J.W. SILVEIRA CO.

499 Embarcadero
Oakland, CA 94606

Tel: (510) 834-9810 Fax: (510) 763-9996
jw_silveira@hotmail.com

Real Estate

April 15, 2011

Mr. Mark Detterman
Alameda County Environmental Health Department
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

SUBJECT: SUB-SLAB SOIL GAS WELL CONSTRUCTION REPORT CERTIFICATION
County File # RO 387
Mel Senna Brake Service
2301 East 12th Street
Oakland, CA

Dear Mr. Detterman:

P&D Environmental, Inc. has prepared the following document:

- Sub-Slab Soil Gas Well Construction Report dated April 15, 2011 (document 0404.R6).

I declare under penalty of perjury that the contents and conclusions in the document are true and correct to the best of my knowledge.

Should you have any questions, please do not hesitate to contact me at (510) 834-9811.

Sincerely,

J.W. Silveira Realty

J.W. Silveira

0404.L14

P&D ENVIRONMENTAL, INC.

55 Santa Clara Ave, Suite 240
Oakland, CA 94610
(510) 658-6916

April 15, 2011
Report 0404.R6

Mr. J.W. Silveira
J.W. Silveira Realty
499 Embarcadero
Oakland, CA 94606

SUBJECT: SUB-SLAB SOIL GAS WELL CONSTRUCTION REPORT
(SG7 THROUGH SG10)
County File #RO 387
Mel Senna Brake Service
2301 East 12th Street
Oakland, California

Dear Mr. Silveira:

P&D Environmental (P&D) is pleased to present this report documenting the construction of four permanant sub-slab soil gas wells designated as SG7 through SG10 and the collection of soil gas samples from the sub-slab soil gas wells at the subject site. The soil gas samples were collected to evaluate risk posed by petroleum hydrocarbon and HVOC soil vapor at the subject site.

This work was performed in accordance with P&D's Subsurface Investigation Work Plan dated September 10, 2010 (document 0404.W2) and a letter from Mr. Mark Detterman at the Alameda County Environmental Health Department (ACDEH) dated December 23, 2010 which provided comments on the work plan. A Site Location Map (Figure 1) and a Site Plan showing underground utilities and the locations of the sub-slab soil gas vapor wells is attached as Figure 2. All work was performed under the direct supervision of a California professional geologist.

BACKGROUND

The subject site was previously a gas station and vehicle repair facility, and is currently a tire and brake repair facility. One gasoline UST, one diesel UST, and two waste oil USTs were removed between December 1990 through March 1991, and excavation of contaminated soil was performed to a depth of approximately 17 to 18 feet below the ground surface. Historical investigation and remedial actions performed by others at the site are summarized in P&D's Subsurface Investigation Work Plan dated December 16, 2008 (document 0404.W1).

Most recently, P&D has prepared a Sensitive Receptor Survey Report dated December 8, 2008 (document 0404.R2) for wells located within a 1/2 – mile radius of the subject site, prepared a Preferential Pathway Survey Report dated December 15, 2008 (document 0404.R3) to identify buried utilities in the vicinity of the subject site that included cross sections showing utility trench and seasonal groundwater depths, and performed subsurface investigation to evaluate the horizontal and vertical extent of impact to groundwater and soil gas at the subject site (Subsurface Investigation Report dated July 7, 2009, document 0404.R4).

FIELD ACTIVITIES

Prior to drilling for construction of the sub-slab soil vapor sampling wells, the drilling locations were marked with white paint, Underground Safety Alert was notified for buried utility location, and a health and safety plan was prepared. No permit was required by the Alameda County Public Works Agency for construction of the sub-slab soil gas wells.

Sub-Slab Soil Gas Well Construction

A total of four permanent sub-slab soil gas wells, designated as SG7 through SG10, were constructed by Vironex, Inc. of Pacheco, California on February 21, 2011 at locations shown in Figure 2. Appendix A contains a sub-slab soil gas well construction diagram showing the construction specifications for sub-slab soil gas wells SG7 through SG10.

The holes for the permanent sub-slab soil vapor wells were drilled using a rotohammer with a 1-inch diameter drill bit to a depth of approximately 3 inches below the bottom of the concrete floor slab. The concrete floor slab was measured to be 6 inches in thickness. The sub-slab soil gas wells were constructed by Vironex, Inc. using a 2-inch long porous high density polyethylene vapor probe tip placed in the bottom of each borehole with a Teflon separator located at the top of the vapor probe tip. A #2/16 Lonestar sack sand was added to the annular space until the lowermost 2.5 inches of the hole was filled with sand. A ¼-inch diameter stainless steel tube extended from the top of the vapor probe tip to ¼ inch below the top of the concrete floor slab. A bentonite slurry was poured into each borehole to a height of two inches above the top of the Teflon separator. The remaining borehole was filled with neat cement. The top of each steel tube was covered with a recessed threaded cap in the floor slab. The sub-slab soil gas wells were constructed so as to prevent potential vapor intrusion from beneath the floor slab to indoor air.

All drill bits used for construction of the sub-slab vapor sampling probes were cleaned with an Alconox solution wash followed by a clean water rinse prior to each use. New, unused sub-slab vapor sampling probe components were used at each location.

Sub-Slab Soil Gas Well Sample Collection

At least 48 hours after construction, soil gas samples were collected from each of the sub-slab soil gas wells by connecting a 6-liter Summa purge canister and 1-liter Summa sample canister to the sub-slab soil gas sampling probe with Teflon tubing using the configuration shown in Figure 3. The soil gas sampling manifold for each location was assembled in a 35-gallon Rubbermaid bin that had been modified by cutting viewing ports into the sides of the bin and covering the viewing ports with transparent polycarbonate sheets. A hole measuring approximately two inches square was also cut in the bottom of the bin to allow the bin to cover the sub-slab soil gas

well while still allowing access to the well through the bottom of the bin. At the time that the sampling manifold was assembled, the vacuum for the sample canister was checked with a vacuum gauge and recorded.

Prior to purging the soil gas from the sub-slab soil gas sampling probe, a 10 minute leak check of the sampling manifold was performed by closing the valve located between the filter and the pressure gauge, opening the purge canister valve, and recording the manifold system vacuum (see Figure 3). No purge testing for purge volume determination was performed because the samples are shallow soil gas samples (collected at less than five feet below the ground surface), and because the samples were collected using Summa canisters. Following successful verification of the manifold leak check, a default of three purge volumes was extracted prior to sample collection. The purge time was calculated using a nominal flow rate provided by the flow controller of 50 milliliters per minute.

Following completion of purging three purge volumes, the valve to the purge canister was closed, a tracer gas (2-Propanol) was placed in a dish adjacent to the purge canister in the bin, and a lid for the bin that had been modified to include two gauntlet nitrile gloves for adjustment of equipment inside the bin while the bin lid is in place and a viewing port covered with a transparent polycarbonate sheet was placed over the top of the bin, enclosing the temporary well, the sampling manifold, and the 1-liter sample canister.

The vapor concentration of the 2-Propanol was monitored with a Photoionization Detector (PID) until 2-Propanol vapor concentration appeared to have equilibrated. The gloves in the lid of the bin were then used to open the sample canister valve. Once the vacuum for the sample canister valve had decreased to 5 inches of mercury, the gloves in the lid of the bin were used to close the sample canister valve. The pressure gage on the inlet side of the flow controller (see Figure 3) was monitored during sample collection to ensure that the vacuum applied to the sub-slab soil gas well did not exceed 100 inches of water.

Following collection of the Summa canister sample, the same manifold was used to collect a soil gas sample using an adsorbent tube. The adsorbent tube was kept in a cooler with ice prior to use and after use. At the time of sample collection, the inlet for the sampling tube was connected to the manifold where the 1-liter Summa canister had been connected. A vacuum pump was connected to the downstream side of the sorbent tube using Swagelok fittings, and the bin lid was then placed onto the bin to fully enclose the manifold and sorbent tube (the vacuum pump was located outside of the Rubbermaid bin). A vacuum was applied with the vacuum pump to the sorbent tube for 20 minutes. The flow controller in the manifold resulted in a nominal flow rate of 50 milliliters per minute, for a total volume of 1,000 milliliters drawn through the adsorbent tube. The pressure gage on the inlet side of the flow controller (see Figure 3) was monitored during sample collection to ensure that the vacuum applied to the temporary well did not exceed 100 inches of water. Following completion of the 20 minute sample collection period, the

sorbent tube were removed from the manifold, the ends of the tube were sealed, and the tube stored in a cooler with ice pending delivery to the laboratory.

One duplicate soil gas sample was collected using a stainless steel sampling tee for the Summa canisters, and one replicate sample was collected using a sorbent tube by sequentially collecting a sorbent tube sample using methods described above immediately following collection of the sorbent tube sample. Following soil gas sample collection, a PID was connected to the Teflon tubing to obtain a preliminary field value for the sample collection location. The soil gas Summa canister samples were then stored in a box and the sorbent tubes were stored in a cooler with ice and promptly shipped to the laboratory for extraction and analysis. Chain of custody procedures were observed for all sample handling. Measurements of vacuums, purging and equilibration time intervals, and PID readings were recorded on Soil Gas Sampling Data Sheets. Copies of the Soil Gas Sampling Data Sheets are attached as Appendix B.

New Teflon tubing and clean, unused vacuum gages and stainless steel sampling manifolds were used at each sample collection location. A new stainless steel tee was used in the sampling manifold for collection of the duplicate sample.

WEATHER INFORMATION

Less than half an inch of rain occurred during the week preceding the soil gas sampling and on the day of soil gas sampling (March 8, 2011). Weather data, including precipitation and barometric pressure for the day of the sampling event and also for the two weeks preceding and following the sampling event is provided as Appendix C. The weather station is located on Encinal Avenue between Lafayette Street and Union Street in Alameda at an elevation of 15 feet, approximately 1.4 miles to the southwest of the subject site. The subject site is located at an elevation of approximately 20 feet above sea level. An internet link to the weather station information is provided in Appendix C.

LABORATORY ANALYSIS

The soil gas samples were analyzed at Air Toxics, Limited in Folsom, California. Analysis was performed for MTBE, benzene, toluene, ethylbenzene, xylenes (BTEX), and the tracer gas 2-Propanol, in addition to other compounds historically detected in groundwater at the site which include acetone, 2-Butanone (MEK), chloroethane, PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride using EPA Method TO-15 Full Scan; naphthalene and the tracer gas 2-Propanol using EPA Method TO-17; and for TPH-Gasoline using EPA Method TO-3.

Additional analysis for nitrogen, oxygen, methane, and carbon dioxide that was requested by the ACDEH in the December 23, 2010 letter approving the work plan was not performed because of an oversight.

The sub-slab soil gas sample results are summarized in Table 1. Copies of the laboratory analytical reports and chain of custody documentation are attached with this report as Appendix D.

SOIL GAS RISK AND HAZARD CALCULATION

The soil gas results for all detected VOCs were evaluated using the Cal/EPA Department of Toxic Substances Control (DTSC) screening-level model for soil gas contamination developed by the CalEPA Human and Ecological Risk Department (last modified February 4, 2009). The model is the California-adopted Johnson Ettinger model used for calculating predicted risk and hazard posed by vapor intrusion to indoor air. The default values of the model DATAENTER page were used with the following exceptions.

- Soil type S was selected for the vadose zone soil type.
- Soil gas sampling depth was approximately one inch below the slab (17.0 centimeters).
- A commercial exposure scenario was calculated using an exposure duration of 25 years and an exposure frequency of 250 days per year).

The modeled cumulative risk and hazard for indoor air was evaluated for each sample and by also using the highest concentration for each detected chemical. The spreadsheet RESULTS page output for the calculated risk and hazard for the commercial exposure scenario are summarized in Table 2. The model input, intercalcs and output sheets for each calculation are attached with this report as Appendix E.

The cumulative hazard quotient was calculated to be less than one and the incremental carcinogenic risk was calculated to be less than 1 in a million for all of the samples with the exception of SG8, where the cumulative incremental risk was 8.3 per million. Similarly, the highest concentration scenario cumulative incremental risk was 8.6 per million. Review of Table 2 shows that almost all of the risk associated with sample SG8 and the maximum concentration scenario is associated with naphthalene.

Sensitivity analysis of the soil gas model was performed using naphthalene for a total of eight scenarios of varying temperature, soil type, sample depth and contaminant concentration. The results of the sensitivity analysis are summarized in Table 3, and the model input, intercalcs and output sheets for each calculation are attached with this report as Appendix F. Review of Table 3 shows that the model is insensitive to average soil temperature and soil type, but is sensitive to soil gas sampling depth and soil gas contaminant concentration.

DISCUSSION AND RECOMMENDATIONS

A total of four permanent sub-slab soil gas wells, designated as SG-7 through SG-10, were installed at the site on collected on February 24, 2011. The soil gas wells were sampled on March 8, 2011. Less than half an inch of rain occurred during the week preceding the soil gas sampling and on the day of soil gas sampling (March 8, 2011). Weather data, including precipitation and barometric pressure for the day of the sampling event and also for the two weeks preceding and following the sampling event is provided as Appendix C.

Review of the sample results in Table 2 shows that the tracer gas 2-Propanol was not detected in the sample results for any of the Summa canisters with the exception of 92 ug/m3 in sample SG9. However, the tracer gas was detected in all of the sorbent tube samples, with elevated concentrations encountered in sample SG8 that prevented quantification of the tracer gas. Review of the laboratory report analytical notes section shows that samples SG9 and SG10 were analyzed immediately after sample SG8, and that carry-over of the tracer gas from sample SG8 into samples SG9 and SG10 occurred. Because the tracer gas concentration was so elevated in sample SG8, the naphthalene concentration for sample SG8 is estimated.

Review of the sample results in Table 2 shows that no analytes were detected above their respective May 2008 SF-RWQCB Table E Environmental Screening Level (ESL) shallow soil gas screening values for either residential or commercial land use with the exception of naphthalene in sample SG8. Naphthalene was detected in sample SG8 at an estimated concentration of 420 ug/m3, which is above the Table E ESL value for shallow soil gas screening of 240 ug/m3 for commercial land use.

Based on the calculated cumulative hazard of less than one for all of the samples and the calculated cumulative incremental risk for all of the samples of less than one in a million with the exception of 8.4 per million at SG8, P&D recommends that the sub-slab wells be sampled again in September, 2011. In addition, P&D recommends that the sample analysis include nitrogen, oxygen, methane, and carbon dioxide as was requested by the ACDEH in the December 23, 2010 letter approving the work plan for installation and sampling of the sub-slab soil gas wells.

DISTRIBUTION

A copy of this report should be uploaded to the Alameda County Environmental Health Department ftp website with a letter on company letterhead identifying the contact information for the responsible party. In addition, a copy of this report should also be uploaded to the GeoTracker website.

LIMITATIONS

This report was prepared solely for the use of J.W. Silveira Realty. The content and conclusions provided by P&D in this assessment are based on information collected during our investigation, which may include, but not be limited to, visual site inspections; interviews with the site owner, regulatory agencies and other pertinent individuals; review of available public documents; subsurface exploration and our professional judgment based on said information at the time of preparation of this document. Any subsurface sample results and observations presented herein are considered to be representative of the area of investigation; however, geological conditions may vary between borings and may not necessarily apply to the general site as a whole. If future subsurface or other conditions are revealed which vary from these findings, the newly revealed conditions must be evaluated and may invalidate the findings of this report.

This report is issued with the understanding that it is the responsibility of the owner, or his representative, to ensure that the information contained herein is brought to the attention of the appropriate regulatory agencies, where required by law. Additionally, it is the sole responsibility of the owner to properly dispose of any hazardous materials or hazardous wastes left onsite, in accordance with existing laws and regulations.

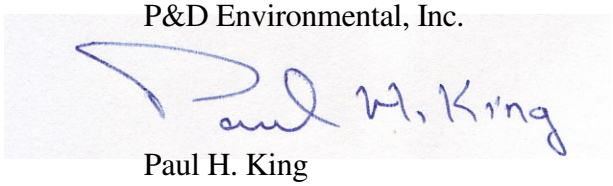
This report has been prepared in accordance with generally accepted practices using standards of care and diligence normally practiced by recognized consulting firms performing services of a similar nature. P&D is not responsible for the accuracy or completeness of information provided by other individuals or entities which is used in this report. This report presents our professional judgment based upon data and findings identified in this report and interpretation of such data based upon our experience and background, and no warranty, either express or implied, is made. The conclusions presented are based upon the current regulatory climate and may require revision if future regulatory changes occur.

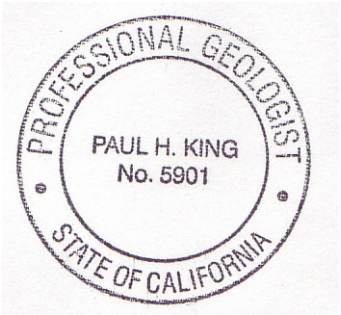
April 15, 2011
Report 0404.R6

Should you have any questions, please do not hesitate to contact us at (510) 658-6916.

Sincerely,

P&D Environmental, Inc.





Paul H. King
California Professional Geologist #5901
Expires: 12/31/11

Attachments:

Table 1 - Summary of Soil Gas Analytical Results
Table 2 - Summary of Soil Gas Risk and Hazard Analysis
Table 3 - Summary of Soil Gas Model Sensitivity Analysis

Figure 1 - Site Location Map
Figure 2 - Site Plan Aerial Photograph Showing Sub-Slab Soil Gas Well Locations
Figure 3 - Typical Soil Gas Sampling Manifold

Appendix A - Sub-Slab Soil Gas Well Construction Diagram
Appendix B - Soil Gas Purge Volume Calculations and Sampling Data Sheets
Appendix C - Weather Data
Appendix D - Laboratory Analytical Reports and Chain of Custody Documentation
Appendix E - Soil Gas Risk and Hazard Calculation Work Sheets
Appendix F - Soil Gas Model Sensitivity Analysis Risk and Hazard Calculation Work Sheets

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TABLES

TABLE 1
Summary of Soil Gas Analytical Results

Sample ID	Sample Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	TPH-G	Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylenes	2-Propanol, b	Other VOCs by TO-15	TO-17 Results
SG7	3/8/2011	ND<7.6	ND<6.0	ND<4.4	ND<4.4	ND<2.9	300	ND<3.6	4.8	ND<4.9	ND<4.9	ND<4.9	ND<11	ND except, Acetone=13	2-Propanol = 570, a Naphthalene = 0.82
SG7-DUP	3/8/2011	ND<7.6	ND<6.0	ND<4.4	ND<4.4	ND<2.9	ND<230	ND<3.6	5.0	ND<4.9	ND<4.9	ND<4.9	ND<11	ND except, Acetone=13	2-Propanol = 430 Naphthalene = 0.79
SG8	3/8/2011	37	ND<15	34	ND<11	ND<7.1	ND<220	ND<8.8	ND<10	ND<12	ND<12	ND<12	ND<27	ND	2-Propanol = NR Naphthalene = **<u>420</u>**, a
SG9	3/8/2011	ND<8.2	ND<6.5	ND<4.8	ND<4.8	ND<3.1	ND<250	ND<3.9	ND<4.6	ND<5.2	ND<5.2	ND<5.2	92	ND	2-Propanol = >5,900, c Naphthalene = 3.4
SG10	3/8/2011	72	6.9	ND<4.6	ND<4.6	ND<3.0	270	ND<3.7	ND<4.4	ND<5.0	ND<5.0	ND<5.0	ND<11	ND except, Acetone=27	2-Propanol = >3,400, c Naphthalene = 1.1
ESL [1]		*410*	*1,200*	*7,300*	*15,000*	*31*	*10,000*	*84*	*63,000*	*980*	*m, p, o xylenes 21,000 combined*		*None*	*Acetone = 660,000*	*2-Propanol =None Naphthalene = 72*
ESL 2		*1,400*	*4,100*	*20,000*	*41,000*	*100*	*29,000*	*280*	*180,000*	*3,300*	*m, p, o xylenes58,000 combined*		*None*	*Acetone = 1,800,000*	*2-Propanol =None Naphthalene = 240*

<u>Abbreviations and Notes:</u>
PCE = Tetrachloroethene
TCE = Trichloroethene
cis-1,2-DCE = cis-1,2-dichloroethene
trans-1,2-DCE = trans-1,2-dichloroethene
TPH-G = Total Petroleum Hydrocarbons as Gasoline.
ND = Not Detected.
NA = Not Analyzed.
NR = Not Reported.
a = Laboratory Note: Exceeds Instrument Calibration Range.
b = 2-propanol used in field as leak detector.
c = Laboratory Note: saturated peak; data reported as estimated.
ESL[1] = Environmental Screening Level, developed by San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB), from Table E – Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Residential Land Use.
ESL[2] = Environmental Screening Level, developed by San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB), from Table E – Indoor Air and Soil Gas (Vapor Intrusion Concerns) Shallow Soil Gas Screening Levels for Commercial/Industrial Land Use.
Values in bold exceed ESL[1]
<u>Values Underlined exceed ESL[2]</u>
All soil gas samples collected at 5-foot depth.
Results in micrograms per cubic meter (µg/m3), unless otherwise indicated.

TABLE 2
Summary of Soil Gas Risk and Hazard Analysis

Cal/EPA Screening-Level Model			
for Soil Gas Contamination (last modified 2/4/2009)			
Mel Senna Brake Service			
2301 E 12th St.		Incremental	Hazard
Oakland, CA		risk from	quotient
Sampled 3/8/11		vapor	from vapor
		intrusion to	intrusion to
		indoor air,	indoor air,
Chemical	Sample	Concentration	carcinogen	noncarcinogen
	Location	($\mu g/m^3$)	(unitless)	(unitless)
	SG7			
Toluene		4.8	NA	2.6E-05
Acetone		13	NA	6.9E-07
Naphthalene		0.82	1.6E-08	4.4E-04
		TOTALS	**1.6E-08**	**4.7E-04**
	SG7-DUP, a			
Toluene		5.0	NA	2.7E-05
Acetone		13	NA	6.9E-07
Naphthalene		0.79	1.6E-08	4.3E-04
		TOTALS	**1.6E-08**	**4.6E-04**
	SG8			
Tetrachloroethene		37	1.3E-07	1.7E-03
cis-1,2-Dichloroethene		34	NA	1.6E-03
Naphthalene		420	8.3E-06	2.3E-01
		TOTALS	**8.4E-06**	**2.3E-01**
	SG9			
Naphthalene		3.4	6.7E-08	1.8E-03
		TOTALS	**6.7E-08**	**1.8E-03**
	SG10			
Tetrachloroethene		72	2.5E-07	3.4E-03
Trichloroethene		6.9	8.1E-09	1.9E-05
Acetone		27	NA	1.4E-06
Naphthalene		1.1	2.2E-08	6.0E-04
		TOTALS	**2.8E-07**	**4.0E-03**
NOTES				
Spreadsheet default values were used, except for vadose zone soil type S (sand) was selected, soil gas				
sampling depth of 2.0 cm , and 25 years exposure duration and 250 days/year exposure frequency				
for commercial exposure scenario.				
a = SG7 Summa cannister field duplicate and SG7 sorbent tube field replicate results were combined for risk and hazard evaluation.				

TABLE 2
Summary of Soil Gas Risk and Hazard Analysis

Cal/EPA Screening-Level Model				
for Soil Gas Contamination (last modified 2/4/2009)				
Mel Senna Brake Service				
2301 E 12th St.			Incremental	Hazard
Oakland, CA			risk from	quotient
Sampled 3/8/11			vapor	from vapor
	Highest		intrusion to	intrusion to
	Detected		indoor air,	indoor air,
Chemical	Sample	Concentration	carcinogen	noncarcinogen
	Location	($\mu g/m^3$)	(unitless)	(unitless)
Tetrachloroethene	SG10	72	2.5E-07	3.4E-03
Trichloroethene	SG10	6.9	8.1E-09	1.9E-05
cis-1,2-Dichloroethene	SG8	34	NA	1.6E-03
Toluene	SG7-DUP	5.0	NA	2.7E-05
Acetone	SG10	27	NA	1.4E-06
Naphthalene	SG8	420	8.3E-06	2.3E-01
		TOTALS	**8.6E-06**	**2.4E-01**
NOTES				
Spreadsheet default values were used, except for vadose zone soil type S (sand) was selected, soil gas				
sampling depth of 2.0 cm , and 25 years exposure duration and 250 days/year exposure frequency				
for commercial exposure scenario.				

TABLE 3

Summary of Soil Gas Model Sensitivity Analysis

USEPA Vapor Intrusion Model (2003)				
Johnson and Ettinger model (DTSC spreadsheet)				
Former Mel Senna Brake Service				
2301 E 12th St.			Incremental	Hazard
Oakland, CA			risk from	quotient
			vapor	from vapor
			intrusion to	intrusion to
			indoor air,	indoor air,
	Concentration	Sample Result	carcinogen	noncarcinogen
Chemical	(ug/m^3)	Location	(unitless)	(unitless)
Scenario 1 = Table 2 Highest Concentration with Model Default Values Except for				
Soil = S and Sample Depth = 17 cm (2.0 cm below slab).				
Naphthalene	420	SG8	8.3E-06	2.3E-01
Scenario 2 = Scenario 1 values except average soil temperature is 15 degrees C.				
Naphthalene	420	SG8	8.3E-06	2.3E-01
Scenario 3 = Scenario 1 values except soil type is CL.				
Naphthalene	420	SG8	8.3E-06	2.3E-01
Scenario 4 = Scenario 1 values except soil type is SI.				
Naphthalene	420	SG8	8.3E-06	2.3E-01
Scenario 5 = Scenario 1 values except soil gas sampling depth is 152.4 cm (5 ft).				
Naphthalene	420	SG8	2.5E-06	6.8E-02
Scenario 6 = Scenario 1 values except soil gas sampling depth is 304.8 cm (10 ft).				
Naphthalene	420	SG8	1.4E-06	3.8E-02
Scenario 7 = Scenario 1 values except naphthalene concentration = 100 ug/m3.				
Naphthalene	100	SG8	2.0E-06	5.4E-02
Scenario 8 = Scenario 1 values except naphthalene concentration = 1,000 ug/m3.				
Naphthalene	1,000	SG8	2.0E-05	5.4E-01
Report 0404.R6 Soil Gas Model Sensitivity Analysis				

FIGURES

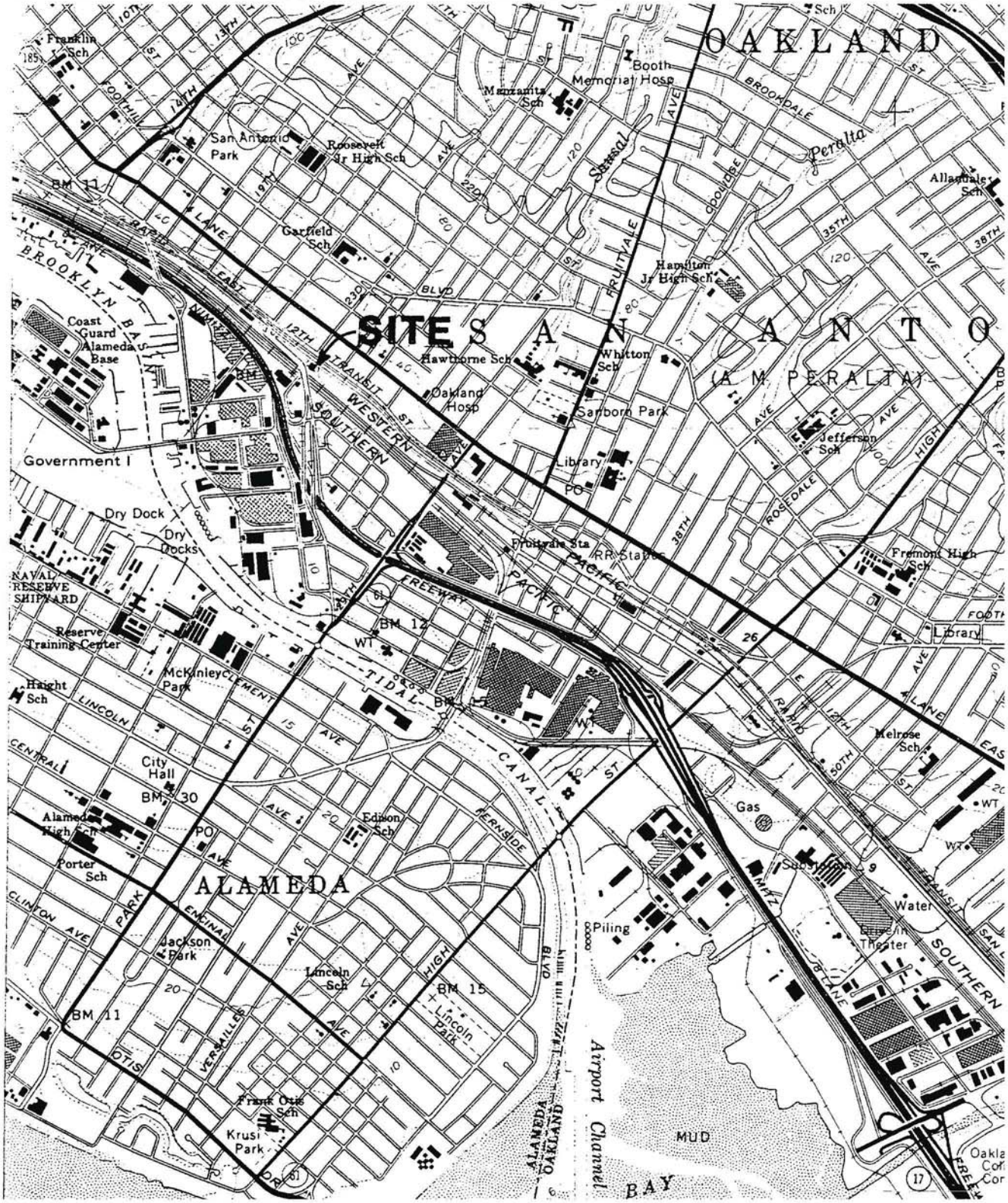


Figure 1
Site Location Map
Mel Senna Brake Service
2301 East 12th Street
Oakland, California

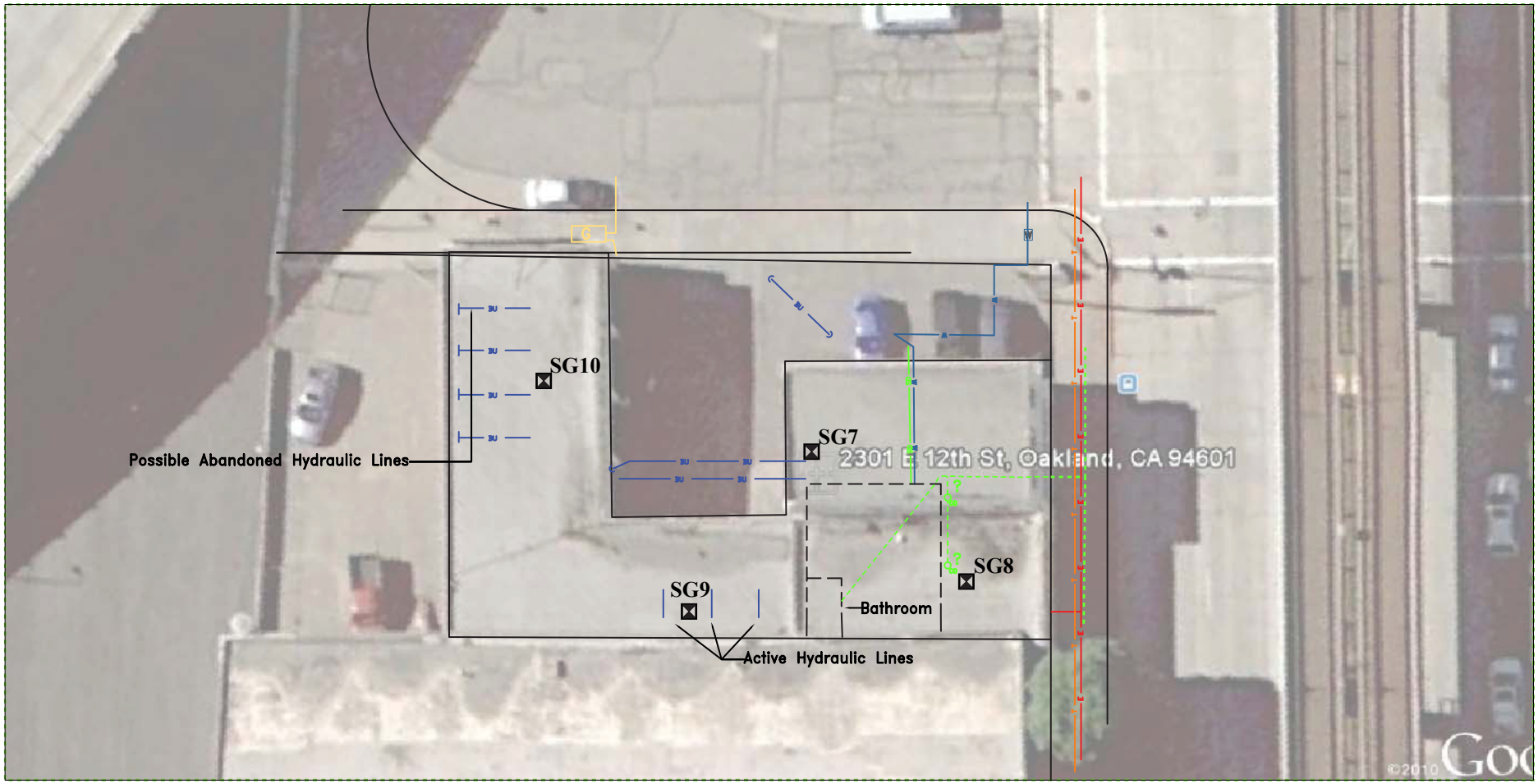
N

Base Map From:
U.S.Geological Survey
Oakland East, California
7.5 Minute Quadrangle
Photorevised 1980

P&D Environmental, Inc.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610

0 1,000 2,000

APPROXIMATE SCALE IN FEET



EXPLANATION:

- BURIED TELEPHONE
- BURIED PIPE
- BURIED ELECTRIC
- BURIED GAS
- BURIED SEWER
- BURIED WATER
- POSSIBLE BURIED PIPE LOCATION
- SIGNAL FROM PIPE TERMINATES
- SEWER CLEANOUT
- BURIED SEWER IDENTIFIED BY P&D
- SG10 Sub-Slab Soil Gas Well Location

NOTE: THIS DRAWING SHOWS THE APPROXIMATE LOCATIONS OF UTILITIES FOUND DURING OUR INVESTIGATION. THERE MAY BE ADDITIONAL UTILITIES AND PIPES THAT WERE NOT DETECTED DURING OUR INVESTIGATION AND ARE NOT SHOWN ON THIS DRAWING.

Figure 2
Site Plan Aerial Photograph Showing Sub-Slab Soil Gas Well Locations
Mel Senna Brake Service
2301 East 12th Street
Oakland, California

Base Map From:
JR Associates Cicil and Environmental Geophysics, San Jose, CA
August 2010

P&D Environmental, Inc.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610

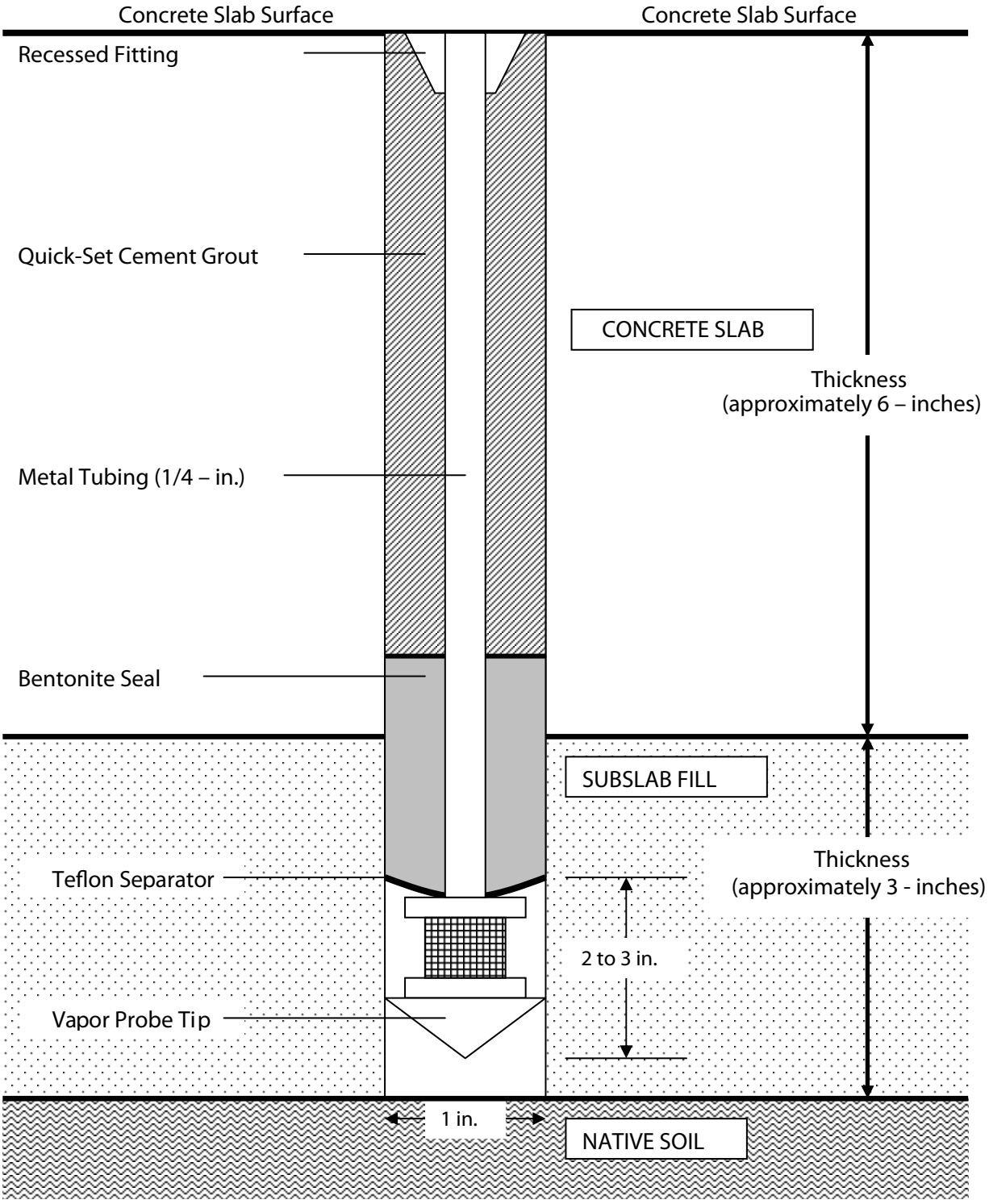
0 15 30
APPROXIMATE SCALE IN FEET

N

Figure 3
Typical Soil Gas Sample Collection Manifold
Mel Senna Brake Service
2301 East 12th Street
Oakland, California

APPENDIX A

Sub-Slab Soil Gas Well Construction Diagram



Sub-Slab Soil Gas Well Construction diagram
Mel Senna Brake Service
2301 East 12th Street
Oakland, California

Schematic from DTSC/Cal-EPA Vapor Intrusion Guidance Document - Final Interim, December 15, 2004	P&D Environmental, Inc. 55 Santa Clara Ave., Suite 240 Oakland, CA 94610	

APPENDIX B

Soil Gas Purge Volume Calculations and Sampling Data Sheets

Report 0404.R6
Appendix B
3 feet tubing, 2.5 inch sand interval

Soil Gas Purge Volume Calculations

One Purge Volume is calculated as the volume of the tubing interior plus the volume of the sand interval of the borehole.

The tubing interior volume is calculated as follows:

V tubing = pi x (r x r) x h, where pi = 3.14, r = 0.187 in./2, and h = 3 ft.

V tubing = 3.14 x (0.0935 x 0.0935) x (3 ft. x 12 in./ft.) =	0.99	cubic inches

The sand interval volume is calculated as follows:

V sand interval = pi x (r x r) x h x porosity, where pi = 3.14, r = 1.0 in./2, h = 2.5 in., and porosity = 0.35

V sand interval = 3.14 x (0.5 x 0.5) x 2.5 x 0.35 =	0.69	cubic inches

The total volume for one purge volume is V tubing + V sand interval, where

V total = 0.99 cubic inches + 0.69 cubic inches =	1.68	cubic inches

To convert to cubic centimeters:

V total = 1.68 cubic inches x 16.39 cubic centimeters/cubic inches =	27.5	cubic centimeters

The total volume to be purged is 3 purge volumes.

V purge total = 27.5 cubic centimeters x 3 =	82	cubic centimeters

The flow controller has a nominal flow rate of 50 cubic centimeters per minute.

The purge time is calculated as follows:

T purge = 82 cubic centimeters/50 cubic centimeters per minute =	1.65	minutes
Converting the purge time to seconds, 1.65 minutes x 60 seconds/ minute =	99	seconds

SOIL GAS SAMPLING DATA SHEET
Address 2301 E 12th ST, OAKLAND
Job # 0404, R6
Date 3/8/11
P&D Sampler MLP
Drilling Company VIRONEX

Probe Method (check one)
o PRT
o Temp Well

Soil Gas Location Designation	Probe Depth (Ft.)	Time Probe Installed	Canister #	Sample Canister Initial Vacuum Check (In. Hg) and time	Start leak check vacuum (In. Hg) and time	End leak check vacuum (In. Hg) and time	ADDITIONAL leak check vacuum (In. Hg) and time	Start PURGE time	End PURGE time	Start of tracer gas equilibration time	Time and conc. (ppm) of tracer gas equilibration	Begin sample collection vacuum (In. Hg) and time	End sample collection vacuum (In. Hg) and time	NOTES
SG 7	0.75		36454	vac -29 time	vac -29 time 10:10	vac -22 time 10:20	vac time	103700 time	103839 time	1040 time	conc. 78 time 1045	vac -29 time 105300	vac -5 time 112130	FLOW CONTROLER 50 ML/MIN
SG 7 DUP	0.75		2198	vac -29 time	vac time	vac time	vac time	time	time	time	conc. time	vac -29 time 105200	vac -5 time 112130	1312 0 PPM
SG 8	0.75		12368	vac -28 time	vac -28 time 10:12	vac -28 time 10:22	vac time	104030 time	104209 time	1042 time	conc. 97 time 1050	vac -29 time 105300	vac -5 time 111130	1350 0 PPM
SG 9	0.75		2166	vac -29 time	vac -28 time 1345	vac -28 time 1355	vac time	time 140430	time 140609	time 140630	conc. 84 time 1412	vac -29 time 141300	vac -5 time 142930	1505 0 PPM
SG 10	0.75		36401	vac -29 time	vac -26 time 1420	vac -26 time 1430	vac time	time 154000	time 154139	time 1545	conc. 88 time 1551	vac -29 time 155110	vac -5 time 160810	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	
SG				vac time	vac time	vac time	vac time	time	time	time	conc. time	vac time	vac time	

SOIL GAS SAMPLING DATA SHEET
Address 2301 E 12th ST, OAKLAND
Job # 0404.R6
Date 3/8/11
P&D Sampler MLD
Drilling Company VIRONEX

Probe Method (check one)
o PRT
o Temp Well

Soil Gas Location Designation	Probe Depth (Ft.)	Time Probe Installed	Canister #	Sample Canister Initial Vacuum Check (In. Hg) and time	Start leak check vacuum (In. Hg) and time	End leak check vacuum (In. Hg) and time	ADDITIONAL leak check vacuum (In. Hg) and time	Start PURGE time	End PURGE time	Start of tracer gas equilibration time	Time and conc. (ppm) of tracer gas equilibration	Begin sample collection vacuum (In. Hg) and time	End sample collection vacuum (In. Hg) and time	NOTES
SG 7				vac	vac	vac	vac				conc. 64	vac	vac	FLOW CONTROLER
TUBE				time	time	time	time	time	time	time 1140	time 1148	time 115000	time 121000	50 MM/MIN
SG 7				vac	vac	vac	vac				conc. 72	vac	vac	1312 0 PPM
TUBE				time	time	time	time	time	time	time 1205	time 1217	time 121900	time 123900	
REP														
SG 8				vac	vac	vac	vac				conc.	vac	vac	
TUBE				time	time	time	time	time	time	time 1315	time 1321	time 132700	time 134200	1350 0 PPM
SG 9				vac	vac	vac	vac				conc. 58	vac	vac	
TUBE				time	time	time	time	time	time	time 1432	time 143900	time 144000	time 150000	1505 0 PPM
SG 10				vac	vac	vac	vac				conc.	vac	vac	
TUBE				time	time	time	time	time	time	time 1600	time 161700	time 161800	time 163800	1645 0 PPM
SG				vac	vac	vac	vac				conc.	vac	vac	
				time	time	time	time	time	time	time	time	time	time	
SG				vac	vac	vac	vac				conc.	vac	vac	
				time	time	time	time	time	time	time	time	time	time	
SG				vac	vac	vac	vac				conc.	vac	vac	
				time	time	time	time	time	time	time	time	time	time	
SG				vac	vac	vac	vac				conc.	vac	vac	
				time	time	time	time	time	time	time	time	time	time	
SG				vac	vac	vac	vac				conc.	vac	vac	
				time	time	time	time	time	time	time	time	time	time	
SG				vac	vac	vac	vac				conc.	vac	vac	
				time	time	time	time	time	time	time	time	time	time	
SG				vac	vac	vac	vac				conc.	vac	vac	
				time	time	time	time	time	time	time	time	time	time	
SG				vac	vac	vac	vac				conc.	vac	vac	
				time	time	time	time	time	time	time	time	time	time	

APPENDIX C

Weather Data

http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAALAME1&graphspan=custom&month=2&day=22&year=2011&monthend=3&dayend=8&yearend=2011

History for KCAALAME1

Encinal & Lafayette, Alameda, CA

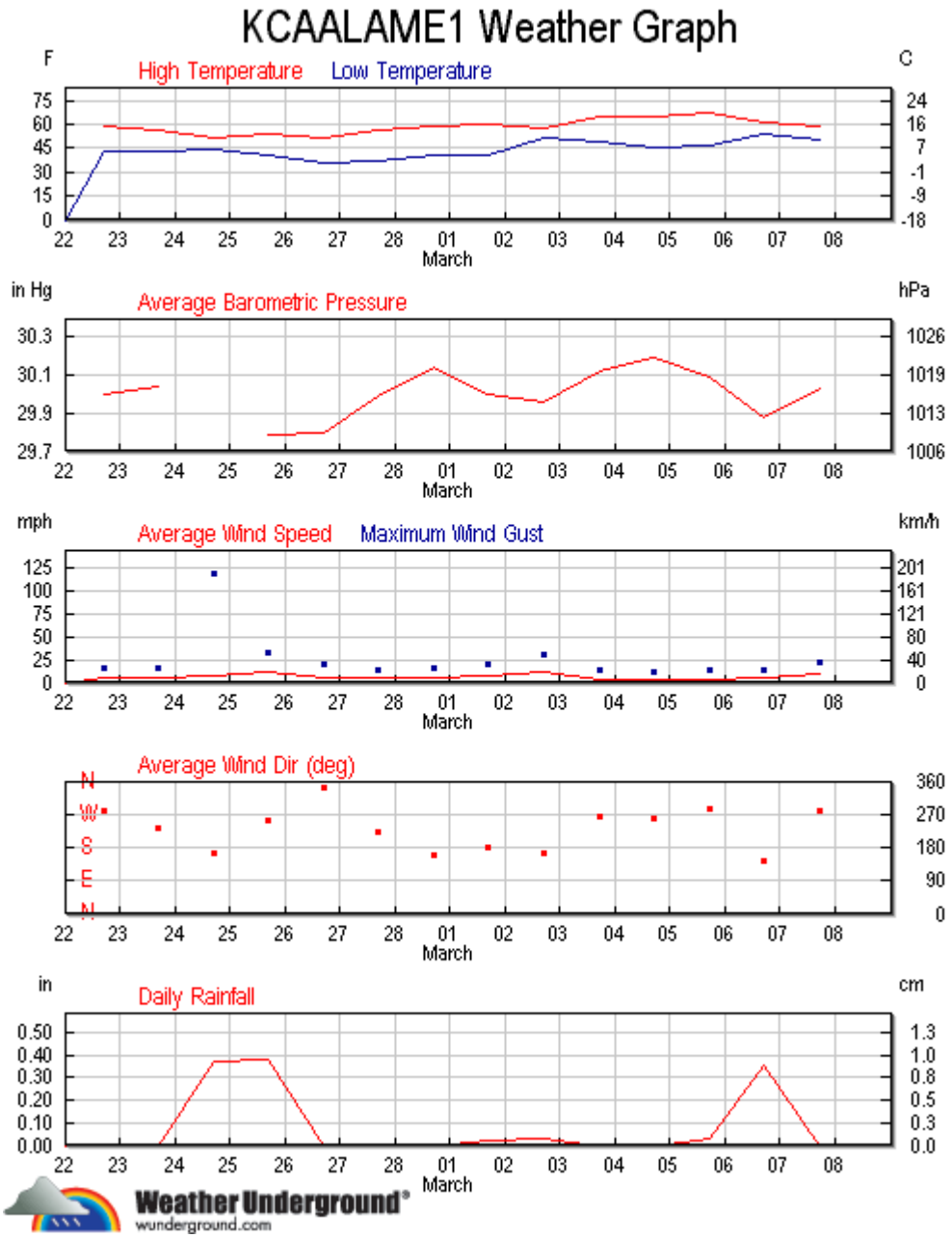
About This Station

Lat: N 37 ° 46 ' 3 " (37.768 °)
Lon: W 122 ° 15 ' 18 " (-122.255 °)
Elevation (ft): 15
Hardware: Davis Vantage Pro 2

February 22 2011 - TO - March 8 2011 Go

Daily Weekly Monthly Yearly **Custom**

	High:	Low:	Average:
Temperature:	**67.3** °F	**35.4** °F	**51.0** °F
Dew Point:	**56.4** °F	**25.2** °F	**44.0** °F
Humidity:	97.0%	41.0%	78.3%
Wind Speed:	**117.3**mph from the SSW	-	**5.7**mph
Wind Gust:	**117.3**mph from the SSW	-	-
Wind:	-	-	SW
Pressure:	**30.24**in	**20.30**in	-
Precipitation:	**1.21**in		


KCAALAME1 Weather Graph
F
High Temperature
Low Temperature
C
75
60
45
30
15
0
24
16
7
-1
-9
-18
22 23 24 25 26 27 28 01 02 03 04 05 06 07 08
March
in Hg
Average Barometric Pressure
hPa
30.3
30.1
29.9
29.7
1026
1019
1013
1006
22 23 24 25 26 27 28 01 02 03 04 05 06 07 08
March
mph
Average Wind Speed
Maximum Wind Gust
km/h
125
100
75
50
25
0
201
161
121
80
40
0
22 23 24 25 26 27 28 01 02 03 04 05 06 07 08
March
Average Wind Dir (deg)
N
W
S
E
N
360
270
180
90
0
22 23 24 25 26 27 28 01 02 03 04 05 06 07 08
March
in
Daily Rainfall
cm
0.50
0.40
0.30
0.20
0.10
0.00
1.3
1.0
0.8
0.5
0.3
0.0
22 23 24 25 26 27 28 01 02 03 04 05 06 07 08
March
Weather Underground
wunderground.com

http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAALAME1&graphspan=day&month=3&day=8&year=2011

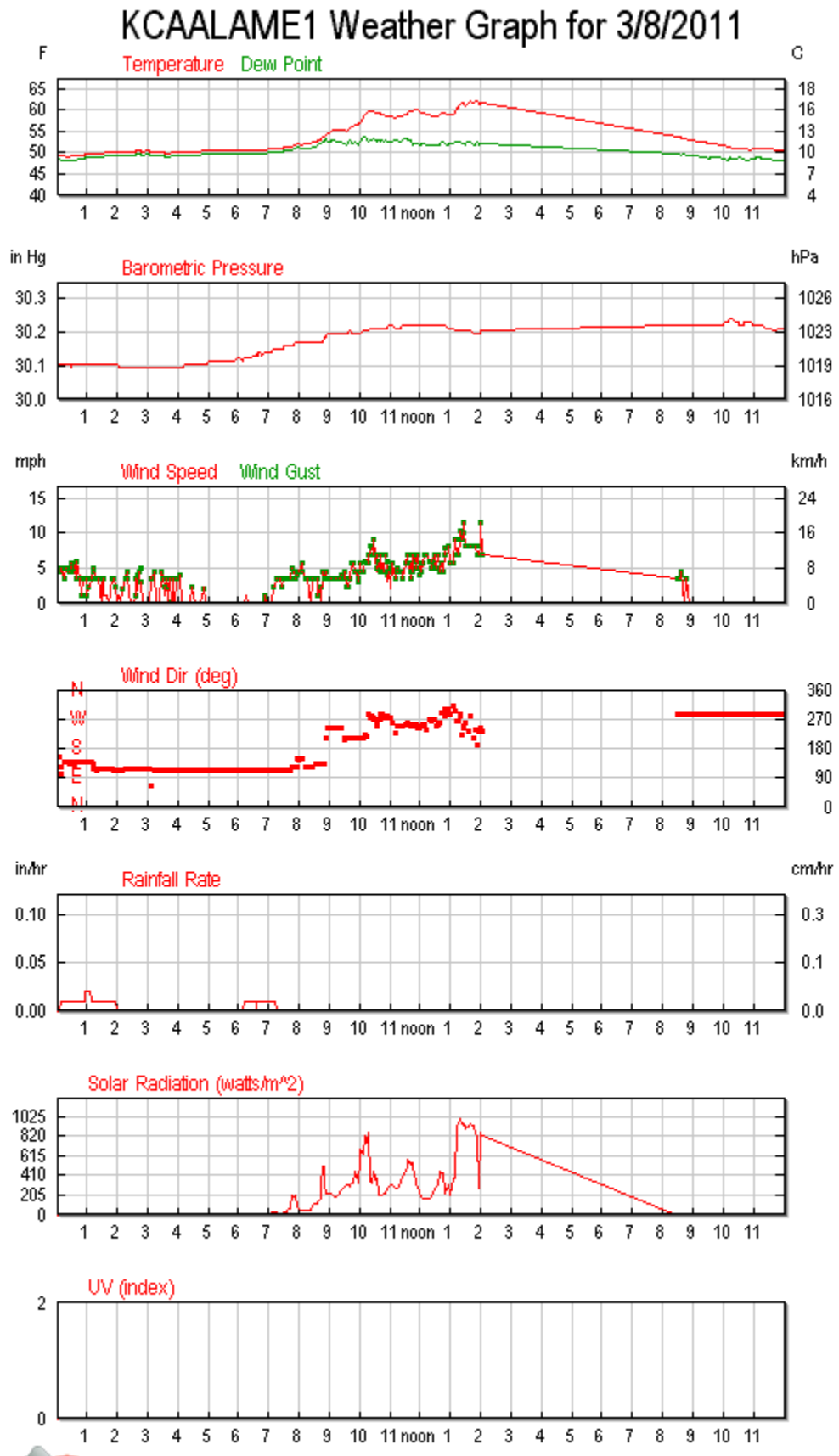
« Previous Day | March | 8 | 2011 | View | Next Day »

Daily | Weekly | Monthly | Yearly | Custom

	Current:	High:	Low:	Average:
Temperature:	**58.2** °F	**62.6** °F	**49.6** °F	**53.7** °F
Dew Point:	**44.8** °F	**54.1** °F	**48.5** °F	**50.8** °F
Humidity:	61%	97%	69%	90%
Wind Speed:	**7.0**mph	**11.5**mph	-	**2.8**mph
Wind Gust:	**13.0**mph	**11.5**mph	-	-
Wind:	SW	-	-	SW
Pressure:	**30.04**in	**30.24**in	**30.09**in	-
Precipitation:	**0.03**in			
Solar Radiation:	**858.0** watts/m^2			
UV Index:	**0.0**			

Statistics for the rest of the month

	High:	Low:	Average:
Temperature:	**83.3** °F	**40.8** °F	**54.0** °F
Dew Point:	**59.0** °F	**37.7** °F	**48.1** °F
Humidity:	97.0%	33.0%	81.6%
Wind Speed:	**38.0**mph from the South	-	**6.5**mph
Wind Gust:	**38.0**mph from the South	-	-
Wind:	-	-	SW
Pressure:	**30.26**in	**29.33**in	-
Precipitation:	**5.31**in		

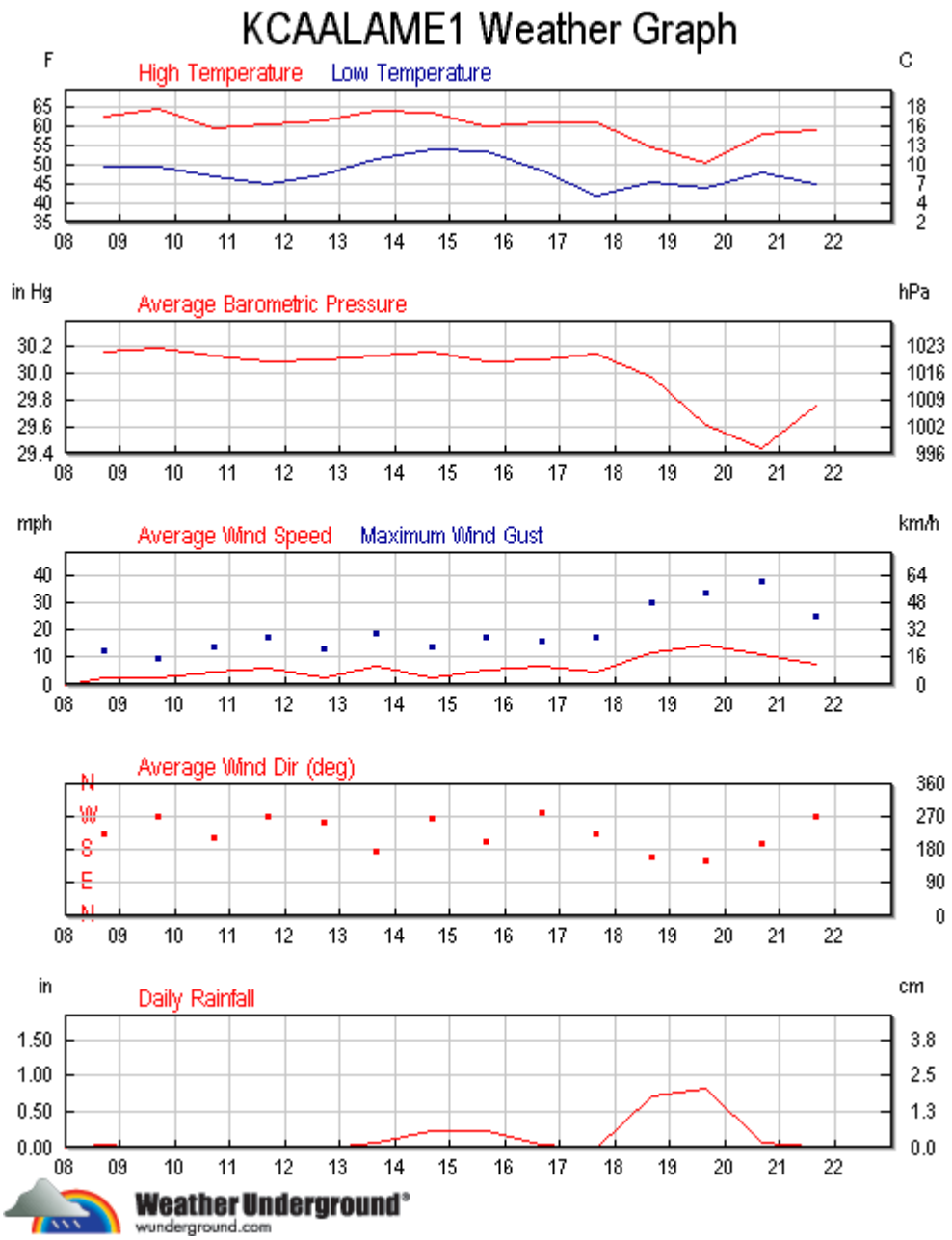

KCAALAME1 Weather Graph for 3/8/2011
F
C
Temperature
Dew Point
65
60
55
50
45
40
18
16
13
10
7
4
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
in Hg
hPa
Barometric Pressure
30.3
30.2
30.1
30.0
1026
1023
1019
1016
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
mph
km/h
Wind Speed
Wind Gust
15
10
5
0
24
16
8
0
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
Wind Dir (deg)
N
W
S
E
N
360
270
180
90
0
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
in/hr
cm/hr
Rainfall Rate
0.10
0.05
0.00
0.3
0.1
0.0
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
Solar Radiation (watts/m^2)
1025
820
615
410
205
0
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
UV (index)
2
0
1 2 3 4 5 6 7 8 9 10 11 noon 1 2 3 4 5 6 7 8 9 10 11
Weather Underground
wunderground.com

http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAALAME1&graphspan=custom&month=3&day=8&year=2011&monthend=3&dayend=22&yearend=2011

March 8 2011 - TO - March 22 2011 Go

Daily Weekly Monthly Yearly **Custom**

	High:	Low:	Average:
Temperature:	**64.7** °F	**42.5** °F	**53.3** °F
Dew Point:	**59.0** °F	**38.6** °F	**48.1** °F
Humidity:	97.0%	48.0%	83.1%
Wind Speed:	**38.0**mph from the South	-	**6.5**mph
Wind Gust:	**38.0**mph from the South	-	-
Wind:	-	-	SW
Pressure:	**30.26**in	**29.33**in	-
Precipitation:	**2.37**in		


KCAALAME1 Weather Graph
F
High Temperature
Low Temperature
C
65 60 55 50 45 40 35
18 16 13 10 7 4 2
08 09 10 11 12 13 14 15 16 17 18 19 20 21 22
in Hg
Average Barometric Pressure
hPa
30.2 30.0 29.8 29.6 29.4
1023 1016 1009 1002 996
mph
Average Wind Speed
Maximum Wind Gust
km/h
40 30 20 10 0
64 48 32 16 0
Average Wind Dir (deg)
N W S E N
360 270 180 90 0
in
Daily Rainfall
cm
1.50 1.00 0.50 0.00
3.8 2.5 1.3 0.0
Weather Underground
wunderground.com

APPENDIX D

Laboratory Analytical Reports and Chain of Custody Documentation

- **Air Toxics Work Order # 1103241B: Soil Gas Samples SG7 - SG10 and Field Duplicate SG7-DUP EPA Method ModifiedTO-3 Analytical Results**
- **Air Toxics Work Order # 1103241A: Soil Gas Samples SG7 - SG10 and Field Duplicate SG7-DUP Modified TO-15 Analytical Results**
- **Air Toxics Work Order # 1103220: Soil Gas Samples SG7 - SG10 and Field Duplicate SG7-Rep Modified TO-17 VI Analytical Results**

3/16/2011
Mr. Paul King
P & D Environmental
55 Santa Clara
Suite 240
Oakland CA 94610

Project Name: MEL SENNA BRAKE SERVICE 2301 E 12TH ST
Project #: 0404.R6
Workorder #: 1103241B

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 3/10/2011 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-3 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kyle Vagadori

Project Manager

Air Toxics LTD.
Laboratory Services Since 1989

WORK ORDER #: 1103241B

Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	**BILL TO:**	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE:	510-658-6916	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0404.R6 MEL SENNA BRAKE SERVICE 2301 E 12TH ST
DATE RECEIVED:	03/10/2011	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	03/16/2011		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SG7	Modified TO-3	3.0 "Hg	15 psi
02A	SG7-DUP	Modified TO-3	3.0 "Hg	15 psi
03A	SG8	Modified TO-3	2.5 "Hg	15 psi
04A	SG9	Modified TO-3	5.0 "Hg	15 psi
05A	SG10	Modified TO-3	4.0 "Hg	15 psi
06A	Lab Blank	Modified TO-3	NA	NA
07A	LCS	Modified TO-3	NA	NA
07AA	LCSD	Modified TO-3	NA	NA

CERTIFIED BY: Linda D. Frumarn DATE: 03/16/11

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763,
NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/11
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified TO-3
P & D Environmental
Workorder# 1103241B

Five 1 Liter Summa Canister samples were received on March 10, 2011. The laboratory performed analysis for volatile organic compounds in air via modified EPA Method TO-3 using gas chromatography with flame ionization detection. The method involves concentrating up to 200 mL of sample. The concentrated aliquot is then dry purged to remove water vapor prior to entering the chromatographic system. The TPH (Gasoline Range) results are calculated using the response factor of Gasoline. A molecular weight of 100 is used to convert the TPH (Gasoline Range) ppmv result to ug/L.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***TO-3***	***ATL Modifications***
Daily Calibration Standard Frequency	Prior to sample analysis and every 4 - 6 hrs	Prior to sample analysis and after the analytical batch </= 20 samples
Initial Calibration Calculation	4-point calibration using a linear regression model	5-point calibration using average Response Factor
Initial Calibration Frequency	Weekly	When daily calibration standard recovery is outside 75 - 125 %, or upon significant changes to procedure or instrumentation
Moisture Control	Nafion system	Sorbent system
Minimum Detection Limit (MDL)	Calculated using the equation DL = A+3.3S, where A is intercept of calibration line and S is the standard deviation of at least 3 reps of low level standard	40 CFR Pt. 136 App. B
Preparation of Standards	Levels achieved through dilution of gas mixture	Levels achieved through loading various volumes of the gas mixture

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

Air Toxics LTD.
Laboratory Services Since 1989

Summary of Detected Compounds
MODIFIED EPA METHOD TO-3 GC/FID

Client Sample ID: SG7

Lab ID#: 1103241B-01A

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.056	0.23	0.073	0.30

Client Sample ID: SG7-DUP

Lab ID#: 1103241B-02A

No Detections Were Found.

Client Sample ID: SG8

Lab ID#: 1103241B-03A

No Detections Were Found.

Client Sample ID: SG9

Lab ID#: 1103241B-04A

No Detections Were Found.

Client Sample ID: SG10

Lab ID#: 1103241B-05A

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.058	0.24	0.067	0.27

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG7

Lab ID#: 1103241B-01A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d031410**	**Date of Collection: 3/8/11 11:21:00 AM**	
Dil. Factor:	**2.24**	**Date of Analysis: 3/14/11 07:02 PM**	

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.056	0.23	0.073	0.30

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	101	75-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG7-DUP

Lab ID#: 1103241B-02A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d031411**	**Date of Collection: 3/8/11 11:21:00 AM**	
Dil. Factor:	**2.24**	**Date of Analysis: 3/14/11 07:35 PM**	

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.056	0.23	Not Detected	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	101	75-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG8

Lab ID#: 1103241B-03A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d031412**	**Date of Collection: 3/8/11 11:11:00 AM**	
Dil. Factor:	**2.20**	**Date of Analysis: 3/14/11 08:26 PM**	

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.055	0.22	Not Detected	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	102	75-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG9

Lab ID#: 1103241B-04A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d031413**	**Date of Collection: 3/8/11 2:29:00 PM**	
Dil. Factor:	**2.42**	**Date of Analysis: 3/14/11 09:03 PM**	

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.060	0.25	Not Detected	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	102	75-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG10

Lab ID#: 1103241B-05A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d031414**	**Date of Collection: 3/8/11 4:08:00 PM**	
Dil. Factor:	**2.33**	**Date of Analysis: 3/14/11 09:36 PM**	

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.058	0.24	0.067	0.27

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	103	75-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1103241B-06A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d031404**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/14/11 02:23 PM**	

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.025	0.10	Not Detected	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	105	75-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCS

Lab ID#: 1103241B-07A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d031402**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/14/11 12:02 PM**	

Compound	**%Recovery**
TPH (Gasoline Range)	94

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
Fluorobenzene (FID)	105	75-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCSD

Lab ID#: 1103241B-07AA

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d031415**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/14/11 10:13 PM**	

Compound	**%Recovery**
TPH (Gasoline Range)	89

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
Fluorobenzene (FID)	108	75-150

P & D ENVIRONMENTAL, INC.
55 Santa Clara Ave, Suite 240
Oakland, CA 94610
(510) 658-6916

1103241

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

PROJECT NUMBER:	PROJECT NAME:
0404.RG	MEL SENNA BRAKE SERVICE 2301 E 12th STREET OAKLAND

SAMPLED BY: (PRINTED AND SIGNATURE) MICHAEL DESCHENES Michael Deschenes

	SAMPLE NUMBER	DATE	TIME	TYPE	INIT VAC	SAMPLE LOCATION SUMMA#	FINAL VAC	PID	NUMBER OF CONTAINERS	ANALYSIS(ES): TPH-G 3X	TO-3	TO-15 Full Scan (See list)	PRESERVATIVE	REMARKS
01A	SG7	3/8/11	112130	SOIL GAS	-29	36454	-5	0	1	X	X		NONE	NORMAL TURN AROUND
02A	SG7-DUP		112130		-29	2198	-5	0	1	X	X			
03A	SG8		111130		-29	12368	-5	0	1	X	X			
04A	SG9		142930		-29	2166	-5	0	1	X	X			
05A	SG10		160810		-29	36401	-5	0	1	X	X			

Tedlar Co.

CUSTODY SEAL INTACT?
Y N (NONE) TEMP N/A

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	TOTAL NO. OF SAMPLES (THIS SHIPMENT)	LABORATORY:
Michael Deschenes			B. Wittaker ATC 3/10/11 1255	5	AIR TOXICS, LTD
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	TOTAL NO. OF CONTAINERS (THIS SHIPMENT) 5	LABORATORY CONTACT: KYLE VAGADORI
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	LABORATORY PHONE NUMBER: (916) 985-1000	SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( )YES (X)NO

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS:
- See attached list for TO-15 Full Scan
- 2-PROPANOL WAS OUR TRACER GAS

1103241

0404.R6

TO-15 Full Scan List

MTBE, benzene, toluene, ethylbenzene, xylenes (BTEX), and the tracer gas 2-Propanol, acetone, 2-Butanone (MEK), chloroethane, PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride using EPA Method TO-15 Full Scan

Air Toxics LTD.
Laboratory Services Since 1989

3/22/2011
Mr. Paul King
P & D Environmental
55 Santa Clara
Suite 240
Oakland CA 94610

Project Name: MEL SENNA BRAKE SERVICE 2301 E 12TH ST
Project #: 0404.R6
Workorder #: 1103241A

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 3/10/2011 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kyle Vagadori

Project Manager

Air Toxics LTD.
Laboratory Services Since 1989

WORK ORDER #: 1103241A

Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	**BILL TO:**	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE:	510-658-6916	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0404.R6 MEL SENNA BRAKE SERVICE 2301 E 12TH ST
DATE RECEIVED:	03/10/2011	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	03/22/2011		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SG7	Modified TO-15	3.0 "Hg	15 psi
02A	SG7-DUP	Modified TO-15	3.0 "Hg	15 psi
03A	SG8	Modified TO-15	2.5 "Hg	15 psi
04A	SG9	Modified TO-15	5.0 "Hg	15 psi
05A	SG10	Modified TO-15	4.0 "Hg	15 psi
06A	Lab Blank	Modified TO-15	NA	NA
06B	Lab Blank	Modified TO-15	NA	NA
07A	CCV	Modified TO-15	NA	NA
07B	CCV	Modified TO-15	NA	NA
08A	LCS	Modified TO-15	NA	NA
08AA	LCSD	Modified TO-15	NA	NA
08B	LCS	Modified TO-15	NA	NA
08BB	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Linda D. Fruman DATE: 03/22/11

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763,
NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/11
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15
P & D Environmental
Workorder# 1103241A

Five 1 Liter Summa Canister samples were received on March 10, 2011. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

All Quality Control Limit exceedences and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page. Target compound non-detects in the samples that are associated with high bias in QC analyses have not been flagged.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit.
UJ- Non-detected compound associated with low bias in the CCV and/or LCS.
N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

Air Toxics LTD.
Laboratory Services Since 1989

Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SG7

Lab ID#: 1103241A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	1.1	1.3	4.2	4.8
Acetone	4.5	5.6	11	13

Client Sample ID: SG7-DUP

Lab ID#: 1103241A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	1.1	1.3	4.2	5.0
Acetone	4.5	5.6	11	13

Client Sample ID: SG8

Lab ID#: 1103241A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	2.8	5.5	19	37
cis-1,2-Dichloroethene	2.8	8.5	11	34

Client Sample ID: SG9

Lab ID#: 1103241A-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	4.8	37	12	92

Client Sample ID: SG10

Lab ID#: 1103241A-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	1.2	10	7.9	72
Trichloroethene	1.2	1.3	6.3	6.9
Acetone	4.7	12	11	27

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG7

Lab ID#: 1103241A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031521**	**Date of Collection: 3/8/11 11:21:00 AM**	
Dil. Factor:	**2.24**	**Date of Analysis: 3/15/11 06:39 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	1.1	Not Detected	7.6	Not Detected
2-Propanol	4.5	Not Detected	11	Not Detected
Methyl tert-butyl ether	1.1	Not Detected	4.0	Not Detected
Benzene	1.1	Not Detected	3.6	Not Detected
Toluene	1.1	1.3	4.2	4.8
Ethyl Benzene	1.1	Not Detected	4.9	Not Detected
m,p-Xylene	1.1	Not Detected	4.9	Not Detected
o-Xylene	1.1	Not Detected	4.9	Not Detected
Trichloroethene	1.1	Not Detected	6.0	Not Detected
cis-1,2-Dichloroethene	1.1	Not Detected	4.4	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.4	Not Detected
Vinyl Chloride	1.1	Not Detected	2.9	Not Detected
Chloroethane	4.5	Not Detected	12	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.5	Not Detected	13	Not Detected
Acetone	4.5	5.6	11	13

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	110	70-130
1,2-Dichloroethane-d4	128	70-130
4-Bromofluorobenzene	94	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG7-DUP

Lab ID#: 1103241A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031522**	**Date of Collection: 3/8/11 11:21:00 AM**	
Dil. Factor:	**2.24**	**Date of Analysis: 3/15/11 07:10 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	1.1	Not Detected	7.6	Not Detected
2-Propanol	4.5	Not Detected	11	Not Detected
Methyl tert-butyl ether	1.1	Not Detected	4.0	Not Detected
Benzene	1.1	Not Detected	3.6	Not Detected
Toluene	1.1	1.3	4.2	5.0
Ethyl Benzene	1.1	Not Detected	4.9	Not Detected
m,p-Xylene	1.1	Not Detected	4.9	Not Detected
o-Xylene	1.1	Not Detected	4.9	Not Detected
Trichloroethene	1.1	Not Detected	6.0	Not Detected
cis-1,2-Dichloroethene	1.1	Not Detected	4.4	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.4	Not Detected
Vinyl Chloride	1.1	Not Detected	2.9	Not Detected
Chloroethane	4.5	Not Detected	12	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.5	Not Detected	13	Not Detected
Acetone	4.5	5.6	11	13

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	108	70-130
1,2-Dichloroethane-d4	130	70-130
4-Bromofluorobenzene	94	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG8

Lab ID#: 1103241A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p031629**	**Date of Collection:**	**3/8/11 11:11:00 AM**
Dil. Factor:	**5.54**	**Date of Analysis:**	**3/16/11 06:42 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	2.8	5.5	19	37
2-Propanol	11	Not Detected	27	Not Detected
Methyl tert-butyl ether	2.8	Not Detected	10	Not Detected
Benzene	2.8	Not Detected	8.8	Not Detected
Toluene	2.8	Not Detected	10	Not Detected
Ethyl Benzene	2.8	Not Detected	12	Not Detected
m,p-Xylene	2.8	Not Detected	12	Not Detected
o-Xylene	2.8	Not Detected	12	Not Detected
Trichloroethene	2.8	Not Detected	15	Not Detected
cis-1,2-Dichloroethene	2.8	8.5	11	34
trans-1,2-Dichloroethene	2.8	Not Detected	11	Not Detected
Vinyl Chloride	2.8	Not Detected	7.1	Not Detected
Chloroethane	11	Not Detected	29	Not Detected
2-Butanone (Methyl Ethyl Ketone)	11	Not Detected	33	Not Detected
Acetone	11	Not Detected	26	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	108	70-130
1,2-Dichloroethane-d4	113	70-130
4-Bromofluorobenzene	95	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG9

Lab ID#: 1103241A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031527**	**Date of Collection: 3/8/11 2:29:00 PM**	
Dil. Factor:	**2.42**	**Date of Analysis: 3/15/11 11:05 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	1.2	Not Detected	8.2	Not Detected
2-Propanol	4.8	37	12	92
Methyl tert-butyl ether	1.2	Not Detected	4.4	Not Detected
Benzene	1.2	Not Detected	3.9	Not Detected
Toluene	1.2	Not Detected	4.6	Not Detected
Ethyl Benzene	1.2	Not Detected	5.2	Not Detected
m,p-Xylene	1.2	Not Detected	5.2	Not Detected
o-Xylene	1.2	Not Detected	5.2	Not Detected
Trichloroethene	1.2	Not Detected	6.5	Not Detected
cis-1,2-Dichloroethene	1.2	Not Detected	4.8	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Vinyl Chloride	1.2	Not Detected	3.1	Not Detected
Chloroethane	4.8	Not Detected	13	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.8	Not Detected	14	Not Detected
Acetone	4.8	Not Detected	11	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	109	70-130
1,2-Dichloroethane-d4	128	70-130
4-Bromofluorobenzene	90	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG10

Lab ID#: 1103241A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p031630**	**Date of Collection: 3/8/11 4:08:00 PM**	
Dil. Factor:	**2.33**	**Date of Analysis: 3/16/11 07:12 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	1.2	10	7.9	72
2-Propanol	4.7	Not Detected	11	Not Detected
Methyl tert-butyl ether	1.2	Not Detected	4.2	Not Detected
Benzene	1.2	Not Detected	3.7	Not Detected
Toluene	1.2	Not Detected	4.4	Not Detected
Ethyl Benzene	1.2	Not Detected	5.0	Not Detected
m,p-Xylene	1.2	Not Detected	5.0	Not Detected
o-Xylene	1.2	Not Detected	5.0	Not Detected
Trichloroethene	1.2	1.3	6.3	6.9
cis-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Vinyl Chloride	1.2	Not Detected	3.0	Not Detected
Chloroethane	4.7	Not Detected	12	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.7	Not Detected	14	Not Detected
Acetone	4.7	12	11	27

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	106	70-130
1,2-Dichloroethane-d4	112	70-130
4-Bromofluorobenzene	94	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1103241A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031506**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/15/11 09:37 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
Acetone	2.0	Not Detected	4.8	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	106	70-130
1,2-Dichloroethane-d4	119	70-130
4-Bromofluorobenzene	96	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1103241A-06B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p031611**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/16/11 09:31 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
Acetone	2.0	Not Detected	4.8	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	109	70-130
1,2-Dichloroethane-d4	107	70-130
4-Bromofluorobenzene	88	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: CCV

Lab ID#: 1103241A-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031502**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/15/11 07:11 AM**	

Compound	%Recovery
Tetrachloroethene	108
2-Propanol	102
Methyl tert-butyl ether	96
Benzene	117
Toluene	118
Ethyl Benzene	108
m,p-Xylene	109
o-Xylene	106
Trichloroethene	117
cis-1,2-Dichloroethene	101
trans-1,2-Dichloroethene	102
Vinyl Chloride	70
Chloroethane	110
2-Butanone (Methyl Ethyl Ketone)	100
Acetone	97

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	111	70-130
1,2-Dichloroethane-d4	117	70-130
4-Bromofluorobenzene	97	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: CCV

Lab ID#: 1103241A-07B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p031602**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/15/11 11:46 PM**	

Compound	%Recovery
Tetrachloroethene	85
2-Propanol	126
Methyl tert-butyl ether	110
Benzene	106
Toluene	115
Ethyl Benzene	108
m,p-Xylene	107
o-Xylene	107
Trichloroethene	105
cis-1,2-Dichloroethene	110
trans-1,2-Dichloroethene	107
Vinyl Chloride	123
Chloroethane	111
2-Butanone (Methyl Ethyl Ketone)	114
Acetone	120

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	109	70-130
1,2-Dichloroethane-d4	119	70-130
4-Bromofluorobenzene	93	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCS

Lab ID#: 1103241A-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031503**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/15/11 08:20 AM**	

Compound	%Recovery
Tetrachloroethene	104
2-Propanol	106
Methyl tert-butyl ether	103
Benzene	115
Toluene	116
Ethyl Benzene	109
m,p-Xylene	110
o-Xylene	108
Trichloroethene	118
cis-1,2-Dichloroethene	106
trans-1,2-Dichloroethene	116
Vinyl Chloride	125
Chloroethane	113
2-Butanone (Methyl Ethyl Ketone)	102
Acetone	98

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	111	70-130
1,2-Dichloroethane-d4	119	70-130
4-Bromofluorobenzene	99	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCSD

Lab ID#: 1103241A-08AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3031504**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/15/11 08:38 AM**	

Compound	%Recovery
Tetrachloroethene	104
2-Propanol	103
Methyl tert-butyl ether	102
Benzene	115
Toluene	117
Ethyl Benzene	107
m,p-Xylene	109
o-Xylene	107
Trichloroethene	116
cis-1,2-Dichloroethene	102
trans-1,2-Dichloroethene	116
Vinyl Chloride	119
Chloroethane	112
2-Butanone (Methyl Ethyl Ketone)	99
Acetone	94

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	112	70-130
1,2-Dichloroethane-d4	119	70-130
4-Bromofluorobenzene	98	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCS

Lab ID#: 1103241A-08B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p031604**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/16/11 12:45 AM**	

Compound	%Recovery
Tetrachloroethene	91
2-Propanol	129
Methyl tert-butyl ether	115
Benzene	113
Toluene	119
Ethyl Benzene	111
m,p-Xylene	111
o-Xylene	113
Trichloroethene	108
cis-1,2-Dichloroethene	110
trans-1,2-Dichloroethene	125
Vinyl Chloride	131 Q
Chloroethane	118
2-Butanone (Methyl Ethyl Ketone)	123
Acetone	114

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	110	70-130
1,2-Dichloroethane-d4	109	70-130
4-Bromofluorobenzene	97	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCSD

Lab ID#: 1103241A-08BB

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p031605**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/16/11 02:05 AM**	

Compound	%Recovery
Tetrachloroethene	89
2-Propanol	130
Methyl tert-butyl ether	117
Benzene	112
Toluene	117
Ethyl Benzene	113
m,p-Xylene	113
o-Xylene	113
Trichloroethene	108
cis-1,2-Dichloroethene	114
trans-1,2-Dichloroethene	127
Vinyl Chloride	134 Q
Chloroethane	123
2-Butanone (Methyl Ethyl Ketone)	122
Acetone	120

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	109	70-130
1,2-Dichloroethane-d4	112	70-130
4-Bromofluorobenzene	95	70-130

P & D ENVIRONMENTAL, INC.
55 Santa Clara Ave, Suite 240
Oakland, CA 94610
(510) 658-6916

1103241

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

PROJECT NUMBER:	PROJECT NAME:
0404.RG	MEL SENNA BRAKE SERVICE 2301 E 12th STREET OAKLAND

SAMPLED BY: (PRINTED AND SIGNATURE) MICHAEL DESCHENES Michael Deschenes

	SAMPLE NUMBER	DATE	TIME	TYPE	INIT VAC	SAMPLE LOCATION SUMMA#	FINAL VAC	PID	NUMBER OF CONTAINERS	ANALYSIS(ES): TPH-G 3X	TO-3	TO-15 Full Scan (See list)	PRESERVATIVE	REMARKS
01A	SG7	3/8/11	112130	SOIL GAS	-29	36454	-5	0	1	X	X		NONE	NORMAL TURN AROUND
02A	SG7-DUP		112130		-29	2198	-5	0	1	X	X			
03A	SG8		111130		-29	12368	-5	0	1	X	X			
04A	SG9		142930		-29	2166	-5	0	1	X	X			
05A	SG10		160810		-29	36401	-5	0	1	X	X			

Tedlar Co.

CUSTODY SEAL INTACT?
Y N (NONE) TEMP N/A

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	TOTAL NO. OF SAMPLES (THIS SHIPMENT)	LABORATORY:
Michael Deschenes			B. Wittaker ATC 3/10/11 1255	5	AIR TOXICS, LTD
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	TOTAL NO. OF CONTAINERS (THIS SHIPMENT) 5	LABORATORY CONTACT: KYLE VAGADORI
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	LABORATORY PHONE NUMBER: (916) 985-1000	SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( )YES (X)NO

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS:
- See attached list for TO-15 Full Scan
- 2-PROPANOL WAS OUR TRACER GAS

1103241

0404.R6

TO-15 Full Scan List

MTBE, benzene, toluene, ethylbenzene, xylenes (BTEX), and the tracer gas 2-Propanol, acetone, 2-Butanone (MEK), chloroethane, PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride using EPA Method TO-15 Full Scan

Air Toxics LTD.
Laboratory Services Since 1989

3/28/2011
Mr. Paul King
P & D Environmental
55 Santa Clara
Suite 240
Oakland CA 94610

Project Name: MEL SENNA BRAKE SERVICE 2301 E 12TH ST
Project #: 0404.R6
Workorder #: 1103220

Dear Mr. Paul King

The following report includes the data for the above referenced project for sample(s) received on 3/10/2011 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-17 VI are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kyle Vagadori

Project Manager

Air Toxics LTD.
Laboratory Services Since 1989

WORK ORDER #: 1103220

Work Order Summary

CLIENT:	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610	**BILL TO:**	Mr. Paul King P & D Environmental 55 Santa Clara Suite 240 Oakland, CA 94610
PHONE:	510-658-6916	**P.O. #**	
FAX:	510-834-0772	**PROJECT #**	0404.R6 MEL SENNA BRAKE SERVICE 2301 E 12TH ST
DATE RECEIVED:	03/10/2011	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	03/28/2011		

FRACTION #	NAME	TEST
01A	SG7	Modified TO-17 VI
02A	SG7- REP.	Modified TO-17 VI
03A	SG8	Modified TO-17 VI
04A	SG9	Modified TO-17 VI
05A	SG10	Modified TO-17 VI
06A	Lab Blank	Modified TO-17 VI
07A	CCV	Modified TO-17 VI
08A	LCS	Modified TO-17 VI
08AA	LCSD	Modified TO-17 VI

CERTIFIED BY: Linda D. Frumarn DATE: 03/28/11

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763,
NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/11
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-17
P & D Environmental
Workorder# 1103220

Five TO-17 VI Tube samples were received on March 10, 2011. The laboratory performed the analysis via EPA Method TO-17 using GC/MS in the full scan mode. TO-17 sorbent tubes are thermally desorbed onto a secondary trap. The trap is thermally desorbed to elute the components into the GC/MS system for further separation.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

Sample SG8 contained extremely high levels of the leak check compound 2-Propanol. The levels were such that the instrument was not only severely saturated for 2-Propanol, the internal standard compound used for quantification was also not recoverable. Although dilutions can be performed using the thermal desorption interface, the significant dilution required to provide reliable results was not possible to achieve with the available parameters. As a result, 2-Propanol could not be reported for sample SG8. Since Naphthalene and its associated internal standard elutes much later than the interfering 2-Propanol peak, an estimated concentration for Naphthalene was reported. The internal standard recovered at 59% which is slightly below the method required limits of 60-140%. The recovery of the corresponding field surrogate, Naphthalene-d8, demonstrated a high recovery in part due to the low recovery of the internal standard.

Samples SG9 and SG10 were analyzed immediately after sample SG8, and carryover of 2-Propanol is likely contributing to the reported results. 2-Propanol results for these samples were flagged as estimated.

A sampling volume of 1.00 L was used to convert ng to ug/m3 for the associated Lab Blank.

The reported CCV and LCS for each daily batch may be derived from more than one analytical file.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit.
UJ- Non-detected compound associated with low bias in the CCV and/or LCS.
N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

Air Toxics LTD.
Laboratory Services Since 1989

Summary of Detected Compounds
EPA METHOD TO-17

Client Sample ID: SG7

Lab ID#: 1103220-01A

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
2-Propanol	49	49	570 E	570 E
Naphthalene	0.50	0.50	0.82	0.82

Client Sample ID: SG7- REP.

Lab ID#: 1103220-02A

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
2-Propanol	49	49	430	430
Naphthalene	0.50	0.50	0.79	0.79

Client Sample ID: SG8

Lab ID#: 1103220-03A

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	0.50	0.50	420 E	420 E

Client Sample ID: SG9

Lab ID#: 1103220-04A

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
2-Propanol	49	49	>5900 S	>5900 S
Naphthalene	0.50	0.50	3.4	3.4

Client Sample ID: SG10

Lab ID#: 1103220-05A

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
2-Propanol	49	49	>3400 S	>3400 S
Naphthalene	0.50	0.50	1.1	1.1

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG7

Lab ID#: 1103220-01A

EPA METHOD TO-17

File Name:	**11031119**	**Date of Extraction: NA**	**Date of Collection: 3/8/11 12:10:00 PM**
Dil. Factor:	**1.00**		**Date of Analysis: 3/11/11 04:54 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
2-Propanol	49	49	570 E	570 E
Naphthalene	0.50	0.50	0.82	0.82

Air Sample Volume(L): 1.00

E = Exceeds instrument calibration range.

Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	97	50-150
Toluene-d8	123	50-150
Naphthalene-d8	100	50-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG7- REP.

Lab ID#: 1103220-02A

EPA METHOD TO-17

File Name:	**11031120**	**Date of Extraction: NA**	**Date of Collection: 3/8/11 12:39:00 PM**
Dil. Factor:	**1.00**		**Date of Analysis: 3/11/11 05:34 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
2-Propanol	49	49	430	430
Naphthalene	0.50	0.50	0.79	0.79

Air Sample Volume(L): 1.00
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	112	50-150
Toluene-d8	120	50-150
Naphthalene-d8	102	50-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG8

Lab ID#: 1103220-03A

EPA METHOD TO-17

File Name:	**11031121**	**Date of Extraction: NA**	**Date of Collection: 3/8/11 1:42:00 PM**
Dil. Factor:	**1.00**		**Date of Analysis: 3/11/11 06:15 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	0.50	0.50	420 E	420 E

Air Sample Volume(L): 1.00
E = Exceeds instrument calibration range.
Q = Exceeds Quality Control limits.
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	240 Q	50-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG9

Lab ID#: 1103220-04A

EPA METHOD TO-17

File Name:	**11031122**	**Date of Extraction: NA**	**Date of Collection: 3/8/11 3:00:00 PM**
Dil. Factor:	**1.00**		**Date of Analysis: 3/11/11 06:55 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
2-Propanol	49	49	>5900 S	>5900 S
Naphthalene	0.50	0.50	3.4	3.4

Air Sample Volume(L): 1.00

S = Saturated peak; data reported as estimated.

Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	50-150
Toluene-d8	115	50-150
Naphthalene-d8	117	50-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SG10

Lab ID#: 1103220-05A

EPA METHOD TO-17

File Name:	**11031123**	**Date of Extraction: NA**	**Date of Collection: 3/8/11 4:38:00 PM**
Dil. Factor:	**1.00**		**Date of Analysis: 3/11/11 07:35 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
2-Propanol	49	49	>3400 S	>3400 S
Naphthalene	0.50	0.50	1.1	1.1

Air Sample Volume(L): 1.00

S = Saturated peak; data reported as estimated.

Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	92	50-150
Toluene-d8	111	50-150
Naphthalene-d8	117	50-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1103220-06A

EPA METHOD TO-17

File Name:	**11031113**	**Date of Extraction: NA**	**Date of Collection: NA**
Dil. Factor:	**1.00**		**Date of Analysis: 3/11/11 12:07 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
2-Propanol	49	49	Not Detected	Not Detected
Naphthalene	0.50	0.50	Not Detected	Not Detected

Air Sample Volume(L): 1.00

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	96	50-150
Toluene-d8	111	50-150
Naphthalene-d8	86	50-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: CCV
Lab ID#: 1103220-07A
EPA METHOD TO-17

File Name:	**11031108**	**Date of Extraction: NA**	**Date of Collection: NA**
Dil. Factor:	**1.00**		**Date of Analysis: 3/11/11 07:33 AM**

Compound	%Recovery
2-Propanol	114
Naphthalene	93

Air Sample Volume(L): 1.00
Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	114	50-150
Toluene-d8	121	50-150
Naphthalene-d8	97	50-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCS
Lab ID#: 1103220-08A
EPA METHOD TO-17

File Name:	**11031110**	**Date of Extraction: NA**	**Date of Collection: NA**
Dil. Factor:	**1.00**		**Date of Analysis: 3/11/11 08:53 AM**

Compound	%Recovery
2-Propanol	97
Naphthalene	Not Spiked

Air Sample Volume(L): 1.00
Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	50-150
Toluene-d8	119	50-150
Naphthalene-d8	95	50-150

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCSD
Lab ID#: 1103220-08AA
EPA METHOD TO-17

File Name:	**11031111**	**Date of Extraction: NA**	**Date of Collection: NA**
Dil. Factor:	**1.00**		**Date of Analysis: 3/11/11 09:33 AM**

Compound	%Recovery
2-Propanol	103
Naphthalene	Not Spiked

Air Sample Volume(L): 1.00
Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	116	50-150
Toluene-d8	117	50-150
Naphthalene-d8	95	50-150

1103220

P & D ENVIRONMENTAL, INC.
55 Santa Clara Ave, Suite 240
Oakland, CA 94610
(510) 658-6916

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

PROJECT NUMBER:	PROJECT NAME:
0404.R6	MEL SENNA BRAKE SERVICE 2301 E 12TH STREET OAKLAND

SAMPLED BY: (PRINTED AND SIGNATURE) MICHAEL DESCHENES Michael Deschenes

	SAMPLE NUMBER	DATE	TIME	TYPE	START TIME	SAMPLE LOCATION	END TIME	NUMBER OF CONTAINERS	ANALYSIS(ES): METHANE, 2-PROPANOL BY EPA TO-17	PRESERVATIVE	REMARKS
01A	SG7	3/8/11	121000	SOIL GAS	115000		121000	1	X	ICE	NORMAL TURN AROUND
02A	SG7-REP	"	123900		121900		123900	1	X		SORBENT TUBE
03A	SG8		134200		132200		134200	1	X		
04A	SG9		150000		144000		150000	1	X		
05A	SG10		163800		161800		163800	1	X		

Fedex Ex.

CUSTODY SEAL INTACT? Y N NOT USED TEMP 4.6°C

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	TOTAL NO. OF SAMPLES (THIS SHIPMENT)	LABORATORY:
Michael Deschenes			B. Wuttke ATL 1255 3/10/11	5	AIR TOXICS, LTD
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	TOTAL NO. OF CONTAINERS (THIS SHIPMENT) 5	LABORATORY CONTACT: KYLE VAGADORI
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)		LABORATORY PHONE NUMBER: (916) 985-1000
					SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( )YES (X)NO

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS: Orig in box w/ Summa Samples
2-PROPANOL WAS OUR TRACER GAS

APPENDIX E

Soil Gas Risk and Hazard Calculation Work Sheets

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
108883	4.80E+00			Toluene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

Lookup Soil Parameters

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	4.80E+00	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_v (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	9,001	6.29E-03	2.58E-01	1.80E-04	6.79E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	4.80E+00	1.25	8.33E+01	6.79E-03	5.00E+03	4.63E+10	2.40E-03	1.15E-02

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	3.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.6E-05

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
67641	1.30E+01			Acetone

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	1.30E+01	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	7,384	3.71E-05	1.52E-03	1.80E-04	9.75E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	1.30E+01	1.25	8.33E+01	9.75E-03	5.00E+03	2.68E+07	2.42E-03	3.14E-02

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	3.1E+01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	6.9E-07

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration i s based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
91203	8.20E-01			Naphthalene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	8.20E-01	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	12,768	4.48E-04	1.84E-02	1.80E-04	4.6 1E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	8.20E-01	1.25	8.33E+01	4.61E-03	5.00E+03	5.18E+15	2.37E-03	1.95E-03

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
3.4E-05	3.0E-03

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.6E-08	4.4E-04

MESSAGE SUMMARY BELOW:

END

SG7-DUP - Toluene 5.0 ug/L

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
108883	5.00E+00			Toluene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	5.00E+00	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	9,001	6.29E-03	2.58E-01	1.80E-04	6.79E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	5.00E+00	1.25	8.33E+01	6.79E-03	5.00E+03	4.63E+10	2.40E-03	1.20E-02

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	3.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.7E-05

MESSAGE SUMMARY BELOW:

END

SG7-DUP - Acetone 13 ug/L

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
67641	1.30E+01			Acetone

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	1.30E+01	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	7,384	3.71E-05	1.52E-03	1.80E-04	9.75E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	1.30E+01	1.25	8.33E+01	9.75E-03	5.00E+03	2.68E+07	2.42E-03	3.14E-02

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	3.1E+01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	6.9E-07

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration i s based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
91203	7.90E-01			Naphthalene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	7.90E-01	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	12,768	4.48E-04	1.84E-02	1.80E-04	4.6 1E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	7.90E-01	1.25	8.33E+01	4.61E-03	5.00E+03	5.18E+15	2.37E-03	1.87E-03

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
3.4E-05	3.0E-03

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.6E-08	4.3E-04

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
127184	3.70E+01			Tetrachloroethylene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

Lookup Soil Parameters

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	3.70E+01	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	9,410	1.74E-02	7.14E-01	1.80E-04	5.62E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	3.70E+01	1.25	8.33E+01	5.62E-03	5.00E+03	7.73E+12	2.39E-03	8.84E-02

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
5.9E-06	3.5E-02

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.3E-07	1.7E-03

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
156592	3.40E+01			cis-1,2-Dichloroethylene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	3.40E+01	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	7,592	3.90E-03	1.60E-01	1.80E-04	5.74E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	3.40E+01	1.25	8.33E+01	5.74E-03	5.00E+03	4.04E+12	2.39E-03	8.13E-02

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	3.5E-02

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.6E-03

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration i s based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
91203	4.20E+02			Naphthalene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

Lookup Soil Parameters

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	4.20E+02	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	12,768	4.48E-04	1.84E-02	1.80E-04	4.6 1E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	4.20E+02	1.25	8.33E+01	4.61E-03	5.00E+03	5.18E+15	2.37E-03	9.97E-01

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
3.4E-05	3.0E-03

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
8.3E-06	2.3E-01

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
91203	3.40E+00			Naphthalene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	3.40E+00	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	12,768	4.48E-04	1.84E-02	1.80E-04	4.61E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	3.40E+00	1.25	8.33E+01	4.61E-03	5.00E+03	5.18E+15	2.37E-03	8.07E-03

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
3.4E-05	3.0E-03

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
6.7E-08	1.8E-03

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
127184	7.20E+01			Tetrachloroethylene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	7.20E+01	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	9,410	1.74E-02	7.14E-01	1.80E-04	5.62E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	7.20E+01	1.25	8.33E+01	5.62E-03	5.00E+03	7.73E+12	2.39E-03	1.72E-01

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
5.9E-06	3.5E-02

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.5E-07	3.4E-03

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
79016	6.90E+00			Trichloroethylene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	6.90E+00	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	8,382	9.80E-03	4.02E-01	1.80E-04	6.16E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	6.90E+00	1.25	8.33E+01	6.16E-03	5.00E+03	5.57E+11	2.39E-03	1.65E-02

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
2.0E-06	6.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
8.1E-09	1.9E-05

MESSAGE SUMMARY BELOW:

END

SG10 - Acetone 27 ug/L

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
67641	2.70E+01			Acetone

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	2.70E+01	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	7,384	3.71E-05	1.52E-03	1.80E-04	9.75E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	2.70E+01	1.25	8.33E+01	9.75E-03	5.00E+03	2.68E+07	2.42E-03	6.53E-02

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	3.1E+01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.4E-06

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration i s based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
91203	1.10E+00			Naphthalene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	1.10E+00	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	12,768	4.48E-04	1.84E-02	1.80E-04	4.61E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	1.10E+00	1.25	8.33E+01	4.61E-03	5.00E+03	5.18E+15	2.37E-03	2.61E-03

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
3.4E-05	3.0E-03

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.2E-08	6.0E-04

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
127184	7.20E+01			Tetrachloroethylene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	7.20E+01	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	9,410	1.74E-02	7.14E-01	1.80E-04	5.62E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	7.20E+01	1.25	8.33E+01	5.62E-03	5.00E+03	7.73E+12	2.39E-03	1.72E-01

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
5.9E-06	3.5E-02

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.5E-07	3.4E-03

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
79016	6.90E+00			Trichloroethylene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	6.90E+00	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	8,382	9.80E-03	4.02E-01	1.80E-04	6.16E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	6.90E+00	1.25	8.33E+01	6.16E-03	5.00E+03	5.57E+11	2.39E-03	1.65E-02

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
2.0E-06	6.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
8.1E-09	1.9E-05

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
156592	3.40E+01			cis-1,2-Dichloroethylene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	3.40E+01	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	7,592	3.90E-03	1.60E-01	1.80E-04	5.74E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	3.40E+01	1.25	8.33E+01	5.74E-03	5.00E+03	4.04E+12	2.39E-03	8.13E-02

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	3.5E-02

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.6E-03

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration i s based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
108883	4.80E+00			Toluene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	4.80E+00	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	9,001	6.29E-03	2.58E-01	1.80E-04	6.79E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	4.80E+00	1.25	8.33E+01	6.79E-03	5.00E+03	4.63E+10	2.40E-03	1.15E-02

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	3.0E-01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.6E-05

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
67641	2.70E+01			Acetone

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^v (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	2.70E+01	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_v (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	7,384	3.71E-05	1.52E-03	1.80E-04	9.75E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	2.70E+01	1.25	8.33E+01	9.75E-03	5.00E+03	2.68E+07	2.42E-03	6.53E-02

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	3.1E+01

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.4E-06

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration i s based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
91203	4.20E+02			Naphthalene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^v (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	4.20E+02	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_v (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	12,768	4.48E-04	1.84E-02	1.80E-04	4.6 1E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	4.20E+02	1.25	8.33E+01	4.61E-03	5.00E+03	5.18E+15	2.37E-03	9.97E-01

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
3.4E-05	3.0E-03

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
8.3E-06	2.3E-01

MESSAGE SUMMARY BELOW:

END

APPENDIX F

Soil Gas Model Sensitivity Analysis Risk and Hazard Calculation Work Sheets

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
91203	4.20E+02			Naphthalene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	4.20E+02	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	12,768	4.48E-04	1.84E-02	1.80E-04	4.6 1E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	4.20E+02	1.25	8.33E+01	4.61E-03	5.00E+03	5.18E+15	2.37E-03	9.97E-01

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
3.4E-05	3.0E-03

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
8.3E-06	2.3E-01

MESSAGE SUMMARY BELOW:

END

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
91203	4.20E+02			Naphthalene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	15	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.00E-07	0.703	7.04E-08	4,000	4.20E+02	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	12,861	2.27E-04	9.59E-03	1.77E-04	4.6 1E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	4.20E+02	1.25	8.33E+01	4.61E-03	5.00E+03	5.04E+15	2.37E-03	9.97E-01

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
3.4E-05	3.0E-03

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
8.3E-06	2.3E-01

MESSAGE SUMMARY BELOW:

END

SG-SCREEN
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Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
91203	4.20E+02			Naphthalene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	CL		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
CL	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.202	1.29E-09	0.891	1.15E-09	4,000	4.20E+02	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	12,768	4.48E-04	1.84E-02	1.80E-04	4.6 1E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	4.20E+02	1.25	8.33E+01	4.61E-03	5.00E+03	5.18E+15	2.37E-03	9.97E-01

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
3.4E-05	3.0E-03

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
8.3E-06	2.3E-01

MESSAGE SUMMARY BELOW:

END

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
91203	4.20E+02			Naphthalene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	SI		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SI	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.263	6.91E-09	0.833	5.75E-09	4,000	4.20E+02	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	12,768	4.48E-04	1.84E-02	1.80E-04	4.6 1E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	4.20E+02	1.25	8.33E+01	4.61E-03	5.00E+03	5.18E+15	2.37E-03	9.97E-01

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
3.4E-05	3.0E-03

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
8.3E-06	2.3E-01

MESSAGE SUMMARY BELOW:

END

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
91203	4.20E+02			Naphthalene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
137.4	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	4.20E+02	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	12,768	4.48E-04	1.84E-02	1.80E-04	4.61E-03	137.4

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	4.20E+02	1.25	8.33E+01	4.61E-03	5.00E+03	5.18E+15	7.05E-04	2.96E-01

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
3.4E-05	3.0E-03

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.5E-06	6.8E-02

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
91203	4.20E+02			Naphthalene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	304.8	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
289.8	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	4.20E+02	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	12,768	4.48E-04	1.84E-02	1.80E-04	4.61E-03	289.8

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	4.20E+02	1.25	8.33E+01	4.61E-03	5.00E+03	5.18E+15	3.94E-04	1.65E-01

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
3.4E-05	3.0E-03

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.4E-06	3.8E-02

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
91203	1.00E+02			Naphthalene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	1.00E+02	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	12,768	4.48E-04	1.84E-02	1.80E-04	4.6 1E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	1.00E+02	1.25	8.33E+01	4.61E-03	5.00E+03	5.18E+15	2.37E-03	2.37E-01

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
3.4E-05	3.0E-03

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.0E-06	5.4E-02

MESSAGE SUMMARY BELOW:

END

SG-SCREEN
A Version 2.0; 04/03

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
91203	1.00E+03			Naphthalene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	17	24	S		

MORE

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
S	1.5	0.43	0.15	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
2	0.280	0.257	1.02E-07	0.703	7.15E-08	4,000	1.00E+03	3.39E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	5.00E-03	15	12,768	4.48E-04	1.84E-02	1.80E-04	4.61E-03	2

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	1.00E+03	1.25	8.33E+01	4.61E-03	5.00E+03	5.18E+15	2.37E-03	2.37E+00

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
3.4E-05	3.0E-03

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.0E-05	5.4E-01

MESSAGE SUMMARY BELOW:

END