METROVATION

June 26, 2013

Mr. Jerry Wickham
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 Mr. Wickham,

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 *Workplan for Additional Site Characterization* dated June 26, 2013.

OAKLAND IRONWORKS BUILDING
580 SECOND STREET, SUITE 260, OAKLAND CA 94607 TELEPHONE (510) 839-4000 FAX (510) 465-4472

BLUE ROCK ENVIRONMENTAL, INC.

Mr. Jerry Wickham
Senior Hazardous Materials Specialist
Alameda County Health Care Services Agency
Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

June 26, 2013

Re: Workplan for Additional Site Characterization
Terradev Jefferson LLC Property
645 4th Street, Oakland, CA 94607
Fuel Leak Case No. RO0003001
Blue Rock Project No. ASE-1

Dear Mr. Wickham,

This workplan, prepared by Blue Rock Environmental, Inc. (Blue Rock) on behalf of Terradev Jefferson, LLC, presents a proposed scope of work to satisfy requests made by the Alameda County Health Care Services Agency – Environmental Health Services (ACHCSA) in their letter dated April 30, 2013. The ACEH letter was written in response to the *Confirmation Soil and Groundwater Sampling Report & Low Threat UST Case Closure Policy Evaluation* dated March 11, 2013.

In their letter dated April 30, 2013, the ACHSA requested additional site information. The request for additional information can be generally separated into the following categories:

1. Provide a copy of the Phase I ESA that was updated in 2006 for the subject property.

2. Perform a geophysical survey in an effort to locate or rule-out any remaining USTs near the source area.

3. Perform additional work to further evaluate potential VI risk.

4. Perform additional work to further characterize extent of the groundwater plume.

The purpose of the requested additional activities is the generation of data viewed by the ACHCSA as necessary for the evaluation of the request for site closure. These "data gaps" and the activities proposed to fill them are described in this letter report.

Background

Site Description and UST Discovery / Removal

The site is located southeast of the intersection of 4th Street and Martin Luther King Jr. Way in Oakland, California (Figure 1). The site consists of a single story commercial building, bounded closely on the sides and back by other commercial buildings. One single-walled steel underground storage tank (UST) was discovered beneath the sidewalk immediately adjacent to the front of the building during renovation in 2006 (Figure 2). The UST is located on the upgradient edge of a developed city block.

Phase I Environmental Site Assessments completed in support of the purchase (1999) and for refinancing in 2006 indicated that no sign of an underground tank was observed during associated site inspections. The Phase I author also interviewed persons knowledgeable with the property from the 1950s until the time of the Phase I; the interviewees could recollect no underground tank being used during the period of their familiarity.

A review of Sanborn Fire Insurance Maps revealed no evidence of subject site use that would potentially require an underground tank, and as such it is difficult to discern precisely when the tank was installed or operated. Based on the Phase I interviews, it is assumed the tank was installed and last used prior to the 1950s. State and local regulations require the proper abandonment of tanks that are no longer used to store or dispense fuels, thus the abandonment work after tank discovery in 2006.

According to Golden Gate Tank Removal, Inc. (Golden Gate), after consultation with the City of Oakland, it was determined that building structural considerations prohibited physical tank removal and that in-place abandonment was the appropriate means to close the subject UST. Therefore, Golden Gate abandoned the UST in-place by triple washing followed by filling it to capacity with concrete slurry on September 5, 2006. Abandonment was performed with the permission and under the oversight of the City of Oakland Fire Prevention Bureau. Details of this event are presented in Golden Gate's *Tank Closure Report* dated September 21, 2006.

Golden Gate reported that the UST contained gasoline with an approximate holding capacity of 1,000-gallons, measuring approximately 10 feet in length and 4 feet in diameter. The bottom of the UST was estimated to be located 7.5 to 8 feet below ground surface (ft bgs). The fill port was reported to be located at the west end of the tank (Figure 2).

At the direction of the Oakland Fire Department, two holes were cored in the bottom of the cleaned tank prior to its abandonment to enable the collection of samples of underlying material. Golden Gate reported that the soil beneath the tank was wet, but that groundwater was not encountered. Soil samples were collected at a depth of 9 ft bgs. The samples were analyzed for concentrations of total petroleum hydrocarbons as diesel (TPHd), gasoline (TPHg), benzene, toluene, ethylbenzene, and xylenes (BTEX), and the five fuel oxygenates (MTBE, TBA, ETBE, DIPE, and TAME). Results of analysis of the sampled sediments indicated the presence of residual fuel hydrocarbons in both samples, with concentrations higher in the sample collected from the western end of the tank. This sample contained TPHg at a 10,000 mg/kg and benzene at 130 mg/kg.

Summary of Investigation Activities

Subsurface investigation began in 2009. A total of four soil borings have been drilled (B-1, B-2, CB-1, CB-2), and three extraction wells (DPE-1 through DPE-3) and three sub-slab soil vapor points (VP-1 through VP-3) have been installed at the site. A summary of well construction details is included in Table 1, and summaries of soil, groundwater, and sub-slab soil vapor sample analytical data are included in Tables 2, 3, and 4, respectively.

Site Conceptual Model

The site conceptual model for the project was initially developed by Amicus in their September 13, 2009 correspondence. The following section presents a summary of the current site conceptual model, which is subject to modification as new data are acquired.

The subject site is located in a commercial/industrial neighborhood along the San Francisco Bay-Margin. The site is underlain by sands and clays. The upper six feet generally consists of a brown sand (SP-SM), which has been interpreted as fill material. Native soil underlying the fill consists of a gray and yellow-brown sandy clay (CL) unit from ~6 – 7 ft bgs and a mottled red-brown and gray clayey sand (SC) from ~7 – 14 ft bgs, a brown sand (SP) from ~14 – 16 ft bgs, and gray clayey sand (SC) from ~ 16 – 20 ft bgs, the maximum depth explored. Groundwater is present in unconfined conditions at a depth of approximately 9 ft bgs. Groundwater flows generally to the south, towards the Oakland Inner Harbor, based on information from nearby sites.

Gasoline range hydrocarbons are present in soil and groundwater proximal to the abandoned UST. Interestingly, the contaminant signature also includes MTBE, a gasoline additive not used abundantly in California until the early/mid 1990s (MTBE became a mandated addition to California gasoline following passage of the Clean Air Act Amendments in 1990). Although it is uncertain when the subject UST was removed from service, it is expected that it was not in service during MTBE's lifespan as a gasoline additive.

Blue Rock understands that an upgradient property at the corner of 5th Street and Martin Luther King Jr. Way was formerly used as a gas station (Global ID T06000101350), the tanks for which were removed many years ago under Alameda County oversight. Additionally, review of Sanborn Maps revealed the presence of a gas station opposite the subject site between on the east side of Grove Street (now Martin Luther King Way) between 4th and 5th Streets. The gas station appears to have been constructed between 1952 and 1957 and operated until the Bay Area Rapid Transit (BART) corridor was constructed on this land around 1970. It is unclear if these are the same station or two different stations. The relationship (if any) between these historic service stations and residual hydrocarbons found at the subject site is unknown, as no data pertaining to them are readily available.

The abandoned UST is located beneath the sidewalk along 4th Street, at the upgradient edge of a city block. The location of densely packed, low ceiling (occupied) buildings prohibits implementation of a traditional environmental investigation (i.e. an array of downgradient borings and wells). The nearest location for the construction of downgradient monitoring wells is the street or sidewalk along 3rd Street, on the other side of the city block. Review of the results of UST studies at nearby sites (Allen property at 345 Martin Luther King Jr. Way and Markus Hardware at 632-638 Second Street) suggest that a 3rd Street location for downgradient monitoring wells for would simply be too far from the expected downgradient edge of the plume to serve any practical purpose. Yet, the results of corrective action at nearby sites can be used to predict aspects of the subject case.

The Allen property, located across Martin Luther King Jr. Way (formerly Grove Street), provides a useful example. Contamination originating from a 10,000-gallon UST at that property extended approximately 75 feet downgradient. According to Allen property reports, a 10,000-gallon UST was used at that property to fuel fleet vehicles prior to its in-place abandonment. Available reports do not describe the installation date, throughput, or contents of the tank; however, the analytes detected in proximal groundwater suggest the tank may have held gasoline. It is notable that the UST at the subject site is much smaller than the Allen UST, and not obviously associated with a business employing a fleet of delivery trucks (implying a possibly lower throughput). Consequently, a conservative approximation of Terradev migratory extent may be the extent of migration of the Allen release (i.e. approximately 75 feet downgradient of the UST). This approximation is clearly far from the 3rd Street edge of the developed block, which is approximately 235 feet downgradient of the UST.

Groundwater beneath this area of Oakland is not presently used for beneficial purposes (consumption or irrigation). Additionally, it is reasonable to assume that the shallowest water-bearing zone in the vicinity of the subject site will plausibly not be used for beneficial consumption for the indeterminate future, if ever (in terms of City habitation). The residual hydrocarbons in groundwater do not, therefore, pose a threat to human health via consumption.

Secondary Source Removal

Amicus evaluated investigative and remedial options available at the site in their September 13, 2009 correspondence. It was noted that corrective actions would be necessarily constrained by the location of the abandoned UST relative to existing development - i.e. assessment proximally downgradient is prohibited, inadequate space to build a traditional fixed in-situ remediation system, and remedial excavation would undermine the existing building. Yet the persistence of elevated concentrations of gasoline range hydrocarbons in the subsurface merited remedial action. As a result, the use of mobile high-vacuum extraction (HVDPE) equipment was recommended as an aggressive approach to reduce the remaining gasoline mass in the vicinity of the UST for which details were proposed in the *Removal Action Workplan* dated February 3, 2010, which was conditionally approved by the ACHCSA in a letter dated February 19, 2010.

First High-Vacuum Dual-Phase Extraction Event (September-October 2010)

An initial mobile HVDPE remedial event was performed at the site from September 28 to October 3, 2010 (5 days). The event was completed using a truck-mounted unit consisting of a 25-horsepower oil sealed liquid-ring pump capable of producing 29 "Hg vacuum, and a thermal oxidizer capable of treating an air flow of approximately 450 ACFM. Wells DPE-1, DPE-2, and DPE-3 were used as extraction wells. A stinger hose was lowered into each well through a vacuum tight cap and placed approximately one foot off the bottom of each well. Depth to water at the beginning of the event was approximately 9.5 ft bgs in all three wells. At the beginning of the event, influent TPHg levels at individual wells ranged from 1,700 ppmv to 3,530 ppmv; however, they dropped to less 1,000 ppmv by the end of the event. The total average hydrocarbon mass recovered was **174 lbs** (based on 122 lbs calculated from field PID data and 225 lbs calculated from lab data), which equates to an average extraction rate of nearly 35 lbs/day.

Second High-Vacuum Dual-Phase Extraction Event (July 2012)

A second mobile HVDPE remedial event was performed at the site from July 9 to 24, 2012 (15days). The event was completed using a truck-mounted unit consisting of a 25-horsepower oil sealed liquid-ring pump capable of producing 29 "Hg vacuum, and a thermal oxidizer capable of treating an air flow of approximately 450 ACFM. Wells DPE-1 and DPE-2 were used as primary extraction wells, as they proved to be the most productive. A stinger hose was lowered into each well through a vacuum tight cap and placed approximately one foot off the bottom of each well. Depth to water at the beginning of the event was approximately 8.5 to 9 ft bgs, and the no LNAPL was observed in any of the wells. The total influent TPHg level was 1,200 ppmv at the start of the event and declined to 430 ppmv by the end of the event. The ending mass recovery rate was estimated to be approximately 11 lbs/day.

Blue Rock estimated the total average hydrocarbon mass recovered was approximately **249 lbs** (based on 199 lbs calculated from field PID data and 298 lbs calculated from lab data). The HVDPE unit provider (CalClean) estimated the total average hydrocarbon mass recovered was approximately **166 lbs** (based on 130 lbs calculated from field PID data and 191 lbs calculated from lab data). The difference between the mass removal estimates appears to be due to the fact that Blue Rock used flowrates from the manufacturer's blower curve based on the measured vacuum and Calclean used flowrates measured in the field with an inline flowmeter.

Cumulative Secondary Source Removal Efforts

The total hydrocarbon mass of approximately **340 to 423 lbs** has been removed by both the 2010 and 2012 events. At the beginning of the 2010 event, total inlet concentrations were 1,660 ppmv resulting in an extraction rate of approximately 90 lbs/day. By the end of the 2012 event, total inlet concentrations had declined to 430 ppmv and the extraction was approximately 10 lbs/day. Based on these data, it appears the use mobile HVDPE may have reached its effective limit and the mass appears to have been removed to the extent practicable. Additional use of mobile HVDPE would likely not be cost effective.

Free-Product Occurrence and Removal

Free-product was measured once in DPE-3 at a thickness of 0.13-feet in January 2011. However, following the second HVDPE event, no measurable thicknesses of free product has been observed in any of the wells.

Evaluation of Secondary Source Removal / Reduction

As presented in Blue Rock's March 11, 2013 report, a comparison of pre- and post-remedial soil quality proximal to the abandoned UST was intended to serve as a proxy for removal / reduction of the secondary source mass. The results of confirmation soil sampling are shown below.

West Side of UST			
Sample ID	Pre-remedial TPHg (mg/kg)	Post-Remedial TPHg (mg/kg)	CB-1 Sample ID
DPE-1-7.5'	6,500	<1.0	CB-1-7.5'
EX-W-9'	10,000	1,200	CB-1-9'
DPE-1-12'	2,300	14,000	CB-1-12'
DPE-1-15'	770	1,000	CB-1-15'

East Side of UST			
Sample ID	Pre-remedial TPHg (mg/kg)	Post-Remedial TPHg (mg/kg)	CB-2 Sample ID
DPE-2-6'	1.2	No sample	
EX-E-9'	920	840	CB-2-9'
DPE-2-11'	160,000	2,700	CB-2-11'
DPE-2-15'	430	380	CB-2-15'

TPHg concentrations in the upper 11 feet of soil were lower compared to pre-remedial levels, while concentrations at a depth of 12 feet and below were similar to, or higher, than pre-remedial levels. The reduction in concentrations in the upper 11 feet is expected based on historical depth to water and temporary local dewatering during the HVDPE events. Static depth to water is approximately 9 ft bgs and the intake hoses were placed at a depth of approximately 14 ft bgs in DPE-3 and 14 ft bgs in DPE-1 / DPE-2 during HVDPE extraction (i.e. one foot off the bottom of the well casing). The combined effect of the naturally occurring vadose zone and depressed water levels in each extraction well likely facilitated better vapor flow, and therefore mass removal, in the upper 11 feet of the soil column relative to soil deeper in the saturated zone. These results are indicative of secondary source reduction primarily in the upper 11 feet of the soil column.

Evaluation of Groundwater Conditions Before and After Secondary Source Reduction

Groundwater quality has improved in wells DPE-1 and DPE-2 since HVDPE events were performed, which is summarized below (please note that DPE-3 cannot be evaluated because a pre-remedial sample is not available):

DPE-1			
Analytes	Before Source Reduction (9/22/10)	After Source Reduction (8/12/12)	After Source Reduction (2/11/13)
TPHd (µg/L)	<4,000	<2,000	<3,000
TPHg (µg/L)	120,000	71,000	81,000
Benzene (µg/L)	25,000	7,500	9,400
MTBE (µg/L)	320	270	240

DPE-2			
Analytes	Before Source Reduction (9/22/10)	After Source Reduction (8/12/12)	After Source Reduction (2/11/13)
TPHd (µg/L)	<4,000	<2,000	<4,000
TPHg (µg/L)	110,000	70,000	60,000
Benzene (µg/L)	21,000	9,900	7,300
MTBE (µg/L)	110	56	34

DPE-3			
Analytes	Before Source Reduction (9/22/10)	After Source Reduction (8/12/12)	After Source Reduction (2/11/13)
TPHd (µg/L)	no sample, well was dry	<200,000	<40,000
TPHg (µg/L)		190,000	130,000
Benzene (µg/L)		1,400	4,700
MTBE (µg/L)		130	<40

These results generally show an order of magnitude decrease in dissolved-phase concentrations from pre-remedial levels (i.e. DPE-1 and DPE-2) or stabilized concentrations after source removal actions (i.e. DPE-3).

Vapor Intrusion Evaluation

In June and August 2012, Blue Rock sampled three sub-slab soil vapor points (VP-1 through VP-3) inside the building adjacent to the closed UST (Figure 2). The points are located between approximately 6 and 38 feet south to southeast of the UST. Results from both events did not indicate a vapor intrusion risk based on comparison to Shallow Soil Gas ESLs from Table E of *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim 2007 (Revised 2008)* and CHHSLs published in *Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties (CALEPA 2005)* for commercial / industrial land use scenarios. Details of this work were presented in Blue Rock's *Sub-Slab Soil Vapor Sampling Report* dated July 7, 2012 and *Second Sub-Slab Soil Vapor Sampling Report* dated October 18, 2012. Sub-slab soil vapor data is summarized in Table 4.

Workplan for Additional Site Characterization

Purpose

In their letter dated April 30, 2013, the ACHSA requested additional site information. The request for additional information can be generally separated into the following categories:

1. Provide a copy of the Phase I ESA that was updated in 2006 for the subject property.

2. Perform a geophysical survey in an effort to locate or rule-out any remaining USTs near the source area.

3. Perform additional work to further evaluate potential VI risk.

4. Perform additional work to further characterize extent of the groundwater plume.

The following sections propose specific activities aimed at gathering additional site information to satisfy these requests.

Phase I ESA Submittal

The Phase I ESA Update dated May 23, 2006 for the subject property was submitted to the ACHSA on June 17, 2013.

Geophysical Survey and File Review

Blue Rock proposes to use surface geophysical survey methods to evaluate the sidewalk area around the subject UST to evaluate the presence of other potential UST(s) in the area (Figure 2). Techniques to be employed may consist of magnetic survey, ground penetrating radar, and/or electromagnetic terrain conductivity survey.

In order to further evaluate the presence of off-site upgradient petroleum sources of contamination, Blue Rock proposes to review files available at the ACHSA and SFBRWQCB for the former service station located at the corner of 5th Street and Martin Luther King Jr. Way and potential petroleum pipelines proximal to the site.

Additional Vapor Intrusion Evaluation

The ACHCSA requested additional sub-slab soil gas sampling noting that the tracer gas was present at concentrations greater than 10% in two previous sub-slab soil gas samples, and that samples containing greater than 5% may not be considered valid. Further, the ACHSA also requested consideration of deeper soil gas samples, presumably at a depth between 5 ft bgs and the water table, to assess the extent of the plume and oxygen content within the bioattenuation zone ostensibly for the purpose of comparing site conditions relative to default options listed for closure under the LTCP for Petroleum Vapor Intrusion to Indoor Air.

For background, it should be noted that the sub-slab soil gas sampling approach to evaluate potential VI risk was developed using the DTSC guidance document (DTSC 12/2004, rev 2/2005), which was earlier approved by the ACHCSA in correspondence dated May 16, 2012. The DTSC guidance document uses a step-wise approach of evaluating VI risk starting with preliminary screening to evaluate if the pathway is present progressing all the way to direct indoor air sampling. Given the specific conditions of this site, it was determined that proceeding directly to collection of sub-slab soil gas samples, which is the final step in the migration pathway before indoor air sampling, would be the most efficient way to evaluate this exposure scenario. Blue Rock believes the rationale of using sub-slab soil gas sample data (located on the immediate downgradient side of the tank) satisfies the LTCP Petroleum Vapor Intrusion to Indoor Air – Option B for a site-specific risk assessment and does not recommend collecting deeper soil gas samples.

With regard to tracer gas present in past sub-slab soil gas samples during past events, it is noteworthy that while two of three samples contained the helium tracer gas at levels between 10% and 11% during the first event, no samples contained tracer gas above 1% during the second event. Therefore, data from the second event should be considered valid. Blue Rock proposes to collect at one more round of sub-slab soil gas samples from existing soil gas points VP-1 through VP-3 to further evaluate VI risk with the methods used for the first two events.

If the proposed sub-slab sampling event yields data that are consistent with previous results and do not contain tracer gas in concentrations greater than 5%, Blue Rock recommends no further activities relating to potential VI risk.

Additional Groundwater Plume Characterization

Blue Rock proposes to evaluate the downgradient extent of the dissolved-phase plume by collection of grab groundwater samples from four temporary borings located within service hallways or patios in the building (Figure 2). Each of the proposed locations is approximately 100 feet from the UST. Additionally, Blue Rock proposes to monitor the existing wells DPE-1

through DPE-3 using the previously employed methods at the site to assess the mitigation of LNAPL occurrence and document remaining source area groundwater quality.

Prior to drilling, Blue Rock will obtain soil boring permits from the ACPWA, and the drilling locations will be marked in white paint and Underground Service Alert was notified to identify utilities proximal to the proposed drilling locations. Blue Rock will also prepare a site specific Health and Safety Plan.

Blue Rock proposes to complete the drilling and sampling using hand-auger methods. At each drilling location, a hand-auger with an approximate 2.5-inch diameter bucket will be used to advance a boring several feet into the water table (i.e. approximately 12 to 13 ft bgs). During drilling, soil types will be logged in accordance with the USCS, and field observations of potential petroleum impact will be noted. Blue Rock proposes to collect one soil sample from the capillary fringe for laboratory analysis (i.e. approximately 8 ft bgs). If petroleum impact is observed at other depths, soil samples from those intervals will be collected also. An impact sampler lined with a clean brass tube will be used to collect the sample. The sample tube will then be covered with Teflon lined plastic end caps, labeled, documented on a chain-of-custody form, and placed on ice in an insulated cooler for transport to the laboratory.

Following advancement of the each boring to the desired depth, a new SCH40 PVC well screen will be placed in each boring to help facilitate collection of a water sample. A new disposable polyethylene bailer will be used to collect a groundwater samples from each boring. Water samples will be transferred to laboratory supplied containers, labeled, documented on a chain-of-custody form, and placed on ice in an insulated cooler for transport to the project laboratory.

A California DHS-certified will analyze the soil and groundwater samples for concentrations of:

- TPHd by EPA Method 8105M
- TPHg by EPA Method 8260B
- BTEX by EPA Method 8260B
- MTBE and TBA by EPA Method 8260B
- 1,2-DCA and EDB by EPA Method 8260B

Upon completion of sampling, all boreholes will backfilled to the surface with cement and finished at the surface with concrete. Drill-rod, hand-augers, and sampling devices will be decontaminated in an Alconox® wash followed by double rinse in clean tap water to prevent cross-contamination. Soil cutting and rinseate will be stored in labeled 55-gallon drums on-site pending removal and disposal.

The boring locations will be surveyed for GEO_XY coordinates per GeoTracker requirements.

Reporting

Following completion of the proposed site activities, Blue Rock will prepare a technical report. The report will include tabulated data and figures depicting site conditions. The report will present an evaluation of site conditions and provide for case closure, if appropriate. The report will be reviewed and signed by a California Professional Geologist at Blue Rock.

References

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

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

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

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

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

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

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

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

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California EPA. 2005. *Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties.* January.

California EPA - DTSC. 2010. *Advisory – Active Soil Gas Investigation.* March

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

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

San Francisco Bay RWQCB. 2008. *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater - Interim Final November 2007 (Revised May 2008)*. May.

Certification

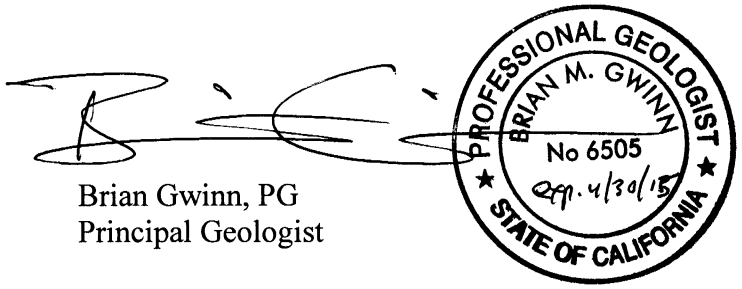
This report was prepared under the supervision of a California Professional Geologist at Blue Rock. All statements, conclusions, and recommendations are based upon published results from past consultants, field observations by Blue Rock, and analyses performed by a state-certified laboratory as they 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:

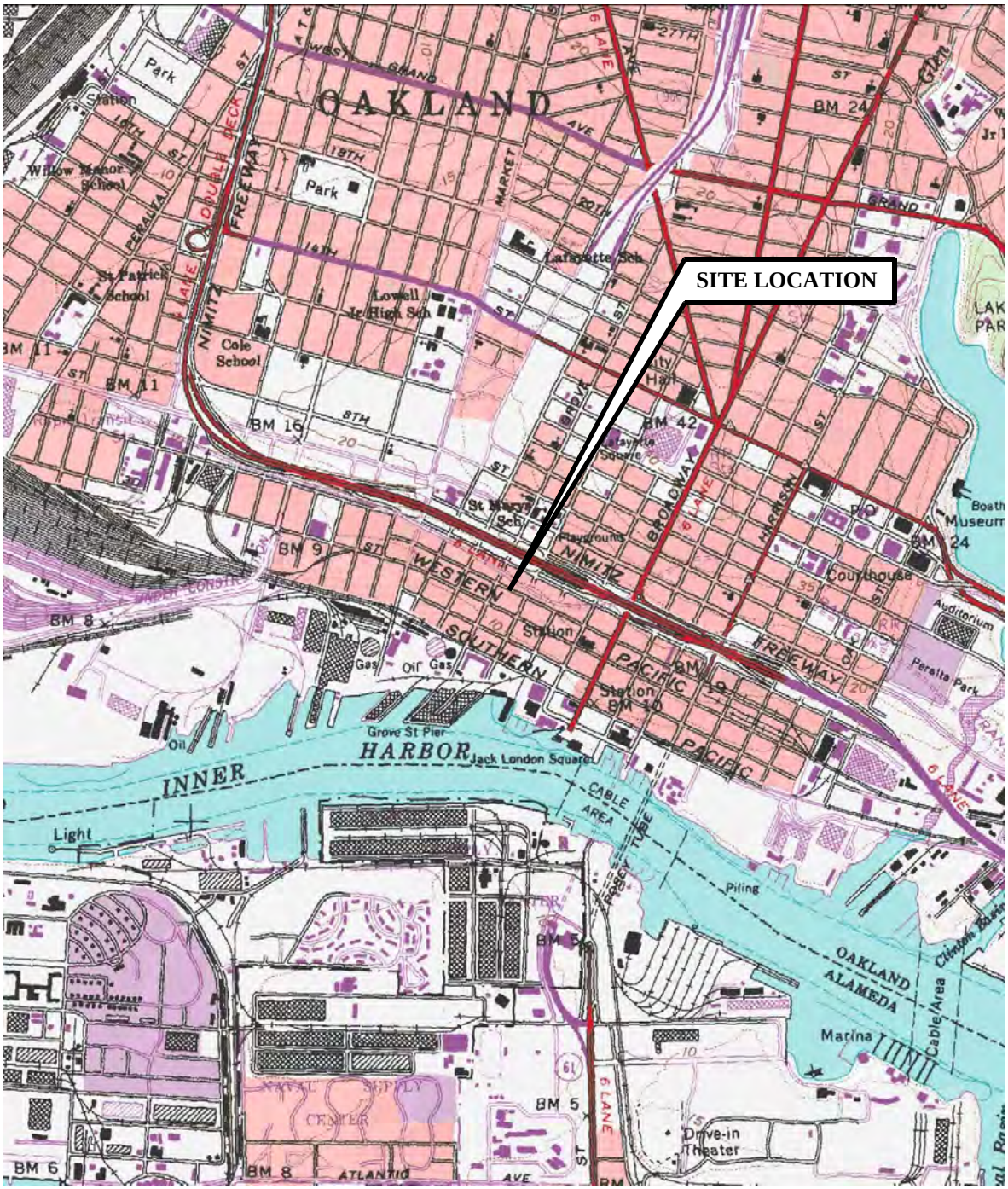
Figure 1: Site Location Map
Figure 2: Site Plan with Proposed Boring Locations

Table 1: Well Construction Data
Table 2: Soil Sample Analytical Data
Table 3: Groundwater Analytical Data
Table 4: Sub-Slab Vapor Sample Analytical Data

Distribution:

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

Mr. Markus Niebanck, Amicus Strategic Environmental Consulting
580 Second St. Suite 260, Oakland, CA 94607



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APPROX. SCALE IN FEET

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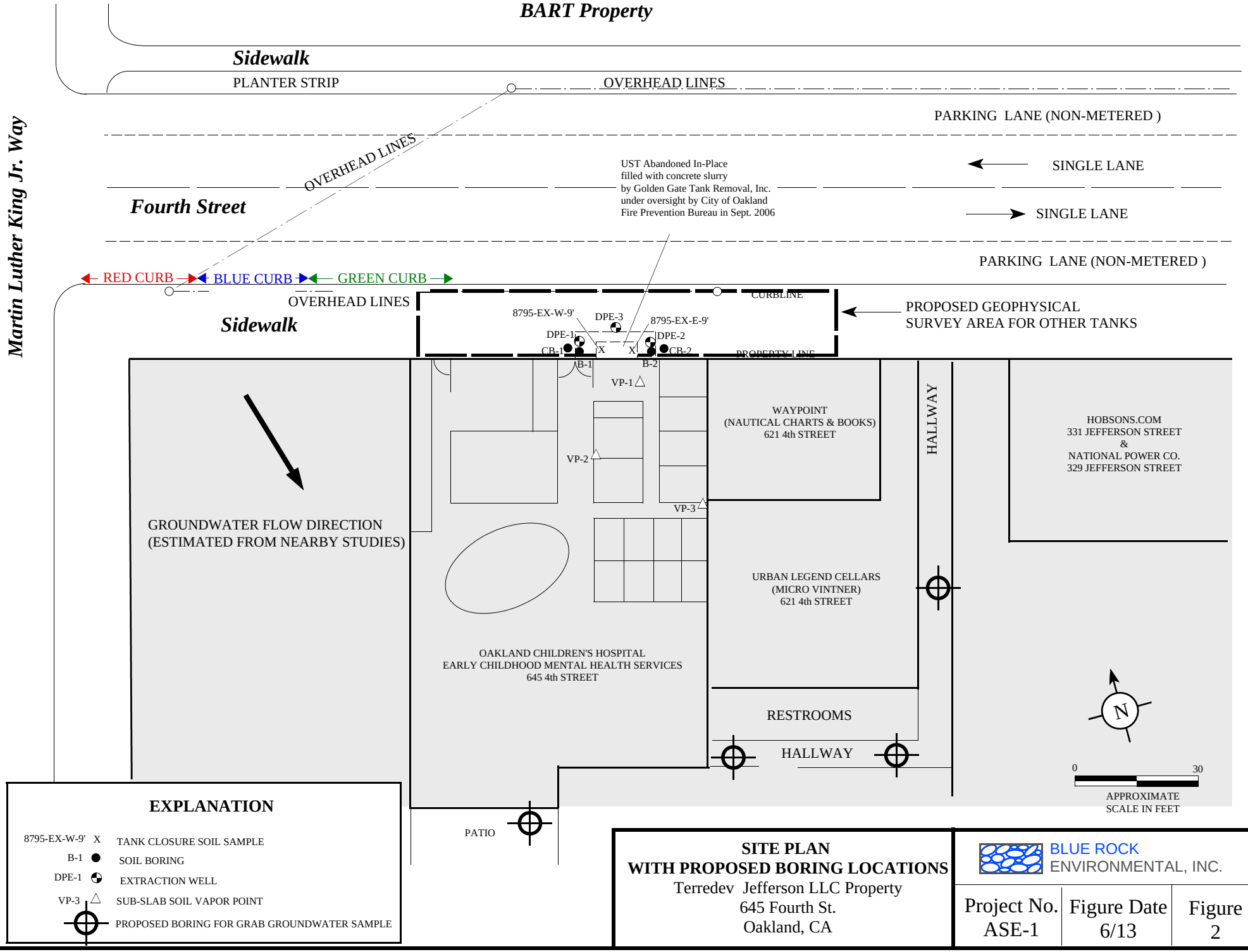
SOURCE: MyTopo.com

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
WITH PROPOSED BORING LOCATIONS
Terredev Jefferson LLC Property
645 Fourth St.
Oakland, CA

BLUE ROCK ENVIRONMENTAL, INC.

Project No.	Figure Date	Figure
ASE-1	6/13	2

TABLE 1
Well Construction Data
Terradev Jefferson, LLC Property
645 Fourth 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 (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

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

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

Sample ID	Depth (ft bgs)	Sample Date	TPHd (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, TAME (mg/kg)	1,2-DCA (mg/kg)	EDB (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	---	---	<0.0050	<0.0050
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	---	---	<0.0050	<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
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 Fourth Street
Oakland, CA

Sample ID	Sample Date	TOC (ft MSL)	DTW (ft)	LNAPL (ft)	GWE (ft MSL)	TPHd (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)
Grab Groundwater Samples															
B-1-GW*	7/10/09	--	~10 - 20	--	--	**5,300**	**78,000**	**15,000**	**13,000**	**1,700**	**10,500**	**570**	--	--	--
B-2-GW*	7/10/09	--	~10 - 20	--	--	**2,300**	**60,000**	**13,000**	**13,000**	**890**	**4,800**	**120**	--	--	--
Monitoring Well Data															
DPE-1	9/22/10	15.81	9.21	0.00	6.60	<4,000^	**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^	**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^	**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^	**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^	**81,000**	**9,400**	**14,000**	**1,800**	**10,000**	**240**	**110**	**210**	<15
DPE-2	9/22/10	16.01	9.44	0.00	6.57	<4,000^	**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^	**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^	**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^	**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^	**60,000**	**7,300**	**9,500**	**1,400**	**7,000**	**34**	<90	**120**	<20
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^	**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^	**130,000**	**4,700**	**9,000**	**1,900**	**25,000**	<40	<200	**54**	**80**

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.
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.
^	Method detection limit increased due to ineterference from gasoline range hydrocarbons
---	Data not available, not monitored, or not sampled

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

		air volume		Consituent Concentrations									Soil Gas Concentrations			Tracer Gas		Sample Can Vacuum	
Sample I.D.	Sample Date	dead space vols. purged	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 ($\mu g/m^3$)	O_2 (%)	CO_2 (%)	CH_4 (%)	In Sample He (%)	In Shroud He - Avg (%)	End of Sampling ("Hg)	Arrival at Lab ("Hg)
VP-1	6/16/12	3.0	1-L	1,300	38	120	21	138	7.3	<0.09	<0.14	<0.050	15	0.096	<0.008	2.4	22.2	~8	~6
Data corrected for 10.8% of leak volume in sample				1,457	43	135	24	155	8.2	<0.10	<0.16	<0.056	---	---	---	---	---	---	---
VP-1	9/22/12	3.0	1-L	<330	<8.0	<9.4	<11	<22	<9.0	<13	<10	<3.8	19	0.78	<0.008	0.19	20.0	~5	~6
Data corrected for 0.95% of leak volume in sample				<333	<8.1	<9.5	<11	<22	<9.1	<13	<10	<3.8	---	---	---	---	---	---	---
VP-2	6/16/12	3.0	1-L	1,200	66	25	2.6	8.2	<6.3	<0.090	<0.14	<0.050	11	1.3	<0.009	<0.003	13.8	~8	~7
VP-2	9/22/12	3.0	1-L	<330	<8.0	<9.4	<11	<22	<9.0	<13	<10	<3.8	14	4.0	<0.008	<0.003	19.0	~7	~6
VP-3	6/16/12	3.0	1-L	960	16	19	2.9	20	<5.8	<0.08	<0.13	<0.050	16	0.029	<0.008	2.6	23.6	~5	~5
Data corrected for 11.0% of leak volume in sample				1,079	18	21	3.3	22	<6.5	<0.09	<0.15	<0.056	---	---	---	---	---	---	---
VP-3	9/22/12	3.0	1-L	<330	<8.0	<9.4	<11	<22	<9.0	<13	<10	<3.8	20	0.46	<0.008	0.036	15.7	~5	~6
Data corrected for 0.23% of leak volume in sample				<331	<8.0	<9.4	<11	<22	<9.0	<13	<10	<3.8	---	---	---	---	---	---	---
ESLs Comm/Indus Soil Gas				*29,000*	*280*	*180,000*	*3,300*	*58,000*	*31,000*	*240*	*310*	*14*							
CHHSLs Comm /Indus Soil Gas				*NA*	*122*	*378,000*	*NA*	*879,000*	*13,400*	*106*	*167*	*NA*							

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
$\mu g/m^3$	Micrograms per cubic meter
<#.##	Compound not detected at or above the reported laboratory detection limit
ESLs	Environmental Screening Levels for Soil Vapor in Commercial/Industrial or Residential setting (SFBRWQCB 2008).
CHHSLs	California Human Health Screening Levels for Soil Vapor in Commercial/Industrial or Residential setting (CalEPA/OEHHA2005)
Tracer Gas in Shroud	Concentration range of tracer gas in shroud recorded during sample collection. Average = (Max - Min) / 2

If helium was detected in the sample, the percentage measured in the sample divided by the average percentage in the shroud represents the proportion of the sample attributable to leakage.
The data were adjusted to account for that proportion by the following: Corrected value ($\mu g/m^3$) = Analyte ($\mu g/m^3$) * [100% / (100% - leak%)]
and rounded to the significant digit of original lab data.