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**SFPP Norwalk Pump Station  
Norwalk, California**

**2018 Annual Soil Vapor Monitoring Report**

Final

May 10, 2019

Kinder Morgan, Inc.



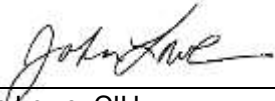
## **SFPP Norwalk Pump Station, Norwalk, California**

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The material and data presented in this report were prepared consistent with current and generally accepted consulting principles and practices. This work was supervised by the following Jacobs licensed professional.



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## Acronyms and Abbreviations

|                      |   |
|----------------------|---|
| µg/L                 | micrograms per liter  |
| AMEC                 | AMEC Geomatrix, Inc.  |
| bgs                  | below ground surface  |
| BTEX                 | benzene, toluene, ethylbenzene, and total xylenes                   |
| CH2M                 | CH2M HILL Engineers, Inc.   |
| COPC                 | chemical of potential concern                                       |
| DFSP                 | Defense Fuel Support Point  |
| DTSC                 | Department of Toxic Substances Control                              |
| EPA                  | U.S. Environmental Protection Agency                                |
| in. H <sub>2</sub> O | inches of water   |
| Jacobs               | Jacobs Engineering Inc.   |
| ml/min               | milliliters per minute  |
| MTBE                 | methyl tert-butyl ether   |
| PCE                  | tetrachloroethylene   |
| SVE                  | soil vapor extraction   |
| TBA                  | tert-butyl alcohol (also known as tert-butanol)                     |
| TPH-g                | total petroleum hydrocarbons quantified as gasoline                 |
| VOC                  | volatile organic compound   |
| Water Board          | California Regional Water Quality Control Board, Los Angeles Region |

## 1. Introduction

This report presents the results of the annual soil vapor monitoring conducted in November and December 2018 at the SFPP Norwalk Pump Station located within the Defense Fuel Support Point (DFSP) Norwalk, at 15306 Norwalk Boulevard, Norwalk, California (the site; Figure 1). The work was performed in accordance with the following work plan and work plan addendum:

- Work Plan for Soil Vapor Monitoring, South-Central and Southeastern Off-Site Areas, Defense Fuel Support Point Norwalk, 15306 Norwalk Boulevard, Norwalk, California (SCP No. 0286B, Site No. 204DM00), prepared by AMEC Geomatrix, Inc. (AMEC), dated May 27, 2010.
- Work Plan Addendum for Soil Vapor Monitoring, South-Central and Southeastern Off-Site Areas, Defense Fuel Support Point Norwalk, 15306 Norwalk Boulevard, Norwalk, California (SCP No. 0286B, Site No. 204DM00), prepared by CH2M<sup>1</sup>, dated June 3, 2011.

Results of the soil vapor monitoring conducted in March, June, and August 2018 during operation of the soil vapor extraction (SVE) system and the biosparge system are included in the second and third quarter 2018 remediation progress reports (Jacobs, 2018a, 2018b).

The project background, approach, and results of the November and December 2018 soil vapor sampling event are presented below.

## 2. Background

A soil vapor monitoring program was implemented at the site in July 2012 pursuant to a request made by the California Regional Water Quality Control Board, Los Angeles Region (Water Board) in its letter dated March 30, 2010. As part of this program, 10 nested soil vapor monitoring probes (SVM-1 through SVM-10) were installed in the south-central and southeastern offsite areas in accordance with the above-referenced work plans (AMEC, 2010; CH2M, 2011). Figure 2 shows the approximate location of the 10 probes. Each monitoring location consists of a soil vapor probe nest with probes installed at depths of approximately 5 and 15 feet below ground surface (bgs) in a single borehole.

In September 2014, six triple-nested soil vapor monitoring probes (SVM-11 to SVM-16) were installed to supplement the existing monitoring probes in the south-central area as part of the south-central horizontal biosparge pilot study (CH2M, 2013). Each monitoring point consists of a soil vapor probe nest with probes completed at approximately 7, 15, and 22 feet bgs in a single borehole.

In May 2016 and February 2017, seven nested soil vapor probes (SVM-17 to SVM-23) were installed in the southeastern area of the site as part of the human health risk assessment for the 15-acre parcel (CH2M, 2016, 2017a), and soil vapor monitoring points for future biosparging were installed in the southeastern area (CH2M, 2013, 2017b). Nested soil vapor probes were completed at 5 and 10 feet bgs at all seven boring locations.

## 3. Approach

Soil vapor samples were collected from the south-central area probes SVM-1 through SVM-3, SVM-5 through SVM-8, and SVM-10 through SVM-16 between November 12 and 14, 2018. Soil vapor samples were also collected from the southeastern area probes SVM-9 and SVM-17 through SVM-23 on December 31, 2018. Kinder Morgan's SVE system was shut down on October 22, 2018, and December 27, 2018, respectively, to allow the vadose zone to reach equilibrium prior to sample collection. Soil vapor sampling was performed by American Analytics under the direction of Jacobs. The soil vapor probes at each monitoring point were purged and sampled in accordance with the recommended guidelines in the Department of Toxic Substances Control (DTSC) *Advisory for Active*

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<sup>1</sup> CH2M HILL Engineers, Inc. (CH2M) is now part of Jacobs Engineering Inc. (Jacobs).

*Soil Gas Investigations* (Advisory), dated July 2015 (DTSC, 2015). The sampling procedures for these activities (including purge volume, shut-in, and leak tests) are described below. The analytical results were evaluated by comparison with soil gas screening levels based on the most current DTSC guidance. The soil gas screening levels are calculated from indoor air screening levels published by DTSC in its *Human Health Risk Assessment (HHRA) Note 3* (DTSC, 2018) using the default attenuation factors presented in DTSC's vapor intrusion guidance (DTSC, 2011).

### 3.1 Purge Volume

As recommended in the Advisory (DTSC, 2015), a default of three purge volumes was used. Purge volume testing is no longer recommended by DTSC. Soil vapor was purged from each probe using a vacuum/pressure sampling pump calibrated to a flow rate of 200 milliliters per minute (ml/min). The use of a consistent low rate at each sample location limited stripping and ambient air intrusion. The purge volume for each probe was recorded in the field.

### 3.2 Shut-In Test

Prior to purging and sampling each soil vapor probe, a shut-in test was conducted to check for leaks in the aboveground sampling train (valves, tubing, and fittings from downstream to the top of the probe). A vacuum of approximately 100 inches of water (in. H<sub>2</sub>O) was applied to the aboveground sampling train for a period of approximately 1 minute. No significant decreases in vacuum were reported during any of the shut-in tests conducted.

### 3.3 Leak Test

During purging and sampling at each soil vapor probe, a leak test was conducted using 2-propanol (a liquid tracer compound) to evaluate the potential for ambient air breakthrough or leaks in the sampling train. Prior to purging, the liquid tracer compound was applied to a paper towel and placed inside the vapor probe vaults; the compound was included in the method analyte list for soil vapor samples. Care was taken to prevent cross-contamination between the liquid tracer compound and the sampling train and sample containers. The 2-propanol was not detected by the mobile laboratory or the fixed laboratory. Further discussion of the leak testing results is presented in the Quality Assurance/Quality Control section below.

### 3.4 Soil Vapor Sampling and Analysis

As described above, soil vapor sampling was conducted from the south-central soil vapor probes SVM-1 through SVM-3, SVM-5 through SVM-8, and SVM-10 through SVM-16 between November 12 and 14, 2018. Soil vapor samples were also collected from the southeastern soil vapor probes SVM-9 and SVM-17 through SVM-23 on December 31, 2018. The soil vapor probes from each monitoring point were purged and sampled using a vacuum/pressure sampling pump calibrated to a flow rate of 200 ml/min 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, shallow probe of SVM-10, and deep probe of SVM-19, due to flow restrictions (excessive vacuum) observed during purging activities with a mechanical and 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.

Soil vapor samples were collected using 1.4-liter Summa canisters (for volatile organic compounds [VOCs]) and glass syringes (for fixed gases), and were analyzed by the American Analytics onsite mobile laboratory (November 2018 sampling event) and the American Analytics fixed laboratory (December 2018 sampling event) for fuel constituents including benzene, toluene, ethylbenzene, and total xylenes (BTEX); methyl tert-butyl ether (MTBE); 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) using U.S. Environmental Protection Agency (EPA) Method TO-15. These constituents were identified as chemicals of potential concern (COPCs) based on the results of the 2006 soil gas investigation (Geomatrix, 2006).



The laboratory also analyzed samples for total petroleum hydrocarbons quantified as gasoline (TPH-g) using EPA Method TO-3 and fixed gases (carbon dioxide, methane, and oxygen) using EPA Method 3C.

In accordance with the Advisory (DTSC, 2015), field duplicate soil vapor samples were collected at a minimum frequency of 1 for every 20 soil vapor samples collected. Duplicate soil vapor samples were collected at SVM-7 (13.25- to 13.75-foot depth), SVM-12 (22- to 22.5-foot depth), SVM-14 (22.5- to 23-foot depth), and SVM-17 (4.5- to 5-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 and fixed laboratories for VOCs and TPH-g. The purpose of the ambient air samples is to quantify background concentrations of COPCs near select sampling locations. The ambient air samples were collected each day of sampling near the following soil vapor probes:

- November 12, 2018 at SVM-7
- November 13, 2018 at SVM-12
- November 14, 2018 at SVM-14R
- December 31, 2018 at SVM-17

The results of the ambient air sampling are discussed in the Quality Assurance/Quality Control section below.

## 4. Laboratory Results

### 4.1 Mobile Laboratory Results

Table 1 presents the analytical results for VOCs and TPH-g provided by the onsite mobile laboratory. Laboratory analytical reports are included in Attachment A. A summary of results is provided below.

- COPCs were not detected in the soil vapor samples collected from the south-central soil vapor probes (SVM-1, SVM-2, SVM-3, SVM-5 through SVM-8, and SVM-10 through SVM-16).
- Ethanol, which does not have a residential or commercial screening level, was detected in sample collected from the 15.5- to 16-foot depth of SVM-6 (0.027 microgram per liter [ $\mu\text{g/L}$ ]) and the 7- to 7.5-foot depth of SVM-7 (0.075  $\mu\text{g/L}$ ).
- Tetrachloroethylene (PCE) was detected in the sample collected from the 21- to 21.5-foot depth of SVM-11 (0.061  $\mu\text{g/L}$ ) and the 22.5- to 23-foot depth of SVM-13 (0.023  $\mu\text{g/L}$ ). Both of these detections were well below the residential screening level of 0.46  $\mu\text{g/L}$ .
- Acetone and TPH-g were detected in the sample collected from the 22.5- to 23-foot depth of SVM-14R at 0.53  $\mu\text{g/L}$  and 51  $\mu\text{g/L}$  (duplicate sample). The acetone and TPH-g detections were significantly below their respective residential screening levels of 32,000  $\mu\text{g/L}$  and 630  $\mu\text{g/L}$ , which are lower than the commercial screening levels.

### 4.2 Fixed Laboratory Results

Table 2 presents the analytical results for VOCs and TPH-g provided by the American Analytics fixed laboratory. Laboratory analytical reports are included in Attachment A. A summary of results is provided below.

- COPCs were not detected in the soil vapor samples collected from the southeastern soil vapor probes (SVM-9 and SVM-17 through SVM-23).
- The only compound detected was PCE. PCE was detected in the sample from the 4.5- to 5-foot depth of SVM-21 (0.024  $\mu\text{g/L}$ ), the 9.5- to 10-foot depth of SVM-21 (0.025  $\mu\text{g/L}$ ), and the 9.5- to 10-foot depth of SVM-23 (0.023  $\mu\text{g/L}$ ). These detections were below the residential screening level of 0.46  $\mu\text{g/L}$ .

### 4.3 Fixed Gases

Tables 1 and 2 also present the analytical results provided by the American Analytics mobile and fixed laboratories for methane, oxygen, and carbon dioxide analysis using EPA Method 3C. Laboratory analytical reports are included in Attachment A. The analysis of methane, oxygen, and carbon dioxide was used to assist with the evaluation of natural attenuation (biodegradation) of hydrocarbon constituents in the vadose zone.

In general, oxygen concentrations decrease with increasing depth. Conversely, carbon dioxide concentrations increase with increasing depth. The results are generally consistent with the data collected in previous monitoring events, with the exception that methane was not detected by the mobile or fixed laboratories in any probes in November and December 2018.

## 5. Quality Assurance/Quality Control

In accordance with the Advisory (DTSC, 2015), field duplicate samples were collected at a minimum frequency of 1 for every 20 primary samples collected. Duplicate soil vapor samples were collected from the following locations:

- SVM-7 (13.25- to 13.75-foot depth), SVM-12 (22- to 22.5-foot depth), and SVM-14 (22.5- to 23-foot depth) during the November 2018 sampling event
- SVM-17 (4.5- to 5-foot depth) during the December 2018 sampling event

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 or fixed laboratory for VOCs and TPH-g. The purpose of the ambient air samples is to quantify background concentrations of COPCs near select sampling locations. All ambient air samples were nondetect.

The leak test compound (2-propanol) was not detected in any of the laboratory samples, indicating there were no leaks in the sampling train during purging and sampling activities.

## 6. Summary and Recommendations

The 2018 annual soil vapor monitoring was conducted at the SFPP Norwalk Pump Station site between November 12 and 14, 2018 and on December 31, 2018, and included the sampling of nested probes SVM-1 through SVM-3, and SVM-5 through SVM-23. A soil vapor sample was not collected at the shallow probe of SVM-2, shallow probe of SVM-10, and deep probe of SVM-19, due to flow restrictions (excessive vacuum) observed during purging activities. Soil vapor samples also were not collected from the shallow or deep probes of SVM-4 due to property access restrictions.

Shallow soil vapor in the south-central and southeastern areas of the site does not pose an unacceptable human health risk to residents based on the data collected. There were no COPCs detected in any of the samples collected. The detected VOCs were below their respective commercial and residential screening levels.

The next planned annual sampling event, which includes sampling in the southeastern area, is anticipated to occur in the fourth quarter 2019.

## 7. References

AMEC. 2010. *Work Plan for Soil Vapor Monitoring, South-Central and Southeastern Off-Site Areas, Defense Fuel Support Point Norwalk, 15306 Norwalk Boulevard, Norwalk, California (SCP No. 0286B, Site No. 204DM00)*. May 27.

California Regional Water Quality Control Board, Los Angeles Region (Water Board). 2010. Letter: Groundwater Investigation, Monitoring and Remediation in the Southern Plume Area, Defense Fuel Support Point Norwalk, 15306 Norwalk Boulevard, Norwalk, California, (SCP No. 0286B, Site No. 204DM00). March 30.

CH2M HILL Engineers, Inc. (CH2M). 2011. *Work Plan Addendum for Soil Vapor Monitoring, South-Central and Southeastern Off-Site Areas, Defense Fuel Support Point Norwalk, 15306 Norwalk Boulevard, Norwalk, California (SCP No. 0286B, Site No. 204DM00)*. June 3.

CH2M HILL Engineers, Inc. (CH2M). 2013. *Horizontal Biosparge System Construction and Pilot Test Work Plan, SFPP Norwalk Pump Station, 15306 Norwalk Boulevard, Norwalk, California*. November 18.

CH2M HILL Engineers, Inc. (CH2M). 2016. *Results of Additional Soil and Soil Vapor Sampling and Human Health Risk Assessment to Support Shallow Soil Closure for the Eastern 15-Acre Parcel, Defense Fuel Support Point, Norwalk, California*. June 28.

CH2M HILL Engineers, Inc. (CH2M). 2017a. *Results of Additional Soil and Soil Vapor Sampling and Revised Human Health Risk Assessment to Support Shallow Soil Closure for the Eastern 15-Acre Parcel, Defense Fuel Support Point, Norwalk, California*. March 16.

CH2M HILL Engineers, Inc. (CH2M). 2017b. *Horizontal Biosparge System Construction Work Plan, SFPP Norwalk Pump Station, 15306 Norwalk Boulevard, Norwalk, California*. October 30.

Department of Toxic Substances Control (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)

Department of Toxic Substances Control (DTSC). 2015. *Advisory for Active Soil Gas Investigations*. July.

Department of Toxic Substances Control (DTSC). 2018. *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*. June.  
<https://www.dtsc.ca.gov/AssessingRisk/upload/HHRA-Note-3-June-2018.pdf>

Geomatrix. 2006. *Vapor Intrusion Sampling and Human Health Risk Assessment, DFSP Norwalk Facility, Norwalk, California*. December.

Jacobs Engineering Group Inc. (Jacobs). 2018a. *Second Quarter 2018 Remediation Progress Report, SFPP Norwalk Pump Station, Norwalk, California*. July 12.

Jacobs Engineering Group Inc. (Jacobs). 2018b. *Second Quarter 2018 Remediation Progress Report, SFPP Norwalk Pump Station, Norwalk, California*. October 15.

## **Tables**

**Table 1. South-Central Field Measurements and Mobile Laboratory Soil Vapor Analytical Results - November 2018**

SFPP Norwalk Pump Station, Norwalk, California

| Analyte Type             | Analyte                         | Unit                    | Current Residential Soil Gas Screening Level <sup>a, b</sup> | Current Commercial Soil Gas Screening Level <sup>a, b</sup> | SVM-1-5<br>11/12/2018<br>SVM-1<br>5-5.5 | SVM-1-15<br>11/12/2018<br>SVM-1<br>14.5-15 | SVM-2-5<br>11/13/2018<br>SVM-2<br>5-5.5 | SVM-3-5<br>11/13/2018<br>SVM-3<br>5-5.5 | SVM-3-15<br>11/13/2018<br>SVM-3<br>15-15.5 | SVM-5-5<br>11/13/2018<br>SVM-5<br>5-5.5 | SVM-5-15<br>11/13/2018<br>SVM-5<br>15.5-16 | SVM-6-7<br>11/12/2018<br>SVM-6<br>6.5-7 | SVM-6-13<br>11/12/2018<br>SVM-6<br>15.5-16 | SVM-7-7<br>11/12/2018<br>SVM-7<br>7-7.5 | SVM-7-13<br>11/12/2018<br>SVM-7<br>13.25-13.75 |
|--------------------------|---------------------------------|-------------------------|--|---|---|--|---|---|--|---|--|---|--|---|--|
| Field Measurements       | Pressure                        | inches H <sub>2</sub> O | ---  | ---   | ---                                     | ---  | ---                                     | ---                                     | ---  | ---                                     | ---  | ---                                     | ---  | ---                                     | ---  |
|                          | PID                             | ppmv                    | ---  | ---   | ---                                     | ---  | ---                                     | ---                                     | ---  | ---                                     | ---  | ---                                     | ---  | ---                                     | ---  |
| COPCs <sup>c</sup>       | 1,2,4-Trimethylbenzene          | µg/L                    | 63   | 262   | <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  |
|                          | 1,3,5-Trimethylbenzene          | µg/L                    | 63   | 262   | <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   |
|                          | 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  |
|                          | 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  |
|                          | 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  |
|                          | 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  |
|                          | 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  |
|                          | 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  |
|                          | 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  |
|                          | 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  |
|                          | 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  |
|                          | 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  |
|                          | tert-Butanol (TBA)              | µg/L                    | ---  | ---   | <20                                     | <20  | <20                                     | <20                                     | <20  | <20                                     | <20  | <20                                     | <20  | <20                                     | <20  |
| Toluene                  | µg/L                            | 5200                    | 22400  | <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 | Acetone                         | µg/L                    | 32000  | 140000  | <0.02                                   | <0.02                                      | <0.02                                   | <0.02                                   | <0.02                                      | <0.02                                   | <0.02                                      | <0.02                                   | <0.02                                      | <0.02                                   | <0.02  |
|                          | Ethanol                         | µg/L                    | ---  | ---   | <0.02                                   | <0.02                                      | <0.02                                   | <0.02                                   | <0.02                                      | <0.02                                   | <0.02                                      | <0.02                                   | <b>0.027</b>                               | <b>0.075</b>                            | <0.02  |
|                          | Tetrachloroethylene (PCE)       | µg/L                    | 0.46   | 2.0   | <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  |
| 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   |
|                          | Oxygen                          | % v/v                   | ---  | ---   | <b>20</b>                               | <b>19</b>                                  | <b>19</b>                               | <b>19</b>                               | <b>18</b>                                  | <b>18</b>                               | <b>19</b>                                  | <b>19</b>                               | <b>17</b>                                  | <b>19</b>                               | <b>19</b>                                      |
|                          | Carbon Dioxide                  | % v/v                   | ---  | ---   | <0.1                                    | <0.1                                       | <0.1                                    | <b>0.13</b>                             | <b>0.28</b>                                | <0.1                                    | <b>0.13</b>                                | <0.1                                    | <b>0.27</b>                                | <b>0.45</b>                             | <b>0.73</b>                                    |

Notes:

<sup>a</sup> Source for the Indoor Air Screening Levels: DTSC, 2018. Human Health Risk Assessment (HHRA) Note Number 3: DTSC Recommended Methodology for use of U.S. Environmental Protection Agency (EPA) Regional Screening Levels (RSLs) in the HHRA Process at Hazardous Waste Sites and Permitted Facilities.

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

**SVM-11-7** Light blue column heading indicates offsite soil vapor probe locations.

**10** Yellow highlighting indicates concentration exceeds human health screening level under residential scenario.

11/12/2018 - 11/14/2018 = sample date

SVM-1 = sample location

SVM-1-5 = sample ID

5-5.5 = sample depth in feet below ground surface

--- = not available

% v/v = percent volume by volume

<0.02 = not detected at the laboratory minimum reporting limit

µg/L = micrograms per liter

COPC = chemical of potential concern

PID = photoionization detector

ppmv = parts per million by volume

TPH-g = total petroleum hydrocarbons quantified as gasoline

**Table 1. South-Central Field Measurements and Mobile Laboratory Soil Vapor Analytical Results - November 2018**

SFPP Norwalk Pump Station, Norwalk, California

| Analyte Type             | Analyte                         | Unit                    | Current Residential Soil Gas Screening Level <sup>a, b</sup> | Current Commercial Soil Gas Screening Level <sup>a, b</sup> | SVM-7-13 DUP<br>11/12/2018<br>SVM-7<br>13.25-13.75 | SVM-8-5<br>11/13/2018<br>SVM-8<br>5-5.5 | SVM-8-15<br>11/13/2018<br>SVM-8<br>15-15.5 | SVM-10-15<br>11/12/2018<br>SVM-10<br>15.5-16 | SVM-11-7<br>11/14/2018<br>SVM-11<br>7-7.5 | SVM-11-15<br>11/14/2018<br>SVM-11<br>15-15.5 | SVM-11-22<br>11/14/2018<br>SVM-11<br>21-21.5 | SVM-12-7<br>11/13/2018<br>SVM-12<br>7-7.5 | SVM-12-15<br>11/13/2018<br>SVM-12<br>15-15.5 | SVM-12-22<br>11/13/2018<br>SVM-12<br>22-22.5 | SVM-12-22 DUP<br>11/13/2018<br>SVM-12<br>22-22.5 |       |
|--------------------------|---------------------------------|-------------------------|--|---|--|---|--|--|---|--|--|---|--|--|--|-------|
| Field Measurements       | Pressure                        | inches H <sub>2</sub> O | ---  | ---   | ---  | ---                                     | ---  | ---  | ---                                       | ---  | ---  | ---                                       | ---  | ---  | ---  | ---   |
|                          | PID                             | ppmv                    | ---  | ---   | ---  | ---                                     | ---  | ---  | ---                                       | ---  | ---  | ---                                       | ---  | ---  | ---  | ---   |
| COPCs <sup>c</sup>       | 1,2,4-Trimethylbenzene          | µg/L                    | 63   | 262   | <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                    | 63   | 262   | <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                            | 5200                    | 22400  | <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 | Acetone                         | µg/L                    | 32000  | 140000  | <0.02  | <0.02                                   | <0.02                                      | <0.02  | <0.02                                     | <0.02  | <0.02  | <0.02                                     | <0.02  | <0.02  | <0.02  | <0.02 |
|                          | Ethanol                         | 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 |
|                          | Tetrachloroethylene (PCE)       | µg/L                    | 0.46   | 2.0   | <0.02  | <0.02                                   | <0.02                                      | <0.02  | <0.02                                     | <0.02  | <b>0.061</b>                                 | <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>19</b>  | <b>19</b>                               | <b>19</b>                                  | <b>15</b>                                    | <b>19</b>                                 | <b>18</b>                                    | <b>7.7</b>                                   | <b>19</b>                                 | <b>16</b>                                    | <b>8.2</b>                                   | <b>8.4</b>                                       |       |
|                          | Carbon Dioxide                  | % v/v                   | ---  | ---   | <b>0.69</b>  | <b>0.13</b>                             | <b>0.18</b>                                | <b>4</b>                                     | <b>0.47</b>                               | <b>1.2</b>                                   | <b>8.2</b>                                   | <b>1.1</b>                                | <b>3</b>                                     | <b>8</b>                                     | <b>7.4</b>                                       |       |

Notes:

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**SVM-11-7** Light blue column heading indicates offsite soil vapor probe locations.

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11/12/2018 - 11/14/2018 = sample date

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<0.02 = not detected at the laboratory minimum reporting limit

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COPC = chemical of potential concern

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ppmv = parts per million by volume

TPH-g = total petroleum hydrocarbons quantified as gasoline

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SFPP Norwalk Pump Station, Norwalk, California

| Analyte Type             | Analyte                         | Unit                    | Current Residential Soil Gas Screening Level <sup>a, b</sup> | Current Commercial Soil Gas Screening Level <sup>a, b</sup> | SVM-13-7<br>11/14/2018<br>SVM-13<br>7-7.5 | SVM-13-15<br>11/14/2018<br>SVM-13<br>15.5-16 | SVM-13-22<br>11/14/2018<br>SVM-13<br>22.5-23 | SVM-14R-8<br>11/14/2018<br>SVM-14R<br>7-7.5 | SVM-14R-16<br>11/14/2018<br>SVM-14R<br>15.5-16 | SVM-14R-22<br>11/14/2018<br>SVM-14R<br>22.5-23 | SVM-14R-22 DUP<br>11/14/2018<br>SVM-14R<br>22.5-23 | SVM-15-7<br>11/12/2018<br>SVM-15<br>7-7.5 | SVM-15-15<br>11/12/2018<br>SVM-15<br>15-15.5 | SVM-15-22<br>11/12/2018<br>SVM-15<br>22-22.5 | SVM-16-7<br>11/13/2018<br>SVM-16<br>7-7.5 |       |
|--------------------------|---------------------------------|-------------------------|--|---|---|--|--|---|--|--|--|---|--|--|---|-------|
| Field Measurements       | Pressure                        | inches H <sub>2</sub> O | ---  | ---   | ---                                       | ---  | ---  | ---   | ---  | ---  | ---  | ---                                       | ---  | ---  | ---                                       | ---   |
|                          | PID                             | ppmv                    | ---  | ---   | ---                                       | ---  | ---  | ---   | ---  | ---  | ---  | ---                                       | ---  | ---  | ---                                       | ---   |
| COPCs <sup>c</sup>       | 1,2,4-Trimethylbenzene          | µg/L                    | 63   | 262   | <0.02                                     | <0.02  | <0.02  | <0.02                                       | <0.02  | <0.4   | <0.4   | <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  | <0.4   | <0.4   | <0.02                                     | <0.02  | <0.02  | <0.02                                     | <0.02 |
|                          | 1,3,5-Trimethylbenzene          | µg/L                    | 63   | 262   | <0.02                                     | <0.02  | <0.02  | <0.02                                       | <0.02  | <0.4   | <0.4   | <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   | <4   | <4   | <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  | <0.4   | <0.4   | <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  | <0.4   | <0.4   | <0.02                                     | <0.02  | <0.02  | <0.02                                     | <0.02 |
|                          | Isopropylbenzene                | µg/L                    | ---  | ---   | <0.02                                     | <0.02  | <0.02  | <0.02                                       | <0.02  | <0.4   | <0.4   | <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  | <0.4   | <0.4   | <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  | <0.4   | <0.4   | <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  | <0.4   | <0.4   | <0.02                                     | <0.02  | <0.02  | <0.02                                     | <0.02 |
|                          | n-Butylbenzene                  | µg/L                    | ---  | ---   | <0.02                                     | <0.02  | <0.02  | <0.02                                       | <0.02  | <0.4   | <0.4   | <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  | <0.4   | <0.4   | <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  | <0.4   | <0.4   | <0.02                                     | <0.02  | <0.02  | <0.02                                     | <0.02 |
|                          | sec-Butylbenzene                | µg/L                    | ---  | ---   | <0.02                                     | <0.02  | <0.02  | <0.02                                       | <0.02  | <0.4   | <0.4   | <0.02                                     | <0.02  | <0.02  | <0.02                                     | <0.02 |
|                          | tert-Butanol (TBA)              | µg/L                    | ---  | ---   | <20                                       | <20  | <20  | <20   | <20  | <400   | <400   | <20                                       | <20  | <20  | <20                                       | <20   |
| Toluene                  | µg/L                            | 5200                    | 22400  | <0.02   | <0.02                                     | <0.02  | <0.02  | <0.02                                       | <0.4   | <0.4   | <0.02  | <0.02                                     | <0.02  | <0.02  | <0.02                                     |       |
| Other Detected Compounds | Acetone                         | µg/L                    | 32000  | 140000  | <0.02                                     | <0.02  | <0.02  | <0.02                                       | <0.02  | <b>0.53</b>                                    | <b>0.48</b>  | <0.02                                     | <0.02  | <0.02  | <0.02                                     | <0.02 |
|                          | Ethanol                         | µg/L                    | ---  | ---   | <0.02                                     | <0.02  | <0.02  | <0.02                                       | <0.02  | <0.4   | <0.4   | <0.02                                     | <0.02  | <0.02  | <0.02                                     | <0.02 |
|                          | Tetrachloroethylene (PCE)       | µg/L                    | 0.46   | 2.0   | <0.02                                     | <0.02  | <b>0.023</b>                                 | <0.02                                       | <0.02  | <0.4   | <0.4   | <0.02                                     | <0.02  | <0.02  | <0.02                                     | <0.02 |
|                          | TPH-g (C4-C12)                  | µg/L                    | 630  | 2600  | <20                                       | <20  | <20  | <20   | <20  | <b>47</b>                                      | <b>51</b>  | <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>19</b>                                 | <b>19</b>                                    | <b>16</b>                                    | <b>15</b>                                   | <b>14</b>                                      | <b>1.9</b>                                     | <b>2.2</b>   | <b>19</b>                                 | <b>19</b>                                    | <b>18</b>                                    | <b>19</b>                                 |       |
|                          | Carbon Dioxide                  | % v/v                   | ---  | ---   | <0.1                                      | <0.1   | <b>1.2</b>                                   | <b>1.7</b>                                  | <b>1.8</b>                                     | <b>5.9</b>                                     | <b>5.7</b>   | <b>0.17</b>                               | <b>0.24</b>                                  | <b>0.3</b>                                   | <b>0.39</b>                               |       |

Notes:

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TPH-g = total petroleum hydrocarbons quantified as gasoline

**Table 1. South-Central Field Measurements and Mobile Laboratory Soil Vapor Analytical Results - November 2018**

SFPP Norwalk Pump Station, Norwalk, California

| Analyte Type             | Analyte                         | Unit                    | Current Residential Soil Gas Screening Level <sup>a, b</sup> | Current Commercial Soil Gas Screening Level <sup>a, b</sup> | SVM-16-16 11/13/2018 SVM-16 15.5-16 | SVM-16-22 11/13/2018 SVM-16 22-22.5 | Ambient Air 11/12/2018 | Ambient Air 11/13/2018 | Ambient Air 11/14/2018 |
|--------------------------|---------------------------------|-------------------------|--|---|-------------------------------------|-------------------------------------|------------------------|------------------------|------------------------|
| Field Measurements       | Pressure                        | inches H <sub>2</sub> O | ---  | ---   | ---                                 | ---                                 | ---                    | ---                    | ---                    |
|                          | PID                             | ppmv                    | ---  | ---   | ---                                 | ---                                 | ---                    | ---                    | ---                    |
| COPCs <sup>c</sup>       | 1,2,4-Trimethylbenzene          | µg/L                    | 63   | 262   | <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                  |
|                          | 1,3,5-Trimethylbenzene          | µg/L                    | 63   | 262   | <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                   |
|                          | Benzene                         | µg/L                    | 0.097  | 0.42  | <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                  |
|                          | Isopropylbenzene                | µg/L                    | ---  | ---   | <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                  |
|                          | Methyl tert-butyl ether (MTBE)  | µg/L                    | 11   | 47  | <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                  |
|                          | n-Butylbenzene                  | µg/L                    | ---  | ---   | <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                  |
|                          | o-Xylene                        | µg/L                    | 100  | 440   | <0.02                               | <0.02                               | <0.02                  | <0.02                  | <0.02                  |
|                          | sec-Butylbenzene                | µg/L                    | ---  | ---   | <0.02                               | <0.02                               | <0.02                  | <0.02                  | <0.02                  |
|                          | tert-Butanol (TBA)              | µg/L                    | ---  | ---   | <20                                 | <20                                 | <20                    | <20                    | <20                    |
| Toluene                  | µg/L                            | 5200                    | 22400  | <0.02   | <0.02                               | <0.02                               | <0.02                  | <0.02                  |                        |
| Other Detected Compounds | Acetone                         | µg/L                    | 32000  | 140000  | <0.02                               | <0.02                               | <0.02                  | <0.02                  | <0.02                  |
|                          | Ethanol                         | µg/L                    | ---  | ---   | <0.02                               | <0.02                               | <0.02                  | <0.02                  | <0.02                  |
|                          | Tetrachloroethylene (PCE)       | µg/L                    | 0.46   | 2.0   | <0.02                               | <0.02                               | <0.02                  | <0.02                  | <0.02                  |
|                          | TPH-g (C4-C12)                  | µg/L                    | 630  | 2600  | <20                                 | <20                                 | <20                    | <20                    | <20                    |
| Fixed Gases              | Methane                         | % v/v                   | ---  | ---   | <0.1                                | <0.1                                | --                     | --                     | --                     |
|                          | Oxygen                          | % v/v                   | ---  | ---   | 17                                  | 6.1                                 | --                     | --                     | --                     |
|                          | Carbon Dioxide                  | % v/v                   | ---  | ---   | 0.75                                | 8.8                                 | --                     | --                     | --                     |

Notes:

<sup>a</sup> Source for the Indoor Air Screening Levels: DTSC, 2018. Human Health Risk Assessment (HHRA) Note Number 3: DTSC Recommended Methodology for use of U.S. Environmental Protection Agency (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-June-2018.pdf>

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

**SVM-11-7** Light blue column heading indicates offsite soil vapor probe locations.

**10** Yellow highlighting indicates concentration exceeds human health screening level under residential scenario

11/12/2018 - 11/14/2018 = sample date

SVM-1 = sample location

SVM-1-5 = sample ID

5-5.5 = sample depth in feet below ground surface

--- = not available

% v/v = percent volume by volume

<0.02 = not detected at the laboratory minimum reporting limit

µg/L = micrograms per liter

COPC = chemical of potential concern

PID = photoionization detector

ppmv = parts per million by volume

TPH-g = total petroleum hydrocarbons quantified as gasoline



**Table 2. Southeastern Field Measurements and Fixed Laboratory Soil Vapor Analytical Results - December 2018**

SFPP Norwalk Pump Station, Norwalk, California

| Analyte Type             | Analyte                         | Unit                    | Current Residential Soil Gas Screening Level <sup>a, b</sup> | Current Commercial Soil Gas Screening Level <sup>a, b</sup> | SVM-9-5 12/31/2018 SVM-9 5-5.5 | SVM-9-14.5 12/31/2018 SVM-9 14.5-15 | SVM-17-5 12/31/2018 SVM-17 4.5-5 | SVM-17-5 Dup 12/31/2018 SVM-17 4.5-5 | SVM-17-14.5 12/31/2018 SVM-17 9.5-10 | SVM-18-5 12/31/2018 SVM-18 4.5-5 | SVM-18-14.5 12/31/2018 SVM-18 9.5-10 | SVM-19-5 12/31/2018 SVM-19 4.5-5 | SVM-20-5 12/31/2018 SVM-20 4.5-5 | SVM-20-14.5 12/31/2018 SVM-20 9.5-10 | SVM-21-5 12/31/2018 SVM-21 4.5-5 |
|--------------------------|---------------------------------|-------------------------|--|---|--------------------------------|-------------------------------------|----------------------------------|--------------------------------------|--------------------------------------|----------------------------------|--------------------------------------|----------------------------------|----------------------------------|--------------------------------------|----------------------------------|
| Field Measurements       | Pressure                        | inches H <sub>2</sub> O | ---  | ---   | ---                            | ---                                 | ---                              | ---                                  | ---                                  | ---                              | ---                                  | ---                              | ---                              | ---                                  | ---                              |
|                          | PID                             | ppmv                    | ---  | ---   | ---                            | ---                                 | ---                              | ---                                  | ---                                  | ---                              | ---                                  | ---                              | ---                              | ---                                  | ---                              |
| COPCs <sup>c</sup>       | 1,2,4-Trimethylbenzene          | µg/L                    | 63   | 262   | <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                            |
|                          | 1,3,5-Trimethylbenzene          | µg/L                    | 63   | 262   | <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                             |
|                          | 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                            |
|                          | 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                            |
|                          | 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                            |
|                          | 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                            |
|                          | 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                            |
|                          | 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                            |
|                          | 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                            |
|                          | 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                            |
|                          | 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                            |
|                          | 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                            |
|                          | tert-Butanol (TBA)              | µg/L                    | ---  | ---   | <20                            | <20                                 | <20                              | <20                                  | <20                                  | <20                              | <20                                  | <20                              | <20                              | <20                                  | <20                              |
| Toluene                  | µg/L                            | 5200                    | 22400  | <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 | Tetrachloroethylene (PCE)       | µg/L                    | 0.46   | 2.0   | <0.02                          | <0.02                               | <0.02                            | <0.02                                | <0.02                                | <0.02                            | <0.02                                | <0.02                            | <0.02                            | <0.02                                | <b>0.024</b>                     |
|                          | TPH-g (C4-C12)                  | µg/L                    | 630  | 2600  | <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                             |
|                          | Oxygen                          | % v/v                   | ---  | ---   | <b>18</b>                      | <b>17</b>                           | <b>19</b>                        | <b>19</b>                            | <b>18</b>                            | <b>18</b>                        | <b>18</b>                            | <b>18</b>                        | <b>19</b>                        | <b>17</b>                            | <b>18</b>                        |
|                          | Carbon Dioxide                  | % v/v                   | ---  | ---   | <b>0.32</b>                    | <b>1.3</b>                          | <b>0.26</b>                      | <b>0.26</b>                          | <b>0.55</b>                          | <b>0.51</b>                      | <b>2</b>                             | <b>0.25</b>                      | <b>0.32</b>                      | <b>0.58</b>                          | <b>0.6</b>                       |

Notes:

<sup>a</sup> Source for the Indoor Air Screening Levels: DTSC, 2018. Human Health Risk Assessment (HHRA) Note Number 3: DTSC Recommended Methodology for use of U.S. Environmental Protection Agency (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-June-2018.pdf>

<sup>b</sup> Attenuation factor for current land use = 0.001. Source for the attenuation factors: DTSC, 2011.

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

**10** Yellow highlighting indicates concentration exceeds human health screening level under residential scenario.

11/12/2018 - 11/14/2018 = sample date

SVM-1 = sample location

SVM-1-5 = sample ID

5-5.5 = sample depth in feet below ground surface

--- = not available

% v/v = percent volume by volume

<0.02 = not detected at the laboratory minimum reporting limit

µg/L = micrograms per liter

COPC = chemical of potential concern

PID = photoionization detector

ppmv = parts per million by volume

TPH-g = total petroleum hydrocarbons quantified as gasoline

**Table 2. Southeastern Field Measurements and Fixed Laboratory Soil Vapor Analytical Results - December 2018**

SFPP Norwalk Pump Station, Norwalk, California

| Analyte Type             | Analyte                         | Unit                    | Current Residential Soil Gas Screening Level <sup>a, b</sup> | Current Commercial Soil Gas Screening Level <sup>a, b</sup> | SVM-21-14.5 12/31/2018 SVM-21 9.5-10 | SVM-22-5 12/31/2018 SVM-22 4.5-5 | SVM-22-14.5 12/31/2018 SVM-22 9.5-10 | SVM-23-5 12/31/2018 SVM-23 4.5-5 | SVM-23-14.5 12/31/2018 SVM-23 9.5-10 | Ambient Air 12/31/2018 |
|--------------------------|---------------------------------|-------------------------|--|---|--------------------------------------|----------------------------------|--------------------------------------|----------------------------------|--------------------------------------|------------------------|
| Field Measurements       | Pressure                        | inches H <sub>2</sub> O | ---  | ---   | ---                                  | ---                              | ---                                  | ---                              | ---                                  | ---                    |
|                          | PID                             | ppmv                    | ---  | ---   | ---                                  | ---                              | ---                                  | ---                              | ---                                  | ---                    |
| COPCs <sup>c</sup>       | 1,2,4-Trimethylbenzene          | µg/L                    | 63   | 262   | <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                  |
|                          | 1,3,5-Trimethylbenzene          | µg/L                    | 63   | 262   | <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                   |
|                          | Benzene                         | µg/L                    | 0.097  | 0.42  | <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                  |
|                          | Isopropylbenzene                | µg/L                    | ---  | ---   | <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                  |
|                          | Methyl tert-butyl ether (MTBE)  | µg/L                    | 11   | 47  | <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                  |
|                          | n-Butylbenzene                  | µg/L                    | ---  | ---   | <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                  |
|                          | o-Xylene                        | µg/L                    | 100  | 440   | <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                  |
|                          | tert-Butanol (TBA)              | µg/L                    | ---  | ---   | <20                                  | <20                              | <20                                  | <20                              | <20                                  | <20                    |
| Toluene                  | µg/L                            | 5200                    | 22400  | <0.02   | <0.02                                | <0.02                            | <0.02                                | <0.02                            | <0.02                                |                        |
| Other Detected Compounds | Tetrachloroethylene (PCE)       | µg/L                    | 0.46   | 2.0   | <b>0.025</b>                         | <0.02                            | <0.02                                | <0.02                            | <b>0.023</b>                         | <0.02                  |
|                          | TPH-g (C4-C12)                  | µg/L                    | 630  | 2600  | <20                                  | <20                              | <20                                  | <20                              | <20                                  | <20                    |
| Fixed Gases              | Methane                         | % v/v                   | ---  | ---   | <0.1                                 | <0.1                             | <0.1                                 | <0.1                             | <0.1                                 | <0.1                   |
|                          | Oxygen                          | % v/v                   | ---  | ---   | <b>19</b>                            | <b>17</b>                        | <b>17</b>                            | <b>18</b>                        | <b>18</b>                            | 18                     |
|                          | Carbon Dioxide                  | % v/v                   | ---  | ---   | <b>0.79</b>                          | <b>0.17</b>                      | <b>0.38</b>                          | <b>0.88</b>                      | <b>1.1</b>                           | <0.1                   |

Notes:

<sup>a</sup> Source for the Indoor Air Screening Levels: DTSC, 2018. Human Health Risk Assessment (HHRA) Note Number 3: DTSC Recommended Methodology for use of U.S. Environmental Protection Agency (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-June-2018.pdf>

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

**10** Yellow highlighting indicates concentration exceeds human health screening level under residential scenario

11/12/2018 - 11/14/2018 = sample date

SVM-1 = sample location

SVM-1-5 = sample ID

5-5.5 = sample depth in feet below ground surface

--- = not available

% v/v = percent volume by volume

<0.02 = not detected at the laboratory minimum reporting limit

µg/L = micrograms per liter

COPC = chemical of potential concern

PID = photoionization detector

ppmv = parts per million by volume

TPH-g = total petroleum hydrocarbons quantified as gasoline

## **Figures**

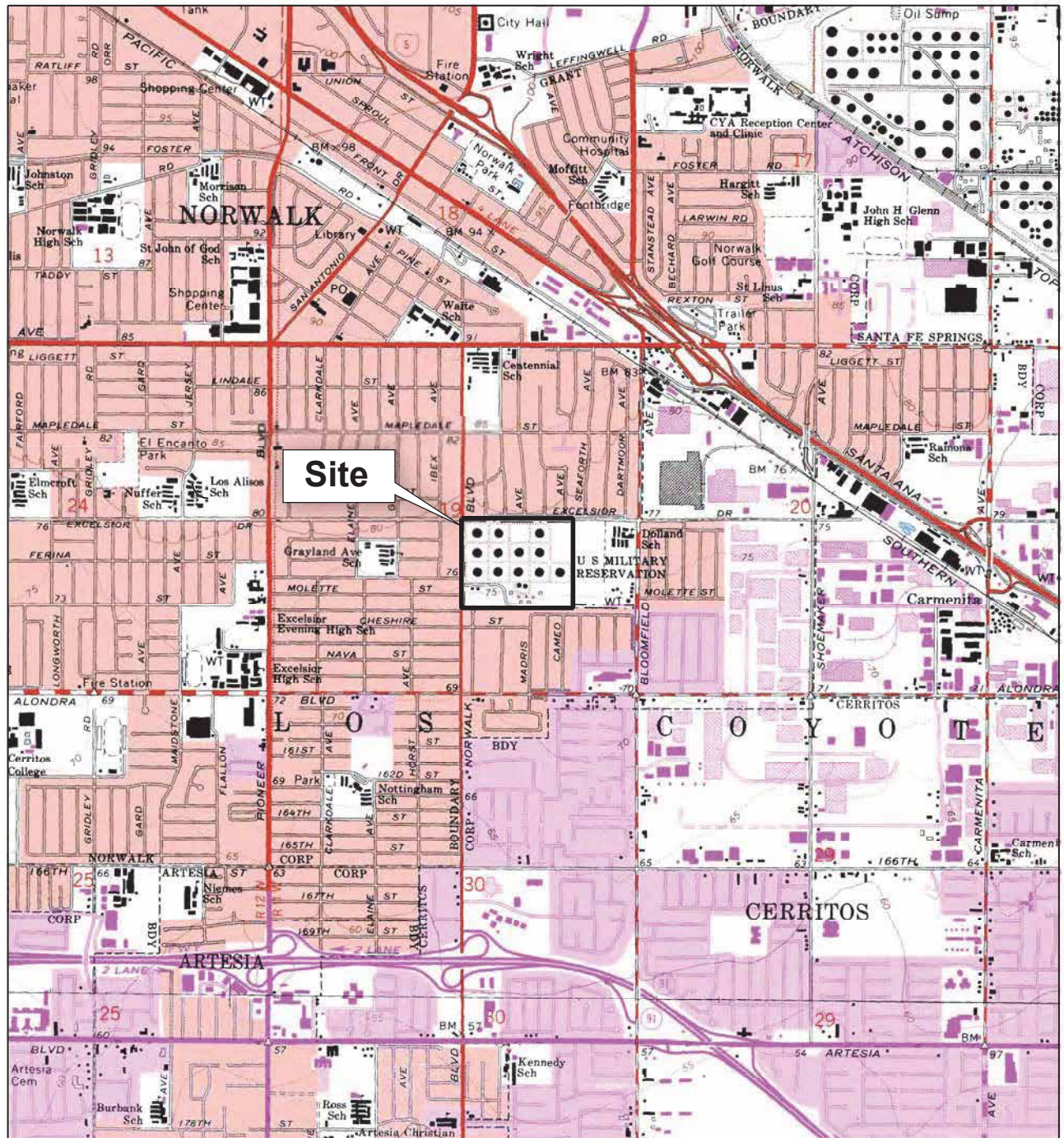
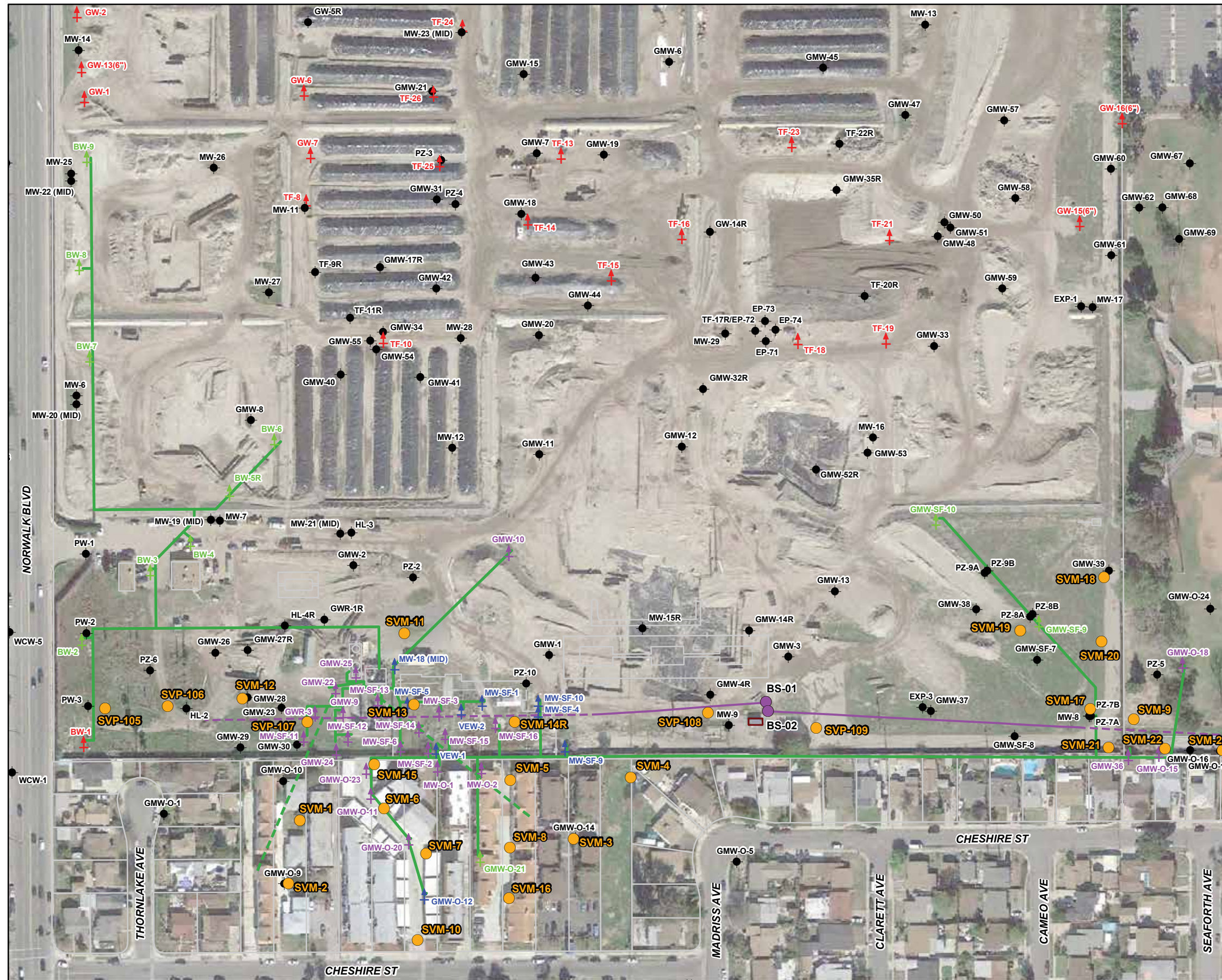


Figure 1. Site Location Map  
 SFPP Norwalk Pump Station  
 Norwalk, California

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.



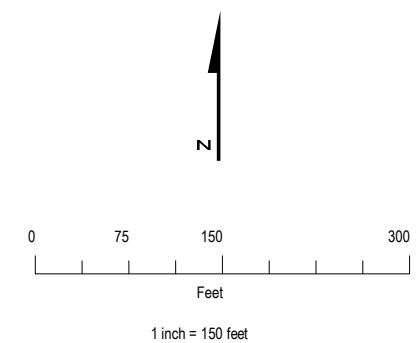




**LEGEND**

- Soil Vapor Probe/Soil Vapor Monitoring Probe
- Horizontal Biosparge Well Entry Point
- Existing Groundwater Monitoring Well
- + Existing Remediation Well
- + Kinder Morgan Combined Soil Vapor and Total Fluids Extraction Wells
- + Kinder Morgan Soil Vapor Extraction Wells
- + Kinder Morgan Total Fluids and/or Groundwater Extraction Wells
- Kinder Morgan Remediation Piping Layout (Above Ground and Below Ground)
- - - Horizontal Vapor Extraction Well Piping
- - - Horizontal Biosparge Well (Dashed Line Depicts Approximate Lateral Extent of Well Screen)
- Air Compressor System

Imagery Source:  
Google Earth October 18, 2016.



**Figure 2. Remediation System Layout**  
SFPP Norwalk Pump Station  
Norwalk, California



**Appendix A**  
**Laboratory Analytical Report**



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

---

November 28, 2018

Vladimir Carino  
CH2M Hill, Inc.  
P.O. Box 241329  
Denver, CO 80224

**Re : KMEP Norwalk Biosparge Startup / 693142**  
**MB187323 / 8K19015**

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received on 11/16/18 16:00 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 that reads 'Allen Aminian'.

Allen Aminian  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Sample ID                         | Laboratory ID | Matrix | TAT | Date Sampled   | Date Received  |
|-----------------------------------|---------------|--------|-----|----------------|----------------|
| <b><u>Fixed Gases - Field</u></b> |               |        |     |                |                |
| SVM-1-5                           | 8K19015-01    | Vapor  | 10  | 11/12/18 07:54 | 11/16/18 16:00 |
| SVM-1-15                          | 8K19015-02    | Vapor  | 10  | 11/12/18 07:55 | 11/16/18 16:00 |
| SVM-2-5                           | 8K19015-03    | Vapor  | 10  | 11/12/18 08:40 | 11/16/18 16:00 |
| SVM-15-7                          | 8K19015-04    | Vapor  | 10  | 11/12/18 09:10 | 11/16/18 16:00 |
| SVM-15-15                         | 8K19015-05    | Vapor  | 10  | 11/12/18 09:12 | 11/16/18 16:00 |
| SVM-15-22                         | 8K19015-06    | Vapor  | 10  | 11/12/18 09:14 | 11/16/18 16:00 |
| SVM-6-7                           | 8K19015-07    | Vapor  | 10  | 11/12/18 09:57 | 11/16/18 16:00 |
| SVM-6-13                          | 8K19015-08    | Vapor  | 10  | 11/12/18 09:59 | 11/16/18 16:00 |
| SVM-7-7                           | 8K19015-09    | Vapor  | 10  | 11/12/18 10:50 | 11/16/18 16:00 |
| SVM-7-13                          | 8K19015-10    | Vapor  | 10  | 11/12/18 10:52 | 11/16/18 16:00 |
| SVM-7-13 DUP                      | 8K19015-11    | Vapor  | 10  | 11/12/18 10:52 | 11/16/18 16:00 |
| SVM-10-15                         | 8K19015-13    | Vapor  | 10  | 11/12/18 11:48 | 11/16/18 16:00 |
| SVM-5-5                           | 8K19015-14    | Vapor  | 10  | 11/13/18 08:03 | 11/16/18 16:00 |
| SVM-5-15                          | 8K19015-15    | Vapor  | 10  | 11/13/18 08:05 | 11/16/18 16:00 |
| SVM-8-5                           | 8K19015-16    | Vapor  | 10  | 11/13/18 08:46 | 11/16/18 16:00 |
| SVM-8-15                          | 8K19015-17    | Vapor  | 10  | 11/13/18 08:48 | 11/16/18 16:00 |
| SVM-16-7                          | 8K19015-18    | Vapor  | 10  | 11/13/18 09:27 | 11/16/18 16:00 |
| SVM-16-16                         | 8K19015-19    | Vapor  | 10  | 11/13/18 09:29 | 11/16/18 16:00 |
| SVM-16-22                         | 8K19015-20    | Vapor  | 10  | 11/13/18 09:31 | 11/16/18 16:00 |

**Allen Aminian**  
QA/QC Manager





## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Sample ID      | Laboratory ID | Matrix | TAT | Date Sampled   | Date Received  |
|----------------|---------------|--------|-----|----------------|----------------|
| SVM-3-5        | 8K19015-21    | Vapor  | 10  | 11/13/18 10:11 | 11/16/18 16:00 |
| SVM-3-15       | 8K19015-22    | Vapor  | 10  | 11/13/18 10:13 | 11/16/18 16:00 |
| SVM-12-7       | 8K19015-24    | Vapor  | 10  | 11/13/18 11:26 | 11/16/18 16:00 |
| SVM-12-15      | 8K19015-25    | Vapor  | 10  | 11/13/18 11:28 | 11/16/18 16:00 |
| SVM-12-22      | 8K19015-26    | Vapor  | 10  | 11/13/18 11:30 | 11/16/18 16:00 |
| SVM-12-22 DUP  | 8K19015-27    | Vapor  | 10  | 11/13/18 11:30 | 11/16/18 16:00 |
| SVM-11-7       | 8K19015-28    | Vapor  | 10  | 11/14/18 08:25 | 11/16/18 16:00 |
| SVM-11-15      | 8K19015-29    | Vapor  | 10  | 11/14/18 08:27 | 11/16/18 16:00 |
| SVM-11-22      | 8K19015-30    | Vapor  | 10  | 11/14/18 08:29 | 11/16/18 16:00 |
| SVM-14R-8      | 8K19015-31    | Vapor  | 10  | 11/14/18 09:20 | 11/16/18 16:00 |
| SVM-14R-16     | 8K19015-32    | Vapor  | 10  | 11/14/18 09:22 | 11/16/18 16:00 |
| SVM-14R-22     | 8K19015-33    | Vapor  | 10  | 11/14/18 09:24 | 11/16/18 16:00 |
| SVM-14R-22 DUP | 8K19015-34    | Vapor  | 10  | 11/14/18 09:24 | 11/16/18 16:00 |
| SVM-13-7       | 8K19015-35    | Vapor  | 10  | 11/14/18 10:33 | 11/16/18 16:00 |
| SVM-13-15      | 8K19015-36    | Vapor  | 10  | 11/14/18 10:35 | 11/16/18 16:00 |
| SVM-13-22      | 8K19015-37    | Vapor  | 10  | 11/14/18 10:37 | 11/16/18 16:00 |

### TO-15 (Mid Level)

|          |            |       |    |                |                |
|----------|------------|-------|----|----------------|----------------|
| SVM-1-5  | 8K19015-01 | Vapor | 10 | 11/12/18 07:54 | 11/16/18 16:00 |
| SVM-1-15 | 8K19015-02 | Vapor | 10 | 11/12/18 07:55 | 11/16/18 16:00 |
| SVM-2-5  | 8K19015-03 | Vapor | 10 | 11/12/18 08:40 | 11/16/18 16:00 |

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Sample ID    | Laboratory ID | Matrix | TAT | Date Sampled   | Date Received  |
|--------------|---------------|--------|-----|----------------|----------------|
| SVM-15-7     | 8K19015-04    | Vapor  | 10  | 11/12/18 09:10 | 11/16/18 16:00 |
| SVM-15-15    | 8K19015-05    | Vapor  | 10  | 11/12/18 09:12 | 11/16/18 16:00 |
| SVM-15-22    | 8K19015-06    | Vapor  | 10  | 11/12/18 09:14 | 11/16/18 16:00 |
| SVM-6-7      | 8K19015-07    | Vapor  | 10  | 11/12/18 09:57 | 11/16/18 16:00 |
| SVM-6-13     | 8K19015-08    | Vapor  | 10  | 11/12/18 09:59 | 11/16/18 16:00 |
| SVM-7-7      | 8K19015-09    | Vapor  | 10  | 11/12/18 10:50 | 11/16/18 16:00 |
| SVM-7-13     | 8K19015-10    | Vapor  | 10  | 11/12/18 10:52 | 11/16/18 16:00 |
| SVM-7-13 DUP | 8K19015-11    | Vapor  | 10  | 11/12/18 10:52 | 11/16/18 16:00 |
| Ambient Air  | 8K19015-12    | Vapor  | 10  | 11/12/18 11:30 | 11/16/18 16:00 |
| SVM-10-15    | 8K19015-13    | Vapor  | 10  | 11/12/18 11:48 | 11/16/18 16:00 |
| SVM-5-5      | 8K19015-14    | Vapor  | 10  | 11/13/18 08:03 | 11/16/18 16:00 |
| SVM-5-15     | 8K19015-15    | Vapor  | 10  | 11/13/18 08:05 | 11/16/18 16:00 |
| SVM-8-5      | 8K19015-16    | Vapor  | 10  | 11/13/18 08:46 | 11/16/18 16:00 |
| SVM-8-15     | 8K19015-17    | Vapor  | 10  | 11/13/18 08:48 | 11/16/18 16:00 |
| SVM-16-7     | 8K19015-18    | Vapor  | 10  | 11/13/18 09:27 | 11/16/18 16:00 |
| SVM-16-16    | 8K19015-19    | Vapor  | 10  | 11/13/18 09:29 | 11/16/18 16:00 |
| SVM-16-22    | 8K19015-20    | Vapor  | 10  | 11/13/18 09:31 | 11/16/18 16:00 |
| SVM-3-5      | 8K19015-21    | Vapor  | 10  | 11/13/18 10:11 | 11/16/18 16:00 |
| SVM-3-15     | 8K19015-22    | Vapor  | 10  | 11/13/18 10:13 | 11/16/18 16:00 |
| Ambient Air  | 8K19015-23    | Vapor  | 10  | 11/13/18 11:20 | 11/16/18 16:00 |

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Sample ID          | Laboratory ID | Matrix | TAT | Date Sampled   | Date Received  |
|--------------------|---------------|--------|-----|----------------|----------------|
| SVM-12-7           | 8K19015-24    | Vapor  | 10  | 11/13/18 11:26 | 11/16/18 16:00 |
| SVM-12-15          | 8K19015-25    | Vapor  | 10  | 11/13/18 11:28 | 11/16/18 16:00 |
| SVM-12-22          | 8K19015-26    | Vapor  | 10  | 11/13/18 11:30 | 11/16/18 16:00 |
| SVM-12-22 DUP      | 8K19015-27    | Vapor  | 10  | 11/13/18 11:30 | 11/16/18 16:00 |
| SVM-11-7           | 8K19015-28    | Vapor  | 10  | 11/14/18 08:25 | 11/16/18 16:00 |
| SVM-11-15          | 8K19015-29    | Vapor  | 10  | 11/14/18 08:27 | 11/16/18 16:00 |
| SVM-11-22          | 8K19015-30    | Vapor  | 10  | 11/14/18 08:29 | 11/16/18 16:00 |
| SVM-14R-8          | 8K19015-31    | Vapor  | 10  | 11/14/18 09:20 | 11/16/18 16:00 |
| SVM-14R-16         | 8K19015-32    | Vapor  | 10  | 11/14/18 09:22 | 11/16/18 16:00 |
| SVM-14R-22         | 8K19015-33    | Vapor  | 10  | 11/14/18 09:24 | 11/16/18 16:00 |
| SVM-14R-22 DUP     | 8K19015-34    | Vapor  | 10  | 11/14/18 09:24 | 11/16/18 16:00 |
| SVM-13-7           | 8K19015-35    | Vapor  | 10  | 11/14/18 10:33 | 11/16/18 16:00 |
| SVM-13-15          | 8K19015-36    | Vapor  | 10  | 11/14/18 10:35 | 11/16/18 16:00 |
| SVM-13-22          | 8K19015-37    | Vapor  | 10  | 11/14/18 10:37 | 11/16/18 16:00 |
| Ambient Air        | 8K19015-38    | Vapor  | 10  | 11/14/18 10:45 | 11/16/18 16:00 |
| <b><u>TO-3</u></b> |               |        |     |                |                |
| SVM-1-5            | 8K19015-01    | Vapor  | 10  | 11/12/18 07:54 | 11/16/18 16:00 |
| SVM-1-15           | 8K19015-02    | Vapor  | 10  | 11/12/18 07:55 | 11/16/18 16:00 |
| SVM-2-5            | 8K19015-03    | Vapor  | 10  | 11/12/18 08:40 | 11/16/18 16:00 |
| SVM-15-7           | 8K19015-04    | Vapor  | 10  | 11/12/18 09:10 | 11/16/18 16:00 |

**Allen Aminian**  
QA/QC Manager



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**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
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**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Sample ID    | Laboratory ID | Matrix | TAT | Date Sampled   | Date Received  |
|--------------|---------------|--------|-----|----------------|----------------|
| SVM-15-15    | 8K19015-05    | Vapor  | 10  | 11/12/18 09:12 | 11/16/18 16:00 |
| SVM-15-22    | 8K19015-06    | Vapor  | 10  | 11/12/18 09:14 | 11/16/18 16:00 |
| SVM-6-7      | 8K19015-07    | Vapor  | 10  | 11/12/18 09:57 | 11/16/18 16:00 |
| SVM-6-13     | 8K19015-08    | Vapor  | 10  | 11/12/18 09:59 | 11/16/18 16:00 |
| SVM-7-7      | 8K19015-09    | Vapor  | 10  | 11/12/18 10:50 | 11/16/18 16:00 |
| SVM-7-13     | 8K19015-10    | Vapor  | 10  | 11/12/18 10:52 | 11/16/18 16:00 |
| SVM-7-13 DUP | 8K19015-11    | Vapor  | 10  | 11/12/18 10:52 | 11/16/18 16:00 |
| Ambient Air  | 8K19015-12    | Vapor  | 10  | 11/12/18 11:30 | 11/16/18 16:00 |
| SVM-10-15    | 8K19015-13    | Vapor  | 10  | 11/12/18 11:48 | 11/16/18 16:00 |
| SVM-5-5      | 8K19015-14    | Vapor  | 10  | 11/13/18 08:03 | 11/16/18 16:00 |
| SVM-5-15     | 8K19015-15    | Vapor  | 10  | 11/13/18 08:05 | 11/16/18 16:00 |
| SVM-8-5      | 8K19015-16    | Vapor  | 10  | 11/13/18 08:46 | 11/16/18 16:00 |
| SVM-8-15     | 8K19015-17    | Vapor  | 10  | 11/13/18 08:48 | 11/16/18 16:00 |
| SVM-16-7     | 8K19015-18    | Vapor  | 10  | 11/13/18 09:27 | 11/16/18 16:00 |
| SVM-16-16    | 8K19015-19    | Vapor  | 10  | 11/13/18 09:29 | 11/16/18 16:00 |
| SVM-16-22    | 8K19015-20    | Vapor  | 10  | 11/13/18 09:31 | 11/16/18 16:00 |
| SVM-3-5      | 8K19015-21    | Vapor  | 10  | 11/13/18 10:11 | 11/16/18 16:00 |
| SVM-3-15     | 8K19015-22    | Vapor  | 10  | 11/13/18 10:13 | 11/16/18 16:00 |
| Ambient Air  | 8K19015-23    | Vapor  | 10  | 11/13/18 11:20 | 11/16/18 16:00 |
| SVM-12-7     | 8K19015-24    | Vapor  | 10  | 11/13/18 11:26 | 11/16/18 16:00 |

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Sample ID      | Laboratory ID | Matrix | TAT | Date Sampled   | Date Received  |
|----------------|---------------|--------|-----|----------------|----------------|
| SVM-12-15      | 8K19015-25    | Vapor  | 10  | 11/13/18 11:28 | 11/16/18 16:00 |
| SVM-12-22      | 8K19015-26    | Vapor  | 10  | 11/13/18 11:30 | 11/16/18 16:00 |
| SVM-12-22 DUP  | 8K19015-27    | Vapor  | 10  | 11/13/18 11:30 | 11/16/18 16:00 |
| SVM-11-7       | 8K19015-28    | Vapor  | 10  | 11/14/18 08:25 | 11/16/18 16:00 |
| SVM-11-15      | 8K19015-29    | Vapor  | 10  | 11/14/18 08:27 | 11/16/18 16:00 |
| SVM-11-22      | 8K19015-30    | Vapor  | 10  | 11/14/18 08:29 | 11/16/18 16:00 |
| SVM-14R-8      | 8K19015-31    | Vapor  | 10  | 11/14/18 09:20 | 11/16/18 16:00 |
| SVM-14R-16     | 8K19015-32    | Vapor  | 10  | 11/14/18 09:22 | 11/16/18 16:00 |
| SVM-14R-22     | 8K19015-33    | Vapor  | 10  | 11/14/18 09:24 | 11/16/18 16:00 |
| SVM-14R-22 DUP | 8K19015-34    | Vapor  | 10  | 11/14/18 09:24 | 11/16/18 16:00 |
| SVM-13-7       | 8K19015-35    | Vapor  | 10  | 11/14/18 10:33 | 11/16/18 16:00 |
| SVM-13-15      | 8K19015-36    | Vapor  | 10  | 11/14/18 10:35 | 11/16/18 16:00 |
| SVM-13-22      | 8K19015-37    | Vapor  | 10  | 11/14/18 10:37 | 11/16/18 16:00 |
| Ambient Air    | 8K19015-38    | Vapor  | 10  | 11/14/18 10:45 | 11/16/18 16:00 |

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*Allen Aminian*

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**Allen Aminian**  
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

#### ANALYTICAL DATA SUMMARY

| Analyte                   | Sample Name | Result      | MRL  | Units       | Dilution | Prepared | Analyzed | Method  |
|---------------------------|-------------|-------------|------|-------------|----------|----------|----------|---------|
| <b>Fixed Gases by TCD</b> |             |             |      |             |          |          |          |         |
| Oxygen                    | SVM-1-5     | <b>20</b>   | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |
| Oxygen                    | SVM-1-15    | <b>19</b>   | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |
| Oxygen                    | SVM-2-5     | <b>19</b>   | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |
| Oxygen                    | SVM-15-7    | <b>19</b>   | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |
| Carbon Dioxide            | SVM-15-7    | <b>0.17</b> | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |
| Oxygen                    | SVM-15-15   | <b>19</b>   | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |
| Carbon Dioxide            | SVM-15-15   | <b>0.24</b> | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |
| Oxygen                    | SVM-15-22   | <b>18</b>   | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |
| Carbon Dioxide            | SVM-15-22   | <b>0.30</b> | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |
| Oxygen                    | SVM-6-7     | <b>19</b>   | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |

**Allen Aminian**  
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
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**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

**ANALYTICAL DATA SUMMARY**

| Analyte        | Sample Name  | Result | MRL  | Units       | Dilution | Prepared | Analyzed | Method  |
|----------------|--------------|--------|------|-------------|----------|----------|----------|---------|
| Oxygen         | SVM-6-13     | 17     | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |
| Carbon Dioxide | SVM-6-13     | 0.27   | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |
| Oxygen         | SVM-7-7      | 19     | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |
| Carbon Dioxide | SVM-7-7      | 0.45   | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |
| Oxygen         | SVM-7-13     | 19     | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |
| Carbon Dioxide | SVM-7-13     | 0.73   | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |
| Oxygen         | SVM-7-13 DUP | 19     | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |
| Carbon Dioxide | SVM-7-13 DUP | 0.69   | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |
| Oxygen         | SVM-10-15    | 15     | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |
| Carbon Dioxide | SVM-10-15    | 4.0    | 0.10 | % by Volume | 1        | 11/12/18 | 11/12/18 | EPA 3CM |
| Oxygen         | SVM-5-5      | 18     | 0.10 | % by Volume | 1        | 11/13/18 | 11/13/18 | EPA 3CM |

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**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

#### ANALYTICAL DATA SUMMARY

| Analyte        | Sample Name | Result | MRL  | Units       | Dilution | Prepared | Analyzed | Method  |
|----------------|-------------|--------|------|-------------|----------|----------|----------|---------|
| Oxygen         | SVM-5-15    | 19     | 0.10 | % by Volume | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Carbon Dioxide | SVM-5-15    | 0.13   | 0.10 | % by Volume | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Oxygen         | SVM-8-5     | 19     | 0.10 | % by Volume | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Carbon Dioxide | SVM-8-5     | 0.13   | 0.10 | % by Volume | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Oxygen         | SVM-8-15    | 19     | 0.10 | % by Volume | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Carbon Dioxide | SVM-8-15    | 0.18   | 0.10 | % by Volume | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Oxygen         | SVM-16-7    | 19     | 0.10 | % by Volume | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Carbon Dioxide | SVM-16-7    | 0.39   | 0.10 | % by Volume | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Oxygen         | SVM-16-16   | 17     | 0.10 | % by Volume | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Carbon Dioxide | SVM-16-16   | 0.75   | 0.10 | % by Volume | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Oxygen         | SVM-16-22   | 6.1    | 0.10 | % by Volume | 1        | 11/13/18 | 11/13/18 | EPA 3CM |

**Allen Aminian**  
QA/QC Manager



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**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

**ANALYTICAL DATA SUMMARY**

| Analyte        | Sample Name | Result      | MRL  | Units              | Dilution | Prepared | Analyzed | Method  |
|----------------|-------------|-------------|------|--------------------|----------|----------|----------|---------|
| Carbon Dioxide | SVM-16-22   | <b>8.8</b>  | 0.10 | % by<br>Volum<br>e | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Oxygen         | SVM-3-5     | <b>19</b>   | 0.10 | % by<br>Volum<br>e | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Carbon Dioxide | SVM-3-5     | <b>0.13</b> | 0.10 | % by<br>Volum<br>e | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Oxygen         | SVM-3-15    | <b>18</b>   | 0.10 | % by<br>Volum<br>e | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Carbon Dioxide | SVM-3-15    | <b>0.28</b> | 0.10 | % by<br>Volum<br>e | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Oxygen         | SVM-12-7    | <b>19</b>   | 0.10 | % by<br>Volum<br>e | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Carbon Dioxide | SVM-12-7    | <b>1.1</b>  | 0.10 | % by<br>Volum<br>e | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Oxygen         | SVM-12-15   | <b>16</b>   | 0.10 | % by<br>Volum<br>e | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Carbon Dioxide | SVM-12-15   | <b>3.0</b>  | 0.10 | % by<br>Volum<br>e | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Oxygen         | SVM-12-22   | <b>8.2</b>  | 0.10 | % by<br>Volum<br>e | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Carbon Dioxide | SVM-12-22   | <b>8.0</b>  | 0.10 | % by<br>Volum<br>e | 1        | 11/13/18 | 11/13/18 | EPA 3CM |

**Allen Aminian**  
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

#### ANALYTICAL DATA SUMMARY

| Analyte        | Sample Name   | Result | MRL  | Units       | Dilution | Prepared | Analyzed | Method  |
|----------------|---------------|--------|------|-------------|----------|----------|----------|---------|
| Oxygen         | SVM-12-22 DUP | 8.4    | 0.10 | % by Volume | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Carbon Dioxide | SVM-12-22 DUP | 7.4    | 0.10 | % by Volume | 1        | 11/13/18 | 11/13/18 | EPA 3CM |
| Oxygen         | SVM-11-7      | 19     | 0.10 | % by Volume | 1        | 11/14/18 | 11/14/18 | EPA 3CM |
| Carbon Dioxide | SVM-11-7      | 0.47   | 0.10 | % by Volume | 1        | 11/14/18 | 11/14/18 | EPA 3CM |
| Oxygen         | SVM-11-15     | 18     | 0.10 | % by Volume | 1        | 11/14/18 | 11/14/18 | EPA 3CM |
| Carbon Dioxide | SVM-11-15     | 1.2    | 0.10 | % by Volume | 1        | 11/14/18 | 11/14/18 | EPA 3CM |
| Oxygen         | SVM-11-22     | 7.7    | 0.10 | % by Volume | 1        | 11/14/18 | 11/14/18 | EPA 3CM |
| Carbon Dioxide | SVM-11-22     | 8.2    | 0.10 | % by Volume | 1        | 11/14/18 | 11/14/18 | EPA 3CM |
| Oxygen         | SVM-14R-8     | 15     | 0.10 | % by Volume | 1        | 11/14/18 | 11/14/18 | EPA 3CM |
| Carbon Dioxide | SVM-14R-8     | 1.7    | 0.10 | % by Volume | 1        | 11/14/18 | 11/14/18 | EPA 3CM |
| Oxygen         | SVM-14R-16    | 14     | 0.10 | % by Volume | 1        | 11/14/18 | 11/14/18 | EPA 3CM |

**Allen Aminian**  
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

#### ANALYTICAL DATA SUMMARY

| Analyte        | Sample Name    | Result | MRL  | Units       | Dilution | Prepared | Analyzed | Method  |
|----------------|----------------|--------|------|-------------|----------|----------|----------|---------|
| Carbon Dioxide | SVM-14R-16     | 1.8    | 0.10 | % by Volume | 1        | 11/14/18 | 11/14/18 | EPA 3CM |
| Oxygen         | SVM-14R-22     | 1.9    | 0.10 | % by Volume | 1        | 11/14/18 | 11/14/18 | EPA 3CM |
| Carbon Dioxide | SVM-14R-22     | 5.9    | 0.10 | % by Volume | 1        | 11/14/18 | 11/14/18 | EPA 3CM |
| Oxygen         | SVM-14R-22 DUP | 2.2    | 0.10 | % by Volume | 1        | 11/14/18 | 11/14/18 | EPA 3CM |
| Carbon Dioxide | SVM-14R-22 DUP | 5.7    | 0.10 | % by Volume | 1        | 11/14/18 | 11/14/18 | EPA 3CM |
| Oxygen         | SVM-13-7       | 19     | 0.10 | % by Volume | 1        | 11/14/18 | 11/14/18 | EPA 3CM |
| Oxygen         | SVM-13-15      | 19     | 0.10 | % by Volume | 1        | 11/14/18 | 11/14/18 | EPA 3CM |
| Oxygen         | SVM-13-22      | 16     | 0.10 | % by Volume | 1        | 11/14/18 | 11/14/18 | EPA 3CM |
| Carbon Dioxide | SVM-13-22      | 1.2    | 0.10 | % by Volume | 1        | 11/14/18 | 11/14/18 | EPA 3CM |

#### VOCs by EPA TO-3

|                               |                |    |    |      |   |          |          |      |
|-------------------------------|----------------|----|----|------|---|----------|----------|------|
| Gasoline Range Organics (GRO) | SVM-14R-22     | 47 | 20 | ug/L | 1 | 11/16/18 | 11/16/18 | TO-3 |
| Gasoline Range Organics (GRO) | SVM-14R-22 DUP | 51 | 20 | ug/L | 1 | 11/16/18 | 11/16/18 | TO-3 |

**Allen Aminian**  
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

**ANALYTICAL DATA SUMMARY**

| Analyte  | Sample Name    | Result       | MRL   | Units | Dilution | Prepared | Analyzed | Method |
|--|----------------|--------------|-------|-------|----------|----------|----------|--------|
| <b><u>VOCs by GCMS EPA TO-15 (Mid Level)</u></b> |                |              |       |       |          |          |          |        |
| Ethanol  | SVM-6-13       | <b>0.027</b> | 0.020 | ug/L  | 1        | 11/12/18 | 11/12/18 | TO-15  |
| Ethanol  | SVM-7-7        | <b>0.075</b> | 0.020 | ug/L  | 1        | 11/12/18 | 11/12/18 | TO-15  |
| Tetrachloroethylene (PCE)                        | SVM-11-22      | <b>0.061</b> | 0.020 | ug/L  | 1        | 11/14/18 | 11/14/18 | TO-15  |
| Acetone  | SVM-14R-22     | <b>0.53</b>  | 0.40  | ug/L  | 20       | 11/16/18 | 11/16/18 | TO-15  |
| Acetone  | SVM-14R-22 DUP | <b>0.48</b>  | 0.40  | ug/L  | 20       | 11/16/18 | 11/16/18 | TO-15  |
| Tetrachloroethylene (PCE)                        | SVM-13-22      | <b>0.023</b> | 0.020 | ug/L  | 1        | 11/14/18 | 11/14/18 | TO-15  |

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### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |     |
| <b>Date Prepared:</b>   | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |     |
| <b>Date Analyzed:</b>   | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |     |
| <b>AA ID No:</b>        | 8K19015-01 | 8K19015-02 | 8K19015-03 | 8K19015-04 |     |
| <b>Client ID No:</b>    | SVM-1-5    | SVM-1-15   | 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 |
|-------------------------------|-----|-----|-----|-----|----|

#### Surrogates

|                      |     |     |     |     |                              |
|----------------------|-----|-----|-----|-----|------------------------------|
| 4-Bromofluorobenzene | 87% | 87% | 89% | 90% | <u>%REC Limits</u><br>70-130 |
|----------------------|-----|-----|-----|-----|------------------------------|

**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |     |
| <b>Date Prepared:</b>   | 11/12/18   | 11/12/18   | 11/13/18   | 11/12/18   |     |
| <b>Date Analyzed:</b>   | 11/12/18   | 11/12/18   | 11/13/18   | 11/12/18   |     |
| <b>AA ID No:</b>        | 8K19015-05 | 8K19015-06 | 8K19015-07 | 8K19015-08 |     |
| <b>Client ID No:</b>    | SVM-15-15  | SVM-15-22  | SVM-6-7    | SVM-6-13   |     |
| <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 |
|-------------------------------|-----|-----|-----|-----|----|

**Surrogates**

|                      |     |     |     |     |                                     |
|----------------------|-----|-----|-----|-----|-------------------------------------|
| 4-Bromofluorobenzene | 90% | 92% | 87% | 93% | <b><u>%REC Limits</u></b><br>70-130 |
|----------------------|-----|-----|-----|-----|-------------------------------------|

**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |              |             |     |
|-------------------------|------------|------------|--------------|-------------|-----|
| <b>Date Sampled:</b>    | 11/12/18   | 11/12/18   | 11/12/18     | 11/12/18    |     |
| <b>Date Prepared:</b>   | 11/12/18   | 11/12/18   | 11/12/18     | 11/12/18    |     |
| <b>Date Analyzed:</b>   | 11/12/18   | 11/12/18   | 11/12/18     | 11/12/18    |     |
| <b>AA ID No:</b>        | 8K19015-09 | 8K19015-10 | 8K19015-11   | 8K19015-12  |     |
| <b>Client ID No:</b>    | SVM-7-7    | SVM-7-13   | SVM-7-13 DUP | Ambient Air |     |
| <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 |
|-------------------------------|-----|-----|-----|-----|----|

**Surrogates**

|                      |     |     |     |     |                                     |
|----------------------|-----|-----|-----|-----|-------------------------------------|
| 4-Bromofluorobenzene | 91% | 91% | 91% | 93% | <b><u>%REC Limits</u></b><br>70-130 |
|----------------------|-----|-----|-----|-----|-------------------------------------|

**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/12/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>Date Prepared:</b>   | 11/12/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>Date Analyzed:</b>   | 11/12/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>AA ID No:</b>        | 8K19015-13 | 8K19015-14 | 8K19015-15 | 8K19015-16 |     |
| <b>Client ID No:</b>    | SVM-10-15  | SVM-5-5    | SVM-5-15   | SVM-8-5    |     |
| <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 |
|-------------------------------|-----|-----|-----|-----|----|

#### Surrogates

|                      |     |     |     |     |                              |
|----------------------|-----|-----|-----|-----|------------------------------|
| 4-Bromofluorobenzene | 94% | 88% | 91% | 92% | <b>%REC Limits</b><br>70-130 |
|----------------------|-----|-----|-----|-----|------------------------------|

**Allen Aminian**  
 QA/QC Manager





### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/13/2018 | 11/13/2018 | 11/13/2018 | 11/13/2018 |     |
| <b>Date Prepared:</b>   | 11/13/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>Date Analyzed:</b>   | 11/13/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>AA ID No:</b>        | 8K19015-17 | 8K19015-18 | 8K19015-19 | 8K19015-20 |     |
| <b>Client ID No:</b>    | SVM-8-15   | SVM-16-7   | SVM-16-16  | SVM-16-22  |     |
| <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 |
|-------------------------------|-----|-----|-----|-----|----|

#### Surrogates

|                      |     |     |     |     |                                     |
|----------------------|-----|-----|-----|-----|-------------------------------------|
| 4-Bromofluorobenzene | 93% | 92% | 92% | 81% | <b><u>%REC Limits</u></b><br>70-130 |
|----------------------|-----|-----|-----|-----|-------------------------------------|

**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |             |            |     |
|-------------------------|------------|------------|-------------|------------|-----|
| <b>Date Sampled:</b>    | 11/13/18   | 11/13/18   | 11/13/18    | 11/13/18   |     |
| <b>Date Prepared:</b>   | 11/13/18   | 11/13/18   | 11/13/18    | 11/14/18   |     |
| <b>Date Analyzed:</b>   | 11/13/18   | 11/13/18   | 11/13/18    | 11/14/18   |     |
| <b>AA ID No:</b>        | 8K19015-21 | 8K19015-22 | 8K19015-23  | 8K19015-24 |     |
| <b>Client ID No:</b>    | SVM-3-5    | SVM-3-15   | Ambient Air | SVM-12-7   |     |
| <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 |
|-------------------------------|-----|-----|-----|-----|----|

**Surrogates**

|                      |     |     |     |     |                                     |
|----------------------|-----|-----|-----|-----|-------------------------------------|
| 4-Bromofluorobenzene | 83% | 83% | 84% | 83% | <b><u>%REC Limits</u></b><br>70-130 |
|----------------------|-----|-----|-----|-----|-------------------------------------|

**Allen Aminian**  
 QA/QC Manager



**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |               |            |     |
|-------------------------|------------|------------|---------------|------------|-----|
| <b>Date Sampled:</b>    | 11/13/18   | 11/13/18   | 11/13/18      | 11/14/18   |     |
| <b>Date Prepared:</b>   | 11/13/18   | 11/13/18   | 11/13/18      | 11/14/18   |     |
| <b>Date Analyzed:</b>   | 11/13/18   | 11/13/18   | 11/13/18      | 11/14/18   |     |
| <b>AA ID No:</b>        | 8K19015-25 | 8K19015-26 | 8K19015-27    | 8K19015-28 |     |
| <b>Client ID No:</b>    | SVM-12-15  | SVM-12-22  | SVM-12-22 DUP | SVM-11-7   |     |
| <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 |
|-------------------------------|-----|-----|-----|-----|----|

**Surrogates**

|                      |     |     |     |     |                                     |
|----------------------|-----|-----|-----|-----|-------------------------------------|
| 4-Bromofluorobenzene | 83% | 87% | 86% | 86% | <b><u>%REC Limits</u></b><br>70-130 |
|----------------------|-----|-----|-----|-----|-------------------------------------|

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 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/14/18   | 11/14/18   | 11/14/18   | 11/14/18   |     |
| <b>Date Prepared:</b>   | 11/14/18   | 11/14/18   | 11/14/18   | 11/14/18   |     |
| <b>Date Analyzed:</b>   | 11/14/18   | 11/14/18   | 11/14/18   | 11/14/18   |     |
| <b>AA ID No:</b>        | 8K19015-29 | 8K19015-30 | 8K19015-31 | 8K19015-32 |     |
| <b>Client ID No:</b>    | SVM-11-15  | SVM-11-22  | SVM-14R-8  | SVM-14R-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 |
|-------------------------------|-----|-----|-----|-----|----|

#### Surrogates

|                      |     |     |     |     |                              |
|----------------------|-----|-----|-----|-----|------------------------------|
| 4-Bromofluorobenzene | 89% | 90% | 83% | 83% | <u>%REC Limits</u><br>70-130 |
|----------------------|-----|-----|-----|-----|------------------------------|

**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |                   |            |            |     |
|-------------------------|------------|-------------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/14/18   | 11/14/18          | 11/14/18   | 11/14/18   |     |
| <b>Date Prepared:</b>   | 11/16/18   | 11/16/18          | 11/14/18   | 11/14/18   |     |
| <b>Date Analyzed:</b>   | 11/16/18   | 11/16/18          | 11/14/18   | 11/14/18   |     |
| <b>AA ID No:</b>        | 8K19015-33 | 8K19015-34        | 8K19015-35 | 8K19015-36 |     |
| <b>Client ID No:</b>    | SVM-14R-22 | SVM-14R-22<br>DUP | SVM-13-7   | SVM-13-15  |     |
| <b>Matrix:</b>          | Vapor      | Vapor             | Vapor      | Vapor      |     |
| <b>Dilution Factor:</b> | 1          | 1                 | 1          | 1          | MRL |

**TO-3 (TO-3)**

|                               |    |    |     |     |    |
|-------------------------------|----|----|-----|-----|----|
| Gasoline Range Organics (GRO) | 47 | 51 | <20 | <20 | 20 |
|-------------------------------|----|----|-----|-----|----|

**Surrogates**

|                      |     |     |     |     |                              |
|----------------------|-----|-----|-----|-----|------------------------------|
| 4-Bromofluorobenzene | 86% | 85% | 83% | 83% | <b>%REC Limits</b><br>70-130 |
|----------------------|-----|-----|-----|-----|------------------------------|

**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |             |     |
|-------------------------|------------|-------------|-----|
| <b>Date Sampled:</b>    | 11/14/18   | 11/14/18    |     |
| <b>Date Prepared:</b>   | 11/14/18   | 11/14/18    |     |
| <b>Date Analyzed:</b>   | 11/14/18   | 11/14/18    |     |
| <b>AA ID No:</b>        | 8K19015-37 | 8K19015-38  |     |
| <b>Client ID No:</b>    | SVM-13-22  | Ambient Air |     |
| <b>Matrix:</b>          | Vapor      | Vapor       |     |
| <b>Dilution Factor:</b> | 1          | 1           | MRL |

**TO-3 (TO-3)**

|                               |     |     |    |
|-------------------------------|-----|-----|----|
| Gasoline Range Organics (GRO) | <20 | <20 | 20 |
|-------------------------------|-----|-----|----|

**Surrogates**

|                      |     |     |                                     |
|----------------------|-----|-----|-------------------------------------|
| 4-Bromofluorobenzene | 85% | 86% | <b><u>%REC Limits</u></b><br>70-130 |
|----------------------|-----|-----|-------------------------------------|

*Allen Aminian*

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**Allen Aminian**  
 QA/QC Manager



**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |     |
| <b>Date Prepared:</b>   | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |     |
| <b>Date Analyzed:</b>   | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |     |
| <b>AA ID No:</b>        | 8K19015-01 | 8K19015-02 | 8K19015-03 | 8K19015-04 |     |
| <b>Client ID No:</b>    | SVM-1-5    | SVM-1-15   | 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)**

|                               |        |        |        |        |       |
|-------------------------------|--------|--------|--------|--------|-------|
| 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:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |            |            |
|-------------------------|------------|------------|------------|------------|
| <b>Date Sampled:</b>    | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |
| <b>Date Prepared:</b>   | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |
| <b>Date Analyzed:</b>   | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |
| <b>AA ID No:</b>        | 8K19015-01 | 8K19015-02 | 8K19015-03 | 8K19015-04 |
| <b>Client ID No:</b>    | SVM-1-5    | SVM-1-15   | 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)**

|                                |        |        |        |        |       |
|--------------------------------|--------|--------|--------|--------|-------|
| 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**

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187323 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 11/16/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 11/28/18 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         |            |            |            |            |
|-------------------------|------------|------------|------------|------------|
| <b>Date Sampled:</b>    | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |
| <b>Date Prepared:</b>   | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |
| <b>Date Analyzed:</b>   | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |
| <b>AA ID No:</b>        | 8K19015-01 | 8K19015-02 | 8K19015-03 | 8K19015-04 |
| <b>Client ID No:</b>    | SVM-1-5    | SVM-1-15   | 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 |
| 1,2,3-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 | 89% | 90% | 91% | 92% | 70-130             |

**Allen Aminian**  
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |     |
| <b>Date Prepared:</b>   | 11/12/18   | 11/12/18   | 11/13/18   | 11/12/18   |     |
| <b>Date Analyzed:</b>   | 11/12/18   | 11/12/18   | 11/13/18   | 11/12/18   |     |
| <b>AA ID No:</b>        | 8K19015-05 | 8K19015-06 | 8K19015-07 | 8K19015-08 |     |
| <b>Client ID No:</b>    | SVM-15-15  | SVM-15-22  | SVM-6-7    | SVM-6-13   |     |
| <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:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |     |
| <b>Date Prepared:</b>   | 11/12/18   | 11/12/18   | 11/13/18   | 11/12/18   |     |
| <b>Date Analyzed:</b>   | 11/12/18   | 11/12/18   | 11/13/18   | 11/12/18   |     |
| <b>AA ID No:</b>        | 8K19015-05 | 8K19015-06 | 8K19015-07 | 8K19015-08 |     |
| <b>Client ID No:</b>    | SVM-15-15  | SVM-15-22  | SVM-6-7    | SVM-6-13   |     |
| <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 | <b>0.027</b> | 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

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187323 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 11/16/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 11/28/18 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |     |
| <b>Date Prepared:</b>   | 11/12/18   | 11/12/18   | 11/13/18   | 11/12/18   |     |
| <b>Date Analyzed:</b>   | 11/12/18   | 11/12/18   | 11/13/18   | 11/12/18   |     |
| <b>AA ID No:</b>        | 8K19015-05 | 8K19015-06 | 8K19015-07 | 8K19015-08 |     |
| <b>Client ID No:</b>    | SVM-15-15  | SVM-15-22  | SVM-6-7    | SVM-6-13   |     |
| <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 |
| 1,2,3-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     | 93% | 95% | 90% | 96% | 70-130                    |

*Allen Aminian*

**Allen Aminian**  
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |              |             |
|-------------------------|------------|------------|--------------|-------------|
| <b>Date Sampled:</b>    | 11/12/18   | 11/12/18   | 11/12/18     | 11/12/18    |
| <b>Date Prepared:</b>   | 11/12/18   | 11/12/18   | 11/12/18     | 11/12/18    |
| <b>Date Analyzed:</b>   | 11/12/18   | 11/12/18   | 11/12/18     | 11/12/18    |
| <b>AA ID No:</b>        | 8K19015-09 | 8K19015-10 | 8K19015-11   | 8K19015-12  |
| <b>Client ID No:</b>    | SVM-7-7    | SVM-7-13   | SVM-7-13 DUP | Ambient Air |
| <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

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187323 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 11/16/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 11/28/18 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         |            |            |              |             |
|-------------------------|------------|------------|--------------|-------------|
| <b>Date Sampled:</b>    | 11/12/18   | 11/12/18   | 11/12/18     | 11/12/18    |
| <b>Date Prepared:</b>   | 11/12/18   | 11/12/18   | 11/12/18     | 11/12/18    |
| <b>Date Analyzed:</b>   | 11/12/18   | 11/12/18   | 11/12/18     | 11/12/18    |
| <b>AA ID No:</b>        | 8K19015-09 | 8K19015-10 | 8K19015-11   | 8K19015-12  |
| <b>Client ID No:</b>    | SVM-7-7    | SVM-7-13   | SVM-7-13 DUP | Ambient Air |
| <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                        | <b>0.075</b> | $<0.020$ | $<0.020$ | $<0.020$ | 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**

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187323 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 11/16/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 11/28/18 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         |            |            |              |             |
|-------------------------|------------|------------|--------------|-------------|
| <b>Date Sampled:</b>    | 11/12/18   | 11/12/18   | 11/12/18     | 11/12/18    |
| <b>Date Prepared:</b>   | 11/12/18   | 11/12/18   | 11/12/18     | 11/12/18    |
| <b>Date Analyzed:</b>   | 11/12/18   | 11/12/18   | 11/12/18     | 11/12/18    |
| <b>AA ID No:</b>        | 8K19015-09 | 8K19015-10 | 8K19015-11   | 8K19015-12  |
| <b>Client ID No:</b>    | SVM-7-7    | SVM-7-13   | SVM-7-13 DUP | Ambient Air |
| <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 |
| 1,2,3-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 | 94% | 94% | 94% | 96% | 70-130             |

*Allen Aminian*

**Allen Aminian**  
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/12/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>Date Prepared:</b>   | 11/12/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>Date Analyzed:</b>   | 11/12/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>AA ID No:</b>        | 8K19015-13 | 8K19015-14 | 8K19015-15 | 8K19015-16 |     |
| <b>Client ID No:</b>    | SVM-10-15  | SVM-5-5    | SVM-5-15   | SVM-8-5    |     |
| <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:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/12/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>Date Prepared:</b>   | 11/12/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>Date Analyzed:</b>   | 11/12/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>AA ID No:</b>        | 8K19015-13 | 8K19015-14 | 8K19015-15 | 8K19015-16 |     |
| <b>Client ID No:</b>    | SVM-10-15  | SVM-5-5    | SVM-5-15   | SVM-8-5    |     |
| <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

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187323 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 11/16/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 11/28/18 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/12/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>Date Prepared:</b>   | 11/12/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>Date Analyzed:</b>   | 11/12/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>AA ID No:</b>        | 8K19015-13 | 8K19015-14 | 8K19015-15 | 8K19015-16 |     |
| <b>Client ID No:</b>    | SVM-10-15  | SVM-5-5    | SVM-5-15   | SVM-8-5    |     |
| <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 |
| 1,2,3-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     | 97% | 90% | 94% | 94% | 70-130                    |

**Allen Aminian**  
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/13/2018 | 11/13/2018 | 11/13/2018 | 11/13/2018 |     |
| <b>Date Prepared:</b>   | 11/13/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>Date Analyzed:</b>   | 11/13/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>AA ID No:</b>        | 8K19015-17 | 8K19015-18 | 8K19015-19 | 8K19015-20 |     |
| <b>Client ID No:</b>    | SVM-8-15   | SVM-16-7   | SVM-16-16  | SVM-16-22  |     |
| <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

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187323 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 11/16/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 11/28/18 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

| Date Sampled:           | 11/13/2018 | 11/13/2018 | 11/13/2018 | 11/13/2018 | MRL |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Prepared:</b>   | 11/13/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>Date Analyzed:</b>   | 11/13/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>AA ID No:</b>        | 8K19015-17 | 8K19015-18 | 8K19015-19 | 8K19015-20 |     |
| <b>Client ID No:</b>    | SVM-8-15   | SVM-16-7   | SVM-16-16  | SVM-16-22  |     |
| <b>Matrix:</b>          | Vapor      | Vapor      | Vapor      | Vapor      |     |
| <b>Dilution Factor:</b> | 1          | 1          | 1          | 1          |     |

### 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

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187323 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 11/16/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 11/28/18 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/13/2018 | 11/13/2018 | 11/13/2018 | 11/13/2018 |     |
| <b>Date Prepared:</b>   | 11/13/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>Date Analyzed:</b>   | 11/13/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>AA ID No:</b>        | 8K19015-17 | 8K19015-18 | 8K19015-19 | 8K19015-20 |     |
| <b>Client ID No:</b>    | SVM-8-15   | SVM-16-7   | SVM-16-16  | SVM-16-22  |     |
| <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 |
| 1,2,3-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><u>%REC Limits</u></b> |
| 4-Bromofluorobenzene | 95% | 95% | 94% | 83% | 70-130                    |

*Allen Aminian*

**Allen Aminian**  
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |             |            |     |
|-------------------------|------------|------------|-------------|------------|-----|
| <b>Date Sampled:</b>    | 11/13/18   | 11/13/18   | 11/13/18    | 11/13/18   |     |
| <b>Date Prepared:</b>   | 11/13/18   | 11/13/18   | 11/13/18    | 11/14/18   |     |
| <b>Date Analyzed:</b>   | 11/13/18   | 11/13/18   | 11/13/18    | 11/14/18   |     |
| <b>AA ID No:</b>        | 8K19015-21 | 8K19015-22 | 8K19015-23  | 8K19015-24 |     |
| <b>Client ID No:</b>    | SVM-3-5    | SVM-3-15   | Ambient Air | SVM-12-7   |     |
| <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:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |             |            |     |
|-------------------------|------------|------------|-------------|------------|-----|
| <b>Date Sampled:</b>    | 11/13/18   | 11/13/18   | 11/13/18    | 11/13/18   |     |
| <b>Date Prepared:</b>   | 11/13/18   | 11/13/18   | 11/13/18    | 11/14/18   |     |
| <b>Date Analyzed:</b>   | 11/13/18   | 11/13/18   | 11/13/18    | 11/14/18   |     |
| <b>AA ID No:</b>        | 8K19015-21 | 8K19015-22 | 8K19015-23  | 8K19015-24 |     |
| <b>Client ID No:</b>    | SVM-3-5    | SVM-3-15   | Ambient Air | SVM-12-7   |     |
| <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

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187323 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 11/16/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 11/28/18 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         |            |            |             |            |
|-------------------------|------------|------------|-------------|------------|
| <b>Date Sampled:</b>    | 11/13/18   | 11/13/18   | 11/13/18    | 11/13/18   |
| <b>Date Prepared:</b>   | 11/13/18   | 11/13/18   | 11/13/18    | 11/14/18   |
| <b>Date Analyzed:</b>   | 11/13/18   | 11/13/18   | 11/13/18    | 11/14/18   |
| <b>AA ID No:</b>        | 8K19015-21 | 8K19015-22 | 8K19015-23  | 8K19015-24 |
| <b>Client ID No:</b>    | SVM-3-5    | SVM-3-15   | Ambient Air | SVM-12-7   |
| <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 |
| 1,2,3-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 |

### Surrogates

|                      |     |     |     |     |                              |
|----------------------|-----|-----|-----|-----|------------------------------|
| 4-Bromofluorobenzene | 85% | 86% | 87% | 86% | <b>%REC Limits</b><br>70-130 |
|----------------------|-----|-----|-----|-----|------------------------------|

*Allen Aminian*

**Allen Aminian**  
QA/QC Manager





## LABORATORY ANALYSIS RESULTS

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187323 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 11/16/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 11/28/18 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         |            |            |               |            |     |
|-------------------------|------------|------------|---------------|------------|-----|
| <b>Date Sampled:</b>    | 11/13/18   | 11/13/18   | 11/13/18      | 11/14/18   |     |
| <b>Date Prepared:</b>   | 11/13/18   | 11/13/18   | 11/13/18      | 11/14/18   |     |
| <b>Date Analyzed:</b>   | 11/13/18   | 11/13/18   | 11/13/18      | 11/14/18   |     |
| <b>AA ID No:</b>        | 8K19015-25 | 8K19015-26 | 8K19015-27    | 8K19015-28 |     |
| <b>Client ID No:</b>    | SVM-12-15  | SVM-12-22  | SVM-12-22 DUP | SVM-11-7   |     |
| <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:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |               |            |     |
|-------------------------|------------|------------|---------------|------------|-----|
| <b>Date Sampled:</b>    | 11/13/18   | 11/13/18   | 11/13/18      | 11/14/18   |     |
| <b>Date Prepared:</b>   | 11/13/18   | 11/13/18   | 11/13/18      | 11/14/18   |     |
| <b>Date Analyzed:</b>   | 11/13/18   | 11/13/18   | 11/13/18      | 11/14/18   |     |
| <b>AA ID No:</b>        | 8K19015-25 | 8K19015-26 | 8K19015-27    | 8K19015-28 |     |
| <b>Client ID No:</b>    | SVM-12-15  | SVM-12-22  | SVM-12-22 DUP | SVM-11-7   |     |
| <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

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187323 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 11/16/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 11/28/18 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         |            |            |               |            |     |
|-------------------------|------------|------------|---------------|------------|-----|
| <b>Date Sampled:</b>    | 11/13/18   | 11/13/18   | 11/13/18      | 11/14/18   |     |
| <b>Date Prepared:</b>   | 11/13/18   | 11/13/18   | 11/13/18      | 11/14/18   |     |
| <b>Date Analyzed:</b>   | 11/13/18   | 11/13/18   | 11/13/18      | 11/14/18   |     |
| <b>AA ID No:</b>        | 8K19015-25 | 8K19015-26 | 8K19015-27    | 8K19015-28 |     |
| <b>Client ID No:</b>    | SVM-12-15  | SVM-12-22  | SVM-12-22 DUP | SVM-11-7   |     |
| <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 |
| 1,2,3-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 |

### Surrogates

|                      |     |     |     |     |                              |
|----------------------|-----|-----|-----|-----|------------------------------|
| 4-Bromofluorobenzene | 85% | 89% | 88% | 88% | <u>%REC Limits</u><br>70-130 |
|----------------------|-----|-----|-----|-----|------------------------------|

*Allen Aminian*

**Allen Aminian**  
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/14/18   | 11/14/18   | 11/14/18   | 11/14/18   |     |
| <b>Date Prepared:</b>   | 11/14/18   | 11/14/18   | 11/14/18   | 11/14/18   |     |
| <b>Date Analyzed:</b>   | 11/14/18   | 11/14/18   | 11/14/18   | 11/14/18   |     |
| <b>AA ID No:</b>        | 8K19015-29 | 8K19015-30 | 8K19015-31 | 8K19015-32 |     |
| <b>Client ID No:</b>    | SVM-11-15  | SVM-11-22  | SVM-14R-8  | SVM-14R-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:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/14/18   | 11/14/18   | 11/14/18   | 11/14/18   |     |
| <b>Date Prepared:</b>   | 11/14/18   | 11/14/18   | 11/14/18   | 11/14/18   |     |
| <b>Date Analyzed:</b>   | 11/14/18   | 11/14/18   | 11/14/18   | 11/14/18   |     |
| <b>AA ID No:</b>        | 8K19015-29 | 8K19015-30 | 8K19015-31 | 8K19015-32 |     |
| <b>Client ID No:</b>    | SVM-11-15  | SVM-11-22  | SVM-14R-8  | SVM-14R-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       | <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 | <b>0.061</b> | <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

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187323 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 11/16/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 11/28/18 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         |            |            |            |            |
|-------------------------|------------|------------|------------|------------|
| <b>Date Sampled:</b>    | 11/14/18   | 11/14/18   | 11/14/18   | 11/14/18   |
| <b>Date Prepared:</b>   | 11/14/18   | 11/14/18   | 11/14/18   | 11/14/18   |
| <b>Date Analyzed:</b>   | 11/14/18   | 11/14/18   | 11/14/18   | 11/14/18   |
| <b>AA ID No:</b>        | 8K19015-29 | 8K19015-30 | 8K19015-31 | 8K19015-32 |
| <b>Client ID No:</b>    | SVM-11-15  | SVM-11-22  | SVM-14R-8  | SVM-14R-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 |
| 1,2,3-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     | 91% | 93% | 86% | 85% | 70-130                    |

**Allen Aminian**  
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |                   |            |            |     |
|-------------------------|------------|-------------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/14/18   | 11/14/18          | 11/14/18   | 11/14/18   |     |
| <b>Date Prepared:</b>   | 11/16/18   | 11/16/18          | 11/14/18   | 11/14/18   |     |
| <b>Date Analyzed:</b>   | 11/16/18   | 11/16/18          | 11/14/18   | 11/14/18   |     |
| <b>AA ID No:</b>        | 8K19015-33 | 8K19015-34        | 8K19015-35 | 8K19015-36 |     |
| <b>Client ID No:</b>    | SVM-14R-22 | SVM-14R-22<br>DUP | SVM-13-7   | SVM-13-15  |     |
| <b>Matrix:</b>          | Vapor      | Vapor             | Vapor      | Vapor      |     |
| <b>Dilution Factor:</b> | 20         | 20                | 1          | 1          | MRL |

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

|                               |             |             |        |        |       |
|-------------------------------|-------------|-------------|--------|--------|-------|
| Acetone                       | <b>0.53</b> | <b>0.48</b> | <0.020 | <0.020 | 0.020 |
| Allyl chloride                | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| tert-Amyl Methyl Ether (TAME) | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| Benzene                       | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| Benzyl chloride               | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| Bromodichloromethane          | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| Bromoform                     | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| Bromomethane                  | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| 1,3-Butadiene                 | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| 2-Butanone (MEK)              | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| tert-Butyl alcohol (TBA)      | <400        | <400        | <20    | <20    | 20    |
| Carbon Disulfide              | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| Carbon Tetrachloride          | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| Chlorobenzene                 | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| Chloroethane                  | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| Chloroform                    | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| Chloromethane                 | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| Cyclohexane                   | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| Dibromochloromethane          | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| 1,2-Dibromoethane (EDB)       | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| 1,2-Dichlorobenzene           | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| 1,3-Dichlorobenzene           | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| 1,4-Dichlorobenzene           | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| Dichlorodifluoromethane (R12) | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| 1,1-Dichloroethane            | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |
| 1,2-Dichloroethane (EDC)      | <0.40       | <0.40       | <0.020 | <0.020 | 0.020 |

**Allen Aminian**  
 QA/QC Manager





### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/14/18   | 11/14/18   | 11/14/18   | 11/14/18   |     |
| <b>Date Prepared:</b>   | 11/16/18   | 11/16/18   | 11/14/18   | 11/14/18   |     |
| <b>Date Analyzed:</b>   | 11/16/18   | 11/16/18   | 11/14/18   | 11/14/18   |     |
| <b>AA ID No:</b>        | 8K19015-33 | 8K19015-34 | 8K19015-35 | 8K19015-36 |     |
| <b>Client ID No:</b>    | SVM-14R-22 | SVM-14R-22 | SVM-13-7   | SVM-13-15  |     |
| <b>Matrix:</b>          | Vapor      | Vapor      | Vapor      | Vapor      |     |
| <b>Dilution Factor:</b> | 20         | 20         | 1          | 1          | MRL |

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

|                                |       |       |        |        |       |
|--------------------------------|-------|-------|--------|--------|-------|
| cis-1,2-Dichloroethylene       | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| 1,1-Dichloroethylene           | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| trans-1,2-Dichloroethylene     | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| 1,2-Dichloropropane            | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| trans-1,3-Dichloropropylene    | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| cis-1,3-Dichloropropylene      | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Dichlorotetrafluoroethane      | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Diisopropyl ether (DIPE)       | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| 1,4-Dioxane                    | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Ethanol                        | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Ethyl Acetate                  | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Ethylbenzene                   | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Ethyl-tert-Butyl Ether (ETBE)  | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| 4-Ethyltoluene                 | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Heptane                        | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Hexachlorobutadiene            | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| n-Hexane                       | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| 2-Hexanone (MBK)               | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Isopropanol (IPA)              | <4.0  | <4.0  | <0.20  | <0.20  | 0.20  |
| Methyl-tert-Butyl Ether (MTBE) | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Methylene Chloride             | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| 4-Methyl-2-pentanone (MIBK)    | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Naphthalene                    | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Propylene                      | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Styrene                        | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| 1,1,2,2-Tetrachloroethane      | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |

**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/14/18   | 11/14/18   | 11/14/18   | 11/14/18   |     |
| <b>Date Prepared:</b>   | 11/16/18   | 11/16/18   | 11/14/18   | 11/14/18   |     |
| <b>Date Analyzed:</b>   | 11/16/18   | 11/16/18   | 11/14/18   | 11/14/18   |     |
| <b>AA ID No:</b>        | 8K19015-33 | 8K19015-34 | 8K19015-35 | 8K19015-36 |     |
| <b>Client ID No:</b>    | SVM-14R-22 | SVM-14R-22 | SVM-13-7   | SVM-13-15  |     |
| <b>Matrix:</b>          | Vapor      | Vapor      | Vapor      | Vapor      |     |
| <b>Dilution Factor:</b> | 20         | 20         | 1          | 1          | MRL |

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

|  |       |       |        |        |       |
|--|-------|-------|--------|--------|-------|
| Tetrachloroethylene (PCE)                    | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Tetrahydrofuran (THF)                        | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Toluene                                      | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| 1,2,4-Trichlorobenzene                       | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| 1,1,2-Trichloroethane                        | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| 1,1,1-Trichloroethane                        | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Trichloroethylene (TCE)                      | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Trichlorofluoromethane (R11)                 | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (R113) | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| 1,3,5-Trimethylbenzene                       | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| 1,2,4-Trimethylbenzene                       | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| 2,2,4-Trimethylpentane                       | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Vinyl acetate                                | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Vinyl bromide                                | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Vinyl chloride                               | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| o-Xylene                                     | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| m,p-Xylenes                                  | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| 1,2,3-Trichloropropane                       | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| sec-Butylbenzene                             | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| Isopropylbenzene                             | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| n-Propylbenzene                              | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| 4-Isopropyltoluene                           | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |
| n-Butylbenzene                               | <0.40 | <0.40 | <0.020 | <0.020 | 0.020 |

**Surrogates**

**%REC Limits**

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187323 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 11/16/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 11/28/18 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         |            |                   |            |            |     |
|-------------------------|------------|-------------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/14/18   | 11/14/18          | 11/14/18   | 11/14/18   |     |
| <b>Date Prepared:</b>   | 11/16/18   | 11/16/18          | 11/14/18   | 11/14/18   |     |
| <b>Date Analyzed:</b>   | 11/16/18   | 11/16/18          | 11/14/18   | 11/14/18   |     |
| <b>AA ID No:</b>        | 8K19015-33 | 8K19015-34        | 8K19015-35 | 8K19015-36 |     |
| <b>Client ID No:</b>    | SVM-14R-22 | SVM-14R-22<br>DUP | SVM-13-7   | SVM-13-15  |     |
| <b>Matrix:</b>          | Vapor      | Vapor             | Vapor      | Vapor      |     |
| <b>Dilution Factor:</b> | 20         | 20                | 1          | 1          | MRL |

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

|                      |     |     |     |     |        |
|----------------------|-----|-----|-----|-----|--------|
| 4-Bromofluorobenzene | 88% | 87% | 86% | 86% | 70-130 |
|----------------------|-----|-----|-----|-----|--------|

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |             |     |
|-------------------------|------------|-------------|-----|
| <b>Date Sampled:</b>    | 11/14/18   | 11/14/18    |     |
| <b>Date Prepared:</b>   | 11/14/18   | 11/14/18    |     |
| <b>Date Analyzed:</b>   | 11/14/18   | 11/14/18    |     |
| <b>AA ID No:</b>        | 8K19015-37 | 8K19015-38  |     |
| <b>Client ID No:</b>    | SVM-13-22  | Ambient Air |     |
| <b>Matrix:</b>          | Vapor      | Vapor       |     |
| <b>Dilution Factor:</b> | 1          | 1           | MRL |

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

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

*Allen Aminian*

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |             |     |
|-------------------------|------------|-------------|-----|
| <b>Date Sampled:</b>    | 11/14/18   | 11/14/18    |     |
| <b>Date Prepared:</b>   | 11/14/18   | 11/14/18    |     |
| <b>Date Analyzed:</b>   | 11/14/18   | 11/14/18    |     |
| <b>AA ID No:</b>        | 8K19015-37 | 8K19015-38  |     |
| <b>Client ID No:</b>    | SVM-13-22  | Ambient Air |     |
| <b>Matrix:</b>          | Vapor      | Vapor       |     |
| <b>Dilution Factor:</b> | 1          | 1           | MRL |

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

| 1,1-Dichloroethylene           | <0.020       | <0.020 | 0.020 |
|--------------------------------|--------------|--------|-------|
| trans-1,2-Dichloroethylene     | <0.020       | <0.020 | 0.020 |
| 1,2-Dichloropropane            | <0.020       | <0.020 | 0.020 |
| trans-1,3-Dichloropropylene    | <0.020       | <0.020 | 0.020 |
| cis-1,3-Dichloropropylene      | <0.020       | <0.020 | 0.020 |
| Dichlorotetrafluoroethane      | <0.020       | <0.020 | 0.020 |
| Diisopropyl ether (DIPE)       | <0.020       | <0.020 | 0.020 |
| 1,4-Dioxane                    | <0.020       | <0.020 | 0.020 |
| Ethanol                        | <0.020       | <0.020 | 0.020 |
| Ethyl Acetate                  | <0.020       | <0.020 | 0.020 |
| Ethylbenzene                   | <0.020       | <0.020 | 0.020 |
| Ethyl-tert-Butyl Ether (ETBE)  | <0.020       | <0.020 | 0.020 |
| 4-Ethyltoluene                 | <0.020       | <0.020 | 0.020 |
| Heptane                        | <0.020       | <0.020 | 0.020 |
| Hexachlorobutadiene            | <0.020       | <0.020 | 0.020 |
| n-Hexane                       | <0.020       | <0.020 | 0.020 |
| 2-Hexanone (MBK)               | <0.020       | <0.020 | 0.020 |
| Isopropanol (IPA)              | <0.20        | <0.20  | 0.20  |
| Methyl-tert-Butyl Ether (MTBE) | <0.020       | <0.020 | 0.020 |
| Methylene Chloride             | <0.020       | <0.020 | 0.020 |
| 4-Methyl-2-pentanone (MIBK)    | <0.020       | <0.020 | 0.020 |
| Naphthalene                    | <0.020       | <0.020 | 0.020 |
| Propylene                      | <0.020       | <0.020 | 0.020 |
| Styrene                        | <0.020       | <0.020 | 0.020 |
| 1,1,2,2-Tetrachloroethane      | <0.020       | <0.020 | 0.020 |
| Tetrachloroethylene (PCE)      | <b>0.023</b> | <0.020 | 0.020 |
| Tetrahydrofuran (THF)          | <0.020       | <0.020 | 0.020 |

**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** ug/L

|                         |            |             |     |
|-------------------------|------------|-------------|-----|
| <b>Date Sampled:</b>    | 11/14/18   | 11/14/18    |     |
| <b>Date Prepared:</b>   | 11/14/18   | 11/14/18    |     |
| <b>Date Analyzed:</b>   | 11/14/18   | 11/14/18    |     |
| <b>AA ID No:</b>        | 8K19015-37 | 8K19015-38  |     |
| <b>Client ID No:</b>    | SVM-13-22  | Ambient Air |     |
| <b>Matrix:</b>          | Vapor      | Vapor       |     |
| <b>Dilution Factor:</b> | 1          | 1           | MRL |

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

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

|                      |     |     |                    |
|----------------------|-----|-----|--------------------|
| <b>Surrogates</b>    |     |     | <b>%REC Limits</b> |
| 4-Bromofluorobenzene | 87% | 88% | 70-130             |

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** % by Volume

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |     |
| <b>Date Prepared:</b>   | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |     |
| <b>Date Analyzed:</b>   | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |     |
| <b>AA ID No:</b>        | 8K19015-01 | 8K19015-02 | 8K19015-03 | 8K19015-04 |     |
| <b>Client ID No:</b>    | SVM-1-5    | SVM-1-15   | 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 (EPA 3CM)

|                |           |           |           |             |      |
|----------------|-----------|-----------|-----------|-------------|------|
| Methane        | <0.10     | <0.10     | <0.10     | <0.10       | 0.10 |
| Oxygen         | <b>20</b> | <b>19</b> | <b>19</b> | <b>19</b>   | 0.10 |
| Carbon Dioxide | <0.10     | <0.10     | <0.10     | <b>0.17</b> | 0.10 |

**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** % by Volume

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |     |
| <b>Date Prepared:</b>   | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |     |
| <b>Date Analyzed:</b>   | 11/12/18   | 11/12/18   | 11/12/18   | 11/12/18   |     |
| <b>AA ID No:</b>        | 8K19015-05 | 8K19015-06 | 8K19015-07 | 8K19015-08 |     |
| <b>Client ID No:</b>    | SVM-15-15  | SVM-15-22  | SVM-6-7    | SVM-6-13   |     |
| <b>Matrix:</b>          | Vapor      | Vapor      | Vapor      | Vapor      |     |
| <b>Dilution Factor:</b> | 1          | 1          | 1          | 1          | MRL |

**Fixed Gases - Field (EPA 3CM)**

|                |             |             |           |             |      |
|----------------|-------------|-------------|-----------|-------------|------|
| Methane        | <0.10       | <0.10       | <0.10     | <0.10       | 0.10 |
| Oxygen         | <b>19</b>   | <b>18</b>   | <b>19</b> | <b>17</b>   | 0.10 |
| Carbon Dioxide | <b>0.24</b> | <b>0.30</b> | <0.10     | <b>0.27</b> | 0.10 |

**Allen Aminian**  
 QA/QC Manager





## LABORATORY ANALYSIS RESULTS

|                      |                                |                       |             |
|----------------------|--------------------------------|-----------------------|-------------|
| <b>Client:</b>       | CH2M Hill, Inc.                | <b>AA Project No:</b> | MB187323    |
| <b>Project No:</b>   | 693142                         | <b>Date Received:</b> | 11/16/18    |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup | <b>Date Reported:</b> | 11/28/18    |
| <b>Method:</b>       | Fixed Gases by TCD             | <b>Units:</b>         | % by Volume |

|                         |            |            |              |            |     |
|-------------------------|------------|------------|--------------|------------|-----|
| <b>Date Sampled:</b>    | 11/12/18   | 11/12/18   | 11/12/18     | 11/12/18   |     |
| <b>Date Prepared:</b>   | 11/12/18   | 11/12/18   | 11/12/18     | 11/12/18   |     |
| <b>Date Analyzed:</b>   | 11/12/18   | 11/12/18   | 11/12/18     | 11/12/18   |     |
| <b>AA ID No:</b>        | 8K19015-09 | 8K19015-10 | 8K19015-11   | 8K19015-13 |     |
| <b>Client ID No:</b>    | SVM-7-7    | SVM-7-13   | SVM-7-13 DUP | SVM-10-15  |     |
| <b>Matrix:</b>          | Vapor      | Vapor      | Vapor        | Vapor      |     |
| <b>Dilution Factor:</b> | 1          | 1          | 1            | 1          | MRL |

### Fixed Gases - Field (EPA 3CM)

|                |             |             |             |            |      |
|----------------|-------------|-------------|-------------|------------|------|
| Methane        | <0.10       | <0.10       | <0.10       | <0.10      | 0.10 |
| Oxygen         | <b>19</b>   | <b>19</b>   | <b>19</b>   | <b>15</b>  | 0.10 |
| Carbon Dioxide | <b>0.45</b> | <b>0.73</b> | <b>0.69</b> | <b>4.0</b> | 0.10 |

*Allen Aminian*

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**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** % by Volume

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/13/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>Date Prepared:</b>   | 11/13/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>Date Analyzed:</b>   | 11/13/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>AA ID No:</b>        | 8K19015-14 | 8K19015-15 | 8K19015-16 | 8K19015-17 |     |
| <b>Client ID No:</b>    | SVM-5-5    | SVM-5-15   | SVM-8-5    | SVM-8-15   |     |
| <b>Matrix:</b>          | Vapor      | Vapor      | Vapor      | Vapor      |     |
| <b>Dilution Factor:</b> | 1          | 1          | 1          | 1          | MRL |

### Fixed Gases - Field (EPA 3CM)

|                |           |             |             |             |      |
|----------------|-----------|-------------|-------------|-------------|------|
| Methane        | <0.10     | <0.10       | <0.10       | <0.10       | 0.10 |
| Oxygen         | <b>18</b> | <b>19</b>   | <b>19</b>   | <b>19</b>   | 0.10 |
| Carbon Dioxide | <0.10     | <b>0.13</b> | <b>0.13</b> | <b>0.18</b> | 0.10 |

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** % by Volume

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/13/2018 | 11/13/2018 | 11/13/2018 | 11/13/2018 |     |
| <b>Date Prepared:</b>   | 11/13/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>Date Analyzed:</b>   | 11/13/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>AA ID No:</b>        | 8K19015-18 | 8K19015-19 | 8K19015-20 | 8K19015-21 |     |
| <b>Client ID No:</b>    | SVM-16-7   | SVM-16-16  | SVM-16-22  | SVM-3-5    |     |
| <b>Matrix:</b>          | Vapor      | Vapor      | Vapor      | Vapor      |     |
| <b>Dilution Factor:</b> | 1          | 1          | 1          | 1          | MRL |

### Fixed Gases - Field (EPA 3CM)

|                |             |             |            |             |      |
|----------------|-------------|-------------|------------|-------------|------|
| Methane        | <0.10       | <0.10       | <0.10      | <0.10       | 0.10 |
| Oxygen         | <b>19</b>   | <b>17</b>   | <b>6.1</b> | <b>19</b>   | 0.10 |
| Carbon Dioxide | <b>0.39</b> | <b>0.75</b> | <b>8.8</b> | <b>0.13</b> | 0.10 |

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** % by Volume

|                         |            |            |            |            |     |
|-------------------------|------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/13/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>Date Prepared:</b>   | 11/13/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>Date Analyzed:</b>   | 11/13/18   | 11/13/18   | 11/13/18   | 11/13/18   |     |
| <b>AA ID No:</b>        | 8K19015-22 | 8K19015-24 | 8K19015-25 | 8K19015-26 |     |
| <b>Client ID No:</b>    | SVM-3-15   | SVM-12-7   | SVM-12-15  | SVM-12-22  |     |
| <b>Matrix:</b>          | Vapor      | Vapor      | Vapor      | Vapor      |     |
| <b>Dilution Factor:</b> | 1          | 1          | 1          | 1          | MRL |

### Fixed Gases - Field (EPA 3CM)

|                |             |            |            |            |      |
|----------------|-------------|------------|------------|------------|------|
| Methane        | <0.10       | <0.10      | <0.10      | <0.10      | 0.10 |
| Oxygen         | <b>18</b>   | <b>19</b>  | <b>16</b>  | <b>8.2</b> | 0.10 |
| Carbon Dioxide | <b>0.28</b> | <b>1.1</b> | <b>3.0</b> | <b>8.0</b> | 0.10 |

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** % by Volume

|                         |               |            |            |            |     |
|-------------------------|---------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/13/18      | 11/14/18   | 11/14/18   | 11/14/18   |     |
| <b>Date Prepared:</b>   | 11/13/18      | 11/14/18   | 11/14/18   | 11/14/18   |     |
| <b>Date Analyzed:</b>   | 11/13/18      | 11/14/18   | 11/14/18   | 11/14/18   |     |
| <b>AA ID No:</b>        | 8K19015-27    | 8K19015-28 | 8K19015-29 | 8K19015-30 |     |
| <b>Client ID No:</b>    | SVM-12-22 DUP | SVM-11-7   | SVM-11-15  | SVM-11-22  |     |
| <b>Matrix:</b>          | Vapor         | Vapor      | Vapor      | Vapor      |     |
| <b>Dilution Factor:</b> | 1             | 1          | 1          | 1          | MRL |

### Fixed Gases - Field (EPA 3CM)

|                |            |             |            |            |      |
|----------------|------------|-------------|------------|------------|------|
| Methane        | <0.10      | <0.10       | <0.10      | <0.10      | 0.10 |
| Oxygen         | <b>8.4</b> | <b>19</b>   | <b>18</b>  | <b>7.7</b> | 0.10 |
| Carbon Dioxide | <b>7.4</b> | <b>0.47</b> | <b>1.2</b> | <b>8.2</b> | 0.10 |

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 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** % by Volume

|                         |            |            |            |                |     |
|-------------------------|------------|------------|------------|----------------|-----|
| <b>Date Sampled:</b>    | 11/14/18   | 11/14/18   | 11/14/18   | 11/14/18       |     |
| <b>Date Prepared:</b>   | 11/14/18   | 11/14/18   | 11/14/18   | 11/14/18       |     |
| <b>Date Analyzed:</b>   | 11/14/18   | 11/14/18   | 11/14/18   | 11/14/18       |     |
| <b>AA ID No:</b>        | 8K19015-31 | 8K19015-32 | 8K19015-33 | 8K19015-34     |     |
| <b>Client ID No:</b>    | SVM-14R-8  | SVM-14R-16 | SVM-14R-22 | SVM-14R-22 DUP |     |
| <b>Matrix:</b>          | Vapor      | Vapor      | Vapor      | Vapor          |     |
| <b>Dilution Factor:</b> | 1          | 1          | 1          | 1              | MRL |

### Fixed Gases - Field (EPA 3CM)

|                |            |            |            |            |      |
|----------------|------------|------------|------------|------------|------|
| Methane        | <0.10      | <0.10      | <0.10      | <0.10      | 0.10 |
| Oxygen         | <b>15</b>  | <b>14</b>  | <b>1.9</b> | <b>2.2</b> | 0.10 |
| Carbon Dioxide | <b>1.7</b> | <b>1.8</b> | <b>5.9</b> | <b>5.7</b> | 0.10 |

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18  
**Units:** % by Volume

|                         |            |            |            |     |
|-------------------------|------------|------------|------------|-----|
| <b>Date Sampled:</b>    | 11/14/18   | 11/14/18   | 11/14/18   |     |
| <b>Date Prepared:</b>   | 11/14/18   | 11/14/18   | 11/14/18   |     |
| <b>Date Analyzed:</b>   | 11/14/18   | 11/14/18   | 11/14/18   |     |
| <b>AA ID No:</b>        | 8K19015-35 | 8K19015-36 | 8K19015-37 |     |
| <b>Client ID No:</b>    | SVM-13-7   | SVM-13-15  | SVM-13-22  |     |
| <b>Matrix:</b>          | Vapor      | Vapor      | Vapor      |     |
| <b>Dilution Factor:</b> | 1          | 1          | 1          | MRL |

### Fixed Gases - Field (EPA 3CM)

|                |           |           |            |      |
|----------------|-----------|-----------|------------|------|
| Methane        | <0.10     | <0.10     | <0.10      | 0.10 |
| Oxygen         | <b>19</b> | <b>19</b> | <b>16</b>  | 0.10 |
| Carbon Dioxide | <0.10     | <0.10     | <b>1.2</b> | 0.10 |

**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

Client: CH2M Hill, Inc.  
Project No: 693142  
Project Name: KMEP Norwalk Biosparge Startup

AA Project No: MB187323  
Date Received: 11/16/18  
Date Reported: 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC %REC | Limit | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|-----------|-------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|-----------|-------|-----|-----------|-------|

**VOCs by EPA TO-3 - Quality Control**

Batch B8K1938 - \*\*\* DEFAULT PREP \*\*\*

**Blank (B8K1938-BLK1)**

Prepared & Analyzed: 11/12/18

|                               |     |    |      |  |  |  |  |  |  |  |
|-------------------------------|-----|----|------|--|--|--|--|--|--|--|
| Gasoline Range Organics (GRO) | <20 | 20 | ug/L |  |  |  |  |  |  |  |
|-------------------------------|-----|----|------|--|--|--|--|--|--|--|

|                                 |       |  |      |      |      |        |  |  |  |  |
|---------------------------------|-------|--|------|------|------|--------|--|--|--|--|
| Surrogate: 4-Bromofluorobenzene | 0.249 |  | ug/L | 0.29 | 86.9 | 70-130 |  |  |  |  |
|---------------------------------|-------|--|------|------|------|--------|--|--|--|--|

**LCS (B8K1938-BS1)**

Prepared & Analyzed: 11/12/18

|                               |       |    |      |      |     |        |  |  |  |  |
|-------------------------------|-------|----|------|------|-----|--------|--|--|--|--|
| Gasoline Range Organics (GRO) | 0.961 | 20 | ug/L | 0.82 | 118 | 70-130 |  |  |  |  |
|-------------------------------|-------|----|------|------|-----|--------|--|--|--|--|

|                                 |       |  |      |      |      |        |  |  |  |  |
|---------------------------------|-------|--|------|------|------|--------|--|--|--|--|
| Surrogate: 4-Bromofluorobenzene | 0.271 |  | ug/L | 0.29 | 94.8 | 70-130 |  |  |  |  |
|---------------------------------|-------|--|------|------|------|--------|--|--|--|--|

**LCS Dup (B8K1938-BSD1)**

Prepared & Analyzed: 11/12/18

|                               |       |    |      |      |     |        |      |    |  |  |
|-------------------------------|-------|----|------|------|-----|--------|------|----|--|--|
| Gasoline Range Organics (GRO) | 0.866 | 20 | ug/L | 0.82 | 106 | 70-130 | 10.4 | 30 |  |  |
|-------------------------------|-------|----|------|------|-----|--------|------|----|--|--|

|                                 |       |  |      |      |      |        |  |  |  |  |
|---------------------------------|-------|--|------|------|------|--------|--|--|--|--|
| Surrogate: 4-Bromofluorobenzene | 0.258 |  | ug/L | 0.29 | 90.2 | 70-130 |  |  |  |  |
|---------------------------------|-------|--|------|------|------|--------|--|--|--|--|

**Duplicate (B8K1938-DUP1)**

Source: 8K19015-10

Prepared & Analyzed: 11/12/18

|                               |     |    |      |  |     |  |  |  |    |  |
|-------------------------------|-----|----|------|--|-----|--|--|--|----|--|
| Gasoline Range Organics (GRO) | <20 | 20 | ug/L |  | <20 |  |  |  | 30 |  |
|-------------------------------|-----|----|------|--|-----|--|--|--|----|--|

|                                 |       |  |      |      |      |        |  |  |  |  |
|---------------------------------|-------|--|------|------|------|--------|--|--|--|--|
| Surrogate: 4-Bromofluorobenzene | 0.262 |  | ug/L | 0.29 | 91.3 | 70-130 |  |  |  |  |
|---------------------------------|-------|--|------|------|------|--------|--|--|--|--|

Batch B8K1942 - \*\*\* DEFAULT PREP \*\*\*

**Blank (B8K1942-BLK1)**

Prepared & Analyzed: 11/13/18

|                               |     |    |      |  |  |  |  |  |  |  |
|-------------------------------|-----|----|------|--|--|--|--|--|--|--|
| Gasoline Range Organics (GRO) | <20 | 20 | ug/L |  |  |  |  |  |  |  |
|-------------------------------|-----|----|------|--|--|--|--|--|--|--|

|                                 |       |  |      |      |      |        |  |  |  |  |
|---------------------------------|-------|--|------|------|------|--------|--|--|--|--|
| Surrogate: 4-Bromofluorobenzene | 0.243 |  | ug/L | 0.29 | 84.9 | 70-130 |  |  |  |  |
|---------------------------------|-------|--|------|------|------|--------|--|--|--|--|

**LCS (B8K1942-BS1)**

Prepared & Analyzed: 11/13/18

|                               |       |    |      |      |      |        |  |  |  |  |
|-------------------------------|-------|----|------|------|------|--------|--|--|--|--|
| Gasoline Range Organics (GRO) | 0.806 | 20 | ug/L | 0.82 | 98.5 | 70-130 |  |  |  |  |
|-------------------------------|-------|----|------|------|------|--------|--|--|--|--|

|                                 |       |  |      |      |      |        |  |  |  |  |
|---------------------------------|-------|--|------|------|------|--------|--|--|--|--|
| Surrogate: 4-Bromofluorobenzene | 0.237 |  | ug/L | 0.29 | 83.0 | 70-130 |  |  |  |  |
|---------------------------------|-------|--|------|------|------|--------|--|--|--|--|

**LCS Dup (B8K1942-BSD1)**

Prepared & Analyzed: 11/13/18

|                               |       |    |      |      |      |        |      |    |  |  |
|-------------------------------|-------|----|------|------|------|--------|------|----|--|--|
| Gasoline Range Organics (GRO) | 0.772 | 20 | ug/L | 0.82 | 94.4 | 70-130 | 4.28 | 30 |  |  |
|-------------------------------|-------|----|------|------|------|--------|------|----|--|--|

|                                 |       |  |      |      |      |        |  |  |  |  |
|---------------------------------|-------|--|------|------|------|--------|--|--|--|--|
| Surrogate: 4-Bromofluorobenzene | 0.238 |  | ug/L | 0.29 | 83.0 | 70-130 |  |  |  |  |
|---------------------------------|-------|--|------|------|------|--------|--|--|--|--|

**Duplicate (B8K1942-DUP1)**

Source: 8K19015-26

Prepared & Analyzed: 11/13/18

|                               |     |    |      |  |     |  |  |  |    |  |
|-------------------------------|-----|----|------|--|-----|--|--|--|----|--|
| Gasoline Range Organics (GRO) | <20 | 20 | ug/L |  | <20 |  |  |  | 30 |  |
|-------------------------------|-----|----|------|--|-----|--|--|--|----|--|

|                                 |       |  |      |      |      |        |  |  |  |  |
|---------------------------------|-------|--|------|------|------|--------|--|--|--|--|
| Surrogate: 4-Bromofluorobenzene | 0.246 |  | ug/L | 0.29 | 85.9 | 70-130 |  |  |  |  |
|---------------------------------|-------|--|------|------|------|--------|--|--|--|--|

Batch B8K2026 - \*\*\* DEFAULT PREP \*\*\*

**Blank (B8K2026-BLK1)**

Prepared & Analyzed: 11/14/18

|                               |     |    |      |  |  |  |  |  |  |  |
|-------------------------------|-----|----|------|--|--|--|--|--|--|--|
| Gasoline Range Organics (GRO) | <20 | 20 | ug/L |  |  |  |  |  |  |  |
|-------------------------------|-----|----|------|--|--|--|--|--|--|--|

Allen Aminian  
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### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| 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 B8K2026 - *** DEFAULT PREP ***</i>                 |              |                 |       |  |               |      |             |      |           |       |
| <b>Blank (B8K2026-BLK1) Continued</b>                       |              |                 |       | Prepared & Analyzed: 11/14/18                    |               |      |             |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>                      | 0.228        |                 | ug/L  | 0.29   |               | 79.7 | 70-130      |      |           |       |
| <b>LCS (B8K2026-BS1)</b>                                    |              |                 |       | Prepared & Analyzed: 11/14/18                    |               |      |             |      |           |       |
| Gasoline Range Organics (GRO)                               | <b>0.876</b> | 20              | ug/L  | 0.82   |               | 107  | 70-130      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>                      | 0.247        |                 | ug/L  | 0.29   |               | 86.3 | 70-130      |      |           |       |
| <b>LCS Dup (B8K2026-BSD1)</b>                               |              |                 |       | Prepared & Analyzed: 11/14/18                    |               |      |             |      |           |       |
| Gasoline Range Organics (GRO)                               | <b>0.834</b> | 20              | ug/L  | 0.82   |               | 102  | 70-130      | 4.88 | 30        |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>                      | 0.240        |                 | ug/L  | 0.29   |               | 83.8 | 70-130      |      |           |       |
| <i>Batch B8K2033 - *** DEFAULT PREP ***</i>                 |              |                 |       |  |               |      |             |      |           |       |
| <b>Blank (B8K2033-BLK1)</b>                                 |              |                 |       | Prepared & Analyzed: 11/16/18                    |               |      |             |      |           |       |
| Gasoline Range Organics (GRO)                               | <20          | 20              | ug/L  |  |               |      |             |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>                      | 0.245        |                 | ug/L  | 0.29   |               | 85.5 | 70-130      |      |           |       |
| <b>LCS (B8K2033-BS1)</b>                                    |              |                 |       | Prepared & Analyzed: 11/16/18                    |               |      |             |      |           |       |
| Gasoline Range Organics (GRO)                               | <b>0.711</b> | 20              | ug/L  | 0.82   |               | 86.9 | 70-130      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>                      | 0.237        |                 | ug/L  | 0.29   |               | 82.7 | 70-130      |      |           |       |
| <b>LCS Dup (B8K2033-BSD1)</b>                               |              |                 |       | Prepared & Analyzed: 11/16/18                    |               |      |             |      |           |       |
| Gasoline Range Organics (GRO)                               | <b>0.746</b> | 20              | ug/L  | 0.82   |               | 91.2 | 70-130      | 4.83 | 30        |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>                      | 0.235        |                 | ug/L  | 0.29   |               | 82.0 | 70-130      |      |           |       |
| <b>Duplicate (B8K2033-DUP1)</b>                             |              |                 |       | Source: 8K19015-33 Prepared & Analyzed: 11/16/18 |               |      |             |      |           |       |
| Gasoline Range Organics (GRO)                               | <b>51.5</b>  | 20              | ug/L  |  | 46.9          |      |             | 9.41 | 30        |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>                      | 0.243        |                 | ug/L  | 0.29   |               | 84.8 | 70-130      |      |           |       |
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b> |              |                 |       |  |               |      |             |      |           |       |
| <i>Batch B8K1937 - *** DEFAULT PREP ***</i>                 |              |                 |       |  |               |      |             |      |           |       |
| <b>Blank (B8K1937-BLK1)</b>                                 |              |                 |       | Prepared & Analyzed: 11/12/18                    |               |      |             |      |           |       |
| 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  |  |               |      |             |      |           |       |

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**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

**VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control**

Batch B8K1937 - \*\*\* DEFAULT PREP \*\*\*

**Blank (B8K1937-BLK1) Continued**

Prepared & Analyzed: 11/12/18

|                               |        |       |      |  |  |  |  |  |  |  |
|-------------------------------|--------|-------|------|--|--|--|--|--|--|--|
| 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 |  |  |  |  |  |  |  |
| 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 |  |  |  |  |  |  |  |

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 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Analyte   | Result | Reporting Limit | Units | Spike Level | Source Result | %REC %REC | Limit | RPD | RPD Limit | Notes |
|---|--------|-----------------|-------|-------------|---------------|-----------|-------|-----|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b> |        |                 |       |             |               |           |       |     |           |       |
| <i>Batch B8K1937 - *** DEFAULT PREP ***</i>                 |        |                 |       |             |               |           |       |     |           |       |
| <b>Blank (B8K1937-BLK1) Continued</b>                       |        |                 |       |             |               |           |       |     |           |       |
| Prepared & Analyzed: 11/12/18                               |        |                 |       |             |               |           |       |     |           |       |
| 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  |             |               |           |       |     |           |       |
| 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  |             |               |           |       |     |           |       |

**Allen Aminian**  
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

Client: CH2M Hill, Inc.  
 Project No: 693142  
 Project Name: KMEP Norwalk Biosparge Startup

AA Project No: MB187323  
 Date Received: 11/16/18  
 Date Reported: 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

#### VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control

Batch B8K1937 - \*\*\* DEFAULT PREP \*\*\*

##### Blank (B8K1937-BLK1) Continued

Prepared & Analyzed: 11/12/18

|                        |        |       |      |
|------------------------|--------|-------|------|
| m,p-Xylenes            | <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 |

Surrogate: 4-Bromofluorobenzene 0.128 ug/L

0.14 89.4 70-130

##### LCS (B8K1937-BS1)

Prepared & Analyzed: 11/12/18

|                               |               |       |      |       |      |        |    |     |
|-------------------------------|---------------|-------|------|-------|------|--------|----|-----|
| Acetone                       | <b>0.0358</b> | 0.020 | ug/L | 0.024 | 151  | 70-130 | 30 | **  |
| Benzene                       | <b>0.0351</b> | 0.020 | ug/L | 0.032 | 110  | 70-130 | 30 |     |
| Benzyl chloride               | <b>0.0610</b> | 0.020 | ug/L | 0.052 | 118  | 70-130 | 30 |     |
| Bromodichloromethane          | <b>0.0658</b> | 0.020 | ug/L | 0.067 | 98.2 | 70-130 | 30 |     |
| Bromoform                     | <b>0.0901</b> | 0.020 | ug/L | 0.10  | 87.2 | 70-130 | 30 |     |
| Bromomethane                  | <b>0.0448</b> | 0.020 | ug/L | 0.039 | 116  | 70-130 | 30 |     |
| 2-Butanone (MEK)              | <b>0.0474</b> | 0.020 | ug/L | 0.029 | 161  | 70-130 | 30 | **  |
| Carbon Disulfide              | <b>0.0367</b> | 0.020 | ug/L | 0.031 | 118  | 70-130 | 30 |     |
| Carbon Tetrachloride          | <b>0.0545</b> | 0.020 | ug/L | 0.063 | 86.6 | 70-130 | 30 |     |
| Chlorobenzene                 | <b>0.0521</b> | 0.020 | ug/L | 0.046 | 113  | 70-130 | 30 |     |
| Chloroethane                  | <b>0.0373</b> | 0.020 | ug/L | 0.026 | 141  | 70-130 | 30 | **  |
| Chloroform                    | <b>0.0517</b> | 0.020 | ug/L | 0.049 | 106  | 70-130 | 30 |     |
| Chloromethane                 | <b>0.0291</b> | 0.020 | ug/L | 0.021 | 141  | 70-130 | 30 | **  |
| Dibromochloromethane          | <b>0.0759</b> | 0.020 | ug/L | 0.085 | 89.1 | 70-130 | 30 |     |
| 1,2-Dibromoethane (EDB)       | <b>0.0811</b> | 0.020 | ug/L | 0.077 | 106  | 70-130 | 30 |     |
| 1,2-Dichlorobenzene           | <b>0.0603</b> | 0.020 | ug/L | 0.060 | 100  | 70-130 | 30 |     |
| 1,3-Dichlorobenzene           | <b>0.0598</b> | 0.020 | ug/L | 0.060 | 99.4 | 70-130 | 30 |     |
| 1,4-Dichlorobenzene           | <b>0.0595</b> | 0.020 | ug/L | 0.060 | 98.9 | 70-130 | 30 |     |
| Dichlorodifluoromethane (R12) | <b>0.0298</b> | 0.020 | ug/L | 0.049 | 60.2 | 70-130 | 30 | *** |
| 1,1-Dichloroethane            | <b>0.0485</b> | 0.020 | ug/L | 0.040 | 120  | 70-130 | 30 |     |
| 1,2-Dichloroethane (EDC)      | <b>0.0425</b> | 0.020 | ug/L | 0.040 | 105  | 70-130 | 30 |     |
| cis-1,2-Dichloroethylene      | <b>0.0456</b> | 0.020 | ug/L | 0.040 | 115  | 70-130 | 30 |     |

Allen Aminian  
QA/QC Manager



LABORATORY ANALYSIS RESULTS

Client: CH2M Hill, Inc.
Project No: 693142
Project Name: KMEP Norwalk Biosparge Startup

AA Project No: MB187323
Date Received: 11/16/18
Date Reported: 11/28/18

Table with 11 columns: Analyte, Result, Reporting Limit, Units, Spike Level, Source Result, %REC, %REC Limits, RPD, RPD Limit, Notes

VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control

Batch B8K1937 - \*\*\* DEFAULT PREP \*\*\*

LCS (B8K1937-BS1) Continued

Prepared & Analyzed: 11/12/18

Main data table listing analytes such as 1,1-Dichloroethylene, trans-1,2-Dichloroethylene, etc., with their respective results and limits.

Handwritten signature of Allen Aminian

Allen Aminian
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

Client: CH2M Hill, Inc.  
Project No: 693142  
Project Name: KMEP Norwalk Biosparge Startup

AA Project No: MB187323  
Date Received: 11/16/18  
Date Reported: 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

#### VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control

Batch B8K1937 - \*\*\* DEFAULT PREP \*\*\*

#### LCS (B8K1937-BS1) Continued

Prepared & Analyzed: 11/12/18

|                    |        |       |      |       |     |        |  |    |  |    |
|--------------------|--------|-------|------|-------|-----|--------|--|----|--|----|
| Isopropylbenzene   | 0.0604 | 0.020 | ug/L | 0.049 | 123 | 70-130 |  | 30 |  |    |
| n-Propylbenzene    | 0.0644 | 0.020 | ug/L | 0.049 | 131 | 70-130 |  | 30 |  | ** |
| 4-Isopropyltoluene | 0.0689 | 0.020 | ug/L | 0.055 | 126 | 70-130 |  | 30 |  |    |

Surrogate: 4-Bromofluorobenzene 0.138 ug/L 0.14 96.3 70-130

#### LCS Dup (B8K1937-BSD1)

Prepared & Analyzed: 11/12/18

|                               |        |       |      |       |      |        |        |    |  |     |
|-------------------------------|--------|-------|------|-------|------|--------|--------|----|--|-----|
| Acetone                       | 0.0299 | 0.020 | ug/L | 0.024 | 126  | 70-130 | 18.0   | 30 |  |     |
| Benzene                       | 0.0351 | 0.020 | ug/L | 0.032 | 110  | 70-130 | 0.0910 | 30 |  |     |
| Benzyl chloride               | 0.0564 | 0.020 | ug/L | 0.052 | 109  | 70-130 | 7.85   | 30 |  |     |
| Bromodichloromethane          | 0.0588 | 0.020 | ug/L | 0.067 | 87.7 | 70-130 | 11.3   | 30 |  |     |
| Bromoform                     | 0.0923 | 0.020 | ug/L | 0.10  | 89.3 | 70-130 | 2.38   | 30 |  |     |
| Bromomethane                  | 0.0424 | 0.020 | ug/L | 0.039 | 109  | 70-130 | 5.70   | 30 |  |     |
| 2-Butanone (MEK)              | 0.0413 | 0.020 | ug/L | 0.029 | 140  | 70-130 | 13.8   | 30 |  | **  |
| Carbon Disulfide              | 0.0344 | 0.020 | ug/L | 0.031 | 111  | 70-130 | 6.39   | 30 |  |     |
| Carbon Tetrachloride          | 0.0486 | 0.020 | ug/L | 0.063 | 77.2 | 70-130 | 11.5   | 30 |  |     |
| Chlorobenzene                 | 0.0522 | 0.020 | ug/L | 0.046 | 113  | 70-130 | 0.177  | 30 |  |     |
| Chloroethane                  | 0.0326 | 0.020 | ug/L | 0.026 | 124  | 70-130 | 13.5   | 30 |  |     |
| Chloroform                    | 0.0456 | 0.020 | ug/L | 0.049 | 93.4 | 70-130 | 12.5   | 30 |  |     |
| Chloromethane                 | 0.0243 | 0.020 | ug/L | 0.021 | 118  | 70-130 | 18.0   | 30 |  |     |
| Dibromochloromethane          | 0.0745 | 0.020 | ug/L | 0.085 | 87.4 | 70-130 | 1.93   | 30 |  |     |
| 1,2-Dibromoethane (EDB)       | 0.0814 | 0.020 | ug/L | 0.077 | 106  | 70-130 | 0.473  | 30 |  |     |
| 1,2-Dichlorobenzene           | 0.0613 | 0.020 | ug/L | 0.060 | 102  | 70-130 | 1.58   | 30 |  |     |
| 1,3-Dichlorobenzene           | 0.0599 | 0.020 | ug/L | 0.060 | 99.7 | 70-130 | 0.301  | 30 |  |     |
| 1,4-Dichlorobenzene           | 0.0598 | 0.020 | ug/L | 0.060 | 99.5 | 70-130 | 0.605  | 30 |  |     |
| Dichlorodifluoromethane (R12) | 0.0248 | 0.020 | ug/L | 0.049 | 50.2 | 70-130 | 18.1   | 30 |  | *** |
| 1,1-Dichloroethane            | 0.0422 | 0.020 | ug/L | 0.040 | 104  | 70-130 | 13.8   | 30 |  |     |
| 1,2-Dichloroethane (EDC)      | 0.0355 | 0.020 | ug/L | 0.040 | 87.8 | 70-130 | 17.8   | 30 |  |     |
| cis-1,2-Dichloroethylene      | 0.0457 | 0.020 | ug/L | 0.040 | 115  | 70-130 | 0.261  | 30 |  |     |
| 1,1-Dichloroethylene          | 0.0395 | 0.020 | ug/L | 0.040 | 99.7 | 70-130 | 15.2   | 30 |  |     |
| trans-1,2-Dichloroethylene    | 0.0415 | 0.020 | ug/L | 0.040 | 105  | 70-130 | 1.64   | 30 |  |     |
| 1,2-Dichloropropane           | 0.0518 | 0.020 | ug/L | 0.046 | 112  | 70-130 | 6.72   | 30 |  |     |
| trans-1,3-Dichloropropylene   | 0.0415 | 0.020 | ug/L | 0.045 | 91.5 | 70-130 | 6.25   | 30 |  |     |

Allen Aminian  
QA/QC Manager





## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Analyte   | Result        | Reporting Limit | Units | Spike Level | Source Result                 | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|---|---------------|-----------------|-------|-------------|-------------------------------|------|-------------|-------|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b> |               |                 |       |             |                               |      |             |       |           |       |
| <i>Batch B8K1937 - *** DEFAULT PREP ***</i>                 |               |                 |       |             |                               |      |             |       |           |       |
| <b>LCS Dup (B8K1937-BSD1) Continued</b>                     |               |                 |       |             | Prepared & Analyzed: 11/12/18 |      |             |       |           |       |
| cis-1,3-Dichloropropylene                                   | <b>0.0429</b> | 0.020           | ug/L  | 0.045       |                               | 94.6 | 70-130      | 5.65  | 30        |       |
| Dichlorotetrafluoroethane                                   | <b>0.0565</b> | 0.020           | ug/L  | 0.070       |                               | 80.8 | 70-130      | 17.6  | 30        |       |
| Ethylbenzene  | <b>0.0499</b> | 0.020           | ug/L  | 0.043       |                               | 115  | 70-130      | 1.55  | 30        |       |
| 4-Ethyltoluene  | <b>0.0618</b> | 0.020           | ug/L  | 0.049       |                               | 126  | 70-130      | 4.36  | 30        |       |
| Hexachlorobutadiene   | <b>0.0867</b> | 0.020           | ug/L  | 0.11        |                               | 81.3 | 70-130      | 2.74  | 30        |       |
| 2-Hexanone (MBK)  | <b>0.0545</b> | 0.020           | ug/L  | 0.041       |                               | 133  | 70-130      | 19.6  | 30        | **    |
| Isopropanol (IPA)   | <b>0.0315</b> | 0.20            | ug/L  | 0.025       |                               | 128  | 70-130      | 14.5  | 30        |       |
| Methylene Chloride  | <b>0.0401</b> | 0.020           | ug/L  | 0.035       |                               | 115  | 70-130      | 5.89  | 30        |       |
| 4-Methyl-2-pentanone (MIBK)                                 | <b>0.0635</b> | 0.020           | ug/L  | 0.041       |                               | 155  | 70-130      | 23.9  | 30        | **    |
| Styrene   | <b>0.0484</b> | 0.020           | ug/L  | 0.043       |                               | 114  | 70-130      | 0.176 | 30        |       |
| 1,1,2,2-Tetrachloroethane                                   | <b>0.0587</b> | 0.020           | ug/L  | 0.069       |                               | 85.5 | 70-130      | 8.30  | 30        |       |
| Tetrachloroethylene (PCE)                                   | <b>0.0609</b> | 0.020           | ug/L  | 0.068       |                               | 89.7 | 70-130      | 8.60  | 30        |       |
| Toluene   | <b>0.0412</b> | 0.020           | ug/L  | 0.038       |                               | 109  | 70-130      | 1.99  | 30        |       |
| 1,2,4-Trichlorobenzene                                      | <b>0.0616</b> | 0.020           | ug/L  | 0.074       |                               | 83.0 | 70-130      | 5.70  | 30        |       |
| 1,1,2-Trichloroethane                                       | <b>0.0611</b> | 0.020           | ug/L  | 0.055       |                               | 112  | 70-130      | 2.82  | 30        |       |
| 1,1,1-Trichloroethane                                       | <b>0.0434</b> | 0.020           | ug/L  | 0.055       |                               | 79.6 | 70-130      | 11.0  | 30        |       |
| Trichloroethylene (TCE)                                     | <b>0.0593</b> | 0.020           | ug/L  | 0.054       |                               | 110  | 70-130      | 5.12  | 30        |       |
| Trichlorofluoromethane (R11)                                | <b>0.0496</b> | 0.020           | ug/L  | 0.056       |                               | 88.3 | 70-130      | 15.1  | 30        |       |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (R113)                | <b>0.0785</b> | 0.020           | ug/L  | 0.077       |                               | 102  | 70-130      | 7.07  | 30        |       |
| 1,3,5-Trimethylbenzene                                      | <b>0.0576</b> | 0.020           | ug/L  | 0.049       |                               | 117  | 70-130      | 4.59  | 30        |       |
| 1,2,4-Trimethylbenzene                                      | <b>0.0585</b> | 0.020           | ug/L  | 0.049       |                               | 119  | 70-130      | 4.76  | 30        |       |
| Vinyl acetate   | <b>0.0407</b> | 0.020           | ug/L  | 0.035       |                               | 116  | 70-130      | 17.1  | 30        |       |
| Vinyl chloride  | <b>0.0280</b> | 0.020           | ug/L  | 0.026       |                               | 109  | 70-130      | 12.3  | 30        |       |
| o-Xylene  | <b>0.0502</b> | 0.020           | ug/L  | 0.043       |                               | 116  | 70-130      | 5.80  | 30        |       |
| m,p-Xylenes   | <b>0.105</b>  | 0.020           | ug/L  | 0.087       |                               | 121  | 70-130      | 0.457 | 30        |       |
| 1,2,3-Trichloropropane                                      | <b>0.0730</b> | 0.020           | ug/L  | 0.060       |                               | 121  | 70-130      | 11.9  | 30        |       |
| sec-Butylbenzene  | <b>0.0704</b> | 0.020           | ug/L  | 0.055       |                               | 128  | 70-130      | 5.24  | 30        |       |
| Isopropylbenzene  | <b>0.0581</b> | 0.020           | ug/L  | 0.049       |                               | 118  | 70-130      | 3.82  | 30        |       |
| n-Propylbenzene   | <b>0.0611</b> | 0.020           | ug/L  | 0.049       |                               | 124  | 70-130      | 5.25  | 30        |       |
| 4-Isopropyltoluene  | <b>0.0672</b> | 0.020           | ug/L  | 0.055       |                               | 122  | 70-130      | 2.58  | 30        |       |

**Allen Aminian**  
QA/QC Manager



**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

**VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control**

Batch B8K1937 - \*\*\* DEFAULT PREP \*\*\*

**LCS Dup (B8K1937-BSD1) Continued**

Prepared & Analyzed: 11/12/18

Surrogate: 4-Bromofluorobenzene 0.128 ug/L 0.14 89.2 70-130

**Duplicate (B8K1937-DUP1)**

Source: 8K19015-10 Prepared & Analyzed: 11/12/18

|                               |        |       |      |        |  |  |  |  |    |  |
|-------------------------------|--------|-------|------|--------|--|--|--|--|----|--|
| 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 |  |
| 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 |  |

**Allen Aminian**  
 QA/QC Manager





### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC %REC | Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|-----------|--------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|-----------|--------|-----|-----------|-------|

**VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control**

Batch B8K1937 - \*\*\* DEFAULT PREP \*\*\*

**Duplicate (B8K1937-DUP1) Continued Source: 8K19015-10 Prepared & Analyzed: 11/12/18**

|  |        |       |      |  |        |  |  |      |    |  |
|--|--------|-------|------|--|--------|--|--|------|----|--|
| 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 |  | 0.0135 |  |  | 25.6 | 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 |  |

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Analyte  | Result       | Reporting Limit | Units       | Spike Level | Source Result | %REC        | %REC Limits   | RPD | RPD Limit | Notes |
|--|--------------|-----------------|-------------|-------------|---------------|-------------|---------------|-----|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b>                                    |              |                 |             |             |               |             |               |     |           |       |
| <i>Batch B8K1937 - *** DEFAULT PREP ***</i>  |              |                 |             |             |               |             |               |     |           |       |
| <b>Duplicate (B8K1937-DUP1) Continued Source: 8K19015-10 Prepared &amp; Analyzed: 11/12/18</b> |              |                 |             |             |               |             |               |     |           |       |
| 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        |       |
| 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>0.135</i> |                 | <i>ug/L</i> | <i>0.14</i> |               | <i>94.0</i> | <i>70-130</i> |     |           |       |
| <i>Batch B8K1940 - *** DEFAULT PREP ***</i>  |              |                 |             |             |               |             |               |     |           |       |
| <b>Blank (B8K1940-BLK1) Prepared &amp; Analyzed: 11/13/18</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        |             |               |             |               |     |           |       |

**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

Client: CH2M Hill, Inc.  
 Project No: 693142  
 Project Name: KMEP Norwalk Biosparge Startup

AA Project No: MB187323  
 Date Received: 11/16/18  
 Date Reported: 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

#### VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control

Batch B8K1940 - \*\*\* DEFAULT PREP \*\*\*

#### Blank (B8K1940-BLK1) Continued

Prepared & Analyzed: 11/13/18

|                                |        |       |      |  |  |  |  |  |  |  |
|--------------------------------|--------|-------|------|--|--|--|--|--|--|--|
| 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 |  |  |  |  |  |  |  |
| 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 |  |  |  |  |  |  |  |

Allen Aminian  
QA/QC Manager



**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Analyte   | Result       | Reporting Limit | Units       | Spike Level | Source Result | %REC %REC   | Limits        | RPD | RPD Limit | Notes |
|---|--------------|-----------------|-------------|-------------|---------------|-------------|---------------|-----|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b> |              |                 |             |             |               |             |               |     |           |       |
| <i>Batch B8K1940 - *** DEFAULT PREP ***</i>                 |              |                 |             |             |               |             |               |     |           |       |
| <b>Blank (B8K1940-BLK1) Continued</b>                       |              |                 |             |             |               |             |               |     |           |       |
| Prepared & Analyzed: 11/13/18                               |              |                 |             |             |               |             |               |     |           |       |
| 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        |             |               |             |               |     |           |       |
| 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        |             |               |             |               |     |           |       |
| 1,2,3-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>0.125</i> |                 | <i>ug/L</i> | <i>0.14</i> |               | <i>87.3</i> | <i>70-130</i> |     |           |       |

**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

Client: CH2M Hill, Inc.  
 Project No: 693142  
 Project Name: KMEP Norwalk Biosparge Startup

AA Project No: MB187323  
 Date Received: 11/16/18  
 Date Reported: 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

#### VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control

Batch B8K1940 - \*\*\* DEFAULT PREP \*\*\*

#### LCS (B8K1940-BS1)

Prepared & Analyzed: 11/13/18

|                               |        |       |      |       |      |        |    |  |  |
|-------------------------------|--------|-------|------|-------|------|--------|----|--|--|
| Acetone                       | 0.0255 | 0.020 | ug/L | 0.024 | 108  | 70-130 | 30 |  |  |
| Benzene                       | 0.0330 | 0.020 | ug/L | 0.032 | 103  | 70-130 | 30 |  |  |
| Benzyl chloride               | 0.0524 | 0.020 | ug/L | 0.052 | 101  | 70-130 | 30 |  |  |
| Bromodichloromethane          | 0.0537 | 0.020 | ug/L | 0.067 | 80.1 | 70-130 | 30 |  |  |
| Bromoform                     | 0.0913 | 0.020 | ug/L | 0.10  | 88.3 | 70-130 | 30 |  |  |
| Bromomethane                  | 0.0343 | 0.020 | ug/L | 0.039 | 88.4 | 70-130 | 30 |  |  |
| 2-Butanone (MEK)              | 0.0360 | 0.020 | ug/L | 0.029 | 122  | 70-130 | 30 |  |  |
| Carbon Disulfide              | 0.0308 | 0.020 | ug/L | 0.031 | 99.0 | 70-130 | 30 |  |  |
| Carbon Tetrachloride          | 0.0494 | 0.020 | ug/L | 0.063 | 78.6 | 70-130 | 30 |  |  |
| Chlorobenzene                 | 0.0497 | 0.020 | ug/L | 0.046 | 108  | 70-130 | 30 |  |  |
| Chloroethane                  | 0.0279 | 0.020 | ug/L | 0.026 | 106  | 70-130 | 30 |  |  |
| Chloroform                    | 0.0419 | 0.020 | ug/L | 0.049 | 85.8 | 70-130 | 30 |  |  |
| Chloromethane                 | 0.0213 | 0.020 | ug/L | 0.021 | 103  | 70-130 | 30 |  |  |
| Dibromochloromethane          | 0.0722 | 0.020 | ug/L | 0.085 | 84.7 | 70-130 | 30 |  |  |
| 1,2-Dibromoethane (EDB)       | 0.0769 | 0.020 | ug/L | 0.077 | 100  | 70-130 | 30 |  |  |
| 1,2-Dichlorobenzene           | 0.0599 | 0.020 | ug/L | 0.060 | 99.7 | 70-130 | 30 |  |  |
| 1,3-Dichlorobenzene           | 0.0590 | 0.020 | ug/L | 0.060 | 98.1 | 70-130 | 30 |  |  |
| 1,4-Dichlorobenzene           | 0.0588 | 0.020 | ug/L | 0.060 | 97.8 | 70-130 | 30 |  |  |
| Dichlorodifluoromethane (R12) | 0.0424 | 0.020 | ug/L | 0.049 | 85.8 | 70-130 | 30 |  |  |
| 1,1-Dichloroethane            | 0.0374 | 0.020 | ug/L | 0.040 | 92.5 | 70-130 | 30 |  |  |
| 1,2-Dichloroethane (EDC)      | 0.0306 | 0.020 | ug/L | 0.040 | 75.7 | 70-130 | 30 |  |  |
| cis-1,2-Dichloroethylene      | 0.0400 | 0.020 | ug/L | 0.040 | 101  | 70-130 | 30 |  |  |
| 1,1-Dichloroethylene          | 0.0348 | 0.020 | ug/L | 0.040 | 87.7 | 70-130 | 30 |  |  |
| trans-1,2-Dichloroethylene    | 0.0382 | 0.020 | ug/L | 0.040 | 96.4 | 70-130 | 30 |  |  |
| 1,2-Dichloropropane           | 0.0470 | 0.020 | ug/L | 0.046 | 102  | 70-130 | 30 |  |  |
| trans-1,3-Dichloropropylene   | 0.0373 | 0.020 | ug/L | 0.045 | 82.1 | 70-130 | 30 |  |  |
| cis-1,3-Dichloropropylene     | 0.0394 | 0.020 | ug/L | 0.045 | 86.8 | 70-130 | 30 |  |  |
| Dichlorotetrafluoroethane     | 0.0490 | 0.020 | ug/L | 0.070 | 70.1 | 70-130 | 30 |  |  |
| Ethylbenzene                  | 0.0459 | 0.020 | ug/L | 0.043 | 106  | 70-130 | 30 |  |  |
| 4-Ethyltoluene                | 0.0588 | 0.020 | ug/L | 0.049 | 120  | 70-130 | 30 |  |  |
| Hexachlorobutadiene           | 0.0894 | 0.020 | ug/L | 0.11  | 83.8 | 70-130 | 30 |  |  |
| 2-Hexanone (MBK)              | 0.0492 | 0.020 | ug/L | 0.041 | 120  | 70-130 | 30 |  |  |

Allen Aminian  
QA/QC Manager



**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

**VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control**

Batch B8K1940 - \*\*\* DEFAULT PREP \*\*\*

**LCS (B8K1940-BS1) Continued**

Prepared & Analyzed: 11/13/18

|  |        |       |      |       |  |      |        |  |    |    |
|--|--------|-------|------|-------|--|------|--------|--|----|----|
| Isopropanol (IPA)                            | 0.0279 | 0.20  | ug/L | 0.025 |  | 114  | 70-130 |  | 30 |    |
| Methylene Chloride                           | 0.0366 | 0.020 | ug/L | 0.035 |  | 105  | 70-130 |  | 30 |    |
| 4-Methyl-2-pentanone (MIBK)                  | 0.0574 | 0.020 | ug/L | 0.041 |  | 140  | 70-130 |  | 30 | ** |
| Styrene                                      | 0.0456 | 0.020 | ug/L | 0.043 |  | 107  | 70-130 |  | 30 |    |
| 1,1,2,2-Tetrachloroethane                    | 0.0528 | 0.020 | ug/L | 0.069 |  | 76.9 | 70-130 |  | 30 |    |
| Tetrachloroethylene (PCE)                    | 0.0616 | 0.020 | ug/L | 0.068 |  | 90.8 | 70-130 |  | 30 |    |
| Toluene                                      | 0.0395 | 0.020 | ug/L | 0.038 |  | 105  | 70-130 |  | 30 |    |
| 1,2,4-Trichlorobenzene                       | 0.0651 | 0.020 | ug/L | 0.074 |  | 87.7 | 70-130 |  | 30 |    |
| 1,1,2-Trichloroethane                        | 0.0590 | 0.020 | ug/L | 0.055 |  | 108  | 70-130 |  | 30 |    |
| 1,1,1-Trichloroethane                        | 0.0413 | 0.020 | ug/L | 0.055 |  | 75.6 | 70-130 |  | 30 |    |
| Trichloroethylene (TCE)                      | 0.0551 | 0.020 | ug/L | 0.054 |  | 102  | 70-130 |  | 30 |    |
| Trichlorofluoromethane (R11)                 | 0.0448 | 0.020 | ug/L | 0.056 |  | 79.8 | 70-130 |  | 30 |    |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (R113) | 0.0733 | 0.020 | ug/L | 0.077 |  | 95.6 | 70-130 |  | 30 |    |
| 1,3,5-Trimethylbenzene                       | 0.0551 | 0.020 | ug/L | 0.049 |  | 112  | 70-130 |  | 30 |    |
| 1,2,4-Trimethylbenzene                       | 0.0543 | 0.020 | ug/L | 0.049 |  | 110  | 70-130 |  | 30 |    |
| Vinyl acetate                                | 0.0350 | 0.020 | ug/L | 0.035 |  | 99.4 | 70-130 |  | 30 |    |
| Vinyl chloride                               | 0.0242 | 0.020 | ug/L | 0.026 |  | 94.8 | 70-130 |  | 30 |    |
| o-Xylene                                     | 0.0456 | 0.020 | ug/L | 0.043 |  | 105  | 70-130 |  | 30 |    |
| m,p-Xylenes                                  | 0.0996 | 0.020 | ug/L | 0.087 |  | 115  | 70-130 |  | 30 |    |
| 1,2,3-Trichloropropane                       | 0.0650 | 0.020 | ug/L | 0.060 |  | 108  | 70-130 |  | 30 |    |
| sec-Butylbenzene                             | 0.0641 | 0.020 | ug/L | 0.055 |  | 117  | 70-130 |  | 30 |    |
| Isopropylbenzene                             | 0.0550 | 0.020 | ug/L | 0.049 |  | 112  | 70-130 |  | 30 |    |
| n-Propylbenzene                              | 0.0554 | 0.020 | ug/L | 0.049 |  | 113  | 70-130 |  | 30 |    |
| 4-Isopropyltoluene                           | 0.0640 | 0.020 | ug/L | 0.055 |  | 116  | 70-130 |  | 30 |    |

Surrogate: 4-Bromofluorobenzene 0.123 ug/L 0.14 86.0 70-130

**LCS Dup (B8K1940-BSD1)**

Prepared & Analyzed: 11/13/18

|                      |        |       |      |       |  |      |        |       |    |  |
|----------------------|--------|-------|------|-------|--|------|--------|-------|----|--|
| Acetone              | 0.0247 | 0.020 | ug/L | 0.024 |  | 104  | 70-130 | 3.41  | 30 |  |
| Benzene              | 0.0329 | 0.020 | ug/L | 0.032 |  | 103  | 70-130 | 0.485 | 30 |  |
| Benzyl chloride      | 0.0517 | 0.020 | ug/L | 0.052 |  | 99.9 | 70-130 | 1.29  | 30 |  |
| Bromodichloromethane | 0.0525 | 0.020 | ug/L | 0.067 |  | 78.3 | 70-130 | 2.27  | 30 |  |

**Allen Aminian**  
 QA/QC Manager





**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

**VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control**

Batch B8K1940 - \*\*\* DEFAULT PREP \*\*\*

**LCS Dup (B8K1940-BSD1) Continued**

Prepared & Analyzed: 11/13/18

|                               |        |       |      |       |  |      |        |        |    |               |
|-------------------------------|--------|-------|------|-------|--|------|--------|--------|----|---------------|
| Bromoform                     | 0.0928 | 0.020 | ug/L | 0.10  |  | 89.8 | 70-130 | 1.68   | 30 |               |
| Bromomethane                  | 0.0347 | 0.020 | ug/L | 0.039 |  | 89.4 | 70-130 | 1.12   | 30 |               |
| 2-Butanone (MEK)              | 0.0355 | 0.020 | ug/L | 0.029 |  | 120  | 70-130 | 1.24   | 30 |               |
| Carbon Disulfide              | 0.0312 | 0.020 | ug/L | 0.031 |  | 100  | 70-130 | 1.30   | 30 |               |
| Carbon Tetrachloride          | 0.0493 | 0.020 | ug/L | 0.063 |  | 78.4 | 70-130 | 0.255  | 30 |               |
| Chlorobenzene                 | 0.0495 | 0.020 | ug/L | 0.046 |  | 108  | 70-130 | 0.371  | 30 |               |
| Chloroethane                  | 0.0289 | 0.020 | ug/L | 0.026 |  | 110  | 70-130 | 3.72   | 30 |               |
| Chloroform                    | 0.0416 | 0.020 | ug/L | 0.049 |  | 85.3 | 70-130 | 0.584  | 30 |               |
| Chloromethane                 | 0.0208 | 0.020 | ug/L | 0.021 |  | 101  | 70-130 | 2.36   | 30 |               |
| Dibromochloromethane          | 0.0719 | 0.020 | ug/L | 0.085 |  | 84.4 | 70-130 | 0.355  | 30 |               |
| 1,2-Dibromoethane (EDB)       | 0.0765 | 0.020 | ug/L | 0.077 |  | 99.5 | 70-130 | 0.601  | 30 |               |
| 1,2-Dichlorobenzene           | 0.0605 | 0.020 | ug/L | 0.060 |  | 101  | 70-130 | 0.899  | 30 |               |
| 1,3-Dichlorobenzene           | 0.0593 | 0.020 | ug/L | 0.060 |  | 98.7 | 70-130 | 0.610  | 30 |               |
| 1,4-Dichlorobenzene           | 0.0597 | 0.020 | ug/L | 0.060 |  | 99.3 | 70-130 | 1.52   | 30 |               |
| Dichlorodifluoromethane (R12) | 0.0203 | 0.020 | ug/L | 0.049 |  | 41.1 | 70-130 | 70.4   | 30 | ***,<br>AA-C1 |
| 1,1-Dichloroethane            | 0.0371 | 0.020 | ug/L | 0.040 |  | 91.7 | 70-130 | 0.869  | 30 |               |
| 1,2-Dichloroethane (EDC)      | 0.0302 | 0.020 | ug/L | 0.040 |  | 74.5 | 70-130 | 1.60   | 30 |               |
| cis-1,2-Dichloroethylene      | 0.0433 | 0.020 | ug/L | 0.040 |  | 109  | 70-130 | 7.80   | 30 |               |
| 1,1-Dichloroethylene          | 0.0345 | 0.020 | ug/L | 0.040 |  | 86.9 | 70-130 | 0.916  | 30 |               |
| trans-1,2-Dichloroethylene    | 0.0385 | 0.020 | ug/L | 0.040 |  | 97.2 | 70-130 | 0.826  | 30 |               |
| 1,2-Dichloropropane           | 0.0461 | 0.020 | ug/L | 0.046 |  | 99.7 | 70-130 | 1.99   | 30 |               |
| trans-1,3-Dichloropropylene   | 0.0372 | 0.020 | ug/L | 0.045 |  | 82.0 | 70-130 | 0.122  | 30 |               |
| cis-1,3-Dichloropropylene     | 0.0388 | 0.020 | ug/L | 0.045 |  | 85.4 | 70-130 | 1.63   | 30 |               |
| Dichlorotetrafluoroethane     | 0.0491 | 0.020 | ug/L | 0.070 |  | 70.2 | 70-130 | 0.143  | 30 |               |
| Ethylbenzene                  | 0.0458 | 0.020 | ug/L | 0.043 |  | 106  | 70-130 | 0.0948 | 30 |               |
| 4-Ethyltoluene                | 0.0591 | 0.020 | ug/L | 0.049 |  | 120  | 70-130 | 0.417  | 30 |               |
| Hexachlorobutadiene           | 0.0882 | 0.020 | ug/L | 0.11  |  | 82.7 | 70-130 | 1.32   | 30 |               |
| 2-Hexanone (MBK)              | 0.0430 | 0.020 | ug/L | 0.041 |  | 105  | 70-130 | 13.5   | 30 |               |
| Isopropanol (IPA)             | 0.0278 | 0.20  | ug/L | 0.025 |  | 113  | 70-130 | 0.265  | 30 |               |
| Methylene Chloride            | 0.0367 | 0.020 | ug/L | 0.035 |  | 106  | 70-130 | 0.285  | 30 |               |
| 4-Methyl-2-pentanone (MIBK)   | 0.0530 | 0.020 | ug/L | 0.041 |  | 130  | 70-130 | 7.79   | 30 |               |

**Allen Aminian**  
 QA/QC Manager



**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

**VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control**

Batch B8K1940 - \*\*\* DEFAULT PREP \*\*\*

**LCS Dup (B8K1940-BSD1) Continued**

Prepared & Analyzed: 11/13/18

|  |        |       |      |       |      |        |        |    |  |
|--|--------|-------|------|-------|------|--------|--------|----|--|
| Styrene                                      | 0.0464 | 0.020 | ug/L | 0.043 | 109  | 70-130 | 1.76   | 30 |  |
| 1,1,2,2-Tetrachloroethane                    | 0.0527 | 0.020 | ug/L | 0.069 | 76.7 | 70-130 | 0.260  | 30 |  |
| Tetrachloroethylene (PCE)                    | 0.0630 | 0.020 | ug/L | 0.068 | 92.9 | 70-130 | 2.29   | 30 |  |
| Toluene                                      | 0.0395 | 0.020 | ug/L | 0.038 | 105  | 70-130 | 0.00   | 30 |  |
| 1,2,4-Trichlorobenzene                       | 0.0642 | 0.020 | ug/L | 0.074 | 86.5 | 70-130 | 1.38   | 30 |  |
| 1,1,2-Trichloroethane                        | 0.0590 | 0.020 | ug/L | 0.055 | 108  | 70-130 | 0.0925 | 30 |  |
| 1,1,1-Trichloroethane                        | 0.0405 | 0.020 | ug/L | 0.055 | 74.3 | 70-130 | 1.73   | 30 |  |
| Trichloroethylene (TCE)                      | 0.0541 | 0.020 | ug/L | 0.054 | 101  | 70-130 | 1.77   | 30 |  |
| Trichlorofluoromethane (R11)                 | 0.0446 | 0.020 | ug/L | 0.056 | 79.4 | 70-130 | 0.503  | 30 |  |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (R113) | 0.0745 | 0.020 | ug/L | 0.077 | 97.2 | 70-130 | 1.66   | 30 |  |
| 1,3,5-Trimethylbenzene                       | 0.0547 | 0.020 | ug/L | 0.049 | 111  | 70-130 | 0.717  | 30 |  |
| 1,2,4-Trimethylbenzene                       | 0.0540 | 0.020 | ug/L | 0.049 | 110  | 70-130 | 0.454  | 30 |  |
| Vinyl acetate                                | 0.0349 | 0.020 | ug/L | 0.035 | 99.0 | 70-130 | 0.403  | 30 |  |
| Vinyl chloride                               | 0.0235 | 0.020 | ug/L | 0.026 | 91.9 | 70-130 | 3.11   | 30 |  |
| o-Xylene                                     | 0.0458 | 0.020 | ug/L | 0.043 | 106  | 70-130 | 0.570  | 30 |  |
| m,p-Xylenes                                  | 0.100  | 0.020 | ug/L | 0.087 | 115  | 70-130 | 0.652  | 30 |  |
| 1,2,3-Trichloropropane                       | 0.0639 | 0.020 | ug/L | 0.060 | 106  | 70-130 | 1.78   | 30 |  |
| sec-Butylbenzene                             | 0.0649 | 0.020 | ug/L | 0.055 | 118  | 70-130 | 1.28   | 30 |  |
| Isopropylbenzene                             | 0.0553 | 0.020 | ug/L | 0.049 | 112  | 70-130 | 0.535  | 30 |  |
| n-Propylbenzene                              | 0.0557 | 0.020 | ug/L | 0.049 | 113  | 70-130 | 0.531  | 30 |  |
| 4-Isopropyltoluene                           | 0.0647 | 0.020 | ug/L | 0.055 | 118  | 70-130 | 1.19   | 30 |  |

Surrogate: 4-Bromofluorobenzene 0.121 ug/L 0.14 84.2 70-130

**Duplicate (B8K1940-DUP1)**

Source: 8K19015-26 Prepared & Analyzed: 11/13/18

|                               |        |       |      |        |  |  |  |    |  |
|-------------------------------|--------|-------|------|--------|--|--|--|----|--|
| 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 |  |

**Allen Aminian**  
QA/QC Manager





### LABORATORY ANALYSIS RESULTS

Client: CH2M Hill, Inc.  
Project No: 693142  
Project Name: KMEP Norwalk Biosparge Startup

AA Project No: MB187323  
Date Received: 11/16/18  
Date Reported: 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

#### VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control

Batch B8K1940 - \*\*\* DEFAULT PREP \*\*\*

Duplicate (B8K1940-DUP1) Continued Source: 8K19015-26 Prepared & Analyzed: 11/13/18

|                               |        |       |      |  |        |  |  |  |    |  |
|-------------------------------|--------|-------|------|--|--------|--|--|--|----|--|
| 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 |  |
| 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 |  |

Allen Aminian  
QA/QC Manager



LABORATORY ANALYSIS RESULTS

Client: CH2M Hill, Inc.
Project No: 693142
Project Name: KMEP Norwalk Biosparge Startup

AA Project No: MB187323
Date Received: 11/16/18
Date Reported: 11/28/18

Table with 10 columns: Analyte, Result, Reporting Limit, Units, Spike Level, Source Result, %REC, %REC Limits, RPD, RPD Limit, Notes

VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control

Batch B8K1940 - \*\*\* DEFAULT PREP \*\*\*

Duplicate (B8K1940-DUP1) Continued Source: 8K19015-26 Prepared & Analyzed: 11/13/18

Main data table listing analytes such as 4-Ethyltoluene, Heptane, Hexachlorobutadiene, etc., with their respective results and limits.

Handwritten signature of Allen Aminian

Allen Aminian
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Analyte  | Result       | Reporting Limit | Units       | Spike Level | Source Result | %REC        | %REC Limits   | RPD | RPD Limit | Notes |
|--|--------------|-----------------|-------------|-------------|---------------|-------------|---------------|-----|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b>                                    |              |                 |             |             |               |             |               |     |           |       |
| <i>Batch B8K1940 - *** DEFAULT PREP ***</i>  |              |                 |             |             |               |             |               |     |           |       |
| <b>Duplicate (B8K1940-DUP1) Continued Source: 8K19015-26 Prepared &amp; Analyzed: 11/13/18</b> |              |                 |             |             |               |             |               |     |           |       |
| 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>0.127</i> |                 | <i>ug/L</i> | <i>0.14</i> |               | <i>88.4</i> | <i>70-130</i> |     |           |       |
| <i>Batch B8K1944 - *** DEFAULT PREP ***</i>  |              |                 |             |             |               |             |               |     |           |       |
| <b>Blank (B8K1944-BLK1) Prepared &amp; Analyzed: 11/14/18</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        |             |               |             |               |     |           |       |

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Analyte   | Result | Reporting Limit | Units | Spike Level | Source Result | %REC %REC | Limit | RPD | RPD Limit | Notes |
|---|--------|-----------------|-------|-------------|---------------|-----------|-------|-----|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b> |        |                 |       |             |               |           |       |     |           |       |
| <i>Batch B8K1944 - *** DEFAULT PREP ***</i>                 |        |                 |       |             |               |           |       |     |           |       |
| <b>Blank (B8K1944-BLK1) Continued</b>                       |        |                 |       |             |               |           |       |     |           |       |
| Prepared & Analyzed: 11/14/18                               |        |                 |       |             |               |           |       |     |           |       |
| 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  |             |               |           |       |     |           |       |
| 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  |             |               |           |       |     |           |       |

**Allen Aminian**  
QA/QC Manager



**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

**VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control**

Batch B8K1944 - \*\*\* DEFAULT PREP \*\*\*

**Blank (B8K1944-BLK1) Continued**

Prepared & Analyzed: 11/14/18

|  |        |       |      |
|--|--------|-------|------|
| 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 |
| 1,2,3-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 |

Surrogate: 4-Bromofluorobenzene 0.117 ug/L 0.14 82.0 70-130

**LCS (B8K1944-BS1)**

Prepared & Analyzed: 11/14/18

|                      |               |       |      |       |      |        |    |
|----------------------|---------------|-------|------|-------|------|--------|----|
| Acetone              | <b>0.0280</b> | 0.020 | ug/L | 0.024 | 118  | 70-130 | 30 |
| Benzene              | <b>0.0349</b> | 0.020 | ug/L | 0.032 | 109  | 70-130 | 30 |
| Benzyl chloride      | <b>0.0568</b> | 0.020 | ug/L | 0.052 | 110  | 70-130 | 30 |
| Bromodichloromethane | <b>0.0599</b> | 0.020 | ug/L | 0.067 | 89.4 | 70-130 | 30 |
| Bromoform            | <b>0.0975</b> | 0.020 | ug/L | 0.10  | 94.3 | 70-130 | 30 |
| Bromomethane         | <b>0.0398</b> | 0.020 | ug/L | 0.039 | 102  | 70-130 | 30 |
| 2-Butanone (MEK)     | <b>0.0389</b> | 0.020 | ug/L | 0.029 | 132  | 70-130 | 30 |
| Carbon Disulfide     | <b>0.0339</b> | 0.020 | ug/L | 0.031 | 109  | 70-130 | 30 |

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 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

Client: CH2M Hill, Inc.  
 Project No: 693142  
 Project Name: KMEP Norwalk Biosparge Startup

AA Project No: MB187323  
 Date Received: 11/16/18  
 Date Reported: 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

#### VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control

Batch B8K1944 - \*\*\* DEFAULT PREP \*\*\*

#### LCS (B8K1944-BS1) Continued

Prepared & Analyzed: 11/14/18

|                               |        |       |      |       |  |      |        |  |    |     |
|-------------------------------|--------|-------|------|-------|--|------|--------|--|----|-----|
| Carbon Tetrachloride          | 0.0486 | 0.020 | ug/L | 0.063 |  | 77.2 | 70-130 |  | 30 |     |
| Chlorobenzene                 | 0.0540 | 0.020 | ug/L | 0.046 |  | 117  | 70-130 |  | 30 |     |
| Chloroethane                  | 0.0322 | 0.020 | ug/L | 0.026 |  | 122  | 70-130 |  | 30 |     |
| Chloroform                    | 0.0464 | 0.020 | ug/L | 0.049 |  | 95.1 | 70-130 |  | 30 |     |
| Chloromethane                 | 0.0243 | 0.020 | ug/L | 0.021 |  | 118  | 70-130 |  | 30 |     |
| Dibromochloromethane          | 0.0779 | 0.020 | ug/L | 0.085 |  | 91.4 | 70-130 |  | 30 |     |
| 1,2-Dibromoethane (EDB)       | 0.0832 | 0.020 | ug/L | 0.077 |  | 108  | 70-130 |  | 30 |     |
| 1,2-Dichlorobenzene           | 0.0645 | 0.020 | ug/L | 0.060 |  | 107  | 70-130 |  | 30 |     |
| 1,3-Dichlorobenzene           | 0.0634 | 0.020 | ug/L | 0.060 |  | 106  | 70-130 |  | 30 |     |
| 1,4-Dichlorobenzene           | 0.0649 | 0.020 | ug/L | 0.060 |  | 108  | 70-130 |  | 30 |     |
| Dichlorodifluoromethane (R12) | 0.0242 | 0.020 | ug/L | 0.049 |  | 49.0 | 70-130 |  | 30 | *** |
| 1,1-Dichloroethane            | 0.0410 | 0.020 | ug/L | 0.040 |  | 101  | 70-130 |  | 30 |     |
| 1,2-Dichloroethane (EDC)      | 0.0336 | 0.020 | ug/L | 0.040 |  | 83.1 | 70-130 |  | 30 |     |
| cis-1,2-Dichloroethylene      | 0.0467 | 0.020 | ug/L | 0.040 |  | 118  | 70-130 |  | 30 |     |
| 1,1-Dichloroethylene          | 0.0386 | 0.020 | ug/L | 0.040 |  | 97.4 | 70-130 |  | 30 |     |
| trans-1,2-Dichloroethylene    | 0.0412 | 0.020 | ug/L | 0.040 |  | 104  | 70-130 |  | 30 |     |
| 1,2-Dichloropropane           | 0.0521 | 0.020 | ug/L | 0.046 |  | 113  | 70-130 |  | 30 |     |
| trans-1,3-Dichloropropylene   | 0.0407 | 0.020 | ug/L | 0.045 |  | 89.6 | 70-130 |  | 30 |     |
| cis-1,3-Dichloropropylene     | 0.0430 | 0.020 | ug/L | 0.045 |  | 94.8 | 70-130 |  | 30 |     |
| Dichlorotetrafluoroethane     | 0.0575 | 0.020 | ug/L | 0.070 |  | 82.3 | 70-130 |  | 30 |     |
| Ethylbenzene                  | 0.0500 | 0.020 | ug/L | 0.043 |  | 115  | 70-130 |  | 30 |     |
| 4-Ethyltoluene                | 0.0644 | 0.020 | ug/L | 0.049 |  | 131  | 70-130 |  | 30 | **  |
| Hexachlorobutadiene           | 0.0961 | 0.020 | ug/L | 0.11  |  | 90.1 | 70-130 |  | 30 |     |
| 2-Hexanone (MBK)              | 0.0513 | 0.020 | ug/L | 0.041 |  | 125  | 70-130 |  | 30 |     |
| Isopropanol (IPA)             | 0.0302 | 0.20  | ug/L | 0.025 |  | 123  | 70-130 |  | 30 |     |
| Methylene Chloride            | 0.0406 | 0.020 | ug/L | 0.035 |  | 117  | 70-130 |  | 30 |     |
| 4-Methyl-2-pentanone (MIBK)   | 0.0599 | 0.020 | ug/L | 0.041 |  | 146  | 70-130 |  | 30 | **  |
| Styrene                       | 0.0492 | 0.020 | ug/L | 0.043 |  | 116  | 70-130 |  | 30 |     |
| 1,1,2,2-Tetrachloroethane     | 0.0594 | 0.020 | ug/L | 0.069 |  | 86.5 | 70-130 |  | 30 |     |
| Tetrachloroethylene (PCE)     | 0.0652 | 0.020 | ug/L | 0.068 |  | 96.1 | 70-130 |  | 30 |     |
| Toluene                       | 0.0426 | 0.020 | ug/L | 0.038 |  | 113  | 70-130 |  | 30 |     |
| 1,2,4-Trichlorobenzene        | 0.0672 | 0.020 | ug/L | 0.074 |  | 90.6 | 70-130 |  | 30 |     |

Allen Aminian  
QA/QC Manager



**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

**VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control**

Batch B8K1944 - \*\*\* DEFAULT PREP \*\*\*

**LCS (B8K1944-BS1) Continued**

Prepared & Analyzed: 11/14/18

|  |        |       |      |       |  |      |        |  |    |    |
|--|--------|-------|------|-------|--|------|--------|--|----|----|
| 1,1,2-Trichloroethane                        | 0.0645 | 0.020 | ug/L | 0.055 |  | 118  | 70-130 |  | 30 |    |
| 1,1,1-Trichloroethane                        | 0.0446 | 0.020 | ug/L | 0.055 |  | 81.7 | 70-130 |  | 30 |    |
| Trichloroethylene (TCE)                      | 0.0611 | 0.020 | ug/L | 0.054 |  | 114  | 70-130 |  | 30 |    |
| Trichlorofluoromethane (R11)                 | 0.0503 | 0.020 | ug/L | 0.056 |  | 89.6 | 70-130 |  | 30 |    |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (R113) | 0.0824 | 0.020 | ug/L | 0.077 |  | 108  | 70-130 |  | 30 |    |
| 1,3,5-Trimethylbenzene                       | 0.0593 | 0.020 | ug/L | 0.049 |  | 121  | 70-130 |  | 30 |    |
| 1,2,4-Trimethylbenzene                       | 0.0588 | 0.020 | ug/L | 0.049 |  | 120  | 70-130 |  | 30 |    |
| Vinyl acetate                                | 0.0386 | 0.020 | ug/L | 0.035 |  | 110  | 70-130 |  | 30 |    |
| Vinyl chloride                               | 0.0271 | 0.020 | ug/L | 0.026 |  | 106  | 70-130 |  | 30 |    |
| o-Xylene                                     | 0.0505 | 0.020 | ug/L | 0.043 |  | 116  | 70-130 |  | 30 |    |
| m,p-Xylenes                                  | 0.110  | 0.020 | ug/L | 0.087 |  | 126  | 70-130 |  | 30 |    |
| 1,2,3-Trichloropropane                       | 0.0736 | 0.020 | ug/L | 0.060 |  | 122  | 70-130 |  | 30 |    |
| sec-Butylbenzene                             | 0.0721 | 0.020 | ug/L | 0.055 |  | 131  | 70-130 |  | 30 | ** |
| Isopropylbenzene                             | 0.0597 | 0.020 | ug/L | 0.049 |  | 122  | 70-130 |  | 30 |    |
| n-Propylbenzene                              | 0.0613 | 0.020 | ug/L | 0.049 |  | 125  | 70-130 |  | 30 |    |
| 4-Isopropyltoluene                           | 0.0699 | 0.020 | ug/L | 0.055 |  | 127  | 70-130 |  | 30 |    |

Surrogate: 4-Bromofluorobenzene 0.123 ug/L

0.14 86.3 70-130

**LCS Dup (B8K1944-BSD1)**

Prepared & Analyzed: 11/14/18

|                      |        |       |      |       |  |      |        |       |    |  |
|----------------------|--------|-------|------|-------|--|------|--------|-------|----|--|
| Acetone              | 0.0267 | 0.020 | ug/L | 0.024 |  | 112  | 70-130 | 4.87  | 30 |  |
| Benzene              | 0.0340 | 0.020 | ug/L | 0.032 |  | 106  | 70-130 | 2.69  | 30 |  |
| Benzyl chloride      | 0.0574 | 0.020 | ug/L | 0.052 |  | 111  | 70-130 | 0.907 | 30 |  |
| Bromodichloromethane | 0.0588 | 0.020 | ug/L | 0.067 |  | 87.7 | 70-130 | 1.92  | 30 |  |
| Bromoform            | 0.101  | 0.020 | ug/L | 0.10  |  | 97.3 | 70-130 | 3.13  | 30 |  |
| Bromomethane         | 0.0396 | 0.020 | ug/L | 0.039 |  | 102  | 70-130 | 0.489 | 30 |  |
| 2-Butanone (MEK)     | 0.0380 | 0.020 | ug/L | 0.029 |  | 129  | 70-130 | 2.38  | 30 |  |
| Carbon Disulfide     | 0.0332 | 0.020 | ug/L | 0.031 |  | 106  | 70-130 | 2.32  | 30 |  |
| Carbon Tetrachloride | 0.0483 | 0.020 | ug/L | 0.063 |  | 76.7 | 70-130 | 0.650 | 30 |  |
| Chlorobenzene        | 0.0545 | 0.020 | ug/L | 0.046 |  | 118  | 70-130 | 0.933 | 30 |  |
| Chloroethane         | 0.0314 | 0.020 | ug/L | 0.026 |  | 119  | 70-130 | 2.32  | 30 |  |
| Chloroform           | 0.0444 | 0.020 | ug/L | 0.049 |  | 90.9 | 70-130 | 4.52  | 30 |  |

**Allen Aminian**  
 QA/QC Manager





### LABORATORY ANALYSIS RESULTS

Client: CH2M Hill, Inc.  
Project No: 693142  
Project Name: KMEP Norwalk Biosparge Startup

AA Project No: MB187323  
Date Received: 11/16/18  
Date Reported: 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

**VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control**

Batch B8K1944 - \*\*\* DEFAULT PREP \*\*\*

**LCS Dup (B8K1944-BSD1) Continued**

Prepared & Analyzed: 11/14/18

|                               |        |       |      |       |  |      |        |       |    |     |
|-------------------------------|--------|-------|------|-------|--|------|--------|-------|----|-----|
| Chloromethane                 | 0.0230 | 0.020 | ug/L | 0.021 |  | 112  | 70-130 | 5.41  | 30 |     |
| Dibromochloromethane          | 0.0780 | 0.020 | ug/L | 0.085 |  | 91.6 | 70-130 | 0.219 | 30 |     |
| 1,2-Dibromoethane (EDB)       | 0.0847 | 0.020 | ug/L | 0.077 |  | 110  | 70-130 | 1.74  | 30 |     |
| 1,2-Dichlorobenzene           | 0.0657 | 0.020 | ug/L | 0.060 |  | 109  | 70-130 | 1.85  | 30 |     |
| 1,3-Dichlorobenzene           | 0.0648 | 0.020 | ug/L | 0.060 |  | 108  | 70-130 | 2.06  | 30 |     |
| 1,4-Dichlorobenzene           | 0.0654 | 0.020 | ug/L | 0.060 |  | 109  | 70-130 | 0.738 | 30 |     |
| Dichlorodifluoromethane (R12) | 0.0230 | 0.020 | ug/L | 0.049 |  | 46.5 | 70-130 | 5.24  | 30 | *** |
| 1,1-Dichloroethane            | 0.0403 | 0.020 | ug/L | 0.040 |  | 99.5 | 70-130 | 1.79  | 30 |     |
| 1,2-Dichloroethane (EDC)      | 0.0322 | 0.020 | ug/L | 0.040 |  | 79.6 | 70-130 | 4.30  | 30 |     |
| cis-1,2-Dichloroethylene      | 0.0458 | 0.020 | ug/L | 0.040 |  | 115  | 70-130 | 1.97  | 30 |     |
| 1,1-Dichloroethylene          | 0.0371 | 0.020 | ug/L | 0.040 |  | 93.6 | 70-130 | 3.98  | 30 |     |
| trans-1,2-Dichloroethylene    | 0.0408 | 0.020 | ug/L | 0.040 |  | 103  | 70-130 | 0.774 | 30 |     |
| 1,2-Dichloropropane           | 0.0514 | 0.020 | ug/L | 0.046 |  | 111  | 70-130 | 1.25  | 30 |     |
| trans-1,3-Dichloropropylene   | 0.0399 | 0.020 | ug/L | 0.045 |  | 88.0 | 70-130 | 1.80  | 30 |     |
| cis-1,3-Dichloropropylene     | 0.0428 | 0.020 | ug/L | 0.045 |  | 94.2 | 70-130 | 0.635 | 30 |     |
| Dichlorotetrafluoroethane     | 0.0561 | 0.020 | ug/L | 0.070 |  | 80.3 | 70-130 | 2.46  | 30 |     |
| Ethylbenzene                  | 0.0503 | 0.020 | ug/L | 0.043 |  | 116  | 70-130 | 0.606 | 30 |     |
| 4-Ethyltoluene                | 0.0640 | 0.020 | ug/L | 0.049 |  | 130  | 70-130 | 0.689 | 30 |     |
| Hexachlorobutadiene           | 0.0964 | 0.020 | ug/L | 0.11  |  | 90.4 | 70-130 | 0.332 | 30 |     |
| 2-Hexanone (MBK)              | 0.0495 | 0.020 | ug/L | 0.041 |  | 121  | 70-130 | 3.58  | 30 |     |
| Isopropanol (IPA)             | 0.0299 | 0.20  | ug/L | 0.025 |  | 122  | 70-130 | 0.901 | 30 |     |
| Methylene Chloride            | 0.0409 | 0.020 | ug/L | 0.035 |  | 118  | 70-130 | 0.853 | 30 |     |
| 4-Methyl-2-pentanone (MIBK)   | 0.0595 | 0.020 | ug/L | 0.041 |  | 145  | 70-130 | 0.686 | 30 | **  |
| Styrene                       | 0.0511 | 0.020 | ug/L | 0.043 |  | 120  | 70-130 | 3.74  | 30 |     |
| 1,1,2,2-Tetrachloroethane     | 0.0595 | 0.020 | ug/L | 0.069 |  | 86.7 | 70-130 | 0.231 | 30 |     |
| Tetrachloroethylene (PCE)     | 0.0672 | 0.020 | ug/L | 0.068 |  | 99.1 | 70-130 | 3.07  | 30 |     |
| Toluene                       | 0.0428 | 0.020 | ug/L | 0.038 |  | 114  | 70-130 | 0.529 | 30 |     |
| 1,2,4-Trichlorobenzene        | 0.0692 | 0.020 | ug/L | 0.074 |  | 93.3 | 70-130 | 2.94  | 30 |     |
| 1,1,2-Trichloroethane         | 0.0642 | 0.020 | ug/L | 0.055 |  | 118  | 70-130 | 0.593 | 30 |     |
| 1,1,1-Trichloroethane         | 0.0429 | 0.020 | ug/L | 0.055 |  | 78.6 | 70-130 | 3.87  | 30 |     |
| Trichloroethylene (TCE)       | 0.0604 | 0.020 | ug/L | 0.054 |  | 112  | 70-130 | 1.15  | 30 |     |
| Trichlorofluoromethane (R11)  | 0.0483 | 0.020 | ug/L | 0.056 |  | 85.9 | 70-130 | 4.22  | 30 |     |

Allen Aminian  
QA/QC Manager





### LABORATORY ANALYSIS RESULTS

Client: CH2M Hill, Inc.  
Project No: 693142  
Project Name: KMEP Norwalk Biosparge Startup

AA Project No: MB187323  
Date Received: 11/16/18  
Date Reported: 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

#### VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control

Batch B8K1944 - \*\*\* DEFAULT PREP \*\*\*

##### LCS Dup (B8K1944-BSD1) Continued

Prepared & Analyzed: 11/14/18

|  |        |       |      |       |  |     |        |        |    |    |
|--|--------|-------|------|-------|--|-----|--------|--------|----|----|
| 1,1,2-Trichloro-1,2,2-trifluoroethane (R113) | 0.0807 | 0.020 | ug/L | 0.077 |  | 105 | 70-130 | 2.07   | 30 |    |
| 1,3,5-Trimethylbenzene                       | 0.0604 | 0.020 | ug/L | 0.049 |  | 123 | 70-130 | 1.81   | 30 |    |
| 1,2,4-Trimethylbenzene                       | 0.0595 | 0.020 | ug/L | 0.049 |  | 121 | 70-130 | 1.16   | 30 |    |
| Vinyl acetate                                | 0.0377 | 0.020 | ug/L | 0.035 |  | 107 | 70-130 | 2.40   | 30 |    |
| Vinyl chloride                               | 0.0262 | 0.020 | ug/L | 0.026 |  | 102 | 70-130 | 3.55   | 30 |    |
| o-Xylene                                     | 0.0511 | 0.020 | ug/L | 0.043 |  | 118 | 70-130 | 1.11   | 30 |    |
| m,p-Xylenes                                  | 0.111  | 0.020 | ug/L | 0.087 |  | 128 | 70-130 | 1.65   | 30 |    |
| 1,2,3-Trichloropropane                       | 0.0725 | 0.020 | ug/L | 0.060 |  | 120 | 70-130 | 1.40   | 30 |    |
| sec-Butylbenzene                             | 0.0725 | 0.020 | ug/L | 0.055 |  | 132 | 70-130 | 0.456  | 30 | ** |
| Isopropylbenzene                             | 0.0609 | 0.020 | ug/L | 0.049 |  | 124 | 70-130 | 1.88   | 30 |    |
| n-Propylbenzene                              | 0.0614 | 0.020 | ug/L | 0.049 |  | 125 | 70-130 | 0.0801 | 30 |    |
| 4-Isopropyltoluene                           | 0.0710 | 0.020 | ug/L | 0.055 |  | 129 | 70-130 | 1.56   | 30 |    |

Surrogate: 4-Bromofluorobenzene 0.122

ug/L 0.14 85.2 70-130

Batch B8K2028 - \*\*\* DEFAULT PREP \*\*\*

##### Blank (B8K2028-BLK1)

Prepared & Analyzed: 11/16/18

|                               |        |       |      |  |  |  |  |  |  |  |
|-------------------------------|--------|-------|------|--|--|--|--|--|--|--|
| 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 |  |  |  |  |  |  |  |

Allen Aminian  
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

Client: CH2M Hill, Inc.  
Project No: 693142  
Project Name: KMEP Norwalk Biosparge Startup

AA Project No: MB187323  
Date Received: 11/16/18  
Date Reported: 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

#### VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control

Batch B8K2028 - \*\*\* DEFAULT PREP \*\*\*

#### Blank (B8K2028-BLK1) Continued

Prepared & Analyzed: 11/16/18

|                                |        |       |      |  |  |  |  |  |  |  |
|--------------------------------|--------|-------|------|--|--|--|--|--|--|--|
| 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 |  |  |  |  |  |  |  |
| 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 |  |  |  |  |  |  |  |

Allen Aminian  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Analyte   | Result       | Reporting Limit | Units       | Spike Level | Source Result | %REC %REC   | Limit         | RPD | RPD Limit | Notes |
|---|--------------|-----------------|-------------|-------------|---------------|-------------|---------------|-----|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b> |              |                 |             |             |               |             |               |     |           |       |
| <i>Batch B8K2028 - *** DEFAULT PREP ***</i>                 |              |                 |             |             |               |             |               |     |           |       |
| <b>Blank (B8K2028-BLK1) Continued</b>                       |              |                 |             |             |               |             |               |     |           |       |
| Prepared & Analyzed: 11/16/18                               |              |                 |             |             |               |             |               |     |           |       |
| 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        |             |               |             |               |     |           |       |
| 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        |             |               |             |               |     |           |       |
| 1,2,3-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>0.126</i> |                 | <i>ug/L</i> | <i>0.14</i> |               | <i>88.0</i> | <i>70-130</i> |     |           |       |
| <b>LCS (B8K2028-BS1)</b>                                    |              |                 |             |             |               |             |               |     |           |       |
| Prepared & Analyzed: 11/16/18                               |              |                 |             |             |               |             |               |     |           |       |

**Allen Aminian**  
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

Client: CH2M Hill, Inc.  
 Project No: 693142  
 Project Name: KMEP Norwalk Biosparge Startup

AA Project No: MB187323  
 Date Received: 11/16/18  
 Date Reported: 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

#### VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control

Batch B8K2028 - \*\*\* DEFAULT PREP \*\*\*

#### LCS (B8K2028-BS1) Continued

Prepared & Analyzed: 11/16/18

|                               |        |       |      |       |  |      |        |  |    |     |
|-------------------------------|--------|-------|------|-------|--|------|--------|--|----|-----|
| Acetone                       | 0.0247 | 0.020 | ug/L | 0.024 |  | 104  | 70-130 |  | 30 |     |
| Benzene                       | 0.0315 | 0.020 | ug/L | 0.032 |  | 98.6 | 70-130 |  | 30 |     |
| Benzyl chloride               | 0.0517 | 0.020 | ug/L | 0.052 |  | 99.9 | 70-130 |  | 30 |     |
| Bromodichloromethane          | 0.0540 | 0.020 | ug/L | 0.067 |  | 80.6 | 70-130 |  | 30 |     |
| Bromoform                     | 0.0956 | 0.020 | ug/L | 0.10  |  | 92.5 | 70-130 |  | 30 |     |
| Bromomethane                  | 0.0333 | 0.020 | ug/L | 0.039 |  | 85.7 | 70-130 |  | 30 |     |
| 2-Butanone (MEK)              | 0.0342 | 0.020 | ug/L | 0.029 |  | 116  | 70-130 |  | 30 |     |
| Carbon Disulfide              | 0.0293 | 0.020 | ug/L | 0.031 |  | 94.2 | 70-130 |  | 30 |     |
| Carbon Tetrachloride          | 0.0453 | 0.020 | ug/L | 0.063 |  | 72.0 | 70-130 |  | 30 |     |
| Chlorobenzene                 | 0.0487 | 0.020 | ug/L | 0.046 |  | 106  | 70-130 |  | 30 |     |
| Chloroethane                  | 0.0247 | 0.020 | ug/L | 0.026 |  | 93.7 | 70-130 |  | 30 |     |
| Chloroform                    | 0.0408 | 0.020 | ug/L | 0.049 |  | 83.6 | 70-130 |  | 30 |     |
| Chloromethane                 | 0.0204 | 0.020 | ug/L | 0.021 |  | 99.0 | 70-130 |  | 30 |     |
| Dibromochloromethane          | 0.0745 | 0.020 | ug/L | 0.085 |  | 87.4 | 70-130 |  | 30 |     |
| 1,2-Dibromoethane (EDB)       | 0.0781 | 0.020 | ug/L | 0.077 |  | 102  | 70-130 |  | 30 |     |
| 1,2-Dichlorobenzene           | 0.0629 | 0.020 | ug/L | 0.060 |  | 105  | 70-130 |  | 30 |     |
| 1,3-Dichlorobenzene           | 0.0613 | 0.020 | ug/L | 0.060 |  | 102  | 70-130 |  | 30 |     |
| 1,4-Dichlorobenzene           | 0.0618 | 0.020 | ug/L | 0.060 |  | 103  | 70-130 |  | 30 |     |
| Dichlorodifluoromethane (R12) | 0.0203 | 0.020 | ug/L | 0.049 |  | 41.0 | 70-130 |  | 30 | *** |
| 1,1-Dichloroethane            | 0.0357 | 0.020 | ug/L | 0.040 |  | 88.3 | 70-130 |  | 30 |     |
| 1,2-Dichloroethane (EDC)      | 0.0299 | 0.020 | ug/L | 0.040 |  | 73.8 | 70-130 |  | 30 |     |
| cis-1,2-Dichloroethylene      | 0.0410 | 0.020 | ug/L | 0.040 |  | 104  | 70-130 |  | 30 |     |
| 1,1-Dichloroethylene          | 0.0333 | 0.020 | ug/L | 0.040 |  | 83.9 | 70-130 |  | 30 |     |
| trans-1,2-Dichloroethylene    | 0.0374 | 0.020 | ug/L | 0.040 |  | 94.4 | 70-130 |  | 30 |     |
| 1,2-Dichloropropane           | 0.0452 | 0.020 | ug/L | 0.046 |  | 97.8 | 70-130 |  | 30 |     |
| trans-1,3-Dichloropropylene   | 0.0363 | 0.020 | ug/L | 0.045 |  | 80.0 | 70-130 |  | 30 |     |
| cis-1,3-Dichloropropylene     | 0.0384 | 0.020 | ug/L | 0.045 |  | 84.5 | 70-130 |  | 30 |     |
| Dichlorotetrafluoroethane     | 0.0493 | 0.020 | ug/L | 0.070 |  | 70.5 | 70-130 |  | 30 |     |
| Ethylbenzene                  | 0.0450 | 0.020 | ug/L | 0.043 |  | 104  | 70-130 |  | 30 |     |
| 4-Ethyltoluene                | 0.0599 | 0.020 | ug/L | 0.049 |  | 122  | 70-130 |  | 30 |     |
| Hexachlorobutadiene           | 0.0989 | 0.020 | ug/L | 0.11  |  | 92.7 | 70-130 |  | 30 |     |
| 2-Hexanone (MBK)              | 0.0500 | 0.020 | ug/L | 0.041 |  | 122  | 70-130 |  | 30 |     |

Allen Aminian  
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

**VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control**

Batch B8K2028 - \*\*\* DEFAULT PREP \*\*\*

**LCS (B8K2028-BS1) Continued**

Prepared & Analyzed: 11/16/18

|  |        |       |      |       |  |      |        |  |    |    |
|--|--------|-------|------|-------|--|------|--------|--|----|----|
| Isopropanol (IPA)                            | 0.0277 | 0.20  | ug/L | 0.025 |  | 112  | 70-130 |  | 30 |    |
| Methylene Chloride                           | 0.0350 | 0.020 | ug/L | 0.035 |  | 101  | 70-130 |  | 30 |    |
| 4-Methyl-2-pentanone (MIBK)                  | 0.0609 | 0.020 | ug/L | 0.041 |  | 149  | 70-130 |  | 30 | ** |
| Styrene                                      | 0.0469 | 0.020 | ug/L | 0.043 |  | 110  | 70-130 |  | 30 |    |
| 1,1,2,2-Tetrachloroethane                    | 0.0518 | 0.020 | ug/L | 0.069 |  | 75.4 | 70-130 |  | 30 |    |
| Tetrachloroethylene (PCE)                    | 0.0660 | 0.020 | ug/L | 0.068 |  | 97.3 | 70-130 |  | 30 |    |
| Toluene                                      | 0.0398 | 0.020 | ug/L | 0.038 |  | 106  | 70-130 |  | 30 |    |
| 1,2,4-Trichlorobenzene                       | 0.0714 | 0.020 | ug/L | 0.074 |  | 96.2 | 70-130 |  | 30 |    |
| 1,1,2-Trichloroethane                        | 0.0591 | 0.020 | ug/L | 0.055 |  | 108  | 70-130 |  | 30 |    |
| 1,1,1-Trichloroethane                        | 0.0404 | 0.020 | ug/L | 0.055 |  | 74.1 | 70-130 |  | 30 |    |
| Trichloroethylene (TCE)                      | 0.0557 | 0.020 | ug/L | 0.054 |  | 104  | 70-130 |  | 30 |    |
| Trichlorofluoromethane (R11)                 | 0.0458 | 0.020 | ug/L | 0.056 |  | 81.6 | 70-130 |  | 30 |    |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (R113) | 0.0727 | 0.020 | ug/L | 0.077 |  | 94.9 | 70-130 |  | 30 |    |
| 1,3,5-Trimethylbenzene                       | 0.0554 | 0.020 | ug/L | 0.049 |  | 113  | 70-130 |  | 30 |    |
| 1,2,4-Trimethylbenzene                       | 0.0559 | 0.020 | ug/L | 0.049 |  | 114  | 70-130 |  | 30 |    |
| Vinyl acetate                                | 0.0342 | 0.020 | ug/L | 0.035 |  | 97.1 | 70-130 |  | 30 |    |
| Vinyl chloride                               | 0.0232 | 0.020 | ug/L | 0.026 |  | 90.6 | 70-130 |  | 30 |    |
| o-Xylene                                     | 0.0461 | 0.020 | ug/L | 0.043 |  | 106  | 70-130 |  | 30 |    |
| m,p-Xylenes                                  | 0.0978 | 0.020 | ug/L | 0.087 |  | 113  | 70-130 |  | 30 |    |
| 1,2,3-Trichloropropane                       | 0.0639 | 0.020 | ug/L | 0.060 |  | 106  | 70-130 |  | 30 |    |
| sec-Butylbenzene                             | 0.0666 | 0.020 | ug/L | 0.055 |  | 121  | 70-130 |  | 30 |    |
| Isopropylbenzene                             | 0.0557 | 0.020 | ug/L | 0.049 |  | 113  | 70-130 |  | 30 |    |
| n-Propylbenzene                              | 0.0565 | 0.020 | ug/L | 0.049 |  | 115  | 70-130 |  | 30 |    |
| 4-Isopropyltoluene                           | 0.0663 | 0.020 | ug/L | 0.055 |  | 121  | 70-130 |  | 30 |    |

Surrogate: 4-Bromofluorobenzene 0.124 ug/L 0.14 86.7 70-130

**LCS Dup (B8K2028-BSD1)**

Prepared & Analyzed: 11/16/18

|                      |        |       |      |       |  |      |        |       |    |  |
|----------------------|--------|-------|------|-------|--|------|--------|-------|----|--|
| Acetone              | 0.0246 | 0.020 | ug/L | 0.024 |  | 103  | 70-130 | 0.675 | 30 |  |
| Benzene              | 0.0316 | 0.020 | ug/L | 0.032 |  | 98.8 | 70-130 | 0.203 | 30 |  |
| Benzyl chloride      | 0.0536 | 0.020 | ug/L | 0.052 |  | 104  | 70-130 | 3.64  | 30 |  |
| Bromodichloromethane | 0.0523 | 0.020 | ug/L | 0.067 |  | 78.0 | 70-130 | 3.28  | 30 |  |

**Allen Aminian**  
QA/QC Manager



**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

**VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control**

Batch B8K2028 - \*\*\* DEFAULT PREP \*\*\*

**LCS Dup (B8K2028-BSD1) Continued**

Prepared & Analyzed: 11/16/18

|                               |        |       |      |       |  |      |        |       |    |     |
|-------------------------------|--------|-------|------|-------|--|------|--------|-------|----|-----|
| Bromoform                     | 0.0976 | 0.020 | ug/L | 0.10  |  | 94.4 | 70-130 | 2.03  | 30 |     |
| Bromomethane                  | 0.0344 | 0.020 | ug/L | 0.039 |  | 88.5 | 70-130 | 3.21  | 30 |     |
| 2-Butanone (MEK)              | 0.0341 | 0.020 | ug/L | 0.029 |  | 116  | 70-130 | 0.259 | 30 |     |
| Carbon Disulfide              | 0.0300 | 0.020 | ug/L | 0.031 |  | 96.4 | 70-130 | 2.31  | 30 |     |
| Carbon Tetrachloride          | 0.0442 | 0.020 | ug/L | 0.063 |  | 70.3 | 70-130 | 2.39  | 30 |     |
| Chlorobenzene                 | 0.0504 | 0.020 | ug/L | 0.046 |  | 110  | 70-130 | 3.44  | 30 |     |
| Chloroethane                  | 0.0249 | 0.020 | ug/L | 0.026 |  | 94.2 | 70-130 | 0.532 | 30 |     |
| Chloroform                    | 0.0407 | 0.020 | ug/L | 0.049 |  | 83.3 | 70-130 | 0.359 | 30 |     |
| Chloromethane                 | 0.0210 | 0.020 | ug/L | 0.021 |  | 102  | 70-130 | 2.59  | 30 |     |
| Dibromochloromethane          | 0.0727 | 0.020 | ug/L | 0.085 |  | 85.4 | 70-130 | 2.31  | 30 |     |
| 1,2-Dibromoethane (EDB)       | 0.0760 | 0.020 | ug/L | 0.077 |  | 98.9 | 70-130 | 2.69  | 30 |     |
| 1,2-Dichlorobenzene           | 0.0627 | 0.020 | ug/L | 0.060 |  | 104  | 70-130 | 0.287 | 30 |     |
| 1,3-Dichlorobenzene           | 0.0624 | 0.020 | ug/L | 0.060 |  | 104  | 70-130 | 1.75  | 30 |     |
| 1,4-Dichlorobenzene           | 0.0628 | 0.020 | ug/L | 0.060 |  | 104  | 70-130 | 1.54  | 30 |     |
| Dichlorodifluoromethane (R12) | 0.0206 | 0.020 | ug/L | 0.049 |  | 41.7 | 70-130 | 1.69  | 30 | *** |
| 1,1-Dichloroethane            | 0.0359 | 0.020 | ug/L | 0.040 |  | 88.7 | 70-130 | 0.452 | 30 |     |
| 1,2-Dichloroethane (EDC)      | 0.0294 | 0.020 | ug/L | 0.040 |  | 72.6 | 70-130 | 1.64  | 30 |     |
| cis-1,2-Dichloroethylene      | 0.0415 | 0.020 | ug/L | 0.040 |  | 105  | 70-130 | 1.15  | 30 |     |
| 1,1-Dichloroethylene          | 0.0342 | 0.020 | ug/L | 0.040 |  | 86.3 | 70-130 | 2.82  | 30 |     |
| trans-1,2-Dichloroethylene    | 0.0382 | 0.020 | ug/L | 0.040 |  | 96.3 | 70-130 | 1.99  | 30 |     |
| 1,2-Dichloropropane           | 0.0446 | 0.020 | ug/L | 0.046 |  | 96.5 | 70-130 | 1.34  | 30 |     |
| trans-1,3-Dichloropropylene   | 0.0360 | 0.020 | ug/L | 0.045 |  | 79.4 | 70-130 | 0.753 | 30 |     |
| cis-1,3-Dichloropropylene     | 0.0386 | 0.020 | ug/L | 0.045 |  | 85.0 | 70-130 | 0.590 | 30 |     |
| Dichlorotetrafluoroethane     | 0.0510 | 0.020 | ug/L | 0.070 |  | 73.0 | 70-130 | 3.48  | 30 |     |
| Ethylbenzene                  | 0.0460 | 0.020 | ug/L | 0.043 |  | 106  | 70-130 | 2.29  | 30 |     |
| 4-Ethyltoluene                | 0.0607 | 0.020 | ug/L | 0.049 |  | 123  | 70-130 | 1.22  | 30 |     |
| Hexachlorobutadiene           | 0.0967 | 0.020 | ug/L | 0.11  |  | 90.7 | 70-130 | 2.18  | 30 |     |
| 2-Hexanone (MBK)              | 0.0440 | 0.020 | ug/L | 0.041 |  | 107  | 70-130 | 12.9  | 30 |     |
| Isopropanol (IPA)             | 0.0272 | 0.20  | ug/L | 0.025 |  | 110  | 70-130 | 1.79  | 30 |     |
| Methylene Chloride            | 0.0364 | 0.020 | ug/L | 0.035 |  | 105  | 70-130 | 3.79  | 30 |     |
| 4-Methyl-2-pentanone (MIBK)   | 0.0528 | 0.020 | ug/L | 0.041 |  | 129  | 70-130 | 14.3  | 30 |     |
| Styrene                       | 0.0478 | 0.020 | ug/L | 0.043 |  | 112  | 70-130 | 1.80  | 30 |     |

*Allen Aminian*

**Allen Aminian**  
 QA/QC Manager





**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

**VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control**

Batch B8K2028 - \*\*\* DEFAULT PREP \*\*\*

**LCS Dup (B8K2028-BSD1) Continued**

Prepared & Analyzed: 11/16/18

|  |        |       |      |       |  |      |        |       |    |  |
|--|--------|-------|------|-------|--|------|--------|-------|----|--|
| 1,1,2,2-Tetrachloroethane                    | 0.0522 | 0.020 | ug/L | 0.069 |  | 76.1 | 70-130 | 0.924 | 30 |  |
| Tetrachloroethylene (PCE)                    | 0.0646 | 0.020 | ug/L | 0.068 |  | 95.2 | 70-130 | 2.18  | 30 |  |
| Toluene                                      | 0.0388 | 0.020 | ug/L | 0.038 |  | 103  | 70-130 | 2.50  | 30 |  |
| 1,2,4-Trichlorobenzene                       | 0.0689 | 0.020 | ug/L | 0.074 |  | 92.9 | 70-130 | 3.49  | 30 |  |
| 1,1,2-Trichloroethane                        | 0.0568 | 0.020 | ug/L | 0.055 |  | 104  | 70-130 | 4.05  | 30 |  |
| 1,1,1-Trichloroethane                        | 0.0408 | 0.020 | ug/L | 0.055 |  | 74.8 | 70-130 | 0.940 | 30 |  |
| Trichloroethylene (TCE)                      | 0.0535 | 0.020 | ug/L | 0.054 |  | 99.5 | 70-130 | 4.13  | 30 |  |
| Trichlorofluoromethane (R11)                 | 0.0446 | 0.020 | ug/L | 0.056 |  | 79.3 | 70-130 | 2.86  | 30 |  |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (R113) | 0.0729 | 0.020 | ug/L | 0.077 |  | 95.1 | 70-130 | 0.211 | 30 |  |
| 1,3,5-Trimethylbenzene                       | 0.0573 | 0.020 | ug/L | 0.049 |  | 116  | 70-130 | 3.40  | 30 |  |
| 1,2,4-Trimethylbenzene                       | 0.0562 | 0.020 | ug/L | 0.049 |  | 114  | 70-130 | 0.614 | 30 |  |
| Vinyl acetate                                | 0.0340 | 0.020 | ug/L | 0.035 |  | 96.7 | 70-130 | 0.413 | 30 |  |
| Vinyl chloride                               | 0.0236 | 0.020 | ug/L | 0.026 |  | 92.3 | 70-130 | 1.86  | 30 |  |
| o-Xylene                                     | 0.0468 | 0.020 | ug/L | 0.043 |  | 108  | 70-130 | 1.40  | 30 |  |
| m,p-Xylenes                                  | 0.101  | 0.020 | ug/L | 0.087 |  | 116  | 70-130 | 3.28  | 30 |  |
| 1,2,3-Trichloropropane                       | 0.0650 | 0.020 | ug/L | 0.060 |  | 108  | 70-130 | 1.78  | 30 |  |
| sec-Butylbenzene                             | 0.0681 | 0.020 | ug/L | 0.055 |  | 124  | 70-130 | 2.20  | 30 |  |
| Isopropylbenzene                             | 0.0564 | 0.020 | ug/L | 0.049 |  | 115  | 70-130 | 1.23  | 30 |  |
| n-Propylbenzene                              | 0.0573 | 0.020 | ug/L | 0.049 |  | 117  | 70-130 | 1.47  | 30 |  |
| 4-Isopropyltoluene                           | 0.0671 | 0.020 | ug/L | 0.055 |  | 122  | 70-130 | 1.32  | 30 |  |

Surrogate: 4-Bromofluorobenzene 0.125 ug/L 0.14 87.1 70-130

**Duplicate (B8K2028-DUP1)**

Source: 8K19015-33 Prepared & Analyzed: 11/16/18

|                               |       |      |      |  |       |  |  |      |    |  |
|-------------------------------|-------|------|------|--|-------|--|--|------|----|--|
| Acetone                       | 0.475 | 0.40 | ug/L |  | 0.526 |  |  | 10.2 | 30 |  |
| Allyl chloride                | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |      | 30 |  |
| tert-Amyl Methyl Ether (TAME) | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |      | 30 |  |
| Benzene                       | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |      | 30 |  |
| Benzyl chloride               | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |      | 30 |  |
| Bromodichloromethane          | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |      | 30 |  |
| Bromoform                     | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |      | 30 |  |
| Bromomethane                  | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |      | 30 |  |

**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

Client: CH2M Hill, Inc.  
 Project No: 693142  
 Project Name: KMEP Norwalk Biosparge Startup

AA Project No: MB187323  
 Date Received: 11/16/18  
 Date Reported: 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

#### VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control

Batch B8K2028 - \*\*\* DEFAULT PREP \*\*\*

Duplicate (B8K2028-DUP1) Continued Source: 8K19015-33 Prepared & Analyzed: 11/16/18

|                               |       |      |      |  |       |  |  |  |    |  |
|-------------------------------|-------|------|------|--|-------|--|--|--|----|--|
| 1,3-Butadiene                 | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 2-Butanone (MEK)              | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| tert-Butyl alcohol (TBA)      | <400  | 400  | ug/L |  | <400  |  |  |  | 30 |  |
| Carbon Disulfide              | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Carbon Tetrachloride          | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Chlorobenzene                 | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Chloroethane                  | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Chloroform                    | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Chloromethane                 | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Cyclohexane                   | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Dibromochloromethane          | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 1,2-Dibromoethane (EDB)       | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 1,2-Dichlorobenzene           | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 1,3-Dichlorobenzene           | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 1,4-Dichlorobenzene           | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Dichlorodifluoromethane (R12) | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 1,1-Dichloroethane            | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 1,2-Dichloroethane (EDC)      | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| cis-1,2-Dichloroethylene      | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 1,1-Dichloroethylene          | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| trans-1,2-Dichloroethylene    | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 1,2-Dichloropropane           | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| trans-1,3-Dichloropropylene   | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| cis-1,3-Dichloropropylene     | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Dichlorotetrafluoroethane     | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Diisopropyl ether (DIPE)      | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 1,4-Dioxane                   | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Ethanol                       | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Ethyl Acetate                 | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Ethylbenzene                  | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Ethyl-tert-Butyl Ether (ETBE) | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 4-Ethyltoluene                | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |

Allen Aminian  
QA/QC Manager





### LABORATORY ANALYSIS RESULTS

Client: CH2M Hill, Inc.  
 Project No: 693142  
 Project Name: KMEP Norwalk Biosparge Startup

AA Project No: MB187323  
 Date Received: 11/16/18  
 Date Reported: 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

#### VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control

Batch B8K2028 - \*\*\* DEFAULT PREP \*\*\*

Duplicate (B8K2028-DUP1) Continued Source: 8K19015-33 Prepared & Analyzed: 11/16/18

|  |       |      |      |  |       |  |  |  |    |  |
|--|-------|------|------|--|-------|--|--|--|----|--|
| Heptane                                      | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Hexachlorobutadiene                          | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| n-Hexane                                     | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 2-Hexanone (MBK)                             | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Isopropanol (IPA)                            | <4.0  | 4.0  | ug/L |  | <4.0  |  |  |  | 30 |  |
| Methyl-tert-Butyl Ether (MTBE)               | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Methylene Chloride                           | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 4-Methyl-2-pentanone (MIBK)                  | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Naphthalene                                  | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Propylene                                    | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Styrene                                      | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 1,1,2,2-Tetrachloroethane                    | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Tetrachloroethylene (PCE)                    | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Tetrahydrofuran (THF)                        | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Toluene                                      | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 1,2,4-Trichlorobenzene                       | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 1,1,2-Trichloroethane                        | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 1,1,1-Trichloroethane                        | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Trichloroethylene (TCE)                      | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Trichlorofluoromethane (R11)                 | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (R113) | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 1,3,5-Trimethylbenzene                       | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 1,2,4-Trimethylbenzene                       | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 2,2,4-Trimethylpentane                       | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Vinyl acetate                                | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Vinyl bromide                                | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| Vinyl chloride                               | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| o-Xylene                                     | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| m,p-Xylenes                                  | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 1,2,3-Trichloropropane                       | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| sec-Butylbenzene                             | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |

Allen Aminian  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

**VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control**

*Batch B8K2028 - \*\*\* DEFAULT PREP \*\*\**

**Duplicate (B8K2028-DUP1) Continued** Source: 8K19015-33 Prepared & Analyzed: 11/16/18

|                    |       |      |      |  |       |  |  |  |    |  |
|--------------------|-------|------|------|--|-------|--|--|--|----|--|
| Isopropylbenzene   | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| n-Propylbenzene    | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| 4-Isopropyltoluene | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |
| n-Butylbenzene     | <0.40 | 0.40 | ug/L |  | <0.40 |  |  |  | 30 |  |

*Surrogate: 4-Bromofluorobenzene 0.125 ug/L 0.14 87.3 70-130*

**Fixed Gases by TCD - Quality Control**

*Batch B8K1939 - \*\*\* DEFAULT PREP \*\*\**

**Blank (B8K1939-BLK1)** Prepared & Analyzed: 11/12/18

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

**LCS (B8K1939-BS1)** Prepared & Analyzed: 11/12/18

|                |      |      |             |     |      |        |  |  |  |  |
|----------------|------|------|-------------|-----|------|--------|--|--|--|--|
| Methane        | 4.57 | 0.10 | % by Volume | 4.5 | 102  | 75-125 |  |  |  |  |
| Oxygen         | 4.01 | 0.10 | % by Volume | 4.0 | 100  | 75-125 |  |  |  |  |
| Carbon Dioxide | 14.8 | 0.10 | % by Volume | 15  | 98.7 | 75-125 |  |  |  |  |

**LCS Dup (B8K1939-BSD1)** Prepared & Analyzed: 11/12/18

|                |      |      |             |     |      |        |       |    |  |  |
|----------------|------|------|-------------|-----|------|--------|-------|----|--|--|
| Methane        | 4.57 | 0.10 | % by Volume | 4.5 | 102  | 75-125 | 0.00  | 30 |  |  |
| Oxygen         | 4.03 | 0.10 | % by Volume | 4.0 | 101  | 75-125 | 0.498 | 30 |  |  |
| Carbon Dioxide | 14.5 | 0.10 | % by Volume | 15  | 96.8 | 75-125 | 1.91  | 30 |  |  |

**Duplicate (B8K1939-DUP1)** Source: 8K19015-10 Prepared & Analyzed: 11/12/18

|         |       |      |             |  |       |  |  |  |    |  |
|---------|-------|------|-------------|--|-------|--|--|--|----|--|
| Methane | <0.10 | 0.10 | % by Volume |  | <0.10 |  |  |  | 30 |  |
|---------|-------|------|-------------|--|-------|--|--|--|----|--|

*Allen A*

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| 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 B8K1939 - *** DEFAULT PREP ***</i>  |        |                 |             |             |               |      |             |      |           |       |
| <b>Duplicate (B8K1939-DUP1) Continued Source: 8K19015-10 Prepared &amp; Analyzed: 11/12/18</b> |        |                 |             |             |               |      |             |      |           |       |
| Oxygen   | 19.1   | 0.10            | % by Volume |             | 18.8          |      |             | 1.90 | 30        |       |
| Carbon Dioxide   | 0.688  | 0.10            | % by Volume |             | 0.726         |      |             | 5.37 | 30        |       |
| <i>Batch B8K1943 - *** DEFAULT PREP ***</i>  |        |                 |             |             |               |      |             |      |           |       |
| <b>Blank (B8K1943-BLK1) Prepared &amp; Analyzed: 11/13/18</b>                                  |        |                 |             |             |               |      |             |      |           |       |
| Methane  | <0.10  | 0.10            | % by Volume |             |               |      |             |      |           |       |
| Oxygen   | <0.10  | 0.10            | % by Volume |             |               |      |             |      |           |       |
| Carbon Dioxide   | <0.10  | 0.10            | % by Volume |             |               |      |             |      |           |       |
| <b>LCS (B8K1943-BS1) Prepared &amp; Analyzed: 11/13/18</b>                                     |        |                 |             |             |               |      |             |      |           |       |
| Methane  | 4.57   | 0.10            | % by Volume | 4.5         |               | 102  | 75-125      |      |           |       |
| Oxygen   | 4.07   | 0.10            | % by Volume | 4.0         |               | 102  | 75-125      |      |           |       |
| Carbon Dioxide   | 14.5   | 0.10            | % by Volume | 15          |               | 96.4 | 75-125      |      |           |       |
| <b>LCS Dup (B8K1943-BSD1) Prepared &amp; Analyzed: 11/13/18</b>                                |        |                 |             |             |               |      |             |      |           |       |
| Methane  | 4.65   | 0.10            | % by Volume | 4.5         |               | 103  | 75-125      | 1.74 | 30        |       |
| Oxygen   | 3.99   | 0.10            | % by Volume | 4.0         |               | 99.8 | 75-125      | 1.91 | 30        |       |
| Carbon Dioxide   | 14.7   | 0.10            | % by Volume | 15          |               | 97.9 | 75-125      | 1.58 | 30        |       |
| <b>Duplicate (B8K1943-DUP1) Source: 8K19015-26 Prepared &amp; Analyzed: 11/13/18</b>           |        |                 |             |             |               |      |             |      |           |       |
| Methane  | <0.10  | 0.10            | % by Volume |             | <0.10         |      |             |      |           | 30    |
| Oxygen   | 8.38   | 0.10            | % by Volume |             | 8.24          |      |             | 1.72 | 30        |       |

**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

| 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 B8K1943 - *** DEFAULT PREP ***</i>  |        |                 |             |             |               |      |             |       |           |       |
| <b>Duplicate (B8K1943-DUP1) Continued Source: 8K19015-26 Prepared &amp; Analyzed: 11/13/18</b> |        |                 |             |             |               |      |             |       |           |       |
| Carbon Dioxide   | 7.42   | 0.10            | % by Volume |             | 8.00          |      |             | 7.57  | 30        |       |
| <i>Batch B8K2027 - *** DEFAULT PREP ***</i>  |        |                 |             |             |               |      |             |       |           |       |
| <b>Blank (B8K2027-BLK1) Prepared &amp; Analyzed: 11/14/18</b>                                  |        |                 |             |             |               |      |             |       |           |       |
| Methane  | <0.10  | 0.10            | % by Volume |             |               |      |             |       |           |       |
| Oxygen   | <0.10  | 0.10            | % by Volume |             |               |      |             |       |           |       |
| Carbon Dioxide   | <0.10  | 0.10            | % by Volume |             |               |      |             |       |           |       |
| <b>LCS (B8K2027-BS1) Prepared &amp; Analyzed: 11/14/18</b>                                     |        |                 |             |             |               |      |             |       |           |       |
| Methane  | 4.48   | 0.10            | % by Volume | 4.5         |               | 99.6 | 75-125      |       |           |       |
| Oxygen   | 4.12   | 0.10            | % by Volume | 4.0         |               | 103  | 75-125      |       |           |       |
| Carbon Dioxide   | 14.3   | 0.10            | % by Volume | 15          |               | 95.1 | 75-125      |       |           |       |
| <b>LCS Dup (B8K2027-BSD1) Prepared &amp; Analyzed: 11/14/18</b>                                |        |                 |             |             |               |      |             |       |           |       |
| Methane  | 4.50   | 0.10            | % by Volume | 4.5         |               | 99.9 | 75-125      | 0.334 | 30        |       |
| Oxygen   | 4.17   | 0.10            | % by Volume | 4.0         |               | 104  | 75-125      | 1.11  | 30        |       |
| Carbon Dioxide   | 14.1   | 0.10            | % by Volume | 15          |               | 94.1 | 75-125      | 1.07  | 30        |       |
| <b>Duplicate (B8K2027-DUP1) Source: 8K19015-33 Prepared &amp; Analyzed: 11/14/18</b>           |        |                 |             |             |               |      |             |       |           |       |
| Methane  | <0.10  | 0.10            | % by Volume |             | <0.10         |      |             |       | 30        |       |
| Oxygen   | 2.22   | 0.10            | % by Volume |             | 1.86          |      |             | 17.6  | 30        |       |
| Carbon Dioxide   | 5.72   | 0.10            | % by Volume |             | 5.88          |      |             | 2.76  | 30        |       |

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187323  
**Date Received:** 11/16/18  
**Date Reported:** 11/28/18

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### Special Notes

- [1] = \*\* : Exceeds upper control limit.
- [2] = \*\*\* : Exceeds lower control limit.
- [3] = AA-C1 : Exceeds RPD control limit.

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A handwritten signature in cursive script, appearing to read 'Allen A.'.

---

**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.: 17069

70053886  
Page 1 of 1

Client: JACOBS Project Name / No.: KINDER MORGAN NORWALK Sampler's Name: WILLIAM SCHONWALK  
 Project Manager: 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 | ANALYSIS REQUESTED (Test Name)                 |   |   |  |  |  |  |  |  |  | Special Instructions |  |  |  |
|--------------|------------|----------|------|---------------|-------------|--|---|---|--|--|--|--|--|--|--|----------------------|--|--|--|
|              |            |          |      |               |             | Please enter the TAT Turnaround Codes ** below |   |   |  |  |  |  |  |  |  |                      |  |  |  |
| SUM-1-S      | 8K19015-01 | 11/17/18 | 0754 | V             | 2           | X  | X | X |  |  |  |  |  |  |  |                      |  |  |  |
| SUM-1-15     | -02        |          | 0755 | V             | 2           | X  | X | X |  |  |  |  |  |  |  |                      |  |  |  |
| SUM-2-S      | -03        |          | 0840 | V             | 2           | X  | X | X |  |  |  |  |  |  |  |                      |  |  |  |
| SUM-15-7     | -04        |          | 0910 | V             | 2           | X  | X | X |  |  |  |  |  |  |  |                      |  |  |  |
| SUM-15-15    | -05        |          | 0912 | V             | 2           | X  | X | X |  |  |  |  |  |  |  |                      |  |  |  |
| SUM-15-22    | -06        |          | 0914 | V             | 2           | X  | X | X |  |  |  |  |  |  |  |                      |  |  |  |
| SUM-6-7      | -07        |          | 0957 | V             | 2           | X  | X | X |  |  |  |  |  |  |  |                      |  |  |  |
| SUM-6-13     | -08        |          | 0959 | V             | 2           | X  | X | X |  |  |  |  |  |  |  |                      |  |  |  |
| SUM-7-7      | -09        |          | 1050 | V             | 2           | X  | X | X |  |  |  |  |  |  |  |                      |  |  |  |
| SUM-7-13     | -10        |          | 1052 | V             | 2           | X  | X | X |  |  |  |  |  |  |  |                      |  |  |  |
| SUM-7-13 DUP | -11        |          | 1052 | V             | 2           | X  | X | X |  |  |  |  |  |  |  |                      |  |  |  |
| AMBIENT AIR  | -12        |          | 1130 | V             | 1           | X  | X |   |  |  |  |  |  |  |  |                      |  |  |  |
| SUM-10-15    | -13        |          | 1148 | V             | 2           | X  | X | X |  |  |  |  |  |  |  |                      |  |  |  |

|   |                                       |                  |               |                                   |
|---|---------------------------------------|------------------|---------------|-----------------------------------|
| <b>For Laboratory Use</b><br><b>REVIEWED</b><br>Date 11/16/18 Time 17:00<br>TAT 5 Days Sign: <u>[Signature]</u> | Relinquished by<br><u>[Signature]</u> | Date<br>11/16/18 | Time<br>14:25 | Received by<br><u>[Signature]</u> |
|   | Relinquished by<br><u>[Signature]</u> | Date<br>11/16/18 | Time<br>16:00 | Received by<br><u>[Signature]</u> |
|   | Relinquished by                       | Date             | Time          | Received by                       |

A.A. Project No.: MB187323 / 8K19015

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. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 45 days following the submittal of the sample(s) to American Analytics.



# AMERICAN ANALYTICS CHAIN-OF-CUSTODY RECORD

9765 ETON AVE., CHATSWORTH, CA 91311

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

A.A. COC No.: 17070

70053884

Page 1 of 1

Client: JACOBS Project Name / No.: KINDRA MORGAN NORWALK Sampler's Name: WILLIAM SCHWAB  
 Project Manager: 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 |      |  |
|---------------|------------|----------|------|---------------|-------------|--|------|------|------|------|------|------|------|------|------|----------------------|------|--|
|               |            |          |      |               |             | TOL5   | TOL3 | FINO | FINO | FINO | FINO | FINO | FINO | FINO | FINO |                      | FINO |  |
| SUM-5-5       | 8K19015-14 | 11-13-18 | 0803 | V             | 2           | X  | X    | X    |      |      |      |      |      |      |      |                      |      |  |
| SUM-5-15      | -15        |          | 0805 | V             | 2           | X  | X    | X    |      |      |      |      |      |      |      |                      |      |  |
| SUM-8-5       | -16        |          | 0846 | V             | 2           | X  | X    | X    |      |      |      |      |      |      |      |                      |      |  |
| SUM-8-15      | -17        |          | 0848 | V             | 2           | X  | X    | X    |      |      |      |      |      |      |      |                      |      |  |
| SUM-16-7      | -18        |          | 0927 | V             | 2           | X  | X    | X    |      |      |      |      |      |      |      |                      |      |  |
| SUM-16-16     | -19        |          | 0927 | V             | 2           | X  | X    | X    |      |      |      |      |      |      |      |                      |      |  |
| SUM-16-22     | -20        |          | 0931 | V             | 2           | X  | X    | X    |      |      |      |      |      |      |      |                      |      |  |
| SUM-3-5       | -21        |          | 1011 | V             | 2           | X  | X    | X    |      |      |      |      |      |      |      |                      |      |  |
| SUM-3-15      | -22        |          | 1013 | V             | 2           | X  | X    | X    |      |      |      |      |      |      |      |                      |      |  |
| AMBIENT AIR   | -23        |          | 1120 | V             | 1           | X  | X    |      |      |      |      |      |      |      |      |                      |      |  |
| SUM-12-7      | -24        |          | 1120 | V             | 2           | X  | X    | X    |      |      |      |      |      |      |      |                      |      |  |
| SUM-12-15     | -25        |          | 1128 | V             | 2           | X  | X    | X    |      |      |      |      |      |      |      |                      |      |  |
| SUM-12-22     | -26        |          | 1130 | V             | 2           | X  | X    | X    |      |      |      |      |      |      |      |                      |      |  |
| SUM-12-22 Dup | -27        |          | 1130 | V             | 2           | X  | X    | X    |      |      |      |      |      |      |      |                      |      |  |

|  |                                       |                         |                      |                                   |
|--|---------------------------------------|-------------------------|----------------------|-----------------------------------|
| <b>For Laboratory Use</b><br><b>REVIEWED</b><br>Date <u>11/16/18</u> Time <u>17:00</u><br>TAT <u>5</u> Days Sign: <u>[Signature]</u> | Relinquished by<br><u>[Signature]</u> | Date<br><u>11/17/18</u> | Time<br><u>11:45</u> | Received by<br><u>[Signature]</u> |
|  | Relinquished by<br><u>[Signature]</u> | Date<br><u>11/16/18</u> | Time<br><u>16:00</u> | Received by<br><u>[Signature]</u> |
|  | Relinquished by                       | Date                    | Time                 | Received by                       |

A.A. Project No.: MB187323 / 8K19015

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. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 45 days following the submittal of the sample(s) to American Analytics.



# AMERICAN ANALYTICS CHAIN-OF-CUSTODY RECORD

9765 ETON AVE., CHATSWORTH, CA 91311

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

A.A. COC No.: 17071

70053885

Page 1 of 1

Client: JACOBS Project Name / No.: KINDRA MORGAN NORWALK Sampler's Name: WILLIAM SCHMIDT  
 Project Manager: 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 | ANALYSIS REQUESTED (Test Name) |     |           |  |  |  |  |  |  |  | Special Instructions |  |  |
|----------------|------------|----------|------|---------------|-------------|--------------------------------|-----|-----------|--|--|--|--|--|--|--|----------------------|--|--|
|                |            |          |      |               |             | T05                            | T03 | FIXED CHG |  |  |  |  |  |  |  |                      |  |  |
| SUM-11-7       | 8K19015-28 | 11-14-18 | 0825 | V             | 2           | X                              | X   | X         |  |  |  |  |  |  |  |                      |  |  |
| SUM-11-15      | -29        |          | 0827 | V             | 2           | X                              | X   | X         |  |  |  |  |  |  |  |                      |  |  |
| SUM-11-22      | -30        |          | 0829 | V             | 2           | X                              | X   | X         |  |  |  |  |  |  |  |                      |  |  |
| SUM-14R-8      | -31        |          | 0920 | V             | 2           | X                              | X   | X         |  |  |  |  |  |  |  |                      |  |  |
| SUM-14R-16     | -32        |          | 0922 | V             | 2           | X                              | X   | X         |  |  |  |  |  |  |  |                      |  |  |
| SUM-14R-22     | -33        |          | 0924 | V             | 2           | X                              | X   | X         |  |  |  |  |  |  |  |                      |  |  |
| SUM-14R-22 DUP | -34        |          | 0924 | V             | 2           | X                              | X   | X         |  |  |  |  |  |  |  |                      |  |  |
| SUM-13-7       | -35        |          | 1037 | V             | 2           | X                              | X   | X         |  |  |  |  |  |  |  |                      |  |  |
| SUM-13-15      | -36        |          | 1035 | V             | 2           | X                              | X   | X         |  |  |  |  |  |  |  |                      |  |  |
| SUM-13-22      | -37        |          | 1037 | V             | 2           | X                              | X   | X         |  |  |  |  |  |  |  |                      |  |  |
| Ambient Air    | -38        |          | 1045 | V             | 1           | X                              | X   |           |  |  |  |  |  |  |  |                      |  |  |

|  |                                    |                      |                   |                                |
|--|------------------------------------|----------------------|-------------------|--------------------------------|
| <b>For Laboratory Use</b><br><b>REVIEWED</b><br>Date <u>11/16/18</u> Time <u>17:00</u><br>TAT <u>5 Days</u> Sign: <u>[Signature]</u> | Relinquished by <u>[Signature]</u> | Date <u>11-14-18</u> | Time <u>1330</u>  | Received by <u>[Signature]</u> |
|  | Relinquished by <u>[Signature]</u> | Date <u>11/16/18</u> | Time <u>16:00</u> | Received by <u>[Signature]</u> |
|  | Relinquished by                    | Date                 | Time              | Received by                    |

A.A. Project No.: MB187323 / 8K19015

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. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 45 days following the submittal of the sample(s) to American Analytics.





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

---

January 10, 2019

Vladimir Carino  
CH2M Hill, Inc.  
P.O. Box 241329  
Denver, CO 80224

**Re : KMEP Norwalk Biosparge Startup / 693142**  
**MB187324 / 9A02002**

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received on 12/31/18 14:31 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 A.', is written above the printed name.

Allen Aminian  
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Sample ID                         | Laboratory ID | Matrix | TAT | Date Sampled   | Date Received  |
|-----------------------------------|---------------|--------|-----|----------------|----------------|
| <b><u>Fixed Gases - Field</u></b> |               |        |     |                |                |
| SVM-9-5                           | 9A02002-01    | Vapor  | 5   | 12/31/18 08:40 | 12/31/18 14:31 |
| SVM-9-14.5                        | 9A02002-02    | Vapor  | 5   | 12/31/18 08:40 | 12/31/18 14:31 |
| SVM-21-5                          | 9A02002-03    | Vapor  | 5   | 12/31/18 09:31 | 12/31/18 14:31 |
| SVM-21-14.5                       | 9A02002-04    | Vapor  | 5   | 12/31/18 09:31 | 12/31/18 14:31 |
| SVM-22-5                          | 9A02002-05    | Vapor  | 5   | 12/31/18 09:50 | 12/31/18 14:31 |
| SVM-22-14.5                       | 9A02002-06    | Vapor  | 5   | 12/31/18 09:54 | 12/31/18 14:31 |
| SVM-23-5                          | 9A02002-07    | Vapor  | 5   | 12/31/18 10:10 | 12/31/18 14:31 |
| SVM-23-14.5                       | 9A02002-08    | Vapor  | 5   | 12/31/18 10:10 | 12/31/18 14:31 |
| SVM-19-5                          | 9A02002-09    | Vapor  | 5   | 12/31/18 12:23 | 12/31/18 14:31 |
| SVM-20-5                          | 9A02002-10    | Vapor  | 5   | 12/31/18 10:40 | 12/31/18 14:31 |
| SVM-20-14.5                       | 9A02002-11    | Vapor  | 5   | 12/31/18 10:42 | 12/31/18 14:31 |
| AMBIENT AIR                       | 9A02002-12    | Vapor  | 5   | 12/31/18 12:35 | 12/31/18 14:31 |
| SVM-17-5                          | 9A02002-13    | Vapor  | 5   | 12/31/18 12:48 | 12/31/18 14:31 |
| SVM-17-5 DUP                      | 9A02002-14    | Vapor  | 5   | 12/31/18 12:48 | 12/31/18 14:31 |
| SVM-17-14.5                       | 9A02002-15    | Vapor  | 5   | 12/31/18 12:48 | 12/31/18 14:31 |
| SVM-18-5                          | 9A02002-16    | Vapor  | 5   | 12/31/18 13:04 | 12/31/18 14:31 |
| SVM-18-14.5                       | 9A02002-17    | Vapor  | 5   | 12/31/18 13:07 | 12/31/18 14:31 |

**TO-15 (Mid Level)**

**Allen Aminian**  
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Sample ID          | Laboratory ID | Matrix | TAT | Date Sampled   | Date Received  |
|--------------------|---------------|--------|-----|----------------|----------------|
| SVM-9-5            | 9A02002-01    | Vapor  | 5   | 12/31/18 08:40 | 12/31/18 14:31 |
| SVM-9-14.5         | 9A02002-02    | Vapor  | 5   | 12/31/18 08:40 | 12/31/18 14:31 |
| SVM-21-5           | 9A02002-03    | Vapor  | 5   | 12/31/18 09:31 | 12/31/18 14:31 |
| SVM-21-14.5        | 9A02002-04    | Vapor  | 5   | 12/31/18 09:31 | 12/31/18 14:31 |
| SVM-22-5           | 9A02002-05    | Vapor  | 5   | 12/31/18 09:50 | 12/31/18 14:31 |
| SVM-22-14.5        | 9A02002-06    | Vapor  | 5   | 12/31/18 09:54 | 12/31/18 14:31 |
| SVM-23-5           | 9A02002-07    | Vapor  | 5   | 12/31/18 10:10 | 12/31/18 14:31 |
| SVM-23-14.5        | 9A02002-08    | Vapor  | 5   | 12/31/18 10:10 | 12/31/18 14:31 |
| SVM-19-5           | 9A02002-09    | Vapor  | 5   | 12/31/18 12:23 | 12/31/18 14:31 |
| SVM-20-5           | 9A02002-10    | Vapor  | 5   | 12/31/18 10:40 | 12/31/18 14:31 |
| SVM-20-14.5        | 9A02002-11    | Vapor  | 5   | 12/31/18 10:42 | 12/31/18 14:31 |
| AMBIENT AIR        | 9A02002-12    | Vapor  | 5   | 12/31/18 12:35 | 12/31/18 14:31 |
| SVM-17-5           | 9A02002-13    | Vapor  | 5   | 12/31/18 12:48 | 12/31/18 14:31 |
| SVM-17-5 DUP       | 9A02002-14    | Vapor  | 5   | 12/31/18 12:48 | 12/31/18 14:31 |
| SVM-17-14.5        | 9A02002-15    | Vapor  | 5   | 12/31/18 12:48 | 12/31/18 14:31 |
| SVM-18-5           | 9A02002-16    | Vapor  | 5   | 12/31/18 13:04 | 12/31/18 14:31 |
| SVM-18-14.5        | 9A02002-17    | Vapor  | 5   | 12/31/18 13:07 | 12/31/18 14:31 |
| <b><u>TO-3</u></b> |               |        |     |                |                |
| SVM-9-5            | 9A02002-01    | Vapor  | 5   | 12/31/18 08:40 | 12/31/18 14:31 |
| SVM-9-14.5         | 9A02002-02    | Vapor  | 5   | 12/31/18 08:40 | 12/31/18 14:31 |

**Allen Aminian**  
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Sample ID    | Laboratory ID | Matrix | TAT | Date Sampled   | Date Received  |
|--------------|---------------|--------|-----|----------------|----------------|
| SVM-21-5     | 9A02002-03    | Vapor  | 5   | 12/31/18 09:31 | 12/31/18 14:31 |
| SVM-21-14.5  | 9A02002-04    | Vapor  | 5   | 12/31/18 09:31 | 12/31/18 14:31 |
| SVM-22-5     | 9A02002-05    | Vapor  | 5   | 12/31/18 09:50 | 12/31/18 14:31 |
| SVM-22-14.5  | 9A02002-06    | Vapor  | 5   | 12/31/18 09:54 | 12/31/18 14:31 |
| SVM-23-5     | 9A02002-07    | Vapor  | 5   | 12/31/18 10:10 | 12/31/18 14:31 |
| SVM-23-14.5  | 9A02002-08    | Vapor  | 5   | 12/31/18 10:10 | 12/31/18 14:31 |
| SVM-19-5     | 9A02002-09    | Vapor  | 5   | 12/31/18 12:23 | 12/31/18 14:31 |
| SVM-20-5     | 9A02002-10    | Vapor  | 5   | 12/31/18 10:40 | 12/31/18 14:31 |
| SVM-20-14.5  | 9A02002-11    | Vapor  | 5   | 12/31/18 10:42 | 12/31/18 14:31 |
| AMBIENT AIR  | 9A02002-12    | Vapor  | 5   | 12/31/18 12:35 | 12/31/18 14:31 |
| SVM-17-5     | 9A02002-13    | Vapor  | 5   | 12/31/18 12:48 | 12/31/18 14:31 |
| SVM-17-5 DUP | 9A02002-14    | Vapor  | 5   | 12/31/18 12:48 | 12/31/18 14:31 |
| SVM-17-14.5  | 9A02002-15    | Vapor  | 5   | 12/31/18 12:48 | 12/31/18 14:31 |
| SVM-18-5     | 9A02002-16    | Vapor  | 5   | 12/31/18 13:04 | 12/31/18 14:31 |
| SVM-18-14.5  | 9A02002-17    | Vapor  | 5   | 12/31/18 13:07 | 12/31/18 14:31 |

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**Allen Aminian**  
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

#### ANALYTICAL DATA SUMMARY

| Analyte                   | Sample Name | Result | MRL  | Units       | Dilution | Prepared | Analyzed | Method  |
|---------------------------|-------------|--------|------|-------------|----------|----------|----------|---------|
| <b>Fixed Gases by TCD</b> |             |        |      |             |          |          |          |         |
| Oxygen                    | SVM-9-5     | 18     | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Carbon Dioxide            | SVM-9-5     | 0.32   | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Oxygen                    | SVM-9-14.5  | 17     | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Carbon Dioxide            | SVM-9-14.5  | 1.3    | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Oxygen                    | SVM-21-5    | 18     | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Carbon Dioxide            | SVM-21-5    | 0.60   | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Oxygen                    | SVM-21-14.5 | 19     | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Carbon Dioxide            | SVM-21-14.5 | 0.79   | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Oxygen                    | SVM-22-5    | 17     | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Carbon Dioxide            | SVM-22-5    | 0.17   | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |

**Allen Aminian**  
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

**ANALYTICAL DATA SUMMARY**

| Analyte        | Sample Name | Result | MRL  | Units       | Dilution | Prepared | Analyzed | Method  |
|----------------|-------------|--------|------|-------------|----------|----------|----------|---------|
| Oxygen         | SVM-22-14.5 | 17     | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Carbon Dioxide | SVM-22-14.5 | 0.38   | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Oxygen         | SVM-23-5    | 18     | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Carbon Dioxide | SVM-23-5    | 0.88   | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Oxygen         | SVM-23-14.5 | 18     | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Carbon Dioxide | SVM-23-14.5 | 1.1    | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Oxygen         | SVM-19-5    | 18     | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Carbon Dioxide | SVM-19-5    | 0.25   | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Oxygen         | SVM-20-5    | 19     | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Carbon Dioxide | SVM-20-5    | 0.32   | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Oxygen         | SVM-20-14.5 | 17     | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |

**Allen Aminian**  
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

#### ANALYTICAL DATA SUMMARY

| Analyte        | Sample Name  | Result | MRL  | Units       | Dilution | Prepared | Analyzed | Method  |
|----------------|--------------|--------|------|-------------|----------|----------|----------|---------|
| Carbon Dioxide | SVM-20-14.5  | 0.58   | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Oxygen         | AMBIENT AIR  | 18     | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Oxygen         | SVM-17-5     | 19     | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Carbon Dioxide | SVM-17-5     | 0.26   | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Oxygen         | SVM-17-5 DUP | 19     | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Carbon Dioxide | SVM-17-5 DUP | 0.26   | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Oxygen         | SVM-17-14.5  | 18     | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Carbon Dioxide | SVM-17-14.5  | 0.55   | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Oxygen         | SVM-18-5     | 18     | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Carbon Dioxide | SVM-18-5     | 0.51   | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |
| Oxygen         | SVM-18-14.5  | 18     | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

### ANALYTICAL DATA SUMMARY

| Analyte        | Sample Name | Result | MRL  | Units       | Dilution | Prepared | Analyzed | Method  |
|----------------|-------------|--------|------|-------------|----------|----------|----------|---------|
| Carbon Dioxide | SVM-18-14.5 | 2.0    | 0.10 | % by Volume | 1        | 01/03/19 | 01/03/19 | EPA 3CM |

### VOCs by EPA TO-3

### VOCs by GCMS EPA TO-15 (Mid Level)

|                           |             |       |       |      |   |          |          |       |
|---------------------------|-------------|-------|-------|------|---|----------|----------|-------|
| Tetrachloroethylene (PCE) | SVM-21-5    | 0.024 | 0.020 | ug/L | 1 | 01/07/19 | 01/07/19 | TO-15 |
| Tetrachloroethylene (PCE) | SVM-21-14.5 | 0.025 | 0.020 | ug/L | 1 | 01/08/19 | 01/08/19 | TO-15 |
| Tetrachloroethylene (PCE) | SVM-23-14.5 | 0.023 | 0.020 | ug/L | 1 | 01/08/19 | 01/08/19 | TO-15 |

**Allen Aminian**  
QA/QC Manager





### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19  
**Units:** ug/L

|                         |            |            |            |             |     |
|-------------------------|------------|------------|------------|-------------|-----|
| <b>Date Sampled:</b>    | 12/31/18   | 12/31/18   | 12/31/18   | 12/31/18    |     |
| <b>Date Prepared:</b>   | 01/07/19   | 01/07/19   | 01/07/19   | 01/08/19    |     |
| <b>Date Analyzed:</b>   | 01/07/19   | 01/07/19   | 01/07/19   | 01/08/19    |     |
| <b>AA ID No:</b>        | 9A02002-01 | 9A02002-02 | 9A02002-03 | 9A02002-04  |     |
| <b>Client ID No:</b>    | SVM-9-5    | SVM-9-14.5 | SVM-21-5   | SVM-21-14.5 |     |
| <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 |
|-------------------------------|-----|-----|-----|-----|----|

#### Surrogates

|                      |     |     |     |     |                              |
|----------------------|-----|-----|-----|-----|------------------------------|
| 4-Bromofluorobenzene | 98% | 98% | 87% | 98% | <u>%REC Limits</u><br>70-130 |
|----------------------|-----|-----|-----|-----|------------------------------|

**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19  
**Units:** ug/L

|                         |            |             |            |             |     |
|-------------------------|------------|-------------|------------|-------------|-----|
| <b>Date Sampled:</b>    | 12/31/18   | 12/31/18    | 12/31/18   | 12/31/18    |     |
| <b>Date Prepared:</b>   | 01/08/19   | 01/08/19    | 01/08/19   | 01/08/19    |     |
| <b>Date Analyzed:</b>   | 01/08/19   | 01/08/19    | 01/08/19   | 01/08/19    |     |
| <b>AA ID No:</b>        | 9A02002-05 | 9A02002-06  | 9A02002-07 | 9A02002-08  |     |
| <b>Client ID No:</b>    | SVM-22-5   | SVM-22-14.5 | SVM-23-5   | SVM-23-14.5 |     |
| <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 |
|-------------------------------|-----|-----|-----|-----|----|

#### Surrogates

|                      |     |     |     |      |                              |
|----------------------|-----|-----|-----|------|------------------------------|
| 4-Bromofluorobenzene | 98% | 96% | 99% | 100% | <u>%REC Limits</u><br>70-130 |
|----------------------|-----|-----|-----|------|------------------------------|

**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19  
**Units:** ug/L

|                         |            |            |             |             |     |
|-------------------------|------------|------------|-------------|-------------|-----|
| <b>Date Sampled:</b>    | 12/31/18   | 12/31/18   | 12/31/18    | 12/31/18    |     |
| <b>Date Prepared:</b>   | 01/08/19   | 01/08/19   | 01/08/19    | 01/07/19    |     |
| <b>Date Analyzed:</b>   | 01/08/19   | 01/08/19   | 01/08/19    | 01/07/19    |     |
| <b>AA ID No:</b>        | 9A02002-09 | 9A02002-10 | 9A02002-11  | 9A02002-12  |     |
| <b>Client ID No:</b>    | SVM-19-5   | SVM-20-5   | SVM-20-14.5 | AMBIENT AIR |     |
| <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 |
|-------------------------------|-----|-----|-----|-----|----|

#### Surrogates

|                      |     |     |      |      |                              |
|----------------------|-----|-----|------|------|------------------------------|
| 4-Bromofluorobenzene | 98% | 98% | 104% | 101% | <u>%REC Limits</u><br>70-130 |
|----------------------|-----|-----|------|------|------------------------------|

**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19  
**Units:** ug/L

|                         |            |              |             |            |     |
|-------------------------|------------|--------------|-------------|------------|-----|
| <b>Date Sampled:</b>    | 12/31/18   | 12/31/18     | 12/31/18    | 12/31/18   |     |
| <b>Date Prepared:</b>   | 01/08/19   | 01/08/19     | 01/08/19    | 01/08/19   |     |
| <b>Date Analyzed:</b>   | 01/08/19   | 01/08/19     | 01/08/19    | 01/08/19   |     |
| <b>AA ID No:</b>        | 9A02002-13 | 9A02002-14   | 9A02002-15  | 9A02002-16 |     |
| <b>Client ID No:</b>    | SVM-17-5   | SVM-17-5 DUP | SVM-17-14.5 | SVM-18-5   |     |
| <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 |
|-------------------------------|-----|-----|-----|-----|----|

#### Surrogates

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

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by EPA TO-3

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19  
**Units:** ug/L

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|                         |             |     |
|-------------------------|-------------|-----|
| <b>Date Sampled:</b>    | 12/31/2018  |     |
| <b>Date Prepared:</b>   | 01/08/19    |     |
| <b>Date Analyzed:</b>   | 01/08/19    |     |
| <b>AA ID No:</b>        | 9A02002-17  |     |
| <b>Client ID No:</b>    | SVM-18-14.5 |     |
| <b>Matrix:</b>          | Vapor       |     |
| <b>Dilution Factor:</b> | 1           | MRL |

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### TO-3 (TO-3)

|                               |     |    |
|-------------------------------|-----|----|
| Gasoline Range Organics (GRO) | <20 | 20 |
|-------------------------------|-----|----|

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### Surrogates

|                      |      |                              |
|----------------------|------|------------------------------|
| 4-Bromofluorobenzene | 101% | <u>%REC Limits</u><br>70-130 |
|----------------------|------|------------------------------|

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**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187324 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 12/31/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 01/10/19 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

| Date Sampled:           | 12/31/18   | 12/31/18   | 12/31/18   | 12/31/18    |     |
|-------------------------|------------|------------|------------|-------------|-----|
| <b>Date Prepared:</b>   | 01/07/19   | 01/07/19   | 01/07/19   | 01/08/19    |     |
| <b>Date Analyzed:</b>   | 01/07/19   | 01/07/19   | 01/07/19   | 01/08/19    |     |
| <b>AA ID No:</b>        | 9A02002-01 | 9A02002-02 | 9A02002-03 | 9A02002-04  |     |
| <b>Client ID No:</b>    | SVM-9-5    | SVM-9-14.5 | SVM-21-5   | SVM-21-14.5 |     |
| <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:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19  
**Units:** ug/L

|                         | 12/31/18   | 12/31/18   | 12/31/18   | 12/31/18    |     |
|-------------------------|------------|------------|------------|-------------|-----|
| <b>Date Sampled:</b>    | 12/31/18   | 12/31/18   | 12/31/18   | 12/31/18    |     |
| <b>Date Prepared:</b>   | 01/07/19   | 01/07/19   | 01/07/19   | 01/08/19    |     |
| <b>Date Analyzed:</b>   | 01/07/19   | 01/07/19   | 01/07/19   | 01/08/19    |     |
| <b>AA ID No:</b>        | 9A02002-01 | 9A02002-02 | 9A02002-03 | 9A02002-04  |     |
| <b>Client ID No:</b>    | SVM-9-5    | SVM-9-14.5 | SVM-21-5   | SVM-21-14.5 |     |
| <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             | <0.050 | <0.050 | <0.050       | <0.050       | 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 | <b>0.024</b> | <b>0.025</b> | 0.020 |
| Tetrahydrofuran (THF)          | <0.020 | <0.020 | <0.020       | <0.020       | 0.020 |

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187324 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 12/31/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 01/10/19 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         |            |            |            |             |     |
|-------------------------|------------|------------|------------|-------------|-----|
| <b>Date Sampled:</b>    | 12/31/18   | 12/31/18   | 12/31/18   | 12/31/18    |     |
| <b>Date Prepared:</b>   | 01/07/19   | 01/07/19   | 01/07/19   | 01/08/19    |     |
| <b>Date Analyzed:</b>   | 01/07/19   | 01/07/19   | 01/07/19   | 01/08/19    |     |
| <b>AA ID No:</b>        | 9A02002-01 | 9A02002-02 | 9A02002-03 | 9A02002-04  |     |
| <b>Client ID No:</b>    | SVM-9-5    | SVM-9-14.5 | SVM-21-5   | SVM-21-14.5 |     |
| <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 |
| 1,2,3-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     | 96% | 97% | 95% | 97% | 70-130                    |

*Allen Aminian*

**Allen Aminian**  
QA/QC Manager





## LABORATORY ANALYSIS RESULTS

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187324 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 12/31/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 01/10/19 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         |            |             |            |             |     |
|-------------------------|------------|-------------|------------|-------------|-----|
| <b>Date Sampled:</b>    | 12/31/18   | 12/31/18    | 12/31/18   | 12/31/18    |     |
| <b>Date Prepared:</b>   | 01/08/19   | 01/08/19    | 01/08/19   | 01/08/19    |     |
| <b>Date Analyzed:</b>   | 01/08/19   | 01/08/19    | 01/08/19   | 01/08/19    |     |
| <b>AA ID No:</b>        | 9A02002-05 | 9A02002-06  | 9A02002-07 | 9A02002-08  |     |
| <b>Client ID No:</b>    | SVM-22-5   | SVM-22-14.5 | SVM-23-5   | SVM-23-14.5 |     |
| <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

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187324 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 12/31/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 01/10/19 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         |            |             |            |             |     |
|-------------------------|------------|-------------|------------|-------------|-----|
| <b>Date Sampled:</b>    | 12/31/18   | 12/31/18    | 12/31/18   | 12/31/18    |     |
| <b>Date Prepared:</b>   | 01/08/19   | 01/08/19    | 01/08/19   | 01/08/19    |     |
| <b>Date Analyzed:</b>   | 01/08/19   | 01/08/19    | 01/08/19   | 01/08/19    |     |
| <b>AA ID No:</b>        | 9A02002-05 | 9A02002-06  | 9A02002-07 | 9A02002-08  |     |
| <b>Client ID No:</b>    | SVM-22-5   | SVM-22-14.5 | SVM-23-5   | SVM-23-14.5 |     |
| <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             | <0.050 | <0.050 | <0.050 | <0.050       | 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 | <b>0.023</b> | 0.020 |
| Tetrahydrofuran (THF)          | <0.020 | <0.020 | <0.020 | <0.020       | 0.020 |

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187324 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 12/31/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 01/10/19 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         |            |             |            |             |     |
|-------------------------|------------|-------------|------------|-------------|-----|
| <b>Date Sampled:</b>    | 12/31/18   | 12/31/18    | 12/31/18   | 12/31/18    |     |
| <b>Date Prepared:</b>   | 01/08/19   | 01/08/19    | 01/08/19   | 01/08/19    |     |
| <b>Date Analyzed:</b>   | 01/08/19   | 01/08/19    | 01/08/19   | 01/08/19    |     |
| <b>AA ID No:</b>        | 9A02002-05 | 9A02002-06  | 9A02002-07 | 9A02002-08  |     |
| <b>Client ID No:</b>    | SVM-22-5   | SVM-22-14.5 | SVM-23-5   | SVM-23-14.5 |     |
| <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 |
| 1,2,3-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 |

### Surrogates

|                      |     |     |     |     |                              |
|----------------------|-----|-----|-----|-----|------------------------------|
| 4-Bromofluorobenzene | 97% | 94% | 98% | 98% | <b>%REC Limits</b><br>70-130 |
|----------------------|-----|-----|-----|-----|------------------------------|

*Allen Aminian*

**Allen Aminian**  
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19  
**Units:** ug/L

|                         |            |            |             |             |     |
|-------------------------|------------|------------|-------------|-------------|-----|
| <b>Date Sampled:</b>    | 12/31/18   | 12/31/18   | 12/31/18    | 12/31/18    |     |
| <b>Date Prepared:</b>   | 01/08/19   | 01/08/19   | 01/08/19    | 01/07/19    |     |
| <b>Date Analyzed:</b>   | 01/08/19   | 01/08/19   | 01/08/19    | 01/07/19    |     |
| <b>AA ID No:</b>        | 9A02002-09 | 9A02002-10 | 9A02002-11  | 9A02002-12  |     |
| <b>Client ID No:</b>    | SVM-19-5   | SVM-20-5   | SVM-20-14.5 | AMBIENT AIR |     |
| <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

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187324 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 12/31/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 01/10/19 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         |            |            |             |             |     |
|-------------------------|------------|------------|-------------|-------------|-----|
| <b>Date Sampled:</b>    | 12/31/18   | 12/31/18   | 12/31/18    | 12/31/18    |     |
| <b>Date Prepared:</b>   | 01/08/19   | 01/08/19   | 01/08/19    | 01/07/19    |     |
| <b>Date Analyzed:</b>   | 01/08/19   | 01/08/19   | 01/08/19    | 01/07/19    |     |
| <b>AA ID No:</b>        | 9A02002-09 | 9A02002-10 | 9A02002-11  | 9A02002-12  |     |
| <b>Client ID No:</b>    | SVM-19-5   | SVM-20-5   | SVM-20-14.5 | AMBIENT AIR |     |
| <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             | <0.050 | <0.050 | <0.050 | <0.050 | 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

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187324 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 12/31/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 01/10/19 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         |            |            |             |             |     |
|-------------------------|------------|------------|-------------|-------------|-----|
| <b>Date Sampled:</b>    | 12/31/18   | 12/31/18   | 12/31/18    | 12/31/18    |     |
| <b>Date Prepared:</b>   | 01/08/19   | 01/08/19   | 01/08/19    | 01/07/19    |     |
| <b>Date Analyzed:</b>   | 01/08/19   | 01/08/19   | 01/08/19    | 01/07/19    |     |
| <b>AA ID No:</b>        | 9A02002-09 | 9A02002-10 | 9A02002-11  | 9A02002-12  |     |
| <b>Client ID No:</b>    | SVM-19-5   | SVM-20-5   | SVM-20-14.5 | AMBIENT AIR |     |
| <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 |
| 1,2,3-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 |

### Surrogates

|                      |     |     |      |     | <u>%REC Limits</u> |
|----------------------|-----|-----|------|-----|--------------------|
| 4-Bromofluorobenzene | 97% | 97% | 104% | 99% | 70-130             |

*Allen Aminian*

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187324 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 12/31/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 01/10/19 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         | 12/31/18   | 12/31/18     | 12/31/18    | 12/31/18   |     |
|-------------------------|------------|--------------|-------------|------------|-----|
| <b>Date Sampled:</b>    | 12/31/18   | 12/31/18     | 12/31/18    | 12/31/18   |     |
| <b>Date Prepared:</b>   | 01/08/19   | 01/08/19     | 01/08/19    | 01/08/19   |     |
| <b>Date Analyzed:</b>   | 01/08/19   | 01/08/19     | 01/08/19    | 01/08/19   |     |
| <b>AA ID No:</b>        | 9A02002-13 | 9A02002-14   | 9A02002-15  | 9A02002-16 |     |
| <b>Client ID No:</b>    | SVM-17-5   | SVM-17-5 DUP | SVM-17-14.5 | SVM-18-5   |     |
| <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

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187324 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 12/31/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 01/10/19 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         |            |              |             |            |     |
|-------------------------|------------|--------------|-------------|------------|-----|
| <b>Date Sampled:</b>    | 12/31/18   | 12/31/18     | 12/31/18    | 12/31/18   |     |
| <b>Date Prepared:</b>   | 01/08/19   | 01/08/19     | 01/08/19    | 01/08/19   |     |
| <b>Date Analyzed:</b>   | 01/08/19   | 01/08/19     | 01/08/19    | 01/08/19   |     |
| <b>AA ID No:</b>        | 9A02002-13 | 9A02002-14   | 9A02002-15  | 9A02002-16 |     |
| <b>Client ID No:</b>    | SVM-17-5   | SVM-17-5 DUP | SVM-17-14.5 | SVM-18-5   |     |
| <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             | <0.050 | <0.050 | <0.050 | <0.050 | 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

|                      |                                    |                       |          |
|----------------------|------------------------------------|-----------------------|----------|
| <b>Client:</b>       | CH2M Hill, Inc.                    | <b>AA Project No:</b> | MB187324 |
| <b>Project No:</b>   | 693142                             | <b>Date Received:</b> | 12/31/18 |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup     | <b>Date Reported:</b> | 01/10/19 |
| <b>Method:</b>       | VOCs by GCMS EPA TO-15 (Mid Level) | <b>Units:</b>         | ug/L     |

|                         |            |              |             |            |     |
|-------------------------|------------|--------------|-------------|------------|-----|
| <b>Date Sampled:</b>    | 12/31/18   | 12/31/18     | 12/31/18    | 12/31/18   |     |
| <b>Date Prepared:</b>   | 01/08/19   | 01/08/19     | 01/08/19    | 01/08/19   |     |
| <b>Date Analyzed:</b>   | 01/08/19   | 01/08/19     | 01/08/19    | 01/08/19   |     |
| <b>AA ID No:</b>        | 9A02002-13 | 9A02002-14   | 9A02002-15  | 9A02002-16 |     |
| <b>Client ID No:</b>    | SVM-17-5   | SVM-17-5 DUP | SVM-17-14.5 | SVM-18-5   |     |
| <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 |
| 1,2,3-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     | 104% | 99% | 100% | 101% | 70-130                    |

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19  
**Units:** ug/L

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|                         |             |     |
|-------------------------|-------------|-----|
| <b>Date Sampled:</b>    | 12/31/2018  |     |
| <b>Date Prepared:</b>   | 01/08/19    |     |
| <b>Date Analyzed:</b>   | 01/08/19    |     |
| <b>AA ID No:</b>        | 9A02002-17  |     |
| <b>Client ID No:</b>    | SVM-18-14.5 |     |
| <b>Matrix:</b>          | Vapor       |     |
| <b>Dilution Factor:</b> | 1           | MRL |

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

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

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**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19  
**Units:** ug/L

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|                         |             |     |
|-------------------------|-------------|-----|
| <b>Date Sampled:</b>    | 12/31/2018  |     |
| <b>Date Prepared:</b>   | 01/08/19    |     |
| <b>Date Analyzed:</b>   | 01/08/19    |     |
| <b>AA ID No:</b>        | 9A02002-17  |     |
| <b>Client ID No:</b>    | SVM-18-14.5 |     |
| <b>Matrix:</b>          | Vapor       |     |
| <b>Dilution Factor:</b> | 1           | MRL |

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

|                                |        |       |
|--------------------------------|--------|-------|
| 1,1-Dichloroethylene           | <0.020 | 0.020 |
| trans-1,2-Dichloroethylene     | <0.020 | 0.020 |
| 1,2-Dichloropropane            | <0.020 | 0.020 |
| trans-1,3-Dichloropropylene    | <0.020 | 0.020 |
| cis-1,3-Dichloropropylene      | <0.020 | 0.020 |
| Dichlorotetrafluoroethane      | <0.020 | 0.020 |
| Diisopropyl ether (DIPE)       | <0.020 | 0.020 |
| 1,4-Dioxane                    | <0.020 | 0.020 |
| Ethanol                        | <0.020 | 0.020 |
| Ethyl Acetate                  | <0.020 | 0.020 |
| Ethylbenzene                   | <0.020 | 0.020 |
| Ethyl-tert-Butyl Ether (ETBE)  | <0.020 | 0.020 |
| 4-Ethyltoluene                 | <0.020 | 0.020 |
| Heptane                        | <0.020 | 0.020 |
| Hexachlorobutadiene            | <0.020 | 0.020 |
| n-Hexane                       | <0.020 | 0.020 |
| 2-Hexanone (MBK)               | <0.020 | 0.020 |
| Isopropanol (IPA)              | <0.20  | 0.20  |
| Methyl-tert-Butyl Ether (MTBE) | <0.020 | 0.020 |
| Methylene Chloride             | <0.050 | 0.020 |
| 4-Methyl-2-pentanone (MIBK)    | <0.020 | 0.020 |
| Naphthalene                    | <0.020 | 0.020 |
| Propylene                      | <0.020 | 0.020 |
| Styrene                        | <0.020 | 0.020 |
| 1,1,2,2-Tetrachloroethane      | <0.020 | 0.020 |
| Tetrachloroethylene (PCE)      | <0.020 | 0.020 |
| Tetrahydrofuran (THF)          | <0.020 | 0.020 |

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**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** VOCs by GCMS EPA TO-15 (Mid Level)

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19  
**Units:** ug/L

|                         |             |     |
|-------------------------|-------------|-----|
| <b>Date Sampled:</b>    | 12/31/2018  |     |
| <b>Date Prepared:</b>   | 01/08/19    |     |
| <b>Date Analyzed:</b>   | 01/08/19    |     |
| <b>AA ID No:</b>        | 9A02002-17  |     |
| <b>Client ID No:</b>    | SVM-18-14.5 |     |
| <b>Matrix:</b>          | Vapor       |     |
| <b>Dilution Factor:</b> | 1           | MRL |

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

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

|                          |     |                           |
|--------------------------|-----|---------------------------|
| <b><u>Surrogates</u></b> |     | <b><u>%REC Limits</u></b> |
| 4-Bromofluorobenzene     | 98% | 70-130                    |

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19  
**Units:** % by Volume

|                         | 12/31/18   | 12/31/18   | 12/31/18   | 12/31/18    |     |
|-------------------------|------------|------------|------------|-------------|-----|
| <b>Date Sampled:</b>    | 12/31/18   | 12/31/18   | 12/31/18   | 12/31/18    |     |
| <b>Date Prepared:</b>   | 01/03/19   | 01/03/19   | 01/03/19   | 01/03/19    |     |
| <b>Date Analyzed:</b>   | 01/03/19   | 01/03/19   | 01/03/19   | 01/03/19    |     |
| <b>AA ID No:</b>        | 9A02002-01 | 9A02002-02 | 9A02002-03 | 9A02002-04  |     |
| <b>Client ID No:</b>    | SVM-9-5    | SVM-9-14.5 | SVM-21-5   | SVM-21-14.5 |     |
| <b>Matrix:</b>          | Vapor      | Vapor      | Vapor      | Vapor       |     |
| <b>Dilution Factor:</b> | 1          | 1          | 1          | 1           | MRL |

### Fixed Gases - Field (EPA 3CM)

|                |             |            |             |             |      |
|----------------|-------------|------------|-------------|-------------|------|
| Methane        | <0.10       | <0.10      | <0.10       | <0.10       | 0.10 |
| Oxygen         | <b>18</b>   | <b>17</b>  | <b>18</b>   | <b>19</b>   | 0.10 |
| Carbon Dioxide | <b>0.32</b> | <b>1.3</b> | <b>0.60</b> | <b>0.79</b> | 0.10 |

**Allen Aminian**  
 QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19  
**Units:** % by Volume

|                         |            |             |            |             |     |
|-------------------------|------------|-------------|------------|-------------|-----|
| <b>Date Sampled:</b>    | 12/31/18   | 12/31/18    | 12/31/18   | 12/31/18    |     |
| <b>Date Prepared:</b>   | 01/03/19   | 01/03/19    | 01/03/19   | 01/03/19    |     |
| <b>Date Analyzed:</b>   | 01/03/19   | 01/03/19    | 01/03/19   | 01/03/19    |     |
| <b>AA ID No:</b>        | 9A02002-05 | 9A02002-06  | 9A02002-07 | 9A02002-08  |     |
| <b>Client ID No:</b>    | SVM-22-5   | SVM-22-14.5 | SVM-23-5   | SVM-23-14.5 |     |
| <b>Matrix:</b>          | Vapor      | Vapor       | Vapor      | Vapor       |     |
| <b>Dilution Factor:</b> | 1          | 1           | 1          | 1           | MRL |

#### Fixed Gases - Field (EPA 3CM)

|                |             |             |             |            |      |
|----------------|-------------|-------------|-------------|------------|------|
| Methane        | <0.10       | <0.10       | <0.10       | <0.10      | 0.10 |
| Oxygen         | <b>17</b>   | <b>17</b>   | <b>18</b>   | <b>18</b>  | 0.10 |
| Carbon Dioxide | <b>0.17</b> | <b>0.38</b> | <b>0.88</b> | <b>1.1</b> | 0.10 |

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19  
**Units:** % by Volume

|                         |            |            |             |             |     |
|-------------------------|------------|------------|-------------|-------------|-----|
| <b>Date Sampled:</b>    | 12/31/18   | 12/31/18   | 12/31/18    | 12/31/18    |     |
| <b>Date Prepared:</b>   | 01/03/19   | 01/03/19   | 01/03/19    | 01/03/19    |     |
| <b>Date Analyzed:</b>   | 01/03/19   | 01/03/19   | 01/03/19    | 01/03/19    |     |
| <b>AA ID No:</b>        | 9A02002-09 | 9A02002-10 | 9A02002-11  | 9A02002-12  |     |
| <b>Client ID No:</b>    | SVM-19-5   | SVM-20-5   | SVM-20-14.5 | AMBIENT AIR |     |
| <b>Matrix:</b>          | Vapor      | Vapor      | Vapor       | Vapor       |     |
| <b>Dilution Factor:</b> | 1          | 1          | 1           | 1           | MRL |

### Fixed Gases - Field (EPA 3CM)

|                |             |             |             |           |      |
|----------------|-------------|-------------|-------------|-----------|------|
| Methane        | <0.10       | <0.10       | <0.10       | <0.10     | 0.10 |
| Oxygen         | <b>18</b>   | <b>19</b>   | <b>17</b>   | <b>18</b> | 0.10 |
| Carbon Dioxide | <b>0.25</b> | <b>0.32</b> | <b>0.58</b> | <0.10     | 0.10 |

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

|                      |                                |                       |             |
|----------------------|--------------------------------|-----------------------|-------------|
| <b>Client:</b>       | CH2M Hill, Inc.                | <b>AA Project No:</b> | MB187324    |
| <b>Project No:</b>   | 693142                         | <b>Date Received:</b> | 12/31/18    |
| <b>Project Name:</b> | KMEP Norwalk Biosparge Startup | <b>Date Reported:</b> | 01/10/19    |
| <b>Method:</b>       | Fixed Gases by TCD             | <b>Units:</b>         | % by Volume |

|                         |            |              |             |            |     |
|-------------------------|------------|--------------|-------------|------------|-----|
| <b>Date Sampled:</b>    | 12/31/18   | 12/31/18     | 12/31/18    | 12/31/18   |     |
| <b>Date Prepared:</b>   | 01/03/19   | 01/03/19     | 01/03/19    | 01/03/19   |     |
| <b>Date Analyzed:</b>   | 01/03/19   | 01/03/19     | 01/03/19    | 01/03/19   |     |
| <b>AA ID No:</b>        | 9A02002-13 | 9A02002-14   | 9A02002-15  | 9A02002-16 |     |
| <b>Client ID No:</b>    | SVM-17-5   | SVM-17-5 DUP | SVM-17-14.5 | SVM-18-5   |     |
| <b>Matrix:</b>          | Vapor      | Vapor        | Vapor       | Vapor      |     |
| <b>Dilution Factor:</b> | 1          | 1            | 1           | 1          | MRL |

### Fixed Gases - Field (EPA 3CM)

|                |             |             |             |             |      |
|----------------|-------------|-------------|-------------|-------------|------|
| Methane        | <0.10       | <0.10       | <0.10       | <0.10       | 0.10 |
| Oxygen         | <b>19</b>   | <b>19</b>   | <b>18</b>   | <b>18</b>   | 0.10 |
| Carbon Dioxide | <b>0.26</b> | <b>0.26</b> | <b>0.55</b> | <b>0.51</b> | 0.10 |

*Allen Aminian*

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QA/QC Manager





## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup  
**Method:** Fixed Gases by TCD

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19  
**Units:** % by Volume

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|                         |             |     |
|-------------------------|-------------|-----|
| <b>Date Sampled:</b>    | 12/31/2018  |     |
| <b>Date Prepared:</b>   | 01/03/19    |     |
| <b>Date Analyzed:</b>   | 01/03/19    |     |
| <b>AA ID No:</b>        | 9A02002-17  |     |
| <b>Client ID No:</b>    | SVM-18-14.5 |     |
| <b>Matrix:</b>          | Vapor       |     |
| <b>Dilution Factor:</b> | 1           | MRL |

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### Fixed Gases - Field (EPA 3CM)

|                |            |      |
|----------------|------------|------|
| Methane        | <0.10      | 0.10 |
| Oxygen         | <b>18</b>  | 0.10 |
| Carbon Dioxide | <b>2.0</b> | 0.10 |

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**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| 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 B9A0920 - *** DEFAULT PREP ***</i> |               |                 |             |  |               |               |        |     |           |       |
| <b>Blank (B9A0920-BLK1)</b>                 |               |                 |             | Prepared & Analyzed: 01/07/19                    |               |               |        |     |           |       |
| Gasoline Range Organics (GRO)               | <20           | 20              | ug/L        |  |               |               |        |     |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>      | <i>0.0349</i> |                 | <i>ug/L</i> | <i>0.036</i>                                     | <i>97.6</i>   | <i>70-130</i> |        |     |           |       |
| <b>LCS (B9A0920-BS1)</b>                    |               |                 |             | Prepared & Analyzed: 01/08/19                    |               |               |        |     |           |       |
| Gasoline Range Organics (GRO)               | <b>0.694</b>  | 20              | ug/L        | 0.82   | 84.9          | 70-130        |        |     |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>      | <i>0.0350</i> |                 | <i>ug/L</i> | <i>0.036</i>                                     | <i>97.8</i>   | <i>70-130</i> |        |     |           |       |
| <b>LCS Dup (B9A0920-BSD1)</b>               |               |                 |             | Prepared & Analyzed: 01/08/19                    |               |               |        |     |           |       |
| Gasoline Range Organics (GRO)               | <b>0.689</b>  | 20              | ug/L        | 0.82   | 84.2          | 70-130        | 0.840  | 30  |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>      | <i>0.0353</i> |                 | <i>ug/L</i> | <i>0.036</i>                                     | <i>98.6</i>   | <i>70-130</i> |        |     |           |       |
| <b>Duplicate (B9A0920-DUP1)</b>             |               |                 |             | Source: 9A02002-12 Prepared & Analyzed: 01/07/19 |               |               |        |     |           |       |
| Gasoline Range Organics (GRO)               | <20           | 20              | ug/L        |  | <20           |               |        |     | 30        |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>      | <i>0.0356</i> |                 | <i>ug/L</i> | <i>0.036</i>                                     | <i>99.4</i>   | <i>70-130</i> |        |     |           |       |
| <i>Batch B9A0921 - *** DEFAULT PREP ***</i> |               |                 |             |  |               |               |        |     |           |       |
| <b>Blank (B9A0921-BLK1)</b>                 |               |                 |             | Prepared & Analyzed: 01/08/19                    |               |               |        |     |           |       |
| Gasoline Range Organics (GRO)               | <20           | 20              | ug/L        |  |               |               |        |     |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>      | <i>0.0351</i> |                 | <i>ug/L</i> | <i>0.036</i>                                     | <i>98.2</i>   | <i>70-130</i> |        |     |           |       |
| <b>LCS (B9A0921-BS1)</b>                    |               |                 |             | Prepared & Analyzed: 01/08/19                    |               |               |        |     |           |       |
| Gasoline Range Organics (GRO)               | <b>0.651</b>  | 20              | ug/L        | 0.82   | 79.6          | 70-130        |        |     |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>      | <i>0.0366</i> |                 | <i>ug/L</i> | <i>0.036</i>                                     | <i>102</i>    | <i>70-130</i> |        |     |           |       |
| <b>LCS Dup (B9A0921-BSD1)</b>               |               |                 |             | Prepared & Analyzed: 01/08/19                    |               |               |        |     |           |       |
| Gasoline Range Organics (GRO)               | <b>0.652</b>  | 20              | ug/L        | 0.82   | 79.7          | 70-130        | 0.0753 | 30  |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>      | <i>0.0364</i> |                 | <i>ug/L</i> | <i>0.036</i>                                     | <i>102</i>    | <i>70-130</i> |        |     |           |       |
| <b>Duplicate (B9A0921-DUP1)</b>             |               |                 |             | Source: 9A02002-13 Prepared & Analyzed: 01/08/19 |               |               |        |     |           |       |
| Gasoline Range Organics (GRO)               | <20           | 20              | ug/L        |  | <20           |               |        |     | 30        |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>      | <i>0.0371</i> |                 | <i>ug/L</i> | <i>0.036</i>                                     | <i>104</i>    | <i>70-130</i> |        |     |           |       |

### VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control

*Batch B9A0811 - \*\*\* DEFAULT PREP \*\*\**

**Blank (B9A0811-BLK1)**

Prepared & Analyzed: 01/07/19

*Allen Aminian*

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Analyte   | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b> |        |                 |       |             |               |      |             |     |           |       |
| <i>Batch B9A0811 - *** DEFAULT PREP ***</i>                 |        |                 |       |             |               |      |             |     |           |       |
| <b>Blank (B9A0811-BLK1) Continued</b>                       |        |                 |       |             |               |      |             |     |           |       |
| Prepared & Analyzed: 01/07/19                               |        |                 |       |             |               |      |             |     |           |       |
| 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:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Analyte   | Result | Reporting Limit | Units | Spike Level | Source Result                 | %REC %REC | Limits RPD | RPD Limit | Notes |
|---|--------|-----------------|-------|-------------|-------------------------------|-----------|------------|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b> |        |                 |       |             |                               |           |            |           |       |
| <i>Batch B9A0811 - *** DEFAULT PREP ***</i>                 |        |                 |       |             |                               |           |            |           |       |
| <b>Blank (B9A0811-BLK1) Continued</b>                       |        |                 |       |             | Prepared & Analyzed: 01/07/19 |           |            |           |       |
| 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  |             |                               |           |            |           |       |

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QA/QC Manager



## LABORATORY ANALYSIS RESULTS

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**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Analyte   | Result        | Reporting Limit | Units       | Spike Level | Source Result | %REC        | %REC Limits   | RPD | RPD Limit | Notes |
|---|---------------|-----------------|-------------|-------------|---------------|-------------|---------------|-----|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b> |               |                 |             |             |               |             |               |     |           |       |
| <i>Batch B9A0811 - *** DEFAULT PREP ***</i>                 |               |                 |             |             |               |             |               |     |           |       |
| <b>Blank (B9A0811-BLK1) Continued</b>                       |               |                 |             |             |               |             |               |     |           |       |
| Prepared & Analyzed: 01/07/19                               |               |                 |             |             |               |             |               |     |           |       |
| 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        |             |               |             |               |     |           |       |
| 1,2,3-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>0.137</i>  |                 | <i>ug/L</i> | <i>0.14</i> |               | <i>96.0</i> | <i>70-130</i> |     |           |       |
| <b>LCS (B9A0811-BS1)</b>                                    |               |                 |             |             |               |             |               |     |           |       |
| Prepared & Analyzed: 01/07/19                               |               |                 |             |             |               |             |               |     |           |       |
| Acetone   | <b>0.0910</b> | 0.020           | ug/L        | 0.095       |               | 95.8        | 70-130        |     | 30        |       |
| Benzene   | <b>0.131</b>  | 0.020           | ug/L        | 0.13        |               | 102         | 70-130        |     | 30        |       |
| Benzyl chloride   | <b>0.198</b>  | 0.020           | ug/L        | 0.21        |               | 95.6        | 70-130        |     | 30        |       |
| Bromodichloromethane  | <b>0.284</b>  | 0.020           | ug/L        | 0.27        |               | 106         | 70-130        |     | 30        |       |
| Bromoform   | <b>0.407</b>  | 0.020           | ug/L        | 0.41        |               | 98.3        | 70-130        |     | 30        |       |
| Bromomethane  | <b>0.161</b>  | 0.020           | ug/L        | 0.16        |               | 104         | 70-130        |     | 30        |       |
| 2-Butanone (MEK)  | <b>0.127</b>  | 0.020           | ug/L        | 0.12        |               | 108         | 70-130        |     | 30        |       |
| Carbon Disulfide  | <b>0.130</b>  | 0.020           | ug/L        | 0.12        |               | 104         | 70-130        |     | 30        |       |
| Carbon Tetrachloride  | <b>0.260</b>  | 0.020           | ug/L        | 0.25        |               | 103         | 70-130        |     | 30        |       |
| Chlorobenzene   | <b>0.177</b>  | 0.020           | ug/L        | 0.18        |               | 96.3        | 70-130        |     | 30        |       |
| Chloroethane  | <b>0.115</b>  | 0.020           | ug/L        | 0.11        |               | 109         | 70-130        |     | 30        |       |
| Chloroform  | <b>0.205</b>  | 0.020           | ug/L        | 0.20        |               | 105         | 70-130        |     | 30        |       |
| Chloromethane   | <b>0.0925</b> | 0.020           | ug/L        | 0.083       |               | 112         | 70-130        |     | 30        |       |
| Dibromochloromethane  | <b>0.364</b>  | 0.020           | ug/L        | 0.34        |               | 107         | 70-130        |     | 30        |       |
| 1,2-Dibromoethane (EDB)                                     | <b>0.314</b>  | 0.020           | ug/L        | 0.31        |               | 102         | 70-130        |     | 30        |       |
| 1,2-Dichlorobenzene   | <b>0.218</b>  | 0.020           | ug/L        | 0.24        |               | 90.7        | 70-130        |     | 30        |       |
| 1,3-Dichlorobenzene   | <b>0.193</b>  | 0.020           | ug/L        | 0.24        |               | 80.1        | 70-130        |     | 30        |       |

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 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Analyte   | Result       | Reporting Limit | Units | Spike Level | Source Result | %REC                          | %REC Limits | RPD | RPD Limit | Notes |
|---|--------------|-----------------|-------|-------------|---------------|-------------------------------|-------------|-----|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b> |              |                 |       |             |               |                               |             |     |           |       |
| <i>Batch B9A0811 - *** DEFAULT PREP ***</i>                 |              |                 |       |             |               |                               |             |     |           |       |
| <b>LCS (B9A0811-BS1) Continued</b>                          |              |                 |       |             |               | Prepared & Analyzed: 01/07/19 |             |     |           |       |
| 1,4-Dichlorobenzene   | <b>0.214</b> | 0.020           | ug/L  | 0.24        |               | 89.0                          | 70-130      |     | 30        |       |
| Dichlorodifluoromethane (R12)                               | <b>0.187</b> | 0.020           | ug/L  | 0.20        |               | 94.5                          | 70-130      |     | 30        |       |
| 1,1-Dichloroethane  | <b>0.163</b> | 0.020           | ug/L  | 0.16        |               | 101                           | 70-130      |     | 30        |       |
| 1,2-Dichloroethane (EDC)                                    | <b>0.175</b> | 0.020           | ug/L  | 0.16        |               | 108                           | 70-130      |     | 30        |       |
| cis-1,2-Dichloroethylene                                    | <b>0.163</b> | 0.020           | ug/L  | 0.16        |               | 103                           | 70-130      |     | 30        |       |
| 1,1-Dichloroethylene  | <b>0.170</b> | 0.020           | ug/L  | 0.16        |               | 107                           | 70-130      |     | 30        |       |
| trans-1,2-Dichloroethylene                                  | <b>0.171</b> | 0.020           | ug/L  | 0.16        |               | 108                           | 70-130      |     | 30        |       |
| 1,2-Dichloropropane   | <b>0.194</b> | 0.020           | ug/L  | 0.18        |               | 105                           | 70-130      |     | 30        |       |
| trans-1,3-Dichloropropylene                                 | <b>0.196</b> | 0.020           | ug/L  | 0.18        |               | 108                           | 70-130      |     | 30        |       |
| cis-1,3-Dichloropropylene                                   | <b>0.192</b> | 0.020           | ug/L  | 0.18        |               | 106                           | 70-130      |     | 30        |       |
| Dichlorotetrafluoroethane                                   | <b>0.228</b> | 0.020           | ug/L  | 0.28        |               | 81.7                          | 70-130      |     | 30        |       |
| Ethylbenzene  | <b>0.156</b> | 0.020           | ug/L  | 0.17        |               | 89.7                          | 70-130      |     | 30        |       |
| 4-Ethyltoluene  | <b>0.193</b> | 0.020           | ug/L  | 0.20        |               | 98.2                          | 70-130      |     | 30        |       |
| Hexachlorobutadiene   | <b>0.306</b> | 0.020           | ug/L  | 0.43        |               | 71.7                          | 70-130      |     | 30        |       |
| 2-Hexanone (MBK)  | <b>0.186</b> | 0.020           | ug/L  | 0.16        |               | 114                           | 70-130      |     | 30        |       |
| Isopropanol (IPA)   | <b>0.109</b> | 0.20            | ug/L  | 0.098       |               | 110                           | 70-130      |     | 30        |       |
| Methylene Chloride  | <b>0.124</b> | 0.020           | ug/L  | 0.14        |               | 89.4                          | 70-130      |     | 30        |       |
| 4-Methyl-2-pentanone (MIBK)                                 | <b>0.199</b> | 0.020           | ug/L  | 0.16        |               | 121                           | 70-130      |     | 30        |       |
| Styrene   | <b>0.163</b> | 0.020           | ug/L  | 0.17        |               | 95.8                          | 70-130      |     | 30        |       |
| 1,1,2,2-Tetrachloroethane                                   | <b>0.223</b> | 0.020           | ug/L  | 0.27        |               | 81.1                          | 70-130      |     | 30        |       |
| Tetrachloroethylene (PCE)                                   | <b>0.255</b> | 0.020           | ug/L  | 0.27        |               | 94.1                          | 70-130      |     | 30        |       |
| Toluene   | <b>0.151</b> | 0.020           | ug/L  | 0.15        |               | 100                           | 70-130      |     | 30        |       |
| 1,2,4-Trichlorobenzene                                      | <b>0.227</b> | 0.020           | ug/L  | 0.30        |               | 76.4                          | 70-130      |     | 30        |       |
| 1,1,2-Trichloroethane                                       | <b>0.225</b> | 0.020           | ug/L  | 0.22        |               | 103                           | 70-130      |     | 30        |       |
| 1,1,1-Trichloroethane                                       | <b>0.226</b> | 0.020           | ug/L  | 0.22        |               | 104                           | 70-130      |     | 30        |       |
| Trichloroethylene (TCE)                                     | <b>0.187</b> | 0.020           | ug/L  | 0.21        |               | 87.2                          | 70-130      |     | 30        |       |
| Trichlorofluoromethane (R11)                                | <b>0.224</b> | 0.020           | ug/L  | 0.22        |               | 99.9                          | 70-130      |     | 30        |       |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (R113)                | <b>0.312</b> | 0.020           | ug/L  | 0.31        |               | 102                           | 70-130      |     | 30        |       |
| 1,3,5-Trimethylbenzene                                      | <b>0.175</b> | 0.020           | ug/L  | 0.20        |               | 89.2                          | 70-130      |     | 30        |       |
| 1,2,4-Trimethylbenzene                                      | <b>0.177</b> | 0.020           | ug/L  | 0.20        |               | 90.1                          | 70-130      |     | 30        |       |
| Vinyl acetate   | <b>0.144</b> | 0.020           | ug/L  | 0.14        |               | 102                           | 70-130      |     | 30        |       |

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

### VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control

Batch B9A0811 - \*\*\* DEFAULT PREP \*\*\*

#### LCS (B9A0811-BS1) Continued

Prepared & Analyzed: 01/07/19

|                        |       |       |      |      |  |      |        |  |    |  |
|------------------------|-------|-------|------|------|--|------|--------|--|----|--|
| Vinyl chloride         | 0.115 | 0.020 | ug/L | 0.10 |  | 113  | 70-130 |  | 30 |  |
| o-Xylene               | 0.153 | 0.020 | ug/L | 0.17 |  | 88.0 | 70-130 |  | 30 |  |
| m,p-Xylenes            | 0.343 | 0.020 | ug/L | 0.35 |  | 98.6 | 70-130 |  | 30 |  |
| 1,2,3-Trichloropropane | 0.215 | 0.020 | ug/L | 0.24 |  | 89.1 | 70-130 |  | 30 |  |
| sec-Butylbenzene       | 0.184 | 0.020 | ug/L | 0.22 |  | 84.0 | 70-130 |  | 30 |  |
| Isopropylbenzene       | 0.176 | 0.020 | ug/L | 0.20 |  | 89.3 | 70-130 |  | 30 |  |
| n-Propylbenzene        | 0.173 | 0.020 | ug/L | 0.20 |  | 87.9 | 70-130 |  | 30 |  |
| 4-Isopropyltoluene     | 0.194 | 0.020 | ug/L | 0.22 |  | 88.6 | 70-130 |  | 30 |  |

Surrogate: 4-Bromofluorobenzene 0.143 ug/L 0.14 99.6 70-130

#### LCS Dup (B9A0811-BSD1)

Prepared & Analyzed: 01/08/19

|                               |        |       |      |       |  |      |        |       |    |  |
|-------------------------------|--------|-------|------|-------|--|------|--------|-------|----|--|
| Acetone                       | 0.0916 | 0.020 | ug/L | 0.095 |  | 96.5 | 70-130 | 0.728 | 30 |  |
| Benzene                       | 0.136  | 0.020 | ug/L | 0.13  |  | 106  | 70-130 | 3.95  | 30 |  |
| Benzyl chloride               | 0.198  | 0.020 | ug/L | 0.21  |  | 95.7 | 70-130 | 0.157 | 30 |  |
| Bromodichloromethane          | 0.306  | 0.020 | ug/L | 0.27  |  | 114  | 70-130 | 7.54  | 30 |  |
| Bromoform                     | 0.426  | 0.020 | ug/L | 0.41  |  | 103  | 70-130 | 4.67  | 30 |  |
| Bromomethane                  | 0.169  | 0.020 | ug/L | 0.16  |  | 109  | 70-130 | 4.63  | 30 |  |
| 2-Butanone (MEK)              | 0.138  | 0.020 | ug/L | 0.12  |  | 117  | 70-130 | 8.69  | 30 |  |
| Carbon Disulfide              | 0.135  | 0.020 | ug/L | 0.12  |  | 108  | 70-130 | 3.48  | 30 |  |
| Carbon Tetrachloride          | 0.284  | 0.020 | ug/L | 0.25  |  | 113  | 70-130 | 8.88  | 30 |  |
| Chlorobenzene                 | 0.190  | 0.020 | ug/L | 0.18  |  | 103  | 70-130 | 6.99  | 30 |  |
| Chloroethane                  | 0.116  | 0.020 | ug/L | 0.11  |  | 110  | 70-130 | 0.755 | 30 |  |
| Chloroform                    | 0.215  | 0.020 | ug/L | 0.20  |  | 110  | 70-130 | 4.71  | 30 |  |
| Chloromethane                 | 0.0879 | 0.020 | ug/L | 0.083 |  | 106  | 70-130 | 5.06  | 30 |  |
| Dibromochloromethane          | 0.389  | 0.020 | ug/L | 0.34  |  | 114  | 70-130 | 6.75  | 30 |  |
| 1,2-Dibromoethane (EDB)       | 0.344  | 0.020 | ug/L | 0.31  |  | 112  | 70-130 | 9.06  | 30 |  |
| 1,2-Dichlorobenzene           | 0.225  | 0.020 | ug/L | 0.24  |  | 93.4 | 70-130 | 2.93  | 30 |  |
| 1,3-Dichlorobenzene           | 0.213  | 0.020 | ug/L | 0.24  |  | 88.6 | 70-130 | 10.1  | 30 |  |
| 1,4-Dichlorobenzene           | 0.227  | 0.020 | ug/L | 0.24  |  | 94.3 | 70-130 | 5.70  | 30 |  |
| Dichlorodifluoromethane (R12) | 0.182  | 0.020 | ug/L | 0.20  |  | 92.0 | 70-130 | 2.68  | 30 |  |
| 1,1-Dichloroethane            | 0.173  | 0.020 | ug/L | 0.16  |  | 107  | 70-130 | 6.14  | 30 |  |
| 1,2-Dichloroethane (EDC)      | 0.182  | 0.020 | ug/L | 0.16  |  | 113  | 70-130 | 4.08  | 30 |  |

*Allen Aminian*

**Allen Aminian**  
 QA/QC Manager



**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Analyte   | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|---|--------|-----------------|-------|-------------|---------------|------|-------------|-------|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b> |        |                 |       |             |               |      |             |       |           |       |
| <i>Batch B9A0811 - *** DEFAULT PREP ***</i>                 |        |                 |       |             |               |      |             |       |           |       |
| <b>LCS Dup (B9A0811-BSD1) Continued</b>                     |        |                 |       |             |               |      |             |       |           |       |
| Prepared & Analyzed: 01/08/19                               |        |                 |       |             |               |      |             |       |           |       |
| cis-1,2-Dichloroethylene                                    | 0.167  | 0.020           | ug/L  | 0.16        |               | 105  | 70-130      | 2.26  | 30        |       |
| 1,1-Dichloroethylene  | 0.175  | 0.020           | ug/L  | 0.16        |               | 110  | 70-130      | 2.78  | 30        |       |
| trans-1,2-Dichloroethylene                                  | 0.172  | 0.020           | ug/L  | 0.16        |               | 109  | 70-130      | 0.623 | 30        |       |
| 1,2-Dichloropropane   | 0.203  | 0.020           | ug/L  | 0.18        |               | 110  | 70-130      | 4.40  | 30        |       |
| trans-1,3-Dichloropropylene                                 | 0.206  | 0.020           | ug/L  | 0.18        |               | 114  | 70-130      | 5.08  | 30        |       |
| cis-1,3-Dichloropropylene                                   | 0.202  | 0.020           | ug/L  | 0.18        |               | 111  | 70-130      | 5.28  | 30        |       |
| Dichlorotetrafluoroethane                                   | 0.221  | 0.020           | ug/L  | 0.28        |               | 78.9 | 70-130      | 3.43  | 30        |       |
| Ethylbenzene  | 0.167  | 0.020           | ug/L  | 0.17        |               | 96.0 | 70-130      | 6.84  | 30        |       |
| 4-Ethyltoluene  | 0.196  | 0.020           | ug/L  | 0.20        |               | 99.6 | 70-130      | 1.39  | 30        |       |
| Hexachlorobutadiene   | 0.327  | 0.020           | ug/L  | 0.43        |               | 76.6 | 70-130      | 6.64  | 30        |       |
| 2-Hexanone (MBK)  | 0.183  | 0.020           | ug/L  | 0.16        |               | 112  | 70-130      | 1.57  | 30        |       |
| Isopropanol (IPA)   | 0.120  | 0.20            | ug/L  | 0.098       |               | 122  | 70-130      | 10.2  | 30        |       |
| Methylene Chloride  | 0.126  | 0.020           | ug/L  | 0.14        |               | 90.8 | 70-130      | 1.64  | 30        |       |
| 4-Methyl-2-pentanone (MIBK)                                 | 0.196  | 0.020           | ug/L  | 0.16        |               | 120  | 70-130      | 1.27  | 30        |       |
| Styrene   | 0.170  | 0.020           | ug/L  | 0.17        |               | 99.9 | 70-130      | 4.19  | 30        |       |
| 1,1,2,2-Tetrachloroethane                                   | 0.234  | 0.020           | ug/L  | 0.27        |               | 85.3 | 70-130      | 5.11  | 30        |       |
| Tetrachloroethylene (PCE)                                   | 0.282  | 0.020           | ug/L  | 0.27        |               | 104  | 70-130      | 9.93  | 30        |       |
| Toluene   | 0.163  | 0.020           | ug/L  | 0.15        |               | 108  | 70-130      | 7.96  | 30        |       |
| 1,2,4-Trichlorobenzene                                      | 0.234  | 0.020           | ug/L  | 0.30        |               | 78.9 | 70-130      | 3.32  | 30        |       |
| 1,1,2-Trichloroethane                                       | 0.242  | 0.020           | ug/L  | 0.22        |               | 111  | 70-130      | 7.42  | 30        |       |
| 1,1,1-Trichloroethane                                       | 0.248  | 0.020           | ug/L  | 0.22        |               | 114  | 70-130      | 9.35  | 30        |       |
| Trichloroethylene (TCE)                                     | 0.205  | 0.020           | ug/L  | 0.21        |               | 95.2 | 70-130      | 8.85  | 30        |       |
| Trichlorofluoromethane (R11)                                | 0.246  | 0.020           | ug/L  | 0.22        |               | 110  | 70-130      | 9.22  | 30        |       |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (R113)                | 0.325  | 0.020           | ug/L  | 0.31        |               | 106  | 70-130      | 3.99  | 30        |       |
| 1,3,5-Trimethylbenzene                                      | 0.182  | 0.020           | ug/L  | 0.20        |               | 92.7 | 70-130      | 3.82  | 30        |       |
| 1,2,4-Trimethylbenzene                                      | 0.186  | 0.020           | ug/L  | 0.20        |               | 94.5 | 70-130      | 4.71  | 30        |       |
| Vinyl acetate   | 0.146  | 0.020           | ug/L  | 0.14        |               | 104  | 70-130      | 1.58  | 30        |       |
| Vinyl chloride  | 0.116  | 0.020           | ug/L  | 0.10        |               | 114  | 70-130      | 0.928 | 30        |       |
| o-Xylene  | 0.165  | 0.020           | ug/L  | 0.17        |               | 94.8 | 70-130      | 7.36  | 30        |       |
| m,p-Xylenes   | 0.372  | 0.020           | ug/L  | 0.35        |               | 107  | 70-130      | 8.27  | 30        |       |
| 1,2,3-Trichloropropane                                      | 0.223  | 0.020           | ug/L  | 0.24        |               | 92.3 | 70-130      | 3.53  | 30        |       |

**Allen Aminian**  
QA/QC Manager



**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Analyte   | Result       | Reporting Limit | Units       | Spike Level | Source Result | %REC        | %REC Limits   | RPD  | RPD Limit | Notes |
|---|--------------|-----------------|-------------|-------------|---------------|-------------|---------------|------|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b> |              |                 |             |             |               |             |               |      |           |       |
| <i>Batch B9A0811 - *** DEFAULT PREP ***</i>                 |              |                 |             |             |               |             |               |      |           |       |
| <b>LCS Dup (B9A0811-BSD1) Continued</b>                     |              |                 |             |             |               |             |               |      |           |       |
| Prepared & Analyzed: 01/08/19                               |              |                 |             |             |               |             |               |      |           |       |
| sec-Butylbenzene  | 0.191        | 0.020           | ug/L        | 0.22        |               | 86.8        | 70-130        | 3.28 | 30        |       |
| Isopropylbenzene  | 0.186        | 0.020           | ug/L        | 0.20        |               | 94.6        | 70-130        | 5.68 | 30        |       |
| n-Propylbenzene   | 0.178        | 0.020           | ug/L        | 0.20        |               | 90.3        | 70-130        | 2.66 | 30        |       |
| 4-Isopropyltoluene  | 0.203        | 0.020           | ug/L        | 0.22        |               | 92.6        | 70-130        | 4.47 | 30        |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>                      | <i>0.142</i> |                 | <i>ug/L</i> | <i>0.14</i> |               | <i>99.1</i> | <i>70-130</i> |      |           |       |
| <b>Duplicate (B9A0811-DUP1)</b>                             |              |                 |             |             |               |             |               |      |           |       |
| Source: 9A02002-12 Prepared & Analyzed: 01/07/19            |              |                 |             |             |               |             |               |      |           |       |
| 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        |       |
| 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        |       |

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Analyte  | Result | Reporting Limit | Units | Spike Level | Source Result | %REC %REC Limits | RPD | RPD Limit | Notes |
|--|--------|-----------------|-------|-------------|---------------|------------------|-----|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b>                                    |        |                 |       |             |               |                  |     |           |       |
| <i>Batch B9A0811 - *** DEFAULT PREP ***</i>  |        |                 |       |             |               |                  |     |           |       |
| <b>Duplicate (B9A0811-DUP1) Continued Source: 9A02002-12 Prepared &amp; Analyzed: 01/07/19</b> |        |                 |       |             |               |                  |     |           |       |
| 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  |             | <0.050        |                  |     | 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        |       |

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

### VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control

Batch B9A0811 - \*\*\* DEFAULT PREP \*\*\*

**Duplicate (B9A0811-DUP1) Continued** Source: 9A02002-12 Prepared & Analyzed: 01/07/19

|  |        |       |      |  |        |  |  |  |    |  |
|--|--------|-------|------|--|--------|--|--|--|----|--|
| 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 |  |
| 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 |  |

Surrogate: 4-Bromofluorobenzene 0.141 ug/L 0.14 98.7 70-130

Batch B9A0919 - \*\*\* DEFAULT PREP \*\*\*

**Blank (B9A0919-BLK1)**

Prepared & Analyzed: 01/08/19

|                               |        |       |      |  |  |  |  |  |  |  |
|-------------------------------|--------|-------|------|--|--|--|--|--|--|--|
| 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 |  |  |  |  |  |  |  |

*Allen Aminian*

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Analyte   | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b> |        |                 |       |             |               |      |             |     |           |       |
| <i>Batch B9A0919 - *** DEFAULT PREP ***</i>                 |        |                 |       |             |               |      |             |     |           |       |
| <b>Blank (B9A0919-BLK1) Continued</b>                       |        |                 |       |             |               |      |             |     |           |       |
| Prepared & Analyzed: 01/08/19                               |        |                 |       |             |               |      |             |     |           |       |
| 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  |             |               |      |             |     |           |       |
| 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  |             |               |      |             |     |           |       |

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Analyte   | Result | Reporting Limit | Units | Spike Level | Source Result | %REC %REC | Limits | RPD | RPD Limit | Notes |
|---|--------|-----------------|-------|-------------|---------------|-----------|--------|-----|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b> |        |                 |       |             |               |           |        |     |           |       |
| <i>Batch B9A0919 - *** DEFAULT PREP ***</i>                 |        |                 |       |             |               |           |        |     |           |       |
| <b>Blank (B9A0919-BLK1) Continued</b>                       |        |                 |       |             |               |           |        |     |           |       |
| Prepared & Analyzed: 01/08/19                               |        |                 |       |             |               |           |        |     |           |       |
| 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  |             |               |           |        |     |           |       |
| 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  |             |               |           |        |     |           |       |
| 1,2,3-Trichloropropane                                      | <0.020 | 0.020           | ug/L  |             |               |           |        |     |           |       |
| sec-Butylbenzene  | <0.020 | 0.020           | ug/L  |             |               |           |        |     |           |       |
| Isopropylbenzene  | <0.020 | 0.020           | ug/L  |             |               |           |        |     |           |       |

**Allen Aminian**  
 QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Analyte   | Result        | Reporting Limit | Units       | Spike Level | Source Result | %REC        | %REC Limits   | RPD | RPD Limit | Notes |
|---|---------------|-----------------|-------------|-------------|---------------|-------------|---------------|-----|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b> |               |                 |             |             |               |             |               |     |           |       |
| <i>Batch B9A0919 - *** DEFAULT PREP ***</i>                 |               |                 |             |             |               |             |               |     |           |       |
| <b>Blank (B9A0919-BLK1) Continued</b>                       |               |                 |             |             |               |             |               |     |           |       |
| Prepared & Analyzed: 01/08/19                               |               |                 |             |             |               |             |               |     |           |       |
| 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>0.142</i>  |                 | <i>ug/L</i> | <i>0.14</i> |               | <i>99.1</i> | <i>70-130</i> |     |           |       |
| <b>LCS (B9A0919-BS1)</b>                                    |               |                 |             |             |               |             |               |     |           |       |
| Prepared & Analyzed: 01/08/19                               |               |                 |             |             |               |             |               |     |           |       |
| Acetone   | <b>0.0947</b> | 0.020           | ug/L        | 0.095       |               | 99.7        | 70-130        |     | 30        |       |
| Benzene   | <b>0.137</b>  | 0.020           | ug/L        | 0.13        |               | 107         | 70-130        |     | 30        |       |
| Benzyl chloride   | <b>0.211</b>  | 0.020           | ug/L        | 0.21        |               | 102         | 70-130        |     | 30        |       |
| Bromodichloromethane  | <b>0.287</b>  | 0.020           | ug/L        | 0.27        |               | 107         | 70-130        |     | 30        |       |
| Bromoform   | <b>0.431</b>  | 0.020           | ug/L        | 0.41        |               | 104         | 70-130        |     | 30        |       |
| Bromomethane  | <b>0.164</b>  | 0.020           | ug/L        | 0.16        |               | 105         | 70-130        |     | 30        |       |
| 2-Butanone (MEK)  | <b>0.130</b>  | 0.020           | ug/L        | 0.12        |               | 110         | 70-130        |     | 30        |       |
| Carbon Disulfide  | <b>0.131</b>  | 0.020           | ug/L        | 0.12        |               | 105         | 70-130        |     | 30        |       |
| Carbon Tetrachloride  | <b>0.270</b>  | 0.020           | ug/L        | 0.25        |               | 107         | 70-130        |     | 30        |       |
| Chlorobenzene   | <b>0.179</b>  | 0.020           | ug/L        | 0.18        |               | 97.0        | 70-130        |     | 30        |       |
| Chloroethane  | <b>0.116</b>  | 0.020           | ug/L        | 0.11        |               | 110         | 70-130        |     | 30        |       |
| Chloroform  | <b>0.212</b>  | 0.020           | ug/L        | 0.20        |               | 108         | 70-130        |     | 30        |       |
| Chloromethane   | <b>0.0917</b> | 0.020           | ug/L        | 0.083       |               | 111         | 70-130        |     | 30        |       |
| Dibromochloromethane  | <b>0.376</b>  | 0.020           | ug/L        | 0.34        |               | 110         | 70-130        |     | 30        |       |
| 1,2-Dibromoethane (EDB)                                     | <b>0.333</b>  | 0.020           | ug/L        | 0.31        |               | 108         | 70-130        |     | 30        |       |
| 1,2-Dichlorobenzene   | <b>0.218</b>  | 0.020           | ug/L        | 0.24        |               | 90.7        | 70-130        |     | 30        |       |
| 1,3-Dichlorobenzene   | <b>0.193</b>  | 0.020           | ug/L        | 0.24        |               | 80.3        | 70-130        |     | 30        |       |
| 1,4-Dichlorobenzene   | <b>0.247</b>  | 0.020           | ug/L        | 0.24        |               | 103         | 70-130        |     | 30        |       |
| Dichlorodifluoromethane (R12)                               | <b>0.261</b>  | 0.020           | ug/L        | 0.20        |               | 132         | 70-130        |     | 30        | **    |
| 1,1-Dichloroethane  | <b>0.161</b>  | 0.020           | ug/L        | 0.16        |               | 99.7        | 70-130        |     | 30        |       |
| 1,2-Dichloroethane (EDC)                                    | <b>0.182</b>  | 0.020           | ug/L        | 0.16        |               | 113         | 70-130        |     | 30        |       |
| cis-1,2-Dichloroethylene                                    | <b>0.170</b>  | 0.020           | ug/L        | 0.16        |               | 107         | 70-130        |     | 30        |       |
| 1,1-Dichloroethylene  | <b>0.174</b>  | 0.020           | ug/L        | 0.16        |               | 110         | 70-130        |     | 30        |       |
| trans-1,2-Dichloroethylene                                  | <b>0.174</b>  | 0.020           | ug/L        | 0.16        |               | 109         | 70-130        |     | 30        |       |
| 1,2-Dichloropropane   | <b>0.196</b>  | 0.020           | ug/L        | 0.18        |               | 106         | 70-130        |     | 30        |       |
| trans-1,3-Dichloropropylene                                 | <b>0.200</b>  | 0.020           | ug/L        | 0.18        |               | 110         | 70-130        |     | 30        |       |

*Allen A*

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**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Analyte   | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b> |        |                 |       |             |               |      |             |     |           |       |
| Batch B9A0919 - *** DEFAULT PREP ***                        |        |                 |       |             |               |      |             |     |           |       |
| <b>LCS (B9A0919-BS1) Continued</b>                          |        |                 |       |             |               |      |             |     |           |       |
| Prepared & Analyzed: 01/08/19                               |        |                 |       |             |               |      |             |     |           |       |
| cis-1,3-Dichloropropylene                                   | 0.196  | 0.020           | ug/L  | 0.18        |               | 108  | 70-130      |     | 30        |       |
| Dichlorotetrafluoroethane                                   | 0.321  | 0.020           | ug/L  | 0.28        |               | 115  | 70-130      |     | 30        |       |
| Ethylbenzene  | 0.172  | 0.020           | ug/L  | 0.17        |               | 99.3 | 70-130      |     | 30        |       |
| 4-Ethyltoluene  | 0.211  | 0.020           | ug/L  | 0.20        |               | 107  | 70-130      |     | 30        |       |
| Hexachlorobutadiene   | 0.340  | 0.020           | ug/L  | 0.43        |               | 79.7 | 70-130      |     | 30        |       |
| 2-Hexanone (MBK)  | 0.185  | 0.020           | ug/L  | 0.16        |               | 113  | 70-130      |     | 30        |       |
| Isopropanol (IPA)   | 0.107  | 0.20            | ug/L  | 0.098       |               | 109  | 70-130      |     | 30        |       |
| Methylene Chloride  | 0.120  | 0.020           | ug/L  | 0.14        |               | 86.3 | 70-130      |     | 30        |       |
| 4-Methyl-2-pentanone (MIBK)                                 | 0.196  | 0.020           | ug/L  | 0.16        |               | 120  | 70-130      |     | 30        |       |
| Styrene   | 0.166  | 0.020           | ug/L  | 0.17        |               | 97.4 | 70-130      |     | 30        |       |
| 1,1,2,2-Tetrachloroethane                                   | 0.225  | 0.020           | ug/L  | 0.27        |               | 82.0 | 70-130      |     | 30        |       |
| Tetrachloroethylene (PCE)                                   | 0.269  | 0.020           | ug/L  | 0.27        |               | 99.0 | 70-130      |     | 30        |       |
| Toluene   | 0.157  | 0.020           | ug/L  | 0.15        |               | 104  | 70-130      |     | 30        |       |
| 1,2,4-Trichlorobenzene                                      | 0.239  | 0.020           | ug/L  | 0.30        |               | 80.6 | 70-130      |     | 30        |       |
| 1,1,2-Trichloroethane                                       | 0.232  | 0.020           | ug/L  | 0.22        |               | 106  | 70-130      |     | 30        |       |
| 1,1,1-Trichloroethane                                       | 0.236  | 0.020           | ug/L  | 0.22        |               | 108  | 70-130      |     | 30        |       |
| Trichloroethylene (TCE)                                     | 0.193  | 0.020           | ug/L  | 0.21        |               | 89.6 | 70-130      |     | 30        |       |
| Trichlorofluoromethane (R11)                                | 0.246  | 0.020           | ug/L  | 0.22        |               | 109  | 70-130      |     | 30        |       |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (R113)                | 0.322  | 0.020           | ug/L  | 0.31        |               | 105  | 70-130      |     | 30        |       |
| 1,3,5-Trimethylbenzene                                      | 0.187  | 0.020           | ug/L  | 0.20        |               | 95.2 | 70-130      |     | 30        |       |
| 1,2,4-Trimethylbenzene                                      | 0.183  | 0.020           | ug/L  | 0.20        |               | 92.9 | 70-130      |     | 30        |       |
| Vinyl acetate   | 0.147  | 0.020           | ug/L  | 0.14        |               | 105  | 70-130      |     | 30        |       |
| Vinyl chloride  | 0.116  | 0.020           | ug/L  | 0.10        |               | 113  | 70-130      |     | 30        |       |
| o-Xylene  | 0.159  | 0.020           | ug/L  | 0.17        |               | 91.6 | 70-130      |     | 30        |       |
| m,p-Xylenes   | 0.355  | 0.020           | ug/L  | 0.35        |               | 102  | 70-130      |     | 30        |       |
| 1,2,3-Trichloropropane                                      | 0.259  | 0.020           | ug/L  | 0.24        |               | 108  | 70-130      |     | 30        |       |
| sec-Butylbenzene  | 0.241  | 0.020           | ug/L  | 0.22        |               | 110  | 70-130      |     | 30        |       |
| Isopropylbenzene  | 0.216  | 0.020           | ug/L  | 0.20        |               | 110  | 70-130      |     | 30        |       |
| n-Propylbenzene   | 0.216  | 0.020           | ug/L  | 0.20        |               | 110  | 70-130      |     | 30        |       |
| 4-Isopropyltoluene  | 0.257  | 0.020           | ug/L  | 0.22        |               | 117  | 70-130      |     | 30        |       |

**Allen Aminian**  
QA/QC Manager





## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

### VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control

Batch B9A0919 - \*\*\* DEFAULT PREP \*\*\*

#### LCS (B9A0919-BS1) Continued

Prepared & Analyzed: 01/08/19

Surrogate: 4-Bromofluorobenzene 0.147 ug/L 0.14 103 70-130

#### LCS Dup (B9A0919-BSD1)

Prepared & Analyzed: 01/08/19

|                               |        |       |      |       |  |      |        |       |    |    |
|-------------------------------|--------|-------|------|-------|--|------|--------|-------|----|----|
| Acetone                       | 0.0946 | 0.020 | ug/L | 0.095 |  | 99.6 | 70-130 | 0.151 | 30 |    |
| Benzene                       | 0.135  | 0.020 | ug/L | 0.13  |  | 106  | 70-130 | 1.03  | 30 |    |
| Benzyl chloride               | 0.201  | 0.020 | ug/L | 0.21  |  | 97.1 | 70-130 | 4.63  | 30 |    |
| Bromodichloromethane          | 0.300  | 0.020 | ug/L | 0.27  |  | 112  | 70-130 | 4.47  | 30 |    |
| Bromoform                     | 0.445  | 0.020 | ug/L | 0.41  |  | 108  | 70-130 | 3.11  | 30 |    |
| Bromomethane                  | 0.164  | 0.020 | ug/L | 0.16  |  | 106  | 70-130 | 0.118 | 30 |    |
| 2-Butanone (MEK)              | 0.126  | 0.020 | ug/L | 0.12  |  | 107  | 70-130 | 2.97  | 30 |    |
| Carbon Disulfide              | 0.132  | 0.020 | ug/L | 0.12  |  | 106  | 70-130 | 1.04  | 30 |    |
| Carbon Tetrachloride          | 0.274  | 0.020 | ug/L | 0.25  |  | 109  | 70-130 | 1.62  | 30 |    |
| Chlorobenzene                 | 0.188  | 0.020 | ug/L | 0.18  |  | 102  | 70-130 | 5.30  | 30 |    |
| Chloroethane                  | 0.116  | 0.020 | ug/L | 0.11  |  | 109  | 70-130 | 0.796 | 30 |    |
| Chloroform                    | 0.210  | 0.020 | ug/L | 0.20  |  | 108  | 70-130 | 0.764 | 30 |    |
| Chloromethane                 | 0.0892 | 0.020 | ug/L | 0.083 |  | 108  | 70-130 | 2.72  | 30 |    |
| Dibromochloromethane          | 0.381  | 0.020 | ug/L | 0.34  |  | 112  | 70-130 | 1.42  | 30 |    |
| 1,2-Dibromoethane (EDB)       | 0.339  | 0.020 | ug/L | 0.31  |  | 110  | 70-130 | 1.58  | 30 |    |
| 1,2-Dichlorobenzene           | 0.223  | 0.020 | ug/L | 0.24  |  | 92.8 | 70-130 | 2.29  | 30 |    |
| 1,3-Dichlorobenzene           | 0.201  | 0.020 | ug/L | 0.24  |  | 83.7 | 70-130 | 4.14  | 30 |    |
| 1,4-Dichlorobenzene           | 0.228  | 0.020 | ug/L | 0.24  |  | 94.7 | 70-130 | 7.94  | 30 |    |
| Dichlorodifluoromethane (R12) | 0.261  | 0.020 | ug/L | 0.20  |  | 132  | 70-130 | 0.265 | 30 | ** |
| 1,1-Dichloroethane            | 0.172  | 0.020 | ug/L | 0.16  |  | 106  | 70-130 | 6.08  | 30 |    |
| 1,2-Dichloroethane (EDC)      | 0.183  | 0.020 | ug/L | 0.16  |  | 113  | 70-130 | 0.266 | 30 |    |
| cis-1,2-Dichloroethylene      | 0.165  | 0.020 | ug/L | 0.16  |  | 104  | 70-130 | 3.03  | 30 |    |
| 1,1-Dichloroethylene          | 0.173  | 0.020 | ug/L | 0.16  |  | 109  | 70-130 | 0.570 | 30 |    |
| trans-1,2-Dichloroethylene    | 0.171  | 0.020 | ug/L | 0.16  |  | 108  | 70-130 | 1.59  | 30 |    |
| 1,2-Dichloropropane           | 0.194  | 0.020 | ug/L | 0.18  |  | 105  | 70-130 | 0.900 | 30 |    |
| trans-1,3-Dichloropropylene   | 0.203  | 0.020 | ug/L | 0.18  |  | 112  | 70-130 | 1.62  | 30 |    |
| cis-1,3-Dichloropropylene     | 0.199  | 0.020 | ug/L | 0.18  |  | 110  | 70-130 | 1.42  | 30 |    |
| Dichlorotetrafluoroethane     | 0.314  | 0.020 | ug/L | 0.28  |  | 112  | 70-130 | 2.14  | 30 |    |
| Ethylbenzene                  | 0.178  | 0.020 | ug/L | 0.17  |  | 102  | 70-130 | 3.00  | 30 |    |
| 4-Ethyltoluene                | 0.199  | 0.020 | ug/L | 0.20  |  | 101  | 70-130 | 6.06  | 30 |    |

*Allen Aminian*

**Allen Aminian**  
QA/QC Manager



**LABORATORY ANALYSIS RESULTS**

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Analyte   | Result       | Reporting Limit | Units       | Spike Level | Source Result                                    | %REC       | %REC Limits   | RPD   | RPD Limit | Notes |
|---|--------------|-----------------|-------------|-------------|--|------------|---------------|-------|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b> |              |                 |             |             |  |            |               |       |           |       |
| <i>Batch B9A0919 - *** DEFAULT PREP ***</i>                 |              |                 |             |             |  |            |               |       |           |       |
| <b>LCS Dup (B9A0919-BSD1) Continued</b>                     |              |                 |             |             | Prepared & Analyzed: 01/08/19                    |            |               |       |           |       |
| Hexachlorobutadiene   | 0.350        | 0.020           | ug/L        | 0.43        |  | 82.1       | 70-130        | 2.87  | 30        |       |
| 2-Hexanone (MBK)  | 0.166        | 0.020           | ug/L        | 0.16        |  | 102        | 70-130        | 10.8  | 30        |       |
| Isopropanol (IPA)   | 0.116        | 0.20            | ug/L        | 0.098       |  | 118        | 70-130        | 7.88  | 30        |       |
| Methylene Chloride  | 0.118        | 0.020           | ug/L        | 0.14        |  | 84.9       | 70-130        | 1.58  | 30        |       |
| 4-Methyl-2-pentanone (MIBK)                                 | 0.193        | 0.020           | ug/L        | 0.16        |  | 118        | 70-130        | 1.77  | 30        |       |
| Styrene   | 0.170        | 0.020           | ug/L        | 0.17        |  | 99.7       | 70-130        | 2.36  | 30        |       |
| 1,1,2,2-Tetrachloroethane                                   | 0.218        | 0.020           | ug/L        | 0.27        |  | 79.4       | 70-130        | 3.25  | 30        |       |
| Tetrachloroethylene (PCE)                                   | 0.272        | 0.020           | ug/L        | 0.27        |  | 100        | 70-130        | 1.23  | 30        |       |
| Toluene   | 0.159        | 0.020           | ug/L        | 0.15        |  | 106        | 70-130        | 1.29  | 30        |       |
| 1,2,4-Trichlorobenzene                                      | 0.228        | 0.020           | ug/L        | 0.30        |  | 76.8       | 70-130        | 4.89  | 30        |       |
| 1,1,2-Trichloroethane                                       | 0.237        | 0.020           | ug/L        | 0.22        |  | 109        | 70-130        | 2.09  | 30        |       |
| 1,1,1-Trichloroethane                                       | 0.242        | 0.020           | ug/L        | 0.22        |  | 111        | 70-130        | 2.33  | 30        |       |
| Trichloroethylene (TCE)                                     | 0.201        | 0.020           | ug/L        | 0.21        |  | 93.6       | 70-130        | 4.37  | 30        |       |
| Trichlorofluoromethane (R11)                                | 0.251        | 0.020           | ug/L        | 0.22        |  | 112        | 70-130        | 2.12  | 30        |       |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (R113)                | 0.326        | 0.020           | ug/L        | 0.31        |  | 106        | 70-130        | 1.11  | 30        |       |
| 1,3,5-Trimethylbenzene                                      | 0.187        | 0.020           | ug/L        | 0.20        |  | 95.3       | 70-130        | 0.105 | 30        |       |
| 1,2,4-Trimethylbenzene                                      | 0.185        | 0.020           | ug/L        | 0.20        |  | 94.2       | 70-130        | 1.42  | 30        |       |
| Vinyl acetate   | 0.144        | 0.020           | ug/L        | 0.14        |  | 102        | 70-130        | 2.22  | 30        |       |
| Vinyl chloride  | 0.114        | 0.020           | ug/L        | 0.10        |  | 112        | 70-130        | 1.47  | 30        |       |
| o-Xylene  | 0.160        | 0.020           | ug/L        | 0.17        |  | 92.2       | 70-130        | 0.653 | 30        |       |
| m,p-Xylenes   | 0.368        | 0.020           | ug/L        | 0.35        |  | 106        | 70-130        | 3.56  | 30        |       |
| 1,2,3-Trichloropropane                                      | 0.264        | 0.020           | ug/L        | 0.24        |  | 109        | 70-130        | 1.75  | 30        |       |
| sec-Butylbenzene  | 0.247        | 0.020           | ug/L        | 0.22        |  | 112        | 70-130        | 2.54  | 30        |       |
| Isopropylbenzene  | 0.225        | 0.020           | ug/L        | 0.20        |  | 115        | 70-130        | 4.34  | 30        |       |
| n-Propylbenzene   | 0.223        | 0.020           | ug/L        | 0.20        |  | 114        | 70-130        | 3.33  | 30        |       |
| 4-Isopropyltoluene  | 0.261        | 0.020           | ug/L        | 0.22        |  | 119        | 70-130        | 1.50  | 30        |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>                      | <i>0.147</i> |                 | <i>ug/L</i> | <i>0.14</i> |  | <i>102</i> | <i>70-130</i> |       |           |       |
| <b>Duplicate (B9A0919-DUP1)</b>                             |              |                 |             |             | Source: 9A02002-13 Prepared & Analyzed: 01/08/19 |            |               |       |           |       |
| Acetone   | <0.020       | 0.020           | ug/L        |             | <0.020   |            |               |       | 30        |       |
| Allyl chloride  | <0.020       | 0.020           | ug/L        |             | <0.020   |            |               |       | 30        |       |

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Analyte  | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|--|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b>                                    |        |                 |       |             |               |      |             |     |           |       |
| <i>Batch B9A0919 - *** DEFAULT PREP ***</i>  |        |                 |       |             |               |      |             |     |           |       |
| <b>Duplicate (B9A0919-DUP1) Continued Source: 9A02002-13 Prepared &amp; Analyzed: 01/08/19</b> |        |                 |       |             |               |      |             |     |           |       |
| 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        |       |
| 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        |       |

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Analyte  | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|--|--------|-----------------|-------|-------------|---------------|------|-------------|-------|-----------|-------|
| <b>VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control</b>                                    |        |                 |       |             |               |      |             |       |           |       |
| <i>Batch B9A0919 - *** DEFAULT PREP ***</i>  |        |                 |       |             |               |      |             |       |           |       |
| <b>Duplicate (B9A0919-DUP1) Continued Source: 9A02002-13 Prepared &amp; Analyzed: 01/08/19</b> |        |                 |       |             |               |      |             |       |           |       |
| 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   | 0.0310 | 0.020           | ug/L  |             | 0.0309        |      |             | 0.449 | 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        |       |

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|---------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

### VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control

Batch B9A0919 - \*\*\* DEFAULT PREP \*\*\*

**Duplicate (B9A0919-DUP1) Continued** Source: 9A02002-13 Prepared & Analyzed: 01/08/19

|                        |        |       |      |  |        |  |  |  |    |  |
|------------------------|--------|-------|------|--|--------|--|--|--|----|--|
| 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 |  |
| 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 |  |

Surrogate: 4-Bromofluorobenzene 0.148 ug/L 0.14 104 70-130

### Fixed Gases by TCD - Quality Control

Batch B9A0302 - \*\*\* DEFAULT PREP \*\*\*

**Blank (B9A0302-BLK1)**

Prepared & Analyzed: 01/03/19

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

**LCS (B9A0302-BS1)**

Prepared & Analyzed: 01/03/19

|                |      |      |             |     |      |        |  |  |  |  |
|----------------|------|------|-------------|-----|------|--------|--|--|--|--|
| Methane        | 2.44 | 0.10 | % by Volume | 2.5 | 97.5 | 75-125 |  |  |  |  |
| Oxygen         | 2.10 | 0.10 | % by Volume | 2.0 | 105  | 75-125 |  |  |  |  |
| Carbon Dioxide | 6.04 | 0.10 | % by Volume | 7.5 | 80.5 | 75-125 |  |  |  |  |

**LCS Dup (B9A0302-BSD1)**

Prepared & Analyzed: 01/03/19

|         |      |      |             |     |      |        |      |    |  |  |
|---------|------|------|-------------|-----|------|--------|------|----|--|--|
| Methane | 2.48 | 0.10 | % by Volume | 2.5 | 99.1 | 75-125 | 1.63 | 30 |  |  |
|---------|------|------|-------------|-----|------|--------|------|----|--|--|

*Allen Aminian*

**Allen Aminian**  
QA/QC Manager



### LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

| 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 B9A0302 - *** DEFAULT PREP ***</i> |        |                 |             |             |  |      |             |      |           |       |
| <b>LCS Dup (B9A0302-BSD1) Continued</b>     |        |                 |             |             | Prepared & Analyzed: 01/03/19                    |      |             |      |           |       |
| Oxygen                                      | 2.29   | 0.10            | % by Volume | 2.0         |  | 114  | 75-125      | 8.47 | 30        |       |
| Carbon Dioxide                              | 6.22   | 0.10            | % by Volume | 7.5         |  | 83.0 | 75-125      | 2.97 | 30        |       |
| <b>Duplicate (B9A0302-DUP1)</b>             |        |                 |             |             | Source: 9A02002-17 Prepared & Analyzed: 01/03/19 |      |             |      |           |       |
| Methane                                     | <0.10  | 0.10            | % by Volume |             | <0.10  |      |             |      | 30        |       |
| Oxygen                                      | 16.2   | 0.10            | % by Volume |             | 18.3   |      |             | 12.2 | 30        |       |
| Carbon Dioxide                              | 1.84   | 0.10            | % by Volume |             | 2.03   |      |             | 9.91 | 30        |       |

**Allen Aminian**  
QA/QC Manager



## LABORATORY ANALYSIS RESULTS

**Client:** CH2M Hill, Inc.  
**Project No:** 693142  
**Project Name:** KMEP Norwalk Biosparge Startup

**AA Project No:** MB187324  
**Date Received:** 12/31/18  
**Date Reported:** 01/10/19

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### Special Notes

[1] = \*\* : Exceeds upper control limit.

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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.: 17337

70055219

Page 1 of 2

|                       |  |                                       |
|-----------------------|--|---------------------------------------|
| Client: <u>JACOBS</u> | Project Name / No.: <u>Kinder Morgan Norwalk</u> | Sampler's Name: <u>Juan Rodriguez</u> |
| Project Manager:      | Site Address: <u>15306 Norwalk Blvd</u>          | Sampler's Signature:                  |
| Phone:                | City: <u>Norwalk</u>                             | P.O. No.:                             |
| Fax:                  | State & Zip: <u>CA</u>                           | 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 | ANALYSIS REQUESTED (Test Name) |     |             |  |  |  |  |  |  |  | Special Instructions |  |  |                   |
|-------------|------------|---------|------|---------------|-------------|--------------------------------|-----|-------------|--|--|--|--|--|--|--|----------------------|--|--|-------------------|
|             |            |         |      |               |             | T015                           | T03 | Fixed gases |  |  |  |  |  |  |  |                      |  |  |                   |
| SUM-9-5     | 9A02002-01 | 12/3/18 | 840  | Vapor         | 1           | X                              | X   | X           |  |  |  |  |  |  |  |                      |  |  |                   |
| SUM-9-14.5  | -02        |         | 840  |               |             | X                              | X   | X           |  |  |  |  |  |  |  |                      |  |  |                   |
| SUM-21-5    | -03        |         | 931  |               |             | X                              | X   | X           |  |  |  |  |  |  |  |                      |  |  |                   |
| SUM-21-14.5 | -04        |         | 931  |               |             | X                              | X   | X           |  |  |  |  |  |  |  |                      |  |  |                   |
| SUM-22-5    | -05        |         | 950  |               |             | X                              | X   | X           |  |  |  |  |  |  |  |                      |  |  |                   |
| SUM-22-14.5 | -06        |         | 954  |               |             | X                              | X   | X           |  |  |  |  |  |  |  |                      |  |  |                   |
| SUM-23-5    | -07        |         | 1010 |               |             | X                              | X   | X           |  |  |  |  |  |  |  |                      |  |  |                   |
| SUM-23-14.5 | -08        |         | 1010 |               |             | X                              | X   | X           |  |  |  |  |  |  |  |                      |  |  |                   |
| SUM-19-5    | -09        |         | 1223 |               |             | X                              | X   | X           |  |  |  |  |  |  |  |                      |  |  |                   |
| SUM-20-5    | -10        |         | 1040 |               |             | X                              | X   | X           |  |  |  |  |  |  |  |                      |  |  |                   |
| SUM-20-14.5 | -11        |         | 1042 |               |             | X                              | X   | X           |  |  |  |  |  |  |  |                      |  |  |                   |
| Ambient Air | -12        |         | 1235 |               |             | X                              | X   | X           |  |  |  |  |  |  |  |                      |  |  | 10 DEC 31 2:31 PM |
| SUM-17-5    | -13        |         | 1248 |               |             | X                              | X   | X           |  |  |  |  |  |  |  |                      |  |  |                   |
| SUM-17-SDP  | -14        |         | 1248 |               |             | X                              | X   | X           |  |  |  |  |  |  |  |                      |  |  |                   |
| SUM-17-14.5 | -15        |         | 1248 |               |             | X                              | X   | X           |  |  |  |  |  |  |  |                      |  |  |                   |

|  |                 |                 |              |             |
|--|-----------------|-----------------|--------------|-------------|
| <p style="text-align: center;"><b>For Laboratory Use</b></p> <p style="text-align: center; font-size: 2em; font-weight: bold;">REVIEWED</p> <p>Date <u>1/2/19</u> Time <u>9:46</u></p> <p>TAT <u>5</u> Days Sign: </p> | Relinquished by | Date            | Time         | Received by |
|  |                 | <u>12/31/18</u> | <u>13:12</u> |             |
|  | Relinquished by | Date            | Time         | Received by |
|  |                 | <u>12-31-18</u> | <u>14:31</u> |             |
|  | Relinquished by | Date            | Time         | Received by |

A.A. Project No. 187324/9A02002

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. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 45 days following the submittal of the sample(s) to American Analytics.



# AMERICAN ANALYTICS CHAIN-OF-CUSTODY RECORD

9765 ETON AVE., CHATSWORTH, CA 91311

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

A.A. COC No.: 17338

70055220

Page 2 of 2

Client: Jacobs Project Name / No.: Kinder Morgan Newwalk Sampler's Name: Jan Rodriguez  
 Project Manager: Site Address: 15806 Newwalk Blvd Sampler's Signature: [Signature]  
 Phone: City: Newwalk 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 | ANALYSIS REQUESTED (Test Name) |     |             |  |  |  |  |  |  |  | Special Instructions |  |  |
|-------------|------------|----------|------|---------------|-------------|--------------------------------|-----|-------------|--|--|--|--|--|--|--|----------------------|--|--|
|             |            |          |      |               |             | T01S                           | T03 | fixed gases |  |  |  |  |  |  |  |                      |  |  |
| SVM-18-5    | 9A02002-16 | 12/31/18 | 1304 | vapor         | 1           | X                              | X   | X           |  |  |  |  |  |  |  |                      |  |  |
| SVM-18-14.5 | -17        | J        | 1307 | J             | 1           | X                              | X   | X           |  |  |  |  |  |  |  |                      |  |  |
|             |            |          |      |               |             |                                |     |             |  |  |  |  |  |  |  |                      |  |  |
|             |            |          |      |               |             |                                |     |             |  |  |  |  |  |  |  |                      |  |  |
|             |            |          |      |               |             |                                |     |             |  |  |  |  |  |  |  |                      |  |  |
|             |            |          |      |               |             |                                |     |             |  |  |  |  |  |  |  |                      |  |  |
|             |            |          |      |               |             |                                |     |             |  |  |  |  |  |  |  |                      |  |  |
|             |            |          |      |               |             |                                |     |             |  |  |  |  |  |  |  |                      |  |  |
|             |            |          |      |               |             |                                |     |             |  |  |  |  |  |  |  |                      |  |  |
|             |            |          |      |               |             |                                |     |             |  |  |  |  |  |  |  |                      |  |  |
|             |            |          |      |               |             |                                |     |             |  |  |  |  |  |  |  |                      |  |  |
|             |            |          |      |               |             |                                |     |             |  |  |  |  |  |  |  |                      |  |  |
|             |            |          |      |               |             |                                |     |             |  |  |  |  |  |  |  |                      |  |  |
|             |            |          |      |               |             |                                |     |             |  |  |  |  |  |  |  |                      |  |  |

|   |  |
|---|--|
| <b>For Laboratory Use</b><br><br><b>REVIEWED</b><br>Date <u>1/2/19</u> Time <u>9:46</u><br>TAT <u>5</u> Days Sign: <u>[Signature]</u> | Relinquished by <u>[Signature]</u> Date <u>12/31/18</u> Time <u>13:12</u> Received by <u>[Signature]</u> |
|   | Relinquished by <u>[Signature]</u> Date <u>12-31-18</u> Time <u>14:31</u> Received by <u>[Signature]</u> |
|   | Relinquished by _____ Date _____ Time _____ Received by _____  |
| A.A. Project No. <u>MB187324/9A02002</u>  |  |

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