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www.alsglobal.com

LABORATORY REPORT

January 22, 2015

William Dorman
CTI Engineers, Inc.
220 Market Avenue South, Suite 750
Canton, OH 44702

RE: City of Massillon

Dear William:

Enclosed are the results of the samples submitted to our laboratory on January 9, 2015. For your reference, these analyses have been assigned our service request number P1500079.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

By Sue Anderson at 10:05 am, Jan 22, 2015

For Kate Aguilera
Project Manager



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Client: CTI Engineers, Inc.
Project: City of Massillon

Service Request No: P1500079

CASE NARRATIVE

The samples were received intact under chain of custody on January 9, 2015 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

BTU and CHONS Analysis

The results for BTU and CHONS were generated according to ASTM D 3588-98. The following analyses were performed and used to calculate the BTU and CHONS results. This method is not included on the laboratory's NELAP, DoD-ELAP, or AIHA-LAP scope of accreditation.

C2 through C6 Hydrocarbon Analysis

Sample Digester A (P1500079-001) was analyzed according to modified EPA Method TO-3 for C2 through >C6 hydrocarbons using a gas chromatograph equipped with a flame ionization detector (FID). This method is not included on the laboratory's NELAP or AIHA-LAP scope of accreditation.

Fixed Gases Analysis

Sample Digester A (P1500079-001) was also analyzed for fixed gases (hydrogen, oxygen/argon, nitrogen, carbon monoxide, methane and carbon dioxide) according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This method is not included on the laboratory's NELAP or AIHA-LAP scope of accreditation.

Hydrogen Sulfide Analysis

Sample Digester A (P1500079-001) was also analyzed for hydrogen sulfide per ASTM D 5504-12 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). This method is not included on the laboratory's NELAP, DoD-ELAP, or AIHA-LAP scope of accreditation.



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Client: CTI Engineers, Inc.
Project: City of Massillon

Service Request No: P1500079

CASE NARRATIVE

Siloxanes

Sample Digester B (P1500079-002) was analyzed for Siloxanes according to CAS AQL 111 using an analytical system comprised of a gas chromatograph/mass spectrometer (GC/MS). This method is not included on the laboratory's NELAP, DoD-ELAP, or AIHA-LAP scope of accreditation.

Sulfur Analysis

Sample Digester A (P1500079-001) was also analyzed for twenty sulfur compounds per ASTM D 5504-12 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). All compounds with the exception of hydrogen sulfide and carbonyl sulfide are quantitated against the initial calibration curve for methyl mercaptan. This method is not included on the laboratory's NELAP, DoD-ELAP, or AIHA-LAP scope of accreditation.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.



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ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	838341
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	CA200007
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-14-5
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA01627201 4-4
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

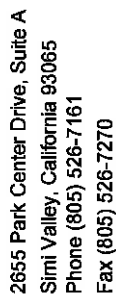
DETAIL SUMMARY REPORT

Client: CTI Engineers, Inc.
Project ID: City of Massillon

Service Request: P1500079

Date Received: 1/9/2015
Time Received: 10:15

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	TO-3 Modified - C1C6+ Bag	3C Modified - Fxd Gases Bag	ASTM D5504-01 - Sulfur Bag	ALS AQL 111 - Siloxanes Bag
Digester A	P1500079-001	Air	1/8/2015	11:16	X	X	X	
Digester B	P1500079-002	Air	1/8/2015	11:14				X



ALS Environmental
Sample Acceptance Check Form

Client: CTI Engineers, Inc.

Work order: P1500079

Project: City of Massillon

Sample(s) received on: 1/9/15

Date opened: 1/9/15

by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

	Yes	No	N/A
1 Were sample containers properly marked with client sample ID?	☒	☐	☐
2 Container(s) supplied by ALS ?	☐	☒	☐
3 Did sample containers arrive in good condition?	☒	☐	☐
4 Were chain-of-custody papers used and filled out?	☒	☐	☐
5 Did sample container labels and/or tags agree with custody papers?	☒	☐	☐
6 Was sample volume received adequate for analysis?	☒	☐	☐
7 Are samples within specified holding times?	☒	☐	☐
8 Was proper temperature (thermal preservation) of cooler at receipt adhered to?	☒	☐	☐
9 Was a trip blank received?	☐	☒	☐
10 Were custody seals on outside of cooler/Box?	☐	☒	☐
Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
Were signature and date included?	☐	☐	☒
Were seals intact?	☐	☐	☒
Were custody seals on outside of sample container?	☐	☒	☐
Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
Were signature and date included?	☐	☐	☒
Were seals intact?	☐	☐	☒
11 Do containers have appropriate preservation , according to method/SOP or Client specified information?	☐	☐	☒
Is there a client indication that the submitted samples are pH preserved?	☐	☐	☒
Were VOA vials checked for presence/absence of air bubbles?	☐	☐	☒
Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it?	☐	☐	☒
12 Tubes: Are the tubes capped and intact?	☐	☐	☒
Do they contain moisture?	☐	☐	☒
13 Badges: Are the badges properly capped and intact?	☐	☐	☒
Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1500079-001.01	1.0 L Tedlar Bag					
P1500079-002.02	1.0 L Tedlar Bag					

Explain any discrepancies: (include lab sample ID numbers): _____

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: CTI Engineers, Inc.
Client Sample ID: Digester A
Client Project ID: City of Massillon

ALS Project ID: P1500079
ALS Sample ID: P1500079-001

Test Code: ASTM D3588-98
Analyst: Mike Conejo/Nalini Lall
Sample Type: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 1/8/15
Date Received: 1/9/15

Components	Result Volume %	Result Weight %	Data Qualifier
Hydrogen	< 0.01	< 0.01	
Oxygen + Argon	0.20	0.25	
Nitrogen	0.85	0.91	
Carbon Monoxide	< 0.01	< 0.01	
Methane	63.61	39.14	
Carbon Dioxide	35.30	59.60	
Hydrogen Sulfide	< 0.01	0.01	
C2 as Ethane	< 0.01	< 0.01	
C3 as Propane	< 0.01	< 0.01	
C4 as n-Butane	< 0.01	< 0.01	
C5 as n-Pentane	< 0.01	< 0.01	
C6 as n-Hexane	< 0.01	< 0.01	
> C6 as n-Hexane	0.02	0.08	
TOTALS	99.99	99.99	

Components	Mole %	Weight %
Carbon	23.22	45.64
Hydrogen	59.73	9.85
Oxygen + Argon	16.64	43.58
Nitrogen	0.40	0.91
Sulfur	< 0.10	< 0.10

Specific Gravity (Air = 1)		0.9001
Specific Volume	ft3/lb	14.56
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	645.7
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	581.4
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	632.5
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	569.5
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	9,399.3
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	8,463.6
Compressibility Factor "Z" (60 F, 14.696 psia)		0.9969

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: CTI Engineers, Inc.

Client Sample ID: Digester B

Client Project ID: City of Massillon

ALS Project ID: P1500079

ALS Sample ID: P1500079-002

Test Code: GC/MS

Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2

Analyst: Zheng Wang

Sample Type: 1.0 L Tedlar Bag

Test Notes: BC, DE

Date Collected: 1/8/15

Date Received: 1/9/15

Date Analyzed: 1/16/15

Desorption Volume: 3.0 ml

Volume Sampled: 1.200 Liter(s)

CAS #	Compound	Result µg/Tube	Result µg/m ³	MRL µg/m ³	Result as Silicon µg/m ³	MRL µg/m ³	Data Qualifier
1066-40-6	Trimethylsilanol	< 0.31	ND	260	ND	82	
107-46-0	Hexamethyldisiloxane (L ₂)	< 0.28	ND	230	ND	81	
541-05-9	Hexamethylcyclotrisiloxane (D ₃)	< 0.28	ND	230	ND	88	
107-51-7	Octamethyltrisiloxane (L ₃)	< 0.27	ND	230	ND	81	
556-67-2	Octamethylcyclotetrasiloxane (D ₄)	0.50	420	230	160	87	
141-62-8	Decamethyltetrasiloxane (L ₄)	< 0.28	ND	230	ND	84	
541-02-6	Decamethylcyclopentasiloxane (D ₅)	1.4	1,100	230	430	88	
141-63-9	Dodecamethylpentasiloxane (L ₅)	< 0.28	ND	230	ND	85	
540-97-6	Dodecamethylcyclohexasiloxane (D ₆)	0.90	750	230	280	89	
Total Silicon					870		

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

BC = Results reported are not blank corrected.

DE = Results reported are corrected for desorption efficiency.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: CTI Engineers, Inc.

Client Sample ID: Method Blank

Client Project ID: City of Massillon

ALS Project ID: P1500079

ALS Sample ID: P150116-MB

Test Code: GC/MS

Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2

Analyst: Zheng Wang

Sample Type: 1.0 L Tedlar Bag

Test Notes: BC, DE

Date Collected: NA

Date Received: NA

Date Analyzed: 1/16/15

Desorption Volume: 3.0 ml

Volume Sampled: NA Liter(s)

CAS #	Compound	Result µg/Tube	Result µg/m ³	MRL µg/m ³	Result as Silicon µg/m ³	MRL µg/m ³	Data Qualifier
1066-40-6	Trimethylsilanol	< 0.31	NA	NA	NA	NA	
107-46-0	Hexamethyldisiloxane (L ₂)	< 0.28	NA	NA	NA	NA	
541-05-9	Hexamethylcyclotrisiloxane (D ₃)	< 0.28	NA	NA	NA	NA	
107-51-7	Octamethyltrisiloxane (L ₃)	< 0.27	NA	NA	NA	NA	
556-67-2	Octamethylcyclotetrasiloxane (D ₄)	< 0.28	NA	NA	NA	NA	
141-62-8	Decamethyltetrasiloxane (L ₄)	< 0.28	NA	NA	NA	NA	
541-02-6	Decamethylcyclopentasiloxane (D ₅)	< 0.28	NA	NA	NA	NA	
141-63-9	Dodecamethylpentasiloxane (L ₅)	< 0.28	NA	NA	NA	NA	
540-97-6	Dodecamethylcyclohexasiloxane (D ₆)	< 0.28	NA	NA	NA	NA	
Total Silicon					ND		

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

NA = Not applicable.

BC = Results reported are not blank corrected.

DE = Results reported are corrected for desorption efficiency.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 1

Client: CTI Engineers, Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: City of Massillon

ALS Project ID: P1500079
 ALS Sample ID: P150116-DLCS

Test Code: GC/MS
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Zheng Wang
Sampling Type: 1.0 L Tedlar Bag
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 1/16/15
Volume(s) Analyzed: NA Liter(s)

CAS #	Compound	Spike Amount	Result		% Recovery		CAS	RPD		Data Qualifier
		LCS / DLCS µg/ml	LCS µg/ml	DLCS µg/ml	LCS	DLCS	Acceptance Limits	RPD	RPD Limit	
1066-40-6	Trimethylsilanol	10.9	9.84	10.6	90	97	70-130	7	30	
107-46-0	Hexamethyldisiloxane	10.8	11.0	11.8	102	109	70-130	7	30	
541-05-9	Hexamethylcyclotrisiloxane	10.9	11.5	12.0	106	110	70-130	4	30	
107-51-7	Octamethyltrisiloxane	11.6	12.5	13.0	108	112	70-130	4	30	
556-67-2	Octamethylcyclotetrasiloxane	11.5	12.9	13.0	112	113	70-130	0.9	30	
141-62-8	Decamethyltetrasiloxane	11.3	12.7	12.9	112	114	70-130	2	30	
541-02-6	Decamethylcyclopentasiloxane	11.7	13.4	13.2	115	113	70-130	2	30	
141-63-9	Dodecamethylpentasiloxane	10.9	12.6	12.1	116	111	70-130	4	30	
540-97-6	Dodecamethylcyclohexasiloxane	11.5	13.6	12.8	118	111	70-130	6	30	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: CTI Engineers, Inc.
Client Sample ID: Digester A
Client Project ID: City of Massillon

ALS Project ID: P1500079
 ALS Sample ID: P1500079-001

Test Code: ASTM D 5504-12
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Mike Conejo
Sample Type: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 1/8/15
Time Collected: 11:16
Date Received: 1/9/15
Date Analyzed: 1/9/15
Time Analyzed: 10:40
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	130,000	70	90,000	50	
463-58-1	Carbonyl Sulfide	ND	120	ND	50	
74-93-1	Methyl Mercaptan	ND	98	ND	50	
75-08-1	Ethyl Mercaptan	220	130	86	50	
75-18-3	Dimethyl Sulfide	ND	130	ND	50	
75-15-0	Carbon Disulfide	ND	78	ND	25	
75-33-2	Isopropyl Mercaptan	ND	160	ND	50	
75-66-1	tert-Butyl Mercaptan	ND	180	ND	50	
107-03-9	n-Propyl Mercaptan	ND	160	ND	50	
624-89-5	Ethyl Methyl Sulfide	160	160	53	50	
110-02-1	Thiophene	ND	170	ND	50	
513-44-0	Isobutyl Mercaptan	ND	180	ND	50	
352-93-2	Diethyl Sulfide	ND	180	ND	50	
109-79-5	n-Butyl Mercaptan	ND	180	ND	50	
624-92-0	Dimethyl Disulfide	ND	96	ND	25	
616-44-4	3-Methylthiophene	ND	200	ND	50	
110-01-0	Tetrahydrothiophene	ND	180	ND	50	
638-02-8	2,5-Dimethylthiophene	ND	230	ND	50	
872-55-9	2-Ethylthiophene	ND	230	ND	50	
110-81-6	Diethyl Disulfide	ND	120	ND	25	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: CTI Engineers, Inc.
Client Sample ID: Method Blank
Client Project ID: City of Massillon

ALS Project ID: P1500079
 ALS Sample ID: P150109-MB

Test Code: ASTM D 5504-12
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Mike Conejo
Sample Type: 1.0 L Tedlar Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 1/09/15
Time Analyzed: 08:25
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

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ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 1

Client: CTI Engineers, Inc.

Client Sample ID: Lab Control Sample

Client Project ID: City of Massillon

ALS Project ID: P1500079

ALS Sample ID: P150109-LCS

Test Code: ASTM D 5504-12

Instrument ID: Agilent 7890A/GC22/SCD

Analyst: Mike Conejo

Sample Type: 1.0 L Tedlar Bag

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 1/09/15

Volume(s) Analyzed: NA ml(s)

CAS #	Compound	Spike Amount ppbV	Result ppbV	% Recovery	ALS	Data Qualifier
					Acceptance Limits	
7783-06-4	Hydrogen Sulfide	1,990	1,630	82	66-131	
463-58-1	Carbonyl Sulfide	2,030	1,630	80	64-131	
74-93-1	Methyl Mercaptan	2,020	1,530	76	68-160	