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Jacobs

Technical Memorandum

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Subject	**2023 Annual Soil Vapor Monitoring Report**	**Project Name**	SFPP Norwalk Pump Station, Norwalk, California
Attention	Mr. Paul Cho/Los Angeles Regional Water Quality Control Board		
Prepared by	Andrea Pearce/Jacobs Todd Kremmin/Jacobs		
Reviewed by	Eric Davis/Jacobs		
Date	February 27, 2024		
Copies to	Court Reece/Kinder Morgan		

1. Introduction

Jacobs Engineering Group Inc. (Jacobs) is pleased to submit this technical memorandum (tech memo) on behalf of Santa Fe Pacific Pipelines, L.P. (SFPP), an operating partner of Kinder Morgan, Inc. (Kinder Morgan). This tech memo presents the 2023 soil vapor monitoring analytical results from two semiannual sampling events performed in May and November, at the SFPP, L.P. (SFPP) Norwalk Pump Station, located within Defense Fuel Support Point (DFSP) Norwalk, at 15306 Norwalk Boulevard, Norwalk, California (the Site; Figure 1).

This tech memo is being submitted to the Los Angeles Regional Water Quality Control Board (Regional Board) in accordance with the Regional Board's provisional approval of the *Sampling and Analysis Plan for Soil Vapor and Fixed Gases – SFPP Norwalk Pump Station* (Jacobs, 2023) via a March 2023 email from the Regional Board (Regional Board, 2023). This provisional approval allows Kinder Morgan to implement the proposed semiannual soil vapor monitoring program while waiting for the Regional Board to complete its review of the Sampling and Analysis Plan (SAP).

2. Background

Kinder Morgan has historically collected laboratory analytical samples from a network of 31 dual- and triple-nested soil vapor probes (SVPs) located within and around three areas of ongoing remediation/ treatment and monitoring at the site: the south-central area in the 36-acre parcel, the offsite/south-central area in the residential area south of the 36-acre parcel, and the southeastern area in the 15-acre parcel (Figure 2).

The 31 SVPs comprised 66 unique sample intervals from approximately 5, 10, 15, and 22 feet below ground surface (bgs), with up to 70 sample locations sampled historically. These 31 SVPs were available for sampling through the first half of 2022. However, as part of the modified monitoring and sampling

plan developed in concurrence with the Regional Board in 2022 (Jacobs, 2022b), several SVPs were destroyed in May 2022, after the first half 2022 sampling event was conducted, due to construction and redevelopment activities. Destroyed SVPs include offsite/south-central SVP "SVM-15" and southeastern area SVPs "SVM-17," "SVM-18," "SVM-19," and "SVM-20." Therefore, in May 2022, the SVP network was reduced from 31 to 26 dual- and triple-nested SVPs, with 55 unique sample intervals available for sampling (Table 1).

The previously mentioned soil vapor monitoring SAP (Jacobs, 2023) proposes a smaller subset of SVPs for ongoing sampling for laboratory analysis of constituents of potential concern (COPCs), whereby some probes will be sampled semiannually (i.e., twice per year) and some probes will be sampled annually (i.e., once per year). This plan includes monitoring 22 discrete sample intervals at 10 probes, comprising 40 soil vapor analytical samples per year, including duplicates and ambient air samples.

In addition, all SVPs, including SVPs not scheduled for ongoing sampling and laboratory analysis of COPCs, will continue to be monitored for fixed field gases using a photo-ionization detector (PID) and field gas meter annually, at a minimum, as part of ongoing natural source zone depletion (NSZD) performance monitoring to confirm that related remedial action objectives (e.g., ongoing hydrocarbon degradation) are being met, as detailed in the Interim Remedial Action Plan (IRAP) (Jacobs, 2022a). SVPs that are not sampled for laboratory testing will be maintained for possible future sampling.

Additional Site background information and historical data from long-term soil vapor monitoring can be found in the *IRAP – Implementing an NSZD Remedy* (Jacobs, 2022a), the *Second 2022 Semiannual Soil Vapor Monitoring Report* (Jacobs, 2022b), and other historical soil vapor monitoring tech memos, available on "GeoTracker", the Regional Board's internet accessible database.

3. Sampling

During the first and second 2023 semiannual sampling events, 34 native samples were collected overall from 7 dual- or triple-nested SVPs (Table 2) in May (12 of 38 samples) and 10 dual- or triple-nested SVPs in November (22 of 38 samples) using 1.4-liter Summa canisters. Three ambient air samples were also collected (including a duplicate air sample), along with three additional duplicate samples. Sampling was performed in accordance with the Department of Toxic Substances Control's (DTSC) *Advisory for Active Soil Gas Investigations* (DTSC, 2015). In addition, pre-sampling and testing was performed in accordance with procedures outlined in the soil vapor monitoring SAP (Jacobs, 2023). The samples were analyzed by the American Analytics laboratory for the following analytes:

- Volatile organic compounds (VOCs) using U.S. Environmental Protection Agency (EPA) Method TO-15
- Total petroleum hydrocarbon – gasoline (TPH-g) using EPA Method TO-3
- Fixed gases (carbon dioxide, methane, and oxygen) using EPA Method 3CM

Included in the TO-15 list of analytes were benzene, toluene, ethylbenzene, and xylene (BTEX), methyl tert-butyl ether (MTBE), naphthalene, tertiary butyl alcohol, 1,2-dichloroethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, n-butylbenzene, sec-butylbenzene, isopropylbenzene, n-propylbenzene, and 2-propanol (the leak test compound). These constituents were identified as COPCs based on the results of the *Vapor Intrusion Sampling and Human Health Risk Assessment* (Geomatrix, 2006).

4. Sampling and Analysis Plan Deviations

There were two minor deviations from the SAP in 2023: SVM-10D was sampled semiannually (twice) rather than annually (once), and SVM-3D was only sampled once (annually) rather than twice (semiannually). These deviations will be addressed prior to conducting sampling events in 2024.

5. Results

Table 2 presents the analytical results for samples collected during the two semiannual sampling events in 2023 compared to DTSC-modified screening levels (DTSC, 2020) and EPA regional screening levels (RSLs) (EPA, 2021), derived with an attenuation factor currently in guidance (DTSC, 2011). Results were reviewed in accordance with the quality assurance and quality control procedures outlined in the soil vapor monitoring SAP (Jacobs, 2023). It should be noted that some analytes do not have established screening levels. Laboratory analytical reports are included in Attachment A. A summary of results is as follows:

- First event - May 2023
  - Naphthalene was detected at a concentration of 0.022 micrograms per liter (µg/L) in SVP-108-5. This is below the residential soil gas screening level of 0.083 µg/L.
  - Non-COPC compounds that were detected include: bromodichloromethane, chloroform, ethanol, tetrachloroethylene (PCE), and TPH-g (C4-C12). No non-COPC compounds exceeded current screening levels (residential or commercial).
- Second event - November 2023
  - Benzene was detected below the residential soil gas screening level of 0.097 µg/L in SVM-12-22 (0.011 µg/L) and SVM-14R-22 (0.063 µg/L).
  - Naphthalene was detected below the residential soil gas screening level of 0.083 µg/L in SVM-12-7 (0.003 µg/L) and SVM14R-22 (0.0039 µg/L).
  - Non-COPC compounds that were detected include:
    - 2,2,4-trimethylpentane, acetone, bromodichloromethane, chloroform, cyclohexane, dichloromethane, ethanol, N-heptane, propene, PCE, and TPH-g (C4-C12). Everything detected was below current screening levels (residential and commercial), except:
      - Bromodichloromethane exceeded residential screening levels (0.076 µg/L) in SVM-3-5 and SVM-3-15 at concentrations of 0.15 µg/L, and 0.19 µg/L, respectively.
      - TPH-g exceeded the residential screening level (630 µg/L) in SVM-14R-22 at a concentration of 810 µg/L. The two shallower samples in this nest, SVM-14R-8 and SVM-14R-16 had non-detectable concentrations of TPH-g.

6. Statistical Evaluation

Recent detections of TPH-g in soil vapor were evaluated using statistical analysis (descriptive and quantitative trends). Only TPH-g trend analysis is discussed in this report, as other contaminants are similar to TPH-g results and TPH-g is a more useful (and conservative) proxy for evaluation of both sitewide vapor phase hydrocarbons and light nonaqueous phase liquid (LNAPL). Section 6.1 summarizes

the statistical approach (methodology) to the evaluation and the underlying assumptions. The quantitative results of the statistical evaluation are described below in Section 6.2.

6.1 Statistical Methodology

The Mann-Kendall test (Mann, 1945; Kendall, 1975; Gilbert, 1987) and the Theil-Sen slope estimator (Theil, 1950; Sen, 1968) were used for trend testing and estimation of trend magnitude, respectively. These methods are suited for univariate time-series with monotonous trends and no seasonal or other cycles in the data (no autocorrelation in the time-series). Nonparametric methods are preferred to parametric methods (i.e., ordinary linear regression analysis) because they make no assumption about the probability distribution of the data. Additionally, nonparametric methods and, in particular, methods for the estimation of trend magnitude, are robust to the presence of outliers or to abrupt breaks due to inhomogeneous time-series (Hirsch et al., 1982).

The null hypothesis in the Mann-Kendall test assumes that there is no trend (the data are independent and randomly ordered) and this is tested against the alternative hypothesis, which assumes that there is a trend. The calculated probability (p-value) of the test represents the probability that any observed trend would occur purely by chance (given the variability and sample size of the data set). A significance level of 0.05 (i.e., 95 percent confidence) was used to test the null hypothesis that there is no trend in the data. The significance level is the probability that a test erroneously detects a trend when none is present. Only p-values less than 0.05 indicate a statistically significant trend. The result of the Mann-Kendall test is either a significantly increasing or decreasing trend, or a non-significant result (no trend, stable).

Additional details about the statistical methodology used are included in Attachment B (Hollander and Wolfe 1973, p. 201; EPA, 2009; ITRC, 2013; Kaplan and Meier, 1958; EPA, 2015, Helsel, 2012, and Singh et al., 2006).

6.2 Statistical Results

Trend analysis was conducted for TPH-g from September 2015 through November 2023. In 2015 biosparging began in the horizontal wells in the south-central area which establishes a natural starting point (time zero) for statistical analysis at most locations. Attachment B represents a summary table of the trend analysis results along with descriptive statistics. The results are summarized as follows:

- There were 55 sample points evaluated using the Mann-Kendall test (inclusive of abandoned/ destroyed locations).
  - No locations exhibited statistically significant increasing or decreasing trends for TPH-g.
  - Fifty-four of the 55 locations exhibited no statistical trend (“Stable”) due to more than half of the samples having non-detectable concentrations of TPH-g.
  - One location (SVP-108D) exhibited no statistical trend (“Not Stable”) because the null hypothesis of “no trend” could not be rejected at the specified 95% confidence level and was considered not stable because the coefficient of variation was greater than 1.0.

7. Conclusions and Path Forward

Constituents of Potential Concern were detected during the May and November 2023 semiannual sampling events, including naphthalene in May and November, and benzene in November. All detections of COPCs were from onsite locations and below both the residential and commercial soil gas screening levels, thus do not present unacceptable risk at the Site.

Non-COPCs were detected during the May and November 2023 semiannual sampling events, with some exceedances above residential soil gas screening levels, but below commercial soil gas screening levels, including bromodichloromethane at 5 feet bgs at SVM-3-5 and 15 feet bgs at SVM-3-15 (offsite/south-central), and TPH-g at 22 feet bgs at SVM-14R-22 (south-central). The measured concentration of bromodichloromethane at SVM-3 was lower in the shallow monitoring point at 5 feet bgs (SVM-3-5) than the deep monitoring point at 15 feet bgs (SVM-3-15). For the exceedance at 22 feet bgs at SVM-14R-22, bounding sample results 16 feet bgs (SVM-14R-16) and 8 feet bgs at SVM-14R-8 exhibited non-detectable concentrations of TPH-g.

A statistical analysis of TPH-g from 2015 through November 2023 demonstrates that there are no statistically significant increasing or decreasing trends for TPH-g in soil vapor. The statistical results demonstrate 'no statistical trend' for most locations due to more than half the samples having non-detectable concentrations of TPH-g.

Other detected compounds (non-COPCs) are detected infrequently and generally at relatively low concentrations below DTSC-modified screening levels and EPA RSLs in the shallow soil vapor (defined as the upper 10 feet of soil).

Observed transitory increases of COPCs, such as benzene and naphthalene, and non-COPCs, such as bromodichloromethane and TPH-g, may represent a slight rebound effect following the recent termination of biosparging in the offsite/south-central area in October 2023. This hypothesis will be confirmed through ongoing sampling.

As concluded in the *IRAP* (Jacobs, 2022a) and other documents such as the *Review of the Offsite Soil Vapor Monitoring Probe Network* (Jacobs, 2020a) and *Updated Human Health Risk Assessment for the Offsite/South-Central and Offsite/Southeastern Areas* (Jacobs, 2020b), exposure pathways at the Site are largely incomplete and insignificant for the petroleum releases in groundwater, subsurface soil, and soil vapor.

Moreover, multiple lines of evidence point to the presence at the Site of a clean, biologically active zone in shallow soil where aerobic biodegradation controls the diffusion of petroleum VOCs to the ground surface, further mitigating potential exposure pathways. This conclusion is also consistent with the conclusions presented in the 2006 human health risk assessment (HHRA) (Geomatrix, 2006) and the HHRAs supporting the closure of the DFSP 15-acre and 36-acre parcels (CH2M, 2017; Jacobs, 2019).

Soil vapor will continue to be in monitored and sampled in 2024 following the *Sampling and Analysis Plan for Soil Vapor and Fixed Gases – SFPP Norwalk Pump Station* (Jacobs, 2023), and the results will be summarized in an annual report in early 2025.

8. References

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Tables

Table 1. Soil Vapor Monitoring Details

SFPP Norwalk Pump Station, Norwalk, California

Location	Easting	Northing	Top of Screen (ft. bgs.)	Bottom of Screen (ft. bgs.)
SV-10S	6540267.797	1782708.769	5	5.5
SV-12S	6539753.345	1782829.667	5	5.5
SV-14S	6540106.046	1782578.069	5	5.5
SV-17S	6541215.289	1782771.241	5	5.5
SV-2SS	6541235.093	1782827.926	0	0.5
SV-4S	6540608.994	1782810.542	5	5.5
SV-6S	6540261.953	1782812.013	5	5.5
SV-7AS	6540091.235	1782773.231	5.5	6
SV-7ASS	6540091.235	1782773.231	0	0.5
SV-7SS	6540091.235	1782773.231	0	0.5
SV-8ASS	6540091.768	1782718.355	0	0.5
SV-8S	6540091.768	1782718.355	5.5	6
SV-8SS	6540091.768	1782718.355	0	0.5
SV-9SS	6540148.554	1782688.239	0	0.5
SVM-01D	6539934.158	1782751.202	15	15.5
SVM-01S	6539934.158	1782751.202	5	5.5
SVM-02D	6539915.418	1782654.309	14.5	15
SVM-02S	6539915.418	1782654.309	5	5.5
SVM-03D	6540352.913	1782727.013	15	15.5
SVM-03S	6540352.913	1782727.013	5	5.5
SVM-04D	6540443.669	1782822.529	14.5	15
SVM-04S	6540443.669	1782822.529	5	5.5
SVM-05D	6540258.286	1782817.347	15	15.5
SVM-05S	6540258.286	1782817.347	5	5.5
SVM-06D	6540063.541	1782775.007	13	13.5
SVM-06S	6540063.541	1782775.007	7	7.5
SVM-07D	6540126.172	1782701.947	13	13.5
SVM-07S	6540126.172	1782701.947	7	7.5
SVM-08D	6540256.879	1782712.476	15	15.5
SVM-08S	6540256.879	1782712.476	5	5.5
SVM-09D	6541218.214	1782917.453	14.5	15
SVM-09S	6541218.214	1782917.453	5	5.5
SVM-10D	6540114.074	1782567.878	15	15.5
SVM-10S	6540114.074	1782567.878	7.5	8
SVM-11D	6540094.409	1783048.449	22	22.5
SVM-11M	6540094.409	1783048.449	15	15.5
SVM-11S	6540094.409	1783048.449	7	7.5
SVM-12D	6539846.272	1782941.099	22	22.5
SVM-12M	6539846.272	1782941.099	15	15.5
SVM-12S	6539846.272	1782941.099	7	7.5
SVM-13D	6540111.667	1782935.598	22	22.5
SVM-13M	6540111.667	1782935.598	15	15.5
SVM-13S	6540111.667	1782935.598	7	7.5
SVM-14D	6540263.685	1782908.941	22	22.5
SVM-14M	6540263.685	1782908.941	15	15.5
SVM-14RD	6540263.685	1782908.941	22	22.5
SVM-14RM	6540263.685	1782908.941	16	16.5
SVM-14RS	6540263.685	1782908.941	8	8.5
SVM-14S	6540263.685	1782908.941	7	7.5

Table 1. Soil Vapor Monitoring Details

SFPP Norwalk Pump Station, Norwalk, California

Location	Easting	Northing	Top of Screen (ft. bgs.)	Bottom of Screen (ft. bgs.)
SVM-15D	6540050.251	1782841.391	22	22.5
SVM-15M	6540050.251	1782841.391	15	15.5
SVM-15S	6540050.251	1782841.391	7	7.5
SVM-16D	6540255.489	1782631.499	22	22.5
SVM-16M	6540255.489	1782631.499	16	16.5
SVM-16S	6540255.489	1782631.499	7	7.5
SVM-17D	6541150.721	1782934.107	14.5	15
SVM-17S	6541150.721	1782934.107	5	5.5
SVM-18D	6541173.614	1783140.197	14.5	15
SVM-18S	6541173.614	1783140.197	5	5.5
SVM-19D	6541044.618	1783056.483	14.5	15
SVM-19S	6541044.618	1783056.483	5	5.5
SVM-20D	6541168.995	1783039.791	14.5	15
SVM-20S	6541168.995	1783039.791	5	5.5
SVM-21D	6541178.744	1782873.691	14.5	15
SVM-21S	6541178.744	1782873.691	5	5.5
SVM-22D	6541265.209	1782872.123	14.5	15
SVM-22S	6541265.209	1782872.123	5	5.5
SVM-23D	6541353.950	1782871.308	14.5	15
SVM-23S	6541353.950	1782871.308	5	5.5
SVM-24D	6541189.441	1782750.500	10	10.5
SVM-24S	6541189.441	1782750.500	5	5.5
SVM-25D	6541358.591	1782748.693	10	10.5
SVM-25S	6541358.591	1782748.693	5	5.5
SVM-26S	6540745.140	1782736.030	10	10.5
SVM-26D	6540745.140	1782736.030	5	5.5
SVM-27S	6541011.400	1782737.530	10	10.5
SVM-27D	6541011.400	1782737.530	5	5.5
SVP-105D	6539634.209	1782925.319	10	10.5
SVP-105S	6539634.209	1782925.319	5	5.5
SVP-106D	6539730.236	1782930.562	10	10.5
SVP-106S	6539730.236	1782930.562	5	5.5
SVP-107D	6539946.272	1782906.510	10	10.5
SVP-107S	6539946.272	1782906.510	5	5.5
SVP-108D	6540562.436	1782924.664	10	10.5
SVP-108S	6540562.436	1782924.664	5	5.5
SVP-109D	6540729.130	1782904.636	10	10.5
SVP-109S	6540729.130	1782904.636	5	5.5

Notes:

D = Deep

ft bgs = feet below ground surface

M = Middle

S = Shallow

SV = Historical Soil Vapor Location (no longer accessible)

SVM = Soil Vapor Monitoring

SVP = Soil Vapor Probe

Text = Destroyed or Abandoned

Table 2. Field Measurements and Laboratory Soil Vapor Analytical Results – May **and November 2023**

SFPP Norwalk Pump Station, Norwalk, California

Analyte Type	Analyte	Unit	Current Residential Soil Gas Screening Level [a, b]	Current Commercial Soil Gas Screening Level [a, b]	SVM-3-5 5/11/2023 SVM-3 5 - 5.5	SVM-3-5 11/02/23 SVM-3 5 - 5.5	SVM-3-15 11/02/23 SVM-3 15 - 15.5	SVM-6-7 05/11/23 SVM-6 7 - 7.5	SVM-6-7 DUP 05/11/23 SVM-6 7 - 7.5	SVM-6-7 11/02/23 SVM-6 7 - 7.5	SVM-6-13 05/11/23 SVM-6 13 - 13.5	SVM-6-13 11/02/23 SVM-6 13 - 13.5	SVM-6-13 DUP 11/02/23 SVM-6 13 - 13.5	SVM-10-15 05/11/23 SVM-10 15 - 15.5	SVM-10-15 11/02/23 SVM-10 15 - 15.5
Field Measurements	Pressure	inches H_2O	--	--	--	--	--	--	--	--	--	--	--	--	--
	PID	ppmv	--	--	--	--	--	--	--	--	--	--	--	--	--
	Oxygen	percent	--	--	--	--	--	--	--	--	--	--	--	--	--
COPCs[c]	1,2,4-Trimethylbenzene	µg/L	63	260	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	1,2-Dichloroethane	µg/L	0.18	0.47	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U
	1,3,5-Trimethylbenzene	µg/L	63	260	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	2-Propanol (leak test compound)	µg/L	--	--	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U
	Benzene	µg/L	0.097	0.42	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U
	Ethylbenzene	µg/L	1.1	4.9	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Isopropylbenzene (aka Cumene)	µg/L	420	1800	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	m,p-Xylenes	µg/L	100	440	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Methyl tert-butyl ether (MTBE)	µg/L	11	47	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Naphthalene	µg/L	0.083	0.36	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U
	n-Butylbenzene	µg/L	210	880	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	n-Propylbenzene (propylbenzene)	µg/L	1000	4400	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	o-Xylene	µg/L	100	440	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	sec-Butylbenzene	µg/L	1000	4400	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	tert-Butanol (TBA)	µg/L	--	--	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
	Toluene	µg/L	310	1300	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
Other Detected Compounds	2,2,4-Trimethylpentane	µg/L	--	--	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	**0.88**
	Acetone	µg/L	--	--	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Bromodichloromethane	µg/L	0.076	0.33	**0.010**	**0.15**	**0.19**	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U
	Chloroform	µg/L	0.12	0.53	**0.024**	**0.089**	**0.10**	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U
	Cyclohexane	µg/L	6300	26000	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Dichloromethane	µg/L	--	--	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Ethanol	µg/L	--	--	**--**	**0.041**	**0.059**	**0.036**	**0.021**	**0.077**	**0.030**	**0.043 J**	**0.066 J**	**0.037**	**0.058**
	N-HEPTANE	µg/L	420	1800	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Propene	µg/L	--	--	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Tetrachloroethene	µg/L	0.46	2	< 0.010 U	< 0.010 U	< 0.010 U	**0.049**	**0.047**	< 0.010 U	**0.029**	< 0.010 U	< 0.010 U	< 0.010 U	< 0.010 U
	Gasoline	µg/L	630	2600	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	**3.2**
Fixed Gases	Methane	% v/v	--	--	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.10 U	< 0.20 U
	Oxygen	% v/v	--	--	**18**	**18**	**18**	**6.6**	**4.9**	**16**	**6.5**	**16**	**16**	**17**	**15**
	Carbon Dioxide	% v/v	--	--	< 0.20 U	< 0.20 U	< 0.20 U	**4.3**	**4.8**	**1.4**	**7.1**	**1.4**	**1.4**	< 0.20 U	< 0.20 U

Notes:

[a] Source for the Indoor Air Screening Levels: DTSC, 2020. *Human Health Risk Assessment (HHRA) Note: Human and Ecological Risk Office (HERO) HHRA Note Number: 3, DTSC-modified Screening Levels (DTSC-SLs).* November.
DTSC has developed modified screening levels based on U.S. Environmental Protection Agency (EPA) Regional Screening Levels (RSLs) for use in the human health risk assessment process at hazardous waste sites and permitted facilities.

[b] 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.

[c] Chemicals of potential concern identified from the 2006 soil gas investigation and HHRA (Geomatrix, 2006). *Vapor Intrusion Sampling and Human Health Risk Assessment, DFSP Norwalk Facility, Norwalk, California.* December.

[1A]-https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables (carcinogenic screening level) November 2020

[1B]-https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables (noncarcinogenic screening level)

[2A]-https://dtsc.ca.gov/wp-content/uploads/sites/31/2019/04/HHRA-Note-3-June-2020-A.pdf (carcinogenic screening level)

[2B]-https://dtsc.ca.gov/wp-content/uploads/sites/31/2019/04/HHRA-Note-3-June-2020-A.pdf (noncarcinogenic screening level)

http://www.dtsc.ca.gov/AssessingRisk/upload/Final_VIG_Oct_2011.pdf.

Bold Values indicates a detectable concentration

SVM-1-5	Light blue highlighting indicates offsite soil vapor probe locations.
	Yellow highlighting indicates concentration exceeds human health screening level under residential scenario.
	Orange highlighting indicates concentration exceeds human health screening level under the commercial scenario.

5/11/23 and 11/1/23 - 11/2/23 = sample dates
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 = contaminant of potential concern
TPH-g = total petroleum hydrocarbons quantified as gasoline
J = Estimated value; analyte was detected, but the reported value may not be accurate or precise.
U = not detected above listed laboratory reporting limit

Table 2. Field Measurements and Laboratory Soil Vapor Analytical Results – May **and November 2023**

SFPP Norwalk Pump Station, Norwalk, California

Analyte Type	Analyte	Unit	Current Residential Soil Gas Screening Level [a, b]	Current Commercial Soil Gas Screening Level [a, b]	SVM-12-7 11/01/23 SVM-12 7 - 7.5	SVM-12-15 11/01/23 SVM-12 15 - 15.5	SVM-12-22 11/01/23 SVM-12 22 - 22.5	SVM-14R-8 11/01/23 SVM-14R 8 - 8.5	SVM-14R-16 11/01/23 SVM-14R 16 - 16.5	SVM-14R-22 11/01/23 SVM-14R 22 - 22.5	SVM-16-7 11/02/23 SVM-16 7 - 7.5	SVM-16-16 11/02/23 SVM-16 16 - 16.5	SVM-16-22 11/02/23 SVM-16 22 - 22.5	SVM-21-5 05/11/23 SVM-21 5 - 5.5	SVM-21-5 11/01/23 SVM-21 5 - 5.5
Field Measurements	Pressure	inches H_2O	--	--	--	--	--	--	--	--	--	--	--	--	--
	PID	ppmv	--	--	--	--	--	--	--	--	--	--	--	--	--
	Oxygen	percent	--	--	--	--	--	--	--	--	--	--	--	--	--
COPCs[c]	1,2,4-Trimethylbenzene	µg/L	63	260	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	1,2-Dichloroethane	µg/L	0.18	0.47	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U
	1,3,5-Trimethylbenzene	µg/L	63	260	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	2-Propanol (leak test compound)	µg/L	--	--	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U
	Benzene	µg/L	0.097	0.42	< 0.0030 U	< 0.0030 U	**0.011**	< 0.0030 U	< 0.0030 U	**0.063**	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U
	Ethylbenzene	µg/L	1.1	4.9	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Isopropylbenzene (aka Cumene)	µg/L	420	1800	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	m,p-Xylenes	µg/L	100	440	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Methyl tert-butyl ether (MTBE)	µg/L	11	47	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Naphthalene	µg/L	0.083	0.36	**0.0030**	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	**0.0039**	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U
	n-Butylbenzene	µg/L	210	880	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	n-Propylbenzene (propylbenzene)	µg/L	1000	4400	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	o-Xylene	µg/L	100	440	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	sec-Butylbenzene	µg/L	1000	4400	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	tert-Butanol (TBA)	µg/L	--	--	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
	Toluene	µg/L	310	1300	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
Other Detected Compounds	2,2,4-Trimethylpentane	µg/L	--	--	< 0.020 U	< 0.020 U	**0.40**	< 0.020 U	< 0.020 U	**26**	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Acetone	µg/L	--	--	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	**22**	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Bromodichloromethane	µg/L	0.076	0.33	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U
	Chloroform	µg/L	0.12	0.53	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	**0.026**	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U
	Cyclohexane	µg/L	6300	26000	< 0.020 U	< 0.020 U	**0.032**	< 0.020 U	< 0.020 U	**11**	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Dichloromethane	µg/L	--	--	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	**0.022**	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Ethanol	µg/L	--	--	**0.046**	**0.036**	**0.041**	**0.033**	**0.027**	**0.047**	**0.046**	**0.049**	**0.049**	**0.032**	**0.060**
	N-HEPTANE	µg/L	420	1800	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	**0.89**	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Propene	µg/L	--	--	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Tetrachloroethene	µg/L	0.46	2	< 0.010 U	**0.017**	**0.016**	< 0.010 U	< 0.010 U	< 0.010 U	< 0.010 U	< 0.010 U	< 0.010 U	< 0.010 U	**0.011**
	Gasoline	µg/L	630	2600	**0.98**	**2.8**	**20**	< 0.50 U	< 0.50 U	**810**	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
Fixed Gases	Methane	% v/v	--	--	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U
	Oxygen	% v/v	--	--	**14**	**3.3 J**	**3.6**	**6.9**	**3.4**	**3.1**	**19**	**19**	**18**	**17**	**17**
	Carbon Dioxide	% v/v	--	--	**2.4**	**8.1**	**7.9**	**1.8**	**5.3**	**12**	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	**0.37**

Notes:

[a] Source for the Indoor Air Screening Levels: DTSC, 2020. *Human Health Risk Assessment (HHRA) Note: Human and Ecological Risk Office (HERO) HHRA Note Number: 3, DTSC-modified Screening Levels (DTSC-SLs).* November.
DTSC has developed modified screening levels based on U.S. Environmental Protection Agency (EPA) Regional Screening Levels (RSLs) for use in the human health risk assessment process at hazardous waste sites and permitted facilities.

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[1A]-https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables (carcinogenic screening level) November 2020

[1B]-https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables (noncarcinogenic screening level)

[2A]-https://dtsc.ca.gov/wp-content/uploads/sites/31/2019/04/HHRA-Note-3-June-2020-A.pdf (carcinogenic screening level)

[2B]-https://dtsc.ca.gov/wp-content/uploads/sites/31/2019/04/HHRA-Note-3-June-2020-A.pdf (noncarcinogenic screening level)

http://www.dtsc.ca.gov/AssessingRisk/upload/Final_VIG_Oct_2011.pdf.

Bold Values indicates a detectable concentration

SVM-1-5	Light blue highlighting indicates offsite soil vapor probe locations.
	Yellow highlighting indicates concentration exceeds human health screening level under residential scenario.
	Orange highlighting indicates concentration exceeds human health screening level under the commercial scenario.

5/11/23 and 11/1/23 - 11/2/23 = sample dates

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 = contaminant of potential concern

TPH-g = total petroleum hydrocarbons quantified as gasoline

J = Estimated value; analyte was detected, but the reported value may not be accurate or precise.

U = not detected above listed laboratory reporting limit

Table 2. Field Measurements and Laboratory Soil Vapor Analytical Results – May **and November 2023**

SFPP Norwalk Pump Station, Norwalk, California

Analyte Type	Analyte	Unit	Current Residential Soil Gas Screening Level [a, b]	Current Commercial Soil Gas Screening Level [a, b]	SVM-21-14.5 05/11/23 SVM-21 14.5 - 15	SVM-21-14.5 11/01/23 SVM-21 14.5 - 15	SVM-26-5 05/11/23 SVM-26 5 - 5.5	SVM-26-5 11/02/23 SVM-26 5 - 5.5	SVM-26-10 05/11/23 SVM-26 10 - 10.5	SVM-26-10 11/02/23 SVM-26 10 - 10.5	SVM-27-5 05/11/23 SVM-27 5 - 5.5	SVM-27-5 11/02/23 SVM-27 5 - 5.5	SVM-27-10 05/11/23 SVM-27 10 - 10.5	SVM-27-10 11/02/23 SVM-27 10 - 10.5
Field Measurements	Pressure	inches H_2O	--	--	--	--	--	--	--	--	--	--	--	--
	PID	ppmv	--	--	--	--	--	--	--	--	--	--	--	--
	Oxygen	percent	--	--	--	--	--	--	--	--	--	--	--	--
COPCs[c]	1,2,4-Trimethylbenzene	µg/L	63	260	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	1,2-Dichloroethane	µg/L	0.18	0.47	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U
	1,3,5-Trimethylbenzene	µg/L	63	260	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	2-Propanol (leak test compound)	µg/L	--	--	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U
	Benzene	µg/L	0.097	0.42	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U
	Ethylbenzene	µg/L	1.1	4.9	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Isopropylbenzene (aka Cumene)	µg/L	420	1800	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	m,p-Xylenes	µg/L	100	440	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Methyl tert-butyl ether (MTBE)	µg/L	11	47	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Naphthalene	µg/L	0.083	0.36	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U
	n-Butylbenzene	µg/L	210	880	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	n-Propylbenzene (propylbenzene)	µg/L	1000	4400	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	o-Xylene	µg/L	100	440	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	sec-Butylbenzene	µg/L	1000	4400	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	tert-Butanol (TBA)	µg/L	--	--	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
	Toluene	µg/L	310	1300	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
Other Detected Compounds	2,2,4-Trimethylpentane	µg/L	--	--	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Acetone	µg/L	--	--	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	**0.020**	< 0.020 U	**0.029**
	Bromodichloromethane	µg/L	0.076	0.33	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U
	Chloroform	µg/L	0.12	0.53	< 0.0040 U	< 0.0040 U	< 0.0040 U	**0.0049**	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	**0.0056**	**0.0040**
	Cyclohexane	µg/L	6300	26000	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Dichloromethane	µg/L	--	--	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Ethanol	µg/L	--	--	**0.031**	**0.031**	**0.025**	**0.055**	**0.033**	**0.043**	**0.033**	**0.035**	**0.028**	**0.062**
	N-HEPTANE	µg/L	420	1800	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Propene	µg/L	--	--	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U
	Tetrachloroethene	µg/L	0.46	2	< 0.010 U	**0.015**	< 0.010 U	< 0.010 U	< 0.010 U	< 0.010 U	< 0.010 U	< 0.010 U	< 0.010 U	< 0.010 U
	Gasoline	µg/L	630	2600	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
Fixed Gases	Methane	% v/v	--	--	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U
	Oxygen	% v/v	--	--	**16**	**17**	**17**	**17**	**18**	**18**	**18**	**17**	**17**	**16**
	Carbon Dioxide	% v/v	--	--	< 0.20 U	**0.35**	**0.39**	**0.54**	**0.46**	**0.62**	< 0.20 U	**0.28**	**0.22**	**1.0**

Notes:

[a] Source for the Indoor Air Screening Levels: DTSC, 2020. *Human Health Risk Assessment (HHRA) Note: Human and Ecological Risk Office (HERO) HHRA Note Number: 3, DTSC-modified Screening Levels (DTSC-SLs).* November.
DTSC has developed modified screening levels based on U.S. Environmental Protection Agency (EPA) Regional Screening Levels (RSLs) for use in the human health risk assessment process at hazardous waste sites and permitted facilities.

[b] 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.

[c] Chemicals of potential concern identified from the 2006 soil gas investigation and HHRA (Geomatrix, 2006). *Vapor Intrusion Sampling and Human Health Risk Assessment, DFSP Norwalk Facility, Norwalk, California.* December.

[1A]-https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables (carcinogenic screening level) November 2020

[1B]-https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables (noncarcinogenic screening level)

[2A]-https://dtsc.ca.gov/wp-content/uploads/sites/31/2019/04/HHRA-Note-3-June-2020-A.pdf (carcinogenic screening level)

[2B]-https://dtsc.ca.gov/wp-content/uploads/sites/31/2019/04/HHRA-Note-3-June-2020-A.pdf (noncarcinogenic screening level)

http://www.dtsc.ca.gov/AssessingRisk/upload/Final_VIG_Oct_2011.pdf.

Bold Values indicates a detectable concentration

SVM-1-5	Light blue highlighting indicates offsite soil vapor probe locations.
	Yellow highlighting indicates concentration exceeds human health screening level under residential scenario.
	Orange highlighting indicates concentration exceeds human health screening level under the commercial scenario.

5/11/23 and 11/1/23 - 11/2/23 = sample dates
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 = contaminant of potential concern
TPH-g = total petroleum hydrocarbons quantified as gasoline
J = Estimated value; analyte was detected, but the reported value may not be accurate or precise.
U = not detected above listed laboratory reporting limit

Table 2. Field Measurements and Laboratory Soil Vapor Analytical Results – May **and November 2023**

SFPP Norwalk Pump Station, Norwalk, California

Analyte Type	Analyte	Unit	Current Residential Soil Gas Screening Level [a, b]	Current Commercial Soil Gas Screening Level [a, b]	SVP-108-5 05/11/23 SVP-108 5 - 5.5	SVP-108-5 11/01/23 SVP-108 5 - 5.5	SVP-108-10 05/11/23 SVP-108 10 - 10.5	SVP-108-10 11/01/23 SVP-108 10 - 10.5	SVP-108-10 DUP 11/01/23 SVP-108 10 - 10.5	AMBIENT AIR 05/11/23	AMBIENT AIR_DUP 05/12/23	AMBIENT AIR 11/01/23	AMBIENT AIR 11/02/23
Field Measurements	Pressure	inches H_2O	--	--	--	--	--	--	--	--	--	--	--
	PID	ppmv	--	--	--	--	--	--	--	--	--	--	--
	Oxygen	percent	--	--	--	--	--	--	--	--	--	--	--
COPCs[c]	1,2,4-Trimethylbenzene	µg/L	63	260	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.020 U
	1,2-Dichloroethane	µg/L	0.18	0.47	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	--	< 0.0040 U	< 0.0040 U
	1,3,5-Trimethylbenzene	µg/L	63	260	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.020 U
	2-Propanol (leak test compound)	µg/L	--	--	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	--	< 0.20 U	< 0.20 U
	Benzene	µg/L	0.097	0.42	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	--	< 0.0030 U	< 0.0030 U
	Ethylbenzene	µg/L	1.1	4.9	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.020 U
	Isopropylbenzene (aka Cumene)	µg/L	420	1800	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.020 U
	m,p-Xylenes	µg/L	100	440	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.020 U
	Methyl tert-butyl ether (MTBE)	µg/L	11	47	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.020 U
	Naphthalene	µg/L	0.083	0.36	**0.022**	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	< 0.0030 U	--	< 0.0030 U	< 0.0030 U
	n-Butylbenzene	µg/L	210	880	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.020 U
	n-Propylbenzene (propylbenzene)	µg/L	1000	4400	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.020 U
	o-Xylene	µg/L	100	440	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.020 U
	sec-Butylbenzene	µg/L	1000	4400	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.020 U
	tert-Butanol (TBA)	µg/L	--	--	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	--	< 2.0 U	< 2.0 U
	Toluene	µg/L	310	1300	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.020 U
Other Detected Compounds	2,2,4-Trimethylpentane	µg/L	--	--	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.020 U
	Acetone	µg/L	--	--	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	**0.021**	< 0.020 U	--	< 0.020 U	**0.023**
	Bromodichloromethane	µg/L	0.076	0.33	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	--	< 0.0025 U	< 0.0025 U
	Chloroform	µg/L	0.12	0.53	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	< 0.0040 U	--	< 0.0040 U	< 0.0040 U
	Cyclohexane	µg/L	6300	26000	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.020 U
	Dichloromethane	µg/L	--	--	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.020 U
	Ethanol	µg/L	--	--	**0.046**	**0.033**	**0.056**	**0.044**	**0.031**	**0.28 J**	--	**0.024**	**0.082**
	N-HEPTANE	µg/L	420	1800	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	< 0.020 U	--	< 0.020 U	< 0.020 U
	Propene	µg/L	--	--	< 0.020 U	< 0.020 U	< 0.020 U	**0.045**	**0.052**	< 0.020 U	--	< 0.020 U	< 0.020 U
	Tetrachloroethene	µg/L	0.46	2	**0.011**	< 0.010 U	< 0.010 U	< 0.010 U	< 0.010 U	< 0.010 U	--	< 0.010 U	< 0.010 U
	Gasoline	µg/L	630	2600	**1.1**	< 0.50 U	**3.8**	**6.4**	**6.9**	< 0.50 U	--	**2.4**	< 0.50 U
Fixed Gases	Methane	% v/v	--	--	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U
	Oxygen	% v/v	--	--	**23**	**12**	**8.4**	**13 J**	**9.0 J**	**20**	**21.0**	**19**	**20**
	Carbon Dioxide	% v/v	--	--	**1.6**	**3.6**	**10**	**5.5**	**7.1**	< 0.20 U	< 0.20 U	< 0.20 U	< 0.20 U

Notes:

[a] Source for the Indoor Air Screening Levels: DTSC, 2020. *Human Health Risk Assessment (HHRA) Note: Human and Ecological Risk Office (HERO) HHRA Note Number: 3, DTSC-modified Screening Levels (DTSC-SLs).* November.
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[c] Chemicals of potential concern identified from the 2006 soil gas investigation and HHRA (Geomatrix, 2006). *Vapor Intrusion Sampling and Human Health Risk Assessment, DFSP Norwalk Facility, Norwalk, California.* December.

[1A]-https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables (carcinogenic screening level) November 2020

[1B]-https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables (noncarcinogenic screening level)

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[2B]-https://dtsc.ca.gov/wp-content/uploads/sites/31/2019/04/HHRA-Note-3-June-2020-A.pdf (noncarcinogenic screening level)

http://www.dtsc.ca.gov/AssessingRisk/upload/Final_VIG_Oct_2011.pdf.

Bold Values indicates a detectable concentration

SVM-1-5	Light blue highlighting indicates offsite soil vapor probe locations.
	Yellow highlighting indicates concentration exceeds human health screening level under residential scenario.
	Orange highlighting indicates concentration exceeds human health screening level under the commercial scenario.

5/11/23 and 11/1/23 - 11/2/23 = sample dates

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

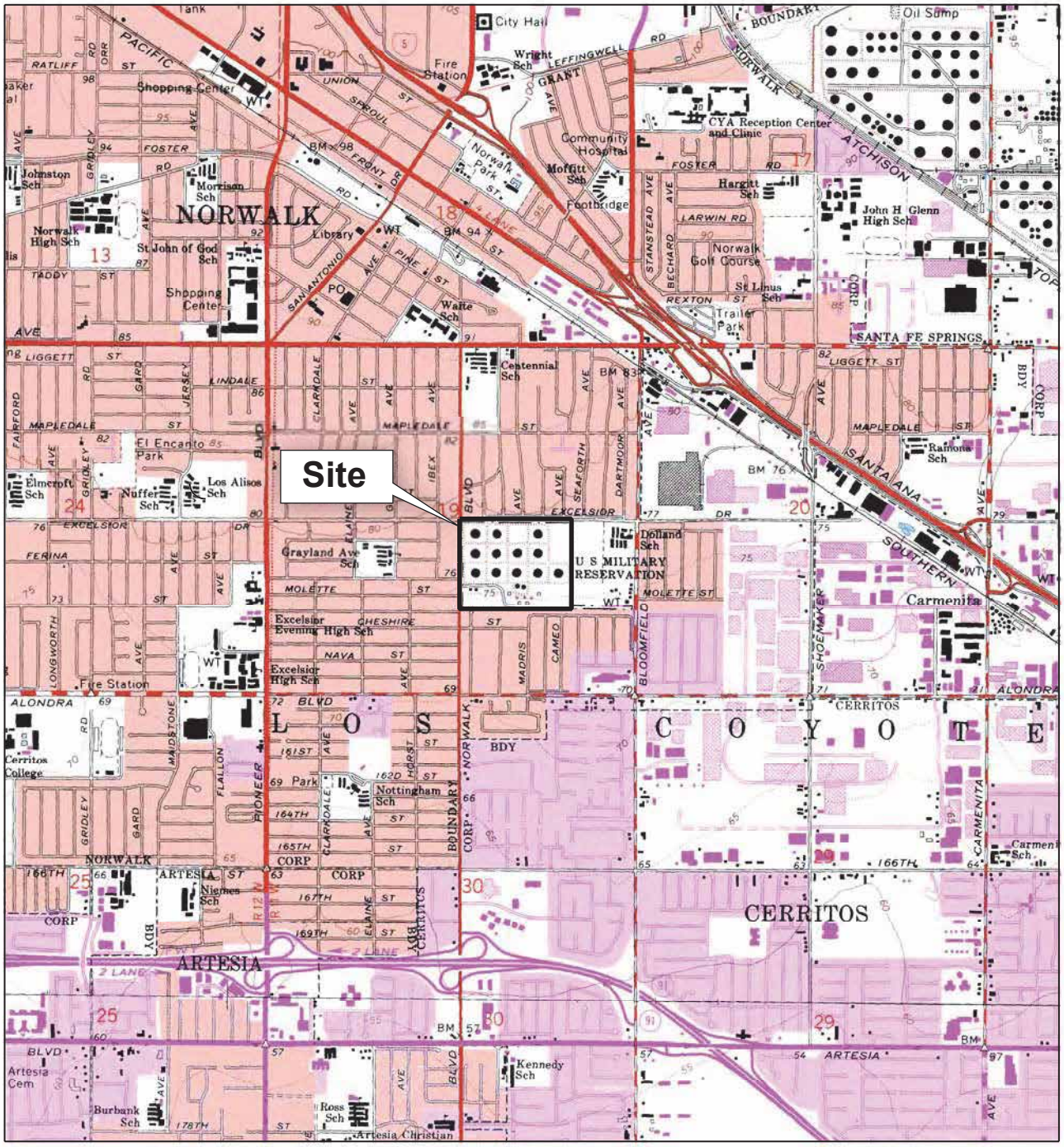
COPC = contaminant of potential concern

TPH-g = total petroleum hydrocarbons quantified as gasoline

J = Estimated value; analyte was detected, but the reported value may not be accurate or precise.

U = not detected above listed laboratory reporting limit

Figures



North

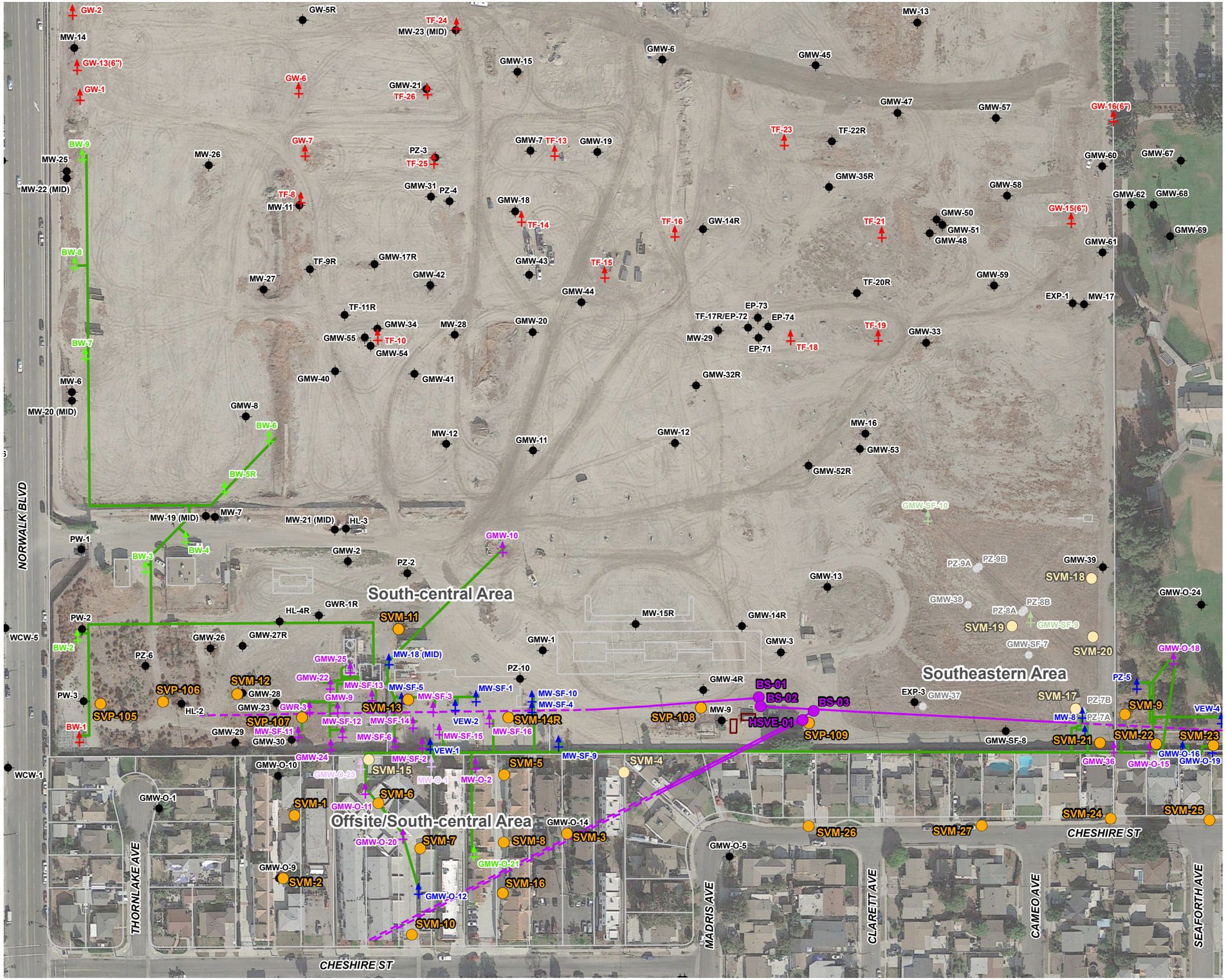
0 1200 2400

Approximate scale in feet

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.

Jacobs



\\DC1VS01\GISPROJ\KINDERMORGAN\NORWALK\MAPFILES\2022\FIGURE_2_REMEDIATION_SYSTEMS_LAYOUT.MXD AESPEJO 8/17/2022

LEGEND

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

Imagery Source:
Google Earth December 3, 2017.

N

0 75 150 300
Feet

1 inch = 150 feet

Figure 2. Current and Historical Remediation System Layout(s)
SFPP Norwalk Pump Station
Norwalk, California

Jacobs

Attachment A
Laboratory Analytical Reports

AMERICAN ANALYTICS

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

June 15, 2023

Eric Davis

CH2M Hill, Inc.

P.O. Box 241329

Denver, CO 80224

Re : KMEP Norwalk Biosparge Startup / 693142

MB187346 / 3E11005

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received on 05/11/23 13:27 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 Analytics.

Sincerely,

Allen Aminian

QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
Fixed Gases					
SVP-108-5	3E11005-01	Vapor	10	05/11/23 09:02	05/11/23 13:27
SVP-108-10	3E11005-02	Vapor	10	05/11/23 09:13	05/11/23 13:27
SVM-21-5	3E11005-03	Vapor	10	05/11/23 09:53	05/11/23 13:27
SVM-21-14.5	3E11005-04	Vapor	10	05/11/23 09:50	05/11/23 13:27
SVM-27-5	3E11005-05	Vapor	10	05/11/23 10:21	05/11/23 13:27
SVM-27-10	3E11005-06	Vapor	10	05/11/23 10:17	05/11/23 13:27
SVM-26-5	3E11005-07	Vapor	10	05/11/23 10:51	05/11/23 13:27
SVM-26-10	3E11005-08	Vapor	10	05/11/23 10:47	05/11/23 13:27
SVM-3-5	3E11005-09	Vapor	10	05/11/23 12:05	05/11/23 13:27
SVM-10-15	3E11005-10	Vapor	10	05/11/23 12:12	05/11/23 13:27
SVM-6-13	3E11005-11	Vapor	10	05/11/23 12:30	05/11/23 13:27
SVM-6-7	3E11005-12	Vapor	10	05/11/23 12:34	05/11/23 13:27
SVM-6-7 DUP	3E11005-13	Vapor	10	05/11/23 12:34	05/11/23 13:27
AMBIENT AIR	3E11005-14	Vapor	10	05/11/23 12:20	05/11/23 13:27
TO-15 (Mid Level)					
SVP-108-5	3E11005-01	Vapor	10	05/11/23 09:02	05/11/23 13:27
SVP-108-10	3E11005-02	Vapor	10	05/11/23 09:13	05/11/23 13:27
SVM-21-5	3E11005-03	Vapor	10	05/11/23 09:53	05/11/23 13:27

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
SVM-21-14.5	3E11005-04	Vapor	10	05/11/23 09:50	05/11/23 13:27
SVM-27-5	3E11005-05	Vapor	10	05/11/23 10:21	05/11/23 13:27
SVM-27-10	3E11005-06	Vapor	10	05/11/23 10:17	05/11/23 13:27
SVM-26-5	3E11005-07	Vapor	10	05/11/23 10:51	05/11/23 13:27
SVM-26-10	3E11005-08	Vapor	10	05/11/23 10:47	05/11/23 13:27
SVM-3-5	3E11005-09	Vapor	10	05/11/23 12:05	05/11/23 13:27
SVM-10-15	3E11005-10	Vapor	10	05/11/23 12:12	05/11/23 13:27
SVM-6-13	3E11005-11	Vapor	10	05/11/23 12:30	05/11/23 13:27
SVM-6-7	3E11005-12	Vapor	10	05/11/23 12:34	05/11/23 13:27
SVM-6-7 DUP	3E11005-13	Vapor	10	05/11/23 12:34	05/11/23 13:27
AMBIENT AIR	3E11005-14	Vapor	10	05/11/23 12:20	05/11/23 13:27
TO-3					
SVP-108-5	3E11005-01	Vapor	10	05/11/23 09:02	05/11/23 13:27
SVP-108-10	3E11005-02	Vapor	10	05/11/23 09:13	05/11/23 13:27
SVM-21-5	3E11005-03	Vapor	10	05/11/23 09:53	05/11/23 13:27
SVM-21-14.5	3E11005-04	Vapor	10	05/11/23 09:50	05/11/23 13:27
SVM-27-5	3E11005-05	Vapor	10	05/11/23 10:21	05/11/23 13:27
SVM-27-10	3E11005-06	Vapor	10	05/11/23 10:17	05/11/23 13:27
SVM-26-5	3E11005-07	Vapor	10	05/11/23 10:51	05/11/23 13:27
SVM-26-10	3E11005-08	Vapor	10	05/11/23 10:47	05/11/23 13:27

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
SVM-3-5	3E11005-09	Vapor	10	05/11/23 12:05	05/11/23 13:27
SVM-10-15	3E11005-10	Vapor	10	05/11/23 12:12	05/11/23 13:27
SVM-6-13	3E11005-11	Vapor	10	05/11/23 12:30	05/11/23 13:27
SVM-6-7	3E11005-12	Vapor	10	05/11/23 12:34	05/11/23 13:27
SVM-6-7 DUP	3E11005-13	Vapor	10	05/11/23 12:34	05/11/23 13:27
AMBIENT AIR	3E11005-14	Vapor	10	05/11/23 12:20	05/11/23 13:27

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
			Fixed Gases by TCD					
Oxygen	SVP-108-5	**23**	0.20	% by Volume	2	06/08/23	06/09/23	ASTM D1946M
Carbon Dioxide	SVP-108-5	**1.6**	0.20	% by Volume	2	06/08/23	06/09/23	ASTM D1946M
Oxygen	SVP-108-10	**8.4**	0.20	% by Volume	2	06/08/23	06/09/23	ASTM D1946M
Carbon Dioxide	SVP-108-10	**10**	0.20	% by Volume	2	06/08/23	06/09/23	ASTM D1946M
Oxygen	SVM-21-5	**17**	0.20	% by Volume	2	06/08/23	06/09/23	ASTM D1946M
Oxygen	SVM-21-14.5	**16**	0.20	% by Volume	2	06/08/23	06/09/23	ASTM D1946M
Oxygen	SVM-27-5	**18**	0.20	% by Volume	2	06/08/23	06/09/23	ASTM D1946M
Oxygen	SVM-27-10	**17**	0.20	% by Volume	2	06/09/23	06/09/23	ASTM D1946M
Carbon Dioxide	SVM-27-10	**0.22**	0.20	% by Volume	2	06/09/23	06/09/23	ASTM D1946M
Oxygen	SVM-26-5	**17**	0.20	% by Volume	2	06/09/23	06/09/23	ASTM D1946M

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
Carbon Dioxide	SVM-26-5	**0.39**	0.20	% by Volume	2	06/09/23	06/09/23	ASTM D1946M
Oxygen	SVM-26-10	**18**	0.20	% by Volume	2	06/09/23	06/09/23	ASTM D1946M
Carbon Dioxide	SVM-26-10	**0.46**	0.20	% by Volume	2	06/09/23	06/09/23	ASTM D1946M
Oxygen	SVM-3-5	**18**	0.20	% by Volume	2	06/09/23	06/09/23	ASTM D1946M
Oxygen	SVM-10-15	**17**	0.20	% by Volume	2	06/09/23	06/09/23	ASTM D1946M
Oxygen	SVM-6-13	**6.5**	0.20	% by Volume	2	06/09/23	06/09/23	ASTM D1946M
Carbon Dioxide	SVM-6-13	**7.1**	0.20	% by Volume	2	06/09/23	06/09/23	ASTM D1946M
Oxygen	SVM-6-7	**6.6**	0.20	% by Volume	2	06/09/23	06/09/23	ASTM D1946M
Carbon Dioxide	SVM-6-7	**4.3**	0.20	% by Volume	2	06/09/23	06/09/23	ASTM D1946M
Oxygen	SVM-6-7 DUP	**4.9**	0.20	% by Volume	2	06/09/23	06/09/23	ASTM D1946M
Carbon Dioxide	SVM-6-7 DUP	**4.8**	0.20	% by Volume	2	06/09/23	06/09/23	ASTM D1946M

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: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result		MRL	Units	Dilution	Prepared	Analyzed	Method
Oxygen	AMBIENT AIR	**20**		0.20	% by Volume	2	06/09/23	06/09/23	ASTM D1946M
		VOCs by EPA TO-3							
Gasoline Range Organics (GRO)	SVP-108-5	**1.1**		0.50	ug/L	1	05/15/23	05/15/23	TO-3
Gasoline Range Organics (GRO)	SVP-108-10	**3.8**		0.50	ug/L	1	05/16/23	05/16/23	TO-3
		VOCs by GCMS EPA TO-15 (Mid Level)							
Ethanol	SVP-108-5	**0.046**		0.020	ug/L	1	05/15/23	05/15/23	TO-15
Naphthalene	SVP-108-5	**0.022**		0.0030	ug/L	1	05/15/23	05/15/23	TO-15
Tetrachloroethylene (PCE)	SVP-108-5	**0.011**		0.010	ug/L	1	05/15/23	05/15/23	TO-15
Ethanol	SVP-108-10	**0.056**		0.020	ug/L	1	05/15/23	05/15/23	TO-15
Ethanol	SVM-21-5	**0.032**		0.020	ug/L	1	05/15/23	05/15/23	TO-15
Ethanol	SVM-21-14.5	**0.031**		0.020	ug/L	1	05/15/23	05/15/23	TO-15
Ethanol	SVM-27-5	**0.033**		0.020	ug/L	1	05/15/23	05/15/23	TO-15
Chloroform	SVM-27-10	**0.0056**		0.0040	ug/L	1	05/15/23	05/15/23	TO-15
Ethanol	SVM-27-10	**0.028**		0.020	ug/L	1	05/15/23	05/15/23	TO-15
Ethanol	SVM-26-5	**0.025**		0.020	ug/L	1	05/15/23	05/15/23	TO-15
Ethanol	SVM-26-10	**0.033**		0.020	ug/L	1	05/15/23	05/15/23	TO-15
Bromodichloromethane	SVM-3-5	**0.010**		0.0025	ug/L	1	05/15/23	05/15/23	TO-15
Chloroform	SVM-3-5	**0.024**		0.0040	ug/L	1	05/15/23	05/15/23	TO-15
Ethanol	SVM-3-5	**0.053**	**E**	0.020	ug/L	1	05/15/23	05/15/23	TO-15
Ethanol	SVM-10-15	**0.037**		0.020	ug/L	1	05/15/23	05/15/23	TO-15
Ethanol	SVM-6-13	**0.030**		0.020	ug/L	1	05/15/23	05/15/23	TO-15
Tetrachloroethylene (PCE)	SVM-6-13	**0.029**		0.010	ug/L	1	05/15/23	05/15/23	TO-15
Ethanol	SVM-6-7	**0.036**		0.020	ug/L	1	05/15/23	05/16/23	TO-15
Tetrachloroethylene (PCE)	SVM-6-7	**0.049**		0.010	ug/L	1	05/15/23	05/16/23	TO-15
Ethanol	SVM-6-7 DUP	**0.021**		0.020	ug/L	1	05/15/23	05/16/23	TO-15

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LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result		MRL	Units	Dilution	Prepared	Analyzed	Method
Tetrachloroethylene (PCE)	SVM-6-7 DUP	**0.047**		0.010	ug/L	1	05/15/23	05/16/23	TO-15
Ethanol	AMBIENT AIR	**0.28**	**E**	0.020	ug/L	1	05/15/23	05/16/23	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: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23
Units: ug/L

Date Sampled:	05/11/23	05/11/23	05/11/23	05/11/23	
Date Prepared:	05/15/23	05/16/23	05/16/23	05/15/23	
Date Analyzed:	05/15/23	05/16/23	05/16/23	05/15/23	
AA ID No:	3E11005-01	3E11005-02	3E11005-03	3E11005-04	
Client ID No:	SVP-108-5	SVP-108-10	SVM-21-5	SVM-21-14.5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-3 (TO-3)					
Gasoline Range Organics (GRO)	**1.1**	**3.8**	<0.50	<0.50	0.50
Surrogates					**%REC Limits**
4-Bromofluorobenzene	100%	101%	95%	96%	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: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23
Units: ug/L

Date Sampled:	05/11/23	05/11/23	05/11/23	05/11/23	
Date Prepared:	05/15/23	05/15/23	05/15/23	05/15/23	
Date Analyzed:	05/15/23	05/15/23	05/15/23	05/15/23	
AA ID No:	3E11005-05	3E11005-06	3E11005-07	3E11005-08	
Client ID No:	SVM-27-5	SVM-27-10	SVM-26-5	SVM-26-10	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-3 (TO-3)					
Gasoline Range Organics (GRO)	<0.50	<0.50	<0.50	<0.50	0.50
Surrogates					**%REC Limits**
4-Bromofluorobenzene	96%	97%	98%	95%	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: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23
Units: ug/L

Date Sampled:	05/11/23	05/11/23	05/11/23	05/11/23	
Date Prepared:	05/15/23	05/15/23	05/15/23	05/15/23	
Date Analyzed:	05/15/23	05/15/23	05/15/23	05/16/23	
AA ID No:	3E11005-09	3E11005-10	3E11005-11	3E11005-12	
Client ID No:	SVM-3-5	SVM-10-15	SVM-6-13	SVM-6-7	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-3 (TO-3)					
Gasoline Range Organics (GRO)	<0.50	<0.50	<0.50	<0.50	0.50
Surrogates					**%REC Limits**
4-Bromofluorobenzene	97%	95%	98%	100%	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: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23
Units: ug/L

Date Sampled:	05/11/23	05/11/23	
Date Prepared:	05/15/23	05/15/23	
Date Analyzed:	05/16/23	05/16/23	
AA ID No:	3E11005-13	3E11005-14	
Client ID No:	SVM-6-7 DUP	AMBIENT AIR	
Matrix:	Vapor	Vapor	
Dilution Factor:	1	1	MRL
TO-3 (TO-3)			
Gasoline Range Organics (GRO)	<0.50	<0.50	0.50
Surrogates			**%REC Limits**
4-Bromofluorobenzene	97%	96%	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: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23
Units: ug/L

Date Sampled:	05/11/23	05/11/23	05/11/23	05/11/23	
Date Prepared:	05/15/23	05/15/23	05/15/23	05/15/23	
Date Analyzed:	05/15/23	05/15/23	05/15/23	05/15/23	
AA ID No:	3E11005-01	3E11005-02	3E11005-03	3E11005-04	
Client ID No:	SVP-108-5	SVP-108-10	SVM-21-5	SVM-21-14.5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-15 (Mid Level) (TO-15)					
Acetone	<0.020	<0.020	<0.020	<0.020	0.020
Allyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
tert-Amyl-Methyl Ether (TAME)	<0.020	<0.020	<0.020	<0.020	0.020
Benzene	<0.0030	<0.0030	<0.0030	<0.0030	0.0030
Benzyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
Bromodichloromethane	<0.0025	<0.0025	<0.0025	<0.0025	0.0025
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)	<2.0	<2.0	<2.0	<2.0	2.0
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	<0.0040	<0.0040	<0.0040	<0.0040	0.0040
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)	<0.0040	<0.0040	<0.0040	<0.0040	0.0040
cis-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020

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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: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23
Units: ug/L

Date Sampled:	05/11/23	05/11/23	05/11/23	05/11/23	
Date Prepared:	05/15/23	05/15/23	05/15/23	05/15/23	
Date Analyzed:	05/15/23	05/15/23	05/15/23	05/15/23	
AA ID No:	3E11005-01	3E11005-02	3E11005-03	3E11005-04	
Client ID No:	SVP-108-5	SVP-108-10	SVM-21-5	SVM-21-14.5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-15 (Mid Level) (TO-15) (continued)					
1,1-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorotetrafluoroethane	<0.020	<0.020	<0.020	<0.020	0.020
Diisopropyl ether (DIPE)	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dioxane	<0.020	<0.020	<0.020	<0.020	0.020
Ethanol	**0.046**	**0.056**	**0.032**	**0.031**	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	**0.022**	<0.0030	<0.0030	<0.0030	0.0030
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)	**0.011**	<0.010	<0.010	<0.010	0.010
Tetrahydrofuran (THF)	<0.020	<0.020	<0.020	<0.020	0.020

Allen Aminian
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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: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23
Units: ug/L

Date Sampled:	05/11/23	05/11/23	05/11/23	05/11/23	
Date Prepared:	05/15/23	05/15/23	05/15/23	05/15/23	
Date Analyzed:	05/15/23	05/15/23	05/15/23	05/15/23	
AA ID No:	3E11005-01	3E11005-02	3E11005-03	3E11005-04	
Client ID No:	SVP-108-5	SVP-108-10	SVM-21-5	SVM-21-14.5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	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					**%REC Limits**
4-Bromofluorobenzene	101%	110%	97%	97%	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: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23
Units: ug/L

Date Sampled:	05/11/23	05/11/23	05/11/23	05/11/23	
Date Prepared:	05/15/23	05/15/23	05/15/23	05/15/23	
Date Analyzed:	05/15/23	05/15/23	05/15/23	05/15/23	
AA ID No:	3E11005-05	3E11005-06	3E11005-07	3E11005-08	
Client ID No:	SVM-27-5	SVM-27-10	SVM-26-5	SVM-26-10	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-15 (Mid Level) (TO-15)					
Acetone	<0.020	<0.020	<0.020	<0.020	0.020
Allyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
tert-Amyl-Methyl Ether (TAME)	<0.020	<0.020	<0.020	<0.020	0.020
Benzene	<0.0030	<0.0030	<0.0030	<0.0030	0.0030
Benzyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
Bromodichloromethane	<0.0025	<0.0025	<0.0025	<0.0025	0.0025
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)	<2.0	<2.0	<2.0	<2.0	2.0
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	<0.0040	**0.0056**	<0.0040	<0.0040	0.0040
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)	<0.0040	<0.0040	<0.0040	<0.0040	0.0040
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: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23
Units: ug/L

Date Sampled:	05/11/23	05/11/23	05/11/23	05/11/23	
Date Prepared:	05/15/23	05/15/23	05/15/23	05/15/23	
Date Analyzed:	05/15/23	05/15/23	05/15/23	05/15/23	
AA ID No:	3E11005-05	3E11005-06	3E11005-07	3E11005-08	
Client ID No:	SVM-27-5	SVM-27-10	SVM-26-5	SVM-26-10	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-15 (Mid Level) (TO-15) (continued)					
1,1-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorotetrafluoroethane	<0.020	<0.020	<0.020	<0.020	0.020
Diisopropyl ether (DIPE)	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dioxane	<0.020	<0.020	<0.020	<0.020	0.020
Ethanol	**0.033**	**0.028**	**0.025**	**0.033**	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	<0.0030	<0.0030	<0.0030	<0.0030	0.0030
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)	<0.010	<0.010	<0.010	<0.010	0.010
Tetrahydrofuran (THF)	<0.020	<0.020	<0.020	<0.020	0.020

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23
Units: ug/L

Date Sampled:	05/11/23	05/11/23	05/11/23	05/11/23	
Date Prepared:	05/15/23	05/15/23	05/15/23	05/15/23	
Date Analyzed:	05/15/23	05/15/23	05/15/23	05/15/23	
AA ID No:	3E11005-05	3E11005-06	3E11005-07	3E11005-08	
Client ID No:	SVM-27-5	SVM-27-10	SVM-26-5	SVM-26-10	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	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					**%REC Limits**
4-Bromofluorobenzene	97%	98%	99%	96%	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: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23
Units: ug/L

Date Sampled:	05/11/23	05/11/23	05/11/23	05/11/23	
Date Prepared:	05/15/23	05/15/23	05/15/23	05/15/23	
Date Analyzed:	05/15/23	05/15/23	05/15/23	05/16/23	
AA ID No:	3E11005-09	3E11005-10	3E11005-11	3E11005-12	
Client ID No:	SVM-3-5	SVM-10-15	SVM-6-13	SVM-6-7	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-15 (Mid Level) (TO-15)					
Acetone	<0.020	<0.020	<0.020	<0.020	0.020
Allyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
tert-Amyl-Methyl Ether (TAME)	<0.020	<0.020	<0.020	<0.020	0.020
Benzene	<0.0030	<0.0030	<0.0030	<0.0030	0.0030
Benzyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
Bromodichloromethane	**0.010**	<0.0025	<0.0025	<0.0025	0.0025
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)	<2.0	<2.0	<2.0	<2.0	2.0
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	**0.024**	<0.0040	<0.0040	<0.0040	0.0040
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)	<0.0040	<0.0040	<0.0040	<0.0040	0.0040
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: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23
Units: ug/L

Date Sampled:	05/11/23	05/11/23	05/11/23	05/11/23	
Date Prepared:	05/15/23	05/15/23	05/15/23	05/15/23	
Date Analyzed:	05/15/23	05/15/23	05/15/23	05/16/23	
AA ID No:	3E11005-09	3E11005-10	3E11005-11	3E11005-12	
Client ID No:	SVM-3-5	SVM-10-15	SVM-6-13	SVM-6-7	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-15 (Mid Level) (TO-15) (continued)					
1,1-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorotetrafluoroethane	<0.020	<0.020	<0.020	<0.020	0.020
Diisopropyl ether (DIPE)	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dioxane	<0.020	<0.020	<0.020	<0.020	0.020
Ethanol	**0.053 [1]**	**0.037**	**0.030**	**0.036**	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	<0.0030	<0.0030	<0.0030	<0.0030	0.0030
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)	<0.010	<0.010	**0.029**	**0.049**	0.010
Tetrahydrofuran (THF)	<0.020	<0.020	<0.020	<0.020	0.020

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23
Units: ug/L

Date Sampled:	05/11/23	05/11/23	05/11/23	05/11/23	
Date Prepared:	05/15/23	05/15/23	05/15/23	05/15/23	
Date Analyzed:	05/15/23	05/15/23	05/15/23	05/16/23	
AA ID No:	3E11005-09	3E11005-10	3E11005-11	3E11005-12	
Client ID No:	SVM-3-5	SVM-10-15	SVM-6-13	SVM-6-7	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	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					**%REC Limits**
4-Bromofluorobenzene	98%	97%	99%	100%	70-130

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	CH2M Hill, Inc.	**AA Project No:**	MB187346
Project No:	693142	**Date Received:**	05/11/23
Project Name:	KMEP Norwalk Biosparge Startup	**Date Reported:**	06/15/23
Method:	VOCs by GCMS EPA TO-15 (Mid Level)	**Units:**	ug/L

Date Sampled:	05/11/23	05/11/23	
Date Prepared:	05/15/23	05/15/23	
Date Analyzed:	05/16/23	05/16/23	
AA ID No:	3E11005-13	3E11005-14	
Client ID No:	SVM-6-7 DUP	AMBIENT AIR	
Matrix:	Vapor	Vapor	
Dilution Factor:	1	1	MRL
TO-15 (Mid Level) (TO-15)			
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	<0.0030	<0.0030	0.0030
Benzyl chloride	<0.020	<0.020	0.020
Bromodichloromethane	<0.0025	<0.0025	0.0025
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)	<2.0	<2.0	2.0
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	<0.0040	<0.0040	0.0040
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)	<0.0040	<0.0040	0.0040
cis-1,2-Dichloroethylene	<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: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23
Units: ug/L

Date Sampled:	05/11/23	05/11/23	
Date Prepared:	05/15/23	05/15/23	
Date Analyzed:	05/16/23	05/16/23	
AA ID No:	3E11005-13	3E11005-14	
Client ID No:	SVM-6-7 DUP	AMBIENT AIR	
Matrix:	Vapor	Vapor	
Dilution Factor:	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	**0.021**	**0.28 [1]**	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	<0.0030	<0.0030	0.0030
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)	**0.047**	<0.010	0.010
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: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23
Units: ug/L

Date Sampled:	05/11/23	05/11/23	
Date Prepared:	05/15/23	05/15/23	
Date Analyzed:	05/16/23	05/16/23	
AA ID No:	3E11005-13	3E11005-14	
Client ID No:	SVM-6-7 DUP	AMBIENT AIR	
Matrix:	Vapor	Vapor	
Dilution Factor:	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
Surrogates			**%REC Limits**
4-Bromofluorobenzene	98%	96%	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: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23
Units: % by Volume

Date Sampled:	05/11/23	05/11/23	05/11/23	05/11/23	
Date Prepared:	06/08/23	06/08/23	06/08/23	06/08/23	
Date Analyzed:	06/09/23	06/09/23	06/09/23	06/09/23	
AA ID No:	3E11005-01	3E11005-02	3E11005-03	3E11005-04	
Client ID No:	SVP-108-5	SVP-108-10	SVM-21-5	SVM-21-14.5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	2	2	2	2	MRL
Fixed Gases (ASTM D1946M)					
Methane	<0.20	<0.20	<0.20	<0.20	0.10
Oxygen	**23**	**8.4**	**17**	**16**	0.10
Carbon Dioxide	**1.6**	**10**	<0.20	<0.20	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: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23
Units: % by Volume

Date Sampled:	05/11/23	05/11/23	05/11/23	05/11/23	
Date Prepared:	06/08/23	06/09/23	06/09/23	06/09/23	
Date Analyzed:	06/09/23	06/09/23	06/09/23	06/09/23	
AA ID No:	3E11005-05	3E11005-06	3E11005-07	3E11005-08	
Client ID No:	SVM-27-5	SVM-27-10	SVM-26-5	SVM-26-10	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	2	2	2	2	MRL
Fixed Gases (ASTM D1946M)					
Methane	<0.20	<0.20	<0.20	<0.20	0.10
Oxygen	**18**	**17**	**17**	**18**	0.10
Carbon Dioxide	<0.20	**0.22**	**0.39**	**0.46**	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: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23
Units: % by Volume

Date Sampled:	05/11/23	05/11/23	05/11/23	05/11/23	
Date Prepared:	06/09/23	06/09/23	06/09/23	06/09/23	
Date Analyzed:	06/09/23	06/09/23	06/09/23	06/09/23	
AA ID No:	3E11005-09	3E11005-10	3E11005-11	3E11005-12	
Client ID No:	SVM-3-5	SVM-10-15	SVM-6-13	SVM-6-7	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	2	1	2	2	MRL
Fixed Gases (ASTM D1946M)					
Methane	<0.20	<0.10	<0.20	<0.20	0.10
Oxygen	**18**	**17**	**6.5**	**6.6**	0.10
Carbon Dioxide	<0.20	<0.20	**7.1**	**4.3**	0.10

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	CH2M Hill, Inc.	**AA Project No:**	MB187346
Project No:	693142	**Date Received:**	05/11/23
Project Name:	KMEP Norwalk Biosparge Startup	**Date Reported:**	06/15/23
Method:	Fixed Gases by TCD	**Units:**	% by Volume

Date Sampled:	05/11/23	05/11/23	
Date Prepared:	06/09/23	06/09/23	
Date Analyzed:	06/09/23	06/09/23	
AA ID No:	3E11005-13	3E11005-14	
Client ID No:	SVM-6-7 DUP	AMBIENT AIR	
Matrix:	Vapor	Vapor	
Dilution Factor:	2	2	MRL
Fixed Gases (ASTM D1946M)			
Methane	<0.20	<0.20	0.10
Oxygen	**4.9**	**20**	0.10
Carbon Dioxide	**4.8**	<0.20	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: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by EPA TO-3 - Quality Control										
*Batch B3E2518 - *** DEFAULT PREP ****										
Blank (B3E2518-BLK1)				Prepared & Analyzed: 05/15/23						
Gasoline Range Organics (GRO)	<0.50	0.50	ug/L							
Surrogate: 4-Bromofluorobenzene	*0.0346*		*ug/L*	*0.0358*		*96.6*	*70-130*			
LCS (B3E2518-BS1)				Prepared: 05/15/23 Analyzed: 05/16/23						
Gasoline Range Organics (GRO)	**0.924**	0.50	ug/L	0.802		115	70-130			
Surrogate: 4-Bromofluorobenzene	*0.0341*		*ug/L*	*0.0358*		*95.2*	*70-130*			
LCS Dup (B3E2518-BSD1)				Prepared: 05/15/23 Analyzed: 05/16/23						
Gasoline Range Organics (GRO)	**0.930**	0.50	ug/L	0.802		116	70-130	0.560	30	
Surrogate: 4-Bromofluorobenzene	*0.0346*		*ug/L*	*0.0358*		*96.8*	*70-130*			
*Batch B3E2519 - *** DEFAULT PREP ****										
Blank (B3E2519-BLK1)				Prepared & Analyzed: 05/16/23						
Gasoline Range Organics (GRO)	<0.50	0.50	ug/L							
Surrogate: 4-Bromofluorobenzene	*0.0342*		*ug/L*	*0.0358*		*95.6*	*70-130*			
LCS (B3E2519-BS1)				Prepared: 05/16/23 Analyzed: 05/17/23						
Gasoline Range Organics (GRO)	**0.849**	0.50	ug/L	0.802		106	70-130			
Surrogate: 4-Bromofluorobenzene	*0.0351*		*ug/L*	*0.0358*		*98.2*	*70-130*			
LCS Dup (B3E2519-BSD1)				Prepared: 05/16/23 Analyzed: 05/17/23						
Gasoline Range Organics (GRO)	**0.710**	0.50	ug/L	0.802		88.5	70-130	17.9	30	
Surrogate: 4-Bromofluorobenzene	*0.0350*		*ug/L*	*0.0358*		*97.8*	*70-130*			
VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control										
*Batch B3E1624 - *** DEFAULT PREP ****										
Blank (B3E1624-BLK1)				Prepared & Analyzed: 05/15/23						
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	<0.0030	0.0030	ug/L							
Benzyl chloride	<0.020	0.020	ug/L							
Bromodichloromethane	<0.0025	0.0025	ug/L							
Bromoform	<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: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23

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 B3E1624 - *** DEFAULT PREP ****										
Blank (B3E1624-BLK1) Continued				Prepared & Analyzed: 05/15/23						
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)	<2.0	2.0	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	<0.0040	0.0040	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)	<0.0040	0.0040	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							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23

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 B3E1624 - *** DEFAULT PREP ****										
Blank (B3E1624-BLK1) Continued				Prepared & Analyzed: 05/15/23						
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	<0.0030	0.0030	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)	<0.010	0.010	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							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23

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 B3E1624 - *** DEFAULT PREP ****										
Blank (B3E1624-BLK1) Continued				Prepared & Analyzed: 05/15/23						
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	*0.0347*		*ug/L*	*0.0358*		*97.0*	*70-130*			
LCS (B3E1624-BS1)				Prepared: 05/15/23 Analyzed: 05/16/23						
Acetone	**0.0216**	0.020	ug/L	0.0238		90.8	70-130			
Benzene	**0.0366**	0.0030	ug/L	0.0319		114	70-130			
Benzyl chloride	**0.0559**	0.020	ug/L	0.0518		108	70-130			
Bromodichloromethane	**0.0693**	0.0025	ug/L	0.0670		103	70-130			
Bromoform	**0.114**	0.020	ug/L	0.103		110	70-130			
Bromomethane	**0.0403**	0.020	ug/L	0.0388		104	70-130			
2-Butanone (MEK)	**0.0317**	0.020	ug/L	0.0295		107	70-130			
Carbon Disulfide	**0.0314**	0.020	ug/L	0.0311		101	70-130			
Carbon Tetrachloride	**0.0649**	0.020	ug/L	0.0629		103	70-130			
Chlorobenzene	**0.0528**	0.020	ug/L	0.0460		115	70-130			
Chloroethane	**0.0274**	0.020	ug/L	0.0264		104	70-130			
Chloroform	**0.0513**	0.0040	ug/L	0.0488		105	70-130			
Chloromethane	**0.0215**	0.020	ug/L	0.0207		104	70-130			
Dibromochloromethane	**0.0951**	0.020	ug/L	0.0852		112	70-130			
1,2-Dibromoethane (EDB)	**0.0900**	0.020	ug/L	0.0768		117	70-130			
1,2-Dichlorobenzene	**0.0841**	0.020	ug/L	0.0601		140	70-130			QL-04
1,3-Dichlorobenzene	**0.0788**	0.020	ug/L	0.0601		131	70-130			QL-02
1,4-Dichlorobenzene	**0.0842**	0.020	ug/L	0.0601		140	70-130			QL-04
Dichlorodifluoromethane (R12)	**0.0419**	0.020	ug/L	0.0495		84.8	70-130			
1,1-Dichloroethane	**0.0434**	0.020	ug/L	0.0405		107	70-130			
1,2-Dichloroethane (EDC)	**0.0419**	0.0040	ug/L	0.0405		104	70-130			
cis-1,2-Dichloroethylene	**0.0435**	0.020	ug/L	0.0396		110	70-130			
1,1-Dichloroethylene	**0.0398**	0.020	ug/L	0.0396		100	70-130			
trans-1,2-Dichloroethylene	**0.0425**	0.020	ug/L	0.0396		107	70-130			

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23

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 B3E1624 - *** DEFAULT PREP ****										
LCS (B3E1624-BS1) Continued				Prepared: 05/15/23 Analyzed: 05/16/23						
1,2-Dichloropropane	**0.0521**	0.020	ug/L	0.0462		113	70-130			
trans-1,3-Dichloropropylene	**0.0521**	0.020	ug/L	0.0454		115	70-130			
cis-1,3-Dichloropropylene	**0.0530**	0.020	ug/L	0.0454		117	70-130			
Dichlorotetrafluoroethane	**0.0360**	0.020	ug/L	0.0699		51.5	70-130			QL-07
Ethylbenzene	**0.0494**	0.020	ug/L	0.0434		114	70-130			
4-Ethyltoluene	**0.0529**	0.020	ug/L	0.0492		108	70-130			
Hexachlorobutadiene	**0.208**	0.020	ug/L	0.107		195	70-130			QL-04
2-Hexanone (MBK)	**0.0447**	0.020	ug/L	0.0410		109	70-130			
Isopropanol (IPA)	**0.0227**	0.20	ug/L	0.0246		92.3	70-130			
Methylene Chloride	**0.0313**	0.020	ug/L	0.0347		90.0	70-130			
4-Methyl-2-pentanone (MIBK)	**0.0429**	0.020	ug/L	0.0410		105	70-130			
Styrene	**0.0514**	0.020	ug/L	0.0426		121	70-130			
1,1,2,2-Tetrachloroethane	**0.0799**	0.020	ug/L	0.0687		116	70-130			
Tetrachloroethylene (PCE)	**0.0819**	0.010	ug/L	0.0679		121	70-130			
Toluene	**0.0433**	0.020	ug/L	0.0377		115	70-130			
1,2,4-Trichlorobenzene	**0.122**	0.020	ug/L	0.0742		165	70-130			QL-04
1,1,2-Trichloroethane	**0.0625**	0.020	ug/L	0.0546		114	70-130			
1,1,1-Trichloroethane	**0.0572**	0.020	ug/L	0.0546		105	70-130			
Trichloroethylene (TCE)	**0.0614**	0.020	ug/L	0.0537		114	70-130			
Trichlorofluoromethane (R11)	**0.0565**	0.020	ug/L	0.0562		100	70-130			
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	**0.0740**	0.020	ug/L	0.0766		96.6	70-130			
1,3,5-Trimethylbenzene	**0.0608**	0.020	ug/L	0.0492		124	70-130			
1,2,4-Trimethylbenzene	**0.0627**	0.020	ug/L	0.0492		128	70-130			
Vinyl acetate	**0.0346**	0.020	ug/L	0.0352		98.3	70-130			
Vinyl chloride	**0.0256**	0.020	ug/L	0.0256		100	70-130			
o-Xylene	**0.0476**	0.020	ug/L	0.0434		110	70-130			
m,p-Xylenes	**0.0971**	0.020	ug/L	0.0868		112	70-130			
1,2,3-Trichloropropane	**0.0730**	0.020	ug/L	0.0603		121	70-130			
sec-Butylbenzene	**0.0711**	0.020	ug/L	0.0549		130	70-130			
Isopropylbenzene	**0.0608**	0.020	ug/L	0.0492		124	70-130			
n-Propylbenzene	**0.0610**	0.020	ug/L	0.0492		124	70-130			

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23

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 B3E1624 - *** DEFAULT PREP ****										
LCS (B3E1624-BS1) Continued				Prepared: 05/15/23 Analyzed: 05/16/23						
4-Isopropyltoluene	**0.0755**	0.020	ug/L	0.0549		138	70-130			QL-04
Surrogate: 4-Bromofluorobenzene	*0.0355*		*ug/L*	*0.0358*		*99.2*	*70-130*			
LCS Dup (B3E1624-BSD1)				Prepared: 05/15/23 Analyzed: 05/16/23						
Acetone	**0.0216**	0.020	ug/L	0.0238		90.9	70-130	0.110	30	
Benzene	**0.0369**	0.0030	ug/L	0.0319		116	70-130	0.870	30	
Benzyl chloride	**0.0563**	0.020	ug/L	0.0518		109	70-130	0.831	30	
Bromodichloromethane	**0.0730**	0.0025	ug/L	0.0670		109	70-130	5.27	30	
Bromoform	**0.115**	0.020	ug/L	0.103		111	70-130	0.996	30	
Bromomethane	**0.0391**	0.020	ug/L	0.0388		101	70-130	3.03	30	
2-Butanone (MEK)	**0.0317**	0.020	ug/L	0.0295		107	70-130	0.00	30	
Carbon Disulfide	**0.0316**	0.020	ug/L	0.0311		102	70-130	0.691	30	
Carbon Tetrachloride	**0.0658**	0.020	ug/L	0.0629		105	70-130	1.44	30	
Chlorobenzene	**0.0534**	0.020	ug/L	0.0460		116	70-130	1.04	30	
Chloroethane	**0.0269**	0.020	ug/L	0.0264		102	70-130	1.75	30	
Chloroform	**0.0517**	0.0040	ug/L	0.0488		106	70-130	0.853	30	
Chloromethane	**0.0213**	0.020	ug/L	0.0207		103	70-130	0.773	30	
Dibromochloromethane	**0.0974**	0.020	ug/L	0.0852		114	70-130	2.39	30	
1,2-Dibromoethane (EDB)	**0.0914**	0.020	ug/L	0.0768		119	70-130	1.44	30	
1,2-Dichlorobenzene	**0.0824**	0.020	ug/L	0.0601		137	70-130	2.09	30	QL-04
1,3-Dichlorobenzene	**0.0771**	0.020	ug/L	0.0601		128	70-130	2.16	30	
1,4-Dichlorobenzene	**0.0803**	0.020	ug/L	0.0601		134	70-130	4.68	30	QL-04
Dichlorodifluoromethane (R12)	**0.0390**	0.020	ug/L	0.0495		78.9	70-130	7.21	30	
1,1-Dichloroethane	**0.0437**	0.020	ug/L	0.0405		108	70-130	0.558	30	
1,2-Dichloroethane (EDC)	**0.0423**	0.0040	ug/L	0.0405		105	70-130	1.06	30	
cis-1,2-Dichloroethylene	**0.0435**	0.020	ug/L	0.0396		110	70-130	0.182	30	
1,1-Dichloroethylene	**0.0400**	0.020	ug/L	0.0396		101	70-130	0.497	30	
trans-1,2-Dichloroethylene	**0.0431**	0.020	ug/L	0.0396		109	70-130	1.57	30	
1,2-Dichloropropane	**0.0531**	0.020	ug/L	0.0462		115	70-130	1.93	30	
trans-1,3-Dichloropropylene	**0.0536**	0.020	ug/L	0.0454		118	70-130	2.84	30	
cis-1,3-Dichloropropylene	**0.0537**	0.020	ug/L	0.0454		118	70-130	1.36	30	
Dichlorotetrafluoroethane	**0.0343**	0.020	ug/L	0.0699		49.0	70-130	4.98	30	QL-07

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23

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 B3E1624 - *** DEFAULT PREP ****										
LCS Dup (B3E1624-BSD1) Continued				Prepared: 05/15/23 Analyzed: 05/16/23						
Ethylbenzene	**0.0496**	0.020	ug/L	0.0434		114	70-130	0.439	30	
4-Ethyltoluene	**0.0530**	0.020	ug/L	0.0492		108	70-130	0.186	30	
Hexachlorobutadiene	**0.201**	0.020	ug/L	0.107		189	70-130	3.13	30	QL-04
2-Hexanone (MBK)	**0.0452**	0.020	ug/L	0.0410		110	70-130	1.09	30	
Isopropanol (IPA)	**0.0226**	0.20	ug/L	0.0246		91.8	70-130	0.543	30	
Methylene Chloride	**0.0299**	0.020	ug/L	0.0347		86.0	70-130	4.55	30	
4-Methyl-2-pentanone (MIBK)	**0.0435**	0.020	ug/L	0.0410		106	70-130	1.23	30	
Styrene	**0.0511**	0.020	ug/L	0.0426		120	70-130	0.665	30	
1,1,2,2-Tetrachloroethane	**0.0789**	0.020	ug/L	0.0687		115	70-130	1.21	30	
Tetrachloroethylene (PCE)	**0.0831**	0.010	ug/L	0.0679		122	70-130	1.48	30	
Toluene	**0.0442**	0.020	ug/L	0.0377		117	70-130	2.07	30	
1,2,4-Trichlorobenzene	**0.131**	0.020	ug/L	0.0742		176	70-130	6.75	30	QL-04
1,1,2-Trichloroethane	**0.0644**	0.020	ug/L	0.0546		118	70-130	3.01	30	
1,1,1-Trichloroethane	**0.0572**	0.020	ug/L	0.0546		105	70-130	0.00	30	
Trichloroethylene (TCE)	**0.0627**	0.020	ug/L	0.0537		117	70-130	2.08	30	
Trichlorofluoromethane (R11)	**0.0553**	0.020	ug/L	0.0562		98.5	70-130	2.01	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	**0.0743**	0.020	ug/L	0.0766		96.9	70-130	0.310	30	
1,3,5-Trimethylbenzene	**0.0604**	0.020	ug/L	0.0492		123	70-130	0.730	30	
1,2,4-Trimethylbenzene	**0.0625**	0.020	ug/L	0.0492		127	70-130	0.314	30	
Vinyl acetate	**0.0347**	0.020	ug/L	0.0352		98.5	70-130	0.203	30	
Vinyl chloride	**0.0260**	0.020	ug/L	0.0256		102	70-130	1.69	30	
o-Xylene	**0.0478**	0.020	ug/L	0.0434		110	70-130	0.364	30	
m,p-Xylenes	**0.0976**	0.020	ug/L	0.0868		112	70-130	0.535	30	
1,2,3-Trichloropropane	**0.0726**	0.020	ug/L	0.0603		120	70-130	0.497	30	
sec-Butylbenzene	**0.0707**	0.020	ug/L	0.0549		129	70-130	0.542	30	
Isopropylbenzene	**0.0604**	0.020	ug/L	0.0492		123	70-130	0.649	30	
n-Propylbenzene	**0.0604**	0.020	ug/L	0.0492		123	70-130	0.891	30	
4-Isopropyltoluene	**0.0751**	0.020	ug/L	0.0549		137	70-130	0.510	30	QL-04
Surrogate: 4-Bromofluorobenzene	*0.0350*		*ug/L*	*0.0358*		*97.8*	*70-130*			
Fixed Gases by TCD - Quality Control										

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Fixed Gases by TCD - Quality Control										
*Batch B3F0808 - *** DEFAULT PREP ****										
Blank (B3F0808-BLK1)				Prepared: 06/08/23 Analyzed: 06/09/23						
Methane	<0.10	0.10	% by Volume							
Oxygen	<0.10	0.10	% by Volume							
Carbon Dioxide	<0.10	0.10	% by Volume							
LCS (B3F0808-BS1)				Prepared: 06/08/23 Analyzed: 06/09/23						
Methane	**2.29**	0.10	% by Volume	2.25		102	70-130			
Oxygen	**1.57**	0.10	% by Volume	2.00		78.4	70-130			
Carbon Dioxide	**7.17**	0.10	% by Volume	7.50		95.6	70-130			
LCS Dup (B3F0808-BSD1)				Prepared: 06/08/23 Analyzed: 06/09/23						
Methane	**2.26**	0.10	% by Volume	2.25		101	70-130	1.18	30	
Oxygen	**1.48**	0.10	% by Volume	2.00		74.0	70-130	5.84	30	
Carbon Dioxide	**7.10**	0.10	% by Volume	7.50		94.7	70-130	0.995	30	
Duplicate (B3F0808-DUP1)				**Source: 3E11005-05** Prepared: 06/08/23 Analyzed: 06/09/23						
Methane	**<0.20**	0.20	% by Volume		<0.20				30	
Oxygen	**18.1**	0.20	% by Volume		17.8			1.84	30	
Carbon Dioxide	**<0.20**	0.20	% by Volume		0.180			3.28	30	
*Batch B3F0904 - *** DEFAULT PREP ****										
Blank (B3F0904-BLK1)				Prepared & Analyzed: 06/09/23						
Methane	<0.10	0.10	% by Volume							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187346
Date Received: 05/11/23
Date Reported: 06/15/23

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Fixed Gases by TCD - Quality Control										
*Batch B3F0904 - *** DEFAULT PREP ****										
Blank (B3F0904-BLK1) Continued				Prepared & Analyzed: 06/09/23						
Oxygen	<0.10	0.10	% by Volume							
Carbon Dioxide	<0.10	0.10	% by Volume							
LCS (B3F0904-BS1)				Prepared & Analyzed: 06/09/23						
Methane	**2.27**	0.10	% by Volume	2.25		101	70-130			
Oxygen	**1.53**	0.10	% by Volume	2.00		76.5	70-130			
Carbon Dioxide	**7.12**	0.10	% by Volume	7.50		95.0	70-130			
LCS Dup (B3F0904-BSD1)				Prepared & Analyzed: 06/09/23						
Methane	**2.40**	0.10	% by Volume	2.25		107	70-130	5.31	30	
Oxygen	**1.60**	0.10	% by Volume	2.00		79.8	70-130	4.16	30	
Carbon Dioxide	**7.55**	0.10	% by Volume	7.50		101	70-130	5.77	30	
Duplicate (B3F0904-DUP1)				**Source: 3E11005-14**	Prepared & Analyzed: 06/09/23					
Methane	**<0.20**	0.20	% by Volume		<0.20				30	
Oxygen	**21.0**	0.20	% by Volume		20.1			4.28	30	
Carbon Dioxide	**<0.20**	0.20	% by Volume		<0.20				30	

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	CH2M Hill, Inc.	**AA Project No:**	MB187346
Project No:	693142	**Date Received:**	05/11/23
Project Name:	KMEP Norwalk Biosparge Startup	**Date Reported:**	06/15/23

Special Notes

[1] = **E** : The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate.

[2] = **QL-02** : The recovery for this analyte is outside of the acceptance control limits for the LCS. The data was validated based on the acceptable recovery for this analyte in the LCSD.

[3] = **QL-04** : The recovery for this analyte in the LCS and LCSD is marginally above the upper control limit. Since the analyte was not detected in any of the associated samples, the analytical results for this analyte are valid.

[4] = **QL-07** : The recovery for this analyte in the LCS and LCSD is marginally below the lower control limit, therefore the reported concentration for this analyte may be biased low.

Allen Aminian
QA/QC Manager

American Analytics Air Toxics Chain-Of-Custody Record (1)

9765 Eton Ave., Chatsworth, CA 91311 Tel: 818-998-5547 Support@AmericanAnalytics.com

A.A. COC#: 26765

Page 1 Of 1

Client Information		Project Information		Sampler Information		TAT Codes
Client:	Jacobs	Project Name:	Kinder Morgan Norwalk	Name:	Kris B.	1 = Same Day Rush
Project Manager:		Street Address:	15306 Norwalk Blvd	Landline:		24 = 24 HR Rush
Address:		City		Cell:		48 = 48 HR Rush
		Sample Matrix Code (SMC*)	Container Code (CC*)	Email:		72 = 72 HR Rush
Landline:		AA Ambient Air	1.4L Cans: 1.4			5 = 5 Day Rush
Cell:		SG Soil Gas	6L Can: 6			X = 10 Work Days (Standard)
Email:		O Other	Tedlar Bag: T			

	Client I.D.	A.A. I.D.	Can I.D.	Sample Train/Flow Controller I.D.	Start Date	Start Time	End Date	End Time	CC*	SMC*	TO-15-SIM	TO-15	TO-3	Fixed gases	Can Vac in Hg Start	Can Vac in Hg End	Comments And Instructions
									Please Enter Codes		TAT Codes						
1	SVP-108-5	3E11005-01	1873	182	5/11/23	840	5/11/23	902	1.4	56		X	X	X	-27	-3	
2	SVP-108-10	-02	6786	256		841		913				X	X	X	-28	-3	
3	SVM-21-5	-03	1242	250		930		953				X	X	X	-27	-2	
4	SVM-21-14.5	-04	12218	262		930		950				X	X	X	-27	-2	
5	SVM-27-5	-05	1557	273		1004		1021				X	X	X	-27	-2	
6	SVM-27-10	-06	2357	249		1005		1017				X	X	X	-27	-2	
7	SVM-26-5	-07	2348	242		1032		1051				X	X	X	-28	-3	
8	SVM-26-10	-08	10615	265		1033		1047				X	X	X	-27	-2	
9	SVM-3-5	-09	10603	194		1139		1205				X	X	X	-27	-3	
10	SVM-10-15	-10	1248	233		1200		1212				X	X	X	-27	-2	
11	SVM-6-13	-11	4580	224		1225		1230				X	X	X	-28	-3	
12	SVM-6-7	-12	2361	186		1215		1234				X	X	X	-27	-2	
13	SVM-6-7 Dup	-13	2359	186		1216		1234				X	X	X	-27	-2	
14	Ambient Air	-14	2385	300		1243		1220	AA			X	X	X	-28	-2	'23 MAY 11 15:00
15																	

REVIEWED

For Laboratory Use

Date 5/12/23 Time 9:16

TAT 10 Days Sign:

Relinquished By	Date	Time	Received By
	5/11/23	1245	
Relinquished By	Date	Time	Received By
	5/11/23	1500	
Relinquished By	Date	Time	Received By

A.A. Project No.: MB187346/3E11005

☐ I, the client, scanned or photographed a copy for my records, or

A.A.: Please Scan and email a copy to Client ☐ Sampler ☐

Client: Total Number Of Cans Received: Number Of Cans Not Used:

Note: By relinquishing samples to American Analytics, Inc. (AA), the client agrees to pay for services requested on this chain of custody form and any additional client-requested analyses performed on this project. Charges will be according to AA's standard price list at the time of the analysis, or per valid quote or agreement with the client. Unless agreed otherwise, payment for services is due within 30 days from the date of invoice. Late payments are subject to 2% interest per month, or as allowed by law. (1) Unless the client has made a special arrangement, in writing, with AA's project manager, sample(s) will be held for up to 1 week following the submittal of results to the client. Longer sample storage times can be arranged for a fee. Clients will receive a list of delivered items (2 copies) when accepting cans, gauges, & other related hardware. Please return a signed copy of the list with the chain-of-custody.

AMERICAN ANALYTICS

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

November 30, 2023

Eric Davis

CH2M Hill, Inc.

P.O. Box 241329

Denver, CO 80224

Re : KMEP Norwalk Biosparge Startup / 693142

MB187347 / 3K01006

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received on 11/01/23 14:53 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 Analytics.

Sincerely,

Allen Aminian

QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
Fixed Gases					
SVM-14R-8	3K01006-01	Vapor	10	11/01/23 10:17	11/01/23 14:53
SVM-14R-16	3K01006-02	Vapor	10	11/01/23 10:19	11/01/23 14:53
SVM-14R-22	3K01006-03	Vapor	10	11/01/23 10:28	11/01/23 14:53
SVM-12-7	3K01006-04	Vapor	10	11/01/23 11:50	11/01/23 14:53
SVM-12-15	3K01006-05	Vapor	10	11/01/23 11:53	11/01/23 14:53
SVM-12-22	3K01006-06	Vapor	10	11/01/23 12:04	11/01/23 14:53
SVM-21-5	3K01006-07	Vapor	10	11/01/23 12:48	11/01/23 14:53
SVM-21-14.5	3K01006-08	Vapor	10	11/01/23 12:51	11/01/23 14:53
SVP-108-5	3K01006-09	Vapor	10	11/01/23 13:26	11/01/23 14:53
SVP-108-10	3K01006-10	Vapor	10	11/01/23 13:32	11/01/23 14:53
SVP-108-10 DUP	3K01006-11	Vapor	10	11/01/23 13:32	11/01/23 14:53
Ambient Air	3K01006-12	Vapor	10	11/01/23 13:30	11/01/23 14:53
SVM-3-5	3K01006-13	Vapor	10	11/02/23 09:40	11/01/23 14:53
SVM-3-15	3K01006-14	Vapor	10	11/02/23 09:43	11/01/23 14:53
SVM-16-7	3K01006-15	Vapor	10	11/02/23 10:14	11/01/23 14:53
SVM-16-16	3K01006-16	Vapor	10	11/02/23 10:18	11/01/23 14:53
SVM-16-22	3K01006-17	Vapor	10	11/02/23 10:16	11/01/23 14:53
SVM-10-15	3K01006-18	Vapor	10	11/02/23 10:57	11/01/23 14:53
SVM-6-7	3K01006-19	Vapor	10	11/02/23 11:48	11/01/23 14:53

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
SVM-6-13	3K01006-20	Vapor	10	11/02/23 11:57	11/01/23 14:53
SVM-6-13 DUP	3K01006-21	Vapor	10	11/02/23 11:57	11/01/23 14:53
Ambient Air	3K01006-22	Vapor	10	11/02/23 11:50	11/01/23 14:53
SVM-26-5	3K01006-23	Vapor	10	11/02/23 12:37	11/01/23 14:53
SVM-26-10	3K01006-24	Vapor	10	11/02/23 12:40	11/01/23 14:53
SVM-27-5	3K01006-25	Vapor	10	11/02/23 13:09	11/01/23 14:53
SVM-27-10	3K01006-26	Vapor	10	11/02/23 13:12	11/01/23 14:53
TO-15 (Mid Level)					
SVM-14R-8	3K01006-01	Vapor	10	11/01/23 10:17	11/01/23 14:53
SVM-14R-16	3K01006-02	Vapor	10	11/01/23 10:19	11/01/23 14:53
SVM-14R-22	3K01006-03	Vapor	10	11/01/23 10:28	11/01/23 14:53
SVM-12-7	3K01006-04	Vapor	10	11/01/23 11:50	11/01/23 14:53
SVM-12-15	3K01006-05	Vapor	10	11/01/23 11:53	11/01/23 14:53
SVM-12-22	3K01006-06	Vapor	10	11/01/23 12:04	11/01/23 14:53
SVM-21-5	3K01006-07	Vapor	10	11/01/23 12:48	11/01/23 14:53
SVM-21-14.5	3K01006-08	Vapor	10	11/01/23 12:51	11/01/23 14:53
SVP-108-5	3K01006-09	Vapor	10	11/01/23 13:26	11/01/23 14:53
SVP-108-10	3K01006-10	Vapor	10	11/01/23 13:32	11/01/23 14:53
SVP-108-10 DUP	3K01006-11	Vapor	10	11/01/23 13:32	11/01/23 14:53
Ambient Air	3K01006-12	Vapor	10	11/01/23 13:30	11/01/23 14:53

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
SVM-3-5	3K01006-13	Vapor	10	11/02/23 09:40	11/01/23 14:53
SVM-3-15	3K01006-14	Vapor	10	11/02/23 09:43	11/01/23 14:53
SVM-16-7	3K01006-15	Vapor	10	11/02/23 10:14	11/01/23 14:53
SVM-16-16	3K01006-16	Vapor	10	11/02/23 10:18	11/01/23 14:53
SVM-16-22	3K01006-17	Vapor	10	11/02/23 10:16	11/01/23 14:53
SVM-10-15	3K01006-18	Vapor	10	11/02/23 10:57	11/01/23 14:53
SVM-6-7	3K01006-19	Vapor	10	11/02/23 11:48	11/01/23 14:53
SVM-6-13	3K01006-20	Vapor	10	11/02/23 11:57	11/01/23 14:53
SVM-6-13 DUP	3K01006-21	Vapor	10	11/02/23 11:57	11/01/23 14:53
Ambient Air	3K01006-22	Vapor	10	11/02/23 11:50	11/01/23 14:53
SVM-26-5	3K01006-23	Vapor	10	11/02/23 12:37	11/01/23 14:53
SVM-26-10	3K01006-24	Vapor	10	11/02/23 12:40	11/01/23 14:53
SVM-27-5	3K01006-25	Vapor	10	11/02/23 13:09	11/01/23 14:53
SVM-27-10	3K01006-26	Vapor	10	11/02/23 13:12	11/01/23 14:53
TO-3					
SVM-14R-8	3K01006-01	Vapor	10	11/01/23 10:17	11/01/23 14:53
SVM-14R-16	3K01006-02	Vapor	10	11/01/23 10:19	11/01/23 14:53
SVM-14R-22	3K01006-03	Vapor	10	11/01/23 10:28	11/01/23 14:53
SVM-12-7	3K01006-04	Vapor	10	11/01/23 11:50	11/01/23 14:53
SVM-12-15	3K01006-05	Vapor	10	11/01/23 11:53	11/01/23 14:53

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
SVM-12-22	3K01006-06	Vapor	10	11/01/23 12:04	11/01/23 14:53
SVM-21-5	3K01006-07	Vapor	10	11/01/23 12:48	11/01/23 14:53
SVM-21-14.5	3K01006-08	Vapor	10	11/01/23 12:51	11/01/23 14:53
SVP-108-5	3K01006-09	Vapor	10	11/01/23 13:26	11/01/23 14:53
SVP-108-10	3K01006-10	Vapor	10	11/01/23 13:32	11/01/23 14:53
SVP-108-10 DUP	3K01006-11	Vapor	10	11/01/23 13:32	11/01/23 14:53
Ambient Air	3K01006-12	Vapor	10	11/01/23 13:30	11/01/23 14:53
SVM-3-5	3K01006-13	Vapor	10	11/02/23 09:40	11/01/23 14:53
SVM-3-15	3K01006-14	Vapor	10	11/02/23 09:43	11/01/23 14:53
SVM-16-7	3K01006-15	Vapor	10	11/02/23 10:14	11/01/23 14:53
SVM-16-16	3K01006-16	Vapor	10	11/02/23 10:18	11/01/23 14:53
SVM-16-22	3K01006-17	Vapor	10	11/02/23 10:16	11/01/23 14:53
SVM-10-15	3K01006-18	Vapor	10	11/02/23 10:57	11/01/23 14:53
SVM-6-7	3K01006-19	Vapor	10	11/02/23 11:48	11/01/23 14:53
SVM-6-13	3K01006-20	Vapor	10	11/02/23 11:57	11/01/23 14:53
SVM-6-13 DUP	3K01006-21	Vapor	10	11/02/23 11:57	11/01/23 14:53
Ambient Air	3K01006-22	Vapor	10	11/02/23 11:50	11/01/23 14:53
SVM-26-5	3K01006-23	Vapor	10	11/02/23 12:37	11/01/23 14:53
SVM-26-10	3K01006-24	Vapor	10	11/02/23 12:40	11/01/23 14:53
SVM-27-5	3K01006-25	Vapor	10	11/02/23 13:09	11/01/23 14:53

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
SVM-27-10	3K01006-26	Vapor	10	11/02/23 13:12	11/01/23 14:53

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
		Fixed Gases by TCD						
Oxygen	SVM-14R-8	**6.9**	0.20	% by Volume	2	11/21/23	11/21/23	ASTM D1946M
Carbon Dioxide	SVM-14R-8	**1.8**	0.20	% by Volume	2	11/21/23	11/21/23	ASTM D1946M
Oxygen	SVM-14R-16	**3.4**	0.20	% by Volume	2	11/21/23	11/21/23	ASTM D1946M
Carbon Dioxide	SVM-14R-16	**5.3**	0.20	% by Volume	2	11/21/23	11/21/23	ASTM D1946M
Oxygen	SVM-14R-22	**3.1**	0.20	% by Volume	2	11/21/23	11/21/23	ASTM D1946M
Carbon Dioxide	SVM-14R-22	**12**	0.20	% by Volume	2	11/21/23	11/21/23	ASTM D1946M
Oxygen	SVM-12-7	**14**	0.20	% by Volume	2	11/21/23	11/21/23	ASTM D1946M
Carbon Dioxide	SVM-12-7	**2.4**	0.20	% by Volume	2	11/21/23	11/21/23	ASTM D1946M
Oxygen	SVM-12-15	**3.3**	0.20	% by Volume	2	11/21/23	11/21/23	ASTM D1946M
Carbon Dioxide	SVM-12-15	**8.1**	0.20	% by Volume	2	11/21/23	11/21/23	ASTM D1946M

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
Oxygen	SVM-12-22	**3.6**	0.20	% by Volume	2	11/22/23	11/22/23	ASTM D1946M
Carbon Dioxide	SVM-12-22	**7.9**	0.20	% by Volume	2	11/22/23	11/22/23	ASTM D1946M
Oxygen	SVM-21-5	**17**	0.20	% by Volume	2	11/22/23	11/22/23	ASTM D1946M
Carbon Dioxide	SVM-21-5	**0.37**	0.20	% by Volume	2	11/22/23	11/22/23	ASTM D1946M
Oxygen	SVM-21-14.5	**17**	0.20	% by Volume	2	11/22/23	11/22/23	ASTM D1946M
Carbon Dioxide	SVM-21-14.5	**0.35**	0.20	% by Volume	2	11/22/23	11/22/23	ASTM D1946M
Oxygen	SVP-108-5	**12**	0.20	% by Volume	2	11/22/23	11/22/23	ASTM D1946M
Carbon Dioxide	SVP-108-5	**3.6**	0.20	% by Volume	2	11/22/23	11/22/23	ASTM D1946M
Oxygen	SVP-108-10	**13**	0.20	% by Volume	2	11/22/23	11/22/23	ASTM D1946M
Carbon Dioxide	SVP-108-10	**5.5**	0.20	% by Volume	2	11/22/23	11/22/23	ASTM D1946M
Oxygen	SVP-108-10 DUP	**9.0**	0.20	% by Volume	2	11/22/23	11/22/23	ASTM D1946M

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
Carbon Dioxide	SVP-108-10 DUP	**7.1**	0.20	% by Volume	2	11/22/23	11/22/23	ASTM D1946M
Oxygen	Ambient Air	**19**	0.20	% by Volume	2	11/22/23	11/22/23	ASTM D1946M
Oxygen	SVM-3-5	**18**	0.20	% by Volume	2	11/22/23	11/22/23	ASTM D1946M
Oxygen	SVM-3-15	**18**	0.20	% by Volume	2	11/22/23	11/22/23	ASTM D1946M
Oxygen	SVM-16-7	**19**	0.20	% by Volume	2	11/22/23	11/22/23	ASTM D1946M
Oxygen	SVM-16-16	**19**	0.20	% by Volume	2	11/22/23	11/22/23	ASTM D1946M
Oxygen	SVM-16-22	**18**	0.20	% by Volume	2	11/22/23	11/22/23	ASTM D1946M
Oxygen	SVM-10-15	**15**	0.20	% by Volume	2	11/22/23	11/22/23	ASTM D1946M
Oxygen	SVM-6-7	**16**	0.20	% by Volume	2	11/27/23	11/27/23	ASTM D1946M
Carbon Dioxide	SVM-6-7	**1.4**	0.20	% by Volume	2	11/27/23	11/27/23	ASTM D1946M
Oxygen	SVM-6-13	**16**	0.20	% by Volume	2	11/27/23	11/27/23	ASTM D1946M

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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
Carbon Dioxide	SVM-6-13	**1.4**	0.20	% by Volume	2	11/27/23	11/27/23	ASTM D1946M
Oxygen	SVM-6-13 DUP	**16**	0.20	% by Volume	2	11/27/23	11/27/23	ASTM D1946M
Carbon Dioxide	SVM-6-13 DUP	**1.4**	0.20	% by Volume	2	11/27/23	11/27/23	ASTM D1946M
Oxygen	Ambient Air	**20**	0.20	% by Volume	2	11/27/23	11/27/23	ASTM D1946M
Oxygen	SVM-26-5	**17**	0.20	% by Volume	2	11/27/23	11/27/23	ASTM D1946M
Carbon Dioxide	SVM-26-5	**0.54**	0.20	% by Volume	2	11/27/23	11/27/23	ASTM D1946M
Oxygen	SVM-26-10	**18**	0.20	% by Volume	2	11/27/23	11/27/23	ASTM D1946M
Carbon Dioxide	SVM-26-10	**0.62**	0.20	% by Volume	2	11/27/23	11/27/23	ASTM D1946M
Oxygen	SVM-27-5	**17**	0.20	% by Volume	2	11/27/23	11/27/23	ASTM D1946M
Carbon Dioxide	SVM-27-5	**0.28**	0.20	% by Volume	2	11/27/23	11/27/23	ASTM D1946M
Oxygen	SVM-27-10	**16**	0.20	% by Volume	2	11/27/23	11/27/23	ASTM D1946M

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LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result		MRL	Units	Dilution	Prepared	Analyzed	Method
Carbon Dioxide	SVM-27-10	**1.0**		0.20	% by Volume	2	11/27/23	11/27/23	ASTM D1946M
		VOCs by EPA TO-3							
Gasoline Range Organics (GRO)	SVM-14R-22	**810**	**a	8.0	ug/L	16	11/06/23	11/06/23	TO-3
Gasoline Range Organics (GRO)	SVM-12-7	**0.98**		0.50	ug/L	1	11/06/23	11/06/23	TO-3
Gasoline Range Organics (GRO)	SVM-12-15	**2.8**		0.50	ug/L	1	11/03/23	11/03/23	TO-3
Gasoline Range Organics (GRO)	SVM-12-22	**20**		0.50	ug/L	1	11/06/23	11/07/23	TO-3
Gasoline Range Organics (GRO)	SVP-108-10	**6.4**		0.50	ug/L	1	11/06/23	11/07/23	TO-3
Gasoline Range Organics (GRO)	SVP-108-10 DUP	**6.9**		0.50	ug/L	1	11/06/23	11/07/23	TO-3
Gasoline Range Organics (GRO)	Ambient Air	**2.4**		0.50	ug/L	1	11/03/23	11/03/23	TO-3
Gasoline Range Organics (GRO)	SVM-10-15	**3.2**		0.50	ug/L	1	11/07/23	11/09/23	TO-3
		VOCs by GCMS EPA TO-15 (Mid Level)							
Ethanol	SVM-14R-8	**0.033**		0.020	ug/L	1	11/06/23	11/06/23	TO-15
Chloroform	SVM-14R-16	**0.026**		0.0040	ug/L	1	11/06/23	11/06/23	TO-15
Ethanol	SVM-14R-16	**0.027**		0.020	ug/L	1	11/06/23	11/06/23	TO-15
Acetone	SVM-14R-22	**22**	**b	8.0	ug/L	400	11/06/23	11/06/23	TO-15
Benzene	SVM-14R-22	**0.063**		0.0030	ug/L	1	11/06/23	11/06/23	TO-15
Cyclohexane	SVM-14R-22	**11**	**b	8.0	ug/L	400	11/06/23	11/06/23	TO-15
Ethanol	SVM-14R-22	**0.047**		0.020	ug/L	1	11/06/23	11/06/23	TO-15
Heptane	SVM-14R-22	**0.89**	**c	0.20	ug/L	10	11/06/23	11/06/23	TO-15
Methylene Chloride	SVM-14R-22	**0.022**		0.020	ug/L	1	11/06/23	11/06/23	TO-15

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result		MRL	Units	Dilution	Prepared	Analyzed	Method
Naphthalene	SVM-14R-22	**0.0039**		0.0030	ug/L	1	11/06/23	11/06/23	TO-15
2,2,4-Trimethylpentane	SVM-14R-22	**26**		8.0	ug/L	400	11/06/23	11/06/23	TO-15
Ethanol	SVM-12-7	**0.046**		0.020	ug/L	1	11/03/23	11/03/23	TO-15
Naphthalene	SVM-12-7	**0.0030**		0.0030	ug/L	1	11/03/23	11/03/23	TO-15
Ethanol	SVM-12-15	**0.036**		0.020	ug/L	1	11/06/23	11/06/23	TO-15
Tetrachloroethylene (PCE)	SVM-12-15	**0.017**		0.010	ug/L	1	11/06/23	11/06/23	TO-15
Benzene	SVM-12-22	**0.011**		0.0030	ug/L	1	11/03/23	11/03/23	TO-15
Cyclohexane	SVM-12-22	**0.032**		0.020	ug/L	1	11/03/23	11/03/23	TO-15
Ethanol	SVM-12-22	**0.041**		0.020	ug/L	1	11/03/23	11/03/23	TO-15
Tetrachloroethylene (PCE)	SVM-12-22	**0.016**		0.010	ug/L	1	11/03/23	11/03/23	TO-15
2,2,4-Trimethylpentane	SVM-12-22	**0.40**		0.25	ug/L	12.5	11/03/23	11/03/23	TO-15
Ethanol	SVM-21-5	**0.060**		0.020	ug/L	1	11/06/23	11/06/23	TO-15
Tetrachloroethylene (PCE)	SVM-21-5	**0.011**		0.010	ug/L	1	11/06/23	11/06/23	TO-15
Ethanol	SVM-21-14.5	**0.031**		0.020	ug/L	1	11/06/23	11/06/23	TO-15
Tetrachloroethylene (PCE)	SVM-21-14.5	**0.015**		0.010	ug/L	1	11/06/23	11/06/23	TO-15
Ethanol	SVP-108-5	**0.033**		0.020	ug/L	1	11/06/23	11/06/23	TO-15
Ethanol	SVP-108-10	**0.044**		0.020	ug/L	1	11/06/23	11/06/23	TO-15
Propylene	SVP-108-10	**0.045**		0.020	ug/L	1	11/06/23	11/06/23	TO-15
Acetone	SVP-108-10 DUP	**0.021**		0.020	ug/L	1	11/06/23	11/06/23	TO-15
Ethanol	SVP-108-10 DUP	**0.031**		0.020	ug/L	1	11/06/23	11/06/23	TO-15
Propylene	SVP-108-10 DUP	**0.052**		0.020	ug/L	1	11/06/23	11/06/23	TO-15
Ethanol	Ambient Air	**0.024**		0.020	ug/L	1	11/06/23	11/06/23	TO-15
Bromodichloromethane	SVM-3-5	**0.15**		0.0025	ug/L	1	11/07/23	11/07/23	TO-15
Chloroform	SVM-3-5	**0.089**		0.0040	ug/L	1	11/07/23	11/07/23	TO-15
Ethanol	SVM-3-5	**0.041**		0.020	ug/L	1	11/07/23	11/07/23	TO-15
Bromodichloromethane	SVM-3-15	**0.19**		0.0025	ug/L	1	11/07/23	11/07/23	TO-15
Chloroform	SVM-3-15	**0.10**		0.0040	ug/L	1	11/07/23	11/07/23	TO-15
Ethanol	SVM-3-15	**0.059**		0.020	ug/L	1	11/07/23	11/07/23	TO-15
Ethanol	SVM-16-7	**0.046**		0.020	ug/L	1	11/07/23	11/07/23	TO-15
Ethanol	SVM-16-16	**0.049**	**	0.020	ug/L	1	11/07/23	11/07/23	TO-15
Ethanol	SVM-16-22	**0.049**		0.020	ug/L	1	11/07/23	11/07/23	TO-15

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
Ethanol	SVM-10-15	**0.058**	0.040	ug/L	2	11/07/23	11/07/23	TO-15
2,2,4-Trimethylpentane	SVM-10-15	**0.88**	0.040	ug/L	2	11/07/23	11/07/23	TO-15
Ethanol	SVM-6-7	**0.077**	0.020	ug/L	1	11/07/23	11/08/23	TO-15
Ethanol	SVM-6-13	**0.043**	0.020	ug/L	1	11/07/23	11/08/23	TO-15
Ethanol	SVM-6-13 DUP	**0.066**	0.020	ug/L	1	11/08/23	11/08/23	TO-15
Acetone	Ambient Air	**0.023**	0.020	ug/L	1	11/08/23	11/08/23	TO-15
Ethanol	Ambient Air	**0.082**	0.020	ug/L	1	11/08/23	11/08/23	TO-15
Chloroform	SVM-26-5	**0.0049**	0.0040	ug/L	1	11/08/23	11/08/23	TO-15
Ethanol	SVM-26-5	**0.055**	0.020	ug/L	1	11/08/23	11/08/23	TO-15
Ethanol	SVM-26-10	**0.043**	0.020	ug/L	1	11/08/23	11/08/23	TO-15
Acetone	SVM-27-5	**0.020**	0.020	ug/L	1	11/08/23	11/08/23	TO-15
Ethanol	SVM-27-5	**0.035**	0.020	ug/L	1	11/08/23	11/08/23	TO-15
Acetone	SVM-27-10	**0.029**	0.020	ug/L	1	11/08/23	11/08/23	TO-15
Chloroform	SVM-27-10	**0.0040**	0.0040	ug/L	1	11/08/23	11/08/23	TO-15
Ethanol	SVM-27-10	**0.062**	0.020	ug/L	1	11/08/23	11/08/23	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/01/23	11/01/23	11/01/23	11/01/23	
Date Prepared:	11/06/23	11/06/23	11/06/23	11/06/23	
Date Analyzed:	11/06/23	11/06/23	11/08/23	11/06/23	
AA ID No:	3K01006-01	3K01006-02	3K01006-03	3K01006-04	
Client ID No:	SVM-14R-8	SVM-14R-16	SVM-14R-22	SVM-12-7	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	16	1	MRL
TO-3 (TO-3)					
Gasoline Range Organics (GRO)	<0.50	<0.50	**810 [2]**	**0.98**	0.50
Surrogates					**%REC Limits**
4-Bromofluorobenzene	98%	98%	96%	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 EPA TO-3

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/01/23	11/01/23	11/01/23	11/01/23	
Date Prepared:	11/03/23	11/06/23	11/06/23	11/06/23	
Date Analyzed:	11/03/23	11/07/23	11/06/23	11/06/23	
AA ID No:	3K01006-05	3K01006-06	3K01006-07	3K01006-08	
Client ID No:	SVM-12-15	SVM-12-22	SVM-21-5	SVM-21-14.5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-3 (TO-3)					
Gasoline Range Organics (GRO)	**2.8**	**20**	<0.50	<0.50	0.50
Surrogates					**%REC Limits**
4-Bromofluorobenzene	99%	100%	100%	99%	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/01/23	11/01/23	11/01/23	11/01/23	
Date Prepared:	11/06/23	11/06/23	11/06/23	11/03/23	
Date Analyzed:	11/06/23	11/07/23	11/07/23	11/03/23	
AA ID No:	3K01006-09	3K01006-10	3K01006-11	3K01006-12	
Client ID No:	SVP-108-5	SVP-108-10	SVP-108-10 DUP	Ambient Air	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-3 (TO-3)					
Gasoline Range Organics (GRO)	<0.50	**6.4**	**6.9**	**2.4**	0.50
Surrogates					**%REC Limits**
4-Bromofluorobenzene	100%	98%	94%	99%	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/02/23	11/02/23	11/02/23	11/02/23	
Date Prepared:	11/07/23	11/07/23	11/07/23	11/07/23	
Date Analyzed:	11/07/23	11/07/23	11/07/23	11/07/23	
AA ID No:	3K01006-13	3K01006-14	3K01006-15	3K01006-16	
Client ID No:	SVM-3-5	SVM-3-15	SVM-16-7	SVM-16-16	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-3 (TO-3)					
Gasoline Range Organics (GRO)	<0.50	<0.50	<0.50	<0.50	0.50
Surrogates					**%REC Limits**
4-Bromofluorobenzene	99%	98%	98%	96%	70-130

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	CH2M Hill, Inc.	**AA Project No:**	MB187347
Project No:	693142	**Date Received:**	11/01/23
Project Name:	KMEP Norwalk Biosparge Startup	**Date Reported:**	11/30/23
Method:	VOCs by EPA TO-3	**Units:**	ug/L

Date Sampled:	11/02/2023	11/02/2023	11/02/2023	11/02/2023	
Date Prepared:	11/07/23	11/07/23	11/07/23	11/07/23	
Date Analyzed:	11/07/23	11/09/23	11/08/23	11/08/23	
AA ID No:	3K01006-17	3K01006-18	3K01006-19	3K01006-20	
Client ID No:	SVM-16-22	SVM-10-15	SVM-6-7	SVM-6-13	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-3 (TO-3)					
Gasoline Range Organics (GRO)	<0.50	**3.2**	<0.50	<0.50	0.50
Surrogates					**%REC Limits**
4-Bromofluorobenzene	99%	96%	100%	102%	70-130

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	CH2M Hill, Inc.	**AA Project No:**	MB187347
Project No:	693142	**Date Received:**	11/01/23
Project Name:	KMEP Norwalk Biosparge Startup	**Date Reported:**	11/30/23
Method:	VOCs by EPA TO-3	**Units:**	ug/L

Date Sampled:	11/02/23	11/02/23	11/02/23	11/02/23	
Date Prepared:	11/08/23	11/08/23	11/08/23	11/08/23	
Date Analyzed:	11/08/23	11/08/23	11/08/23	11/08/23	
AA ID No:	3K01006-21	3K01006-22	3K01006-23	3K01006-24	
Client ID No:	SVM-6-13 DUP	Ambient Air	SVM-26-5	SVM-26-10	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-3 (TO-3)					
Gasoline Range Organics (GRO)	<0.50	<0.50	<0.50	<0.50	0.50
Surrogates					**%REC Limits**
4-Bromofluorobenzene	97%	97%	96%	95%	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/02/23	11/02/23	
Date Prepared:	11/08/23	11/08/23	
Date Analyzed:	11/08/23	11/08/23	
AA ID No:	3K01006-25	3K01006-26	
Client ID No:	SVM-27-5	SVM-27-10	
Matrix:	Vapor	Vapor	
Dilution Factor:	1	1	MRL
TO-3 (TO-3)			
Gasoline Range Organics (GRO)	<0.50	<0.50	0.50
Surrogates			**%REC Limits**
4-Bromofluorobenzene	95%	97%	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/01/23	11/01/23	11/01/23	11/01/23	
Date Prepared:	11/06/23	11/06/23	11/06/23	11/03/23	
Date Analyzed:	11/06/23	11/06/23	11/08/23	11/06/23	
AA ID No:	3K01006-01	3K01006-02	3K01006-03	3K01006-04	
Client ID No:	SVM-14R-8	SVM-14R-16	SVM-14R-22	SVM-12-7	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-15 (Mid Level) (TO-15)					
Acetone	<0.020	<0.020	**22 [3]**	<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	<0.0030	<0.0030	**0.063**	<0.0030	0.0030
Benzyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
Bromodichloromethane	<0.0025	<0.0025	<0.0025	<0.0025	0.0025
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)	<2.0	<2.0	<2.0	<2.0	2.0
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	<0.0040	**0.026**	<0.0040	<0.0040	0.0040
Chloromethane	<0.020	<0.020	<0.020	<0.020	0.020
Cyclohexane	<0.020	<0.020	**11 [3]**	<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)	<0.0040	<0.0040	<0.0040	<0.0040	0.0040
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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/01/23	11/01/23	11/01/23	11/01/23	
Date Prepared:	11/06/23	11/06/23	11/06/23	11/03/23	
Date Analyzed:	11/06/23	11/06/23	11/08/23	11/06/23	
AA ID No:	3K01006-01	3K01006-02	3K01006-03	3K01006-04	
Client ID No:	SVM-14R-8	SVM-14R-16	SVM-14R-22	SVM-12-7	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-15 (Mid Level) (TO-15) (continued)					
1,1-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorotetrafluoroethane	<0.020	<0.020	<0.020	<0.020	0.020
Diisopropyl ether (DIPE)	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dioxane	<0.020	<0.020	<0.020	<0.020	0.020
Ethanol	**0.033**	**0.027**	**0.047**	**0.046**	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	**0.89 [4]**	<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	**0.022**	<0.020	0.020
4-Methyl-2-pentanone (MIBK)	<0.020	<0.020	<0.020	<0.020	0.020
Naphthalene	<0.0030	<0.0030	**0.0039**	**0.0030**	0.0030
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)	<0.010	<0.010	<0.010	<0.010	0.010
Tetrahydrofuran (THF)	<0.020	<0.020	<0.020	<0.020	0.020

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/01/23	11/01/23	11/01/23	11/01/23	
Date Prepared:	11/06/23	11/06/23	11/06/23	11/03/23	
Date Analyzed:	11/06/23	11/06/23	11/08/23	11/06/23	
AA ID No:	3K01006-01	3K01006-02	3K01006-03	3K01006-04	
Client ID No:	SVM-14R-8	SVM-14R-16	SVM-14R-22	SVM-12-7	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	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	**26**	<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					**%REC Limits**
4-Bromofluorobenzene	94%	94%	96%	96%	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/01/23	11/01/23	11/01/23	11/01/23	
Date Prepared:	11/06/23	11/03/23	11/06/23	11/06/23	
Date Analyzed:	11/06/23	11/06/23	11/06/23	11/06/23	
AA ID No:	3K01006-05	3K01006-06	3K01006-07	3K01006-08	
Client ID No:	SVM-12-15	SVM-12-22	SVM-21-5	SVM-21-14.5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-15 (Mid Level) (TO-15)					
Acetone	<0.020	<0.020	<0.020	<0.020	0.020
Allyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
tert-Amyl-Methyl Ether (TAME)	<0.020	<0.020	<0.020	<0.020	0.020
Benzene	<0.0030	**0.011**	<0.0030	<0.0030	0.0030
Benzyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
Bromodichloromethane	<0.0025	<0.0025	<0.0025	<0.0025	0.0025
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)	<2.0	<2.0	<2.0	<2.0	2.0
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	<0.0040	<0.0040	<0.0040	<0.0040	0.0040
Chloromethane	<0.020	<0.020	<0.020	<0.020	0.020
Cyclohexane	<0.020	**0.032**	<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)	<0.0040	<0.0040	<0.0040	<0.0040	0.0040
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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/01/23	11/01/23	11/01/23	11/01/23	
Date Prepared:	11/06/23	11/03/23	11/06/23	11/06/23	
Date Analyzed:	11/06/23	11/06/23	11/06/23	11/06/23	
AA ID No:	3K01006-05	3K01006-06	3K01006-07	3K01006-08	
Client ID No:	SVM-12-15	SVM-12-22	SVM-21-5	SVM-21-14.5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-15 (Mid Level) (TO-15) (continued)					
1,1-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorotetrafluoroethane	<0.020	<0.020	<0.020	<0.020	0.020
Diisopropyl ether (DIPE)	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dioxane	<0.020	<0.020	<0.020	<0.020	0.020
Ethanol	**0.036**	**0.041**	**0.060**	**0.031**	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	<0.0030	<0.0030	<0.0030	<0.0030	0.0030
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)	**0.017**	**0.016**	**0.011**	**0.015**	0.010
Tetrahydrofuran (THF)	<0.020	<0.020	<0.020	<0.020	0.020

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/01/23	11/01/23	11/01/23	11/01/23	
Date Prepared:	11/06/23	11/03/23	11/06/23	11/06/23	
Date Analyzed:	11/06/23	11/06/23	11/06/23	11/06/23	
AA ID No:	3K01006-05	3K01006-06	3K01006-07	3K01006-08	
Client ID No:	SVM-12-15	SVM-12-22	SVM-21-5	SVM-21-14.5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	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	**0.40**	<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					**%REC Limits**
4-Bromofluorobenzene	103%	100%	96%	95%	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/01/23	11/01/23	11/01/23	11/01/23	
Date Prepared:	11/06/23	11/06/23	11/06/23	11/06/23	
Date Analyzed:	11/06/23	11/06/23	11/06/23	11/06/23	
AA ID No:	3K01006-09	3K01006-10	3K01006-11	3K01006-12	
Client ID No:	SVP-108-5	SVP-108-10	SVP-108-10 DUP	Ambient Air	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-15 (Mid Level) (TO-15)					
Acetone	<0.020	<0.020	**0.021**	<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	<0.0030	<0.0030	<0.0030	<0.0030	0.0030
Benzyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
Bromodichloromethane	<0.0025	<0.0025	<0.0025	<0.0025	0.0025
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)	<2.0	<2.0	<2.0	<2.0	2.0
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	<0.0040	<0.0040	<0.0040	<0.0040	0.0040
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)	<0.0040	<0.0040	<0.0040	<0.0040	0.0040
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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/01/23	11/01/23	11/01/23	11/01/23	
Date Prepared:	11/06/23	11/06/23	11/06/23	11/06/23	
Date Analyzed:	11/06/23	11/06/23	11/06/23	11/06/23	
AA ID No:	3K01006-09	3K01006-10	3K01006-11	3K01006-12	
Client ID No:	SVP-108-5	SVP-108-10	SVP-108-10 DUP	Ambient Air	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-15 (Mid Level) (TO-15) (continued)					
1,1-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorotetrafluoroethane	<0.020	<0.020	<0.020	<0.020	0.020
Diisopropyl ether (DIPE)	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dioxane	<0.020	<0.020	<0.020	<0.020	0.020
Ethanol	**0.033**	**0.044**	**0.031**	**0.024**	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	<0.0030	<0.0030	<0.0030	<0.0030	0.0030
Propylene	<0.020	**0.045**	**0.052**	<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)	<0.010	<0.010	<0.010	<0.010	0.010
Tetrahydrofuran (THF)	<0.020	<0.020	<0.020	<0.020	0.020

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/01/23	11/01/23	11/01/23	11/01/23	
Date Prepared:	11/06/23	11/06/23	11/06/23	11/06/23	
Date Analyzed:	11/06/23	11/06/23	11/06/23	11/06/23	
AA ID No:	3K01006-09	3K01006-10	3K01006-11	3K01006-12	
Client ID No:	SVP-108-5	SVP-108-10	SVP-108-10 DUP	Ambient Air	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	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					**%REC Limits**
4-Bromofluorobenzene	96%	79%	87%	100%	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/02/23	11/02/23	11/02/23	11/02/23	
Date Prepared:	11/07/23	11/07/23	11/07/23	11/07/23	
Date Analyzed:	11/07/23	11/07/23	11/07/23	11/07/23	
AA ID No:	3K01006-13	3K01006-14	3K01006-15	3K01006-16	
Client ID No:	SVM-3-5	SVM-3-15	SVM-16-7	SVM-16-16	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-15 (Mid Level) (TO-15)					
Acetone	<0.020	<0.020	<0.020	<0.020	0.020
Allyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
tert-Amyl-Methyl Ether (TAME)	<0.020	<0.020	<0.020	<0.020	0.020
Benzene	<0.0030	<0.0030	<0.0030	<0.0030	0.0030
Benzyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
Bromodichloromethane	**0.15**	**0.19**	<0.0025	<0.0025	0.0025
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)	<2.0	<2.0	<2.0	<2.0	2.0
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	**0.089**	**0.10**	<0.0040	<0.0040	0.0040
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)	<0.0040	<0.0040	<0.0040	<0.0040	0.0040
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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/02/23	11/02/23	11/02/23	11/02/23	
Date Prepared:	11/07/23	11/07/23	11/07/23	11/07/23	
Date Analyzed:	11/07/23	11/07/23	11/07/23	11/07/23	
AA ID No:	3K01006-13	3K01006-14	3K01006-15	3K01006-16	
Client ID No:	SVM-3-5	SVM-3-15	SVM-16-7	SVM-16-16	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-15 (Mid Level) (TO-15) (continued)					
1,1-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorotetrafluoroethane	<0.020	<0.020	<0.020	<0.020	0.020
Diisopropyl ether (DIPE)	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dioxane	<0.020	<0.020	<0.020	<0.020	0.020
Ethanol	**0.041**	**0.059**	**0.046**	**0.049 [1]**	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	<0.0030	<0.0030	<0.0030	<0.0030	0.0030
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)	<0.010	<0.010	<0.010	<0.010	0.010
Tetrahydrofuran (THF)	<0.020	<0.020	<0.020	<0.020	0.020

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/02/23	11/02/23	11/02/23	11/02/23	
Date Prepared:	11/07/23	11/07/23	11/07/23	11/07/23	
Date Analyzed:	11/07/23	11/07/23	11/07/23	11/07/23	
AA ID No:	3K01006-13	3K01006-14	3K01006-15	3K01006-16	
Client ID No:	SVM-3-5	SVM-3-15	SVM-16-7	SVM-16-16	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	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					**%REC Limits**
4-Bromofluorobenzene	95%	95%	94%	93%	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/02/2023	11/02/2023	11/02/2023	11/02/2023	
Date Prepared:	11/07/23	11/07/23	11/07/23	11/07/23	
Date Analyzed:	11/07/23	11/09/23	11/08/23	11/08/23	
AA ID No:	3K01006-17	3K01006-18	3K01006-19	3K01006-20	
Client ID No:	SVM-16-22	SVM-10-15	SVM-6-7	SVM-6-13	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-15 (Mid Level) (TO-15)					
Acetone	<0.020	<0.020	<0.020	<0.020	0.020
Allyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
tert-Amyl-Methyl Ether (TAME)	<0.020	<0.020	<0.020	<0.020	0.020
Benzene	<0.0030	<0.0030	<0.0030	<0.0030	0.0030
Benzyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
Bromodichloromethane	<0.0025	<0.0025	<0.0025	<0.0025	0.0025
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)	<2.0	<2.0	<2.0	<2.0	2.0
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	<0.0040	<0.0040	<0.0040	<0.0040	0.0040
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)	<0.0040	<0.0040	<0.0040	<0.0040	0.0040
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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/02/2023	11/02/2023	11/02/2023	11/02/2023	
Date Prepared:	11/07/23	11/07/23	11/07/23	11/07/23	
Date Analyzed:	11/07/23	11/09/23	11/08/23	11/08/23	
AA ID No:	3K01006-17	3K01006-18	3K01006-19	3K01006-20	
Client ID No:	SVM-16-22	SVM-10-15	SVM-6-7	SVM-6-13	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-15 (Mid Level) (TO-15) (continued)					
1,1-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorotetrafluoroethane	<0.020	<0.020	<0.020	<0.020	0.020
Diisopropyl ether (DIPE)	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dioxane	<0.020	<0.020	<0.020	<0.020	0.020
Ethanol	**0.049**	**0.058**	**0.077**	**0.043**	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	<0.0030	<0.0030	<0.0030	<0.0030	0.0030
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)	<0.010	<0.010	<0.010	<0.010	0.010
Tetrahydrofuran (THF)	<0.020	<0.020	<0.020	<0.020	0.020

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/02/2023	11/02/2023	11/02/2023	11/02/2023	
Date Prepared:	11/07/23	11/07/23	11/07/23	11/07/23	
Date Analyzed:	11/07/23	11/09/23	11/08/23	11/08/23	
AA ID No:	3K01006-17	3K01006-18	3K01006-19	3K01006-20	
Client ID No:	SVM-16-22	SVM-10-15	SVM-6-7	SVM-6-13	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	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	**0.88**	<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					**%REC Limits**
4-Bromofluorobenzene	95%	97%	97%	97%	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/02/23	11/02/23	11/02/23	11/02/23	
Date Prepared:	11/08/23	11/08/23	11/08/23	11/08/23	
Date Analyzed:	11/08/23	11/08/23	11/08/23	11/08/23	
AA ID No:	3K01006-21	3K01006-22	3K01006-23	3K01006-24	
Client ID No:	SVM-6-13 DUP	Ambient Air	SVM-26-5	SVM-26-10	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-15 (Mid Level) (TO-15)					
Acetone	<0.020	**0.023**	<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	<0.0030	<0.0030	<0.0030	<0.0030	0.0030
Benzyl chloride	<0.020	<0.020	<0.020	<0.020	0.020
Bromodichloromethane	<0.0025	<0.0025	<0.0025	<0.0025	0.0025
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)	<2.0	<2.0	<2.0	<2.0	2.0
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	<0.0040	<0.0040	**0.0049**	<0.0040	0.0040
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)	<0.0040	<0.0040	<0.0040	<0.0040	0.0040
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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/02/23	11/02/23	11/02/23	11/02/23	
Date Prepared:	11/08/23	11/08/23	11/08/23	11/08/23	
Date Analyzed:	11/08/23	11/08/23	11/08/23	11/08/23	
AA ID No:	3K01006-21	3K01006-22	3K01006-23	3K01006-24	
Client ID No:	SVM-6-13 DUP	Ambient Air	SVM-26-5	SVM-26-10	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-15 (Mid Level) (TO-15) (continued)					
1,1-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,2-Dichloroethylene	<0.020	<0.020	<0.020	<0.020	0.020
1,2-Dichloropropane	<0.020	<0.020	<0.020	<0.020	0.020
trans-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
cis-1,3-Dichloropropylene	<0.020	<0.020	<0.020	<0.020	0.020
Dichlorotetrafluoroethane	<0.020	<0.020	<0.020	<0.020	0.020
Diisopropyl ether (DIPE)	<0.020	<0.020	<0.020	<0.020	0.020
1,4-Dioxane	<0.020	<0.020	<0.020	<0.020	0.020
Ethanol	**0.066**	**0.082**	**0.055**	**0.043**	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	<0.0030	<0.0030	<0.0030	<0.0030	0.0030
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)	<0.010	<0.010	<0.010	<0.010	0.010
Tetrahydrofuran (THF)	<0.020	<0.020	<0.020	<0.020	0.020

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/02/23	11/02/23	11/02/23	11/02/23	
Date Prepared:	11/08/23	11/08/23	11/08/23	11/08/23	
Date Analyzed:	11/08/23	11/08/23	11/08/23	11/08/23	
AA ID No:	3K01006-21	3K01006-22	3K01006-23	3K01006-24	
Client ID No:	SVM-6-13 DUP	Ambient Air	SVM-26-5	SVM-26-10	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	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					**%REC Limits**
4-Bromofluorobenzene	94%	93%	94%	91%	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/02/23	11/02/23	
Date Prepared:	11/08/23	11/08/23	
Date Analyzed:	11/08/23	11/08/23	
AA ID No:	3K01006-25	3K01006-26	
Client ID No:	SVM-27-5	SVM-27-10	
Matrix:	Vapor	Vapor	
Dilution Factor:	1	1	MRL
TO-15 (Mid Level) (TO-15)			
Acetone	**0.020**	**0.029**	0.020
Allyl chloride	<0.020	<0.020	0.020
tert-Amyl-Methyl Ether (TAME)	<0.020	<0.020	0.020
Benzene	<0.0030	<0.0030	0.0030
Benzyl chloride	<0.020	<0.020	0.020
Bromodichloromethane	<0.0025	<0.0025	0.0025
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)	<2.0	<2.0	2.0
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	<0.0040	**0.0040**	0.0040
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)	<0.0040	<0.0040	0.0040
cis-1,2-Dichloroethylene	<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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/02/23	11/02/23	
Date Prepared:	11/08/23	11/08/23	
Date Analyzed:	11/08/23	11/08/23	
AA ID No:	3K01006-25	3K01006-26	
Client ID No:	SVM-27-5	SVM-27-10	
Matrix:	Vapor	Vapor	
Dilution Factor:	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	**0.035**	**0.062**	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	<0.0030	<0.0030	0.0030
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)	<0.010	<0.010	0.010
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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: ug/L

Date Sampled:	11/02/23	11/02/23	
Date Prepared:	11/08/23	11/08/23	
Date Analyzed:	11/08/23	11/08/23	
AA ID No:	3K01006-25	3K01006-26	
Client ID No:	SVM-27-5	SVM-27-10	
Matrix:	Vapor	Vapor	
Dilution Factor:	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
Surrogates			**%REC Limits**
4-Bromofluorobenzene	91%	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: Fixed Gases by TCD

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: % by Volume

Date Sampled:	11/01/23	11/01/23	11/01/23	11/01/23	
Date Prepared:	11/21/23	11/21/23	11/21/23	11/21/23	
Date Analyzed:	11/21/23	11/21/23	11/21/23	11/21/23	
AA ID No:	3K01006-01	3K01006-02	3K01006-03	3K01006-04	
Client ID No:	SVM-14R-8	SVM-14R-16	SVM-14R-22	SVM-12-7	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	2	2	2	2	MRL
Fixed Gases (ASTM D1946M)					
Methane	<0.20	<0.20	<0.20	<0.20	0.10
Oxygen	**6.9**	**3.4**	**3.1**	**14**	0.10
Carbon Dioxide	**1.8**	**5.3**	**12**	**2.4**	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: % by Volume

Date Sampled:	11/01/23	11/01/23	11/01/23	11/01/23	
Date Prepared:	11/21/23	11/22/23	11/22/23	11/22/23	
Date Analyzed:	11/21/23	11/22/23	11/22/23	11/22/23	
AA ID No:	3K01006-05	3K01006-06	3K01006-07	3K01006-08	
Client ID No:	SVM-12-15	SVM-12-22	SVM-21-5	SVM-21-14.5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	2	2	2	2	MRL
Fixed Gases (ASTM D1946M)					
Methane	<0.20	<0.20	<0.20	<0.20	0.10
Oxygen	**3.3**	**3.6**	**17**	**17**	0.10
Carbon Dioxide	**8.1**	**7.9**	**0.37**	**0.35**	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: % by Volume

Date Sampled:	11/01/23	11/01/23	11/01/23	11/01/23	
Date Prepared:	11/22/23	11/22/23	11/22/23	11/22/23	
Date Analyzed:	11/22/23	11/22/23	11/22/23	11/22/23	
AA ID No:	3K01006-09	3K01006-10	3K01006-11	3K01006-12	
Client ID No:	SVP-108-5	SVP-108-10	SVP-108-10 DUP	Ambient Air	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	2	2	2	2	MRL
Fixed Gases (ASTM D1946M)					
Methane	<0.20	<0.20	<0.20	<0.20	0.10
Oxygen	**12**	**13**	**9.0**	**19**	0.10
Carbon Dioxide	**3.6**	**5.5**	**7.1**	<0.20	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: % by Volume

Date Sampled:	11/02/23	11/02/23	11/02/23	11/02/23	
Date Prepared:	11/22/23	11/22/23	11/22/23	11/22/23	
Date Analyzed:	11/22/23	11/22/23	11/22/23	11/22/23	
AA ID No:	3K01006-13	3K01006-14	3K01006-15	3K01006-16	
Client ID No:	SVM-3-5	SVM-3-15	SVM-16-7	SVM-16-16	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	2	2	2	2	MRL
Fixed Gases (ASTM D1946M)					
Methane	<0.20	<0.20	<0.20	<0.20	0.10
Oxygen	**18**	**18**	**19**	**19**	0.10
Carbon Dioxide	<0.20	<0.20	<0.20	<0.20	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: % by Volume

Date Sampled:	11/02/2023	11/02/2023	11/02/2023	11/02/2023	
Date Prepared:	11/22/23	11/22/23	11/27/23	11/27/23	
Date Analyzed:	11/22/23	11/22/23	11/27/23	11/27/23	
AA ID No:	3K01006-17	3K01006-18	3K01006-19	3K01006-20	
Client ID No:	SVM-16-22	SVM-10-15	SVM-6-7	SVM-6-13	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	2	2	2	2	MRL
Fixed Gases (ASTM D1946M)					
Methane	<0.20	<0.20	<0.20	<0.20	0.10
Oxygen	**18**	**15**	**16**	**16**	0.10
Carbon Dioxide	<0.20	<0.20	**1.4**	**1.4**	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: % by Volume

Date Sampled:	11/02/23	11/02/23	11/02/23	11/02/23	
Date Prepared:	11/27/23	11/27/23	11/27/23	11/27/23	
Date Analyzed:	11/27/23	11/27/23	11/27/23	11/27/23	
AA ID No:	3K01006-21	3K01006-22	3K01006-23	3K01006-24	
Client ID No:	SVM-6-13 DUP	Ambient Air	SVM-26-5	SVM-26-10	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	2	2	2	2	MRL
Fixed Gases (ASTM D1946M)					
Methane	<0.20	<0.20	<0.20	<0.20	0.10
Oxygen	**16**	**20**	**17**	**18**	0.10
Carbon Dioxide	**1.4**	<0.20	**0.54**	**0.62**	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23
Units: % by Volume

Date Sampled:	11/02/23	11/02/23	
Date Prepared:	11/27/23	11/27/23	
Date Analyzed:	11/27/23	11/27/23	
AA ID No:	3K01006-25	3K01006-26	
Client ID No:	SVM-27-5	SVM-27-10	
Matrix:	Vapor	Vapor	
Dilution Factor:	2	2	MRL
Fixed Gases (ASTM D1946M)			
Methane	<0.20	<0.20	0.10
Oxygen	**17**	**16**	0.10
Carbon Dioxide	**0.28**	**1.0**	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by EPA TO-3 - Quality Control										
*Batch B3K1616 - *** DEFAULT PREP ****										
Blank (B3K1616-BLK1)				Prepared & Analyzed: 11/06/23						
Gasoline Range Organics (GRO)	<0.50	0.50	ug/L							
Surrogate: 4-Bromofluorobenzene	*0.0345*		*ug/L*	*0.0358*		*96.4*	*70-130*			
LCS (B3K1616-BS1)				Prepared & Analyzed: 11/06/23						
Gasoline Range Organics (GRO)	**0.837**	0.50	ug/L	0.802		104	70-130			
Surrogate: 4-Bromofluorobenzene	*0.0353*		*ug/L*	*0.0358*		*98.6*	*70-130*			
LCS Dup (B3K1616-BSD1)				Prepared & Analyzed: 11/06/23						
Gasoline Range Organics (GRO)	**0.857**	0.50	ug/L	0.802		107	70-130	2.39	30	
Surrogate: 4-Bromofluorobenzene	*0.0350*		*ug/L*	*0.0358*		*97.8*	*70-130*			
*Batch B3K1617 - *** DEFAULT PREP ****										
Blank (B3K1617-BLK1)				Prepared & Analyzed: 11/07/23						
Gasoline Range Organics (GRO)	<0.50	0.50	ug/L							
Surrogate: 4-Bromofluorobenzene	*0.0364*		*ug/L*	*0.0358*		*102*	*70-130*			
LCS (B3K1617-BS1)				Prepared: 11/07/23 Analyzed: 11/08/23						
Gasoline Range Organics (GRO)	**0.695**	0.50	ug/L	0.802		86.7	70-130			
Surrogate: 4-Bromofluorobenzene	*0.0341*		*ug/L*	*0.0358*		*95.4*	*70-130*			
LCS Dup (B3K1617-BSD1)				Prepared: 11/07/23 Analyzed: 11/08/23						
Gasoline Range Organics (GRO)	**0.714**	0.50	ug/L	0.802		89.1	70-130	2.73	30	
Surrogate: 4-Bromofluorobenzene	*0.0343*		*ug/L*	*0.0358*		*95.8*	*70-130*			
*Batch B3K1618 - *** DEFAULT PREP ****										
Blank (B3K1618-BLK1)				Prepared & Analyzed: 11/08/23						
Gasoline Range Organics (GRO)	<0.50	0.50	ug/L							
Surrogate: 4-Bromofluorobenzene	*0.0333*		*ug/L*	*0.0358*		*93.0*	*70-130*			
LCS (B3K1618-BS1)				Prepared: 11/08/23 Analyzed: 11/09/23						
Gasoline Range Organics (GRO)	**0.718**	0.50	ug/L	0.802		89.5	70-130			
Surrogate: 4-Bromofluorobenzene	*0.0336*		*ug/L*	*0.0358*		*93.8*	*70-130*			
LCS Dup (B3K1618-BSD1)				Prepared: 11/08/23 Analyzed: 11/09/23						
Gasoline Range Organics (GRO)	**0.751**	0.50	ug/L	0.802		93.7	70-130	4.56	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by EPA TO-3 - Quality Control										
*Batch B3K1618 - *** DEFAULT PREP ****										
LCS Dup (B3K1618-BSD1) Continued				Prepared: 11/08/23 Analyzed: 11/09/23						
Surrogate: 4-Bromofluorobenzene	*0.0339*		*ug/L*	*0.0358*		*94.8*	*70-130*			
VOCs by GCMS EPA TO-15 (Mid Level) - Quality Control										
*Batch B3K1608 - *** DEFAULT PREP ****										
Blank (B3K1608-BLK1)				Prepared & Analyzed: 11/06/23						
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	<0.0030	0.0030	ug/L							
Benzyl chloride	<0.020	0.020	ug/L							
Bromodichloromethane	<0.0025	0.0025	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)	<2.0	2.0	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	<0.0040	0.0040	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)	<0.0040	0.0040	ug/L							
cis-1,2-Dichloroethylene	<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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

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 B3K1608 - *** DEFAULT PREP ****										
Blank (B3K1608-BLK1) Continued				Prepared & Analyzed: 11/06/23						
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	<0.0030	0.0030	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)	<0.010	0.010	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							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

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 B3K1608 - *** DEFAULT PREP ****										
Blank (B3K1608-BLK1) Continued				Prepared & Analyzed: 11/06/23						
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	*0.134*		*ug/L*	*0.143*		*93.4*	*70-130*			
LCS (B3K1608-BS1)				Prepared & Analyzed: 11/06/23						
Acetone	**0.0989**	0.020	ug/L	0.0950		104	70-130			
Benzene	**0.129**	0.0030	ug/L	0.128		101	70-130			
Benzyl chloride	**0.160**	0.020	ug/L	0.207		77.1	70-130			
Bromodichloromethane	**0.236**	0.0025	ug/L	0.268		88.1	70-130			
Bromoform	**0.328**	0.020	ug/L	0.413		79.2	70-130			
Bromomethane	**0.156**	0.020	ug/L	0.155		101	70-130			
2-Butanone (MEK)	**0.113**	0.020	ug/L	0.118		95.5	70-130			
Carbon Disulfide	**0.127**	0.020	ug/L	0.125		102	70-130			
Carbon Tetrachloride	**0.207**	0.020	ug/L	0.252		82.4	70-130			
Chlorobenzene	**0.172**	0.020	ug/L	0.184		93.5	70-130			
Chloroethane	**0.107**	0.020	ug/L	0.106		102	70-130			
Chloroform	**0.178**	0.0040	ug/L	0.195		91.4	70-130			

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

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 B3K1608 - *** DEFAULT PREP ****										
LCS (B3K1608-BS1) Continued				Prepared & Analyzed: 11/06/23						
Chloromethane	**0.0998**	0.020	ug/L	0.0826		121	70-130			
Dibromochloromethane	**0.307**	0.020	ug/L	0.341		90.0	70-130			
1,2-Dibromoethane (EDB)	**0.296**	0.020	ug/L	0.307		96.3	70-130			
1,2-Dichlorobenzene	**0.237**	0.020	ug/L	0.240		98.4	70-130			
1,3-Dichlorobenzene	**0.224**	0.020	ug/L	0.240		93.1	70-130			
1,4-Dichlorobenzene	**0.230**	0.020	ug/L	0.240		95.7	70-130			
Dichlorodifluoromethane (R12)	**0.145**	0.020	ug/L	0.198		73.3	70-130			
1,1-Dichloroethane	**0.161**	0.020	ug/L	0.162		99.6	70-130			
1,2-Dichloroethane (EDC)	**0.144**	0.0040	ug/L	0.162		88.7	70-130			
cis-1,2-Dichloroethylene	**0.159**	0.020	ug/L	0.159		100	70-130			
1,1-Dichloroethylene	**0.158**	0.020	ug/L	0.159		99.4	70-130			
trans-1,2-Dichloroethylene	**0.139**	0.020	ug/L	0.159		87.9	70-130			
1,2-Dichloropropane	**0.185**	0.020	ug/L	0.185		100	70-130			
trans-1,3-Dichloropropylene	**0.187**	0.020	ug/L	0.182		103	70-130			
cis-1,3-Dichloropropylene	**0.187**	0.020	ug/L	0.182		103	70-130			
Dichlorotetrafluoroethane	**0.135**	0.020	ug/L	0.280		48.3	70-130			QL-07
Ethylbenzene	**0.162**	0.020	ug/L	0.174		93.1	70-130			
4-Ethyltoluene	**0.166**	0.020	ug/L	0.197		84.5	70-130			
Hexachlorobutadiene	**0.376**	0.020	ug/L	0.427		88.1	70-130			
2-Hexanone (MBK)	**0.152**	0.020	ug/L	0.164		92.5	70-130			
Isopropanol (IPA)	**0.101**	0.20	ug/L	0.0983		102	70-130			
Methylene Chloride	**0.131**	0.020	ug/L	0.139		94.1	70-130			
4-Methyl-2-pentanone (MIBK)	**0.150**	0.020	ug/L	0.164		91.6	70-130			
Styrene	**0.167**	0.020	ug/L	0.170		97.8	70-130			
1,1,2,2-Tetrachloroethane	**0.251**	0.020	ug/L	0.275		91.4	70-130			
Tetrachloroethylene (PCE)	**0.262**	0.010	ug/L	0.271		96.7	70-130			
Toluene	**0.152**	0.020	ug/L	0.151		101	70-130			
1,2,4-Trichlorobenzene	**0.241**	0.020	ug/L	0.297		81.2	70-130			
1,1,2-Trichloroethane	**0.205**	0.020	ug/L	0.218		93.7	70-130			
1,1,1-Trichloroethane	**0.184**	0.020	ug/L	0.218		84.2	70-130			
Trichloroethylene (TCE)	**0.205**	0.020	ug/L	0.215		95.6	70-130			
Trichlorofluoromethane (R11)	**0.215**	0.020	ug/L	0.225		95.6	70-130			

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

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 B3K1608 - *** DEFAULT PREP ****										
LCS (B3K1608-BS1) Continued				Prepared & Analyzed: 11/06/23						
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	**0.309**	0.020	ug/L	0.307		101	70-130			
1,3,5-Trimethylbenzene	**0.178**	0.020	ug/L	0.197		90.3	70-130			
1,2,4-Trimethylbenzene	**0.189**	0.020	ug/L	0.197		95.9	70-130			
Vinyl acetate	**0.125**	0.020	ug/L	0.141		89.0	70-130			
Vinyl chloride	**0.104**	0.020	ug/L	0.102		102	70-130			
o-Xylene	**0.153**	0.020	ug/L	0.174		88.0	70-130			
m,p-Xylenes	**0.306**	0.020	ug/L	0.347		88.2	70-130			
1,2,3-Trichloropropane	**0.197**	0.020	ug/L	0.241		81.8	70-130			
sec-Butylbenzene	**0.178**	0.020	ug/L	0.220		80.9	70-130			
Isopropylbenzene	**0.165**	0.020	ug/L	0.197		84.0	70-130			
n-Propylbenzene	**0.164**	0.020	ug/L	0.197		83.5	70-130			
4-Isopropyltoluene	**0.184**	0.020	ug/L	0.220		83.7	70-130			
Surrogate: 4-Bromofluorobenzene	*0.137*		*ug/L*	*0.143*		*95.5*	*70-130*			
LCS Dup (B3K1608-BSD1)				Prepared & Analyzed: 11/06/23						
Acetone	**0.0946**	0.020	ug/L	0.0950		99.6	70-130	4.42	30	
Benzene	**0.127**	0.0030	ug/L	0.128		99.7	70-130	1.10	30	
Benzyl chloride	**0.160**	0.020	ug/L	0.207		77.3	70-130	0.259	30	
Bromodichloromethane	**0.236**	0.0025	ug/L	0.268		88.0	70-130	0.114	30	
Bromoform	**0.335**	0.020	ug/L	0.413		81.0	70-130	2.25	30	
Bromomethane	**0.151**	0.020	ug/L	0.155		97.2	70-130	3.44	30	
2-Butanone (MEK)	**0.109**	0.020	ug/L	0.118		92.2	70-130	3.52	30	
Carbon Disulfide	**0.125**	0.020	ug/L	0.125		101	70-130	1.60	30	
Carbon Tetrachloride	**0.204**	0.020	ug/L	0.252		81.2	70-130	1.47	30	
Chlorobenzene	**0.176**	0.020	ug/L	0.184		95.5	70-130	2.12	30	
Chloroethane	**0.100**	0.020	ug/L	0.106		95.1	70-130	6.61	30	
Chloroform	**0.177**	0.0040	ug/L	0.195		90.7	70-130	0.686	30	
Chloromethane	**0.0798**	0.020	ug/L	0.0826		96.6	70-130	22.3	30	
Dibromochloromethane	**0.312**	0.020	ug/L	0.341		91.7	70-130	1.87	30	
1,2-Dibromoethane (EDB)	**0.299**	0.020	ug/L	0.307		97.4	70-130	1.16	30	
1,2-Dichlorobenzene	**0.240**	0.020	ug/L	0.240		99.8	70-130	1.34	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

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 B3K1608 - *** DEFAULT PREP ****										
LCS Dup (B3K1608-BSD1) Continued				Prepared & Analyzed: 11/06/23						
1,3-Dichlorobenzene	**0.228**	0.020	ug/L	0.240		94.7	70-130	1.76	30	
1,4-Dichlorobenzene	**0.232**	0.020	ug/L	0.240		96.5	70-130	0.832	30	
Dichlorodifluoromethane (R12)	**0.142**	0.020	ug/L	0.198		71.9	70-130	2.00	30	
1,1-Dichloroethane	**0.159**	0.020	ug/L	0.162		98.1	70-130	1.52	30	
1,2-Dichloroethane (EDC)	**0.141**	0.0040	ug/L	0.162		87.3	70-130	1.70	30	
cis-1,2-Dichloroethylene	**0.155**	0.020	ug/L	0.159		97.5	70-130	2.73	30	
1,1-Dichloroethylene	**0.153**	0.020	ug/L	0.159		96.6	70-130	2.81	30	
trans-1,2-Dichloroethylene	**0.133**	0.020	ug/L	0.159		83.9	70-130	4.63	30	
1,2-Dichloropropane	**0.183**	0.020	ug/L	0.185		99.2	70-130	0.978	30	
trans-1,3-Dichloropropylene	**0.189**	0.020	ug/L	0.182		104	70-130	1.43	30	
cis-1,3-Dichloropropylene	**0.185**	0.020	ug/L	0.182		102	70-130	0.731	30	
Dichlorotetrafluoroethane	**0.130**	0.020	ug/L	0.280		46.5	70-130	3.64	30	QL-07
Ethylbenzene	**0.162**	0.020	ug/L	0.174		93.4	70-130	0.349	30	
4-Ethyltoluene	**0.167**	0.020	ug/L	0.197		85.0	70-130	0.619	30	
Hexachlorobutadiene	**0.394**	0.020	ug/L	0.427		92.3	70-130	4.69	30	
2-Hexanone (MBK)	**0.154**	0.020	ug/L	0.164		94.2	70-130	1.82	30	
Isopropanol (IPA)	**0.0956**	0.20	ug/L	0.0983		97.2	70-130	5.21	30	
Methylene Chloride	**0.128**	0.020	ug/L	0.139		92.1	70-130	2.07	30	
4-Methyl-2-pentanone (MIBK)	**0.149**	0.020	ug/L	0.164		90.7	70-130	1.01	30	
Styrene	**0.166**	0.020	ug/L	0.170		97.6	70-130	0.179	30	
1,1,2,2-Tetrachloroethane	**0.256**	0.020	ug/L	0.275		93.1	70-130	1.73	30	
Tetrachloroethylene (PCE)	**0.271**	0.010	ug/L	0.271		99.8	70-130	3.18	30	
Toluene	**0.153**	0.020	ug/L	0.151		102	70-130	0.543	30	
1,2,4-Trichlorobenzene	**0.256**	0.020	ug/L	0.297		86.2	70-130	5.88	30	
1,1,2-Trichloroethane	**0.207**	0.020	ug/L	0.218		94.8	70-130	1.11	30	
1,1,1-Trichloroethane	**0.183**	0.020	ug/L	0.218		83.6	70-130	0.745	30	
Trichloroethylene (TCE)	**0.207**	0.020	ug/L	0.215		96.1	70-130	0.600	30	
Trichlorofluoromethane (R11)	**0.213**	0.020	ug/L	0.225		94.6	70-130	1.05	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	**0.302**	0.020	ug/L	0.307		98.5	70-130	2.43	30	
1,3,5-Trimethylbenzene	**0.187**	0.020	ug/L	0.197		95.4	70-130	5.41	30	
1,2,4-Trimethylbenzene	**0.191**	0.020	ug/L	0.197		97.2	70-130	1.32	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

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 B3K1608 - *** DEFAULT PREP ****										
LCS Dup (B3K1608-BSD1) Continued				Prepared & Analyzed: 11/06/23						
Vinyl acetate	**0.121**	0.020	ug/L	0.141		85.9	70-130	3.55	30	
Vinyl chloride	**0.0981**	0.020	ug/L	0.102		95.9	70-130	6.36	30	
o-Xylene	**0.154**	0.020	ug/L	0.174		88.9	70-130	1.05	30	
m,p-Xylenes	**0.310**	0.020	ug/L	0.347		89.2	70-130	1.09	30	
1,2,3-Trichloropropane	**0.199**	0.020	ug/L	0.241		82.6	70-130	1.03	30	
sec-Butylbenzene	**0.180**	0.020	ug/L	0.220		82.2	70-130	1.53	30	
Isopropylbenzene	**0.167**	0.020	ug/L	0.197		84.7	70-130	0.919	30	
n-Propylbenzene	**0.166**	0.020	ug/L	0.197		84.5	70-130	1.13	30	
4-Isopropyltoluene	**0.185**	0.020	ug/L	0.220		84.4	70-130	0.744	30	
Surrogate: 4-Bromofluorobenzene	*0.138*		*ug/L*	*0.143*		*96.1*	*70-130*			
*Batch B3K1609 - *** DEFAULT PREP ****										
Blank (B3K1609-BLK1)				Prepared & Analyzed: 11/07/23						
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	<0.0030	0.0030	ug/L							
Benzyl chloride	<0.020	0.020	ug/L							
Bromodichloromethane	<0.0025	0.0025	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)	<2.0	2.0	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	<0.0040	0.0040	ug/L							
Chloromethane	<0.020	0.020	ug/L							
Cyclohexane	<0.020	0.020	ug/L							
Dibromochloromethane	<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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

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 B3K1609 - *** DEFAULT PREP ****										
Blank (B3K1609-BLK1) Continued				Prepared & Analyzed: 11/07/23						
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)	<0.0040	0.0040	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	<0.0030	0.0030	ug/L							
Propylene	<0.020	0.020	ug/L							
Styrene	<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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

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 B3K1609 - *** DEFAULT PREP ****										
Blank (B3K1609-BLK1) Continued				Prepared & Analyzed: 11/07/23						
1,1,2,2-Tetrachloroethane	<0.020	0.020	ug/L							
Tetrachloroethylene (PCE)	<0.010	0.010	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							
Surrogate: 4-Bromofluorobenzene	*0.141*		*ug/L*	*0.143*		*98.5*	*70-130*			
LCS (B3K1609-BS1)				Prepared: 11/07/23 Analyzed: 11/08/23						
Acetone	**0.115**	0.020	ug/L	0.0950		121	70-130			
Benzene	**0.122**	0.0030	ug/L	0.128		95.1	70-130			
Benzyl chloride	**0.156**	0.020	ug/L	0.207		75.3	70-130			
Bromodichloromethane	**0.226**	0.0025	ug/L	0.268		84.3	70-130			

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

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 B3K1609 - *** DEFAULT PREP ****										
LCS (B3K1609-BS1) Continued				Prepared: 11/07/23 Analyzed: 11/08/23						
Bromoform	**0.307**	0.020	ug/L	0.413		74.4	70-130			
Bromomethane	**0.179**	0.020	ug/L	0.155		115	70-130			
2-Butanone (MEK)	**0.103**	0.020	ug/L	0.118		87.3	70-130			
Carbon Disulfide	**0.114**	0.020	ug/L	0.125		91.7	70-130			
Carbon Tetrachloride	**0.191**	0.020	ug/L	0.252		75.9	70-130			
Chlorobenzene	**0.165**	0.020	ug/L	0.184		89.8	70-130			
Chloroethane	**0.123**	0.020	ug/L	0.106		117	70-130			
Chloroform	**0.167**	0.0040	ug/L	0.195		85.4	70-130			
Chloromethane	**0.115**	0.020	ug/L	0.0826		139	70-130			QL-02
Dibromochloromethane	**0.298**	0.020	ug/L	0.341		87.4	70-130			
1,2-Dibromoethane (EDB)	**0.290**	0.020	ug/L	0.307		94.3	70-130			
1,2-Dichlorobenzene	**0.239**	0.020	ug/L	0.240		99.2	70-130			
1,3-Dichlorobenzene	**0.221**	0.020	ug/L	0.240		92.1	70-130			
1,4-Dichlorobenzene	**0.236**	0.020	ug/L	0.240		98.1	70-130			
Dichlorodifluoromethane (R12)	**0.141**	0.020	ug/L	0.198		71.3	70-130			
1,1-Dichloroethane	**0.151**	0.020	ug/L	0.162		93.2	70-130			
1,2-Dichloroethane (EDC)	**0.131**	0.0040	ug/L	0.162		80.8	70-130			
cis-1,2-Dichloroethylene	**0.146**	0.020	ug/L	0.159		91.8	70-130			
1,1-Dichloroethylene	**0.151**	0.020	ug/L	0.159		95.2	70-130			
trans-1,2-Dichloroethylene	**0.138**	0.020	ug/L	0.159		86.8	70-130			
1,2-Dichloropropane	**0.179**	0.020	ug/L	0.185		96.8	70-130			
trans-1,3-Dichloropropylene	**0.179**	0.020	ug/L	0.182		98.3	70-130			
cis-1,3-Dichloropropylene	**0.185**	0.020	ug/L	0.182		102	70-130			
Dichlorotetrafluoroethane	**0.130**	0.020	ug/L	0.280		46.7	70-130			QL-07
Ethylbenzene	**0.155**	0.020	ug/L	0.174		89.5	70-130			
4-Ethyltoluene	**0.162**	0.020	ug/L	0.197		82.3	70-130			
Hexachlorobutadiene	**0.371**	0.020	ug/L	0.427		87.0	70-130			
2-Hexanone (MBK)	**0.142**	0.020	ug/L	0.164		87.0	70-130			
Isopropanol (IPA)	**0.112**	0.20	ug/L	0.0983		114	70-130			
Methylene Chloride	**0.123**	0.020	ug/L	0.139		88.3	70-130			
4-Methyl-2-pentanone (MIBK)	**0.140**	0.020	ug/L	0.164		85.3	70-130			
Styrene	**0.163**	0.020	ug/L	0.170		96.0	70-130			

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

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 B3K1609 - *** DEFAULT PREP ****										
LCS (B3K1609-BS1) Continued				Prepared: 11/07/23 Analyzed: 11/08/23						
1,1,2,2-Tetrachloroethane	**0.248**	0.020	ug/L	0.275		90.3	70-130			
Tetrachloroethylene (PCE)	**0.265**	0.010	ug/L	0.271		97.7	70-130			
Toluene	**0.151**	0.020	ug/L	0.151		100	70-130			
1,2,4-Trichlorobenzene	**0.236**	0.020	ug/L	0.297		79.6	70-130			
1,1,2-Trichloroethane	**0.201**	0.020	ug/L	0.218		92.0	70-130			
1,1,1-Trichloroethane	**0.169**	0.020	ug/L	0.218		77.3	70-130			
Trichloroethylene (TCE)	**0.203**	0.020	ug/L	0.215		94.3	70-130			
Trichlorofluoromethane (R11)	**0.249**	0.020	ug/L	0.225		111	70-130			
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	**0.283**	0.020	ug/L	0.307		92.4	70-130			
1,3,5-Trimethylbenzene	**0.182**	0.020	ug/L	0.197		92.8	70-130			
1,2,4-Trimethylbenzene	**0.184**	0.020	ug/L	0.197		93.8	70-130			
Vinyl acetate	**0.114**	0.020	ug/L	0.141		80.7	70-130			
Vinyl chloride	**0.117**	0.020	ug/L	0.102		115	70-130			
o-Xylene	**0.149**	0.020	ug/L	0.174		85.7	70-130			
m,p-Xylenes	**0.299**	0.020	ug/L	0.347		86.1	70-130			
1,2,3-Trichloropropane	**0.190**	0.020	ug/L	0.241		78.9	70-130			
sec-Butylbenzene	**0.177**	0.020	ug/L	0.220		80.7	70-130			
Isopropylbenzene	**0.160**	0.020	ug/L	0.197		81.3	70-130			
n-Propylbenzene	**0.161**	0.020	ug/L	0.197		81.8	70-130			
4-Isopropyltoluene	**0.183**	0.020	ug/L	0.220		83.5	70-130			
Surrogate: 4-Bromofluorobenzene	*0.137*		*ug/L*	*0.143*		*95.4*	*70-130*			
LCS Dup (B3K1609-BSD1)				Prepared: 11/07/23 Analyzed: 11/08/23						
Acetone	**0.0908**	0.020	ug/L	0.0950		95.6	70-130	23.2	30	
Benzene	**0.122**	0.0030	ug/L	0.128		95.4	70-130	0.236	30	
Benzyl chloride	**0.149**	0.020	ug/L	0.207		71.9	70-130	4.69	30	
Bromodichloromethane	**0.226**	0.0025	ug/L	0.268		84.4	70-130	0.119	30	
Bromoform	**0.313**	0.020	ug/L	0.413		75.6	70-130	1.70	30	
Bromomethane	**0.148**	0.020	ug/L	0.155		95.5	70-130	19.0	30	
2-Butanone (MEK)	**0.100**	0.020	ug/L	0.118		84.9	70-130	2.87	30	
Carbon Disulfide	**0.113**	0.020	ug/L	0.125		90.6	70-130	1.15	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

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 B3K1609 - *** DEFAULT PREP ****										
LCS Dup (B3K1609-BSD1) Continued				Prepared: 11/07/23 Analyzed: 11/08/23						
Carbon Tetrachloride	**0.189**	0.020	ug/L	0.252		75.3	70-130	0.761	30	
Chlorobenzene	**0.167**	0.020	ug/L	0.184		90.4	70-130	0.666	30	
Chloroethane	**0.0991**	0.020	ug/L	0.106		93.9	70-130	21.5	30	
Chloroform	**0.166**	0.0040	ug/L	0.195		85.0	70-130	0.411	30	
Chloromethane	**0.0827**	0.020	ug/L	0.0826		100	70-130	32.6	30	
Dibromochloromethane	**0.291**	0.020	ug/L	0.341		85.4	70-130	2.31	30	
1,2-Dibromoethane (EDB)	**0.280**	0.020	ug/L	0.307		91.0	70-130	3.56	30	
1,2-Dichlorobenzene	**0.232**	0.020	ug/L	0.240		96.4	70-130	2.89	30	
1,3-Dichlorobenzene	**0.223**	0.020	ug/L	0.240		92.8	70-130	0.811	30	
1,4-Dichlorobenzene	**0.228**	0.020	ug/L	0.240		95.0	70-130	3.24	30	
Dichlorodifluoromethane (R12)	**0.109**	0.020	ug/L	0.198		55.0	70-130	25.9	30	QL-03
1,1-Dichloroethane	**0.147**	0.020	ug/L	0.162		90.7	70-130	2.77	30	
1,2-Dichloroethane (EDC)	**0.127**	0.0040	ug/L	0.162		78.3	70-130	3.18	30	
cis-1,2-Dichloroethylene	**0.145**	0.020	ug/L	0.159		91.4	70-130	0.355	30	
1,1-Dichloroethylene	**0.144**	0.020	ug/L	0.159		91.0	70-130	4.51	30	
trans-1,2-Dichloroethylene	**0.137**	0.020	ug/L	0.159		86.1	70-130	0.839	30	
1,2-Dichloropropane	**0.174**	0.020	ug/L	0.185		93.9	70-130	2.99	30	
trans-1,3-Dichloropropylene	**0.175**	0.020	ug/L	0.182		96.4	70-130	2.03	30	
cis-1,3-Dichloropropylene	**0.177**	0.020	ug/L	0.182		97.3	70-130	4.47	30	
Dichlorotetrafluoroethane	**0.106**	0.020	ug/L	0.280		37.9	70-130	20.7	30	QL-07
Ethylbenzene	**0.154**	0.020	ug/L	0.174		88.6	70-130	1.07	30	
4-Ethyltoluene	**0.158**	0.020	ug/L	0.197		80.3	70-130	2.40	30	
Hexachlorobutadiene	**0.337**	0.020	ug/L	0.427		79.0	70-130	9.73	30	
2-Hexanone (MBK)	**0.138**	0.020	ug/L	0.164		84.1	70-130	3.33	30	
Isopropanol (IPA)	**0.0880**	0.20	ug/L	0.0983		89.6	70-130	24.0	30	
Methylene Chloride	**0.119**	0.020	ug/L	0.139		86.0	70-130	2.61	30	
4-Methyl-2-pentanone (MIBK)	**0.135**	0.020	ug/L	0.164		82.7	70-130	3.10	30	
Styrene	**0.159**	0.020	ug/L	0.170		93.2	70-130	2.88	30	
1,1,2,2-Tetrachloroethane	**0.244**	0.020	ug/L	0.275		89.0	70-130	1.42	30	
Tetrachloroethylene (PCE)	**0.257**	0.010	ug/L	0.271		94.5	70-130	3.30	30	
Toluene	**0.146**	0.020	ug/L	0.151		96.9	70-130	3.40	30	
1,2,4-Trichlorobenzene	**0.217**	0.020	ug/L	0.297		73.0	70-130	8.72	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

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 B3K1609 - *** DEFAULT PREP ****										
LCS Dup (B3K1609-BSD1) Continued				Prepared: 11/07/23 Analyzed: 11/08/23						
1,1,2-Trichloroethane	**0.195**	0.020	ug/L	0.218		89.4	70-130	2.81	30	
1,1,1-Trichloroethane	**0.165**	0.020	ug/L	0.218		75.8	70-130	1.99	30	
Trichloroethylene (TCE)	**0.202**	0.020	ug/L	0.215		94.1	70-130	0.265	30	
Trichlorofluoromethane (R11)	**0.207**	0.020	ug/L	0.225		92.3	70-130	18.3	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	**0.274**	0.020	ug/L	0.307		89.2	70-130	3.50	30	
1,3,5-Trimethylbenzene	**0.170**	0.020	ug/L	0.197		86.2	70-130	7.32	30	
1,2,4-Trimethylbenzene	**0.180**	0.020	ug/L	0.197		91.6	70-130	2.35	30	
Vinyl acetate	**0.115**	0.020	ug/L	0.141		81.6	70-130	1.20	30	
Vinyl chloride	**0.0998**	0.020	ug/L	0.102		97.6	70-130	16.2	30	
o-Xylene	**0.147**	0.020	ug/L	0.174		84.4	70-130	1.44	30	
m,p-Xylenes	**0.293**	0.020	ug/L	0.347		84.4	70-130	2.05	30	
1,2,3-Trichloropropane	**0.188**	0.020	ug/L	0.241		77.8	70-130	1.28	30	
sec-Butylbenzene	**0.171**	0.020	ug/L	0.220		77.9	70-130	3.50	30	
Isopropylbenzene	**0.158**	0.020	ug/L	0.197		80.3	70-130	1.33	30	
n-Propylbenzene	**0.157**	0.020	ug/L	0.197		79.7	70-130	2.51	30	
4-Isopropyltoluene	**0.175**	0.020	ug/L	0.220		79.6	70-130	4.75	30	
Surrogate: 4-Bromofluorobenzene	*0.132*		*ug/L*	*0.143*		*92.6*	*70-130*			
*Batch B3K1610 - *** DEFAULT PREP ****										
Blank (B3K1610-BLK1)				Prepared & Analyzed: 11/08/23						
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	<0.0030	0.0030	ug/L							
Benzyl chloride	<0.020	0.020	ug/L							
Bromodichloromethane	<0.0025	0.0025	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)	<2.0	2.0	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

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 B3K1610 - *** DEFAULT PREP ****										
Blank (B3K1610-BLK1) Continued				Prepared & Analyzed: 11/08/23						
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	<0.0040	0.0040	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)	<0.0040	0.0040	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							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

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 B3K1610 - *** DEFAULT PREP ****										
Blank (B3K1610-BLK1) Continued				Prepared & Analyzed: 11/08/23						
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	<0.0030	0.0030	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)	<0.010	0.010	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							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

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 B3K1610 - *** DEFAULT PREP ****										
Blank (B3K1610-BLK1) Continued				Prepared & Analyzed: 11/08/23						
n-Butylbenzene	<0.020	0.020	ug/L							
Surrogate: 4-Bromofluorobenzene	*0.129*		*ug/L*	*0.143*		*89.9*	*70-130*			
LCS (B3K1610-BS1)				Prepared: 11/08/23 Analyzed: 11/09/23						
Acetone	**0.101**	0.020	ug/L	0.0950		106	70-130			
Benzene	**0.122**	0.0030	ug/L	0.128		95.1	70-130			
Benzyl chloride	**0.164**	0.020	ug/L	0.207		79.2	70-130			
Bromodichloromethane	**0.249**	0.0025	ug/L	0.268		92.8	70-130			
Bromoform	**0.350**	0.020	ug/L	0.413		84.7	70-130			
Bromomethane	**0.152**	0.020	ug/L	0.155		97.6	70-130			
2-Butanone (MEK)	**0.0987**	0.020	ug/L	0.118		83.6	70-130			
Carbon Disulfide	**0.121**	0.020	ug/L	0.125		97.3	70-130			
Carbon Tetrachloride	**0.217**	0.020	ug/L	0.252		86.3	70-130			
Chlorobenzene	**0.185**	0.020	ug/L	0.184		100	70-130			
Chloroethane	**0.102**	0.020	ug/L	0.106		96.3	70-130			
Chloroform	**0.177**	0.0040	ug/L	0.195		90.7	70-130			
Chloromethane	**0.0911**	0.020	ug/L	0.0826		110	70-130			
Dibromochloromethane	**0.324**	0.020	ug/L	0.341		95.2	70-130			
1,2-Dibromoethane (EDB)	**0.304**	0.020	ug/L	0.307		98.9	70-130			
1,2-Dichlorobenzene	**0.258**	0.020	ug/L	0.240		107	70-130			
1,3-Dichlorobenzene	**0.252**	0.020	ug/L	0.240		105	70-130			
1,4-Dichlorobenzene	**0.255**	0.020	ug/L	0.240		106	70-130			
Dichlorodifluoromethane (R12)	**0.0941**	0.020	ug/L	0.198		47.5	70-130			QL-07
1,1-Dichloroethane	**0.154**	0.020	ug/L	0.162		95.4	70-130			
1,2-Dichloroethane (EDC)	**0.138**	0.0040	ug/L	0.162		85.1	70-130			
cis-1,2-Dichloroethylene	**0.146**	0.020	ug/L	0.159		92.1	70-130			
1,1-Dichloroethylene	**0.156**	0.020	ug/L	0.159		98.2	70-130			
trans-1,2-Dichloroethylene	**0.149**	0.020	ug/L	0.159		93.7	70-130			
1,2-Dichloropropane	**0.180**	0.020	ug/L	0.185		97.2	70-130			
trans-1,3-Dichloropropylene	**0.183**	0.020	ug/L	0.182		101	70-130			
cis-1,3-Dichloropropylene	**0.187**	0.020	ug/L	0.182		103	70-130			
Dichlorotetrafluoroethane	**0.0893**	0.020	ug/L	0.280		31.9	70-130			QL-07

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

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 B3K1610 - *** DEFAULT PREP ****										
LCS (B3K1610-BS1) Continued				Prepared: 11/08/23 Analyzed: 11/09/23						
Ethylbenzene	**0.169**	0.020	ug/L	0.174		97.0	70-130			
4-Ethyltoluene	**0.177**	0.020	ug/L	0.197		89.8	70-130			
Hexachlorobutadiene	**0.391**	0.020	ug/L	0.427		91.6	70-130			
2-Hexanone (MBK)	**0.141**	0.020	ug/L	0.164		86.1	70-130			
Isopropanol (IPA)	**0.0934**	0.20	ug/L	0.0983		95.0	70-130			
Methylene Chloride	**0.124**	0.020	ug/L	0.139		89.2	70-130			
4-Methyl-2-pentanone (MIBK)	**0.141**	0.020	ug/L	0.164		86.3	70-130			
Styrene	**0.172**	0.020	ug/L	0.170		101	70-130			
1,1,2,2-Tetrachloroethane	**0.269**	0.020	ug/L	0.275		97.9	70-130			
Tetrachloroethylene (PCE)	**0.285**	0.010	ug/L	0.271		105	70-130			
Toluene	**0.154**	0.020	ug/L	0.151		102	70-130			
1,2,4-Trichlorobenzene	**0.254**	0.020	ug/L	0.297		85.4	70-130			
1,1,2-Trichloroethane	**0.213**	0.020	ug/L	0.218		97.4	70-130			
1,1,1-Trichloroethane	**0.184**	0.020	ug/L	0.218		84.3	70-130			
Trichloroethylene (TCE)	**0.220**	0.020	ug/L	0.215		102	70-130			
Trichlorofluoromethane (R11)	**0.227**	0.020	ug/L	0.225		101	70-130			
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	**0.304**	0.020	ug/L	0.307		99.3	70-130			
1,3,5-Trimethylbenzene	**0.189**	0.020	ug/L	0.197		96.4	70-130			
1,2,4-Trimethylbenzene	**0.200**	0.020	ug/L	0.197		102	70-130			
Vinyl acetate	**0.115**	0.020	ug/L	0.141		81.9	70-130			
Vinyl chloride	**0.0999**	0.020	ug/L	0.102		97.7	70-130			
o-Xylene	**0.160**	0.020	ug/L	0.174		92.3	70-130			
m,p-Xylenes	**0.320**	0.020	ug/L	0.347		92.1	70-130			
1,2,3-Trichloropropane	**0.207**	0.020	ug/L	0.241		85.7	70-130			
sec-Butylbenzene	**0.190**	0.020	ug/L	0.220		86.5	70-130			
Isopropylbenzene	**0.175**	0.020	ug/L	0.197		89.0	70-130			
n-Propylbenzene	**0.173**	0.020	ug/L	0.197		87.9	70-130			
4-Isopropyltoluene	**0.196**	0.020	ug/L	0.220		89.4	70-130			
Surrogate: 4-Bromofluorobenzene	*0.135*		*ug/L*	*0.143*		*94.1*	*70-130*			
LCS Dup (B3K1610-BSD1)				Prepared: 11/08/23 Analyzed: 11/09/23						

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

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 B3K1610 - *** DEFAULT PREP ****										
LCS Dup (B3K1610-BSD1) Continued				Prepared: 11/08/23 Analyzed: 11/09/23						
Acetone	**0.102**	0.020	ug/L	0.0950		108	70-130	1.19	30	
Benzene	**0.124**	0.0030	ug/L	0.128		96.8	70-130	1.72	30	
Benzyl chloride	**0.167**	0.020	ug/L	0.207		80.6	70-130	1.81	30	
Bromodichloromethane	**0.246**	0.0025	ug/L	0.268		91.7	70-130	1.14	30	
Bromoform	**0.351**	0.020	ug/L	0.413		84.9	70-130	0.295	30	
Bromomethane	**0.155**	0.020	ug/L	0.155		99.8	70-130	2.23	30	
2-Butanone (MEK)	**0.0992**	0.020	ug/L	0.118		84.1	70-130	0.537	30	
Carbon Disulfide	**0.123**	0.020	ug/L	0.125		98.8	70-130	1.50	30	
Carbon Tetrachloride	**0.215**	0.020	ug/L	0.252		85.6	70-130	0.814	30	
Chlorobenzene	**0.184**	0.020	ug/L	0.184		100	70-130	0.225	30	
Chloroethane	**0.104**	0.020	ug/L	0.106		98.3	70-130	2.06	30	
Chloroform	**0.181**	0.0040	ug/L	0.195		92.4	70-130	1.91	30	
Chloromethane	**0.0919**	0.020	ug/L	0.0826		111	70-130	0.880	30	
Dibromochloromethane	**0.324**	0.020	ug/L	0.341		95.2	70-130	0.0263	30	
1,2-Dibromoethane (EDB)	**0.303**	0.020	ug/L	0.307		98.7	70-130	0.228	30	
1,2-Dichlorobenzene	**0.264**	0.020	ug/L	0.240		110	70-130	2.26	30	
1,3-Dichlorobenzene	**0.251**	0.020	ug/L	0.240		104	70-130	0.383	30	
1,4-Dichlorobenzene	**0.262**	0.020	ug/L	0.240		109	70-130	2.74	30	
Dichlorodifluoromethane (R12)	**0.0916**	0.020	ug/L	0.198		46.3	70-130	2.66	30	QL-07
1,1-Dichloroethane	**0.154**	0.020	ug/L	0.162		95.1	70-130	0.263	30	
1,2-Dichloroethane (EDC)	**0.144**	0.0040	ug/L	0.162		89.2	70-130	4.73	30	
cis-1,2-Dichloroethylene	**0.148**	0.020	ug/L	0.159		93.1	70-130	1.05	30	
1,1-Dichloroethylene	**0.160**	0.020	ug/L	0.159		101	70-130	2.54	30	
trans-1,2-Dichloroethylene	**0.155**	0.020	ug/L	0.159		97.7	70-130	4.10	30	
1,2-Dichloropropane	**0.178**	0.020	ug/L	0.185		96.5	70-130	0.826	30	
trans-1,3-Dichloropropylene	**0.183**	0.020	ug/L	0.182		101	70-130	0.00	30	
cis-1,3-Dichloropropylene	**0.183**	0.020	ug/L	0.182		101	70-130	2.01	30	
Dichlorotetrafluoroethane	**0.0823**	0.020	ug/L	0.280		29.4	70-130	8.07	30	QL-07
Ethylbenzene	**0.168**	0.020	ug/L	0.174		97.0	70-130	0.0258	30	
4-Ethyltoluene	**0.178**	0.020	ug/L	0.197		90.5	70-130	0.777	30	
Hexachlorobutadiene	**0.400**	0.020	ug/L	0.427		93.9	70-130	2.48	30	
2-Hexanone (MBK)	**0.140**	0.020	ug/L	0.164		85.3	70-130	0.992	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: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

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 B3K1610 - *** DEFAULT PREP ****										
LCS Dup (B3K1610-BSD1) Continued				Prepared: 11/08/23 Analyzed: 11/09/23						
Isopropanol (IPA)	**0.0930**	0.20	ug/L	0.0983		94.6	70-130	0.448	30	
Methylene Chloride	**0.126**	0.020	ug/L	0.139		90.7	70-130	1.67	30	
4-Methyl-2-pentanone (MIBK)	**0.139**	0.020	ug/L	0.164		85.0	70-130	1.58	30	
Styrene	**0.172**	0.020	ug/L	0.170		101	70-130	0.149	30	
1,1,2,2-Tetrachloroethane	**0.270**	0.020	ug/L	0.275		98.3	70-130	0.382	30	
Tetrachloroethylene (PCE)	**0.280**	0.010	ug/L	0.271		103	70-130	1.54	30	
Toluene	**0.152**	0.020	ug/L	0.151		101	70-130	1.33	30	
1,2,4-Trichlorobenzene	**0.264**	0.020	ug/L	0.297		89.1	70-130	4.21	30	
1,1,2-Trichloroethane	**0.209**	0.020	ug/L	0.218		95.7	70-130	1.79	30	
1,1,1-Trichloroethane	**0.184**	0.020	ug/L	0.218		84.5	70-130	0.207	30	
Trichloroethylene (TCE)	**0.219**	0.020	ug/L	0.215		102	70-130	0.440	30	
Trichlorofluoromethane (R11)	**0.236**	0.020	ug/L	0.225		105	70-130	3.83	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (R113)	**0.308**	0.020	ug/L	0.307		101	70-130	1.33	30	
1,3,5-Trimethylbenzene	**0.194**	0.020	ug/L	0.197		98.6	70-130	2.31	30	
1,2,4-Trimethylbenzene	**0.200**	0.020	ug/L	0.197		102	70-130	0.00	30	
Vinyl acetate	**0.116**	0.020	ug/L	0.141		82.7	70-130	0.973	30	
Vinyl chloride	**0.100**	0.020	ug/L	0.102		97.8	70-130	0.102	30	
o-Xylene	**0.161**	0.020	ug/L	0.174		93.0	70-130	0.756	30	
m,p-Xylenes	**0.322**	0.020	ug/L	0.347		92.8	70-130	0.690	30	
1,2,3-Trichloropropane	**0.208**	0.020	ug/L	0.241		86.2	70-130	0.611	30	
sec-Butylbenzene	**0.193**	0.020	ug/L	0.220		87.7	70-130	1.41	30	
Isopropylbenzene	**0.175**	0.020	ug/L	0.197		89.2	70-130	0.168	30	
n-Propylbenzene	**0.175**	0.020	ug/L	0.197		88.9	70-130	1.16	30	
4-Isopropyltoluene	**0.199**	0.020	ug/L	0.220		90.5	70-130	1.25	30	
Surrogate: 4-Bromofluorobenzene	*0.133*		*ug/L*	*0.143*		*93.0*	*70-130*			
Fixed Gases by TCD - Quality Control										
*Batch B3K2016 - *** DEFAULT PREP ****										
Blank (B3K2016-BLK1)				Prepared & Analyzed: 11/21/23						
Methane	<0.10	0.10	% by Volume							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Fixed Gases by TCD - Quality Control										
*Batch B3K2016 - *** DEFAULT PREP ****										
Blank (B3K2016-BLK1) Continued				Prepared & Analyzed: 11/21/23						
Oxygen	<0.10	0.10	% by Volume							
Carbon Dioxide	<0.10	0.10	% by Volume							
LCS (B3K2016-BS1)				Prepared & Analyzed: 11/21/23						
Methane	**2.55**	0.10	% by Volume	2.02		126	70-130			
Oxygen	**1.64**	0.10	% by Volume	1.80		90.8	70-130			
Carbon Dioxide	**7.06**	0.10	% by Volume	6.75		105	70-130			
LCS Dup (B3K2016-BSD1)				Prepared & Analyzed: 11/21/23						
Methane	**2.47**	0.10	% by Volume	2.02		122	70-130	3.18	30	
Oxygen	**1.65**	0.10	% by Volume	1.80		91.7	70-130	0.974	30	
Carbon Dioxide	**6.90**	0.10	% by Volume	6.75		102	70-130	2.32	30	
Duplicate (B3K2016-DUP1)				**Source: 3K01006-05**	Prepared & Analyzed: 11/21/23					
Methane	**<0.20**	0.20	% by Volume		<0.20				30	
Oxygen	**1.71**	0.20	% by Volume		3.29			63.4	30	QR-03
Carbon Dioxide	**8.63**	0.20	% by Volume		8.14			5.89	30	
*Batch B3K2224 - *** DEFAULT PREP ****										
Blank (B3K2224-BLK1)				Prepared & Analyzed: 11/22/23						
Methane	<0.10	0.10	% by Volume							
Oxygen	<0.10	0.10	% by Volume							

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Fixed Gases by TCD - Quality Control										
*Batch B3K2224 - *** DEFAULT PREP ****										
Blank (B3K2224-BLK1) Continued				Prepared & Analyzed: 11/22/23						
Carbon Dioxide	<0.10	0.10	% by Volume							
LCS (B3K2224-BS1)				Prepared & Analyzed: 11/22/23						
Methane	**2.48**	0.10	% by Volume	2.02		122	70-130			
Oxygen	**1.59**	0.10	% by Volume	1.80		88.5	70-130			
Carbon Dioxide	**6.86**	0.10	% by Volume	6.75		102	70-130			
LCS Dup (B3K2224-BSD1)				Prepared & Analyzed: 11/22/23						
Methane	**2.58**	0.10	% by Volume	2.02		127	70-130	3.99	30	
Oxygen	**1.64**	0.10	% by Volume	1.80		90.9	70-130	2.66	30	
Carbon Dioxide	**7.12**	0.10	% by Volume	6.75		106	70-130	3.83	30	
*Batch B3K2716 - *** DEFAULT PREP ****										
Blank (B3K2716-BLK1)				Prepared & Analyzed: 11/27/23						
Methane	<0.10	0.10	% by Volume							
Oxygen	<0.10	0.10	% by Volume							
Carbon Dioxide	<0.10	0.10	% by Volume							
LCS (B3K2716-BS1)				Prepared & Analyzed: 11/27/23						
Methane	**2.62**	0.10	% by Volume	2.02		129	70-130			
Oxygen	**1.64**	0.10	% by Volume	1.80		90.9	70-130			
Carbon Dioxide	**7.16**	0.10	% by Volume	6.75		106	70-130			
LCS Dup (B3K2716-BSD1)				Prepared & Analyzed: 11/27/23						

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187347
Date Received: 11/01/23
Date Reported: 11/30/23

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Fixed Gases by TCD - Quality Control										
*Batch B3K2716 - *** DEFAULT PREP ****										
Methane	**2.38**	0.10	% by Volume	2.02		118	70-130	9.55	30	
Oxygen	**1.58**	0.10	% by Volume	1.80		87.9	70-130	3.42	30	
Carbon Dioxide	**6.59**	0.10	% by Volume	6.75		97.7	70-130	8.29	30	
Duplicate (B3K2716-DUP1)			**Source: 3K01006-26**	Prepared & Analyzed: 11/27/23						
Methane	**<0.20**	0.20	% by Volume		<0.20				30	
Oxygen	**16.4**	0.20	% by Volume		16.5			0.390	30	
Carbon Dioxide	**0.994**	0.20	% by Volume		1.03			3.17	30	

Allen Aminian
QA/QC Manager

LABORATORY ANALYSIS RESULTS

Client:	CH2M Hill, Inc.	**AA Project No:**	MB187347
Project No:	693142	**Date Received:**	11/01/23
Project Name:	KMEP Norwalk Biosparge Startup	**Date Reported:**	11/30/23

Special Notes

[1] = ****** :

[2] = ****a** : Result obtained from DF=16

[3] = ****b** : Result obtained from DF=400

[4] = ****c** : Result obtained from DF=50

[5] = **QL-02** : The recovery for this analyte is outside of the acceptance control limits for the LCS. The data was validated based on the acceptable recovery for this analyte in the LCSD.

[6] = **QL-03** : The recovery for this analyte is outside of the acceptance control limits for the LCSD. The data was validated based on the acceptable recovery for this analyte in the LCS.

[7] = **QL-07** : The recovery for this analyte in the LCS and LCSD is marginally below the lower control limit, therefore the reported concentration for this analyte may be biased low.

[8] = **QR-03** : The RPD value for the sample duplicate or MS/MSD was outside of QC acceptance limits due to matrix interference. QC batch accepted based on LCS and/or LCSD recovery and/or RPD values.

Allen Aminian
QA/QC Manager

American Analytics **Air Toxics** Chain-Of-Custody Record (1)

A.A. COC#: 27567

9765 Eton Ave., Chatsworth, CA 91311 Tel: 818-998-5547 Support@AmericanAnalytics.com

Page 1 Of 1

Client Information		Project Information		Sampler Information		TAT Codes
Client:	Jacobs	Project Name:	Kinder Morgan Norwalk	Name:	Kris B.	1 = Same Day Rush
Project Manager:		Street Address:	15306 Norwalk Blvd.	Landline:		24 = 24 HR Rush
Address:		City		Cell:		48 = 48 HR Rush
		Sample Matrix Code (SMC*)	Container Code (CC*)	Email:		72 = 72 HR Rush
Landline:		AA Ambient Air	1.4L Cans: 1.4			5 = 5 Day Rush
Cell:		SG Soil Gas	6L Can: 6			X = 10 Work Days (Standard)
Email:		O Other	Tedlar Bag: T			

Client I.D.	A.A. I.D.	Can I.D.	Sample Train/Flow Controller I.D.	Start Date	Start Time	End Date	End Time	CC*	SMC*	TO-15-SIM	TO-15	TO-3	Fixed gases	Can Vac in Hg Start	Can Vac in Hg End	Comments And Instructions
								Please Enter Codes		TAT Codes						
SVM-14R-8	3K01606-01	1245	242	11/1/23	958	11/1/23	1017	1.4	SG		X	X	X	-27	-2	
SVM-14R-16	-02	11444	246		958		1019				X	X	X	-27	-2	
SVM-14R-22	-03	11413	261		1012		1028				X	X	X	-27	-2	
SVM-12-7	-04	5133	182		1133		1150				X	X	X	-27	-3	
SVM-12-15	-05	11342	217		1135		1153				X	X	X	-27	-3	
SVM-12-22	-06	11454	255		1144		1204				X	X	X	-28	-3	
SVM-21-5	-07	2031	248		1230		1248				X	X	X	-27	-2	
SVM-21-14.5	-08	12220	222		1232		1251				X	X	X	-27	-2	
SVP-108-5	-09	4571	225		1309		1326				X	X	X	-27	-2	
SVP-108-10	-10	1243	125		1312		1332				X	X	X	-28	-3	
SVP-108-10 Dup	-11	12238	125		1312		1332				X	X	X	-28	-3	
Ambient Air	-12	581	274		1311		1330		AA		X	X	X	-28	-3	

'23 NOV 1 15:36

For Laboratory Use

VIEWED

11/3/23 Time 9:17

TAT 10 Days Signature

Project No.: MB187347/3K01606

	Relinquished By	Date	Time	Received By
		11/1/23	1340	
		11/1/23	1536	
		Date	Time	

I, the client, scanned or photographed a copy for my records, or Please Scan and email a copy to Client ☐ Sampler ☐

Client: Total Number Of Cans Received: Number Of Cans Not Used:

By relinquishing samples to American Analytics, Inc. (AA), the client agrees to pay for services requested on this chain of custody form and any additional client-requested analyses performed on this project. Charges will be according to AA's standard price list at the time of the analysis, or per valid quote or agreement with the client. Unless agreed otherwise, payment for services is due within 30 days from the date of invoice. Late payments are subject to 2% interest per month, or as required by law. (1) Unless the client has made a special arrangement, in writing, with AA's project manager, sample(s) will be held for up to 1 week following the submittal of results to the client. Longer sample storage times can be arranged for a fee.

American Analytics **Air Toxics** Chain-Of-Custody Record (1)

A.A. COC#: 27568

9765 Eton Ave., Chatsworth, CA 91311 Tel: 818-998-5547 Support@AmericanAnalytics.com

Page 1 Of 1

Client Information		Project Information		Sampler Information		TAT Codes
Client:	Jacobs	Project Name:	Kinder Morgan Norwalk	Name:	Kris B.	1 = Same Day Rush
oject Manager:		Street Address:	15306 Norwalk Blvd.	Landline:		24 = 24 HR Rush
Address:		City		Cell:		48 = 48 HR Rush
		Sample Matrix Code (SMC*)	Container Code (CC*)	Email:		72 = 72 HR Rush
Landline:		AA Ambient Air	1.4L Cans: 1.4			5 = 5 Day Rush
Cell:		SG Soil Gas	6L Can: 6			X = 10 Work Days (Standard)
Email:		O Other	Tedlar Bag: T			

Client I.D.	A.A. I.D.	Can I.D.	Sample Train/Flow Controller I.D.	Start Date	Start Time	End Date	End Time	CC*	SMC*	TO-15-SIM	TO-15	TO-3	Fixed gases	Can Vac in Hg Start	Can Vac in Hg End	Comments And Instructions
								Please Enter Codes		TAT Codes						
SVM-3-5	3K01006-~~01~~ SK	4578	101	11/2/23	920	11/2/23	940	1.4	SG		X	X	X	-27	-2	*IPA tracer
SVM-3-15	-~~14~~ 02	12222	273		922		943				X	X	X	-27	-2	for all
SVM-16-7	-15	12252	175		1000		1014				X	X	X	-27	-2	samples *
SVM-16-16	-16	11022	263		1002		1018				X	X	X	-28	-3	
SVM-16-22	-17	4333	184		1006		1016				X	X	X	-27	-2	
SVM-10-15	-18	12201	163		1039		1057				X	X	X	-27	-2	
SVM-6-7	-19	12291	223		1130		1148				X	X	X	-27	-2	
SVM-6-13	-20	12268	117		1139		1157				X	X	X	-28	-3	
SVM-6-13 Dup	-21	1251	117		1139		1157				X	X	X	-28	-3	
Ambient Air	-22	12299	103		1135		1150		AA		X	X	X	-28	-3	
SVM-26-5	-23	2044	236		1220		1237		SG		X	X	X	-27	-2	
SVM-26-10	-24	12235	126		1222		1240				X	X	X	-27	-2	
SVM-27-5	-25	11428	240		1253		1309				X	X	X	-27	-2	
SVM-27-10	-26	1551	259		1255		1312				X	X	X	-28	-3	

'23 NOV 2 15:01

For Laboratory Use

~~Time~~ 11/2/23 Time 9:17

TAT 10 Days Sign:

Project No.: MB14734T/3K01006

Relinquished By	Date	Time	Received By
	11/2/23	1320	
	11/2/23	1501	

I, the client, scanned or photographed a copy for my records, or Please Scan and email a copy to Client ☐ Sampler ☐

Client: Total Number Of Cans Received: Number Of Cans Not Used:

: By relinquishing samples to American Analytics, Inc. (AA), the client agrees to pay for services requested on this chain of custody form and any additional client-requested analyses performed on this project. Charges will be according to AA's lard price list at the time of the analysis, or per valid quote or agreement with the client. Unless agreed otherwise, payment for services is due within 30 days from the date of invoice. Late payments are subject to 2% interest per month, or as ved by law. (1) Unless the client has made a special arrangement, in writing, with AA's project manager, sample(s) will be held for up to 1 week following the submittal of results to the client. Longer sample storage times can be arranged for a fee.

Attachment B
Statistical Analysis Summary Table

Attachment B

Statistical Methodology

The Mann-Kendall test is a nonparametric procedure used to assess if there is a monotonic upward or downward trend of the variable of interest over time. A monotonic upward (downward) trend means that the variable consistently increases (decreases) through time, but the trend may or may not be linear. The data values are evaluated as an ordered time series. Each data value is compared to all subsequent data values. Thus, the test can be viewed as a nonparametric test for zero slope of the linear regression of time-ordered data versus time, as illustrated by Hollander and Wolfe 1973, p. 201.

The Mann-Kendall test compares the relative magnitudes of sample data rather than the data values themselves. One benefit of this is that the data need not conform to any distribution. Additionally, the test has a low sensitivity to abrupt breaks due to non-homogeneous time series. Data reported as nondetects are included in the test by assigning them a common value that is less than the smallest measured value in the data set (EPA, 2009).

The Mann-Kendall test statistic (S) is found by counting the number of "concordant observations", where the later-in-time observation has a larger value for the series, and subtracting the number of "discordant observations", where the later-in-time observation has a smaller value for the series. This is done for all pairs of observations in the data set. The total difference is denoted S. Positive values of S indicate an increase in constituent concentrations over time, whereas negative values indicate a decrease in constituent concentrations over time. The strength of the trend is proportional to the magnitude of the S (i.e., the larger the absolute value of S, the stronger the evidence for a real increasing or decreasing trend).

Let x_1, x_2,…x_n represent n data points where x_j represents the data point at time *j*. Then the Mann-Kendall statistic (S) is given by:

$$S = \sum_{k=1}^{n-1} \sum_{j=k+1}^{n} sign(x_j - x_k)$$

Where:

$$sign(x_j - x_k) = 1 \; if \; x_j - x_k > 0$$

$$= \; 0 \; if \; x_j - x_k = 0$$

$$= -1 \; if \; x_j - x_k < 0$$

The null hypothesis in the Mann-Kendall test assumes that there is no trend (the data are independent and randomly ordered) and this is tested against the alternative hypothesis, which assumes that there is a trend. The calculated probability (p-value) of the test represents the probability that any observed trend would occur purely by chance (given the variability and sample size of the data set). A significance level of 0.05 (i.e., 95 percent confidence) was used to test the null hypothesis that there is no trend in the data.

The significance level is the probability that a test erroneously detects a trend when none is present. Only p-values less than 0.05 indicate a statistically significant trend. The result of the Mann-Kendall test is either a significantly increasing or decreasing trend, or a non-significant result (no trend, stable).

To gauge the magnitude of the trend, the Theil-Sen slope was calculated for wells exhibiting a statistically significant trend in constituent concentrations. Although nonparametric, the Theil-Sen slope estimator does not use data ranks but rather the concentrations themselves. The method is nonparametric because the median pairwise slope is utilized, thus ignoring extreme values that might otherwise skew the slope estimate. Consequently, the Theil-Sen line estimates the change in median concentration over time and not the mean as in linear regression. The Theil-Sen method handles nondetects in the same manner as the Mann-Kendall test; it assigns each nondetect a common value less than any detected measurement (EPA, 2009). Unlike the Mann-Kendall test, however, the actual concentration values are important in computing the slope estimate in the Theil-Sen procedure. Therefore, the approach is not appropriate when more than 50 percent of the concentration measurements are nondetects (ITRC, 2013).

Where there was insufficient evidence for identifying a significant, non-zero trend at the 95 percent confidence level, concentrations were deemed stable if the coefficient of variation (CV) is less than 1. The CV is recognized as an acceptable measure of intrinsic variability in positive-valued data sets (EPA, 2009) and can be used as an indication of stability. The CV is a relative measure of variation described by the ratio of the sample standard deviation to the sample mean. Values less than or near 1 indicate that the data form a relatively close group about the mean value. Values larger than 1 indicate that the data show a greater degree of scatter about the mean. It should be noted that the CV is a relative measure of variation in groundwater concentration data and can be affected by the magnitude of concentration (EPA, 2009). As such, relatively higher concentrations can include significant variation while exhibiting a small CV.

Descriptive statistics (mean, median, standard deviation, and CV) were calculated using the Kaplan-Meier (KM) product-limit estimator (Kaplan and Meier, 1958) for nondetects. The KM method is a standard nonparametric method for computing descriptive statistics of censored data. It is widely used in survival or lifetime data analysis to incorporate data with multiple censoring levels and does not require specification of an assumed distribution. A percentile is assigned to each detected observation, starting at the largest detected value and working down the data set, based on the number of detects and nondetects above and below each observation. Percentiles are not assigned to nondetects, but nondetects affect the percentiles calculated for detected observations. The survival curve, a step function plot of the cumulative distribution function, gives the shape of the data set. Estimates of the mean and standard deviation are computed from the estimated cumulative distribution function and these estimates then can be used in parametric statistical tests. EPA (2009) recommends the use of the KM method when dealing with environmental data sets containing multiple detection or reporting limits.

The details of the various estimation methods including the KM method can be found in EPA, 2015, Helsel, 2012, and Singh et al., 2006. Field duplicate data and duplicate samples were not incorporated into this evaluation; only normal sample data were used.

Attachment B. Statistical Trend Results

SFPP Norwalk Pump Station, Norwalk, California

Mann-Kendall TestData Preparation (September 2015 to Present)																					
Location	**Analyte**	**COUNT**	**DET**	**CEN**	**PER.DET**	**MIN.CEN**	**MAX.CEN**	**MIN.DET**	**MAX.DET**	**MEAN**	**MEDIAN**	**SD**	**CV**	**LASTVALUE**	**LASTDATE**	**S**	**PVAL**	**SLOPE**	**RESULT**	**TREND**	**STABILITY**	**MIN.LAG**
SVM-01D	TPH-g	24	0	24	0	0.5	20	---	---	15.9375	20	8.0896	0.5076	ND (0.5)	2022-09-01	0	0.51	---	49% (+)	No Trend	>50% ND	20
SVM-01S	TPH-g	24	0	24	0	0.5	20	---	---	15.9375	20	8.0896	0.5076	ND (0.5)	2022-09-01	0	0.51	---	49% (+)	No Trend	>50% ND	20
SVM-02S	TPH-g	24	1	23	4.17	0.5	20	0.81	0.81	15.9504	20	8.0641	0.5056	ND (0.5)	2022-09-01	17	0.347	---	65.3% (+)	No Trend	>50% ND	20
SVM-03D	TPH-g	25	2	23	8	0.5	20	0.55	1.2	0.625	20	0.2578	0.4125	ND (0.5)	2023-11-01	35	0.2155	---	78.5% (+)	No Trend	>50% ND	20
SVM-03S	TPH-g	26	2	24	7.69	0.5	20	0.51	22	1.3283	20	4.1343	3.1125	ND (0.5)	2023-11-01	27	0.285	---	71.5% (+)	No Trend	>50% ND	20
SVM-05D	TPH-g	24	0	24	0	0.5	20	---	---	15.9375	20	8.0896	0.5076	ND (0.5)	2022-08-01	0	0.51	---	49% (+)	No Trend	>50% ND	20
SVM-05S	TPH-g	24	0	24	0	0.5	20	---	---	15.9375	20	8.0896	0.5076	ND (0.5)	2022-08-01	0	0.51	---	49% (+)	No Trend	>50% ND	20
SVM-06D	TPH-g	28	3	25	10.71	0.5	20	31	22000	1180.125	20	4496.0519	3.8098	ND (0.5)	2023-11-01	28	0.298	---	70.2% (+)	No Trend	>50% ND	1
SVM-06S	TPH-g	26	2	24	7.69	0.5	20	1.5	150	6.4103	20	28.7203	4.4804	ND (0.5)	2023-11-01	39	0.203	---	79.7% (+)	No Trend	>50% ND	20
SVM-07D	TPH-g	24	0	24	0	0.5	20	---	---	15.9375	20	8.0896	0.5076	ND (0.5)	2022-09-01	0	0.51	---	49% (+)	No Trend	>50% ND	20
SVM-07S	TPH-g	24	0	24	0	0.5	20	---	---	15.9375	20	8.0896	0.5076	ND (0.5)	2022-09-01	0	0.51	---	49% (+)	No Trend	>50% ND	20
SVM-08D	TPH-g	24	0	24	0	0.5	20	---	---	15.9375	20	8.0896	0.5076	ND (0.5)	2022-08-01	0	0.51	---	49% (+)	No Trend	>50% ND	20
SVM-08S	TPH-g	24	0	24	0	0.5	20	---	---	15.9375	20	8.0896	0.5076	ND (0.5)	2022-08-01	0	0.51	---	49% (+)	No Trend	>50% ND	20
SVM-09D	TPH-g	10	0	10	0	0.5	20	---	---	14.15	20	9.4194	0.6657	ND (0.5)	2022-08-01	0	0.5357	---	46.4% (+)	No Trend	>50% ND	132
SVM-09S	TPH-g	10	0	10	0	0.5	20	---	---	14.15	20	9.4194	0.6657	ND (0.5)	2022-08-01	0	0.5357	---	46.4% (+)	No Trend	>50% ND	132
SVM-10D	TPH-g	25	2	23	8	0.5	20	3.2	4.8	1.5	20	1.6379	1.092	3.2	2023-11-01	41	0.177	---	82.3% (+)	No Trend	>50% ND	20
SVM-11D	TPH-g	23	1	22	4.35	0.5	20	0.73	0.73	15.7709	20	8.2047	0.5202	ND (0.5)	2022-08-01	14	0.367	---	63.3% (+)	No Trend	>50% ND	20
SVM-11M	TPH-g	23	0	23	0	0.5	20	---	---	15.7609	20	8.224	0.5218	ND (0.5)	2022-08-01	0	0.5107	---	48.9% (+)	No Trend	>50% ND	20
SVM-11S	TPH-g	23	1	22	4.35	0.5	20	830	830	50.9783	20	170.0173	3.3351	ND (0.5)	2022-08-01	-10	0.407	---	59.3% (-)	No Trend	>50% ND	20
SVM-12D	TPH-g	26	6	20	23.08	0.5	20	0.95	3300	267.7842	20	764.9256	2.8565	20	2023-11-01	-19	0.347	---	65.3% (-)	No Trend	>50% ND	20
SVM-12M	TPH-g	26	2	24	7.69	0.5	20	2.8	510	20.4647	20	97.9107	4.7844	2.8	2023-11-01	13	0.397	---	60.3% (+)	No Trend	>50% ND	20
SVM-12S	TPH-g	26	1	25	3.85	0.5	40	0.98	0.98	16.2877	20	9.6015	0.5895	0.98	2023-11-01	25	0.3	---	70% (+)	No Trend	>50% ND	20
SVM-13D	TPH-g	24	2	22	8.33	0.5	20	74	1500	66.0417	20	299.3608	4.5329	ND (0.5)	2022-08-01	-41	0.1625	---	83.8% (-)	No Trend	>50% ND	21
SVM-13M	TPH-g	23	0	23	0	0.5	20	---	---	15.7609	20	8.224	0.5218	ND (0.5)	2022-08-01	0	0.5107	---	48.9% (+)	No Trend	>50% ND	21
SVM-13S	TPH-g	24	0	24	0	0.5	20	---	---	15.9375	20	8.0896	0.5076	ND (0.5)	2022-08-01	0	0.51	---	49% (+)	No Trend	>50% ND	21
SVM-14RD	TPH-g	15	3	12	20	0.5	20	0.6	810	56.784	20	201.4882	3.5483	810	2023-11-01	11	0.313	---	68.7% (+)	No Trend	>50% ND	70
SVM-14RM	TPH-g	15	0	15	0	0.5	20	---	---	12.2	20	9.8883	0.8105	ND (0.5)	2023-11-01	0	0.52	---	48% (+)	No Trend	>50% ND	70
SVM-14RS	TPH-g	15	0	15	0	0.5	20	---	---	12.2	20	9.8883	0.8105	ND (0.5)	2023-11-01	0	0.52	---	48% (+)	No Trend	>50% ND	70
SVM-16D	TPH-g	26	7	19	26.92	0.5	20	0.6	9200	923.7299	20	2512.6971	2.7202	ND (0.5)	2023-11-01	54	0.1225	---	87.8% (+)	No Trend	>50% ND	1
SVM-16M	TPH-g	26	0	26	0	0.5	20	---	---	15.5	20	8.3785	0.5406	ND (0.5)	2023-11-01	0	0.5087	---	49.1% (+)	No Trend	>50% ND	1
SVM-16S	TPH-g	25	0	25	0	0.5	20	---	---	15.32	20	8.4999	0.5548	ND (0.5)	2023-11-01	0	0.509	---	49.1% (+)	No Trend	>50% ND	20
SVM-21D	TPH-g	10	1	9	10	0.5	20	0.62	0.62	10.262	10.31	10.2648	1.0003	ND (0.5)	2023-11-01	5	0.364	---	63.6% (+)	No Trend	>50% ND	133
SVM-21S	TPH-g	10	0	10	0	0.5	20	---	---	10.25	10.25	10.2774	1.0027	ND (0.5)	2023-11-01	0	0.5357	---	46.4% (+)	No Trend	>50% ND	133
SVM-22D	TPH-g	8	0	8	0	0.5	20	---	---	12.6875	20	10.0922	0.7954	ND (0.5)	2022-08-01	0	0.548	---	45.2% (+)	No Trend	>50% ND	133
SVM-22S	TPH-g	8	0	8	0	0.5	20	---	---	12.6875	20	10.0922	0.7954	ND (0.5)	2022-08-01	0	0.548	---	45.2% (+)	No Trend	>50% ND	133
SVM-23D	TPH-g	8	0	8	0	0.5	20	---	---	12.6875	20	10.0922	0.7954	ND (0.5)	2022-08-01	0	0.548	---	45.2% (+)	No Trend	>50% ND	133
SVM-23S	TPH-g	8	0	8	0	0.5	20	---	---	12.6875	20	10.0922	0.7954	ND (0.5)	2022-08-01	0	0.548	---	45.2% (+)	No Trend	>50% ND	133
SVM-24D	TPH-g	5	0	5	0	0.5	20	---	---	8.3	0.5	10.6806	1.2868	ND (0.5)	2022-08-01	0	0.592	---	40.8% (+)	No Trend	>50% ND	134
SVM-24S	TPH-g	5	0	5	0	0.5	20	---	---	8.3	0.5	10.6806	1.2868	ND (0.5)	2022-08-01	0	0.592	---	40.8% (+)	No Trend	>50% ND	134
SVM-25D	TPH-g	5	0	5	0	0.5	20	---	---	8.3	0.5	10.6806	1.2868	ND (0.5)	2022-08-01	0	0.592	---	40.8% (+)	No Trend	>50% ND	134
SVM-25S	TPH-g	5	0	5	0	0.5	20	---	---	8.3	0.5	10.6806	1.2868	ND (0.5)	2022-08-01	0	0.592	---	40.8% (+)	No Trend	>50% ND	134
SVM-26D	TPH-g	6	1	5	16.67	0.5	0.5	0.73	0.73	0.5383	0.5	0.0939	0.1744	ND (0.5)	2023-11-01	-3	0.36	---	64% (-)	No Trend	>50% ND	27
SVM-26S	TPH-g	5	0	5	0	0.5	0.5	---	---	0.5	0.5	0	0	ND (0.5)	2023-11-01	0	0.592	---	40.8% (+)	No Trend	>50% ND	134
SVM-27D	TPH-g	5	0	5	0	0.5	0.5	---	---	0.5	0.5	0	0	ND (0.5)	2023-11-01	0	0.592	---	40.8% (+)	No Trend	>50% ND	134
SVM-27S	TPH-g	5	1	4	20	0.5	0.5	0.59	0.59	0.518	0.5	0.0402	0.0777	ND (0.5)	2023-11-01	-2	0.408	---	59.2% (-)	No Trend	>50% ND	134
SVP-105D	TPH-g	6	0	6	0	0.5	20	---	---	13.5	20	10.0698	0.7459	ND (0.5)	2022-08-01	0	0.5773	---	42.3% (+)	No Trend	>50% ND	21
SVP-105S	TPH-g	6	0	6	0	0.5	20	---	---	13.5	20	10.0698	0.7459	ND (0.5)	2022-08-01	0	0.5773	---	42.3% (+)	No Trend	>50% ND	21
SVP-106D	TPH-g	6	0	6	0	0.5	20	---	---	13.5	20	10.0698	0.7459	ND (0.5)	2022-08-01	0	0.5773	---	42.3% (+)	No Trend	>50% ND	21
SVP-106S	TPH-g	6	0	6	0	0.5	20	---	---	13.5	20	10.0698	0.7459	ND (0.5)	2022-08-01	0	0.5773	---	42.3% (+)	No Trend	>50% ND	21
SVP-107D	TPH-g	6	0	6	0	0.5	20	---	---	13.5	20	10.0698	0.7459	ND (0.5)	2022-08-01	0	0.5773	---	42.3% (+)	No Trend	>50% ND	21
SVP-107S	TPH-g	6	0	6	0	0.5	20	---	---	13.5	20	10.0698	0.7459	ND (0.5)	2022-08-01	0	0.5773	---	42.3% (+)	No Trend	>50% ND	21
SVP-108D	TPH-g	9	7	2	77.78	20	20	3.8	9100	1992.9815	20	3380.1853	1.696	6.4	2023-11-01	-11	0.1545	---	84.5% (-)	No Trend	Not Stable	20
SVP-108S	TPH-g	9	2	7	22.22	0.5	20	1.1	1.1	11.4667	20	10.1215	0.8827	ND (0.5)	2023-11-01	10	0.179	---	82.1% (+)	No Trend	>50% ND	20

Attachment B. Statistical Trend Results

SFPP Norwalk Pump Station, Norwalk, California

Mann-Kendall TestData Preparation (September 2015 to Present)																					
Location	**Analyte**	**COUNT**	**DET**	**CEN**	**PER.DET**	**MIN.CEN**	**MAX.CEN**	**MIN.DET**	**MAX.DET**	**MEAN**	**MEDIAN**	**SD**	**CV**	**LASTVALUE**	**LASTDATE**	**S**	**PVAL**	**SLOPE**	**RESULT**	**TREND**	**STABILITY**	**MIN.LAG**
SVP-109D	TPH-g	9	0	9	0	0.5	20	---	---	15.6667	20	8.5987	0.5489	ND (0.5)	2022-08-01	0	0.54	---	46% (+)	No Trend	>50% ND	21
SVP-109S	TPH-g	9	0	9	0	0.5	20	---	---	15.6667	20	8.5987	0.5489	ND (0.5)	2022-08-01	0	0.54	---	46% (+)	No Trend	>50% ND	21

Notes:

ND	Non-Detect
N/A	Not Applicable
IS	Insufficient Data for trend analysis (valid statistical trend analysis requires 3 or more observations)
>50% ND	Valid statistical trend analysis requires 3 or more observations, with less than 50% nondetect values per well
Stable	CV is <1.0
Not Stable	CV is >1.0
No Trend	Trend in well is not statistically significant in a positive or negative direction
Increasing	Statistically significant increasing trend observed in the data over time
Decreasing	Statistically significant decreasing trend observed in the data over time
COUNT	Count of Sample Results
DET	Number of Detections
CEN	Number of Non-Detections
PER.DET	Percent Detections
MIN.CEN	Minimum Non-Detect Value in Dataset
MAX.CEN	Maximum Non-Detect Value in Dataset
MIN.DET	Minimum Detected Value in Dataset
MAX.DET	Maximum Detected Value in Dataset
SD	Standard Deviation
CV	Coefficient of Variation
LASTVALUE	Last Analytical Result Value
LASTDATE	Last Analytical Result Date
S	S Statistic for Mann-Kendall Analysis
PVAL	Probability Value
MIN.LAG	Minimum Spacing Between Consecutive Measurements in Dataset (Days)