METROVATION

RECEIVED
By Alameda County Environmental Health 8:48 am, Apr 21, 2016

April 15, 2016

Ms. Anne Jurek
Senior Hazardous Materials Specialist
Alameda County Health Care Services Agency
Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

Re: Terradev Jefferson LLC Property
645 Fourth Street, Oakland, CA 94607
Fuel Leak Case No. RO0003001
Blue Rock Project No. ASE-1

Dear Ms. Jurek,

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge.

Sincerely,

Sara May
Director of Operations
Metrovation, LLC, managing agent for
Terradev Jefferson, LLC

Attachment:

Blue Rock Environmental, Inc.'s *Indoor Air Study – Report of Supplemental Findings* (April 13, 2016).

OAKLAND IRONWORKS BUILDING
580 SECOND STREET, SUITE 260, OAKLAND CA 94607 TELEPHONE (510) 839-4000 FAX (510) 839-4025

BLUE ROCK ENVIRONMENTAL, INC.

Ms. Anne Jurek
Senior Hazardous Materials Specialist
Alameda County Health Care Services Agency
Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

April 13, 2016

Re: Indoor Air Study – Report of Supplemental Findings
Terradev Jefferson LLC Property
645 4th Street, Oakland, CA 94607
Fuel Leak Case No. RO0003001
Blue Rock Project No. ASE-1

Dear Ms. Jurek,

This report, prepared by Blue Rock Environmental, Inc. (Blue Rock) on behalf of Terradev Jefferson, LLC, presents the results of additional indoor air sampling and sub-slab vapor sampling at the subject site (Figure 1). This work was recommended in Blue Rock's *Indoor Air Study – Report of Initial Findings* dated January 4, 2016, which was concurred with by the Alameda County Department of Environmental Health (ACDEH) in a letter dated January 11, 2016. The purpose of this work was to provide supplemental data to the initial data set to aid in determination of indoor air conditions and potential associated human health risk. In their concurrence letter, the ACDEH requested expansion of the analyte list to include all volatile organic compounds so that the potential contribution of outdoor air to indoor air could be more thoroughly evaluated. Please note that the investigative methodologies documented herein are in general accordance with the California Environmental Protection Agency - Department of Toxic Substances Control's (DTSC's) *Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air* (DTSC Guidance Document; DTSC, 2011) used in conjunction with the San Francisco Bay Regional Water Quality Control Board's *Users Guide: Derivation and Application of Environmental Screening Levels* (ESLs; SFBRWQCB 2016). The sampling event and following risk assessment evaluations contained herein were conducted to provide an assessment of indoor air conditions and potential associated human health risk.

This work was performed as part of an ongoing investigation of a leaking underground storage tank (UST) associated 645 4th Street. The UST, located in the southern sidewalk of 4th Street, was closed in-place under permit in 2006. Historical site investigation sample locations are shown on Figure 2 and well construction and analytical data are summarized in Tables 1, 2, 3, 4, 5, and 6. Please refer to technical documents on the project's GeoTracker web-page for detailed site history: http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T10000001072.

Sub-Slab Vapor Sampling

Sub-Slab Vapor Point Purging and Sampling

On March 12, 2016, Blue Rock purged and sampled four sub-slab vapor points: VP-1, VP-2, VP-4, and VP-5. Sub-slab vapor samples were collected the same day as indoor and outdoor air samples to aid in data evaluation, as recommended in the DTSC guidance document.

The sample train for soil vapor sampling consisted of tubing, connectors, valves, and vacuum canisters. All gauges and canisters were connected by laboratory-supplied stainless steel tubing and dedicated flexible Teflon or nylon tubing. The sample train was assembled using dedicated ¼-inch (outer diameter) tubing for all vapor sampling. Swagelok® connectors were used for all connections between tubing and other sampling components. A flow regulator of 100 – 200 mL/min was placed in-line between the manifold and the downhole side Swagelok® valve. Sampling equipment was inspected to ensure tight fittings between all components. A transparent shroud was placed over each vapor point and sampling train to create an atmosphere with elevated helium concentrations for leak checking.

Leak Testing and Tracer Gas

The sampling manifold was leak tested by inducing a vacuum on the manifold. In preparation for manifold leak testing, the downhole side Swagelok® valve remained closed, as did the valves going to the purge and sample ends of the sample train. To commence leak testing, an electric air pump was connected to the purge valve end of the sample train. The purge valve was opened and the air pump turned on to induce a vacuum of approximately 30" Hg on the assembly, and the purge valve was closed again. The vacuum on the manifold assembly was monitored for at least 15 minutes. The manifold was considered to have passed the leak test if vacuum was maintained for at least 15 minutes with <0.2" Hg vacuum loss. After ensuring that all connections between the purge and sample valves, flow controller, and sample manifold were tight, soil vapor purging and sampling activities were performed.

During sample collection, helium (He) was used as a tracer gas to test for air leakage into the sampling system. The inner-shroud environment was enriched with helium supplied by a cylinder. The helium concentration inside the shroud was maintained at a minimum of 5% to 10%, so as to have detectable levels of tracer gas should leakage into the sampling train occur.

Sub-Slab Vapor Point Purging

Prior to collecting a vapor sample, the sub-slab vapor points were purged to ensure that the vapor samples are representative of actual sub-slab concentrations. The dead-space volume for each vapor probe is approximately 0.02-liters (i.e. the total volume of casing, annular pore space, and sample train tubing). Although a purge step-test is recommended by guidance documents, it cannot be practicably completed in a single field day with these sub-slab vapor points due to the comparatively small dead-space volume of 0.02-liters relative to the sample canister volume of 1-liter. In other words, the collection of a single sample volume is significantly greater than the commonly used step-test purge volumes. For the purpose of this sampling, a volume of approximately 0.2–liters was purged using an electric air pump and known flow limits of the manifold regulators. After purging was completed, the sample train purge valve was closed in preparation for sample collection.

Sub-Slab Vapor Point Sampling

The laboratory supplied the flow controller and sample canisters. The initial and final vacuum, start and finish times, and helium tracer gas percentages inside the shroud were documented (see attached field sheets).

All samples were collected in clean, laboratory-supplied 1-liter vacuum canisters immediately after purging. Each sample canister had a starting vacuum of approximately 30 "Hg. To collect a sample, the valve on the sample canister was opened and the time and initial vacuum documented. As the canister was being filled, the vacuum gauge on the flow controller was observed to ensure that the vacuum in the canister was decreasing over time. When the vacuum on the sample canister decreased to approximately 5 "Hg, the valve was closed and sampling ended. Helium tracer gas concentrations were monitored inside the shroud during sample collection using a field meter. Helium concentrations in the shroud for this entire sampling event ranged from 7.6% to 11.1%.

Sub-Slab Vapor Sample Analysis

The samples were labeled, documented on a chain-of-custody form, and transported to Analytical Sciences in Petaluma, California for analysis.

In accordance with the ACDEH's request of January 11, 2016, the vapor samples were analyzed by EPA Method TO-15 for all volatile organic compounds (VOCs) on the TO-15 list, which includes for the following constituents of potential concern (CPOCs) associated with gasoline that have been detected in earlier soil and/or groundwater samples:

- TPHg, BTEX, and MTBE by modified EPA Method TO-15
- Naphthalene, 1,2-DCA, and EDB by modified EPA Method TO-15

In addition, the vapor samples were analyzed for the following fixed gases:

- Helium, Oxygen, Carbon Dioxide, and Methane by Modified ASTM D-1946

Sub-Slab Vapor Sample Results

Sub-slab vapor sample analytical results are summarized below:

- VP-1: No CPOCs or VOCs were detected above method reporting limits.
- VP-2: No CPOCs or VOCs were detected above method reporting limits.
- VP-4: TPHg, benzene, toluene, and xylenes were detected at 10,000,000 µg/m^3, 4,100 µg/m^3, 6,500 µg/m^3, and 22,400 µg/m^3, respectively. No other CPOCs or VOCs were detected above method reporting limits (which were elevated).
- VP-5: TPHg, benzene, toluene, ethylbenzene, and xylenes were detected at 780,000 µg/m^3, 9,100 µg/m^3, 6,500 µg/m^3, 3,700 µg/m^3, and 208,000 µg/m^3, respectively. No other CPOCs or VOCs were detected above method reporting limits (which were elevated).

The tracer gas, helium (He), was detected in all of the samples at concentrations ranging from 0.009% to 0.28%, which indicates very minor leakage into sample train during collection. However, the leakage is not considered significant in any of the samples because the leakage percent, defined as the He concentration in the sample divided by the He concentration within the shroud (x100), did not exceed 5%, a value below which the amount of leakage is considered acceptable to rely on the sample results. Sub-slab vapor analytical data are summarized in Table 5 and the laboratory report is attached.

Comparison of Sub-Slab Vapor Data to Applicable Screening Levels

As recommended in the DTSC *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air* dated October 2011, sub-slab vapor data should be evaluated using an attenuation factor for potential migration to indoor air. The attenuation factor (α) of sub-slab vapor to indoor air concentrations is defined by the following equation:

$$\alpha = \frac{Concenration\ (indoor\ air)}{Concentration\ (subslab\ vapor)}$$

The guidance document identifies an attenuation rate (α) of 0.05 for both residential and commercial scenarios. Therefore, the resulting screening level for sub-slab vapor samples is defined by the following equation:

$$Screening\ level\ (subslab\ vapor) = \frac{Screening\ level\ (indoor\ air)}{0.05}$$

The indoor air screening levels shown in the *User's Guide: Derivation of and Application of Environmental Screening Levels – Interim Final (SFBRWQCB 2016)* were used to calculate sub-slab vapor screening levels using the attenuation rate of 0.05. The constituents detected in VP-4 and VP-5 exceed the calculated sub-slab vapor screening levels, and reporting limits for compounds not detected were also above the calculated screening levels. This result is consistent with the initial sampling event performed in September 2015 (Table 5). In order to determine if these exceedances result in a vapor intrusion risk, additional indoor air samples were collected for analysis.

Indoor and Outdoor Air Sampling

Public Outreach and Building Parameters

The buildings of interest consist of single story construction and form three separate and distinct interior spaces associated with 645 4th Street, 380 MLK Jr Way, and 638 3rd Street. The canisters were placed approximately three feet above the floor and more than 25 feet from any exterior door or window. Additionally, all exterior doors and windows remained shut and the HVAC system operated as normal during the sample collection period. All three buildings are occupied by medical offices providing outpatient pediatric psychological and behavioral services. In late January 2016, an on-site tenant representative was verbally notified of the additional sampling activities planned and provided with a *Fact Sheet - Results of Indoor Air Sampling* leaflet dated January 22, 2016.

The three buildings consist of slab-on-grade construction with no basements or crawl spaces. Each building has its own roof mounted heating, ventilation, and air conditioning (HVAC) system. The thermostat for each HVAC system was set to approximately 68 degrees Fahrenheit, which is the normal setting when workers are in the buildings.

The subject property is located approximately one block south of Interstate 880, a busy transit thoroughfare through downtown Oakland.

Building Inspection

Blue Rock previously conducted a building inventory in accordance with DTSC guidance documents on December 5, 2015. The completed Building Inventory Forms were included in the *Indoor Air Study – Report of Initial Findings* dated January 4, 2016.

Sample Locations and Duration

On March 12, 2106, Blue Rock collected indoor air samples from the interior spaces associated with 645 4th Street, 380 MLK Jr Way, and 638 3rd Street. The samples were collected from approximately the center of each building over an 8-bour period at a height of approximately three to five feet above the floor surface.

Simultaneously, two outdoor air samples were collected from roof locations of 645 4th Street and 380 MLK Jr Way / 638 3rd Street. The wind conditions at the time of sampling were light and variable. Therefore, the central locations on the roof were selected.

Air Sampling Equipment

The samples were collected in 6-liter vacuum canisters. The canisters were certified clean and placed under vacuum by the analytical laboratory prior to shipment. A flow regulator, set to limit flow to fill the canister over an 8-hour period, was connected to the air inlet of the canister. Each canister had vacuums readings of approximately 30 "Hg at the start of sampling.

Air Sampling Procedures

Each sample canister had a starting vacuum of approximately 30 "Hg. To collect a sample, the valve on the sample canister was opened and the time and initial vacuum documented. As the canister was being filled, the vacuum gauge on the flow controller was observed to ensure that the vacuum in the canister was decreasing slowly over time. The valve on the sample canister was closed at the end of the 8-hour sample period. Sampling start time, sampling ending time, initial starting vacuum, and ending vacuum readings for the canisters were recorded. At the end of sampling, the samples were labeled, documented on a chain-of-custody form, and transported to the project laboratory for analysis.

Air Sample Analysis

In accordance with the ACDEH's request of January 11, 2016, the vapor samples were analyzed by EPA Method TO-15 for all volatile organic compounds (VOCs) on the TO-15 list, which includes for the following constituents of potential concern (CPOCs) associated with gasoline that have been detected in earlier soil and/or groundwater samples:

- TPHg, BTEX, and MTBE by modified EPA Method TO-15
- Naphthalene, 1,2-DCA, and EDB by modified EPA Method TO-15

Indoor Air Sample Results

Indoor air sample analytical results are summarized below:

- 645 4th: Benzene was detected at 0.74 $\mu g/m^3$. No other CPOCs or VOCs were detected above method reporting limits.

- 380 MLK: Benzene was detected at 0.42 $\mu g/m^3$. No other CPOCs or VOCs were detected above method reporting limits.

- 638 3rd: Benzene was detected at 0.36 $\mu g/m^3$. No other CPOCs or VOCs were detected above method reporting limits.

Outdoor Air Sample Results

Outdoor air sample analytical results are summarized below:

- R-1: Benzene was detected at 0.31 µg/m^3. No other CPOCs or VOCs were detected above method reporting limits.

- R-2: Benzene was detected at 0.32 µg/m^3. No other CPOCs or VOCs were detected above method reporting limits.

Air sample analytical data are summarized in Table 6 and the laboratory report is attached.

Comparison of Indoor Air Data to Applicable Screening Levels

In order to evaluate the significance of the CPOC concentrations detected in indoor air, the reported values were compared with the corresponding ESLs published in the San Francisco Bay Regional Water Quality Control Board's *Users Guide: Derivation and Application of Environmental Screening Levels* for commercial exposure scenarios (SFBRWQCB 2016) (Table 6). Exceedances are discussed below:

- 645 4th: This sample was collected within the interior space of 645 4th Street, near the center of the building and sub-slab vapor point VP-4. The benzene level of 0.74 µg/m^3 exceeds the commercial ESL of 0.42 µg/m^3. All remaining detected CPOCs were below applicable ESLs. Additionally, the reporting limits for non-detected CPOCs were below the applicable ESLs.

- 380 MLK: This sample was collected within the interior space of 380 MLK Jr Way, near the center of the building and sub-slab vapor point VP-5. The benzene level of 0.42 µg/m^3 is equal to the commercial ESL of 0.42 µg/m^3. All remaining detected CPOCs were below applicable ESLs. Additionally, the reporting limits for non-detected CPOCs were below the applicable ESLs.

- 638 3rd: This sample was collected within the interior space of 638 3rd Street. The benzene level of 0.36 µg/m^3 is below the commercial ESL of 0.42 µg/m^3. All remaining detected CPOCs were below applicable ESLs. Additionally, the reporting limits for non-detected CPOCs were below the applicable ESLs.

It is noteworthy that the outdoor air samples analytical results were essentially the same as the indoor air sample results, in that benzene was the only CPOC detected and at similar concentrations (i.e. 0.31 µg/m^3 and 0.32 µg/m^3).

Human Health Risk Assessment

Based on the findings and discussion contained herein, the quality of data obtained from this indoor air study appears to have been conducted in general accordance with the DTSC Guidance Document.

Exposure Assessment

An exposure assessment was conducted in general accordance with the DTSC Guidance Document. As specified in the DTSC Guidance Document, the following assumptions were made:

- Exposure time is 8 hrs/day for commercial settings and 24 hrs/day residential settings;
- Exposure frequency is 250 days/yr for commercial settings and 350 days/yr for residential settings; and
- Exposure duration is 25 years for commercial settings and 30 years for residential settings.

Toxicity Assessment

In evaluating indoor carcinogenic and non-carcinogenic air toxicity for the selected COPCs, Blue Rock used the inhalation unit risk (IUR) defined in the SFRWQCB ESL Document (SFRWQCB 2016) as the potency of a carcinogenic chemical as risk per $\mu g/m^3$ when inhaled. In evaluating non-carcinogenic risk, Blue Rock used the reference concentration (RfC) presented in the same aforementioned documentation.

Risk Characterization

Methodology

In characterizing risk associated with soil vapor intrusion at the project site, Blue Rock utilized the DTSC Guidance Document's Appendix C - Risk Assessment in combination with the aforementioned IUR and RfC values. The cancer risk, defined as the incremental probability of an individual developing cancer in a lifetime as a result of exposure to a potential carcinogen, was calculated for each COPC using the generic equation:

$$Risk = \frac{Cindoor\ air\ x\ ET\ x\ EF\ x\ ED\ x\ IUR}{ATc\ x\ 365\ \left(\frac{days}{year}\right)\ x\ 24\ \left(\frac{hours}{day}\right)}$$

Where:

$C_{indoor\ air}$ = Concentration of indoor air, in µg/m^3 for COPCs above the reporting limit. For COPCs not detected, the reporting limit was used to be conservative.

ET = Exposure time in hours per day, assumed to be 8 hours per day for commercial exposure and 24 hours per day for residential exposure.

EF = Exposure frequency in days per year, assumed to be 250 days per year for commercial exposure and 350 day per year for residential exposure.

ED = Exposure duration in years, assumed to be 25 years for commercial settings and 30 years for residential settings.

IUR = Inhalation Unit Risk, (risk per µg/m^3 or (µg/m^3)$^{-1}$)

AT_c = Averaging Time for carcinogens, assumed to be 70 years.

The risk for non-carcinogenic chronic toxic effects was evaluated by the determination of a Hazard Quotient (HQ) where:

$$HQ = \frac{Cindoor\ air\ x\ ET\ x\ EF\ x\ ED}{ATnc\ x\ 365\ \left(\frac{days}{year}\right)\ x\ 24\ \left(\frac{hours}{day}\right)\ x\ RfC}$$

Where:

ET = Exposure time in hours per day, assumed to be 8 hours per day for commercial exposure and 24 hours per day for residential exposure.

EF = Exposure frequency in days per year, assumed to be 250 days per year for commercial exposure and 350 day per year for residential exposure.

ED = Exposure duration in years, assumed to be 25 years for commercial settings and 30 years for residential settings.

RfC = Reference Concentration of Contaminant (µg/m^3) that a person can be exposed to without adverse health effects.

AT_{nc} = Averaging Time for non-carcinogens, assumed to be 25 years for commercial settings and 30 years for residential settings.

The cumulative incremental inhaled cancer risk from multiple volatile contaminants is the sum of all the chemical-specific cancer risks for the pathway. For carcinogenic chemical species S_1, S_2, . . . , S_n with chemical-specific risks of $Risk_1S_1$, $Risk_2S_2$, . . . , $Risk_nS_n$ the cumulative incremental cancer risk is:

$$Risk = Risk_1S_1 + Risk_2S_2 + \ldots + Risk_nS_n$$

The hazard index (HI) is the sum of the chemical-specific HQs, including the HQs for non-carcinogenic effects posed by carcinogenic contaminants. For chemical species S_1, S_2, . . . , S_n with chemical-specific hazard quotients of HQ_1S_1, HQ_2S_2, . . . , HQ_nS_n the hazard index is:

$$HI = HQ_1S_1 + HQ_2S_2 + \ldots + HQ_nS_n$$

Carcinogenic risks and hazard quotients, as well as cumulative risks and hazard indices, were calculated for each of the indoor air sample locations (please see attached sheets).

Evaluation of Risk

Two sets of indoor air samples have been collected. The initial samples were collected in December 2015 and the supplemental samples were collected in March 2016. Some input parameters identified from the SFRWQCB ESL Document were updated in the most recent version released in February 2016. Therefore, the cumulative risk and hazard indices for both sets of indoor air samples were calculated for commercial exposure scenario:

Sample	**645 4th**		**380 MLK**		**638 3rd**	
Date	**Risk**	**HI**	**Risk**	**HI**	**Risk**	**HI**
12/5/2015	$< 6.4 \times 10^{-6}$	< 0.18	$< 6.8 \times 10^{-6}$	< 0.19	$< 4.9 \times 10^{-6}$	< 0.13
3/12/2016	$< 3.8 \times 10^{-6}$	< 0.10	$< 3.0 \times 10^{-6}$	< 0.074	$< 2.9 \times 10^{-6}$	< 0.069

The following table shows recommended responses to numerical risk and hazard evaluations, as published in the DTSC Guidance Document:

Vapor Intrusion Risk / Hazard	***Risk Management Decision***	***Activities***
Risk < $1x10^{-6}$ Hazard Index ≤ 1.0	No Further Action	• None
$1x10^{-6}$ < Risk < $1x10^{-4}$ Hazard Index >1.0	Evaluate Need for Action	Possible Actions: • Additional Data Collection • Monitoring • Additional Risk Characterization • Mitigation • Source Remediation
Risk > $1x10^{-4}$	Response Action Needed	• Vapor Intrusion Mitigation • Source Remediation

It is notable that the indoor and outdoor analytical results for this event are essentially the same. This indicates that the calculated cumulative risk and hazard index for outdoor air in the area of the site would be essentially the same as those calculated for the indoor air samples.

As shown in the matrix above, the cumulative risks for the samples collected within 645 4th Street, 380 MLK Jr Way, and 638 3rd Street slightly exceed <1 x 10^{-6}, while the hazard indices are ≤ 1.0 for both sets of data. While the exceedance of cumulative risk is not greatly in excess of screening criteria, it indicates that the appropriate risk management decision would be to evaluate the need for action.

Discussion and Conclusions

Indoor air has been sampled on two occasions: the first event occurred in December 2015 and second occurred in March 2016. The December 2015 indoor air samples from 645 4th Street, 380 MLK Jr Way contained trace concentrations of TPHg and BTEX, and the indoor air sample from 638 3rd Street contained a trace concentration of benzene. Low levels of benzene were also detected in the coeval outdoor air samples. Due to the similarity between the analytical results, the concentrations of CPOCs detected in indoor air during that event can be attributed to subterranean contamination or "fresh" air introduced by the HVAC system, or a combination of both.

The March 2016 indoor air samples from 645 4th Street, 380 MLK Jr Way, and 638 3rd only contained trace concentrations of benzene, as did the coeval outdoor air samples. Due to the fact that the indoor and outdoor air samples contained only benzene at similar concentrations, the benzene detected in indoor air during that event appears to be primarily attributable to "fresh" air introduced by the HVAC system.

The outdoor air quality (i.e. benzene) by itself exceeds, or nearly exceeds, the indoor air screening levels, and the cumulative risk and hazard indices for outdoor air quality would similar to those for indoor air quality. These measurements are not considered unusual in an urban setting proximal to a busy Interstate highway.

The possible actions listed in the matrix above include: additional data collection, monitoring, additional risk characterization, mitigation, and source remediation. This second indoor air sampling event reported herein represents additional data collection, monitoring, and risk characterization to supplement the initial findings. The benzene concentrations in ambient air render moot the concept of introducing more outdoor air into the buildings to reduce risk as a mitigation approach. Source remediation was undertaken to the extent practicable in 2010 and 2012 in the form of mobile high-vacuum dual-phase extraction in the location of the closed UST.

The DTSC Guidance Document indicates at least two sampling events should be performed before a risk determination is made. Two indoor air sampling events have now been completed. The results for indoor and outdoor air are similar, and the resulting risk and hazard indices are nearly the same. The presence of benzene, the primary constituent presenting risk, in outdoor air will likely continue to be exhibited in indoor air at similar concentrations until ambient air quality improves for the area of site. Based on these data and observations, additional monitoring of indoor air does not appear to be warranted as part of the vapor intrusion evaluation because the indoor air inhalation exposure risk associated with subterranean contamination appears to be relatively minimal compared to the risk posed by ambient air quality in this area of Oakland.

Recommendations

Blue Rock does not recommend further evaluation of potential vapor intrusion or additional indoor air quality monitoring.

Blue Rock is currently preparing to undertake other previously ACDEH approved investigation activities, which include additional soil and groundwater sampling on the BART property north of the site and along 3rd Street.

References

AEI Consultant, 2013, *Site Status Update and Case Closure Request*, Allen Property, 325 Martin Luther King Jr. Way, Oakland, November 5

Amicus Strategic Environmental Consulting, 2009, letter regarding Terradev Jefferson, LLC Property, 645 4th Street, Oakland, March 4.

Amicus Strategic Environmental Consulting, 2009, letter regarding Terradev Jefferson, LLC Property, 645 4th Street, Oakland, September 13.

Blue Rock, 2010, *Removal Action Workplan*, 645 4th Street, Oakland, California, February 3.

Blue Rock, 2010, *Well Installation and Removal Action Report*, 645 4th Street, Oakland, California, October 29.

Blue Rock, 2011, *Groundwater Monitoring Report – First Quarter 2011*, 645 4th Street, Oakland, California, February 1.

Blue Rock, 2012, *Sub-Slab Soil Vapor Sampling Workplan and Project Schedule*, 645 4th Street, Oakland, California, April 23.

Blue Rock, 2012, *Sub-Slab Soil Vapor Sampling Report*, 645 4th Street, Oakland, California, July 7.

Blue Rock, 2012, *Second Removal Action and Groundwater Monitoring Report*, 645 4th Street, Oakland, California, August 16.

Blue Rock, 2012, *Second Sub-Slab Soil Vapor Sampling Report*, 645 4th Street, Oakland, California, October 18.

Blue Rock, 2013, *Confirmation Soil and Groundwater Sampling Report & Low Threat UST Case Closure Policy Evaluation*, 645 4th Street, Oakland, California, March 11.

Blue Rock, 2014, *Additional Site Characterization Report*, 645 4th Street, Oakland, California, May 29.

Blue Rock, 2014, *Report for Geophysical Survey and Additional Site Characterization Workplan,* 645 4th Street, Oakland, California, September 18.

Blue Rock, 2015, *Additional Site Characterization Report,* 645 4th Street, Oakland, California, March 27.

Blue Rock, 2015, *Workplan for Additional Site Characterization, Sub-Slab Vapor Sampling, and Indoor Air Sampling,* 645 4th Street, Oakland, California, June 15.

Blue Rock, 2015, *Sub-Slab Vapor Point Installation and Sampling Report***,** 645 4th Street, Oakland, California, November 6.

Blue Rock, 2016, *Indoor Air Study – Initial Report of Finding,* 645 4th Street, Oakland, California, January 4.

California EPA - DTSC. 2011. *Final - Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Vapor Intrusion Guidance).* October

California EPA - DTSC. 2012. *Advisory – Active Soil Gas Investigations.* April.

Clayton Environmental Consultants, 1993, *UST Closure Report*, 424 Martin Luther King Jr. Way, Oakland, California, April 30.

Ninyo & Moore, 2009, *Limited Phase II Environmental Site Assessment*, 645 4th Street, Oakland, California, July 24.

Golden Gate Tank Removal, Inc. 2006, *Tank Closure Report*, 645 4th Street, Oakland, California, September 21.

San Francisco Bay RWQCB. 2016. *Users Guide: Derivation and Application of Environmental Screening Level (ESLs).*

Certification

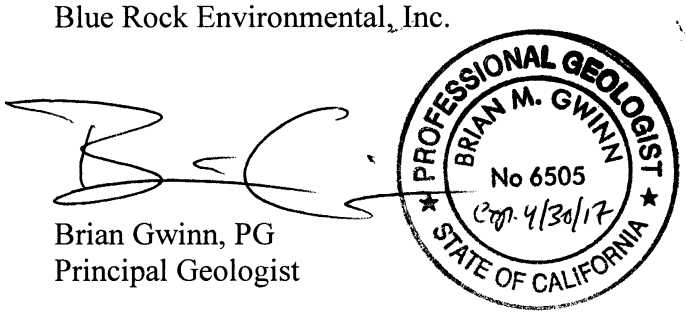
This report was prepared under the supervision of a California Professional Geologist at Blue Rock. All statements, conclusions, and recommendations are based upon published results from past consultants, field observations by Blue Rock, and analyses performed by a state-certified laboratory as they relate to the time, location, and depth of points sampled by Blue Rock. Interpretation of data, including spatial distribution and temporal trends, are based on commonly used geologic and scientific principles. It is possible that interpretations, conclusions, and recommendations presented in this report may change, as additional data become available and/or regulations change.

Information and interpretation presented herein are for the sole use of the client and regulating agency. The information and interpretation contained in this document should not be relied upon by a third party.

The service performed by Blue Rock has been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions in the area of the site. No other warranty, expressed or implied, is made.

If you have any questions regarding this project, please contact us at (650) 522-9292.

Sincerely,
Blue Rock Environmental, Inc.



Brian Gwinn, PG
Principal Geologist

Attachments:

Figure 1: Site Location Map
Figure 2: Site Plan
Figure 3: Air Sample Map

Table 1: Well Construction Data
Table 2: Soil Sample Analytical Data
Table 3: Groundwater Analytical Data
Table 4: Passive Soil Gas Sample Analytical Data
Table 5: Sub-Slab Vapor Sample Analytical Data
Table 6: Air Sample Analytical Data

Blue Rock Sub-Slab Vapor Field Sampling Notes (3/12/16)

Carcinogenic Risk and Hazard Quotient Example Calculation Sheet with Input Parameters

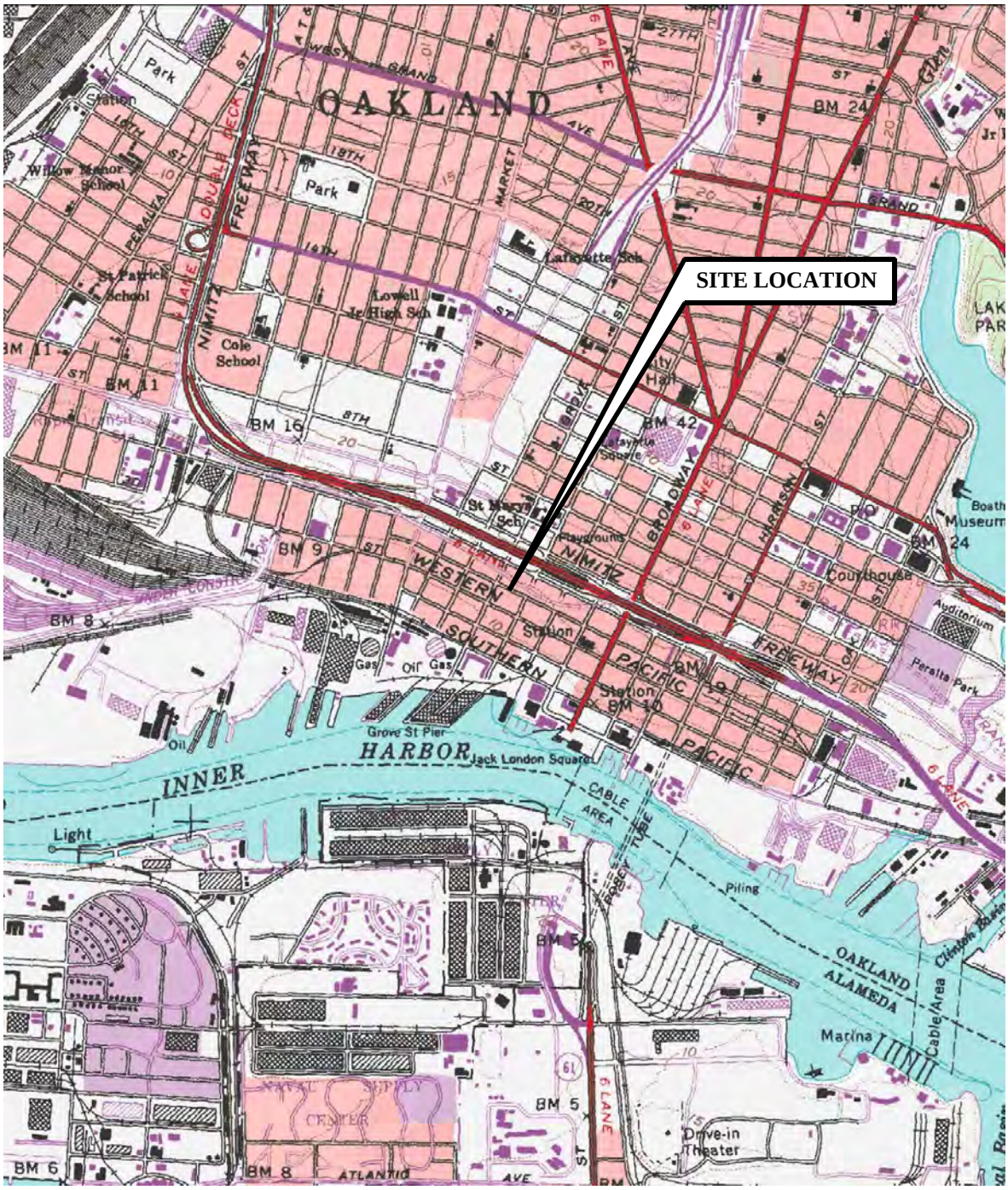
Summary of Cumulative Risk and Hazard Indices for:
645 4th, 380 MLK, and 638 3rd - 12/5/15 and 3/12/16

Laboratory Report and Chain-of-Custody Form (Sub-Slab Vapor Samples)

Laboratory Report and Chain-of-Custody Form (Indoor and Outdoor Air Samples)

Distribution:

Ms. Sara May, Metrovation, 580 Second St. Suite 260, Oakland, CA 94607



0 2,000

APPROX. SCALE IN FEET

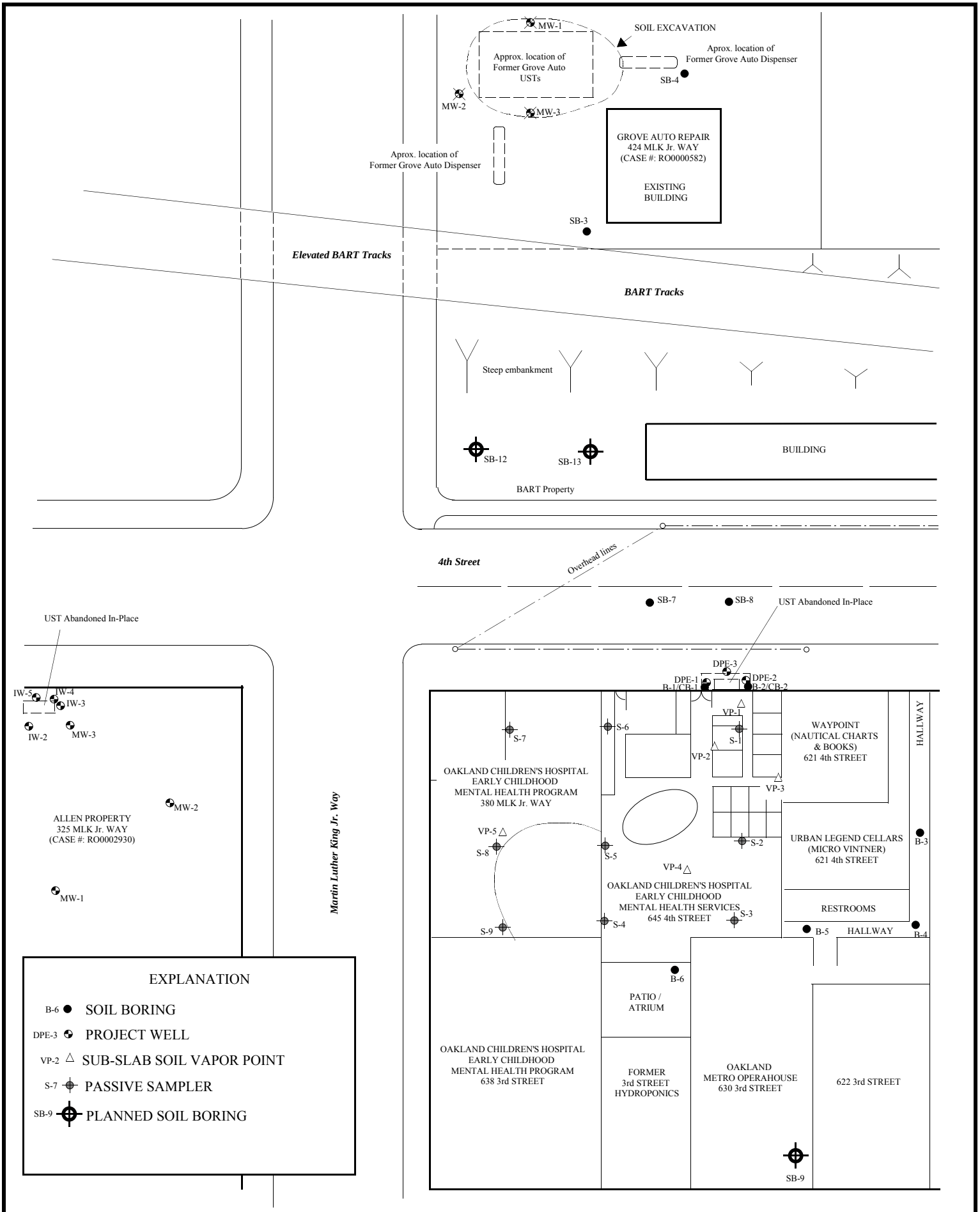
N

SOURCE: MyTopo.com

SITE LOCATION MAP
Terradev Jefferson LLC Property
645 Fourth St.
Oakland, CA

BLUE ROCK ENVIRONMENTAL, INC.

Project No.	Figure Date	Figure
ASE-1	10/10	1



SITE PLAN
Terredev Jefferson LLC Property
645 4th St.
Oakland, CA

BLUE ROCK ENVIRONMENTAL, INC.

Project No.	Figure Date	Figure
ASE-1	4/16	2

EXPLANATION

■ 645 4th	INDOOR AIR SAMPLE (12/5/15, 3/12/16)
⧓ R-1	OUTDOOR AIR SAMPLE (12/5/15, 3/12/16)

AIR SAMPLE MAP
Terredev Jefferson LLC Property
645 4th St.
Oakland, CA

BLUE ROCK ENVIRONMENTAL, INC.

Project No.	Figure Date	Figure
ASE-1	4/16	3

0 50
APPROXIMATE SCALE IN FEET

N

SOURCE: GOOGLE EARTH

TABLE 1
Well Construction Data
Terradev Jefferson, LLC Property
645 4th Street
Oakland, CA

Extraction Wells

Well ID	Date Installed	Total Boring Depth (ft bgs)	Casing Diameter (inches)	Screen Depth (ft bgs)	Sandpack Depth (ft bgs)	Bentonite Depth (ft bgs)	Cement Grout Depth (ft bgs)
DPE-1	9/20/10	15	2	8 - 15	7 - 15	5 - 7	0 - 5
DPE-2	9/20/10	15	2	8 - 15	7 - 15	5 - 7	0 - 5
DPE-3	9/20/10	10	2	6 - 10	5 - 10	3 - 5	0 - 3

Vapor Probes

Well ID	Date Installed	Total Probe Depth (in bgs)	Tubing Diameter (inches)	Slab Thickness (in bgs)	Screen Depth (in bgs)	Rubber Plug / Bentonite (in bgs)	Cement Depth (in bgs)
VP-1	6/16/12	9	0.25	6.0	6 - 9	5.0 - 6.0	0 - 5
VP-2	6/16/12	9	0.25	4.5	6 - 9	3.5 - 4.5	0 - 3.5
VP-3	6/16/12	9	0.25	4.0	6 - 9	3.0 - 4.0	0 - 3
VP-4	8/29/15	9	0.25	5.5	6 - 9	3.0 - 6.0	0 - 3
VP-5	8/29/15	9	0.25	5.5	6 - 9	3.0 - 6.0	0 - 3

Notes:
ft bgs Feet below ground surface.
in bgs Inches below ground surface.

TABLE 2
Soil Sample Analytical Data
Terradev Jefferson, LLC Property
645 4th Street
Oakland, CA

Sample ID	Depth (ft bgs)	Sample Date	TPHd (mg/kg)	TPHd w/SGCU (mg/kg)	TPHg (mg/kg)	B (mg/kg)	T (mg/kg)	E (mg/kg)	X (mg/kg)	MTBE (mg/kg)	TBA (mg/kg)	DIPE, ETBE, TAMI (mg/kg)	1,2-DCA (mg/kg)	EDB (mg/kg)	Napht. (mg/kg)
UST Removal Samples															
8795-EX-W-9'	9	8/23/06	<120	---	**10,000**	**130**	**1,000**	**230**	**1,200**	<12	<100	all<12	---	---	---
8795-EX-E-9'	9	8/23/06	<25	---	**920**	**6.8**	**55**	**18**	**110**	<1.2	<10	all<1.2	---	---	---
Investigation Samples															
DPE-1-7.5	7.5	9/20/10	**810^**	---	**6,500**	**14**	**320**	**180**	**980**	<0.50	<2.5	---	<0.50	**0.50**	---
DPE-1-12	12	9/20/10	**260^**	---	**2,300**	**26**	**160**	**45**	**240**	**0.71**	<1.5	---	<0.30	<0.30	---
DPE-1-15	15	9/20/10	**92^**	---	**770**	**10**	**53**	**15**	**80**	**0.39**	<0.50	---	**0.11**	<0.090	---
DPE-2-6	6	9/20/10	**15**	---	**1.2**	<0.0050	**0.0054**	<0.0050	**0.021**	<0.0050	<0.0050	---	<0.0050	<0.0050	---
DPE-2-11	11	9/20/10	**1,200^**	---	**160,000**	**1,400**	**10,000**	**3,300**	**19,000**	<0.25	<1.5	---	<0.25	**1.8**	---
DPE-2-15	15	9/20/10	**66^**	---	**430**	**3.8**	**25**	**8.3**	**47**	<0.50	<2.5	---	<0.050	<0.50	---
DPE-3-7	7	9/20/10	**260^**	---	**860**	**2.1**	**37**	**19**	**100**	<0.10	<0.50	---	<0.10	<0.10	---
DPE-3-10	10	9/20/10	**800^**	---	**8,900**	**78**	**580**	**180**	**980**	<0.25	<1.5	---	<0.25	**0.82**	---
CB-1-7.5	7.5	2/18/13	**1.2***	---	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	---	---	<0.0050	<0.0050	---
CB-1-9	9	2/18/13	**110^**	---	**1,200**	**2.8**	**55**	**27**	**150**	<0.25	---	---	<0.25	<0.25	---
CB-1-12	12	2/18/13	**880^**	---	**14,000**	**100**	**850**	**180**	**1,400**	**0.53**	---	---	<0.25	**0.86**	---
CB-1-15	15	2/18/13	**89^**	---	**1,000**	**8.4**	**62**	**15**	**100**	<0.050	---	---	<0.050	<0.050	---
CB-2-9	9	2/18/13	**120^**	---	**840**	**0.44**	**17**	**20**	**110**	<0.15	---	---	<0.15	<0.15	---
CB-2-11	11	2/18/13	**110^**	---	**2,700**	**23**	**160**	**48**	**260**	<0.40	---	---	<0.40	<0.40	---
CB-2-15	15	2/18/13	**45^**	---	**380**	**3.9**	**18**	**6.6**	**34**	<0.050	---	---	<0.050	<0.050	---
B-6-6'	6.5	1/11/14	**340^**	**350^**	**1,700**	**0.13**	**8.0**	**12**	**91**	<0.050	<0.25	---	<0.050	<0.050	---
B-6-10.5'	10.5	1/11/14	**280^**	**280^**	**1,500**	**4.1**	**48**	**26**	**130**	<0.25	<1.5	---	<0.25	<0.25	---
SB7-8.5/9	8.5-9	12/29/14	**1.2^**	---	**4.0**	**0.16**	**0.50**	**0.081**	**0.50**	<0.0050	<0.0050	---	<0.0050	**0.0070**	**0.043**
SB7-10.5/11	10.5-11	12/29/14	**1,400^**	---	**19,000**	**150**	**1,100**	**330**	**1,800**	<0.25	<1.5	---	<0.25	**2.5**	**99**
SB7-12.5/13	12.5-13	12/29/14	**310^**	---	**3,600**	**29**	**200**	**59**	**330**	<0.090	<1.5	---	<0.090	**0.46**	**23**
SB-8-8.5/9	8.5-9	12/29/14	**750^**	---	**6,600**	**30**	**290**	**120**	**580**	<0.25	<1.5	---	<0.25	**0.38**	**38**
SB-8 11.5/12	11.5-12	12/29/14	**170^**	---	**1,400**	**6.4**	**54**	**22**	**130**	<0.25	<1.5	---	<0.25	<0.25	**10**
SB-8 14.5	14.5	12/29/14	<1.0	---	<1.0	**0.026**	**0.060**	**0.011**	**0.065**	<0.0050	<0.0050	---	<0.0050	<0.0050	<0.0050

Notes:

ft bgs	feet below ground surface
mg/kg	milligrams per kilogram
TPHd	total petroleum hydrocarbons as diesel by EPA Method 8015M or 8015B, w/SCGCU = analysis performed after silica-gel clean-up.
TPHg	total petroleum hydrocarbons as gasoline by EPA Method 8260B
BTEX	benzene, toluene, ethylbenzene, and xylenes by EPA Method 8260B
MTBE, TBA, ETBE, DIPE, TAME	methyl tert-butyl ether, tert-butanol, ethyl tert-butyl ether, di-isopropyl ether, tert-amyl methyl ether by EPA Method 8260B,
1,2-DCA, EDB	1,2-dichloroethane, 1,2-dibromoethane by EPA Method 8260B.
µg/L	Micrograms per liter.
<###	Not detected at or above the indicated reporting limit.
^	Laboratory Flag: Hydrocarbons are lower-boiling than typical Diesel Fuel
*	Laboratory Flag: Hydrocarbons are higher-boiling than typical Diesel Fuel
---	Data not available, not monitored, or not sampled

TABLE 3
Groundwater Analytical Data
Terradev Jefferson, LLC Property
645 4th Street
Oakland, CA

Sample ID	Sample Date	TOC (ft MSL)	DTW (ft)	LNAPL (ft)	GWE (ft MSL)	TPHd (µg/L)	TPHd w/SGCU (µg/L)	TPHg (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	Napht. (µg/L)
Grab Groundwater Samples																	
B-1-GW*	7/10/09	--	~9.5	--	--	**5,300**	--	**78,000**	**15,000**	**13,000**	**1,700**	**10,500**	**570**	--	--	--	--
B-2-GW*	7/10/09	--	~9.5	--	--	**2,300**	--	**60,000**	**13,000**	**13,000**	**890**	**4,800**	**120**	--	--	--	--
B-3	1/10/14	--	~12	--	--	**58#**	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	--
B-4	1/10/14	--	~12	--	--	**67#**	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	--
B-5	1/10/14	--	~12	--	--	**110#**	<50	**110**	**1.2**	**1.4**	**0.65**	**4.5**	**2.7**	**200**	**43**	<0.50	--
B-6 (2)	1/11/14	--	~11	--	--	**5,200^**	**360^**	**84,000**	**1,800**	**7,600**	**2,400**	**12,000**	**5,100**	**180J**	**110**	<20	--
SB-7	12/29/14	--	~9	--	--	**60,000^**	--	**250,000**	**15,000**	**34,000**	**4,000**	**20,000**	<40	<200	**130**	**240**	**1,000**
SB-8	12/29/14	--	~9	--	--	**16,000^**	--	**180,000**	**9,100**	**22,000**	**3,000**	**16,000**	<40	<200	**130**	**140**	**1,200**
Monitoring Well Data																	
DPE-1	9/22/10	15.81	9.21	0.00	6.60	<4,000 (1)	--	**120,000**	**25,000**	**18,000**	**3,300**	**17,000**	**320**	**320**	**620**	<40	--
Screen	9/28-10/3/10	15.81	--	--	--	5-day HVDPE Remedial Event											
~8' - 15'	10/18/10	15.81	9.26	sheen	6.55	<4,000 (1)	--	**97,000**	**15,000**	**20,000**	**1,600**	**11,000**	**490**	**270**	**390**	<40	--
	1/20/11	15.81	8.56	sheen	7.25	<3,000 (1)	--	**83,000**	**12,000**	**16,000**	**2,000**	**11,000**	**270**	<200	**220**	<40	--
	7/6/12	15.81	8.85	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--
	7/9-7/24/12	15.81	--	--	--	15-day HVDPE Remedial Event											
	8/12/12	15.81	9.03	0.00	6.78	<2,000 (1)	--	**71,000**	**7,500**	**9,800**	**1,000**	**6,500**	**280**	**89**	**190**	<15	--
	2/11/13	15.81	8.74	0.00	7.07	<3,000 (1)	--	**81,000**	**9,400**	**14,000**	**1,800**	**10,000**	**240**	**110**	**210**	<15	--
	1/10/14	15.81	9.84	0.00	5.97	**1,600^**	**56^**	**98,000**	**14,000**	**13,000**	**2,100**	**12,000**	**270**	**200**	**270**	<25	--
DPE-2	9/22/10	16.01	9.44	0.00	6.57	<4,000 (1)	--	**110,000**	**21,000**	**18,000**	**3,100**	**14,000**	**200**	**260**	**540**	**110**	--
Screen	9/28-10/3/10	16.01	--	--	--	5-day HVDPE Remedial Event											
~8' - 15'	10/18/10	16.01	9.48	sheen	6.53	<5,000 (1)	--	**84,000**	**11,000**	**16,000**	**1,600**	**9,200**	**77**	<200	**220**	**77**	--
	1/20/11	16.01	8.77	sheen	7.24	<5,000 (1)	--	**94,000**	**12,000**	**19,000**	**2,500**	**13,000**	**64**	<200	**220**	**88**	--
	7/6/12	16.01	9.06	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--
	7/9-7/24/12	16.01	--	--	--	15-day HVDPE Remedial Event											
	8/12/12	16.01	9.27	0.00	6.74	<2,000 (1)	--	**70,000**	**9,900**	**16,000**	**1,700**	**9,600**	**54**	<200	**160**	**56**	--
	2/11/13	16.01	8.95	0.00	7.06	<4,000 (1)	--	**60,000**	**7,300**	**9,500**	**1,400**	**7,000**	**34**	<90	**120**	<20	--
	1/10/14	16.01	10.08	0.00	5.93	**2,800^**	<50	**100,000**	**17,000**	**15,000**	**2,400**	**11,000**	**120**	**100**	**220**	**27**	--
DPE-3	9/22/10	15.87	9.43	0.00	6.44	insufficient water column for sampling (i.e. <0.5-ft)											
Screen	9/28-10/3/10	15.87	--	--	--	5-day HVDPE Remedial Event											
~6' - 10'	10/18/10	15.87	9.35	0.00	6.52	insufficient water column for sampling (i.e. <0.5-ft)											
	1/20/11	15.87	8.51	**0.13**	7.36	no groundwater sample collected, LNAPL present.											
	7/6/12	15.87	8.65	0.00	--												
	7/9-7/24/12	15.87	--	--	--	15-day HVDPE Remedial Event											
	8/12/12	15.87	9.02	sheen	6.85	<200,000 (1)	--	**190,000**	**1,400**	**7,800**	**3,700**	**29,000**	**27**	**120**	**40**	**130**	--
	2/11/13	15.87	8.34	sheen	7.53	<40,000 (1)	--	**130,000**	**4,700**	**9,000**	**1,900**	**25,000**	<40	<200	**54**	**80**	--
	1/10/14	15.87	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

Screen	Well screen depth interval.
TOC	Top of casing relative to feet above mean sea level (ft MSL) (ref NAVD88).
DTW	Depth to water (for borings DTW shows "depth to water" and "depth to bottom of boring")
LNAPL	Light non-aqueous phase liquid petroleum, "sheen" is an immeasurable thickness (i.e. <0.01-ft)
GWE	Groundwater Elevation (TOC-DTW) in ft MSL. (This does not account for LNAPL thickness, if present).
TPHd	Total petroleum hydrocarbons as diesel by EPA Method 8015M, *8015B. SGCU = Silica-gel cleanup prior to analysis.
TPHg	Total petroleum hydrocarbons as gasoline by EPA Method 8260B, *8015B.
BTEX	Benzene, toluene, ethylbenzene, and xylenes by EPA Method 8260B, *8021B.
	Note: total xylenes equal the sum of sepearate isomers reported for the 7/09 samples.
MTBE	Methyl tert-butyl ether by EPA Method 8260B, * 8021B.
TBA	Tert-butanol by EPA Method 8260B.
1,2-DCA, EDB	1,2-dichloroethane, 1,2-dibromoethane by EPA Method 8260B.
µg/L	Micrograms per liter.
<###	Not detected at or above the indicated reporting limit.
---	Data not available, not monitored, or not sampled
^	Laboratory Flag: Hydrocarbons are lower-boiling than typical Diesel Fuel
#	Laboratory Flag: Discrete peaks in Diesel range, atypical for Diesel Fuel
J	Laboratory Flag: TBA concentration may be biased slightly high due to conversion of a small fraction of MTBE to TBA during water sample analysis.
(1)	Method detection limit increased due to ineterference from gasoline range hydrocarbons
(2)	Repeat analysis by Method 8260B yielded inconsistent results. The concentrations appear to vary between bottles. The highest valid result is reported.

TABLE 4
Passive Soil Gas Sample Analytical Data
Terradev Jefferson, LLC Property
645 Fourth Street
Oakland, CA

Sample ID	Sample Depth (ft bgs)	Install Date	Retrieval Date	TPH (µg)	DRPH (µg)	GRPH (µg)	B (µg)	T (µg)	E (µg)	X (µg)	MTBE (µg)	1,2-DCA (µg)	Napht. (µg)
S-1	~2 - 3	2/7/15	2/14/15	**13.33**	**2.90**	**10.86**	**0.04**	**0.03**	**0.02**	**0.17**	**0.25**	**0.13**	**0.20**
S-2	~2 - 3	2/7/15	2/14/15	**273.77**	**59.21**	**223.55**	**48.01**	**209.52**	**123.77**	**505.33**	<0.02	**3.97**	**35.44**
S-3	~2 - 3	2/7/15	2/14/15	**183.36**	**72.98**	**115.01**	**33.38**	**127.13**	**113.16**	**367.48**	<0.02	**2.35**	**37.35**
S-4	~2 - 3	2/7/15	2/14/15	**1.00**	<0.50	**0.66**	**0.02**	**0.02**	<0.02	**0.18**	<0.02	**2.35**	<0.50
S-5	~2 - 3	2/7/15	2/14/15	**220.53**	**107.91**	**117.33**	**20.23**	**90.58**	**24.79**	**369.71**	<0.02	**2.01**	**30.63**
S-6	~2 - 3	2/7/15	2/14/15	**169.75**	**54.69**	**119.88**	**15.94**	**29.38**	**31.45**	**337.65**	<0.02	**0.90**	**2.45**
S-7	~2 - 3	2/7/15	2/14/15	**1.03**	**0.74**	<0.50	**0.07**	**0.15**	**0.06**	**0.59**	<0.02	<0.02	<0.50
S-8	~2 - 3	2/7/15	2/14/15	**245.41**	**106.20**	**145.04**	**32.86**	**103.45**	**76.32**	**421.35**	<0.02	**2.53**	**36.09**
S-9	~2 - 3	2/7/15	2/14/15	<0.50	<0.50	<0.50	**0.36**	**0.36**	**0.03**	**0.16**	<0.02	**0.02**	<0.50

Notes:

ft bgs	feet below ground surface
µg	micrograms
TPH	Total petroleum hydrocarbons by SPG-WI-0292
DRPH	Diesel range petroleum hydrocarbons by SPG-WI-0292
GRPH	Gasoline range petroleum hydrocarbons by SPG-WI-0292
BTEX	benzene, toluene, ethylbenzene, and xylenes by SPG-WI-0292
MTBE	methyl tert-butyl ether by SPG-WI-0292
1,2-DCA	1,2-dichloroethane by SPG-WI-0292
Naphthalene	Naphthalene by SPG-WI-0292
<###	Not detected at or above the indicated reporting limit.

Table 5
SUB-SLAB VAPOR SAMPLE ANALYTICAL DATA
Terradev Jefferson LLC Property
645 4th St.
Oakland, CA

			Consituent Concentrations									Soil Gas Concentrations			Tracer Gas			Sample Can Vacuum	
Sample I.D.	Sample Date	sample container	TPHg (µg/m^3)	B (µg/m^3)	T (µg/m^3)	E (µg/m^3)	X (µg/m^3)	MTBE (µg/m^3)	Naphthalene (µg/m^3)	1,2-DCA (µg/m^3)	EDB (µg/m^3)	O_2 (%)	CO_2 (%)	CH_4 (%)	In Shroud He - Avg (%)	In Sample He (%)	Leak Percent^ Leak (%)	End of Sampling ("Hg)	Arrival at Lab ("Hg)
VP-1	6/16/12	1-L	1,300	38	120	21	138	7.3	<0.09	<0.14	<0.050	15	0.096	<0.008	22.2	2.4	10.8%	~8	~6
	9/22/12	1-L	<330	<8.0	<9.4	<11	<22	<9.0	<13	<10	<3.8	19	0.78	<0.008	20.0	0.19	1.0%	~5	~6
	1/25/14	1-L	<330	<8.0	<9.4	<11	<22	<9.0	<13	<10	<3.8	14	4.7	<0.008	5.7	0.023	0.40%	~5	~5
	12/5/15	1-L	<330	<8.0	<9.4	<11	<22	<9.0	<13	<10	<3.8	11	2.6	<0.008	8.0	<0.003	<0.04%	~5	~1
	3/12/16	1-L	<330	<8.0	<9.4	<11	<22	<9.0	<13	<10	<3.8	13	2.4	<0.009	10.0	0.009	0.09%	~5	~4
VP-2	6/16/12	1-L	1,200	66	25	2.6	8.2	<6.3	<0.090	<0.14	<0.050	11	1.3	<0.009	13.8	<0.003	<0.02%	~8	~7
	9/22/12	1-L	<330	<8.0	<9.4	<11	<22	<9.0	<13	<10	<3.8	14	4.0	<0.008	19.0	<0.003	<0.02%	~7	~6
	1/25/14	1-L	<330	<8.0	<9.4	<11	<22	<9.0	<13	<10	<3.8	12	7.4	<0.008	6.6	<0.003	<0.05%	~5	~5
	12/5/15	1-L	<330	<8.0	<9.4	<11	<22	<9.0	<13	<10	<3.8	5.2	4.2	<0.010	8.3	<0.003	<0.04%	~5	~2
	3/12/16	1-L	<330	<8.0	<9.4	<11	<22	<9.0	<13	<10	<3.8	9.3	6.8	<0.010	9.6	0.009	0.09%	~5	~4
VP-3	6/16/12	1-L	960	16	19	2.9	20	<5.8	<0.08	<0.13	<0.050	16	0.029	<0.008	23.6	2.6	11%	~5	~5
	9/22/12	1-L	<330	<8.0	<9.4	<11	<22	<9.0	<13	<10	<3.8	20	0.46	<0.008	15.7	0.036	0.23%	~5	~6
	1/25/14	1-L	<330	<8.0	<9.4	<11	<22	<9.0	<13	<10	<3.8	19	1.5	<0.008	6.6	0.012	0.18%	~5	~1
VP-4	9/6/15	1-L	5,600,000	<58,000	<69,000	<79,000	600,000	<66,000	<95,000	<74,000	<140,000	7.5	0.37	<0.009	6.5	0.004	0.06%	~5	~2
	12/5/15	1-L	2,000,000	<1,100	<1,300	<1,500	55,000	<1,200	<1,800	<1,400	<530	17	2.9	<0.007	8.2	<0.003	<0.04%	~5	~3
	3/12/16	1-L	10,000,000	4,100	6,500	<1,700	22,400	<1,400	<2,000	<1,600	<590	0.82	13	0.055	8.7	0.28	3.2%	~5	~4
VP-5	9/6/15	1-L	5,000,000	180,000	140,000	110,000	1,390,000	<54,000	<78,000	<60,000	<110,000	2.7	3.3	<0.007	7.0	<0.003	<0.04%	~5	~3
	12/5/15	1-L	8,200,000	170,000	180,000	150,000	1,310,000	<12,000	<18,000	<14,000	<5,300	1.9	13	0.008	8.2	<0.003	<0.04%	~5	~1
	3/12/16	1-L	780,000	9,100	6,500	3,700	208,000	<1,300	<1,900	<1,400	<550	15	1.6	<0.007	8.9	0.13	1.5%	~5	~2

Subslab Soil Gas Sceening Levels Calculated as: Screening level (subslab soil gas) = Screening level (indoor air) / 0.05

ESLs Residential Indoor Air divided by 0.05	*2,000*	*1.9*	*6,200*	*22*	*2,000*	*220*	*1.7*	*2.2*	*0.094*
ESLs Comm/Indus Indoor Air divided by 0.05	*2,000*	*8.4*	*26,000*	*98*	*8,800*	*940*	*7.2*	*9.4*	*0.40*

Indoor Air Screening Levels

ESLs Residential Indoor Air	*100*	*0.097*	*310*	*1.1*	*100*	*11*	*0.083*	*0.11*	*0.0047*
ESLs Comm/Indus Indoor Air	*100*	*0.42*	*1,300*	*4.9*	*440*	*47*	*0.36*	*0.47*	*0.020*

Notes:

TPHg	Total Petroluem Hydrocarbons as gasoline by EPA Method TO-15
BTEX, MTBE	Benzene, Toluene, Ethylbenzene, and Total Xylenes, Methyl tert-Butyl Ether by EPA Method TO-15(M) GC/MS (note: Xylene number shown in table is the sum of xylene isomers reported by lab)
Naphthalene	Naphthalene by EPA Method TO-15
1,2-DCA, EDB	1,2-dichloroethane, 1,2-dibromoethane by EPA Method TO-15
O_2, CO_2, CH_4, He	Oxygen, Carbon Dioxide, Methane, and Helium by modified ASTM D-1946
µg/m^3	Micrograms per cubic meter
<#.##	Compound not detected at or above the reported laboratory detection limit
ESLs	Environmental Screening Levels for Indoor Air in Commercial/Industrial or Residential setting (SFBRWQCB 2016)
Tracer Gas in Shroud	Concentration range of tracer gas in shroud recorded during sample collection. Average = (Max + Min) / 2
Tracer Gas in Sample	Concentration of tracer gas in sample as detected by lab analysis.
Tracer Gas Leak into Sample	If helium was detected in the sample, the concentration measured in the sample was divided by the average concentration in the shroud (and multiplied by 100 to convert to percent).
	^ a leak of less than 5% is considered acceptable for data evaluation.
	Shaded samples indicate a tracer gas leak of more than 5%.

Table 6
AIR SAMPLE ANALYTICAL DATA
Terradev Jefferson LLC Property
645 4th St.
Oakland, CA

				Consituent Concentrations									Sample Can Vacuum	
Sample I.D.	Sample Date	Sample Duration	sample container	TPHg ($\mu g/m^3$)	B ($\mu g/m^3$)	T ($\mu g/m^3$)	E ($\mu g/m^3$)	X ($\mu g/m^3$)	MTBE ($\mu g/m^3$)	Naphthalene ($\mu g/m^3$)	1,2-DCA ($\mu g/m^3$)	EDB ($\mu g/m^3$)	End of Sampling ("Hg)	Arrival at Lab ("Hg)
Indoor Air Samples														
645 4th	12/5/15	8 hrs	6-L	36	1.8	5.4	1.2	5.4	<3.6	<0.05	<0.08	<0.03	~2.5	~1
	3/12/16	8 hrs	6-L	<9.8	0.74	<3.8	<0.87	<8.6	<3.6	<0.05	<0.08	<0.03	~0	~0
380 MLK	12/5/15	8 hrs	6-L	17	2.0	5.4	1.2	4.9	<3.6	<0.05	<0.08	<0.03	~0	~0
	3/12/16	8 hrs	6-L	<9.8	0.42	<3.8	<0.87	<8.6	<3.6	<0.05	<0.08	<0.03	~4	~2
638 3rd	12/5/15	8 hrs	6-L	<9.8	1.2	<3.8	<0.87	<8.6	<3.6	<0.05	<0.08	<0.03	~5	~3
	3/12/16	8 hrs	6-L	<9.8	0.36	<3.8	<0.87	<8.6	<3.6	<0.05	<0.08	<0.03	~5	~2
Outdoor Air Samples														
R-1	12/5/15	8 hrs	6-L	<9.8	0.78	<3.8	<0.87	<8.6	<3.6	<0.05	<0.08	<0.03	~5	~2
	3/12/16	8 hrs	6-L	<9.8	0.31	<3.8	<0.87	<8.6	<3.6	<0.05	<0.08	<0.03	~1	~0
R-2	12/5/15	8 hrs	6-L	<9.8	1.2	<3.8	<0.87	<8.6	<3.6	<0.05	<0.08	<0.03	~4.5	~1
	3/12/16	8 hrs	6-L	<9.8	0.32	<3.8	<0.87	<8.6	<3.6	<0.05	<0.08	<0.03	~3.25	~0

Indoor Air Screening Levels

ESLs Residential Indoor Air	*100*	*0.097*	*310*	*1.1*	*100*	*11*	*0.083*	*0.11*	*0.0047*
ESLs Comm/Indus Indoor Air	*100*	*0.42*	*1,300*	*4.9*	*440*	*47*	*0.36*	*0.47*	*0.020*

Notes:

TPHg	Total Petroluem Hydrocarbons as gasoline by EPA Method TO-15
BTEX, MTBE	Benzene, Toluene, Ethylbenzene, and Total Xylenes, Methyl tert-Butyl Ether by EPA Method TO-15(M) GC/MS (note: Xylene number shown in table is the sum of xylene isomers reported by lab)
Naphthalene	Naphthalene by EPA Method TO-15
1,2-DCA, EDB	1,2-dichloroethane, 1,2-dibromoethane by EPA Method TO-15
$\mu g/m^3$	Micrograms per cubic meter
<#.##	Compound not detected at or above the reported laboratory detection limit
ESLs	Environmental Screening Levels for Indoor Air in Commercial/Industrial or Residential setting (SFBRWQCB 2016)

Date: 3/12/16

Technician: LT

Job No.: ASE-1

WELL ID: VP-1		Manifold ID#: NA	
Purge ~~Source~~: VAC Pump	Volume: ~0.06L purge		Start Presure: ~~NA~~
Sample Suma ID#: 318	Volume: 1L		Start Presure: 30" Hg
Shut-in Test Start Time/Pressure: 0940 / 30" Hg		Shut-in Test End Time/Pressure: 1003 / 30" Hg Pass	

	Time (24 Hr)	Pre-Regulator Presure (-"H_2O)	Post-Regulator Presure (-"Hg)	He Tracer (%)
Purge Start	1831	90 sec. Purge	24	NA
	1832.5		24	
	1833		30	11.1
	1836		23	9.6
	1838		17	6.9
	1841		9	9.1
End	1842		5	8.8

Notes:

Date: 3/12/16
Technician: LT
Job No.: ASE-1

WELL ID: VP-2		Manifold ID#: NA	
Purge ~~Suma~~ ID#: Vac Pump	Volume: ~0.06L		Start Presure: NA
Sample Suma ID#: 306	Volume: 1L		Start Presure: 29
Shut-in Test Start Time/Pressure: 0945/29"Hg		Shut-in Test End Time/Pressure: 1005/29"Hg	

	Time (24 Hr)	Pre-Regulator Presure (-"H_2O)	Post-Regulator Presure (-"Hg)	He Tracer (%)
	1814	90sec Purge	NA/25"Hg	NA
Purge start	1815.5		NA/25"Hg	NA
	1816		29	10.6
	1819		20	9.2
	1821		15	8.6
	1823		12	9.1
	1825		7	8.8
end	1826		5	8.6

Notes:

Date: 3/12/16
Technician: LT
Job No.: ASE-1

WELL ID: VP-4		Manifold ID#: NA	
Purge ~~Soma ID#~~: VAC PUMP	Volume: ~0.06L		Start Presure:
Sample Suma ID#: 315	Volume: 1L		Start Presure:
Shut-in Test Start Time/Pressure: 0938/29"Hg		Shut-in Test End Time/Pressure: 1000/29"Hg PASS	

	Time (24 Hr)	Pre-Regulator Presure (-"H_2O)	Post-Regulator Presure (-"Hg)	He Tracer (%)
Purge	1725.0	NA	24	NA
	1726.5			
start	1734		29	9.7
	1733		24	8.4
	1736		17	8.0
	1738		11	7.6
end	1740		5	8.1

Notes:

Date: 3/12/16
Technician: LT
Job No.: ASE-1

WELL ID: VP-5		Manifold ID#: NA	
Purge ~~Sample~~ ID#: VAC PUMP	Volume: ~0.06L		Start Presure:
Sample Suma ID#: 312	Volume: 1L		Start Presure:
Shut-in Test Start Time/Pressure: 0939/>30"Hg		Shut-in Test End Time/Pressure: 1001/>30"Hg PASS	

	Time (24 Hr)	Pre-Regulator Presure (-"H_2O)	Post-Regulator Presure (-"Hg)	He Tracer (%)
Purge	1748.0	NA	25"	
	1749.5	NA	25"	
start	1751		>30	10.1
	1753		25	8.1
	1755		20	7.6
	1757		15	8.3
	1759		9	8.7
end	1800		5	8.2

Notes:

AMBIENT & INDOOR AIR SAMPLE DATA

~~WELL GAUGING DATA/PURGE CALCULATIONS~~

Job No.: ASE-1 Location: Terradev Jefferson LLC Property Date: 3/12/16 Tech(s): LJ

WELL NO.	TIME START (hr)	DTB (ft)	DTW (ft)	ST (ft)	CV (gal)	PV (gal)	SPL (ft)	NOTES
R-1	0810 30"Hg	1005 22"Hg	1242 12"Hg		1610 1"Hg			c# 7005 m# 1079
R-2	0812 >30"Hg	1009 25"Hg	1243 15"Hg		1612 >3"Hg	~3.25"Hg		c# 6976 m# 3385
645 4th	0802 30"Hg	1007 22"Hg	1238 11"Hg		1602 0"Hg			c# 7007 m# 931
380 MLK	0805 30"Hg	1005 24"Hg	1239 15"Hg		1605 4"Hg			c# 7004 m# 7399
638 3rd	0807 30"Hg	1006 24.5	1241 15.5"Hg		1607 5"Hg			c# 7006 m# 7402

Explanation:
DIAM = Well Diameter
DTB = Depth to Bottom
DTW = Depth to Water
ST = Saturated Thickness (DTB-DTW)
CV = Casing Volume (ST x cf)
PV = Purge Volume (standard 3 x CV, well development 10 x CV)
SPL = Thickness of Separate Phase Liquid

Conversion Factors (cf)
1 inch diameter well cf = 0.04 gal/ft
2 inch diameter well cf = 0.16 gal/ft
4 inch diameter well cf = 0.65 gal/ft
6 inch diameter well cf = 1.44 gal/ft

BLUE ROCK ENVIRONMENTAL, INC.
1169 Chess Drive, Suite C, Foster City, CA 94404 Phone (650) 522-9292 Fax (650) 522-9259

Risk Calculation Example Sheet for Indoor Air Inhalation Exposure

$$\text{Risk} = \frac{C_{\text{indoor air}} \times ET \times EF \times ED \times IUR}{AT_c \times 365\ \text{day/yr} \times 24\ \text{hr/day}}$$

$$\text{Hazard Quotient (HQ)} = \frac{C_{\text{indoor air}} \times ET \times EF \times ED}{AT_{nc} \times 365\ \text{day/yr} \times 24\ \text{hr/day} \times RfC}$$

where:

$C_{\text{indoor air}}$ ($\mu g/m^3$) =	Sample specific

	Exposure Scenario	
	Resdiential	Commercial
ET (hr/day) =	24	8
EF day/yr =	350	250
ED (yr)=	30	25
AT_c (yr)=	70	70
AT_{nc} (yr)=	30	25

Source: DTSC 2011

	TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	Naph-thalene	1,2-DCA	EDB
IUR $(\mu g/m^3)^{-1}$ =	No Value	2.9E-05	No Value	2.5E-06	No Value	2.6E-07	3.4E-05	2.6E-05	6.0E-04
RfC ($\mu g/m^3$) =	5.7E+02	3.0E+00	3.0E+02	1.0E+03	1.0E+02	3.0E+03	3.0E+00	7.0E+00	8.0E-01

Source: SFBRWQCB 2016

Summary of Cumulative Risk and Hazard Index

Project: **Terradev Jefferson LCC property, 645 4th St., Oakland, CA**
Sample ID: **645 4th**
Sample date: **12/5/2015**

		TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	Naphtha-lene	1,2-DCA	EDB		
Residential	Risk	No Value	2.1E-05	No Value	1.2E-06	No Value	<3.8E-07	<7.0E-07	<8.5E-07	<7.4E-06	**CR**	**<3.2E-05**
	HQ	0.061	0.58	0.017	0.0012	0.052	<0.0012	<0.016	<0.011	<0.036	**HI**	**<0.77**
Commercial	Risk	No Value	4.3E-06	No Value	2.4E-07	No Value	<7.6E-08	<1.4E-07	<1.7E-07	<1.5E-06	**CR**	**<6.4E-06**
	HQ	0.014	0.14	0.0041	0.00027	0.012	<0.00027	<0.0038	<0.0026	<0.0086	**HI**	**<0.18**

Summary of Cumulative Risk and Hazard Index

Project: **Terradev Jefferson LCC property, 645 4th St., Oakland, CA**
Sample ID: **645 4th**
Sample date: **3/12/2016**

		TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	Naphtha-lene	1,2-DCA	EDB		
Residential	Risk	No Value	8.8E-06	No Value	<8.9E-07	No Value	<3.8E-07	<7.0E-07	<8.5E-07	<7.4E-06	**CR**	**<1.9E-05**
	HQ	<0.016	0.24	<0.012	<0.00083	<0.082	<0.0012	<0.016	<0.011	<0.036	**HI**	**<0.41**
Commercial	Risk	No Value	1.7E-06	No Value	<1.8E-07	No Value	<7.6E-08	<1.4E-07	<1.7E-07	<1.5E-06	**CR**	**<3.8E-06**
	HQ	<0.0039	0.056	<0.0029	<0.00020	<0.020	<0.00027	<0.0038	<0.0026	<0.0086	**HI**	**<0.10**

Summary of Cumulative Risk and Hazard Index

Project: **Terradev Jefferson LCC property, 645 4th St., Oakland, CA**
Sample ID: **380 MLK**
Sample date: **12/5/2015**

		TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	Naphtha-lene	1,2-DCA	EDB		
Residential	Risk	No Value	2.4E-05	No Value	1.2E-06	No Value	<3.8E-07	<7.0E-07	<8.5E-07	<7.4E-06	**CR**	**<3.4E-05**
	HQ	0.029	0.64	0.017	0.0012	0.047	<0.0012	<0.016	<0.011	<0.036	**HI**	**<0.80**
Commercial	Risk	No Value	4.7E-06	No Value	2.4E-07	No Value	<7.6E-08	<1.4E-07	<1.7E-07	<1.5E-06	**CR**	**<6.8E-06**
	HQ	0.0068	0.15	0.0041	0.00027	0.011	<0.00027	<0.0038	<0.0026	<0.0086	**HI**	**<0.19**

Summary of Cumulative Risk and Hazard Index

Project: **Terradev Jefferson LCC property, 645 4th St., Oakland, CA**
Sample ID: **380 MLK**
Sample date: **3/12/2016**

		TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	Naphtha-lene	1,2-DCA	EDB		
Residential	Risk	No Value	5.0E-06	No Value	<8.9E-07	No Value	<3.8E-07	<7.0E-07	<8.5E-07	<7.4E-06	**CR**	**<1.5E-05**
	HQ	<0.016	0.13	<0.012	<0.00083	<0.082	<0.0012	<0.016	<0.011	<0.036	**HI**	**<0.31**
Commercial	Risk	No Value	9.9E-07	No Value	<1.8E-07	No Value	<7.6E-08	<1.4E-07	<1.7E-07	<1.5E-06	**CR**	**<3.0E-06**
	HQ	<0.0039	0.032	<0.0029	<0.00020	<0.020	<0.00027	<0.0038	<0.0026	<0.0086	**HI**	**<0.074**

Summary of Cumulative Risk and Hazard Index

Project: **Terradev Jefferson LCC property, 645 4th St., Oakland, CA**
Sample ID: **638 3rd**
Sample date: **12/5/2015**

		TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	Naphtha-lene	1,2-DCA	EDB		
Residential	Risk	No Value	1.4E-05	No Value	<8.9E-07	No Value	<3.8E-07	<7.0E-07	<8.5E-07	<7.4E-06	**CR**	**<2.5E-05**
	HQ	<0.016	0.38	<0.012	<0.00083	<0.082	<0.0012	<0.016	<0.011	<0.036	**HI**	**<0.56**
Commercial	Risk	No Value	2.8E-06	No Value	<1.8E-07	No Value	<7.6E-08	<1.4E-07	<1.7E-07	<1.5E-06	**CR**	**<4.9E-06**
	HQ	<0.0039	0.091	<0.0029	<0.00020	<0.020	<0.00027	<0.0038	<0.0026	<0.0086	**HI**	**<0.13**

Summary of Cumulative Risk and Hazard Index

Project: **Terradev Jefferson LCC property, 645 4th St., Oakland, CA**
Sample ID: **638 3rd**
Sample date: **3/12/2016**

		TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	Naphtha-lene	1,2-DCA	EDB		
Residential	Risk	No Value	4.3E-06	No Value	<8.9E-07	No Value	<3.8E-07	<7.0E-07	<8.5E-07	<7.4E-06	**CR**	**<1.5E-05**
	HQ	<0.016	0.12	<0.012	<0.00083	<0.082	<0.0012	<0.016	<0.011	<0.036	**HI**	**<0.29**
Commercial	Risk	No Value	8.5E-07	No Value	<1.8E-07	No Value	<7.6E-08	<1.4E-07	<1.7E-07	<1.5E-06	**CR**	**<2.9E-06**
	HQ	<0.0039	0.027	<0.0029	<0.00020	<0.020	<0.00027	<0.0038	<0.0026	<0.0086	**HI**	**<0.069**

Analytical Sciences

Report Date: April 05, 2016

Laboratory Report

Brian Gwinn
Blue Rock Environmental
1157 Chess Drive, Ste. 107
Foster City, CA 94404

Project Name: **Terradev Jefferson LLC** **ASE-1**

Lab Project Number: **6031724**

This 10 page report of analytical data has been reviewed and approved for release.

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA
94952

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (µg/m³)		RDL (µg/m³)
6031724-01	**VP-1**	Gasoline	ND	VAa	330
		Dichlorodifluoromethane (F-12)	ND		12
		Chloromethane	ND		5.2
		Vinyl chloride	ND		6.4
		Chloroethane (CE)	ND		6.6
		Trichlorofluoromethane (F-11)	ND		14
		1,1-Dichloroethene (1,1-DCE)	ND		9.9
		Trichlorotrifluoroethane (F-113)	ND		19
		Methylene chloride	ND		8.7
		trans-1,2-Dichloroethene	ND		9.9
		1,1-Dichloroethane (1,1-DCA)	ND		10
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		9.9
		Chloroform (THM1)	ND		12
		1,1,1-Trichloroethane (TCA)	ND		14
		1,2-Dichloroethane (EDC)	ND		10
		Carbon tetrachloride	ND		9.4
		Benzene	ND		8.0
		Trichloroethene (TCE)	ND		13
		cis-1,3-Dichloropropene	ND		11
		trans-1,3-Dichloropropene	ND		11
		Toluene	ND		9.4
		1,1,2-Trichloroethane	ND		14
		Tetrachloroethene (PCE)	ND		17
		1,2-Dibromoethane (EDB)	ND		3.8
		Chlorobenzene	ND		12
		Ethylbenzene	ND		11
		m,p-Xylene	ND		11
		o-Xylene	ND		11
		1,1,2,2-Tetrachloroethane	ND		17
		1,3-Dichlorobenzene	ND		15
		1,4-Dichlorobenzene	ND		15
		1,2-Dichlorobenzene	ND		15
		1,2,4-Trichlorobenzene	ND		19
		Naphthalene	ND		13
		Methyl tert-Butyl Ether (MTBE)	ND		9.0
		Isopropyl alcohol (LEAK CHECK)	ND		61

Surrogates	Result (µg/m³)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	38.8	100	70-130
4-Bromofluorobenzene	40.8	105	70-130

Date Sampled:	03/12/16	Date Analyzed:	03/18/16	QC Batch: B015584
Date Received:	03/17/16	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (µg/m³)		RDL (µg/m³)
6031724-02	**VP-2**	Gasoline	330	VAa	330
		Dichlorodifluoromethane (F-12)	ND		12
		Chloromethane	ND		5.2
		Vinyl chloride	ND		6.4
		Chloroethane (CE)	ND		6.6
		Trichlorofluoromethane (F-11)	ND		14
		1,1-Dichloroethene (1,1-DCE)	ND		9.9
		Trichlorotrifluoroethane (F-113)	ND		19
		Methylene chloride	ND		8.7
		trans-1,2-Dichloroethene	ND		9.9
		1,1-Dichloroethane (1,1-DCA)	ND		10
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		9.9
		Chloroform (THM1)	ND		12
		1,1,1-Trichloroethane (TCA)	ND		14
		1,2-Dichloroethane (EDC)	ND		10
		Carbon tetrachloride	ND		9.4
		Benzene	ND		8.0
		Trichloroethene (TCE)	ND		13
		cis-1,3-Dichloropropene	ND		11
		trans-1,3-Dichloropropene	ND		11
		Toluene	ND		9.4
		1,1,2-Trichloroethane	ND		14
		Tetrachloroethene (PCE)	ND		17
		1,2-Dibromoethane (EDB)	ND		3.8
		Chlorobenzene	ND		12
		Ethylbenzene	ND		11
		m,p-Xylene	28		11
		o-Xylene	12		11
		1,1,2,2-Tetrachloroethane	ND		17
		1,3-Dichlorobenzene	ND		15
		1,4-Dichlorobenzene	ND		15
		1,2-Dichlorobenzene	ND		15
		1,2,4-Trichlorobenzene	ND		19
		Naphthalene	ND		13
		Methyl tert-Butyl Ether (MTBE)	ND		9.0
		Isopropyl alcohol (LEAK CHECK)	ND		61

Surrogates	Result (µg/m³)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	38.9	100	70-130
4-Bromofluorobenzene	39.9	103	70-130

Date Sampled:	03/12/16	Date Analyzed:	03/18/16	QC Batch: B015584
Date Received:	03/17/16	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (µg/m³)		RDL (µg/m³)
6031724-03	**VP-4**	Gasoline	10000000	VAa	800000
		Dichlorodifluoromethane (F-12)	ND		1900
		Chloromethane	ND		800
		Vinyl chloride	ND		980
		Chloroethane (CE)	ND		1000
		Trichlorofluoromethane (F-11)	ND		2200
		1,1-Dichloroethene (1,1-DCE)	ND		1500
		Trichlorotrifluoroethane (F-113)	ND		3000
		Methylene chloride	ND		1300
		trans-1,2-Dichloroethene	ND		1500
		1,1-Dichloroethane (1,1-DCA)	ND		1600
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		1500
		Chloroform (THM1)	ND		1900
		1,1,1-Trichloroethane (TCA)	ND		2100
		1,2-Dichloroethane (EDC)	ND		1600
		Carbon tetrachloride	ND		1500
		Benzene	4100		1200
		Trichloroethene (TCE)	ND		2100
		cis-1,3-Dichloropropene	ND		1700
		trans-1,3-Dichloropropene	ND		1700
		Toluene	6500		1500
		1,1,2-Trichloroethane	ND		2100
		Tetrachloroethene (PCE)	ND		2600
		1,2-Dibromoethane (EDB)	ND		590
		Chlorobenzene	ND		1800
		Ethylbenzene	ND		1700
		m,p-Xylene	14000		1700
		o-Xylene	8400		1700
		1,1,2,2-Tetrachloroethane	ND		2600
		1,3-Dichlorobenzene	ND		2300
		1,4-Dichlorobenzene	ND		2300
		1,2-Dichlorobenzene	ND		2300
		1,2,4-Trichlorobenzene	ND		2900
		Naphthalene	ND		2000
		Methyl tert-Butyl Ether (MTBE)	ND		1400
		Isopropyl alcohol (LEAK CHECK)	ND		9500

Surrogates	Result (µg/m³)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	38.9	100	70-130
4-Bromofluorobenzene	39.4	101	70-130

Date Sampled:	03/12/16	Date Analyzed:	03/18/16	QC Batch: B015584
Date Received:	03/17/16	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (µg/m³)		RDL (µg/m³)
6031724-04	**VP-5**	Gasoline	780000	VA	46000
		Dichlorodifluoromethane (F-12)	ND		1800
		Chloromethane	ND		740
		Vinyl chloride	ND		910
		Chloroethane (CE)	ND		940
		Trichlorofluoromethane (F-11)	ND		2000
		1,1-Dichloroethene (1,1-DCE)	ND		1400
		Trichlorotrifluoroethane (F-113)	ND		2700
		Methylene chloride	ND		1200
		trans-1,2-Dichloroethene	ND		1400
		1,1-Dichloroethane (1,1-DCA)	ND		1400
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		1400
		Chloroform (THM1)	ND		1700
		1,1,1-Trichloroethane (TCA)	ND		2000
		1,2-Dichloroethane (EDC)	ND		1400
		Carbon tetrachloride	ND		1300
		Benzene	9100		1100
		Trichloroethene (TCE)	ND		1900
		cis-1,3-Dichloropropene	ND		1600
		trans-1,3-Dichloropropene	ND		1600
		Toluene	6500		1300
		1,1,2-Trichloroethane	ND		2000
		Tetrachloroethene (PCE)	ND		2400
		1,2-Dibromoethane (EDB)	ND		550
		Chlorobenzene	ND		1600
		Ethylbenzene	3700		1600
		m,p-Xylene	150000		7800
		o-Xylene	58000		7800
		1,1,2,2-Tetrachloroethane	ND		2500
		1,3-Dichlorobenzene	ND		2100
		1,4-Dichlorobenzene	ND		2100
		1,2-Dichlorobenzene	ND		2100
		1,2,4-Trichlorobenzene	ND		2700
		Naphthalene	ND		1900
		Methyl tert-Butyl Ether (MTBE)	ND		1300
		Isopropyl alcohol (LEAK CHECK)	ND		8800

Surrogates	Result (µg/m³)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	38.8	100	70-130
4-Bromofluorobenzene	36.9	95	70-130

Date Sampled:	03/12/16	Date Analyzed:	03/18/16	QC Batch: B015584
Date Received:	03/17/16	Method:	EPA TO-15	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
6031724-01	**VP-1**	Oxygen (O2)	13	0.009
		Carbon Dioxide (CO2)	2.4	0.009
		Methane	ND	0.009
		Helium	0.009	0.004

Date Sampled:	03/12/16	Date Analyzed:	03/23/16	QC Batch: B015604
Date Received:	03/17/16	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
6031724-02	**VP-2**	Oxygen (O2)	9.3	0.010
		Carbon Dioxide (CO2)	6.8	0.010
		Methane	ND	0.010
		Helium	0.009	0.004

Date Sampled:	03/12/16	Date Analyzed:	03/23/16	QC Batch: B015604
Date Received:	03/17/16	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
6031724-03	**VP-4**	Oxygen (O2)	0.82	0.008
		Carbon Dioxide (CO2)	13	0.008
		Methane	0.055	0.008
		Helium	0.28	0.003

Date Sampled:	03/12/16	Date Analyzed:	03/23/16	QC Batch: B015604
Date Received:	03/17/16	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
6031724-04	**VP-5**	Oxygen (O2)	15	0.007
		Carbon Dioxide (CO2)	1.6	0.007
		Methane	ND	0.007
		Helium	0.13	0.003

Date Sampled:	03/12/16	Date Analyzed:	03/23/16	QC Batch: B015604
Date Received:	03/17/16	Method:	ASTM 1946 D	

Quality Assurance Report

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B015584 - Air prep GC/MS										
Blank (B015584-BLK1)				Prepared: 03/17/16 Analyzed: 03/18/16						
Gasoline	ND	330	µg/m³							
Dichlorodifluoromethane (F-12)	ND	12	µg/m³							
Chloromethane	ND	5.2	µg/m³							
Vinyl chloride	ND	6.4	µg/m³							
Chloroethane (CE)	ND	6.6	µg/m³							
Trichlorofluoromethane (F-11)	ND	14	µg/m³							
1,1-Dichloroethene (1,1-DCE)	ND	9.9	µg/m³							
Trichlorotrifluoroethane (F-113)	ND	19	µg/m³							
Methylene chloride	ND	8.7	µg/m³							
trans-1,2-Dichloroethene	ND	9.9	µg/m³							
1,1-Dichloroethane (1,1-DCA)	ND	10	µg/m³							
cis-1,2-Dichloroethene (c1,2-DCE)	ND	9.9	µg/m³							
Chloroform (THM1)	ND	12	µg/m³							
1,1,1-Trichloroethane (TCA)	ND	14	µg/m³							
1,2-Dichloroethane (EDC)	ND	10	µg/m³							
Carbon tetrachloride	ND	9.4	µg/m³							
Benzene	ND	8.0	µg/m³							
Trichloroethene (TCE)	ND	13	µg/m³							
cis-1,3-Dichloropropene	ND	11	µg/m³							
trans-1,3-Dichloropropene	ND	11	µg/m³							
Toluene	ND	9.4	µg/m³							
1,1,2-Trichloroethane	ND	14	µg/m³							
Tetrachloroethene (PCE)	ND	17	µg/m³							
1,2-Dibromoethane (EDB)	ND	3.8	µg/m³							
Chlorobenzene	ND	12	µg/m³							
Ethylbenzene	ND	11	µg/m³							
m,p-Xylene	ND	11	µg/m³							
o-Xylene	ND	11	µg/m³							
1,1,2,2-Tetrachloroethane	ND	17	µg/m³							
1,3-Dichlorobenzene	ND	15	µg/m³							
1,4-Dichlorobenzene	ND	15	µg/m³							
1,2-Dichlorobenzene	ND	15	µg/m³							
1,2,4-Trichlorobenzene	ND	19	µg/m³							
Naphthalene	ND	13	µg/m³							
Methyl tert-Butyl Ether (MTBE)	ND	9.0	µg/m³							
Isopropyl alcohol (LEAK CHECK)	ND	61	µg/m³							
Surrogate: Dibromofluoromethane	*7.78*		*µg/m³*	*7.79*		*100*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*8.56*		*µg/m³*	*7.76*		*110*	*70-130*			

Fixed Gases (%)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B015604 - Air prep GC										
Duplicate (B015604-DUP1)		**Source: 6031724-03**		Prepared & Analyzed: 03/23/16						
Oxygen (O2)	0.8	0.008	%		0.8			0	20	
Carbon Dioxide (CO2)	13.0	0.008	%		12.9			0.5	20	
Methane	0.06	0.008	%		0.06			0	20	
Helium	0.3	0.003	%		0.3			1	20	

Notes and Definitions

VAa	The sample canister was received by the laboratory with a vacuum gauge reading of 4 inches of mercury.
VA	The sample canister was received by the laboratory with a vacuum gauge reading of 2 inches of mercury.
RDL	Reporting Detection Limit
ND	Analyte NOT DETECTED at or above the reporting detection limit (RDL)
RPD	Relative Percent Difference
NR	Not Reported

Analytical Sciences
P.O. Box 750336, Petaluma, CA 94975-0336
110 Liberty Street, Petaluma, CA 94952
(707) 769-3128
Fax (707) 769-8093

CHAIN OF CUSTODY

Lab Project Number: 603/724
Client's Project Name: ~~ASE~~ Terradev Jeffers
Client's Project Number: ASE-1

CLIENT INFORMATION

Company Name: **Blue Rock Environmental**
Address: **1157 Chess Dr., Suite # 107**
Foster City, CA 94404
Contact: **Loren Taylor**
Phone #: **(650) 522-9292**
Fax #: **(650) 522-9259**
e-mail: Loren/orBrian@blue rockenv.com

TURNAROUND TIME (check one)

Same Day ____
48 Hours ____ 24 Hours ____
5 Days ____ Normal ____

GeoTracker Required Yes No
GeoTracker Number:

Page 1 of 1

Item	Client Sample ID	Date	Matrix	Canister ID #	Regulator ID #	Sample Start Time / Vac "Hg	Sample End Time / Vac "Hg	ANALYSIS: TO-15 + TPHg	ANALYSIS: Mod. ASTM 1946 He, O2, CO2, Methane	Comments	Lab Sample #
1	VP-1	3/12/16	Air	318	NA	1833/30	1842/5	X	X	Please report vacuum upon receipt	01
2	VP-2	3/12/16	Air	306	NA	1816/29	1826/5				02
3	VP-4	3/12/16	Air	315	NA	173/29	1740/5				03
4	VP-5	3/12/16	Air	312	NA	1751/30	1809/5				04
5			All samples Soil Gas								
6											
7											
8											
9											
10											

SIGNATURES

Relinquished By: _____ Signature
Sampled By: Loren Taylor
3/17/16 Date 1100 Time
Received By: _____ Signature
3/17/16 Date 1100 Time

Analytical Sciences

Report Date: April 05, 2016

Laboratory Report

Brian Gwinn
Blue Rock Environmental
1157 Chess Drive, Ste. 107
Foster City, CA 94404

Project Name: **Terradev Jefferson LLC** **ASE-1**

Lab Project Number: **6031723**

This 8 page report of analytical data has been reviewed and approved for release.

Mark A. Valentini, Ph.D.
Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA
94952

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (µg/m³)		RDL (µg/m³)
6031723-01	**645 4th**	Gasoline	ND	VA	9.8
		Dichlorodifluoromethane (F-12)	ND		4.9
		Chloromethane	ND		2.1
		Vinyl chloride	ND		0.03
		Chloroethane (CE)	ND		2.6
		Trichlorofluoromethane (F-11)	ND		5.6
		1,1-Dichloroethene (1,1-DCE)	ND		4.0
		Trichlorotrifluoroethane (F-113)	ND		7.7
		Methylene chloride	ND		3.5
		trans-1,2-Dichloroethene	ND		4.0
		1,1-Dichloroethane (1,1-DCA)	ND		1.2
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		4.0
		Chloroform (THM1)	ND		0.39
		1,1,1-Trichloroethane (TCA)	ND		5.5
		1,2-Dichloroethane (EDC)	ND		0.08
		Carbon tetrachloride	ND		0.02
		Benzene	0.74		0.06
		Trichloroethene (TCE)	ND		1.1
		cis-1,3-Dichloropropene	ND		0.14
		trans-1,3-Dichloropropene	ND		0.14
		Toluene	ND		3.8
		1,1,2-Trichloroethane	ND		0.11
		Tetrachloroethene (PCE)	ND		0.41
		1,2-Dibromoethane (EDB)	ND		0.03
		Chlorobenzene	ND		4.6
		Ethylbenzene	ND		0.87
		m,p-Xylene	ND		4.3
		o-Xylene	ND		4.3
		1,1,2,2-Tetrachloroethane	ND		0.04
		1,2,4-Trichlorobenzene	ND		0.74
		1,3-Dichlorobenzene	ND		6.0
		1,4-Dichlorobenzene	ND		0.18
		1,2-Dichlorobenzene	ND		6.0
		Naphthalene	ND		0.05
		Methyl tert-Butyl Ether (MTBE)	ND		3.6

Surrogates	Result (µg/m³)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	7.78	100	70-130
4-Bromofluorobenzene	7.19	93	70-130

Date Sampled:	03/12/16	Date Analyzed:	03/17/16	QC Batch: B015584
Date Received:	03/17/16	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (µg/m³)		RDL (µg/m³)
6031723-02	**380 MLK**	Gasoline	ND	VAa	9.8
		Dichlorodifluoromethane (F-12)	ND		4.9
		Chloromethane	ND		2.1
		Vinyl chloride	ND		0.03
		Chloroethane (CE)	ND		2.6
		Trichlorofluoromethane (F-11)	ND		5.6
		1,1-Dichloroethene (1,1-DCE)	ND		4.0
		Trichlorotrifluoroethane (F-113)	ND		7.7
		Methylene chloride	ND		3.5
		trans-1,2-Dichloroethene	ND		4.0
		1,1-Dichloroethane (1,1-DCA)	ND		1.2
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		4.0
		Chloroform (THM1)	ND		0.39
		1,1,1-Trichloroethane (TCA)	ND		5.5
		1,2-Dichloroethane (EDC)	ND		0.08
		Carbon tetrachloride	ND		0.02
		Benzene	0.42		0.06
		Trichloroethene (TCE)	ND		1.1
		cis-1,3-Dichloropropene	ND		0.14
		trans-1,3-Dichloropropene	ND		0.14
		Toluene	ND		3.8
		1,1,2-Trichloroethane	ND		0.11
		Tetrachloroethene (PCE)	ND		0.41
		1,2-Dibromoethane (EDB)	ND		0.03
		Chlorobenzene	ND		4.6
		Ethylbenzene	ND		0.87
		m,p-Xylene	ND		4.3
		o-Xylene	ND		4.3
		1,1,2,2-Tetrachloroethane	ND		0.04
		1,2,4-Trichlorobenzene	ND		0.74
		1,3-Dichlorobenzene	ND		6.0
		1,4-Dichlorobenzene	ND		0.18
		1,2-Dichlorobenzene	ND		6.0
		Naphthalene	ND		0.05
		Methyl tert-Butyl Ether (MTBE)	ND		3.6

Surrogates	Result (µg/m³)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	7.75	100	70-130
4-Bromofluorobenzene	7.24	93	70-130

Date Sampled:	03/12/16	Date Analyzed:	03/17/16	QC Batch: B015584
Date Received:	03/17/16	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (µg/m³)		RDL (µg/m³)
6031723-03	**638 3rd**	Gasoline	ND	VAa	9.8
		Dichlorodifluoromethane (F-12)	ND		4.9
		Chloromethane	ND		2.1
		Vinyl chloride	ND		0.03
		Chloroethane (CE)	ND		2.6
		Trichlorofluoromethane (F-11)	ND		5.6
		1,1-Dichloroethene (1,1-DCE)	ND		4.0
		Trichlorotrifluoroethane (F-113)	ND		7.7
		Methylene chloride	ND		3.5
		trans-1,2-Dichloroethene	ND		4.0
		1,1-Dichloroethane (1,1-DCA)	ND		1.2
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		4.0
		Chloroform (THM1)	ND		0.39
		1,1,1-Trichloroethane (TCA)	ND		5.5
		1,2-Dichloroethane (EDC)	ND		0.08
		Carbon tetrachloride	ND		0.02
		Benzene	0.36		0.06
		Trichloroethene (TCE)	ND		1.1
		cis-1,3-Dichloropropene	ND		0.14
		trans-1,3-Dichloropropene	ND		0.14
		Toluene	ND		3.8
		1,1,2-Trichloroethane	ND		0.11
		Tetrachloroethene (PCE)	ND		0.41
		1,2-Dibromoethane (EDB)	ND		0.03
		Chlorobenzene	ND		4.6
		Ethylbenzene	ND		0.87
		m,p-Xylene	ND		4.3
		o-Xylene	ND		4.3
		1,1,2,2-Tetrachloroethane	ND		0.04
		1,2,4-Trichlorobenzene	ND		0.74
		1,3-Dichlorobenzene	ND		6.0
		1,4-Dichlorobenzene	ND		0.18
		1,2-Dichlorobenzene	ND		6.0
		Naphthalene	ND		0.05
		Methyl tert-Butyl Ether (MTBE)	ND		3.6

Surrogates	Result (µg/m³)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	7.75	100	70-130
4-Bromofluorobenzene	7.39	95	70-130

Date Sampled:	03/12/16	Date Analyzed:	03/17/16	QC Batch: B015584
Date Received:	03/17/16	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (µg/m³)		RDL (µg/m³)
6031723-04	**R-1**	Gasoline	ND	VA	9.8
		Dichlorodifluoromethane (F-12)	ND		4.9
		Chloromethane	ND		2.1
		Vinyl chloride	ND		0.03
		Chloroethane (CE)	ND		2.6
		Trichlorofluoromethane (F-11)	ND		5.6
		1,1-Dichloroethene (1,1-DCE)	ND		4.0
		Trichlorotrifluoroethane (F-113)	ND		7.7
		Methylene chloride	ND		3.5
		trans-1,2-Dichloroethene	ND		4.0
		1,1-Dichloroethane (1,1-DCA)	ND		1.2
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		4.0
		Chloroform (THM1)	ND		0.39
		1,1,1-Trichloroethane (TCA)	ND		5.5
		1,2-Dichloroethane (EDC)	ND		0.08
		Carbon tetrachloride	ND		0.02
		Benzene	0.31		0.06
		Trichloroethene (TCE)	ND		1.1
		cis-1,3-Dichloropropene	ND		0.14
		trans-1,3-Dichloropropene	ND		0.14
		Toluene	ND		3.8
		1,1,2-Trichloroethane	ND		0.11
		Tetrachloroethene (PCE)	ND		0.41
		1,2-Dibromoethane (EDB)	ND		0.03
		Chlorobenzene	ND		4.6
		Ethylbenzene	ND		0.87
		m,p-Xylene	ND		4.3
		o-Xylene	ND		4.3
		1,1,2,2-Tetrachloroethane	ND		0.04
		1,2,4-Trichlorobenzene	ND		0.74
		1,3-Dichlorobenzene	ND		6.0
		1,4-Dichlorobenzene	ND		0.18
		1,2-Dichlorobenzene	ND		6.0
		Naphthalene	ND		0.05
		Methyl tert-Butyl Ether (MTBE)	ND		3.6

Surrogates	Result (µg/m³)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	7.78	100	70-130
4-Bromofluorobenzene	7.96	103	70-130

Date Sampled:	03/12/16	Date Analyzed:	03/17/16	QC Batch: B015584
Date Received:	03/17/16	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (µg/m³)		RDL (µg/m³)
6031723-05	**R-2**	Gasoline	ND	VA	9.8
		Dichlorodifluoromethane (F-12)	ND		4.9
		Chloromethane	ND		2.1
		Vinyl chloride	ND		0.03
		Chloroethane (CE)	ND		2.6
		Trichlorofluoromethane (F-11)	ND		5.6
		1,1-Dichloroethene (1,1-DCE)	ND		4.0
		Trichlorotrifluoroethane (F-113)	ND		7.7
		Methylene chloride	ND		3.5
		trans-1,2-Dichloroethene	ND		4.0
		1,1-Dichloroethane (1,1-DCA)	ND		1.2
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		4.0
		Chloroform (THM1)	ND		0.39
		1,1,1-Trichloroethane (TCA)	ND		5.5
		1,2-Dichloroethane (EDC)	ND		0.08
		Carbon tetrachloride	ND		0.02
		Benzene	0.32		0.06
		Trichloroethene (TCE)	ND		1.1
		cis-1,3-Dichloropropene	ND		0.14
		trans-1,3-Dichloropropene	ND		0.14
		Toluene	ND		3.8
		1,1,2-Trichloroethane	ND		0.11
		Tetrachloroethene (PCE)	ND		0.41
		1,2-Dibromoethane (EDB)	ND		0.03
		Chlorobenzene	ND		4.6
		Ethylbenzene	ND		0.87
		m,p-Xylene	ND		4.3
		o-Xylene	ND		4.3
		1,1,2,2-Tetrachloroethane	ND		0.04
		1,2,4-Trichlorobenzene	ND		0.74
		1,3-Dichlorobenzene	ND		6.0
		1,4-Dichlorobenzene	ND		0.18
		1,2-Dichlorobenzene	ND		6.0
		Naphthalene	ND		0.05
		Methyl tert-Butyl Ether (MTBE)	ND		3.6

Surrogates	Result (µg/m³)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	7.75	100	70-130
4-Bromofluorobenzene	7.85	101	70-130

Date Sampled:	03/12/16	Date Analyzed:	03/17/16	QC Batch: B015584
Date Received:	03/17/16	Method:	EPA TO-15	

Quality Assurance Report

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B015584 - Air prep GC/MS										
Blank (B015584-BLK1)				Prepared & Analyzed: 03/17/16						
Gasoline	ND	9.8	µg/m³							
Dichlorodifluoromethane (F-12)	ND	4.9	µg/m³							
Chloromethane	ND	2.1	µg/m³							
Vinyl chloride	ND	0.03	µg/m³							
Chloroethane (CE)	ND	2.6	µg/m³							
Trichlorofluoromethane (F-11)	ND	5.6	µg/m³							
1,1-Dichloroethene (1,1-DCE)	ND	4.0	µg/m³							
Trichlorotrifluoroethane (F-113)	ND	7.7	µg/m³							
Methylene chloride	ND	3.5	µg/m³							
trans-1,2-Dichloroethene	ND	4.0	µg/m³							
1,1-Dichloroethane (1,1-DCA)	ND	1.2	µg/m³							
cis-1,2-Dichloroethene (c1,2-DCE)	ND	4.0	µg/m³							
Chloroform (THM1)	ND	0.39	µg/m³							
1,1,1-Trichloroethane (TCA)	ND	5.5	µg/m³							
1,2-Dichloroethane (EDC)	ND	0.08	µg/m³							
Carbon tetrachloride	ND	0.02	µg/m³							
Benzene	ND	0.06	µg/m³							
Trichloroethene (TCE)	ND	1.1	µg/m³							
cis-1,3-Dichloropropene	ND	0.14	µg/m³							
trans-1,3-Dichloropropene	ND	0.14	µg/m³							
Toluene	ND	3.8	µg/m³							
1,1,2-Trichloroethane	ND	0.11	µg/m³							
Tetrachloroethene (PCE)	ND	0.41	µg/m³							
1,2-Dibromoethane (EDB)	ND	0.03	µg/m³							
Chlorobenzene	ND	4.6	µg/m³							
Ethylbenzene	ND	0.87	µg/m³							
m,p-Xylene	ND	4.3	µg/m³							
o-Xylene	ND	4.3	µg/m³							
1,1,2,2-Tetrachloroethane	ND	0.04	µg/m³							
1,2,4-Trichlorobenzene	ND	0.74	µg/m³							
1,3-Dichlorobenzene	ND	6.0	µg/m³							
1,4-Dichlorobenzene	ND	0.18	µg/m³							
1,2-Dichlorobenzene	ND	6.0	µg/m³							
Naphthalene	ND	0.05	µg/m³							
Methyl tert-Butyl Ether (MTBE)	ND	3.6	µg/m³							
Surrogate: Dibromofluoromethane	*7.75*		*µg/m³*	*7.79*		*100*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*8.36*		*µg/m³*	*7.76*		*108*	*70-130*			

Notes and Definitions

VAa	The sample canister was received by the laboratory with a vacuum gauge reading of 2 inches of mercury.
VA	The sample canister was received by the laboratory with a vacuum gauge reading of 0 inches of mercury.
RDL	Reporting Detection Limit
ND	Analyte NOT DETECTED at or above the reporting detection limit (RDL)
RPD	Relative Percent Difference
NR	Not Reported

Analytical Sciences
P.O. Box 750336, Petaluma, CA 94975-0336
110 Liberty Street, Petaluma, CA 94952
(707) 769-3128
Fax (707) 769-8093

CHAIN OF CUSTODY

Lab Project Number: 6031723
Client's Project Name: Terrader Jefferson
Client's Project Number: A3E-1

CLIENT INFORMATION

Company Name: **Blue Rock Environmental**
Address: **1157 Chess Dr., Suite # 107**
Foster City, CA 94404
Contact: **Loren Taylor**
Phone #: **(650) 522-9292**
Fax #: **(650) 522-9259**
e-mail: Loren/orBrian@blue rockenv.com

TURNAROUND TIME (check one)

Same Day _____
48 Hours _____ 24 Hours _____
5 Days _____ Normal _____

GeoTracker Required Yes No
GeoTracker Number:

Page 1 of 1

Item	Client Sample ID	Date	Matrix	Canister ID #	Regulator ID #	Sample Start Time	Sample End Time	ANALYSIS: TO-15 + TPHg	Comments	Lab Sample #
1	645 4th	3/17/16	Air	7007	931	0802	1602	X	Please return vacuums	01
2	380 MLK	"	"	7004	7399	0805	1605	"		02
3	638 3rd	"	"	7006	7402	0807	1607	"		03
4	R-1	"	"	7005	1079	0810	1610	"		04
5	R-2	3/12/16	Air	6976	3385	0812	1612	"		05
6										
7										
8										
9										
10										

SIGNATURES

Sampled By: Loren Taylor

Relinquished By: _____ (Signature) 3/17/16 (Date) 1057 (Time)

Received By: _____ (Signature) 3/17/16 (Date) 1057 (Time)