March 5, 2011

Mr. Paresh Khatri
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway
Alameda, CA 9502-6577

Subject: Crow Canyon Dry Cleaners
7272 San Ramon Road Dublin, CA
RO# 000283

Dear Mr. Khatri:

This enclosed report has been prepared by Endpoint Consulting, Inc. on behalf of the Burrows Company, Dwight & Carleton Perry, Gabriel H. Chui & Lai H. Trust, the Lee Family, Nam Sun and Seung Hee Park, and James Roessler.

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge. If you have any questions, please contact Mr. Mehrdad Javaher. of Endpoint at 415-706-8935.

Sincerely,

James Roessler

February 28, 2011

Mr. Paresh Khatri
Hazardous Materials Specialist
Alameda County Health Care Services Agency (ACHCSA)
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

Subject: Semi-Annual Vapor Monitoring Report
Crow Canyon Dry Cleaners
7272 San Ramon Road, Dublin, California
(RO # 0002863)

Dear Mr. Khatri,

Endpoint Consulting, Inc. (Endpoint) is pleased to present this letter report summarizing the second of two semi-annual vapor monitoring events requested by the ACHCSA at and near the above-referenced site (Site) (see Figure 1). The work was conducted in accordance with the workplan (Endpoint, 2010a) and the workplan addendum (Endpoint, 2010b) approved in letters dated April 15, 2010 and July 1, 2010, respectively, by the ACHCSA. The primary objective of the vapor sampling activities was to evaluate PCE concentrations approximately one and one-half years following completion of interim remedial actions (IRA) involving soil vapor extraction (SVE) at the Site (Endpoint, 2009).

This report summarizes the results of the second of two semi-annual monitoring events requested by the ACHCSA and evaluates the change in PCE concentrations since termination of IRA activities via a comparison of detected tetrachloroethene (PCE) concentrations with a range of potential cleanup goals previously discussed with the ACHCSA.

VAPOR MONITORING ACTIVITIES

On January 12, 2011, a total of twelve vapor monitoring wells, as defined by the approved workplan, were sampled by Vironex, Inc., under the supervision of Endpoint. Vapor well VE-1D was not sampled because there were several inches of water in the well and a vapor sample could not be collected. Prior to sampling, a stepped purge test was performed on VM-9SS, following a shut-in test. This location was chosen as it was at the source, and because using a well with two-inch casing would have resulted in delays to extract the casing volumes using the required limited flow rates. Based on photoizonization detection (PID) readings from a "T" fitting sampling port of 20.5 parts per million (ppm) for one casing volume, 12.5 ppm for three casing volumes, and 9.3 ppm for seven casing volumes, a purge volume of one casing volume was used throughout the remaining soil vapor sampling activities. Field notes reflecting the vapor sampling efforts are included as Appendix B, including data on the purge tests, shut-in tests, and leak tests associated with the vapor sampling.

Per the approved workplan, a shroud containing helium was used for leak testing. A plastic shroud was placed over the sample point and manifold, and the shroud was filled with helium to a concentration of approximately 10 to 16 %, based on helium meter monitoring. A "T" fitting was used to obtain PID and helium readings instead of tedlar bags due to the time it would take to fill tedlar bags (The one-liter summa canisters at 3 subslab locations took 40 minutes to fill). Per the work plan, a duplicate sample in a Tedlar bag for helium testing was collected at VE-1S and submitted to the lab, however, the helium was ultimately measured by the laboratory from the Summa canister sample at this location due to the limited hold time for the tedlar bag, which was received at the laboratory just prior to the weekend.

Following the helium leak test, summa canisters were utilized to collect soil vapor samples. For each vapor sample, final sampling times were recorded on the Chain of Custody. The sample elapse time ranged up to approximately 40 minutes at some locations.

Helium was not detected in the samples in the field (see Appendix A). The field screening did identify sporadic detections of low VOC concentrations in sample tubing based on field screening by PID (see Appedix A;) these ranged from zero to 20.5 ppmv.

Laboratory Analysis:

The vapor samples in summa canisters were transported on the same day to McCampbell Analytical in Pittsburg, California, a State-certified laboratory. The vapor samples were analyzed for EPA Method 8010 constituents by EPA Method TO-15. The laboratory analytical report is included as Appendix B. To confirm the helium screening result in the field, one vapor sample VE-1S was also analyzed for helium using ASTM D1946.

VAPOR MONITORING RESULTS

No breakthrough of the helium tracer was indicated during the vapor sample collection, as helium was recorded at 0% in the field (see A), and at <10 ug/L in the laboratory sample at VE-1S (see Appendix B lab result).

The vapor sampling results from 12 wells are summarized in Table 1 and presented on Figure 1. During this sampling event, the maximum concentrations of PCE, the primary chemical of potential concern (COPC) at the site, were detected in wells VE-1S (19,000 ug/m^3), VE-9SS (14,000 ug/m^3), and VE-2S (13,000 ug/$m^{3)}$; all located in close proximity to one another and to the former location of the historical PCE-related dry cleaning machine (recognized as the former release area). The PCE concentrations decline with distance away from the former dry cleaning, reaching non-detect levels (<14 ug/m^3) in a sub-slab vapor sample from VM-2SS located inside the Montessori School (see Figure 2).

It should also be noted that trichloroethene (TCE) was also detected in three of the 12 samples (See Appendix B), but all at levels below residential environmental screening levels (ESLs) for protection of indoor air quality (Regional Water Quality Control Board [RWQCB], 2008).

DISCUSSION

In support of evaluating the PCE impacts over time prior to and after the IRA activities, Table 1 also includes historical PCE data collected prior to initiation of SVE operations (Baseline sampling), two sampling events conducted during SVE activities, one round of sampling conducted approximately one month after termination of SVE activities, and the results of two semi-annual vapor sampling events at approximately 11 months and 17 months after termination of SVE operations.

Per a discussion with ACHCSA, 95% upper confidence limit of the mean concentration (95% UCL) of PCE (see Appendix C for UCL calculations) were used to further compare the detected concentrations of PCE to a range of screening levels for the Site; these included the PCE residential ESL for protection of indoor air quality (RWQCB, 2008), commercial/industrial ESL for protection of indoor air quality (RWQCB, 2008), and a site-specific indoor air screening calculated using the DTSC-version of the Johnson and Ettinger (J&E) vapor model, accounting for school-specific exposure duration and frequency for children present in the school. The residential and commercial/industrial risks were back-calculated directly from the corresponding ESLs per the equations summarized on Table 1.

The school-specific screening level and related risks were calculated from the equation shown on Table 1 for for children as the most sensitive (and conservative) receptor and was done so based on an exposure frequency and duration of 180 days per year (DTSC, 2004) and 4 years (based on personal communication with the Montessori School personnel), respectively; all other default parameters, including building dimensions and ventilation rate, in the J&E model were maintained as unchanged from the conservative values in the DTSC's version of the model. J&E model input and output data are included as Appendix D. The model estimated indoor air concentrations under the school scenario (see table below and Appendix D) were then used to calculate the potential risk based on the previously mentioned exposure duration/frequency, estimated body weight for children (15 kg) (DTSC, 2005), inhalation rate for children (10 m^3/day) for children (DTSC, 2005), a PCE cancer slope factor of 0.021 $(mg/kg\text{-}d)^{-1}$ (DTSC, 2005), and an averaging time of 70 years (DTSC, 2005).

J&E Model Estimated Indoor Air Concentrations

PCE Source Concentration (ug/m3) (95% UCL-See Table 1)	Indoor Air Concentration (ug/m3) (See Appendix D)
7642	6.18
270	0.218
115	0.0931
489	0.396
4111	3.3
7751	6.27

As indicated in Table 1, the 95% UCL concentration of PCE approximated 7,642 ug/m^3 prior to initiation of SVE operations in July 2009; this concentration corresponds to an estimated carcinogenic risk of 1.86 x 10^{-5} under residential land use, a carcinogenic risk of 5.46 x 10^{-6} under commercial/industrial land use, and a carcinogenic risk of 2.4 x 10^{-6} under the site-specific school use for children. These risk levels are within the target acceptable risk range of 1 x 10^{-4} to 1 x 10^{-6} defined by the US Environmental Protection Agency.

As shown in Table 1, in the months following initiation of SVE operations, the PCE concentrations declined significantly, resulting in a reduction of risks under all three cleanup scenarios to levels below the target risk range of 1 x 10^{-4} to 1 x 10^{-6}. In November 2009, approximately one month following termination of the SVE system, the 95% UCL concentration of PCE rebounded slightly to 489 ug/m^3, again yielding estimated risk levels for all three endpoints (i.e, residential, commercial/industrial, and site-specific school children) that were below the target risk range of 1 x 10^{-4} to 1 x 10^{-6}.

As shown on Table 1, the sampling results obtained during the August 2010 round of sampling indicate additional rebound of PCE concentrations since the sampling in November 2009, resulting in a 95% UCL concentration of 4,111 for PCE approximately 11 months following termination of SVE operations; however, while marking a rebound since the last sampling event, the PCE levels remain largely below levels detected prior to initiation of SVE operations. Specifically, the 95% UCL concentration of PCE during this event marks a 46% reduction from the Baseline sampling event, with estimated risk levels ranging from 1.0 x 10^{-5} under residential land use, 2.9 x 10^{-6} under commercial/industrial land use, and 1.3 x 10^{-6} under school usage by children; all within the target acceptable risk range of 1 x 10^{-4} to 1 x 10^{-6}.

The 95% UCL concentration of PCE during the January 2011 monitoring event approximated 7,751 ug/m^3. This corresponds to a risk of 1.9 x 10^{-5} under residential land use, a risk of 5.5 x 10^{-6} under commercial/industrial land use, and a risk of 2.2 x 10^{-6} under school usage by children; all within the target acceptable all within the target acceptable risk range of 1 x 10^{-4} to 1 x 10^{-6}.

Lastly, it is also worth noting is that the maximum detected concentration of PCE within the footprint of the Montessori School during the January 2011 semi-annual monitoring event (i.e, 1,100 ug/m^3) correspond to an estimated risk of approximately 3.1 x 10^{-7} under the school land use for children (which is below the target acceptable risk range); this concentration marks a significant reduction from 6,800 ug/m^3 historically detected (Ceres, 2008) at adjacent historical sub-slab sample SB-13 (see Figure 1).

PLANNED ACTIVITIES

The January 2011 monitoring event completes the two semi-annual events required by the ACHCSA. Discussions will be held following completion of this report to determine the next course of required action by the ACHCSA.

As always, we appreciate your assistance with this project. If you have any questions, please contact Mehrdad Javaherian at 415-706-8935, or at mehrdad@endpoint-inc.com .

Sincerely,
Endpoint Consulting, Inc.

Mehrdad M. Javaherian
Associate Engineer

Attachments:

Table 1 - PCE and Estimated Risks in Soil Vapor

Figure 1 – Vapor Monitoring Results (January 2011)

Appendix A – Field Data Sheets
Appendix B – Laboratory Analytical Reports of Vapor Samples
Appendix C – ProUCL Calculation
Appendix D – J&E Model Input and Output

References:

Ceres Associates, 2008. Soil Vapor and Soil Sampling Report, Crow Canyon Dry Cleaners, 7272 San Ramon Road, Dublin, California. May 2008.

DTSC, 2004. Guidance for School Site Risk Assessment Pursuant to Health and Safety Code Section 901(f): Guidance for Assessing Exposures and Health Risks at Existing and Proposed School Sites, Final Report, February.

DTSC, 2005. Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties, January 5.

DTSC, 2010. *Advisory – Active Soil Gas Sampling*, Department of Toxic Substances Control, California Environmental Protection Agency, March 2010

Endpoint, 2009. *Interim Remedial Action Report*, Crow Canyon Cleaners Site, 7272 San Ramon Road, Dublin, California, January 26, 2010

Endpoint, 2010a. *Vapor Well Installation and Monitoring Workplan*, Crow Canyon Cleaners Site, 7272 San Ramon Road, Dublin, California, May 10, 2010

Endpoint, 2010b. *Addendum Letter to Vapor Well Installation and Monitoring Workplan*, Crow Canyon Cleaners Site, 7272 San Ramon Road, Dublin, California, June 21, 2010

Endpoint, 2010c. *Vapor Well Installation and Monitoring Report.* Crow Canyon Cleaners Site, 7272 San Ramon Road, Dublin, California, September.

RWQCB 2008. "*Screening For Environmental Concerns at Sites with Contaminated Soil and Groundwater*", California Regional Water Quality Control Board, Interim Final, May 2008

TABLE

Table 1
PCE and Estimated Risks in Soil Vapor
Crow Canyon Dry Clenaers
7272 San Ramon Road,
Dublin, California

	PCE Concentrations (ug/m^3)					
Well I.D.	**7/18/2009 to 7/30/2009 Baseline-Purge Test-SVE Shakedown Sampling Events**	**9/1/2009 1 Month after operation of SVE system**	**9/28/2009 2 Months after operation of SVE system**	**11/4/09 ~ 1 month after shutdown of SVE system**	**8/26/10 ~ 11 months after shutdown of SVE system**	**1/12/11 ~ 17 months after shutdown of SVE system**
VE-1S	1,200	23	<14	970	1,100	19,000
VE-1D	420	300	<14	770	NS	NS
VE-2S	5,900	<14	200	500	3,400	13,000
VE-2D	1,100	<14	<14	350	NS	NS
VE-3S	2,200	30	38	<14	870	260
VE-3D	3,800	24	51	<14	NS	NS
VM-1S	<73	-	<14	20	2,600	580
VM-1D	160	-	16	140	NS	NS
VM-3S	8,100	-	55	81	NS	NS
VM-3D	34J	-	<14	300	NS	NS
VM-4S	10,000	-	180	310	1,100	1,100
VM-5SS	-	-	-	-	1,300	1,100
VM-6SS	-	-	-	-	650	390
VM-2SS	-	-	-	-	28	<14
VM-7	-	-	-	-	310	<14
VM-8	-	-	-	-	1,300	640
VM-9SS	-	-	-	-	11,000	14,000
VM-10	-	-	-	-	450	210
95% UCL Concentration (1)	**7,642**	**270**	**115**	**489**	**4,111**	**7,751**
Carcinogneic Risk-Residential Land Use (2)	**1.9E-05**	**6.6E-07**	**2.8E-07**	**1.2E-06**	**1.0E-05**	**1.9E-05**
Carcinogneic Commercial Land Use (3)	**5.5E-06**	**1.9E-07**	**8.2E-08**	**3.5E-07**	**2.9E-06**	**5.5E-06**
Carcinogneic Risk-School Land Use (4)	**2.4E-06**	**8.6E-08**	**3.7E-08**	**1.6E-07**	**1.3E-06**	**2.2E-06**
ESLs Residential Exposure: 410 ug/m^3						
ESLs Commercial/Industrial Land Use: 1,400 ug/m3						
Site-Specific Screening Level for School Children: 2,600 ug/m^3						

Table 1
PCE and Estimated Risks in Soil Vapor
Crow Canyon Dry Clenaers
7272 San Ramon Road,
Dublin, California

Abbreviations:
SVE = Soil Vapor Extraction
ug/m^3 = microgram per cubic meter
"-" or "NS" = not available or not sampled
"<" = less than laboratory reporting limit
ESLs = Environmental Screening Levels developed by RWQCB, San Francisco Bay Region, May 2008 (Table E).

Notes:
(1) 95% UCL calculation is detailed in Appendix D.
(2) Since the residential ESL for PCE in soil vapor is 410 ug/m^3 derived from a target risk level of 1E-06, and the risk is approximately directly proportional to concentration, a potential risk posed by site PCE concentration (95% UCL) is estimated as follows:

$$risk \approx 4{,}111 ug/m^3 \times \frac{1E-06}{410 ug/m^3} \approx 1E-05$$

(3) Since the commercial ESL for PCE in soil vapor is 1,400 ug/m^3 derived from a target risk level of 1E-06, and the risk is approximately directly proportional to concentration, a potential risk posed by site PCE concentration (95% UCL) is estimated as follows:

$$risk \approx 4{,}111 ug/m^3 \times \frac{1E-06}{1{,}400 ug/m^3} \approx 2.94E-06$$

(4) A potential risk to children posed by site PCE concentration (95% UCL) for school use scenario is calculated based on J&E Model (Appendix E) and the equation below.

Risk = (Indoor air concentration x Inhalation Rate x Exposure Frequency x Exposure Duration x Inahlation Cancer Slope Factor)/(Body Weight x Averaging Time for Carcinog

FIGURE

LANDSCAPING
WALKWAY
LANDSCAPING
NATURAL GAS (~4' DEEP)
SB-34 <100)
SB-20 (<100)
CLEANOUT
SB-31 (<100)
SB-24 (110)
SB-22 (1,100)
SB-21 (7,500)
(210) VM-10
LANDSCAPING
S/D (260) VE-3
(580) VM-1 S/D
SB-23 (17,000)
WALKWAY
SB-12 (270)
CLEANOUT
SB-4 (16,000)
(19,000) VE-1 S/D
SB-11 (380,000)
SB-5
SB-6
SB-37 (1,900)
VM-4 S (1,100)
SB-19
(14,000) VM-9 SS
DRY CLEARING MACHINE
VM-3 S/D
SB-3
(1600) SUBSLAB - 2300
SB-1
VM-5 SS (1,100)
SB-13 (6800)
SB-10 (230)
VE-2 S/D (13,000)
SB-2
COMMERICAL UNITS
SB-9 (30)
(390) VM-6 SS
SB-16
(610) SUBSLAB = 570
SB-32 (200)
SB-7
SEWER LINE (~3.5' DEEP)
SEWER LINE (~3.5' DEEP)
UNOCCUPIED SUITE
7272 SAN RAMON ROAD (CROW CANYONG DRY CLEANERS)
LANDSCAPING
SIDEWALK
(<14) VM-2 SS
SB-17
(190) SUBSLAB = <100
MONTESSORI PRESCHOOL
SB-27 (120)
VM-7 (<14)
WALKWAY, RAMP
WALKWAY
ELECTRICAL BOX
SB-15 (630)
SB-18 (150)
SB-30 (<100)
SB-33 (<100)
SB-14
SB-8
SEWER LINE (~5' DEEP)
PARKING LOT
SB-25 (250)
640 VM-8
SB-29 (570)
SB-28 (<100)
SB-36 (<100)
ELECTRICAL BOX
WATER (~3.5' DEEP)
NATURAL GAS (~4' DEEP)

LEGEND:

- VM-4 — Proposed Vapor Monitoring Locations (existing wells)
- VM-2SS — Newly Installed Sub-Slab Vapor Monitoring Well (2010)
- VM-7 — Newly Installed Shallow Vapor Monitoring Well (2010)
- VE-1 — Soil Vapor Extraction Well Locations
- VM-3 — Soil Vapor Monitoring Well Location
- SB-1 — Soil Boring Locations (PCE Concentration in $\mu g/m^3$)
- S/D — Shallow Well Screen/Deep Well Screen
- SS — Sub-Slab Vapor Monigtoring Wells
- Utility Line

N

0 10 20
Scale (feet)

Reference: Base map from drawing titled "PCE Concentrations in Soil Vapor", by Ceres, dated April 2008.

VAPOR MONITORING RESULTS JANUARY 2011

CROW CANYON DRY CLEANERS
7272 SAN RAMON ROAD
DUBLIN, CALIFORNIA

Endpoint. Strategy. Science. Sustainability.

Date: 2/27/2011

Figure: 1

Appendix A

Field Data Sheets

APPENDIX B - FIELD FORM FOR SOIL VAPOR/SUB SLAB SAMPLING

Project Name: Crow Canyon Cleaners
Date: 1/12/11 Project Number: _____
Site Location: 7272 San Ramon Rd, Dublin
Weather: Sunny
Field Personnel: ~~John McAssey (Vironex), Joel Greger (Conspectus)~~ Scott Polsteu
Recorded by: ~~EG~~ SP

Soil Vapor Probe No: _____
Sub Slab Probe No: VM-255
PID Serial No: RAE 2000.64 PID Lamp: 10.6 eV
MDG 2002 Serial No: MDG 2002.02
Tracer Gas: 1,1-DFA

Surface Type: Asphalt _____ Concrete X Grass _____ Other _____
Surface Thickness (i.e., asphalt or concrete) _____

1 Casing Volume:
Sub Slab Volume 1 mL
Soil Vapor Probe Volume _____ L

Initial Vacuum Prior to Pumping 30 inches of water
Shut-in Test 6 inches of Water held for 120 seconds
Field Tubing: Blank PID Reading 0 ppmv
Shut in Test Completed Prior to Purging: X Yes _____ No

Purging

Date	Start Time	End Time	Elapsed Time (min.)	Bag Volume (L)	Purge Rate (LPM)	Cumulative Volume (L)	Tracer Gas		Sample (ppmv, %)	VOCs by PID (ppmv)
1/12/11					50mL					
	1935	1936	.25		30	.25 mL	Shroud (%)		0	0.0
							Min	Max		
							10.6	13.5		

Helium Concentration in Field Screen Samples is Less than 5% of Minimum Concentration in the Shroud?

_____ **Yes** _____ **No**

MAW 316 718

Sample Collection

Date	Time	Sample ID		Summa Canister ID	Flow Controller #	Vaccum Gage #	Initial Vacuum (in of Hg)	Final Vacuum (in Hg)
1/12/11		VM255						
		1936	~~1937~~ 2007	A7525			30	7

APPENDIX B - FIELD FORM FOR SOIL VAPOR/SUB SLAB SAMPLING

Project Name: Crow Canyon Cleaners
Date: 1/12/11 Project Number: _____
Site Location: 7272 San Ramon Rd, Dublin
Weather: Sunny
Field Personnel: ~~John McAssay (Vironex), Joel Gregac (Cardno)~~ Scott Preston
Recorded by: JGS/SP

Soil Vapor Probe No: _____
Sub Slab Probe No: VM-SS
PID Serial No: RAE 2000-64 PID Lamp: _____ eV
MDG 2002 Serial No: MDG 2002-02
Tracer Gas: He

Surface Type: Asphalt _____ Concrete X Grass _____ Other _____
Surface Thickness (i.e., asphalt or concrete) _____

1 Casing Volume:
Sub Slab Volume 1.1 mL
Soil Vapor Probe Volume _____ L

Initial Vacuum Prior to Pumping 22 inches of water
Shut-in Test 6 inches of Water held for 120 seconds
Field Tubing: Blank PID Reading 0 ppmv
Shut in Test Completed Prior to Purging: X Yes _____ No

Purging

Date	Start Time	End Time	Elapsed Time (min.)	Bag Volume (L)	Purge Rate (LPM)	Cumulative Volume (L)	Tracer Gas		Sample (ppmv, %)	VOCs by PID (ppmv)
1/12/4					50ML					
	1903	1903	35sec			1.25ML	Shroud (%)		0	0
							Min	Max		
							10.2	11.7		

Helium Concentration in Field Screen Samples is Less than 5% of Minimum Concentration in the Shroud?

_____ **Yes** _____ **No**

MAW 316-080

Sample Collection

Date	Time	Sample ID		Summa Canister ID	Flow Controller #	Vaccum Gage #	Initial Vacuum (in of Hg)	Final Vacuum (in Hg)
1/12/4		VM-655						
	1929	1904	1929	6204			22	7

APPENDIX B - FIELD FORM FOR SOIL VAPOR/SUB SLAB SAMPLING

Project Name: Crow Canyon Cleaners
Date: 11/2/11 Project Number: _____
Site Location: 7272 San Ramon Rd, Dublin
Weather: Sunny
Field Personnel: ~~John McAssey (Vironex), Joel Greger (Cenpoint)~~ Scott Polston
Recorded by: JG SP

Soil Vapor Probe No: _____
Sub Slab Probe No: VM-5S5
PID Serial No: RAE 2000, 64 PID Lamp: 10.6 eV
MDG 2002 Serial No: MGD 7002 02
Tracer Gas: He

Surface Type: Asphalt _____ Concrete X Grass _____ Other _____
Surface Thickness (i.e., asphalt or concrete) _____

1 Casing Volume:
Sub Slab Volume 11 mL
Soil Vapor Probe Volume _____ L

Initial Vacuum Prior to Pumping _____ inches of water
Shut-in Test 6 inches of Water held for 180 seconds
Field Tubing: Blank PID Reading 0 ppmv
Shut in Test Completed Prior to Purging: X Yes _____ No

Purging

Date	Start Time	End Time	Elapsed Time (min.)	Bag Volume (L)	Purge Rate (LPM)	Cumulative Volume (L)	Tracer Gas		Sample (ppmv, %)	VOCs by PID (ppmv)
1/12/11					50	12.5 mL				
	1827	1927	~~5:15~~			~~Total~~	Shroud (%)		0	0
							Min	Max		
							10.9	14.1		

Helium Concentration in Field Screen Samples is Less than 5% of Minimum Concentration in the Shroud?

_____ Yes _____ No

Sample Collection 1828 MW316-605

Date	Time	Sample ID		Summa Canister ID	Flow Controller #	Vaccum Gage #	Initial Vacuum (in of Hg)	Final Vacuum (in Hg)
1/12/11		VM-555						
	1900	1828	1900	A7508			28	07

APPENDIX B - FIELD FORM FOR SOIL VAPOR/SUB SLAB SAMPLING

Project Name: Crow Canyon Cleaners
Date: 1/12/11 Project Number: ____________
Site Location: 7272 San Ramon Rd, Dublin
Weather: Sunny
Field Personnel: ~~Julian McAssey (Vironex), Joel Greger (Endpoint)~~ ~~GARCIA~~ Scott Rolston
Recorded by: ~~JG~~ SR

Soil Vapor Probe No: VE-3S
Sub Slab Probe No: ____________
PID Serial No: RAE2000.64 PID Lamp: 10.6 eV
MDG 2002 Serial No: MGD 2002.22
Tracer Gas: He

Surface Type: Asphalt ______ Concrete ______ Grass ______ Other Soil
Surface Thickness (i.e., asphalt or concrete) ____________

1 Casing Volume:
Sub Slab Volume ______ L
Soil Vapor Probe Volume 1235 L

Initial Vacuum Prior to Pumping -28 inches of water
Shut-in Test -20 inches of Water held for 90 seconds
Field Tubing: Blank PID Reading 0 ppmv
Shut in Test Completed Prior to Purging: X Yes ______ No

Purging

Date	Start Time	End Time	Elapsed Time (min.)	Bag Volume (L)	Purge Rate (LPM)	Cumulative Volume (L)	Tracer Gas		Sample (ppmv, %)	VOCs by PID (ppmv)
12/11	1733	1942	9		150	1350	Shroud (%)			
							Min	Max	0	9.3
							10.9	13.8	↓	

Helium Concentration in Field Screen Samples is Less than 5% of Minimum Concentration in the Shroud?

_____ **Yes** _____ **No**

Sample Collection MAH 316712

Date	Time	Sample ID		Summa Canister ID	Flow Controller #	Vaccum Gage #	Initial Vacuum (in of Hg)	Final Vacuum (in Hg)
12/11	1743	VE-35		1461			28	6
	1747							

APPENDIX B - FIELD FORM FOR SOIL VAPOR/SUB SLAB SAMPLING

Project Name: Crow Canyon Cleaners
Date: 1/12/11 Project Number: _____
Site Location: 7272 San Ramon Rd, Dublin
Weather: Sunny
Field Personnel: ~~John McAsseg (Vironex), Joel Greger (Endpoint)~~ Scott Preston
Recorded by: ~~JCG~~ SP

Soil Vapor Probe No: VM-10
Sub Slab Probe No: _____
PID Serial No: ~~LAE 2000-64~~ PID Lamp: 10.6 eV
MDG 2002 Serial No: MDG 2002-02
Tracer Gas: Helium

Surface Type: Asphalt _____ Concrete _____ Grass _____ Other Soil
Surface Thickness (i.e., asphalt or concrete) _____

1 Casing Volume:
Sub Slab Volume _____ L
Soil Vapor Probe Volume 58 mL

Initial Vacuum Prior to Pumping 28 inches of water
Shut-in Test 27 inches of Water held for 180 seconds
Field Tubing: Blank PID Reading 0 ppmv
Shut in Test Completed Prior to Purging: X Yes _____ No

Purging

Date	Start Time	End Time	Elapsed Time (min.)	Bag Volume (L)	Purge Rate (LPM) mL	Cumulative Volume (L) mL	Tracer Gas		Sample (ppmv, %) Helium	VOCs by PID (ppmv)
							Shroud (%)			
							Min	Max		
1/12/11	1324	1325	1		150	75	10	14	0	19.0

Helium Concentration in Field Screen Samples is Less than 5% of Minimum Concentration in the Shroud?

_____ Yes _____ No

MANIFOLD 316-664

Sample Collection

Date	Time	Sample ID VM-10		Summa Canister ID	Flow Controller #	Vaccum Gage #	Initial Vacuum (in of Hg)	Final Vacuum (in Hg)
1/12/11	1329			0423			28	6.5

APPENDIX B - FIELD FORM FOR SOIL VAPOR/SUB SLAB SAMPLING

Project Name: Crow Canyon Cleaners
Date: 4/12/11 Project Number: _____
Site Location: 7272 San Ramon Rd, Dublin
Weather: SUNNY
Field Personnel: ~~John McAssey (Vironex), Joel Kregar (Cenport)~~ Scott Poston
Recorded by: ~~TG~~ SP

Soil Vapor Probe No: VM-1S
Sub Slab Probe No: _____
PID Serial No: RAE 200.661 PID Lamp: 10.6eV
MDG 2002 Serial No: MDG2002.01
Tracer Gas: _____

Surface Type: Asphalt _____ Concrete _____ Grass _____ Other S.L
Surface Thickness (i.e., asphalt or concrete) _____

1 Casing Volume:
Sub Slab Volume _____ L
Soil Vapor Probe Volume 1.235 L

Initial Vacuum Prior to Pumping -28 inches of water
Shut-in Test 9 inches of Water held for 90 seconds
Field Tubing: Blank PID Reading 0 ppmv
Shut in Test Completed Prior to Purging: X Yes _____ No

Purging

Date	Start Time	End Time	Elapsed Time (min.)	Bag Volume (L)	Purge Rate ~~(LPM)~~ mL 150	Cumulative Volume ~~(L)~~ mL	Tracer Gas		Sample (ppmv, %)	VOCs by PID (ppmv)
1/12/10	1712	1721	9	5		1350	Shroud (%)			
							Min	Max		8.2
							10.7	14.0		

Helium Concentration in Field Screen Samples is Less than 5% of Minimum Concentration in the Shroud?

_____ **Yes** _____ **No**

MAW 316 669

Sample Collection

Date	Time	Sample ID VM15		Summa Canister ID	Flow Controller #	Vaccum Gage #	Initial Vacuum (in of Hg)	Final Vacuum (in Hg)
1/12/10	1725			6200			28	7

APPENDIX B - FIELD FORM FOR SOIL VAPOR/SUB SLAB SAMPLING

Project Name: Crow Canyon Cleaners
Date: 4/12/11 Project Number: _____
Site Location: 7272 San Ramon Rd, Dublin
Weather: Sunny
Field Personnel: ~~John McAssey (Uranex), Joel Gregor (Enspond)~~ Scott Poirson
Recorded by: JG

Soil Vapor Probe No: VE-1S
Sub Slab Probe No: _____
PID Serial No: RAE 7xxx64 PID Lamp: 10.6 eV
MDG 2002 Serial No: MGD 2002.02
Tracer Gas: He

Surface Type: Asphalt _____ Concrete _____ Grass _____ Other Soil
Surface Thickness (i.e., asphalt or concrete) _____

1 Casing Volume:
Sub Slab Volume _____ L
Soil Vapor Probe Volume 1.35 L

Initial Vacuum Prior to Pumping ~27 inches of water
Shut-in Test 22 inches of Water held for 190 seconds Hg
Field Tubing: Blank PID Reading 0 ppmv
Shut in Test Completed Prior to Purging: ✓ Yes _____ No

Purging

Date	Start Time	End Time	Elapsed Time (min.)	Bag Volume (L)	Purge Rate ~~(LPM)~~ mL 150	Cumulative Volume ~~(L)~~ mL	Tracer Gas		Sample (ppmv, %)	VOCs by PID (ppmv)
1/12/11	1651	1700	9			1350	Shroud (%)			
							Min	Max	0	0
							11.2	13.8		

Helium Concentration in Field Screen Samples is Less than 5% of Minimum Concentration in the Shroud?

_____ Yes _____ No

MAW 316-670

Sample Collection

Date	Time	Sample ID VE-15		Summa Canister ID	Flow Controller #	Vaccum Gage #	Initial Vacuum (in of Hg)	Final Vacuum (in Hg)
1/12/11	1704			A7351			27	5

APPENDIX B - FIELD FORM FOR SOIL VAPOR/SUB SLAB SAMPLING

Project Name: Crow Canyon Cleaners
Date: 1/23/14 Project Number: _____
Site Location: 7272 San Ramon Rd, Dublin
Weather: Sunny
Field Personnel: ~~John McAssey (Vironex), Joel Greger (Cardno)~~ Scott Poulsen
Recorded by: JG SP

Soil Vapor Probe No: VE-2S
Sub Slab Probe No: _____
PID Serial No: RAE 200104 PID Lamp: 10.6 eV
MDG 2002 Serial No: MGD 200202
Tracer Gas: He

Surface Type: Asphalt _____ Concrete X 4"-5" Grass _____ Other _____
Surface Thickness (i.e., asphalt or concrete) _____

1 Casing Volume:
Sub Slab Volume _____ L
Soil Vapor Probe Volume 1.25 L

Initial Vacuum Prior to Pumping -29 inches of water
Shut-in Test 9 inches of Water held for 120 seconds
Field Tubing: Blank PID Reading 0 ppmv
Shut in Test Completed Prior to Purging: X Yes _____ No

Purging

Date	Start Time	End Time	Elapsed Time (min.)	Bag Volume (L)	Purge Rate (LPM) 150 mL	Cumulative Volume ~~(L)~~ mL	Tracer Gas		Sample (ppmv, %)	VOCs by PID (ppmv)
1/12/11	1625	1634	9		150mL	1350	Shroud (%)			
							Min	Max	0	10.6
							10.1	12.4		

Helium Concentration in Field Screen Samples is Less than 5% of Minimum Concentration in the Shroud?

_____ Yes _____ No

NAN 316-673

Sample Collection

Date	Time	Sample ID VE-2S		Summa Canister ID	Flow Controller #	Vaccum Gage #	Initial Vacuum (in of Hg)	Final Vacuum (in Hg)
1/12/11	1632			6171			29	5

APPENDIX B - FIELD FORM FOR SOIL VAPOR/SUB SLAB SAMPLING

Project Name: Crow Canyon Cleaners
Date: 1/12/11 Project Number: _____
Site Location: 7272 San Ramon Rd, Dublin
Weather: Clear
Field Personnel: John McAssey (Vironex), Joel Greger (Enviroent) Scott Preston
Recorded by: EG SP

Soil Vapor Probe No: _____
Sub Slab Probe No: VM-9 S/S
PID Serial No: ILAE2000.64 PID Lamp: 10.6 eV
~~MDG~~ 2002 Serial No: MGD2002.02 MGD
Tracer Gas: Helium

Surface Type: Asphalt _____ Concrete X Grass _____ Other _____
Surface Thickness (i.e., asphalt or concrete) 4.5

1 Casing Volume:
Sub Slab Volume 21 mL
Soil Vapor Probe Volume _____ L

Initial Vacuum Prior to Pumping -29 inches of ~~water~~ Hg
Shut-in Test -27 inches of ~~Water~~ held for 300 seconds Hg
Field Tubing: Blank PID Reading 0.0 ppmv
Shut in Test Completed Prior to Purging: X Yes _____ No

Purging

Date	Start Time	End Time	Elapsed Time (min.) Sec	Bag Volume (L)	Purge Rate (LPM) ML/m	Cumulative Volume (L)	Tracer Gas		Sample (ppmv, %) Helium	VOCs by PID (ppmv)
11/2/11	1253	1258			50		Shroud (%)			
							Min	Max		~~15.4~~
			30	Casing Vol 1	~~25~~	21 25	10.2	14.1	0	20.5
			90	Casing Vol 2		63	↓	↓	↓	12.5
			210	Casing Vol 3			↓	↓	↓	9.3
								13.2		

Helium Concentration in Field Screen Samples is Less than 5% of Minimum Concentration in the Shroud? 686

_____ Yes _____ No

MAN 316 ~~[redacted]~~

Sample Collection

Date	Time	Sample ID VM95		Summa Canister ID	Flow Controller #	Vaccum Gage #	Initial Vacuum (in of Hg)	Final Vacuum (in Hg)
11/2/11	1625	1603	1625	68206			29	7

APPENDIX B - FIELD FORM FOR SOIL VAPOR/SUB SLAB SAMPLING

Project Name: Crow Canyon Cleaners
Date: 11/2/11 Project Number: _____
Site Location: 7272 San Ramon Rd, Dublin
Weather: Sunny
Field Personnel: ~~John McAssey (Vironex), Joel Gregar (Cardno)~~ Scott Preston
Recorded by: JG SP

Soil Vapor Probe No: VM-4S
Sub Slab Probe No: _____
PID Serial No: RAE 200069 PID Lamp: 10.6 eV
MDG 2002 Serial No: MGD2002102
Tracer Gas: Helium

Surface Type: Asphalt _____ Concrete X Grass _____ Other _____
Surface Thickness (i.e., asphalt or concrete) 4.5

1 Casing Volume:
Sub Slab Volume _____ L
Soil Vapor Probe Volume 1.35 L

Initial Vacuum Prior to Pumping -28 inches of water
Shut-in Test 14 inches of Water held for 180 seconds
Field Tubing: Blank PID Reading 0 ppmv
Shut in Test Completed Prior to Purging: X Yes _____ No

9

Purging

Date	Start Time	End Time	Elapsed Time (min.)	Bag Volume ~~(L)~~	Purge Rate ~~(LPM)~~ mL	Cumulative Volume (L)	Tracer Gas		Sample (ppmv, %)	VOCs by PID (ppmv)
1/12/11	1535	1544	9		150	1350	Shroud (%)			
							Min	Max		
							14.8	14.8	0	18.8 ppm

Helium Concentration in Field Screen Samples is Less than 5% of Minimum Concentration in the Shroud?

_____ **Yes** _____ **No**

MAN 316-714

Sample Collection

Date	Time	Sample ID		Summa Canister ID	Flow Controller #	Vaccum Gage #	Initial Vacuum (in of Hg)	Final Vacuum (in Hg)
		VM-45						
1/12/11	1547			0169			28	~~7~~

APPENDIX B - FIELD FORM FOR SOIL VAPOR/SUB SLAB SAMPLING

Project Name: Crow Canyon Cleaners
Date: 1/12/11 Project Number: _____
Site Location: 7272 San Ramon Rd, Dublin
Weather: Sunny
Field Personnel: ~~Johnny McAssay (Ultratech), Joel Gregor (Endpoint)~~ Scott Polston
Recorded by: ~~JG~~ SP

Soil Vapor Probe No: VM-8
Sub Slab Probe No: _____
PID Serial No: RAE 200,641 PID Lamp: 10.6 eV
MDG 2002 Serial No: MDG 2002.02
Tracer Gas: He

Surface Type: Asphalt X Concrete _____ Grass _____ Other _____
Surface Thickness (i.e., asphalt or concrete) _____

1 Casing Volume:
Sub Slab Volume _____ L
Soil Vapor Probe Volume 58 L

Initial Vacuum Prior to Pumping 30 inches of water
Shut-in Test 15 inches of Water held for 180 seconds
Field Tubing: Blank PID Reading 0 ppmv
Shut in Test Completed Prior to Purging: X Yes _____ No

Purging

Date	Start Time	End Time	Elapsed Time (min.)	Bag Volume (L)	Purge Rate (LPM) 150 mL	Cumulative Volume (L) mL	Tracer Gas		Sample (ppmv, %)	VOCs by PID (ppmv)
1/12/11	1440	1441	.5		150	75	Shroud (%)			
							Min	Max		
							10.1	14.2	[redacted]	25 ppmv

Helium Concentration in Field Screen Samples is Less than 5% of Minimum Concentration in the Shroud?

_____ Yes _____ No

Sample Collection MW-316-999

Date	Time	Sample ID	Summa Canister ID	Flow Controller #	Vaccum Gage #	Initial Vacuum (in of Hg)	Final Vacuum (in Hg)
1/12/11	1512	VM-8	5803			30	7

APPENDIX B - FIELD FORM FOR SOIL VAPOR/SUB SLAB SAMPLING

Project Name: Crow Canyon Cleaners
Date: 1/12/11 Project Number: _____
Site Location: 7272 San Ramon Rd, Dublin
Weather: Sunny
Field Personnel: ~~John McAssey (Vironex), Joel Gregar (EnviroTech)~~ Scott Polston
Recorded by: ~~JG~~ SP

Soil Vapor Probe No: VM-7
Sub Slab Probe No: _____
PID Serial No: KAE 7000164 PID Lamp: 10.6 eV
MDG 2002 Serial No: MGD 2002102
Tracer Gas: He

Surface Type: Asphalt _____ Concrete _____ Grass _____ Other Soil
Surface Thickness (i.e., asphalt or concrete) _____

1 Casing Volume:
Sub Slab Volume _____ L
Soil Vapor Probe Volume 58 L

Initial Vacuum Prior to Pumping -27 inches of water
Shut-in Test 25 inches of Water held for 120 seconds
Field Tubing: Blank PID Reading 0 ppmv
Shut in Test Completed Prior to Purging: X Yes _____ No

Purging

Date	Start Time	End Time	Elapsed Time (min.)	Bag Volume (L)	Purge Rate (LPM) mL	Cumulative Volume (L) mL	Tracer Gas		Sample (ppmv, %)	VOCs by PID (ppmv)
1/12/11	1411	1412	1		150	75	Shroud (%)			
							Min	Max	0	0.0
							10%	14%		

Helium Concentration in Field Screen Samples is Less than 5% of Minimum Concentration in the Shroud?

_____ **Yes** _____ **No**

MAN 316-762

Sample Collection

Date	Time	Sample ID VM-7		Summa Canister ID	Flow Controller #	Vaccum Gage #	Initial Vacuum (in of Hg)	Final Vacuum (in Hg)
1/12/11	1416			6165			27	5

FILLED IN LESS THAN 1 MIN

Appendix B

Laboratory Analytical Reports of Vapor Samples

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Web: www.mccampbell.com E-mail: main@mccampbell.com
Telephone: 877-252-9262 Fax: 925-252-9269

Endpoint 98 Battery Street, Suite 200 San Francisco, CA 94111	Client Project ID: Crow Canyon, 7272 San Ramon Rd, Dublin	Date Sampled: 01/12/11
		Date Received: 01/13/11
	Client Contact: Mehrdad Javaher	Date Reported: 01/26/11
	Client P.O.:	Date Completed: 01/26/11

WorkOrder: 1101316

January 26, 2011

Dear Mehrdad:

Enclosed within are:

1) The results of the **12** analyzed samples from your project: **Crow Canyon, 7272 San Ramon Rd, Dublin,**
2) A QC report for the above samples,
3) A copy of the chain of custody, and
4) An invoice for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits.

If you have any questions or concerns, please feel free to give me a call. Thank you for choosing

McCampbell Analytical Laboratories for your analytical needs.

Best regards,

Angela Rydelius
Laboratory Manager
McCampbell Analytical, Inc.

104316

McCAMPBELL ANALYTICAL, INC.

1534 WILLOW PASS ROAD
PITTSBURG, CA 94565-1701
Website: www.mccampbell.com Email: main@mccampbell.com
Telephone: (877) 252-9262 Fax: (925) 252-9269

CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAY

☐ GeoTracker EDF ☐ PDF ☐ Excel ☐ Write On (DW)

Report To: M. JAVATHERIAN Bill To: ENDPOINT
Company: ENDPOINT CONSULTING
98 BATTERY ST SUITE 200
E-Mail: MEHEDAD@ENDPOINT
Tele: (415) 706-8935 Fax: ( )
Project #: Project Name: CROW CANYON
Project Location: 7272 SAN RAMON RD DUBLIN
Sampler Signature:

SAMPLE ID	LOCATION/ Field Point Name	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX Water	MATRIX Soil	MATRIX Air	MATRIX Sludge	MATRIX Other	METHOD PRESERVED ICE	METHOD PRESERVED HCL	METHOD PRESERVED HNO_3	METHOD PRESERVED Other
VM-10		1/12/11	1335	1	5			X						X
VM-7			1411											
VM-8			1512											
VM-4S			1551											
VM-9S			1625											
VE-2S			1637											
VE-1S			1704											
VM-1S			1725											
VE-3S			1747											
VM-5S			1900											
VM-6SS			1929											
VM-2S			2007											

Analysis Request	Other	Comments
MTBE / BTEX & TPH as Gas (602 / 8021 + 8015)	8010 List - To 15	Filter Samples for Metals analysis: Yes / No
MTBE / BTEX ONLY (EPA 602 / 8021)	Helium	
TPH as Diesel / Motor Oil (8015)		
Total Petroleum Oil & Grease (1664 / 5520 E/B&F)		
Total Petroleum Hydrocarbons (418.1)		
EPA 502.2 / 601 / 8010 / 8021 (HVOCs)		
EPA 505/ 608 / 8081 (Cl Pesticides)		
EPA 608 / 8082 PCB's ONLY; Aroclors / Congeners		
EPA 507 / 8141 (NP Pesticides)		
EPA 515 / 8151 (Acidic Cl Herbicides)		
EPA 524.2 / 624 / 8260 (VOCs)		
EPA 525.2 / 625 / 8270 (SVOCs)		
EPA 8270 SIM / 8310 (PAHs / PNAs)		
CAM 17 Metals (200.7 / 200.8 / 6010 / 6020)		
LUFT 5 Metals (200.7 / 200.8 / 6010 / 6020)		
Lead (200.7 / 200.8 / 6010 / 6020)		

Relinquished By:	Date:	Time:	Received By:
	1/13/11	1407	ENVIROTECH
ENVIROTECH	1/13/11	1450	
	1/13/11	1530	

ICE/t° n/a
GOOD CONDITION ✓
HEAD SPACE ABSENT
DECHLORINATED IN LAB
APPROPRIATE CONTAINERS ✓
PRESERVED IN LAB

COMMENTS: 2 manifolds received cracked
1 unused summa

	VOAS	O&G	METALS	OTHER
PRESERVATION			pH<2	

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1101316 **ClientCode: EPB**

☐ WaterTrax ☐ WriteOn ☐ EDF ☑ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Mehrdad Javaher
Endpoint
98 Battery Street, Suite 200
San Francisco, CA 94111
415-706-8935 FAX:

Email: mehrdad@endpoint-inc.com
cc:
PO:
ProjectNo: Crow Canyon, 7272 San Ramon Rd, Dublin

Bill to:
Accounts Payable
Endpoint
98 Battery Street, Suite 200
San Francisco, CA 94111

Requested TAT: 5 days

Date Received: **01/13/2011**
Date Printed: **01/27/2011**

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
1101316-001	VM-10	Soil Vapor	1/12/2011 13:35	☐		A	A									
1101316-002	VM-7	Soil Vapor	1/12/2011 14:11	☐			A									
1101316-003	VM-8	Soil Vapor	1/12/2011 15:12	☐			A									
1101316-004	VM-4S	Soil Vapor	1/12/2011 15:51	☐			A									
1101316-005	VM-9S	Soil Vapor	1/12/2011 16:25	☐			A									
1101316-006	VE-2S	Soil Vapor	1/12/2011 16:37	☐			A									
1101316-007	VE-1S	Soil Vapor	1/12/2011 17:04	☐	A		A									
1101316-008	VM-1S	Soil Vapor	1/12/2011 17:25	☐			A									
1101316-009	VE-3S	Soil Vapor	1/12/2011 17:47	☐			A									
1101316-010	VM-5S	Soil Vapor	1/12/2011 19:00	☐			A									
1101316-011	VM-6SS	Soil Vapor	1/12/2011 19:29	☐			A									
1101316-012	VM-2SS	Soil Vapor	1/12/2011 20:07	☐			A									

Test Legend:

1	HELIUM_SOILGAS	2	PRUNUSEDSUMMA	3	TO15-8010_SOIL(UG/M3)	4		5	
6		7		8		9		10	
11		12							

The following SampIDs: 001A, 002A, 003A, 004A, 005A, 006A, 007A, 008A, 009A, 010A, 011A, 012A contain testgroup.

Prepared by: Melissa Valles

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Web: www.mccampbell.com E-mail: main@mccampbell.com
Telephone: 877-252-9262 Fax: 925-252-9269

Sample Receipt Checklist

Client Name: **Endpoint** Date and Time Received: **1/13/2011 5:00:00 PM**

Project Name: **Crow Canyon, 7272 San Ramon Rd, Dublin** Checklist completed and reviewed by: Melissa Valles

WorkOrder N°: **1101316** Matrix Soil Vapor Carrier: EnviroTech (MTZ)

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐
Chain of custody signed when relinquished and received?	Yes ☑	No ☐
Chain of custody agrees with sample labels?	Yes ☑	No ☐
Sample IDs noted by Client on COC?	Yes ☑	No ☐
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐
Sampler's name noted on COC?	Yes ☐	No ☑

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature	Cooler Temp:		NA ☑
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	No VOA vials submitted ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☐	No ☑	

** NOTE: If the "No" box is checked, see comments below.*

Client contacted: Date contacted: Contacted by:

Comments:

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Web: www.mccampbell.com E-mail: main@mccampbell.com
Telephone: 877-252-9262 Fax: 925-252-9269

Endpoint	Client Project ID: Crow Canyon, 7272 San Ramon Rd, Dublin	Date Sampled: 01/12/11
		Date Received: 01/13/11
98 Battery Street, Suite 200	Client Contact: Mehrdad Javaher	Date Extracted: 01/26/11
San Francisco, CA 94111	Client P.O.:	Date Analyzed: 01/26/11

Helium*

Extraction method: ASTM D 1946-90 Analytical methods: ASTM D 1946-90 Work Order: 1101316

Lab ID	Client ID	Matrix	Initial Pressure	Final Pressure	Helium	DF	% SS	Comments
007A	VE-1S	Soil Vapor	11.29	22.56	ND	1	N/A	

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	psia	psia	NA	NA
	Soil Vapor	psia	psia	10	µg/L

* vapor samples are reported in µg/L.

%SS = Percent Recovery of Surrogate Standard
DF = Dilution Factor

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.
"When Quality Counts"
1534 Willow Pass Road, Pittsburg, CA 94565-1701
Web: www.mccampbell.com E-mail: main@mccampbell.com
Telephone: 877-252-9262 Fax: 925-252-9269

Endpoint	Client Project ID: Crow Canyon, 7272 San Ramon Rd, Dublin	Date Sampled: 01/12/11
98 Battery Street, Suite 200		Date Received: 01/13/11
San Francisco, CA 94111	Client Contact: Mehrdad Javaher	Date Extracted: 01/19/11-01/20/11
	Client P.O.:	Date Analyzed: 01/19/11-01/20/11

Halogenated Volatile Organic Compounds in µg/m³*

Extraction Method: TO15 Analytical Method: TO15 Work Order: 1101316

Lab ID	1101316-001A	1101316-002A	1101316-003A	1101316-004A	Reporting Limit for DF =1	
Client ID	VM-10	VM-7	VM-8	VM-4S		
Matrix	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor		
DF	1	1	1	1	Soil Vapor	W
Initial Pressure (psia)	11.72	11.95	11.38	11.32		
Final Pressure (psia)	23.34	23.90	22.66	22.60		
Compound	**Concentration**				µg/m³	ug/L
Bromodichloromethane	ND	ND	ND	ND	14	NA
Bromoform	ND	ND	ND	ND	21	NA
Bromomethane	ND	ND	ND	ND	7.9	NA
Carbon Tetrachloride	ND	ND	ND	ND	13	NA
Chlorobenzene	ND	ND	ND	ND	9.4	NA
Chloroethane	ND	ND	ND	ND	5.4	NA
Chloroform	ND	ND	ND	ND	9.9	NA
Chloromethane	ND	ND	ND	ND	4.2	NA
Dibromochloromethane	ND	ND	ND	ND	17	NA
1,2-Dibromoethane (EDB)	ND	ND	ND	ND	16	NA
1,2-Dichlorobenzene	ND	ND	ND	ND	12	NA
1,3-Dichlorobenzene	ND	ND	ND	ND	12	NA
1,4-Dichlorobenzene	ND	ND	ND	ND	12	NA
Dichlorodifluoromethane	ND	ND	ND	ND	10	NA
1,1-Dichloroethane	ND	ND	ND	ND	8.2	NA
1,2-Dichloroethane (1,2-DCA)	ND	ND	ND	ND	8.2	NA
1,1-Dichloroethene	ND	ND	ND	ND	8.1	NA
cis-1,2-Dichloroethene	ND	ND	ND	ND	8.1	NA
trans-1,2-Dichloroethene	ND	ND	ND	ND	8.1	NA
1,2-Dichloropropane	ND	ND	ND	ND	9.4	NA
cis-1,3-Dichloropropene	ND	ND	ND	ND	9.2	NA
trans-1,3-Dichloropropene	ND	ND	ND	ND	9.2	NA
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	ND	ND	ND	14	NA
Freon 113	ND	ND	ND	ND	16	NA
Methylene chloride	ND	ND	ND	ND	7.1	NA
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	14	NA
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	14	NA
Tetrachloroethene	210	ND	640	1100	14	NA
1,2,4-Trichlorobenzene	ND	ND	ND	ND	15	NA
1,1,1-Trichloroethane	ND	ND	ND	ND	11	NA
1,1,2-Trichloroethane	ND	ND	ND	ND	11	NA
Trichloroethene	ND	ND	ND	ND	11	NA
Trichlorofluoromethane	ND	ND	ND	ND	11	NA
Vinyl Chloride	ND	ND	ND	ND	5.2	NA
Surrogate Recoveries (%)						
%SS1:	114	121	123	123		
%SS2:	111	112	113	112		
%SS3:	117	119	119	118		
Comments						

*vapor samples are reported in µg/m³.

ND means not detected above the reporting limit/method detection limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

%SS = Percent Recovery of Surrogate Standard
DF = Dilution Factor

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager

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Telephone: 877-252-9262 Fax: 925-252-9269

Endpoint	Client Project ID: Crow Canyon, 7272 San Ramon Rd, Dublin	Date Sampled: 01/12/11
98 Battery Street, Suite 200		Date Received: 01/13/11
San Francisco, CA 94111	Client Contact: Mehrdad Javaher	Date Extracted: 01/19/11-01/20/11
	Client P.O.:	Date Analyzed: 01/19/11-01/20/11

Halogenated Volatile Organic Compounds in µg/m³*

Extraction Method: TO15 Analytical Method: TO15 Work Order: 1101316

Lab ID	1101316-005A	1101316-006A	1101316-007A	1101316-008A	Reporting Limit for DF =1	
Client ID	VM-9S	VE-2S	VE-1S	VM-1S		
Matrix	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor		
DF	1	1	1	1	Soil Vapor	W
Initial Pressure (psia)	11.48	12.62	11.29	11.70		
Final Pressure (psia)	22.94	25.14	22.56	23.34		
Compound	**Concentration**				µg/m³	ug/L
Bromodichloromethane	ND	ND	ND	ND	14	NA
Bromoform	ND	ND	ND	ND	21	NA
Bromomethane	ND	ND	ND	ND	7.9	NA
Carbon Tetrachloride	ND	ND	ND	ND	13	NA
Chlorobenzene	ND	ND	ND	ND	9.4	NA
Chloroethane	ND	ND	ND	ND	5.4	NA
Chloroform	ND	ND	ND	ND	9.9	NA
Chloromethane	ND	ND	ND	ND	4.2	NA
Dibromochloromethane	ND	ND	ND	ND	17	NA
1,2-Dibromoethane (EDB)	ND	ND	ND	ND	16	NA
1,2-Dichlorobenzene	ND	ND	ND	ND	12	NA
1,3-Dichlorobenzene	ND	ND	ND	ND	12	NA
1,4-Dichlorobenzene	ND	ND	ND	ND	12	NA
Dichlorodifluoromethane	ND	ND	ND	ND	10	NA
1,1-Dichloroethane	ND	ND	ND	ND	8.2	NA
1,2-Dichloroethane (1,2-DCA)	ND	ND	ND	ND	8.2	NA
1,1-Dichloroethene	ND	ND	ND	ND	8.1	NA
cis-1,2-Dichloroethene	ND	ND	ND	ND	8.1	NA
trans-1,2-Dichloroethene	ND	ND	ND	ND	8.1	NA
1,2-Dichloropropane	ND	ND	ND	ND	9.4	NA
cis-1,3-Dichloropropene	ND	ND	ND	ND	9.2	NA
trans-1,3-Dichloropropene	ND	ND	ND	ND	9.2	NA
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	ND	ND	ND	14	NA
Freon 113	ND	ND	ND	ND	16	NA
Methylene chloride	ND	ND	ND	ND	7.1	NA
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	14	NA
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	14	NA
Tetrachloroethene	14,000	13,000	19,000	580	14	NA
1,2,4-Trichlorobenzene	ND	ND	ND	ND	15	NA
1,1,1-Trichloroethane	ND	ND	ND	ND	11	NA
1,1,2-Trichloroethane	ND	ND	ND	ND	11	NA
Trichloroethene	41	12	15	ND	11	NA
Trichlorofluoromethane	ND	ND	ND	ND	11	NA
Vinyl Chloride	ND	ND	ND	ND	5.2	NA
Surrogate Recoveries (%)						
%SS1:	124	127	124	119		
%SS2:	113	113	115	112		
%SS3:	121	117	121	117		
Comments						

*vapor samples are reported in µg/m³.

ND means not detected above the reporting limit/method detection limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

%SS = Percent Recovery of Surrogate Standard
DF = Dilution Factor

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Endpoint	Client Project ID: Crow Canyon, 7272 San Ramon Rd, Dublin	Date Sampled: 01/12/11
98 Battery Street, Suite 200		Date Received: 01/13/11
San Francisco, CA 94111	Client Contact: Mehrdad Javaher	Date Extracted: 01/19/11-01/20/11
	Client P.O.:	Date Analyzed: 01/19/11-01/20/11

Halogenated Volatile Organic Compounds in µg/m³*

Extraction Method: TO15 Analytical Method: TO15 Work Order: 1101316

Lab ID	1101316-009A	1101316-010A	1101316-011A	1101316-012A	Reporting Limit for DF =1	
Client ID	VE-3S	VM-5S	VM-6SS	VM-2SS		
Matrix	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor		
DF	1	1	1	1	Soil Vapor	W
Initial Pressure (psia)	12.87	10.49	10.61	11.59		
Final Pressure (psia)	25.66	20.90	21.12	23.08		
Compound	**Concentration**				µg/m³	ug/L
Bromodichloromethane	ND	ND	ND	ND	14	NA
Bromoform	ND	ND	ND	ND	21	NA
Bromomethane	ND	ND	ND	ND	7.9	NA
Carbon Tetrachloride	ND	ND	ND	ND	13	NA
Chlorobenzene	ND	ND	ND	ND	9.4	NA
Chloroethane	ND	ND	ND	ND	5.4	NA
Chloroform	ND	ND	ND	ND	9.9	NA
Chloromethane	ND	ND	ND	ND	4.2	NA
Dibromochloromethane	ND	ND	ND	ND	17	NA
1,2-Dibromoethane (EDB)	ND	ND	ND	ND	16	NA
1,2-Dichlorobenzene	ND	ND	ND	ND	12	NA
1,3-Dichlorobenzene	ND	ND	ND	ND	12	NA
1,4-Dichlorobenzene	ND	ND	ND	ND	12	NA
Dichlorodifluoromethane	ND	ND	ND	ND	10	NA
1,1-Dichloroethane	ND	ND	ND	ND	8.2	NA
1,2-Dichloroethane (1,2-DCA)	ND	ND	ND	ND	8.2	NA
1,1-Dichloroethene	ND	ND	ND	ND	8.1	NA
cis-1,2-Dichloroethene	ND	ND	ND	ND	8.1	NA
trans-1,2-Dichloroethene	ND	ND	ND	ND	8.1	NA
1,2-Dichloropropane	ND	ND	ND	ND	9.4	NA
cis-1,3-Dichloropropene	ND	ND	ND	ND	9.2	NA
trans-1,3-Dichloropropene	ND	ND	ND	ND	9.2	NA
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	ND	ND	ND	14	NA
Freon 113	ND	ND	ND	ND	16	NA
Methylene chloride	ND	ND	ND	ND	7.1	NA
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	14	NA
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	14	NA
Tetrachloroethene	260	1100	390	ND	14	NA
1,2,4-Trichlorobenzene	ND	ND	ND	ND	15	NA
1,1,1-Trichloroethane	ND	ND	ND	ND	11	NA
1,1,2-Trichloroethane	ND	ND	ND	ND	11	NA
Trichloroethene	ND	ND	ND	ND	11	NA
Trichlorofluoromethane	ND	ND	ND	ND	11	NA
Vinyl Chloride	ND	ND	ND	ND	5.2	NA
Surrogate Recoveries (%)						
%SS1:	114	116	114	114		
%SS2:	110	111	110	111		
%SS3:	114	119	115	115		
Comments						

*vapor samples are reported in µg/m³.

ND means not detected above the reporting limit/method detection limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

%SS = Percent Recovery of Surrogate Standard
DF = Dilution Factor

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Endpoint	Client Project ID: Crow Canyon, 7272 San Ramon Rd, Dublin	Date Sampled: 01/12/11
		Date Received: 01/13/11
98 Battery Street, Suite 200	Client Contact: Mehrdad Javaher	Date Extracted: 01/19/11-01/20/11
San Francisco, CA 94111	Client P.O.:	Date Analyzed: 01/19/11-01/20/11

Leak Check Compound*

Extraction method: TO15 Analytical methods: TO15 Work Order: 1101316

Lab ID	Client ID	Matrix	Initial Pressure	Final Pressure	Isopropyl Alcohol	DF	% SS	Comments
001A	VM-10	Soil Vapor	11.72	23.34	ND	1	N/A	
002A	VM-7	Soil Vapor	11.95	23.90	ND	1	N/A	
003A	VM-8	Soil Vapor	11.38	22.66	ND	1	N/A	
004A	VM-4S	Soil Vapor	11.32	22.60	ND	1	N/A	
005A	VM-9S	Soil Vapor	11.48	22.94	ND	1	N/A	
006A	VE-2S	Soil Vapor	12.62	25.14	ND	1	N/A	
007A	VE-1S	Soil Vapor	11.29	22.56	ND	1	N/A	
008A	VM-1S	Soil Vapor	11.70	23.34	ND	1	N/A	
009A	VE-3S	Soil Vapor	12.87	25.66	ND	1	N/A	
010A	VM-5S	Soil Vapor	10.49	20.90	ND	1	N/A	
011A	VM-6SS	Soil Vapor	10.61	21.12	ND	1	N/A	
012A	VM-2SS	Soil Vapor	11.59	23.08	ND	1	N/A	

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	A	psia	psia	10	µg/L
	S	psia	psia	NA	NA

* leak check compound is reported in µg/L.

ND means not detected above the reporting limit/method detection limit; N/A means analyte not applicable to this analysis.

The IPA reference is:

DTSC, Advisory-Active Soil Gas Investigations, January 28, 2003, page 10, section 2.4.2:

"Tracer compounds, such as ...isopropanol..., may be used as leak check compounds, if a detection limit of 10 µg/L or less can be achieved."
This implies that 10 µg/L is the cut off definition for a leak, which equals 10,000 µg/m³.
The other low IPA hits may be due to extremely small leaks or may be naturally occuring in soil gas, particularly at biologically active sites.

%SS = Percent Recovery of Surrogate Standard
DF = Dilution Factor

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QC SUMMARY REPORT FOR ASTM D 1946-90

W.O. Sample Matrix: Soil Vapor QC Matrix: Soil Vapor WorkOrder: 1101316

EPA Method: ASTM D 1946-90	Extraction: ASTM D 1946-90				BatchID: 55621	
Analyte	Spiked	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	% Rec.	% Rec.	% RPD	LCS / LCSD	RPD
Helium	8.3	104	121	14.9	70 - 130	20

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 55621 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1101316-007A	01/12/11 5:04 PM	01/26/11	01/26/11 5:20 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

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QA/QC Officer

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QC SUMMARY REPORT FOR TO15

W.O. Sample Matrix: Air/Soil Vapor | QC Matrix: Soil Vapor | BatchID: 55620 | WorkOrder: 1101316

EPA Method: TO15 **Extraction: TO15** **Spiked Sample ID: N/A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	µg/m³	µg/m³	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
Chlorobenzene	N/A	117	N/A	N/A	N/A	97.9	97	0.933	N/A	N/A	70 - 130	30
1,2-Dibromoethane (EDB)	N/A	195.3	N/A	N/A	N/A	98.4	97.6	0.766	N/A	N/A	70 - 130	30
1,2-Dichloroethane (1,2-DCA)	N/A	102.9	N/A	N/A	N/A	107	106	1.33	N/A	N/A	70 - 130	30
1,2-Dichloro-1,1,2,2-tetrafluoroethan	N/A	177.7	N/A	N/A	N/A	96.7	98.7	2.09	N/A	N/A	70 - 130	30
Freon 113	N/A	194.8	N/A	N/A	N/A	100	99.2	1.15	N/A	N/A	70 - 130	30
Methylene chloride	N/A	88.2	N/A	N/A	N/A	113	111	1.22	N/A	N/A	70 - 130	30
1,1,1,2-Tetrachloroethane	N/A	174.5	N/A	N/A	N/A	106	104	1.55	N/A	N/A	70 - 130	30
1,1,2,2-Tetrachloroethane	N/A	174.5	N/A	N/A	N/A	86.3	84.8	1.81	N/A	N/A	70 - 130	30
1,2,4-Trichlorobenzene	N/A	188.6	N/A	N/A	N/A	94.7	94.4	0.353	N/A	N/A	70 - 130	30
Trichloroethene	N/A	136.6	N/A	N/A	N/A	91.7	89.6	2.28	N/A	N/A	70 - 130	30
%SS1:	N/A	500	N/A	N/A	N/A	99	98	1.43	N/A	N/A	70 - 130	30
%SS2:	N/A	500	N/A	N/A	N/A	104	103	1.03	N/A	N/A	70 - 130	30
%SS3:	N/A	500	N/A	N/A	N/A	101	100	1.09	N/A	N/A	70 - 130	30

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 55620 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1101316-001A	01/12/11 1:35 PM	01/19/11	01/19/11 12:16 PM	1101316-001A	01/12/11 1:35 PM	01/19/11	01/19/11 12:16 PM
1101316-002A	01/12/11 2:11 PM	01/19/11	01/19/11 1:01 PM	1101316-002A	01/12/11 2:11 PM	01/19/11	01/19/11 1:01 PM
1101316-003A	01/12/11 3:12 PM	01/19/11	01/19/11 1:47 PM	1101316-003A	01/12/11 3:12 PM	01/19/11	01/19/11 1:47 PM
1101316-004A	01/12/11 3:51 PM	01/19/11	01/19/11 2:32 PM	1101316-004A	01/12/11 3:51 PM	01/19/11	01/19/11 2:32 PM
1101316-005A	01/12/11 4:25 PM	01/19/11	01/19/11 3:17 PM	1101316-005A	01/12/11 4:25 PM	01/19/11	01/19/11 3:17 PM
1101316-005A	01/12/11 4:25 PM	01/20/11	01/20/11 3:12 PM	1101316-006A	01/12/11 4:37 PM	01/19/11	01/19/11 4:02 PM
1101316-006A	01/12/11 4:37 PM	01/19/11	01/19/11 4:02 PM	1101316-006A	01/12/11 4:37 PM	01/19/11	01/19/11 9:18 PM
1101316-007A	01/12/11 5:04 PM	01/19/11	01/19/11 4:47 PM	1101316-007A	01/12/11 5:04 PM	01/19/11	01/19/11 4:47 PM
1101316-007A	01/12/11 5:04 PM	01/20/11	01/20/11 3:56 PM	1101316-008A	01/12/11 5:25 PM	01/19/11	01/19/11 5:32 PM
1101316-008A	01/12/11 5:25 PM	01/19/11	01/19/11 5:32 PM	1101316-009A	01/12/11 5:47 PM	01/19/11	01/19/11 6:17 PM
1101316-009A	01/12/11 5:47 PM	01/19/11	01/19/11 6:17 PM	1101316-010A	01/12/11 7:00 PM	01/19/11	01/19/11 7:02 PM
1101316-010A	01/12/11 7:00 PM	01/19/11	01/19/11 7:02 PM	1101316-011A	01/12/11 7:29 PM	01/19/11	01/19/11 7:49 PM
1101316-011A	01/12/11 7:29 PM	01/19/11	01/19/11 7:49 PM	1101316-012A	01/12/11 8:07 PM	01/20/11	01/20/11 2:27 PM
1101316-012A	01/12/11 8:07 PM	01/20/11	01/20/11 2:27 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

* MS and / or MSD spike recoveries may not be near 100% or the RPDs near 0% if: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) if that specific sample matrix interferes with spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.
NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

Laboratory extraction solvents such as methylene chloride and acetone may occasionally appear in the method blank at low levels.

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Appendix C

ProUCL Calculation

General UCL Statistics for Full Data Sets

User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

C0

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	10

Raw Statistics		Log-transformed Statistics	
Minimum	7	Minimum of Log Data	1.946
Maximum	19000	Maximum of Log Data	9.852
Mean	4191	Mean of log Data	6.372
Median	610	SD of log Data	2.588
SD	6867		
Coefficient of Variation	1.638		
Skewness	1.482		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.642	Shapiro Wilk Test Statistic	0.902
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	7751	95% H-UCL	2207636
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	33630
95% Adjusted-CLT UCL (Chen-1995)	8358	97.5% Chebyshev (MVUE) UCL	44830
95% Modified-t UCL (Johnson-1978)	7892	99% Chebyshev (MVUE) UCL	66829

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.313	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	13406		
MLE of Mean	4191		
MLE of Standard Deviation	7496		
nu star	7.503		
Approximate Chi Square Value (.05)	2.451	Nonparametric Statistics	
Adjusted Level of Significance	0.029	95% CLT UCL	7452
Adjusted Chi Square Value	2.033	95% Jackknife UCL	7751
		95% Standard Bootstrap UCL	7351
Anderson-Darling Test Statistic	0.692	95% Bootstrap-t UCL	9231
Anderson-Darling 5% Critical Value	0.816	95% Hall's Bootstrap UCL	6341
Kolmogorov-Smirnov Test Statistic	0.27	95% Percentile Bootstrap UCL	7277
Kolmogorov-Smirnov 5% Critical Value	0.264	95% BCA Bootstrap UCL	8335
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12831
		97.5% Chebyshev(Mean, Sd) UCL	16570
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	23914
95% Approximate Gamma UCL	12831		
95% Adjusted Gamma UCL	15465		

Potential UCL to Use		Use 95% Adjusted Gamma UCL	15465

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Appendix D

J&E Model Input and Output

DATA ENTRY SHEET

SG-SCREEN
?A Version 2.0; 04/

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	7.75E+03			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	152.4	24			1.00E-08

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)
C	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	6	6	250

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Molecular weight, MW (g/mol)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	5.9E-06	3.5E-02	165.83

END

Soil Properties Lookup Table

SCS Soil Type	K_s (cm/h)	α_1 (1/cm)	N (unitless)	M (unitless)	n (cm^3/cm^3)	θ_r (cm^3/cm^3)	Mean Grain Diameter (cm)	Bulk Density (g/cm^3)	θ_w (cm^3/cm^3)	SCS Soil Name
C	0.61	0.01496	1.253	0.2019	0.459	0.098	0.0092	1.43	0.215	Clay
CL	0.34	0.01581	1.416	0.2938	0.442	0.079	0.016	1.48	0.168	Clay Loam
L	0.50	0.01112	1.472	0.3207	0.399	0.061	0.020	1.59	0.148	Loam
LS	4.38	0.03475	1.746	0.4273	0.390	0.049	0.040	1.62	0.076	Loamy Sand
S	26.78	0.03524	3.177	0.6852	0.375	0.053	0.044	1.66	0.054	Sand
SC	0.47	0.03342	1.208	0.1722	0.385	0.117	0.025	1.63	0.197	Sandy Clay
SCL	0.55	0.02109	1.330	0.2481	0.384	0.063	0.029	1.63	0.146	Sandy Clay Loam
SI	1.82	0.00658	1.679	0.4044	0.489	0.050	0.0046	1.35	0.167	Silt
SIC	0.40	0.01622	1.321	0.2430	0.481	0.111	0.0039	1.38	0.216	Silty Clay
SICL	0.46	0.00839	1.521	0.3425	0.482	0.090	0.0056	1.37	0.198	Silty Clay Loam
SIL	0.76	0.00506	1.663	0.3987	0.439	0.065	0.011	1.49	0.180	Silt Loam
SL	1.60	0.02667	1.449	0.3099	0.387	0.039	0.030	1.62	0.103	Sandy Loam

Chemical Properties Lookup Table

CalEPA Toxicity Criteria in bold (last updated 2/4/09 DTSC/HERD)

Original EPA Values

CAS No.	Chemical	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Pure component water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (°C)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Molecular weight, MW (g/mol)	URF extrapolated (X)	RfC extrapolated (X)	EPA Unit risk factor, URF $(\mu g/m^3)^{-1}$	EPA Reference conc., RfC (mg/m^3)	EPA URF extrapolated (X)	EPA RfC extrapolated (X)
56235	Carbon tetrachloride	1.74E+02	7.80E-02	8.80E-06	7.93E+02	1.24E+00	3.03E-02	25	349.90	556.60	7,127	**4.2E-05**	**4.0E-02**	1.54E+02			1.5E-05	0.0E+00		
57749	Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05	25	624.24	885.73	14,000	**3.4E-04**	7.0E-04	4.10E+02			1.0E-04	7.0E-04		
58899	gamma-HCH (Lindane)	1.07E+03	1.42E-02	7.34E-06	7.30E+00	5.73E-04	1.40E-05	25	596.55	839.36	15,000	**3.1E-04**	1.1E-03	2.91E+02	?	X	3.7E-04	1.1E-03	X	X
60297	Ethyl ether	5.73E+00	7.82E-02	8.61E-06	5.68E+04	1.35E+00	3.29E-02	25	307.50	466.74	6,338	0.0E+00	7.0E-01	7.41E+01		X	0.0E+00	7.0E-01		X
60571	Dieldrin	2.14E+04	1.25E-02	4.74E-06	1.95E-01	6.18E-04	1.51E-05	25	613.32	842.25	17,000	**4.6E-03**	1.8E-04	3.81E+02		X	4.6E-03	1.8E-04		X
67641	Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.87E-05	25	329.20	508.10	6,955	0.0E+00	**3.1E+01**	5.81E+01		X	0.0E+00	3.5E-01		X
67663	Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03	25	334.32	536.40	6,988	**5.3E-06**	**3.0E-01**	1.19E+02			2.3E-05	0.0E+00		
67721	Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03	25	458.00	695.00	9,510	**1.1E-05**	3.5E-03	2.37E+02		X	4.0E-06	3.5E-03		X
71432	Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	5.54E-03	25	353.24	562.16	7,342	**2.9E-05**	3.0E-02	7.81E+01			7.8E-06	0.0E+00		
71556	1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	1.72E-02	25	347.24	545.00	7,136	0.0E+00	**5.0E+00**	1.33E+02			0.0E+00	2.2E+00		
72435	Methoxychlor	9.77E+04	1.56E-02	4.46E-06	1.00E-01	6.46E-04	1.58E-05	25	651.02	848.49	16,000	0.0E+00	1.8E-02	3.46E+02		X	0.0E+00	1.8E-02		X
72559	DDE	4.47E+06	1.44E-02	5.87E-06	1.20E-01	8.59E-04	2.09E-05	25	636.44	860.38	15,000	**9.7E-05**	0.0E+00	3.18E+02	?		9.7E-05	0.0E+00	X	
74839	Methyl bromide	1.05E+01	7.28E-02	1.21E-05	1.52E+04	2.55E-01	6.22E-03	25	276.71	467.00	5,714	0.0E+00	**5.0E-03**	9.49E+01			0.0E+00	5.0E-03		
74873	Methyl chloride (chloromethane)	2.12E+00	1.26E-01	6.50E-06	5.33E+03	3.61E-01	8.80E-03	25	249.00	416.25	5,115	**1.8E-06**	9.0E-02	5.05E+01			1.0E-06	9.0E-02		
74908	Hydrogen cyanide	3.80E+00	1.93E-01	2.10E-05	1.00E+06	5.44E-03	1.33E-04	25	299.00	456.70	6,676	0.0E+00	3.0E-03	2.70E+01			0.0E+00	3.0E-03		
74953	Methylene bromide	1.26E+01	4.30E-02	8.44E-06	1.19E+04	3.52E-02	8.59E-04	25	370.00	583.00	7,868	0.0E+00	3.5E-02	1.74E+02		X	0.0E+00	3.5E-02		X
75003	Chloroethane (ethyl chloride)	4.40E+00	2.71E-01	1.15E-05	5.68E+03	3.61E-01	8.80E-03	25	285.30	460.40	5,879	8.3E-07	1.0E+01	6.45E+01	?		8.3E-07	1.0E+01	X	
75014	Vinyl chloride (chloroethene)	1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	2.69E-02	25	259.25	432.00	5,250	**7.8E-05**	1.0E-01	6.25E+01			8.8E-06	1.0E-01		
75058	Acetonitrile	4.20E+00	1.28E-01	1.66E-05	1.00E+06	1.42E-03	3.45E-05	25	354.60	545.50	7,110	0.0E+00	6.0E-02	4.11E+01			0.0E+00	6.0E-02		
75070	Acetaldehyde	1.06E+00	1.24E-01	1.41E-05	1.00E+06	3.23E-03	7.87E-05	25	293.10	466.00	6,157	**2.7E-06**	**9.0E-03**	4.41E+01			2.2E-06	9.0E-03		
75092	Methylene chloride	1.17E+01	1.01E-01	1.17E-05	1.30E+04	8.96E-02	2.18E-03	25	313.00	510.00	6,706	**1.0E-06**	**4.0E-01**	8.49E+01			4.7E-07	3.0E+00		
75150	Carbon disulfide	4.57E+01	1.04E-01	1.00E-05	1.19E+03	1.24E+00	3.02E-02	25	319.00	552.00	6,391	0.0E+00	7.0E-01	7.61E+01			0.0E+00	7.0E-01		
75218	Ethylene oxide	1.33E+00	1.04E-01	1.45E-05	3.04E+05	2.27E-02	5.54E-04	25	283.60	469.00	6,104	**8.8E-05**	**3.0E-02**	4.41E+01		?	1.0E-04	0.0E+00		
75252	Bromoform	8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.41E-02	5.88E-04	25	422.35	696.00	9,479	1.1E-06	7.0E-02	2.53E+02		X	1.1E-06	7.0E-02		X
75274	Bromodichloromethane	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.54E-02	1.60E-03	25	363.15	585.85	7,800	**3.7E-05**	7.0E-02	1.64E+02	?	X	1.8E-05	7.0E-02	X	X
75296	2-Chloropropane	9.14E+00	8.88E-02	1.01E-05	3.73E+03	5.93E-01	1.45E-02	25	308.70	485.00	6,286	0.0E+00	1.0E-01	7.85E+01		?	0.0E+00	1.0E-01		
75343	1,1-Dichloroethane	3.16E+01	7.42E-02	1.05E-05	5.06E+03	2.30E-01	5.61E-03	25	330.55	523.00	6,895	**1.6E-06**	**7.0E-01**	9.90E+01		X	0.0E+00	5.0E-01		
75354	1,1-Dichloroethylene	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	2.60E-02	25	304.75	576.05	6,247	0.0E+00	**7.0E-02**	9.69E+01			0.0E+00	2.0E-01		
75456	Chlorodifluoromethane	4.79E+01	1.01E-01	1.28E-05	2.00E+00	1.10E+00	2.70E-02	25	232.40	369.30	4,836	0.0E+00	5.0E+01	8.65E+01			0.0E+00	5.0E+01		
75694	Trichlorofluoromethane	4.97E+02	8.70E-02	9.70E-06	1.10E+03	3.97E+00	9.68E-02	25	296.70	471.00	5,999	0.0E+00	7.0E-01	1.37E+02			0.0E+00	7.0E-01		
75718	Dichlorodifluoromethane	4.57E+02	6.65E-02	9.92E-06	2.80E+02	1.40E+01	3.42E-01	25	243.20	384.95	9,421	0.0E+00	2.0E-01	1.21E+02			0.0E+00	2.0E-01		
76131	1,1,2-Trichloro-1,2,2-trifluoroethar	1.11E+04	7.80E-02	8.20E-06	1.70E+02	1.97E+01	4.80E-01	25	320.70	487.30	6,463	0.0E+00	3.0E+01	1.87E+02			0.0E+00	3.0E+01		
76448	Heptachlor	1.41E+06	1.12E-02	5.69E-06	1.80E-01	6.05E+01	1.48E+00	25	603.69	846.31	13,000	**1.2E-03**	1.8E-03	3.73E+02		X	1.3E-03	1.8E-03		X
77474	Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.10E+00	2.69E-02	25	512.15	746.00	10,931	0.0E+00	2.0E-04	2.73E+02			0.0E+00	2.0E-04		
78831	Isobutanol	2.59E+00	8.60E-02	9.30E-06	8.50E+04	4.83E-04	1.18E-05	25	381.04	547.78	10,936	0.0E+00	1.1E+00	7.41E+01		X	0.0E+00	1.1E+00		X
78875	1,2-Dichloropropane	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	2.79E-03	25	369.52	572.00	7,590	**1.0E-05**	4.0E-03	1.13E+02	?		1.9E-05	4.0E-03	X	
78933	Methylethylketone (2-butanone)	2.30E+00	8.08E-02	9.80E-06	2.23E+05	2.29E-03	5.58E-05	25	352.50	536.78	7,481	0.0E+00	5.0E+00	7.21E+01			0.0E+00	1.0E+00		
79005	1,1,2-Trichloroethane	5.01E+01	7.80E-02	8.80E-06	4.42E+03	3.73E-02	9.11E-04	25	386.15	602.00	8,322	**1.6E-05**	1.4E-02	1.33E+02		X	1.6E-05	1.4E-02		X
79016	Trichloroethylene	1.66E+02	7.90E-02	9.10E-06	1.47E+03	4.21E-01	1.03E-02	25	360.36	544.20	7,505	**2.0E-06**	**6.0E-01**	1.31E+02	?		1.1E-04	4.0E-02	X	
79209	Methyl acetate	3.26E+00	1.04E-01	1.00E-05	2.00E+03	4.84E-03	1.18E-04	25	329.80	506.70	7,260	0.0E+00	3.5E+00	7.41E+01		X	0.0E+00	3.5E+00		X
79345	1,1,2,2-Tetrachloroethane	9.33E+01	7.10E-02	7.90E-06	2.96E+03	1.41E-02	3.44E-04	25	419.60	661.15	8,996	**5.8E-05**	**1.4E-02**	1.68E+02		X	5.8E-05	2.1E-01		X
79469	2-Nitropropane	1.17E+01	9.23E-02	1.01E-05	1.70E+04	5.03E-03	1.23E-04	25	393.20	594.00	8,383	2.7E-03	2.0E-02	8.91E+01			2.7E-03	2.0E-02		
80626	Methylmethacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.38E-02	3.36E-04	25	373.50	567.00	8,975	0.0E+00	7.0E-01	1.00E+02			0.0E+00	7.0E-01		
83329	Acenaphthene	7.08E+03	4.21E-02	7.69E-06	3.57E+00	6.34E-03	1.55E-04	25	550.54	803.15	12,155	0.0E+00	2.1E-01	1.54E+02		X	0.0E+00	2.1E-01		X
86737	Fluorene	1.38E+04	3.63E-02	7.88E-06	1.98E+00	2.60E-03	6.34E-05	25	570.44	870.00	12,666	0.0E+00	1.4E-01	1.66E+02		X	0.0E+00	1.4E-01		X
87683	Hexachloro-1,3-butadiene	5.37E+04	5.61E-02	6.16E-06	3.20E+00	3.33E-01	8.13E-03	25	486.15	738.00	10,206	2.2E-05	**3.5E-03**	2.61E+02		X	2.2E-05	7.0E-04		X
88722	o-Nitrotoluene	3.24E+02	5.87E-02	8.67E-06	6.50E+02	5.11E-04	1.25E-05	25	495.00	720.00	12,239	0.0E+00	**3.2E-03**	1.37E+02		X	0.0E+00	3.5E-02		X
91203	Naphthalene	2.00E+03	5.90E-02	7.50E-06	3.10E+01	1.98E-02	4.82E-04	25	491.14	748.40	10,373	**3.4E-05**	3.0E-03	1.28E+02			0.0E+00	3.0E-03		
91576	2-Methylnaphthalene	2.81E+03	5.22E-02	7.75E-06	2.46E+01	2.12E-02	5.17E-04	25	514.26	761.00	12,600	0.0E+00	**1.4E-02**	1.42E+02		X	0.0E+00	7.0E-02		X
92524	Biphenyl	4.38E+03	4.04E-02	8.15E-06	7.45E+00	1.23E-02	2.99E-04	25	529.10	789.00	10,890	0.0E+00	1.8E-01	1.54E+02		X	0.0E+00	1.8E-01		X
95476	o-Xylene	3.63E+02	8.70E-02	1.00E-05	1.78E+02	2.12E-01	5.18E-03	25	417.60	630.30	8,661	0.0E+00	1.0E-01	1.06E+02			0.0E+00	1.0E-01		
95501	1,2-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	1.56E+02	7.77E-02	1.90E-03	25	453.57	705.00	9,700	0.0E+00	2.0E-01	1.47E+02			0.0E+00	2.0E-01		
95578	2-Chlorophenol	3.88E+02	5.01E-02	9.46E-06	2.20E+04	1.60E-02	3.90E-04	25	447.53	675.00	9,572	0.0E+00	1.8E-02	1.29E+02		X	0.0E+00	1.8E-02		X
95636	1,2,4-Trimethylbenzene	1.35E+03	6.06E-02	7.92E-06	5.70E+01	2.52E-01	6.14E-03	25	442.30	649.17	9,369	0.0E+00	**7.0E-03**	1.20E+02			0.0E+00	6.0E-03		
96184	1,2,3-Trichloropropane	2.20E+01	7.10E-02	7.90E-06	1.75E+03	1.67E-02	4.08E-04	25	430.00	652.00	9,171	**2.0E-03**	**2.1E-02**	1.47E+02	X	X	5.7E-04	4.9E-03	X	
96333	Methyl acrylate	4.53E+00	9.76E-02	1.02E-05	6.00E+04	7.68E-03	1.87E-04	25	353.70	536.00	7,749	0.0E+00	1.1E-01	8.61E+01		X	0.0E+00	1.1E-01		X
97632	Ethylmethacrylate	2.95E+01	6.53E-02	8.37E-06	3.67E+03	3.44E-02	8.40E-04	25	390.00	571.00	10,957	0.0E+00	3.2E-01	1.14E+02		X	0.0E+00	3.2E-01		X
98066	tert-Butylbenzene	7.71E+02	5.65E-02	8.02E-06	2.95E+01	4.87E-01	1.19E-02	25	442.10	1220.00	8,980	0.0E+00	1.4E-01	1.34E+02		X	0.0E+00	1.4E-01		X
98828	Cumene	4.89E+02	6.50E-02	7.10E-06	6.13E+01	4.74E+01	1.16E+00	25	425.56	631.10	10,335	0.0E+00	4.0E-01	1.20E+02			0.0E+00	4.0E-01		
98862	Acetophenone	5.77E+01	6.00E-02	8.73E-06	6.13E+03	4.38E-04	1.07E-05	25	475.00	709.50	11,732	0.0E+00	3.5E-01	1.20E+02		X	0.0E+00	3.5E-01		X
98953	Nitrobenzene	6.46E+01	7.60E-02	8.60E-06	2.09E+03	9.82E-04	2.39E-05	25	483.95	719.00	10,566	0.0E+00	2.0E-03	1.23E+02			0.0E+00	2.0E-03		
100414	Ethylbenzene	3.63E+02	7.50E-02	7.80E-06	1.69E+02	3.22E-01	7.86E-03	25	409.34	617.20	8,501	**2.5E-06**	1.0E+00	1.06E+02			0.0E+00	1.0E+00		
100425	Styrene	7.76E+02	7.10E-02	8.00E-06	3.10E+02	1.12E-01	2.74E-03	25	418.31	636.00	8,737	0.0E+00	**9.0E-01**	1.04E+02			0.0E+00	1.0E+00		
100447	Benzylchloride	6.14E+01	7.50E-02	7.80E-06	5.25E+02	1.70E-02	4.14E-04	25	452.00	685.00	8,773	**4.9E-05**	**1.0E-03**	1.27E+02	?		4.9E-05	0.0E+00	X	
100527	Benzaldehyde	4.59E+01	7.21E-02	9.07E-06	3.30E+03	9.73E-04	2.37E-05	25	452.00	695.00	11,658	0.0E+00	3.5E-01	1.06E+02		X	0.0E+00	3.5E-01		X
103651	n-Propylbenzene	5.62E+02	6.01E-02	7.83E-06	6.00E+01	4.37E-01	1.07E-02	25	432.20	630.00	9,123	0.0E+00	1.4E-01	1.20E+02		X	0.0E+00	1.4E-01		X
104518	n-Butylbenzene	1.11E+03	5.70E-02	8.12E-06	2.00E+00	5.38E-01	1.31E-02	25	456.46	660.50	9,290	0.0E+00	1.4E-01	1.34E+02		X	0.0E+00	1.4E-01		X
106423	p-Xylene	3.89E+02	7.69E-02	8.44E-06	1.85E+02	3.13E-01	7.64E-03	25	411.52	616.20	8,525	0.0E+00	1.0E-01	1.06E+02		?	0.0E+00	1.0E-01		
106467	1,4-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	7.90E+01	9.82E-02	2.39E-03	25	447.21	684.75	9,271	**1.1E-05**	**8.0E-01**	1.47E+02			0.0E+00	8.0E-01		
106934	1,2-Dibromoethane (ethylene dibr	2.50E+01	2.17E-02	1.19E-05	4.18E+03	3.04E-02	7.41E-04	25	404.60	583.00	8,310	**7.1E-05**	**8.0E-04**	1.88E+02			6.0E-04	9.0E-03		
106990	1,3-Butadiene	1.91E+01	2.49E-01	1.08E-05	7.35E+02	3.01E+00	7.34E-02	25	268.60	425.00	5,370	**1.7E-04**	2.0E-03	5.41E+01			3.0E-05	0.0E+00		
107028	Acrolein	2.76E+00	1.05E-01	1.22E-05	2.13E+05	4.99E-03	1.22E-04	25	325.60	506.00	6,731	0.0E+00	2.0E-05	5.61E+01			0.0E+00	2.0E-05		
107062	1,2-Dichloroethane	1.74E+01	1.04E-01	9.90E-06	8.52E+03	4.00E-02	9.77E-04	25	356.65	561.00	7,643	**2.1E-05**	**4.0E-01**	9.90E+01			2.6E-05	0.0E+00		
107131	Acrylonitrile	5.90E+00	1.22E-01	1.34E-05	7.40E+04	4.21E-03	1.03E-04	25	350.30	519.00	7,786	**2.9E-04**	2.0E-03	5.31E+01			6.8E-05	2.0E-03		
108054	Vinyl acetate	5.25E+00	8.50E-02	9.20E-06	2.00E+04	2.09E-02	5.10E-04	25	345.65	519.13	7,800	0.0E+00	**2.0E-01**	8.61E+01			0.0E+00	2.0E-01		
108101	Methylisobutylketone (4-methyl-2-|	9.06E+00	7.50E-02	7.80E-06	1.90E+04	5.64E-03	1.38E-04	25	389.50	571.00	8,243	0.0E+00	**3.0E+00**	1.00E+02			0.0E+00	8.0E-02		
108383	m-Xylene	4.07E+02	7.00E-02	7.80E-06	1.61E+02	3.00E-01	7.32E-03	25	412.27	617.05	8,523	0.0E+00	1.0E-01	1.06E+02		?	0.0E+00	1.0E-01		
108678	1,3,5-Trimethylbenzene	1.35E+03	6.02E-02	8.67E-06	2.00E+00	2.41E-01	5.87E-03	25	437.89	637.25	9,321	0.0E+00	6.0E-03	1.20E+02			0.0E+00	6.0E-03		
108872	Methylcyclohexane	7.85E+01	7.35E-02	8.52E-06	1.40E+01	4.22E+00	1.03E-01	25	373.90	572.20	7,474	0.0E+00	3.0E+00	9.82E+01		?	0.0E+00	3.0E+00		
108883	Toluene	1.82E+02	8.70E-02	8.60E-06	5.26E+02	2.72E-01	6.62E-03	25	383.78	591.79	7,930	0.0E+00	**3.0E-01**	9.21E+01			0.0E+00	4.0E-01		
108907	Chlorobenzene	2.19E+02	7.30E-02	8.70E-06	4.72E+02	1.51E-01	3.69E-03	25	404.87	632.40	8,410	0.0E+00	**1.0E+00**	1.13E+02			0.0E+00	6.0E-02		
109693	1-Chlorobutane	1.72E+01	8.26E-02	1.00E-05	1.10E+03	6.93E-01	1.69E-02	25	351.60	542.00	7,263	0.0E+00	**1.4E-01**	9.26E+01		X	0.0E+00	1.4E+00		X
110009	Furan	1.86E+01	1.04E-01	1.22E-05	1.00E+04	2.21E-01	5.39E-03	25	304.60	490.20	6,477	0.0E+00	3.5E-03	6.81E+01		X	0.0E+00	3.5E-03		X
110543	Hexane	4.34E+01	2.00E-01	7.77E-06	1.24E+01	6.82E+01	1.66E+00	25	341.70	508.00	6,895	0.0E+00	**7.0E-01**	8.62E+01			0.0E+00	2.0E-01		
111444	Bis(2-chloroethyl)ether	1.55E+01	6.92E-02	7.53E-06	1.72E+04	7.36E-04	1.80E-05	25	451.15	659.79	10,803	**7.1E-04**	0.0E+00	1.43E+02			3.3E-04	0.0E+00		
115297	Endosulfan	2.14E+03	1.15E-02	4.55E-06	5.10E-01	4.58E-04	1.12E-05	25	674.43	942.94	14,000	0.0E+00	2.1E-02	4.07E+02		X	0.0E+00	2.1E-02		X
118741	Hexachlorobenzene	5.50E+04	5.42E-02	5.91E-06	5.00E-03	5.40E-02	1.32E-03	25	582.55	825.00	14,447	**5.1E-04**	2.8E-03	2.85E+02		X	4.6E-04	2.8E-03		X
120821	1,2,4-Trichlorobenzene	1.78E+03	3.00E-02	8.23E-06	4.88E+01	5.81E-02	1.42E-03	25	486.15	725.00	10,471	**0.0E+00**	**4.0E-03**	1.81E+02			0.0E+00	2.0E-01		
123739	Crotonaldehyde (2-butenal)	4.82E+00	9.56E-02	1.07E-05	3.69E+04	7.99E-04	1.95E-05	25	375.20	568.00	9	5.4E-04	0.0E+00	7.01E+01	X		5.4E-04	0.0E+00	X	
124481	Chlorodibromomethane	6.31E+01	1.96E-02	1.05E-05	2.60E+03	3.20E-02	7.81E-04	25	416.14	678.20	5,900	**2.7E-05**	7.0E-02	2.08E+02	?	X	2.4E-05	7.0E-02	X	X
126987	Methacrylonitrile	3.58E+01	1.12E-01	1.32E-05	2.54E+04	1.01E-02	2.46E-04	25	363.30	554.00	7,600	0.0E+00	7.0E-04	6.71E+01			0.0E+00	7.0E-04		
126998	2-Chloro-1,3-butadiene (chloropre	6.73E+01	8.58E-02	1.03E-05	2.12E+03	4.91E-01	1.20E-02	25	332.40	525.00	8,075	0.0E+00	7.0E-03	8.85E+01			0.0E+00	7.0E-03		
127184	Tetrachloroethylene	1.55E+02	7.20E-02	8.20E-06	2.00E+02	7.53E-01	1.84E-02	25	394.40	620.20	8,288	**5.9E-06**	**3.5E-02**	1.66E+02			3.0E-06	0.0E+00		
129000	Pyrene	1.05E+05	2.72E-02	7.24E-06	1.35E+00	4.50E-04	1.10E-05	25	667.95	936	14370	0.0E+00	1.1E-01	2.02E+02		X	0.0E+00	1.1E-01		X
132649	Dibenzofuran	5.15E+03	2.38E-02	6.00E-06	3.10E+00	5.15E-04	1.26E-05	25	560	824	66400	0.0E+00	1.4E-02	1.68E+02		X	0.0E+00	1.4E-02		X
135988	sec-Butylbenzene	9.66E+02	5.70E-02	8.12E-06	3.94E+00	5.68E-01	1.39E-02	25	446.5	679	88730	0.0E+00	1.4E-01	1.34E+02		X	0.0E+00	1.4E-01		X
141786	Ethylacetate	6.44E+00	7.32E-02	9.70E-06	8.03E+04	5.64E-03	1.38E-04	25	350.26	523.3	7633.66	0.0E+00	3.2E+00	8.81E+01		X	0.0E+00	3.2E+00		X
156592	cis-1,2-Dichloroethylene	3.55E+01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	4.07E-03	25	333.65	544	7192	0.0E+00	3.5E-02	9.69E+01		X	0.0E+00	3.5E-02		X
156605	trans-1,2-Dichloroethylene	5.25E+01	7.07E-02	1.19E-05	6.30E+03	3.84E-01	9.36E-03	25	320.85	516.5	6717	0.0E+00	**6.0E-02**	9.69E+01		X	0.0E+00	7.0E-02		X
205992	Benzo(b)fluoranthene	1.23E+06	2.26E-02	5.56E-06	1.50E-03	4.54E-03	1.11E-04	25	715.9	969.27	17000	**1.1E-04**	0.0E+00	2.52E+02	?		2.1E-04	0.0E+00	X	
218019	Chrysene	3.98E+05	2.48E-02	6.21E-06	6.30E-03	3.87E-03	9.44E-05	25	714.15	979	16455	**1.1E-05**	0.0E+00	2.28E+02	?		2.1E-06	0.0E+00	X	
309002	Aldrin	2.45E+06	1.32E-02	4.86E-06	1.70E-02	6.95E-03	1.70E-04	25	603.01	839.37	15000	**4.9E-03**	1.1E-04	3.65E+02		X	4.9E-03	1.1E-04		X
319846	alpha-HCH (alpha-BHC)	1.23E+03	1.42E-02	7.34E-06	2.00E+00	4.34E-04	1.06E-05	25	596.55	839.36	15000	**7.7E-04**	0.0E+00	2.91E+02			1.8E-03	0.0E+00		
541731	1,3-Dichlorobenzene	1.98E+03	6.92E-02	7.86E-06	1.34E+02	1.27E-01	3.09E-03	25	446	684	9230.18	0.0E+00	1.1E-01	1.47E+02		X	0.0E+00	1.1E-01		X
542756	1,3-Dichloropropene	4.57E+01	6.26E-02	1.00E-05	2.80E+03	7.24E-01	1.77E-02	25	381.15	587.38	7900	**1.6E-05**	2.0E-02	1.11E+02			4.0E-06	2.0E-02		
630206	1,1,1,2-Tetrachloroethane	1.16E+02	7.10E-02	7.90E-06	1.10E+03	9.90E-02	2.41E-03	25	403.5	624	9768.282525	7.4E-06	1.1E-01	1.68E+02		X	7.4E-06	1.1E-01		X
1634044	MTBE	7.26E+00	1.02E-01	1.05E-05	5.10E+04	2.56E-02	6.23E-04	25	328.3	497.1	6677.66	**2.6E-07**	3.0E+00	8.82E+01			0.0E+00	3.0E+00		
7439976	Mercury (elemental)	5.20E+01	3.07E-02	6.30E-06	2.00E+01	4.40E-01	1.07E-02	25	629.88	1750	14127	0.0E+00	**3.0E-05**	2.01E+02			0.0E+00	3.0E-04		

INTERMEDIATE CALCULATIONS SHEET

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)
0.280	#N/A	#N/A	#N/A	1.00E-08	4,000	7.75E+03	3.39E+04

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)
5.00E-03	15	9,410	1.74E-02	7.14E-01	1.80E-04	5.62E-03	137.4

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., $C_{building}$ ($\mu g/m^3$)
7.75E+03	1.25	8.33E+01	5.62E-03	5.00E+03	7.73E+12	8.09E-04	6.27E+00

Reference conc., RfC (mg/m^3)
3.5E-02

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-06	1.2E-01

MESSAGE SUMMARY BELOW:

END