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Mr. Paul Cho
Regional Water Quality Control Board
Los Angeles Region
320 West 4th Street, Suite 200
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January 28, 2016

Subject: Results of September 2015 Soil Vapor Monitoring at the South-Central and Southeastern Areas of the SFPP Norwalk Pump Station, Norwalk, California

Dear Mr. Cho,

This letter report presents the results of the follow-up annual soil vapor monitoring conducted in September 2015 at the SFPP Norwalk Pump Station, located at 15306 Norwalk Boulevard, Norwalk, California (the site; Figure 1). The work was performed by CH2M HILL Engineers, Inc. (CH2M) in accordance with the following work plan and work plan addendum:

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

The project background, approach, and results of the September 2015 soil vapor sampling event are presented below.

Background

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

- *Results of Soil Vapor Monitoring at the South-Central and Southeastern Offsite Areas of the SFPP Norwalk Pump Station, Norwalk, California*, prepared by CH2M, dated November 30, 2012.

A technical meeting between Kinder Morgan Energy Partners, L.P. (Kinder Morgan) and the RWQCB was held on December 14, 2012, and the results of the soil vapor investigation (CH2M, 2012) were

presented. A reduction in the soil vapor monitoring frequency from semiannual to annual was recommended by the RWQCB since the concentrations of constituents of potential concern (COPCs) were below California Human Health Screening Levels.

Follow-up annual soil vapor monitoring using mobile and fixed laboratories was conducted in August 2013; the results are presented in the following report:

- *Results of August 2013 Soil Vapor Monitoring at the South-Central and Southeastern Offsite Areas of the SFPP Norwalk Pump Station, Norwalk, California*, prepared by CH2M, dated February 18, 2014.

In September 2014, CH2M retained Environmental Support Technologies, Inc., of Irvine, California, to install six triple-nested soil vapor monitoring probes (SVM-11 to SVM-16) to supplement the existing monitoring probes in the south-central area. Figure 2 shows the locations of the new soil vapor monitoring points. The objective of these probes was to have a sufficient coverage of probes spatially to evaluate (1) the radius of influence (ROI) during upcoming pilot testing of the newly constructed horizontal biosparge well, (2) potential migration of vapor hydrocarbons, and (3) the changes in vapor chemistry with distance above the hydrocarbon smear zone and increasing distance from the biosparge well. Each monitoring point consists of a soil vapor probe nest with probes completed at approximately 7, 15, and 22 feet bgs in a single borehole. Figure 3 presents a typical nested soil vapor monitoring probe completion diagram. Additional details are presented in the following report:

- *Horizontal Biosparge Well and Soil Vapor Monitoring Probe Completion Report, SFPP Norwalk Pump Station, Norwalk, California*, prepared by CH2M, dated February 18, 2015.

In October 2014, CH2M retained American Analytics, Inc., of Chatsworth, California, to conduct the annual soil vapor monitoring, which included the sampling of probes SVM-1 through SVM-3, and SVM-5 through SVM-16. The results are presented in the following report:

- *Results of October 2014 Soil Vapor Monitoring at the South-Central and Southeastern Offsite Areas of the SFPP Norwalk Pump Station, Norwalk, California*, prepared by CH2M, dated February 24, 2015.

CH2M retained American Analytics to conduct the 2015 annual soil vapor monitoring between September 23 and 25, 2015, which included the sampling of probes SVM-1 through SVM-3, and SVM-5 through SVM-16. A mobile laboratory was used American Analytics for onsite laboratory analysis of soil vapor samples. Fixed laboratory samples also were collected and submitted to an offsite laboratory (Air Technology Laboratories, Inc., of City of Industry, California). The technical approach and analytical results are discussed below.

Approach

Soil vapor samples were collected from probes SVM-1 through SVM-3, and SVM-5 through SVM-16 between September 23 and 25, 2015. SFPP's soil vapor extraction (SVE) system was shut down on September 17, 2015, to allow the vadose zone to reach equilibrium prior to sample collection. Soil vapor sampling was performed by American Analytics under the direction of CH2M. The soil vapor probes at each monitoring point were purged and sampled in accordance with the recommended guidelines in the Department of Toxic Substances Control (DTSC) *Advisory for Active Soil Gas Investigations (Advisory)*, dated July 2015 (DTSC, 2015a). The sampling procedures for these activities (including purge volume, shut-in, and leak tests) are described below. The analytical results were evaluated by comparison with soil gas screening levels based on the most current DTSC guidance. The soil gas screening levels are calculated from indoor air screening levels published by DTSC in its Human Health Risk Assessment (HHRA) Note 3 (DTSC, 2015b) using the default attenuation factors presented in DTSC's vapor intrusion guidance (DTSC, 2011).

Purge Volume

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

Shut-In Test

Prior to purging and sampling each soil vapor probe, a shut-in test was conducted to check for leaks in the aboveground sampling train (valves, tubing, and fittings from downstream to the top of the probe). A vacuum of approximately 100 inches of water (in. H₂O) was applied to the aboveground sampling train for a period of approximately 1 minute. No significant decreases in vacuum were reported during any of the shut-in tests conducted.

Leak Test

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

Soil Vapor Sampling and Analysis

As described above, soil vapor sampling was conducted from probes SVM-1 through SVM-3, and SVM-5 through SVM-16 between September 23 and 25, 2015. The soil vapor probes from each monitoring point were purged and sampled using a vacuum/pressure sampling pump calibrated to a flow rate of 200 ml/min in accordance with recommended flow rates in the Advisory (DTSC, 2015a).

A soil vapor sample was not collected at the deep probe of SVM-2 and shallow probe of SVM-10 due to flow restrictions (excessive vacuum) observed during purging activities with a mechanical and hand-held sampling pump. Soil vapor samples also were not collected from the shallow or deep probes of SVM-4 due to property access restrictions.

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

Four confirmation soil vapor samples were collected in 1-liter Summa canisters at the deepest probes of SVM-1 (14.5-foot depth), SVM-5 (15-foot depth), SVM-7 (13.25-foot depth), and SVM-14 (22-foot depth). The Summa canisters were submitted by CH2M to Air Technology Laboratories and analyzed for VOCs using EPA Method TO-15 and TPH-g using EPA Method TO-3. Fixed gas samples were analyzed by

Air Technology Laboratories using ASTM International (ASTM) Method D1946. The analysis of methane, oxygen, and carbon dioxide will assist with the evaluation of natural attenuation in the vadose zone.

In accordance with the Advisory (DTSC, 2015a), field duplicate soil vapor samples were collected at a minimum frequency of 1 per every 20 soil vapor samples collected. Duplicate soil vapor samples were collected at SVM-3 (5-foot depth), SVM-7 (13.25-foot depth), SVM-10 (15.5-foot depth), and SVM-14 (15-foot depth). The duplicate samples were collected and analyzed in the same manner as the primary samples.

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

- September 23, 2015 at SVM-13
- September 24, 2015 at SVM-9
- September 25, 2015 at SVM-10

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

Mobile Laboratory Results

VOCs and TPH-g

Table 1 presents the analytical results for VOCs and TPH-g provided by the onsite mobile laboratory. VOCs and TPH-g results are also shown on Figure 4. Laboratory analytical reports are provided in Attachment A. A summary of results is provided below.

- COPCs were nondetect at all sample depths in probes SVM-1, SVM-2, SVM-5, SVM-7, and SVM-10.
- 1,2,4-Trimethylbenzene was detected in the 15-foot sample depth of SVM-3 (0.023 microgram per liter [$\mu\text{g/L}$]) and the 7-foot depth of SVM-6 (0.023 $\mu\text{g/L}$). Both detections were low, near the laboratory reporting limit, and were below screening levels under residential and commercial scenarios.
- Toluene and m,p-xylenes were the most frequently detected COPCs. These constituents were detected in one or more sample depth in probes SVM-3, SVM-6, SVM-8, SVM-9, and SVM-11 through SVM-16. Reported concentrations of toluene and m,p-xylenes were generally low, near the laboratory reporting limit, with the exception of those reported in the 22-foot sample depth of probes SVM-14 and SVM-16. The maximum concentrations of toluene and m,p-xylenes were 99 $\mu\text{g/L}$ and 150 $\mu\text{g/L}$, respectively. Both of these detections were reported in the 22-foot sample depth of SVM-14. All toluene and m,p-xylene detections were below screening levels under residential and commercial scenarios.
- 1,3,5-Trimethylbenzene and TPH-g were detected in the 22-foot sample depth of SVM-14, but were not detected in the shallower depths at this location. The reported concentration of 1,3,5-trimethylbenzene (48 $\mu\text{g/L}$) was above the residential screening level of 14.6 $\mu\text{g/L}$ but below the commercial screening level of 62 $\mu\text{g/L}$. The reported concentration of TPH-g (12,000 $\mu\text{g/L}$) was above both residential and commercial screening levels of 1,260 $\mu\text{g/L}$ and 5,200 $\mu\text{g/L}$, respectively. All other detections of COPCs at SVM-14 were below screening levels under residential and commercial scenarios.

- Benzene and TPH-g were detected in the 22-foot sample depth of SVM-16, but were not detected in the shallower depths at this location. The reported concentration of benzene (8.4 µg/L) was above residential and commercial screening levels of 0.17 µg/L and 0.84 µg/L, respectively. The reported concentration of TPH-g (1,700 µg/L) was above the residential screening level of 1,260 µg/L but below the commercial screening level of 5,200 µg/L. All other detections of COPCs at SVM-16 were below screening levels under residential and commercial scenarios.

Fixed Gases

Table 1 also presents the analytical results provided by the mobile laboratory for methane, oxygen, and carbon dioxide analysis using EPA Method 3C. Laboratory analytical reports are provided in Attachment A. As mentioned in the previous section, the analysis of methane, oxygen, and carbon dioxide was used to assist with the evaluation of natural attenuation (biodegradation) of hydrocarbon constituents in the vadose zone.

Figures 5 and 6 present oxygen and carbon dioxide concentrations with increasing depth, respectively, at probes SVM-11 through SVM-16. Methane results were not plotted since concentrations of methane were nondetect at all depths in these probes. In general, oxygen concentrations decrease with increasing depth. Conversely, carbon dioxide concentrations increase with increasing depth. The results are generally consistent with the data collected in 2014, with the exception that methane was not detected by the mobile laboratory in any probes in 2015. Although the mobile laboratory results for methane were nondetect, the fixed laboratory results (presented in the following section) indicate the presence of methane at the 22-foot depth of SVM-14.

Quality Assurance/Quality Control

Fixed Laboratory Results

Table 2 presents the fixed laboratory analytical results for VOCs using EPA Method TO-15, TPH-g using EPA Method TO-3, and fixed gases using ASTM Method D1946. The laboratory analytical reports are provided in Attachment B. The fixed laboratory was able to achieve much lower detection limits than those provided by the mobile laboratory for TO-15 analysis. The results presented in Table 2 are for samples collected at the deepest probes of SVM-1, SVM-5, SVM-7, and SVM-14. As shown in Table 2, several COPCs were detected at all probes sampled, but at relatively low concentrations just above the laboratory minimum detection limit. The “J-flagged” qualifier indicates that the sample result was above the minimum detection limit but below the laboratory reporting limit. Detections of COPCs in SVM-1, SVM-5, and SVM-7 were below human health screening levels under residential and commercial scenarios. In SVM-14 at the 22-foot depth, 1,2,4-trimethylbenzene (16 µg/L), 1,2-dichloroethylene (0.84 µg/L), and 1,3,5-trimethylbenzene (36 µg/L) were detected at concentrations above the respective residential screening levels but below the commercial screening levels. Benzene (33 µg/L), ethylbenzene (11 µg/L), and TPH-g (22,000 µg/L) were detected above screening levels under both residential and commercial scenarios. 1,3,5-trimethylbenzene, m,p-xylenes, and TPH-g concentrations were generally consistent with the concentrations reported by the mobile laboratory. However, due to the higher reporting limits required by the mobile laboratory sample, a comparison of the other detected COPCs could not be made.

Leak Testing

The leak test compound (2-propanol) was not detected in the mobile laboratory samples, indicating there were no leaks in the sampling train during purging and sampling activities. However, 2-propanol was detected at concentrations at or below the laboratory reporting limit in the fixed gas samples. Although 2-propanol was detected, the concentrations are still less than 10 times the concentration of

the laboratory reporting limit. According to the Advisory (DTSC, 2015a), if a leak test compound is detected at a concentration 10 times or more above the laboratory reporting limit, then corrective actions are required to be taken in order to confirm ambient air breakthrough or leaks in the sampling train. The concentration of the leak detection compound was below this level; therefore, no corrective action was required or performed.

Ambient Blanks

As discussed previously, ambient air samples were collected each day of sampling to confirm ambient air concentrations of COPCs near select probe locations (SVM-9, SVM-10, and SVM-13). The results are presented in Table 1. Toluene and m,p-xylenes were the only two detectable COPCs in ambient air samples collected September 23 and 24, 2015. Concentrations were low and close to the mobile laboratory reporting limits. All COPCs were nondetect in the sample collected on September 25, 2015. It is suspected that the trace detections of toluene and m,p-xylenes were a result of combustion engine emissions from nearby vehicles or heavy equipment used as part of the ongoing demolition activities at the Norwalk site. Because the sample train used during purging and sampling activities is a closed system, it is unlikely that there was any effect on analytical results.

Summary and Recommendations

The 2015 annual soil vapor monitoring was conducted at the SFPP Norwalk Pump Station site between September 23 and 25, 2015, and included the sampling of nested probes SVM-1 through SVM-3, and SVM-5 through SVM-16. A soil vapor sample was not collected at the deep probe of SVM-2 and shallow probe of SVM-10 due to flow restrictions (excessive vacuum) observed during purging activities. Soil vapor samples also were not collected from the shallow or deep probes of SVM-4 due to property access restrictions.

Mobile laboratory detections of COPCs were reported in the deeper probes (22-foot depth) of SVM-14 and SVM-16 at concentrations greater than human health screening levels under residential and/or commercial scenarios. Depth to water across the site is between 25 and 30 feet bgs, with the hydrocarbon smear zone occurring at average depths of approximately 27 to 31 feet bgs in the south-central area. Therefore, it is not unexpected that soil vapor samples at the 22-foot depth probes have elevated COPCs at concentrations exceeding screening levels. Detected COPCs shallower than 22 feet were generally low, near the laboratory reporting limit, and below human health screening levels.

The fixed laboratory results for samples collected at SVM-1, SVM-5, SVM-7, and SVM-14 showed detections of several COPCs. Most of the detections at SVM-1, SVM-5, and SVM-7 were below analytical reporting limits (J-flagged), and all detections were below the human health screening levels. In SVM-14 at the 22-foot depth, several COPCs were detected above screening levels under residential and/or commercial scenarios. COPC concentrations at SVM-14 were generally consistent with the concentrations reported by the mobile laboratory.

The concentration trends of oxygen and carbon dioxide (and to some degree methane) with depth are as expected given the site conditions. The generally low concentrations of carbon dioxide and methane, and high concentrations of oxygen at depths shallower than 15 feet bgs indicate that shallow soil media beneath the site is predominantly aerobic, which is favorable for natural attenuation of hydrocarbon constituents. Lower oxygen concentrations at greater depths indicate that the deeper soil media is approaching anaerobic conditions. The presence of methane in the fixed laboratory sample at the 22-foot depth of SVM-14 suggests that natural attenuation of hydrocarbon constituents is still occurring near the smear zone.

Monthly soil vapor sampling will be implemented as part of the pilot testing activities in the south-central area of the site. Pilot testing commenced in early January 2016 and will continue for a period of approximately 1 year. Details of the sampling are provided in the *Horizontal Biosparge System Construction and Pilot Test Work Plan* submitted to the RWQCB on November 18, 2013 (CH2M, 2013). The next planned annual sampling event, which includes sampling in the southeastern area, is anticipated to occur in the fourth quarter 2016.

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

Regards,
CH2M HILL Engineers, Inc.



Dan Jablonski
Project Manager



John Lowe, CIH
Vapor Intrusion Consultant

Attachments:

References
Table 1 – Mobile Laboratory Analytical Results
Table 2 – Fixed Laboratory Analytical Results
Figure 1 – Site Location Map
Figure 2 – Soil Vapor Monitoring Probe Locations
Figure 3 – Typical Nested Soil Vapor Monitoring Probe Completion Diagram
Figure 4 – Mobile Laboratory Soil Vapor Analytical Results
Figure 5 – Soil Oxygen Concentrations with Depth
Figure 6 – Soil Carbon Dioxide Concentrations with Depth
Attachment A – Mobile Laboratory Analytical Reports
Attachment B – Fixed Laboratory Analytical Reports

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Tables

Table 1. Mobile Laboratory Analytical Results
SFPF Norwalk Pump Station, Norwalk, California

Analyte	Unit	Future Residential Soil Gas Screening Level ^{a, b}	Future Commercial Soil Gas Screening Level ^{a, b}	SVM-1-5 9/24/2015 SVM-1 5-5.5	SVM-1-14.5 9/24/2015 SVM-1 14.5-15	SVM-2-5 9/24/2015 SVM-2 5-5.5	SVM-3-5 DUP 9/25/2015 SVM-3 5-5.5	SVM-3-5 9/25/2015 SVM-3 5-5.5	SVM-3-15 9/25/2015 SVM-3 15-15.5	SVM-5-5 9/25/2015 SVM-5 5-5.5	SVM-5-15 9/25/2015 SVM-5 15-15.5	SVM-6-7 9/24/2015 SVM-6 7-7.5	SVM-6-15 9/24/2015 SVM-6 15-15.5
1,2,4-Trimethylbenzene	µg/L	14.6	62	<0.02	<0.02	<0.02	<0.02	<0.02	0.023	<0.02	<0.02	0.023	<0.02
1,2-Dichloroethane	µg/L	0.22	0.94	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,3,5-Trimethylbenzene	µg/L	14.6	62	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
2-Propanol (leak test compound)	µg/L	---	---	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29
Benzene	µg/L	0.17	0.84	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	µg/L	2.2	9.8	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Isopropylbenzene	µg/L	2000	8800	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
m,p-Xylenes	µg/L	200	880	<0.02	<0.02	<0.02	<0.02	<0.02	0.046	<0.02	<0.02	0.043	0.031
Methyl tert-butyl ether (MTBE)	µg/L	22	94	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	2000	8800	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
n-Propylbenzene	µg/L	2000	8800	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
o-Xylene	µg/L	200	880	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
sec-Butylbenzene	µg/L	2000	8800	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
tert-Butanol (TBA)	µg/L	62000	260000	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Toluene	µg/L	620	2600	<0.02	<0.02	<0.02	<0.02	<0.02	0.039	<0.02	<0.02	0.037	0.026
TPH-g (C4-C12)	µg/L	1260	5200	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Methane	% v/v	---	---	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Oxygen	% v/v	---	---	18	18	18	19	18	18	18	18	18	18
Carbon Dioxide	% v/v	---	---	0.1	0.12	0.17	0.29	0.28	0.45	0.11	0.19	0.14	0.23

Table 1. Mobile Laboratory Analytical Results
SFPF Norwalk Pump Station, Norwalk, California

Analyte	Unit	Future Residential Soil Gas Screening Level ^{a, b}	Future Commercial Soil Gas Screening Level ^{a, b}	SVM-7-7 9/24/2015 SVM-7 7-7.5	SVM-7-13.25 9/24/2015 SVM-7 13.25-13.75	SVM-7-13.25 DUP 9/24/2015 SVM-7 13.25-13.75	SVM-8-5 9/25/2015 SVM-8 5-5.5	SVM-8-15 9/25/2015 SVM-8 15-15.5	SVM-9-5 9/24/2015 SVM-9 5-5.5	SVM-9-14.5 9/24/2015 SVM-9 14.5-15	SVM-10-15.5 9/25/2015 SVM-10 15.5-16	SVM-10-15.5 DUP 9/25/2015 SVM-10 15.5-16	SVM-11-7 9/23/2015 SVM-11 7-7.5
1,2,4-Trimethylbenzene	µg/L	14.6	62	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloroethane	µg/L	0.22	0.94	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,3,5-Trimethylbenzene	µg/L	14.6	62	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
2-Propanol (leak test compound)	µg/L	---	---	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29
Benzene	µg/L	0.17	0.84	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	µg/L	2.2	9.8	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Isopropylbenzene	µg/L	2000	8800	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
m,p-Xylenes	µg/L	200	880	<0.02	<0.02	<0.02	0.028	0.03	0.023	<0.02	<0.02	<0.02	0.035
Methyl tert-butyl ether (MTBE)	µg/L	22	94	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	2000	8800	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
n-Propylbenzene	µg/L	2000	8800	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
o-Xylene	µg/L	200	880	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
sec-Butylbenzene	µg/L	2000	8800	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
tert-Butanol (TBA)	µg/L	62000	260000	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Toluene	µg/L	620	2600	<0.02	<0.02	<0.02	0.032	0.031	<0.02	<0.02	<0.02	<0.02	0.027
TPH-g (C4-C12)	µg/L	1260	5200	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Methane	% v/v	---	---	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Oxygen	% v/v	---	---	18	18	18	18	18	18	16	15	15	18
Carbon Dioxide	% v/v	---	---	0.56	0.89	0.89	0.33	0.36	0.84	2.8	5.4	5.3	0.63

Table 1. Mobile Laboratory Analytical Results
SFPF Norwalk Pump Station, Norwalk, California

Analyte	Unit	Future Residential Soil Gas Screening Level ^{a, b}	Future Commercial Soil Gas Screening Level ^{a, b}	SVM-11-15 9/23/2015 SVM-11 15-15.5	SVM-11-22 9/23/2015 SVM-11 22-22.5	SVM-12-7 9/23/2015 SVM-12 7-7.5	SVM-12-15 9/23/2015 SVM-12 15-15.5	SVM-12-22 9/23/2015 SVM-12 22-22.5	SVM-13-7 9/23/2015 SVM-13 7-7.5	SVM-13-15.5 9/23/2015 SVM-13 15.5-16	SVM-13-22.5 9/23/2015 SVM-13 22.5-23	SVM-14-7 9/23/2015 SVM-14 7-7.5	SVM-14-15 9/23/2015 SVM-14 15-15.5
1,2,4-Trimethylbenzene	µg/L	14.6	62	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloroethane	µg/L	0.22	0.94	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,3,5-Trimethylbenzene	µg/L	14.6	62	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
2-Propanol (leak test compound)	µg/L	---	---	<0.29	<0.29	<0.58	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29
Benzene	µg/L	0.17	0.84	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	µg/L	2.2	9.8	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Isopropylbenzene	µg/L	2000	8800	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
m,p-Xylenes	µg/L	200	880	0.02	0.029	0.042	0.043	0.029	0.036	0.026	0.028	0.035	0.025
Methyl tert-butyl ether (MTBE)	µg/L	22	94	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	2000	8800	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
n-Propylbenzene	µg/L	2000	8800	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
o-Xylene	µg/L	200	880	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
sec-Butylbenzene	µg/L	2000	8800	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
tert-Butanol (TBA)	µg/L	62000	260000	<20	<20	<40	<20	<20	<20	<20	<20	<20	<20
Toluene	µg/L	620	2600	<0.02	0.023	<0.04	0.035	0.026	0.032	0.021	0.025	0.027	0.022
TPH-g (C4-C12)	µg/L	1260	5200	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Methane	% v/v	---	---	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Oxygen	% v/v	---	---	18	18	18	17	12	18	19	17	18	18
Carbon Dioxide	% v/v	---	---	0.96	0.34	1.1	2.5	5.4	<0.1	<0.1	0.38	0.45	0.51

Table 1. Mobile Laboratory Analytical Results
 SFPP Norwalk Pump Station, Norwalk, California

Analyte	Unit	Future Residential Soil Gas Screening Level ^{a, b}	Future Commercial Soil Gas Screening Level ^{a, b}	SVM-14-15 DUP 9/23/2015 SVM-14 15-15.5	SVM-14-22 9/23/2015 SVM-14 22-22.5	SVM-15-7 9/24/2015 SVM-15 7-7.5	SVM-15-15 9/24/2015 SVM-15 15-15.5	SVM-15-22 9/24/2015 SVM-15 22-22.5	SVM-16-7 9/25/2015 SVM-16 7-7.5	SVM-16-15.5 9/25/2015 SVM-16 15.5-16	SVM-16-22 9/25/2015 SVM-16 22-22.5	Ambient Air 9/23/2015	Ambient Air 9/24/2015	Ambient Air 9/25/2015
1,2,4-Trimethylbenzene	µg/L	14.6	62	<0.02	<40	<0.02	<0.02	<0.02	<0.02	<0.02	<10	<0.02	<0.02	<0.02
1,2-Dichloroethane	µg/L	0.22	0.94	<0.02	<40	<0.02	<0.02	<0.02	<0.02	<0.02	<10	<0.02	<0.02	<0.02
1,3,5-Trimethylbenzene	µg/L	14.6	62	<0.02	48	<0.02	<0.02	<0.02	<0.02	<0.02	<10	<0.02	<0.02	<0.02
2-Propanol (leak test compound)	µg/L	---	---	<0.29	<580	<0.29	<0.29	<0.29	<0.29	<0.29	<140	<0.29	<0.29	<0.29
Benzene	µg/L	0.17	0.84	<0.02	<40	<0.02	<0.02	<0.02	<0.02	<0.02	8.4	<0.02	<0.02	<0.02
Ethylbenzene	µg/L	2.2	9.8	<0.02	<40	<0.02	<0.02	<0.02	<0.02	<0.02	<10	<0.02	<0.02	<0.02
Isopropylbenzene	µg/L	2000	8800	<0.02	<40	<0.02	<0.02	<0.02	<0.02	<0.02	<10	<0.02	<0.02	<0.02
m,p-Xylenes	µg/L	200	880	0.027	150	0.029	0.022	0.03	0.03	0.031	9.4	0.034	0.029	<0.02
Methyl tert-butyl ether (MTBE)	µg/L	22	94	<1	<2000	<1	<1	<1	<1	<1	<500	<1	<1	<1
n-Butylbenzene	µg/L	2000	8800	<0.02	<40	<0.02	<0.02	<0.02	<0.02	<0.02	<10	<0.02	<0.02	<0.02
n-Propylbenzene	µg/L	2000	8800	<0.02	<40	<0.02	<0.02	<0.02	<0.02	<0.02	<10	<0.02	<0.02	<0.02
o-Xylene	µg/L	200	880	<0.02	180	<0.02	<0.02	<0.02	<0.02	<0.02	<10	<0.02	<0.02	<0.02
sec-Butylbenzene	µg/L	2000	8800	<0.02	<40	<0.02	<0.02	<0.02	<0.02	<0.02	<10	<0.02	<0.02	<0.02
tert-Butanol (TBA)	µg/L	62000	260000	<20	<40000	<20	<20	<20	<20	<20	<10000	<20	<20	<20
Toluene	µg/L	620	2600	0.026	99	0.025	<0.02	0.034	0.029	0.028	9.7	0.032	0.028	<0.02
TPH-g (C4-C12)	µg/L	1260	5200	<20	12000	<20	<20	<20	<20	<20	1700	<20	<20	<20
Methane	% v/v	---	---	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	---	---	---
Oxygen	% v/v	---	---	18	3.3	18	18	18	18	18	1.1	---	---	---
Carbon Dioxide	% v/v	---	---	0.45	12	0.21	0.18	0.35	0.68	1.5	13	---	---	---

Notes:

^a Screening levels in soil gas are derived from indoor air screening levels (DTSC, 2015a) using the attenuation factor for soil gas samples for future land use (DTSC, 2011, Table 2).

^b There are no screening levels for TBA; surrogate sec-butyl alcohol screening levels provided.

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

--- = not available

% v/v = percent volume by volume

<0.02 = not detected at the laboratory minimum reporting limit

µg/L = micrograms per liter

DUP = field duplicate

J = the analyte was positively detected but is estimated

TPH-g = total petroleum hydrocarbons quantified as gasoline

5-5.5 = sample depth in feet below ground surface

9/24/2015 = sample date

SVM-1 = sample location

SVM-1-5 = sample ID

Table 2. Fixed Laboratory Analytical Results
SFPF Norwalk Pump Station, Norwalk, California

Analyte	Units	Future Residential Soil Gas Screening Level ^{a, b}	Future Commercial Soil Gas Screening Level ^{a, b}	SVM-1-14.5_092415 9/24/2015 SVM-1 14.5-15	SVM-5-15.5_092515 9/25/2015 SVM-5 15-15.5	SVM-7-13.25_092415 9/24/2015 SVM-7 13.25-13.75	SVM-14-22_092315 9/23/2015 SVM-14 22-22.5
1,2,4-Trimethylbenzene	µg/L	14.6	62	0.013 J	0.0093 J	0.014 J	16
1,2-Dichloroethane	µg/L	0.22	0.94	<0.00057	<0.00055	<0.00061	0.84
1,3,5-Trimethylbenzene	µg/L	14.6	62	0.0027 J	0.0019 J	0.0031 J	36
2-Propanol (leak test compound)	µg/L	---	---	0.0015 J	0.0032 J	0.025	0.032 J
Benzene	µg/L	0.17	0.84	0.0033 J	0.0036 J	0.012	33
Ethylbenzene	µg/L	2.2	9.8	0.0048 J	0.0039 J	0.0059 J	11
Isopropylbenzene	µg/L	2000	8800	<0.00098	<0.00094	0.0011 J	0.37 J
m,p-Xylenes	µg/L	200	880	0.022	0.017	0.02	100
Methyl tert-butyl ether (MTBE)	µg/L	22	94	<0.0015	<0.0015	<0.0016	<0.075
n-Butylbenzene	µg/L	2000	8800	0.0017 J	0.0013 J	0.0021 J	<0.038
n-Propylbenzene	µg/L	2000	8800	0.0022 J	0.0018 J	0.0023 J	0.97
o-Xylene	µg/L	200	880	0.0092	0.0077 J	0.011	120
sec-Butylbenzene	µg/L	2000	8800	<0.001	<0.00098	<0.0011	0.17 J
tert-Butanol (TBA)	µg/L	62000	260000	<0.0011	0.0015 J	0.013 J	<0.054
Toluene	µg/L	620	2600	0.018	0.016	0.016	71
TPH-g (C4-C12)	µg/L	1260	5200	2.2 J	2.1 J	10	22000
Methane	% v/v	---	---	<0.000087	<0.000084	<0.000092	0.02
Oxygen	% v/v	---	---	21	21	21	3.2
Carbon Dioxide	% v/v	---	---	0.13	0.24	1	13

Notes:

^a Screening levels in soil gas are derived from indoor air screening levels (DTSC, 2015a) using the attenuation factor for soil gas samples for future land use (DTSC, 2011, Table 2).

^b There are no screening levels for TBA; surrogate sec-butyl alcohol screening levels provided.

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

--- = not available

% v/v = percent volume by volume

<0.00057 = not detected above the laboratory minimum detection limit

µg/L = micrograms per liter

J = the analyte was positively detected but is estimated

TPH-g = total petroleum hydrocarbons quantified as gasoline

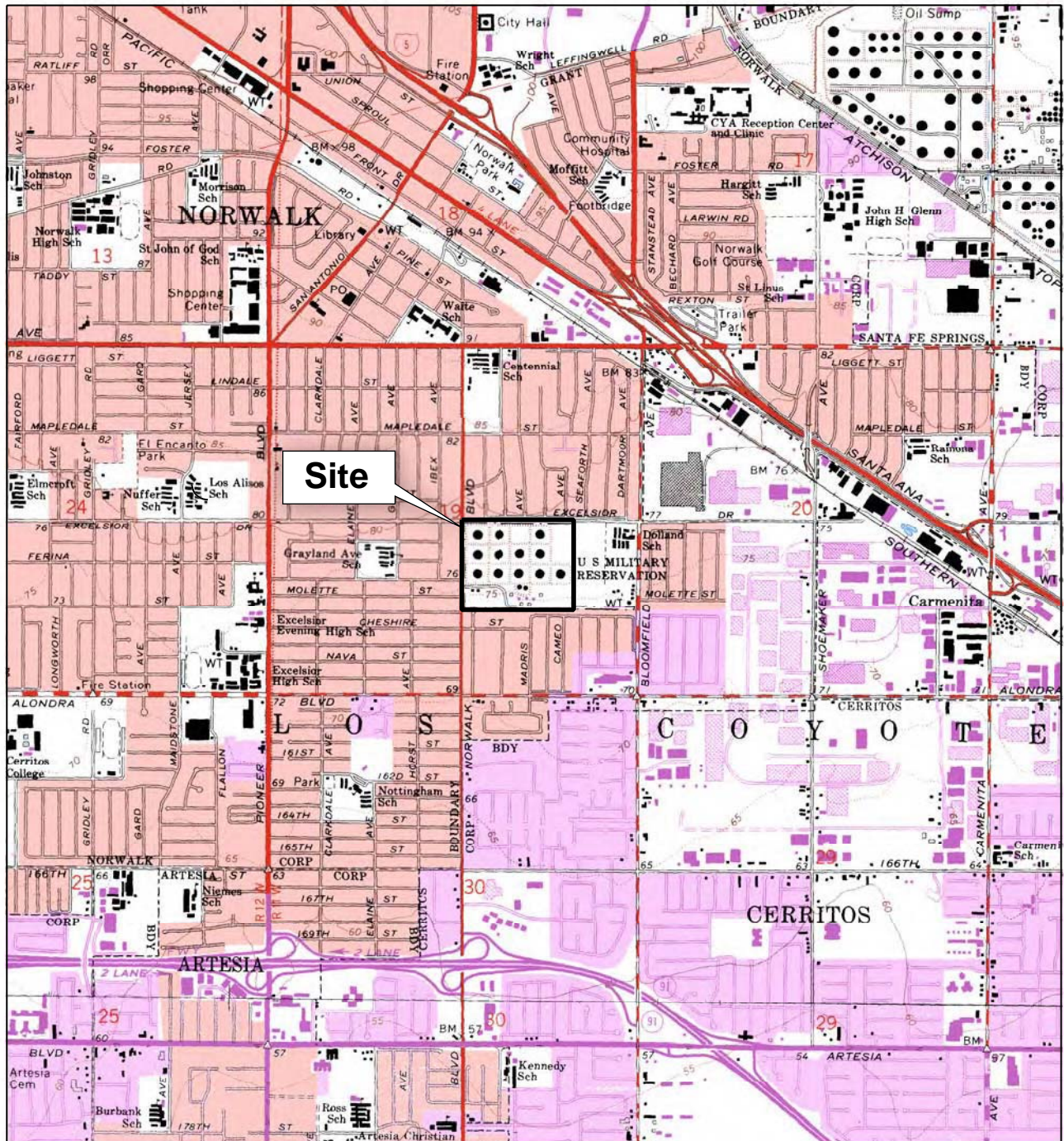
14.5-15 = sample depth in feet below ground surface

9/24/2015 = sample date

SVM-1 = sample location

SVM-1-14.5_092415 = sample ID

Figures



Site

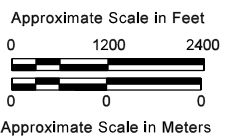
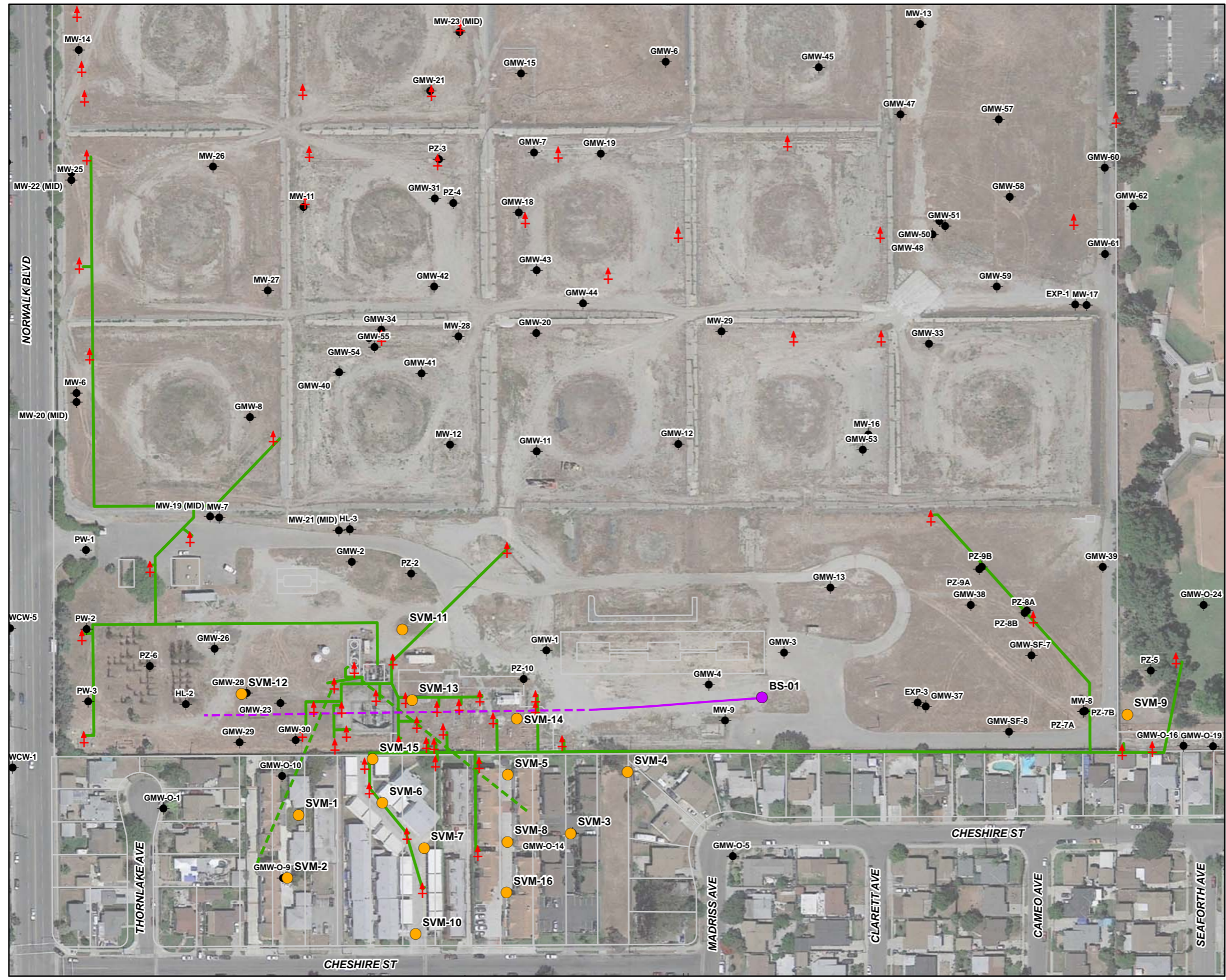


Figure 1
Site Location Map
SFPP Norwalk Pump Station
Norwalk, California

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





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

Imagery Source:
Google Earth April 17, 2013.

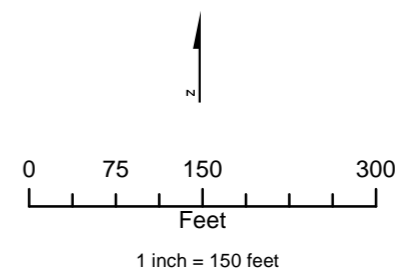


Figure 2
Soil Vapor Monitoring Probe Locations
SFPP Norwalk Pump Station
Norwalk, California

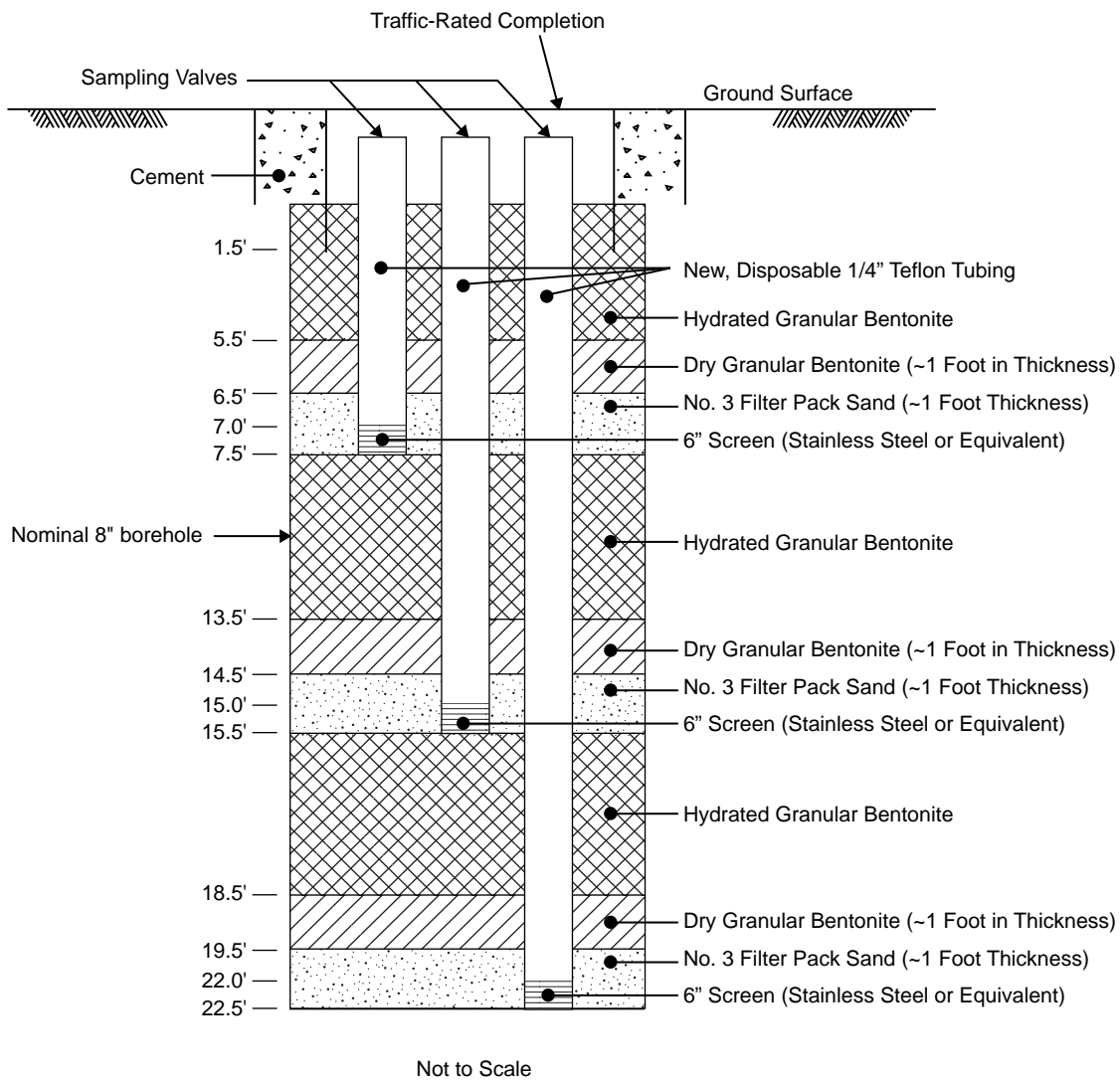
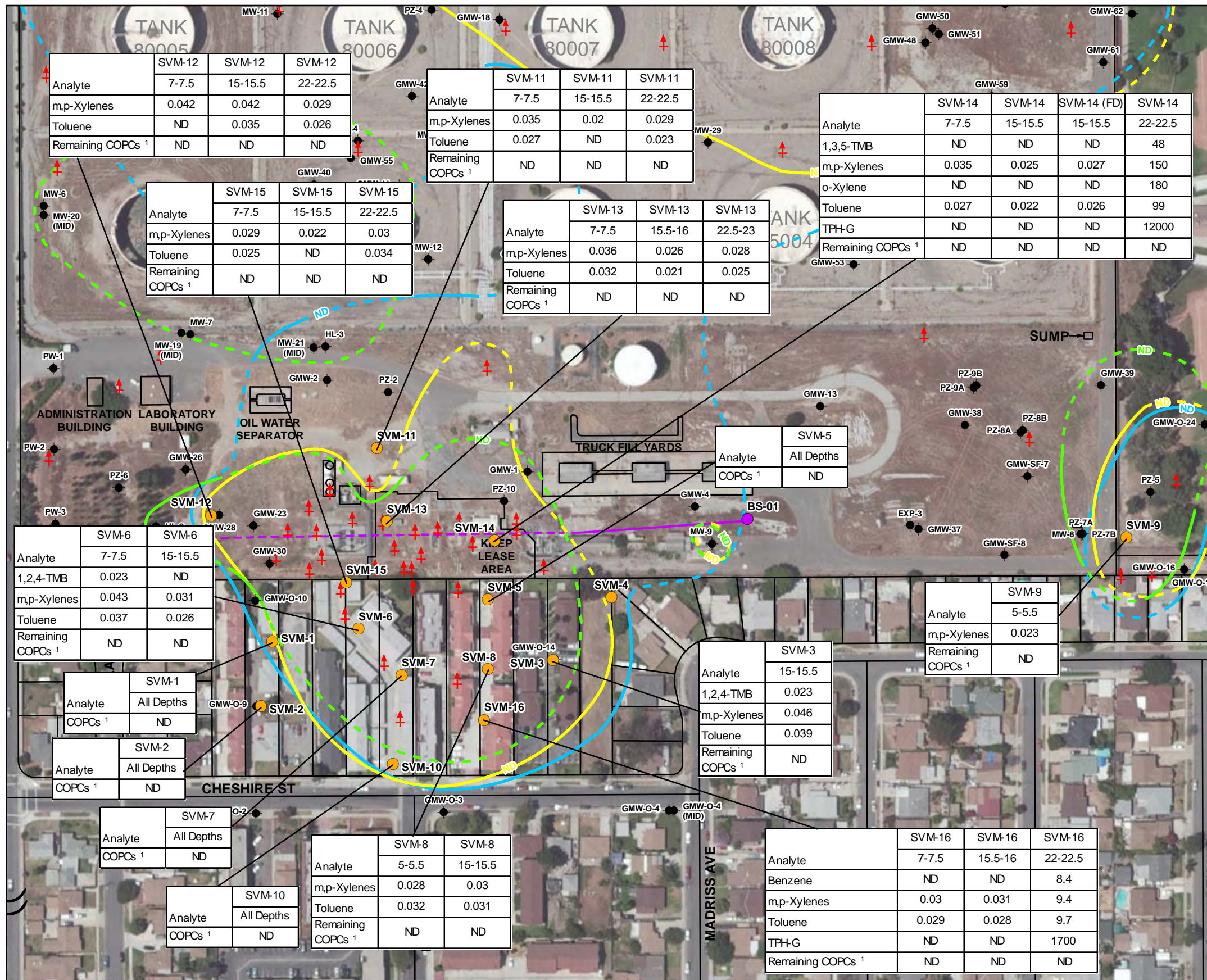


Figure 3
Typical Nested Soil Vapor
Monitoring Probe Completion Diagram
SFPP Norwalk Pump Station
Norwalk, California





LEGEND

- Monitoring Well Location
- ⊕ Vapor extraction, groundwater extraction, total fluids, or free product extraction well used for site remediation
- Soil Vapor Monitoring Probes
- Horizontal Biosparge Well Entry Point
- Horizontal Biosparge Well (dashed line depicts approximate lateral extent of well screen)

2015 Groundwater plume extents (South-central and Southeastern Areas)

- Estimated extent of dissolved total petroleum hydrocarbons (TPH) in groundwater based on data from April 2015; dashed where inferred
- Estimated extent of dissolved methyl tert-butyl ether (MTBE) in groundwater based on data from April 2015; dashed where inferred
- Estimated extent of dissolved benzene in groundwater based on data from April 2015; dashed where inferred

Notes:

1. COPCs =
 - 1,2,4-Trimethylbenzene (1,2,4-TMB)
 - 1,2-Dichloroethane (1,2-DCA)
 - 1,3,5-Trimethylbenzene (1,3,5-TMB)
 - 2-Propanol
 - Benzene
 - Ethylbenzene
 - Isopropylbenzene
 - m,p-Xylenes
 - Methyl Tert-Butyl Ether (MTBE)
 - n-Butylbenzene
 - n-Propylbenzene
 - o-Xylene
 - sec-Butylbenzene
 - Tertiary Butyl Alcohol (TBA)
 - Toluene
 - Total petroleum hydrocarbons quantified as gas (TPH-G)
2. ND = non-detect at the laboratory minimum detection limits

SVM-16 = Soil Probe Location ID
 15.5-16 = Sample Depth
 0.031 = Result

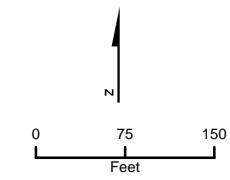


Figure 4
Mobile Laboratory Soil Vapor Analytical Results
 SFPP Norwalk Pump Station
 Norwalk, California

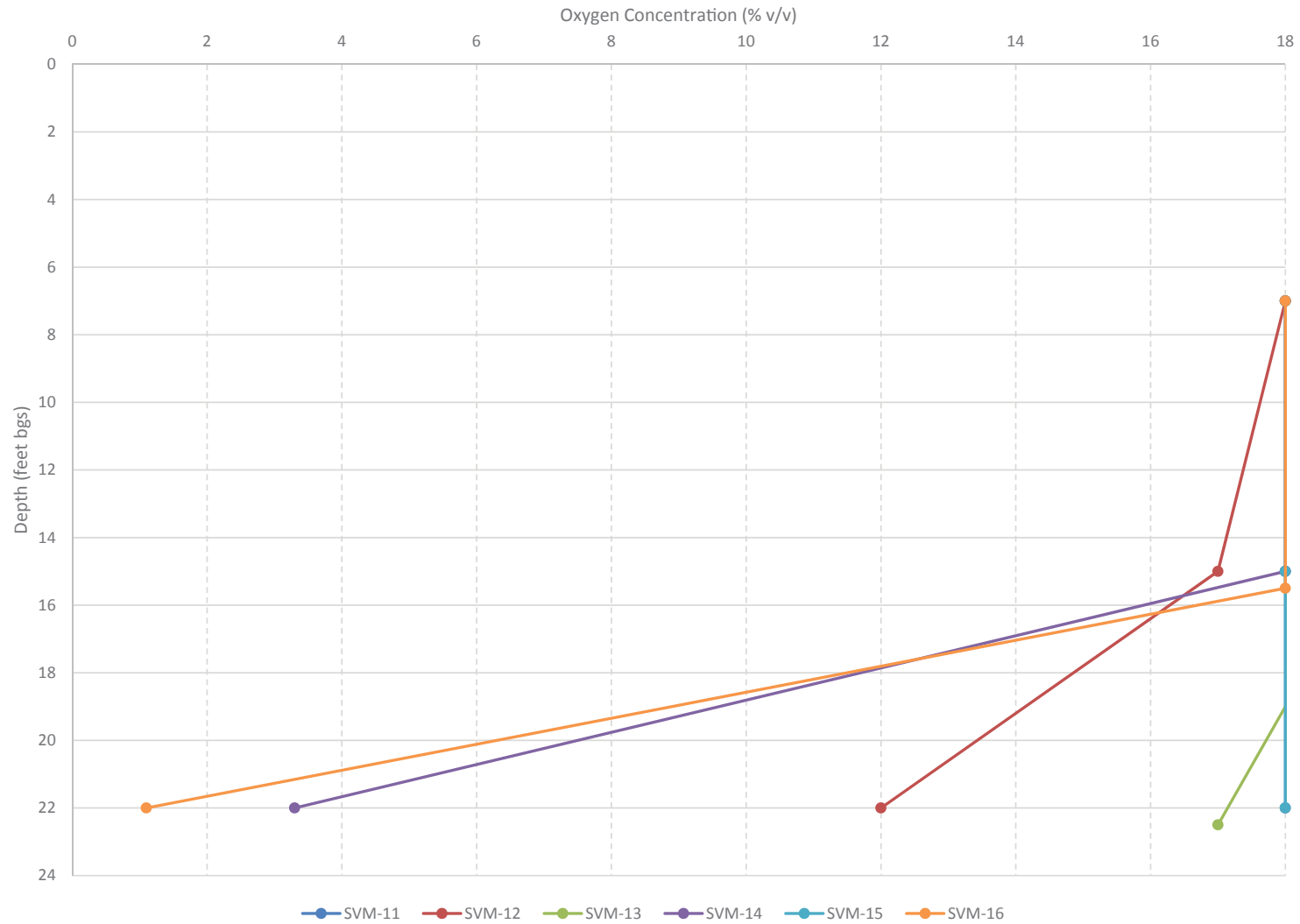


Figure 5
Soil Oxygen Concentrations with Depth
SFPP Norwalk Pump Station
Norwalk, California



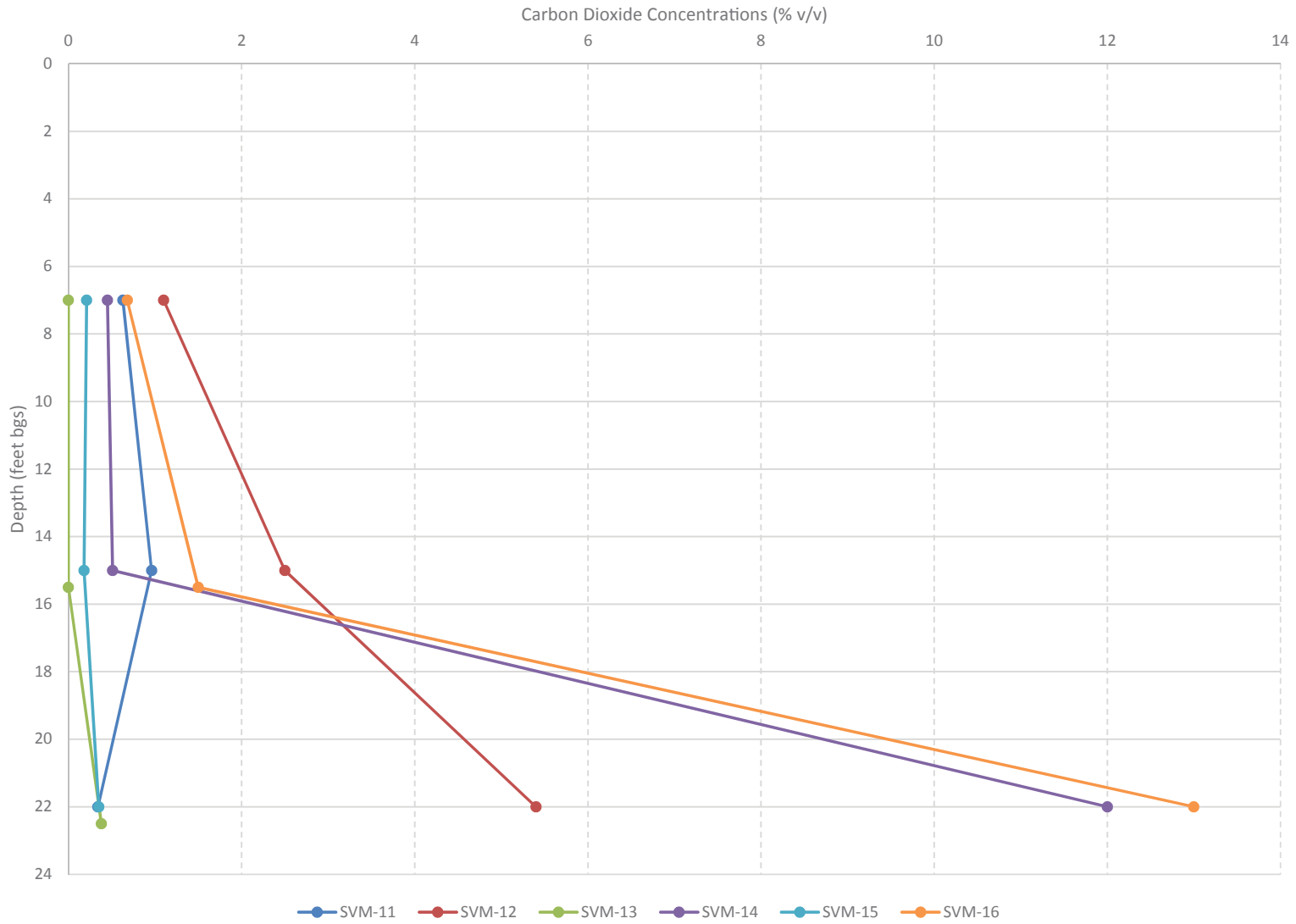


Figure 6
Soil Carbon Dioxide Concentrations with Depth
SFPP Norwalk Pump Station
Norwalk, California



Attachment A

Mobile Laboratory Analytical Reports



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

October 09, 2015

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

**Re : KMEP Norwalk Biosparge Startup / 496965.A1.01
MB187302 / 5J02025**

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received on 09/23/15 15:05 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 Analyticals.

Sincerely,

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

Allen Aminian
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
-----------	---------------	--------	-----	--------------	---------------

Fixed Gases - Field

SVM-12-15	5J02025-01	Vapor	10	09/23/15 08:53	09/23/15 15:05
SVM-12-7	5J02025-02	Vapor	10	09/23/15 09:22	09/23/15 15:05
SVM-12-22	5J02025-03	Vapor	10	09/23/15 09:47	09/23/15 15:05
SVM-11-7	5J02025-04	Vapor	10	09/23/15 10:48	09/23/15 15:05
SVM-11-15	5J02025-05	Vapor	10	09/23/15 11:02	09/23/15 15:05
SVM-11-22	5J02025-06	Vapor	10	09/23/15 11:29	09/23/15 15:05
SVM-13-7	5J02025-07	Vapor	10	09/23/15 12:57	09/23/15 15:05
SVM-13-15.5	5J02025-08	Vapor	10	09/23/15 13:12	09/23/15 15:05
SVM-13-22.5	5J02025-09	Vapor	10	09/23/15 13:38	09/23/15 15:05
SVM-14-7	5J02025-10	Vapor	10	09/23/15 14:06	09/23/15 15:05
SVM-14-15	5J02025-11	Vapor	10	09/23/15 14:35	09/23/15 15:05
SVM-14-15 DUP	5J02025-12	Vapor	10	09/23/15 14:35	09/23/15 15:05
SVM-14-22	5J02025-13	Vapor	10	09/23/15 14:48	09/23/15 15:05

TO-15 (Mid Level)

SVM-12-15	5J02025-01	Vapor	10	09/23/15 08:53	09/23/15 15:05
SVM-12-7	5J02025-02	Vapor	10	09/23/15 09:22	09/23/15 15:05
SVM-12-22	5J02025-03	Vapor	10	09/23/15 09:47	09/23/15 15:05
SVM-11-7	5J02025-04	Vapor	10	09/23/15 10:48	09/23/15 15:05

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
SVM-11-15	5J02025-05	Vapor	10	09/23/15 11:02	09/23/15 15:05
SVM-11-22	5J02025-06	Vapor	10	09/23/15 11:29	09/23/15 15:05
SVM-13-7	5J02025-07	Vapor	10	09/23/15 12:57	09/23/15 15:05
SVM-13-15.5	5J02025-08	Vapor	10	09/23/15 13:12	09/23/15 15:05
SVM-13-22.5	5J02025-09	Vapor	10	09/23/15 13:38	09/23/15 15:05
SVM-14-7	5J02025-10	Vapor	10	09/23/15 14:06	09/23/15 15:05
SVM-14-15	5J02025-11	Vapor	10	09/23/15 14:35	09/23/15 15:05
SVM-14-15 DUP	5J02025-12	Vapor	10	09/23/15 14:35	09/23/15 15:05
SVM-14-22	5J02025-13	Vapor	10	09/23/15 14:48	09/23/15 15:05
Ambient Air	5J02025-14	Vapor	10	09/23/15 14:51	09/23/15 15:05

TO-3

SVM-12-15	5J02025-01	Vapor	10	09/23/15 08:53	09/23/15 15:05
SVM-12-7	5J02025-02	Vapor	10	09/23/15 09:22	09/23/15 15:05
SVM-12-22	5J02025-03	Vapor	10	09/23/15 09:47	09/23/15 15:05
SVM-11-7	5J02025-04	Vapor	10	09/23/15 10:48	09/23/15 15:05
SVM-11-15	5J02025-05	Vapor	10	09/23/15 11:02	09/23/15 15:05
SVM-11-22	5J02025-06	Vapor	10	09/23/15 11:29	09/23/15 15:05
SVM-13-7	5J02025-07	Vapor	10	09/23/15 12:57	09/23/15 15:05
SVM-13-15.5	5J02025-08	Vapor	10	09/23/15 13:12	09/23/15 15:05
SVM-13-22.5	5J02025-09	Vapor	10	09/23/15 13:38	09/23/15 15:05

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
SVM-14-7	5J02025-10	Vapor	10	09/23/15 14:06	09/23/15 15:05
SVM-14-15	5J02025-11	Vapor	10	09/23/15 14:35	09/23/15 15:05
SVM-14-15 DUP	5J02025-12	Vapor	10	09/23/15 14:35	09/23/15 15:05
SVM-14-22	5J02025-13	Vapor	10	09/23/15 14:48	09/23/15 15:05
Ambient Air	5J02025-14	Vapor	10	09/23/15 14:51	09/23/15 15:05

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
Fixed Gases by TCD								
Oxygen	SVM-12-15	17	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Carbon Dioxide	SVM-12-15	2.5	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Oxygen	SVM-12-7	18	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Carbon Dioxide	SVM-12-7	1.1	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Oxygen	SVM-12-22	12	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Carbon Dioxide	SVM-12-22	5.4	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Oxygen	SVM-11-7	18	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Carbon Dioxide	SVM-11-7	0.63	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Oxygen	SVM-11-15	18	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Carbon Dioxide	SVM-11-15	0.96	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD

Allen Aminian
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
Oxygen	SVM-11-22	18	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Carbon Dioxide	SVM-11-22	0.34	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Oxygen	SVM-13-7	18	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Oxygen	SVM-13-15.5	19	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Oxygen	SVM-13-22.5	17	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Carbon Dioxide	SVM-13-22.5	0.38	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Oxygen	SVM-14-7	18	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Carbon Dioxide	SVM-14-7	0.45	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Oxygen	SVM-14-15	18	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Carbon Dioxide	SVM-14-15	0.51	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Oxygen	SVM-14-15 DUP	18	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD

Allen Aminian
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
Carbon Dioxide	SVM-14-15 DUP	0.45	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Oxygen	SVM-14-22	3.3	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD
Carbon Dioxide	SVM-14-22	12	0.10	% by Volume	1	09/23/15	09/23/15	VOCs by GC/TCD

VOCs by EPA TO-3

Gasoline Range Organics (GRO)	SVM-14-22	12000	8000	ug/L	400	09/23/15	09/23/15	TO-3
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VOCs by GCMS EPA TO-15

Toluene	SVM-12-15	0.035	0.020	ug/L	1	09/23/15	09/23/15	TO-15
m,p-Xylenes	SVM-12-15	0.043	0.020	ug/L	1	09/23/15	09/23/15	TO-15
m,p-Xylenes	SVM-12-7	0.042	0.040	ug/L	2	09/23/15	09/23/15	TO-15
Toluene	SVM-12-22	0.026	0.020	ug/L	1	09/23/15	09/23/15	TO-15
m,p-Xylenes	SVM-12-22	0.029	0.020	ug/L	1	09/23/15	09/23/15	TO-15
Toluene	SVM-11-7	0.027	0.020	ug/L	1	09/23/15	09/23/15	TO-15
m,p-Xylenes	SVM-11-7	0.035	0.020	ug/L	1	09/23/15	09/23/15	TO-15
m,p-Xylenes	SVM-11-15	0.020	0.020	ug/L	1	09/23/15	09/23/15	TO-15
Toluene	SVM-11-22	0.023	0.020	ug/L	1	09/23/15	09/23/15	TO-15
m,p-Xylenes	SVM-11-22	0.029	0.020	ug/L	1	09/23/15	09/23/15	TO-15
Toluene	SVM-13-7	0.032	0.020	ug/L	1	09/23/15	09/23/15	TO-15
m,p-Xylenes	SVM-13-7	0.036	0.020	ug/L	1	09/23/15	09/23/15	TO-15
Toluene	SVM-13-15.5	0.021	0.020	ug/L	1	09/23/15	09/23/15	TO-15
m,p-Xylenes	SVM-13-15.5	0.026	0.020	ug/L	1	09/23/15	09/23/15	TO-15
Toluene	SVM-13-22.5	0.025	0.020	ug/L	1	09/23/15	09/23/15	TO-15
m,p-Xylenes	SVM-13-22.5	0.028	0.020	ug/L	1	09/23/15	09/23/15	TO-15
Toluene	SVM-14-7	0.027	0.020	ug/L	1	09/23/15	09/23/15	TO-15

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
m,p-Xylenes	SVM-14-7	0.035	0.020	ug/L	1	09/23/15	09/23/15	TO-15
Toluene	SVM-14-15	0.022	0.020	ug/L	1	09/23/15	09/23/15	TO-15
m,p-Xylenes	SVM-14-15	0.025	0.020	ug/L	1	09/23/15	09/23/15	TO-15
Toluene	SVM-14-15 DUP	0.026	0.020	ug/L	1	09/23/15	09/23/15	TO-15
m,p-Xylenes	SVM-14-15 DUP	0.027	0.020	ug/L	1	09/23/15	09/23/15	TO-15
Toluene	SVM-14-22	99	40	ug/L	2000	09/23/15	09/23/15	TO-15
1,3,5-Trimethylbenzene	SVM-14-22	48	40	ug/L	2000	09/23/15	09/23/15	TO-15
o-Xylene	SVM-14-22	180	40	ug/L	2000	09/23/15	09/23/15	TO-15
m,p-Xylenes	SVM-14-22	150	40	ug/L	2000	09/23/15	09/23/15	TO-15
Toluene	Ambient Air	0.032	0.020	ug/L	1	09/23/15	09/23/15	TO-15
m,p-Xylenes	Ambient Air	0.034	0.020	ug/L	1	09/23/15	09/23/15	TO-15

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15
Units: ug/L

Date Sampled:	09/23/15	09/23/15	09/23/15	09/23/15	
Date Prepared:	09/23/15	09/23/15	09/23/15	09/23/15	
Date Analyzed:	09/23/15	09/23/15	09/23/15	09/23/15	
AA ID No:	5J02025-01	5J02025-02	5J02025-03	5J02025-04	
Client ID No:	SVM-12-15	SVM-12-7	SVM-12-22	SVM-11-7	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

TO-3 (TO-3)

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

4-Bromofluorobenzene	109%	106%	106%	109%	<u>%REC Limits</u> 70-130
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Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15
Units: ug/L

Date Sampled:	09/23/15	09/23/15	09/23/15	09/23/15	
Date Prepared:	09/23/15	09/23/15	09/23/15	09/23/15	
Date Analyzed:	09/23/15	09/23/15	09/23/15	09/23/15	
AA ID No:	5J02025-05	5J02025-06	5J02025-07	5J02025-08	
Client ID No:	SVM-11-15	SVM-11-22	SVM-13-7	SVM-13-15.5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

TO-3 (TO-3)

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

4-Bromofluorobenzene	100%	110%	109%	110%	<u>%REC Limits</u> 70-130
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Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15
Units: ug/L

Date Sampled:	09/23/15	09/23/15	09/23/15	09/23/15	
Date Prepared:	09/23/15	09/23/15	09/23/15	09/23/15	
Date Analyzed:	09/23/15	09/23/15	09/23/15	09/23/15	
AA ID No:	5J02025-09	5J02025-10	5J02025-11	5J02025-12	
Client ID No:	SVM-13-22.5	SVM-14-7	SVM-14-15	SVM-14-15 DUP	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

TO-3 (TO-3)

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

4-Bromofluorobenzene	107%	110%	110%	109%	<u>%REC Limits</u> 70-130
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Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15
Units: ug/L

Date Sampled:	09/23/15	09/23/15	
Date Prepared:	09/23/15	09/23/15	
Date Analyzed:	09/23/15	09/23/15	
AA ID No:	5J02025-13	5J02025-14	
Client ID No:	SVM-14-22	Ambient Air	
Matrix:	Vapor	Vapor	
Dilution Factor:	400	1	MRL

TO-3 (TO-3)

Gasoline Range Organics (GRO)	12000	<20	20
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Surrogates

4-Bromofluorobenzene	119%	109%	<u>%REC Limits</u> 70-130
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Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15
Units: ug/L

Date Sampled:	09/23/15	09/23/15	09/23/15	09/23/15	
Date Prepared:	09/23/15	09/23/15	09/23/15	09/23/15	
Date Analyzed:	09/23/15	09/23/15	09/23/15	09/23/15	
AA ID No:	5J02025-01	5J02025-02	5J02025-03	5J02025-04	
Client ID No:	SVM-12-15	SVM-12-7	SVM-12-22	SVM-11-7	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	2	1	1	MRL

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

Benzene	<0.020	<0.040	<0.020	<0.020	0.020
tert-Butyl alcohol (TBA)	<20	<40	<20	<20	20
1,2-Dichloroethane (EDC)	<0.020	<0.040	<0.020	<0.020	0.020
Ethylbenzene	<0.020	<0.040	<0.020	<0.020	0.020
Isopropanol (IPA)	<0.29	<0.58	<0.29	<0.29	0.29
Methyl-tert-Butyl Ether (MTBE)	<1.0	<2.0	<1.0	<1.0	1.0
Toluene	0.035	<0.040	0.026	0.027	0.020
1,3,5-Trimethylbenzene	<0.020	<0.040	<0.020	<0.020	0.020
1,2,4-Trimethylbenzene	<0.020	<0.040	<0.020	<0.020	0.020
o-Xylene	<0.020	<0.040	<0.020	<0.020	0.020
m,p-Xylenes	0.043	0.042	0.029	0.035	0.020
sec-Butylbenzene	<0.020	<0.040	<0.020	<0.020	0.020
Isopropylbenzene	<0.020	<0.040	<0.020	<0.020	0.020
n-Propylbenzene	<0.020	<0.040	<0.020	<0.020	0.020
n-Butylbenzene	<0.020	<0.040	<0.020	<0.020	0.020

Surrogates

4-Bromofluorobenzene	106%	104%	104%	106%	%REC Limits 70-130
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Allen Aminian

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15
Units: ug/L

	09/23/15	09/23/15	09/23/15	09/23/15	
Date Sampled:	09/23/15	09/23/15	09/23/15	09/23/15	
Date Prepared:	09/23/15	09/23/15	09/23/15	09/23/15	
Date Analyzed:	09/23/15	09/23/15	09/23/15	09/23/15	
AA ID No:	5J02025-05	5J02025-06	5J02025-07	5J02025-08	
Client ID No:	SVM-11-15	SVM-11-22	SVM-13-7	SVM-13-15.5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

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

Benzene	<0.020	<0.020	<0.020	<0.020	0.020
tert-Butyl alcohol (TBA)	<20	<20	<20	<20	20
1,2-Dichloroethane (EDC)	<0.020	<0.020	<0.020	<0.020	0.020
Ethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Isopropanol (IPA)	<0.29	<0.29	<0.29	<0.29	0.29
Methyl-tert-Butyl Ether (MTBE)	<1.0	<1.0	<1.0	<1.0	1.0
Toluene	<0.020	0.023	0.032	0.021	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
o-Xylene	<0.020	<0.020	<0.020	<0.020	0.020
m,p-Xylenes	0.020	0.029	0.036	0.026	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
n-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020

Surrogates

					<u>%REC Limits</u>
4-Bromofluorobenzene	97%	107%	106%	108%	70-130

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15
Units: ug/L

	09/23/15	09/23/15	09/23/15	09/23/15	
Date Sampled:	09/23/15	09/23/15	09/23/15	09/23/15	
Date Prepared:	09/23/15	09/23/15	09/23/15	09/23/15	
Date Analyzed:	09/23/15	09/23/15	09/23/15	09/23/15	
AA ID No:	5J02025-09	5J02025-10	5J02025-11	5J02025-12	
Client ID No:	SVM-13-22.5	SVM-14-7	SVM-14-15	SVM-14-15 DUP	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

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

Benzene	<0.020	<0.020	<0.020	<0.020	0.020
tert-Butyl alcohol (TBA)	<20	<20	<20	<20	20
1,2-Dichloroethane (EDC)	<0.020	<0.020	<0.020	<0.020	0.020
Ethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Isopropanol (IPA)	<0.29	<0.29	<0.29	<0.29	0.29
Methyl-tert-Butyl Ether (MTBE)	<1.0	<1.0	<1.0	<1.0	1.0
Toluene	0.025	0.027	0.022	0.026	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
o-Xylene	<0.020	<0.020	<0.020	<0.020	0.020
m,p-Xylenes	0.028	0.035	0.025	0.027	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
n-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020

Surrogates

					<u>%REC Limits</u>
4-Bromofluorobenzene	104%	108%	107%	106%	70-130

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15
Units: ug/L

Date Sampled:	09/23/15	09/23/15	
Date Prepared:	09/23/15	09/23/15	
Date Analyzed:	09/23/15	09/23/15	
AA ID No:	5J02025-13	5J02025-14	
Client ID No:	SVM-14-22	Ambient Air	
Matrix:	Vapor	Vapor	
Dilution Factor:	2000	1	MRL

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

Benzene	<40	<0.020	0.020
tert-Butyl alcohol (TBA)	<40000	<20	20
1,2-Dichloroethane (EDC)	<40	<0.020	0.020
Ethylbenzene	<40	<0.020	0.020
Isopropanol (IPA)	<580	<0.29	0.29
Methyl-tert-Butyl Ether (MTBE)	<2000	<1.0	1.0
Toluene	99	0.032	0.020
1,3,5-Trimethylbenzene	48	<0.020	0.020
1,2,4-Trimethylbenzene	<40	<0.020	0.020
o-Xylene	180	<0.020	0.020
m,p-Xylenes	150	0.034	0.020
sec-Butylbenzene	<40	<0.020	0.020
Isopropylbenzene	<40	<0.020	0.020
n-Propylbenzene	<40	<0.020	0.020
n-Butylbenzene	<40	<0.020	0.020

Surrogates

4-Bromofluorobenzene	99%	110%	%REC Limits 70-130
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Allen Aminian

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15
Units: % by Volume

Date Sampled:	09/23/15	09/23/15	09/23/15	09/23/15	
Date Prepared:	09/23/15	09/23/15	09/23/15	09/23/15	
Date Analyzed:	09/23/15	09/23/15	09/23/15	09/23/15	
AA ID No:	5J02025-01	5J02025-02	5J02025-03	5J02025-04	
Client ID No:	SVM-12-15	SVM-12-7	SVM-12-22	SVM-11-7	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

Fixed Gases - Field (VOCs by GC/TCD)

Methane	<0.10	<0.10	<0.10	<0.10	0.10
Oxygen	17	18	12	18	0.10
Carbon Dioxide	2.5	1.1	5.4	0.63	0.10

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15
Units: % by Volume

Date Sampled:	09/23/15	09/23/15	09/23/15	09/23/15	
Date Prepared:	09/23/15	09/23/15	09/23/15	09/23/15	
Date Analyzed:	09/23/15	09/23/15	09/23/15	09/23/15	
AA ID No:	5J02025-05	5J02025-06	5J02025-07	5J02025-08	
Client ID No:	SVM-11-15	SVM-11-22	SVM-13-7	SVM-13-15.5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

Fixed Gases - Field (VOCs by GC/TCD)

Methane	<0.10	<0.10	<0.10	<0.10	0.10
Oxygen	18	18	18	19	0.10
Carbon Dioxide	0.96	0.34	<0.10	<0.10	0.10

Allen Aminian

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15
Units: % by Volume

Date Sampled:	09/23/15	09/23/15	09/23/15	09/23/15	
Date Prepared:	09/23/15	09/23/15	09/23/15	09/23/15	
Date Analyzed:	09/23/15	09/23/15	09/23/15	09/23/15	
AA ID No:	5J02025-09	5J02025-10	5J02025-11	5J02025-12	
Client ID No:	SVM-13-22.5	SVM-14-7	SVM-14-15	SVM-14-15 DUP	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

Fixed Gases - Field (VOCs by GC/TCD)

Methane	<0.10	<0.10	<0.10	<0.10	0.10
Oxygen	17	18	18	18	0.10
Carbon Dioxide	0.38	0.45	0.51	0.45	0.10

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15
Units: % by Volume

Date Sampled:	09/23/15	
Date Prepared:	09/23/15	
Date Analyzed:	09/23/15	
AA ID No:	5J02025-13	
Client ID No:	SVM-14-22	
Matrix:	Vapor	
Dilution Factor:	1	MRL

Fixed Gases - Field (VOCs by GC/TCD)

Methane	<0.10	0.10
Oxygen	3.3	0.10
Carbon Dioxide	12	0.10

Allen Aminian

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	Limit	RPD	RPD Limit	Notes
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VOCs by EPA TO-3 - Quality Control

Batch B5J0219 - *** DEFAULT PREP ***

Blank (B5J0219-BLK1)

Prepared & Analyzed: 09/23/15

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

Surrogate: 4-Bromofluorobenzene 0.154 ug/L 0.14 107 70-130

LCS (B5J0219-BS1)

Prepared & Analyzed: 09/23/15

Gasoline Range Organics (GRO) **0.898** 20 ug/L 0.82 110 70-130

Surrogate: 4-Bromofluorobenzene 0.156 ug/L 0.14 109 70-130

LCS Dup (B5J0219-BSD1)

Prepared & Analyzed: 09/23/15

Gasoline Range Organics (GRO) **0.855** 20 ug/L 0.82 104 70-130 4.90 30

Surrogate: 4-Bromofluorobenzene 0.152 ug/L 0.14 106 70-130

Duplicate (B5J0219-DUP1)

Source: 5J02025-11 Prepared & Analyzed: 09/23/15

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

Surrogate: 4-Bromofluorobenzene 0.156 ug/L 0.14 109 70-130

VOCs by GCMS EPA TO-15 - Quality Control

Batch B5J0210 - *** DEFAULT PREP ***

Blank (B5J0210-BLK1)

Prepared & Analyzed: 09/23/15

Benzene <0.020 0.020 ug/L

tert-Butyl alcohol (TBA) <20 20 ug/L

1,2-Dichloroethane (EDC) <0.020 0.020 ug/L

Ethylbenzene <0.020 0.020 ug/L

Isopropanol (IPA) <0.29 0.29 ug/L

Methyl-tert-Butyl Ether (MTBE) <1.0 1.0 ug/L

Toluene <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

o-Xylene <0.020 0.020 ug/L

m,p-Xylenes <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

n-Butylbenzene <0.020 0.020 ug/L

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
<i>Batch B5J0210 - *** DEFAULT PREP ***</i>										
Blank (B5J0210-BLK1) Continued										
Prepared & Analyzed: 09/23/15										
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.154</i>		<i>ug/L</i>	<i>0.14</i>		<i>107</i>	<i>70-130</i>			
LCS (B5J0210-BS1)										
Prepared & Analyzed: 09/23/15										
Benzene	0.0278	0.020	ug/L	0.032		87.0	70-130		30	
1,2-Dichloroethane (EDC)	0.0394	0.020	ug/L	0.040		97.4	70-130		30	
Ethylbenzene	0.0349	0.020	ug/L	0.043		80.3	70-130		30	
Isopropanol (IPA)	0.0233	0.29	ug/L	0.025		94.8	70-130		30	
Toluene	0.0337	0.020	ug/L	0.038		89.4	70-130		30	
1,3,5-Trimethylbenzene	0.0354	0.020	ug/L	0.049		72.1	70-130		30	
1,2,4-Trimethylbenzene	0.0361	0.020	ug/L	0.049		73.5	70-130		30	
o-Xylene	0.0340	0.020	ug/L	0.043		78.4	70-130		30	
m,p-Xylenes	0.0339	0.020	ug/L	0.043		78.2	70-130		30	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.158</i>		<i>ug/L</i>	<i>0.14</i>		<i>110</i>	<i>70-130</i>			
LCS Dup (B5J0210-BSD1)										
Prepared & Analyzed: 09/23/15										
Benzene	0.0304	0.020	ug/L	0.032		95.1	70-130	8.90	30	
1,2-Dichloroethane (EDC)	0.0432	0.020	ug/L	0.040		107	70-130	9.11	30	
Ethylbenzene	0.0466	0.020	ug/L	0.043		107	70-130	28.9	30	
Isopropanol (IPA)	0.0204	0.29	ug/L	0.025		82.9	70-130	13.4	30	
Toluene	0.0394	0.020	ug/L	0.038		105	70-130	15.7	30	
1,3,5-Trimethylbenzene	0.0409	0.020	ug/L	0.049		83.3	70-130	14.4	30	
1,2,4-Trimethylbenzene	0.0384	0.020	ug/L	0.049		78.1	70-130	6.07	30	
o-Xylene	0.0432	0.020	ug/L	0.043		99.5	70-130	23.7	30	
m,p-Xylenes	0.0441	0.020	ug/L	0.043		102	70-130	26.0	30	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.161</i>		<i>ug/L</i>	<i>0.14</i>		<i>112</i>	<i>70-130</i>			
Duplicate (B5J0210-DUP1)										
Source: 5J02025-11 Prepared & Analyzed: 09/23/15										
Benzene	<0.020	0.020	ug/L		<0.020				30	
tert-Butyl alcohol (TBA)	<20	20	ug/L		<20				30	
1,2-Dichloroethane (EDC)	<0.020	0.020	ug/L		<0.020				30	
Ethylbenzene	<0.020	0.020	ug/L		<0.020				30	
Isopropanol (IPA)	<0.29	0.29	ug/L		<0.29				30	
Methyl-tert-Butyl Ether (MTBE)	<1.0	1.0	ug/L		<1.0				30	
Toluene	0.0262	0.020	ug/L		0.0220			17.2	30	

Allen Aminian

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
<i>Batch B5J0210 - *** DEFAULT PREP ***</i>										
Duplicate (B5J0210-DUP1) Continued Source: 5J02025-11 Prepared & Analyzed: 09/23/15										
1,3,5-Trimethylbenzene	<0.020	0.020	ug/L		<0.020					30
1,2,4-Trimethylbenzene	<0.020	0.020	ug/L		<0.020					30
o-Xylene	<0.020	0.020	ug/L		<0.020					30
m,p-Xylenes	0.0267	0.020	ug/L		0.0249			6.91		30
sec-Butylbenzene	<0.020	0.020	ug/L		<0.020					30
Isopropylbenzene	<0.020	0.020	ug/L		<0.020					30
n-Propylbenzene	<0.020	0.020	ug/L		<0.020					30
n-Butylbenzene	<0.020	0.020	ug/L		<0.020					30
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.152</i>		<i>ug/L</i>	<i>0.14</i>		<i>106</i>	<i>70-130</i>			
Fixed Gases by TCD - Quality Control										
<i>Batch B5J0222 - *** DEFAULT PREP ***</i>										
Blank (B5J0222-BLK1) Prepared & Analyzed: 09/23/15										
Methane	<0.10	0.10	% by Volume							
Oxygen	<0.10	0.10	% by Volume							
Carbon Dioxide	<0.10	0.10	% by Volume							
LCS (B5J0222-BS1) Prepared & Analyzed: 09/23/15										
Methane	4.44	0.10	% by Volume	4.5		98.6	75-125			
Oxygen	3.82	0.10	% by Volume	4.0		95.4	75-125			
Carbon Dioxide	14.3	0.10	% by Volume	15		95.5	75-125			
LCS Dup (B5J0222-BSD1) Prepared: 09/23/15 Analyzed: 10/07/15										
Methane	4.47	0.10	% by Volume	4.5		99.4	75-125	0.718		30
Oxygen	3.85	0.10	% by Volume	4.0		96.2	75-125	0.731		30

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Fixed Gases by TCD - Quality Control										
<i>Batch B5J0222 - *** DEFAULT PREP ***</i>										
LCS Dup (B5J0222-BSD1) Continued										
					Prepared: 09/23/15 Analyzed: 10/07/15					
Carbon Dioxide	14.3	0.10	% by Volume	15		95.6	75-125	0.105	30	
Duplicate (B5J0222-DUP1)										
					Source: 5J02025-11 Prepared: 09/23/15 Analyzed: 10/07/15					
Methane	<0.10	0.10	% by Volume		<0.10				30	
Oxygen	17.7	0.10	% by Volume		17.7			0.0170	30	
Carbon Dioxide	0.447	0.10	% by Volume		0.513			13.8	30	

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187302
Date Received: 09/23/15
Date Reported: 10/09/15

Special Notes

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

Allen Aminian
QA/QC Manager



AMERICAN ANALYTICS CHAIN-OF-CUSTODY RECORD

9765 ETON AVE., CHATSWORTH, CA 91311

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

A.A. COC No.: 123450

70043205
Page 1 of 1

Client: CH2M HILL Project Name / No.: KINDEN MORGAN NORWALK Sampler's Name: _____
 Project Manager: _____ Site Address: 15036 NORWALK BLVD Sampler's Signature: _____
 Phone: _____ City: NORWALK P.O. No.: _____
 Fax: _____ State & Zip: CA Quote No.: _____

TAT Turnaround Codes **

ANALYSIS REQUESTED (Test Name)

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

Client I.D.	A.A. I.D.	Date	Time	Sample Matrix	No. of Cont	ANALYSIS REQUESTED (Test Name)										Special Instructions				
						Please enter the TAT Turnaround Codes ** below														
SUM-12-15	SS02025-1	9-23-15	0858	✓	2	X	X	X												
SUM-12-7	-2		0922	✓	2	X	X	X												
SUM-12-22	-3		0947	✓	2	X	X	X												
SUM-11-7	-4		1048	✓	2	X	X	X												
SUM-11-15	-5		1102	✓	2	X	X	X												
SUM-11-22	-6		1129	✓	2	X	X	X												
SUM-13-7	-7		1257	✓	2	X	X	X												
SUM-13-15.5	-8		1312	✓	2	X	X	X												
SUM-13-22.5	-9		1338	✓	2	X	X	X												
SUM-14-7	-10		1406	✓	2	X	X	X												
SUM-14-15	-11		1435	✓	2	X	X	X												
SUM-14-15 DUP	-12		1435	✓	2	X	X	X												
SUM-14-22	-13		1448	✓	2	X	X	X												
Ambient Air	-14		1451	✓	1	X	X													

REVIEWED

Date 10/2/15 Time 11:06
TAT 5 Days Sign: [Signature]

Relinquished by <u>[Signature]</u>	Date <u>9-23-15</u>	Time <u>1505</u>	Received by <u>[Signature]</u>
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by

A.A. Project No.: MB187302/SS02025

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



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

October 09, 2015

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

Re : KMEP Norwalk Biosparge Startup / 496965.A1.01
MB187303 / 5J02027

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received on 09/24/15 14:30 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 Analyticals.

Sincerely,

A handwritten signature in black ink, appearing to read 'Allen A.', is written above the printed name.

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
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Fixed Gases - Field

SVM-9-5	5J02027-02	Vapor	10	09/24/15 08:13	09/24/15 14:30
SVM-9-14.5	5J02027-03	Vapor	10	09/24/15 08:21	09/24/15 14:30
SVM-2-5	5J02027-04	Vapor	10	09/24/15 09:46	09/24/15 14:30
SVM-1-14.5	5J02027-05	Vapor	10	09/24/15 10:13	09/24/15 14:30
SVM-1-5	5J02027-06	Vapor	10	09/24/15 10:19	09/24/15 14:30
SVM-15-15	5J02027-07	Vapor	10	09/24/15 11:25	09/24/15 14:30
SVM-15-22	5J02027-08	Vapor	10	09/24/15 11:45	09/24/15 14:30
SVM-15-7	5J02027-09	Vapor	10	09/24/15 11:47	09/24/15 14:30
SVM-6-7	5J02027-10	Vapor	10	09/24/15 13:00	09/24/15 14:30
SVM-6-15	5J02027-11	Vapor	10	09/24/15 12:55	09/24/15 14:30
SVM-7-7	5J02027-12	Vapor	10	09/24/15 13:50	09/24/15 14:30
SVM-7-13.25	5J02027-13	Vapor	10	09/24/15 14:06	09/24/15 14:30
SVM-7-13.25 DUP	5J02027-14	Vapor	10	09/24/15 14:06	09/24/15 14:30

TO-15 (Mid Level)

Ambient Air	5J02027-01	Vapor	10	09/24/15 08:00	09/24/15 14:30
SVM-9-5	5J02027-02	Vapor	10	09/24/15 08:13	09/24/15 14:30
SVM-9-14.5	5J02027-03	Vapor	10	09/24/15 08:21	09/24/15 14:30
SVM-2-5	5J02027-04	Vapor	10	09/24/15 09:46	09/24/15 14:30

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
SVM-1-14.5	5J02027-05	Vapor	10	09/24/15 10:13	09/24/15 14:30
SVM-1-5	5J02027-06	Vapor	10	09/24/15 10:19	09/24/15 14:30
SVM-15-15	5J02027-07	Vapor	10	09/24/15 11:25	09/24/15 14:30
SVM-15-22	5J02027-08	Vapor	10	09/24/15 11:45	09/24/15 14:30
SVM-15-7	5J02027-09	Vapor	10	09/24/15 11:47	09/24/15 14:30
SVM-6-7	5J02027-10	Vapor	10	09/24/15 13:00	09/24/15 14:30
SVM-6-15	5J02027-11	Vapor	10	09/24/15 12:55	09/24/15 14:30
SVM-7-7	5J02027-12	Vapor	10	09/24/15 13:50	09/24/15 14:30
SVM-7-13.25	5J02027-13	Vapor	10	09/24/15 14:06	09/24/15 14:30
SVM-7-13.25 DUP	5J02027-14	Vapor	10	09/24/15 14:06	09/24/15 14:30

TO-3

Ambient Air	5J02027-01	Vapor	10	09/24/15 08:00	09/24/15 14:30
SVM-9-5	5J02027-02	Vapor	10	09/24/15 08:13	09/24/15 14:30
SVM-9-14.5	5J02027-03	Vapor	10	09/24/15 08:21	09/24/15 14:30
SVM-2-5	5J02027-04	Vapor	10	09/24/15 09:46	09/24/15 14:30
SVM-1-14.5	5J02027-05	Vapor	10	09/24/15 10:13	09/24/15 14:30
SVM-1-5	5J02027-06	Vapor	10	09/24/15 10:19	09/24/15 14:30
SVM-15-15	5J02027-07	Vapor	10	09/24/15 11:25	09/24/15 14:30
SVM-15-22	5J02027-08	Vapor	10	09/24/15 11:45	09/24/15 14:30
SVM-15-7	5J02027-09	Vapor	10	09/24/15 11:47	09/24/15 14:30

Allen Aminian
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
SVM-6-7	5J02027-10	Vapor	10	09/24/15 13:00	09/24/15 14:30
SVM-6-15	5J02027-11	Vapor	10	09/24/15 12:55	09/24/15 14:30
SVM-7-7	5J02027-12	Vapor	10	09/24/15 13:50	09/24/15 14:30
SVM-7-13.25	5J02027-13	Vapor	10	09/24/15 14:06	09/24/15 14:30
SVM-7-13.25 DUP	5J02027-14	Vapor	10	09/24/15 14:06	09/24/15 14:30

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
Fixed Gases by TCD								
Oxygen	SVM-9-5	18	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Carbon Dioxide	SVM-9-5	0.84	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Oxygen	SVM-9-14.5	16	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Carbon Dioxide	SVM-9-14.5	2.8	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Oxygen	SVM-2-5	18	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Carbon Dioxide	SVM-2-5	0.17	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Oxygen	SVM-1-14.5	18	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Carbon Dioxide	SVM-1-14.5	0.12	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Oxygen	SVM-1-5	18	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Carbon Dioxide	SVM-1-5	0.10	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD

Allen Aminian
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
Oxygen	SVM-15-15	18	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Carbon Dioxide	SVM-15-15	0.18	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Oxygen	SVM-15-22	18	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Carbon Dioxide	SVM-15-22	0.35	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Oxygen	SVM-15-7	18	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Carbon Dioxide	SVM-15-7	0.21	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Oxygen	SVM-6-7	18	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Carbon Dioxide	SVM-6-7	0.14	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Oxygen	SVM-6-15	18	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Carbon Dioxide	SVM-6-15	0.23	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Oxygen	SVM-7-7	18	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD

Allen Aminian
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
Carbon Dioxide	SVM-7-7	0.56	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Oxygen	SVM-7-13.25	18	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Carbon Dioxide	SVM-7-13.25	0.89	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Oxygen	SVM-7-13.25 DUP	18	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD
Carbon Dioxide	SVM-7-13.25 DUP	0.89	0.10	% by Volume	1	09/24/15	09/24/15	VOCs by GC/TCD

VOCs by EPA TO-3**VOCs by GCMS EPA TO-15**

Toluene	Ambient Air	0.028	0.020	ug/L	1	09/24/15	09/24/15	TO-15
m,p-Xylenes	Ambient Air	0.029	0.020	ug/L	1	09/24/15	09/24/15	TO-15
m,p-Xylenes	SVM-9-5	0.023	0.020	ug/L	1	09/24/15	09/24/15	TO-15
m,p-Xylenes	SVM-15-15	0.022	0.020	ug/L	1	09/24/15	09/24/15	TO-15
Toluene	SVM-15-22	0.034	0.020	ug/L	1	09/24/15	09/24/15	TO-15
m,p-Xylenes	SVM-15-22	0.030	0.020	ug/L	1	09/24/15	09/24/15	TO-15
Toluene	SVM-15-7	0.025	0.020	ug/L	1	09/24/15	09/24/15	TO-15
m,p-Xylenes	SVM-15-7	0.029	0.020	ug/L	1	09/24/15	09/24/15	TO-15
Toluene	SVM-6-7	0.037	0.020	ug/L	1	09/24/15	09/24/15	TO-15
1,2,4-Trimethylbenzene	SVM-6-7	0.023	0.020	ug/L	1	09/24/15	09/24/15	TO-15
m,p-Xylenes	SVM-6-7	0.043	0.020	ug/L	1	09/24/15	09/24/15	TO-15
Toluene	SVM-6-15	0.026	0.020	ug/L	1	09/24/15	09/24/15	TO-15
m,p-Xylenes	SVM-6-15	0.031	0.020	ug/L	1	09/24/15	09/24/15	TO-15

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15
Units: ug/L

Date Sampled:	09/24/15	09/24/15	09/24/15	09/24/15	
Date Prepared:	09/24/15	09/24/15	09/24/15	09/24/15	
Date Analyzed:	09/24/15	09/24/15	09/24/15	09/24/15	
AA ID No:	5J02027-01	5J02027-02	5J02027-03	5J02027-04	
Client ID No:	Ambient Air	SVM-9-5	SVM-9-14.5	SVM-2-5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

TO-3 (TO-3)

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

4-Bromofluorobenzene	109%	108%	107%	106%	<u>%REC Limits</u> 70-130
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Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15
Units: ug/L

Date Sampled:	09/24/15	09/24/15	09/24/15	09/24/15	
Date Prepared:	09/24/15	09/24/15	09/24/15	09/24/15	
Date Analyzed:	09/24/15	09/24/15	09/24/15	09/24/15	
AA ID No:	5J02027-05	5J02027-06	5J02027-07	5J02027-08	
Client ID No:	SVM-1-14.5	SVM-1-5	SVM-15-15	SVM-15-22	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

TO-3 (TO-3)

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

4-Bromofluorobenzene	108%	107%	110%	110%	<u>%REC Limits</u> 70-130
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Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15
Units: ug/L

Date Sampled:	09/24/15	09/24/15	09/24/15	09/24/15	
Date Prepared:	09/24/15	09/24/15	09/24/15	09/24/15	
Date Analyzed:	09/24/15	09/24/15	09/24/15	09/24/15	
AA ID No:	5J02027-09	5J02027-10	5J02027-11	5J02027-12	
Client ID No:	SVM-15-7	SVM-6-7	SVM-6-15	SVM-7-7	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

TO-3 (TO-3)

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

4-Bromofluorobenzene	110%	108%	109%	104%	<u>%REC Limits</u> 70-130
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Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15
Units: ug/L

Date Sampled:	09/24/15	09/24/15	
Date Prepared:	09/24/15	09/24/15	
Date Analyzed:	09/24/15	09/24/15	
AA ID No:	5J02027-13	5J02027-14	
Client ID No:	SVM-7-13.25	SVM-7-13.25 DUP	
Matrix:	Vapor	Vapor	
Dilution Factor:	1	1	MRL

TO-3 (TO-3)

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

4-Bromofluorobenzene	107%	108%	<u>%REC Limits</u> 70-130
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Allen Aminian

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15
Units: ug/L

	09/24/15	09/24/15	09/24/15	09/24/15	
Date Sampled:	09/24/15	09/24/15	09/24/15	09/24/15	
Date Prepared:	09/24/15	09/24/15	09/24/15	09/24/15	
Date Analyzed:	09/24/15	09/24/15	09/24/15	09/24/15	
AA ID No:	5J02027-01	5J02027-02	5J02027-03	5J02027-04	
Client ID No:	Ambient Air	SVM-9-5	SVM-9-14.5	SVM-2-5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

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

Benzene	<0.020	<0.020	<0.020	<0.020	0.020
tert-Butyl alcohol (TBA)	<20	<20	<20	<20	20
1,2-Dichloroethane (EDC)	<0.020	<0.020	<0.020	<0.020	0.020
Ethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Isopropanol (IPA)	<0.29	<0.29	<0.29	<0.29	0.29
Methyl-tert-Butyl Ether (MTBE)	<1.0	<1.0	<1.0	<1.0	1.0
Toluene	0.028	<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
o-Xylene	<0.020	<0.020	<0.020	<0.020	0.020
m,p-Xylenes	0.029	0.023	<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
n-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020

Surrogates

					%REC Limits
4-Bromofluorobenzene	106%	105%	104%	104%	70-130

Allen Aminian

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15
Units: ug/L

Date Sampled:	09/24/15	09/24/15	09/24/15	09/24/15	
Date Prepared:	09/24/15	09/24/15	09/24/15	09/24/15	
Date Analyzed:	09/24/15	09/24/15	09/24/15	09/24/15	
AA ID No:	5J02027-05	5J02027-06	5J02027-07	5J02027-08	
Client ID No:	SVM-1-14.5	SVM-1-5	SVM-15-15	SVM-15-22	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

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

Benzene	<0.020	<0.020	<0.020	<0.020	0.020
tert-Butyl alcohol (TBA)	<20	<20	<20	<20	20
1,2-Dichloroethane (EDC)	<0.020	<0.020	<0.020	<0.020	0.020
Ethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Isopropanol (IPA)	<0.29	<0.29	<0.29	<0.29	0.29
Methyl-tert-Butyl Ether (MTBE)	<1.0	<1.0	<1.0	<1.0	1.0
Toluene	<0.020	<0.020	<0.020	0.034	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
o-Xylene	<0.020	<0.020	<0.020	<0.020	0.020
m,p-Xylenes	<0.020	<0.020	0.022	0.030	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
n-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020

Surrogates

4-Bromofluorobenzene	105%	104%	107%	107%	%REC Limits 70-130
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Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15
Units: ug/L

	09/24/15	09/24/15	09/24/15	09/24/15	
Date Sampled:	09/24/15	09/24/15	09/24/15	09/24/15	
Date Prepared:	09/24/15	09/24/15	09/24/15	09/24/15	
Date Analyzed:	09/24/15	09/24/15	09/24/15	09/24/15	
AA ID No:	5J02027-09	5J02027-10	5J02027-11	5J02027-12	
Client ID No:	SVM-15-7	SVM-6-7	SVM-6-15	SVM-7-7	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

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

Benzene	<0.020	<0.020	<0.020	<0.020	0.020
tert-Butyl alcohol (TBA)	<20	<20	<20	<20	20
1,2-Dichloroethane (EDC)	<0.020	<0.020	<0.020	<0.020	0.020
Ethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Isopropanol (IPA)	<0.29	<0.29	<0.29	<0.29	0.29
Methyl-tert-Butyl Ether (MTBE)	<1.0	<1.0	<1.0	<1.0	1.0
Toluene	0.025	0.037	0.026	<0.020	0.020
1,3,5-Trimethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
1,2,4-Trimethylbenzene	<0.020	0.023	<0.020	<0.020	0.020
o-Xylene	<0.020	<0.020	<0.020	<0.020	0.020
m,p-Xylenes	0.029	0.043	0.031	<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
n-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020

Surrogates

					<u>%REC Limits</u>
4-Bromofluorobenzene	107%	108%	106%	101%	70-130

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15
Units: ug/L

Date Sampled:	09/24/15	09/24/15	
Date Prepared:	09/24/15	09/24/15	
Date Analyzed:	09/24/15	09/24/15	
AA ID No:	5J02027-13	5J02027-14	
Client ID No:	SVM-7-13.25	SVM-7-13.25 DUP	
Matrix:	Vapor	Vapor	
Dilution Factor:	1	1	MRL

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

Benzene	<0.020	<0.020	0.020
tert-Butyl alcohol (TBA)	<20	<20	20
1,2-Dichloroethane (EDC)	<0.020	<0.020	0.020
Ethylbenzene	<0.020	<0.020	0.020
Isopropanol (IPA)	<0.29	<0.29	0.29
Methyl-tert-Butyl Ether (MTBE)	<1.0	<1.0	1.0
Toluene	<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
o-Xylene	<0.020	<0.020	0.020
m,p-Xylenes	<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
n-Butylbenzene	<0.020	<0.020	0.020

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

Allen Aminian

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15
Units: % by Volume

Date Sampled:	09/24/15	09/24/15	09/24/15	09/24/15	
Date Prepared:	09/24/15	09/24/15	09/24/15	09/24/15	
Date Analyzed:	09/24/15	09/24/15	09/24/15	09/24/15	
AA ID No:	5J02027-02	5J02027-03	5J02027-04	5J02027-05	
Client ID No:	SVM-9-5	SVM-9-14.5	SVM-2-5	SVM-1-14.5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

Fixed Gases - Field (VOCs by GC/TCD)

Methane	<0.10	<0.10	<0.10	<0.10	0.10
Oxygen	18	16	18	18	0.10
Carbon Dioxide	0.84	2.8	0.17	0.12	0.10

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15
Units: % by Volume

Date Sampled:	09/24/15	09/24/15	09/24/15	09/24/15	
Date Prepared:	09/24/15	09/24/15	09/24/15	09/24/15	
Date Analyzed:	09/24/15	09/24/15	09/24/15	09/24/15	
AA ID No:	5J02027-06	5J02027-07	5J02027-08	5J02027-09	
Client ID No:	SVM-1-5	SVM-15-15	SVM-15-22	SVM-15-7	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

Fixed Gases - Field (VOCs by GC/TCD)

Methane	<0.10	<0.10	<0.10	<0.10	0.10
Oxygen	18	18	18	18	0.10
Carbon Dioxide	0.10	0.18	0.35	0.21	0.10

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15
Units: % by Volume

Date Sampled:	09/24/15	09/24/15	09/24/15	09/24/15	
Date Prepared:	09/24/15	09/24/15	09/24/15	09/24/15	
Date Analyzed:	09/24/15	09/24/15	09/24/15	09/24/15	
AA ID No:	5J02027-10	5J02027-11	5J02027-12	5J02027-13	
Client ID No:	SVM-6-7	SVM-6-15	SVM-7-7	SVM-7-13.25	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

Fixed Gases - Field (VOCs by GC/TCD)

Methane	<0.10	<0.10	<0.10	<0.10	0.10
Oxygen	18	18	18	18	0.10
Carbon Dioxide	0.14	0.23	0.56	0.89	0.10

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15
Units: % by Volume

Date Sampled:	09/24/15	
Date Prepared:	09/24/15	
Date Analyzed:	09/24/15	
AA ID No:	5J02027-14	
Client ID No:	SVM-7-13.25	
	DUP	
Matrix:	Vapor	
Dilution Factor:	1	MRL

Fixed Gases - Field (VOCs by GC/TCD)

Methane	<0.10	0.10
Oxygen	18	0.10
Carbon Dioxide	0.89	0.10

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC Limits	RPD	RPD Limit	Notes
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VOCs by EPA TO-3 - Quality Control

Batch B5J0220 - *** DEFAULT PREP ***

Blank (B5J0220-BLK1)

Prepared & Analyzed: 09/24/15

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

Surrogate: 4-Bromofluorobenzene 0.157 ug/L 0.14 110 70-130

LCS (B5J0220-BS1)

Prepared & Analyzed: 09/24/15

Gasoline Range Organics (GRO) **0.817** 20 ug/L 0.82 99.9 70-130

Surrogate: 4-Bromofluorobenzene 0.155 ug/L 0.14 108 70-130

LCS Dup (B5J0220-BSD1)

Prepared & Analyzed: 09/24/15

Gasoline Range Organics (GRO) **0.810** 20 ug/L 0.82 99.0 70-130 0.925 30

Surrogate: 4-Bromofluorobenzene 0.157 ug/L 0.14 110 70-130

Duplicate (B5J0220-DUP1)

Source: 5J02027-13 Prepared & Analyzed: 09/24/15

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

Surrogate: 4-Bromofluorobenzene 0.155 ug/L 0.14 108 70-130

VOCs by GCMS EPA TO-15 - Quality Control

Batch B5J0212 - *** DEFAULT PREP ***

Blank (B5J0212-BLK1)

Prepared & Analyzed: 09/24/15

Benzene <0.020 0.020 ug/L

tert-Butyl alcohol (TBA) <20 20 ug/L

1,2-Dichloroethane (EDC) <0.020 0.020 ug/L

Ethylbenzene <0.020 0.020 ug/L

Isopropanol (IPA) <0.29 0.29 ug/L

Methyl-tert-Butyl Ether (MTBE) <1.0 1.0 ug/L

Toluene <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

o-Xylene <0.020 0.020 ug/L

m,p-Xylenes <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

n-Butylbenzene <0.020 0.020 ug/L

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
<i>Batch B5J0212 - *** DEFAULT PREP ***</i>										
Blank (B5J0212-BLK1) Continued										
Prepared & Analyzed: 09/24/15										
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.157</i>		<i>ug/L</i>	<i>0.14</i>		<i>110</i>	<i>70-130</i>			
LCS (B5J0212-BS1)										
Prepared & Analyzed: 09/24/15										
Benzene	0.0304	0.020	ug/L	0.032		95.1	70-130		30	
1,2-Dichloroethane (EDC)	0.0438	0.020	ug/L	0.040		108	70-130		30	
Ethylbenzene	0.0446	0.020	ug/L	0.043		103	70-130		30	
Isopropanol (IPA)	0.0188	0.29	ug/L	0.025		76.3	70-130		30	
Toluene	0.0363	0.020	ug/L	0.038		96.2	70-130		30	
1,3,5-Trimethylbenzene	0.0382	0.020	ug/L	0.049		77.8	70-130		30	
1,2,4-Trimethylbenzene	0.0359	0.020	ug/L	0.049		73.0	70-130		30	
o-Xylene	0.0418	0.020	ug/L	0.043		96.2	70-130		30	
m,p-Xylenes	0.0422	0.020	ug/L	0.043		97.2	70-130		30	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.157</i>		<i>ug/L</i>	<i>0.14</i>		<i>110</i>	<i>70-130</i>			
LCS Dup (B5J0212-BSD1)										
Prepared & Analyzed: 09/24/15										
Benzene	0.0296	0.020	ug/L	0.032		92.7	70-130	2.56	30	
1,2-Dichloroethane (EDC)	0.0431	0.020	ug/L	0.040		106	70-130	1.49	30	
Ethylbenzene	0.0445	0.020	ug/L	0.043		102	70-130	0.0975	30	
Isopropanol (IPA)	0.0198	0.29	ug/L	0.025		80.4	70-130	5.23	30	
Toluene	0.0369	0.020	ug/L	0.038		97.8	70-130	1.65	30	
1,3,5-Trimethylbenzene	0.0393	0.020	ug/L	0.049		79.9	70-130	2.66	30	
1,2,4-Trimethylbenzene	0.0376	0.020	ug/L	0.049		76.4	70-130	4.55	30	
o-Xylene	0.0431	0.020	ug/L	0.043		99.2	70-130	3.07	30	
m,p-Xylenes	0.0428	0.020	ug/L	0.043		98.6	70-130	1.48	30	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.154</i>		<i>ug/L</i>	<i>0.14</i>		<i>107</i>	<i>70-130</i>			
Duplicate (B5J0212-DUP1)										
Source: 5J02027-13 Prepared & Analyzed: 09/24/15										
Benzene	<0.020	0.020	ug/L		<0.020				30	
tert-Butyl alcohol (TBA)	<20	20	ug/L		<20				30	
1,2-Dichloroethane (EDC)	<0.020	0.020	ug/L		<0.020				30	
Ethylbenzene	<0.020	0.020	ug/L		<0.020				30	
Isopropanol (IPA)	<0.29	0.29	ug/L		<0.29				30	
Methyl-tert-Butyl Ether (MTBE)	<1.0	1.0	ug/L		<1.0				30	
Toluene	<0.020	0.020	ug/L		<0.020				30	

Allen Aminian

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
<i>Batch B5J0212 - *** DEFAULT PREP ***</i>										
Duplicate (B5J0212-DUP1) Continued Source: 5J02027-13 Prepared & Analyzed: 09/24/15										
1,3,5-Trimethylbenzene	<0.020	0.020	ug/L		<0.020				30	
1,2,4-Trimethylbenzene	<0.020	0.020	ug/L		<0.020				30	
o-Xylene	<0.020	0.020	ug/L		<0.020				30	
m,p-Xylenes	<0.020	0.020	ug/L		<0.020				30	
sec-Butylbenzene	<0.020	0.020	ug/L		<0.020				30	
Isopropylbenzene	<0.020	0.020	ug/L		<0.020				30	
n-Propylbenzene	<0.020	0.020	ug/L		<0.020				30	
n-Butylbenzene	<0.020	0.020	ug/L		<0.020				30	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.152</i>		<i>ug/L</i>	<i>0.14</i>		<i>106</i>	<i>70-130</i>			

Fixed Gases by TCD - Quality Control

*Batch B5J0223 - *** DEFAULT PREP ****

Blank (B5J0223-BLK1)

Prepared & Analyzed: 09/24/15

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

LCS (B5J0223-BS1)

Prepared & Analyzed: 09/24/15

Methane	4.54	0.10	% by Volume	4.5		101	75-125			
Oxygen	3.67	0.10	% by Volume	4.0		91.8	75-125			
Carbon Dioxide	13.8	0.10	% by Volume	15		92.3	75-125			

LCS Dup (B5J0223-BSD1)

Prepared & Analyzed: 09/24/15

Methane	4.56	0.10	% by Volume	4.5		101	75-125	0.352	30	
Oxygen	3.61	0.10	% by Volume	4.0		90.3	75-125	1.65	30	

Allen Aminian

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Fixed Gases by TCD - Quality Control										
<i>Batch B5J0223 - *** DEFAULT PREP ***</i>										
LCS Dup (B5J0223-BSD1) Continued					Prepared & Analyzed: 09/24/15					
Carbon Dioxide	13.9	0.10	% by Volume	15	92.8	75-125	0.526	30		
Duplicate (B5J0223-DUP1)					Source: 5J02027-13 Prepared & Analyzed: 09/24/15					
Methane	<0.10	0.10	% by Volume		<0.10			30		
Oxygen	17.9	0.10	% by Volume		17.8		0.387	30		
Carbon Dioxide	0.891	0.10	% by Volume		0.888		0.337	30		

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187303
Date Received: 09/24/15
Date Reported: 10/09/15

Special Notes

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

Allen Aminian
QA/QC Manager



AMERICAN ANALYTICS CHAIN-OF-CUSTODY RECORD

9765 ETON AVE., CHATSWORTH, CA 91311

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

A.A. COC No.: 123451

70043206

Page 1 of 1

Client: CH2MHILL Project Name/No.: KINDEN MORGAN NORWALK Sampler's Name: WILLIAM SCHEIDT
 Project Manager: Site Address: 15036 NORWALK BLVD Sampler's Signature: [Signature]
 Phone: City: NORWALK P.O. No.:
 Fax: State & Zip: CA Quote No.:

TAT Turnaround Codes **

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

ANALYSIS REQUESTED (Test Name)

Client I.D.	A.A. I.D.	Date	Time	Sample Matrix	No. of Cont	Please enter the TAT Turnaround Codes ** below										Special Instructions	
						TO 15	TO 3	FIXED RATE									
AMBIENT AIR	5J02027-1	9-24-15	0800	V	1	X	X										
SUM-9-5	-2		0813	V	2	X	X	X									FV3
SUM-9-14.5	-3		0821	V	2	X	X	X									
SUM-2-5	-4		0846	V	2	X	X	X									
SUM-1-14.5	-5		1013	V	2	X	X	X									
SUM-1-5	-6		1019	V	2	X	X	X									
SUM-15-5	-7		1125	V	2	X	X	X									
SUM-15-22	-8		1145	V	2	X	X	X									
SUM-15-7	-9		1147	V	2	X	X	X									
SUM-6-7	-10		1302	V	2	X	X	X									
SUM-6-15	-11		1285	V	2	X	X	X									
SUM-7-7	-12		1350	V	2	X	X	X									
SUM-7-13.25	-13		1406	V	2	X	X	X									
SUM-7-13.25 ADP	-14		1406	V	2	X	X	X									

For Laboratory Use

REVIEWED
 Date 10/2/15 Time 11:16
 TATS Days Sign: [Signature]

Relinquished by <u>V. CAT</u>	Date <u>9-24-15</u>	Time <u>1430</u>	Received by <u>[Signature]</u>
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by

A.A. Project No.: MB187303/5J02027

Note: By relinquishing samples to American Analytics, client agrees to pay for the services requested on this chain of custody form and any additional client-requested analyses performed on this project. Sample(s) will be disposed of after 45 days from the date of invoice.



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

October 09, 2015

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

**Re : KMEP Norwalk Biosparge Startup / 496965.A1.01
MB187304 / 5J02028**

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received on 09/25/15 14:15 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 Analyticals.

Sincerely,

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

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
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Fixed Gases - Field

SVM-10-15.5	5J02028-02	Vapor	10	09/25/15 08:42	09/25/15 14:15
SVM-10-15.5 DUP	5J02028-03	Vapor	10	09/25/15 08:42	09/25/15 14:15
SVM-5-15	5J02028-04	Vapor	10	09/25/15 09:59	09/25/15 14:15
SVM-5-5	5J02028-05	Vapor	10	09/25/15 10:13	09/25/15 14:15
SVM-8-15	5J02028-06	Vapor	10	09/25/15 10:48	09/25/15 14:15
SVM-8-5	5J02028-07	Vapor	10	09/25/15 11:14	09/25/15 14:15
SVM-16-22	5J02028-08	Vapor	10	09/25/15 11:48	09/25/15 14:15
SVM-16-7	5J02028-09	Vapor	10	09/25/15 11:51	09/25/15 14:15
SVM-16-15.5	5J02028-10	Vapor	10	09/25/15 12:07	09/25/15 14:15
SVM-3-15	5J02028-11	Vapor	10	09/25/15 13:34	09/25/15 14:15
SVM-3-5	5J02028-12	Vapor	10	09/25/15 13:56	09/25/15 14:15
SVM-3-5 DUP	5J02028-13	Vapor	10	09/25/15 13:56	09/25/15 14:15

TO-15 (Mid Level)

Ambient Air	5J02028-01	Vapor	10	09/25/15 08:00	09/25/15 14:15
SVM-10-15.5	5J02028-02	Vapor	10	09/25/15 08:42	09/25/15 14:15
SVM-10-15.5 DUP	5J02028-03	Vapor	10	09/25/15 08:42	09/25/15 14:15
SVM-5-15	5J02028-04	Vapor	10	09/25/15 09:59	09/25/15 14:15
SVM-5-5	5J02028-05	Vapor	10	09/25/15 10:13	09/25/15 14:15

Allen Aminian
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
SVM-8-15	5J02028-06	Vapor	10	09/25/15 10:48	09/25/15 14:15
SVM-8-5	5J02028-07	Vapor	10	09/25/15 11:14	09/25/15 14:15
SVM-16-22	5J02028-08	Vapor	10	09/25/15 11:48	09/25/15 14:15
SVM-16-7	5J02028-09	Vapor	10	09/25/15 11:51	09/25/15 14:15
SVM-16-15.5	5J02028-10	Vapor	10	09/25/15 12:07	09/25/15 14:15
SVM-3-15	5J02028-11	Vapor	10	09/25/15 13:34	09/25/15 14:15
SVM-3-5	5J02028-12	Vapor	10	09/25/15 13:56	09/25/15 14:15
SVM-3-5 DUP	5J02028-13	Vapor	10	09/25/15 13:56	09/25/15 14:15

TO-3

Ambient Air	5J02028-01	Vapor	10	09/25/15 08:00	09/25/15 14:15
SVM-10-15.5	5J02028-02	Vapor	10	09/25/15 08:42	09/25/15 14:15
SVM-10-15.5 DUP	5J02028-03	Vapor	10	09/25/15 08:42	09/25/15 14:15
SVM-5-15	5J02028-04	Vapor	10	09/25/15 09:59	09/25/15 14:15
SVM-5-5	5J02028-05	Vapor	10	09/25/15 10:13	09/25/15 14:15
SVM-8-15	5J02028-06	Vapor	10	09/25/15 10:48	09/25/15 14:15
SVM-8-5	5J02028-07	Vapor	10	09/25/15 11:14	09/25/15 14:15
SVM-16-22	5J02028-08	Vapor	10	09/25/15 11:48	09/25/15 14:15
SVM-16-7	5J02028-09	Vapor	10	09/25/15 11:51	09/25/15 14:15
SVM-16-15.5	5J02028-10	Vapor	10	09/25/15 12:07	09/25/15 14:15
SVM-3-15	5J02028-11	Vapor	10	09/25/15 13:34	09/25/15 14:15

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15

Sample ID	Laboratory ID	Matrix	TAT	Date Sampled	Date Received
SVM-3-5	5J02028-12	Vapor	10	09/25/15 13:56	09/25/15 14:15
SVM-3-5 DUP	5J02028-13	Vapor	10	09/25/15 13:56	09/25/15 14:15

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
Fixed Gases by TCD								
Oxygen	SVM-10-15.5	15	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Carbon Dioxide	SVM-10-15.5	5.4	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Oxygen	SVM-10-15.5 DUP	15	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Carbon Dioxide	SVM-10-15.5 DUP	5.3	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Oxygen	SVM-5-15	18	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Carbon Dioxide	SVM-5-15	0.19	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Oxygen	SVM-5-5	18	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Carbon Dioxide	SVM-5-5	0.11	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Oxygen	SVM-8-15	18	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Carbon Dioxide	SVM-8-15	0.36	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD

Allen Aminian
QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
Oxygen	SVM-8-5	18	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Carbon Dioxide	SVM-8-5	0.33	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Oxygen	SVM-16-22	1.1	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Carbon Dioxide	SVM-16-22	13	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Oxygen	SVM-16-7	18	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Carbon Dioxide	SVM-16-7	0.68	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Oxygen	SVM-16-15.5	18	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Carbon Dioxide	SVM-16-15.5	1.5	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Oxygen	SVM-3-15	18	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Carbon Dioxide	SVM-3-15	0.45	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Oxygen	SVM-3-5	18	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15

ANALYTICAL DATA SUMMARY

Analyte	Sample Name	Result	MRL	Units	Dilution	Prepared	Analyzed	Method
Carbon Dioxide	SVM-3-5	0.28	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Oxygen	SVM-3-5 DUP	19	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD
Carbon Dioxide	SVM-3-5 DUP	0.29	0.10	% by Volume	1	09/25/15	09/25/15	VOCs by GC/TCD

VOCs by EPA TO-3

Gasoline Range Organics (GRO)	SVM-16-22	1700	400	ug/L	20	09/25/15	09/25/15	TO-3
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VOCs by GCMS EPA TO-15

Toluene	SVM-8-15	0.031	0.020	ug/L	1	09/25/15	09/25/15	TO-15
m,p-Xylenes	SVM-8-15	0.030	0.020	ug/L	1	09/25/15	09/25/15	TO-15
Toluene	SVM-8-5	0.032	0.020	ug/L	1	09/25/15	09/25/15	TO-15
m,p-Xylenes	SVM-8-5	0.028	0.020	ug/L	1	09/25/15	09/25/15	TO-15
Benzene	SVM-16-22	8.4	2.0	ug/L	100	09/25/15	09/25/15	TO-15
Toluene	SVM-16-22	9.7	2.0	ug/L	100	09/25/15	09/25/15	TO-15
m,p-Xylenes	SVM-16-22	9.4	2.0	ug/L	100	09/25/15	09/25/15	TO-15
Toluene	SVM-16-7	0.029	0.020	ug/L	1	09/25/15	09/25/15	TO-15
m,p-Xylenes	SVM-16-7	0.030	0.020	ug/L	1	09/25/15	09/25/15	TO-15
Toluene	SVM-16-15.5	0.028	0.020	ug/L	1	09/25/15	09/25/15	TO-15
m,p-Xylenes	SVM-16-15.5	0.031	0.020	ug/L	1	09/25/15	09/25/15	TO-15
Toluene	SVM-3-15	0.039	0.020	ug/L	1	09/25/15	09/25/15	TO-15
1,2,4-Trimethylbenzene	SVM-3-15	0.023	0.020	ug/L	1	09/25/15	09/25/15	TO-15
m,p-Xylenes	SVM-3-15	0.046	0.020	ug/L	1	09/25/15	09/25/15	TO-15

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15
Units: ug/L

Date Sampled:	09/25/15	09/25/15	09/25/15	09/25/15	
Date Prepared:	09/25/15	09/25/15	09/25/15	09/25/15	
Date Analyzed:	09/25/15	09/25/15	09/25/15	09/25/15	
AA ID No:	5J02028-01	5J02028-02	5J02028-03	5J02028-04	
Client ID No:	Ambient Air	SVM-10-15.5	SVM-10-15.5 DUP	SVM-5-15	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL
TO-3 (TO-3)					
Gasoline Range Organics (GRO)	<20	<20	<20	<20	20
Surrogates					
4-Bromofluorobenzene	113%	112%	112%	112%	%REC Limits 70-130

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15
Units: ug/L

Date Sampled:	09/25/15	09/25/15	09/25/15	09/25/15	
Date Prepared:	09/25/15	09/25/15	09/25/15	09/25/15	
Date Analyzed:	09/25/15	09/25/15	09/25/15	09/25/15	
AA ID No:	5J02028-05	5J02028-06	5J02028-07	5J02028-08	
Client ID No:	SVM-5-5	SVM-8-15	SVM-8-5	SVM-16-22	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	20	MRL

TO-3 (TO-3)

Gasoline Range Organics (GRO)	<20	<20	<20	1700	20
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Surrogates

4-Bromofluorobenzene	111%	112%	111%	108%	<u>%REC Limits</u> 70-130
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Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15
Units: ug/L

Date Sampled:	09/25/15	09/25/15	09/25/15	09/25/15	
Date Prepared:	09/25/15	09/25/15	09/25/15	09/25/15	
Date Analyzed:	09/25/15	09/25/15	09/25/15	09/25/15	
AA ID No:	5J02028-09	5J02028-10	5J02028-11	5J02028-12	
Client ID No:	SVM-16-7	SVM-16-15.5	SVM-3-15	SVM-3-5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

TO-3 (TO-3)

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

4-Bromofluorobenzene	111%	106%	107%	104%	<u>%REC Limits</u> 70-130
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Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15
Units: ug/L

Date Sampled:	09/25/15	
Date Prepared:	09/25/15	
Date Analyzed:	09/25/15	
AA ID No:	5J02028-13	
Client ID No:	SVM-3-5 DUP	
Matrix:	Vapor	
Dilution Factor:	1	MRL

TO-3 (TO-3)

Gasoline Range Organics (GRO)	<20	20
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Surrogates

		<u>%REC Limits</u>
4-Bromofluorobenzene	106%	70-130

Allen Aminian

Allen Aminian
 QA/QC Manager

**LABORATORY ANALYSIS RESULTS**

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15
Units: ug/L

Date Sampled:	09/25/15	09/25/15	09/25/15	09/25/15	
Date Prepared:	09/25/15	09/25/15	09/25/15	09/25/15	
Date Analyzed:	09/25/15	09/25/15	09/25/15	09/25/15	
AA ID No:	5J02028-01	5J02028-02	5J02028-03	5J02028-04	
Client ID No:	Ambient Air	SVM-10-15.5	SVM-10-15.5 DUP	SVM-5-15	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

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

Benzene	<0.020	<0.020	<0.020	<0.020	0.020
tert-Butyl alcohol (TBA)	<20	<20	<20	<20	20
1,2-Dichloroethane (EDC)	<0.020	<0.020	<0.020	<0.020	0.020
Ethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Isopropanol (IPA)	<0.29	<0.29	<0.29	<0.29	0.29
Methyl-tert-Butyl Ether (MTBE)	<1.0	<1.0	<1.0	<1.0	1.0
Toluene	<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
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
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
n-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020

Surrogates

4-Bromofluorobenzene	110%	109%	110%	109%	%REC Limits 70-130
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Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15
Units: ug/L

Date Sampled:	09/25/15	09/25/15	09/25/15	09/25/15	
Date Prepared:	09/25/15	09/25/15	09/25/15	09/25/15	
Date Analyzed:	09/25/15	09/25/15	09/25/15	09/25/15	
AA ID No:	5J02028-05	5J02028-06	5J02028-07	5J02028-08	
Client ID No:	SVM-5-5	SVM-8-15	SVM-8-5	SVM-16-22	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	100	MRL

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

Benzene	<0.020	<0.020	<0.020	8.4	0.020
tert-Butyl alcohol (TBA)	<20	<20	<20	<10000	20
1,2-Dichloroethane (EDC)	<0.020	<0.020	<0.020	<10	0.020
Ethylbenzene	<0.020	<0.020	<0.020	<10	0.020
Isopropanol (IPA)	<0.29	<0.29	<0.29	<140	0.29
Methyl-tert-Butyl Ether (MTBE)	<1.0	<1.0	<1.0	<500	1.0
Toluene	<0.020	0.031	0.032	9.7	0.020
1,3,5-Trimethylbenzene	<0.020	<0.020	<0.020	<10	0.020
1,2,4-Trimethylbenzene	<0.020	<0.020	<0.020	<10	0.020
o-Xylene	<0.020	<0.020	<0.020	<10	0.020
m,p-Xylenes	<0.020	0.030	0.028	9.4	0.020
sec-Butylbenzene	<0.020	<0.020	<0.020	<10	0.020
Isopropylbenzene	<0.020	<0.020	<0.020	<10	0.020
n-Propylbenzene	<0.020	<0.020	<0.020	<10	0.020
n-Butylbenzene	<0.020	<0.020	<0.020	<10	0.020

Surrogates

4-Bromofluorobenzene	108%	109%	108%	105%	%REC Limits 70-130
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Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15
Units: ug/L

	09/25/15	09/25/15	09/25/15	09/25/15	
Date Sampled:	09/25/15	09/25/15	09/25/15	09/25/15	
Date Prepared:	09/25/15	09/25/15	09/25/15	09/25/15	
Date Analyzed:	09/25/15	09/25/15	09/25/15	09/25/15	
AA ID No:	5J02028-09	5J02028-10	5J02028-11	5J02028-12	
Client ID No:	SVM-16-7	SVM-16-15.5	SVM-3-15	SVM-3-5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

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

Benzene	<0.020	<0.020	<0.020	<0.020	0.020
tert-Butyl alcohol (TBA)	<20	<20	<20	<20	20
1,2-Dichloroethane (EDC)	<0.020	<0.020	<0.020	<0.020	0.020
Ethylbenzene	<0.020	<0.020	<0.020	<0.020	0.020
Isopropanol (IPA)	<0.29	<0.29	<0.29	<0.29	0.29
Methyl-tert-Butyl Ether (MTBE)	<1.0	<1.0	<1.0	<1.0	1.0
Toluene	0.029	0.028	0.039	<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	0.023	<0.020	0.020
o-Xylene	<0.020	<0.020	<0.020	<0.020	0.020
m,p-Xylenes	0.030	0.031	0.046	<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
n-Butylbenzene	<0.020	<0.020	<0.020	<0.020	0.020

Surrogates

					<u>%REC Limits</u>
4-Bromofluorobenzene	108%	103%	104%	101%	70-130

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15
Units: ug/L

Date Sampled:	09/25/15	
Date Prepared:	09/25/15	
Date Analyzed:	09/25/15	
AA ID No:	5J02028-13	
Client ID No:	SVM-3-5 DUP	
Matrix:	Vapor	
Dilution Factor:	1	MRL

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

Benzene	<0.020	0.020
tert-Butyl alcohol (TBA)	<20	20
1,2-Dichloroethane (EDC)	<0.020	0.020
Ethylbenzene	<0.020	0.020
Isopropanol (IPA)	<0.29	0.29
Methyl-tert-Butyl Ether (MTBE)	<1.0	1.0
Toluene	<0.020	0.020
1,3,5-Trimethylbenzene	<0.020	0.020
1,2,4-Trimethylbenzene	<0.020	0.020
o-Xylene	<0.020	0.020
m,p-Xylenes	<0.020	0.020
sec-Butylbenzene	<0.020	0.020
Isopropylbenzene	<0.020	0.020
n-Propylbenzene	<0.020	0.020
n-Butylbenzene	<0.020	0.020

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

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15
Units: % by Volume

Date Sampled:	09/25/15	09/25/15	09/25/15	09/25/15	
Date Prepared:	09/25/15	09/25/15	09/25/15	09/25/15	
Date Analyzed:	09/25/15	09/25/15	09/25/15	09/25/15	
AA ID No:	5J02028-02	5J02028-03	5J02028-04	5J02028-05	
Client ID No:	SVM-10-15.5	SVM-10-15.5 DUP	SVM-5-15	SVM-5-5	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

Fixed Gases - Field (VOCs by GC/TCD)

Methane	<0.10	<0.10	<0.10	<0.10	0.10
Oxygen	15	15	18	18	0.10
Carbon Dioxide	5.4	5.3	0.19	0.11	0.10

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15
Units: % by Volume

Date Sampled:	09/25/15	09/25/15	09/25/15	09/25/15	
Date Prepared:	09/25/15	09/25/15	09/25/15	09/25/15	
Date Analyzed:	09/25/15	09/25/15	09/25/15	09/25/15	
AA ID No:	5J02028-06	5J02028-07	5J02028-08	5J02028-09	
Client ID No:	SVM-8-15	SVM-8-5	SVM-16-22	SVM-16-7	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

Fixed Gases - Field (VOCs by GC/TCD)

Methane	<0.10	<0.10	<0.10	<0.10	0.10
Oxygen	18	18	1.1	18	0.10
Carbon Dioxide	0.36	0.33	13	0.68	0.10

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15
Units: % by Volume

Date Sampled:	09/25/15	09/25/15	09/25/15	09/25/15	
Date Prepared:	09/25/15	09/25/15	09/25/15	09/25/15	
Date Analyzed:	09/25/15	09/25/15	09/25/15	09/25/15	
AA ID No:	5J02028-10	5J02028-11	5J02028-12	5J02028-13	
Client ID No:	SVM-16-15.5	SVM-3-15	SVM-3-5	SVM-3-5 DUP	
Matrix:	Vapor	Vapor	Vapor	Vapor	
Dilution Factor:	1	1	1	1	MRL

Fixed Gases - Field (VOCs by GC/TCD)

Methane	<0.10	<0.10	<0.10	<0.10	0.10
Oxygen	18	18	18	19	0.10
Carbon Dioxide	1.5	0.45	0.28	0.29	0.10

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	Limit	RPD	RPD Limit	Notes
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VOCs by EPA TO-3 - Quality Control

Batch B5J0221 - *** DEFAULT PREP ***

Blank (B5J0221-BLK1)

Prepared & Analyzed: 09/25/15

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

Surrogate: 4-Bromofluorobenzene 0.155 ug/L 0.14 108 70-130

LCS (B5J0221-BS1)

Prepared & Analyzed: 09/25/15

Gasoline Range Organics (GRO) **0.769** 20 ug/L 0.82 94.0 70-130

Surrogate: 4-Bromofluorobenzene 0.153 ug/L 0.14 107 70-130

LCS Dup (B5J0221-BSD1)

Prepared & Analyzed: 09/25/15

Gasoline Range Organics (GRO) **0.785** 20 ug/L 0.82 96.0 70-130 2.11 30

Surrogate: 4-Bromofluorobenzene 0.154 ug/L 0.14 107 70-130

Duplicate (B5J0221-DUP1)

Source: 5J02028-02 Prepared & Analyzed: 09/25/15

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

Surrogate: 4-Bromofluorobenzene 0.152 ug/L 0.14 106 70-130

VOCs by GCMS EPA TO-15 - Quality Control

Batch B5J0213 - *** DEFAULT PREP ***

Blank (B5J0213-BLK1)

Prepared & Analyzed: 09/25/15

Benzene <0.020 0.020 ug/L

tert-Butyl alcohol (TBA) <20 20 ug/L

1,2-Dichloroethane (EDC) <0.020 0.020 ug/L

Ethylbenzene <0.020 0.020 ug/L

Isopropanol (IPA) <0.29 0.29 ug/L

Methyl-tert-Butyl Ether (MTBE) <1.0 1.0 ug/L

Toluene <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

o-Xylene <0.020 0.020 ug/L

m,p-Xylenes <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

n-Butylbenzene <0.020 0.020 ug/L

Allen Aminian
 QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
<i>Batch B5J0213 - *** DEFAULT PREP ***</i>										
Blank (B5J0213-BLK1) Continued										
Prepared & Analyzed: 09/25/15										
<i>Surrogate: 4-Bromofluorobenzene</i>	0.151		ug/L	0.14		106	70-130			
LCS (B5J0213-BS1)										
Prepared & Analyzed: 09/25/15										
Benzene	0.0336	0.020	ug/L	0.032		105	70-130		30	
1,2-Dichloroethane (EDC)	0.0409	0.020	ug/L	0.040		101	70-130		30	
Ethylbenzene	0.0565	0.020	ug/L	0.043		130	70-130		30	
Isopropanol (IPA)	0.0257	0.29	ug/L	0.025		105	70-130		30	
Toluene	0.0467	0.020	ug/L	0.038		124	70-130		30	
1,3,5-Trimethylbenzene	0.0576	0.020	ug/L	0.049		117	70-130		30	
1,2,4-Trimethylbenzene	0.0559	0.020	ug/L	0.049		114	70-130		30	
o-Xylene	0.0565	0.020	ug/L	0.043		130	70-130		30	
m,p-Xylenes	0.0565	0.020	ug/L	0.043		130	70-130		30	
<i>Surrogate: 4-Bromofluorobenzene</i>	0.168		ug/L	0.14		118	70-130			
LCS Dup (B5J0213-BSD1)										
Prepared & Analyzed: 09/25/15										
Benzene	0.0254	0.020	ug/L	0.032		79.5	70-130	27.7	30	
1,2-Dichloroethane (EDC)	0.0364	0.020	ug/L	0.040		89.9	70-130	11.7	30	
Ethylbenzene	0.0471	0.020	ug/L	0.043		108	70-130	18.1	30	
Isopropanol (IPA)	0.0164	0.29	ug/L	0.025		66.8	70-130	44.2	30	
Toluene	0.0427	0.020	ug/L	0.038		113	70-130	8.93	30	
1,3,5-Trimethylbenzene	0.0385	0.020	ug/L	0.049		78.3	70-130	39.7	30	QR-02
1,2,4-Trimethylbenzene	0.0374	0.020	ug/L	0.049		76.0	70-130	39.7	30	QR-02
o-Xylene	0.0471	0.020	ug/L	0.043		108	70-130	18.0	30	
m,p-Xylenes	0.0495	0.020	ug/L	0.043		114	70-130	13.2	30	
<i>Surrogate: 4-Bromofluorobenzene</i>	0.163		ug/L	0.14		114	70-130			
Duplicate (B5J0213-DUP1)										
Source: 5J02028-12 Prepared & Analyzed: 09/25/15										
Benzene	<0.020	0.020	ug/L		<0.020				30	
tert-Butyl alcohol (TBA)	<20	20	ug/L		<20				30	
1,2-Dichloroethane (EDC)	<0.020	0.020	ug/L		<0.020				30	
Ethylbenzene	<0.020	0.020	ug/L		<0.020				30	
Isopropanol (IPA)	<0.29	0.29	ug/L		<0.29				30	
Methyl-tert-Butyl Ether (MTBE)	<1.0	1.0	ug/L		<1.0				30	
Toluene	<0.020	0.020	ug/L		<0.020				30	

Allen Aminian

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
VOCs by GCMS EPA TO-15 - Quality Control										
<i>Batch B5J0213 - *** DEFAULT PREP ***</i>										
Duplicate (B5J0213-DUP1) Continued Source: 5J02028-12 Prepared & Analyzed: 09/25/15										
1,3,5-Trimethylbenzene	<0.020	0.020	ug/L		<0.020				30	
1,2,4-Trimethylbenzene	<0.020	0.020	ug/L		<0.020				30	
o-Xylene	<0.020	0.020	ug/L		<0.020				30	
m,p-Xylenes	<0.020	0.020	ug/L		<0.020				30	
sec-Butylbenzene	<0.020	0.020	ug/L		<0.020				30	
Isopropylbenzene	<0.020	0.020	ug/L		<0.020				30	
n-Propylbenzene	<0.020	0.020	ug/L		<0.020				30	
n-Butylbenzene	<0.020	0.020	ug/L		<0.020				30	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.157</i>		<i>ug/L</i>	<i>0.14</i>		<i>110</i>	<i>70-130</i>			
Fixed Gases by TCD - Quality Control										
<i>Batch B5J0224 - *** DEFAULT PREP ***</i>										
Blank (B5J0224-BLK1) Prepared & Analyzed: 09/25/15										
Methane	<0.10	0.10	% by Volume							
Oxygen	<0.10	0.10	% by Volume							
Carbon Dioxide	<0.10	0.10	% by Volume							
LCS (B5J0224-BS1) Prepared & Analyzed: 09/25/15										
Methane	4.33	0.10	% by Volume	4.5		96.3	75-125			
Oxygen	3.73	0.10	% by Volume	4.0		93.2	75-125			
Carbon Dioxide	13.9	0.10	% by Volume	15		92.9	75-125			
LCS Dup (B5J0224-BSD1) Prepared & Analyzed: 09/25/15										
Methane	4.47	0.10	% by Volume	4.5		99.4	75-125	3.16	30	
Oxygen	3.91	0.10	% by Volume	4.0		97.6	75-125	4.61	30	

Allen Aminian

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Fixed Gases by TCD - Quality Control										
<i>Batch B5J0224 - *** DEFAULT PREP ***</i>										
LCS Dup (B5J0224-BSD1) Continued					Prepared & Analyzed: 09/25/15					
Carbon Dioxide	13.7	0.10	% by Volume	15	91.1	75-125	1.96	30		
Duplicate (B5J0224-DUP1)					Source: 5J02028-02 Prepared & Analyzed: 09/25/15					
Methane	<0.10	0.10	% by Volume		<0.10			30		
Oxygen	14.6	0.10	% by Volume		14.9		1.80	30		
Carbon Dioxide	5.30	0.10	% by Volume		5.40		1.85	30		

Allen Aminian
QA/QC Manager



LABORATORY ANALYSIS RESULTS

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

AA Project No: MB187304
Date Received: 09/25/15
Date Reported: 10/09/15

Special Notes

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

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

Allen Aminian
QA/QC Manager



AMERICAN ANALYTICS CHAIN-OF-CUSTODY RECORD

9765 ETON AVE., CHATSWORTH, CA 91311

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

A.A. COC No.: 123452

70042679

Page 1 of 1

Client: CH2MHILL Project Name/No.: KINDER MORGAN NORWALK Sampler's Name: WILLIAM S. [Signature]
 Project Manager: _____ Site Address: 15036 NORWALK BLVD Sampler's Signature: [Signature]
 Phone: _____ City: NORWALK P.O. No.: _____
 Fax: _____ State & Zip: CA. Quote No.: _____

TAT Turnaround Codes **

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

ANALYSIS REQUESTED (Test Name)

TO15	TO3	FIXED CARBON																		
------	-----	--------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Client I.D.	A.A. I.D.	Date	Time	Sample Matrix	No. of Cont	Please enter the TAT Turnaround Codes ** below										Special Instructions						
						①	②	③	④	⑤	X											
AMBIENT AIR	SS02028-1	9-25-15	0800	V	1	X	X															
SUM-10-15.5	-2		0842	V	2	X	X	X														
SUM-10-15.5 DUP	-3		0842	V	2	X	X	X														
SUM-5-15	-4		0959	V	2	X	X	X														
SUM-5-5	-5		1013	V	2	X	X	X														
SUM-8-15	-6		1048	V	2	X	X	X														
SUM-8-5	-7		1114	V	2	X	X	X														
SUM-16-22	-8		1148	V	2	X	X	X														
SUM-16-7	-9		1151	V	2	X	X	X														
SUM-16-18.5	-10		1207	V	2	X	X	X														
SUM-3-15	-11		1334	V	2	X	X	X														
SUM-3-5	-12		1358	V	2	X	X	X														
SUM-3-5 DUP	-13		1358	V	2	X	X	X														

REVIEWED

For Laboratory Use
 Date 10/2/15 Time 11:25
 TAT 5 Days Sign: [Signature]

Relinquished by <u>[Signature]</u>	Date <u>9-25-15</u>	Time <u>1405</u>	Received by <u>[Signature]</u>
Relinquished by <u>[Signature]</u>	Date	Time	Received by
Relinquished by	Date	Time	Received by

A.A. Project No.: MB187304/SS02028

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

Attachment B

Fixed Laboratory Analytical Reports

November 11, 2015

CH2M HILL
ATTN: Daniel Jablonski
5742 Costello Ave.
Van Nuys, CA 91401



ADE-1461
EPA Methods TO-3,
TO14A, TO15 SIM & Scan,
ASTM D1946



LA Cert 04140
EPA Methods TO3, TO14A, TO15, 25C/3C,
RSK-175

TX Cert T104704450—14-6
EPA Methods TO14A, TO15

UT Cert CA0133332015-3
EPA Methods TO3, TO14A, TO15, RSK-175

LABORATORY TEST RESULTS

Project Reference: SFPP – Norwalk Site
Lab Number: G092501-01/04

Enclosed are results for sample(s) received 9/25/15 by Air Technology Laboratories. Samples were received intact. Analyses were performed according to specifications on the chain of custody provided with the sample(s).

Report Narrative:

- This report has been **revised** to include units of ug/L for EPA Method TO-3 per client request.
- Unless otherwise noted in the report, sample analyses were performed within method performance criteria and meet all requirements of the NELAC Standards.
- The enclosed results relate only to the sample(s).

Preliminary results were e-mailed to Dan Jablonski, Vidal Cortes and Steve Defibaugh on 10/02/15.

ATL appreciates the opportunity to provide testing services to your company. If you have any questions regarding these results, please call me at (626) 964-4032.

Sincerely,

A handwritten signature in blue ink, appearing to read "Mark Johnson".

Mark Johnson
Operations Manager
MJohnson@AirTechLabs.com

Note: The cover letter is an integral part of this analytical report.

Air Technology Laboratories, Inc.

18501 Gale Ave # 130

City of Industry, CA 91748

Tel: (626) 964-4032

Joann De La Ossa (JDeLaOssa@airtechlabs.com)

G092501-01/04

CHAIN OF CUSTODY RECORD

DATE: 9/25/15

PAGE: 1 OF 1

LABORATORY CLIENT: CH2M HILL: Attn - Dan Jablonski					CLIENT PROJECT NAME / NUMBER: SFPP - Norwalk Site					P.O. NO.:																		
ADDRESS: 6 Hutton Centre Dr, Suite 700					PROJECT CONTACT: Vidal Cortes					QUOTE NO.:																		
CITY: Santa Ana, CA 92707					SAMPLER(S): (SIGNATURE) <i>V. Cortes</i>					LAB USE ONLY: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>																		
TEL: 714-429-2020		FAX:		E-MAIL: Daniel.Jablonski@CH2M.com																								
TURNAROUND TIME <input type="checkbox"/> SAME DAY <input type="checkbox"/> 24 HR <input type="checkbox"/> 48HR <input type="checkbox"/> 72 HR <input checked="" type="checkbox"/> 5 DAYS <input type="checkbox"/> 10 DAYS										REQUESTED ANALYSIS																		
SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY) <input type="checkbox"/> RWQCB REPORTING <input type="checkbox"/> ARCHIVE SAMPLES UNTIL ___/___/___																												
SPECIAL INSTRUCTIONS Report: Jablonski, Daniel/LAC - Daniel.Jablonski@CH2M.com, Cortes, Vidal/SCO - Vidal.Cortes@CH2M.com																												
"J" flags required/Use lowest possible detection limit - all methods.																												
LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING				MAT-RIX	NO. OF CONT.	TO-15 (VOCs Target Analytes)	TO-3 (TPH-g)	ASTM-D 1946 (O2/Argon, CO2, CH4, N2)											Comments						
			DATE	TIME	INITIAL PRESSURE ("Hg)	FINAL PRESSURE ("Hg)																						
	SVM-14-22-092315		9/25/15	1444	-30	-3	Air	1	X	X	X																	
	SVM-1-14.5-092415		9/24/15	1006	-30	-4	Air	1	X	X	X																	
	SVM-7-13.25-092415		9/24/15	1400	-30	-4	Air	1	X	X	X																	
	SVM-5-15.5-092515		9/25/15	0957	-30	-3	Air	1	X	X	X																	
Relinquished by: (Signature) <i>V. Cortes</i>								Received by: (Signature) <i>Dan M...</i>								Date: 9/25/15	Time: 1320											
Relinquished by: (Signature)								Received by: (Signature)								Date:	Time:											
Relinquished by: (Signature)								Received by: (Signature)								Date:	Time:											

Client: CH2M HILL
 Attn: Daniel Jablonski
 Project Name: SFPP - Norwalk Site
 Project No.: NA
 Date Received: 09/25/15
 Matrix: Air
 Reporting Units: ug/L

EPA Method TO15

Lab No.:	G092501-01			G092501-02			G092501-03			G092501-04		
Client Sample I.D.:	SVM-14-22 - 092315			SVM-1-14.5 - 092415			SVM-7-13.25 - 092415			SVM-5-15.5 - 092515		
Date/Time Sampled:	9/23/15 14:44			9/24/15 10:06			9/24/15 14:00			9/25/15 9:51		
Date/Time Analyzed:	9/29/15 14:50			9/29/15 20:23			9/29/15 21:04			9/29/15 21:45		
QC Batch No.:	150929MS2A1			150929MS2A1			150929MS2A1			150929MS2A1		
Analyst Initials:	DT			DT			DT			DT		
Dilution Factor:	94			1.9			2.0			1.8		
ANALYTE	Result ug/L	RL ug/L	MDL ug/L	Result ug/L	RL ug/L	MDL ug/L	Result ug/L	RL ug/L	MDL ug/L	Result ug/L	RL ug/L	MDL ug/L
t-Butyl Methyl Ether (MTBE)	ND	0.34	0.075	ND	0.0069	0.0015	ND	0.0073	0.0016	ND	0.0066	0.0015
Benzene	33	0.30	0.029	0.0033 J	0.0061	0.00059	0.012	0.0065	0.00062	0.0036 J	0.0059	0.00056
1,2-Dichloroethane	0.84	0.38	0.028	ND	0.0077	0.00057	ND	0.0082	0.00061	ND	0.0074	0.00055
Toluene	71	0.35	0.028	0.018	0.0072	0.00057	0.016	0.0076	0.00061	0.016	0.0069	0.00055
Ethylbenzene	11	0.41	0.023	0.0048 J	0.0083	0.00048	0.0059 J	0.0088	0.00050	0.0039 J	0.0080	0.00046
p,&m-Xylene	100	0.41	0.046	0.022	0.0083	0.00094	0.020	0.0088	0.00099	0.017	0.0080	0.00090
o-Xylene	120 d	0.81	0.099	0.0092	0.0083	0.0010	0.011	0.0088	0.0011	0.0077 J	0.0080	0.00097
Isopropyl benzene	0.37 J	0.46	0.048	ND	0.0094	0.00098	0.0011 J	0.0099	0.0010	ND	0.0090	0.00094
n-Propyl Benzene	0.97	0.46	0.027	0.0022 J	0.0094	0.00055	0.0023 J	0.0099	0.00058	0.0018 J	0.0090	0.00053
1,3,5-Trimethylbenzene	36	0.92	0.079	0.0027 J	0.019	0.0016	0.0031 J	0.020	0.0017	0.0019 J	0.018	0.0016
1,2,4-Trimethylbenzene	16	0.92	0.052	0.013 J	0.019	0.0011	0.014 J	0.020	0.0011	0.0093 J	0.018	0.0010
sec-Butylbenzene	0.17 J	0.51	0.050	ND	0.010	0.0010	ND	0.011	0.0011	ND	0.010	0.00098
n-Butylbenzene	ND	0.51	0.038	0.0017 J	0.010	0.00076	0.0021 J	0.011	0.00081	0.0013 J	0.010	0.00074
Isopropanol	0.032 J	1.2	0.020	0.0015 J	0.023	0.00040	0.025	0.025	0.00042	0.0032 J	0.023	0.00039
t-Butanol	ND	1.4	0.054	ND	0.029	0.0011	0.013 J	0.031	0.0012	0.0015 J	0.028	0.0011

MDL = Method Detection Limit
 ND= Not Detected (below MDL)
 RL = Reporting Limit
 J = Trace amount. Analyte concentration between RL and MDL.
 d = Analyte reported from secondary dilution.

Reviewed/Approved By: Mark Johnson
 Mark Johnson
 Operations Manager

Date 11-11-15

The cover letter is an integral part of this analytical report



Client: CH2M HILL
 Attn: Daniel Jablonski
 Project Name: SFPP - Norwalk Site
 Project No.: NA
 Date Received: 09/25/15
 Matrix: Air
 Reporting Units: ug/L

EPA Method TO15

Lab No.:	METHOD BLANK												
Client Sample I.D.:	-												
Date/Time Sampled:	-												
Date/Time Analyzed:	9/29/15 13:20												
QC Batch No.:	150929MS2A1												
Analyst Initials:	DT												
Dilution Factor:	0.20												
ANALYTE	Result ug/L	RL ug/L	MDL ug/L										
t-Butyl Methyl Ether (MTBE)	ND	0.00072	0.00016										
Benzene	0.00010 J	0.00064	0.000061										
1,2-Dichloroethane	ND	0.00081	0.000060										
Toluene	ND	0.00075	0.000060										
Ethylbenzene	ND	0.00087	0.000050										
p,&m-Xylene	ND	0.00087	0.000098										
o-Xylene	ND	0.00087	0.00011										
Isopropyl benzene	ND	0.00098	0.00010										
n-Propyl Benzene	ND	0.00098	0.000057										
1,3,5-Trimethylbenzene	ND	0.0020	0.00017										
1,2,4-Trimethylbenzene	ND	0.0020	0.00011										
sec-Butylbenzene	ND	0.0011	0.00011										
n-Butylbenzene	ND	0.0011	0.000080										
Isopropanol	ND	0.0025	0.000042										
t-Butanol	ND	0.0030	0.00012										

MDL = Method Detection Limit
 ND = Not Detected (below MDL)
 RL = Reporting Limit
 J = Trace amount. Analyte concentration between RL and MDL.

Reviewed/Approved By: Mark Johnson
 Mark Johnson
 Operations Manager

Date 10-11-15

The cover letter is an integral part of this analytical report



QC Batch #: 150929MS2A1

Matrix: Air

EPA Method TO-14/TO-15											
Lab No:	Method Blank		LCS		LCSD						
Date/Time Analyzed:	9/29/15 13:20		9/29/15 11:49		9/29/15 12:28						
Data File ID:	29SEP006.D		29SEP004.D		29SEP005.D						
Analyst Initials:	DT		DT		DT						
Dilution Factor:	0.2		1.0		1.0		Limits				
ANALYTE	Result ppbv	Spike Amount	Result ppbv	% Rec	Result ppbv	% Rec	RPD	Low %Rec	High %Rec	Max. RPD	Pass/Fail
1,1-Dichloroethene	0.0	10.0	9.4	94	8.4	84	10.9	70	130	30	Pass
Methylene Chloride	0.0	10.0	9.8	98	8.9	89	8.9	70	130	30	Pass
Trichloroethene	0.0	10.0	9.7	97	9.1	91	6.4	70	130	30	Pass
Toluene	0.0	10.0	9.3	93	8.5	85	9.8	70	130	30	Pass
1,1,2,2-Tetrachloroethane	0.0	10.0	8.8	88	8.3	83	5.6	70	130	30	Pass

RPD = Relative Percent Difference

Reviewed/Approved By: Mark Johnson
 Mark Johnson
 Operations Manager

Date: 11-11-15

The cover letter is an integral part of this analytical report



Client: CH2M HILL
Attn: Daniel Jablonski
Project Name: SFPP - Norwalk Site
Project No.: NA
Date Received: 09/25/15
Matrix: Air
Reporting Units: % v/v

ASTM D1946

Lab No.:	G092501-01	G092501-02	G092501-03	G092501-04								
Client Sample I.D.:	SVM-14-22 - 092315	SVM-1-14.5 - 092415	SVM-7-13.25 - 092415	SVM-5-15.5 - 092515								
Date/Time Sampled:	9/23/15 14:44	9/24/15 10:06	9/24/15 14:00	9/25/15 9:51								
Date/Time Analyzed:	9/28/15 10:22	9/28/15 10:36	9/28/15 10:51	9/28/15 11:05								
QC Batch No.:	150928GC8A1	150928GC8A1	150928GC8A1	150928GC8A1								
Analyst Initials:	AS	AS	AS	AS								
Dilution Factor:	1.9	1.9	2.0	1.8								
ANALYTE	Result % v/v	RL % v/v	MDL % v/v	Result % v/v	RL % v/v	MDL % v/v	Result % v/v	RL % v/v	MDL % v/v	Result % v/v	RL % v/v	MDL % v/v
Carbon Dioxide	13	0.019	0.00079	0.13	0.019	0.00081	1.0	0.020	0.00086	0.24	0.018	0.00078
Oxygen/Argon	3.2	0.94	0.069	21	0.95	0.070	21	1.0	0.074	21	0.92	0.068
Nitrogen	82	1.9	0.27	79	1.9	0.28	78	2.0	0.29	78	1.8	0.27
Methane	0.020	0.0019	0.000086	ND	0.0019	0.000087	ND	0.0020	0.000092	ND	0.0018	0.000084

Results normalized including non-methane hydrocarbons

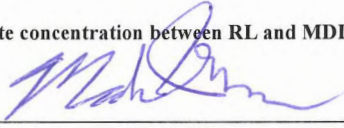
MDL = Method Detection Limit

ND= Not Detected (below MDL)

RL = Reporting Limit

J = Trace amount. Analyte concentration between RL and MDL.

Reviewed/Approved By:



Mark Johnson
Operations Manager

Date

11-11-15

The cover letter is an integral part of this analytical report




QC Batch No.: 150928GC8A1
Matrix: Air
Units: % v/v

QC for ASTM D1946

Lab No.:	Method Blank	LCS	LCSD						
Date/Time Analyzed:	9/28/15 10:05	9/28/15 9:05	9/28/15 9:20						
Analyst Initials:	AS	AS	AS						
Datafile:	28sep007	28sep004	28sep005						
Dilution Factor:	1.0	1.0	1.0						
ANALYTE	Results	RL	MDL	% Rec.	Criteria	% Rec.	Criteria	%RPD	Criteria
Carbon Dioxide	0.00073 J	0.010	0.00042	92	70-130%	94	70-130%	3.0	<30
Oxygen/Argon	0.17 J	0.50	0.037	100	70-130%	103	70-130%	3.1	<30
Nitrogen	0.54 J	1.0	0.14	100	70-130%	103	70-130%	3.1	<30
Methane	ND	0.0010	0.000050	99	70-130%	98	70-130%	0.8	<30

ND = Not Detected (Below RL)
J = Trace amount. Analyte concentration between RL and MDL.

Reviewed/Approved By:  Date: 11-11-15
Mark J. Johnson
Operations Manager

The cover letter is an integral part of this analytical report.



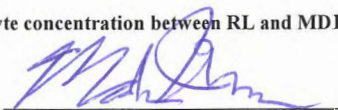
Client: CH2M HILL
 Attn: Daniel Jablonski
 Project Name: SFPP - Norwalk Site
 Project No.: NA
 Date Received: 09/25/15
 Matrix: Air
 Reporting Units: ug/L

EPA METHOD TO3

Lab No.:	G092501-01			G092501-02			G092501-03			G092501-04		
Client Sample I.D.:	SVM-14-22 - 092315			SVM-1-14.5 - 092415			SVM-7-13.25 - 092415			SVM-5-15.5 - 092515		
Date/Time Sampled:	9/23/15 14:44			9/24/15 10:06			9/24/15 14:00			9/25/15 9:51		
Date/Time Analyzed:	9/28/15 15:46			9/28/15 13:28			9/28/15 13:51			9/28/15 14:14		
QC Batch No.:	150928GC11A1			150928GC11A1			150928GC11A1			150928GC11A1		
Analyst Initials:	AS			AS			AS			AS		
Dilution Factor:	37			1.9			2.0			1.8		
ANALYTE	Result ug/L	RL ug/L	MDL ug/L	Result ug/L	RL ug/L	MDL ug/L	Result ug/L	RL ug/L	MDL ug/L	Result ug/L	RL ug/L	MDL ug/L
TVOC as Gasoline	22,000	150	18	2.2 J	7.8	0.90	10	8.3	0.96	2.1 J	7.5	0.87

MDL = Method Detection Limit
 ND= Not Detected (below MDL)
 RL = Reporting Limit
 J = Trace amount. Analyte concentration between RL and MDL.

Reviewed/Approved By:



Mark Johnson
 Operations Manager

Date

11-11-15

The cover letter is an integral part of this analytical report



QC Batch No: 150928GC11A1

Matrix: Air

Reporting Units: ug/L

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G092501a

EPA METHOD TO3											
LABORATORY CONTROL SAMPLE SUMMARY											

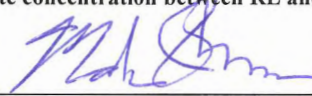
Lab No.:	METHOD BLANK			LCS		LCSD					
Date Analyzed:	9/28/15 11:33			9/28/15 15:00		9/28/15 15:23					
Analyst Initials:	AS			AS		AS					
Dilution Factor:	1.0			1.0		1.0					
ANALYTE	Result ug/L	RL ug/L	MDL ug/L	Result ug/L	% Rec.	Result ug/L	% Rec.	RPD %	Low %Rec	High %Rec	Max. RPD
TVOC as Gasoline	ND	4.1	0.47	397	106	390	104	1.7	70	130	25

MDL = Method Detection Limit

ND= Not Detected (below MDL)

RL = Reporting Limit

J = Trace amount. Analyte concentration between RL and MDL.

Reviewed/Approved By: 

Date 11-11-15

Mark Johnson
Operations Manager

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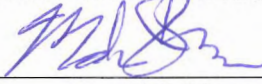


Client: CH2M HILL
Attn: Daniel Jablonski
Project Name: SFPP - Norwalk Site
Project No.: NA
Date Received: 09/25/15
Matrix: Air
Reporting Units: ppmv

EPA METHOD TO3

Lab No.:	G092501-01			G092501-02			G092501-03			G092501-04		
Client Sample I.D.:	SVM-14-22 - 092315			SVM-1-14.5 - 092415			SVM-7-13.25 - 092415			SVM-5-15.5 - 092515		
Date/Time Sampled:	9/23/15 14:44			9/24/15 10:06			9/24/15 14:00			9/25/15 9:51		
Date/Time Analyzed:	9/28/15 15:46			9/28/15 13:28			9/28/15 13:51			9/28/15 14:14		
QC Batch No.:	150928GC11A1			150928GC11A1			150928GC11A1			150928GC11A1		
Analyst Initials:	AS			AS			AS			AS		
Dilution Factor:	37			1.9			2.0			1.8		
ANALYTE	Result ppmv	RL ppmv	MDL ppmv	Result ppmv	RL ppmv	MDL ppmv	Result ppmv	RL ppmv	MDL ppmv	Result ppmv	RL ppmv	MDL ppmv
TVOC as Gasoline	5,400	37	4.3	0.55 J	1.9	0.22	2.5	2.0	0.23	0.51 J	1.8	0.21

MDL = Method Detection Limit
 ND= Not Detected (below MDL)
 RL = Reporting Limit
 J = Trace amount. Analyte concentration between RL and MDL.

Reviewed/Approved By: 
 Mark Johnson
 Operations Manager

Date 11-17-15

The cover letter is an integral part of this analytical report



QC Batch No: 150928GC11A1

Matrix: Air

Reporting Units: ppmv

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G092501a

EPA METHOD TO3
LABORATORY CONTROL SAMPLE SUMMARY

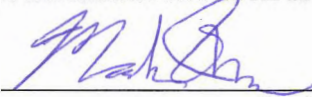
Lab No.:	METHOD BLANK	LCS	LCSD								
Date Analyzed:	9/28/15 11:33	9/28/15 15:00	9/28/15 15:23								
Analyst Initials:	AS	AS	AS								
Dilution Factor:	1.0	1.0	1.0								
ANALYTE	Result ppmv	RL ppmv	MDL ppmv	Result ppmv	% Rec.	Result ppmv	% Rec.	RPD %	Low %Rec	High %Rec	Max. RPD
TVOC as Gasoline	ND	1.0	0.12	97.0	106	95.3	104	1.7	70	130	25

MDL = Method Detection Limit

ND= Not Detected (below MDL)

RL = Reporting Limit

J = Trace amount. Analyte concentration between RL and MDL.

Reviewed/Approved By: 
 Mark Johnson
 Operations Manager

Date 11-17-15

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