

**Andy Saberi**  
1045 Airport Boulevard  
South San Francisco, CA 94080

**RECEIVED**

By Alameda County Environmental Health 11:03 am, Jul 30, 2015

Mr. Jerry Wickham  
Alameda County Health Care Services Agency  
1131 Harbor Bay Parkway, Suite 250  
Alameda, CA 94502-6577

Re: 1230 14<sup>th</sup> Street, Oakland, California  
ACEH Case No. 295

Dear Mr. Wickham:

I, Mr. Andy Saberi, have retained Pangea Environmental Services, Inc. (Pangea) as the environmental consultant for the project referenced above. Pangea is submitting the attached report on my behalf.

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

If you have any questions, please call me at (650) 588-3088.

Sincerely,

  
Andy Saberi



July 28, 2015

*VIA ALAMEDA COUNTY FTP SITE*

Mr. Jerry Wickham  
Hazardous Materials Specialist  
Alameda County Environmental Health  
1131 Harbor Bay Parkway, Suite 250  
Alameda, CA 94502-6577

Re: **Workplan for Soil Excavation**  
Former Shell Service Station  
1230 14<sup>th</sup> Street  
Oakland, California  
Fuel Leak Case No. RO0000433

Dear Mr. Wickham:

On behalf of property owner Andy Saberi, Pangea Environmental Services, Inc., (Pangea) has prepared this *Workplan for Soil Excavation* for the subject site. This report describes proposed excavation to target subsurface hydrocarbons identified during post-remediation compliance sampling. Following the proposed excavation, Pangea anticipates site conditions will satisfy criteria of the Low Threat Closure Policy and be eligible for case closure. Described below is the project background, proposed excavation and associated confirmation sampling.

## **PROJECT BACKGROUND**

The former Shell-branded service station is located at the northeast corner of 14th Street and Union Street in Oakland, California (Figure 1). Currently, an abandoned one-story station building and a pump-island canopy occupy the site, and much of the property is paved except for the former UST excavation. Land use in the surrounding area is currently residential to the north, south, and east, and is commercial/industrial to the west and southwest. Following case closure the site will likely be developed for residential site use. The site topography is essentially flat

Significant site assessment and remediation has been conducted at the site for a former unauthorized release. Soil and soil gas sampling was conducted at six locations to evaluate conditions after in situ remediation. As described in the *Soil and Soil Gas Sampling Report* dated April 7, 2015, soil boring SG-6 contained TPHg, TPHd, and naphthalene concentrations in soil exceeding applicable ESLs for commercial (and residential) site use. (The detected naphthalene concentration of 11 mg/Kg also exceeded the LTCP criteria for direct contact and outdoor air for

**PANGEA Environmental Services, Inc.**

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

residential site use). Additionally, soil gas contaminant concentrations in probe SG-6 exceeded RWQCB ESLs for commercial and residential site use. Soil and soil gas results are summarized on Tables 1 and 2, respectively. This soil and soil gas information indicates that residual impact exceeds select agency screening levels at location SG-6. This impact could pose a risk to human health via direct exposure or potential vapor intrusion into future site buildings. To target residual hydrocarbon impact near SG-6 and the former southern dispenser, Pangea proposed limited soil excavation to target shallow soil impact as shown on Figure 2.

## **PROPOSED EXCAVATION**

Excavation is proposed at the location shown on Figure 2. The initial planned excavation would be approximately 12 ft by 8 ft by 10 ft deep. The soil volume of the initial excavation would be approximately 35 cubic yards (50 tons). The excavation would be expanded until confirmation samples meet acceptable levels approved by ACEH. Figure 2 also shows a possible excavation extent for expanded excavation, representing approximately 25 ft by 15 ft (approximately 165 cubic yards [250 tons]). To safely excavate around the footings for the canopy, the canopy will be removed during the excavation.

State licensed waste hauler(s) will transport waste to appropriate recycling and/or disposal facilities. The canopy will be disposed at an appropriately licensed facility.

## **CONFIRMATION SAMPLING**

Primary confirmation sampling is anticipated at approximately 6 ft bgs along each sidewall. Some shallower and a few deeper confirmation (and excavation floor) samples will be collected for vertical characterization. The confirmation samples will be collected from areas with field indications of contamination such as visual soil discoloration and odor. Additionally, Pangea will screen soil for sampling in the field using a photoionization detector (PID). Soil sampling will be performed in accordance with Pangea's *Standard Field Procedures for Excavation Sampling* presented in Appendix A.

Confirmation soil samples (and groundwater if sufficiently encountered) will be analyzed for the following:

- TPHg by EPA Method 8015
- TPHd and TPHmo by EPA Method 8015 with silica cleanup gel
- Benzene, toluene, ethylbenzene, xylenes (BTEX), methyl tert-butyl ether (MTBE), naphthalene, and lead scavengers [1,2-dibromoethane (EDB) and 1,2-dichloroethane (EDC or 1,2-DCA)] by EPA Method 8260B.

Following receipt of analytical results, additional excavation may be performed to target any identified impact exceeding applicable ESLs. These ESLs include:

- 100 milligrams/kilogram (mg/kg) total petroleum hydrocarbons as gasoline (TPHg),
- 100 mg/kg total petroleum hydrocarbons as diesel (TPHd),
- 0.044 mg/Kg benzene,
- 2.9 mg/kg toluene,
- 3.3 mg/Kg ethylbenzene
- 2.3 mg/kg xylenes, and
- 1.2 mg/kg naphthalene.

After completion of any additional excavation, confirmation sampling will be performed to characterize post-excavation soil conditions. If sufficient groundwater (e.g., 50 gallons) enters the excavation, a grab groundwater sample will be collected for analysis upon completion of excavation activities.

To facilitate soil sample collection, a backhoe or excavator will be used to collect soil. Soil samples will be collected in stainless steel or brass tubes hammered into the soil and capped with Teflon and plastic end caps. The samples will be placed into a cooler filled with ice, and delivered under chain-of-custody procedures to McCampbell Analytical, Inc. of Pittsburg, California, a State-certified laboratory.

Stockpile soil sampling and analysis will be performed as required to facilitate soil disposal at an appropriately licensed facility.

## **EXCAVATION PROCEDURES**

Soil excavation will be performed by an appropriately licensed contractor. Excavation notification, preparation, and procedures are presented below.

### **Permitting and Notification**

Prior to initiating field activities, Pangea will conduct the following tasks:

- Obtain permits from the City of Oakland as necessary.
- Pre-mark the excavation area with white paint and notify Underground Service Alert (USA) of the excavation activities at least 48 hours before work begins;

- Prepare a site-specific health and safety plan to educate personnel and minimize their exposure to potential hazards related to site activities; and
- Coordinate with excavation and laboratory contractors and with involved parties.

### **Excavation Preparation**

The contractor will prepare a site-specific Health and Safety Plan (HASP). The HASP is a requirement of the Occupational Safety and Health Administration (OSHA), “Hazardous Waste Operation and Emergency Response” guidelines (29 CFR 1910.120) and the California Occupational Safety and Health Administration (Cal/OSHA) “Hazardous Waste Operation and Emergency Response” guidelines (CCR Title 8, section 5192). The HASP is designed to address safety provisions during field activities and protect the field crew from physical and chemical hazards resulting from drilling and sampling. The HASP establishes personnel responsibilities, general safe work practices, field procedures, personal protective equipment standards, decontamination procedures, and emergency action plans. The HASP will be reviewed and signed by field staff and contractors prior to beginning field operations at the site.

Prior to field activities, the contractor will mark the proposed excavation area using white paint. The contractor will notify Underground Service Alert (USA) of the planned excavation areas and may retain a private utility locator to survey the proposed excavation area to locate any additional subsurface conduits. The contractor will take appropriate action during excavation activities to protect or temporarily reroute any encountered lines, as feasible. Utility companies may be notified for any utility that may be impacted or located near the excavation work.

The areas located beneath concrete may be saw cut. Perimeter barriers will be installed and maintained throughout excavation and backfilling activities. Because the excavation work is on private property, it is anticipated that *no* encroachment onto the public right of way will be necessary during soil excavation work.

### **Excavation Procedures**

Throughout field activities, the contractor will follow all applicable municipal codes and best management practices and standards. The contractor will utilize mechanical and manual (hand digging) excavation techniques during remedial activities. Procedures before and during excavation activity include:

- A competent person trained to identify hazardous conditions, with authority to take corrective action, will be in charge of excavation. This person will inspect excavations daily and after every rain event, and ensure that all equipment and materials are in good, working condition.

- Excavated or other materials as required will be stored 2 feet or more from the edge of the excavation. Workers will stay away from any equipment loading or unloading material. Perimeter protection will be provided at all times.
- Stockpiles of materials will not be placed within a public right of way, will not obstruct drainage ways, will not be subject to erosion, will not endanger other properties, and will not create a public nuisance or safety hazard.
- Workers will have all appropriate training and wear the required personal protective equipment including hardhats, safety footwear, gloves, eye protection, hearing protection, and fall protection devices, as needed.
- Excavated material and the excavation pit will be monitored by hand-held screening instrumentation, (e.g., PID), as well as visual and olfactory indications of soil impact from petroleum hydrocarbons (e.g., visible green or gray staining, odor).

The contractor will follow city noise guidelines during the excavation activities and will also use vapor suppressant sprays to limit any odors. Plastic sheeting will be used as necessary to minimize odor and dust generation. The contractor will comply with Cal/OSHA requirement to ensure a safe working environment and to keep the sides of the excavation stable. Excavation activities will be documented by photographs.

The contractor will perform groundwater removal and disposal if necessary to manage groundwater accumulation in the excavation. Depending on volumes and recharge rates, groundwater will be pumped either directly into vacuum trucks for transport and disposal, or will be pumped into a recovery tank for storage and future permitted discharge to the sanitary sewer or offsite recycling/disposal at an appropriate facility.

### **Stockpiling, Dust and Noise Control**

Any soil not off-hauled from the site the same day will be stockpiled on plastic sheeting, covered with plastic, and weighted down by sandbags at the end of each working day, or immediately in the event of rain, suspicious odors, or if visible dust is being generated from the stockpiles. PID readings will be taken periodically to ensure stockpiles meet regulations on volatile organic compound (VOC) emissions. Debris (brick, rubble, etc.) encountered during excavation as well as concrete and/or asphalt cuttings will be separated from the excavated soil and disposed of separately.

All graded surfaces of any nature shall be wetted, or otherwise suitably contained to prevent nuisance from dust or spillage on city streets or adjacent properties. Equipment, materials and roadways on the site shall be used in a manner or treated as to prevent excessive dust conditions. Dust and dirt control activities shall not result in any material entering the storm drain system.

Dust control measures during excavation, backfilling, and handling of contaminated soil will consist of spraying the minimum amount of water needed to suppress the dust onto the soil and work area. Noise generated during excavation will be monitored and modified accordingly, to ensure compliance with any applicable noise ordinances. Vapor suppressant spray will also be utilized, as deemed necessary.

### **Grading and Erosion Control**

The following grading and erosion control best management practices (BMP) will be observed and implemented throughout excavation activities:

- Delineate with field markers clearing limits, easements, setbacks, sensitive or critical areas, buffer zones, trees, and drainage courses.
- Stabilize all denuded areas and install and maintain all temporary erosion and sediment controls continuously between October 15th and April 15th.
- Perform clearing and earth moving activities only during dry weather (without significant rainfall).
- Provisions will be made for diverting on-site runoff around exposed areas and diverting off-site runoff around the site.
- Provisions for preventing erosion and trapping sediment on site, storm drain inlet protection, covers for soil stock piles, and/or other measures.
- Store, handle, and dispose of construction materials and wastes properly, so as to prevent their contact with stormwater.
- Control and prevent the discharge of all potential pollutants, including pavement cutting wastes, concrete, petroleum products, chemicals, washwater or sediments, and non-storm water discharges to storm drains and any nearby surface water.
- Avoid cleaning or maintaining vehicles on site, except in a designated area where washwater is contained and treated.
- Protect adjacent properties and undisturbed areas from construction impacts.
- Limit construction access routes and stabilize designated access points.
- Avoid tracking dirt or other materials off site; clean off-site paved areas and sidewalks using dry sweeping methods.

- Train and provide instruction to all employees and subcontractors regarding the construction BMPs.

If any storm water catch basins are found in close proximity to excavation, the contractor will implement the following procedures designed to ensure that grading and erosion control practices proposed for the above project comply with best management practices and standards.

- Any catch basin will be protected by silt fencing or other erosion sedimentation prevention devices at all times.
- Erosion control devices will not be moved or modified without approval of the project manager.
- All removable erosion protective devices shall be in place at the beginning and end of each working day at all times.
- All silt and debris shall be removed from streets and public right of way immediately.
- All immediate downstream inlets will be protected.



## Reporting

Upon completion of soil excavation, a technical report will be prepared to document soil excavation activities and analytical results. The report will include a figure illustrating the excavation extent, table(s) presenting analytical data, and photographs of the excavation extent. The report will discuss backfilling activities and recycling and/or disposal of generated materials.

## CLOSING

If you have any questions or comments, feel free to reach me at (510) 435-8664 or briddell@pangeaenv.com.

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



Bob Clark-Riddell, P.E.  
Principal Engineer



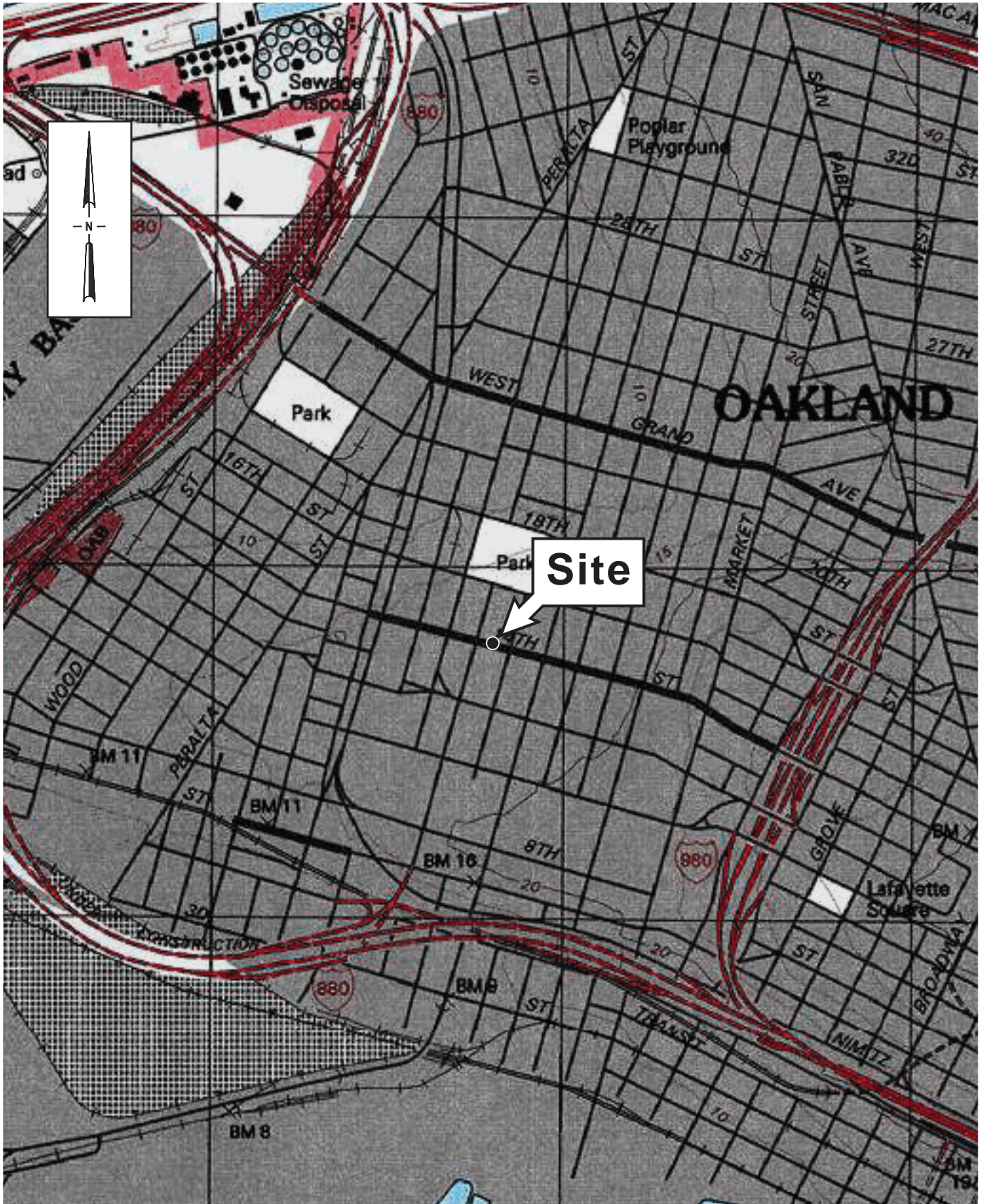
## ATTACHMENTS

Figure 1 – Vicinity Map  
Figure 2 – Proposed Excavation Area

Table 1 – Soil Analytical Data  
Table 2 – Soil Gas Analytical Data

Appendix A – Standard Sampling Procedures

cc: Andy Saberi (electronic copy)  
Perry Pineda, Shell Oil Products US (electronic copy)  
SWRCB Geotracker (electronic copy)



Figure

**1**

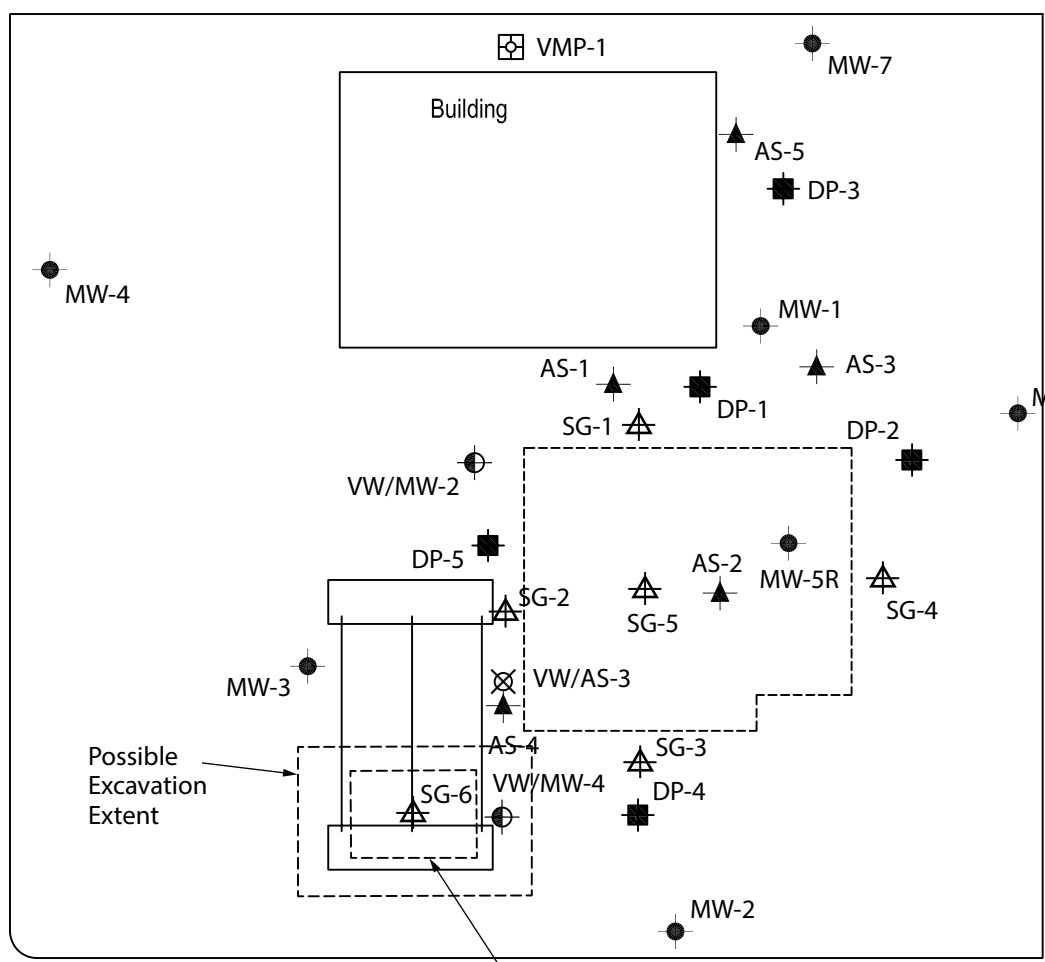
**Former Shell Service Station**  
 1230 14th Street  
 Oakland, California



Vicinity Map



UNION STREET



**EXPLANATION**

- SG-5 Soil gas probe/Soil Boring (2014)
- DP-1 Dual phase extraction (DPE) well
- AS-1 Air sparge well (AS)
- VMP-1 Vapor monitoring point
- MW-1 Groundwater monitoring well
- VW/MW-4 Combination soil vapor extraction well/monitoring well
- VW/AS-3 Destroyed Well



Estimated groundwater flow direction

14TH STREET

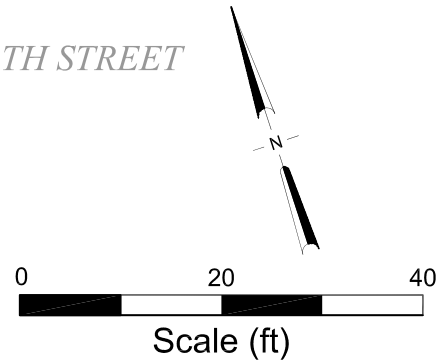


Figure 2

# Pangea

**Table 1. Soil Analytical Data - Former Shell-branded Service Station, 1230 14th St., Oakland, California**

Sample ID	Date	Depth (ft bgs)	TPHg	TPHd	TPHmo	Benzene	Toluene mg/kg	Ethylbenzene	Xylenes	MTBE	Naphthalene	Other VOCs
Commercial ESL Shallow, drinking water			500	110	500	0.044	2.9	3.3	2.3	0.023	1.2	varies
Commercial ESL Deep, drinking water			770	110	1,000	0.044	2.9	3.3	2.3	0.023	1.2	varies
Commercial ESL Shallow, non-drinking water			500	110	500	1.2	9.3	4.7	11	8.4	4.8	varies
Commercial ESL Deep, non-drinking water			1,000	110	1,000	1.2	9.3	4.7	11	8.4	4.8	varies
LTCP Commercial Criteria (0 - 5 ft bgs)			--	--	--	8.2	--	89	--	--	45	--
LTCP Residential Criteria (0 - 5 ft bgs)			--	--	--	1.9	--	21	--	--	9.7	--
LTCP Commercial Criteria (5 - 10 ft bgs)			--	--	--	12	--	134	--	--	45	--
LTCP Residential Criteria (5 - 10 ft bgs)			--	--	--	2.8	--	32	--	--	9.7	--

## September 2014

SG-1-3'	9/11/2014	3	<1.0	2.1	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND
SG-1-6'	9/11/2014	6	<1.0	2.1	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND
SG-2-3'	9/18/2014	3	<1.0	3.1	15	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND
SG-2-6'	9/18/2014	6	<1.0	3.6	21	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND
SG-3-3'	9/18/2014	3	<1.0	1.1	<5.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND
SG-3-6'	9/18/2014	6	<1.0	1.2	<5.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND
SG-4-3'	9/11/2014	3	<1.0	3.7	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND
SG-4-6'	9/18/2014	6	<1.0	8.1	29	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND
SG-5-3'	9/11/2014	3	<1.0	4.2	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND
SG-6-3'	9/18/2014	3	<1.0	6.1	28	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND
SG-6-6'	9/18/2014	6	1,900	620	26	<2.0	3.2	3.0	49	<2.0	11	Varies

## November 2003 Post-Peroxide Injection Sampling

S-18-4	11/7/2003	4	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-18-9	11/7/2003	9	1,800	--	--	4.0	35	21	150	--	--	--
S-18-14	11/7/2003	14	2,000	--	--	27	120	42	230	--	--	--
S-18-19	11/7/2003	19	<1.0	--	--	0.028	0.073	0.019	0.10	--	--	--
S-18-24	11/7/2003	24	<4.6	--	--	<0.023	0.027	<0.023	0.061	--	--	--
S-19-4	11/7/2003	4	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-19-8	11/7/2003	8	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-19-9	11/7/2003	9	3.5	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-19-14	11/7/2003	14	2,000	--	--	9.6	71	34	190	--	--	--
S-19-19	11/7/2003	19	<1.0	--	--	0.0075	0.017	0.0079	0.036	--	--	--
S-20-9	11/7/2003	9	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-20-15	11/7/2003	15	<5.0	--	--	1.2	<0.025	0.095	0.026	--	--	--
S-20-19.5	11/7/2003	19.5	<1.0	--	--	<0.0050	<0.005	<0.005	<0.005	--	--	--
S-20-21	11/7/2003	21	<4.6	--	--	0.84	<0.023	0.067	0.026	--	--	--

# Pangea

**Table 1. Soil Analytical Data - Former Shell-branded Service Station, 1230 14th St., Oakland, California**

Sample ID	Date	Depth (ft bgs)	TPHg	TPHd	TPHmo	Benzene	Toluene mg/kg	Ethylbenzene	Xylenes	MTBE	Naphthalene	Other VOCs
Commercial ESL Shallow, drinking water			500	110	500	0.044	2.9	3.3	2.3	0.023	1.2	varies
Commercial ESL Deep, drinking water			770	110	1,000	0.044	2.9	3.3	2.3	0.023	1.2	varies
Commercial ESL Shallow, non-drinking water			500	110	500	1.2	9.3	4.7	11	8.4	4.8	varies
Commercial ESL Deep, non-drinking water			1,000	110	1,000	1.2	9.3	4.7	11	8.4	4.8	varies
LTCP Commercial Criteria (0 - 5 ft bgs)			--	--	--	8.2	--	89	--	--	45	--
LTCP Residential Criteria (0 - 5 ft bgs)			--	--	--	1.9	--	21	--	--	9.7	--
LTCP Commercial Criteria (5 - 10 ft bgs)			--	--	--	12	--	134	--	--	45	--
LTCP Residential Criteria (5 - 10 ft bgs)			--	--	--	2.8	--	32	--	--	9.7	--
S-20-24	11/7/2003	24	<1.0	--	--	<0.0050	<0.005	<0.005	<0.005	--	--	--
S-21-4	11/7/2003	4	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-21-9	11/7/2003	9	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-21-11	11/7/2003	11	680	--	--	<0.5	<0.5	4.4	14	--	--	--
S-21-14	11/7/2003	14	1,400	--	--	5.5	67	26	130	--	--	--
S-21-19	11/7/2003	19	<1.0	--	--	0.0083	0.033	0.01	0.044	--	--	--
S-21-24	11/7/2003	24	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
<b>June 2002 Soil Investigation</b>												
S-10 5.0-5.5	6/7/2002	5.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-10 8.5-9.0	6/7/2002	8.5	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-10 10-10.5	6/7/2002	10.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-10 12.5-13	6/7/2002	12.5	1,700	--	--	1.2	6.3	25	120	--	--	--
S-10 15-15.5	6/7/2002	15.0	4,300	--	--	4.3	46	57	470	--	--	--
S-10 17.5-18	6/7/2002	17.5	<1.0	--	--	0.012	0.012	0.012	0.062	--	--	--
S-10 20-20.5	6/7/2002	20.0	690	--	--	2.0	9.1	11	56	--	--	--
S-10 22.5-23	6/7/2002	22.5	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-10 24.5-25	6/7/2002	24.5	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-11 5-5.5	6/7/2002	5.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-11 7.5-8	6/7/2002	7.5	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-11 10.5-11	6/7/2002	10.5	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-11 12.5-13	6/7/2002	12.5	1,400	--	--	3.7	26	21	140	--	--	--
S-11 15-15.5	6/7/2002	15.5	3,200	--	--	8.6	55	42	230	--	--	--
S-11 17.5-18	6/7/2002	17.5	330	--	--	1.3	5.9	4.2	24	--	--	--
S-11 20-20.5	6/7/2002	20.0	<1.0	--	--	0.015	0.018	<0.005	0.019	--	--	--
S-11 22.5-23	6/7/2002	22.5	<1.0	--	--	0.019	0.045	0.015	0.092	--	--	--
S-11 24.5-25	6/7/2002	24.5	<1.0	--	--	0.01	0.023	0.062	0.037	--	--	--
S-11 26-26.5	6/7/2002	26.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-11 28.5-29	6/7/2002	28.5	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-12 5-5.5	6/7/2002	5.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-12 7.5-8	6/7/2002	7.5	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-12 13.5-14	6/7/2002	13.5	650	--	--	5.7	30	12	64	--	--	--
S-12 15-15.5	6/7/2002	15.0	13,000	--	--	130	740	290	1,500	--	--	--
S-12 17.5-18	6/7/2002	17.5	16	--	--	0.65	2.1	0.42	2.3	--	--	--

# Pangea

**Table 1. Soil Analytical Data - Former Shell-branded Service Station, 1230 14th St., Oakland, California**

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												VOCs
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Commercial ESL Deep, drinking water			770	110	1,000	0.044	2.9	3.3	2.3	0.023	1.2	varies
Commercial ESL Shallow, non-drinking water			500	110	500	1.2	9.3	4.7	11	8.4	4.8	varies
Commercial ESL Deep, non-drinking water			1,000	110	1,000	1.2	9.3	4.7	11	8.4	4.8	varies
LTCP Commercial Criteria (0 - 5 ft bgs)			--	--	--	8.2	--	89	--	--	45	--
LTCP Residential Criteria (0 - 5 ft bgs)			--	--	--	1.9	--	21	--	--	9.7	--
LTCP Commercial Criteria (5 - 10 ft bgs)			--	--	--	12	--	134	--	--	45	--
LTCP Residential Criteria (5 - 10 ft bgs)			--	--	--	2.8	--	32	--	--	9.7	--
S-12 20-20.5	6/7/2002	20.0	2	--	--	0.058	0.19	0.049	0.29	--	--	--
S-12 22.5-23	6/7/2002	22.5	220	--	--	1.3	9	4.2	24	--	--	--
S-12 24.5-25	6/7/2002	24.5	1.9	--	--	0.047	0.2	0.052	0.26	--	--	--
S-13 5-5.5	6/7/2002	5.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-13 7.5-8	6/7/2002	7.5	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-13 12.5-13	6/7/2002	12.5	9,800	--	--	26	310	130	1,100	--	--	--
S-13 15-15.5	6/7/2002	15.0	3,900	--	--	37	180	76	360	--	--	--
S-13 17.5-18	6/7/2002	17.5	4,700	--	--	6.5	130	59	580	--	--	--
S-13 20-20.5	6/7/2002	20.0	<1.0	--	--	0.028	0.0085	<0.005	0.068	--	--	--
S-14 5.5-6	6/10/2002	5.5	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-14 7.5-8	6/10/2002	7.5	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-14 9-9.5	6/10/2002	9.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-14 11.5-12	6/10/2002	11.5	<1.0	--	--	<0.005	<0.005	<0.005	0.0078	--	--	--
S-14 12.5-13	6/10/2002	12.5	670	--	--	<0.25	0.71	5.4	19	--	--	--
S-14 15-15.5	6/10/2002	15.0	1,100	--	--	0.88	25	22	120	--	--	--
S-14 17.5-18	6/10/2002	17.5	3.8	--	--	0.1	0.3	0.89	0.48	--	--	--
S-14 20-20.5	6/10/2002	20.0	4	--	--	0.39	0.51	0.12	0.5	--	--	--
S-15 5-5.5	6/10/2002	5.0	<1.0	--	--	<0.005	<0.005	<0.005	0.011	--	--	--
S-15 7.5-8	6/10/2002	7.5	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-15 10-10.5	6/10/2002	10.0	2.3	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-15 12.5-13	6/10/2002	12.5	<1.0	--	--	<0.005	<0.005	<0.005	0.032	--	--	--
S-15 15-15.5	6/10/2002	15.0	1,200	--	--	1.9	4.3	22	110	--	--	--
S-15 17.5-18	6/10/2002	17.5	24	--	--	1.3	1.9	0.4	1.9	--	--	--
S-15 20-20.5	6/10/2002	20.0	270	--	--	0.51	3.5	4.2	21	--	--	--
S-16 7.5-8	6/10/2002	7.5	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-16 10-10.5	6/10/2002	10.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-16 11.5-12	6/10/2002	11.5	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-16 15-15.5	6/10/2002	15.0	4,500	--	--	<1.0	4.0	94	460	--	--	--
S-16 17.5-18	6/10/2002	17.5	5,000	--	--	<1.0	23	76	360	--	--	--
S-16 20-20.5	6/10/2002	20.0	1.3	--	--	0.12	0.0088	0.08	0.08	--	--	--
S-17 5-5.5	6/10/2002	5.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-17 10-10.5	6/10/2002	10.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	--	--	--
S-17 12.5-13	6/10/2002	12.5	4,300	--	--	0.64	6.8	48	340	--	--	--

# Pangea

**Table 1. Soil Analytical Data - Former Shell-branded Service Station, 1230 14th St., Oakland, California**

Sample ID	Date	Depth (ft bgs)	TPHg	TPHd	TPHmo	Benzene	Toluene mg/kg	Ethylbenzene	Xylenes	MTBE	Naphthalene	Other VOCs
Commercial ESL Shallow, drinking water			500	110	500	0.044	2.9	3.3	2.3	0.023	1.2	varies
Commercial ESL Deep, drinking water			770	110	1,000	0.044	2.9	3.3	2.3	0.023	1.2	varies
Commercial ESL Shallow, non-drinking water			500	110	500	1.2	9.3	4.7	11	8.4	4.8	varies
Commercial ESL Deep, non-drinking water			1,000	110	1,000	1.2	9.3	4.7	11	8.4	4.8	varies
LTCP Commercial Criteria (0 - 5 ft bgs)			--	--	--	8.2	--	89	--	--	45	--
LTCP Residential Criteria (0 - 5 ft bgs)			--	--	--	1.9	--	21	--	--	9.7	--
LTCP Commercial Criteria (5 - 10 ft bgs)			--	--	--	12	--	134	--	--	45	--
LTCP Residential Criteria (5 - 10 ft bgs)			--	--	--	2.8	--	32	--	--	9.7	--
<b>MW-5 Installation</b>												
MW-5-9.5	9/27/2001	9.5	3.9	--	--	<0.005	<0.005	0.0069	0.019	<0.5	--	--
MW-5-14.0	9/27/2001	14.5	790	--	--	2.7	30	11	67	<1.0	--	--
<b>December 2000 Geoprobe Investigation</b>												
GP-1-5	12/11/2000	5.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	--	--
GP-1-10	12/11/2000	10.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	--	--
GP-1-15	12/11/2000	15.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	--	--
GP-1-20	12/11/2000	20.0	120	--	--	<0.02	0.022	0.64	1.1	<0.02	--	--
GP-2-5	12/11/2000	5.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	--	--
GP-2-10.5	12/11/2000	10.5	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	--	--
GP-2-15	12/11/2000	15.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	--	--
GP-3-5	12/11/2000	5.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	--	--
GP-3-10.0	12/11/2000	10.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	--	--
GP-3-15.0	12/11/2000	15.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	--	--
GP-4-5	12/11/2000	5.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	--	--
GP-4-10	12/11/2000	10.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	--	--
GP-4-15	12/11/2000	15.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	--	--
GP-5-5	12/11/2000	5.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	--	--
GP-5-10	12/11/2000	10.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	--	--
GP-5-15	12/11/2000	15.0	<1.0	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	--	--
<b>March 1996 Investigation</b>												
SB-A/(MW-1)-10.5	03/06/96	10.5	<1.0	--	--	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--
SB-A/(MW-1)-16.0	03/06/96	16.0	9.8	--	--	1.9	0.4	0.22	1.1	--	--	--
SB-A/(MW-1)-20.5	03/06/96	20.5	5.9	--	--	0.89	0.049	0.19	0.25	--	--	--
SB-B/(MW-2)-10.5	03/06/96	10.5	<1.0	--	--	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--
SB-B/(MW-2)-16.0	03/06/96	16.0	<1.0	--	--	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--

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**Table 1. Soil Analytical Data - Former Shell-branded Service Station, 1230 14th St., Oakland, California**

Sample ID	Date	Depth (ft bgs)	TPHg	TPHd	TPHmo	Benzene	Toluene mg/kg	Ethylbenzene	Xylenes	MTBE	Naphthalene	Other VOCs
Commercial ESL Shallow, drinking water			500	110	500	0.044	2.9	3.3	2.3	0.023	1.2	varies
Commercial ESL Deep, drinking water			770	110	1,000	0.044	2.9	3.3	2.3	0.023	1.2	varies
Commercial ESL Shallow, non-drinking water			500	110	500	1.2	9.3	4.7	11	8.4	4.8	varies
Commercial ESL Deep, non-drinking water			1,000	110	1,000	1.2	9.3	4.7	11	8.4	4.8	varies
LTCP Commercial Criteria (0 - 5 ft bgs)			--	--	--	8.2	--	89	--	--	45	--
LTCP Residential Criteria (0 - 5 ft bgs)			--	--	--	1.9	--	21	--	--	9.7	--
LTCP Commercial Criteria (5 - 10 ft bgs)			--	--	--	12	--	134	--	--	45	--
LTCP Residential Criteria (5 - 10 ft bgs)			--	--	--	2.8	--	32	--	--	9.7	--
SB-C-11.75	03/06/96	11.8	<1.0	--	--	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--
SB-C-15.5	03/06/96	15.5	1.9	--	--	0.022	0.12	0.086	0.32	--	--	--
SB-D(MW-3)-10.5	03/06/96	10.5	<1.0	--	--	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--
SB-D(MW-3)-15.5	03/06/96	15.5	<1.0	--	--	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--
SB-E-10.5	03/06/96	10.5	<1.0	--	--	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--
SB-E-16.0	03/06/96	16.0	<1.0	--	--	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--
SB-F(VW/AS)-1-5.5	03/07/96	5.5	<1.0	--	--	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--
SB-F(VW/AS-1)-10.5	03/07/96	10.5	62	--	--	0.97	4.2	1.4	8.0	--	--	--
SB-F(VW/AS-1)-15.5	03/07/96	15.5	7.4	--	--	1.7	0.44	0.2	0.6	--	--	--
SB-F(VW/AS-1)-20.5	03/07/96	20.5	20	--	--	2.6	1.7	0.5	2.0	--	--	--
SB-G(VW/MW-2)-8.5	03/07/96	8.5	<1.0	--	--	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--
SB-G(VW/MW-2)-10.5	03/07/96	10.5	<1.0	--	--	0.0032	<0.0025	<0.0025	<0.0025	--	--	--
SB-G(VW/MW-2)-20.5	03/07/96	20.5	2.9	--	--	0.47	0.34	0.15	0.57	--	--	--
SB-H(VW/AS-3)-8.5	03/07/96	8.5	<1.0	--	--	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--
SB-H(VW/AS-3)-10.5	03/07/96	10.5	<1.0	--	--	0.018	<0.0025	<0.0025	0.014	--	--	--
SB-H(VW/AS-3)-21.0	03/07/96	21.0	1.0	--	--	0.047	0.016	0.0037	0.017	--	--	--
SB-I(VW/MW-4)-5.5	03/08/96	5.5	<1.0	--	--	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--
SB-I(VW/MW-4)-8.5	03/08/96	8.5	80	--	--	0.14	0.33	1.3	5.2	--	--	--
SB-I(VW/MW-4)-15.5	03/08/96	15.5	3.4	--	--	0.23	0.093	0.1	0.42	--	--	--
SB-J-10.5	03/08/96	10.5	<1.0	--	--	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--
SB-K(MW-4)-10.5	03/08/96	10.5	<1.0	--	--	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--
<b>Product Piping Samples</b>												
TS-1-4.0	11/27/1995	4	<1.0	--	--	<0.005	0.005	<0.005	<0.005	--	--	--
TS-2-2.0	11/27/1995	2	<1.0	--	--	<0.005	0.0057	<0.005	0.0075	--	--	--
TS-3-3.0	11/27/1995	3	<1.0	--	--	<0.005	<0.005	<0.005	0.0069	--	--	--
TS-4-3.0	11/27/1995	3	<0.005	--	--	0.011	0.038	0.0073	0.043	--	--	--
TS-5-2.5	11/27/1995	2.5	46	--	--	<0.10	<0.10	<0.10	2	--	--	--
TS-6-3.0	11/27/1995	3	3,100	--	--	30	<6.0	33	230	--	--	--
<b>Tankpit Excavation Confirmation Samples</b>												
S2-15.0	11/27/1995	15	3,600	--	--	<6.0	140	78	430	--	--	--



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**Table 1. Soil Analytical Data - Former Shell-branded Service Station, 1230 14th St., Oakland, California**

Sample ID	Date	Depth (ft bgs)	TPHg	TPHd	TPHmo	Benzene	Toluene mg/kg	Ethylbenzene	Xylenes	MTBE	Naphthalene	Other VOCs
Commercial ESL Shallow, drinking water			500	110	500	0.044	2.9	3.3	2.3	0.023	1.2	varies
Commercial ESL Deep, drinking water			770	110	1,000	0.044	2.9	3.3	2.3	0.023	1.2	varies
Commercial ESL Shallow, non-drinking water			500	110	500	1.2	9.3	4.7	11	8.4	4.8	varies
Commercial ESL Deep, non-drinking water			1,000	110	1,000	1.2	9.3	4.7	11	8.4	4.8	varies
LTCP Commercial Criteria (0 - 5 ft bgs)			--	--	--	8.2	--	89	--	--	45	--
LTCP Residential Criteria (0 - 5 ft bgs)			--	--	--	1.9	--	21	--	--	9.7	--
LTCP Commercial Criteria (5 - 10 ft bgs)			--	--	--	12	--	134	--	--	45	--
LTCP Residential Criteria (5 - 10 ft bgs)			--	--	--	2.8	--	32	--	--	9.7	--
S3-15.0	11/27/1995	15	1,000	--	--	7.6	33	19	100	--	--	--
S4-15.0	11/27/1995	15	5,600	--	--	72	280	110	580	--	--	--
S5-15.0	11/27/1995	15	2,800	--	--	36	160	64	350	--	--	--
S6-15.0	11/27/1995	15	3,800	--	--	<6.0	<6.0	76	350	--	--	--
S7-15.0	11/27/1995	15	570	--	--	<0.50	<0.50	4.9	13	--	--	--
S8-15.0	11/27/1995	15	3,200	--	--	60	200	69	350	--	--	--
S9-15.0	11/27/1995	15	5,100	--	--	62	260	110	570	--	--	--
<b>1993 UST and Dispenser Removal Samples</b>												
S-1	08/25/93	8.5	67	1,200	--	0.038	0.089	0.110	0.380	--	--	--
S-2	08/25/93	14.0	2,200	--	--	1.4	3.2	3.5	13	--	--	--
S-3	08/25/93	11.0	530	--	--	0.4	0.76	0.83	3.1	--	--	--
S-4	08/25/93	11.0	40	--	--	0.031	0.059	0.066	0.29	--	--	--
S-5	08/25/93	11.0	1.4	--	--	<0.005	0.0063	0.0081	0.025	--	--	--
S-6	08/25/93	13.0	1,600	--	--	0.97	2.3	2.7	10	--	--	--
S-7	08/25/93	11.0	11,000	--	--	6.7	16	18	69	--	--	--
S-8	08/25/93	11.0	18,000	--	--	11	26	30	110	--	--	--
S-9	08/25/93	11.0	6,200	--	--	3.7	8.7	10	37	--	--	--
DS-1	08/25/93	1.0	0.013	--	--	0.0070	0.017	0.021	0.072	--	--	--
DS-2	08/25/93	1.0	0.0020	--	--	0.0053	0.0089	0.012	0.031	--	--	--
DS-3	08/25/93	1.0	0.0013	--	--	<0.005	0.0059	0.0061	0.018	--	--	--
DS-4	08/25/93	1.0	0.0027	--	--	0.0055	0.0094	0.016	0.047	--	--	--
DS-5	08/25/93	1.0	0.0034	--	--	0.0059	0.011	0.018	0.061	--	--	--
DS-6	08/25/93	1.0	0.011	--	--	0.0068	0.015	0.018	0.064	--	--	--
VSW-1	08/25/93	6.0	4,800	--	--	2.9	7.0	8.0	30	--	--	--
VSW-2	08/25/93	6.0	0.021	--	--	0.15	0.29	0.33	1.3	--	--	--
<b>1991 Soil Borings</b>												
SB1-6-6.5	2/21/1991	6.0	11	--	--	0.014	0.37	0.22	1.2	--	--	--
SB1-10.5-11	2/21/1991	10.5	4.6	--	--	0.15	0.5	0.13	0.68	--	--	--
SB1-15.5-16	2/21/1991	15.5	7.5	--	--	2.1	1.8	0.18	1.1	--	--	--
SB2-6-6.5	2/21/1991	6.0	<1.0	--	--	<0.005	<0.005	<0.005	0.034	--	--	--
SB2-10.5-11	2/21/1991	10.5	1.8	--	--	0.062	0.038	0.035	0.085	--	--	--
SB2-15.5-16	2/21/1991	15.5	6.1	--	--	1.2	1.4	0.15	0.8	--	--	--

# Pangea

**Table 1. Soil Analytical Data - Former Shell-branded Service Station, 1230 14th St., Oakland, California**

Sample ID	Date	Depth (ft bgs)	TPHg	TPHd	TPHmo	Benzene	Toluene mg/kg	Ethylbenzene	Xylenes	MTBE	Naphthalene	Other VOCs
Commercial ESL Shallow, drinking water			<b>500</b>	<b>110</b>	500	<b>0.044</b>	<b>2.9</b>	<b>3.3</b>	<b>2.3</b>	0.023	<b>1.2</b>	varies
Commercial ESL Deep, drinking water			770	110	1,000	0.044	2.9	3.3	2.3	0.023	1.2	varies
Commercial ESL Shallow, non-drinking water			500	110	500	1.2	9.3	4.7	11	8.4	4.8	varies
Commercial ESL Deep, non-drinking water			1,000	110	1,000	1.2	9.3	4.7	11	8.4	4.8	varies
LTCP Commercial Criteria (0 - 5 ft bgs)			--	--	--	<b>8.2</b>	--	<b>89</b>	--	--	45	--
LTCP Residential Criteria (0 - 5 ft bgs)			--	--	--	1.9	--	21	--	--	9.7	--
LTCP Commercial Criteria (5 - 10 ft bgs)			--	--	--	<b>12</b>	--	<b>134</b>	--	--	45	--
LTCP Residential Criteria (5 - 10 ft bgs)			--	--	--	2.8	--	32	--	--	9.7	--
SB3-6-6.5	2/21/1991	6.0	<1.0	--	--	0.038	0.0054	0.015	0.034	--	--	--
SB3-10.5-11	2/21/1991	10.5	<b>1,600</b>	--	--	<b>18</b>	<b>98</b>	35	<b>190</b>	--	--	--
SB3-15.5-16	2/21/1991	15.5	2.4	--	--	<b>0.31</b>	0.21	0.064	0.35	--	--	--

**Notes:**

Commercial/Residential ESL, drinking water = Table A - Environmental Screening Levels for Shallow Soil (<3 meters) where groundwater is a current or potential source of drinking water, as established by the RWQCB-SFBR, Interim Final February 2005 (Revised December 2013).

Commercial/Residential ESL, non-drinking water = Table B - Environmental Screening Levels for Shallow Soil (<3 meters) where groundwater is a not current or potential source of drinking water, as established by the RWQCB-SFBR, Interim Final February 2005 (Revised December 2013).

**130** = Samples which contain concentrations exceeding the ESL for commercial site use are shown in **bold**.

**8.2** = Samples which contain concentrations exceeding LTCP criteria for soil are shown with a bold outline.

Sample depth = Feet below ground surface

mg/kg = milligrams per kilogram

TPHg = Total Petroleum Hydrocarbons as gasoline, analyzed by EPA Method 8015 in 3/6/96 event; by EPA Method 8260B for subsequent events.

TPHd = Total petroleum hydrocarbons as diesel by EPA Method 8015B.

TPHmo = Total petroleum hydrocarbons as motor oil by EPA Method 8015B.

Benzene, toluene, ethylbenzene, and xylene analyzed by EPA Method 8020 in 3/6/96 event; by EPA Method 8260B for subsequent events.

MTBE = Methyl tertiary butyl ether, analyzed by EPA Method 8260B.

Naphthalene analyzed by EPA 8260.

Other VOCs = VOCs analyzed by EPA 8260 not listed individually on this table.

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**Table 2. Soil Gas Analytical Data - Former Shell-branded Service Station, 1230 14th St., Oakland, California**

Boring/ Sample ID	Date Sampled	Depth (ft-ft bgs)	Benzene	Toluene	Ethylbenzene	Xylenes	TPH Gasoline	MTBE	Naphthalene	Other VOCs	Helium	Oxygen	Carbon Dioxide	Methane	Notes
			ug/m <sup>3</sup>								%	%	%	%	
Residential ESL for shallow soil gas:			42	160,000	490	52,000	<b>50,000</b>	4,700	36	Varies	--	--	--	--	
Commercial ESL for shallow soil gas:			420	1,300,000	4,900	220,000	<b>50,000</b>	47,000	360	Varies	--	--	--	--	
LTCP Commercial Criteria (With Bioattenuation Zone)			280,000	--	3,600,000	--	--	--	310,000	--	--	--	--	--	
LTCP Commercial Criteria (No Bioattenuation Zone)			<b>280</b>	--	3,600	--	--	--	310	--	--	--	--	--	
SG-1	11/11/2014	5-6	<3.7	<4.4	<5.0	<10	<240	<4.2	<24	--	<0.12	18	--	--	
SG-2	11/11/2014	5-6	<3.8	<4.5	<5.2	<10.4	<240	<4.3	<25	--	<0.12	20	--	--	
SG-3	11/11/2014	5-6	<3.9	<4.6	<5.2	<10.4	<250	<4.4	<25	--	<0.12	18	--	--	
SG-4	11/11/2014	5-6	<3.9	<4.6	<5.2	<10.4	<250	<4.4	<25	--	<0.12	16	--	--	
SG-5	11/11/2014	3.5-4.5	<3.9	<4.6	<5.4	<10.8	<250	<4.4	<26	--	<0.12	18	--	--	
SG-6	11/11/2014	5-6	<b>1,300</b>	480	<520	17,700	<b>9,800,000</b>	<440	<2,500	--	<0.12	14	--	--	
VMP-1	11/11/2014	5-6	<3.7	<4.4	<5.0	<10	490	<4.2	<24	--	<0.12	19	--	--	

**Abbreviations:**

SG-1 = Soil Gas Sample

ug/m<sup>3</sup> = 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.

Other VOCs = Volatile organic compounds by EPA Method TO-15, uses GC/MS scan.

< 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 ground surface (Table E).

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).

Varies = Concentration detections for VOCs varies. Please see analytical report.

## **APPENDIX A**

### Standard Operating Procedures

## **STANDARD FIELD PROCEDURES FOR EXCAVATION SAMPLING**

During remedial excavation activities compliance sampling is typically required to assess the extent of the contamination remaining in site soil. Pangea has developed standard field procedures for compliance sampling and excavation to provide sample collection, handling and documentation in compliance with State and local regulatory agency regulations.

### **Soil Sampling**

Soil samples are typically collected from the bottom and sidewalls of the excavation. If water is present in the excavation, soil samples are typically collected from the soil/water interface. The soil samples are collected in steam-cleaned brass or steel tubes from either a driven split-spoon type sampler or the bucket of a backhoe or excavator. When a backhoe or excavator is used, approximately three inches of soil are scraped from the surface and the tube is driven into the exposed soil. The location and number of samples is determined by the environmental professional and/or regulatory agency representatives overseeing the excavation.

When required or requested before sample collection, Pangea field staff screen soil with a portable photoionization detector (PID) to qualitatively assess the presence or absence of volatile contaminants. Excavated soil is typically segregated based on contaminant concentration and stockpiled on site on plastic sheeting. When field observations and/or PID measurements indicate that the contaminant-bearing soil has been satisfactorily removed, Pangea collects soil samples from excavation sidewalls and floor for confirmatory analysis at a State-certified analytic laboratory.

### **Stockpile Soil Sampling**

To facilitate soil disposal at approved offsite facilities, Pangea typically collects one four-point composite soil samples for 200 cubic yards or less of stockpiled soil. If the soil stockpile volume is between 200 and 1,000 cubic yards, two four-point composite samples are typically collected. If soil is segregated based on field observations, at least one four-point composite soil sample is collected for each segregated stockpile. To generate a composite sample, Pangea collects four individual soil samples in steam-cleaned brass or steel tubes by hand, or from either a driven split-spoon type sampler or the bucket of a backhoe or excavator. The sample locations and depths are selected to obtain composite soil sample representative of the stockpile. The four individual soil tubes are composited by the state-certified laboratory. When hand sampling or backhoe/excavator is used, approximately three inches of soil are scraped from the surface and the tube is driven into the exposed soil. Additional stockpile sampling procedures may be required to facilitate reuse of soil onsite in accordance with regulatory oversight.

### **Grab Ground Water Sampling**

If groundwater enters the excavation, grab ground water samples are typically collected from the open excavation. Grab groundwater sample can be collected from excavator equipment, disposable Tygon<sup>®</sup> tubing placed into the excavation, or other appropriate sampling equipment placed into the water. The groundwater samples are decanted into the appropriate containers supplied by the analytic laboratory.

### **Sample Storage, Handling and Transport**

Upon removal from the sampler or the backhoe, soil samples are trimmed flush, capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4°C on either crushed or dry ice, depending upon local regulations. Groundwater samples in appropriate containers are labeled, placed in protective bags, and stored on crushed ice at or below 4° C. All samples are transported under chain-of-custody to a State-certified analytic laboratory.

## **Duplicates and Blanks**

Duplicate or blind duplicate samples can be collected, if requested. For water sampling, laboratory-supplied trip blanks can accompany samples to check for cross-contamination caused by sample handling and transport. These trip blanks are analyzed if the internal laboratory quality assurance/quality control (QA/QC) blanks contain the suspected field contaminants. An equipment blank may also be analyzed if non-dedicated sampling equipment is used.