

Prepared for:

Equilon Enterprises, LLC

INDOOR AIR SAMPLING AND ANALYSIS WORK PLAN

**Former KAST Property
Carson, California
Site Cleanup No. 1230
Site ID. 2040330**

Prepared by:

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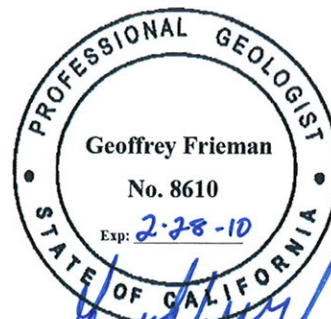
Equilon Enterprises, LLC

Prepared by:

Geosyntec Consultants, Inc.



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1.0 INTRODUCTION

This work plan has been prepared for Equilon Enterprises, LLC, doing business as Shell Oil Products US (SOPUS), by Geosyntec Consultants (Geosyntec) and presents an Indoor Air Sampling and Analysis Work Plan for the Former Kast Property (Site) located in Carson, California. The Site is comprised of approximately 275 individual residential properties. Based on known historical Site operations, the primary chemicals of concern (COCs) are related to crude oil and bunker oil. Chlorinated compounds have not been identified as Site COCs.

Interim Site characterization activities were performed in city streets, including the collection of soil, soil vapor and groundwater samples (URS, 2009a). Subsequently, a *Work Plan for Phase II Site Characterization* (URS, 2009b) was prepared that focused site characterization activities on individual residential properties, including (i) the screening of indoor air for methane and (ii) the sampling of soil and sub-slab soil gas. The Phase II Site characterization work plan also describes interim response actions to be implemented if elevated concentrations of COCs are detected in sub-slab soil gas at the residential properties. The interim response actions included the collection of interior sub-slab soil gas or indoor air samples to evaluate the potential for vapor intrusion.

The objectives of this indoor air sampling and analysis work plan are (i) to describe methodologies to be used for the collection of data for the evaluation of the vapor intrusion pathway and (ii) to present a contingency plan for evaluating future actions at the properties sampled.

Prior to any work on the property, the owner/tenants will be contacted and written permission obtained for the work, if not already obtained through an existing access agreement. All work will be conducted under the direction of a California registered Professional Geologist or Professional Civil Engineer.

2.0 SAMPLING METHODOLOGY

This indoor air sampling and analysis plan has been prepared in general accordance with DTSC guidance on evaluation of the vapor intrusion pathway ([DTSC, 2005] *Interim Final – Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air*, revised February 2005).

The following sections discuss the sample locations, sample collection duration, and analytical methods.

2.1 Pre-Sampling Building Survey and Chemical Inventory

Prior to the sampling event, a pre-sampling survey and chemical inventory will be conducted. These tasks will be scheduled with the home owner/tenant (i) to provide them with a description of sampling activities, (ii) obtain building-specific information for the pre-sampling survey, (iii) perform a chemical inventory and remove chemical products as appropriate, and (iv) provide the home owner/tenant with a checklist of instructions for the sampling event.

2.2 Indoor Air Sample Locations

In coordination with the home owner/tenant, two indoor air sample locations will be selected. The samples will be located on the ground floor of the home with one sample in a frequently-occupied area of the residence (e.g., living room and bedroom) and the second sample in an area with utility connections (e.g., kitchen or bathroom). The indoor air samples will be collected 3 to 5 feet above finished floor.

2.3 Background Air Sample Locations

Outdoor air samples will be collected from two sides of the residence (e.g., front and back yard) to obtain background air concentrations. The outdoor air sample locations will be 3 to 5 feet above ground level and 5 to 15 feet away from structures that may affect air flow or streets/driveways that may be sources of petroleum hydrocarbons due to automobiles.

Because it is frequently impractical to remove chemical sources from an attached garage (e.g., automobiles, gasoline-powered equipment, or other stored chemicals), an additional background air sample will be collected from the garage. The garage sample will be collected 3 to 5 feet above finished floor.

2.4 Duration of Air Sample Collection

Indoor and outdoor air samples will be collected in individually certified, 6-L Summa canisters over an approximate 24-hour period. The outdoor air sampling period will begin 1 – 2 hours prior to the collection of the indoor air samples and will continue until near the end of the indoor air sampling (i.e., less than 30 minutes prior to the end of the indoor air sampling).

2.5 Sample Analysis

Based on historical Site operations, petroleum hydrocarbons are the primary Site-related COCs. Other constituents have been detected in sub-slab soil gas samples that have not been identified as Site COCs. As recommended in the DTSC vapor intrusion guidance (DTSC, 2005), indoor and outdoor air samples will be analyzed for petroleum hydrocarbon compounds and other volatile organic compounds (VOCs) that have been detected in soil gas and groundwater at the Site. The compounds to be analyzed are listed in **Table 1**. The compound list may be expanded if additional VOCs are detected in sub-slab soil gas during the course of the Site characterization.

Air samples will be analyzed for VOCs by USEPA Method TO-15 and TO-15 SIM (selective ion monitoring). Lower reporting limits can be achieved using the TO-15 SIM analysis, but a limited number of compounds are available for this method. Utilizing both methods allows for analysis of the target analytes while achieving the data quality objectives for this investigation. **Table 1** lists the reporting limits for compounds that may be analyzed by methods TO-15 and TO-15 SIM. However, the practical quantitation limit for samples may vary due to sample dilution, interference from non-target compounds, or other laboratory issues. Analyses will be conducted by a National Environmental Laboratory Accreditation Conference (NELAC)-certified laboratory using appropriate analytical practices for TO-15 SIM analyses.

3.0 FIELD METHODS AND PROCEDURES

Samples of indoor air and outdoor air will be collected using similar methods as described below. A checklist for the sampling procedures is provided in **Appendix A**.

3.1 Pre-Sampling Building Survey and Chemical Inventory

A minimum of 24-hours prior to sample collection, a pre-sampling meeting with the home owner/tenant will be arranged to describe sampling activities and conduct a pre-sampling survey. During this meeting, a pre-sampling survey and chemical inventory will be conducted. The building survey form provided in the DTSC 2005 vapor intrusion guidance will be used to document this information. An inventory of household products for each residence will be included with this building survey. One form will be completed for each residence sampled. A copy of the building survey and household products inventory forms is provided in **Appendix B**.

This initial survey will include a field screening of the house with a photoionization detector (PID) and completion of a chemical inventory. The PID screening will be performed to identify potential locations of background sources or potential soil gas entry into the home (e.g., utility connections). Following the chemical inventory, products that contain target analytes will be removed from the residence until the sampling is complete (with permission from the home owner/tenant). It is preferable that the removed chemical products will be stored off-property; however, if the resident objects, these products may be stored by the home owner/tenant in a sealed container outside the house (e.g., storage shed or garage).

The indoor and outdoor air sample locations will also be discussed with the home owner/tenant to confirm that the proposed locations are satisfactory to the resident. Additionally, the home owner/tenant will be provided a set of instructions for the sampling event (**Appendix C**). These instructions describe the sampling process and include a request that the home owner/tenant comply with the following procedures for a period from 24 hours prior to the scheduled sampling event until the sampling is completed:

- Operate furnace, or central air conditioning as appropriate for the current weather conditions;
- Do not keep doors or windows open longer than necessary;
- Do not use wood stoves or fireplaces and avoid using window air conditioners, fans, or vents;
- Limit direct access between home and attached garage (i.e., do not enter the house through the garage door);

- Do not store gasoline, petroleum-based products, or other solvents within the home or attached garage;
- Do not start, operate, or store automobiles or gasoline-powered equipment in an attached garage, and do not operate gasoline-powered equipment in or near the home;
- Do not use paints or varnishes (up to one week in advance if possible);
- Do not use household cleaning products, polishers, air fresheners;
- Avoid hobbies indoors that use paints, glues or adhesives;
- Do not smoke inside the house;
- Limit use of personal care products with high VOC content (e.g., nail polish, nail polish remover, hair spray);
- Avoid bringing recently dry cleaned clothes into the house;
- Do not apply pesticides.

Deviations from these actions that are reported by the homeowner or visually observed during the sampling event will be noted and included in the report.

3.2 Indoor and Outdoor Air Sampling

Indoor and outdoor air samples will be collected within the breathing zone (3 to 5 feet above the floor) using 6-liter Summa canisters with a flow regulator set to collect a 24-hour time-integrated sample. The Summa canisters and flow regulators will be individually certified clean by the analytical laboratory. The sampling rate of the flow regulators will be set by the analytical laboratory.

During the initial canister set-up, a photoionization detector (PID) will be used to screen for any obvious sources of VOCs in the selected sample locations. Sample locations may be modified based on the findings of this screening evaluation.

Summa canisters received from the laboratory are under vacuum of approximately 29 - 30 inches of mercury. After the canisters are set up in a sample location, the protective cap will be removed and an initial vacuum reading will be measured and recorded to ensure that the canister had not leaked during shipment (i.e., vacuum in canister will be a minimum of 27 inches of mercury prior to use). If the canister vacuum is less than 27 inches of mercury, the canister will not be used for sampling. The flow regulator restricts the air flow into the canister so that a time integrated sample can be collected. The flow regulator is used only for a single sample and is set by the analytical laboratory. At the end of the sample period, the valve on the Summa canister will be closed, the flow regulator removed, and a laboratory-grade vacuum gauge attached to the sample port. The final vacuum will then be measured and recorded on

both the field forms and the canister laboratory label. After receipt of the canisters at the laboratory the vacuum will be measured again to ensure that the canister did not leak during shipment.

The following items will be recorded for each sample:

- Sample location (including sketch and photograph)
- Room temperature
- Canister identification number
- Flow regulator identification number
- Initial canister vacuum
- Time and date sample collection begins and ends
- Final canister vacuum

3.3 Field Logs

Field logs will document where, when, how, and from whom any vital project information was obtained. Log entries will be sufficiently detailed to permit reconstruction of field activities. Each page will be dated and the time of entry noted in military time. All entries will be legible, written in ink, and signed by the individual making the entries. If an error occurs, a correction will be made by marking a line through the error and entering the correct information. Corrections will be dated and initialed. No entries will be obliterated or rendered unreadable.

3.4 Meteorological Data

Local meteorological data from a public weather station will be obtained for the sampling period to record temperature, barometric pressure, wind direction and wind speed to assess diurnal or seasonal fluctuations in atmospheric conditions that may affect the sampling results.

3.5 Reporting

The investigation findings will be presented as an Indoor Air Sampling and Analysis Report. The report will include field notes, log sheets, meteorological data, laboratory analytical reports and tabular summaries of the analytical results from this investigation. The report will also document variances from the sampling plan. Exceedances of action levels and recommendations for follow-up work will be included.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

Data quality is measured by the ability of the collected data to meet specific quantitative and qualitative objectives. Data quality indicators that are quantitative include precision, accuracy, and completeness. Qualitative data quality indicators include representativeness and comparability. The quality assurance/quality control (QA/QC) procedures for this project require that the data meet minimum requirements for precision, accuracy, completeness, representativeness, and comparability. Analytical data will be validated and the results of the validation will be included in the report.

4.1 Precision

Precision is the degree of agreement between independent measurements and expressed as a calculation of Relative Percent Difference (RPD). Analytical precision measures the variability associated with repetitive analyses of the same sample. Laboratory quality control samples are used to assess precision.

Analytical precision may be measured by the use of the same analytical instrument to make repeated analyses on the same sample and/or the use of the same method to make repeated measurements of the same sample within a single laboratory. Analytical precision will be evaluated with the analysis of laboratory control sample (LCS) and LCS duplicates in the fixed laboratory, and if used, sample and sample duplicate. The acceptance criteria will be based on the laboratory's in-house specified limits.

4.2 Accuracy

Accuracy is a measurement of the correctness of the analyses. Field and laboratory activities are subject to accuracy checks.

Laboratory accuracy can be assessed using LCS. Measurement is considered accurate when the concentration measured during the analysis has a reported value or percent recovery within the laboratory's acceptable limits. The laboratory will meet accuracy objectives established in accordance with their certification and the specific analytical method.

4.3 Representativeness

Representativeness describes the degree to which the data collected are an accurate characterization of the media sampled. Careful planning of the field activities based on known conditions and historical site usage has been undertaken to promote a representative work plan. This work plan has been prepared to provide a representative data set to evaluate the vapor intrusion pathway for the home sampled.

4.4 Completeness

Completeness describes the content of the data set once errors, if any, have been identified and flagged and the data failing to meet the data quality objectives have been removed from the data set. The data set will be considered complete if at least 90 percent of the data collected is usable without meaningful flags or errors.

4.5 Comparability

Comparability is a measure of the confidence with which one data set can be compared to another. The data set will be considered comparable when methods described in USEPA and/or DTSC Guidance documents have been used for analyses, the data set is representative, and the field activities meet the standards and requirements set forth by the DTSC, if any.

4.6 Work Plan QA/QC Procedures

The following QA/QC procedures will be followed during indoor air sampling and analysis:

- Duplicate samples will be collected and analyzed at a minimum rate of 10% of the primary samples. At a minimum, one duplicate sample will be collected during each day indoor air samples are collected.
- One trip blank sample will be analyzed during each event.
- Samples will be transferred under chain-of-custody control to a NELAC-accredited laboratory, and will be subject to the laboratory's conventional QA/QC analytical procedures, including method blank, laboratory control sample and sample duplicate analyses.

5.0 CONTINGENCY PLAN

Data collected during this indoor air sampling event may be used to evaluate potential health risks and whether additional activities are necessary. As listed in the DTSC vapor intrusion guidance (DTSC, 2005) potential additional activities may include:

- Limited evaluation to assess the stability of the vapor plume,
- Additional sub-slab or indoor air monitoring, or
- Implementation of engineering controls.

The contingency plan summarized in **Table 2** provides guidelines for evaluating future actions following the receipt of the validated indoor air analytical results. The listed actions are based on a comparison of the measured indoor air concentrations to conservative screening levels as well as consideration of the sub-slab soil gas results.

The indoor air screening levels are indoor air California Human Health Screening Levels (CHHSLs) for residential land use¹ (OEHHA, 2005). The sub-slab screening levels are based on the indoor air screening levels and assume attenuation between sub-slab and indoor air concentrations.

The actions are divided into three categories:

- Indoor air concentrations are less than or equal to indoor air screening levels or below background levels. In this case, limited data collection is suggested to corroborate the measured concentrations. Provided the homeowner/tenant consents, follow-up indoor air monitoring within 6 months of the initial sampling will be performed to assess temporal variability in indoor air concentrations. Additionally, a review of site information to assess whether indoor air impacts are a result of background sources (either outdoor air or chemical use within the residence) will be conducted. If elevated soil gas concentrations have been reported for the property, then additional sub-slab monitoring may be conducted.
- Indoor air concentrations are above indoor air screening levels and above background levels. In this case, the collection of additional monitoring data may be appropriate. More extensive monitoring data (indoor air and/or soil gas) are suggested for areas where elevated soil gas concentrations have been

¹ For target analytes without published CHHSLs, indoor air screening levels are calculated following methods presented by California Office of Environmental Health Hazard Assessment (OEHHA, 2005)

detected. Additionally, an evaluation of the need for engineering controls may be considered.

- Indoor air concentrations are greater than chronic reference exposure levels (RELs). If these conditions exist, the RWQCB will be notified of the results within 24 hours of receipt of validated data and the occupants of the house may be asked to stay temporarily in alternative accommodations. An evaluation of engineering controls will be conducted and additional monitoring data may be collected. Based on these results, engineering controls may be implemented to reduce concentrations below the RELs.

Indoor air and sub-slab soil gas screening levels used in the Phase II Site Characterization and Cal-EPA reference exposure levels (RELs) are provided in **Table 1**.

6.0 HEALTH AND SAFETY PLAN

Field activities will be conducted in accordance with a health and safety plan (HASP) that complies with California Department of Occupational Health and Safety, Health and Safety Code, Title 8, California Code of Regulations (CCR), Section 5192 and other appropriate sections. Personnel performing field work for this project will be briefed about job health and safety measures and the contents of the health and safety plan prior to commencing fieldwork each day.

7.0 REPORTING AND SCHEDULE

The report format and schedule for the field investigation, data analysis and reporting is described in the following sections.

7.1 Reporting

A data package summarizing the findings of this investigation will be prepared to document the methods, results, analysis of all data collection activities upon completion of the fieldwork. The report will include:

- Data tables and maps summarizing the validated analytical results;
- Meteorological conditions during sampling; and
- Appendices containing field documentation and laboratory reports.

The report will be signed and stamped by a California registered Professional Geologist or Professional Civil Engineer.

7.2 Schedule

The schedule for this work will be based on the receipt of sub-slab soil gas analytical results and scheduling with the home owner/tenant. The pre-sampling meeting will be arranged at least one day prior to the sampling. Sampling equipment will be set up on the first day of field mobilization and the air samples will be collected the following day. Analytical results will be provided to the Los Angeles Regional Water Quality Control Board after the laboratory data is validated. Additionally, a report describing the sampling activities and results will be prepared within 30 days of the receipt of the analytical results.

8.0 REFERENCES

California DTSC, 2005. Interim Final – Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air. February 2005.

California Environmental Protection Agency, 2005. Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties. January 2005.

URS, 2009a. Interim Site Characterization Report, Former Kast Property, Carson, California. August 20, 2009.

URS, 2009b. Work Plan for Phase II Site Characterization, Former Kast Property, Carson, California. September 21, 2009.

TABLES

Table 1
Target Analytes, Reporting Limits, Screening Levels and Chronic Reference Exposure Levels
Former Kast Site
Carson, California

Compound	Method Reporting Limit		Indoor Air Screening Level ug/m ³	Sub-Slab Soil Gas Screening Level ug/m ³	Chronic Reference Exposure Level ug/m ³
	TO-15 SIM	TO-15			
	ug/m ³	ug/m ³			
1,1-Dichloroethane	0.025	0.50	1.5	150	--
1,1-Dichloroethene	0.025	0.50	73	7300	70
1,1,1-Trichloroethane	0.025	0.50	1000	100000	1000
1,1,2,2-Tetrachloroethane *	0.025	0.50	0.042	4.2	--
1,1,2-Trichloroethane *	0.10	0.50	0.15	15	--
1,2,4-Trimethylbenzene	--	0.50	7.3	730	--
1,2-Dichlorobenzene	0.025	0.50	210	21000	--
1,2-Dichloroethane *	0.025	0.50	0.12	12	400
1,3,5-Trimethylbenzene	--	0.50	6.3	630	--
1,3-Dichlorobenzene	0.025	0.50	210	21000	--
1,4-Dichlorobenzene *	0.025	0.50	0.22	22	800
2-Butanone (MEK)	--	0.50	5200	520000	--
2-Hexanone	--	0.50	3100	310000	--
2-Propanol (Isopropyl Alcohol)	--	0.50	7300	730000	7000
4-Ethyltoluene	--	0.50	730	73000	--
4-Methyl-2-pentanone	--	0.50	3100	310000	--
Acetone	--	5.00	32000	3200000	--
Benzene *	0.075	0.50	0.084	8.4	60
Bromodichloromethane *	0.025	0.50	0.066	6.6	--
Bromomethane	0.025	0.50	5.2	521	5
Carbon Disulfide	--	0.50	830	83000	800
Chloroethane	0.025	0.50	31000	3100000	--
Chloroform *	0.10	0.50	0.46	46	300
Chloromethane	0.025	0.50	94	9400	--
cis-1,2-Dichloroethene	0.025	0.50	37	3700	--
Cumene	--	0.50	420	42000	--
Cyclohexane	--	0.50	6300	630000	--
Dichlorodifluoromethane (CFC 12)	--	0.50	210	21000	--
Ethanol	--	5.00	--	--	--
Ethylbenzene *	0.10	0.50	0.97	97	2000
Hexachlorobutadiene	--	0.50	0.11	11	--
m,p-Xylenes	0.10	0.50	730	73000	700
Methyl tert-Butyl Ether	--	0.50	9.4	936	8000
Methylene chloride *	0.10	0.50	2.4	243	400
Naphthalene *	0.025	0.50	0.072	7.2	9
n-Heptane	--	0.50	7300	730000	--
n-Hexane	--	0.50	7300	730000	7000
n-Propylbenzene	--	0.50	150	15000	--
o-Xylene	0.10	0.50	730	73000	700

Table 1
 Target Analytes, Reporting Limits, Screening Levels and Chronic Reference Exposure Levels
 Former Kast Site
 Carson, California

Compound	Method Reporting Limit		Indoor Air Screening Level ug/m ³	Sub-Slab Soil Gas Screening Level ug/m ³	Chronic Reference Exposure Level ug/m ³
	TO-15 SIM	TO-15			
	ug/m ³	ug/m ³			
Styrene	--	0.50	940	94000	900
Tetrachloroethene *	0.025	0.50	0.41	41	35
Tetrahydrofuran (THF)	--	0.50	1.3	125	--
Toluene	0.10	0.50	310	31000	300
trans-1,2-Dichloroethene	0.025	0.50	73	7300	--
Trichloroethene	0.025	0.50	1.22	122	600
Trichlorotrifluoroethane	0.025	0.50	31000	3100000	--
Trichlorofluoromethane	0.025	0.50	730	73000	--

Method reporting limit from Columbia Analytical Services Laboratory, 2009.

Indoor air screening level (IASL). Residential indoor air CHHSL (CalEPA, 2005) or calculated following CHHSL methodology

Sub-slab soil gas screening level. 100 x IASL

REL - Reference Exposure Level. From California EPA Office of Environmental Health Hazard Assessment (Dec. 2008)

-- not reported or not calculated

* To be analyzed by TO-15 SIM

Table 2
Indoor Air Monitoring Contingency Plan
Former Kast Site
Carson, California

Criteria		Indoor Air Concentrations (IAC) *		
		IAC < IASL ² OR IAC < Bkgrd ³	IAC > IASL AND IAC > Bkgrd AND IAC < Chronic RELs ⁵	IAC > Chronic RELs ⁵
Sub-Slab Soil Gas Concentration	>100 X SSSL ⁴	Follow-up IA Monitoring Source Invest. Sub-Slab Mon. EC Evaluation	Source Invest. Sub-Slab Mon. IA Mon. EC Evaluation	Alt. Accommodations Source Invest. Sub-Slab Mon. IA Mon. Engr. Control
	<100 X SSSL > SSSL	Follow-up IA Monitoring Source Invest. Sub-Slab Mon.	Source Invest. IA Mon. Sub-Slab Mon. EC Evaluation	Alt. Accommodations Source Invest. Sub-Slab Mon. IA Mon. Engr. Control
	< SSSL	Follow-up IA Monitoring Source Invest.	Source Invest. IA Mon. Sub-Slab Mon.	Alt. Accommodations Source Invest. Sub-Slab Mon. IA Mon. EC Evaluation

Notes:

- * Indoor air concentration accounting for background sources
- 1 Actions listed will be considered for implementation and may be modified as additional information is collected. All actions may not be performed. Indoor air and sub-slab soil gas screening levels are listed in Tables 1a and 1b.
- 2 Indoor air screening levels (IASLs) presented in Tables 1a and 1b. IASLs equal to CalEPA CHHSLs or calculated following CalEPA methodology.
- 3 Background concentrations based on outdoor air measurements and typical values.
- 4 Sub-slab soil gas screening levels (SSSLs) are presented in Tables 1a and 1b. SSSLs are based on residential exposure assumptions and DTSC screening level vapor intrusion attenuation factor.
- 5 Chronic Reference Exposure Levels (RELs) are published by Cal-EPA and listed in Tables 1a and 1b.

Actions:

- Follow-up IA Monitoring A minimum of 2 indoor air sampling events will be conducted for each property.
- Source Invest. Investigate indoor sources of chemicals. Review chemical inventory, outdoor air measurements, and any other potential (non-subsurface) sources of chemical.
- Sub-Slab Mon. Additional sub-slab monitoring to confirm previous results.

- IA Mon. Additional indoor air monitoring to confirm previous results/evaluate engineering controls effectiveness.

- Engr Control Install engineering controls for vapor intrusion pathway mitigation

- EC Evaluation Evaluate engineering control options and needs

- Alt. Accommodations Residents may be asked to stay temporarily in alternative accommodations.

APPENDIX A

INDOOR AIR SAMPLING CHECKLIST

Appendix A
Indoor Air Sampling Checklist
Former Kast Site
Carson, California

- Review soil gas/soil results and identify COCs for indoor air sampling
- Schedule pre-sampling interview and sampling date with home owner/tenant
- Identify sampling team members

- Pre-sampling interview
 - Explain sampling procedures with home owner/tenant
 - Complete building survey
 - Conduct chemical inventory
 - Perform PID screen of house
 - Remove products containing target compounds (container provided by sampling team)
 - Select indoor and outdoor sample locations with home owner/tenant
 - Leave home owner/tenant "Instructions to Occupant" checklist

- Sampling Preparation Activities
 - Coordinate sampling equipment from laboratory
 - Notify fire and police department of sampling activities and Summa canister placement

- Sampling Activities
 - Review HASP / safety tailgate meeting
 - Confirm "Instructions to Occupant" checklist followed by home owner/tenant
 - Place outdoor samplers and initiate sampling
 - Re-screen (i.e., PID) /survey (visual inspection) indoor sampling locations
 - Place and initiate indoor air samplers (1-2 hours after initiation of outdoor air sampling)
 - Fill out field forms
 - Photodocumentation of sampling
 - Check regulators/canister vacuum during day (if access to home available)

- Post-Sampling Activities
 - Review sampling instructions with homeowner/tenant and document deviations
 - Check-out with home owner/tenant
 - Fill out sample labels, chain of custody documentation
 - Transport samples to laboratory

- Reporting
 - Prepare report for submittal to LARWQCB
 - Report results to home owner/tenant

APPENDIX B

BUILDING SURVEY AND HOUSEHOLD PRODUCTS INVENTORY FORMS

APPENDIX K - BUILDING SURVEY FORM

This form must be completed for each building involved in an indoor air investigation.

Preparer's name _____ Date prepared _____

Preparer's affiliation _____

Telephone number _____

1. OCCUPANT

Name _____

Address _____

City _____

Home telephone number _____

Office telephone number _____

2. OWNER OR LANDLORD

Name _____
(If different than occupant)

Address _____

Telephone number _____

A. Type of Building Construction

Type (circle appropriate responses): Single Family Multiple Dwelling Commercial

Ranch	Two-family
Raised Ranch	Duplex
Split Level	Office
Colonial	Warehouse
Mobile Home	Strip Mall
Apartment Building:	Number of Units _____
Other _____	

Building Age _____ Number of stories _____

Area of the Building (square feet) _____

Is the building insulated? yes / no How sealed is the building? _____

Number of elevators in the building _____

Condition of the elevator pits (sealed, open earth, etc.) _____

General description of building construction materials _____

B. Foundation Characteristics (circle all that apply)

1. Full basement, crawlspace, slab on grade, other _____
2. Basement floor description: concrete, dirt, wood, other _____
 - a. The basement is: wet, damp, dry _____
 - b. Sump present? yes / no _____ Water in sump? yes / no _____
 - c. The basement is: finished, unfinished _____
 - d. Is the basement sealed? Provide a description _____

3. Concrete floor description: unsealed, painted, covered; with _____
4. Foundation walls: poured concrete, block, stone, wood, other _____
5. Identify all potential soil gas entry points and their size (e.g., cracks, voids, pipes, utility ports, sumps, drain holes, etc.). Include these points on the building diagram.

C. Heating, Ventilation, and Air Conditioning (circle all that apply)

1. The type of heating system(s):

Hot Air Circulation	Heat Pump
Hot Water Radiation	Unvented Kerosene Heater
Steam Radiation	Wood Stove
Electric Baseboard	Other (specify) _____
2. The type of fuel used: Natural Gas, Fuel Oil, Electric, Wood, Coal, Solar
Other (specify) _____
3. Location of heating system: _____
4. Is there air-conditioning? yes / no Central Air or Window Units?

Specify the location _____

5. Are there air distribution ducts present? yes / no
6. Describe the supply and cold air return duct work including whether there is a cold air return and comment on the tightness of duct joints.

-
7. Is there a whole house fan? yes / no _____
What is the rated size of the fan? _____

8. Temperature settings inside during sampling. Note day and night temperatures.
 - a. Daytime temperature(s) _____
 - b. Nighttime temperature(s) _____
(Note times if system cycles during non-occupied hours during the day)

9. Estimate the average time doors and windows are open to allow fresh outside air into the building. Note rooms that frequently have open windows or doors.
-

D. Potential Indoor Sources of Pollution

1. Is the laundry room located inside the home? yes / no
 2. Has the house ever had a fire? yes / no
 2. Is there an attached garage? yes / no
 3. Is a vehicle normally parked in the garage? yes / no
 4. Is there a kerosene heater present? yes / no
 5. Is there a workshop, hobby or craft area in the residence? yes / no
 6. An inventory of all products used or stored in the home should be performed. Any products that contain volatile organic compounds or chemicals similar to the target compounds should be listed. The attached product inventory form should be used for this purpose.
 7. Is there a kitchen exhaust fan? yes / no Where is it vented? _____
 8. Is the stove gas or electric? _____ Is the oven gas or electric? _____
 9. Is there an automatic dishwasher? yes / no
 10. Is smoking allowed in the building? yes / no
 11. Has the house ever been fumigated or sprayed for pests? If yes, give date, type and location of treatment.
-

E. Water and Sewage (Circle the appropriate response)

Source of Water

Public Water Drilled Well Driven Well Dug Well Other (Specify) _____

Water Well Specifications

Well Diameter _____ Grouted or Ungouted _____

Well Depth _____ Type of Storage Tank _____

Depth to Bedrock _____ Size of Storage Tank _____

Feet of Casing _____ Describe type(s) of Treatment _____

Water Quality

Taste and/or odor problems with water? yes / no If so, describe _____

Is the water chlorinated, brominated, or ozonated? yes / no _____

How long has the taste and/or odor problem been present? _____

Sewage Disposal: Public Sewer Septic Tank Leach Field Other (Specify) _____

Distance from well to septic system _____ Type of septic tank additives _____

F. Plan View

Sketch each floor and if applicable, indicate air sampling locations, possible indoor air pollution sources, preferential pathways and field instrument readings.

G. Potential Outdoor Sources of Pollution

Draw a diagram of the area surrounding the building being sampled. If applicable, provide information on the spill locations (if known), potential air contamination sources (industries, service stations, repair shops, retail shops, landfills, etc.), outdoor air sampling locations, and field instrument readings.

Also, on the diagram, indicate barometric pressure, weather conditions, ambient and indoor temperatures, compass direction, wind direction and speed during sampling, the locations of the water wells, septic systems, and utility corridors if applicable, and a statement to help locate the site on a topographical map.

APPENDIX L – HOUSEHOLD PRODUCTS INVENTORY FORM

Occupant of Building _____

Address _____

City _____

Field Investigator _____ Date _____

Product Description (commercial name, dispenser type, container size, manufacturer, etc.)	Volatile Ingredients in the Product	Field Instrument Reading

Comments:

APPENDIX C

HOMEOWNER INSTRUCTIONS

Appendix C

Instructions for Occupants – Indoor Air Sampling

Employees of an environmental consulting firm with expertise in air sampling will be collecting one or more indoor air samples from your home. A pre-sampling meeting will be held at least a day before sampling. The purpose of this meeting will be to describe the sampling activities and to help identify sources of chemicals from everyday products and activities, such as grease removers and dry cleaning, that may affect the sampling results. During this meeting, a survey containing a series of questions about your home's construction, consumer products you store in your home, and typical household activities will be completed.

In addition to the survey, a preliminary sample will be taken using a hand-held detector. This sample will be used to help identify typical sources of indoor air chemicals. Household products, which may affect the extended indoor air sampling, will be identified and should be removed from the residence 24 hours before as well as during sampling.

Proposed air sample locations will be discussed with you to confirm that the proposed locations are satisfactory. It is anticipated that sampling will take about 24 hours. We will ask you to follow the following list of procedures 24 hours before the scheduled sampling as well as during sampling:

- Do not use wood stoves, fireplaces or equipment kerosene heater
- Do not open windows or keep doors open
- Do not smoke inside
- Do not use air fresheners or odor eliminators
- Do not use cleaning products (e.g., bathroom cleaners, furniture polish, appliance cleaners, all purpose cleaners, floor cleaners)
- Do not use cosmetics including hair spray, nail polish remover, perfume, etc.
- Avoid bringing freshly dry cleaned clothes inside
- Do not partake in hobbies indoors that use solvents (e.g., glue, degreasers, paint thinner)
- Do not use bug sprays or repellants
- Do not store containers of gasoline, oil or petroleum based solvents within the building or attached garages
- Do not operate or store automobiles in an attached garage
- Do not operate gasoline powered equipment inside attached garages or around the immediate perimeter of the home
- Do not use paints or varnishes— preferably up to a week in advance of the sampling

If possible, avoid using window air conditioners, fans or vents. You may operate your central air and heating as needed. This should not affect the sampling results.

The picture shows an example of the canister that will be left in your home during the 24-hour sampling period. It is approximately 24 inches high by 12 inches round and will be placed as unobtrusively as possible in the agreed upon sampling locations.

Any questions and concerns you have may be raised at the pre-sampling meeting, but if you have questions before or after the meeting, please call the community line at (310) 857-2335. Thank you for allowing us to sample your home.



Typical Air Sampling Equipment

Instrucciones para Residentes - Muestreo del Aire Interior

Personal de una empresa de consultoría ambiental, recolectarán una o más muestras del aire dentro de su casa. Estaremos en contacto con usted por lo menos un día antes de la toma de muestras para discutir los detalles. Queremos visitarlo antes del muestreo para darle más información sobre nuestras actividades y para que nos ayude a identificar las fuentes de productos y actividades cotidianas (disolventes y ropa de la tintorería) en el interior de su casa que pudieran afectar los resultados del muestreo. Le daremos una encuesta con una serie de preguntas sobre la construcción de su casa, productos que almacena en su casa y sus actividades cotidianas en el hogar.

Además de la encuesta, utilizaremos un instrumento manual que nos podrá ayudar a identificar las fuentes comunes de productos químicos en el aire interior. Aquellos productos que pudieran afectar la toma de muestras del aire serán identificados y, si es posible, deberán ser alejados de la residencia 24 horas antes y durante el muestreo.

Le diremos en donde tomaremos las muestras y nos podrá decir si estas ubicaciones son de su agrado. Se espera que el muestreo dure 24 horas. Le pedimos que por favor siga los procedimientos indicados a continuación 24 horas antes y durante el muestreo:

- No utilice estufas de leña, chimeneas o calentadores de queroseno
- No abra las ventanas y mantenga las puertas cerradas
- No fume dentro de la casa
- No utilice ambientadores ni eliminadores de olores
- No utilice productos de limpieza (por ejemplo, limpiadores de baño, cera para muebles, aparatos de limpieza, limpiadores de piso)
- No use cosméticos como spray para el cabello, removedor de esmalte de uñas, perfumes, etc.
- Evite el ingreso de la ropa recién lavada en la tintorería
- No utilice disolventes en interiores (por ejemplo, el pegamento, desengrasantes, disolventes de pintura)
- No utilice insecticidas o repelentes
- No almacene envases de gasolina o disolventes a base de petróleo dentro de su casa o en el garaje anexo
- No utilice ni almacene automóviles en el garaje anexo
- No utilice equipos con motores a base de gasolina dentro de garajes o en el perímetro inmediato de la casa
- No utilice pinturas o barnices, preferiblemente una semana antes de la toma de muestras.

Si es posible, evite el uso de acondicionadores de aire de ventana, ventiladores o rejillas de ventilación. Sin embargo, puede operar su aire y calefacción central, según sea necesario. Esto no debería afectar los resultados del muestreo.

Esta imagen muestra un ejemplo del contenedor que quedará en su casa durante las 24 horas del período de muestreo. El contenedor mide aproximadamente 24 pulgadas de alto con una circunferencia de 12 pulgadas. Éste se colocará en un lugar acordado y en donde no interfiera con sus actividades.

Usted puede dirigir sus preguntas y preocupaciones personalmente el día antes del muestreo. Mientras tanto, si usted tiene preguntas, por favor llame al 310) 857-2335. Gracias por su participación en el muestreo y por su paciencia con nuestras actividades.



Equipo de muestreo del aire