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Subject: Horizontal Pilot Testing Project – Results of June 2016 Soil Vapor Monitoring at the South-Central Area of the SFPP Norwalk Pump Station, Norwalk, California

Dear Mr. Cho,

This letter report presents the results of the soil vapor monitoring conducted in June 2016 at the SFPP Norwalk Pump Station, located at 15306 Norwalk Boulevard, Norwalk, California (the site; Figure 1). The soil vapor work was performed by CH2M HILL Engineers, Inc. (CH2M), on behalf of SFPP, L.P. (SFPP), as part of the pilot testing program for SFPP's horizontal biosparge system. Groundwater monitoring data collected as part of the pilot testing will be provided under separate cover in a comprehensive evaluation report that will be prepared after additional data are collected. Both soil vapor and groundwater monitoring are conducted in general accordance with the approved *Horizontal Biosparge System Construction and Pilot Test Work Plan* (CH2M, 2013). The project background, purpose, approach, and results of the soil vapor monitoring are presented below, followed by a summary and recommendations.

## Background

In August 2014, SFPP completed installation of a horizontal biosparge system to enhance mass removal of hydrocarbon constituents beneath the south-central area of the site. Construction of the biosparge well is documented in the report titled, *Horizontal Biosparge Well and Soil Vapor Monitoring Probe Completion Report SFPP Norwalk Pump Station, 15306 Norwalk Boulevard, Norwalk, California* (CH2M, 2015). Pilot testing of the system was initiated on January 6, 2016, and is anticipated to continue for approximately 1 year in order to evaluate the feasibility of system expansion.

During biosparge system startup, ambient air was injected into the biosparge well, via a rotary screw air compressor, at increasing flow rates over several weeks until the maximum design rate of approximately 500 standard cubic feet per minute (scfm) was achieved. Soil vapor monitoring of onsite and offsite soil vapor probes has been performed to ensure that shallow subsurface vapors do not pose an unacceptable human health risk to residents in the offsite area south of the site during biosparge system operations. Soil vapor monitoring results for samples collected in January/February, April, and May 2016, were previously submitted to the Regional Water Quality Control Board, Los Angeles Region (RWQCB). Soil vapor monitoring data were not collected in March 2016 due to downtime of SFPP's soil vapor extraction (SVE) and biosparge systems. The SVE system has an interlock, which ensures that biosparging cannot occur unless the SVE system is operating. Operation of the SVE system reduces the potential for offgassing of volatile organic compounds (VOCs) during biosparge operations.

The data presented in this report were obtained from sampling onsite and offsite soil vapor monitoring probes on June 22, 23, and 24, 2016. A mobile laboratory was used for onsite analysis of soil vapor samples. During sampling activities, the biosparge system was operating at a flow rate of approximately 420 scfm and the SVE system was in full operation.

## Purpose

The purpose of the soil vapor monitoring is to ensure that shallow subsurface vapors do not pose an unacceptable human health risk to residents in the offsite area south of the site during biosparge system operations.

## Approach

CH2M retained American Analytics of Chatsworth, California, to collect and analyze soil vapor samples from the soil vapor monitoring network (SVM-1 through SVM-3, SVM-5 through SVM-8, and SVM-10 through SVM-16). Probes SVM-11 through SVM-14 are located onsite; the remaining probes are in the offsite area. SVM-11 was permanently damaged prior to this monitoring event, and therefore was not accessible for sampling. A nested replacement probe was installed on July 27, 2016, so that sampling at this location can continue during the next monitoring event. Figure 2 shows the location of soil vapor monitoring probes and the horizontal biosparge well. Figure 3 shows the completion details of a typical nested probe. A mobile laboratory was used by American Analytics for onsite analysis of soil vapor samples. Field photoionization detector (PID) and vacuum measurements were also taken by CH2M staff prior to sample collection. The technical approach and analytical results are discussed below.

### PID and Vacuum Measurements

A CH2M engineer collected field VOC measurements from the soil vapor probe network in the south-central area using a PID calibrated against hexane. Field readings were collected after each probe was purged approximately three system volumes using a hand-held portable vacuum pump. A vacuum measurement was also collected from each probe using a digital manometer.

### Monitoring with Mobile Laboratory

Soil vapor samples were collected by American Analytics and analyzed onsite using their mobile laboratory under the direction of CH2M. Sampling was conducted from June 22 to 24, 2016. The soil vapor probes at each monitoring location were purged and sampled in accordance with the recommended guidelines in the Department of Toxic Substances Control (DTSC) *Advisory for Active Soil Gas Investigations* (the Advisory), dated July 2015 (DTSC, 2015). The analytical results were evaluated by comparing the results to soil gas screening levels based on the most current DTSC guidance (*Human Health Risk Assessment [HHRA] Note 3*; DTSC, 2016). The soil gas screening levels are calculated from indoor air screening levels published by DTSC (2016) using the default attenuation factors presented in DTSC's vapor intrusion guidance (DTSC, 2011).

### Sampling and Analysis

As described above, soil vapor sampling was conducted from probes SVM-1 through SVM-3, SVM-5 through SVM-8, SVM-10, and SVM-12 through SVM-16. The soil vapor probes from each monitoring location were purged and sampled using a vacuum/pressure sampling pump calibrated to a flow rate of 200 milliliters per minute in accordance with recommended flow rates in the Advisory (DTSC, 2015).

A soil vapor sample was not collected at the deep probe of SVM-2 and shallow probe of SVM-10 due to flow restrictions (excessive vacuum) observed during purging activities with a hand-held sampling pump. Soil vapor samples also were not collected from the shallow or deep probes of SVM-4 due to property access restrictions, nor were samples collected from SVM-11 because this location was permanently

damaged as described above. The shallow and deep probes of SVM-9 are located in the southeastern area (outside of the pilot testing area), and therefore were not monitored.

Soil vapor samples were collected using 1.4-liter Summa canisters and glass syringes, and were analyzed by the American Analytics onsite mobile laboratory for VOCs using U.S. Environmental Protection Agency (EPA) Method TO-15. Total petroleum hydrocarbons quantified as gasoline (TPH-g) were analyzed using EPA Method TO-3, and fixed gases (carbon dioxide, methane, and oxygen) were analyzed using EPA Method 3C. Included in the TO-15 list of analytes were benzene, toluene, ethylbenzene, and total xylenes (BTEX); methyl tert-butyl ether (MTBE); naphthalene; tert-butyl alcohol (TBA [also known as tert-butanol]); 1,2-dichloroethane; 1,2,4-trimethylbenzene; 1,3,5-trimethylbenzene; n-butylbenzene; sec-butylbenzene; isopropylbenzene; n-propylbenzene; and 2-propanol (the leak test compound). These constituents were identified as chemicals of potential concern (COPCs) based on the results of the 2006 soil gas investigation and HHRA (Geomatrix, 2006).

In accordance with the Advisory (DTSC, 2015), field duplicate samples were collected at a minimum frequency of 1 per every 20 primary samples collected. Duplicate soil vapor samples were collected at SVM-5 (5-foot depth), SVM-7 (7-foot depth), and SVM-14 (7-foot depth). The duplicate samples were collected and analyzed in the same manner as the primary samples.

Ambient air samples were also collected each day of sampling and analyzed by the mobile laboratory for VOCs and TPH-g. The purpose of the ambient air samples is to quantify background concentrations of COPCs near select sampling locations.

## Field PID and Vacuum Results

Table 1 presents a summary of field VOC measurements (using a PID) and vacuum measurements collected from the south-central area soil vapor monitoring network during the June 2016 event. The biosparge system flow rate during soil vapor monitoring was approximately 420 scfm; the SVE system was operational during monitoring. The following observations were made.

### Offsite Probes

- Shallow, middle, and deep probe depths in the offsite soil vapor probes had VOC measurements ranging from 0.0 parts per million by volume (ppmv) in many offsite probes to 2.4 ppmv in the shallow (7-foot depth) of SVM-16. Concentrations in this range are generally associated with background (ambient air) conditions.
- Vacuum (pressure) measurements ranged from 0 inches of water (in. H<sub>2</sub>O) in many offsite probes to negative 7.3 in. H<sub>2</sub>O in the deep probe (22-foot depth) of SVM-15. Negative values are indicative of negative pressure created by nearby vapor extraction wells.

### Onsite Probes

- Shallow, middle, and deep probe depths in the onsite soil vapor probes had VOC measurements ranging from 0.0 ppmv in many probes to 2,427 ppmv in the deepest probe (22-foot depth) of SVM-14. SVM-14 is located less than 10 feet from the horizontal biosparge well; therefore, elevated VOC concentrations at this location were not unexpected.
- Vacuum measurements ranged from negative 19.2 in. H<sub>2</sub>O in the deepest probe (22.5-foot depth) of SVM-13 to positive 26.2 in. H<sub>2</sub>O in the deepest probe (22-foot depth) of SVM-14. The maximum positive pressure that was reported at the deepest probe of SVM-14 also was not unexpected due to its close lateral and vertical proximity to the biosparge well.

## Mobile Laboratory Results

Table 2 presents the analytical results for samples collected during the June 2016 sampling event. Laboratory analytical reports are included in Attachment A. A summary of results is provided below.

### Offsite Probes

- VOCs and TPH-g were nondetect at offsite probes SVM-1, SVM-2, SVM-5 through SVM-8, SVM-10, and SVM-15.
- Non-COPCs bromodichloromethane (0.055 micrograms per liter [ $\mu\text{g/L}$ ]) and chloroform (0.055  $\mu\text{g/L}$ ) were detected in the shallow probe (5-foot depth) of SVM-3; bromodichloromethane (0.03  $\mu\text{g/L}$ ) and chloroform (0.059  $\mu\text{g/L}$ ) were also detected in the deepest probe (15-foot depth) of SVM-3. These detections were just above the laboratory reporting limits and below screening levels under residential and commercial scenarios. TPH-g was nondetect at both depths of SVM-3.
- VOCs and TPH-g were nondetect in the shallow probe (7-foot depth) and middle probe (16-foot depth) of SVM-16. In the deepest probe (22-foot depth) of SVM-16, non-COPCs heptane and n-hexane were detected at concentrations of 0.037  $\mu\text{g/L}$  and 0.04  $\mu\text{g/L}$ , respectively. There are no established screening levels for heptane. The reported concentration of n-hexane was below screening levels under residential and commercial scenarios. TPH-g was nondetect in the 22-foot depth of SVM-16.

### Onsite Probes

- VOCs and TPH-g were nondetect at onsite probes SVM-12 and SVM-13.
- VOCs and TPH-g were nondetect in the shallow probe (7-foot depth) of SVM-14. Three VOCs (m,p-xylenes, o-xylene, and toluene) were detected in the middle probe (15-foot depth) of SVM-14 at concentrations below screening levels under residential and commercial scenarios. TPH-g and all other VOCs were nondetect at this depth. Five VOCs (1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, m,p-xylenes, o-xylenes, and 4-ethyltoluene) and TPH-g were detected in the deep probe (22-foot depth) of SVM-14. Of these, 1,2,4-trimethylbenzene (66  $\mu\text{g/L}$ ) and TPH-g (2,400  $\mu\text{g/L}$ ) were detected at concentrations above screening levels under residential and/or commercial scenarios. 1,3,5-Trimethylbenzene and non-COPC 4-ethyltoluene were detected at concentrations of 75  $\mu\text{g/L}$  and 80  $\mu\text{g/L}$ , respectively. There are no established screening levels for 1,3,5-trimethylbenzene and 4-ethyltoluene.

## Summary and Recommendations

Soil vapor monitoring was conducted in the south-central area of the SFPP Norwalk Pump Station during biosparging operations in June 2016. The purpose of the soil vapor monitoring is to ensure that shallow subsurface vapors do not pose an unacceptable human health risk to residents in the offsite area south of the site during biosparge system operations. The SVE remained online during biosparge operations (and soil vapor monitoring) to reduce the potential for offgassing of subsurface VOCs. Monitoring included the collection of field VOCs and vacuum measurements using hand-held field equipment (PID, digital manometer), and sampling and analysis of soil vapor samples using an onsite mobile laboratory.

The soil vapor probes monitored were SVM-1 through SVM-3, SVM-5 through SVM-8, SVM-10, and SVM-12 through SVM-16. The deep probe of SVM-2 and shallow probe of SVM-10 were not monitored due to flow restrictions (excessive vacuum) observed during purging activities. The shallow and deep probes of SVM-4 also were not monitored due to property access restrictions. SVM-11 probes were not sampled because they were damaged during construction of SFPP's new remediation pad. A nested replacement probe was installed on July 27, 2016, and will be available for sampling during the next

monitoring event. The shallow and deep probes of SVM-9 are located in the southeastern area (outside of the pilot testing area), and therefore were not monitored.

Analytical results from the mobile laboratory were generally consistent with field PID measurements collected during this event.

- In the offsite area, VOCs and TPH-g were nondetect in all probes with the exception of SVM-3 and SVM-16. Non-COPCs bromodichloromethane and chloroform were detected in the shallow probe (5-foot depth) and deep probe (15-foot depth) of SVM-3; heptane and n-hexane were detected in the deep probe (22-foot depth) of SVM-16. These isolated detections were below established screening levels under residential and commercial scenarios.
- In the onsite area, VOCs and TPH-g were nondetect in SVM-12 and SVM-13. Detections of VOCs and/or TPH-g were reported in the onsite probe SVM-14 in the middle and deeper probe depths. Detections in the middle probe depth were below residential and commercial screening levels. 1,2,4-Trimethylbenzene and TPH-g detections in the deeper probe depth of SVM-14 were above residential and/or commercial screening levels. 1,3,5-Trimethylbenzene and 4-ethyltoluene also were detected in the deeper probe depth of SVM-14, but there are no established screening levels for these constituents. Elevated VOC and TPH-g concentrations in the deepest probe (22-foot depth) of SVM-14 were not unexpected given that the hydrocarbon smear zone occurs at an average depth of approximately 27 to 31 feet below ground surface in the south-central area.

Based on the data collected thus far, SFPP recommends continued operation of the biosparge system and continued sampling of the south-central soil vapor monitoring network using the mobile laboratory contractor. Shallow soil vapor in the offsite area does not pose an unacceptable human health risk to residents based on the data collected since startup. The SVE system will continue to remain online during biosparging operations.

SFPP will resume soil vapor monitoring using the mobile laboratory on a quarterly basis (in lieu of monthly) as indicated in the approved work plan (CH2M, 2013). The next scheduled soil vapor monitoring event will be conducted during the last week of August 2016. This event will include sampling of southeastern probe SVM-9, as part of the RWQCB's requirement to sample this probe annually. Additional soil vapor monitoring reports will be prepared and submitted to the RWQCB and Restoration Advisory Board as new data become available.

If you have any questions regarding this report, please contact Dan Jablonski at (213) 228-8271, or Mr. Stephen Defibaugh, Kinder Morgan's Remediation Project Manager, at (714) 560-4802.

Regards,  
CH2M HILL Engineers, Inc.



Dan Jablonski  
Project Manager



John Lowe, CIH  
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**Attachments:**

References

Tables

Table 1 – Soil Vapor Probe Field VOCs and Vacuum Readings – June 2016

Table 2 – Mobile Laboratory Soil Vapor Analytical Results – June 2016

Figures

Figure 1 – Site Location Map

Figure 2 – Soil Vapor Monitoring Probe Locations

Figure 3 – Typical Nested Soil Vapor Monitoring Probe Completion Diagram

Attachment A – Mobile Laboratory Analytical Reports

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## References

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Tables



**Table 1. Soil Vapor Probe Field VOCs and Vacuum Readings - June 2016**

*SFPP Norwalk Pump Station, Norwalk, California*

			Date		6/22/16 to 6/24/16	
			SVE System		On	
			BS System		On	
			BS Flow Rate (scfm)		420	
Probe	Location	Zone	Screen Interval (feet bgs)		VOCs <sup>1</sup> (ppmv)	Vacuum (in. H <sub>2</sub> O)
			From	To		
SVM-1	Offsite	Shallow	5	5.5	0	0
SVM-1	Offsite	Deep	14.5	15	0	-1.7
SVM-2	Offsite	Shallow	5	5.5	0	0
SVM-2	Offsite	Deep	14.5	15	--	--
SVM-3	Offsite	Shallow	5	5.5	0	0
SVM-3	Offsite	Deep	15	15.5	1.1	-0.7
SVM-5	Offsite	Shallow	5	5.5	0	0
SVM-5	Offsite	Deep	15.5	16	0	-4.6
SVM-6	Offsite	Shallow	6.5	7	0.4	0
SVM-6	Offsite	Deep	15.5	16	1	-2.7
SVM-7	Offsite	Shallow	7	7.5	0	0
SVM-7	Offsite	Deep	13.25	13.75	0	-0.5
SVM-8	Offsite	Shallow	5	5.5	1.5	0
SVM-8	Offsite	Deep	15	15.5	0	-1.6
SVM-10	Offsite	Shallow	7.5	8	--	--
SVM-10	Offsite	Deep	15.5	16	0	0
SVM-11	Onsite	Shallow	7	7.5	--	--
SVM-11	Onsite	Middle	15	15.5	--	--
SVM-11	Onsite	Deep	21	21.5	--	--
SVM-12	Onsite	Shallow	7	7.5	0	0
SVM-12	Onsite	Middle	15	15.5	0	0
SVM-12	Onsite	Deep	22	22.5	0	0
SVM-13	Onsite	Shallow	7	7.5	0	-2
SVM-13	Onsite	Middle	15.5	16	2	-14.7
SVM-13	Onsite	Deep	22.5	23	2	-19.2
SVM-14	Onsite	Shallow	7	7.5	3.8	0
SVM-14	Onsite	Middle	15	15.5	3.1	0
SVM-14	Onsite	Deep	22	22.5	2427	26.2
SVM-15	Offsite	Shallow	7	7.5	0	0
SVM-15	Offsite	Middle	15	15.5	0	0
SVM-15	Offsite	Deep	22	22.5	0	-7.3
SVM-16	Offsite	Shallow	7	7.5	2.4	0
SVM-16	Offsite	Middle	15.5	16	1.5	-1.1
SVM-16	Offsite	Deep	22	22.5	2.2	-1.5

Notes:

<sup>1</sup> 4-gas meter MultiRae IR calibrated to 50 ppm hexane

bgs - below ground surface

BS - Biosparge

in. H<sub>2</sub>O - inches of water

PID - photoionization detector

ppmv - parts per million by volume

scfm - standard cubic feet per minute

scfm - standard cubic feet per minute

SVE - soil vapor extraction

VOC = volatile organic compound

Table 2. Mobile Laboratory Soil Vapor Analytical Results - June 2016

SFPP Norwalk Pump Station, Norwalk, California

Analyte Type	Analyte	Unit	Current Residential Soil Gas Screening Level <sup>1,2</sup>	Current Commercial Soil Gas Screening Level <sup>1,2</sup>	SVM-1-5 6/22/2016 SVM-1 5-5.5	SVM-1-15 6/22/2016 SVM-1 15-15.5	SVM-2-5 6/22/2016 SVM-2 5-5.5	SVM-3-5 6/23/2016 SVM-3 5-5.5	SVM-3-15 6/23/2016 SVM-3 15-15.5	SVM-5-5 6/23/2016 SVM-5 5-5.5	SVM-5-5 DUP 6/23/2016 SVM-5 5-5.5	SVM-5-15 6/23/2016 SVM-5 15-15.5	SVM-6-7 6/22/2016 SVM-6 7-7.5	SVM-6-15 6/22/2016 SVM-6 15-15.5	SVM-7-7 6/22/2016 SVM-7 7-7.5	SVM-7-7 DUP 6/22/2016 SVM-7 7-7.5
COPCs <sup>4</sup>	1,2,4-Trimethylbenzene	µg/L	7.3	31	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	1,2-Dichloroethane	µg/L	0.11	0.47	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	1,3,5-Trimethylbenzene	µg/L	---	---	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	2-Propanol (leak test compound)	µg/L	---	---	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Benzene	µg/L	0.097	0.42	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Ethylbenzene	µg/L	1.1	4.9	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Isopropylbenzene	µg/L	---	---	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	m,p-Xylenes	µg/L	100	440	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Methyl tert-butyl ether (MTBE)	µg/L	11	47	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Naphthalene	µg/L	0.083	0.36	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	n-Butylbenzene	µg/L	---	---	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	n-Propylbenzene	µg/L	1000	4400	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	o-Xylene	µg/L	100	440	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	sec-Butylbenzene	µg/L	---	---	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	tert-Butanol (TBA)	µg/L	---	---	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Toluene	µg/L	310	1300	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Other Detected Compounds	4-Ethyltoluene	µg/L	---	---	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Bromodichloromethane	µg/L	0.076	0.33	<0.02	<0.02	<0.02	<b>0.055</b>	<b>0.03</b>	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Chloroform	µg/L	0.12	0.53	<0.02	<0.02	<0.02	<b>0.055</b>	<b>0.059</b>	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Heptane	µg/L	---	---	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	n-Hexane	µg/L	730	3100	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	TPH-G (C4-C12)	µg/L	630	2600	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Fixed Gases	Methane	% v/v	---	---	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Oxygen	% v/v	---	---	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>
	Carbon Dioxide	% v/v	---	---	<0.1	<0.1	<b>0.2</b>	<b>0.11</b>	<b>0.14</b>	<0.1	<0.1	<0.1	<0.1	<0.1	<b>0.21</b>	<b>0.2</b>

Table 2. Mobile Laboratory Soil Vapor Analytical Results - June 2016

SFPP Norwalk Pump Station, Norwalk, California

Analyte Type	Analyte	Unit	Current Residential Soil Gas Screening Level <sup>1,2</sup>	Current Commercial Soil Gas Screening Level <sup>1,2</sup>	SVM-7-13 6/22/2016 SVM-7 13-13.5	SVM-8-5 6/23/2016 SVM-8 5-5.5	SVM-8-15 6/23/2016 SVM-8 15-15.5	SVM-10-15 6/23/2016 SVM-10 15-15.5	SVM-12-7 6/23/2016 SVM-12 7-7.5	SVM-12-15 6/23/2016 SVM-12 15-15.5	SVM-12-22 6/23/2016 SVM-12 22-22.5	SVM-13-7 6/24/2016 SVM-13 7-7.5	SVM-13-15.5 6/24/2016 SVM-13 15.5-16	SVM-13-22.5 6/24/2016 SVM-13 22.5-23	SVM-14-7 6/24/2016 SVM-14 7-7.5	SVM-14-7 DUP 6/24/2016 SVM-14 7-7.5
COPCs <sup>4</sup>	1,2,4-Trimethylbenzene	µg/L	7.3	31	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	1,2-Dichloroethane	µg/L	0.11	0.47	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	1,3,5-Trimethylbenzene	µg/L	---	---	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	2-Propanol (leak test compound)	µg/L	---	---	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Benzene	µg/L	0.097	0.42	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Ethylbenzene	µg/L	1.1	4.9	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Isopropylbenzene	µg/L	---	---	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	m,p-Xylenes	µg/L	100	440	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Methyl tert-butyl ether (MTBE)	µg/L	11	47	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Naphthalene	µg/L	0.083	0.36	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	n-Butylbenzene	µg/L	---	---	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	n-Propylbenzene	µg/L	1000	4400	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	o-Xylene	µg/L	100	440	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	sec-Butylbenzene	µg/L	---	---	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	tert-Butanol (TBA)	µg/L	---	---	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Toluene	µg/L	310	1300	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Other Detected Compounds	4-Ethyltoluene	µg/L	---	---	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Bromodichloromethane	µg/L	0.076	0.33	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Chloroform	µg/L	0.12	0.53	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Heptane	µg/L	---	---	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	n-Hexane	µg/L	730	3100	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	TPH-G (C4-C12)	µg/L	630	2600	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Fixed Gases	Methane	% v/v	---	---	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Oxygen	% v/v	---	---	<b>17</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>17</b>	<b>11</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>17</b>	<b>17</b>
	Carbon Dioxide	% v/v	---	---	<b>2.1</b>	<b>0.13</b>	<b>0.11</b>	<b>0.26</b>	<b>0.52</b>	<b>1.3</b>	<b>4.9</b>	<0.1	<0.1	<b>0.4</b>	<b>0.94</b>	<b>0.94</b>

Table 2. Mobile Laboratory Soil Vapor Analytical Results - June 2016

SFPP Norwalk Pump Station, Norwalk, California

Analyte Type	Analyte	Unit	Current Residential Soil Gas Screening Level <sup>1,2</sup>	Current Commercial Soil Gas Screening Level <sup>1,2</sup>	SVM-14-15 6/24/2016 SVM-14 15-15.5	SVM-14-22 6/24/2016 SVM-14 22-22.5	SVM-15-7 6/22/2016 SVM-15 7-7.5	SVM-15-15 6/22/2016 SVM-15 15-15.5	SVM-15-22 6/22/2016 SVM-15 22-22.5	SVM-16-7 6/23/2016 SVM-16 7-7.5	SVM-16-16 6/23/2016 SVM-16 16-16.5	SVM-16-22 6/23/2016 SVM-16 22-22.5	Ambient Air 6/22/2016	Ambient Air 6/23/2016	Ambient Air 6/24/2016
COPCs <sup>4</sup>	1,2,4-Trimethylbenzene	µg/L	7.3	31	<0.02	66	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	1,2-Dichloroethane	µg/L	0.11	0.47	<0.02	<8	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	1,3,5-Trimethylbenzene	µg/L	---	---	<0.02	75	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	2-Propanol (leak test compound)	µg/L	---	---	<0.2	<80	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Benzene	µg/L	0.097	0.42	<0.02	<8	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Ethylbenzene	µg/L	1.1	4.9	<0.02	<8	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Isopropylbenzene	µg/L	---	---	<0.02	<8	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	m,p-Xylenes	µg/L	100	440	0.1	19	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Methyl tert-butyl ether (MTBE)	µg/L	11	47	<0.02	<8	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Naphthalene	µg/L	0.083	0.36	<0.02	<8	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	n-Butylbenzene	µg/L	---	---	<0.02	<8	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	n-Propylbenzene	µg/L	1000	4400	<0.02	<8	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	o-Xylene	µg/L	100	440	0.047	24	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	sec-Butylbenzene	µg/L	---	---	<0.02	<8	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	tert-Butanol (TBA)	µg/L	---	---	<20	<8000	<20	<20	<20	<20	<20	<20	<20	<20	<20
Toluene	µg/L	310	1300	0.049	<8	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Other Detected Compounds	4-Ethyltoluene	µg/L	---	---	<0.02	80	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Bromodichloromethane	µg/L	0.076	0.33	<0.02	<8	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Chloroform	µg/L	0.12	0.53	<0.02	<8	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Heptane	µg/L	---	---	<0.02	<8	<0.02	<0.02	<0.02	<0.02	<0.02	0.037	<0.02	<0.02	<0.02
	n-Hexane	µg/L	730	3100	<0.02	<8	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.02
	TPH-G (C4-C12)	µg/L	630	2600	<20	2400	<20	<20	<20	<20	<20	<20	<20	<20	<20
Fixed Gases	Methane	% v/v	---	---	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	---	---	---
	Oxygen	% v/v	---	---	17	17	18	18	18	18	18	11	---	---	---
	Carbon Dioxide	% v/v	---	---	0.83	0.54	0.11	0.11	0.12	0.3	0.4	4.8	---	---	---

Notes:

<sup>1</sup> Source for the Indoor Air Screening Levels: DTSC, 2016. Human Health Risk Assessment (HHRA) Note Number 3: DTSC Recommended Methodology for use of U.S. EPA Regional Screening Levels (RSLs) in the HHRA Process at Hazardous Waste Sites and Permitted Facilities. <https://www.dtsc.ca.gov/AssessingRisk/upload/HHRA-Note-3-2016-01.pdf>

<sup>2</sup> Attenuation factor for current land use = 0.001. Source for the attenuation factors: DTSC, 2011. Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Vapor Intrusion Guidance). October. [http://www.dtsc.ca.gov/AssessingRisk/upload/Final\\_VIG\\_Oct\\_2011.pdf](http://www.dtsc.ca.gov/AssessingRisk/upload/Final_VIG_Oct_2011.pdf)

<sup>3</sup> TPH aliphatic low screening level used for TPH-g screening levels

<sup>4</sup> Chemicals of potential concern identified from the 2006 soil gas investigation and HHRA (Geomatrix, 2006)

66 Yellow highlighting indicates concentration exceeds human health screening level under residential and/or commercial scenarios.

--- = not available

% v/v = percent volume by volume

<0.02 = not detected at the laboratory minimum reporting limit

µg/L = micrograms per liter

COPCs = chemicals of potential concern

DUP = field duplicate

TPH-g = total petroleum hydrocarbons quantified as gasoline

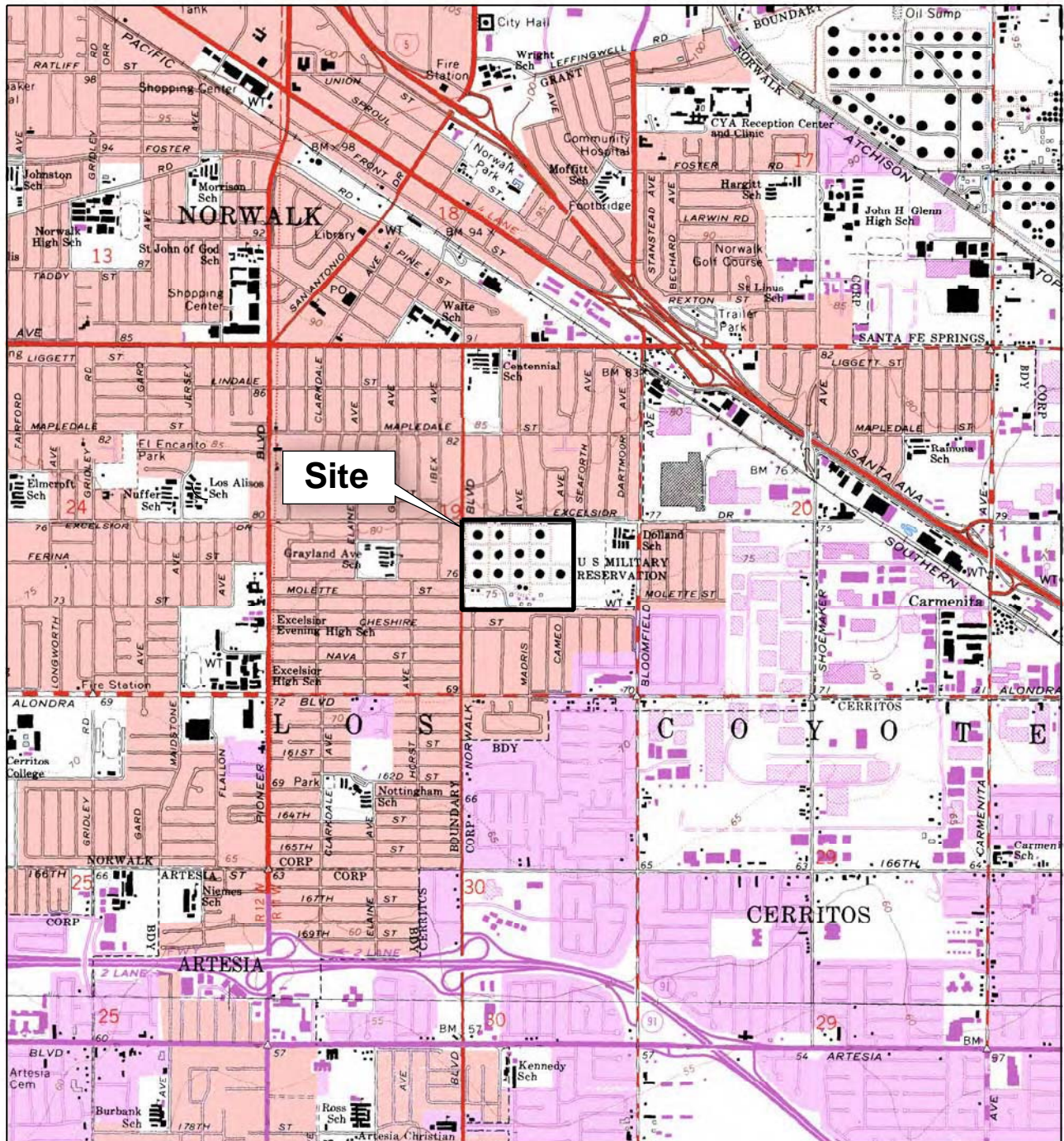
5-5.5 = sample depth in feet below ground surface

6/22/2016 = sample date

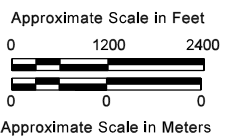
SVM-1 = sample location

SVM-1-5 = sample ID

Figures



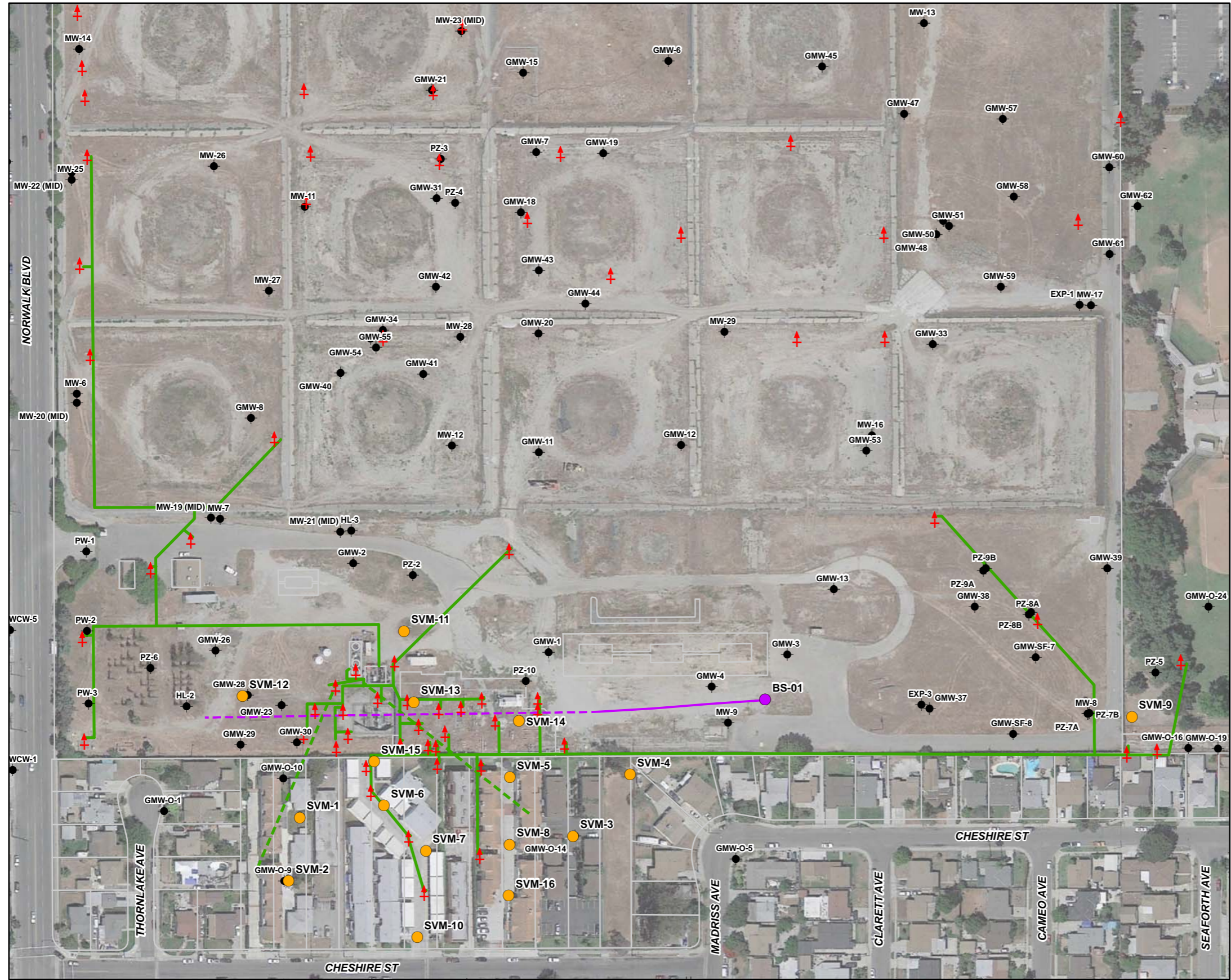
Site



**Figure 1**  
**Site Location Map**  
*SFPP Norwalk Pump Station*  
*Norwalk, California*

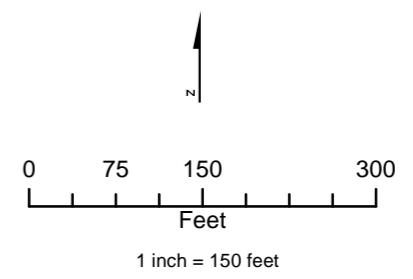
BASEMAP MODIFIED FROM U.S.G.S. 7.5 MINUTE QUADRANGLE MAP  
 LOS ALAMITOS 1964, CALIFORNIA. PHOTO-REVISED 1981.  
 WHITTIER 1965, CALIFORNIA. PHOTO-REVISED 1981.



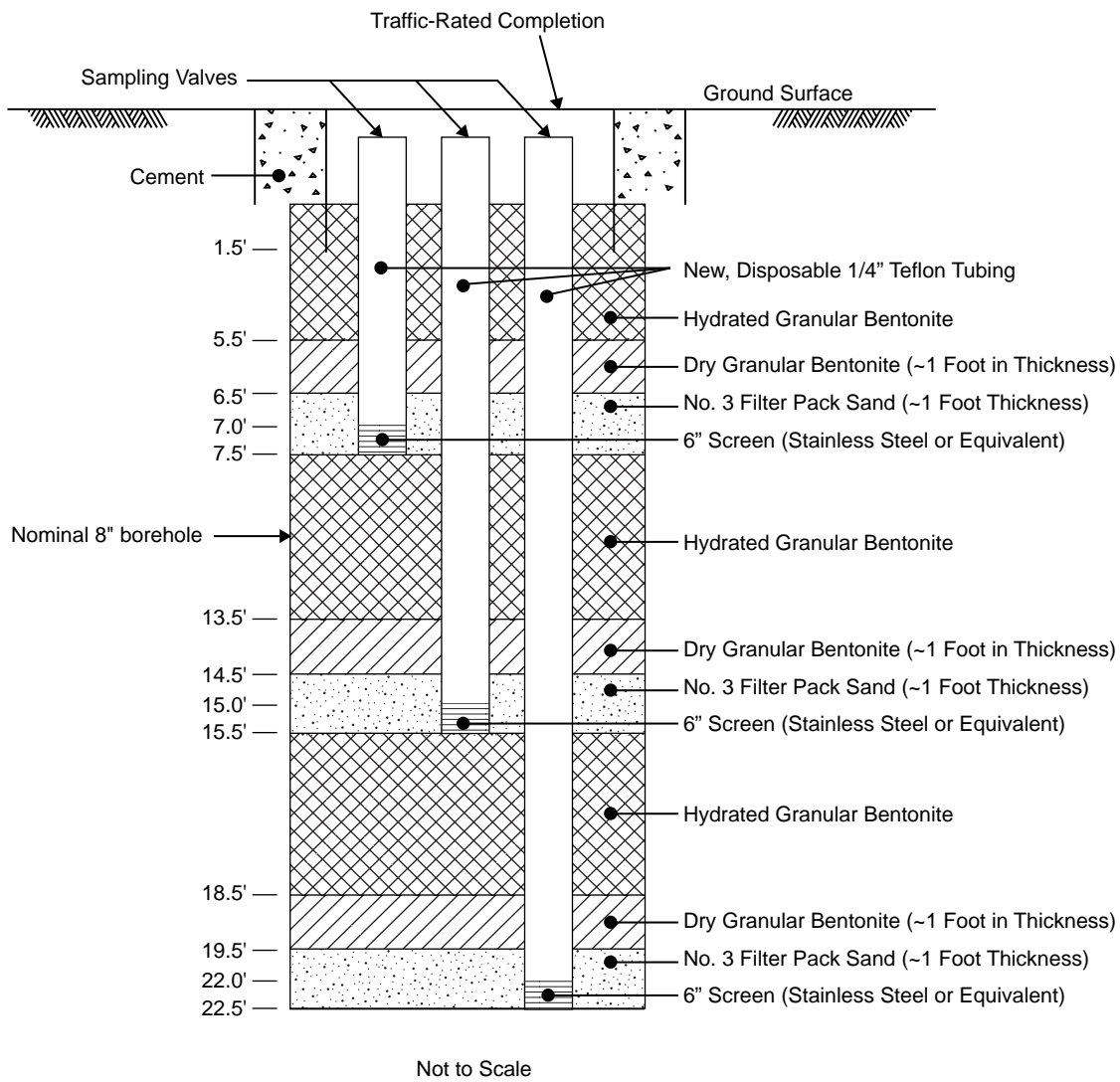


- Legend**
- Soil Vapor Monitoring Probes
  - Horizontal Biosparge Well Entry Point
  - Existing Groundwater Monitoring Well
  - ⊕ Existing Remediation Well
  - Horizontal Biosparge Well (dashed line depicts approximate lateral extent of well screen)
  - Kinder Morgan Remediation Piping Layout (above ground and below ground)
  - Horizontal Vapor Extraction Well Piping

Imagery Source:  
Google Earth April 17, 2013.



**Figure 2**  
Soil Vapor Monitoring Probe Locations  
SFPP Norwalk Pump Station  
Norwalk, California



**Figure 3**  
**Typical Nested Soil Vapor**  
**Monitoring Probe Completion Diagram**  
*SFPP Norwalk Pump Station*  
*Norwalk, California*





Attachment A  
Mobile Laboratory Analytical Reports



9765 Eton Avenue  
Chatsworth  
California 91311  
Tel: (818) 998-5547  
Fax: (818) 998-7258

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July 15, 2016

Dan Jablonski  
CH2M Hill, Inc.  
1000 Wilshire Blvd., Suite 2100  
Los Angeles, CA 90017-2457

**Re : KMEP Norwalk Biosparge Startup / 496965.A1.01  
MB187311 / 6F29015**

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received on 06/27/16 15:00 and analyzed in accordance with the attached chain-of-custody.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Assurance Program Manual, applicable standard operating procedures, and other related documentation. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report or require additional information please call me at American Analytix.

Sincerely,

A handwritten signature in black ink, appearing to read 'Allen Aminian', is written in a cursive style.

Allen Aminian  
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
<b><u>Fixed Gases - Field</u></b>					
SVM-1-15	6F29015-01	Vapor	5	06/22/16 08:05	06/27/16 15:00
SVM-1-5	6F29015-02	Vapor	5	06/22/16 08:18	06/27/16 15:00
SVM-2-5	6F29015-03	Vapor	5	06/22/16 08:51	06/27/16 15:00
SVM-15-7	6F29015-04	Vapor	5	06/22/16 09:52	06/27/16 15:00
SVM-15-22	6F29015-05	Vapor	5	06/22/16 09:53	06/27/16 15:00
SVM-15-15	6F29015-06	Vapor	5	06/22/16 10:18	06/27/16 15:00
SVM-6-7	6F29015-07	Vapor	5	06/22/16 10:53	06/27/16 15:00
SVM-6-15	6F29015-08	Vapor	5	06/22/16 10:53	06/27/16 15:00
SVM-7-7	6F29015-09	Vapor	5	06/22/16 12:15	06/27/16 15:00
SVM-7-7 DUP	6F29015-10	Vapor	5	06/22/16 12:15	06/27/16 15:00
SVM-7-13	6F29015-11	Vapor	5	06/22/16 12:31	06/27/16 15:00
SVM-10-15	6F29015-12	Vapor	5	06/22/16 12:45	06/27/16 15:00
SVM-3-15	6F29015-14	Vapor	5	06/23/16 08:01	06/27/16 15:00
SVM-3-5	6F29015-15	Vapor	5	06/23/16 08:14	06/27/16 15:00
SVM-5-15	6F29015-16	Vapor	5	06/23/16 08:58	06/27/16 15:00
SVM-5-5	6F29015-17	Vapor	5	06/23/16 09:18	06/27/16 15:00
SVM-5-5 DUP	6F29015-18	Vapor	5	06/23/16 09:18	06/27/16 15:00
SVM-8-5	6F29015-19	Vapor	5	06/23/16 10:04	06/27/16 15:00
SVM-8-15	6F29015-20	Vapor	5	06/23/16 10:05	06/27/16 15:00

**Allen Aminian**  
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
SVM-16-7	6F29015-22	Vapor	5	06/23/16 11:03	06/27/16 15:00
SVM-16-22	6F29015-23	Vapor	5	06/23/16 11:04	06/27/16 15:00
SVM-16-16	6F29015-24	Vapor	5	06/23/16 11:22	06/27/16 15:00
SVM-12-7	6F29015-25	Vapor	5	06/23/16 13:18	06/27/16 15:00
SVM-12-22	6F29015-26	Vapor	5	06/23/16 13:19	06/27/16 15:00
SVM-12-15	6F29015-27	Vapor	5	06/23/16 13:31	06/27/16 15:00
SVM-13-22.5	6F29015-28	Vapor	5	06/24/16 08:05	06/27/16 15:00
SVM-13-7	6F29015-29	Vapor	5	06/24/16 08:14	06/27/16 15:00
SVM-13-15.5	6F29015-30	Vapor	5	06/24/16 08:15	06/27/16 15:00
SVM-14-22	6F29015-31	Vapor	5	06/24/16 08:57	06/27/16 15:00
SVM-14-7	6F29015-32	Vapor	5	06/24/16 08:58	06/27/16 15:00
SVM-14-7 DUP	6F29015-33	Vapor	5	06/24/16 08:58	06/27/16 15:00
SVM-14-15	6F29015-34	Vapor	5	06/24/16 09:12	06/27/16 15:00

**TO-15 (Mid Level)**

SVM-1-15	6F29015-01	Vapor	5	06/22/16 08:05	06/27/16 15:00
SVM-1-5	6F29015-02	Vapor	5	06/22/16 08:18	06/27/16 15:00
SVM-2-5	6F29015-03	Vapor	5	06/22/16 08:51	06/27/16 15:00
SVM-15-7	6F29015-04	Vapor	5	06/22/16 09:52	06/27/16 15:00
SVM-15-22	6F29015-05	Vapor	5	06/22/16 09:53	06/27/16 15:00
SVM-15-15	6F29015-06	Vapor	5	06/22/16 10:18	06/27/16 15:00

**Allen Aminian**  
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
SVM-6-7	6F29015-07	Vapor	5	06/22/16 10:53	06/27/16 15:00
SVM-6-15	6F29015-08	Vapor	5	06/22/16 10:53	06/27/16 15:00
SVM-7-7	6F29015-09	Vapor	5	06/22/16 12:15	06/27/16 15:00
SVM-7-7 DUP	6F29015-10	Vapor	5	06/22/16 12:15	06/27/16 15:00
SVM-7-13	6F29015-11	Vapor	5	06/22/16 12:31	06/27/16 15:00
SVM-10-15	6F29015-12	Vapor	5	06/22/16 12:45	06/27/16 15:00
Ambient Air	6F29015-13	Vapor	5	06/22/16 12:46	06/27/16 15:00
SVM-3-15	6F29015-14	Vapor	5	06/23/16 08:01	06/27/16 15:00
SVM-3-5	6F29015-15	Vapor	5	06/23/16 08:14	06/27/16 15:00
SVM-5-15	6F29015-16	Vapor	5	06/23/16 08:58	06/27/16 15:00
SVM-5-5	6F29015-17	Vapor	5	06/23/16 09:18	06/27/16 15:00
SVM-5-5 DUP	6F29015-18	Vapor	5	06/23/16 09:18	06/27/16 15:00
SVM-8-5	6F29015-19	Vapor	5	06/23/16 10:04	06/27/16 15:00
SVM-8-15	6F29015-20	Vapor	5	06/23/16 10:05	06/27/16 15:00
Ambient Air	6F29015-21	Vapor	5	06/23/16 10:38	06/27/16 15:00
SVM-16-7	6F29015-22	Vapor	5	06/23/16 11:03	06/27/16 15:00
SVM-16-22	6F29015-23	Vapor	5	06/23/16 11:04	06/27/16 15:00
SVM-16-16	6F29015-24	Vapor	5	06/23/16 11:22	06/27/16 15:00
SVM-12-7	6F29015-25	Vapor	5	06/23/16 13:18	06/27/16 15:00
SVM-12-22	6F29015-26	Vapor	5	06/23/16 13:19	06/27/16 15:00

**Allen Aminian**  
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
SVM-12-15	6F29015-27	Vapor	5	06/23/16 13:31	06/27/16 15:00
SVM-13-22.5	6F29015-28	Vapor	5	06/24/16 08:05	06/27/16 15:00
SVM-13-7	6F29015-29	Vapor	5	06/24/16 08:14	06/27/16 15:00
SVM-13-15.5	6F29015-30	Vapor	5	06/24/16 08:15	06/27/16 15:00
SVM-14-22	6F29015-31	Vapor	5	06/24/16 08:57	06/27/16 15:00
SVM-14-7	6F29015-32	Vapor	5	06/24/16 08:58	06/27/16 15:00
SVM-14-7 DUP	6F29015-33	Vapor	5	06/24/16 08:58	06/27/16 15:00
SVM-14-15	6F29015-34	Vapor	5	06/24/16 09:12	06/27/16 15:00
Ambient Air	6F29015-35	Vapor	5	06/24/16 09:13	06/27/16 15:00

**TO-3**

SVM-1-15	6F29015-01	Vapor	5	06/22/16 08:05	06/27/16 15:00
SVM-1-5	6F29015-02	Vapor	5	06/22/16 08:18	06/27/16 15:00
SVM-2-5	6F29015-03	Vapor	5	06/22/16 08:51	06/27/16 15:00
SVM-15-7	6F29015-04	Vapor	5	06/22/16 09:52	06/27/16 15:00
SVM-15-22	6F29015-05	Vapor	5	06/22/16 09:53	06/27/16 15:00
SVM-15-15	6F29015-06	Vapor	5	06/22/16 10:18	06/27/16 15:00
SVM-6-7	6F29015-07	Vapor	5	06/22/16 10:53	06/27/16 15:00
SVM-6-15	6F29015-08	Vapor	5	06/22/16 10:53	06/27/16 15:00
SVM-7-7	6F29015-09	Vapor	5	06/22/16 12:15	06/27/16 15:00
SVM-7-7 DUP	6F29015-10	Vapor	5	06/22/16 12:15	06/27/16 15:00

**Allen Aminian**  
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
SVM-7-13	6F29015-11	Vapor	5	06/22/16 12:31	06/27/16 15:00
SVM-10-15	6F29015-12	Vapor	5	06/22/16 12:45	06/27/16 15:00
Ambient Air	6F29015-13	Vapor	5	06/22/16 12:46	06/27/16 15:00
SVM-3-15	6F29015-14	Vapor	5	06/23/16 08:01	06/27/16 15:00
SVM-3-5	6F29015-15	Vapor	5	06/23/16 08:14	06/27/16 15:00
SVM-5-15	6F29015-16	Vapor	5	06/23/16 08:58	06/27/16 15:00
SVM-5-5	6F29015-17	Vapor	5	06/23/16 09:18	06/27/16 15:00
SVM-5-5 DUP	6F29015-18	Vapor	5	06/23/16 09:18	06/27/16 15:00
SVM-8-5	6F29015-19	Vapor	5	06/23/16 10:04	06/27/16 15:00
SVM-8-15	6F29015-20	Vapor	5	06/23/16 10:05	06/27/16 15:00
Ambient Air	6F29015-21	Vapor	5	06/23/16 10:38	06/27/16 15:00
SVM-16-7	6F29015-22	Vapor	5	06/23/16 11:03	06/27/16 15:00
SVM-16-22	6F29015-23	Vapor	5	06/23/16 11:04	06/27/16 15:00
SVM-16-16	6F29015-24	Vapor	5	06/23/16 11:22	06/27/16 15:00
SVM-12-7	6F29015-25	Vapor	5	06/23/16 13:18	06/27/16 15:00
SVM-12-22	6F29015-26	Vapor	5	06/23/16 13:19	06/27/16 15:00
SVM-12-15	6F29015-27	Vapor	5	06/23/16 13:31	06/27/16 15:00
SVM-13-22.5	6F29015-28	Vapor	5	06/24/16 08:05	06/27/16 15:00
SVM-13-7	6F29015-29	Vapor	5	06/24/16 08:14	06/27/16 15:00
SVM-13-15.5	6F29015-30	Vapor	5	06/24/16 08:15	06/27/16 15:00

**Allen Aminian**  
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
SVM-14-22	6F29015-31	Vapor	5	06/24/16 08:57	06/27/16 15:00
SVM-14-7	6F29015-32	Vapor	5	06/24/16 08:58	06/27/16 15:00
SVM-14-7 DUP	6F29015-33	Vapor	5	06/24/16 08:58	06/27/16 15:00
SVM-14-15	6F29015-34	Vapor	5	06/24/16 09:12	06/27/16 15:00
Ambient Air	6F29015-35	Vapor	5	06/24/16 09:13	06/27/16 15:00

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**Allen Aminian**  
QA/QC Manager





### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

#### ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
<b>Fixed Gases by TCD</b>								
Oxygen	SVM-1-15	18	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD
Oxygen	SVM-1-5	18	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD
Oxygen	SVM-2-5	18	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD
Carbon Dioxide	SVM-2-5	0.20	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD
Oxygen	SVM-15-7	18	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD
Carbon Dioxide	SVM-15-7	0.11	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD
Oxygen	SVM-15-22	18	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD
Carbon Dioxide	SVM-15-22	0.12	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD
Oxygen	SVM-15-15	18	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD
Carbon Dioxide	SVM-15-15	0.11	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD

**Allen Aminian**  
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

**ANALYTICAL DATA SUMMARY**

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
Oxygen	SVM-6-7	18	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD
Oxygen	SVM-6-15	18	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD
Oxygen	SVM-7-7	18	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD
Carbon Dioxide	SVM-7-7	0.21	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD
Oxygen	SVM-7-7 DUP	18	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD
Carbon Dioxide	SVM-7-7 DUP	0.20	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD
Oxygen	SVM-7-13	17	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD
Carbon Dioxide	SVM-7-13	2.1	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD
Oxygen	SVM-10-15	18	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD
Carbon Dioxide	SVM-10-15	0.26	0.10	% by Volume	1	06/22/16	06/22/16	VOCs by GC/TCD
Oxygen	SVM-3-15	18	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD

**Allen Aminian**  
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

**ANALYTICAL DATA SUMMARY**

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
Carbon Dioxide	SVM-3-15	<b>0.14</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Oxygen	SVM-3-5	<b>18</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Carbon Dioxide	SVM-3-5	<b>0.11</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Oxygen	SVM-5-15	<b>18</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Oxygen	SVM-5-5	<b>18</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Oxygen	SVM-5-5 DUP	<b>18</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Oxygen	SVM-8-5	<b>18</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Carbon Dioxide	SVM-8-5	<b>0.13</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Oxygen	SVM-8-15	<b>18</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Carbon Dioxide	SVM-8-15	<b>0.11</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Oxygen	SVM-16-7	<b>18</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD

**Allen Aminian**  
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

**ANALYTICAL DATA SUMMARY**

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
Carbon Dioxide	SVM-16-7	<b>0.30</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Oxygen	SVM-16-22	<b>11</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Carbon Dioxide	SVM-16-22	<b>4.8</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Oxygen	SVM-16-16	<b>18</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Carbon Dioxide	SVM-16-16	<b>0.40</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Oxygen	SVM-12-7	<b>18</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Carbon Dioxide	SVM-12-7	<b>0.52</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Oxygen	SVM-12-22	<b>11</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Carbon Dioxide	SVM-12-22	<b>4.9</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Oxygen	SVM-12-15	<b>17</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD
Carbon Dioxide	SVM-12-15	<b>1.3</b>	0.10	% by Volume	1	06/23/16	06/23/16	VOCs by GC/TCD

**Allen Aminian**  
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

#### ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
Oxygen	SVM-13-22.5	18	0.10	% by Volume	1	06/24/16	06/24/16	VOCs by GC/TCD
Carbon Dioxide	SVM-13-22.5	0.40	0.10	% by Volume	1	06/24/16	06/24/16	VOCs by GC/TCD
Oxygen	SVM-13-7	18	0.10	% by Volume	1	06/24/16	06/24/16	VOCs by GC/TCD
Oxygen	SVM-13-15.5	18	0.10	% by Volume	1	06/24/16	06/24/16	VOCs by GC/TCD
Oxygen	SVM-14-22	17	0.10	% by Volume	1	06/24/16	06/24/16	VOCs by GC/TCD
Carbon Dioxide	SVM-14-22	0.54	0.10	% by Volume	1	06/24/16	06/24/16	VOCs by GC/TCD
Oxygen	SVM-14-7	17	0.10	% by Volume	1	06/24/16	06/24/16	VOCs by GC/TCD
Carbon Dioxide	SVM-14-7	0.94	0.10	% by Volume	1	06/24/16	06/24/16	VOCs by GC/TCD
Oxygen	SVM-14-7 DUP	17	0.10	% by Volume	1	06/24/16	06/24/16	VOCs by GC/TCD
Carbon Dioxide	SVM-14-7 DUP	0.94	0.10	% by Volume	1	06/24/16	06/24/16	VOCs by GC/TCD
Oxygen	SVM-14-15	17	0.10	% by Volume	1	06/24/16	06/24/16	VOCs by GC/TCD

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

### ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
Carbon Dioxide	SVM-14-15	<b>0.83</b>	0.10	% by Volume	1	06/24/16	06/24/16	VOCs by GC/TCD
<b><u>VOCs by EPA TO-3</u></b>								
Gasoline Range Organics (GRO)	SVM-14-22	<b>2400</b>	20	ug/L	1	06/24/16	06/24/16	TO-3
<b><u>VOCs by GCMS EPA TO-15</u></b>								
Bromodichloromethane	SVM-3-15	<b>0.030</b>	0.020	ug/L	1	06/23/16	06/23/16	TO-15
Chloroform	SVM-3-15	<b>0.059</b>	0.020	ug/L	1	06/23/16	06/23/16	TO-15
Bromodichloromethane	SVM-3-5	<b>0.055</b>	0.020	ug/L	1	06/23/16	06/23/16	TO-15
Chloroform	SVM-3-5	<b>0.055</b>	0.020	ug/L	1	06/23/16	06/23/16	TO-15
Heptane	SVM-16-22	<b>0.037</b>	0.020	ug/L	1	06/23/16	06/23/16	TO-15
n-Hexane	SVM-16-22	<b>0.040</b>	0.020	ug/L	1	06/23/16	06/23/16	TO-15
4-Ethyltoluene	SVM-14-22	<b>80</b>	8.0	ug/L	400	06/24/16	06/24/16	TO-15
1,3,5-Trimethylbenzene	SVM-14-22	<b>75</b>	8.0	ug/L	400	06/24/16	06/24/16	TO-15
1,2,4-Trimethylbenzene	SVM-14-22	<b>66</b>	8.0	ug/L	400	06/24/16	06/24/16	TO-15
o-Xylene	SVM-14-22	<b>24</b>	8.0	ug/L	400	06/24/16	06/24/16	TO-15
m,p-Xylenes	SVM-14-22	<b>19</b>	8.0	ug/L	400	06/24/16	06/24/16	TO-15
Toluene	SVM-14-15	<b>0.049</b>	0.020	ug/L	1	06/24/16	06/24/16	TO-15
o-Xylene	SVM-14-15	<b>0.047</b>	0.020	ug/L	1	06/24/16	06/24/16	TO-15
m,p-Xylenes	SVM-14-15	<b>0.10</b>	0.020	ug/L	1	06/24/16	06/24/16	TO-15

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

<b>Date Sampled:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Prepared:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Analyzed:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>AA ID No:</b>	6F29015-01	6F29015-02	6F29015-03	6F29015-04	
<b>Client ID No:</b>	SVM-1-15	SVM-1-5	SVM-2-5	SVM-15-7	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### TO-3 (TO-3)

Gasoline Range Organics (GRO)	<20	<20	<20	<20	20
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### Surrogates

4-Bromofluorobenzene	102%	106%	107%	107%	<u>%REC Limits</u> 70-130
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**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

<b>Date Sampled:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Prepared:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Analyzed:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>AA ID No:</b>	6F29015-05	6F29015-06	6F29015-07	6F29015-08	
<b>Client ID No:</b>	SVM-15-22	SVM-15-15	SVM-6-7	SVM-6-15	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### TO-3 (TO-3)

Gasoline Range Organics (GRO)	<20	<20	<20	<20	20
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### Surrogates

4-Bromofluorobenzene	101%	102%	105%	103%	<u>%REC Limits</u> 70-130
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**Allen Aminian**  
 QA/QC Manager





### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

<b>Date Sampled:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Prepared:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Analyzed:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>AA ID No:</b>	6F29015-09	6F29015-10	6F29015-11	6F29015-12	
<b>Client ID No:</b>	SVM-7-7	SVM-7-7 DUP	SVM-7-13	SVM-10-15	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

#### TO-3 (TO-3)

Gasoline Range Organics (GRO)	<20	<20	<20	<20	20
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#### Surrogates

4-Bromofluorobenzene	102%	101%	103%	98%	<u>%REC Limits</u> 70-130
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**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

<b>Date Sampled:</b>	06/22/16	06/23/16	06/23/16	06/23/16	
<b>Date Prepared:</b>	06/22/16	06/23/16	06/23/16	06/23/16	
<b>Date Analyzed:</b>	06/22/16	06/23/16	06/23/16	06/23/16	
<b>AA ID No:</b>	6F29015-13	6F29015-14	6F29015-15	6F29015-16	
<b>Client ID No:</b>	Ambient Air	SVM-3-15	SVM-3-5	SVM-5-15	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

#### TO-3 (TO-3)

Gasoline Range Organics (GRO)	<20	<20	<20	<20	20
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#### Surrogates

4-Bromofluorobenzene	101%	106%	105%	105%	<b>%REC Limits</b> 70-130
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**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

<b>Date Sampled:</b>	06/23/2016	06/23/2016	06/23/2016	06/23/2016	
<b>Date Prepared:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Analyzed:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>AA ID No:</b>	6F29015-17	6F29015-18	6F29015-19	6F29015-20	
<b>Client ID No:</b>	SVM-5-5	SVM-5-5 DUP	SVM-8-5	SVM-8-15	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### TO-3 (TO-3)

Gasoline Range Organics (GRO)	<20	<20	<20	<20	20
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### Surrogates

4-Bromofluorobenzene	106%	106%	104%	104%	<b>%REC Limits</b> 70-130
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**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

<b>Date Sampled:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Prepared:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Analyzed:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>AA ID No:</b>	6F29015-21	6F29015-22	6F29015-23	6F29015-24	
<b>Client ID No:</b>	Ambient Air	SVM-16-7	SVM-16-22	SVM-16-16	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

#### TO-3 (TO-3)

Gasoline Range Organics (GRO)	<20	<20	<20	<20	20
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#### Surrogates

4-Bromofluorobenzene	106%	105%	102%	106%	<b>%REC Limits</b> 70-130
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**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

<b>Date Sampled:</b>	06/23/16	06/23/16	06/23/16	06/24/16	
<b>Date Prepared:</b>	06/23/16	06/23/16	06/23/16	06/24/16	
<b>Date Analyzed:</b>	06/23/16	06/23/16	06/23/16	06/24/16	
<b>AA ID No:</b>	6F29015-25	6F29015-26	6F29015-27	6F29015-28	
<b>Client ID No:</b>	SVM-12-7	SVM-12-22	SVM-12-15	SVM-13-22.5	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### TO-3 (TO-3)

Gasoline Range Organics (GRO)	<20	<20	<20	<20	20
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### Surrogates

4-Bromofluorobenzene	106%	105%	108%	108%	<u>%REC Limits</u> 70-130
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**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

<b>Date Sampled:</b>	06/24/16	06/24/16	06/24/16	06/24/16	
<b>Date Prepared:</b>	06/24/16	06/24/16	06/24/16	06/24/16	
<b>Date Analyzed:</b>	06/24/16	06/24/16	06/24/16	06/24/16	
<b>AA ID No:</b>	6F29015-29	6F29015-30	6F29015-31	6F29015-32	
<b>Client ID No:</b>	SVM-13-7	SVM-13-15.5	SVM-14-22	SVM-14-7	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

#### TO-3 (TO-3)

Gasoline Range Organics (GRO)	<20	<20	<b>2400</b>	<20	20
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#### Surrogates

4-Bromofluorobenzene	108%	107%	113%	108%	<b>%REC Limits</b> 70-130
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**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

<b>Date Sampled:</b>	06/24/16	06/24/16	06/24/16	
<b>Date Prepared:</b>	06/24/16	06/24/16	06/24/16	
<b>Date Analyzed:</b>	06/24/16	06/24/16	06/24/16	
<b>AA ID No:</b>	6F29015-33	6F29015-34	6F29015-35	
<b>Client ID No:</b>	SVM-14-7 DUP	SVM-14-15	Ambient Air	
<b>Matrix:</b>	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	MRL

### TO-3 (TO-3)

Gasoline Range Organics (GRO)	<20	<20	<20	20
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### Surrogates

4-Bromofluorobenzene	103%	107%	106%	<b>%REC Limits</b> 70-130
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*Allen Aminian*

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

Date Sampled:	06/22/16	06/22/16	06/22/16	06/22/16	
Date Prepared:	06/22/16	06/22/16	06/22/16	06/22/16	
Date Analyzed:	06/22/16	06/22/16	06/22/16	06/22/16	
AA ID No:	6F29015-01	6F29015-02	6F29015-03	6F29015-04	
Client ID No:	SVM-1-15	SVM-1-5	SVM-2-5	SVM-15-7	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15)

Acetone	<0.020	<0.020	<0.020	<0.020	0.020
Allyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
tert-Amyl Methyl Ether (TAME)	<0.020	<0.020	<0.020	<0.020	0.020
Benzene	<0.020	<0.020	<0.020	<0.020	0.020
Benzyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
Bromodichloromethane	<0.020	<0.020	<0.020	<0.020	0.020
Bromoform	<0.020	<0.020	<0.020	<0.020	0.020
Bromomethane	<0.020	<0.020	<0.020	<0.020	0.020
1,3-Butadiene	<0.020	<0.020	<0.020	<0.020	0.020
2-Butanone (MEK)	<0.020	<0.020	<0.020	<0.020	0.020
tert-Butyl alcohol (TBA)	<20	<20	<20	<20	20
Carbon Disulfide	<0.020	<0.020	<0.020	<0.020	0.020
Carbon Tetrachloride	<0.020	<0.020	<0.020	<0.020	0.020
Chlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
Chloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Chloroform	<0.020	<0.020	<0.020	<0.020	0.020
Chloromethane	<0.020	<0.020	<0.020	<0.020	0.020
Cyclohexane	<0.020	<0.020	<0.020	<0.020	0.020
Dibromochloromethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dibromoethane (EDB)	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,3-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorodifluoromethane (R12)	<0.020	<0.020	<0.020	<0.020	0.020
1,1-Dichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloroethane (EDC)	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020

**Allen Aminian**  
 QA/QC Manager





## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

Date Sampled:	06/22/16	06/22/16	06/22/16	06/22/16	
Date Prepared:	06/22/16	06/22/16	06/22/16	06/22/16	
Date Analyzed:	06/22/16	06/22/16	06/22/16	06/22/16	
AA ID No:	6F29015-01	6F29015-02	6F29015-03	6F29015-04	
Client ID No:	SVM-1-15	SVM-1-5	SVM-2-5	SVM-15-7	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15) (continued)

1,1-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorotetrafluoroethane	<0.020	<0.020	<0.020	<0.020	0.020
Diisopropyl ether (DIPE)	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dioxane	<0.020	<0.020	<0.020	<0.020	0.020
Ethanol	<0.020	<0.020	<0.020	<0.020	0.020
Ethyl Acetate	<0.020	<0.020	<0.020	<0.020	0.020
Ethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Ethyl-tert-Butyl Ether (ETBE)	<0.020	<0.020	<0.020	<0.020	0.020
4-Ethyltoluene	<0.020	<0.020	<0.020	<0.020	0.020
Heptane	<0.020	<0.020	<0.020	<0.020	0.020
Hexachlorobutadiene	<0.020	<0.020	<0.020	<0.020	0.020
n-Hexane	<0.020	<0.020	<0.020	<0.020	0.020
2-Hexanone (MBK)	<0.020	<0.020	<0.020	<0.020	0.020
Isopropanol (IPA)	<0.20	<0.20	<0.20	<0.20	0.20
Methyl-tert-Butyl Ether (MTBE)	<0.020	<0.020	<0.020	<0.020	0.020
Methylene Chloride	<0.020	<0.020	<0.020	<0.020	0.020
4-Methyl-2-pentanone (MIBK)	<0.020	<0.020	<0.020	<0.020	0.020
Naphthalene	<0.020	<0.020	<0.020	<0.020	0.020
Propylene	<0.020	<0.020	<0.020	<0.020	0.020
Styrene	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2,2-Tetrachloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Tetrachloroethylene (PCE)	<0.020	<0.020	<0.020	<0.020	0.020
Tetrahydrofuran (THF)	<0.020	<0.020	<0.020	<0.020	0.020

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

<b>Date Sampled:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Prepared:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Analyzed:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>AA ID No:</b>	6F29015-01	6F29015-02	6F29015-03	6F29015-04	
<b>Client ID No:</b>	SVM-1-15	SVM-1-5	SVM-2-5	SVM-15-7	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15) (continued)

Toluene	<0.020	<0.020	<0.020	<0.020	0.020
1,2,4-Trichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2-Trichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,1,1-Trichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Trichloroethylene (TCE)	<0.020	<0.020	<0.020	<0.020	0.020
Trichlorofluoromethane (R11)	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.020	<0.020	<0.020	<0.020	0.020
1,3,5-Trimethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,2,4-Trimethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
2,2,4-Trimethylpentane	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl acetate	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl bromide	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
o-Xylene	<0.020	<0.020	<0.020	<0.020	0.020
m,p-Xylenes	<0.020	<0.020	<0.020	<0.020	0.020
1,1,1,2-Tetrachloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2,3-Trichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
sec-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Isopropylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
n-Propylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
4-Isopropyltoluene	<0.020	<0.020	<0.020	<0.020	0.020
n-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020

<b><u>Surrogates</u></b>					<b><u>%REC Limits</u></b>
4-Bromofluorobenzene	102%	105%	106%	106%	70-130

*Allen Aminian*

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

Date Sampled:	06/22/16	06/22/16	06/22/16	06/22/16	
Date Prepared:	06/22/16	06/22/16	06/22/16	06/22/16	
Date Analyzed:	06/22/16	06/22/16	06/22/16	06/22/16	
AA ID No:	6F29015-05	6F29015-06	6F29015-07	6F29015-08	
Client ID No:	SVM-15-22	SVM-15-15	SVM-6-7	SVM-6-15	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15)

Acetone	<0.020	<0.020	<0.020	<0.020	0.020
Allyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
tert-Amyl Methyl Ether (TAME)	<0.020	<0.020	<0.020	<0.020	0.020
Benzene	<0.020	<0.020	<0.020	<0.020	0.020
Benzyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
Bromodichloromethane	<0.020	<0.020	<0.020	<0.020	0.020
Bromoform	<0.020	<0.020	<0.020	<0.020	0.020
Bromomethane	<0.020	<0.020	<0.020	<0.020	0.020
1,3-Butadiene	<0.020	<0.020	<0.020	<0.020	0.020
2-Butanone (MEK)	<0.020	<0.020	<0.020	<0.020	0.020
tert-Butyl alcohol (TBA)	<20	<20	<20	<20	20
Carbon Disulfide	<0.020	<0.020	<0.020	<0.020	0.020
Carbon Tetrachloride	<0.020	<0.020	<0.020	<0.020	0.020
Chlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
Chloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Chloroform	<0.020	<0.020	<0.020	<0.020	0.020
Chloromethane	<0.020	<0.020	<0.020	<0.020	0.020
Cyclohexane	<0.020	<0.020	<0.020	<0.020	0.020
Dibromochloromethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dibromoethane (EDB)	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,3-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorodifluoromethane (R12)	<0.020	<0.020	<0.020	<0.020	0.020
1,1-Dichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloroethane (EDC)	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Sampled:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Prepared:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Analyzed:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>AA ID No:</b>	6F29015-05	6F29015-06	6F29015-07	6F29015-08	
<b>Client ID No:</b>	SVM-15-22	SVM-15-15	SVM-6-7	SVM-6-15	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15) (continued)

1,1-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorotetrafluoroethane	<0.020	<0.020	<0.020	<0.020	0.020
Diisopropyl ether (DIPE)	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dioxane	<0.020	<0.020	<0.020	<0.020	0.020
Ethanol	<0.020	<0.020	<0.020	<0.020	0.020
Ethyl Acetate	<0.020	<0.020	<0.020	<0.020	0.020
Ethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Ethyl-tert-Butyl Ether (ETBE)	<0.020	<0.020	<0.020	<0.020	0.020
4-Ethyltoluene	<0.020	<0.020	<0.020	<0.020	0.020
Heptane	<0.020	<0.020	<0.020	<0.020	0.020
Hexachlorobutadiene	<0.020	<0.020	<0.020	<0.020	0.020
n-Hexane	<0.020	<0.020	<0.020	<0.020	0.020
2-Hexanone (MBK)	<0.020	<0.020	<0.020	<0.020	0.020
Isopropanol (IPA)	<0.20	<0.20	<0.20	<0.20	0.20
Methyl-tert-Butyl Ether (MTBE)	<0.020	<0.020	<0.020	<0.020	0.020
Methylene Chloride	<0.020	<0.020	<0.020	<0.020	0.020
4-Methyl-2-pentanone (MIBK)	<0.020	<0.020	<0.020	<0.020	0.020
Naphthalene	<0.020	<0.020	<0.020	<0.020	0.020
Propylene	<0.020	<0.020	<0.020	<0.020	0.020
Styrene	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2,2-Tetrachloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Tetrachloroethylene (PCE)	<0.020	<0.020	<0.020	<0.020	0.020
Tetrahydrofuran (THF)	<0.020	<0.020	<0.020	<0.020	0.020

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

<b>Date Sampled:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Prepared:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Analyzed:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>AA ID No:</b>	6F29015-05	6F29015-06	6F29015-07	6F29015-08	
<b>Client ID No:</b>	SVM-15-22	SVM-15-15	SVM-6-7	SVM-6-15	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15) (continued)

Toluene	<0.020	<0.020	<0.020	<0.020	0.020
1,2,4-Trichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2-Trichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,1,1-Trichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Trichloroethylene (TCE)	<0.020	<0.020	<0.020	<0.020	0.020
Trichlorofluoromethane (R11)	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.020	<0.020	<0.020	<0.020	0.020
1,3,5-Trimethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,2,4-Trimethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
2,2,4-Trimethylpentane	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl acetate	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl bromide	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
o-Xylene	<0.020	<0.020	<0.020	<0.020	0.020
m,p-Xylenes	<0.020	<0.020	<0.020	<0.020	0.020
1,1,1,2-Tetrachloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2,3-Trichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
sec-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Isopropylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
n-Propylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
4-Isopropyltoluene	<0.020	<0.020	<0.020	<0.020	0.020
n-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020

<b>Surrogates</b>					<b>%REC Limits</b>
4-Bromofluorobenzene	100%	101%	104%	102%	70-130

*Allen Aminian*

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

Date Sampled:	06/22/16	06/22/16	06/22/16	06/22/16	
Date Prepared:	06/22/16	06/22/16	06/22/16	06/22/16	
Date Analyzed:	06/22/16	06/22/16	06/22/16	06/22/16	
AA ID No:	6F29015-09	6F29015-10	6F29015-11	6F29015-12	
Client ID No:	SVM-7-7	SVM-7-7 DUP	SVM-7-13	SVM-10-15	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15)

Acetone	<0.020	<0.020	<0.020	<0.020	0.020
Allyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
tert-Amyl Methyl Ether (TAME)	<0.020	<0.020	<0.020	<0.020	0.020
Benzene	<0.020	<0.020	<0.020	<0.020	0.020
Benzyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
Bromodichloromethane	<0.020	<0.020	<0.020	<0.020	0.020
Bromoform	<0.020	<0.020	<0.020	<0.020	0.020
Bromomethane	<0.020	<0.020	<0.020	<0.020	0.020
1,3-Butadiene	<0.020	<0.020	<0.020	<0.020	0.020
2-Butanone (MEK)	<0.020	<0.020	<0.020	<0.020	0.020
tert-Butyl alcohol (TBA)	<20	<20	<20	<20	20
Carbon Disulfide	<0.020	<0.020	<0.020	<0.020	0.020
Carbon Tetrachloride	<0.020	<0.020	<0.020	<0.020	0.020
Chlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
Chloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Chloroform	<0.020	<0.020	<0.020	<0.020	0.020
Chloromethane	<0.020	<0.020	<0.020	<0.020	0.020
Cyclohexane	<0.020	<0.020	<0.020	<0.020	0.020
Dibromochloromethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dibromoethane (EDB)	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,3-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorodifluoromethane (R12)	<0.020	<0.020	<0.020	<0.020	0.020
1,1-Dichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloroethane (EDC)	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

Date Sampled:	06/22/16	06/22/16	06/22/16	06/22/16	
Date Prepared:	06/22/16	06/22/16	06/22/16	06/22/16	
Date Analyzed:	06/22/16	06/22/16	06/22/16	06/22/16	
AA ID No:	6F29015-09	6F29015-10	6F29015-11	6F29015-12	
Client ID No:	SVM-7-7	SVM-7-7 DUP	SVM-7-13	SVM-10-15	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15) (continued)

1,1-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorotetrafluoroethane	<0.020	<0.020	<0.020	<0.020	0.020
Diisopropyl ether (DIPE)	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dioxane	<0.020	<0.020	<0.020	<0.020	0.020
Ethanol	<0.020	<0.020	<0.020	<0.020	0.020
Ethyl Acetate	<0.020	<0.020	<0.020	<0.020	0.020
Ethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Ethyl-tert-Butyl Ether (ETBE)	<0.020	<0.020	<0.020	<0.020	0.020
4-Ethyltoluene	<0.020	<0.020	<0.020	<0.020	0.020
Heptane	<0.020	<0.020	<0.020	<0.020	0.020
Hexachlorobutadiene	<0.020	<0.020	<0.020	<0.020	0.020
n-Hexane	<0.020	<0.020	<0.020	<0.020	0.020
2-Hexanone (MBK)	<0.020	<0.020	<0.020	<0.020	0.020
Isopropanol (IPA)	<0.20	<0.20	<0.20	<0.20	0.20
Methyl-tert-Butyl Ether (MTBE)	<0.020	<0.020	<0.020	<0.020	0.020
Methylene Chloride	<0.020	<0.020	<0.020	<0.020	0.020
4-Methyl-2-pentanone (MIBK)	<0.020	<0.020	<0.020	<0.020	0.020
Naphthalene	<0.020	<0.020	<0.020	<0.020	0.020
Propylene	<0.020	<0.020	<0.020	<0.020	0.020
Styrene	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2,2-Tetrachloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Tetrachloroethylene (PCE)	<0.020	<0.020	<0.020	<0.020	0.020
Tetrahydrofuran (THF)	<0.020	<0.020	<0.020	<0.020	0.020

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

<b>Date Sampled:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Prepared:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Analyzed:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>AA ID No:</b>	6F29015-09	6F29015-10	6F29015-11	6F29015-12	
<b>Client ID No:</b>	SVM-7-7	SVM-7-7 DUP	SVM-7-13	SVM-10-15	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15) (continued)

Toluene	<0.020	<0.020	<0.020	<0.020	0.020
1,2,4-Trichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2-Trichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,1,1-Trichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Trichloroethylene (TCE)	<0.020	<0.020	<0.020	<0.020	0.020
Trichlorofluoromethane (R11)	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.020	<0.020	<0.020	<0.020	0.020
1,3,5-Trimethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,2,4-Trimethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
2,2,4-Trimethylpentane	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl acetate	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl bromide	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
o-Xylene	<0.020	<0.020	<0.020	<0.020	0.020
m,p-Xylenes	<0.020	<0.020	<0.020	<0.020	0.020
1,1,1,2-Tetrachloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2,3-Trichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
sec-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Isopropylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
n-Propylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
4-Isopropyltoluene	<0.020	<0.020	<0.020	<0.020	0.020
n-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020

<b>Surrogates</b>					<b>%REC Limits</b>
4-Bromofluorobenzene	101%	101%	102%	97%	70-130

*Allen Aminian*

**Allen Aminian**  
 QA/QC Manager





## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

	06/22/16	06/23/16	06/23/16	06/23/16	
<b>Date Sampled:</b>	06/22/16	06/23/16	06/23/16	06/23/16	
<b>Date Prepared:</b>	06/22/16	06/23/16	06/23/16	06/23/16	
<b>Date Analyzed:</b>	06/22/16	06/23/16	06/23/16	06/23/16	
<b>AA ID No:</b>	6F29015-13	6F29015-14	6F29015-15	6F29015-16	
<b>Client ID No:</b>	Ambient Air	SVM-3-15	SVM-3-5	SVM-5-15	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15)

Acetone	<0.020	<0.020	<0.020	<0.020	0.020
Allyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
tert-Amyl Methyl Ether (TAME)	<0.020	<0.020	<0.020	<0.020	0.020
Benzene	<0.020	<0.020	<0.020	<0.020	0.020
Benzyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
Bromodichloromethane	<0.020	<b>0.030</b>	<b>0.055</b>	<0.020	0.020
Bromoform	<0.020	<0.020	<0.020	<0.020	0.020
Bromomethane	<0.020	<0.020	<0.020	<0.020	0.020
1,3-Butadiene	<0.020	<0.020	<0.020	<0.020	0.020
2-Butanone (MEK)	<0.020	<0.020	<0.020	<0.020	0.020
tert-Butyl alcohol (TBA)	<20	<20	<20	<20	20
Carbon Disulfide	<0.020	<0.020	<0.020	<0.020	0.020
Carbon Tetrachloride	<0.020	<0.020	<0.020	<0.020	0.020
Chlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
Chloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Chloroform	<0.020	<b>0.059</b>	<b>0.055</b>	<0.020	0.020
Chloromethane	<0.020	<0.020	<0.020	<0.020	0.020
Cyclohexane	<0.020	<0.020	<0.020	<0.020	0.020
Dibromochloromethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dibromoethane (EDB)	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,3-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorodifluoromethane (R12)	<0.020	<0.020	<0.020	<0.020	0.020
1,1-Dichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloroethane (EDC)	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

	06/22/16	06/23/16	06/23/16	06/23/16	
<b>Date Sampled:</b>	06/22/16	06/23/16	06/23/16	06/23/16	
<b>Date Prepared:</b>	06/22/16	06/23/16	06/23/16	06/23/16	
<b>Date Analyzed:</b>	06/22/16	06/23/16	06/23/16	06/23/16	
<b>AA ID No:</b>	6F29015-13	6F29015-14	6F29015-15	6F29015-16	
<b>Client ID No:</b>	Ambient Air	SVM-3-15	SVM-3-5	SVM-5-15	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15) (continued)

1,1-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorotetrafluoroethane	<0.020	<0.020	<0.020	<0.020	0.020
Diisopropyl ether (DIPE)	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dioxane	<0.020	<0.020	<0.020	<0.020	0.020
Ethanol	<0.020	<0.020	<0.020	<0.020	0.020
Ethyl Acetate	<0.020	<0.020	<0.020	<0.020	0.020
Ethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Ethyl-tert-Butyl Ether (ETBE)	<0.020	<0.020	<0.020	<0.020	0.020
4-Ethyltoluene	<0.020	<0.020	<0.020	<0.020	0.020
Heptane	<0.020	<0.020	<0.020	<0.020	0.020
Hexachlorobutadiene	<0.020	<0.020	<0.020	<0.020	0.020
n-Hexane	<0.020	<0.020	<0.020	<0.020	0.020
2-Hexanone (MBK)	<0.020	<0.020	<0.020	<0.020	0.020
Isopropanol (IPA)	<0.20	<0.20	<0.20	<0.20	0.20
Methyl-tert-Butyl Ether (MTBE)	<0.020	<0.020	<0.020	<0.020	0.020
Methylene Chloride	<0.020	<0.020	<0.020	<0.020	0.020
4-Methyl-2-pentanone (MIBK)	<0.020	<0.020	<0.020	<0.020	0.020
Naphthalene	<0.020	<0.020	<0.020	<0.020	0.020
Propylene	<0.020	<0.020	<0.020	<0.020	0.020
Styrene	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2,2-Tetrachloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Tetrachloroethylene (PCE)	<0.020	<0.020	<0.020	<0.020	0.020
Tetrahydrofuran (THF)	<0.020	<0.020	<0.020	<0.020	0.020

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

<b>Date Sampled:</b>	06/22/16	06/23/16	06/23/16	06/23/16	
<b>Date Prepared:</b>	06/22/16	06/23/16	06/23/16	06/23/16	
<b>Date Analyzed:</b>	06/22/16	06/23/16	06/23/16	06/23/16	
<b>AA ID No:</b>	6F29015-13	6F29015-14	6F29015-15	6F29015-16	
<b>Client ID No:</b>	Ambient Air	SVM-3-15	SVM-3-5	SVM-5-15	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15) (continued)

Toluene	<0.020	<0.020	<0.020	<0.020	0.020
1,2,4-Trichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2-Trichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,1,1-Trichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Trichloroethylene (TCE)	<0.020	<0.020	<0.020	<0.020	0.020
Trichlorofluoromethane (R11)	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.020	<0.020	<0.020	<0.020	0.020
1,3,5-Trimethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,2,4-Trimethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
2,2,4-Trimethylpentane	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl acetate	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl bromide	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
o-Xylene	<0.020	<0.020	<0.020	<0.020	0.020
m,p-Xylenes	<0.020	<0.020	<0.020	<0.020	0.020
1,1,1,2-Tetrachloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2,3-Trichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
sec-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Isopropylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
n-Propylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
4-Isopropyltoluene	<0.020	<0.020	<0.020	<0.020	0.020
n-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020

<b>Surrogates</b>					<b>%REC Limits</b>
4-Bromofluorobenzene	101%	106%	104%	104%	70-130

*Allen Aminian*

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

	06/23/2016	06/23/2016	06/23/2016	06/23/2016	
<b>Date Sampled:</b>	06/23/2016	06/23/2016	06/23/2016	06/23/2016	
<b>Date Prepared:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Analyzed:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>AA ID No:</b>	6F29015-17	6F29015-18	6F29015-19	6F29015-20	
<b>Client ID No:</b>	SVM-5-5	SVM-5-5 DUP	SVM-8-5	SVM-8-15	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15)

Acetone	<0.020	<0.020	<0.020	<0.020	0.020
Allyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
tert-Amyl Methyl Ether (TAME)	<0.020	<0.020	<0.020	<0.020	0.020
Benzene	<0.020	<0.020	<0.020	<0.020	0.020
Benzyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
Bromodichloromethane	<0.020	<0.020	<0.020	<0.020	0.020
Bromoform	<0.020	<0.020	<0.020	<0.020	0.020
Bromomethane	<0.020	<0.020	<0.020	<0.020	0.020
1,3-Butadiene	<0.020	<0.020	<0.020	<0.020	0.020
2-Butanone (MEK)	<0.020	<0.020	<0.020	<0.020	0.020
tert-Butyl alcohol (TBA)	<20	<20	<20	<20	20
Carbon Disulfide	<0.020	<0.020	<0.020	<0.020	0.020
Carbon Tetrachloride	<0.020	<0.020	<0.020	<0.020	0.020
Chlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
Chloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Chloroform	<0.020	<0.020	<0.020	<0.020	0.020
Chloromethane	<0.020	<0.020	<0.020	<0.020	0.020
Cyclohexane	<0.020	<0.020	<0.020	<0.020	0.020
Dibromochloromethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dibromoethane (EDB)	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,3-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorodifluoromethane (R12)	<0.020	<0.020	<0.020	<0.020	0.020
1,1-Dichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloroethane (EDC)	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

	06/23/2016	06/23/2016	06/23/2016	06/23/2016	
<b>Date Sampled:</b>	06/23/2016	06/23/2016	06/23/2016	06/23/2016	
<b>Date Prepared:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Analyzed:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>AA ID No:</b>	6F29015-17	6F29015-18	6F29015-19	6F29015-20	
<b>Client ID No:</b>	SVM-5-5	SVM-5-5 DUP	SVM-8-5	SVM-8-15	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15) (continued)

1,1-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorotetrafluoroethane	<0.020	<0.020	<0.020	<0.020	0.020
Diisopropyl ether (DIPE)	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dioxane	<0.020	<0.020	<0.020	<0.020	0.020
Ethanol	<0.020	<0.020	<0.020	<0.020	0.020
Ethyl Acetate	<0.020	<0.020	<0.020	<0.020	0.020
Ethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Ethyl-tert-Butyl Ether (ETBE)	<0.020	<0.020	<0.020	<0.020	0.020
4-Ethyltoluene	<0.020	<0.020	<0.020	<0.020	0.020
Heptane	<0.020	<0.020	<0.020	<0.020	0.020
Hexachlorobutadiene	<0.020	<0.020	<0.020	<0.020	0.020
n-Hexane	<0.020	<0.020	<0.020	<0.020	0.020
2-Hexanone (MBK)	<0.020	<0.020	<0.020	<0.020	0.020
Isopropanol (IPA)	<0.20	<0.20	<0.20	<0.20	0.20
Methyl-tert-Butyl Ether (MTBE)	<0.020	<0.020	<0.020	<0.020	0.020
Methylene Chloride	<0.020	<0.020	<0.020	<0.020	0.020
4-Methyl-2-pentanone (MIBK)	<0.020	<0.020	<0.020	<0.020	0.020
Naphthalene	<0.020	<0.020	<0.020	<0.020	0.020
Propylene	<0.020	<0.020	<0.020	<0.020	0.020
Styrene	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2,2-Tetrachloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Tetrachloroethylene (PCE)	<0.020	<0.020	<0.020	<0.020	0.020
Tetrahydrofuran (THF)	<0.020	<0.020	<0.020	<0.020	0.020

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

	06/23/2016	06/23/2016	06/23/2016	06/23/2016	
<b>Date Sampled:</b>	06/23/2016	06/23/2016	06/23/2016	06/23/2016	
<b>Date Prepared:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Analyzed:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>AA ID No:</b>	6F29015-17	6F29015-18	6F29015-19	6F29015-20	
<b>Client ID No:</b>	SVM-5-5	SVM-5-5 DUP	SVM-8-5	SVM-8-15	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15) (continued)

Toluene	<0.020	<0.020	<0.020	<0.020	0.020
1,2,4-Trichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2-Trichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,1,1-Trichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Trichloroethylene (TCE)	<0.020	<0.020	<0.020	<0.020	0.020
Trichlorofluoromethane (R11)	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.020	<0.020	<0.020	<0.020	0.020
1,3,5-Trimethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,2,4-Trimethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
2,2,4-Trimethylpentane	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl acetate	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl bromide	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
o-Xylene	<0.020	<0.020	<0.020	<0.020	0.020
m,p-Xylenes	<0.020	<0.020	<0.020	<0.020	0.020
1,1,1,2-Tetrachloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2,3-Trichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
sec-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Isopropylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
n-Propylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
4-Isopropyltoluene	<0.020	<0.020	<0.020	<0.020	0.020
n-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020

<u>Surrogates</u>					<u>%REC Limits</u>
4-Bromofluorobenzene	105%	105%	103%	103%	70-130

*Allen Aminian*

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Sampled:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Prepared:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Analyzed:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>AA ID No:</b>	6F29015-21	6F29015-22	6F29015-23	6F29015-24	
<b>Client ID No:</b>	Ambient Air	SVM-16-7	SVM-16-22	SVM-16-16	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15)

Acetone	<0.020	<0.020	<0.020	<0.020	0.020
Allyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
tert-Amyl Methyl Ether (TAME)	<0.020	<0.020	<0.020	<0.020	0.020
Benzene	<0.020	<0.020	<0.020	<0.020	0.020
Benzyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
Bromodichloromethane	<0.020	<0.020	<0.020	<0.020	0.020
Bromoform	<0.020	<0.020	<0.020	<0.020	0.020
Bromomethane	<0.020	<0.020	<0.020	<0.020	0.020
1,3-Butadiene	<0.020	<0.020	<0.020	<0.020	0.020
2-Butanone (MEK)	<0.020	<0.020	<0.020	<0.020	0.020
tert-Butyl alcohol (TBA)	<20	<20	<20	<20	20
Carbon Disulfide	<0.020	<0.020	<0.020	<0.020	0.020
Carbon Tetrachloride	<0.020	<0.020	<0.020	<0.020	0.020
Chlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
Chloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Chloroform	<0.020	<0.020	<0.020	<0.020	0.020
Chloromethane	<0.020	<0.020	<0.020	<0.020	0.020
Cyclohexane	<0.020	<0.020	<0.020	<0.020	0.020
Dibromochloromethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dibromoethane (EDB)	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,3-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorodifluoromethane (R12)	<0.020	<0.020	<0.020	<0.020	0.020
1,1-Dichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloroethane (EDC)	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Sampled:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Prepared:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Analyzed:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>AA ID No:</b>	6F29015-21	6F29015-22	6F29015-23	6F29015-24	
<b>Client ID No:</b>	Ambient Air	SVM-16-7	SVM-16-22	SVM-16-16	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15) (continued)

1,1-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorotetrafluoroethane	<0.020	<0.020	<0.020	<0.020	0.020
Diisopropyl ether (DIPE)	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dioxane	<0.020	<0.020	<0.020	<0.020	0.020
Ethanol	<0.020	<0.020	<0.020	<0.020	0.020
Ethyl Acetate	<0.020	<0.020	<0.020	<0.020	0.020
Ethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Ethyl-tert-Butyl Ether (ETBE)	<0.020	<0.020	<0.020	<0.020	0.020
4-Ethyltoluene	<0.020	<0.020	<0.020	<0.020	0.020
Heptane	<0.020	<0.020	<b>0.037</b>	<0.020	0.020
Hexachlorobutadiene	<0.020	<0.020	<0.020	<0.020	0.020
n-Hexane	<0.020	<0.020	<b>0.040</b>	<0.020	0.020
2-Hexanone (MBK)	<0.020	<0.020	<0.020	<0.020	0.020
Isopropanol (IPA)	<0.20	<0.20	<0.20	<0.20	0.20
Methyl-tert-Butyl Ether (MTBE)	<0.020	<0.020	<0.020	<0.020	0.020
Methylene Chloride	<0.020	<0.020	<0.020	<0.020	0.020
4-Methyl-2-pentanone (MIBK)	<0.020	<0.020	<0.020	<0.020	0.020
Naphthalene	<0.020	<0.020	<0.020	<0.020	0.020
Propylene	<0.020	<0.020	<0.020	<0.020	0.020
Styrene	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2,2-Tetrachloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Tetrachloroethylene (PCE)	<0.020	<0.020	<0.020	<0.020	0.020
Tetrahydrofuran (THF)	<0.020	<0.020	<0.020	<0.020	0.020

**Allen Aminian**  
 QA/QC Manager





## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Sampled:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Prepared:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Analyzed:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>AA ID No:</b>	6F29015-21	6F29015-22	6F29015-23	6F29015-24	
<b>Client ID No:</b>	Ambient Air	SVM-16-7	SVM-16-22	SVM-16-16	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15) (continued)

Toluene	<0.020	<0.020	<0.020	<0.020	0.020
1,2,4-Trichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2-Trichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,1,1-Trichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Trichloroethylene (TCE)	<0.020	<0.020	<0.020	<0.020	0.020
Trichlorofluoromethane (R11)	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.020	<0.020	<0.020	<0.020	0.020
1,3,5-Trimethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,2,4-Trimethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
2,2,4-Trimethylpentane	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl acetate	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl bromide	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
o-Xylene	<0.020	<0.020	<0.020	<0.020	0.020
m,p-Xylenes	<0.020	<0.020	<0.020	<0.020	0.020
1,1,1,2-Tetrachloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2,3-Trichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
sec-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Isopropylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
n-Propylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
4-Isopropyltoluene	<0.020	<0.020	<0.020	<0.020	0.020
n-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020

<u>Surrogates</u>					<u>%REC Limits</u>
4-Bromofluorobenzene	105%	104%	102%	105%	70-130

*Allen Aminian*

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

Date Sampled:	06/23/16	06/23/16	06/23/16	06/24/16	
Date Prepared:	06/23/16	06/23/16	06/23/16	06/24/16	
Date Analyzed:	06/23/16	06/23/16	06/23/16	06/24/16	
AA ID No:	6F29015-25	6F29015-26	6F29015-27	6F29015-28	
Client ID No:	SVM-12-7	SVM-12-22	SVM-12-15	SVM-13-22.5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15)

Acetone	<0.020	<0.020	<0.020	<0.020	0.020
Allyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
tert-Amyl Methyl Ether (TAME)	<0.020	<0.020	<0.020	<0.020	0.020
Benzene	<0.020	<0.020	<0.020	<0.020	0.020
Benzyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
Bromodichloromethane	<0.020	<0.020	<0.020	<0.020	0.020
Bromoform	<0.020	<0.020	<0.020	<0.020	0.020
Bromomethane	<0.020	<0.020	<0.020	<0.020	0.020
1,3-Butadiene	<0.020	<0.020	<0.020	<0.020	0.020
2-Butanone (MEK)	<0.020	<0.020	<0.020	<0.020	0.020
tert-Butyl alcohol (TBA)	<20	<20	<20	<20	20
Carbon Disulfide	<0.020	<0.020	<0.020	<0.020	0.020
Carbon Tetrachloride	<0.020	<0.020	<0.020	<0.020	0.020
Chlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
Chloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Chloroform	<0.020	<0.020	<0.020	<0.020	0.020
Chloromethane	<0.020	<0.020	<0.020	<0.020	0.020
Cyclohexane	<0.020	<0.020	<0.020	<0.020	0.020
Dibromochloromethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dibromoethane (EDB)	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,3-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorodifluoromethane (R12)	<0.020	<0.020	<0.020	<0.020	0.020
1,1-Dichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloroethane (EDC)	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

	06/23/16	06/23/16	06/23/16	06/24/16	
<b>Date Sampled:</b>	06/23/16	06/23/16	06/23/16	06/24/16	
<b>Date Prepared:</b>	06/23/16	06/23/16	06/23/16	06/24/16	
<b>Date Analyzed:</b>	06/23/16	06/23/16	06/23/16	06/24/16	
<b>AA ID No:</b>	6F29015-25	6F29015-26	6F29015-27	6F29015-28	
<b>Client ID No:</b>	SVM-12-7	SVM-12-22	SVM-12-15	SVM-13-22.5	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15) (continued)

1,1-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorotetrafluoroethane	<0.020	<0.020	<0.020	<0.020	0.020
Diisopropyl ether (DIPE)	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dioxane	<0.020	<0.020	<0.020	<0.020	0.020
Ethanol	<0.020	<0.020	<0.020	<0.020	0.020
Ethyl Acetate	<0.020	<0.020	<0.020	<0.020	0.020
Ethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Ethyl-tert-Butyl Ether (ETBE)	<0.020	<0.020	<0.020	<0.020	0.020
4-Ethyltoluene	<0.020	<0.020	<0.020	<0.020	0.020
Heptane	<0.020	<0.020	<0.020	<0.020	0.020
Hexachlorobutadiene	<0.020	<0.020	<0.020	<0.020	0.020
n-Hexane	<0.020	<0.020	<0.020	<0.020	0.020
2-Hexanone (MBK)	<0.020	<0.020	<0.020	<0.020	0.020
Isopropanol (IPA)	<0.20	<0.20	<0.20	<0.20	0.20
Methyl-tert-Butyl Ether (MTBE)	<0.020	<0.020	<0.020	<0.020	0.020
Methylene Chloride	<0.020	<0.020	<0.020	<0.020	0.020
4-Methyl-2-pentanone (MIBK)	<0.020	<0.020	<0.020	<0.020	0.020
Naphthalene	<0.020	<0.020	<0.020	<0.020	0.020
Propylene	<0.020	<0.020	<0.020	<0.020	0.020
Styrene	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2,2-Tetrachloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Tetrachloroethylene (PCE)	<0.020	<0.020	<0.020	<0.020	0.020
Tetrahydrofuran (THF)	<0.020	<0.020	<0.020	<0.020	0.020

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

<b>Date Sampled:</b>	06/23/16	06/23/16	06/23/16	06/24/16	
<b>Date Prepared:</b>	06/23/16	06/23/16	06/23/16	06/24/16	
<b>Date Analyzed:</b>	06/23/16	06/23/16	06/23/16	06/24/16	
<b>AA ID No:</b>	6F29015-25	6F29015-26	6F29015-27	6F29015-28	
<b>Client ID No:</b>	SVM-12-7	SVM-12-22	SVM-12-15	SVM-13-22.5	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### TO-15 (Mid Level) (TO-15) (continued)

Toluene	<0.020	<0.020	<0.020	<0.020	0.020
1,2,4-Trichlorobenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2-Trichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,1,1-Trichloroethane	<0.020	<0.020	<0.020	<0.020	0.020
Trichloroethylene (TCE)	<0.020	<0.020	<0.020	<0.020	0.020
Trichlorofluoromethane (R11)	<0.020	<0.020	<0.020	<0.020	0.020
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.020	<0.020	<0.020	<0.020	0.020
1,3,5-Trimethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,2,4-Trimethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
2,2,4-Trimethylpentane	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl acetate	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl bromide	<0.020	<0.020	<0.020	<0.020	0.020
Vinyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
o-Xylene	<0.020	<0.020	<0.020	<0.020	0.020
m,p-Xylenes	<0.020	<0.020	<0.020	<0.020	0.020
1,1,1,2-Tetrachloroethane	<0.020	<0.020	<0.020	<0.020	0.020
1,2,3-Trichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
sec-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Isopropylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
n-Propylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
4-Isopropyltoluene	<0.020	<0.020	<0.020	<0.020	0.020
n-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020

<b>Surrogates</b>					<b>%REC Limits</b>
4-Bromofluorobenzene	105%	104%	107%	108%	70-130

*Allen Aminian*

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

	06/24/16	06/24/16	06/24/16	06/24/16	
<b>Date Sampled:</b>	06/24/16	06/24/16	06/24/16	06/24/16	
<b>Date Prepared:</b>	06/24/16	06/24/16	06/24/16	06/24/16	
<b>Date Analyzed:</b>	06/24/16	06/24/16	06/24/16	06/24/16	
<b>AA ID No:</b>	6F29015-29	6F29015-30	6F29015-31	6F29015-32	
<b>Client ID No:</b>	SVM-13-7	SVM-13-15.5	SVM-14-22	SVM-14-7	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	400	1	MRL

### TO-15 (Mid Level) (TO-15)

Acetone	<0.020	<0.020	<8.0	<0.020	0.020
Allyl chloride	<0.020	<0.020	<8.0	<0.020	0.020
tert-Amyl Methyl Ether (TAME)	<0.020	<0.020	<8.0	<0.020	0.020
Benzene	<0.020	<0.020	<8.0	<0.020	0.020
Benzyl chloride	<0.020	<0.020	<8.0	<0.020	0.020
Bromodichloromethane	<0.020	<0.020	<8.0	<0.020	0.020
Bromoform	<0.020	<0.020	<8.0	<0.020	0.020
Bromomethane	<0.020	<0.020	<8.0	<0.020	0.020
1,3-Butadiene	<0.020	<0.020	<8.0	<0.020	0.020
2-Butanone (MEK)	<0.020	<0.020	<8.0	<0.020	0.020
tert-Butyl alcohol (TBA)	<20	<20	<8000	<20	20
Carbon Disulfide	<0.020	<0.020	<8.0	<0.020	0.020
Carbon Tetrachloride	<0.020	<0.020	<8.0	<0.020	0.020
Chlorobenzene	<0.020	<0.020	<8.0	<0.020	0.020
Chloroethane	<0.020	<0.020	<8.0	<0.020	0.020
Chloroform	<0.020	<0.020	<8.0	<0.020	0.020
Chloromethane	<0.020	<0.020	<8.0	<0.020	0.020
Cyclohexane	<0.020	<0.020	<8.0	<0.020	0.020
Dibromochloromethane	<0.020	<0.020	<8.0	<0.020	0.020
1,2-Dibromoethane (EDB)	<0.020	<0.020	<8.0	<0.020	0.020
1,2-Dichlorobenzene	<0.020	<0.020	<8.0	<0.020	0.020
1,3-Dichlorobenzene	<0.020	<0.020	<8.0	<0.020	0.020
1,4-Dichlorobenzene	<0.020	<0.020	<8.0	<0.020	0.020
Dichlorodifluoromethane (R12)	<0.020	<0.020	<8.0	<0.020	0.020
1,1-Dichloroethane	<0.020	<0.020	<8.0	<0.020	0.020
1,2-Dichloroethane (EDC)	<0.020	<0.020	<8.0	<0.020	0.020
cis-1,2-Dichloroethylene	<0.020	<0.020	<8.0	<0.020	0.020

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

	06/24/16	06/24/16	06/24/16	06/24/16	
<b>Date Sampled:</b>	06/24/16	06/24/16	06/24/16	06/24/16	
<b>Date Prepared:</b>	06/24/16	06/24/16	06/24/16	06/24/16	
<b>Date Analyzed:</b>	06/24/16	06/24/16	06/24/16	06/24/16	
<b>AA ID No:</b>	6F29015-29	6F29015-30	6F29015-31	6F29015-32	
<b>Client ID No:</b>	SVM-13-7	SVM-13-15.5	SVM-14-22	SVM-14-7	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	400	1	MRL

### TO-15 (Mid Level) (TO-15) (continued)

1,1-Dichloroethylene	<0.020	<0.020	<8.0	<0.020	0.020
trans-1,2-Dichloroethylene	<0.020	<0.020	<8.0	<0.020	0.020
1,2-Dichloropropane	<0.020	<0.020	<8.0	<0.020	0.020
trans-1,3-Dichloropropylene	<0.020	<0.020	<8.0	<0.020	0.020
cis-1,3-Dichloropropylene	<0.020	<0.020	<8.0	<0.020	0.020
Dichlorotetrafluoroethane	<0.020	<0.020	<8.0	<0.020	0.020
Diisopropyl ether (DIPE)	<0.020	<0.020	<8.0	<0.020	0.020
1,4-Dioxane	<0.020	<0.020	<8.0	<0.020	0.020
Ethanol	<0.020	<0.020	<8.0	<0.020	0.020
Ethyl Acetate	<0.020	<0.020	<8.0	<0.020	0.020
Ethylbenzene	<0.020	<0.020	<8.0	<0.020	0.020
Ethyl-tert-Butyl Ether (ETBE)	<0.020	<0.020	<8.0	<0.020	0.020
4-Ethyltoluene	<0.020	<0.020	<b>80</b>	<0.020	0.020
Heptane	<0.020	<0.020	<8.0	<0.020	0.020
Hexachlorobutadiene	<0.020	<0.020	<8.0	<0.020	0.020
n-Hexane	<0.020	<0.020	<8.0	<0.020	0.020
2-Hexanone (MBK)	<0.020	<0.020	<8.0	<0.020	0.020
Isopropanol (IPA)	<0.20	<0.20	<80	<0.20	0.20
Methyl-tert-Butyl Ether (MTBE)	<0.020	<0.020	<8.0	<0.020	0.020
Methylene Chloride	<0.020	<0.020	<8.0	<0.020	0.020
4-Methyl-2-pentanone (MIBK)	<0.020	<0.020	<8.0	<0.020	0.020
Naphthalene	<0.020	<0.020	<8.0	<0.020	0.020
Propylene	<0.020	<0.020	<8.0	<0.020	0.020
Styrene	<0.020	<0.020	<8.0	<0.020	0.020
1,1,2,2-Tetrachloroethane	<0.020	<0.020	<8.0	<0.020	0.020
Tetrachloroethylene (PCE)	<0.020	<0.020	<8.0	<0.020	0.020
Tetrahydrofuran (THF)	<0.020	<0.020	<8.0	<0.020	0.020

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

<b>Date Sampled:</b>	06/24/16	06/24/16	06/24/16	06/24/16	
<b>Date Prepared:</b>	06/24/16	06/24/16	06/24/16	06/24/16	
<b>Date Analyzed:</b>	06/24/16	06/24/16	06/24/16	06/24/16	
<b>AA ID No:</b>	6F29015-29	6F29015-30	6F29015-31	6F29015-32	
<b>Client ID No:</b>	SVM-13-7	SVM-13-15.5	SVM-14-22	SVM-14-7	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	400	1	MRL

### TO-15 (Mid Level) (TO-15) (continued)

Toluene	<0.020	<0.020	<8.0	<0.020	0.020
1,2,4-Trichlorobenzene	<0.020	<0.020	<8.0	<0.020	0.020
1,1,2-Trichloroethane	<0.020	<0.020	<8.0	<0.020	0.020
1,1,1-Trichloroethane	<0.020	<0.020	<8.0	<0.020	0.020
Trichloroethylene (TCE)	<0.020	<0.020	<8.0	<0.020	0.020
Trichlorofluoromethane (R11)	<0.020	<0.020	<8.0	<0.020	0.020
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.020	<0.020	<8.0	<0.020	0.020
1,3,5-Trimethylbenzene	<0.020	<0.020	<b>75</b>	<0.020	0.020
1,2,4-Trimethylbenzene	<0.020	<0.020	<b>66</b>	<0.020	0.020
2,2,4-Trimethylpentane	<0.020	<0.020	<8.0	<0.020	0.020
Vinyl acetate	<0.020	<0.020	<8.0	<0.020	0.020
Vinyl bromide	<0.020	<0.020	<8.0	<0.020	0.020
Vinyl chloride	<0.020	<0.020	<8.0	<0.020	0.020
o-Xylene	<0.020	<0.020	<b>24</b>	<0.020	0.020
m,p-Xylenes	<0.020	<0.020	<b>19</b>	<0.020	0.020
1,1,1,2-Tetrachloroethane	<0.020	<0.020	<8.0	<0.020	0.020
1,2,3-Trichloropropane	<0.020	<0.020	<8.0	<0.020	0.020
sec-Butylbenzene	<0.020	<0.020	<8.0	<0.020	0.020
Isopropylbenzene	<0.020	<0.020	<8.0	<0.020	0.020
n-Propylbenzene	<0.020	<0.020	<8.0	<0.020	0.020
4-Isopropyltoluene	<0.020	<0.020	<8.0	<0.020	0.020
n-Butylbenzene	<0.020	<0.020	<8.0	<0.020	0.020

### Surrogates

4-Bromofluorobenzene	107%	107%	112%	108%	<b>%REC Limits</b> 70-130
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*Allen Aminian*

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

	06/24/16	06/24/16	06/24/16	
<b>Date Sampled:</b>	06/24/16	06/24/16	06/24/16	
<b>Date Prepared:</b>	06/24/16	06/24/16	06/24/16	
<b>Date Analyzed:</b>	06/24/16	06/24/16	06/24/16	
<b>AA ID No:</b>	6F29015-33	6F29015-34	6F29015-35	
<b>Client ID No:</b>	SVM-14-7 DUP	SVM-14-15	Ambient Air	
<b>Matrix:</b>	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	MRL

### TO-15 (Mid Level) (TO-15)

Acetone	<0.020	<0.020	<0.020	0.020
Allyl chloride	<0.020	<0.020	<0.020	0.020
tert-Amyl Methyl Ether (TAME)	<0.020	<0.020	<0.020	0.020
Benzene	<0.020	<0.020	<0.020	0.020
Benzyl chloride	<0.020	<0.020	<0.020	0.020
Bromodichloromethane	<0.020	<0.020	<0.020	0.020
Bromoform	<0.020	<0.020	<0.020	0.020
Bromomethane	<0.020	<0.020	<0.020	0.020
1,3-Butadiene	<0.020	<0.020	<0.020	0.020
2-Butanone (MEK)	<0.020	<0.020	<0.020	0.020
tert-Butyl alcohol (TBA)	<20	<20	<20	20
Carbon Disulfide	<0.020	<0.020	<0.020	0.020
Carbon Tetrachloride	<0.020	<0.020	<0.020	0.020
Chlorobenzene	<0.020	<0.020	<0.020	0.020
Chloroethane	<0.020	<0.020	<0.020	0.020
Chloroform	<0.020	<0.020	<0.020	0.020
Chloromethane	<0.020	<0.020	<0.020	0.020
Cyclohexane	<0.020	<0.020	<0.020	0.020
Dibromochloromethane	<0.020	<0.020	<0.020	0.020
1,2-Dibromoethane (EDB)	<0.020	<0.020	<0.020	0.020
1,2-Dichlorobenzene	<0.020	<0.020	<0.020	0.020
1,3-Dichlorobenzene	<0.020	<0.020	<0.020	0.020
1,4-Dichlorobenzene	<0.020	<0.020	<0.020	0.020
Dichlorodifluoromethane (R12)	<0.020	<0.020	<0.020	0.020
1,1-Dichloroethane	<0.020	<0.020	<0.020	0.020
1,2-Dichloroethane (EDC)	<0.020	<0.020	<0.020	0.020
cis-1,2-Dichloroethylene	<0.020	<0.020	<0.020	0.020

**Allen Aminian**  
 QA/QC Manager





## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

<b>Date Sampled:</b>	06/24/16	06/24/16	06/24/16	
<b>Date Prepared:</b>	06/24/16	06/24/16	06/24/16	
<b>Date Analyzed:</b>	06/24/16	06/24/16	06/24/16	
<b>AA ID No:</b>	6F29015-33	6F29015-34	6F29015-35	
<b>Client ID No:</b>	SVM-14-7 DUP	SVM-14-15	Ambient Air	
<b>Matrix:</b>	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	MRL

### TO-15 (Mid Level) (TO-15) (continued)

1,1-Dichloroethylene	<0.020	<0.020	<0.020	0.020
trans-1,2-Dichloroethylene	<0.020	<0.020	<0.020	0.020
1,2-Dichloropropane	<0.020	<0.020	<0.020	0.020
trans-1,3-Dichloropropylene	<0.020	<0.020	<0.020	0.020
cis-1,3-Dichloropropylene	<0.020	<0.020	<0.020	0.020
Dichlorotetrafluoroethane	<0.020	<0.020	<0.020	0.020
Diisopropyl ether (DIPE)	<0.020	<0.020	<0.020	0.020
1,4-Dioxane	<0.020	<0.020	<0.020	0.020
Ethanol	<0.020	<0.020	<0.020	0.020
Ethyl Acetate	<0.020	<0.020	<0.020	0.020
Ethylbenzene	<0.020	<0.020	<0.020	0.020
Ethyl-tert-Butyl Ether (ETBE)	<0.020	<0.020	<0.020	0.020
4-Ethyltoluene	<0.020	<0.020	<0.020	0.020
Heptane	<0.020	<0.020	<0.020	0.020
Hexachlorobutadiene	<0.020	<0.020	<0.020	0.020
n-Hexane	<0.020	<0.020	<0.020	0.020
2-Hexanone (MBK)	<0.020	<0.020	<0.020	0.020
Isopropanol (IPA)	<0.20	<0.20	<0.20	0.20
Methyl-tert-Butyl Ether (MTBE)	<0.020	<0.020	<0.020	0.020
Methylene Chloride	<0.020	<0.020	<0.020	0.020
4-Methyl-2-pentanone (MIBK)	<0.020	<0.020	<0.020	0.020
Naphthalene	<0.020	<0.020	<0.020	0.020
Propylene	<0.020	<0.020	<0.020	0.020
Styrene	<0.020	<0.020	<0.020	0.020
1,1,2,2-Tetrachloroethane	<0.020	<0.020	<0.020	0.020
Tetrachloroethylene (PCE)	<0.020	<0.020	<0.020	0.020
Tetrahydrofuran (THF)	<0.020	<0.020	<0.020	0.020

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** ug/L

<b>Date Sampled:</b>	06/24/16	06/24/16	06/24/16	
<b>Date Prepared:</b>	06/24/16	06/24/16	06/24/16	
<b>Date Analyzed:</b>	06/24/16	06/24/16	06/24/16	
<b>AA ID No:</b>	6F29015-33	6F29015-34	6F29015-35	
<b>Client ID No:</b>	SVM-14-7 DUP	SVM-14-15	Ambient Air	
<b>Matrix:</b>	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	MRL

### TO-15 (Mid Level) (TO-15) (continued)

Toluene	<0.020	<b>0.049</b>	<0.020	0.020
1,2,4-Trichlorobenzene	<0.020	<0.020	<0.020	0.020
1,1,2-Trichloroethane	<0.020	<0.020	<0.020	0.020
1,1,1-Trichloroethane	<0.020	<0.020	<0.020	0.020
Trichloroethylene (TCE)	<0.020	<0.020	<0.020	0.020
Trichlorofluoromethane (R11)	<0.020	<0.020	<0.020	0.020
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.020	<0.020	<0.020	0.020
1,3,5-Trimethylbenzene	<0.020	<0.020	<0.020	0.020
1,2,4-Trimethylbenzene	<0.020	<0.020	<0.020	0.020
2,2,4-Trimethylpentane	<0.020	<0.020	<0.020	0.020
Vinyl acetate	<0.020	<0.020	<0.020	0.020
Vinyl bromide	<0.020	<0.020	<0.020	0.020
Vinyl chloride	<0.020	<0.020	<0.020	0.020
o-Xylene	<0.020	<b>0.047</b>	<0.020	0.020
m,p-Xylenes	<0.020	<b>0.10</b>	<0.020	0.020
1,1,1,2-Tetrachloroethane	<0.020	<0.020	<0.020	0.020
1,2,3-Trichloropropane	<0.020	<0.020	<0.020	0.020
sec-Butylbenzene	<0.020	<0.020	<0.020	0.020
Isopropylbenzene	<0.020	<0.020	<0.020	0.020
n-Propylbenzene	<0.020	<0.020	<0.020	0.020
4-Isopropyltoluene	<0.020	<0.020	<0.020	0.020
n-Butylbenzene	<0.020	<0.020	<0.020	0.020

### Surrogates

4-Bromofluorobenzene	102%	106%	105%	<b>%REC Limits</b> 70-130
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**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** % by Volume

<b>Date Sampled:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Prepared:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Analyzed:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>AA ID No:</b>	6F29015-01	6F29015-02	6F29015-03	6F29015-04	
<b>Client ID No:</b>	SVM-1-15	SVM-1-5	SVM-2-5	SVM-15-7	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### Fixed Gases - Field (VOCs by GC/TCD)

Methane	<0.10	<0.10	<0.10	<0.10	0.10
Oxygen	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	0.10
Carbon Dioxide	<0.10	<0.10	<b>0.20</b>	<b>0.11</b>	0.10

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** % by Volume

<b>Date Sampled:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Prepared:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Analyzed:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>AA ID No:</b>	6F29015-05	6F29015-06	6F29015-07	6F29015-08	
<b>Client ID No:</b>	SVM-15-22	SVM-15-15	SVM-6-7	SVM-6-15	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### Fixed Gases - Field (VOCs by GC/TCD)

Methane	<0.10	<0.10	<0.10	<0.10	0.10
Oxygen	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	0.10
Carbon Dioxide	<b>0.12</b>	<b>0.11</b>	<0.10	<0.10	0.10

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** % by Volume

<b>Date Sampled:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Prepared:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>Date Analyzed:</b>	06/22/16	06/22/16	06/22/16	06/22/16	
<b>AA ID No:</b>	6F29015-09	6F29015-10	6F29015-11	6F29015-12	
<b>Client ID No:</b>	SVM-7-7	SVM-7-7 DUP	SVM-7-13	SVM-10-15	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### Fixed Gases - Field (VOCs by GC/TCD)

Methane	<0.10	<0.10	<0.10	<0.10	0.10
Oxygen	<b>18</b>	<b>18</b>	<b>17</b>	<b>18</b>	0.10
Carbon Dioxide	<b>0.21</b>	<b>0.20</b>	<b>2.1</b>	<b>0.26</b>	0.10

**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** % by Volume

<b>Date Sampled:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Prepared:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Analyzed:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>AA ID No:</b>	6F29015-14	6F29015-15	6F29015-16	6F29015-17	
<b>Client ID No:</b>	SVM-3-15	SVM-3-5	SVM-5-15	SVM-5-5	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

#### Fixed Gases - Field (VOCs by GC/TCD)

Methane	<0.10	<0.10	<0.10	<0.10	0.10
Oxygen	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	0.10
Carbon Dioxide	<b>0.14</b>	<b>0.11</b>	<0.10	<0.10	0.10

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** % by Volume

<b>Date Sampled:</b>	06/23/2016	06/23/2016	06/23/2016	06/23/2016	
<b>Date Prepared:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Analyzed:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>AA ID No:</b>	6F29015-18	6F29015-19	6F29015-20	6F29015-22	
<b>Client ID No:</b>	SVM-5-5 DUP	SVM-8-5	SVM-8-15	SVM-16-7	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### Fixed Gases - Field (VOCs by GC/TCD)

Methane	<0.10	<0.10	<0.10	<0.10	0.10
Oxygen	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	0.10
Carbon Dioxide	<0.10	<b>0.13</b>	<b>0.11</b>	<b>0.30</b>	0.10

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** % by Volume

<b>Date Sampled:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Prepared:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>Date Analyzed:</b>	06/23/16	06/23/16	06/23/16	06/23/16	
<b>AA ID No:</b>	6F29015-23	6F29015-24	6F29015-25	6F29015-26	
<b>Client ID No:</b>	SVM-16-22	SVM-16-16	SVM-12-7	SVM-12-22	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### Fixed Gases - Field (VOCs by GC/TCD)

Methane	<0.10	<0.10	<0.10	<0.10	0.10
Oxygen	<b>11</b>	<b>18</b>	<b>18</b>	<b>11</b>	0.10
Carbon Dioxide	<b>4.8</b>	<b>0.40</b>	<b>0.52</b>	<b>4.9</b>	0.10

**Allen Aminian**  
 QA/QC Manager





## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** % by Volume

<b>Date Sampled:</b>	06/23/16	06/24/16	06/24/16	06/24/16	
<b>Date Prepared:</b>	06/23/16	06/24/16	06/24/16	06/24/16	
<b>Date Analyzed:</b>	06/23/16	06/24/16	06/24/16	06/24/16	
<b>AA ID No:</b>	6F29015-27	6F29015-28	6F29015-29	6F29015-30	
<b>Client ID No:</b>	SVM-12-15	SVM-13-22.5	SVM-13-7	SVM-13-15.5	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### Fixed Gases - Field (VOCs by GC/TCD)

Methane	<0.10	<0.10	<0.10	<0.10	0.10
Oxygen	<b>17</b>	<b>18</b>	<b>18</b>	<b>18</b>	0.10
Carbon Dioxide	<b>1.3</b>	<b>0.40</b>	<0.10	<0.10	0.10

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16  
**Units:** % by Volume

<b>Date Sampled:</b>	06/24/16	06/24/16	06/24/16	06/24/16	
<b>Date Prepared:</b>	06/24/16	06/24/16	06/24/16	06/24/16	
<b>Date Analyzed:</b>	06/24/16	06/24/16	06/24/16	06/24/16	
<b>AA ID No:</b>	6F29015-31	6F29015-32	6F29015-33	6F29015-34	
<b>Client ID No:</b>	SVM-14-22	SVM-14-7	SVM-14-7 DUP	SVM-14-15	
<b>Matrix:</b>	Vapor	Vapor	Vapor	Vapor	
<b>Dilution Factor:</b>	1	1	1	1	MRL

### Fixed Gases - Field (VOCs by GC/TCD)

Methane	<0.10	<0.10	<0.10	<0.10	0.10
Oxygen	<b>17</b>	<b>17</b>	<b>17</b>	<b>17</b>	0.10
Carbon Dioxide	<b>0.54</b>	<b>0.94</b>	<b>0.94</b>	<b>0.83</b>	0.10

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	Limits	RPD	RPD Limit	Notes
<b>VOCs by EPA TO-3 - Quality Control</b>										
<i>Batch B6G0810 - *** DEFAULT PREP ***</i>										
<b>Blank (B6G0810-BLK1)</b>				Prepared & Analyzed: 06/22/16						
Gasoline Range Organics (GRO)	<20	20	ug/L							
<i>Surrogate: 4-Bromofluorobenzene</i>	0.153		ug/L	0.14	107	70-130				
<b>LCS (B6G0810-BS1)</b>				Prepared & Analyzed: 06/22/16						
Gasoline Range Organics (GRO)	<b>0.900</b>	20	ug/L	0.82	110	70-130				
<i>Surrogate: 4-Bromofluorobenzene</i>	0.143		ug/L	0.14	99.9	70-130				
<b>LCS Dup (B6G0810-BSD1)</b>				Prepared & Analyzed: 06/22/16						
Gasoline Range Organics (GRO)	<b>0.912</b>	20	ug/L	0.82	112	70-130	1.35	30		
<i>Surrogate: 4-Bromofluorobenzene</i>	0.148		ug/L	0.14	104	70-130				
<b>Duplicate (B6G0810-DUP1)</b>				<b>Source: 6F29015-09</b> Prepared & Analyzed: 06/22/16						
Gasoline Range Organics (GRO)	<b>&lt;20</b>	20	ug/L	<20				30		
<i>Surrogate: 4-Bromofluorobenzene</i>	0.145		ug/L	0.14	101	70-130				
<i>Batch B6G0811 - *** DEFAULT PREP ***</i>										
<b>Blank (B6G0811-BLK1)</b>				Prepared & Analyzed: 06/23/16						
Gasoline Range Organics (GRO)	<20	20	ug/L							
<i>Surrogate: 4-Bromofluorobenzene</i>	0.151		ug/L	0.14	106	70-130				
<b>LCS (B6G0811-BS1)</b>				Prepared & Analyzed: 06/23/16						
Gasoline Range Organics (GRO)	<b>0.888</b>	20	ug/L	0.82	108	70-130				
<i>Surrogate: 4-Bromofluorobenzene</i>	0.146		ug/L	0.14	102	70-130				
<b>LCS Dup (B6G0811-BSD1)</b>				Prepared & Analyzed: 06/23/16						
Gasoline Range Organics (GRO)	<b>0.916</b>	20	ug/L	0.82	112	70-130	3.17	30		
<i>Surrogate: 4-Bromofluorobenzene</i>	0.153		ug/L	0.14	107	70-130				
<b>Duplicate (B6G0811-DUP1)</b>				<b>Source: 6F29015-17</b> Prepared & Analyzed: 06/23/16						
Gasoline Range Organics (GRO)	<b>&lt;20</b>	20	ug/L	<20				30		
<i>Surrogate: 4-Bromofluorobenzene</i>	0.151		ug/L	0.14	106	70-130				
<i>Batch B6G0812 - *** DEFAULT PREP ***</i>										
<b>Blank (B6G0812-BLK1)</b>				Prepared & Analyzed: 06/24/16						
Gasoline Range Organics (GRO)	<20	20	ug/L							

*Allen Aminian*

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by EPA TO-3 - Quality Control</b>										
<i>Batch B6G0812 - *** DEFAULT PREP ***</i>										
<b>Blank (B6G0812-BLK1) Continued</b>										
Prepared & Analyzed: 06/24/16										
Surrogate: 4-Bromofluorobenzene	0.154		ug/L	0.14		108	70-130			
<b>LCS (B6G0812-BS1)</b>										
Prepared & Analyzed: 06/24/16										
Gasoline Range Organics (GRO)	<b>1.00</b>	20	ug/L	0.82		122	70-130			
Surrogate: 4-Bromofluorobenzene	0.152		ug/L	0.14		106	70-130			
<b>LCS Dup (B6G0812-BSD1)</b>										
Prepared & Analyzed: 06/24/16										
Gasoline Range Organics (GRO)	<b>1.01</b>	20	ug/L	0.82		124	70-130	0.813	30	
Surrogate: 4-Bromofluorobenzene	0.152		ug/L	0.14		106	70-130			
<b>Duplicate (B6G0812-DUP1)</b>										
<b>Source: 6F29015-32</b> Prepared & Analyzed: 06/24/16										
Gasoline Range Organics (GRO)	<b>&lt;20</b>	20	ug/L			<20			30	
Surrogate: 4-Bromofluorobenzene	0.147		ug/L	0.14		103	70-130			

### VOCs by GCMS EPA TO-15 - Quality Control

*Batch B6G0807 - \*\*\* DEFAULT PREP \*\*\**

#### Blank (B6G0807-BLK1)

Prepared & Analyzed: 06/22/16

Acetone	<0.020	0.020	ug/L
Allyl chloride	<0.020	0.020	ug/L
tert-Amyl Methyl Ether (TAME)	<0.020	0.020	ug/L
Benzene	<0.020	0.020	ug/L
Benzyl chloride	<0.020	0.020	ug/L
Bromodichloromethane	<0.020	0.020	ug/L
Bromoform	<0.020	0.020	ug/L
Bromomethane	<0.020	0.020	ug/L
1,3-Butadiene	<0.020	0.020	ug/L
2-Butanone (MEK)	<0.020	0.020	ug/L
tert-Butyl alcohol (TBA)	<20	20	ug/L
Carbon Disulfide	<0.020	0.020	ug/L
Carbon Tetrachloride	<0.020	0.020	ug/L
Chlorobenzene	<0.020	0.020	ug/L
Chloroethane	<0.020	0.020	ug/L
Chloroform	<0.020	0.020	ug/L
Chloromethane	<0.020	0.020	ug/L

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

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**AA Project No:** MB187311  
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**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	Limit	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0807 - *** DEFAULT PREP ***</i>										
<b>Blank (B6G0807-BLK1) Continued</b>										
Prepared & Analyzed: 06/22/16										
Cyclohexane	<0.020	0.020	ug/L							
Dibromochloromethane	<0.020	0.020	ug/L							
1,2-Dibromoethane (EDB)	<0.020	0.020	ug/L							
1,2-Dichlorobenzene	<0.020	0.020	ug/L							
1,3-Dichlorobenzene	<0.020	0.020	ug/L							
1,4-Dichlorobenzene	<0.020	0.020	ug/L							
Dichlorodifluoromethane (R12)	<0.020	0.020	ug/L							
1,1-Dichloroethane	<0.020	0.020	ug/L							
1,2-Dichloroethane (EDC)	<0.020	0.020	ug/L							
cis-1,2-Dichloroethylene	<0.020	0.020	ug/L							
1,1-Dichloroethylene	<0.020	0.020	ug/L							
trans-1,2-Dichloroethylene	<0.020	0.020	ug/L							
1,2-Dichloropropane	<0.020	0.020	ug/L							
trans-1,3-Dichloropropylene	<0.020	0.020	ug/L							
cis-1,3-Dichloropropylene	<0.020	0.020	ug/L							
Dichlorotetrafluoroethane	<0.020	0.020	ug/L							
Diisopropyl ether (DIPE)	<0.020	0.020	ug/L							
1,4-Dioxane	<0.020	0.020	ug/L							
Ethanol	<0.020	0.020	ug/L							
Ethyl Acetate	<0.020	0.020	ug/L							
Ethylbenzene	<0.020	0.020	ug/L							
Ethyl-tert-Butyl Ether (ETBE)	<0.020	0.020	ug/L							
4-Ethyltoluene	<0.020	0.020	ug/L							
Heptane	<0.020	0.020	ug/L							
Hexachlorobutadiene	<0.020	0.020	ug/L							
n-Hexane	<0.020	0.020	ug/L							
2-Hexanone (MBK)	<0.020	0.020	ug/L							
Isopropanol (IPA)	<0.20	0.20	ug/L							
Methyl-tert-Butyl Ether (MTBE)	<0.020	0.020	ug/L							
Methylene Chloride	<0.020	0.020	ug/L							
4-Methyl-2-pentanone (MIBK)	<0.020	0.020	ug/L							
Naphthalene	<0.020	0.020	ug/L							

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

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**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0807 - *** DEFAULT PREP ***</i>										
<b>Blank (B6G0807-BLK1) Continued</b>										
Prepared & Analyzed: 06/22/16										
Propylene	<0.020	0.020	ug/L							
Styrene	<0.020	0.020	ug/L							
1,1,2,2-Tetrachloroethane	<0.020	0.020	ug/L							
Tetrachloroethylene (PCE)	<0.020	0.020	ug/L							
Tetrahydrofuran (THF)	<0.020	0.020	ug/L							
Toluene	<0.020	0.020	ug/L							
1,2,4-Trichlorobenzene	<0.020	0.020	ug/L							
1,1,2-Trichloroethane	<0.020	0.020	ug/L							
1,1,1-Trichloroethane	<0.020	0.020	ug/L							
Trichloroethylene (TCE)	<0.020	0.020	ug/L							
Trichlorofluoromethane (R11)	<0.020	0.020	ug/L							
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.020	0.020	ug/L							
1,3,5-Trimethylbenzene	<0.020	0.020	ug/L							
1,2,4-Trimethylbenzene	<0.020	0.020	ug/L							
2,2,4-Trimethylpentane	<0.020	0.020	ug/L							
Vinyl acetate	<0.020	0.020	ug/L							
Vinyl bromide	<0.020	0.020	ug/L							
Vinyl chloride	<0.020	0.020	ug/L							
o-Xylene	<0.020	0.020	ug/L							
m,p-Xylenes	<0.020	0.020	ug/L							
1,1,1,2-Tetrachloroethane	<0.020	0.020	ug/L							
1,2,3-Trichloropropane	<0.020	0.020	ug/L							
sec-Butylbenzene	<0.020	0.020	ug/L							
Isopropylbenzene	<0.020	0.020	ug/L							
n-Propylbenzene	<0.020	0.020	ug/L							
4-Isopropyltoluene	<0.020	0.020	ug/L							
n-Butylbenzene	<0.020	0.020	ug/L							
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.152</i>		<i>ug/L</i>	<i>0.14</i>		<i>106</i>	<i>70-130</i>			
<b>LCS (B6G0807-BS1)</b>										
Prepared & Analyzed: 06/22/16										
Acetone	<b>0.0315</b>	0.020	ug/L	0.024		133	70-130		30	**

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

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**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
Batch B6G0807 - *** DEFAULT PREP ***										
<b>LCS (B6G0807-BS1) Continued</b>										
Prepared & Analyzed: 06/22/16										
Benzene	0.0278	0.020	ug/L	0.032		87.1	70-130		30	
Benzyl chloride	0.0507	0.020	ug/L	0.052		97.9	70-130		30	
Bromodichloromethane	0.0817	0.020	ug/L	0.067		122	70-130		30	
Bromoform	0.114	0.020	ug/L	0.10		111	70-130		30	
Bromomethane	0.0534	0.020	ug/L	0.039		138	70-130		30	**
2-Butanone (MEK)	0.0273	0.020	ug/L	0.029		92.4	70-130		30	
Carbon Disulfide	0.0350	0.020	ug/L	0.031		112	70-130		30	
Carbon Tetrachloride	0.0816	0.020	ug/L	0.063		130	70-130		30	
Chlorobenzene	0.0453	0.020	ug/L	0.046		98.4	70-130		30	
Chloroethane	0.0381	0.020	ug/L	0.026		144	70-130		30	**
Chloroform	0.0556	0.020	ug/L	0.049		114	70-130		30	
Chloromethane	0.0341	0.020	ug/L	0.021		165	70-130		30	**
Dibromochloromethane	0.0886	0.020	ug/L	0.085		104	70-130		30	
1,2-Dibromoethane (EDB)	0.0659	0.020	ug/L	0.077		85.8	70-130		30	
1,2-Dichlorobenzene	0.0489	0.020	ug/L	0.060		81.4	70-130		30	
1,3-Dichlorobenzene	0.0526	0.020	ug/L	0.060		87.5	70-130		30	
1,4-Dichlorobenzene	0.0493	0.020	ug/L	0.060		82.0	70-130		30	
Dichlorodifluoromethane (R12)	0.0747	0.020	ug/L	0.049		151	70-130		30	**
1,1-Dichloroethane	0.0468	0.020	ug/L	0.040		116	70-130		30	
1,2-Dichloroethane (EDC)	0.0473	0.020	ug/L	0.040		117	70-130		30	
cis-1,2-Dichloroethylene	0.0318	0.020	ug/L	0.040		80.2	70-130		30	
1,1-Dichloroethylene	0.0534	0.020	ug/L	0.040		135	70-130		30	**
trans-1,2-Dichloroethylene	0.0336	0.020	ug/L	0.040		84.7	70-130		30	
1,2-Dichloropropane	0.0438	0.020	ug/L	0.046		94.7	70-130		30	
trans-1,3-Dichloropropylene	0.0387	0.020	ug/L	0.045		85.2	70-130		30	
cis-1,3-Dichloropropylene	0.0395	0.020	ug/L	0.045		87.0	70-130		30	
Dichlorotetrafluoroethane	0.108	0.020	ug/L	0.070		155	70-130		30	**
Ethylbenzene	0.0406	0.020	ug/L	0.043		93.6	70-130		30	
4-Ethyltoluene	0.0462	0.020	ug/L	0.049		93.9	70-130		30	
Hexachlorobutadiene	0.0848	0.020	ug/L	0.11		79.5	70-130		30	
2-Hexanone (MBK)	0.0392	0.020	ug/L	0.041		95.6	70-130		30	
Isopropanol (IPA)	0.0286	0.20	ug/L	0.025		116	70-130		30	

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

Client: CH2M Hill, Inc.  
 Project No: 496965.A1.01  
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AA Project No: MB187311  
 Date Received: 06/27/16  
 Date Reported: 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
Batch B6G0807 - *** DEFAULT PREP ***										
<b>LCS (B6G0807-BS1) Continued</b>										
Prepared & Analyzed: 06/22/16										
Methylene Chloride	0.0413	0.020	ug/L	0.035		119	70-130		30	
4-Methyl-2-pentanone (MIBK)	0.0413	0.020	ug/L	0.041		101	70-130		30	
Styrene	0.0331	0.020	ug/L	0.043		77.8	70-130		30	
1,1,2,2-Tetrachloroethane	0.0769	0.020	ug/L	0.069		112	70-130		30	
Tetrachloroethylene (PCE)	0.0528	0.020	ug/L	0.068		77.8	70-130		30	
Toluene	0.0301	0.020	ug/L	0.038		79.9	70-130		30	
1,2,4-Trichlorobenzene	0.0519	0.020	ug/L	0.074		70.0	70-130		30	
1,1,2-Trichloroethane	0.0478	0.020	ug/L	0.055		87.6	70-130		30	
1,1,1-Trichloroethane	0.0610	0.020	ug/L	0.055		112	70-130		30	
Trichloroethylene (TCE)	0.0554	0.020	ug/L	0.054		103	70-130		30	
Trichlorofluoromethane (R11)	0.0875	0.020	ug/L	0.056		156	70-130		30	**
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	0.0881	0.020	ug/L	0.077		115	70-130		30	
1,3,5-Trimethylbenzene	0.0463	0.020	ug/L	0.049		94.2	70-130		30	
1,2,4-Trimethylbenzene	0.0462	0.020	ug/L	0.049		93.9	70-130		30	
Vinyl acetate	0.0347	0.020	ug/L	0.035		98.5	70-130		30	
Vinyl chloride	0.0380	0.020	ug/L	0.026		149	70-130		30	**
o-Xylene	0.0436	0.020	ug/L	0.043		100	70-130		30	
m,p-Xylenes	0.0792	0.020	ug/L	0.087		91.2	70-130		30	
1,2,3-Trichloropropane	0.0623	0.020	ug/L	0.060		103	70-130		30	
sec-Butylbenzene	0.0459	0.020	ug/L	0.055		83.6	70-130		30	
Isopropylbenzene	0.0424	0.020	ug/L	0.049		86.3	70-130		30	
n-Propylbenzene	0.0431	0.020	ug/L	0.049		87.6	70-130		30	
4-Isopropyltoluene	0.0440	0.020	ug/L	0.055		80.2	70-130		30	
Surrogate: 4-Bromofluorobenzene	0.141		ug/L	0.14		98.8	70-130			
<b>LCS Dup (B6G0807-BSD1)</b>										
Prepared & Analyzed: 06/22/16										
Acetone	0.0421	0.020	ug/L	0.024		177	70-130	28.9	30	**
Benzene	0.0342	0.020	ug/L	0.032		107	70-130	20.4	30	
Benzyl chloride	0.0640	0.020	ug/L	0.052		124	70-130	23.2	30	
Bromodichloromethane	0.0926	0.020	ug/L	0.067		138	70-130	12.5	30	**
Bromoform	0.128	0.020	ug/L	0.10		124	70-130	11.7	30	

**Allen Aminian**  
QA/QC Manager



**LABORATORY ANALYSIS RESULTS**

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
Batch B6G0807 - *** DEFAULT PREP ***										
<b>LCS Dup (B6G0807-BSD1) Continued</b>										
Prepared & Analyzed: 06/22/16										
Bromomethane	0.0547	0.020	ug/L	0.039	141	70-130	2.30	30		**
2-Butanone (MEK)	0.0395	0.020	ug/L	0.029	134	70-130	36.8	30		**
Carbon Disulfide	0.0357	0.020	ug/L	0.031	114	70-130	1.76	30		
Carbon Tetrachloride	0.0939	0.020	ug/L	0.063	149	70-130	14.0	30		**
Chlorobenzene	0.0483	0.020	ug/L	0.046	105	70-130	6.49	30		
Chloroethane	0.0392	0.020	ug/L	0.026	149	70-130	2.94	30		**
Chloroform	0.0659	0.020	ug/L	0.049	135	70-130	17.0	30		**
Chloromethane	0.0295	0.020	ug/L	0.021	143	70-130	14.3	30		**
Dibromochloromethane	0.100	0.020	ug/L	0.085	118	70-130	12.5	30		
1,2-Dibromoethane (EDB)	0.0792	0.020	ug/L	0.077	103	70-130	18.3	30		
1,2-Dichlorobenzene	0.0578	0.020	ug/L	0.060	96.2	70-130	16.7	30		
1,3-Dichlorobenzene	0.0603	0.020	ug/L	0.060	100	70-130	13.6	30		
1,4-Dichlorobenzene	0.0596	0.020	ug/L	0.060	99.1	70-130	18.9	30		
Dichlorodifluoromethane (R12)	0.0783	0.020	ug/L	0.049	158	70-130	4.72	30		**
1,1-Dichloroethane	0.0528	0.020	ug/L	0.040	130	70-130	12.0	30		**
1,2-Dichloroethane (EDC)	0.0577	0.020	ug/L	0.040	142	70-130	19.7	30		**
cis-1,2-Dichloroethylene	0.0420	0.020	ug/L	0.040	106	70-130	27.6	30		
1,1-Dichloroethylene	0.0578	0.020	ug/L	0.040	146	70-130	7.99	30		**
trans-1,2-Dichloroethylene	0.0422	0.020	ug/L	0.040	106	70-130	22.7	30		
1,2-Dichloropropane	0.0512	0.020	ug/L	0.046	111	70-130	15.8	30		
trans-1,3-Dichloropropylene	0.0514	0.020	ug/L	0.045	113	70-130	28.2	30		
cis-1,3-Dichloropropylene	0.0501	0.020	ug/L	0.045	110	70-130	23.7	30		
Dichlorotetrafluoroethane	0.111	0.020	ug/L	0.070	159	70-130	2.55	30		**
Ethylbenzene	0.0517	0.020	ug/L	0.043	119	70-130	23.9	30		
4-Ethyltoluene	0.0559	0.020	ug/L	0.049	114	70-130	19.2	30		
Hexachlorobutadiene	0.106	0.020	ug/L	0.11	99.5	70-130	22.3	30		
2-Hexanone (MBK)	0.0449	0.020	ug/L	0.041	110	70-130	13.6	30		
Isopropanol (IPA)	0.0391	0.20	ug/L	0.025	159	70-130	31.0	30		**
Methylene Chloride	0.0432	0.020	ug/L	0.035	124	70-130	4.44	30		
4-Methyl-2-pentanone (MIBK)	0.0456	0.020	ug/L	0.041	111	70-130	10.0	30		
Styrene	0.0415	0.020	ug/L	0.043	97.5	70-130	22.5	30		
1,1,2,2-Tetrachloroethane	0.0884	0.020	ug/L	0.069	129	70-130	14.0	30		

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0807 - *** DEFAULT PREP ***</i>										
<b>LCS Dup (B6G0807-BSD1) Continued</b>					Prepared & Analyzed: 06/22/16					
Tetrachloroethylene (PCE)	0.0632	0.020	ug/L	0.068		93.2	70-130	18.0	30	
Toluene	0.0378	0.020	ug/L	0.038		100	70-130	22.5	30	
1,2,4-Trichlorobenzene	0.0684	0.020	ug/L	0.074		92.2	70-130	27.4	30	
1,1,2-Trichloroethane	0.0538	0.020	ug/L	0.055		98.6	70-130	11.8	30	
1,1,1-Trichloroethane	0.0752	0.020	ug/L	0.055		138	70-130	20.8	30	**
Trichloroethylene (TCE)	0.0625	0.020	ug/L	0.054		116	70-130	12.0	30	
Trichlorofluoromethane (R11)	0.0974	0.020	ug/L	0.056		173	70-130	10.7	30	**
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	0.0969	0.020	ug/L	0.077		126	70-130	9.52	30	
1,3,5-Trimethylbenzene	0.0566	0.020	ug/L	0.049		115	70-130	20.1	30	
1,2,4-Trimethylbenzene	0.0551	0.020	ug/L	0.049		112	70-130	17.7	30	
Vinyl acetate	0.0505	0.020	ug/L	0.035		144	70-130	37.2	30	**
Vinyl chloride	0.0394	0.020	ug/L	0.026		154	70-130	3.50	30	**
o-Xylene	0.0558	0.020	ug/L	0.043		128	70-130	24.4	30	
m,p-Xylenes	0.0931	0.020	ug/L	0.087		107	70-130	16.0	30	
1,1,1,2-Tetrachloroethane	ND	0.020	ug/L				70-130		30	
1,2,3-Trichloropropane	0.0726	0.020	ug/L	0.060		120	70-130	15.2	30	
sec-Butylbenzene	0.0560	0.020	ug/L	0.055		102	70-130	19.9	30	
Isopropylbenzene	0.0528	0.020	ug/L	0.049		108	70-130	21.9	30	
n-Propylbenzene	0.0535	0.020	ug/L	0.049		109	70-130	21.7	30	
4-Isopropyltoluene	0.0540	0.020	ug/L	0.055		98.3	70-130	20.3	30	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.146</i>		<i>ug/L</i>	<i>0.14</i>		<i>102</i>	<i>70-130</i>			
<b>Duplicate (B6G0807-DUP1)</b>					Source: 6F29015-09 Prepared & Analyzed: 06/22/16					
Acetone	<0.020	0.020	ug/L		<0.020				30	
Allyl chloride	<0.020	0.020	ug/L		<0.020				30	
tert-Amyl Methyl Ether (TAME)	<0.020	0.020	ug/L		<0.020				30	
Benzene	<0.020	0.020	ug/L		<0.020				30	
Benzyl chloride	<0.020	0.020	ug/L		<0.020				30	
Bromodichloromethane	<0.020	0.020	ug/L		<0.020				30	
Bromoform	<0.020	0.020	ug/L		<0.020				30	
Bromomethane	<0.020	0.020	ug/L		<0.020				30	

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0807 - *** DEFAULT PREP ***</i>										
<b>Duplicate (B6G0807-DUP1) Continued Source: 6F29015-09 Prepared &amp; Analyzed: 06/22/16</b>										
1,3-Butadiene	<0.020	0.020	ug/L		<0.020				30	
2-Butanone (MEK)	<0.020	0.020	ug/L		<0.020				30	
tert-Butyl alcohol (TBA)	<20	20	ug/L		<20				30	
Carbon Disulfide	<0.020	0.020	ug/L		<0.020				30	
Carbon Tetrachloride	<0.020	0.020	ug/L		<0.020				30	
Chlorobenzene	<0.020	0.020	ug/L		<0.020				30	
Chloroethane	<0.020	0.020	ug/L		<0.020				30	
Chloroform	<0.020	0.020	ug/L		<0.020				30	
Chloromethane	<0.020	0.020	ug/L		<0.020				30	
Cyclohexane	<0.020	0.020	ug/L		<0.020				30	
Dibromochloromethane	<0.020	0.020	ug/L		<0.020				30	
1,2-Dibromoethane (EDB)	<0.020	0.020	ug/L		<0.020				30	
1,2-Dichlorobenzene	<0.020	0.020	ug/L		<0.020				30	
1,3-Dichlorobenzene	<0.020	0.020	ug/L		<0.020				30	
1,4-Dichlorobenzene	<0.020	0.020	ug/L		<0.020				30	
Dichlorodifluoromethane (R12)	<0.020	0.020	ug/L		<0.020				30	
1,1-Dichloroethane	<0.020	0.020	ug/L		<0.020				30	
1,2-Dichloroethane (EDC)	<0.020	0.020	ug/L		<0.020				30	
cis-1,2-Dichloroethylene	<0.020	0.020	ug/L		<0.020				30	
1,1-Dichloroethylene	<0.020	0.020	ug/L		<0.020				30	
trans-1,2-Dichloroethylene	<0.020	0.020	ug/L		<0.020				30	
1,2-Dichloropropane	<0.020	0.020	ug/L		<0.020				30	
trans-1,3-Dichloropropylene	<0.020	0.020	ug/L		<0.020				30	
cis-1,3-Dichloropropylene	<0.020	0.020	ug/L		<0.020				30	
Dichlorotetrafluoroethane	<0.020	0.020	ug/L		<0.020				30	
Diisopropyl ether (DIPE)	<0.020	0.020	ug/L		<0.020				30	
1,4-Dioxane	<0.020	0.020	ug/L		<0.020				30	
Ethanol	<0.020	0.020	ug/L		<0.020				30	
Ethyl Acetate	<0.020	0.020	ug/L		<0.020				30	
Ethylbenzene	<0.020	0.020	ug/L		<0.020				30	
Ethyl-tert-Butyl Ether (ETBE)	<0.020	0.020	ug/L		<0.020				30	
4-Ethyltoluene	<0.020	0.020	ug/L		<0.020				30	

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0807 - *** DEFAULT PREP ***</i>										
<b>Duplicate (B6G0807-DUP1) Continued Source: 6F29015-09 Prepared &amp; Analyzed: 06/22/16</b>										
Heptane	<0.020	0.020	ug/L		<0.020				30	
Hexachlorobutadiene	<0.020	0.020	ug/L		<0.020				30	
n-Hexane	<0.020	0.020	ug/L		<0.020				30	
2-Hexanone (MBK)	<0.020	0.020	ug/L		<0.020				30	
Isopropanol (IPA)	<0.20	0.20	ug/L		<0.20				30	
Methyl-tert-Butyl Ether (MTBE)	<0.020	0.020	ug/L		<0.020				30	
Methylene Chloride	<0.020	0.020	ug/L		<0.020				30	
4-Methyl-2-pentanone (MIBK)	<0.020	0.020	ug/L		<0.020				30	
Naphthalene	<0.020	0.020	ug/L		<0.020				30	
Propylene	<0.020	0.020	ug/L		<0.020				30	
Styrene	<0.020	0.020	ug/L		<0.020				30	
1,1,2,2-Tetrachloroethane	<0.020	0.020	ug/L		<0.020				30	
Tetrachloroethylene (PCE)	<0.020	0.020	ug/L		<0.020				30	
Tetrahydrofuran (THF)	<0.020	0.020	ug/L		<0.020				30	
Toluene	<0.020	0.020	ug/L		<0.020				30	
1,2,4-Trichlorobenzene	<0.020	0.020	ug/L		<0.020				30	
1,1,2-Trichloroethane	<0.020	0.020	ug/L		<0.020				30	
1,1,1-Trichloroethane	<0.020	0.020	ug/L		<0.020				30	
Trichloroethylene (TCE)	<0.020	0.020	ug/L		<0.020				30	
Trichlorofluoromethane (R11)	<0.020	0.020	ug/L		<0.020				30	
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.020	0.020	ug/L		<0.020				30	
1,3,5-Trimethylbenzene	<0.020	0.020	ug/L		<0.020				30	
1,2,4-Trimethylbenzene	<0.020	0.020	ug/L		<0.020				30	
2,2,4-Trimethylpentane	<0.020	0.020	ug/L		<0.020				30	
Vinyl acetate	<0.020	0.020	ug/L		<0.020				30	
Vinyl bromide	<0.020	0.020	ug/L		<0.020				30	
Vinyl chloride	<0.020	0.020	ug/L		<0.020				30	
o-Xylene	<0.020	0.020	ug/L		<0.020				30	
m,p-Xylenes	<0.020	0.020	ug/L		<0.020				30	
1,2,3-Trichloropropane	<0.020	0.020	ug/L		<0.020				30	
sec-Butylbenzene	<0.020	0.020	ug/L		<0.020				30	

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0807 - *** DEFAULT PREP ***</i>										
<b>Duplicate (B6G0807-DUP1) Continued Source: 6F29015-09 Prepared &amp; Analyzed: 06/22/16</b>										
Isopropylbenzene	<0.020	0.020	ug/L		<0.020				30	
n-Propylbenzene	<0.020	0.020	ug/L		<0.020				30	
4-Isopropyltoluene	<0.020	0.020	ug/L		<0.020				30	
n-Butylbenzene	<0.020	0.020	ug/L		<0.020				30	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.144</i>		<i>ug/L</i>	<i>0.14</i>		<i>101</i>	<i>70-130</i>			
<i>Batch B6G0808 - *** DEFAULT PREP ***</i>										
<b>Blank (B6G0808-BLK1) Prepared &amp; Analyzed: 06/23/16</b>										
Acetone	<0.020	0.020	ug/L							
Allyl chloride	<0.020	0.020	ug/L							
tert-Amyl Methyl Ether (TAME)	<0.020	0.020	ug/L							
Benzene	<0.020	0.020	ug/L							
Benzyl chloride	<0.020	0.020	ug/L							
Bromodichloromethane	<0.020	0.020	ug/L							
Bromoform	<0.020	0.020	ug/L							
Bromomethane	<0.020	0.020	ug/L							
1,3-Butadiene	<0.020	0.020	ug/L							
2-Butanone (MEK)	<0.020	0.020	ug/L							
tert-Butyl alcohol (TBA)	<20	20	ug/L							
Carbon Disulfide	<0.020	0.020	ug/L							
Carbon Tetrachloride	<0.020	0.020	ug/L							
Chlorobenzene	<0.020	0.020	ug/L							
Chloroethane	<0.020	0.020	ug/L							
Chloroform	<0.020	0.020	ug/L							
Chloromethane	<0.020	0.020	ug/L							
Cyclohexane	<0.020	0.020	ug/L							
Dibromochloromethane	<0.020	0.020	ug/L							
1,2-Dibromoethane (EDB)	<0.020	0.020	ug/L							
1,2-Dichlorobenzene	<0.020	0.020	ug/L							
1,3-Dichlorobenzene	<0.020	0.020	ug/L							
1,4-Dichlorobenzene	<0.020	0.020	ug/L							
Dichlorodifluoromethane (R12)	<0.020	0.020	ug/L							

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
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**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0808 - *** DEFAULT PREP ***</i>										
<b>Blank (B6G0808-BLK1) Continued</b>										
Prepared & Analyzed: 06/23/16										
1,1-Dichloroethane	<0.020	0.020	ug/L							
1,2-Dichloroethane (EDC)	<0.020	0.020	ug/L							
cis-1,2-Dichloroethylene	<0.020	0.020	ug/L							
1,1-Dichloroethylene	<0.020	0.020	ug/L							
trans-1,2-Dichloroethylene	<0.020	0.020	ug/L							
1,2-Dichloropropane	<0.020	0.020	ug/L							
trans-1,3-Dichloropropylene	<0.020	0.020	ug/L							
cis-1,3-Dichloropropylene	<0.020	0.020	ug/L							
Dichlorotetrafluoroethane	<0.020	0.020	ug/L							
Diisopropyl ether (DIPE)	<0.020	0.020	ug/L							
1,4-Dioxane	<0.020	0.020	ug/L							
Ethanol	<0.020	0.020	ug/L							
Ethyl Acetate	<0.020	0.020	ug/L							
Ethylbenzene	<0.020	0.020	ug/L							
Ethyl-tert-Butyl Ether (ETBE)	<0.020	0.020	ug/L							
4-Ethyltoluene	<0.020	0.020	ug/L							
Heptane	<0.020	0.020	ug/L							
Hexachlorobutadiene	<0.020	0.020	ug/L							
n-Hexane	<0.020	0.020	ug/L							
2-Hexanone (MBK)	<0.020	0.020	ug/L							
Isopropanol (IPA)	<0.20	0.20	ug/L							
Methyl-tert-Butyl Ether (MTBE)	<0.020	0.020	ug/L							
Methylene Chloride	<0.020	0.020	ug/L							
4-Methyl-2-pentanone (MIBK)	<0.020	0.020	ug/L							
Naphthalene	<0.020	0.020	ug/L							
Propylene	<0.020	0.020	ug/L							
Styrene	<0.020	0.020	ug/L							
1,1,2,2-Tetrachloroethane	<0.020	0.020	ug/L							
Tetrachloroethylene (PCE)	<0.020	0.020	ug/L							
Tetrahydrofuran (THF)	<0.020	0.020	ug/L							
Toluene	<0.020	0.020	ug/L							
1,2,4-Trichlorobenzene	<0.020	0.020	ug/L							

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
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**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0808 - *** DEFAULT PREP ***</i>										
<b>Blank (B6G0808-BLK1) Continued</b>					Prepared & Analyzed: 06/23/16					
1,1,2-Trichloroethane	<0.020	0.020	ug/L							
1,1,1-Trichloroethane	<0.020	0.020	ug/L							
Trichloroethylene (TCE)	<0.020	0.020	ug/L							
Trichlorofluoromethane (R11)	<0.020	0.020	ug/L							
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.020	0.020	ug/L							
1,3,5-Trimethylbenzene	<0.020	0.020	ug/L							
1,2,4-Trimethylbenzene	<0.020	0.020	ug/L							
2,2,4-Trimethylpentane	<0.020	0.020	ug/L							
Vinyl acetate	<0.020	0.020	ug/L							
Vinyl bromide	<0.020	0.020	ug/L							
Vinyl chloride	<0.020	0.020	ug/L							
o-Xylene	<0.020	0.020	ug/L							
m,p-Xylenes	<0.020	0.020	ug/L							
1,1,1,2-Tetrachloroethane	<0.020	0.020	ug/L							
1,2,3-Trichloropropane	<0.020	0.020	ug/L							
sec-Butylbenzene	<0.020	0.020	ug/L							
Isopropylbenzene	<0.020	0.020	ug/L							
n-Propylbenzene	<0.020	0.020	ug/L							
4-Isopropyltoluene	<0.020	0.020	ug/L							
n-Butylbenzene	<0.020	0.020	ug/L							
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.150</i>		<i>ug/L</i>	<i>0.14</i>		<i>105</i>	<i>70-130</i>			
<b>LCS (B6G0808-BS1)</b>					Prepared & Analyzed: 06/23/16					
Acetone	<b>0.0350</b>	0.020	ug/L	0.024		147	70-130	30		**
Benzene	<b>0.0298</b>	0.020	ug/L	0.032		93.2	70-130	30		
Benzyl chloride	<b>0.0549</b>	0.020	ug/L	0.052		106	70-130	30		
Bromodichloromethane	<b>0.0886</b>	0.020	ug/L	0.067		132	70-130	30		**
Bromoform	<b>0.123</b>	0.020	ug/L	0.10		119	70-130	30		
Bromomethane	<b>0.0555</b>	0.020	ug/L	0.039		143	70-130	30		**
2-Butanone (MEK)	<b>0.0303</b>	0.020	ug/L	0.029		103	70-130	30		
Carbon Disulfide	<b>0.0368</b>	0.020	ug/L	0.031		118	70-130	30		

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
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**AA Project No:** MB187311  
**Date Received:** 06/27/16  
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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0808 - *** DEFAULT PREP ***</i>										
<b>LCS (B6G0808-BS1) Continued</b>						Prepared & Analyzed: 06/23/16				
Carbon Tetrachloride	<b>0.0898</b>	0.020	ug/L	0.063		143	70-130	30		**
Chlorobenzene	<b>0.0463</b>	0.020	ug/L	0.046		101	70-130	30		
Chloroethane	<b>0.0385</b>	0.020	ug/L	0.026		146	70-130	30		**
Chloroform	<b>0.0603</b>	0.020	ug/L	0.049		124	70-130	30		
Chloromethane	<b>0.0311</b>	0.020	ug/L	0.021		151	70-130	30		**
Dibromochloromethane	<b>0.0953</b>	0.020	ug/L	0.085		112	70-130	30		
1,2-Dibromoethane (EDB)	<b>0.0721</b>	0.020	ug/L	0.077		93.8	70-130	30		
1,2-Dichlorobenzene	<b>0.0527</b>	0.020	ug/L	0.060		87.7	70-130	30		
1,3-Dichlorobenzene	<b>0.0568</b>	0.020	ug/L	0.060		94.5	70-130	30		
1,4-Dichlorobenzene	<b>0.0527</b>	0.020	ug/L	0.060		87.7	70-130	30		
Dichlorodifluoromethane (R12)	<b>0.0785</b>	0.020	ug/L	0.049		159	70-130	30		**
1,1-Dichloroethane	<b>0.0511</b>	0.020	ug/L	0.040		126	70-130	30		
1,2-Dichloroethane (EDC)	<b>0.0523</b>	0.020	ug/L	0.040		129	70-130	30		
cis-1,2-Dichloroethylene	<b>0.0346</b>	0.020	ug/L	0.040		87.2	70-130	30		
1,1-Dichloroethylene	<b>0.0625</b>	0.020	ug/L	0.040		158	70-130	30		**
trans-1,2-Dichloroethylene	<b>0.0381</b>	0.020	ug/L	0.040		96.0	70-130	30		
1,2-Dichloropropane	<b>0.0485</b>	0.020	ug/L	0.046		105	70-130	30		
trans-1,3-Dichloropropylene	<b>0.0441</b>	0.020	ug/L	0.045		97.1	70-130	30		
cis-1,3-Dichloropropylene	<b>0.0430</b>	0.020	ug/L	0.045		94.8	70-130	30		
Dichlorotetrafluoroethane	<b>0.114</b>	0.020	ug/L	0.070		163	70-130	30		**
Ethylbenzene	<b>0.0441</b>	0.020	ug/L	0.043		102	70-130	30		
4-Ethyltoluene	<b>0.0483</b>	0.020	ug/L	0.049		98.2	70-130	30		
Hexachlorobutadiene	<b>0.0941</b>	0.020	ug/L	0.11		88.2	70-130	30		
2-Hexanone (MBK)	<b>0.0587</b>	0.020	ug/L	0.041		143	70-130	30		**
Isopropanol (IPA)	<b>0.0321</b>	0.20	ug/L	0.025		131	70-130	30		**
Methylene Chloride	<b>0.0522</b>	0.020	ug/L	0.035		150	70-130	30		**
4-Methyl-2-pentanone (MIBK)	<b>0.0592</b>	0.020	ug/L	0.041		144	70-130	30		**
Styrene	<b>0.0352</b>	0.020	ug/L	0.043		82.7	70-130	30		
1,1,2,2-Tetrachloroethane	<b>0.0803</b>	0.020	ug/L	0.069		117	70-130	30		
Tetrachloroethylene (PCE)	<b>0.0558</b>	0.020	ug/L	0.068		82.2	70-130	30		
Toluene	<b>0.0356</b>	0.020	ug/L	0.038		94.5	70-130	30		
1,2,4-Trichlorobenzene	<b>0.0599</b>	0.020	ug/L	0.074		80.7	70-130	30		

**Allen Aminian**  
 QA/QC Manager



**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0808 - *** DEFAULT PREP ***</i>										
<b>LCS (B6G0808-BS1) Continued</b>					Prepared & Analyzed: 06/23/16					
1,1,2-Trichloroethane	<b>0.0541</b>	0.020	ug/L	0.055		99.2	70-130		30	
1,1,1-Trichloroethane	<b>0.0688</b>	0.020	ug/L	0.055		126	70-130		30	
Trichloroethylene (TCE)	<b>0.0599</b>	0.020	ug/L	0.054		112	70-130		30	
Trichlorofluoromethane (R11)	<b>0.0945</b>	0.020	ug/L	0.056		168	70-130		30	**
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<b>0.101</b>	0.020	ug/L	0.077		132	70-130		30	**
1,3,5-Trimethylbenzene	<b>0.0496</b>	0.020	ug/L	0.049		101	70-130		30	
1,2,4-Trimethylbenzene	<b>0.0484</b>	0.020	ug/L	0.049		98.4	70-130		30	
Vinyl acetate	<b>0.0400</b>	0.020	ug/L	0.035		114	70-130		30	
Vinyl chloride	<b>0.0387</b>	0.020	ug/L	0.026		151	70-130		30	**
o-Xylene	<b>0.0473</b>	0.020	ug/L	0.043		109	70-130		30	
m,p-Xylenes	<b>0.0842</b>	0.020	ug/L	0.087		97.0	70-130		30	
1,2,3-Trichloropropane	<b>0.0661</b>	0.020	ug/L	0.060		110	70-130		30	
sec-Butylbenzene	<b>0.0483</b>	0.020	ug/L	0.055		88.0	70-130		30	
Isopropylbenzene	<b>0.0455</b>	0.020	ug/L	0.049		92.5	70-130		30	
n-Propylbenzene	<b>0.0457</b>	0.020	ug/L	0.049		93.0	70-130		30	
4-Isopropyltoluene	<b>0.0463</b>	0.020	ug/L	0.055		84.3	70-130		30	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.150</i>		<i>ug/L</i>	<i>0.14</i>		<i>105</i>	<i>70-130</i>			
<b>LCS Dup (B6G0808-BSD1)</b>					Prepared & Analyzed: 06/23/16					
Acetone	<b>0.0361</b>	0.020	ug/L	0.024		152	70-130	2.94	30	**
Benzene	<b>0.0323</b>	0.020	ug/L	0.032		101	70-130	8.13	30	
Benzyl chloride	<b>0.0558</b>	0.020	ug/L	0.052		108	70-130	1.59	30	
Bromodichloromethane	<b>0.0864</b>	0.020	ug/L	0.067		129	70-130	2.53	30	
Bromoform	<b>0.119</b>	0.020	ug/L	0.10		115	70-130	3.25	30	
Bromomethane	<b>0.0547</b>	0.020	ug/L	0.039		141	70-130	1.55	30	**
2-Butanone (MEK)	<b>0.0331</b>	0.020	ug/L	0.029		112	70-130	8.93	30	
Carbon Disulfide	<b>0.0349</b>	0.020	ug/L	0.031		112	70-130	5.30	30	
Carbon Tetrachloride	<b>0.0881</b>	0.020	ug/L	0.063		140	70-130	1.91	30	**
Chlorobenzene	<b>0.0449</b>	0.020	ug/L	0.046		97.6	70-130	3.03	30	
Chloroethane	<b>0.0396</b>	0.020	ug/L	0.026		150	70-130	2.77	30	**
Chloroform	<b>0.0627</b>	0.020	ug/L	0.049		128	70-130	3.81	30	

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0808 - *** DEFAULT PREP ***</i>										
<b>LCS Dup (B6G0808-BSD1) Continued</b>					Prepared & Analyzed: 06/23/16					
Chloromethane	<b>0.0305</b>	0.020	ug/L	0.021	148	70-130	1.94	30		**
Dibromochloromethane	<b>0.0932</b>	0.020	ug/L	0.085	109	70-130	2.26	30		
1,2-Dibromoethane (EDB)	<b>0.0724</b>	0.020	ug/L	0.077	94.2	70-130	0.426	30		
1,2-Dichlorobenzene	<b>0.0503</b>	0.020	ug/L	0.060	83.7	70-130	4.67	30		
1,3-Dichlorobenzene	<b>0.0530</b>	0.020	ug/L	0.060	88.2	70-130	6.90	30		
1,4-Dichlorobenzene	<b>0.0512</b>	0.020	ug/L	0.060	85.1	70-130	3.01	30		
Dichlorodifluoromethane (R12)	<b>0.0781</b>	0.020	ug/L	0.049	158	70-130	0.505	30		**
1,1-Dichloroethane	<b>0.0511</b>	0.020	ug/L	0.040	126	70-130	0.0792	30		
1,2-Dichloroethane (EDC)	<b>0.0586</b>	0.020	ug/L	0.040	145	70-130	11.4	30		**
cis-1,2-Dichloroethylene	<b>0.0401</b>	0.020	ug/L	0.040	101	70-130	14.9	30		
1,1-Dichloroethylene	<b>0.0692</b>	0.020	ug/L	0.040	175	70-130	10.2	30		**
trans-1,2-Dichloroethylene	<b>0.0402</b>	0.020	ug/L	0.040	101	70-130	5.47	30		
1,2-Dichloropropane	<b>0.0477</b>	0.020	ug/L	0.046	103	70-130	1.63	30		
trans-1,3-Dichloropropylene	<b>0.0478</b>	0.020	ug/L	0.045	105	70-130	8.20	30		
cis-1,3-Dichloropropylene	<b>0.0456</b>	0.020	ug/L	0.045	100	70-130	5.74	30		
Dichlorotetrafluoroethane	<b>0.112</b>	0.020	ug/L	0.070	160	70-130	1.98	30		**
Ethylbenzene	<b>0.0452</b>	0.020	ug/L	0.043	104	70-130	2.33	30		
4-Ethyltoluene	<b>0.0494</b>	0.020	ug/L	0.049	100	70-130	2.32	30		
Hexachlorobutadiene	<b>0.0923</b>	0.020	ug/L	0.11	86.5	70-130	1.95	30		
2-Hexanone (MBK)	<b>0.0419</b>	0.020	ug/L	0.041	102	70-130	33.5	30		QR-02
Isopropanol (IPA)	<b>0.0362</b>	0.20	ug/L	0.025	147	70-130	12.0	30		**
Methylene Chloride	<b>0.0511</b>	0.020	ug/L	0.035	147	70-130	2.29	30		**
4-Methyl-2-pentanone (MIBK)	<b>0.0387</b>	0.020	ug/L	0.041	94.4	70-130	41.9	30		QR-02
Styrene	<b>0.0361</b>	0.020	ug/L	0.043	84.7	70-130	2.39	30		
1,1,2,2-Tetrachloroethane	<b>0.0732</b>	0.020	ug/L	0.069	107	70-130	9.12	30		
Tetrachloroethylene (PCE)	<b>0.0570</b>	0.020	ug/L	0.068	84.0	70-130	2.17	30		
Toluene	<b>0.0360</b>	0.020	ug/L	0.038	95.5	70-130	1.05	30		
1,2,4-Trichlorobenzene	<b>0.0583</b>	0.020	ug/L	0.074	78.6	70-130	2.64	30		
1,1,2-Trichloroethane	<b>0.0497</b>	0.020	ug/L	0.055	91.1	70-130	8.51	30		
1,1,1-Trichloroethane	<b>0.0740</b>	0.020	ug/L	0.055	136	70-130	7.34	30		**
Trichloroethylene (TCE)	<b>0.0597</b>	0.020	ug/L	0.054	111	70-130	0.359	30		
Trichlorofluoromethane (R11)	<b>0.0973</b>	0.020	ug/L	0.056	173	70-130	2.87	30		**

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0808 - *** DEFAULT PREP ***</i>										
<b>LCS Dup (B6G0808-BSD1) Continued</b>										
Prepared & Analyzed: 06/23/16										
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	0.0962	0.020	ug/L	0.077		126	70-130	4.82	30	
1,3,5-Trimethylbenzene	0.0486	0.020	ug/L	0.049		98.9	70-130	2.00	30	
1,2,4-Trimethylbenzene	0.0498	0.020	ug/L	0.049		101	70-130	2.81	30	
Vinyl acetate	0.0434	0.020	ug/L	0.035		123	70-130	8.18	30	
Vinyl chloride	0.0377	0.020	ug/L	0.026		147	70-130	2.75	30	**
o-Xylene	0.0476	0.020	ug/L	0.043		110	70-130	0.641	30	
m,p-Xylenes	0.0810	0.020	ug/L	0.087		93.3	70-130	3.89	30	
1,2,3-Trichloropropane	0.0646	0.020	ug/L	0.060		107	70-130	2.31	30	
sec-Butylbenzene	0.0491	0.020	ug/L	0.055		89.5	70-130	1.69	30	
Isopropylbenzene	0.0460	0.020	ug/L	0.049		93.6	70-130	1.18	30	
n-Propylbenzene	0.0473	0.020	ug/L	0.049		96.2	70-130	3.38	30	
4-Isopropyltoluene	0.0483	0.020	ug/L	0.055		87.9	70-130	4.18	30	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.151</i>		<i>ug/L</i>	<i>0.14</i>		<i>105</i>	<i>70-130</i>			
<b>Duplicate (B6G0808-DUP1)</b>										
Source: 6F29015-17 Prepared & Analyzed: 06/23/16										
Acetone	<0.020	0.020	ug/L		<0.020				30	
Allyl chloride	<0.020	0.020	ug/L		<0.020				30	
tert-Amyl Methyl Ether (TAME)	<0.020	0.020	ug/L		<0.020				30	
Benzene	<0.020	0.020	ug/L		<0.020				30	
Benzyl chloride	<0.020	0.020	ug/L		<0.020				30	
Bromodichloromethane	<0.020	0.020	ug/L		<0.020				30	
Bromoform	<0.020	0.020	ug/L		<0.020				30	
Bromomethane	<0.020	0.020	ug/L		<0.020				30	
1,3-Butadiene	<0.020	0.020	ug/L		<0.020				30	
2-Butanone (MEK)	<0.020	0.020	ug/L		<0.020				30	
tert-Butyl alcohol (TBA)	<20	20	ug/L		<20				30	
Carbon Disulfide	<0.020	0.020	ug/L		<0.020				30	
Carbon Tetrachloride	<0.020	0.020	ug/L		<0.020				30	
Chlorobenzene	<0.020	0.020	ug/L		<0.020				30	
Chloroethane	<0.020	0.020	ug/L		<0.020				30	
Chloroform	<0.020	0.020	ug/L		<0.020				30	

*Allen Aminian*

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## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
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**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0808 - *** DEFAULT PREP ***</i>										
<b>Duplicate (B6G0808-DUP1) Continued Source: 6F29015-17 Prepared &amp; Analyzed: 06/23/16</b>										
Chloromethane	<0.020	0.020	ug/L		<0.020				30	
Cyclohexane	<0.020	0.020	ug/L		<0.020				30	
Dibromochloromethane	<0.020	0.020	ug/L		<0.020				30	
1,2-Dibromoethane (EDB)	<0.020	0.020	ug/L		<0.020				30	
1,2-Dichlorobenzene	<0.020	0.020	ug/L		<0.020				30	
1,3-Dichlorobenzene	<0.020	0.020	ug/L		<0.020				30	
1,4-Dichlorobenzene	<0.020	0.020	ug/L		<0.020				30	
Dichlorodifluoromethane (R12)	<0.020	0.020	ug/L		<0.020				30	
1,1-Dichloroethane	<0.020	0.020	ug/L		<0.020				30	
1,2-Dichloroethane (EDC)	<0.020	0.020	ug/L		<0.020				30	
cis-1,2-Dichloroethylene	<0.020	0.020	ug/L		<0.020				30	
1,1-Dichloroethylene	<0.020	0.020	ug/L		<0.020				30	
trans-1,2-Dichloroethylene	<0.020	0.020	ug/L		<0.020				30	
1,2-Dichloropropane	<0.020	0.020	ug/L		<0.020				30	
trans-1,3-Dichloropropylene	<0.020	0.020	ug/L		<0.020				30	
cis-1,3-Dichloropropylene	<0.020	0.020	ug/L		<0.020				30	
Dichlorotetrafluoroethane	<0.020	0.020	ug/L		<0.020				30	
Diisopropyl ether (DIPE)	<0.020	0.020	ug/L		<0.020				30	
1,4-Dioxane	<0.020	0.020	ug/L		<0.020				30	
Ethanol	<0.020	0.020	ug/L		<0.020				30	
Ethyl Acetate	<0.020	0.020	ug/L		<0.020				30	
Ethylbenzene	<0.020	0.020	ug/L		<0.020				30	
Ethyl-tert-Butyl Ether (ETBE)	<0.020	0.020	ug/L		<0.020				30	
4-Ethyltoluene	<0.020	0.020	ug/L		<0.020				30	
Heptane	<0.020	0.020	ug/L		<0.020				30	
Hexachlorobutadiene	<0.020	0.020	ug/L		<0.020				30	
n-Hexane	<0.020	0.020	ug/L		<0.020				30	
2-Hexanone (MBK)	<0.020	0.020	ug/L		<0.020				30	
Isopropanol (IPA)	<0.20	0.20	ug/L		<0.20				30	
Methyl-tert-Butyl Ether (MTBE)	<0.020	0.020	ug/L		<0.020				30	
Methylene Chloride	<0.020	0.020	ug/L		<0.020				30	
4-Methyl-2-pentanone (MIBK)	<0.020	0.020	ug/L		<0.020				30	

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**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0808 - *** DEFAULT PREP ***</i>										
<b>Duplicate (B6G0808-DUP1) Continued Source: 6F29015-17 Prepared &amp; Analyzed: 06/23/16</b>										
Naphthalene	<0.020	0.020	ug/L		<0.020				30	
Propylene	<0.020	0.020	ug/L		<0.020				30	
Styrene	<0.020	0.020	ug/L		<0.020				30	
1,1,2,2-Tetrachloroethane	<0.020	0.020	ug/L		<0.020				30	
Tetrachloroethylene (PCE)	<0.020	0.020	ug/L		<0.020				30	
Tetrahydrofuran (THF)	<0.020	0.020	ug/L		<0.020				30	
Toluene	<0.020	0.020	ug/L		<0.020				30	
1,2,4-Trichlorobenzene	<0.020	0.020	ug/L		<0.020				30	
1,1,2-Trichloroethane	<0.020	0.020	ug/L		<0.020				30	
1,1,1-Trichloroethane	<0.020	0.020	ug/L		<0.020				30	
Trichloroethylene (TCE)	<0.020	0.020	ug/L		<0.020				30	
Trichlorofluoromethane (R11)	<0.020	0.020	ug/L		<0.020				30	
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.020	0.020	ug/L		<0.020				30	
1,3,5-Trimethylbenzene	<0.020	0.020	ug/L		<0.020				30	
1,2,4-Trimethylbenzene	<0.020	0.020	ug/L		<0.020				30	
2,2,4-Trimethylpentane	<0.020	0.020	ug/L		<0.020				30	
Vinyl acetate	<0.020	0.020	ug/L		<0.020				30	
Vinyl bromide	<0.020	0.020	ug/L		<0.020				30	
Vinyl chloride	<0.020	0.020	ug/L		<0.020				30	
o-Xylene	<0.020	0.020	ug/L		<0.020				30	
m,p-Xylenes	<0.020	0.020	ug/L		<0.020				30	
1,1,1,2-Tetrachloroethane	<0.020	0.020	ug/L		<0.020				30	
1,2,3-Trichloropropane	<0.020	0.020	ug/L		<0.020				30	
sec-Butylbenzene	<0.020	0.020	ug/L		<0.020				30	
Isopropylbenzene	<0.020	0.020	ug/L		<0.020				30	
n-Propylbenzene	<0.020	0.020	ug/L		<0.020				30	
4-Isopropyltoluene	<0.020	0.020	ug/L		<0.020				30	
n-Butylbenzene	<0.020	0.020	ug/L		<0.020				30	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.150</i>		<i>ug/L</i>	<i>0.14</i>		<i>105</i>	<i>70-130</i>			
<i>Batch B6G0809 - *** DEFAULT PREP ***</i>										

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	Limit	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0809 - *** DEFAULT PREP ***</i>										
<b>Blank (B6G0809-BLK1)</b>										
Prepared & Analyzed: 06/24/16										
Acetone	<0.020	0.020	ug/L							
Allyl chloride	<0.020	0.020	ug/L							
tert-Amyl Methyl Ether (TAME)	<0.020	0.020	ug/L							
Benzene	<0.020	0.020	ug/L							
Benzyl chloride	<0.020	0.020	ug/L							
Bromodichloromethane	<0.020	0.020	ug/L							
Bromoform	<0.020	0.020	ug/L							
Bromomethane	<0.020	0.020	ug/L							
1,3-Butadiene	<0.020	0.020	ug/L							
2-Butanone (MEK)	<0.020	0.020	ug/L							
tert-Butyl alcohol (TBA)	<20	20	ug/L							
Carbon Disulfide	<0.020	0.020	ug/L							
Carbon Tetrachloride	<0.020	0.020	ug/L							
Chlorobenzene	<0.020	0.020	ug/L							
Chloroethane	<0.020	0.020	ug/L							
Chloroform	<0.020	0.020	ug/L							
Chloromethane	<0.020	0.020	ug/L							
Cyclohexane	<0.020	0.020	ug/L							
Dibromochloromethane	<0.020	0.020	ug/L							
1,2-Dibromoethane (EDB)	<0.020	0.020	ug/L							
1,2-Dichlorobenzene	<0.020	0.020	ug/L							
1,3-Dichlorobenzene	<0.020	0.020	ug/L							
1,4-Dichlorobenzene	<0.020	0.020	ug/L							
Dichlorodifluoromethane (R12)	<0.020	0.020	ug/L							
1,1-Dichloroethane	<0.020	0.020	ug/L							
1,2-Dichloroethane (EDC)	<0.020	0.020	ug/L							
cis-1,2-Dichloroethylene	<0.020	0.020	ug/L							
1,1-Dichloroethylene	<0.020	0.020	ug/L							
trans-1,2-Dichloroethylene	<0.020	0.020	ug/L							
1,2-Dichloropropane	<0.020	0.020	ug/L							
trans-1,3-Dichloropropylene	<0.020	0.020	ug/L							
cis-1,3-Dichloropropylene	<0.020	0.020	ug/L							

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0809 - *** DEFAULT PREP ***</i>										
<b>Blank (B6G0809-BLK1) Continued</b>										
Prepared & Analyzed: 06/24/16										
Dichlorotetrafluoroethane	<0.020	0.020	ug/L							
Diisopropyl ether (DIPE)	<0.020	0.020	ug/L							
1,4-Dioxane	<0.020	0.020	ug/L							
Ethanol	<0.020	0.020	ug/L							
Ethyl Acetate	<0.020	0.020	ug/L							
Ethylbenzene	<0.020	0.020	ug/L							
Ethyl-tert-Butyl Ether (ETBE)	<0.020	0.020	ug/L							
4-Ethyltoluene	<0.020	0.020	ug/L							
Heptane	<0.020	0.020	ug/L							
Hexachlorobutadiene	<0.020	0.020	ug/L							
n-Hexane	<0.020	0.020	ug/L							
2-Hexanone (MBK)	<0.020	0.020	ug/L							
Isopropanol (IPA)	<0.20	0.20	ug/L							
Methyl-tert-Butyl Ether (MTBE)	<0.020	0.020	ug/L							
Methylene Chloride	<0.020	0.020	ug/L							
4-Methyl-2-pentanone (MIBK)	<0.020	0.020	ug/L							
Naphthalene	<0.020	0.020	ug/L							
Propylene	<0.020	0.020	ug/L							
Styrene	<0.020	0.020	ug/L							
1,1,2,2-Tetrachloroethane	<0.020	0.020	ug/L							
Tetrachloroethylene (PCE)	<0.020	0.020	ug/L							
Tetrahydrofuran (THF)	<0.020	0.020	ug/L							
Toluene	<0.020	0.020	ug/L							
1,2,4-Trichlorobenzene	<0.020	0.020	ug/L							
1,1,2-Trichloroethane	<0.020	0.020	ug/L							
1,1,1-Trichloroethane	<0.020	0.020	ug/L							
Trichloroethylene (TCE)	<0.020	0.020	ug/L							
Trichlorofluoromethane (R11)	<0.020	0.020	ug/L							
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.020	0.020	ug/L							
1,3,5-Trimethylbenzene	<0.020	0.020	ug/L							
1,2,4-Trimethylbenzene	<0.020	0.020	ug/L							

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0809 - *** DEFAULT PREP ***</i>										
<b>Blank (B6G0809-BLK1) Continued</b>										
Prepared & Analyzed: 06/24/16										
2,2,4-Trimethylpentane	<0.020	0.020	ug/L							
Vinyl acetate	<0.020	0.020	ug/L							
Vinyl bromide	<0.020	0.020	ug/L							
Vinyl chloride	<0.020	0.020	ug/L							
o-Xylene	<0.020	0.020	ug/L							
m,p-Xylenes	<0.020	0.020	ug/L							
1,1,1,2-Tetrachloroethane	<0.020	0.020	ug/L							
1,2,3-Trichloropropane	<0.020	0.020	ug/L							
sec-Butylbenzene	<0.020	0.020	ug/L							
Isopropylbenzene	<0.020	0.020	ug/L							
n-Propylbenzene	<0.020	0.020	ug/L							
4-Isopropyltoluene	<0.020	0.020	ug/L							
n-Butylbenzene	<0.020	0.020	ug/L							
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.153</i>		<i>ug/L</i>	<i>0.14</i>		<i>107</i>	<i>70-130</i>			
<b>LCS (B6G0809-BS1)</b>										
Prepared & Analyzed: 06/24/16										
Acetone	<b>0.0366</b>	0.020	ug/L	0.024		154	70-130	30		**
Benzene	<b>0.0301</b>	0.020	ug/L	0.032		94.3	70-130	30		
Benzyl chloride	<b>0.0563</b>	0.020	ug/L	0.052		109	70-130	30		
Bromodichloromethane	<b>0.0905</b>	0.020	ug/L	0.067		135	70-130	30		**
Bromoform	<b>0.127</b>	0.020	ug/L	0.10		122	70-130	30		
Bromomethane	<b>0.0532</b>	0.020	ug/L	0.039		137	70-130	30		**
2-Butanone (MEK)	<b>0.0351</b>	0.020	ug/L	0.029		119	70-130	30		
Carbon Disulfide	<b>0.0459</b>	0.020	ug/L	0.031		147	70-130	30		**
Carbon Tetrachloride	<b>0.0922</b>	0.020	ug/L	0.063		147	70-130	30		**
Chlorobenzene	<b>0.0458</b>	0.020	ug/L	0.046		99.5	70-130	30		
Chloroethane	<b>0.0384</b>	0.020	ug/L	0.026		146	70-130	30		**
Chloroform	<b>0.0635</b>	0.020	ug/L	0.049		130	70-130	30		
Chloromethane	<b>0.0315</b>	0.020	ug/L	0.021		152	70-130	30		**
Dibromochloromethane	<b>0.0957</b>	0.020	ug/L	0.085		112	70-130	30		
1,2-Dibromoethane (EDB)	<b>0.0724</b>	0.020	ug/L	0.077		94.2	70-130	30		
1,2-Dichlorobenzene	<b>0.0524</b>	0.020	ug/L	0.060		87.1	70-130	30		

**Allen Aminian**  
 QA/QC Manager





## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
Batch B6G0809 - *** DEFAULT PREP ***										
<b>LCS (B6G0809-BS1) Continued</b>										
Prepared & Analyzed: 06/24/16										
1,3-Dichlorobenzene	0.0574	0.020	ug/L	0.060		95.4	70-130		30	
1,4-Dichlorobenzene	0.0550	0.020	ug/L	0.060		91.5	70-130		30	
Dichlorodifluoromethane (R12)	0.0780	0.020	ug/L	0.049		158	70-130		30	**
1,1-Dichloroethane	0.0678	0.020	ug/L	0.040		168	70-130		30	**
1,2-Dichloroethane (EDC)	0.0550	0.020	ug/L	0.040		136	70-130		30	**
cis-1,2-Dichloroethylene	0.0369	0.020	ug/L	0.040		93.0	70-130		30	
1,1-Dichloroethylene	0.0639	0.020	ug/L	0.040		161	70-130		30	**
trans-1,2-Dichloroethylene	0.0560	0.020	ug/L	0.040		141	70-130		30	**
1,2-Dichloropropane	0.0493	0.020	ug/L	0.046		107	70-130		30	
trans-1,3-Dichloropropylene	0.0453	0.020	ug/L	0.045		99.7	70-130		30	
cis-1,3-Dichloropropylene	0.0438	0.020	ug/L	0.045		96.5	70-130		30	
Dichlorotetrafluoroethane	0.112	0.020	ug/L	0.070		160	70-130		30	**
Ethylbenzene	0.0473	0.020	ug/L	0.043		109	70-130		30	
4-Ethyltoluene	0.0487	0.020	ug/L	0.049		99.1	70-130		30	
Hexachlorobutadiene	0.0931	0.020	ug/L	0.11		87.3	70-130		30	
2-Hexanone (MBK)	0.0588	0.020	ug/L	0.041		144	70-130		30	**
Isopropanol (IPA)	0.0335	0.20	ug/L	0.025		136	70-130		30	**
Methylene Chloride	0.0525	0.020	ug/L	0.035		151	70-130		30	**
4-Methyl-2-pentanone (MIBK)	0.0599	0.020	ug/L	0.041		146	70-130		30	**
Styrene	0.0365	0.020	ug/L	0.043		85.7	70-130		30	
1,1,2,2-Tetrachloroethane	0.0808	0.020	ug/L	0.069		118	70-130		30	
Tetrachloroethylene (PCE)	0.0549	0.020	ug/L	0.068		80.9	70-130		30	
Toluene	0.0364	0.020	ug/L	0.038		96.7	70-130		30	
1,2,4-Trichlorobenzene	0.0564	0.020	ug/L	0.074		76.0	70-130		30	
1,1,2-Trichloroethane	0.0548	0.020	ug/L	0.055		100	70-130		30	
1,1,1-Trichloroethane	0.0692	0.020	ug/L	0.055		127	70-130		30	
Trichloroethylene (TCE)	0.0605	0.020	ug/L	0.054		112	70-130		30	
Trichlorofluoromethane (R11)	0.0949	0.020	ug/L	0.056		169	70-130		30	**
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	0.122	0.020	ug/L	0.077		159	70-130		30	**
1,3,5-Trimethylbenzene	0.0488	0.020	ug/L	0.049		99.3	70-130		30	
1,2,4-Trimethylbenzene	0.0490	0.020	ug/L	0.049		99.6	70-130		30	

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0809 - *** DEFAULT PREP ***</i>										
<b>LCS (B6G0809-BS1) Continued</b>										
Prepared & Analyzed: 06/24/16										
Vinyl acetate	0.0526	0.020	ug/L	0.035	149	70-130	30			**
Vinyl chloride	0.0372	0.020	ug/L	0.026	145	70-130	30			**
o-Xylene	0.0484	0.020	ug/L	0.043	112	70-130	30			
m,p-Xylenes	0.0869	0.020	ug/L	0.087	100	70-130	30			
1,2,3-Trichloropropane	0.0690	0.020	ug/L	0.060	114	70-130	30			
sec-Butylbenzene	0.0491	0.020	ug/L	0.055	89.5	70-130	30			
Isopropylbenzene	0.0458	0.020	ug/L	0.049	93.1	70-130	30			
n-Propylbenzene	0.0458	0.020	ug/L	0.049	93.2	70-130	30			
4-Isopropyltoluene	0.0469	0.020	ug/L	0.055	85.4	70-130	30			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.152</i>		<i>ug/L</i>	<i>0.14</i>	<i>106</i>	<i>70-130</i>				
<b>LCS Dup (B6G0809-BSD1)</b>										
Prepared & Analyzed: 06/24/16										
Acetone	0.0348	0.020	ug/L	0.024	147	70-130	5.05	30		**
Benzene	0.0301	0.020	ug/L	0.032	94.2	70-130	0.106	30		
Benzyl chloride	0.0557	0.020	ug/L	0.052	108	70-130	1.11	30		
Bromodichloromethane	0.0921	0.020	ug/L	0.067	137	70-130	1.76	30		**
Bromoform	0.120	0.020	ug/L	0.10	116	70-130	5.11	30		
Bromomethane	0.0511	0.020	ug/L	0.039	132	70-130	4.02	30		**
2-Butanone (MEK)	0.0331	0.020	ug/L	0.029	112	70-130	5.88	30		
Carbon Disulfide	0.0445	0.020	ug/L	0.031	143	70-130	2.96	30		**
Carbon Tetrachloride	0.0953	0.020	ug/L	0.063	152	70-130	3.29	30		**
Chlorobenzene	0.0444	0.020	ug/L	0.046	96.5	70-130	3.06	30		
Chloroethane	0.0363	0.020	ug/L	0.026	137	70-130	5.86	30		**
Chloroform	0.0613	0.020	ug/L	0.049	126	70-130	3.44	30		
Chloromethane	0.0272	0.020	ug/L	0.021	132	70-130	14.6	30		**
Dibromochloromethane	0.0980	0.020	ug/L	0.085	115	70-130	2.46	30		
1,2-Dibromoethane (EDB)	0.0758	0.020	ug/L	0.077	98.6	70-130	4.56	30		
1,2-Dichlorobenzene	0.0520	0.020	ug/L	0.060	86.5	70-130	0.691	30		
1,3-Dichlorobenzene	0.0528	0.020	ug/L	0.060	87.8	70-130	8.30	30		
1,4-Dichlorobenzene	0.0518	0.020	ug/L	0.060	86.2	70-130	5.97	30		
Dichlorodifluoromethane (R12)	0.0750	0.020	ug/L	0.049	152	70-130	3.94	30		**
1,1-Dichloroethane	0.0552	0.020	ug/L	0.040	136	70-130	20.4	30		**

**Allen Aminian**  
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
Batch B6G0809 - *** DEFAULT PREP ***										
<b>LCS Dup (B6G0809-BSD1) Continued</b>										
Prepared & Analyzed: 06/24/16										
1,2-Dichloroethane (EDC)	0.0551	0.020	ug/L	0.040	136	70-130	0.147	30		**
cis-1,2-Dichloroethylene	0.0393	0.020	ug/L	0.040	99.0	70-130	6.25	30		
1,1-Dichloroethylene	0.0651	0.020	ug/L	0.040	164	70-130	1.84	30		**
trans-1,2-Dichloroethylene	0.0571	0.020	ug/L	0.040	144	70-130	1.82	30		**
1,2-Dichloropropane	0.0505	0.020	ug/L	0.046	109	70-130	2.50	30		
trans-1,3-Dichloropropylene	0.0517	0.020	ug/L	0.045	114	70-130	13.4	30		
cis-1,3-Dichloropropylene	0.0475	0.020	ug/L	0.045	105	70-130	8.06	30		
Dichlorotetrafluoroethane	0.106	0.020	ug/L	0.070	151	70-130	5.65	30		**
Ethylbenzene	0.0467	0.020	ug/L	0.043	108	70-130	1.29	30		
4-Ethyltoluene	0.0475	0.020	ug/L	0.049	96.7	70-130	2.45	30		
Hexachlorobutadiene	0.0905	0.020	ug/L	0.11	84.9	70-130	2.79	30		
2-Hexanone (MBK)	0.0561	0.020	ug/L	0.041	137	70-130	4.78	30		**
Isopropanol (IPA)	0.0348	0.20	ug/L	0.025	142	70-130	3.81	30		**
Methylene Chloride	0.0500	0.020	ug/L	0.035	144	70-130	4.88	30		**
4-Methyl-2-pentanone (MIBK)	0.0489	0.020	ug/L	0.041	119	70-130	20.1	30		
Styrene	0.0365	0.020	ug/L	0.043	85.7	70-130	0.00	30		
1,1,2,2-Tetrachloroethane	0.0726	0.020	ug/L	0.069	106	70-130	10.6	30		
Tetrachloroethylene (PCE)	0.0603	0.020	ug/L	0.068	88.8	70-130	9.31	30		
Toluene	0.0379	0.020	ug/L	0.038	101	70-130	3.95	30		
1,2,4-Trichlorobenzene	0.0570	0.020	ug/L	0.074	76.8	70-130	1.05	30		
1,1,2-Trichloroethane	0.0536	0.020	ug/L	0.055	98.2	70-130	2.22	30		
1,1,1-Trichloroethane	0.0694	0.020	ug/L	0.055	127	70-130	0.236	30		
Trichloroethylene (TCE)	0.0624	0.020	ug/L	0.054	116	70-130	3.15	30		
Trichlorofluoromethane (R11)	0.0941	0.020	ug/L	0.056	167	70-130	0.892	30		**
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	0.117	0.020	ug/L	0.077	153	70-130	3.78	30		**
1,3,5-Trimethylbenzene	0.0474	0.020	ug/L	0.049	96.5	70-130	2.86	30		
1,2,4-Trimethylbenzene	0.0485	0.020	ug/L	0.049	98.6	70-130	1.01	30		
Vinyl acetate	0.0466	0.020	ug/L	0.035	132	70-130	12.1	30		**
Vinyl chloride	0.0356	0.020	ug/L	0.026	139	70-130	4.21	30		**
o-Xylene	0.0472	0.020	ug/L	0.043	109	70-130	2.54	30		
m,p-Xylenes	0.0809	0.020	ug/L	0.087	93.1	70-130	7.19	30		

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0809 - *** DEFAULT PREP ***</i>										
<b>LCS Dup (B6G0809-BSD1) Continued</b>					Prepared & Analyzed: 06/24/16					
1,2,3-Trichloropropane	<b>0.0637</b>	0.020	ug/L	0.060	106	70-130	8.09	30		
sec-Butylbenzene	<b>0.0474</b>	0.020	ug/L	0.055	86.3	70-130	3.64	30		
Isopropylbenzene	<b>0.0449</b>	0.020	ug/L	0.049	91.4	70-130	1.84	30		
n-Propylbenzene	<b>0.0461</b>	0.020	ug/L	0.049	93.8	70-130	0.642	30		
4-Isopropyltoluene	<b>0.0464</b>	0.020	ug/L	0.055	84.6	70-130	0.941	30		
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.153</i>		<i>ug/L</i>	<i>0.14</i>	<i>107</i>	<i>70-130</i>				
<b>Duplicate (B6G0809-DUP1)</b>					Source: 6F29015-32 Prepared & Analyzed: 06/24/16					
Acetone	<b>&lt;0.020</b>	0.020	ug/L					30		
Allyl chloride	<b>&lt;0.020</b>	0.020	ug/L					30		
tert-Amyl Methyl Ether (TAME)	<b>&lt;0.020</b>	0.020	ug/L					30		
Benzene	<b>&lt;0.020</b>	0.020	ug/L					30		
Benzyl chloride	<b>&lt;0.020</b>	0.020	ug/L					30		
Bromodichloromethane	<b>&lt;0.020</b>	0.020	ug/L					30		
Bromoform	<b>&lt;0.020</b>	0.020	ug/L					30		
Bromomethane	<b>&lt;0.020</b>	0.020	ug/L					30		
1,3-Butadiene	<b>&lt;0.020</b>	0.020	ug/L					30		
2-Butanone (MEK)	<b>&lt;0.020</b>	0.020	ug/L					30		
tert-Butyl alcohol (TBA)	<b>&lt;20</b>	20	ug/L					30		
Carbon Disulfide	<b>&lt;0.020</b>	0.020	ug/L					30		
Carbon Tetrachloride	<b>&lt;0.020</b>	0.020	ug/L					30		
Chlorobenzene	<b>&lt;0.020</b>	0.020	ug/L					30		
Chloroethane	<b>&lt;0.020</b>	0.020	ug/L					30		
Chloroform	<b>&lt;0.020</b>	0.020	ug/L					30		
Chloromethane	<b>&lt;0.020</b>	0.020	ug/L					30		
Cyclohexane	<b>&lt;0.020</b>	0.020	ug/L					30		
Dibromochloromethane	<b>&lt;0.020</b>	0.020	ug/L					30		
1,2-Dibromoethane (EDB)	<b>&lt;0.020</b>	0.020	ug/L					30		
1,2-Dichlorobenzene	<b>&lt;0.020</b>	0.020	ug/L					30		
1,3-Dichlorobenzene	<b>&lt;0.020</b>	0.020	ug/L					30		
1,4-Dichlorobenzene	<b>&lt;0.020</b>	0.020	ug/L					30		
Dichlorodifluoromethane (R12)	<b>&lt;0.020</b>	0.020	ug/L					30		

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0809 - *** DEFAULT PREP ***</i>										
<b>Duplicate (B6G0809-DUP1) Continued Source: 6F29015-32 Prepared &amp; Analyzed: 06/24/16</b>										
1,1-Dichloroethane	<0.020	0.020	ug/L		<0.020				30	
1,2-Dichloroethane (EDC)	<0.020	0.020	ug/L		<0.020				30	
cis-1,2-Dichloroethylene	<0.020	0.020	ug/L		<0.020				30	
1,1-Dichloroethylene	<0.020	0.020	ug/L		<0.020				30	
trans-1,2-Dichloroethylene	<0.020	0.020	ug/L		<0.020				30	
1,2-Dichloropropane	<0.020	0.020	ug/L		<0.020				30	
trans-1,3-Dichloropropylene	<0.020	0.020	ug/L		<0.020				30	
cis-1,3-Dichloropropylene	<0.020	0.020	ug/L		<0.020				30	
Dichlorotetrafluoroethane	<0.020	0.020	ug/L		<0.020				30	
Diisopropyl ether (DIPE)	<0.020	0.020	ug/L		<0.020				30	
1,4-Dioxane	<0.020	0.020	ug/L		<0.020				30	
Ethanol	<0.020	0.020	ug/L		<0.020				30	
Ethyl Acetate	<0.020	0.020	ug/L		<0.020				30	
Ethylbenzene	<0.020	0.020	ug/L		<0.020				30	
Ethyl-tert-Butyl Ether (ETBE)	<0.020	0.020	ug/L		<0.020				30	
4-Ethyltoluene	<0.020	0.020	ug/L		<0.020				30	
Heptane	<0.020	0.020	ug/L		<0.020				30	
Hexachlorobutadiene	<0.020	0.020	ug/L		<0.020				30	
n-Hexane	<0.020	0.020	ug/L		<0.020				30	
2-Hexanone (MBK)	<0.020	0.020	ug/L		<0.020				30	
Isopropanol (IPA)	<0.20	0.20	ug/L		<0.20				30	
Methyl-tert-Butyl Ether (MTBE)	<0.020	0.020	ug/L		<0.020				30	
Methylene Chloride	<0.020	0.020	ug/L		<0.020				30	
4-Methyl-2-pentanone (MIBK)	<0.020	0.020	ug/L		<0.020				30	
Naphthalene	<0.020	0.020	ug/L		<0.020				30	
Propylene	<0.020	0.020	ug/L		<0.020				30	
Styrene	<0.020	0.020	ug/L		<0.020				30	
1,1,2,2-Tetrachloroethane	<0.020	0.020	ug/L		<0.020				30	
Tetrachloroethylene (PCE)	<0.020	0.020	ug/L		<0.020				30	
Tetrahydrofuran (THF)	<0.020	0.020	ug/L		<0.020				30	
Toluene	<0.020	0.020	ug/L		<0.020				30	
1,2,4-Trichlorobenzene	<0.020	0.020	ug/L		<0.020				30	

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>VOCs by GCMS EPA TO-15 - Quality Control</b>										
<i>Batch B6G0809 - *** DEFAULT PREP ***</i>										
<b>Duplicate (B6G0809-DUP1) Continued Source: 6F29015-32 Prepared &amp; Analyzed: 06/24/16</b>										
1,1,2-Trichloroethane	<0.020	0.020	ug/L		<0.020				30	
1,1,1-Trichloroethane	<0.020	0.020	ug/L		<0.020				30	
Trichloroethylene (TCE)	<0.020	0.020	ug/L		<0.020				30	
Trichlorofluoromethane (R11)	<0.020	0.020	ug/L		<0.020				30	
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	<0.020	0.020	ug/L		<0.020				30	
1,3,5-Trimethylbenzene	<0.020	0.020	ug/L		<0.020				30	
1,2,4-Trimethylbenzene	<0.020	0.020	ug/L		<0.020				30	
2,2,4-Trimethylpentane	<0.020	0.020	ug/L		<0.020				30	
Vinyl acetate	<0.020	0.020	ug/L		<0.020				30	
Vinyl bromide	<0.020	0.020	ug/L		<0.020				30	
Vinyl chloride	<0.020	0.020	ug/L		<0.020				30	
o-Xylene	<0.020	0.020	ug/L		<0.020				30	
m,p-Xylenes	<0.020	0.020	ug/L		<0.020				30	
1,1,1,2-Tetrachloroethane	<0.020	0.020	ug/L		<0.020				30	
1,2,3-Trichloropropane	<0.020	0.020	ug/L		<0.020				30	
sec-Butylbenzene	<0.020	0.020	ug/L		<0.020				30	
Isopropylbenzene	<0.020	0.020	ug/L		<0.020				30	
n-Propylbenzene	<0.020	0.020	ug/L		<0.020				30	
4-Isopropyltoluene	<0.020	0.020	ug/L		<0.020				30	
n-Butylbenzene	<0.020	0.020	ug/L		<0.020				30	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.146</i>		<i>ug/L</i>	<i>0.14</i>		<i>102</i>	<i>70-130</i>			

### Fixed Gases by TCD - Quality Control

*Batch B6G0804 - \*\*\* DEFAULT PREP \*\*\**

#### Blank (B6G0804-BLK1)

Prepared & Analyzed: 06/22/16

Methane	<0.10	0.10	% by Volume
Oxygen	<0.10	0.10	% by Volume
Carbon Dioxide	<0.10	0.10	% by Volume

*Allen Aminian*

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Fixed Gases by TCD - Quality Control</b>										
<i>Batch B6G0804 - *** DEFAULT PREP ***</i>										
<b>LCS (B6G0804-BS1)</b>					Prepared & Analyzed: 06/22/16					
Methane	4.33	0.10	% by Volume	4.5		96.2	75-125			
Oxygen	3.63	0.10	% by Volume	4.0		90.7	75-125			
Carbon Dioxide	13.6	0.10	% by Volume	15		90.5	75-125			
<b>LCS Dup (B6G0804-BSD1)</b>					Prepared & Analyzed: 06/22/16					
Methane	4.56	0.10	% by Volume	4.5		101	75-125	5.16	30	
Oxygen	3.64	0.10	% by Volume	4.0		91.1	75-125	0.468	30	
Carbon Dioxide	14.1	0.10	% by Volume	15		93.8	75-125	3.61	30	
<b>Duplicate (B6G0804-DUP1)</b>					Source: 6F29015-09 Prepared & Analyzed: 06/22/16					
Methane	<0.10	0.10	% by Volume		<0.10				30	
Oxygen	18.0	0.10	% by Volume		17.9			0.813	30	
Carbon Dioxide	0.203	0.10	% by Volume		0.212			4.34	30	
<i>Batch B6G0805 - *** DEFAULT PREP ***</i>										
<b>Blank (B6G0805-BLK1)</b>					Prepared & Analyzed: 06/23/16					
Methane	<0.10	0.10	% by Volume							
Oxygen	<0.10	0.10	% by Volume							
Carbon Dioxide	<0.10	0.10	% by Volume							
<b>LCS (B6G0805-BS1)</b>					Prepared & Analyzed: 06/23/16					
Methane	4.56	0.10	% by Volume	4.5		101	75-125			

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Fixed Gases by TCD - Quality Control</b>										
<i>Batch B6G0805 - *** DEFAULT PREP ***</i>										
<b>LCS (B6G0805-BS1) Continued</b> <span style="float: right;">Prepared &amp; Analyzed: 06/23/16</span>										
Oxygen	3.80	0.10	% by Volume	4.0		94.9	75-125			
Carbon Dioxide	13.1	0.10	% by Volume	15		87.6	75-125			
<b>LCS Dup (B6G0805-BSD1)</b> <span style="float: right;">Prepared &amp; Analyzed: 06/23/16</span>										
Methane	4.65	0.10	% by Volume	4.5		103	75-125	1.89	30	
Oxygen	3.62	0.10	% by Volume	4.0		90.6	75-125	4.61	30	
Carbon Dioxide	14.0	0.10	% by Volume	15		93.1	75-125	6.10	30	
<b>Duplicate (B6G0805-DUP1)</b> <span style="float: right;">Source: 6F29015-17 Prepared &amp; Analyzed: 06/23/16</span>										
Methane	<0.10	0.10	% by Volume		<0.10				30	
Oxygen	18.2	0.10	% by Volume		18.1			0.418	30	
Carbon Dioxide	<0.10	0.10	% by Volume		<0.10				30	
<i>Batch B6G0806 - *** DEFAULT PREP ***</i>										
<b>Blank (B6G0806-BLK1)</b> <span style="float: right;">Prepared &amp; Analyzed: 06/24/16</span>										
Methane	<0.10	0.10	% by Volume							
Oxygen	<0.10	0.10	% by Volume							
Carbon Dioxide	<0.10	0.10	% by Volume							
<b>LCS (B6G0806-BS1)</b> <span style="float: right;">Prepared &amp; Analyzed: 06/24/16</span>										
Methane	4.45	0.10	% by Volume	4.5		98.9	75-125			
Oxygen	3.96	0.10	% by Volume	4.0		99.1	75-125			

**Allen Aminian**  
 QA/QC Manager





## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Fixed Gases by TCD - Quality Control</b>										
<i>Batch B6G0806 - *** DEFAULT PREP ***</i>										
<b>LCS (B6G0806-BS1) Continued</b>					Prepared & Analyzed: 06/24/16					
Carbon Dioxide	13.9	0.10	% by Volume	15		92.4	75-125			
<b>LCS Dup (B6G0806-BSD1)</b>					Prepared & Analyzed: 06/24/16					
Methane	4.32	0.10	% by Volume	4.5		96.1	75-125	2.89	30	
Oxygen	3.91	0.10	% by Volume	4.0		97.7	75-125	1.42	30	
Carbon Dioxide	13.0	0.10	% by Volume	15		86.6	75-125	6.52	30	
<b>Duplicate (B6G0806-DUP1)</b>					Source: 6F29015-32 Prepared & Analyzed: 06/24/16					
Methane	<0.10	0.10	% by Volume		<0.10				30	
Oxygen	17.0	0.10	% by Volume		17.4			2.24	30	
Carbon Dioxide	0.936	0.10	% by Volume		0.945			0.957	30	

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 496965.A1.01  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187311  
**Date Received:** 06/27/16  
**Date Reported:** 07/15/16

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### Special Notes

- [1] = \*\* : Analyte recovery exceeds the upper control limit.
- [2] = **QR-02** : The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.

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A handwritten signature in black ink, appearing to read 'Allen Aminian'.

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**Allen Aminian**  
QA/QC Manager



# AMERICAN ANALYTICS CHAIN-OF-CUSTODY RECORD

9765 ETON AVE., CHATSWORTH, CA 91311

Tel: 818-998-5547 FAX: 818-998-7258

A.A. COC No.: 125357

70045794

Page 1 of 1

Client: CH2M HILL Project Name / No.: KMER NORMAN BIOSPACE Sampler's Name: William J. S. [Signature]  
 Project Manager: DAN JABLONSKY Site Address: 15306 NORMAN RD Sampler's Signature: [Signature]  
 Phone: \_\_\_\_\_ City: NORWALK P.O. No.: \_\_\_\_\_  
 Fax: \_\_\_\_\_ State & Zip: CA Quote No.: \_\_\_\_\_

### TAT Turnaround Codes \*\*

- ① = Same Day Rush
- ② = 24 Hour Rush
- ③ = 48 Hour Rush
- ④ = 72 Hour Rush
- ⑤ = 5 Day Rush
- X = 10 Working Days (Standard TAT)

### ANALYSIS REQUESTED (Test Name)

TO15	TO3	FIXED CHMS																	
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Special Instructions

Client I.D.	A.A. I.D.	Date	Time	Sample Matrix	No. of Cont	Please enter the TAT Turnaround Codes ** below										Special Instructions					
						①	②	③	④	⑤	X										
SUM-1-15	6F29015-01	6-22-16	0805	V	2	X	X	X													
SUM-1-5	2	↓	0818	V	2	X	X	X													
SUM-2-5	3		0851	V	2	X	X	X													
SUM-15-7	4		0952	V	2	X	X	X													
SUM-15-22	5		0953	V	2	X	X	X													
SUM-15-15	6		1018	V	2	X	X	X													
SUM-6-7	7		1053	V	2	X	X	X													
SUM-6-15	8		1053	V	2	X	X	X													
SUM-7-7	9		1215	V	2	X	X	X													
SUM-7-7 DUP	10		1215	V	2	X	X	X													
SUM-7-13	11		1231	V	2	X	X	X													
SUM-10-15	12		1245	V	2	X	X	X													
AMBIENT AIR	13		1246	V	1	X	X														

For Laboratory Use	Relinquished by: <u>[Signature]</u>	Date: <u>6-22-16</u>	Time: <u>1300</u>	Received by: <u>[Signature]</u>
	Relinquished by: <u>[Signature]</u>	Date: <u>6/27/16</u>	Time: <u>15:00</u>	Received by: <u>[Signature]</u>
	Relinquished by: _____	Date: _____	Time: _____	Received by: _____

A.A. Project No.: MB187311/6F29015

Note: By relinquishing samples to American Analytics, client agrees to pay for the services requested on this chain of custody form and any additional client requested analyses performed on this project.



# AMERICAN ANALYTICS CHAIN-OF-CUSTODY RECORD

9765 ETON AVE., CHATSWORTH, CA 91311

Tel: 818-998-5547 FAX: 818-998-7258

A.A. COC No.: 125358

70045783  
Page 1 of 1

Client: CH2MHILL Project Name/No.: KMEP NORWALK BIOSPARGE Sampler's Name: WILLIAM SCHUMM  
 Project Manager: DAN JABLONSKI Site Address: 15306 NORWALK BLVD Sampler's Signature: [Signature]  
 Phone: \_\_\_\_\_ City: NORWALK P.O. No.: \_\_\_\_\_  
 Fax: \_\_\_\_\_ State & Zip: CA Quote No.: \_\_\_\_\_

### TAT Turnaround Codes \*\*

- ① = Same Day Rush
- ② = 24 Hour Rush
- ③ = 48 Hour Rush
- ④ = 72 Hour Rush
- ⑤ = 5 Day Rush
- X = 10 Working Days (Standard TAT)

### ANALYSIS REQUESTED (Test Name)

Client I.D.	A.A. I.D.	Date	Time	Sample Matrix	No. of Cont	Please enter the TAT Turnaround Codes ** below										Special Instructions	
						TOIS	TO3	FLUO CAMES									
SUM-3-15	14	6-23-16	0801	V	2	X	X	X									
SUM-3-5	15		0814	V	2	X	X	X									
SUM-5-15	16		0858	V	2	X	X	X									
SUM-5-5	17		0918	V	2	X	X	X									
SUM-5-SDUP	18		0918	V	2	X	X	X									
SUM-8-5	19		1004	V	2	X	X	X									
SUM-8-15	20		1005	V	2	X	X	X									
AMBIENT AIR	21		1038	V	1	X	X										
SUM-16-7	22		1103	V	2	X	X	X									
SUM-16-22	23		1104	V	2	X	X	X									
SUM-16-16	24		1122	V	2	X	X	X									
SUM-12-7	25		1318	V	2	X	X	X									
SUM-12-22	26		1319	V	2	X	X	X									
SUM-12-15	27		1331	V	2	X	X	X									

For Laboratory Use	Relinquished by <u>[Signature]</u>	Date <u>6-23-16</u>	Time <u>1345</u>	Received by <u>[Signature]</u>
	Relinquished by <u>[Signature]</u>	Date <u>6/27/16</u>	Time <u>1550</u>	Received by <u>[Signature]</u>
	Relinquished by _____	Date _____	Time _____	Received by _____

A.A. Project No.: MB 187311/6429015

Note: By relinquishing samples to American Analytics, client agrees to pay for the services requested on this chain of custody form and any additional client-requested analyses performed on this project.



# AMERICAN ANALYTICS CHAIN-OF-CUSTODY RECORD

9765 ETON AVE., CHATSWORTH, CA 91311  
Tel: 818-998-5547 FAX: 818-998-7258

A.A. COC No.: 125359

70045793  
Page 1 of 1

Client: CH2MHILL Project Name / No.: KMCP NORWALK BIOSPACE Sampler's Name: William S. Hoffmann  
 Project Manager: DAN JABLONSKI Site Address: 15306 NORWALK BLVD Sampler's Signature: [Signature]  
 Phone: \_\_\_\_\_ City: NORWALK P.O. No.: \_\_\_\_\_  
 Fax: \_\_\_\_\_ State & Zip: CA Quote No.: \_\_\_\_\_

### TAT Turnaround Codes \*\*

- ① = Same Day Rush
- ② = 24 Hour Rush
- ③ = 48 Hour Rush
- ④ = 72 Hour Rush
- ⑤ = 5 Day Rush
- X = 10 Working Days (Standard TAT)

### ANALYSIS REQUESTED (Test Name)

Client I.D.	A.A. I.D.	Date	Time	Sample Matrix	No. of Cont	Please enter the TAT Turnaround Codes ** below										Special Instructions	
						TO15	TO3	Fixed Conts									
SUM-13-22.S	28	6-24-16	0809	U	2	X	X	X									
SUM-13-7	29		0814	U	2	X	X	X									
SUM-13-15.S	30		0815	U	2	X	X	X									
SUM-14-22	31		0857	U	2	X	X	X									
SUM-14-7	32		0858	U	2	X	X	X									
SUM-14-7 DUP	33		0858	U	2	X	X	X									
SUM-14-15	34		0912	U	2	X	X	X									
AMBIENT AIR	35		0913	U	1	X	X										

For Laboratory Use	Relinquished by <u>[Signature]</u>	Date <u>06/24/2016</u>	Time <u>0945</u>	Received by <u>[Signature]</u>
	Relinquished by <u>[Signature]</u>	Date <u>6/27/16</u>	Time <u>15:00</u>	Received by <u>[Signature]</u>
	Relinquished by	Date	Time	Received by

A.A. Project No.: MB187311/6729015

Note: By relinquishing samples to American Analytics, client agrees to pay for the services requested on this chain of custody form and any additional client-requested analyses performed on this project.