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[www.alsglobal.com](http://www.alsglobal.com)

## LABORATORY REPORT

April 27, 2016

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

**RE: Keystone Landfill/PADOH/PADEP / 1604620**

Dear Rob:

Enclosed are the results of the sample submitted to our laboratory on April 14, 2016. For your reference, these analyses have been assigned our service request number P1601966.

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 5:11 pm, Apr 27, 2016

Kate Aguilera  
Project Manager



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Client: ALS Environmental  
Project: Keystone Landfill/PADOH/PADEP / 1604620

Service Request No: P1601966

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## CASE NARRATIVE

The sample was received intact under chain of custody on April 14, 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 also analyzed for volatile organic 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.pjlab.com/search-accredited-labs">http://www.pjlab.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>	4068-003
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

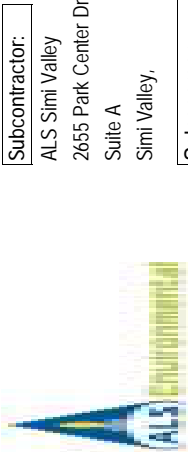
Client: ALS Environmental  
 Project ID: Keystone Landfill/PADOH/PADEP / 1604620

Service Request: P1601966

Date Received: 4/14/2016  
 Time Received: 09:45

ASTM D 5504-12 - Sulfur Can	TO-15 - VOC Cans
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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
1604620-06A (SHP041316-Summa)	P1601966-001	Air	4/13/2016	11:27	AS00891	-4.09	3.34	X	X



# CHAIN-OF-CUSTODY RECORD

Date: **20-Apr-16**  
 COC ID: **3990**  
 Due Date **03-May-16**

Page 1 of 1

P1601966

Subcontractor:  
 ALS Simi Valley  
 2655 Park Center Drive  
 Suite A  
 Simi Valley,  
 Salesperson

TEL: (805) 526-7161  
 FAX: (805) 526-7270  
 Acct #:

Customer Information		Project Information		Parameter/Method Request for Analysis												
Purchase Order	31-2077	Project Name	1604620	A	Sulfur gases by ASTM 5504 Mod. (A5504)											
Work Order		Project Number		B	TO-15 by GC/MS (ETO-15)											
Company Name	ALS Group USA, Corp	Bill To Company	ALS Group USA, Corp	C												
Send Report To	Rob Nieman	Inv Attn	Accounts Payable	D												
Address	4388 Glendale Milford Rd	Address	4388 Glendale Milford Rd	E												
				F												
City/State/Zip	Cincinnati, Ohio 45242-	City/State/Zip	Cincinnati, Ohio 45242-	G												
Phone	(513) 733-5336	Phone	(513) 733-5336	H												
Fax	(513) 733-5347	Fax	(513) 733-5347	I												
eMail Address	alsen.reporting@alsglobal.com	eMail CC		J												
<b>Sample ID</b>		<b>Matrix</b>	<b>Collection Date 24hr</b>	<b>Bottle</b>	A	B	C	D	E	F	G	H	I	J		
1604620-06A (SHP041316-Summa)	Air	13/Apr/2016 11:27	(1) SUMMA	X	X											

Relinquished by:	Date/Time	Received by:	Date/Time	Cooler IDs	Report/QC Level
Relinquished by:		Received by:			Std
Relinquished by:		Received by:	04/14/16 @ 0945		

**Comments:**



## ALS Environmental Sample Acceptance Check Form

Client: ALS Environmental Work order: P1601966  
 Project: Keystone Landfill/PADOH/PADEP / 1604620  
 Sample(s) received on: 4/14/16 Date opened: 4/14/16 by: KKELPE

**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 <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>sealing inner box</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
P1601966-001.01	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:** 1604620-06A (SHP041316-Summa)  
**Client Project ID:** Keystone Landfill/PADOH/PADEP / 1604620

ALS Project ID: P1601966  
 ALS Sample ID: P1601966-001

Test Code: ASTM D 5504-12  
 Instrument ID: Agilent 7890A/GC22/SCD  
 Analyst: Mike Conejo  
 Sample Type: 6.0 L Silonite Canister  
 Test Notes:  
 Container ID: AS00891

Date Collected: 4/13/16  
 Time Collected: 11:27  
 Date Received: 4/14/16  
 Date Analyzed: 4/15/16  
 Time Analyzed: 10:38  
 Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -4.09      Final Pressure (psig): 3.34

Canister Dilution Factor: 1.70

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	8.5	
463-58-1	Carbonyl Sulfide	ND	21	ND	8.5	
74-93-1	Methyl Mercaptan	ND	17	ND	8.5	
75-08-1	Ethyl Mercaptan	ND	22	ND	8.5	
75-18-3	Dimethyl Sulfide	ND	22	ND	8.5	
75-15-0	Carbon Disulfide	ND	13	ND	4.3	
75-33-2	Isopropyl Mercaptan	ND	26	ND	8.5	
75-66-1	tert-Butyl Mercaptan	ND	31	ND	8.5	
107-03-9	n-Propyl Mercaptan	ND	26	ND	8.5	
624-89-5	Ethyl Methyl Sulfide	ND	26	ND	8.5	
110-02-1	Thiophene	ND	29	ND	8.5	
513-44-0	Isobutyl Mercaptan	ND	31	ND	8.5	
352-93-2	Diethyl Sulfide	ND	31	ND	8.5	
109-79-5	n-Butyl Mercaptan	ND	31	ND	8.5	
624-92-0	Dimethyl Disulfide	ND	16	ND	4.3	
616-44-4	3-Methylthiophene	ND	34	ND	8.5	
110-01-0	Tetrahydrothiophene	ND	31	ND	8.5	
638-02-8	2,5-Dimethylthiophene	ND	39	ND	8.5	
872-55-9	2-Ethylthiophene	ND	39	ND	8.5	
110-81-6	Diethyl Disulfide	ND	21	ND	4.3	

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 / 1604620

ALS Project ID: P1601966  
 ALS Sample ID: P160415-MB

Test Code: ASTM D 5504-12  
 Instrument ID: Agilent 7890A/GC22/SCD  
 Analyst: Mike Conejo  
 Sample Type: 6.0 L Silonite Canister  
 Test Notes:

Date Collected: NA  
 Time Collected: NA  
 Date Received: NA  
 Date Analyzed: 4/15/16  
 Time Analyzed: 08:01  
 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 / 1604620

ALS Project ID: P1601966  
ALS Sample ID: P160415-LCS

Test Code: ASTM D 5504-12  
Instrument ID: Agilent 7890A/GC22/SCD  
Analyst: Mike Conejo  
Sample Type: 6.0 L Silonite Canister  
Test Notes:

Date Collected: NA  
Date Received: NA  
Date Analyzed: 4/15/16  
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	961	96	65-138	
463-58-1	Carbonyl Sulfide	1,000	1,040	104	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:** 1604620-06A (SHP041316-Summa)  
**Client Project ID:** Keystone Landfill/PADOH/PADEP / 1604620

ALS Project ID: P1601966  
 ALS Sample ID: P1601966-001

Test Code: EPA TO-15  
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8  
 Analyst: Wida Ang  
 Sample Type: 6.0 L Silonite Canister  
 Test Notes:  
 Container ID: AS00891

Date Collected: 4/13/16  
 Date Received: 4/14/16  
 Date Analyzed: 4/22/16  
 Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -4.09      Final Pressure (psig): 3.34

Canister Dilution Factor: 1.70

CAS #	Compound	Result µg/m <sup>3</sup>	MRL µg/m <sup>3</sup>	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	0.85	ND	0.49	
75-71-8	Dichlorodifluoromethane (CFC 12)	<b>2.2</b>	0.85	<b>0.44</b>	0.17	
74-87-3	Chloromethane	ND	0.85	ND	0.41	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.85	ND	0.12	
75-01-4	Vinyl Chloride	ND	0.85	ND	0.33	
106-99-0	1,3-Butadiene	ND	0.85	ND	0.38	
74-83-9	Bromomethane	ND	0.85	ND	0.22	
75-00-3	Chloroethane	ND	0.85	ND	0.32	
64-17-5	Ethanol	ND	8.5	ND	4.5	
75-05-8	Acetonitrile	ND	0.85	ND	0.51	
107-02-8	Acrolein	ND	3.4	ND	1.5	
67-64-1	Acetone	ND	8.5	ND	3.6	
75-69-4	Trichlorofluoromethane	<b>1.1</b>	0.85	<b>0.20</b>	0.15	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	8.5	ND	3.5	
107-13-1	Acrylonitrile	ND	0.85	ND	0.39	
75-35-4	1,1-Dichloroethene	ND	0.85	ND	0.21	
75-09-2	Methylene Chloride	ND	0.85	ND	0.24	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.85	ND	0.27	
76-13-1	Trichlorotrifluoroethane	ND	0.85	ND	0.11	
75-15-0	Carbon Disulfide	ND	8.5	ND	2.7	
156-60-5	trans-1,2-Dichloroethene	ND	0.85	ND	0.21	
75-34-3	1,1-Dichloroethane	ND	0.85	ND	0.21	
1634-04-4	Methyl tert-Butyl Ether	ND	0.85	ND	0.24	
108-05-4	Vinyl Acetate	ND	8.5	ND	2.4	
78-93-3	2-Butanone (MEK)	ND	8.5	ND	2.9	

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:** 1604620-06A (SHP041316-Summa)

**Client Project ID:** Keystone Landfill/PADOH/PADEP / 1604620

ALS Project ID: P1601966

ALS Sample ID: P1601966-001

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8

Analyst: Wida Ang

Sample Type: 6.0 L Silonite Canister

Test Notes:

Container ID: AS00891

Date Collected: 4/13/16

Date Received: 4/14/16

Date Analyzed: 4/22/16

Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -4.09      Final Pressure (psig): 3.34

Canister Dilution Factor: 1.70

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	0.85	ND	0.21	
141-78-6	Ethyl Acetate	ND	1.7	ND	0.47	
110-54-3	n-Hexane	ND	0.85	ND	0.24	
67-66-3	Chloroform	ND	0.85	ND	0.17	
109-99-9	Tetrahydrofuran (THF)	ND	0.85	ND	0.29	
107-06-2	1,2-Dichloroethane	ND	0.85	ND	0.21	
71-55-6	1,1,1-Trichloroethane	ND	0.85	ND	0.16	
71-43-2	Benzene	ND	0.85	ND	0.27	
56-23-5	Carbon Tetrachloride	ND	0.85	ND	0.14	
110-82-7	Cyclohexane	ND	1.7	ND	0.49	
78-87-5	1,2-Dichloropropane	ND	0.85	ND	0.18	
75-27-4	Bromodichloromethane	ND	0.85	ND	0.13	
79-01-6	Trichloroethene	ND	0.85	ND	0.16	
123-91-1	1,4-Dioxane	ND	0.85	ND	0.24	
80-62-6	Methyl Methacrylate	ND	1.7	ND	0.42	
142-82-5	n-Heptane	ND	0.85	ND	0.21	
10061-01-5	cis-1,3-Dichloropropene	ND	0.85	ND	0.19	
108-10-1	4-Methyl-2-pentanone	ND	0.85	ND	0.21	
10061-02-6	trans-1,3-Dichloropropene	ND	0.85	ND	0.19	
79-00-5	1,1,2-Trichloroethane	ND	0.85	ND	0.16	
108-88-3	Toluene	ND	0.85	ND	0.23	
591-78-6	2-Hexanone	ND	0.85	ND	0.21	
124-48-1	Dibromochloromethane	ND	0.85	ND	0.10	
106-93-4	1,2-Dibromoethane	ND	0.85	ND	0.11	
123-86-4	n-Butyl Acetate	ND	0.85	ND	0.18	

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:** 1604620-06A (SHP041316-Summa)

**Client Project ID:** Keystone Landfill/PADOH/PADEP / 1604620

ALS Project ID: P1601966

ALS Sample ID: P1601966-001

Test Code: EPA TO-15

Date Collected: 4/13/16

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8

Date Received: 4/14/16

Analyst: Wida Ang

Date Analyzed: 4/22/16

Sample Type: 6.0 L Silonite Canister

Volume(s) Analyzed: 1.00 Liter(s)

Test Notes:

Container ID: AS00891

Initial Pressure (psig): -4.09      Final Pressure (psig): 3.34

Canister Dilution Factor: 1.70

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	0.85	ND	0.18	
127-18-4	Tetrachloroethene	ND	0.85	ND	0.13	
108-90-7	Chlorobenzene	ND	0.85	ND	0.18	
100-41-4	Ethylbenzene	ND	0.85	ND	0.20	
179601-23-1	m,p-Xylenes	ND	1.7	ND	0.39	
75-25-2	Bromoform	ND	0.85	ND	0.082	
100-42-5	Styrene	ND	0.85	ND	0.20	
95-47-6	o-Xylene	ND	0.85	ND	0.20	
111-84-2	n-Nonane	ND	0.85	ND	0.16	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.85	ND	0.12	
98-82-8	Cumene	ND	0.85	ND	0.17	
80-56-8	alpha-Pinene	ND	0.85	ND	0.15	
103-65-1	n-Propylbenzene	ND	0.85	ND	0.17	
622-96-8	4-Ethyltoluene	ND	0.85	ND	0.17	
108-67-8	1,3,5-Trimethylbenzene	ND	0.85	ND	0.17	
95-63-6	1,2,4-Trimethylbenzene	ND	0.85	ND	0.17	
100-44-7	Benzyl Chloride	ND	0.85	ND	0.16	
541-73-1	1,3-Dichlorobenzene	ND	0.85	ND	0.14	
106-46-7	1,4-Dichlorobenzene	ND	0.85	ND	0.14	
95-50-1	1,2-Dichlorobenzene	ND	0.85	ND	0.14	
5989-27-5	d-Limonene	ND	0.85	ND	0.15	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.85	ND	0.088	
120-82-1	1,2,4-Trichlorobenzene	ND	0.85	ND	0.11	
91-20-3	Naphthalene	ND	0.85	ND	0.16	
87-68-3	Hexachlorobutadiene	ND	0.85	ND	0.080	

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 / 1604620

ALS Project ID: P1601966

ALS Sample ID: P160422-MB

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8

Analyst: Wida Ang

Sample Type: 6.0 L Silonite Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 4/22/16

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 / 1604620

ALS Project ID: P1601966

ALS Sample ID: P160422-MB

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8

Analyst: Wida Ang

Sample Type: 6.0 L Silonite Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 4/22/16

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 / 1604620

ALS Project ID: P1601966

ALS Sample ID: P160422-MB

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8

Analyst: Wida Ang

Sample Type: 6.0 L Silonite Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 4/22/16

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 / 1604620

ALS Project ID: P1601966

Test Code: EPA TO-15  
 Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8  
 Analyst: Wida Ang  
 Sample Type: 6.0 L Silonite Canister(s)  
 Test Notes:

Date(s) Collected: 4/13/16

Date(s) Received: 4/14/16

Date(s) Analyzed: 4/22/16

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	P160422-MB	<b>103</b>	<b>99</b>	<b>103</b>	70-130	
Lab Control Sample	P160422-LCS	<b>100</b>	<b>95</b>	<b>104</b>	70-130	
1604620-06A (SHP041316-Summa)	P1601966-001	<b>104</b>	<b>98</b>	<b>102</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

**Client:** ALS Environmental

**Client Sample ID:** Lab Control Sample

**Client Project ID:** Keystone Landfill/PADOH/PADEP / 1604620

ALS Project ID: P1601966

ALS Sample ID: P160422-LCS

Test Code: EPA TO-15

Date Collected: NA

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8

Date Received: NA

Analyst: Wida Ang

Date Analyzed: 4/22/16

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	174	89	49-131	
75-71-8	Dichlorodifluoromethane (CFC 12)	188	175	93	65-117	
74-87-3	Chloromethane	200	203	102	48-132	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	204	187	92	65-122	
75-01-4	Vinyl Chloride	200	212	106	65-128	
106-99-0	1,3-Butadiene	206	232	113	62-143	
74-83-9	Bromomethane	202	206	102	65-130	
75-00-3	Chloroethane	200	196	98	69-126	
64-17-5	Ethanol	998	912	91	57-126	
75-05-8	Acetonitrile	212	189	89	51-134	
107-02-8	Acrolein	214	199	93	55-146	
67-64-1	Acetone	1,080	912	84	57-120	
75-69-4	Trichlorofluoromethane	216	178	82	59-139	
67-63-0	2-Propanol (Isopropyl Alcohol)	418	403	96	59-129	
107-13-1	Acrylonitrile	212	216	102	64-136	
75-35-4	1,1-Dichloroethene	216	214	99	72-123	
75-09-2	Methylene Chloride	222	190	86	63-117	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	218	240	110	50-141	
76-13-1	Trichlorotrifluoroethane	220	205	93	68-118	
75-15-0	Carbon Disulfide	210	162	77	55-143	
156-60-5	trans-1,2-Dichloroethene	210	216	103	69-129	
75-34-3	1,1-Dichloroethane	212	198	93	66-122	
1634-04-4	Methyl tert-Butyl Ether	216	204	94	55-128	
108-05-4	Vinyl Acetate	1,040	1110	107	66-140	
78-93-3	2-Butanone (MEK)	220	172	78	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 / 1604620

ALS Project ID: P1601966

ALS Sample ID: P160422-LCS

Test Code: EPA TO-15

Date Collected: NA

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8

Date Received: NA

Analyst: Wida Ang

Date Analyzed: 4/22/16

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	216	99	65-125	
141-78-6	Ethyl Acetate	428	422	99	64-132	
110-54-3	n-Hexane	212	163	77	58-126	
67-66-3	Chloroform	224	204	91	68-117	
109-99-9	Tetrahydrofuran (THF)	220	217	99	64-123	
107-06-2	1,2-Dichloroethane	214	203	95	63-124	
71-55-6	1,1,1-Trichloroethane	210	210	100	68-120	
71-43-2	Benzene	226	198	88	61-110	
56-23-5	Carbon Tetrachloride	230	224	97	65-137	
110-82-7	Cyclohexane	424	391	92	68-122	
78-87-5	1,2-Dichloropropane	216	204	94	67-122	
75-27-4	Bromodichloromethane	218	225	103	71-124	
79-01-6	Trichloroethene	216	196	91	71-121	
123-91-1	1,4-Dioxane	210	233	111	67-122	
80-62-6	Methyl Methacrylate	422	409	97	76-130	
142-82-5	n-Heptane	216	191	88	67-125	
10061-01-5	cis-1,3-Dichloropropene	208	213	102	73-131	
108-10-1	4-Methyl-2-pentanone	220	223	101	66-132	
10061-02-6	trans-1,3-Dichloropropene	210	224	107	76-135	
79-00-5	1,1,2-Trichloroethane	216	213	99	73-121	
108-88-3	Toluene	218	162	74	67-117	
591-78-6	2-Hexanone	220	216	98	59-128	
124-48-1	Dibromochloromethane	220	230	105	73-132	
106-93-4	1,2-Dibromoethane	218	213	98	73-128	
123-86-4	n-Butyl Acetate	226	230	102	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 / 1604620

ALS Project ID: P1601966

ALS Sample ID: P160422-LCS

Test Code: EPA TO-15

Date Collected: NA

Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8

Date Received: NA

Analyst: Wida Ang

Date Analyzed: 4/22/16

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	187	89	67-124	
127-18-4	Tetrachloroethene	202	180	89	65-126	
108-90-7	Chlorobenzene	220	198	90	68-120	
100-41-4	Ethylbenzene	218	201	92	69-123	
179601-23-1	m,p-Xylenes	428	389	91	67-125	
75-25-2	Bromoform	228	230	101	68-153	
100-42-5	Styrene	222	225	101	68-132	
95-47-6	o-Xylene	210	193	92	67-124	
111-84-2	n-Nonane	204	190	93	60-130	
79-34-5	1,1,2,2-Tetrachloroethane	210	201	96	72-128	
98-82-8	Cumene	208	191	92	67-124	
80-56-8	alpha-Pinene	212	200	94	67-129	
103-65-1	n-Propylbenzene	204	191	94	67-125	
622-96-8	4-Ethyltoluene	214	201	94	66-128	
108-67-8	1,3,5-Trimethylbenzene	214	197	92	65-125	
95-63-6	1,2,4-Trimethylbenzene	218	205	94	62-134	
100-44-7	Benzyl Chloride	220	249	113	74-145	
541-73-1	1,3-Dichlorobenzene	228	210	92	63-133	
106-46-7	1,4-Dichlorobenzene	208	196	94	62-129	
95-50-1	1,2-Dichlorobenzene	220	207	94	62-134	
5989-27-5	d-Limonene	210	215	102	66-137	
96-12-8	1,2-Dibromo-3-chloropropane	218	229	105	71-147	
120-82-1	1,2,4-Trichlorobenzene	230	214	93	60-145	
91-20-3	Naphthalene	218	207	95	56-158	
87-68-3	Hexachlorobutadiene	230	200	87	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.