



December 18, 2015

Bancroft and 77th, LLC  
Attn: Victoria Vela  
6500 Flotilla St.  
Los Angeles, CA 90040

Re: **Soil Gas Sampling Report**  
7701 Bancroft Avenue  
Oakland, California 94605  
Fuel Leak Case No. RO0003115  
Global ID T10000004796

Dear Ms. Vela:

On behalf of Bancroft and 77th, LLC, Pangea Environmental Services, Inc has prepared this *Soil Gas Sampling Report*). This report describes shallow soil gas sampling to evaluate potential human health impacts during future site use.

If you have any questions, please contact me at (510) 435-8664 or email [briddell@pangeaenv.com](mailto:briddell@pangeaenv.com).

Sincerely,  
**Pangea Environmental Services, Inc.**

A handwritten signature in blue ink that reads "Bob Clark-Riddell". The signature is fluid and cursive.

Bob Clark-Riddell, P.E.  
Principal Engineer

Attachment: *Soil Gas Sampling Report*

cc: Karel Detterman (electronic copy)

**PANGEA Environmental Services, Inc.**

1710 Franklin Street, Suite 200, Oakland, CA 94612 Telephone 510.836.3700 Facsimile 510.836.3709 [www.pangeaenv.com](http://www.pangeaenv.com)



## SOIL GAS SAMPLING REPORT

**7701 Bancroft Avenue  
Oakland, California 94605  
Fuel Leak Case No. RO0003115  
Global ID T10000004796**

**December 18, 2015**

*Prepared for:*


Bancroft and 77th, LLC  
Attn: Victoria Vela  
6500 Flotilla St.  
Los Angeles, CA 90040


*Prepared by:*

Pangea Environmental Services, Inc.  
1710 Franklin Street, Suite 200  
Oakland, California 94612

*Written by:*



  
\_\_\_\_\_  
Elizabeth Avery  
Project Geologist

  
\_\_\_\_\_  
Bob Clark-Riddell, P.E.  
Principal Engineer

**PANGEA Environmental Services, Inc.**

## INTRODUCTION

On behalf of Bancroft and 77th, LLC, Pangea Environmental Services, Inc has prepared this *Soil Gas Sampling Report*. This report describes shallow soil gas sampling to evaluate potential human health impacts for future site use.

## SITE BACKGROUND

The site is a vacant lot located in a residential neighborhood with an adjacent liquor store. According to reviewed documentation, the subject site was occupied by a Wilshire Oil Company (Gulf) gasoline service station from the 1962 to 1969 and a Stop N Go convenience store from 1974 to approximately the mid 1980's. No records were apparently found regarding the installation, operation, or removal of the underground storage tanks (USTs), although building department records indicate the demolition of the site building 1997, leaving the lot vacant since that time.

A *Limited Phase II Spoil and Groundwater Investigation Letter Report* dated April 16, 2012 was prepared on behalf of Union Bank by Geologica Inc. A geophysical survey was conducted and seven direct-push soil borings were drilled onsite for evaluation of the presence of historic USTs and residual petroleum hydrocarbon in soil and/or groundwater at the site. While the geophysical survey did not identify USTs, the survey identified an anomaly in the northern corner of the property presumed as the former UST location and identified suspected reinforced concrete pad (potential dispenser location). Hydrocarbon impact detected in soil and groundwater indicates that an unauthorized release from the underground storage tanks (USTs) had occurred at the site. Concentrations of up to 110 milligrams per kilogram (mg/kg) total petroleum hydrocarbons (TPH) as gasoline (TPHG), 1,500 mg/kg TPH as diesel (TPHD), 4,500 mg/kg TPH as motor oil (TPHmo), and 0.019 mg/kg ethylbenzene were documented in soil samples. Concentrations of up to 150 micrograms per liter (ug/l) TPHD and 370 ug/l TPHmo were documented in grab groundwater samples. The TPH impact in soil was found at 4 ft and 14 ft below grade surface (bgs) at the site. The TPH impact in grab groundwater was found in boring GP-1 and GP-2 located near the apparent former UST location. Groundwater was first encountered at depths of 13 to 18 ft bgs, and static was estimated between 12 and 14 ft bgs. Soil was relatively low permeability clayey soil.

The release was referred to the Alameda County Environmental Health - Local Oversight Program (ACEH-LOP), the lead agency for oversight of investigation and cleanup of petroleum hydrocarbon releases in Alameda County. ACEH-LOP subsequently listed the subject case on our data base of fuel leak sites. The February 10, 2014 letter from ACEH-LOP requested a *Data Gap Investigation Work Plan* supported by a Site Conceptual Model (SCM) to guide further site corrective action.

## **SITE ASSESSMENT PROCEDURES**

The objective of the investigation is to evaluate the potential for vapor intrusion for current site use and potential future site buildings.

### **Pre-Field Activities**

Drilling permits were obtained from Alameda County Public Works Agency (ACPWA). A comprehensive site safety plan was prepared to protect site workers and the plan was kept onsite during all field activities. The proposed drilling locations were marked and Underground Service Alert was notified at least 48 hours before the proposed field activities. Drilling permits are included in Appendix A.

### **Soil Gas Probe Installation**

On July 7, 2014, Pangea coordinated installation of three soil gas probes (SG-1 through SG-3) to facilitate evaluation of shallow soil gas conditions. Pangea retained Confluence Environmental (Confluence) of Sacramento, California, to hand auger the borings and install the soil gas probes. Soil gas probe SG-1 was installed within the boundary of a GPR anomalous zone representing a possible former excavation. Soil gas probe SG-2 was installed along the southeastern boundary of a buried reinforced concrete pad. Soil gas probe SG-3 was installed in the southern portion of the site within a vertical magnetic gradient anomaly. Soil gas probe locations are shown in Figure 1.

The soil gas probe boreholes were advanced with a 3.25-inch diameter hand auger to a total depth of approximately 5 ft below grade surface (bgs) (SG-1), 7 ft bgs (SG-2), and 9 ft bgs (SG-3). At boring locations SG-1, SG-2, and SG-3, soil samples were collected at approximately 4 ft bgs, 4 ft and 7 ft bgs, and 4 ft and 9 ft bgs, respectively. Soil samples were collected within new brass or stainless steel liners driven into undisturbed soil with a slide-hammer. The soil samples were classified according to the United Soil Classification System (USCS) and screened for field indications of petroleum hydrocarbons using visual and olfactory observations. All site investigation activities were performed under the supervision of a California Registered Civil Professional Engineer (P.E.). Additional soil and assessment procedures are presented in our Standard Operating Procedures (SOPs) for Soil Borings in Appendix B.

Following soil sampling, six semi-permanent soil gas probes were constructed with a stainless steel Geoprobe™ implant connected to new ¼-inch diameter Teflon tubing and capped with a Swagelok® type fitting. The implant was placed in a 0.5 ft thick sand pack with 0.5 ft of dry granular bentonite above, followed by hydrated bentonite. Probe sampling intervals are approximately 5.0 to 6.0 ft bgs (for SG-5 the sampling interval is 3.5 to 4.5 ft bgs). A schematic of the soil gas probe construction is shown in the SOPs in Appendix B.

## **SOIL GAS SAMPLING PROCEDURES**

To evaluate shallow soil gas conditions, Pangea coordinated soil gas sampling from three semi-permanent soil gas probe locations (SG-1 through SG-3) on July 7, 2014. Soil gas analytical results are summarized on Table 1. Laboratory analytical reports are in Appendix C.

The soil gas sampling was conducted in general accordance with procedures described in Pangea's Standard Operating Procedures (SOPs) for Soil Gas Sampling in Appendix C. The soil and soil gas sampling was performed by Pangea staff Scott Polston under the supervision of Pangea's Bob Clark-Riddell, a California Registered Professional Civil Engineer.

To prepare for the soil gas sampling, a site safety plan (SSP) was prepared to protect site workers. Pangea collected soil gas samples using tedlar bags (SG-1 through SG-3) for sampling. Tedlar bag samples were collected using a vacuum chamber and vacuum pump. The vacuum chamber was connected to the probe using new Teflon tubing and a Swagelok fitting. After purging approximately five or more times the ambient volume of air in the assembly/probe, each sample was collected in a new Tedlar Bag.

The soil gas sampling was also conducted in general accordance with procedures described in California EPA's *Advisory Active Soil Gas Investigations* April 2012. The soil gas samples were submitted for analysis to McCampbell Analytical, Inc., of Pittsburg, California, a State-certified laboratory.

### **Soil Gas Analyses**

Soil gas samples were analyzed for total petroleum hydrocarbons as gasoline (TPHg) by EPA Method 8015; for benzene, toluene, ethylbenzene, xylene(s) (BTEX), methyl-tertiary butyl ether (MTBE), and naphthalene by EPA Method 8260; and for percent oxygen (leak check compound) by Method ASTM D-1946. The oxygen analysis helps evaluate the potential for future degradation and bio-attenuation of detected hydrocarbons, and helps assess soil column characteristics ( $\geq 4\%$  oxygen in soil gas is referenced as a bio-attenuation zone in the SWRCB's Underground Storage Tank Low-Threat Site Closure Policy).

## **SITE ASSESSMENT RESULTS**

Analytical results from soil gas sampling are described below. The soil samples collected during this assessment were not analyzed due to temporary discontinuance of the property transaction.

### **Soil Gas Analytical Results**

All hydrocarbons and VOCs in samples from soil gas probes SG-1 through SG-3 were below method reporting limits ('non-detect'). Soil gas analytical results are summarized in Table 1.

The percent oxygen detected in soil gas probes SG-1 through SG-3 were between 4.5% and 5.5%. These percentages exceed the 4% oxygen presented in the Low Threat UST Closure Policy as sufficient to represent a ‘bioattenuation zone’ that provides biodegradation of residual hydrocarbon vapors.

## CONCLUSIONS AND RECOMMENDATIONS

Based on the above information, Pangea offers the following conclusions and recommendations:

- All hydrocarbon and VOC concentrations detected in *soil gas* this investigation were below applicable ESLs and LTCP criteria. The oxygen concentrations in soil gas represent a ‘bioattenuation zone’ that provides biodegradation of residual hydrocarbon vapors based on LTCP criteria.

## REFERENCES

California EPA, 2012, *Advisory-Active Soil Gas Investigation*, California Environmental Protection Agency, Department of Toxic Substances Control, Los Angeles Regional Water Quality Control Board, San Francisco Regional Water Quality Control Board, April.

## ATTACHMENTS

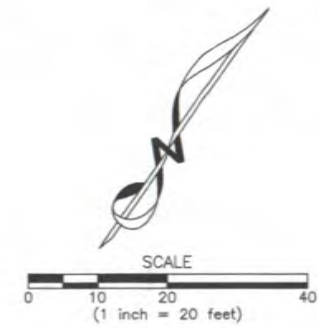
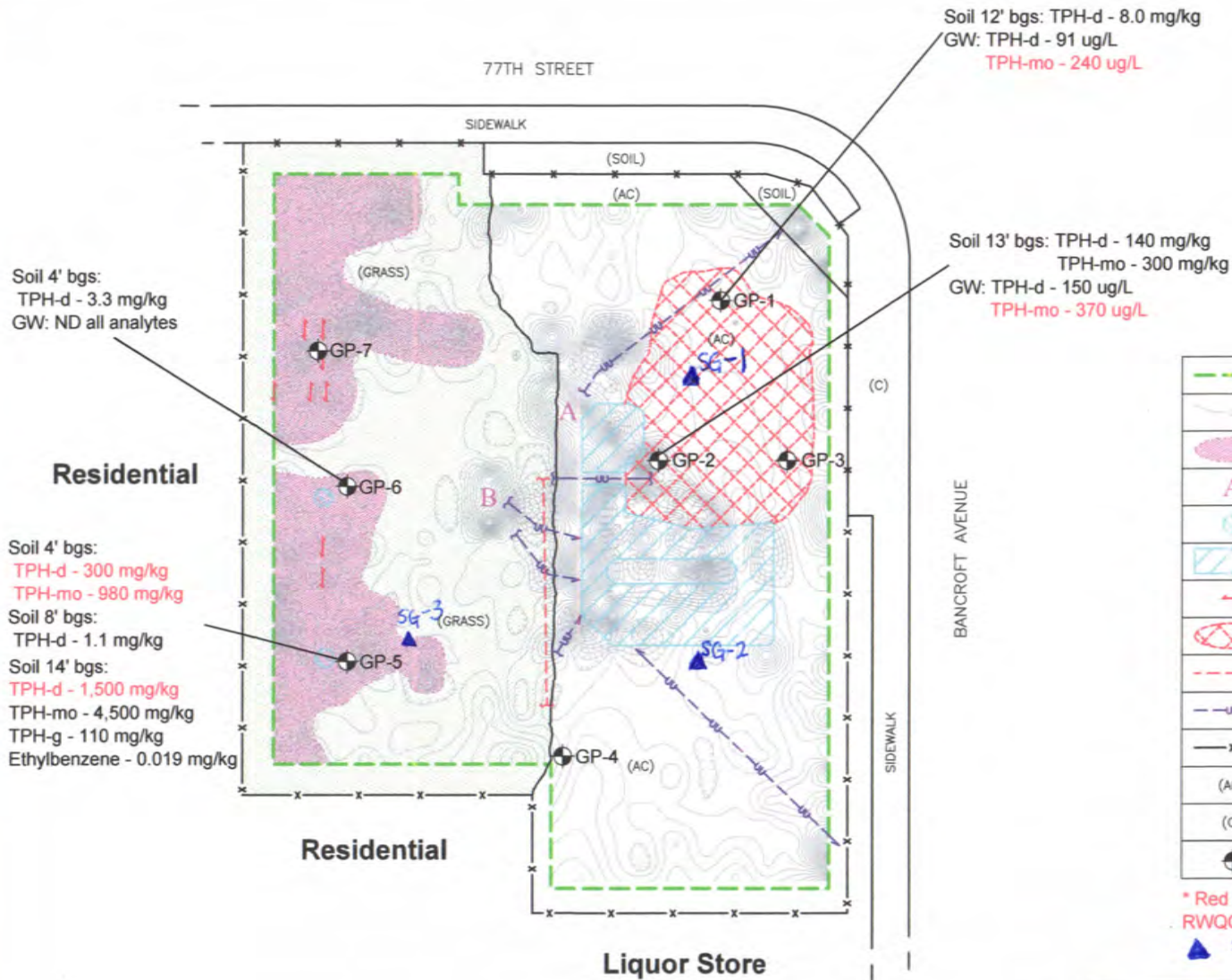
Figure 1 – Soil Gas Sampling Locations

Table 1 – Soil Gas Analytical Data

Appendix A – Permit

Appendix B – Standard Operating Procedures

Appendix C – Laboratory Analytical Reports



**LEGEND**

	LIMITS OF GEOPHYSICAL SURVEY
	VERTICAL MAGNETIC GRADIENT CONTOUR (CONTOUR INTERVAL = 200 nT/m)
	VERTICAL MAGNETIC GRADIENT ANOMALY
	VERTICAL MAGNETIC GRADIENT ANOMALY
	METAL DETECTOR ANOMALY REPRESENTING ISOLATED BURIED METAL
	METAL DETECTOR ANOMALY REPRESENTING BURIED REINFORCED CONCRETE PAD
	GPR ANOMALY
	GPR ANOMALOUS ZONE REPRESENTING POSSIBLE FORMER EXCAVATION
	GPR ANOMALY REPRESENTING POSSIBLE UTILITY ALIGNMENT
	UNDIFFERENTIATED UTILITY LINE
	CHAIN-LINK FENCE
(AC)	ASPHALT
(C)	CONCRETE
	Boring Location

\* Red highlight indicates sample result exceeding RWQCB Table B and/or D ESLs  
 ▲ = soil gas sampling location

**Sample Detection Map**  
 7701 Bancroft Avenue  
 Oakland, California 94621

Figure 1

# Pangea

**Table 1. Soil Gas Analytical Data - 7701 Bancroft Avenue, Oakland, California**

Boring/ Sample ID	Date Sampled	Depth (ft-ft bgs)	TPH Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	Oxygen	Notes
			← $\mu\text{g}/\text{m}^3$ →							%	
Residential ESL for shallow soil gas:			50,000	42	160,000	490	52,000	4,700	36	--	
Commercial ESL for shallow soil gas:			50,000	420	1,300,000	4,900	220,000	47,000	360	--	
LTCP Commercial Criteria (With Bioattenuation Zone)			--	280,000	--	3,600,000	--	--	310,000	--	
LTCP Commercial Criteria (No Bioattenuation Zone)			--	280	--	3,600	--	--	310	--	
SG-1	7/7/2014	4-5	<25,000	<250	<250	<250	<250	<250	<250	5.0	
SG-2	7/7/2014	4-5	<25,000	<250	<250	<250	<250	<250	<250	4.5	
SG-3	7/7/2014	4-5	<25,000	<250	<250	<250	<250	<250	<250	5.5	

**Abbreviations:**

TPH(g) by EPA method 8015 Cm

VOCs by EPA method 8260 B

Oxygen by ASTM D 1946-90

SG-1 = Soil Gas Sample

$\mu\text{g}/\text{m}^3$  = Micrograms per cubic meter of air results calculated by laboratory from parts per billion results using normal temperature and pressure (NPT).

ft - ft bgs = Depth interval below ground surface (bgs) in feet.

< n = Chemical not present at a concentration in excess of detection limit shown.

--- = Not analyzed

MRL = Method reporting limit.

ESL = Environmental Screening Level for Shallow Soil Gas with Residential and Commercial/Industrial Land Use, for samples less than five feet below a building foundation or ESL established by the SFBRWQCB, Interim Final - November 2007 (revised December 2013).

LTCP = Low Threat Closure Policy established by the State Water Resources Control Board and adopted May 1, 2012. Soil Gas Criteria.

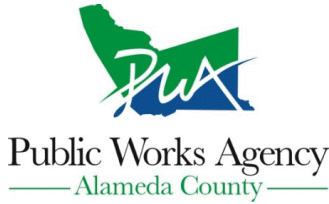
**Bold** = Concentrations above ESLs for Residential and/or Commercial Land Use for shallow soil gas (SG samples).



## **APPENDIX A**

Permit

# Alameda County Public Works Agency - Water Resources Well Permit



399 Elmhurst Street  
Hayward, CA 94544-1395  
Telephone: (510)670-6633 Fax:(510)782-1939

**Application Approved on: 06/25/2014 By jamesy**

**Permit Numbers: W2014-0630**  
**Permits Valid from 07/07/2014 to 07/07/2014**

**Application Id:** 1403734880540  
**Site Location:** 7701 Bancroft Ave  
**Project Start Date:** 07/07/2014  
**Assigned Inspector:** Contact Sam Brathwaite at (925) 570-7609 or sbrathwaite@groundzonees.com  
**Extension Start Date:** 07/07/2014  
**Extension Count:** 1

**City of Project Site:**Oakland  
**Completion Date:**07/08/2014  
**Extension End Date:** 07/07/2014  
**Extended By:** jamesy

**Applicant:** Pangea Environmental Services, Inc. - Morgan Gillies  
1710 Franklin St, #200, Oakland, CA 94612  
**Property Owner:** Union Bank  
332 SW Everett Mall Way, Everette, WA 98204  
**Client:** \*\* same as Property Owner \*\*

**Phone:** 510-836-3700  
**Phone:** 425-513-6633

	<b>Total Due:</b>	\$265.00
<b>Receipt Number: WR2014-0267</b>	<b>Total Amount Paid:</b>	\$265.00
<b>Payer Name : Robert Clark-Riddell</b>	Paid By: VISA	<b>PAID IN FULL</b>

**Works Requesting Permits:**

Well Construction-Vapor monitoring well-Vapor monitoring well - 3 Wells  
Driller: Confluence Environmental - Lic #: 913194 - Method: Hand

**Work Total: \$265.00**

**Specifications**

Permit #	Issued Date	Expire Date	Owner Well Id	Hole Diam.	Casing Diam.	Seal Depth	Max. Depth
W2014-0630	06/25/2014	10/05/2014	SG-1	3.25 in.	0.25 in.	4.00 ft	5.00 ft
W2014-0630	06/25/2014	10/05/2014	SG-2	3.25 in.	0.25 in.	4.00 ft	5.00 ft
W2014-0630	06/25/2014	10/05/2014	SG-3	3.25 in.	0.25 in.	4.00 ft	5.00 ft

**Specific Work Permit Conditions**

1. Drilling Permit(s) can be voided/ cancelled only in writing. It is the applicant's responsibility to notify Alameda County Public Works Agency, Water Resources Section in writing for an extension or to cancel the drilling permit application. No drilling permit application(s) shall be extended beyond ninety (90) days from the original start date. Applicants may not cancel a drilling permit application after the completion date of the permit issued has passed.
2. Compliance with the above well-sealing specifications shall not exempt the well-sealing contractor from complying with appropriate state reporting-requirements related to well destruction (Sections 13750 through 13755 (Division 7, Chapter 10, Article 3) of the California Water Code). Contractor must complete State DWR Form 188 and mail original to the Alameda County Public Works Agency, Water Resources Section, within 60 days, including permit number and site map.
3. Permittee shall assume entire responsibility for all activities and uses under this permit and shall indemnify, defend and save the Alameda County Public Works Agency, its officers, agents, and employees free and harmless from any and all expense, cost, liability in connection with or resulting from the exercise of this Permit including, but not limited to, properly damage, personal injury and wrongful death.
4. Permittee, permittee's contractors, consultants or agents shall be responsible to assure that all material or waters

## Alameda County Public Works Agency - Water Resources Well Permit

generated during drilling, boring destruction, and/or other activities associated with this Permit will be safely handled, properly managed, and disposed of according to all applicable federal, state, and local statutes regulating such. In no case shall these materials and/or waters be allowed to enter, or potentially enter, on or off-site storm sewers, dry wells, or waterways or be allowed to move off the property where work is being completed.

5. Prior to any drilling activities, it shall be the applicant's responsibility to contact and coordinate an Underground Service Alert (USA), obtain encroachment permit(s), excavation permit(s) or any other permits or agreements required for that Federal, State, County or City, and follow all City or County Ordinances. No work shall begin until all the permits and requirements have been approved or obtained. It shall also be the applicants responsibilities to provide to the Cities or to Alameda County an Traffic Safety Plan for any lane closures or detours planned. No work shall begin until all the permits and requirements have been approved or obtained.

6. No changes in construction procedures or well type shall change, as described on this permit application. This permit may be voided if it contains incorrect information.

7. Applicant shall submit the copies of the approved encroachment permit to this office within 60 days.

8. Applicant shall contact assigned inspector listed on the top of the permit at least five (5) working days prior to starting, once the permit has been approved. Confirm the scheduled date(s) at least 24 hours prior to drilling.

9. Wells shall have a Christy box or similar structure with a locking cap or cover. Well(s) shall be kept locked at all times. Well(s) that become damaged by traffic or construction shall be repaired in a timely manner or destroyed immediately (through permit process). No well(s) shall be left in a manner to act as a conduit at any time.

10. Copy of approved drilling permit must be on site at all times. Failure to present or show proof of the approved permit application on site shall result in a fine of \$500.00.

11. Vapor monitoring wells above water level constructed with tubing maybe be backfilled with pancake-batter consistency bentonite. Minimum surface seal thickness is two inches of cement grout around well box.

Vapor monitoring wells above water level constructed with pvc pipe shall have a minimum seal depth (Neat Cement Seal) of 2 feet below ground surface (BGS). Minimum surface seal thickness is two inches of cement grout around well box. All other conditions for monitoring well construction shall apply.

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## **APPENDIX B**

### Standard Operating Procedures

# STANDARD OPERATING PROCEDURE FOR SOIL VAPOR SAMPLING

## 1.0 PURPOSE

This standard operating procedure (SOP) describes the procedures for collecting soil vapor samples using temporary and semi-permanent soil gas probes/wells and evacuated stainless-steel Summa canisters. The SOP is modified from procedures and information presented in Cal/EPA 2012 (*Advisory-Active Soil Investigations*); Cal/EPA 2011; Cal/EPA 2010; U.S. EPA, 2006; and DiGiulio, 2003. This SOP includes (a) real-time leak-check procedures to evaluate integrity of the soil gas probe and sampling assembly during probe purging and post sampling, and (b) real-time field screening of soil gas concentrations during probe purging and post sampling.

## 2.0 REQUIRED EQUIPMENT

- Hammer drill with fittings for installing and removing vapor probes (for direct push vapor probes)
- Vapor probes with retractable or dedicated drop-off tips (e.g. AMS SGVP) (for direct push vapor probes).
- Hand auger (for soil vapor wells)
- Tubing with Swagelok or similar threaded compression-fittings, vapor-tight caps, valves
- Screens (for soil vapor wells)
- Filter-pack sand (for dedicated tips and soil vapor wells)
- Granular bentonite (for vapor well construction)
- VOA vials
- Vacuum pump with rotameter for purging and leak testing
- 1-Liter Summa canister with vacuum gauge for each sample
- Tedlar bags (for helium measurement and vapor screening)
- Stainless-steel sampling manifold
- Leak-check compound (e.g., helium)
- Calibrated photoionization detector (PID) or other organic vapor analyzer
- Isobutylene for PID calibration
- Vacuum chamber (iron lung) for pre- and post-sampling leak-check
- Leak-check enclosure(s) (small bucket [or similar] with openings for sample tubing, helium introduction and sampling enclosure atmosphere)
- Weather stripping or bentonite (for leak check enclosure seal)
- Record-keeping materials
- Latex or nitrile gloves

## 3.0 PROCEDURES

### 3.1 Boring Clearance

Prior to installing soil vapor probes, ensure that a utility clearance has been conducted.

### 3.2 Probe Depths

This SOP describes procedures for installing soil gas probes/wells at sufficient depth to provide a minimum of 5 feet between the ground surface and the top of the dry bentonite overlying the sand pack that surrounds the soil gas screen interval. This is because soil gas samples collected shallower than 5 ft depth may be subject to barometric pressure effects and prone to breakthrough of ambient air through the soil column.

In some cases shallower probe installation may be required to provide soil gas characterization immediately above the contaminant impact zone, to avoid shallow groundwater/capillary fringe, or to provide additional vertical characterization. Variation of sample depths and the need for deeper sample locations should be evaluated based on site specific characteristics and data quality objectives. If vertical characterization to groundwater is needed, the deepest soil gas sample should be collected near the top of the capillary fringe. Soil gas probes/wells should not be installed within or below the capillary fringe.

Collecting soil gas sampling near contaminant sources is recommended when performing vapor intrusion modeling. Risk estimates may be biased low if quantified with shallow soil gas measurements (five feet below grade) using the Johnson & Ettinger 1991 model. Vertical soil gas sampling should be conducted to determine the source of subsurface contamination, ideally using numerous vertical profiles of soil gas to accurately locate subsurface sources. Once located, soil gas can be targeted at these depths site wide.

### 3.3 Semi-permanent Direct-Push Vapor Probe Installation

1. Use a rotary hammer drill or concrete-coring equipment to core any paved surfaces.
2. The drive rod is driven to a predetermined depth and then partially or fully removed (depending on soil type), leaving a disposable drop-off tip in the hole. The hole should be sufficiently deep that there is a minimum of 5 feet between the surface and the top of the dry bentonite overlying the sand pack (see below for details). If possible, remove the drive rod and place 3" of sand in the hole before placing the drop-off tip.
3. The inner soil gas pathway from probe tip to the surface should be continuously sealed (e.g., a sampling tube attached to the probe tip with a barbed fitting or a screw adapter with an o-ring) to prevent leakage. If a screw adapter with o-ring is used, inspect the o-ring to ensure that it is not flawed and use rigid tubing that can be tightened from the surface. Tightly cap the top end of the sampling tube. The volume of the sampling apparatus should be minimized. DTSC guidance requires that tubing should be no greater than 1/4" nominal diameter.
4. Cover the probe tip with at least 3" of sand (resulting in a minimum 6" sand pack), followed by at least 6" of dry granular bentonite (see **Figure 1**). Fill the remainder of the boring with hydrated bentonite slurry. For multiple depth soil gas probes, separate vapor probe sand packs with hydrated bentonite as shown on **Figure 2**. VOA vials are useful for measuring and placing these materials because they have approximately the same inside diameter as the AMS SGVP drive rod outer diameter. Check the annular space for bridging and construction material depths using a narrow rod.
5. **Equilibration Time:** Record probe installation time/date, and wait at least **2 hours** before conducting purge volume tests, leak tests, or soil gas sampling -- if there is a minimum of 5

feet between the surface and the top of the dry bentonite overlying the sand pack. If there is less than 5 feet between the surface and the top of the dry bentonite overlying the sand pack or the borehole was hand augered, wait at least **48 hours** after probe installation and capping before conducting purge volume tests, leak tests, or soil gas sampling. If the probe was installed with a combination of hand augering and direct-push drilling methods and there is less than 5 feet between the bottom of the hand auger depth and the top of the dry bentonite overlying the sand pack, wait at least **48 hours** after probe installation and capping before conducting purge volume tests, leak tests, or soil gas sampling.

6. Decontamination: Decontaminate drive rods and other reusable components between sample locations by washing equipment with Alconox or Liquinox soap and rinsing with tap water and/or by steam-cleaning. Use new flexible tubing for each sample point (do not reuse).

### 3.4 Semi-permanent Augered Vapor Well Installation

1. Use a rotary hammer drill or concrete-coring equipment to core any paved surfaces.
2. Auger to a depth sufficient to allow a minimum of 5 feet between the surface and the top of the dry bentonite overlying the sand pack (see below for details). It is recommended to use the smallest diameter auger feasible to minimize future purging volumes and optimize representativeness of soil gas data.
3. Install small diameter tubing with a short (<6" long) screened section close to the bottom of the hole. The soil gas pathway from screen to the surface should be continuously sealed (e.g., a sampling tube attached to the probe tip with a barbed fitting or a screw adapter with an o-ring) to prevent leakage. If a screw adapter with o-ring is used, inspect the o-ring to ensure that it is not now flawed and use rigid tubing that can be tightened from the surface. The volume of the sampling apparatus should be minimized. DTSC guidance specifies that tubing should be no greater than 1/4" nominal diameter.
4. For deep wells (>10 feet), install a down-hole rod or other support to ensure that the screened section remains at the proper depth.
5. Cover the screened section with at least 6" of sand, followed by at least 6" of dry granular bentonite. Ensure that the screened section is near the center of the sand pack. Fill the remainder of the boring with hydrated bentonite. The bentonite should be hydrated at the surface and poured into the borehole.
6. **Equilibration Time:** After probe installation, tightly cap the tubing, record probe installation time/date, and wait at least **48 hours** before conducting purge volume tests, leak tests, or soil gas sampling:
7. Decontamination: Decontaminate drive rods and other reusable components between sample locations by washing equipment with Alconox or Liquinox soap and rinsing with tap water and/or by steam-cleaning. Use new flexible tubing for each sample point (do not reuse).

### 3.5 Temporary Vapor Probe Installation Using Tubing and Expendable Tip

1. This method should only be used for qualitative assessments due to the possibility of vapor leaks along the drive rods. This method should not be used when sampling in coarse granular materials due to potential leakage along the probe.
2. Use a rotary hammer drill or concrete-coring equipment to core any paved surfaces.
3. The drive rod is driven to a predetermined depth (generally 6 feet minimum) and then pulled back (approximately 1") to expose the short screened section of the probe (typically an expendable tip, **Figure 3**).

4. The probe tip should be attached to the sampling tube with either a barbed fitting or a screw adapter with an o-ring to prevent leakage. If a screw adapter with o-ring is used, replace o-rings daily and inspect them for flaws before installing each probe. Use rigid tubing that can be tightened from the surface to ensure that the o-ring is properly sealed. The volume of the sampling apparatus should be minimized. DTSC guidance requires that tubing should be no greater than 1/4" nominal diameter.
5. Hydrated bentonite should be used to seal around the drive rod at the ground surface to prevent ambient air intrusion
6. **Equilibration Time:** After probe installation, tightly cap the tubing, record probe installation time/date, wait at least **2 hours** before conducting purge volume tests, leak tests, or soil gas sampling.

### 3.6 Vapor Sample Collection

During vapor sampling, record all valve open/close times and canister/manifold vacuum readings at each step. Do not conduct sampling within **5 days following a significant rain event** (0.5 inches of rainfall during any 24-hour period) or after significant nearby irrigation.

#### Setup

1. Calculate and record the volume of the sampling assembly, tubing, vapor probe, and any *permeable* air-, sand-, or dry bentonite-filled annular space around the vapor probe tip.

$$\text{One Purge Volume} = \pi * r^2 * L = 3.14 * (1/2 * \text{ID}) * (1/2 * \text{ID}) * L,$$

where ID = tubing or manifold inside diameter and L = length of tubing/manifold/borehole segment.

- 1/8" ID tubing volume = 2.4 ml/ft,
- 1/4" ID tubing volume = 9.7 ml/ft,
- 1/4" OD (0.17" ID) tubing volume = 4.5 ml/ft
- 2-1/8" auger boring volume = 697 ml/ft \* 0.4 = 278 ml/ft (sand) minus tubing volume
- 2-1/8" auger boring volume = 697 ml/ft \* 0.5 = 349 ml/ft (dry bentonite) minus tubing volume
- 3-1/4" auger boring volume = 1631 ml/ft \* 0.4 = 652 ml/ft (sand) minus tubing volume
- 3-1/4" auger boring volume = 1631 ml/ft \* 0.5 = 816 ml/ft (dry bentonite) minus tubing volume

#### Sample Purge Volumes

Item	One (1) Purge Volume (approx)	Three (3) Purge Volumes	Ten (10) Purge Volumes
1/4" ID tubing (10 ft)	100 ml	300 ml	1,000 ml
1/4" ID tubing (10 ft) with 6" dry bentonite and 6" sand, inside 3-1/4" diameter auger boring	830 ml	2,500 ml	8,300 ml
1/4" ID tubing (10 ft) with 1 ft dry bentonite and 1 ft sand, inside 3-1/4" diameter auger boring	1,550 ml	4,650 ml	15,550 ml



2. Wear latex or nitrile gloves while handling sampling equipment. Change gloves whenever a new sample is collected and after handling leak-check compound.
3. Replace the vapor probe cap with a closed Swagelok valve. Connect the sampling manifold to the vapor probe, sample Summa canister and vacuum pump using Swagelok fittings and stainless-steel, nylon, or Teflon tubing. Check all fittings for tightness (do not over-tighten).
4. Close all valves. Record pre-test vacuum reading on the Summa canister.

#### Shut-In Check

1. Open valve on vapor sampling manifold and open 3-way valve #1 so the vacuum pump of the purging assembly can evacuate the vapor sampling manifold assembly (keep valves #2 and #3 closed to the Tedlar bag/vacuum chamber of the vapor screening assembly) (**Figure 4**). Start the vacuum pump. Do *not* open #1 valve to the probe assembly, or the valve on the sample Summa canister. Allow manifold/tubing vacuum to stabilize at approximately 10" Hg.
2. Stop the vacuum pump, close 3-way valves #2 and #3 (to allow shut-in testing of vapor sampling manifold), and conduct a shut-in test by waiting at least **5 minutes** (if using 150 inches of water gauge) or **10 minutes** (if using 30 inches of mercury gauge). Monitor manifold vacuum gauge to test for leaks. If the vacuum decreases, rectify the leak before proceeding.

#### Purge, Flow and Leak Check

1. **Calculate purge volume and duration.** Do *not* over-purge. Purge volumes should be determined in one of the following ways:
  - a) For vapor sampling in support of sensitive human health risk assessments for regulatory review, a step-purge test should be conducted at a "worst case" sampling point, **using 1, 3 and 10 purge volumes** (including tubing, sampling assembly and annular space) to determine the appropriate volume that yields the highest target compound concentration.
  - b) For collecting samples from depths of 5 feet or less, or if step purge tests yield no detectable target compounds, use a default purge of approximately **3 purge volumes** (including tubing, sampling assembly and annular space).
  - c) For semi-permanent wells subject to frequent sampling, **purge 1 volume** only of the tubing and manifold volume (not including the dry bentonite or sand pack section) after waiting at least **2 weeks** following the previous sampling event.
2. Place leak-check enclosure over vapor probe and seal to ground using hydrated bentonite or weather stripping.
3. Introduce helium gas into the leak-check enclosure and monitor with the helium gas analyzer until it reads between 20% and 30% helium.
4. **Conduct purging.** Start vacuum pump and open 3-way valve #1 (and 3-way valves #2 and #3) so the vacuum pump can evacuate the probe. Do *not* over-purge. Closely monitor the flow on the rotameter and the vacuum on the vacuum gauge. For most samples flow should be limited to 150mL/min or 200 mL/min maximum. Flow rates greater than 200 mL/min may be used when purging times are excessive, such as for deep wells with larger-diameter tubing. However, a vacuum of 100" of water or less must be maintained during sampling whenever a higher flow rate is used. If the vacuum remains below approximately 7" Hg, then sufficient flow is present to collect a representative sample (Cal/EPA 2012) and continue purging for the planned purge duration.

5. If the probe-side vacuum exceeds approximately 7" Hg, then insufficient flow may be present to collect a representative sample and this condition should be noted. (Evaluate probe integrity or consider re-installation of probe, especially if probe installed in coarse-grain material). **To sample soil gas under low flow conditions, follow this alternate sampling method** derived from Appendix D, Cal/EPA 2012. Make a reasonable attempt to purge one purge volume (as defined above), but as a minimum purge one volume of the sampling assembly, tubing, and probe. After purging, open sample Summa canister until sampling manifold vacuum threshold is achieved, then close Summa sample valve until probe vacuum dissipates. Repeat this sampling procedure as necessary to sufficiently fill the sample Summa canister. Alternatively, consider installing a soil gas probe with a larger probe annulus space, or employing passive soil gas sampling methods.
6. **Pre-Sample Vapor Screening.** To pre-screen soil vapor, open valves #2 and #3 of the vapor screening assembly to route vapor into the Tedlar bag within a vacuum chamber (iron lung). Partially fill the Tedlar bag (and return valves #2 and #3 to purging position). Monitor the rotameter for changes in flow while filling the Tedlar bag. Check bag with the helium gas analyzer to screen probe vapors for leakage (indicated by presence of helium). If helium concentration in bag is below 1% then continue sampling. If helium concentration in bag is above 1%, then discontinue sampling and check for leaks around the probe. The probe may need to be repaired or re-installed. Additionally, check the Tedlar bag for contaminants using the PID for qualitative contaminant assessment (optional). For tight soil formations, consider skipping the pre-sample vapor screening or conducting screening as initial probe purging.
7. When purge duration complete and ready to discontinue purging, close 3-way valve #1 so that the probe is connected to the sampling manifold, and then stop the vacuum pump.
8. Record helium reading for leak-check enclosure about each minute during purging and sampling.

### Sample Collection

1. **Opening Sample Canister.** Once a helium reading of at least 20% has been reached, open sample canister valve. **Sampling takes approximately 5 minutes for a 1-liter Summa canister** (at 150 ml/min sampling flow rate).
2. Close sampling canister valve when vacuum decreases to 5" mercury. Do *not* allow vacuum to fall below this range.
3. **Post-Sample Vapor Screening.** After sampling, open 3-way valve #1 so that the vapor screening assembly is connected to the probe, turn on the vacuum pump, and open 3-way valves #2 and #3 to partially fill the Tedlar bag within the vacuum chamber (iron lung). When Tedlar bag is sufficiently filled, return valves #2 and #3 to purging position. Check Tedlar bag for indication of sampling leakage using the helium gas analyzer. If helium concentration is below 1% then sample is sufficiently representative. If helium concentration is above 1%, then the sample may not be sufficiently representative; the probe may need to be repaired or re-installed and re-sampled. Additionally, check the Tedlar bag for contaminants using the PID for qualitative contaminant assessment (optional).
4. **Shroud Sample.** To confirm helium meter readings, collect one shroud sample per day to analyze for percent helium. Connect the shroud sample Summa canister and manifold to a port near the bottom of the shroud and open the canister valve at the beginning of sampling. Close sampling canister valve when vacuum decreases to 5" mercury. Do *not* allow vacuum to fall below this range. Disassemble sampling assembly, and cap (or remove and restore) vapor sampling point.

5. **Analyses.** Fill out chain-of-custody form for analysis for **chemicals of concern (i.e. TO-15)**, and for **leak-check compound** for at least 10% of samples. Analyze all samples for **percent oxygen** by ASTM D1946-90. Additionally, samples may be analyzed for **percent methane and carbon dioxide** by ASTM D1946-90 when in support of sensitive human health risk assessments for regulatory review. Include final vacuum reading and serial numbers of canister and flow restrictor on chain-of-custody form.
6. For vapor sampling in support of sensitive human health risk assessments for regulatory review, collect at least one *duplicate* sample per site per sampling event from the sampling point with the anticipated highest vapor concentrations. The duplicate sample should be collected by attaching a fresh sample canister following collection of the initial sample. If a new manifold is used, follow the same purging and sampling procedures used for the original sample. If the same manifold is used, collect a sample without further purging, using the same sampling procedures used for the original sample.

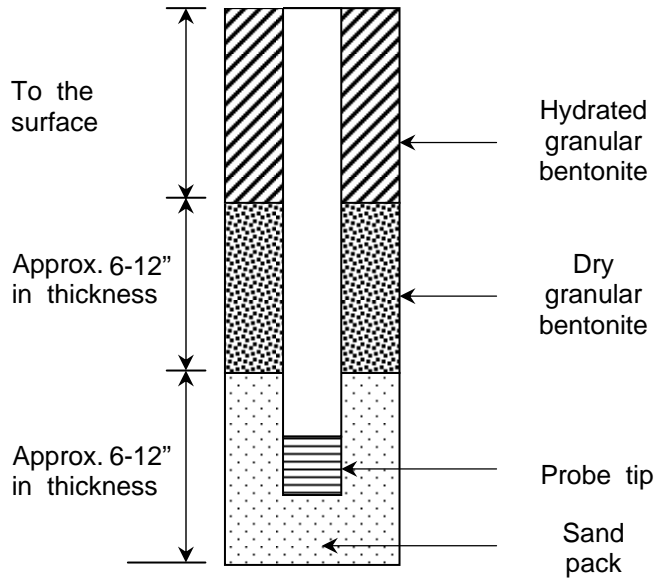
#### Decontamination and Decommissioning

1. Use a decontaminated sampling manifold and new tubing for each sample location. Return equipment to laboratory for decontamination.
2. Backfill any open soil vapor probe holes with bentonite slurry or Portland cement and cap with concrete or other surface material to match the area.
3. To retain the soil gas probe for future sampling, cap the Swagelock fitting and cover the probe with a small vault or other protective device.

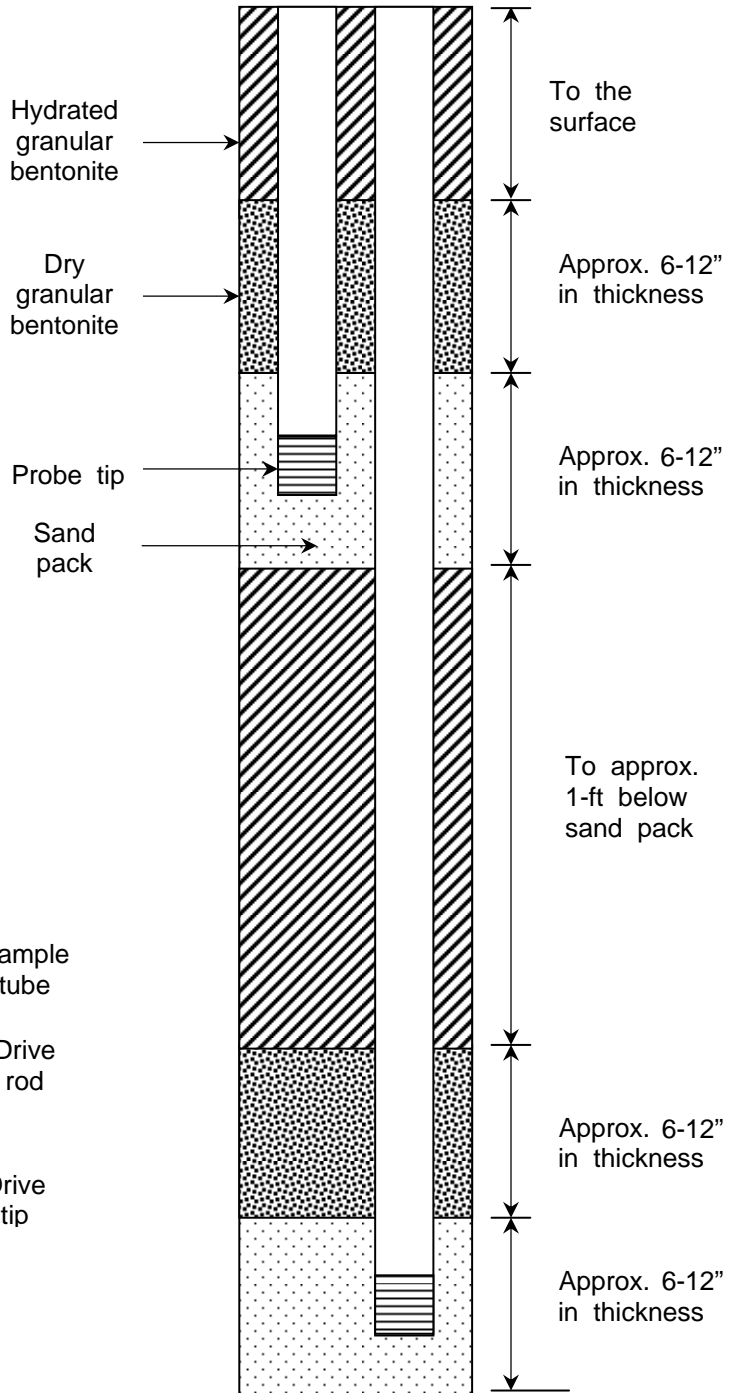
## **REFERENCES**

- Cal/EPA, 2012, Advisory-Active Soil Gas Investigation, California Environmental Protection Agency, Department of Toxic Substances Control, Los Angeles Regional Water Quality Control Board, San Francisco Regional Water Quality Control Board, April.
- Cal/EPA, 2011, Guidance for the evaluation and mitigation of subsurface vapor intrusion to indoor air (vapor intrusion guidance), California Environmental Protection Agency, Department of Toxic Substances Control, October.
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- Dominic DiGiulio, 2003, Standard Operating Procedure (SOP) for installation of sub-slab vapor probes and sampling using EPA Method TO-15 to support vapor intrusion investigations, U.S. Environmental Protection Agency, Office of Research and Development, National Risk Management Research Laboratory, Ground-Water and Ecosystem Restoration Division, Ada, Oklahoma (included as Appendix C of Colorado Department of Public Health and Environment, 2004, Draft Indoor Air Guidance, Hazardous Materials and Waste Division), September.

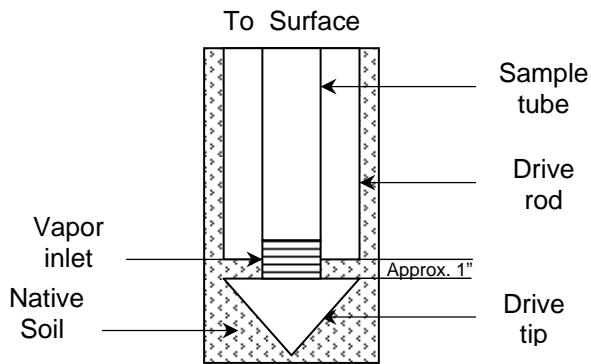
**Figure 1 – Permanent/Semi-permanent Gas Vapor well Construction Diagram**





**Figure 2 – Multi-depth Gas Vapor Well Construction Diagram**

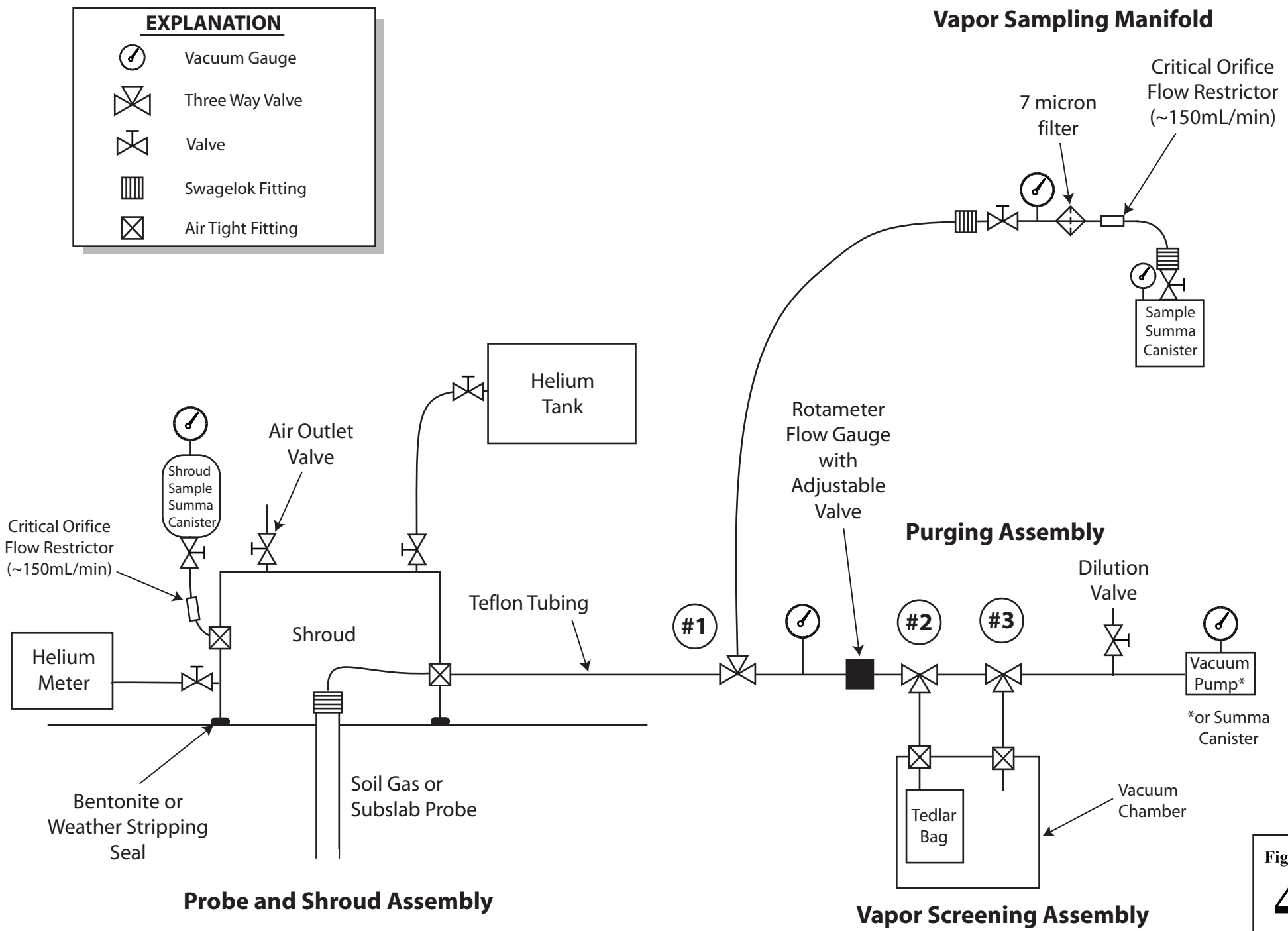


**Figure 3 - Temporary Soil Gas Probe (with Expendible Tip)**



**EXPLANATION**

-  Vacuum Gauge
-  Three Way Valve
-  Valve
-  Swagelok Fitting
-  Air Tight Fitting



**Figure 4**

## **APPENDIX C**

Laboratory Analytical Reports



# McC Campbell Analytical, Inc.

"When Quality Counts"

## Analytical Report

**WorkOrder:** 1407185

**Report Created for:** Pangea Environmental Svcs., Inc.  
1710 Franklin Street, Ste. 200  
Oakland, CA 94612

**Project Contact:** Morgan Gillies

**Project P.O.:**

**Project Name:** 7701 BANCROFT OAKLAND

**Project Received:** 07/07/2014

Analytical Report reviewed & approved for release on 07/09/2014 by:

*Question about  
your data?*

[Click here to email  
McC Campbell](#)

Angela Rydelius,  
Laboratory Manager

***The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.***





## Glossary of Terms & Qualifier Definitions

**Client:** Pangea Environmental Svcs., Inc.  
**Project:** 7701 BANCROFT OAKLAND  
**WorkOrder:** 1407185

### Glossary Abbreviation

95% Interval	95% Confident Interval
DF	Dilution Factor
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not detected at or above the indicated MDL or RL
NR	Matrix interferences, or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix; or sample diluted due to high matrix or analyte content.
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
TEQ	Toxicity Equivalence

### Analytical Qualifiers

H samples were analyzed out of holding time





## Analytical Report

**Client:** Pangea Environmental Svcs., Inc.  
**Project:** 7701 BANCROFT OAKLAND  
**Date Received:** 7/7/14 18:03  
**Date Prepared:** 7/8/14

**WorkOrder:** 1407185  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8260B  
**Unit:** µg/m<sup>3</sup>

### Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SG-2	1407185-006A	Air	07/07/2014 12:29	GC28	92480

Initial Pressure (psia)	Final Pressure (psia)
1.00	1.00

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Benzene	ND	H	250	1	07/08/2014 13:20
Ethylbenzene	ND	H	250	1	07/08/2014 13:20
Methyl-t-butyl ether (MTBE)	ND	H	250	1	07/08/2014 13:20
Naphthalene	ND	H	250	1	07/08/2014 13:20
Toluene	ND	H	250	1	07/08/2014 13:20
Xylenes, Total	ND	H	250	1	07/08/2014 13:20

Surrogates	REC (%)	Qualifiers	Limits	Date Analyzed
Dibromofluoromethane	88	H	70-130	07/08/2014 13:20
Toluene-d8	94	H	70-130	07/08/2014 13:20
4-BFB	86	H	70-130	07/08/2014 13:20

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SG-3	1407185-007A	Air	07/07/2014 12:37	GC28	92480

Initial Pressure (psia)	Final Pressure (psia)
1.00	1.00

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Benzene	ND	H	250	1	07/08/2014 14:00
Ethylbenzene	ND	H	250	1	07/08/2014 14:00
Methyl-t-butyl ether (MTBE)	ND	H	250	1	07/08/2014 14:00
Naphthalene	ND	H	250	1	07/08/2014 14:00
Toluene	ND	H	250	1	07/08/2014 14:00
Xylenes, Total	ND	H	250	1	07/08/2014 14:00

Surrogates	REC (%)	Qualifiers	Limits	Date Analyzed
Dibromofluoromethane	91	H	70-130	07/08/2014 14:00
Toluene-d8	92	H	70-130	07/08/2014 14:00
4-BFB	86	H	70-130	07/08/2014 14:00

(Cont.)



# Analytical Report

**Client:** Pangea Environmental Svcs., Inc.  
**Project:** 7701 BANCROFT OAKLAND  
**Date Received:** 7/7/14 18:03  
**Date Prepared:** 7/8/14

**WorkOrder:** 1407185  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8260B  
**Unit:** µg/m<sup>3</sup>

## Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SG-1	1407185-008A	Air	07/07/2014 12:45	GC28	92480

Initial Pressure (psia)	Final Pressure (psia)
1.00	1.00

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Benzene	ND	H	250	1	07/08/2014 14:39
Ethylbenzene	ND	H	250	1	07/08/2014 14:39
Methyl-t-butyl ether (MTBE)	ND	H	250	1	07/08/2014 14:39
Naphthalene	ND	H	250	1	07/08/2014 14:39
Toluene	ND	H	250	1	07/08/2014 14:39
Xylenes, Total	ND	H	250	1	07/08/2014 14:39

Surrogates	REC (%)	Qualifiers	Limits	Date Analyzed
Dibromofluoromethane	94	H	70-130	07/08/2014 14:39
Toluene-d8	91	H	70-130	07/08/2014 14:39
4-BFB	88	H	70-130	07/08/2014 14:39



## Analytical Report

**Client:** Pangea Environmental Svcs., Inc.  
**Project:** 7701 BANCROFT OAKLAND  
**Date Received:** 7/7/14 18:03  
**Date Prepared:** 7/8/14

**WorkOrder:** 1407185  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8260B  
**Unit:** µg/L

### Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
<b>SG-2</b>	<b>1407185-006A</b>	<b>Air</b>	<b>07/07/2014 12:29</b>	<b>GC28</b>	<b>92480</b>

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Benzene	ND	H	0.25	1	07/08/2014 13:20
Ethylbenzene	ND	H	0.25	1	07/08/2014 13:20
Methyl-t-butyl ether (MTBE)	ND	H	0.25	1	07/08/2014 13:20
Naphthalene	ND	H	0.25	1	07/08/2014 13:20
Toluene	ND	H	0.25	1	07/08/2014 13:20
Xylenes, Total	ND	H	0.25	1	07/08/2014 13:20

Surrogates	REC (%)	Qualifiers	Limits	
Dibromofluoromethane	88	H	70-130	07/08/2014 13:20
Toluene-d8	94	H	70-130	07/08/2014 13:20
4-BFB	86	H	70-130	07/08/2014 13:20

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
<b>SG-3</b>	<b>1407185-007A</b>	<b>Air</b>	<b>07/07/2014 12:37</b>	<b>GC28</b>	<b>92480</b>

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Benzene	ND	H	0.25	1	07/08/2014 14:00
Ethylbenzene	ND	H	0.25	1	07/08/2014 14:00
Methyl-t-butyl ether (MTBE)	ND	H	0.25	1	07/08/2014 14:00
Naphthalene	ND	H	0.25	1	07/08/2014 14:00
Toluene	ND	H	0.25	1	07/08/2014 14:00
Xylenes, Total	ND	H	0.25	1	07/08/2014 14:00

Surrogates	REC (%)	Qualifiers	Limits	
Dibromofluoromethane	91	H	70-130	07/08/2014 14:00
Toluene-d8	92	H	70-130	07/08/2014 14:00
4-BFB	86	H	70-130	07/08/2014 14:00

(Cont.)



# Analytical Report

**Client:** Pangea Environmental Svcs., Inc.  
**Project:** 7701 BANCROFT OAKLAND  
**Date Received:** 7/7/14 18:03  
**Date Prepared:** 7/8/14

**WorkOrder:** 1407185  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8260B  
**Unit:** µg/L

## Volatile Organics by P&T and GC/MS (Basic Target List)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SG-1	1407185-008A	Air	07/07/2014 12:45	GC28	92480
<u>Analytes</u>	<u>Result</u>	<u>Qualifiers</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Benzene	ND	H	0.25	1	07/08/2014 14:39
Ethylbenzene	ND	H	0.25	1	07/08/2014 14:39
Methyl-t-butyl ether (MTBE)	ND	H	0.25	1	07/08/2014 14:39
Naphthalene	ND	H	0.25	1	07/08/2014 14:39
Toluene	ND	H	0.25	1	07/08/2014 14:39
Xylenes, Total	ND	H	0.25	1	07/08/2014 14:39
<u>Surrogates</u>	<u>REC (%)</u>	<u>Qualifiers</u>	<u>Limits</u>		
Dibromofluoromethane	94	H	70-130		07/08/2014 14:39
Toluene-d8	91	H	70-130		07/08/2014 14:39
4-BFB	88	H	70-130		07/08/2014 14:39



# Analytical Report

**Client:** Pangea Environmental Svcs., Inc.  
**Project:** 7701 BANCROFT OAKLAND  
**Date Received:** 7/7/14 18:03  
**Date Prepared:** 7/8/14

**WorkOrder:** 1407185  
**Extraction Method:** ASTM D 1946-90  
**Analytical Method:** ASTM D 1946-90  
**Unit:** uL/L

## Light Gases

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SG-2	1407185-006A	Air	07/07/2014 12:29	GC26	92486

Initial Pressure (psia)	Final Pressure (psia)
1.00	1.00

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Oxygen	45,000	H	4000	1	07/08/2014 14:27

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SG-3	1407185-007A	Air	07/07/2014 12:37	GC26	92486

Initial Pressure (psia)	Final Pressure (psia)
1.00	1.00

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Oxygen	55,000	H	4000	1	07/08/2014 14:48

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SG-1	1407185-008A	Air	07/07/2014 12:45	GC26	92486

Initial Pressure (psia)	Final Pressure (psia)
1.00	1.00

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Oxygen	50,000	H	4000	1	07/08/2014 15:10



## Quality Control Report

**Client:** Pangea Environmental Svcs., Inc.  
**Date Prepared:** 7/8/14  
**Date Analyzed:** 7/8/14  
**Instrument:** GC28  
**Matrix:** Water  
**Project:** 7701 BANCROFT OAKLAND

**WorkOrder:** 1407185  
**BatchID:** 92480  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8260B  
**Unit:** µg/L  
**Sample ID:** MB/LCS-92480

### QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acetone	ND	-	10	-	-	-	-
tert-Amyl methyl ether (TAME)	ND	16.8	0.50	20	-	84	70-130
Benzene	ND	19.6	0.50	20	-	98.2	70-130
Bromobenzene	ND	-	0.50	-	-	-	-
Bromochloromethane	ND	-	0.50	-	-	-	-
Bromodichloromethane	ND	-	0.50	-	-	-	-
Bromoform	ND	-	0.50	-	-	-	-
Bromomethane	ND	-	0.50	-	-	-	-
2-Butanone (MEK)	ND	-	2.0	-	-	-	-
t-Butyl alcohol (TBA)	ND	57.6	2.0	80	-	72.1	70-130
n-Butyl benzene	ND	-	0.50	-	-	-	-
sec-Butyl benzene	ND	-	0.50	-	-	-	-
tert-Butyl benzene	ND	-	0.50	-	-	-	-
Carbon Disulfide	ND	-	0.50	-	-	-	-
Carbon Tetrachloride	ND	-	0.50	-	-	-	-
Chlorobenzene	ND	19.7	0.50	20	-	98.3	70-130
Chloroethane	ND	-	0.50	-	-	-	-
Chloroform	ND	-	0.50	-	-	-	-
Chloromethane	ND	-	0.50	-	-	-	-
2-Chlorotoluene	ND	-	0.50	-	-	-	-
4-Chlorotoluene	ND	-	0.50	-	-	-	-
Dibromochloromethane	ND	-	0.50	-	-	-	-
1,2-Dibromo-3-chloropropane	ND	-	0.20	-	-	-	-
1,2-Dibromoethane (EDB)	ND	15.7	0.50	20	-	78.7	70-130
Dibromomethane	ND	-	0.50	-	-	-	-
1,2-Dichlorobenzene	ND	-	0.50	-	-	-	-
1,3-Dichlorobenzene	ND	-	0.50	-	-	-	-
1,4-Dichlorobenzene	ND	-	0.50	-	-	-	-
Dichlorodifluoromethane	ND	-	0.50	-	-	-	-
1,1-Dichloroethane	ND	-	0.50	-	-	-	-
1,2-Dichloroethane (1,2-DCA)	ND	16.1	0.50	20	-	80.4	70-130
1,1-Dichloroethene	ND	17.6	0.50	20	-	88	70-130
cis-1,2-Dichloroethene	ND	-	0.50	-	-	-	-
trans-1,2-Dichloroethene	ND	-	0.50	-	-	-	-
1,2-Dichloropropane	ND	-	0.50	-	-	-	-
1,3-Dichloropropane	ND	-	0.50	-	-	-	-
2,2-Dichloropropane	ND	-	0.50	-	-	-	-
1,1-Dichloropropene	ND	-	0.50	-	-	-	-
cis-1,3-Dichloropropene	ND	-	0.50	-	-	-	-
trans-1,3-Dichloropropene	ND	-	0.50	-	-	-	-

(Cont.)



## Quality Control Report

**Client:** Pangea Environmental Svcs., Inc.  
**Date Prepared:** 7/8/14  
**Date Analyzed:** 7/8/14  
**Instrument:** GC28  
**Matrix:** Water  
**Project:** 7701 BANCROFT OAKLAND

**WorkOrder:** 1407185  
**BatchID:** 92480  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8260B  
**Unit:** µg/L  
**Sample ID:** MB/LCS-92480

### QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Diisopropyl ether (DIPE)	ND	17.0	0.50	20	-	85	70-130
Ethylbenzene	ND	-	0.50	-	-	-	-
Ethyl tert-butyl ether (ETBE)	ND	17.1	0.50	20	-	85.6	70-130
Freon 113	ND	-	0.50	-	-	-	-
Hexachlorobutadiene	ND	-	0.50	-	-	-	-
Hexachloroethane	ND	-	0.50	-	-	-	-
2-Hexanone	ND	-	0.50	-	-	-	-
Isopropylbenzene	ND	-	0.50	-	-	-	-
4-Isopropyl toluene	ND	-	0.50	-	-	-	-
Methyl-t-butyl ether (MTBE)	ND	16.4	0.50	20	-	82	70-130
Methylene chloride	1.04	-	0.50	-	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	-	0.50	-	-	-	-
Naphthalene	ND	-	0.50	-	-	-	-
n-Propyl benzene	ND	-	0.50	-	-	-	-
Styrene	ND	-	0.50	-	-	-	-
1,1,1,2-Tetrachloroethane	ND	-	0.50	-	-	-	-
1,1,2,2-Tetrachloroethane	ND	-	0.50	-	-	-	-
Tetrachloroethene	ND	-	0.50	-	-	-	-
Toluene	ND	19.8	0.50	20	-	98.9	70-130
1,2,3-Trichlorobenzene	ND	-	0.50	-	-	-	-
1,2,4-Trichlorobenzene	ND	-	0.50	-	-	-	-
1,1,1-Trichloroethane	ND	-	0.50	-	-	-	-
1,1,2-Trichloroethane	ND	-	0.50	-	-	-	-
Trichloroethene	ND	20.2	0.50	20	-	101	70-130
Trichlorofluoromethane	ND	-	0.50	-	-	-	-
1,2,3-Trichloropropane	ND	-	0.50	-	-	-	-
1,2,4-Trimethylbenzene	ND	-	0.50	-	-	-	-
1,3,5-Trimethylbenzene	ND	-	0.50	-	-	-	-
Vinyl Chloride	ND	-	0.50	-	-	-	-
Xylenes, Total	ND	-	0.50	-	-	-	-

**Surrogate Recovery**

Dibromofluoromethane	22.7	40.8		45	91	91	70-130
Toluene-d8	23.7	41.3		45	95	92	70-130
4-BFB	2.10	3.93		4.5	84	87	70-130



## Quality Control Report

**Client:** Pangea Environmental Svcs., Inc.  
**Date Prepared:** 7/8/14  
**Date Analyzed:** 7/8/14  
**Instrument:** GC26  
**Matrix:** SoilGas  
**Project:** 7701 BANCROFT OAKLAND

**WorkOrder:** 1407185  
**BatchID:** 92486  
**Extraction Method:** ASTM D 1946-90  
**Analytical Method:** ASTM D 1946-90  
**Unit:** uL/L  
**Sample ID:** MB/LCS-92486

---

### QC Summary Report for ASTM D1946-90

---

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Oxygen	ND	6670	4000	7000	-	95.2	70-130

---





1534 Willow Pass Rd  
 Pittsburg, CA 94565-1701  
 (925) 252-9262

# CHAIN-OF-CUSTODY RECORD

**WorkOrder: 1407185**

**ClientCode: PEO**

WaterTrax   
  WriteOn   
  EDF   
  Excel   
  EQulS   
  Email   
  HardCopy   
  ThirdParty   
  J-flag

**Report to:**  
 Morgan Gillies  
 Pangea Environmental Svcs., Inc.  
 1710 Franklin Street, Ste. 200  
 Oakland, CA 94612  
 (510) 836-3700    FAX: (510) 836-3709

**Email:** mgillies@pangeaenv.com; tdelafuente@pa  
 cc/3rd Party:  
**PO:**  
**ProjectNo:** 7701 BANCROFT OAKLAND

**Bill to:**  
 Bob Clark-Riddell  
 Pangea Environmental Svcs., Inc.  
 1710 Franklin Street, Ste. 200  
 Oakland, CA 94612

**Requested TAT:**                    **2 days**  
  
**Date Received:**            **07/07/2014**  
**Date Printed:**                **07/08/2014**

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)												
					1	2	3	4	5	6	7	8	9	10	11	12	
1407185-006	SG-2	Air	7/7/2014 12:29	<input type="checkbox"/>	A												
1407185-007	SG-3	Air	7/7/2014 12:37	<input type="checkbox"/>	A												
1407185-008	SG-1	Air	7/7/2014 12:45	<input type="checkbox"/>	A												

**Test Legend:**

1	8260B_A	2		3		4		5	
6		7		8		9		10	
11		12							

**Prepared by: Shana Carter**

**Comments:**

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).  
 Hazardous samples will be returned to client or disposed of at client expense.



## WORK ORDER SUMMARY

**Client Name:** PANGEA ENVIRONMENTAL SVCS., INC.

**QC Level:** LEVEL 2

**Work Order:** 1407185

**Project:** 7701 BANCROFT OAKLAND

**Client Contact:** Morgan Gillies

**Date Received:** 7/7/2014

**Comments:**

**Contact's Email:** mgillies@pangeaenv.com;  
 tdela Fuente@pangeaenv.com

WaterTrax     WriteOn     EDF     Excel     Fax     Email     HardCopy     ThirdParty     J-flag

Lab ID	Client ID	Matrix	Test Name	Number of Containers	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1407185-001A	SG-2-4	Soil		1		<input type="checkbox"/>	7/7/2014 7:50			<input checked="" type="checkbox"/>	
1407185-002A	SG-2-7	Soil		1		<input type="checkbox"/>	7/7/2014 8:12			<input checked="" type="checkbox"/>	
1407185-003A	SG-3-4	Soil		1		<input type="checkbox"/>	7/7/2014 8:45			<input checked="" type="checkbox"/>	
1407185-004A	SG-3-9	Soil		1		<input type="checkbox"/>	7/7/2014 9:08			<input checked="" type="checkbox"/>	
1407185-005A	SG-1-4	Soil		1		<input type="checkbox"/>	7/7/2014 9:47			<input checked="" type="checkbox"/>	
1407185-006A	SG-2	Air	SW8260B (MTBE & BTEX)	1	Tedlar	<input type="checkbox"/>	7/7/2014 12:29	2 days		<input type="checkbox"/>	
			SW8260B (VOCs) <Naphthalene, Xylenes, Total>			<input type="checkbox"/>		2 days		<input type="checkbox"/>	
1407185-007A	SG-3	Air	SW8260B (MTBE & BTEX)	1	Tedlar	<input type="checkbox"/>	7/7/2014 12:37	2 days		<input type="checkbox"/>	
			SW8260B (VOCs) <Naphthalene, Xylenes, Total>			<input type="checkbox"/>		2 days		<input type="checkbox"/>	
1407185-008A	SG-1	Air	SW8260B (MTBE & BTEX)	1	Tedlar	<input type="checkbox"/>	7/7/2014 12:45	2 days		<input type="checkbox"/>	
			SW8260B (VOCs) <Naphthalene, Xylenes, Total>			<input type="checkbox"/>		2 days		<input type="checkbox"/>	

**\* NOTE: STLC and TCLP extractions require 48 hrs to complete; therefore, all TATs begin after the extraction is completed (i.e., 24hr TAT yields results in 72 hrs from sample submission).**

**Bottle Legend:**

=  
 Tedlar = Tedlar Air Bag

1407185

**McCAMPBELL ANALYTICAL, INC.**

1534 Willow Pass Road  
Pittsburg, CA 94565

Website: [www.mccampbell.com](http://www.mccampbell.com) Email: [main@mccampbell.com](mailto:main@mccampbell.com)

Telephone: (925) 252-9262 Fax: (925) 252-9269

**CHAIN OF CUSTODY RECORD**

TURN AROUND TIME

RUSH 24 HR 48 HR 72 HR 5 DAY

EDF Required? Coelt (Normal) No Write On (DW) No

Report To: Morgan Gillies Bill To: Pangea  
Company: Pangea Environmental Services, Inc.  
1710 Franklin Street, Suite 200, Oakland, CA 94612  
E-Mail: [mgillies@pangeaenv.com](mailto:mgillies@pangeaenv.com)  
Tele: (510) 836-3702 Fax: (510) 836-3709  
Project #: Project Name:  
Project Location: 770Y BANCROFT OAKLAND  
Sampler Signature: [Signature]

SAMPLE ID	LOCATION (Field Point Name)	SAMPLING		# Containers	Type Containers	MATRIX					METHOD PRESERVED				Analysis Request	Other	Comments
		Date	Time			Water	Soil	Air	Sludge	Other	ICE	HCL	HNO <sub>3</sub>	Other			
SG-2-4		7/7/14	6750	1	J	X						X					
SG-2-7			0812	1													
SG-3-4			0845	1													
SG-3-9			0908	1													
SG-1-4			0947	2													
SG-2		7/7/14		1	B		X										
SG-3				1													
SG-1				1													

Analysis Request	Other	Comments
BTEX & TPH as Gas (602/8020 + 8015/MTBE) <u>8260</u>		
TPH as Diesel (8015) w/ Silica Gel Cleanup		
Total Petroleum OH & Grease (5520 E&F/B&F)		
Total Petroleum Hydrocarbons (418.1)		
EPA 601 / 8010 / 8021		
BTEX ONLY (EPA 602 / 8020)		
Multi-range TPH (g.d.mo)		
EPA 608 / 8082 PCB's ONLY		
EPA-8140/8141 Oz Pkg ASTM		
EPA-8150/8151 <u>toption</u>		
EPA-5242/624/8260 <u>NapHTHAlene</u>		
EPA 525 / 625 / 8270		
PAH's / PNA's by EPA 625 / 8270 / 8310		
CAM-17 Metals (6010 / 6020)		
LUFT 5 Metals (6010 / 6020)		
Lead (200.8 / 200.9 / 6010)		
Five fuel oxygenates by EPA Method 8260		
Total Suspended Solids (TSS) <u>HOLD</u>		
Chemical Oxygen Demand (COD)		

Relinquished By: [Signature] Date: 7/7/14 Time: 17:35 Received By: [Signature]  
Relinquished By: Date: Time: Received By:  
Relinquished By: Date: Time: Received By:

ICE/PC ✓ COMMENTS:  
GOOD CONDITION \_\_\_\_\_  
HEAD SPACE ABSENT \_\_\_\_\_  
DECHLORINATED IN LAB \_\_\_\_\_  
APPROPRIATE CONTAINERS \_\_\_\_\_  
PRESERVED IN LAB \_\_\_\_\_  
VOAS O&G METALS OTHER  
PRESERVATION pH<2



### Sample Receipt Checklist

Client Name: **Pangea Environmental Svcs., Inc.** Date and Time Received: **7/7/2014 6:03:30 PM**  
 Project Name: **7701 BANCROFT OAKLAND** Login Reviewed by: **Shana Carter**  
 WorkOrder No: **1407185** Matrix: Air/Soil Carrier: Client Drop-In

**Chain of Custody (COC) Information**

Chain of custody present? Yes  No   
 Chain of custody signed when relinquished and received? Yes  No   
 Chain of custody agrees with sample labels? Yes  No   
 Sample IDs noted by Client on COC? Yes  No   
 Date and Time of collection noted by Client on COC? Yes  No   
 Sampler's name noted on COC? Yes  No

**Sample Receipt Information**

Custody seals intact on shipping container/cooler? Yes  No  NA   
 Shipping container/cooler in good condition? Yes  No   
 Samples in proper containers/bottles? Yes  No   
 Sample containers intact? Yes  No   
 Sufficient sample volume for indicated test? Yes  No

**Sample Preservation and Hold Time (HT) Information**

All samples received within holding time? Yes  No   
 Container/Temp Blank temperature Cooler Temp: 6°C NA   
 Water - VOA vials have zero headspace / no bubbles? Yes  No  NA   
 Sample labels checked for correct preservation? Yes  No   
 pH acceptable upon receipt (Metal: pH<2; 522: pH<4)? Yes  No  NA   
 Samples Received on Ice? Yes  No

(Ice Type: WET ICE )

\* NOTE: If the "No" box is checked, see comments below.

-----  
 Comments:



# McC Campbell Analytical, Inc.

"When Quality Counts"

## Analytical Report

**WorkOrder:** 1407185 A

**Report Created for:** Pangea Environmental Svcs., Inc.  
1710 Franklin Street, Ste. 200  
Oakland, CA 94612

**Project Contact:** Morgan Gillies

**Project P.O.:**

**Project Name:** 7701 BANCROFT OAKLAND

**Project Received:** 07/07/2014

Analytical Report reviewed & approved for release on 07/09/2014 by:

Question about  
your data?

[Click here to email  
McC Campbell](#)

Angela Rydelius,  
Laboratory Manager

***The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.***





## Glossary of Terms & Qualifier Definitions

**Client:** Pangea Environmental Svcs., Inc.  
**Project:** 7701 BANCROFT OAKLAND  
**WorkOrder:** 1407185

### Glossary Abbreviation

95% Interval	95% Confident Interval
DF	Dilution Factor
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not detected at or above the indicated MDL or RL
NR	Matrix interferences, or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix; or sample diluted due to high matrix or analyte content.
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
TEQ	Toxicity Equivalence

### Analytical Qualifiers

H samples were analyzed out of holding time



## Analytical Report

**Client:** Pangea Environmental Svcs., Inc.  
**Project:** 7701 BANCROFT OAKLAND  
**Date Received:** 7/7/14 18:03  
**Date Prepared:** 7/8/14

**WorkOrder:** 1407185  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8021B/8015Bm  
**Unit:** µg/m<sup>3</sup>

### Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
<b>SG-2</b>	<b>1407185-006A</b>	<b>Air</b>	<b>07/07/2014 12:29</b>	<b>GC7</b>	<b>92497</b>

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
TPH(g)	ND	H	25,000	1	07/08/2014 19:59
MTBE	---		2500	1	07/08/2014 19:59
Benzene	---		250	1	07/08/2014 19:59
Toluene	---		250	1	07/08/2014 19:59
Ethylbenzene	---		250	1	07/08/2014 19:59
Xylenes	---		250	1	07/08/2014 19:59
Surrogates	REC (%)	Qualifiers	Limits		
aaa-TFT_2	95	H	70-130		07/08/2014 19:59

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
<b>SG-3</b>	<b>1407185-007A</b>	<b>Air</b>	<b>07/07/2014 12:37</b>	<b>GC7</b>	<b>92497</b>

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
TPH(g)	ND	H	25,000	1	07/08/2014 21:00
MTBE	---		2500	1	07/08/2014 21:00
Benzene	---		250	1	07/08/2014 21:00
Toluene	---		250	1	07/08/2014 21:00
Ethylbenzene	---		250	1	07/08/2014 21:00
Xylenes	---		250	1	07/08/2014 21:00
Surrogates	REC (%)	Qualifiers	Limits		
aaa-TFT_2	96	H	70-130		07/08/2014 21:00

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
<b>SG-1</b>	<b>1407185-008A</b>	<b>Air</b>	<b>07/07/2014 12:45</b>	<b>GC7</b>	<b>92497</b>

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
TPH(g)	ND	H	25,000	1	07/08/2014 20:29
MTBE	---		2500	1	07/08/2014 20:29
Benzene	---		250	1	07/08/2014 20:29
Toluene	---		250	1	07/08/2014 20:29
Ethylbenzene	---		250	1	07/08/2014 20:29
Xylenes	---		250	1	07/08/2014 20:29
Surrogates	REC (%)	Qualifiers	Limits		
aaa-TFT_2	101	H	70-130		07/08/2014 20:29



## Analytical Report

**Client:** Pangea Environmental Svcs., Inc.  
**Project:** 7701 BANCROFT OAKLAND  
**Date Received:** 7/7/14 18:03  
**Date Prepared:** 7/8/14

**WorkOrder:** 1407185  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8021B/8015Cm  
**Unit:** µg/L

### Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
<b>SG-2</b>	<b>1407185-006A</b>	<b>Air</b>	<b>07/07/2014 12:29</b>	<b>GC7</b>	<b>92497</b>

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
TPH(g)	ND	H	25	1	07/08/2014 19:59
MTBE	---		2.5	1	07/08/2014 19:59
Benzene	---		0.25	1	07/08/2014 19:59
Toluene	---		0.25	1	07/08/2014 19:59
Ethylbenzene	---		0.25	1	07/08/2014 19:59
Xylenes	---		0.25	1	07/08/2014 19:59
Surrogates	REC (%)	Qualifiers	Limits		
aaa-TFT	95	H	70-130		07/08/2014 19:59

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
<b>SG-3</b>	<b>1407185-007A</b>	<b>Air</b>	<b>07/07/2014 12:37</b>	<b>GC7</b>	<b>92497</b>

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
TPH(g)	ND	H	25	1	07/08/2014 21:00
MTBE	---		2.5	1	07/08/2014 21:00
Benzene	---		0.25	1	07/08/2014 21:00
Toluene	---		0.25	1	07/08/2014 21:00
Ethylbenzene	---		0.25	1	07/08/2014 21:00
Xylenes	---		0.25	1	07/08/2014 21:00
Surrogates	REC (%)	Qualifiers	Limits		
aaa-TFT	96	H	70-130		07/08/2014 21:00

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
<b>SG-1</b>	<b>1407185-008A</b>	<b>Air</b>	<b>07/07/2014 12:45</b>	<b>GC7</b>	<b>92497</b>

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
TPH(g)	ND	H	25	1	07/08/2014 20:29
MTBE	---		2.5	1	07/08/2014 20:29
Benzene	---		0.25	1	07/08/2014 20:29
Toluene	---		0.25	1	07/08/2014 20:29
Ethylbenzene	---		0.25	1	07/08/2014 20:29
Xylenes	---		0.25	1	07/08/2014 20:29
Surrogates	REC (%)	Qualifiers	Limits		
aaa-TFT	101	H	70-130		07/08/2014 20:29





## Quality Control Report

**Client:** Pangea Environmental Svcs., Inc.  
**Date Prepared:** 7/9/14  
**Date Analyzed:** 7/8/14  
**Instrument:** GC7  
**Matrix:** Water  
**Project:** 7701 BANCROFT OAKLAND

**WorkOrder:** 1407185  
**BatchID:** 92497  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8021B/8015Bm  
**Unit:** µg/L  
**Sample ID:** MB/LCS-92497  
 1407107-001AMS/MSD

### QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH(btex)	ND	60.4	40	60	-	101	70-130
MTBE	ND	10.3	5.0	10	-	103	70-130
Benzene	ND	10.5	0.50	10	-	105	70-130
Toluene	ND	10.6	0.50	10	-	106	70-130
Ethylbenzene	ND	10.9	0.50	10	-	109	70-130
Xylenes	ND	33.0	0.50	30	-	110	70-130

**Surrogate Recovery**

aaa-TFT_2	9.89	8.55		10	99	86	70-130
-----------	------	------	--	----	----	----	--------

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH(btex)	NR	NR	0	610	NR	NR	-	NR	
MTBE	NR	NR	0	1400	NR	NR	-	NR	
Benzene	NR	NR	0	3700	NR	NR	-	NR	
Toluene	NR	NR	0	43	NR	NR	-	NR	
Ethylbenzene	NR	NR	0	110	NR	NR	-	NR	
Xylenes	NR	NR	0	200	NR	NR	-	NR	

**Surrogate Recovery**

aaa-TFT_2	NR	NR	0		NR	NR	-	NR	
-----------	----	----	---	--	----	----	---	----	--

1534 Willow Pass Rd  
Pittsburg, CA 94565-1701  
(925) 252-9262

# CHAIN-OF-CUSTODY RECORD

**WorkOrder: 1407185 A ClientCode: PEO**

WaterTrax  
  WriteOn  
  EDF  
  Excel  
  Fax  
 Email  
  HardCopy  
  ThirdParty  
  J-flag

**Report to:**  
Morgan Gillies  
Pangea Environmental Svcs., Inc.  
1710 Franklin Street, Ste. 200  
Oakland, CA 94612  
(510) 836-3700 FAX: (510) 836-3709

**Email:** mgillies@pangeaenv.com; tdelafuente@pa  
cc/3rd Party:  
**PO:**  
**ProjectNo:** 7701 BANCROFT OAKLAND

**Bill to:**  
Bob Clark-Riddell  
Pangea Environmental Svcs., Inc.  
1710 Franklin Street, Ste. 200  
Oakland, CA 94612

**Requested TAT:** 2 days  
**Date Received:** 07/07/2014  
**Date Add-On:** 07/08/2014  
**Date Printed:** 07/08/2014

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)												
					1	2	3	4	5	6	7	8	9	10	11	12	
1407185-006	SG-2	Air	7/7/2014 12:29	<input type="checkbox"/>	A	A											
1407185-007	SG-3	Air	7/7/2014 12:37	<input type="checkbox"/>	A	A											
1407185-008	SG-1	Air	7/7/2014 12:45	<input type="checkbox"/>	A	A											

**Test Legend:**

1	G-MBTEX(UG/M3)_A	2	G-MBTEX_A	3		4		5	
6		7		8		9		10	
11		12							

**Prepared by: Shana Carter**  
**Add-On Prepared By: Maria Venegas**

**Comments:** Gas by 8015 & O2 added 7/8/14 Rush TAT.

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).  
Hazardous samples will be returned to client or disposed of at client expense.



## WORK ORDER SUMMARY

**Client Name:** PANGEA ENVIRONMENTAL SVCS., INC.  
**Project:** 7701 BANCROFT OAKLAND  
**Comments:** Gas by 8015 & O2 added 7/8/14 Rush TAT.

**QC Level:** LEVEL 2  
**Client Contact:** Morgan Gillies  
**Contact's Email:** mgillies@pangeaenv.com;  
 tdelafuente@pangeaenv.com

**Work Order:** 1407185  
**Date Received:** 7/7/2014  
**Date Add-On:** 7/8/2014

Lab ID	Client ID	Matrix	Test Name	Number of Containers	Bottle & Preservative	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1407185-006A	SG-2	Air	TPH(g) + MBTEX	1	Tedlar	7/7/2014 12:29	1 day		<input type="checkbox"/>	
1407185-007A	SG-3	Air	TPH(g) + MBTEX	1	Tedlar	7/7/2014 12:37	1 day		<input type="checkbox"/>	
1407185-008A	SG-1	Air	TPH(g) + MBTEX	1	Tedlar	7/7/2014 12:45	1 day		<input type="checkbox"/>	

**\* NOTE: STLC and TCLP extractions require 48 hrs to complete; therefore, all TATs begin after the extraction is completed (i.e., 24hr TAT yields results in 72 hrs from sample submission).**

**Bottle Legend:**

Tedlar = Tedlar Air Bag

1407185

**McCAMPBELL ANALYTICAL, INC.**

1534 Willow Pass Road  
Pittsburg, CA 94565

Website: [www.mccampbell.com](http://www.mccampbell.com) Email: [main@mccampbell.com](mailto:main@mccampbell.com)

Telephone: (925) 252-9262 Fax: (925) 252-9269

**CHAIN OF CUSTODY RECORD**

TURN AROUND TIME  RUSH  24 HR  48 HR  72 HR  5 DAY  
EDF Required? Coelt (Normal)  No Write On (DW)  No

Report To: Morgan Gillies Bill To: Pangea  
Company: Pangea Environmental Services, Inc.  
1710 Franklin Street, Suite 200, Oakland, CA 94612  
E-Mail: [mgillies@pangeaenv.com](mailto:mgillies@pangeaenv.com)  
Tele: (510) 836-3702 Fax: (510) 836-3709  
Project #: Project Name:  
Project Location: 770Y BANCROFT OAKLAND  
Sampler Signature: [Signature]

SAMPLE ID	LOCATION (Field Point Name)	SAMPLING		# Containers	Type Containers	MATRIX					METHOD PRESERVED				Analysis Request	Other	Comme
		Date	Time			Water	Soil	Air	Sludge	Other	ICE	HCL	HNO <sub>3</sub>	Other			
SG-2-4		7/7/14	6750	1	J	X						X					
SG-2-7			0812	1	J												X
SG-3-4			0845	1	J												X
SG-3-9			0908	1	J												X
SG-1-4			0947	2	J												X
SG-2		7/7/14		1	B		X					X					X
SG-3				1	J							X					X
SG-1				1	J							X					X

Relinquished By: [Signature] Date: 7/7/14 Time: 17:00 Received By: [Signature]  
 Relinquished By: Date: Time: Received By:  
 Relinquished By: Date: Time: Received By:

ICE/° 60 COMMENTS:  
 GOOD CONDITION  
 HEAD SPACE ABSENT  
 DECHLORINATED IN LAB  
 APPROPRIATE CONTAINERS  
 PRESERVED IN LAB

VOAS O&G METALS OTHER  
 PRESERVATION pH<2