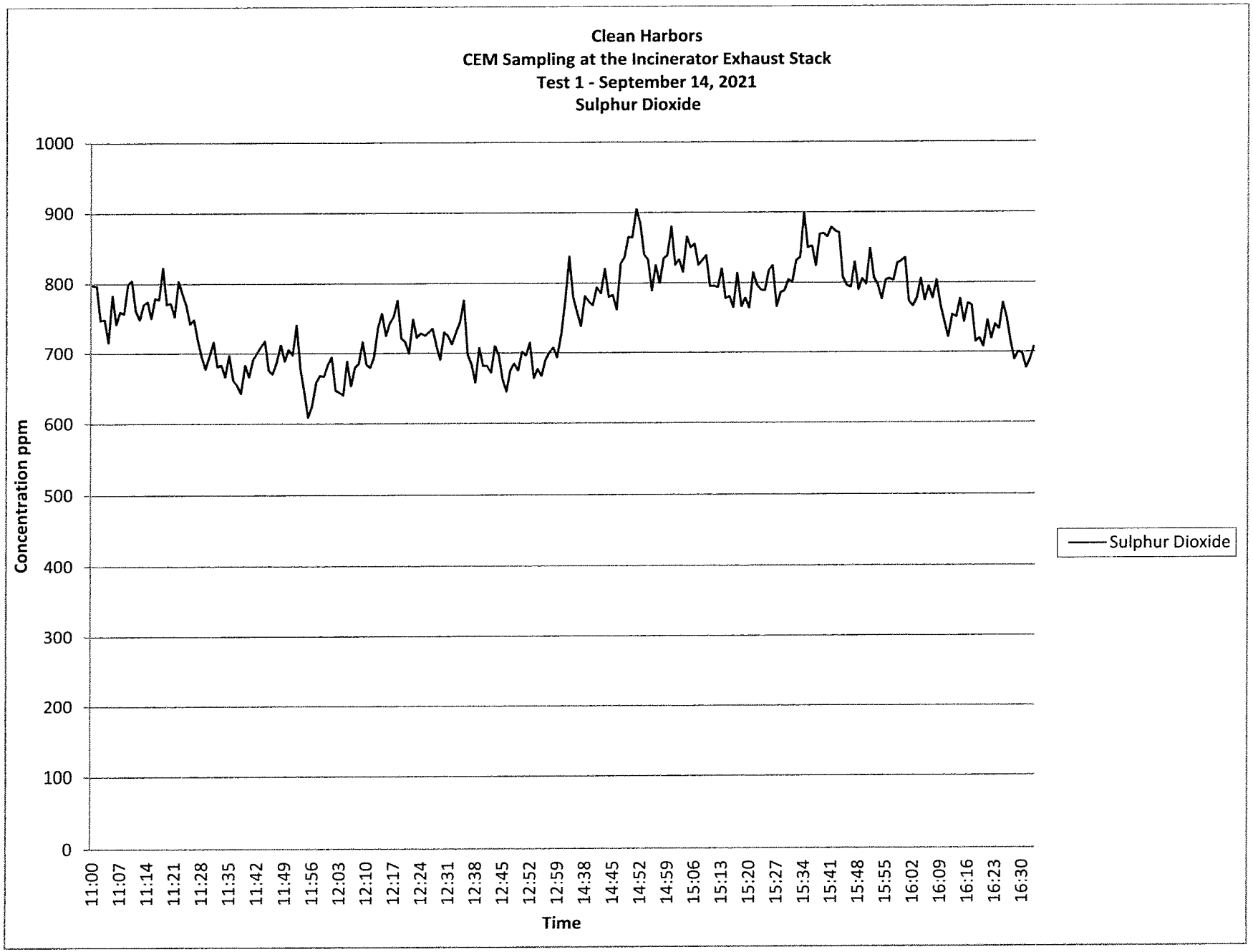
Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - September 16, 2021

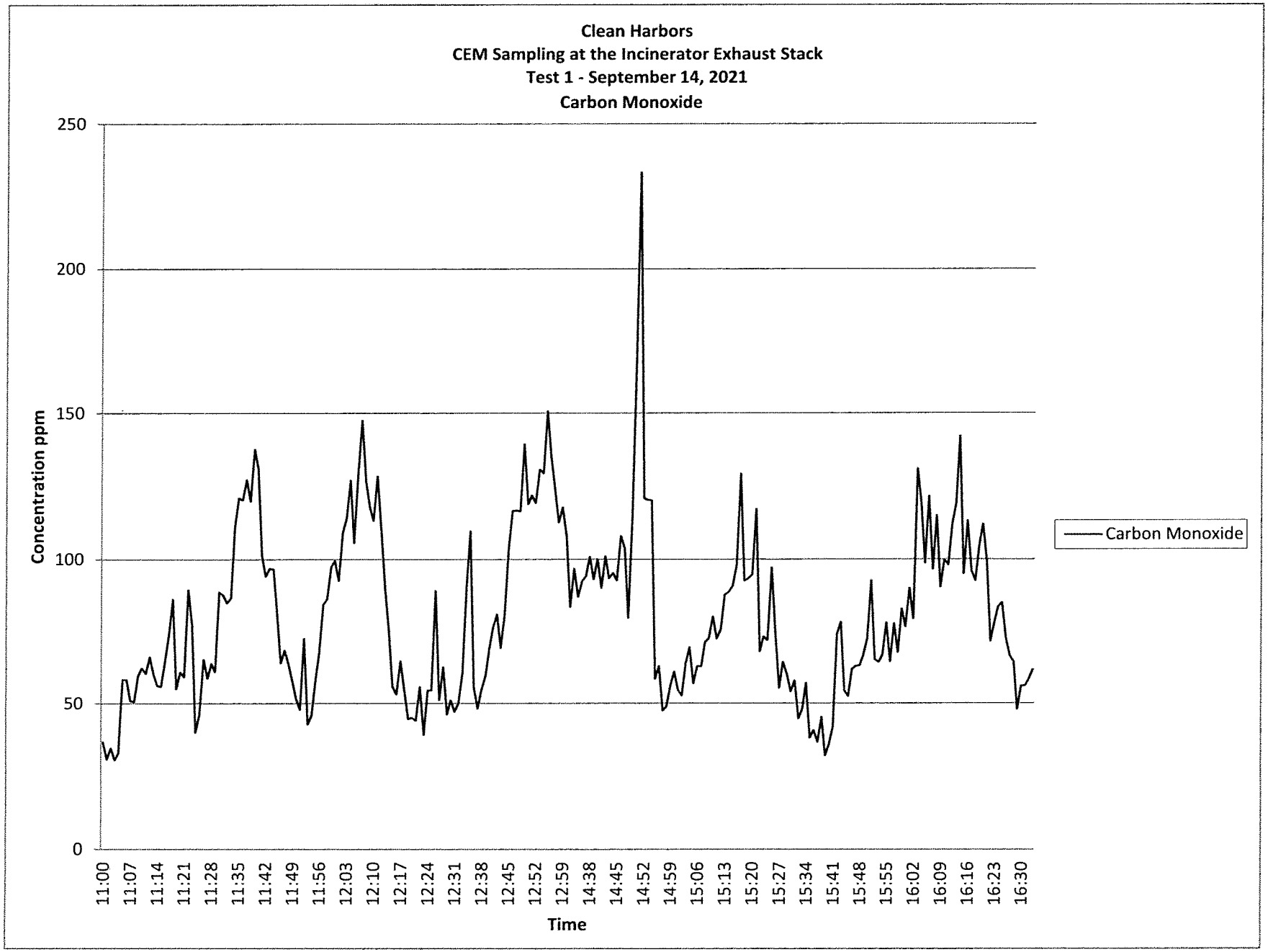
Time	O2 %	CO2 %	SO2 ppm	CO ppm	THC (ppm) 1-min	THC (ppm) 10-min	NO ppm	NOx ppm
13:45	8.98	9.01	494	15.7	6.1	6.4	120.0	122.8
13:46	8.75	9.15	499	17.7	6.6	6.4	118.5	120.8
13:47	8.52	9.35	540	27.1	7.8	6.6	111.3	114.2
13:48	9.11	8.91	491	22.4	6.6	6.5	114.9	115.3
13:49	9.15	8.89	496	18.5	6.6	6.6	120.6	123.0
13:50	9.17	8.83	475	19.5	7.3	6.7	116.2	116.6
13:51	8.80	9.14	511	24.9	7.6	6.8	116.3	117.8
13:52	9.13	8.89	503	19.9	7.1	6.9	115.4	116.2
13:53	8.80	9.12	509	19.3	7.0	6.9	115.3	116.5
13:54	8.88	9.07	523	17.4	7.1	7.0	116.1	116.8
Min	8.27	8.31	466	13.5	5.8	6.4	96.0	95.3
Max	9.99	9.52	602	147.2	22.7	9.9	124.2	126.8
Avg	9.08	8.96	524	32.5	8.1	8.2	107.7	108.9

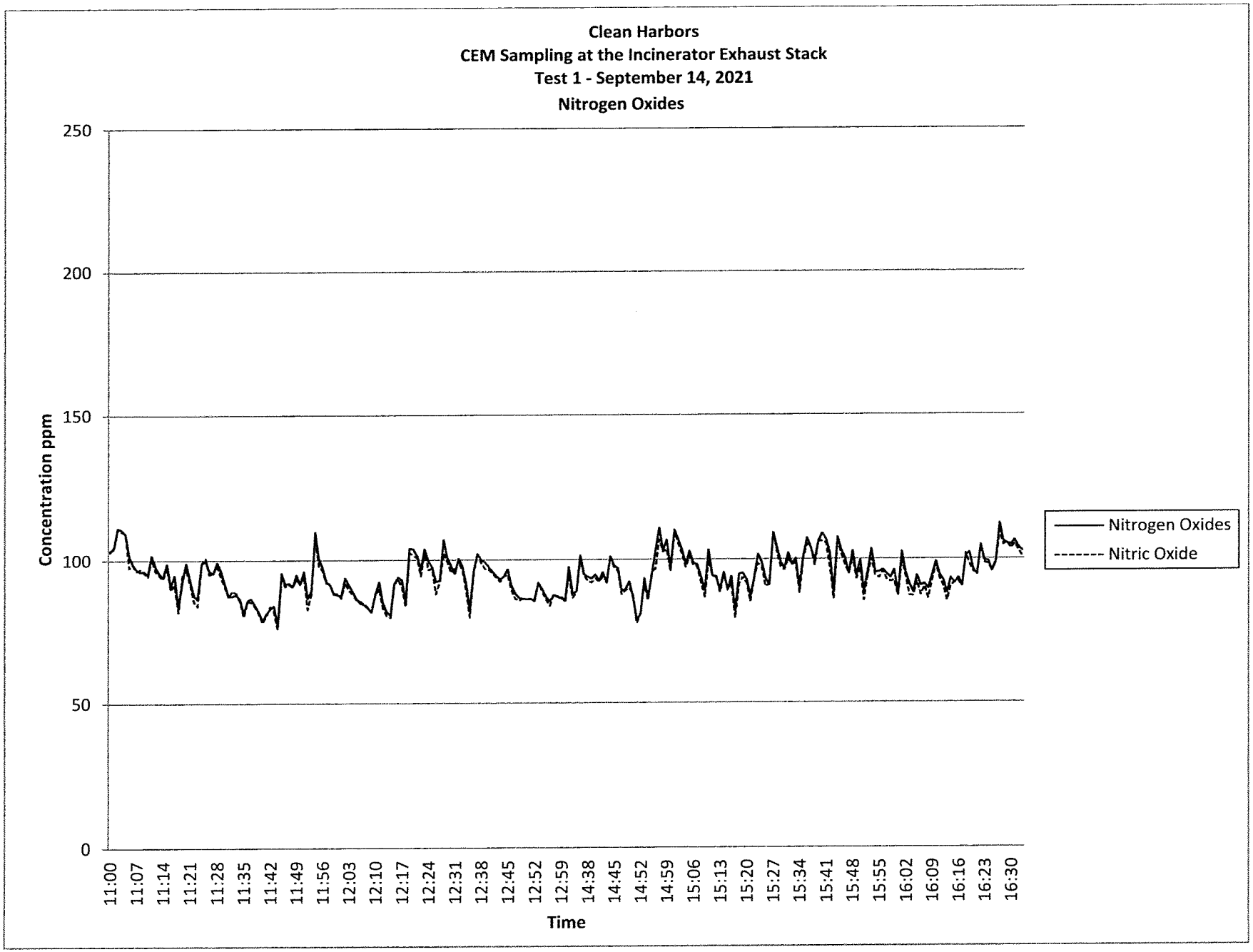
APPENDIX 25

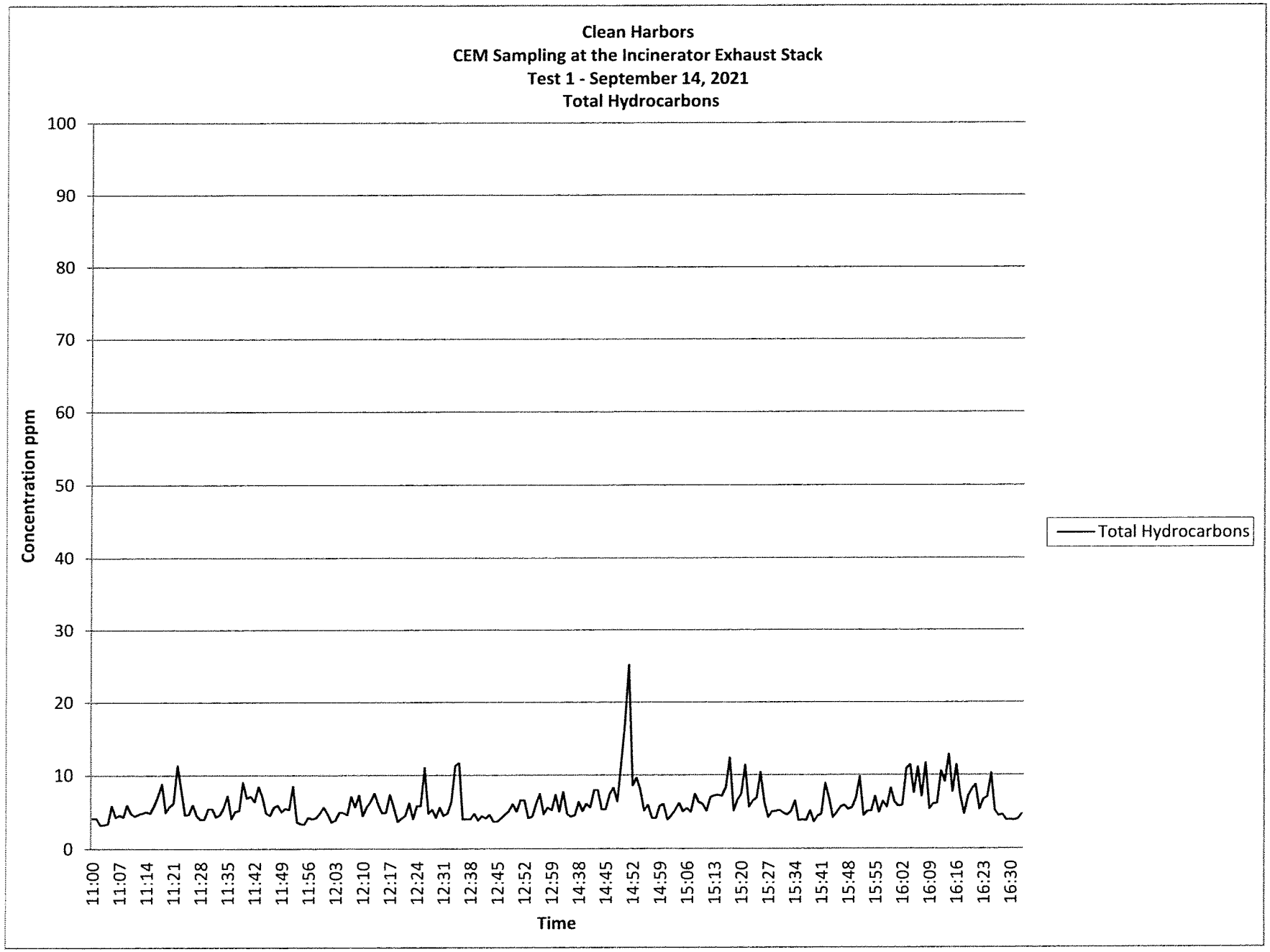
Gas Analysis Graphs
(15 pages)


Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - September 14, 2021
Oxygen & Carbon Dioxide
Conventration %
25
20
15
10
5
0
11:00
11:07
11:14
11:21
11:28
11:35
11:42
11:49
11:56
12:03
12:10
12:17
12:24
12:31
12:38
12:45
12:52
12:59
14:38
14:45
14:52
14:59
15:06
15:13
15:20
15:27
15:34
15:41
15:48
15:55
16:02
16:09
16:16
16:23
16:30
Time
Oxygen
Carbon Dioxide

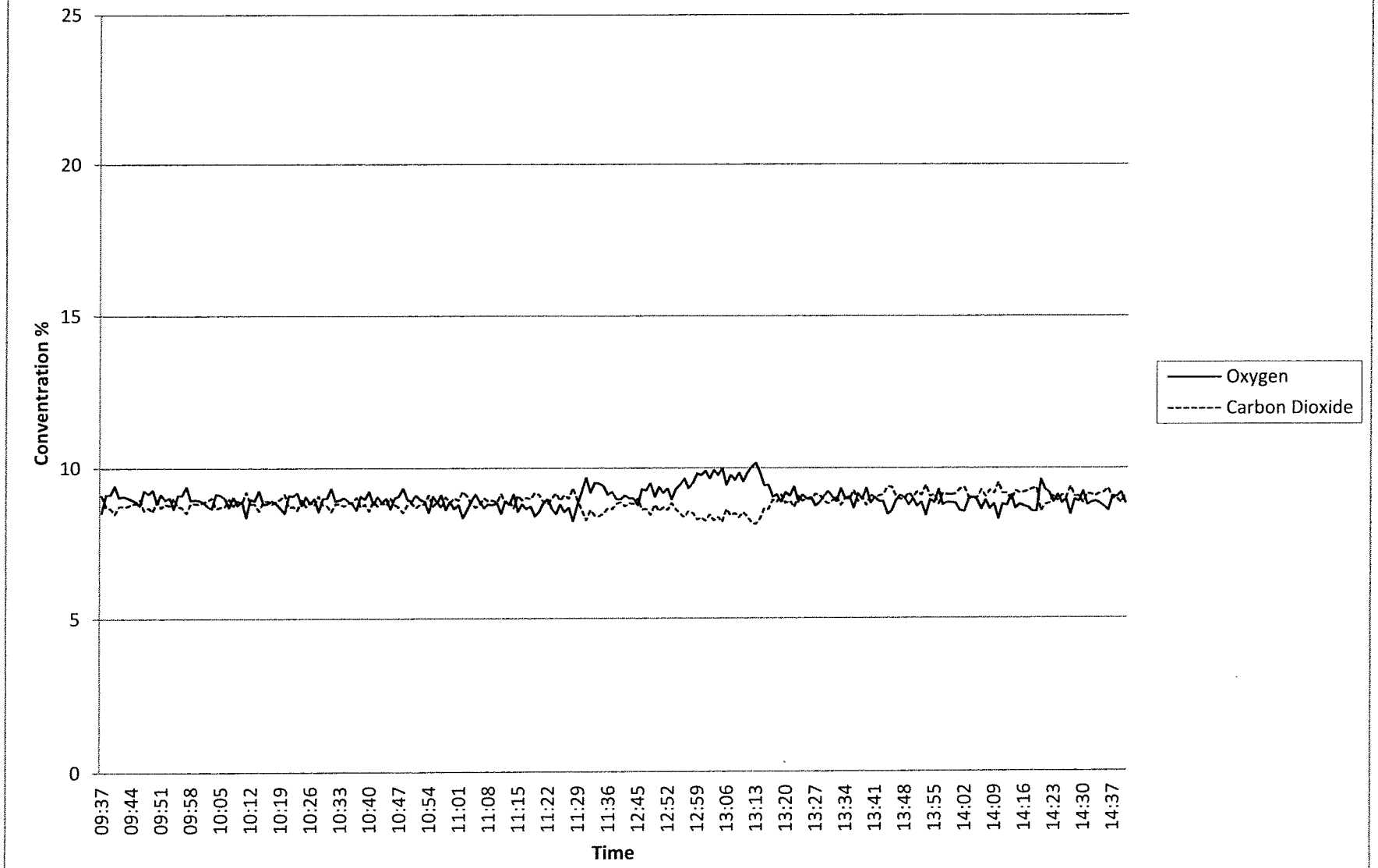

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - September 14, 2021
Sulphur Dioxide
Concentration ppm
1000
900
800
700
600
500
400
300
200
100
0
11:00
11:07
11:14
11:21
11:28
11:35
11:42
11:49
11:56
12:03
12:10
12:17
12:24
12:31
12:38
12:45
12:52
12:59
14:38
14:45
14:52
14:59
15:06
15:13
15:20
15:27
15:34
15:41
15:48
15:55
16:02
16:09
16:16
16:23
16:30
Time
Sulphur Dioxide

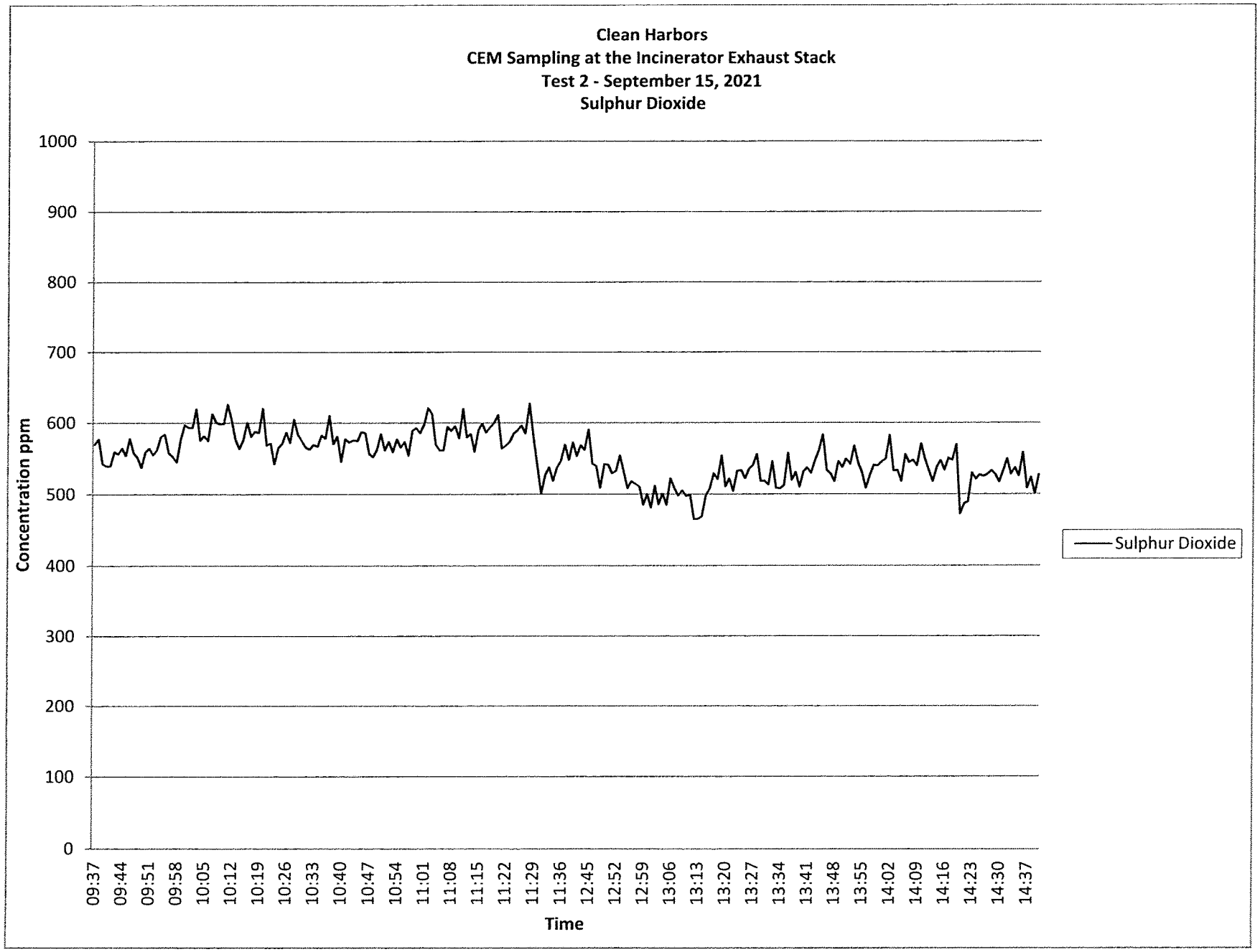

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - September 14, 2021
Carbon Monoxide
Concentration ppm
250
200
150
100
50
0
11:00
11:07
11:14
11:21
11:28
11:35
11:42
11:49
11:56
12:03
12:10
12:17
12:24
12:31
12:38
12:45
12:52
12:59
14:38
14:45
14:52
14:59
15:06
15:13
15:20
15:27
15:34
15:41
15:48
15:55
16:02
16:09
16:16
16:23
16:30
Time
Carbon Monoxide

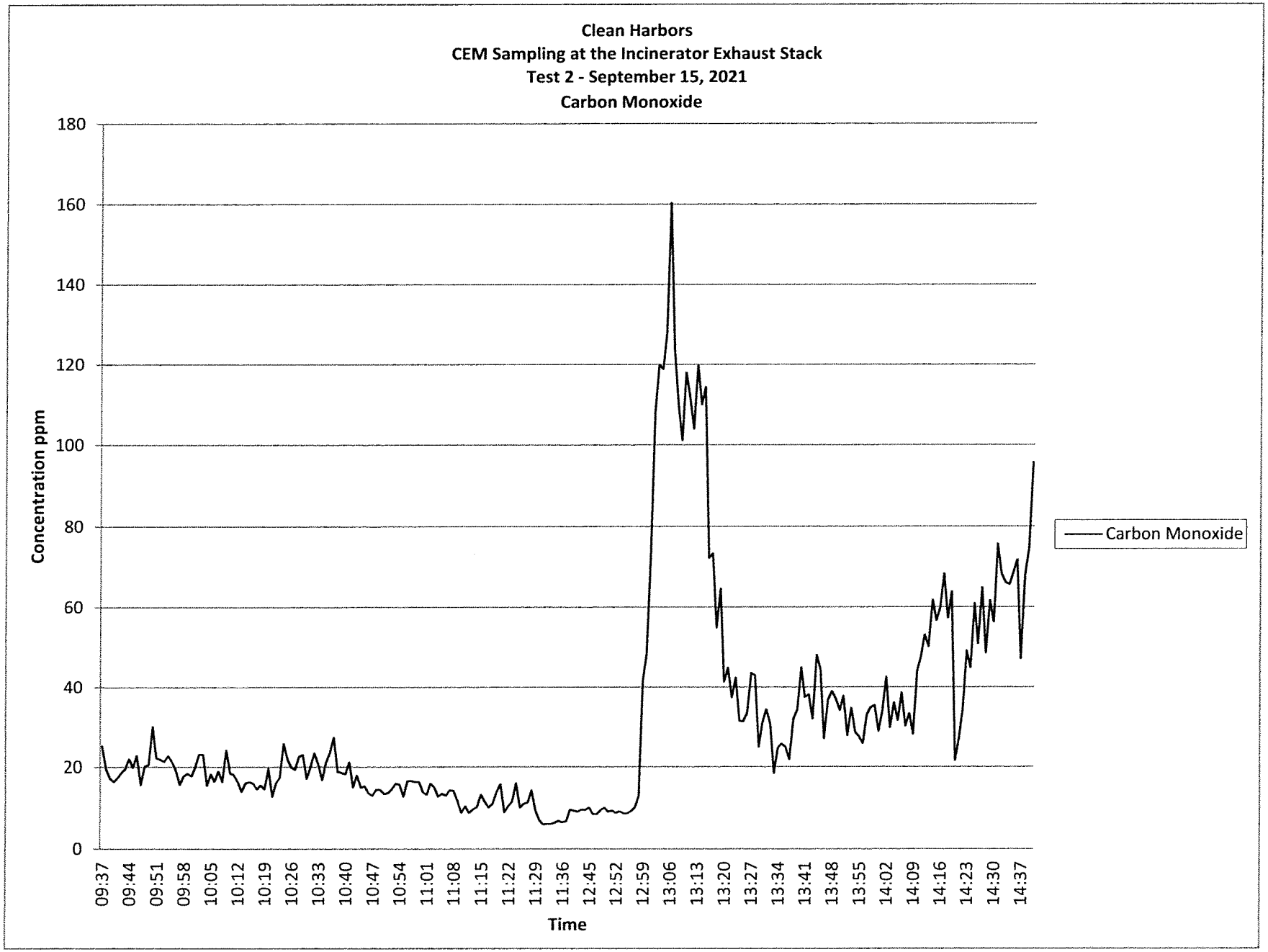

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - September 14, 2021
Nitrogen Oxides
Concentration ppm
250
200
150
100
50
0
11:00
11:07
11:14
11:21
11:28
11:35
11:42
11:49
11:56
12:03
12:10
12:17
12:24
12:31
12:38
12:45
12:52
12:59
14:38
14:45
14:52
14:59
15:06
15:13
15:20
15:27
15:34
15:41
15:48
15:55
16:02
16:09
16:16
16:23
16:30
Time
Nitrogen Oxides
Nitric Oxide

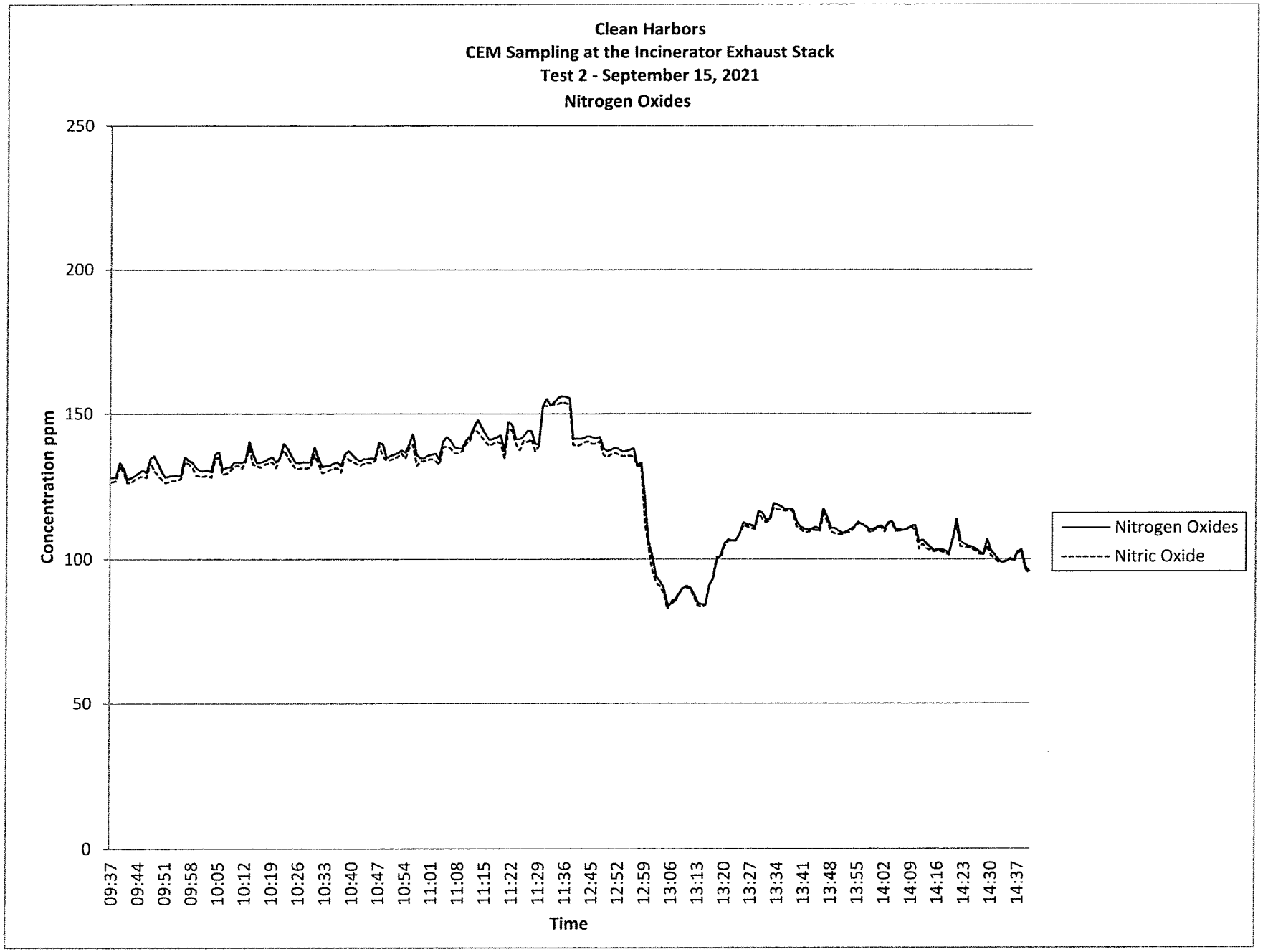

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 1 - September 14, 2021
Total Hydrocarbons
Concentration ppm
100
90
80
70
60
50
40
30
20
10
0
11:00
11:07
11:14
11:21
11:28
11:35
11:42
11:49
11:56
12:03
12:10
12:17
12:24
12:31
12:38
12:45
12:52
12:59
14:38
14:45
14:52
14:59
15:06
15:13
15:20
15:27
15:34
15:41
15:48
15:55
16:02
16:09
16:16
16:23
16:30
Time
Total Hydrocarbons

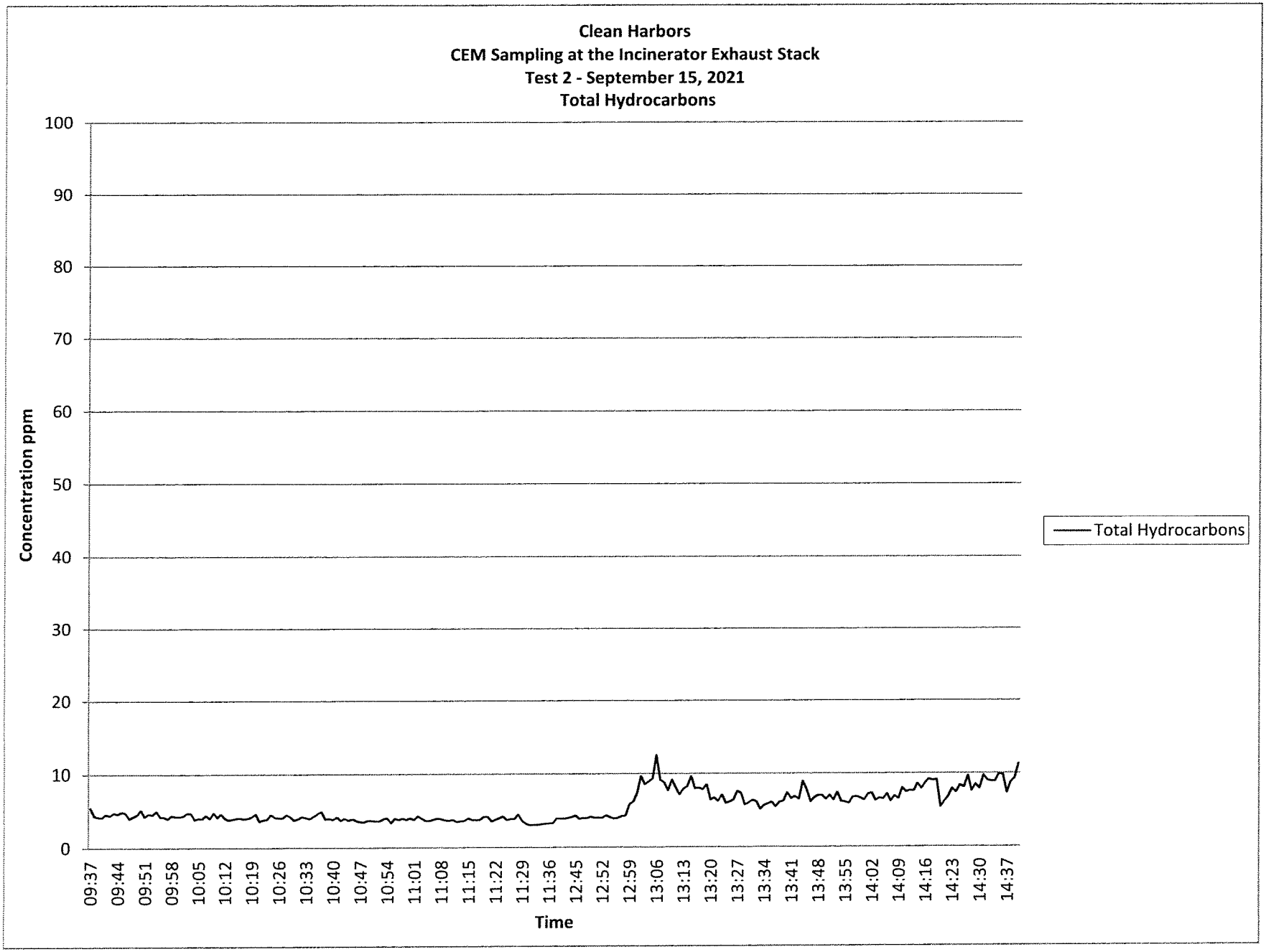
Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - September 15, 2021
Oxygen & Carbon Dioxide

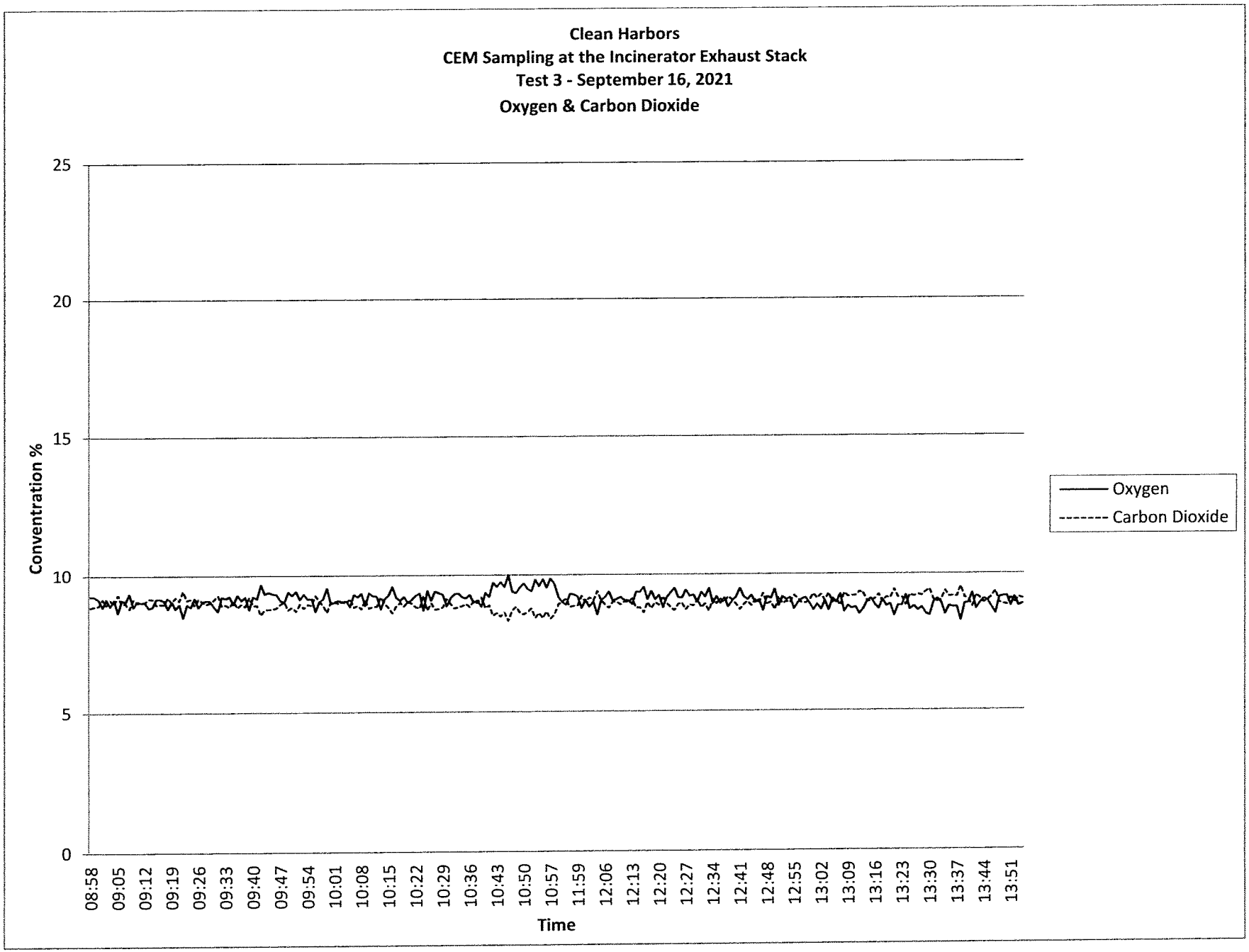


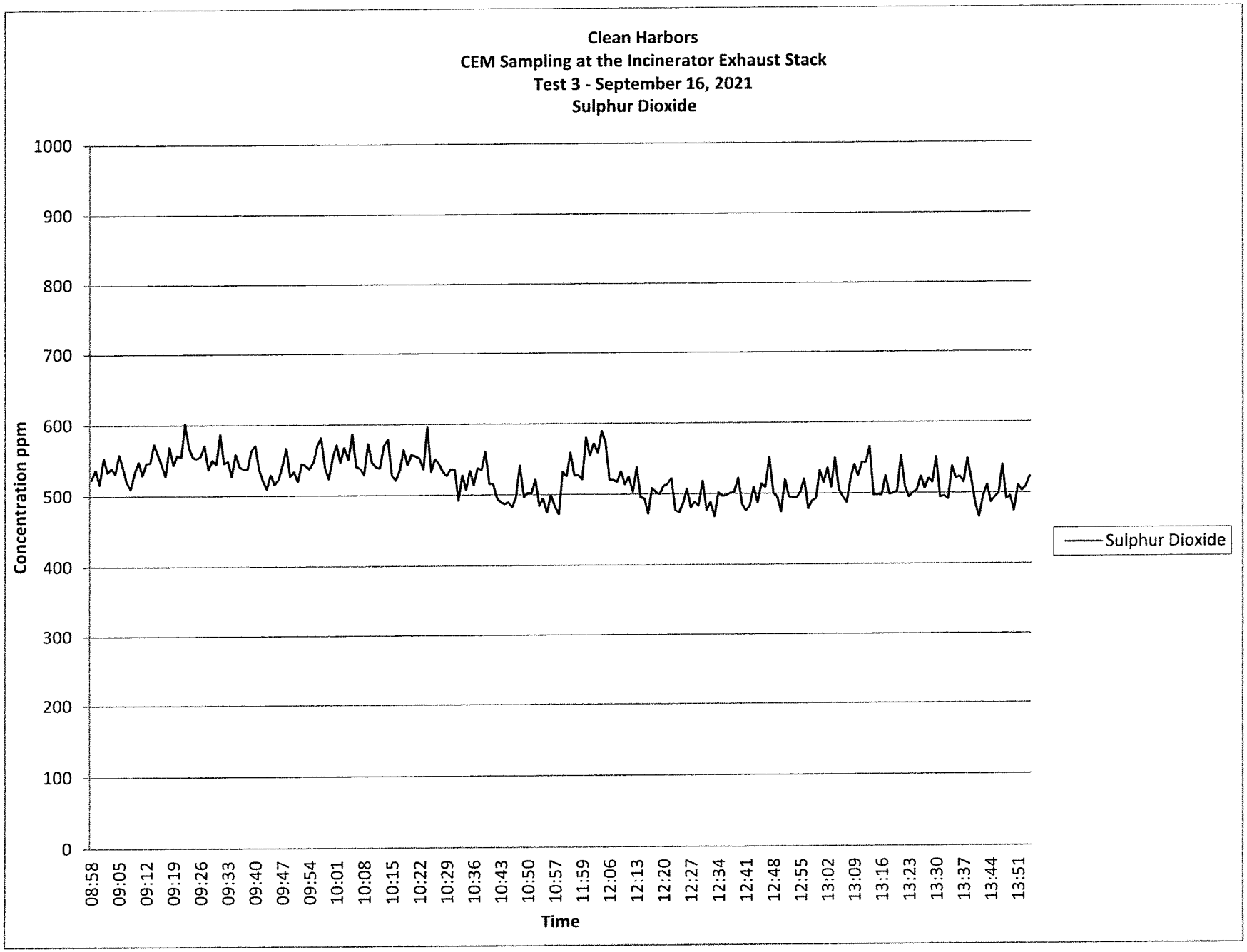

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - September 15, 2021
Sulphur Dioxide
Concentration ppm
1000
900
800
700
600
500
400
300
200
100
0
09:37
09:44
09:51
09:58
10:05
10:12
10:19
10:26
10:33
10:40
10:47
10:54
11:01
11:08
11:15
11:22
11:29
11:36
12:45
12:52
12:59
13:06
13:13
13:20
13:27
13:34
13:41
13:48
13:55
14:02
14:09
14:16
14:23
14:30
14:37
Time
Sulphur Dioxide

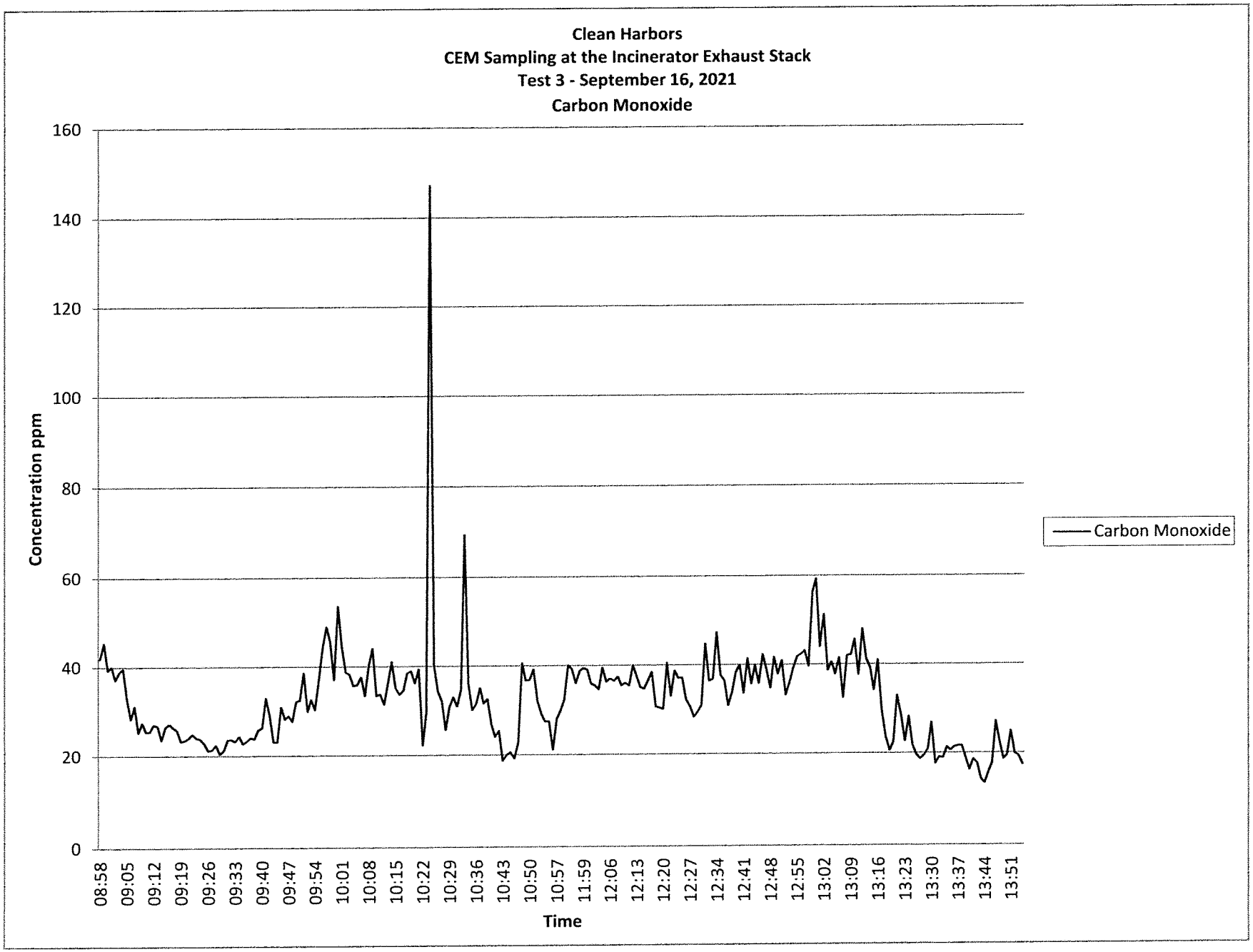

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - September 15, 2021
Carbon Monoxide
Concentration ppm
180
160
140
120
100
80
60
40
20
0
09:37
09:44
09:51
09:58
10:05
10:12
10:19
10:26
10:33
10:40
10:47
10:54
11:01
11:08
11:15
11:22
11:29
11:36
12:45
12:52
12:59
13:06
13:13
13:20
13:27
13:34
13:41
13:48
13:55
14:02
14:09
14:16
14:23
14:30
14:37
Time
Carbon Monoxide

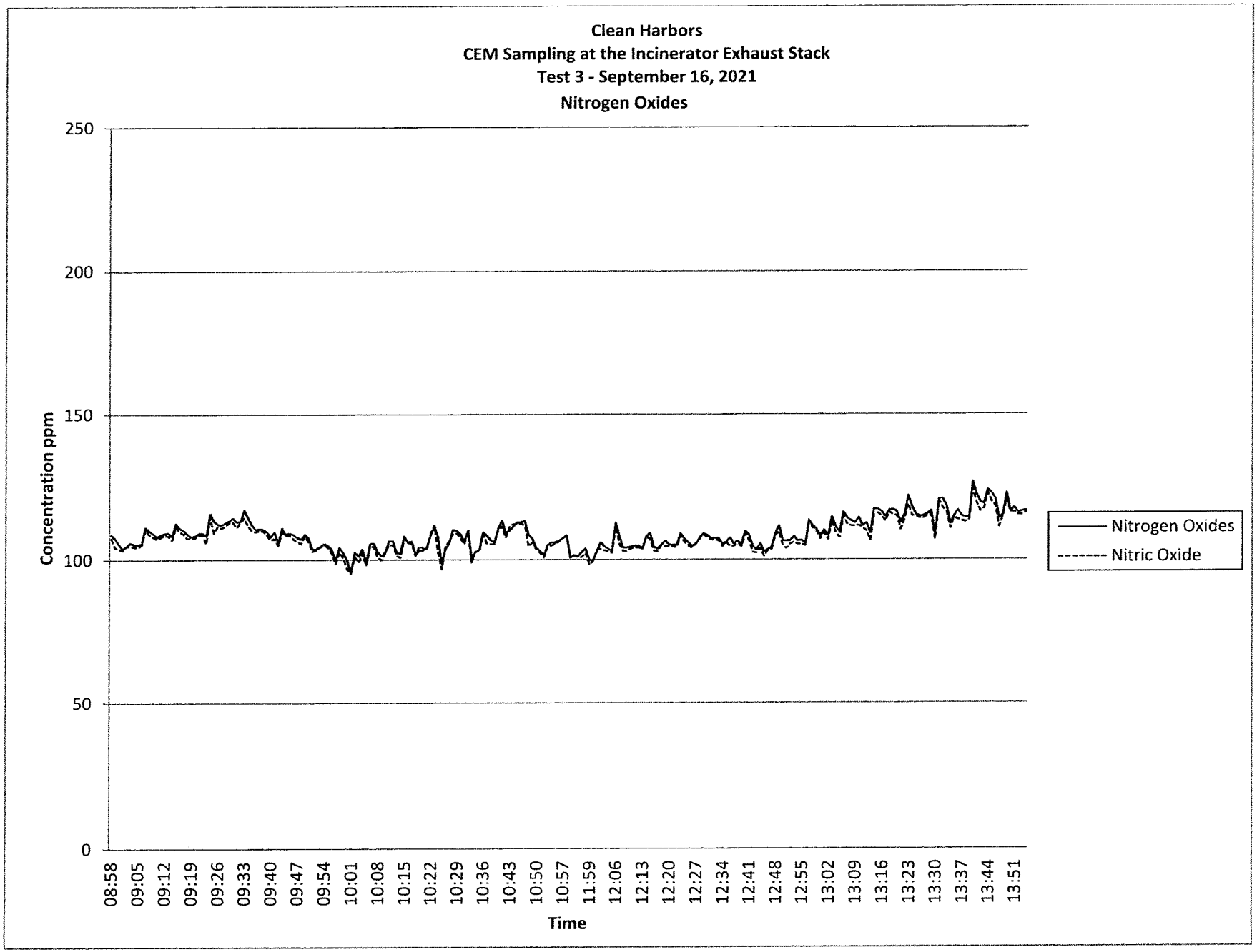

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - September 15, 2021
Nitrogen Oxides
250
200
150
100
50
0
Concentration ppm
09:37
09:44
09:51
09:58
10:05
10:12
10:19
10:26
10:33
10:40
10:47
10:54
11:01
11:08
11:15
11:22
11:29
11:36
12:45
12:52
12:59
13:06
13:13
13:20
13:27
13:34
13:41
13:48
13:55
14:02
14:09
14:16
14:23
14:30
14:37
Time
Nitrogen Oxides
Nitric Oxide

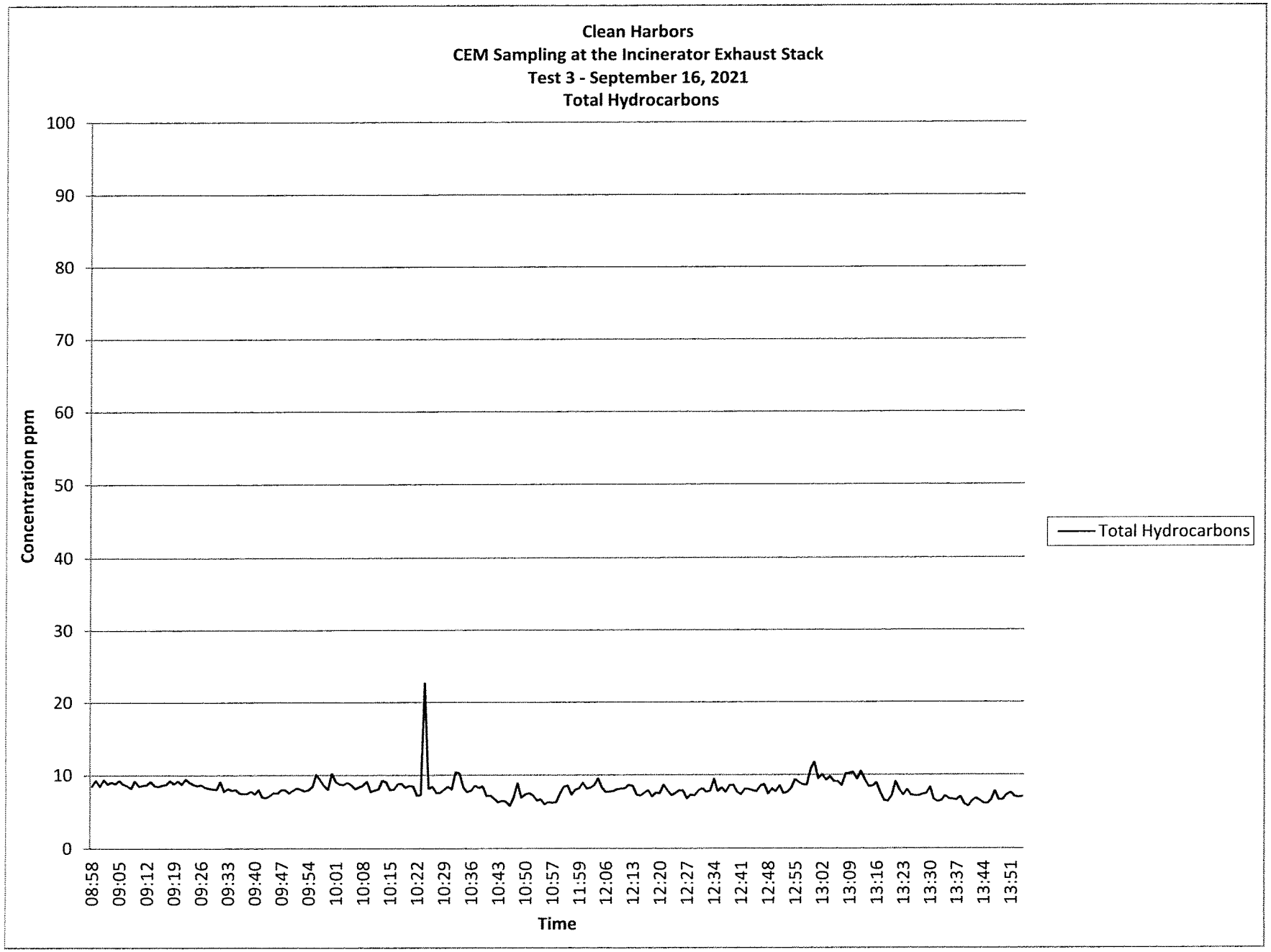

Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 2 - September 15, 2021
Total Hydrocarbons
Concentration ppm
100
90
80
70
60
50
40
30
20
10
0
09:37
09:44
09:51
09:58
10:05
10:12
10:19
10:26
10:33
10:40
10:47
10:54
11:01
11:08
11:15
11:22
11:29
11:36
12:45
12:52
12:59
13:06
13:13
13:20
13:27
13:34
13:41
13:48
13:55
14:02
14:09
14:16
14:23
14:30
14:37
Time
Total Hydrocarbons


Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - September 16, 2021
Oxygen & Carbon Dioxide
Conventration %
25
20
15
10
5
0
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
10:43
10:50
10:57
11:59
12:06
12:13
12:20
12:27
12:34
12:41
12:48
12:55
13:02
13:09
13:16
13:23
13:30
13:37
13:44
13:51
Time
Oxygen
Carbon Dioxide


Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - September 16, 2021
Sulphur Dioxide
Concentration ppm
1000
900
800
700
600
500
400
300
200
100
0
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
10:43
10:50
10:57
11:59
12:06
12:13
12:20
12:27
12:34
12:41
12:48
12:55
13:02
13:09
13:16
13:23
13:30
13:37
13:44
13:51
Time
Sulphur Dioxide


Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - September 16, 2021
Carbon Monoxide
Concentration ppm
160
140
120
100
80
60
40
20
0
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
10:43
10:50
10:57
11:59
12:06
12:13
12:20
12:27
12:34
12:41
12:48
12:55
13:02
13:09
13:16
13:23
13:30
13:37
13:44
13:51
Time
Carbon Monoxide


Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - September 16, 2021
Nitrogen Oxides
Concentration ppm
250
200
150
100
50
0
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
10:43
10:50
10:57
11:59
12:06
12:13
12:20
12:27
12:34
12:41
12:48
12:55
13:02
13:09
13:16
13:23
13:30
13:37
13:44
13:51
Time
Nitrogen Oxides
Nitric Oxide


Clean Harbors
CEM Sampling at the Incinerator Exhaust Stack
Test 3 - September 16, 2021
Total Hydrocarbons
Concentration ppm
100
90
80
70
60
50
40
30
20
10
0
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
10:43
10:50
10:57
11:59
12:06
12:13
12:20
12:27
12:34
12:41
12:48
12:55
13:02
13:09
13:16
13:23
13:30
13:37
13:44
13:51
Time
Total Hydrocarbons

APPENDIX 26

AERMOD Modelling Files
(1 CD)

APPENDIX 27

Clean Harbors Feed Data Summaries
(4 pages)

Total Organic Chlorine in Feed

Test No. 1

Feed Type	Stream Feed Rate L/min	Feed Density g/mL	Stream Feed Rate kg/s	Chlorine Concentration % w/w	Chlorine Feed Rate kg/s
Rich	38.5	0.91	0.58	0	0
Lean	159	1.04	2.75	0.046	0.0013
Emulsion	8.6	1.01	0.14	0	0
Total	206		3.4760		0.0013
Total Organic Chlorine in Feed (% w/w)				**0.036**	

Test No. 2

Feed Type	Stream Feed Rate L/min	Feed Density g/mL	Stream Feed Rate kg/s	Chlorine Concentration % w/w	Chlorine Feed Rate kg/s
Rich	38.2	0.89	0.57	0.01	0.000057
Lean	160	1.05	2.81	0.26	0.0073
Emulsion	7.1	1.09	0.13	11.43	0.015
Total	206		3.5026		0.022
Total Organic Chlorine in Feed (% w/w)				**0.63**	

Test No. 3

Feed Type	Stream Feed Rate L/min	Feed Density g/mL	Stream Feed Rate kg/s	Chlorine Concentration % w/w	Chlorine Feed Rate kg/s
Rich	41.8	0.89	0.62	0.20	0.0012
Lean	162	1.05	2.84	0.22	0.0062
Emulsion	7.6	1.01	0.13	8.38	0.011
Total	211		3.5830		0.018
Total Organic Chlorine in Feed (% w/w)				**0.51**	

Note: combined feed rate of the Rich, Lean, and Emulsion feed streams not to exceed 245 L/min

Clean Harbors

DAILY INCINERATION REPORT OF ANALYSIS

Incineration Date: _____ **Analysis Date:** SEPT 14/2021

Storage Location: _____ **Lab No.:** _____

Parameter		Method #	Units	MDL	Lean Storage		Lean Feed		Emulsion	Rich Feed			Alkaline	
					T-801	T-802	T-804		T-813	T-822	T-824	T-118	T-111	T-113
Date Received at LAB					SEPT 14/21	SEPT 14/21	SEPT 14/21		SEPT 14/21		SEPT 14/21			SEPT 14/21
Time Received at LAB					7:00	7:00	7:00		7:00		7:00			7:00
pH		AM047	pH				12		9		7			12.24
Conductivity @ 20 - 25 C		AM007	mS/cm	0.02										8.66
Specific Gravity		AM045	g/ml				1.04		1.01		0.91			1
Heat Value		AM005	MJ/kg	0.3	3	6.3	4.88		11.61		30.7			
Ash @ 750 C		AM129	% mass	0.03			6.57		4.14		1.75			
Fluoride	Total	AM005	% mass F	0.05			0.198		0.036		0.016			
	Soluble	AM036	% mass F	0.05			0.171		0.072		0.051			0.003
	Organic	AM005	% mass F	0.05			0.027		0		0.035			
Chloride	Total	AM005	% mass Cl	0.05	0.95	0.99	1.086		2.617		3.744			
	Soluble	AM036	% mass Cl	0.05			1.04		2.729		4.178			0.017
	Organic	AM005	% mass Cl	0.05			0.046		0		0			
Nitrite	Soluble	AM005	% massNO2	0.05										
Sulphur	Total	AM005	% mass S	0.02			0.686		0.23		0.156			
	Soluble	AM036	% mass S	0.02			0.137		0.035		0.029			0.003
	Non Sulphate	AM005	% mass S	0.02			0.549		0.195		0.127			
Alkalinity	as Carbonate	AM001	ppm CaCO3	30										
	Normality	AM046	N	0.01										0.06
Phase Composition	Organic	AM045	% volume	0.5			5		10		50			
	Emulsion	"	% volume	0.5					80		45			
	Aqueous	"	% volume	0.5			89							
	Sludge	"	% volume	0.5										
	Solid	"	% volume	0.5			6		10		5			2
Viscosity @ 20 - 25 C		AM066	cps	0.1					<100		<100			
Solids @ 110 C		AM003	% mass	0.03										0.37
Total Organic Carbon		AM142	ppm	1										
Water Content by KF :		AM074	% H2O						OOS		OOS			

Additional Analysis: _____

Comments: _____

ANALYST: MS

Clean Harbors

DAILY INCINERATION REPORT OF ANALYSIS

Incineration Date: _____ **Analysis Date:** Wednesday, September 15, 2021

Storage Location: _____ **Lab No.:** C21-2875

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					15-Sep-21			15-Sep-21	15-Sep-21		15-Sep-21			15-Sep-21
Time Received at LAB					6:30			6:30	6:30		6:30			6:30
pH		AM047	pH					13	11		10			12.46
Conductivity @ 20 - 25 C		AM007	mS/cm	0.02										9.12
Specific Gravity		AM045	g/ml					1.05	1.09		0.89			1.01
Heat Value		AM005	MJ/kg	0.3	3.8			5.21	11.4		30.5			
Ash @ 750 C		AM129	% mass	0.03				6.47	2.52		1.21			
Fluoride	Total	AM005	% mass F	0.05				0.24	0.07		0.01			
	Soluble	AM036	% mass F	0.05				0	0		0			0
	Organic	AM005	% mass F	0.05				0.24	0.07		0.01			
Chloride	Total	AM005	% mass Cl	0.05	1.06			1.23	12.41		1.88			
	Soluble	AM036	% mass Cl	0.05				0.97	0.98		1.87			0.02
	Organic	AM005	% mass Cl	0.05				0.26	11.43		0.01			
Nitrite	Soluble	AM005	% massNO2	0.05										
Sulphur	Total	AM005	% mass S	0.02				0.74	0.18		0.09			
	Soluble	AM036	% mass S	0.02				0.13	0.02		0.01			0
	Non Sulphate	AM005	% mass S	0.02				0.61	0.16		0.08			
Alkalinity	as Carbonate	AM001	ppm CaCO3	30										
	Normality	AM046	N	0.01										0.07
Phase Composition	Organic	AM045	% volume	0.5				6	21		42			
	Emulsion	"	% volume	0.5				0	74		56			
	Aqueous	"	% volume	0.5				90	0		0			
	Sludge	"	% volume	0.5				0	0		0			
	Solid	"	% volume	0.5				4	5		2			2
Viscosity @ 20 - 25 C		AM066	cps	0.1					<100		<100			
Solids @ 110 C		AM003	% mass	0.03										0.35
Total Organic Carbon		AM142	ppm	1										
Water Content by KF :		AM074	% H2O						*oos		*oos			

Additional Analysis: _____

Comments: *oos= out of service.

ANALYST: JO

Clean Harbors

DAILY INCINERATION REPORT OF ANALYSIS

Incineration Date: _____ **Analysis Date:** Thursday, September 16, 2021

Storage Location: _____ **Lab No.:** C21-2884

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					16-Sep-21	16-Sep-21		16-Sep-21	16-Sep-21		16-Sep-21			16-Sep-21
Time Received at LAB					6:45	6:45		6:45	6:45		6:45			6:45
pH		AM047	pH					12	11		9			12.41
Conductivity @ 20 - 25 C		AM007	mS/cm	0.02										8.51
Specific Gravity		AM045	g/ml					1.05	1.01		0.89			1
Heat Value		AM005	MJ/kg	0.3	3.4	4.8		5.1	9.3		26.5			
Ash @ 750 C		AM129	% mass	0.03				6.64	2.87		2.33			
Fluoride	Total	AM005	% mass F	0.05				0.19	0.06		0.04			
	Soluble	AM036	% mass F	0.05				0	0		0			0
	Organic	AM005	% mass F	0.05				0.19	0.06		0.04			
Chloride	Total	AM005	% mass Cl	0.05	1.1	1.36		1.12	9.54		1.57			
	Soluble	AM036	% mass Cl	0.05				0.9	1.16		1.37			0.02
	Organic	AM005	% mass Cl	0.05				0.22	8.38		0.2			
Nitrite	Soluble	AM005	% massNO2	0.05										
Sulphur	Total	AM005	% mass S	0.02				0.6	0.2		0.11			
	Soluble	AM036	% mass S	0.02				0.13	0.03		0.02			0
	Non Sulphate	AM005	% mass S	0.02				0.47	0.17		0.09			
Alkalinity	as Carbonate	AM001	ppm CaCO3	30										
	Normality	AM046	N	0.01										0.07
Phase Composition	Organic	AM045	% volume	0.5				6	14		46			
	Emulsion	"	% volume	0.5				0	80		46			
	Aqueous	"	% volume	0.5				90	0		0			
	Sludge	"	% volume	0.5				0	0		0			
	Solid	"	% volume	0.5				4	6		8			1
Viscosity @ 20 - 25 C		AM066	cps	0.1					<100		<100			
Solids @ 110 C		AM003	% mass	0.03										0.35
Total Organic Carbon		AM142	ppm	1										
Water Content by KF :		AM074	% H2O						*oos		*oos			

Additional Analysis: _____

Comments: *oos= out of service.

ANALYST: JO

APPENDIX 28

Clean Harbors One-Minute Average
Combustion Gas Results
(12 pages)

Test No. 1 - September 14, 2021
CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
11:00:00	73.9	105.0	8.2	50.1	11.2	9.0	0.9	874.7
11:01:00	83.3	94.3	8.4	50.6	10.7	8.7	1.0	899.5
11:02:00	84.1	91.9	8.4	50.7	9.6	8.5	1.0	907.2
11:03:00	79.0	89.9	8.3	50.6	11.3	8.5	0.9	901.7
11:04:00	83.7	88.1	8.4	50.9	5.5	8.5	0.7	909.3
11:05:00	62.8	88.1	8.3	51.1	5.9	8.5	0.9	889.4
11:06:00	40.4	90.4	8.2	50.7	4.7	8.7	1.0	855.2
11:07:00	40.1	93.0	8.2	50.4	4.9	8.9	1.0	836.0
11:08:00	39.2	96.8	8.0	50.0	4.9	9.2	0.7	815.0
11:09:00	37.9	96.8	8.0	49.9	8.4	9.2	0.8	804.1
11:10:00	52.3	94.6	8.1	50.1	5.9	9.2	0.9	824.9
11:11:00	62.6	92.9	8.2	50.5	6.7	8.9	1.0	833.4
11:12:00	64.2	89.8	8.1	50.4	5.5	8.9	0.6	825.6
11:13:00	59.3	88.2	8.2	50.4	8.0	8.9	0.7	830.2
11:14:00	62.3	88.2	8.3	50.5	6.7	8.9	0.9	847.1
11:15:00	70.1	86.5	8.3	50.7	6.5	8.7	0.9	854.5
11:16:00	71.2	88.8	8.3	50.6	7.0	8.7	0.8	838.0
11:17:00	73.5	88.8	8.1	50.4	6.6	9.0	0.8	816.8
11:18:00	72.0	87.4	8.2	50.5	7.7	9.0	1.0	822.9
11:19:00	67.8	87.4	8.3	50.7	6.8	9.0	0.9	833.4
11:20:00	65.0	87.4	8.3	50.6	8.1	9.0	0.9	826.0
11:21:00	68.7	85.5	8.3	50.6	9.4	9.0	0.7	830.7
11:22:00	79.7	84.2	8.4	51.0	12.8	8.8	0.8	846.7
11:23:00	86.8	80.4	8.5	51.4	6.5	8.4	0.9	867.5
11:24:00	77.9	78.6	8.4	50.9	7.7	8.4	1.0	850.1
11:25:00	64.6	78.6	8.3	50.2	8.4	8.4	0.7	817.2
11:26:00	66.8	79.9	8.3	50.3	15.3	8.7	0.8	820.4
11:27:00	86.3	79.9	8.5	50.8	8.8	8.7	0.9	851.7
11:28:00	85.4	78.4	8.5	51.0	6.6	8.3	0.9	851.6
11:29:00	65.0	78.4	8.4	50.9	5.4	8.3	0.6	832.2
11:30:00	55.2	78.4	8.3	50.7	8.4	8.6	0.7	801.3
11:31:00	63.0	78.4	8.3	50.9	6.2	8.6	0.9	801.3
11:32:00	70.4	76.5	8.2	50.8	5.7	8.6	0.9	782.7
11:33:00	71.0	76.5	8.2	50.7	5.7	8.9	0.8	765.2
11:34:00	73.9	77.5	8.1	50.4	7.3	9.2	0.8	745.6
11:35:00	89.6	79.1	8.2	50.6	8.2	9.2	1.0	753.2
11:36:00	95.8	79.1	8.3	51.0	5.6	9.2	0.9	768.6
11:37:00	96.1	75.9	8.2	50.6	6.6	9.2	0.9	747.1
11:38:00	96.3	75.9	8.2	50.5	7.9	9.2	0.7	739.5
11:39:00	110.3	74.7	8.1	50.6	10.2	9.2	0.6	732.4
11:40:00	128.2	71.7	8.2	50.8	5.7	9.2	0.9	742.9
11:41:00	131.3	69.9	8.1	50.3	7.2	9.2	0.9	725.7
11:42:00	133.7	69.9	8.0	49.9	7.5	9.2	0.7	704.0
11:43:00	134.7	69.9	8.1	50.1	11.0	9.4	0.8	708.7
11:44:00	145.2	68.7	8.2	50.6	7.6	9.4	0.9	729.4
11:45:00	146.5	65.3	8.3	50.7	9.5	9.1	0.9	734.4
11:46:00	124.9	61.5	8.4	50.6	7.4	8.8	0.6	743.9
11:47:00	105.6	61.5	8.4	50.8	10.2	8.8	0.7	761.5
11:48:00	103.9	61.5	8.5	50.8	11.6	8.8	0.8	765.9
11:49:00	106.6	59.9	8.5	50.9	6.5	8.6	0.9	760.7
11:50:00	90.6	60.9	8.4	50.5	6.9	8.6	0.8	735.2
11:51:00	80.6	60.9	8.4	50.3	7.9	8.6	0.7	726.8
11:52:00	74.3	64.1	8.4	50.6	8.0	8.9	1.0	736.7
11:53:00	75.0	65.1	8.5	51.0	7.3	8.9	0.8	757.5
11:54:00	67.4	64.1	8.5	51.0	8.3	8.6	0.9	757.6
11:55:00	65.3	64.1	8.9	51.1	6.9	8.6	0.6	761.2
11:56:00	59.3	63.0	9.2	51.1	14.5	8.6	0.6	765.8
11:57:00	68.3	61.2	9.3	51.5	5.2	8.3	0.9	782.4
11:58:00	64.4	61.2	8.9	51.0	4.8	8.3	0.9	758.7
11:59:00	51.3	64.6	8.2	50.1	4.8	8.9	0.7	691.4
12:00:00	57.7	66.9	8.1	50.1	5.9	9.3	0.7	675.3
12:01:00	72.2	71.1	8.1	50.1	5.4	9.5	0.8	681.6
12:02:00	93.1	74.8	8.1	50.3	6.0	9.5	0.8	708.9
12:03:00	97.0	74.8	8.1	50.3	6.5	9.5	0.6	716.1
12:04:00	106.6	74.8	8.2	50.4	6.9	9.5	0.6	722.6
12:05:00	110.8	74.8	8.2	50.6	7.4	9.3	0.8	732.1
12:06:00	106.7	72.2	8.2	50.5	5.3	9.3	0.8	733.9
12:07:00	109.6	72.2	8.1	50.0	5.8	9.3	0.8	712.5
12:08:00	121.9	74.3	7.9	49.4	7.4	9.5	0.7	683.0
12:09:00	128.9	74.3	8.0	49.7	7.6	9.5	0.8	697.4
12:10:00	129.1	74.3	8.1	50.2	6.3	9.5	0.8	720.3
12:11:00	132.0	70.9	8.1	50.0	12.1	9.5	0.8	710.4
12:12:00	146.4	70.9	8.1	50.0	7.6	9.5	0.6	716.7
12:13:00	149.5	68.7	8.2	50.6	9.9	9.3	0.6	745.0

Test No. 1 - September 14, 2021
CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
12:14:00	131.5	64.8	8.3	50.8	5.5	9.0	0.8	755.5
12:15:00	126.6	64.8	8.3	50.5	7.5	9.0	0.9	743.7
12:16:00	133.4	66.1	8.3	50.2	7.5	9.2	0.7	737.4
12:17:00	132.1	66.1	8.4	50.2	9.2	9.2	0.7	747.8
12:18:00	113.1	64.5	8.8	50.7	7.0	9.0	0.8	790.4
12:19:00	89.0	64.5	8.9	50.9	5.9	8.6	0.8	799.5
12:20:00	76.5	64.5	8.5	50.8	6.5	8.6	0.7	790.5
12:21:00	62.8	63.3	8.5	50.8	10.5	8.6	0.6	791.1
12:22:00	64.7	62.0	8.9	51.0	8.4	8.6	0.8	800.9
12:23:00	65.7	60.4	9.2	51.0	5.2	8.4	0.9	808.2
12:24:00	53.9	62.8	8.5	50.5	5.9	8.4	0.8	773.1
12:25:00	53.8	65.0	8.4	50.3	5.4	8.7	0.7	759.3
12:26:00	54.9	68.2	8.7	50.4	8.5	8.7	0.8	761.3
12:27:00	58.4	68.2	9.1	51.0	5.2	8.7	0.8	785.1
12:28:00	53.5	68.2	8.8	51.0	8.5	8.7	0.9	784.9
12:29:00	52.5	66.9	8.5	50.8	7.2	8.7	0.5	780.1
12:30:00	63.0	66.9	8.5	50.8	15.0	8.7	0.6	787.4
12:31:00	79.0	63.6	9.2	51.2	5.3	8.5	0.8	812.6
12:32:00	77.1	63.6	9.2	51.0	8.9	8.2	0.9	793.2
12:33:00	62.6	65.0	8.5	50.6	5.4	8.6	0.6	751.6
12:34:00	60.9	66.3	8.4	50.5	7.7	8.6	0.7	745.5
12:35:00	58.0	67.5	8.7	50.6	5.9	8.9	0.9	760.3
12:36:00	55.5	67.5	8.8	51.0	6.7	8.6	0.9	773.3
12:37:00	55.4	67.5	8.5	50.9	10.5	8.6	0.8	767.7
12:38:00	66.8	67.5	8.5	50.9	14.8	8.6	0.6	776.7
12:39:00	80.0	67.5	8.9	51.1	16.2	8.6	0.9	791.6
12:40:00	105.0	62.4	9.3	51.5	5.6	8.4	0.9	804.9
12:41:00	95.4	62.4	8.9	51.2	5.9	8.4	0.9	781.7
12:42:00	62.5	63.6	8.3	50.4	5.4	8.7	0.7	727.3
12:43:00	63.8	68.5	8.3	50.4	6.9	8.9	0.7	713.8
12:44:00	65.3	70.5	8.3	50.8	5.1	8.9	0.8	734.8
12:45:00	74.6	70.5	8.3	50.6	6.8	8.9	0.8	730.6
12:46:00	81.4	69.1	8.3	50.3	5.5	8.9	0.5	722.5
12:47:00	88.7	69.1	8.3	50.4	6.2	9.2	0.6	730.1
12:48:00	85.1	70.2	8.4	50.9	5.0	9.2	0.8	754.0
12:49:00	88.0	68.6	8.3	50.6	5.7	9.0	0.8	744.2
12:50:00	109.3	68.6	8.1	49.9	5.6	9.3	0.5	711.0
12:51:00	117.0	68.6	8.0	49.7	6.6	9.3	0.6	698.7
12:52:00	129.7	68.6	8.1	49.9	8.1	9.5	0.8	708.0
12:53:00	132.6	70.0	8.2	50.2	9.7	9.5	0.8	728.0
12:54:00	141.2	70.0	8.2	50.1	7.7	9.5	0.7	732.0
12:55:00	141.1	68.7	8.2	50.4	8.9	9.3	0.5	747.6
12:56:00	134.6	68.7	8.3	50.4	9.4	9.3	0.8	750.9
12:57:00	132.4	64.7	8.3	50.3	6.3	9.0	0.8	756.5
12:58:00	140.0	64.7	8.1	49.7	6.5	9.2	0.8	725.5
12:59:00	142.9	66.3	8.0	49.4	8.9	9.2	0.6	714.6
14:33:00	98.0	74.9	8.3	50.0	6.9	8.9	0.6	799.5
14:34:00	100.5	75.9	8.3	49.7	8.6	9.2	0.8	796.9
14:35:00	100.7	75.9	8.3	50.1	5.2	9.2	0.8	826.2
14:36:00	94.1	75.9	8.3	50.2	6.5	9.2	0.8	826.2
14:37:00	85.5	81.1	8.3	50.3	6.0	9.2	0.6	824.4
14:38:00	88.2	81.1	8.3	50.4	10.5	9.2	0.6	830.0
14:39:00	100.5	79.4	8.5	50.7	5.2	8.9	0.8	863.2
14:40:00	100.5	78.2	8.4	50.7	5.6	8.9	0.8	836.9
14:41:00	103.1	80.4	8.3	50.4	5.3	8.9	0.5	821.6
14:42:00	106.3	80.4	8.2	50.0	8.1	9.2	0.7	803.4
14:43:00	108.1	80.4	8.3	50.0	6.9	9.2	0.8	806.2
14:44:00	106.6	79.1	8.4	50.3	8.1	9.2	0.8	825.7
14:45:00	109.5	77.6	8.4	50.5	7.8	9.2	0.7	837.4
14:46:00	109.4	77.6	8.4	50.6	10.5	9.2	0.5	841.8
14:47:00	109.0	77.6	8.4	50.5	11.0	9.0	0.7	854.1
14:48:00	109.6	77.6	8.5	50.6	6.9	9.0	0.8	861.0
14:49:00	105.1	77.6	8.4	50.2	6.6	9.0	0.8	840.2
14:50:00	105.9	79.6	8.4	50.1	8.5	9.0	0.7	834.9
14:51:00	111.3	80.8	8.3	49.9	9.7	9.0	0.7	823.1
14:52:00	113.9	80.8	8.5	50.5	7.2	9.0	0.8	873.3
14:53:00	103.4	85.7	8.5	50.5	14.2	8.8	0.8	894.7
14:54:00	114.5	93.9	8.8	50.6	20.0	8.8	0.5	920.5
14:55:00	143.0	95.0	8.8	50.8	31.4	8.8	0.6	928.1
14:56:00	216.0	91.6	9.2	50.9	8.3	8.5	0.8	952.3
14:57:00	159.6	90.4	8.8	50.5	13.3	8.5	0.8	924.7
14:58:00	130.1	95.0	8.5	50.2	6.8	8.5	0.6	909.2
14:59:00	126.9	98.5	8.4	50.0	5.0	8.8	0.6	883.9
15:00:00	100.1	105.5	8.2	49.7	6.6	9.1	0.8	852.4

Test No. 1 - September 14, 2021
CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
15:01:00	65.0	119.1	8.2	49.7	5.5	9.1	0.8	847.3
15:02:00	64.3	124.1	8.3	49.9	5.3	9.1	0.7	860.4
15:03:00	57.9	125.2	8.3	49.9	6.8	9.1	0.6	868.4
15:04:00	63.5	126.3	8.4	50.2	7.5	9.1	0.7	894.9
15:05:00	67.8	124.0	8.4	50.6	4.9	9.1	0.8	913.3
15:06:00	64.4	126.8	8.4	50.2	5.2	8.9	0.8	889.6
15:07:00	63.0	131.5	8.3	50.2	6.9	9.1	0.6	885.0
15:08:00	69.0	129.7	8.3	49.9	7.6	9.1	0.6	880.9
15:09:00	72.7	129.7	8.4	50.2	5.8	9.1	0.8	906.0
15:10:00	69.7	129.7	8.4	50.3	6.9	8.9	0.8	907.9
15:11:00	70.6	129.7	8.4	50.5	5.2	8.9	0.5	909.6
15:12:00	72.7	123.4	8.4	50.5	9.0	8.9	0.6	894.5
15:13:00	78.9	105.8	8.4	50.4	6.3	8.9	0.7	880.0
15:14:00	81.2	95.7	8.4	50.5	7.0	8.9	0.8	876.3
15:15:00	84.7	95.7	8.4	50.3	6.3	8.9	0.6	863.1
15:16:00	86.5	92.9	8.3	49.8	7.2	8.9	0.6	837.2
15:17:00	82.3	91.7	8.3	49.8	10.4	8.9	0.9	837.2
15:18:00	90.4	86.9	8.5	50.7	8.4	8.9	0.8	860.3
15:19:00	94.3	81.2	8.4	50.1	10.0	8.9	0.8	830.9
15:20:00	99.5	79.2	8.4	50.2	9.2	8.9	0.6	828.9
15:21:00	112.0	75.8	8.4	50.6	17.4	8.9	0.7	835.2
15:22:00	124.8	73.4	8.5	50.6	5.6	8.9	0.8	842.3
15:23:00	116.9	71.3	8.3	50.2	7.6	8.7	0.8	822.6
15:24:00	104.2	74.6	8.3	50.2	7.8	8.9	0.6	820.9
15:25:00	106.3	75.8	8.3	50.1	14.5	8.9	0.6	827.4
15:26:00	115.9	75.8	8.5	50.7	5.4	8.9	0.7	858.9
15:27:00	102.8	74.5	8.5	50.6	8.0	8.9	0.8	852.4
15:28:00	78.9	75.6	8.4	50.4	6.0	8.9	0.5	841.7
15:29:00	79.1	76.9	8.4	50.5	11.8	8.9	0.5	845.8
15:30:00	94.0	75.7	8.8	50.6	7.2	8.9	0.7	866.3
15:31:00	86.1	75.5	8.8	50.4	5.0	8.6	0.8	849.5
15:32:00	72.6	76.7	8.4	50.1	6.4	8.6	0.6	826.3
15:33:00	70.8	78.1	8.3	49.8	6.0	8.9	0.6	812.2
15:34:00	72.9	79.2	8.3	49.8	7.7	8.9	1.0	817.0
15:35:00	66.1	82.1	8.5	50.5	6.6	8.9	0.8	852.0
15:36:00	65.3	86.4	8.4	50.5	5.6	8.9	0.9	859.5
15:37:00	59.1	89.6	8.4	50.3	6.4	8.9	0.6	873.7
15:38:00	55.1	98.2	8.5	50.6	9.4	8.9	0.7	907.2
15:39:00	60.3	99.5	8.5	50.8	4.2	8.7	0.8	928.0
15:40:00	54.1	105.0	8.5	50.4	4.9	8.7	0.9	907.7
15:41:00	48.4	112.7	8.4	50.4	4.4	8.7	0.6	900.7
15:42:00	46.5	121.7	8.4	50.1	7.9	8.9	0.7	891.0
15:43:00	46.3	126.0	8.4	50.3	4.2	8.9	0.8	918.4
15:44:00	43.8	127.7	8.4	50.3	5.4	8.9	0.8	920.7
15:45:00	42.4	134.5	8.4	50.4	5.0	8.9	0.5	920.5
15:46:00	45.7	138.5	8.4	50.5	10.2	8.9	0.6	923.4
15:47:00	69.1	134.2	8.8	50.8	7.9	8.9	0.8	929.7
15:48:00	85.5	104.6	8.8	50.7	5.0	8.7	0.8	899.2
15:49:00	76.2	98.4	8.4	50.7	6.2	8.7	0.7	873.1
15:50:00	65.0	96.0	8.4	50.4	6.9	8.9	0.7	842.7
15:51:00	66.4	93.8	8.3	50.2	7.8	8.9	0.9	840.9
15:52:00	71.5	90.3	8.5	50.7	5.9	8.9	0.8	863.0
15:53:00	73.8	88.9	8.4	50.5	7.2	8.9	0.9	847.9
15:54:00	76.9	86.5	8.4	50.3	7.5	8.9	0.6	846.7
15:55:00	81.5	86.5	8.5	50.7	11.7	8.9	0.6	865.5
15:56:00	91.3	84.9	8.8	50.9	5.1	8.9	0.8	881.6
15:57:00	85.9	81.8	8.7	50.3	6.4	8.6	0.9	856.6
15:58:00	76.0	85.0	8.4	50.2	5.6	8.6	0.6	844.7
15:59:00	75.4	85.0	8.3	50.0	9.7	8.9	0.7	831.8
16:00:00	83.4	83.7	8.4	50.5	4.8	8.9	0.8	851.2
16:01:00	81.2	83.7	8.4	50.6	8.6	8.9	0.8	853.7
16:02:00	81.6	83.7	8.4	50.4	6.3	8.9	0.6	854.1
16:03:00	83.4	81.2	8.4	50.5	9.7	8.9	0.6	856.5
16:04:00	86.2	80.2	8.5	50.9	7.7	8.9	0.7	871.2
16:05:00	89.0	75.9	8.5	50.8	7.7	8.7	0.8	858.2
16:06:00	91.3	77.2	8.4	50.5	6.9	8.7	0.7	836.8
16:07:00	100.3	78.9	8.3	50.1	14.0	9.0	0.7	817.7
16:08:00	111.0	77.1	8.3	50.1	16.6	9.0	0.9	817.7
16:09:00	132.4	75.7	8.5	50.6	8.7	9.0	0.8	845.9
16:10:00	124.9	75.7	8.5	50.7	14.1	9.0	0.8	845.9
16:11:00	122.5	74.4	8.5	50.8	8.1	9.0	0.6	843.3
16:12:00	117.6	72.8	8.5	50.6	17.3	9.0	0.6	839.2
16:13:00	117.3	70.7	8.4	50.6	5.3	8.8	0.8	841.3
16:14:00	114.2	69.0	8.4	50.3	7.0	8.8	0.8	818.1

Test No. 1 - September 14, 2021
CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
16:15:00	107.4	71.8	8.2	49.7	6.8	9.0	0.6	784.0
16:16:00	108.7	73.5	8.2	49.6	10.3	9.0	0.6	777.2
16:17:00	124.9	73.5	8.4	50.3	7.4	9.0	0.7	808.1
16:18:00	124.2	70.4	8.3	50.1	14.1	8.8	0.7	797.9
16:19:00	126.9	70.4	8.3	50.1	8.4	8.8	0.6	794.1
16:20:00	127.1	70.4	8.4	50.5	11.1	8.8	0.5	807.2
16:21:00	115.6	69.4	8.5	50.6	9.4	8.8	0.7	815.4
16:22:00	112.0	68.0	8.4	50.4	5.5	8.8	0.7	799.1
16:23:00	102.8	68.0	8.3	50.3	10.2	8.8	0.7	777.8
16:24:00	112.0	71.2	8.2	49.9	10.7	9.1	0.6	760.9
16:25:00	120.1	71.2	8.2	49.9	13.9	9.1	0.8	762.7
16:26:00	114.5	71.2	8.4	50.7	5.7	9.1	0.7	793.5
16:27:00	91.0	72.7	8.4	50.4	8.7	9.1	0.7	780.2
16:28:00	86.3	72.7	8.4	50.2	8.7	9.1	0.5	777.6
16:29:00	91.1	71.1	8.4	50.4	13.4	8.9	0.5	791.3
16:30:00	94.4	69.9	8.5	50.6	4.8	8.9	0.6	803.3
16:31:00	88.0	68.1	8.4	50.6	5.5	8.6	0.8	788.9
16:32:00	81.8	71.1	8.4	50.4	4.8	8.9	0.5	772.4
16:33:00	74.1	73.9	8.2	49.9	4.1	9.1	0.5	742.1
Max	216.0	138.5	9.3	51.5	31.4	9.5	1.0	952.3
Min	37.9	59.9	7.9	49.4	4.1	8.2	0.5	675.3
Average	89.8	80.7	8.4	50.4	7.9	8.9	0.7	810.9

Test No. 2 - September 15, 2021
CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
9:37:00	20.9	80.8	7.8	48.6	6.4	9.5	0.8	538.2
9:38:00	22.5	80.8	7.9	49.1	5.8	9.3	0.9	564.5
9:39:00	24.3	80.8	7.9	49.1	6.1	9.0	1.0	570.9
9:40:00	24.2	79.3	8.0	49.1	5.7	9.0	0.7	574.7
9:41:00	23.0	79.3	8.1	49.6	7.8	9.0	0.7	597.4
9:42:00	25.5	79.3	8.2	50.2	5.8	8.7	0.9	616.9
9:43:00	26.7	75.7	8.2	50.2	5.9	8.5	1.0	612.9
9:44:00	21.9	77.8	8.0	49.7	5.8	8.8	0.8	581.2
9:45:00	21.9	79.1	8.0	49.6	6.3	8.8	0.9	575.1
9:46:00	21.2	79.1	8.0	49.4	6.5	8.8	1.0	579.5
9:47:00	22.5	80.2	8.1	49.9	6.8	8.8	1.0	595.1
9:48:00	23.4	80.2	8.2	50.0	6.8	8.8	1.0	602.4
9:49:00	25.5	78.5	8.2	50.1	6.9	8.8	0.7	597.4
9:50:00	26.2	78.5	8.2	50.2	7.1	8.8	0.9	597.4
9:51:00	27.5	76.4	8.3	50.5	5.6	8.8	1.0	609.4
9:52:00	25.8	76.4	8.2	50.2	6.3	8.8	1.1	597.6
9:53:00	23.0	76.4	8.1	49.6	6.2	8.8	0.8	575.4
9:54:00	25.1	77.5	8.0	49.4	7.9	8.8	0.9	577.3
9:55:00	29.4	77.5	8.1	49.8	5.8	8.8	1.0	591.8
9:56:00	29.1	77.5	8.1	50.0	6.8	8.8	1.1	599.3
9:57:00	26.4	77.5	8.1	49.9	5.7	8.8	0.7	599.3
9:58:00	26.9	77.5	8.1	50.2	7.0	8.8	0.7	609.1
9:59:00	27.2	77.5	8.2	50.3	6.0	8.8	0.9	616.0
10:00:00	27.7	76.5	8.2	50.3	5.9	8.5	1.0	613.3
10:01:00	22.9	78.0	8.1	49.9	5.9	8.8	0.9	589.8
10:02:00	22.7	78.0	8.1	49.6	6.1	8.8	0.9	579.5
10:03:00	22.8	80.0	8.1	49.8	6.4	8.8	1.2	586.3
10:04:00	23.3	80.0	8.2	50.3	6.0	8.8	1.0	605.6
10:05:00	23.6	80.0	8.2	50.3	6.3	8.8	1.0	608.4
10:06:00	24.7	78.5	8.2	50.3	6.7	8.8	0.7	612.4
10:07:00	25.8	78.5	8.2	50.2	7.1	8.8	0.8	615.5
10:08:00	28.1	78.5	8.3	50.5	5.3	8.5	1.0	625.9
10:09:00	26.0	78.5	8.2	50.4	5.9	8.5	1.0	613.6
10:10:00	22.0	80.0	8.1	50.0	5.5	8.8	0.8	589.2
10:11:00	21.7	80.0	8.1	49.9	6.1	8.8	0.8	587.9
10:12:00	23.0	80.0	8.2	50.0	5.4	8.8	0.9	605.6
10:13:00	21.0	80.0	8.2	50.2	6.7	8.6	1.1	611.6
10:14:00	23.4	80.0	8.2	50.2	5.5	8.6	0.6	612.7
10:15:00	26.0	78.3	8.2	50.2	6.5	8.6	0.7	615.9
10:16:00	24.0	78.3	8.2	50.4	5.8	8.6	0.9	623.8
10:17:00	22.3	75.9	8.3	50.5	5.4	8.4	1.0	629.6
10:18:00	18.7	75.9	8.2	50.0	5.9	8.6	0.9	601.4
10:19:00	19.4	77.5	8.1	49.8	5.8	8.6	0.9	590.2
10:20:00	20.7	79.8	8.1	49.8	6.2	8.6	1.1	586.4
10:21:00	22.3	79.8	8.3	50.3	5.7	8.6	1.0	603.2
10:22:00	20.7	79.8	8.3	50.4	5.8	8.6	1.0	606.0
10:23:00	19.9	78.5	8.2	50.2	5.7	8.6	0.7	603.7
10:24:00	19.2	77.4	8.2	50.1	6.9	8.6	0.7	607.2
10:25:00	20.9	75.9	8.3	50.4	5.0	8.4	0.9	626.5
10:26:00	20.2	75.9	8.3	50.4	5.6	8.4	1.0	615.7
10:27:00	17.7	77.5	8.1	49.9	5.5	8.7	0.8	582.8
10:28:00	22.9	80.2	8.0	49.8	6.4	8.9	0.8	580.3
10:29:00	26.8	80.2	8.1	50.2	5.4	8.9	1.0	594.8
10:30:00	29.2	80.2	8.2	50.2	5.8	8.7	1.0	600.7
10:31:00	26.9	78.9	8.2	50.1	5.5	8.7	0.7	597.4
10:32:00	23.4	78.9	8.2	50.0	6.4	8.7	0.7	598.5
10:33:00	24.2	78.9	8.2	50.1	6.8	8.7	0.9	607.7
10:34:00	27.0	77.7	8.3	50.5	5.3	8.7	1.0	617.4
10:35:00	23.3	77.7	8.2	49.9	5.8	8.7	1.0	595.5
10:36:00	22.4	79.5	8.1	49.6	6.2	8.7	0.8	586.8
10:37:00	25.2	79.5	8.1	49.7	6.2	8.7	1.0	577.1
10:38:00	27.7	79.5	8.2	50.2	5.7	8.7	0.9	586.3
10:39:00	24.0	79.5	8.1	50.0	6.6	8.7	1.0	588.9
10:40:00	25.9	79.5	8.2	50.2	6.1	8.7	0.6	599.3
10:41:00	27.7	79.5	8.2	50.3	7.3	8.7	0.7	605.4
10:42:00	31.3	75.8	8.3	50.5	5.2	8.7	0.9	621.1
10:43:00	30.1	75.8	8.2	50.4	5.8	8.5	1.0	612.3
10:44:00	24.9	77.9	8.1	50.1	5.5	8.7	0.7	594.1
10:45:00	21.9	77.9	8.1	49.7	6.0	8.7	0.8	580.9
10:46:00	22.9	77.9	8.1	49.7	5.2	8.7	0.9	583.3
10:47:00	23.8	77.9	8.2	50.2	5.8	8.7	1.0	595.8
10:48:00	23.2	77.9	8.2	50.3	5.3	8.7	0.7	597.6
10:49:00	21.9	79.4	8.2	50.4	5.8	8.7	0.7	598.6
10:50:00	19.4	79.4	8.3	50.6	5.6	8.7	0.9	611.4

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Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
10:51:00	19.2	76.9	8.2	50.5	5.0	8.7	0.9	611.4
10:52:00	16.8	76.9	8.1	49.8	5.2	8.7	0.9	583.2
10:53:00	17.7	76.9	8.0	49.5	5.6	8.7	0.8	571.3
10:54:00	19.3	78.4	8.0	49.6	5.6	8.9	0.9	574.8
10:55:00	18.7	80.7	8.2	50.2	5.3	8.9	0.9	589.5
10:56:00	17.0	80.7	8.2	50.0	5.4	8.9	0.9	588.0
10:57:00	19.0	79.4	8.2	50.2	5.5	8.9	0.6	590.0
10:58:00	19.0	79.4	8.2	50.2	6.0	8.9	0.7	592.5
10:59:00	19.6	76.5	8.3	50.4	4.7	8.6	0.9	615.6
11:00:00	19.1	75.3	8.3	50.4	5.8	8.6	1.0	609.8
11:01:00	19.8	76.5	8.2	50.0	5.4	8.6	0.7	587.5
11:02:00	22.5	77.8	8.2	49.9	5.7	8.6	0.8	590.5
11:03:00	21.8	77.8	8.2	50.1	5.4	8.6	0.9	599.4
11:04:00	20.5	79.1	8.3	50.5	5.7	8.6	1.0	615.0
11:05:00	19.6	79.1	8.3	50.4	5.5	8.6	0.8	611.7
11:06:00	18.1	79.1	8.3	50.5	6.2	8.6	0.7	616.0
11:07:00	18.5	76.9	8.4	50.5	6.1	8.6	1.0	623.7
11:08:00	19.2	74.6	8.4	50.7	5.1	8.3	0.9	636.9
11:09:00	17.6	74.6	8.3	50.2	5.5	8.5	0.9	603.5
11:10:00	17.1	76.4	8.1	49.9	5.5	8.5	0.8	586.6
11:11:00	16.3	76.4	8.1	49.7	5.7	8.8	0.9	575.6
11:12:00	16.8	77.7	8.2	50.1	5.4	8.8	1.0	590.7
11:13:00	19.9	77.7	8.3	50.4	5.1	8.8	1.0	615.7
11:14:00	16.9	77.7	8.3	50.3	5.1	8.8	0.6	612.0
11:15:00	14.1	76.6	8.3	50.2	5.4	8.8	0.7	609.5
11:16:00	13.7	75.6	8.3	50.3	4.7	8.5	0.9	626.3
11:17:00	14.3	73.9	8.3	50.3	4.9	8.5	1.0	622.0
11:18:00	13.7	75.4	8.2	50.1	4.7	8.5	0.6	604.9
11:19:00	15.6	78.4	8.2	50.2	5.5	8.7	0.8	601.9
11:20:00	17.2	79.6	8.3	50.4	5.4	8.7	0.9	606.3
11:21:00	17.7	78.1	8.4	50.6	5.2	8.7	1.0	621.3
11:22:00	16.4	78.1	8.3	50.4	5.0	8.5	0.9	620.2
11:23:00	14.5	76.4	8.3	50.3	5.9	8.5	0.7	620.2
11:24:00	17.2	76.4	8.4	50.8	6.1	8.5	1.0	638.4
11:25:00	20.2	76.4	8.4	50.9	4.8	8.5	0.9	640.3
11:26:00	15.6	75.0	8.3	50.4	5.3	8.3	1.0	604.6
11:27:00	13.4	75.0	8.2	50.2	5.4	8.5	0.8	594.6
11:28:00	16.4	76.2	8.3	50.2	6.0	8.5	0.8	599.3
11:29:00	18.6	76.2	8.3	50.5	5.1	8.5	1.0	615.5
11:30:00	18.0	73.7	8.3	50.4	5.2	8.5	1.0	619.3
11:31:00	13.7	73.7	8.3	50.4	5.1	8.5	0.6	615.4
11:32:00	13.7	73.7	8.3	50.4	6.1	8.5	0.7	615.4
11:33:00	16.3	73.3	8.4	50.7	4.8	8.3	0.9	632.6
11:34:00	15.2	72.2	8.4	50.9	4.4	8.3	0.9	629.2
11:35:00	11.0	72.3	8.2	49.9	4.2	8.5	0.6	575.5
11:36:00	8.8	74.6	7.9	49.0	4.4	9.1	0.8	532.2
11:37:00	8.8	76.1	7.9	49.2	4.3	9.1	0.9	537.7
12:40:00	12.3	82.2	8.2	49.7	5.4	8.7	0.6	598.1
12:41:00	12.4	82.2	8.3	50.1	5.4	8.7	0.8	606.2
12:42:00	13.2	80.7	8.3	50.3	4.8	8.7	0.9	609.3
12:43:00	12.2	80.7	8.1	49.7	4.9	8.7	0.9	578.6
12:44:00	13.9	82.5	8.1	49.5	5.2	9.0	0.8	565.2
12:45:00	14.1	82.5	8.0	49.4	5.4	9.0	1.0	566.7
12:46:00	13.4	85.4	8.2	49.9	5.0	9.0	0.9	587.8
12:47:00	13.1	85.4	8.2	49.7	5.2	9.0	1.0	587.8
12:48:00	13.4	87.3	8.2	49.8	5.1	9.0	0.6	589.5
12:49:00	14.1	87.3	8.2	50.1	5.6	9.0	0.6	601.8
12:50:00	15.0	85.9	8.3	50.2	4.6	8.7	0.8	609.5
12:51:00	13.4	84.9	8.2	49.7	4.9	8.7	0.9	581.1
12:52:00	12.0	86.9	8.1	49.6	4.8	8.7	0.6	569.1
12:53:00	12.5	88.1	8.0	49.4	5.1	9.1	0.7	554.9
12:54:00	14.7	89.5	8.1	49.4	4.7	9.1	0.9	570.0
12:55:00	13.7	89.5	8.1	49.6	4.9	9.1	0.9	567.6
12:56:00	12.5	89.5	8.0	49.6	4.8	9.1	0.6	563.8
12:57:00	12.2	89.5	8.1	49.7	5.4	9.1	0.6	563.8
12:58:00	11.4	89.5	8.1	49.9	5.0	9.1	0.8	572.0
12:59:00	12.1	88.1	8.1	50.0	4.7	9.1	0.8	572.0
13:00:00	13.9	88.1	8.0	49.5	4.9	9.1	0.8	544.4
13:01:00	13.3	91.9	7.9	49.1	5.2	9.1	0.7	532.5
13:02:00	13.0	91.9	7.9	49.1	5.2	9.1	0.9	527.2
13:03:00	17.2	90.5	8.0	49.5	7.7	9.1	0.8	529.2
13:04:00	29.2	90.5	7.9	49.6	7.4	9.1	0.9	527.2
13:05:00	55.6	91.7	7.9	49.7	8.8	9.4	0.5	528.4
13:06:00	77.3	91.6	7.8	49.6	11.4	9.4	0.6	522.1

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Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
13:07:00	98.7	91.6	7.8	49.7	10.4	9.4	0.8	529.1
13:08:00	130.1	88.2	7.8	49.4	10.6	9.4	0.9	526.6
13:09:00	133.0	88.2	7.9	49.3	9.9	9.4	0.5	524.6
13:10:00	136.5	88.2	7.8	49.1	14.2	9.4	0.7	520.0
13:11:00	145.8	86.9	7.8	48.9	10.8	9.4	0.8	522.9
13:12:00	148.3	85.4	7.9	49.2	10.7	9.4	0.8	541.6
13:13:00	117.1	85.4	7.9	49.0	9.2	9.4	0.7	534.2
13:14:00	115.6	85.4	7.9	49.1	11.7	9.4	0.5	532.2
13:15:00	118.1	85.4	7.9	49.1	11.3	9.4	0.8	525.6
13:16:00	121.4	83.5	7.9	49.2	8.5	9.4	0.8	518.1
13:17:00	118.6	83.5	7.7	48.7	10.3	9.4	0.9	504.9
13:18:00	123.2	83.5	7.7	48.4	10.3	9.6	0.7	490.0
13:19:00	124.7	82.2	7.7	48.4	13.3	9.6	0.8	490.0
13:20:00	119.2	82.2	7.9	49.1	9.1	9.6	0.9	521.3
13:21:00	106.8	80.8	8.0	49.3	10.1	9.4	0.9	533.3
13:22:00	85.1	79.6	8.2	49.6	8.4	9.4	0.6	551.2
13:23:00	69.7	77.8	8.3	50.0	10.1	9.1	0.6	559.8
13:24:00	69.3	76.5	8.4	50.3	6.8	9.1	0.8	568.3
13:25:00	59.2	74.4	8.3	50.0	8.1	8.8	0.9	556.6
13:26:00	52.5	74.4	8.2	49.8	7.3	8.8	0.6	549.9
13:27:00	49.2	75.4	8.2	49.4	8.5	9.0	0.7	543.4
13:28:00	48.2	77.0	8.3	49.4	7.3	9.0	0.9	560.4
13:29:00	45.1	77.0	8.3	49.9	7.2	8.8	0.9	564.1
13:30:00	36.4	75.9	8.3	49.7	7.8	8.8	0.8	557.1
13:31:00	37.9	75.9	8.3	49.8	8.5	8.8	0.6	557.1
13:32:00	47.4	75.9	8.3	50.1	9.3	8.8	0.8	567.3
13:33:00	52.9	75.9	8.3	50.3	6.7	8.8	0.8	576.3
13:34:00	42.5	74.6	8.3	50.1	7.7	8.8	0.9	561.6
13:35:00	37.6	74.6	8.2	49.6	7.0	8.8	0.6	541.9
13:36:00	38.3	76.3	8.2	49.5	7.9	8.8	0.7	538.8
13:37:00	38.9	77.3	8.3	49.9	5.7	8.8	0.8	560.1
13:38:00	34.2	77.3	8.3	50.1	6.8	8.8	0.9	558.0
13:39:00	28.0	78.7	8.2	50.0	6.7	9.0	0.5	539.5
13:40:00	32.3	78.7	8.3	50.2	6.8	9.0	0.6	554.7
13:41:00	32.4	77.1	8.4	50.3	5.8	8.7	0.8	570.1
13:42:00	30.6	75.9	8.3	50.1	7.2	8.7	0.9	563.5
13:43:00	33.1	77.2	8.3	50.1	7.0	8.7	0.6	555.1
13:44:00	40.8	77.2	8.2	49.8	7.9	8.7	0.7	548.3
13:45:00	49.0	78.6	8.3	50.0	7.7	8.7	0.8	557.3
13:46:00	49.0	78.6	8.4	50.4	8.0	8.7	0.8	565.2
13:47:00	43.9	78.6	8.3	50.3	8.4	8.7	0.8	567.0
13:48:00	43.5	78.6	8.4	50.2	10.5	8.7	0.6	570.3
13:49:00	48.5	78.6	8.8	50.6	9.1	8.7	0.8	593.7
13:50:00	51.8	74.2	9.1	50.9	7.3	8.4	0.8	603.9
13:51:00	42.1	74.2	8.8	50.4	8.6	8.4	0.9	583.9
13:52:00	40.2	75.9	8.3	50.0	7.9	8.7	0.7	557.9
13:53:00	44.7	77.4	8.3	49.9	8.1	8.7	0.7	553.5
13:54:00	47.5	77.4	8.4	50.2	7.2	8.7	0.8	568.4
13:55:00	46.0	79.2	8.4	50.4	8.3	8.7	0.9	573.1
13:56:00	45.2	78.2	8.4	50.2	6.8	8.7	0.6	576.5
13:57:00	39.4	79.3	8.4	50.0	9.0	8.7	0.6	580.1
13:58:00	38.9	79.3	8.8	50.2	6.9	8.7	0.8	588.9
13:59:00	39.8	78.1	9.1	50.2	7.3	8.5	0.8	581.0
14:00:00	37.7	80.3	8.7	50.1	6.9	8.5	0.6	567.5
14:01:00	34.4	82.3	8.3	49.7	7.8	8.7	0.6	552.0
14:02:00	38.3	82.3	8.3	49.7	8.5	8.7	1.0	560.5
14:03:00	41.7	82.3	8.4	50.1	7.7	8.7	0.9	572.7
14:04:00	42.3	82.3	8.4	50.1	7.6	8.7	0.8	577.6
14:05:00	40.4	82.3	8.4	50.3	8.1	8.7	0.6	578.9
14:06:00	38.8	82.3	8.7	50.4	9.2	8.7	0.7	588.6
14:07:00	43.4	82.3	9.1	50.6	6.9	8.7	0.8	601.6
14:08:00	44.0	80.3	8.8	50.3	7.6	8.4	0.9	584.7
14:09:00	41.0	84.0	8.6	49.8	7.6	8.7	0.6	557.2
14:10:00	40.6	84.0	8.6	49.6	8.4	8.7	0.6	554.8
14:11:00	42.8	84.0	8.4	50.0	6.7	8.7	0.8	575.1
14:12:00	42.7	84.0	8.4	50.3	8.2	8.7	0.9	581.6
14:13:00	39.0	84.0	8.7	50.2	6.7	8.7	0.5	581.7
14:14:00	39.0	84.0	9.1	50.3	8.2	8.7	0.5	587.5
14:15:00	43.1	82.3	9.2	50.6	8.6	8.7	0.7	599.8
14:16:00	56.6	80.0	9.2	50.8	8.6	8.4	0.8	604.0
14:17:00	59.5	80.0	8.7	50.3	8.7	8.4	0.6	585.9
14:18:00	61.4	80.0	8.4	49.7	10.5	8.7	0.6	565.7
14:19:00	65.9	81.2	8.7	50.0	9.6	8.7	1.0	574.7
14:20:00	68.6	81.2	8.7	50.1	10.2	8.7	0.8	581.6

Test No. 2 - September 15, 2021
CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
14:21:00	69.9	80.0	8.7	50.0	10.8	8.7	0.9	581.6
14:22:00	74.5	80.0	9.1	50.2	10.4	8.7	0.5	587.8
14:23:00	73.2	81.2	9.4	50.6	10.9	8.7	0.6	600.2
14:24:00	65.2	75.9	9.4	50.7	5.4	8.4	0.7	596.3
14:25:00	49.9	75.9	8.6	49.6	6.9	8.4	0.9	556.2
14:26:00	28.7	79.3	8.0	48.9	7.5	9.0	0.6	511.5
14:27:00	35.3	80.4	8.1	49.2	9.5	9.0	0.6	525.8
14:28:00	50.0	80.4	8.3	49.7	6.9	9.0	0.8	559.4
14:29:00	51.5	81.7	8.3	49.7	9.3	8.7	0.9	564.3
14:30:00	61.1	81.7	8.3	49.8	7.5	8.7	0.5	567.6
14:31:00	64.9	80.4	8.3	49.9	10.2	8.7	0.6	576.5
14:32:00	67.5	80.4	8.7	50.2	8.9	8.7	0.8	590.7
14:33:00	66.1	79.1	8.8	50.6	9.2	8.5	0.9	596.2
14:34:00	64.0	79.1	8.4	50.1	8.5	8.5	0.7	580.0
14:35:00	67.9	80.7	8.3	49.3	10.4	8.5	0.7	561.6
14:36:00	78.4	80.7	8.6	49.4	11.3	8.7	0.9	573.5
14:37:00	81.3	82.2	8.7	50.1	9.4	8.7	0.9	585.5
14:38:00	75.3	80.8	8.4	49.7	10.7	8.7	0.9	576.6
14:39:00	76.6	79.7	8.4	49.8	10.3	8.7	0.6	577.8
14:40:00	76.0	79.7	8.8	50.2	12.1	8.7	0.6	586.3
Max	148.3	91.9	9.4	50.9	14.2	9.6	1.2	640.3
Min	8.8	72.2	7.7	48.4	4.2	8.3	0.5	490.0
Average	36.6	79.7	8.3	50.0	6.9	8.8	0.8	581.8

Test No. 3 - September 16, 2021
CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
8:58:00	42.3	94.2	8.3	49.4	9.0	8.8	0.8	555.0
8:59:00	43.0	95.3	8.3	49.6	9.9	8.8	0.8	554.5
9:00:00	46.0	95.3	8.4	49.7	13.0	8.8	0.6	556.4
9:01:00	54.0	93.7	8.4	49.7	10.5	8.8	0.8	564.9
9:02:00	54.0	93.7	8.4	49.7	10.5	8.8	0.8	564.9
9:03:00	54.0	93.7	8.4	49.7	10.5	8.8	0.8	564.9
9:04:00	54.0	93.7	8.4	49.7	10.5	8.8	0.8	564.9
9:05:00	54.0	93.7	8.4	49.7	10.5	8.8	0.8	564.9
9:06:00	49.6	93.2	8.4	49.8	9.3	9.0	0.9	556.3
9:07:00	48.3	92.1	8.3	49.7	9.8	9.0	0.8	550.3
9:08:00	48.6	91.0	8.3	49.7	10.5	8.8	0.6	549.0
9:09:00	48.3	91.0	8.4	49.7	11.5	8.8	0.7	550.1
9:10:00	42.3	87.6	8.8	49.9	9.0	8.8	0.8	566.6
9:11:00	40.3	87.6	8.7	49.9	9.2	8.8	0.8	556.4
9:12:00	38.7	92.4	8.3	49.5	8.8	8.8	0.7	531.2
9:13:00	35.2	92.4	8.2	49.2	10.2	8.8	0.7	528.5
9:14:00	35.4	92.4	8.3	49.5	8.4	8.8	0.8	545.5
9:15:00	34.0	92.4	8.3	49.7	9.8	8.8	1.0	551.3
9:16:00	33.7	92.4	8.3	49.7	9.0	8.8	0.6	550.1
9:17:00	36.7	93.4	8.4	49.9	10.5	8.8	0.6	561.2
9:18:00	36.4	93.4	8.7	50.1	9.6	8.8	0.8	570.3
9:19:00	32.1	91.1	9.0	49.9	9.7	8.8	0.8	568.8
9:20:00	34.0	93.2	8.3	49.5	9.5	8.8	0.8	545.6
9:21:00	35.8	93.2	8.3	49.3	10.3	8.8	0.8	542.3
9:22:00	34.3	93.2	8.3	49.2	10.6	8.8	0.9	550.1
9:23:00	34.5	93.2	8.4	49.6	9.7	8.8	0.9	567.9
9:24:00	33.5	93.2	8.4	49.7	10.1	8.8	0.9	569.2
9:25:00	31.8	93.2	8.7	49.7	9.9	8.8	0.6	569.2
9:26:00	32.0	93.2	9.0	49.8	10.8	8.8	0.6	577.6
9:27:00	34.1	91.1	9.4	50.3	8.8	8.5	0.8	603.9
9:28:00	33.5	91.1	9.1	50.2	9.7	8.5	0.9	594.5
9:29:00	31.7	94.1	8.7	49.6	8.5	8.5	0.8	569.7
9:30:00	31.2	94.1	8.6	49.4	9.5	8.7	0.7	566.5
9:31:00	30.1	94.1	8.6	49.5	8.2	8.7	0.8	573.0
9:32:00	29.9	97.0	8.3	49.7	8.7	8.7	0.9	569.2
9:33:00	29.9	98.7	8.3	49.8	8.3	8.7	0.6	564.1
9:34:00	30.7	99.8	8.3	49.8	8.9	8.7	0.6	564.1
9:35:00	30.7	99.8	8.3	49.9	11.9	8.7	0.9	570.9
9:36:00	31.4	95.1	8.7	50.0	7.9	8.7	0.9	589.2
9:37:00	31.1	97.0	8.3	49.5	8.5	8.7	0.9	566.5
9:38:00	30.4	99.0	8.2	49.2	9.2	8.7	0.8	552.8
9:39:00	32.3	100.8	8.2	49.4	8.7	9.0	0.9	557.3
9:40:00	32.1	100.8	8.3	49.8	8.1	9.0	0.9	570.4
9:41:00	31.1	101.8	8.3	49.6	8.4	9.0	0.9	561.1
9:42:00	33.5	101.8	8.3	49.5	8.0	9.0	0.6	557.5
9:43:00	33.4	101.8	8.3	49.6	9.0	9.0	0.6	561.5
9:44:00	35.1	98.8	8.4	49.8	7.2	8.8	0.8	583.0
9:45:00	37.4	98.8	8.4	49.8	8.5	8.8	0.8	578.2
9:46:00	42.8	102.2	8.3	49.5	6.5	8.8	0.6	560.3
9:47:00	40.7	102.2	8.2	49.2	7.5	9.0	0.7	544.3
9:48:00	30.8	102.2	8.0	48.9	7.6	9.3	0.8	526.9
9:49:00	34.0	102.2	8.1	49.3	8.2	9.3	0.8	543.3
9:50:00	37.2	103.5	8.1	49.1	8.1	9.3	0.7	543.3
9:51:00	38.3	103.5	8.1	49.3	9.3	9.3	0.7	551.9
9:52:00	39.5	103.5	8.3	49.8	8.4	9.3	0.9	565.6
9:53:00	38.2	100.2	8.4	49.8	7.9	9.0	0.8	576.7
9:54:00	39.7	102.7	8.2	49.2	9.0	9.0	0.9	551.1
9:55:00	41.8	104.1	8.1	49.3	9.4	9.0	0.7	547.4
9:56:00	45.7	104.1	8.1	49.3	9.2	9.0	0.7	550.3
9:57:00	44.5	102.6	8.2	49.5	8.2	9.0	0.9	561.7
9:58:00	42.4	102.6	8.2	49.6	8.6	9.0	0.9	563.6
9:59:00	42.4	102.6	8.2	49.5	8.8	9.0	0.5	560.9
10:00:00	46.0	102.6	8.3	49.7	12.5	9.0	0.6	572.6
10:01:00	56.1	97.8	8.4	50.2	8.2	8.7	0.8	601.3
10:02:00	58.0	97.8	8.4	50.1	9.7	8.7	0.9	595.0
10:03:00	54.0	100.8	8.3	49.4	7.9	8.7	0.6	562.5
10:04:00	51.0	100.8	8.2	49.0	11.1	9.0	0.7	550.7
10:05:00	57.1	100.8	8.2	49.3	10.1	9.0	0.9	564.8
10:06:00	55.5	100.8	8.3	49.8	10.0	9.0	0.9	584.8
10:07:00	52.3	100.8	8.3	49.7	9.5	9.0	0.8	581.6
10:08:00	47.5	100.8	8.3	49.7	11.1	9.0	0.6	577.5
10:09:00	45.4	100.8	8.3	49.6	8.9	9.0	0.7	577.5
10:10:00	45.7	98.1	8.6	49.5	9.0	8.7	0.9	587.6
10:11:00	45.1	101.5	8.2	49.4	8.7	8.7	0.8	564.1

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CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
10:12:00	45.4	103.9	8.2	49.3	9.3	8.9	0.7	557.5
10:13:00	50.2	106.1	8.2	49.3	10.2	8.9	0.7	561.2
10:14:00	52.6	104.4	8.3	49.6	7.5	8.9	0.8	574.2
10:15:00	44.7	102.9	8.2	49.6	8.0	8.9	0.8	567.6
10:16:00	41.6	106.1	8.2	49.6	8.7	8.9	0.5	557.6
10:17:00	43.1	106.1	8.3	49.8	10.6	8.9	0.5	565.8
10:18:00	47.3	99.0	8.3	50.0	8.4	8.9	0.7	594.9
10:19:00	48.9	99.0	8.3	49.8	8.3	8.7	0.8	585.8
10:20:00	46.3	102.3	8.2	49.3	8.3	9.0	0.6	550.4
10:21:00	43.3	101.1	8.1	48.9	10.0	9.0	0.7	537.6
10:22:00	43.8	103.1	8.1	48.9	9.7	9.2	0.8	547.5
10:23:00	48.4	103.1	8.3	49.7	9.2	9.2	1.0	574.9
10:24:00	48.4	101.3	8.2	49.6	9.4	8.9	0.8	569.8
10:25:00	46.3	98.2	8.2	49.4	9.6	8.9	0.6	569.3
10:26:00	46.2	98.2	8.3	49.6	8.2	8.9	0.8	574.0
10:27:00	38.7	98.2	8.3	49.8	7.7	8.9	0.8	568.0
10:28:00	67.1	102.6	8.3	49.6	19.8	8.9	0.9	569.8
10:29:00	88.2	102.6	8.3	49.6	9.0	8.9	0.7	576.0
10:30:00	65.3	100.3	8.3	49.3	9.1	8.9	0.7	564.2
10:31:00	47.1	100.3	8.3	49.4	7.7	8.9	0.8	562.6
10:32:00	42.5	103.7	8.3	49.4	8.2	8.9	0.8	561.0
10:33:00	36.1	105.2	8.2	49.1	8.1	9.2	0.5	552.9
10:34:00	36.9	105.2	8.2	49.1	9.4	9.2	0.6	544.9
10:35:00	40.8	99.4	8.3	49.6	8.0	8.9	0.8	552.3
10:36:00	42.1	96.4	8.3	49.6	9.2	8.9	0.8	549.6
10:37:00	58.3	99.3	8.2	49.3	8.0	8.9	0.7	532.9
10:38:00	61.6	98.1	8.1	48.8	9.6	8.9	0.7	528.5
10:39:00	48.2	98.1	8.1	48.9	8.0	8.9	0.8	526.1
10:40:00	42.0	99.5	8.2	49.7	8.9	8.9	0.8	545.1
10:41:00	39.9	99.5	8.2	49.5	9.8	8.9	0.9	543.2
10:42:00	44.6	99.5	8.3	50.0	9.6	8.9	0.6	557.8
10:43:00	44.9	99.5	8.3	50.2	9.3	8.9	0.7	565.1
10:44:00	41.3	93.9	8.4	50.0	7.1	8.9	0.8	569.4
10:45:00	35.9	96.7	8.2	49.6	7.9	8.9	0.9	538.2
10:46:00	34.9	100.1	8.1	49.4	6.9	8.9	0.7	531.2
10:47:00	32.6	101.2	8.0	49.0	6.3	9.1	0.7	519.3
10:48:00	29.6	101.2	8.0	49.0	7.0	9.4	0.7	512.4
10:49:00	28.0	102.4	8.0	48.9	6.9	9.4	0.8	508.2
10:50:00	28.0	104.0	8.0	48.9	5.9	9.4	0.5	508.2
10:51:00	27.3	105.1	7.9	48.7	8.1	9.4	0.6	495.8
10:52:00	35.8	103.6	8.0	49.2	8.3	9.6	0.8	519.7
10:53:00	42.1	100.3	8.1	49.4	7.9	9.3	0.9	535.6
10:54:00	46.6	100.3	8.1	49.1	8.1	9.3	0.8	524.0
10:55:00	46.1	101.3	8.0	48.8	8.5	9.3	0.8	512.1
10:56:00	47.2	101.3	8.0	48.7	7.9	9.3	0.9	514.3
10:57:00	43.3	101.3	8.0	49.1	7.3	9.3	0.8	523.3
10:58:00	39.7	99.9	8.0	48.8	7.4	9.3	0.8	512.1
11:54:00	53.2	109.0	8.2	48.7	7.9	8.7	0.6	534.5
11:55:00	50.1	110.3	8.1	48.5	10.0	9.0	0.7	534.2
11:56:00	52.5	110.3	8.2	48.8	8.6	9.0	0.8	544.2
11:57:00	54.6	110.3	8.3	49.4	9.5	9.0	0.8	562.3
11:58:00	48.2	110.3	8.3	49.2	8.2	9.0	0.7	551.3
11:59:00	44.9	110.3	8.3	49.0	9.7	9.0	0.5	550.0
12:00:00	48.2	111.7	8.6	49.4	9.5	9.0	0.8	566.4
12:01:00	50.7	108.4	9.0	49.6	8.0	9.0	0.8	575.8
12:02:00	46.8	108.4	8.6	49.1	9.4	8.8	0.7	555.0
12:03:00	49.2	110.3	8.3	48.9	9.7	9.0	0.6	544.7
12:04:00	50.6	108.8	8.3	49.2	9.4	9.0	0.7	553.5
12:05:00	49.3	104.8	8.4	49.9	8.8	8.7	0.7	589.9
12:06:00	48.0	103.3	8.4	49.9	9.0	8.7	0.8	589.9
12:07:00	44.5	100.4	8.4	49.9	10.0	8.7	0.5	588.0
12:08:00	46.8	99.0	8.7	50.0	10.7	8.7	0.6	595.2
12:09:00	50.0	96.9	9.1	50.7	7.5	8.7	0.7	609.1
12:10:00	47.2	93.0	8.7	50.0	8.5	8.5	0.7	580.2
12:11:00	46.8	96.0	8.3	49.5	8.0	8.7	0.5	557.4
12:12:00	48.3	98.3	8.2	49.3	8.1	9.0	0.6	543.1
12:13:00	47.0	98.3	8.2	49.3	8.4	9.0	0.8	543.1
12:14:00	44.6	98.3	8.3	49.4	9.3	9.0	0.7	545.8
12:15:00	43.7	98.3	8.2	49.3	9.4	9.0	0.6	540.2
12:16:00	44.9	98.3	8.3	49.5	9.8	9.0	0.5	540.2
12:17:00	49.3	96.3	8.3	49.7	8.8	9.0	0.7	545.5
12:18:00	48.5	93.2	8.4	49.8	8.1	8.8	0.7	554.1
12:19:00	45.2	95.7	8.2	49.5	8.5	8.8	0.7	531.7
12:20:00	46.9	98.0	8.2	49.4	8.6	9.0	0.6	513.7

Test No. 3 - September 16, 2021
CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
12:21:00	47.5	96.8	8.2	49.2	9.0	9.0	0.7	516.3
12:22:00	46.3	96.8	8.3	49.5	7.8	9.0	0.7	534.0
12:23:00	44.2	95.4	8.3	49.4	8.0	9.0	0.8	530.6
12:24:00	39.8	95.4	8.3	49.4	8.0	9.0	0.5	532.3
12:25:00	40.7	95.4	8.3	49.5	10.2	9.0	0.5	535.0
12:26:00	47.8	93.4	8.4	50.0	7.8	9.0	0.7	550.1
12:27:00	46.9	90.8	8.3	49.6	8.1	8.7	0.8	531.5
12:28:00	46.7	92.6	8.2	49.4	7.9	8.7	0.5	515.1
12:29:00	48.3	94.1	8.1	49.0	8.7	9.0	0.6	503.7
12:30:00	48.3	94.1	8.2	49.1	8.6	9.0	0.7	508.6
12:31:00	45.0	92.8	8.3	49.6	7.3	9.0	0.7	525.0
12:32:00	40.4	94.4	8.2	49.2	7.5	9.0	0.7	512.9
12:33:00	39.0	94.4	8.2	49.2	7.9	9.0	0.4	512.9
12:34:00	38.8	93.2	8.3	49.5	8.7	9.0	0.7	520.8
12:35:00	39.3	92.1	8.3	49.7	9.5	9.0	0.6	530.8
12:36:00	48.2	90.4	8.2	49.1	8.3	8.8	0.7	512.5
12:37:00	47.1	92.2	8.1	48.9	8.7	9.0	0.5	503.1
12:38:00	47.1	92.2	8.1	49.2	11.2	9.0	0.5	506.0
12:39:00	52.3	92.2	8.3	49.6	8.3	9.0	0.7	524.9
12:40:00	51.1	90.7	8.3	49.4	9.1	9.0	0.7	523.3
12:41:00	46.8	90.7	8.3	49.5	7.7	9.0	0.4	523.3
12:42:00	41.7	90.7	8.3	49.5	9.4	8.8	0.5	524.7
12:43:00	43.3	90.7	8.3	49.5	8.3	8.8	0.7	531.1
12:44:00	49.2	89.5	8.3	49.7	8.2	8.8	0.6	526.2
12:45:00	48.1	91.8	8.3	49.6	8.0	8.8	0.5	514.5
12:46:00	46.7	93.7	8.1	49.2	9.3	9.1	0.6	501.8
12:47:00	48.5	93.7	8.1	49.2	8.6	9.1	0.8	504.0
12:48:00	49.1	93.7	8.3	49.7	10.0	9.1	0.7	523.6
12:49:00	49.7	93.7	8.3	49.6	8.7	9.1	0.7	528.5
12:50:00	49.5	93.7	8.4	49.8	9.3	9.1	0.5	535.7
12:51:00	51.3	93.7	8.3	49.7	9.8	8.8	0.6	542.9
12:52:00	51.3	92.0	8.4	49.9	7.8	8.8	0.7	555.6
12:53:00	45.8	92.0	8.3	49.6	9.8	8.6	0.8	531.1
12:54:00	48.1	94.4	8.2	49.3	8.6	8.8	0.6	507.0
12:55:00	49.6	94.4	8.2	49.2	9.9	8.8	0.6	509.8
12:56:00	49.6	94.4	8.4	49.8	7.7	8.8	0.7	532.0
12:57:00	47.1	94.4	8.4	49.8	9.7	8.8	0.7	529.4
12:58:00	46.1	93.1	8.4	49.9	8.8	8.8	0.5	526.6
12:59:00	48.4	91.6	8.3	49.9	10.7	8.8	0.5	526.6
13:00:00	51.4	89.0	8.6	49.9	9.4	8.8	0.6	535.8
13:01:00	51.9	87.7	8.7	49.8	10.2	8.8	0.6	531.0
13:02:00	53.3	89.8	8.3	49.6	8.7	8.8	0.5	519.5
13:03:00	54.6	90.8	8.3	49.3	13.1	8.8	0.6	514.8
13:04:00	58.4	90.8	8.3	49.4	13.5	8.8	0.8	520.3
13:05:00	67.5	89.7	8.7	49.7	10.6	8.8	0.7	547.4
13:06:00	59.4	89.7	8.7	50.0	11.0	8.6	0.7	554.5
13:07:00	56.3	89.7	8.7	50.1	10.9	8.6	0.5	554.5
13:08:00	52.0	89.7	8.7	49.8	10.9	8.6	0.5	548.7
13:09:00	52.0	89.7	8.7	49.9	9.6	8.6	0.7	558.7
13:10:00	50.3	88.3	8.4	49.6	10.1	8.6	0.7	543.0
13:11:00	48.7	93.4	8.3	49.3	9.4	8.6	0.5	523.3
13:12:00	46.5	93.4	8.3	49.3	13.1	8.9	0.6	526.7
13:13:00	50.4	91.2	9.0	49.9	9.8	8.9	0.7	557.8
13:14:00	52.6	91.2	9.0	50.1	12.3	8.5	0.7	563.6
13:15:00	53.3	91.2	8.7	50.1	9.5	8.5	0.4	566.5
13:16:00	54.8	91.2	9.1	50.1	12.0	8.5	0.5	573.2
13:17:00	56.5	88.8	9.1	50.1	11.7	8.5	0.7	581.1
13:18:00	54.3	86.5	9.1	50.1	9.4	8.3	0.7	571.0
13:19:00	51.8	87.6	8.7	49.9	9.8	8.3	0.6	548.4
13:20:00	48.2	90.2	8.3	49.5	10.7	8.6	0.6	521.5
13:21:00	49.3	90.2	8.3	49.5	9.2	8.6	0.7	522.7
13:22:00	45.0	90.2	9.0	50.1	6.9	8.6	0.7	543.5
13:23:00	34.0	90.2	8.7	50.0	7.0	8.6	0.7	532.0
13:24:00	31.9	90.2	8.4	50.0	8.2	8.6	0.5	532.0
13:25:00	33.4	90.2	8.7	49.9	10.5	8.6	0.4	540.1
13:26:00	37.0	87.8	9.0	50.0	7.2	8.6	0.6	554.4
13:27:00	38.7	85.0	8.7	50.2	7.5	8.4	0.6	547.1
13:28:00	35.1	90.1	8.4	49.9	8.2	8.7	0.5	522.0
13:29:00	36.3	90.1	8.3	49.6	7.6	8.7	0.5	516.3
13:30:00	32.6	90.1	8.7	49.7	6.6	8.7	0.7	532.8
13:31:00	28.2	90.1	8.7	49.8	7.3	8.7	0.7	539.8
13:32:00	27.0	90.1	8.7	49.8	7.2	8.7	0.4	542.8
13:33:00	28.3	90.1	8.8	50.0	7.8	8.5	0.4	545.5
13:34:00	30.2	90.1	8.8	50.3	7.9	8.5	0.6	557.5

Test No. 3 - September 16, 2021
CEM Analyzers

Time	CO ppm	HCl ppm	CO2 %	H2O %	THC ppm	O2 %	Opacity %	SO2 ppm
13:35:00	32.7	88.9	9.1	50.2	7.0	8.5	0.7	558.9
13:36:00	31.6	90.3	8.8	50.0	7.2	8.5	0.6	541.3
13:37:00	27.7	93.2	8.6	49.4	7.5	8.5	0.6	521.4
13:38:00	28.2	94.4	8.7	49.2	8.6	8.5	0.7	543.2
13:39:00	30.4	94.4	9.1	50.2	7.8	8.5	0.7	561.8
13:40:00	29.8	93.2	9.1	50.0	7.6	8.5	0.8	557.0
13:41:00	29.7	93.2	9.0	50.2	8.1	8.5	0.5	558.4
13:42:00	31.4	93.2	9.1	50.4	8.2	8.5	0.5	565.4
13:43:00	30.8	90.5	9.2	50.3	5.9	8.5	0.8	572.9
13:44:00	26.9	88.8	8.8	50.1	6.6	8.2	0.8	548.0
13:45:00	26.3	92.9	8.3	49.7	6.9	8.5	0.5	508.4
13:46:00	26.7	92.9	8.3	49.5	6.9	8.8	0.6	505.8
13:47:00	25.8	92.9	8.7	50.1	6.1	8.8	0.6	530.0
13:48:00	24.4	92.9	8.7	50.2	6.3	8.8	0.7	535.7
13:49:00	22.1	92.9	8.3	49.9	6.4	8.8	0.6	522.5
13:50:00	22.8	94.1	8.4	49.8	7.7	8.8	0.5	523.9
13:51:00	26.9	94.1	8.7	50.0	8.6	8.8	0.9	541.9
13:52:00	33.9	92.1	8.7	50.4	7.2	8.6	0.7	555.9
13:53:00	33.0	92.1	8.4	50.2	7.0	8.6	0.7	541.1
13:54:00	27.9	95.9	8.3	49.5	7.6	8.6	0.6	517.5
Max	88.2	111.7	9.4	50.7	19.8	9.6	1.0	609.1
Min	22.1	85.0	7.9	48.5	5.9	8.2	0.4	495.8
Average	42.9	96.5	8.4	49.6	8.9	8.9	0.7	548.0

APPENDIX 29

Clean Harbors One-Minute Average
Process Data
(15 pages)

Test No. 1 - September 14, 2021

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
11:00:00	36.6	6.9	158.3	218.2	15.3	413.9	28.4	18025	13601	61388.2	1447.6	1105.5	504.0	200.0	195.6	-9.9	-37.9	-90.3	271.9
11:01:00	36.4	6.8	158.8	217.4	14.1	411.8	27.5	18694	13719	63590.9	1451.1	1107.3	503.9	200.5	195.6	-18.4	-51.0	-106.5	223.7
11:02:00	36.9	6.7	158.9	218.3	15.1	411.5	27.4	18156	13618	60047.1	1454.3	1107.4	503.8	201.0	195.6	-10.9	-40.8	-92.4	238.8
11:03:00	36.3	6.4	158.3	216.2	15.1	413.6	27.4	18669	13770	62231.7	1455.9	1109.4	503.9	202.0	195.6	-18.3	-43.5	-106.7	246.1
11:04:00	36.5	7.1	153.9	218.5	15.1	414.5	28.2	18044	13551	60556.4	1446.6	1102.5	503.9	202.0	196.7	-7.1	-34.1	-86.5	279.4
11:05:00	36.6	7.2	153.4	217.1	15.1	413.2	28.6	18463	13758	67407.9	1444.4	1101.6	503.9	201.5	196.7	-34.9	-73.0	-129.6	173.6
11:06:00	37.1	7.5	153.0	219.0	15.1	413.6	28.0	18700	13770	63395.0	1433.2	1096.1	503.9	201.5	196.7	-19.5	-50.6	-107.4	239.0
11:07:00	37.0	6.7	153.7	218.0	15.1	412.7	27.5	18469	13663	65822.9	1433.3	1096.9	503.7	201.5	196.7	-21.6	-59.5	-107.8	210.2
11:08:00	36.5	6.6	153.9	218.9	15.1	413.0	27.4	18319	13556	64406.2	1430.1	1094.7	503.7	201.5	196.7	-12.4	-41.9	-91.9	262.8
11:09:00	36.8	7.1	157.4	216.5	15.1	411.5	28.4	18044	13573	62309.3	1435.2	1098.6	503.4	201.0	196.7	-8.2	-37.6	-86.6	271.6
11:10:00	36.0	7.8	159.1	216.9	15.1	411.5	28.7	18344	13702	64972.8	1432.3	1094.9	503.5	201.0	196.7	-16.3	-48.4	-100.9	229.2
11:11:00	35.8	6.8	157.7	217.8	15.1	411.5	28.7	18131	13601	60837.8	1433.8	1096.9	503.4	201.0	196.7	-13.6	-42.9	-94.2	242.7
11:12:00	36.2	7.2	158.7	217.7	15.1	411.9	27.6	18100	13607	61717.4	1430.6	1094.6	503.3	201.0	196.7	-9.1	-40.5	-87.0	270.4
11:13:00	36.4	7.4	158.8	218.5	15.2	413.6	28.5	17981	13607	61610.2	1437.7	1099.7	503.2	200.5	196.7	-6.5	-35.4	-82.6	283.3
11:14:00	35.9	7.3	158.5	217.9	15.2	414.2	27.7	18644	13714	62903.0	1431.2	1096.8	503.3	200.5	196.7	-20.0	-53.8	-107.4	224.3
11:15:00	36.2	6.8	159.2	218.2	15.2	414.2	27.5	18294	13736	63613.8	1430.9	1095.1	503.2	200.5	196.7	-15.5	-46.3	-99.7	240.6
11:16:00	36.2	6.1	159.1	218.7	15.2	414.1	27.4	18538	13747	61214.3	1430.6	1093.8	502.8	200.5	196.7	-14.8	-47.0	-97.9	256.6
11:17:00	35.9	6.7	158.7	219.2	14.0	414.2	27.4	18138	13641	64240.3	1432.9	1095.2	502.9	201.0	196.7	-11.7	-42.1	-93.2	269.3
11:18:00	36.6	6.4	158.8	217.8	15.1	413.9	28.5	18531	13742	62247.5	1436.1	1095.9	502.8	200.5	196.7	-16.7	-47.5	-103.5	215.6
11:19:00	36.4	7.4	160.2	218.0	15.1	413.3	27.8	18156	13629	62012.6	1434.9	1096.5	502.7	200.5	196.7	-10.6	-40.8	-93.4	237.1
11:20:00	36.3	7.8	160.5	217.7	15.1	412.9	28.6	18563	13736	65667.0	1437.6	1098.9	502.8	200.5	196.7	-25.0	-62.6	-119.0	193.0
11:21:00	35.9	7.2	160.5	219.1	15.1	412.7	28.6	17963	13635	62991.2	1442.6	1101.2	502.8	200.5	196.7	-7.0	-37.3	-85.3	278.8
11:22:00	36.0	6.6	160.4	217.8	15.1	412.7	27.5	18000	13669	66266.0	1451.1	1106.7	502.6	200.5	196.7	-27.1	-65.5	-119.5	175.6
11:23:00	36.7	6.2	160.4	217.6	15.1	413.3	27.4	18575	13657	63429.1	1444.3	1102.0	502.5	200.5	196.7	-16.6	-47.8	-104.4	237.3
11:24:00	35.9	7.1	160.3	219.7	15.1	412.7	28.3	18300	13652	62742.8	1446.7	1103.7	502.5	201.5	196.7	-10.9	-43.1	-95.0	248.5
11:25:00	37.7	6.6	160.8	218.5	15.1	411.8	27.4	18206	13618	62732.2	1451.2	1106.2	502.4	202.0	197.7	-11.9	-46.1	-95.1	265.2
11:26:00	37.4	7.3	160.4	218.0	15.1	413.9	28.5	18056	13618	60007.5	1461.6	1112.1	502.4	202.5	197.7	-8.1	-38.3	-86.8	274.3
11:27:00	36.3	6.9	160.3	219.4	15.1	413.5	27.4	18131	13618	62484.1	1462.3	1112.5	502.3	202.5	197.7	-13.6	-44.6	-97.9	228.8
11:28:00	35.9	7.0	161.0	217.9	15.1	414.2	27.9	18000	13618	62157.6	1451.9	1106.4	502.3	203.0	197.7	-10.1	-40.9	-88.5	243.7
11:29:00	35.9	7.1	161.0	217.4	15.1	413.9	28.0	18431	13646	59926.9	1441.4	1099.8	502.4	202.5	197.7	-12.2	-43.9	-91.4	274.2
11:30:00	36.2	6.9	161.0	219.2	15.1	414.4	27.7	17838	13539	61201.1	1440.6	1099.7	502.4	202.0	197.7	-4.6	-33.3	-81.5	283.5
11:31:00	36.1	6.6	161.0	217.5	15.1	413.3	28.4	18788	13663	63256.3	1429.8	1092.6	502.4	200.5	196.6	-19.6	-55.5	-108.6	226.8
11:32:00	36.0	7.1	159.7	216.9	15.3	413.1	28.7	18481	13646	63277.4	1421.1	1088.5	502.3	200.0	196.6	-18.0	-51.4	-101.3	244.4
11:33:00	35.9	7.0	160.4	219.0	15.3	413.3	27.5	18500	13747	63005.1	1416.8	1087.0	502.4	199.0	196.6	-16.8	-51.4	-100.8	254.8
11:34:00	35.7	6.9	160.7	217.8	14.2	413.3	28.1	18063	13629	61591.3	1419.7	1087.5	502.1	198.5	195.6	-10.2	-40.9	-89.9	267.7
11:35:00	36.1	7.0	160.4	216.8	15.2	413.6	27.4	18681	13899	63392.8	1421.2	1088.5	501.9	197.5	195.6	-23.6	-54.9	-116.0	203.2
11:36:00	35.0	7.1	160.6	218.2	15.2	413.2	28.5	18188	13562	60215.1	1413.9	1084.1	502.0	197.0	194.6	-13.7	-41.9	-95.0	233.3
11:37:00	34.8	7.4	160.1	216.1	15.2	411.5	27.4	18713	13652	64546.8	1413.1	1083.8	501.7	196.0	193.6	-28.4	-65.6	-120.6	190.3
11:38:00	34.7	7.7	160.2	218.5	15.2	414.0	27.4	18000	13657	62093.6	1410.8	1079.4	501.4	195.5	193.6	-10.2	-41.0	-89.3	274.2
11:39:00	35.2	6.3	160.7	217.9	15.2	413.6	28.4	18144	13657	66977.5	1416.1	1083.6	501.1	194.5	192.6	-25.7	-65.8	-110.5	205.0
11:40:00	35.2	6.8	160.7	217.5	15.2	415.4	27.7	18569	13736	64639.3	1409.6	1078.0	500.7	194.0	192.6	-21.1	-53.3	-109.3	236.1
11:41:00	35.5	7.4	160.0	217.1	15.2	410.9	27.4	18381	13629	62668.6	1412.3	1078.6	500.7	194.0	192.6	-16.8	-50.3	-102.9	248.9
11:42:00	35.0	6.8	160.3	217.3	15.2	414.0	27.4	18263	13646	63681.9	1413.7	1080.8	500.3	194.0	192.6	-16.7	-50.5	-100.4	262.3
11:43:00	37.4	7.6	161.2	217.4	15.2	413.9	27.5	18119	13646	62783.1	1424.6	1087.6	499.9	193.5	192.6	-10.9	-41.0	-92.4	272.9
11:44:00	37.2	7.5	160.7	217.9	15.2	413.9	27.4	18344	13629	63654.8	1435.1	1090.9	499.8	193.5	191.6	-14.9	-47.0	-98.9	227.4
11:45:00	36.9	7.4	160.1	216.8	15.2	414.4	28.4	18200	13629	63274.2	1443.2	1096.1	499.2	193.5	191.6	-12.2	-44.1	-92.7	243.1
11:46:00	37.2	6.4	161.0	218.3	15.2	413.7	28.7	18263	13635	62876.7	1445.7	1096.9	499.1	193.5	191.6	-11.2	-41.1	-94.6	276.3
11:47:00	37.5	6.8	160.2	218.3	15.2	410.9	28.4	17875	13635	61577.0	1451.3	1099.5	498.9	194.0	191.6	-7.4	-33.8	-86.5	286.1
11:48:00	37.3	7.3	161.4	218.3	15.2	413.2	28.0	19050	13787	62871.9	1452.8	1100.4	498.4	193.5	191.6	-24.4	-57.5	-117.5	229.4
11:49:00	37.2	6.4	160.0	218.5	15.2	411.3	28.7	18331	13680	62584.7	1450.2	1098.5	498.1	194.0	191.6	-16.9	-50.0	-103.6	246.6
11:50:00	36.9	6.5	160.8	218.9	15.2	412.5	28.7	18819	13708	64315.4	1450.6	1102.2	497.9	195.0	192.7	-16.8	-52.0	-104.9	257.7
11:51:00	36.9	6.9	160.9	218.7	15.2	414.3	27.3	18088	13590	63376.2	1455.4	1104.7	497.6	195.5	192.7	-10.2	-41.8	-93.5	269.3

Test No. 1 - September 14, 2021

	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	$mm\ H_2O$	$mm\ H_2O$	$mm\ H_2O$	$mm\ H_2O$
11:52:00	36.9	7.2	160.6	217.9	15.2	413.9	27.4	18319	13714	66600.3	1457.9	1109.2	497.6	195.5	192.7	-27.7	-63.3	-121.1	180.8
11:53:00	37.2	7.2	160.6	218.3	15.2	410.6	27.5	18394	13607	61267.0	1458.8	1108.6	497.4	196.0	192.7	-12.1	-40.9	-95.0	235.7
11:54:00	37.1	7.1	161.1	217.2	15.2	412.6	28.3	18194	13607	65439.0	1465.7	1113.8	497.4	196.0	192.7	-27.1	-66.3	-119.9	188.8
11:55:00	37.3	6.5	160.0	218.2	15.2	412.5	28.3	17988	13579	61890.1	1467.6	1114.0	497.0	196.5	192.7	-7.5	-36.9	-87.4	276.4
11:56:00	36.8	6.7	160.0	216.6	15.2	411.4	28.7	17931	13579	60750.0	1474.4	1119.1	497.0	196.5	192.7	-6.9	-36.4	-84.1	290.3
11:57:00	36.0	7.2	160.5	217.9	15.2	414.0	28.5	18656	13730	62293.1	1464.4	1112.4	497.0	197.0	192.7	-21.9	-56.8	-113.0	234.1
11:58:00	35.9	7.1	160.2	217.8	15.2	410.5	28.6	18431	13629	62869.7	1448.9	1098.9	496.8	197.5	193.7	-18.3	-54.0	-103.3	249.0
11:59:00	35.1	7.1	160.1	218.6	15.2	410.8	27.7	18575	13635	63052.1	1432.7	1089.6	496.8	197.0	193.7	-15.5	-45.3	-98.4	260.6
12:00:00	35.2	8.0	160.8	217.2	15.2	413.5	28.7	18144	13624	62878.8	1429.7	1088.3	496.6	196.5	193.7	-13.1	-44.8	-93.6	269.4
12:01:00	35.6	7.3	160.1	218.3	15.2	411.7	27.4	18669	13635	64123.5	1423.7	1084.1	496.8	195.5	193.7	-19.3	-53.9	-104.4	223.9
12:02:00	35.4	7.7	160.1	218.9	15.2	413.3	27.4	18263	13629	63160.1	1423.3	1084.6	496.6	195.5	192.6	-14.3	-45.9	-95.1	237.1
12:03:00	35.4	8.0	159.4	217.7	15.2	410.9	28.5	18413	13736	61729.3	1417.4	1083.1	496.2	194.5	192.6	-13.0	-44.0	-95.7	266.9
12:04:00	35.3	7.8	157.9	218.6	15.2	410.9	28.8	18025	13635	62696.3	1420.1	1085.1	496.1	194.0	192.6	-10.0	-38.9	-88.6	279.0
12:05:00	35.3	8.4	155.7	217.4	15.2	412.6	28.5	18869	13775	64719.3	1419.8	1084.5	496.0	193.0	191.6	-32.1	-73.6	-123.1	214.5
12:06:00	35.3	8.1	158.6	216.9	15.2	410.9	27.4	18406	13669	63309.3	1414.2	1078.4	495.8	193.0	191.6	-22.0	-56.0	-108.6	241.3
12:07:00	35.9	7.8	158.0	218.4	15.2	412.7	28.5	18838	13770	62571.9	1412.6	1078.2	495.6	193.0	191.6	-23.5	-56.4	-118.2	237.1
12:08:00	36.0	8.2	159.2	217.4	14.8	413.7	28.2	18219	13562	62437.5	1417.2	1080.9	495.3	192.5	191.6	-12.9	-44.4	-94.1	263.9
12:09:00	35.9	7.7	160.1	218.9	14.8	413.3	28.4	18500	13663	67399.1	1422.8	1084.9	495.1	192.0	190.6	-33.3	-71.5	-127.1	177.8
12:10:00	36.2	8.3	157.7	217.6	14.8	413.9	28.3	18319	13663	64248.0	1417.7	1081.1	494.9	192.0	190.6	-16.7	-48.4	-100.1	232.8
12:11:00	36.4	7.3	160.9	217.8	14.8	411.9	27.6	18325	13641	67633.5	1424.1	1084.7	494.7	191.5	189.6	-26.4	-66.3	-112.7	202.3
12:12:00	36.6	7.1	161.0	218.0	14.8	410.8	27.4	18244	13624	62672.7	1422.2	1084.6	494.1	191.5	189.6	-12.2	-44.0	-91.5	278.1
12:13:00	37.0	7.7	159.2	218.2	14.8	413.1	27.8	18038	13523	62499.8	1427.8	1089.8	493.9	191.0	189.6	-11.1	-40.0	-88.8	291.7
12:14:00	37.5	8.2	160.0	217.7	15.3	413.3	28.5	18688	13770	63928.0	1419.7	1086.9	493.7	191.0	189.6	-24.2	-57.6	-114.2	235.0
12:15:00	39.1	7.2	159.4	216.6	15.3	414.4	28.5	18306	13669	64101.8	1427.2	1091.6	493.3	191.5	189.6	-19.1	-53.8	-105.9	250.5
12:16:00	39.3	8.2	159.4	218.7	15.3	413.3	28.4	18325	13669	63033.5	1440.9	1101.5	493.3	192.0	189.6	-14.6	-45.9	-100.5	262.5
12:17:00	39.3	8.4	158.3	218.3	15.3	412.2	28.6	18081	13562	63295.4	1455.6	1109.9	492.9	192.5	189.6	-11.0	-42.3	-93.6	275.8
12:18:00	38.6	8.0	158.6	218.3	15.3	411.2	27.4	18394	13601	63251.0	1459.4	1110.8	492.7	193.5	190.7	-17.8	-52.6	-102.5	223.0
12:19:00	38.3	6.6	158.1	217.4	15.3	413.3	27.6	18344	13601	60838.8	1464.7	1111.4	492.6	194.0	190.7	-10.9	-41.6	-93.5	239.5
12:20:00	37.7	7.6	158.0	217.5	15.3	410.9	27.9	18350	13601	60827.1	1464.9	1111.7	492.5	194.5	190.7	-12.0	-44.9	-95.7	267.4
12:21:00	38.7	8.2	158.7	220.4	15.3	411.1	27.8	17950	13596	60752.2	1471.8	1115.2	492.3	194.5	190.7	-7.3	-36.5	-86.6	283.2
12:22:00	38.3	7.7	159.1	219.6	15.3	412.3	27.4	18850	13708	64805.7	1472.7	1118.5	492.2	195.0	191.7	-25.1	-61.8	-119.6	202.6
12:23:00	38.0	8.4	158.5	220.2	15.2	414.4	27.5	18638	13601	62603.7	1466.3	1112.6	492.1	195.5	191.7	-18.4	-54.9	-107.7	239.4
12:24:00	38.2	7.3	158.3	218.8	15.2	410.7	27.5	18513	13697	65076.0	1468.6	1111.6	492.1	196.5	192.7	-28.5	-64.1	-123.2	195.6
12:25:00	37.8	8.0	158.7	220.1	15.2	412.0	28.7	18200	13596	62226.9	1469.2	1111.0	492.4	197.0	192.7	-11.6	-42.9	-93.4	263.6
12:26:00	37.7	7.6	158.8	217.4	15.2	411.2	27.4	18019	13579	64489.7	1472.3	1116.8	492.5	197.0	193.8	-25.4	-66.5	-116.4	176.8
12:27:00	37.8	6.9	158.4	218.0	15.2	411.2	28.7	18200	13579	63717.7	1467.7	1113.3	492.5	197.5	193.8	-13.6	-49.1	-98.6	231.0
12:28:00	37.8	7.7	160.2	216.5	15.2	411.2	27.9	18069	13579	60942.3	1474.1	1115.1	492.6	197.5	193.8	-10.3	-42.9	-93.7	244.3
12:29:00	37.6	7.7	160.4	216.7	15.2	411.4	28.8	18025	13478	61333.4	1475.3	1116.3	492.6	198.0	193.8	-8.7	-40.4	-89.6	271.9
12:30:00	37.9	8.1	159.8	217.2	15.2	411.2	28.7	17831	13444	60719.7	1479.9	1121.7	492.6	198.5	193.8	-6.1	-34.3	-83.5	285.6
12:31:00	37.1	7.7	160.4	219.6	15.2	413.5	27.5	18538	13719	62641.3	1471.1	1113.5	492.9	198.5	193.8	-20.0	-54.5	-110.7	226.5
12:32:00	37.2	7.4	160.3	218.4	15.2	413.6	28.7	18238	13590	62641.9	1467.2	1111.2	492.9	199.0	194.9	-15.7	-49.8	-102.2	243.1
12:33:00	37.3	8.2	160.6	219.6	15.2	412.8	27.5	18269	13618	63971.1	1467.3	1109.6	493.1	199.5	194.9	-11.5	-44.4	-94.6	254.8
12:34:00	37.0	7.5	160.6	218.0	15.2	411.3	28.8	17925	13500	63322.6	1470.8	1113.2	492.9	199.5	195.9	-8.7	-39.1	-90.1	267.5
12:35:00	37.1	8.1	160.9	218.3	15.2	413.7	27.9	18369	13635	61540.1	1469.2	1109.7	493.2	199.5	195.9	-15.1	-46.9	-100.7	220.5
12:36:00	37.5	7.5	161.5	218.1	15.2	414.3	27.8	18156	13534	61750.4	1468.1	1110.5	493.2	200.0	195.9	-10.4	-39.9	-92.2	236.3
12:37:00	37.0	7.4	164.7	217.4	15.2	412.4	28.2	18325	13556	61282.7	1466.1	1110.9	493.5	199.5	195.9	-12.1	-43.3	-96.1	268.1
12:38:00	37.4	7.5	162.8	218.6	15.2	412.0	27.6	17763	13545	61025.5	1473.6	1113.5	493.8	200.0	195.9	-5.0	-33.8	-83.5	282.2
12:39:00	37.3	7.2	161.4	218.2	15.2	413.3	28.7	18606	13753	64138.3	1474.3	1115.6	493.8	199.5	195.9	-27.2	-65.6	-122.4	194.1
12:40:00	37.3	7.0	161.7	218.5	15.2	413.3	28.4	18331	13551	63493.7	1464.4	1108.2	494.0	199.5	195.9	-16.5	-50.6	-104.8	237.6
12:41:00	36.6	6.8	160.8	217.5	15.2	410.9	27.9	18438	13669	65155.0	1458.1	1103.8	493.7	199.5	195.9	-26.1	-65.9	-117.4	197.5
12:42:00	36.8	7.6	161.3	218.0	15.2	412.9	28.7	18175	13551	62878.1	1449.1	1100.9	494.3	199.5	195.9	-11.1	-41.4	-94.4	262.9
12:43:00	37.0	7.8	160.0	217.6	15.2	410.3	27.5	18063	13551	67261.3	1448.3	1101.1	494.2	199.0	195.9	-21.3	-62.3	-104.6	201.4

Test No. 1 - September 14, 2021

	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
12:44:00	36.9	8.4	160.1	217.3	15.2	410.8	27.4	18388	13669	62002.1	1440.1	1093.8	494.2	198.5	194.8	-15.1	-46.5	-98.7	229.1
12:45:00	37.3	7.5	161.4	217.7	15.2	411.4	27.7	18156	13652	64125.0	1439.7	1093.7	494.2	198.0	194.8	-13.0	-46.1	-94.9	245.9
12:46:00	37.7	7.4	160.0	219.6	15.2	414.3	28.7	18181	13652	63206.1	1433.6	1092.3	493.9	197.5	194.8	-12.0	-41.4	-93.8	274.4
12:47:00	37.3	7.6	160.3	218.3	15.2	412.8	28.6	17956	13551	61726.9	1440.6	1095.6	494.0	196.5	193.8	-10.2	-41.1	-88.7	287.5
12:48:00	37.0	7.5	160.9	216.4	15.2	413.3	27.4	18650	13787	62982.7	1433.2	1089.5	493.9	196.0	193.8	-23.5	-59.5	-112.7	229.4
12:49:00	36.9	7.8	160.2	217.6	15.2	414.2	27.4	18263	13663	63083.2	1428.8	1086.2	493.8	196.0	193.8	-19.4	-48.8	-106.1	245.0
12:50:00	37.0	7.5	159.8	217.2	15.2	413.3	28.1	18350	13663	62314.3	1421.8	1083.4	493.6	195.5	193.8	-17.5	-48.4	-103.8	258.6
12:51:00	37.1	7.6	160.7	218.0	15.2	413.7	28.2	18150	13534	63696.0	1424.6	1084.6	493.4	195.0	192.8	-13.5	-45.6	-94.5	271.5
12:52:00	36.9	8.5	159.6	218.0	15.2	414.2	27.4	18631	13764	64027.9	1424.9	1084.6	493.3	194.5	192.8	-20.5	-55.0	-105.8	218.9
12:53:00	37.9	8.0	161.0	219.2	15.2	414.0	27.6	18356	13635	64119.0	1429.1	1085.7	493.1	194.0	191.8	-16.9	-52.5	-99.0	236.7
12:54:00	37.5	8.0	159.0	218.0	15.2	414.5	27.6	18844	13747	63093.0	1429.1	1086.8	492.9	194.0	191.8	-18.1	-47.4	-104.0	262.1
12:55:00	37.8	7.2	160.5	218.4	15.2	413.3	27.6	18163	13539	63692.2	1433.4	1088.1	492.6	193.5	191.8	-13.0	-42.9	-91.7	280.0
12:56:00	37.5	7.0	159.4	217.0	15.2	413.0	28.4	18788	13803	68438.4	1434.7	1090.7	492.5	193.0	190.8	-35.3	-75.6	-133.9	173.8
12:57:00	37.8	7.6	161.0	217.9	15.2	416.0	28.7	18538	13674	65028.1	1427.3	1083.4	492.2	193.0	190.8	-22.5	-55.0	-108.8	234.8
12:58:00	38.5	8.0	160.1	218.0	15.2	415.0	28.3	18719	13674	65669.3	1425.2	1084.5	492.0	193.5	190.8	-29.5	-64.6	-119.2	196.1
12:59:00	39.0	7.4	160.4	219.3	15.2	414.4	28.1	18331	13562	63460.7	1430.7	1086.4	491.7	193.5	190.8	-16.6	-44.5	-99.3	265.6
14:33:00	41.0	8.7	158.1	218.2	14.9	410.1	27.5	18088	13500	64184.1	1438.7	1098.1	483.9	191.5	189.0	-17.0	-41.1	-101.6	262.0
14:34:00	39.9	10.7	158.6	217.6	14.9	410.3	27.4	18106	13517	68378.2	1443.9	1102.8	484.0	191.0	189.0	-32.3	-64.9	-122.4	176.1
14:35:00	39.8	10.2	158.0	217.7	14.9	410.4	27.3	18231	13607	65360.8	1434.3	1097.1	484.0	191.5	189.0	-16.2	-47.9	-99.3	225.4
14:36:00	39.5	9.8	159.4	217.8	14.6	410.1	27.4	18006	13405	62438.2	1433.8	1098.1	483.9	191.5	189.0	-12.9	-45.1	-91.7	239.3
14:37:00	40.9	9.6	160.0	219.3	14.6	409.1	28.7	17981	13545	63414.5	1432.8	1097.9	483.8	191.5	189.0	-12.6	-42.3	-92.6	267.8
14:38:00	40.9	9.7	157.9	218.4	14.6	410.0	28.6	17956	13421	62247.6	1441.9	1104.3	483.9	191.0	189.0	-9.7	-36.0	-87.4	281.0
14:39:00	39.4	9.7	159.2	217.3	14.6	411.8	27.7	18506	13539	62974.2	1436.3	1099.6	483.7	191.0	189.0	-21.3	-52.5	-108.8	225.0
14:40:00	39.5	9.9	158.9	218.2	14.6	410.2	28.4	18175	13433	64065.7	1429.9	1096.2	483.7	191.5	189.0	-19.8	-53.6	-104.3	240.0
14:41:00	39.3	10.0	158.9	217.5	14.6	408.6	28.7	18319	13534	62706.3	1429.6	1093.9	483.8	191.5	189.0	-14.6	-43.3	-96.0	250.8
14:42:00	40.1	9.6	158.9	218.0	14.6	407.5	27.5	17969	13534	63994.6	1432.4	1098.5	483.7	191.5	189.0	-13.3	-42.1	-96.1	265.9
14:43:00	39.5	9.6	159.2	217.6	14.6	408.8	27.4	18444	13534	64220.5	1434.1	1097.8	483.8	191.0	189.0	-17.8	-48.0	-102.6	218.8
14:44:00	41.4	9.8	158.7	218.1	14.6	408.4	28.3	17944	13421	63751.1	1434.1	1102.2	483.4	191.0	189.0	-14.7	-38.5	-97.1	234.9
14:45:00	39.9	9.1	158.6	217.2	14.6	410.3	28.2	18306	13556	64012.4	1435.2	1101.8	483.6	191.0	189.0	-16.4	-44.1	-99.7	266.6
14:46:00	39.9	10.0	157.0	218.6	15.6	408.7	28.6	17938	13455	63976.5	1437.6	1105.4	483.5	191.0	189.0	-12.3	-38.8	-93.9	280.1
14:47:00	41.2	10.5	158.3	218.3	14.4	411.1	28.1	18569	13567	65205.5	1438.4	1107.4	483.4	191.0	189.0	-29.9	-67.5	-124.9	191.4
14:48:00	41.3	9.7	157.9	218.7	15.5	409.1	28.1	18288	13472	64749.1	1438.3	1104.3	483.4	191.0	189.0	-21.7	-53.0	-107.5	232.9
14:49:00	41.2	9.3	158.5	216.8	15.4	409.2	27.9	18338	13494	67049.9	1436.8	1104.1	483.3	191.5	189.0	-31.5	-65.9	-122.4	191.5
14:50:00	41.1	9.6	158.3	217.4	15.4	410.2	27.8	18094	13405	64548.3	1437.7	1103.1	483.2	192.0	189.0	-15.8	-40.9	-96.0	259.3
14:51:00	40.9	10.3	159.3	217.4	15.4	409.9	28.7	17856	13405	67646.7	1447.1	1108.8	483.0	192.0	189.0	-21.7	-59.4	-105.4	201.4
14:52:00	41.1	10.3	159.6	219.0	15.4	410.0	28.8	18144	13416	64447.4	1446.2	1108.7	483.2	192.5	189.0	-15.2	-43.9	-98.0	226.4
14:53:00	41.4	9.6	158.6	216.2	15.4	409.4	27.7	18150	13410	62948.8	1453.2	1111.7	483.2	192.5	189.0	-10.7	-39.8	-91.9	239.3
14:54:00	40.2	9.8	160.1	218.9	15.5	409.3	27.5	18063	13326	61138.7	1453.8	1109.8	483.0	193.0	189.0	-10.3	-39.4	-89.7	269.4
14:55:00	41.0	9.7	160.0	219.0	15.5	410.0	28.6	17756	13315	63371.0	1461.2	1112.0	483.5	193.5	190.1	-8.4	-35.1	-84.4	284.6
14:56:00	40.2	10.0	158.7	217.7	14.4	411.2	28.6	18363	13517	64798.2	1458.8	1107.7	483.4	193.5	190.1	-23.1	-54.9	-110.3	222.8
14:57:00	41.2	9.6	159.2	217.6	14.4	412.2	28.6	18088	13416	63717.7	1458.4	1106.7	483.1	194.0	190.1	-16.9	-47.3	-101.1	238.8
14:58:00	40.0	9.9	159.2	217.5	14.4	413.0	28.4	18113	13427	64865.4	1458.7	1106.0	483.6	194.5	191.2	-15.1	-41.1	-102.2	252.1
14:59:00	39.8	9.9	153.2	219.1	15.5	410.9	27.9	18094	13427	64727.7	1464.6	1106.6	483.5	194.0	191.2	-12.5	-43.0	-93.4	263.8
15:00:00	39.9	9.0	148.7	218.7	14.3	410.3	28.5	18494	13556	64856.7	1465.8	1107.3	483.6	193.5	191.2	-21.4	-45.4	-108.2	213.0
15:01:00	40.3	9.5	153.9	220.0	15.3	411.2	27.6	18100	13433	63845.4	1462.9	1107.8	483.7	193.0	190.1	-15.4	-42.9	-100.7	231.8
15:02:00	40.1	10.0	152.9	219.1	15.3	411.0	28.4	18794	13556	63710.0	1465.3	1107.3	484.0	192.5	190.1	-16.6	-43.3	-100.5	256.9
15:03:00	41.2	9.7	154.8	218.5	15.3	411.5	28.7	17819	13455	64734.1	1465.8	1109.5	484.0	192.0	190.1	-8.6	-34.4	-89.5	273.1
15:04:00	41.7	10.0	154.3	217.2	15.3	410.7	28.0	18569	13573	68089.7	1468.1	1112.9	483.9	191.5	189.1	-34.9	-70.4	-131.3	168.6
15:05:00	40.3	9.9	155.7	218.3	15.3	413.7	28.5	18431	13562	63803.1	1463.8	1107.9	483.9	192.0	189.1	-18.8	-51.1	-106.3	228.2
15:06:00	39.9	9.8	155.6	218.3	15.3	410.3	28.4	18188	13438	67656.1	1464.3	1109.3	483.8	192.0	189.1	-25.9	-58.5	-116.2	191.4
15:07:00	41.0	9.6	155.4	218.9	15.3	412.1	27.6	18150	13461	63854.3	1462.6	1110.2	483.8	192.5	189.1	-12.9	-46.1	-94.5	256.7
15:08:00	40.1	9.4	155.4	218.6	15.3	412.1	27.7	17931	13348	62863.5	1467.3	1112.0	483.7	192.5	189.1	-12.1	-43.4	-90.9	267.6

Test No. 1 - September 14, 2021

	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	$mm\ H_2O$	$mm\ H_2O$	$mm\ H_2O$	$mm\ H_2O$
15:09:00	41.1	9.5	155.4	219.1	15.3	412.1	27.4	18269	13461	63878.6	1468.6	1110.0	483.6	192.5	189.1	-16.0	-47.0	-99.0	222.4
15:10:00	39.4	9.8	154.6	216.9	15.3	411.9	27.5	17988	13466	63355.7	1472.8	1110.7	483.7	192.5	189.1	-16.5	-43.6	-97.8	239.3
15:11:00	41.2	9.8	153.0	219.1	15.3	410.8	28.7	18069	13483	63196.0	1467.8	1107.9	483.5	192.5	189.1	-13.2	-36.6	-96.4	271.4
15:12:00	40.9	9.9	156.3	217.4	15.3	411.0	27.9	17769	13287	61476.7	1476.2	1111.7	483.4	192.0	189.1	-8.5	-34.1	-88.4	284.4
15:13:00	41.1	9.6	154.0	217.8	15.3	412.2	28.4	18350	13618	64388.6	1475.8	1111.4	483.5	191.5	189.1	-23.0	-58.4	-114.1	225.3
15:14:00	39.7	9.9	155.1	217.8	15.3	411.5	28.7	18044	13489	63144.4	1471.6	1112.6	483.2	192.0	189.1	-17.5	-49.6	-104.9	239.8
15:15:00	40.7	9.8	157.0	219.1	15.3	410.4	27.5	18294	13483	64841.8	1469.7	1110.6	483.7	192.5	190.2	-16.7	-47.5	-98.0	252.9
15:16:00	41.0	10.0	156.2	220.6	15.3	410.1	27.9	18031	13500	62224.4	1475.2	1113.1	483.6	192.5	190.2	-9.7	-34.8	-93.2	261.8
15:17:00	39.9	9.9	156.7	218.5	15.3	411.2	27.8	18338	13601	64928.2	1475.3	1113.0	483.3	192.5	190.2	-20.0	-49.0	-110.0	213.9
15:18:00	41.1	9.9	157.3	219.5	15.3	409.4	27.7	18075	13494	63266.0	1475.2	1112.1	483.4	192.5	190.2	-12.5	-41.8	-98.7	233.1
15:19:00	39.2	9.3	156.6	218.3	15.3	409.0	28.6	18550	13472	65552.2	1475.1	1111.3	483.5	192.5	190.2	-21.6	-46.0	-118.7	236.1
15:20:00	40.5	10.0	156.3	218.2	15.3	409.1	28.7	18031	13433	64490.4	1478.8	1110.8	483.4	193.0	190.2	-12.7	-39.6	-92.4	274.3
15:21:00	39.8	9.7	156.2	218.1	15.3	407.3	28.7	18213	13433	67412.8	1486.3	1113.4	483.4	192.5	189.1	-32.4	-68.6	-129.2	168.3
15:22:00	39.6	9.5	156.8	219.2	15.3	410.4	28.6	18319	13528	65467.4	1476.9	1108.5	483.6	192.5	189.1	-18.6	-50.4	-105.5	232.3
15:23:00	40.9	9.2	157.5	219.3	15.3	409.6	27.4	18200	13511	68152.5	1481.8	1111.6	483.4	193.0	190.2	-21.3	-56.9	-108.8	206.2
15:24:00	40.8	9.5	156.4	219.0	15.3	410.9	28.6	18081	13393	62337.1	1481.1	1114.2	483.7	193.0	190.2	-13.7	-43.4	-96.3	256.4
15:25:00	39.1	9.8	157.8	219.0	15.3	410.9	28.6	17981	13405	64166.1	1486.7	1118.0	483.6	193.5	190.2	-13.0	-40.3	-95.2	268.7
15:26:00	40.0	9.8	154.7	217.9	15.3	411.0	27.5	18281	13506	63189.2	1481.6	1114.7	483.8	193.5	190.2	-15.8	-50.0	-100.8	222.7
15:27:00	41.3	9.6	155.8	218.2	15.3	409.4	27.7	17938	13506	62368.2	1482.3	1116.8	483.8	193.5	190.2	-13.7	-41.8	-97.2	238.5
15:28:00	41.5	9.4	157.4	218.6	15.3	409.5	27.5	17969	13427	65045.1	1480.3	1118.5	483.8	193.5	190.2	-12.0	-36.8	-94.8	267.0
15:29:00	40.9	9.7	157.4	219.6	15.3	408.5	27.9	17763	13433	64119.9	1484.9	1120.8	483.7	193.5	190.2	-8.3	-36.0	-85.7	279.6
15:30:00	41.1	10.2	155.0	219.2	15.3	410.0	28.4	18581	13573	64073.5	1482.6	1117.6	483.8	193.5	190.2	-24.7	-55.3	-117.2	219.8
15:31:00	40.7	9.3	156.7	219.0	15.3	409.7	28.3	18263	13449	64678.1	1478.7	1117.1	483.8	194.0	190.2	-20.6	-47.9	-106.1	233.9
15:32:00	40.4	8.8	156.0	219.4	15.3	411.6	28.4	18306	13556	63646.4	1474.1	1115.4	483.8	194.5	191.2	-18.7	-45.5	-104.3	248.4
15:33:00	40.1	9.6	156.9	216.7	13.3	409.7	28.0	18000	13455	65342.0	1474.8	1116.6	484.2	194.5	191.2	-11.3	-40.5	-94.0	264.0
15:34:00	40.6	10.2	157.7	218.6	14.7	410.3	28.0	18563	13545	64394.8	1475.4	1116.9	484.1	194.5	191.2	-23.0	-54.1	-112.7	210.3
15:35:00	40.0	9.6	158.1	218.1	14.7	411.5	28.5	18050	13433	63365.2	1472.3	1114.9	484.5	195.0	191.2	-13.2	-46.1	-95.9	230.6
15:36:00	40.3	9.5	157.7	217.2	14.7	410.9	27.4	18575	13539	66501.6	1475.3	1115.7	484.4	194.5	191.2	-29.6	-62.5	-125.3	187.4
15:37:00	40.6	9.2	157.2	218.3	14.7	410.6	28.2	17644	13337	63705.9	1477.2	1116.5	484.6	194.5	191.2	-8.7	-37.9	-89.4	272.7
15:38:00	40.6	10.1	157.5	217.8	14.7	409.1	27.4	18013	13466	68586.7	1480.6	1119.9	484.7	194.5	191.2	-29.5	-62.0	-122.3	172.9
15:39:00	40.7	10.3	157.8	219.2	14.7	411.1	28.2	18175	13567	64537.3	1470.2	1116.7	484.7	194.5	191.2	-18.4	-51.0	-106.8	229.6
15:40:00	39.8	9.7	156.4	217.6	14.7	409.4	28.3	18300	13449	63614.2	1469.4	1116.9	484.7	194.5	191.2	-16.0	-44.3	-101.9	245.1
15:41:00	40.1	9.7	157.9	217.9	14.7	410.0	28.8	17875	13438	64508.3	1461.8	1114.9	484.8	195.0	191.2	-13.9	-41.5	-98.8	257.8
15:42:00	40.1	10.0	159.1	218.2	14.7	410.5	28.5	17900	13545	63453.5	1466.2	1118.2	484.7	194.5	191.2	-11.1	-38.5	-89.6	271.4
15:43:00	40.1	10.3	159.2	219.4	14.7	410.6	28.7	18138	13444	64211.9	1461.6	1116.1	484.8	194.5	191.2	-15.2	-37.4	-102.5	222.4
15:44:00	40.0	10.0	158.1	217.7	14.7	408.3	28.7	17788	13444	62819.7	1459.2	1117.0	484.8	194.5	191.2	-12.5	-41.1	-93.6	238.1
15:45:00	39.6	9.6	158.2	218.5	14.7	408.3	27.9	18013	13438	63429.8	1460.6	1116.0	485.0	194.5	191.2	-13.2	-43.3	-95.2	266.8
15:46:00	39.9	9.8	159.0	219.8	14.7	407.0	27.7	17744	13332	62409.3	1461.4	1119.3	485.2	194.5	191.2	-9.3	-24.3	-89.6	281.6
15:47:00	39.9	10.0	161.4	217.6	14.7	407.7	27.7	18494	13663	64757.8	1461.9	1117.1	485.1	194.5	191.2	-23.2	-58.0	-113.1	216.4
15:48:00	39.7	9.7	158.5	218.9	14.7	410.6	27.3	18263	13449	64588.2	1459.2	1114.1	485.1	194.5	191.2	-19.8	-51.3	-106.7	234.8
15:49:00	39.9	10.0	159.1	217.0	14.7	409.7	28.0	18400	13562	64050.1	1457.2	1113.3	485.2	194.5	191.2	-16.6	-46.0	-102.3	247.3
15:50:00	39.9	10.4	159.4	218.0	14.7	409.2	28.4	18094	13332	63180.3	1458.8	1114.5	485.2	195.0	191.2	-12.7	-43.5	-92.7	261.4
15:51:00	39.5	10.1	156.5	217.3	14.7	408.9	28.6	18581	13438	64860.0	1458.8	1115.1	485.2	194.5	191.2	-24.1	-55.0	-116.5	193.9
15:52:00	39.9	9.4	159.0	220.5	14.7	410.9	28.4	18088	13528	65438.8	1455.6	1113.4	485.0	194.5	191.2	-13.7	-32.8	-101.0	228.8
15:53:00	39.9	10.1	156.9	218.3	14.7	411.5	28.7	18181	13421	68303.6	1459.3	1114.8	485.4	194.5	191.2	-29.9	-68.6	-122.0	186.3
15:54:00	40.3	9.9	157.9	218.1	14.7	411.0	28.5	17825	13405	63184.2	1460.8	1114.9	485.4	194.5	191.2	-10.9	-36.3	-91.6	271.0
15:55:00	40.1	9.1	159.8	218.6	14.7	411.0	28.2	17606	13298	66901.9	1465.2	1118.8	485.2	194.0	191.2	-23.3	-66.5	-108.5	203.9
15:56:00	40.6	9.8	158.6	219.2	14.7	406.8	27.9	18438	13511	64873.4	1457.9	1113.6	485.5	194.5	191.2	-21.2	-50.6	-108.0	228.9
15:57:00	40.3	10.4	158.9	218.9	14.7	409.9	27.4	18094	13399	64056.6	1457.2	1113.8	485.5	195.0	191.2	-15.9	-50.4	-100.8	240.4
15:58:00	39.6	9.3	157.1	216.6	14.7	407.0	28.6	18113	13511	63557.6	1457.3	1109.7	485.3	195.0	191.2	-13.9	-43.3	-96.3	256.8
15:59:00	39.8	10.5	158.4	218.7	14.7	410.8	27.6	17931	13399	63415.9	1460.8	1110.1	485.5	194.5	191.2	-11.3	-42.9	-91.1	269.1
16:00:00	40.0	9.6	157.3	218.1	14.7	410.6	27.5	18081	13416	63713.7	1457.6	1109.0	485.6	194.5	191.2	-16.4	-46.1	-102.7	221.1

Test No. 1 - September 14, 2021

	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
16:01:00	40.4	10.0	158.0	219.6	14.7	409.4	27.3	18000	13416	62252.6	1459.8	1111.3	485.4	194.5	191.2	-12.1	-37.9	-93.7	237.9
16:02:00	39.9	9.6	159.5	217.8	14.7	408.8	27.4	18006	13410	62926.8	1460.9	1110.8	485.6	194.0	191.2	-12.3	-42.9	-92.8	269.6
16:03:00	40.4	10.1	158.9	220.4	14.7	408.5	27.6	17956	13410	64160.8	1465.8	1113.3	485.6	194.0	191.2	-8.4	-37.3	-85.5	280.5
16:04:00	39.5	9.6	158.1	216.8	14.7	408.8	28.7	18731	13523	63414.6	1461.4	1112.0	485.6	193.5	191.2	-24.1	-56.8	-111.6	217.3
16:05:00	39.9	9.8	159.1	217.7	14.7	408.5	28.5	18088	13523	65105.8	1455.6	1109.1	485.6	193.5	191.2	-17.5	-47.3	-105.1	236.8
16:06:00	39.2	10.1	158.3	217.9	14.7	408.3	27.6	18456	13523	65120.8	1453.3	1109.0	485.7	194.0	191.2	-20.4	-46.5	-107.8	247.9
16:07:00	39.2	9.9	157.1	218.2	14.7	407.6	27.4	18063	13416	63355.1	1454.6	1110.4	485.5	194.0	191.2	-12.5	-37.9	-92.4	261.9
16:08:00	40.0	9.7	158.7	219.4	14.7	409.0	28.4	18375	13551	68183.0	1455.8	1112.0	485.5	193.5	191.2	-30.3	-68.4	-123.0	173.8
16:09:00	40.6	9.9	157.6	220.1	14.7	408.8	27.6	18244	13449	63436.3	1456.2	1110.3	485.6	193.5	191.2	-15.1	-42.9	-98.5	229.8
16:10:00	40.1	10.1	159.0	217.4	14.7	407.4	27.5	17850	13551	66756.1	1461.1	1112.3	485.3	193.5	191.2	-28.8	-62.9	-119.0	188.1
16:11:00	40.6	9.4	154.8	216.8	14.7	410.9	28.6	18013	13427	63207.9	1459.2	1110.9	485.4	193.5	191.2	-10.2	-36.9	-88.7	273.4
16:12:00	40.1	9.5	157.8	218.5	14.7	408.5	27.7	17794	13427	62443.6	1464.4	1113.0	485.5	193.5	190.1	-8.5	-33.4	-88.9	284.1
16:13:00	41.5	10.2	157.3	218.4	14.7	410.6	28.5	18225	13534	65020.7	1458.9	1107.9	485.5	193.5	190.1	-19.7	-50.3	-106.6	227.3
16:14:00	40.6	9.7	156.7	218.0	14.7	410.0	28.6	18188	13421	62368.4	1450.8	1106.8	485.5	193.5	190.1	-17.4	-46.3	-101.9	243.3
16:15:00	39.4	9.9	157.1	219.5	14.7	409.9	27.4	18088	13433	65554.3	1452.4	1107.1	485.5	194.0	191.2	-17.1	-50.1	-99.4	255.2
16:16:00	39.8	9.8	164.7	219.8	14.7	408.8	27.5	17875	13433	65035.4	1454.8	1109.9	485.4	194.0	191.2	-10.5	-38.9	-91.1	268.3
16:17:00	42.1	11.3	160.3	225.2	14.7	408.3	27.9	18356	13449	63684.7	1449.7	1106.1	485.4	194.0	191.2	-16.3	-45.8	-102.4	219.3
16:18:00	40.7	9.8	159.5	218.7	14.7	408.4	28.6	18181	13449	63820.5	1456.9	1114.5	485.2	194.0	191.2	-13.7	-39.4	-95.1	235.3
16:19:00	40.4	9.4	156.3	217.1	14.7	407.8	27.6	18275	13506	64413.3	1456.3	1112.6	485.4	194.0	191.2	-15.4	-43.9	-95.5	266.1
16:20:00	40.3	9.9	155.1	217.8	14.7	407.3	28.4	17844	13405	62764.4	1456.9	1114.0	485.3	194.5	191.2	-10.5	-33.9	-88.8	276.8
16:21:00	39.8	9.4	158.2	217.3	14.7	408.6	27.4	18675	13523	63966.0	1456.9	1112.5	485.3	194.0	191.2	-28.7	-66.4	-118.7	210.3
16:22:00	39.8	9.5	153.6	218.7	14.7	408.7	27.5	18338	13523	64998.1	1450.4	1108.4	485.5	194.5	191.2	-21.9	-53.8	-107.9	234.1
16:23:00	40.2	10.2	156.1	218.6	14.7	408.6	28.7	18600	13635	66205.7	1449.2	1108.8	485.4	194.5	191.2	-26.3	-54.3	-114.6	229.4
16:24:00	40.8	10.1	156.0	219.1	14.7	407.2	28.0	17969	13506	63512.1	1450.1	1110.1	485.4	194.5	191.2	-12.4	-41.1	-93.5	260.5
16:25:00	40.4	9.8	156.3	219.3	14.7	407.4	28.7	18275	13517	67621.8	1455.2	1114.6	485.5	194.0	191.2	-27.1	-63.1	-118.1	174.9
16:26:00	39.6	9.9	155.3	218.5	14.7	410.0	28.6	18100	13427	64226.7	1453.6	1112.2	485.4	194.0	191.2	-15.9	-44.1	-98.1	225.6
16:27:00	40.4	9.1	156.3	217.9	14.7	408.0	27.4	17950	13427	66768.3	1456.6	1114.5	485.5	193.5	191.2	-22.8	-66.0	-105.9	200.7
16:28:00	40.4	9.7	154.7	217.1	14.7	407.2	27.5	18094	13405	63183.6	1456.9	1114.7	485.5	193.5	191.2	-10.2	-38.3	-88.4	271.4
16:29:00	40.3	10.3	160.7	218.6	14.7	407.3	27.4	17744	13376	62816.8	1459.9	1119.0	485.5	193.5	191.2	-6.0	-29.0	-82.2	285.1
16:30:00	40.0	9.4	153.6	218.8	14.7	407.3	27.8	18413	13584	63950.9	1454.7	1114.9	485.4	193.0	190.1	-23.5	-57.3	-107.4	225.0
16:31:00	39.0	9.3	154.0	218.3	14.7	410.0	28.8	18175	13483	63255.2	1453.3	1112.6	485.2	193.5	190.1	-17.4	-48.4	-100.4	239.6
16:32:00	39.1	10.0	151.8	219.2	14.7	410.3	28.4	18256	13489	63767.9	1444.7	1108.9	485.2	193.5	190.1	-16.7	-48.4	-97.1	252.1
16:33:00	39.0	9.4	154.1	218.6	14.7	409.5	27.6	17988	13455	62950.1	1445.8	1108.6	485.0	193.0	190.1	-13.4	-44.1	-93.3	263.0
Max	42.1	11.3	164.7	225.2	15.6	416.0	28.8	19050	13899	68586.7	1486.7	1121.7	504.0	203.0	197.7	-4.6	-24.3	-81.5	291.7
Min	34.7	6.1	148.7	216.1	13.3	406.8	27.3	17606	13287	59926.9	1409.6	1078.0	483.0	191.0	189.0	-35.3	-75.6	-133.9	168.3
Average	38.5	8.6	158.5	218.2	15.00	411.3	28.0	18235	13557	63736.5	1450.9	1104.4	490.9	195.2	192.1	-16.7	-47.9	-101.3	241.5

Test No. 2 - September 15, 2021

	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
9:37:00	36.0	6.2	157.0	217.8	9.1	419.0	27.8	18831	14051	68725.5	1438.1	1114.9	473.4	184.0	182.3	-11.6	-43.8	-99.6	271.3
9:38:00	36.4	7.4	158.6	218.7	9.1	419.1	28.7	18994	14079	67734.8	1439.1	1115.2	473.4	184.5	182.3	-17.2	-51.8	-108.9	227.9
9:39:00	36.2	7.6	158.8	219.2	9.1	419.9	28.1	18744	14073	65988.1	1442.6	1118.4	474.0	185.0	183.4	-9.2	-40.6	-96.8	238.0
9:40:00	36.7	7.1	159.2	220.3	9.1	419.5	27.6	18675	13972	65781.6	1445.6	1119.5	474.1	185.5	183.4	-9.3	-41.0	-94.7	271.5
9:41:00	36.3	7.0	158.5	219.9	9.1	420.0	28.4	18581	13820	65439.8	1454.2	1124.1	474.4	186.0	183.4	-6.2	-37.8	-89.8	283.1
9:42:00	36.2	7.3	159.6	217.8	9.1	420.3	27.7	19131	14169	67709.9	1447.6	1120.0	474.8	186.0	184.4	-20.9	-56.6	-116.8	220.0
9:43:00	36.0	6.7	158.7	219.8	9.3	420.0	28.7	18725	14174	67692.4	1440.9	1116.8	475.2	187.0	184.4	-16.0	-50.4	-107.2	236.2
9:44:00	36.1	6.8	159.1	219.6	9.4	419.2	27.8	18813	14051	68451.2	1438.3	1115.0	475.7	187.5	185.4	-15.6	-47.3	-105.3	249.7
9:45:00	35.9	8.0	159.5	219.0	9.3	421.9	28.7	18700	14051	67908.4	1441.8	1116.3	476.2	188.0	185.4	-9.9	-42.3	-97.2	261.3
9:46:00	36.1	7.0	160.1	220.4	9.5	419.6	27.6	19156	14174	68061.2	1441.6	1117.5	476.4	188.0	185.4	-17.4	-52.5	-110.9	210.8
9:47:00	36.1	7.2	160.4	220.6	9.3	422.0	28.7	18669	13972	67335.9	1444.9	1118.3	477.0	188.5	185.4	-11.0	-40.9	-99.5	229.1
9:48:00	35.9	7.1	160.2	219.1	9.3	419.3	28.5	19194	14090	67570.6	1445.3	1119.8	477.3	188.5	185.4	-24.8	-57.5	-123.0	220.4
9:49:00	36.0	7.2	159.6	220.6	9.3	420.5	28.0	18444	13882	65267.4	1446.2	1119.3	477.6	189.0	186.4	-7.0	-36.9	-92.2	273.9
9:50:00	35.9	6.7	160.0	219.9	9.4	420.4	28.7	18925	13994	70174.0	1450.8	1122.4	477.8	188.5	186.4	-28.2	-67.5	-129.3	165.6
9:51:00	35.6	6.8	160.6	219.5	9.4	420.0	28.5	19069	14079	66256.0	1442.1	1116.1	478.3	189.0	186.4	-17.4	-53.5	-110.8	227.4
9:52:00	35.8	7.7	160.0	219.4	9.5	421.8	27.7	18819	14084	66518.1	1441.3	1116.4	478.3	189.5	186.4	-14.5	-46.4	-106.5	215.1
9:53:00	36.0	7.3	160.6	219.6	9.6	421.3	27.3	18738	13978	66424.6	1439.2	1116.2	478.7	190.0	187.5	-10.6	-42.6	-98.6	249.6
9:54:00	35.9	7.3	159.5	218.3	8.3	419.4	27.4	18500	13978	65063.9	1445.7	1119.6	479.1	190.0	187.5	-9.9	-43.0	-95.5	264.4
9:55:00	35.8	7.2	160.4	220.6	9.6	421.8	28.0	18856	14000	67562.1	1443.4	1117.0	479.4	190.0	187.5	-13.5	-47.0	-104.2	218.8
9:56:00	35.9	7.2	159.7	219.7	9.6	419.5	27.4	18619	14000	66843.6	1443.8	1118.4	479.6	190.5	187.5	-10.1	-43.0	-98.5	234.4
9:57:00	36.1	6.8	160.2	220.3	8.9	418.6	27.9	18600	13994	64763.0	1445.9	1117.8	479.9	190.5	187.5	-10.7	-43.5	-97.4	264.8
9:58:00	35.9	7.8	160.1	220.9	8.9	419.4	27.7	18463	14000	65702.2	1449.3	1121.4	480.1	190.5	187.5	-6.3	-36.9	-89.8	277.0
9:59:00	35.9	7.2	159.7	219.3	8.9	419.0	28.1	19113	14118	66992.4	1447.8	1119.0	480.5	190.0	187.5	-18.7	-53.1	-114.8	219.5
10:00:00	35.8	7.0	159.5	219.8	8.9	420.0	27.4	19000	14011	66720.4	1442.6	1117.2	480.5	190.5	187.5	-15.7	-51.0	-107.3	233.8
10:01:00	35.9	7.5	160.1	219.2	8.9	419.6	27.6	19075	13994	66350.2	1442.3	1116.7	481.0	191.0	188.6	-13.9	-47.0	-104.0	248.4
10:02:00	36.2	7.8	159.5	220.4	8.9	420.1	28.7	18638	13888	66812.5	1443.7	1119.0	480.9	191.5	188.6	-10.8	-43.0	-96.9	260.2
10:03:00	35.9	6.8	160.2	221.1	8.9	417.5	27.9	19063	14096	67940.1	1449.2	1119.8	481.1	191.5	188.6	-19.7	-52.4	-114.5	206.7
10:04:00	35.9	8.1	160.1	221.2	8.9	417.9	27.9	18519	13989	64927.4	1448.8	1119.8	481.2	191.5	188.6	-11.1	-42.3	-99.3	229.1
10:05:00	35.9	7.1	159.7	220.2	8.9	417.6	27.6	19100	13972	69169.5	1451.3	1122.4	481.4	191.5	188.6	-26.3	-65.5	-127.0	187.4
10:06:00	36.2	7.3	159.2	220.2	8.9	416.4	27.3	18475	13865	63244.7	1452.7	1121.8	481.9	191.5	188.6	-7.9	-37.3	-91.8	273.2
10:07:00	35.7	7.4	159.2	217.3	8.9	417.5	28.5	18419	13989	70422.3	1456.2	1124.8	482.1	191.5	188.6	-26.0	-63.5	-121.3	172.3
10:08:00	35.6	7.4	159.2	218.0	8.9	419.1	28.0	18788	14096	66170.8	1447.1	1118.8	482.3	191.5	188.6	-17.7	-51.1	-110.9	226.8
10:09:00	36.0	7.1	159.2	219.2	9.5	417.1	27.6	18650	13966	65899.6	1445.1	1119.9	482.4	192.0	188.6	-13.9	-48.4	-104.7	239.7
10:10:00	36.6	6.9	159.5	220.8	9.6	416.9	28.5	18588	13966	64548.3	1448.9	1121.2	482.6	192.5	188.6	-12.1	-44.1	-99.9	253.6
10:11:00	36.0	7.4	159.8	220.5	9.5	418.9	27.8	18544	13966	64699.0	1452.4	1124.2	482.9	192.5	188.6	-7.5	-37.9	-93.1	261.6
10:12:00	36.2	6.4	159.6	218.3	9.5	419.6	28.6	18738	14067	67212.1	1450.8	1121.8	483.0	192.5	188.6	-13.8	-48.8	-104.1	217.5
10:13:00	36.2	7.4	159.4	220.4	9.4	418.5	27.4	18569	14073	65218.5	1453.8	1124.5	483.3	192.5	188.6	-9.4	-43.4	-98.9	233.0
10:14:00	36.4	7.1	159.1	218.3	9.3	416.4	27.6	18713	13978	65549.0	1452.6	1123.8	483.7	192.5	188.6	-9.2	-40.9	-95.4	264.1
10:15:00	36.5	6.5	159.5	221.0	9.3	418.5	28.6	18425	13983	65390.9	1460.1	1128.0	483.6	192.5	188.6	-5.9	-38.5	-88.4	274.5
10:16:00	36.4	6.9	159.4	219.1	8.5	419.2	27.5	19038	14118	67427.7	1458.4	1126.8	483.8	192.0	188.6	-22.0	-59.0	-117.9	213.0
10:17:00	36.5	6.6	159.8	219.4	9.5	417.2	27.4	18831	14000	67123.3	1452.1	1123.4	483.9	192.5	188.6	-16.6	-52.0	-106.8	232.1
10:18:00	36.1	7.2	159.8	218.7	9.5	417.2	28.6	18713	13961	66328.2	1451.2	1121.8	484.0	193.0	189.8	-12.7	-46.1	-104.1	244.7
10:19:00	36.3	7.0	159.7	220.0	9.2	417.5	27.9	18463	13961	66877.0	1453.2	1123.2	484.1	193.0	189.8	-9.6	-41.1	-96.2	258.8
10:20:00	36.4	7.0	159.4	220.8	9.2	417.5	28.6	18944	13955	69780.4	1457.3	1126.2	484.4	193.0	189.8	-26.5	-62.9	-122.0	182.6
10:21:00	36.1	6.7	159.4	219.6	9.2	417.4	27.8	18556	13955	64833.9	1456.6	1124.6	484.6	193.0	189.8	-9.7	-42.5	-99.0	224.5
10:22:00	36.4	6.9	159.3	220.9	9.2	417.5	28.4	18813	13949	68955.7	1459.6	1125.8	484.9	193.0	189.8	-26.0	-63.4	-125.5	184.0
10:23:00	36.7	7.1	160.1	219.9	9.2	417.0	27.9	18369	13927	65214.4	1458.2	1125.6	484.9	193.5	189.8	-5.5	-34.1	-89.2	269.6
10:24:00	36.5	6.8	160.1	220.2	9.2	416.5	28.7	18238	13927	66077.9	1466.6	1130.5	484.9	193.0	189.8	-11.8	-58.8	-98.0	231.1
10:25:00	35.8	7.1	160.2	219.6	9.2	417.2	27.5	18850	14073	66397.9	1457.2	1123.5	485.1	193.0	189.8	-16.7	-53.0	-110.1	222.3
10:26:00	35.7	6.9	159.7	220.2	9.2	417.5	28.0	18681	13961	66797.4	1454.2	1122.2	485.2	193.5	189.8	-13.9	-48.5	-103.4	237.3
10:27:00	35.6	6.8	160.1	219.9	9.2	417.5	27.4	18638	13848	65989.7	1449.6	1120.7	485.1	193.5	189.8	-11.5	-45.5	-99.7	251.9
10:28:00	35.5	7.7	160.5	218.8	9.2	417.0	28.1	18656	13961	64386.1	1453.9	1124.0	485.4	193.5	189.8	-8.8	-39.3	-94.7	263.6

Test No. 2 - September 15, 2021

	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
10:29:00	35.5	6.7	160.2	219.3	9.2	416.3	27.9	18738	13961	66689.6	1450.4	1120.8	485.5	193.5	189.8	-12.8	-46.4	-104.3	217.7
10:30:00	36.0	6.9	160.2	220.0	9.5	416.4	27.4	18625	13955	65738.8	1453.8	1122.4	485.6	193.5	189.8	-9.4	-42.4	-96.5	233.5
10:31:00	36.0	6.9	160.9	219.6	9.5	416.8	28.1	18694	13983	63319.9	1453.8	1121.1	485.7	193.5	189.8	-8.6	-41.4	-96.0	265.8
10:32:00	36.0	6.4	159.6	219.9	9.3	417.2	27.9	18338	13983	65293.4	1458.2	1124.2	485.7	193.0	189.8	-5.6	-35.8	-88.6	279.0
10:33:00	35.8	6.9	159.6	219.2	9.3	417.5	28.6	19088	14017	67435.7	1453.3	1122.7	486.0	192.5	189.8	-22.5	-59.1	-120.0	210.2
10:34:00	36.0	6.7	160.4	220.3	9.3	417.5	27.4	18819	14039	65247.1	1448.8	1120.2	486.1	193.0	189.8	-16.3	-50.4	-106.7	232.1
10:35:00	35.9	7.1	159.8	221.0	9.3	417.5	28.6	18969	14124	66063.0	1449.9	1120.1	486.0	193.0	189.8	-17.4	-50.0	-109.8	243.1
10:36:00	35.8	6.2	159.5	218.6	9.3	417.3	28.6	18581	13983	65135.4	1451.3	1120.5	486.2	193.5	189.8	-9.8	-42.0	-97.9	258.3
10:37:00	35.7	7.0	159.7	218.4	9.3	417.4	28.0	18819	14000	70106.6	1453.3	1122.1	486.2	193.0	189.8	-23.0	-61.6	-123.0	171.8
10:38:00	36.2	7.0	159.3	220.0	9.3	417.4	28.7	18681	13910	65982.1	1450.1	1120.4	486.3	193.0	189.8	-11.0	-44.5	-100.7	224.8
10:39:00	35.7	7.1	159.3	219.1	9.3	417.0	28.7	18613	13910	69380.3	1455.3	1122.7	486.4	193.0	189.8	-24.0	-64.0	-122.0	186.5
10:40:00	35.8	7.5	159.4	220.3	9.3	417.2	28.3	18375	14011	66135.8	1454.4	1123.0	486.5	193.0	189.8	-7.9	-40.1	-93.6	268.9
10:41:00	35.8	7.0	159.8	220.9	9.3	416.5	28.3	18300	13978	63418.9	1460.3	1126.5	486.5	192.5	189.8	-4.6	-36.5	-85.4	279.6
10:42:00	36.0	7.0	160.7	220.6	9.3	418.9	28.3	18825	14096	63922.0	1452.6	1121.1	486.7	192.0	189.8	-16.1	-50.8	-109.5	227.4
10:43:00	35.5	7.1	159.5	219.3	9.3	416.5	28.5	18863	13966	65198.2	1452.6	1120.7	486.7	192.5	189.8	-12.2	-45.0	-104.2	240.3
10:44:00	35.7	7.0	159.4	218.4	9.3	417.2	27.5	18531	13978	67250.1	1449.2	1119.4	486.5	193.0	189.8	-12.7	-43.9	-100.1	253.2
10:45:00	35.7	7.0	159.4	219.2	9.3	416.9	28.0	18400	13978	65395.6	1453.7	1122.4	486.8	193.0	189.8	-7.8	-38.4	-94.1	264.9
10:46:00	36.2	6.5	159.2	220.1	9.3	417.1	28.4	18875	14084	66866.8	1453.1	1121.6	486.8	192.5	189.8	-14.2	-47.8	-105.4	215.7
10:47:00	36.3	7.2	160.1	220.6	9.3	416.9	28.7	18638	13972	65333.4	1455.2	1123.1	486.7	193.0	189.8	-10.1	-41.3	-96.5	233.0
10:48:00	35.9	6.1	160.0	219.4	9.3	416.8	28.5	18788	13955	65832.9	1451.4	1122.1	486.6	192.5	189.8	-11.0	-42.1	-99.5	260.5
10:49:00	36.0	7.5	159.4	219.4	9.3	415.9	28.6	18250	13955	64513.3	1455.2	1123.6	486.8	192.5	189.8	-6.2	-37.5	-88.8	274.6
10:50:00	35.9	7.0	158.0	218.8	9.3	416.2	27.5	19225	14202	66615.8	1455.8	1123.5	486.8	192.5	189.8	-25.6	-64.1	-123.4	201.4
10:51:00	36.1	7.6	158.7	220.4	9.3	415.7	28.7	18869	14084	65483.7	1447.9	1120.0	487.0	192.5	189.8	-14.7	-49.5	-107.5	229.6
10:52:00	35.5	7.1	159.1	219.6	9.3	416.8	27.8	19113	14225	70091.3	1447.7	1121.2	486.9	192.5	189.8	-23.6	-56.9	-120.9	216.4
10:53:00	35.9	7.1	158.3	219.8	9.3	416.9	28.0	18500	13983	66578.3	1450.6	1122.0	487.0	193.0	189.8	-10.5	-43.9	-98.9	255.9
10:54:00	35.8	6.9	159.2	220.0	9.3	416.3	28.7	18775	13983	70383.9	1451.7	1123.3	486.9	192.5	189.8	-26.1	-65.0	-124.1	169.8
10:55:00	35.9	7.3	159.0	219.7	9.3	415.7	28.6	18644	13983	66904.7	1450.1	1121.4	487.1	192.5	189.8	-12.4	-47.4	-102.3	224.6
10:56:00	35.6	7.6	155.8	219.5	9.3	415.9	28.6	18600	13899	69143.9	1451.7	1123.1	486.9	192.5	189.8	-17.9	-61.5	-106.2	203.3
10:57:00	36.6	7.5	158.1	221.0	9.3	415.7	27.7	18425	13899	65319.9	1451.8	1123.4	487.2	192.5	189.8	-5.6	-37.5	-91.6	272.0
10:58:00	36.5	7.0	158.0	219.4	9.3	415.7	28.0	18344	14011	65127.6	1459.9	1129.9	487.0	192.5	189.8	-5.2	-35.3	-87.7	282.3
10:59:00	36.6	7.3	158.0	220.1	9.3	416.8	27.9	18806	14011	65295.3	1456.8	1125.8	487.3	192.0	188.8	-16.0	-51.4	-110.7	223.1
11:00:00	36.3	7.3	161.9	219.1	9.3	417.0	28.4	18681	14011	66712.8	1455.8	1125.4	487.3	192.5	188.8	-11.7	-45.4	-105.0	238.3
11:01:00	36.5	7.5	160.0	219.4	9.3	417.2	27.4	18775	14011	66410.2	1455.4	1125.0	487.3	193.0	190.0	-11.3	-46.0	-101.6	251.7
11:02:00	36.5	6.8	159.4	220.4	9.3	417.3	28.0	18481	13910	65121.2	1460.3	1127.8	487.2	193.5	190.0	-8.8	-41.0	-94.1	264.1
11:03:00	36.4	6.9	160.1	221.2	9.3	416.4	28.5	18925	14051	64670.0	1458.3	1127.1	487.3	193.5	190.0	-13.3	-47.3	-105.5	216.0
11:04:00	36.8	7.3	160.4	221.8	9.3	415.8	27.4	18438	13938	64060.2	1460.7	1128.4	487.4	193.5	190.0	-9.4	-41.4	-96.5	232.4
11:05:00	37.0	6.8	159.4	220.5	9.3	418.1	27.4	18775	14062	65154.6	1463.9	1128.6	487.5	193.5	190.0	-8.8	-40.9	-97.4	265.3
11:06:00	36.9	6.9	159.8	222.1	9.3	415.5	28.6	18550	13848	62970.0	1468.8	1132.4	487.7	194.0	190.0	-4.9	-35.4	-90.6	275.4
11:07:00	36.6	6.9	160.6	219.7	9.3	416.0	28.6	19169	13994	66458.5	1472.2	1133.6	487.8	193.5	190.0	-21.3	-58.5	-122.3	198.1
11:08:00	36.7	6.9	160.9	220.9	9.3	418.4	28.7	18725	13994	64927.5	1464.2	1129.2	487.9	194.0	190.0	-13.5	-49.3	-107.0	230.5
11:09:00	36.5	6.7	155.7	219.6	9.3	416.0	27.4	18844	13994	66519.0	1464.8	1128.0	488.0	194.5	191.1	-24.2	-60.8	-122.1	189.5
11:10:00	36.7	7.0	157.8	221.0	9.3	416.3	28.7	18375	13893	63701.9	1464.2	1128.1	488.0	194.5	191.1	-8.8	-40.9	-97.4	258.1
11:11:00	36.8	7.0	162.9	220.5	9.3	415.4	28.6	18713	13899	68400.9	1470.4	1132.2	488.1	194.5	191.1	-20.7	-59.1	-117.3	174.9
11:12:00	37.2	7.1	158.9	222.0	9.3	416.9	28.4	18656	13893	66540.1	1469.1	1132.1	488.4	194.5	191.1	-10.3	-44.3	-100.1	222.9
11:13:00	37.0	6.7	153.5	219.7	9.3	414.3	27.5	18663	13893	63533.8	1472.4	1132.9	488.4	194.5	191.1	-10.1	-40.8	-96.3	236.9
11:14:00	36.8	7.4	156.7	222.0	9.3	417.0	28.7	18413	14006	62883.3	1469.7	1132.4	488.5	194.5	191.1	-7.2	-37.6	-93.2	268.4
11:15:00	37.1	6.7	157.7	219.3	9.3	415.9	28.7	18394	13978	63247.3	1475.7	1136.6	488.6	194.0	191.1	-3.9	-33.8	-88.2	280.7
11:16:00	37.0	7.2	159.5	220.4	9.3	416.7	27.9	18850	14101	65910.6	1471.3	1132.4	488.9	194.0	191.1	-16.4	-52.0	-112.5	220.9
11:17:00	37.0	7.7	159.0	219.5	9.3	416.7	28.7	18606	13978	64350.6	1468.4	1132.0	488.8	194.5	191.1	-12.3	-47.3	-103.7	235.3
11:18:00	37.1	7.9	167.7	220.0	9.3	417.2	28.3	18619	13983	64996.6	1466.7	1131.1	488.8	195.0	191.1	-9.6	-42.3	-99.3	249.6
11:19:00	37.2	7.6	159.8	222.4	9.3	417.0	28.5	18419	13978	64447.4	1470.1	1135.2	488.9	195.5	191.1	-8.4	-41.8	-94.2	261.6
11:20:00	37.0	6.8	159.1	220.9	9.3	416.3	27.5	18700	14090	64858.6	1472.3	1134.2	489.1	195.0	191.1	-12.5	-46.9	-104.7	215.7

Test No. 2 - September 15, 2021

	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	$mm\ H_2O$	$mm\ H_2O$	$mm\ H_2O$	$mm\ H_2O$
11:21:00	36.9	7.6	159.0	222.1	9.3	417.1	27.8	18438	13989	63809.7	1473.8	1134.5	489.2	195.5	191.1	-9.1	-42.0	-97.0	232.0
11:22:00	36.8	7.3	158.2	219.2	9.3	416.6	27.7	18713	14006	65179.9	1472.3	1134.4	489.4	195.5	191.1	-11.3	-45.4	-101.1	261.3
11:23:00	36.7	7.3	158.2	220.1	9.3	416.6	28.2	18194	13893	63801.1	1478.8	1136.3	489.7	195.5	191.1	-5.1	-34.4	-89.3	275.8
11:24:00	36.8	7.0	159.2	219.6	9.3	416.9	27.4	18975	14135	67559.9	1482.8	1139.3	489.6	195.0	191.1	-23.8	-60.1	-125.3	186.3
11:25:00	37.1	7.0	158.6	219.7	9.3	416.3	28.7	18781	14034	64353.3	1473.8	1132.9	489.7	195.5	191.1	-13.6	-49.3	-105.7	229.5
11:26:00	37.2	7.3	161.1	220.6	9.3	413.9	27.6	18638	14034	66622.0	1474.3	1134.4	489.8	195.5	192.3	-20.1	-57.8	-115.7	189.2
11:27:00	37.0	7.2	160.0	221.8	9.3	415.6	28.7	18544	13933	63456.8	1476.6	1135.1	489.8	196.0	192.3	-8.6	-39.3	-96.2	256.0
11:28:00	36.9	7.0	159.1	221.2	9.3	416.0	27.8	18325	13826	64806.0	1482.1	1138.8	490.1	196.0	192.3	-7.3	-42.6	-101.3	212.4
11:29:00	36.7	7.5	159.2	219.2	9.3	416.9	28.4	18475	14045	64388.7	1480.4	1136.3	490.2	196.0	192.3	-9.8	-44.9	-99.9	223.1
11:30:00	36.3	7.3	159.5	219.5	9.3	416.9	27.4	18538	13927	63846.6	1480.3	1136.9	490.2	196.0	192.3	-7.7	-39.8	-94.3	238.1
11:31:00	36.6	7.4	158.6	220.2	9.3	416.5	27.3	18350	13933	64118.1	1477.9	1135.6	490.4	196.0	192.3	-5.8	-38.4	-90.9	267.8
11:32:00	36.8	6.7	159.2	220.8	9.3	416.5	28.1	18256	13933	61915.9	1484.3	1140.0	490.3	196.0	192.3	-2.8	-32.0	-84.1	276.3
11:33:00	36.5	6.7	157.4	219.5	9.3	417.2	27.5	18838	13955	64476.0	1477.3	1136.3	490.3	195.5	192.3	-16.7	-52.3	-111.6	220.9
11:34:00	36.8	6.8	143.5	220.1	9.3	416.2	27.7	18900	14096	63604.6	1471.9	1132.2	490.7	196.0	192.3	-17.1	-51.3	-107.9	233.4
11:35:00	36.7	6.7	146.9	220.5	9.3	416.3	28.1	18756	14225	63639.5	1468.7	1129.4	490.7	195.5	192.3	-12.5	-44.4	-101.0	249.3
11:36:00	37.3	7.1	145.0	221.2	9.3	416.8	28.7	18494	14118	65111.6	1472.2	1131.2	490.6	195.0	192.3	-11.7	-42.9	-96.2	260.9
11:37:00	36.7	7.3	144.7	220.2	9.0	415.8	27.4	19075	14326	64655.4	1468.2	1129.1	490.8	194.0	191.3	-17.7	-52.9	-111.7	209.5
12:40:00	38.6	7.3	154.7	220.4	8.9	413.9	28.4	18350	14084	62496.2	1467.2	1130.8	486.1	196.5	191.6	-5.5	-37.4	-90.5	277.8
12:41:00	38.3	7.1	155.3	218.8	8.9	413.0	28.1	19050	14208	64165.3	1466.2	1129.4	486.3	196.5	191.6	-22.6	-58.4	-121.3	211.3
12:42:00	38.3	7.0	154.5	219.6	8.9	413.2	28.7	18881	14208	63541.4	1460.4	1127.0	486.5	196.5	191.6	-15.7	-52.4	-107.0	230.6
12:43:00	38.5	7.3	156.2	219.9	8.9	413.5	28.4	19006	14208	63518.2	1455.9	1125.9	486.7	197.0	191.6	-15.9	-51.4	-109.3	240.9
12:44:00	38.7	6.8	156.4	220.1	8.9	412.4	28.5	18644	14084	64491.0	1456.2	1126.0	486.7	197.5	192.7	-9.4	-43.0	-97.2	256.8
12:45:00	38.5	6.9	155.2	218.7	9.0	412.3	28.1	18931	14219	66665.4	1456.9	1127.5	487.0	197.5	192.7	-25.7	-64.0	-124.5	172.4
12:46:00	38.4	6.9	155.8	220.9	9.0	412.4	27.3	18575	14118	63103.9	1454.1	1125.1	487.2	197.5	192.7	-10.3	-44.0	-101.2	223.8
12:47:00	38.6	6.5	155.7	220.3	9.0	411.7	28.6	18706	14118	65490.4	1453.4	1126.4	487.5	197.5	192.7	-24.7	-62.3	-122.6	185.9
12:48:00	38.7	6.8	155.7	220.9	9.0	411.7	28.5	18319	14118	62454.8	1452.3	1125.3	487.5	197.5	192.7	-7.2	-38.4	-90.0	266.3
12:49:00	38.8	7.6	156.1	219.7	9.0	411.0	27.4	18463	14006	61158.6	1455.7	1128.7	487.9	197.5	192.7	-5.2	-36.9	-87.8	277.0
12:50:00	38.6	7.3	154.7	218.9	9.0	411.2	27.8	19075	14225	65255.0	1446.1	1122.8	488.0	197.0	192.7	-16.3	-52.1	-112.2	220.6
12:51:00	38.3	7.3	154.7	219.1	9.0	412.4	28.6	18825	14219	63656.5	1444.1	1120.5	488.3	197.5	192.7	-13.4	-46.1	-105.8	235.6
12:52:00	38.1	6.9	154.6	218.4	9.0	414.0	27.6	18663	14118	63453.4	1441.1	1118.5	488.5	198.0	192.7	-11.9	-44.6	-100.8	248.6
12:53:00	38.5	6.8	154.7	219.2	9.0	410.8	27.8	18419	14118	63782.0	1445.3	1120.5	488.8	198.0	192.7	-9.0	-40.4	-95.5	261.3
12:54:00	37.9	6.8	154.9	219.3	8.8	411.3	27.9	18888	14230	65632.4	1439.3	1117.9	488.9	197.5	192.7	-13.4	-45.0	-104.2	213.3
12:55:00	38.4	7.3	155.9	220.6	9.7	412.9	28.2	18713	14107	63202.4	1440.1	1117.6	488.7	197.5	192.7	-11.6	-44.4	-98.8	227.4
12:56:00	37.5	7.6	152.9	219.5	8.6	412.8	28.7	18925	14124	63057.1	1437.6	1116.4	489.1	197.0	192.7	-10.3	-41.8	-100.2	259.2
12:57:00	37.7	7.0	154.5	220.0	9.6	410.6	28.6	18550	14124	62865.9	1441.1	1118.3	489.1	197.0	192.7	-6.9	-35.3	-91.0	271.6
12:58:00	37.6	7.6	153.8	219.5	9.5	413.7	28.5	19288	14264	65358.6	1437.6	1117.2	489.2	196.0	192.7	-25.2	-61.1	-125.1	198.9
12:59:00	37.4	7.0	153.8	219.7	9.5	414.2	27.5	18913	14163	64746.9	1431.6	1113.5	489.1	196.0	192.7	-18.8	-54.6	-110.1	224.4
13:00:00	37.3	7.3	154.9	218.6	9.5	413.0	27.6	19100	14275	66987.9	1431.7	1113.2	489.5	196.0	192.7	-20.8	-53.0	-121.5	214.3
13:01:00	36.8	6.6	155.3	220.8	9.4	415.4	28.7	18694	14157	64084.4	1430.4	1113.9	489.3	196.5	192.7	-12.6	-46.0	-101.0	251.9
13:02:00	37.1	6.5	154.6	219.4	9.5	413.5	27.6	18981	14163	67634.9	1429.2	1111.1	489.3	196.0	192.7	-27.6	-66.3	-128.1	168.4
13:03:00	37.0	6.8	159.4	220.1	9.6	414.2	28.7	18613	14129	63238.5	1424.2	1097.1	489.3	195.5	192.7	-15.4	-48.0	-104.7	219.1
13:04:00	36.8	6.8	163.4	219.3	8.5	413.0	28.7	18556	14118	65400.2	1421.7	1091.9	489.2	195.0	191.6	-17.3	-62.1	-109.5	197.3
13:05:00	36.9	6.8	162.5	220.4	9.5	413.5	28.6	18556	14023	62789.8	1413.9	1083.2	489.3	194.0	191.6	-8.9	-39.6	-96.6	265.7
13:06:00	36.8	6.6	165.2	220.1	9.4	414.1	27.8	18575	14034	62334.7	1414.4	1082.4	489.3	193.0	190.6	-8.6	-39.0	-91.4	276.9
13:07:00	37.6	6.9	165.0	220.7	9.4	414.5	28.6	19000	14152	63604.5	1404.4	1077.9	488.9	192.0	189.6	-20.3	-55.8	-117.2	219.8
13:08:00	37.7	7.0	165.4	219.8	9.4	414.1	28.5	18888	14152	65729.8	1402.2	1076.4	488.9	192.0	189.6	-16.3	-50.9	-108.8	232.9
13:09:00	39.2	6.7	164.7	219.8	9.6	414.2	28.6	18800	14163	66274.2	1396.9	1074.3	488.6	191.5	189.6	-14.7	-49.1	-103.7	247.2
13:10:00	39.6	7.1	165.8	220.5	8.6	413.9	27.6	18650	14045	63204.7	1401.4	1078.7	488.5	191.0	189.6	-10.1	-40.9	-99.4	259.4
13:11:00	39.8	6.5	160.0	220.5	9.5	415.8	28.6	19063	14174	64906.0	1400.7	1079.9	488.2	191.0	188.6	-18.0	-51.4	-111.9	212.3
13:12:00	40.0	7.3	161.0	221.1	9.5	413.5	28.1	18825	14067	65123.9	1400.4	1081.5	488.0	190.5	188.6	-13.5	-46.8	-104.4	227.4
13:13:00	38.6	6.6	160.4	219.3	9.5	413.8	28.1	19063	14180	65422.0	1396.8	1079.8	487.8	190.0	188.6	-15.4	-49.1	-105.3	260.8
13:14:00	38.5	7.2	159.9	219.6	9.5	416.9	27.8	18644	14056	62484.0	1396.9	1079.9	487.4	190.0	187.6	-10.2	-40.4	-96.9	270.5

Test No. 2 - September 15, 2021

	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
13:15:00	38.5	7.7	160.7	219.2	9.6	416.3	28.6	19475	14258	66697.3	1395.4	1079.5	487.0	189.0	187.6	-31.2	-67.0	-130.7	193.4
13:16:00	37.9	7.0	160.5	220.4	9.8	415.0	27.4	19069	14152	65831.0	1387.2	1072.2	486.9	188.5	187.6	-20.3	-54.8	-113.2	222.5
13:17:00	38.0	7.4	159.0	220.0	8.7	416.0	28.7	19088	14258	67258.3	1382.9	1071.6	486.8	188.5	187.6	-29.5	-66.1	-128.3	181.6
13:18:00	39.1	6.8	160.6	220.1	8.9	413.7	27.8	18856	14152	66533.4	1381.3	1071.4	486.5	188.0	186.6	-14.1	-48.0	-102.0	246.4
13:19:00	41.0	6.9	159.9	219.9	8.9	413.8	27.6	18950	14152	66920.5	1392.2	1079.3	486.4	187.5	186.6	-25.0	-64.3	-121.8	168.9
13:20:00	40.9	7.4	160.1	220.3	8.4	413.9	28.1	18900	14152	62437.6	1399.6	1082.2	485.8	187.5	186.6	-12.4	-46.0	-101.2	211.9
13:21:00	40.6	6.7	159.6	219.8	9.8	413.9	28.0	18563	14051	62053.6	1410.3	1091.1	485.6	187.0	186.6	-9.4	-40.4	-94.7	224.8
13:22:00	41.1	6.8	159.7	220.1	8.5	413.3	27.4	18706	14062	63711.4	1414.9	1092.1	485.5	187.0	185.6	-6.7	-38.5	-92.1	257.3
13:23:00	40.5	6.8	159.3	218.9	9.5	415.6	28.7	18563	13955	61542.6	1420.3	1097.4	485.2	187.0	185.6	-6.9	-39.3	-86.6	266.9
13:24:00	40.8	7.0	160.3	220.3	9.4	415.4	27.4	18931	14185	62242.1	1418.6	1094.3	485.0	186.5	185.6	-16.9	-52.1	-109.1	214.4
13:25:00	40.9	7.4	158.6	221.0	9.4	414.9	28.4	18831	14185	62822.5	1421.6	1095.6	484.7	187.0	185.6	-13.2	-46.4	-104.2	225.1
13:26:00	40.8	6.8	159.6	220.7	9.4	414.5	27.4	18819	14096	62242.4	1422.8	1097.5	484.7	187.0	185.6	-9.5	-44.3	-99.9	239.4
13:27:00	40.9	6.7	159.0	219.7	9.4	414.5	27.3	18775	14079	62953.9	1427.3	1101.3	484.7	187.5	185.6	-8.5	-40.4	-94.0	250.2
13:28:00	40.8	6.8	159.2	219.4	9.6	414.4	28.2	18969	14191	63812.8	1430.8	1102.5	484.4	187.0	185.6	-12.7	-48.4	-103.7	206.1
13:29:00	40.6	7.7	159.7	220.0	10.1	413.9	28.2	18750	14062	62694.4	1429.8	1104.1	484.3	187.5	185.6	-9.0	-42.3	-96.8	220.9
13:30:00	40.6	7.3	160.6	219.8	8.6	415.7	27.5	18913	14157	62057.8	1432.8	1103.4	484.4	187.5	185.6	-10.3	-43.1	-99.5	250.7
13:31:00	40.6	6.7	160.3	219.3	9.6	414.1	27.5	18475	14051	62641.1	1434.6	1103.9	484.1	187.5	185.6	-4.2	-36.4	-88.7	262.9
13:32:00	40.8	6.7	157.4	219.2	9.7	413.9	28.6	19150	14185	65689.3	1439.2	1107.3	484.1	187.5	185.6	-25.3	-60.8	-124.0	179.1
13:33:00	40.9	6.3	159.2	221.0	8.6	413.8	27.4	18900	14185	63477.6	1435.2	1103.4	484.2	187.5	185.6	-12.5	-48.1	-103.9	221.0
13:34:00	40.4	6.7	159.9	218.6	8.6	415.0	28.0	18800	14079	65326.6	1433.6	1104.4	484.0	188.0	186.7	-20.5	-58.4	-115.3	179.8
13:35:00	40.6	7.5	159.9	219.5	8.3	414.5	27.6	18719	14079	62741.8	1433.6	1104.7	484.1	188.5	186.7	-9.0	-40.4	-95.6	245.1
13:36:00	40.2	6.4	159.4	219.1	9.5	415.2	28.5	18494	13972	63906.7	1435.8	1106.7	483.9	188.5	186.7	-8.9	-45.0	-101.2	204.8
13:37:00	40.6	7.2	160.4	219.4	8.8	414.5	27.8	18813	14101	63695.2	1425.3	1102.8	484.3	188.5	186.7	-11.3	-43.1	-99.7	211.9
13:38:00	41.2	6.8	160.3	218.5	8.7	414.5	28.3	18600	14011	62118.4	1423.9	1102.7	484.1	188.5	186.7	-8.6	-40.9	-95.5	224.9
13:39:00	41.5	7.1	161.3	219.7	8.8	413.3	27.5	18581	14034	61058.8	1424.6	1103.0	484.2	188.5	186.7	-6.4	-37.9	-93.0	254.0
13:40:00	41.7	7.2	159.8	219.8	8.9	413.5	28.3	18331	14141	60946.8	1427.2	1107.3	484.2	188.5	186.7	-4.1	-35.4	-86.8	267.3
13:41:00	41.0	7.1	164.0	220.1	10.0	415.4	28.5	18988	14141	62108.8	1422.8	1103.6	484.4	188.5	186.7	-15.9	-50.4	-110.1	211.6
13:42:00	41.0	7.1	163.6	219.4	8.9	416.0	27.5	18838	14039	62324.6	1419.7	1100.2	484.3	189.0	186.7	-11.9	-45.8	-102.5	225.6
13:43:00	41.0	7.6	164.2	219.0	8.9	413.3	27.5	18794	14039	63023.9	1416.8	1099.3	484.3	189.0	186.7	-10.4	-45.9	-99.0	239.6
13:44:00	40.9	7.4	165.9	218.4	8.9	413.7	28.0	18575	14039	61989.0	1419.2	1100.3	484.0	189.5	186.7	-6.4	-36.9	-92.7	249.6
13:45:00	40.8	6.7	165.4	218.7	10.0	413.9	28.0	18806	14141	63524.0	1418.3	1099.5	484.3	189.0	186.7	-13.4	-48.0	-104.2	203.6
13:46:00	41.1	7.0	164.3	219.6	8.8	414.3	27.5	18688	14034	62998.2	1418.1	1100.1	484.4	189.5	186.7	-8.3	-41.5	-93.6	218.6
13:47:00	41.6	6.8	164.9	219.1	8.7	414.2	28.7	19188	14135	61100.2	1420.6	1101.7	484.3	189.5	186.7	-9.5	-40.9	-100.2	250.3
13:48:00	41.9	7.0	165.2	218.8	9.8	414.5	27.4	18400	14028	62539.4	1427.2	1105.9	484.1	189.5	186.7	-5.2	-36.1	-88.4	262.4
13:49:00	42.0	7.3	165.5	219.8	8.7	414.2	27.8	19006	14281	63834.0	1431.9	1110.1	484.2	189.5	186.7	-24.3	-63.0	-125.5	158.9
13:50:00	40.9	7.1	166.1	221.3	8.7	413.6	28.2	19006	14073	61993.6	1423.1	1103.0	484.3	189.5	186.7	-13.8	-50.4	-104.6	216.9
13:51:00	41.0	6.7	164.9	221.0	8.8	413.4	27.8	18663	14079	63334.7	1420.6	1101.3	484.4	190.0	187.7	-18.5	-55.3	-113.3	179.5
13:52:00	40.8	7.0	165.3	219.7	8.8	414.0	28.7	18644	13972	61776.8	1418.1	1100.5	484.4	190.5	187.7	-9.3	-41.4	-96.1	242.3
13:53:00	40.7	7.2	165.4	217.8	9.7	413.2	28.4	18319	14107	61725.2	1420.9	1102.4	484.6	190.5	187.7	-7.3	-37.3	-90.6	252.8
13:54:00	41.1	7.3	165.6	219.7	9.6	413.0	28.5	18550	14096	61903.7	1419.7	1099.9	484.7	190.5	187.7	-9.0	-41.5	-97.8	210.8
13:55:00	41.1	6.8	165.4	219.5	9.6	413.3	27.6	18669	14096	60698.0	1421.2	1102.6	484.5	191.0	187.7	-7.8	-39.9	-94.9	224.4
13:56:00	41.0	7.4	165.7	219.5	8.6	414.4	27.4	18556	14090	60750.7	1422.8	1101.7	484.8	191.5	187.7	-6.3	-37.3	-92.0	257.9
13:57:00	41.0	7.0	165.3	220.1	8.6	414.4	27.5	18344	14090	59895.6	1425.6	1104.8	484.8	192.0	188.7	-3.7	-32.8	-85.3	267.4
13:58:00	41.1	7.3	165.6	221.0	9.5	413.4	28.2	19038	14067	61613.5	1420.7	1101.8	485.1	192.5	188.7	-16.6	-54.4	-112.1	208.5
13:59:00	41.2	6.9	164.6	221.3	9.5	412.7	28.7	18881	14073	60385.3	1419.6	1101.1	485.2	193.5	189.7	-11.9	-47.8	-102.8	222.9
14:00:00	40.5	6.8	164.9	219.7	9.5	413.6	28.0	18825	14174	61242.4	1415.3	1098.7	485.6	194.5	190.7	-10.6	-43.0	-99.9	236.8
14:01:00	40.7	6.8	164.8	219.6	9.5	413.0	28.6	18444	14051	61938.8	1415.7	1099.8	485.8	195.0	190.7	-7.4	-39.5	-93.6	246.8
14:02:00	40.9	6.8	165.1	220.4	9.5	413.9	28.1	19088	14062	61742.8	1417.1	1100.3	486.0	195.0	190.7	-13.1	-48.8	-105.6	201.2
14:03:00	41.0	6.4	163.5	220.5	9.5	414.6	28.6	18506	14062	59941.8	1416.8	1100.7	486.3	195.5	190.7	-6.8	-35.9	-91.5	218.0
14:04:00	40.8	7.3	164.3	220.0	9.5	413.9	28.7	19100	14197	61537.7	1419.2	1101.1	486.5	195.5	190.7	-19.8	-50.5	-113.5	216.8
14:05:00	41.0	7.3	164.1	222.2	9.5	413.3	28.6	18444	13989	59489.1	1419.9	1102.1	486.9	196.0	191.7	-5.0	-36.4	-87.9	259.6
14:06:00	41.0	7.5	165.3	219.9	9.5	413.6	27.4	18656	14096	64545.6	1424.4	1105.0	487.1	195.5	191.7	-23.8	-61.8	-121.3	158.7

Test No. 2 - September 15, 2021

	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
14:07:00	41.0	7.2	164.8	219.8	9.5	413.6	28.7	18981	13978	59287.1	1417.9	1100.0	487.4	196.0	191.7	-14.0	-47.6	-106.3	214.9
14:08:00	40.7	6.9	164.6	219.5	9.5	416.3	28.7	18750	14090	64278.2	1416.3	1100.3	487.5	196.5	192.7	-14.6	-51.8	-103.3	199.1
14:09:00	41.3	6.5	164.9	221.3	9.6	413.3	28.6	18594	14090	59743.4	1416.3	1100.0	487.9	197.0	192.7	-7.7	-39.1	-94.4	242.2
14:10:00	41.0	7.0	164.5	219.7	9.4	412.9	27.8	18350	14084	60481.6	1418.2	1101.9	488.2	197.0	192.7	-5.3	-36.4	-90.4	250.9
14:11:00	40.9	6.6	164.7	221.0	8.6	413.3	28.1	18619	14084	61621.7	1415.1	1101.4	488.2	197.0	192.7	-9.4	-41.8	-97.5	208.8
14:12:00	41.1	7.1	165.0	219.9	9.7	413.0	27.7	18525	13978	59691.5	1418.9	1102.9	488.7	197.0	192.7	-5.4	-34.3	-92.5	221.9
14:13:00	40.9	7.1	165.2	220.5	9.5	413.8	28.7	18406	14084	61300.0	1415.2	1102.7	488.8	197.0	192.7	-5.8	-34.8	-89.4	253.9
14:14:00	41.1	6.8	165.0	220.5	9.5	415.4	28.7	18438	13983	60372.0	1423.9	1106.0	489.2	197.0	192.7	-3.0	-32.1	-83.4	263.8
14:15:00	40.9	6.7	165.0	220.4	9.6	413.8	28.7	18863	14197	61247.7	1431.4	1101.3	489.3	196.5	192.7	-16.3	-51.3	-107.9	206.6
14:16:00	40.8	6.6	165.3	220.9	9.6	414.1	28.6	18513	14073	60759.6	1431.4	1098.5	489.4	196.5	192.7	-10.9	-43.6	-101.6	222.2
14:17:00	40.9	7.0	165.3	220.3	9.4	414.7	27.5	18738	14073	61842.9	1432.1	1096.8	489.8	197.0	192.7	-10.1	-44.4	-99.6	234.3
14:18:00	41.1	6.7	165.0	220.1	9.5	415.0	27.4	18375	14073	59938.8	1437.2	1098.9	490.0	197.0	192.7	-7.1	-37.8	-94.5	245.0
14:19:00	40.9	7.2	165.7	219.6	9.3	416.1	27.9	18744	14197	59611.1	1436.9	1099.8	490.0	197.0	192.7	-12.9	-45.1	-105.4	197.9
14:20:00	41.0	6.8	165.1	220.7	9.3	413.7	27.4	18294	13989	59468.1	1439.2	1099.2	490.1	197.0	192.7	-9.3	-41.3	-94.3	215.9
14:21:00	41.1	7.0	165.8	219.4	9.3	414.0	28.7	18719	14197	62389.6	1441.3	1099.7	490.2	197.0	192.7	-22.1	-60.3	-120.8	176.7
14:22:00	40.8	6.6	164.9	221.0	9.3	413.9	27.4	18200	13888	60492.3	1447.1	1101.0	490.5	197.0	192.7	-3.8	-32.1	-86.2	263.3
14:23:00	40.9	7.1	164.9	218.8	9.3	416.5	27.8	18281	13888	65216.9	1452.9	1104.6	490.5	196.5	192.7	-23.5	-61.1	-121.1	165.5
14:24:00	41.1	7.5	155.3	220.5	9.3	416.6	28.7	18819	14124	60062.1	1440.1	1096.9	490.7	196.5	192.7	-17.4	-51.4	-110.0	218.3
14:25:00	40.7	6.6	161.2	220.5	9.3	416.4	28.1	18631	14124	61621.1	1439.1	1097.6	490.7	196.5	192.7	-15.8	-51.0	-104.7	229.0
14:26:00	40.8	7.0	162.7	221.2	9.3	416.1	28.5	18500	14023	60756.7	1441.8	1096.9	490.7	196.5	192.7	-10.5	-43.6	-98.0	245.0
14:27:00	41.0	7.3	165.2	220.1	9.3	415.2	27.4	18319	14023	62864.7	1444.1	1098.4	490.8	196.5	192.7	-9.3	-41.3	-95.0	254.8
14:28:00	41.1	7.1	166.0	219.8	9.3	415.7	28.7	18763	14129	64211.8	1441.7	1097.5	491.1	196.5	192.7	-12.2	-45.5	-102.4	211.3
14:29:00	40.9	7.2	165.8	220.7	9.3	413.1	27.4	18544	14011	61385.4	1444.3	1098.4	491.0	197.0	192.7	-8.7	-40.9	-96.2	224.9
14:30:00	41.2	7.1	166.8	220.1	9.3	415.9	28.1	18463	14051	61183.9	1443.1	1097.6	491.3	197.5	192.7	-8.2	-39.0	-92.8	259.6
14:31:00	41.1	7.3	167.3	219.9	9.3	413.6	27.6	18156	13944	60085.4	1450.9	1099.8	491.1	197.5	192.7	-4.9	-34.4	-87.0	267.6
14:32:00	41.0	7.1	166.7	220.2	9.3	413.8	27.5	19006	14174	61898.9	1450.8	1098.1	491.5	197.5	192.7	-19.8	-56.4	-114.3	208.1
14:33:00	41.0	7.0	166.1	221.5	9.5	415.0	27.6	18744	14073	61156.7	1446.1	1095.8	491.8	198.0	193.7	-14.4	-50.1	-105.4	224.6
14:34:00	40.8	7.0	167.0	220.0	9.5	413.3	28.6	18850	14174	60082.7	1442.9	1095.1	491.9	198.5	194.7	-12.2	-45.6	-101.9	239.4
14:35:00	40.8	7.2	167.8	219.8	9.5	411.8	27.9	18469	14056	61648.6	1446.6	1096.5	492.0	199.0	194.7	-7.0	-38.4	-94.4	250.9
14:36:00	40.8	7.4	167.4	220.1	9.6	412.7	28.4	18900	14275	63938.5	1447.2	1094.0	492.2	199.0	194.7	-19.1	-51.4	-116.1	183.4
14:37:00	40.8	7.5	167.1	219.1	9.6	412.8	28.6	18744	14174	61119.8	1446.8	1092.8	492.2	199.0	194.7	-8.9	-42.9	-96.6	217.9
14:38:00	40.9	7.1	166.7	221.0	9.1	410.8	27.6	18813	14185	65030.9	1448.4	1094.3	492.3	199.0	194.7	-23.8	-61.4	-121.8	179.7
14:39:00	41.1	7.1	166.3	219.9	9.1	413.5	27.5	18294	14084	59613.7	1448.6	1093.3	492.6	199.0	194.7	-3.6	-34.0	-87.9	262.3
14:40:00	40.6	7.2	166.8	220.2	9.1	412.0	27.5	18294	14084	60657.7	1455.8	1096.7	492.7	198.5	194.7	-19.1	-62.5	-103.7	200.2
Max	42.0	8.1	167.8	222.4	10.1	422.0	28.7	19475	14326	70422.3	1484.3	1140.0	492.7	199.0	194.7	-2.8	-32.0	-83.4	283.1
Min	35.5	6.1	143.5	217.3	8.3	410.6	27.3	18156	13820	59287.1	1381.3	1071.4	473.4	184.0	182.3	-31.2	-67.5	-130.7	158.7
Average	38.2	7.1	160.4	219.9	9.2	415.7	28.1	18705	14054	64366.1	1442.6	1113.1	486.1	192.9	189.7	-13.0	-46.6	-103.0	232.3

Test No. 3 - September 16, 2021

	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
8:58:00	42.5	7.8	163.4	213.1	15.6	428.5	26.0	18975	13478	68678.0	1481.4	1087.9	465.1	195.5	190.2	-10.9	-43.3	-98.3	228.9
8:59:00	42.3	7.6	162.8	212.5	15.6	429.5	25.2	19475	13787	68829.6	1483.9	1086.4	464.9	195.5	190.2	-12.7	-45.3	-102.7	258.8
9:00:00	42.5	7.7	163.5	212.3	15.6	428.9	25.4	18675	13545	67270.9	1486.2	1084.3	464.9	195.5	190.2	-6.6	-37.1	-89.4	272.8
9:01:00	42.2	7.6	163.2	212.5	15.6	428.6	25.4	19075	13534	72775.4	1490.9	1088.1	464.9	195.0	190.2	-29.6	-69.0	-128.7	167.4
9:02:00	42.2	7.6	163.2	212.5	15.6	428.6	25.4	19075	13534	72775.4	1490.9	1088.1	464.9	195.0	190.2	-29.6	-69.0	-128.7	167.4
9:03:00	42.2	7.6	163.2	212.5	15.6	428.6	25.4	19075	13534	72775.4	1490.9	1088.1	464.9	195.0	190.2	-29.6	-69.0	-128.7	167.4
9:04:00	42.2	7.6	163.2	212.5	15.6	428.6	25.4	19075	13534	72775.4	1490.9	1088.1	464.9	195.0	190.2	-29.6	-69.0	-128.7	167.4
9:05:00	42.2	7.6	163.2	212.5	15.6	428.6	25.4	19075	13534	72775.4	1490.9	1088.1	464.9	195.0	190.2	-29.6	-69.0	-128.7	167.4
9:06:00	42.4	8.0	163.1	213.5	15.4	430.3	25.6	18925	13489	68977.9	1482.6	1085.2	464.3	195.0	190.2	-11.7	-45.6	-97.9	225.2
9:07:00	42.4	7.3	163.5	211.9	15.3	427.7	26.6	19325	13444	70835.9	1487.3	1085.6	464.3	195.0	190.2	-27.3	-68.6	-126.0	182.3
9:08:00	42.3	7.6	162.8	213.2	15.3	430.1	25.3	18794	13539	66055.4	1484.9	1085.9	464.4	195.0	190.2	-5.6	-35.1	-88.8	271.9
9:09:00	42.1	7.7	162.5	212.0	15.3	428.6	25.9	18675	13427	66925.4	1492.3	1091.7	464.4	194.5	190.2	-6.4	-37.0	-101.0	233.6
9:10:00	42.3	7.5	162.0	213.0	15.3	428.5	25.8	19469	13787	69194.9	1483.8	1090.5	464.3	194.0	190.2	-17.2	-52.3	-108.7	223.8
9:11:00	42.5	7.9	163.3	212.0	15.3	428.4	26.4	18981	13674	67856.9	1483.1	1090.2	464.2	194.5	190.2	-15.6	-49.9	-104.8	237.1
9:12:00	42.6	7.6	162.1	212.6	15.3	430.7	26.6	18994	13545	67287.7	1483.1	1090.5	464.3	194.5	190.2	-10.1	-43.6	-96.5	247.3
9:13:00	42.6	7.7	162.4	214.2	15.3	429.3	25.4	18888	13545	68781.7	1487.1	1092.4	464.2	194.5	190.2	-11.0	-43.0	-96.9	260.8
9:14:00	42.4	7.8	163.0	212.6	15.3	431.3	26.0	19025	13567	69177.4	1485.6	1092.2	463.9	194.0	190.2	-14.4	-48.0	-104.2	216.2
9:15:00	42.3	7.5	162.8	213.9	16.2	428.6	26.4	18863	13567	66796.9	1487.4	1092.3	463.9	194.5	190.2	-11.3	-44.5	-98.0	231.1
9:16:00	42.3	7.7	162.5	210.7	16.3	427.9	26.3	19019	13567	66694.5	1488.3	1092.6	463.8	194.0	190.2	-9.4	-41.4	-95.5	260.3
9:17:00	42.2	7.7	162.5	212.7	15.2	430.8	25.2	18738	13466	66504.7	1491.2	1094.2	463.6	194.0	190.2	-7.3	-38.6	-91.2	273.4
9:18:00	42.9	7.7	163.6	211.7	16.2	431.5	25.7	19538	13601	67837.6	1489.9	1095.0	463.5	193.5	189.1	-24.7	-61.1	-121.2	209.1
9:19:00	42.9	7.8	162.4	212.6	16.2	428.6	25.8	19138	13607	67250.5	1485.7	1092.4	463.4	194.0	189.1	-16.7	-51.6	-108.2	228.5
9:20:00	42.8	7.8	162.4	213.2	15.9	428.0	25.8	19431	13714	68293.5	1486.4	1092.8	463.2	194.5	190.2	-17.4	-51.0	-109.6	240.4
9:21:00	42.6	7.9	162.5	213.7	15.9	430.7	26.6	18781	13590	68807.9	1487.3	1094.4	463.3	195.0	190.2	-11.4	-43.3	-97.7	255.7
9:22:00	42.5	7.8	162.7	211.6	15.2	430.7	26.0	19300	13624	68611.9	1493.3	1096.8	463.1	194.5	190.2	-26.5	-65.8	-124.7	173.6
9:23:00	42.8	7.7	163.3	212.3	15.3	427.7	26.5	18856	13489	66798.6	1492.4	1096.1	463.0	195.0	190.2	-11.4	-44.8	-98.1	225.6
9:24:00	42.7	7.6	163.5	214.7	15.3	428.1	26.6	18956	13494	70171.2	1497.1	1098.0	463.0	195.0	190.2	-25.0	-63.3	-119.6	186.0
9:25:00	42.9	7.8	163.4	212.7	15.4	430.0	26.0	18644	13506	66902.6	1494.1	1099.0	463.1	195.0	190.2	-6.9	-37.4	-90.8	272.8
9:26:00	43.1	7.7	163.2	211.1	15.4	430.0	26.6	18656	13500	65806.1	1501.9	1102.5	463.1	194.5	190.2	-4.9	-35.1	-87.0	281.8
9:27:00	43.3	8.0	162.7	211.7	15.4	430.7	26.4	19156	13601	66918.4	1498.9	1100.0	462.8	194.5	190.2	-17.9	-53.4	-111.3	220.7
9:28:00	43.1	7.8	162.7	212.4	15.4	429.9	25.3	18894	13612	65405.3	1494.9	1100.1	462.8	195.0	190.2	-13.3	-47.4	-104.6	237.4
9:29:00	42.7	7.4	163.1	211.9	15.4	429.8	26.5	18694	13506	65773.3	1493.8	1100.9	462.9	195.5	191.2	-12.5	-45.8	-101.1	251.2
9:30:00	42.3	7.7	163.2	210.8	15.6	428.5	26.5	18763	13506	66734.8	1492.7	1102.0	462.7	196.0	191.2	-10.2	-43.1	-96.6	259.8
9:31:00	41.6	7.9	163.2	212.2	15.6	430.4	26.4	19044	13455	66229.6	1488.8	1097.7	462.6	195.5	191.2	-14.2	-47.4	-104.4	216.3
9:32:00	41.7	7.8	162.9	211.4	15.6	429.4	25.7	19013	13438	66049.9	1484.6	1096.6	462.7	195.5	191.2	-12.3	-45.9	-98.0	230.1
9:33:00	41.5	7.7	162.8	210.6	15.6	430.5	25.4	18838	13669	67290.2	1481.3	1095.3	462.5	195.5	191.2	-11.6	-44.9	-99.0	261.8
9:34:00	41.9	8.1	163.6	212.5	15.6	429.0	25.9	18813	13427	65745.7	1486.4	1098.3	462.4	195.5	191.2	-7.3	-37.9	-90.2	274.3
9:35:00	41.8	7.8	162.1	212.4	15.6	430.1	25.8	19381	13685	68779.3	1488.3	1101.3	462.7	195.0	191.2	-25.9	-64.8	-121.7	198.5
9:36:00	42.0	7.8	163.6	212.0	15.6	428.6	25.4	19025	13584	66500.9	1483.3	1097.7	462.5	195.0	191.2	-16.7	-52.0	-107.1	226.7
9:37:00	41.9	7.6	162.0	212.0	15.5	431.3	25.9	19294	13697	68646.2	1480.4	1096.4	462.6	195.5	191.2	-27.5	-67.3	-122.6	201.1
9:38:00	42.1	7.7	162.7	212.0	15.4	429.0	26.6	18894	13472	67729.9	1481.8	1094.9	462.6	195.5	191.2	-11.9	-45.1	-96.8	255.1
9:39:00	41.3	7.7	162.3	211.8	15.4	429.1	26.6	18863	13567	70623.9	1483.6	1096.3	462.5	195.5	191.2	-25.9	-65.8	-123.0	172.1
9:40:00	41.4	8.0	163.0	211.6	15.4	431.8	26.2	18938	13444	67581.7	1478.3	1092.6	462.4	195.5	191.2	-13.9	-49.0	-103.1	222.8
9:41:00	41.5	7.7	161.5	211.6	15.4	429.4	26.6	18831	13449	66742.6	1479.6	1092.7	462.3	195.5	191.2	-10.9	-44.5	-103.4	208.8
9:42:00	41.7	7.9	163.4	211.9	15.5	430.4	25.2	18644	13573	66273.8	1477.9	1090.7	462.2	195.5	191.2	-9.3	-41.9	-92.9	269.3
9:43:00	41.6	7.5	162.0	212.0	15.5	428.2	25.2	18619	13449	64417.9	1480.7	1094.8	462.0	195.5	191.2	-7.3	-39.3	-90.0	278.2
9:44:00	41.6	7.6	162.8	212.8	15.5	431.6	26.4	19138	13539	69071.7	1477.1	1091.0	462.3	195.0	191.2	-19.4	-56.1	-112.4	220.3
9:45:00	41.9	7.8	162.6	210.8	15.5	430.0	25.6	18938	13523	67674.8	1476.2	1088.7	461.9	195.5	191.2	-15.3	-51.0	-106.5	232.4
9:46:00	41.7	7.5	156.5	211.5	15.5	429.8	26.4	19181	13523	66972.6	1473.9	1087.4	462.0	195.5	191.2	-15.3	-48.5	-103.7	247.3
9:47:00	41.5	7.9	158.4	211.3	15.5	430.8	25.4	18825	13500	67620.2	1473.3	1089.9	462.1	195.0	191.2	-12.3	-44.9	-97.7	257.8
9:48:00	41.4	7.7	160.4	213.1	15.5	430.7	25.7	19050	13523	68599.1	1472.6	1086.9	462.2	194.5	191.2	-17.2	-51.9	-107.2	213.8
9:49:00	41.6	7.8	160.3	211.1	15.5	430.4	26.2	18938	13523	66863.7	1472.1	1086.2	461.9	194.5	191.2	-10.7	-43.6	-97.3	227.2

Test No. 3 - September 16, 2021

	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
9:50:00	41.7	7.8	160.2	211.1	15.3	430.3	26.4	19106	13506	67172.3	1472.6	1086.7	462.0	194.0	190.1	-12.5	-45.9	-100.0	265.0
9:51:00	41.6	7.9	160.4	213.8	15.3	430.9	25.5	18719	13405	66757.9	1476.4	1090.0	462.0	194.0	190.1	-8.7	-40.4	-91.3	273.2
9:52:00	41.6	7.8	162.5	211.8	15.3	429.2	26.4	19319	13685	68334.0	1477.3	1090.1	461.7	193.5	190.1	-26.7	-65.4	-123.8	196.6
9:53:00	41.3	7.7	162.5	212.5	15.3	429.8	25.6	19113	13461	67078.9	1470.7	1085.4	461.6	193.5	190.1	-17.3	-51.0	-110.0	227.6
9:54:00	41.6	7.6	163.2	212.7	15.3	431.0	26.2	19294	13584	70074.3	1470.2	1085.0	461.5	193.5	190.1	-27.5	-67.4	-125.4	186.6
9:55:00	41.8	7.5	158.1	213.2	15.5	428.4	26.4	18906	13596	64104.7	1466.8	1084.1	461.6	194.0	190.1	-12.7	-47.0	-100.7	252.8
9:56:00	41.7	7.5	162.2	212.8	15.5	431.0	26.1	18775	13489	69541.6	1473.6	1088.1	461.5	193.5	190.1	-23.0	-62.3	-119.7	176.6
9:57:00	41.6	7.7	162.7	213.9	15.5	430.0	25.9	19031	13483	66881.0	1469.8	1085.5	461.5	193.5	190.1	-14.3	-48.0	-101.3	222.1
9:58:00	41.6	7.9	166.5	212.7	15.5	428.9	25.3	18781	13590	65902.2	1472.9	1085.9	461.3	193.5	190.1	-9.3	-42.6	-95.7	236.1
9:59:00	41.7	7.9	162.4	212.0	15.5	428.9	26.5	18869	13528	67110.0	1471.9	1084.8	461.1	193.5	190.1	-7.8	-39.0	-91.5	265.6
10:00:00	41.8	7.4	166.4	212.4	15.5	427.9	25.5	18588	13421	64534.3	1477.7	1087.1	461.0	193.0	190.1	-3.7	-35.1	-85.7	274.8
10:01:00	41.6	7.8	165.3	212.4	15.5	430.5	25.6	19200	13641	64929.7	1472.4	1084.5	461.1	193.0	189.1	-19.1	-56.8	-113.6	221.1
10:02:00	41.5	7.7	163.5	211.3	15.5	428.0	26.2	19088	13523	67260.9	1469.9	1083.3	461.1	193.5	190.2	-18.6	-53.1	-109.2	234.3
10:03:00	41.6	7.5	166.0	211.5	15.5	428.6	25.7	18881	13545	68350.7	1468.2	1081.7	461.0	194.0	190.2	-11.8	-43.1	-101.9	249.1
10:04:00	41.7	7.7	164.6	212.4	15.5	429.2	25.2	18900	13444	67771.5	1471.3	1084.4	460.8	194.0	190.2	-10.1	-42.4	-97.0	258.1
10:05:00	41.7	7.7	164.6	211.5	15.5	428.0	26.6	19213	13584	68769.3	1470.8	1084.8	460.9	194.0	190.2	-17.4	-52.5	-108.5	212.4
10:06:00	41.7	7.7	165.3	212.3	15.5	428.7	26.4	18825	13382	66383.1	1471.8	1087.4	460.6	194.5	190.2	-9.0	-39.9	-97.3	228.8
10:07:00	41.5	7.7	157.9	212.2	15.5	428.9	25.6	19319	13657	66034.5	1474.1	1086.8	460.7	194.5	190.2	-18.3	-53.0	-104.7	260.0
10:08:00	41.5	7.8	162.6	211.1	15.6	428.2	25.7	18800	13421	65704.9	1474.7	1089.3	460.6	195.0	190.2	-6.9	-39.3	-91.5	273.2
10:09:00	41.1	7.8	164.2	212.0	15.6	428.3	25.5	19475	13523	71757.8	1477.3	1091.3	460.7	194.5	190.2	-31.6	-71.1	-129.9	178.6
10:10:00	41.4	7.6	163.1	214.2	15.6	430.6	25.4	19094	13461	66344.5	1471.2	1084.9	460.6	195.0	190.2	-18.1	-51.8	-109.8	223.8
10:11:00	41.1	7.9	164.1	212.8	15.6	429.8	26.5	19188	13562	70121.2	1468.2	1085.2	460.7	195.5	191.2	-25.4	-63.5	-123.0	186.6
10:12:00	41.6	7.9	163.9	213.6	15.6	429.2	25.4	18775	13455	68148.7	1469.4	1084.1	460.4	196.0	191.2	-11.5	-44.9	-99.0	252.3
10:13:00	41.6	7.8	160.6	214.4	15.6	430.6	25.5	18781	13449	65794.4	1471.8	1086.9	460.5	196.0	191.2	-11.3	-43.5	-100.2	234.8
10:14:00	41.7	8.0	160.7	212.9	15.6	433.1	26.6	19031	13556	66020.7	1470.4	1085.8	460.6	196.0	191.2	-12.9	-45.8	-101.0	221.3
10:15:00	41.8	7.4	160.8	212.7	15.6	430.7	26.6	18925	13466	64969.2	1471.6	1086.5	460.5	195.5	191.2	-10.6	-42.8	-96.4	234.8
10:16:00	41.7	7.4	161.1	214.4	15.6	430.3	26.5	18756	13472	64957.3	1472.8	1085.9	460.5	195.5	191.2	-8.5	-39.3	-93.3	265.3
10:17:00	41.7	7.7	162.0	213.1	15.6	431.0	26.4	18519	13371	64058.7	1478.2	1088.6	460.4	195.0	191.2	-6.6	-36.6	-88.8	278.6
10:18:00	41.7	7.6	162.5	213.1	15.2	429.8	26.4	19300	13573	66857.8	1472.2	1084.6	460.7	195.0	191.2	-21.0	-58.4	-114.6	218.4
10:19:00	41.6	7.8	159.1	213.2	15.4	429.3	25.4	19113	13438	65465.9	1472.2	1084.2	460.8	195.0	191.2	-17.0	-50.9	-106.4	231.8
10:20:00	41.6	7.5	158.7	212.7	15.2	430.5	26.6	19063	13523	68060.9	1468.8	1082.0	460.5	195.0	191.2	-14.3	-49.0	-102.6	247.0
10:21:00	41.6	7.8	163.5	211.7	16.2	428.3	25.4	18725	13416	67446.2	1470.3	1084.8	460.4	194.5	191.2	-11.6	-45.1	-98.4	255.5
10:22:00	41.3	7.6	162.6	211.8	15.4	428.3	25.4	19438	13494	69379.9	1474.1	1085.1	460.5	194.5	191.2	-18.3	-55.4	-109.7	209.8
10:23:00	41.7	7.8	162.1	213.5	15.4	428.7	25.4	18819	13523	64821.5	1474.3	1085.4	460.5	194.5	191.2	-13.1	-47.0	-100.7	225.5
10:24:00	41.6	7.6	162.3	213.1	15.4	428.4	25.4	19363	13539	66104.0	1476.7	1087.8	460.7	194.0	191.2	-14.5	-49.8	-104.9	252.7
10:25:00	41.6	7.6	146.7	212.9	16.2	431.6	25.3	18700	13438	65064.5	1478.1	1089.2	460.7	194.0	190.1	-12.5	-42.4	-95.6	271.9
10:26:00	41.6	7.4	162.1	212.3	16.4	428.9	26.6	19319	13573	69297.9	1477.6	1093.9	460.7	193.0	190.1	-30.8	-70.5	-131.0	165.3
10:27:00	41.9	7.9	182.2	213.5	16.4	430.1	25.2	18975	13449	66423.7	1472.9	1089.8	460.6	193.0	190.1	-9.8	-47.4	-103.6	225.7
10:28:00	41.5	7.6	161.0	212.2	16.3	431.6	26.0	18900	13551	68026.8	1472.4	1085.3	460.5	193.5	190.1	-22.7	-61.1	-118.3	187.1
10:29:00	41.5	7.8	158.3	211.9	16.0	428.2	26.4	18819	13539	65175.3	1470.7	1085.1	460.3	194.0	190.1	-13.9	-49.1	-100.8	253.1
10:30:00	41.5	7.6	155.4	212.6	16.0	430.1	25.5	18800	13433	65449.9	1476.7	1087.7	460.2	194.0	190.1	-12.1	-45.1	-97.8	263.0
10:31:00	41.8	7.9	154.7	212.7	16.2	430.3	25.4	18919	13478	67451.3	1471.9	1086.6	460.2	194.5	190.1	-18.2	-53.1	-108.3	218.2
10:32:00	41.6	7.7	159.5	212.7	16.2	431.3	26.3	18775	13478	65926.9	1473.7	1088.3	460.1	194.5	190.1	-11.5	-44.6	-99.4	232.6
10:33:00	41.9	7.9	161.6	214.0	16.5	431.5	26.6	18831	13371	65175.0	1474.4	1087.7	460.2	194.5	190.1	-9.0	-41.3	-94.6	263.6
10:34:00	41.9	7.6	161.0	213.5	15.5	428.6	25.5	18588	13438	65114.4	1478.7	1090.8	460.2	194.5	190.1	-7.7	-37.9	-91.1	275.4
10:35:00	41.8	7.8	156.8	212.4	15.2	429.4	26.5	19356	13562	67392.5	1473.2	1088.1	460.1	194.0	190.1	-24.6	-61.3	-119.1	215.4
10:36:00	41.7	7.7	166.2	213.1	15.2	430.5	26.0	18750	13461	66278.8	1472.6	1086.5	460.2	194.5	190.1	-17.6	-55.1	-109.5	229.8
10:37:00	41.7	7.7	160.6	211.4	15.3	429.8	26.5	19231	13483	65983.4	1470.9	1084.9	460.0	195.5	191.2	-17.1	-53.1	-107.5	244.3
10:38:00	41.5	7.8	158.8	212.0	16.1	430.7	25.9	18775	13388	65894.6	1475.1	1085.3	460.0	196.0	191.2	-13.3	-46.5	-99.8	254.8
10:39:00	41.8	7.8	159.4	212.5	16.0	430.7	26.0	19231	13534	68182.9	1473.7	1088.2	460.1	195.5	191.2	-20.3	-56.5	-111.9	209.2
10:40:00	41.6	7.7	161.6	212.1	16.0	430.8	25.9	18888	13478	66780.8	1472.9	1088.5	460.0	195.0	191.2	-12.2	-46.9	-99.3	226.1
10:41:00	41.5	7.6	161.3	211.6	16.2	430.7	25.4	19300	13562	69147.6	1473.3	1089.2	460.2	195.0	191.2	-29.6	-70.3	-125.6	213.8

Test No. 3 - September 16, 2021

	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
10:42:00	41.8	7.7	161.0	211.9	16.3	431.1	26.5	18531	13332	66253.9	1477.6	1090.2	460.1	194.5	191.2	-8.2	-40.5	-93.1	270.6
10:43:00	41.3	7.6	158.7	211.6	16.3	431.0	26.6	18850	13444	69111.7	1476.9	1095.4	460.1	194.0	191.2	-30.9	-70.9	-128.6	165.3
10:44:00	41.4	7.9	159.8	212.9	16.3	433.7	26.6	18988	13562	66456.9	1466.4	1089.6	460.1	194.0	191.2	-17.2	-53.1	-109.6	224.9
10:45:00	41.2	7.5	159.3	212.4	16.1	431.7	25.5	18781	13528	67463.8	1466.9	1089.9	459.9	194.0	191.2	-15.6	-51.9	-108.4	217.1
10:46:00	41.4	7.5	151.4	213.9	16.1	430.8	25.6	19088	13528	68139.4	1464.9	1088.3	460.0	194.0	191.2	-16.2	-49.8	-105.4	251.3
10:47:00	41.5	7.6	151.6	213.2	16.1	431.0	25.4	18819	13405	67136.5	1467.6	1091.6	460.0	193.0	191.2	-12.9	-44.5	-100.1	260.0
10:48:00	41.6	7.8	156.1	213.4	16.1	432.6	26.3	19019	13466	66755.8	1467.1	1089.3	459.9	192.5	190.0	-17.8	-52.6	-108.4	216.8
10:49:00	41.4	7.7	147.6	213.9	16.3	431.8	26.6	18881	13573	67237.6	1466.3	1090.4	459.9	192.0	188.9	-16.4	-48.5	-104.0	229.7
10:50:00	40.9	7.8	152.7	212.3	15.2	433.2	26.5	19044	13478	67585.5	1460.4	1087.9	459.8	191.0	188.9	-13.3	-45.6	-100.8	265.6
10:51:00	41.3	7.5	175.4	213.7	15.2	433.4	25.3	18881	13416	67235.0	1467.4	1090.8	459.6	190.0	187.8	-4.6	-35.5	-90.3	277.8
10:52:00	41.0	7.6	161.8	214.0	15.2	431.6	25.4	19450	13641	69111.2	1463.2	1086.6	459.5	189.5	187.8	-25.0	-61.9	-122.1	215.5
10:53:00	41.0	7.6	160.8	212.9	16.1	433.1	25.6	19225	13539	68845.4	1460.1	1082.9	459.6	190.0	187.8	-19.6	-56.6	-112.8	229.9
10:54:00	41.1	7.3	159.1	212.8	15.2	434.0	25.3	19144	13551	67150.4	1458.4	1080.6	459.3	190.0	187.8	-18.9	-51.9	-110.9	242.3
10:55:00	41.4	7.7	160.3	214.2	15.1	432.3	25.5	18894	13348	67370.8	1458.1	1082.1	459.1	190.5	187.8	-14.4	-45.3	-104.0	254.9
10:56:00	41.3	7.6	152.1	212.9	16.2	433.3	25.3	19356	13556	66298.3	1457.8	1083.0	458.8	190.0	187.8	-27.5	-65.0	-123.5	202.4
10:57:00	41.2	7.9	154.6	213.6	16.4	433.1	25.4	18863	13556	68749.4	1457.3	1081.9	458.8	190.0	187.8	-17.1	-51.6	-107.8	223.8
10:58:00	41.0	7.8	152.9	212.1	16.2	433.5	26.5	19463	13562	70897.3	1456.7	1082.7	458.4	189.5	186.8	-34.5	-73.1	-135.7	181.2
11:54:00	42.0	7.6	162.8	212.7	15.5	430.4	26.5	18863	13489	64487.2	1472.9	1086.4	450.9	198.5	191.7	-15.8	-48.5	-108.6	245.6
11:55:00	42.4	7.7	162.8	213.3	15.3	428.0	26.3	18650	13371	63272.8	1474.9	1089.2	451.4	199.0	191.7	-12.3	-45.9	-101.1	258.0
11:56:00	42.1	7.4	163.4	214.5	15.0	429.7	26.6	19031	13455	64492.0	1476.6	1088.6	451.5	199.5	192.7	-16.5	-51.9	-110.0	214.2
11:57:00	41.9	7.7	160.1	214.0	16.4	427.8	25.3	18925	13449	63657.7	1477.1	1089.9	452.0	200.0	192.7	-15.0	-49.1	-105.4	227.4
11:58:00	42.0	7.6	162.5	212.2	15.3	428.7	25.3	18900	13596	62456.3	1473.7	1089.4	452.4	200.5	192.7	-12.9	-47.4	-104.0	262.6
11:59:00	42.2	7.7	161.6	212.6	16.4	428.8	25.9	18519	13365	62710.9	1478.3	1091.1	452.6	200.5	192.7	-9.8	-42.5	-93.6	271.6
12:00:00	42.1	7.7	162.1	213.4	15.4	429.2	26.0	19300	13517	64274.2	1479.8	1093.5	452.9	200.5	192.7	-27.2	-65.1	-129.5	190.8
12:01:00	42.2	7.8	162.9	214.1	15.4	431.0	26.7	18944	13410	63345.1	1473.7	1087.9	453.2	201.0	193.7	-18.4	-54.8	-112.5	224.9
12:02:00	42.1	7.7	162.6	213.1	15.4	430.5	26.3	19100	13416	66525.3	1475.1	1086.9	453.7	201.5	194.7	-25.9	-63.4	-125.3	184.4
12:03:00	42.4	7.8	162.7	214.1	16.4	431.6	26.6	18663	13405	64595.4	1479.3	1089.6	454.1	201.5	194.7	-11.1	-42.4	-98.7	251.5
12:04:00	42.1	7.8	162.2	215.3	16.3	432.0	26.5	18713	13455	65851.4	1480.6	1092.7	454.4	200.5	194.7	-23.3	-63.5	-119.3	175.3
12:05:00	42.3	7.5	162.5	213.8	15.4	431.9	26.1	18725	13438	61454.8	1479.9	1089.6	454.8	200.0	194.7	-13.3	-46.9	-103.8	219.8
12:06:00	42.1	7.7	161.9	213.7	15.4	431.6	25.6	18475	13438	60345.4	1482.2	1094.7	455.2	199.5	193.6	-11.4	-44.6	-101.2	232.8
12:07:00	42.2	7.6	163.7	213.9	15.4	431.8	25.7	18438	13348	62147.1	1482.4	1094.3	455.5	199.0	193.6	-8.8	-40.0	-96.0	263.2
12:08:00	42.0	7.6	162.3	213.9	15.4	431.2	25.6	18438	13348	59778.3	1490.4	1097.5	455.6	198.0	192.6	-8.2	-37.3	-93.1	275.0
12:09:00	42.2	7.7	162.1	214.3	15.4	433.1	25.5	19175	13562	62104.6	1484.9	1092.4	455.7	197.0	192.6	-22.0	-59.4	-120.7	219.2
12:10:00	41.8	7.6	163.0	214.5	15.4	430.7	26.6	18950	13455	63768.0	1481.1	1088.1	456.1	197.0	192.6	-17.7	-54.4	-112.4	232.0
12:11:00	41.9	7.5	162.0	213.5	15.7	433.4	26.6	19056	13455	62698.0	1477.7	1087.5	456.3	197.5	192.6	-14.8	-50.0	-106.8	247.9
12:12:00	41.7	7.5	163.3	213.4	15.7	431.6	26.6	18669	13337	62278.1	1479.2	1090.1	456.3	197.5	192.6	-12.9	-45.8	-101.4	258.9
12:13:00	41.8	7.6	163.0	212.8	15.7	431.6	25.4	19181	13612	64196.8	1479.1	1088.5	456.6	197.0	192.6	-18.5	-53.8	-111.4	211.9
12:14:00	42.1	7.7	163.0	213.8	15.7	430.6	25.8	18919	13500	63318.3	1479.3	1088.0	456.5	197.5	192.6	-14.7	-49.5	-106.1	226.3
12:15:00	42.1	7.4	162.3	215.2	15.7	430.7	25.3	19156	13545	62703.0	1480.1	1086.3	456.9	197.0	192.6	-16.3	-51.0	-108.7	262.8
12:16:00	41.8	7.7	163.2	215.5	15.7	431.1	26.1	18650	13421	61725.3	1482.2	1088.4	457.0	197.0	192.6	-10.5	-45.1	-98.8	269.1
12:17:00	41.7	7.4	161.4	213.8	15.7	431.4	25.3	19388	13562	66732.1	1483.2	1092.8	457.1	196.5	191.6	-29.1	-64.3	-132.5	176.8
12:18:00	42.0	7.9	162.6	212.9	15.7	433.8	25.9	19044	13562	64088.6	1474.6	1087.5	457.2	197.0	191.6	-22.0	-61.1	-118.7	222.8
12:19:00	41.7	7.7	162.8	212.6	15.7	431.8	26.5	19006	13455	66301.0	1474.9	1087.6	457.1	197.0	192.7	-28.4	-66.4	-130.4	184.2
12:20:00	41.8	7.6	162.3	212.4	15.7	433.4	25.5	18725	13360	61237.7	1475.7	1087.1	457.2	197.5	192.7	-11.1	-43.6	-101.1	249.8
12:21:00	41.5	7.4	160.9	213.6	15.7	433.3	26.3	18744	13494	65317.5	1481.4	1091.1	457.2	197.0	192.7	-12.0	-45.5	-106.1	234.1
12:22:00	41.7	7.5	162.8	213.7	15.7	433.1	26.5	18788	13360	61976.4	1480.3	1090.2	457.2	197.0	192.7	-15.2	-50.8	-109.7	220.9
12:23:00	42.0	7.6	162.7	214.3	15.5	430.8	25.4	18575	13365	63112.3	1481.7	1094.5	457.2	197.0	192.7	-13.0	-48.5	-100.7	231.6
12:24:00	41.7	7.5	162.5	212.9	15.5	431.3	25.7	18769	13360	62840.9	1480.8	1090.9	457.3	197.0	192.7	-12.8	-45.5	-102.0	266.3
12:25:00	41.4	7.3	162.6	212.1	15.5	431.7	25.6	18413	13360	62647.3	1483.9	1093.0	457.4	197.0	192.7	-8.8	-42.3	-95.3	281.2
12:26:00	41.7	7.7	162.4	213.2	15.5	431.6	26.5	19150	13579	65098.2	1476.4	1088.9	457.4	196.5	192.7	-22.7	-60.6	-121.2	218.3
12:27:00	42.0	7.5	162.3	214.5	15.2	431.3	25.3	19006	13472	62410.0	1474.8	1086.4	457.8	197.0	192.7	-20.2	-57.9	-115.0	230.9
12:28:00	42.0	7.6	162.2	213.9	15.3	430.9	25.5	18838	13472	63190.4	1474.3	1084.9	457.5	197.0	192.7	-17.1	-52.4	-109.8	248.2

Test No. 3 - September 16, 2021

	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
12:29:00	41.7	7.5	162.6	214.5	15.2	431.4	26.4	18700	13360	63104.4	1475.9	1088.1	457.6	197.0	192.7	-13.1	-48.5	-102.8	257.8
12:30:00	41.7	7.7	159.9	212.4	16.2	431.6	26.6	19363	13461	64091.5	1475.2	1088.4	457.8	197.0	192.7	-19.6	-56.3	-117.0	210.4
12:31:00	41.7	7.6	160.6	213.1	15.3	431.9	25.5	18850	13421	62286.3	1474.2	1088.3	457.8	197.0	192.7	-13.8	-47.0	-104.4	226.3
12:32:00	41.9	7.7	160.3	213.1	16.5	430.7	26.6	19488	13584	64014.7	1474.1	1089.8	458.0	196.5	192.7	-17.9	-52.4	-112.5	255.1
12:33:00	41.7	7.6	161.2	213.1	16.2	431.0	26.5	18938	13371	64477.4	1478.3	1089.8	457.8	196.5	192.7	-11.4	-43.9	-98.9	271.9
12:34:00	41.6	7.5	161.6	212.9	16.2	431.9	25.4	19225	13489	67028.0	1479.6	1092.0	457.9	196.0	191.6	-33.8	-75.6	-138.9	168.6
12:35:00	41.8	7.6	162.2	214.4	15.9	431.7	26.3	19050	13489	64027.0	1474.1	1084.3	457.8	196.0	191.6	-18.1	-54.3	-113.9	226.4
12:36:00	41.7	7.4	163.0	213.8	15.9	431.8	26.3	18988	13376	66006.6	1474.9	1085.6	457.8	196.5	192.7	-26.1	-67.4	-123.9	190.1
12:37:00	41.7	7.6	162.6	213.8	15.9	432.1	26.6	18956	13388	64793.3	1472.1	1084.5	458.1	196.5	192.7	-15.2	-49.4	-105.8	254.3
12:38:00	41.3	7.3	162.6	213.0	15.9	431.7	25.8	18631	13388	63330.0	1478.1	1087.6	458.0	196.5	192.7	-10.4	-44.0	-97.4	262.9
12:39:00	41.7	7.2	163.9	214.0	15.9	432.3	25.6	18981	13376	63709.2	1475.9	1086.5	458.2	196.5	192.7	-12.3	-47.1	-104.7	217.6
12:40:00	41.7	7.5	163.0	213.6	15.9	429.2	25.3	18850	13405	63837.9	1480.6	1090.0	458.3	196.5	192.7	-12.4	-46.5	-99.3	231.3
12:41:00	41.8	7.4	162.7	214.1	15.9	429.7	25.3	18925	13410	64437.0	1479.2	1088.6	458.4	196.5	192.7	-11.9	-44.5	-98.6	266.5
12:42:00	41.9	7.8	163.8	213.6	15.9	431.2	25.3	18538	13303	61797.3	1481.4	1092.3	458.2	196.5	192.7	-9.0	-41.4	-96.5	276.5
12:43:00	41.6	7.5	163.1	214.1	15.9	428.6	26.3	19225	13455	64979.6	1478.7	1089.0	458.2	196.5	192.7	-22.0	-58.6	-119.1	213.1
12:44:00	41.8	7.3	163.3	214.1	15.9	430.6	26.4	19044	13444	64872.7	1472.3	1086.7	458.2	196.5	192.7	-20.4	-56.6	-114.5	229.9
12:45:00	41.4	7.5	162.6	214.2	15.9	431.5	25.3	19269	13539	64740.2	1470.9	1084.1	458.2	197.0	192.7	-16.7	-50.9	-108.8	245.1
12:46:00	41.9	7.4	163.0	212.1	15.9	429.8	26.5	18906	13421	63380.6	1474.9	1085.8	458.2	197.5	192.7	-11.4	-46.0	-100.5	254.5
12:47:00	41.7	7.6	162.7	213.1	15.9	430.7	25.4	19338	13416	65652.7	1474.4	1086.8	458.4	197.0	192.7	-20.0	-55.1	-116.3	209.0
12:48:00	42.3	7.7	162.6	213.8	15.9	430.6	26.4	18656	13433	63330.6	1475.4	1087.7	458.3	197.5	192.7	-13.8	-47.0	-104.9	224.4
12:49:00	41.9	7.7	162.4	214.0	15.9	433.6	26.1	19388	13562	67889.2	1476.3	1089.0	458.1	197.5	192.7	-30.3	-68.6	-129.5	212.8
12:50:00	41.6	7.6	162.5	213.5	15.9	431.8	26.3	18394	13337	63647.7	1480.4	1090.2	458.4	197.5	192.7	-9.8	-43.3	-95.9	269.4
12:51:00	41.6	7.7	163.3	214.1	15.9	430.5	25.2	18644	13489	67631.3	1486.8	1096.5	458.4	197.5	192.7	-31.1	-71.8	-133.5	165.8
12:52:00	41.6	7.5	164.0	214.0	15.9	431.0	26.2	18963	13523	65506.3	1479.1	1088.7	458.4	197.5	192.7	-19.3	-56.4	-115.8	225.2
12:53:00	41.3	7.5	163.0	213.3	15.9	430.4	26.6	18850	13405	63237.4	1478.2	1087.2	458.5	198.0	193.7	-18.9	-58.5	-113.2	218.1
12:54:00	41.4	7.4	163.3	212.4	15.9	429.6	25.4	18600	13410	63595.2	1476.6	1086.4	458.5	198.0	193.7	-10.9	-43.3	-100.9	249.5
12:55:00	41.6	7.7	162.5	213.2	15.9	431.0	26.6	18525	13393	63371.9	1480.8	1089.8	458.6	198.0	193.7	-10.3	-41.0	-98.8	263.1
12:56:00	41.6	7.7	163.0	214.8	15.9	431.6	25.3	18806	13309	63206.7	1478.8	1089.7	458.6	198.0	193.7	-15.0	-47.9	-107.0	215.5
12:57:00	41.6	7.6	162.5	214.1	15.9	430.7	26.5	18719	13309	61387.8	1480.4	1089.4	458.6	197.5	193.7	-12.3	-45.0	-102.2	229.7
12:58:00	41.6	7.7	163.3	215.3	15.9	431.8	25.6	18650	13421	62643.4	1481.3	1086.3	458.6	197.5	193.7	-10.9	-44.9	-99.1	265.1
12:59:00	41.4	7.5	162.4	213.4	15.9	428.1	25.6	18525	13309	63683.9	1485.3	1089.0	458.9	197.5	193.7	-10.1	-41.8	-95.7	278.1
13:00:00	41.7	7.3	162.6	213.8	15.9	431.3	26.4	19419	13511	65081.8	1482.3	1087.8	458.9	197.0	193.7	-25.1	-62.5	-122.0	213.6
13:01:00	41.7	7.6	162.7	214.2	15.9	433.2	26.6	19006	13388	63839.5	1479.8	1086.7	458.8	197.5	193.7	-18.4	-54.9	-111.3	231.0
13:02:00	41.6	7.6	162.8	213.5	15.9	431.8	25.3	19131	13399	63188.6	1482.7	1087.9	459.0	198.0	193.7	-16.5	-51.3	-109.1	246.4
13:03:00	42.2	7.7	163.1	214.3	15.9	431.4	25.3	18606	13399	62223.8	1483.8	1088.4	459.1	198.5	193.7	-11.9	-45.8	-101.9	257.7
13:04:00	41.5	7.5	162.5	213.2	15.9	430.1	25.8	19363	13399	61177.9	1488.3	1090.3	459.0	198.5	193.7	-20.6	-56.6	-116.4	200.9
13:05:00	41.4	7.5	162.8	213.7	15.9	431.3	25.9	18794	13275	62875.4	1488.7	1090.7	459.2	199.0	193.7	-11.7	-46.5	-100.8	222.1
13:06:00	41.6	7.6	159.0	213.2	15.9	432.1	25.8	19100	13506	67841.4	1491.2	1094.2	459.2	199.0	193.7	-32.4	-73.8	-134.6	182.0
13:07:00	41.7	7.4	162.1	214.8	15.9	432.9	25.4	18700	13303	61567.6	1489.2	1092.7	459.2	199.0	193.7	-9.9	-43.3	-97.8	270.5
13:08:00	41.6	7.4	161.0	214.1	15.9	431.9	25.3	18531	13202	68210.8	1494.6	1097.6	459.1	199.0	193.7	-27.9	-70.3	-127.2	173.3
13:09:00	41.8	7.7	161.4	213.6	15.9	432.0	25.3	19019	13466	62796.1	1491.3	1092.3	459.4	199.0	194.7	-21.1	-57.3	-118.2	221.8
13:10:00	41.8	7.5	161.3	214.2	15.9	431.0	26.5	18763	13337	65914.0	1491.6	1092.9	459.5	199.5	194.7	-17.2	-51.5	-110.0	234.2
13:11:00	42.0	7.5	160.8	214.3	15.9	432.7	25.5	18644	13354	63590.1	1492.8	1095.0	459.6	200.0	195.7	-11.8	-44.1	-101.1	247.2
13:12:00	41.9	7.6	162.7	213.5	15.9	431.4	26.4	18419	13230	62355.5	1500.4	1097.4	459.7	200.0	195.7	-9.4	-43.3	-97.4	258.3
13:13:00	41.8	7.4	163.5	214.3	15.9	430.6	26.5	18800	13410	61408.8	1499.9	1095.1	459.6	200.0	195.7	-14.7	-49.3	-106.9	218.8
13:14:00	42.2	7.5	161.8	214.1	15.9	431.3	26.5	18450	13421	63722.6	1500.2	1094.9	459.6	200.5	195.7	-10.0	-42.1	-99.1	230.3
13:15:00	42.1	7.5	162.7	213.3	16.1	432.9	25.3	18569	13320	61836.9	1501.2	1096.4	459.8	200.5	195.7	-10.1	-44.1	-100.6	266.9
13:16:00	41.7	7.7	162.2	214.2	16.1	433.0	26.5	18444	13320	61665.3	1509.1	1100.3	459.7	200.5	195.7	-6.2	-36.9	-92.3	274.8
13:17:00	41.9	7.5	162.4	213.3	16.4	431.3	26.5	19300	13534	62273.0	1506.9	1097.6	459.9	200.0	195.7	-23.1	-60.3	-122.3	214.8
13:18:00	41.9	7.5	163.2	213.5	16.3	430.7	25.5	18819	13449	63251.2	1501.2	1093.9	459.9	200.5	195.7	-15.9	-51.4	-111.6	230.8
13:19:00	41.7	7.3	163.1	213.0	15.6	431.7	26.6	18950	13427	62699.3	1498.3	1092.8	460.1	201.0	195.7	-16.4	-51.1	-110.2	245.6
13:20:00	41.5	7.8	162.1	213.7	15.6	431.0	25.3	18519	13326	61896.0	1502.7	1094.8	460.4	201.5	196.7	-10.0	-42.4	-98.5	254.0

Test No. 3 - September 16, 2021

	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
13:21:00	41.6	7.3	161.7	212.4	15.6	431.0	25.5	19113	13449	65962.1	1504.3	1098.5	460.2	201.0	196.7	-24.2	-58.4	-125.0	180.6
13:22:00	41.6	7.6	161.5	213.0	15.6	431.5	26.0	18663	13382	61752.0	1500.4	1099.5	460.4	201.0	196.7	-13.7	-47.3	-102.9	224.1
13:23:00	41.6	7.5	162.7	214.0	15.6	430.3	26.5	18631	13489	65912.4	1501.8	1104.1	460.4	201.0	196.7	-26.7	-64.1	-125.6	182.1
13:24:00	42.0	7.7	163.3	215.0	15.4	433.6	26.5	18300	13275	61467.0	1502.1	1103.4	460.6	201.0	196.7	-9.4	-39.9	-96.6	268.6
13:25:00	41.7	7.5	162.4	214.7	15.4	429.6	26.6	18531	13258	60039.8	1506.3	1103.3	460.7	201.0	196.7	-11.9	-60.6	-96.7	242.3
13:26:00	41.7	7.7	162.0	213.9	15.5	433.3	26.2	19150	13444	64986.4	1501.4	1100.6	461.0	201.0	195.6	-18.3	-53.1	-114.4	222.6
13:27:00	41.6	7.4	162.0	213.8	15.1	432.2	26.1	18906	13421	62794.4	1499.6	1100.4	461.2	201.0	195.6	-15.6	-51.0	-108.8	235.7
13:28:00	41.8	7.4	161.7	214.4	15.2	431.0	25.4	18831	13360	62095.2	1498.9	1096.4	461.0	201.5	196.7	-12.9	-45.8	-102.6	250.4
13:29:00	41.7	7.6	161.8	214.0	15.2	430.7	25.8	18500	13258	60832.9	1503.7	1105.4	461.4	201.5	196.7	-10.1	-42.5	-96.6	258.1
13:30:00	41.8	7.7	162.5	213.3	16.0	430.5	26.5	18894	13360	61395.4	1501.2	1104.4	461.2	201.5	196.7	-13.1	-46.4	-102.9	213.3
13:31:00	41.7	7.6	163.2	215.0	16.0	429.8	26.3	18700	13376	64734.6	1502.9	1106.4	461.6	201.5	196.7	-11.0	-44.5	-100.3	230.4
13:32:00	41.9	7.6	162.3	214.0	16.0	431.2	26.7	18713	13399	61799.0	1500.3	1104.5	461.6	201.5	196.7	-13.4	-47.9	-102.3	261.4
13:33:00	41.9	7.6	162.8	214.6	16.0	430.8	26.1	18394	13264	60662.3	1505.1	1108.4	461.5	202.0	196.7	-5.2	-38.3	-90.0	271.7
13:34:00	41.6	7.5	162.2	212.8	16.0	431.3	26.4	19231	13393	63223.5	1502.8	1109.4	462.0	201.5	196.7	-24.4	-61.9	-124.2	205.4
13:35:00	41.9	7.8	163.7	215.0	16.0	433.1	26.4	18881	13258	62300.4	1499.3	1105.3	462.0	202.0	196.7	-18.0	-54.3	-111.0	227.4
13:36:00	41.5	7.5	163.1	213.3	16.1	432.3	25.6	19050	13444	63601.5	1497.8	1104.6	461.9	202.5	197.7	-19.4	-55.5	-116.0	238.9
13:37:00	42.1	7.5	162.8	214.4	16.2	433.7	26.6	18325	13303	61329.2	1499.1	1108.3	461.9	203.0	197.7	-12.6	-45.4	-102.2	255.1
13:38:00	41.7	7.5	162.1	215.0	15.4	433.3	26.0	18775	13405	65252.3	1504.3	1111.6	461.9	203.0	197.7	-25.9	-65.1	-127.1	171.3
13:39:00	42.2	7.4	162.8	214.8	16.4	434.2	26.7	18700	13275	60336.0	1505.4	1109.7	462.2	203.5	197.7	-13.8	-48.4	-105.1	224.5
13:40:00	41.4	7.5	164.1	212.4	16.0	433.2	26.6	18344	13270	65678.5	1505.9	1110.6	462.1	203.5	197.7	-26.7	-65.3	-126.0	186.6
13:41:00	41.7	7.6	163.0	213.1	16.0	432.4	26.1	18350	13242	61246.7	1505.9	1110.8	462.2	203.5	197.7	-7.4	-39.9	-95.4	267.6
13:42:00	41.5	7.4	162.9	212.7	16.0	432.5	26.4	18281	13242	59779.4	1509.4	1115.6	462.3	203.0	197.7	-4.6	-35.3	-88.0	276.6
13:43:00	40.8	7.6	162.6	213.3	16.0	432.3	26.6	18813	13382	62557.3	1500.3	1111.5	462.4	203.0	197.7	-19.6	-54.5	-115.8	223.3
13:44:00	41.0	6.8	161.0	214.7	16.0	432.5	25.8	18731	13382	63144.4	1500.8	1107.0	462.5	203.0	197.7	-15.1	-48.4	-108.1	236.8
13:45:00	41.2	7.5	162.5	214.0	16.0	431.9	26.3	18631	13371	61480.6	1496.2	1103.6	462.8	203.0	197.7	-10.3	-42.1	-98.5	246.4
13:46:00	40.9	7.6	161.5	214.0	15.0	431.3	25.5	18581	13270	61868.6	1497.6	1109.1	462.9	203.0	197.7	-9.0	-39.3	-94.8	258.5
13:47:00	40.9	7.5	161.5	212.9	16.1	433.3	25.4	18850	13264	62032.3	1494.3	1110.9	463.1	202.5	197.7	-15.9	-50.0	-106.8	214.1
13:48:00	40.9	7.5	164.0	213.9	16.3	430.6	25.6	18725	13303	61259.8	1494.9	1110.2	462.8	202.5	197.7	-10.4	-41.9	-100.3	229.1
13:49:00	40.8	7.6	162.8	213.9	16.3	432.5	26.4	18700	13399	62679.1	1493.9	1108.1	463.0	202.0	197.7	-12.7	-46.3	-102.6	263.8
13:50:00	41.0	7.6	163.5	213.9	15.2	430.4	26.0	18375	13298	60841.5	1495.1	1109.8	463.1	202.0	197.7	-6.3	-36.0	-91.7	273.3
13:51:00	40.9	7.5	163.0	215.5	16.0	431.3	25.7	19306	13399	63416.6	1495.9	1107.2	463.3	201.5	196.6	-26.1	-64.0	-127.5	197.3
13:52:00	40.4	7.6	164.0	215.0	16.0	430.3	26.6	18863	13506	62276.7	1487.3	1099.9	463.3	201.5	196.6	-16.7	-51.4	-109.7	227.9
13:53:00	40.5	7.5	162.9	214.4	16.0	431.6	26.5	19188	13421	65393.0	1484.3	1100.8	463.4	201.5	196.6	-26.9	-64.1	-125.6	199.5
13:54:00	40.8	7.6	163.4	214.2	16.0	431.3	25.9	18463	13214	63427.8	1485.2	1101.1	463.2	202.0	197.7	-11.3	-44.3	-99.9	254.2
Max	43.3	8.1	182.2	215.5	16.5	434.2	26.7	19538	13787	72775.4	1509.4	1115.6	465.1	203.5	197.7	-3.7	-35.1	-85.7	281.8
Min	40.4	6.8	146.7	210.6	15.0	427.7	25.2	18281	13202	59778.3	1456.7	1080.6	450.9	189.5	186.8	-34.5	-75.6	-138.9	165.3
Average	41.8	7.6	162.0	213.1	15.7	430.7	26.0	18907	13461	65412.6	1482.2	1092.0	460.2	196.7	192.4	-15.9	-50.7	-107.1	232.7

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.: 16687 - 1 to 3
Report date: Oct 14 , 2021
Sample in: Sept 27, 2021
P.O. no.: 22114-J2805

Re: Process Samples from Clean Harbors, Sarnia, Sept 27 ,2021, Project no.: 22114 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.
16687-	Test #1 Sept 14,2021 19-22114	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	1.45	<0.01	48.72	11.08	3.05	35.70	33.00
2	FL-4 Lean Feed	5.10	0.67	9.20	10.73	1.04	73.26	69.50
3	FE-4 Emulsion Feed	2.76	0.22	18.69	10.21	1.71	66.41	37.50

* 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.: 16687 - 4 to 6
Report date: Oct 14 , 2021
Sample in: Sept 27, 2021
P.O. no.: 22114-J2805

Attn: Christine Belore, Tina Sanderson

Re: Process Samples from Clean Harbors, Sarnia, Sept 27,2021 , Project no.: 22114
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.
16687-	Test #1 Sept 15,2021 19-22114-	Ash ASTM D3174 (A)	Sulphur ASTM D1559 (S)	Carbon ASTM D3178 (C)	Hydrogen ASTM D3178 (H)	Nitrogen ASTM D3179 (N)	Oxygen (O)	Water ASTM D3173
4	FR-9 Rich Feed	1.29	<0.01	49.84	10.61	2.07	36.19	14.50
5	FL-9 Lean Feed	6.10	0.75	10.40	10.71	1.07	70.97	76.30
6	FE-9 Emulsion Feed	2.49	0.31	20.41	10.05	1.44	65.30	63.50

* 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.: 16687 - 7 to 9
Report date: Oct 14, 2021
Sample in: Sept 27, 2021
P.O. no.: 22114 - J2805

Attn: Christine Belore, Tina Sanderson

Re: Process Samples from Clean Harbors, Sarnia, Sept 27,2021 , Project no.: 22114
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.
16687-	Test #1 Sept 16,2021 19-22114-	Ash ASTM D3174 (A)	Sulphur ASTM D1559 (S)	Carbon ASTM D3178 (C)	Hydrogen ASTM D3178 (H)	Nitrogen ASTM D3179 (N)	Oxygen (O)	Water ASTM D3173
7	FR-14 Rich Feed	2.05	<0.01	51.90	10.88	1.21	33.96	37.40
8	FL-14 Lean Feed	3.37	0.66	7.41	10.33	1.66	76.57	88.25
9	FE-14 Emulsion Feed	1.71	0.19	20.38	10.00	1.46	66.26	65.30

* 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.: 16687- 1 to 9
Report date: Oct 14 , 2021
Sample in: Sept 27, 2021
P.O. no.: 22114-J2805

Attn: Christine Belore, Tina Sanderson

Process Samples : Clean Harbors, Sarnia Ortech Project #22114
Ash content - % by weight -test method- ASTM D482

Lab no.	Sample ID#	Run 1	Run 2	Average	Repeatability
16687-	19-221114				Difference between Run 1 and 2
1	FR-4 Rich feed	1.44	1.46	1.45	0.02
2	FL-4 Lean feed	5.17	5.03	5.10	0.14
3	FE-4 Emulsion feed	2.82	2.70	2.76	0.12
4	FR-9 Rich feed	1.36	1.22	1.29	0.14
5	FL-9 Lean feed	6.15	6.05	6.10	0.10
6	FE-9 Emulsion feed	2.55	2.42	2.49	0.13
7	FR-14 Rich feed	1.99	2.10	2.05	0.11
8	FL-14 Lean feed	3.30	3.44	3.37	0.14
9	FE-14 Emulsion feed	1.65	1.77	1.71	0.12

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.: 16687- 1 to 9
Report date: Oct 14 , 2021
Sample in: Sept 27, 2021
P.O. no.: 22114-J2805

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
16687-	19-22114-				Difference between Run 1 and 2
1	FR-4 Rich feed	<0.01	<0.01	<0.01	<0.01
2	FL-4 Lean feed	0.63	0.71	0.67	0.08
3	FE-4 Emulsion feed	0.22	0.22	0.22	0.00
4	FR-9 Rich feed	<0.01	<0.01	<0.01	<0.01
5	FL-9 Lean feed	0.79	0.71	0.75	0.08
6	FE-9 Emulsion feed	0.35	0.26	0.31	0.09
7	FR-14 Rich feed	<0.01	<0.01	<0.01	<0.01
8	FL-14 Lean feed	0.69	0.62	0.66	0.07
9	FE-14 Emulsion feed	0.15	0.22	0.19	0.07

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.: 16687 - 1 to 9
Report date: Oct 14 , 2021
Sample in: Sept 27, 2021
P.O. no.: 22114- J2805

Attn: Christine Belore, Tina Sanderson

Process Samples : Clean Harbors, Sarnia Ortech Project #22114
Carbon content - % by weight -test method- ASTM D3176

Lab no.	Sample ID#	Run 1	Run 2	Average	Repeatability
16687-	19-22114				Difference between Run 1 and 2
1	FR-4 Rich feed	48.57	48.86	48.72	0.29
2	FL-4 Lean feed	9.12	9.27	9.20	0.15
3	FE-4 Emulsion feed	18.81	18.56	18.69	0.25
4	FR-9 Rich feed	49.65	50.02	49.84	0.37
5	FL-9 Lean feed	10.45	10.34	10.40	0.11
6	FE-9 Emulsion feed	20.35	20.46	20.41	0.11
7	FR-14 Rich feed	51.78	52.01	51.90	0.23
8	FL-14 Lean feed	7.36	7.46	7.41	0.10
9	FE-14 Emulsion feed	20.45	20.30	20.38	0.15

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.: 16687- 1 to 9
Report date: Oct 14 , 2021
Sample in: Sept 27, 2021
P.O. no.: 22114-J2805

Attn: Christine Belore, Tina Sanderson

Process Samples : Clean Harbors, Sarnia Ortech Project #22114
Hydrogen content - % by weight -test method- ASTM 3176 (Modified)

Lab no.	Sample ID#	Run 1	Run 2	Average	Repeatability
16687-	19-22114-				Difference between Run 1 and 2
1	FR-4 Rich feed	11.04	11.11	11.08	0.07
2	FL-4 Lean feed	10.78	10.67	10.73	0.11
3	FE-4 Emulsion feed	10.28	10.14	10.21	0.14
4	FR-9 Rich feed	10.67	10.55	10.61	0.12
5	FL-9 Lean feed	10.65	10.77	10.71	0.12
6	FE-9 Emulsion feed	10.12	9.98	10.05	0.14
7	FR-14 Rich feed	10.81	10.95	10.88	0.14
8	FL-14 Lean feed	10.38	10.27	10.33	0.11
9	FE-14 Emulsion feed	10.06	9.94	10.00	0.12

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.: 16687- 1 to 9
Report date: Oct 14 , 2021
Sample in: Sept 27, 2021
P.O. no.: 22114-J2805

Attn: Christine Belore, Tina Sanderson

Process Samples : Clean Harbors, Sarnia Ortech Project #22114
Nitrogen content - % by weight -test method- ASTM 3176 (Modified)

Lab no.	Sample ID#	Run 1	Run 2	Average	Repeatability
16687-	19-22114-				Difference between Run 1 and 2
1	FR-4 Rich feed	3.01	3.08	3.05	0.07
2	FL-4 Lean feed	0.99	1.09	1.04	0.10
3	FE-4 Emulsion feed	1.72	1.69	1.71	0.03
4	FR-9 Rich feed	2.12	2.02	2.07	0.10
5	FL-9 Lean feed	1.09	1.04	1.07	0.05
6	FE-9 Emulsion feed	1.47	1.40	1.44	0.07
7	FR-14 Rich feed	1.26	1.16	1.21	0.10
8	FL-14 Lean feed	1.60	1.71	1.66	0.11
9	FE-14 Emulsion feed	1.41	1.50	1.46	0.09

Tested by : A.C.(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.: 16687- 1 to 9
Report date: Oct 14 , 2021
Sample in: Sept 27, 2021
P.O. no.: 22114 -J2805

Attn: Christine Belore, Tina Sanderson

Process Samples : Clean Harbors, Sarnia Ortech Project #22114
Water content - % by weight -test method- ASTM D3113, D1744

Lab no.	Sample ID#	Run 1	Run 2	Average	Repeatability
16687-	19-22114-				Difference between Run 1 and 2
1	FR-4 Rich feed	32.88	33.12	33.00	0.24
2	FL-4 Lean feed	69.32	69.68	69.50	0.36
3	FE-4 Emulsion feed	37.65	37.35	37.50	0.30
4	FR-9 Rich feed	14.68	14.32	14.50	0.36
5	FL-9 Lean feed	76.11	76.49	76.30	0.38
6	FE-9 Emulsion feed	63.71	63.29	63.50	0.42
7	FR-14 Rich feed	37.62	37.18	37.40	0.44
8	FL-14 Lean feed	87.98	88.52	88.25	0.54
9	FE-14 Emulsion feed	65.09	65.51	65.30	0.42

Tested by : A.C.(chemist)

Member of ASTM
JS: LN

Approved by *James Szeto*

James Szeto, B.Sc.
Chief Chemist