



May 31, 2006

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

RE: Response to Agency Comments
P&D 23rd Avenue Associates
(Formerly 23rd Avenue Partners)
1125 Miller Avenue, Oakland, CA
Clearwater Group Project No, CB018E
Fuel Leak Case No. RO0000294

Dear Mr. Wickham,

As the legally authorized representative of the above-reference project location I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge.

Sincerely,



Mr. Dermot O'Doherty
Director of Property Management

Tribune Tower
409 Thirteenth St., 8th Floor
Oakland, CA 94612

P.O. Box 687
Oakland, CA 94604

510.452.2944

510.452.2973 Fax

www.mpfcorp.com

RECEIVED

By lopprojectop at 11:45 am, Jun 02, 2006



May 31, 2006

Mr. Jerry Wickham
Hazardous Materials Specialist
Alameda County Health Care Services Agency
Environmental Health Services
Environmental Protection
1131 Harbor Bay Parkway, Suite 250
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Re: Response to Agency Comments
P&D 23rd Avenue Associates
(Formerly 23rd Avenue Partners)
1125 Miller Avenue, Oakland, CA
Clearwater Project No. CB018E
Fuel Case Leak No. RO0000294

Dear Mr. Wickham,

Clearwater Group (Clearwater) on behalf of Mr. Dermot O'Doherty of P&D 23rd Avenue Associates (formerly 23rd Avenue Partners), is pleased to present the *Response to Agency Comments* prepared for the project site located at 1125 Miller Avenue, Oakland, Alameda County, California (**Figure 1**).

Purpose of Response to Agency Comments

In response to the *Subsurface Investigation Results* report dated November 16, 2005 prepared by Clearwater for the above-referenced project location, the Alameda County Environmental Health Department (ACEH) provided technical comments in their March 24, 2006 letter (**Attachment A**). The purpose of the *Response to Agency Comments* is to address the concerns outlined in technical comment #2 of said letter regarding (1) field observations and analytical results for the shallow soil boring (S8) completed near the former fuel dispenser location (**Figure 2**). Within the same technical comment, the ACEH, requested that an evaluation and discussion be provided to address (2) the potential for residual product in shallow soil to create nuisance odors inside the building or pose a potential human health risk via indoor vapor intrusion. Lastly, ACEH requested (3) a response for additional work to complete the evaluation or remediation of the impacted shallow soil.



(1) Field Observations vs. Analytical Results for Soil Boring S8

On November 16, 2005, under the supervision of a Clearwater geologist, Fast-Tek Engineering Support Services of Pt. Richmond, California (C-57 license # 624461) completed boring S8 to the target depth of 4 feet bgs and a soil sample was collected for analysis of total petroleum hydrocarbons as diesel (TPHd) by EPA Method 8015M and benzene, toluene, ethylbenzene and xylenes (BTEX) by EPA Method 8260B by Kiff Analytical, LLC (Kiff) a California Department of Health Services (DHS) certified laboratory located in Davis, California. The Clearwater staff geologist described the soil sample (S8-4) as being clay with minor gravel and sand. In the soil boring log it was noted that “product” surrounded the outside of the soil sample core and that the sample had a strong diesel odor (**Attachment B**). As noted by the ACEH staff, residual product surrounding the soil core and the observed strong diesel odor is not consistent with an analytical result of 92 milligrams per kilogram (mg/Kg) of TPHd as reported by Kiff (analytical results are summarized in **Table 1**).

Upon receiving the ACEH staff’s March 24, 2006 letter Clearwater contacted Kiff to inquire about the analytical process and possible inconsistencies between field observations and analytical results. According to Mr. Troy Turpin (Project Manager, Kiff Analytical, LLC) a 2-inch by 6-inch soil core sample contains between 300 and 600 grams of material depending on the density and the specific gravity of the material. To complete the analysis of TPHd by EPA Method 8015M the lab technician prepares the sample by removing the first inch of soil from the same end of the sample that the volatile organic sample was collected from (which also requires the removal of at least 1 inch of soil from the end of the soil core) or from one unopened end of the soil core if no volatile organic analysis has been performed yet. A 30 gram aliquot is then collected from the very middle of the soil core and the analysis of TPHd is completed using the 30 grams of soil removed from the original soil sample core. Homogenizing soil samples is not automatically performed by the laboratory unless specifically requested.

A soil core containing heterogeneous material has the capability of producing highly variant concentrations of TPHd depending on the type of material collected in the aliquot. Since the



amount of soil that is actually analyzed is, at a maximum, 1/10th the original volume of soil collected, analytical results can often vary from field observations.

Prior to the collection of the soil sample that was to be submitted to the laboratory for analysis the photo ionization detector (PID) malfunctioned (the battery depleted) therefore the Clearwater staff geologist was unable to corroborate the strong diesel odor in the field. The PID readings obtained prior to the malfunction of the monitoring device indicated an increase in vapor readings between 1 and 2 feet below ground surface (bgs). The vapor readings increased from 6 parts per million (ppm) detected at 1 foot bgs to 22 ppm detected at 2 feet bgs. The increase in vapor readings between 1 and 2 feet bgs suggests that the sample collected at 4 feet bgs more than likely produced strong vapors.

(2) Discussion - Potential for Residual Product in Shallow Soil to Create Nuisance Odors or Pose a Human Health Risk via Indoor Vapor Intrusion

Several factors influence whether or not residual soil contamination will impact indoor air and cause exposures resulting in risks to human health. A few of these factors include the location of the residual soil contamination in reference to the building's foundation, the nature of the contaminant, the level of degradation experienced by the contaminant, the soil type and whether shallow groundwater is present. The construction style of the building may also contribute to the risk of vapor intrusion. Construction factors such as the material used in the foundation, the use of vapor barriers in the construction of the foundation, location of subsurface utilities and the presence of drain tiles or sumps can also contribute to whether or not residual soil contamination will impact indoor air.

The results of two subsurface investigation events conducted within the vicinity of the former fuel dispenser on October 24, 2000 and November 16, 2005 indicated the presence of residual shallow soil contamination. Shallow groundwater was not present in either soil boring location but observed at 17 feet bgs in other deeper boring locations. Both soil boring locations (D1 and S8) were completed within the confines of the perimeter of the building's foundation and contained



detectable concentrations of TPHd above the standard laboratory reporting limit of 50 mg/Kg. The more volatile benzene compound was not detected in either sample location above the standard reporting limit of 0.005 mg/Kg (**Table 1**).

As previously stated the Clearwater staff geologist described the soil collected from boring S8 as being clay with minor gravel and sand. Fine grained or tight soils such as clay inhibit long distance contaminant migration, but increased capillarity allows greater vertical contaminant transport. Coarse grained soils such as sand and gravel can direct contaminant migration long distances but also provide easier venting to the atmosphere. However, typically there is a significant reduction in contaminant concentration and an increase in contaminant variability as the contaminant partitions from one matrix to another towards indoor air. The PID readings recorded in the field during the November 16, 2005 event support the theory of reduced contaminant vapor concentration experienced during vertical migration. The material used in the construction of the foundation may reduce or inhibit vertical migration of soil vapors.

Older buildings with stone foundations are more porous and provide increased opportunity for vapor intrusion than that of poured concrete slab foundations of newer buildings. The building located on the subject property dates back to 1967 and has a concrete slab foundation. Within the vicinity of the former fuel dispenser there is a small opening in the concrete slab exposing the soils beneath the slab. The small opening may act as a preferential pathway for the vertical migration of soil vapors. The section of the building where the opening in the concrete floor is located is used as a general storage area (small gasoline cans, propane tanks, garden hoses and various barricades have been photographed in this area). The commercial and residential space of the rest of the building is separated from this area by a fire wall further inhibiting exposure to soil vapor intrusion.



(3) Additional Work Proposed to Complete the Evaluation or Remediation of the Impacted Shallow Soil

To confirm the presence of shallow soil contamination in the vicinity of the former fuel dispenser, Clearwater recommends that an additional soil boring event coupled with a soil vapor sampling event be conducted using Direct Push Technology with a Macro-Core® Soil Sampler (**Figure 3**).

Clearwater recommends that soil vapor samples be collected at approximately 2 feet and 4 feet bgs in 3 locations (V-1 through V-3) using the direct soil gas sampling system provided by Geoprobe Systems® (**Attachment C**). The direct soil gas sampling system allows the driller (a C-57 licensed drilling contractor) to drive probe rods to the desired depth, connect the gas sampling cap to the top of the drive rod, pull up on the drive rod to expose the soil vapor screen located below ground, connect a sample pump to the gas sampling cap and collect soil vapors. The soil vapor sample would be collected and analyzed using EPA Method TO-17 for concentrations of TPHd and BTEX. Air Toxics, LTD. of Folsom, California has developed a protocol for the analysis of TPHd using EPA Method TO-17 which provides a laboratory reporting limit of 100 nanograms. The laboratory reporting limit for BTEX is 10 nanograms. Limited information regarding EPA Method TO-17 is provided in **Attachment D**. Additional information can be found on the Air Toxics website at www.airtoxics.com/literature/TO-17pdf.

Upon completion of the soil vapor sample collection, Clearwater recommends that at least 3 additional soil borings (S9 through S11) be completed in the vicinity of the former fuel dispenser. Each soil boring will be completed to approximately 4 feet bgs and a soil sample will be collected at the termination of the boring for submittal to Kiff for the analysis of TPHd by EPA Method 8015M and BTEX by EPA Method 8260B. Clearwater recommends that the laboratory homogenize each sample prior to the analysis of TPHd to reduce the risk of variance in the results. The soil samples collected for the analysis of BTEX will be prepared in the field using EPA Method 5035. Portions of the soil sample will be retained for visual classification according to the Unified Soil Classification System as well as field screened with a photo-ionization detector (PID).



Standard Operating Procedure for Drilling, Soil Sampling, and Analysis

Prior to conducting field activities, a soil boring permit for drilling will be obtained from the Alameda County Public Works Agency and the site specific Health and Safety Plan will be updated as needed. All field personnel on-site will review and sign the site specific Health and Safety plan, prepared in accordance with OSHA 1910.120, at the start of the field day. All fieldwork will be conducted in accordance with Clearwater's Field Procedures (**Attachment E**).

Proposed Investigation Report Preparation

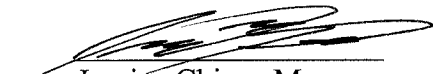
Upon receiving the analytical results of the soil vapor and soil sampling event Clearwater will prepare a report under the supervision of a Professional Geologist in the State of California describing in detail the methodology used to collect the samples, their results and any field observations made at the time of the sample collection. Clearwater recommends that if the soil vapor samples submitted for analysis contain detectable concentrations of TPHd or BTEX above the standard laboratory reporting limit, a Risk Based Contaminant Analysis (RBCA) be completed to further evaluate the potential human health risk due to indoor vapor intrusion.

CERTIFICATION

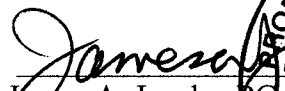
This report was prepared under the supervision of a Professional Geologist in the State of California. All statements, conclusions and recommendations are based solely upon reported results from previous work, field observations by Clearwater and analyses performed by a California State-certified laboratory related to the work performed by Clearwater. Information and interpretation presented herein is for the sole use of the client and regulating agency. A third party should not rely upon the information contained in this document. The service performed by Clearwater has been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of this profession currently practicing under similar conditions in the area of the site. No other warranty, expressed or implied, is made.

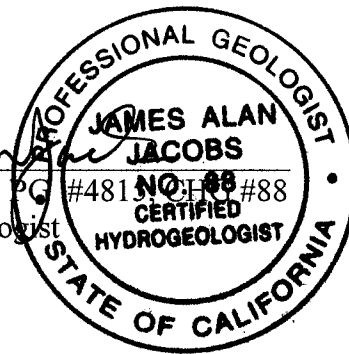
Sincerely,

Clearwater Group



Jessica Chiaro-Moreno
Project Manager


James A. Jacobs, PG
Chief Hydrogeologist





FIGURES:

Figure 1: Site Location Map

Figure 2: Site Plan

Figure 3: Proposed Soil Boring and Soil Vapor Sample Locations

TABLES:

Table 1: Soil Sampling Analytical Results

ATTACHMENTS:

Attachment A: Alameda County Health Care Services letter dated March 24, 2006

Attachment B: Soil Boring Log (S8)

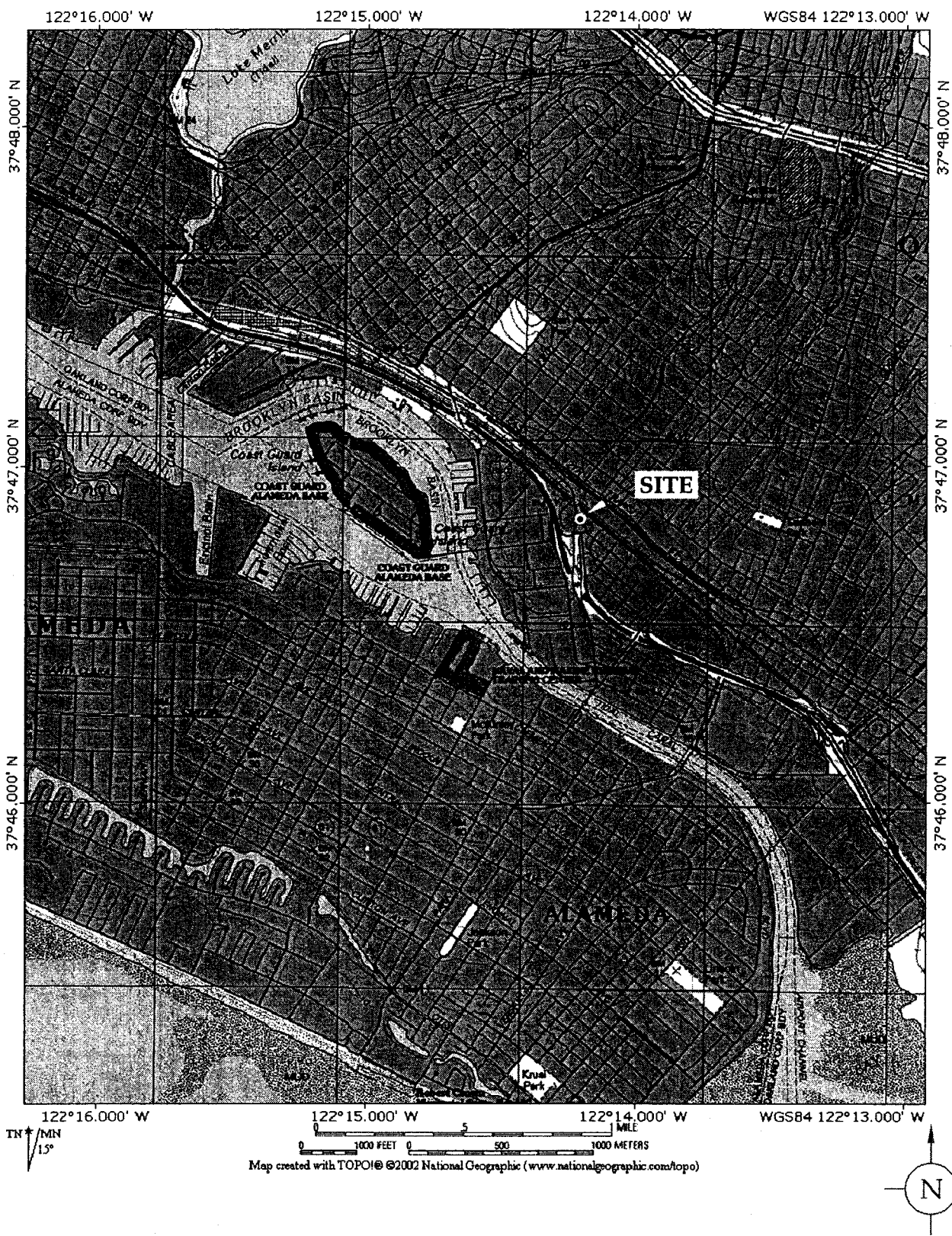
Attachment C: Geoprobe® Soil Gas Sampling System Description

Attachment D: EPA Method TO-17 Description

Attachment E: Clearwater Group Field Protocols

cc: Mr. Dermot O'Doherty
P&D 23rd Avenue Associates
c/o: Madison Park Financial Corporation
P.O. Box 687
Oakland, CA 94604

FIGURES



Site Vicinity Map

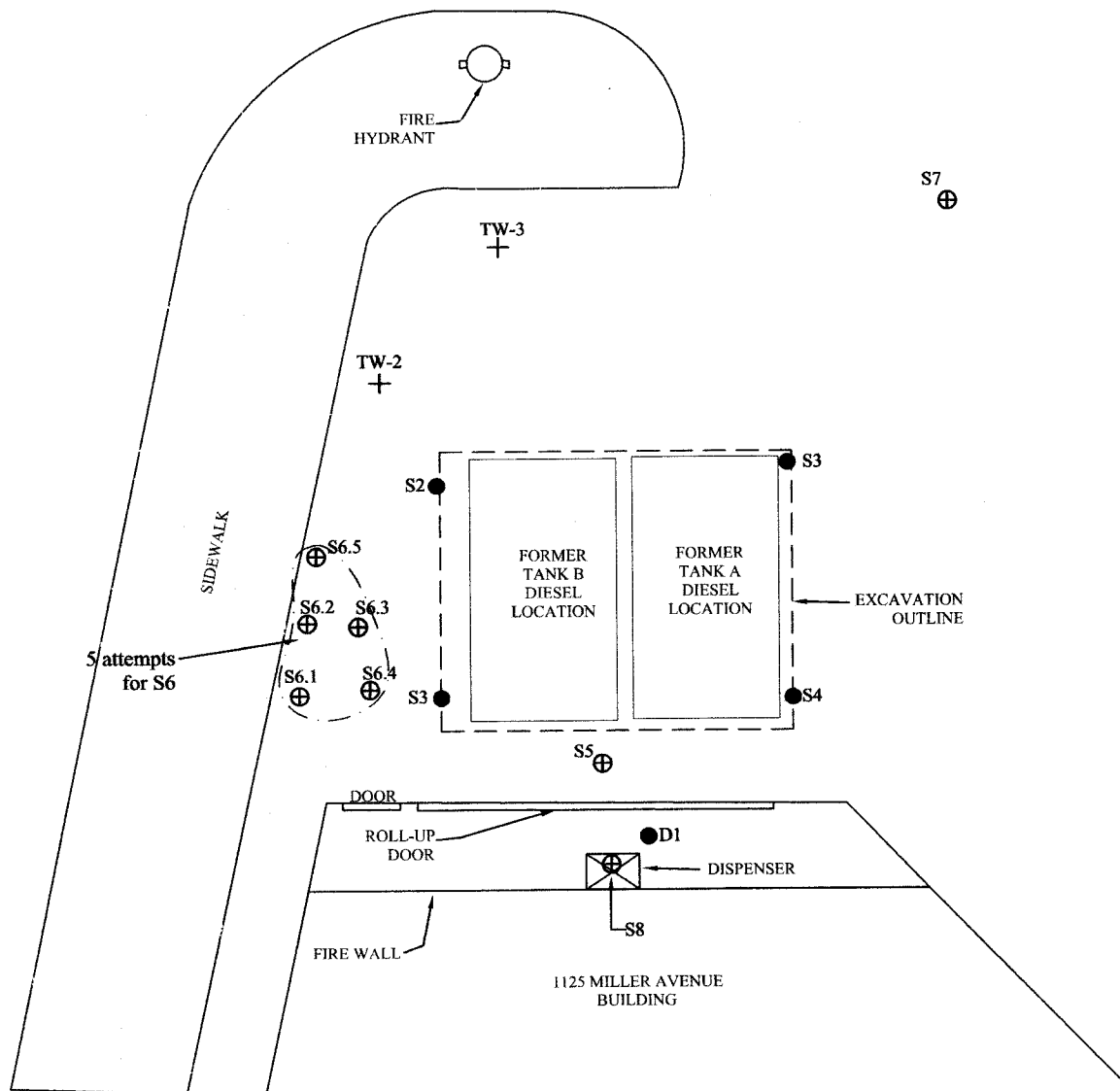
1125 Miller Avenue
Oakland, California

CLEARWATER GROUP

Project No.
CB018

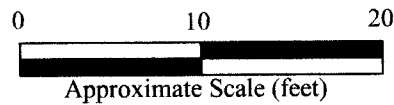
Figure Date
9/05

Figure
1



LEGEND

- S1-S4 Soil Boring Location (12/2/98)
- S5-S8 Soil Boring Location (11/16/05)
- D1 Soil Sample Location (10/24/00)
- TW-3 Temporary Well (10/24/00)



*Note: Five attempts to bore S6 met refusal at 4-6' due to subsurface debris

SITE MAP

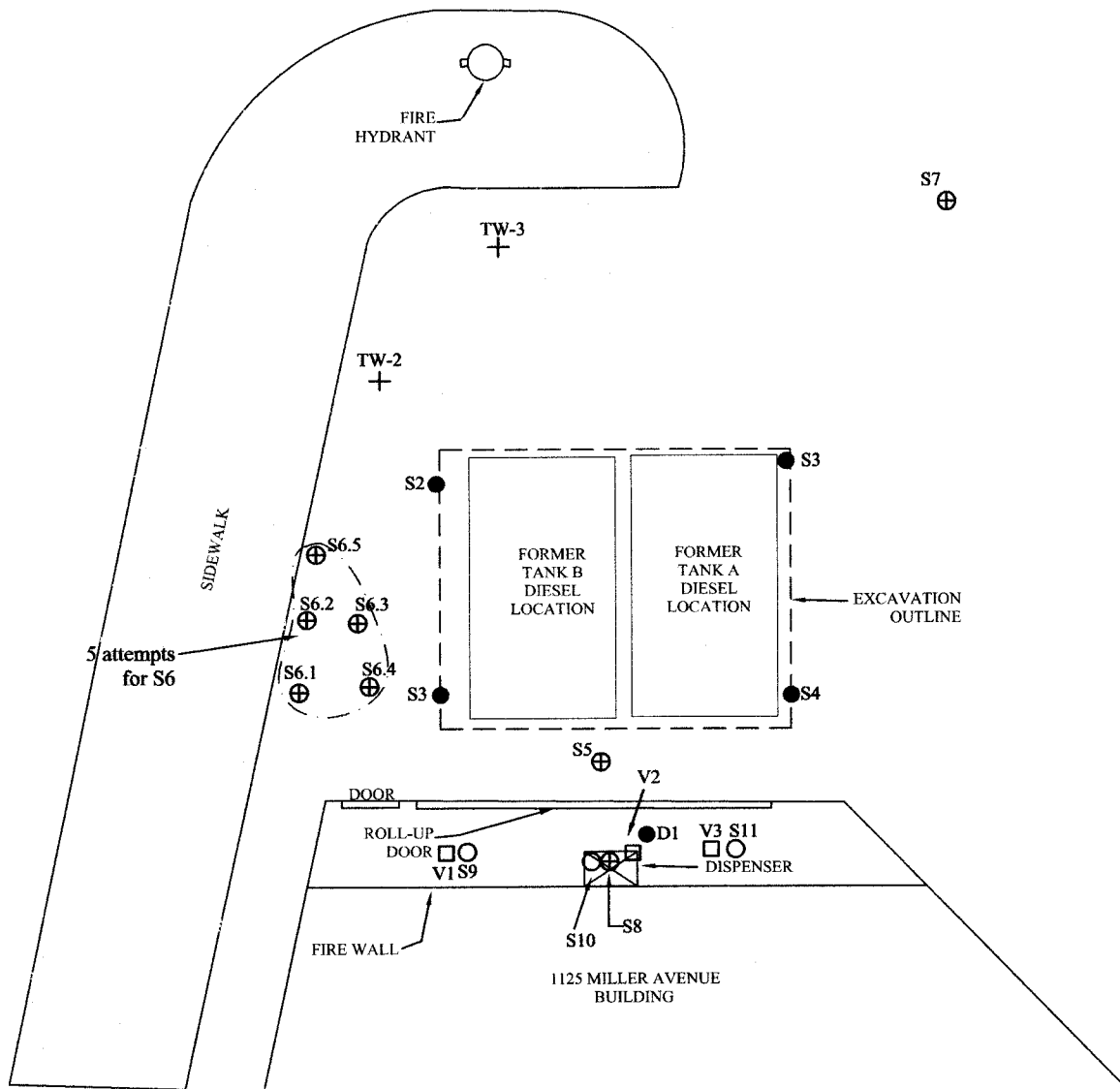
1125 Miller Avenue
Oakland, California

CLEARWATER GROUP

Project No.
CB018D

Figure Date
12/05

Figure
2



LEGEND

- S1-S4 ⊕ Soil Boring Location (12/2/98)
- S5-S8 ⊕ Soil Boring Location (11/16/05)
- D1 ● Soil Sample Location (10/24/00)
- TW-3 + Temporary Well (10/24/00)
- S9 ○ Proposed Boring Location
- V1 □ Proposed Soil Vapor Sample Location

*Note: Five attempts to bore S6 met refusal at 4-6' due to subsurface debris

PROPOSED SOIL BORING & SOIL VAPOR SAMPLE LOCATIONS 1125 Miller Avenue Oakland, California	CLEARWATER GROUP		
	Project No. CB018E	Figure Date 05/06	Figure 3

TABLES

TABLE 1
SOIL SAMPLING ANALYTICAL RESULTS
 23rd Avenue Partners
 1125 Miller Avenue
 Oakland, CA
 Clearwater Project No. CB018

Sample (#)	Sampling Date	TPHd (mg/Kg)	B (mg/Kg)	T (mg/Kg)	E (mg/Kg)	X (mg/Kg)	MTBE (mg/Kg)
TW2 -16.5	24-Oct-00	4,200	1.4	ND	ND	ND	ND
TW3-17	24-Oct-00	2,700	ND	ND	ND	ND	ND
D1-3	24-Oct-00	3,400	ND	ND	ND	ND	ND
D1-8	24-Oct-00	34	ND	ND	ND	ND	ND
S5-5	16-Nov-05	14**	<0.0050	<0.0050	<0.0050	<0.0050	*****
S5-10	16-Nov-05	610	<0.0050	<0.0050	<0.0050	<0.0050	*****
S5-15	16-Nov-05	620	<0.0050	<0.0050	<0.0050	<0.0050	*****
S5-20	16-Nov-05	5.8	<0.0050	<0.0050	<0.0050	<0.0050	*****
S7-5	16-Nov-05	150* ¹	<0.0050	<0.0050	<0.0050	<0.0050	*****
S6-6	16-Nov-05	1,800* ¹	NA* ²	NA* ²	NA* ²	NA* ²	*****
S7-10	16-Nov-05	32* ¹	<0.0050	<0.0050	<0.0050	<0.0050	*****
S7-15	16-Nov-05	1,200	<0.0050	<0.0050	<0.0050	<0.0050	*****
S7-20	16-Nov-05	300	<0.0050	<0.0050	<0.0050	<0.0050	*****
S8-4	16-Nov-05	92	<0.0050	<0.0050	<0.0050	<0.0050	*****

NOTES: SOIL SAMPLES

- TPHd Total petroleum hydrocarbons as diesel using EPA Method 8015/8020(modified)
- B Benzene using EPA Method 8015/8020 (modified)
- T Toluene using EPA Method 8015/8020 (modified)
- E Ethyl benzene using EPA Method 8015/8020 (modified)
- X Xylenes using EPA Method 8015/8020 (modified)
- MTBE Methyl tertiary-butyl ether using EPA Method 8260
- mg/Kg Milligrams per kilogram (approximately equal to parts per million)
- NA Not analyzed
- ND Not detected/below laboratory reporting limits
- TW3-17 Temporary well number and depth sampled
- S5-5 Soil boring and depth sampled.
- <0.0050 Not detected in concentrations exceeding the indicated laboratory reporting limit

*¹ Concentration reported is atypical for diesel, these hydrocarbons have a higher boiling point

*² Analysis not performed due to lack of sample volume.

***** Analysis of MTBE not required by ACEH.

Analytical results reported in italics are from the December 31, 2001 *Subsurface Exploration Report* prepared by Environmental Bio-Systems.

ATTACHMENT A

ALAMEDA COUNTY
HEALTH CARE SERVICES



AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

March 24, 2006

Mr. Allen Pelton
23rd Avenue Partners
P.O. Box 7509
Oakland, CA 94601

Subject: Fuel Leak Case No. RO0000294, 1125 Miller Avenue, Oakland, CA

Dear Mr. Pelton:

Alameda County Environmental Health (ACEH) staff has reviewed the fuel leak case file for the above-referenced site and the report entitled, "Subsurface Investigation Results," dated February 23, 2006, prepared on your behalf by Clearwater Group. The report presents the results of soil and groundwater sampling conducted at the site on November 16, 2005. Based upon our review of these results, ACEH requests that a **Response to Agency Comments be submitted by May 31, 2006 to address the technical comments below.**

We request that you address the following technical comments, perform the proposed work, and send us the reports described below.

TECHNICAL COMMENTS

1. **Groundwater Monitoring Wells.** Based on the investigation results to date and site hydrogeology, the installation of a groundwater monitoring network or additional grab groundwater sampling is not required by ACEH at this time.
2. **Soil Contamination in the Area of the Former Dispenser.** In previous correspondence dated August 31, 2005, ACEH expressed concern with the potential for shallow soil contamination inside the building in the area of the former dispenser. As proposed in the "Response to Agency Comments and Workplan Addendum," dated October 12, 2005, boring S8 was advanced to a depth of four feet bgs at the former location of the fuel dispenser in order "to confirm or rule out any historic dispenser leakage." Total petroleum hydrocarbons as diesel were detected at a concentration of 92 milligrams per kilogram (mg/kg) in the soil sample collected at a depth of 3 to 4 feet below ground surface (bgs) in boring S8. However, the boring log for S8 indicates that product was observed surrounding the soil core and a strong diesel odor was observed. The observance of product around the core and a strong diesel odor does not appear to be consistent with the detection of 92 mg/kg of TPHd. Residual product in the soil would result in higher concentrations than 92 mg/kg. A soil sample collected at a depth of 3 feet bgs in boring D1, which was advanced in the area of the former dispenser in October 2000, contained 3,400 mg/kg of TPHd. Please discuss any factors that may have affected the sampling and analytical results for boring S8. In addition, please evaluate and discuss the potential for residual product in shallow soil to create nuisance odors inside the building or pose a potential human health risk due to indoor vapor

intrusion. Please propose any additional work that may be required to complete this evaluation or to remediate the shallow soil in the area of the dispenser.

TECHNICAL REPORT REQUEST

Please submit technical reports to Alameda County Environmental Health (Attention: Jerry Wickham), according to the following schedule:

- **May 31, 2006** – Response to Agency Comments

These reports are being requested pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from a petroleum UST system, and require your compliance with this request.

ELECTRONIC SUBMITTAL OF REPORTS

Effective **January 31, 2006**, the Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of all reports in electronic form to the county's ftp site. Paper copies of reports will no longer be accepted. The electronic copy replaces the paper copy and will be used for all public information requests, regulatory review, and compliance/enforcement activities. Instructions for submission of electronic documents to the Alameda County Environmental Cleanup Oversight Program ftp site are provided on the attached "Electronic Report Upload (ftp) Instructions." Please do not submit reports as attachments to electronic mail.

Submission of reports to the Alameda County ftp site is an addition to existing requirements for electronic submittal of information to the State Water Resources Control Board (SWRCB) Geotracker website. Submission of reports to the Geotracker website does not fulfill the requirement to submit documents to the Alameda County ftp site. In September 2004, the SWRCB adopted regulations that require electronic submittal of information for groundwater cleanup programs. For several years, responsible parties for cleanup of leaks from underground storage tanks (USTs) have been required to submit groundwater analytical data, surveyed locations of monitor wells, and other data to the Geotracker database over the Internet. Beginning July 1, 2005, electronic submittal of a complete copy of all necessary reports was required in Geotracker (in PDF format). Please visit the SWRCB website for more information on these requirements (http://www.swrcb.ca.gov/ust/cleanup/electronic_reporting).

In order to facilitate electronic correspondence, we request that you provide up to date electronic mail addresses for all responsible and interested parties. Please provide current electronic mail addresses and notify us of future changes to electronic mail addresses by sending an electronic mail message to me at jerry.wickham@acgov.org.

PERJURY STATEMENT

All work plans, technical reports, or technical documents submitted to ACEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following: "I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge." This letter must be signed by an officer or legally authorized representative of your company. Please include a cover

Mr. Allen Pelton
March 24, 2006
Page 3

letter satisfying these requirements with all future reports and technical documents submitted for this fuel leak case.

PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6735, 6835, and 7835.1) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately registered or certified professional. For your submittal to be considered a valid technical report, you are to present site specific data, data interpretations, and recommendations prepared by an appropriately licensed professional and include the professional registration stamp, signature, and statement of professional certification. Please ensure all that all technical reports submitted for this fuel leak case meet this requirement.

UNDERGROUND STORAGE TANK CLEANUP FUND

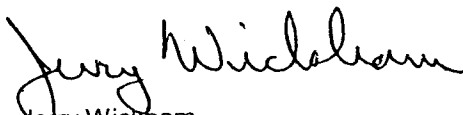
Please note that delays in investigation, later reports, or enforcement actions may result in your becoming ineligible to receive grant money from the state's Underground Storage Tank Cleanup Fund (Senate Bill 2004) to reimburse you for the cost of cleanup.

AGENCY OVERSIGHT

If it appears as though significant delays are occurring or reports are not submitted as requested, we will consider referring your case to the Regional Board or other appropriate agency, including the County District Attorney, for possible enforcement actions. California Health and Safety Code, Section 25299.76 authorizes enforcement including administrative action or monetary penalties of up to \$10,000 per day for each day of violation.

If you have any questions, please call me at (510) 567-6791.

Sincerely,



Jerry Wickham
Hazardous Materials Specialist

Enclosure: ACEH Electronic Report Upload (ftp) Instructions

cc: Jessica Chiaro-Moreno
Clearwater Group
229 Tewksbury Avenue
Point Richmond, CA 94801

Donna Drogos, ACEH
Jerry Wickham, ACEH
File

ATTACHMENT B

CLEARWATER

GROUP, INC.

Environmental Services

229 Tewksbury Ave, Point Richmond, California 94801

CLIENT/ 1125 Miller Ave
LOCATION Oakland, CA

BORING/WELL CONSTRUCTION LOG

DRILLING CONTRACTOR **Fast-Tek**
 DRILL RIG OPERATOR **Eric Austin**
 DRILL RIG TYPE **Geo Probe 5400**
 LOGGED BY **JCG**
 REVIEWED BY **Jim Jacobs**
 PLANNED USE **soil investigation**
 DATES DRILLED: **11/16/05**
 DRILLING START **1645**
 DRILLING FINISH **1700**

BORING/
WELL NUMBER **S8**
 PROJECT NUMBER **CB018D**
 BORING DEPTH **4'**
 WELL DEPTH **-**
 SCREEN SLOT SIZE **-**
 BORE/CASE DIAMETER **2"**
 FILTER PACK **-**
 WELL MATERIAL **-**
 DEPTH TO WATER **N/A**

☒ Approximate First Encountered Water Depth
 ☒ Approximate Stabilized Water Depth

DEPTH (feet)	SAMPLING			WATER LEVEL	OVM READING (ppm)	LITHOLOGY	USCS SYMBOL	LITHOLOGIC DESCRIPTION/ NOTES	WELL CONSTRUCTION DETAILS
	INTERVAL	RECOVERY	ANALYTICAL						
0								(0.0- 4.0) Clay; dark brown; moist; dense; high plasticity; minor gravel and sand; product surrounding soil core @ 3-4'; strong diesel odor	0
1					6				-1
2					22		CH		-2
3									-3
4									-4
5									-5
6									-6
7									-7
8									-8
9									-9
10									-10
11									-11
12									-12
13									-13
14									-14
15									-15
16									-16
17									-17
18									-18
19									-19
20									-20

PID battery ran out @1700hrs and was not used to screen below 2' @ S8

* Indicates sample sent to lab for analysis

ATTACHMENT C

COLLECTING A VALID TO-17 SAMPLE

What is the best way to ensure success?

Because the composition of the sample is often unknown, it is best to collect a series of samples using 2 or 3 different sample volumes. This is referred to as distributive volume sampling. The method specifies that a 1 and 5L sample be collected; however, this may not meet project DQO. If calculations indicate that the sample volume should be 10 L, it is best to collect a 5 L, a 10 L and a 20 L sample. The laboratory will first analyze the 5 L sample to determine if this is sufficient sample volume to provide the high quality data. Often the data from the 5 L is sufficient to satisfy project objectives. Distributive sampling results in an additional analysis, but it may eliminate the need for re-sampling by ensuring usable, defensible data.

What kind of compounds is amenable to this technique?

When using a CarboTrap 300 sorbent tube, the compounds should have boiling points between -25 (chloromethane) and 317 °C. If the boiling point is less than -25 °C, there is a concern about breakthrough (a common problem with VOCs). If the boiling point is greater than 300 °C, it is difficult to quantitatively thermally desorb the compound from the sorbent. In addition, the compound(s) must be thermally stable so that no degradation or decomposition occurs during desorption.

How is the sample actually collected?

There are mg quantities of sorbents used in the multi-bed CarboTrap 300 TO-17 tube; consequently the sorbent tube has very little pressure drop. This means that a portable industrial hygiene pump can be used. These pumps are battery powered and can be used for extended periods of time. One must record the sampling time and rate to determine the sample volume "pulled" through the tube.

What flow rate should be used?

The flow rate through the sorbent tube is generally kept below 1 L/minute. Rates of 0.1- 0.5 L/min. are common. There is no lower limit to the flow; rates as low as 0.005 L/min. have been used to extend the sampling interval.

What about water and acid in the sample?

Ambient air normally does not contain enough water or acid to render the technique unusable. When analyzing high moisture samples like landfill gas or stationary sources, water and acid do not normally pose a problem given the low volumes (1 - 5 L) sampled. Of course water, as such, should not be allowed to enter the tube. If it is raining, cover the tube inlet. Should the tube become saturated with water, there is danger that it will effectively "deactivate" the surface of the sorbent. This will prevent the adsorption of the organics and possibly invalidate the sample. Excessive water or the presence of acid may also interfere with the analysis.

How should the tubes be stored and shipped?

The sorbent tube should always be stored in a glass transport tube containing a bit of activated charcoal. Tubes should be stored and transported at 4 °C.

What is the sample hold time?

Our data indicates that samples are stable on the sorbent (if properly stored) in excess of 60 days. The compounds are adsorbed on a high energy surface; they are not "free" to react. The tubes are cool and the sorbent area is dark; consequently, there is little energy available to either catalyze a reaction with another species or initiate decomposition.

For more information refer to *Air Toxics' Guide to Sorbent-Based Sampling: Volatiles and Semi-volatiles*

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Method : Modified TO-17 + TPHd

Compound	Rpt. Limit (nG)
Chloromethane	10
Vinyl Chloride	10
Bromomethane	20
Chloroethane	20
Freon 11	10
2-Chloropropane	10
1,1-Dichloroethene	10
Freon 113	10
Carbon Disulfide	10
3-Chloropropene	10
Methylene Chloride	10
trans-1,2-Dichloroethene	10
Acrylonitrile	10
Hexane	10
1,1-Dichloroethane	10
2,2-Dichloropropane	10
cis-1,2-Dichloroethene	10
Bromochloromethane	10
Chloroform	10
1,1,1-Trichloroethane	10
Carbon Tetrachloride	10
1,1-Dichloropropene	10
Benzene	10
1,2-Dichloroethane	10
Trichloroethene	10
1,2-Dichloropropane	10
Dibromomethane	10
Bromodichloromethane	10
cis-1,3-Dichloropropene	10
trans-1,3-Dichloropropene	10
Toluene	10
1,1,2-Trichloroethane	10
Tetrachloroethene	10
1,3-Dichloropropane	10
Dibromochloromethane	10
Chlorobenzene	10
1,2-Dibromoethane (EDB)	10
Ethyl Benzene	10
m,p-Xylene	10
o-Xylene	10
Styrene	10
Bromoform	10
1,1,2,2-Tetrachloroethane	10

Reporting Limits cited do not take into account sample dilution due to canister pressurization.

AIR TOXICS LTD.

Method : Modified TO-17 + TPHd

Compound	Rpt. Limit (nG)
1,3-Dichlorobenzene	10
1,4-Dichlorobenzene	10
1,2-Dichlorobenzene	10
Cumene	10
<u>cis-1,4-Dichloro-2-butene</u>	50
Bromobenzene	10
1,2,3-Trichloropropane	10
trans-1,4-Dichloro-2-butene	50
Propylbenzene	10
<u>2-Chlorotoluene</u>	10
4-Chlorotoluene	10
1,3,5-Trimethylbenzene	10
tert-Butylbenzene	10
1,2,4-Trimethylbenzene	10
<u>sec-Butylbenzene</u>	10
p-Cymene	10
1,2-Dibromo-3-chloropropane	50
1,2,4-Trichlorobenzene	50
Naphthalene	50
<u>Hexachlorobutadiene</u>	50
1,2,3-Trichlorobenzene	50
1,1,1,2-Tetrachloroethane	10
Butylbenzene	10
TPH (Diesel Range)	100

Surrogate	Method Limits
Dibromofluoromethane	70-130
1,2-Dichloroethane-d4	70-130
Toluene-d8	70-130
4-Bromofluorobenzene	70-130

Reporting Limits cited do not take into account sample dilution due to canister pressurization.

METHOD TO-17

Determination of Volatile Organic Compounds in Ambient Air Using Active Sampling Onto Sorbent Tubes

1. Scope

1.1 This document describes a sorbent tube/thermal desorption/gas chromatographic-based monitoring method for volatile organic compounds (VOCs) in ambient air at 0.5 to 25 parts per billion (ppbv) concentration levels. Performance criteria are provided as part of the method in Section 14. EPA has previously published Compendium Method TO-1 describing the use of the porous polymer Tenax® GC for sampling nonpolar VOCs and Compendium Method TO-2 describing the use of carbon molecular sieve for highly volatile, nonpolar organics (1). Since these methods were developed, a new generation of thermal desorption systems as well as new types of solid adsorbents have become available commercially. These sorbents are used singly or in multisorbent packings. Tubes with more than one sorbent, packed in order of increasing sorbent strength are used to facilitate quantitative retention and desorption of VOCs over a wide volatility range. The higher molecular weight compounds are retained on the front, least retentive sorbent; the more volatile compounds are retained farther into the packing on a stronger adsorbent. The higher molecular weight compounds never encounter the stronger adsorbents, thereby improving the efficiency of the thermal desorption process.

1.2 A large amount of data on solid adsorbents is available through the efforts of the Health and Safety Laboratory, Health and Safety Executive (HSE), Sheffield, United Kingdom (UK). This group has provided written methods for use of solid adsorbent packings in monitoring workplace air. Some of their documents on the subject are referenced in Section 2.2. Also, a table of information on safe sampling volumes from their research is provided in Appendix 1.

1.3 EPA has developed data on the use of solid sorbents in multisorbent tubes for concentration of VOCs from the ambient air as part of its program for methods development of automated gas chromatographs. The experiments required to validate the use of these sorbent traps include capture and release efficiency studies for given sampling volumes. These studies establish the validity of using solid adsorbents for target sets of VOCs with minimal (at most one hour) storage time. Although questions related to handling, transport and storage of samples between the times of sampling and analysis are not addressed, these studies provide information on safe sampling volumes. Appendix 2 delineates the results of sampling a mixture of humidified zero air and the target VOCs specified in the Compendium Method TO-14 (2) using a specific multisorbent.

1.4 An EPA workshop was convened in November of 1995 to determine if a consensus could be reached on the use of solid sorbent tubes for ambient air analysis. The draft method available at the workshop has evolved through several reviews and modifications into the current document. The method is supported by data reported in the scientific literature as cited in the text, and by recent experimental tests performed as a consequence of the workshop (see Table 1).

1.5 The analytical approach using gas chromatography/mass spectroscopy (GC/MS) is identical to that mentioned in Compendium Method TO-15 and, as noted later, is adapted for this method once the sample has been thermally desorbed from the adsorption tube onto the focusing trap of the analytical system.

1.6 Performance criteria are given in Section 14 to allow acceptance of data obtained with any of the many variations of sampling and analytical approaches.

2. Summary of Method

2.1 The monitoring procedure involves pulling a volume of air through a sorbent packing to collect VOCs followed by a thermal desorption-capillary GC/MS analytical procedure.

2.2 Conventional detectors are considered alternatives for analysis subject to the performance criteria listed in Section 14 but are not covered specifically in this method text.

2.3 Key steps of this method are listed below.

2.3.1 Selection of a sorbent or sorbent mix tailored for a target compound list, data quality objectives and sampling environment.

2.3.2 Screening the sampling location for VOCs by taking single tube samples to allow estimates of the nature and amount of sample gases.

2.3.3 Initial sampling sequences with two tubes at nominally 1 and 4 liter total sample volumes (or appropriate proportional scaling of these volumes to fit the target list and monitoring objectives).

2.3.4 Analysis of the samples and comparison to performance criteria.

2.3.5 Acceptance or rejection of the data.

2.3.6 If rejection, then review of the experimental arrangement including repeat analysis or repeat analysis with backup tubes and/or other QC features.

[Note: EPA requires the use of distributed volume pairs (see Section 14.4) for monitoring to insure high quality data. However, in situations where acceptable data have been routinely obtained through use of distributed volume pairs and the ambient air is considered well characterized, cost considerations may warrant single tube sampling. Any attendant risk to data quality objectives is the responsibility of the project's decision maker.]

2.4 Key steps in sample analysis are listed below.

2.4.1 Dry purge of the sorbent tube with dry, inert gas before analysis to remove water vapor and air. The sorbent tube can be held at temperatures above ambient for the dry purge.

2.4.2 Thermal desorption of the sorbent tube (primary desorption).

2.4.3 Analyte refocusing on a secondary trap.

2.4.4 Rapid desorption of the trap and injection/transfer of target analytes into the gas chromatograph (secondary desorption).

2.4.5 Separation of compounds by high resolution capillary gas chromatography (GC).

2.4.6 Measurement by mass spectrometry (MS) or conventional GC detectors (only the MS approach is explicitly referred to in Compendium Method TO-17; an FID/ECD detector combination or other GC detector can be used if Section 14 criteria are met. However, no explicit QA guidelines are given here for those alternatives).

2.5 The target compound list (TCL) is the same as listed in Compendium Method TO-15 (i.e., subsets of the 97 VOCs listed as hazardous pollutants in Title III of the Clean Air Act Amendments of 1990). Only a portion of these compounds has been monitored by the use of solid adsorbents. This method provides performance criteria to demonstrate acceptable performance of the method (or modifications of the method) for monitoring a given compound or set of compounds.

3. Significance

3.1 This method is an alternative to the canister-based sampling and analysis methods that are presented in Compendium Methods TO-14 and TO-15 and to the previous sorbent-based methods that were formalized as Compendium Methods TO-1 and TO-2. All of these methods are of the type that include sampling at one location, storage and transport of the sample, and analysis at another, typically more favorable site.

3.2 The collection of VOCs in ambient air samples by passage through solid sorbent packings is generally recognized to have a number of advantages for monitoring. These include the following:

- The small size and light weight of the sorbent packing and attendant equipment.
- The placement of the sorbent packing as the first element (with the possible exception of a filter or chemical scrubber for ozone) in the sampling train so as to reduce the possibility of contamination from upstream elements.
- The availability of a large selection of sorbents to match the target set of compounds including polar VOC.
- The commercial availability of thermal desorption systems to release the sample from the sorbent and into the analytical system.
- The possibility of water management using a combination of hydrophobic sorbents (to cause water breakthrough while sampling); dry gas purge of water from the sorbent after sampling; and splitting of the sample during analysis.
- The large amount of literature on the use of sorbent sampling and thermal desorption for monitoring of workplace air, particularly the literature from the Health and Safety Executive in the United Kingdom.

3.3 Accurate risk assessment of human and ecological exposure to toxic VOCs is an important goal of the U. S. Environmental Protection Agency (EPA) with increased emphasis on their role as endocrine disrupters. Accurate data is fundamental to reaching this goal. The portability and small size of typical sampling packages for sorbent-based sampling and the wide range of sorbent choices make this monitoring approach appealing for special monitoring studies of human exposure to toxic gases and to use in network monitoring to establish prevalence and trends of toxic gases. Microenvironmental and human subject studies are typical of applications for Compendium Method TO-17.

3.4 Sorbent-based monitoring can be combined with canister-based monitoring methods, on-site autoGC systems, open path instrumentation, and other specialized point monitoring instruments to address most monitoring needs for volatile organic gases. More than one of these approaches can be used simultaneously as a means to check and insure the quality of the data being produced.

ATTACHMENT D

CLEARWATER GROUP

Direct-Push Drilling Investigation Procedures

The direct push method of soil boring has several advantages over hollow-stem auger drill rigs. The direct push method produces no drill cuttings and is capable of 150 to 200 feet of boring or well installation per work day. Direct push can be used for soil gas surveys, soil sampling, groundwater sampling, installation of small-diameter monitoring wells, and components of remediation systems such as air sparge points. The equipment required to perform direct push work is varied ranging from a roto-hammer and operator to a pickup truck-mounted rig capable of substantial static downward force combined with percussive force. This method allows subsurface investigation work to be performed in areas inaccessible to conventional drill rigs such as in basements, beneath canopies, or below power lines. Direct push equipment is ideal at sites with unconsolidated soil or overburden, and for sampling depths of less than 30 feet. This method is not appropriate for boring through bedrock or gravelly soils.

Permitting and Site Preparation

Prior to direct push boring work, Clearwater Group will obtain all necessary permits and locate all underground and above ground utilities through Underground Service Alert (USA) and a thorough site inspection. All drilling equipment will be inspected daily and will be maintained in safe operating condition. All down-hole drilling equipment will be cleaned prior to arriving on-site. Working components of the rig near the borehole, as well as driven casing and sampling equipment will be thoroughly decontaminated between each boring location by either steam cleaning or washing with an Alconox® solution. All drilling and sampling methods will be consistent with ASTM Method D-1452-80 and county, state and federal regulations.

Boring Installation and Soil Sampling

Direct push uses a 1.5-inch outer barrel with an inner rod held in place during pushing. Soil samples are collected by penetrating to the desired depth, retracting the inner rod and attaching a spoon sampler. The sampler is then thrust beyond the outer barrel into native soil. Soil samples are recovered in brass or stainless containers lining the spoon.

Soil removed from the upper tube section is used for lithologic descriptions (according to the unified soil classification system) and for organic vapor field analysis. If organic vapors will be analyzed in the field, a portion of each soil sample will be placed in a plastic zip-lock bag. The bag will be sealed and warmed for approximately 10 minutes to allow vapors to be released from the soil sample and diffuse into the head space of the bag. The bag is then pierced with the probe of a calibrated organic vapor detector. The results of the field testing will be noted with the lithologic descriptions on the field exploratory soil boring log. Soil samples selected for laboratory analysis will be covered on both ends with Teflon™ tape and plastic end caps. The samples will then be labeled, documented on a chain-of-custody form and placed in a cooler for transport to a state certified analytical laboratory.

Temporary Well Installation and Groundwater Sampling

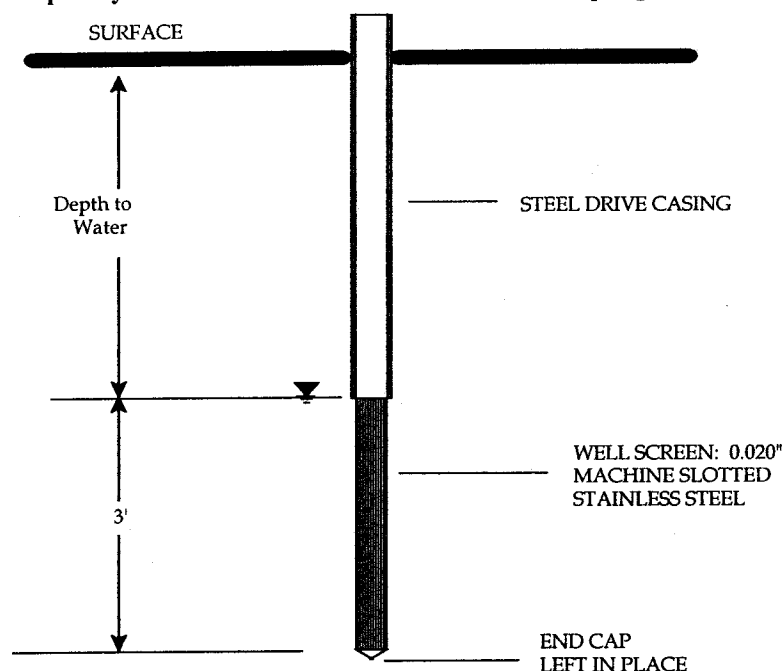


Figure 1

Groundwater samples are collected by removing the inner rod and attaching a 4-foot stainless steel screen with a drive point at the end (Figure 1). The screen and rod are then inserted in the outer barrel and driven to the desired depth where the outer rod is retracted to expose the screen. If enough water for sampling is not produced through the stainless well screen, a 1-inch PVC screen can be installed in the boring and the outer rod retracted to leave a temporary well point for collecting groundwater samples or water levels.

Monitoring Well Installation and Development

Permanent small-diameter monitoring wells are installed by driving the outer barrel and inner rod as described above. Upon reaching the desired depth the system is removed and 2-inch OD (1/2-inch ID) pre-packed PVC piping is installed. The well plug is created using granular bentonite. The well seal is constructed of cement and sealed at the surface with a conventional "Christy® Box" or similar vault. Monitoring wells are developed by surging the well with a small diameter bailer and removing 3 to 5 casing volumes of water until the produced water is clear.

Groundwater Sample Collection and Water Level Measurement

Prior to collecting groundwater from the wells the water levels are measured in all wells using an electronic water level gauge. Monitoring wells are prepared for sampling by purging three well bore volumes of water. Water is removed using small diameter bailers, a peristaltic pump, or manually using tubing with a check valve at the bottom. During removal of each volume, the temperature, pH and conductivity are measured and recorded on the field sampling form. Successive well volumes are removed until the parameters have stabilized or the well has gone dry. Prior to sampling, the well is allowed to recover to within 90% of the stabilized water levels.

Groundwater samples¹ are collected using small diameter bailers. The samples are decanted into laboratory supplied containers, labeled, recorded on a chain-of-custody form and placed on ice for transport to a certified laboratory.

¹ Small diameter wells often produce small sample quantities and are appropriate for analysis of volatile and aromatic compounds and dissolved metals analysis using VOA vials. Obtaining liter-size samples can be difficult and time consuming. Monitoring wells installed by the direct push method are most effective at sites where the subsurface soils are more coarse than silt, gasoline components are the key contaminants of concern, and water levels are not more than 25 feet below ground surface.

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5035SC™ Soil Core Sampler and Procedures

The purpose of the EPA Method 5035 is to reduce volatilization of soil samples prior to laboratory analyses. Other methods, notably ASTM (D4547-98) have also been developed to minimize losses in volatile organic compounds (VOC) and semi-volatile organic compound (SVOC) during soil sample collection and storage. Soil piles or even soil tubes from trenches or borings can use EPA Method 5035.

The United States Environmental Protection Agency (USEPA) developed EPA Method 5035, Closed-System Purge-and-Trap Extraction for Volatile Organics in Soil and Waste Samples in June 1997 in SW-846, Test Methods for Evaluating Solid Waste, Physical / Chemical Methods, Update III (Method 5035). In July 2002, USEPA updated the Method within SW-846 as Method 5035A. (USEPA, 2003). The 5035SC™ Sampler is a zero-headspace, multi-functional sampling device (MFSD) designed to meet the EPA Method 5035 and Florida Department of Environmental Protection FS 3000 approved methods. The MFSD act as both the coring tool and airtight storage container (USEPA, 2003).

5035SC™ SAMPLER

The 5035SC™ Sampler is a pre-cleaned syringe subcore sampler and storage device. The USEPA (2003) approves the use of the disposable plastic syringes that have been converted into subcoring devices. The syringe “needle end” has been cut off neatly, creating a blunt, even coring end. The 5035SC™ Sampler was designed to meet the description of the EPA, by being disposable, inexpensive, and to have zero headspace. The 5035SC™ Sampler requires no in-field weighing and no preservative. The 5035SC™ Sampler features a patented “plunger stop” sleeve which prevents the plunger from exiting the open end of the syringe. Each 5035SC™ Sampler comes with an airtight plastic cap. The disposable samplers may be used once per sampling location and should not be reused.

APPROVAL FOR USE

The California Regional Water Quality Control Board, Region 1 (North Coast) has approved the 5035SC™ Sampler for fuel related sites as both a coring and as a transportation device. The Department of Toxic Substances Control (DTSC) and the U.S. EPA (Region 9) have approved the 5035SC™ Sampler for use for the soil coring and preservation in the field at DTSC and EPA sites, respectively. Using the 5035SC™ Sampler as a transportation device for DTSC or EPA sites has not yet been approved.

COLLECTING THE SOIL

All sampling activities are to be performed using sanitary, industrial grade, chemically resistant gloves. The soil sample is collected using the 5035SC™ Sampler by removing the pre-cleaned plastic cap. The plunger is shipped in the forward position. Holding the wingtips on either side of the sampler body, the 5035SC™ Sampler is pushed into the soil to be sampled. The 4.5 to 5.5 grams of dry to semi-dry soils will pack tightly into the

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body of the 5035SC™ Sampler, pushing the plunger back to its rear position. The patented plunger stop of the 5035SC™ Sampler sleeve prevents the plunger from exiting the body of the sampler. The filled soil sampler containing 5 grams of soil is then removed from the soil and the airtight plastic cap is pushed over the open end of the sampler.

The soil sample is then either placed into specially prepared 40 ml glass VOAs for chemical preservation (see below) or placed into a hermetically sealed reclosable polyethylene-shipping bag. Once the 5035SC™ Sampler is placed in the sampler-shipping bag and is tagged with the waterproof label, it is ready to be placed into the cooler with the dry ice to be kept at $<-7^{\circ}$ C. Chain-of-custody procedures are used to accompany the samples to the laboratory.

SCREENING OF SOIL SAMPLES

In order to provide valuable soil analysis data, lithologic variations and heterogeneity, both vertically and laterally must be well characterized and understood so that representative soil samples are collected. Soil samples should be screened in the field with a meter that measures organic vapors, such as a photoionization detector (PID). Field screening gives a rough estimate of VOC concentration and other factors such as visual staining, soil discoloration and professional judgment should be used to pick the samples for EPA Method 5035.

FIELD PRESERVATION METHODS

There are several field preservation methods using a variety of procedures and chemicals. The preservation concepts are described below. For field preservation methods using chemicals, the 5035SC™ Sampler is then removed from the syringe and extruded into the glass VOA vial using the syringe's plunger if other field preservation methods are to be used. Please refer to USEPA, 2003 for more detailed preservation descriptions.

U.S. EPA and the California DTSC have approved the 5035SC™ Sampler for use as a soil-coring device. Field preservation methods are to be used with the 5035SC™ Sampler for EPA and DTSC sites. Many laboratories will supply consultants with the glass 40 ml VOAs with the preservation chemicals, as described below.

CHEMICAL PRESERVATION FOR LOW LEVEL ANALYSIS

Low Level Analysis uses a hermetically sealed sampling container, such as the 5035SC™ Sampler, and analysis of the sample in the laboratory by a closed-system purge-and-trap process. The Low Level Analysis method uses a direct purging of the VOCs from the liquid inserted into the soil sample in the field. The liquid can be either sodium bisulfate or reagent water, the former acts as both preservative and extractant medium, while the water acts only as an extractant medium. No sample dilution is involved, giving detection limits of approximately 0.5 µg/kg.

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The 5035SC™ Sampler has been approved for use as a coring device by U.S. EPA and the California DTSC. Field preservation methods are to be used with the 5035SC™ Sampler for EPA and DTSC sites.

CHEMICAL PRESERVATION FOR HIGH LEVEL ANALYSIS

The procedures for High Level Analysis use the same procedures outlined above, except methanol is the liquid used for both preservative and extractant medium. The samples are diluted with methanol yielding detection limits of greater than 200 µg/kg.

FIELD PRESERVATION BY FREEZING

The 5035SC™ Sampler can be used with field freezing with dry ice as the preservation method. Freezing the sample in its storage device immediately after collection preserves VOC concentrations in all samples matrices (including biologically active soils that would tend to degrade BTEX compounds) and for both types of VOC analytes for up to 14 days of storage. In one study, sample integrity was maintained with less than a 5% loss of analyte concentrations even after a 14-day holding time. Freezing can be initiated in the field through the use of dry ice in well-insulated coolers. Alternatively, bags of water ice mixed with table salt may be used to achieve cooler temperatures between -12 and -4°C (Hewitt, 1999). Dry ice is recommended as being the easiest method of field freezing and preservation. The disadvantage of using ice (4°C +/- 2°C) is that the samples would be required to be analyzed within 48 hours in the laboratory, instead of the 7 days for dry ice freezing.

After collecting the 4.5 to 5.5 grams of soil samples in the pre-cleaned 5035SC™ Sampler, the sampler is sealed with an airtight inert plastic cap. The 5035SC™ Sampler is then placed into a hermetically-sealed reclosable polyethylene shipping bag, with a waterproof label with date, time, sampler's name, sample number, site location, compounds of interest, chemical preservation techniques (if any), and laboratory equipment specifications or laboratory methods.

The 5035SC Samplers are then placed in a cooler with dry ice to ensure freezing of the 5035SC™ Samplers. There must be adequate dry ice to cool the samples to <-7° C and that the temperature is maintained in the cooler during transport to the laboratory. The samples are labeled and shipped under chain-of-custody procedures to the state-approved laboratory for the requested analysis. The 5035SC™ Samplers should not be frozen below -20° C. A temperature blank should be included with the samples so that the laboratory can verify the temperature upon receipt and the arrival temperature of the samples should be noted on the chain-of-custody forms. Because the entire sampling device is to be submitted to the laboratory, a visual inspection of the seals is required to be noted on the chain-of-custody by the receiving person at the laboratory to verify that the 5035SC™ Sampler is intact and sample volatilization has not occurred.

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LABORATORY HOLD TIME

The 5035SC™ Samplers preserved with dry ice the samples can be held at <-7° C for up to seven days prior to analysis from the sample collection date, providing the laboratory places the samples in a refrigerated environment or uses a chemical preservation method.

TEMPERATURE BLANK

Method 5035 requires and many laboratories expect three 5035SC™ Samplers for each soil sampling point. For example, if a soil boring has 2 samples, one at 5 feet and one at 10 feet below ground surface, three 5035SC™ Samplers are needed for each soil sampling point, with a total of six 5035SC™ Samplers required for the two sampling points. On the receiving end, an infrared thermometer should be used to measure the temperature blank when the samples arrive at the laboratory.

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PHOTOS SHOWING THE 5035SC™ SAMPLER

- 1) The soil sample is collected using the 5035SC™ Sampler by removing the pre-cleaned plastic cap. The plunger will be in the forward position.
- 2) Holding the wingtips on either side of the sampler body, push the 5035SC™ Sampler into the soil to be sampled. The soil will pack tightly into the body of the 5035SC™ Sampler, pushing the plunger back to its rear position. The patented plunger stop of the 5035SC™ Sampler sleeve prevents the plunger from exiting the body of the sampler.
- 3) Remove the filled soil sampler from the soil and press the airtight plastic cap over the open end of the sampler. The soil sample is placed into a hermetically sealed reclosable polyethylene-shipping bag.
- 4) Once the 5035SC™ Sampler is placed in the sampler shipping bag and is tagged with the waterproof label, it is ready to be placed into the cooler with the dry ice to be kept at $<-7^{\circ}\text{C}$ (7-days) or ice cooled to 4°C (48-hour preservation).

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