N00247.000631
NTC SAN DIEGO
SSIC #5090.3

ADDENDUM
FINAL EXPANDED SITE INSPECTION
WORK PLAN

NAVAL TRAINING CENTER, SAN DIEGO, CA

Contract No. N68711-96-D-2111 D.O. No 0003
SOTA Project No. 97HW025

SITE 15, BUILDING 443
FORMER DRY-CLEANING TRAINING FACILITY

October 19, 1998

SOTA
Environmental Technology, Inc.

Addendum
Final Work Plan
Expanded Site Inspection, Site 15, Building 443
Former Dry-Cleaning Training Facility
Naval Training Center
San Diego, California

Prepared for:

Southwest Division
Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Building 127, Room 112
San Diego, CA 92132-5187

Indefinite Quantity Contract for A-E Services Underground Storage Tank Engineering Surveys and Prepare Designs

Contract No. N68711-96-D-2111 D.O. No. 0003

October 19, 1998

Prepared by:

SOTA Environmental Technology, Inc.
16980 Via Tazon, Suite 130
San Diego, CA 92127-1633

Signature: V. Saravanan Date: 10-19-98

Signature: [illegible] Date: 10/19/98

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NTC SAN DIEGO
SSIC # 5090.3

FINAL EXPANDED SITE INSPECTION WORK PLAN SITE 15, BUILDING 443 FORMER DRY-CLEANING TRAINING FACILITY

DATED 28 MAY 1998

IS ENTERED IN THE DATABASE AND FILED AT ADMINISTRATIVE RECORD NO. **N00247.000506**

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ACRONYMS/ABBREVIATIONS

DoN	Department of the Navy
DQO	Data Quality Objectives
EPA	Environmental Protection Agency
FSP	Field Sampling Plan
IDIQ	Indefinite Delivery Order and Indefinite Quantity
NTC	Naval Training Center
PCE	Tetrachloroethene (aka: Perchloroethylene)
QAPP	Quality Assurance Project Plan
RWQCB	Regional Water Quality Control Board
QA/QC	Quality Assurance/Quality Control
SI	Site Inspection
SOTA	SOTA Environmental Technology, Inc.
SWDIV	Southwest Division Naval Facilities Engineering Command
TEG	Transglobal Environmental Geochemistry
US EPA	United States Environmental Protection Agency

1.0 INTRODUCTION

SOTA Environmental Technology, Inc. (SOTA) has prepared this Addendum to the Final Expanded Site Inspection Work Plan, Site 15 – Building 443, Naval Training Center (NTC), San Diego, California. This Work Plan dated May 28, 1998 was approved by the United States Environmental Protection Agency, Region IX, San Francisco (US EPA) and the Regional Water Quality Control Board, San Diego Region (RWQCB).

SOTA performed the expanded Site Inspection (SI) in accordance with the work plan on behalf of the United States Department of the Navy (DoN), Southwest Division Naval Facilities Engineering Command (SWDIV) in accordance with Delivery Order # 0003. This DO was issued under the Indefinite Delivery Order and Indefinite Quantity (IDIQ) Contract for A-E Services, contract No. N68711-96-D-2111.

This addendum to the work plan presents the soil gas sampling design, rationale, and procedures, soil gas sample analysis methodology, and Quality Assurance (QA) / Quality Control (QC) protocol towards conducting an active soil gas investigation. This addendum must only be used in conjunction with the Work Plan and its Attachments (Field Sampling Plan, Quality Assurance Project Plan, Health and Safety Plan, and Investigative Derived Waste Management Plan).

1.1 BACKGROUND

The technical approach that was presented in the Work Plan was developed following US EPA's Guidance for the Data Quality Objectives (DQO) Process. The seven step DQO process has been followed in the implementation of the work plan. The soil gas investigation is being conducted to meet the decision criteria that were developed to resolve the decision question of this investigation (Section 4, Work Plan).

Subsequent to the completion of Phase I of the field activities that were identified in the Work Plan, a data review meeting was held at the RWQCB office on July 1, 1998. The meeting was attended by representatives from US EPA, RWQCB, SWDIV, NTC, and SOTA. SOTA summarized the field activities along with the data that was collected and indicated that adequate evaluation of the subsurface conditions at Site 15 had been completed. Based on this, SOTA indicated that Phase II field activities were not warranted and the Site Assessment Report could be prepared with recommendations for case closure. During the discussion that followed among the attendees, the US EPA and RWQCB representatives concurred that adequate evaluation had been completed and a limited risk assessment should be conducted and presented towards case closure requirements. Accordingly, the following studies were suggested: (1) a fate and transport study of the potential migration of subsurface residual contamination to San Diego Bay, and (2) potential inhalation hazard as a result of possible vapor phase migration to indoor air.

1.2 Objective

The objective of this study is to perform an active soil gas survey beneath Building 443, in order to conduct a representative evaluation of the inhalation hazard for Building 443 (source area). The results of the soil gas sample analyses will be used to estimate the indoor air concentration of Tetrachloroethylene (PCE). The estimated indoor PCE concentration would be used in SOTA's risk assessment to estimate the excess cancer risk as a result of the residual PCE contamination beneath the building.

2.0 SUMMARY OF ACTIVITIES

The technical approach for the performance of the field activities is described in this section.

2.1 Field Investigation

Building 443, which housed the Dry Cleaning Training Facility, has a concrete floor. Figure 1 shows the plan view and the location of the dry cleaning machines and washers at the building. Soil gas samples will be collected from the subsurface soil beneath the building floor. The samples will be analyzed to determine the vapor phase PCE concentrations.

2.1.1 Soil Gas Sampling

This soil gas survey will be conducted in general accordance with the "Interim Guidance for Active Soil Gas Investigation", California Regional Water Quality Control Board-Los Angeles Region (February 25, 1997), which is included as Appendix A.

Transglobal Environmental Geochemistry, Solana Beach, CA (TEG) will be the subcontractor performing the vapor sampling and analysis (using a mobile laboratory). Soil vapor sampling procedures and analytical methodology will include TEG's Soil Vapor Standard Operating Procedures that are presented in Appendix B.

The TEG sampling procedures describe the vapor probe construction, probe insertion, collection of the soil gas, flushing and decontamination procedures, field collection log, and transfer of samples to the laboratory.

2.1.1.1 Sampling Location and Rationale

The sampling is proposed to be conducted in two phases. A total of 6 to 9 sampling points are proposed on the building floor. At each sampling point on the building floor, samples will be collected at two depths. The selection of the depths at which the samples are proposed to be collected are discussed later in this section in detail. Four sampling locations are proposed as part of the first phase as shown in Figure 1. These locations conform to a grid of approximately 20 feet by 35 feet for the entire floor area of Building 443. Based on a real-time evaluation of

mobile laboratory analytical results of the Phase I samples (4 locations-8 samples), an additional 2 to 5 locations on the building floor will be decided in the field. These samples will be collected at a depth varying from 1 to 5 feet bgs. Phase I samples which are reported at concentrations above detection limits will require at least one additional sampling location within a radial distance of 10 feet.

The pathway of the PCE vapor phase that is of interest in this investigation is the upward transport from residual soil and/or groundwater contamination. The potential migration of this vapor phase through the concrete slab (cracks, etc.) to the indoor air of Building 443 will complete the potential inhalation exposure pathway. Accordingly, the PCE vapor in the vadose zone soil immediately beneath the building's concrete floor would serve as the source (located contiguous to the building's indoor air), for potential migration of PCE vapor into the building. This soil zone is considered to be 0 to 5 feet below the concrete floor.

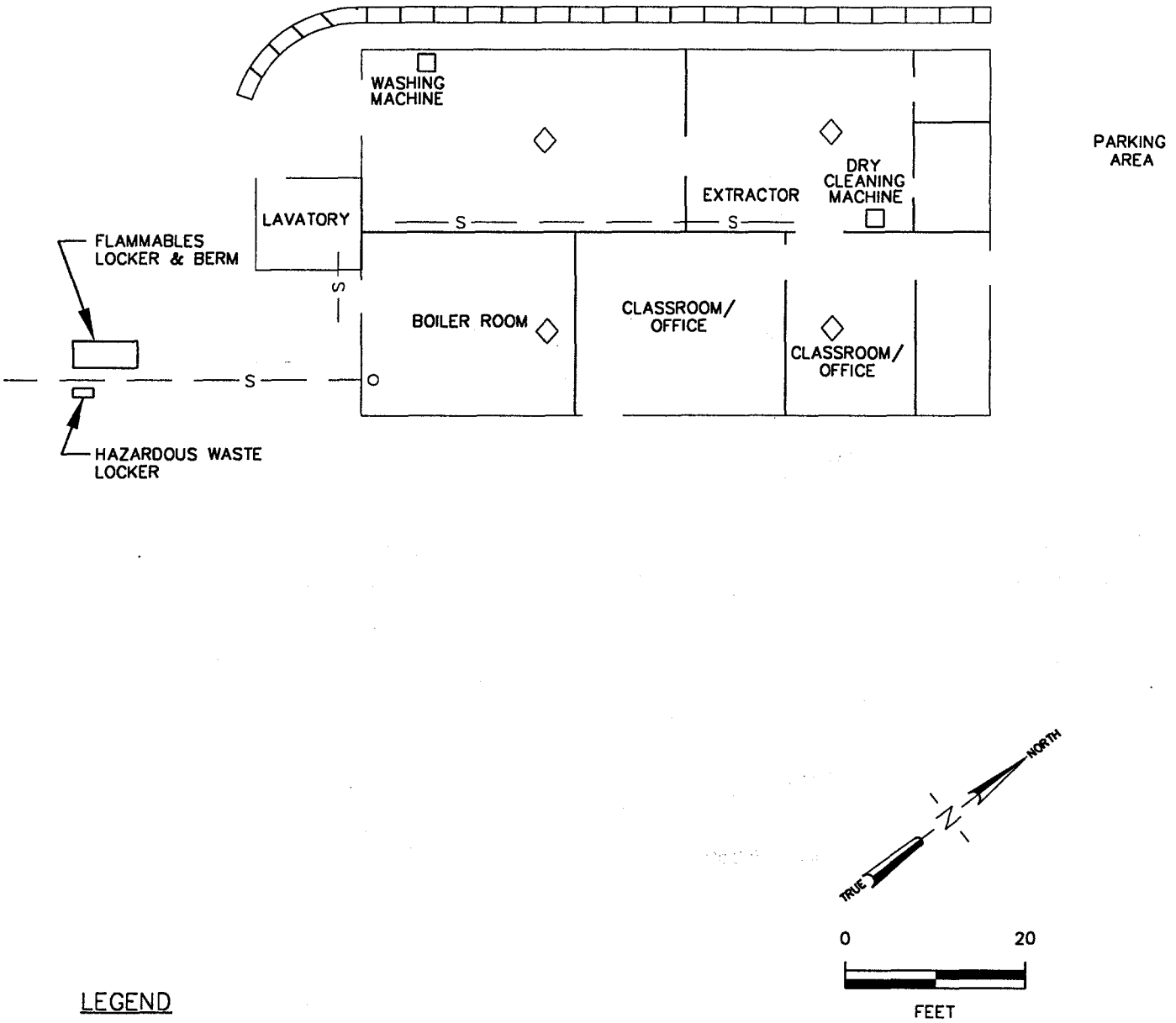
At each Phase I sampling point, the samples are proposed to be collected at the following depths: (1) within a depth of 1 foot from the bottom of the concrete slab, and (2) within a depth of 4 to 5 feet from the bottom of the concrete slab. Nominal depths recommended in the "Interim Guidance for Active Soil Gas Investigation" (Appendix A) for sample collection to minimize potential dilution by ambient air is 5 feet below the ground surface (bgs). The second sample (4-5 feet bgs) that is proposed to be collected at each Phase I location conforms to this requirement. However, the first sample (0-1 foot below the bottom of the slab) has the potential of being diluted by ambient air. Care will be exercised to limit sample dilution by driving the probe at least 6 inches into the native soil.

2.1.2 ANALYTICAL METHODOLOGIES

Soil gas analyses will be performed in an on-site mobile laboratory following EPA Method 8010/8021. The analytical methodology describing the operating conditions and instrumentation, standard preparation, instrument calibration, injection of soil vapor samples, compound confirmation, blanks, duplicates, sample identification, sample holding time, and calculation of soil vapor concentration is presented in Appendix B.

2.2 DATA EVALUATION

The results of the soil gas investigation will be utilized in the limited risk assessment studies, to meet the decision criteria discussed in the Work Plan. The soil gas investigation field investigation and the analytical results will be documented in the final Site Inspection Report.



LEGEND

◇ PROPOSED SOIL GAS SAMPLING LOCATIONS AT DEPTHS OF 0-1' AND 4-5' Below Building Floor

CONCRETE BLOCK WALL

—S— SEWER LINE

SOURCE: BECHTEL NATIONAL, INC., 1997.

FLOOR PLAN/PROPOSED SOIL GAS SAMPLE LOCATIONS
SITE 15 – BUILDING 443
NAVAL TRAINING CENTER
SAN DIEGO, CALIFORNIA

SOTA Environmental Technology, Inc.

FIGURE 1

SOTA PROJECT NO. 97HW025

SEPTEMBER 1998

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NTC SAN DIEGO
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ATTACHMENT A
ADDENDUM TO FIELD SAMPLING PLAN

ADDENDUM
FINAL EXPANDED SITE INSPECTION WORK PLAN
SITE 15, BUILDING 443
FORMER DRY-CLEANING TRAINING FACILITY

DATED 19 OCTOBER 1998

Addendum
Final Field Sampling Plan
Expanded Site Inspection, Site 15, Building 443
Former Dry-Cleaning Training Facility
Naval Training Center
San Diego, California

Prepared for:

Southwest Division
Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Building 127, Room 112
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Indefinite Quantity Contract for A-E Services Underground Storage Tank Engineering Surveys and Prepare Designs

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October 19, 1998

Prepared by:

SOTA Environmental Technology, Inc.
16980 Via Tazon, Suite 130
San Diego, CA 92127-1633

Signature: V. Saravanan Date: 10-19-98

Signature: [illegible] Date: 10/19/98

Signature: [illegible] Date: 10/20/98

Nars Ancog, U.S. Navy Quality Assurance Officer

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ACRONYMS/ABBREVIATIONS

DoN	Department of the Navy
FSP	Field Sampling Plan
IDIQ	Indefinite Delivery Order and Indefinite Quantity
QAPP	Quality Assurance Project Plan
RWQCB	Regional Water Quality Control Board
SI	Site Inspection
SOTA	SOTA Environmental Technology, Inc.
SWDIV	Southwest Division Naval Facilities Engineering Command
TEG	Transglobal Environmental Geochemistry
US EPA	United States Environmental Protection Agency

1.0 INTRODUCTION

SOTA Environmental Technology, Inc. (SOTA) has prepared this Addendum to the Final Field Sampling Plan (FSP) of the Expanded Site Inspection, Site 15 – Building 443, Naval Training Center, San Diego, California. This FSP dated May 15, 1998 was part of the work plan approved by the United States Environmental Protection Agency, Region IX, San Francisco (US EPA) and the Regional Water Quality Control Board, San Diego Region (RWQCB).

SOTA performed the expanded Site Inspection (SI) in accordance with the work plan on behalf of the United States Department of the Navy (DoN), Southwest Division Naval Facilities Engineering Command (SWDIV) in accordance with Delivery Order # 0003. This DO was issued under the Indefinite Delivery Order and Indefinite Quantity (IDIQ) Contract for A-E Services, contract No. N68711-96-D-2111.

This addendum to the FSP describes the procedures that will be followed while performing field activities towards conducting an active soil gas investigation.

2.0 FIELD ACTIVITIES AND SAMPLING PROTOCOL

Field activities that will be performed as part of the active soil gas investigation are soil gas sample collection and analyses in an on-site mobile laboratory. This soil gas investigation will be conducted in general accordance with the "Interim Guidance for Active Soil Gas Investigation", California Regional Water Quality Control Board-Los Angeles Region (February 25, 1997), which is included as Appendix A of this Work Plan Addendum.

2.1 SAMPLING LOCATIONS AND RATIONALE

Building 443, which housed the Dry Cleaning Training Facility, has a concrete floor. Figure 1 shows the plan view and the location of the dry cleaning machines and washers at the building. Soil gas samples will be collected from the subsurface soil beneath the building floor. Coring of the concrete floor will be first done at the sample locations to facilitate sample collection using the vapor probe.

The sampling is proposed to be conducted in two phases. Four sampling locations are proposed as part of the first phase, as shown in Figure 1. These locations conform to a grid of approximately 20 feet by 35 feet for the entire floor area of Building 443. At each Phase I sampling point on the building floor, samples will be collected at two depths; the first at 0-1 feet bgs, and the second at 4-5 feet bgs. A total of 2 to 5 sampling points are proposed on the building floor for Phase II. Samples will be collected at a depth between one to five feet bgs, at either one or two depths. Phase II sampling locations and depths will be decided based on the results of the Phase I sample analytical results.

2.2 SAMPLE COLLECTION PROCEDURES

Transglobal Environmental Geochemistry, Solana Beach, CA (TEG) will be the subcontractor performing the vapor sampling and analysis (using a mobile laboratory). Soil vapor sampling procedures and analytical methodology will include TEG's Soil Vapor Standard Operating Procedures that are presented in Appendix B of this Work Plan Addendum.

The TEG sampling procedures describe the vapor probe construction, probe insertion, collection of the soil gas, flushing and decontamination procedures, field collection log, and transfer of samples to the laboratory.

2.3 BOREHOLE ABANDONMENT

Soil probes of 5/8th inch diameter are driven into the ground as described in Appendix B of this Work Plan Addendum. Abandonment of the hole will be done in accordance with Section 2.6 of the Final FSP dated May 15, 1998. The concrete floor which will be cored to facilitate driving the probe will be restored to its original condition.

3.0 LABORATORY ANALYSIS

Soil gas analyses will be performed in an on-site mobile laboratory following EPA Method 8010/8021. The analytical methodology describing the operating conditions and instrumentation, standard preparation, instrument calibration, injection of soil vapor samples, compound confirmation, blanks, duplicates, sample identification, sample holding time, and calculation of soil vapor concentration is presented in Appendix B of this Work Plan Addendum. All laboratory analyses will follow the approved Work Plan, including the Final FSP and the Quality Assurance Project Plan (QAPP), dated May 15, 1998.

4.0 SAMPLE HANDLING

General sample handling procedures will be done in accordance with the FSP (May 15, 1998) that was approved. Additionally procedures outlined in Appendices A and B of this Work Plan Addendum will be followed with respect to soil gas sample handling and analysis in the mobile laboratory.

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ATTACHMENT B - ADDENDUM TO QUALITY ASSURANCE PROJECT PLAN

ADDENDUM
FINAL EXPANDED SITE INSPECTION WORK PLAN
SITE 15, BUILDING 443
FORMER DRY-CLEANING TRAINING FACILITY

DATED 19 OCTOBER 1998

Addendum
Final Quality Assurance Project Plan
Expanded Site Inspection, Site 15, Building 443
Former Dry-Cleaning Training Facility
Naval Training Center
San Diego, California

Prepared for:

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Nars Ancog, U.S. Navy Quality Assurance Officer

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ACRONYMS/ABBREVIATIONS

DoN	Department of the Navy
FSP	Field Sampling Plan
IDIQ	Indefinite Delivery Order and Indefinite Quantity
QAPP	Quality Assurance Project Plan
RWQCB	Regional Water Quality Control Board
SI	Site Inspection
SOTA	SOTA Environmental Technology, Inc.
SWDIV	Southwest Division Naval Facilities Engineering Command
TEG	Transglobal Environmental Geochemistry
US EPA	United States Environmental Protection Agency

1.0 INTRODUCTION

SOTA Environmental Technology, Inc. (SOTA) has prepared this Addendum to the Final Quality Assurance Project Plan (QAPP) of the Expanded Site Inspection, Site 15 – Building 443, Naval Training Center, San Diego, California. This QAPP dated May 15, 1998 was part of the work plan approved by the United States Environmental Protection Agency, Region IX, San Francisco (US EPA) and the Regional Water Quality Control Board, San Diego Region (RWQCB).

SOTA performed the expanded Site Inspection (SI) in accordance with the work plan on behalf of the United States Department of the Navy (DoN), Southwest Division Naval Facilities Engineering Command (SWDIV) in accordance with Delivery Order # 0003. This DO was issued under the Indefinite Delivery Order and Indefinite Quantity (IDIQ) Contract for A-E Services, contract No. N68711-96-D-2111.

This objective of this addendum to the QAPP is to assure that the data collected during the active soil gas investigation are precise, accurate, representative, complete, and comparable to actual site conditions, and that they meet the criteria of technical project procedures during sample collection, sample analysis, and data evaluation, as described in the approved QAPP.

2.0 SAMPLE CUSTODY/DOCUMENTATION

In addition to the general sample custody and documentation methods described in the approved QAPP, Appendix A and B of this Work Plan will be followed with respect to the soil gas investigation.

3.0 ANALYTICAL QUALITY CONTROL/DATA VALIDATION PROCEDURES

Quality control procedure for mobile laboratory analyses of the soil gas samples will be in accordance with the Soil Vapor Analytical Methodology section included in Transglobal Environmental Geochemistry's (TEG) Standard Operating Procedures that is included in Appendix B of this Work Plan. All laboratory analyses and Quality Control procedures will follow the approved Work Plan, including the Final FSP and QAPP (dated May 15, 1998).

The data will be validated in accordance with SWDIV Policy Memorandum #13.

Appendix A

Interim Guidance for Active Soil Gas Investigation
California Regional Water Quality Control Board
Los Angeles Region (February 25, 1997)

STATE OF CALIFORNIA
California Regional Water Quality Control Board
Los Angeles Region

INTERIM GUIDANCE FOR ACTIVE SOIL GAS INVESTIGATION
(February 25, 1997)

Introduction

Volatile organic compounds (VOCs) within the unsaturated zone partition into the adsorbed, dissolved, free liquid, and vapor phases. Measurement of VOCs through an active soil gas investigation allows: 1) evaluation of whether waste discharges of VOCs have occurred which may impact groundwater, 2) determination of spatial pattern and extent of vapor phase soil contamination, 3) establishment of vapor distribution for the design of soil vapor extraction (SVE) system, and 4) determination of the efficiency of reduction in threat to groundwater from any cleanup action, including SVE. The work plan should include, but not be limited to, the following:

1.0 Survey Design

1.1
Provide a scaled facility map depicting potential sources and proposed sampling points. Include locations and coordinates of identifiable geographic landmarks (e.g., street center-line, benchmark, street intersection, wells, north arrow, property line).

1.2
Locate initial sampling points in potential source areas and areas with known soil contamination using an adjustable 10 to 20 foot grid pattern. Provide rationale for the number, location and depth of sampling points. Screen the remainder of the site with a 100-foot or less grid pattern.

1.3
Conduct a close interval (10 to 20 foot grid pattern) and multi-level sampling (5 to 10 feet vertical distance between points) in areas with known or relatively high VOC concentrations.

1.4
Use an on-site mobile laboratory with laboratory-grade certifiable instrumentation and procedures for real-time analysis of individual VOCs. Non-specific portable organic vapor analyzers and/or GC-based handheld detectors may not be used for analysis, except for daily or weekly vapor monitoring during SVE.

1.5
Maintain flexibility in the sampling plan such that field modifications (grid pattern density, location and depth) can be made as real-time evaluation of analytical test results occurs. Include in the work plan decision-making criteria for these adjustments and explain decisions in the report. Field decisions shall be made in consultation with Regional Board staff.

1.6
Re-sample at any sampling point if anomalous data (i.e., 2 to 3 orders of magnitude difference from surrounding samples) are obtained. Board staff may require additional points to resolve the spatial distribution of the contaminants within the interval in question.

2.0 Sample Collection

2.1
Obtain samples at an adequate depth (nominally 5 feet) below ground surface (bgs) to minimize potential dilution by ambient air.

2.2
Conduct a site-specific purge volume versus contaminant concentration test at the start of the initial soil gas survey and vapor monitoring well sampling. The purpose of the test is to purge ambient air in the sampling system with minimal disturbance of soil gas around the probe tip. Conduct this test based on soil type and where VOC concentrations are suspected to be highest. Describe specific method and equipment to determine optimal purge rates and volumes. Take into account the potential sorption of target compounds to the tubing and adjust the purge rate and time to achieve the optimal purge volume. Limit the sampling vacuum to collect proper samples. Optimum purge volume may be compound specific. "Lighter" early eluting VOCs, such as vinyl chloride, may reach their highest concentration with less purging than "heavier" late eluting VOCs like PCE. Therefore, optimize the purge volume for the compound(s) of greatest concern.

2.3
Explain the expected zone of influence for sample points, taking into consideration soil types, land cover, drive point construction and sample purge rate/time/volume. The vertical zone of influence for purging and sampling must not intersect the ground surface.

2.4
Discuss soil gas sample collection and handling procedures. Discuss the procedures to prevent collection of samples under partial vacuum and the methods to minimize equipment cross-contamination between sampling points.

2.5
Avoid making a pilot hole (e.g., using a slam bar) prior to inserting the probe rod, except to drill through asphalt or concrete. The process of making a pilot hole may promote vapor contaminant aeration and result in lower sample concentration.

2.6
Specify that the sampling equipment (e.g., gas tight syringe, sorbent trap) will not compromise the integrity of the samples. Tedlar bags may only be used for qualitative analysis.

2.7
Assure that the probe tip, probe and probe connectors have the same diameter to provide a good seal between the formation and the sampling assembly. If a space develops between the probe and the formation, as a result of probe advancement, seal (e.g., with bentonite) the area around the probe at the surface to minimize the potential for ambient air intrusion.

2.8
Some sampling systems (e.g., Geoprobe) utilize the probe rod as a conduit for the tubing that connects to the probe tip. Assure a tight fit between the tubing and probe tip to minimize potential for leakage and dilution of the sample.

2.9
Follow the sampling method specified in the soil gas consultant's standard operating procedure (SOP). Discuss with Board staff any deviations from the SOP before it is implemented in the field.

3.0 Laboratory Analysis of Soil Gas Samples

3.1 Primary Target Compounds

1. Carbon tetrachloride
2. Chloroethane
3. Chloroform
4. 1,1-Dichloroethane
5. 1,2-Dichloroethane
6. 1,1-Dichloroethene
7. cis-1,2-Dichloroethene
8. trans-1,2-Dichloroethene
9. Dichloromethane (methylene chloride)
10. Tetrachloroethene
11. 1,1,1,2-Tetrachloroethane
12. 1,1,2,2-Tetrachloroethane
13. 1,1,1-Trichloroethane
14. 1,1,2-Trichloroethane
15. Trichloroethene
16. Vinyl chloride
17. Benzene
18. Toluene
19. Ethylbenzene
20. Xylenes
21. Trichlorofluoromethane (Freon 11)
22. Dichlorodifluoromethane (Freon 12)
23. 1,1,2-Trichloro-trifluoroethane (Freon 113)

3.2 Other Target Compounds
Analyze for other VOCs (e.g., methyl ethyl ketone, methyl isobutyl ketone, ethylene dibromide, petroleum hydrocarbons, etc.) based upon site history and conditions.

3.3 Detection Limit (DL)
Attain a DL of not more than 1 µg/L for all target compounds. A higher DL is acceptable only for the compound(s) whose concentration exceeds the initial calibration range.

3.4 Detectors
Use the following detectors in appropriate combinations:

Electrolytic conductivity detector (ELCD) (e.g., Hall)
Photoionization detector (PID)
Flame ionization detector (FID)
Mass spectrometer (MS)
Electron capture detector (ECD)

3.5.0 Identification of Calibration Standards & Laboratory Control Sample (LCS)

3.5.1
Properly and clearly identify all calibration standards and LCS. The identification must agree with the data on record for the standards and LCS.

3.5.2
Prepare LCS from a second source standard that is totally independent from the standards used for the initial calibration. Second source means a different supplier (whenever possible) or a different lot from the same supplier.

3.6.0 GC Conditions

3.6.1
Use a type of column that can separate all the target compounds. Coelution of the target compounds is not acceptable unless the compounds are distinguished and quantified by two different types of detectors in use at that time.

3.6.2
Analyze the initial calibration and daily mid-point calibration check standards, LCS, blank, and samples using the same GC conditions (i.e., detector, temperature program, etc.).

3.6.3
Use a GC run time that is long enough to identify and quantify all the target compounds.

3.7.0 **Initial Calibration** (Record in Table 1)

3.7.1
Perform an initial calibration:

1. for all 23 compounds listed in Section 3.1;
2. when the GC column type is changed;
3. when the GC operating conditions have changed;
4. when the daily mid-point calibration check cannot meet the requirement in Section 3.8.3; and
5. when specified by Regional Board staff based on the scope and nature of the investigation.

3.7.2
Include at least three different concentrations of the standard in the initial calibration, with the lowest one not exceeding 5 times the DL for each compound.

3.7.3
Calculate the response factor (RF) for each compound and calibration concentration prior to analyzing any site samples. Calculate the average RF for each compound. The percent relative standard deviation (%RSD) for each target compound must not exceed 20% except for the following compounds which must not exceed 30%:

Trichlorofluoromethane (Freon 11)
Dichlorodifluoromethane (Freon 12)
Trichlorotrifluoromethane (Freon 113)
Chloroethane
Vinyl chloride

3.7.4
Verify the true concentration of the standard solutions used with the LCS after each initial calibration. Conduct the verification using a LCS with a mid-point concentration within the initial calibration range. The LCS must include all the target compounds. The RF of each compound must be within ±15% difference from the initial calibration, except for freon 11, 12 and 113, chloroethane, and vinyl chloride which must be within ±25% difference from the initial calibration.

3.8.0 **Daily Mid-point Calibration Check** (Record in Table 1)

3.8.1
Check the calibration using the calibration standard solution with a mid-point concentration within the linear range of the initial calibration before any sample is analyzed.

3.8.2
Include in the daily mid-point calibration check standard the following compounds and **every** compound expected or detected at the site:

1. 1,1-Dichloroethane
2. 1,2-Dichloroethane
3. 1,1-Dichloroethene
4. cis-1,2-Dichloroethene
5. trans-1,2-Dichloroethene
6. Tetrachloroethene
7. 1,1,1-Trichloroethane
8. 1,1,2-Trichloroethane
9. Trichloroethene
10. Benzene
11. Toluene
12. Xylenes

3.8.3
Assure that the RF of each compound (except for freons 11, 12 and 113, chloroethane, and vinyl chloride) is within ±15% difference from the initial calibration's average RF. The RF for freons 11, 12 and 113, chloroethane, and vinyl chloride must be within ±25%.

3.9.0 **Blank**

3.9.1
Analyze field blank(s) to detect any possible interference from ambient air.

3.9.2
Investigate and determine the source(s) and resolve any laboratory contamination problem prior to analyzing any samples if the blank shows a measurable amount (≥1 µg/L) of the target compound(s).

3.10.0 **Sample Analysis**

3.10.1
Assure that the requirements for initial calibration, daily mid-point check, blank, and LCS are met before any site samples are analyzed.

3.10.2
Analyze samples within 30 minutes after collection to minimize VOC loss. Longer holding time may be

allowed if the laboratory uses a special sampling equipment (e.g., sorbent trap, glass bulb) and demonstrates that the holding time can exceed 30 minutes with no decrease in results.

3.10.3
Assure that the concentrations of constituent(s) in a sample do not exceed 50% of the highest concentration in the calibration range. Reanalyze the sample using a smaller volume or dilution if the detected concentration exceed 50% of the highest concentration in the calibration range.

3.10.4
Attain DL of not more than 1 µg/L for all target compounds. If lesser sample volumes or dilutions are used to off-set possible high concentration of constituents in the initial run, use the initial run to calculate the results for constituents that are not affected by the high concentration so that DL of 1 µg/L for these compounds can be achieved.

3.10.5
Quantify sample results using the average RF from the most recent initial calibration.

3.10.6
Add surrogate compounds to all samples. Assure that the surrogate compound concentration is within the initial calibration range. Two to three different surrogate compounds [one aromatic hydrocarbon and two chlorinated compounds (early and middle eluting, except gases)] should be used to cover the different temperature programming range for each GC run.

3.10.7
Calculate the surrogate recovery for each GC run. Surrogate recovery must not exceed ±25% difference from the true concentration of the surrogate, as the sample result would be considered questionable and may be rejected by this Regional Board.

3.11.0 Compound Confirmation

3.11.1
Conduct compound confirmation by GC/MS whenever possible. Use second column confirmation with surrogate for compound confirmation if GC/MS is not used.

3.11.2
Add surrogate compounds to standards and site samples for second column confirmation to monitor the relative retention time (RRT) shift between GC runs. This is required for better compound identification when ELCD, PID, ECD, and FID are used for analysis.

3.11.3
Usually one sample is adequate and quantitation is not required for second column confirmation. Second column confirmation can be done with a different GC. The representative sample can be collected in Tedlar bag and confirmation can be done off site.

3.11.4
Second column confirmation is not necessary if the compounds present have been confirmed from previous soil gas investigations.

3.12.0 Samples with High Concentration

3.12.1
DL may be raised above 1 µg/L for compounds with high results (i.e., the limit as specified in Section 3.10.3) and those closely eluting compounds for which quantitation may be interfered by the high concentrations.

3.12.2
Quantify sample results according to Section 3.10.4 for analytes which are not affected by the high concentration compounds.

3.12.3
If high VOC concentration in an area is known from previous soil gas analysis, Sections 3.12.1 and 3.12.2 are not necessary when analyzing samples from the area in question.

3.12.4
When dilution with ambient air is used for samples with high results, dilute and analyze in duplicate each day at least one sample to verify the dilution procedure. Ambient air should be checked periodically during each day of analysis.

3.13.0 Shortened Analysis Time

3.13.1
Shorten the GC run time under the following conditions only:

1. The exact number and identification of compounds are known from previous soil and soil gas investigations; and

2. The consultant has been given permission by Regional Board staff to analyze only for specific compounds.

3.13.2
Meet the following requirements when shortening GC run-time:

1. Regional Board staff must approved the shortened run time;

2. The compounds must not coelute;

3. Perform initial calibration and daily mid-point calibration check and analyze LCS and samples under the same conditions as the shorter GC run-time;

4. Quantitate using the average RF from the initial calibration utilizing the shorter run-time; and

5. Perform a normal run-time analysis whenever peaks are detected within retention time windows where coelution, as indicated by the calibration chromatograms, is likely.

3.14.0 Last GC Test Run Per Day of Analysis (Record in Table 1)

3.14.1
A LCS as the last GC run of the day is not mandatory, except under conditions in Section 3.14.2. Include the same compounds used in the daily mid-point calibration check analysis, as listed in Section 3.8.2. Attain RF for each compound within ±20% difference from the initial calibration's average RF, except for freons 11, 12, 113, chloroethane, and vinyl chloride which must be within ±30%.

3.14.2
Analyze a LCS at the detection limit concentration instead of the mid-point concentration if all samples from same day of analysis show non-detect (ND) results. The recovery for each compound must be at least 50%. If it is less than 50%, all the ND results of the samples become questionable.

3.15.0 On-site Evaluation Check Sample

3.15.1
Analyze on-site the evaluation check sample as part of the QA/QC procedures when presented with such a check sample by Regional Board staff. Provide preliminary results on-site.

3.15.2
If the results show that the soil gas consultant has problems with the analysis, all the results generated during the same day may be rejected. Correct all problems before any more samples are analyzed.

3.16.0 Site Inspection

3.16.1
Unannounced, on-site inspection by Regional Board staff is routine. Provide upon request hard copies of the complete laboratory data, including raw data for initial calibration, daily mid-point check, LCS and blank results. Failure to allow such inspection or to present these records or field data may result in rejection of all sample results.

3.16.2
The soil gas consultant must understand the instruments, analytical and QA/QC procedures and must be capable of responding to reasonable inquiries.

3.17.0 Recordkeeping in the Mobile Laboratory
Maintain the following records in the mobile laboratory:

1. A hard copy record of calibration standards and LCS with the following information:

   a. Date of receipt
   b. Name of supplier
   c. Lot number
   d. Date of preparation for intermediate standards (dilution from the stock or concentrated solution from supplier)
   e. ID number or other identification data
   f. Name of person who performed the dilution
   g. Volume of concentrated solution taken for dilution
   h. Final volume after dilution
   i. Calculated concentration after dilution

2. A hard copy of each initial calibration for each instrument used for the past few months.

3. The laboratory standard operating procedures.

4.0 Reporting of Soil Gas Sample Results and QA/QC Data (Record in Table 1 and 2)

4.1
Report all sample test results and QA/QC data using the reporting formats in Appendix A. Compounds may be listed by retention time or in alphabetical order. Include in the table of sample results all compounds in the analyte list. Report unidentified or tentatively identified peaks. Submit upon request all data in electronic format and raw data, including the chromatograms. Identify the source(s) of the contaminants detected in the investigation, as indicated by the data.

4.2
Report the following for all calibration standards, LCS and environmental samples:

1. Site name
2. Laboratory name
3. Date of analysis
4. Name of analyst
5. Instrument identification
6. Normal injection volume
7. Injection time
8. Any special analytical conditions/remark

4.3

Provide additional information, as specified, for different types of analyses. Tabulate and present in a clear legible format all information according to the following grouping:

1. Initial calibration

   a. Source of standard (STD LOT ID NO.)
   b. Detector for quantitation (DETECTOR)
   c. Retention time (RT)
   d. Standard mass or concentration (MASS/CONC)
   e. Peak area (AREA)
   f. Response factor (RF)
   g. Average response factor (RF_{ave})
   h. Standard deviation (SD_{n-1}) of RF, i.e.,

$$[\sum_{i=1}^{n} (RF_{ave} - RF_i)^2 / (n - 1)]^{1/2}$$

n = number of points in initial calibration

   i. Percent relative standard deviation (% RSD), i.e., (SD_{n-1} / RF_{ave}) x 100 (%)
   j. Acceptable range of %RSD (ACC RGE)

2. Daily calibration check sample

   a. Source of standard
   b. Detector
   c. Retention time (RT)
   d. Standard mass or concentration
   e. Peak area
   f. Response factor (RF)
   g. Percent difference between RF and RF_{ave} from initial calibration (% DIFF)
   h. Acceptable range of %DIFF (ACC RGE)

3. LCS. Same format as daily calibration

4. Environmental sample

   a. Sample identification
   b. Sampling depth
   c. Purge volume
   d. Vacuum pressure
   e. Sampling time
   f. Injection time
   g. Injection volume
   h. Dilution factor (or concentration factor if trap is used)
   i. Detector for quantitation
   j. Retention time (RT)
   k. Peak area
   l. Concentration in µg/L (CONC)
   m. Total number of peaks found by each detector
   n. Unidentified peaks and/or other analytical remarks

5. Surrogate and second column confirmation

   Mark RT and compound name on: a) second column chromatogram of standard and b) second column chromatogram of confirmation sample.

4.4

Discuss the method(s) to be used for data interpolation (contouring). Provide isoconcentration maps for each VOC detected, total chlorinated volatile organics, total aromatic hydrocarbons, and petroleum-based hydrocarbons for each sampling depth, as applicable. Provide cross-section(s) depicting the geology and changes in contaminant concentration with depth, as justified by the data.

5.0 Companion Soil Sampling

5.1

Discuss soil boring locations with Regional Board staff. Locate borings and sampling depths based on all available information including soil gas test results.

5.2

Conduct the soil sampling and analysis per this Regional Board's **Well Investigation Program General Requirements for Subsurface Investigations, Requirements for Subsurface Soil Investigation** and **Laboratory Requirements for Soil and Water Sample Analyses.**

6.0 Soil Vapor Monitoring Well/Vertical Profiling

Install soil vapor monitoring wells for vertical profiling in areas where significant VOC concentrations were identified during the vapor investigation. The objectives of vertical profiling are to: 1) assess the vertical distribution of VOCs in the vapor phase within the unsaturated zone. 2) determine the spatial pattern of vapor phase soil contamination at different depths within the unsaturated zone. 3) identify migration pathways at depth along which VOCs may have migrated from sources, and 4) serve as discrete monitoring points to evaluate the efficiency of a cleanup action Soil vapor monitoring wells offer the

opportunity to resample as many times as necessary to monitor soil vapor changes over time.

Address appropriate items in the following sections when conducting vertical profiling.

6.1
Install nested, cluster, and/or multi-port vapor monitoring wells to obtain discrete multi-depth soil vapor data in the unsaturated zone. Provide a schematic diagram of the well design and a cross-section of the site showing the major lithologic units and zones for vapor monitoring.

6.2
Collect undisturbed soil samples if fine-grained soils are encountered during drilling of the boring for the probes. Due to air-stripping effect, VOC analysis of soil samples is not acceptable if air drilling method is used. Refer to Section 5.2 for sampling and testing requirements.

6.3
Use all available information (e.g., geologic log, organic vapor concentration reading) to select appropriate depths for vapor monitoring. Install probes at depths with elevated vapor readings (headspace) and/or slightly above fine-grained soils which can retard the migration of VOCs. The deepest probe should be installed above the capillary fringe.

6.4
Consider installing nested vapor probes in the annular space of the groundwater monitoring well to serve as a dual-purpose well if both vapor and groundwater monitoring are required. This design saves costs by installing vapor and groundwater monitoring wells in a single borehole.

6.5
Use small-diameter (e.g., ≤¼-inch) continuous tubing attached from the vapor probe to the ground surface to minimize purge volume.

6.6
Design and construct the vapor wells to serve as long-term monitoring points to evaluate the efficiency of a cleanup action and soil vapor changes over time. Protect the tubing from being damaged or clogged by subsurface soil materials especially in deep installations (e.g., place inside a PVC casing) or consider using ½-inch PVC pipe in place of the tubing. If a tubing is used, consider attaching a weight at the probe tip and/or attaching the tubing onto a supporting pipe or rod to ensure that the probe tip remains in-place during installation.

Properly cap the top end of each tubing/pipe (e.g., control valve) and label each tubing/pipe with the correct sampling depth.

6.7
Attach the bottom-end of the tubing to an appropriate vapor probe (e.g., PVC screen, stainless steel wire screen, stainless steel probe, or brass elbow, etc). If a vacuum pump is used for purging and sampling, include a wire screen around the probe to prevent soil particles from blocking the probe's airways. Ensure that the connection between the tubing and the vapor probe is tight to prevent leakage.

6.8
Place the filter pack (e.g., sand or pea gravel) around each vapor probe and isolate each monitoring zone with bentonite seals. Use an appropriate method (e.g., tremie method) to avoid bridging or segregation during placement of the filter packs and bentonite seals.

Extend the filter pack to a sufficient distance above the probe to allow for settling of backfill materials. In general, the filter pack should not exceed 3 feet in thickness. In deep borings, the filter pack should extend about four feet above the probe to allow for settling of backfill materials and to reduce the potential for the bentonite seal settling around the probe.

Consider placing fine sand above the filter pack to prevent the bentonite seal from entering the filter pack. Place a minimum of two feet thick bentonite seal above and below the filter pack. Allow sufficient time (e.g., one-half to one hour) for bentonite seal to properly hydrate before placing filter pack or cement-based sealing materials.

6.9
Prevent infiltration of surface runoff and unauthorized access (e.g., use a locking subsurface utility vault).

6.10
Specify the schedule for sampling the vapor probes. In general, soil vapor monitoring is required a minimum of one and two months after installation. Due to the VOC stripping caused by air drilling methods, conduct soil vapor monitoring at least two and four months following well completion. Regional Board staff may require a different sampling schedule and additional sampling based upon site conditions and test results.

6.11
Specify the procedures to properly decommission vapor wells that are no longer needed. The decommissioning activity should achieve an effective and long-term seal of subsurface geologic materials

and prevent cross contamination in the subsurface.

7.0 Soil Gas Consultants

This Regional Board reserves the authority to review any soil gas consultant's work to assure compliance with all applicable statutes, regulations, orders, and guidelines. It is your responsibility to ascertain that the individual directing the field investigation is professionally qualified and conducts the field work in accordance with the Board's guidance for active soil gas investigations.

Acknowledgements

This guideline was prepared under the direction of Roy R. Sakaida by David Bacharowski, Alex Carlos, Wayne Chiou, Keith Elliott, Jack Price, Yue Rong, Hiam Tan and Rueen Fang Wang of the California Regional Water Quality Control Board-Los Angeles Region (CRWQCB-LA) Soil Gas Committee. Special thanks go to the staff of the CRWQCB-LA for reviewing the information contained in this document. In addition, discussions and written comments received from soil gas consultants have greatly improved its content. Former CRWQCB-LA staff Philip Chandler and Samuel Yu assisted in preparing previous versions of this guideline.

Table 1
SOIL GAS INITIAL CALIBRATION

SITE NAME: _____ LAB NAME: _____ DATE: _____

ANALYST: _____ STD LOT ID NO.: _____ INSTRUMENT ID: _____

NORMAL INJECTION VOLUME: _____ INJECTION TIME: _____

COMPOUND	DETECTOR	1st CONC RT/RRT	1st CONC MASS/CONC	1st CONC AREA	1st CONC RF	2nd CONC RT/RRT	2nd CONC MASS/CONC	2nd CONC AREA	2nd CONC RF	3rd CONC RT/RRT	3rd CONC MASS/CONC	3rd CONC AREA	3rd CONC RF	RF_{ave}	SD_{n-1}	%RSD	ACC RGE

OR

COMPOUND	DETECTOR	RT/RRT	MASS/CONC	AREA	RF	RF_{ave}	SD_{n-1}	%RSD	ACC RGE
Compound 1		_____	1st conc	_____	_____				
		_____	2nd conc	_____	_____				
		_____	3rd conc	_____	_____				
Compound 2 (Surrogate)									

SOIL GAS DAILY MID-POINT CALIBRATION STANDARD

AND

SOIL GAS LABORATORY CONTROL SAMPLES (LCS)

SITE NAME: _____ LAB NAME: _____ DATE: _____

ANALYST: _____ STD LOT ID NO.: _____ INSTRUMENT ID: _____

NORMAL INJECTION VOLUME: _____ INJECTION TIME: _____

COMPOUND (SURROGATE)	DETECTOR	RT/RRT	MASS/CONC	AREA	RF	%DIFF	ACC RGE

Table 2
SOIL GAS SAMPLE RESULTS

SITE NAME: _____ LAB NAME: _____ DATE: _____

ANALYST: _____ COLLECTOR: _____ INSTRUMENT ID: _____

NORMAL INJECTION VOLUME: _____

Sample ID	Sample 1	Sample 2	Sample 3 .....
Sampling Depth			
Purge Volume			
Vacuum			
Sampling Time			
Injection Time			
Injection Volume			
Dilution Factor			

COMPOUND	DETECTOR	RT	AREA	CONC	RT	AREA	CONC	RT	AREA	CONC
Compound 1										
Compound 2										
Compound 3										
.										
.										
.										
.										
.										
Surrogate 1										
Surrogate 2										
Total Number of Peaks										
by Detector 1 (specify)										
by Detector 2 (specify)										

Unidentified peaks and/or other analytical remarks

ALTERNATIVE FORMAT FOR REPORTING SOIL GAS SAMPLE RESULTS

SITE NAME: _____ LAB NAME: _____ DATE: _____

Sample ID Sampling Depth	Sample 1	Sample 2	Sample 3 ...
COMPOUND	CONC	CONC	CONC
Compound 1			
Compound 2			
Compound 3			
.			
.			
.			
.			
.			
.			

(Page 1 of 2, Results Summary)

SITE NAME: _____ LAB NAME: _____ DATE: _____

ANALYST: _____ COLLECTOR: _____ INSTRUMENT ID: _____

NORMAL INJECTION VOLUME: _____

Sample ID	Sample 1	Sample 2	Sample 3 ...
Sampling Depth			
Purge Volume			
Vacuum			
Sampling Time			
Injection Time			
Injection Volume			
Dilution Factor			

COMPOUND	DETECTOR	RT	AREA	RT	AREA	RT	AREA
Compound 1							
Compound 2							
Compound 3							
.							
.							
.							
Surrogate 1							
Surrogate 2							
.							
.							
Total Number of Peaks							
by Detector 1 (specify)							
by Detector 2 (specify)							

Unidentified peaks and/or other analytical remarks

(Page 2 of 2, Analytical Raw Data)

Appendix B

Soil Vapor Standard Operating Procedures
Transglobal Environmental Geochemistry
Solana Beach, CA (TEG)

SOIL VAPOR STANDARD OPERATING PROCEDURES (SOP)

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432 NORTH CEDROS AVENUE • SOLANA BEACH, CA 92075 • 619-793-0401 • FAX 619-793-0404

teg

SOIL VAPOR SAMPLING PROCEDURES

Probe Construction

TEG's soil vapor probes are constructed of 5/8 inch diameter, stainless steel, equipped with a hardened, reverse-threaded steel tip. Nominal lengths are 6 feet although additional lengths may be added. An inert 1/8 inch polypropylene nylaflow tube runs down the center of the probe to sampling ports beneath the tip.

Probe Insertion

The probe is driven into the ground by an electric rotary hammer with or without a hydraulic assist system. Once inserted to the desired depth, the probe is rotated 3 to 5 turns in a clockwise direction, which opens the tip and exposes the vapor sampling ports. This design prevents clogging of the sampling ports and cross-contamination from soils during insertion.

Soil Gas Sampling

Soil vapor is withdrawn from the nylaflow tubing using a 20 cc syringe connected via an on-off valve. The first 40 cc of gas are discarded to flush the 8 dead volumes of the probe and fill it with in-situ soil vapor. The next 20 cc of gas are withdrawn in the syringe, plugged, and immediately transferred to the mobile lab for analysis within minutes of collection. Additional soil vapor samples may be collected and stored in gas-tight containers as desired.

Flushing & Decontamination Procedures

To minimize the potential for cross-contamination between sites, all external probe parts are cleaned of excess dirt and moisture prior to insertion. The internal nylaflow tubing and sampling ports are flushed with hundreds of cc's of ambient air between samples. If water, dirt, or any material is observed in the tubing, the tubing is replaced with fresh tubing. If concentrations greater than 100 ppmv are detected for any compound (except methane), the tubing is replaced.

Sampling syringes are opened and exposed to outside air on a clean surface to allow any volatiles to escape after each use. If concentrations greater than 100 ppmv are detected for any compound (except methane), the syringe is discarded.

Field Collection Log

The field technician completes a logsheet summarizing depth of penetration, refusal, which probe is used on each sampling location, when tubing is replaced, any visual contamination on the probe, OVM readings as applicable, and any other unusual occurrences at a particular sampling location.

Transfer of Samples to the Laboratory

The sample syringe is immediately transferred to the mobile laboratory for immediate analysis following the protocols discussed in the Analytical Methodology Section.

SOIL VAPOR ANALYTICAL METHODOLOGY

OPERATING CONDITIONS & INSTRUMENTATION

8010/8015/8020 (Halogenated, TPH, & Aromatic Hydrocarbons)

Instrument: Shimadzu GC-14 Gas Chromatograph
Column: 75 meter DB-624, megabore capillary.
Carrier flow: Helium at 15 ml/min.
Detectors: Photoionization/Hall (ElCD) detectors in series.
Detectors: Flame ionization detector on separate column.
Column oven: 45°C for 2 min, 45°C to 175°C at 5°C/min.

STANDARD PREPARATION

Primary (stock) standards (100 mg/l of each component in methanol) are purchased from certified suppliers.

Secondary (Working) Standards (10 ug/ml) are made at least monthly by diluting primary standard 10 times (400 ul primary to 4 ml solvent).

Neat (Pure) Standards of many compounds are carried in the laboratory to enable on-site preparation of compound-specific standards as appropriate.

QC Check Sample is prepared at the midpoint concentration from a standard purchased from a source different than the primary standards.

Lot numbers and preparations of all standards are recorded on a log sheet in kept in the mobile laboratory.

INSTRUMENT CALIBRATION

Three point calibration curves for each target component are prepared by analyzing low, mid, & high calibration standards covering the expected concentrataion range.

Continuing Calibration

Continuing Calibration is performed at the start of each day and end of each day by injecting a mid-range calibration standard. Acceptable continuing calibration agreement: +/- 20% to the calibration curve.

INJECTION OF SOIL VAPOR SAMPLES

Vapor samples are withdrawn from the sampling syringe with a 1 cc syringe and injected directly into a sampling port on the gas chromatograph. The injection syringe is flushed 2 times with the sample prior to injection. Injection syringes are baked between injections and discarded if values greater than 100 ppmv of any compound are measured.

COMPOUND CONFIRMATION

All 8010/8020 analyses are performed with PID/Hall detectors in series on parallel 60 to 100 meter columns following EPA Method 8021 protocols. This configuration gives required separation and dual-detector confirmation. In addition, a second analysis is done on all samples using a second column with an FID detector.

BLANKS

Blanks are analyzed at the start of each day and more often as appropriate depending upon the measured concentrations. Typically, when values exceeding 100 ppmv are encountered, additional blanks may be analyzed.

DUPLICATES

Duplicate samples are analyzed when inconsistent data are observed or as requested by the client or regulatory agency. Because soil vapor duplicates can vary widely, TEG's nominal RPD acceptance criteria is +/- a factor of 2.

SAMPLE IDENTIFICATION

Each sample is given a unique ID specifying location & depth.

SAMPLE HOLDING TIME

Soil vapor samples are not stored, but analyzed immediately upon collection.

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APPENDIX B – SOIL VAPOR STANDARD OPERATING PROCEDURES, TRANSGLOBAL ENVIRONMENTAL GEOCHEMISTRY, SOLANA BEACH, CA (TEG)
SOIL VAPOR ANALYTICAL METHODOLOGY
CALCULATION OF SOIL VAPOR CONCENTRATION

ADDENDUM
FINAL EXPANDED SITE INSPECTION WORK PLAN
SITE 15, BUILDING 443
FORMER DRY-CLEANING TRAINING FACILITY

THE ABOVE IDENTIFIED SECTION IS NOT AVAILABLE.

EXTENSIVE RESEARCH WAS PERFORMED BY SOUTHWEST DIVISION TO LOCATE THIS SECTION. THIS PAGE HAS BEEN INSERTED AS A PLACEHOLDER AND WILL BE REPLACED SHOULD THE MISSING ITEM BE LOCATED.

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SSIC # 5090.3

QUESTIONS MAY BE DIRECTED TO:

DIANE C. SILVA
RECORDS MANAGEMENT SPECIALIST
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 532-3676