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2655 Park Center Dr., Suite A  
Simi Valley, CA 93065  
T: +1 805 526 7161  
F: +1 805 526 7270  
[www.alsglobal.com](http://www.alsglobal.com)

## LABORATORY REPORT

March 24, 2016

Rob Nieman  
ALS Environmental  
4388 Glendale Milford Road  
Cincinnati, OH 45242

**RE: Keystone Landfill/PADOH/PADEP / 1603488**

Dear Rob:

Enclosed are the results of the sample submitted to our laboratory on March 9, 2016. For your reference, these analyses have been assigned our service request number P1601261.

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](http://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 Kate Aguilera at 4:30 pm, Mar 24, 2016

Kate Aguilera  
Project Manager



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Client: ALS Environmental  
Project: Keystone Landfill/PADOH/PADEP / 1603488

Service Request No: P1601261

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## CASE NARRATIVE

The sample was received intact under chain of custody on March 9, 2016 and was 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 sample at the time of sample receipt.

### Sulfur Analysis

The sample was 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 included on the laboratory's NELAP scope of accreditation, however it is not part of the DoD-ELAP or AIHA-LAP accreditation.

### Volatile Organic Compound Analysis

The sample was analyzed for volatile organic compounds and tentatively identified compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation, however it is not part of the AIHA-LAP accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The container was cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

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*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	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>	101661
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0694
DoD ELAP	<a href="http://www.pjlabs.com/search-accredited-labs">http://www.pjlabs.com/search-accredited-labs</a>	L15-398
Florida DOH (NELAP)	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E871020
Maine DHHS	<a href="http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm">http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm</a>	2014025
Minnesota DOH (NELAP)	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	977273
New Jersey DEP (NELAP)	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	CA009
New York DOH (NELAP)	<a href="http://www.wadsworth.org/labcert/elap/elap.html">http://www.wadsworth.org/labcert/elap/elap.html</a>	11221
Oregon PHD (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	4068-001
Pennsylvania DEP	<a href="http://www.depweb.state.pa.us/labs">http://www.depweb.state.pa.us/labs</a>	68-03307 (Registration)
Texas CEQ (NELAP)	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704413-15-6
Utah DOH (NELAP)	<a href="http://www.health.utah.gov/lab/labimp/certification/index.html">http://www.health.utah.gov/lab/labimp/certification/index.html</a>	CA01627201 5-5
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	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](http://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: ALS Environmental  
 Project ID: Keystone Landfill/PADOH/PADEP / 1603488

Service Request: P1601261

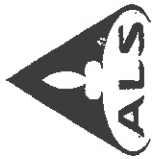
Date Received: 3/9/2016  
 Time Received: 09:45

ASTM D 5504-12 - Sulfur Can
TO-15 - VOC Cans

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	ASTM D 5504-12 - Sulfur Can	TO-15 - VOC Cans
1603488-06A (MVH 030816-Summa)	P1601261-001	Air	3/8/2016	10:26	AS01102	-4.16	3.99	X	X

# SUMMA

## Air - Chain of Custody Record & Analytical Service Request



2655 Park Center Drive, Suite A  
 Simi Valley, California 93065  
 Phone (805) 526-7161  
 Fax (805) 528-7270

Company Name & Address (Reporting Information) Pennsylvania Dept. of Environmental Protection 2 Public Square Wilkes-Barre, PA 18701-1915		Project Name <b>Keystone Landfill/PADOH/PADEP</b> Project Number _____ P.O. # / Billing Information _____ Sampler (Print & Sign) _____		Requested Turnaround Time in Business Days (Surcharges) please circle 1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard		ALS Project No. <b>P1601261</b> ALS Contact: _____	
Project Manager <b>Roger Bellas</b> Phone (570) 826-2511 Email Address for Result Reporting <b>RBELLAS@PA.GOV</b>		Laboratory ID Number <b>11</b> Date Collected <b>03/08/16</b> Time Collected <b>10:26</b>		Canister ID (Bar code # - AC, SC, etc.) <b>16070</b> Flow Controller ID (Bar code # - FC #) <b>03450</b> Canister Start Pressure "Hg <b>-30</b> Canister End Pressure "Hg/psig <b>-10</b> Sample Volume _____		Analysis Method _____ Legal Seal # <b>I 106571</b>	
Client Sample ID <b>MV4 030816</b>		Report Tier Levels - please select Tier I - Results (Default in not specified) _____ Tier II (Results + QC Summaries) _____ Tier III (Results + QC & Calibration Summaries) _____ Tier IV (Date Validation Package) 10% Surcharge _____		EDD required YES / No _____ Type: _____ Units: _____		Chain of Custody Seal: (Circle) <input checked="" type="radio"/> INTACT <input type="radio"/> BROKEN <input type="radio"/> ABSENT	
Relinquished by: (Signature) Relinquished by: (Signature) _____		Date: <b>03/08/16</b> Time: <b>11:30</b>		Received by: (Signature) Received by: (Signature) _____		Date: <b>3/9/16</b> Time: <b>0945</b>	
Project Requirements (MRLs, OAPP) _____		Cooler / Blank Temperature _____ °C					

**ALS Environmental  
Sample Acceptance Check Form**

Client: ALS Environmental Work order: P1601261  
 Project: Keystone Landfill/PADOH/PADEP  
 Sample(s) received on: 3/9/16 Date opened: 3/9/16 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.

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

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1601261-001.01	6.0 L Silonite Can					

Explain any discrepancies: (include lab sample ID numbers): \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

# ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

Page 1 of 1

**Client:** ALS Environmental  
**Client Sample ID:** 1603488-06A (MVH 030816-Summa)  
**Client Project ID:** Keystone Landfill/PADOH/PADEP / 1603488

ALS Project ID: P1601261  
 ALS Sample ID: P1601261-001

Test Code: ASTM D 5504-12  
 Instrument ID: Agilent 7890B/GC30/SCD  
 Analyst: Mike Conejo  
 Sample Type: 6.0 L Silonite Canister  
 Test Notes:  
 Container ID: AS01102

Date Collected: 3/8/16  
 Time Collected: 10:26  
 Date Received: 3/9/16  
 Date Analyzed: 3/11/16  
 Time Analyzed: 14:01  
 Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -4.16      Final Pressure (psig): 3.99

Canister Dilution Factor: 1.77

CAS #	Compound	Result µg/m <sup>3</sup>	MRL µg/m <sup>3</sup>	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	12	ND	8.9	
463-58-1	Carbonyl Sulfide	ND	22	ND	8.9	
74-93-1	Methyl Mercaptan	ND	17	ND	8.9	
75-08-1	Ethyl Mercaptan	ND	22	ND	8.9	
75-18-3	Dimethyl Sulfide	ND	22	ND	8.9	
75-15-0	Carbon Disulfide	ND	14	ND	4.4	
75-33-2	Isopropyl Mercaptan	ND	28	ND	8.9	
75-66-1	tert-Butyl Mercaptan	ND	33	ND	8.9	
107-03-9	n-Propyl Mercaptan	ND	28	ND	8.9	
624-89-5	Ethyl Methyl Sulfide	ND	28	ND	8.9	
110-02-1	Thiophene	ND	30	ND	8.9	
513-44-0	Isobutyl Mercaptan	ND	33	ND	8.9	
352-93-2	Diethyl Sulfide	ND	33	ND	8.9	
109-79-5	n-Butyl Mercaptan	ND	33	ND	8.9	
624-92-0	Dimethyl Disulfide	ND	17	ND	4.4	
616-44-4	3-Methylthiophene	ND	36	ND	8.9	
110-01-0	Tetrahydrothiophene	ND	32	ND	8.9	
638-02-8	2,5-Dimethylthiophene	ND	41	ND	8.9	
872-55-9	2-Ethylthiophene	ND	41	ND	8.9	
110-81-6	Diethyl Disulfide	ND	22	ND	4.4	

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:** ALS Environmental  
**Client Sample ID:** Method Blank  
**Client Project ID:** Keystone Landfill/PADOH/PADEP / 1603488

ALS Project ID: P1601261  
 ALS Sample ID: P160311-MB

Test Code: ASTM D 5504-12  
 Instrument ID: Agilent 7890B/GC30/SCD  
 Analyst: Mike Conejo  
 Sample Type: 6.0 L Silonite Canister  
 Test Notes:

Date Collected: NA  
 Time Collected: NA  
 Date Received: NA  
 Date Analyzed: 3/11/16  
 Time Analyzed: 08:17  
 Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m <sup>3</sup>	MRL µg/m <sup>3</sup>	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.

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



# ALS ENVIRONMENTAL

## LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 1

**Client:** ALS Environmental  
**Client Sample ID:** Lab Control Sample  
**Client Project ID:** Keystone Landfill/PADOH/PADEP / 1603488

ALS Project ID: P1601261  
ALS Sample ID: P160311-LCS

Test Code: ASTM D 5504-12  
Instrument ID: Agilent 7890B/GC30/SCD  
Analyst: Mike Conejo  
Sample Type: 6.0 L Silonite Canister  
Test Notes:

Date Collected: NA  
Date Received: NA  
Date Analyzed: 3/11/16  
Volume(s) Analyzed: NA ml(s)

CAS #	Compound	Spike Amount ppbV	Result ppbV	% Recovery	ALS	Data Qualifier
					Acceptance Limits	
7783-06-4	Hydrogen Sulfide	1,000	938	94	65-138	
463-58-1	Carbonyl Sulfide	1,000	904	90	60-135	
74-93-1	Methyl Mercaptan	1,000	984	98	57-140	

# ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

Page 1 of 3

**Client:** ALS Environmental  
**Client Sample ID:** 1603488-06A (MVH 030816-Summa)  
**Client Project ID:** Keystone Landfill/PADOH/PADEP / 1603488

ALS Project ID: P1601261  
 ALS Sample ID: P1601261-001

Test Code: EPA TO-15  
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9  
 Analyst: Simon Cao  
 Sample Type: 6.0 L Silonite Canister  
 Test Notes:  
 Container ID: AS01102

Date Collected: 3/8/16  
 Date Received: 3/9/16  
 Date Analyzed: 3/21/16  
 Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -4.16      Final Pressure (psig): 3.99

Canister Dilution Factor: 1.77

CAS #	Compound	Result	MRL	Result	MRL	Data Qualifier
		µg/m <sup>3</sup>	µg/m <sup>3</sup>	ppbV	ppbV	
115-07-1	Propene	2.7	0.89	1.6	0.51	
75-71-8	Dichlorodifluoromethane (CFC 12)	1.9	0.89	0.38	0.18	
74-87-3	Chloromethane	ND	0.89	ND	0.43	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.89	ND	0.13	
75-01-4	Vinyl Chloride	ND	0.89	ND	0.35	
106-99-0	1,3-Butadiene	ND	0.89	ND	0.40	
74-83-9	Bromomethane	ND	0.89	ND	0.23	
75-00-3	Chloroethane	ND	0.89	ND	0.34	
64-17-5	Ethanol	ND	8.9	ND	4.7	
75-05-8	Acetonitrile	ND	0.89	ND	0.53	
107-02-8	Acrolein	ND	3.5	ND	1.5	
67-64-1	Acetone	ND	8.9	ND	3.7	
75-69-4	Trichlorofluoromethane	1.0	0.89	0.19	0.16	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	8.9	ND	3.6	
107-13-1	Acrylonitrile	ND	0.89	ND	0.41	
75-35-4	1,1-Dichloroethene	ND	0.89	ND	0.22	
75-09-2	Methylene Chloride	ND	0.89	ND	0.25	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.89	ND	0.28	
76-13-1	Trichlorotrifluoroethane	ND	0.89	ND	0.12	
75-15-0	Carbon Disulfide	ND	8.9	ND	2.8	
156-60-5	trans-1,2-Dichloroethene	ND	0.89	ND	0.22	
75-34-3	1,1-Dichloroethane	ND	0.89	ND	0.22	
1634-04-4	Methyl tert-Butyl Ether	ND	0.89	ND	0.25	
108-05-4	Vinyl Acetate	ND	8.9	ND	2.5	
78-93-3	2-Butanone (MEK)	ND	8.9	ND	3.0	

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 2 of 3

**Client:** ALS Environmental  
**Client Sample ID:** 1603488-06A (MVH 030816-Summa)  
**Client Project ID:** Keystone Landfill/PADOH/PADEP / 1603488

ALS Project ID: P1601261  
 ALS Sample ID: P1601261-001

Test Code: EPA TO-15  
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9  
 Analyst: Simon Cao  
 Sample Type: 6.0 L Silonite Canister  
 Test Notes:  
 Container ID: AS01102

Date Collected: 3/8/16  
 Date Received: 3/9/16  
 Date Analyzed: 3/21/16  
 Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -4.16      Final Pressure (psig): 3.99

Canister Dilution Factor: 1.77

CAS #	Compound	Result $\mu\text{g}/\text{m}^3$	MRL $\mu\text{g}/\text{m}^3$	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.89	ND	0.22	
141-78-6	Ethyl Acetate	<b>30</b>	1.8	<b>8.4</b>	0.49	
110-54-3	n-Hexane	ND	0.89	ND	0.25	
67-66-3	Chloroform	ND	0.89	ND	0.18	
109-99-9	Tetrahydrofuran (THF)	ND	0.89	ND	0.30	
107-06-2	1,2-Dichloroethane	ND	0.89	ND	0.22	
71-55-6	1,1,1-Trichloroethane	ND	0.89	ND	0.16	
71-43-2	Benzene	<b>1.2</b>	0.89	<b>0.37</b>	0.28	
56-23-5	Carbon Tetrachloride	ND	0.89	ND	0.14	
110-82-7	Cyclohexane	ND	1.8	ND	0.51	
78-87-5	1,2-Dichloropropane	ND	0.89	ND	0.19	
75-27-4	Bromodichloromethane	ND	0.89	ND	0.13	
79-01-6	Trichloroethene	ND	0.89	ND	0.16	
123-91-1	1,4-Dioxane	ND	0.89	ND	0.25	
80-62-6	Methyl Methacrylate	ND	1.8	ND	0.43	
142-82-5	n-Heptane	ND	0.89	ND	0.22	
10061-01-5	cis-1,3-Dichloropropene	ND	0.89	ND	0.20	
108-10-1	4-Methyl-2-pentanone	ND	0.89	ND	0.22	
10061-02-6	trans-1,3-Dichloropropene	ND	0.89	ND	0.20	
79-00-5	1,1,2-Trichloroethane	ND	0.89	ND	0.16	
108-88-3	Toluene	<b>3.4</b>	0.89	<b>0.90</b>	0.23	
591-78-6	2-Hexanone	ND	0.89	ND	0.22	
124-48-1	Dibromochloromethane	ND	0.89	ND	0.10	
106-93-4	1,2-Dibromoethane	ND	0.89	ND	0.12	
123-86-4	n-Butyl Acetate	ND	0.89	ND	0.19	

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 3 of 3

**Client:** ALS Environmental  
**Client Sample ID:** 1603488-06A (MVH 030816-Summa)  
**Client Project ID:** Keystone Landfill/PADOH/PADEP / 1603488

ALS Project ID: P1601261  
 ALS Sample ID: P1601261-001

Test Code: EPA TO-15  
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9  
 Analyst: Simon Cao  
 Sample Type: 6.0 L Silonite Canister  
 Test Notes:  
 Container ID: AS01102

Date Collected: 3/8/16  
 Date Received: 3/9/16  
 Date Analyzed: 3/21/16  
 Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -4.16      Final Pressure (psig): 3.99

Canister Dilution Factor: 1.77

CAS #	Compound	Result µg/m <sup>3</sup>	MRL µg/m <sup>3</sup>	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.89	ND	0.19	
127-18-4	Tetrachloroethene	ND	0.89	ND	0.13	
108-90-7	Chlorobenzene	ND	0.89	ND	0.19	
100-41-4	Ethylbenzene	ND	0.89	ND	0.20	
179601-23-1	m,p-Xylenes	ND	1.8	ND	0.41	
75-25-2	Bromoform	ND	0.89	ND	0.086	
100-42-5	Styrene	<b>6.1</b>	0.89	<b>1.4</b>	0.21	
95-47-6	o-Xylene	ND	0.89	ND	0.20	
111-84-2	n-Nonane	ND	0.89	ND	0.17	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.89	ND	0.13	
98-82-8	Cumene	ND	0.89	ND	0.18	
80-56-8	alpha-Pinene	ND	0.89	ND	0.16	
103-65-1	n-Propylbenzene	ND	0.89	ND	0.18	
622-96-8	4-Ethyltoluene	ND	0.89	ND	0.18	
108-67-8	1,3,5-Trimethylbenzene	ND	0.89	ND	0.18	
95-63-6	1,2,4-Trimethylbenzene	ND	0.89	ND	0.18	
100-44-7	Benzyl Chloride	ND	0.89	ND	0.17	
541-73-1	1,3-Dichlorobenzene	ND	0.89	ND	0.15	
106-46-7	1,4-Dichlorobenzene	ND	0.89	ND	0.15	
95-50-1	1,2-Dichlorobenzene	ND	0.89	ND	0.15	
5989-27-5	d-Limonene	ND	0.89	ND	0.16	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.89	ND	0.092	
120-82-1	1,2,4-Trichlorobenzene	ND	0.89	ND	0.12	
91-20-3	Naphthalene	ND	0.89	ND	0.17	
87-68-3	Hexachlorobutadiene	ND	0.89	ND	0.083	

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 3

**Client:** ALS Environmental

**Client Sample ID:** Method Blank

**Client Project ID:** Keystone Landfill/PADOH/PADEP / 1603488

ALS Project ID: P1601261

ALS Sample ID: P160321-MB

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9

Analyst: Simon Cao

Sample Type: 6.0 L Silonite Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 3/21/16

Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result	MRL	Result	MRL	Data Qualifier
		µg/m <sup>3</sup>	µg/m <sup>3</sup>	ppbV	ppbV	
115-07-1	Propene	ND	0.50	ND	0.29	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	0.50	ND	0.10	
74-87-3	Chloromethane	ND	0.50	ND	0.24	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.50	ND	0.072	
75-01-4	Vinyl Chloride	ND	0.50	ND	0.20	
106-99-0	1,3-Butadiene	ND	0.50	ND	0.23	
74-83-9	Bromomethane	ND	0.50	ND	0.13	
75-00-3	Chloroethane	ND	0.50	ND	0.19	
64-17-5	Ethanol	ND	5.0	ND	2.7	
75-05-8	Acetonitrile	ND	0.50	ND	0.30	
107-02-8	Acrolein	ND	2.0	ND	0.87	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	0.50	ND	0.089	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	5.0	ND	2.0	
107-13-1	Acrylonitrile	ND	0.50	ND	0.23	
75-35-4	1,1-Dichloroethene	ND	0.50	ND	0.13	
75-09-2	Methylene Chloride	ND	0.50	ND	0.14	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.50	ND	0.16	
76-13-1	Trichlorotrifluoroethane	ND	0.50	ND	0.065	
75-15-0	Carbon Disulfide	ND	5.0	ND	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	0.50	ND	0.13	
75-34-3	1,1-Dichloroethane	ND	0.50	ND	0.12	
1634-04-4	Methyl tert-Butyl Ether	ND	0.50	ND	0.14	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	ND	5.0	ND	1.7	

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 2 of 3

**Client:** ALS Environmental

**Client Sample ID:** Method Blank

**Client Project ID:** Keystone Landfill/PADOH/PADEP / 1603488

ALS Project ID: P1601261

ALS Sample ID: P160321-MB

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9

Analyst: Simon Cao

Sample Type: 6.0 L Silonite Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 3/21/16

Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m <sup>3</sup>	MRL µg/m <sup>3</sup>	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.50	ND	0.13	
141-78-6	Ethyl Acetate	ND	1.0	ND	0.28	
110-54-3	n-Hexane	ND	0.50	ND	0.14	
67-66-3	Chloroform	ND	0.50	ND	0.10	
109-99-9	Tetrahydrofuran (THF)	ND	0.50	ND	0.17	
107-06-2	1,2-Dichloroethane	ND	0.50	ND	0.12	
71-55-6	1,1,1-Trichloroethane	ND	0.50	ND	0.092	
71-43-2	Benzene	ND	0.50	ND	0.16	
56-23-5	Carbon Tetrachloride	ND	0.50	ND	0.080	
110-82-7	Cyclohexane	ND	1.0	ND	0.29	
78-87-5	1,2-Dichloropropane	ND	0.50	ND	0.11	
75-27-4	Bromodichloromethane	ND	0.50	ND	0.075	
79-01-6	Trichloroethene	ND	0.50	ND	0.093	
123-91-1	1,4-Dioxane	ND	0.50	ND	0.14	
80-62-6	Methyl Methacrylate	ND	1.0	ND	0.24	
142-82-5	n-Heptane	ND	0.50	ND	0.12	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ND	0.11	
108-10-1	4-Methyl-2-pentanone	ND	0.50	ND	0.12	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ND	0.11	
79-00-5	1,1,2-Trichloroethane	ND	0.50	ND	0.092	
108-88-3	Toluene	ND	0.50	ND	0.13	
591-78-6	2-Hexanone	ND	0.50	ND	0.12	
124-48-1	Dibromochloromethane	ND	0.50	ND	0.059	
106-93-4	1,2-Dibromoethane	ND	0.50	ND	0.065	
123-86-4	n-Butyl Acetate	ND	0.50	ND	0.11	

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 3 of 3

**Client:** ALS Environmental

**Client Sample ID:** Method Blank

**Client Project ID:** Keystone Landfill/PADOH/PADEP / 1603488

ALS Project ID: P1601261

ALS Sample ID: P160321-MB

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9

Analyst: Simon Cao

Sample Type: 6.0 L Silonite Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 3/21/16

Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m <sup>3</sup>	MRL µg/m <sup>3</sup>	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.50	ND	0.11	
127-18-4	Tetrachloroethene	ND	0.50	ND	0.074	
108-90-7	Chlorobenzene	ND	0.50	ND	0.11	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	0.50	ND	0.048	
100-42-5	Styrene	ND	0.50	ND	0.12	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
111-84-2	n-Nonane	ND	0.50	ND	0.095	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	ND	0.073	
98-82-8	Cumene	ND	0.50	ND	0.10	
80-56-8	alpha-Pinene	ND	0.50	ND	0.090	
103-65-1	n-Propylbenzene	ND	0.50	ND	0.10	
622-96-8	4-Ethyltoluene	ND	0.50	ND	0.10	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	ND	0.10	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	ND	0.10	
100-44-7	Benzyl Chloride	ND	0.50	ND	0.097	
541-73-1	1,3-Dichlorobenzene	ND	0.50	ND	0.083	
106-46-7	1,4-Dichlorobenzene	ND	0.50	ND	0.083	
95-50-1	1,2-Dichlorobenzene	ND	0.50	ND	0.083	
5989-27-5	d-Limonene	ND	0.50	ND	0.090	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.50	ND	0.052	
120-82-1	1,2,4-Trichlorobenzene	ND	0.50	ND	0.067	
91-20-3	Naphthalene	ND	0.50	ND	0.095	
87-68-3	Hexachlorobutadiene	ND	0.50	ND	0.047	

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

## SURROGATE SPIKE RECOVERY RESULTS

Page 1 of 1

**Client:** ALS Environmental  
**Client Project ID:** Keystone Landfill/PADOH/PADEP / 1603488

ALS Project ID: P1601261

Test Code: EPA TO-15  
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9  
 Analyst: Simon Cao  
 Sample Type: 6.0 L Silonite Canister(s)  
 Test Notes:

Date(s) Collected: 3/8/16  
 Date(s) Received: 3/9/16  
 Date(s) Analyzed: 3/21/16

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4	Toluene-d8	Bromofluorobenzene	Acceptance Limits	Data Qualifier
		Percent Recovered	Percent Recovered	Percent Recovered		
Method Blank	P160321-MB	<b>98</b>	<b>101</b>	<b>101</b>	70-130	
Lab Control Sample	P160321-LCS	<b>95</b>	<b>99</b>	<b>104</b>	70-130	
1603488-06A (MVH 030816-Summa)	P1601261-001	<b>98</b>	<b>100</b>	<b>104</b>	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.

Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.



# ALS ENVIRONMENTAL

## LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 3

<b>Client:</b>	<b>ALS Environmental</b>	
<b>Client Sample ID:</b>	<b>Lab Control Sample</b>	ALS Project ID: P1601261
<b>Client Project ID:</b>	<b>Keystone Landfill/PADOH/PADEP / 1603488</b>	ALS Sample ID: P160321-LCS
Test Code:	EPA TO-15	Date Collected: NA
Instrument ID:	Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9	Date Received: NA
Analyst:	Simon Cao	Date Analyzed: 3/21/16
Sample Type:	6.0 L Silonite Canister	Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:		

CAS #	Compound	Spike Amount µg/m <sup>3</sup>	Result µg/m <sup>3</sup>	% Recovery	ALS	Data Qualifier
					Acceptance Limits	
115-07-1	Propene	196	147	75	49-131	
75-71-8	Dichlorodifluoromethane (CFC 12)	188	138	73	65-117	
74-87-3	Chloromethane	200	134	67	48-132	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	204	141	69	65-122	
75-01-4	Vinyl Chloride	200	143	72	65-128	
106-99-0	1,3-Butadiene	206	163	79	62-143	
74-83-9	Bromomethane	202	151	75	65-130	
75-00-3	Chloroethane	200	152	76	69-126	
64-17-5	Ethanol	998	791	79	57-126	
75-05-8	Acetonitrile	212	150	71	51-134	
107-02-8	Acrolein	214	170	79	55-146	
67-64-1	Acetone	1,080	831	77	57-120	
75-69-4	Trichlorofluoromethane	216	146	68	59-139	
67-63-0	2-Propanol (Isopropyl Alcohol)	418	333	80	59-129	
107-13-1	Acrylonitrile	212	175	83	64-136	
75-35-4	1,1-Dichloroethene	216	173	80	72-123	
75-09-2	Methylene Chloride	222	164	74	63-117	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	218	177	81	50-141	
76-13-1	Trichlorotrifluoroethane	220	168	76	68-118	
75-15-0	Carbon Disulfide	210	155	74	55-143	
156-60-5	trans-1,2-Dichloroethene	210	181	86	69-129	
75-34-3	1,1-Dichloroethane	212	163	77	66-122	
1634-04-4	Methyl tert-Butyl Ether	216	169	78	55-128	
108-05-4	Vinyl Acetate	1,040	934	90	66-140	
78-93-3	2-Butanone (MEK)	220	186	85	62-127	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result. Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

# ALS ENVIRONMENTAL

## LABORATORY CONTROL SAMPLE SUMMARY

Page 2 of 3

**Client:** ALS Environmental

**Client Sample ID:** Lab Control Sample

**Client Project ID:** Keystone Landfill/PADOH/PADEP / 1603488

ALS Project ID: P1601261

ALS Sample ID: P160321-LCS

Test Code: EPA TO-15

Date Collected: NA

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9

Date Received: NA

Analyst: Simon Cao

Date Analyzed: 3/21/16

Sample Type: 6.0 L Silonite Canister

Volume(s) Analyzed: 0.125 Liter(s)

Test Notes:

CAS #	Compound	Spike Amount µg/m <sup>3</sup>	Result µg/m <sup>3</sup>	% Recovery	ALS	Data Qualifier
					Acceptance Limits	
156-59-2	cis-1,2-Dichloroethene	218	177	81	65-125	
141-78-6	Ethyl Acetate	428	376	88	64-132	
110-54-3	n-Hexane	212	171	81	58-126	
67-66-3	Chloroform	224	168	75	68-117	
109-99-9	Tetrahydrofuran (THF)	220	178	81	64-123	
107-06-2	1,2-Dichloroethane	214	167	78	63-124	
71-55-6	1,1,1-Trichloroethane	210	168	80	68-120	
71-43-2	Benzene	226	152	67	61-110	
56-23-5	Carbon Tetrachloride	230	182	79	65-137	
110-82-7	Cyclohexane	424	340	80	68-122	
78-87-5	1,2-Dichloropropane	216	170	79	67-122	
75-27-4	Bromodichloromethane	218	179	82	71-124	
79-01-6	Trichloroethene	216	159	74	71-121	
123-91-1	1,4-Dioxane	210	192	91	67-122	
80-62-6	Methyl Methacrylate	422	379	90	76-130	
142-82-5	n-Heptane	216	174	81	67-125	
10061-01-5	cis-1,3-Dichloropropene	208	187	90	73-131	
108-10-1	4-Methyl-2-pentanone	220	190	86	66-132	
10061-02-6	trans-1,3-Dichloropropene	210	194	92	76-135	
79-00-5	1,1,2-Trichloroethane	216	180	83	73-121	
108-88-3	Toluene	218	168	77	67-117	
591-78-6	2-Hexanone	220	203	92	59-128	
124-48-1	Dibromochloromethane	220	197	90	73-132	
106-93-4	1,2-Dibromoethane	218	194	89	73-128	
123-86-4	n-Butyl Acetate	226	206	91	61-136	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result. Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

# ALS ENVIRONMENTAL

## LABORATORY CONTROL SAMPLE SUMMARY

Page 3 of 3

**Client:** ALS Environmental

**Client Sample ID:** Lab Control Sample

**Client Project ID:** Keystone Landfill/PADOH/PADEP / 1603488

ALS Project ID: P1601261

ALS Sample ID: P160321-LCS

Test Code: EPA TO-15

Date Collected: NA

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9

Date Received: NA

Analyst: Simon Cao

Date Analyzed: 3/21/16

Sample Type: 6.0 L Silonite Canister

Volume(s) Analyzed: 0.125 Liter(s)

Test Notes:

CAS #	Compound	Spike Amount µg/m <sup>3</sup>	Result µg/m <sup>3</sup>	% Recovery	ALS	Data Qualifier
					Acceptance Limits	
111-65-9	n-Octane	210	175	83	67-124	
127-18-4	Tetrachloroethene	202	166	82	65-126	
108-90-7	Chlorobenzene	220	176	80	68-120	
100-41-4	Ethylbenzene	218	181	83	69-123	
179601-23-1	m,p-Xylenes	428	362	85	67-125	
75-25-2	Bromoform	228	194	85	68-153	
100-42-5	Styrene	222	202	91	68-132	
95-47-6	o-Xylene	210	174	83	67-124	
111-84-2	n-Nonane	204	174	85	60-130	
79-34-5	1,1,2,2-Tetrachloroethane	210	192	91	72-128	
98-82-8	Cumene	208	171	82	67-124	
80-56-8	alpha-Pinene	212	176	83	67-129	
103-65-1	n-Propylbenzene	204	172	84	67-125	
622-96-8	4-Ethyltoluene	214	177	83	66-128	
108-67-8	1,3,5-Trimethylbenzene	214	181	85	65-125	
95-63-6	1,2,4-Trimethylbenzene	218	195	89	62-134	
100-44-7	Benzyl Chloride	220	224	102	74-145	
541-73-1	1,3-Dichlorobenzene	228	194	85	63-133	
106-46-7	1,4-Dichlorobenzene	208	183	88	62-129	
95-50-1	1,2-Dichlorobenzene	220	190	86	62-134	
5989-27-5	d-Limonene	210	180	86	66-137	
96-12-8	1,2-Dibromo-3-chloropropane	218	206	94	71-147	
120-82-1	1,2,4-Trichlorobenzene	230	201	87	60-145	
91-20-3	Naphthalene	218	193	89	56-158	
87-68-3	Hexachlorobutadiene	230	188	82	56-139	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result. Reported results are shown in concentration units and as a result of the calculation, may vary slightly.